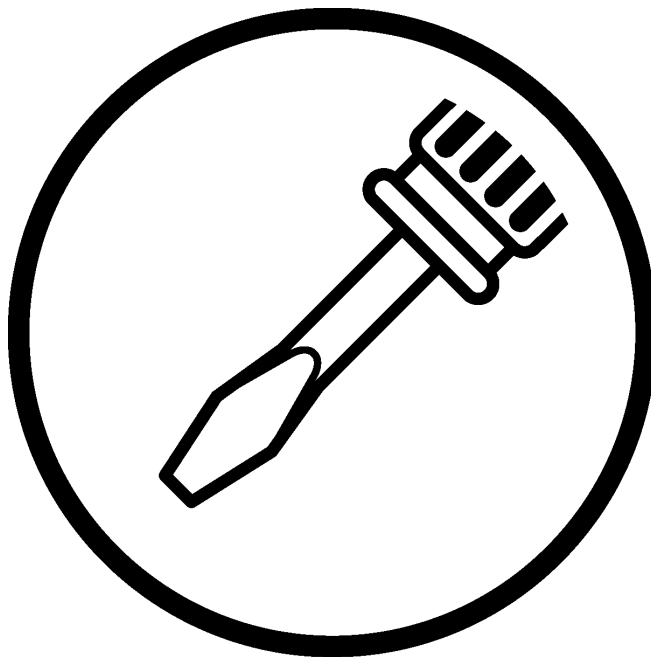


S-7200C

SERVICE MANUAL

Please read this manual before making any adjustments.

SINGLE NEEDLE DIRECT DRIVE STRAIGHT LOCK STITCHER
WITH THREAD TRIMMER



brother[®]

This service manual is intended for S-7200C; be sure to read the S-7200C instruction manual before this manual.

Carefully read the "SAFETY INSTRUCTIONS" 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.
 CAUTION	The instructions which follow this term indicate situations where failure to follow the instructions could cause injury when using the machine or physical damage to equipment and surroundings.

Symbols




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



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



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

[2] Notes on safety

DANGER



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

CAUTION

Environmental requirements



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



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



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



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



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



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

Installation



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



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



The sewing machine weighs more than 45 kg. The installation should be carried out by two or more people.



Do not connect the power cord until installation is complete. The machine may operate if the treadle is depressed by mistake, which could result in injury.



Turn off the power switch before inserting or removing the plug, otherwise damage to the control box could 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.



When securing the cords, do not bend the cords excessively or fasten them too hard with staples, otherwise there is the danger that fire or electric shocks could occur.



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



Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.














Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.








Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhea. 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. The machine may operate if the treadle is depressed by mistake, which could result in injury.
 - 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.
-  Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  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. The machine may operate if the treadle is depressed by mistake, which could result in injury.
-  Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhea. Keep the oil out of the reach of children.
-  Use only the proper replacement parts as specified by Brother.

Maintenance and inspection

-  Disassembly, assembly, 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 treadle is depressed by mistake, which could result in injury.
 - When carrying out inspection, adjustment and maintenance
 - When replacing consumable parts such as the rotary hook
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.
-  Turn off the power switch before inserting or removing the plug, otherwise damage to the control box could result.
-  Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.
-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  Use only the proper replacement parts as specified by Brother.
-  If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.
-  Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

[3] Warning labels

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

1

	▲ 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 5 minutes 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 avant d'ouvrir le capot.	Un voltaje inadecuado puede provocar las heridas. Apagar el interruptor principal y esperar 5 minutos antes de abrir esta cubierta.	

2 Touching areas where high voltages are present can result in severe injury. Turn off the power before opening the cover.

4 Be careful not to get your hands caught when returning the machine head to its original position after it has been tilted.

3

CAUTION
Moving parts may cause injury.

Operate with safety devices* installed.

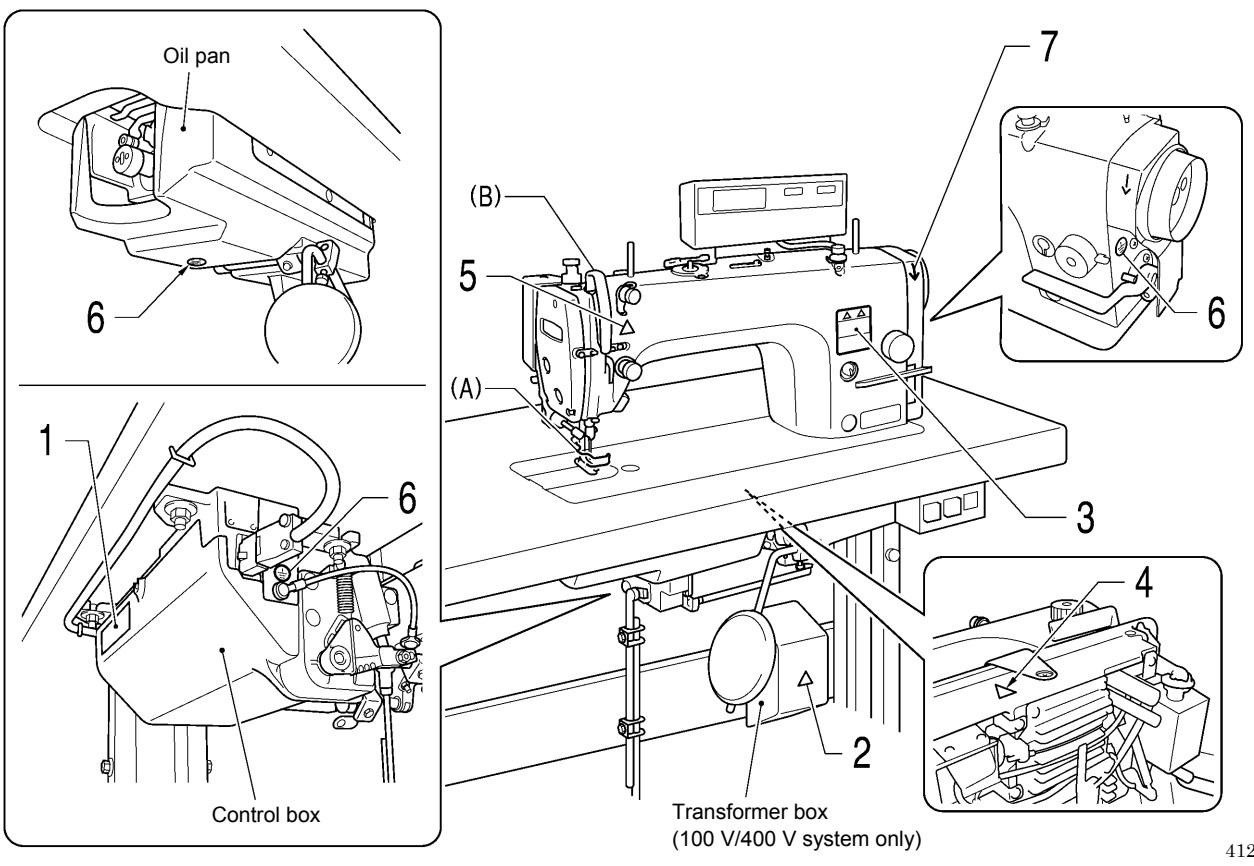
Turn off the power before carrying out operations such as threading, changing the needle, bobbin, knives or hook, cleaning and adjusting.

5 Be careful to avoid injury from the moving thread take-up.

6 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.

7 Direction of operation

* Safety devices: (A) Finger guard
(B) Thread take-up cover




4123M

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1. MACHINE SPECIFICATIONS

				3	4	
		Quick reverse		0	0	
		Thread wiper		-	0	
				0	3	5
Lubrication type		Minimum lubrication	Semi dry	Complete dry		
				S	3	5
Use		For light-weight and difficult-to-sew materials	For medium-weight materials	For heavy-weight materials		

	-33S, -43S -45S	-453	-303, -403 -333, -433	-305 -405
Max. sewing speed	4,000 sti/min		5,000 sti/min *	4,500 sti/min *
Start backtacking and continuous backtacking speed	220 - 3,000 sti/min			
End backtacking speed	1,800 sti/min			
Max. stitch length	4.2 mm	5 mm		
Presser foot height	Lifting lever	6 mm		
	Knee lifter	16 mm		
Feed dog height	0.8 mm			1.2 mm
Needle (DB×1, DP×5)	NS #9 - #11	#11 - #18	#19 - #22	
Motor	AC servo motor (4-pole, 450W)			
Control circuit	Microprocessor			

*...When sewing at speeds of 4,000 sti/min or higher, set the stitch length to 4.2 mm or less.

Rotary hook

-33S -43S	-303, -403 -333, -433	-305 -405	-45S -453
Lubricated / for light materials	Lubricated / for medium materials	Lubricated / for heavy materials	Rotary hook RP (lubrication-free rotary hook)

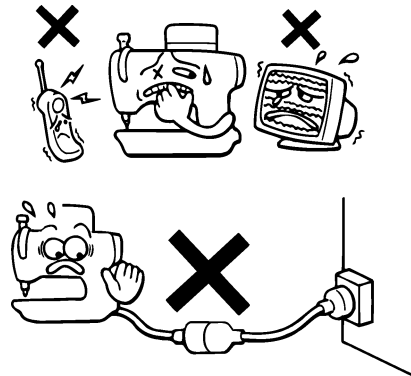
Lubricating oil

	-30□, -40□	-33□, -43□	-45□
Rotary hook	High-speed spindle	High-speed spindle	-
Needle bar		Special Brother grease	Special Brother grease

2. NOTES ON HANDLING

About the machine set-up location

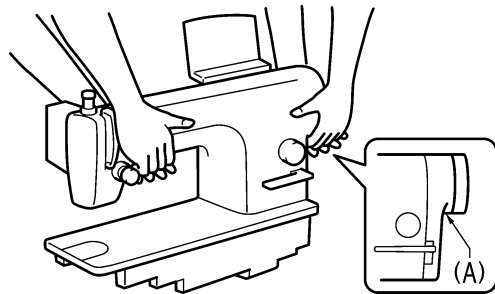
- Do not set up this sewing machine near other equipment such as televisions, radios or cordless telephones, otherwise such equipment may be affected by electronic interference from the sewing machine.
- The sewing machine should be plugged directly into an AC wall outlet. Operation problems may result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



2086M

Carrying the machine

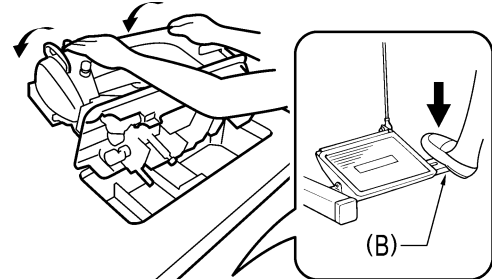
- The machine should be carried by the arm by two people as shown in the illustration.
- * Hold the motor cover (A) by hand also so that the pulley does not rotate.



4125M

Tilting back the machine head

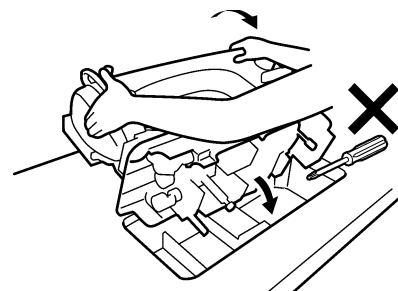
- Hold section (B) with your foot so that the table does not move, and then push the arm with both hands to tilt back the machine head.



2088M

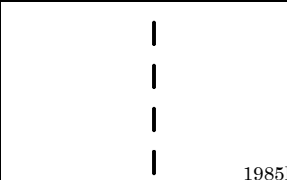
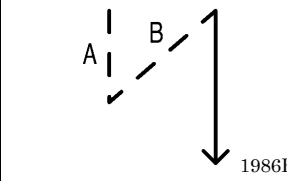
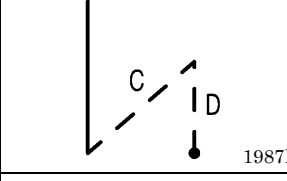
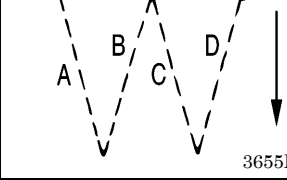

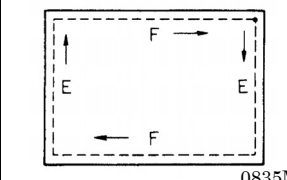
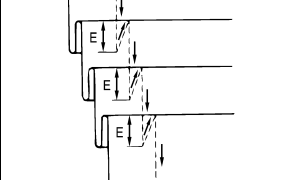
Returning the machine head to the upright position

- Clear away any tools, etc. which may be near the table holes.
- While holding the face plate with your left hand, gently return the machine head to the upright position with your right hand.



2089M

3. COMPARISON OF FUNCTIONS (G50 AND G10 OPERATION PANELS)

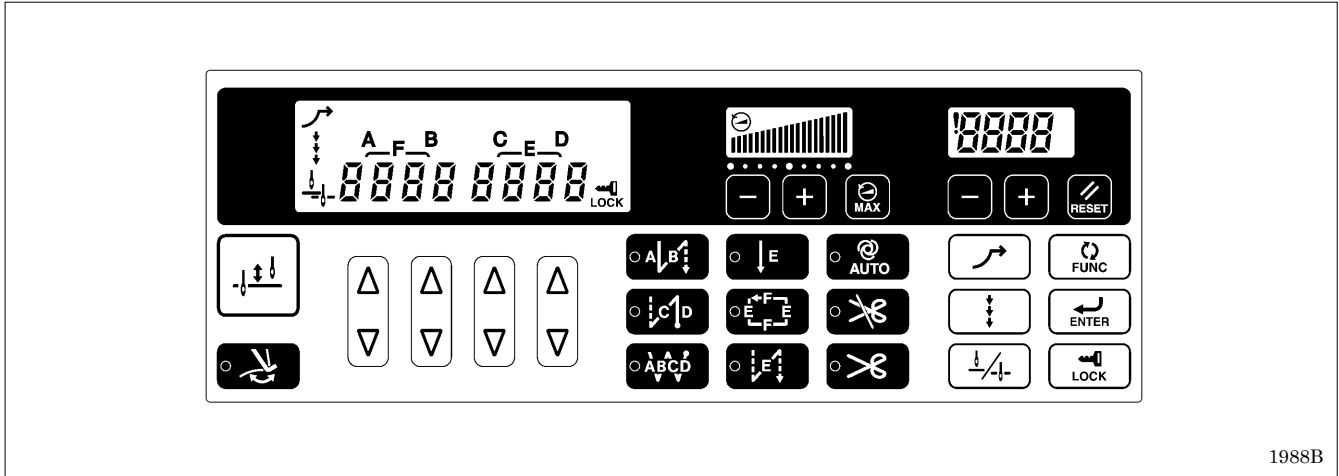
			G10 operation panel	G50 operation panel
Sewing pattern	Normal sewing (*1)	 1985B	○	○
	Start backtack sewing	 1986B	○	○
	End backtack sewing	 1987B	○	○
	Continuous backtack sewing	 3655M	○	○
	Fixed stitch sewing	 0827M	-	○
	Name label sewing	 0835M	-	○
	Pleat presser sewing	 2163M	-	○
	Program sewing		-	○
Memory switch		-	○	
Lower thread counter		-	○	

(*1) Normal sewing refers to sewing carried out when no functions have been set.



4. FUNCTION SETTINGS (G50 OPERATION PANEL)

4 - 1 . List of advanced functions

This section contains a list of advanced functions and the key operations which are used to call the setting mode for the functions.



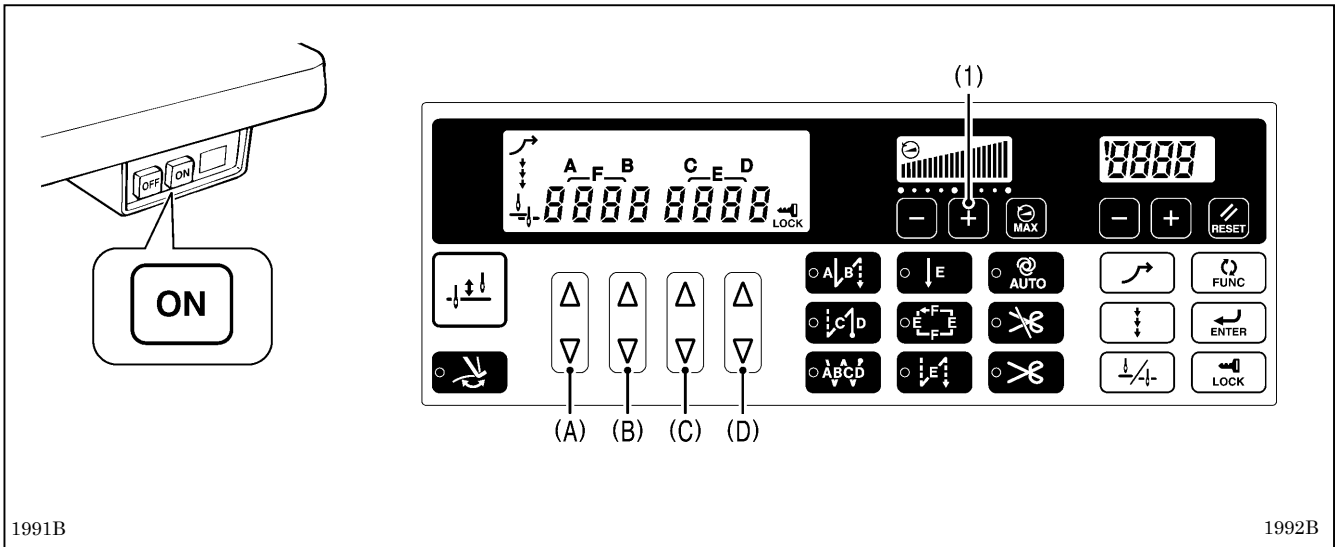
1988B

1	<p>Maximum sewing speed and start backtack sewing speed setting</p> <p>Release the lock + </p> <p>Refer to “4-3. Maximum sewing speed and start backtack sewing speed setting methods”. 1989B</p>
2	<p>Memory switch setting mode (Standard)</p> <p>Release the lock + </p> <p>Refer to “4-5. Memory switch setting method (Standard)”. 1990B</p>

* For details on releasing the lock, refer to “4-4. Using the LOCK key”.


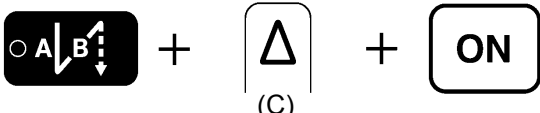
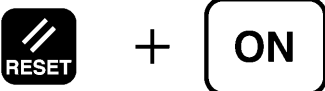
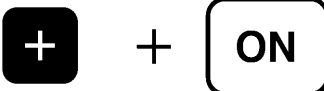
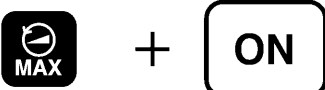
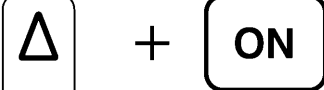
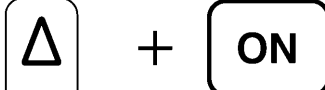
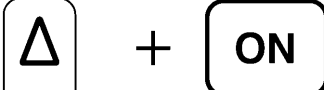
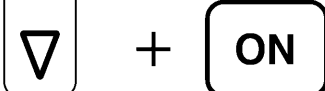
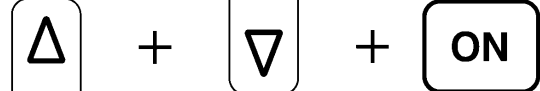
4 - 2. List of special functions when power is turned on

This section contains a list of functions for the G50 operation panel and the key operations which are used to call the setting mode for the functions.



1991B

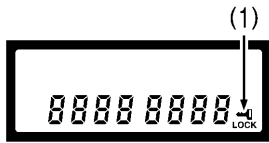
1992B

<p>1 Memory switch setting mode (Advanced)</p>  <p>Refer to "4-6. Memory switch setting method (Advanced)".</p>	<p>6 Protect setting mode [DIP switch 1 = OFF]</p>  <p>Refer to "4-11. Protection settings".</p>
<p>2 Data initialization function</p>  <p>Refer to "4-7. Data initialization function".</p>	<p>7 Software version display function</p>  <p>Refer to "4-12. Software version checking method".</p>
<p>3 Error log display function</p>  <p>Refer to "4-8. Error history checking method".</p>	<p>8 Treadle position adjustment mode [DIP switch 4 = ON]</p>  <p>Refer to "13. SETTING METHOD FOR STANDARD DEPRESSION STROKES".</p>
<p>4 Input checking function</p>  <p>Refer to "4-9. Input checking method".</p>	<p>9 Sewing machine reference position adjustment mode</p>  <p>Refer to "4-14. Adjusting the sewing machine reference position".</p>
<p>5 Output checking function</p>  <p>Refer to "4-10. Output checking method".</p>	<p>10 Maintenance information viewing mode</p>  <p>Refer to "4-13. Viewing maintenance information".</p>

1993B-1995B, 1999B, 1996B

1997B-1999B, 1999B-2000B

4-3. Maximum sewing speed and start backtack sewing speed setting methods



If the LOCK key icon (1) is on, release the lock before carrying out the following operations.

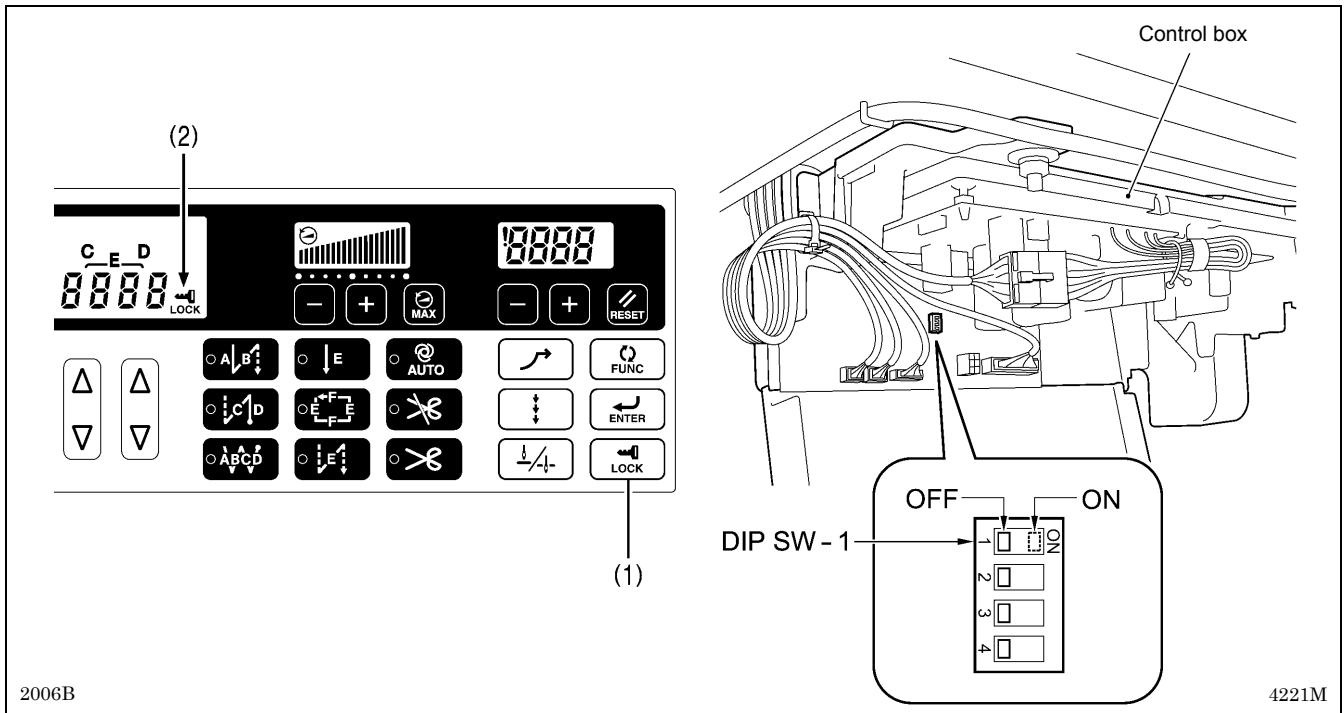
2001B

<p>1</p>	<p>Maximum sewing speed Start backtack sewing speed</p> <p>The main display (2) will change from an orange display to a green display.</p> <p style="text-align: right;">2002B</p>
<p>2</p>	<p>Maximum sewing speed setting</p> <ul style="list-style-type: none"> • The maximum sewing speed can be set to a speed from 220 sti/min to the maximum sewing speed that has been set for the head detector unit. • If all numbers in the sewing speed control display (3) are illuminated, sewing will be carried out at the maximum speed that is set here when the treadle is fully depressed. <p style="text-align: right;">2003B 2004B</p>
<p>3</p>	<p>Start backtack sewing speed setting</p> <ul style="list-style-type: none"> • The start backtack sewing speed can be set to a speed from 220 sti/min to 3,000 sti/min. (The factory default setting is 1,800 sti/min.) <p style="text-align: right;">2005B</p>
<p>4</p>	<p>The sewing speed display disappears and the main display (2) returns to the orange display.</p> <p style="text-align: right;">2159M</p>

NOTE:

If the main display (2) appears in green, normal key operations cannot be carried out. If this happens, press the MAX key once more to clear the sewing speed display and return to the orange display. Normal key operations can then be carried out.

4 - 4 . Using the LOCK key



When the power switch is turned on, the LOCK key (1) turns on. (The icon (2) is illuminated.)

This causes all key operations which have been set using the protect settings feature to become disabled, and you can use this feature to prevent setting values from being changed by accident.

* For details on the protect settings feature, refer to “4-11. Protecting settings”.

<Releasing the lock>

Press down the LOCK key (1) for 2 seconds or more. The icon (2) will switch off and the lock will be released.

NOTE:

- * If DIP switch 1 is set to ON, the lock cannot be released.
- * The lock cannot be released if the protection level has been set to “2” or “3” using the protect settings feature.
- * At the time of shipment from the factory, the protection level is set to “1”.

<Setting the lock>

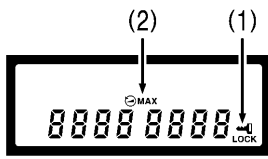
When the icon (2) is switched off, press down the LOCK key (1) for 2 seconds or more.

The icon (2) will illuminate and operations for keys which have been set using protect setting mode will be disabled.

* About the icon (2)

If the protection level has been set to “0” using the protect settings feature, the status of the icon (2) will be stored when the lock settings have been changed.

4 - 5. Memory switch setting method (Standard)



NOTE:

- This cannot be set if DIP switch 1 has been set to ON, so set it to OFF.
- If the LOCK key icon (1) is on, release the lock before carrying out the following operations.
- If the MAX key icon (2) is on, press the MAX key to return the main display to stitch number display (orange).

2007B

1	<p>Change to memory switch mode</p> <p>The memory switch number (A) and the setting details (B) for that number will be displayed in green in the main display (3).</p> <p>NOTE: If the current setting value is different from the initial value, it will be displayed in yellow.</p>	2008B
2	<p>Select a memory switch number (A)</p> <p>* If you press the Δ or ∇ key (4) at this time, only the memory switch numbers with a current value that is different from the initial value will be displayed in yellow.</p>	2009B 2093B 2138M 2139M
3	<p>Change the setting details (B).</p> <p>* If you would like to return the setting which is currently being displayed to the default value, press the RESET key.</p> <p>* If the setting details for the memory switch are different from the original setting details, the setting details (B) will flash.</p> <p>* If the setting details for the memory switch are different from the initial values, they will be displayed in yellow.</p>	2011B 4173M
4	<p>The setting for the memory switch will be stored and (B) will stop flashing and illuminate steadily.</p> <p>NOTE: The changed settings will be enabled after memory switch mode has been exited.</p>	4192M
5	<p>Repeat steps 2 to 4 above to change other memory switch settings.</p>	
6	<p>Normal sewing machine operation will then be possible.</p>	4193M

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Presser foot lifter operation and pedal operation settings (001-)

No.	Setting range	Initial value	Setting units	Setting details
001	ON/OFF	OFF	-	Presser foot status when treadle is returned to neutral after thread trimming ON: Presser foot does not drop OFF: Presser foot drops (Presser foot will not drop if No. 851 is set to OFF.)
002	ON/OFF	OFF	-	Presser foot status after treadle stops at neutral ON: Presser foot lifts OFF: Presser foot does not lift
003	ON/OFF	ON	-	Presser foot lifting when treadle is depressed backward to 1st step after returning to neutral * If No. 004 is "OFF", this function will operate as if the setting is "OFF". ON: Possible OFF: Not possible
004	ON/OFF	ON	-	Operation when treadle is depressed backward ON: Thread trimming and end backtack sewing operations are enabled (If thread trimming operation has been disabled, needle up operations will be carried out without thread trimming.) OFF: Thread trimming and end backtack sewing operations are disabled (Presser foot is raised when treadle is depressed backward.)
010	ON/OFF	OFF	-	Alternate standing operation pedal and treadle operation ON: Standing operation pedal and the treadle can operate alternately (If the standing operation pedal and the treadle are operated at the same time, the standing operation pedal will have priority.) OFF: Treadle operation can also be used after standing operation pedal is used
011	0-2	0	1	Operation when standing operation variable speed pedal is on 0: Sewing speed corresponds to treadle depression amount 1: Sewing speed corresponds to sewing speed control key setting (constant speed) 2: Sewing speed corresponds to end backtack speed
012	0-500 (ms)	80 (ms)	10 (ms)	Delay time from standing pedal turning on until motor starts operating
013	ON/OFF	ON	-	Pause function during standing operation when presser foot lifter pedal is operated (when AUTO key is set to ON) ON: Operation pauses during sewing when presser foot lifter pedal is ON OFF: No operation
014	ON/OFF	ON	-	Pause function during standing operation when high-speed pedal is operated (when AUTO key is set to ON) ON: Operation pauses during sewing when high-speed pedal turns ON once more. Sewing is resumed when high-speed pedal next turns OFF. OFF: No operation
015	ON/OFF	ON	-	Presser foot lifting operation from thread trimming pedal after thread is trimmed during standing operation ON: Presser foot can be lifted and lowered (If No. 051 is "OFF", the thread trimming pedal operation is disabled after the presser foot lifter pedal has been operated during standing operation.) OFF: No operation (Only possible by using presser foot lifter pedal.)

Sewing machine motor settings (100-)

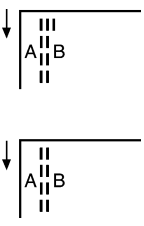
No.	Setting range	Initial value	Setting units	Setting details
100	1-99 (needles)	2 (needles)	1	Number of slow start stitches
101	OFF/1-3	OFF	1	Pedal response switching settings immediately after sewing has started OFF: No switching 1: Slow start only when sewing starts after thread trimming 2: Slow start only when sewing starts after sewing has been paused 3: Slow start always when sewing starts
102	1-5	1	1	Pedal response immediately after sewing has started * The larger the value, the slower the speed when sewing starts. * If No. 101 is set to "OFF", this setting is disabled.

Operation panel settings (300-)

No.	Setting range	Initial value	Setting units	Setting details
300	1-3	1	1	Lower thread counter display operations 1: Lower thread counter (Counting units are set by No. 301.) 2: Thread trimming counter (incremented by 1 each time of a thread trimming operation occurs) * The counter is incremented even if thread trimming is set to disabled. 3: Needle replacement counter (Counting units are set by No. 303.)
301	0-100 (needles)	10 (needles)	1	Lower thread counter counting units 0: No counting operation 1-100: Display counts down by the set number of stitches
302	0-2	1	1	Operation for counter warning (when < ! > warning icon is displayed) 0: Starting using the treadle is always enabled 1: After thread trimming stops, starting using the treadle is disabled (enabled until depressed backward) 2: Operation using treadle fully disabled after treadle is returned to neutral position and sewing stops
303	0-1000 (needles)	100 (needles)	10	Needle replacement counter counting units 0: No counting operation 10-1000: Display counts down by the set number of stitches

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Sewing program settings (400-)

No.	Setting range	Initial value	Setting units	Setting details
400	2-6	2	1	<p>Start backtack sewing pattern</p> <p>* If A=0, there is no A operation, and if B=0, there is no B operation.</p> <p>2: A-B 3: B-A-B 4: A-B-A-B 5: B-A-B-A-B 6: A-B-A-B-A-B</p>
401	2-6	2	1	<p>End backtack sewing pattern</p> <p>* If C=0, there is no C operation, and if D=0, there is no D operation.</p> <p>2: C-D 3: C-D-C 4: C-D-C-D 5: C-D-C-D-C 6: C-D-C-D-C-D</p>
402	1-2	1	1	<p>Continuous backtack sewing pattern</p> <p>1: A-B-C-D</p> <p>* If A=0, there is no A operation, and if B=0, there is no B operation. If C=0, there is no C operation, and if D=0, there is no D operation.</p> <p>2: A-B × D times</p> <p>* If A=0, there is no A operation, and if B=0, there is no B operation. If A ≠ 0, B ≠ 0 and D=4, operation is in the order A-B-A-B.</p>
403	ON/OFF	OFF	-	<p>Stopping while start backtacking is in progress, and speed during start backtacking</p> <p>ON: When the treadle is returned to the neutral position, start backtacking can be stopped before it is finished, and the speed during start backtacking becomes the speed corresponding to the treadle depression amount. (low speed-start backtacking speed)</p> <p>OFF: When the treadle is returned to the neutral position, start backtacking ends, sewing stops and the sewing speed becomes the start backtacking speed.</p>
404	ON/OFF	OFF	-	<p>Feed direction when sewing is stopped immediately after start backtacking is complete</p> <p>ON: Quick reverse solenoid turns OFF after sewing stops</p> <p>* If No. 403 is "OFF", operation occurs when the treadle is depressed slightly.</p> <p>OFF: Quick reverse solenoid turns OFF and feed returns to normal direction, then stops</p> <p>* If No. 452 is "ON", the operation set by this setting is disabled.</p> 
405	1-2	1	1	<p>Operation when pleat presser sewing key is ON (fixed stitch sewing load function)</p> <p>1: Reverse stitching operation when actuator switch is ON 2: Fixed stitch sewing operation when actuator switch is ON</p>

Standard device settings (500-)

No.	Setting range	Initial value	Setting units	Setting details
500	OFF/1-3	1	1	Actuator switch function when sewing is stopped (*1) OFF: No operation 1: Correction sewing switch (*2) 2: Thread trimming switch (*3) 3: Cloth feed quick reverse switch (*4)
501	OFF/1-2	1	1	Actuator switch function during sewing (*1) OFF: No operation 1: Manual backtack switch (*2) 2: Thread trimming switch (*2)
502	OFF/1	1	1	Presser foot lifter switch function OFF: No operation 1: Presser foot lifter switch

(*1) When the pleat presser sewing key is ON, the pleat presser sewing switch function is enabled.

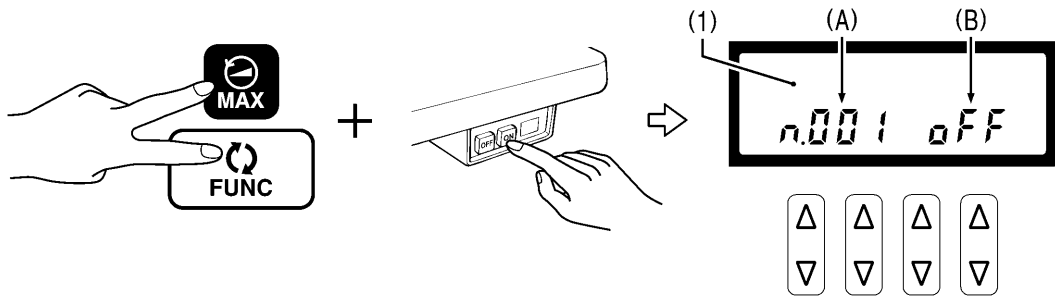
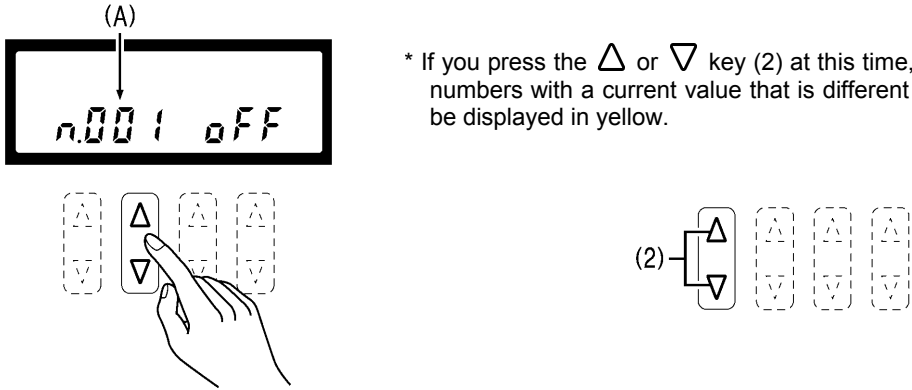
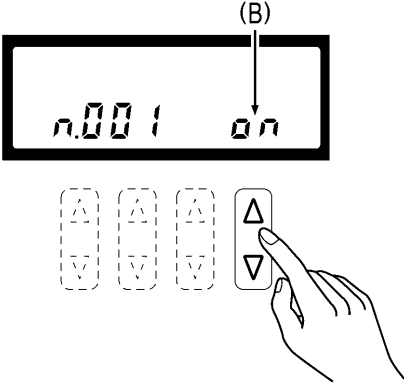



However, when set to "2", the thread trimming switch function takes priority.

(*2) When the pleat presser sewing key is set to ON, the correction sewing switch function is disabled.

(*3) To make it function as a thread trimming switch while sewing is in progress, No. 501 must be set to "2".

(*4) To make it function as a quick reverse switch while sewing is in progress, No. 501 must be set to "1".

4 - 6. Memory switch setting method (Advanced)

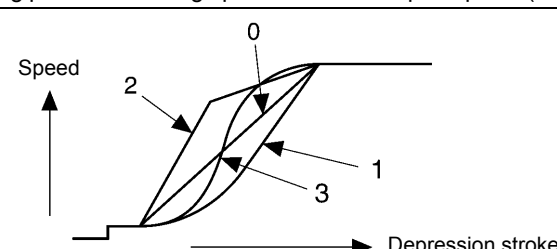
<p>1</p>	<p>Change to memory switch mode</p>  <p>(While holding down the MAX key and the FUNC (function) key, press the power ON switch.)</p> <p>The memory switch number (A) and the setting details (B) for that number will be displayed in green in the main display (1).</p> <p style="text-align: right;">2012B</p>
<p>2</p>	<p>Select a memory switch number (A)</p>  <p>* If you press the Δ or ∇ key (2) at this time, only the memory switch numbers with a current value that is different from the initial value will be displayed in yellow.</p> <p style="text-align: right;">2009B 2013B 2138M 2139M</p>
<p>3</p>	<p>Change the setting details (B)</p>  <p>* If you would like to return the setting which is currently being displayed to the default value, press the  key.</p> <p>* If the setting details for the memory switch are different from the original setting details, the setting details (B) will flash.</p> <p>* If the setting details for the memory switch are different from the initial values, they will be displayed in yellow.</p> <p style="text-align: right;">2011B 4173M</p>
<p>4</p>	 <p>The setting for the memory switch will be stored and (B) will stop flashing and illuminate steadily.</p> <p>NOTE: The changed settings will be enabled after memory switch mode has been exited.</p> <p style="text-align: right;">4192M</p>
<p>5</p>	<p>Repeat steps 2 to 4 above to change other memory switch settings.</p>
<p>6</p>	 <p>Normal sewing machine operation will then be possible.</p> <p style="text-align: right;">4193M</p>

Presser foot lifter and presser foot lifter pedal settings (050-)

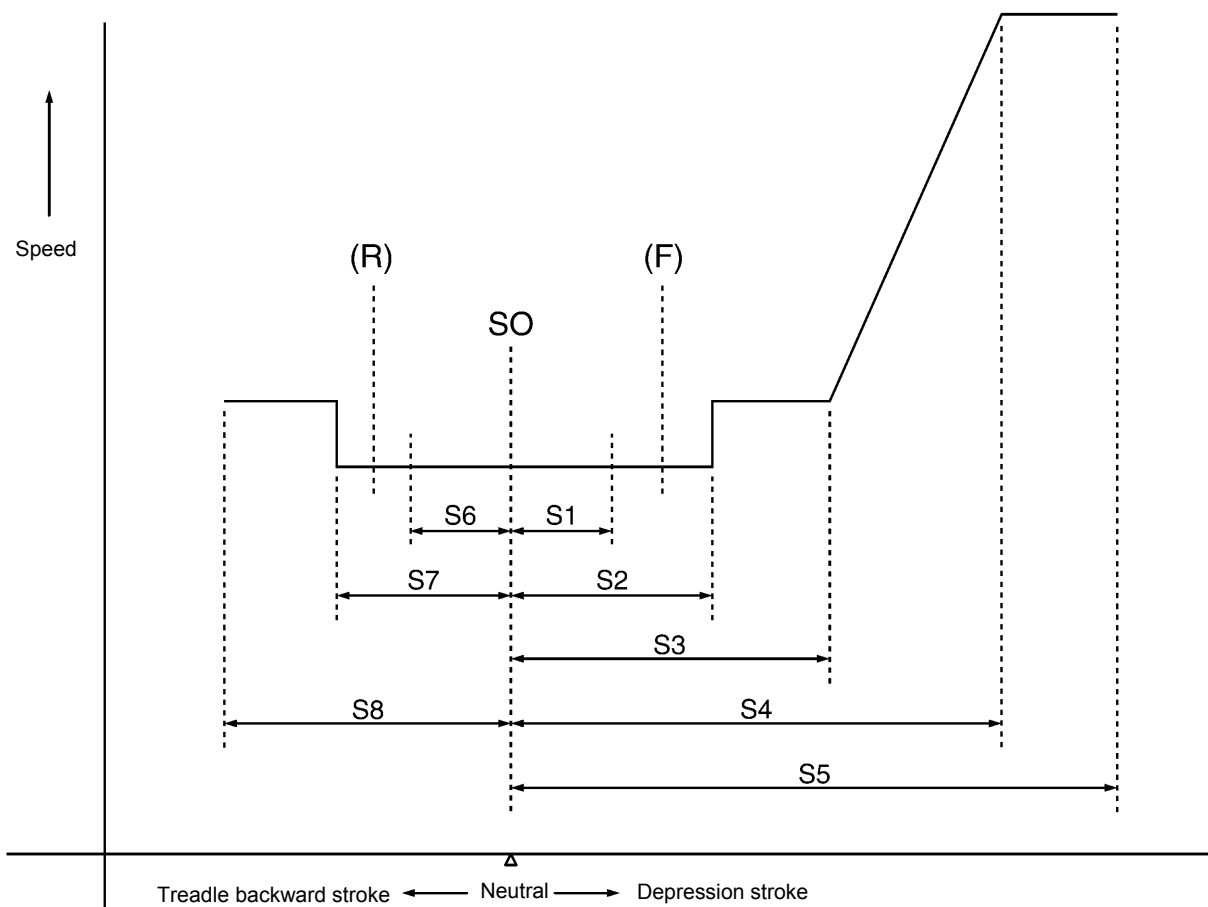
No.	Setting range	Initial value	Setting units	Setting details
050	ON/OFF	ON	-	Forward treadle operation interlock during thread trimming ON: Depressing treadle forward during thread trimming is disabled (After the treadle is returned to the neutral position, depressing it forward is enabled.) OFF: Depressing treadle forward during thread trimming is enabled
051	ON/OFF	(*1)	-	Operation after knee switch is used to raise and lower presser foot ON: Presser foot can be raised and lowered by depressing the treadle backward OFF: Above operation is not possible
055	ON/OFF	OFF	-	Backward treadle operation when presser foot is lifted, or operation after knee switch is operated * This setting is only enabled when No. 851 is "ON" and No. 001 is "ON". ON: Presser foot does not lift when treadle is returned to neutral position OFF: Presser foot lifts when treadle is returned to neutral position
057	ON/OFF	(*1)	-	Presser foot dropping when treadle is depressed forward to 1st step * This is disabled when No. 852 is set to "OFF". ON: Presser foot is lowered OFF: Presser foot is not lowered

(*1) The initial value varies depending on the destination. For Europe and the Americas, the initial setting is "ON", and for all other destinations, it is "OFF".

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

No.	Setting range	Initial value	Setting units	Setting details
080	-7-7	0	1	Treadle backward on (thread trimming) point (S7)
081	-5-5	0	1	Treadle backward 1st step on (presser foot lifting) point (S6)
082	-5-5	0	1	Treadle forward 1st step on (presser foot dropping) point (S1)
083	-5-5	0	1	Treadle forward on (starting) point (S2)
084	-5-7	0	1	Treadle variable speed range starting point (S3)
085	-7-7	0	1	Treadle high speed range reaching point (S4)
086	-2-2	0	1	Variable speed range starting point for standing operation variable speed pedal (S3)
087	-2-2	0	1	High speed range reaching point for standing operation variable speed pedal (S4)
088	0-3	(*2)	1	<p>Treadle speed curve</p> <p>0: Constant</p> <p>1: Curves downward</p> <p>2: Curves upward</p> <p>3: S line curve</p> 

(*2) The initial value varies depending on the destination. For Japan, the initial value is "1", and for all other destinations, it is "0".



2015B

Sewing machine motor settings (150-)

No.	Setting range	Initial value	Setting units	Setting details
150	ON/OFF	ON	-	Slow stop control when treadle is returned to neutral ON: Slow stop control without step operation (Low speed operating time before sewing stops is almost constant) OFF: Above control is not used (Low speed operating time before sewing stops is not constant)
151	ON/OFF	OFF	-	Effective hammer operation if needle does not pierce ON: Effective hammer operation OFF: No effective hammer operation
152	ON/OFF	OFF	-	Highest needle position stop operation ON: Used OFF: Not used
153	10-500 (ms)	150 (ms)	10 (ms)	Delay time until reverse operation starts during highest needle position stop operation * This is only enabled when No. 152 is set to "ON".
154	-20-20 (degrees)	0 (degrees)	1	Quick reverse needle up stop position setting * This is only enabled when No. 152 is set to "ON". <div style="text-align: center;"> <p style="text-align: right; margin-right: 20px;">2248M</p> </div>
155	0	1	1	Thread wiping operation and presser foot lifting operation during highest needle position stop operation * This is only enabled when No. 152 is set to "ON". 0: The needle is raised, then thread wiping is carried out, and then the presser foot is lifted
170	5-12 (A)	11 (A)	1	Current limit value during acceleration * The larger the value, the faster the sewing machine motor acceleration; the smaller the value, the slower the acceleration. (Setting a small value may be effective in preventing fluorescent light flickering.)
171	5-12 (A)	10 (A)	1	Current limit value during deceleration * The larger the value, the faster the sewing machine motor deceleration; the smaller the value, the slower the deceleration.
172	-3-6	0	1	Gain during high-speed motor operation [Do not change this setting.]
173	-3-6	0	1	Gain during low-speed motor operation [Do not change this setting.]
174	-3-6	0	1	Weak gain during thread trimming [Do not change this setting.]
175	OFF/1	OFF	1	Servo lock operation OFF: None 1: Servo lock operation occurs when sewing is stopped
176	OFF/1-120 (seconds)	OFF	1	Servo lock timer setting * This is disabled when No. 175 is set to "OFF". OFF: No timer operation 1-120: Timer operates (1-120 seconds)
177	30-89 (degrees)	45 (degrees)	1	Servo lock release rotation angle [Do not change this setting.] * This is disabled when No. 175 is set to "OFF".

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

No.	Setting range	Initial value	Setting units	Setting details
180	150-300 (sti/min)	220 (sti/min)	10	Thread trimming speed (TRIM) (*1)
181	150-300 (sti/min)	220 (sti/min)	10	Inching speed (INCH)
182	500-2500 (sti/min)	1400 (sti/min)	100	Stop improvement speed (POS) [Do not change this setting.]
183	150-1000 (sti/min)	700 (sti/min)	10	Slow speed (SLOW) (*2)
184	150-3000 (sti/min)	3,000 (sti/min)	100	Upper limit for start backtack speed setting (SBL) (*2)
186	150-3000 (sti/min)	1800 (sti/min)	100	End backtacking speed (EBT) (*2)
188	150-HIL (sti/min)	HIL (sti/min)	100	Automatic speed (AUTO) (*2), (*3)
189	150-(*3) (sti/min)	(*3) (sti/min)	100	Maximum sewing speed limit speed (HIL) (*3)

(*1) The actual upper limit for the operating speed will be the speed set by No. 181.

(*2) The actual lower limit for the operating speed will be the speed set by No. 181.

(*3) The upper limit set will vary depending on the machine head specifications. In addition, the initial value will vary depending on the destination.

No.	Machine head specifications	Destination	Initial value	Set upper limit		
188	Dry specifications: -[]5[] Lightweight difficult-to-sew material specifications: -[]S	All	4000 sti/min	4000 sti/min		
		Japan ----- China ----- Europe, Americas ----- General export	4000 sti/min 4300 sti/min 4700 sti/min 4000 sti/min	-[]03 : 5000 sti/min -[]33 : 5000 sti/min -[]05 : 4500 sti/min -[]35 : 4500 sti/min		
	Medium-weight material specifications: -[]03, -[]33	Japan ----- China ----- Europe, Americas ----- General export	4000 sti/min 4300 sti/min 4500 sti/min 4000 sti/min			
		Heavy-weight material Specifications: -[]05, -[]35	Japan ----- China ----- Europe, Americas ----- General export		4000 sti/min 4300 sti/min 4500 sti/min 4000 sti/min	
			Dry specifications: -[]5[] Lightweight difficult-to-sew material specifications: -[]S		All	4000 sti/min
				Japan ----- China ----- Europe, Americas ----- General export	4300 sti/min 4300 sti/min 4700 sti/min 4000 sti/min	-[]03 : 5000 sti/min -[]33 : 5000 sti/min -[]05 : 4500 sti/min -[]35 : 4500 sti/min
	Medium-weight material specifications: -[]03, -[]33		Japan ----- China ----- Europe, Americas ----- General export	4300 sti/min 4300 sti/min 4700 sti/min 4000 sti/min		
		Heavy-weight material specifications: -[]05, -[]35	Japan ----- China ----- Europe, Americas ----- General export	4300 sti/min 4300 sti/min 4500 sti/min 4000 sti/min		

Panel operation settings (350-)

No.	Setting range	Initial value	Setting units	Setting details
350	ON/OFF	ON	-	Buzzer (electronic sound) during panel operation ON: Used OFF: Not used * The buzzer will always be ON when a warning or error is displayed.
351	0-10 (seconds)	0 (seconds)	1	Additional display time for model name in head detector PCB when power switch is turned on 0: Not displayed 1-10: Machine head model name is displayed for the set time in the main display using 8 characters
352	ON/OFF	ON	-	Limit for maximum speed setting in start and end backtacking speed settings ON: Limited by MAX key and speed bar key settings OFF: Not limited by MAX key and speed bar key settings
353	ON/OFF	ON	-	End backtack sewing speed ON: Separate setting from start backtack sewing speed is possible OFF: Setting for start backtack sewing is used * Refer to "4-3. Maximum sewing speed and start backtack sewing speed setting methods".
354	0-2	1	1	Correction sewing function * This is only enabled when No. 500 is set to "1". * When the <correction sewing> icon at the left side is turned off, the operation will be what is illuminated at the right side. 0: Half stitch correction sewing / Single stitch correction sewing 1: No correction sewing / Single stitch correction sewing 2: Reverse stitch (reverse feed) correction sewing / Single stitch correction sewing

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Sewing program settings (450-)

No.	Setting range	Initial value	Setting units	Setting details
450	ON/OFF	OFF	-	Correction sewing using actuator switch after thread trimming * This is only enabled when No. 500 is set to "1". ON: Enabled OFF: Disabled (switch operation disabled)
451	ON/OFF	(*1)	-	Speed for moving to end backtack (Set to "ON" if you want cycle time to be shorter.) OFF: Decelerates to low speed, then end backtacking starts ON: Decelerates to end backtacking speed, then end backtacking starts * If No. 452 has been set to "ON", the operation when No. 451 is set to "ON" will be disabled.
452	ON/OFF	OFF	-	Seam matching function during automatic backtacking (Set to "ON" if you want to match seams accurately during automatic backtacking.) ON: Momentarily stops when material feed direction is changed OFF: No stopping when material feed direction is changed * The stopping position for No. 453 can be changed by changing the time before restarting using No. 454.
453	0-350 (degrees)	180 (degrees)	10	Momentary stopping position when material feed direction is changed (The stopping position is the angle from when the needle up signal turns ON.) * This is only enabled when No. 452 is set to "ON".
454	10-500 (ms)	100 (ms)	10 (ms)	Momentary stopping time when material feed direction is changed (The quick reverse mechanism switches at the stopping position, and then after the stopping time has elapsed, sewing automatically restarts.) * This is only enabled when No. 452 is set to "ON".
455	OFF/ 1-2	(*2)	1	Synchronization function when quick reverse mechanism has been operated using the actuator switch OFF: Disabled (Quick reverse mechanism is synchronized with switch) 1: Quick reverse mechanism synchronization without motor deceleration 2: Quick reverse mechanism synchronization when motor decelerates automatically to the speed set by No. 456
456	300-4000 (sti/min)	4000 (sti/min)	100	Automatic deceleration speed when quick reverse mechanism has been operated using the actuator switch * This is only enabled when No. 455 is set to "1" or "2".
457	0-355 (degrees)	0 (degrees)	1	Quick reverse mechanism operation angle at low speed (less than 1000 sti/min) * This is only enabled when No. 455 is set to "1" or "2".
458	0-355 (degrees)	150 (degrees)	1	Quick reverse mechanism operation angle at high speed (1000 sti/min or more) * This is only enabled when No. 455 is set to "1" or "2".
471	ON/OFF	OFF (*3)	-	Spare

(*1) The initial value varies depending on the destination. For Japan, the initial value is "ON", and for all other destinations, it is "OFF".

(*2) The initial value varies depending on the destination. For Japan, the initial value is "OFF", and for all other destinations, it is "2".

(*3) This is not initialized during initialization mode.

Standard device settings (550-)

No.	Setting range	Initial value	Setting units	Setting details
550	0-1	0 (*1)	1	Automatic presser foot lifter type 0: Solenoid type (Duty during chopping can be changed using No. 565.) 1: Pneumatic type (Duty during chopping can be changed using No. 566.)
551	0-500 (ms)	150 (ms)	10 (ms)	Sewing machine motor start delay time when presser foot is raised
555	-345-345 (degrees)	0 (degrees)	1	Quick reverse solenoid on timing during start backtacking/continuous backtacking
556	-345-345 (degrees)	0 (degrees)	1	Quick reverse solenoid off timing during start backtacking/continuous backtacking
557	-345-345 (degrees)	0 (degrees)	1	Quick reverse solenoid off timing during end backtacking
558	-345-345 (degrees)	0 (degrees)	1	Quick reverse solenoid on timing during end backtacking * This is only enabled when No. 451 is set to "ON".
560	10-200 (ms)	20 (ms)	10 (ms)	Thread wiping and presser foot lift operation timing after thread trimming
561	10-200 (ms)	50 (ms)	10 (ms)	
562	10-200 (ms)	50 (ms)	10 (ms)	
563	10-990 (ms)	300 (ms)	10 (ms)	Presser foot lifter solenoid fully ON time
564	0-240 (seconds)	180 (seconds)	1	Presser foot lift time 0: No timer function (does not drop) 1-240: Presser foot drops after set time
565	10-60 (%)	25 (%)	1	On duty when solenoid-type presser lifter solenoid is chopping * This is only enabled when No. 550 is set to "0".
566	10-60 (%)	50 (%)	1	On duty when pneumatic-type presser lifter solenoid is chopping * This is only enabled when No. 550 is set to "1".
567	0-1	0	1	Presser foot soft down mode 0: Automatic mode (This can be adjusted using No. 569.) 1: Manual mode (This must be adjusted using No. 568.)
568	20-120 (ms)	40 (ms)	5 (ms)	Delay time for presser foot lifter solenoid to turn on after presser foot drop command * This is only enabled when No. 567 is set to "1".
569	10-12	12	1	Voltage detection constant for presser foot lifter solenoid to turn on after presser foot drop command * This is only enabled when No. 567 is set to "0". If it is set to "10", the response time will be fastest and the operating sound will be loudest.
573	40-100 (ms)	85 (ms)	5 (ms)	Fully on time for quick reverse solenoid
574	10-60 (%)	40 (%)	1	On duty when quick reverse solenoid is chopping

2016B

(*1) This is not initialized during initialization mode.

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Error processing settings (650-)

No.	Setting range	Initial value	Setting units	Setting details
650	OFF/ 5-30 (seconds)	OFF	1	Time until buzzer stops (seconds) OFF: Buzzer does not stop 5-30: Buzzer stops after the specified time
651	OFF/ 1-30 (minutes)	3 (minutes)	1	Overtime error display * If the thread wiper key is OFF, error displays do not appear. OFF: None 1-30: After continuous operation for the set length of time, operation stops and [E190] is displayed.
652	ON/OFF	ON	-	Needle up stop error display OFF: None ON: If the needle does not stop at the up position after thread trimming, [E111] is displayed.

Specifications and destination settings (850-)

No.	Setting range	Initial value	Setting units	Setting details
851	ON/OFF	(*1)	-	Treadle operation specifications ON: Specifications for Europe and the Americas <ul style="list-style-type: none"> • If No. 001 is "OFF" (When the treadle is returned to the neutral position after thread trimming, the presser foot is lowered.) * If the treadle is returned to the neutral position during thread trimming, the presser foot does not rise. • If No. 001 is "ON" After thread trimming, the presser foot rises. The presser foot does not drop even when the treadle is returned to the neutral position. • If No. 001 or No. 002 is "ON" (Even after the treadle has been depressed to the 1st step and the presser foot has dropped, the presser foot rises when the treadle is returned to the neutral position.) * If No. 852 and No. 057 are not both "ON" at the same time, the presser foot lowering function at the treadle's 1st step will be disabled. OFF: Other specifications <ul style="list-style-type: none"> • The presser foot does not drop even when the treadle is returned to the neutral position after thread trimming. • When the treadle is depressed backward or the knee switch changes from ON to OFF, the presser foot drops. (The presser foot does not rise at the treadle neutral position regardless of the settings for No. 001 and No. 002.)
852	ON/OFF	(*1)	-	Presser foot lowering at the forward 1st step ON: Enabled OFF: Disabled

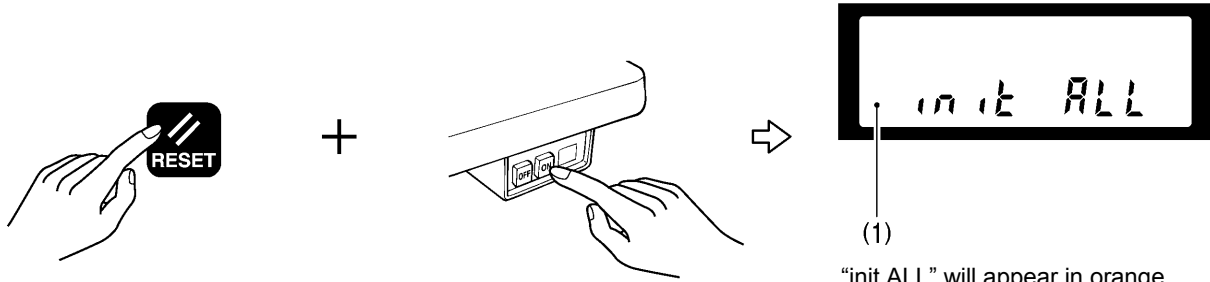
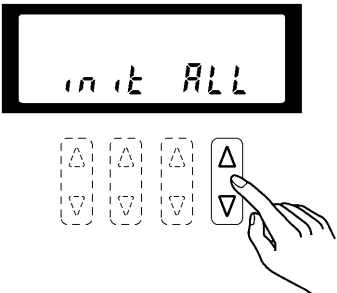


(*1) This is not initialized during initialization mode.

The initial value varies depending on the destination. For Europe and the Americas, the initial setting is "ON", and for all other destinations are "OFF".

4 - 7 . Data initialization function

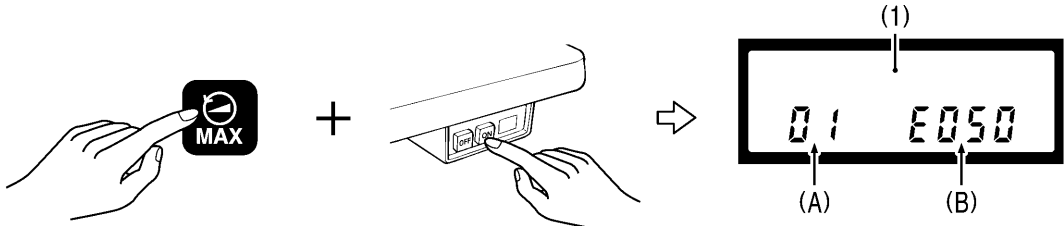
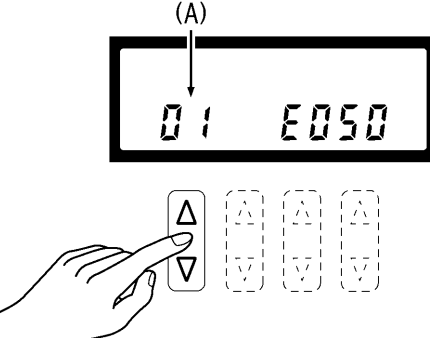
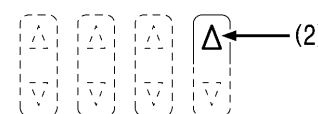
NOTE:

When DIP switch 1 is set to ON, set it to OFF and then carry out the following operations.

<p>1</p>	<p>Change to initialization mode</p>  <p>(While pressing the RESET key, press the power ON switch.)</p> <p>"init ALL" will appear in orange in the main display (1).</p> <p style="text-align: right;">4195M</p>															
<p>2</p>	<p>Select the item to be initialized</p>  <table border="1" data-bbox="638 784 1356 1052"> <thead> <tr> <th>Item No.</th> <th>Main display</th> <th>Details to be initialized</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>[INIT ALL]</td> <td>Clears all settings (Items 2, 3 and 4 will be initialized.)</td> </tr> <tr> <td>2</td> <td>[INIT MEM]</td> <td>Memory switches</td> </tr> <tr> <td>3</td> <td>[INIT SPD]</td> <td>Speed setting (MAX, Speed bar) Settings for memory switch Nos. 180-189</td> </tr> <tr> <td>4</td> <td>[INIT SEW]</td> <td>Sewing programs (operation panel display)</td> </tr> </tbody> </table> <p style="text-align: right;">2094B</p>	Item No.	Main display	Details to be initialized	1	[INIT ALL]	Clears all settings (Items 2, 3 and 4 will be initialized.)	2	[INIT MEM]	Memory switches	3	[INIT SPD]	Speed setting (MAX, Speed bar) Settings for memory switch Nos. 180-189	4	[INIT SEW]	Sewing programs (operation panel display)
Item No.	Main display	Details to be initialized														
1	[INIT ALL]	Clears all settings (Items 2, 3 and 4 will be initialized.)														
2	[INIT MEM]	Memory switches														
3	[INIT SPD]	Speed setting (MAX, Speed bar) Settings for memory switch Nos. 180-189														
4	[INIT SEW]	Sewing programs (operation panel display)														
<p>3</p>	 <p>(Press for 2 seconds or more)</p> <p>Once initialization is complete, the main display (1) will return to green.</p> <p>NOTE: If the initialization items are changed after initialization, the color will return to orange.</p> <p style="text-align: right;">4192M</p>															
<p>4</p>	 <p>Initialization mode will be exited and normal sewing machine operation will then be possible.</p> <p style="text-align: right;">4193M</p>															

4 - 8 . Error history checking method

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

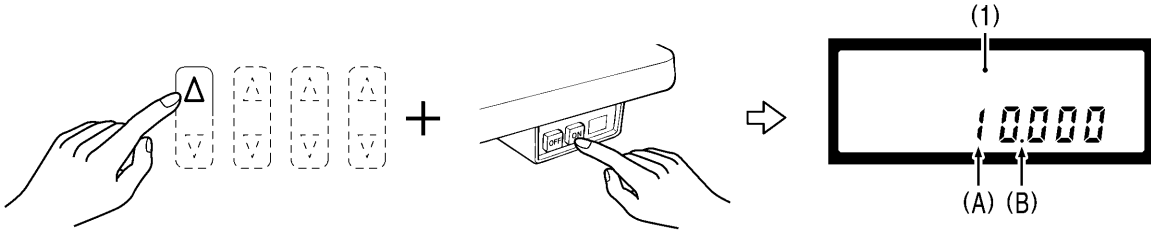
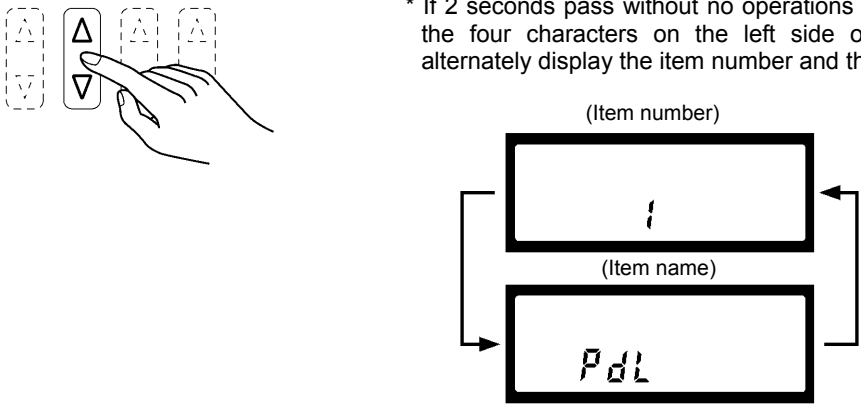
<p>1</p>	<p>Change to error history display mode</p>  <p>(While pressing the MAX key, press the power ON switch.)</p> <p>The history number (A) and the error code (B) will appear in the main display (1) in orange.</p> <p>NOTE: The following error codes do not remain in the history, and so they will not be displayed. [E065, E066, E095, E440, E441, E901]</p> <p style="text-align: right;">2017B</p>
<p>2</p>	<p>Changing the history number (A)</p>  <p>Up to 99 histories (01-99) are stored in order starting from the newest. No. 01 represents the newest error. (If there is no error code for a history number, [E---] will be displayed as the error code.)</p> <p>* While the Δ key (2) is being pressed, the main display (1) will change to displaying the time that the error occurred.</p>  <p>(The last 7 digits of [T*****] are the time. [Units: hours]) When the Δ key (2) is released, the display returns to the original error code display.</p> <p style="text-align: right;">2018B 2040B 2138M</p>
<p>3</p>	<p>Turn off the power switch to exit error history checking mode.</p>

4 - 9 . Input checking method

This is used at the following times.

- When there is a problem with an operation panel key, PCB or sensor
- 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.

<p>1</p>	<p>Change to input check mode 2019B 2138M</p>  <p>(While pressing the Δ key, press the power ON switch.)</p> <p>The item number (A) and the input status (B) will appear in the main display (1) in orange.</p>
<p>2</p>	<p>Select the item number (A)</p>  <p>* If 2 seconds pass without no operations having been carried out, the four characters on the left side of the main display will alternately display the item number and the item name.</p> <p style="text-align: right;">2036B 2095B</p>
<p>3</p>	<p>Check the responses from the keys and switches, etc. while referring to the <Input check list> (following page).</p>
<p>4</p>	<p>[To return to the normal sewing machine starting condition] Press the power OFF switch to turn off the power, and then turn the power back on.</p>

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

<Input check list >

The four characters on the left side of the main display on the operation panel show the item number/item name, and the four characters on the right side show the input status.

Item No.	Item name	Input status	Check item and checking method
[1]	[PDL]	[0.000]-[5.000] [V]	Treadle pedal voltage Depress the treadle forward/backward.
[2]	[ENC]	[0]-[359] [degrees]	Motor position signal (needle up side reference signal = 0 degrees) Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[3]	[NLUP]	[ON]-[OFF]	Needle up signal Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[4]	[NLDN]	[ON]-[OFF]	Needle drop signal Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[5]	[UPOG]	[ON]/[OFF]	Needle up sensor signal Turn the machine pulley by hand.
[6]	[REZL]	[ALL]/[TES1]-[TES7]	Resolver signal test * Refer to <Resolver signal test> (P.27).
[7]	[VOLT]	[***]	Power supply voltage 100 V systems : Display value ÷ 2 is the actual voltage. 200 V systems : The display value is the actual voltage. 400 V systems : Display value × 2 is the actual voltage. * There may be an error of about ±5% in the display value.
[8]	[HEAD]	[ON]-[OFF]	Safety switch input Becomes "OFF" when the machine head is tilted back.
[9]	[BT]	[ON]-[OFF]	Actuator switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[10]	[PRE]	[ON]-[OFF]	Knee switch or standing pedal presser foot lifter switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[11]	[OPDL]	[0.000]-[5.000] [V]	Standing pedal speed input Depress the variable speed pedal of the standing pedal.
[12]	[HIGH]	[ON]-[OFF]	Standing pedal high speed switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[13]	[TRIM]	[ON]-[OFF]	Standing pedal thread trimming switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[14]	[INCH]	[ON]-[OFF]	Standing pedal low speed switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[15]	[PNL]	[****]/[OFF]	Operation panel key input Press any key on the panel other than B△ or B▽. The name of the key pressed will be displayed as the right four characters. If no key is pressed, "OFF" will be displayed. * Refer to <Operation panel key input> (P.28).
[16]	[OH]	[0.000]-[5.000] [V]	Motor overheating protection sensor input

2138M 2139M

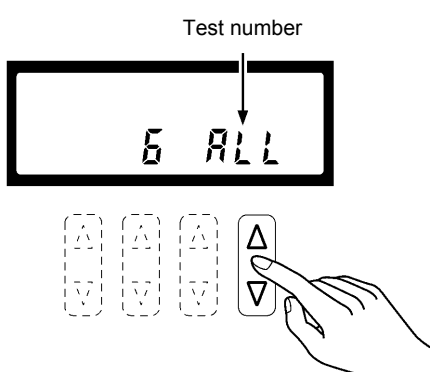
4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Item No.	Item name	Input status	Check item and checking method
[17]	[IN1]	[ON]-[OFF]	Option input 1 "ON" when the input signal is LOW, and "OFF" when it is HIGH.
[18]	[IN2]	[ON]-[OFF]	Option input 2 "ON" when the input signal is LOW, and "OFF" when it is HIGH.
[19]	[IN3]	[ON]-[OFF]	Option input 3 "ON" when the input signal is LOW, and "OFF" when it is HIGH.
[20]	[DIP1]	[ON]-[OFF]	DIP switch 1 "ON" when the switch is at ON, and "OFF" when the switch is at OFF.
[21]	[DIP2]	[ON]-[OFF]	DIP switch 2 "ON" when the switch is at ON, and "OFF" when the switch is at OFF.
[22]	[DIP4]	[ON]-[OFF]	DIP switch 4 "ON" when the switch is at ON, and "OFF" when the switch is at OFF.
[23]	[EDGK]	[ON]-[OFF]	Spare
[24]	[EDGS]	[ON]-[OFF]	Spare

<Resolver signal test>

1 Select the test number

Test number




Test number	Test name
[ALL]	All tests (Test 1-Test 7)
[TES1]	Test 1 (Individual)
[TES2]	Test 2 (Individual)
[TES3]	Test 3 (Individual)
[TES4]	Test 4 (Individual)
[TES5]	Test 5 (Individual)
[TES6]	Test 6 (Individual)
[TES7]	Test 7 (Individual)

2020B

2 Start the test

A. For all tests ([ALL])



⇒


6 7 OK

Test number Test result
(OK / NG)

All tests from Test 1 to Test 7 are carried out.

- If all tests are completed and the results are all OK, [7 OK] will be displayed as the right four characters in the main display.
- If an NG result occurs during the test, [* NG] will be displayed as the right four characters in the main display. (* indicates the number of the test which produced the NG result.)

B. For individual tests (example: [TES1])



⇒

6 1 OK

Test number Test result
(OK / NG)

The test specified by the number will be carried out.

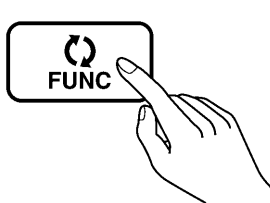
- If the test is completed and the result is OK, [* OK] will be displayed as the right four characters in the main display. If the result is NG, [* NG] will be displayed.

NOTE:
Once testing has started, no items other than a resolver signal test can be checked. To check a different item, carry out step 4 given below, and then change back to input check mode.

2021B 2022B

3 [If carrying out another resolver signal test]

1)



⇒

6 ALL

2) Repeat steps 1 and 2 above.

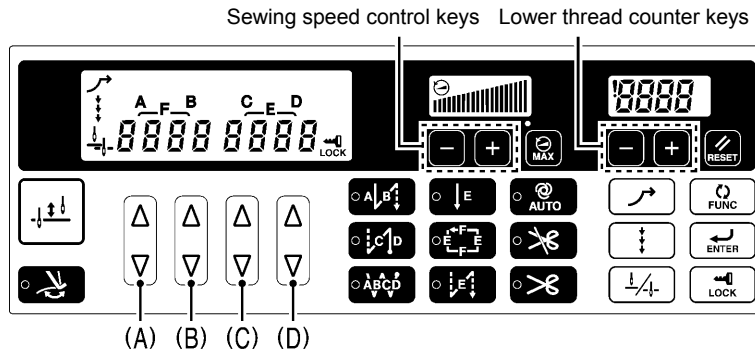
2023B

4 [To return to the normal sewing machine starting condition]

- 1) Press the power OFF switch to turn off the power.
- 2) Check that the power indicator (green) on the operation panel has turned off, and then turn the power back on.

NOTE:
If you turn the power back on while the power indicator (green) is still illuminated, [E131] may be displayed.

<Operation panel key input>



2096B

Key name	Display
	[HUD]
Lower thread counter key	[CTUP]
Lower thread counter key	[CTDN]
	[RSET]
	[NTRM]
(A)	[A-UP]
(A)	[A-DN]
(B)	
(B)	
(C)	[C-UP]
(C)	[C-DN]
(D)	[D-UP]
(D)	[D-DN]
Sewing speed control key	[SPDN]
Sewing speed control key	[SPUP]

4172M, 2098B, 2099B, 4173M, 4171M, 2024B, 2025B

Key name	Display
	[SBT]
	[EBT]
	[RBT]
	[FIX]
	[NAME]
	[PLET]
	[AUTO]
	[ATRM]
	[WIP]
	[POS]
	[CORR]
	[SLOW]
	[ENT]
	[FUNC]
	[SPED]
	[LOCK]

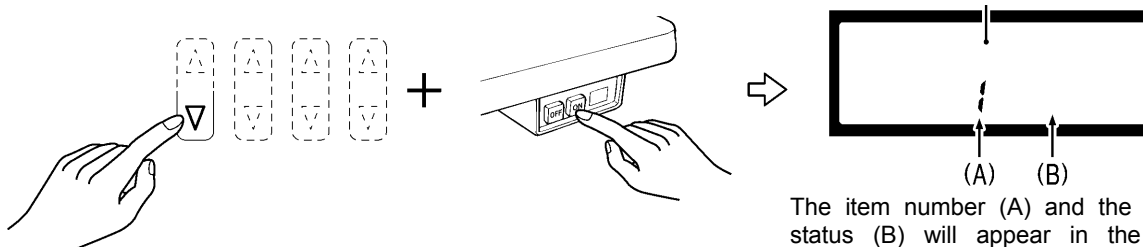
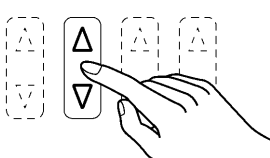
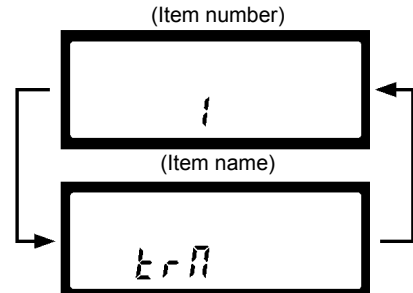
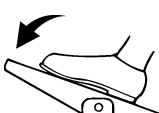
4161M-4166M, 4168M, 4167M, 4174M, 2026B-2029B, 1990B, 1989B, 2030B

4-10. Output checking method

This is used at the following times.

- When there is a problem with the operation panel PCB
- When there is a problem with the drive mechanism
- When you would like to check for broken codes.

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

<p>1</p>	<p>Change to output check mode 2031B 2139M</p>  <p>(While pressing the ▽ key, press the power ON switch.)</p> <p>The item number (A) and the output status (B) will appear in the main display (1) in orange.</p>
<p>2</p>	<p>Select the item number (A)</p>  <p>* If 2 seconds pass without no operations having been carried out, the four characters on the left side of the main display will alternately display the item number and the item name.</p>  <p style="text-align: right;">2036B 2097B</p>
<p>3</p>	 <p>The operation corresponding to the item number being checked will be carried out.</p> <p style="text-align: right;">2159M</p>
<p>4</p>	<p>[To check another item]</p> <p>Return the treadle to the neutral position, and then repeat the operations in steps 2 and 3 above.</p>
<p>5</p>	<p>[To return to the normal sewing machine starting condition]</p> <p>Press the power OFF switch to turn off the power, and then turn the power back on.</p>

<Output check list >

The four characters on the left side of the main display on the operation panel show the item number/item name, and the four characters on the right side show the output status.

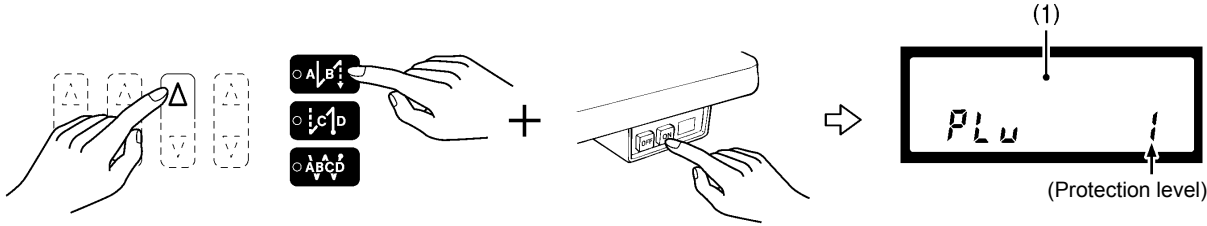
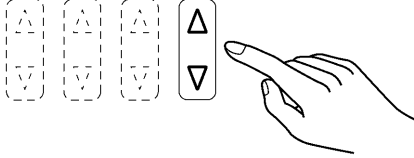
Item No.	Item name	Output status	Check item and checking method
[1]	[TRM]	OFF	Thread trimming solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[2]	[WIP]	OFF	Thread wiper solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[3]	[REV]	OFF	Quick reverse solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[4]	[PRE]	OFF	Presser foot lifter solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[5]	[OPT]	OFF	Option solenoid signal When the treadle is depressed, the solenoid signal turns on for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[6]	[INCH]	Shows the actual sewing machine speed	Inching speed operation When the treadle is depressed, the upper shaft rotates at the inching speed. When the treadle is returned to the neutral position, the upper shaft stops.
[7]	[TRIM]		Thread trimming speed operation When the treadle is depressed, the upper shaft rotates at the thread trimming speed. When the treadle is returned to the neutral position, the upper shaft stops.
[8]	[SLOW]		Slow speed operation When the treadle is depressed, the upper shaft rotates at slow speed. When the treadle is returned to the neutral position, the upper shaft stops.
[9]	[SBT]		[****] [sti/min] Start backtack sewing speed operation When the treadle is depressed, the upper shaft rotates at the start backtack sewing speed. When the treadle is returned to the neutral position, the upper shaft stops.
[10]	[EBT]		End backtack sewing speed operation When the treadle is depressed, the upper shaft rotates at the end backtack sewing speed. When the treadle is returned to the neutral position, the upper shaft stops.
[11]	[HIGH]		High speed operation When the treadle is depressed, the upper shaft rotates at a speed corresponding to the treadle depression amount (inching speed to maximum speed). When the treadle is returned to the neutral position, the upper shaft stops.
[12]	[AUTO]		Automatic speed operation When the treadle is depressed, the upper shaft rotates at the automatic speed. When the treadle is returned to the neutral position, the upper shaft stops.
[13]	[POS]		Stop improvement speed operation When the treadle is depressed, the upper shaft rotates at the stop improvement speed. When the treadle is returned to the neutral position, the upper shaft stops.

(Continued on next page.)

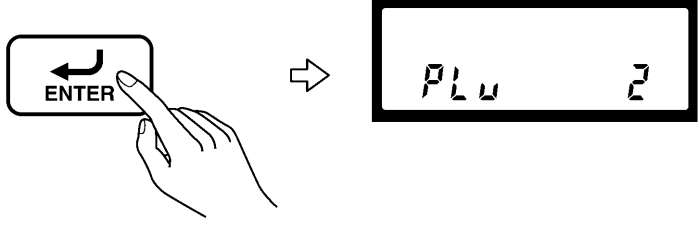

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

Item No.	Item name	Output status	Check item and checking method
[14]	[BUZZ]	OFF	Buzzer When the treadle is depressed, the buzzer sounds for 1 second.
[15]	[PNL]	[****]	Panel display When the treadle is depressed, checking of the operation panel indicators, main display, speed display and lower thread counter display starts. When the treadle is returned to the neutral position, all indicators will illuminate, and then the display will return to how it was before the treadle was depressed.
[16]	[MOVE]	OFF	Operation synchronization signal When the treadle is depressed, the operation synchronization signal turns on. When the treadle is returned to the neutral position, the signal turns off.
[17]	[OUT1]	OFF	Option output signal 1 When the treadle is depressed, the option output signal turns on. When the treadle is returned to the neutral position, the signal turns off.
[18]	[OUT2]	OFF	Option output signal 2 When the treadle is depressed, the option output signal turns on. When the treadle is returned to the neutral position, the signal turns off.

4-1-1. Protection settings

1	Set the power switch to OFF, and then set DIP switch 1 to OFF.
2	<p>Change to protect setting mode</p>  <p>(While pressing the Δ key and the start backtick key, press the power ON switch.)</p> <p>[PLV] and the protection level will appear in the main display (1) in orange. (At the time of shipment from the factory, the protection level is set to "1".)</p> <p style="text-align: right;">2032B 2138M</p>
3	<p>Set the protection level (0 to 3)</p>  <p>NOTE: The range for disabling operation varies depending on the setting for DIP switch 1. For details, refer to <Protection setting list> (P.34).</p> <p>* If the protection level is different from the original value, the protection level will flash in the display.</p> <p style="text-align: right;">2033B</p>

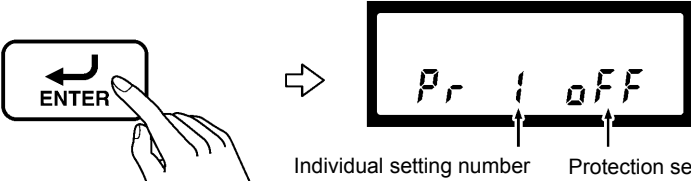

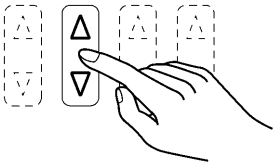
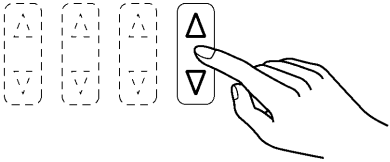

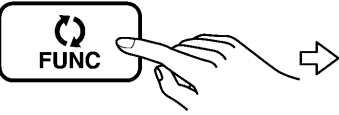
[If set to level 0 – 2]

4	<p>Confirm the protection level (example: set to level 2)</p>  <p>The protection level will return to illuminating steadily.</p> <p style="text-align: right;">2034B</p>
5	 <p>Protect setting mode will be exited and normal operation will be possible.</p> <p style="text-align: right;">4193M</p>

4. FUNCTION SETTINGS (G50 OPERATION PANEL)

[If set to level 3]

To make individual settings, select level 3.

<p>4</p>	<p>Confirm the protection level</p>  <p>Individual setting number Protection setting value (ON/OFF)</p> <p>* When the  key is pressed, the display will return to the protection level setting display [PLV 3].</p> <p style="text-align: right;">2035B 4161M</p>														
<p>5</p>	<p>Select an individual setting number (1 – 6)</p>  <p>NOTE: The range for disabling operation varies depending on the setting for DIP switch 1. For details, refer to <Protection setting list> (P.34).</p> <table border="1" data-bbox="676 826 1374 1057"> <thead> <tr> <th>Individual setting number</th> <th>Details of main operation disabled</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>MAX key</td> </tr> <tr> <td>2</td> <td>Memory switches (for administrator)</td> </tr> <tr> <td>3</td> <td>Correction key</td> </tr> <tr> <td>4</td> <td>Mainly keys with indicators</td> </tr> <tr> <td>5</td> <td>Stitch number settings (ABCD, EF)</td> </tr> <tr> <td>6</td> <td>Initialization</td> </tr> </tbody> </table> <p style="text-align: right;">2036B</p>	Individual setting number	Details of main operation disabled	1	MAX key	2	Memory switches (for administrator)	3	Correction key	4	Mainly keys with indicators	5	Stitch number settings (ABCD, EF)	6	Initialization
Individual setting number	Details of main operation disabled														
1	MAX key														
2	Memory switches (for administrator)														
3	Correction key														
4	Mainly keys with indicators														
5	Stitch number settings (ABCD, EF)														
6	Initialization														
<p>6</p>	<p>Make the individual protection (ON/OFF) setting</p>  <p>Use the Δ key to turn the setting on, and use the ∇ key to turn the setting off. * If the individual protection setting value is different from the original value, the protection setting value will flash.</p> <p style="text-align: right;">2033B 2138M 2139M</p>														
<p>7</p>	<p>Confirm the protection setting value</p>  <p>The protection setting value will return to illuminating steadily.</p> <p style="text-align: right;">4192M</p>														
<p>8</p>	<p></p> <p>Protect setting mode will be exited and normal operation will be possible.</p> <p style="text-align: right;">4193M</p>														

<Protection setting list>

○: Enabled

□: Immediately after the power is turned on, the LOCK key icon will show the previous status. After this, the LOCK key can be used to change the enabled/disabled status.

△: Immediately after the power is turned on, the function is disabled (the LOCK icon illuminates). After this, the LOCK key can be used to change the enabled/disabled status.

×: Disabled

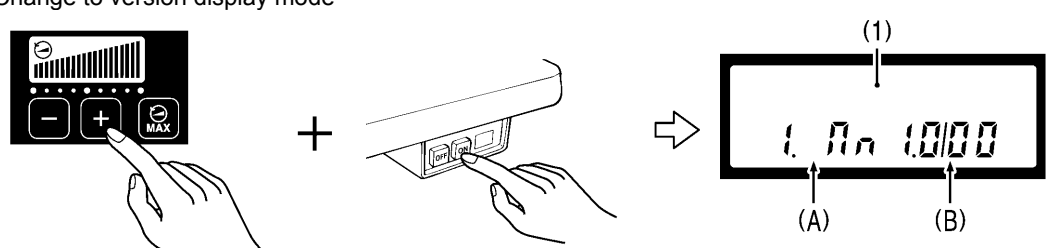
Setting function	Level	0	1	2	3 (Individual setting)						
					All OFF	① =ON	② =ON	③ =ON	④ =ON	⑤ =ON	⑥ =ON
Sewing speed ([MAX] setting)		□ (×)	△ (×)	× (×)	□ (×)	× (×)	(×)	(×)	(×)	(×)	(×)
Memory Switch Setting	After startup For operator	□ (×)	△ (×)	× (×)	□ (×)	(×)	(×)	(×)	(×)	(×)	(×)
	When power is on For mechanic	○ (○)	○ (○)	× (×)	○ (○)	()	× (×)	()	()	()	()
[Half stitch] key		○ (○)	○ (○)	○ (○)	○ (○)	()	()	()	()	()	()
[Needle up/down] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Correction] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	× (×)	× (×)	()	()
[Slow start] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Thread trimming disabled] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Thread wiping] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[LOCK] setting		○ (×)	○ (×)	× (×)	○ (×)	(×)	(×)	(×)	× (×)	(×)	(×)
[Start backtack] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[End backtack] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Continuous backtack] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Fixed stitch] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Name label] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Pleat presser sewing] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[AUTO] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
[Automatic thread trimming] setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()
A-D stitch number setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	()	× (×)	()
E / F stitch number setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	()	× (×)	()
Speed level setting		○ (○)	○ (○)	× (×)	○ (○)	()	()	()	()	× (×)	()
Lower thread counter initial value setting		○ (×)	○ (×)	○ (×)	○ (×)	()	()	()	()	× (×)	()
Initialization		○ (×)	○ (×)	○ (×)	○ (×)	(×)	(×)	(×)	(×)	(×)	× (×)
Protection setting		○ (×)	○ (×)	○ (×)	○ (×)	(×)	(×)	(×)	(×)	(×)	(×)

* Values inside () are when DIP switch 1 is set to ON.

* Individual settings are disabled if even one of 1 to 6 is ×. If all columns are blank, the setting is enabled.

4-1 2. Software version checking method

1 Change to version display mode

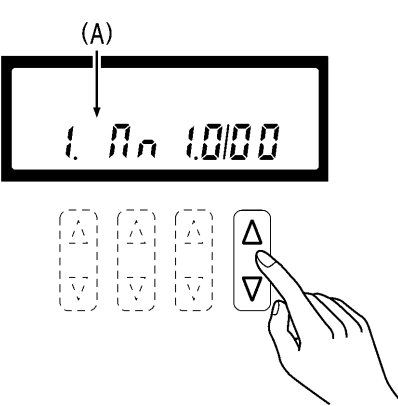


The software type (A) and the software version (B) will be displayed in the main display (1) in orange.

(While pressing the speed key (+), press the power ON switch.)

2037B

2 Select the software type (A)

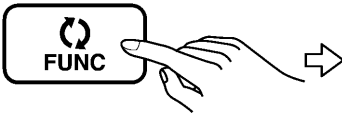


Software type (A)	Software	Version (B)
[1. MN]	Main CPU	[1.0]00
[2. PL]	Panel CPU	[1.000]
[3. IPL]	Main IPL	[1.000]

* Initially the main CPU version will be displayed.

2038B

3



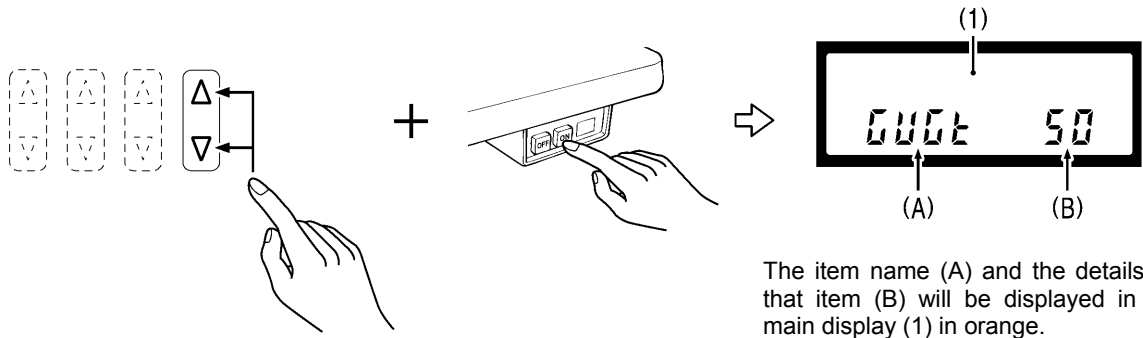
Version display mode will be exited and normal operation will be possible.

4193M

4-13. Viewing maintenance information

This allows you to check the information which is stored in the head detector unit.

1 Change to maintenance display mode

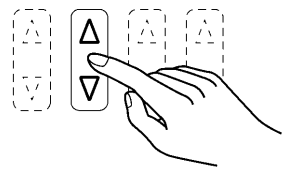


(While pressing the Δ ∇ keys, press the power ON switch.)

The item name (A) and the details for that item (B) will be displayed in the main display (1) in orange.

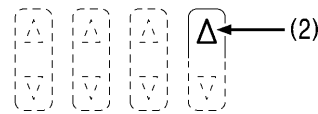
2039B 2138M 2139M

2 Select the item name



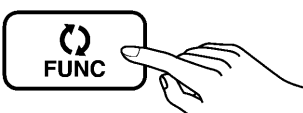
No.	Item name	Item name (A) display	Details (B)
1	Grease up counter *1	[GUCT]	[0-102](%)
2	Grease-up time	[GULI]	[4000] (hours)
3	Cumulative power on time (7 characters)	[PONT]	[****] (hours) *2
4	Cumulative operating time (7 characters)	[MONT]	[****] (hours) *2

*1 : If the RESET key is pressed for 2 seconds or more while the grease up counter details are being displayed, the counter will be cleared.
 *2 : Normally the last 4 digits of the counter are displayed, but if you press the Δ key (2), the first three digits ([T****]) will be displayed.



2036B 2040B 2138M

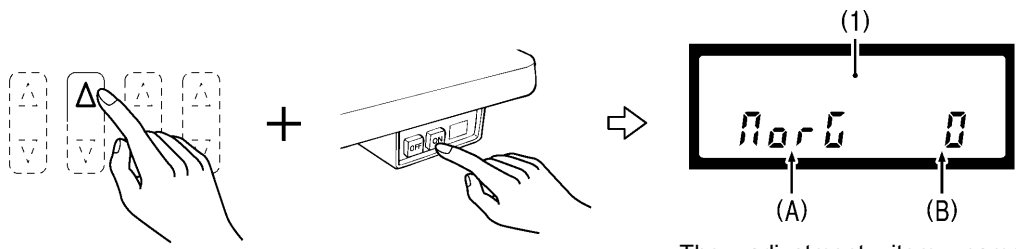
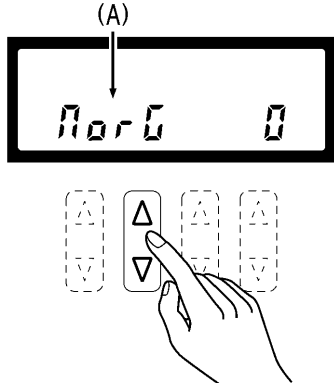
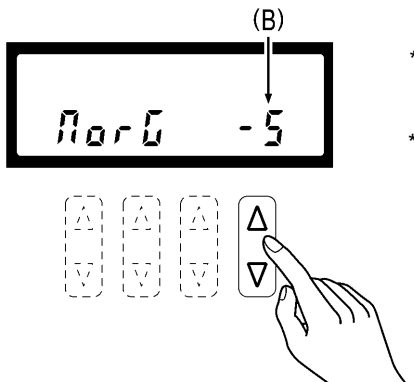

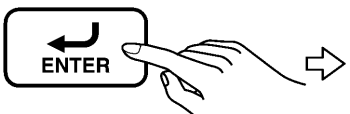

3



Maintenance display mode will be exited and normal operation will be possible.

4193M

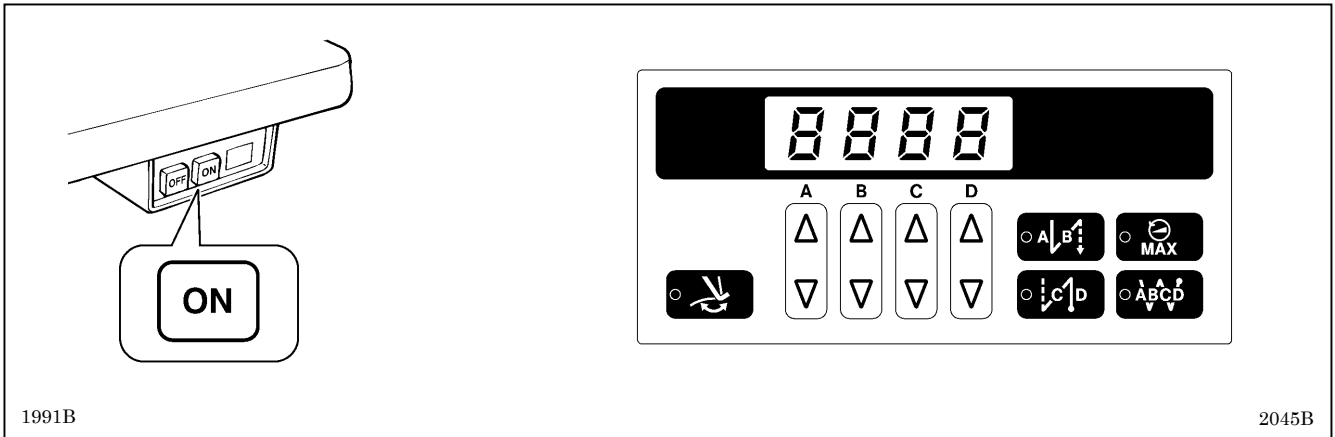
4 - 1 4 . Adjusting the sewing machine reference position

1	<p>Change to sewing machine reference position adjustment mode</p>  <p>(While pressing the Δ key, press the power ON switch.)</p>	<p>2041B 2138M</p> <p>The adjustment item name (A) and the adjustment value for that item (B) will be displayed in the main display (1) in orange.</p>																		
2	<p>Select the adjustment item</p>  <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Adjustment item</th> <th colspan="2">Main display</th> </tr> <tr> <th>Adjustment item name (A)</th> <th>Adjustment value (B)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Sewing machine reference position (Adjustment when motor is replaced)</td> <td style="text-align: center;">[MORG]</td> <td style="text-align: center;">-20-20 degrees</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Needle up stop position (during individual adjustment)</td> <td style="text-align: center;">[UPOS]</td> <td style="text-align: center;">-5-10 degrees</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Needle down stop position (during individual adjustment)</td> <td style="text-align: center;">[DPOS]</td> <td style="text-align: center;">-5-10 degrees</td> </tr> </tbody> </table>		Adjustment item	Main display		Adjustment item name (A)	Adjustment value (B)	1	Sewing machine reference position (Adjustment when motor is replaced)	[MORG]	-20-20 degrees	2	Needle up stop position (during individual adjustment)	[UPOS]	-5-10 degrees	3	Needle down stop position (during individual adjustment)	[DPOS]	-5-10 degrees	<p>2042B</p>
	Adjustment item			Main display																
		Adjustment item name (A)	Adjustment value (B)																	
1	Sewing machine reference position (Adjustment when motor is replaced)	[MORG]	-20-20 degrees																	
2	Needle up stop position (during individual adjustment)	[UPOS]	-5-10 degrees																	
3	Needle down stop position (during individual adjustment)	[DPOS]	-5-10 degrees																	
3	<p>Set the adjustment value (B)</p> 	<p>* If you would like to clear the value which is being displayed, press the  key.</p> <p>* If the adjustment value is different from the original value, the adjustment value will flash.</p>																		
4		<p>Save the adjustment value. The adjustment value (B) will change from flashing to illuminated steadily.</p> <p>NOTE: Any changed settings will take effect after sewing machine reference position adjustment mode has been exited.</p>																		
5		<p>Sewing machine reference position adjustment mode will be exited and normal operation will be possible.</p>																		

5. FUNCTION SETTINGS (G10 OPERATION PANEL)























5-1. List of special functions when power is turned on

This section contains a list of functions for the G10 operation panel and the key operations which are used to call the setting mode for the functions.



1991B

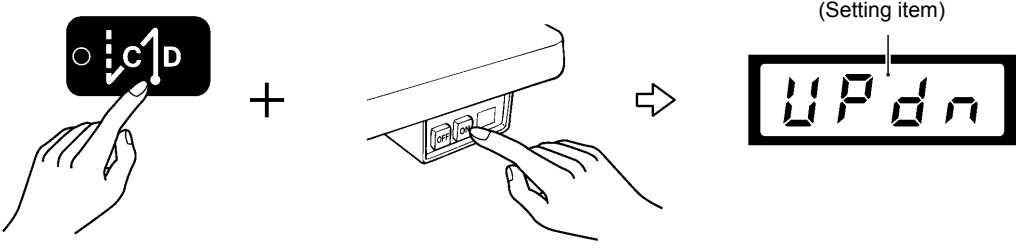
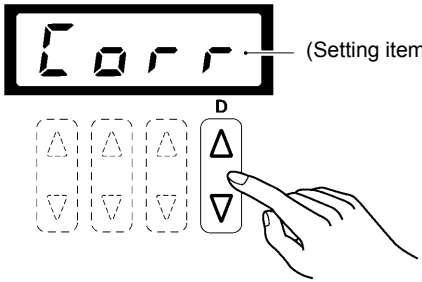
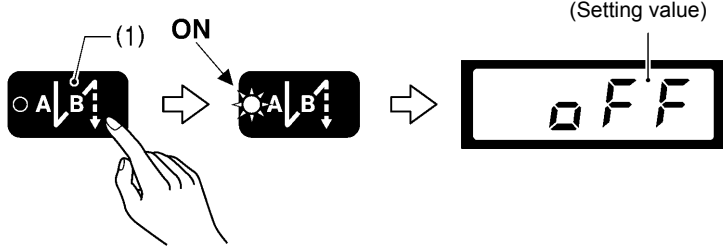
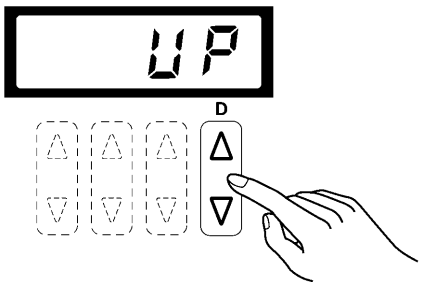
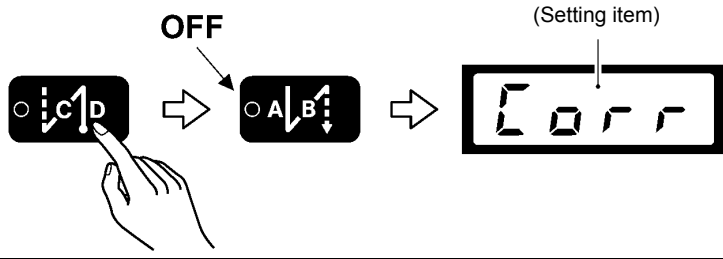
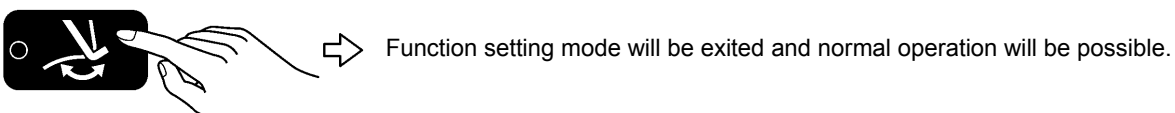
2045B

<p>1 Memory switch setting mode (Standard) (This setting is not possible with the G10 operation panel.)</p>	<p>7 Protect setting mode [DIP switch 1 = OFF]  + (C)  + </p> <p>Refer to "5-7. Protection settings".</p>
<p>2 Memory switch setting mode (Advanced) (This setting is not possible with the G10 operation panel.)</p>	<p>8 Software version display function  + </p> <p>Refer to "5-8. Software version checking method".</p>
<p>3 Data initialization function  + </p> <p>Refer to "5-3. Data initialization function".</p>	<p>9 Treadle position adjustment mode [DIP switch 4 = ON] (C)  + </p> <p>Refer to "13. SETTING METHOD FOR STANDARD DEPRESSION STROKES".</p>
<p>4 Error log display function  + </p> <p>Refer to "5-4. Error history checking method".</p>	<p>10 Sewing machine reference position adjustment mode (B)  + </p> <p>Refer to "5-10. Adjusting the sewing machine reference position".</p>
<p>5 Input checking function (A)  + </p> <p>Refer to "5-5. Input checking method".</p>	<p>11 Maintenance information viewing mode (D)  + (D)  + </p> <p>Refer to "5-9. Viewing maintenance information".</p>
<p>6 Output checking function (A)  + </p> <p>Refer to "5-6. Output checking method".</p>	<p>12 Function setting mode  + </p> <p>Refer to "5-2. Function setting method".</p>

2046B, 2047B, 1999B, 1996B

1997B, 2048B, 1999B, 2000B, 2049B

5-2. Function setting method

<p>1</p>	<p>Change to function setting mode</p>  <p>(Setting item)</p> <p>(While pressing the end backtick key, press the power ON switch.)</p> <p style="text-align: right;">4203M</p>
<p>2</p>	<p>Select the setting item (Refer to <Setting item list> (P.40))</p>  <p>(Setting item)</p> <p style="text-align: right;">2050B</p>
<p>3</p>	<p>Change to the setting value display</p>  <p>(Setting value)</p> <p style="text-align: right;">2051B</p>
<p>4</p>	<p>Change the setting value.</p>  <p style="text-align: right;">2052B</p> <p>* If the setting value is different from the original details, the setting value will flash.</p> <p>NOTE: If the start backtick key (1) is pressed once more, the start backtick indicator will switch off and the display will return to the setting item.</p>
<p>5</p>	<p>Confirm the setting value.</p>  <p>(Setting item)</p> <p style="text-align: right;">2053B</p>
<p>6</p>	<p>To set other items, repeat the operations in steps 2 to 5 and change the settings.</p>
<p>7</p>	 <p>Function setting mode will be exited and normal operation will be possible.</p> <p style="text-align: right;">4206M</p>

<Setting item list>

Setting item	Display		Setting value or operation when setting	Default value
	Setting item display	Setting value display		
Needle up/down stop	[UPDN]	[UP]	Needle up stop	[DN]
		[DN]	Needle down stop	
Correction sewing	[CORR]	[ON]	Correction sewing	[OFF]
		[OFF]	No correction sewing	
Slow start	[SLOW]	[ON]	Slow start	[OFF]
		[OFF]	No slow start	
Thread trimming disable	[TRDI]	[ON]	Thread trimming disabled	[OFF]
		[OFF]	Thread trimming enabled	
Start backtack speed	[SBSP]	[****]	Inching speed (*1)-3000 (Initial value depends on machine head specifications)	[1200] [1800]
Automatic operation during continuous backtack sewing	[CBAT]	[ON]	Automatic operation	[OFF]
		[OFF]	No automatic operation	
Pedal response switching settings immediately after sewing has started	[SLMD]	[OFF]	No switching	[OFF]
		[1]	Slow start only when sewing starts after thread trimming	
		[2]	Slow start only when sewing starts after sewing has been paused	
		[3]	Slow start always when sewing starts	
Pedal response immediately after sewing has started	[SLPN]	[*]	* Setting range: 1-5 <ul style="list-style-type: none"> • The larger the value, the slower is the speed when sewing starts. • If [SLMD] is set to "OFF", this setting is disabled. 	[1]
Start backtack sewing pattern	[SBTP]	[2]	A-B	[2]
		[3]	B-A-B	
		[4]	A-B-A-B	
		[5]	B-A-B-A-B	
		[6]	A-B-A-B-A-B	
End backtack sewing pattern	[EBTP]	[2]	C-D	[2]
		[3]	C-D-C	
		[4]	C-D-C-D	
		[5]	C-D-C-D-C	
		[6]	C-D-C-D-C-D	
Continuous backtack sewing pattern	[RBTP]	[1]	A, B, C, D	[1]
		[2]	A, B × D	
Quick reverse needle up function	[RUP]	[ON]	Function available	[OFF]
		[OFF]	Function not available	
Backtack matching function	[BTAD]	[ON]	Function available	[OFF]
		[OFF]	Function not available	

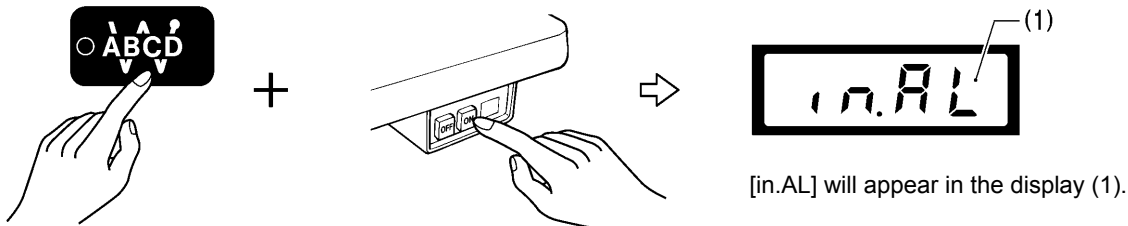
(*1) The inching speed setting value is the value in the machine head memory.

5-3. Data initialization function

NOTE:

When DIP switch 1 is set to ON, set it to OFF and then carry out the following operations.

1 Change to initialization mode



[in.AL] will appear in the display (1).

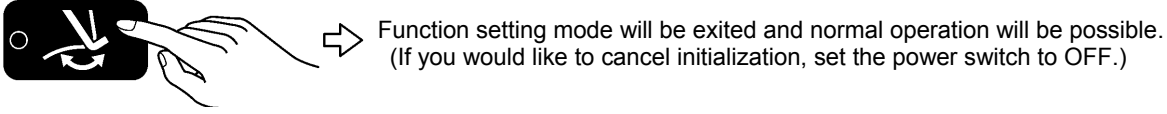
(While pressing the continuous backtack key, press the power ON switch.)

	Display	Initialization item
1	[in.AL]	Clear all (Sewing programs (panel display), memory switch settings, speed settings and function settings [Refer to <Setting item list> (P.40)] will be initialized.)

* The only initialization item is clear all.

4222M

2

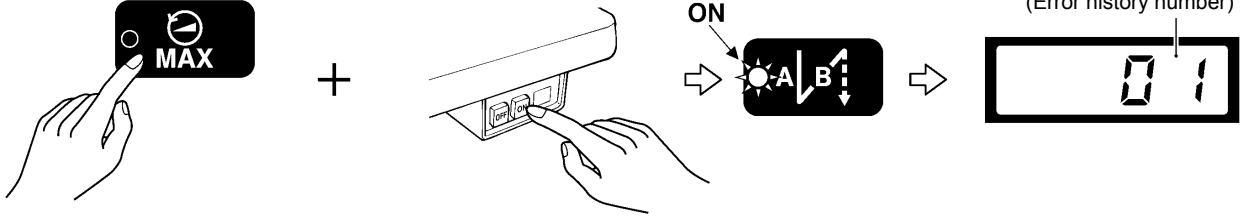
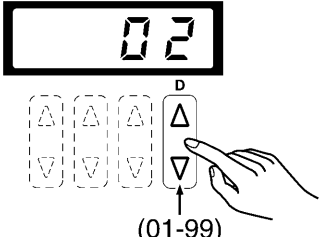
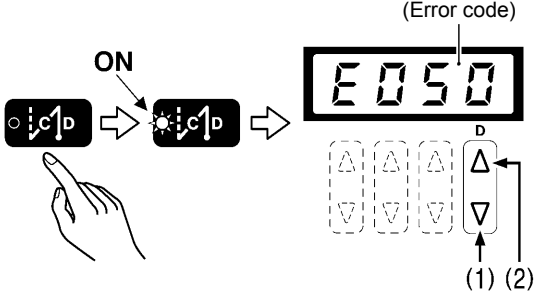
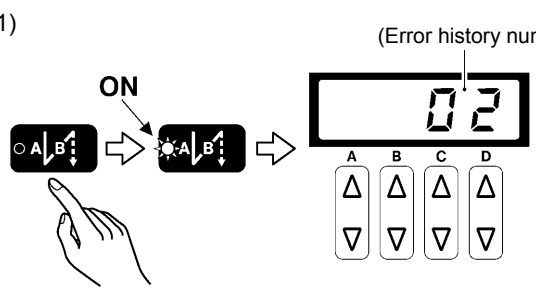


(Press for 2 seconds or more.)

4206M

5-4. Error history checking method

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

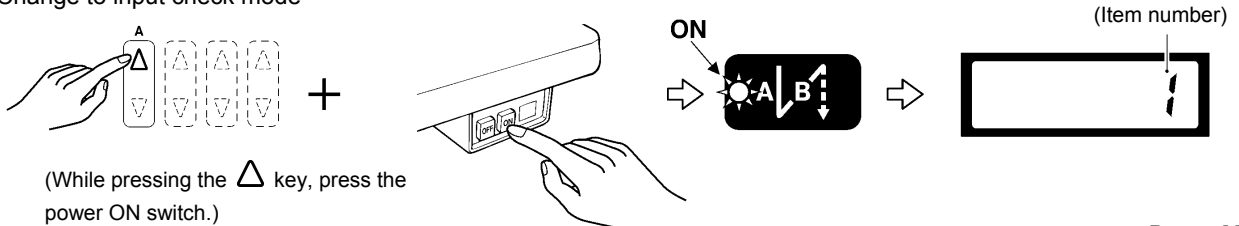
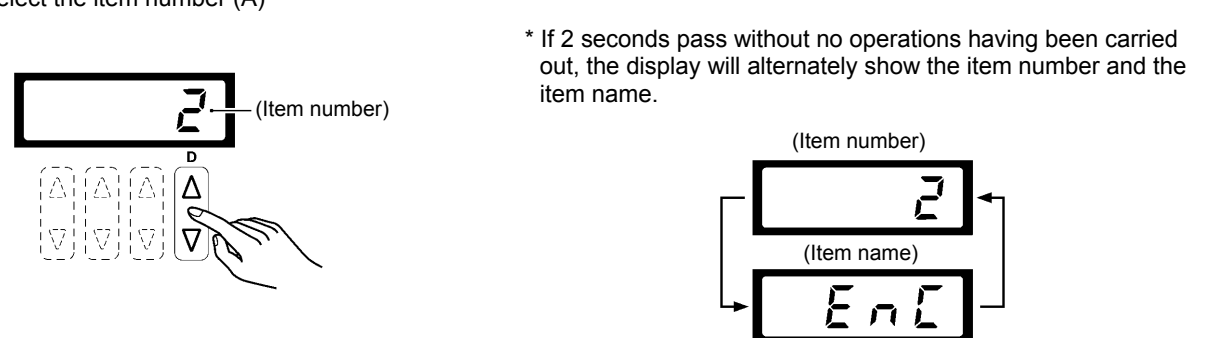
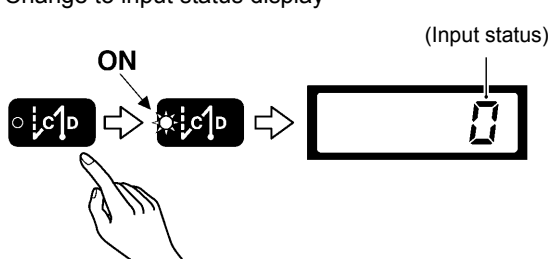
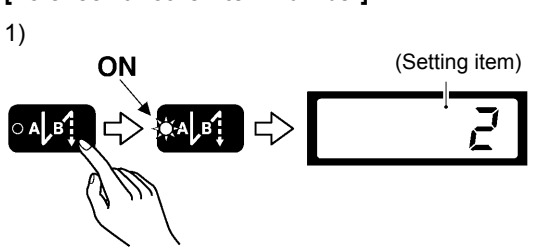
<p>1</p>	<p>Change to error history display mode</p>  <p>(While pressing the MAX key, press the power ON switch.)</p> <p style="text-align: right;">2054B</p>
<p>2</p>	<p>Change the error history number</p>  <p>(01-99)</p> <p>Up to 99 histories (01-99) are stored in order starting from the newest. (No. 01 represents the newest error.)</p> <p style="text-align: right;">2055B</p>
<p>3</p>	<p>Check the history details</p>  <p>(Error code)</p> <p>If there is no error code, [E---] will be displayed.</p> <p>* While the ▽ key (1) or the △ key (2) is being pressed, the display will change to displaying the time the error occurred.</p> <ul style="list-style-type: none"> • While the ▽ key is being pressed, the last 4 digits are displayed. [Units: 1 hour] • While the △ key is being pressed, the first 3 digits ([T***]) are displayed. [Units: 10,000 hours] However, if the total is less than 10,000 hours, the first 3 digits will not be displayed. • When the key is released, the display returns to the original error code. <p>NOTE: The following error cods do not remain in the history, and so they will not be displayed. [E065, E066, E095, E440, E441, E901]</p> <p style="text-align: right;">2056B 2139M 2138M</p>
<p>4</p>	<p>[If checking the details for another error history number]</p> <p>1)</p>  <p>(Error history number)</p> <p>2) Repeat steps 2 and 3 above.</p> <p style="text-align: right;">2057B</p>
<p>5</p>	<p>[To exit error history display mode]</p> <p>Set the power switch to OFF.</p>

5-5. Input checking method

This is used at the following times.

- When there is a problem with an operation panel key, PCB or sensor
- 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.

<p>1</p>	<p>Change to input check mode</p>  <p>(While pressing the Δ key, press the power ON switch.)</p> <p style="text-align: right;">2058B 2138M</p>
<p>2</p>	<p>Select the item number (A)</p>  <p>* If 2 seconds pass without no operations having been carried out, the display will alternately show the item number and the item name.</p> <p style="text-align: right;">2059B 2060B</p>
<p>3</p>	<p>Change to input status display</p>  <p style="text-align: right;">2061B</p>
<p>4</p>	<p>Check the responses from the keys and switches, etc. while referring to the <Input check list> (P.44).</p>
<p>5</p>	<p>[To check another item number]</p> <p>1)</p>  <p>2) Repeat steps 2 to 4 above.</p> <p style="text-align: right;">2073B</p>
<p>6</p>	<p>Set the power switch to OFF and then turn the power back on again.</p>

<Input check list >

The display on the operation panel shows the item number/item name, or the input status.

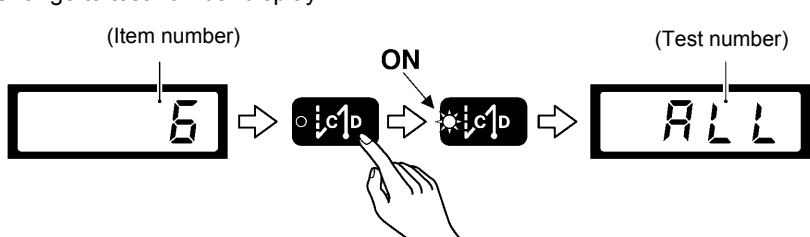
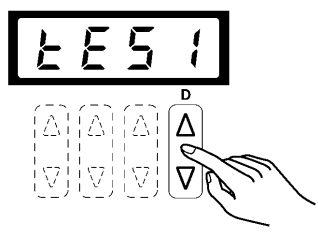
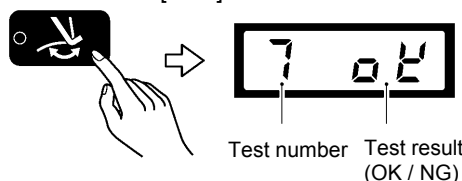
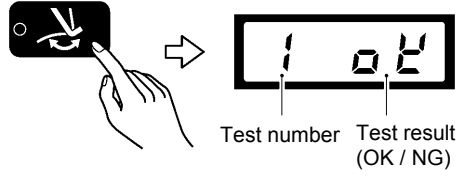
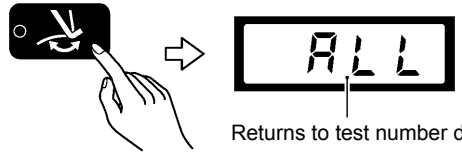
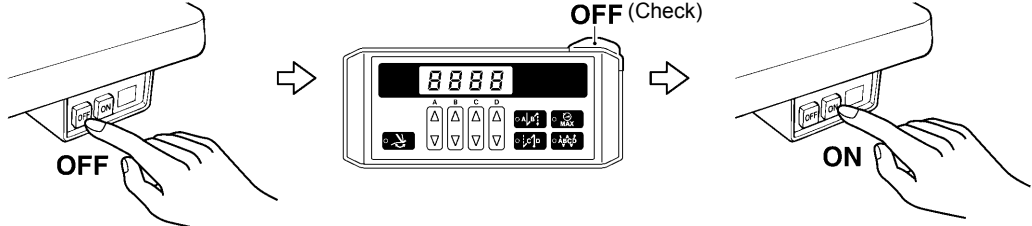
Item No.	Item name	Input status	Checking item and checking method
[1]	[PDL]	[0.000]-[5.000] [V]	Treadle pedal voltage Depress the treadle forward/backward.
[2]	[ENC]	[0]-[359] [degrees]	Motor position signal (needle up side reference signal = 0 degrees) Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[3]	[NLUP]	[ON]-[OFF]	Needle up signal Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[4]	[NLDN]	[ON]-[OFF]	Needle drop signal Turn the machine pulley by hand. * The input will be unstable until the reference signal from the resolver is detected.
[5]	[UPOG]	[ON]/[OFF]	Needle up sensor signal Turn the machine pulley by hand.
[6]	[REZL]	[ALL]/[TES1]-[TES7]	Resolver signal test * Refer to <Resolver signal test> (P.46).
[7]	[VOLT]	[***]	Power supply voltage 100 V systems : Display value ÷ 2 is the actual voltage. 200 V systems : The display value is the actual voltage. 400 V systems : Display value × 2 is the actual voltage. * There may be an error of about ±5% in the display value.
[8]	[HEAD]	[ON]-[OFF]	Safety switch input Becomes "OFF" when the machine head is tilted back.
[9]	[BT]	[ON]-[OFF]	Actuator switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[10]	[PRE]	[ON]-[OFF]	Knee switch or standing pedal presser foot lifter switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[11]	[OPDL]	[0.000]-[5.000] [V]	Standing pedal speed input Depress the variable speed pedal of the standing pedal.
[12]	[HIGH]	[ON]-[OFF]	Standing pedal high speed switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[13]	[TRIM]	[ON]-[OFF]	Standing pedal thread trimming switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[14]	[INCH]	[ON]-[OFF]	Standing pedal low speed switch input "ON" when the switch is ON, and "OFF" when the switch is OFF.
[15]	[PNL]	[****]/[OFF]	Operation panel key input Press any key on the panel other than B△ or B▽. The name of the key pressed will be displayed as the right four characters. If no key is pressed, "OFF" will be displayed. * Refer to <Operation panel key input> (P.47). 2138M 2139M
[16]	[OH]	[0.000]-[5.000] [V]	Motor overheating protection sensor input

(Continued on next page.)

5. FUNCTION SETTINGS (G10 OPERATION PANEL)

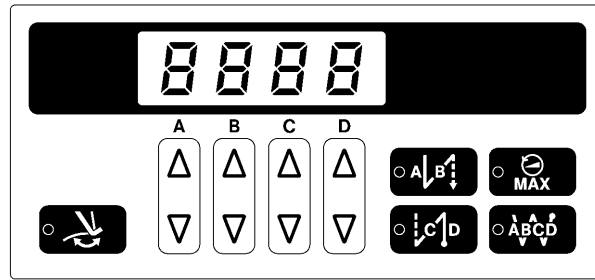
Item No.	Item name	Input status	Checking item and checking method
[17]	[IN1]	[ON]~[OFF]	Option input 1 “ON” when the input signal is LOW, and “OFF” when it is HIGH.
[18]	[IN2]	[ON]~[OFF]	Option input 2 “ON” when the input signal is LOW, and “OFF” when it is HIGH.
[19]	[IN3]	[ON]~[OFF]	Option input 3 “ON” when the input signal is LOW, and “OFF” when it is HIGH.
[20]	[DIP1]	[ON]~[OFF]	DIP switch No. 1 “ON” when the switch is at ON, and “OFF” when the switch is at OFF.
[21]	[DIP2]	[ON]~[OFF]	DIP switch No. 2 “ON” when the switch is at ON, and “OFF” when the switch is at OFF.
[22]	[DIP4]	[ON]~[OFF]	DIP switch No. 4 “ON” when the switch is at ON, and “OFF” when the switch is at OFF.

<Resolver signal test>

1	<p>Change to test number display 2063B</p> <p>(Item number) (Test number)</p> 																											
2	<p>Select the test number 2064B</p>  <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Number</th> <th>Test number</th> <th>Test name</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>[ALL]</td> <td>All tests (Test 1-Test 7)</td> </tr> <tr> <td>2</td> <td>[TES1]</td> <td>Test 1 (Individual)</td> </tr> <tr> <td>3</td> <td>[TES2]</td> <td>Test 2 (Individual)</td> </tr> <tr> <td>4</td> <td>[TES3]</td> <td>Test 3 (Individual)</td> </tr> <tr> <td>5</td> <td>[TES4]</td> <td>Test 4 (Individual)</td> </tr> <tr> <td>6</td> <td>[TES5]</td> <td>Test 5 (Individual)</td> </tr> <tr> <td>7</td> <td>[TES6]</td> <td>Test 6 (Individual)</td> </tr> <tr> <td>8</td> <td>[TES7]</td> <td>Test 7 (Individual)</td> </tr> </tbody> </table>	Number	Test number	Test name	1	[ALL]	All tests (Test 1-Test 7)	2	[TES1]	Test 1 (Individual)	3	[TES2]	Test 2 (Individual)	4	[TES3]	Test 3 (Individual)	5	[TES4]	Test 4 (Individual)	6	[TES5]	Test 5 (Individual)	7	[TES6]	Test 6 (Individual)	8	[TES7]	Test 7 (Individual)
Number	Test number	Test name																										
1	[ALL]	All tests (Test 1-Test 7)																										
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3	[TES2]	Test 2 (Individual)																										
4	[TES3]	Test 3 (Individual)																										
5	[TES4]	Test 4 (Individual)																										
6	[TES5]	Test 5 (Individual)																										
7	[TES6]	Test 6 (Individual)																										
8	[TES7]	Test 7 (Individual)																										
3	<p>Start the test 2065B 2066B</p> <p>When the thread wiper key is pressed, the test starts.</p> <p>A. For all tests [ALL]</p>  <p style="margin-left: 100px;">Test number Test result (OK / NG)</p> <p>B. For individual tests [TES*]</p>  <p style="margin-left: 100px;">Test number Test result (OK / NG)</p> <p>NOTE: Once testing has started, no items other than a resolver signal test can be checked. To check a different item, carry out step 5 given below, and then change back to input check mode.</p> <p>All tests from Test 1 to Test 7 are carried out.</p> <ul style="list-style-type: none"> • If all tests are completed and the results are all OK, [7 OK] will be displayed. • If an NG result occurs during the test, [* NG] will be displayed as the right four characters in the display. (* indicates the number of the test which produced the NG result.) <p>Number of the test specified will be carried out.</p> <ul style="list-style-type: none"> • If the test is completed and the result is OK, [* OK] will be displayed as the right four characters in the display. • If the result is NG, [* NG] will be displayed. 																											
4	<p>[If carrying out another resolver signal test]</p>  <p style="margin-left: 100px;">Returns to test number display. 2067B</p>																											
5	<p>[To return to the normal sewing machine starting condition]</p>  <p style="margin-left: 100px;">NOTE: If you turn the power back on while the power indicator (green) is still illuminated, [E131] may be displayed. 2068B</p>																											

5. FUNCTION SETTINGS (G10 OPERATION PANEL)

<Operation panel key input>



2045B

Key name	Display
(A)	[A-UP]
(A)	[A-DN]
(B)	[B-UP]
(B)	[B-DN]
(C)	[C-UP]
(C)	[C-DN]

2024B-2025B

Key name	Display
(D)	[D-UP]
(D)	[D-DN]
	[WIP]
	[EBT]
	[RBT]
	[SPED]

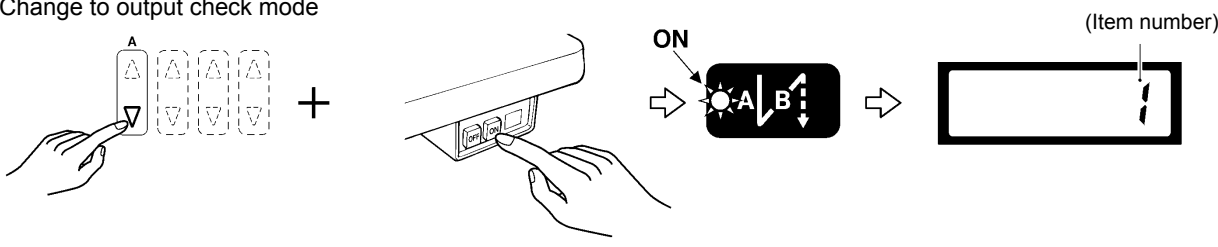
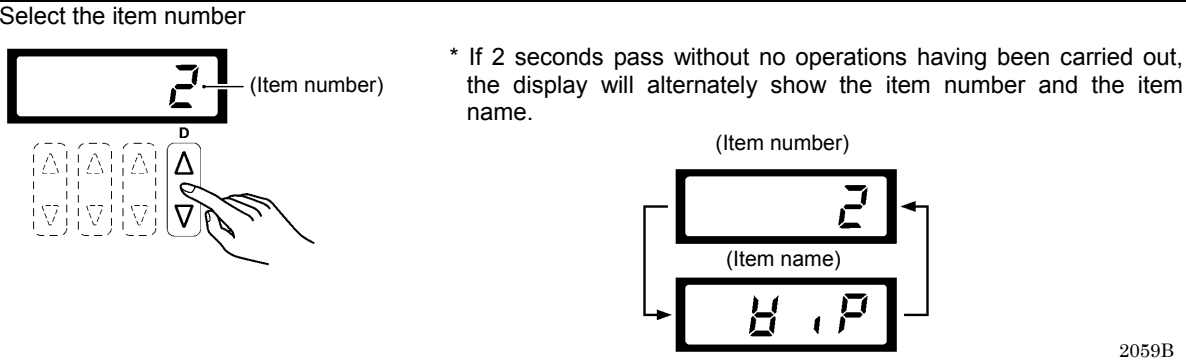
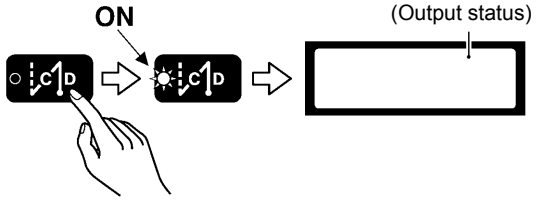
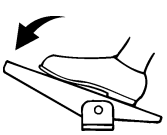
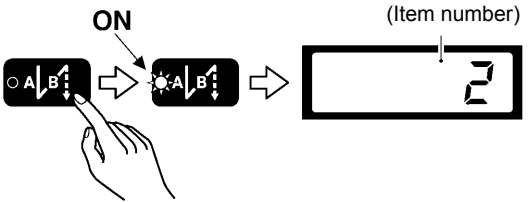
2024B, 2025B, 4174M, 4161M-4163M, 2096B

5-6. Output checking method

This is used at the following times.

- When there is a problem with the operation panel PCB
- When there is 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	<p>Change to output check mode</p>  <p>(While pressing the ▽ key, press the power ON switch.)</p> <p style="text-align: right;">2070B 2139M</p>
2	<p>Select the item number</p>  <p style="text-align: right;">2059B 2071B</p>
3	<p>Change to output status display</p>  <p style="text-align: right;">2072B</p>
4	 <p>⇒ The operation corresponding to the item number being checked will be carried out.</p> <p style="text-align: right;">2159M</p>
5	<p>[To check another item]</p> <p>1) Return the treadle to the neutral position</p> <p>2)</p>  <p>3) repeat the operations in steps 2 to 4 above.</p> <p style="text-align: right;">2073B</p>
6	<p>Press the power OFF switch to turn off the power, and then turn the power back on.</p>

5. FUNCTION SETTINGS (G10 OPERATION PANEL)

<Output check list >

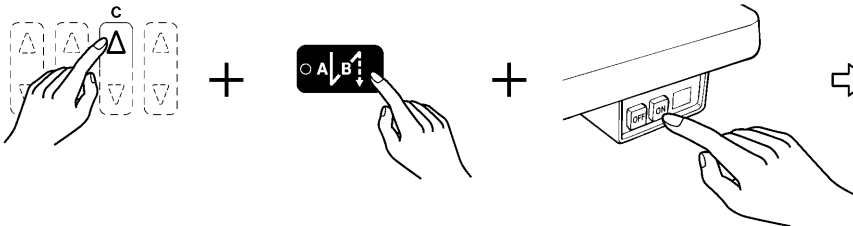
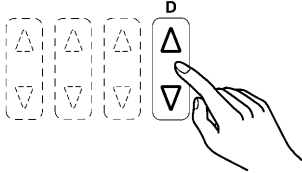
The display on the operation panel shows the item number/item name, or the output status.

Item No.	Item name	Output status	Checking item and checking method
[1]	[TRM]	OFF	Thread trimming solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[2]	[WIP]	OFF	Thread wiper solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[3]	[REV]	OFF	Quick reverse solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[4]	[PRE]	OFF	Presser foot lifter solenoid When the treadle is depressed, the solenoid operates for 2 seconds. When the treadle is returned to the neutral position, the solenoid turns off.
[5]	[OPT]	OFF	Option solenoid signal When the treadle is depressed, the solenoid signal turns on for 2 seconds. When the treadle is returned to the neutral position, the solenoid signal turns off.
[6]	[INCH]	Shows the actual sewing machine speed	Inching speed operation When the treadle is depressed, the upper shaft rotates at the inching speed. When the treadle is returned to the neutral position, the upper shaft stops.
[7]	[TRIM]		Thread trimming speed operation When the treadle is depressed, the upper shaft rotates at the thread trimming speed. When the treadle is returned to the neutral position, the upper shaft stops.
[8]	[SLOW]		Slow speed operation When the treadle is depressed, the upper shaft rotates at slow speed. When the treadle is returned to the neutral position, the upper shaft stops.
[9]	[SBT]		[****] [sti/min] Start backtack sewing speed operation When the treadle is depressed, the upper shaft rotates at the start backtack sewing speed. When the treadle is returned to the neutral position, the upper shaft stops.
[10]	[EBT]		End backtack sewing speed operation When the treadle is depressed, the upper shaft rotates at the end backtack sewing speed. When the treadle is returned to the neutral position, the upper shaft stops.
[11]	[HIGH]		High speed operation When the treadle is depressed, the upper shaft rotates at a speed corresponding to the treadle depression amount (inching speed to maximum speed). When the treadle is returned to the neutral position, the upper shaft stops.
[12]	[AUTO]		Automatic speed operation When the treadle is depressed, the upper shaft rotates at the automatic speed. When the treadle is returned to the neutral position, the upper shaft stops.
[13]	[POS]		Stop improvement speed operation When the treadle is depressed, the upper shaft rotates at the stop improvement speed. When the treadle is returned to the neutral position, the upper shaft stops.


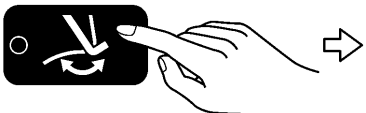
5. FUNCTION SETTINGS (G10 OPERATION PANEL)

Item No.	Item name	Output status	Checking item and checking method
[14]	[BUZZ]	OFF	Buzzer When the treadle is depressed, the buzzer sounds for 1 second.
[15]	[PNL]	[****]	Panel display When the treadle is depressed, checking of the operation panel indicators and display will start. When the treadle is returned to the neutral position, all indicators will illuminate, and then the display will return to how it was before the treadle was depressed.
[16]	[MOVE]	OFF	Operation synchronization signal When the treadle is depressed, the operation synchronization signal turns on. When the treadle is returned to the neutral position, the signal turns off.
[17]	[OUT1]	OFF	Option output signal 1 When the treadle is depressed, the option output signal turns on. When the treadle is returned to the neutral position, the signal turns off.
[18]	[OUT2]	OFF	Option output signal 2 When the treadle is depressed, the option output signal turns on. When the treadle is returned to the neutral position, the signal turns off.

5-7. Protection settings

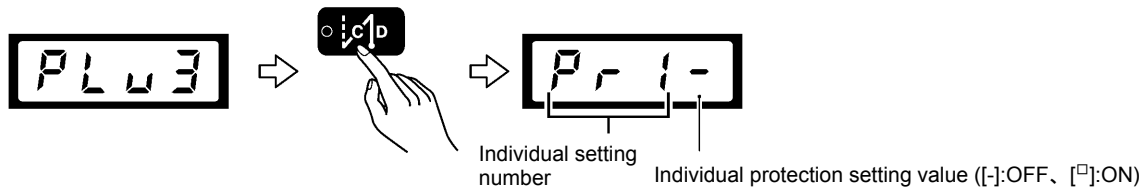

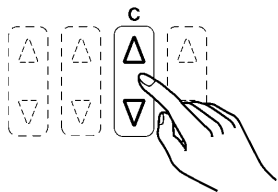
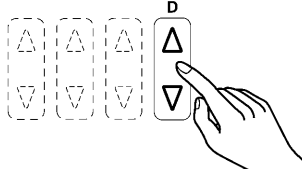


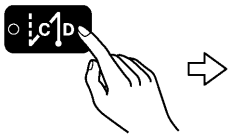
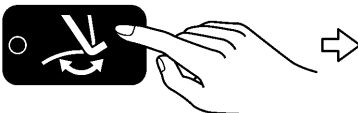
1	Set the power switch to OFF, and then set DIP switch 1 to OFF.	
2	<p>Change to protect setting mode</p>  <p>(While pressing the Δ key and the start backtick key, press the power ON switch.)</p> <p>[PLV] and the protection level will be displayed in the display. (* is the protection level. At the time of shipment from the factory, the protection level is set to "1".)</p>	2074B 2138M
3	<p>Set the protection level (0 to 3)</p>  <p>NOTE: The range for disabling operation varies depending on the setting for DIP switch 1. For details, refer to <Protection setting list"> (P.53). * If the protection level is different from the original value, the protection level will flash in the display.</p>	2033B

[If set to level 0 – 2]

4	<p>Confirm the protection level (example: set to level 2)</p>  <p>(Flashing) → (Illuminated)</p>	2075B
5	 <p>Protect setting mode will be exited and normal operation will be possible.</p>	4206M

[If set to level 3]

To make individual settings, select level 3.

4	Confirm the protection level	 <p style="text-align: center;">Individual setting number Individual protection setting value ([-]:OFF、[□]:ON)</p>																
	<p>NOTE:</p> <p>* When the  key is pressed, the display will return to the protection level setting display [PLV 3].</p>		2076B 4161M															
5	Select an individual setting number (1-6)		<p>NOTE:</p> <p>The range for disabling operation varies depending on the setting for DIP switch 1. For details, refer to <Protection setting list> (P.53).</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Individual setting number</th> <th style="text-align: center;">Details of main operation disabled</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>MAX key</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Function setting</td> </tr> <tr> <td style="text-align: center;">3</td> <td>None (setting disabled)</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Mainly keys with indicators</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Stitch number settings (ABCD)</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Initialization</td> </tr> </tbody> </table>	Individual setting number	Details of main operation disabled	1	MAX key	2	Function setting	3	None (setting disabled)	4	Mainly keys with indicators	5	Stitch number settings (ABCD)	6	Initialization	2077B
Individual setting number	Details of main operation disabled																	
1	MAX key																	
2	Function setting																	
3	None (setting disabled)																	
4	Mainly keys with indicators																	
5	Stitch number settings (ABCD)																	
6	Initialization																	
6	Make the individual protection (ON/OFF) setting		<p>Use the  key to turn the setting on, and use the  key to turn the setting off.</p> <p>* If the individual protection setting value is different from the original value, the protection setting value will flash.</p>	2100B 2138M 2139M														
7	Confirm the protection setting value		<p>The protection setting value will return to illuminating steadily.</p>	2078B														
8			<p>Protect setting mode will be exited and normal operation will be possible.</p>	4206M														

5. FUNCTION SETTINGS (G10 OPERATION PANEL)

<Protection setting list>

○: Enabled

×: Disabled

Level Setting function	0	1	2	3 (Individual setting)							
				All OFF	1 =ON	2 =ON	3 =ON	4 =ON	5 =ON	6 =ON	
Sewing speed ([MAX] setting)	○ (×)	○ (×)	× (×)	○ (×)	× (×)	(×)	(×)	(×)	(×)	(×)	(×)
Function setting	○ (○)	○ (○)	× (×)	○ (○)	()	× (×)	()	()	()	()	()
[Thread wiping] setting	○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()	()
[Start backtack] setting	○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()	()
[End backtack] setting	○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()	()
[Continuous backtack] setting	○ (○)	○ (○)	× (×)	○ (○)	()	()	()	× (×)	()	()	()
A-D stitch number setting	○ (○)	○ (○)	× (×)	○ (○)	()	()	()	()	× (×)	()	()
Initialization	○ (×)	○ (×)	○ (×)	○ (×)	(×)	(×)	(×)	(×)	(×)	(×)	× (×)
Protection setting	○ (×)	○ (×)	○ (×)	○ (×)	(×)	(×)	(×)	(×)	(×)	(×)	(×)

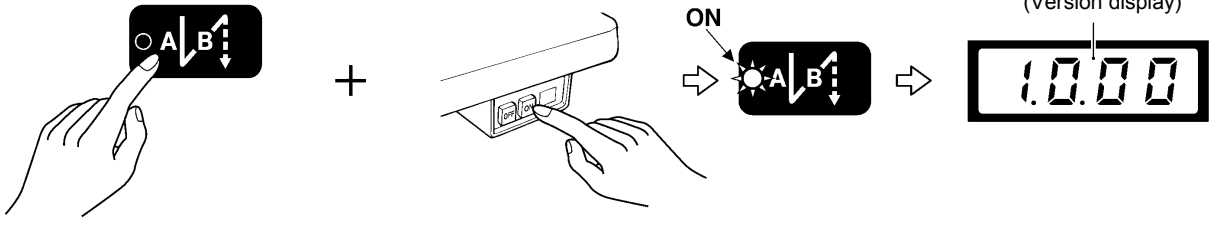
* Values inside () are when DIP switch 1 is set to ON.

* Individual settings are disabled if even one of 1 to 6 is ×. If all columns are blank, the setting is enabled.

* The setting details for level 0 and level 1 are the same.

5-8. Software version checking method

1 Change to version display mode

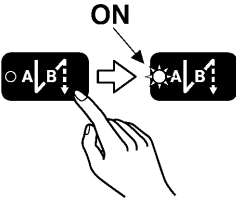
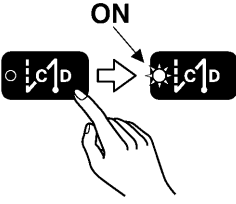
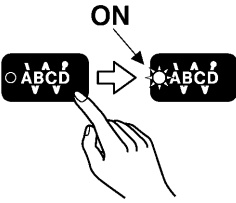


(While pressing the start backtick key, press the power ON switch.)

2079B

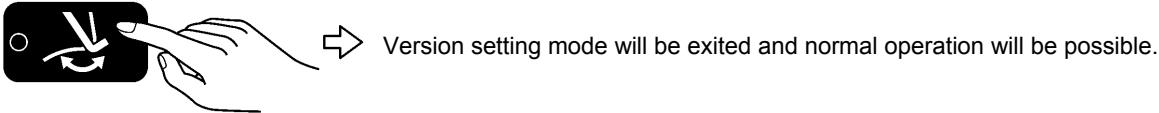
2 Check the versions of each software

If you press the buttons as shown in the table, you can check the various software versions.

Indicator	Software	Version display
	Main CPU	[1.0.00]
	Panel CPU	[1.000]
	Main IPL	[1.000]

2080B 2081B 2082B

3



4206M

5-9. Viewing maintenance information

This allows you to check the information which is stored in the head detector unit.

1 Change to maintenance display mode

(While pressing the Δ and ∇ keys, press the power ON switch.)

2083B 2138M 2139M

2 Select the maintenance item

No.	Item name	Item name display
1	Grease up counter	[GUCT]
2	Grease up time	[GUL]
3	Cumulative power on time	[PONT]
4	Cumulative operating time	[MONT]

2084B

3 Change to detail display

No.	Item name	Detail (Display)
1	Grease up counter *1	[***] 0-102(%)
2	Grease up time	[4000] (Units: 1 hour)
3	Cumulative power on time (7 characters)	[****] (Units: 1 hour) *2
4	Cumulative operating time (7 characters)	[****] (Units: 1 hour) *2

*1: If the continuous backtack key is pressed for 2 seconds or more while the grease up counter details are being displayed, the counter will be cleared.
 *2: Normally the last 4 digits of the counter are displayed, but if you press the Δ key (1), the first three digits will be displayed.

2085B 2086B 2138M

4 [To check another item]

1)

2) Repeat steps 2 to 3 above.

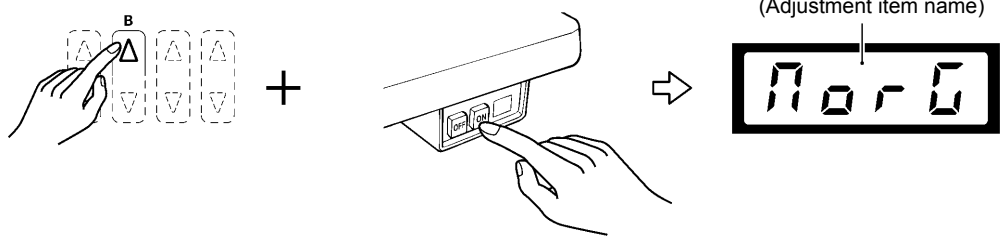
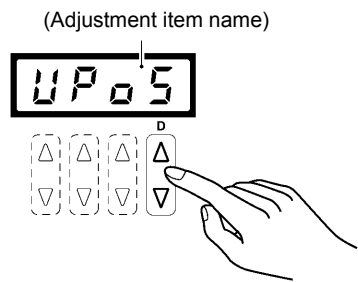
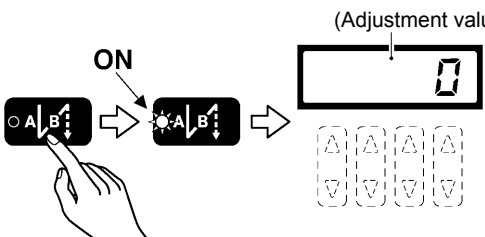

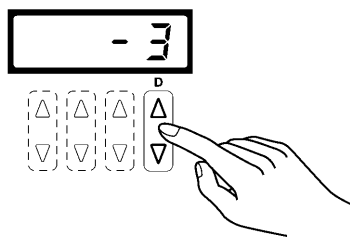
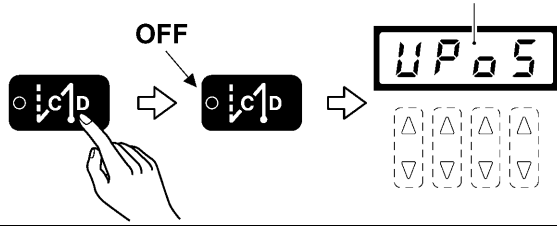

2087B

5

⇒ Maintenance mode will be exited and normal operation will be possible.

4206M

5-1 0. Adjusting the sewing machine reference position

1	<p>Change to sewing machine reference position adjustment mode</p>  <p>(Adjustment item name)</p> <p style="text-align: center;">MORG</p> <p>(While pressing the Δ key, press the power ON switch.)</p>	2088B 2138M																		
2	<p>Select the adjustment item</p>  <p>(Adjustment item name)</p> <p style="text-align: center;">UPOS</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Adjustment item</th> <th colspan="2">Display</th> </tr> <tr> <th>Adjustment item name</th> <th>Adjustment value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Sewing machine reference position (Adjustment when motor is replaced)</td> <td style="text-align: center;">[MORG]</td> <td style="text-align: center;">-20-20 degrees</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Needle up stop position (during individual adjustment)</td> <td style="text-align: center;">[UPOS]</td> <td style="text-align: center;">-5-10 degrees</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Needle down stop position (during individual adjustment)</td> <td style="text-align: center;">[DPOS]</td> <td style="text-align: center;">-5-10 degrees</td> </tr> </tbody> </table> <p>* "1 Sewing machine reference position" is adjusted at the time of shipment from the factory. * If you would like to change only the stop positions, make adjustments at "2 Needle up stop position" or "3 Needle down stop position".</p> <p>NOTE: When an adjustment value is changed, the needle up and needle down signal positions will change. Other settings such as solenoid operation timing and needle up/down stop positions will change in line with this.</p>		Adjustment item	Display		Adjustment item name	Adjustment value	1	Sewing machine reference position (Adjustment when motor is replaced)	[MORG]	-20-20 degrees	2	Needle up stop position (during individual adjustment)	[UPOS]	-5-10 degrees	3	Needle down stop position (during individual adjustment)	[DPOS]	-5-10 degrees	2089B
	Adjustment item			Display																
		Adjustment item name	Adjustment value																	
1	Sewing machine reference position (Adjustment when motor is replaced)	[MORG]	-20-20 degrees																	
2	Needle up stop position (during individual adjustment)	[UPOS]	-5-10 degrees																	
3	Needle down stop position (during individual adjustment)	[DPOS]	-5-10 degrees																	
3	<p>Change to the adjustment value display</p>  <p>(Adjustment value)</p> <p style="text-align: center;">0</p> <p>* If you press the  key once more, the display will return to the adjustment value display.</p>	2090B 4161M																		
4	<p>Change the adjustment value</p>  <p>If the adjustment value is different from the original value, the adjustment value will flash.</p>	2091B																		
5	<p>Confirm the adjustment value</p>  <p>(Adjustment item name)</p> <p style="text-align: center;">UPOS</p> <p>The display will return to the setting item name display.</p> <p>NOTE: Any changed settings will take effect after sewing machine reference position adjustment mode has been exited.</p>	2092B																		
6	 <p>Sewing machine reference position adjustment mode will be exited and normal operation will be possible.</p>	4206M																		

6. SETTING THE DIP SWITCHES (G50 AND G10 OPERATION PANELS)

DANGER



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

1	Key protect settings	ON/OFF	Disables operation panel key operations. (*1)
2			Should always be set to OFF.
3			Should always be set to OFF.
4			Should always be set to OFF. (*2)

(*1) The disabled operations will vary depending on the ON/OFF settings. For details, refer to “4-11. Protection settings” (P.32) or “5-7. Protection settings” (P.51).

(*2) If set to ON, operations using the treadle will be disabled, and so always be sure to set to OFF. If you set it to ON and turn on the power, error code [E901] will be displayed on the operation panel.

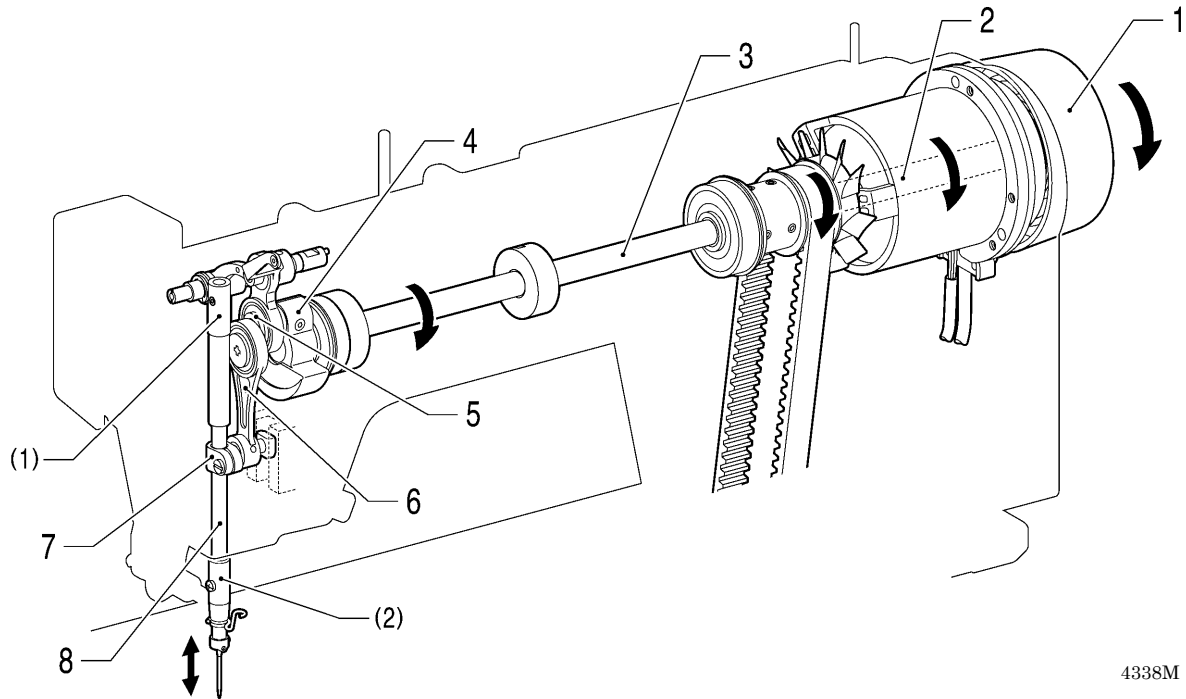
7. MECHANICAL DESCRIPTIONS

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

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

* (number) indicates part names only. (They do not represent the flow of operations.)

7 - 1 . Upper shaft and needle bar mechanism



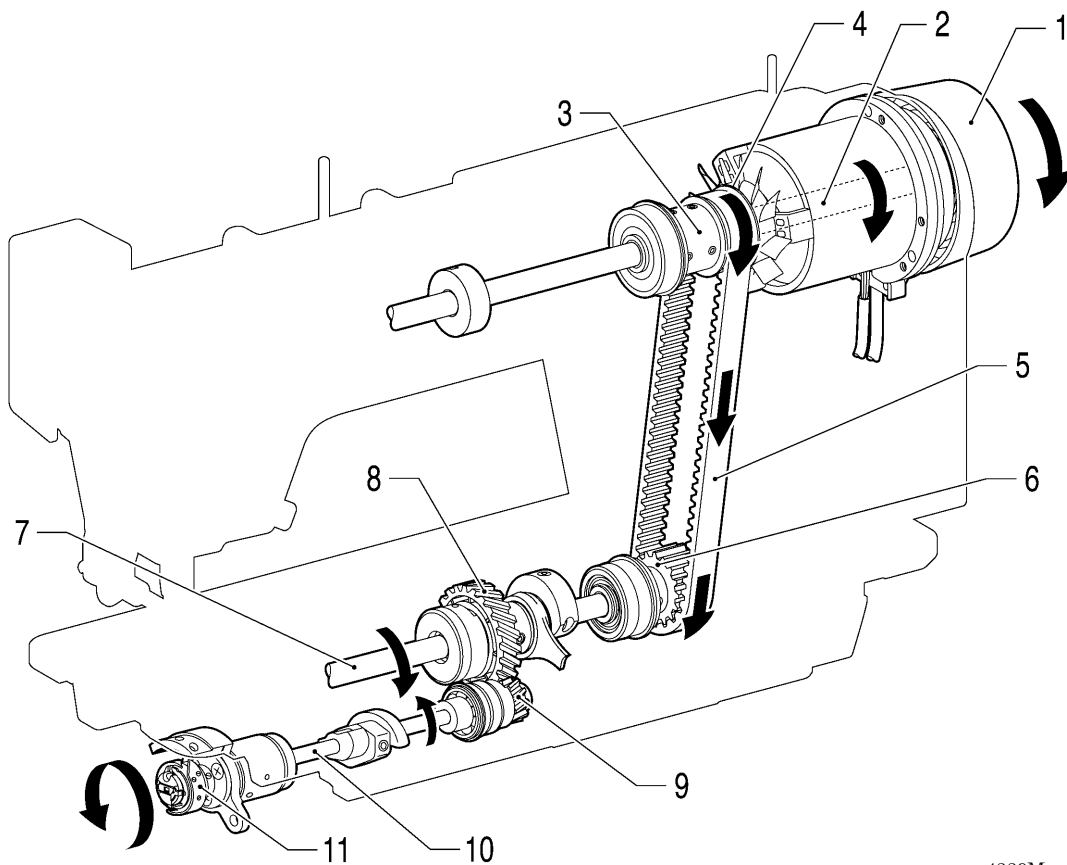
4338M

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

- (1) Needle bar bush U
- (2) Needle bar bush D

The needle bar is guided by needle bar bush U (1) and needle bar bush D (2).

7 - 2 . Lower shaft and rotary hook mechanism

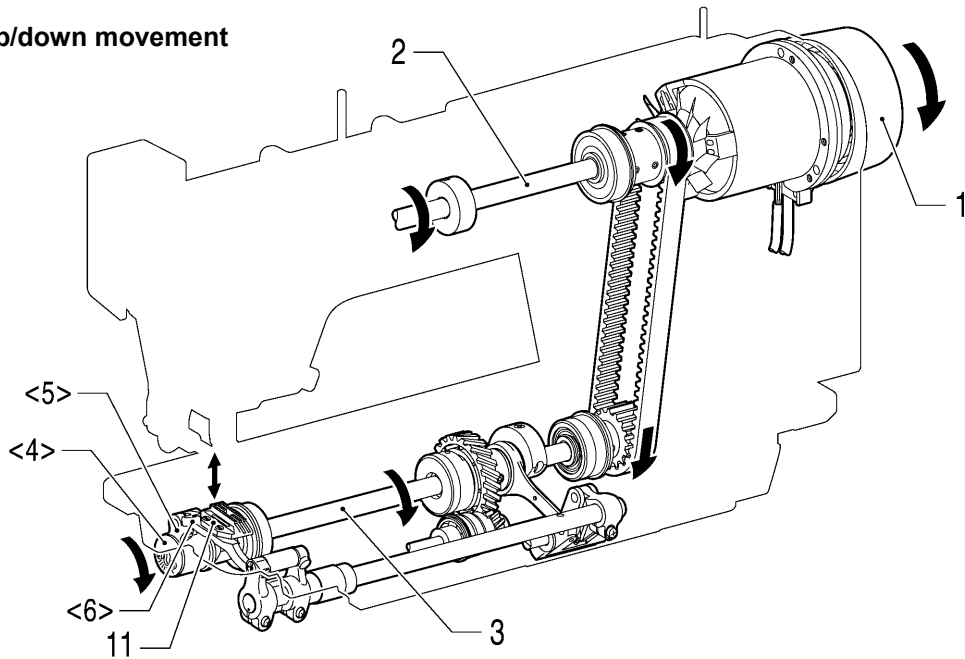


4339M

- 1. Pulley
- 2. Motor shaft
- 3. Joint assembly
- 4. Timing pulley U
- 5. Timing belt
- 6. Timing pulley D
- 7. Lower shaft
- 8. Lower shaft gear
- 9. Rotary hook shaft gear
- 10. Rotary hook shaft
- 11. Rotary hook assembly

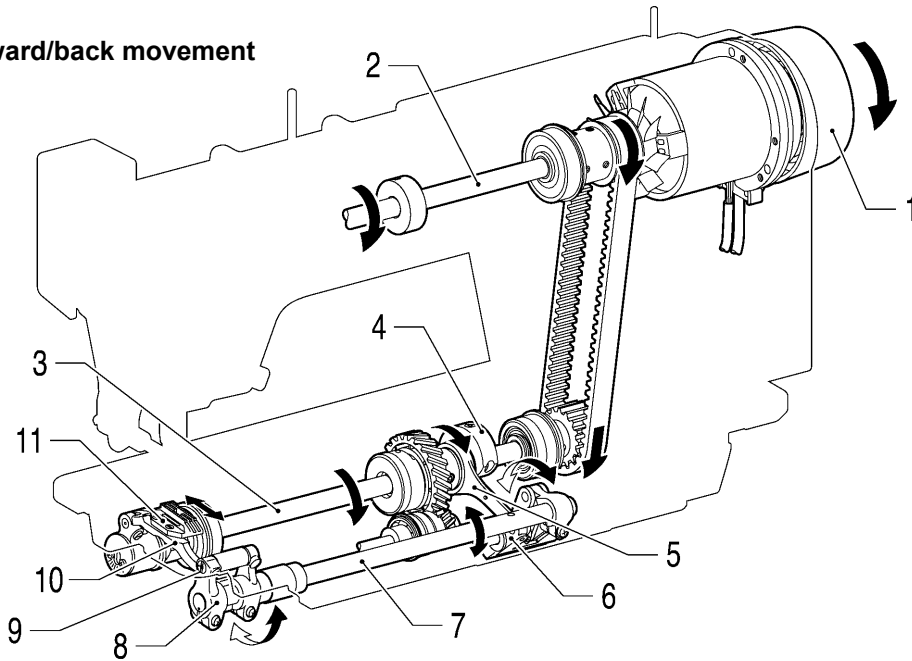
7 - 3 . Feed mechanism

Feed dog up/down movement



4340M

Feed dog forward/back movement



4341M

- 1. Pulley
- 2. Upper shaft
- 3. Lower shaft

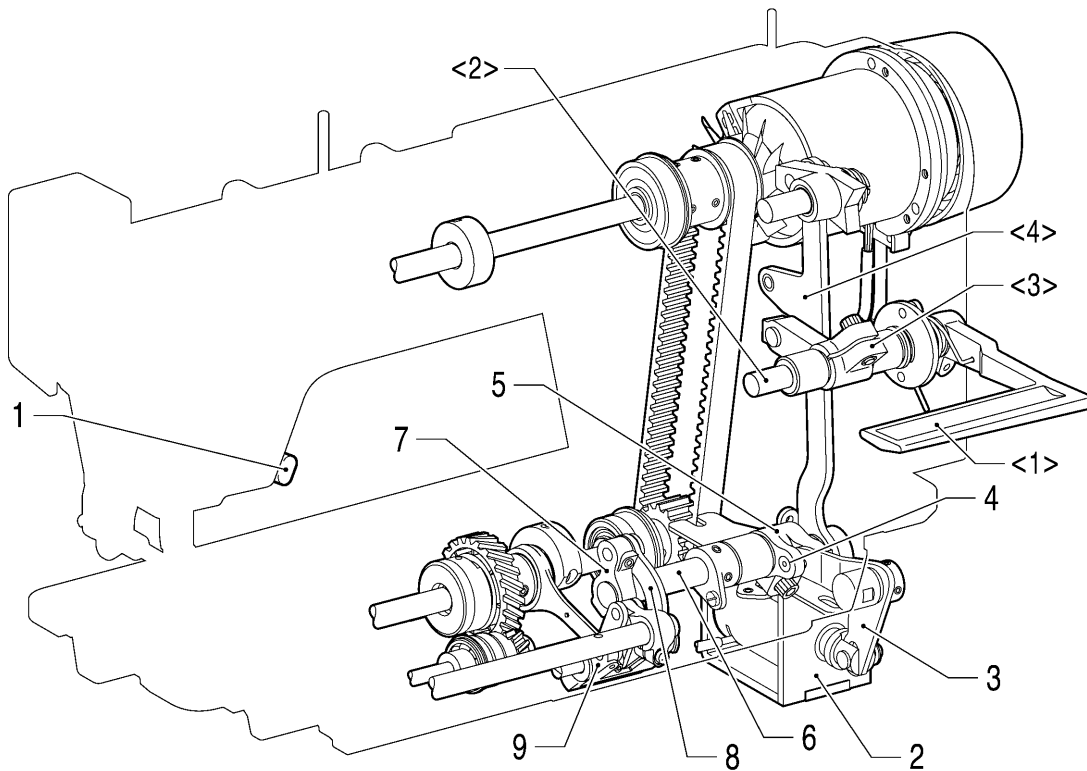
- (Feed dog up/down movement)
- <4> Feed lifting eccentric wheel assembly
- <5> Feed lifting feed shaft assembly
- <6> Feed bar

- (Feed dog forward/back movement)
- 4. Level feed eccentric wheel assembly
- 5. Level feed connecting rod
- 6. Feed regulator assembly
- 7. Feed rock shaft
- 8. Feed rock bracket arm
- 9. Feed bar shaft assembly
- 10. Feed bar

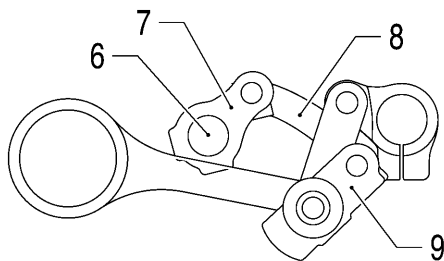
11. Feed dog

*The feed locus for -□□S specifications is different from -□□3 and -□□5 specifications.

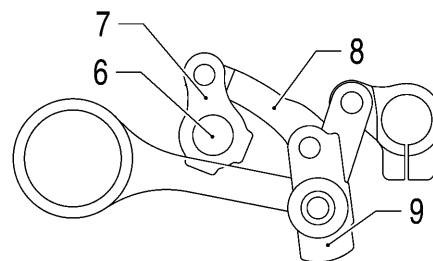
7 - 4 . Quick reverse mechanism (quick back mechanism)



Normal feed



Reverse feed



4342M

- | | |
|---------------------------|-----------------------------------|
| 1. Actuator | <1> Reverse lever |
| 2. Quick reverse solenoid | <2> Reverse sewing shaft |
| 3. Solenoid lever | <3> Handle shaft arm assembly |
| | <4> Feed regulator connecting rod |
-
- | |
|------------------------------------|
| 4. Eccentric pin |
| 5. Feed regulator shaft arm |
| 6. Feed regulator shaft |
| 7. Feed regulator shaft joint |
| 8. Feed regulator connecting rod S |
| 9. Feed regulator (Angle changes) |

7 - 5 . Lubrication mechanism (thread take-up and rotary hook)

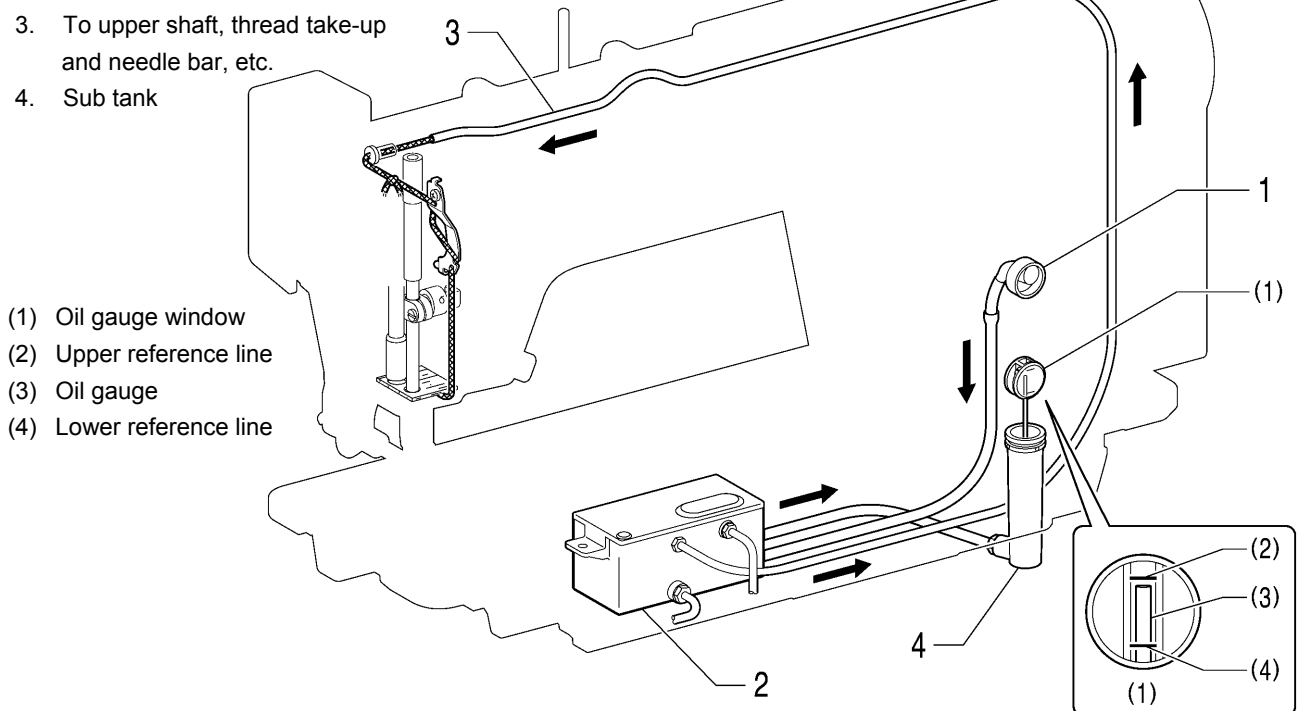
This sewing machine's lubrication mechanism is a dry head type using tank lubrication.

The oil level can be checked in the oil gauge window without needing to tilt back the machine head or operate the sewing machine.

Thread take-up minimum lubrication

To upper shaft, thread take-up and needle bar, etc. (-[0] specifications)

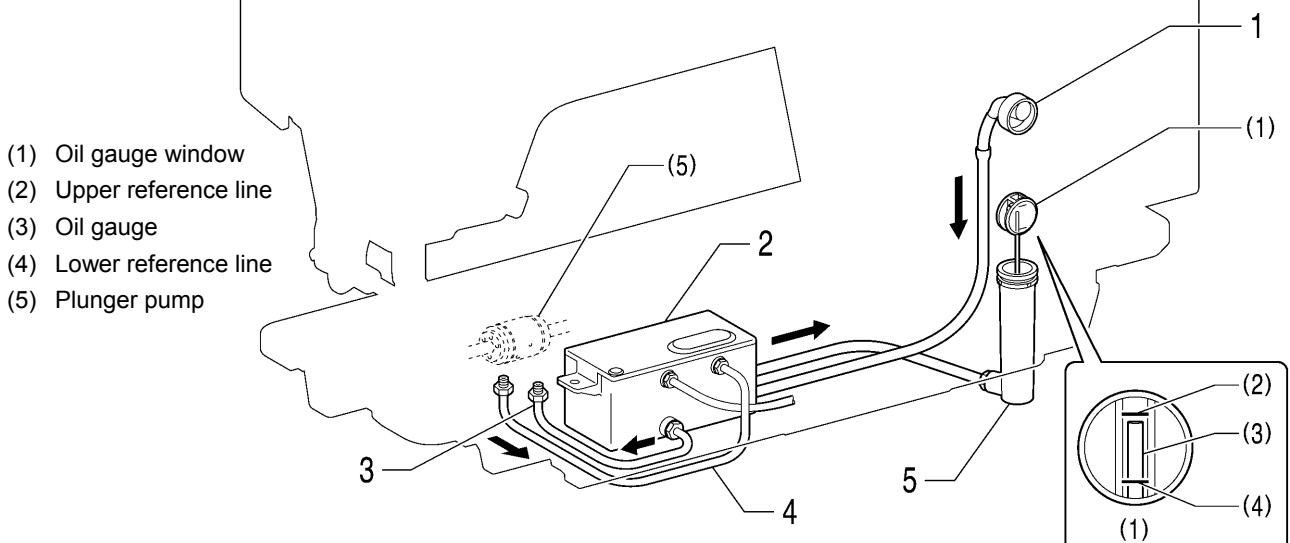
1. Oil feeding pocket
2. Oil tank
3. To upper shaft, thread take-up and needle bar, etc.
4. Sub tank



4343M

To rotary hook and rotary hook shaft (-[0], -[3] specifications)

1. Oil feeding pocket
2. Oil tank
3. To rotary hook and rotary hook shaft
4. Remaining return oil
5. Sub tank



4344M

* Fine adjustments can be made to the lubrication amount for the rotary hook using the adjustment screw.

(Refer to "10-19. Adjusting the rotary hook lubrication amount (-[0], [3] specifications)".)

7 - 6 . Thread trimming mechanism

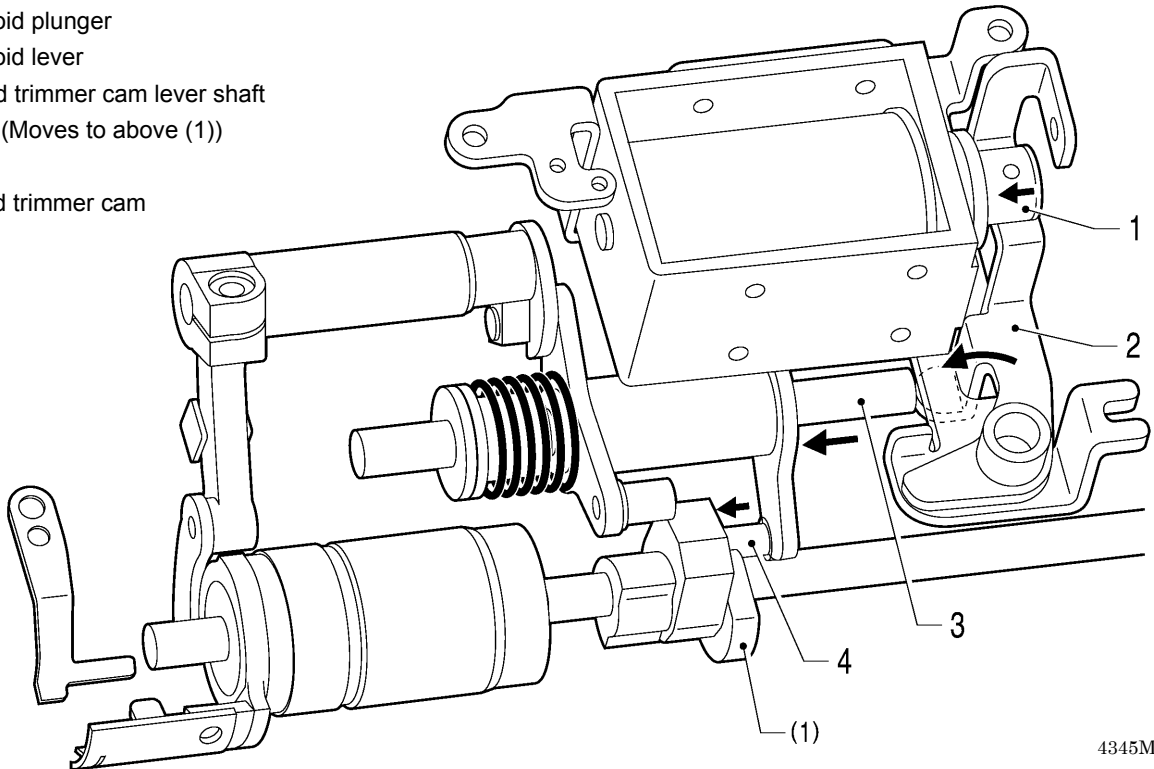
7 - 6 - 1 . Thread trimming mechanism operation sequence

The illustration below shows the mechanism with the high-speed rotary hook removed.

1) When thread rimming signal is input

1. Solenoid plunger
2. Solenoid lever
3. Thread trimmer cam lever shaft
4. Roller (Moves to above (1))

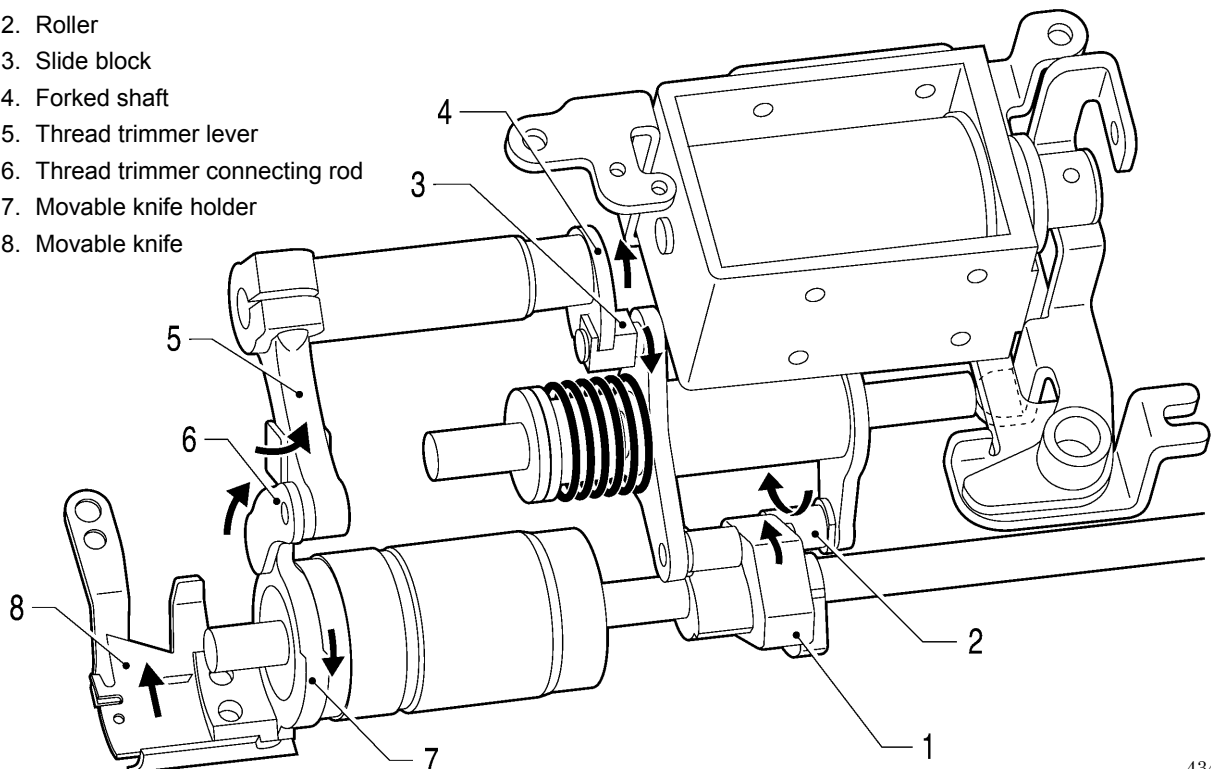
(1) Thread trimmer cam



4345M

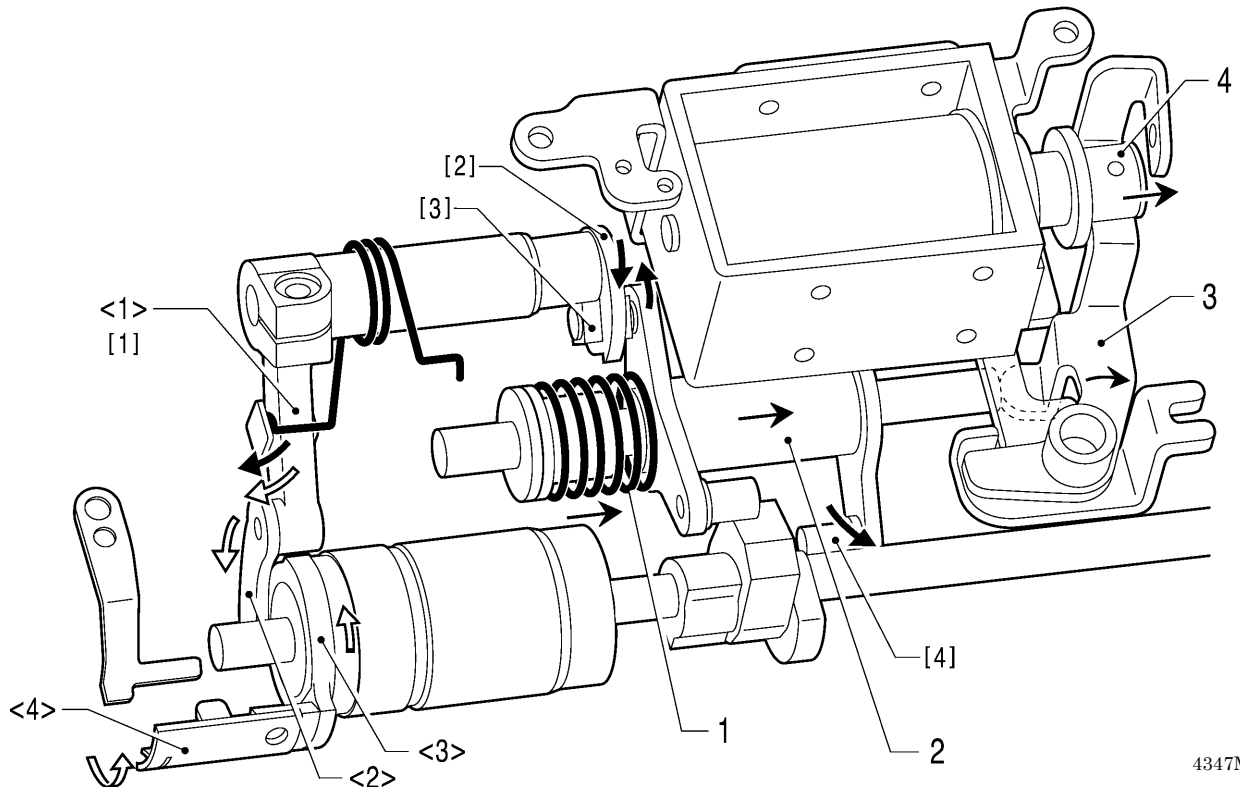
2) Rocking of movable knife holder

1. Thread trimmer cam
2. Roller
3. Slide block
4. Forked shaft
5. Thread trimmer lever
6. Thread trimmer connecting rod
7. Movable knife holder
8. Movable knife



4346M

3) Thread trimming complete and operation stopped



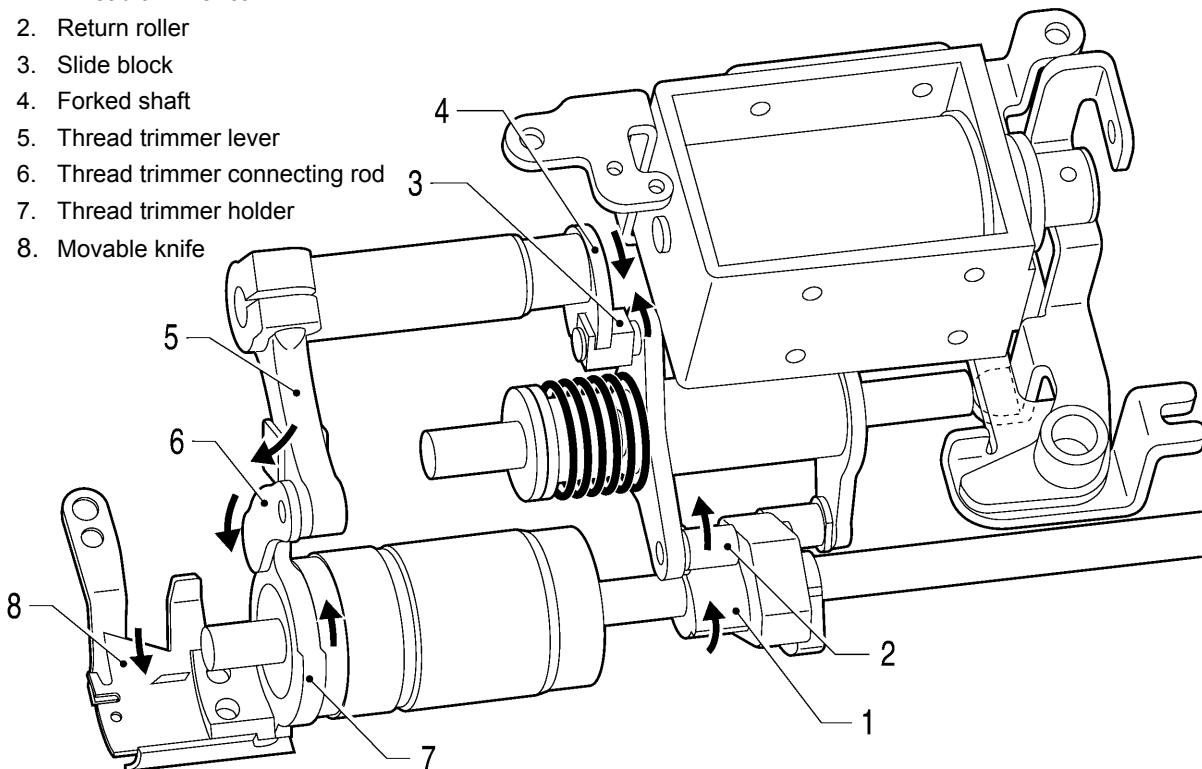
4347M

- | | | |
|-----------------------------|-----------------------------------|--------------------------|
| 1. Extension spring | <1> Thread trimmer lever | [1] Thread trimmer lever |
| 2. Thread trimmer cam lever | <2> Thread trimmer connecting rod | [2] Forked shaft |
| 3. Solenoid lever | <3> Thread trimmer holder | [3] Slide block |
| 4. Solenoid plunger | <4> Movable knife | [4] Roller |

4) Thread trimming safety device

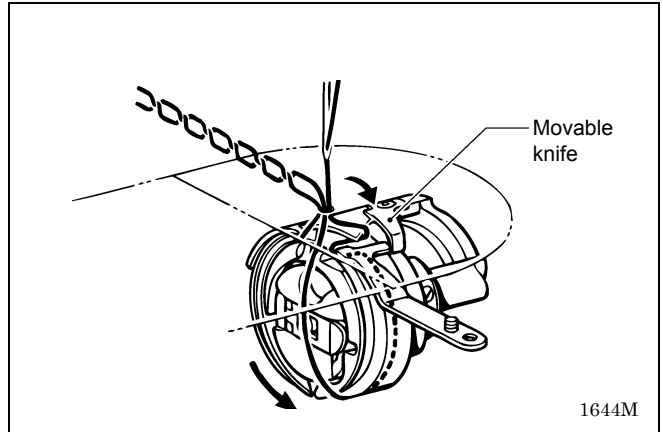
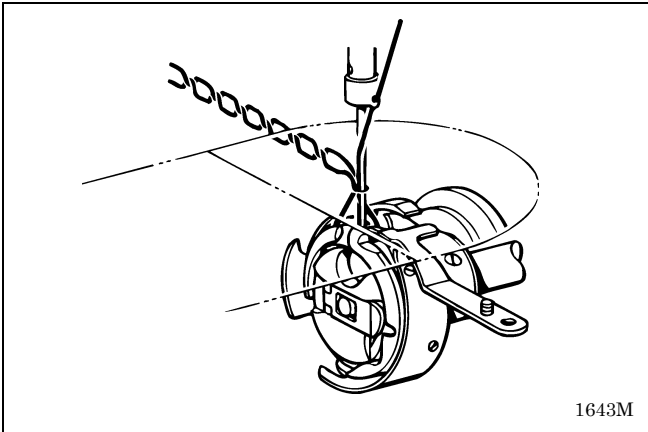
If the movable knife does not return to its original position, the operation shown in the illustration below ensures that the movable knife will return to a position where it will not touch the needle.

1. Thread trimmer cam
2. Return roller
3. Slide block
4. Forked shaft
5. Thread trimmer lever
6. Thread trimmer connecting rod
7. Thread trimmer holder
8. Movable knife



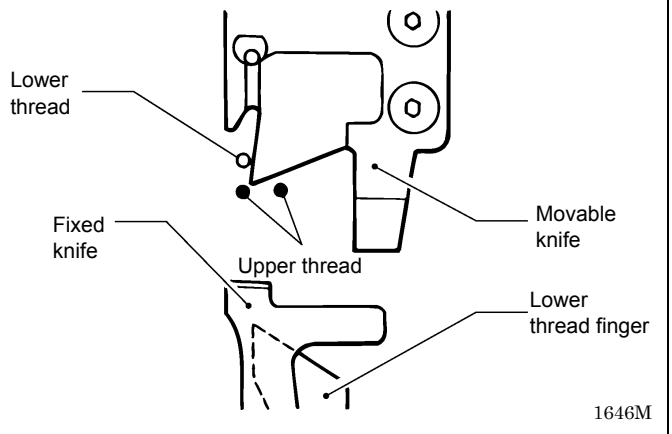
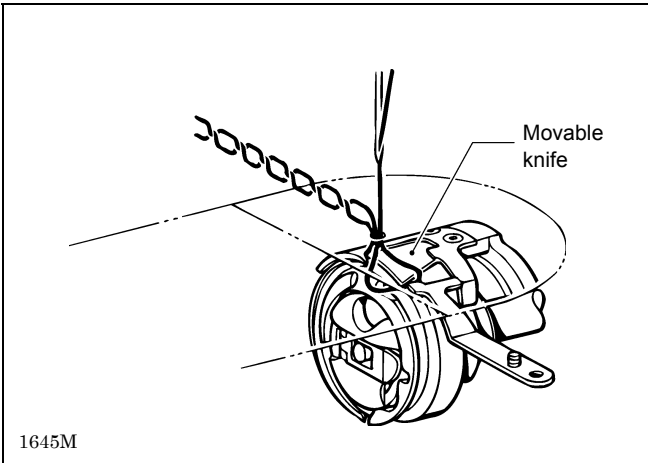
4348M

7-6-2. Upper and lower thread trimming sequence



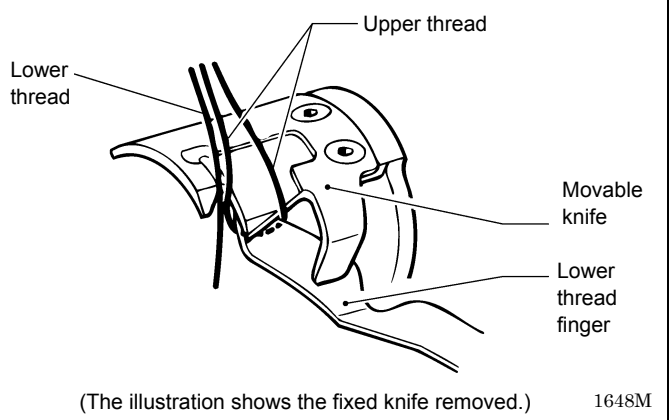
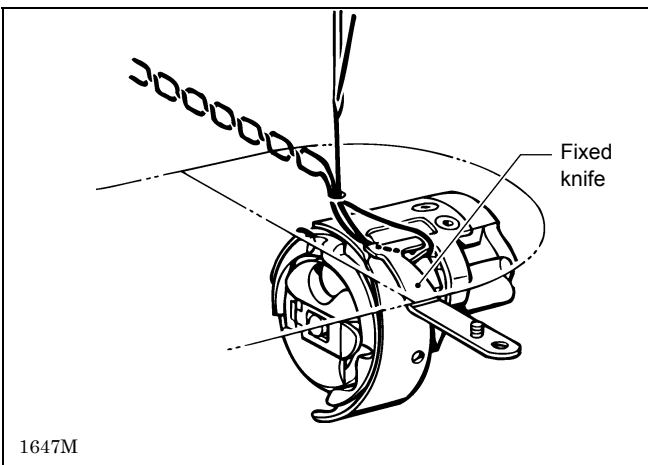
1. The needle rises 1.8 mm from its lowest position and the rotary hook tip catches the loop made by the needle. (For heavy-weight materials, it rises 2.2 mm.)

2. The thread trimming signal turns on and the thread trimming cam moves the movable knife. The upper thread is held by the rotary hook, and it passes underneath the inner rotary hook.



3. The tip of the movable knife pierces the middle of the triangular loop formed underneath the needle plate by the tip of the rotary hook as shown in the illustration, and the upper and lower threads are separated. At this time, the thread take-up is slightly higher than its lowest position. (approximately 330° of angular rotation of the upper shaft)

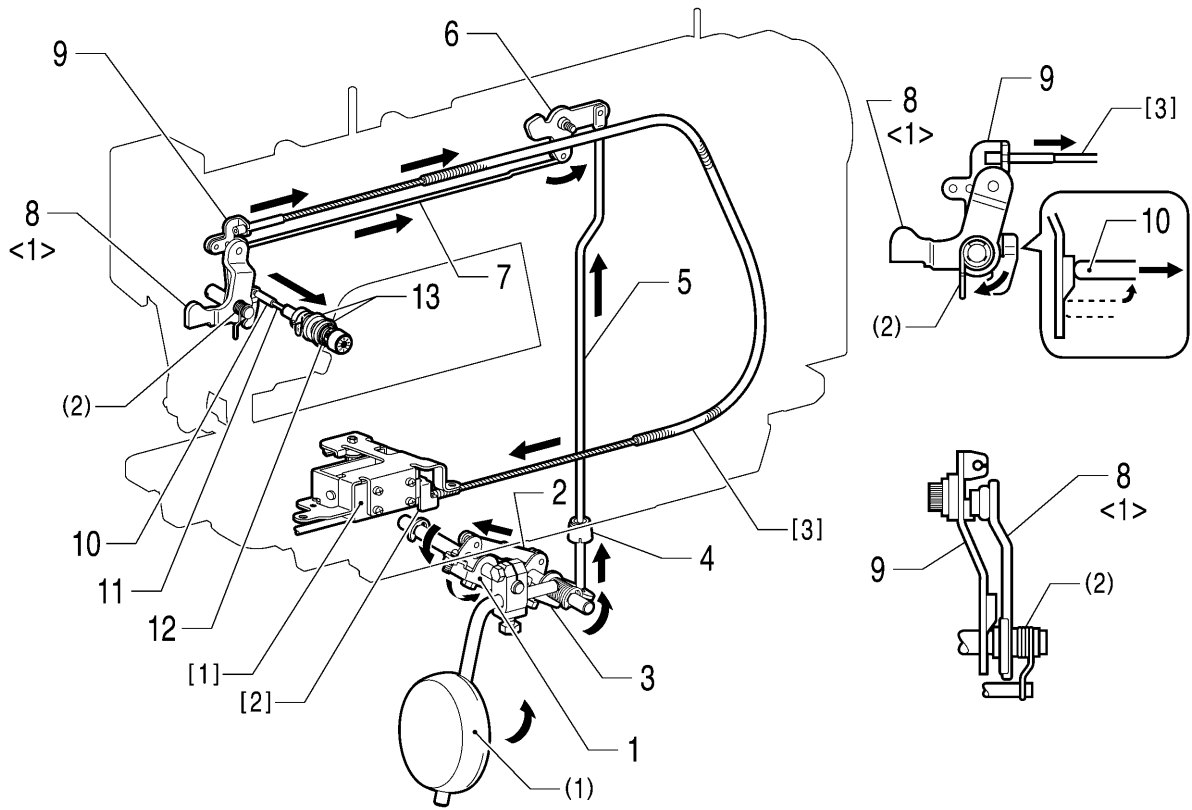
* If the timing for this is too fast, it will affect the separation of the threads by the movable knife, and thread trimming errors may occur.



4. The upper and lower threads being held by the movable knife in step 3 are spread out gradually by the spread knives and the lower thread finger and are cut by the tip of the fixed knife. At this time the thread take-up reaches to about its highest position.

When the knives are spreading the threads, the tension release is activated at the same time so that the upper thread is fed out smoothly and excessive force is not applied to the upper thread. The amount of thread which is held by the movable knife is the trailing length of upper thread from the needle after thread trimming and the length of lower thread trailing out from the bobbin case, and these amounts affect the formation of the seam at the next sewing start.

7 - 7 . Tension release mechanism



4349M

When the thread trimming signal turns off, parts such as the solenoid lever [2] and the tension release wire [3] return to their original positions.

When the presser foot is lowered, the presser bar lifter lever spring (2) causes the tension release plate 9 to return.

(Presser foot is raised using the knee lifter plate (1))

- 1. Knee lifter
- 2. Knee lifter connecting rod
- 3. Knee lifter R
- 4. Knee lifter complying bar
- 5. Knee lifter bar
- 6. Knee lifter lever
- 7. Knee lifter connecting rod
- 8. Presser bar lifter lever

(Presser foot is raised using the lifting lever)

<1> Presser bar lifter lever

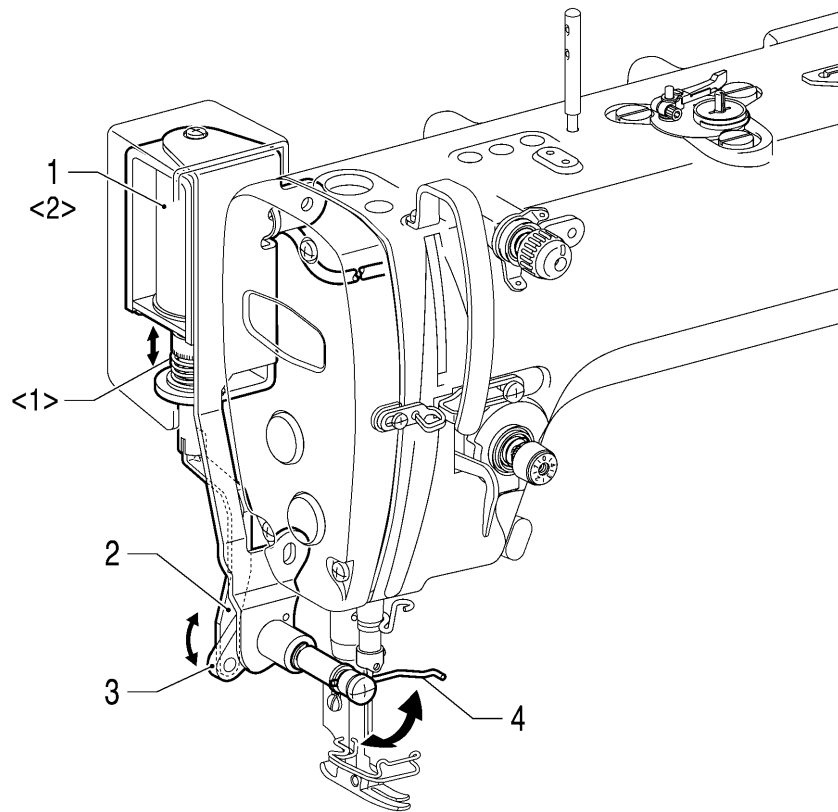
(Thread trimming signal is input)

- [1] Thread trimmer solenoid
- [2] Solenoid lever
- [3] Tension release wire

- 9. Tension release plate
- 10. Tension release stud
- 11. Tension release pin
- 12. Tension disc presser
- 13. Tension disc (Lifts up)

- (1) Knee lifter plate
- (2) Presser bar lifter lever spring

7 - 8 . Thread wiper mechanism (option device)



4350M

(Thread wiper signal is input)

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

(Thread wiper signal is turned off)

- <1> Thread wiper spring
- <2> Thread wiper solenoid (Returns)

8. DISASSEMBLY

⚠ DANGER



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

⚠ CAUTION



Disassembly should only be carried out by a qualified technician.



Turn off the power switch before carrying out disassembly. If the treadle is depressed by mistake, the sewing machine might start operating and injury could result.



Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.



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

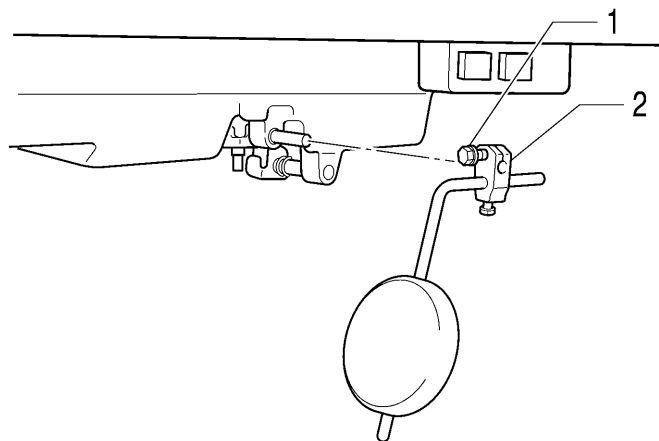


Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

Disassemble the parts in the order shown in the illustration.

* (number) indicates part names only. (It does not indicate the disassembly order.)

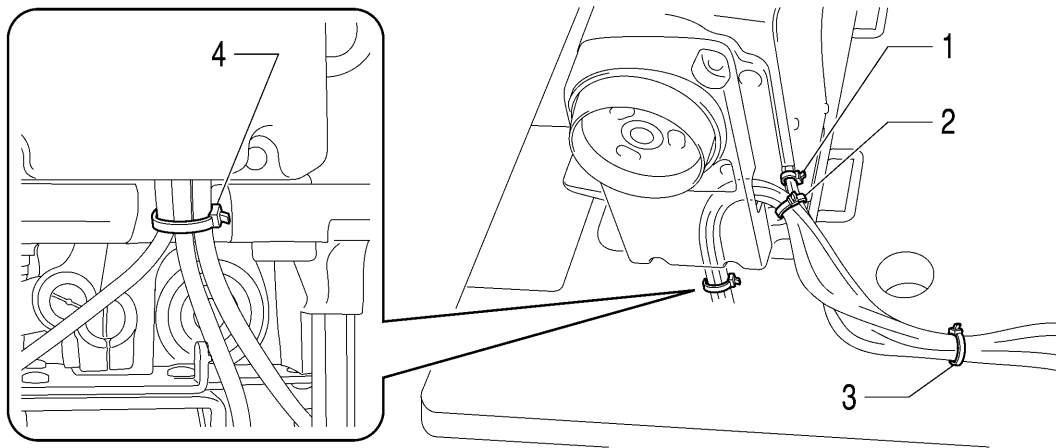
8 - 1 . Knee lifter assembly



4373M

1. Bolt (Loosen)
2. Knee lifter bracket

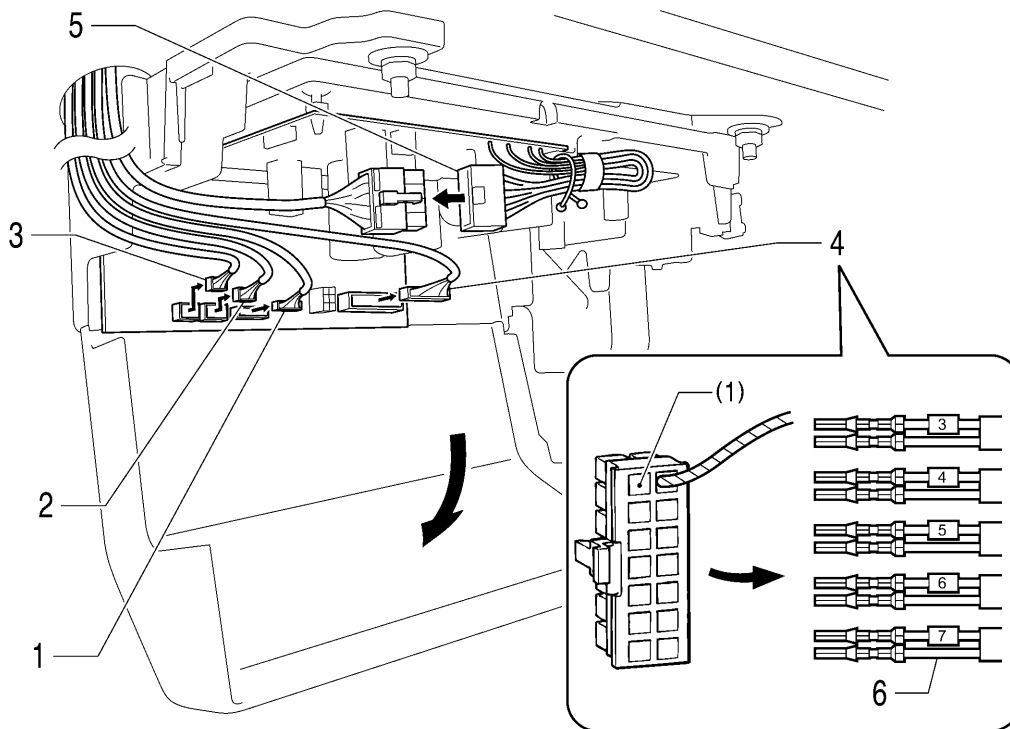
8 - 2 . Cable tie



1. Cable tie (Cut)
2. Cable tie (Cut)
3. Cable tie (Cut)
4. Cable tie (Cut)

4374M

8 - 3 . Connector



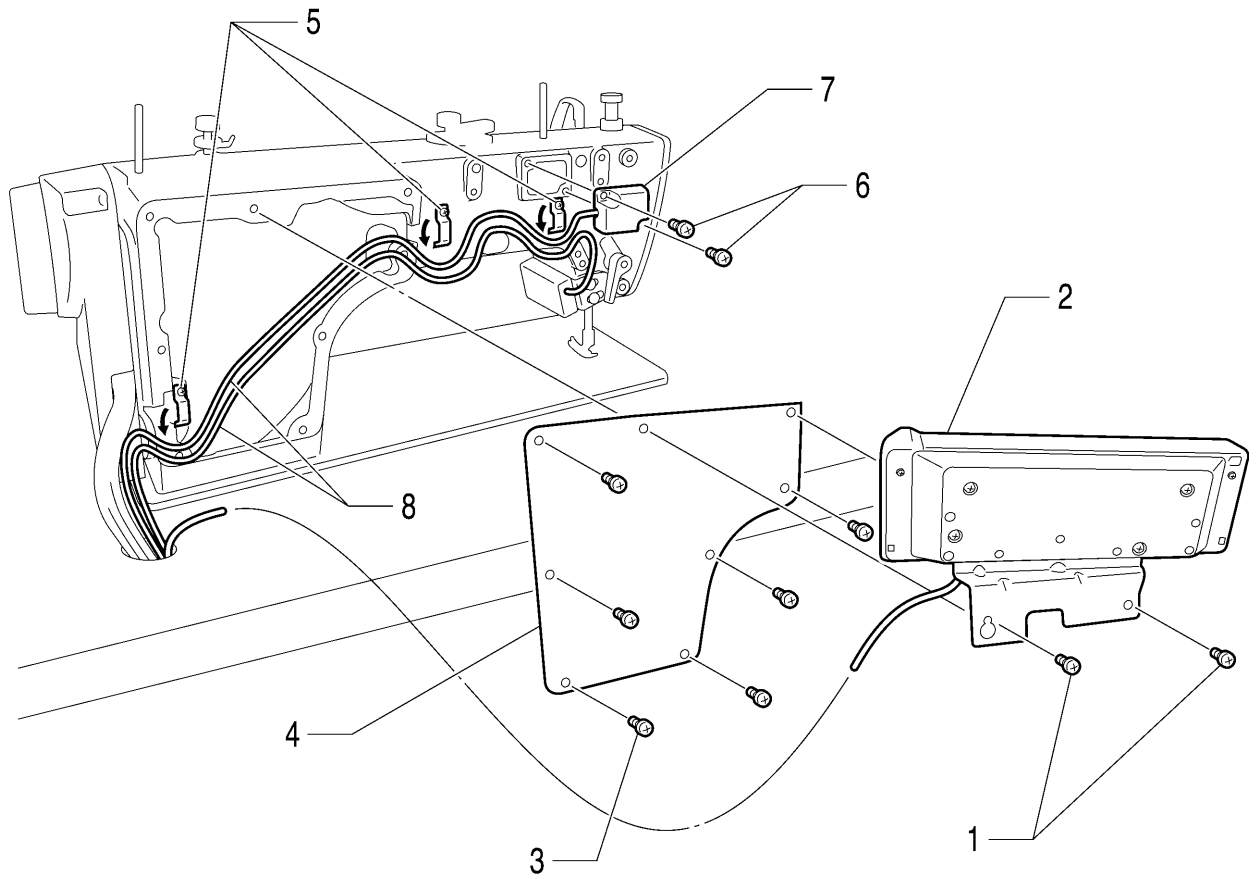
4375M

1. Head detector unit connector
2. Operation panel connector
3. Resolver connector
4. Connector
5. Motor connector
6. Pins

(1) Connector

When pulling out the pin from the connector, use a pin puller manufactured by Molex (model no. 570316000).

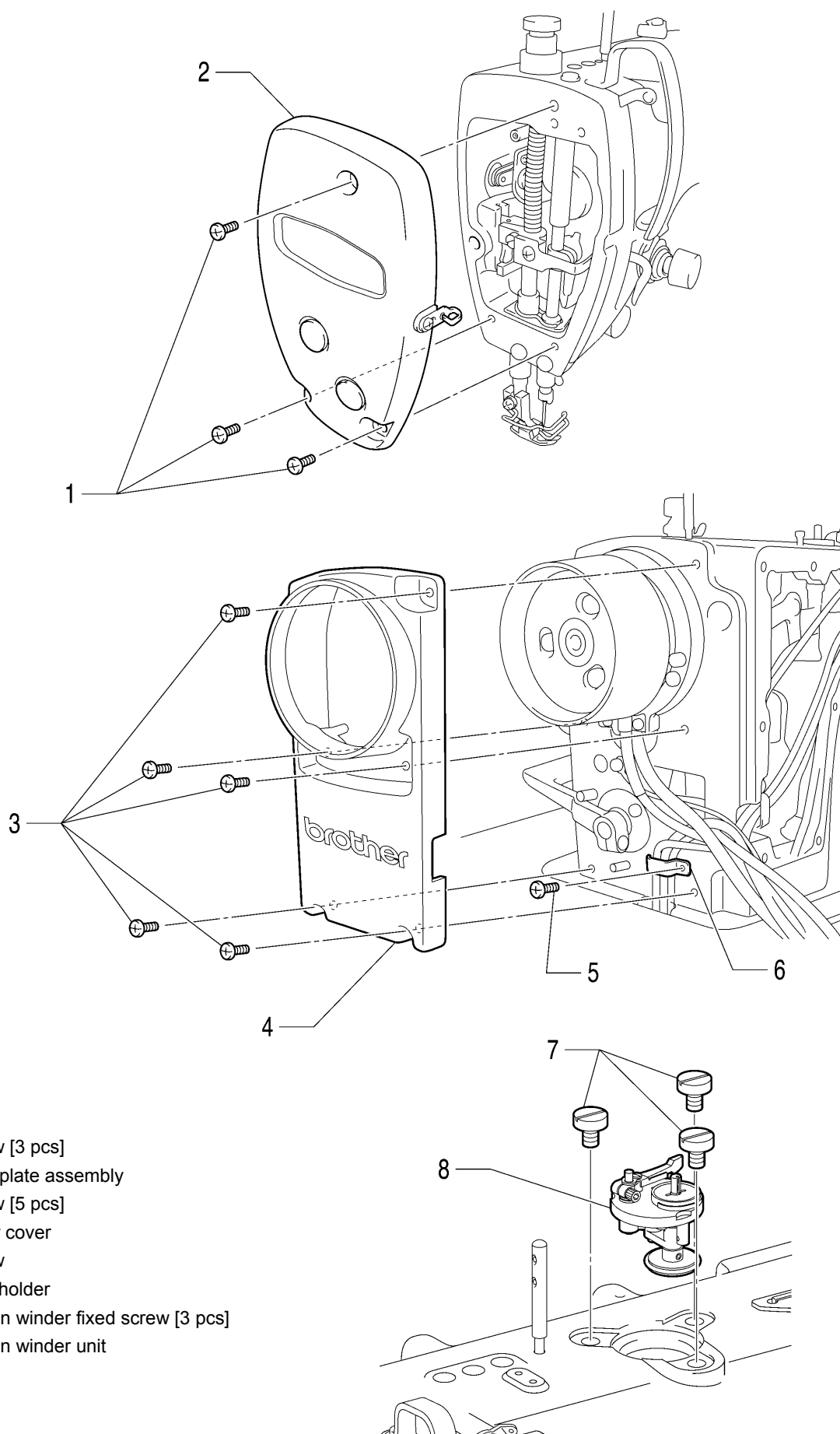
8 - 4 . Operation panel and head detector unit



4376M

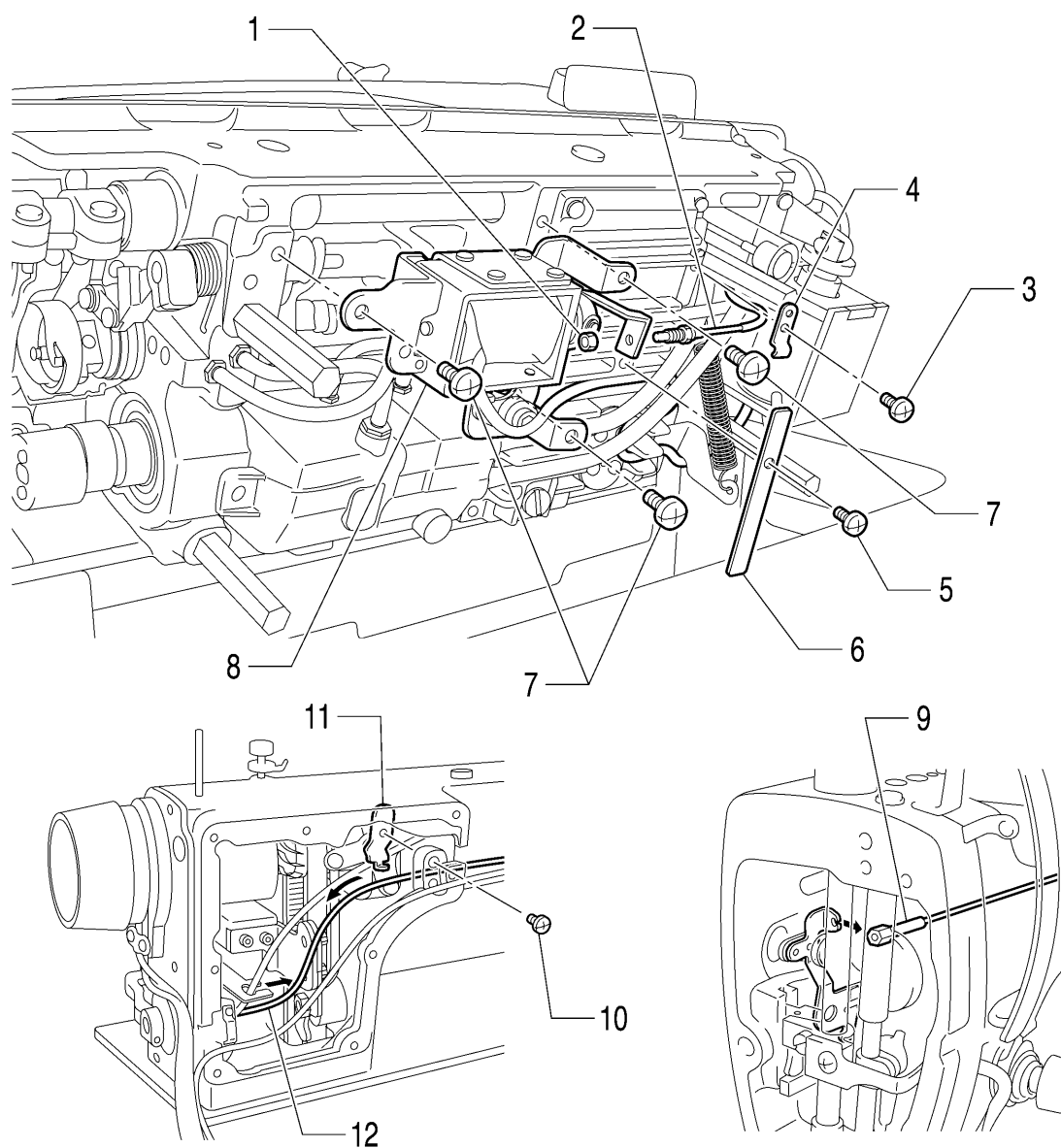
1. Screw [2 pcs]
2. Operation panel
3. Screw [6 pcs]
4. Side plate
5. Screw [3 pcs] (Loosen)
6. Screw [2 pcs]
7. Head detector unit
8. Cord [2 pcs]

8 - 5 . Covers and bobbin winder unit



- 1. Screw [3 pcs]
- 2. Face plate assembly
- 3. Screw [5 pcs]
- 4. Motor cover
- 5. Screw
- 6. Cord holder
- 7. Bobbin winder fixed screw [3 pcs]
- 8. Bobbin winder unit

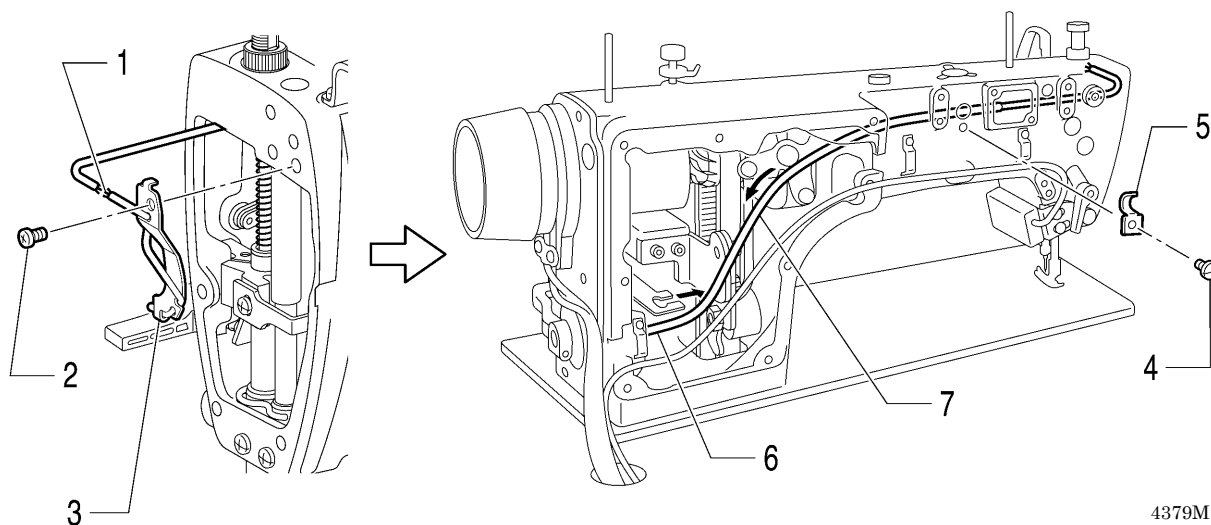
8 - 6 . Tension release wire and thread trimmer solenoid



1. Screw
2. Tension release wire
3. Screw
4. Wire holder D
5. Screw
6. Cord holder plate
7. Screw [3 pcs]
8. Thread trimmer solenoid
9. Tension release wire (Remove from tension release plate)
10. Screw
11. Wire holder U
12. Tension release wire (Pull out)

4378M

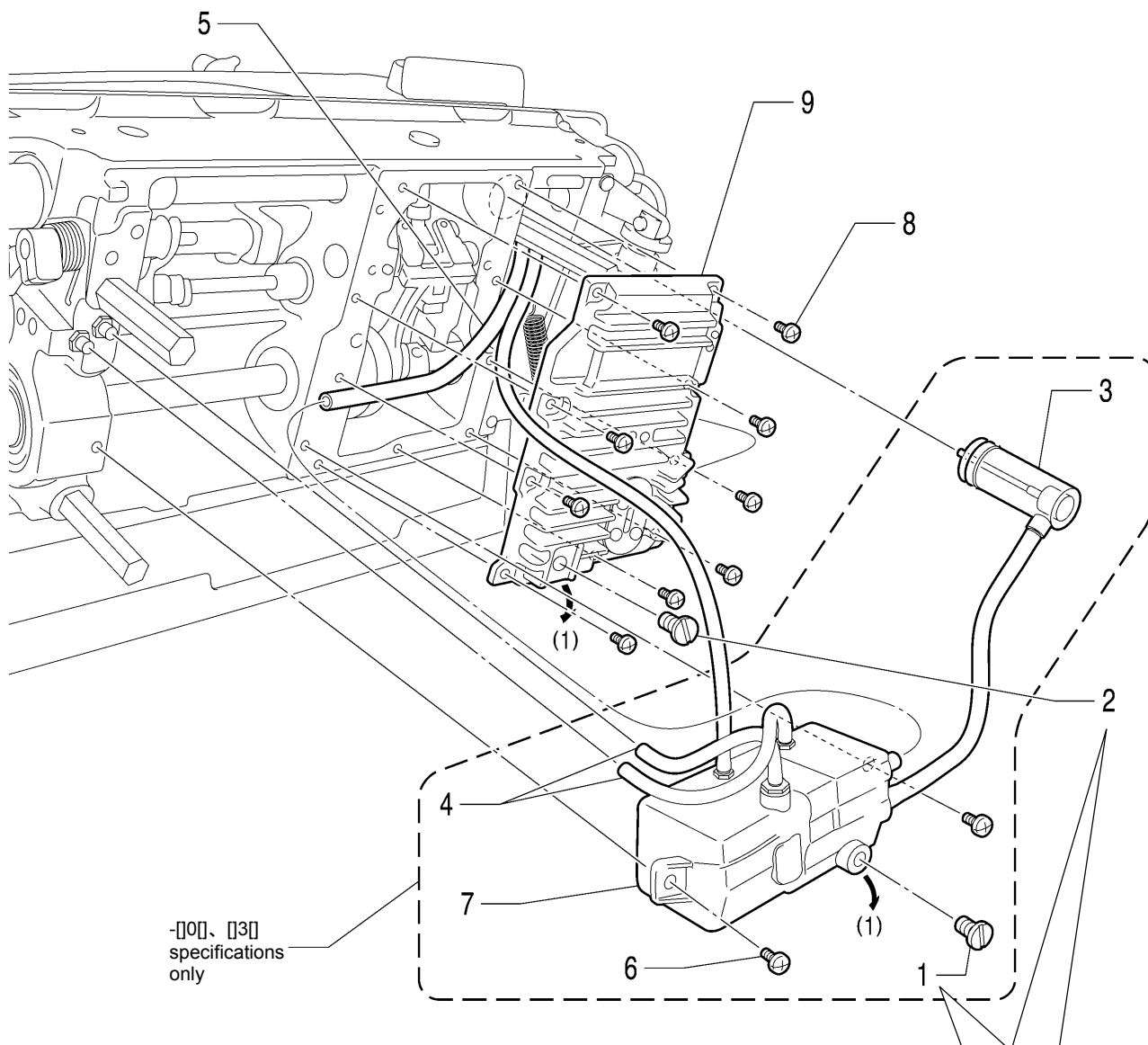
8 - 7 . Wick holder and oil tube (-[0] specifications)



4379M

1. Wick (Unite the knot)
2. Screw
3. Wick holder
4. Screw
5. Cord holder
6. Vinyl tube (Remove from wire code holder)
7. Vinyl tube (Pull out)

8 - 8 . Oil tank, bed bottom cover and sub tank



-[0], [3] specifications only

- 1) Hold a dish under the lubricating oil drain hole, and then remove the screw to drain out the lubricating oil (1).
- 2) Install the screw to the lubricating oil drain hole.

-[0], [3] specifications only

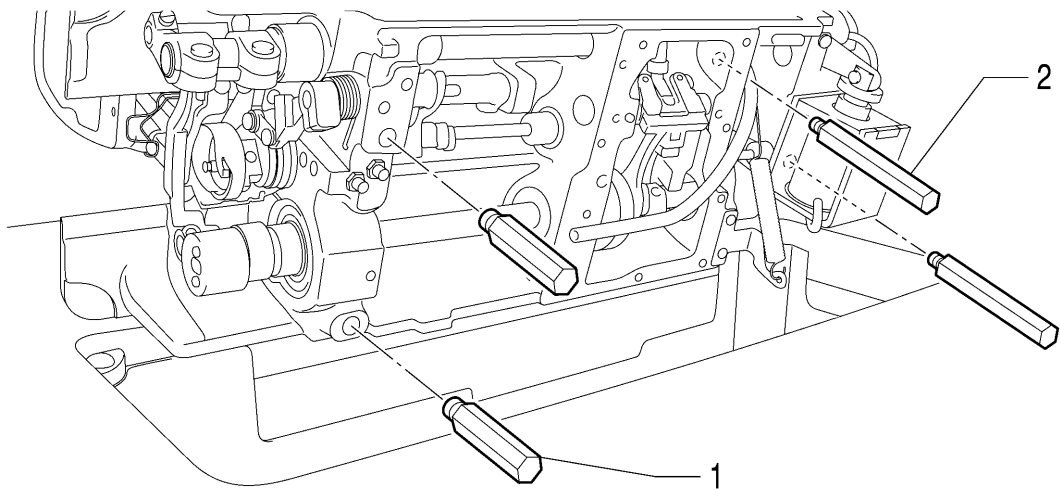
- 1. Screw
- 2. Screw
- 3. Sub tank assembly (Pull out)
- 4. Vinyl tube (Pull out)
- 5. Vinyl tube (Pull out)
- 6. Screw [2 pcs]
- 7. Oil tank

- 8. Screw [9 pcs]
- 9. Bed bottom cover

(1) Lubricating oil

4380M

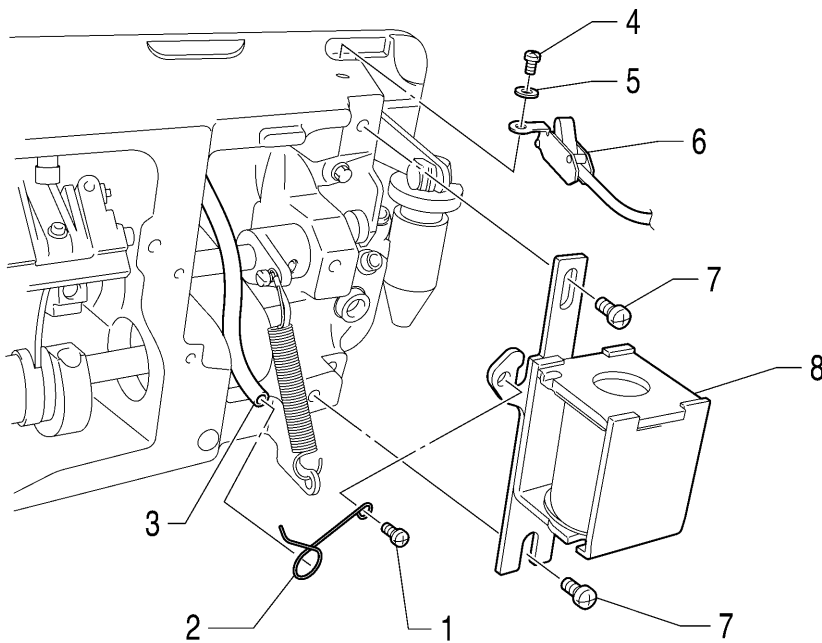
8 - 9 . Stand



4381M

- 1. Stand L [2 pcs]
- 2. Stand R [2 pcs]

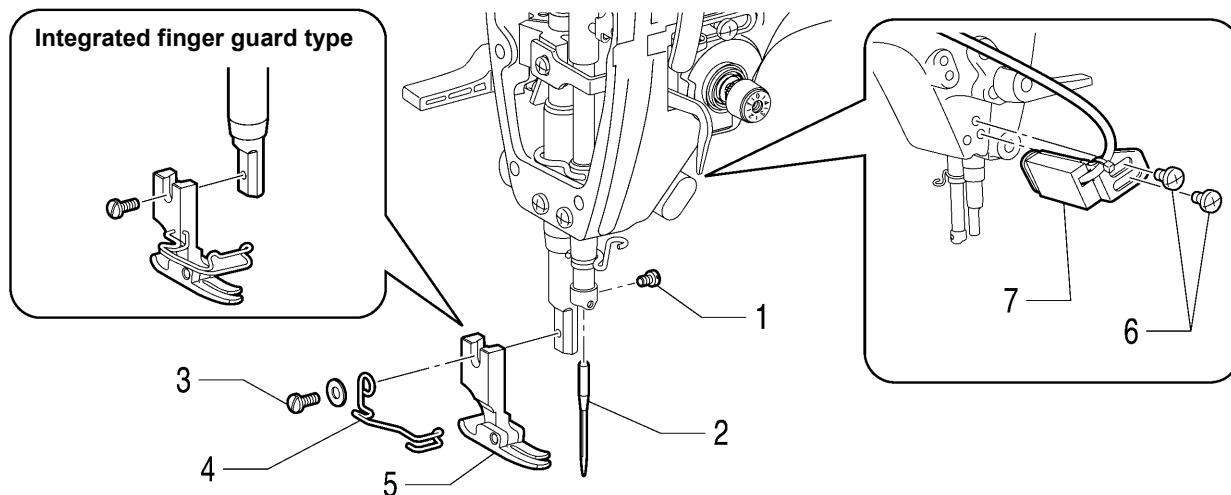
8 - 1 0 . Safety switch and quick reverse solenoid



4382M

- 1. Screw
- 2. Tube holder
- 3. Vinyl tube (Pull out)
- 4. Screw
- 5. Washer
- 6. Safety switch
- 7. Screw [2 pcs]
- 8. Quick reverse solenoid

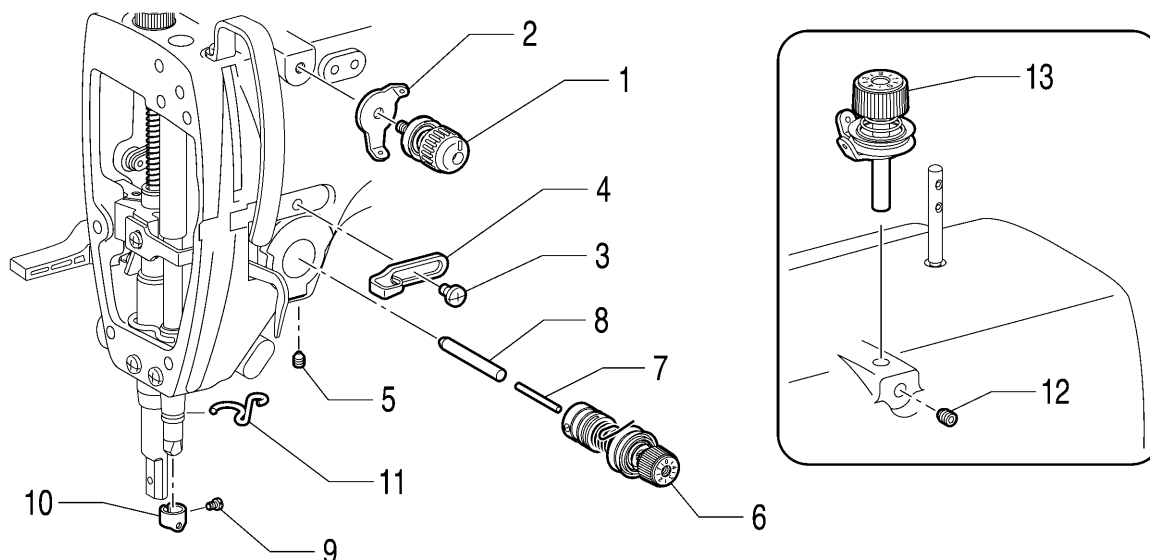
8 - 1 1 . Needle, presser foot and R-actuator



4383M

- | | |
|-----------------|------------------|
| 1. Set screw | 5. Presser foot |
| 2. Needle | 6. Screw [2 pcs] |
| 3. Screw | 7. R-actuator |
| 4. Finger guard | |

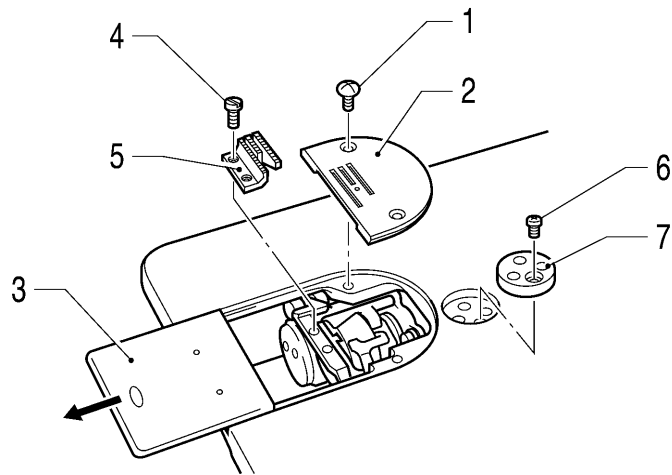
8 - 1 2 . Thread tension mechanism



4384M

- | | |
|------------------------------------|------------------------------------|
| 1. Pre-tension assembly | 8. Tension release stud |
| 2. Thread guide | 9. Screw |
| 3. Screw | 10. Needle bar thread guide |
| 4. Arm thread guide R | 11. Thread guide D |
| 5. Set screw | 12. Set screw |
| 6. Thread tension bracket assembly | 13. Bobbin winder tension assembly |
| 7. Tension release pin | |

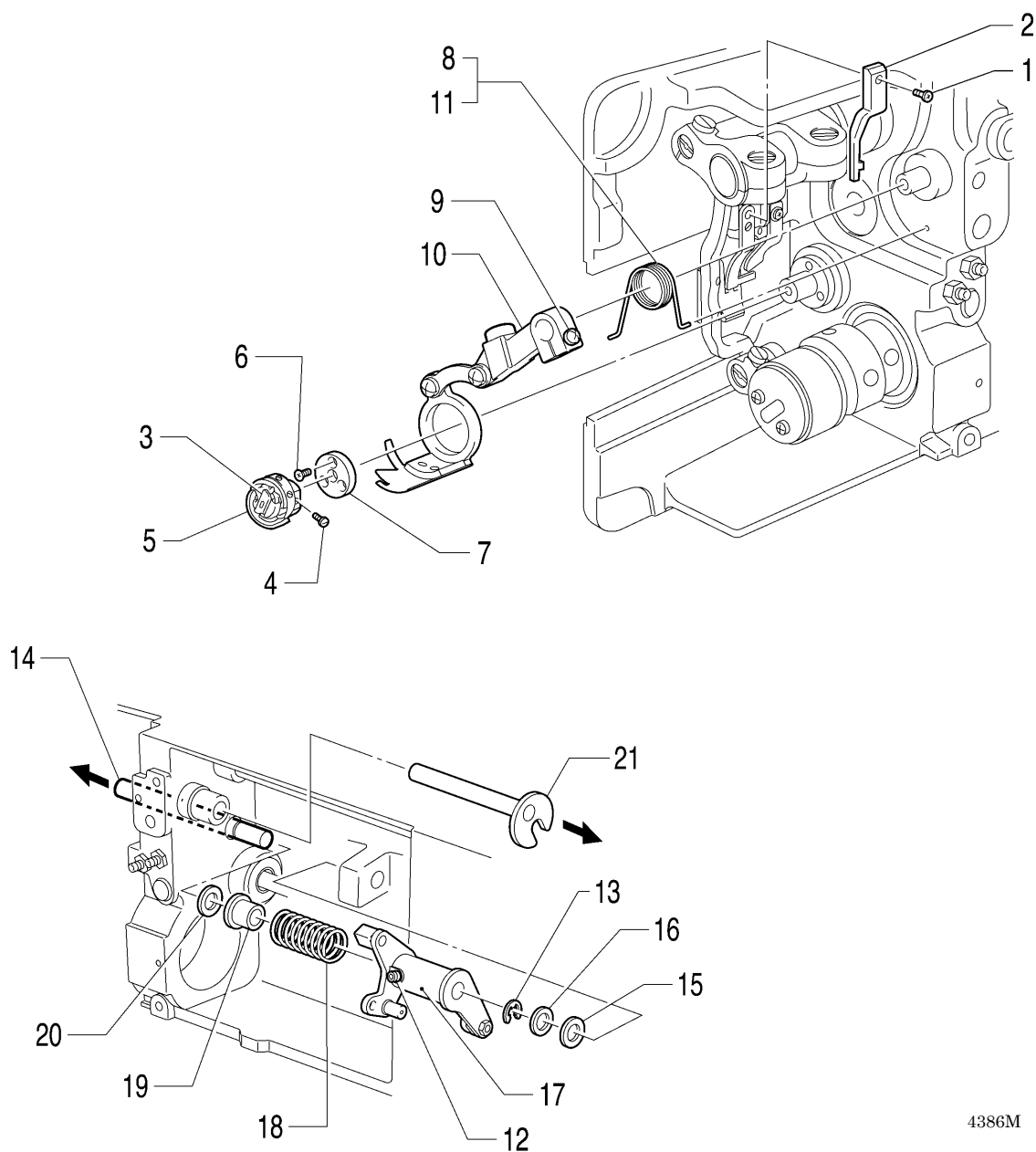
8 - 1 3. Needle plate, feed dog, etc.



4385M

- 1. Flat screw [2 pcs]
- 2. Needle plate
- 3. Slide plate
- 4. Screw [2 pcs]
- 5. Feed dog
- 6. Screw
- 7. Ruler plate

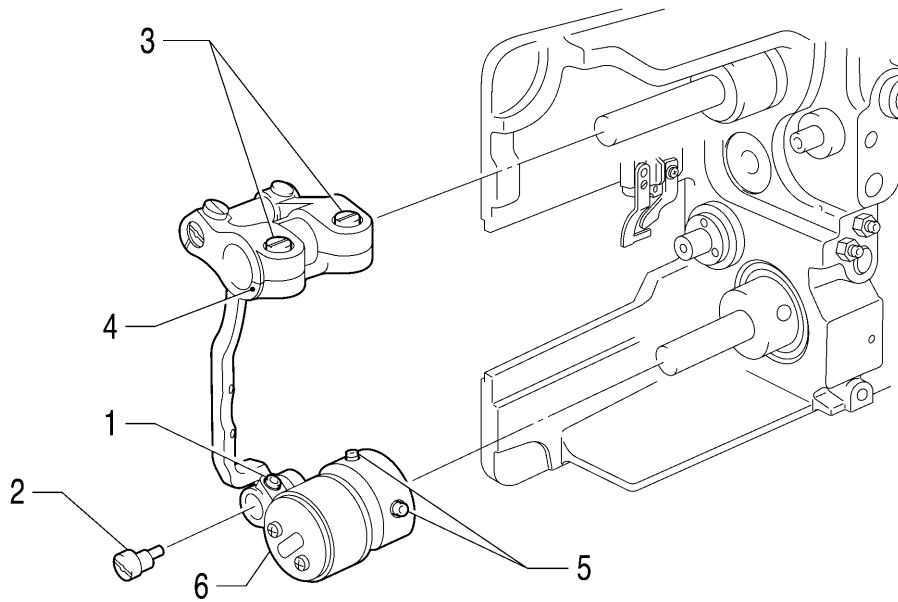
8 - 1 4. Bobbin case, rotary hook and thread trimmer mechanism



4386M

- | | |
|---|---|
| 1. Screw | 11. Thread trimmer lever spring (Remove) |
| 2. Hook stopper | 12. Set screw (Loosen) |
| 3. Bobbin case | 13. Retaining ring E |
| 4. Set screw [3 pcs] | 14. Thread trimmer cam lever shaft (Pull out) |
| 5. Rotary hook | 15. Cushion |
| 6. Flat screw [3 pcs] | 16. Washer |
| 7. Knife holder presser plate | 17. Thread trimmer lever assembly |
| 8. Thread trimmer lever spring (Remove from hole) | 18. Extension spring |
| 9. Screw (Loosen) | 19. Collar |
| 10. Thread trimmer lever assembly | 20. Rubber cushion |
| | 21. Forked shaft (Pull out) |

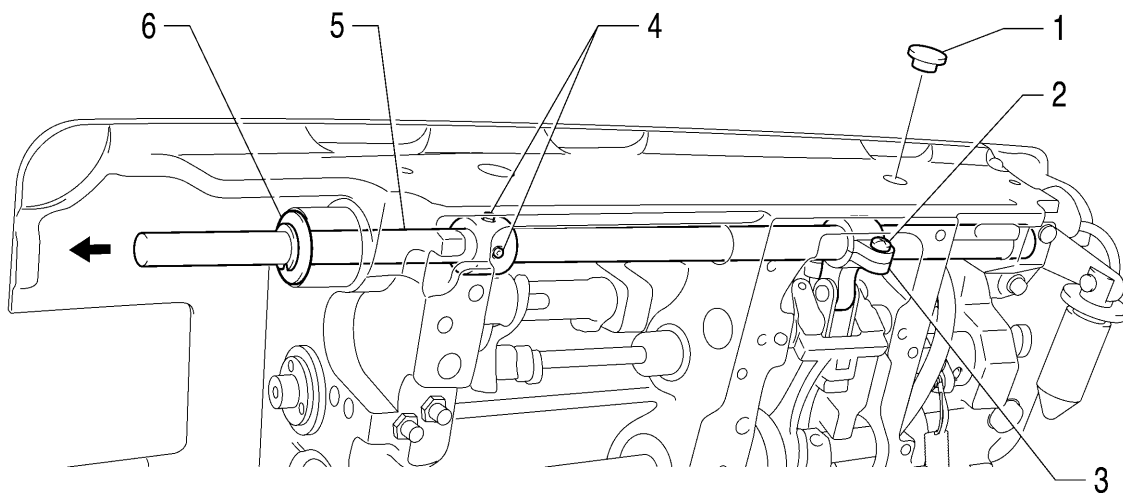
8 - 1 5 . Feed bar mechanism



4387M

1. Set screw (Loosen)
2. Feed lifting rock bar shaft
3. Screw [2 pcs] (Loosen)
4. Feed bar assembly (Open)
5. Set screw [2 pcs] (Loosen)
6. Feed lifting eccentric wheel assembly

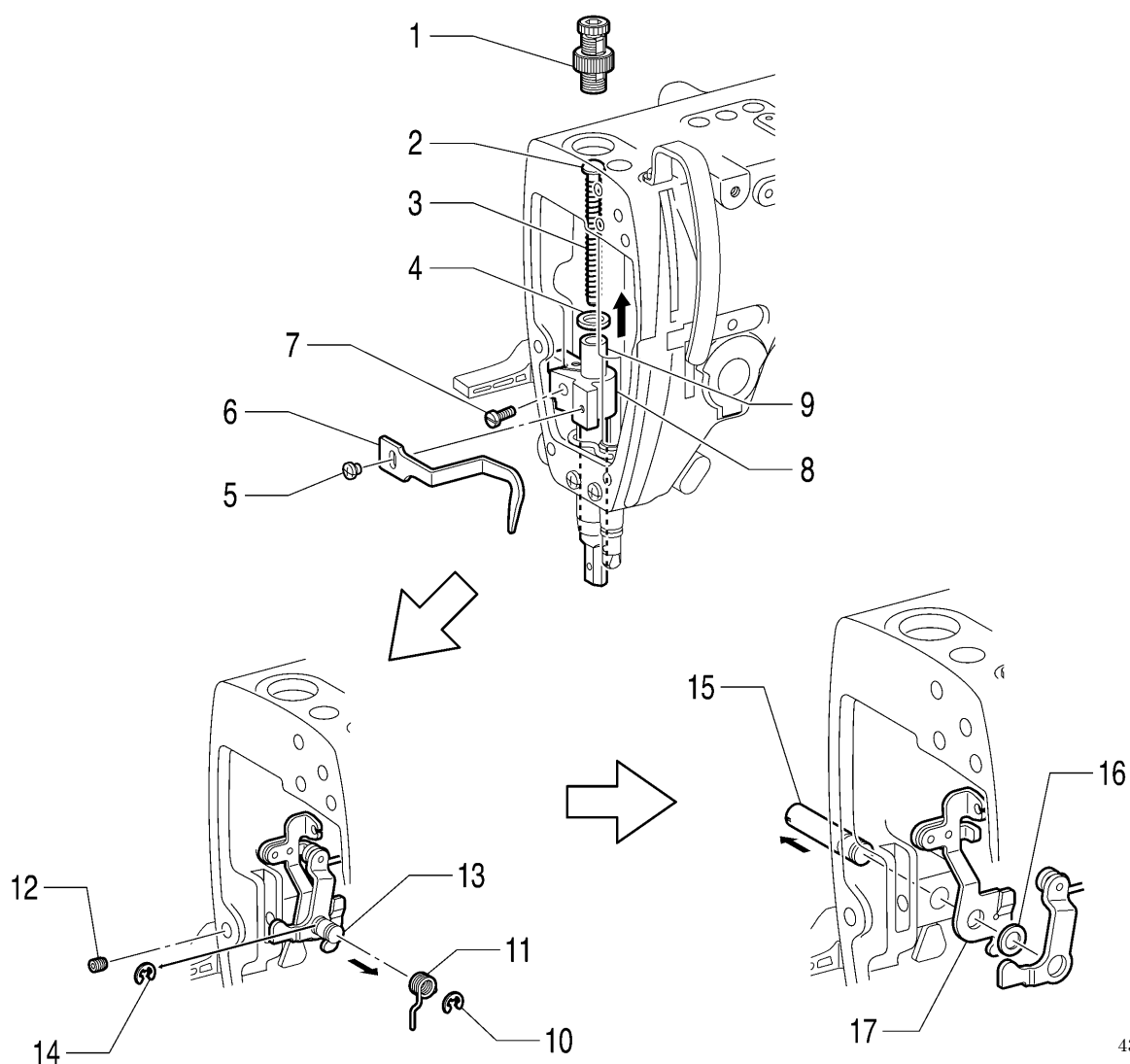
8 - 1 6 . Feed rock shaft



4388M

1. Rubber cap
2. Screw (Loosen)
3. Feed rock arm (Open)
4. Set screw [2 pcs] (Loosen)
5. Feed rock shaft (Pull out)
6. Washer

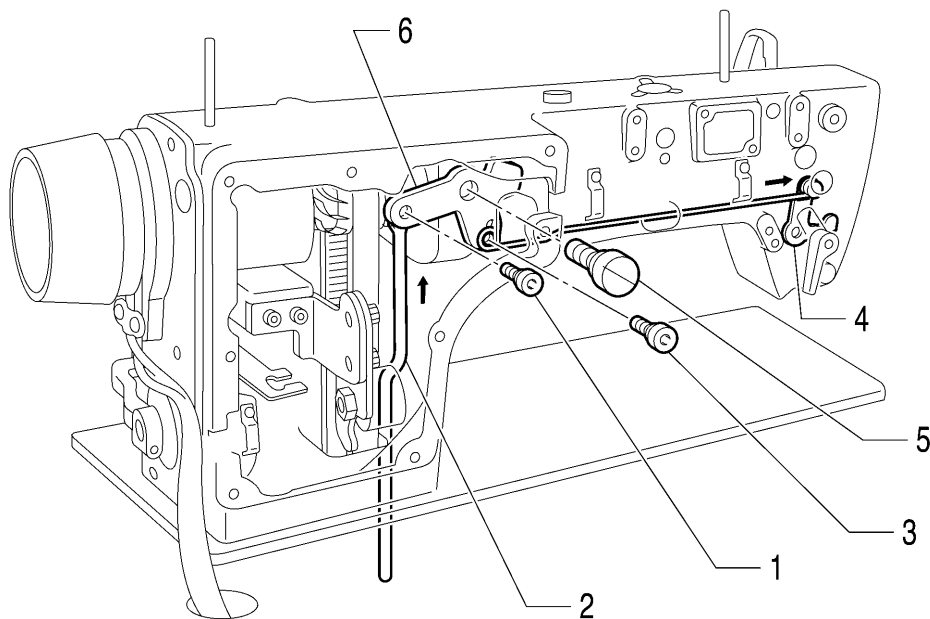
8 - 1 7 . Presser foot mechanism



4389M

1. Presser adjusting screw
2. Spring guide
3. Presser bar spring
4. Washer
5. Screw
6. Thread guide presser bar bracket
7. Screw
8. Presser bar guide bracket
9. Presser bar (Pull upward)
10. Retaining ring E
11. Presser bar lifter lever spring
12. Set screw
13. Presser bar lifter lever shaft (Slide to the right)
14. Retaining ring E
15. Presser bar lifter lever shaft (Pull out)
16. Washer
17. Tension release plate

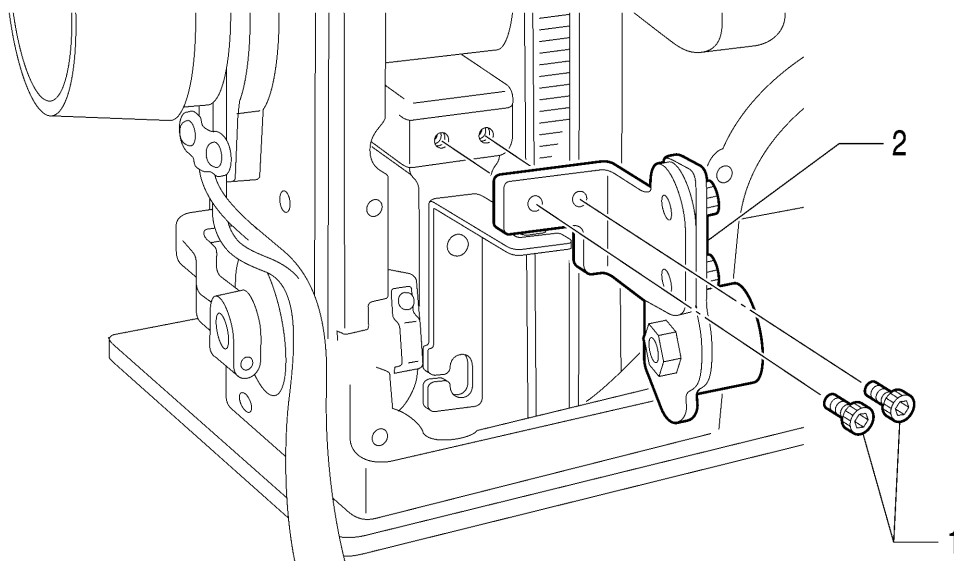
8 - 1 8 . Knee lifter lever mechanism



4390M

- 1. Shoulder screw
- 2. Knee lifter bar (Pull out)
- 3. Shoulder screw
- 4. Presser bar lifter lever assembly (Remove in the direction of the allow)
- 5. Shoulder screw
- 6. Knee lifter lever

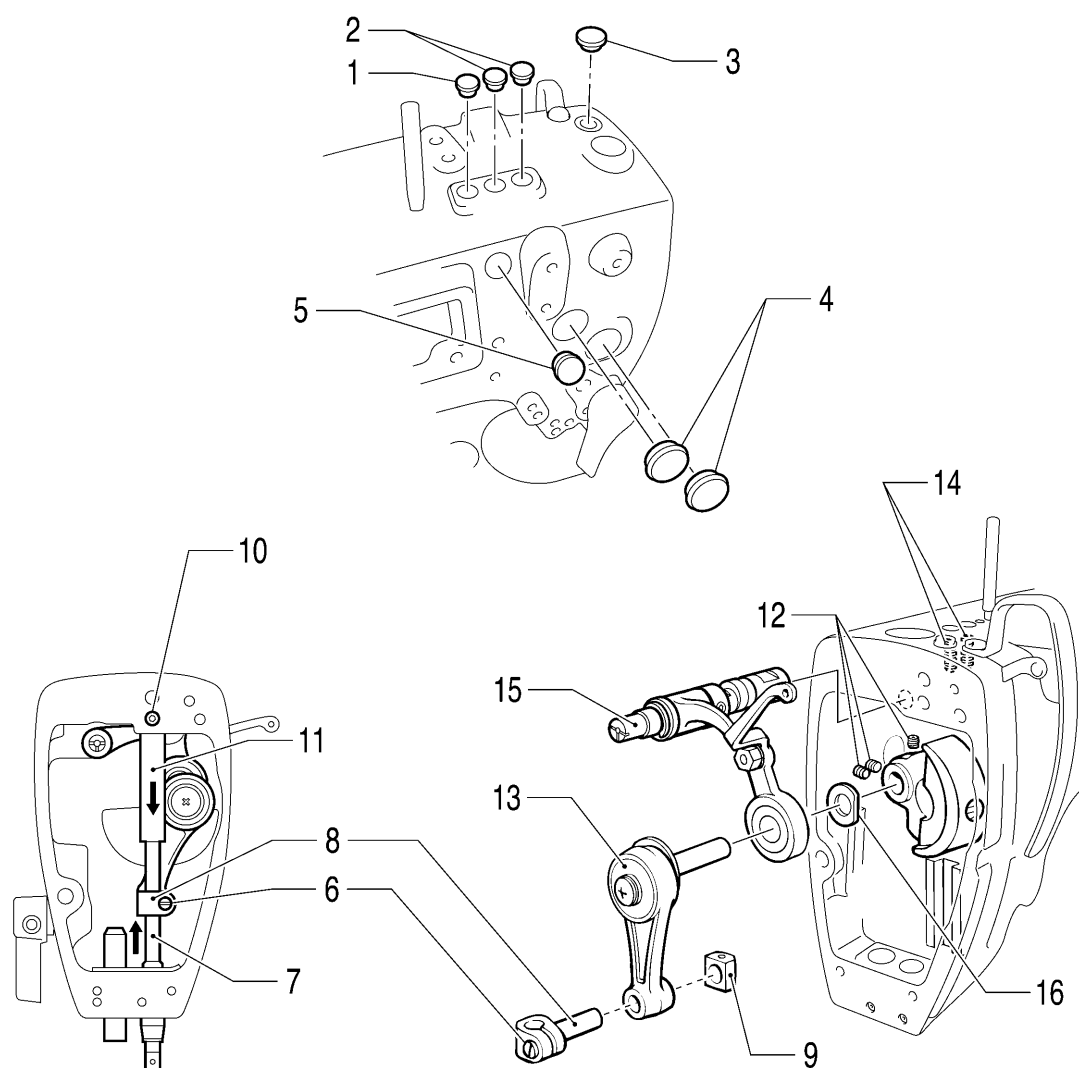
8 - 1 9 . Tension pulley



4391M

- 1. Bolt [2 pcs]
- 2. Tension pulley unit

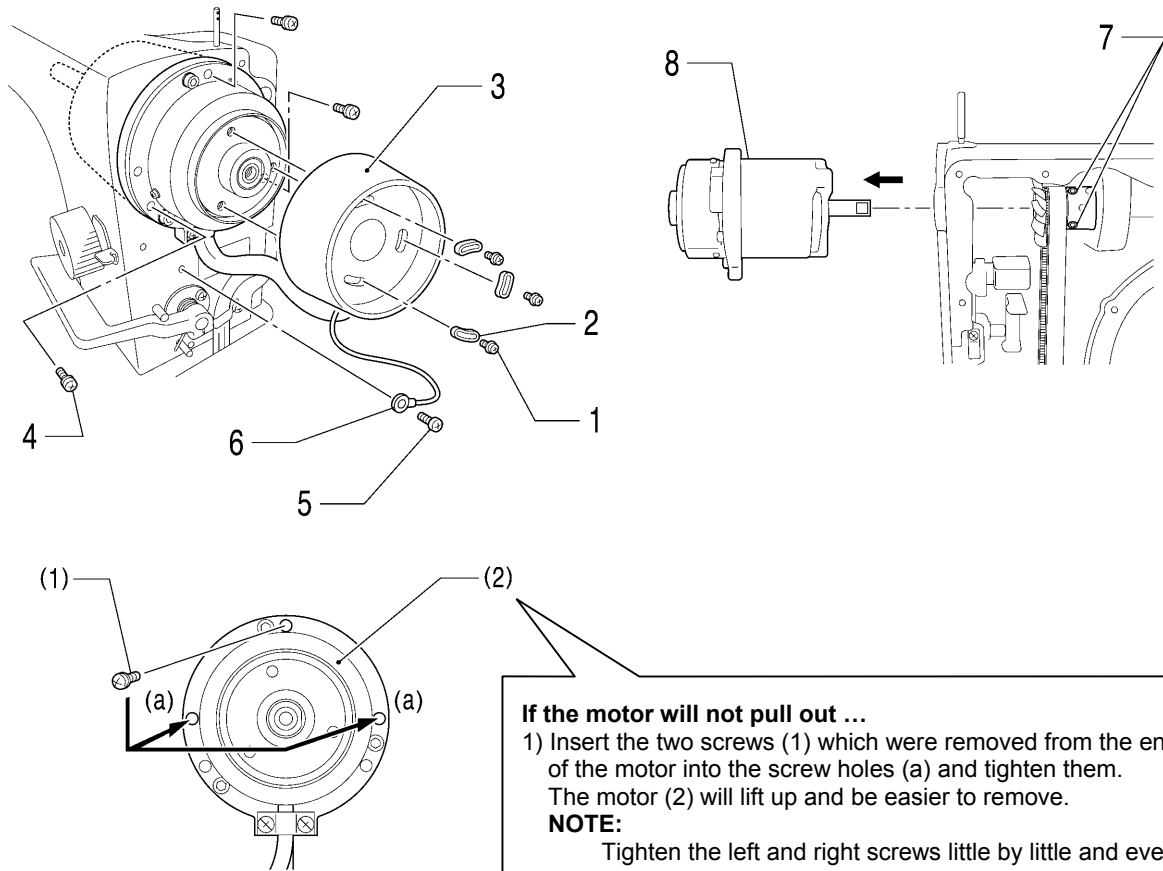
8 - 2 0 . Needle bar and thread take-up mechanism



4392M

1. Rubber cap
2. Rubber cap [2 pcs]
3. Rubber cap
4. Rubber cap [2 pcs]
5. Rubber cap
6. Screw (Loosen)
7. Needle bar
8. Needle bar clamp
9. Needle bar guide slide block
10. Set screw (Loosen)
11. Needle bar bush U
12. Set screw [3 pcs] (Loosen)
13. Needle bar crank
14. Set screw [2 pcs] (Loosen)
15. Thread take-up lever assembly
16. Washer

8-2 1. Pulley and motor



If the motor will not pull out ...
 1) Insert the two screws (1) which were removed from the end of the motor into the screw holes (a) and tighten them.
 The motor (2) will lift up and be easier to remove.
NOTE:
 Tighten the left and right screws little by little and evenly.
 2) Once the motor (2) can be removed, remove the screws (1).

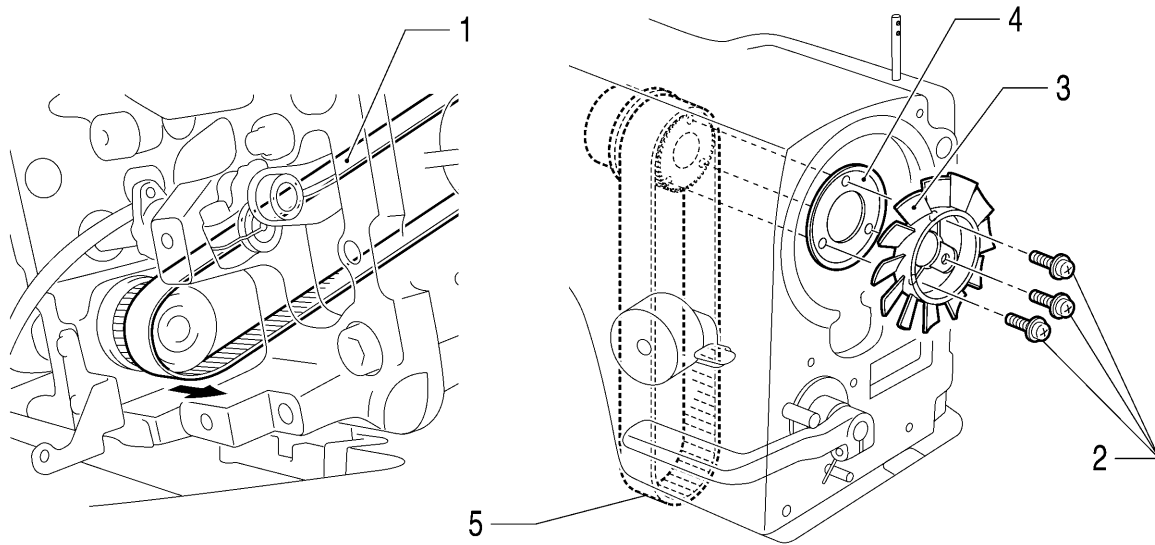
- 1. Screw [3 pcs]
- 2. Pulley washer [3 pcs]
- 3. Pulley
- 4. Screw [3 pcs]
- 5. Screw
- 6. Ground wire
- 7. Set screw [Two at motor side] (Loosen)
- 8. Motor (Pull out)

4393M

- (1) Screw
- (2) Motor

(a) Screw hole

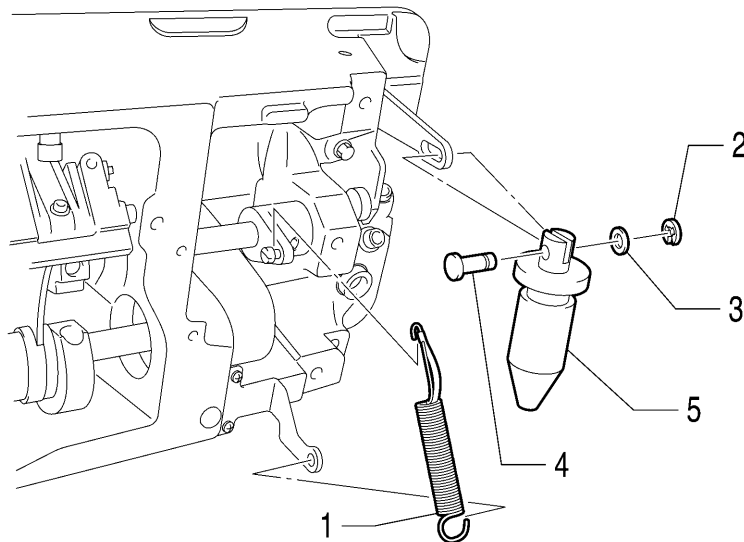
8 - 2 2. Timing belt



4394M

1. Timing belt (Remove from timing pulley D)
2. Screw [3 pcs]
3. Fan
4. Flange
5. Timing belt (Remove from arm)

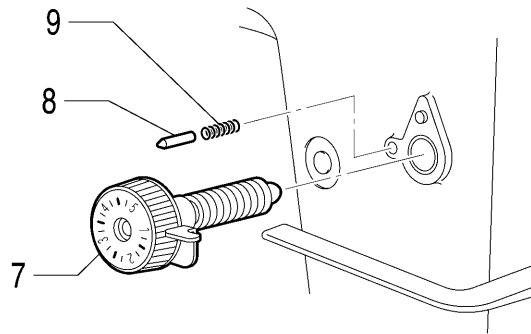
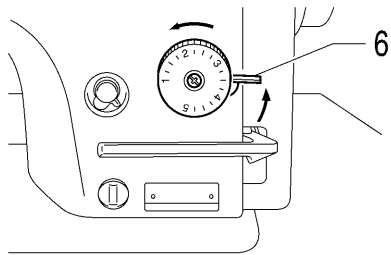
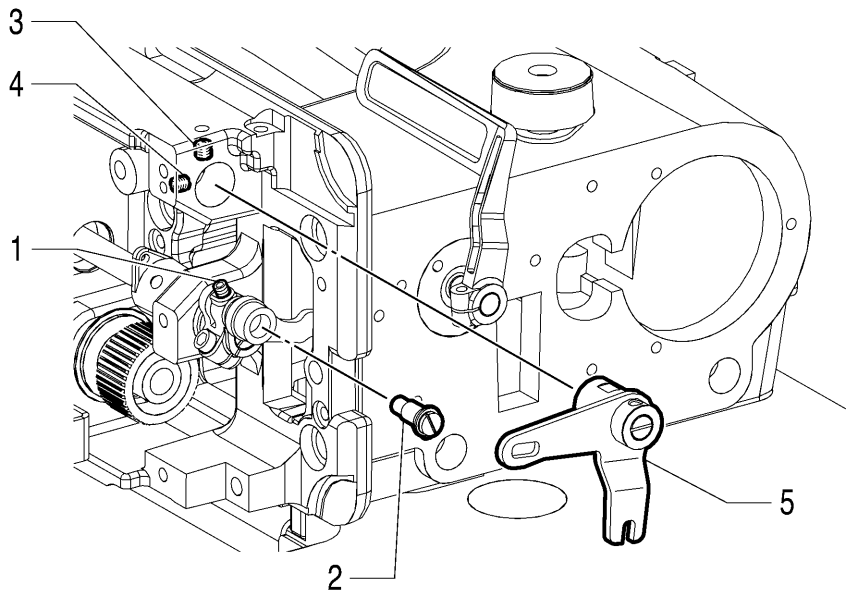
8 - 2 3. Feed mechanism (1)



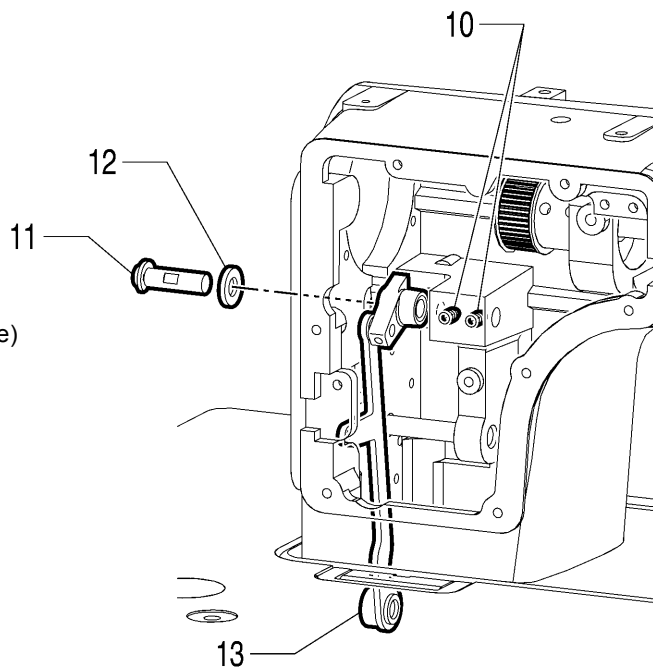
4403M

1. Spring assembly
2. Retaining ring C
3. Washer
4. Pin
5. Quick reverse solenoid plunger

8 - 2 4 . Feed mechanism (2)

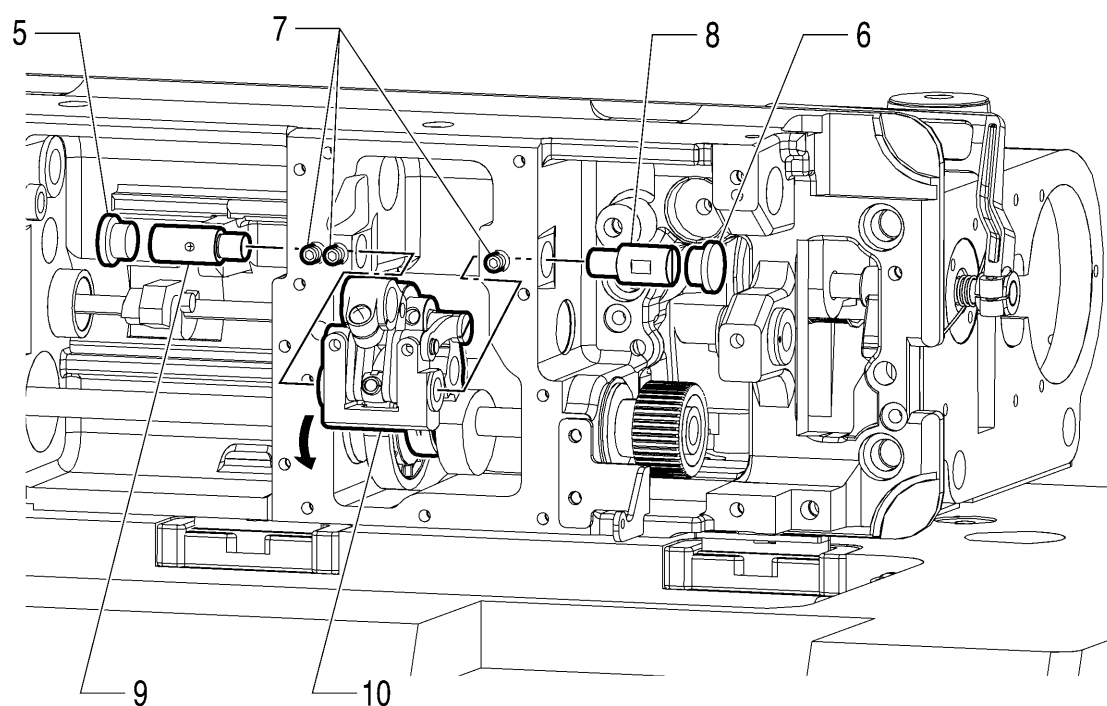
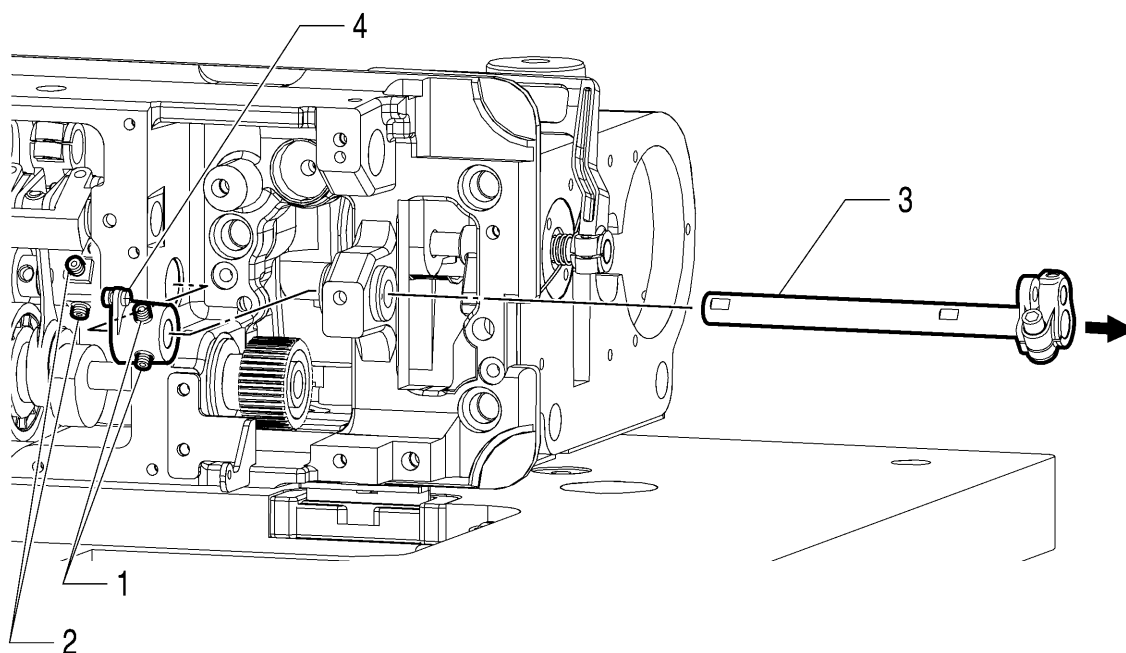


1. Set screw (Loosen)
2. Eccentric pin
3. Set screw (Loosen)
4. Set screw (Loosen)
5. Solenoid lever assembly
6. Dial lock lever (Raise)
7. Stitch length dial (Turn to the left and remove)
8. Positioning pin
9. Notch spring
10. Set screw [2 pcs] (Loosen)
11. Feed regulator shaft
12. Washer
13. Feed regulator assembly



4395M

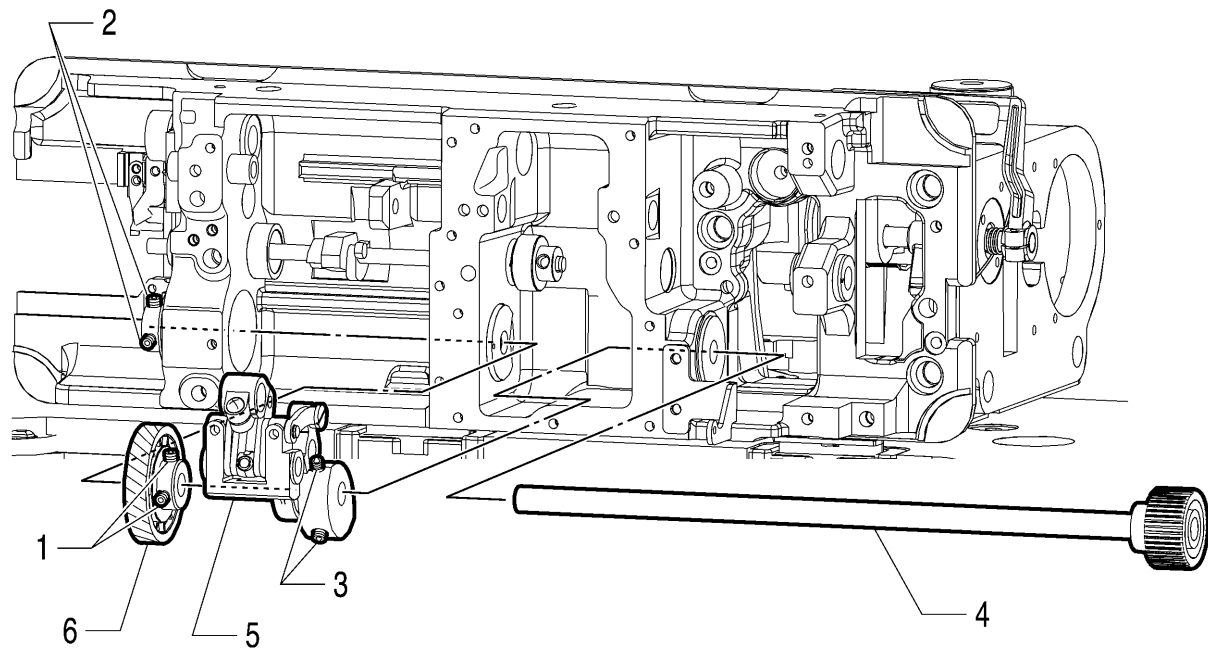
8-2 5. Feed mechanism (3)



4396M

- | | |
|------------------------------------|---|
| 1. Set screw [2 pcs] (Loosen) | 6. Rubber cap |
| 2. Set screw [2 pcs] (Loosen) | 7. Set screw [3 pcs] (Loosen) |
| 3. Feed regulator shaft (Pull out) | 8. Feed regulator support shaft |
| 4. Spring hook arm assembly | 9. Feed regulator shaft L |
| 5. Rubber cap | 10. Feed regulator assembly (Only the top can be removed) |

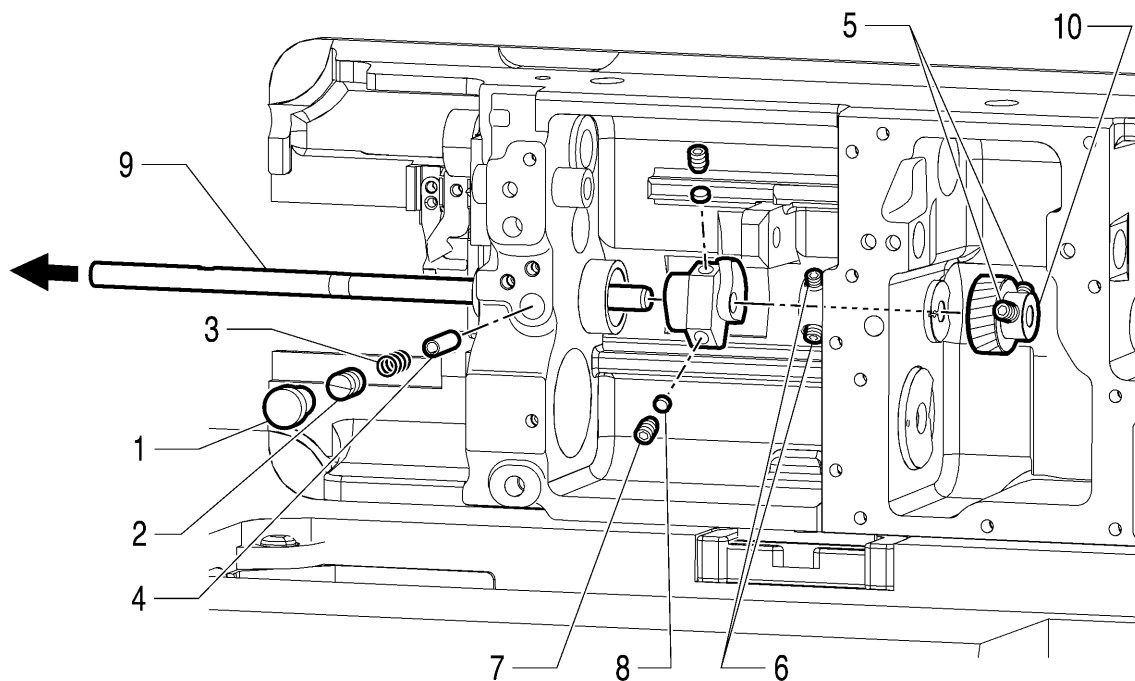
8 - 2 6 . Lower shaft, lower shaft gear and feed regulator unit



4397M

1. Set screw [2pcs] (Loosen)
2. Set screw [2pcs] (Loosen)
3. Set screw [2pcs] (Loosen)
4. Lower shaft assembly
5. Feed regulator assembly
6. Lower shaft gear

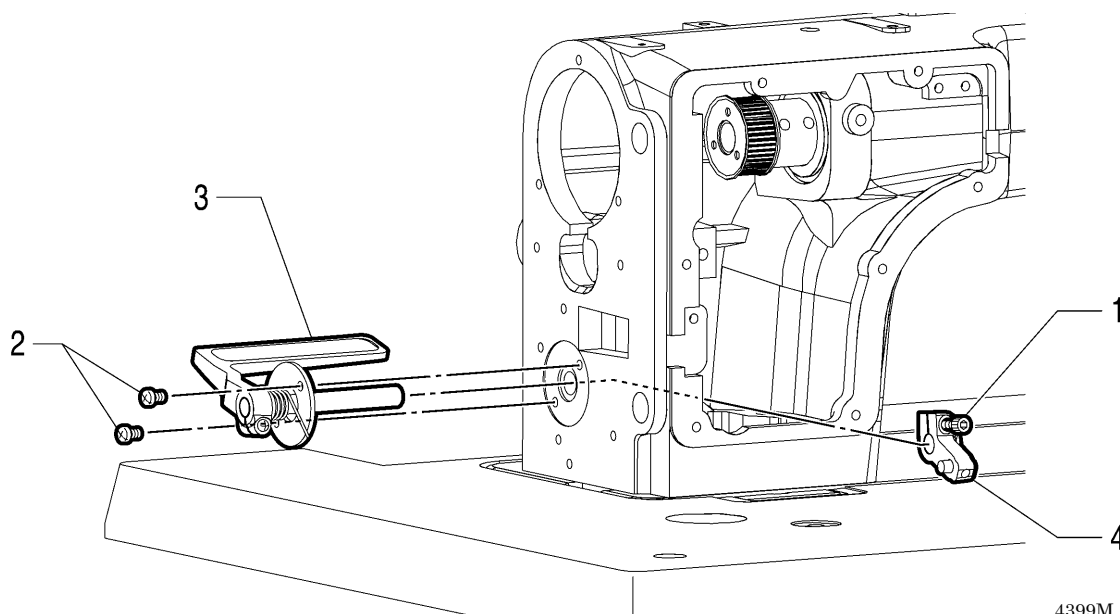
8 - 2 7 . Plunger, rotary hook shaft, rotary hook shaft gear and thread trimmer cam



4398M

- | | |
|-------------------------------|------------------------------|
| 1. Rubber cap | 6. Set screw [2pcs] (Loosen) |
| 2. Cap screw pump | 7. Set screw [2pcs] |
| 3. Spring | 8. Spacer [2pcs] |
| 4. Plunger | 9. Rotary hook shaft |
| 5. Set screw [2 pcs] (Loosen) | 10. Rotary hook shaft gear |

8 - 2 8 . Reverse lever



4399M

- | | |
|-------------------------|---------------------------|
| 1. Socket bolt (Loosen) | 3. Reverse lever assembly |
| 2. Screw [2pcs] | 4. Handle shaft support |

9. ASSEMBLY

DANGER



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

CAUTION



Assembly should only be carried out by a qualified technician.



Turn off the power switch before carrying out assembly. If the treadle is depressed by mistake, the sewing machine might start operating and injury could result.



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



Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.



Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result.

Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhea.

Keep the oil out of the reach of children.



Use only the proper replacement parts as specified by Brother.



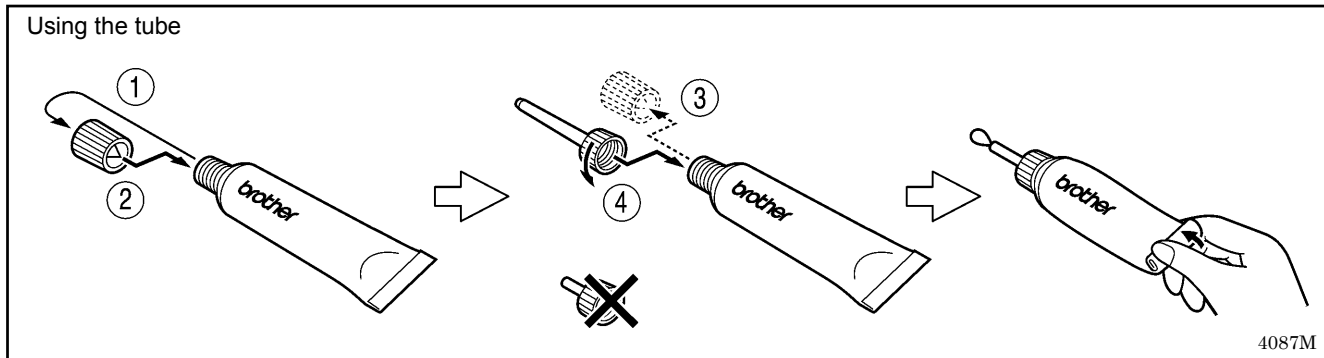
If any safety devices have been removed, be absolutely sure to re-install them to their original positions and check that they operate correctly before using the machine.



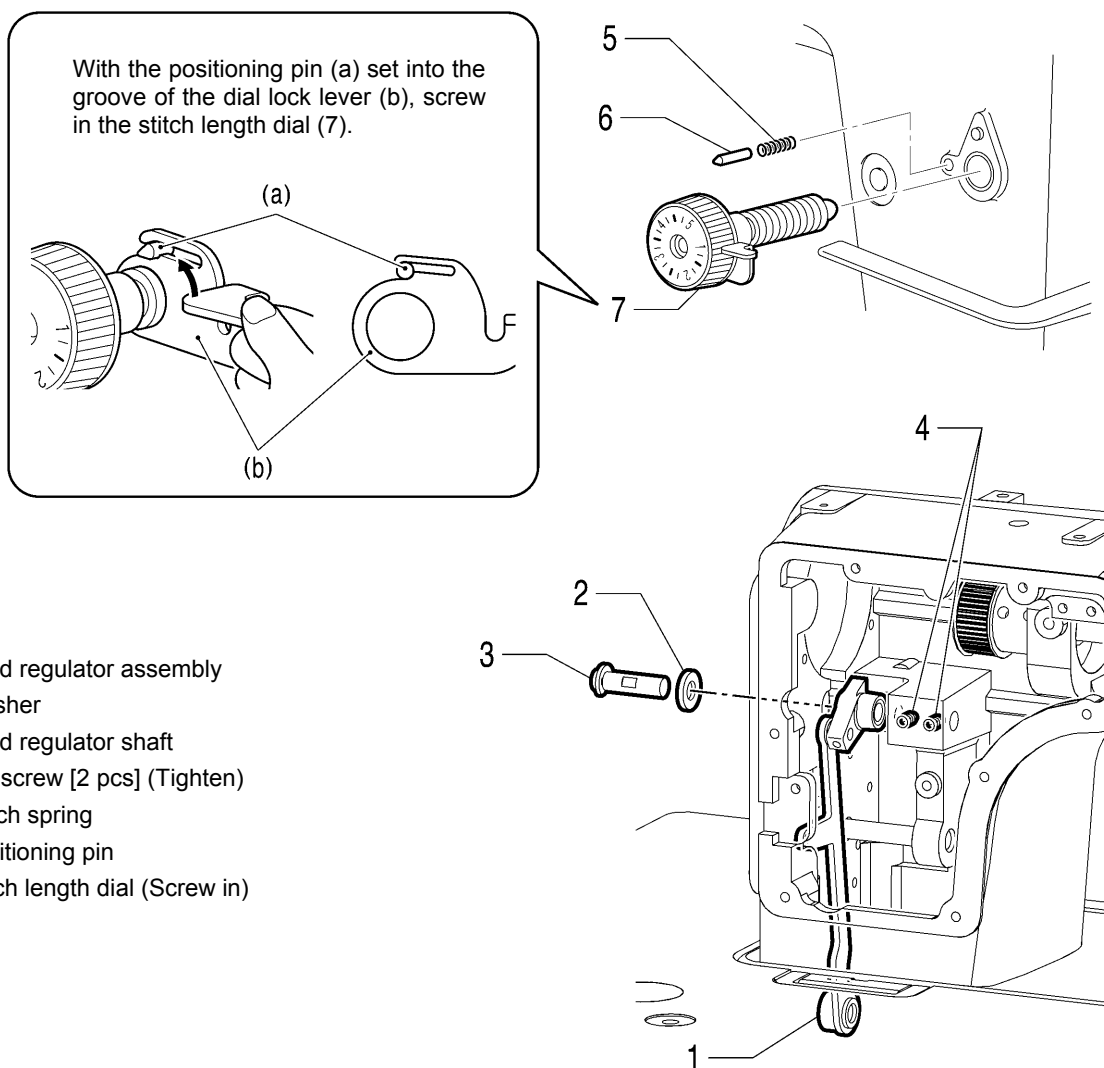
Any problems in machine operation which result from unauthorized modifications to the machine will not be covered by the warranty.

Assemble each part in the order shown in the illustration.

■ Apply grease to the places marked with white arrows in the illustrations.
Use the "Grease kit (SA8837-001)" specified by Brother for the grease.



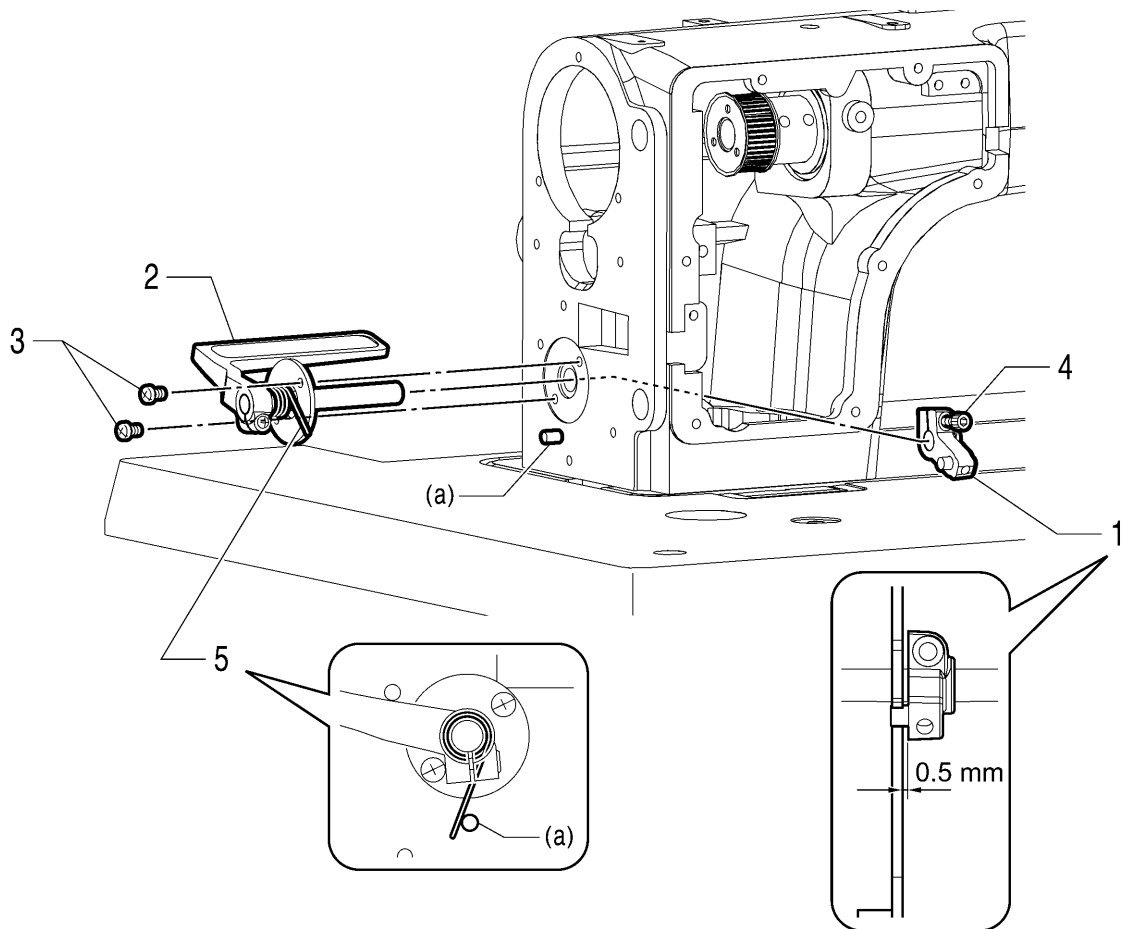
9 - 1 . Stitch length dial and feed regulator mechanism



- 1. Feed regulator assembly
- 2. Washer
- 3. Feed regulator shaft
- 4. Set screw [2 pcs] (Tighten)
- 5. Notch spring
- 6. Positioning pin
- 7. Stitch length dial (Screw in)

4405M

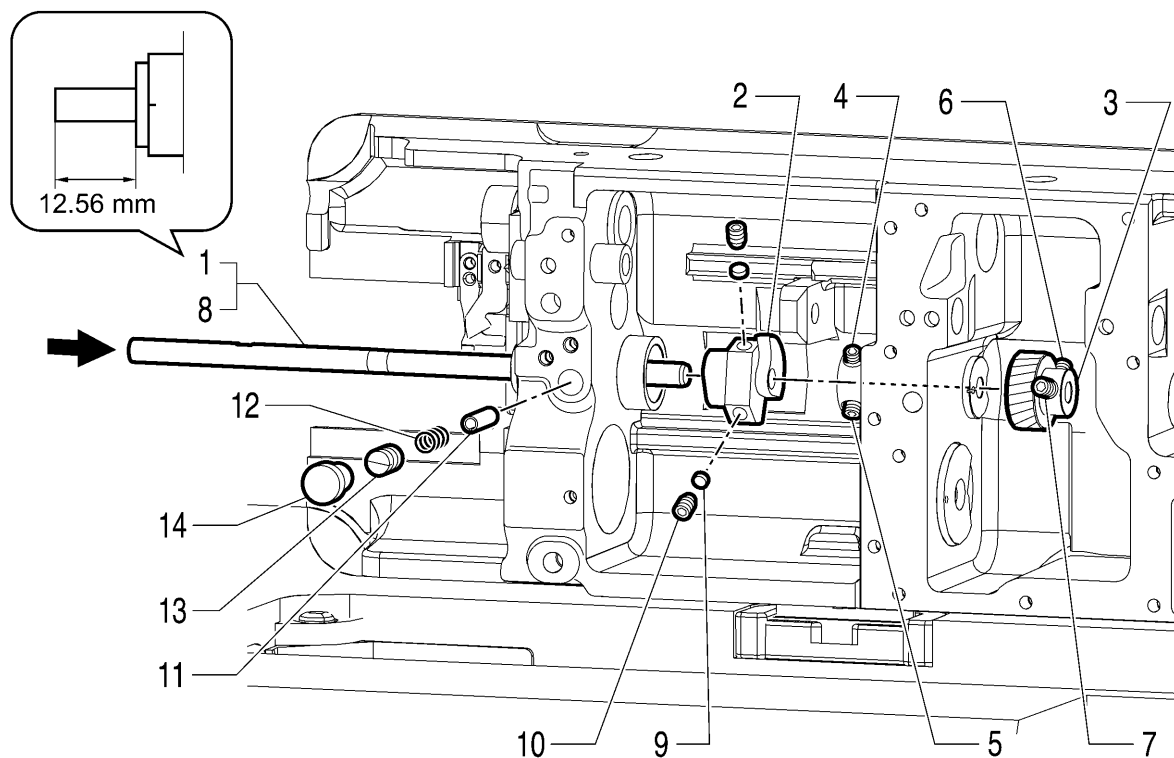
9 - 2 . Reverse lever



4406M

1. Handle shaft support
2. Reverse lever assembly
3. Screw [2 pcs]
4. Socket bolt (Tighten)
5. Spring (Attach to pin (a))

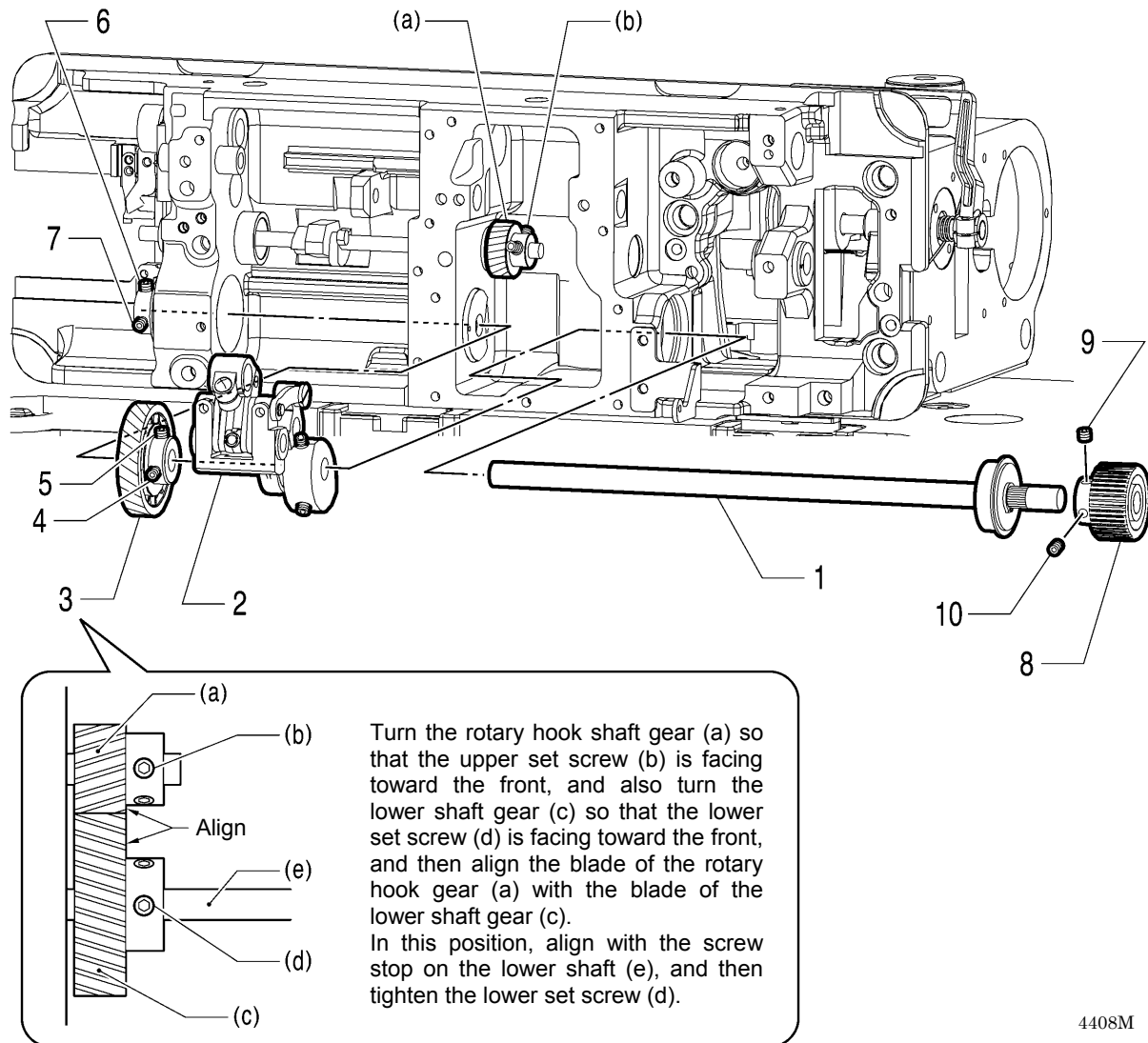
9-3. Plunger, rotary hook shaft, rotary hook shaft gear and thread trimmer cam



4407M

- | | |
|--|--------------------|
| 1. Rotary hook shaft (Insert) | 11. Plunger |
| 2. Thread trimmer cam | 12. Spring |
| 3. Rotary hook shaft gear | 13. Pump cap screw |
| 4. Set screw (Align with screw stop) | 14. Rubber cap |
| 5. Set screw (Tighten) | |
| 6. Set screw (Align with screw stop) | |
| 7. Set screw (Tighten) | |
| 8. Rotary hook shaft (Check that it rotates smoothly with no play) | |
| 9. Spacer [2 pcs] | |
| 10. Set screw [2 pcs] (Provisionally tighten) | |

9 - 4 . Lower shaft, lower shaft gear and feed regulator unit

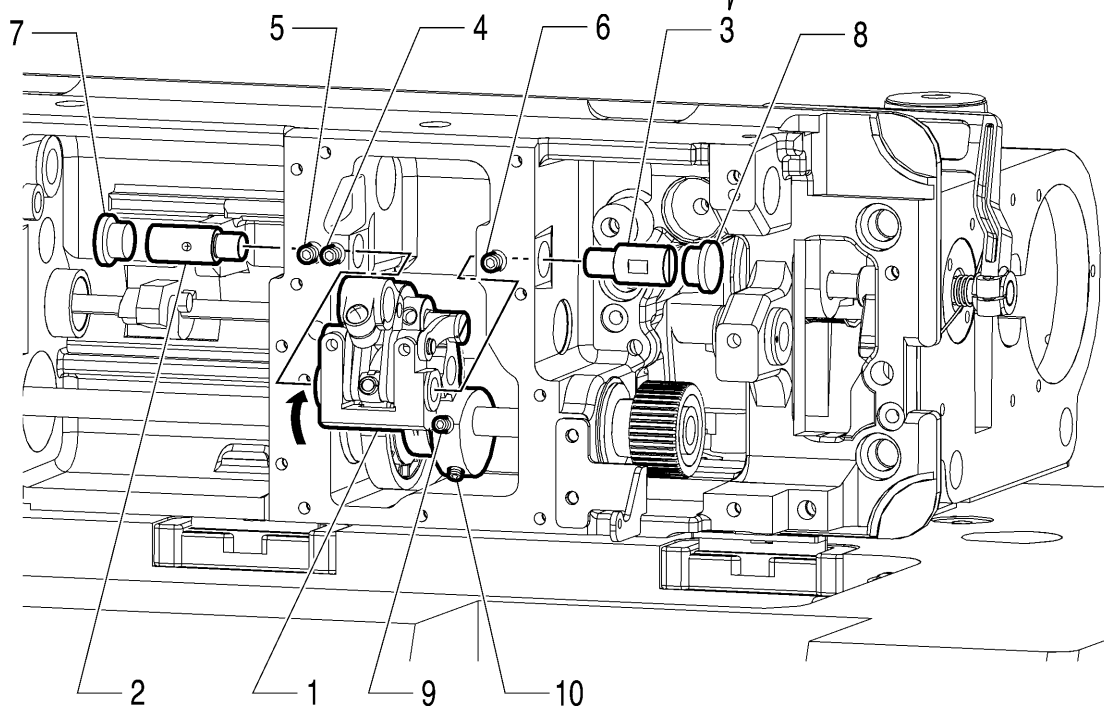


4408M

1. Lower shaft assembly
2. Feed regulator assembly
3. Lower shaft gear
4. Set screw (Align with screw stop)
5. Set screw (Tighten)
6. Set screw (Align with screw stop)
7. Set screw (Tighten)
8. Timing pulley D
9. Set screw (Align with screw stop)
10. Set screw (Tighten)

9 - 5 . Feed mechanism (1)

Turn the feed regulator support shaft (3) so that the screw stop is facing toward the front and so that the feed regulator assembly (1) is in a position where it can turn smoothly with no play, and then tighten.

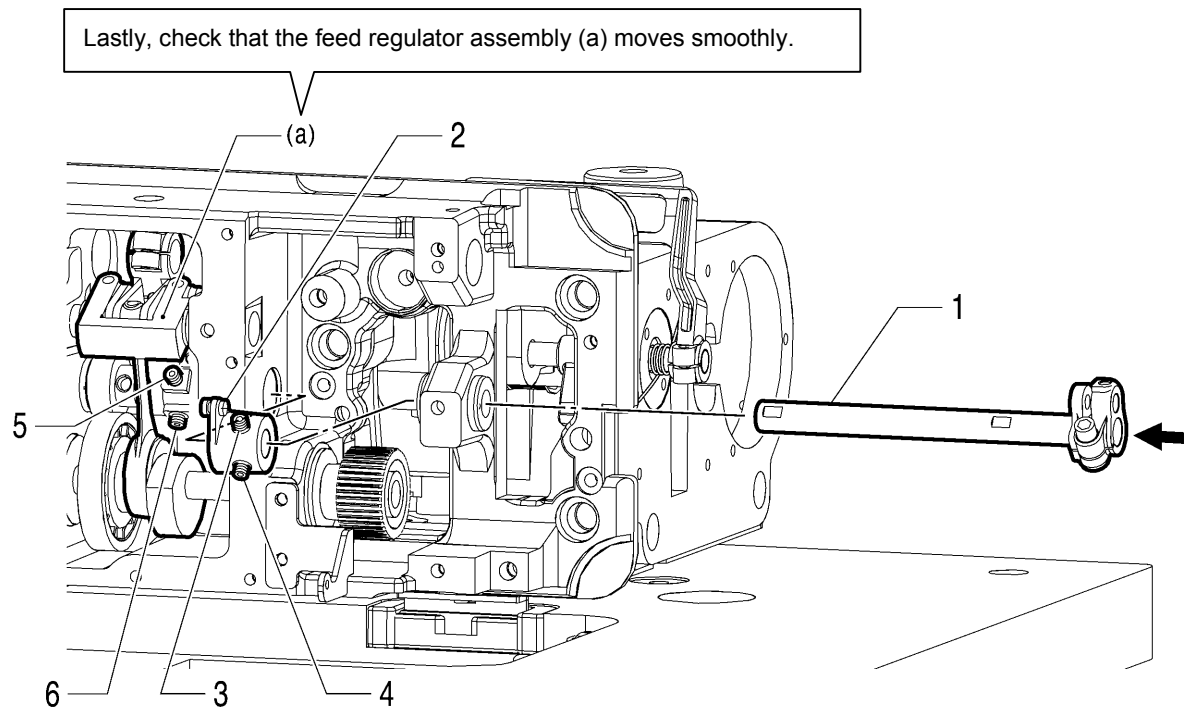


Lastly, check that the feed regulator assembly (1) moves smoothly.

4409M

1. Feed regulator assembly
2. Feed regulator shaft L
3. Feed regulator support shaft
4. Set screw (Sharp tip .. align with hole in feed regulator shaft L and tighten)
5. Set screw (Tighten)
6. Set screw (Tighten)
7. Rubber cap
8. Rubber cap
9. Set screw (Align with screw stop)
10. Set screw (Tighten)

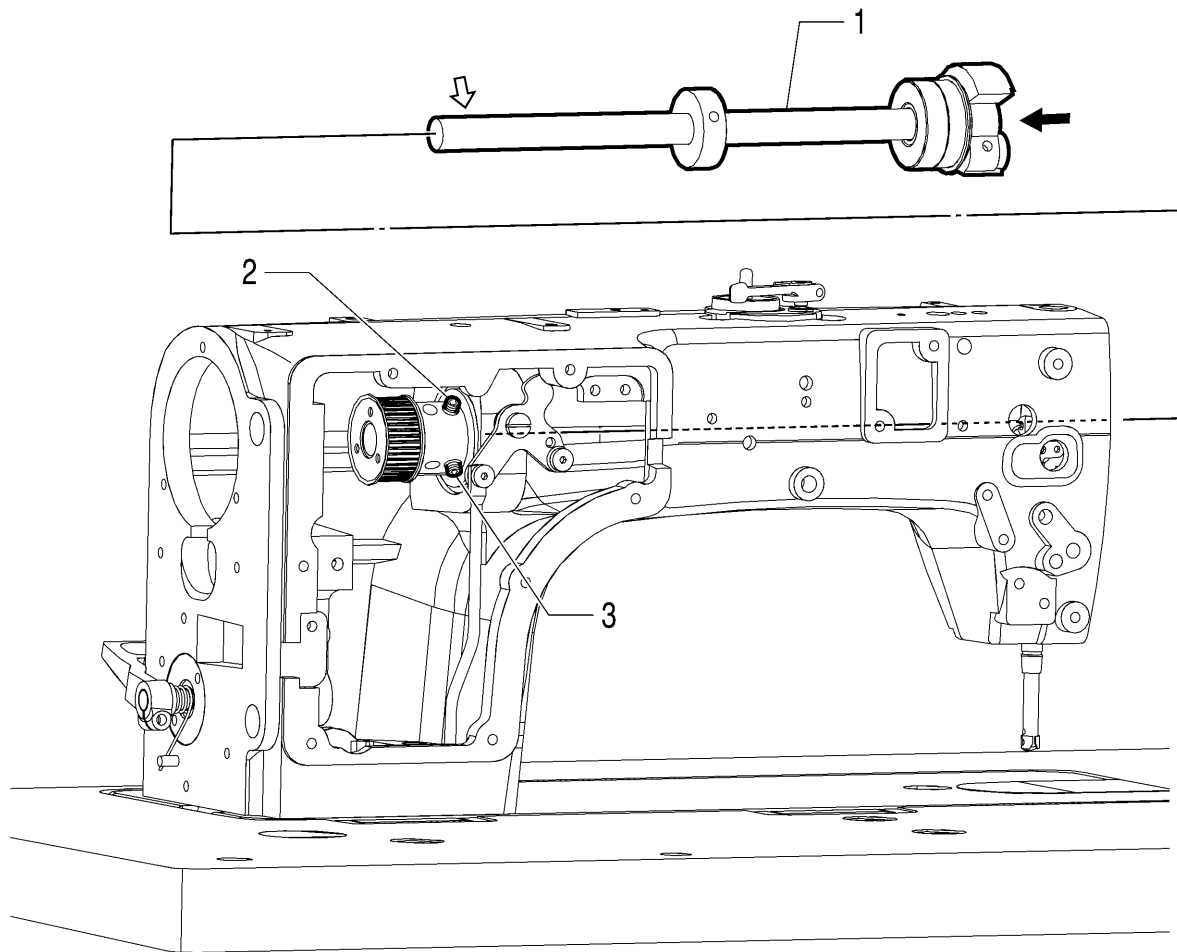
9 - 6 . Feed mechanism (2)



4410M

1. Feed regulator shaft (Insert)
2. Spring hook arm assembly
3. Set screw (Align with screw stop)
4. Set screw (Tighten)
5. Set screw (Align with screw stop)
6. Set screw (Tighten)

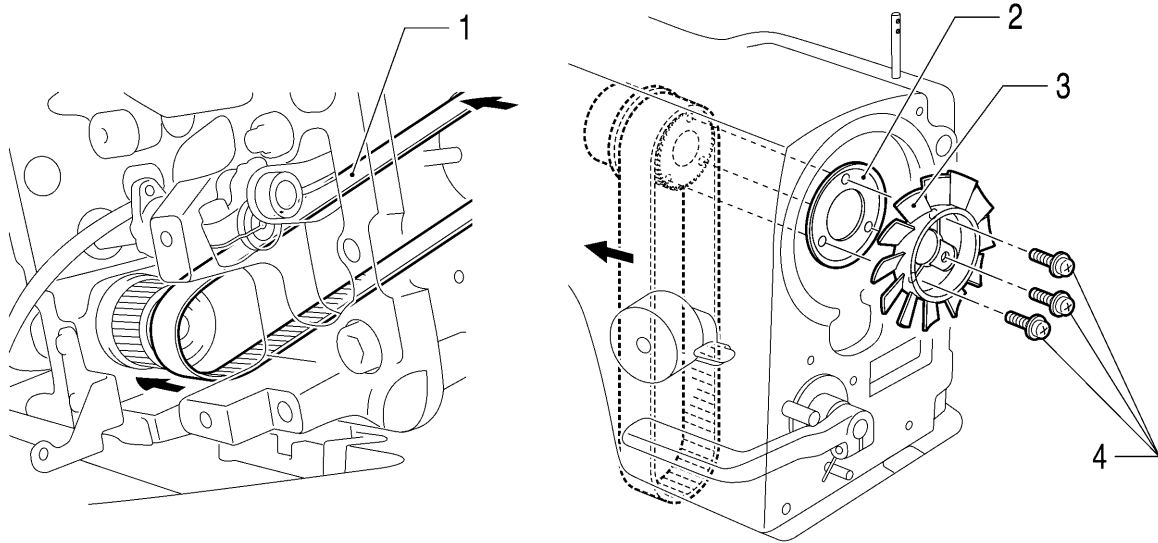
9 - 7 . Upper shaft mechanism



4414M

1. Upper shaft assembly (Insert)
2. Set screw [One at upper shaft side] (Align with screw stop)
3. Set screw [One at upper shaft side] (Tighten)

9 - 8 . Timing belt

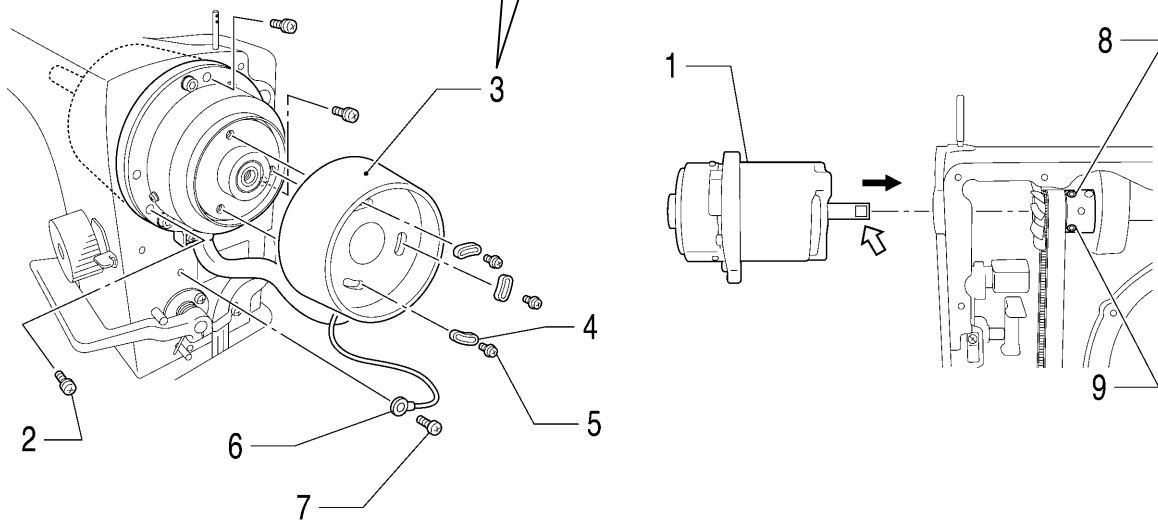


- 1. Timing belt
- 2. Flange
- 3. Fan
- 4. Screw [3 pcs]

4411M

9 - 9 . Pulley, motor and ground wire

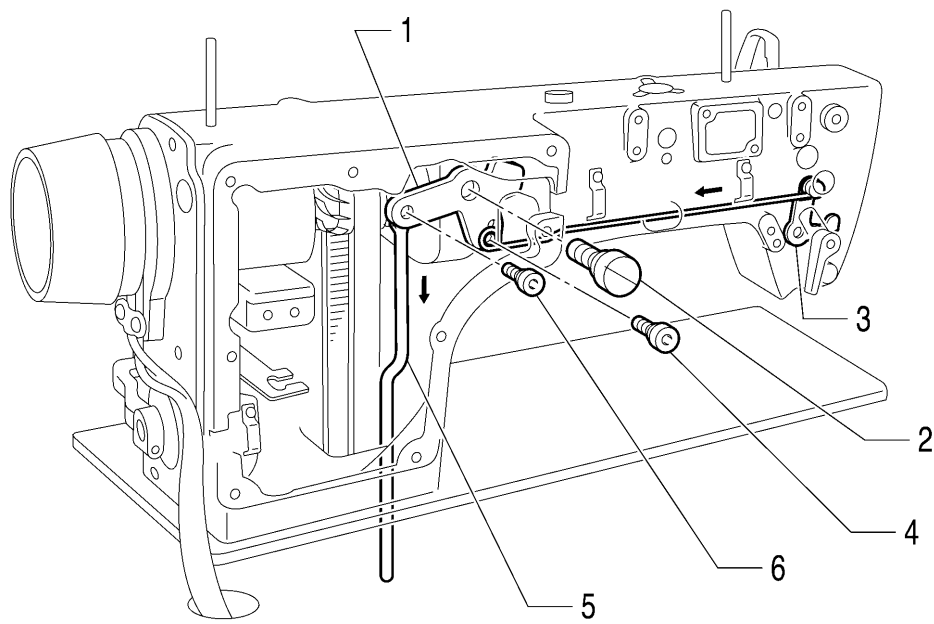
■ Refer to "11-3. Motor and timing belt" when carrying out assembly.



- 1. Motor (Insert)
- 2. Screw [3 pcs]
- 3. Pulley
- 4. Pulley washer [3 pcs]
- 5. Screw [3 pcs]
- 6. Ground wire
- 7. Screw
- 8. Set screw [One at motor side] (Align with screw stop)
- 9. Set screw [One at motor side] (Tighten)

4412M

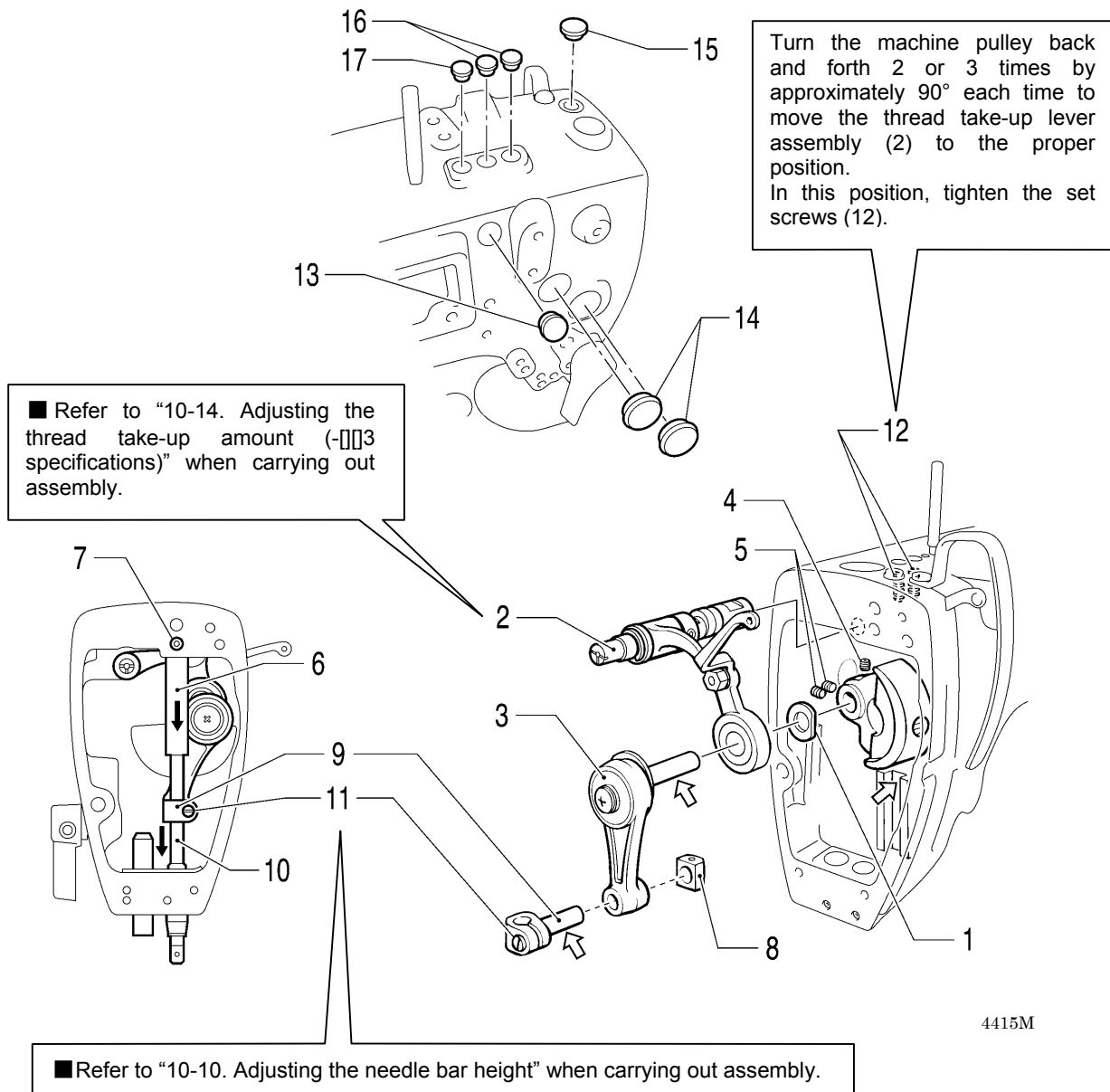
9 - 1 0 . Knee lifter lever mechanism



4413M

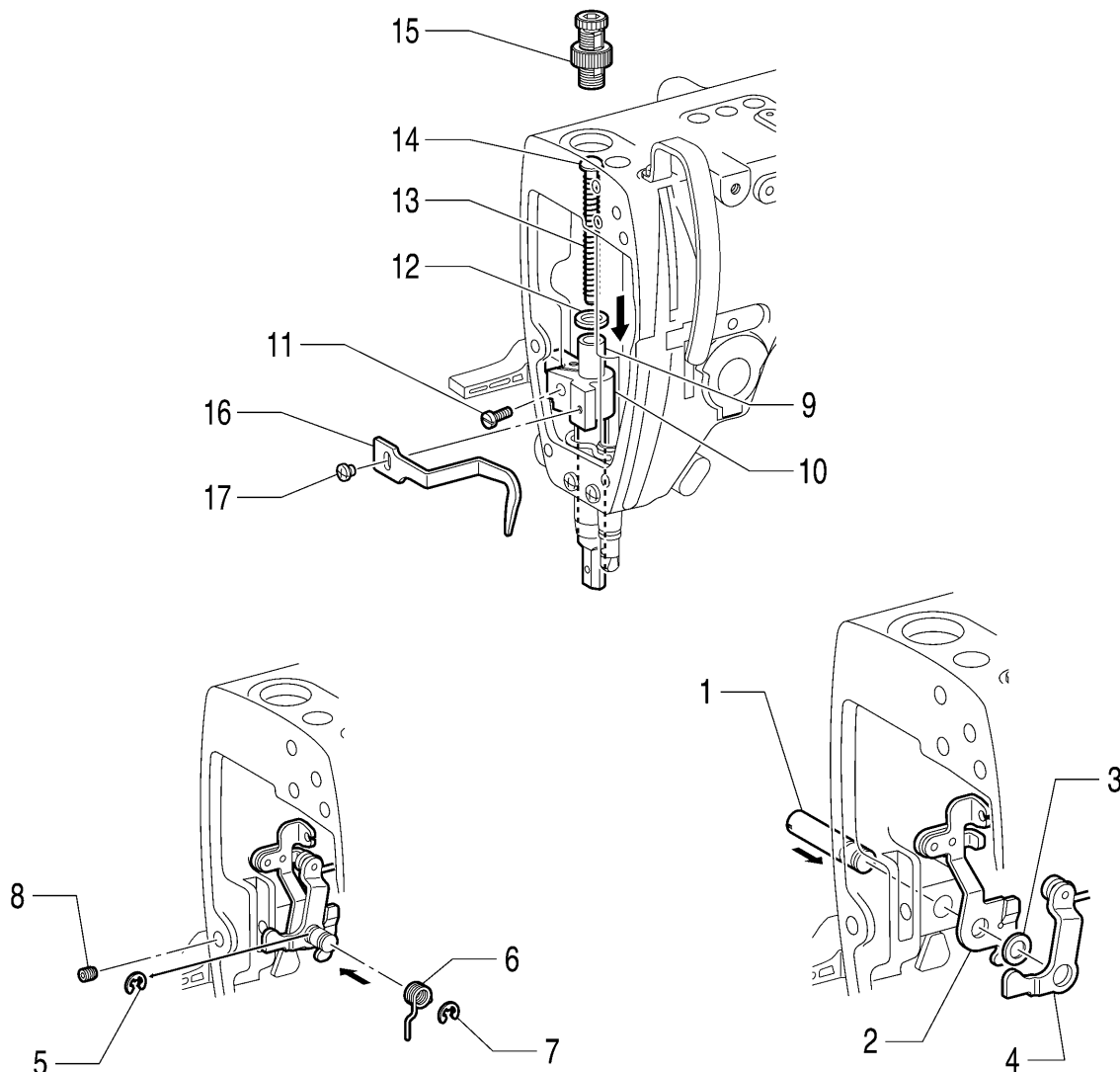
1. Knee lifter lever
2. Shoulder screw
3. Presser bar lifter lever assembly (Insert)
4. Shoulder screw
5. Knee lifter bar (Insert)
6. Shoulder screw

9 - 1 1 . Needle bar and thread take-up mechanism



- | | |
|--------------------------------------|---|
| 1. Washer | 11. Screw (Tighten) |
| 2. Thread take-up lever assembly | 12. Set screw [2 pcs] (Align with screw stop) |
| 3. Needle bar crank | 13. Rubber cap |
| 4. Set screw (Align with screw stop) | 14. Rubber cap [2 pcs] |
| 5. Set screw [2 pcs] (Tighten) | 15. Rubber cap |
| 6. Needle bar bush U | 16. Rubber cap [2 pcs] |
| 7. Set screw (Tighten) | 17. Rubber cap |
| 8. Needle bar guide slide block | |
| 9. Needle bar clamp | |
| 10. Needle bar | |

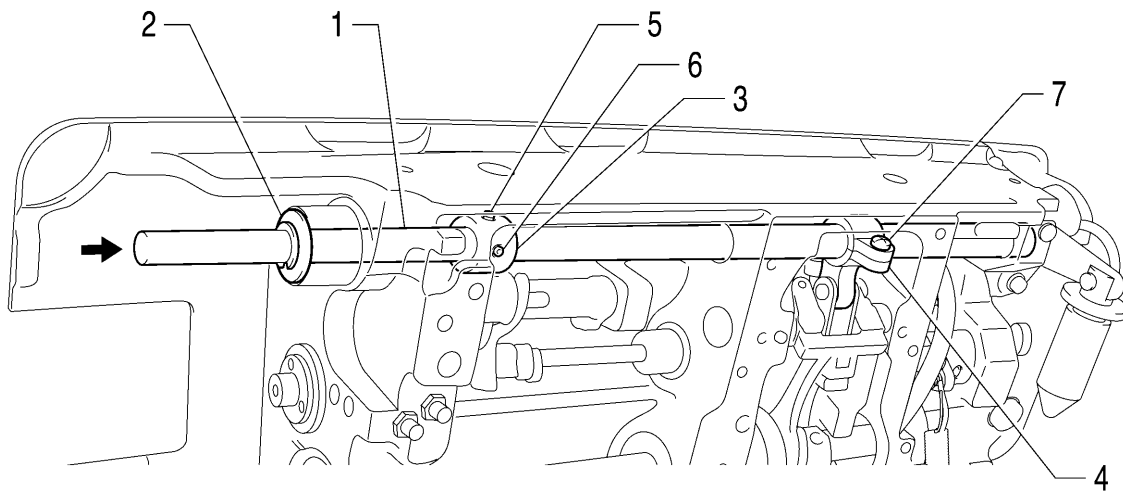
9 - 1 2 . Presser foot mechanism



4416M

- | | |
|--|--------------------------------------|
| 1. Presser bar lifter lever shaft (Insert) | 11. Screw (Provisionally tighten) |
| 2. Tension release plate | 12. Washer |
| 3. Washer | 13. Presser bar spring |
| 4. Presser bar lifter lever assembly | 14. Spring guide |
| 5. Retaining ring E | 15. Presser adjusting screw |
| 6. Presser bar lifter lever spring | 16. Thread guide presser bar bracket |
| 7. Retaining ring E | 17. Screw (Provisionally tighten) |
| 8. Set screw | |
| 9. Presser bar (Insert) | |
| 10. Presser bar guide bracket | |

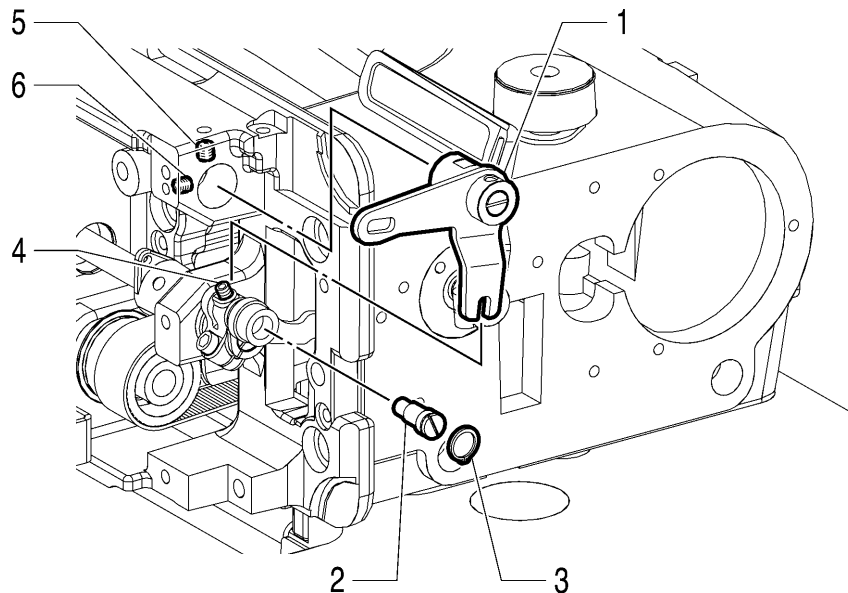
9 - 1 3 . Feed rock shaft



4417M

- | | |
|-----------------------------|--------------------------------------|
| 1. Feed rock shaft (Insert) | 5. Set screw (Align with screw stop) |
| 2. Washer | 6. Set screw (Tighten) |
| 3. Set screw collar | 7. Screw (Tighten) |
| 4. Feed rock arm | |

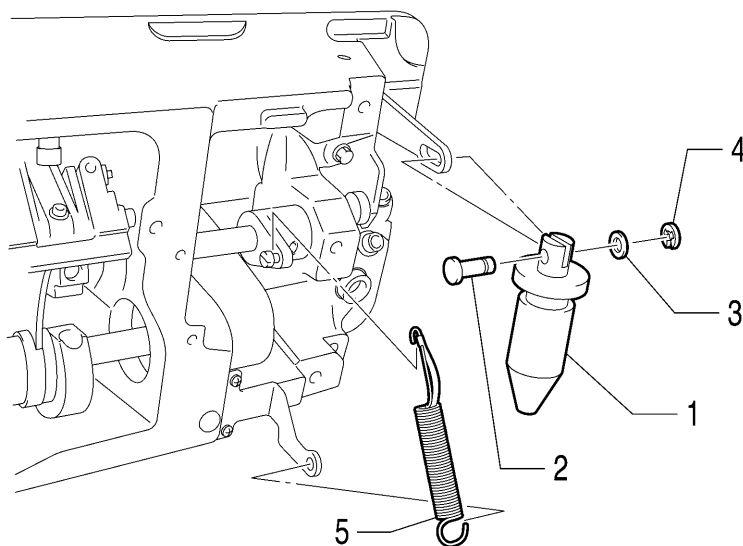
9 - 1 4 . Feed mechanism (1)



4418M

- | | |
|----------------------------|--------------------------------------|
| 1. Solenoid lever assembly | 4. Set screw (Tighten) |
| 2. Eccentric pin | 5. Set screw (Align with screw stop) |
| 3. Retaining ring C | 6. Set screw (Tighten) |

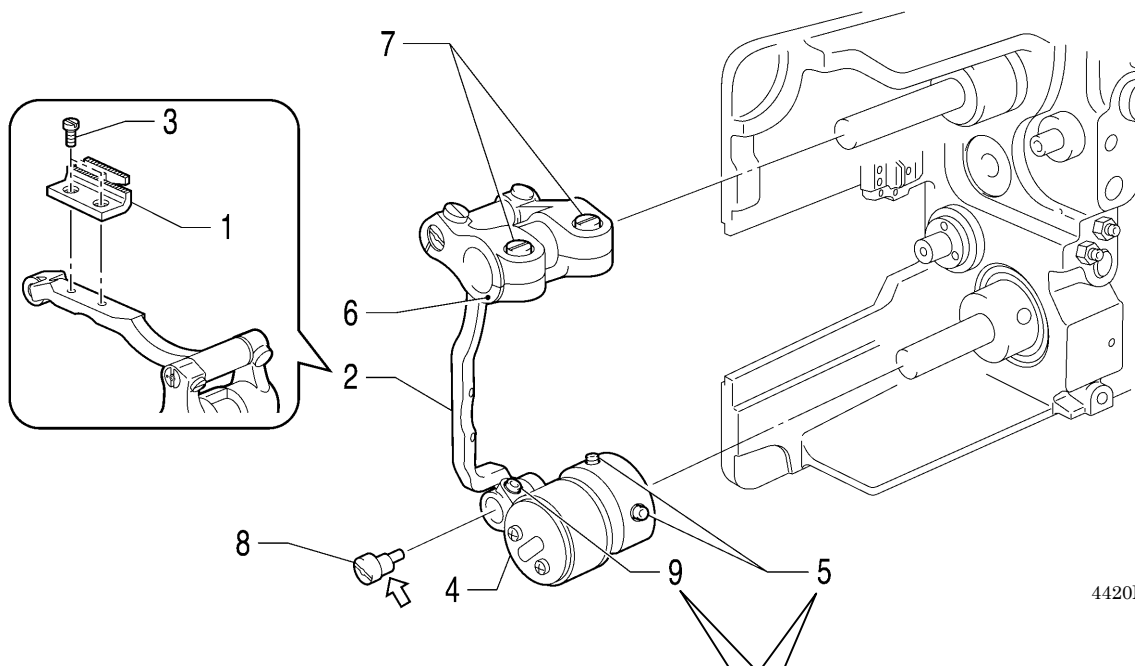
9 - 1 5 . Feed mechanism (2)



4419M

- | | |
|-----------------------------------|---------------------|
| 1. Quick reverse solenoid plunger | 4. Retaining ring C |
| 2. Pin | 5. Spring assembly |
| 3. Washer | |

9 - 1 6 . Feed bar mechanism

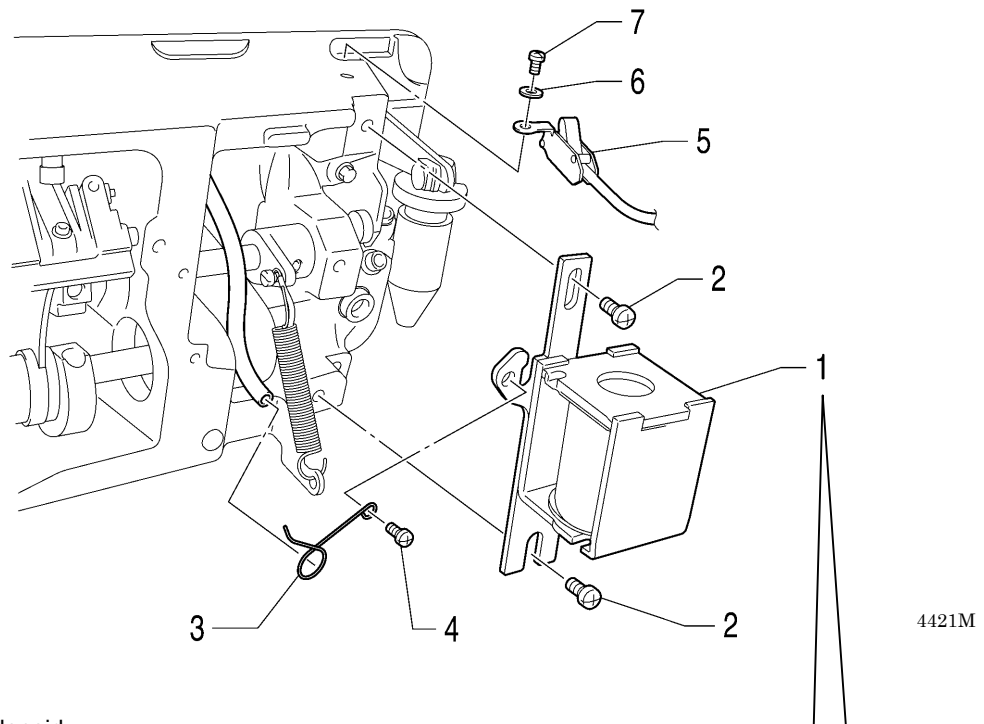


4420M

■ Refer to "10-8. Adjusting the feed dog height", "10-9. Adjusting the feed dog angle" and "10-11. Adjusting the needle and feed mechanism timing" when carrying out assembly.

- | | |
|--|--------------------------------|
| 1. Feed dog | 6. Feed bar assembly |
| 2. Feed bar | 7. Screw [2 pcs] (Tighten) |
| 3. Screw (Tighten) | 8. Feed lifting rock bar shaft |
| 4. Feed lifting eccentric wheel assembly | 9. Set screw (Tighten) |
| 5. Set screw [2 pcs] (Tighten) | |

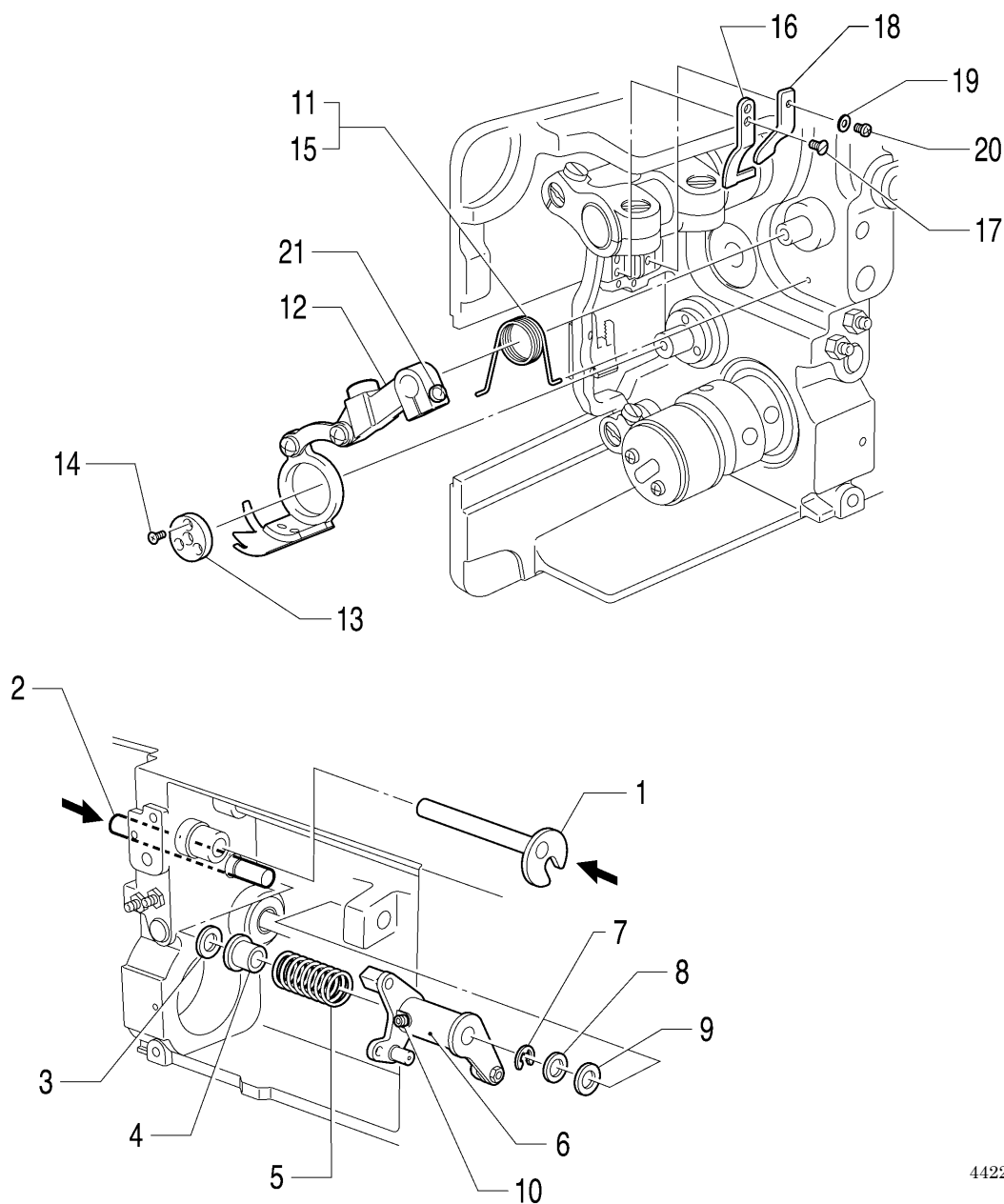
9 - 1 7 . Tube holder, safety switch and quick reverse solenoid



- 1. Quick reverse solenoid
- 2. Screw [2 pcs]
- 3. Tube holder
- 4. Screw
- 5. Safety switch
- 6. Washer
- 7. Screw

■ Refer to "10-6. Quick reverse device" when carrying out assembly.

9 - 1 8. Thread trimmer mechanism

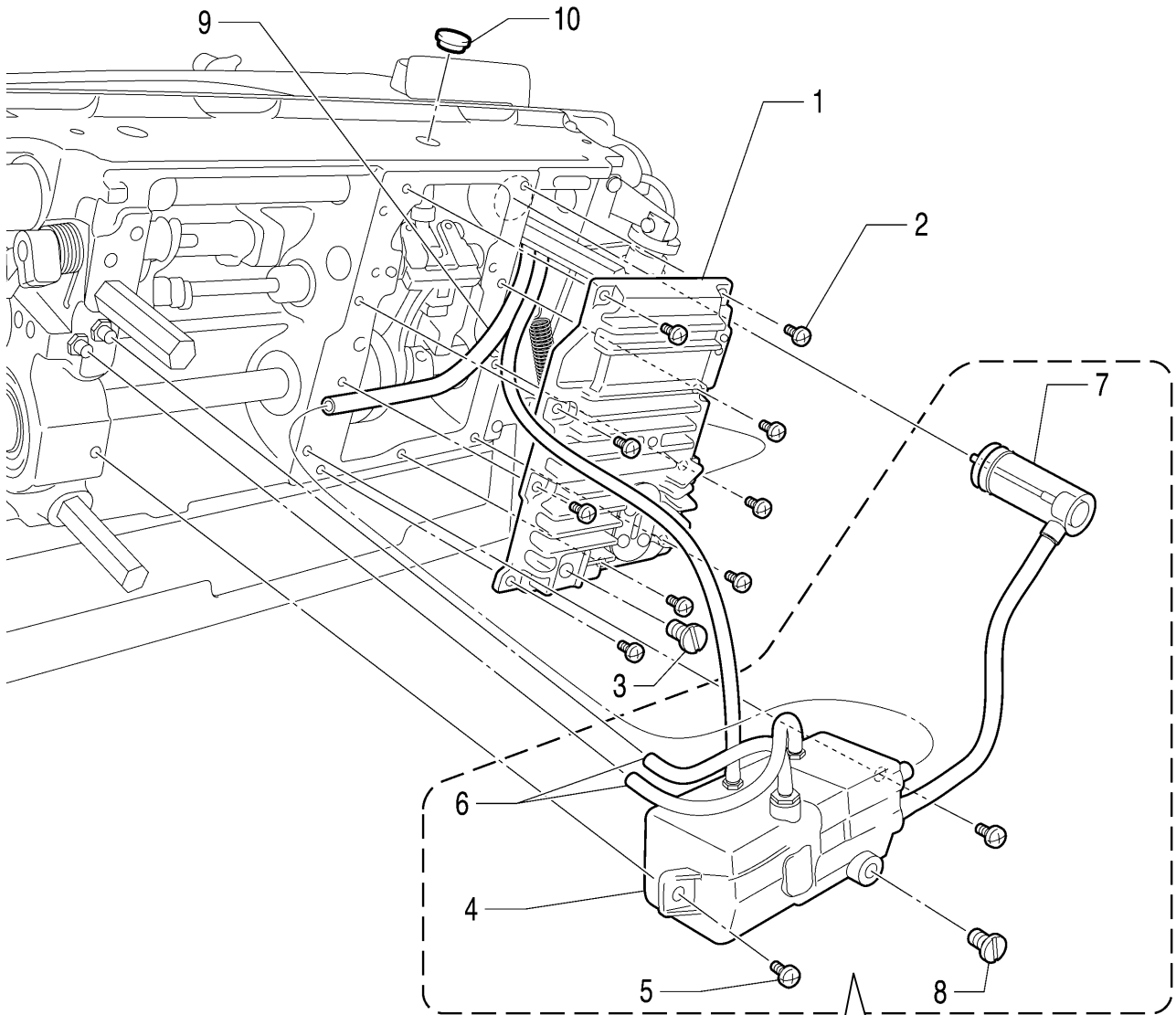


4422M

- | | |
|--|--|
| 1. Forked shaft (Insert) | 11. Thread trimmer lever spring |
| 2. Thread trimmer cam lever shaft (Insert) | 12. Thread trimmer lever assembly |
| 3. Rubber cushion | 13. Knife holder presser plate |
| 4. Collar | 14. Flat screw [3 pcs] |
| 5. Extension spring | 15. Thread trimmer lever spring (Insert into hole) |
| 6. Thread trimmer lever assembly | 16. Fixed knife |
| 7. Retaining ring E | 17. Flat screw (Tighten) |
| 8. Washer | 18. Lower thread finger |
| 9. Cushion | 19. Washer |
| 10. Set screw (Tighten) | 20. Screw (Tighten) |
| | 21. Screw (Provisionally tighten) |

9 - 1 9. Oil tank, bed bottom cover and sub tank

■ Refer to “11-1. Daily cleaning procedures [2. Lubrication]” in the Instruction Manual when carrying out assembly.



■ Refer to “3-3. Lubrication (-[]0[], []3[] specifications)” in the Instruction Manual when carrying out assembly.

- 1. Bed bottom cover
- 2. Screw [9 pcs]
- 3. Screw
- 4. Oil tank
- 5. Screw [2 pcs]
- 6. Vinyl tube (Insert)
- 7. Sub tank assembly (Insert)
- 8. Screw
- 9. Vinyl tube (Insert)
- 10. Rubber cap

4423M

9 - 2 0 . Needle, presser foot and R-actuator

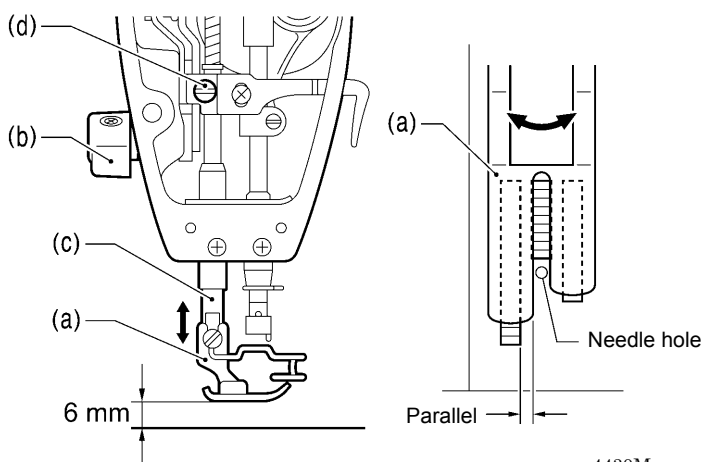
■ Adjusting the presser foot height

The standard lifting amount is 6 mm when the presser foot (a) has been lifted by the lifting lever (b).

1. Use the lifting lever (b) to lift the presser foot (a).
2. Move the presser bar (c) up or down to adjust the height of the presser foot (a) so that it is 6 mm above the top of the needle plate.

In addition, adjust so that the groove in the presser foot (a) is parallel to the groove in the needle plate, and so that the needle hole in the needle plate is at the center of the groove in the presser foot (a).

3. Tighten the screw (d).

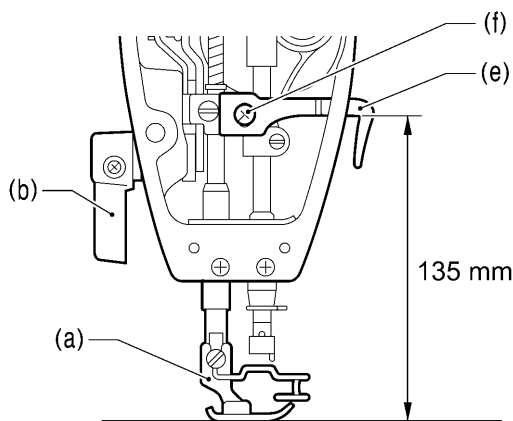


4430M

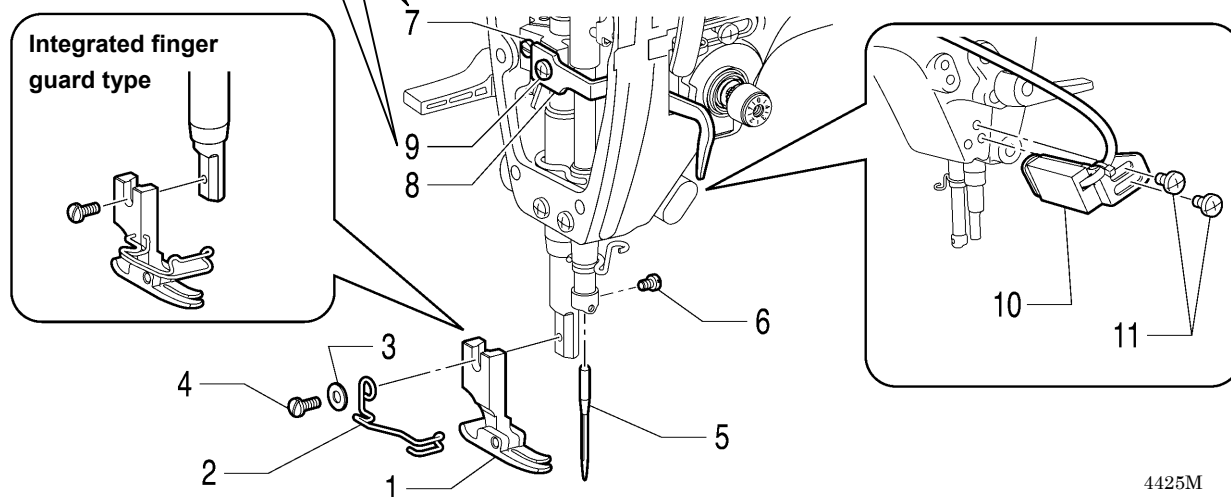
■ Adjusting the height of the presser bar bracket thread guide

The standard height for the presser bar bracket thread guide (e) is 121 mm from the top of the bed when the presser foot (a) is lowered.

1. Loosen the screw (f).
2. Adjust the height of the presser bar bracket thread guide (e) so that it is 135 mm from the top of the bed, and then tighten the screw (f).



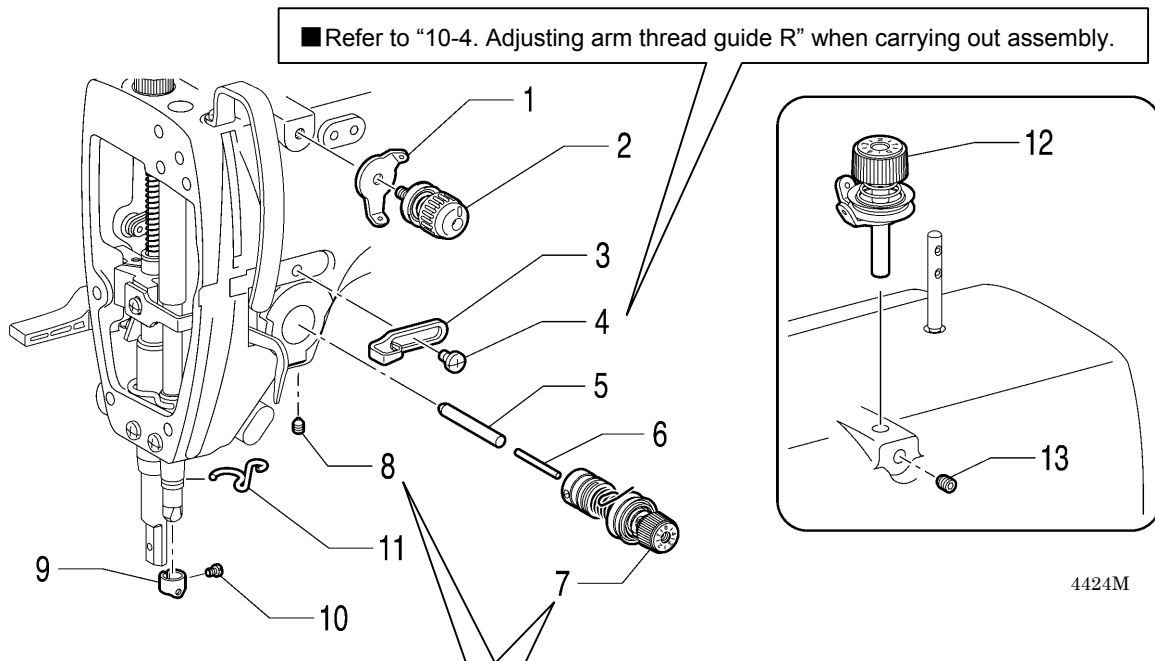
4431M



4425M

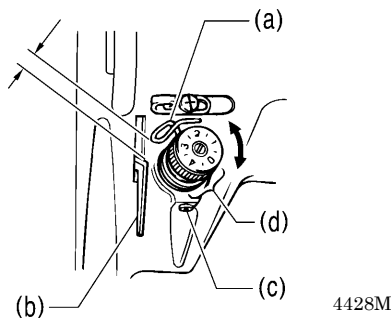
- | | |
|-----------------|-------------------------------------|
| 1. Presser foot | 6. Set screw |
| 2. Finger guard | 7. Screw |
| 3. Washer | 8. Presser bar bracket thread guide |
| 4. Screw | 9. Screw |
| 5. Needle | 10. R-actuator |

9-2 1. Thread tension mechanism



<-3[S · -3]3> 6~8 mm

<-3]5> 4~6 mm

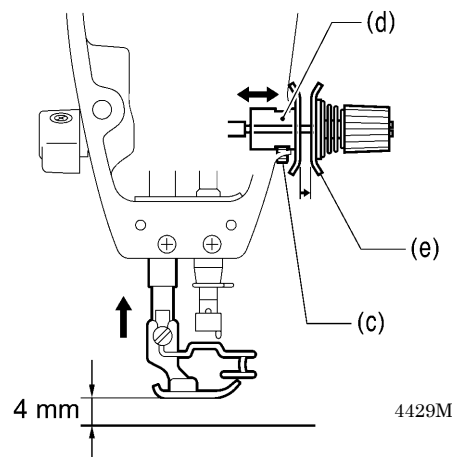


■ Adjusting the vertical position of the thread take-up spring

The standard vertical position for the thread take-up spring (a) is 6 to 8 mm (4 to 6 mm for -3]5 specifications) above the top of the presser bar bracket thread guide (b) when the presser foot is lowered.

1. Lower the presser foot.
2. Loosen the set screw (c).
3. Turn the thread tension bracket (d) to adjust the position of the thread take-up spring (a).
4. Tighten the set screw (c).

* Check the forward/back position of the thread tension bracket (d) before tightening the set screw (c).



■ Adjusting the thread tension bracket forward/back position

The forward/back position of the thread tension bracket (d) is the position where the tension discs (e) start to open when the presser foot has risen 4 mm above the needle plate.

1. Loosen the set screw (c).
2. With the presser foot raised 4 mm above the needle plate, move the thread tension bracket (d) forward or back to the point where the tension discs (e) start to open.
3. Tighten the set screw (c).

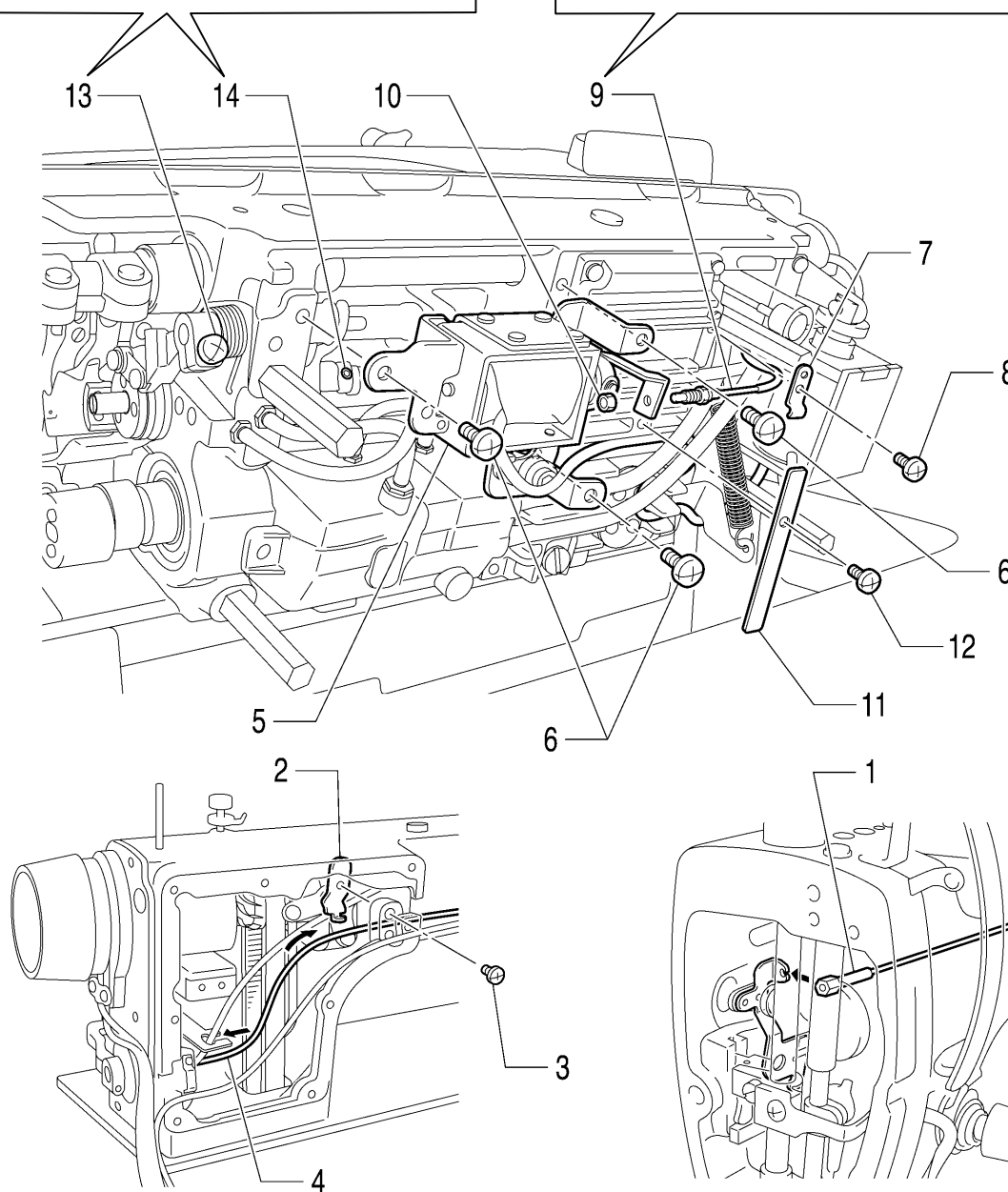
* Check the vertical position of the thread take-up spring (a) before tightening the set screw (c).

- | | | |
|-------------------------|------------------------------------|------------------------------------|
| 1. Thread guide | 6. Tension release pin | 11. Thread guide D |
| 2. Pre-tension assembly | 7. Thread tension bracket assembly | 12. Bobbin winder tension assembly |
| 3. Arm thread guide R | 8. Set screw | 13. Set screw |
| 4. Screw | 9. Needle bar thread guide | |
| 5. Tension release stud | 10. Screw | |

9 - 2 2. Tension release wire and thread trimmer solenoid

■ Refer to "10-13. Adjusting the thread trimming timing" when carrying out assembly.

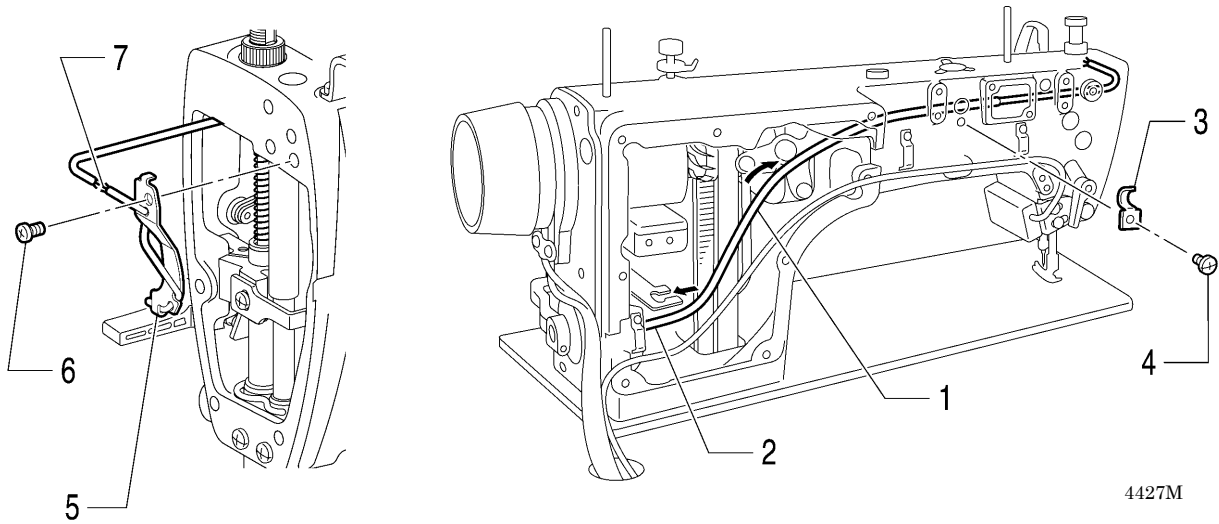
■ Refer to "10-18. Adjusting the tension release wire" when carrying out assembly.



4426M

- | | |
|---|-------------------------|
| 1. Tension release wire (Insert into tension release plate) | 8. Screw |
| 2. Wire holder U | 9. Tension release wire |
| 3. Screw | 10. Screw |
| 4. Tension release wire (Insert) | 11. Cord holder plate |
| 5. Thread trimmer solenoid | 12. Screw |
| 6. Screw [3 pcs] | 13. Screw (Tighten) |
| 7. Wire holder D | 14. Set screw (Tighten) |

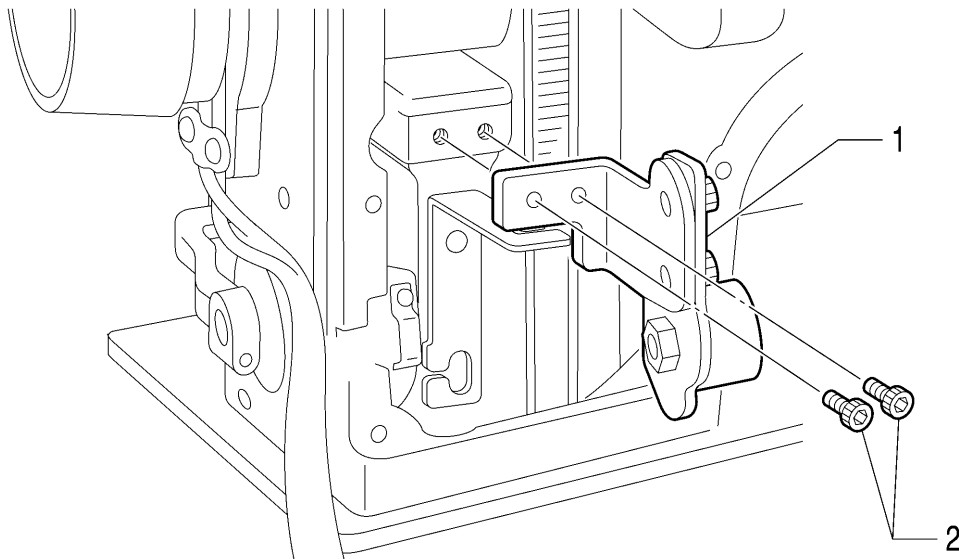
9 - 2 3 . Wick holder and oil tube (-[0] specifications)



- 1. Vinyl tube (Insert)
- 2. Vinyl tube (Insert into wire cord holder)
- 3. Cord holder
- 4. Screw

- 5. Wick holder
- 6. Screw
- 7. Wick (Clamp)

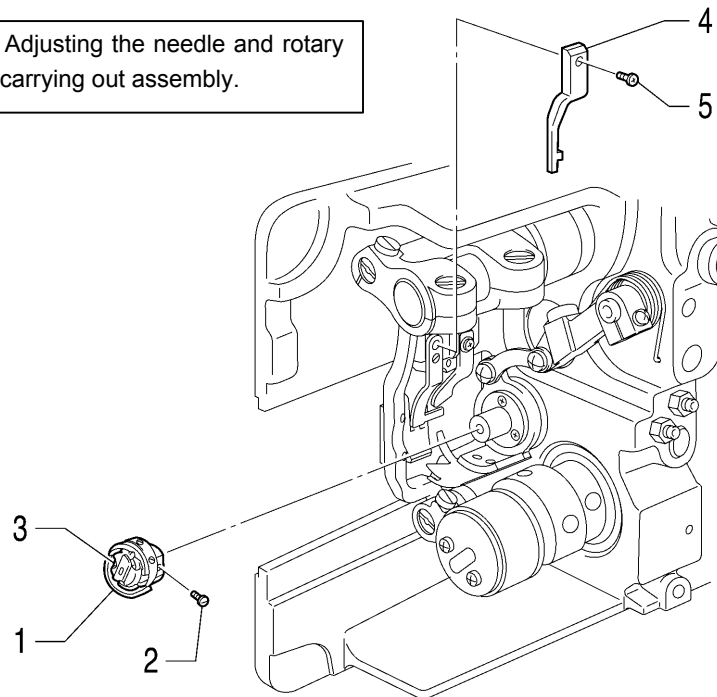
9 - 2 4 . Tension pulley



- 1. Tension pulley unit
- 2. Bolt [2 pcs]

9 - 2 5 . Rotary hook

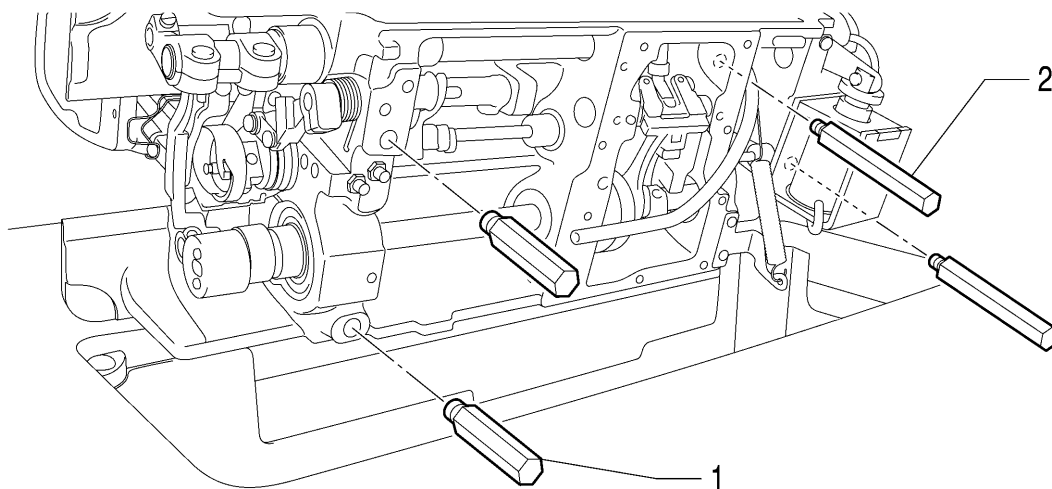
■ Refer to “10-12. Adjusting the needle and rotary hook timing” when carrying out assembly.



4439M

1. Rotary hook
2. Set screw [3 pcs] (Tighten)
3. Bobbin case
4. Hook stopper
5. Screw (Tighten)

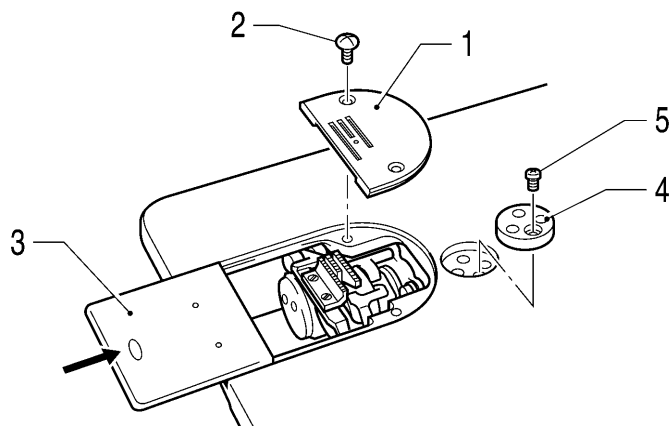
9 - 2 6 . Stand



4381M

- 1. Stand L [2 pcs]
- 2. Stand R [2 pcs]

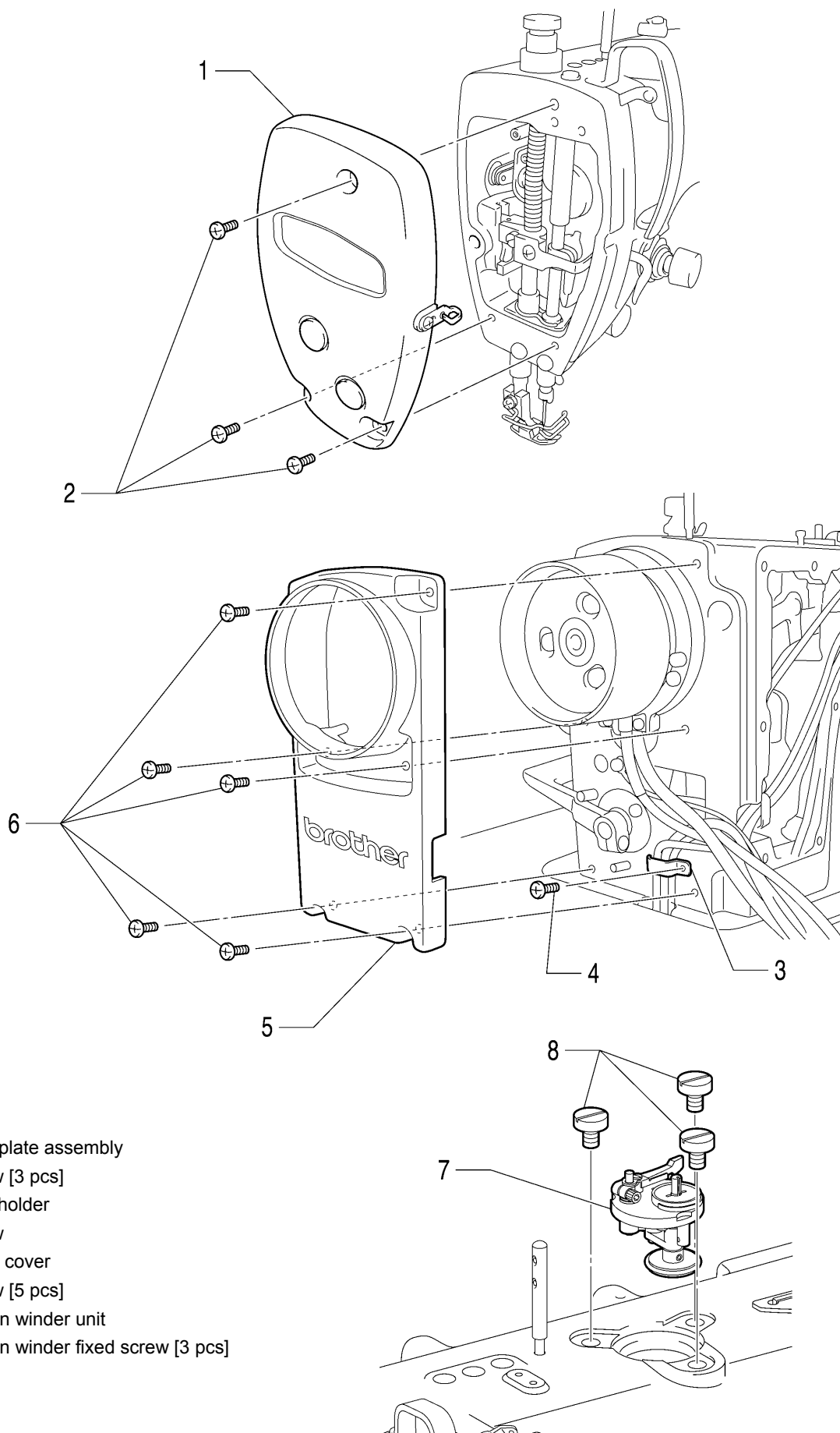
9 - 2 7 . Needle plate, feed dog, etc.



4433M

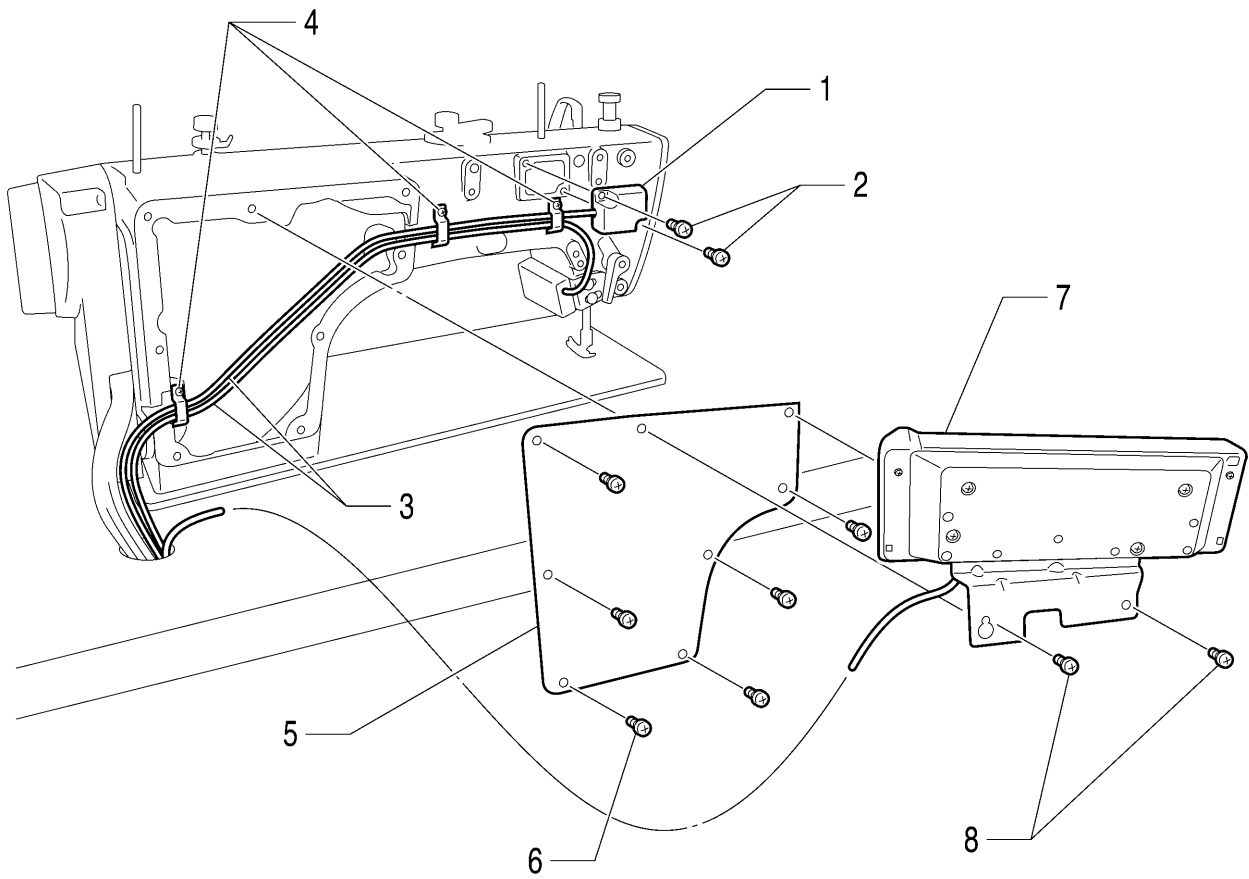
- 1. Needle plate
- 2. Flat screw [2 pcs]
- 3. Slide plate
- 4. Ruler plate
- 5. Screw

9-2 8. Covers and operation panel (1)



- 1. Face plate assembly
- 2. Screw [3 pcs]
- 3. Cord holder
- 4. Screw
- 5. Motor cover
- 6. Screw [5 pcs]
- 7. Bobbin winder unit
- 8. Bobbin winder fixed screw [3 pcs]

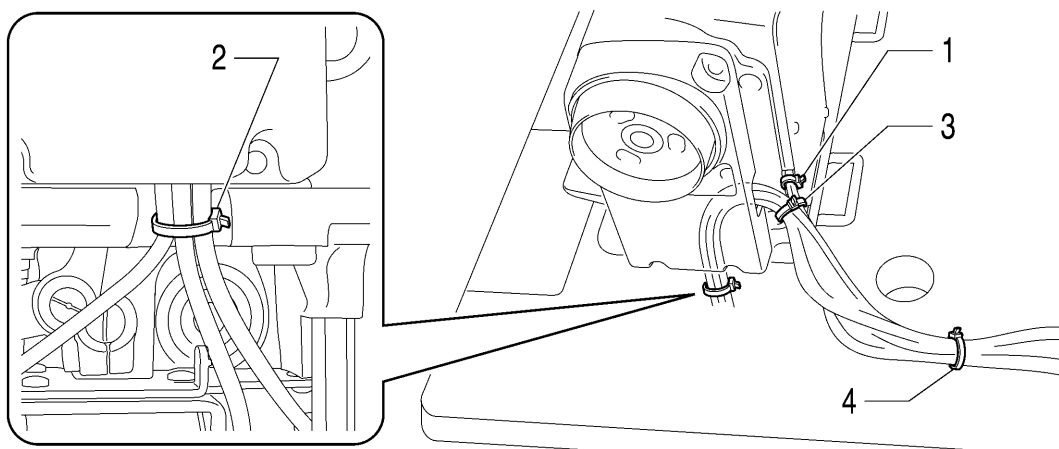
9 - 2 9 . Covers and operation panel (2)



4435M

- | | |
|----------------------------|--------------------|
| 1. Head detector unit | 5. Side plate |
| 2. Screw [2 pcs] | 6. Screw [6 pcs] |
| 3. Cord [2 pcs] | 7. Operation panel |
| 4. Screw [3 pcs] (Tighten) | 8. Screw [2 pcs] |

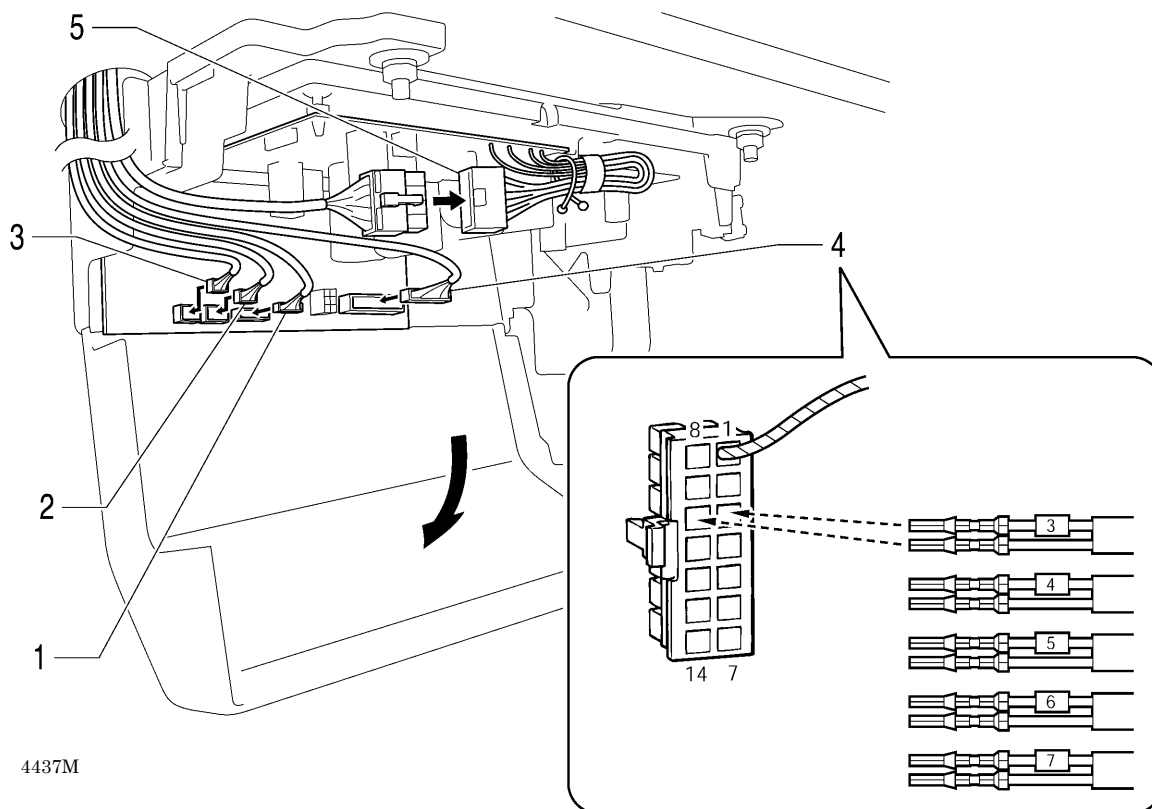
9 - 3 0 . Cable tie



4436M

- | | |
|--------------|--------------|
| 1. Cable tie | 3. Cable tie |
| 2. Cable tie | 4. Cable tie |

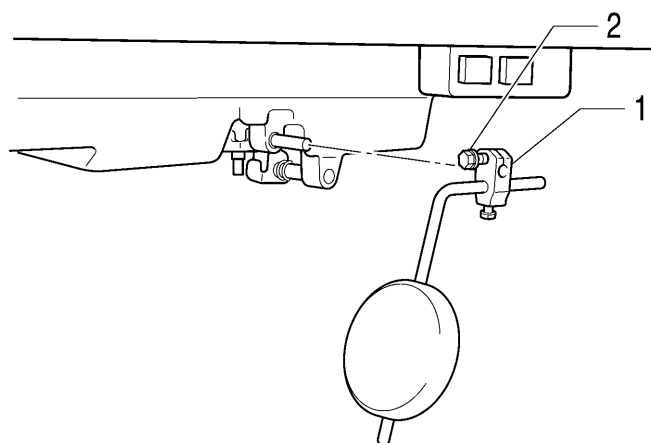
9-3 1. Connector



- 1. Head detector unit connector
- 2. Operation panel connector
- 3. Resolver connector
- 4. Connector
- 5. Motor connector
- 6. Pins

14P	Cord	14P	Cord
1	(Ground)	8	—
2	—	9	—
3	Thread trimmer solenoid	10	Thread trimmer solenoid
4	Thread wiper	11	Thread wiper
5	Quick reverse solenoid	12	Quick reverse solenoid
6	R-actuator	13	R-actuator
7	Safety switch	14	Safety switch

9-3 2. Knee lifter lever










- 1. Knee lifter bracket
- 2. Bolt (Tighten)

4438M

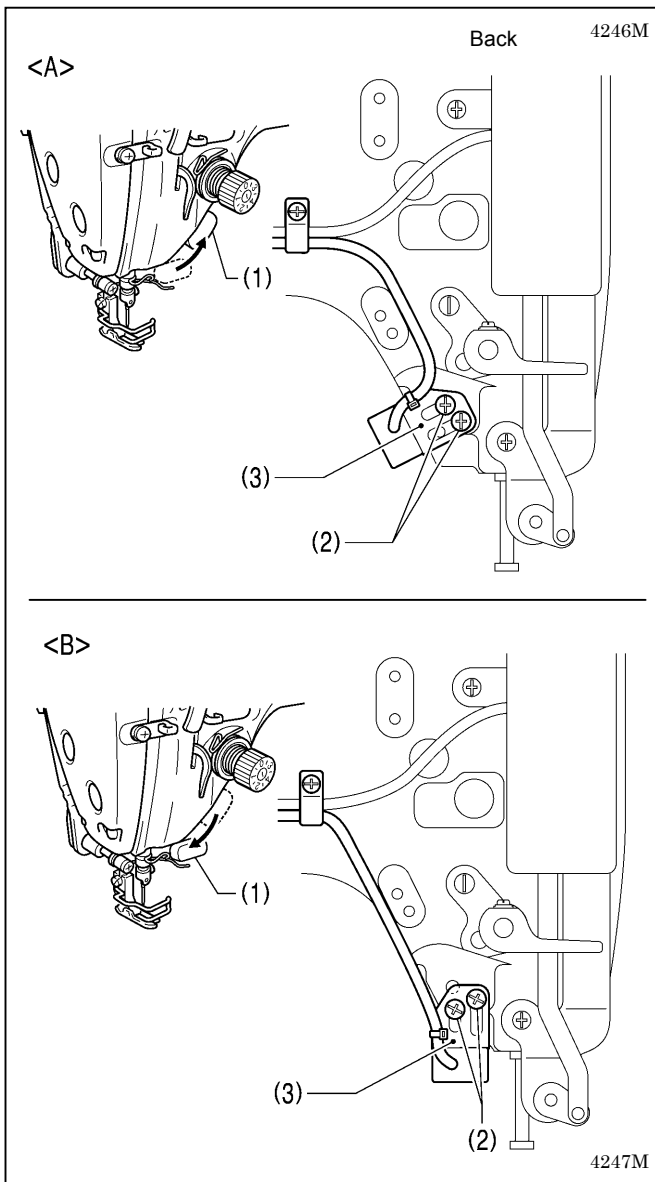
1 0. ADJUSTMENTS

! CAUTION

-  Maintenance and inspection of the sewing machine should only be carried out by a qualified technician.
-  Ask your Brother dealer or a qualified electrician to carry out any maintenance and inspection of the electrical system.
-  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.
-  Secure the table so that it will not move when tilting back the machine head. If the table moves, it may crush your feet or cause other injuries.

-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  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 treadle is depressed by mistake, which could result in injury.
 - When carrying out inspection, adjustment and maintenance
 - When replacing consumable parts such as the rotary hook and knife
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

1 0-1. Adjusting the actuator switch position



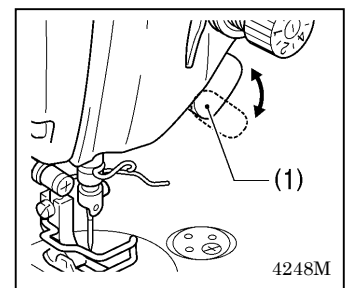
The installation position for the actuator switch (1) can be adjusted to <A> or . Adjust so that it is in a position where it is easy to operate.

1. Remove the two screws (2).
2. Move the switch setting base (3) to move the actuator switch (1) to the preferred position <A> or .
3. Tighten the two screws (2).

* If using the thread wiper, use it at position <A>. If the thread wiper is used at position , it may obstruct the actuator switch (1) when it operates.

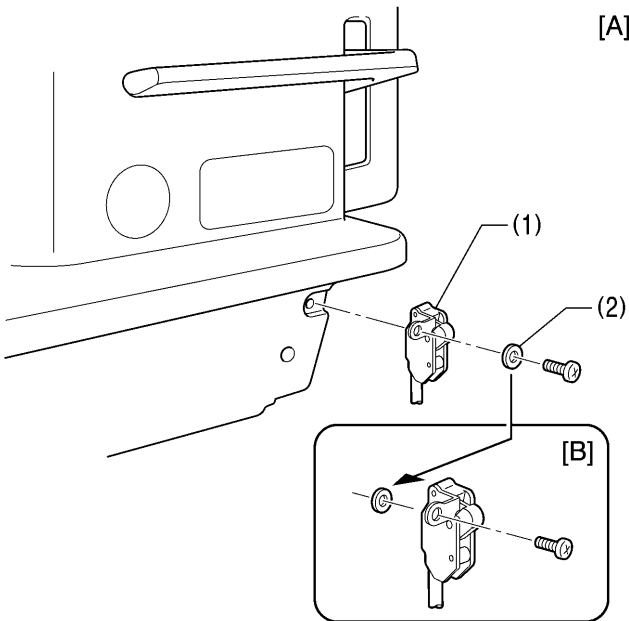
< Actuator switch rotation function >

Additionally, the actuator switch (1) can be rotated 90 degrees as shown in the illustration. Select the position that is easier to use.



1 0-2. Adjusting the safety switch position

4249M



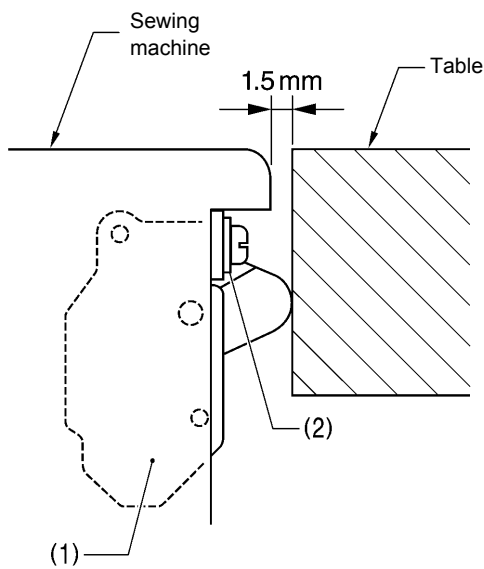
The safety switch (1) is normally installed as shown in figure [A]. However, if the processing method used for the table leaves too much space between the machine head and the table hole, it may adversely affect the operation of the safety switch (1).

<Adjustment method>

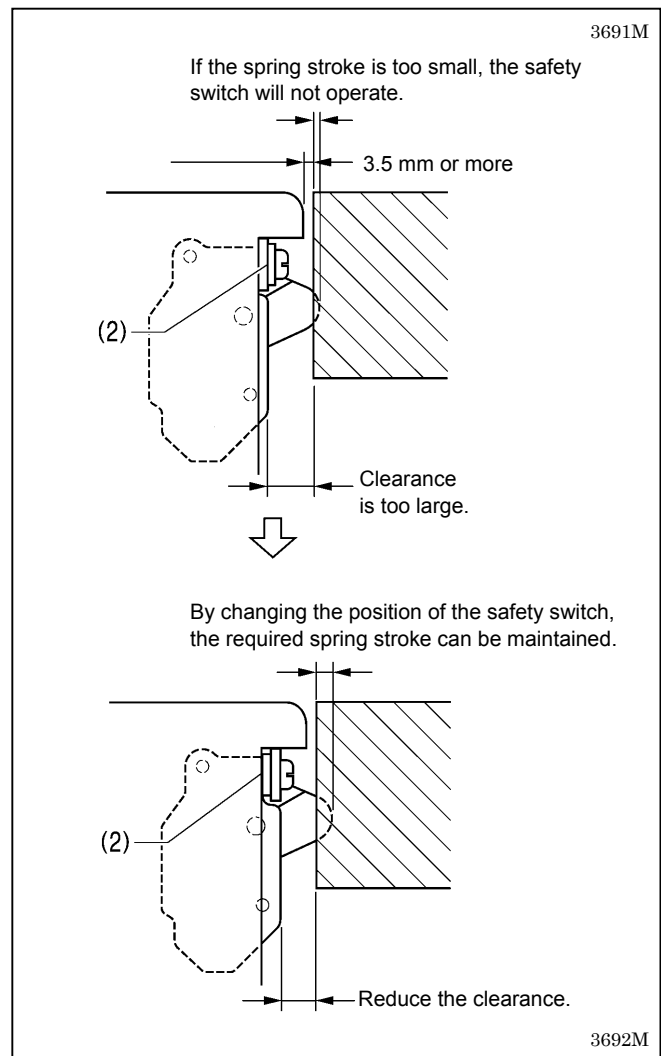
The standard amount of clearance between the machine head and the table hole is 1.5 mm. If the clearance is 3.5 mm or more, install the safety switch (1) so that the washer (2) is on the machine head side as shown in Figure [B].

* If the position cannot be satisfactorily adjusted in this way, add more washers of the same thickness.

<Safety switch operation>



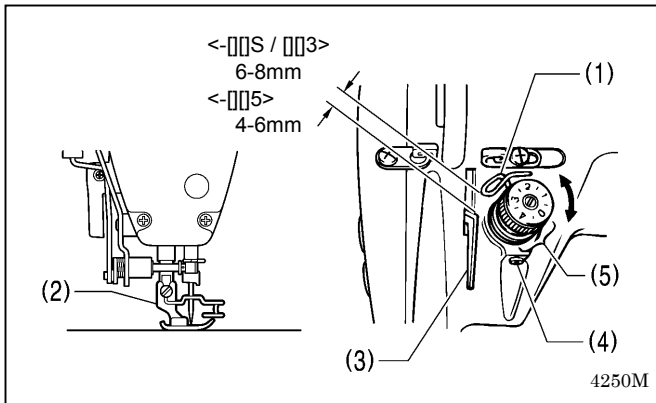
3690M



3691M

3692M

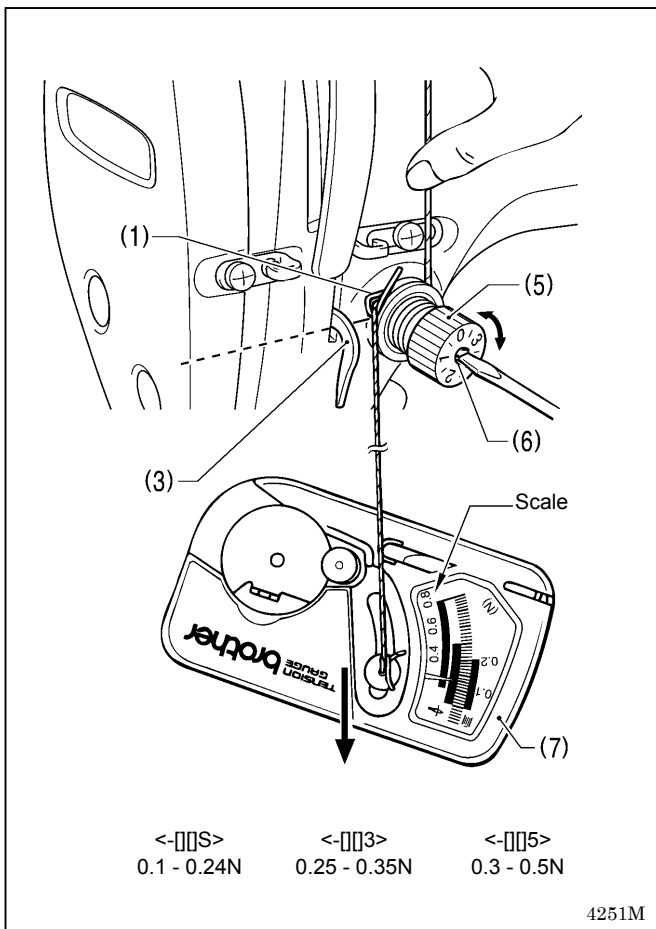
1 0-3. Adjusting the thread take-up spring



<Thread take-up spring position>

The standard position of the thread take-up spring (1) is 6-8 mm [4-6 mm for -□□5 specifications] above the surface of the thread guide (3) when the presser foot (2) is lowered.

1. Lower the presser foot (2).
2. Loosen the set screw (4).
3. Turn the thread tension bracket (5) to adjust the spring position.
4. Securely tighten the set screw (4).



<Thread take-up spring tension>

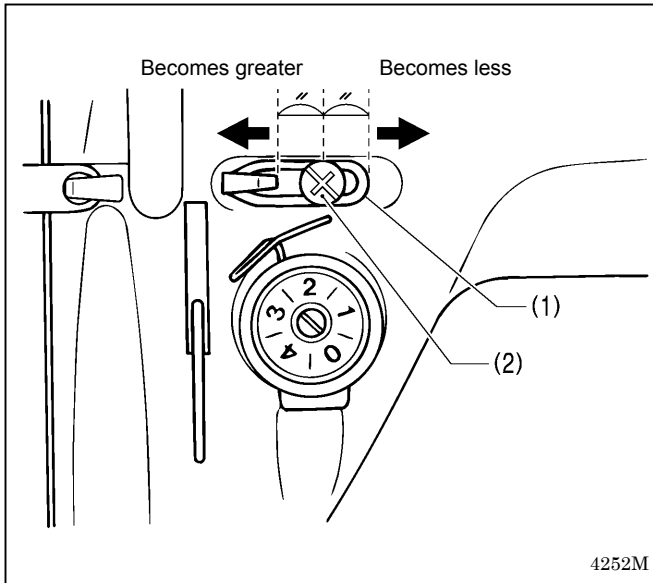
The standard tension of the thread take-up spring (1) varies in accordance with the machine specifications as shown in the table.

-□□S specifications	0.1 - 0.24N
-□□3 specifications	0.25 - 0.35N
-□□5 specifications	0.30 - 0.5N

1. Push the needle thread with your finger until it is slightly higher than the thread tension bracket (5) and so that the upper thread is not pulled out.
2. Pull the upper thread down until the thread take-up spring (1) is at the same height as the base of the thread guide (3), and then measure the tension of the thread take-up spring (1).
3. Insert a screwdriver into the slot of the tension stud (6), and turn the screwdriver to adjust the tension of the thread take-up spring (1).

NOTE: If using the tension gauge (7) (sold separately) to measure the tension, take the reading from the scale on the side of the red line.

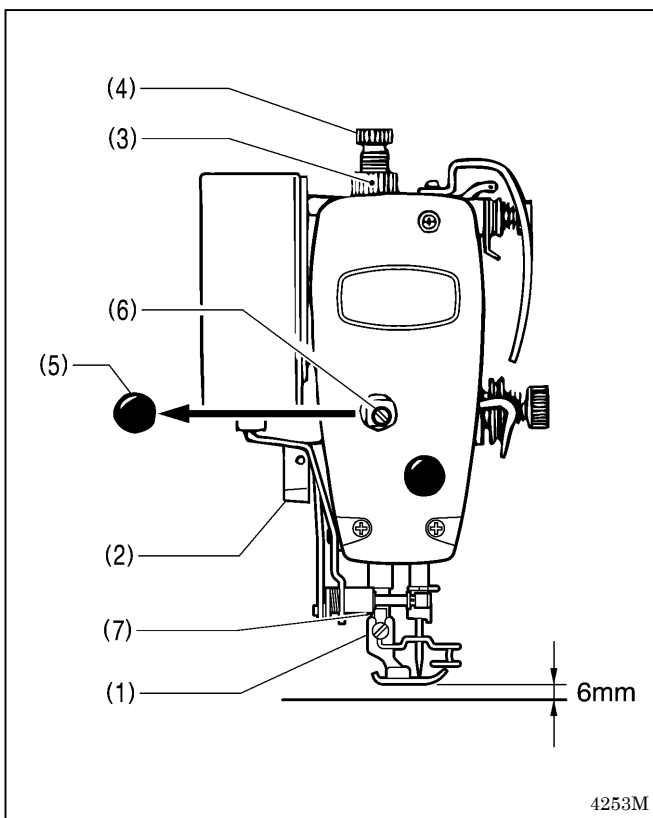
1 O-4. Adjusting arm thread guide R



The standard position of arm thread guide R (1) is the position where the screw (2) is in the center of the adjustable range for arm thread guide R (1).

- * To adjust the position, loosen the screw (2) and then move arm thread guide R (1).
 - When sewing thick material, move arm thread guide R (1) to the left. (The thread take-up amount will become greater.)
 - When sewing thin material, move arm thread guide R (1) to the right. (The thread take-up amount will become less.)

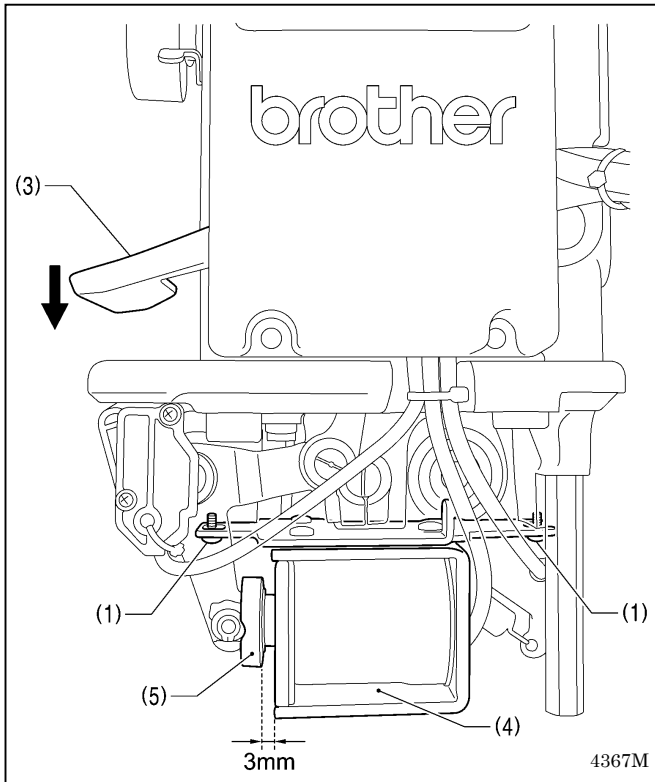
1 O-5. Adjusting the presser foot height



The standard height of the presser foot (1) is 6 mm when the presser foot (1) is raised by means of the lifting lever (2).

1. Loosen the nut (3) of the adjustment screw (4), and then turn the adjustment screw (4) so that there is no pressure applied to the presser foot.
2. Raise the lifting lever (2). The presser foot (1) will also rise.
3. Remove the oil cap (5).
4. Loosen the bolt (6) and then move the presser bar (7) up or down until the presser foot (1) is at the standard height of 6 mm.
5. Tighten the bolt (6).
6. Replace the oil cap (5).
7. Adjust the presser foot pressure using the adjustment screw (4), and then tighten the nut (3).

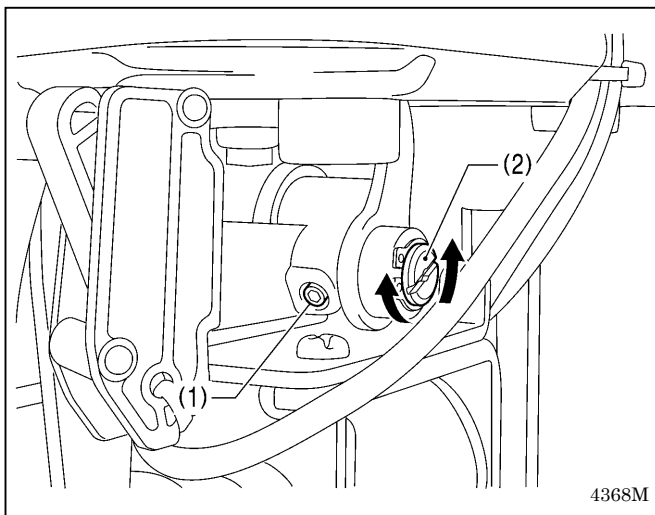
1 O-6. Quick reverse device



1. Turn the stitch length dial to the maximum setting.
2. Remove the side plate.
3. Tilt back the machine head.
4. Turn the stitch length dial to the maximum setting.
5. Loosen the two screws (1).
6. With the reverse lever (3) lowered as far as it will go, push quick reverse solenoid (4) until the clearance between the surface of the quick reverse solenoid (4) and the groove in the plunger (5) is 3 mm.
7. Tighten the screws (1).

* If the clearance mentioned above is larger than 3 mm, the operation of the quick reverse solenoid (4) will become stiff. Furthermore, if the clearance is smaller than 3 mm, then impact noise will easily occur when the quick reverse solenoid (4) operates.

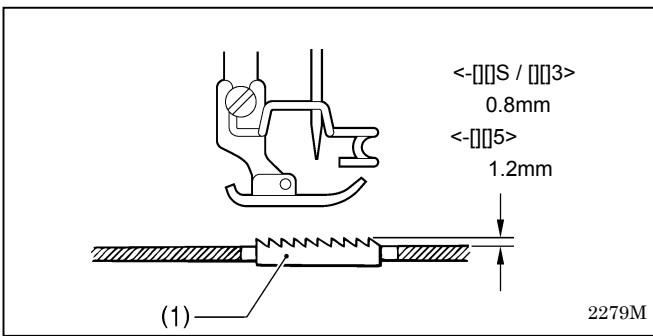
1 O-7. Matching the stitch lengths for forward feed and reverse feed



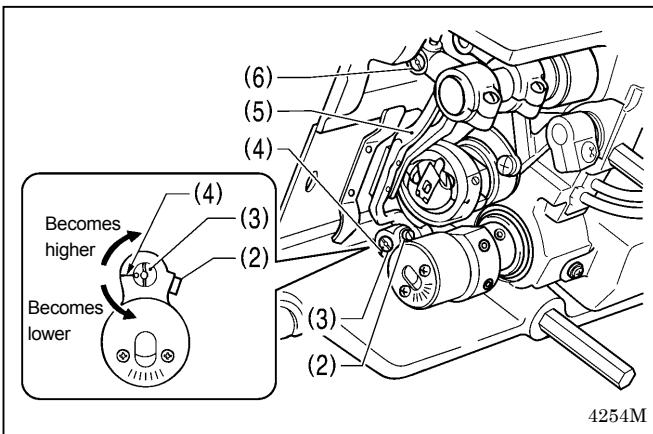
This matches the stitch lengths for forward feed and reverse feed.

1. Turn the stitch length dial to "3".
2. Sew at low speed (220 sti/min) in the forward and reverse feed directions. (11 stitches in each direction)
3. If adjustment is necessary, carry out the following.
 - 1) Tilt back the machine head.
 - 2) Loosen the set screw (1).
 - 3) Adjust by turning the eccentric pin (2) within a range of 90°. (If the eccentric pin (2) is turned more than 90°, the adjustment will be reversed.)
 - * If the stitch length is larger in the forward feed direction than in the reverse feed direction, turn the eccentric pin (2) in the clockwise direction.
 - * If the stitch length is smaller in the forward feed direction than in the reverse feed direction, turn the eccentric pin (2) in the counterclockwise direction.
4. After adjusting, securely tighten the set screw (1).

10-8. Adjusting the feed dog height

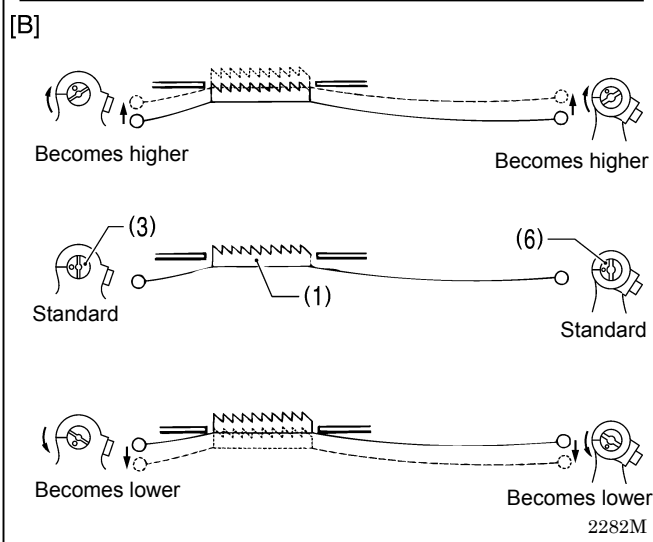
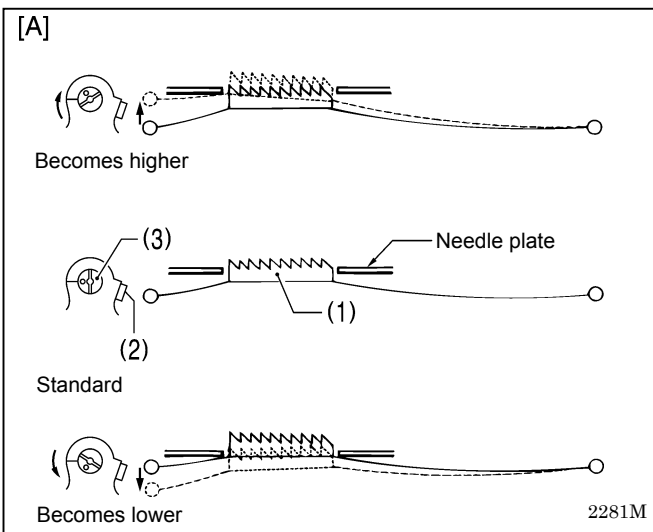


The standard height of the feed dog (1) when it is at its maximum height above the top of the needle plate is 0.8 mm for $\langle -\square\square S / \square\square 3 \rangle$ specifications, and 1.2 mm for $\langle -\square\square 5 \rangle$ specifications.

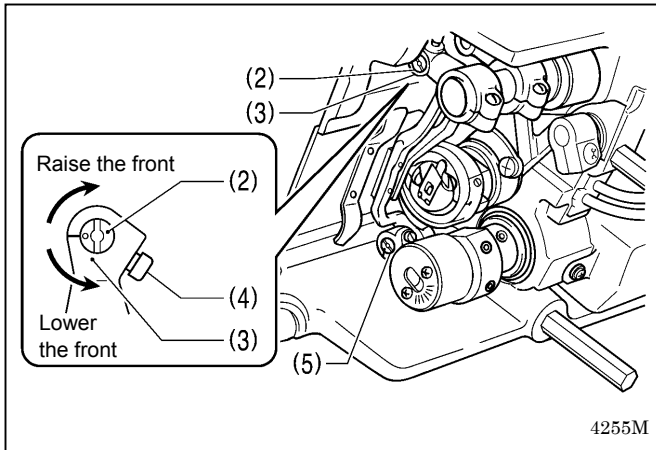


1. Turn the pulley until the feed dog (1) rises to the highest position.
2. Tilt back the machine head.
3. Loosen the screw (2).
4. Turn the feed lifting rock bracket stud (3) within a range of 90° from the reference line (4) to adjust the vertical height of the feed bar (5). (Fig. [A])
5. Tighten the screw (2).

* If you are worried about the angle of the feed dog (1), turn the shaft (6) while carrying out the above adjustment. (Fig. [B]) (Refer to "10-9. Adjusting the feed dog angle" on the next page for details of this operation.)



10-9. Adjusting the feed dog angle



The standard angle for the feed dog (1) when it is at its highest position above the needle plate is when the "O" mark (or V groove) on the shaft (2) is aligned with the feed rocker bracket arm (3).

1. Turn the machine pulley to move the feed dog (1) to its highest position above the needle plate.
2. Tilt back the machine head.
3. Loosen the two set screws (4).
4. Turn the shaft (2) in the direction of the arrow within a range of 90° with respect to the standard position. (Fig. [C])

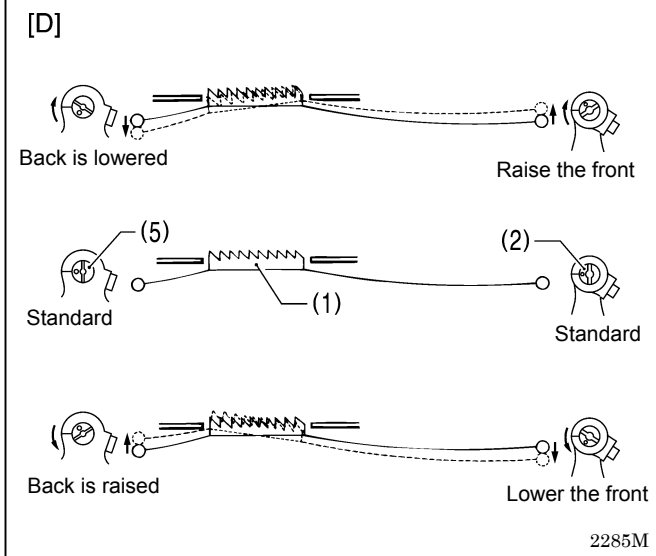
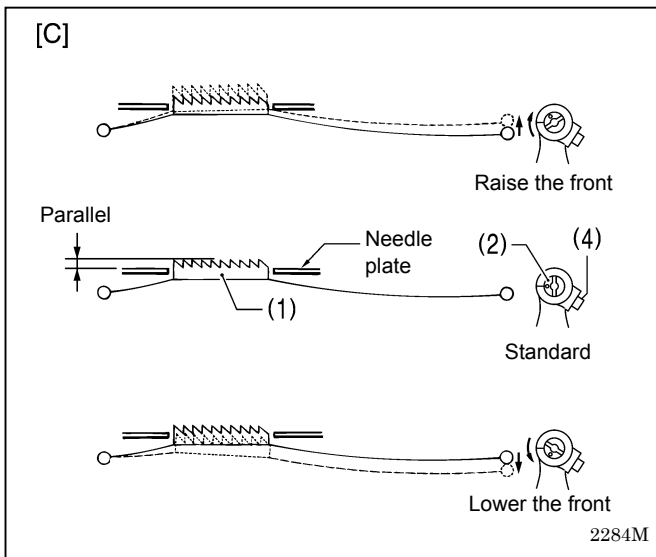
- In order to prevent puckering, lower the front of the feed dog (1).
- In order to prevent the material from slipping, raise the front of the feed dog (1).

5. Securely tighten the set screws (4).

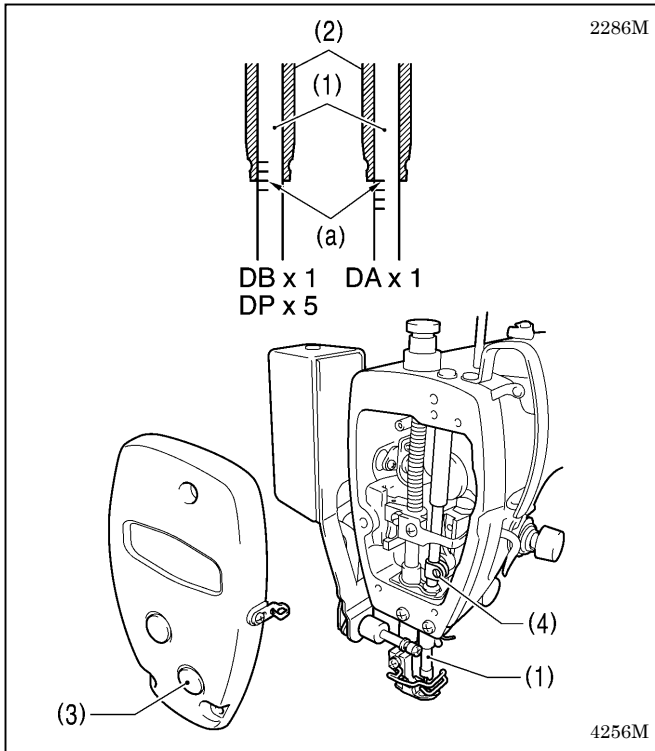
* If you would like to tilt the feed dog (1) further, turn the feed lifting rock bracket stud (5) while carrying out the above adjustment. (Fig. [D])

(Refer to "10-8. Adjusting the feed dog height" on the previous page for details of this operation.)

* The height of the feed dog (1) will change after the angle has been adjusted, so it will be necessary to re-adjust the height of the feed dog (1).



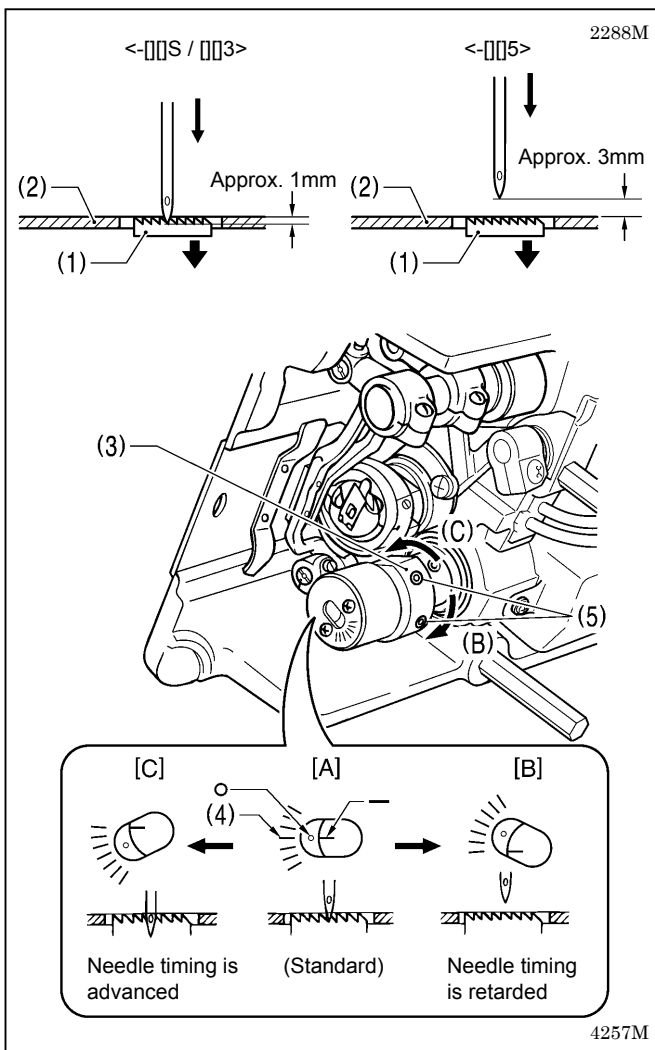
1 O-1 0. Adjusting the needle bar height



Reference line (a), which is the second line from the bottom of the needle bar (1) (fourth line from the bottom when using a DA x 1 needle) should be aligned with the lower edge of the needle bar bush D (2) as shown in the illustration when the needle bar (1) is at its lowest position.

1. Turn the machine pulley to set the needle bar (1) to its lowest position.
2. Remove the oil cap (3).
3. Loosen the screw (4) and then move the needle bar (1) up or down to adjust its position.
4. Securely tighten the screw (4).
5. Replace the oil cap (3).

1 O-1 1. Adjusting the needle and feed mechanism timing



The standard position for point of the needle is as described below when the feed dog (1) is lowered from its highest position until it is aligned with the top of the needle plate (2). (At this time, the “-” mark on the lower shaft will be aligned with the center of the scale (4) (“O” mark) on the vertical cam (3).)

<-□□S / -□□3>

The top of the feed dog (1) and the top of the needle plate (2) should be aligned, and the point of the needle should be approximately 1 mm below the needle plate (2).

<-□□5>

The top of the feed dog (1) and the top of the needle plate (2) should be aligned, and there should be a clearance of approximately 3 mm between the point of the needle and the needle plate (2).

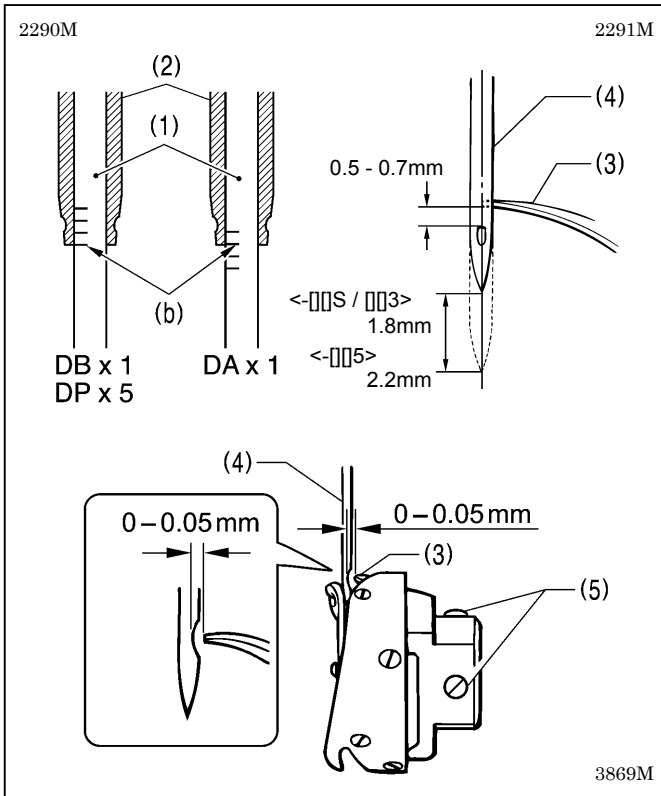
1. Tilt back the machine head.
2. Loosen the two set screws (5), and then turn the vertical cam (3) slightly to adjust the timing. (Use the “-” mark on the lower shaft and the alignment position on the scale (4) of the vertical cam (3) as a guide.)

- To set to the standard position, align the “-” mark on the lower shaft with the center of the scale (4) (“O” mark) on the vertical cam (3). ([A] in the illustration)
- To prevent material slippage from occurring, retard the needle timing. (Turn the vertical cam (3) in the direction of (B). Refer to [B] in the illustration.)
- To improve thread tightening, advance the needle timing. (Turn the vertical cam (3) in the direction of (C). Refer to [C] in the illustration.)

NOTE: Do not turn the vertical cam (3) too far in the direction of (C), otherwise it could cause the needle to break.

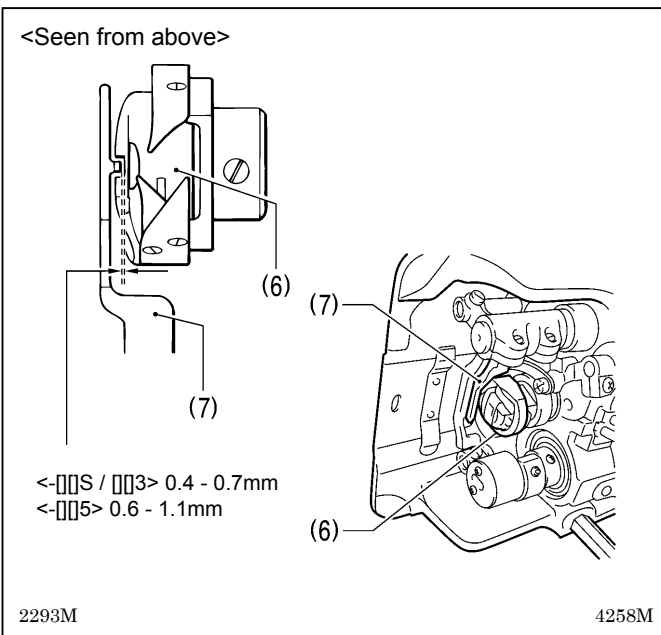
3. After adjustment is completed, securely tighten the two screws (5).

1 0-1 2. Adjusting the needle and rotary hook timing



The tip of the rotary hook (3) should be aligned with the center of the needle (4) when the needle bar (1) moves up from its lowest position to the position where reference line (b), which is the line at the bottom of the needle bar (1) (third line from the bottom when using a DA x 1 needle), is aligned with the lower edge of the needle bar bush D (2) as shown in the illustration.

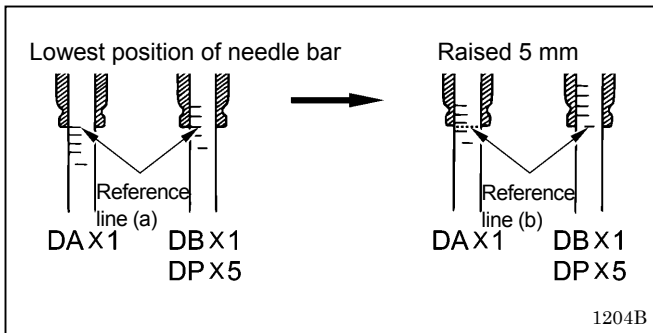
1. Turn the machine pulley to raise the needle bar (1) from its lowest position until reference line (b) is aligned with the lower edge of the needle bar bush D (2) as shown in the illustration.
(The needle should rise by 1.8 mm [2.2 mm for $-\square\square 5$ specifications] and the distance from the needle hole to the tip of the rotary hook should be 0.5 - 0.7 mm.)
2. Loosen the set screws (5), and then align the tip of the rotary hook (3) with the center of the needle (4).
The distance between the tip of the rotary hook (3) and the needle (4) should be approximately 0 - 0.05 mm.
3. Securely tighten the set screws (5).



<Checking the clearance between the rotary hook and bobbin case holder position bracket>

Check that the clearance between the rotary hook (6) and the bobbin case holder position bracket (7) is enough to allow the thread being used to pass through smoothly. The clearance should be 0.4 - 0.7 mm for $-\square\square S / \square\square 3$ models, and 0.6 - 1.1 mm for $-\square\square 5$ models.

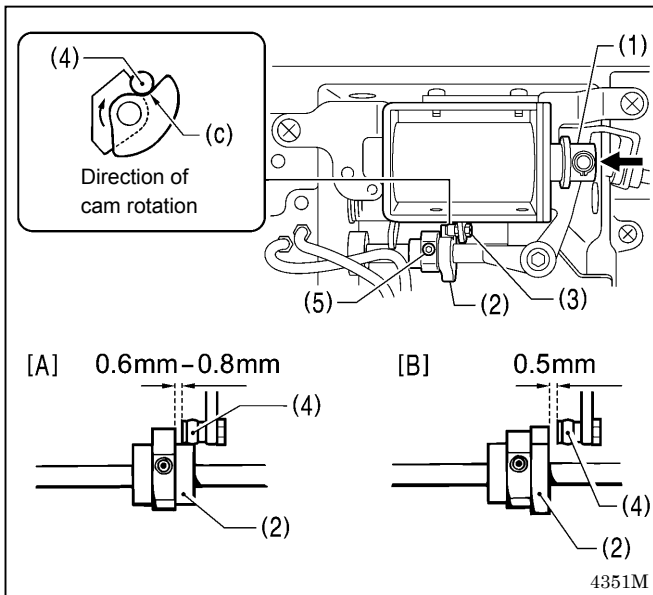
1 0-1 3. Adjusting the thread trimming timing



Remove the presser foot, needle plate and feed dog.

< Thread trimming cam position adjustment >

1. Turn the machine pulley to raise the needle bar 5 mm from its lowest position (reference line (a) position) so that reference line (b) is aligned with the bottom edge of the needle bar bush.

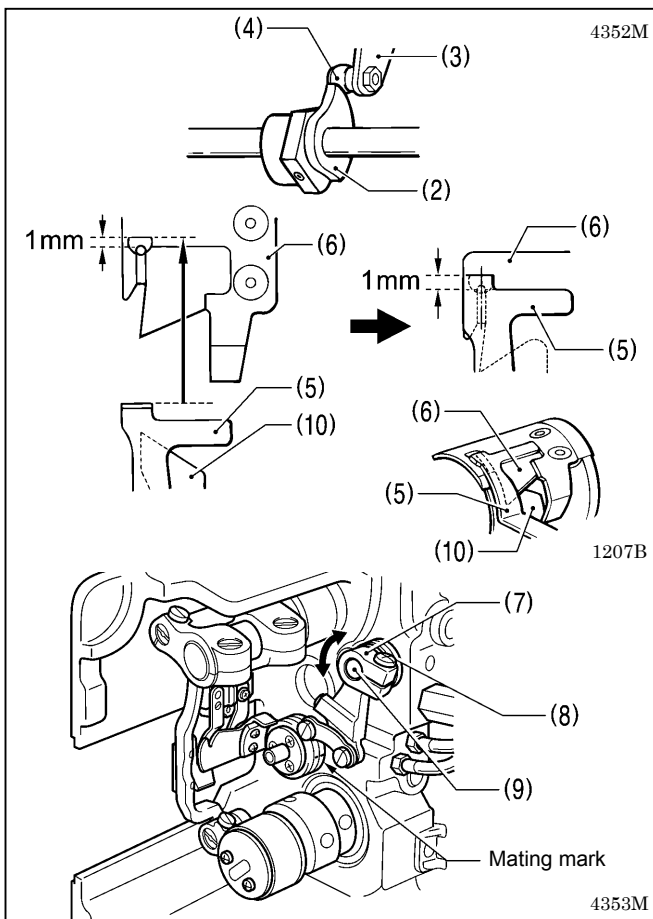


2. At the above position, push the plunger (1) of the thread trimming solenoid with your finger in the direction of the arrow.

Adjust the position of the thread trimmer cam (2) at this time so that the roller shaft (4) of the thread trimmer cam lever assembly (3) touches the hollow (c) of the thread trimmer cam (2) and so that the clearance between the edge of the thread trimmer cam (2) and the roller shaft (4) is 0.6 to 0.8 mm, and then tighten the set screws (5). (Fig. [A])

3. Check that the clearance between the edge of the thread trimmer cam (2) and the roller shaft (4) is 0.5 mm when the roller shaft (4) returns to the right. (Fig. [B])

* Tighten the two set screws (5) to approximately 4 N.m.



< Movable knife and fixed knife position adjustment >

1. Turn the machine pulley, and then push the plunger (1) of the thread trimming solenoid with your finger.
2. In this condition, turn the machine pulley until the roller shaft (4) of the thread trimmer cam lever assembly (3) is sitting on top of the thread trimmer cam (2), then move the thread trimmer lever (7) to adjust its position so that the tip of the fixed knife (5) and the blade of the movable knife (6) are meshed by 1 mm, and then tighten the screw (8).

* Adjust so that the meshing amount is 1 mm at this time, by using the position where the mating marks on the thread trimmer holder and the bushing are aligned as a guide.

* Tighten the screw (8) so that there is no play in the forked shaft (9).

* The lower thread finger (10) must be underneath the movable knife (6).

3. Install the feed dog, needle plate and presser foot.

1 0-1 4. Adjusting the thread take-up amount (-□□3 specifications)

⚠ CAUTION



Turn off the power switch before carrying out this operation.
The machine may operate if the treadle is depressed by mistake, which could result in injury.

NOTE:

Do not use this function with models that are not -□□3 specifications.

When sewing heavy materials, the thread tension can be adjusted more easily if the thread take-up amount is set to a larger amount.

1. Remove the face plate.
2. Remove the two rubber caps (1).
3. Use a hexagonal wrench 3 to loosen the set screws (2) and (3) by approximately two turns.
4. Adjust the thread take-up amount.

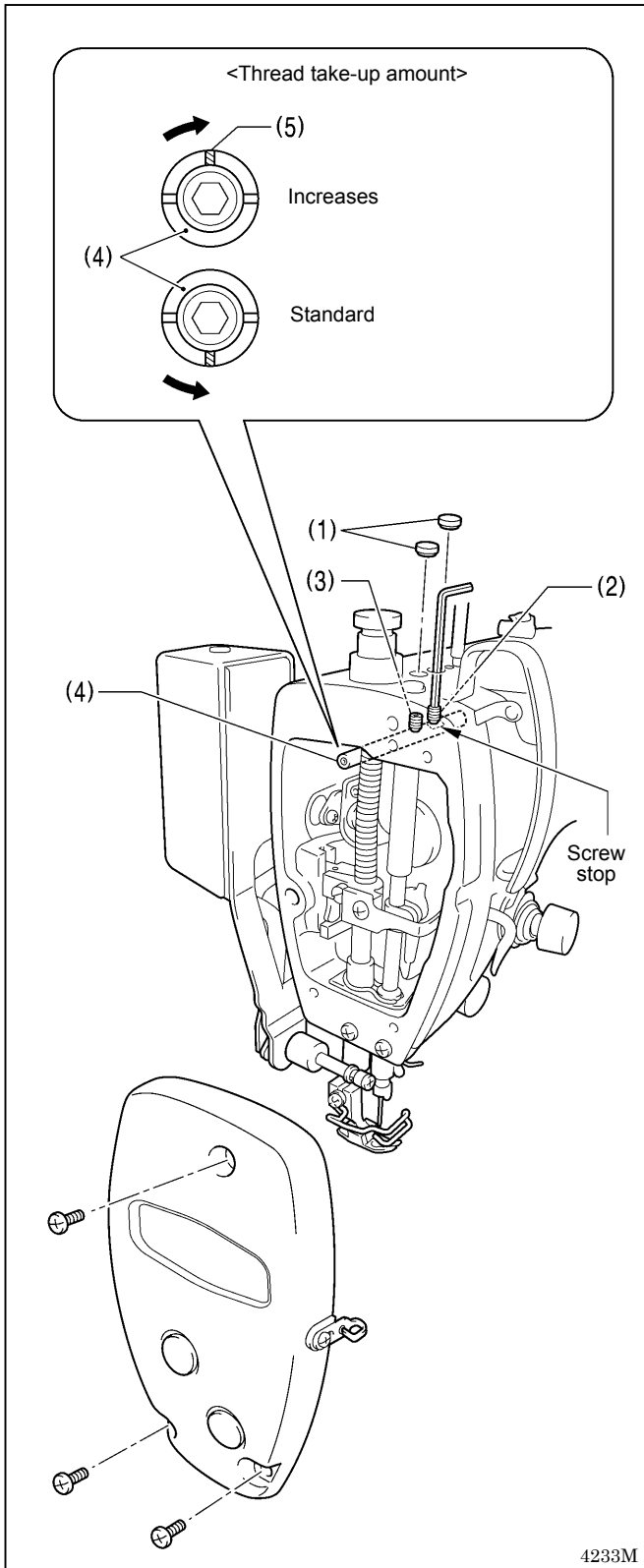
<To increase the thread take-up amount>

Turn the thread take-up support shaft (4) clockwise so that the groove (5) is facing straight upward.

<To return the thread take-up amount to the standard setting>

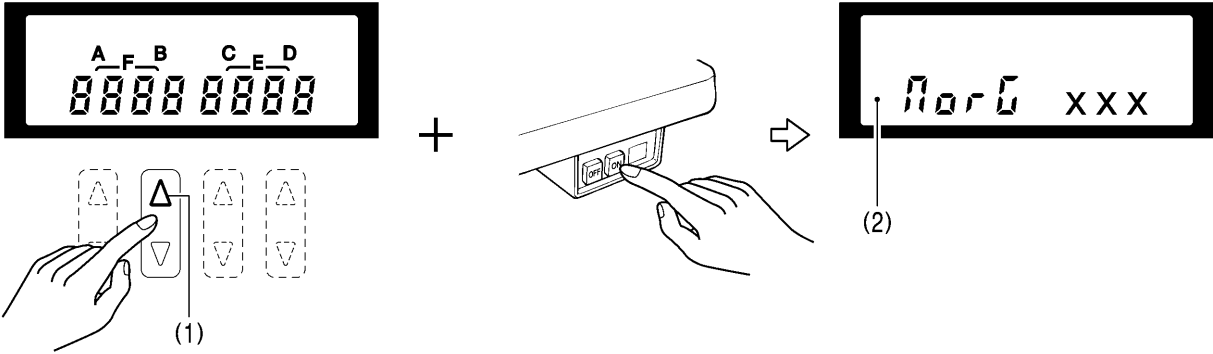
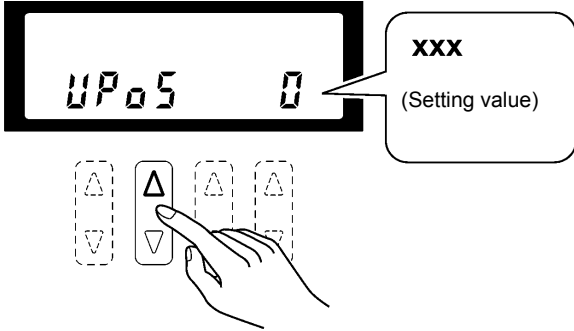
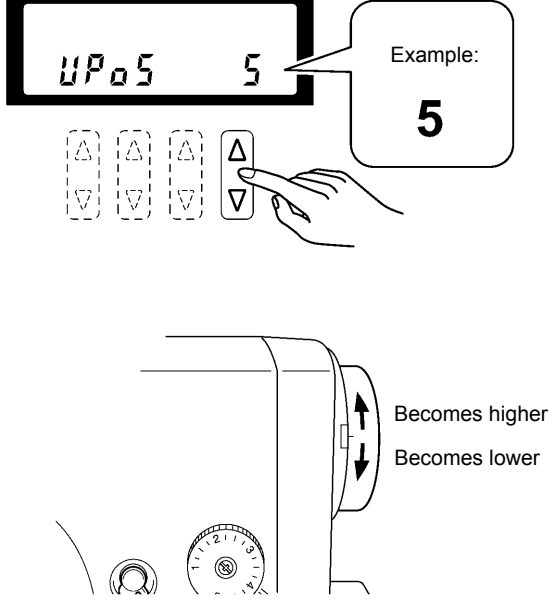


Turn the thread take-up support shaft (4) counterclockwise so that the groove (5) is facing straight downward.

5. With the thread take-up support shaft (4) pushed in as far as it will go, first tighten the set screw (2) until it touches the screw stop on the thread take-up support shaft (4).
6. After this, tighten the set screw (3).
7. Install the two rubber caps (1).
8. Install the face plate.



10-15. Adjusting the needle up stop position

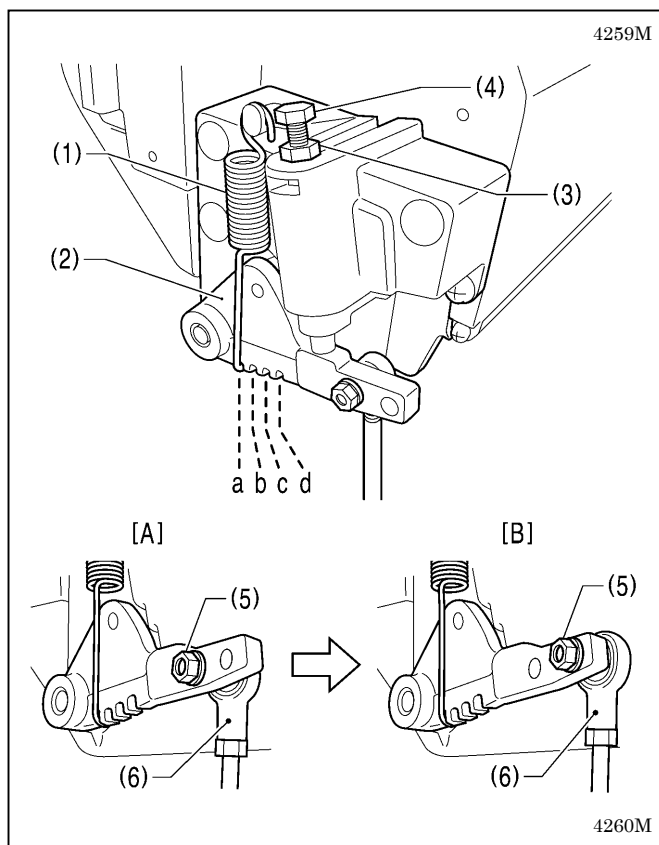
<G50 operation panel>

<p>1</p>	 <p style="text-align: right;">2128B 2138M</p> <p>(While pressing the Δ key (1), press the power ON switch.)</p> <p>"MorG xxx" will appear in orange in the main display (2). (xxx is the value at the time of shipment from the factory, and varies depending on the sewing machine.)</p>
<p>2</p>	<p>Selecting "UpoS xxx"</p>  <p>(Press once)</p> <p style="text-align: right;">4190M</p> <p>"xxx" is the setting value for the needle up stop position, and "0" is the default setting.</p>
<p>3</p>	<p>Needle up stop position setting</p>  <p>Example: 5</p> <ul style="list-style-type: none"> • If you press the Δ key, the setting value will increase and the needle up stop position will become lower. • If you press the ∇ key, the setting value will decrease and the needle up stop position will become higher. • The setting range is from -10 to 10. <p>* A setting value of "10" corresponds to an angle of rotation of approximately 10° for the upper shaft.</p> <p style="text-align: right;">4191M 2138M 2139M</p>
<p>4</p>	 <p>The setting values will be memorized.</p> <p style="text-align: right;">4192M</p>
<p>5</p>	 <p>Normal sewing machine operation will then be possible.</p> <p style="text-align: right;">4193M</p>

<G10 operation panel >

<p>1</p>	<p>(1)</p>	<p>4217M 2138M</p> <p>(2)</p>
<p>(While pressing the Δ key (1), press the power ON switch.) "MorG" will appear in the display (2).</p>		
<p>2</p>	<p>Selecting "UPoS"</p> <p>(Setting item)</p> <p>(Press once)</p>	<p>4218M</p>
<p>3</p>	<p>Needle up stop position setting</p> <p>Example: 5</p> <p>(Setting value)</p> <p>Becomes higher Becomes lower</p>	<ul style="list-style-type: none"> • If you press the Δ key, the setting value will increase and the needle up stop position will become lower. • If you press the ∇ key, the setting value will decrease and the needle up stop position will become higher. • The setting range is from -10 to 10. <p>* A setting value of "10" corresponds to an angle of rotation of approximately 10° for the upper shaft.</p> <p>4219M 2138M 2139M</p>
<p>4</p>	<p>OFF</p> <p>(Setting item)</p>	<p>The setting will be stored and the display will return to the setting item.</p> <p>4220M</p>
<p>5</p>		<p>Normal sewing machine operation will then be possible.</p> <p>4206M</p>

1 O-1 6. Adjusting the treadle



<Forward depression sensitivity adjustment>

If the machine starts running at low speed when your foot is simply resting on the treadle, or if the treadle pressure is felt to be too weak, adjust the position (a to c) at which the treadle spring (1) is hooked onto the treadle lever (2).

* a is the weakest position, and it becomes gradually stronger at b, c and d respectively.

<Backward depression sensitivity adjustment>

1. Loosen the nut (3) and turn the bolt (4).

* When the bolt (4) is tightened, the treadle operation becomes heavier, and when it is loosened, the operation becomes lighter.

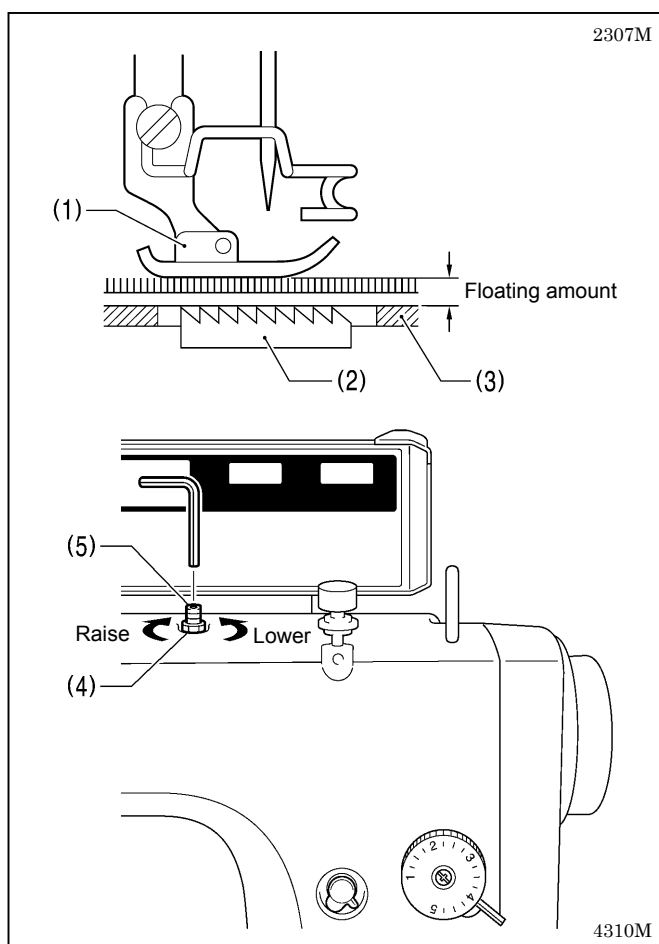
2. Tighten the nut (3).

<Adjusting the treadle stroke>

Remove the nut (5), and then move the connecting rod joint (6) from the position in figure A to the position in figure B. The treadle stroke will then be increased by approximately 27 %.

At this time, the treadle forward and backward depression sensitivity will change, so readjust if necessary.

1 O-1 7. Adjusting the presser foot floating amount (minute lifting amount)



When sewing stretch materials and materials with long pile, you can make minute adjustments to the floating amount for the presser foot (1) in accordance with the material.

1. Turn the sewing machine pulley by hand to move the feed dog (2) below the needle plate (3).

2. Use the lifting lever to lower the presser foot (1).

3. Loosen the nut (4).

4. Use a hexagon wrench to turn the adjusting screw (5) to adjust the floating amount.

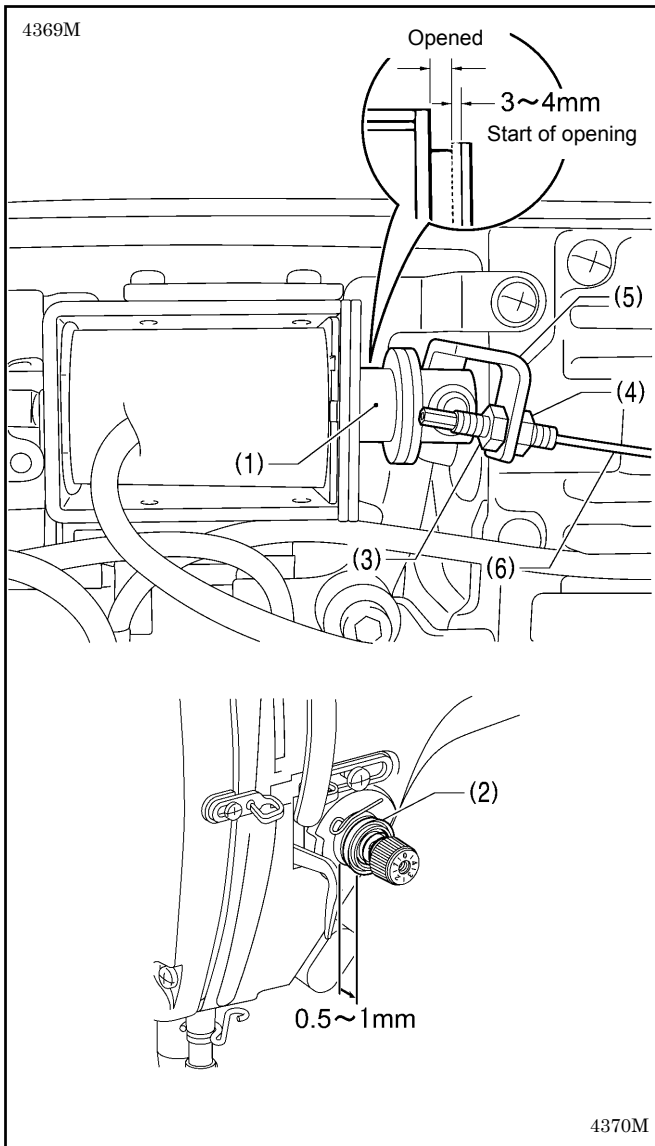
• To raise the presser foot (1) ...
Turn the adjusting screw (5) clockwise.

• To lower the presser foot (1) ...
Turn the adjusting screw (5) counterclockwise.

5. Tighten the nut (4).

* After making the adjustment, sew a piece of material to check the floating amount.

1 O-1 8. Adjusting the tension release wire



If the tension discs remain open or if the upper thread pulls out from the needle hole after thread trimming, carry out the following adjustment.

* Lower the presser foot before carrying out the adjustment.

A. If the upper thread pulls out of the needle hole (The tension release wire is not operating enough during thread trimming.)

- When the plunger (1) of the thread trimming solenoid is pushed 3 to 4 mm, the tension discs (2) start to open, and when it is pushed as far as it will go, the tension discs (2) should always be open.
- When the plunger (1) is released, the tension discs (2) close.

1. Loosen the nuts (3) and (4), and then push the plunger (1) of the thread trimming solenoid 3 to 4 mm.
2. Tighten the nut (3) [left side] until the tension discs (2) start to open.
3. Check that the tension discs (2) open when the plunger (1) is pushed as far as it will go, and that the tension discs (2) close when the plunger (1) is released.
4. Tighten the nut (4) [right side].

B. If the tension discs remain open

1. Check that the solenoid lever (5) has returned.
2. Check that the tension release wire (6) is not being stretched.
3. Use nuts (3) and (4) to adjust as described in A above.
* If adjustment is not possible, adjust the tension of the tension release wire (6).

1 0-1 9. Adjusting the rotary hook lubrication amount (-[10], [13] specifications)

CAUTION

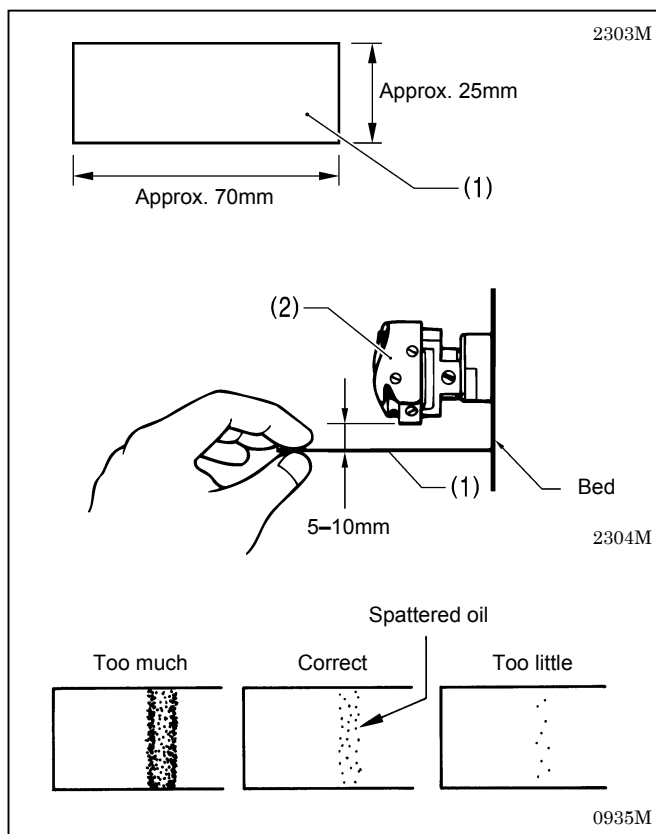


Be careful not to touch your fingers or the lubrication amount check sheet against moving parts such as the rotary hook or the feed mechanism when checking the amount of oil supplied to the rotary hook, otherwise injury may result.

Use the following procedure to check the amount of oil being supplied to the rotary hook when replacing the rotary hook or when changing the sewing speed.

NOTE:

If the sewing machine is sub-class -[5], it is a fully dry-type machine and so adjustment of the rotary hook lubrication amount is not necessary.



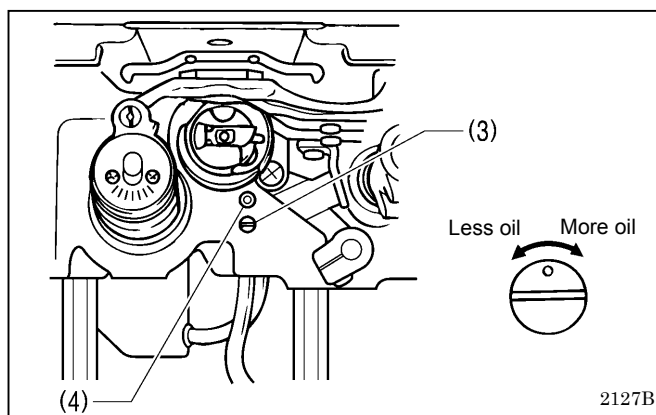
<Checking the lubrication amount>

1. Remove the thread from all points from the thread take-up to the needle.
2. Use the lifting lever to lift the presser foot.
3. Run the machine at the normal sewing speed for approximately 1 minute without sewing any material (following the same start/stop pattern as when actually sewing).
4. Place the lubrication amount check sheet (1) underneath the rotary hook (2) and hold it there. Then run the sewing machine at the normal sewing speed for 8 seconds. (Any type of paper can be used as the lubrication amount check sheet (1).)
5. Check the amount of oil which has spattered onto the sheet.

If adjustment is necessary, carry out the following operations in "Adjusting the lubrication amount".

NOTE:

If the lubrication amount does not match the correct amount shown in the illustration at left (if the amount of spattered oil is too much or none at all), turn the adjusting screw (3) clockwise to fully tighten it, turn it back counterclockwise by 2 1/2 turns, and then carry out the following adjustment.








<Adjusting the lubrication amount>

1. Tilt back the machine head.
2. Turn the adjusting screw (3) to adjust the lubrication amount.
 - If the rotary hook adjusting screw (3) is turned clockwise, the lubrication amount becomes greater.
 - If the rotary hook adjusting screw (3) is turned counterclockwise, the lubrication amount becomes smaller.
3. Check the lubrication amount again according to the procedure given in "Checking the lubrication amount" above.
 - * Turn the adjusting screw (3) and check the lubrication amount repeatedly until the lubrication amount is correct.
4. Check the lubrication amount again after the sewing machine has been used for approximately two hours.

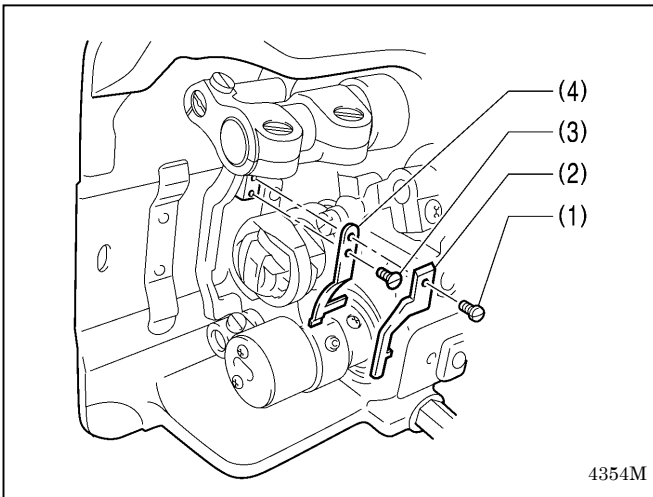
1 1. REPLACING PARTS

! CAUTION

-  Replacement of parts should only be carried out by a qualified technician.
-  Use only the proper replacement parts as specified by Brother.
-  Turn off the power switch and disconnect the power cord before replacing any parts. The machine may operate if the treadle is depressed by mistake, which could result in injury.

-  Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.
-  Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhea. Keep the oil out of the reach of children.

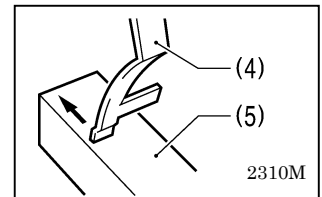
1 1-1. Fixed knife



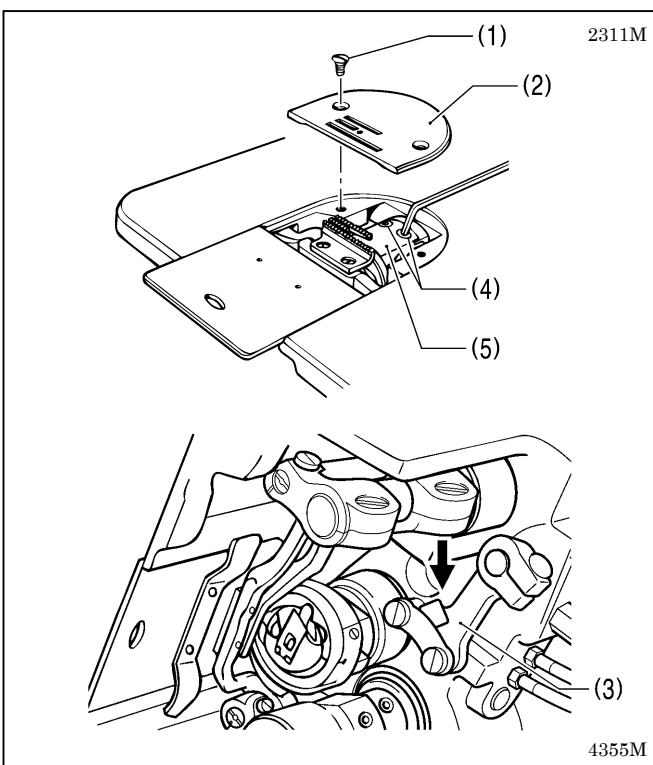
1. Tilt back the machine head.
 2. Remove the screw (1), and then remove the rotary hook stopper (2).
 3. Remove the screw (3), and then remove the fixed knife (4).
- * Carry out the above steps in reverse to install the fixed knife (4).

Sharpening the fixed knife

If the cutting performance deteriorates, sharpen the fixed knife (4) on a whetstone (5) as shown in the illustration.

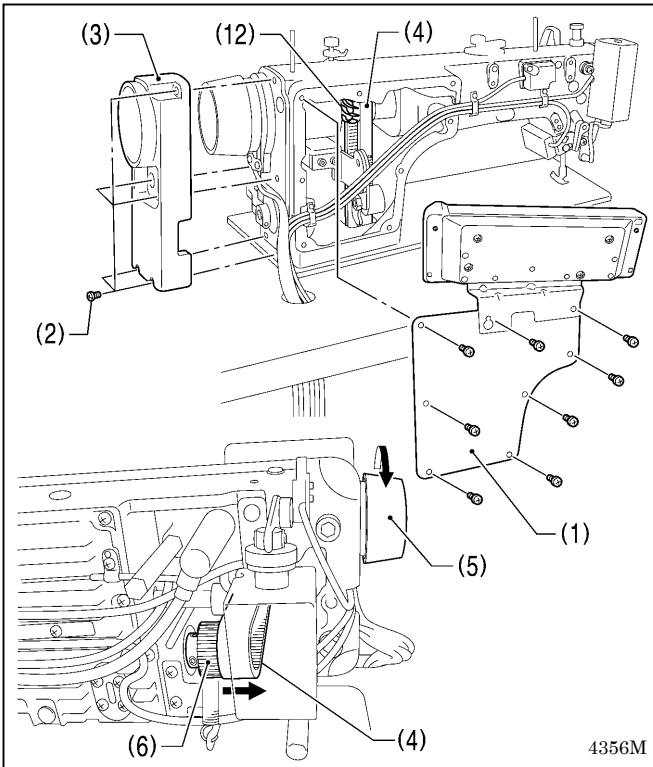


1 1-2. Movable knife



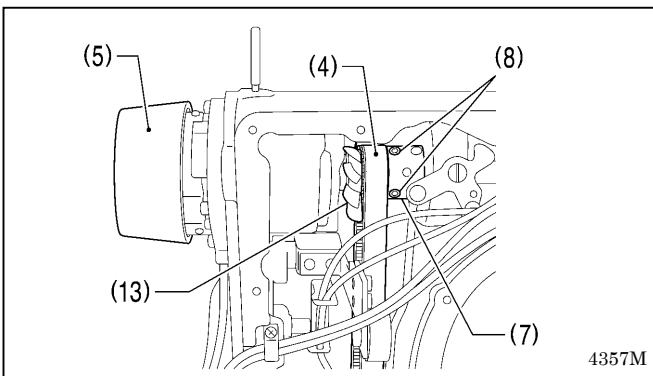
1. Remove the needle.
 2. Lift up the presser foot using the lifting lever.
 3. Remove the two screws (1), and then remove the needle plate (2).
 4. Turn the machine pulley to raise the needle bar to its highest position.
 5. Tilt back the machine head.
 6. Push the thread trimmer connecting rod (3) in the direction of the arrow until the two screws (4) can be seen.
 7. Remove the two screws (4), and then remove the movable knife (5).
- * Carry out the above steps in reverse to install the movable knife (5).

1 1-3. Motor and timing belt

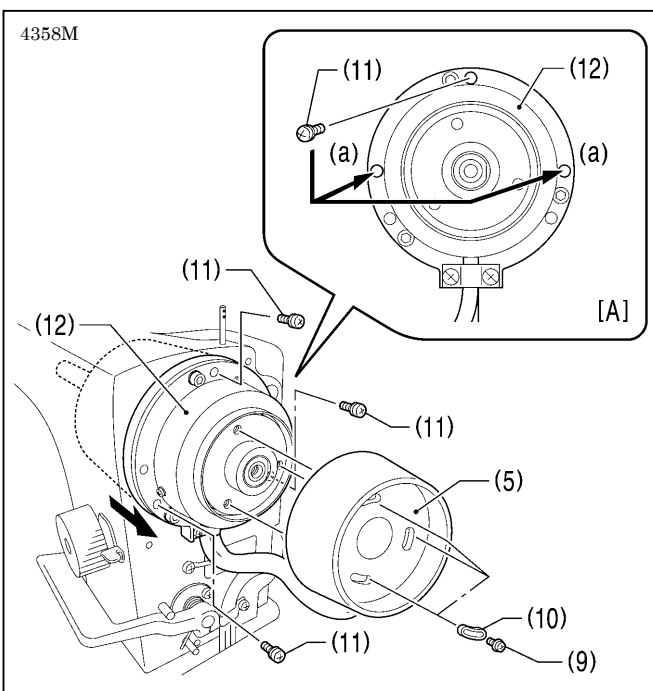


< Timing belt removal >

1. Remove the side plate (1).
2. Remove the five screws (2), and then remove the motor cover (3).
3. Tilt back the machine head.
4. While pushing the timing belt (4) in the direction of the arrow, turn the machine pulley (5) forward to remove the timing belt (4) from timing pulley D (6).
5. Return the machine head to its original position.



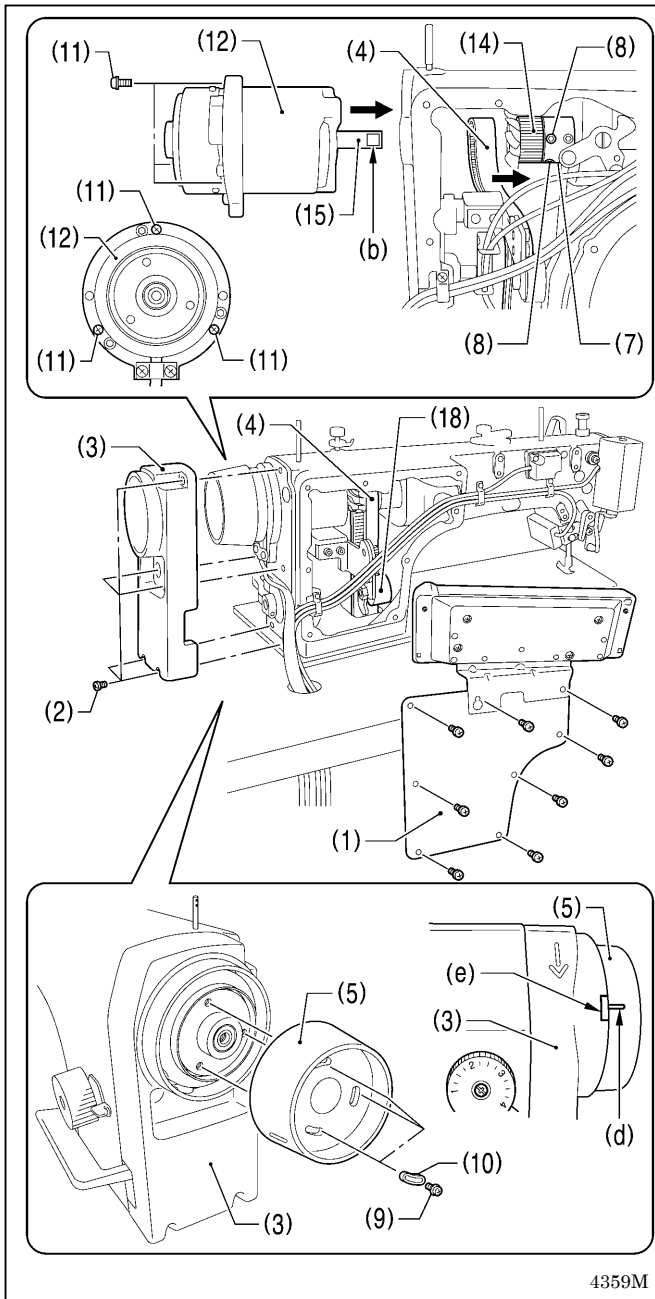
6. Turn the machine pulley (5) until the four set screws (8) on the joint (7) are facing toward the front. Loosen the two set screws (8) at the left by about five turns each.



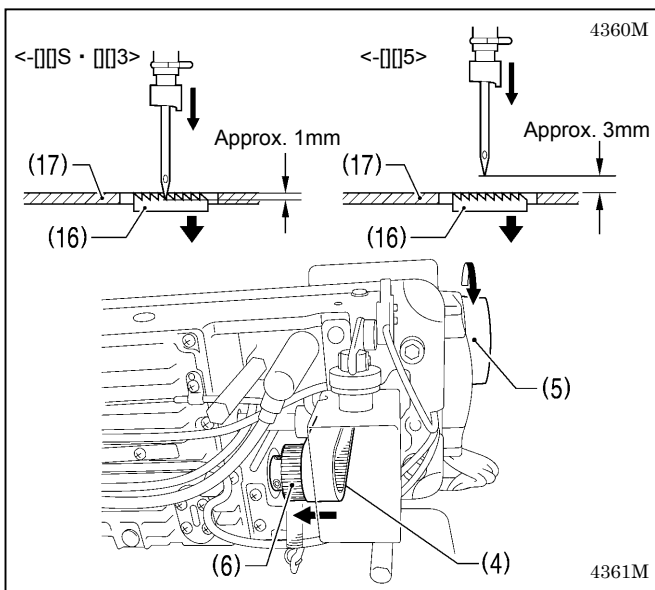
7. Remove the three screws (9), and then remove the pulley washer (10) and the machine pulley (5).
8. Remove the three screws (11), and then remove the motor (12).
* If it is difficult to remove the motor (12), gradually tighten the two removed screws (11) evenly into the screw holes (a) at the left or right. The motor (12) can then be pulled forward and removed. (Fig. [A])
9. Pull out the timing belt (4) by hand while being careful not to get it caught on the fan (13).

< Motor removal >

Carry out steps 1 and 2 and steps 6 to 8 of <Timing belt removal>.



4359M



4360M

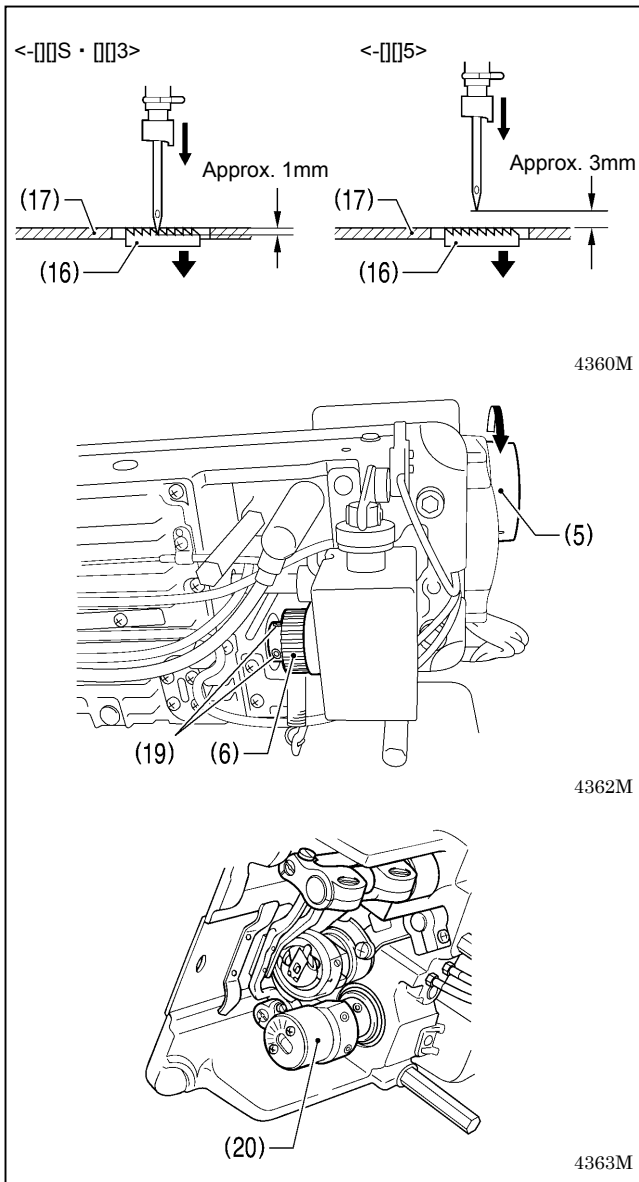
4361M

< Timing belt installation >

1. Place the timing belt (4) onto timing pulley U (14).
 2. Secure the motor (12) with the three screws (11).
 - * Insert the motor (12) so that the upper set screws (8) on the joint (7) are facing toward the front and also so that the notch (b) on the motor shaft (15) is facing toward the front.
 3. Tighten the two set screws (8) at the left side of the joint (7) starting from the one at the top.
 - * Check that the set screw (8) at the top of the joint (7) is facing toward the front at this time.
 4. Secure the motor cover (3) with the five screws (2).
 5. Raise the thread take-up to its highest position, turn the machine pulley (5) so that the reference line (d) is aligned within the mark (e) on the motor cover (3) as shown in the illustration, and then secure the machine pulley (5) and the pulley washer (10) by tightening the three screws (9).
 - * Tighten the three screws (9) so that they are in the middle of the screw holes. (The reference line (d) and the mark (e) may move out of alignment when tightening the screws, but this is not a problem.)
 6. Adjust the positions of the machine pulley (5) and timing pulley D (6) as follows.
 - 1) Tilt back the machine head.
 - 2) Turn timing pulley D (6) forward to lower the feed dog (16) until it is at the same height as the needle plate (17).
 - 3) Turn the machine pulley (5) forward to adjust so that the tip of the needle is at the following position.
 - <-□□S · □□3> So that the point of the needle is approximately 1 mm below the needle plate (17)
 - <-□□5> So that there is a clearance of approximately 3 mm between the point of the needle and the top of the needle plate (17)
 7. Place the timing belt (4) onto timing pulley D (6).
 - * Check that the timing belt (4) is placed on the back position of the tension pulley (18).
 8. Turn the machine pulley (5) forward until the timing belt (4) is set securely.
 9. Return the machine head to its original position.
 10. Install the side plate (1).
- * After the timing belt has been installed, be sure to then carry out the steps in <Timing belt installation check> (refer to the next page).

< Motor installation >

Carry out steps 2 to 5 and step 10 of <Timing belt installation>.



< Timing belt installation check >

1. Check that the needle and rotary hook timing is correct. (Refer to "10-12. Adjusting the needle and rotary hook timing".)
 - * If they are correct, continue from step 5, otherwise continue from step 2.
2. Check that the needle and feed mechanism timing is correct.

Turn the machine pulley (5) forward to lower the feed dog (16) from its highest position until it is aligned with the top of the needle plate (17), and check that the tip of the needle is at the following position at this time.

 - <S · 3> The top of the feed dog (16) and the top of the needle plate (17) should be aligned, and the point of the needle should be approximately 1 mm below the needle plate (17).
 - <5> The top of the feed dog (16) and the top of the needle plate (17) should be aligned, and there should be a clearance of approximately 3 mm between the point of the needle and the needle plate (17).
 - * If it is not in the correct position, carry out the following steps.
 - 1) Tilt back the machine head, and then loosen the two set screws (19).
 - 2) Turn timing pulley D (6) forward to lower the feed dog (16) until it is at the same height as the needle plate (17).
 - 3) While holding the vertical cam (20) with one hand so that it will not move, turn the machine pulley (5) forward to lower the needle to the correct position.
 - 4) Tighten the two set screws (19).
3. Adjust the needle and rotary hook timing so that it is correct. (Refer to "10-12. Adjusting the needle and rotary hook timing".)
4. Check that the thread trimming timing is correct. If it is not correct, adjust it by following the adjustment procedure. (Refer to "10-13. Adjusting the thread trimming timing".)
5. Set the sewing machine to needle up stopping, and then operate the sewing machine and let it stop. Check that the reference line (d) on the machine pulley (5) is within the range of the mark (e) on the motor cover (3) at this time. (Refer to previous page)

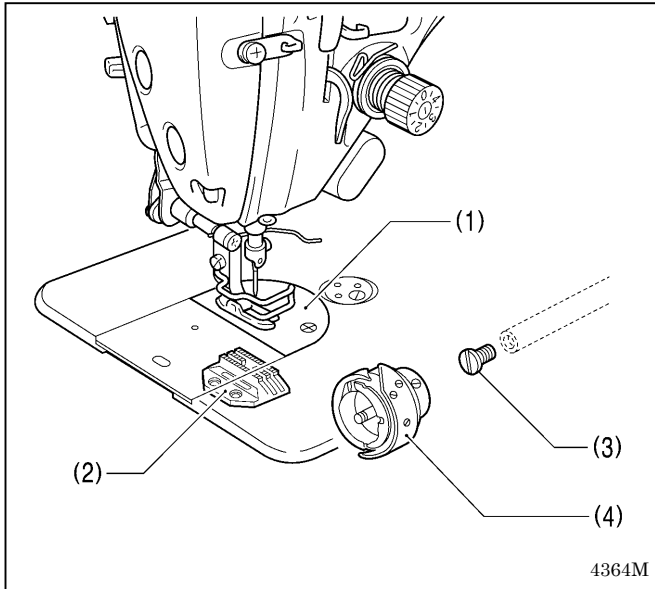
If the reference line (d) is not aligned within the mark (e), loosen the three screws (9), adjust the position of the machine pulley (5) so that the reference line (d) is aligned within the mark (e), and then tighten the three screws (9).
6. If adjustment of the needle up stop position is necessary, adjust according to the procedure in "10-15. Adjusting the needle up stop position".

1 1-4. Rotary hook RP

If replacing the standard rotary hook with a rotary hook RP (lubrication-free rotary hook) on sub-class -40[] or -43[] machines, use the following parts.

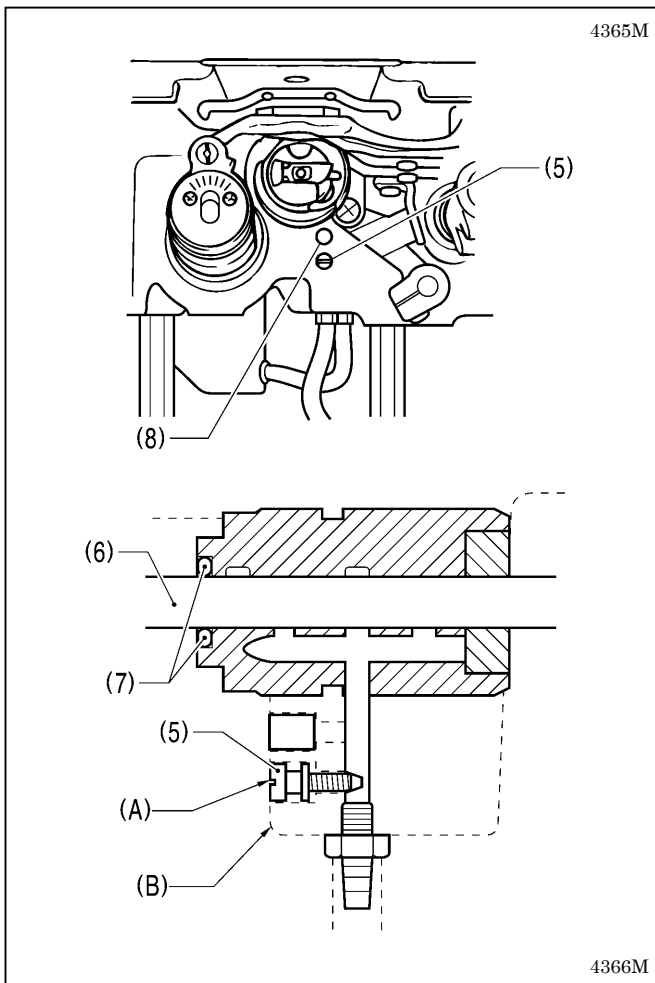
S52936-001 (ROTARY HOOK, W/BOX)
SB0414001 (SCREW, CAP)

NOTE: When using the rotary hook RP (lubrication-free rotary hook), set the sewing speed to 4,000 sti/min or less.



<Replacing>

1. Remove the needle and the presser foot.
2. Remove the needle plate (1) and the feed dog (2).
3. Remove the rotary hook.
4. Replace the screw (3).
Tighten the screw (3) securely.
5. Install the rotary hook RP(4) and the needle.
After installing the rotary hook RP, adjust the needle and rotary hook timing. (Refer to "10-12. Adjusting the needle and rotary hook timing".)
6. Install the feed dog (2).
7. Install the needle plate (1).
Adjust the installation position of the feed dog (2) so that it is in the middle of the needle plate (1) groove.
8. Install the presser foot.



<Adjusting the adjusting screw>

Tighten the adjusting screw (5) as far as it will go, and then turn it back the other way about three full turns. (At this time, the head (A) of the adjusting screw (5) should be almost flush with the edge (B) of the bed.)

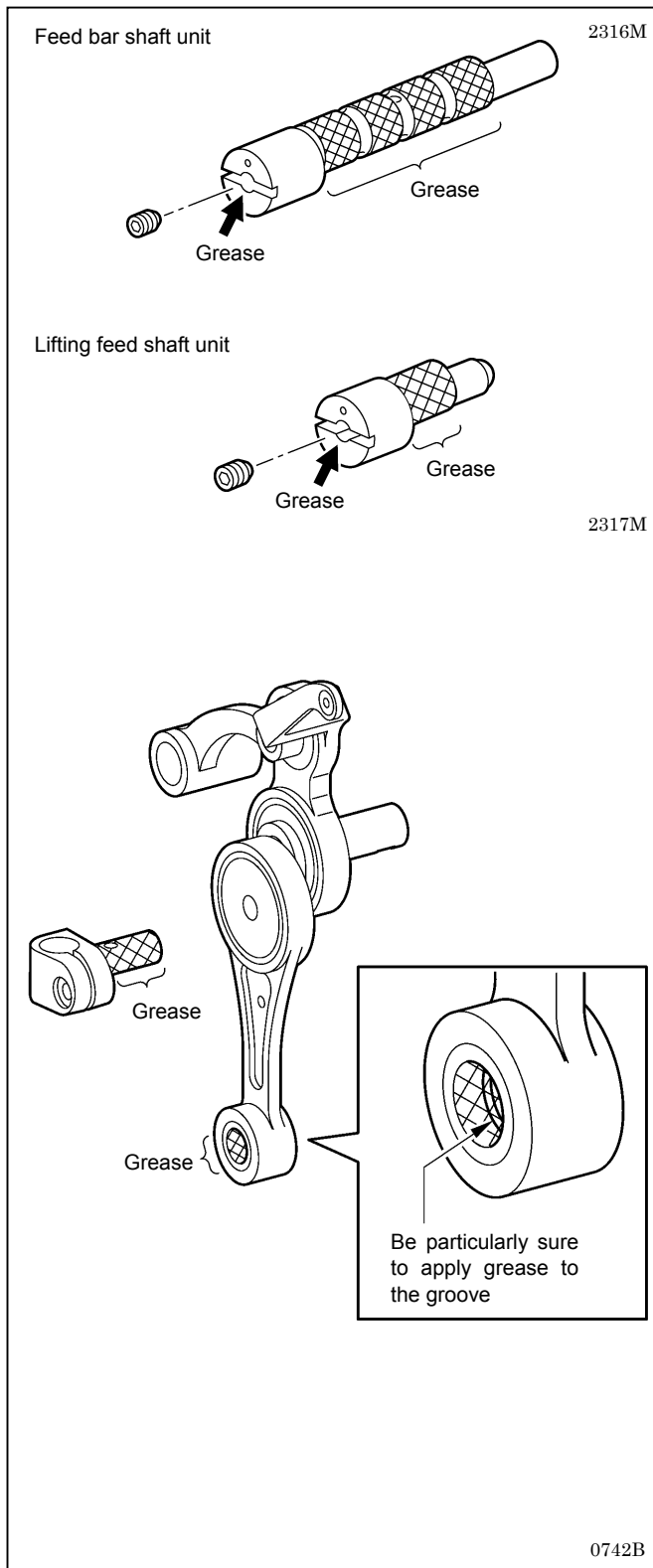
NOTE:


- If the sewing machine is used while the adjusting screw (5) is in the fully-tightened position, it will cause oil to leak out through the gap between the rotary hook shaft (6) and the bracket (7).
- Do not remove the rubber cap (8).

1 1-5. Feed bar shaft, lifting feed shaft

When changing over these parts, apply grease as described below and then install the parts to the sewing machine.

* Use Brother-specified grease (SA8837-001).



1. Apply grease to the holes of each part as shown in the arrow until a small amount of grease overflows.
2. Tighten the screws to force the grease in.
3. Wipe away any excess grease from around the screws.
4. Apply grease to the meshing areas ( areas) of each part.
5. Install each part to the sewing machine.

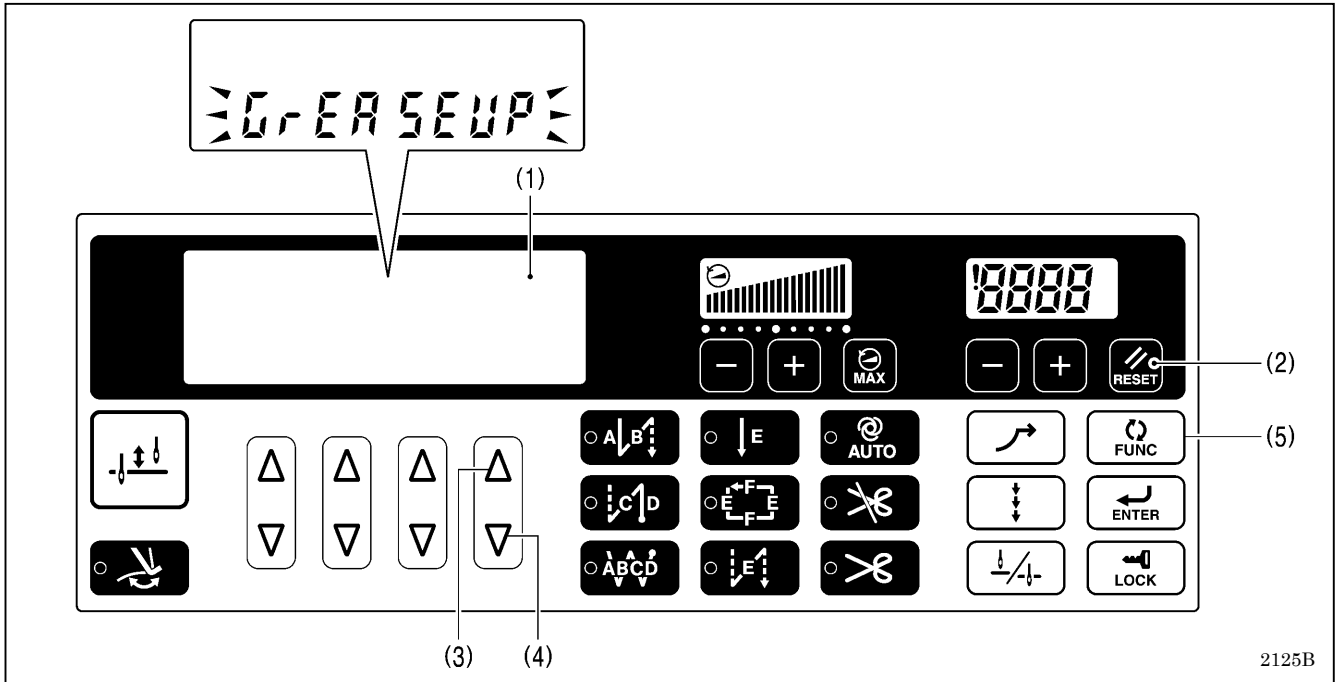
2319M

1 2. APPLYING GREASE (-[3], [5] SPECIFICATIONS)

1 2-1. When “GrEASEUP” appears...When using the G50 operation panel

If “GrEASEUP” flashes on the main display (1) and a buzzer sounds when the power switch is turned on, it means that grease needs to be applied. (The sewing machine will not operate at this time, even if the treadle is depressed.) Apply grease as required, while referring to the following for details.

* If the sewing machine is of -[0] specifications, it is a minimum lubrication-type sewing machine, and so there is no need to add grease.



<To continue sewing without applying grease>

1. Press the RESET key (2).
2. The main display (1) will change to stitch number display mode, and sewing will be possible when the treadle is depressed.

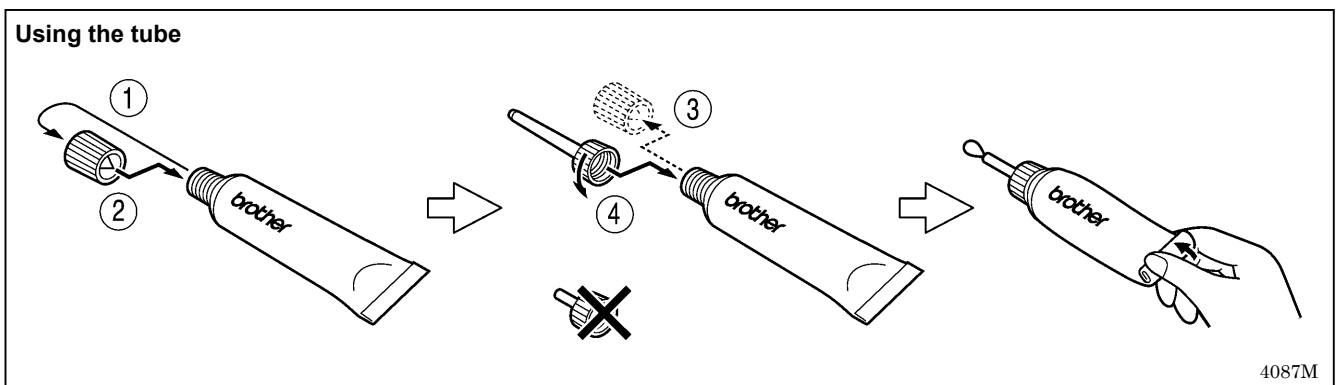
NOTE

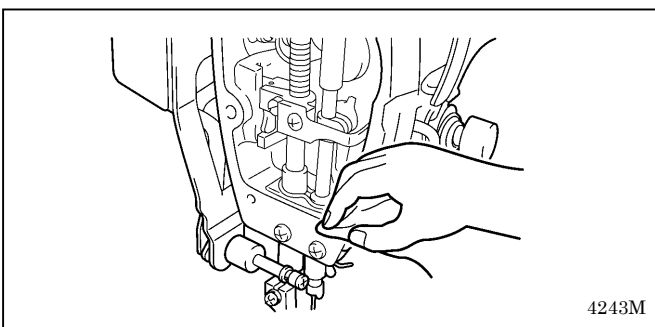
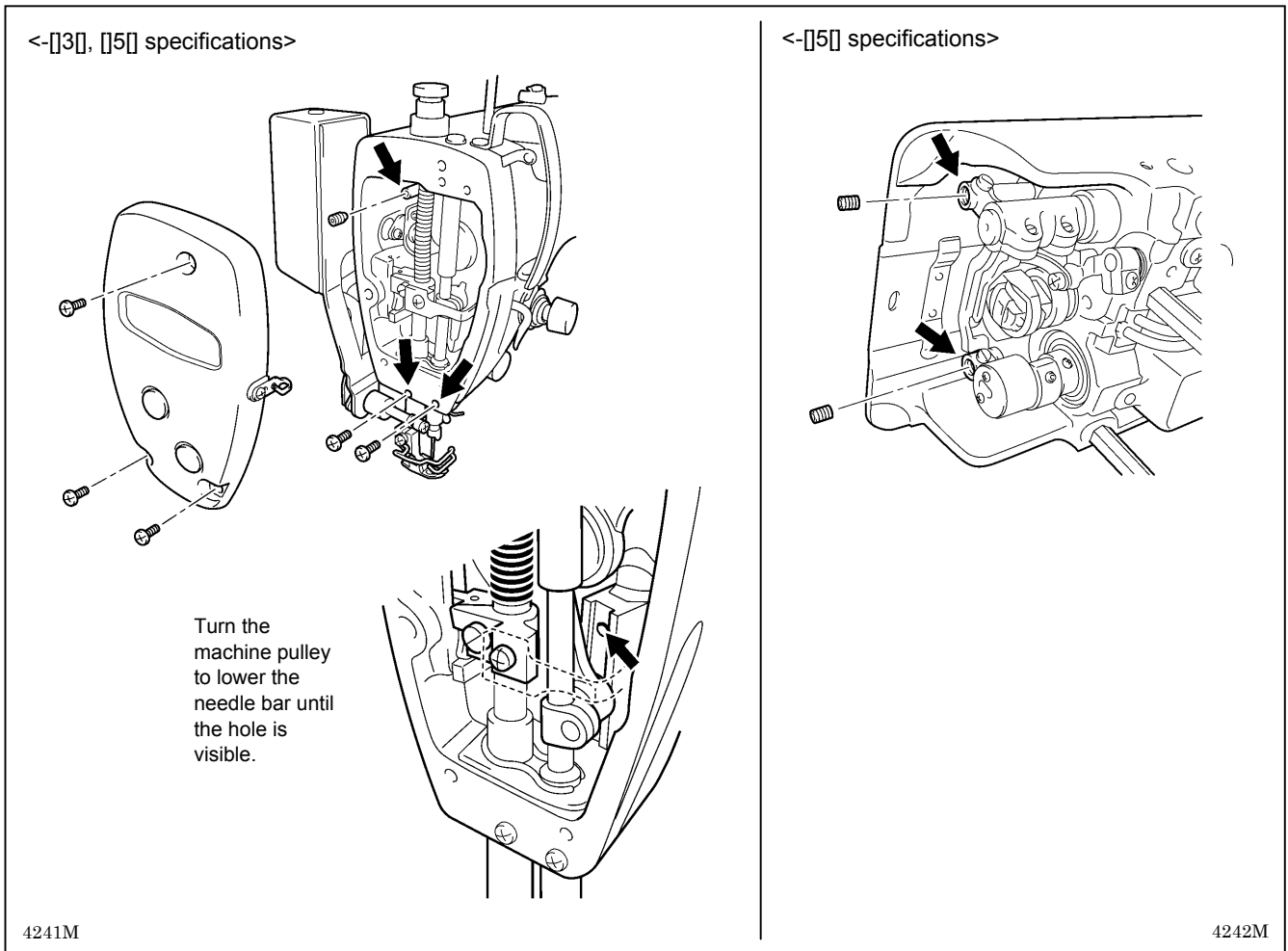
- If you do not apply grease when the “GrEASEUP” notification flashes, the notification will continue to flash each time the power is turned on until you reset the notification by carrying out the procedure on the following page.
- If you continue to use the sewing machine after the “GrEASEUP” notification appears without applying grease (or without carrying out the reset procedure), “ E100” will appear after a certain period of time and the sewing machine will be forcibly prevented from operating for safety reasons. If this happens, apply grease and carry out the reset procedure.

* If you continue to use the sewing machine after carrying out the reset procedure but without applying grease, problems with the sewing machine may result.

<Applying grease>

Use Brother-specified “Grease unit (SA8837-001)”.





1. Turn the power switch to "OFF".
2. Remove the screws and the set screws.
3. Apply grease to each of the holes until the grease overflows slightly.
4. Tighten the screws and the set screws in order to push the grease in.
5. Turn the machine pulley by hand to move the needle bar up and down several times in order to disperse the grease.
6. Use a cloth to wipe away any excess grease from around the screws and set screws and from underneath needle bar bush D.
7. Carry out the reset procedure given below.

<Resetting the grease consumption amount>

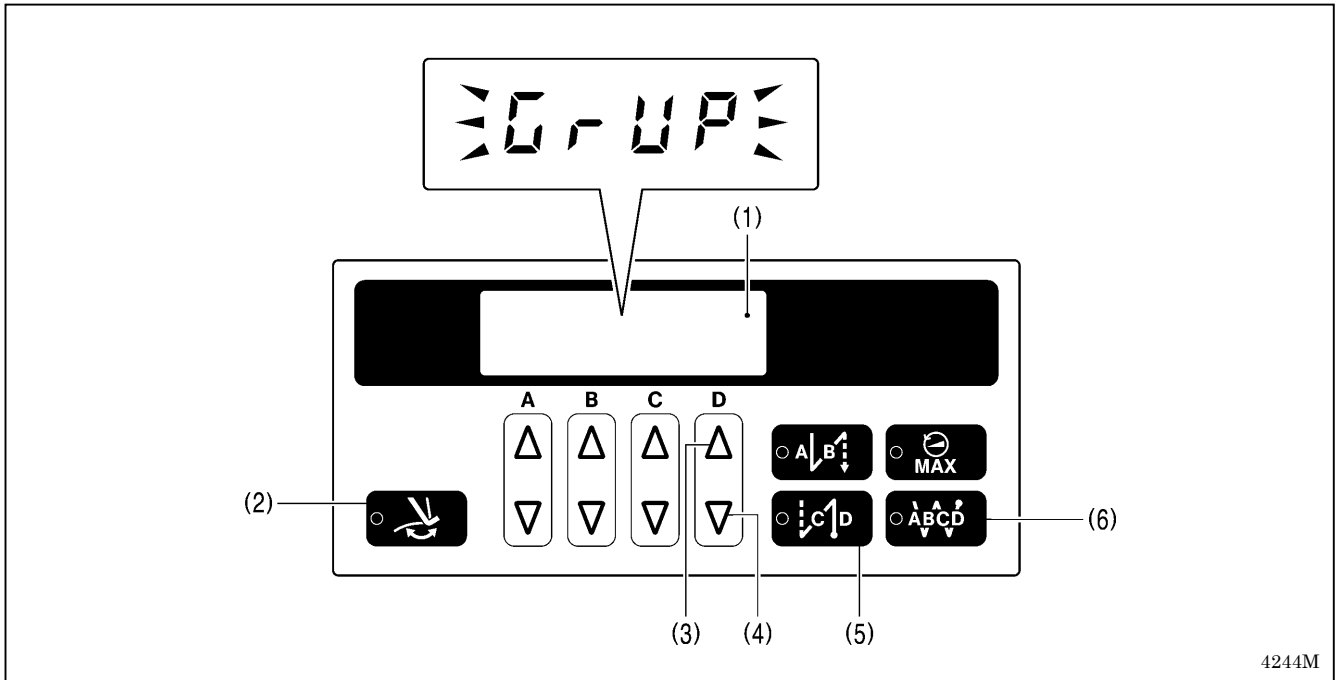
After the grease has been applied, carry out the following procedure to reset the grease consumption amount.

1. While pressing the Δ key (3) and the ∇ key (4) at the right end simultaneously, press the power ON switch.
2. "GuCt xxx" will appear in the main display (1). ("xxx" represents the amount of grease consumed. For example, "100" means that 100% of the grease has been consumed.)
3. Press the RESET key (2) for two seconds or more.
4. The main display (1) will change to "GuCt 0".
5. Press the FUNC key (5). The main display (1) will change to stitch number display mode and treadle operation will be possible. (This completes the reset procedure.)

1 2-2. When “GrUP” appears ... When using the G10 operation panel

If “GrUP” flashes in the display (1) and the buzzer sounds when the power ON switch is pressed, it means that it is time to add grease. (The sewing machine will not operate at this time, even if the treadle is depressed.)
Apply grease as required, while referring to the following for details.

* If the sewing machine is of -[0] specifications, it is a minimum lubrication-type sewing machine, and so there is no need to add grease.



<To continue sewing without applying grease>

1. Press the thread wiper key (2).
2. The display (1) will change to stitch number display mode and sewing will be possible when the treadle is depressed.

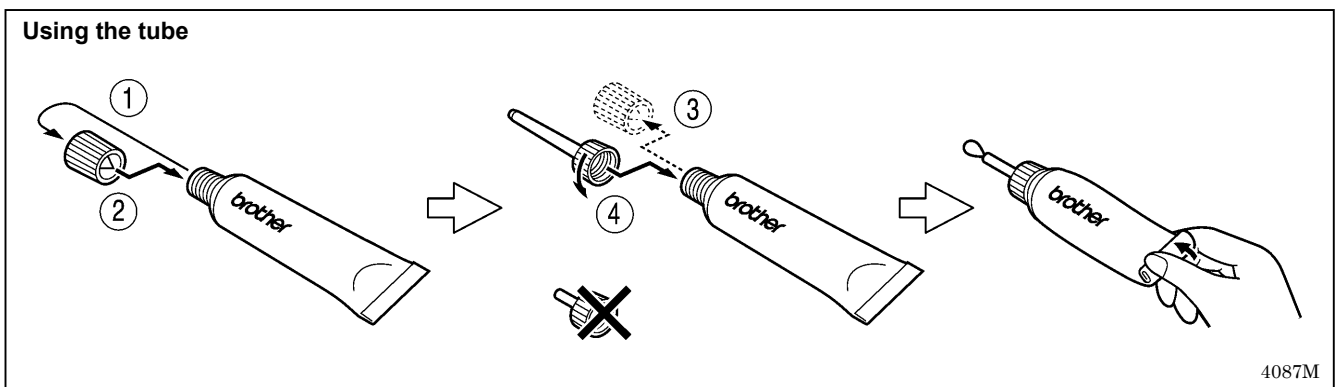
NOTE

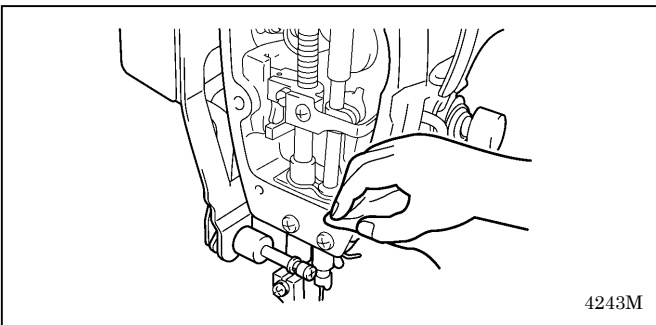
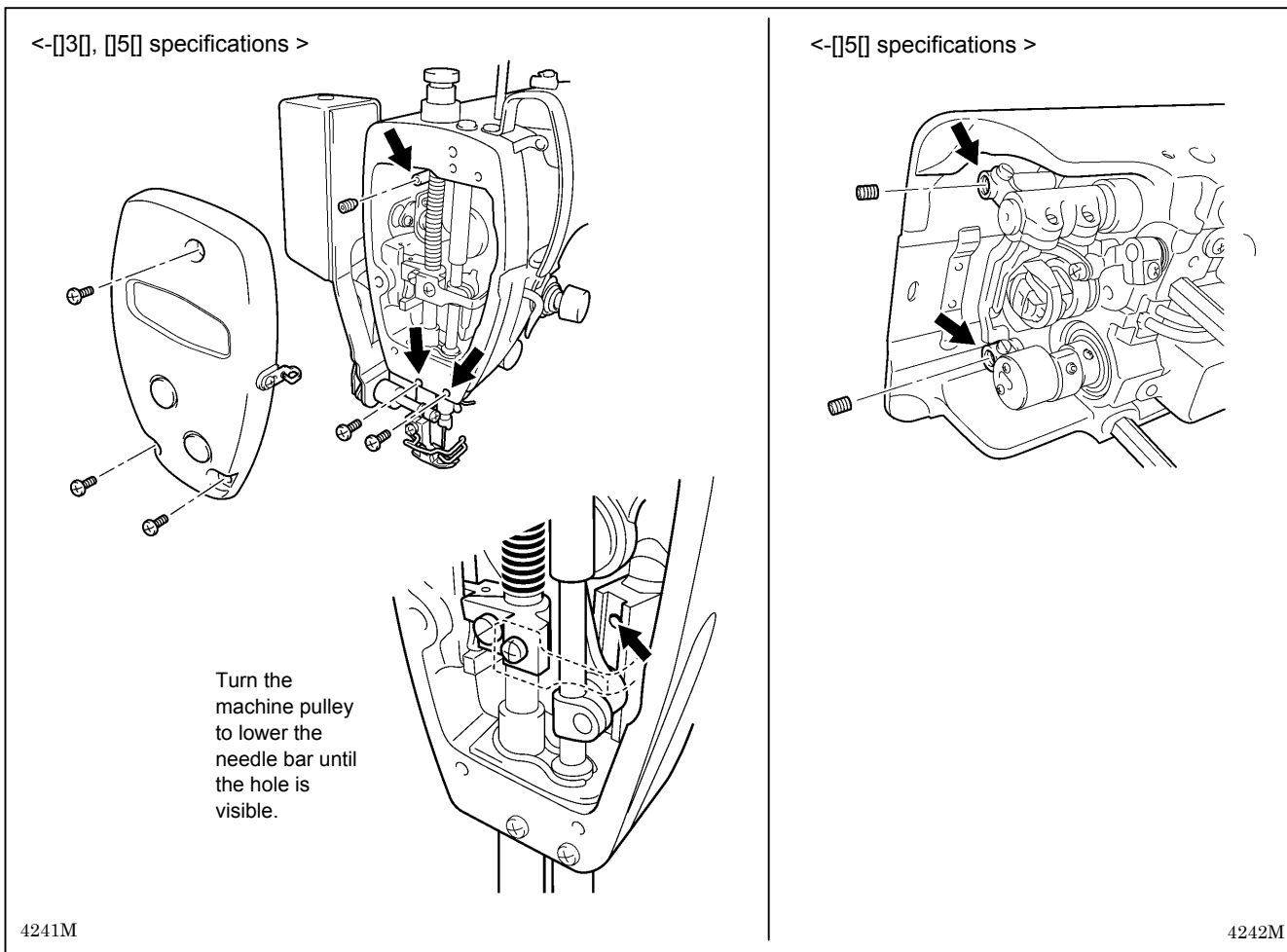
- If you do not apply grease when the “GrUP” notification flashes, the notification will continue to flash each time the power is turned on until you reset the notification by carrying out the procedure on the following page.
- If you continue to use the sewing machine after the “GrUP” notification appears without applying grease (or without carrying out the reset procedure), “E100” will appear after a certain period of time and the sewing machine will be forcibly prevented from operating for safety reasons.
If this happens, apply grease and carry out the reset procedure.

* If you continue to use the sewing machine after carrying out the reset procedure but without applying grease, problems with the sewing machine may result.

<Applying grease>

Use Brother-specified “Grease unit (SA8837-001)”.





1. Turn the power switch to "OFF".
2. Remove the screws and the set screws.
3. Apply grease to each of the holes until the grease overflows slightly.
4. Tighten the screws and the set screws in order to push the grease in.
5. Turn the machine pulley by hand to move the needle bar up and down several times in order to disperse the grease.
6. Use a cloth to wipe away any excess grease from around the screws and set screws and from underneath needle bar bush D.
7. Carry out the reset procedure given below.


<Resetting the grease consumption amount>

After the grease has been applied, carry out the following procedure to reset the grease consumption amount.

1. While pressing the Δ key (3) and the ∇ key (4) at the right end simultaneously, press the power ON switch.
2. "GuCt" will appear in the display (1).
3. Press the end backtack key (5).
4. The indicator of the end backtack key (5) will illuminate and the display (1) will change to showing "xxx". ("xxx" represents the amount of grease consumed.) For example, "100" means that 100% of the grease has been consumed.
5. Press the continuous backtack key (6) for 2 seconds or more.
6. The display (1) will change to " 0".
7. Press the thread wiper key (2). The display (1) will change to stitch number display mode and treadle operation will be possible. (This completes the reset procedure.)

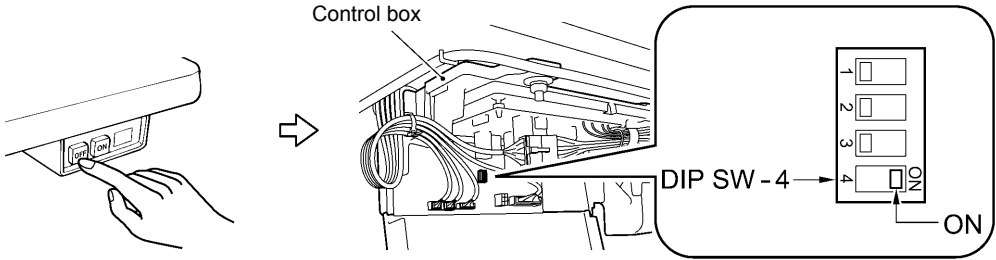
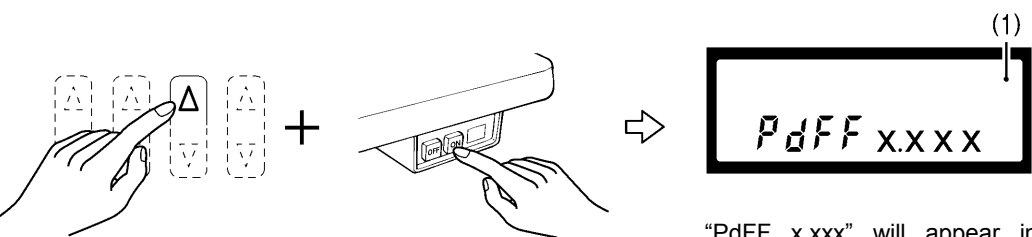
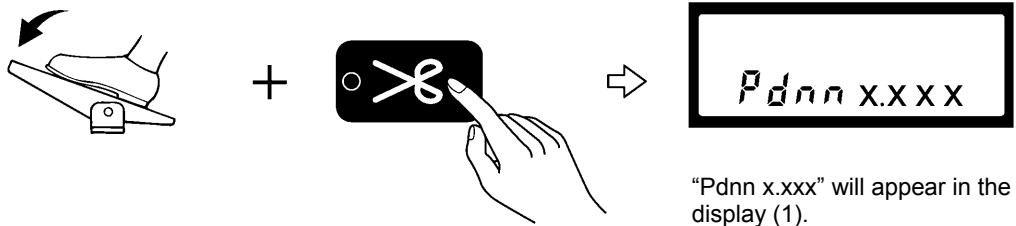
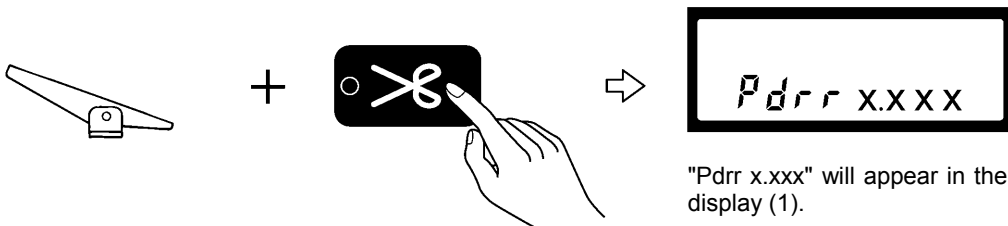
1 3. SETTING METHOD FOR STANDARD DEPRESSION STROKES

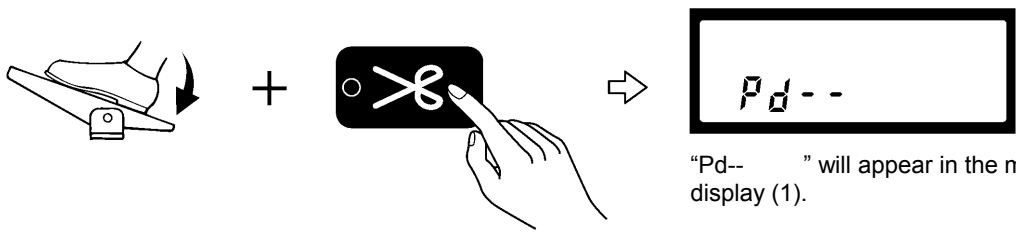
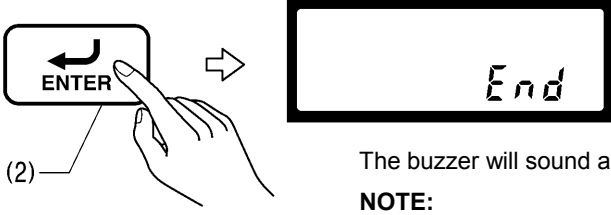
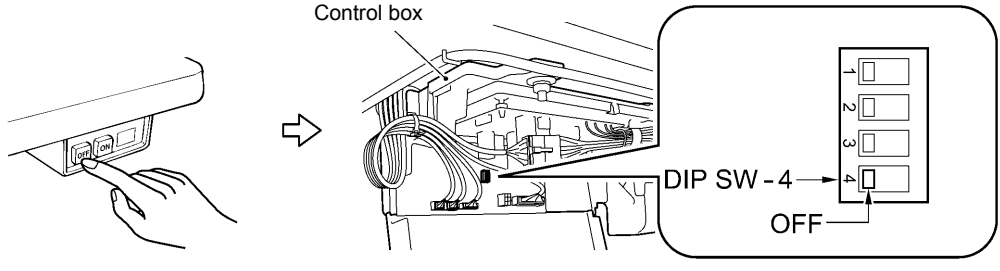
⚠ DANGER

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

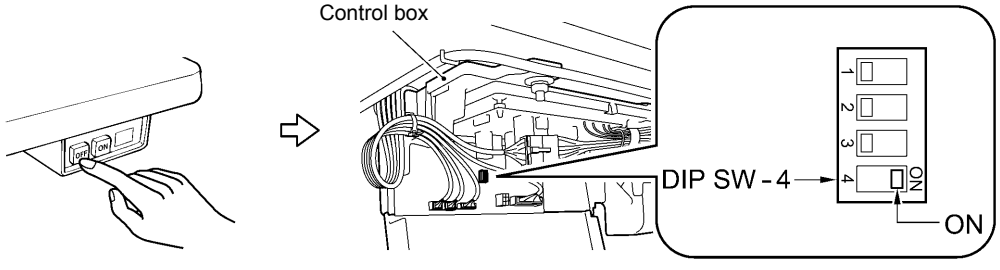
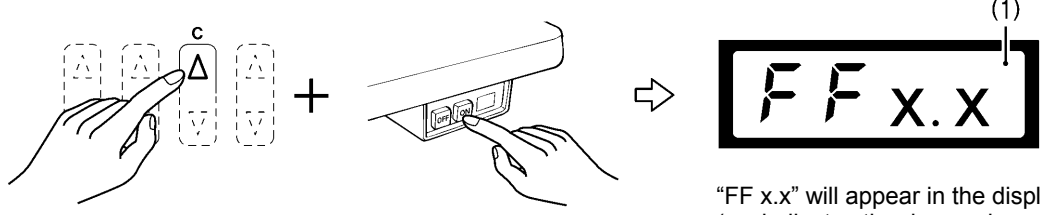
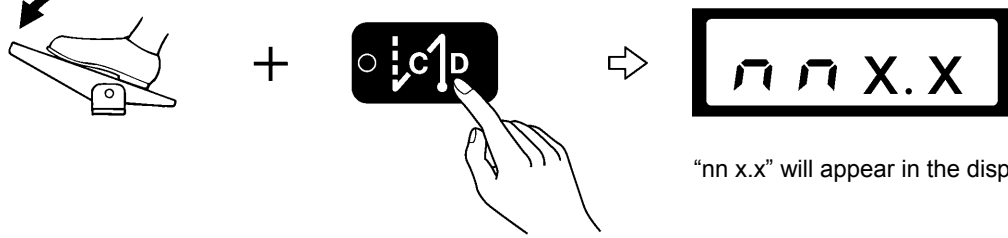
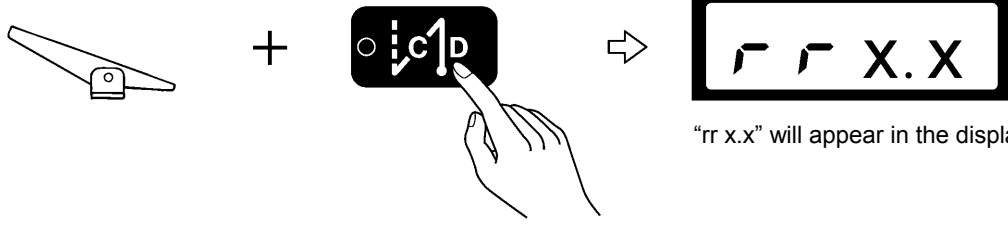
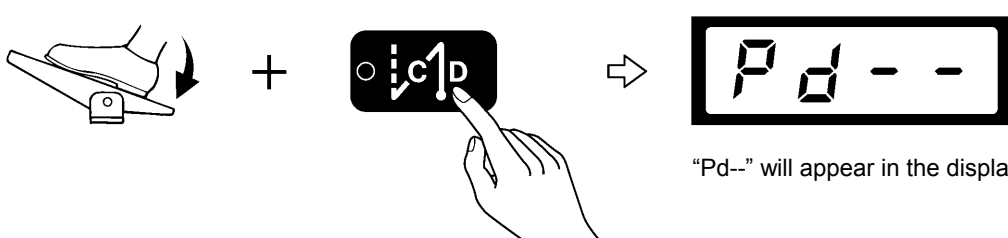
Use the following procedure to set the operating positions for the depression stroke.

1 3-1. When using the G50 operation panel

1	<p>Signal setting entry</p>  <p>(Press the power OFF switch, and then set DIP switch No. 4 to ON.)</p> <p style="text-align: right;">2104B</p>
2	 <p>"PdFF x.xxx" will appear in the main display (1). (x.xxx indicates the depression voltage.)</p> <p>(While pressing the Δ key, press the power ON switch.)</p> <p style="text-align: right;">2105B 2138M</p>
3	<p>Memorizing the maximum forward position</p>  <p>"Pdnn x.xxx" will appear in the main display (1).</p> <p>(With the treadle depressed forward to the maximum forward position, press the thread trimming key.)</p> <p style="text-align: right;">2106B</p>
4	<p>Memorizing the neutral position</p>  <p>"Pdrr x.xxx" will appear in the main display (1).</p> <p>(With your foot released from the treadle, press the thread trimming key.)</p> <p style="text-align: right;">2107B</p>

<p>5</p>	<p>Memorizing the maximum backward position</p>  <p>“Pd-- ” will appear in the main display (1).</p> <p>(With the treadle depressed backward <u>to the maximum backward position</u>, press the thread trimming key.)</p> <p style="text-align: right;">2108B</p>
<p>6</p>	<p>Completion of setting</p>  <p>The buzzer will sound and “ End” will appear in the main display (1).</p> <p>NOTE:</p> <ul style="list-style-type: none"> • If you do not press the ENTER key (2), the settings will not be memorized. • If the treadle is not operated correctly, “E091” may be displayed. If this happens, after “PdFF x.xxx” appears in the main display (1), repeat the operation from step 3. <p style="text-align: right;">2109B</p>
<p>7</p>	 <p>(Press the power OFF switch, and then return DIP switch No. 4 to OFF.)</p> <p style="text-align: right;">2110B</p>

1 3-2. When using the G10 operation panel

<p>1</p>	<p>Signal setting entry</p>  <p>(Press the power OFF switch, and then set DIP switch No. 4 to ON.)</p> <p style="text-align: right;">2104B</p>
<p>2</p>	 <p>(While pressing the Δ key at C, press the power ON switch.)</p> <p>"FF x.x" will appear in the display (1). (x.x indicates the depression voltage.)</p> <p style="text-align: right;">2111B 2138M</p>
<p>3</p>	 <p>(With the treadle depressed <u>to the maximum forward position</u>, press the end bartack key.)</p> <p>"nn x.x" will appear in the display (1).</p> <p style="text-align: right;">2112B</p>
<p>4</p>	 <p>(With your foot released from the treadle, press the end backtack key.)</p> <p>"rr x.x" will appear in the display (1).</p> <p style="text-align: right;">2113B</p>
<p>5</p>	 <p>(With the treadle depressed backward <u>to the maximum backward position</u>, press the thread trimming key.)</p> <p>"Pd--" will appear in the display (1).</p> <p style="text-align: right;">2114B</p>

6

Completion of setting

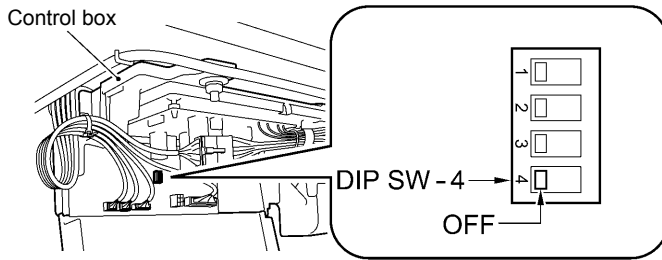
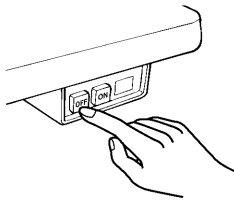


The buzzer will sound and “ End” will appear in the display (1).

NOTE:

- If you do not press the thread wiper key (2), the settings will not be memorized.
- If the treadle is not operated correctly, “E091” may be displayed. If this happens, after “FF x.x” appears in the display (1), repeat the operation from step 3.

7





(Press the power OFF switch, and then return DIP switch No. 4 to OFF.)

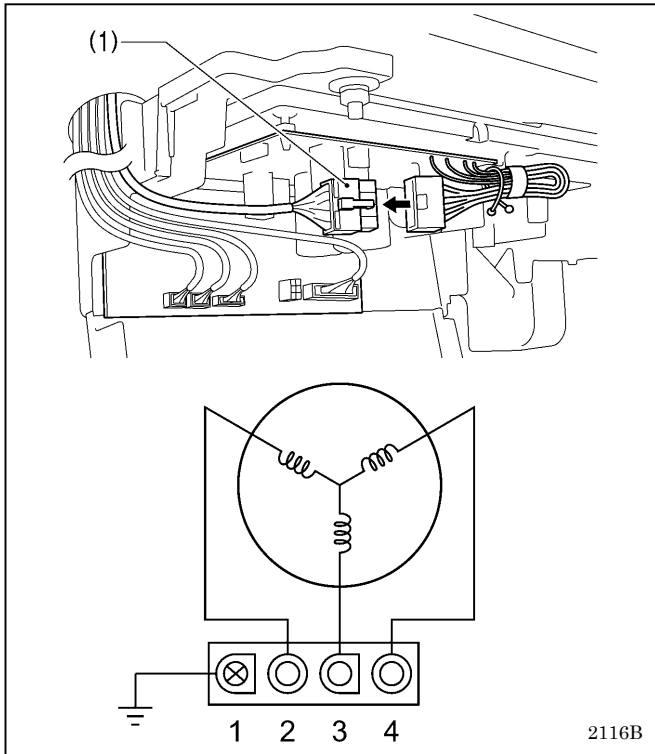
1 4. CONTROL BOX AND MOTOR

1 4-1. Checking the motor and power supply

⚠ CAUTION

-  Turn off the power switch and disconnect the power cord from the wall outlet before carrying out these operations. The machine may operate if the treadle is depressed by mistake, which could result in injury.
-  If the power switch needs to be left on when carrying out some adjustment, be extremely careful to observe all safety precautions.

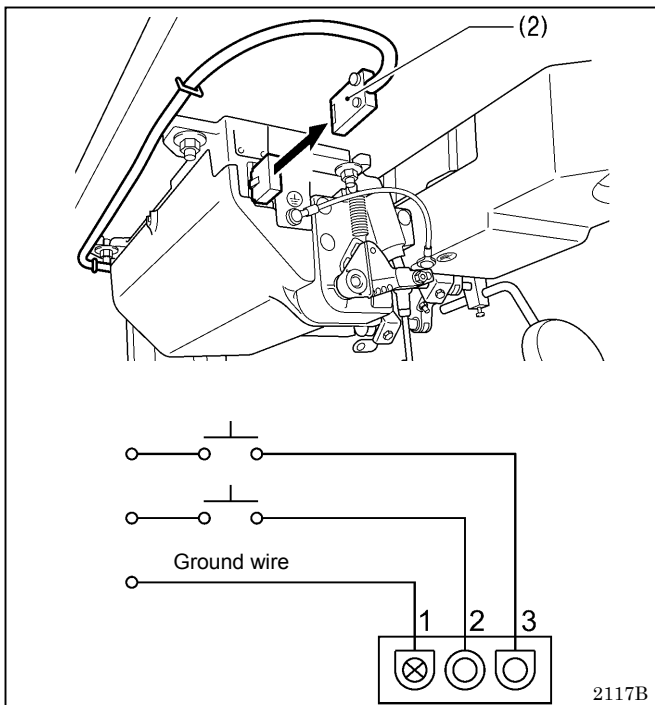
<Motor>



1. Disconnect the motor connector 4P (1) from the control box.
2. Measure the resistance of the motor connector (1) using an ohmmeter in the x 1 range. If the value is as shown in the table below, the connector is normal.

Between 2-3	Approx. 1.8Ω
Between 3-4	
Between 4-2	

<Power switch>



1. Disconnect the power supply connector 3P (2) from the control box.
2. Turn on the power switch.
3. Measure the voltage at the power supply connector (2) using the AC voltage range of a multimeter, and check that the voltage is within the allowable range for the specified voltage rating. If the value is as shown in the table below, the connector is normal.

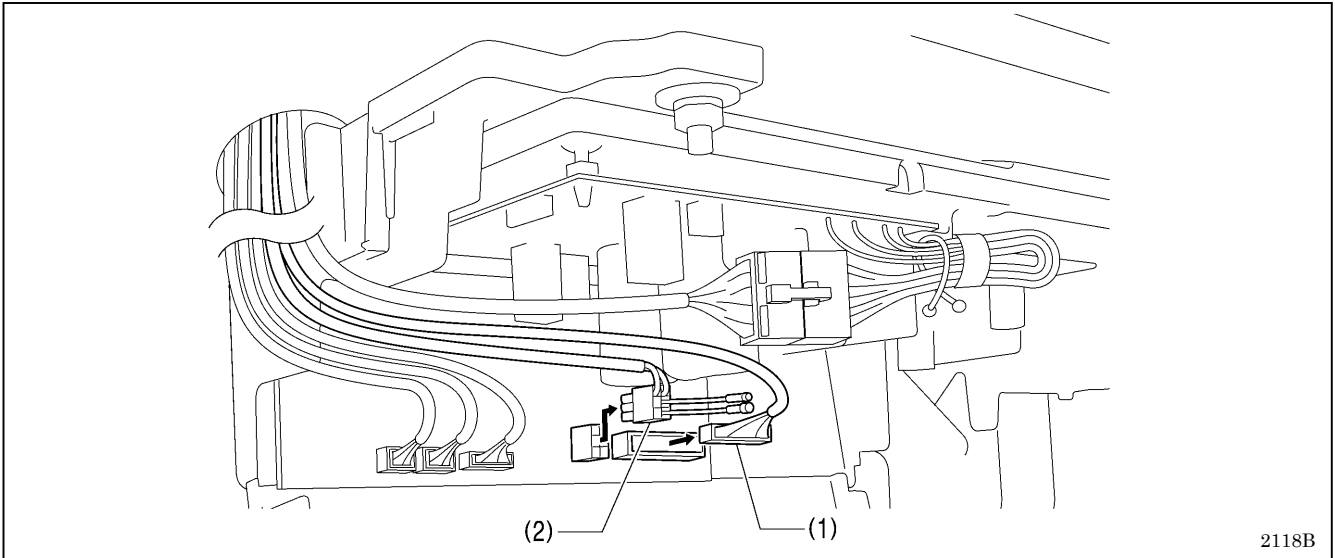
Between 2-3	AC 180V-265V
-------------	--------------

1 4-2. Checking the solenoids

DANGER

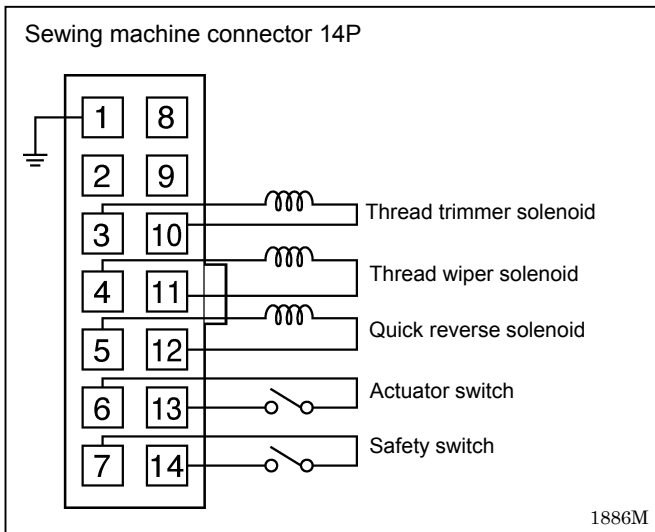


Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.



2118B

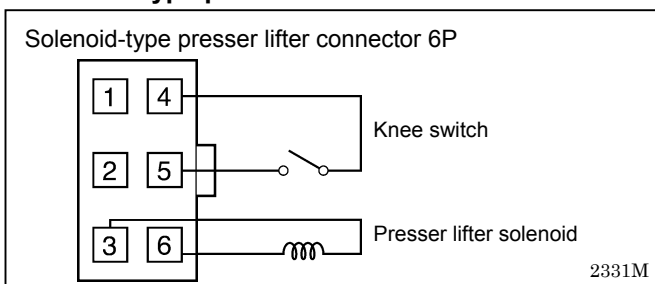
<Machine head>



1. Disconnect the 14P sewing machine connector (1) from the main PCB.
2. Measure the resistance of the sewing machine connector 14P (1) using an ohmmeter in the x 1 range. If the values are as shown in the table below, the connector is normal.

Between 3–10	Thread trimmer solenoid: Approx. 7.6 Ω
Between 4–11	Thread wiper solenoid: Approx. 10.1Ω
Between 5–12	Quick reverse solenoid: Approx. 4.5Ω
Between 6–13	When actuator is pressed: 0Ω
	When actuator is released: ∞ Ω
Between 7–14	When machine head is upright (switch ON): 0 Ω
	When machine head is tilted back (switch OFF): ∞ Ω

<Solenoid-type presser lifter connector>



1. Disconnect the 6P solenoid-type presser lifter connector (2) from the main PCB.
2. Measure the resistance of the solenoid-type presser lifter connector 6P (2) using an ohmmeter in the x 1 range. If the values are as shown in the table below, the connector is normal.

Between 3–6	Presser lifter solenoid: Approx. 9.6 Ω
Between 4–5	When knee switch is pressed: 0 Ω
	When knee switch is released: ∞ Ω

1 5. STANDING OPERATION PEDAL

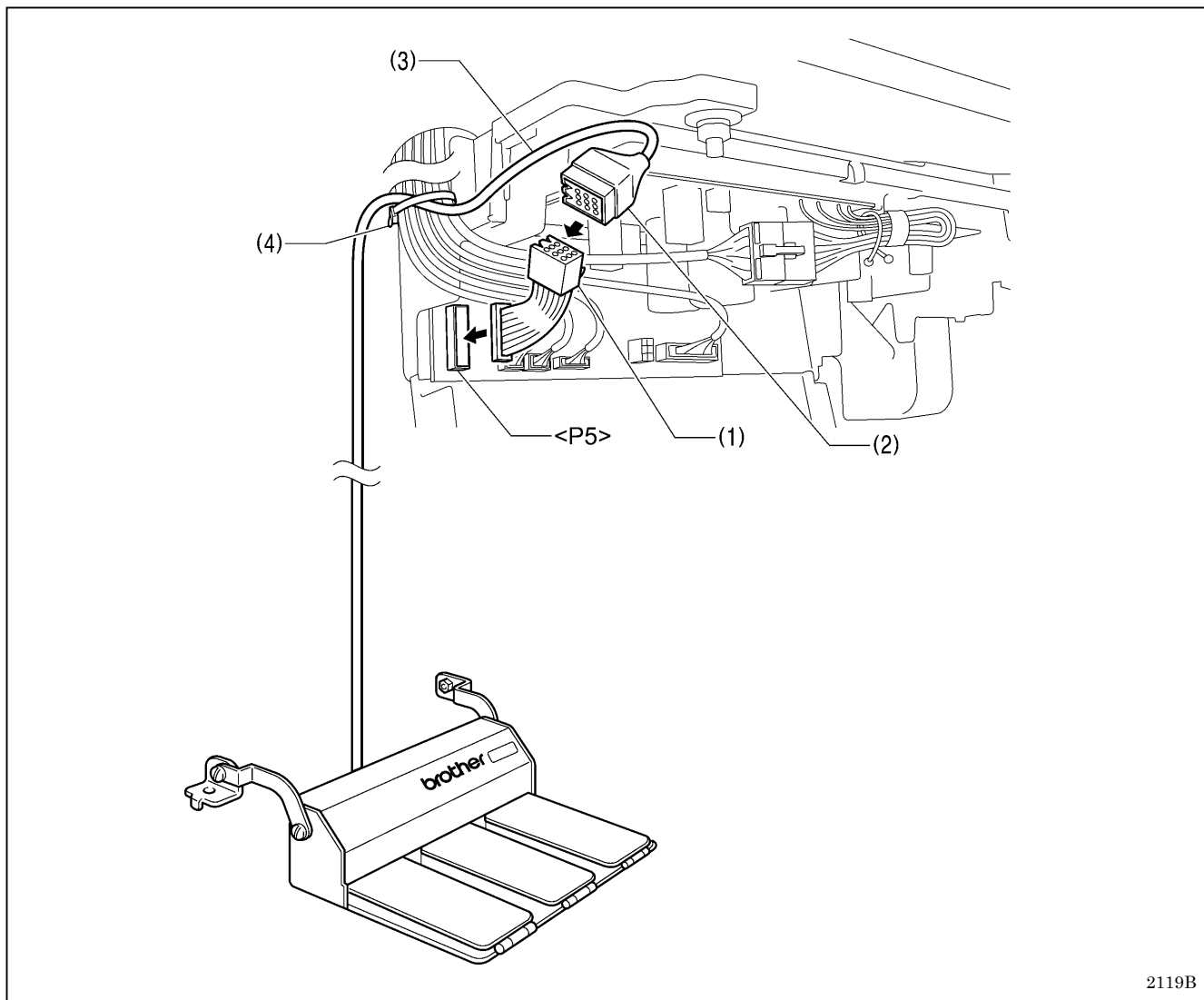
The foot plug assembly CDD (J04099-101) that is sold separately is required.

1 5-1. Installing the foot plug

DANGER



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

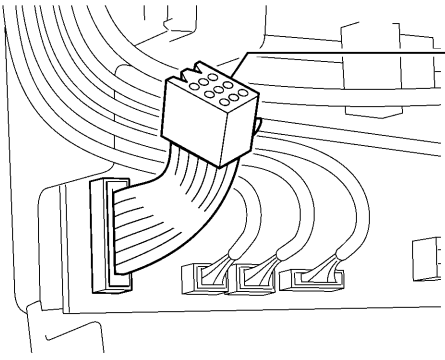


2119B

1. Insert the foot plug (1) into connector <P5> on the main PCB.
2. Connect the standing pedal connector (2) to the foot plug (1).
3. Secure the cord (3) of the standing pedal with the cable tie (4).

1 5-2. Connectors

<At foot plug>



No.	Standing operation pedal 9P connector
1	DC+8 V
2	High-speed switch
3	Thread trimmer switch
4	SOV
5	Spare
6	Low-speed switch
7	Presser foot switch
8	Variable speed input
9	Ground

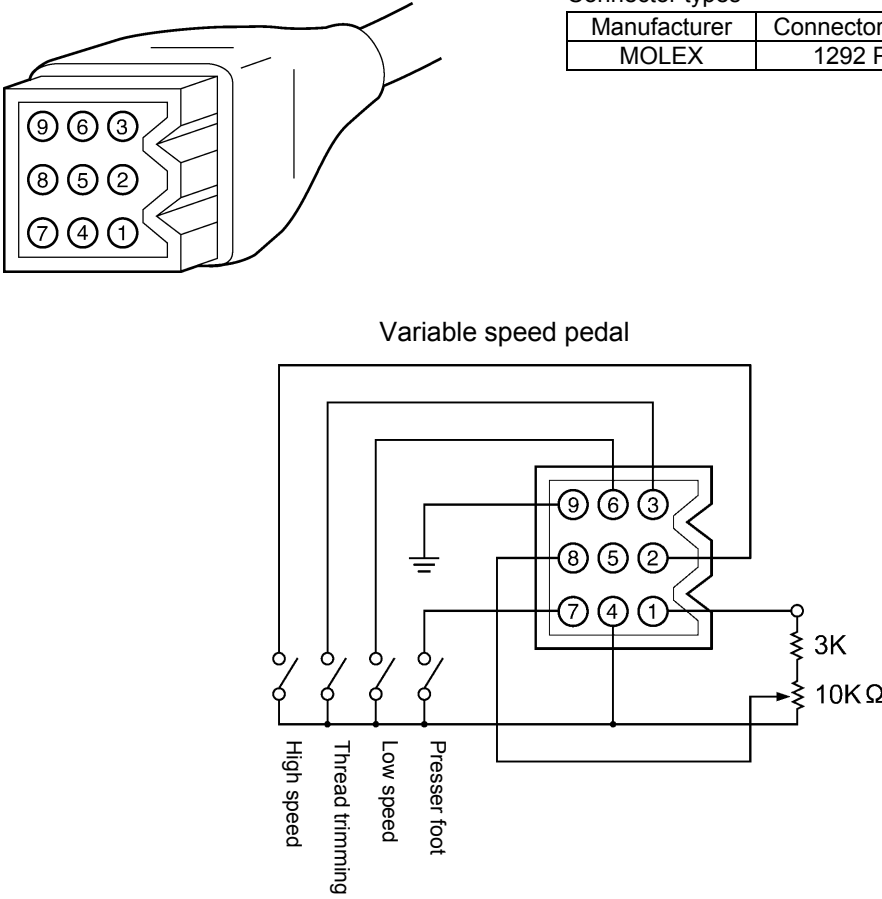
2120B

<At pedal>

1867M

NOTE:
Connector types

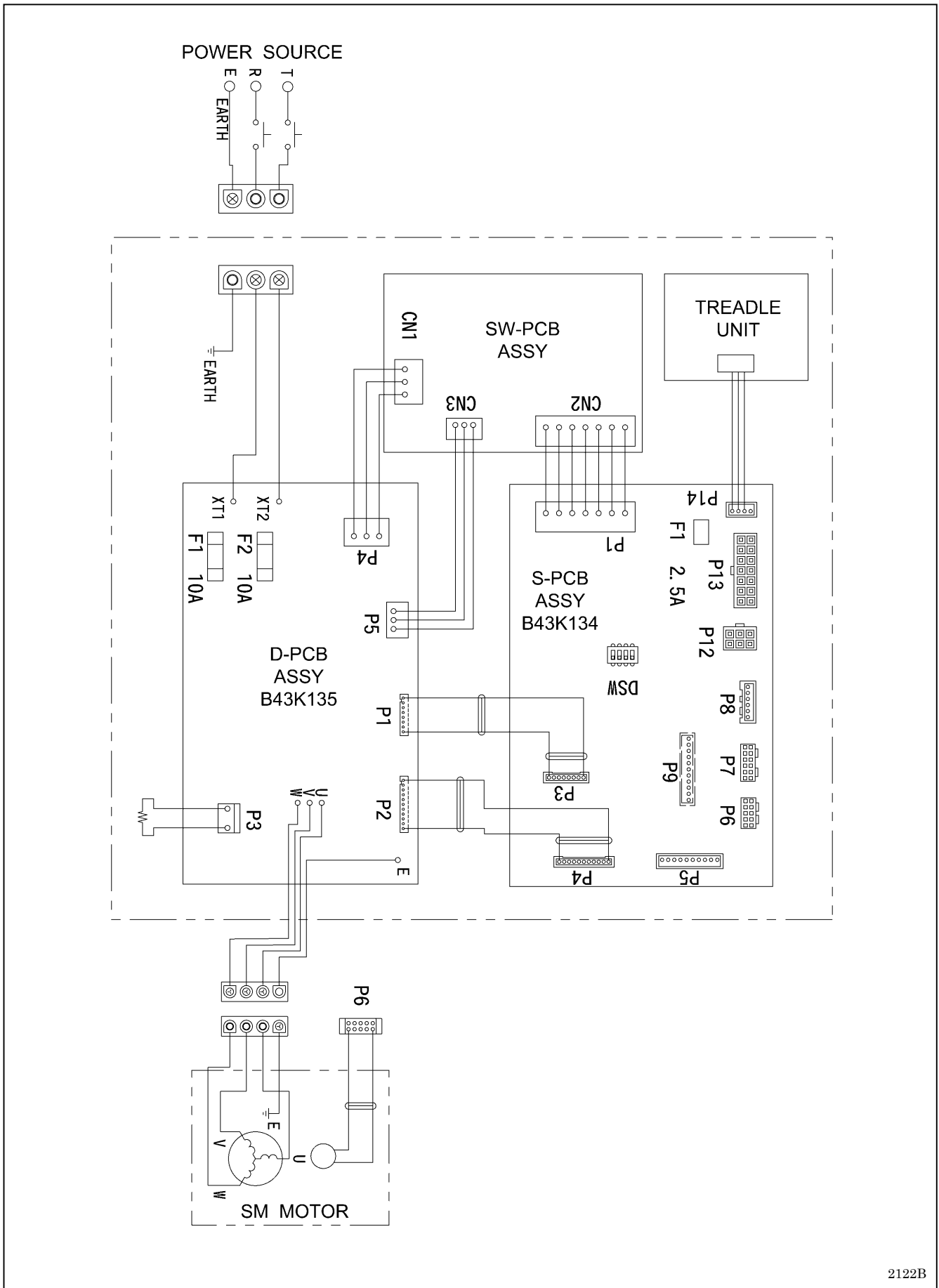
Manufacturer	Connector No.	Connector terminal
MOLEX	1292 P	1380 TL



Variable speed pedal

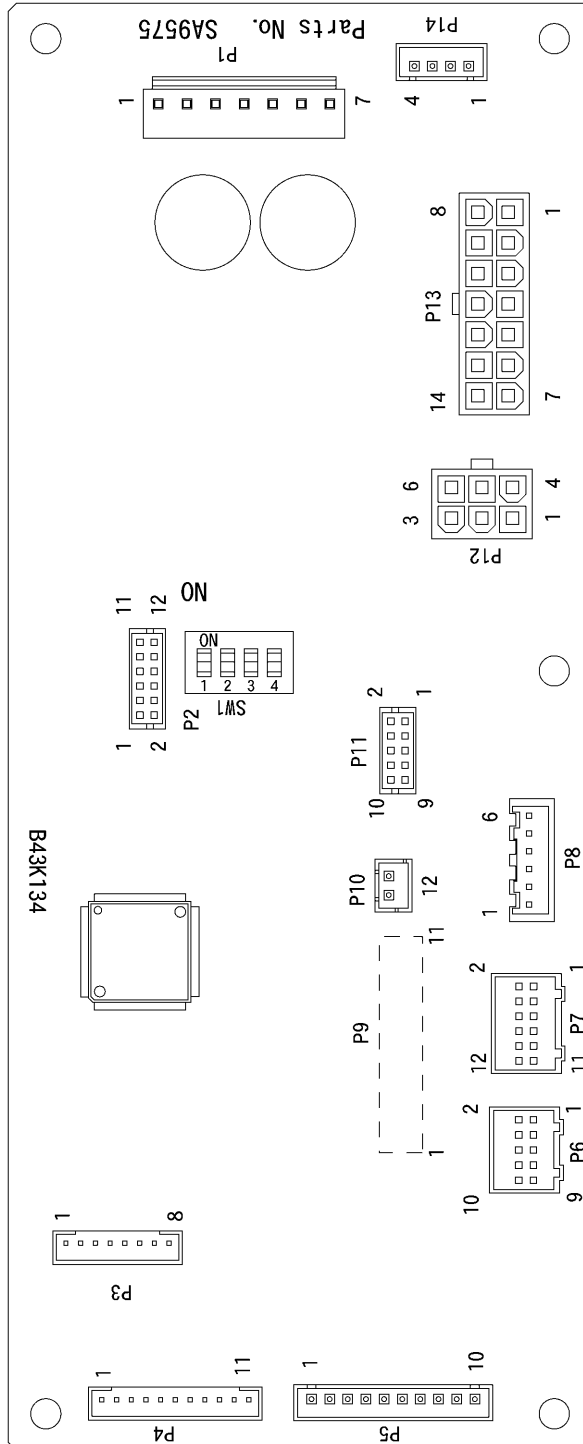
2121B

1 6. WIRING DIAGRAMS (X-7200C)



2122B

1 7. CONNECTOR LAYOUT DIAGRAM (MAIN PCB)



2123B

(Continued on next page.)

17. CONNECTOR LAYOUT DIAGRAM (MAIN PCB)

<List of connector numbers>

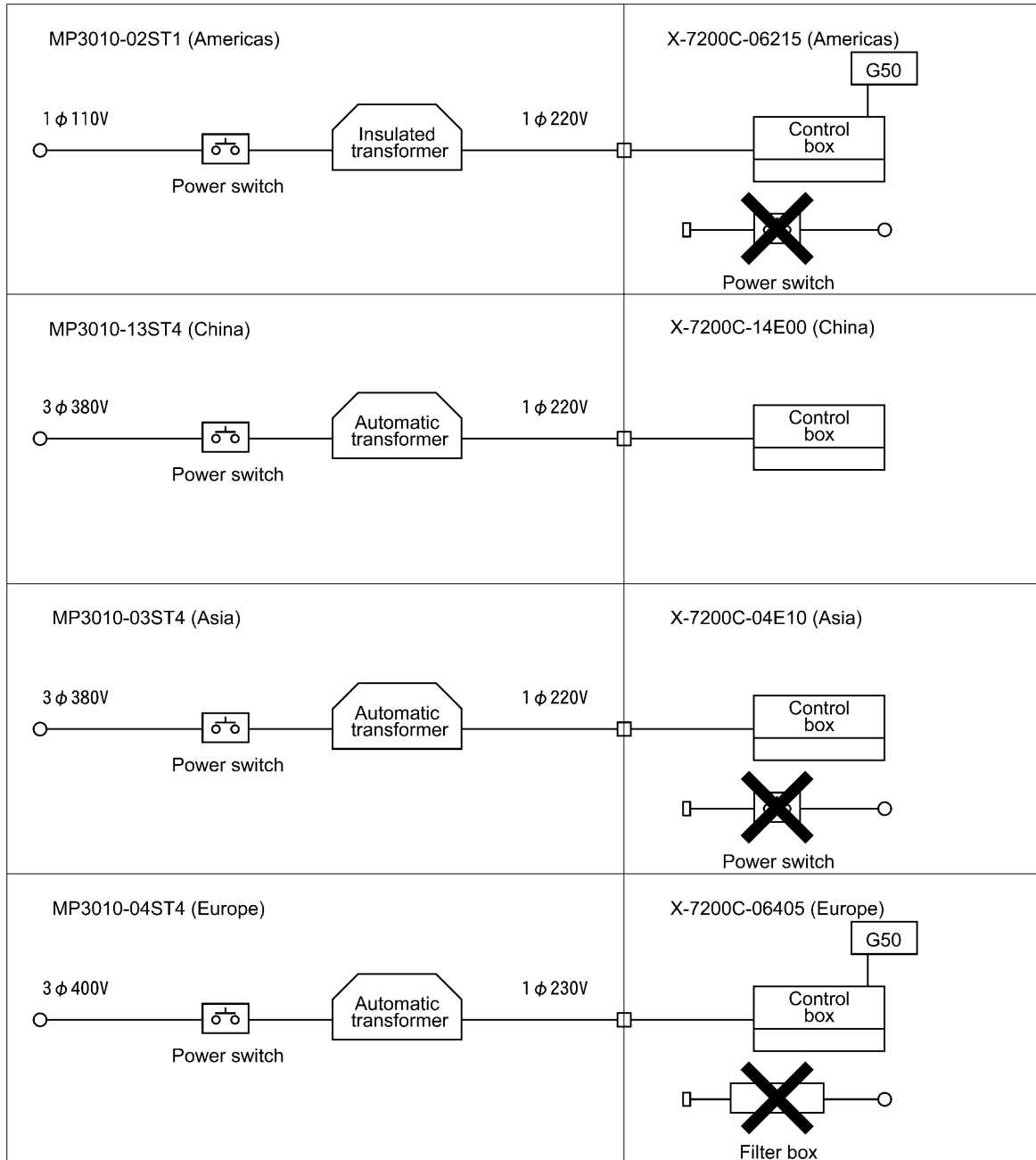
Connector No.	Name	Description
P8	Head detector unit connector	Connects to connector from machine head.
P12	Solenoid-type pressure lifter connector	
P13	Sewing machine connector	
P6	Resolver connector	
P7	Operation panel connector	
P3	Relay connector	Connects to connector from drive PCB.
P4	Coupler connector	
P1	DC power connector	Supplies power from switching power supply PCB.
P14	Treadle connector	Connects to connector from treadle unit.
P5	Standing operation connector	Connects to plug for standing operation (sold separately).
P11	SD connector (for writing)	Connects to special writing unit.
P9	Option connector (not mounted)	Output signals for external devices are available.

<List of terminal numbers>

Terminal No.	P5	P9	P12	P13	P1
	Standing operation connector	Option connector	Solenoid-type pressure lifter connector	Sewing machine connector	DC power connector
1	DC+8V	DC+5V	Ground	Ground	DC+8V
2	High-speed switch	N.C	N.C	N.C	DC+5V
3	Thread trimmer switch	N.C	Presser foot lifter solenoid Power supply (DC+30V)	Thread trimming solenoid Power supply (DC+30V)	S0V
4	S0V	N.C	S0V	Thread wiper solenoid Power supply (DC+30V)	DC line voltage signal
5	Low-speed switch	Needle down signal output (L level: Needle down stop position) (*1)	Presser foot switch	Quick reverse solenoid Power supply (DC+30V)	0V
6	Presser foot switch	Needle up signal output (L level: Needle up stop position) (*1)	Presser foot lifter solenoid output	S0V	N.C
7	Variable speed input	Machine shaft sync signal (128 pulses/stitch) (*1)	-	S0V	DC+30V
8	N.C	Operation signal output (H level: Operating) (*1)	-	N.C	-
9	N.C	N.C	-	N.C	-
10	Ground	N.C	-	Thread trimming solenoid output	-
11	-	N.C	-	Thread wiper solenoid output	-
12	-	-	-	Quick reverse solenoid output	-
13	-	-	-	Actuator switch	-
14	-	-	-	Safety switch	-

(*1) This is open collector output.

1 8. COMBINATION OF TRANSFORMER SPECIFICATIONS AND CONTROL DEVICE SPECIFICATIONS



"X" indicates accessory parts which are not used.

2116B

19. 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.

⚠ DANGER






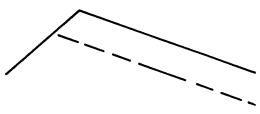
Wait at least 5 minutes after turning off the power switch and disconnecting the power cord from the wall outlet before opening the face plate of the control box. Touching areas where high voltages are present can result in severe injury.

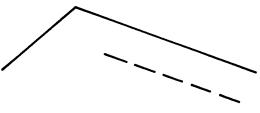
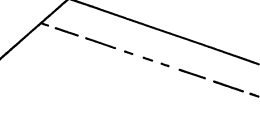

⚠ CAUTION

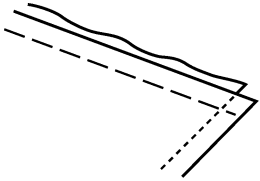
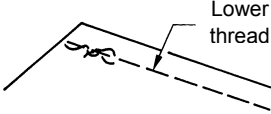
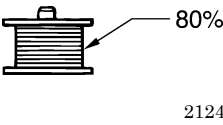
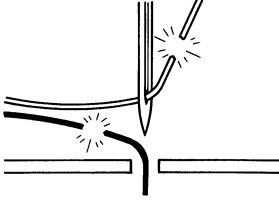


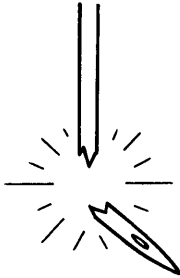
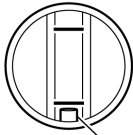
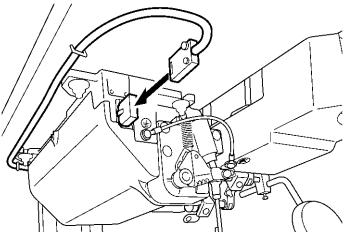
Turn off the power switch and disconnect the power cord before carrying out troubleshooting. The machine may operate if the treadle is depressed by mistake, which could result in injury.

19-1. Sewing

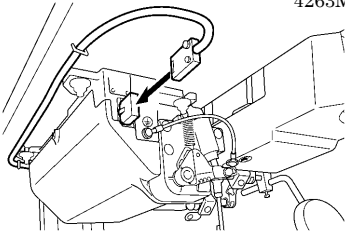
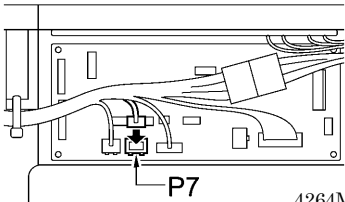
Problem		Possible cause	Page
1	Upper thread is not tight  0573M	<ul style="list-style-type: none"> • Is the upper thread tension too weak, or is the lower thread tension too strong? Adjust the upper thread tension or lower thread tension. • Is the needle and feed timing correct? Advance the needle timing. 	Instruction manual 122
2	Lower thread is not tight  0574M	<ul style="list-style-type: none"> • Is the lower thread tension too weak, or is the upper thread tension too strong? Adjust the lower thread tension or upper thread tension. 	Instruction manual
3	Loops appear in seam  0977M	<ul style="list-style-type: none"> • Is the thread path not smooth enough? Use a file with a fine grain or sandpaper to polish smooth the thread path. • Is the bobbin not turning smoothly? Pull out the lower thread to check that there is no slackness in the thread tension, or replace the bobbin or bobbin case. 	
4	Skipped stitches occur while sewing  0470M	<ul style="list-style-type: none"> • Is the needle tip bent? Is the needle tip blunt? If the needle tip is bent or broken, replace the needle. • Is the needle properly installed? If it is incorrect, install the needle correctly. • Is the machine properly threaded? If it is incorrect, thread the thread correctly. • Is the presser foot pressure too weak? Adjust the presser foot pressure. • Is the needle too thin? Replace the needle with a needle that is one rank thicker. • Is the presser foot too high? Adjust the height of the presser foot. • Is the thread take-up spring too weak? Adjust the tension of the thread take-up spring. • Is the needle and rotary hook timing correct? Adjust the height of the needle bar. Adjust the clearance between the needle and the tip of the rotary hook. 	Instruction manual Instruction manual Instruction manual 118 117 122 123

	Problem	Possible cause	Page
5	<p>Skipped stitches at sewing start Thread unravelling at sewing start</p>  <p>0749M</p>	<ul style="list-style-type: none"> • Is the thread take-up spring tension too strong? Reduce the tension of the thread take-up spring. • Is the thread take-up spring operating range too large? Lower the position of the thread take-up spring. • Are the trailing lengths of the upper threads too short after thread trimming? Adjust the pretension. • Are the threads not being trimmed cleanly? Sharpen the fixed knives, or replace the fixed and movable knives if necessary. • Is the needle too thick? Try using a needle with a count that is one lower than the current needle. • Is the length of thread trailing out from the bobbin case after thread trimming too short? If the bobbin is spinning loosely, replace the anti-spin spring in the bobbin case. • Is the sewing speed too fast at the sewing start? Set so that slow start is enabled. (G10 operation panel) Use the slow start feature. (G50 operation panel) • Is the needle up stop position too high? Adjust the needle up stop position. 	<p>117 117 Instruction manual Instruction manual Instruction manual Instruction manual 126, 127</p>
6	<p>Uneven seam</p>  <p>0473M</p>	<ul style="list-style-type: none"> • Is the presser foot pressure too weak? Adjust the presser foot pressure. • Is the feed dog too low? Adjust the feed dog height. • Is the bobbin scratched? If the bobbin is damaged, smooth it with an oiled grindstone or replace it. 	<p>Instruction manual 120</p>
7	<p>Large degree of puckering (excess tension)</p>  <p>0978M</p>	<ul style="list-style-type: none"> • Is the upper thread tension too strong? Make the upper thread tension as weak as possible. • Is the lower thread tension too strong? Make the lower thread tension as weak as possible. • Is the needle tip blunt? Replace the needle if it is blunt. • Is the needle too thick? Replace with as thin a needle as possible. • Are the thread take-up spring tensions too strong? Make the thread take-up spring tension as weak as possible. • Is the thread take-up spring operating range too large? Lower the position of the thread take-up spring to as low a position as possible. • Is the presser foot pressure too strong? Adjust the presser foot pressure. • Is the sewing speed too fast? Gradually reduce the maximum sewing speed (G10 operation panel) Use the sewing speed control keys to gradually reduce the sewing speed. (G50 operation panel) • Is the angle of the feed dog correct? Tilt the front of the feed dog down slightly. 	<p>Instruction manual Instruction manual 117 117 Instruction manual Instruction manual Instruction manual 121</p>

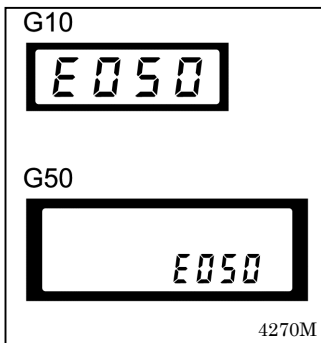
	Problem	Possible cause	Page
8	Material slippage  0750M	<ul style="list-style-type: none"> Is the presser foot pressure too strong? Adjust the presser foot pressure. 	Instruction manual
9	Lower thread is tangled at the sewing start. Spinning of bobbin during thread trimming  0751M	<ul style="list-style-type: none"> Is the bobbin spinning direction correct when the lower thread is being pulled? Set the bobbin so that it turns in the opposite direction to the rotary hook. Is there too much thread wound onto the bobbin? The bobbin winding amount should not be more than 80%.  Is the anti-spin spring attached? Attach the anti-spin spring. Is the bobbin turning smoothly? If the bobbin is not turning smoothly, replace the bobbin. Is a bobbin other than the light-alloy bobbins specified by Brother being used? Use only bobbins which are specified by Brother. 	Instruction manual Instruction manual Instruction manual Instruction manual
10	Upper and lower threads are breaking.  0471M	<ul style="list-style-type: none"> Is the needle bent or is the needle tip broken? Replace the needle if it is bent or broken. Is the needle properly installed? If it is incorrect, install the needle correctly. Is the machine properly threaded? If it is incorrect, thread the thread correctly. Is the rotary hook sufficiently lubricated? (-[0], [3] specifications) If the oil gauge is down to the lower reference line in the oil gauge window, add more oil. Is the upper or lower thread tension too weak or too strong? Adjust the upper thread or lower thread tension. Is the upper thread may be loose because the thread take-up spring operating range is too small? Adjust the position of the thread take-up spring. Is the rotary hook, feed dog or other part damaged? If they are damaged, smooth them with an oiled grindstone or replace the damaged parts. Is the thread path damaged? If the thread path is damaged, smooth it with sandpaper or replace the damaged part. 	Instruction manual Instruction manual Instruction manual Instruction manual 117
11	Incorrect thread trimming (Upper and lower threads are both not being trimmed)	<ul style="list-style-type: none"> Is the fixed knife or movable knife damaged or worn? Replace the fixed knife or the movable knife. 	
12	Incorrect thread trimming (Upper thread or lower thread is not being trimmed)	<ul style="list-style-type: none"> Is the needle properly installed? If it is incorrect, install the needle correctly. Is the fixed knife or movable knife blunt? Replace the fixed knife or the movable knife. 	Instruction manual

	Problem	Possible cause	Page
13	<p>Broken needles</p>  <p>0469M</p>	<ul style="list-style-type: none"> • Is the material being pushed or pulled with excessive force during sewing? • Is the needle properly installed? If it is incorrect, install the needle correctly. • Is the needle bent, is the needle tip broken, or is the needle hole blocked? Replace the needle. • Is the needle and rotary hook timing correct? Adjust the height of the needle bar. Adjust the clearance between the needle and the tip of the rotary hook. • Is the needle timing too advanced with respect to the feed dog? Retard the needle timing. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Caution</p> <ul style="list-style-type: none"> • It is extremely dangerous to leave any pieces of broken needle sticking in the material. If the needle breaks, search for all pieces until the whole of the needle is found again. • Furthermore, we recommend that through steps be taken to account for such needles to comply with product liability regulations. </div>	<p>Instruction manual</p> <p>122</p> <p>123</p> <p>122</p>
14	<p>Oil gauge (1) is not visible in oil gauge window.</p>  <p>(1) 4262M</p>	<ul style="list-style-type: none"> • Is the oil tank empty? (-[]0[], []3[] specifications) Fill the oil tank with oil. 	<p>Instruction manual</p>
15	<p>Machine does not operate when power is turned on and treadle is pressed.</p>	<ul style="list-style-type: none"> • Is the power supply connector disconnected from the control box? Insert the connector securely.  <p>4263M</p>	<p>Instruction manual</p>
16	<p>Machine does not operate at high speed.</p>	<ul style="list-style-type: none"> • Is the sewing speed setting or backtack speed setting incorrect? Set the maximum sewing speed to a higher speed (G10 operation panel) Use the sewing speed control keys to set the high speed. (G50 operation panel) 	<p>Instruction manual</p> <p>Instruction manual</p>
17	<p>Machine stops during sewing.</p>	<ul style="list-style-type: none"> • Is the fixed stitch key turned on? Press the fixed stitch key so that the indicator turns off. (G50 operation panel) • Is the power supply voltage too low? Check the power supply. (If the power cord is too long or too many appliances are being run from a single outlet, this may cause voltage drops which will in turn cause the reset function to activate and stop the machine, even if the power supply itself is normal.) 	<p>Instruction manual</p>

19. TROUBLESHOOTING

18	Problem	Possible cause	Page
	Nothing appears on the operation panel display	<ul style="list-style-type: none"> <li data-bbox="523 241 890 322">• Is the power supply connector disconnected from the control box? Insert the connector securely. <li data-bbox="523 533 890 667">• Is the operation panel connector P7 inside the control box disconnected? Insert the connector securely. <li data-bbox="523 703 890 869">• Are the relay connector of the drive PCB and P3 on the main PCB inside the control box disconnected? Insert the connector securely. 	<p data-bbox="1235 241 1295 264">4263M</p>  <p data-bbox="1326 322 1442 376">Instruction manual</p>  <p data-bbox="1326 591 1442 672">150-151 Instruction manual</p> <p data-bbox="1337 837 1431 869">150-151</p>
19	"GrUP" or "GrEASEUP" flashes in the panel display when the power switch is turned on.	<ul style="list-style-type: none"> <li data-bbox="523 904 1161 963">• This display is to notify you that it is time to apply grease. Apply grease. 	137, 139

1 9-2. Error code displays



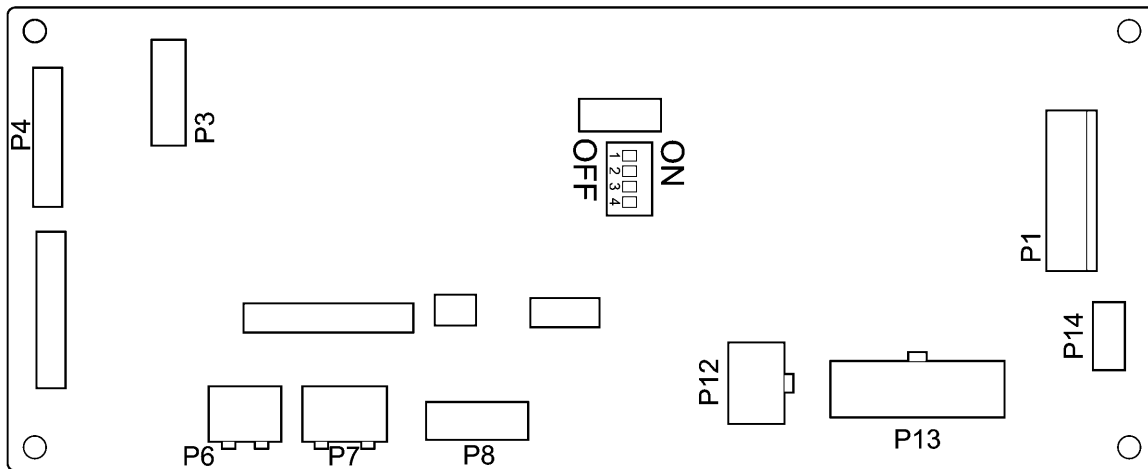
If an error code appears on the operation panel display

1. Make a note of the error code and then turn off the power.
2. After the operation panel display has turned off, eliminate the cause of the error and then turn the power back on.

- For items with “ * ” appearing in the “Page” column, ask the place of purchase for advice.

< Connector and DIP switch layout diagram >

Main PCB

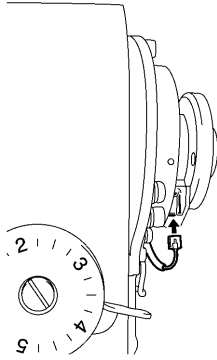


4266M

Error code	Possible cause	Page
E050	<ul style="list-style-type: none"> • The machine head was detected as being tilted back when the treadle was depressed. Press the power OFF switch and then return the machine head to the upright position. (If tilting back the machine head to carry out any tasks, press the power OFF switch first.) 	
E051	<ul style="list-style-type: none"> • The machine head was detected as being tilted back during sewing. Turn the power off and then back on again. 	
E055	<ul style="list-style-type: none"> • Was the power ON switch pressed while the machine head was still tilted back? Press the power OFF switch and then return the machine head to the upright position. • Is the 14-pin machine connector inside the control box disconnected? Press the power OFF switch, and then check that the 14-pin machine connector is connected to connector P13 on the main PCB. 	150-151 Instruction manual
E065	<ul style="list-style-type: none"> • Was the power ON switch pressed while an invalid key was being pressed on the operation panel? Press the power OFF switch and check that no operation panel keys are being pressed. • There is a malfunction of the operation panel. Replace the operation panel. 	*
E066	<ul style="list-style-type: none"> • Was the actuator switch being pressed when the power ON switch was pressed? Press the power OFF switch and check that the actuator switch is not being pressed • There is a problem with the actuator switch. Replace the actuator switch. 	*

19. TROUBLESHOOTING

Error code	Possible cause	Page
E090 Treadle connector is not connected.	<ul style="list-style-type: none"> • Is the 4-pin treadle connector inside the control box disconnected? Press the power OFF switch, and then check that the 4-pin treadle connector is connected to connector P14 on the main PCB. If there is a broken wire in the cord of the treadle connector, replace the treadle unit. 	150-151 *
E091	<ul style="list-style-type: none"> • The settings in "Setting method for standard depression stroke" may be incorrect. Redo the settings in "Setting method for standard depression strokes". • Problem with treadle unit. Replace the treadle unit. 	141-144 *
E095	<ul style="list-style-type: none"> • Was the power ON switch pressed while the treadle was still depressed? Return the treadle to the neutral position. When the treadle neutral position is detected, the error will be cleared and normal operation will then be possible. • Is the power supply voltage too low? Check the power supply voltage. 	
E100	<ul style="list-style-type: none"> • This appears on the display when the sewing machine has continued to be used for a certain period after the "GrEASEUP" or "GrUP" notification appears without the grease being applied (without the reset procedure being carried out). Press the power OFF switch, apply grease, and then carry out the reset procedure. 	137, 139
E111	<ul style="list-style-type: none"> • The sewing machine could not stop correctly at the needle up stop position after thread trimming. Remove any thread scraps that may be blocking the motor. Press the power OFF switch and then turn the machine pulley by hand and check that it turns easily. Check that there are no problems with the thread trimming mechanism. 	*
E130	The sewing machine or motor do not operate when the treadle is depressed. <ul style="list-style-type: none"> • Is the 4-pin motor connector inside the control box disconnected? Press the power OFF switch and check the connection of the 4-pin motor connector. • Has the sewing machine locked up? Press the power OFF switch and then turn the machine pulley by hand and check that it turns easily. • Problem with control box. Replace the control box. 	145 Instruction manual *
E131 Problem with motor encoder signal.	<ul style="list-style-type: none"> • Is the 10-pin resolver connector inside the control box disconnected? Press the power OFF switch, and then check that the 10-pin resolver connector is connected to connector P6 on the main PCB. • Problem with motor or main PCB. Replace the motor or the control box. 	150-151 Instruction manual *
E132 Problem with motor operation.	<ul style="list-style-type: none"> • Problem with motor. Replace the motor. • Problem with drive P.C. board. Replace the control box. 	* *
E140 Motor reverse operation	<ul style="list-style-type: none"> • Motor reverse operation was detected. Replace the motor. 	132

Error code	Possible cause	Page
E150 Motor is overheating.	<ul style="list-style-type: none"> This is displayed when the motor becomes abnormally hot and the temperature protection has activated. After the temperature has dropped, press the power ON switch and operate the sewing machine as normal. 	
E151 Problem with motor overheating sensor.	<ul style="list-style-type: none"> Is the connector inside the motor disconnected? Press the power OFF switch, and then check that the connector is securely inserted. Malfunction of motor overheating sensor Replace the motor.  <p style="text-align: right; font-size: small;">4267M</p>	*
E190 Motor timeout	<ul style="list-style-type: none"> This appears on the display when the sewing machine has been operating continuously for 3 minutes or more. Turn the power switch off and then back on again, and then operate the sewing machine normally. 	
E191 Thread trimming solenoid timeout	<ul style="list-style-type: none"> This is displayed if the sewing machine motor locks during thread trimming. Remove any thread scraps that may be blocking the motor. Check that there are no problems with the thread trimming mechanism. 	*
E410 Error communicating with operation panel	<ul style="list-style-type: none"> Is the 12-pin operation panel connector inside the control box disconnected? Press the power OFF switch, and then check that the 12-pin operation panel connector is connected to connector P7 on the main PCB. 	150-151 Instruction manual
E440 Error writing data to main PCB	<ul style="list-style-type: none"> Problem with main PCB. Replace the control box. 	*
E441 Error reading data from main PCB	<ul style="list-style-type: none"> Problem with main PCB. Replace the control box. 	*
E442 Problem with data on main PCB	<ul style="list-style-type: none"> The data on the main PCB is corrupted. Corrupt data was initialized. Turn the power off and then back on again. 	
E450	<ul style="list-style-type: none"> Model selection could not be loaded from the head detector unit. Check that the head detector unit specifications are correct. 	
E451 Error writing data to head detector unit	<ul style="list-style-type: none"> Problem with head detector unit. Replace the head detector unit. 	*

19. TROUBLESHOOTING

Error code	Possible cause	Page
E452 Head detector unit connection error	<ul style="list-style-type: none"> • Is the 6-pin head detector unit connector inside the control box disconnected? Press the power OFF switch, and then check that the 6-pin head detector unit connector is connected to connector P8 on the main PCB. 	150-151 Instruction manual
E701 Abnormally high power supply voltage	<ul style="list-style-type: none"> • Does the power supply voltage match the control box voltage specifications? Check that the voltage matches. • Is the power supply voltage abnormally high? Check the power supply voltage. • Problem with control box. Replace the control box. 	145 *
E705 Abnormally low power supply voltage	<ul style="list-style-type: none"> • Is the power supply voltage abnormally low? Check the power supply voltage. • Problem with control box. Replace the control box. 	*
E710 Motor overcurrent	<ul style="list-style-type: none"> • Is the electrical equipment connector inside the control box disconnected? Press the power OFF switch, and then check that the drive PCB coupler connector is connected to connector P4 on the main PCB. • This is displayed if the machine pulley moves stiffly when it is turned by hand, or if the sewing machine locks up and an abnormal current is flowing. Press the power OFF switch, and then turn the machine pulley by hand and check that it turns easily. • This is displayed if there is some problem with the motor and an abnormal current is flowing. Replace the motor. • Problem with control box. Replace the control box. 	150-151 * *
E791 Solenoid overcurrent	<ul style="list-style-type: none"> • This is displayed when there is overcurrent in any of the solenoids (thread trimming, thread wiping, quick reverse or presser lifter). Check the resistances of the solenoids. • Problem with main PCB. Replace the control box. 	146 *
E901	<ul style="list-style-type: none"> • DIP switch No. 4 inside the control box is set to ON. Press the power OFF switch and set DIP switch No. 4 to OFF. 	57, 158

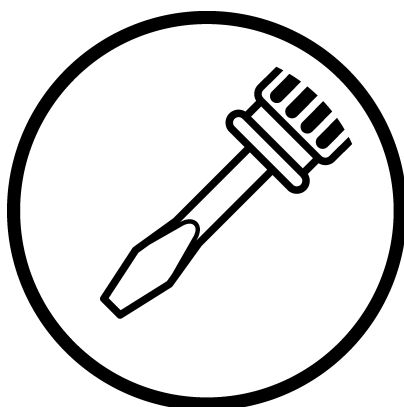
If an error code that is not listed above appears or if carrying out the specified remedy does not solve the problem, contact the place of purchase.

2 0. 7-SEGMENT DISPLAY

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

4268M

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1-5, Kitajizoyama, Noda-cho, Kariya 448-0803, Japan. Phone : 81-566-95-0088

Printed in Japan

S-7200C
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