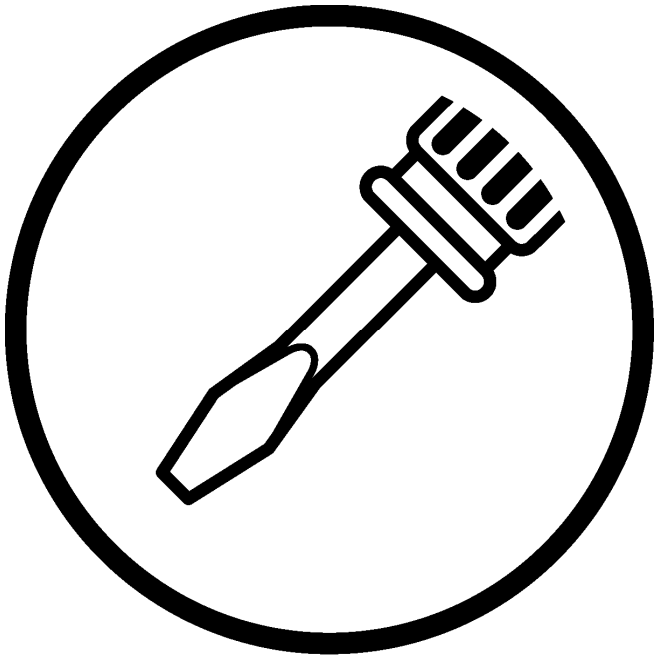
BAS-311H

SERVICE MANUAL

Please read this manual before making any adjustments.

DIRECT DRIVE

PROGRAMMABLE ELECTRONIC PATTERN SEWER



brother

This service manual is intended for BAS-311H; be sure to read the BAS-311H instruction manual before this manual.

Carefully read the “SAFETY INSTRUCTIONS” below and the whole of this manual to understand this product before you start maintenance.

As a result of research and improvements regarding this product, some details of this manual may not be the same as those for the product you purchased.

If you have any questions regarding this product, please contact a Brother dealer.

SAFETY INSTRUCTIONS

[1] Safety indications and their meanings

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

Indications

DANGER	The instructions which follow this term indicate situations where failure to follow the instructions will result in death or serious injury.
WARNING	The instructions which follow this term indicate situations where failure to follow the instructions could result in death or serious injury.
CAUTION	This instructions which follow this term indicate situations where failure to follow the instructions may result in minor or moderate injury.

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.


……The symbol (⃠) indicates something that you must not do.


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

⚠ WARNING

Do not allow any liquids to get onto this sewing machine, otherwise fire, electric shocks or operating problems may occur.

If any liquid gets inside the sewing machine (machine head or control box), immediately turn off the power and disconnect the power plug from the electrical outlet, and then contact the place of purchase or a qualified technician.

⚠ CAUTION

Environmental requirements

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

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

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

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

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

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

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

Installation

Machine installation should only be carried out by a qualified technician.

Contact your Brother dealer or a qualified electrician for any electrical work that may need to be done.

The sewing machine weights 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 Brother dealer or a qualified technician.

If the machine develops a problem, contact your nearest Brother dealer or a qualified technician.

Cleaning

Turn off the power switch before carrying out 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.

Maintenance and inspection

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

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

Turn off the power switch and disconnect the power cord 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.

When replacing parts and installing optional accessories, be sure to use only genuine Brother parts.
Brother will not be held responsible for any accidents or problems resulting from the use of non-genuine parts.

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.

To prevent accidents and problems, do not modify the machine yourself.

Brother will not be held responsible for any accidents or problems resulting from modifications made to the machine.

[3] Warning labels

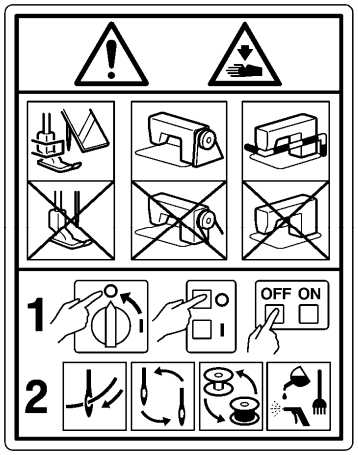
The following warning labels appear on the sewing machine.
Please follow the instructions on the labels at all times when using the machine. If the labels have been removed or are difficult to read, please contact your nearest Brother dealer.

1

	⚠ 危 険	⚠ 危 険
	高電圧部分にふれて、大けがをすることがある。 電源を切り、5分たってからカバーをはずすこと。	触摸高压电部分，会导致受伤。 在切断电源5分钟后，再开启盖罩。

⚠ DANGER	⚠ GEFAHR	⚠ DANGER	⚠ PELIGRO
Hazardous voltage will cause injury.Turn off main switch and wait 5minutes before opening this cover.	Hochspannung verletzungsgefahr! Bitte schalten sie den hauptschalter aus und warten sie 5 minuten, bevor sie diese abdeckung öffnen.	Un voltage non adapte provoque des blessures.Eteindre l'interrupteur et attendre 5 minutes avantd'ouvrir le capot.	Un voltaje inadecuado puede provocar las heridas.Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.

2



CAUTION
Moving parts may cause injury.

Operate with safety devices* installed.

Turn off the power before carrying out operations such as threading, changing the needle, bobbin, knives or hook, cleaning and adjusting.

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

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

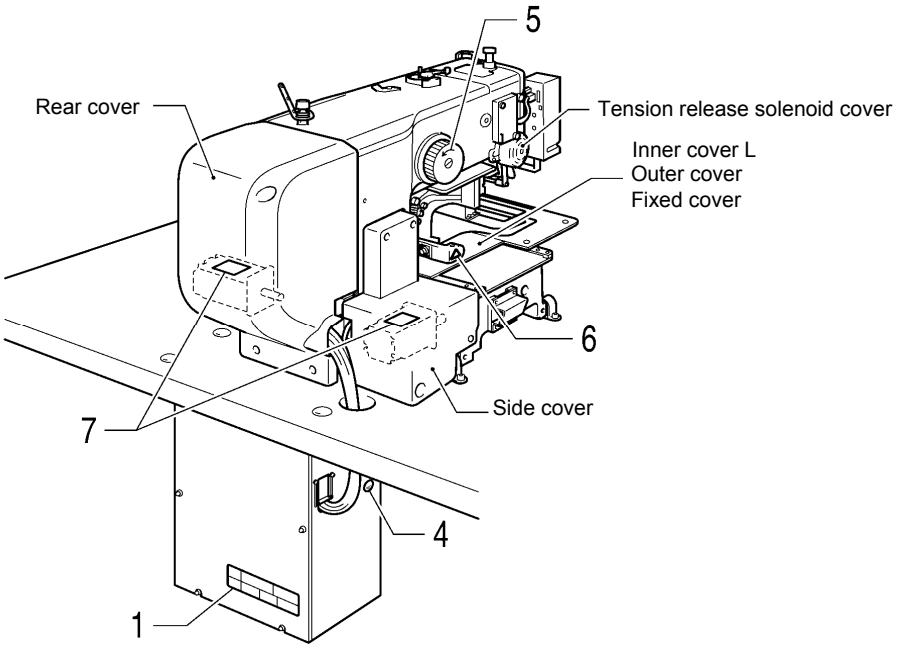
Direction of operation

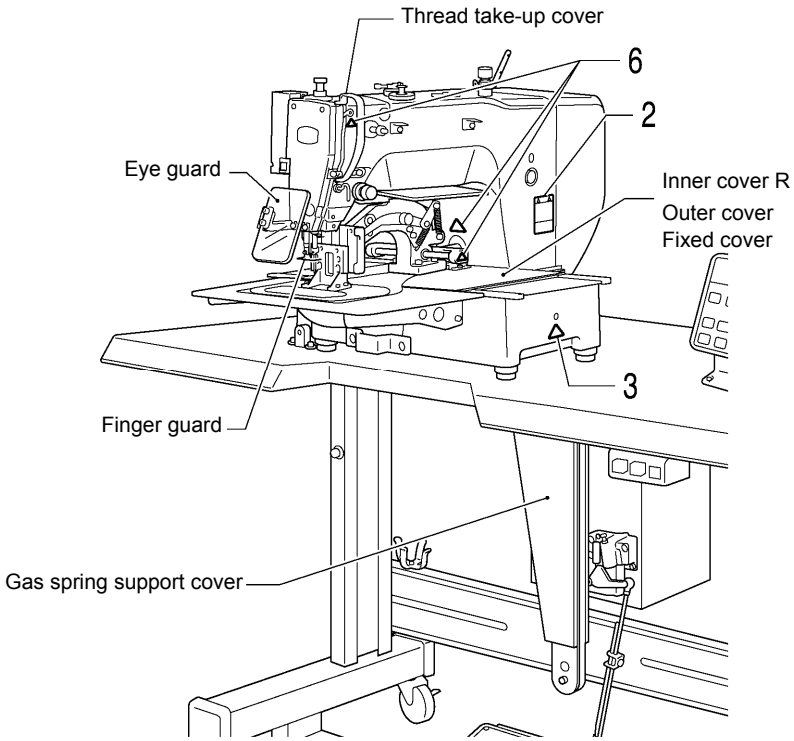
6

Be careful to avoid injury from moving parts.

7

Do not hold, otherwise problems with operation or injury may occur.


5
Rear cover
Tension release solenoid cover
Inner cover L
Outer cover
Fixed cover
6
Side cover
7
4
1


Thread take-up cover
6
2
Eye guard
Inner cover R
Outer cover
Fixed cover
3
Finger guard
Gas spring support cover

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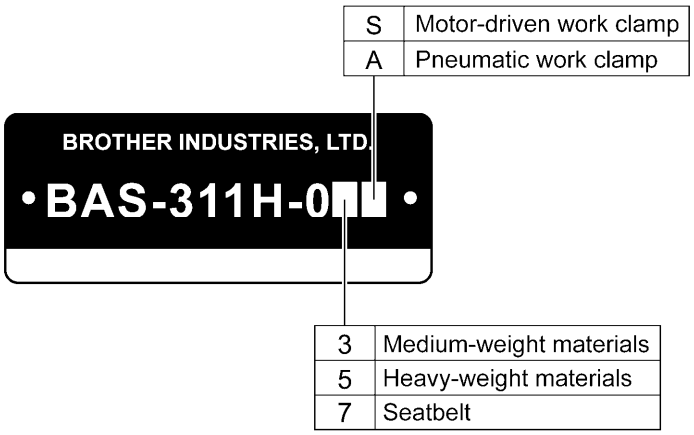
CONTENTS

1. SPECFICATIONS



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Sewing machine	Lock stitch pattern tacking sewing machine (with large shuttle hook)
Stitch formation	Single needle lock stitch
Max. sewing speed	2,800 sti./min
Max. sewing area (XxY)	150 x 100 mm
Feed mechanism	Intermittent feed, pulse motor drive
Stitch length	0.05 – 12.7 mm
No. of stitches	500,000-stitch internal memory (*1)
Maximum No. of stitches	20,000 stitches (per program)
No. of sewing data items that can be stored	Internal memory: 512 (*1), SD card: 900
Work clamp lift method	Motor-driven work clamp specifications: Pulse motor drive method Pneumatic work clamp specifications: Pneumatic method
	Motor-driven work clamp specifications: Integrated-type work clamp Pneumatic work clamp specifications: Separate-type work clamp
Work clamp height	Motor-driven work clamp specifications: Max. 25 mm Pneumatic work clamp specifications: Max. 30 mm
Intermittent presser foot lift amount	22 mm
Intermittent stroke	2 – 4.5 mm, 4.5 – 10 mm or 0 (Default setting 3 mm)
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), SD card (*2)
User programs	900
Cycle programs	30
Motor	550 W AC servo motor
Weights	Machine head approx. 88 kg, operation panel approx. 0.4 kg Control box 9 kg (Differs depending on destination)
Power source	Single-phase 110V / 220V / 230V, 3-phase 220V / 380V / 400V (For single-phase 110V and three-phase 380V / 400V, the trans box is required.)
Air pressure	0.5 MPa 1.8 l/min.

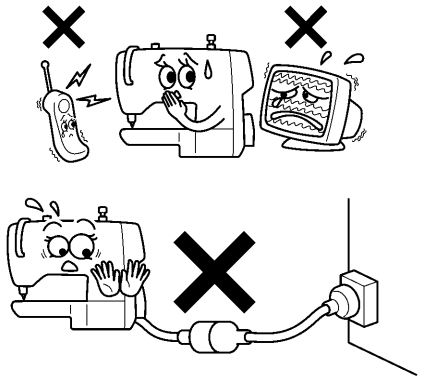
(*1) The number of data items and stitches that can be stored will vary depending on the number of stitches in each program.

(*2) No guarantees of operation can be given for any media.

2. NOTES ON HANDLING

About the machine set-up location

- Do not set up this sewing machine near other equipment such as televisions, radios or cordless telephones, otherwise such equipment may be affected by electronic interference from the sewing machine.
- The sewing machine should be plugged directly into an AC wall outlet. Operation problems may result if extension cords are used.



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Carrying the machine

- The machine should be carried by the arm by two people as shown in the illustration.
- When holding the machine head, do not hold it by the motor, otherwise it may damage the motor.
- Do not hold the shaded parts, as they can bend easily.

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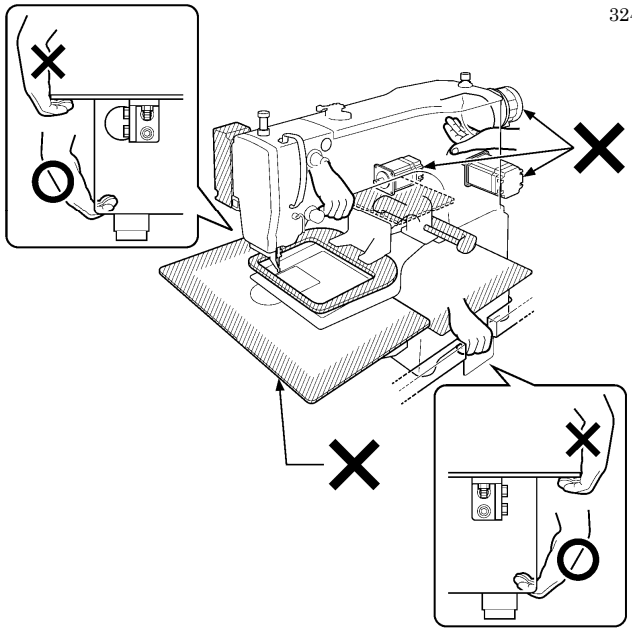
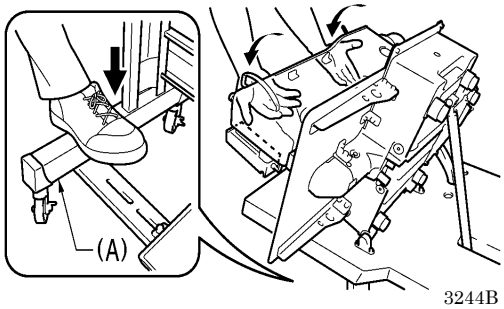


Tilting back the machine head

1. Pack away any tools which are near the table.
2. Secure the foot (A) so that the table will not move, and then pull the arm with both hands to tilt back the machine head.

   * While supporting the arm with both hands, gently lower it.



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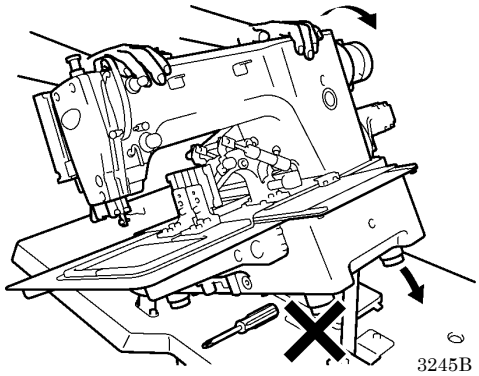
Returning the machine head to the upright position

1. Pack away any tools which are near the table.
2. While supporting the arm with both hands, gently return the machine head to its original position.



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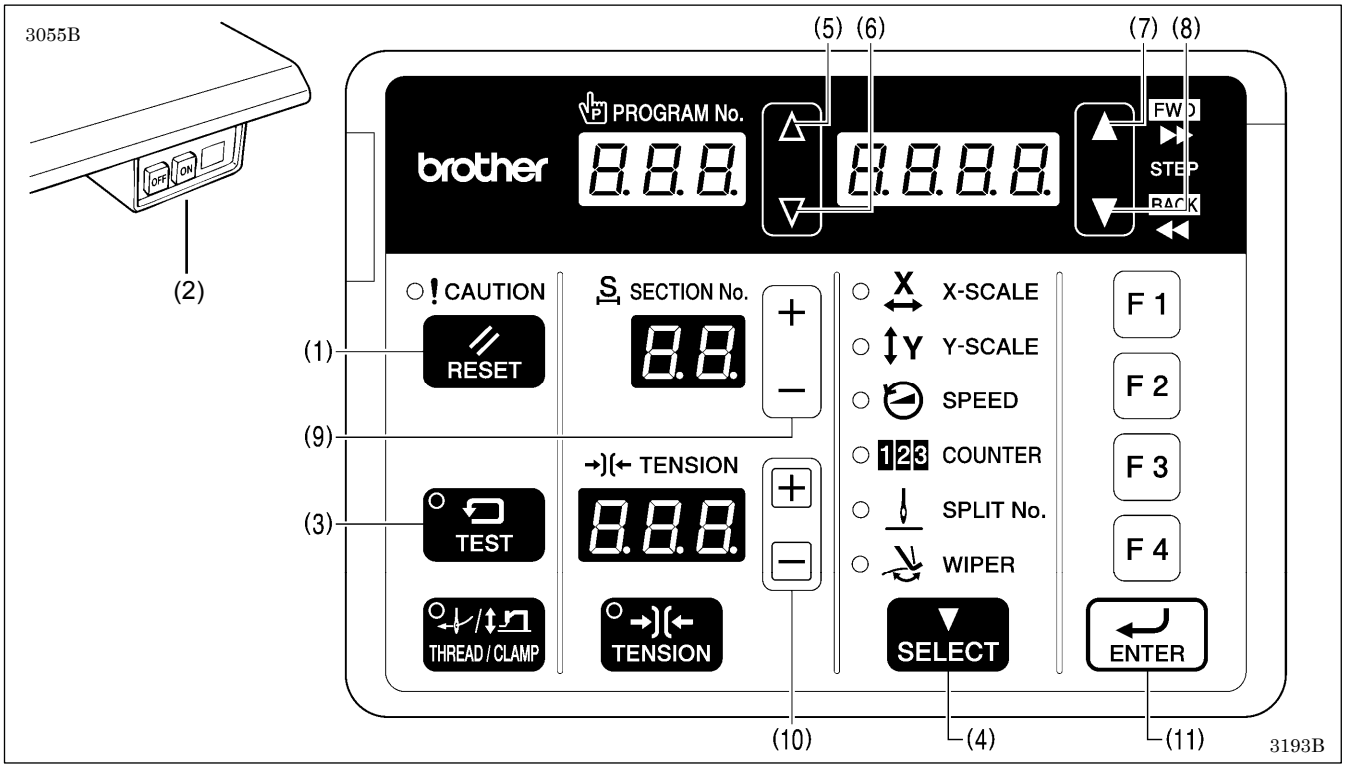
3. FUNCTION SETTINGS

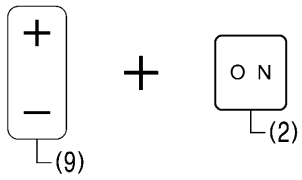
3-1. List of special functions when power is turned on

This list shows the key operations for using special functions.



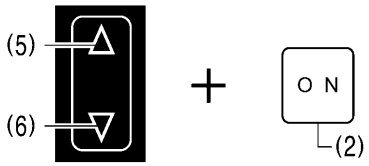
1	**Data initialization function** 2595B RESET (1) + ON (2) Refer to the CD Instruction Manual.		5	**Software version display function** 2599B (7) + ON (2) Refer to “3-9. Confirming software version”.	
2	**Memory switch setting mode (Advanced)** 2596B TEST (3) + SELECT (4) + ON (2) Refer to “3-3. Setting memory switches (Advanced)”.		6	**Error log display function** 2600B (8) + ON (2) Refer to “3-6. Error history checking method”.	
3	**Input check function** 2597B (5) + ON (2) Refer to “3-7. Input checking method”.		7	**Home position adjusting mode** 2601B (7) (8) + ON (2) Refer to “8-22. Adjusting the home position”.	
4	**Output check function** 2598B (6) + ON (2) Refer to “3-8. Output checking method”.		8	**Treadle position adjustment mode** 2602B (5) (7) + ON (2) Refer to “8-25. Setting method for standard depression strokes (Foot switch)”.	

9 **Motor standard position adjustment mode** 2603B



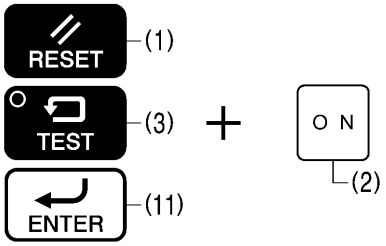
Refer to “8-23. Adjusting the motor standard position”.

10 **Needle up stop position adjustment mode** 3194B



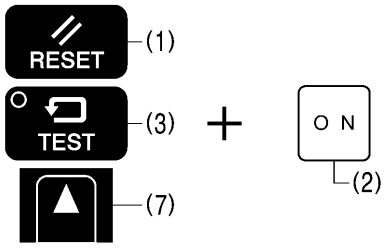
Refer to “8-24. Adjusting the needle up stop position”.

11 **Protect setting mode** 2605B



Refer to “3-10. Protection settings”.

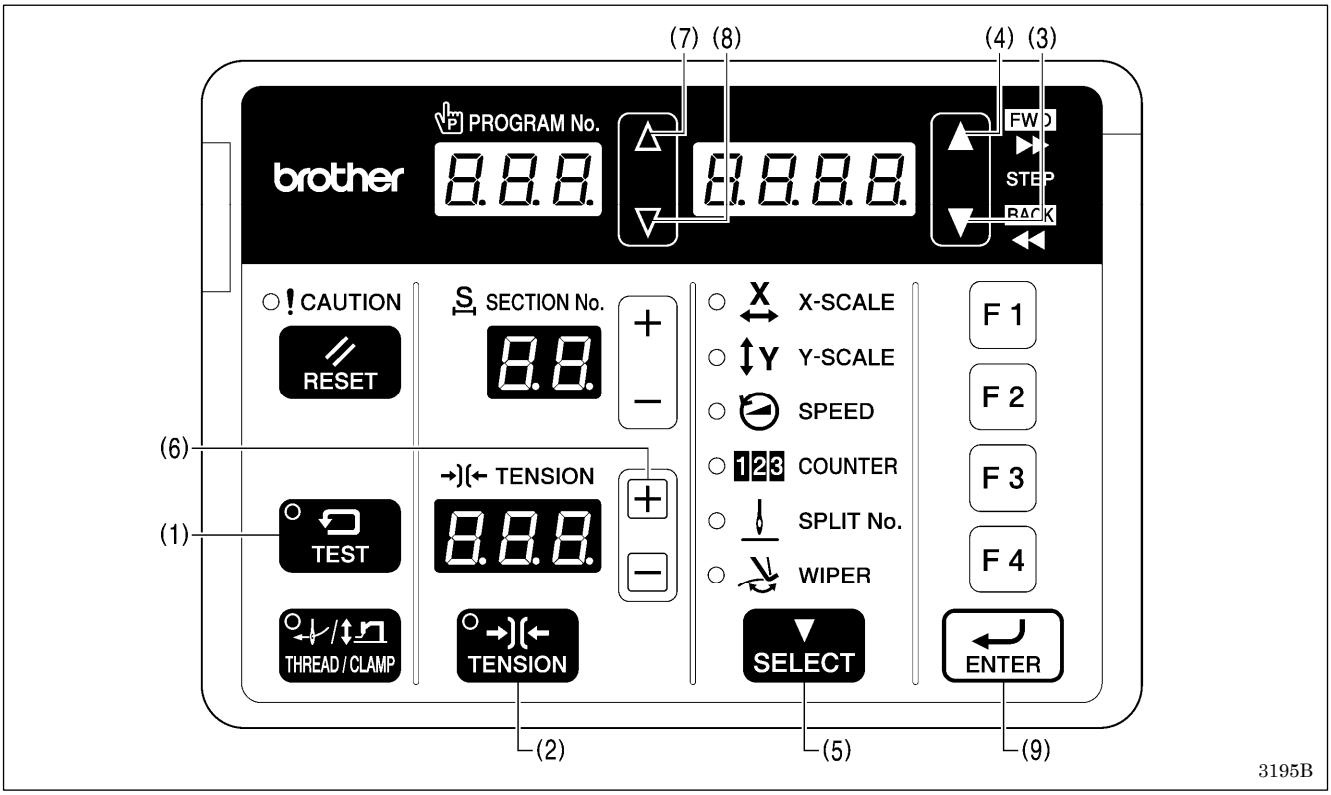
12 **Version update** 2606B



Refer to “5-13. Updating the control program version”.

3-2. List of advanced functions

This list shows the key operations for using advanced functions.

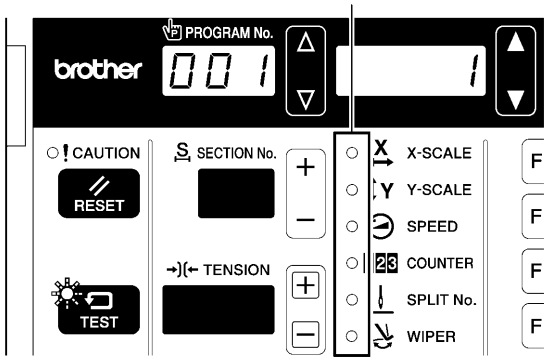


1	**Memory switch setting mode (Standard)** 2608B TEST (1) + TENSION (2) Refer to the CD Instruction Manual.	5	**Cycle program setting mode** 2612B TEST (1) + (6) Refer to the CD Instruction Manual.
2	**Lower thread counter setting mode** 2609B TEST (1) + (3) Refer to the CD Instruction Manual.	6	**Parallel movement mode** 2614B TEST (1) + (8) Refer to “4. X and Y parallel movement of sewing patterns”.
3	**Production counter setting mode** 2610B TEST (1) + (4) Refer to the CD Instruction Manual.	7	**SD data read/write mode** 2615B TEST (1) + ENTER (9) Refer to “5-3. Preparation for reading and writing data”.
4	**Program mode** 2611B TEST (1) + SELECT (5) Refer to the CD Instruction Manual.		

3-3. Setting memory switches (Advanced)

1 **Change the mode to memory switch setting mode.**

All indicators switch off



While pressing the TEST key and the SELECT key, turn on the power switch.

- The memory switch number will be displayed in the PROGRAM No. display and the setting value for that number will be displayed in the menu display.

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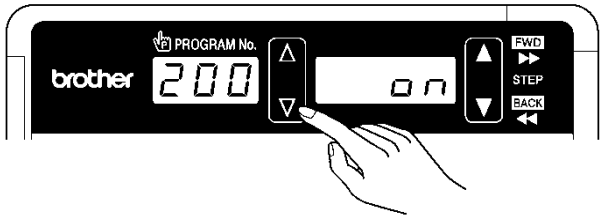
2 **Select the memory switch that you would like to change the setting for.**



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

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If you would like to display only the numbers of memory switches that have been changed from default settings

While pressing the SELECT key, press the △ or ▽ key (1).

- The numbers of memory switches that have been changed from default settings will appear in order.

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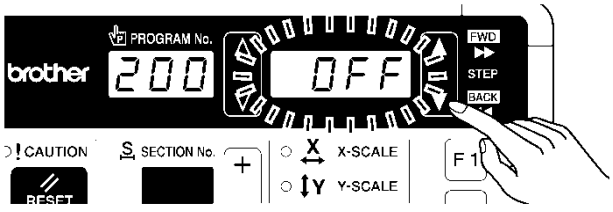
3 **Change the memory switch setting.**



Press the ▲ or ▼ key to change the setting value.

- The flashing display means that the setting has not yet been applied.
- You can make the initial setting appear in the display by pressing the RESET key.

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4 **Apply the changed setting.**

2414B

Press the ENTER key.

- The menu display will change from flashing to illuminated, and this means that the parameter setting has been applied.
- If you press the △ or ▽ key (1) or the TEST key without pressing the ENTER key, you can cancel the parameter changes.

5 Repeat steps 2 to 4 above to set each memory switch.

6 **Exit setting mode**

TEST indicator switches off

Press the TEST key.

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

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3-4. List of memory switches

No.	Setting range	Settings	Setting details	Initial value	Specification limits
001	0-2	Work clamp lift timing after sewing is completed		2	None
		0	Work clamp is not raised automatically.		
		1	Work clamp is raised at the final stitch position. * Disabled when memory switch No. 71 is set to “2”, or when memory switch No. 72 is set to “2”.		
		2	Work clamp is raised after moving to the home position. * Disabled when memory switch No. 71 is set to "2", or when memory switch No. 72 is set to "2".		
002	0-2	Work clamp lowering sequence for separate work clamp (Pneumatic work clamp specifications only)		0	Pneumatic
		0	Left and right work clamps are lowered at the same time.		
		1	Work clamp is lowered in the order left → right.		
		2	Work clamp is lowered in the order right → left.		
003	0-2	Work clamp lowering operation (Motor-driven work clamp specifications only)		2	Solenoid
		0	Analog lowering: Work clamp is lowered in direct proportion to the pedal depression amount, and sewing starts when the pedal is fully depressed. * This operation is only possible for foot switch specifications; for two-pedal foot switch specifications, operation is the same as for a 2-step work clamp.		
		1	1-step work clamp: Work clamp is lowered when pedal is depressed to the 1st step, and sewing starts when pedal is depressed to the 2nd step.		
		2	2-step work clamp: Work clamp is lowered to intermediate height when pedal is depressed to the 1st step, and work clamp is fully lowered and sewing starts when the pedal is depressed to the 2nd step.		
100	ON/OFF	Slow start method			
		OFF	The sewing speed for the first 5 stitches will be in accordance with the setting for memory switch Nos. 151 to 155.	OFF	None
		ON	The sewing speed for the first 5 stitches can be selected from the nine slow start patterns “Lo1” to “Lo9”. (Refer to the CD Instruction Manual.)	Lo4	
200	ON/OFF	Single-stitch test feed		OFF	None
		OFF	Test feed starts when the foot switch (start switch) is depressed, and it continues automatically until the final stitch.		
		ON	Test feed starts when the foot switch (start switch) is depressed, and it moves forward by one stitch each time the switch is depressed. In addition, when the TEST indicator is flashing, test feed will move forward one stitch at a time when the machine pulley is turned by hand.		
300	ON/OFF	Production counter display		OFF	None
		OFF	Lower thread counter display		
		ON	Production counter display		
400	ON/OFF	Sewing condition detail settings			
		OFF	Parameters which are common to all programs are used.	OFF	None
		ON	Parameters can be set separately for each program.		
402	ON/OFF	Unit display for pattern zoom ratio		OFF	None
		OFF	Displayed as %		
		ON	Displayed as mm		
403	0-1	Split mode selection		0	None
		0	Continuous split mode		
		1	Single split mode		
405 *1	ON/OFF	Cycle program No. (C01 to C30) display		ON	None
		OFF	Disabled (Skipped)		
		ON	Enabled		

No.	Setting range	Settings	Settings details	Initial value	Specification limits
406 *2	0-2	F key specifications		0	None
		0	F keys become direct selection keys for sewing program numbers (101 to 104).		
		1	F keys become direct selection keys for cycle program numbers (C01 to C04). * Selection is possible when memory switch No. 400 is set to “ON”.		
		2	F keys become shortcut keys for program numbers which have been assigned to the keys. F1 … Setting number for memory switch No. 407 F2 … Setting number for memory switch No. 408 F3 … Setting number for memory switch No. 409 F4 … Setting number for memory switch No. 410		
407		Assignment number to F1 key		101	None
			100-999, C01-C30		
408		Assignment number to F2 key		102	None
			100-999, C01-C30		
409		Assignment number to F3 key		103	None
			100-999, C01-C30		
410		Assignment number to F4 key		104	None
			100-999, C01-C30		

*1: If there are no valid sewing programs when memory switch No. 405 is set to "OFF", only the standard program numbers are displayed. If it is set to "ON" when no programs have been registered, nothing is displayed (the display is skipped).

*2: If an F key which does not have a program registered to it is pressed, the key will be invalid. (The buzzer will sound twice.)

Work clamp settings

No.	Setting range	Settings	Settings details	Initial value	Specification limits
051	ON/OFF	Work clamp operation before home position detection		ON	None
		OFF	Work clamp cannot be raised or lowered before home position is detected. *1		
		ON	Work clamp can be raised and lowered before home position is detected.		
052	ON/OFF	Work clamp operation during split programs		OFF	None
		OFF	Work clamp lifts automatically when sewing pauses due to a split program.		
		ON	Work clamp does not lift automatically when sewing pauses due to a split program.		
053	0-999	Time from intermittent presser foot lifting until feed mechanism starts moving		100	None
			Units (ms), Increments of 1		
054	0-2	Intermittent presser foot drop timing		0	None
		0	Presser foot drops when the work clamp switch is depressed, but it does not drop at the retract position.		
		1	Presser foot drops when the work clamp switch is depressed.		
		2	Presser foot drops at the sewing start, regardless of the work clamp switch operation.		
055	0-2	Work clamp signal valve special output for pneumatic-type work clamp		0	Pneumatic
		0	Disabled		
		1	Valve output is reversed for pneumatic-type work clamp specifications. (Connect the air tubes in reverse so that the work clamp can lift when the power is turned off.)		
		2	Reverse valve output for pneumatic specifications is output simultaneously for 2-position valve specifications. (Right work clamp reverse = Option output No. 4: Left work clamp reverse = Option output No. 5)		
056	ON/OFF	Thread winding operation before home position is detected		OFF	None
		OFF	Thread winding cannot be carried out before home position is detected.		
		ON	Thread winding can be carried out before home position is detected.		
057	ON/OFF	Work clamp operation when feed moves to sewing start position after home position is detected		ON	None
		OFF	Work clamp stays dropped after home position is detected. Work clamp lifts when work clamp switch is depressed (when depressed backward for foot switch).		
		ON	Work clamp lifts automatically after home position is detected.		
059	0-1	Operation settings for heavy-weight materials		0	Pneumatic
		0	Standard		
		1	When using a heavy work clamp and feed plate (Maximum sewing speed is limited to 2,200 sti./min.)		
060	0-3000	Time after the work clamp drops until the shaft starts rotating.		0	None
			Units (ms), Increments of 10		

*1: If memory switch No. 051 is set to "OFF", thread winding is not possible before home position detection is carried out. Thread winding is not possible during intermittent lifting and before work clamp home position detection is carried out (such as when the work clamp switch has not been depressed at all after the power was turned on), even when memory switch No. 056 is set to "ON".

Pedal type and work clamp operation settings

No.	Setting range	Settings	Settings details	Initial value	Specification limits
070	1-3	Pedal specifications (Not reset during initialization)		1 (Solenoid) 2 (Pneumatic)	None
		1	Foot switch (Memory switch No. 71 can be set, and memory switch Nos. 72 and 73 are not displayed.)		
		2	Two-pedal foot switch (Memory switch No. 72 can be set, and memory switch Nos. 71 and 73 are not displayed.)		
		3	Three-pedal foot switch (Memory switch No. 73 can be set, and memory switch Nos. 71 and 72 are not displayed.)		
071	1-3	Work clamp operation when **foot switch** is set (Can be set when memory switch No. 70 is set to "1". Not displayed at other times.) (Not reset during initialization)		1	
		1	[Standard]		None
		2	[No automatic work clamp lifting] Work clamp lifts when pedal is depressed backward.		None
		3	[2-step work clamp using two presses] When work clamp switch is depressed: (1st step) Drop → (2nd step) Drop (skipped for single step work clamp) → Start When depressed backward = Both work clamps lift * Operates as a 2-step work clamp when memory switch No. 003 is set to "0".		Solenoid
072	1-7	Work clamp operation when **two-pedal foot switch** is set (Can be set when memory switch No. 70 is set to "2". Not displayed at other times.) (Not reset during initialization)		1	
		1	[Standard] Work clamp lifts automatically and drops when the work clamp switch is depressed. The left and right order can be changed using memory switch No. 002.		None
		2	[No automatic work clamp lifting] Work clamp lifts while work clamp switch is being depressed.		None
		3	[Left/right work clamp → intermittent presser foot 2-step work clamp] When work clamp switch is depressed to the 1st step, both the left and right work clamps are lowered, and when it is depressed to the 2nd step, the intermittent presser foot is lowered. Lifting is in the same order.		Pneumatic
		4	[Left and right alternating 2-step work clamp] 2-step operation, with left and right order switching for each item sewn. Starts from right.		Pneumatic
		5	[Forward/reverse pedal] When the start switch is depressed, the work clamp drops and the sewing machine starts in that order with forward control, and when the work clamp switch is depressed, the sewing machine reverses and the work clamp lifts. * The left and right order can be changed using memory switch No. 002.		Pneumatic
		6	[2-step work clamp using two presses] When the work clamp switch is depressed, the left work clamp drops → Right work clamp drops → Both work clamps lift in that order * The left and right order can be changed using memory switch No. 002.		Pneumatic
		7	[Work clamp drops and sewing starts only when work clamp switch is depressed] Work clamp drops and sewing starts only by depressing the work clamp switch. * Starting sewing is also possible by using the start switch.		None

No.	Setting range	Settings	Settings details	Initial value	Specification limits
073	1-3	Work clamp operation when **three-pedal foot switch** is set (Can be set when memory switch No. 70 is set to "3". Not displayed at other times.) (Not reset during initialization)		1	
		1	[Standard] Pneumatic method: The left pedal raises and lowers the left work clamp, and the right pedal (center) raises and lowers the right work clamp. The start switch (right) starts the sewing machine. Motor-driven method (Solenoid) : 1st step when left pedal is depressed: 2nd step when right (center) pedal is depressed (invalid for single step work clamp) The start switch (right) starts the sewing machine.		None
		2	[Independent home detection] The right pedal (center) is used exclusively for detecting the home position. The left pedal raises and lowers the left and right work clamps, and the start pedal (right) starts the sewing machine. The start switch (right) starts the sewing machine.		Pneumatic
		3	[Independent home detection] The right pedal (center) is used exclusively for detecting the home position. The left work clamp only is raised and lowered when the left pedal is depressed. The start switch (right) lowers the right work clamp and starts the sewing machine.		Pneumatic

Upper shaft motor settings

No.	Setting range	Settings	Settings details	Initial value	Specification limits
150	ON/OFF	Highest needle position stop (When set to "ON", memory switch Nos. 165 and 166 can be set.)		OFF	None
		OFF			
		ON	When the upper shaft motor stops, the motor operation reverse to return the needle bar close to its highest position. * When the motor operates in reverse to raise the needle, the thread take-up will stop at a position which is lower than its normal stopping position. As a result, the thread take-up will rise slightly at the sewing start, and this may result in the thread pulling out under certain conditions.		
151 *1	200-2800	1st stitch sewing speed at the sewing start		400	None
			Units (sti./min), Increments of 100		
152 *1	200-2800	2nd stitch sewing speed at the sewing start		800	None
			Units (sti./min), Increments of 100		
153 *1	200-2800	3rd stitch sewing speed at the sewing start		1200	None
			Units (sti./min), Increments of 100		
154 *1	200-2800	4th stitch sewing speed at the sewing start		2800	None
			Units (sti./min), Increments of 100		
155 *1	200-2800	5th stitch sewing speed at the sewing start		2800	None
			Units (sti./min), Increments of 100		
156	200-2800	Sewing speed for 5th stitch before the sewing end		2800	None
			Units (sti./min), Increments of 100		
157	200-2800	Sewing speed for 4th stitch before the sewing end		2800	None
			Units (sti./min), Increments of 100		
158	200-2800	Sewing speed for 3rd stitch before the sewing end		2800	None
			Units (sti./min), Increments of 100		
159	200-2000	Sewing speed for 2nd stitch before the sewing end		1200	None
			Units (sti./min), Increments of 100		
161	ON/OFF	Piercing force boosting operation		OFF	None
		OFF	Disabled		
		ON	Enabled (Piercing force boosting operations are carried out when the sewing machine motor is locked.)		
162	ON/OFF	Regulation of sewing speed changes due to sewing pitch changes		OFF	None
		OFF	Sewing speed varies depending on sewing pitch of the sewing data.		
		ON	Speed is fixed at the minimum sewing speed for the maximum pitch of the sewing data. (Set to “ON” if there may be a problem with sewing speed changes as a result of pitch changes.)		
163	1200-2800	The maximum value is limited when the sewing speed is set using the menu. It is applied to the panel speed display. The maximum values are limited for all speed setting values which have been programmed.		2800	None
			Units (sti./min), Increments of 100		
164	ON/OFF	Thread trimming disabled		OFF	None
		OFF	Thread trimming is carried out in accordance with the sewing data.		
		ON	Thread trimming is not carried out.		

No.	Setting range	Settings	Settings details	Initial value	Specification limits
165	-20-20	Stop position settings at highest needle position stop (Can only be set when memory switch No. 150 is set to "ON", not displayed at other times.)		0	None
			Needle bar height increases for values in the negative direction. Units (degree), Increments of 1		
166	10-500	Delay time until reverse operation starts during highest needle position stop operation (Can only be set when memory switch No. 150 is set to "ON", not displayed at other times.)		150	None
			Units (ms), Increments of 10		
167	ON/OFF	Servo lock enabled or disabled setting (When set to "ON", memory switch Nos. 168 and 169 can be set.)		OFF	None
		OFF	Disable		
		ON	Enable		
168	0-120	Servo lock timer setting (Can only be set when memory switch No. 167 is set to "ON", not displayed at other times. If it is set to “0”, no timer operation.)		0	None
			Units (s), Increments of 1		
169	30-89	Servo lock release rotation angle (Can only be set when memory switch No. 167 is set to "ON", not displayed at other times.)		45	None
			Units (degree), Increments of 1		
170	0-2800	Lowers the allowable speed for the sewing pitch by the amount set.		0	None
			Overall speed reduction (sti./min) Increments of 100 However, the minimum allowable speed value is 400 sti./min.		
171	ON/OFF	Automatic needle lifter operation		ON	None
		OFF	Does not operate automatically, and a needle up stop position error is generated. (When memory switch No. 655 is set to "ON", the sensor can also be ignored.)		
		ON	If the needle bar is not at the needle up stop position during feeding or work clamp home position detection, it moves automatically to the needle up stop position.		

*1: Only enabled when memory switch No. 100 is set to "OFF".

Feed settings

No.	Setting range	Settings	Settings details	Initial value	Specification limits
250	ON/OFF	Mechanism home position return when sewing is finished		OFF	None
		OFF	When sewing is finished, the feed returns to the start position.		
		ON	When sewing is finished, the feed moves via the machine home position to the start position.		
251	1-5	The speed of the feeding operation		3	None
		1	Slow 100 mm/s		
		2	200 mm/s		
		3	300 mm/s		
		4	400 mm/s		
		5	Fast 500 mm/s		
252 *1	ON/OFF	High-speed test feed method		OFF	None
		OFF	Normally slow, but becomes faster when the foot switch is depressed to the 1st step. (For a two-pedal foot switch, when the work clamp switch is depressed.)		
		ON	High-speed feeding starts at the same time test feeding starts.		
253	0-2	Moving method to the start point (Not reset during initialization)		0	None
		0	Depress the foot switch to the 2nd step while the program number is flashing. (For a two-pedal foot switch, depress the start switch.)		
		1	When the RESET key is pressed while the program number is flashing: When work clamp is lowered before moving to sewing start position → Moves to sewing start position When work clamp is lowered after moving to sewing start position → Ignored When work clamp is raised before moving to sewing start position → Work clamp is lowered + Moves to sewing start position When work clamp is raised after moving to sewing start position → Ignored		
		2 *2	When the expansion input switch (EXIN3) is pressed while the program number is flashing: When work clamp is lowered before moving to sewing start position → Moves to sewing start position When work clamp is lowered after moving to sewing start position → Ignored When work clamp is raised before moving to sewing start position → Ignored When work clamp is raised after moving to sewing start position → Ignored		
254	0-3	Movement path from mechanism home position to start position (Not reset during initialization)		0	None
		0	No route specified		
		1	Moves in the order X→Y when moving to the home position, and in the order Y→X when moving to the sewing start position.		
		2	Moves in the order Y→X when moving to the home position, and in the order X→Y when moving to the sewing start position.		
		3	Operates while avoiding the center of the clamped area.		
255	ON/OFF	Y-feed full stroke movement operation		ON	None
		OFF	Y-feed full stroke movement operation does not occur when home position detection is carried out immediately after the power is turned on.		
		ON	Y-feed full stroke movement operation occurs when home position detection is carried out immediately after the power is turned on.		
260	-80-80	Changes the overall feed timing (-80 Early ←→80: Late)		0	None
			Units (degree), Increments of 1		

*1: Only enabled when memory switch No. 200 is set to "OFF".
*2: The start switch is disabled. Cannot be set when memory switch No.650 is set to "2".

No.	Setting range	Settings	Setting details	Initial value	Specification limits
261	-80-80	Changes the feed timing for the 1st stitch at the sewing start (-80 Early ←→80: Late)		0	None
			Units (degree), Increments of 1		
262	-80-80	Changes the feed timing for the 2nd stitch at the sewing start (-80 Early←→80: Late)		0	None
			Units (degree), Increments of 1		
263	-80-80	Changes the feed timing for the 3rd stitch at the sewing start (-80 Early ←→80: Late)		0	None
			Units (degree), Increments of 1		
264	-80-80	Changes the feed timing for the 3rd stitch before the sewing end (-80 Early←→80: Late)		0	None
			Units (degree), Increments of 1		
265	-80-80	Changes the feed timing for the 2nd stitch before the sewing end (-80 Early ←→80: Late)		0	None
			Units (degree), Increments of 1		
266	-80-80	Changes the feed timing for the 1st stitch before the sewing end (-80 Early ←→80: Late)		0	None
			Units (degree), Increments of 1		
267	0-99	When the overall feed timing has been changed using memory switch No. 260, this specifies the effective number of stitches.		0	None
		0	No limit		
		1-99	When the specified number of stitches is exceeded, the feed timing returns to the standard timing.		
268	0-3	Changes the overall feed timing reference		1	None
		0	[Feed start reference] Makes the timing uniform at the start of feed.		
		1	[Needle up reference] Changes the timing at the start of feed so that the needle zigzagging is even.		
		2	[Feed end reference] Makes the timing uniform at the end of feed.		
		3	[Linked to speed] Feed timing is uniform even if the sewing speed changes.		
269	0-2	Changes the feed timing reference for the first three stitches at the sewing start		1	None
		0	[Feed start reference] Makes the timing uniform at the start of feed.		
		1	[Needle up reference] Changes the timing at the start of feed so that the needle zigzagging is even.		
		2	[Feed end reference] Makes the timing uniform at the end of feed.		
270	0-3	Home position detection operation when the program is changed		0	None
		0	Home position detection is not carried out. Moves to sewing start position when start switch is depressed, and then stops.		
		1	Home position detection is not carried out. Moves via the center of the sewing area to the sewing start position when start switch is depressed, and then stops.		
		2	Home position detection is carried out. Moves to sewing start position after home position detection when start switch is depressed, and then stops.		
		3	Home position detection is not carried out. If the program has changed, moves to the next sewing start position and then stops.		

Panel operation settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
352	0-2	Counting method for production counter and lower thread counter		0	None
		0	Counted for each item of sewing data.		
		1	Counted for each thread trimming operation.		
		2	Counted when sewing data ends or when split stops.		
353	ON/OFF	Counter timing for lower thread counter		OFF	None
		OFF	Counted at the end of sewing.		
		ON	Counted at the start of sewing.		
354	0-9	Switching program numbers using an external switch		0	None
		0	Disable		
		1-9	Program number is switched by means of the 5 bits of option input (EXIN6 − EXIN10). * Applicable numbers are: Setting number = 3rd digit, last two digits can be 1 − 31.		
355	ON/OFF	Switches split numbers using an external switch		OFF	None
		OFF	Disable		
		ON	Split number is switched by means of the 5 bits of option input (EXIN6 − EXIN10). * Applicable numbers are 1 − 31 (only enabled for independent split mode).		

Program settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
460	0-150	X-sewing area setting (Not reset during initialization)		150	None
			Units (mm), Increments of 1		
461	0-100	Y-sewing area setting (Not reset during initialization)		100	None
			Units (mm), Increments of 1		
462	0-8	Enlargement/reduction reference point		0	None
		0	Zoom reference point is the center of the sewing frame.		
		1	Zoom reference point is the sewing start position.		
		2	Zoom reference point is the center of the sewing pattern.		
		3	Front of pattern center		
		4	Back of pattern center		
		5	Back-left corner of sewing area		
		6	Front-left corner of sewing area		
		7	Back-right corner of sewing area		
		8	Front-right corner of sewing area		
465	1-3	The parallel movement amount is stored even when the power is turned off.		1	None
		1	Movement amount is Initialized when program number or enlargement/reduction ratio is changed and when power is turned off.		
		2	Movement amount is Initialized when program number or enlargement/reduction ratio is changed but not when power is turned off.		
		3	Set separately for each program. * Disabled when memory switch No. 400 is set to "OFF". (Parallel movement mode cannot be used.) * Select "1" or "2" when memory switch No. 400 is set to "OFF".		
468	ON/OFF	Retract point switching at parallel movement point		OFF	None
		OFF	Disable		
		ON	The position moved to by parallel movement is recorded as the retract point.		

Device settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
550	0-2000	Needle cooler device		0	None
		0	Disable		
		100-2000	Needle cooler device is used. Continuous output time after sewing machine stops (ms) Increments of 100		
551	0-3	Upper thread tension release at the sewing start		0	None
		0	Not released		
		1-3	Released during the specified number of stitches		
552	-80-8	Tension release timing during thread trimming		0 (-3,-5) -24 (-7)	None
		0	-3: Medium-weight material specifications -5: Heavy-weight material specifications		
		-24	-7: Seatbelt specifications		
554	ON/OFF	Thread breakage sensor		OFF	None
		OFF	Disable		
		ON	Fiber-type thread breakage sensor is used.		
555	ON/OFF	Thread breakage sensor detection sensitivity		OFF	None
		OFF	5 stitches at sewing start, 3 stitches while sewing		
		ON	10 stitches at sewing start, 3 stitches while sewing		
556	0-3	Inner clamping device (Option output No.13) (Not reset during initialization)		0	None
		0	Disable		
		1	Inner clamping device is used. (Retract operation is carried out at the sewing end to prevent interference with the needle.)		
		2	Inner clamping device is used. (No retract operation at the sewing end)		
		3	Inner clamping device operates for 1/4 of the sewing pattern and returns for the other 3/4. (No retract operation)		
557	0-2	Wiper device		1	None
		0	Disable		
		1	Standard wiper device is used.		
		2	Pneumatic-type wiper device is used. (Option output No. 2)		
558	ON/OFF	External error monitoring input		OFF	None
		OFF	Disable		
		ON	Enabled (Option input No. 13 [AIRSW])		
559	ON/OFF	Operating indicator output		OFF	None
		OFF	Disable		
		ON	Option output No. 9 : Output ON while operating Option output No. 10: ON during lower thread conversion and during test mode Option output No. 11: ON when error is generated		
560	0-3	Automatic ejector (Option output No. 3 output: Option input No. 1 = right sensor: Input No. 2 = left sensor) * When this device is used, memory switch No. 002 should be set to "0".		0	Pneumatic
		0	Disable		
		1	Standard automatic ejector operation occurs.		
		2	Sewing starts when cassette sensor is ON.		
		3	Start switch is enabled even if cassette sensor is OFF.		

No.	Setting range	Settings	Setting details	Initial value	Specification limits
561	0-999	Time from sensor turning on to sewing start when memory switch No. 560 is set to "2"		100	Pneumatic
			Units (ms), Increments of 1		
564	ON/OFF	2-step tension		OFF	None
		OFF	Disable		
		ON	2-step tension is used.		
565	0-2	Tension release force setting		0 (-3,-5) 1 (-7)	None
		0	Standard (Tension release is open at the sewing end.)		
		1	Increases the force. (Tension release is closed at the sewing end. When using threading mode, it will be closed in approximately 5 minutes.)		
		2	Tension release force is set to the maximum. (Tension release is closed at the sewing end. When using threading mode, it will be closed in approximately 1 minute.)		
567	ON/OFF	Upper thread tension during test feed		OFF	None
		OFF	Upper thread tension not applied.		
		ON	Upper thread tension applied.		
569	0-3	Detection timing for lower thread sensor (Not reset during initialization)		0	None
			0: Sensor not used = 1: Before = 2: After = 3: Before and after		
570	1-99	Wait time after lower thread detection is complete		30	None
			Units (×10 ms), Increments of 1		
571	1-99	Wait time for lower thread detection response		30	None
			Units (×10 ms), Increments of 1		
572	1-99	Output time for lower thread detection operation command signal		50	None
			Units (×10 ms), Increments of 1		

Error processing settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
650	0-2	Error release method when operation has stopped (Not reset during initialization)		0	None
		0	Press the RESET key on the operation panel to release errors.		
		1	Press the RESET key or the STOP key to release errors.		
		2	Press the RESET key or input a signal from the expansion input switch (EXIN3) to release errors. Cannot be set when memory switch No. 253 is set to "2".		
651	0-2	Needle up stop when operation is paused		0	None
		0	Stops at the needle down position when sewing is interrupted by the STOP key.		
		1	Stops at the needle up position when sewing is interrupted by the STOP key.		
		2	Stops at the needle up position after thread trimming when sewing is interrupted by the STOP key. (Thread trimming cannot be set when memory switch No. 652 is set to "0".)		
652	ON/OFF	Thread trimming operation prevention when sewing is paused		OFF	None
		OFF	Thread trimming is carried out when the pause is canceled.		
		ON	Thread trimming is not carried out when the pause is canceled.		
653	ON/OFF	Resuming sewing after sewing is paused		OFF	None
		OFF	STOP switch → RESET key →▼ key → Sewing starts		
		ON	STOP switch → RESET key → Sewing starts		
655	ON/OFF	Disables needle up stop position monitoring sensor		OFF (-3,-5) ON (-7)	None
		OFF	Sensor enabled (“UP” will be displayed)		
		ON	Sensor disabled		
656	ON/OFF	Home position return when sewing is paused		OFF	None
		OFF	Mechanism moves to home position and then moves to sewing start position.		
		ON	Mechanism steps back to the sewing start position along the sewing path without moving to the home position.		
657	0-30	Time from error occurring to buzzer stopping		0	None
		0	Buzzer does not stop.		
		2-30	Units (s), Increments of 2		

Maintenance settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
750	0-3	Run-in operation mode		0	None
		0	Disable		
		1	Continuous operation (one work clamp up/down operation per cycle) occurs while the start switch remains on. Not raised and lowered when memory switch No. 001 is set to "OFF".		
		2	Continuous operation (two work clamp up/down operations per cycle) occurs while the start switch remains on. Not raised and lowered when memory switch No. 001 is set to "OFF".		
		3	Continuous operation (three work clamp up/down operations per cycle) occurs while the start switch remains on. Not raised and lowered when memory switch No. 001 is set to "OFF".		
751	0-3000	Run-in operation stop time		200	None
			Units (ms), Increments of 10		
752	0-99	Sewing machine ID code (Sewing data specified on SD card)		0	None
			Folder specified		

Specification and destination settings

No.	Setting range	Settings	Setting details	Initial value	Specification limits
850	3,5,7	Specification code setting (Not reset during initialization)		-	None
		3	-3: Medium-weight material specifications		
		5	-5: Heavy-weight material specifications		
		7	-7: Seatbelt specifications		

Unique settings for each model

No.	Setting range	Settings	Setting details	Initial value	Specification limits
951	ON/OFF	Program number output		OFF	None
		OFF	Disable		
		ON	When the last two digits of the program number are 1 to 15, the program number is output in 4 bits to option output 4 − 7.		

3-5. Setting the work clamp mode

Combinations of memory switch settings can be used to switch the work clamp operating mode to any one of the following modes.

＜Motor-driven work clamp specifications, Foot switch standard operations＞

Foot switch operation is set when memory switch No. 070 is set to "1".

Operating mode				Memory switch setting			
Lowering operation	Automatic work clamp lifting	After home position detection	After sewing start	003	071	057	001
Analog lowering	Enabled	Automatic lift	Automatic lift	0	1	ON	2
			Lowered	0	1	ON	0
		Lowered	Automatic lift	0	1	OFF	2
			Lowered	0	1	OFF	0
	Disabled	Lowered	Lowered	0	2	-	-
Work clamp dropping in 1 step	Enabled	Automatic lift	Automatic lift	1	1	ON	2
			Lowered	1	1	ON	0
		Lowered	Automatic lift	1	1	OFF	2
			Lowered	1	1	OFF	0
	Disabled	Lowered	Lowered	1	2	-	-
Work clamp dropping in 2 steps	Enabled	Automatic lift	Automatic lift	2	1	ON	2
			Lowered	2	1	ON	0
		Lowered	Automatic lift	2	1	OFF	2
			Lowered	2	1	OFF	0
	Disabled	Lowered	Lowered	2	2	-	-

＜Motor-driven work clamp specifications, Foot switch sequence operations＞

Operating mode				Memory switch setting			
Lowering operation	Automatic work clamp lifting	After home position detection	After sewing start	003	071	057	001
Work clamp dropping in 1 step	Enabled	Automatic lift	Automatic lift	1	3	ON	2
			Lowered	1	3	ON	0
		Lowered	Automatic lift	1	3	OFF	2
			Lowered	1	3	OFF	0
Work clamp dropping in 2 steps	Enabled	Automatic lift	Automatic lift	2	3	ON	2
			Lowered	2	3	ON	0
		Lowered	Automatic lift	2	3	OFF	2
			Lowered	2	3	OFF	0

＜Pneumatic work clamp specifications, two-pedal foot switch standard operations＞

Two-pedal foot switch operation is set when memory switch No. 070 is set to "2".

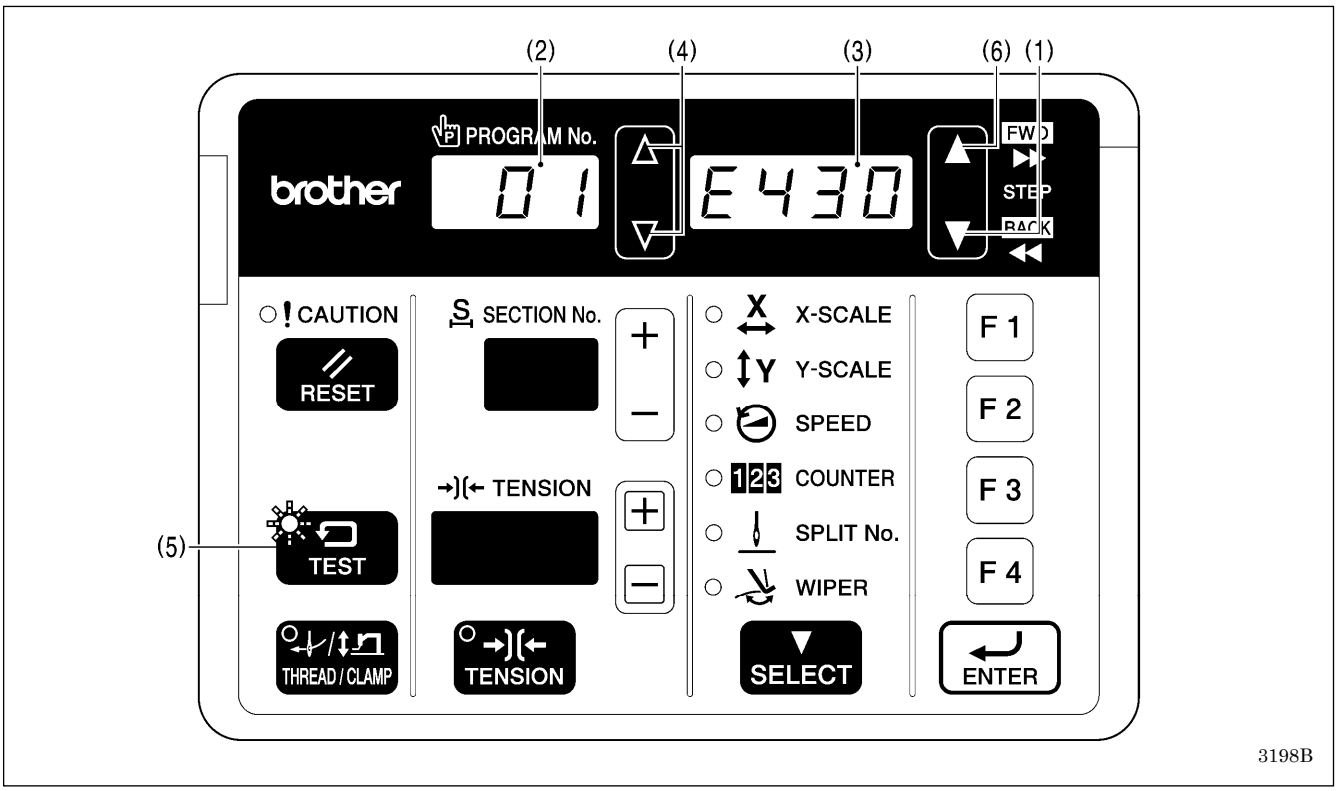
Operating mode			Memory switch setting			
Work clamp operation	After home position detection	After sewing start	002	072	057	001
Work clamp lifts automatically and drops when the work clamp switch is depressed.	Automatic lift	Automatic lift	Work clamp lowering sequence selection 0 : Left and right simultaneously 1 : Left → Right 2 : Right → Left	1	ON	2
		Lowered		1	ON	0
	Lowered	Automatic lift		1	OFF	2
		Lowered		1	OFF	0
Work clamp rises while work clamp switch is depressed.	Lowered	Lowered	-	2	-	-
Work clamp switch 1st step : Both left and right work clamp drop 2nd step : Intermittent presser foot drops Lifting is simultaneous	Automatic lift	Automatic lift	-	3	ON	2
		Lowered		3	ON	0
	Lowered	Automatic lift		3	OFF	2
		Lowered		3	OFF	0
Work clamp drop sequence at work clamp switch 1st and 2nd step alternates each time an article is sewn. Initially right → left	Automatic lift	Automatic lift	-	4	ON	2
		Lowered		4	ON	0
	Lowered	Automatic lift		4	OFF	2
		Lowered		4	OFF	0

＜Pneumatic work clamp specifications, two-pedal foot switch sequence operations＞

Operating mode			Memory switch setting			
Work clamp operation	After home position detection	After sewing start	002	072	057	001
When start switch is depressed, work clamp drops → sewing starts Lifts in reverse order using work clamp switch	Automatic lift	Automatic lift	Work clamp drop sequence selection 0 : Left and right simultaneously 1 : Left → Right 2 : Right → Left	5	ON	2
		Lowered		5	ON	0
	Lowered	Automatic lift		5	OFF	2
		Lowered		5	OFF	0
Work clamp switch Left (right) work clamp → Right (left) work clamp → Both work clamps lift	Automatic lift	Automatic lift	Work clamp drop sequence selection 0 : Left and right simultaneously 1 : Left → Right 2 : Right → Left	6	ON	2
		Lowered		6	ON	0
	Lowered	Automatic lift		6	OFF	2
		Lowered		6	OFF	0

3-6. Error history checking method

The past error history can be checked by the following procedure.



1. While pressing the ▼ key (1), turn on the power switch.
   The error history sequence number will be displayed in the PROGRAM No. display (2) and the error code will be displayed in the menu display (3).

   NOTE:
   E025, E035, E065, E705 and error codes which can be reset do not remain in the error history, and so they will not be displayed.

2. Press the △ or ▽ key (4) to change the order of the error history number.
   The history stores 99 entries (01 to 99) in order starting from the most recent. No. 01 is the most recent entry. (If there are no error codes, “E---” will be displayed.)
   The production counter when the error occurred will appear in the PROGRAM No. display (2) and the menu display (3) in units of 100 stitches while the ▲ key (6) is being pressed.

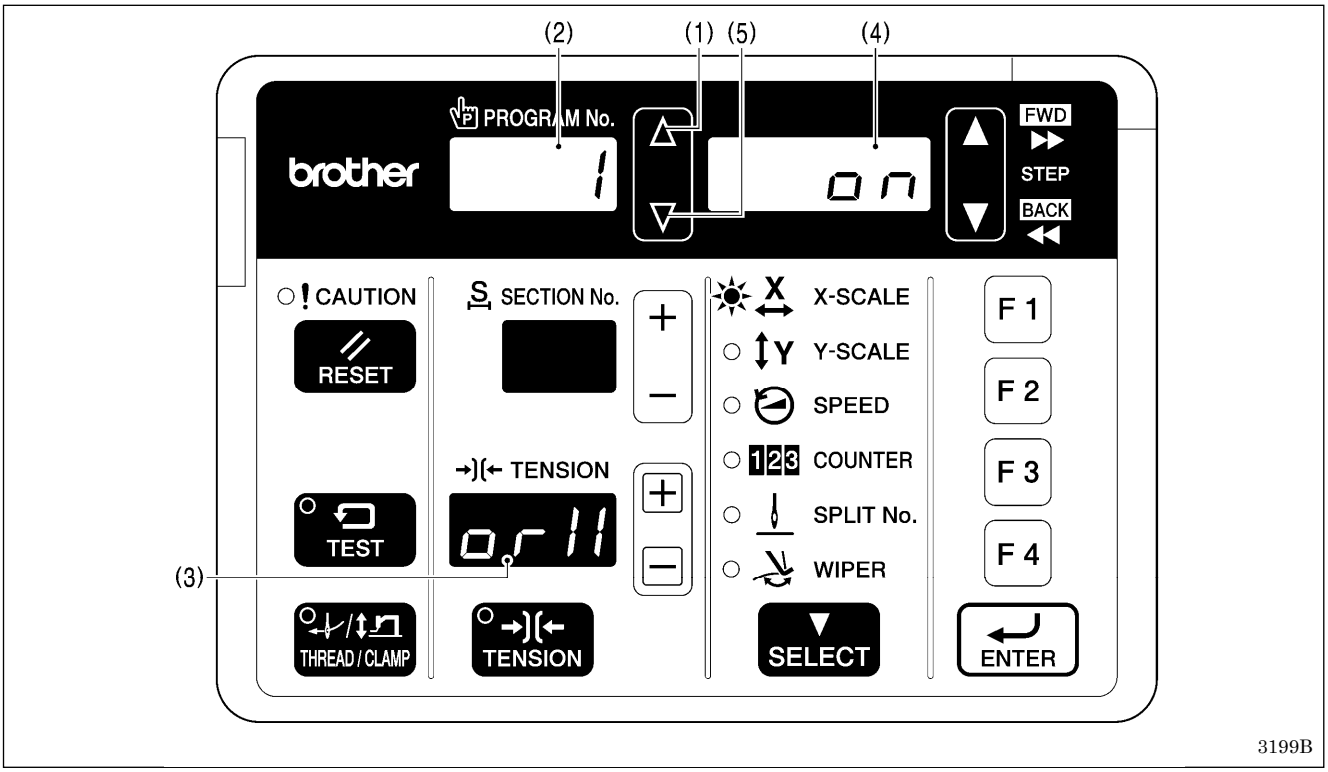
3. Press the TEST key (5) to return to the normal display. The sewing machine will switch to home position detection standby.

3-7. Input checking method

This is used at the following times.

- When you would like to check for problems with the operation panel
- When you would like to check for broken cords
- When you would like to adjust a sensor position

This lets you check if the CPU is reading signals from the keys and the sensors correctly.



1. While pressing the △ key (1), turn on the power switch.
   The item number will appear in the PROGRAM No. display (2), the item name will appear in the tension display (3), and the input status will appear in the menu display (4).
2. Press the △ key (1) or the ▽ key (5) to select the desired item number.
3. Refer to the input check list to check the key and sensor responses.
4. When returning to normal operation, turn power off and then on again.

＜Input check list＞

Item No.	Item name	Input status	Check items and checking methods
[1]	[orX]	[on] / [oFF]	X-feed motor home position sensor position Move the work clamp manually in the X direction. Right = ON, Left = OFF
[2]	[EnX]	[-999] - [999]	X-feed motor encoder counter value Move the work clamp manually in the X direction. Right = down, Left = up When the power is turned on, the position will be “0”.
[3]	[orY]	[on] / [oFF]	Y-feed motor home position sensor position Move the work clamp manually in the Y direction. Back = ON, Forward = OFF
[4]	[EnY]	[-999] - [999]	Y-feed motor encoder counter value Move the work clamp manually in the Y direction. Back = down, Forward = up When the power is turned on, the position will be “0”.

Item No.	Item name	Input status	Check items and checking methods
［ 5］	［orP］	［ on］/［oFF］	Work clamp motor home position sensor position Remove the rear cover and raise the work clamp manually. ON when raised, OFF when lowered
［ 6］	［EnP］	［-999］～［ 999］	Work clamp motor encoder counter value Remove the rear cover and raise the work clamp manually. Back = down, Forward = up When the power is turned on, the position will be “0”.
［ 7］	［dEG］	［000］～［359］	Upper shaft 360 rotation segment signal Turn the pulley by hand. Increases in the forward direction (the direction of the arrow).
［ 8］	［UP］	［ on］/［oFF］	Needle up signal Turn the pulley by hand. ON in the needle up region, OFF in any other region
［ 9］	［voL］	［＊＊＊］	Shows the input voltage.
［10］	［PnL］	［＊］/［oFF］	Operation panel key input check The key name will be displayed while a key is pressed.
		*On display	Key name
		［rESt］	RESET key
		［tESt］	TEST key
		［tHrE］	THREAD/CLAMP key
		［tEn］	TENSION key
		［SELE］	SELECT key
		［UP-M］	▲ key
		［dn-M］	▼ key
		［UP-S］	SECTION + key
		［dn-S］	SECTION - key
		［UP-t］	TENSION + key
		［dn-t］	TENSION - key
		［ F1］	Function key F1
		［ F2］	Function key F2
		［ F3］	Function key F3
		［ F4］	Function key F4
		［Ent］	ENTER key
［11］	［FtA］	［ 0］～［255］	Foot switch analog value Depress the foot switch. When depressed forward, the value increases. Should normally display somewhere around 102 when at the neutral position.
［12］	［FtS］	［bAck］/［oFF］/ ［CLnp］/［Strt］	Foot switch signal bAck：Depressed backward oFF：Neutral CLnP：1st step (Work clamp signal) Strt：2nd step (Start signal)
［13］	［CL1］	［ on］/［oFF］	Work clamp switch 1st step for two-pedal foot switch Depress the work clamp switch to the 1st step.
［14］	［CL2］	［ on］/［oFF］	Work clamp switch 2nd step for two-pedal foot switch Depress the work clamp switch to the 2nd step.
［15］	［Stt］	［ on］/［oFF］	Start switch for two-pedal foot switch Depress the start switch.

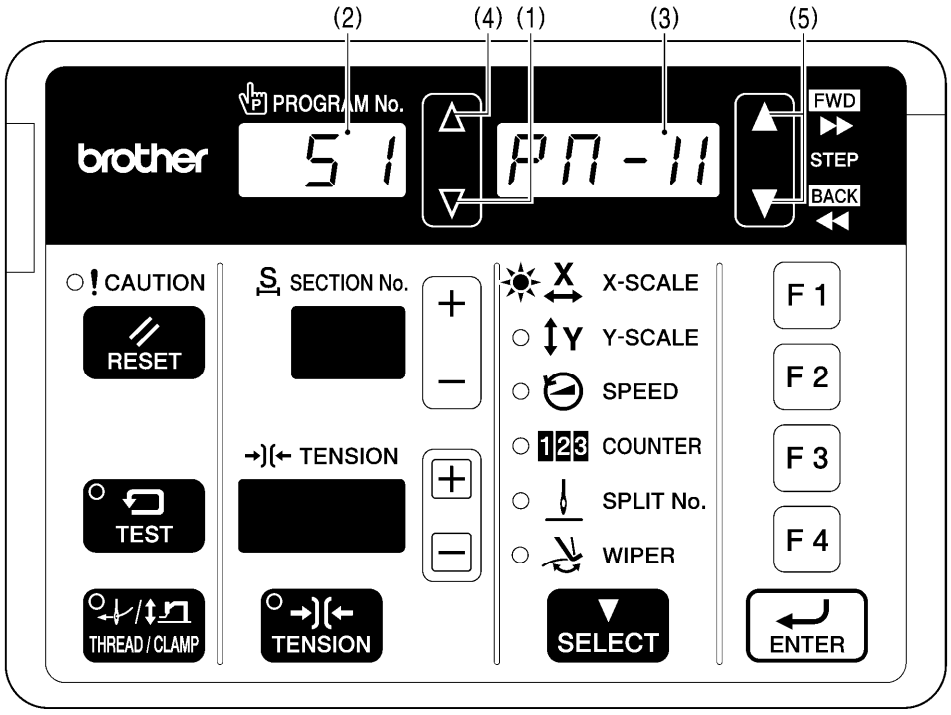
Item No.	Item name	Input status	Check items and checking methods
［16］	［EMC］	［ no］/ ［oFF］/［ on］	Stop switch [no] is displayed when not connected.
［17］	［HEd］	［ on］/［oFF］	Machine head switch [oFF] is displayed when the machine head is tilted back.
［18］	［EXE］	［ on］/［oFF］	External input error detection Option input (IN13)
［19］			Not used
［20］			Not used
［21］	［Fib］	［ on］/［oFF］	Fiber-type thread breakage detection Option input (IN14)
［22］	［in1］	［ on］/［oFF］	Option input (IN1)
［23］	［in2］	［ on］/［oFF］	Option input (IN2)
［24］	［in3］	［ on］/［oFF］	Option input (IN3)
［25］	［in4］	［ on］/［oFF］	Option input (IN4)
［26］	［in5］	［ on］/［oFF］	Option input (IN5)
［27］	［in6］	［ on］/［oFF］	Option input (IN6)
［28］	［in7］	［ on］/［oFF］	Option input (IN7)
［29］	［in8］	［ on］/［oFF］	Option input (IN8)
［30］	［in9］	［ on］/［oFF］	Option input (IN9)
［31］	［i10］	［ on］/［oFF］	Option input (IN10)
［32］	［i12］	［ on］/［oFF］	Option input (IN12)

3-8. Output checking method

This is used at the following times.

- When you would like to check for problems with the operation panel
- When you would like to check for a problem with the drive mechanism
- When you would like to check for broken cords

You can check whether the signals being output by the CPU are driving the mechanisms correctly.



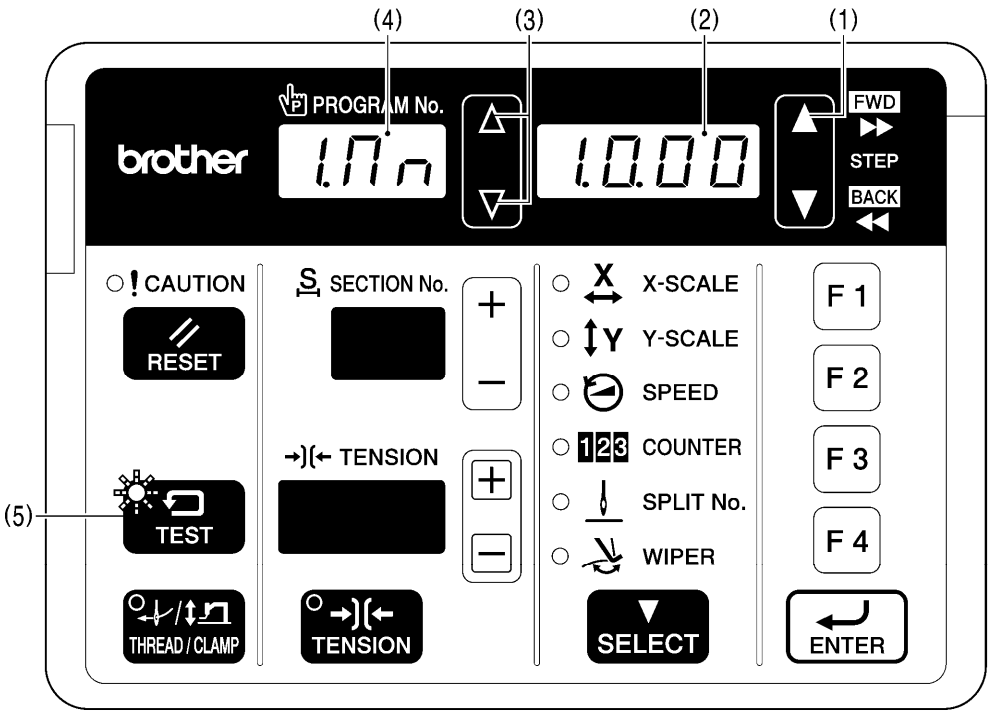
1. While pressing the ▽ key (1), turn on the power switch.
   The item number will appear in the PROGRAM No. display (2), and the item name will appear in the menu display (3).
2. Press the △ key (4) or the ▽ key (1) to select the desired item number.
3. For item numbers 51 to 54, press the ▲ or ▼ key (5) to check the operation.
   * The operation for that check item will be carried out while the key is being pressed.
4. For item numbers 55 onward, depress the foot switch to the 2nd step. (For a two-pedal foot switch, depress the start switch.)
   * The operation for that check item will be carried out while the foot switch is being depressed.
5. When returning to normal operation, turn power off and then on again.

Item No.	Item name	Operation
[51]	[PM－X]	When the ▲ key is pressed, the work clamp moves to the left. When the ▼ key is pressed, the work clamp moves to the right.
[52]	[PM－y]	When the ▲ key is pressed, the work clamp moves to the forward. When the ▼ key is pressed, the work clamp moves to the back.
[53]	[PM－F]	When the ▲ key is pressed, the work clamp and intermittent presser foot are raised (for motor-driven type). When the ▼ key is pressed, the work clamp and intermittent presser foot are lowered (for motor-driven type). When the ▲ key is pressed, only the intermittent presser foot is raised (pneumatic type). When the ▼ key is pressed, only the intermittent presser foot is lowered (pneumatic type).
[54]		Not used

Item No.	Item name	Operation
［55］	［CL－r］	Right clamp valve turns on. (OUT16) *1
［56］	［CL－L］	Left clamp valve turns on. (OUT15) *1
［57］	［Foot］	Option output 14 turns on.
［58］	［FLiP］	Inner clamping valve is turned ON. (OUT13) *1
［59］	［CooL］	Needle cooler valve is turned ON. (OUT12) *1
［60］		The panel LEDs illuminate in order, and then the seven segments of the PROGRAM No. display and the menu display illuminate one by one.
［61］	［CUt］	Thread trimmer solenoid is turned ON.
［62］	［rEL］/ ［dtEn］	Turns on the tension release solenoid/digital tension solenoid. *2 However, in the case of digital tension, the solenoid turns on at the tension that has been set.
［63］	［WiP］	The wiper solenoid is turned ON.
［64］	［oP 1］	Option output 1 turns ON.
［65］	［oP 2］	Option output 2 turns ON.
［66］	［oP 3］	Option output 3 turns ON.
［67］	［oP 4］	Option output 4 turns ON.
［68］	［oP 5］	Option output 5 turns ON.
［69］	［oP 6］	Option output 6 turns ON.
［70］	［oP 7］	Option output 7 turns ON.
［71］	［oP 8］	Option output 8 turns ON.
［72］	［oP 9］	Option output 9 turns ON.
［73］	［oP10］	Option output 10 turns ON.
［74］	［oP11］	Option output 11 turns ON.
［75］	［oP17］	Option output 17 turns ON.
［76］	［oP18］	Option output 18 turns ON.
［77］	［oP19］	Option output 19 turns ON.
［78］	［oP20］	Option output 20 turns ON.

*1: Applies for pneumatic work clamp specifications when corresponding devices are installed.
*2: Can be determined automatically using a connector shorting pin.

3-9. Confirming software version



1. If you turn on the power while pressing the ▲ key (1), the software version will be displayed in the menu display (2).
2. The PROGRAM No. display (4) will change as follows each time the △ or ▽ key (3) is pressed.

PROGRAM No. display (4)	Software	Menu display (2) example
[1.Mn]	Main control program	[1.0.00]
[2.Mt]	Motor control program	[1.00]
[3.PL]	Panel control program	[1.00]
[4.in]	Main IPL	[1.00]
[5.it]	Motor IPL	[1.00]
[6.iL]	Panel IPL	[1.00]

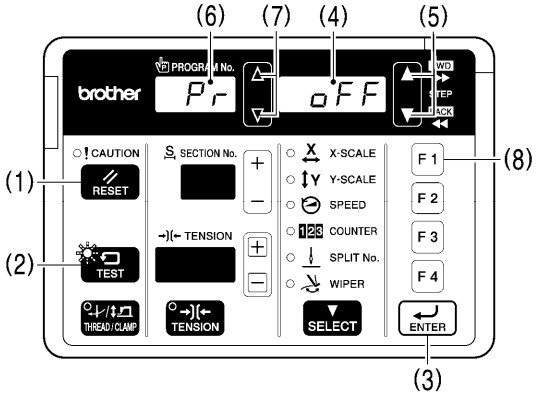
3. Press the TEST key (5) to return to the normal display. The sewing machine will switch to home position detection standby.

3-10. Protection settings

There are two ways which can be used to switch to protect setting mode: **Method A** (which does not require an SD card) and **Method B** (which requires an SD card).
If you want to set up the sewing machine so that these modes cannot be distinguished, it is recommended that you set the method to **Method B**.
* If using an SD card, read the section titled “5-1.Notes on handling SD cards (commercially available)”.

● **Method A**

1. While pressing the RESET key (1) and the TEST key (2) and the ENTER key (3), turn on the power switch.
   * The previous protection level (OFF, 1 to 7) will appear in the menu display (4).
   * The protection level is set to “OFF” at the time of shipment from the factory.



   * If a beeping sound is heard and “ Pr” “diFF” is displayed, it means that the method has been set to **Method B**. In this case, start by means of **Method B**. (Refer to the next page)

2. Press the ▲ or ▼ key (5) to select the protection level.

Protection level	Details
OFF	Nothing is disallowed.
1-6	Certain operations are disallowed depending on the protection level. * Protected items have been preset for each level. Refer to “Table of protection levels and corresponding protected items” on page 33.
7	You can change the protection setting for each of the 22 items individually. * Set to “ON” (disallowed) or “OFF” (allowed) for each item. * All items are set to “OFF” at the time of shipment from the factory.

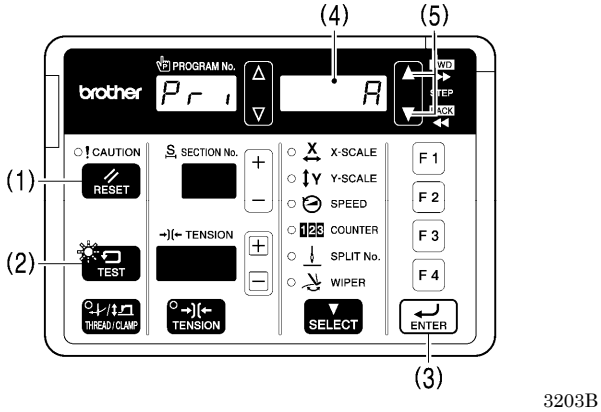
3. Press the ENTER key (3) to store the protection level.
   * If setting to a protection level other than level 7, proceed to step 4. If setting to level 7, proceed to step 5.
4. Press the TEST key (2).
   The display will return to the normal display and the sewing machine will change to home position standby.
5. The item number will appear in the PROGRAM No. display (6), and the setting (ON/OFF) will appear in the menu display (4).
6. Press the △ or ▽ key (7) to select the item number (1-21).
7. Press the ▲ or ▼ key (5) to change the setting (ON/OFF).
8. Press the ENTER key (3) to store the setting (ON/OFF).
9. Repeat steps 6 to 8 above for each item, and then press the TEST key (2).
   * The protect setting mode will be exited and the sewing machine will change to home position standby.
   * If you would like to return to protection level setting (2 above), press the F1 key (8).

●Method B

Have an SD card ready.

* The SD card is only used at the step of selecting protect setting mode, so any type of SD card can be used as long as it can be accessed. In addition, if making the setting two or more times, a different SD card from the one used before can be used.

1. Insert the SD card, and then while pressing the RESET key (1) and the TEST key (2) and the ENTER key (3), turn on the power switch.
   * The previous starting method (A or b) will be displayed in the menu display.
   * The method is set to “A” at the time of shipment from the factory.



3203B

2. Press the ▲ or ▼ key (5) to select the next starting method.

Starting method	Details
A	Protect setting mode can be started using either Method A or Method B.
B	Protect setting mode can only be started using Method B.

3. Press the ENTER key (3) to store the starting method.
4. For the method of operation from this point onward, refer to steps 2 to 9 in “**Method A**” (previous page).

Table of protection levels and corresponding protected items

× : Operation disallowed

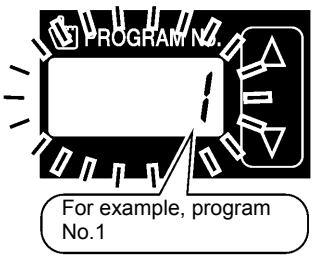
Selected number / Setting items	OFF	1	2	3	4	5	6	7																				
								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Data initialization		×	×	×	×	×	×	×																				
Memory switch : For operators									×																			
Memory switch : For technicians		×	×	×	×	×	×			×																		
<Home position, main shaft reference> position adjustment											×																	
Program No.		×	×	×	×	×						×																
XY enlarge change during wait (Possible if 100% or less)							×						×															
XY enlarge/reduce change during wait		×	×	×	×									×														
Sewing speed during wait		×	×	×											×													
Slow start during wait		×	×	×												×												
Work clamp height during wait		×	×														×											
Tension during wait *1		×	×															×										
Lower thread counter change during wait		×																	×									
Production counter clear during wait		×																		×								
Lower thread counter setting mode																					×							
Production counter setting mode																						×						
Program setting mode		×	×	×	×	×																						
Cycle program setting mode		×	×	×	×	×																		×				
Pattern data editing mode *1																									×			
Data read/write mode																										×		
Sewing start after pause																											×	
Parallel movement mode																												×
Program copy mode		×	×	×	×	×																	×					

*1: The standard setting is that the tension settings during pattern editing and wait are not displayed because of to the digital tension option.

4. X AND Y PARALLEL MOVEMENT OF SEWING PATTERNS

The work clamp can be moved to any desire position so that sewing patterns can be moved in parallel directions forward, back, or to the left or right.
Use this when you would like to correct the sewing position with respect to the intermittent work clamp.

1

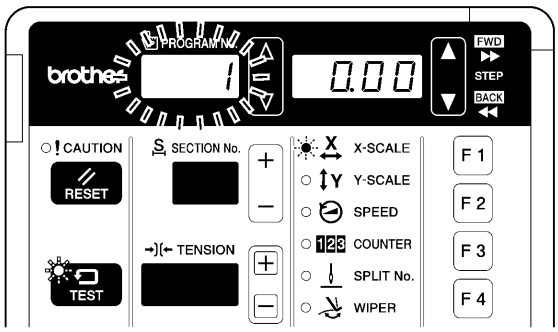


2776B

Press the △ or ▽ key to select the program number.

* If a cycle program has been selected, the following operation cannot be carried out. Select a program from 1 to 999.

2

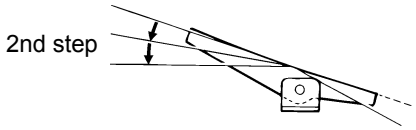


3204B 2648B

While holding down the TEST key, press the ▽ key to switch to parallel movement mode.

- The amount of parallel movement in the horizontal direction which has currently been set will be displayed in the menu display in mm units.

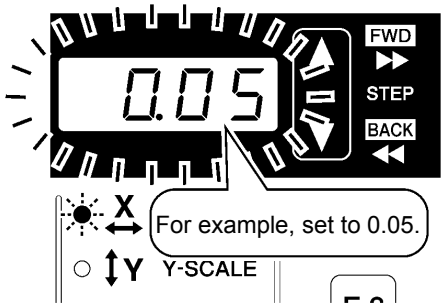
3



4441Q

Depress the foot switch to the 2nd step.
- Home position detection will be carried out.
- The pattern number will change to illuminated.

4



3205B

Each time the ▲ or ▼ key is pressed, the work clamp will move by 0.05 mm.
- In X-scale parallel movement mode, the work clamp will move to the left when the ▲ key is pressed, and to the right when the ▼ key is pressed.
- The movement units change in accordance with the movement distance.
  0 - 9.95 mm : Increments of 0.05 mm
  10.0 - 99.9 mm : Increments of 0.1 mm
  100 - : Increments of 1 mm

5 **Confirm the movement amount**

2414B

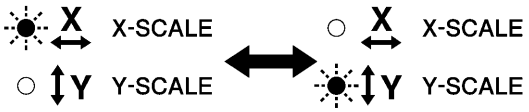
Press the ENTER key.
- The amount of parallel movement in the horizontal direction will be confirmed, and the menu display will change to illuminated.

(Continued on next page)

6

X-scale
Parallel movement mode

Y-scale
Parallel movement mode



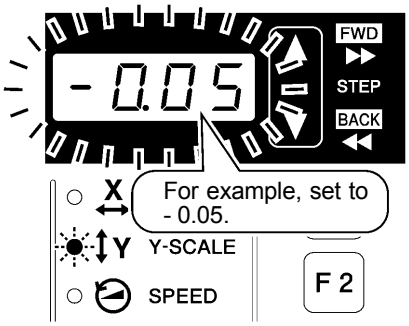
2649B

Press the SELECT key so that the Y-SCALE indicator flashes.

2401B

* When the SELECT key is pressed, the X-SCALE indicator and the Y-SCALE indicator will flash alternately.

7



3206B

Each time the ▲ or ▼ key is pressed, the work clamp will move by 0.05 mm.

- In Y-scale parallel movement mode, the work clamp will move forward when the ▲ key is pressed, and backward when the ▼ key is pressed.
- The movement units change in accordance with the movement distance.
  0 - 9.95 mm : Increments of 0.05 mm
  10.0 - 100 mm : Increments of 0.1 mm

8 **Confirm the movement amount**

2414B

Press the ENTER key.

- The amount of parallel movement in the vertical direction will be confirmed, and the menu display will change to illuminated.

9 **Exit parallel movement mode**

TEST indicator switches off

Press the TEST key.

- The display will return to the normal display and the sewing machine will change to home position standby.

* If you would like to return to step 4, press the SELECT key instead of the TEST key.

2404B

NOTE:

- If you change the program number, the X-scale or the Y-scale, the movement amount which has been stored will be reset. However, if memory switch No. 465 is set to “3”, the movement amount will remain stored and not be reset.
- When the power switch is turned off, the movement amount which has been stored will be reset. However, if memory switch No. 465 is set to “2” or “3”, the movement amount will remain stored and will not be reset.
- If memory switch No. 465 is set to “3”, the movement amount can be set for each program using parameters.
  The “Movement amount setting” parameter selection comes in between “Sewing speed” and “Counter”.

5. USING SD CARD

5-1. Notes on handling SD cards (commercially available)

- Use an SD card or a multimedia card with a capacity of 2GB or less.
- Do not disassemble or alter SD cards.
- Do not bend, drop, scratch or place heavy objects on top of the SD cards.
- Do not allow the SD cards to become wet, such as with water, oil, solvents, drinks or any other liquids.
- Do not use or store the SD cards in a locations exposed to strong static electricity or electrical interference.
- Do not use or store the SD cards in a locations exposed to vibrations or impacts, direct sunlight, extreme dust (or lint), high temperatures, high humidity, severe temperature fluctuations, or strong magnetic forces (such as from speakers).
- Do not subject the SD cards to vibration or shocks or remove them from the sewing machine while data reading or writing is in progress.
- Data on the SD cards may be lost or damaged due to some malfunction or accident. We recommend backing up important data.
- The SD cards that you purchased is already formatted. We recommend that the SD cards not be reformatted.
- The recommended SD cards are those sold by SanDisk and Panasonic. Cards from other manufacturers may use different formatting methods and may not work correctly as a result.

For additional information, refer to the instruction manual included with the SD cards that you have purchased.

* This product is compatible with SD cards that have been formatted using the FAT16/32 method. Cards that have been formatted using other formatting methods cannot be used.

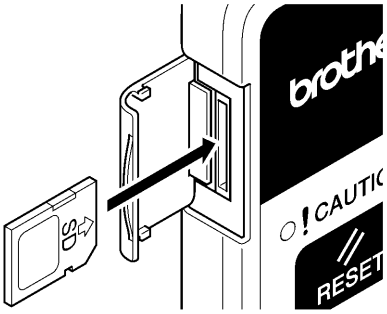
* All other company and product names mentioned in this instruction manual are trademarks or registered trademarks of their respective companies. However, the explanations for markings such as TM are not clearly described within the text.

5-2. Structure of an SD card folder

Data type	Folder name	File name
Control program	¥BROTHER¥ISM¥ISMSYS¥	ISM19MN.BVP (Main control program) ISM19MT.BVP (Motor control program) ISM19PL.BVP (Panel control program)
Sewing data	¥BROTHER¥ISM¥ISMDB**¥ * '**' represents the sewing machine ID cord. (memory switch No.752) If you would like to keep additional sewing data for different sewing machines on a single SD card, change the folder name.	ISMS0***.sew * '***' represents the sewing data number.
Memory switch	Same as above	ISMMSW.SEW
Parameter	Same as above	ISMUPG.SEW
Cycle program	Same as above	ISMCYC.SEW
Error log	¥BROTHER¥ISM¥ISMLDT¥	Stores the files which relate to error logs.

5-3. Preparation for reading and writing data

1



2650B

Insert the SD card into the SD slot.

NOTE:

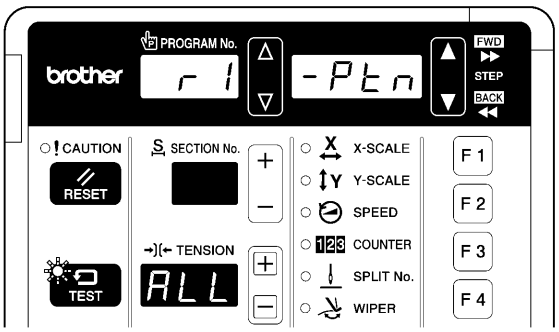
- Make sure the SD card is facing the correct way.
- The cover should be closed at all times except when the SD card is inserted and removed, otherwise dust may cause trouble.

2

Turn on the power switch.

3

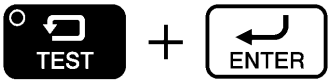
Switching to SD data read/write mode



TEST indicator flashes

3207B

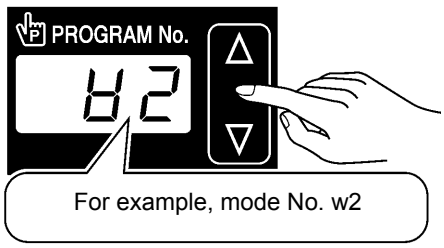
While pressing the TEST key, press the ENTER key.



2652B

- " sd" will appear in the PROGRAM No. display and "read" will appear in the menu display while the SD card is being read.
- Once reading of the SD card is complete, the mode number will appear in the PROGRAM No. display and the setting for that mode number will appear in the menu display.
- The initial mode is additional sewing data reading mode. (Refer to "Read/write mode list" below.)

4



For example, mode No. w2

2653B

Press the △ or ▽ key to select the mode.

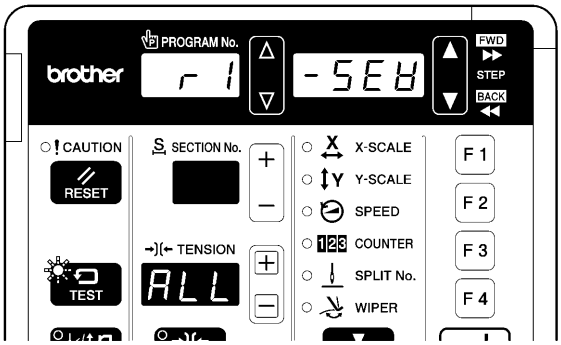
[Read/write mode list]

PROGRAM No. display	Menu display	Setting items
r 1	[-Sew]	Additional sewing data is read from the SD card. *1
w 2	[Sew-]	Additional sewing data is written to the SD card.
r 3	[-MEM]	Memory switch settings are read from the SD card.
w 4	[MEM-]	Memory switch settings are written to the SD card.
r 5	[-PrG]	Reads sewing program data and cycle program data from the SD card.
w 6	[PrG-]	Writes sewing program data and cycle program data to the SD card.
r 7	[-ALL]	Reads all sewing machine data (sewing program data, cycle program data, memory switch settings and additional sewing data) from the SD card.
w 8	[ALL-]	Writes all sewing machine data (sewing program data, cycle program data, memory switch settings and additional sewing data) to the SD card.
w 9	[LoG-]	Error log data is written to the SD card.

*1: The additional sewing data that can be used with this sewing machine is data which has been created for the BAS-311H.

5-4. [r 1] Reading additional sewing data

1

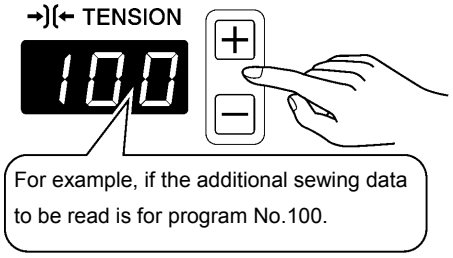


3098B

Select the " r 1" SD data read/write mode.

- The number of the additional sewing data in the SD memory card folder will appear in the tension display. (The initial value displayed is "ALL".)

2

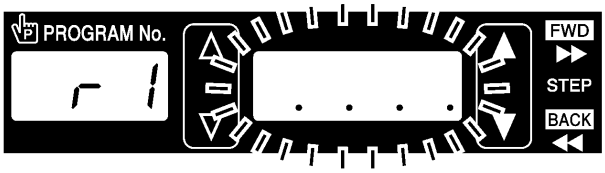


3099B

Press the [+] or [−] key to select the number for the additional sewing data that you would like to be read (ALL, 100 to 999).

- When "ALL" is displayed, all of the additional sewing data will be read at once.
- Only the data in the SD card folder corresponding to the additional sewing data number will be displayed. (If there is not a single item of data in the folder, "---" will be displayed.)

3



While reading

The number for the additional sewing data number which is currently being read will appear in the tension value display.

2657B 3100B

Press the ENTER key.

2414B

- The buzzer will sound and the selected additional sewing data will be read from the SD card and copied into the sewing machine's internal memory.
- If no additional sewing data exists, an error buzzer will sound.

4

3101B

When the display returns to the status in step 1, reading of the additional sewing data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

5

Exit read/write mode

TEST indicator switches off

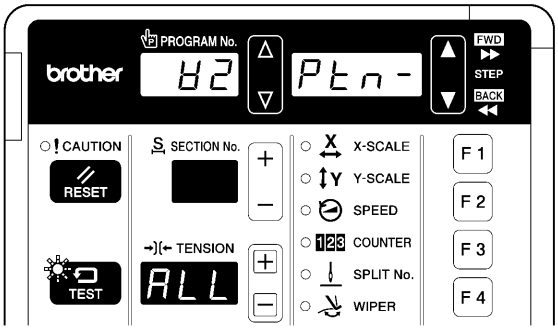
2404B

Press the TEST key.

* Contact the place of purchase for information on other reading and writing modes.

5-5. [w 2] Writing additional sewing data to an SD card

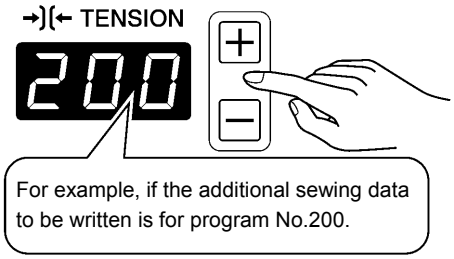
1 **Select the " w 2" SD data read/write mode.**



3208B

- The numbers for the additional sewing data in the sewing machine memory will appear in the tension display.
  (The initial value displayed is "ALL".)

2

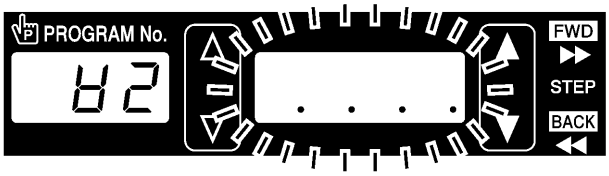


2656B

Press the [+] or [−] key to select the number for the additional sewing data that you would like to write (ALL, 001 to 999).

- When "ALL" is displayed, all of the additional sewing data will be read at once.
- The additional sewing data numbers displayed will only be those that are in the sewing machine memory. (If there is no data in the memory, "ALL" will be the only thing displayed.)

3



While writing

Additional sewing data number being written appears in the tension display.

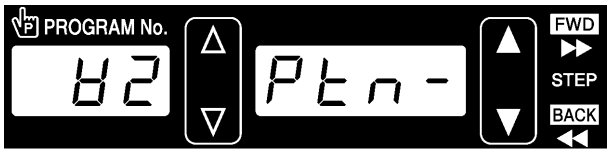
2660B 2658B

Press the ENTER key.

2414B

- The buzzer will sound and the selected sewing data will be written to the SD card.
- If no additional sewing data exists, an error buzzer will sound.

4



2659B

When the display returns to the status in step 1, writing of the additional sewing data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

5 **Exit read/write mode**

TEST indicator switches off

2404B

Press the TEST key.

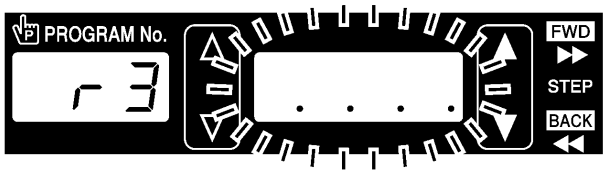
5-6. [r 3] Reading memory switch data

1

2661B

Select the " r3" SD data read/write mode.

2



While reading

"MEM" appears in the tension display.

2662B 2663B

Press the ENTER key.

2414B

- The buzzer will sound and the memory switch data will be read from the SD card and stored in the sewing machine memory, and the memory switch settings will then be applied.
- If no memory switch data exists, an error buzzer will sound.

3

2661B

When the display returns to the status in step 1, reading of the memory switch data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

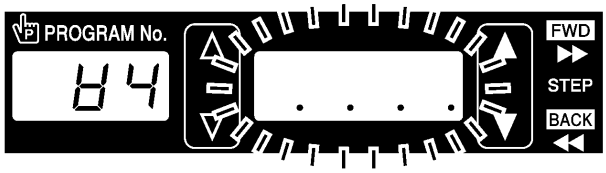
Exit read/write mode

TEST indicator switches off

2404B

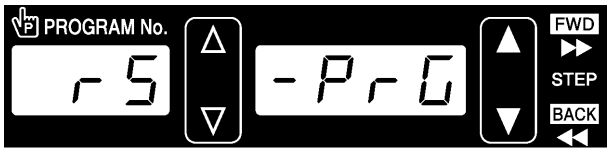
Press the TEST key.

5-7. [w 4] Writing memory switch data to the SD card

1	 2664B	Select the “ w4” SD data read/write mode.
2	 While writing →)(← TENSION  “MEM” appears in the tension display. 2902B 2663B	Press the ENTER key.  2414B ・ The buzzer will sound and the memory switch data will be copied to the SD card.
3	 2664B	When the display returns to the status in step 1, writing of the memory switch data is complete. ・ If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.
4	**Exit read/write mode**  TEST indicator switches off 2404B	Press the TEST key.

5-8. [r 5] Reading program data

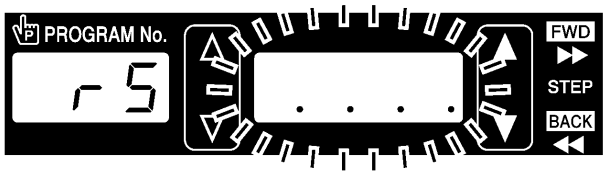
1



2665B

Select the " r5" SD data read/write mode.

2



While reading

→)(← TENSION

"PrG" appears in the tension display.

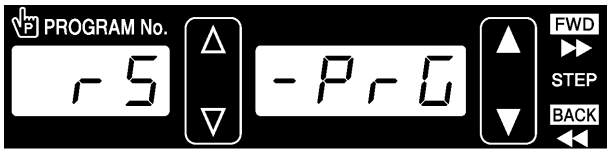
2903B 2668B

Press the ENTER key.

2414B

- The buzzer will sound and the sewing program data and cycle program data will be read from the SD card and stored in the sewing machine's memory, and the sewing programs and cycle programs will then be set.
- If no sewing program data or cycle program data exists, an error buzzer will sound.

3



2665B

When the display returns to the status in step 1, reading of the program data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

Exit read/write mode

TEST indicator switches off

2404B

Press the TEST key.

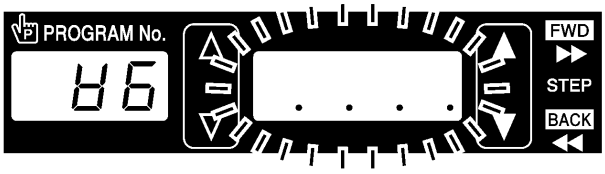
5-9. [w 6] Writing program data to an SD card

1

2666B

Select the “ w6” SD data read/write mode.

2



While writing

→)(← TENSION

“PrG” appears in the tension display.

2667B 2668B

Press the ENTER key.

2414B

- The buzzer will sound and the memory switch data will be copied to the SD card.

3

2666B

When the display returns to the status in step 1, writing of the program data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

Exit read/write mode

TEST indicator switches off

2404B

Press the TEST key.

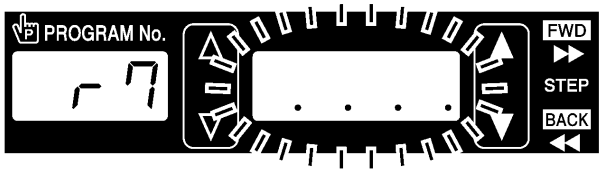
5-10. [r 7] Reading sewing machine data

1

2669B

Select the " r7" SD data read/write mode.

2



While reading

"MEM" appears in the tension display while memory switch settings are being read, the sewing data number appears while additional sewing data is being read, and "PrG" appears while program data is being read.

2670B 2663B

Press the ENTER key.

2414B

- The buzzer will sound and the sewing program data, cycle program data, memory switch settings and additional sewing data will be read from the SD memory card and stored in the sewing machine's memory, and the sewing programs, cycle programs and memory switch settings will be applied.
- If no sewing program data or cycle program data exists, an error buzzer will sound.

3

2669B

When the display returns to the status in step 1, reading of the program data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

Exit read/write mode

TEST indicator switches off

2404B

Press the TEST key.

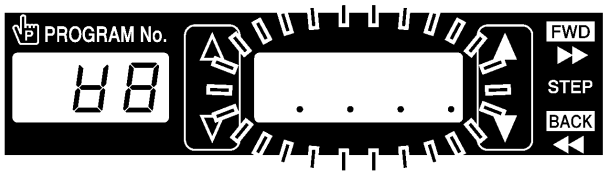
5-11. [w 8] Writing sewing machine data to an SD card

1

2671B

Select the “ w8” SD data read/write mode.

2



While writing

→)(← TENSION

“MEM” appears in the tension display while memory switch settings are being written, the sewing number appears while additional sewing data is being written, and “PrG” appears while program data is being written.

2672B 2663B

Press the ENTER key.

2414B

- The buzzer will sound and the sewing program data, cycle program data, memory switch settings and additional sewing data will be copied to the SD card.

3

2671B

When the display returns to the status in step 1, writing of the sewing machine data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

Exit read/write mode

TEST indicator switches off

2404B

Press the TEST key

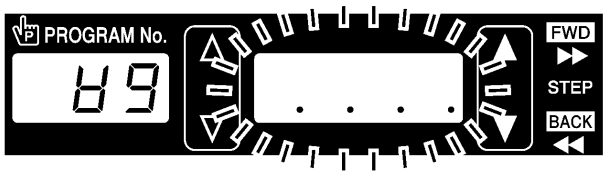
5-12. [w 9] Writing error log data and memory switch log data to an SD card

1

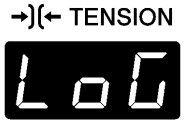
2673B

Select the “w9” SD data read/write mode.

2



While writing



“LoG” appears in the tension display while log data is being written.

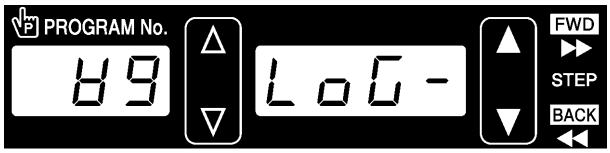
2674B 2675B

Press the ENTER key.

2414B

- The buzzer will sound and the error log data and memory switch log data will be copied to the SD card.

3



2673B

When the display returns to the status in step 1, writing of the log data is complete.

- If you would like to use any other read/write modes, press the △ or ▽ key to select the mode and then run it.

4

Exit read/write mode

TEST indicator switches off

2404B

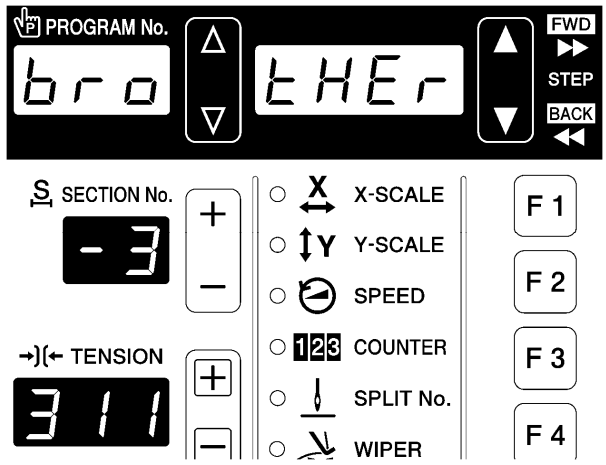
Press the TEST key

5-13. Updating the control program version

1 Place the control program that you would like to update into the folder of the SD card as specified in “5-2”.

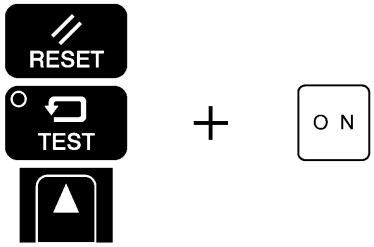
2 With the power switch turned off, insert the SD card into the SD card slot.

3



3226B

While holding down the RESET, TEST and ▲ keys, turn on the power switch.



3209B

The same “bro”, “ther”, “-3” (may vary depending on specifications) and “311” as appear in the PROGRAM No. display, menu display, section No. display and tension display will appear. Keep holding down the keys until you hear a beep.

4

2678B

“1.Mn” will appear in the PROGRAM No. display and “*.*.**” (control program version stored on the SD card) will appear in the menu display.

5

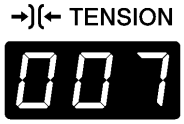
3227B

Press the △ or ▽ key to select the program to be updated.

Control program	PROGRAM No. display	Menu display
Mian	[1.Mn]	[*.*.**]
Motor	[2.Mt]	[*.**]
Panel	[3.PL]	[*.**]

- If there is no program to be updated which is stored on the SD card, “----” (“---”) will appear in the menu display.

6



“WAIT” will appear in the menu display and the value in the tension display will increment while the program version is being updated.

2680B 2681B

Press the ENTER key.

2414B

- The buzzer will sound and updating of the program version will start.
- When “End” appears in the menu display, updating is complete.
- To continue updating another program, return to step 5 and select the next program to be updated.

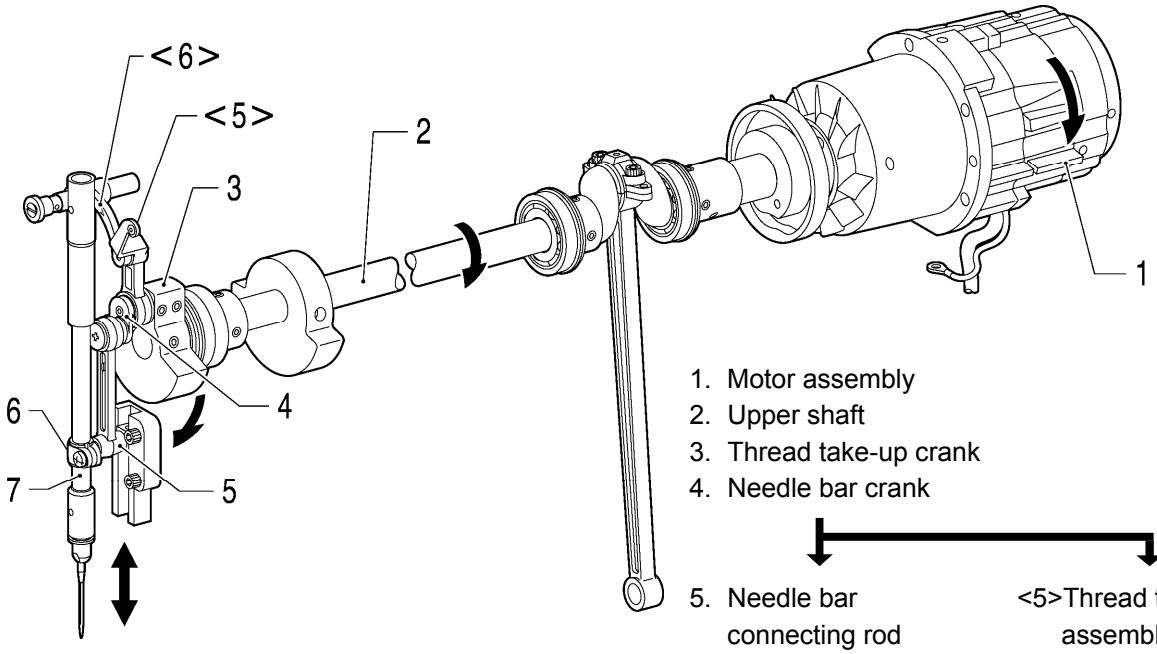
7 Turn off the power switch.

6. MECHANICAL DESCRIPTIONS

The mechanisms operate in the order of the given in the illustrations.

* <number> indicates the flow of each operations given.

6-1. Needle bar and thread take-up mechanisms

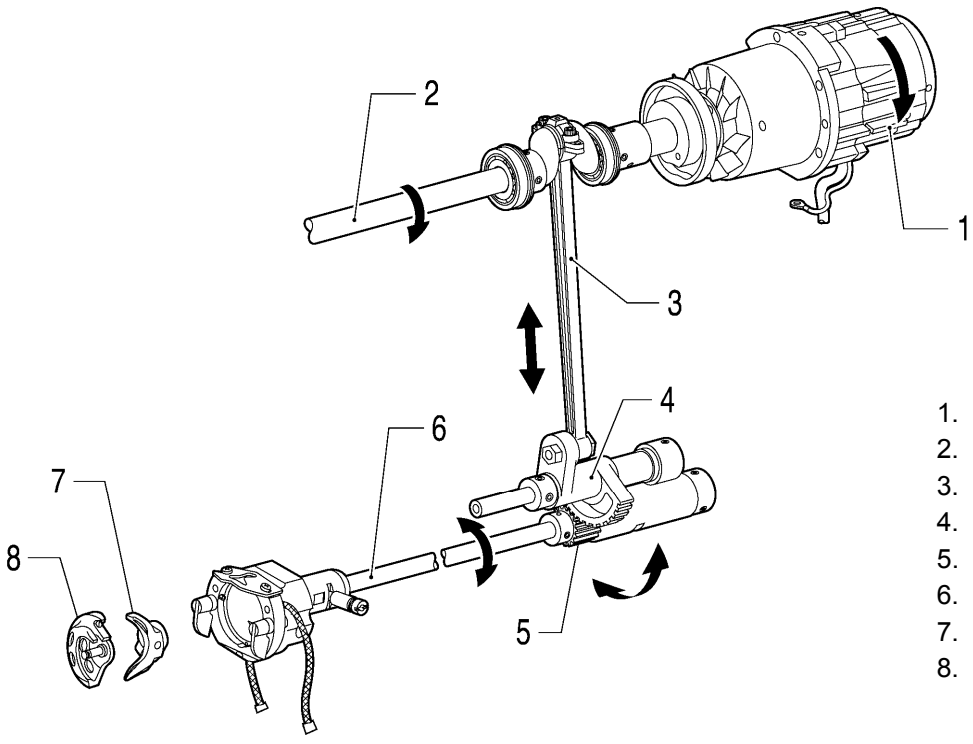


3246B

1. Motor assembly
2. Upper shaft
3. Thread take-up crank
4. Needle bar crank
5. Needle bar connecting rod
6. Needle bar clamp
7. Needle bar

<5>Thread take-up lever assembly
<6>Thread take-up support

6-2. Lower shaft and shuttle race mechanisms

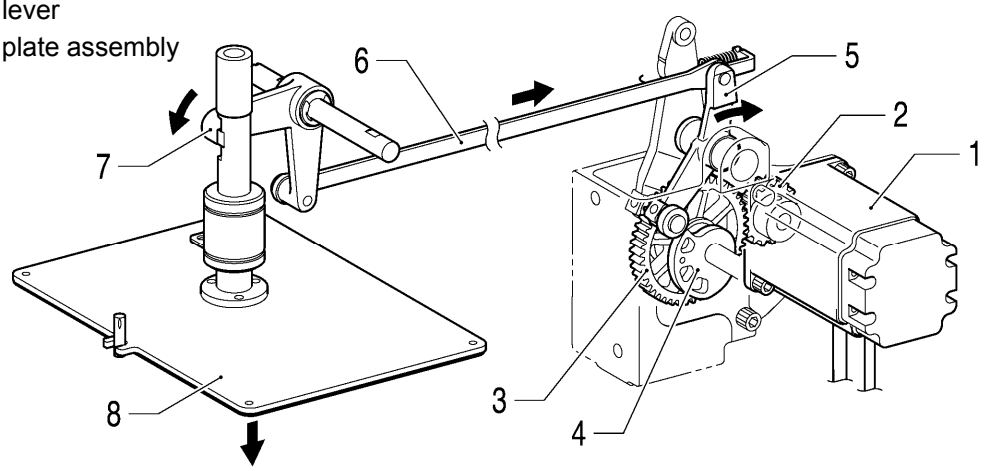


3247B

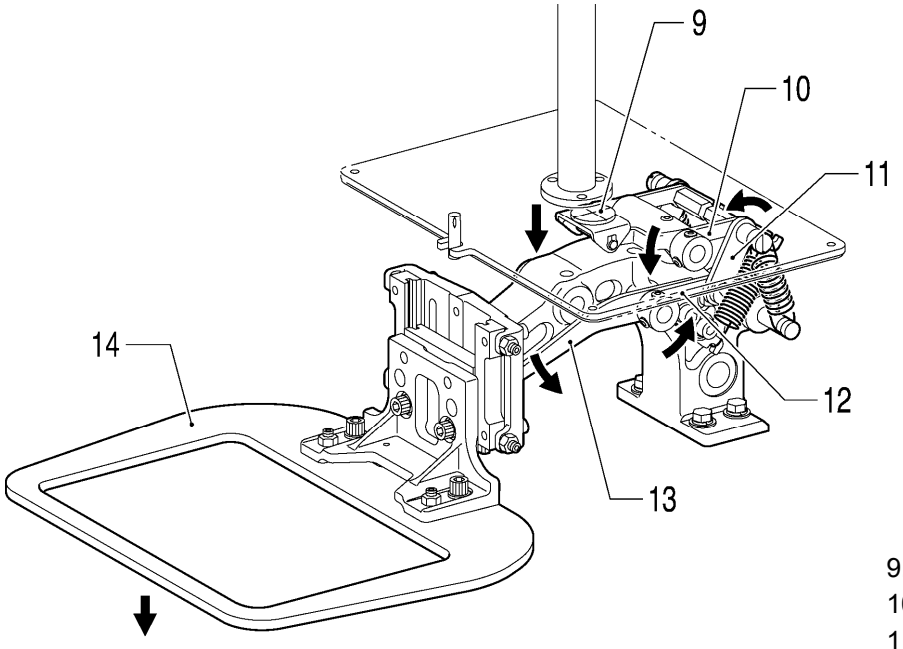
1. Motor assembly
2. Upper shaft
3. Crank rod assembly
4. Rock gear
5. Lower gear
6. Lower shaft
7. Driver
8. Shuttle hook

6-3. Work clamp lifter mechanism (Motor-driven work clamp specifications)

1. Work clamp pulse motor
2. Work clamp driving gear
3. Work clamp cam gear
4. Work clamp cam
5. Work clamp driving lever
6. Work clamp lifter link
7. Work clamp lifter lever
8. Work clamp lifter plate assembly



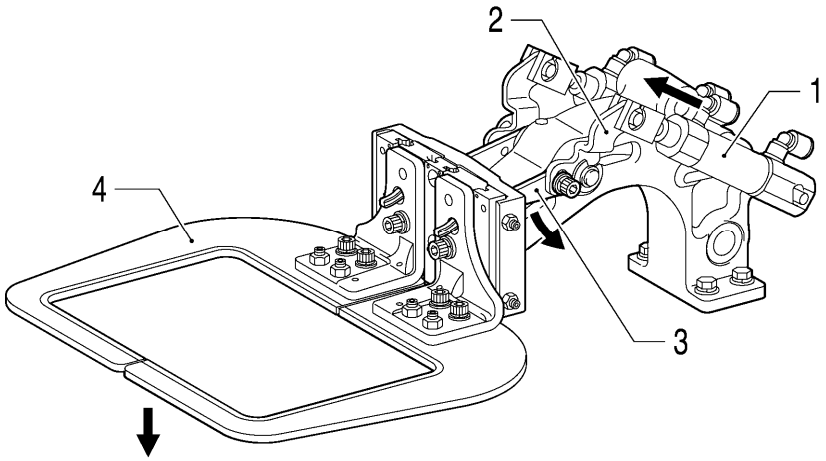
3248B



3249B

9. Slider
10. Work clamp lifter lever
11. Connecting rod
12. Connecting link
13. Work clamp lifter lever
14. Work clamp

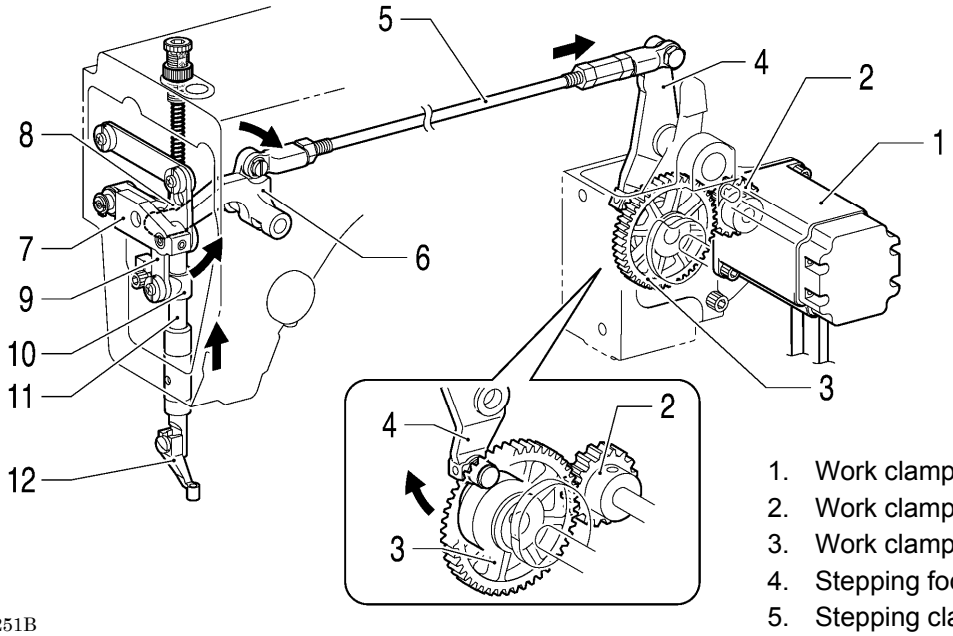
6-4. Work clamp lifter mechanism (Pneumatic work clamp specifications)



3250B

1. Air cylinder
2. Work clamp lifter lever
3. Work clamp arm lever
4. Work clamp plate

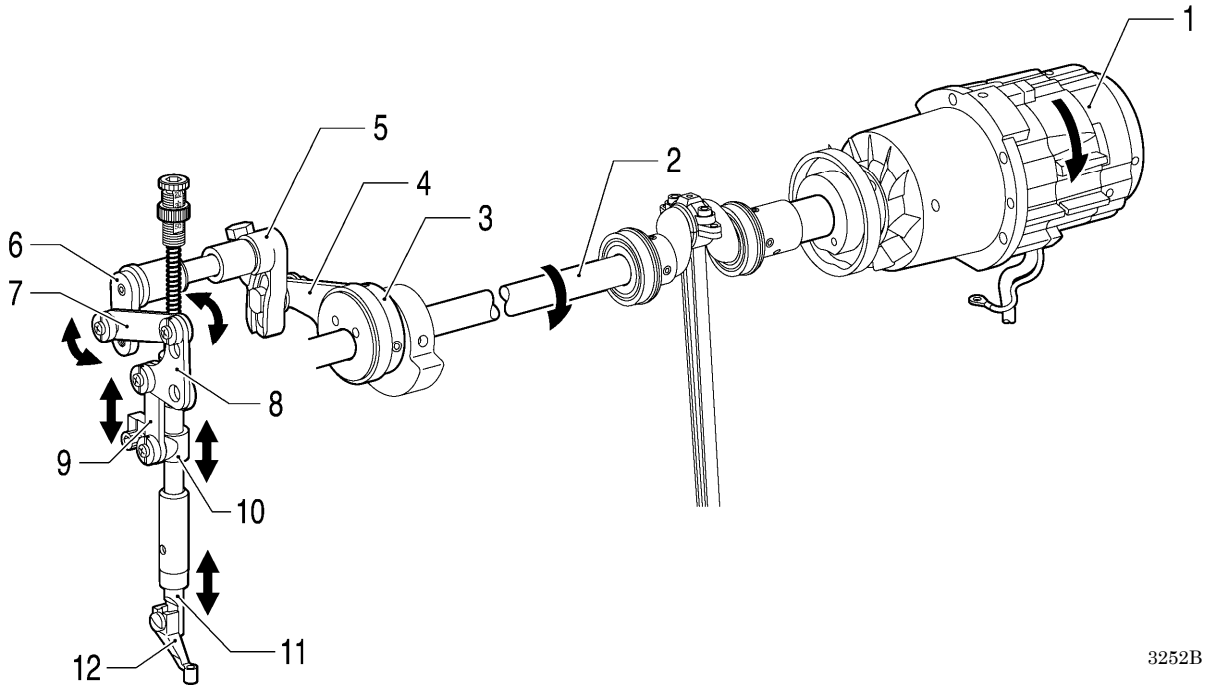
6-5. Intermittent presser foot lifter mechanism



3251B

1. Work clamp pulse motor
2. Work clamp driving gear
3. Work clamp cam gear
4. Stepping foot driving lever
5. Stepping clamp lifter rod
6. Stepping clamp lifter
7. Stepping clamp lifter link
8. Stepping clamp link
9. Stepping clamp connecting rod B
10. Presser bar clamp
11. Presser bar
12. Presser foot

6-6. Intermittent presser foot stroke mechanism

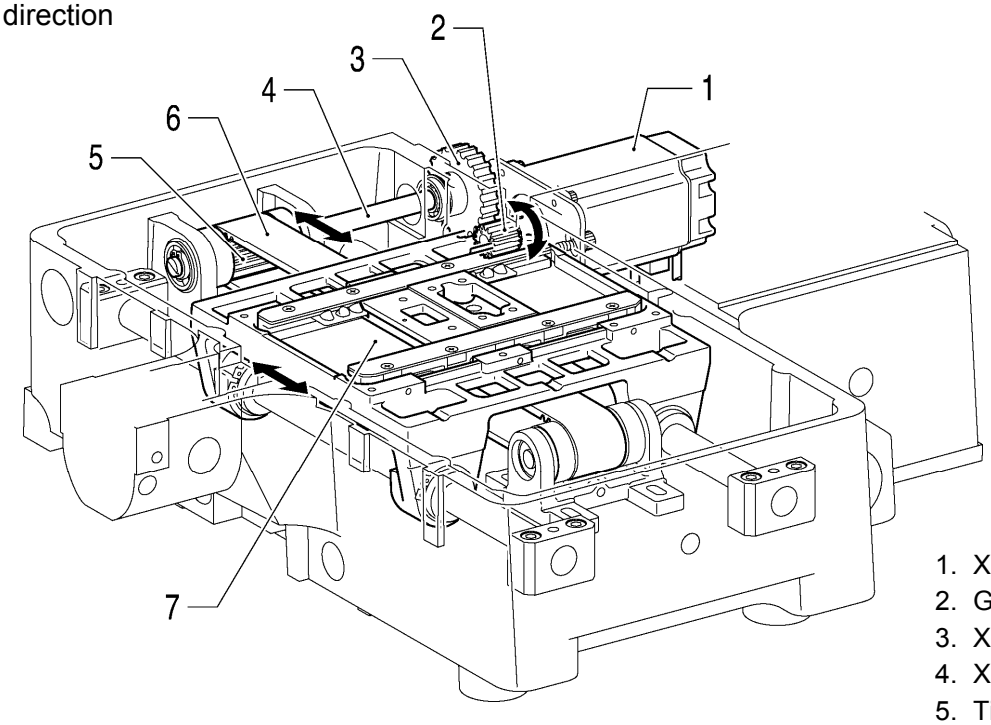


1. Motor assembly
2. Upper shaft
3. Stepping clamp cam
4. Stepping clamp connecting rod
5. Stepping clamp arm R
6. Stepping clamp arm F
7. Stepping clamp connecting rod A
8. Stepping clamp link
9. Stepping clamp connecting rod B
10. Presser bar clamp
11. Presser bar
12. Presser foot

6-7. Feed mechanism

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

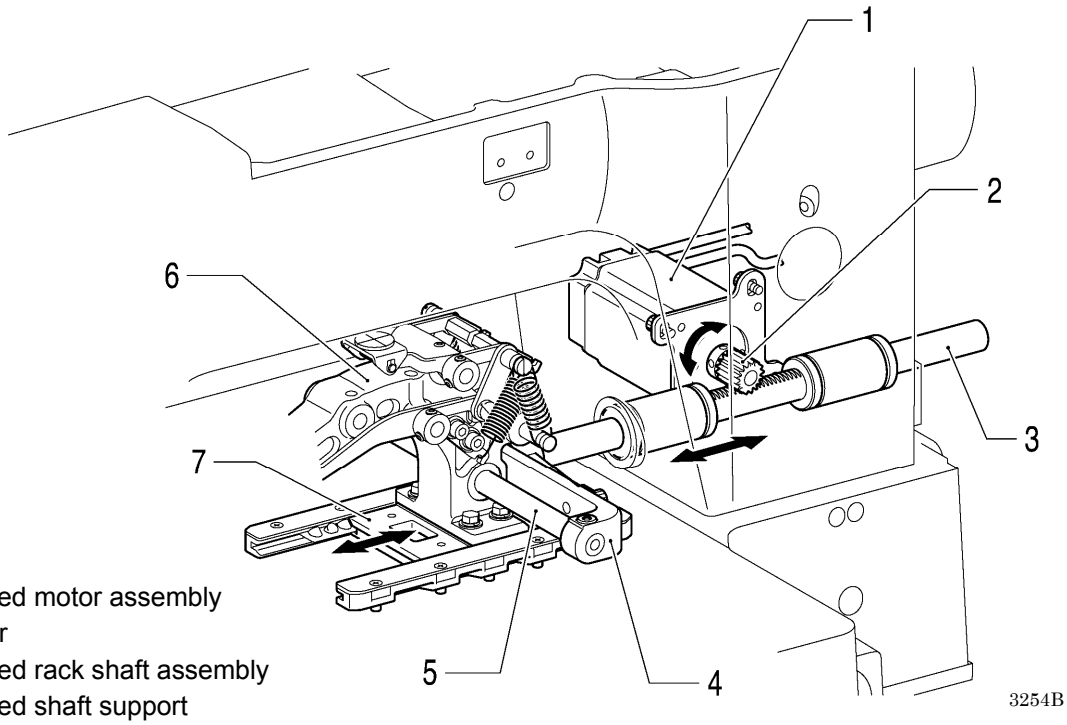
X direction



3253B

1. X-feed motor assembly
2. Gear
3. X-feed gear
4. X-pulley driving shaft
5. Timing pulley
6. Timing belt
7. X-feed bracket assembly

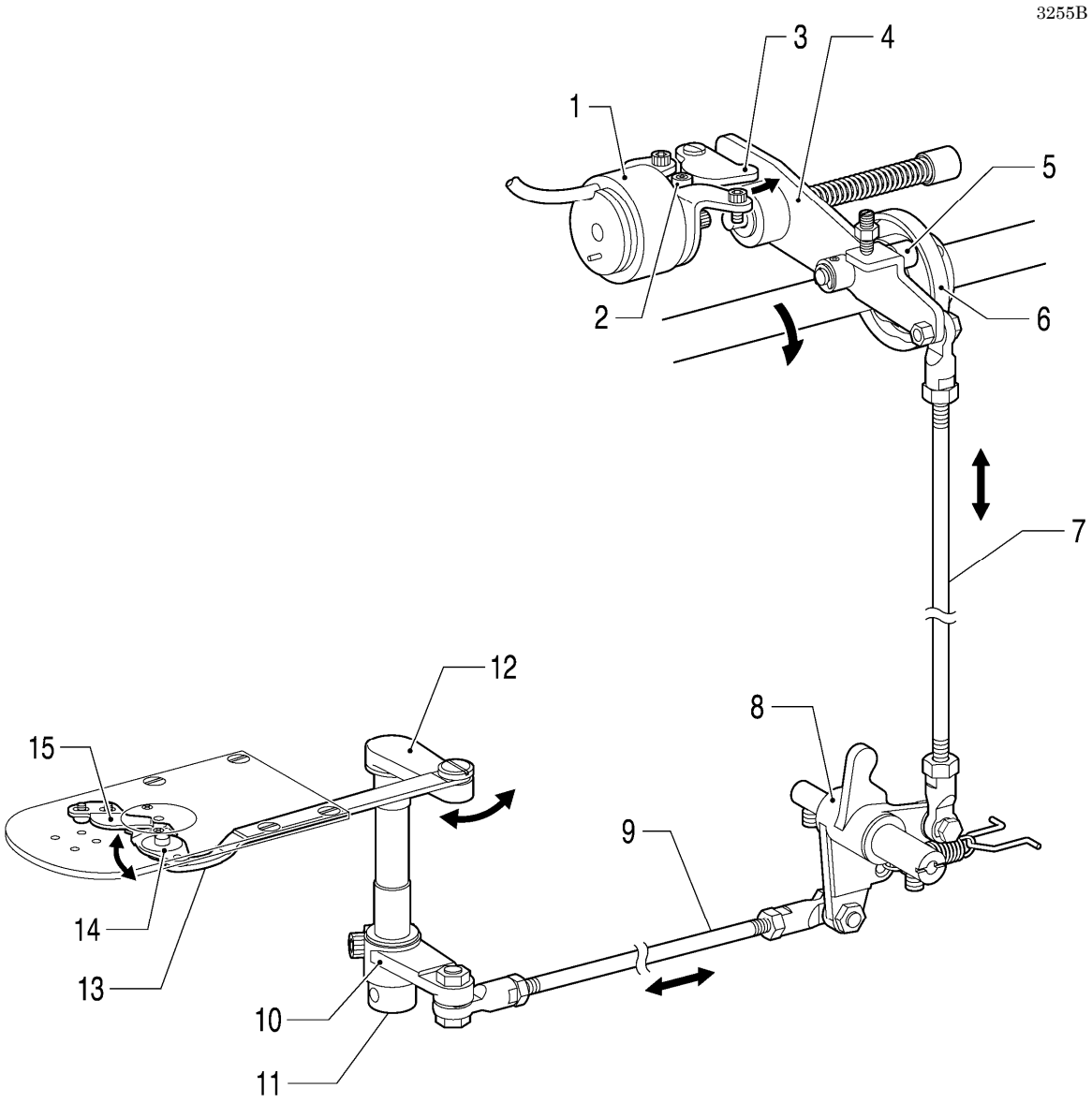
Y direction



3254B

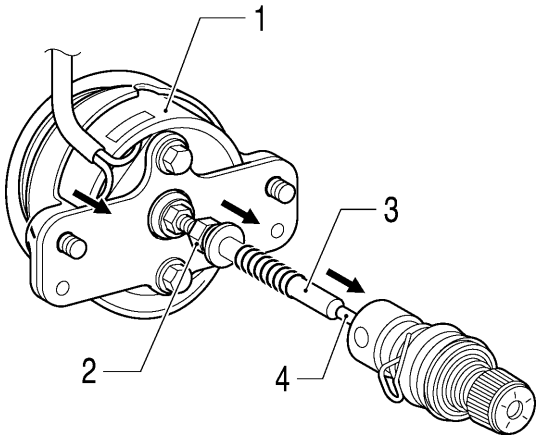
1. Y-feed motor assembly
2. Gear
3. Y-feed rack shaft assembly
4. X-feed shaft support
5. X-feed shaft
6. Work clamp arm assembly
7. Y-feed bracket

6-8. Thread trimmer mechanism



1. Thread trimmer solenoid
2. Solenoid lever
3. Pushing lever
4. Driving lever
5. Thread trimmer collar
6. Thread trimmer cam
7. Thread trimmer rod V
8. Thread trimmer lever
9. Thread trimmer rod H
10. Movable knife lever
11. Set screw collar
12. Movable knife lever shaft
13. Movable knife connecting plate
14. Movable knife
15. Fixed knife

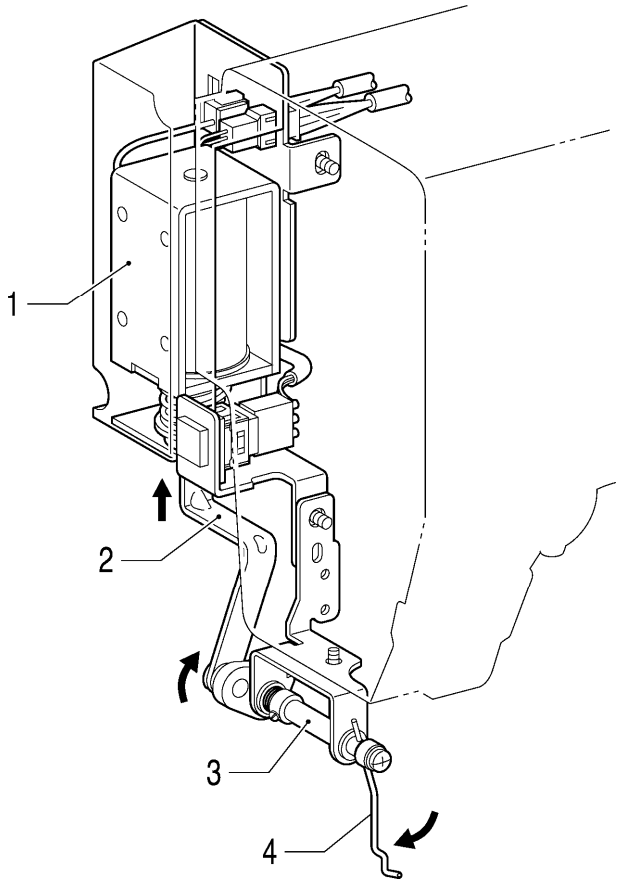
6-9. Tension release mechanism



3320B

1. Tension release solenoid
2. Bolt
3. Tension release bar
4. Tension release pin

6-10. Thread wiper mechanism



3345B

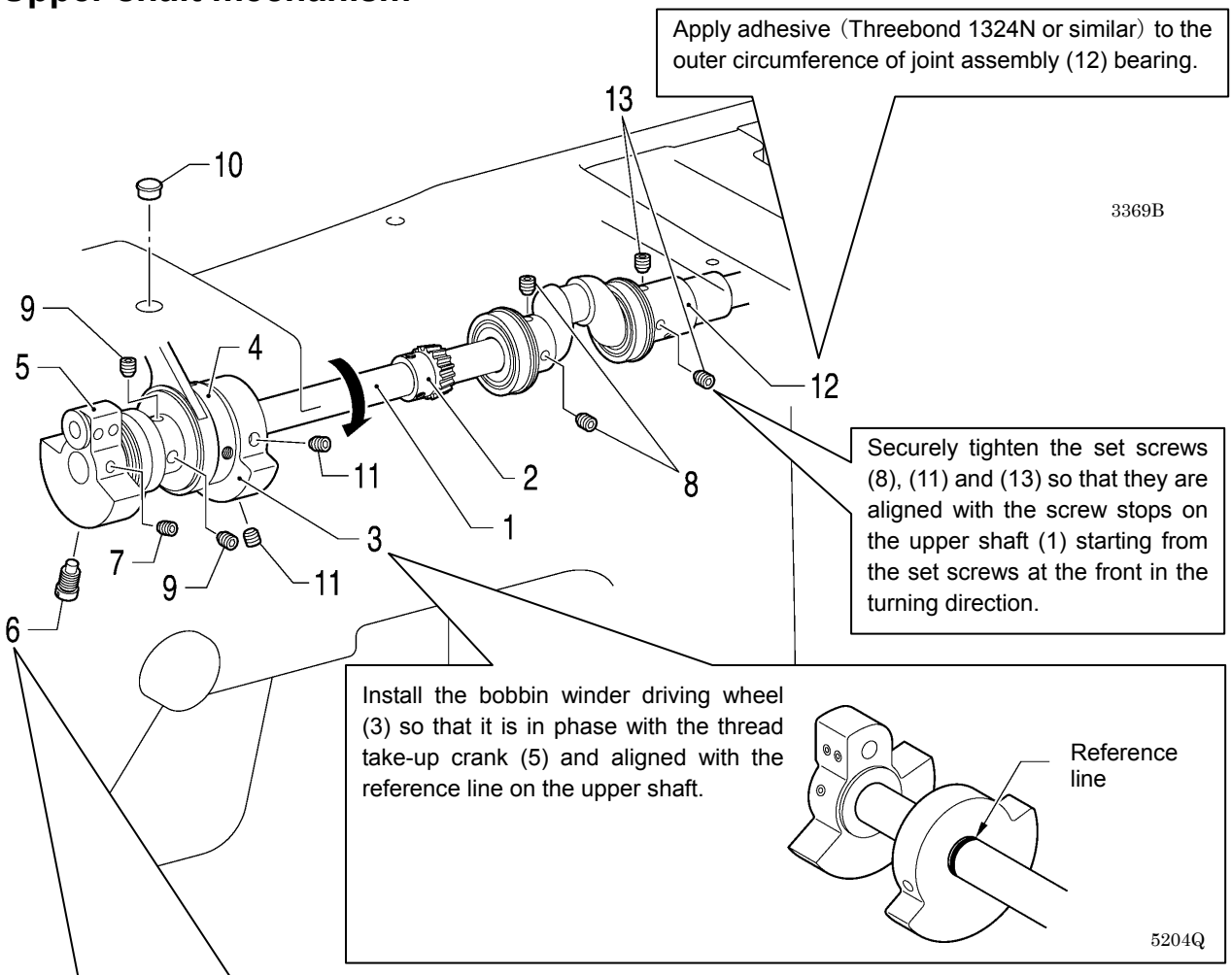
1. Thread wiper solenoid assembly
2. Thread wiper rod
3. Thread wiper crank assembly
4. Wiper

7. ASSEMBLY

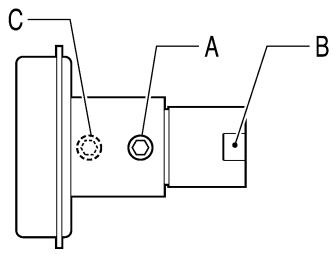
Assemble each part order of the numbers.

* (number) indicates part names only. (They do not indicate the order of assembly.)
Apply greases to the required places when reassembling the parts and once every two years.

7-1. Upper shaft mechanism

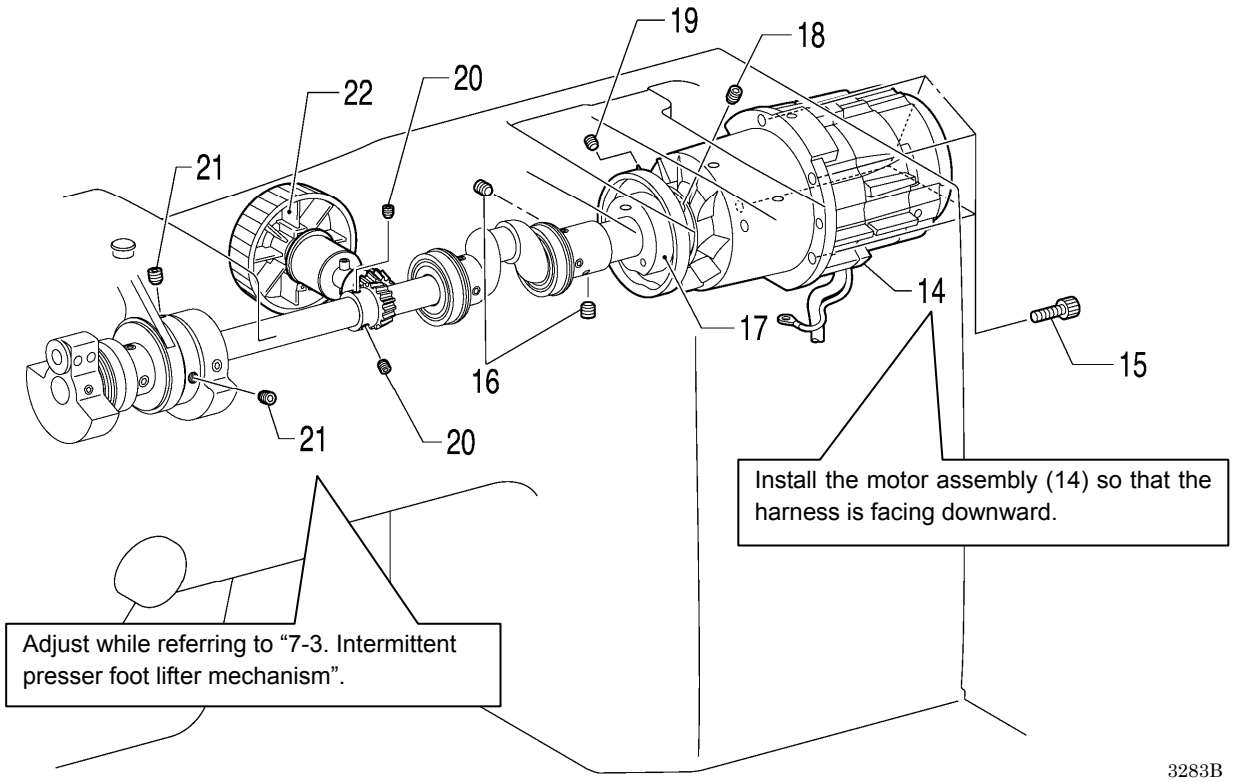


1. Upper shaft
2. Pulley gear R
3. Bobbin winder driving wheel
4. Stepping clamp cam assembly
5. Thread take-up crank
6. Screw
7. Set screw
8. Set screws [2 pcs.]
9. Set screws [2 pcs.]
10. Rubber cap
11. Set screws [2 pcs.]
12. Joint assembly
13. Set screws [2 pcs.]



Tighten the set screw so that the screw stop A on the motor shaft is in the same phase as the screw stop B on the thread trimmer cam.
Tighten the set screw so that the screw stop C on the upper shaft is at a phase of approximately 180 degrees from the screw stop A on the motor shaft.

4644Q

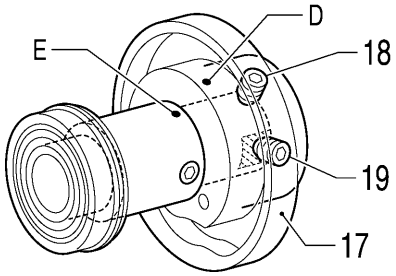


3283B

14. Motor assembly
15. Bolts [4 pcs.]
16. Set screws [2 pcs.]
17. Thread trimmer cam
18. Set screw
19. Set screw
20. Set screws [2 pcs.]
21. Set screws [2 pcs.] (Temporarily tighten)
22. Pulley assembly

1) Align the index mark D on the thread trimmer cam (17) and the index mark E on the joint assembly (12), and then provisionally tighten the set screw (18) at the index mark side.
2) After tightening the set screw (19) at the screw stop side, fully tighten the set screw (18) at the index mark side.
3) Carry out the adjustments in “8-10. Adjusting the thread trimmer cam position”.

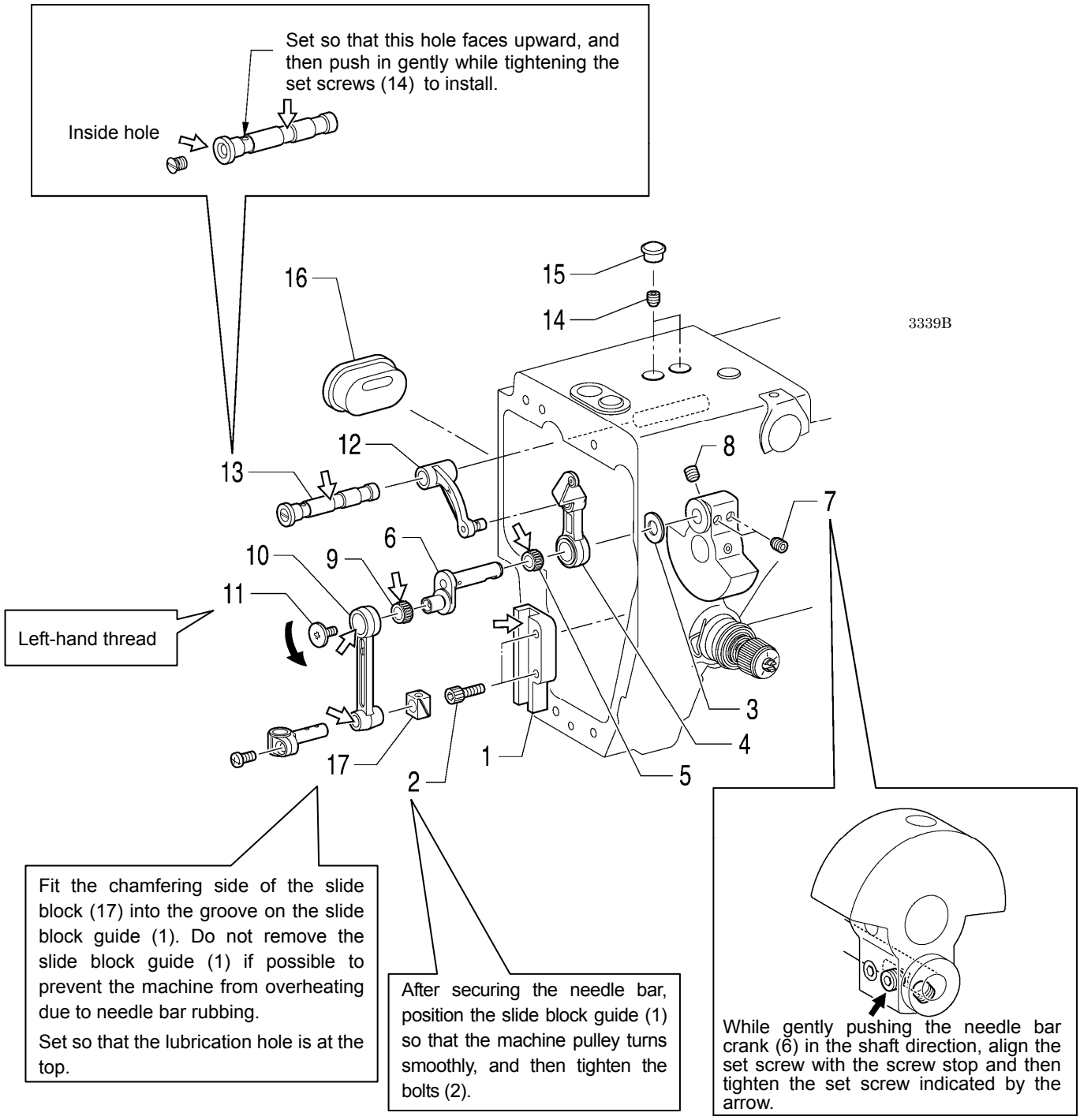
Apply the specified grease unit (SB1275-101) to the grooves.



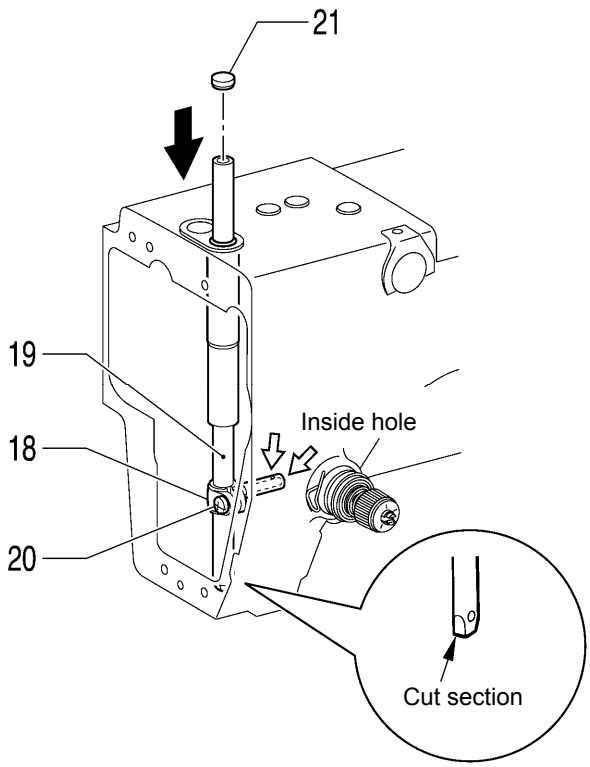
3284B

7-2. Needle bar mechanism

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.



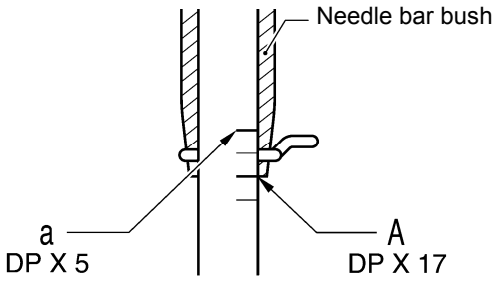
1. Slide block guide
2. Bolts [2 pcs.] (Temporarily tighten)
3. Washer
4. Thread take-up lever assembly
5. Needle bearing
6. Needle bar crank
7. Set screws [2 pcs.]
8. Set screw
9. Needle bearing
10. Needle bar connecting rod
11. Screw
12. Thread take-up support
13. Thread take-up support shaft assembly
14. Set screws [2 pcs.]
15. Rubber caps [2 pcs.]
16. Rubber cap
17. Slide block



3340B

18. Needle bar clamp
19. Needle bar (Insert from above)
20. Screw
21. Rubber cap

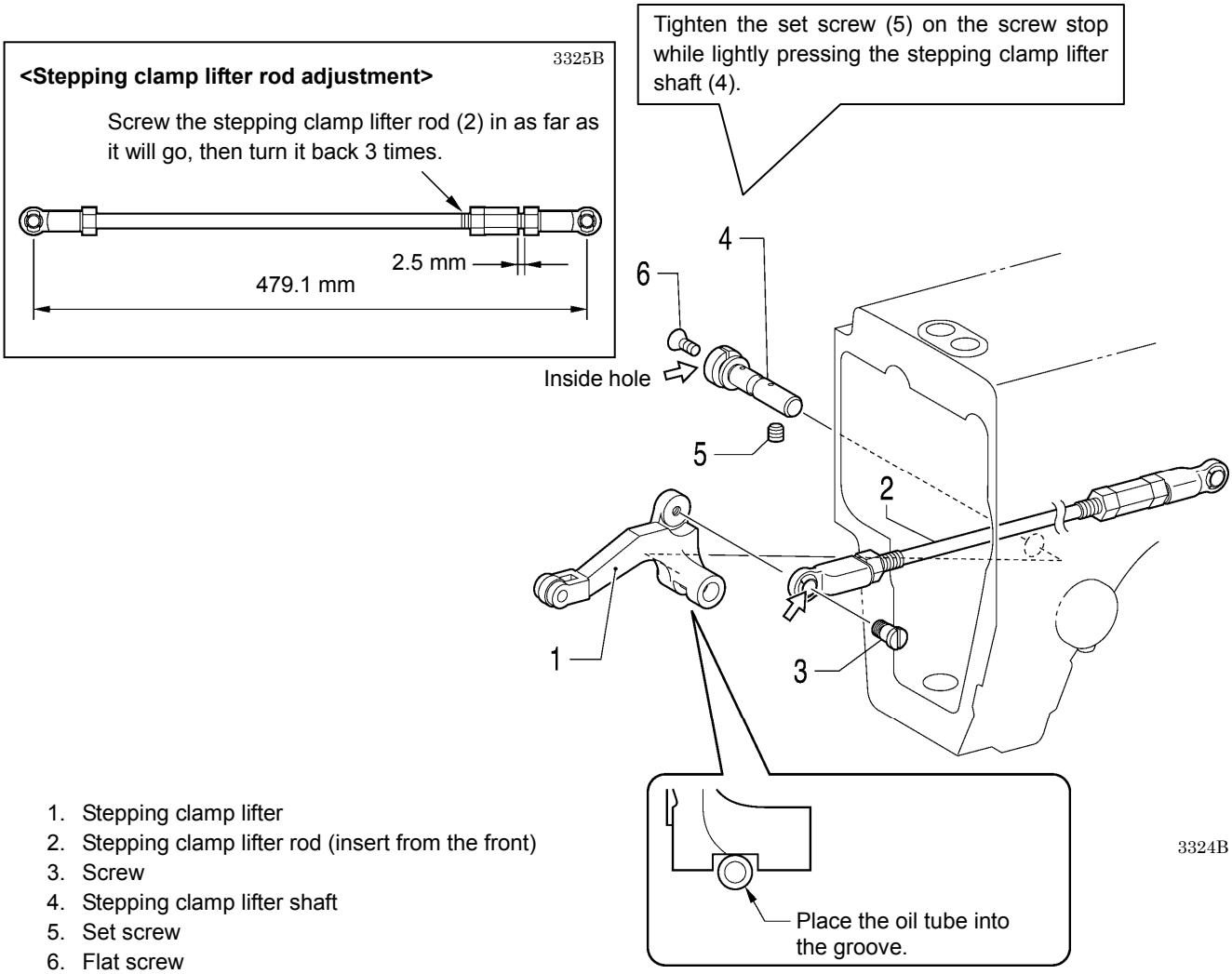
Align the needle bar (19) so that reference line A (the second lowest reference line on the needle bar (19)) or reference line a (top reference line) is aligned with the lower edge of the needle bar bush when the machine pulley is turned to raise the needle bar (19) from its lowest position, and then set the cut section so that it is facing forward and tighten the screw.



4647Q

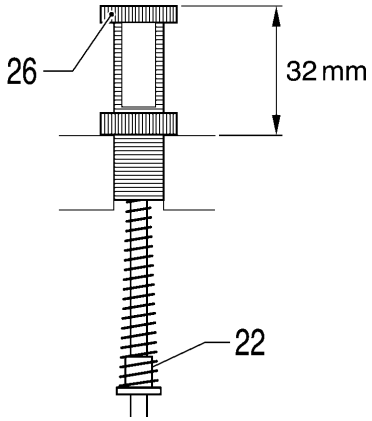
7-3. Intermittent presser foot lifter mechanism

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.



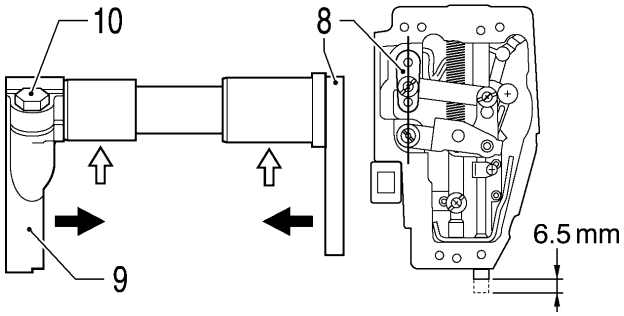
1. Stepping clamp lifter
2. Stepping clamp lifter rod (insert from the front)
3. Screw
4. Stepping clamp lifter shaft
5. Set screw
6. Flat screw

Install the presser bar spring collar (22) as shown in the illustration, and then adjust the height of the presser adjusting screw (26) to 32 mm.



3370B

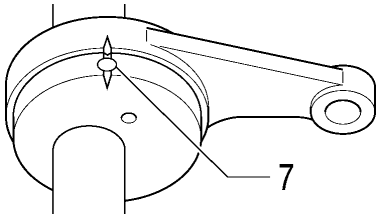
1) With the needle bar lowered approximately 6.5 mm from its highest position, set the stepping clamp arm F (8) to the position of the straight line in the illustration.
2) Place a bushing in between stepping clamp arm F (8) and stepping clamp arm R (9) so that there is no play, and then tighten the bolt (10).



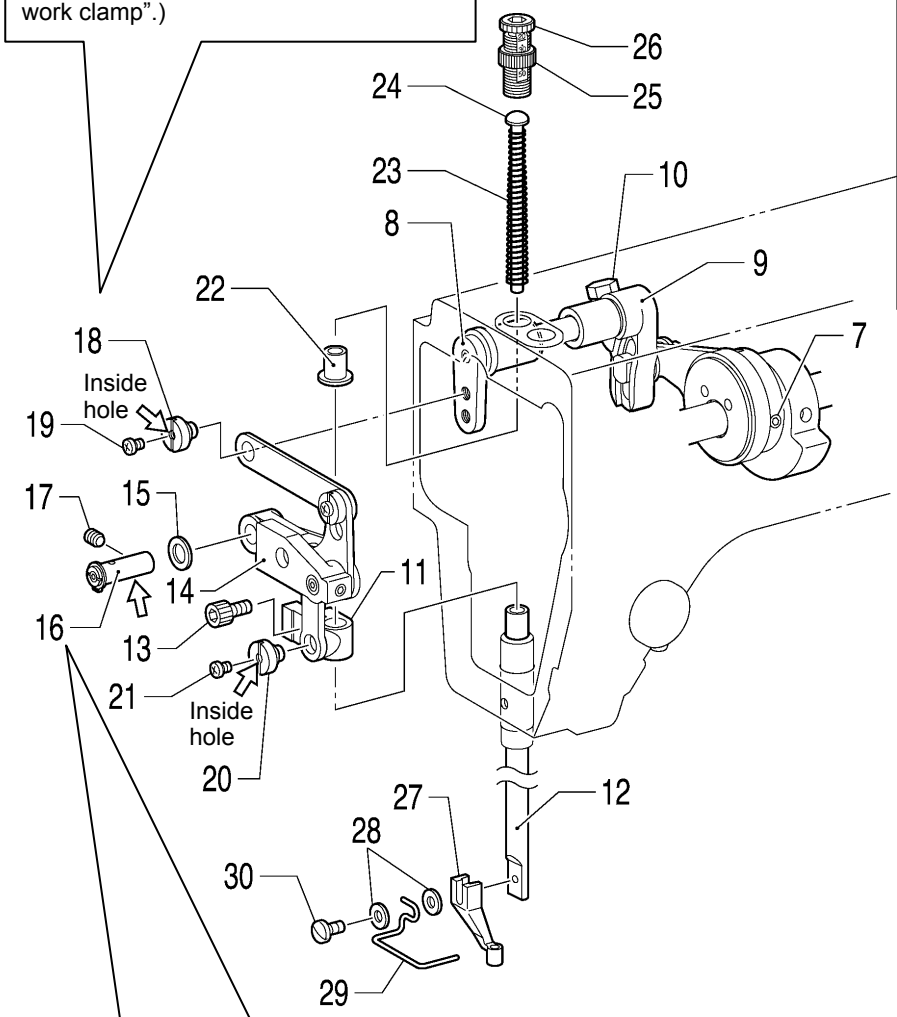
3371B

Notes on the installation position (Refer to “8-16. Adjusting the intermittent work clamp”.)

At the needle bar timing position, align the index marks of the stepping clamp cam and the stepping clamp connecting rod, and then tighten the set screws (7).



3372B



Tighten the set screw (17) on the screw stop while lightly pressing the link shaft (16).

3373B

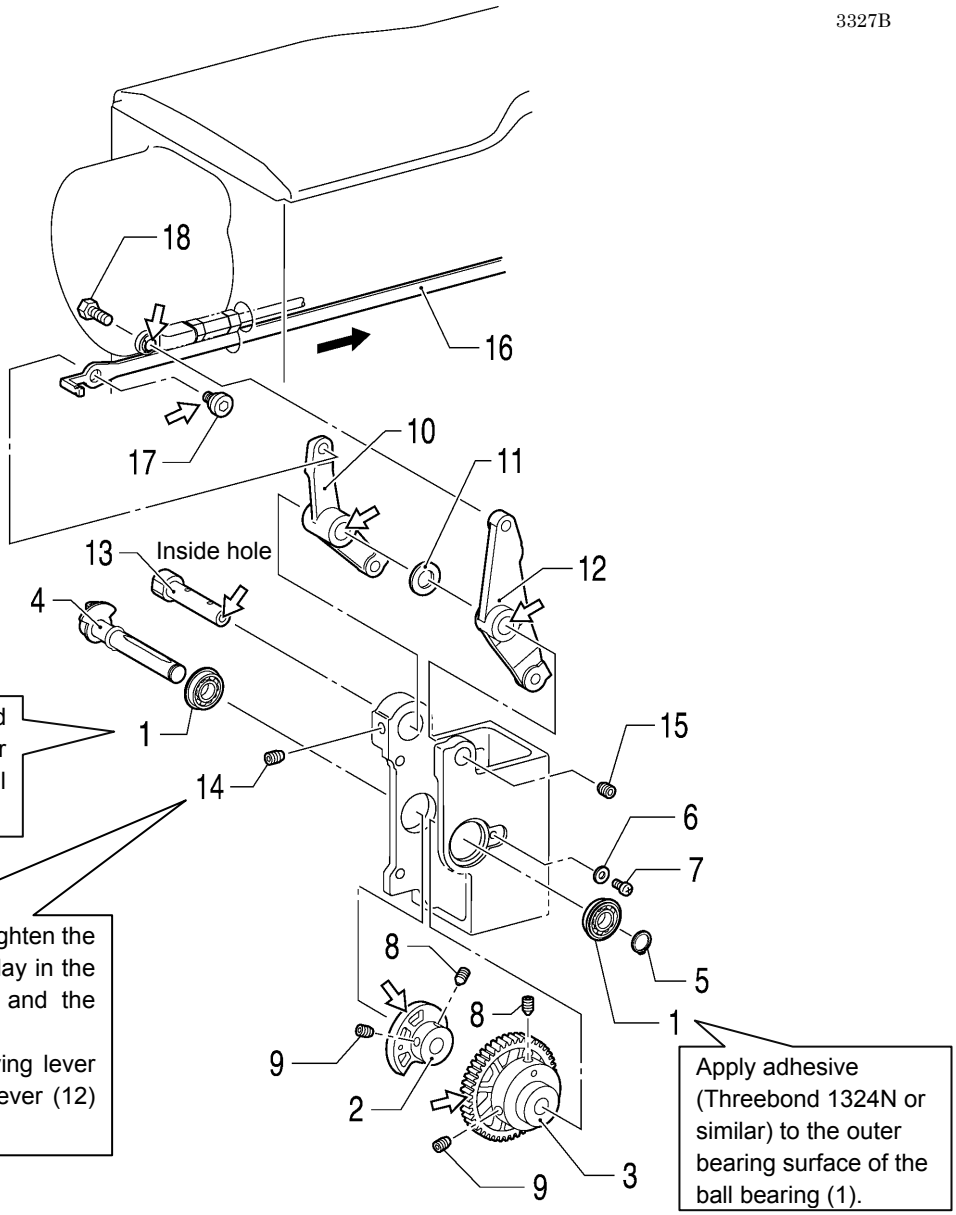
7. Set screws [2 pcs.]
8. Stepping clamp arm F
9. Stepping clamp arm R
10. Bolt
11. Presser bar clamp
12. Presser bar
13. Bolt (Temporarily tighten)
14. Stepping clamp lifter link
15. Washer
16. Link shaft (with retaining ring)
17. Set screw
18. Shoulder screw
19. Screw
20. Shoulder screw
21. Screw
22. Presser bar spring collar
23. Presser bar spring
24. Presser bar spring guide
25. Adjusting screw nut
26. Presser adjusting screw
27. Presser foot
28. Plain washers [2 pcs.]
29. Finger guard
30. Screw (Temporarily tighten)

7-4. Work clamp lifter mechanism (Motor-driven work clamp specifications)

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.

1. Ball bearings [2 pcs.]
2. Work clamp cam
3. Work clamp cam gear
4. Work clamp fulcrum shaft
5. Retaining ring C
6. Plain washer
7. Screw
8. Set screws [2 pcs.]
9. Set screws [2 pcs.]
10. Work clamp driving lever
11. Plain washer
12. Stepping foot driving lever
13. Work clamp lever shaft
14. Set screw
15. Set screw
16. Work clamp lifter link (Insert from the back)
17. Link shoulder screw
18. Bolt

3327B

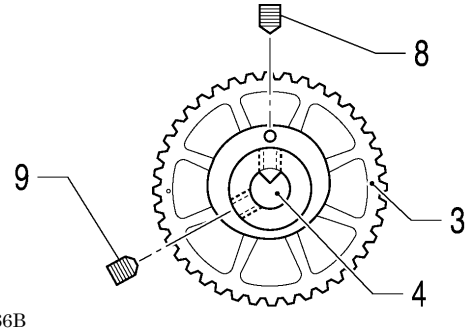


Apply adhesive (Threebond 1324N or similar) to the outer bearing surface of the ball bearing (1).

Align the screw stop, and then tighten the screw (14) so that there is no play in the work clamp driving lever (10) and the stepping foot driving lever (12).
Check that the work clamp driving lever (10) and stepping foot driving lever (12) turn smoothly.

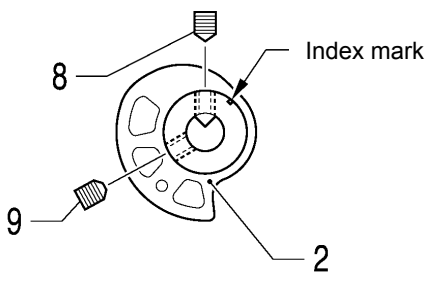
Apply adhesive (Threebond 1324N or similar) to the outer bearing surface of the ball bearing (1).

1) Set the work clamp cam gear (3) so that there is no clearance between it and the ball bearing (1) in the shaft direction, and then align the V groove in the work clamp fulcrum shaft (4) with the thread on the hole side of the work clamp cam gear (3). Then tighten the set screw (8).

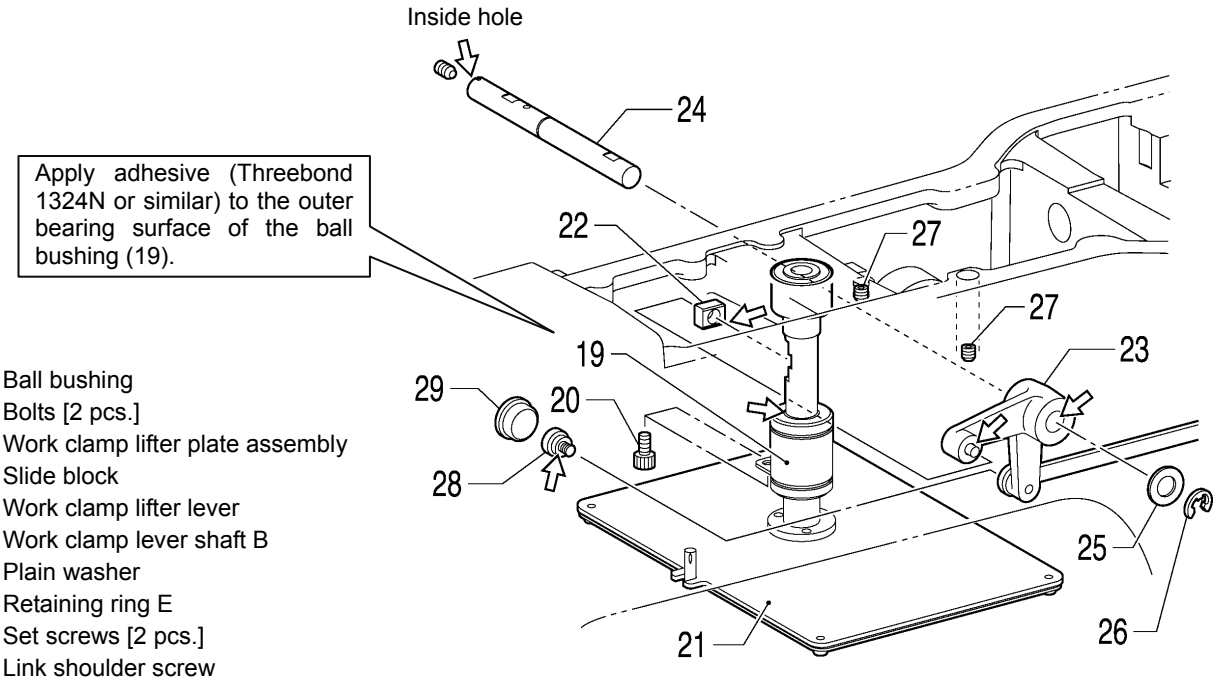


3366B

2) Set the work clamp cam (2) so that there is no clearance between it and the work clamp cam gear (3) in the shaft direction, and then align the V groove in the work clamp fulcrum shaft (4) with the thread on the index mark side on the work clamp cam (2). Then tighten the set screw (8).
3) Lastly, tighten the two set screws (9).



3367B



3269B

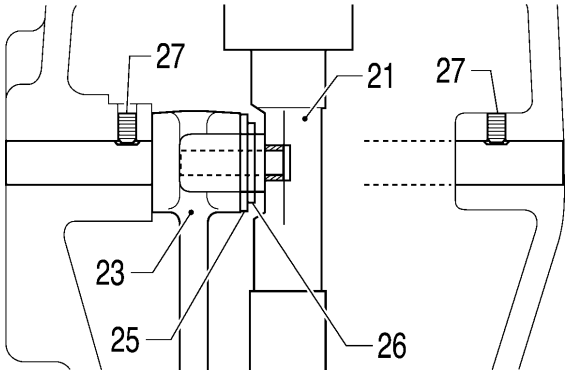
19. Ball bushing
20. Bolts [2 pcs.]
21. Work clamp lifter plate assembly
22. Slide block
23. Work clamp lifter lever
24. Work clamp lever shaft B
25. Plain washer
26. Retaining ring E
27. Set screws [2 pcs.]
28. Link shoulder screw
29. Rubber cap

Place the slide block (22) onto the pin of the work clamp lifter lever (23).
While aligning the slide block (22) with the groove in the work clamp lifter plate assembly (21), pass the work clamp lever shaft B (24) through the work clamp lifter lever (23).

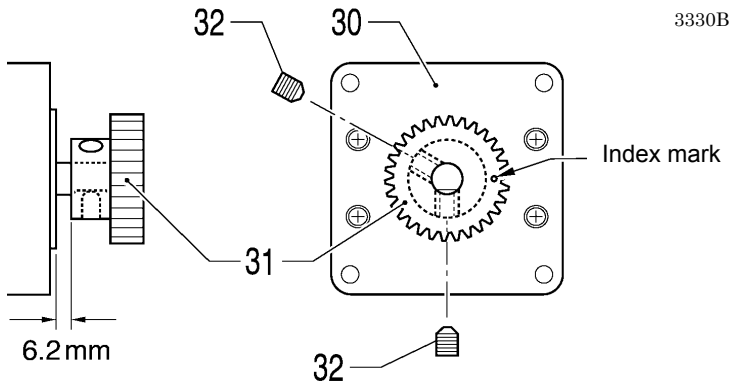
NOTE:

When the work clamp lifter plate assembly (21) is lowered, the slide block (22) moves away, so hold the work clamp lifter plate assembly (21) in place until the link shoulder screw (28) is tightened.

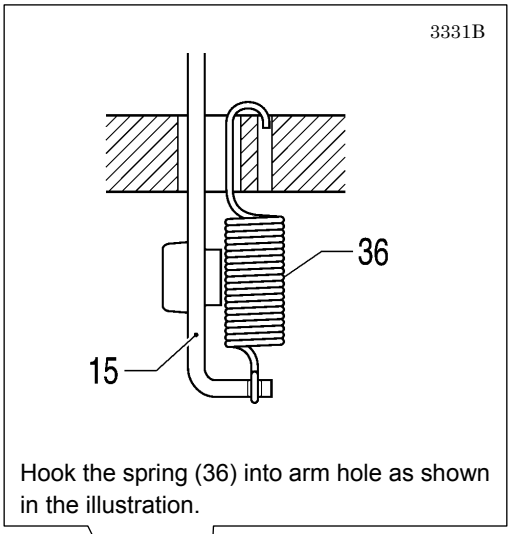
Align the set screws (27) with the screw stops and then tighten them so that there is no play in the work clamp lifter lever (23). Check that the work clamp lifter lever (23) moves smoothly.



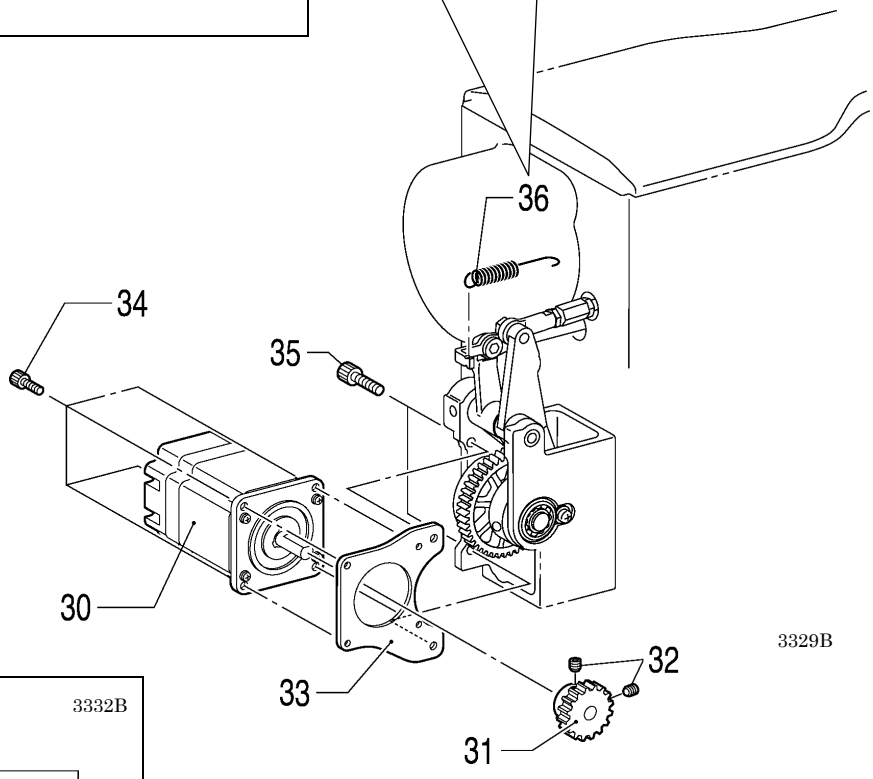
3328B

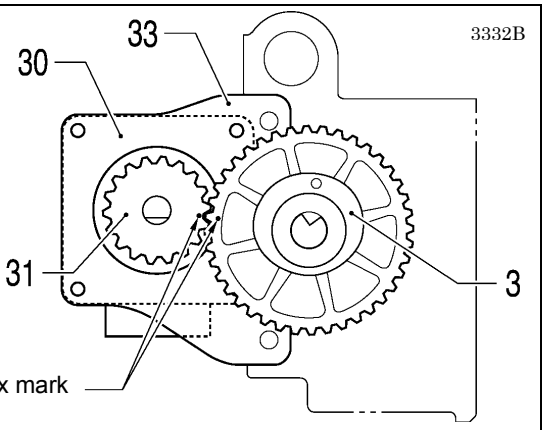


1) Set so that the clearance between the work clamp pulse motor P assembly (30) and the work clamp driving gear (31) is 6.2 mm when the screw stop on the pulse motor P assembly (30) is facing downward and the index mark on the work clamp driving gear (31) is on the right, and then tighten the two set screws (32) against the screw stops one after the other.



Hook the spring (36) into arm hole as shown in the illustration.





2) Install the work clamp pulse motor P assembly (30) to the work clamp motor plate (33) with the four bolts (34) so that the motor connector is facing downward.
3) Align the index marks on the work clamp cam gear (3) and the work clamp driving gear (31), and then install the work clamp motor plate (33) with the two bolts (35) so that the backlash is 0.01 – 0.05 mm.

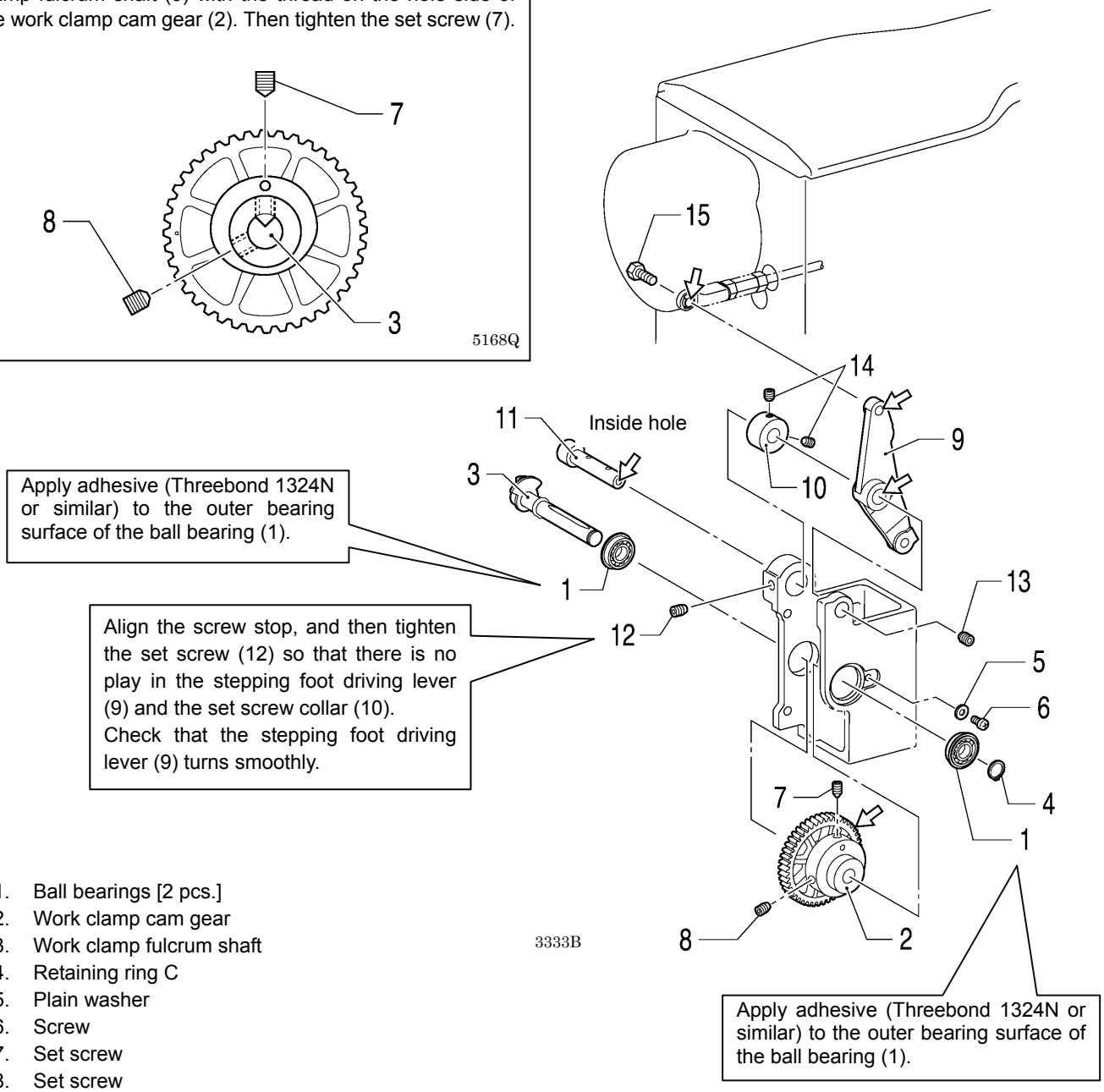
30. Work clamp pulse motor P assembly
31. Work clamp driving gear
32. Set screws [2 pcs.]
33. Work clamp motor plate
34. Bolts [4 pcs.]
35. Bolts [2 pcs.]
36. Work clamp spring

7-5. Work clamp lifter mechanism (pneumatic work clamp specifications)

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.

Set the work clamp cam gear (2) so that there is no clearance between it and the two ball bearings (1) in the shaft direction, and then align the V groove in the work clamp fulcrum shaft (3) with the thread on the hole side of the work clamp cam gear (2). Then tighten the set screw (7).

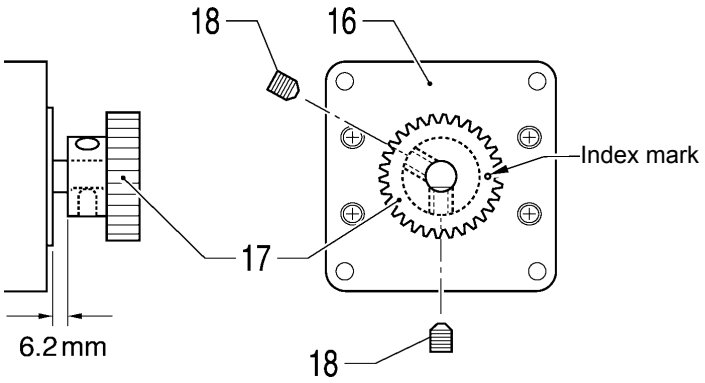
5168Q



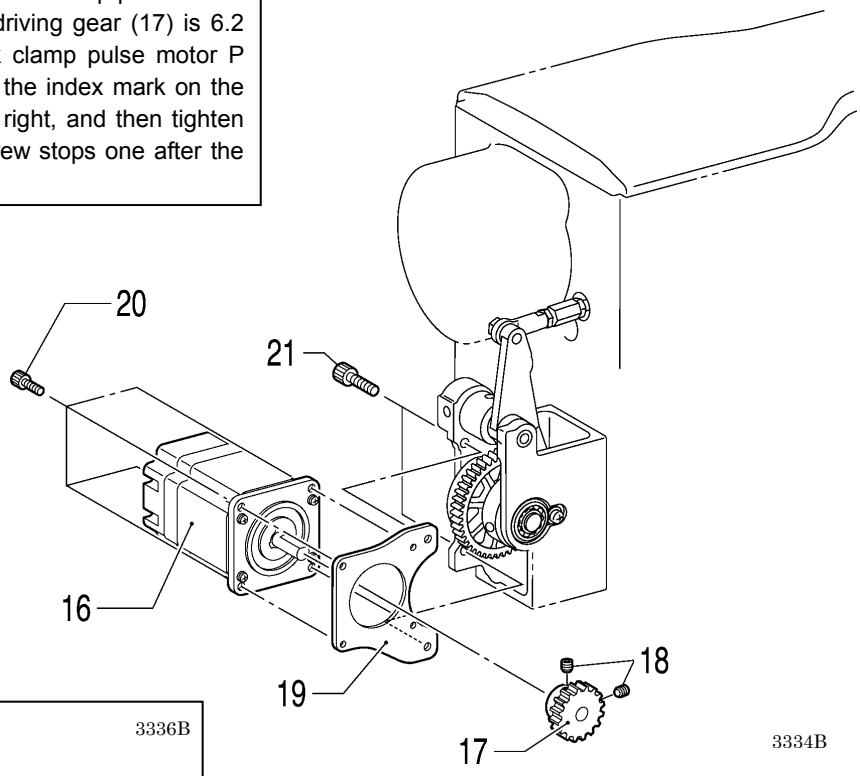
3333B

1. Ball bearings [2 pcs.]
2. Work clamp cam gear
3. Work clamp fulcrum shaft
4. Retaining ring C
5. Plain washer
6. Screw
7. Set screw
8. Set screw
9. Stepping foot driving lever
10. Set screw collar
11. Work clamp lever shaft
12. Set screw
13. Set screw
14. Shoulder screws [2 pcs.]
15. Bolt

3335B

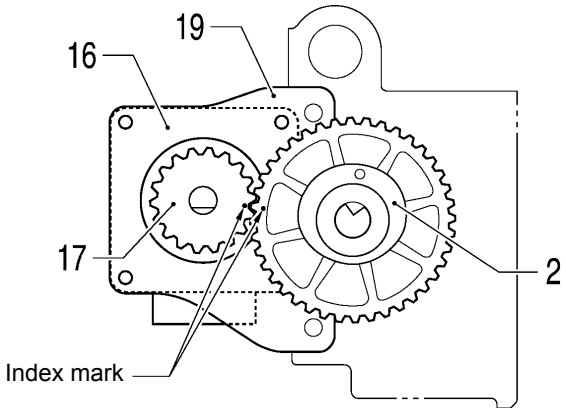


1) Set so that the clearance between the work clamp pulse motor P assembly (16) and the work clamp driving gear (17) is 6.2 mm when the screw stop on the work clamp pulse motor P assembly (16) is facing downward and the index mark on the work clamp driving gear (17) is on the right, and then tighten the two set screws (18) against the screw stops one after the other.



3334B

3336B

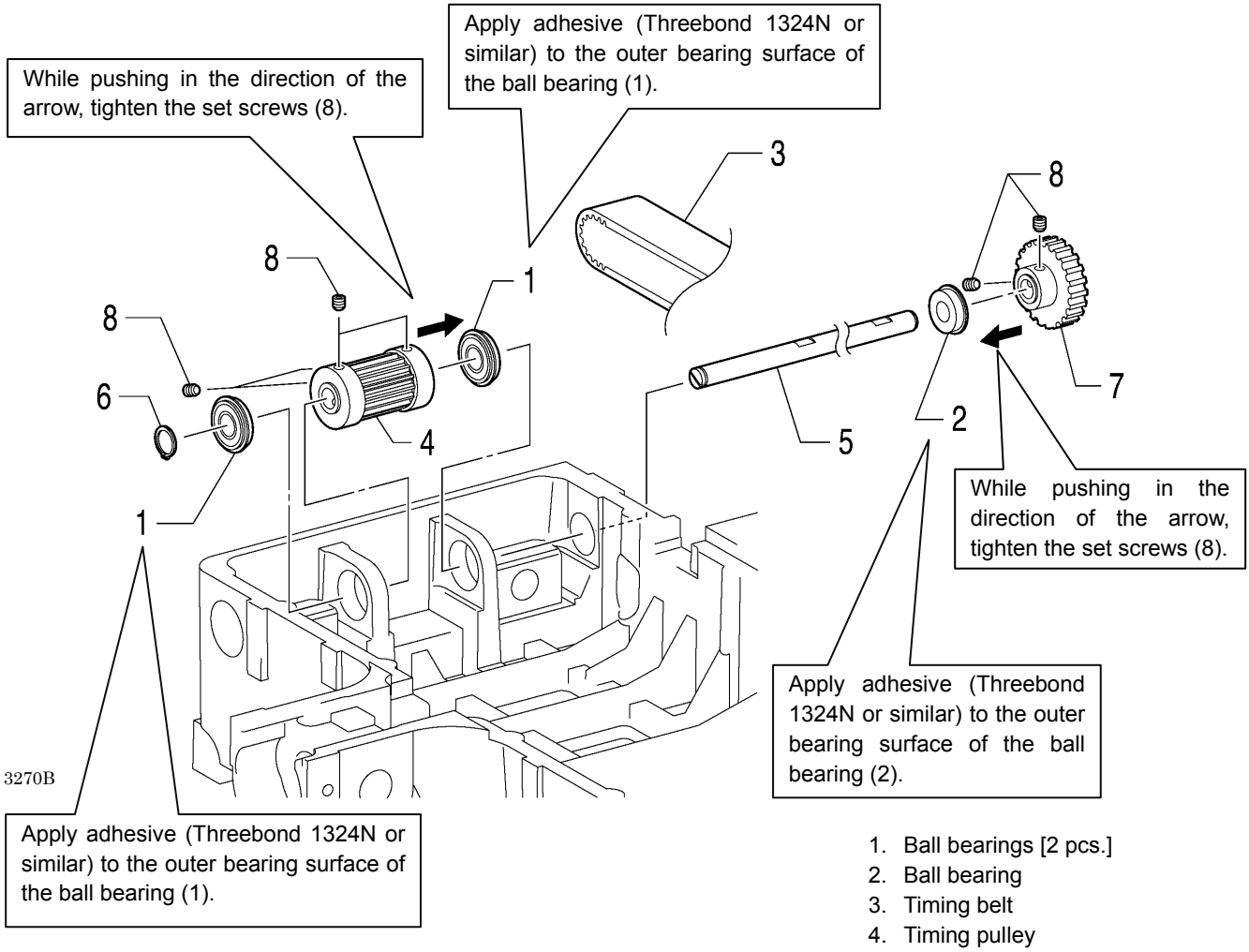


2) Install the work clamp pulse motor P assembly (16) to the work clamp motor plate (19) with the four bolts (20) so that the motor connector is facing downward.
3) Align the index marks on the work clamp cam gear (2) and the work clamp driving gear (17), and then install the work clamp motor plate (19) with the two bolts (21) so that the backlash is 0.01 – 0.05 mm.

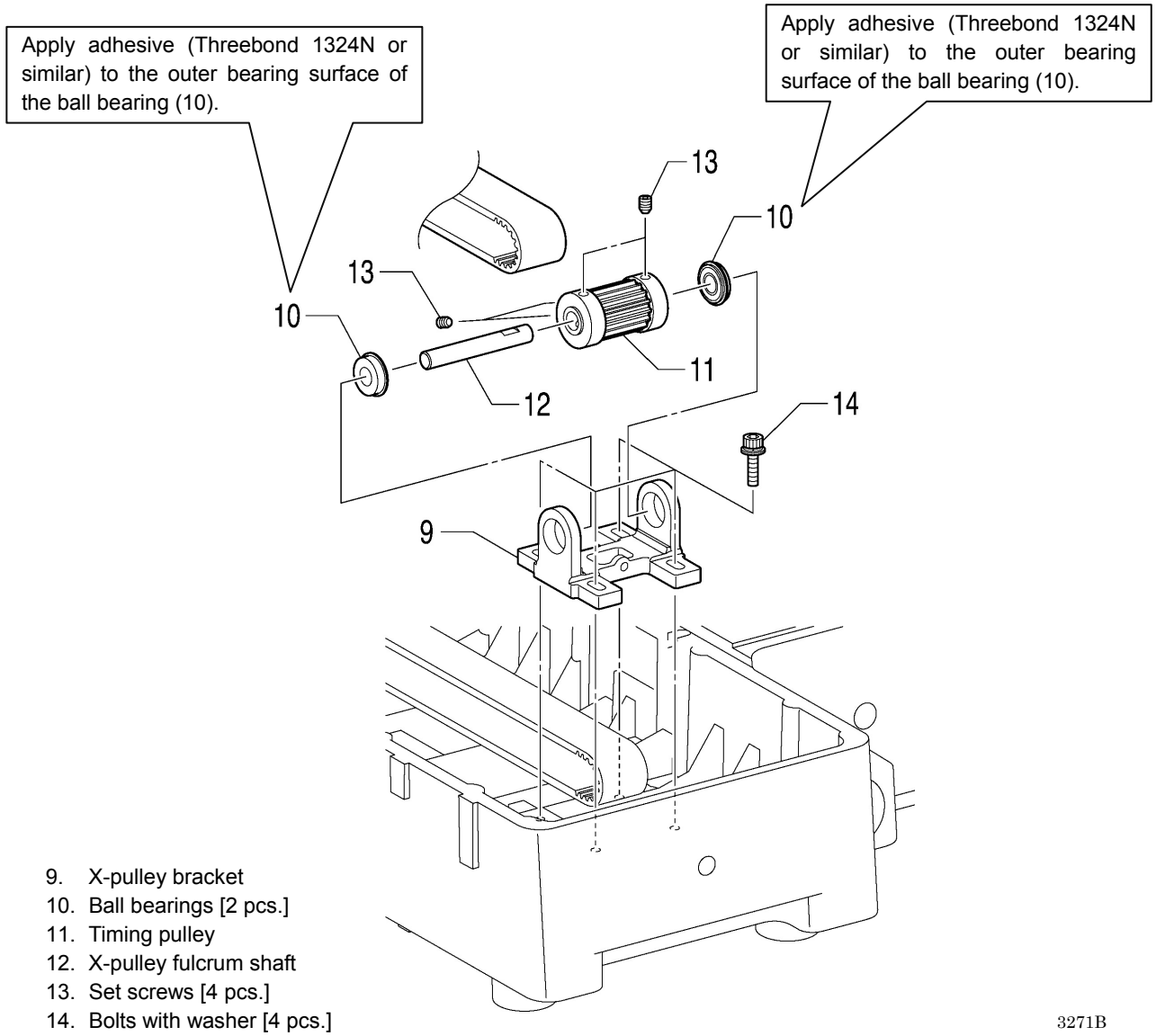
16. Work clamp pulse motor P assembly
17. Work clamp driving gear
18. Set screws [2 pcs.]
19. Work clamp motor plate
20. Bolts [4 pcs.]
21. Bolts [2 pcs.]

7-6. Feed mechanism

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.



1. Ball bearings [2 pcs.]
2. Ball bearing
3. Timing belt
4. Timing pulley
5. X-pulley driving shaft
6. Retaining ring C
7. X-feed gear
8. Set screws [6 pcs.]

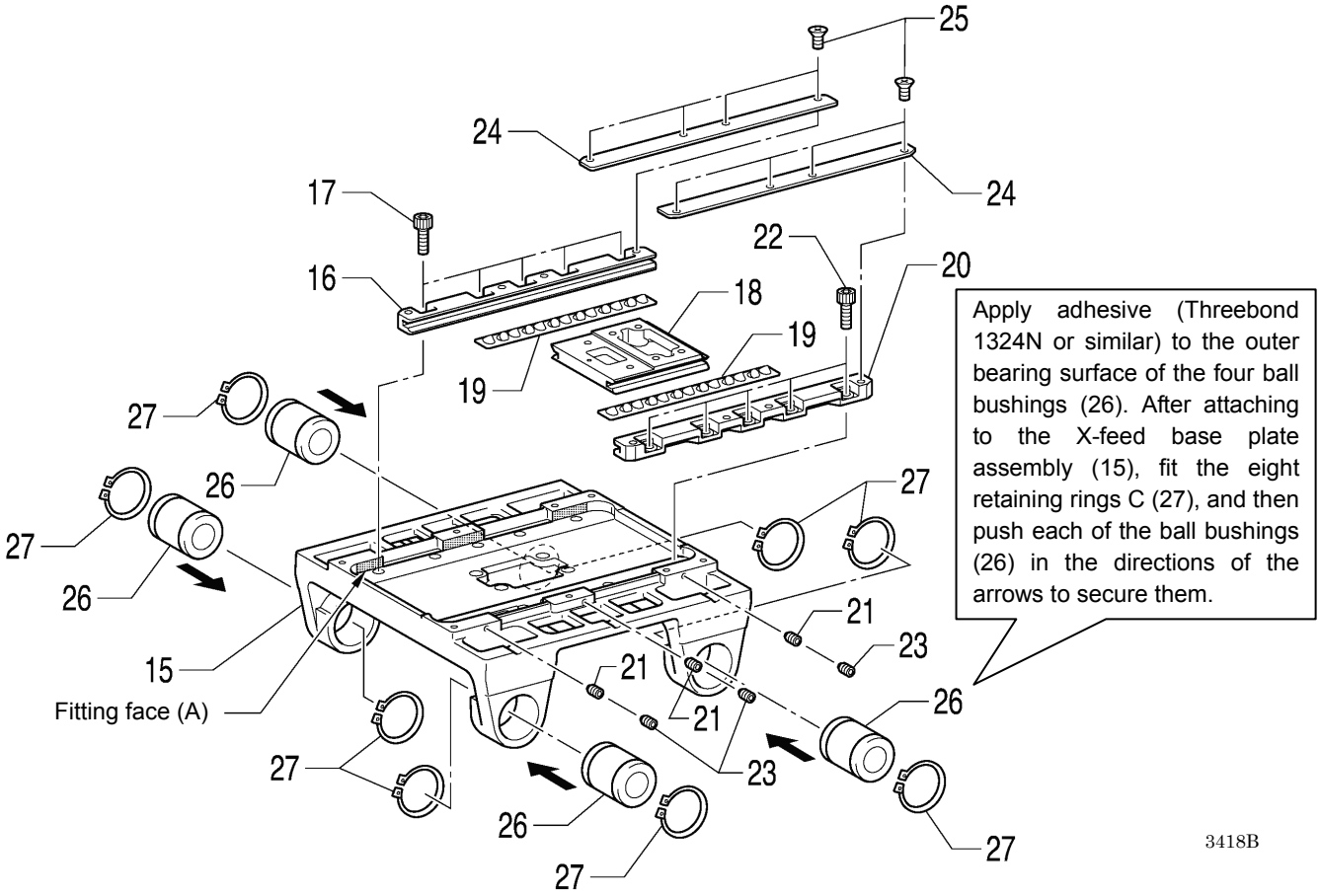


9. X-pulley bracket
10. Ball bearings [2 pcs.]
11. Timing pulley
12. X-pulley fulcrum shaft
13. Set screws [4 pcs.]
14. Bolts with washer [4 pcs.]

3271B

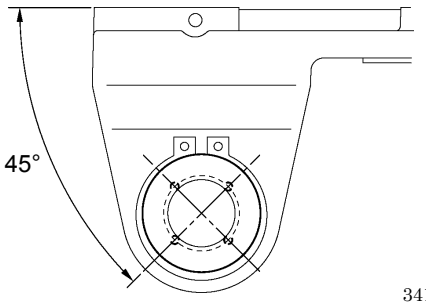
After installing, carry out the adjustments in "8-19. Belt tension adjustment".

1. Gently press the left Y-feed guide (16) against the fitting face (A) of the X-feed base plate assembly (15) and then install it by securely tightening the five bolts (17).
2. Install the Y-feed bracket (18) and the two cross rollers (19) and the right-side Y-feed guide (20).
   When installing the right-side Y-feed guide (20), push it gently to the left, and then use the three set screws (3) to adjust so that the Y-feed bracket (18) moves smoothly with no play; then, securely tighten the five bolts (22) to install the Y-feed guide (20) to the X-feed base plate assembly (15); lastly insert the three set screws (23) which have had adhesive (Threebond 1401N or similar) applied to them so that the Y-feed guide (20) is gently touching against the three set screws (21) on the inside.
3. Install the two Y-feed guide covers (24) to the two Y-feed guides (16) and (20) using the eight flat screws (25) which have had adhesive (Threebond 1401N or similar) applied to them.

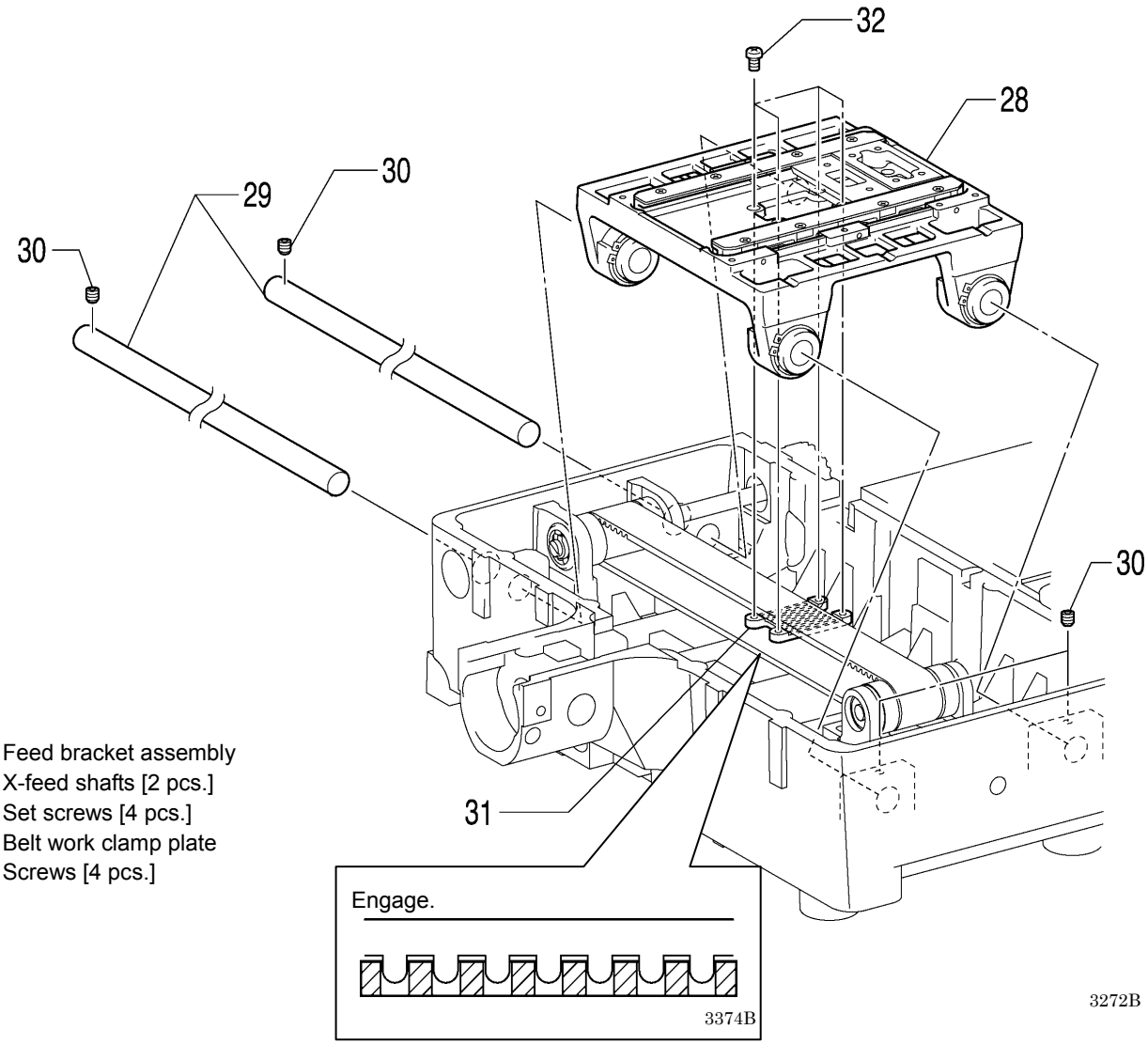


Apply adhesive (Threebond 1324N or similar) to the outer bearing surface of the four ball bushings (26). After attaching to the X-feed base plate assembly (15), fit the eight retaining rings C (27), and then push each of the ball bushings (26) in the directions of the arrows to secure them.

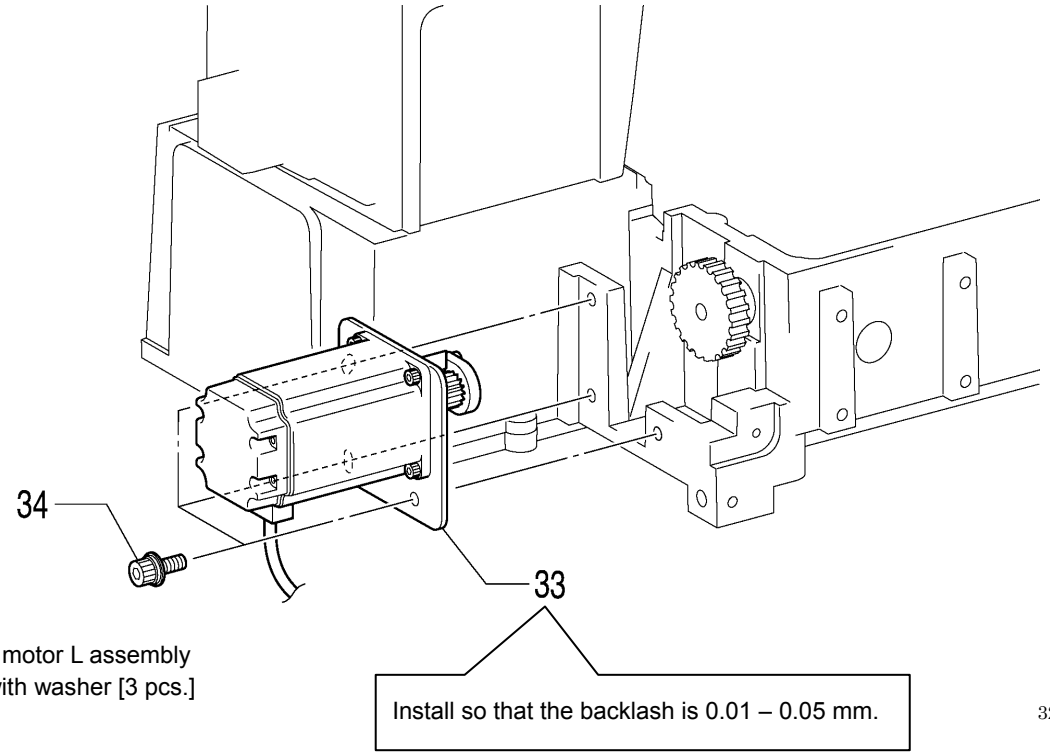
Position the ball bushings so that the balls in the ball bushings are at an angle of 45° to the surface of the X-feed base.



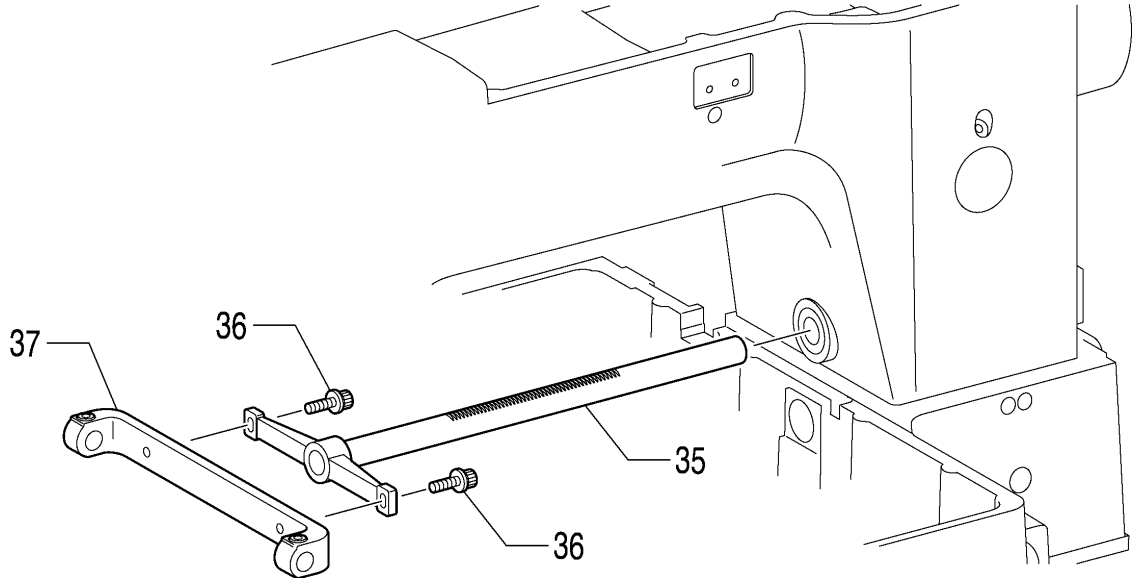
15. X-feed base plate assembly
16. Y-feed guide
17. Bolts [5 pcs.]
18. Y-feed bracket
19. Cross rollers [2 pcs.]
20. Y-feed guide
21. Set screws [3 pcs.]
22. Bolts [5 pcs.]
23. Set screws [3 pcs.]
24. Y-feed guide covers [2 pcs.]
25. Flat screws [8 pcs.]
26. Ball bushings [4 pcs.]
27. Retaining rings C [8 pcs.]



28. Feed bracket assembly
29. X-feed shafts [2 pcs.]
30. Set screws [4 pcs.]
31. Belt work clamp plate
32. Screws [4 pcs.]

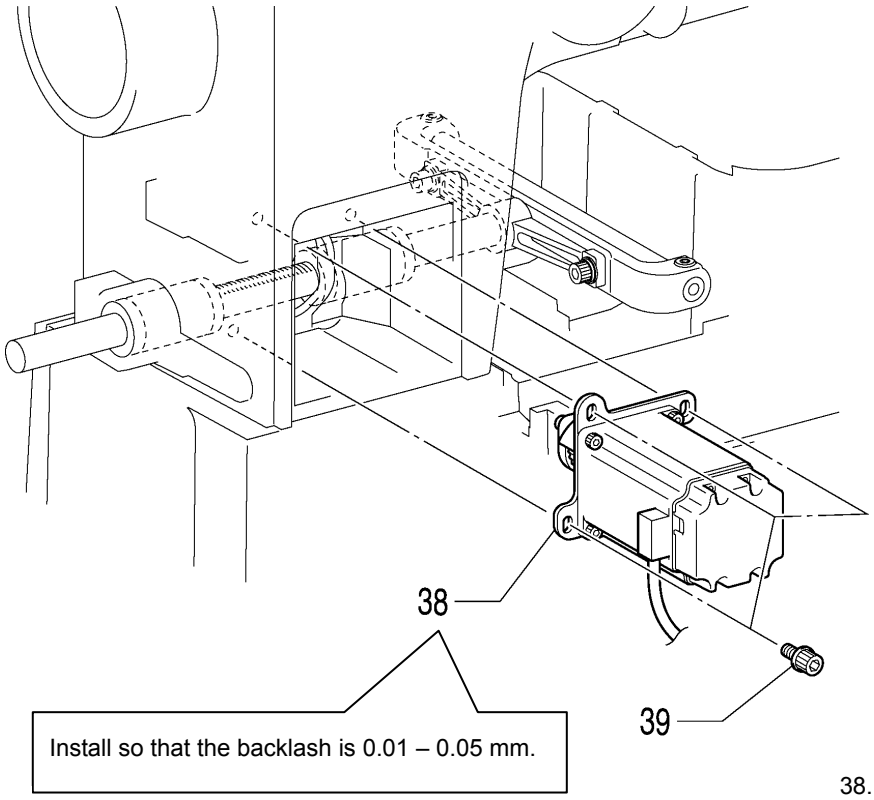


33. X-feed motor L assembly
34. Bolts with washer [3 pcs.]



35. Y-rack shaft assembly
36. Bolts with washer [2 pcs.] (Temporarily tighten)
37. X-feed shaft support

3274B

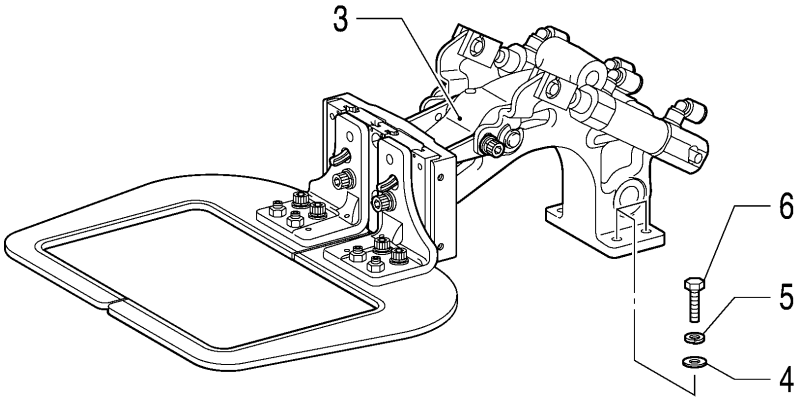


38. Y-feed motor L assembly
39. Bolts with washer [3 pcs.]

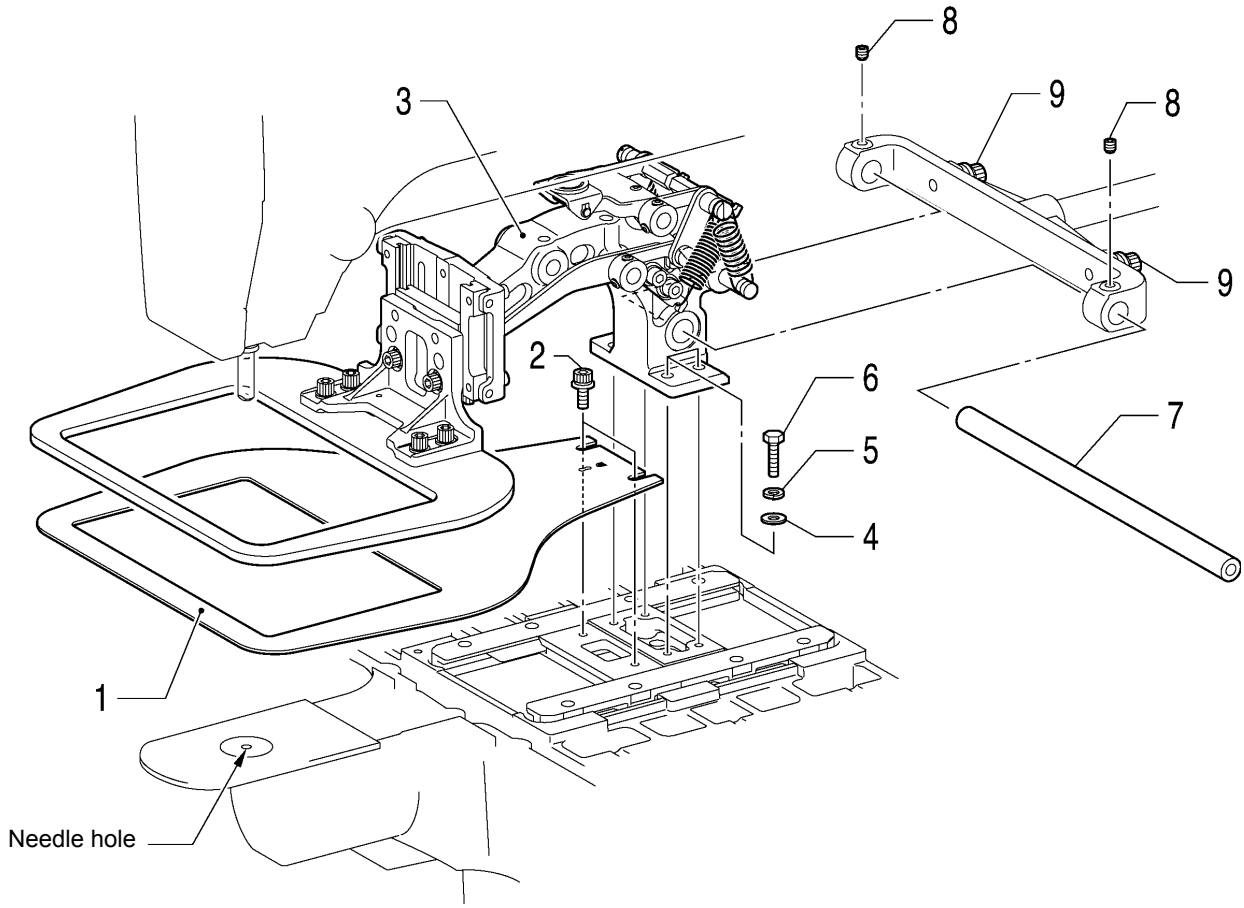
3275B

7-7. Work clamp arm mechanism

Pneumatic work clamp specifications



3276B

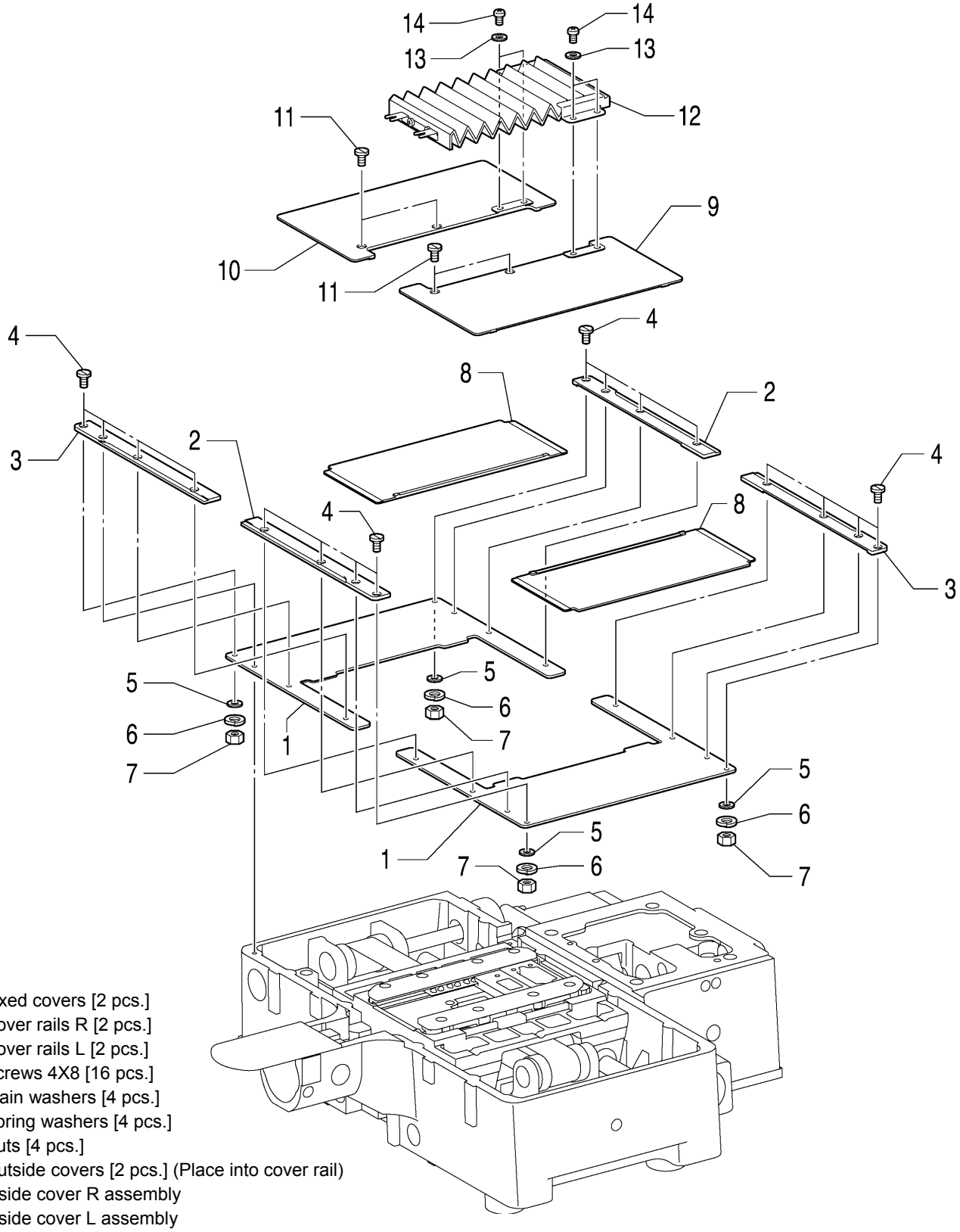


3277B

1. Feed plate
2. Bolts with washer [2 pcs.]
3. Work clamp arm assembly
4. Plain washers [4 pcs.]
5. Spring washers [4 pcs.]
6. Bolts [4 pcs.]
7. X-feed shaft
8. Set screws [2 pcs.]
9. Bolts with washer [2 pcs.] (Fully tighten)

After installing, carry out test feeding and check that the needle hole is inside the work clamp arm assembly (3) and the feed plate (1) frame. If the needle hole is not inside the frame, adjust the position of the work clamp arm assembly (3) and feed plate (1).

7-8. Feed covers

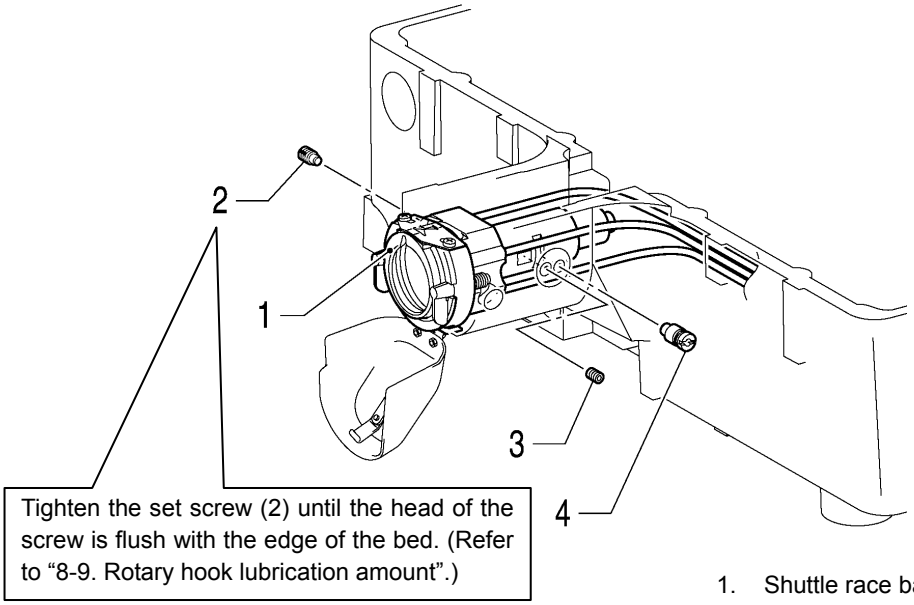


1. Fixed covers [2 pcs.]
2. Cover rails R [2 pcs.]
3. Cover rails L [2 pcs.]
4. Screws 4X8 [16 pcs.]
5. Plain washers [4 pcs.]
6. Spring washers [4 pcs.]
7. Nuts [4 pcs.]
8. Outside covers [2 pcs.] (Place into cover rail)
9. Inside cover R assembly
10. Inside cover L assembly
11. Screws 4X8 [4 pcs.]
12. Bellow assembly
13. Plain washers [4 pcs.]
14. Screws [4 pcs.]

3278B

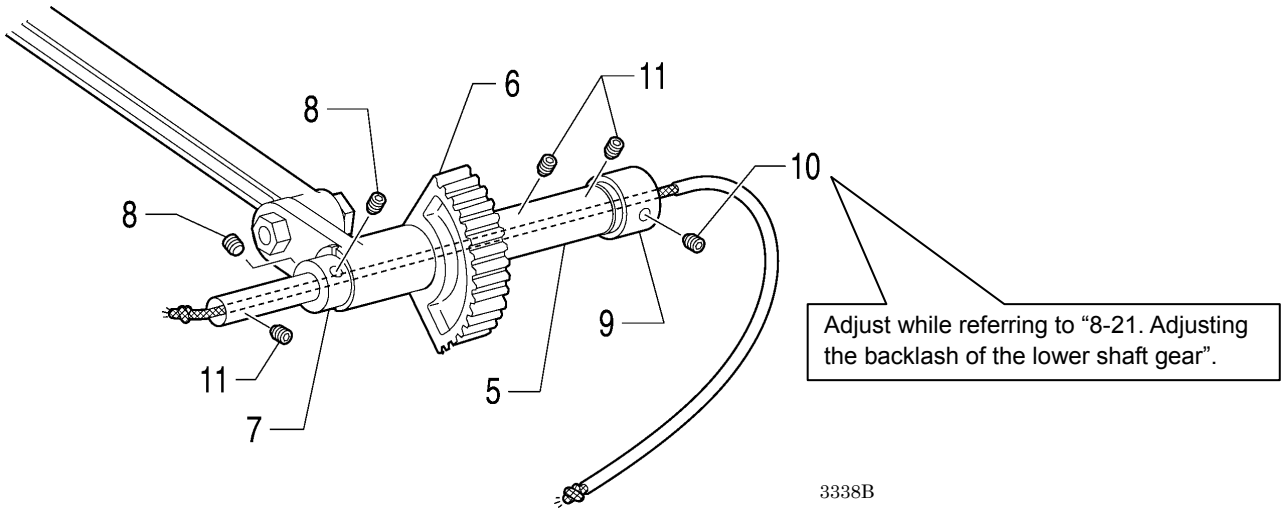
7-9. Lower shaft mechanism

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.



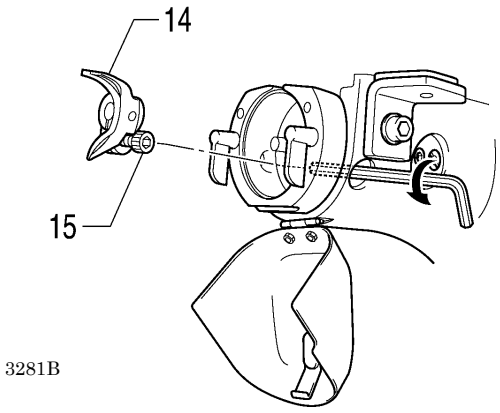
1. Shuttle race base assembly
2. Set screw
3. Set screw
4. Adjusting stud

3280B

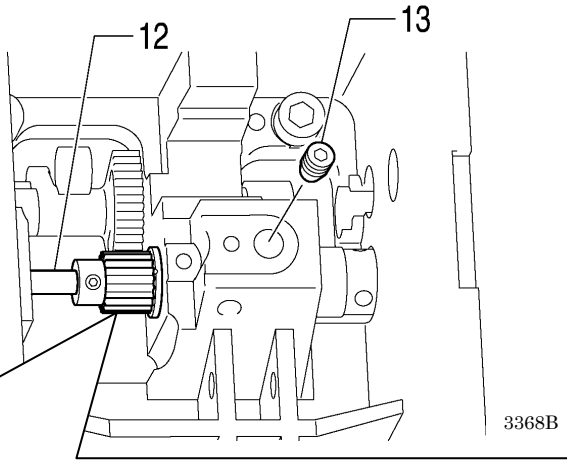


3338B

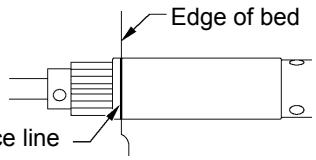
5. Rock gear shaft
   (Insert from the rear of the machine head)
6. Rock gear
7. Set screw collar B
8. Set screws [2 pcs.]
9. Set screw collar R
10. Set screw (Temporarily tighten)
11. Set screws [3 pcs.] (Temporarily tighten)



3281B

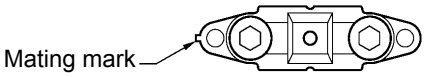


3368B

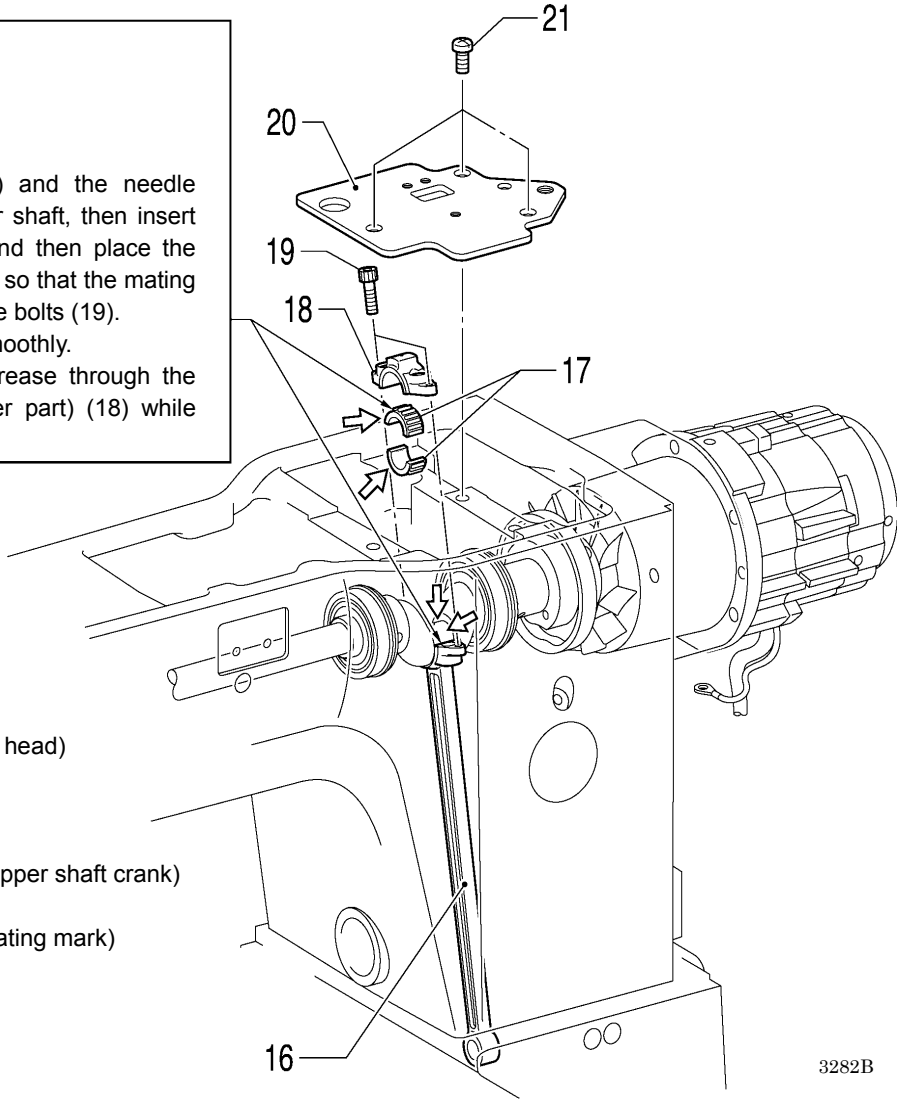


Align the bush reference line of the lower shaft assembly (12) with the edge of the bed, and then tighten the set screw (13).

3375B



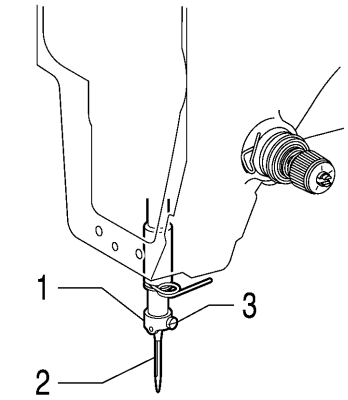
Insert the crank rod (lower part) (16) and the needle bearing (17) into the crank of the upper shaft, then insert the needle bearing (17) from above, and then place the crank rod (upper part) (18) on top of that so that the mating marks are aligned; then gently tighten the bolts (19).
* Check that the machine pulley turns smoothly.
After tightening the bolts (19), apply grease through the hole in the top of the crank rod (upper part) (18) while turning the upper shaft.



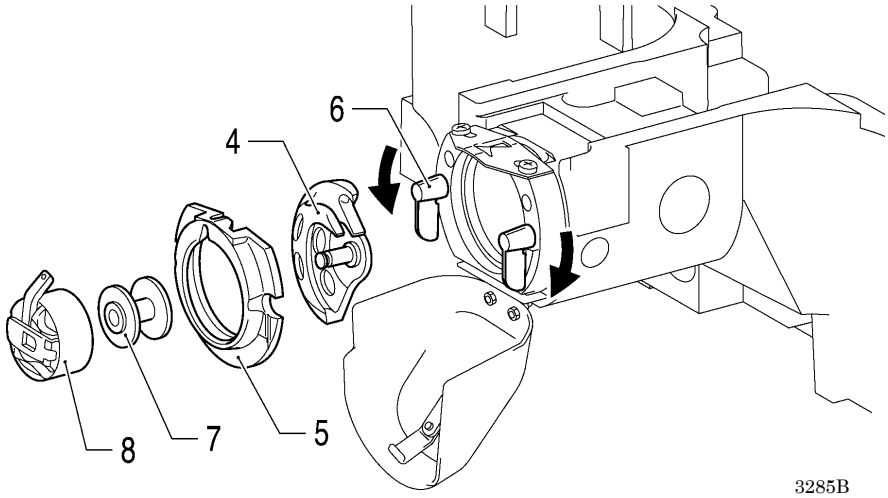
3282B

12. Lower shaft assembly
    (Insert from the rear of the machine head)
13. Set screw
14. Driver
15. Bolt (Temporarily tighten)
16. Crank rod [Lower part] (Insert into upper shaft crank)
17. Needle bearing
18. Crank rod [Upper part] (Align the mating mark)
19. Bolts [2 pcs.]
20. Crank cover
21. Screws [3 pcs.]

7-10. Shuttle hook mechanism



5149Q



3285B

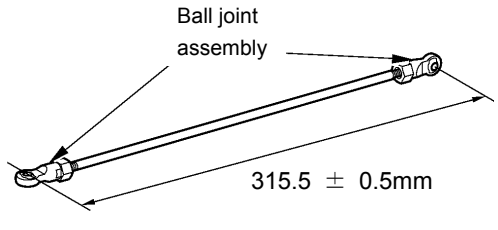
After installing the shuttle hook (4), carry out the adjustments in “8-6. Adjusting the timing and the driver needle guard” and “8-7. Adjusting the needle clearance”.

1. Needle bar thread guide
2. Needle
3. Set screw
4. Shuttle hook
5. Shuttle race base
6. Shuttle race base setting claw (Close)
7. Bobbin
8. Bobbin case

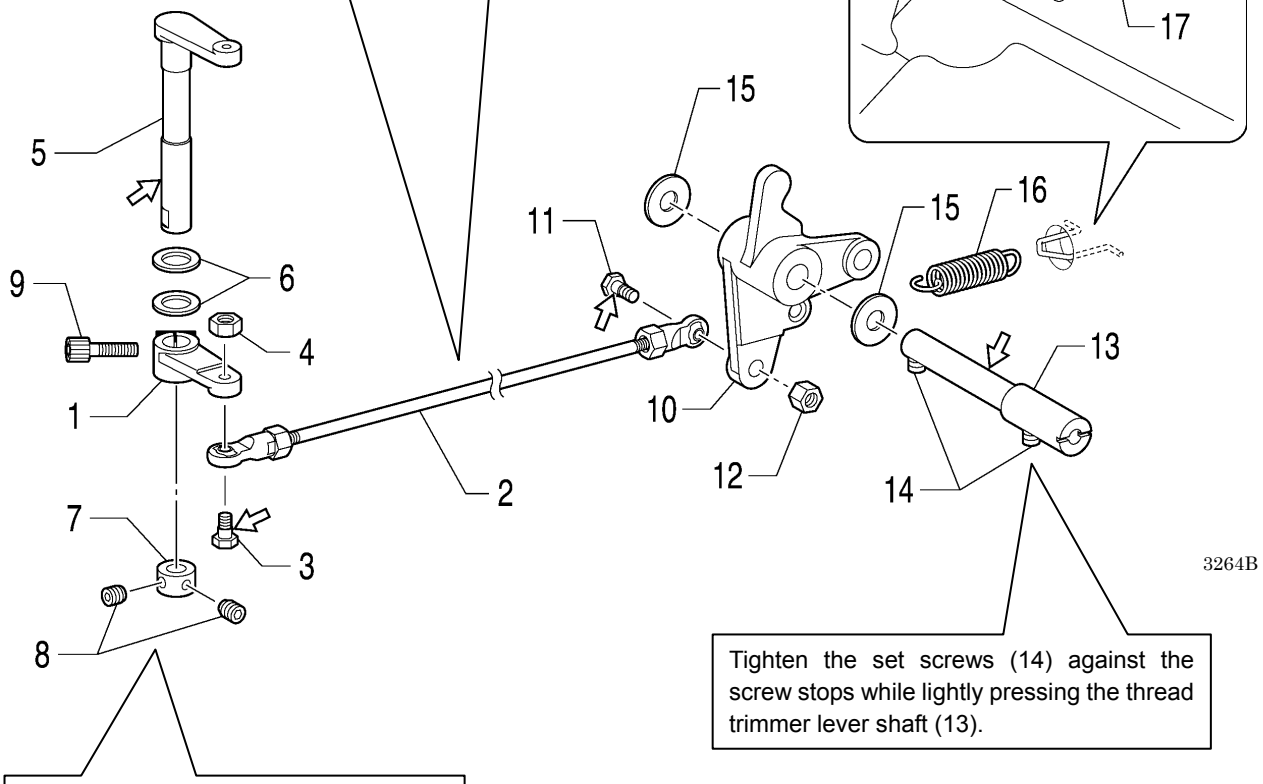
7-11. Thread trimmer mechanism

Apply grease <Grease unit (SB1275-101)> specified by Brother to the portions indicated by the white arrows.

When the ball joint assembly of thread trimmer rod assembly H (2) has been disassembled, assemble it so that the distance between the centers of the holes is 315.5 ± 0.5 mm.



3265B

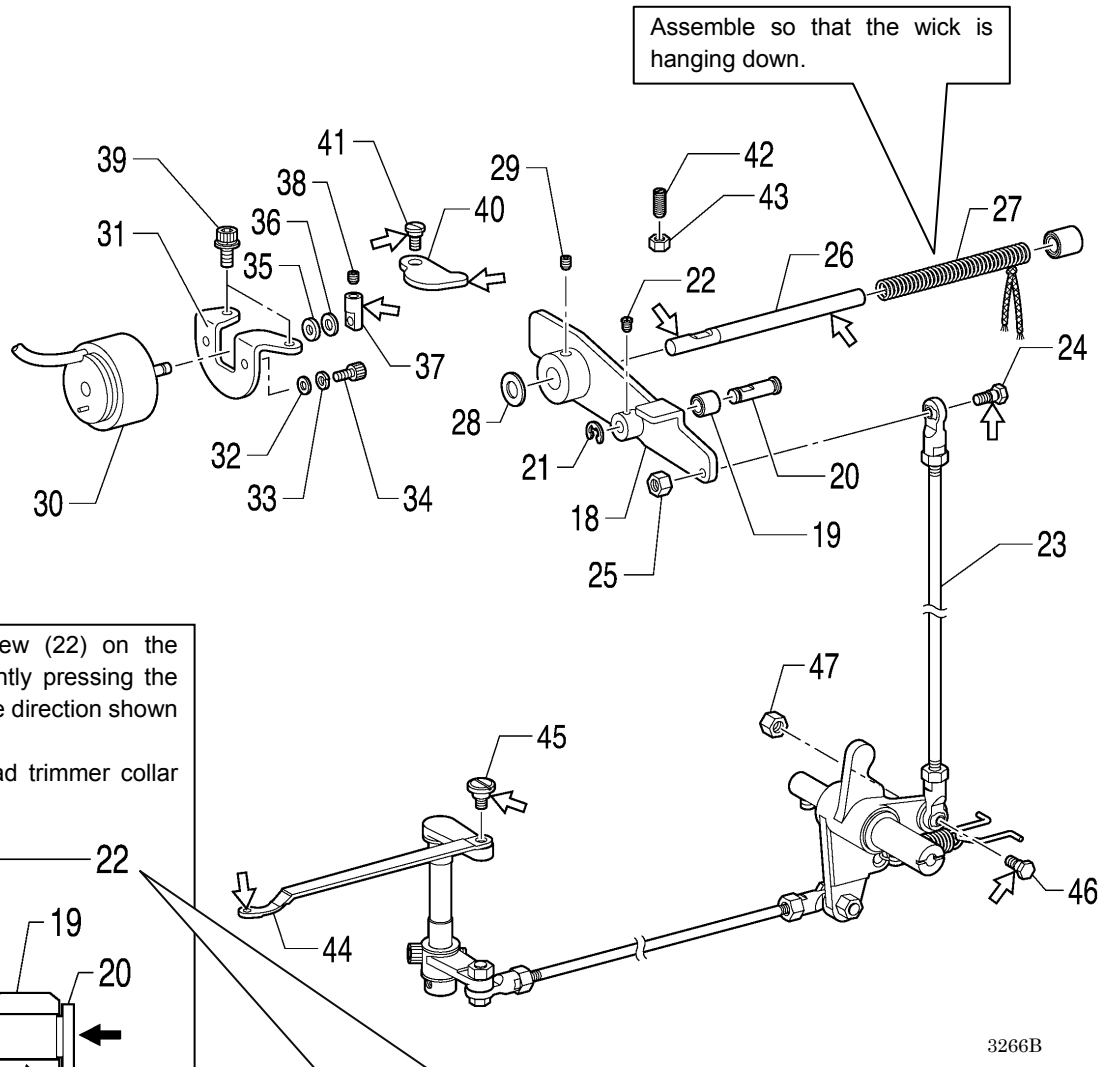


3264B

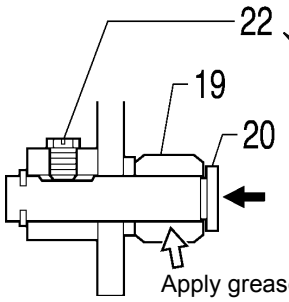
While gently pushing the movable knife lever shaft (5) and the set screw collar (7) together from above and below, tighten the set screws (8) against the screw stops.

Tighten the set screws (14) against the screw stops while lightly pressing the thread trimmer lever shaft (13).

1. Movable knife lever
2. Thread trimmer rod assembly H
3. Shoulder screw B
4. Nut
5. Movable knife lever shaft
6. Thrust washers [2 pcs.]
7. Set screw collar
8. Set screws [2 pcs.]
9. Bolt
10. Thread trimmer lever V
11. Shoulder screw B
12. Nut
13. Thread trimmer lever shaft
14. Set screws [2 pcs.]
15. Spacers [2 pcs.]
16. Spring
17. Spring hook



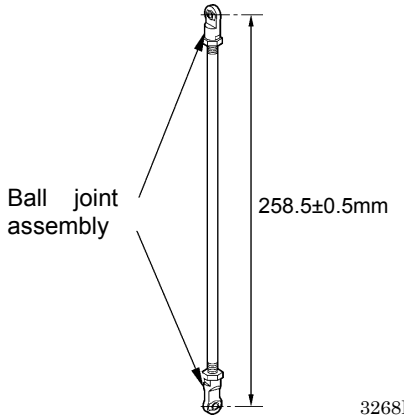
Tighten the set screw (22) on the screw stop while lightly pressing the collar shaft (20) in the direction shown in the illustration.
Check that the thread trimmer collar (19) turns smoothly.

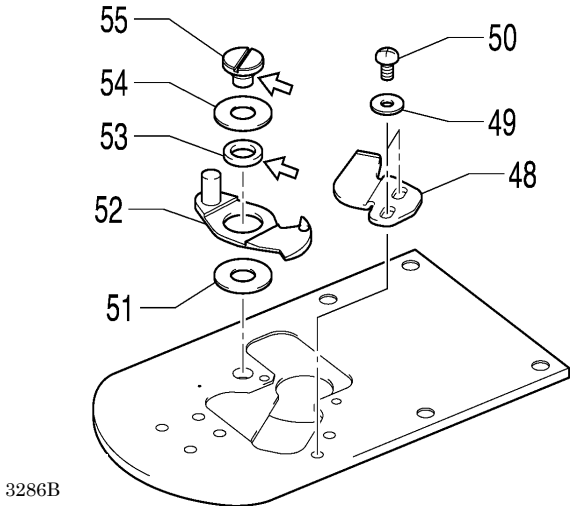


Apply adhesive (Threebond 1401N or similar) to the thread section of the set screw (22).

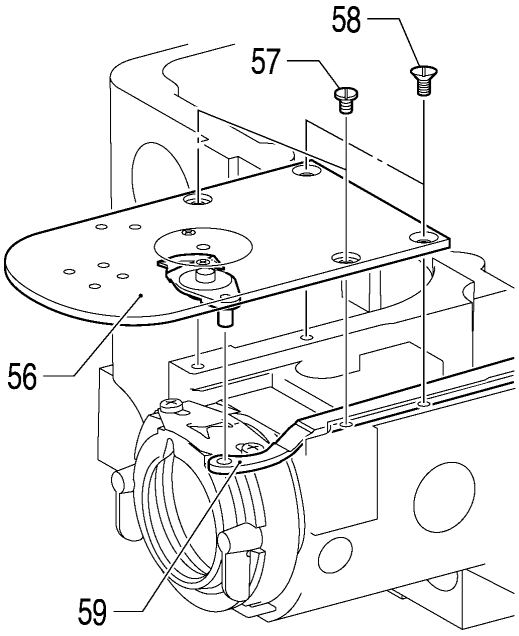
18. Driving lever
19. Thread trimmer collar
20. Collar shaft
21. Retaining ring E
22. Set screw
23. Thread trimmer rod assembly V
24. Shoulder screw B
25. Nut
26. Guide shaft
27. Spring
28. Cushion
29. Set screw
30. Thread trimmer solenoid
31. Solenoid setting plate
32. Plain washers [2 pcs.]
33. Spring washers [2 pcs.]
34. Bolts [2 pcs.]
35. Solenoid cushion
36. Washer
37. Solenoid lever
38. Set screw
39. Bolts with washer [2 pcs.]
40. Driving lever pushing lever
41. Shoulder screw
42. Set screw
43. Nut
44. Movable knife connecting plate
45. Shoulder screw
46. Shoulder screw B
47. Nut

When the ball joint assembly of the thread trimmer rod assembly V (23) has been disassembled, assemble it so that the distance between the centers of the holes is 287.5 ± 0.5 mm.





3286B

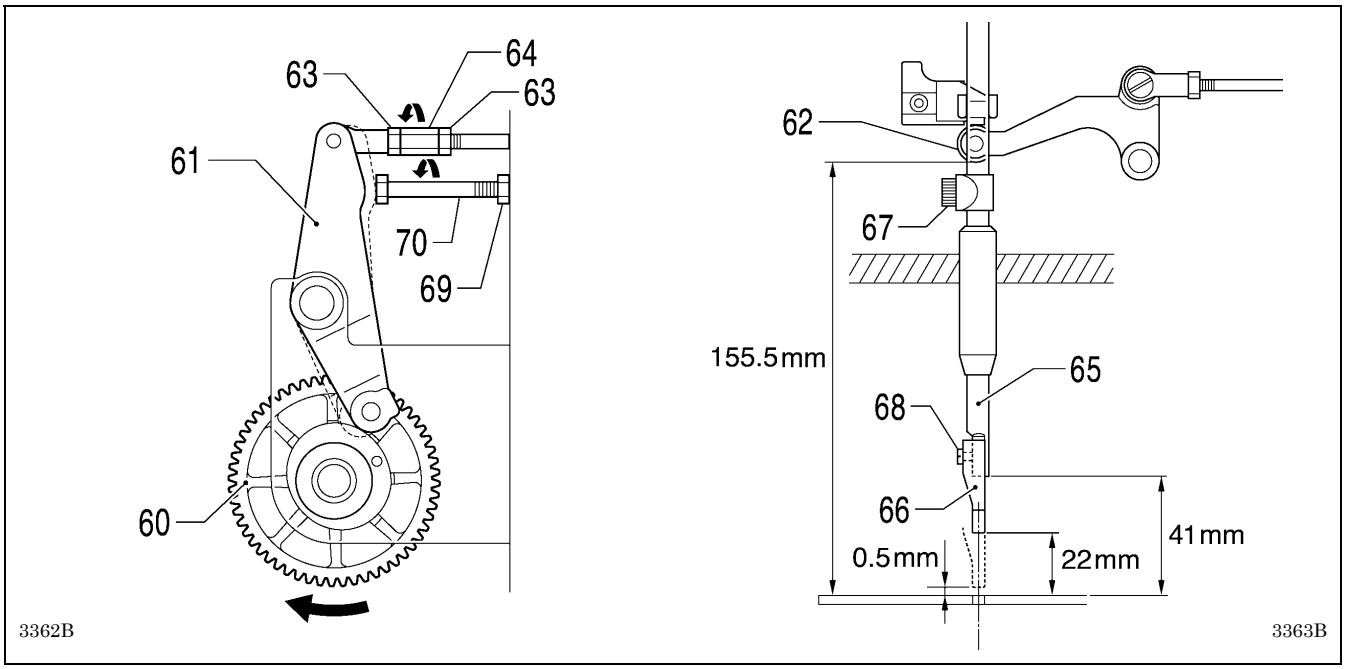


3287B

48. Fixed knife
49. Plain washers [2 pcs.]
50. Screws [2 pcs.]
51. Movable knife spacer
52. Movable knife assembly
53. Movable knife collar
54. Thrust washer
55. Movable knife shoulder screw
56. Needle plate
57. Screws [2 pcs.]
58. Flat screws [2 pcs.]
59. Movable knife connecting plate

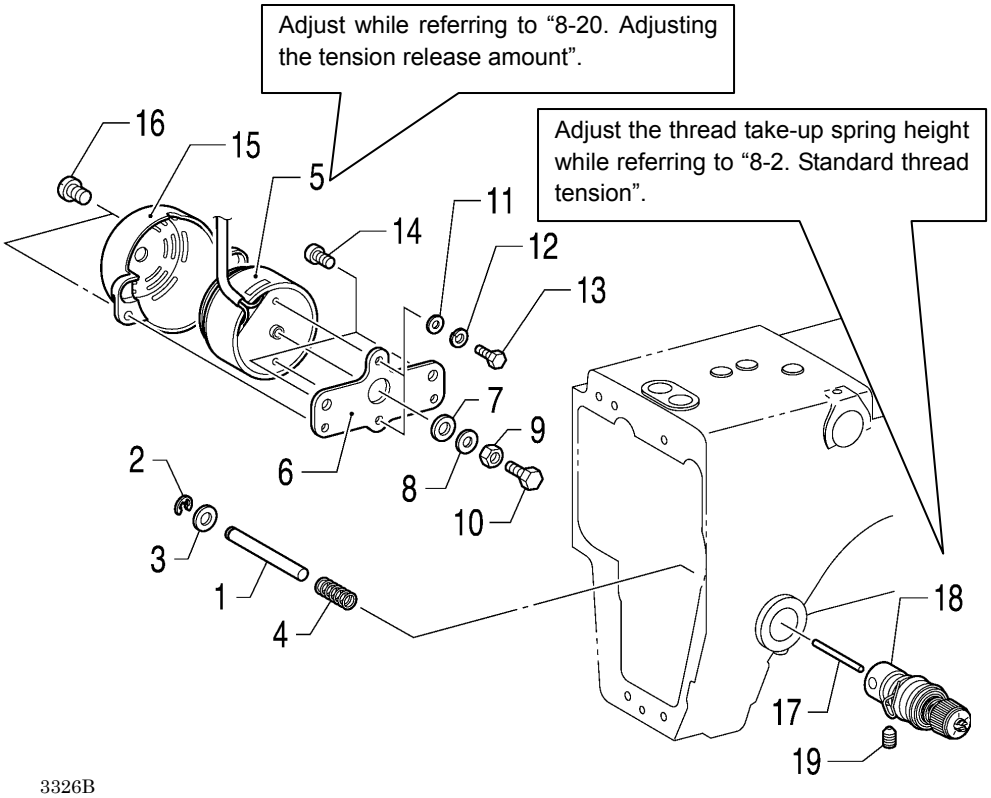
Insert the pin of the movable knife assembly (52) into the hole in the movable knife connecting plate (59), and then install the needle plate (56) with the screws (57) and the flat screws (58) so that the needle drops into the center of the needle hole.

After installing the needle plate while referring to “7-11. Thread trimmer mechanism”, carry out the following adjustment.



1. When the cam gear (60) is turned, the position of the top of the stepping foot driving lever (61) changes back and forth, so turn the cam gear (60) to move the stepping foot driving lever (61) to the back position (the position in the illustration).
2. Loosen the two nuts (63) and turn the joint (64) to adjust the height of the roller (62) so that it is 155.5 mm above the top of the needle plate.
3. Set the height of the presser bar (65) to 41 mm above the needle plate, align the center of the presser foot (66) hole and the needle hole, and then tighten the bolt (67).
4. Set the height of the presser foot (66) to 22 mm above the needle plate, and then tighten the screw (68).
5. Turn the cam gear (60) in the direction of the arrow to move the stepping foot driving lever (61) forward (to the dotted line position shown in the illustration).
6. Set the needle bar to the timing position.
7. Loosen the nut (69) and turn the bolt (70) to set the height of the presser foot (66) to 0.5 mm above the needle plate.

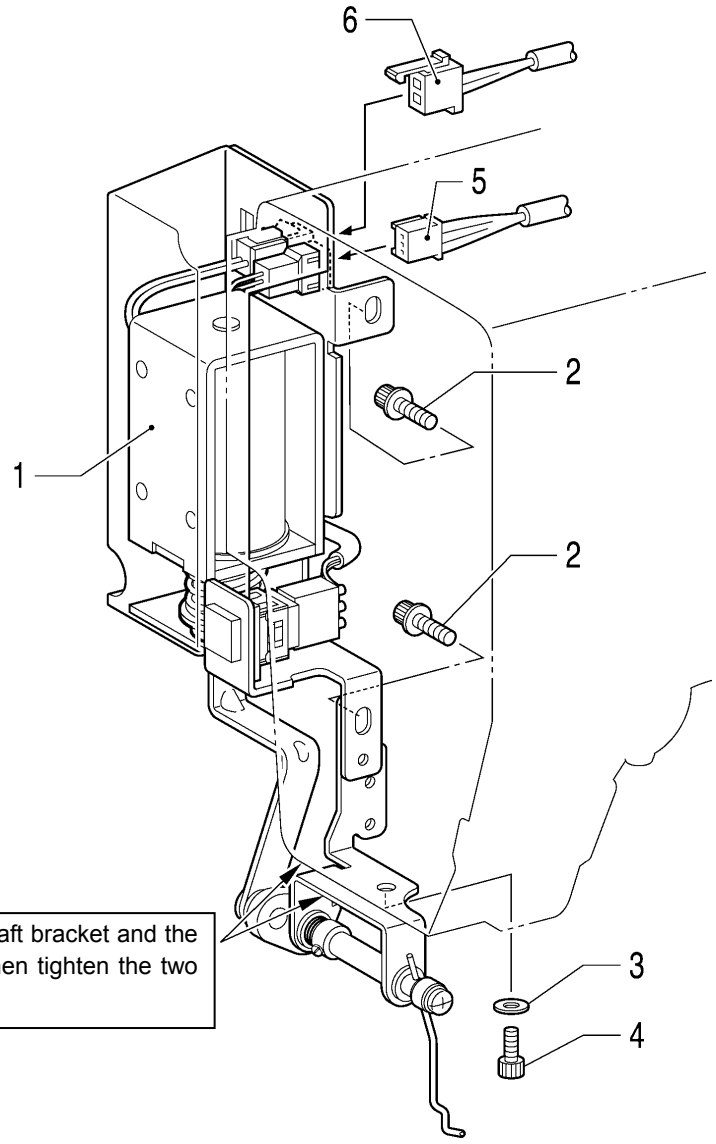
7-12. Tension release mechanism



3326B

1. Tension release bar
2. Retaining ring E
3. Plain washer
4. Spring
5. Tension release solenoid
6. Solenoid setting plate
7. Solenoid cushion
8. Plain washer
9. Nut
10. Bolt
11. Plain washers [2 pcs.]
12. Spring washers [2 pcs.]
13. Bolts [2 pcs.]
14. Screws [2 pcs.]
15. Solenoid cover
16. Screws [2 pcs.]
17. Tension release pin
18. Tension bracket assembly
19. Set screw

7-13. Thread wiper mechanism

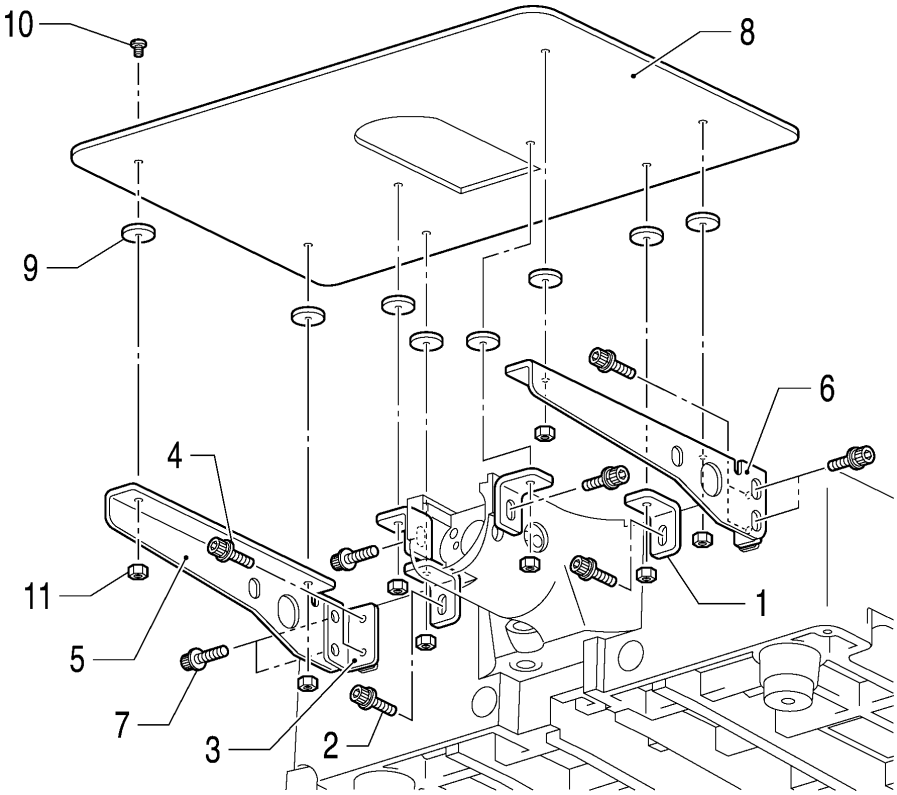


Align the thread wiper shaft bracket and the bottom of the arm and then tighten the two bolts with washer (2).

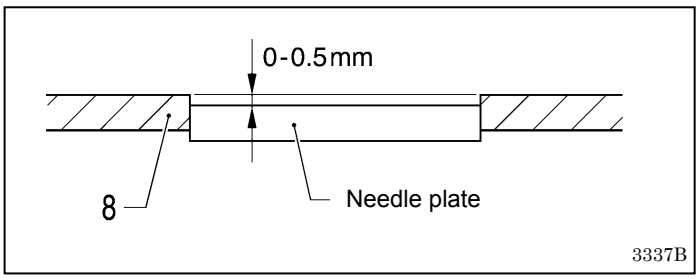
3341B

1. Thread wiper unit
2. Bolts with washer [2 pcs.]
3. Plain washer
4. Bolt
5. STOP switch harness
6. Thread wiper solenoid harness

7-14. Auxiliary plate



3279B

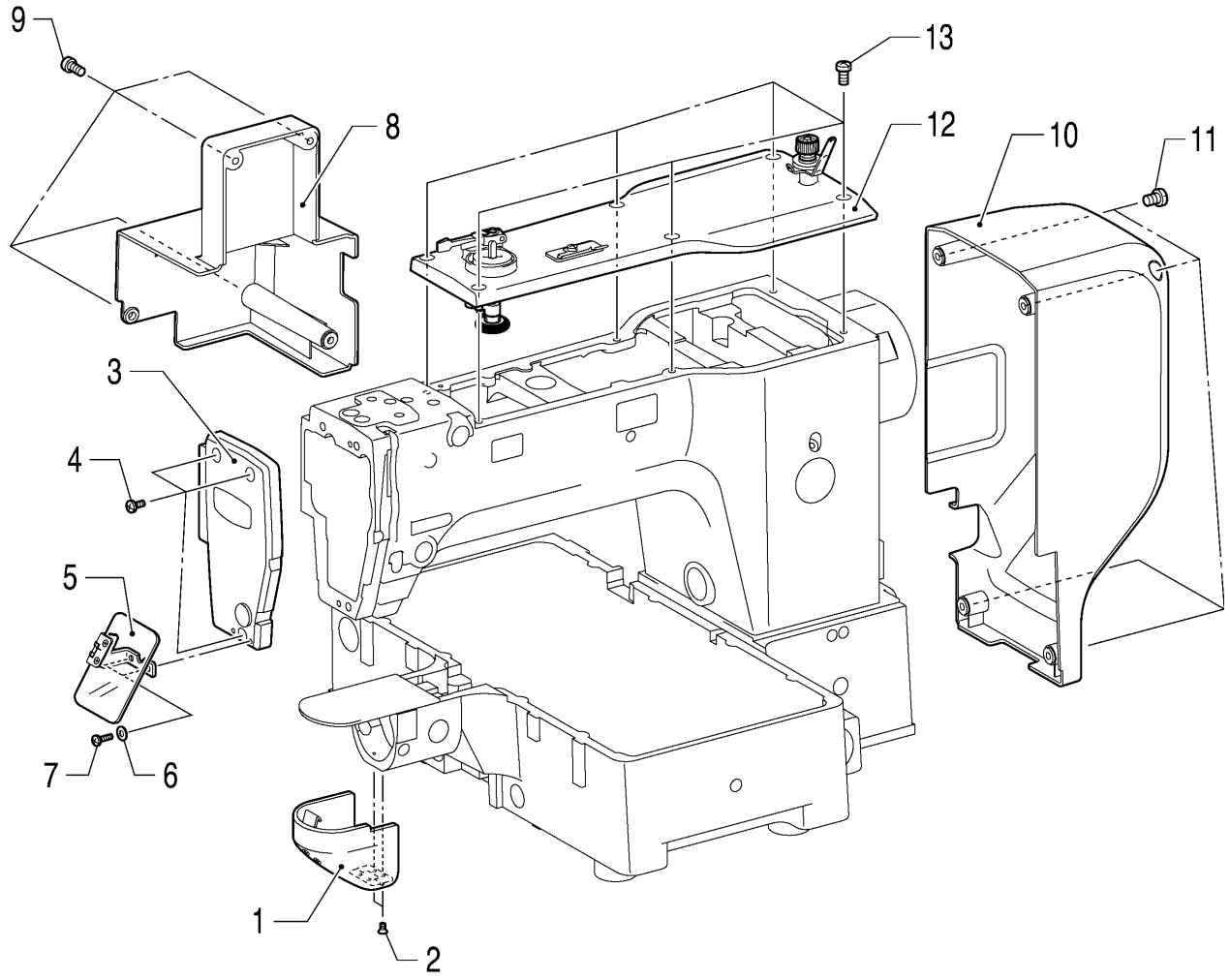


3337B

1. Auxiliary plate brackets [4 pcs.]
2. Bolts with washer [4 pcs.]
3. Auxiliary plate brackets M [2 pcs.]
4. Bolts with washer [4 pcs.]
5. Auxiliary plate brackets L
6. Auxiliary plate brackets R
7. Bolts with washer [4 pcs.]
8. Auxiliary plate
9. Auxiliary plate cushions [8 pcs.]
10. Screws [8 pcs.]
11. Nuts [8 pcs.]

After installing, carry out the adjustments in "8-22-2. X-Y feed home position ".

7-15. Covers



3288B

1. Shuttle race cover assembly
2. Screws [2 pcs.]
3. Face plate assembly
4. Screws [3 pcs.]
5. Eye guard assembly
6. Plain washers [2 pcs.]
7. Screws [2 pcs.]
8. Side cover
9. Screws [4 pcs.]
10. Rear cover
11. Screws [4 pcs.]
12. Top cover
13. Screws [6 pcs.]

8. ADJUSTMENT

⚠ CAUTION

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

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

Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the foot switch is depressed by mistake, which may result in injury.

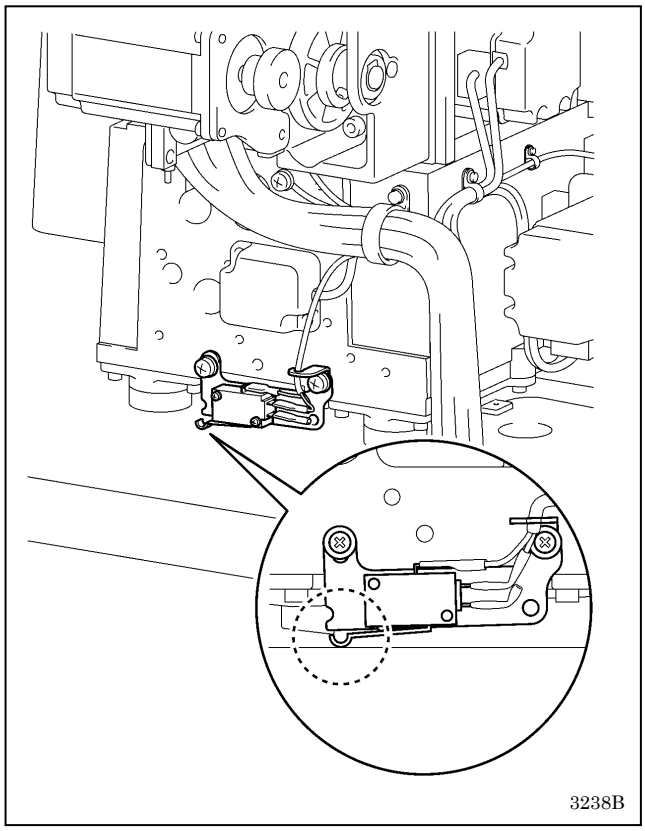
- When carrying out inspection, adjustment and maintenance.
- When replacing consumable parts such as the rotary hook.

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

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.

8-1. Checking the machine head switch



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

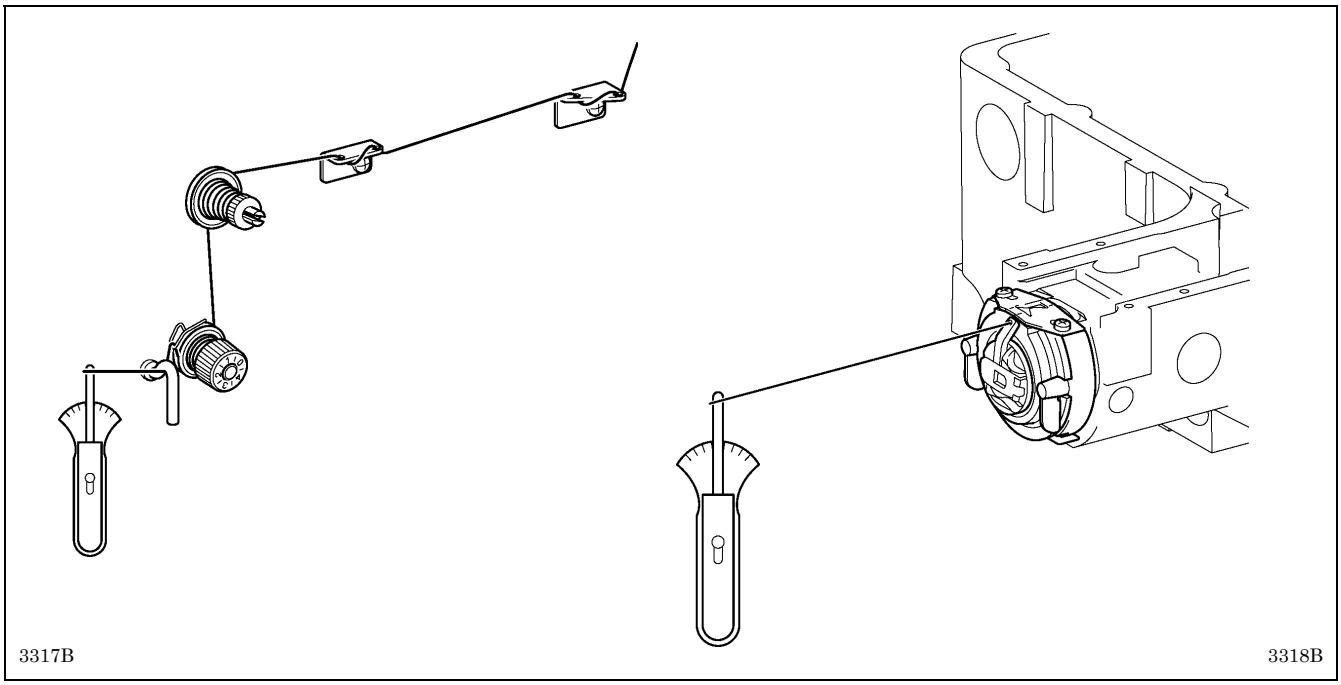
NOTE:

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

8-2. Standard thread tension

Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07[])
Upper thread	#50 or similar	#20 or similar	#4 or similar
Lower thread	#50 or similar	#20 or similar	#4 or similar
Upper thread tension (N)	0.8 − 1.2	1.4 − 1.8	1.2 − 2.0
Lower thread tension (N)	0.2 − 0.3		1.0 − 1.5
Pre-tension (N)	0.1 − 0.3	0.1 − 0.6	0.3 − 0.6
Needle	DP x 5 #16	DP x 17 #19	DP x 17 #25
Normal sewing speed	2,000 sti./min	2,000 sti./min	1,300 sti./min

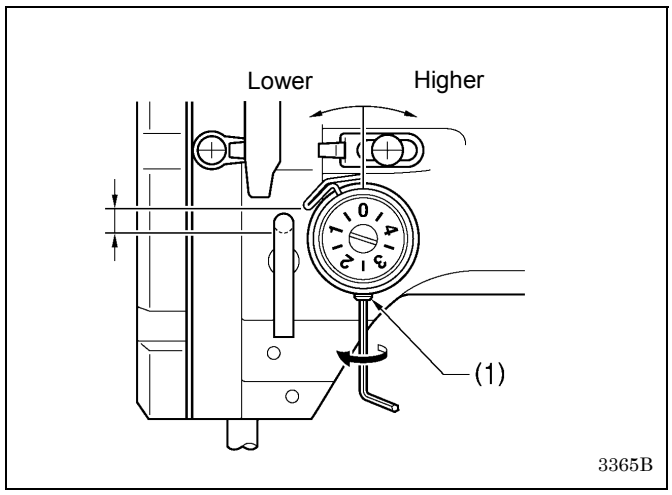
8-2-1. Upper and lower thread tension



3317B 3318B

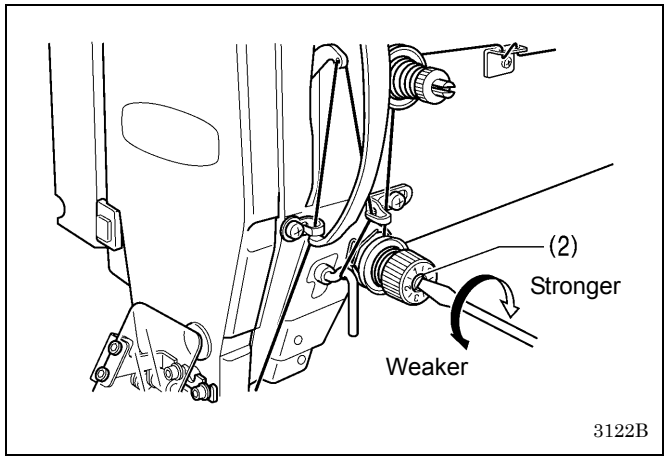
8-3. Thread take-up spring

Specifications	Medium-weight materials (-03[])	Heavy-weight materials (-05[])	Seatbelt (-07[])
Thread take-up spring height (mm)	7 − 10		2 − 4
Thread take-up spring tension (N)	0.2 − 0.5	0.6 − 1.2	1.0 − 1.4



<Thread take-up spring height>

Loosen the set screw (1) and turn the adjuster to adjust.



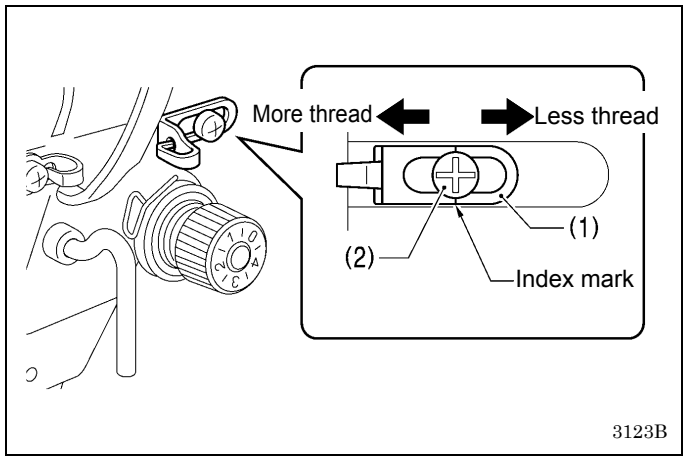
<Thread take-up spring tension>

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.

8-4. Arm thread guide R

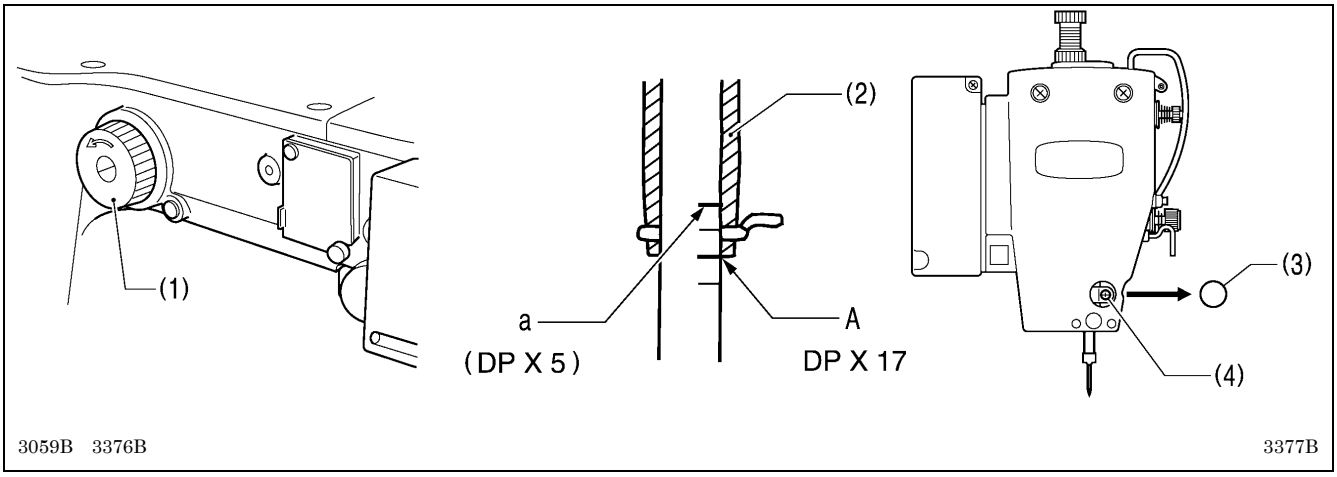


The standard position of arm thread guide R (1) is when the screw (2) is aligned with the index mark.

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.)

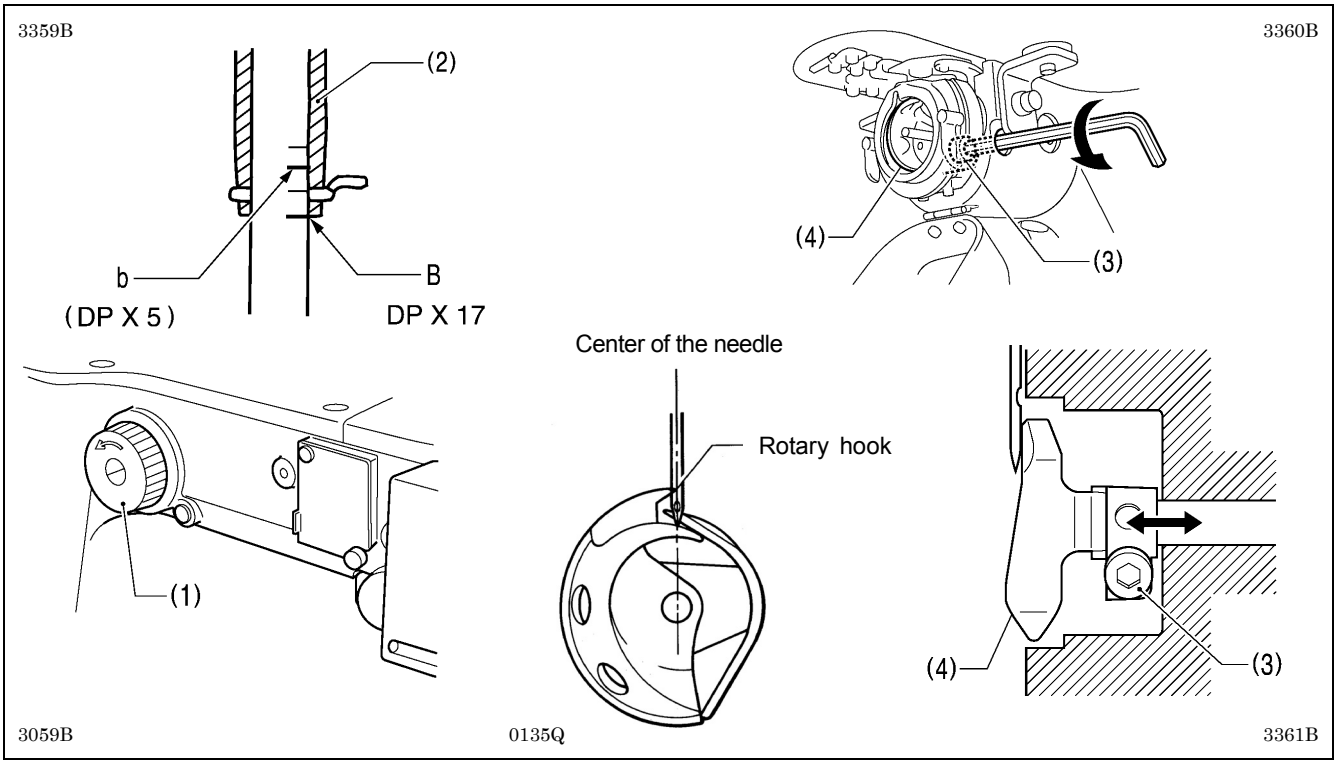
8-5. Adjusting the needle bar height



Turn the pulley (1) in the direction of the arrow to move the needle bar to the lowest position. Then remove the rubber plug (3), loosen the screw (4) 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 (2).

* If using a DP x 5 needle, use the highest reference line (reference line a).

8-6. Adjusting the timing and the driver needle guard

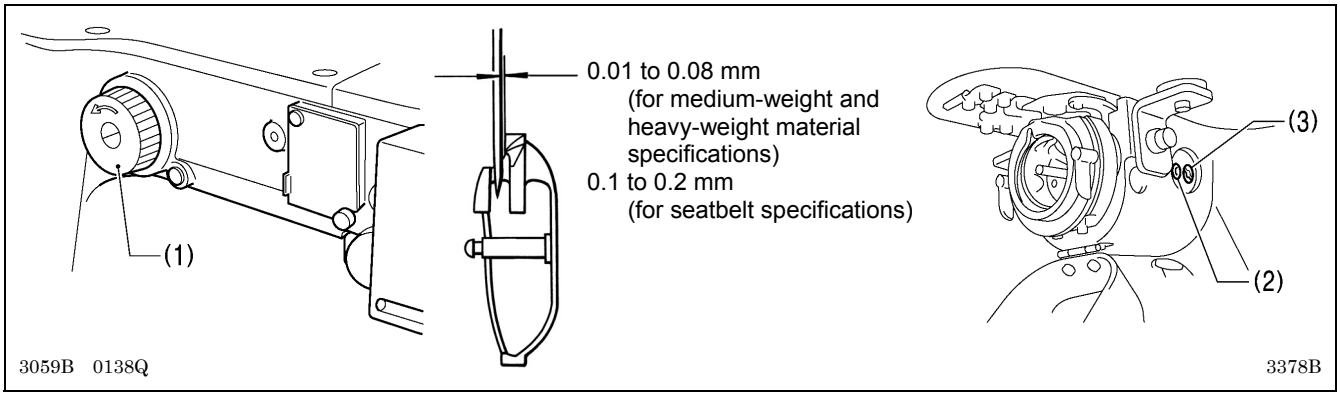


1. Turn the pulley (1) in the direction of the arrow to raise the needle bar from the lowest position until the lowest reference line on the needle bar (reference line B) is aligned with the lower edge of the needle bar bush (2).
   * If using a DP x 5 needle, align with reference line b which is the second reference line from the top.
2. Loosen the bolt (3).
3. Move the driver (4) sideways so that the rotary hook tip is aligned with the middle of the needle, and then move the driver (4) back and forth so that it is touching the needle. Then tighten the bolt (3).

NOTE:

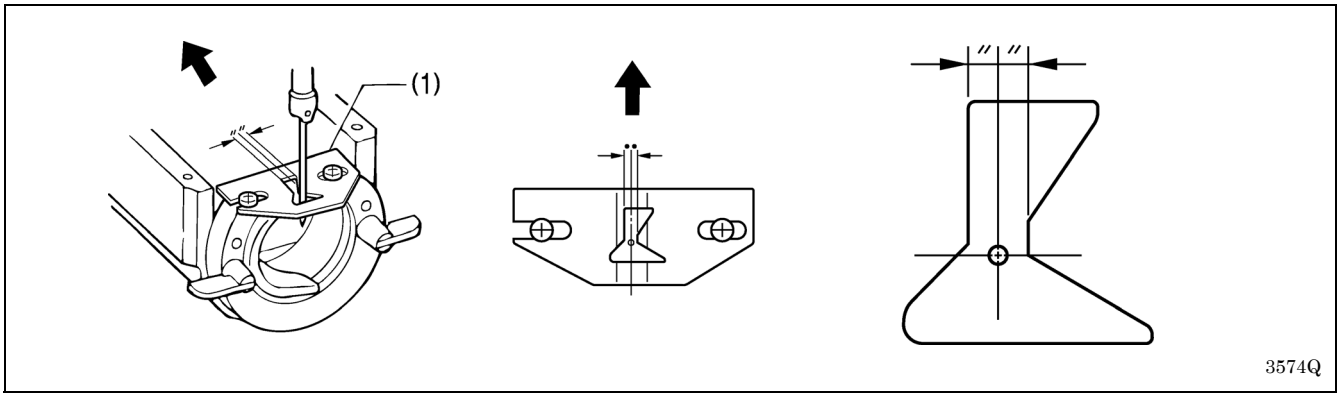
If the driver (4) crosses the needle more than necessary, it will cause problems with the thread tension. Furthermore, if it does not cross the needle, skipped stitches or needle breakages may occur.

8-7. Adjusting the needle clearance



Turn the pulley (1) in the direction of the arrow 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 clearance between the needle and the rotary hook is 0.01 to 0.08 mm.

8-8. Adjusting the shuttle race thread guide



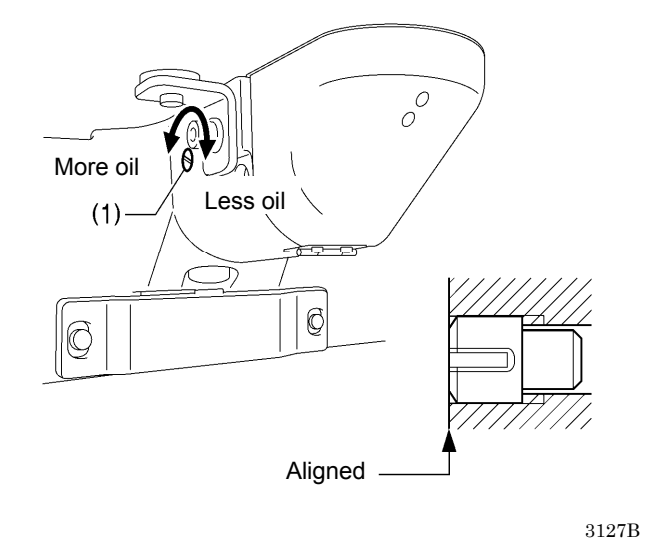
Install the shuttle race thread guide (1) by pushing it in the direction of the arrow so that the needle groove is aligned with the center of the needle plate hole.

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.

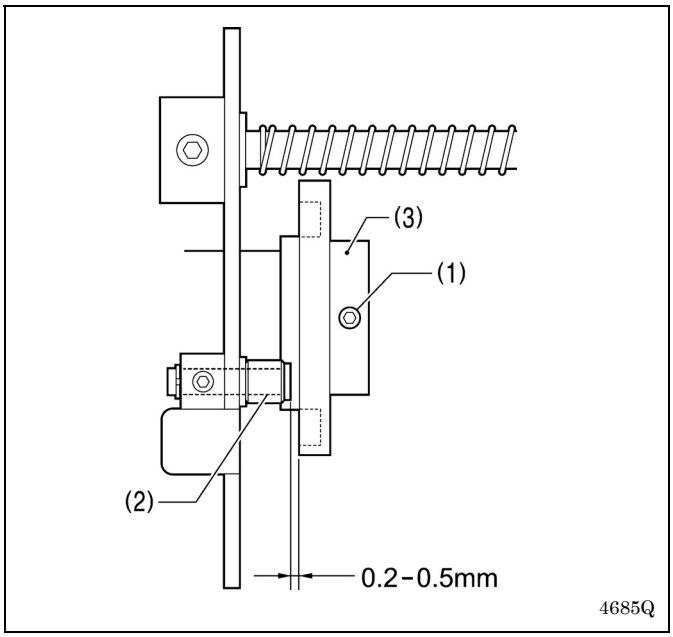
8-9. Rotary hook lubrication amount



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.

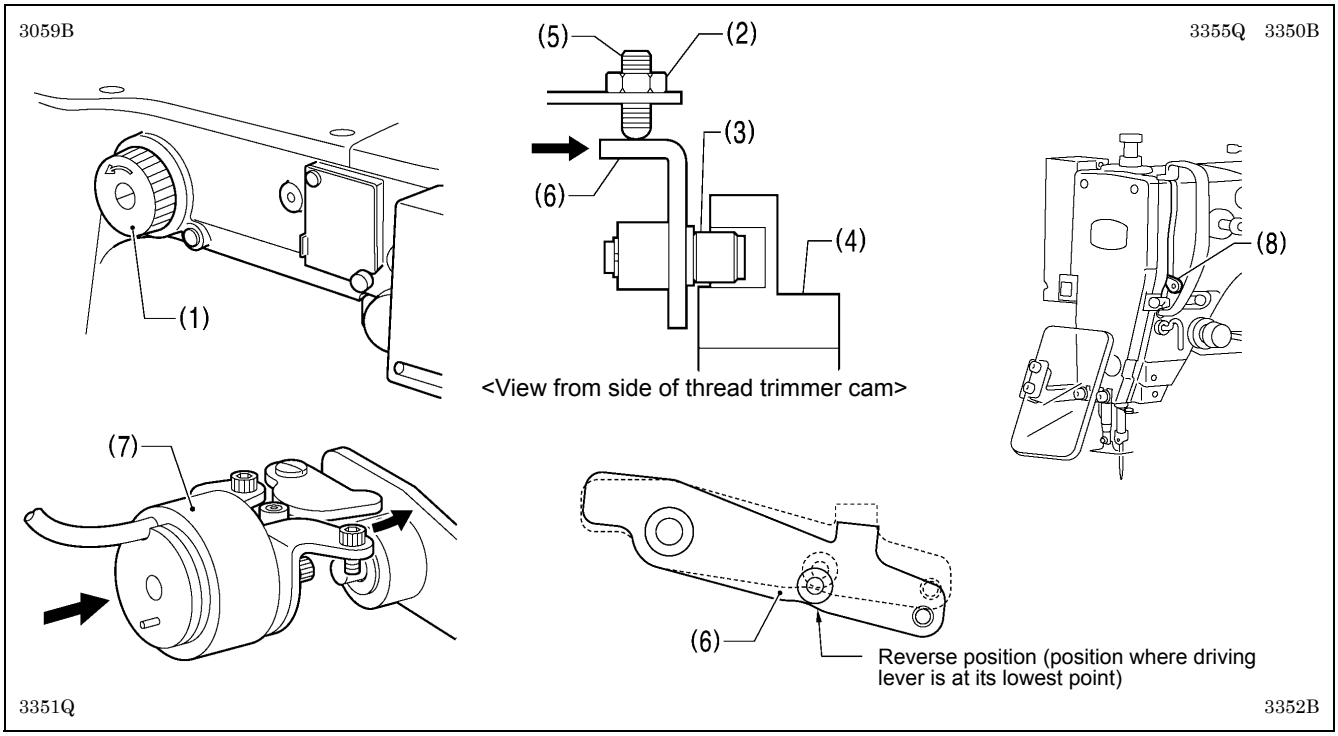
- If the set screw (1) is turned clockwise, the lubrication amount becomes smaller.
- If the set screw (1) is turned counterclockwise, the lubrication amount becomes greater.

8-10. Adjusting the thread trimmer cam position

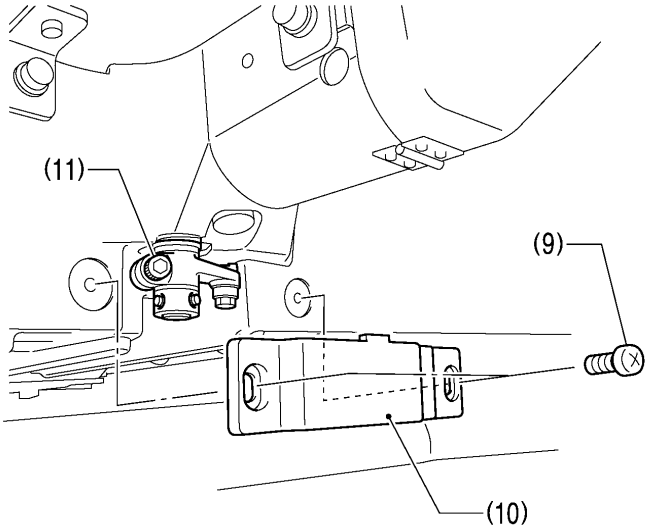


1. Remove the top cover.
2. Loosen the two set screws (1), and then adjust the position of the thread trimmer cam (3) so that the distance between the edge of the collar shaft (2) and the edge of the thread trimmer cam (3) is 0.2 to 0.5 mm. After adjusting, tighten the two set screws (1) one after the other. (Refer to “7-1. Upper shaft mechanism”.)
3. Install the top cover.

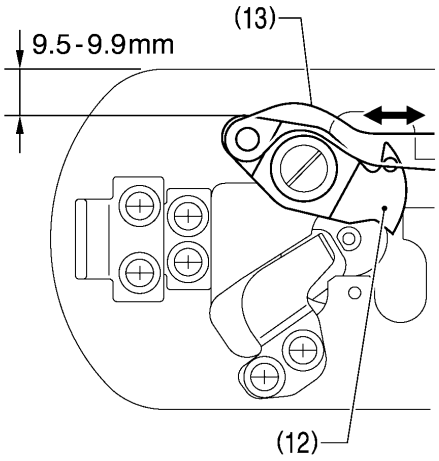
8-11. Adjusting the position of the movable knife



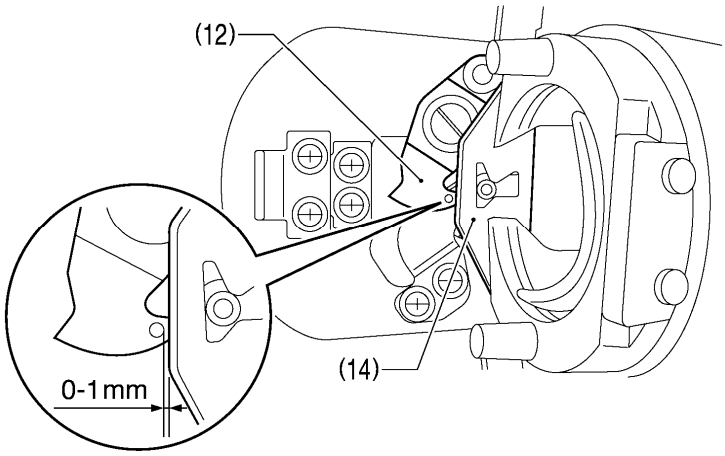
1. Open the top cover and tilt back the machine head.
2. Turn the pulley (1) in the direction of the arrow to move the needle bar to its lowest position.
3. Loosen the nut (2), tighten the set screw (5) until the collar (3) touches the inside of the groove in the thread trimmer cam (4), and then loosen the set screw (5) by approximately 1/4 of a turn.
4. Tighten the nut (2), 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 (6) by hand toward the thread trimmer cam (4) until the collar (3) touches the groove of the thread trimmer cam (4), and then check that the driving lever (6) returns smoothly to its original position when it is released.
5. Turn the pulley (1) in the direction of the arrow to move the needle bar to its lowest position, and push the thread trimming solenoid (7) as far as it will go.
6. 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 (6) to the reverse position and so that the driving lever (6) is at its lowest point (when the thread take-up (8) is close to its lowest position).



3353B



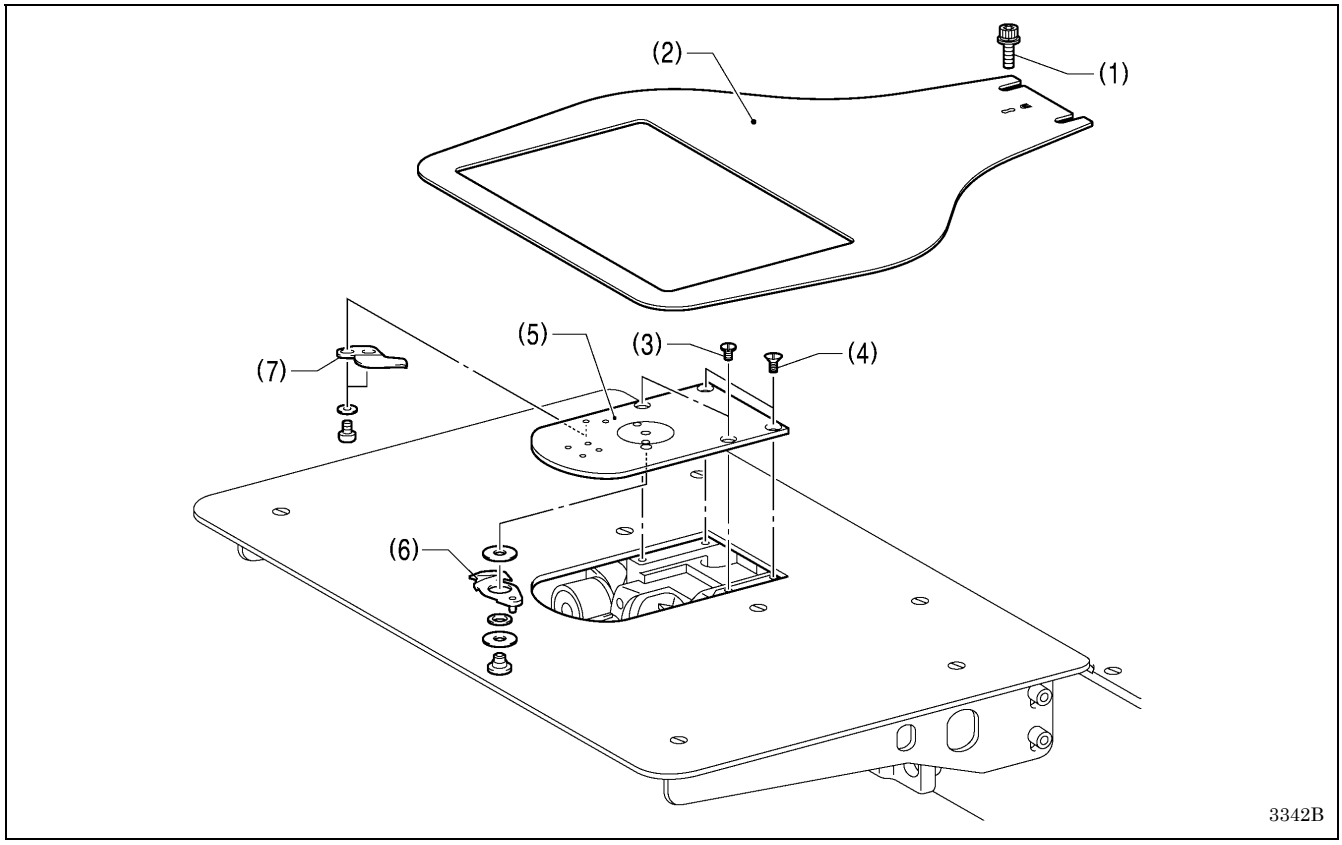
3354B



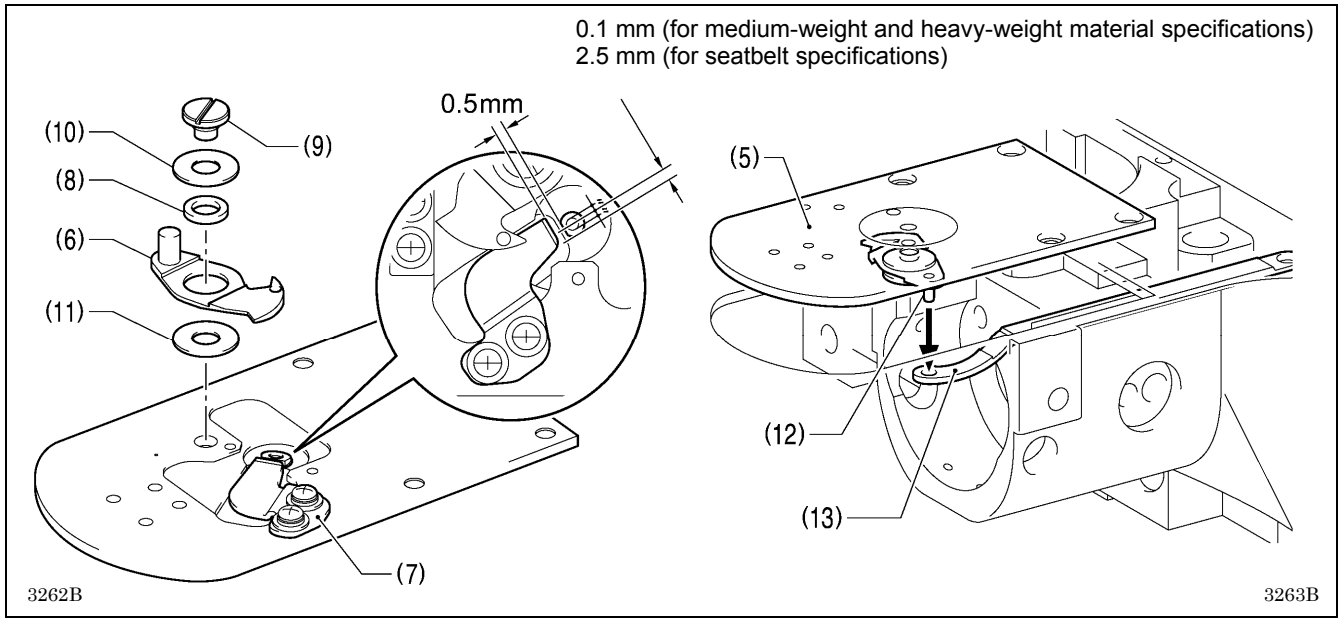
3356B

7. Loosen the two screws (9), and then remove the cover (10).
8. Loosen the bolt (11).
9. Move the movable knife connecting plate (13) back and forth to adjust so that the distance from the ridge on the right side of the needle plate to the ridge on the movable knife (12) is 9.5 to 9.9 mm.
10. After tightening the bolt (11), check the above position once more.
    * Ignore the index mark on the needle plate.
11. Replace the cover (10).
12. Check that there is a gap of about 0 - 1 mm between the outside of the hole in the movable knife (12) and the ridge line on the shuttle race thread guide (14) when there is still play between the parts.

8-12. Replacing the movable and fixed knives

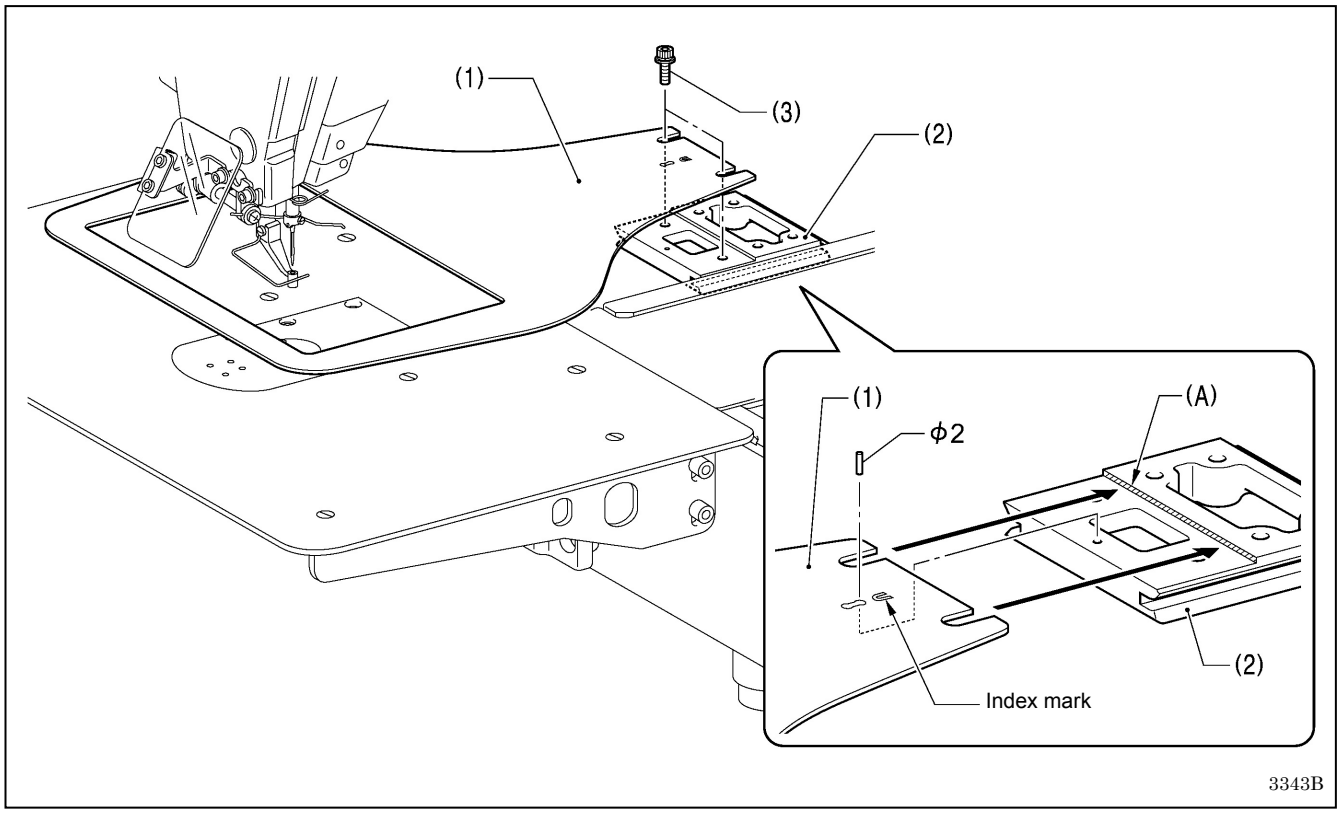


1. Loosen the two bolts (1) and then remove the feed plate (2).
2. Open the shuttle race cover, and remove the two screws (3) and the two flat screws (4), and then remove the needle plate (5).
3. Remove the movable knife (6) and the fixed knife (7).



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 (6) 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.

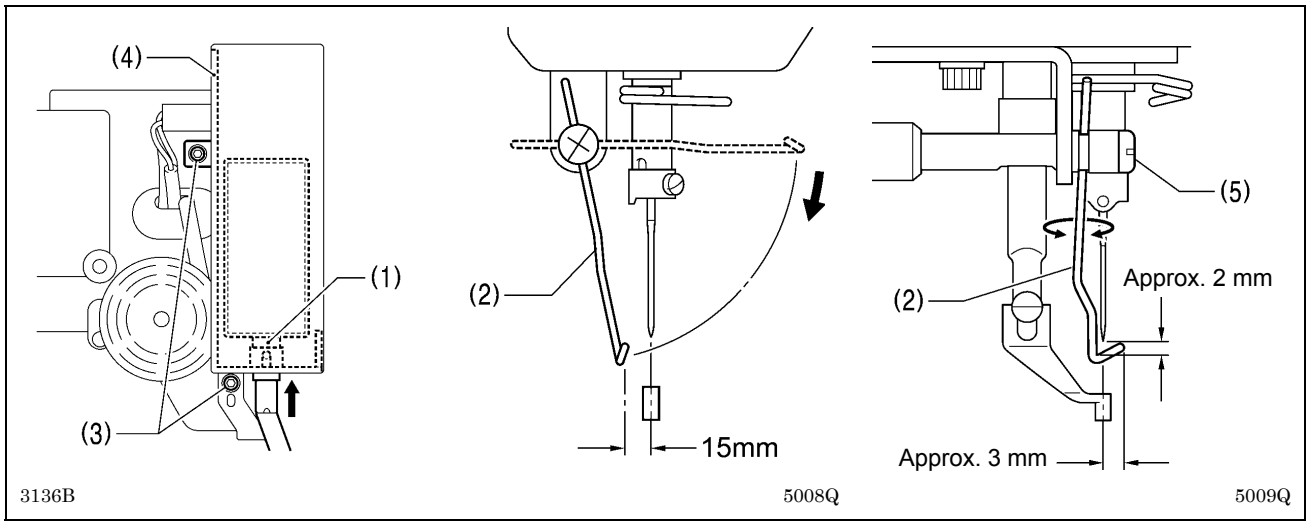
8-13. Installing the feed plate



NOTE:
Install the feed plate (1) so that the surface with the index mark (U) is facing upward.

Place the rear edge of the feed plate (1) against the stepped part of base plate Y (2) (shaded section (A)) and use a 2 mm diameter pin (such as a needle) to align the hole in the feed plate (1) with the hole in base plate Y (2); then tighten the two socket bolts (3).

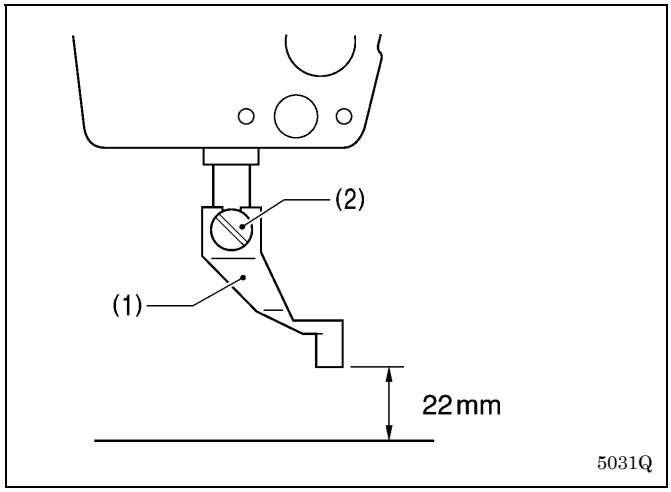
8-14. Adjusting the thread wiper



1. 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.
2. Loosen the screw (5) and adjust the position of the thread wiper (2) so that the distance from the thread wiper (2) 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.

8-15. Presser foot installation position

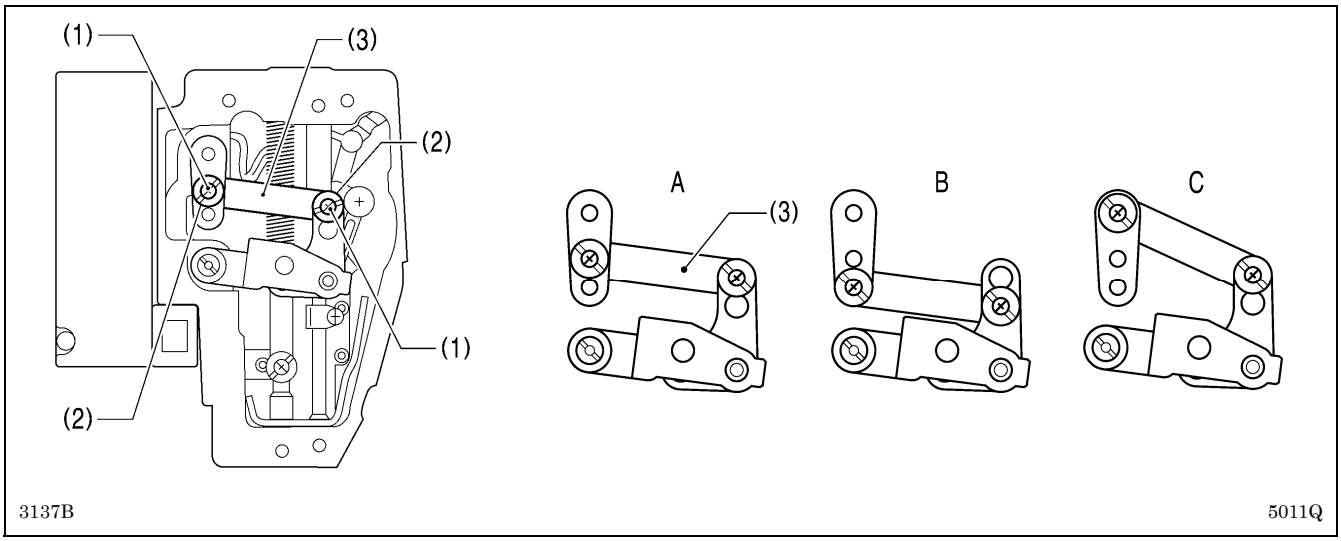


Install the presser foot (1) with the screw (2) so that the distance from the bottom of the presser foot (1) to the top of the needle plate is 22 mm when the sewing machine is stopped and the presser foot (1) is raised.

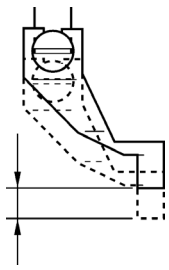
8-16. Adjusting the intermittent work clamp

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>

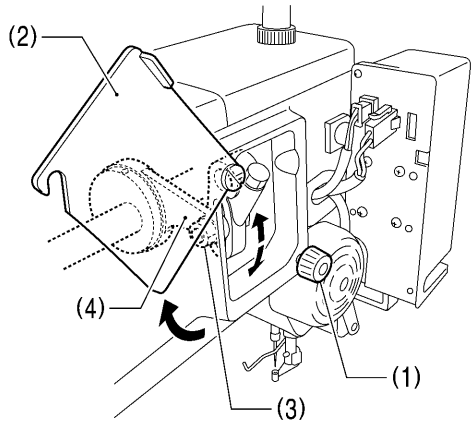


1. Remove the face plate.
2. Remove the two screws (1) and the two shoulder screws (2), and then remove stepping clamp link A (3).
3. Change the installation position for stepping clamp link A (3) to either A, B or C above.
   If the position of the stepping clamp connecting rod is adjusted as described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

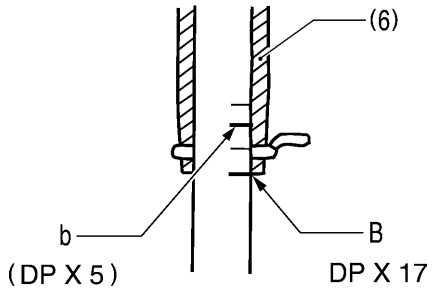
Installation position	Intermittent stroke range	
A	2 - 4.5 mm	 5012Q
B	4.5 - 10 mm	
C	0 mm (Intermittent presser foot does not move up and down)	

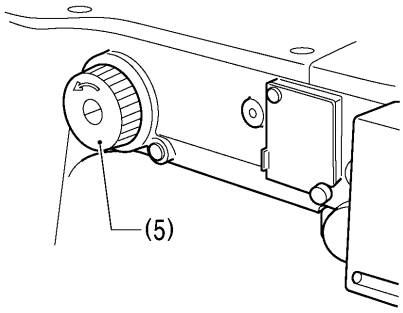
<Stepping clamp connecting rod position adjustment>

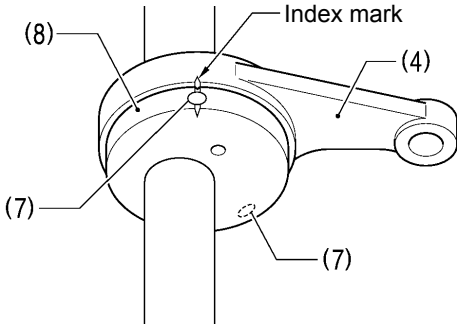
3138B



3380B







3379B

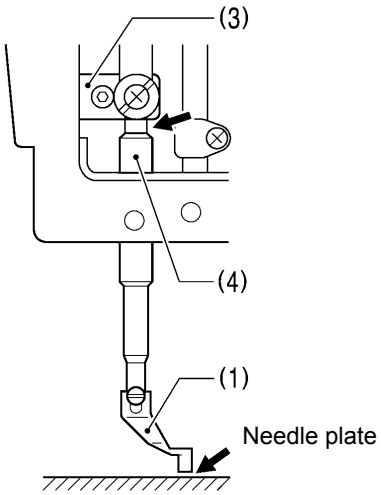
3381B

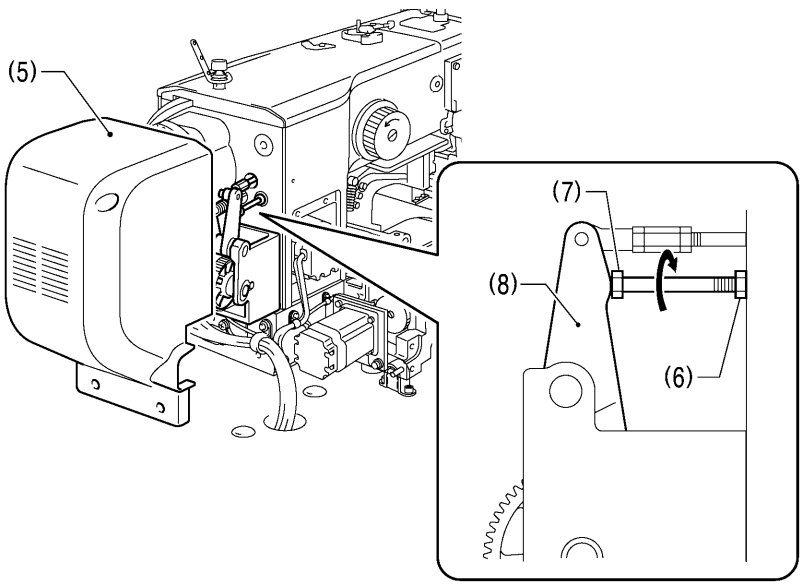
1. Loosen the screw (1), and then open the cover (2).
2. Loosen the nut (3), and then adjust the position of the stepping clamp connecting rod (4).
   - When the stepping clamp connecting rod (4) is raised, the intermittent stroke will increase.
   - When the stepping clamp connecting rod (4) is lowered,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

   Next, adjust the needle bar and presser foot timing.
3. Turn the pulley (5) in the direction of the arrow 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 (6).
   (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 (7).
5. Align the index marks on the stepping clamp cam (8) and the stepping clamp connecting rod (4), and then tighten the two set screws (7).

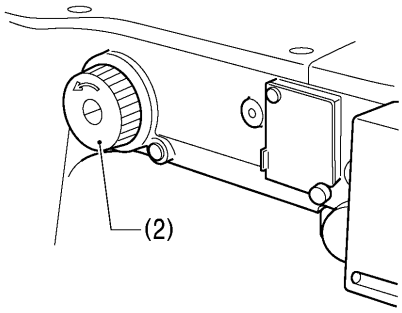
Check the following after changing the intermittent stroke.

3383B





3239B



3382B

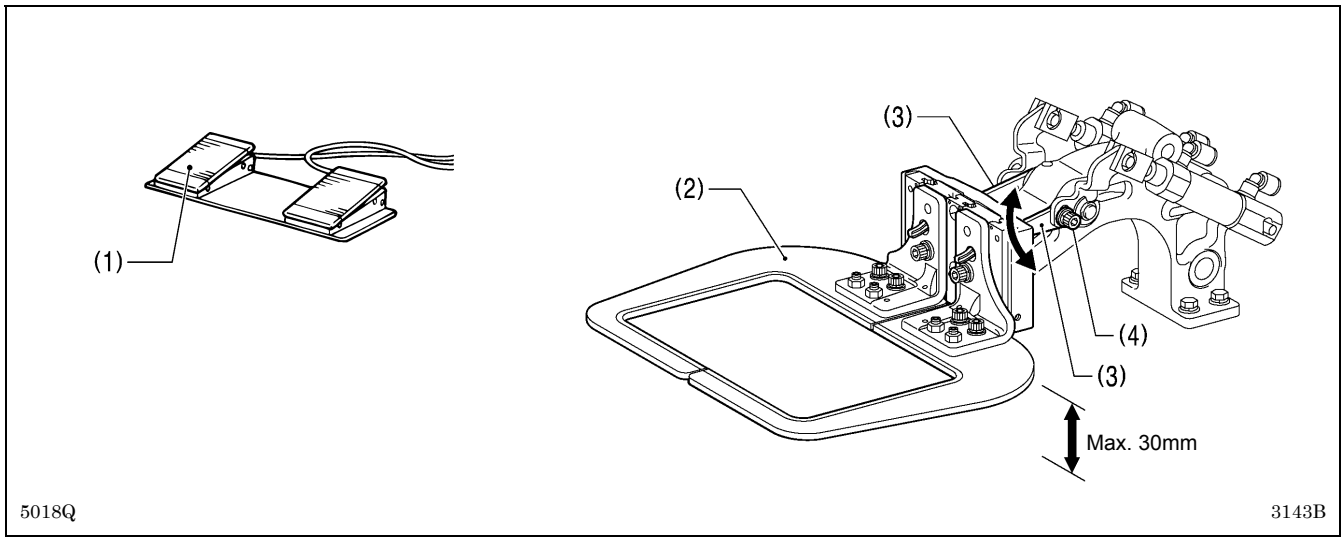
1. With the intermittent presser foot (1) lowered, turn the pulley (2) in the direction of the arrow to move the intermittent presser foot (1) to its lowest position.
2. Check that the presser foot (1) does not touch the needle plate and that the presser bar clamp (3) does not touch the presser bar bush (4).

<If they are touching>
Remove the motor cover (5).
Loosen the nut (6), and turn the bolt (7) until it is pressing against the intermittent drive lever (8), and then adjust until the two points mentioned above are not touching.

8-17. Adjusting the work clamp lift amount

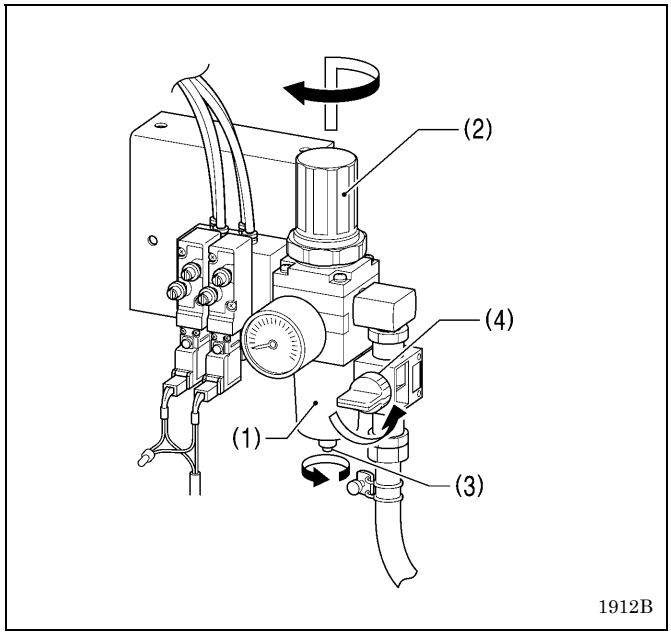
<Motor-driven work clamp specifications>
The operation panel settings can be used to adjust the height to within 15 - 25 mm. (Refer to “5-5. Setting the work clamp lift amount” in the instruction manual.)

<Pneumatic work clamp specifications>
The maximum lift amount for the work clamp is 30 mm above the surface of the needle plate.



1. Turn on the air, and then depress the 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.

8-18. Adjusting the air pressure (pneumatic work clamp specifications)

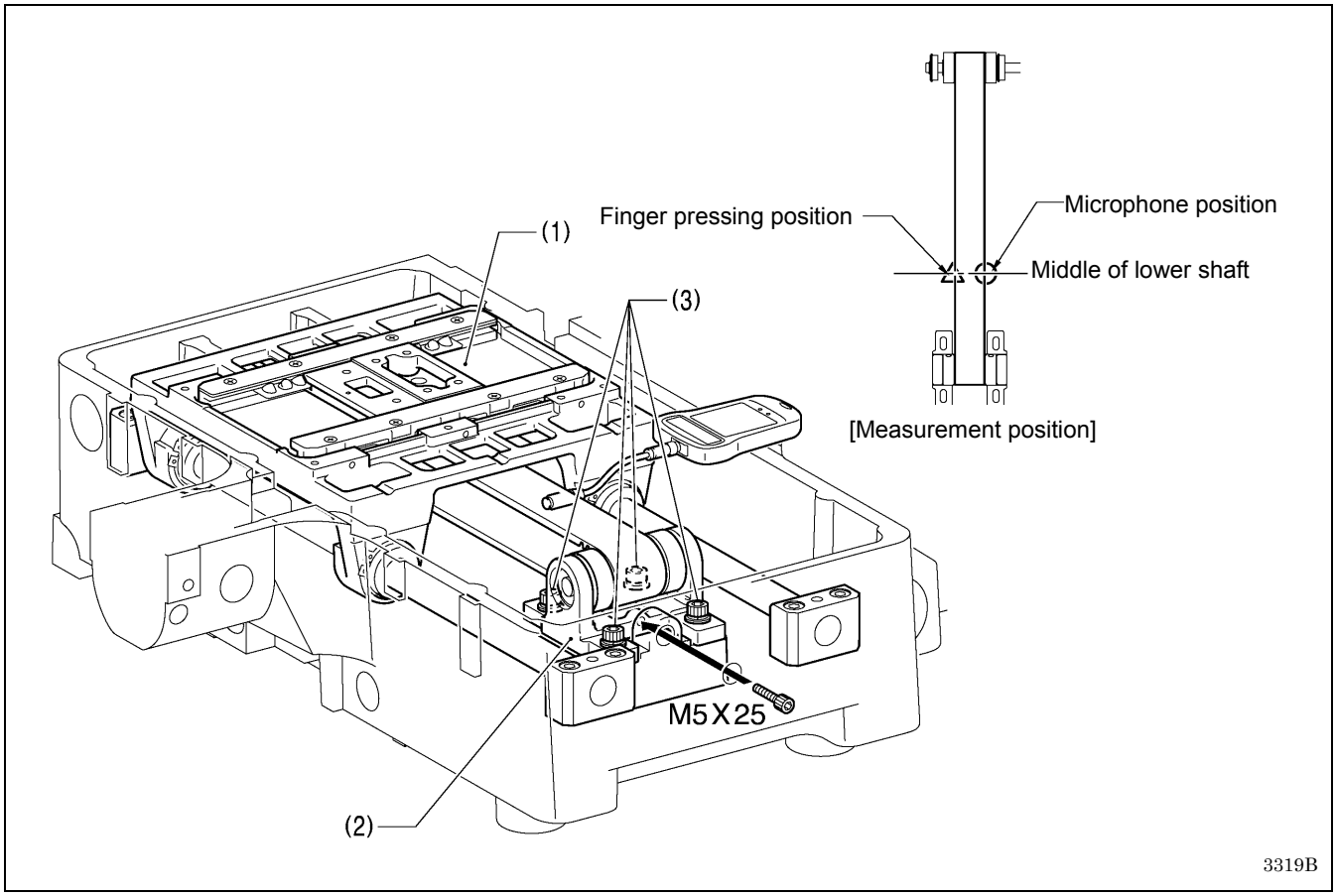


Lift up the handle (2) of the regulator (1) and then turn it to adjust the air pressure to 0.5 MPa.
After adjustment is complete, push the handle (2) downward to lock it.

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

NOTE:
Open the air cock (4) slowly.

8-19. Belt tension adjustment



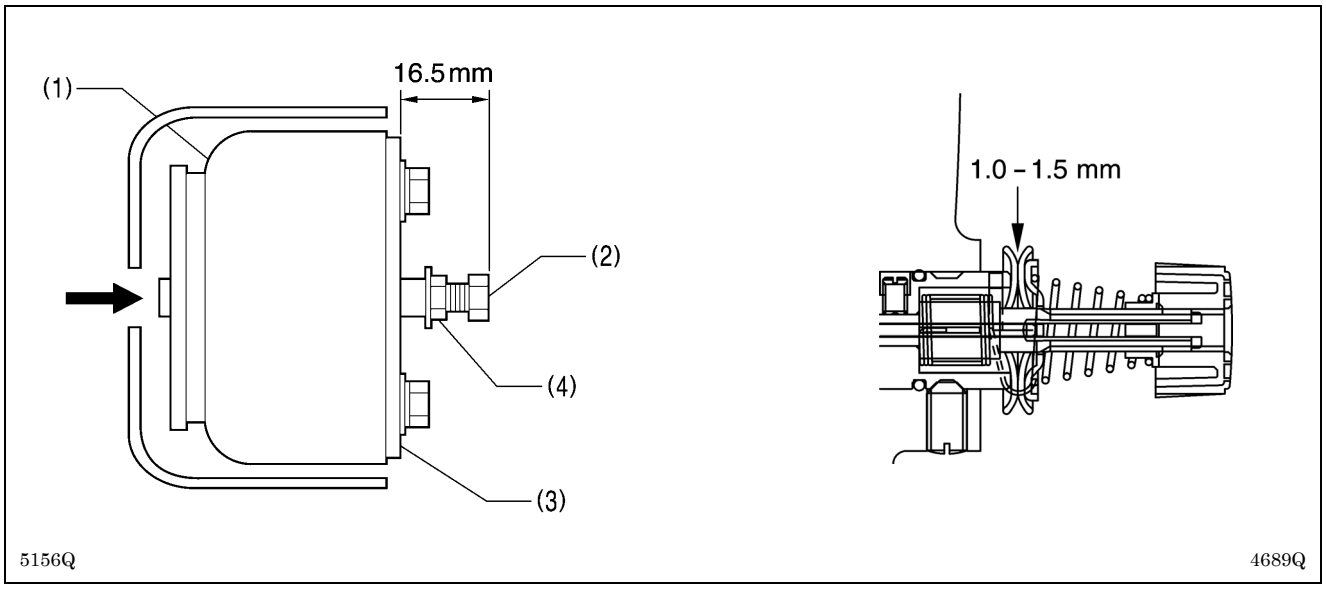
1. Move the X-feed bracket (1) at the left edge of the sewing area.
2. Loosen the four bolts (3) of the X-pulley bracket (2), and then provisionally tighten them.
3. Pass the M5 x 25 screw through the countersunk hole in the side of the bed and screw it into the tap hold in the X-pulley bracket (2). Then pull the X-pulley bracket (2) to increase the tension.
4. Tighten the four bolts (3), and then remove the M5×25 screw.
5. Use a tension gauge to measure the belt tension at the middle of the lower shaft while referring to "Measurement position" in the illustration.

* Check that the value for the belt tension is within the following value ranges. If it is not within this range, repeat steps 3 to 5.
[For a new belt: 530 – 570N; For a reused belt: 420 – 570N.]

* The belt tension gauge should be set to measure a unit weight of 4 g/mm･m , a belt width of 30 mm and a span length of 310 mm.

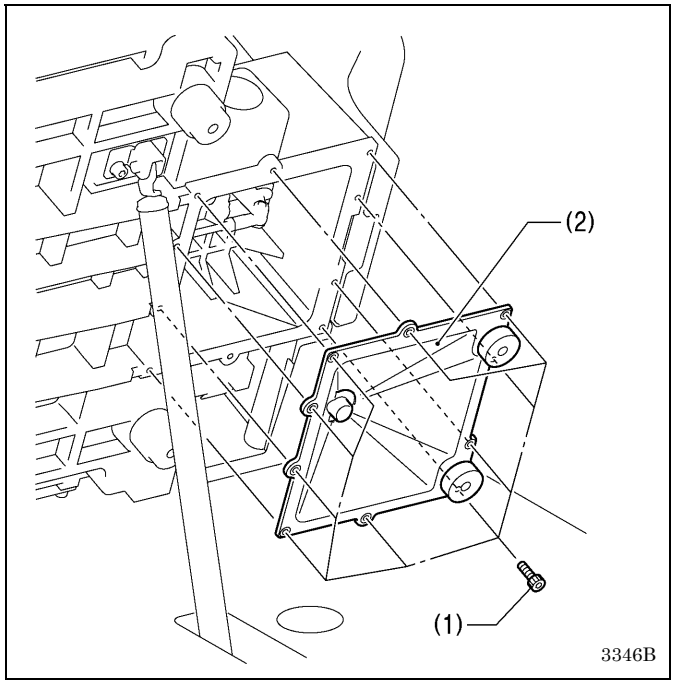
* It is recommended that you use the Yunitta U-505 tension gauge.

8-20. Adjusting the tension release amount

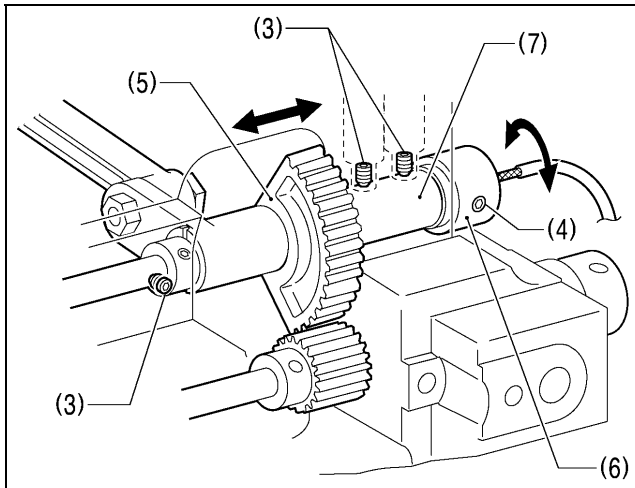


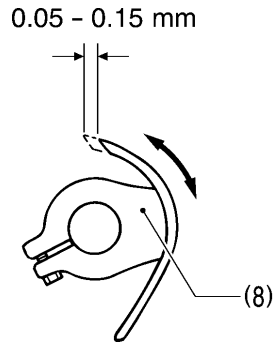
1. Loosen the nut (4) and turn the bolt (2) to adjust so that the distance between the tip of the bolt (2) and the solenoid setting plate (3) is 16.5 mm when the plunger of the tension release solenoid (1) is pushed in as far as it will go.
2. Check that the tension disc opening amount is 1.0 - 1.5 mm when the tension release solenoid (1) is installed to the arm and the plunger is pushed with a screwdriver or similar tool through the hole in the solenoid cover.

8-21. Adjusting the backlash of the lower shaft gear



1. Gently tilt back the machine head.
2. Remove the ten screws (1) and remove the oil cover (2).
   * When the oil cover is removed, oil will drip out from it, so it is recommended that you place a rag or similar over the table to catch the oil that drips.

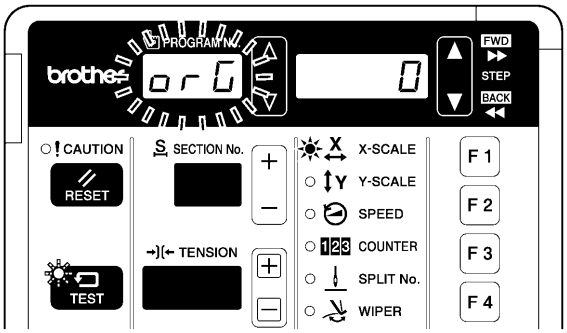
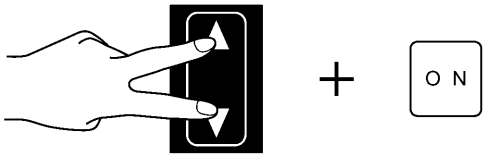
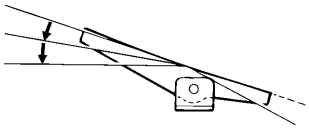




3. Loosen the three set screws (3).
4. Loosen the set screw (4) and turn the pulley while moving the rock gear (5) back and forth. At the position where the pulley moves freely, place set screw collar R (6) against the edge of the bed and tighten the set screw (4).
5. Turn the rock gear shaft (7) to adjust the play at the end of the driver (8) to 0.05 – 0.15 mm, and tighten the three set screws(3).

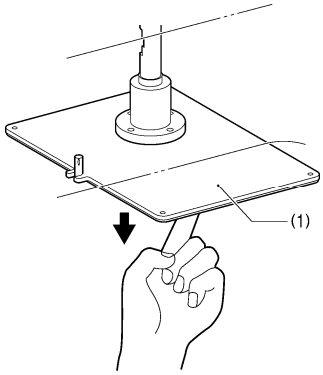
8-22. Adjusting the home position

8-22-1. Work clamp lift home position

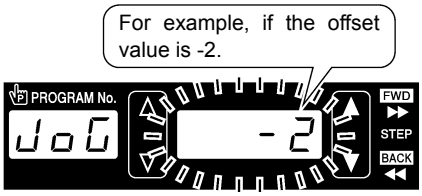
1	**With the power switch turned off, turn the pulley in the direction of the arrow to set the needle to the needle up stop position (near the highest thread take-up position).**
2	 While pressing the ▲▼ keys simultaneously, turn on the power switch.  ・ “orG” will flash in the PROGRAM No. display and the currently-recorded offset value will be displayed in the menu display. 3256B 2789B
3	 2798B Press the SELECT key so that the THREAD/CLAMP indicator illuminates.
4	2nd step  4441Q Depress the foot switch to the 2nd step (for a two-pedal foot switch, depress the start switch). ・ Home position detection for the work clamp lift motor will be carried out based on the currently-displayed offset value. ・ “orG” will illuminate in the PROGRAM No. display. * If you would like to reset, press the RESET key for 2 seconds or more at this time. Then the offset value will be reset to “0” and home position detection for the work clamp lift motor will be carried out.  2634B

(Continued on next page)

5 **<Motor-driven work clamp specifications>**

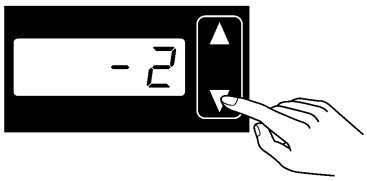


Touch the bottom of the work clamp lifter plate and check the position where it starts to lower.

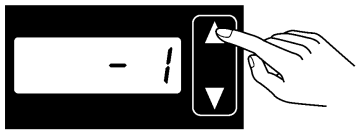


1. Press the ▲ or ▼ key to change the offset value (-999 to 999) so that the work clamp lifter plate (1) moves to the position where it starts to lower.

   The offset value in the menu display will flash, and "JoG" will illuminate in the PROGRAM No. display.



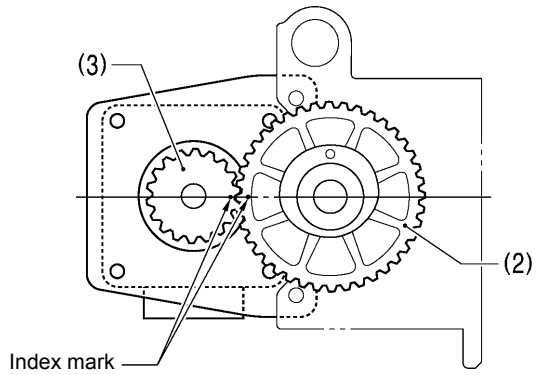
2. Press the ▲ key once to reduce the offset value by 1.

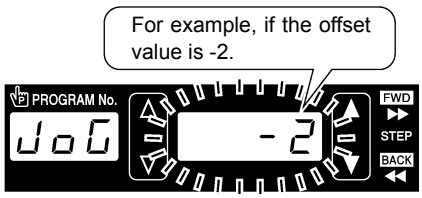


- The work clamp lifter plate (1) will move in conjunction with the setting value.

5206Q 2800B 2801B 2899B

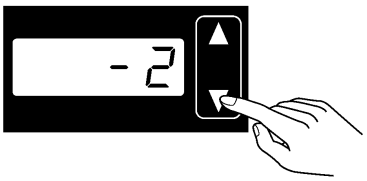
<Pneumatic work clamp specifications>



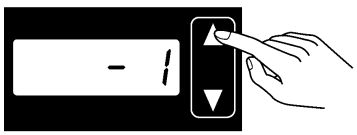


1. Remove the rear cover, align the index marks of the work clamp cam gear (2) and the work clamp driving gear (3) to the center line, and then press the ▲ or ▼ key to change the offset value (-999 – 999).

   The offset value in the menu display will flash, and "JoG" will illuminate in the PROGRAM No. display.

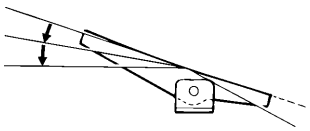


2. Press the ▲ key once to reduce the offset value by 1.



- The work clamp driving gear (3) will move in conjunction with the setting value.

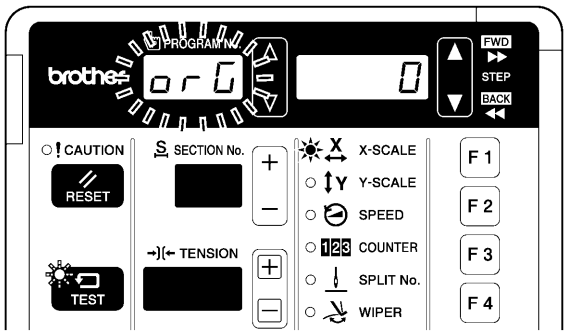
5207Q 2800B 2801B 2899B

6	2nd step  4441B	Depress the foot switch to the 2nd step (for a two-pedal foot switch, depress the start switch) to provisionally confirm the offset value. ・ Home position detection for the work clamp lift motor will be carried out based on the currently-displayed offset value. ・ “JoG” will disappear from the TENSION display.
7	**Repeat steps 5 and 6 to set the home position to the correct position.**	
8	 2414B	Press the ENTER key to confirm the offset value. ・ The offset value will illuminate in the menu display. * If the offset value has not been provisionally confirmed (if “JoG” is illuminated), the invalid buzzer will sound.
9	**Exit adjustment mode**  TEST indicator switches off 2404B	Press the TEST key. ・ The display will return to the normal display and the sewing machine will switch to home position detection standby.
10	**Turn off the power switch.**	

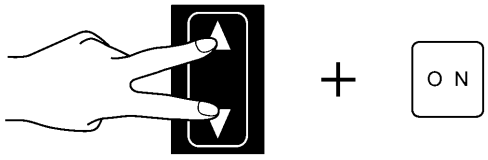
8-22-2. X-Y feed home position

1 **With the power switch turned off, turn the pulley in the direction of the arrow to set the needle up stop position (near the highest thread take-up position).**

2



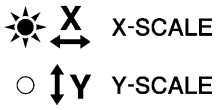
While pressing the ▲▼ keys simultaneously, turn on the power switch.



- "orG" will flash in the PROGRAM No. display and the currently-recorded offset value will be displayed in the menu display.

3256B 2789B

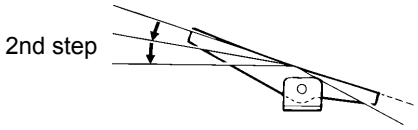
3



Press the SELECT key so that either the X-SCALE indicator or the Y-SCALE indicator illuminates.

2790B 2401B

4



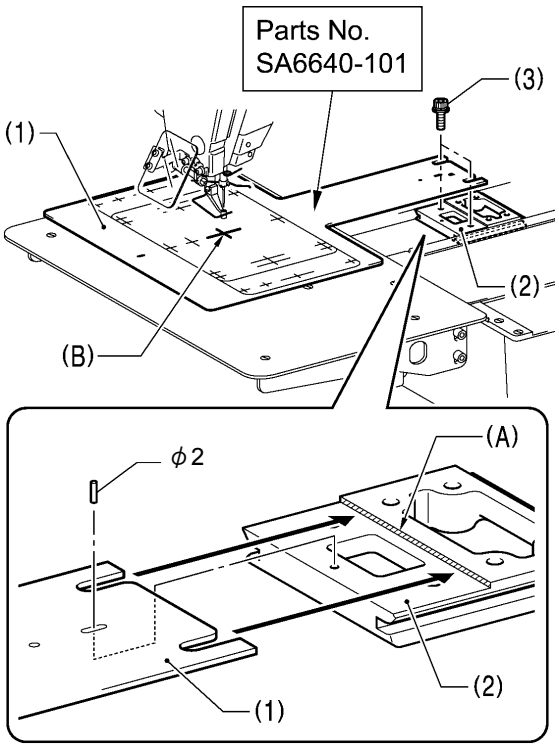
Depress the foot switch to the 2nd step (for a two-pedal foot switch, depress the start switch).

- Home position detection for the X-feed or Y-feed motor will be carried out based on the currently-displayed offset value.
- "orG" will illuminate in the PROGRAM No. display.

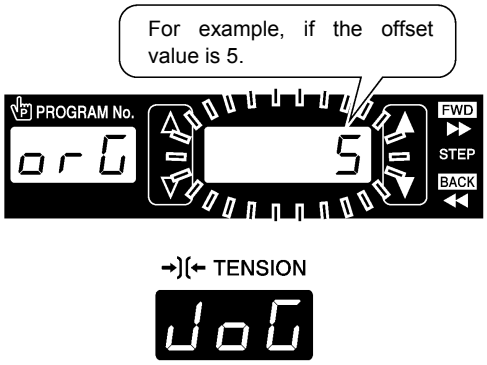
  * If you would like to reset, press the RESET key for 2 seconds or more at this time. Then the offset value will be reset to "0" and home position detection for the X-feed or Y-feed motor will be carried out.

4441Q 2791B 2634B

5



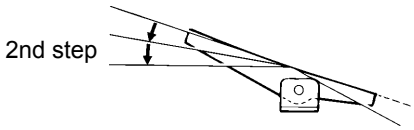
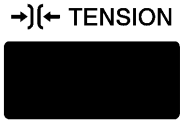
1. Remove the feed plate.
2. Place the rear edge of the home position reference plate (1) against the stepped part (shaded section (A)) of Y-feed bracket (2) and use a 2 mm diameter pin (such as a needle) to align the hole in the home position reference plate (1) with the hole in Y-feed bracket (2); then tighten the two bolts (3).
3. Press the ▲ or ▼ key to set the offset value (-50 to 50) so that the needle drops to the center of the mark (B) on the home position reference plate.



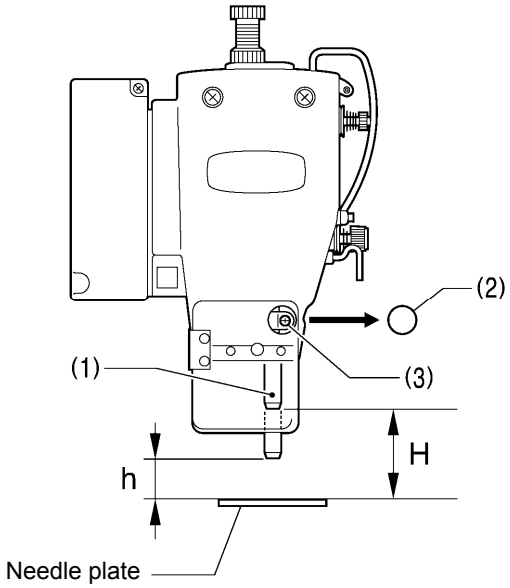
- The X-feed or Y-feed motor will operate according to the offset value.
- The offset value in the menu display will flash, and “JoG” will illuminate in the TENSION display.

3258B 2793B 2794B 2795B

(Continued on next page)

6	 	Depress the foot switch to the 2nd (for a two-pedal foot switch, depress the start switch) to provisionally confirm the offset value. ・ Home position detection for the X-feed or Y-feed motor will be carried out based on the currently-displayed offset value. Check the home position. ・ “JoG” will disappear from the TENSION display. 4441Q 2796B
7	**Repeat steps 5 and 6 to set the home position to the correct position.**	
8		Press the ENTER key to confirm the offset value. ・ The offset value will illuminate in the menu display. * If the offset value has not been provisionally confirmed (if “JoG” is illuminated), the invalid buzzer will sound. 2414B
9	**Exit adjustment mode**  TEST indicator switches off	Press the TEST key. ・ The display will return to the normal display and the sewing machine will switch to home position detection standby. 2404B

8-23. Adjusting the motor standard position



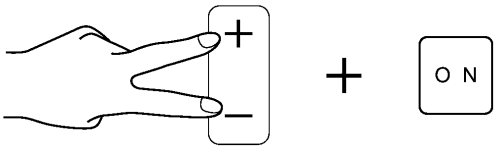
3259B

Needle	DP×17	DP×5
Distance H	57.0 mm	51.9 mm
Distance h	18.0 mm	12.9 mm

1	**Remove the needle and the needle bar thread guide.**
2	**Turn the pulley to move the needle bar (1) to its lowest position.**
3	**Remove the rubber cap (2) from the face plate, and then loosen the screw (3) of the needle bar clamp.**
4	**Adjust so that the lowest needle bar position is at the distance h.**
5	**Tighten the screw (3) and then install the rubber cap (2).**

6 **With the power switch turned off, turn the pulley in the direction of the arrow to set the needle to the needle up stop position (near the highest thread take-up position).**

7



While pressing the [+−] keys simultaneously, turn on the power switch.

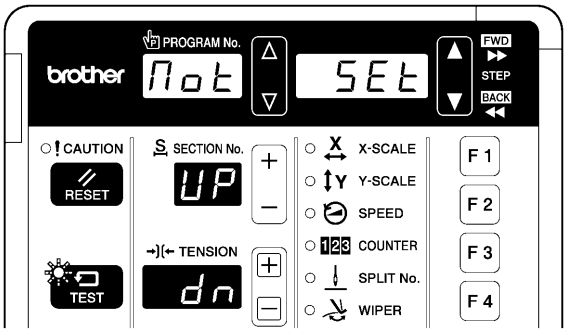
- "orG" will flash in the PROGRAM No. display and the currently-recorded offset value will be displayed in the menu display.

3364B

8 **Turn the machine pulley once to lower the needle bar (1) to height H.**

* **When the needle bar (1) is at the position of H, it is lowered 6.7 mm from its highest position.**

9



Press the ENTER key.

- "UP" will illuminate in the SECTION No. display and " dn" will illuminate in the TENSION display.

* If the displays are still flashing, carry out step 4 once more.

3260B 2414B

10 **Exit adjustment mode**

TEST indicator switches off

Press the TEST key.

- The display will return to the normal display and the sewing machine will switch to home position detection standby.

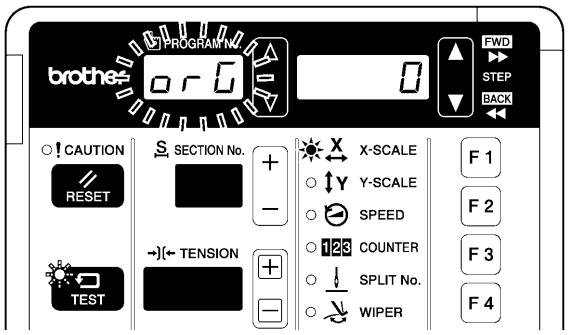
2404B

11 **Turn off the power switch, and install the needle and the needle bar thread guide.**

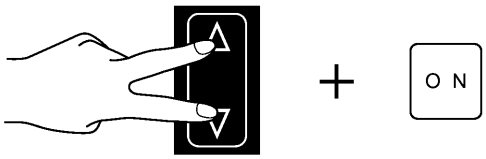
8-24. Adjusting the needle up stop position

[Adjustment method]

1



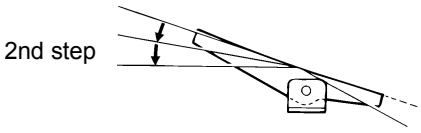
While pressing the ▽ △ keys simultaneously, turn on the power switch.



- "orG" will flash in the PROGRAM No. display and the offset value will be displayed in the menu display.

3256B 3420B

2



Depress the foot switch to 2nd step.
(If using a two-pedal foot switch, lower the work clamp before depressing the start switch.)

- X-Y home position detection will be carried out and the "orG" will stop flashing and illuminate steadily.

4441Q

3

Press the ▲ or ▼ key to set the offset value (-9 – 10).

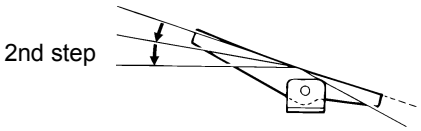
- When you press the ▲ key, the needle bar will drop, and when you press the ▼ key, it will rise.

NOTE:

After changing the offset value, check that the thread trimming operation is normal.

2793B

4



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 upper shaft will move and stop at the offset value that has been set.

4441Q

5

Exit adjustment mode

TEST indicator switches off

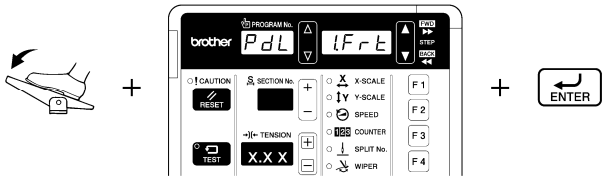
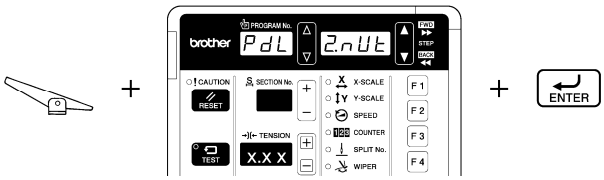
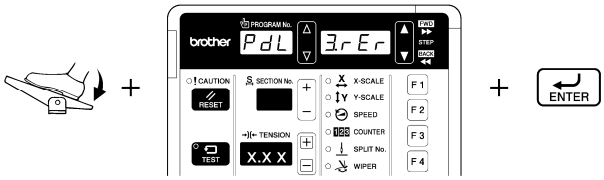
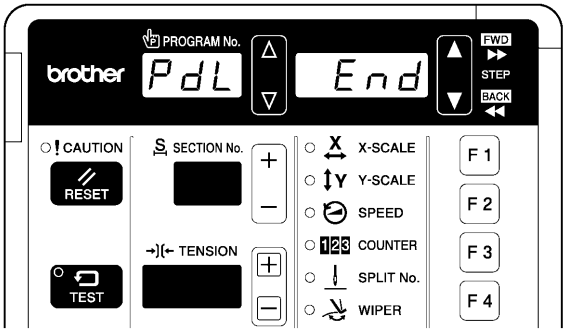
Press the TEST key.

- The offset value will be memorized and the sewing machine will switch to home position detection standby.

2404B

8-25. Setting method for standard depression strokes (Foot switch)

Use the following procedure to set operating positions for the depression strokes.

1	**Signal setting entry** 	While pressing the △ and ▲ key, turn on the power switch. ▪ “PdL” wil illuminate in the PROGRAM No. display and “1.Frt” will illuminate in the menu display. 2826B
2	**Memorizing the maximum forward position** 	With the foot switch depressed all the way forward, wait until the value in the TENSION display stabilizes and then press the ENTRY key. * XXX indicates the treadle depression voltage. 3397B
3	**Memorizing the neutral position** 	With your foot released from the foot switch, wait until the value in the TENSION display stabilizes and press the ENTER key. 3398B
4	**Memorizing the maximum backward position** 	With the foot switch depressed all the way backward, wait until the value in the TENSION display stabilizes and then press the ENTER key. 3399B
5	**Completion of setting** 	“END” will be display in the menu display. **NOTE:** If the foot switch operations are not carried out correctly, “END” will not be displayed and the buzzer will sound. After “1.Frt” is displayed in the menu display, repeat the operation from step 2. 3400B
6	**Turn off the power.**	

9. APPLYING GREASE (FEED MECHANISM)

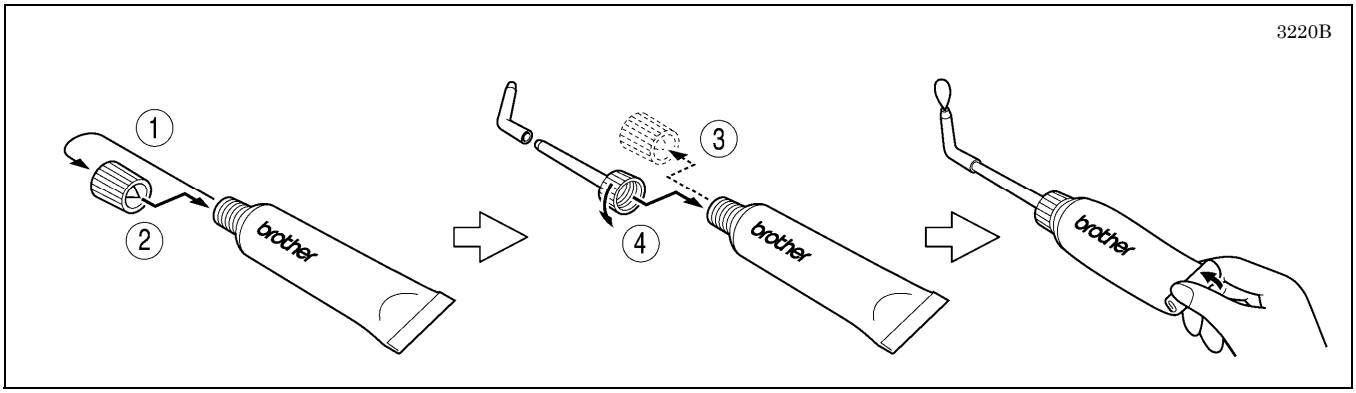
⚠ CAUTION

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.

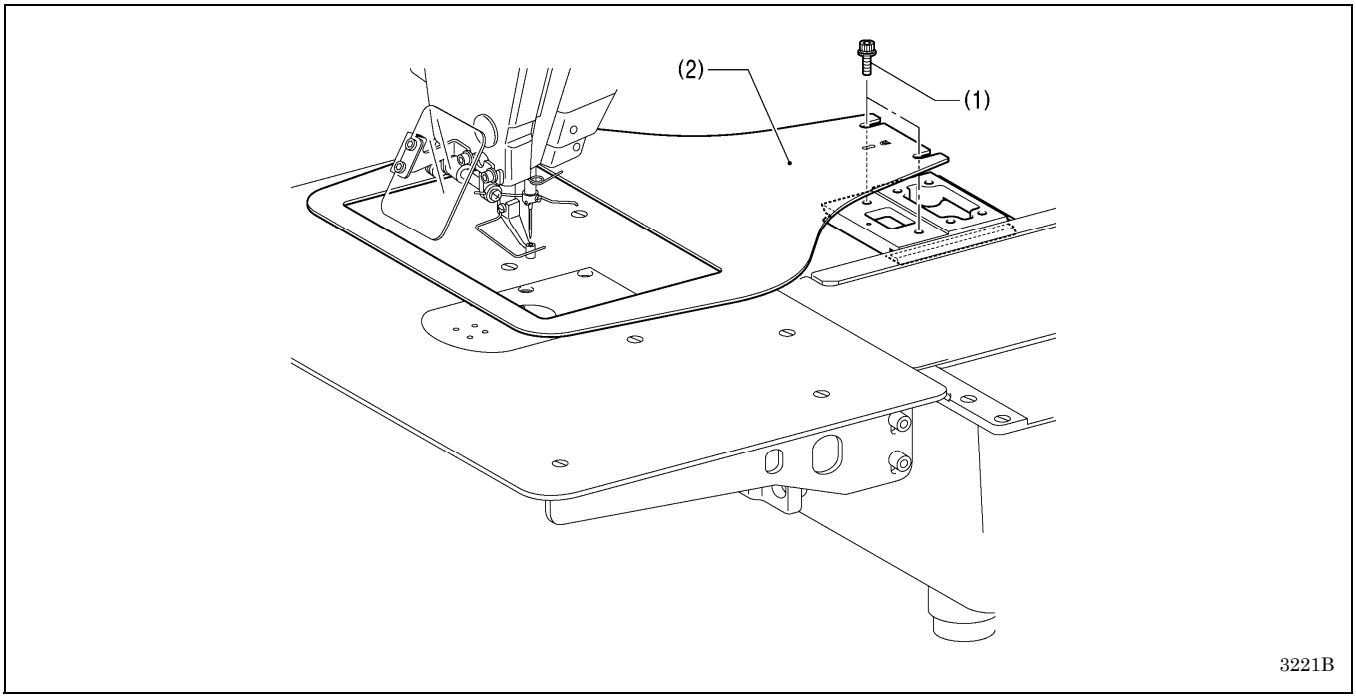
If you are frequently sewing heavy-weight materials, using the sewing machine for long periods or using the sewing machine in places where there is a lot of dust, it is recommend that you apply grease to maintain the performance of the feed mechanism.

<Applying grease>
Use Brother-specified “Grease unit (SB1275-101)”.
Ask the place of purchase for details on obtaining these items.

1. Using the tube



2. Removing the feed plate

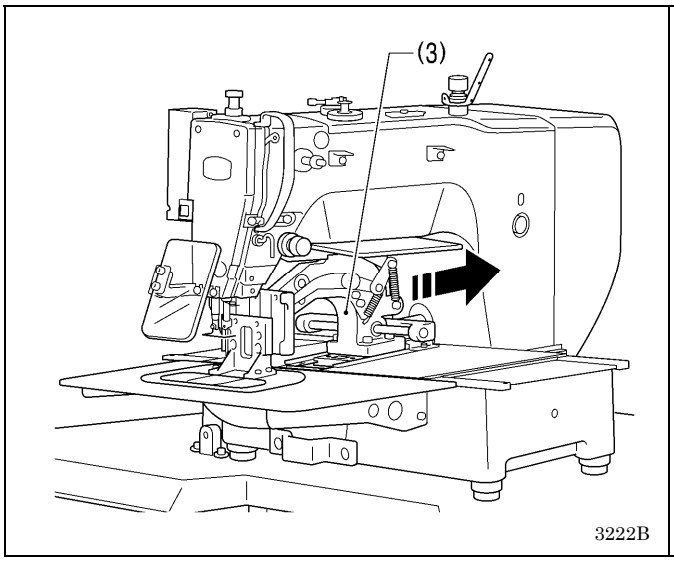


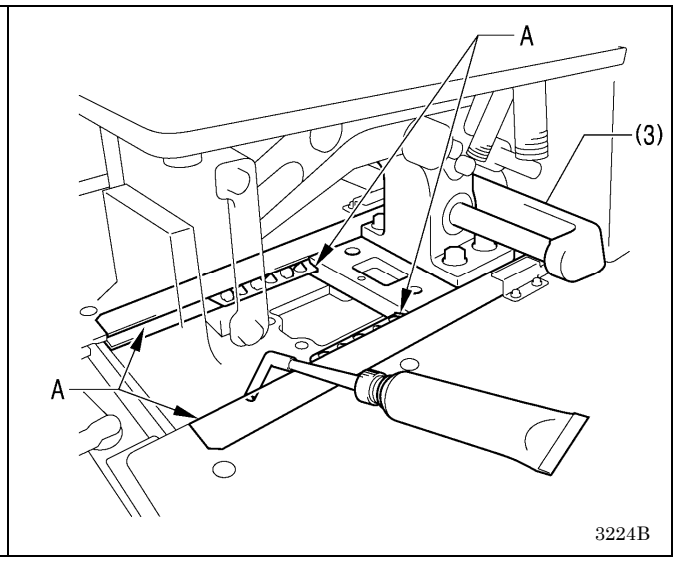
Loosen the two bolts (1), and then remove the feed plate (2).

NOTE:

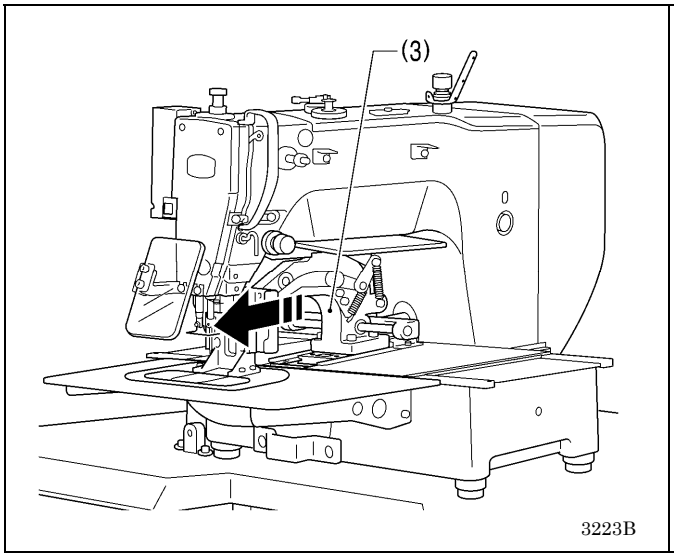
Never loosen or remove any bolts other than the bolts which are securing the feed plate (2).

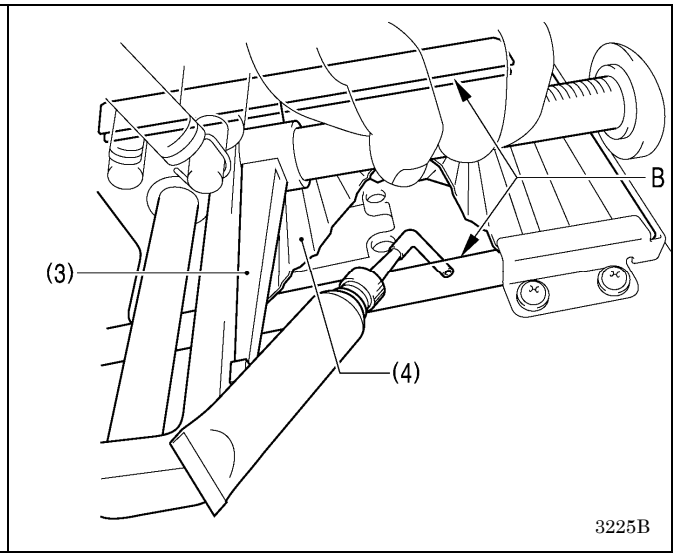
3. Applying grease





Push the work clamp arm (3) all the way to the rear edge, and then apply grease to groove A.





Push the work clamp arm (3) all the way to the front edge, lift up the bellows (4), and then apply grease to groove B.

4. Install the feed plate. (Refer to the CD Instruction Manual “10-11. Installing the feed plate”.)

10. ELECTRIC MECHANISM

⚠ DANGER

Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltage are present will result in serious injury from electric shocks.

10-1. Precautions at the time of adjustment

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

Electric shock

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

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

Some adjustments require measuring the voltage while the power is turned on with the control box kept open.
In such a case, be careful no to touch any place other than that for the measurement. In addition, always keep in mind that a high voltage remains for about 5 minutes after power is turned off.

Injury

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

10-2. Components inside and outside the control box and in the operation panel

Main PCB
Secured to the rear. This PCB drives the pulse motor and solenoids.

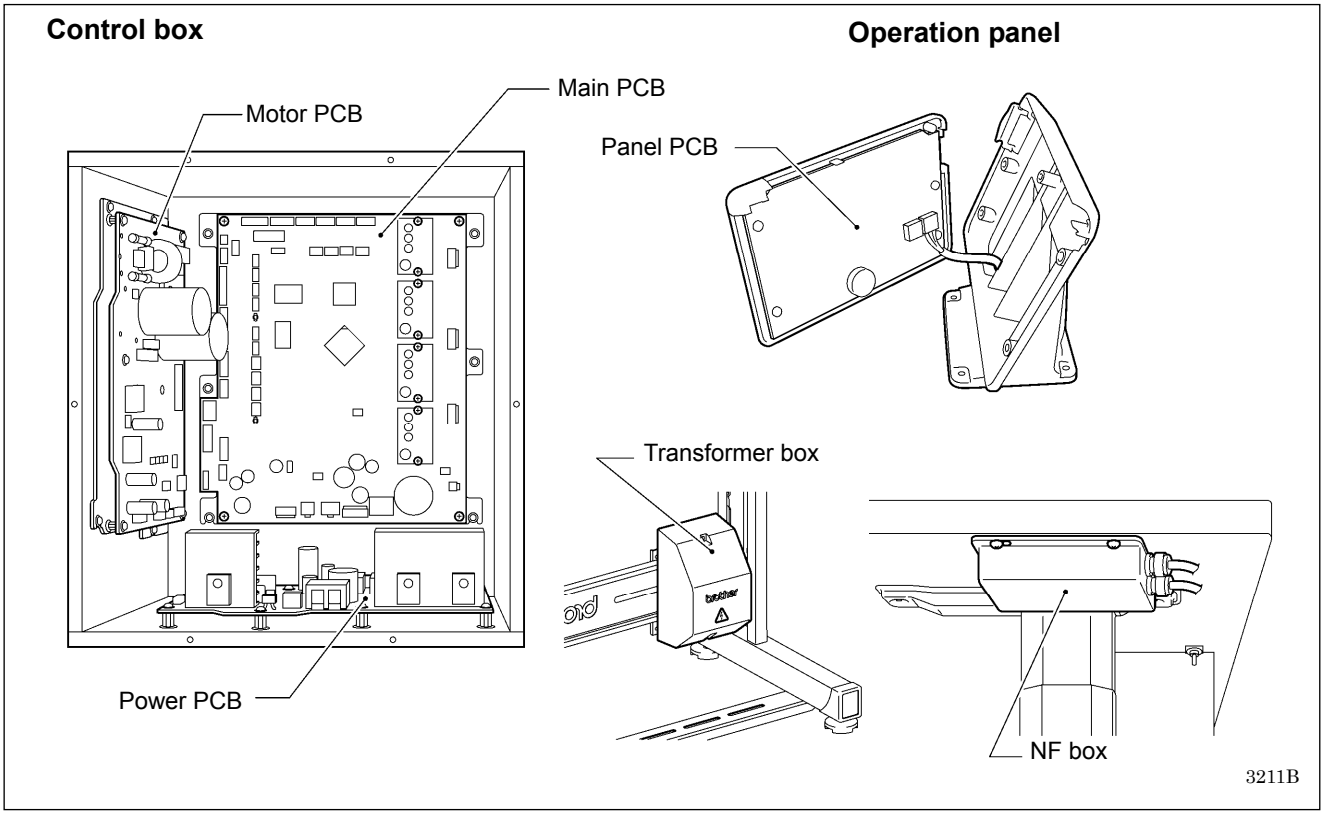
Motor PCB
Secured to the side. This PCB drives the main shaft motor. There are two fuses on this PCB.

Power PCB
Secured to the base. This PCB generates the voltages which are required for control operations.

Conversion transformer box (100V, 110V, 380V, 400V AC specifications only)
Steps-down the power supply voltage and generates the voltage that are required for the control box.

NF box (For Europe)
Eliminates electrical noise that is transmitted along the power supply line.

Panel PCB
Secured inside the operation panel. This PCB controls indications of the machine status and the input operation.

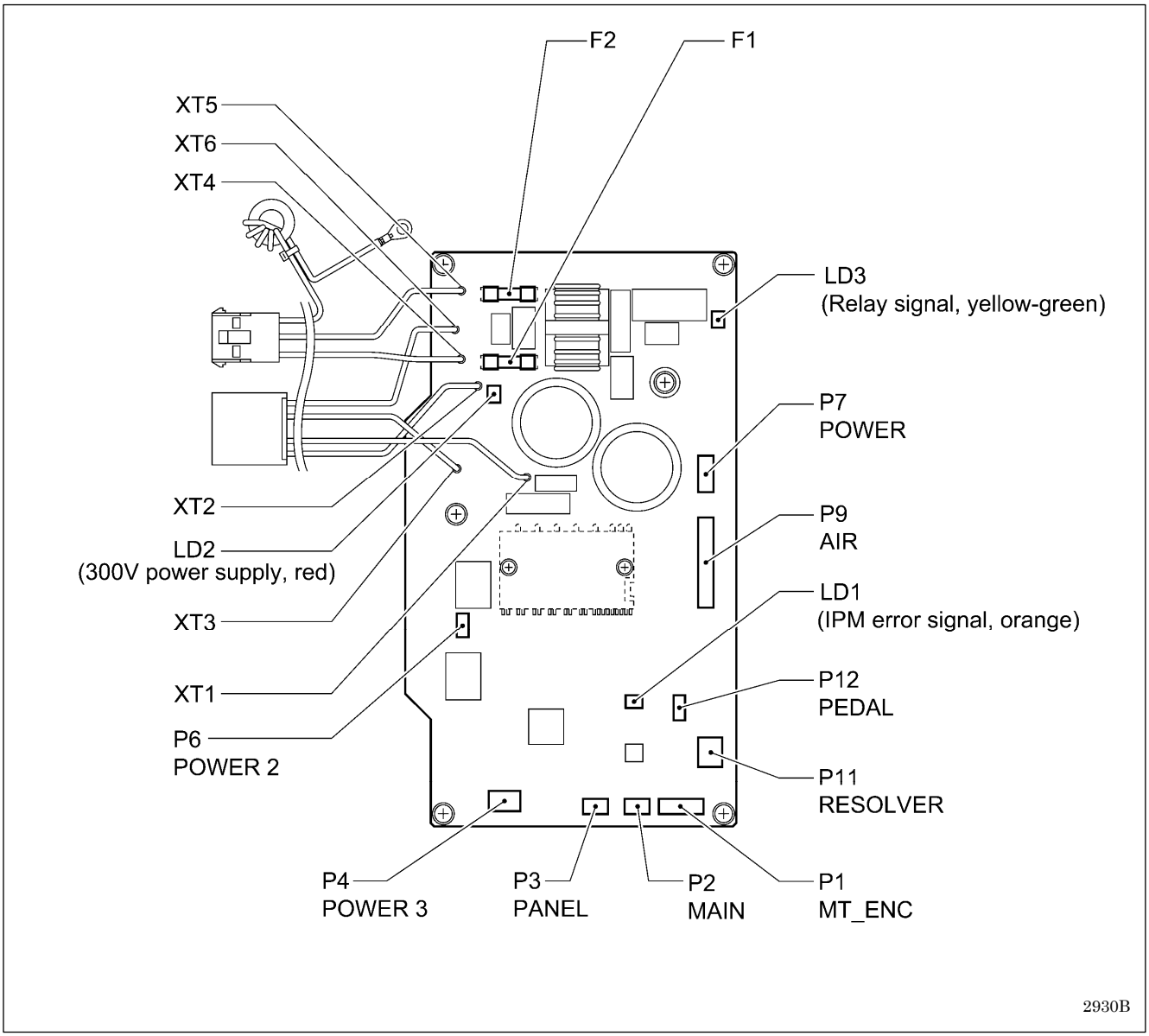


10-3. Fuse explanation

When replacing a fuse, be sure to use the specified ones listed below.
If a component on a PCB is damaged, the fuses may blow again soon even after they have been replaced.

No.	Part name	Part code	When a fuse has blow
F1 F2	G fuse 10A-250V (Glass tube fuse, 10A-250V)	J04417-001	The power indicator is not illuminated, and nothing operates.

Motor PCB

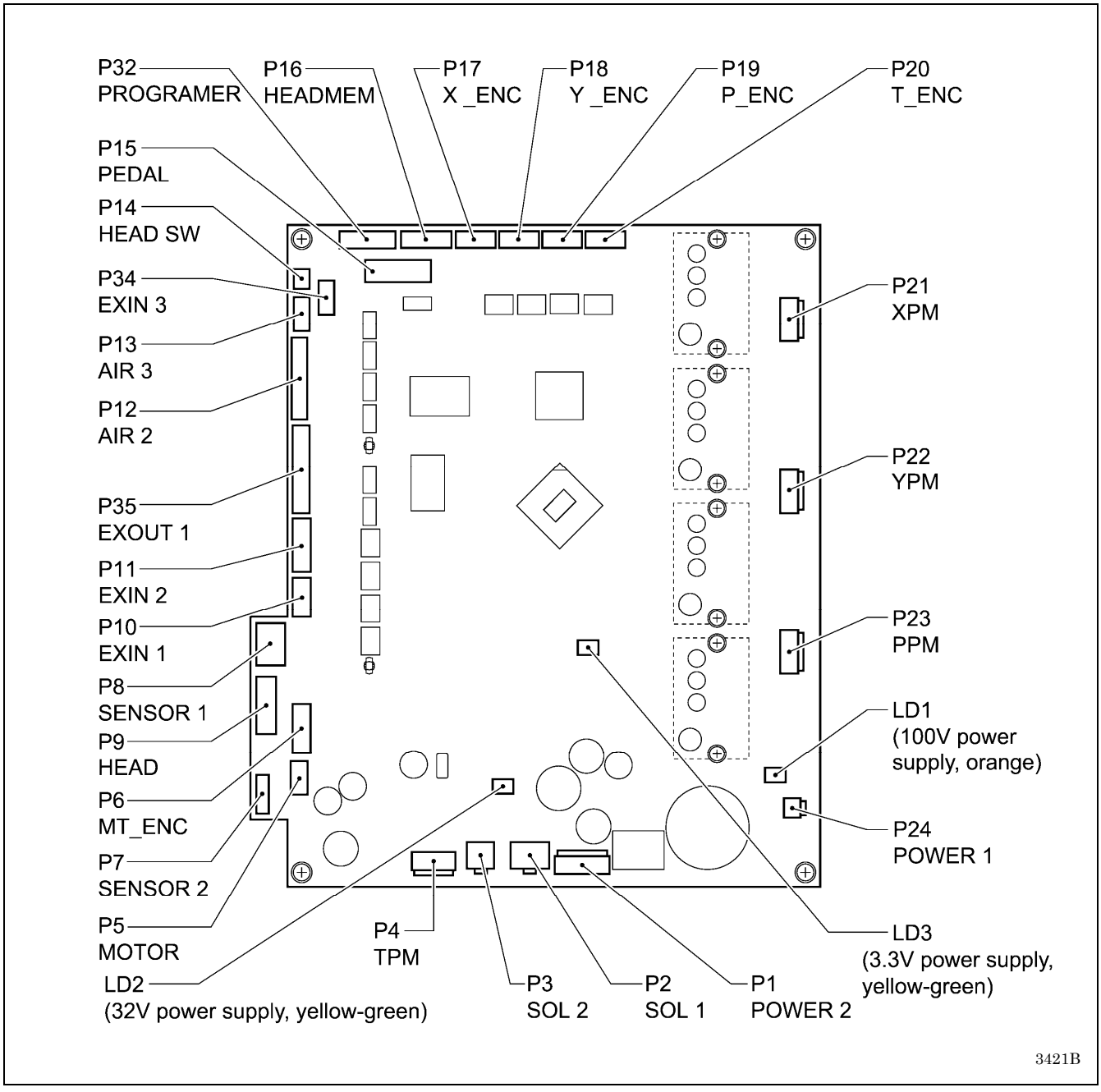


10-4. Description of connectors

A large number of problems are often caused by connectors that are not inserted correctly or which are contacting poorly. As a result, check that all connectors are inserted correctly and that the pins and wires are crimped properly before carrying out problem diagnosis.

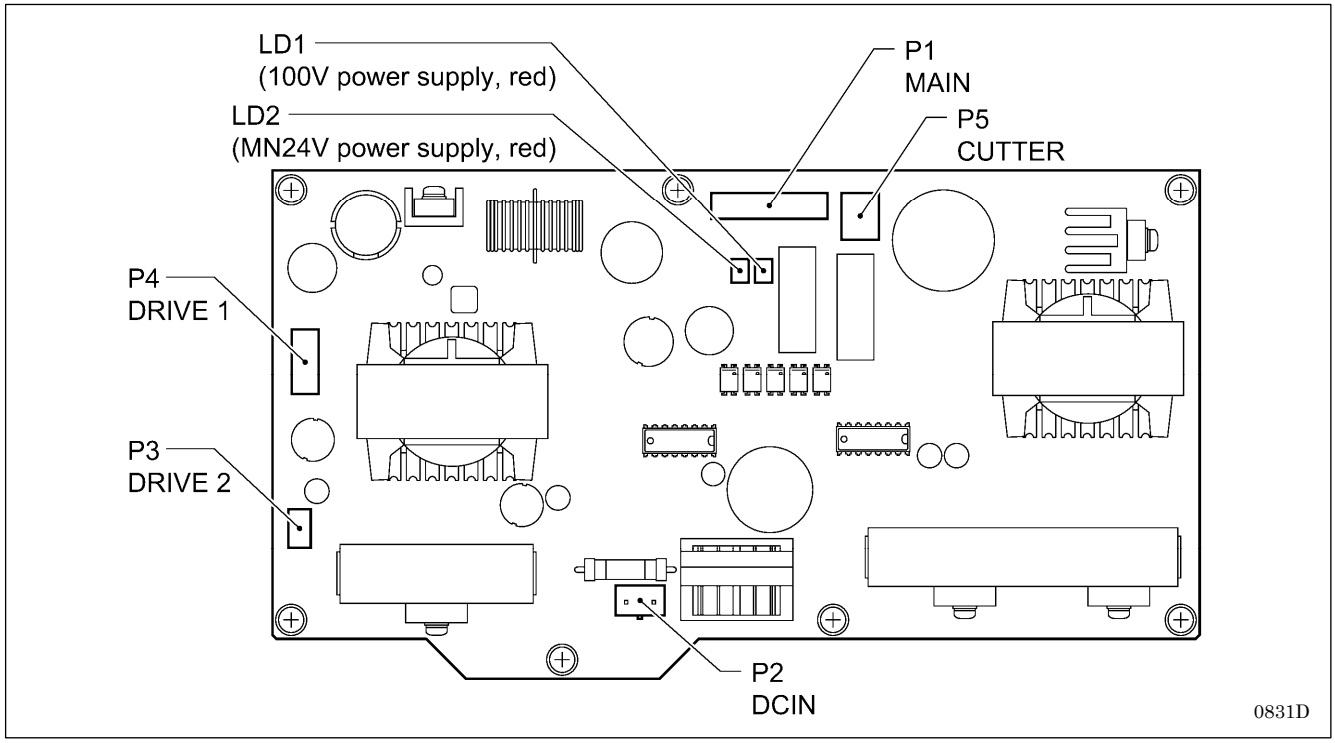
10-4-1. Connector positions

Main PCB

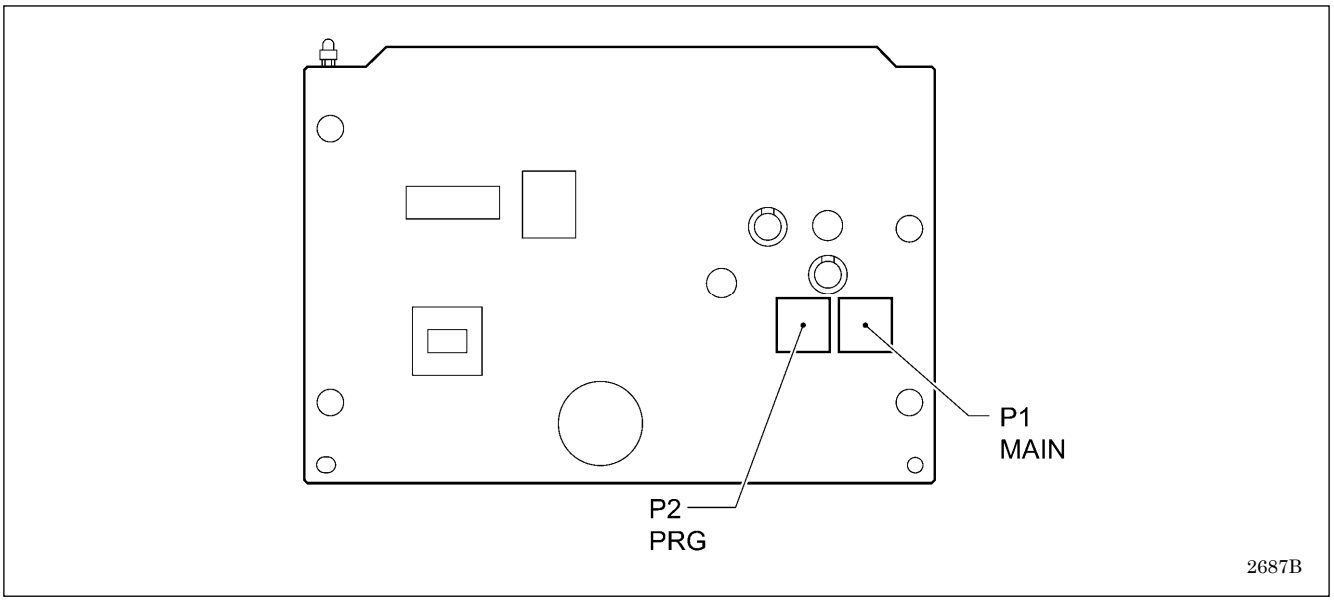


Motor PCB
(Refer to the diagram in “10-3. Fuse explanation”.)

Power PCB



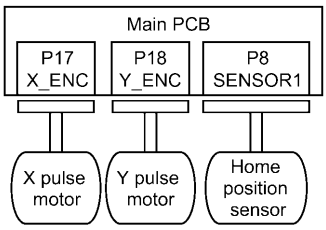
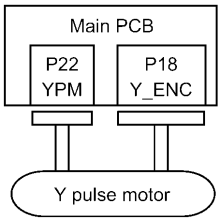
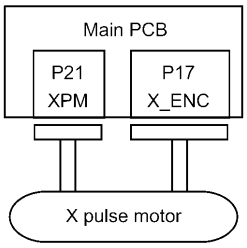
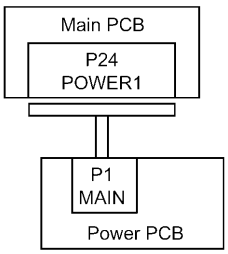
Panel PCB



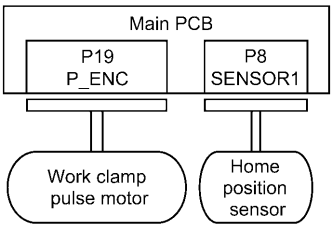
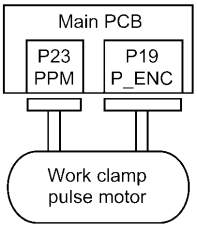
10-4-2. Symptoms when there are poor connections

This divides the functions of the connectors into five sections, but some connectors have more than one function, so be sure to refer to the trouble symptoms in other sections too.

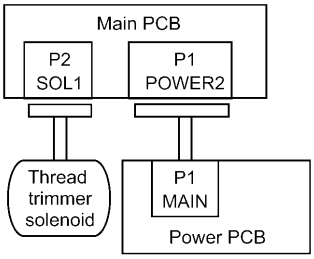
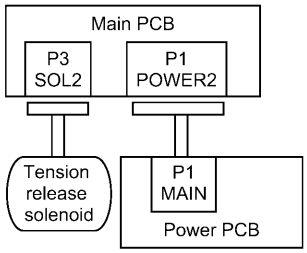
Feed mechanism

Trouble symptom	Connector No. and position
・The work clamp operates for a moment but the home position is not detected correctly. ・Error [E200] or [E210] is displayed.	 3422B
・Problem with movement in the forward/back (Y) direction. ・Error [E210], [E211], [E214], [E215] or [E216] is displayed.	 2934B
・Problem with movement in the sideways (X) direction. ・Error [E200], [E201], [E204], [E205] or [E206] is displyaed.	 2935B
・The feed motor does not operate for home position detection immediaterly after the power is turned on. ・Error [E300] is displayed.	 2936B

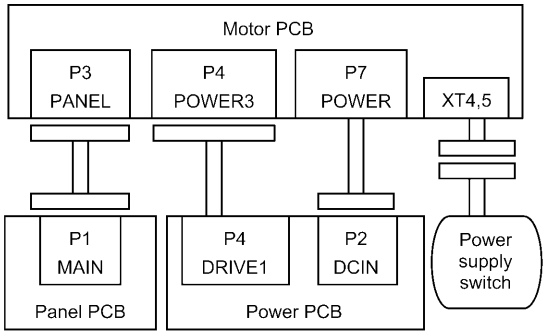
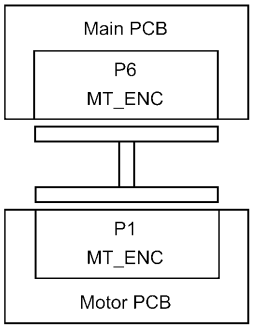
Work clamp mechanism

Problem	Connector No. and position
・The work clamp pulse motor rotates but the home position is not detected correctly. ・Error [E300] is displayed.	 3423B
・The work clamp pulse motor does not rotate correctly. ・Error [E300] or [E301] is displayed.	 2938B

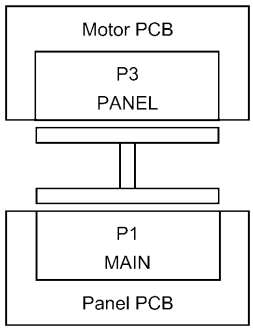
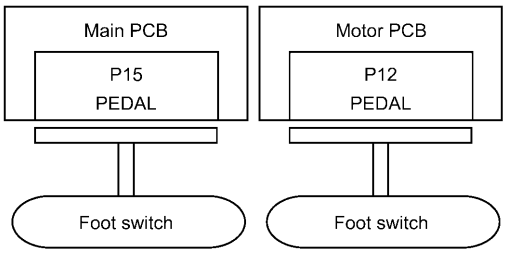
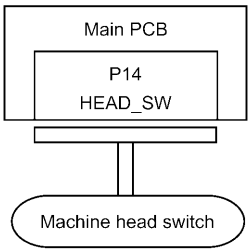
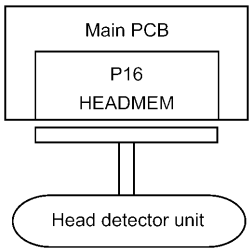
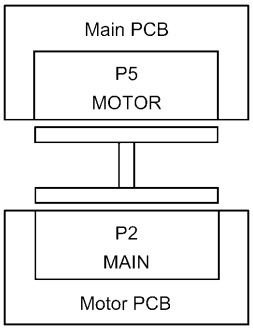
Thread trimming mechanism

Problem	Connector No. and position
▪ Thread trimming does not operate. (No error displayed.)	 2939B
▪ Tension release solenoid does not operate. (No error displayed.)	 0838D

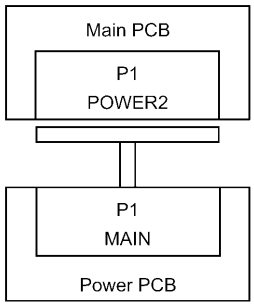
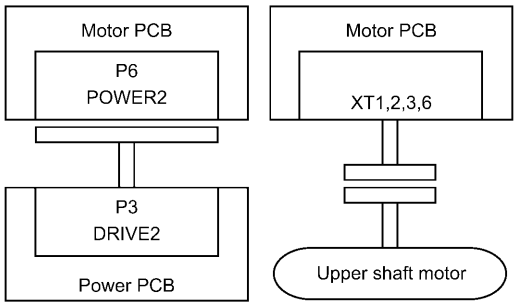
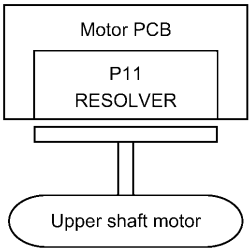
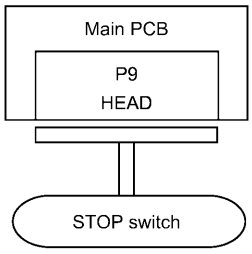
Sewing operation

Problem	Connector No. and position
▪ The power indicator is not illuminated, and nothing operates. ▪ Machine operation is unstable.	 2942B
▪ The main shaft motor does not operate correctly. ▪ Error [E130] is displayed.	 2943B

Others

Problems	Connector No. and position
▪ Panel indication is strange. ▪ The power indicator is not illuminated. ▪ Any operation panel key does not have any effect.	 2944B
▪ The sewing machine does not operate when the foot switch is depressed. (No error displayed.)	 3424B
▪ Error [E055] is displayed after the power is turned on.	 2946B
▪ Error [E452] is displayed after the power is turned on.	 2947B
▪ The machine does not start up with the “brother” display appearing.	 2948B

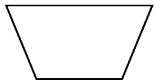
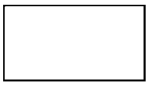
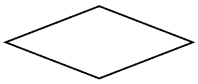
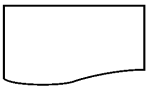
(Continued on next page)

Problems	Connector No. and position
▪ Only the power indicator illuminates. ▪ Nothing appears on the operation panel display.	 2949B
▪ The sewing machine does not operate when the foot switch is depressed. ▪ Error [E130] is displayed.	 0848D
▪ Error [E131] is displayed.	 0849D
▪ Error [E015] or [E016] is displayed after the power is turned on.	 0843D

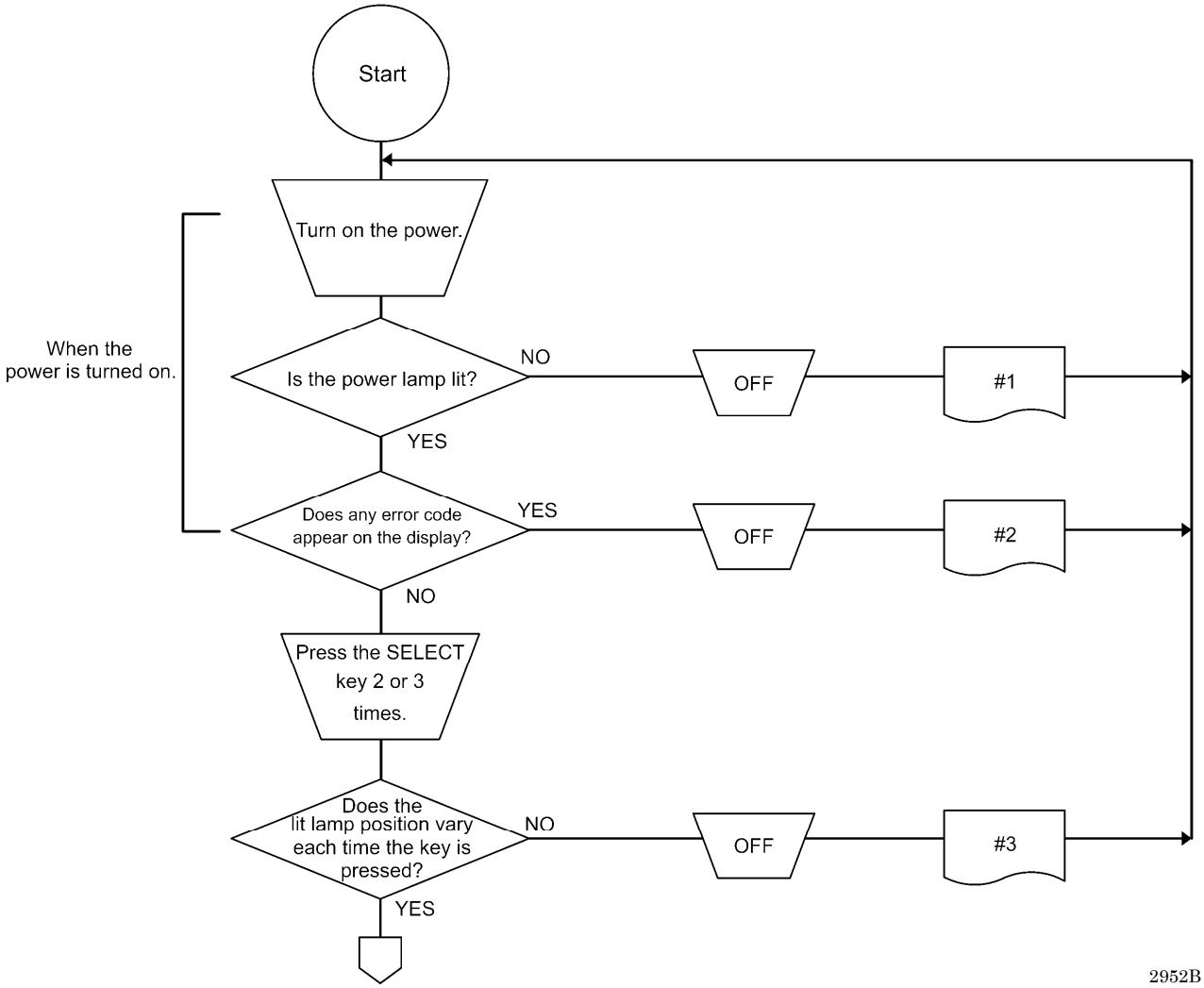
10-5. Troubleshooting

10-5-1. Troubleshooting flowchart

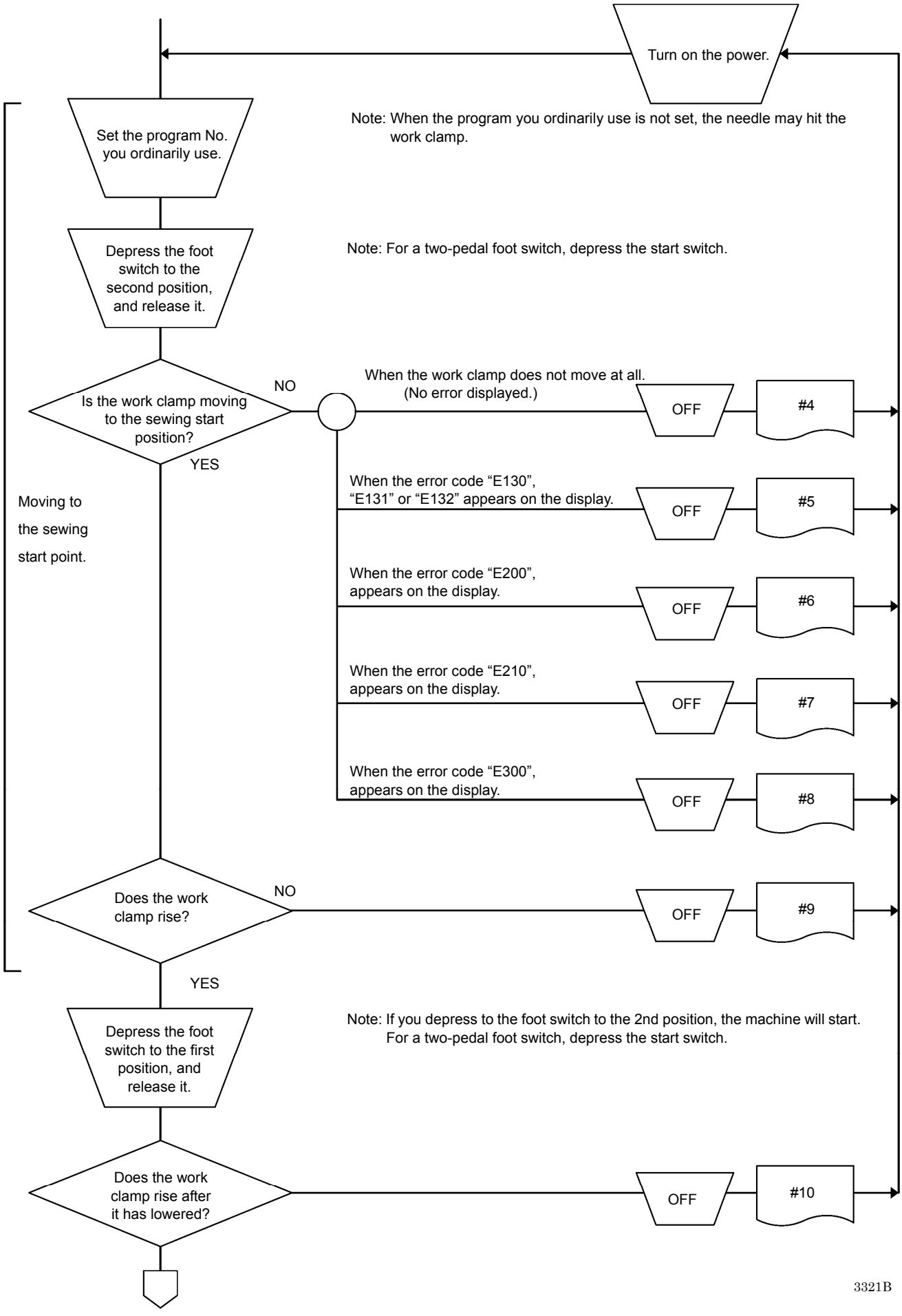
Symbols and their meanings

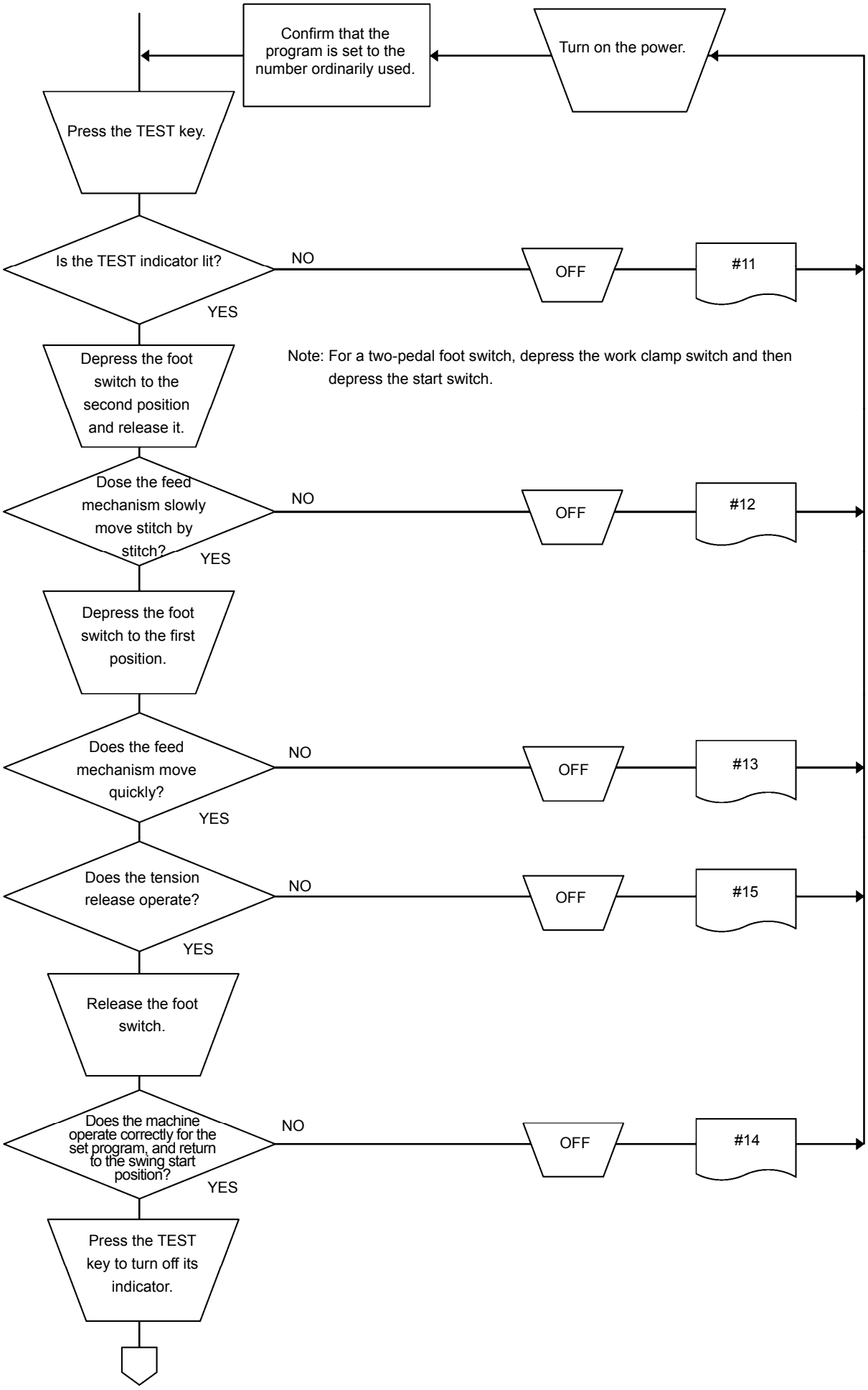
	Switch operation		Set-up operation or condition
	Yes-or-no decision-making process		The procedure to follow continues on the next page
	The error status number in the first column of the table of “10-5-2. Problem solution and measures”		Turning-off of the power switch

2707B

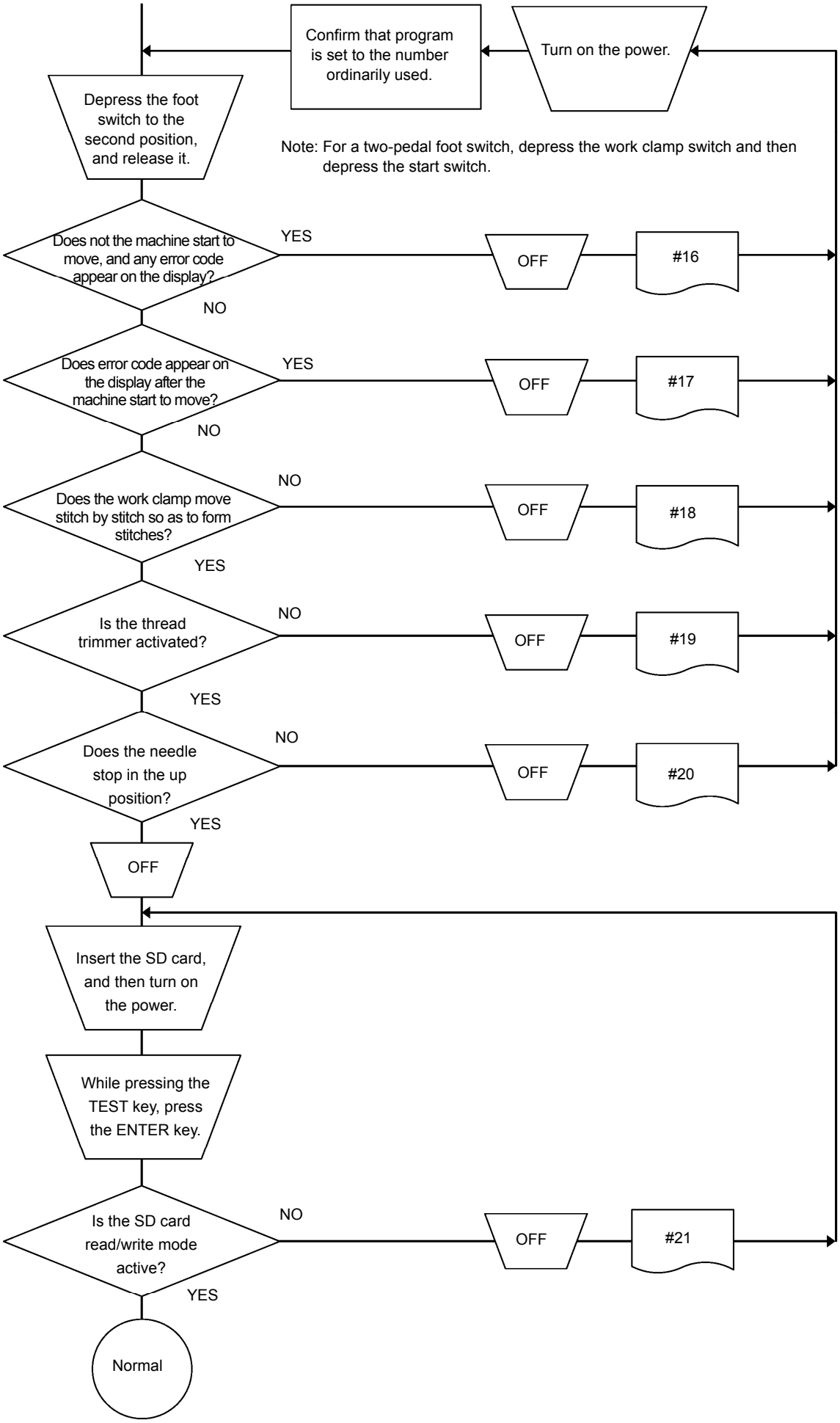


2952B


Turn on the power.
Set the program No. you ordinarily use.
Note: When the program you ordinarily use is not set, the needle may hit the work clamp.
Depress the foot switch to the second position, and release it.
Note: For a two-pedal foot switch, depress the start switch.
Is the work clamp moving to the sewing start position?
NO
YES
When the work clamp does not move at all. (No error displayed.)
OFF
#4
When the error code “E130”, “E131” or “E132” appears on the display.
OFF
#5
When the error code “E200”, appears on the display.
OFF
#6
When the error code “E210”, appears on the display.
OFF
#7
When the error code “E300”, appears on the display.
OFF
#8
Moving to the sewing start point.
Does the work clamp rise?
NO
OFF
#9
YES
Depress the foot switch to the first position, and release it.
Note: If you depress to the foot switch to the 2nd position, the machine will start. For a two-pedal foot switch, depress the start switch.
Does the work clamp rise after it has lowered?
OFF
#10
3321B


Turn on the power.
Confirm that the program is set to the number ordinarily used.
Press the TEST key.
Is the TEST indicator lit?
NO
OFF
#11
YES
Depress the foot switch to the second position and release it.
Note: For a two-pedal foot switch, depress the work clamp switch and then depress the start switch.
Dose the feed mechanism slowly move stitch by stitch?
NO
OFF
#12
YES
Depress the foot switch to the first position.
Does the feed mechanism move quickly?
NO
OFF
#13
YES
Does the tension release operate?
NO
OFF
#15
YES
Release the foot switch.
Does the machine operate correctly for the set program, and return to the swing start position?
NO
OFF
#14
YES
Press the TEST key to turn off its indicator.

3322B


Turn on the power.
Confirm that program is set to the number ordinarily used.
Depress the foot switch to the second position, and release it.
Note: For a two-pedal foot switch, depress the work clamp switch and then depress the start switch.
Does not the machine start to move, and any error code appear on the display?
YES
OFF
#16
NO
Does error code appear on the display after the machine start to move?
YES
OFF
#17
NO
Does the work clamp move stitch by stitch so as to form stitches?
NO
OFF
#18
YES
Is the thread trimmer activated?
NO
OFF
#19
YES
Does the needle stop in the up position?
NO
OFF
#20
YES
OFF
Insert the SD card, and then turn on the power.
While pressing the TEST key, press the ENTER key.
Is the SD card read/write mode active?
NO
OFF
#21
YES
Normal

3323B

10-5-2. Problem solution and measures

⚠ DANGER

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

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

   Electrical shock

   Some large capacitors may have a high voltage remaining in them for up to 5 minutes after the power is turned off. To prevent electrical shock, wait at least 5 minutes after the power is turned off before doing the following.
   - Opening and closing the control box
   - Replacing fuses
   - Separating and joining connectors
   - Measuring resistance
   - Doing anything with a possibility of touching something inside the control box

Some adjustments require measuring the voltage while the power is turned on with the control box kept open. In such a case, be careful not to touch any place other than that for the measurement. In addition, always keep in mind that a high voltage remains for about 5 minutes after power is turned off.

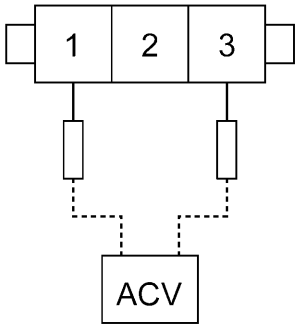
Injury

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

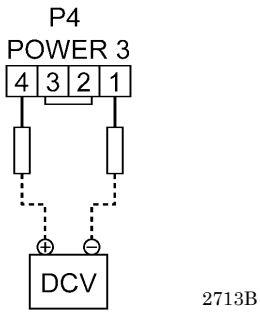
2. When replacing a fuse, be sure to use a new one of the same quality and capacity as the old one.

Before adjustment

1. While the power is turned off, check each connector is securely plugged in by referring to “10-4. Description of connectors”.
2. Find the error status number in the troubleshooting flowchart.
3. From the applicable part of the flowchart, take the reference number to find the correspondingly number details of the problem in the following table.

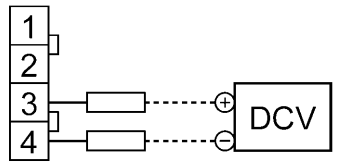
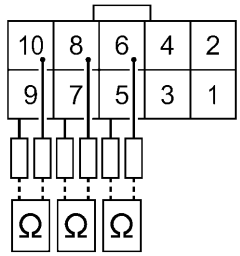
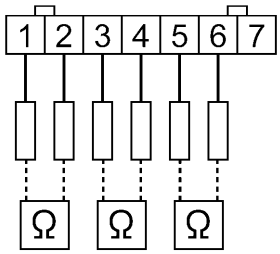
Error status #1 The power indicator does not light when the power is turned on.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. (Check the LEDs)	Turn on the power switch and check that the various LEDs illuminate in the following order. a. LD2 (red) on motor PCB does not illuminate. →#1-2, #1-3, #1-4 b. LD2 (red) on power PCB does not illuminate. →#1-5, #1-6, #1-7, #1-8 c. LD3 (green) on motor PCB does not illuminate. →#1-9 d. Power indicator on panel does not illuminate. →#1-10	
2. Malfunction of power cord  2712B	Turn off the power switch and disconnect the power supply connector which links the power cord for the power switch and the motor PCB, turn on the power switch, and then measure the voltage between terminals 1 and 3 of the cord-side connector. OK if the voltage is the same as mains voltage. In addition, check that the power supply voltage at the wall outlet is within the range of the specification voltage +/- 10%. After inspecting, turn off the power switch and connect the power supply connector.	
3. Blown fuse	Turn off the power switch, wait for five minutes or more, and then remove fuses F1 and F2 from the motor PCB and check the continuity. OK if there is continuity.	GFUSE10A-250V (10A-250V)
4. Malfunction of motor PCB 1	Turn off the power switch and remove P2 (DCIN) from the power PCB, turn the power back on, and then check LD2 (red) on the motor PCB. OK if illuminated. After checking, turn off the power switch, wait for five minutes or more, and then insert P2 into the power PCB. Turn the power back on, and then with P2 inserted into the power PCB, check the voltage between terminals 1 and 3 of P2. OK if 240 to 380V DC.	Motor PCB assembly
5. Malfunction of power PCB	Turn off the power switch and disconnect connector P1 (POWER2) from the main PCB and connectors P4 (POWER3) and P6 (POWER2) from the motor PCB, and then turn on the power switch and check LD2 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 into the main PCB and P4 and P6 into the motor PCB.	Power PCB assembly

(Continued on next page)

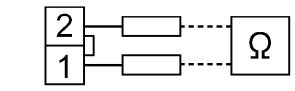
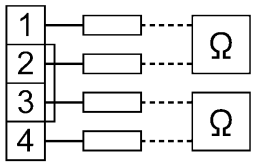
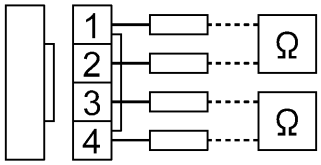
Error status #1 The power indicator does not light when the power is turned on.		
Probable causes	Check/repair/adjust	Parts to be replaced
6. Malfunction of main PCB	Turn off the power switch and disconnect connectors P4 (POWER3) and P6 (POWER2) from the motor PCB, and then turn on the power switch and check LD2 (red) on the power PCB. OK if illuminated. (LD1 (red) on power PCB does not illuminate.) After checking, turn off the power switch, wait for one minute or more, and then insert P4 and P6 into the motor PCB.	Main PCB assembly 311H
7. Malfunction of main PCB 2	Turn off the power switch and disconnect connector P1 (POWER2) from the main PCB and connectors P1 (MT-ENC), P2 (MAIN) and P3 (PANEL) from the motor PCB, and then turn on the power switch and check LD2 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 into the main PCB and P1, P2 and P3 into the motor PCB.	Motor PCB assembly
8. Malfunction of panel PCB	Turn off the power switch and disconnect connector P1 (POWER2) from the main PCB and connectors P1 (MT-ENC) and P2 (MAIN) from the motor PCB, and then turn on the power switch and check LD2 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 into the main PCB and P1 and P2 into the motor PCB.	Panel PCB assembly Panel harness
9. Poor harness connection 	Turn off the power switch and check that connector P4 (POWER3) of the motor PCB is inserted, and then turn on the power switch and check the voltage between terminals 1 and 4 of P4. OK if approximately 24 V DC.	Power PCB assembly
10. Malfunction of operation panel	Check that connector P3 (PANEL) of the motor PCB is inserted.	Operation panel assembly Panel PCB assembly Panel harness

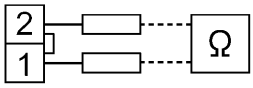
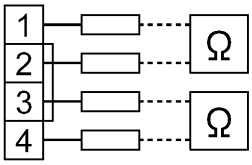
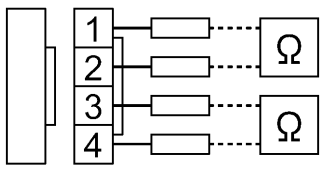
Error status #2 Error code appears on the display when the power is turned on.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If “E015” or “E016” is displayed, there is a poor connection of the STOP switch.	a. Check that the STOP switch is not stuck down. b. Check if there is a harness short-circuit. c. Check that connector P9 (HEAD-SW) is inserted into the main P.C. board.	STOP switch
2. If “E025” or “E035” is displayed, the foot switch is still depressed.	a. Check if the foot switch is still depressed. b. Check if there is a short-circuit in the harness. c. Check if connector P12 (PEDAL) is connected to the motor PCB. d. Reset the depression stroke for the foot switch while referring to “8-25. Setting method for standard depression stroke (Foot switch)”. * For a two-pedal foot switch, the connector for the main PCB will be P15 (PEDAL).	Treadle unit two-pedal foot switch assembly
3. If “E055” is displayed, there is a malfunction of the machine head switch.	a. Check if the machine head switch is off. b. Check if there is a broken wire in the harness. c. Check if connector P14 (HEAD-SW) is connected to the main PCB.	Switch assembly machine head
4. If “E065” is displayed, one of the keys on the operation panel is still depressed.	a. Check that there is no incorrect sensitivity when the surface of the panel sheet and the keys are pressed. b. Check that connector P3 (PANEL) is connected to the motor PCB, and that connector P1 (MAIN) is connected to the panel PCB.	Operation panel assembly Panel PCB assembly Panel harness
5. If “E131” is displayed, there is a poor connection of the synchronizer.	Check that connector P11 (RESOLVER) and P1 (MT-ENC) is connected to the motor PCB, and that connector P6 (MT-ENC) is connected to the main PCB.	
6. If “E401” and “E410” is displayed, there is a connection fault between the main PCB, motor PCB and the panel PCB.	a. Check LD3 (green) on the main PCB. OK if illuminated. b. Check LD3 (green) on the motor PCB. OK if illuminated. c. Check that connector P5 (MOTOR) is connected to the main PCB, and that connector P2 (MAIN) is connected to the motor PCB. d. Check that connector P3 (PANEL) is connected to the motor PCB, and that connector P4 (MAIN) is connected to the panel PCB. e. Check if there is a broken wire in the harness.	Main PCB assembly 311H Motor PCB assembly Panel PCB assembly Connection harness Panel harness
7. If “E450” or “E452” is displayed, the machine head memory cannot be recognized.	a. Check if connector P3 (HEAD-M) is connected to the main PCB. b. Check if there is a broken wire in the harness.	
8. If “E700” is displayed, the power supply voltage is abnormally high.	a. Check that the power supply voltage at the mains is at the specification voltage plus or minus 10%. b. See #1-2.	
9. If “E705” is displayed, the power supply voltage is abnormally low.	a. Check that the power supply voltage at the mains is at the specification voltage plus or minus 10%. b. See #1-2.	

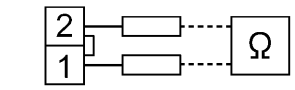
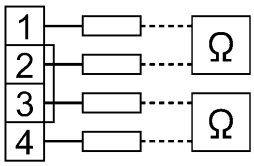
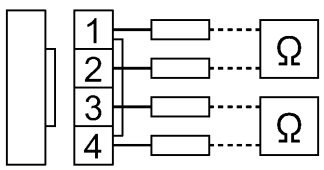
Error status #3 No keys on the operation panel are not activated.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Malfunction of panel PCB	Check that connector P3 (PANEL) is connected to the motor PCB, and that connector P1 (MAIN) is connected to the panel PCB.	Operation panel assembly Panel PCB assembly Panel harness
2. Main software not installed correctly	Carry out the restore operation by referring to "5-13. Updating the control program version".	

Error status #4 Work clamp does not return to the home position even after the foot switch is depressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect depression position adjustment.	Adjust the home position while referring to "8-25. Setting method for standard depression strokes (Foot switch)".	
2. Malfunction of treadle unit P12 PEDAL  2714B	With the motor PCB connector P12 (PEDAL) connected, turn on the power and measure the voltage between pins 3-4 of the cord connector (No. 3 +, No. 4 -). OK if the voltage is approximately 2 V at neutral, approximately 4 V when the foot switch is depressed as far as it will go, and approximately 0.5 V when it is depressed backward.	Foot switch
3. Malfunction of foot switch and cord (option) **Connector on the foot switch**  2715B	(Check that the power is turned off.) Disconnect the foot switch from the foot switch adapter harness, and measure the voltage between pins 5-6 and 7-8 of the foot switch connector. (Check between pins 9-10 if using a two-pedal foot switch.) OK if the resistance is normally ∞ ohms but 0 ohms when depressed.	Foot switch
4. Malfunction of foot switch adapter harness (option) P15 PEDAL  2716B	After checking the foot switch in step 3, connect the foot switch adapter harness to the foot switch and measure the voltage between pins 1-2 and 3-4 of connector P15 (PEDAL) of the main PCB. (Check between pins 5-6 if using a two-pedal foot switch.) (Touch the ohmmeter against the lead wires without disconnecting the connector.) OK if the resistance is normally ∞ ohms but 0 ohms when depressed.	Foot switch Foot switch cord

Error status #5 Error code appears on the display when the foot switch is depressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If “E130”, “E131” or “E132” is displayed, there is a poor connection of the synchronizer.	Refer to inspection #2-4.	
2. If “E130”, “E131” or “E132” is displayed, there is a poor connection of the upper shaft motor.	Check the connection of the relay connector between the upper shaft motor and the motor PCB.	
3. If “E130”, “E131” or “E132” is displayed, there is a blown fuse.	a. Remove fuses F1 and F2 from the motor PCB and check the continuity. OK if there is continuity. b. If fuse F1 of F2 is blown, check the resistance values between each pin of the relay connector between the upper shaft motor and the motor PCB and between each terminal of the fuses. OK if ∞ ohms. c. If the fuses blow again after they are replaced, replace the motor PCB.	GFUSE10A-250V (10A-250V) Motor PCB assembly
4. If “E130”, “E131” or “E132” is displayed, there is a malfunction of the motor PCB.	a. Check the synchronizer input while referring to “3-7. Input checking method”. OK if the signal turns on and off. b. If step a (above) is OK, there is a malfunction of the motor PCB.	Resolver stator 430 assembly Motor PCB assembly

Error status #6 Error code appears on the display when the foot switch is depressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If the X feed does not move and "E200" is displayed, there is a malfunction of the power PCB.	Disconnect connectors P1 (POWER2) and P24 (POWER1) from the main PCB, and then turn on the power switch and check LD1 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 and P24 into the main PCB.	Power PCB assembly
2. If the X feed does not move and "E200" is displayed, there is a malfunction of the main PCB. P24 POWER 1  P21 XPM  2717B 2718B	a. Disconnect connector P24 (POWER1) from the main PCB, and check the continuity between terminals 1 and 2 of P24. OK if ∞ ohms. b. Disconnect connector P21 (XPM) from the main PCB, and check the continuity between terminals 1 and 2, 3 and 4 of P21. OK if ∞ ohms. c. Insert P21 and P24 into the main PCB, turn on the power switch and then check LD1 (red) on the power PCB. OK if illuminated. If LD1 is illuminated during the check in step 1 but it does not illuminate when P1 and P24 are connected, there is a malfunction of the main PCB. d. Check LD1 (orange) on the main PCB. OK if illuminated.	Main PCB assembly 311H
3. If the X feed moves slightly and "E200" is displayed, there is a malfunction of the encoder.	a. Check that connector P17 (X-ENC) is inserted into the main PCB and that the color matches. b. Check the encoder input while referring to "3-7. Input checking method".	Pulse motor X assembly Main PCB assembly 311H
4. If the X feed does not move and "E200" is displayed, there is a malfunction of the pulse motor and cord. P21 XPM  2719B	a. Disconnect the main PCB connector P21 (XPM) and measure the resistance between pins 1-2 and 3-4 of the cord connector. OK if 2-3 ohms. b. If step a (above) is OK, there is a malfunction of the main PCB.	Pulse motor X assembly Main PCB assembly 311H

Error status #7 Error code appears on the display when the foot switch is depressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If the Y feed does not move and "E210" is displayed, there is a malfunction of the power PCB.	Disconnect connectors P1 (POWER2) and P24 (POWER1) from the main PCB, and then turn on the power switch and check LD1 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 and P24 into the main PCB.	Power PCB assembly
2. If the Y feed does not move and "E210" is displayed, there is a malfunction of the main PCB. P24 POWER 1  P22 YPM  2717B 2720B	a. Disconnect connector P24 (POWER1) from the main PCB, and check the continuity between terminals 1 and 2 of P24. OK if ∞ ohms. b. Disconnect connector P22 (YPM) from the main PCB, and check the continuity between terminals 1 and 2, 3 and 4 of P22. OK if ∞ ohms. c. Insert P22 and P24 into the main PCB, turn on the power switch and then check LD1 (red) on the power PCB. OK if illuminated. If LD1 is illuminated during the check in step 1 but it does not illuminate when P1 and P24 are connected, there is a malfunction of the main PCB. d. Check LD1 (orange) on the main PCB. OK if illuminated.	Main PCB assembly 311H
3. If the Y feed moves slightly and "E210" is displayed, there is a malfunction of the encoder.	a. Check that connector P18 (Y-ENC) is inserted into the main PCB and that the color matches. b. Check the encoder input while referring to "3-7. Input checking method".	Pulse motor Y assembly Main PCB assembly 311H
4. If the Y feed does not move and "E210" is displayed, there is a malfunction of the pulse motor and cord. P22 YPM  2721B	a. Disconnect the main PCB connector P22 (YPM) and measure the resistance between pins 1-2 and 3-4 of the cord connector. OK if 2-3 ohms. b. If step a (above) is OK, there is a malfunction of the main PCB.	Pulse motor Y assembly Main PCB assembly 311H

Error status #8 Error code appears on the display when the foot switch is depressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If the work clamp pulse motor does not operate and “E300” is displayed, there is a malfunction of the power PCB.	Disconnect connectors P1 (POWER2) and P24 (POWER1) from the main PCB, and then turn on the power switch and check LD1 (red) on the power PCB. OK if illuminated. After checking, turn off the power switch, wait for one minute or more, and then insert P1 and P24 into the main PCB.	Power PCB assembly
2. If the work clamp pulse motor does not move and “E300” is displayed, there is a malfunction of the main PCB. P24 POWER 1  P23 PPM  2717B 2722B	a. Disconnect connector P24 (POWER1) from the main PCB, and check the continuity between terminals 1 and 2 of P24. OK if ∞ ohms. b. Disconnect connector P23 (PPM) from the main PCB, and check the continuity between terminals 1 and 2, 3 and 4 of P23. OK if ∞ ohms. c. Insert P23 and P24 into the main PCB, turn on the power switch and then check LD1 (red) on the power PCB. OK if illuminated. If LD1 is illuminated during the check in step 1 but it does not illuminate when P1 and P24 are connected, there is a malfunction of the main PCB. d. Check LD1 (orange) on the main PCB. OK if illuminated.	Main PCB assembly 311H
3. If the work clamp pulse motor moves slightly and “E300” is displayed, there is a malfunction of the encoder.	a. Check that connector P19 (P-ENC) is inserted into the main PCB and that the color matches. b. Check the encoder input while referring to “3-7. Input checking method”.	Pulse motor P assembly Main PCB assembly 311H
4. If the work clamp pulse motor does not move and “E300” is displayed, there is a malfunction of the pulse motor and cord. P23 PPM  2723B	a. Disconnect the main PCB connector P23 (PPM) and measure the resistance between pins 1-2 and 3-4 of the cord connector. OK if 2-3 ohms. b. If step a (above) is OK, there is a malfunction of the main PCB.	Pulse motor P assembly Main PCB assembly 311H

Error status #9 Work clamp does not rise.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect work clamp home position adjustment	a. Adjust the home position while referring to "8-22. Adjusting the home position". b. Check if the work clamp/button clamp is touching anything.	
2. Incorrect mechanism adjustment	Check if the work clamp arm moves smoothly.	Work clamp arm assembly

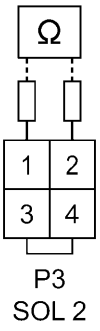
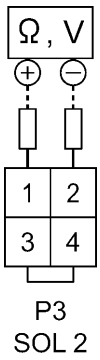
Error status #10 Work clamp does not lower.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect work clamp home position adjustment	a. Adjust the home position while referring to "8-22. Adjusting the home position". b. Check if the work clamp/button clamp is touching anything.	
2. Incorrect mechanism adjustment	Check if the work clamp arm moves smoothly.	Work clamp arm assembly

Error status #11 The TEST indicator does not light when the TEST key is pressed.		
Probable causes	Check/repair/adjust	Parts to be replaced
Malfunction of panel PCB	Check that connector P3 (PANEL) is connected to the motor PCB, and that connector P1 (MAIN) is connected to the panel PCB.	Panel PCB assembly Panel harness

Error status #12 The feed mechanism does not slowly move stitch by stitch during test feeding.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect memory switch setting	Set memory switch No. 200 to OFF.	
2. Malfunction of foot switch and cord	See #4.	

Error status #13 Quick feeding cannot be performed during test feeding.		
Probable causes	Check/repair/adjust	Parts to be replaced
Malfunction of foot switch and cord	See #4.	

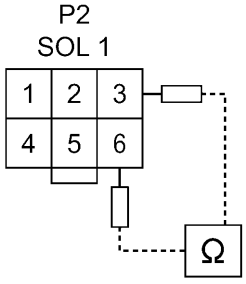
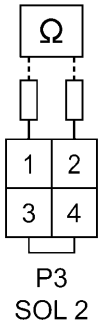
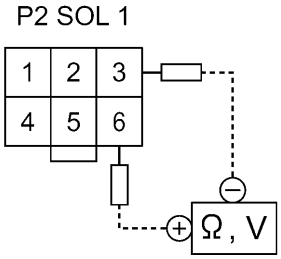
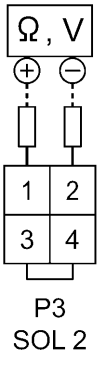
Error status #14 The machine does not operate correctly for the set program test feeding.		
Probable causes	Check/repair/adjust	Parts to be replaced
Malfunction of foot switch and cord	See #4.	

Error status #15 Tension release does not operate during test feeding.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Poor connector connection	Check that main PCB connector P3 (SOL2) is connected.	
2. Malfunction of tension release solenoid  2727B	Disconnect main PCB connector P3 (SOL2) and measure the resistance between pins 1-2 of the cord connector. OK if 6-8 ohms.	Tension release solenoid
3. Malfunction of main PCB  0651D	a. Turn on the power switch and check LD2 (green) on the main PCB. OK if illuminated. b. With connector P3 (SOL2) disconnected from the main PCB, check the continuity between terminals 1 and 2 of connector P3 on the main PCB. OK if ∞ ohms. c. With main PCB connector P3 (SOL2) connected, turn on the power and carry out sewing, and measure the voltage between pins 1-2 of connector P3 (SOL2). OK if there is voltage output change during sewing.	Main PCB assembly 311H

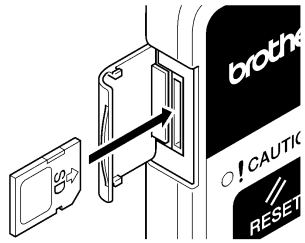
Error status #16 The machine does not operate during sewing, and the error code [E130], [E131] or [E132] appears on the display.		
Probable causes	Check/repair/adjust	Parts to be replaced
Malfunction of synchronizer, upper shaft motor, fuses or motor PCB.	Refer to steps 1 to 4 in #5.	

Error status #17 Error code appears on the display after the machine operates.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If “E111”,“E130”, “E131”, “E132” or “E133” is displayed after the sewing machine operates, there is a poor connection of the synchronizer.	Check that connections P11 (RESOLVER) and P1 (MT-ENC) of the motor PCB and connector P6 (MT-ENC) of the main PCB are inserted.	
2. If “E111”,“E130”, “E131”, “E132” or “E133” is displayed after the sewing machine operates, there is a poor connection of the upper shaft motor.	Check the connection of the relay connector between the upper shaft motor and the motor PCB.	
3. If “E111”,“E130”, “E131”, “E132” or “E133” is displayed after the sewing machine operates, interference is causing operating errors.	Check that the ground wire is securely connected and that the sewing machine is not close to any equipment that generates strong electrical interference.	
4. If “E111”,“E130”, “E131”, “E132” or “E133” is displayed after the sewing machine operates, there is a malfunction of the motor PCB.	Refer to steps 1 to 4 in #5.	Resolver stator assembly Motor PCB assembly
5. If “E111”,“E130”, “E131”, “E132” or “E133” is displayed after the sewing machine operates, there is a malfunction of the motor PCB or of the upper shaft motor.	If an error occurs after inspection steps 1 to 4 above have been carried out, there is a malfunction of the upper shaft motor.	Motor 430 assembly
6. If “E121” is displayed after the sewing machine operates, there is a malfunction of a component.	Check if the blades of the fixed knife and movable knife are damaged or worn.	
7. If “E121” is displayed after the sewing machine operates, the home position is incorrectly adjusted.	Adjust the home position while referring to “8-22. Adjusting the home position”.	
8. If “E121” is displayed after the sewing machine operates, there is a problem with the operation of the work clamp pulse motor.	Refer to steps 3 to 4 in #8.	Main PCB assembly 311H Pulse motor P assembly
9. If “E150” is displayed after the sewing machine operates, the motor is abnormally overheating.	a. Turn off the power and let the motor stand for 30 minutes or more. b. Turn the power back on, and OK if operation is normal. c. If the area around the motor is not hot, carry out steps 1 to 5 in #17. * Avoid repeated sewing of sewing data that contains 15 stitches or less.	Resolver stator 430 assembly Motor PCB assembly Motor 430 assembly

Error status #18 The machine cannot produce correct stitches.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Malfunction of synchronizer	Refer to step 1 in #17.	
2. If uneven seams are being sewn, there is a malfunction of the pulse motor or the mechanism is incorrectly adjusted.	a. Refer to step 4 in #6. b. If the uneven seams are due to insufficient work clamp pressure, adjust while referring to “8-17. Adjusting the work clamp lift amount”. c. If there is play in the feed mechanism, adjust the feed mechanism.	

Error status #19 The thread trimmer does not operate.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect memory switch setting	Set memory switch No. 164 to OFF. * If it is set to ON, thread trimming will not be carried out.	
2. Incorrect mechanism adjustment	Adjust the thread trimmer mechanism while referring to “8-10. Adjusting the thread trimmer cam position”. * If it seems that the thread trimming mechanism is not operating properly, carry out steps 3 to 6 below.	
3. Poor connector connection	Check that main PCB connector P2 (SOL1) and P3 (SOL2) is connected.	
4. Malfunction of thread trimmer solenoid 	Disconnect main PCB connector P2 (SOL1) and measure the resistance between pins 3-6 of the cord connector. OK if 6-8 ohms.	Thread trimmer solenoid assembly
5. Malfunction of tension solenoid 	Disconnect main PCB connector P3 (SOL2) and measure the resistance between pins 1-2 of the cord connector. OK if 6-8 ohms.	Tension solenoid
6. Malfunction of main PCB.  	a. Turn on the power switch and check LD2 (green) on the main PCB. OK if illuminated. b. Turn off the power switch, and with connector P2 (SOL1) disconnected from the main PCB, check the continuity between terminals 3 and 6 of connector P2 on the main PCB. OK if ∞ ohms. c. With connector P3 (SOL2) disconnected from the main PCB, check the continuity between terminals 1 and 2 of connector P3 on the main PCB. OK if ∞ ohms. d. With connector P2 (SOL1) inserted into the main PCB, turn on the power switch, carry out sewing and measure the voltage between terminals 3 and 6 of connector P2. OK if voltage is output momentarily at the sewing end. e. With main PCB connector P3 (SOL2) connected, turn on the power and carry out sewing, and measure the voltage between pins 1-2 of connector P3 (SOL2). OK if there is voltage output momentarily after sewing stops.	Main PCB assembly

Error status #20 The machine does not stop at the needle up stop position. (“UP” is frequently displayed after sewing)		
Probable causes	Check/repair/adjust	Parts to be replaced
1. Incorrect adjustment	Adjust while referring to "8-22. Adjusting the home position”.	
2. Problem with upper shaft motor operation	Refer to steps 1 to 5 in #17	Resolver stator assembly Motor PCB assembly Motor 430 assembly

Error status #21 SD card read/write mode cannot be activated.		
Probable causes	Check/repair/adjust	Parts to be replaced
1. If “E420” is displayed, the SD card is incorrectly inserted.  2650B	a. Check the direction of insertion of the SD card. (Insert the card so that it matches the direction of the pattern on the card cover.) b. Check the insertion of the SD card.	
2. “E425” SD card is write-protected.	Remove the write protection for the SD card.	
3. Malfunction of SD card	Use a PC to check if the contents of the SD card can be read.	
4. Malfunction of operation panel	See #11.	Panel PCB assembly Panel harness

11. LIST 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 control box cover. 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.

Warnings displayed as symbols

Code	Cause of error and remedy
CLdn	The start switch was pressed without the work clamp being lowered. First lower the work clamp.
UP	The needle bar is not stopped in the needle up stop position. Turn the pulley until the point where the error display disappears.

Switch-related errors

Code	Cause of error and remedy
E010	The STOP switch was pressed. Press the RESET key to clear the error.
E011	The 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.
E012	The STOP switch was pressed. Press the RESET key to clear the error, and then depress the start switch to move the feed mechanism to the home position.
E015	The stop switch was still being pressed when the power was turned on, or there is a problem with the stop switch connection. Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.
E016	Problem with the stop switch connection. Turn off the power, and then check that connector P9 on the main P.C. board is properly connected.
E025	Start switch was being depressed when power was turned on. (For a foot switch, the foot switch was being depressed to the 2nd step.) Turn off the power and check the foot switch.
E035	Work clamp switch was being depressed when power was turned on. (For a foot switch, the foot switch was being depressed to the 1st step.) Turn off the power and check the foot switch.
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 P14 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 P14 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 P14 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.

Motor-related errors

Code	Cause of error and remedy
E111	Needle bar did not stop at the needle up stop position when the sewing machine stopped. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board and connector P6 on the main P.C. board are properly inserted.
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	Upper shaft motor stopped due to a problem, or synchronizer is faulty. Turn off the power, and then turn the pulley and check if the sewing machine has locked up. Check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E131	Synchronizer is not connected correctly. Turn off the power, and then check that connector P11 on the motor P.C. board is properly connected.
E132	Problem detected with upper shaft motor operation. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E133	Upper shaft motor stopping position is incorrect. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E150	Upper shaft motor is overheating, or temperature sensor is faulty. Turn off the power, and then check the upper shaft motor. (When sewing data with a small number of stitches (15 stitches or less) is sewn repeatedly (short cycle operation), the upper shaft motor may overheat and the “E150” error code may be generated.)

Feed mechanism-related errors

Code	Cause of error 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 connectors P17, P21 and P8 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. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected.
E204	X-feed motor stopped due to a problem during sewing. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected.
E205	X-feed motor stopped due to a problem while moving to the sewing start position. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected.
E206	X-feed motor stopped due to a problem during test feeding. Turn off the power, and then check if there are any problems in the X-feed direction. Turn off the power, and then check that connectors P17 and P21 on the main P.C. board are properly connected.
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 connectors P18, P22 and P8 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. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected.
E214	Y-feed motor stopped due to a problem during sewing. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected.
E215	Y-feed motor stopped due to a problem while moving to the sewing start position. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected.
E216	Y-feed motor stopped due to a problem during test feeding. Turn off the power, and then check if there are any problems in the Y-feed direction. Turn off the power, and then check that connectors P18 and P22 on the main P.C. board are properly connected.
E230	Feed motor stopped due to a problem. Reduce the sewing speed or set memory switch No.059 = 1.

Work clamp-related errors

Code	Cause of error 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 connectors P19, P23 and P8 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. Turn off the power, and then check that connectors P19 and P23 on the main P.C. board are properly connected.

Communication and memory-related errors

Code	Cause of error and remedy
E401	Communication error detected between the main P.C. board and the motor P.C. board when the power was turned on. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E410	Communication error detected between the main P.C. board and the panel P.C. board. Turn off the power, and then turn it back on again. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E411	Communication error detected between the main P.C. board and the motor P.C. board. Turn off the power, and then turn it back on again. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E412	Communication error detected between the panel and the programmer. Turn off the power, and then turn it back on again.
E420	No SD card is inserted. Press the RESET key to clear the error. Insert an SD card and then try again.
E421	The sewing data number is invalid or it has no corresponding data. Press the RESET key to clear the error. Check that data for this sewing data number is present on the SD card.
E422	An error occurred while reading from the SD card. Check the data. When reading BAS-311G user programs, first read the sewing data. Press the RESET key to clear the error. Check the data on the SD card.
E424	Insufficient free space on the SD card. Press the RESET key to clear the error. Use a different SD card.
E425	An error occurred while writing to the SD card. Check the SD card. The card may be write-protected. Press the RESET key to clear the error. Use the specified type of SD card.
E427	The program containing the specified cycle program has been cleared. Press the RESET key to clear the error. Redo the cycle program.
E430	Data cannot be backed up to the main P.C. board. Turn off the power, and then turn it back on again.
E440	Data cannot be backed up to the main P.C. board. Turn off the power, and then turn it back on again.
E450	Model selection cannot be read from the machine head memory. Turn off the power, and then check that connector P16 on the main P.C. board is properly connected.
E452	Machine head memory is not connected. Turn off the power, and then check that connector P16 on the main P.C. board is properly connected.
E453	Problem with data in machine head memory. Turn off the power, and then turn it back on again.
E474	Internal memory is full and copying is not possible. Press the RESET key to clear the error. Clear the sewing data.

Data editing-related errors

Code	Cause of error and remedy
E500	The enlargement ratio setting caused the sewing data to extend outside the sewing area. Set the enlargement ratio again. Press the RESET key to clear the error.
E502	The enlargement ratio caused the data pitch to exceed the maximum pitch of 12.7 mm. Press the RESET key to clear the error. Set the enlargement ratio again.
E510	Error in sewing data. Press the RESET key to clear the error. If an error occurs while reading or revising the sewing data, revise the data.
E511	No end code has been input into pattern data. Press the RESET key to clear the error.
E512	Number of stitches exceeds allowed maximum. Press the RESET key to clear the error.
E581	Memory switch file cannot be read correctly. The model for the data which was read does not match the model being written to. Press the RESET key to clear the error. Read data for the same sewing machine model.
E582	Memory switch versions do not match. Press the RESET key to clear the error. Read data for the same version.
E583	User program versions do not match. Press the RESET key to clear the error. Read data for the same version.

Device-related errors

Code	Cause of error and remedy
E600	Upper thread breakage occurred. Thread the upper thread. Re-sewing is then possible. Turn off the power, and then check that connector P14 on the main P.C. board is properly connected.
E670	Problem with the lower thread detector. Turn off the power, and then check the lower thread detector.

11. LIST OF ERROR CODES

P.C. board-related errors

Code	Cause of error and remedy
E700	Abnormal rise in power supply voltage. Turn off the power, and then check the input voltage.
E701	Abnormal rise in upper shaft motor drive voltage. Turn off the power, and then check the voltage.
E705	Abnormal drop in power supply voltage. Turn off the power, and then check the input voltage.
E710	Abnormal current detected in upper shaft motor. Turn off the power, and then check if there are any problems with the sewing machine. Turn off the power, and then check that connectors P11 and P1 on the motor P.C. board, connector P6 on the main P.C. board and connector P4 on the upper shaft motor P.C. board are properly inserted.
E711	Abnormal current detected in pulse motor. Turn off the power, and then check if there are any problems with the work clamp operation.
E730	External error input (AIRSW) detected. Turn off the power, and then check the air pressure.

Version updating-related errors

Code	Cause of error and remedy
E870	No control program is present. Install the control program.
E880	Version update requests cannot be received. Turn off the power, and then turn it back on again.
E881	Version updating did not complete normally. Turn off the power, and then repeat the version update procedure.
E882	Communication error detected between the main P.C. board and the panel P.C. board. Turn off the power, and then check that connector P1 on the panel P.C. board, connector P5 on the main P.C. board and connectors P2 and P3 on the motor P.C. board are properly inserted.
E883	No control program is present on the SD card. Check that the control program has been saved into the correct folder.
E884	There is a problem with the control program. Save the correct file onto the SD card.
E885 - E887	Version updating could not be carried out. Turn off the power, and then turn it back on again.

If an error code that is not listed above appears or if carrying out the specified remedy does not solve the problem, contact the place of purchase.

12. 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 these operations.
The machine may operate if the foot switch is depressed by mistake, which could result in injury.

Problem	Cause	Remedy	Reference
Sewing machine does not start when the power is turned on and the foot switch is depressed.	Machine head switch does not work.	Check if the machine head switch cord is disconnected.	CD Instruction manual
		Adjust the position of the machine head switch.	CD Instruction manual P.85
		If the machine head switch is malfunctioning, replace it with a new one.	
Work clamp does not work. **・ Work clamp** *** Pneumatic work clamp specifications only**	Air cock is closed.	Open the air cock.	P.98
	Air pressure is too weak.	Adjust the regulator so that the air pressure is about 0.5 MPa.	P.98
	Speed controller has been tightened too far.	Adjust the speed controller by loosening it 4 turns from the fully-tightened position.	CD Instruction manual
Thread wiper does not work.	Thread wiper setting is OFF.	Set the thread wiper setting to ON.	CD Instruction manual
Work clamp dose not rise to the maximum height.	Work clamp arm lever position is incorrect. * Pneumatic work clamp specifications	Adjust the position of the wok clamp arm lever.	P.98
	Work clamp arm assembly stopper position is incorrect. * Motor-driven work clamp specifications	Adjust the position of the work clamp arm assembly stopper.	
Work clamp pressure is too weak. *** Pneumatic work clamp specifications only**	Air pressure is too weak.	Adjust the regulator so that the air pressure is about 0.5 MPa.	P.98
Work clamp pressure is not uniform at front and back of work clamp.	Work clamp is tilted.	Adjust the tilt of the work clamp.	
Thread wiper dose not operate correctly.	The thread wiper is obstructing the needle.	Adjust the height of the thread wiper.	P.94
		Adjust the operating stroke of the thread wiper.	P.94
	Thread wiper position is incorrect.	Adjust the operating stroke of the thread wiper.	P.94

(Continued on next page)

Problem	Cause	Remedy	reference
Lower thread winds to one side.	Height of bobbin winder tension assembly is incorrect.	Adjust the height of the bobbin winder tension assembly.	CD Instruction manual
Lower thread winding amount is incorrect.	Bobbin presser position is incorrect.	Adjust the position of the bobbin presser.	CD Instruction manual
Thread unraveling at sewing start.	Needle is too thick.	Select a needle that is suitable for the sewing conditions.	CD Instruction manual
	Upper thread trailing length is too short.	When threading the thread through the needle, allow a distance of approximately 40 mm between the needle hole and the end of the thread.	CD Instruction manual
		Adjust the sub-tension so that the upper thread trailing length after thread trimming is approximately 40 mm.	CD Instruction manual
	Amount of lower thread being fed out from bobbin is too small.	Set the feeding amount to approximately 30 mm.	CD Instruction manual
	Sewing start speed is too fast.	Adjust the sewing start speed.	CD Instruction manual
Skipped stitches occur.	Rotary hook tip is missing.	Replace the part.	
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	CD Instruction manual
	Needle is too thick.		
	Needle is bent.	Replace the needle.	CD Instruction manual
	Needle is not installed correctly.	Install the needle so that it faces correctly.	CD Instruction manual
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P.88
	Clearance between needle and rotary hook tip is too large.	Adjust the needle clearance.	P.89
	Needle and rotary hook timing is incorrect.	Adjust the timing.	P.88
	Material is flapping.	Replace the needle hole plate with one with a smaller needle diameter.	
		Use a thinner feed plate. * Recommended thickness: 1.5 mm	
		Process the work clamps and the feed plate into shapes that can hold the material near the seam.	CD Instruction manual
		Adjust the intermittent height of the intermittent work clamp.	CD Instruction manual

(Continued on next page)

Problem	Cause	Remedy	Reference
Upper thread is breaking.	Thread is too thick for the needle.	Select a thread which is suitable for the needle.	CD Instruction manual
	Needle is not installed correctly.	Install the needle so that it faces correctly.	CD Instruction manual
	Thread is not threaded correctly.	Thread the thread correctly.	CD Instruction manual
	Damage or burring in parts such as the rotary hook, needle hole plate, needle or thread path.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Needle and rotary hook timing is incorrect.	Adjust the timing.	P.88
	Upper thread tension is too strong.	Reduce the upper thread tension.	CD Instruction manual
	Thread take-up spring tension is too strong.	Reduce the tension of the thread take-up spring.	P.87
	Thread breaks due to heat.	Use a needle cooler unit (optional). Reduce the sewing speed.	CD Instruction manual
Lower thread is breaking.	Damage to the needle hole plate or bobbin case.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Lower thread tension is too strong.	Reduce the lower thread tension.	CD Instruction manual
Needle breaks.	Needle is bent.	Replace the needle.	CD Instruction manual
	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	CD Instruction manual
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P.88
		Adjust the needle clearance.	P.89
	Needle and rotary hook timing is incorrect.	Adjust the timing.	P.88
	Feed timing is too slow.	Advance the feed timing.	
Upper thread is not cut.	Movable knife is blunt.	Replace the movable knife with a new one.	P.90 P.92
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P.92
	Movable knife is not picking up the upper thread.	Adjust the timing.	P.88
		Adjust the standby position of the movable knife.	P.90
	Movable knife is not picking up the needle thread because the last stitch is being skipped.	Refer to “Skipped stitches occur”.	P.149
Lower thread is not cut.	Lower thread tension is too weak.	Increase the lower thread tension.	CD Instruction manual

(Continued on next page)

Problem	Cause	Remedy	Reference
Upper thread is not tight.  0573M	Needle is too thin.	Select a needle that is suitable for the sewing conditions.	CD Instruction manual
	Hole diameter in needle hole plate is too small.	Replace the needle hole plate with one with a larger hole diameter.	
	Feed plate is too thin.	Use a thicker feed plate. * Recommended thickness: 1.5 mm	
	Hole diameter of intermittent work clamp is too small.	Replace the intermittent work clamp with one with a larger hole diameter.	
	Sliding parts of outer rotary hook and inner hook have little or no sewing machine oil.	Lubricate the felts for the sliding parts of the outer rotary hook and inner hook.	CD Instruction manual
	Damage or burring in parts such as the rotary hook, needle hole plate, needle or thread path.	Repair the respective part by buffing it. Alternatively, replace the part.	
	Lower thread tension is too strong.	Reduce the lower thread tension.	CD Instruction manual
	Upper thread tension is too weak.	Increase the upper thread tension. * Adjust the upper thread tension after adjusting the lower thread tension.	CD Instruction manual
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P.87
	Feed timing is too fast.	Retard the feed timing.	
	Intermittent height of intermittent work clamp is too low.	Adjust the intermittent height of the intermittent work clamp.	CD Instruction manual
	Needle and rotary hook tip are touching.	Adjust the driver needle guard.	P.88
		Adjust the needle clearance.	P.89
Lower thread is not tight.  0574M	Lower thread tension is too weak.	Increase the lower thread tension.	CD Instruction manual
	Upper thread tension is too strong.	Reduce the upper thread tension. * Adjust the upper thread tension after adjusting the lower thread tension.	CD Instruction manual
Poor seam finish on underside of material at the sewing start.	Upper thread trailing length is too long.	Adjust the sub-tension so that the upper thread trailing length after thread trimming is approximately 40 mm.	CD Instruction manual
Upper thread trailing length is irregular.	Movable knife is blunt.	Replace the movable knife with a new one.	P.92
	Fixed knife is blunt.	Sharpen the fixed knife or replace it with a new one.	P.92
	Sub-tension is too weak.	Adjust the sub-tension.	CD Instruction manual
	Thread take-up spring tension is too weak.	Increase the tension of the thread take-up spring.	P.87
Pattern is distorted.	Work clamp and feed plate are too heavy.	If using a heavy work clamp and feed plate, change the operation settings to the settings for heavy-weight materials. Ask the place of purchase for details on the setting method.	

13. 7-SEGMENT DISPLAY LIST

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					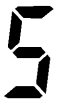				
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				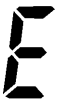					
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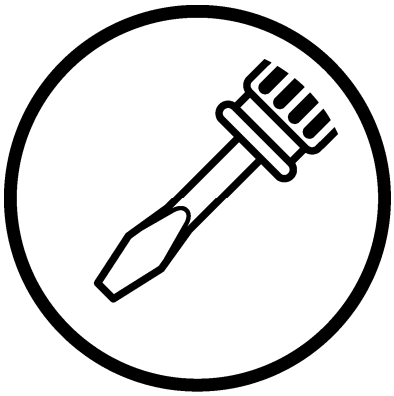

SERVICE MANUAL

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