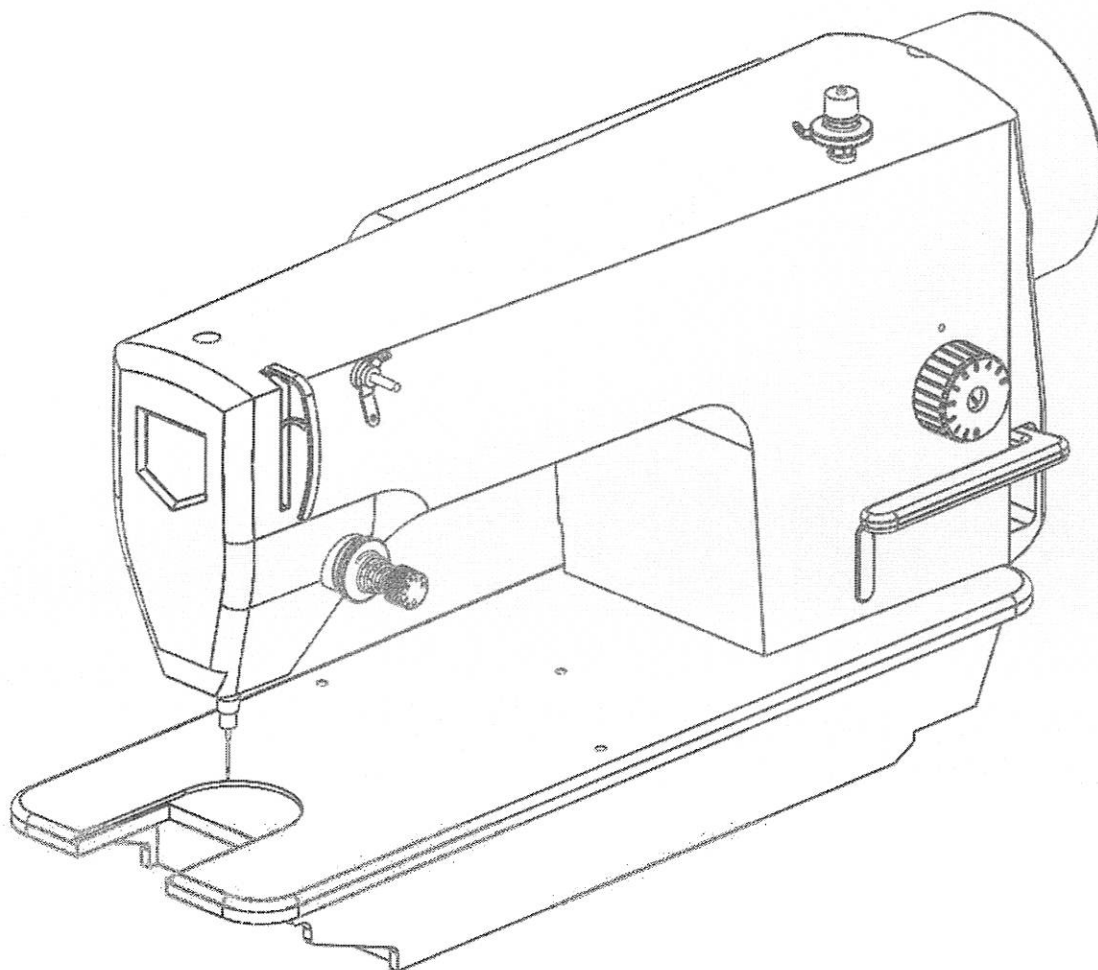


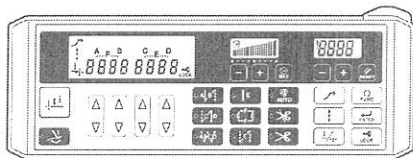
ROBOTECH



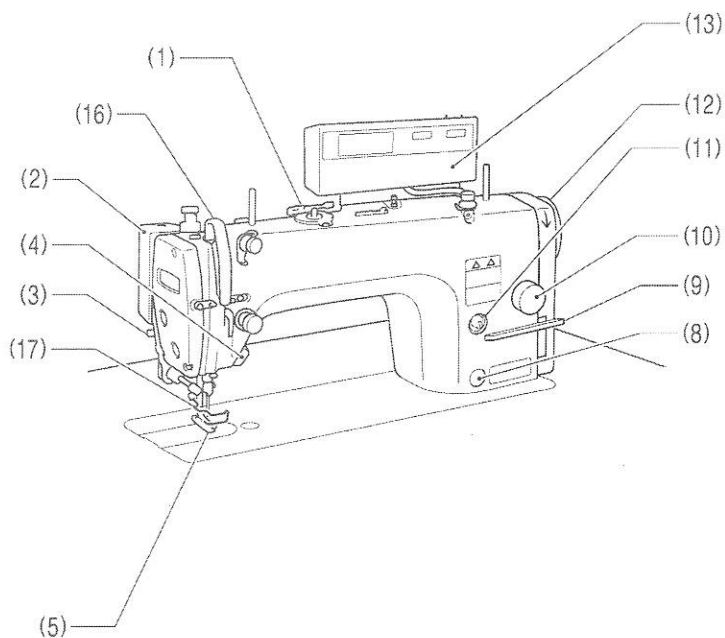
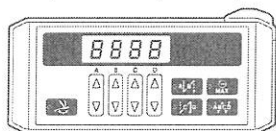
USE AND MAINTENANCE OF THE
MACHINE HEAD

NAMES OF MAJOR PARTS

G50 operation panel (advanced function LCD)



G10 operation panel (basic function LED)



4124M

- | | |
|---|---|
| (1) Bobbin winder | (2) Thread wiper (-4[] specifications) |
| (3) Lifting lever | (4) Actuator switch |
| (5) Presser foot | (8) Oil gauge window (-[]0[], []3[] specifications) |
| (9) Reverse lever | (10) Stitch length dial |
| (11) Oil feeding pocket (-[]0[] · []3[] specifications) | (12) Machine pulley |
| (13) Operation panel | |

Safety devices

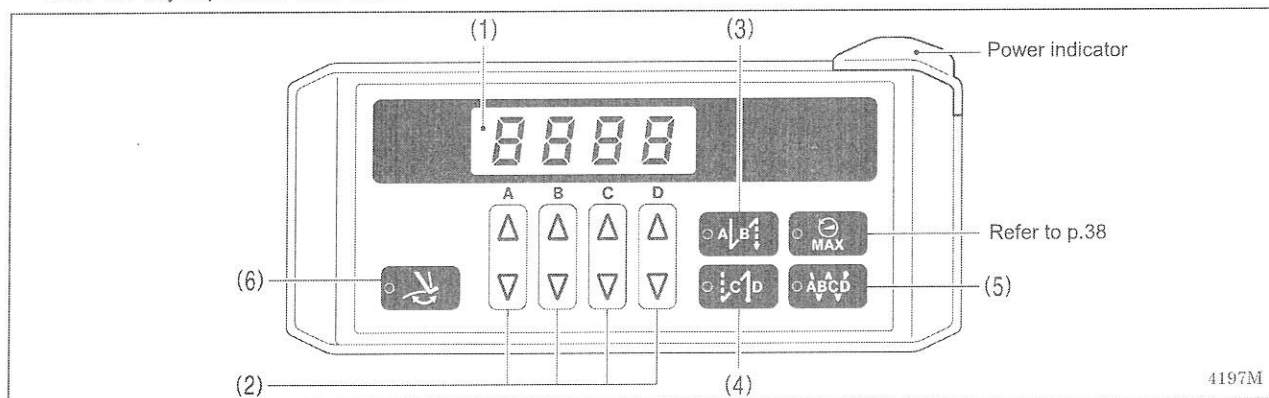
- | | |
|---------------------------|-------------------|
| (16) Thread take-up cover | (17) Finger guard |
|---------------------------|-------------------|

USING THE G10 OPERATION PANEL

(BASIC OPERATIONS)

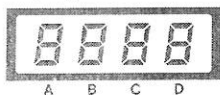
Names and functions

- The operation panel keys cannot be operated while sewing is in progress. Select the keys and set the number of stitches before starting sewing.
- In the case of keys with indicators, the indicator illuminates when that function is operating, and the indicator switches off when the key is pressed once more.



The power indicator illuminates when the power switch is turned on.

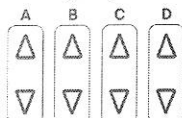
(1) Display



- When start backtack stitches are being displayed, the indicator of the start backtack key (3) will illuminate, and the number of A stitches will appear in the A column and the number of B stitches will appear in the B column.
- When end backtack stitches are being displayed, the indicator of the end backtack key (4) will illuminate, and the number of C stitches will appear in the C column and the number of D stitches will appear in the D column.
- When continuous backtack stitches are displayed, the indicator of the continuous backtack key (5) will illuminate, and the number of A, B, C and D stitches will appear in order starting from the left column of the display.

4198M

(2) Setting keys

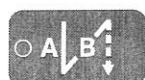


These keys are used to set the number of backtack stitches for A, B, C and D.

- When the Δ key is pressed, the setting increases from 0 up to 9.
- When the ∇ key is pressed, the setting decreases from 9 down to 0.

4199M 2138M 2139M

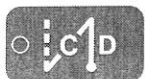
(3) Start backtack key



When this key is pressed so that the indicator illuminates, the number of start backtack stitches (0 - 9) in the A and B columns of the display are sewn.

4161M

(4) End backtack key



When this key is pressed so that the indicator illuminates, the number of end backtack stitches (0 - 9) in the C and D columns of the display are sewn. When the treadle is depressed backward, the end backtack stitches are sewn and then the thread is trimmed automatically.

If the treadle has not yet been depressed backward, the end backtack function can be set to ON, the number of stitches can be changed and the function can be set back to OFF.

4162M

(5) Continuous backtack key



When this key is pressed so that the indicator illuminates, the number of backtack stitches (0 - 9) in the A, B, C and D columns of the display are sewn continuously. After the sewing machine sews a full cycle of stitches set by A, B, C and D, the thread is trimmed automatically.

4163M

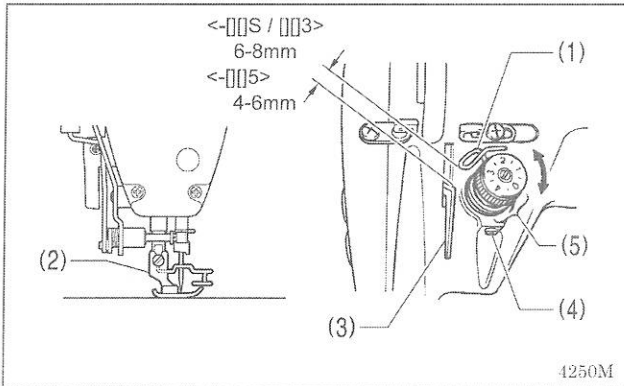
(6) Thread wiper key



- When this key is pressed so that the indicator illuminates, the thread wiper (-4□□ specifications) operates. (Refer to "4-7. Using the thread wiper".)
- If the thread trimming lock has been set, the thread wiper key (6) will be disabled. (For details on the thread trimming lock, refer to "8-4. Thread trimming lock".)
- If thread trimming lock is set when the indicator of this key is illuminated, the indicator of the thread wiper key (6) will switch off.

4174M

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 $-\square\square 5$ 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).

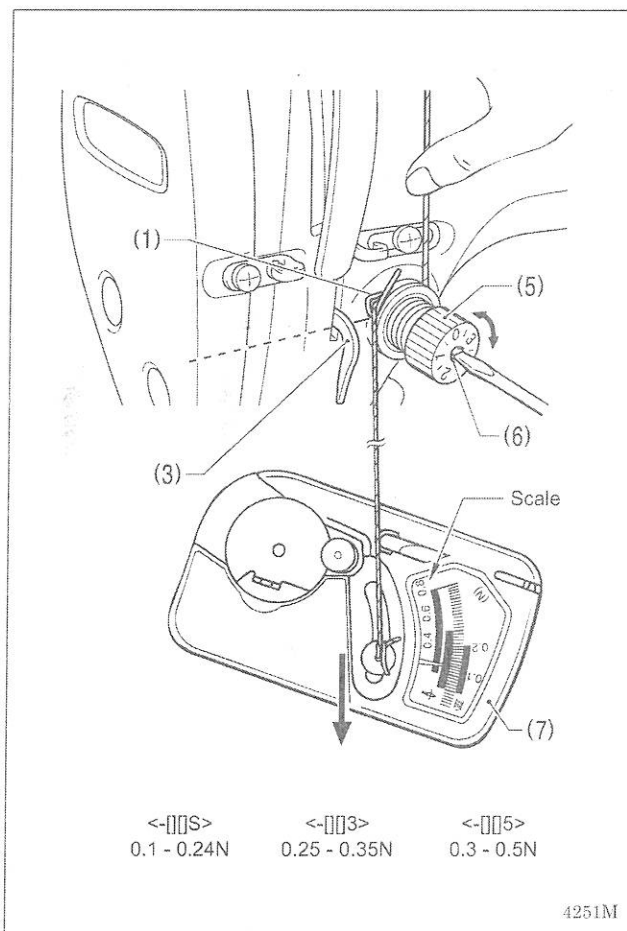
<Thread take-up spring tension>

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

$-\square\square S$ specifications	0.1 - 0.24N
$-\square\square 3$ specifications	0.25 - 0.35N
$-\square\square 5$ 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.



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 rpm		5,000 rpm*	4,500 rpm*
Start backtacking and continuous backtacking speed	220 - 3,000 rpm			
End backtacking speed	1,800 rpm			
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 rpm 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 Robotech grease	Special Robotech grease

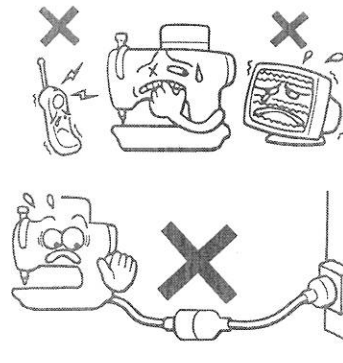
INSTALLATION

⚠ CAUTION

-  Machine installation should only be carried out by a qualified technician.
-  Contact your Robotech 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.
-  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.

About the machine set-up location

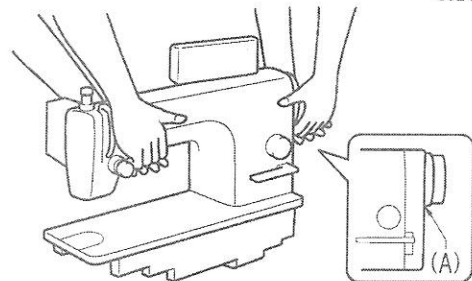
- Do not set up this sewing machine near other equipment such as televisions, radios or cordless telephones, otherwise such equipment may be affected by electronic interference from the sewing machine.
- The sewing machine should be plugged directly into an AC wall outlet. Operation problems may result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



2086M

Carrying the machine

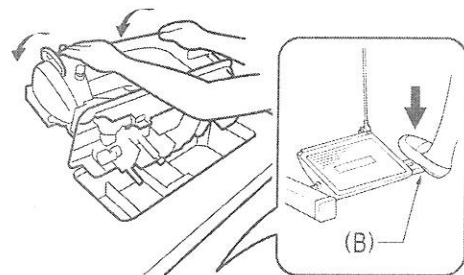
- The machine should be carried by the arm by two people as shown in the illustration.
- * Hold the motor cover (A) by hand also so that the pulley does not rotate.



4125M

Tilting back the machine head

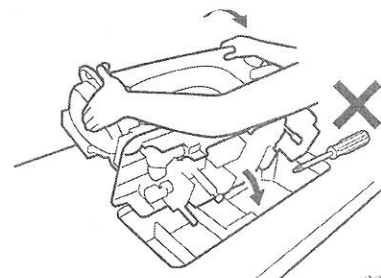
- Hold section (B) with your foot so that the table does not move, and then push the arm with both hands to tilt back the machine head.



2088M

Returning the machine head to the upright position

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



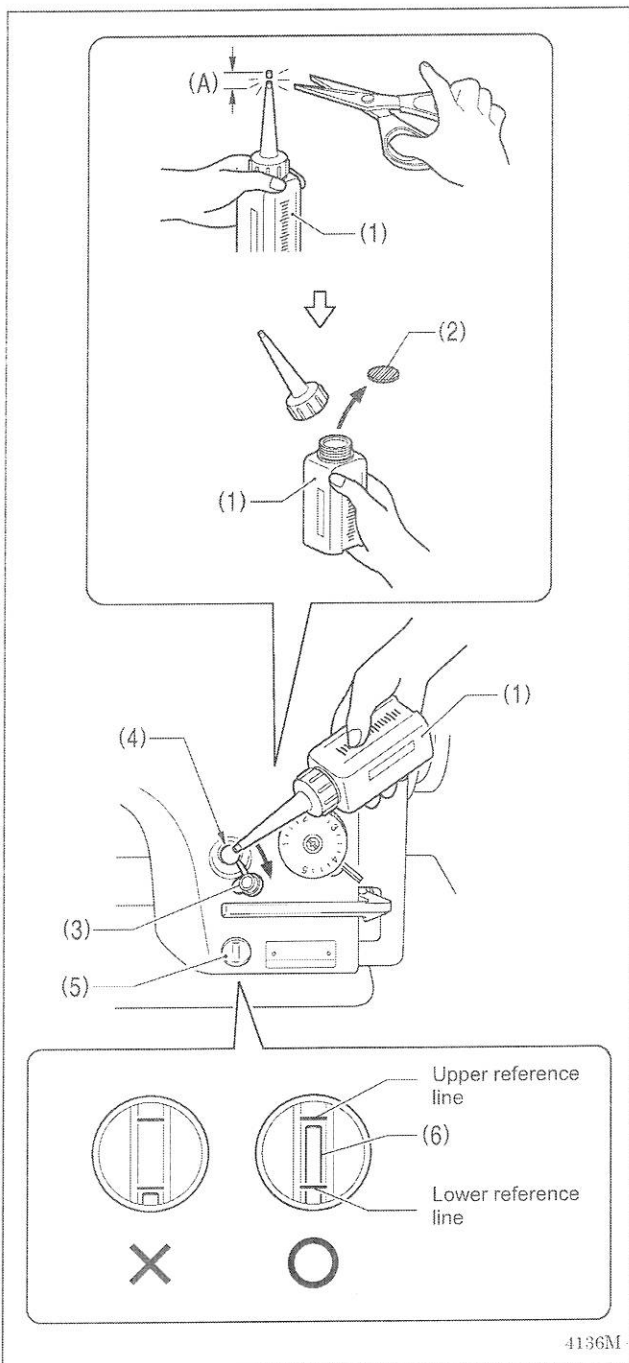
2089M

Lubrication (-[10], [3] specifications)

* If the sewing machine is -[5] specifications, it is a complete dry type machine, and so no lubrication is necessary.

⚠ CAUTION

- ⊘ Do not connect the power cord until lubrication has been completed, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.
- ⊘ Be sure to wear protective goggles and gloves when handling the lubricating oil and grease, so that they do not get into your eyes or onto your skin, otherwise inflammation can result. Furthermore, do not drink the oil or eat the grease under any circumstances, as they can cause vomiting and diarrhea. Keep the oil out of the reach of children.
- ⚠ When cutting the nozzle of the oil tank, hold the base of the nozzle securely. If you hold the end of the nozzle, injury from the scissors may result.



* The sewing machine should always be lubricated and the oil supply replenished before it is used for the first time, and also after long periods of non-use.

* Use only the lubricating oil <Nippon Oil Corporation Sewing Lube 10N; VG10> specified by Robotech.

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

1. Hold the base of the nozzle of the accessory oil tank (1), and use scissors to cut about half-way along the straight section (A) of the nozzle.
2. Loosen and remove the nozzle, and then remove the seal (2).
3. Tighten the nozzle.
4. Open the oil feeding pocket cover (3).
5. Insert the nozzle of the oil tank (1) deeply into the oil feeding pocket (4), and then add about 120 ml of lubricating oil.
6. Check that the oil gauge (6) comes to the upper reference line in the oil gauge window (5).
7. Close the oil feeding pocket cover (3).

<Lubrication oil replenishment interval>

Be sure to add more oil if the oil gauge (6) is below the lower reference line.

4136M

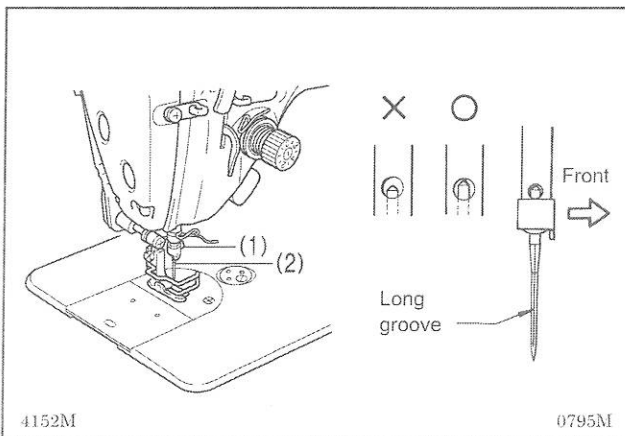
PREPARATION BEFORE SEWING

Installing the needle

CAUTION



Turn off the power switch before installing the needle.
The machine may operate if the treadle is depressed by mistake, which could result in injury.



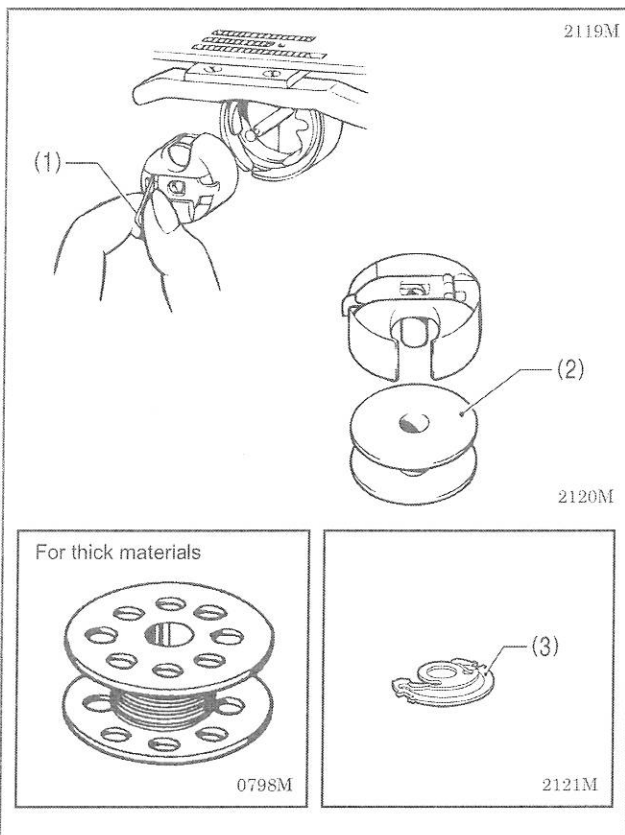
1. Turn the machine pulley to move the needle bar to its highest position.
2. Loosen the screw (1).
3. Insert the needle (2) in a straight line as far as it will go, making sure that the long groove on the needle is at the left, and then securely tighten the screw (1).

Removing the bobbin case

CAUTION



Turn off the power switch before removing the bobbin case.
The machine may operate if the treadle is depressed by mistake, which could result in injury.



1. Turn the machine pulley to raise the needle until it is above the needle plate.
2. Pull the latch (1) of the bobbin case upward and then remove the bobbin case.
3. The bobbin (2) will come out when the latch (1) is released.

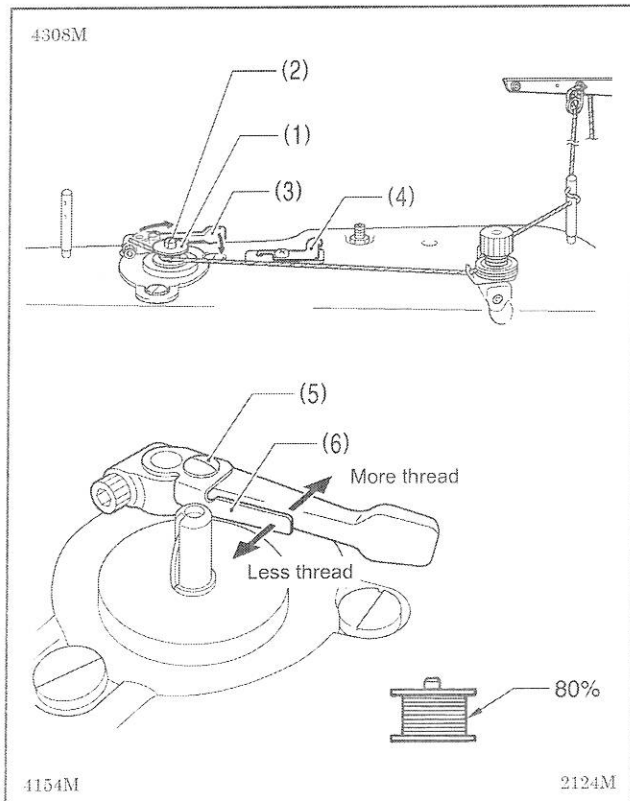
- * There is an anti-spin spring (3) inside the bobbin case. The anti-spin spring (3) prevents the bobbin from racing at times such as during thread trimming.
- * Use bobbins (2) made of light alloy as specified by Robotech

Winding the lower thread

CAUTION



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



1. Turn on the power switch.
2. Place the bobbin (1) onto the bobbin winder shaft (2).
3. Wind the thread several times around the bobbin (1) in the direction indicated by the arrow.
4. Push the bobbin presser arm (3) toward the bobbin (1).
5. Raise the presser foot with the lifting lever.
6. Depress the treadle. Lower thread winding will then start.
7. Once winding of the lower thread is completed, the bobbin presser arm (3) will return automatically.
8. After the thread has been wound on, remove the bobbin and cut the thread with the knife (4).

* Loosen the screw (5) and move the bobbin presser (6) to adjust the amount of thread wound onto the bobbin.

NOTE:

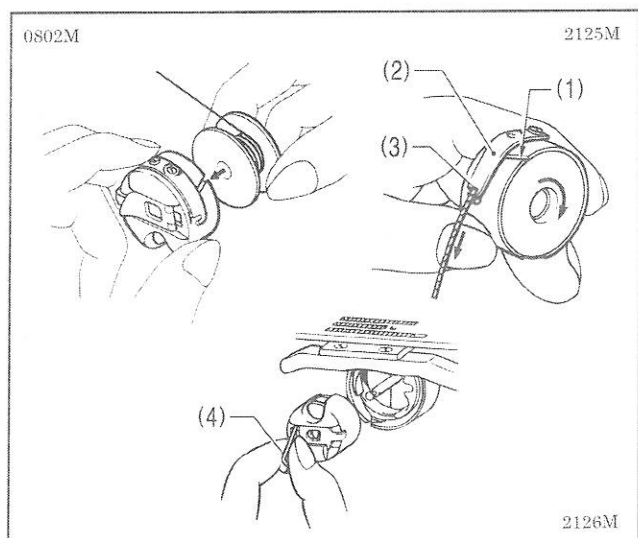
The amount of thread wound onto the bobbin should be a maximum of 80 % of the bobbin capacity.

Installing the bobbin case

CAUTION



Turn off the power switch before installing the bobbin case. The machine may operate if the treadle is depressed by mistake, which could result in injury.



1. Turn the machine pulley to raise the needle until it is above the needle plate.
2. While holding the bobbin so that the thread winds to the right, insert the bobbin into the bobbin case.
3. Pass the thread through the slot (1) and under the tension spring (2), and then pull it out from the thread guide (3).
4. Check that the bobbin turns clockwise when the thread is pulled.
5. Hold the latch (4) on the bobbin case and insert the bobbin case into the rotary hook.

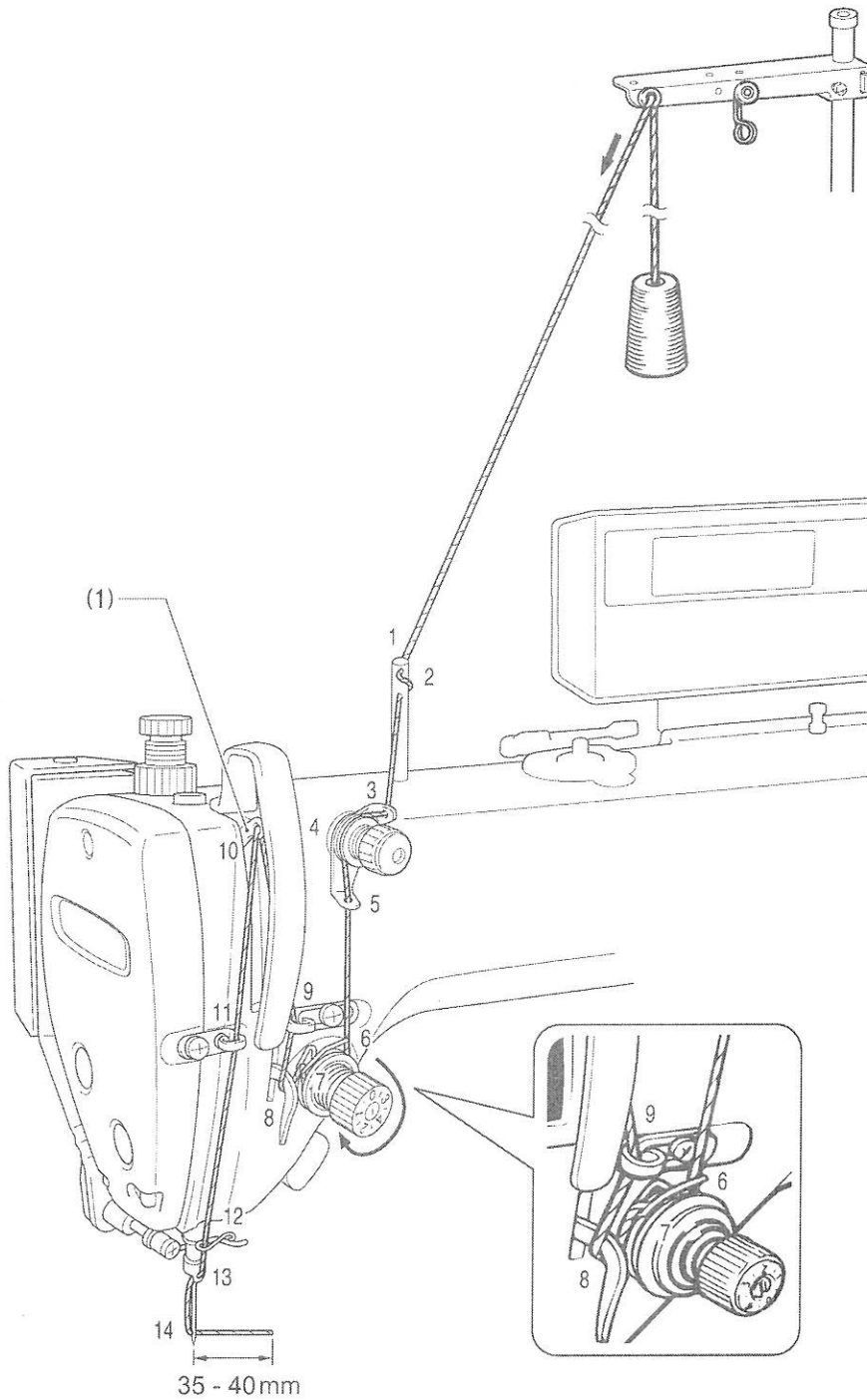
Threading the upper thread

⚠ CAUTION



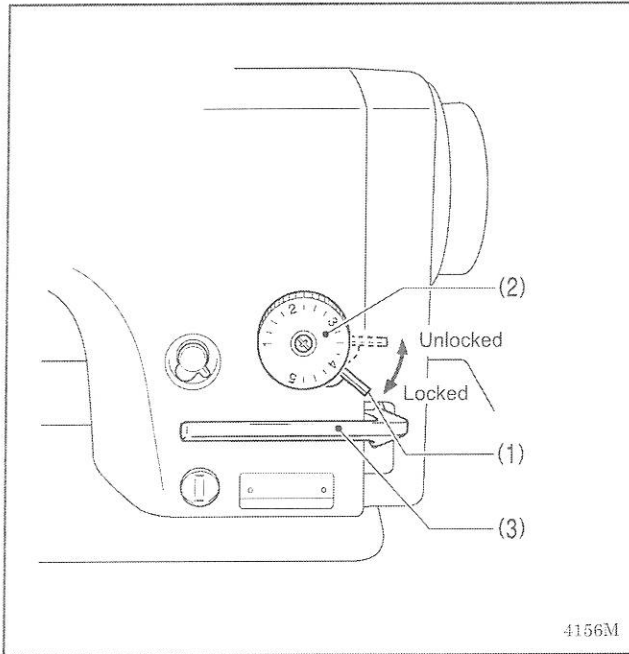
Turn off the power switch before threading the upper thread.
The machine may operate if the treadle is depressed by mistake, which could result in injury.

Turn the machine pulley and raise the thread take-up (1) before threading the upper thread.
This will make threading easier and it will prevent the thread from coming out at the sewing start.



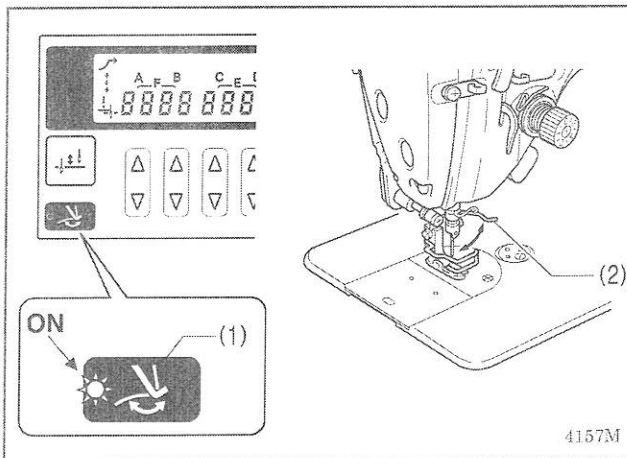
4155M

Adjusting the stitch length



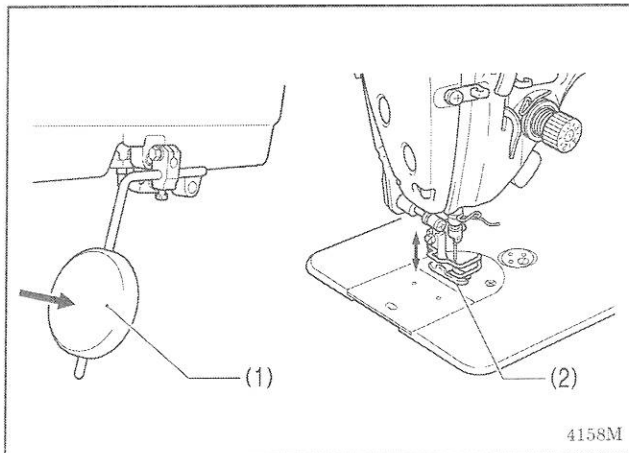
1. Push the dial lock lever (1) up until it clicks to release the lock.
 2. Turn the stitch length dial (2) clockwise or counter-clockwise so that the desired stitch length is at the uppermost position on the dial.
 - The larger the number, the longer the stitch length will be.
(The numbers on the dial are for use as a guide. The length of the finished stitches may vary depending on the type and thickness of material being sewn. Adjust while looking at the finished stitches.)
 - When turning the stitch length dial (2) from a larger setting to a smaller setting, it will be easier to turn the dial if the reverse lever (3) is pushed to the halfway-down position.
 3. Push the dial lock lever (1) down firmly to lock it.
- * Check that the stitch length dial (2) does not rotate.

Using the thread wiper (-4[] specifications)



Press the thread wiper key (1) on the operation panel so that the indicator illuminates. If this is done, the thread wiper (2) will operate after the thread is trimmed.

Using the knee lifter

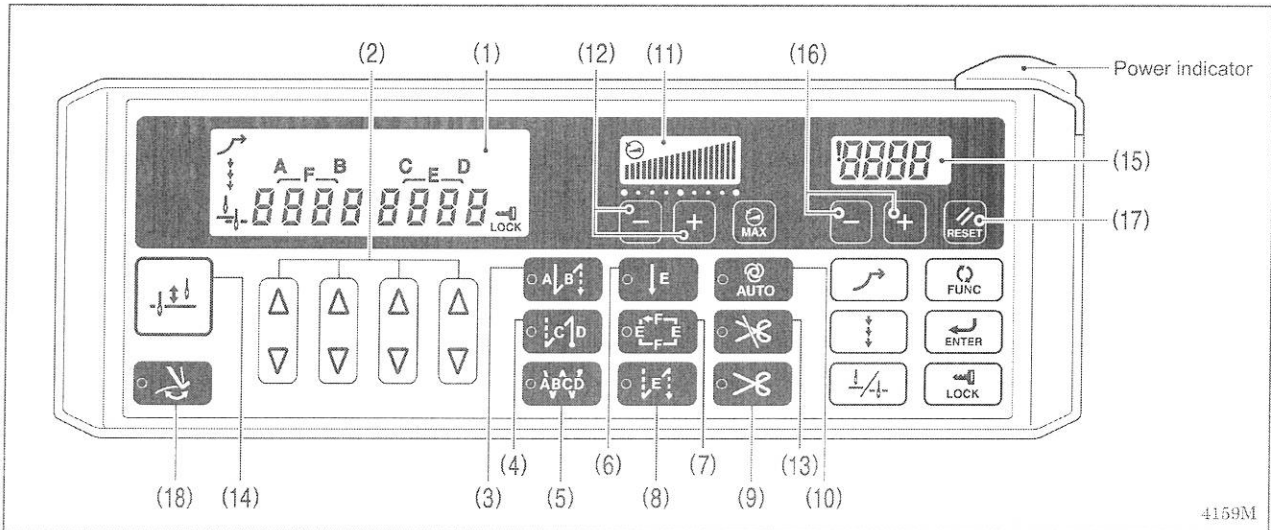


The presser foot (2) can be raised by pressing the knee lifter plate (1).

USING THE G50 OPERATION PANEL (BASIC OPERATIONS)

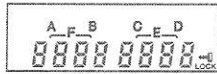
Names and functions

- The operation panel keys cannot be operated while sewing is in progress. Select the keys and set the number of stitches before starting sewing.
- In the case of keys with indicators, the indicator illuminates when that function is operating, and the indicator switches off when the key is pressed once more.



The power indicator illuminates when the power switch is turned on.

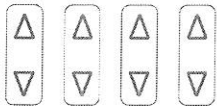
(1) Main display



- In start backtick display, AB illuminates and the number of stitches for A and B are displayed.
- In end backtick display, CD illuminates and the number of stitches for C and D are displayed.
- In continuous backtick display, ABCD illuminates and the number of stitches for A, B, C and D are displayed.
- In fixed stitch display, E or F illuminates and the number of stitches for E or F are displayed.

2136M

(2) Setting keys



These keys are used to set the number of backtick stitches for A, B, C and D and the number of fixed stitches for E and F.

- When the Δ key is pressed, the setting increases from 0 up to 99.
- When the ∇ key is pressed, the setting decreases from 99 down to 0.

4160M 2138M 2139M

(3) Start backtick key



When this key is pressed so that the indicator illuminates, the number of start backtick stitches (0-99) in the A and B stitch number displays is sewn.

4161M

(4) End backtick key



When this key is pressed so that the indicator illuminates, the number of end backtick stitches (0-99) in the C and D stitch number displays is sewn. When the treadle is depressed backward, the end backtick stitches are sewn and then the thread is trimmed automatically.

If the treadle has not yet been depressed backward, the end backtick function can be set to ON, the number of stitches can be changed and the function can be set back to OFF.

4162M

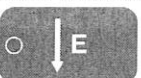
(5) Continuous backtick key



When this key is pressed so that the indicator illuminates, the number of backtick stitches (0-99) in the A, B, C and D stitch number displays is sewn continuously. After the sewing machine sews a full cycle of stitches set by A, B, C and D, the thread is trimmed automatically.

4163M

(6) Fixed stitch key



When this key is pressed so that the indicator illuminates, the number of stitches (1-1999) in the E stitch number display is sewn, and then the sewing machine stops automatically.

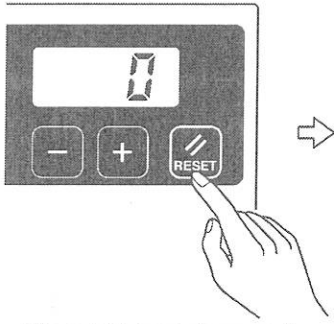
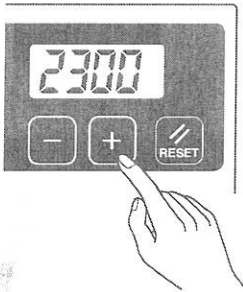
4164M

(7) Name label key		When this key is pressed so that the indicator illuminates, fixed stitch sewing of the number of stitches (1-1999) in the E and F stitch number displays is carried out repeatedly.	4165M
(8) Pleat presser sewing key		When this key is pressed so that the indicator illuminates, the number of backtack stitches (1-1999) in the E stitch number display can be sewn by pressing the actuator switch.	4166M
(9) Thread trimming key		<ul style="list-style-type: none"> • This can only be set for use together with the fixed stitch key (6) or the name label key (7). • When this key is pressed so that the indicator illuminates, the set number of stitches (start or end backtack stitches or fixed stitches) are sewn, and then the thread is trimmed automatically. 	4167M
(10) AUTO key		<ul style="list-style-type: none"> • This can only be set for use together with the continuous backtack key (5), the fixed stitch key (6) or the name label key (7). • When this key is pressed so that the indicator illuminates, the set number of stitches (start or end backtack stitches, fixed stitches or thread trimming) are sewn automatically simply by depressing the treadle once. 	4168M
(11) Sewing speed control display		<p>This shows the sewing speed when the treadle is depressed to the maximum amount.</p> <ul style="list-style-type: none"> • If all bars are illuminated, it indicates that the maximum speed can be set. • If all bars are switched off, it indicates the minimum speed (220 rpm). 	4169M
(12) Sewing speed control keys		<p>These keys let you adjust the sewing speed that is used when the treadle is depressed to the maximum amount.</p> <p>The sewing speed can also be adjusted while sewing is in progress.</p> <ul style="list-style-type: none"> • When the + key is pressed, the sewing speed becomes faster. • When the - key is pressed, the sewing speed becomes slower. 	4170M
(13) Thread trimming lock key		<ul style="list-style-type: none"> • When this key is pressed so that the indicator illuminates, the sewing machine stops in the needle up position without thread trimming being carried out even if the treadle is depressed backward. • If the indicator of the AUTO key (10) is illuminated, the sewing machine stops in the needle up position without thread trimming being carried out after the set number of stitches have been sewn. 	4171M
(14) Half stitch key		When the sewing machine is stopped, the needle bar can be moved up and down by pressing this key.	4172M
(15) Lower thread counter display		<p>This shows the lower thread counter value.</p> <p>The counter is reduced by "1" for every ten stitches sewn.</p>	2154M
(16) Lower thread counter keys		These keys are used to set the initial value for the lower thread counter. (Refer to "5-7. Using the lower thread counter".)	4170M
(17) RESET key		This key is used to return the lower thread counter to its initial value and to cancel warning conditions. (Refer to "5-7. Using the lower thread counter".)	4173M
(18) Thread wiper key		<ul style="list-style-type: none"> • When this key is pressed so that the indicator illuminates, the thread wiper (-4□□ specifications) operates. (Refer to "4-7. Using the thread wiper".) • When the indicator of the thread trimming lock key (13) is illuminated, the thread wiper key (18) is disabled. • If you press the thread trimming lock key (13) so that its indicator illuminates while the indicator of the thread wiper key (18) is illuminated, the indicator of the thread wiper key (18) will switch off. 	4174M

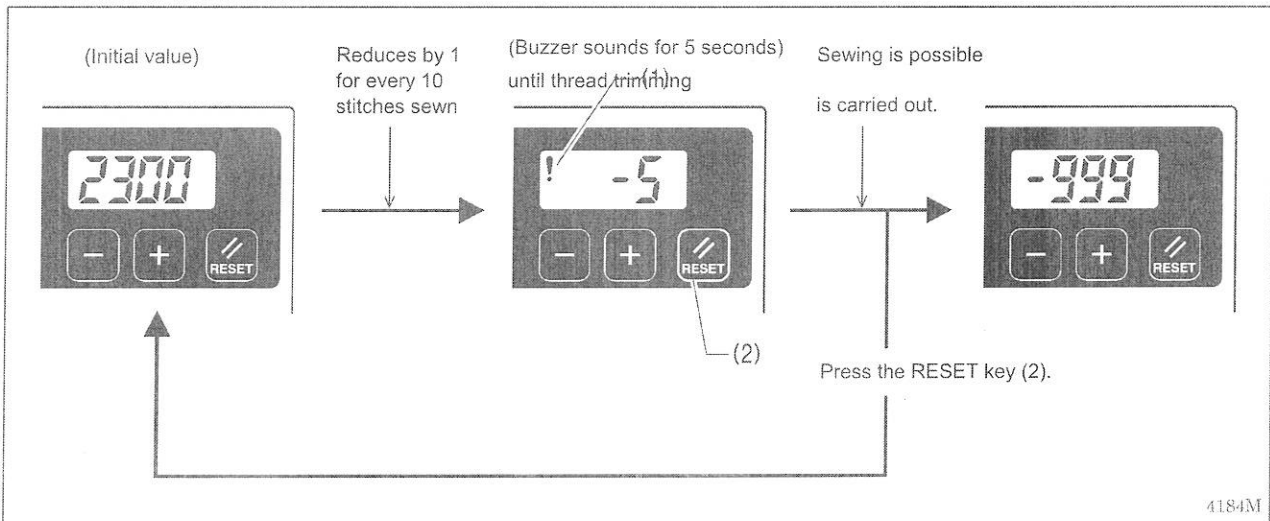
Using the lower thread counter

- The lower thread counter can be used to let you know approximately how much lower thread is remaining.
- The value displayed by the lower thread counter display is reduced by 1 from the initial setting value each time the sewing machine sews 10 stitches, and a warning is given when the counter goes below "0".

<Initial value setting>

1	 <p>After about 2 seconds, the buzzer will sound and the lower thread counter display will show the initial value which was set previously.</p> <p>(Press for 2 seconds or more)</p>	4182M
2	 <ul style="list-style-type: none"> • When the + key is pressed, the setting increases. • When the - key is pressed, the setting decreases. • If you hold down the keys, the setting will change more quickly. • If a value of "0" is set, the lower thread counter will not operate. • The initial setting value will be accepted when sewing starts. 	4183M

<Lower thread counter operation>

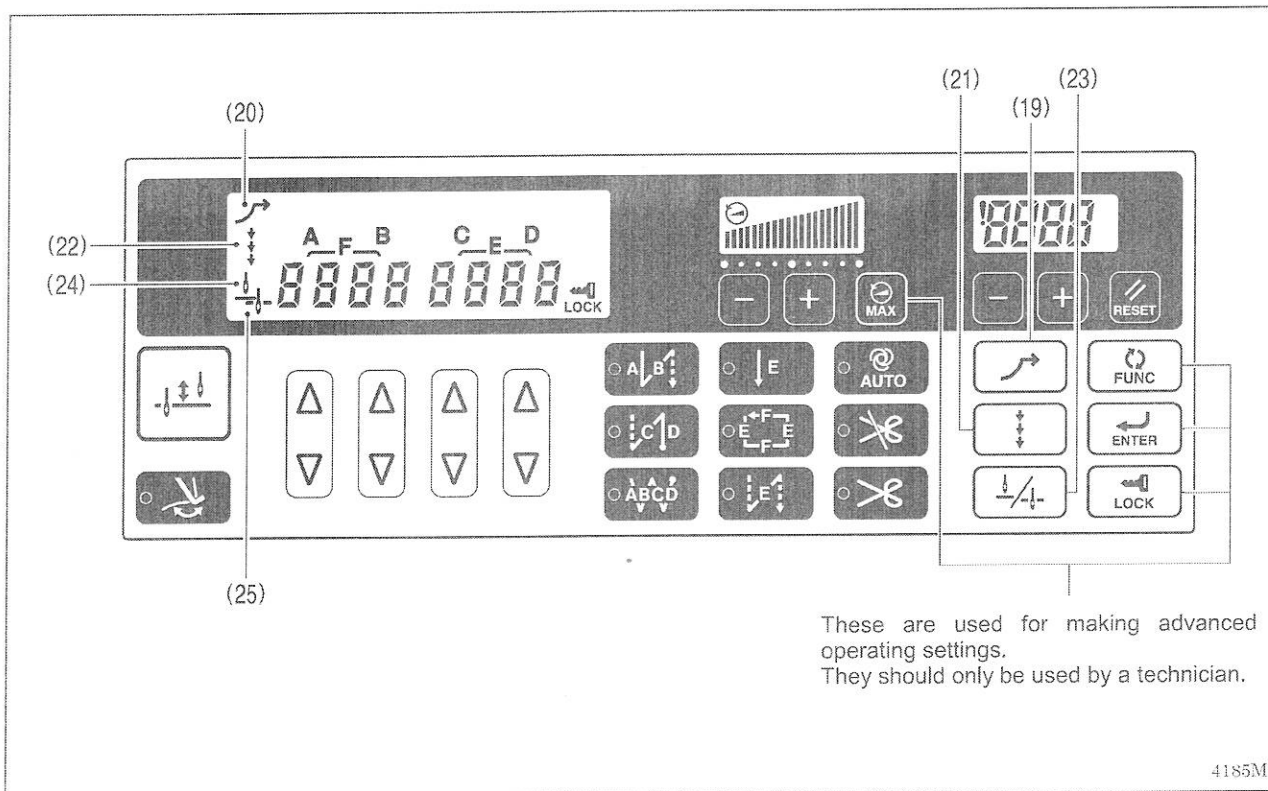


1. When sewing is carried out, the value shown in the lower thread counter display is reduced by 1 for every 10 stitches sewn. (When the value goes below zero ("0"), a minus sign appears and counting continues to a maximum of "-999".)
2. When the value goes below "0", a warning icon (1) illuminates and an electronic buzzer sounds for 5 seconds.
3. Sewing will be possible even after the treadle is returned to the neutral position and the sewing machine stops. However, after the treadle has been depressed backward and thread trimming has been carried out, sewing using the treadle will no longer be possible.
4. When the RESET key (2) is pressed, the warning icon (1) will switch off and the display will return to showing the initial values. Sewing using the treadle will then be possible.

USING THE G50 OPERATION PANEL (ADVANCED OPERATIONS)

The operations described in this section should only be carried out by a technician.

Names and functions



These are used for making advanced operating settings. They should only be used by a technician.

4185M

(19) Slow start key



- When this key is pressed so that the slow start icon (20) illuminates, the first two stitches sewn after the thread is trimmed are sewn at 700 rpm. After this, the sewing speed corresponds to the treadle depression amount.
- If you press this key again while the icon (20) is illuminated, the icon (20) will turn off.

4186M

(21) Correction key



- When this key is pressed so that the correction icon (22) illuminates, correction sewing can be carried out. If the sewing machine is stopped, sewing will be carried out at slow speed (220 rpm) while the actuator switch is being pressed.
- NOTE:**
 - If you press the actuator switch while sewing is in progress, backtack stitches will be sewn.
 - Correction sewing cannot be carried out while the indicator of the pleat presser sewing key (8) is illuminated.
- If you press this key again while the icon (22) is illuminated, the icon (22) will turn off.

4187M

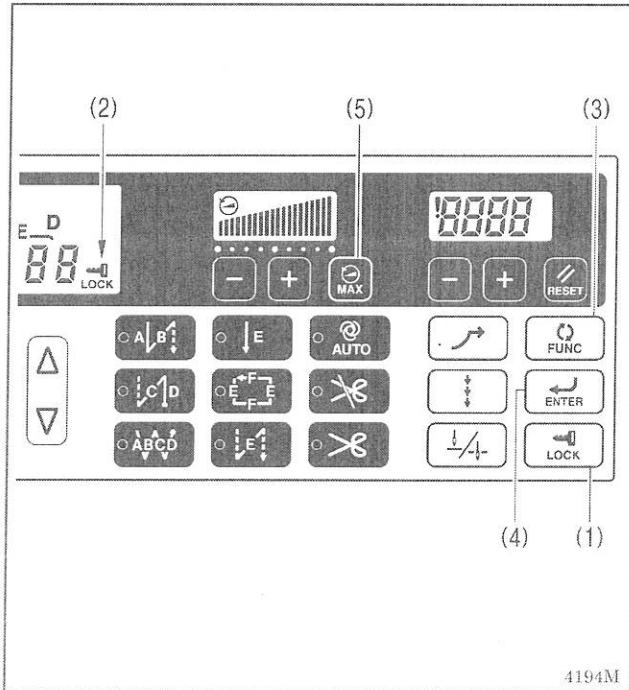
(23) Needle up/down key



- Use this key to select whether the needle bar stops in the up position or the down position when the treadle is returned to the neutral position and sewing stops.
- When the needle up icon \uparrow (24) is illuminated, the needle bar stops in the up position.
 - When the needle down icon \downarrow (25) is illuminated, the needle bar stops in the down position.

4188M 2207M 2208M

LOCK key



When the power switch is turned on, the LOCK key (1) turns ON. (The icon (2) is illuminated.)
In this state, the following three key operations are disabled so that the setting values cannot be changed accidentally.

FUNC key (3)

This key is used to make settings for various functions.

ENTER key (4)

This key is used to accept function settings.

MAX key (5)

This key is used to change the maximum sewing speed.

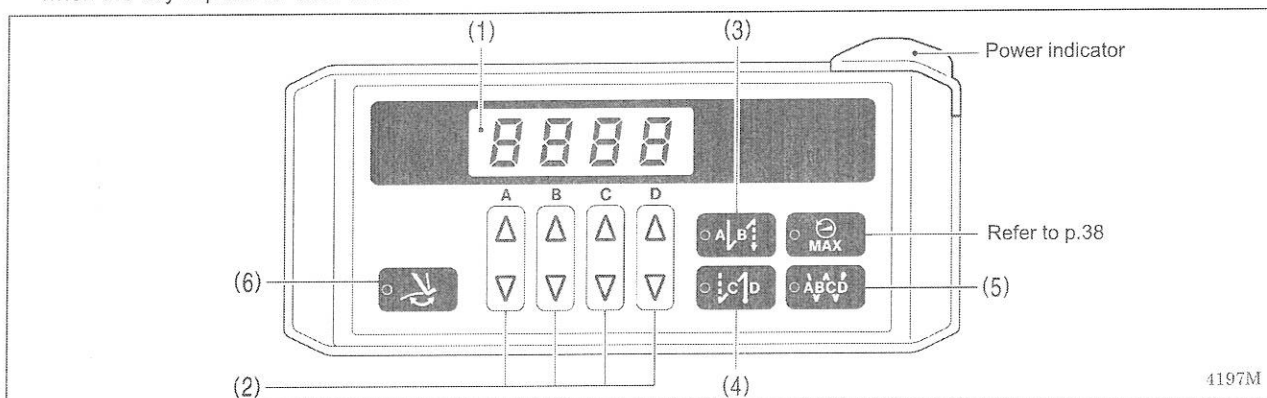
* Refer to the Service Manual for details on using these keys.

USING THE G10 OPERATION PANEL

(BASIC OPERATIONS)

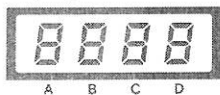
Names and functions

- The operation panel keys cannot be operated while sewing is in progress. Select the keys and set the number of stitches before starting sewing.
- In the case of keys with indicators, the indicator illuminates when that function is operating, and the indicator switches off when the key is pressed once more.



The power indicator illuminates when the power switch is turned on.

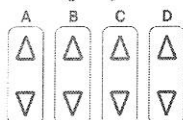
(1) Display



- When start backtack stitches are being displayed, the indicator of the start backtack key (3) will illuminate, and the number of A stitches will appear in the A column and the number of B stitches will appear in the B column.
- When end backtack stitches are being displayed, the indicator of the end backtack key (4) will illuminate, and the number of C stitches will appear in the C column and the number of D stitches will appear in the D column.
- When continuous backtack stitches are displayed, the indicator of the continuous backtack key (5) will illuminate, and the number of A, B, C and D stitches will appear in order starting from the left column of the display.

4198M

(2) Setting keys



These keys are used to set the number of backtack stitches for A, B, C and D.

- When the Δ key is pressed, the setting increases from 0 up to 9.
- When the ∇ key is pressed, the setting decreases from 9 down to 0.

4199M 2138M 2139M

(3) Start backtack key



When this key is pressed so that the indicator illuminates, the number of start backtack stitches (0 - 9) in the A and B columns of the display are sewn.

4161M

(4) End backtack key



When this key is pressed so that the indicator illuminates, the number of end backtack stitches (0 - 9) in the C and D columns of the display are sewn. When the treadle is depressed backward, the end backtack stitches are sewn and then the thread is trimmed automatically.

If the treadle has not yet been depressed backward, the end backtack function can be set to ON, the number of stitches can be changed and the function can be set back to OFF.

4162M

(5) Continuous backtack key



When this key is pressed so that the indicator illuminates, the number of backtack stitches (0 - 9) in the A, B, C and D columns of the display are sewn continuously. After the sewing machine sews a full cycle of stitches set by A, B, C and D, the thread is trimmed automatically.

4163M

(6) Thread wiper key



- When this key is pressed so that the indicator illuminates, the thread wiper (-4□□ specifications) operates. (Refer to "4-7. Using the thread wiper".)
- If the thread trimming lock has been set, the thread wiper key (6) will be disabled. (For details on the thread trimming lock, refer to "8-4. Thread trimming lock".)
- If thread trimming lock is set when the indicator of this key is illuminated, the indicator of the thread wiper key (6) will switch off.

4174M

Setting the maximum sewing speed

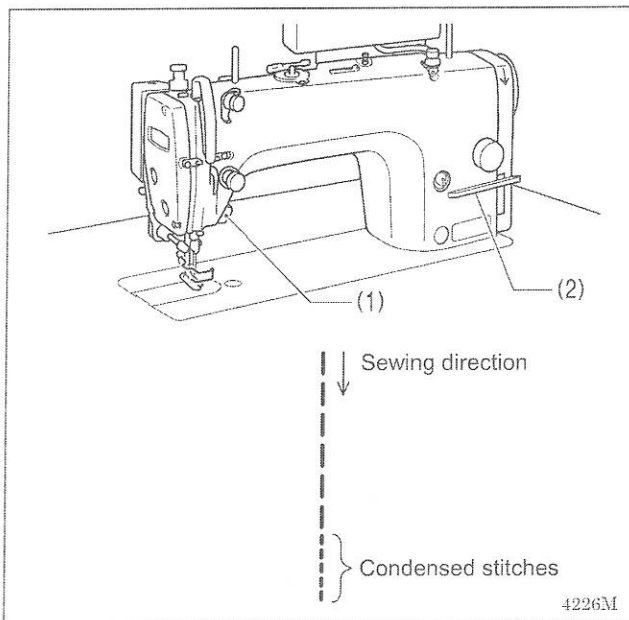
- The maximum sewing speed can be set to a speed from 220 rpm up to the maximum sewing speed which is set for the head detector unit.
- If the treadle is depressed as far as it will go, sewing will be carried out at the maximum sewing speed which is set here.
 - * This setting cannot be carried out if the lock function is on. (For details on turning the lock function off, refer to "8-7. Lock function".)

1		<p>(Current setting value)</p> <p style="text-align: right;">4214M</p>
2	<p>Setting the maximum sewing speed</p>	<p>The maximum sewing speed is set in columns A and B. (Setting can be carried out in units of 100 rpm.)</p> <ul style="list-style-type: none"> • When the Δ key is pressed, the setting increases. • When the ∇ key is pressed, the setting decreases. <p style="text-align: right;">4215M 2138M 2139M</p>
3		<p>The display will return to what was shown before the MAX key was pressed.</p> <p style="text-align: right;">4216M</p>

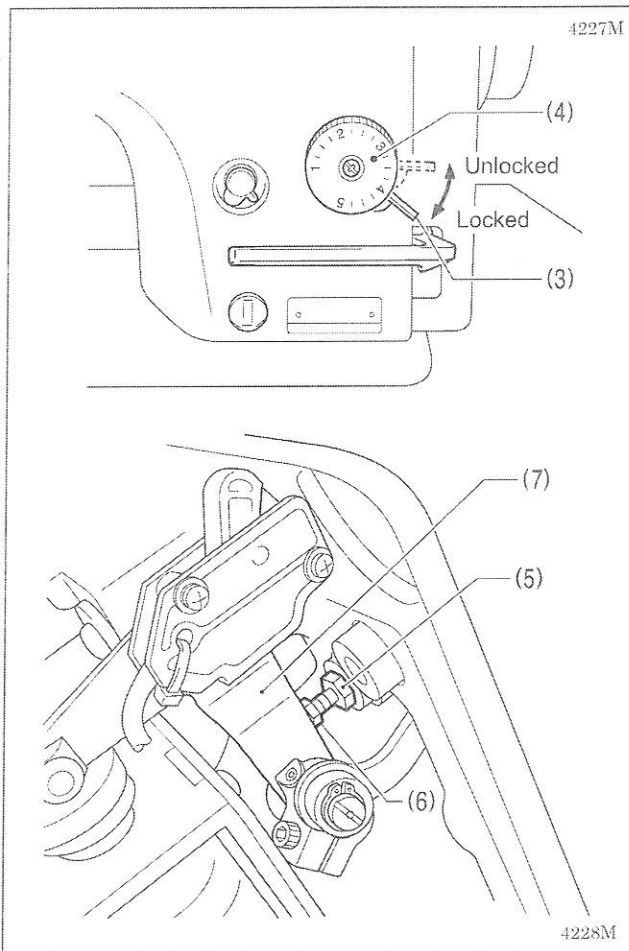
NOTE:

While the indicator of the MAX key is illuminated, all keys other than the Δ / ∇ keys for the A and B columns will be disabled. If the MAX key is pressed once more, the indicator of the MAX key will switch off and normal key operations can then be carried out.

Sewing condensed stitches



- If you press the actuator switch (1) or the reverse lever (2) while sewing is in progress, you can sew stitches (forward direction) with small stitch lengths.
- Before carrying out sewing, set the stitch length for condensed stitches as follows.



<Setting>

1. Lift up the dial lock lever (3) to release the lock.
2. Turn the stitch length dial (4) to the stitch length to be used for condensed stitches.
3. Tilt back the machine head.
4. Loosen the nut (5) and then turn the bolt (6) until its head is touching the solenoid lever (7).
5. Tighten the nut (5) to secure the bolt (6).
6. Return the machine head to its normal position.

<Sewing>

1. Return the stitch length dial (4) to the stitch length for normal sewing.
2. Push down the dial lock lever (3) to engage the lock.
3. Start sewing.
4. At the position where you would like to start sewing condensed stitches, press the actuator switch (1) or the reverse lever (2).
(Condensed stitches are sewn while the actuator switch (1) or reverse lever (2) is being pressed.)

* To stop sewing condensed stitches, tighten the bolt (6) so that its head is not touching the solenoid lever (7).

THREAD TENSION

Adjusting the thread tension

⚠ CAUTION



Turn off the power switch before removing or inserting the bobbin case.
The machine may operate if the treadle is depressed by mistake, which could result in injury.

Good even stitches



0572M



0573M

Upper thread tension too weak or lower thread tension too strong

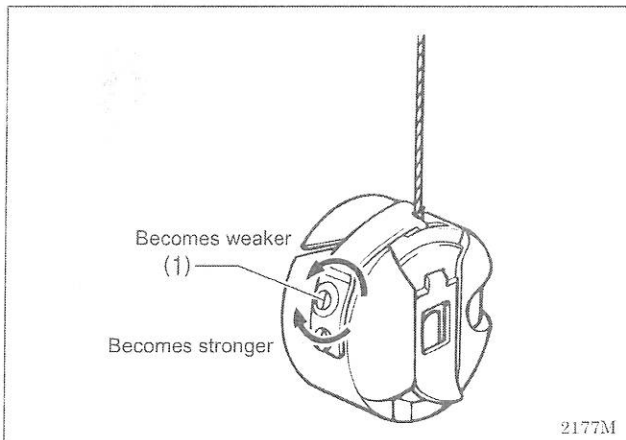
→ Increase the upper thread tension.
Decrease the lower thread tension.



0574M

Upper thread tension too strong or lower thread tension too weak

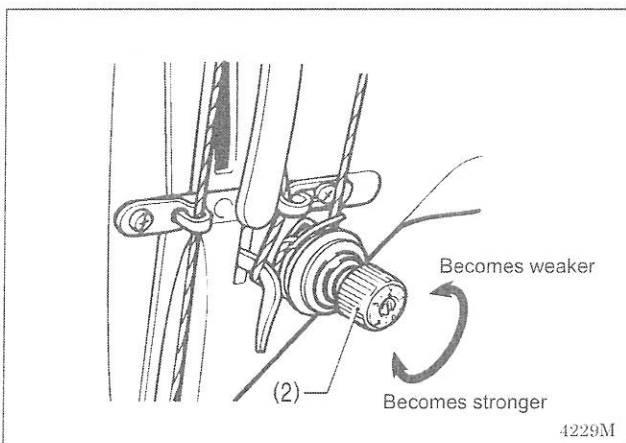
→ Decrease the upper thread tension.
Increase the lower thread tension.



2177M

<Lower thread tension>

Adjust by turning the adjustment screw (1) until the bobbin case drops gently by its own weight while the thread end coming out of the bobbin case is held.



4229M

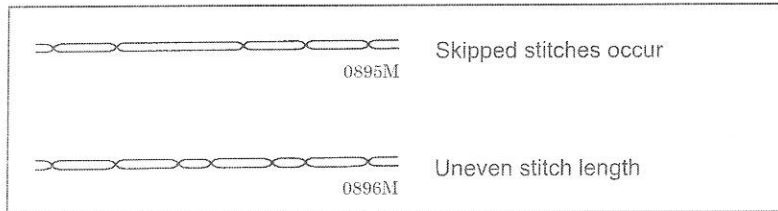
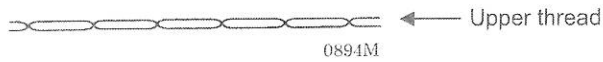
<Upper thread tension>

After the lower thread tension has been adjusted, adjust the upper thread tension so that a good, even stitch is obtained.

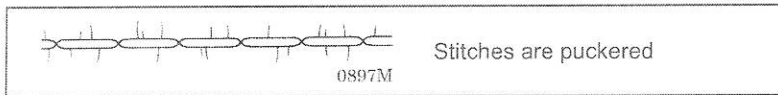
1. Lower the presser foot.
2. Adjust by turning the tension nut (2).

Adjusting the presser foot pressure

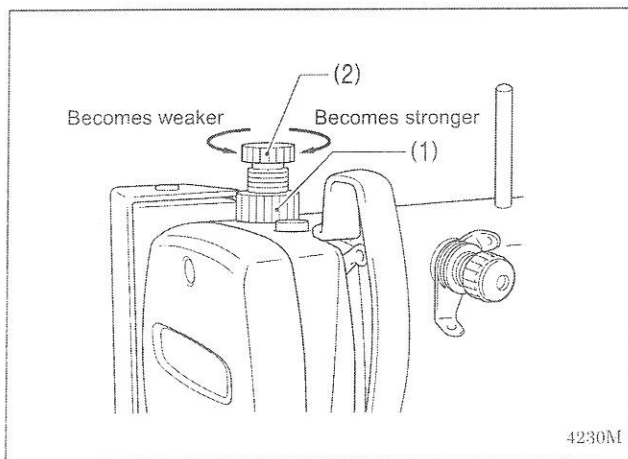
Correct stitches



→ Increase the pressure.



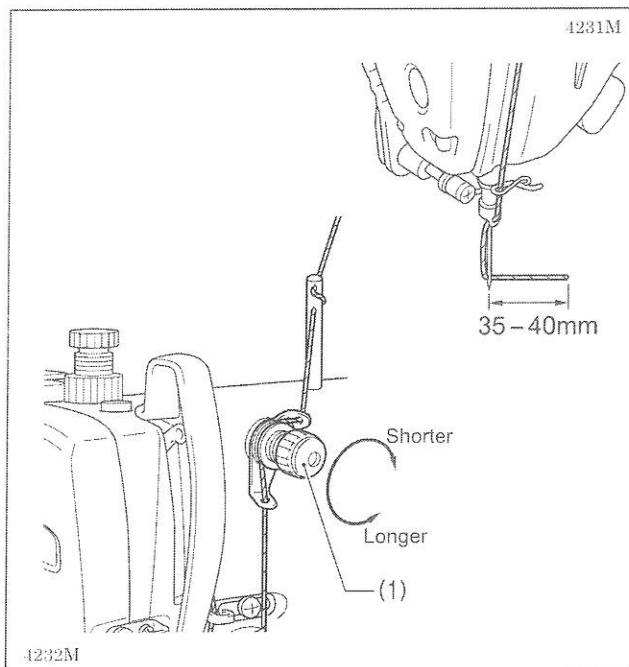
→ Decrease the pressure.



The presser foot pressure should be as weak as possible, but strong enough so that the material does not slip.

1. Loosen the adjusting nut (1).
2. Turn the presser adjusting screw (2) to adjust the presser foot pressure.
3. Tighten the adjusting nut (1).

10-3. Adjusting the trailing length after thread trimming



- At the time of thread trimming, the thread tension is loosened and tension is applied by the pretension (1) only.
- The standard trailing length for the upper thread is 35-40 mm.
- If the tension of the pretension (1) is increased, the lengths of the threads trailing from the needle tips will be reduced; if the tension is reduced, the lengths will be increased.

Adjust by turning the pretension (1).

Adjusting the thread take-up amount (-[][]3 specifications)

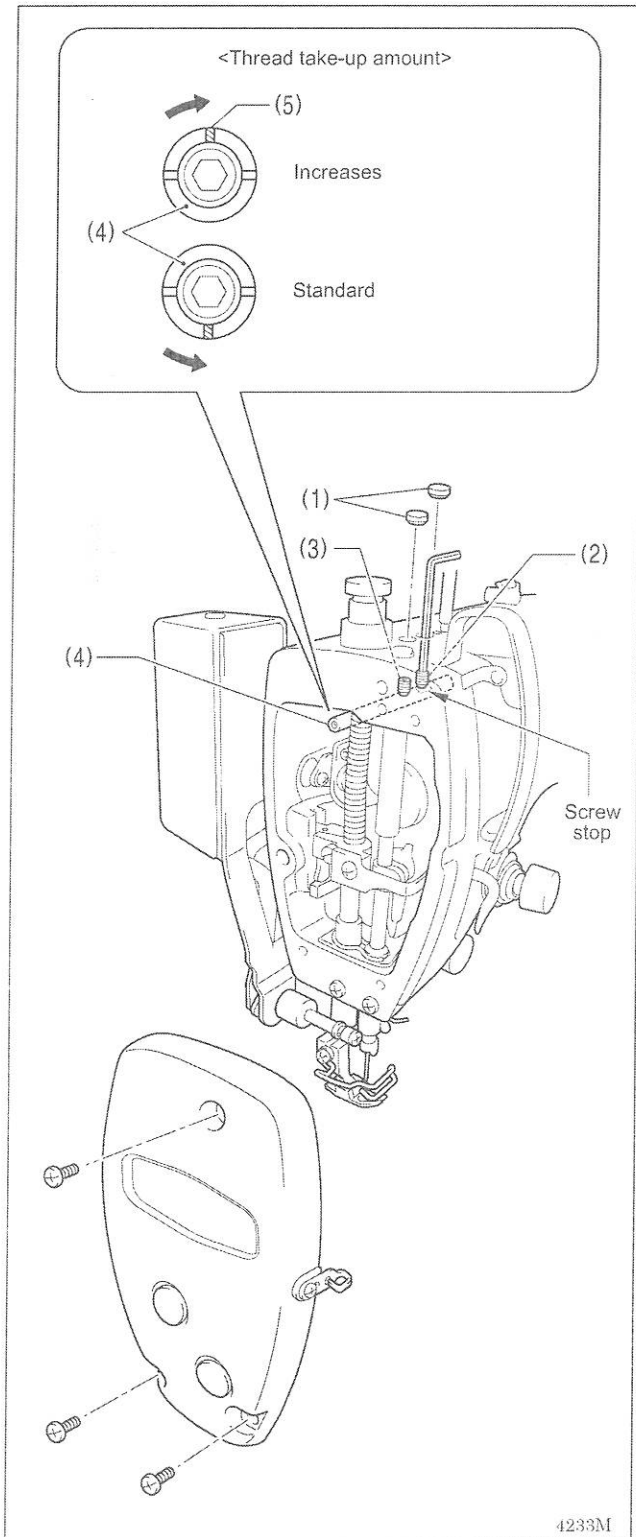
CAUTION



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.

CLEANING

⚠ CAUTION



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.



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.



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.

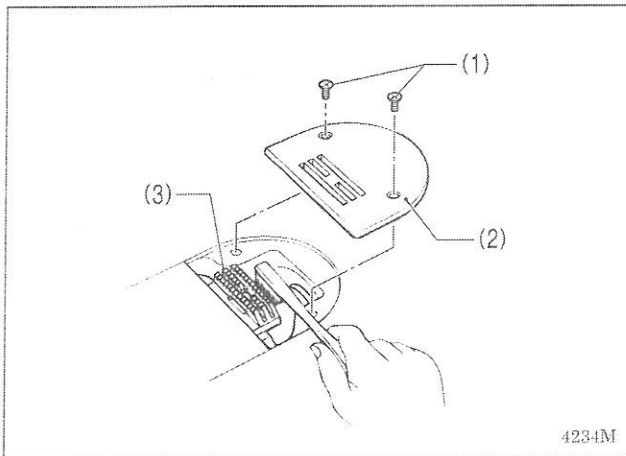


Use both hands to hold the machine head when tilting it back or returning it to its original position. If only one hand is used, the weight of the machine head may cause your hand to slip, and your hand may get caught.

Daily cleaning procedures

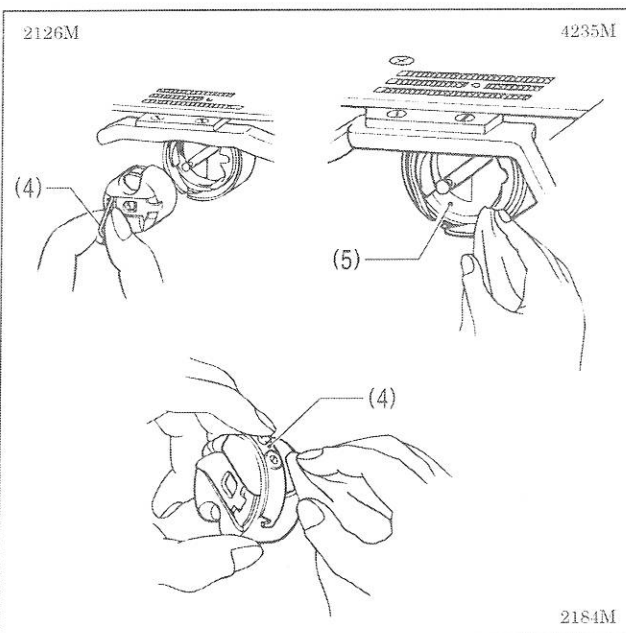
The following cleaning operations should be carried out each day in order to maintain the performance of this machine and to ensure a long service life.

Furthermore, if the sewing machine has not been used for a long period of time, carry out the following cleaning procedures before using it again.

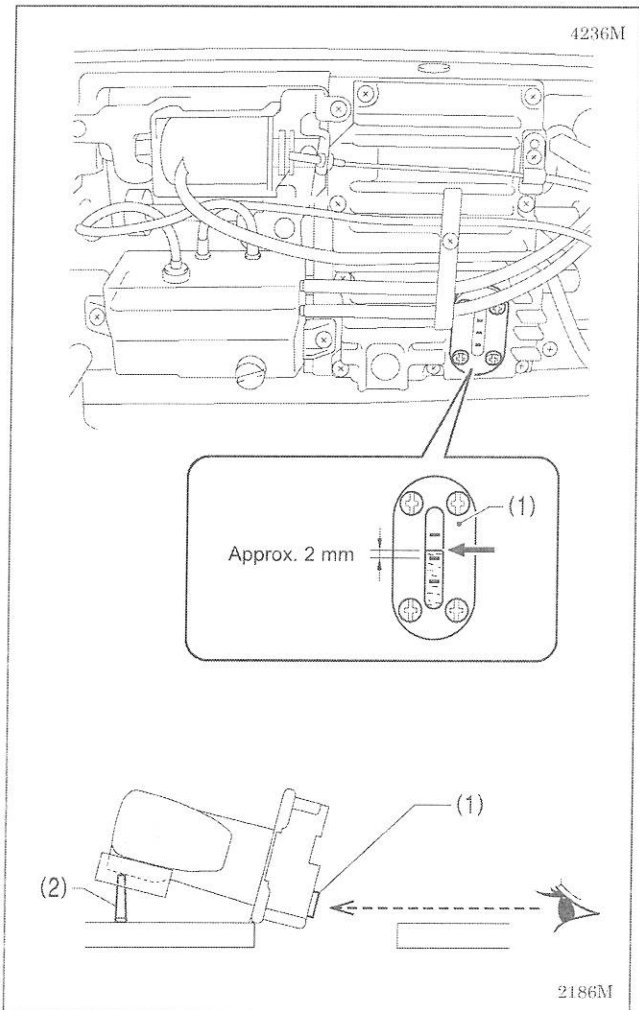


1. Cleaning

1. Raise the presser foot.
2. Remove the two screws (1), and then remove the needle plate (2).
3. Use a soft wire brush to clean any dust from the feed dog (3).
4. Install the needle plate (2) with the two screws (1).



5. Tilt back the machine head.
6. Remove the bobbin case (4).
7. Wipe off any dust from the rotary hook (5) with a soft cloth, and check that there is no damage to the rotary hook (5).
8. Remove the bobbin from the bobbin case (4) and clean the bobbin case (4) with a cloth.
9. Insert the bobbin into the bobbin case (4), and then place the bobbin case (4) back into the machine.



Lubrication

A. Gearbox oil quantity

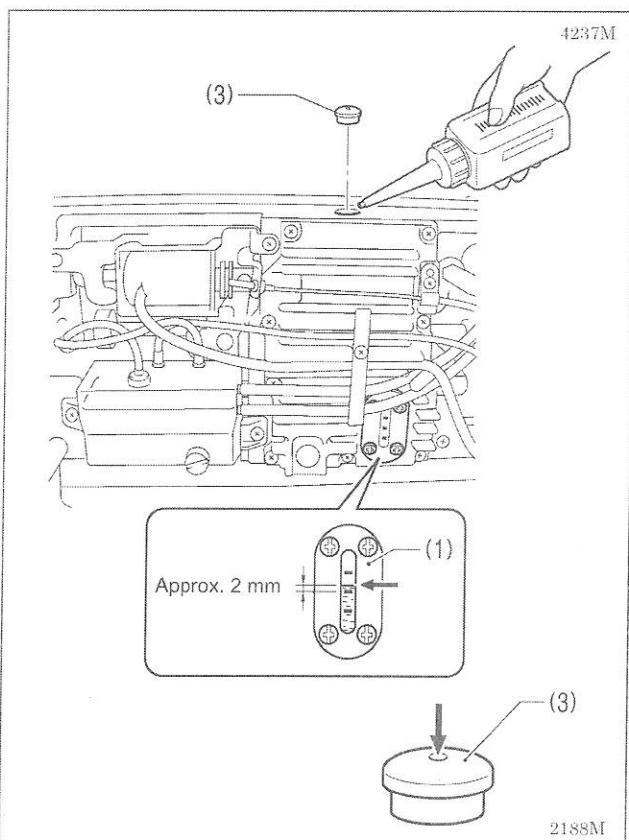
NOTE:

- Check the quantity of oil in the gearbox immediately after tilting back the machine head. When the machine head is left for long periods in the tilted-back position, the amount of oil in the felt inside the gearbox drops and the oil level seen from the oil window (1) rises, so that it becomes impossible to measure the actual oil level accurately.
- The position of the oil level in the oil window (1) will vary depending on the angle of the machine head. Tilt back the machine head while the head rest (2) is installed in the correct position as shown in the table processing diagram on page 4 (refer to page 5).

<Checking the oil quantity>

The oil level should normally be approximately 2 mm above the center reference line in the oil window (1). (70 ml of lubricating oil is added to the gearbox at the time of shipment from the factory.)

1. Look at the oil window (1) from directly in front.
2. If the oil level is below the normal level, add more lubricating oil as described in the following procedure.



<Lubrication>

Use only the lubricating oil <Nippon Oil Corporation Sewing Lube 10N; VG10> specified by Robotech

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

1. Remove the rubber cap (3).
2. Add lubricating oil until the oil level is approximately 2 mm above the center reference line in the oil window (1). Do not pour all of the lubricating oil in at once at this time. Pour the lubricating oil 10 ml at a time while checking the oil window (1).

NOTE:

Do not pour too much lubricating oil into the specified location.

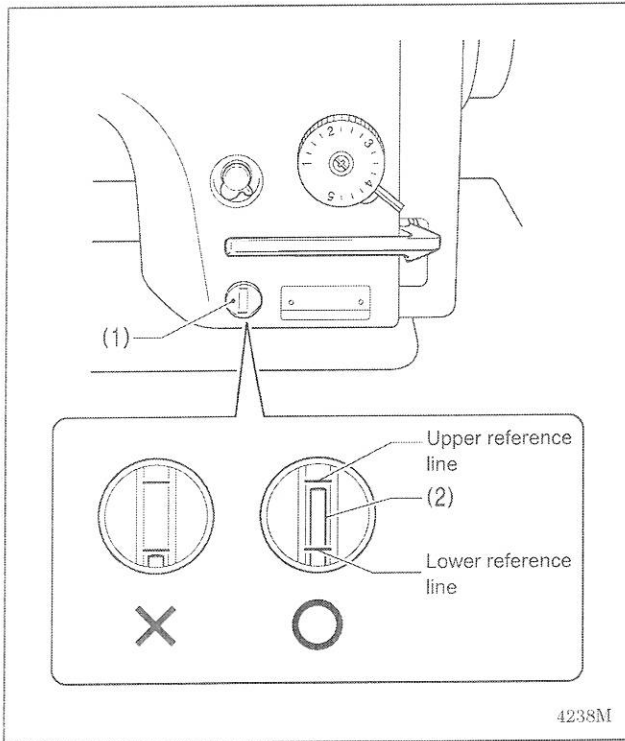
If too much oil is added, oil leaks may result.

3. Insert the rubber cap (3) securely.
4. Return the machine head to its original position.

NOTE:

The rubber cap (3) has a hole in it for adjusting the air pressure.

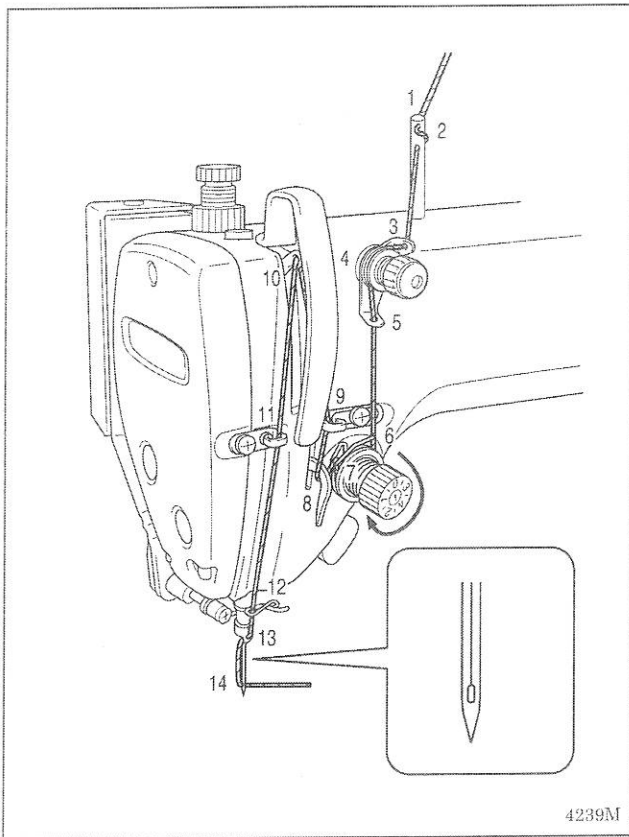
When replacing the rubber cap (3) use only the replacement part specified by Robotech.



B. Oil tank oil quantity (-[10], [13] specifications)

Check the oil gauge window (1), and add more oil if the oil gauge (2) is below the lower reference line. (Refer to page 8.)

4238M



Checking

1. Replace the needle if it is bent or if the tip is broken.
2. Check that the upper threads have been threaded correctly. (Refer to page 17.)
3. Carry out a test sewing.

4239M

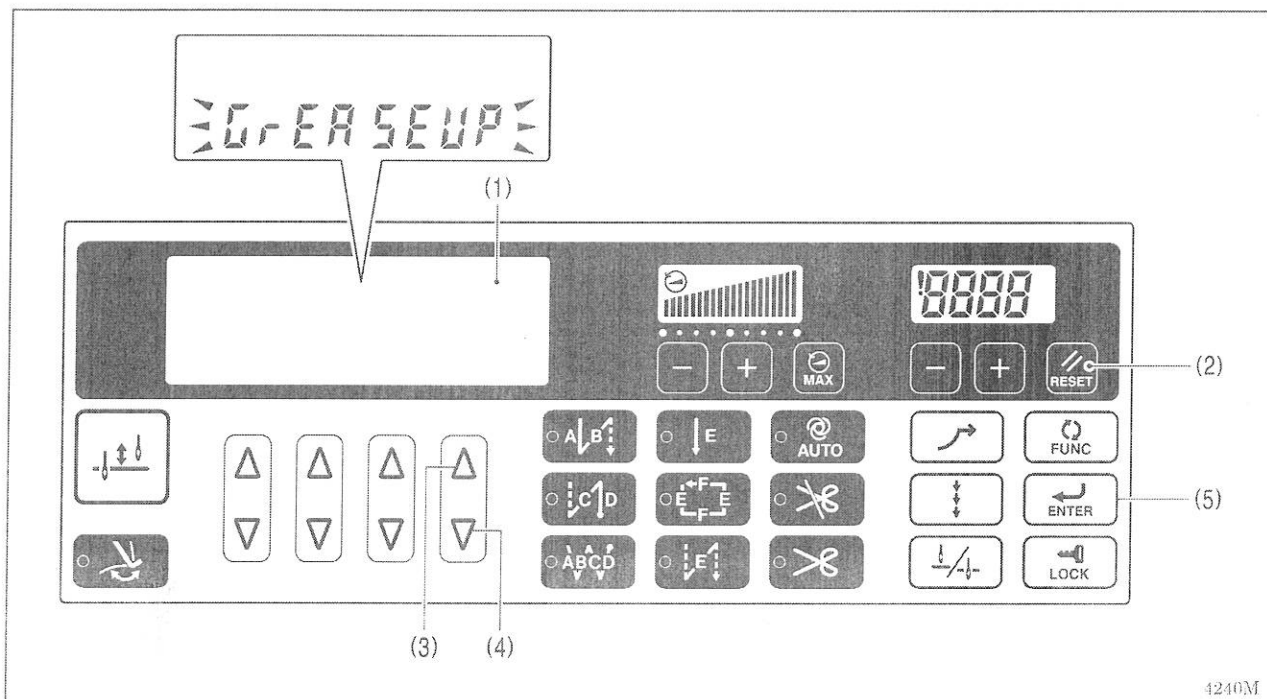
Applying grease (-[3], [5] specifications*)

[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.



4240M

<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.

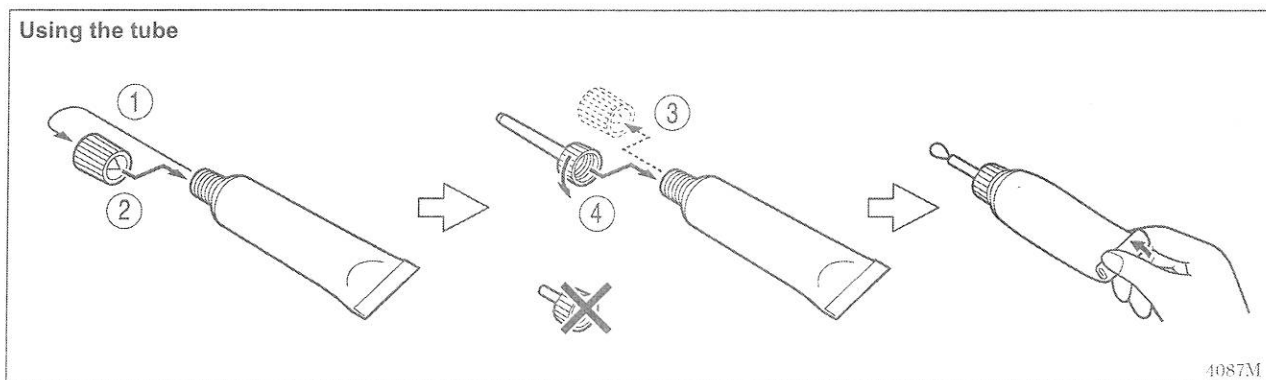
NOTE

- 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.

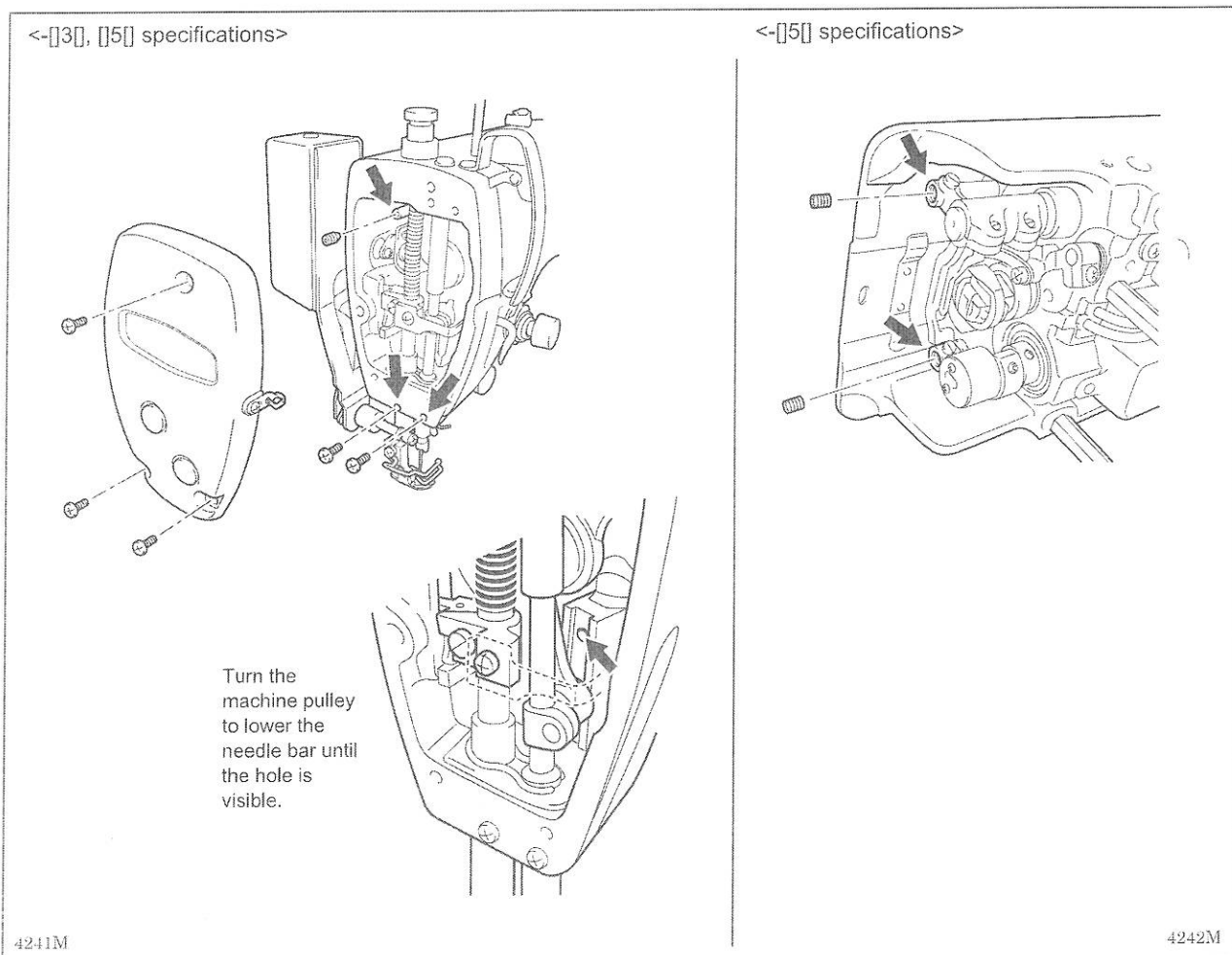
* If you continue to use the sewing machine after carrying out the reset procedure but without applying grease, problems with the sewing machine may result.

<Applying grease>

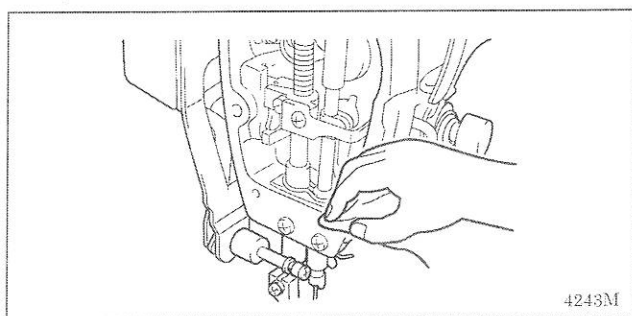
Use robotech-specified "Grease unit (SA8837-001)".



4087M



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>

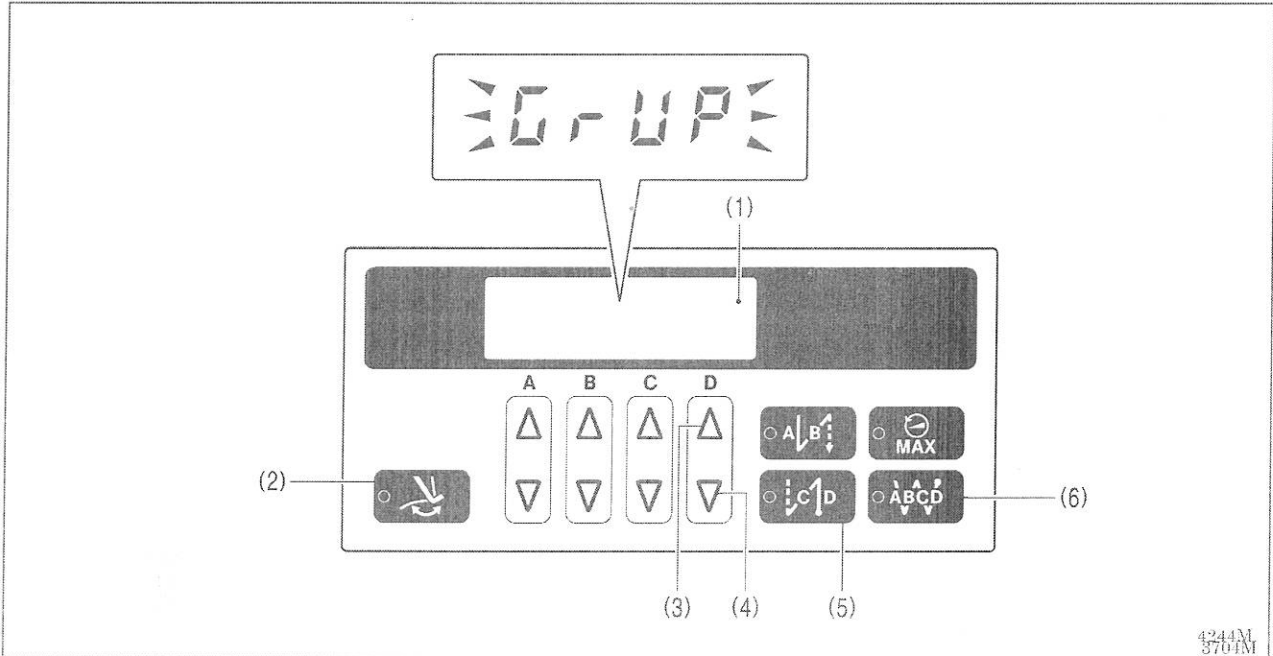
After the grease has been applied, carry out the following procedure to reset the grease consumption amount.

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 ENTER key (5). The main display (1) will change to stitch number display mode and treadle operation will be possible. (This completes the reset procedure.)

Applying grease (-[3], [5] specifications*) [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.

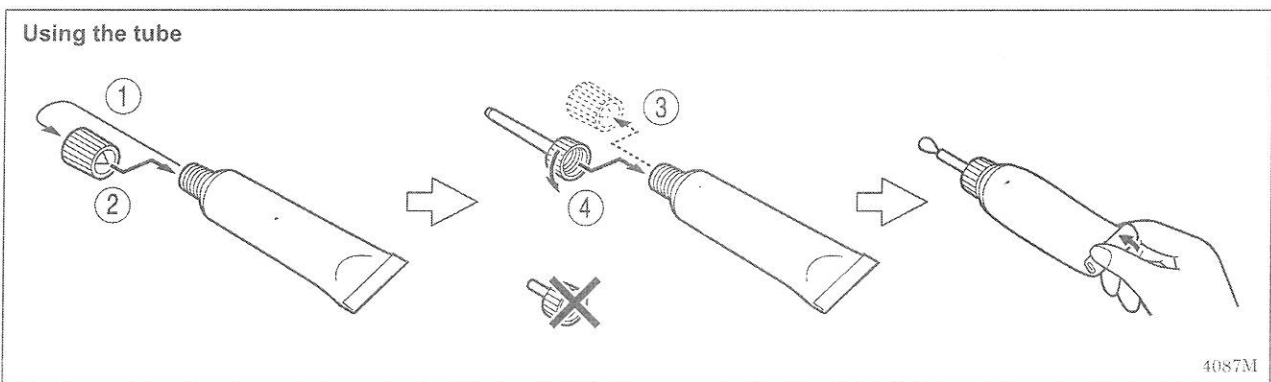
NOTE

- 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.

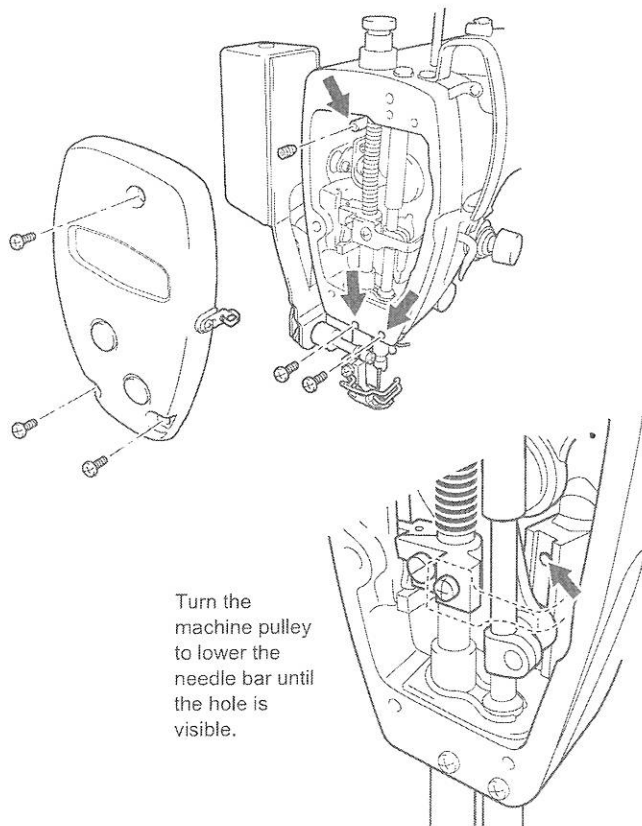
* If you continue to use the sewing machine after carrying out the reset procedure but without applying grease, problems with the sewing machine may result.

<Applying grease>

Use Robotech -specified "Grease unit (SA8837-001)".

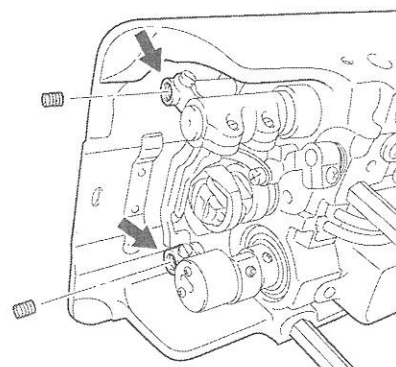


<-[3] · [5] specifications >

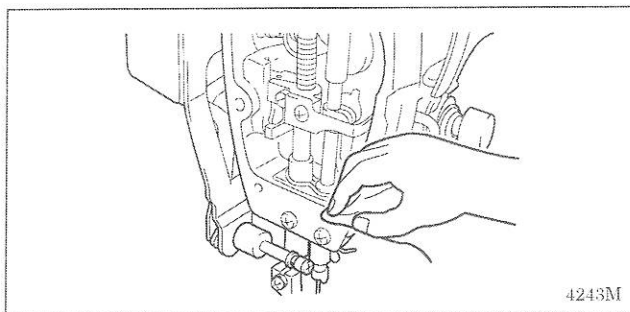


4241M

<-[5] specifications >



4242M



4243M

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.)

2138M 2139M

ADJUSTING THE ROTARY HOOK LUBRICATION AMOUNT (-[0], [3] specifications)

⚠ CAUTION

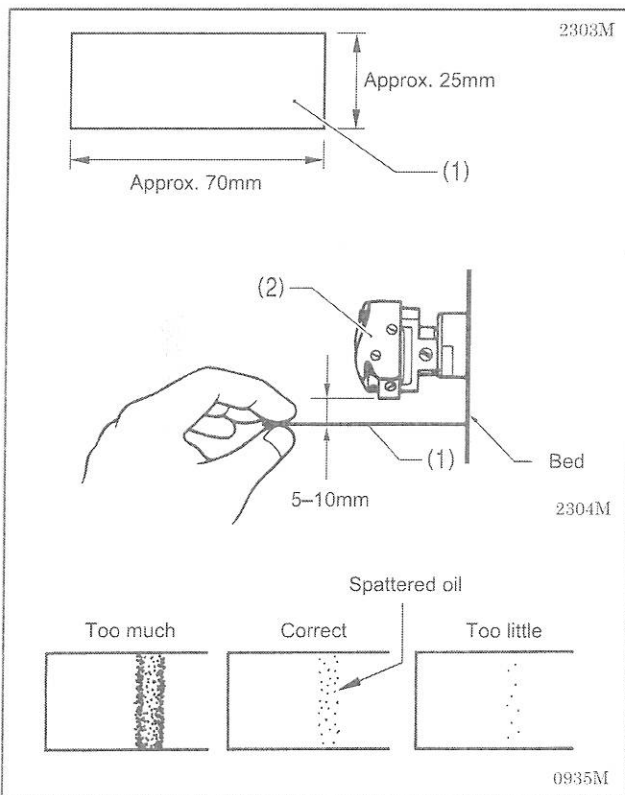


Be careful not to touch your fingers or the lubrication amount check sheet against moving parts such as the rotary hook or the feed mechanism when checking the amount of oil supplied to the rotary hook, otherwise injury may result.

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.



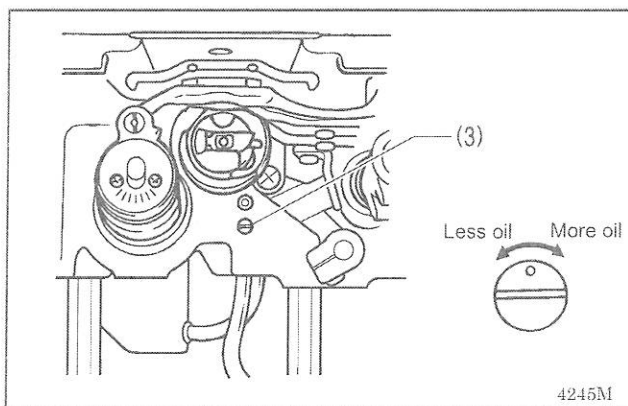
<Checking the lubrication amount>

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.

STANDARD ADJUSTMENTS

CAUTION



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



Ask your Robotech 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.



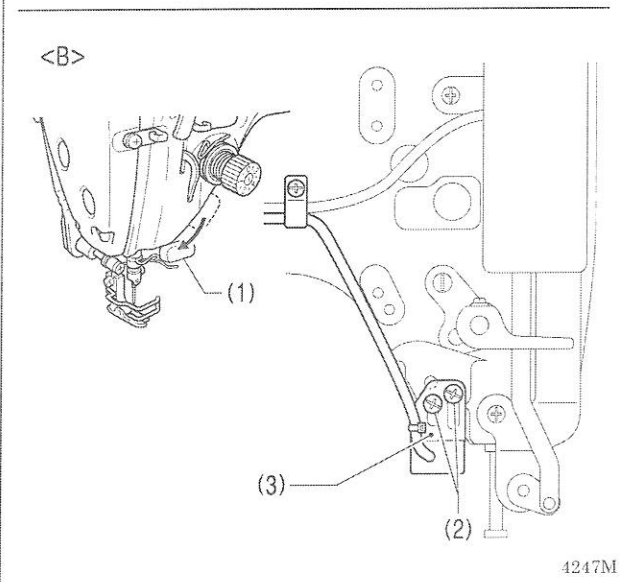
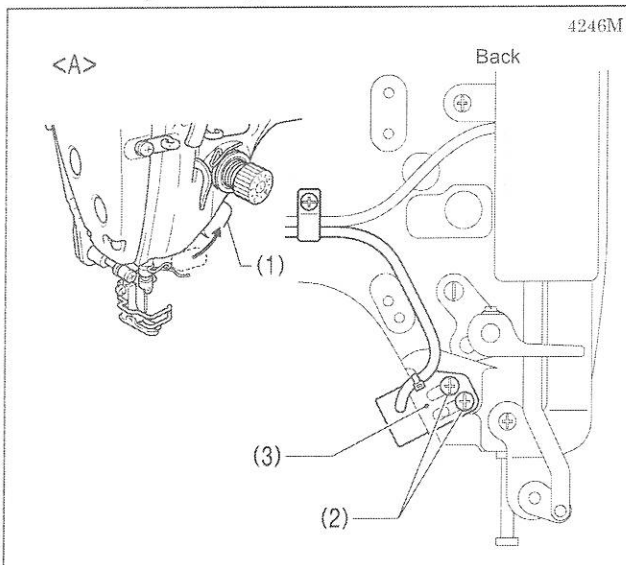
Turn off the power switch and disconnect the power cord from the wall outlet at the following times, otherwise the machine may operate if the treadle is depressed by mistake, which could result in injury.

- 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.

13-1. Adjusting the actuator switch position



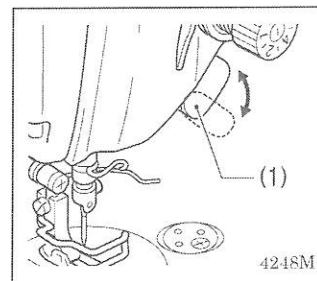
The installation position for the actuator switch (1) can be adjusted to <A> or .

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).

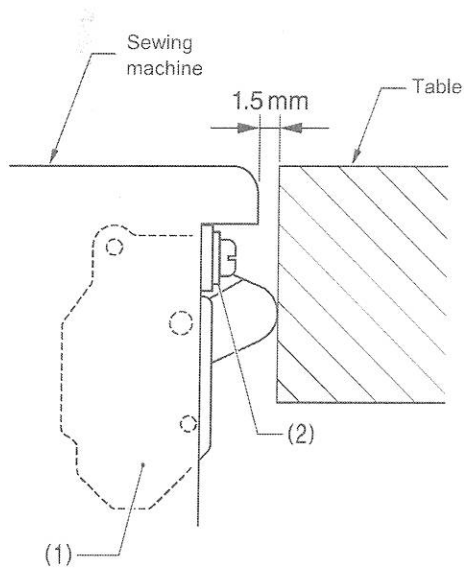
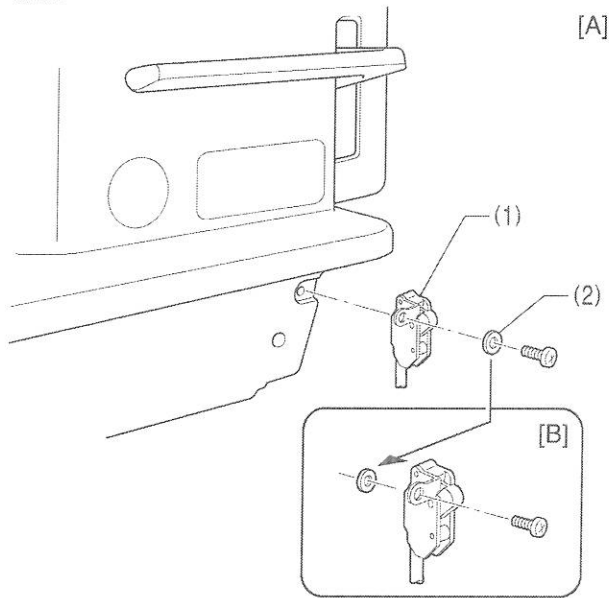
< Actuator switch rotation function >

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



Adjusting the safety switch position

4249M



3690M

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>

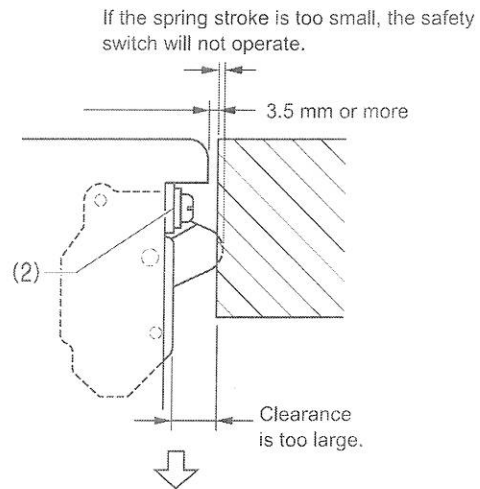
The standard amount of clearance between the machine head and the table hole is 1.5 mm.

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].

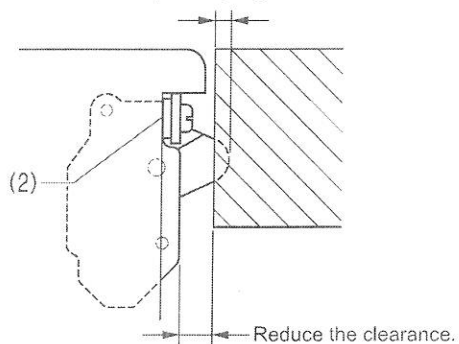
* If the position cannot be satisfactorily adjusted in this way, add more washers of the same thickness.

<Safety switch operation>

3691M

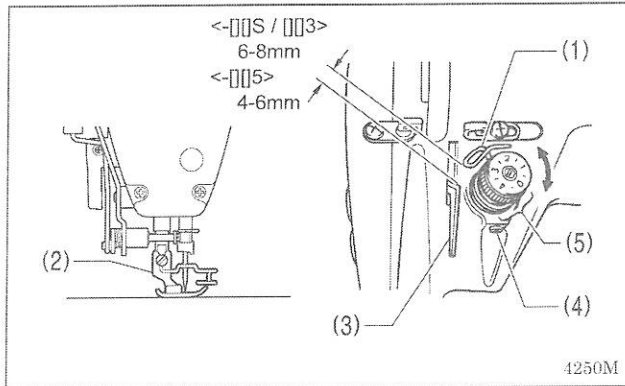


By changing the position of the safety switch, the required spring stroke can be maintained.



3692M

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 $-\square\square 5$ 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).

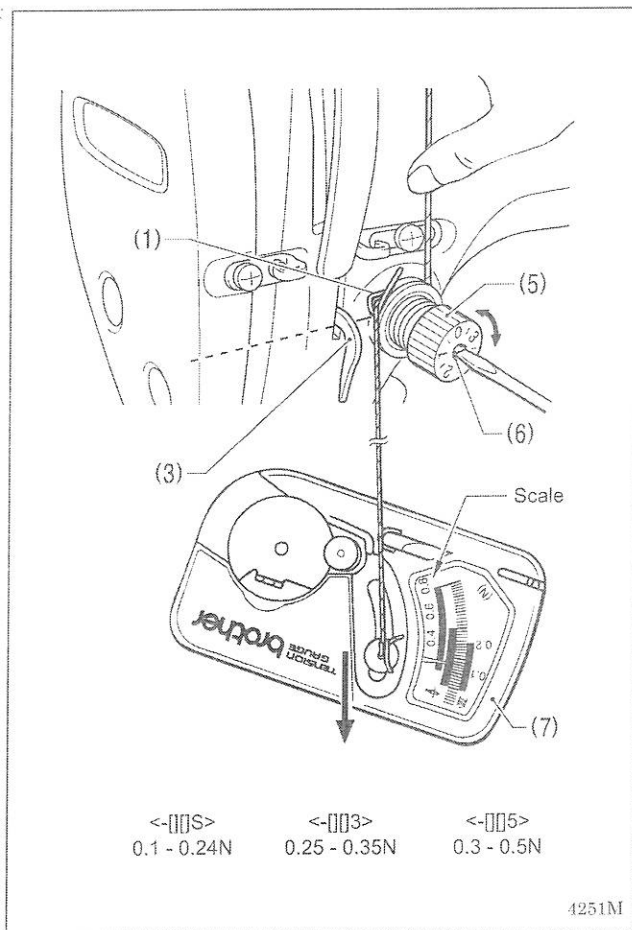
<Thread take-up spring tension>

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

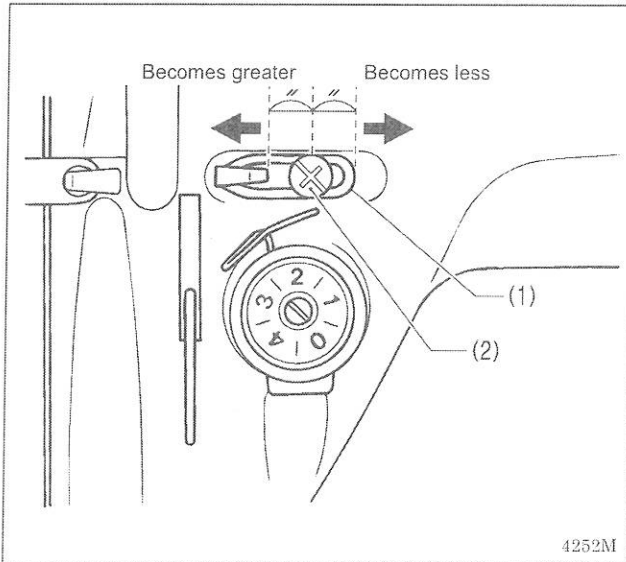
$-\square\square S$ specifications	0.1 - 0.24N
$-\square\square 3$ specifications	0.25 - 0.35N
$-\square\square 5$ specifications	0.30 - 0.5N

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.



Adjusting arm thread guide R

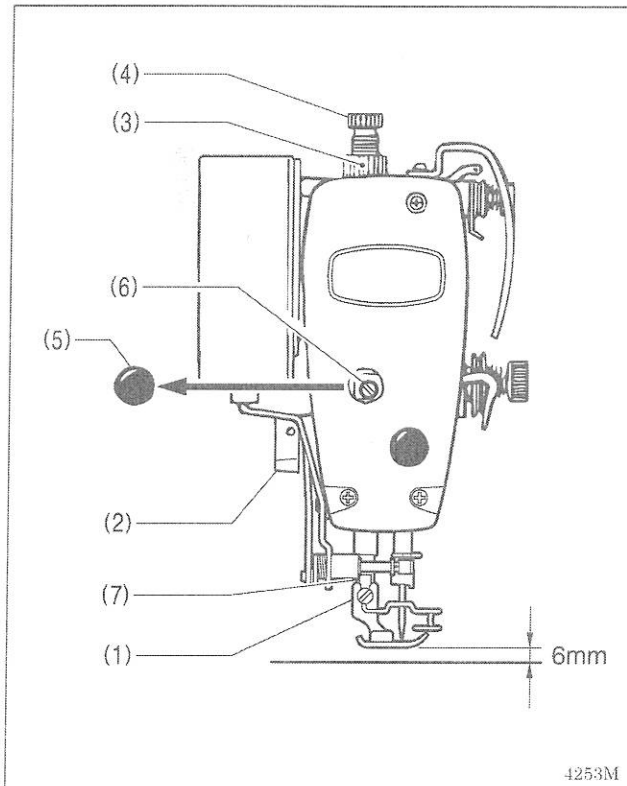


The standard position of arm thread guide R (1) is the position where the screw (2) is in the center of the adjustable range for arm thread guide R (1).

* 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.)

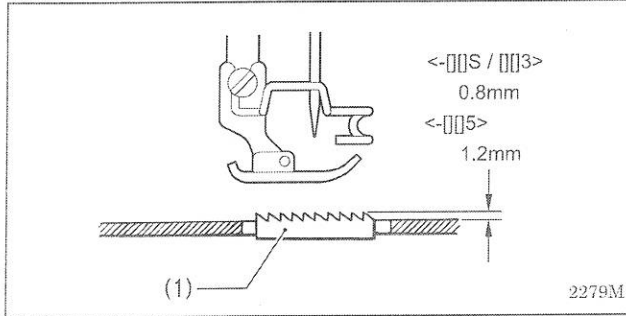
Adjusting the presser foot height



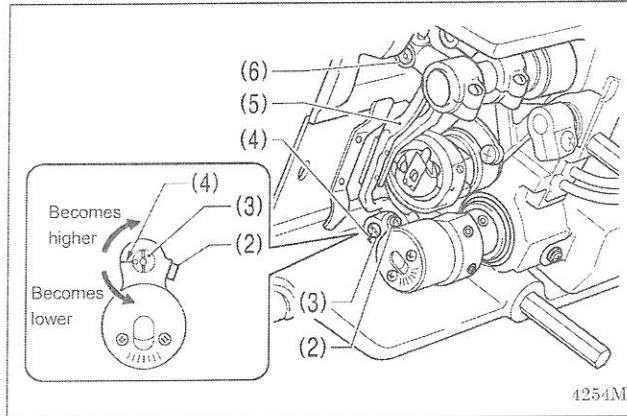
The standard height of the presser foot (1) is 6 mm when the presser foot (1) is raised by means of the lifting lever (2).

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).

Adjusting of the feed dog height

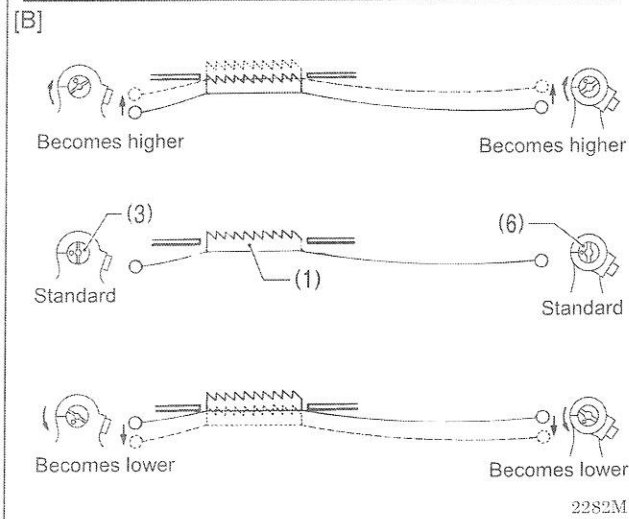
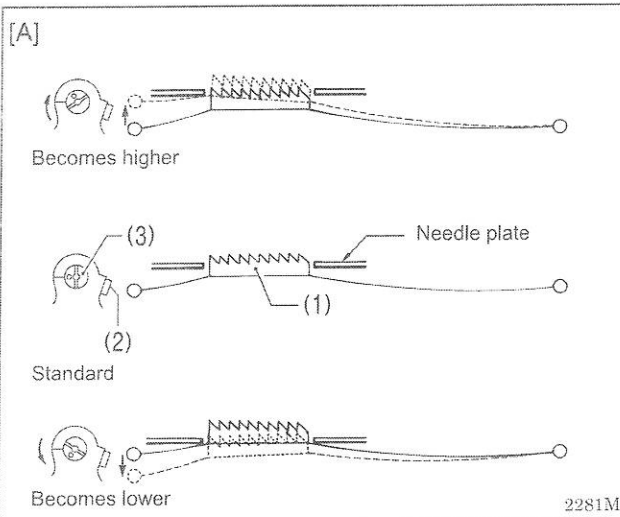


The standard height of the feed dog (1) when it is at its maximum height above the top of the needle plate is 0.8 mm for $-\square\square S / \square\square 3$ specifications, and 1.2 mm for $-\square\square 5$ specifications.

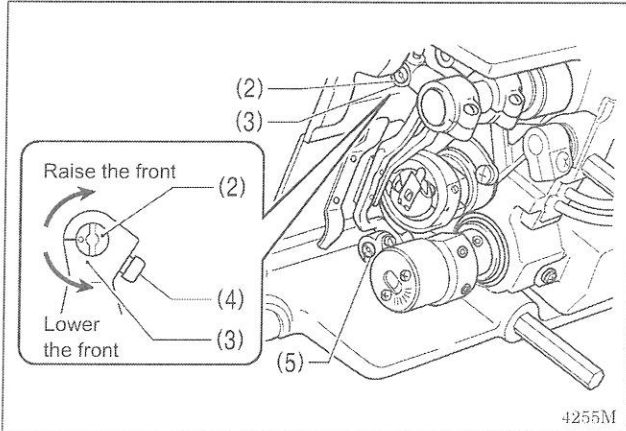


1. Turn the pulley until the feed dog (1) rises to the highest position.
2. Tilt back the machine head.
3. Loosen the screw (2).
4. Turn the feed lifting rock bracket stud (3) within a range of 90° from the reference line (4) to adjust the vertical height of the feed bar (5). (Fig. [A])
5. Tighten the 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 "13-7. Adjusting the feed dog angle" on the next page for details of this operation.)



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) and the feed dog (1) is parallel to the needle plate.

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).

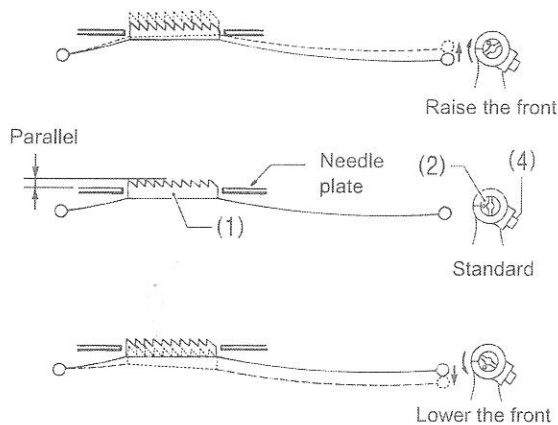
5. Securely tighten the set screws (4).

* 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])

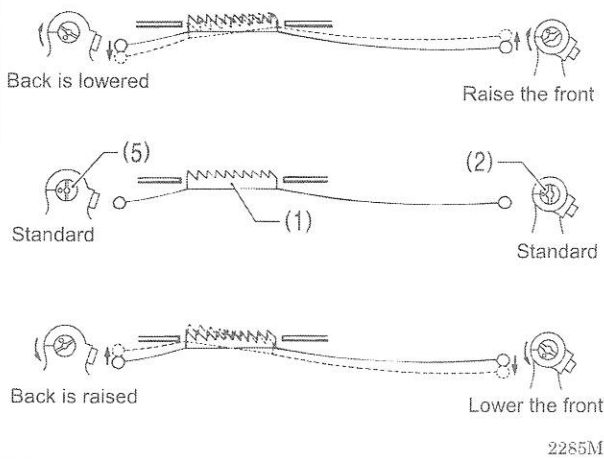
(Refer to "13-6. Adjusting the feed dog height" on the previous page for details of this operation.)

* 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).

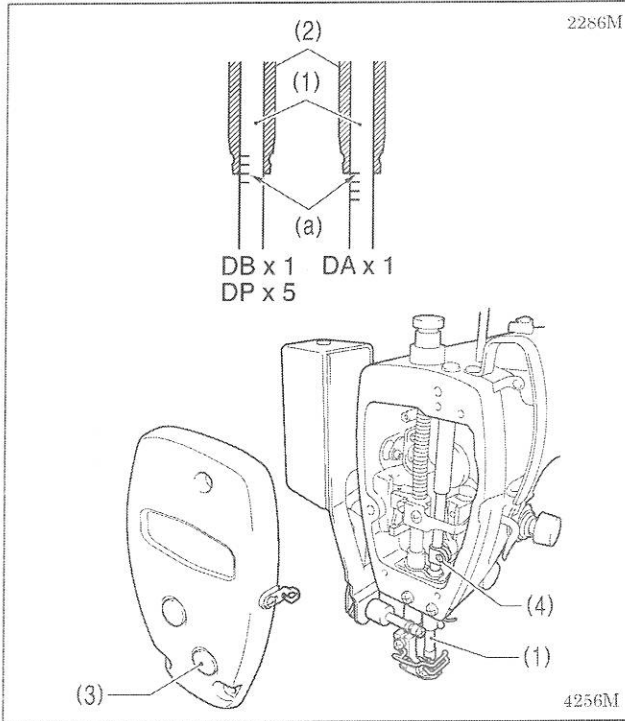
[C]



[D]



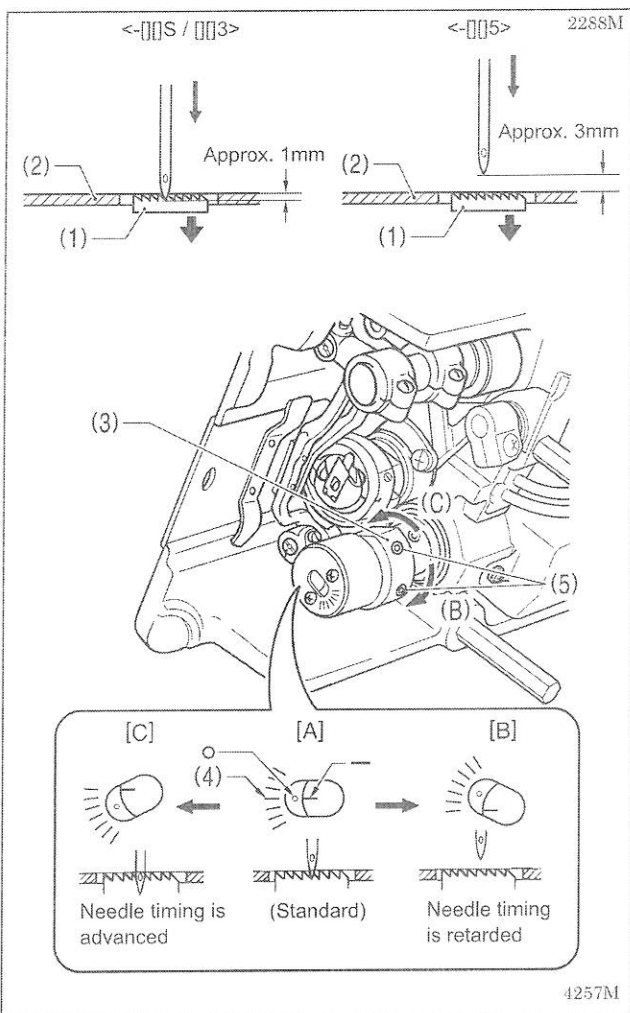
Adjusting the needle bar height



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).

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).

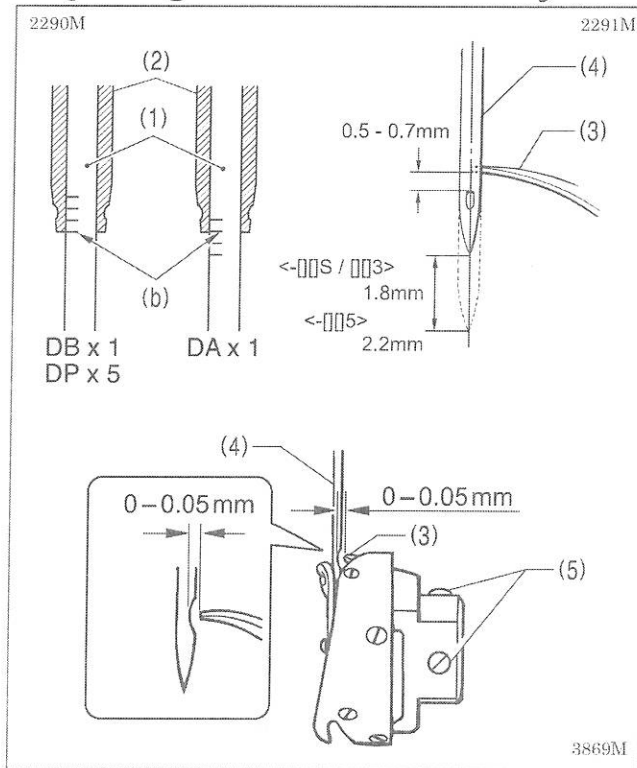
1. Tilt back the machine head.
2. Loosen the two set screws (5), and then turn the vertical cam (3) slightly to adjust the timing. (Use the "-" mark on the lower shaft and the alignment position on the scale (4) of the vertical cam (3) as a guide.)

- 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.

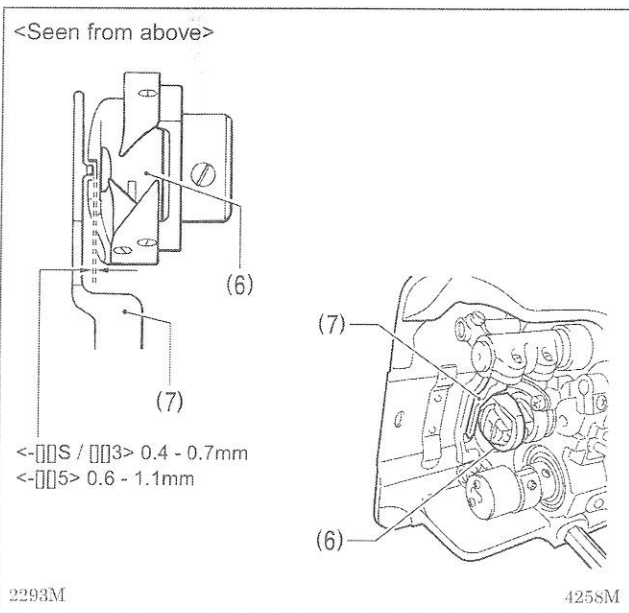
3. After adjustment is completed, securely tighten the two screws (5).

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 -□□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).

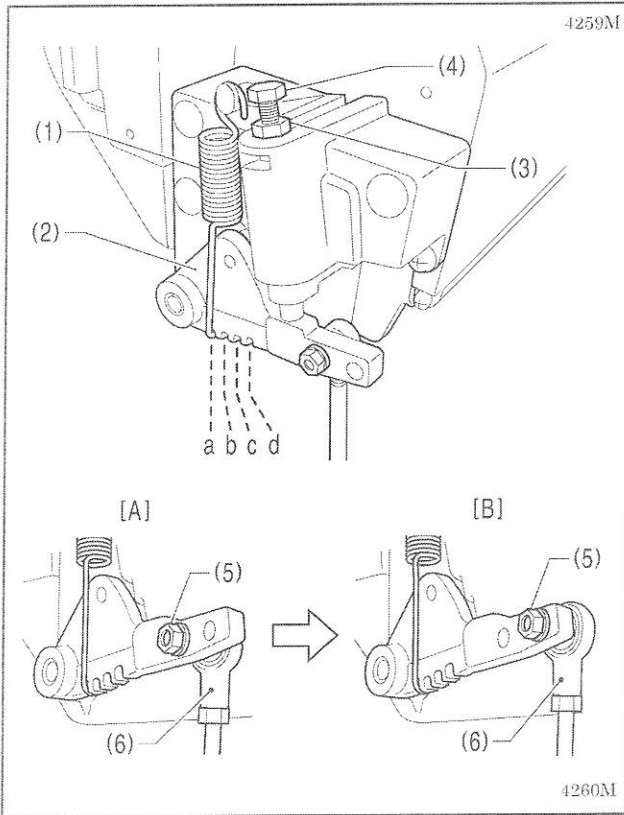


<Checking the clearance between the rotary hook and bobbin case holder position bracket>

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 -□□S / □□3 models, and 0.6 - 1.1 mm for -□□5 models.

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.

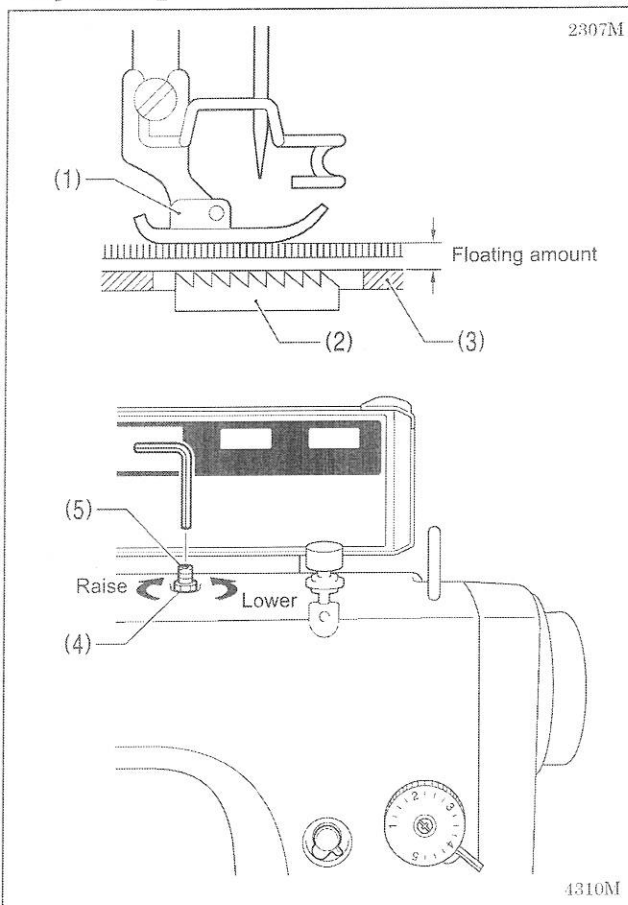
2. Tighten the nut (3).

<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.

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.

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 cover of the control box. Touching areas where high voltages are present can result in severe injury.




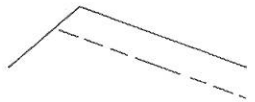
⚠ CAUTION






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.

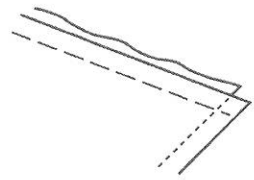

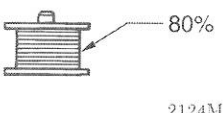
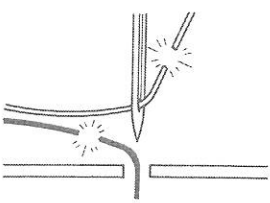
Sewing

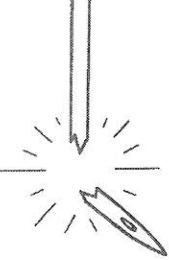
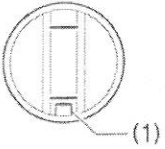
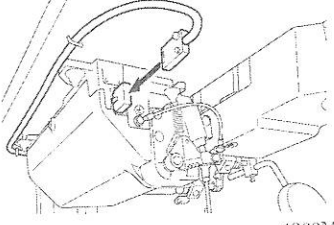
Items with a "*" in the "Page" column should only be checked by a qualified technician.

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. 	43 60*
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. 	43
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. 	15 17 44 57* 56* 60* 61*

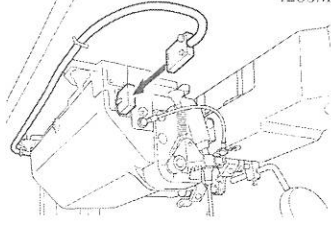
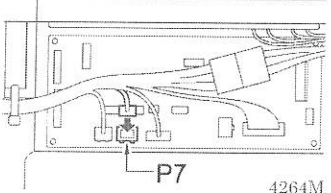
	Problem	Possible cause	Page
5	<p>Skipped stitches at sewing start</p> <p>Thread unravelling at sewing start</p>  <p>0749M</p>	<ul style="list-style-type: none"> • Is the thread take-up spring tension too strong? Reduce the tension of the thread take-up spring. • Is the thread take-up spring operating 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? Use the slow start feature. (G50 operation panel) Set so that slow start is enabled. (G10 operation panel) • Is the needle up stop position too high? Adjust the needle up stop position. 	<p>56*</p> <p>56*</p> <p>44</p> <p>*</p> <p>15</p> <p>27*</p> <p>35*</p> <p>28, 39*</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>44</p> <p>58*</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? Use the sewing speed control keys to gradually reduce the sewing speed. (G50 operation panel) Gradually reduce the maximum sewing speed (G10 operation panel) • Is the angle of the feed dog correct? Tilt the front of the feed dog down slightly. 	<p>43</p> <p>43</p> <p>56*</p> <p>56*</p> <p>44</p> <p>20</p> <p>38*</p> <p>59*</p>

TROUBLESHOOTING

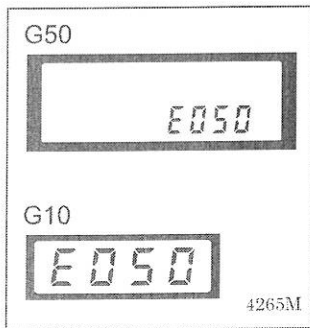
	Problem	Possible cause	Page
8	<p>Material slippage</p>  <p>0750M</p>	<ul style="list-style-type: none"> Is the presser foot pressure too strong? Adjust the presser foot pressure. 	44
9	<p>Lower thread is tangled at the sewing start. Spinning of bobbin during thread trimming</p>  <p>0751M</p>	<ul style="list-style-type: 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 Robotech being used? Use only bobbins which are specified by Robotech.  <p>2124M</p>	16 16 15 15
10	<p>Upper and lower threads are breaking.</p>  <p>0471M</p>	<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. 	15 17 8 43 56* * *
11	<p>Incorrect thread trimming (Upper and lower threads are both not being trimmed)</p>	<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	<p>Incorrect thread trimming (Upper thread or lower thread is not being trimmed)</p>	<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. 	15 *

	Problem	Possible cause	Page
13	Broken needles  0469M	<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>	15 60* 61* 60*
14	Oil gauge (1) is not visible in oil gauge window.  4262M	<ul style="list-style-type: none"> Is the oil tank empty? (-[]0[], []3[] specifications) Fill the oil tank with oil. 	8
15	Machine does not operate when power is turned on and treadle is pressed.	<ul style="list-style-type: none"> Is the power supply connector disconnected from the control box? Insert the connector securely.  4263M	12, 13
16	Machine does not operate at high speed.	<ul style="list-style-type: none"> Is the sewing speed setting or backtack speed setting incorrect? Use the sewing speed control keys to set the high speed. (G50 operation panel) Set the maximum sewing speed to a higher speed (G10 operation panel) 	20 38*
17	Machine stops during sewing.	<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.) 	23 *

TROUBLESHOOTING

	Problem	Possible cause	Page
18	Nothing appears on the operation panel display.	<ul style="list-style-type: none"> <li data-bbox="539 253 890 387">• Is the power supply connector disconnected from the control box? Insert the connector securely. <li data-bbox="539 521 890 656">• Is the operation panel connector inside the control box disconnected? Insert the connector securely. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>4263M</p> </div> <div style="text-align: center;">  <p>P7 4264M</p> </div> </div>	<p style="text-align: center;">12</p> <p style="text-align: center;">10*</p>
19	"GrEASEUP" or "GrUP" flashes in the panel display when the power switch is turned on.	<ul style="list-style-type: none"> <li data-bbox="539 745 1145 801">• This display is to notify you that it is time to apply grease. Apply grease. 	<p style="text-align: center;">49, 51*</p>

Error code displays



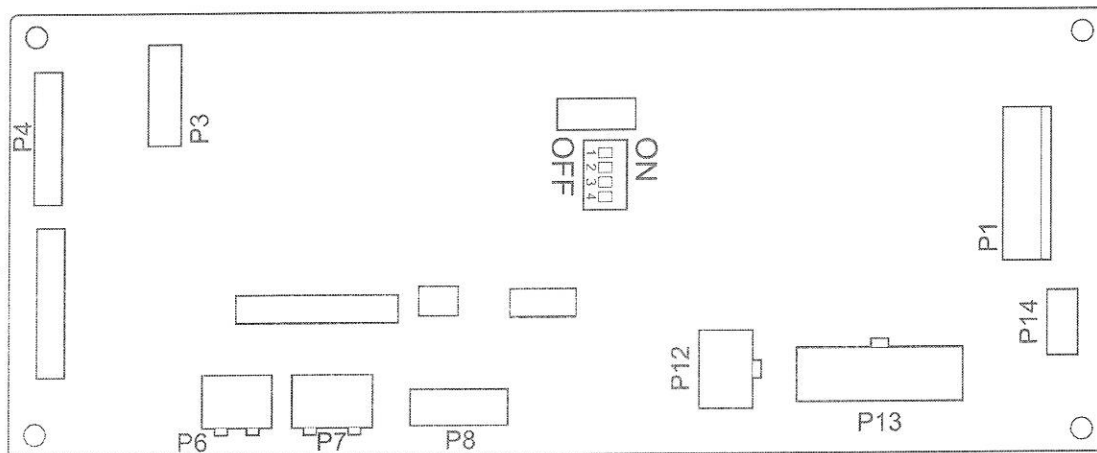
If an error code appears on the operation panel display

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.

- Items with a "*" in the "Page" column should only be checked by a qualified technician.
- For items with "***" appearing in the "Page" column, ask the place of purchase for advice.

< Connector and DIP switch layout diagram >

Main P.C. board



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 P.C. board. 	10*
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. 	54

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 P.C. board. If there is a broken wire in the cord of the treadle connector, replace the treadle unit. 	* **
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 stroke". • Problem with treadle unit. Replace the treadle unit. 	* **
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. 	49, 51*
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. 	10* * **
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 P.C. board. • Problem with motor or main P.C. board. Replace the motor or the control box. 	10* **
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. 	** **
E134 Motor open phase detected	<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. • Problem with drive P.C. board or motor. Replace the control box or the motor. 	* **

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 P.C. board. 	10*
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. 	* * **
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 P.C. board connectors are connected to connectors P3 and P4 on the main P.C. board. • Problem with control box. Replace the control box. 	* **
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 P.C. board. Replace the control box. 	* **
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. 	*

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.

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