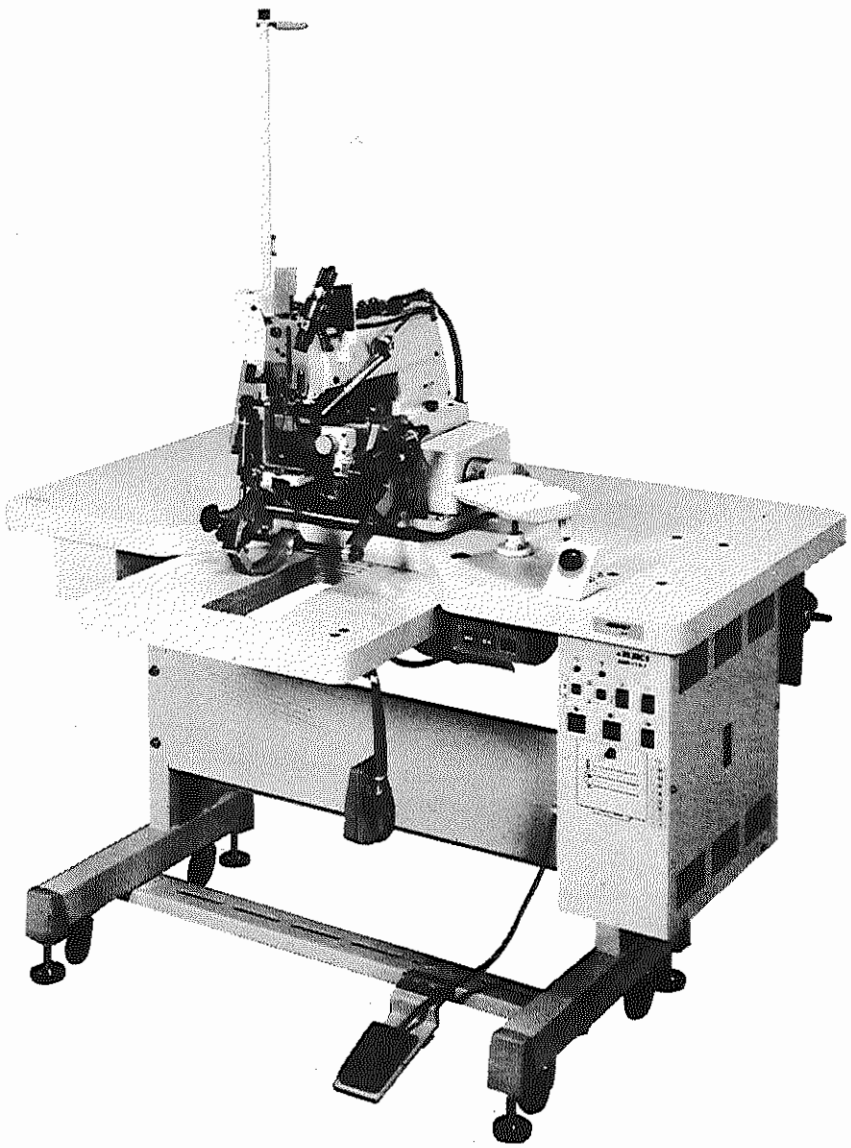
JUKI

Computer-controlled, single-thread chainstitch,
button neck wrapping machine

AMB-187

ENGINEER'S MANUAL



No. IV-53
1991. 2

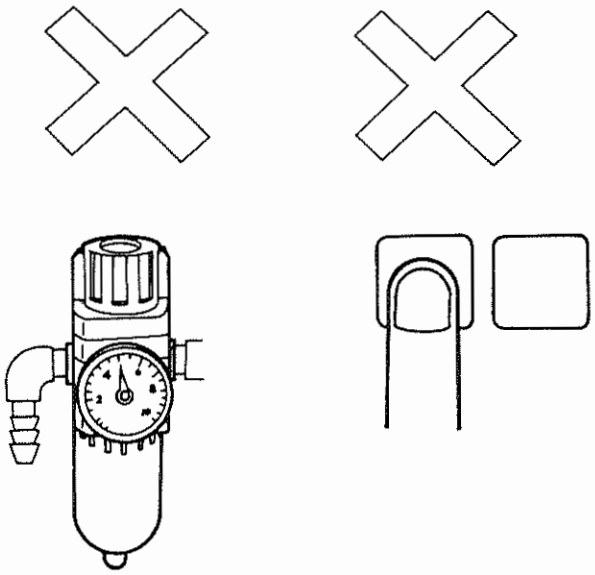
PREFACE

The Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines.

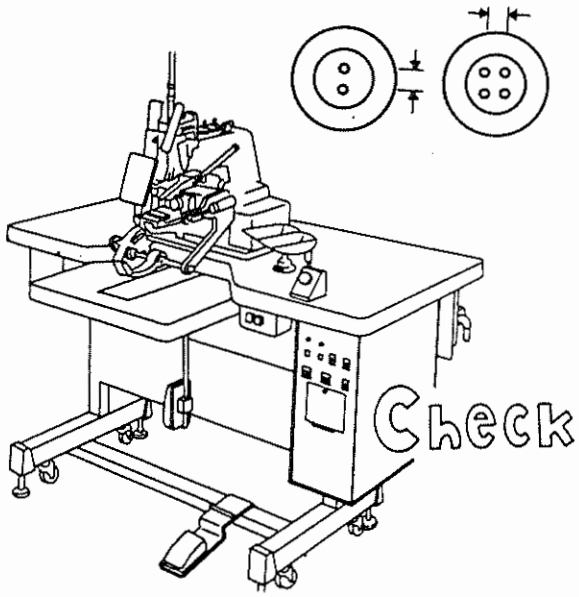
The Instruction Manual for these machines intended for the maintenance perfonnel and operators at an apparel factory contains detailed operating instructions. And this manual describes "How to Adjust", "Results of Improper Adjustment", and other information which are not covered by the Instruction Manual.

It is advisable to use the pertinent Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

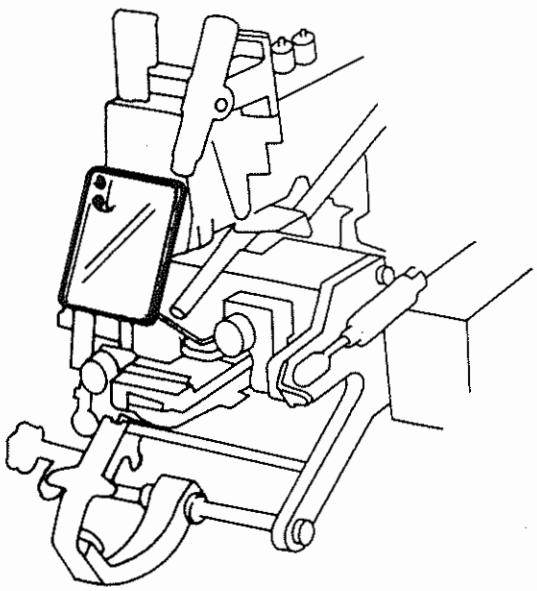
CAUTION



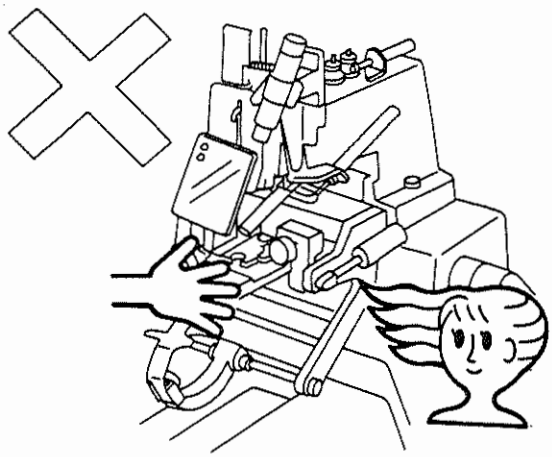
1. During an operation, do not turn OFF the power or the air supply to the machine.



2. Whenever changing the button to be sewn or the thickness of the material, confirm the input data and check the performance of the machine by operating it manually. Then start trial stitching.



3. Be sure to operate the machine with the eye guard facing toward you.



4. During an operation, be careful not to allow your head or fingers or those of any other person to come close to the throat plate or any other driving components. At the same time, do not place anything close to such components.

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1. SPECIFICATIONS

(1) Mechanical specifications

Model:	AMB-187
Name:	Computer-controlled, single-thread chainstitch, button neck wrapping machine
Stitch system:	Single-thread chainstitch
Application and features:	Sewing buttons with/without neck wraps on men's wear, ladies' upper garments, vests, coats and pants
Sewing speed:	700 s.p.m.
Needle bar stroke:	58.6 mm (2.307")
Needle:	With neck wraps: ORGAN SM332LG standard #16 (#12, #14, #18) Without neck wraps: SCHMETZ 332LGH KSP standard #100 (#90, #110)
Thread:	Cotton thread . . . . . #30 to #60 Spun thread . . . . . #30 to #60
Lubrication:	Manual
Outside diameter of button:	Standard ϕ14 to ϕ28 mm (0.551" to 1.102") (optional button chuck for small button: ϕ8 to ϕ16 mm (0.315" to 0.630"))
Number of neck wraps:	2 to 30 in 2-stitch steps
Number of neck wraps:	2 to 44 stitches in 2-stitch steps If the number of stitches exceeds 16, the set value is specified in 4-stitch steps.
Height of the button neck:	2.5 to 6 mm, (0.098" to 0.236"), to be set in increments of 0.5 mm (0.02")
Number of stay stitches:	0, 1 or 2
Stay stitch feed amount:	0 to 3 mm (0.118"), to be set in increments of 0.2 mm (0.008")
Number of reinforcing stitches:	1
Neck wrapping position:	Determined in accordance with the starting position and the highest position of neck wrapping
Buttonhole (X, Y) pitch:	X = 2 to 5 mm (0.079" to 0.197") Y = 2 to 5 mm (0.079" to 0.197") To be set in increments of 0.2 mm (0.008")
Stitch width of neck wrap:	0 to 3 mm (0.118") from the center of the button hole toward either end, to be set in increments of 0.2 mm (0.008")
Production capacity:	1,800 buttons/8 hrs. Condition: Machine time required to sew two 4-holed buttons, 8 stitches, neck wraps of 10 stitches, without cross-over stitches, 1 stay stitch: 6.8 sec. Time required to set buttons and set/remove the material: 6 sec. Allowance rate: 25%
Power requirements:	Single-phase 110V, 120V, 200V, 220V, 240V 3-phase 200V, 220V, 240V, 380V, 415V, 440V
Power consumption:	300W
Compressed air:	5 kg/cm^2
Air consumption:	15 ℓ/min.
Dimensions:	1,110 mm (43.70") (W) x 810 mm (31.89") (D) Table height, 750 to 1,030 mm (29.53" to 40.55")
Weight:	120 kg

(2) Button specifications

1. Specifications of the buttons to be used for the AMB-187 (specifications for 4-holed and 2-holed buttons)

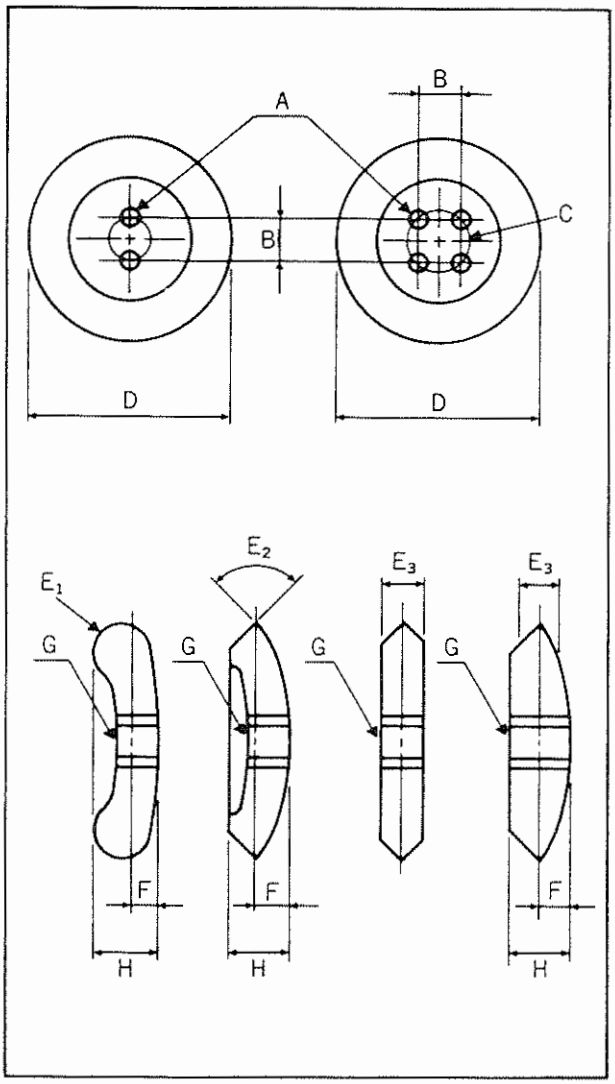


Fig. 1-1

A. Button hole diameter
Needle: For #12 – #16 needles, ϕ1.5 mm (0.059″) or more
Needle: For #12 – #18 needles, ϕ2 mm (0.079″) or more

B. Distance between the button holes
2 – 5 mm (0.079″ – 0.197″)

C. Button holes
All holes must be located equidistantly from the center of each button.

D. Outside diameter
Min. ϕ14 mm (0.551″)
Max. ϕ28 mm (1.102″)
When using the optional button chuck:
Min. ϕ8 mm (0.315″)
Max. ϕ16 mm (0.630″))
Line size ±0.25 mm (0.010″) or less

E_1. Button with a round edge:
The button must have a radius of 3 mm (0.118″) or less.

E_2. Button with a V-shaped edge: Within 120°

E_3. Button with an angular edge:
The thickness must be 5 mm (0.197″) or less.

F. Bulge: 5 mm (0.197″) or less

G. Area around the holes: Must be smooth

H. Thickness: 8 mm (0.315″) or less

2. MACHINE COMPONENTS

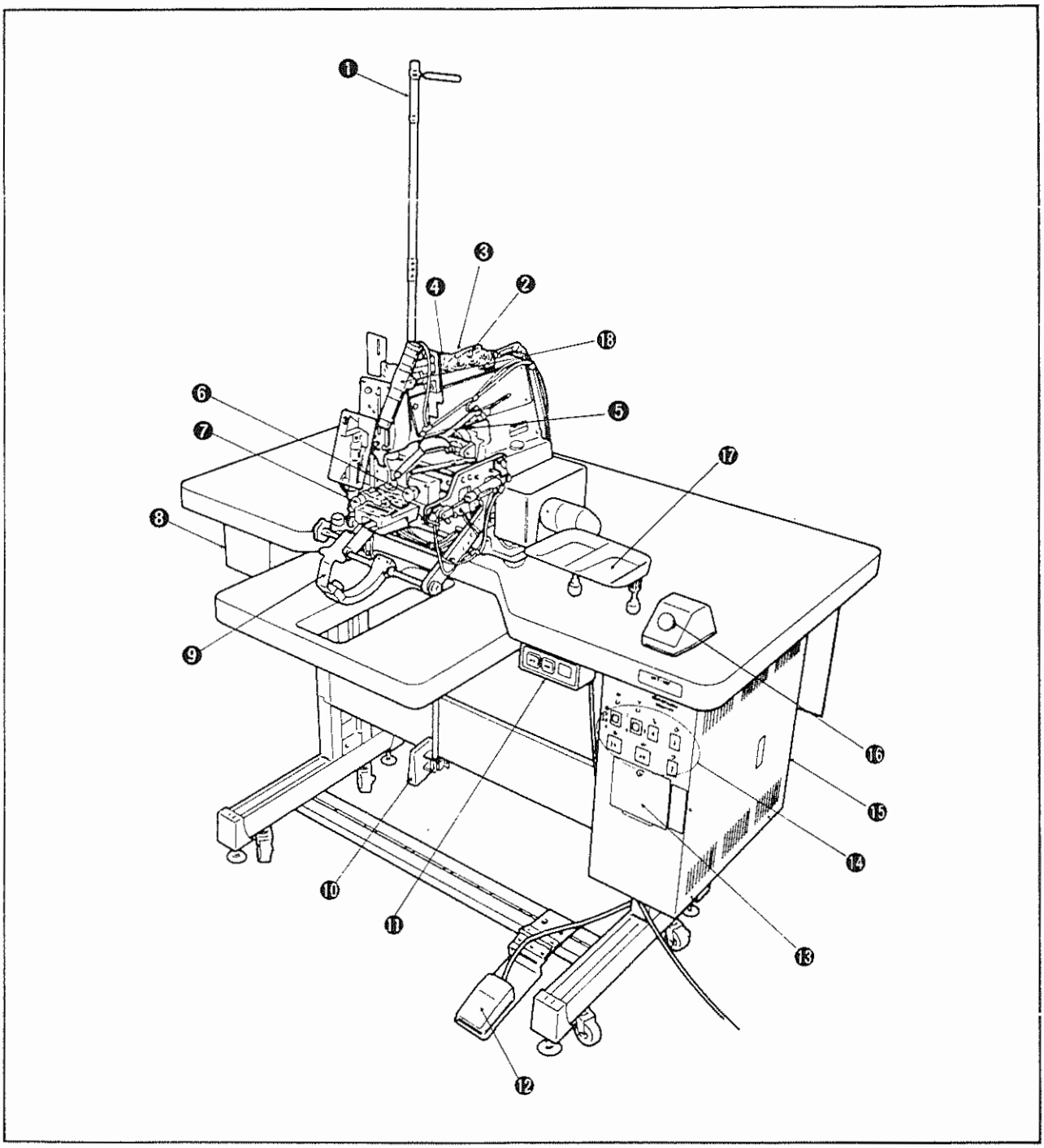


Fig. 2-1

❶	Thread stand	❿	Knee switch (start switch)
❷	Thread tensioner No. 1 (for neck wrapping)	⓫	Power switch
❸	Thread tensioner No. 1 (for button sewing)	⓬	Foot pedal
❹	Thread tensioner No. 2	⓭	Input data panel
❺	Wiper	⓮	Control panel
❻	Knob to adjust neck wrap height	⓯	Control box
❼	Knob to adjust the depth of tie stitches	⓰	Emergency stop switch
❽	Drawer	⓱	Button tray
❾	Cloth holder (tongue)	⓲	Marker lamp

3. INSTALLATION

(1) Precaution before operation

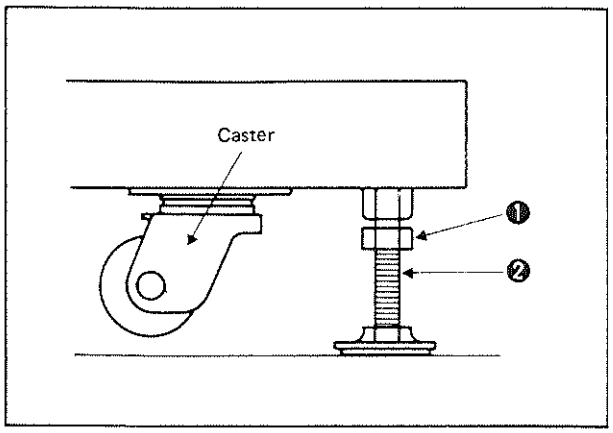


Fig. 3-1

1. Adjust the main unit so that it is level.

To ensure that the machine operates properly, it is necessary to set up the sewing machine on a flat surface free from vibration.
[How to level the machine]
Loosen four locknuts ❶ installed on the bottom of the main unit, and turn adjustment bolts ❷ to level the whole machine. After adjusting the machine so that it is level, be sure to tighten up the locknuts.

2. Confirm the rotational direction of the sewing machine.

The machine should rotate away from the operator.

3. Make sure that the air pressure gauge indicates 5 kg/cm^2.

(2) Caution to be taken during an operation

1. Whenever changing the material or button to be sewn or before, starting the button sewing, check the performance of the machine by carrying out a trial stitching taking care of the following points.
   1) Caution to be taken when changing the type of material to be sewn
      - Phenomena such that a too long thread remains on the top face of the button, and such that the thread is likely to come off the material are contrary to each other. In this case, stitch skipping may result. It is therefore necessary to feed first a longer thread and gradually decrease the length of thread to be fed while checking the finished state of stitches by carrying out a trial stitching. . . . . Refer to the "3. Length of remaining thread and corrective measures" on page 39.
      - The needle may fail to penetrate the material of a certain thickness. In this case, turn the knob to adjust the tie stitch depth in the direction to maximize the tie stitch depth. . . . . Refer to the "Depth of tie stitches and the scale" on page 46.
   2) Caution to be taken when changing the type of button to be sewn

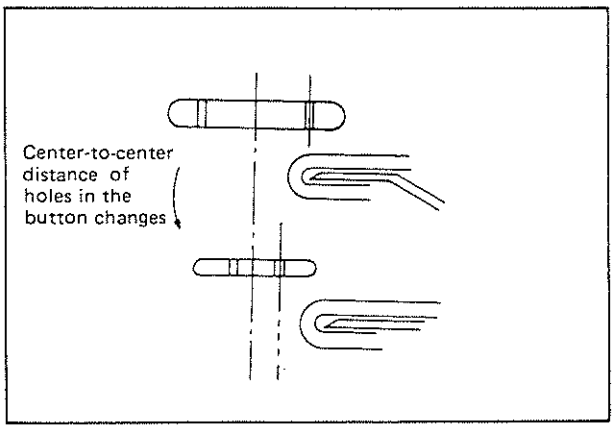


Fig. 3-2

- If the center-to-center distance of holes in the button changes, the needle position should be changed. So adjust the needle position using the knob to adjust the tie stitch depth. . . . . Refer to the "Depth of tie stitches and the scale" on page 46.
- If the thickness of button changes, the sole of the button may come in contact with the throat plate, thereby twisting the button resulting in needle breakage. In this case, make an adjustment to prevent the trouble using the knob to adjust neck wrap height and the SW6 on the input data panel referring to the "4. Adjusting the control panel to the thickness of the button" on page 42.

2. When changing the operation mode from the "without neck wraps" to the "with neck wraps", be sure to operate the selector switch after screw ❸ in throat plate chip ❷ of throat plate ❶ has been loosened and moved backward.

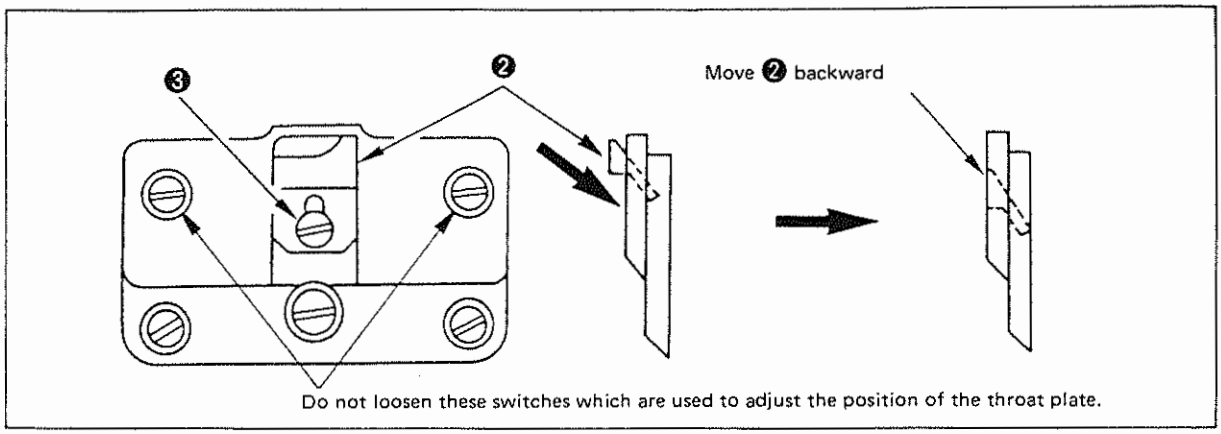


Fig. 3-3

3. When setting the operation mode to the "with neck wraps", use the ORGAN SM x 332LG #16 needle (standard). When setting the operation mode to the "without neck wraps", use the SCHMETZ 332LGH KSP #100 needle (standard).
4. During an operation, do not run OFF the power or the air supply to the machine.
5. Be sure to operate the machine with the eye guard facing toward you.
6. During an operation, be careful not to allow your head or fingers or those of any other person to come close to the throat plate or any other driving components. At the same time, do not place anything close to such components. If any of the following phenomena occurs, immediately turn OFF the power switch, and ask the maintenance personnel to inspect the machine.
   1) Frequent needle breakage or thread breakage. The machine often fails to attach the buttons properly.
   2) The machine performs an unusual operation.
7. Whenever changing the button to be sewn or the thickness of the material, confirm the input data and check the performance of the machine by operating it manually. Then start trial stitching.
8. When the power to the machine is turned OFF, the feed plate used to sew the buttons without neck wraps may move slowly. This does not mean that there is a functional trouble, so you need not concern yourself about it.
9. Whenever changing the count of thread, re-adjust the timing to release the thread tension. . . . Refer to "Aligning the timing to release the thread tension" on page 26.

(3) Lubrication

1. Lubricate the red-painted points and hole in the chuck inverting bracket indicated by the arrows in the figure and the hole in the chuck inverting bracket, using JUKI New Defrix Oil No. 1.
2. Check whether the oil level reaches the top of the oil felt inside the bed mounting base. If not, supply oil until the oil felt is immersed in oil up to the top.

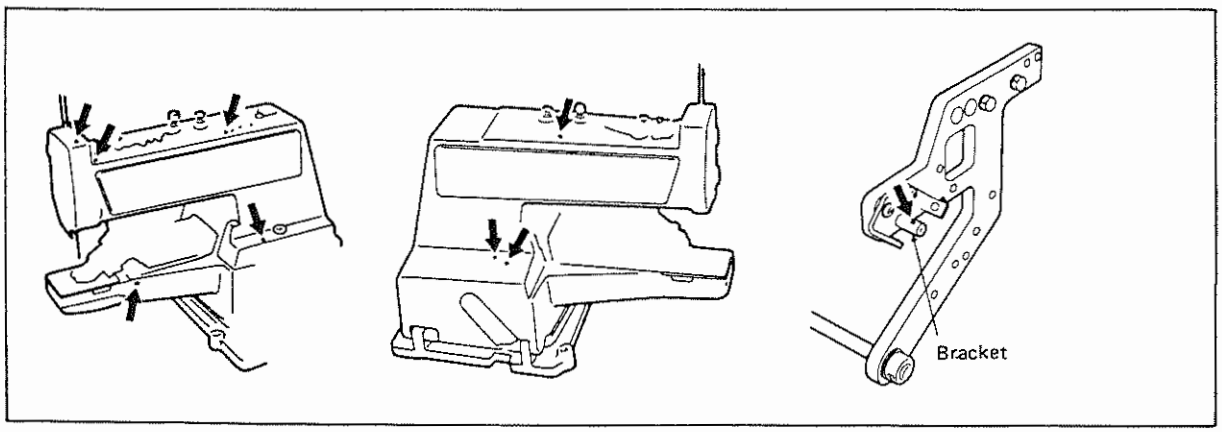


Fig. 3-4

4. CONTROL PANELS COMPONENTS

(1) Main unit and the switches provided for the machine

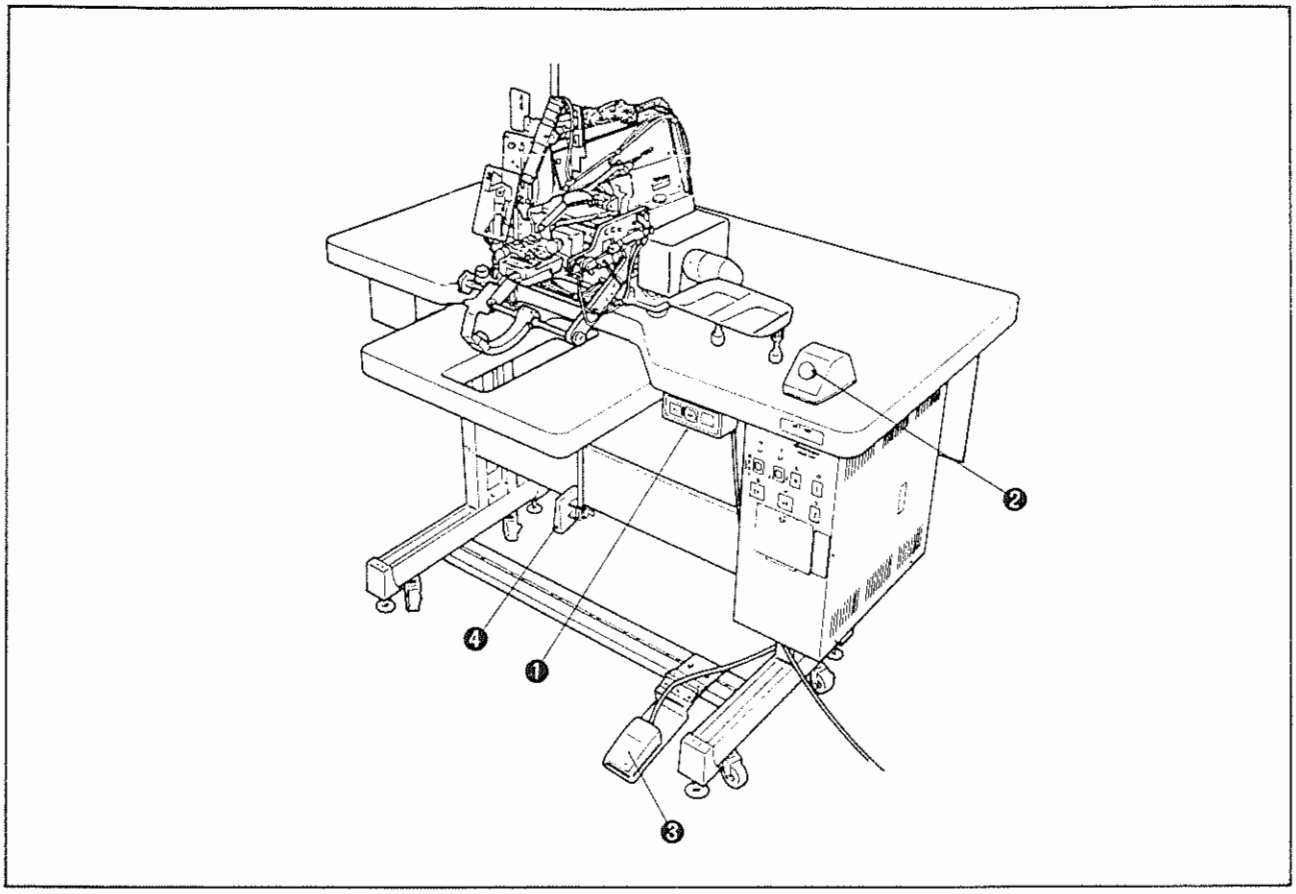


Fig. 4-1

Name of switch	Description of switch
❶ **Power switch**	• This switch should be kept to its OFF state when the machine is not used. • The machine has been designed to stop feeding the air when the power switch is turned OFF.
❷ **Emergency stop switch**	• Press this switch to stop the machine at an emergency whenever any abnormal performance of the machine is observed. • When the emergency stop switch is pressed, the motor of the sewing machine and the X-Y travel action will stop. At this time, "ALARM 12" will be given on the display. To reset the machine, bring the needle bar to its highest stop position and press the reset switch.
❸ **Foot pedal**	• Depress the foot pedal after the button is placed on the machine, and the chuck will secure the button in place. • If the machine is provided with only the foot pedal (the knee switch is not used), this switch is used for all kinds of operations of the machine.
❹ **Knee switch**	• This switch is used to start sewing. In the case of manual operation, this switch is used to make the machine perform a series of operations step by step.

(2) Control panel switches [A]

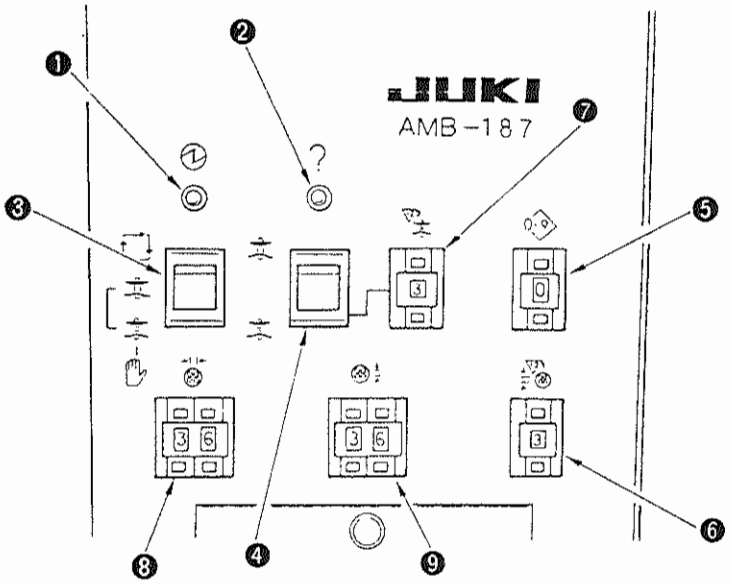
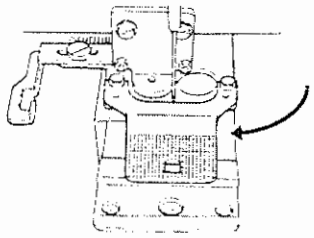
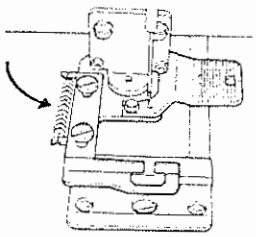


Fig. 4-2

Name of switch	Description of switch
❶ Power indicator lamp	• The lamp lights up in green when the power switch is turned ON.
❷ Error indicator	• The lamp lights up in red when an error occurs. • This lamp flashes on and off when the stop position of the machine is properly adjusted to the needle-up stop position in the case where the machine fails to stop with its needle up (ALARM 13).
❸ Switch to set the operation mode	• Used to select the automatic operation mode or the manual operation mode. (The switch is a three-step seesaw switch.) **1. Automatic operation** • When this switch is set to select the " " , the machine will complete a series of operation required to sew the button by pressing the knee switch after the button is fixed in place using the foot pedal. **(Caution) Be sure to run the machine under the automatic operation mode after you have confirmed the stitch diagram by operating the machine in the manual operation mode and then have performed a trial stitching.** **2. Manual operation** • When this switch is set to select the " " , the machine will run under the manual operation mode. • You can manually operate the machine through whole of the 1st and 2nd steps of the button sewing process with neck wrapping. • The stitch diagram is confirmed and a trial stitching is performed under the manual operation mode. **3. Manual operation** • When this switch is set to select the " " , the machine will run under the manual operation mode. • You can operate the machine from the second process of the button sewing with neck wraps. • This mode should be selected when checking the stitch diagram for the button sewing with neck wraps or when checking the thickness of the button to be sewn.

Name of switch	Description of switch
❹ **Switch to set with/without neck wraps**	• This switch is used to change from sewing button with neck wraps to sewing buttons without neck wraps and vice versa. **1. Without neck wraps**  Fig. 4-3 • Buttons can be sewn without neck wraps by setting this switch to the " " position. (Sewing buttons without the button neck) • The feed plate for the sewing buttons without the button neck rotates until it comes to the needle entry section as illustrated in Fig. 4-3. However, the feed plate rotates after this switch " / " has been changed over and the knob to adjust the neck wrap height and the sewing pattern have been re-specified accordingly. **2. With neck wraps**  Fig. 4-4 • Buttons can be sewn with neck wraps by setting this switch to the " " position. • The feed plate for the sewing buttons with neck wraps rotates until it comes to the needle entry section as illustrated in Fig. 4-4. However, the feed plate rotates after this switch " / " has been changed over and the knob to adjust the neck wrap height and the sewing pattern have been re-specified accordingly.
❺ **Switches to set the sewing pattern**	• This switch is used to select the desired sewing pattern. Table 4-1 shows the pattern numbers and types of the sewing pattern. Table 4-1

	Pattern No.	Type of sewing pattern	Name of sewing pattern
	0		Parallel stitching without cross-over stitches
	1		Parallel stitching with cross-over stitches
	2		Cross stitching without cross-over stitches
	3		Cross stitching with cross-over stitches
★	4		Parallel stitching (lateral) without cross-over stitches
★	5		Parallel stitching (lateral) with cross-over stitches
	7		2-holed button sewing. Set switch ❽ to specify the center-to-center distance between the button holes in the X direction to "0".
★	8		2-holed button sewing (lateral). Set switch ❾ to specify the center-to-center distance between the button holes in the Y direction to "0".

★ The patterns marked by an asterisk (★) should be specified only when sewing buttons without neck wraps.

Name of switch	Description of switch
⑥ **Switch to set the number of tie stitches**	• This switch is used to specify the number of tie stitches for sewing a button. • Table 4-2 shows the specified values and indicated values. • Specify the number of tie stitches considering the count and type of thread to be used.

Table 4-2

Indicated value	Specified values (number of neck wraps)	Indicated value	Specified values (number of tie stitches)
0	–	8	16 stitches
1	2 stitches	9	18 stitches
2	4 stitches	A	20 stitches
3	6 stitches	B	22 stitches
4	8 stitches	C	24 stitches
5	10 stitches	D	26 stitches
6	12 stitches	E	28 stitches
7	14 stitches	F	30 stitches

(Caution) The number of stitches specified is the number of threads which ties the holes in the button. If six threads are necessary to tie the holes in the button, specify "6". In this case, the indicated value will be "3". However, the number of stitches on the stitch diagram will be "7" by adding the first stitch of the button sewing.

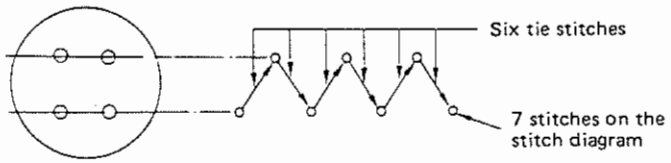


Fig. 4-5

Name of switch	Description of switch
❼ **Switch to set the number of neck wraps**	• This switch is used to specify the number of neck wraps. • Table 4-3 shows the specified values and indicated values.

Table 4-3

Indicated value	Specified values (number of neck wraps)	Indicated value	Specified values (number of neck wraps)
0	–	8	16 stitches
1	2 stitches	9	20 stitches
2	4 stitches	A	24 stitches
3	6 stitches	B	28 stitches
4	8 stitches	C	32 stitches
5	10 stitches	D	36 stitches
6	12 stitches	E	40 stitches
7	14 stitches	F	44 stitches

(Caution) 1. The number of stitches specified is the number of threads which wrap the tie stitches. If six threads are necessary to wrap the tie stitches specify "6". In this case, the indicated value will be "3". However, the number of stitches on the stitch diagram will be "9" by adding on stitch on the material (the first stitch of the neck wraps), one stitch at the start position of neck wrapping and one stitch at the start position of neck wrapping and one stay stitch.

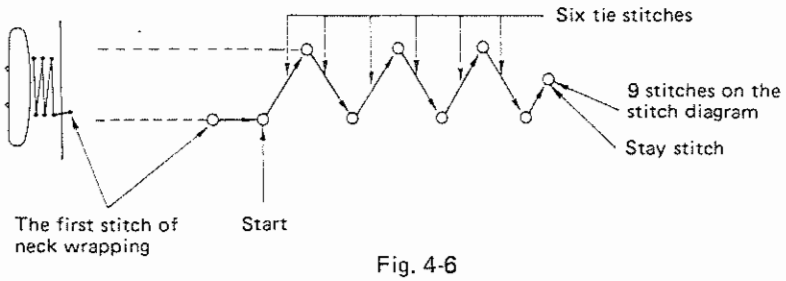


Fig. 4-6

2. Feeling, etc. of the neck wrap stitches depend of the neck wrap height and the number of neck wraps specified. Adjust the position of the knob to adjust the neck wrap height properly and optimize the thread tension before starting sewing buttons.

❽ **Switch to set the center-to-center distance between the button holes (X direction)**	• This switch is used to specified the center-to-center distance between the holes in the button in the X direction (lateral direction). • The center-to-center distance of the button holes can be specified within the range of 2 to 5 mm (0.079" – 0.197") in the 0.2 mm (0.008") steps. The switch to set the center-to-center distance between the button holes can specify the distance in the 0.1 mm (0.004") steps. However, the first digit under decimal can be round down to an even number. (This rule is also applied to the center-to-center distance between the button holes in the Y direction.) • Refer to the table given on the page 42 for how to measure the actual center-to-center distance between the button holes.

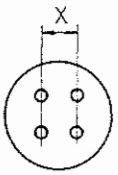


Fig. 4-7

❾ **Switch to set the center-to-center distance between the button holes (Y direction)**	• This switch is used to specified the center-to-center distance between the holes in the button in the Y direction (longitudinal direction).

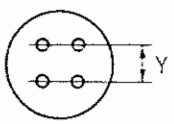


Fig. 4-8

(3) Control panel switches [B]

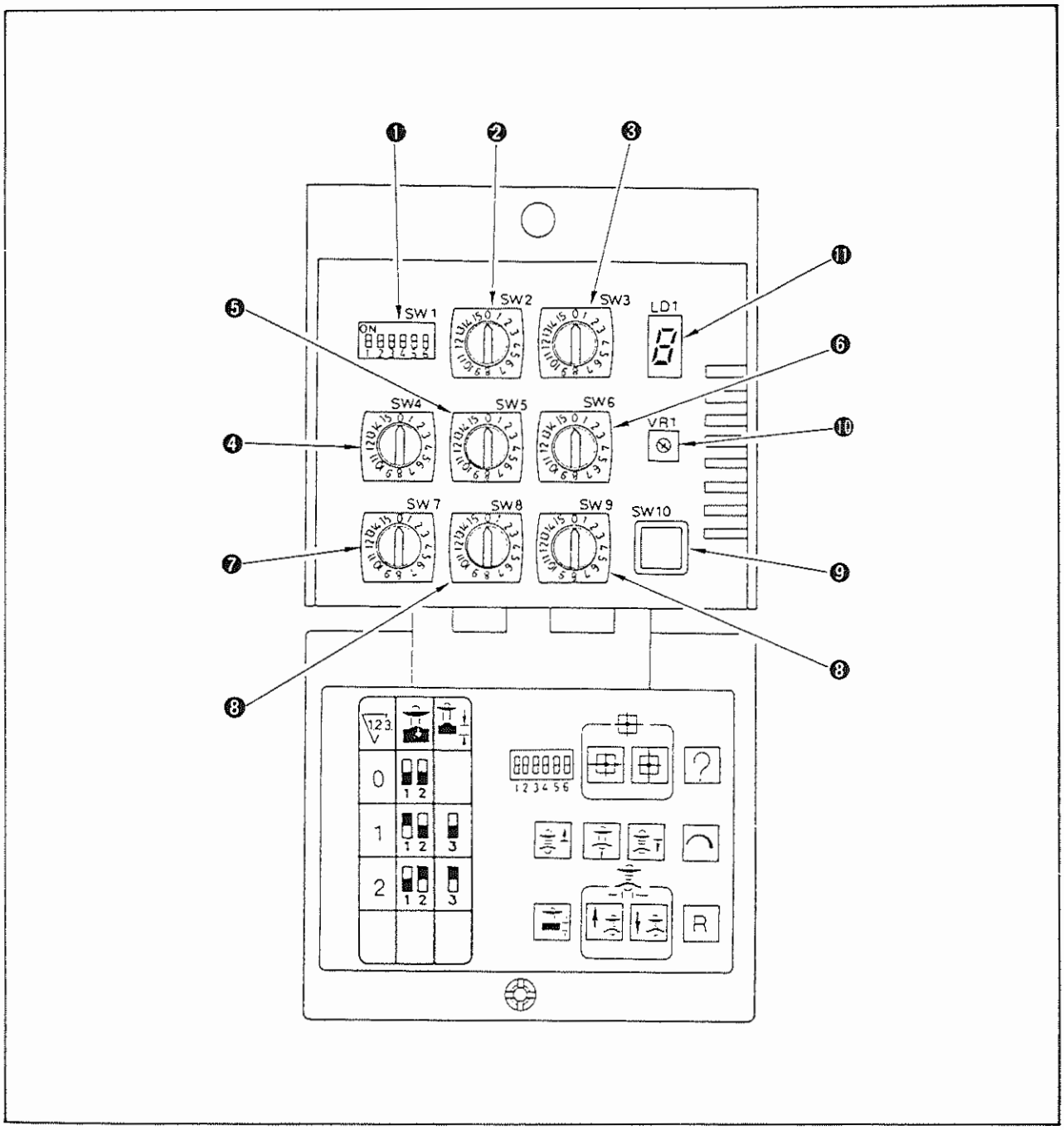
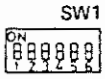
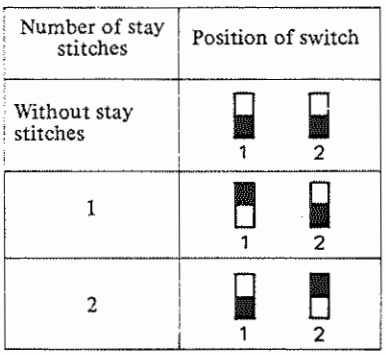
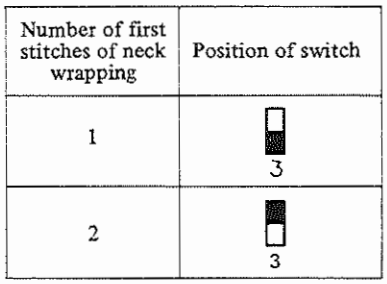
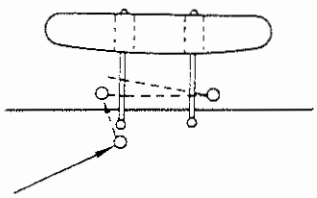
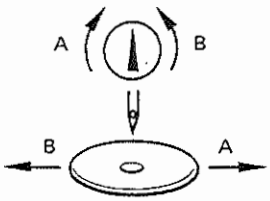
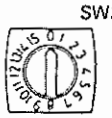
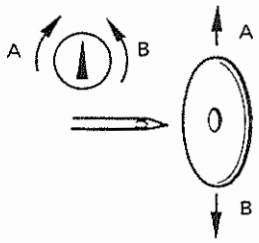
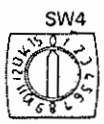
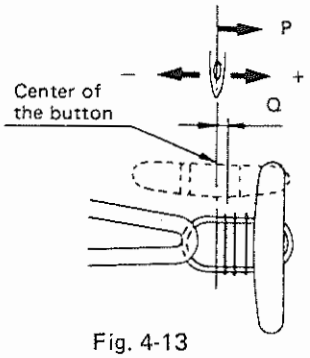
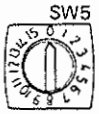
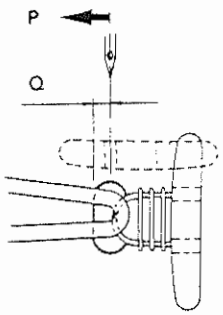
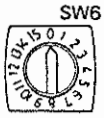
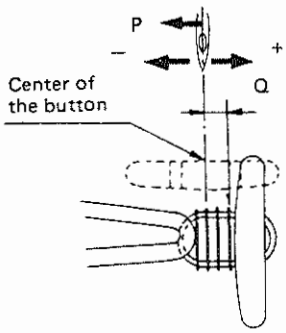
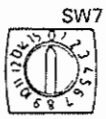
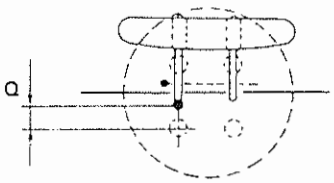
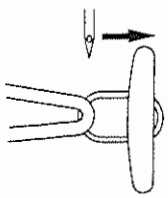


Fig. 4-9

Name of switch	Description of switch
❶ SW1  **DIP switches to specify the number of stay stitches and the number of the first stitches for neck wrapping**	• These switches are used to specify the number of stay stitches and the number of the first stitches for neck wrapping. **1. Switches No. 1 and 2 of DIP switches 1 Number of stay stitches** • You can select the number of stay stitches from among "without stay stitch", "1" and "2" by changing over the setting of the DIP switches.  **(Caution) The relationship between the number of stay stitches and that of threads are as follows:** **One stay stitch corresponds to two threads.** **Two stay stitches corresponds to four threads.** **2. Switch No. 3 of DIP switch 1 Number of the first stitches for neck wrapping** • The number of the first stitches for the second step (neck wrapping) of button sewing process can be specified either to 1 stitch or to 2 stitches by changing over the setting of the switch No. 3 of the DIP switches 1. • The first stitch of neck wrapping is better tensed by setting the number of the first stitches to "2", thereby improving the quality of the feeling of the finished neck wraps.   Fig. 4-10

Name of switch	Description of switch
❷ **SW2** SW2  **To adjust the origin in the X direction**	• This switch is used to finely adjust the position of the origin in the X direction. • One graduation of the scale of the rotary switch corresponds to 0.2 mm (0.008″). This means that the position of the origin with respect to the X direction can be adjusted in the 0.2 mm (0.008″) steps using the rotary switch. (This rule is also applied when adjusting the origin in the Y direction.) • Insert the reference button gauge in the chuck, and carry out the adjustment. • The chuck (X-Y table) moves in direction A by turning the switch in direction A, or in direction B by turning the switch in direction B. • Confirm the position of the origin is properly adjusted after the chuck has been replaced, etc. **(Caution) The limit of the adjustment range in direction A is 7 and in direction B is 8. Whenever the limit in the respective directions is exceeded, the position of the origin will be inverted. This rule is also applied to the adjustment of the origin in the direction Y.**  Fig. 4-11
❸ **SW3** SW3  **To adjust the origin in the Y direction**	• This switch is used to finely adjust the position of the origin in the Y direction. • The chuck (X-Y table) moves in direction A by turning the switch in direction A, or in direction B by turning the switch in direction B.  Fig. 4-12

Name of switch	Description of switch
❹ SW4  **To specify the start position of neck wrapping**	• This switch is used to specify the start position of neck wrapping. • The start position can be specified from the center of the button toward the cloth ("–" direction) or toward the button ("+" direction) in increments of 0.2 mm (0.008"). (The needle entry point moves in direction P by increasing the value on the scale of the rotary switch.)  Fig. 4-13 Table 4-4 Rotary switch / Distance Q / Rotary switch / Distance Q 0 / –0.6 (–0.024") / 8 / 1.0 (0.039") 1 / –0.4 (–0.016") / 9 / 1.2 (0.047") 2 / –0.2 (–0.008") / A / 1.4 (0.055") 3 / 0 / B / 1.6 (0.063") 4 / 0.2 (0.008") / C / 1.8 (0.071") 5 / 0.4 (0.016") / D / 2.0 (0.079") 6 / 0.6 (0.024") / E / 2.2 (0.087") 7 / 0.8 (0.031") / F / 2.4 (0.094") • Specify the start position of neck wrapping appropriately by increasing the set value when starting neck wrapping from the cloth or decreasing the set value when starting it from the button.
❺ SW5  **To set the location of the stay stitch**	• This switch is used to specify the location of the stay switch. • The location of the stay switch can be specified from the button hole (those located near the operator) toward the cloth within the range of 0 to 3 mm (0.118") in increments of 0.2 mm (0.008"). • The location of the stay stitch moves in direction P by increasing the set value.  Fig. 4-14 Table 4-5 Rotary switch / Distance Q / Rotary switch / Distance Q 0 / – / 8 / 1.6 (0.063") 1 / 0.2 (0.008") / 9 / 1.8 (0.071") 2 / 0.4 (0.016") / A / 2.0 (0.079") 3 / 0.6 (0.024") / B / 2.2 (0.087") 4 / 0.8 (0.031") / C / 2.4 (0.094") 5 / 1.0 (0.039") / D / 2.6 (0.102") 6 / 1.2 (0.047") / E / 2.8 (0.110") 7 / 1.4 (0.055") / F / 3.0 (0.118") • If the feeding amount of the stay stitch is inadequate, increase the set value. If it is excessive, decrease the set value.

Name of switch	Description of switch
❻ SW6  SW6 **To set the highest position of the neck wraps**	• This switch is used to specify the highest position of the neck wraps. • The highest position of the neck wraps is specified from the center of the button toward the cloth ("–" direction) or toward the button ("+" direction) in increments of 0.2 mm (0.008"). Note that this feature is effective when the knob to adjust the height of the neck wraps is set to "2.5" on its scale. If the neck wrap height is increased, the value of Q will increase accordingly. (The needle entry point moves in direction P by increasing the scale value of the rotary switch.)  Fig. 4-15 Table 4-6 Rotary switch / Distance Q / Rotary switch / Distance Q 0 1.5 (0.059") 8 –0.1 (–0.004") 1 1.3 (0.051") 9 –0.3 (–0.012") 2 1.1 (0.043") A –0.5 (–0.020") 3 0.9 (0.035") B –0.7 (–0.028") 4 0.7 (0.028") C –0.9 (–0.035") 5 0.5 (0.020") D –1.1 (–0.043") 6 0.3 (0.012") E –1.3 (–0.051") 7 0.1 (0.004") F –1.5 (–0.059") • If the needle comes in contact with the button or the button comes in contact with the throat plate, decrease the distance Q to prevent the needle and throat plate from approaching the button.
❼ SW7  SW7 **To set the needle entry point of the first stitch of neck wrapping**	• This switch is used to specify the needle entry point of the first stitch of neck wrapping. • The needle entry point can be specified from the button sewing position (holes in the button located near the operator) toward the button within the range of 0 to 3 mm (0.118") in increments of 0.2 mm (0.008").  Fig. 4-16  Fig. 4-17 Table 4-7 Rotary switch / Distance Q / Rotary switch / Distance Q 0 – 8 1.6 (0.063") 1 0.2 (0.008") 9 1.8 (0.071") 2 0.4 (0.016") A 2.0 (0.079") 3 0.6 (0.024") B 2.2 (0.087") 4 0.8 (0.031") C 2.4 (0.094") 5 1.0 (0.039") D 2.6 (0.102") 6 1.2 (0.047") E 2.8 (0.110") 7 1.4 (0.055") F 3.0 (0.118") • The needle entry point of the first stitch of neck wrapping process after tying the button on the cloth is drawn toward the button by tilting the button, together with the cloth on which the button is sewn. To compensate the dislocation of the needle entry point of the first stitch of neck wrapping due to the above-stated phenomenon, the needle entry point of the first stitch of neck wrapping is adjusted.

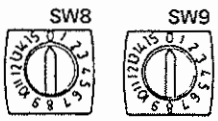
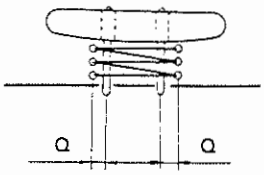
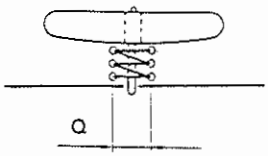
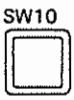
Name of switch	Description of switch
❽ **SW8 and SW9**  **To set the stitch width for neck wrapping**	• This switch is used to specify the stitch width for neck wrapping. • The SW8 is used to specify the stitch width when the neck wraps are made from the cloth to the button (up-stroke), and the SW9 is used to specify that are made from the button to the cloth (down-stroke). • The specification method of the stitch width of neck wrap for 2-holed buttons and that for 4-holed buttons are different. Specify the stitch width for neck wrap for the respective types of button following the below-stated procedures. **1. 4-holed button** ○ The stitch width is specified from the center of either end of the button within the range of 0 to 3 mm (0.118″) in increments of 0.2 mm (0.008″).  Fig. 4-18 Table 4-8 • The maximum stitch width is 8 mm (0.315″). **2. 2-holed button** ○ The stitch width is specified within the range of 0.8 to 3.8 mm (0.031″ – 0.150″) in increments of 0.2 mm (0.008″) setting the maximum stitch width to 0.8 mm (0.031″) with respect to the center of the button.  Fig. 4-19 Table 4-9
❾ **SW10**  **Reset switch**	• This switch is pressed to reset the machine to the normal operation mode after correcting an error.

Table 4-8

Rotary switch	Distance Q	Rotary switch	Distance Q
0	–	8	1.6 (0.063″)
1	0.2 (0.008″)	9	1.8 (0.071″)
2	0.4 (0.016″)	A	2.0 (0.079″)
3	0.6 (0.024″)	B	2.2 (0.087″)
4	0.8 (0.031″)	C	2.4 (0.094″)
5	1.0 (0.039″)	D	2.6 (0.102″)
6	1.2 (0.047″)	E	2.8 (0.110″)
7	1.4 (0.055″)	F	3.0 (0.118″)

Table 4-9

Rotary switch	Distance Q	Rotary switch	Distance Q
0	0.8 (0.031″)	8	2.4 (0.094″)
1	1.0 (0.039″)	9	2.6 (0.102″)
2	1.2 (0.047″)	A	2.8 (0.110″)
3	1.4 (0.055″)	B	3.0 (0.118″)
4	1.6 (0.063″)	C	3.2 (0.126″)
5	1.8 (0.071″)	D	3.4 (0.134″)
6	2.0 (0.079″)	E	3.6 (0.142″)
7	2.2 (0.087″)	F	3.8 (0.150″)

Name of switch	Description of switch
⑩ **VR1** VR1  **Variable resistor**	• This variable resistor is used to change the number of revolutions of the sewing machine. (The maximum sewing speed is 700 s.p.m.)
⑪ **LD1 LED** LD1 	• This LED indicates the error code or the specified values of the number of tie stitches and the number of neck wraps. • Since the LED only indicates the number of single digit, it shows the number in turn. For "AL12" It indicates as "[A]→[L]→[–]→[1]→[2]" while flashing on and off. For "8 tie stitches and 16 neck wraps" It indicates as "[8]→[–]→[1]→[6]" while flashing on and off. • It repeats indicating the number of tie stitches and the number of neck wraps three times after the relevant data changing.

(4) Example of operation of the switches on the control panels . . . The description of the adjustment of the sewing conditions is excluded.

[Example of sewing specification]

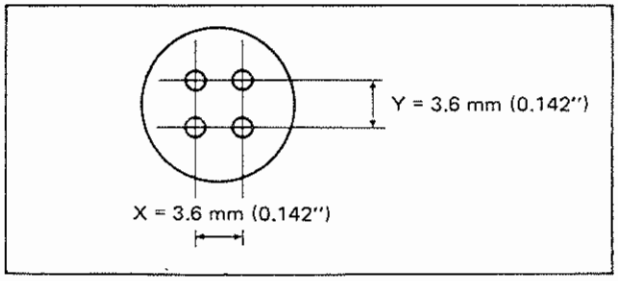


Fig. 4-20

4-holed button, parallel stitching, without cross-over stitch, with neck wrap stitches, 8 tie stitches ea., 14 neck wraps, 1 reinforcing stitch, 1 stay stitch, neck wrap height of 3 mm

1. Data input

Table 4-10 1/2

Panel	Item	Switch	Data	Panel operation
Control panel A	a) Sewing pattern	0-9		Set to "0".
	b) Number of tie stitches		8 stitches	Set to "4".
	c) Number of neck wraps		14 stitches	Set to "7".
	d) Center-to-center distance X between the button holes		3.6 mm (0.142")	Set to "36".
	e) Center-to-center distance Y between the button holes		3.6 mm (0.142")	Set to "36".
	f) With/without neck wraps		With neck wraps	Set the switch to its lower position.
Control panel B	g) Number of stay stitches for neck wrapping	Switch No. 1 and No. 2 of DIP SW1	1 stitch	Set the switches No. 1 to its upper position and No. 2 to its lower position.
	h) Number of the first stitches for neck wrapping	Switch No. 3 of DIP SW 1	1 stitch	Set the switch No. 3 to its lower position.
	i) Stitch width for neck wrapping	SW8, SW9	5.2 mm (0.205") for the up-stroke and the down-stroke	Set the switches to "4"
	j) Location of the stay stitch	SW5	1.0 mm (0.039") away from this side hole in the button	Set the switch to "5".
	k) Number of revolutions of the sewing machine	VR1	700 s.p.m.	Turn the variable resistor clockwise until it will go no further.

To be continued to the next page.

Table 4-10 2/2

Panel	Item	Switch	Data	Panel operation
Control panel B	l) Start position of neck wrapping	SW4	Starts from the center of the button	Set the switch to "3".
	m) The highest position of the neck wraps	SW6	0.6 mm (0.024") above the center of the button	Set the switch to "7".
	n) The position of the first stitch for neck wrapping	SW7	The position of this side hole in the button	Set the switch to "0".
Knob	o) Height of the neck wraps	Knob to adjust the neck wrap height	Neck wrap height is set to 3 mm (0.118") (reference)	Set the knob to "3".
	p) Depth of tie stitches	Knob to adjust the thrusting amount	Position of this side hole in the button	Set the knob to "0".

(Caution)

1. **The actual values of switches and knobs i), j), k), l), m), n), o) and p) may change in accordance with the thickness of the material to be used. Consequently, the switches and knobs stated above should be adjusted by performing trial stitching by way of manual operation.**
2. **If distance a exceeds 1 mm (0.039") at the time of chucking the button, the exceeding amount should be added to the scale value of 2.5 which indicates the neck wrap height so as to raise the highest position of the neck wraps. (The highest position of the neck wraps should be adjusted using the SW6, in this case, since the button comes in contact with the throat plate.)**
3. **Adjust position n) in accordance with the type of the material and the pulling force applied to the material toward the button at the time of neck wrapping.**

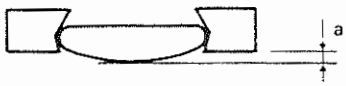


Fig. 4-21

2. Adjusting the origin of button sewing

Insert the button gauge to the chuck and align the center of the button gauge with the needle of the sewing machine.

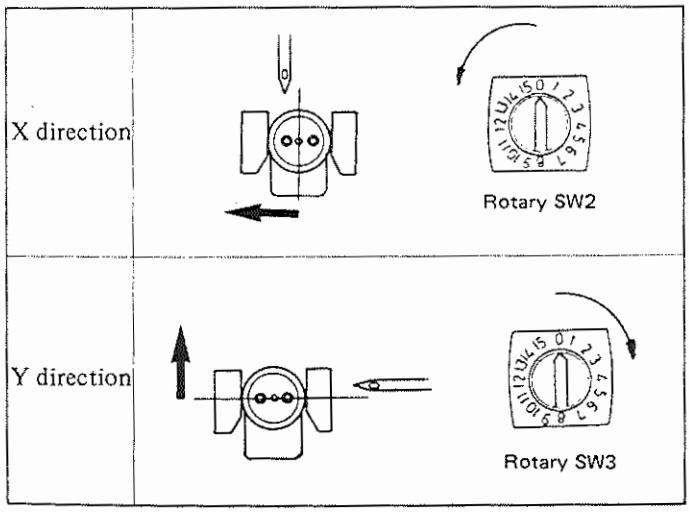


Fig. 4-22

3. Checking the stitch diagram by way of manual operation of the machine

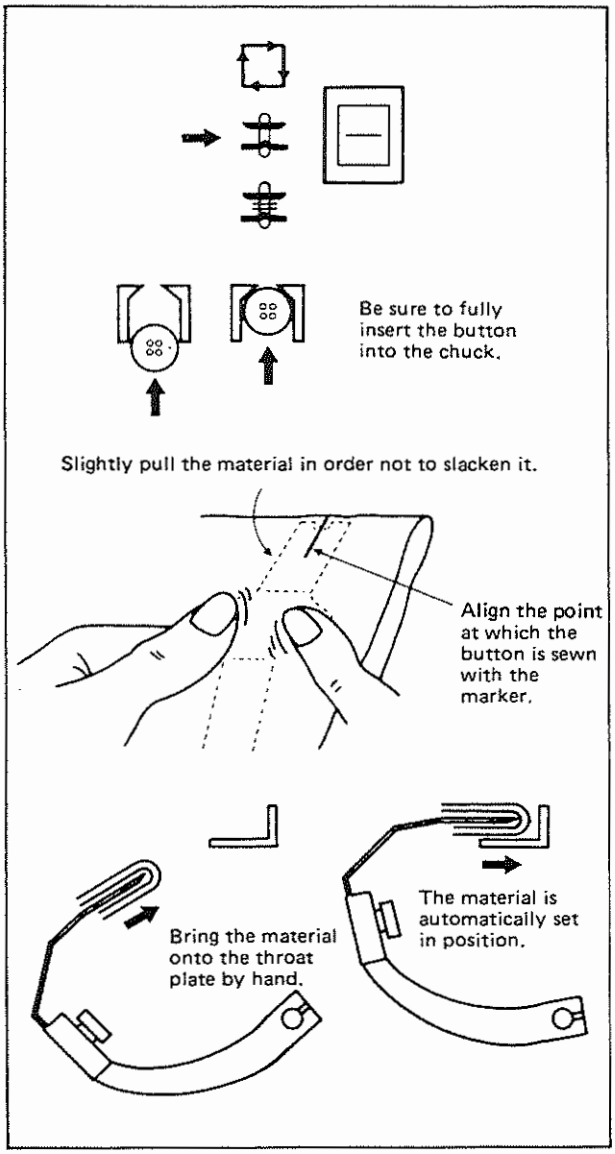


Fig. 4-23

1) Set the operation mode to the manual operation mode.
2) Insert the button in position.
3) Set the material on the tongue.

- ○ When the tongue on which the material is set is brought onto the throat plate, the air may be automatically actuated to set the material in position on the throat plate.
- ○ Once the material is set in position, take care not to apply external load to the tongue.

★ How to reset
Turn ON the foot pedal twice (only for the machine provided with the foot switch and the knee switch), or change the setting of the mode selector switch.

(Caution) Foot switch and knee switch

Table 4-11

		Foot switch	Knee switch	
Normal state (at the time of delivery) Switch No. 1 of the DIP switches on the CPU circuit board in the control box is set to its OFF (lower) position.		ON		Fixes the chuck (in its setting state)
			ON	Starts sewing
	Manual		ON → ON	Proceeds to the next step
If starting the machine using the foot switch Switch No. 1 of the DIP switches on the CPU circuit board in the control box is set to its ON (upper) position.		ON (the foot pedal is being depressed)		Fixes the chuck (in its setting state)
		Release the pedal		Starts sewing
	Manual	ON → ON		Proceeds to the next step

4) Button sewing process

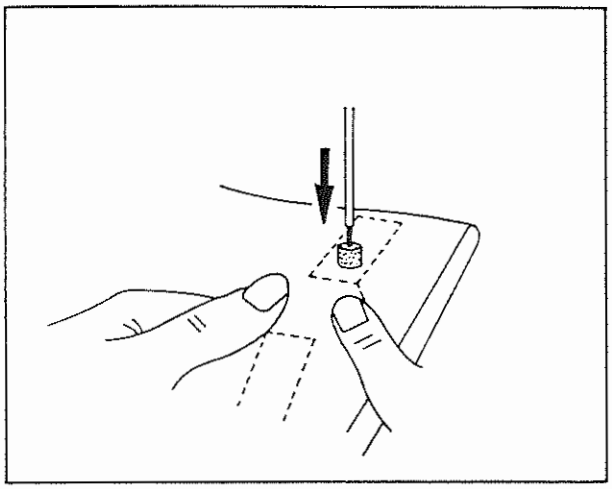


Fig. 4-24

a) Depressing the pedal will automatically
- make the chuck fix the button in position,
- make the chuck come down to the neck wrap height and
- actuate the work clamp.

(Depressing the foot pedal again will make the machine enter into its reset state.)

(Caution) Be careful not to allow your hands to come near to the work clamp preventing the work clamp to come in contact with your hands.

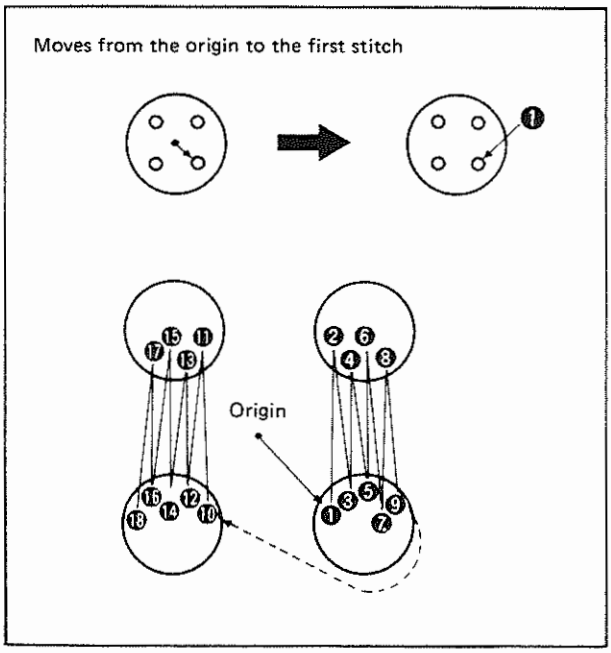


Fig. 4-25

b) Pressing the knee switch will automatically
- make the button move from its origin to the position of the first stitch (position ❶).

c) Every press on the knee switch will advance the button by one stitch from position ❷ through position ⓲. Turning the driving pulley by hand will make the machine perform the operation same as the above.
At positions ❾ and ⓲, the machine will automatically trim the thread by pressing the knee switch.

5) Neck wrapping process

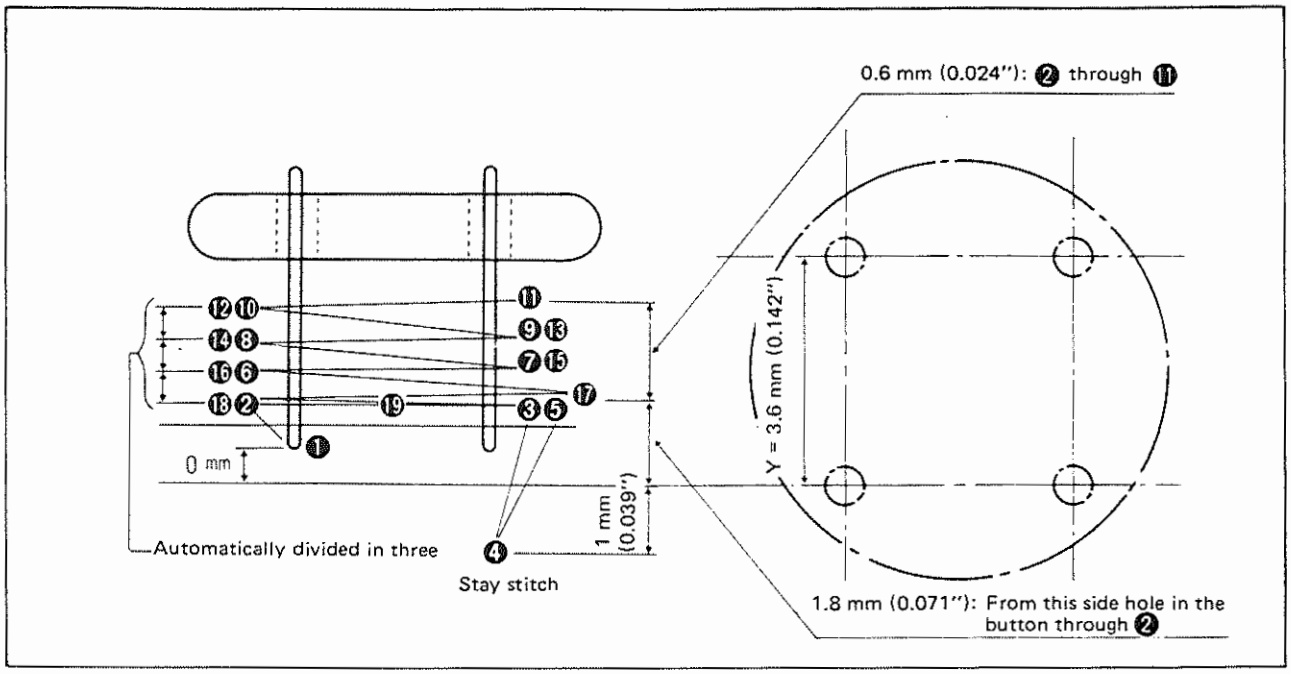


Fig. 4-26

a) Pressing the knee switch will automatically invert the chuck.
b) Every press on the knee switch will advance the needle by one stitch from position ❶ through position ⓳. Turning the driving pulley by hand will make the machine perform the operation same as the above.
c) At position ⓳, the machine will automatically trim the thread by pressing the knee switch.
d) Pressing the knee switch will automatically return the chuck to its home position.
e) Pressing the knee switch will automatically
   - release the chuck,
   - make the chuck go up,
   - return the work clamp to its home position and
   - release the tongue.

★ For sewing the button without neck wraps, the operation will stop upon completion of the first process (4)-C) of button sewing.
★ The highest position of the neck wraps should be specified to prevent the button from coming in contact with the throat plate.
If there is a clearance between the button and the throat plate:
Set the scale of SW6 to 7 → 6 → 5 → 4.
If the button comes in contact with the throat plate:
Set the scale of SW6 to 7 → 8 → 9 → 10.

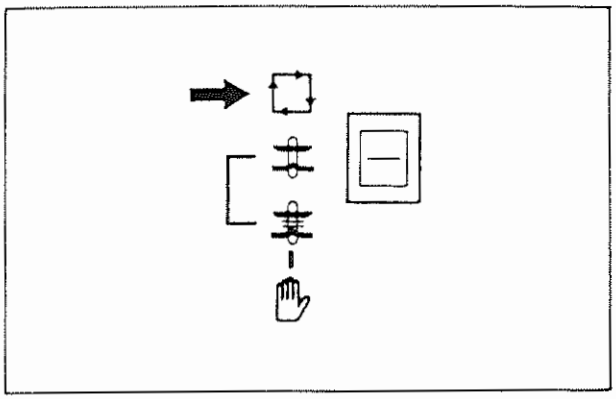
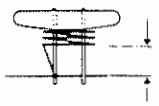
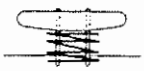
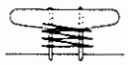
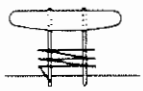
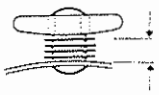
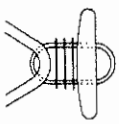
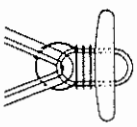


Fig. 4-27

1) Set the operation mode selector switch to the automatic operation.
2) Refer to the description of "3. Checking the stitch diagram by way of manual operation of the machine". The machine will automatically perform step B) of 4) and beyond in the said description.

If any trouble occurs, refer to the corrective measures shown in Table 4-12.

Table 4-12

No.	Trouble		Corrective measure
1	There is a clearance between the cloth and the first neck wrap.		Adjust the set value for the start position of neck wrapping to 3 → 2 → 1.
2	Neck wraps are made even on the cloth.		Adjust the set value for the start position of neck wrapping to 3 → 4 → 5.
3	The needle comes in contact with the button, or the button comes in contact with the throat plate.		Adjust the set value for the highest position of the neck wraps to 7 → 8 → 9.
4	Loose neck wraps (the machine fails to wrap around the neck until the neck wraps comes very close to the button)		Adjust the set value for the highest position of the neck wraps to 7 → 6 → 5.
5	Neck wrap height is insufficient.		Adjust the set value for the neck wrap height to 3 → 3.5 → 4.
6	Depth of tie stitches is excessive (the stitch length on the wrong side of the material is excessive).		Adjust the set value for the depth of tie stitches to 0 → –2 → –4.
7	Stay stitch is too long.		Adjust the position of the stay stitches to 5 → 4 → 3.
8	Neck wraps are made inside the tie stitches.		Adjust the set value for the neck wrap width to 4 → 5 → 6.

5. INDEPENDENT OPERATION OF THE AIR CYLINDER

(1) Configuration of the solenoid valves

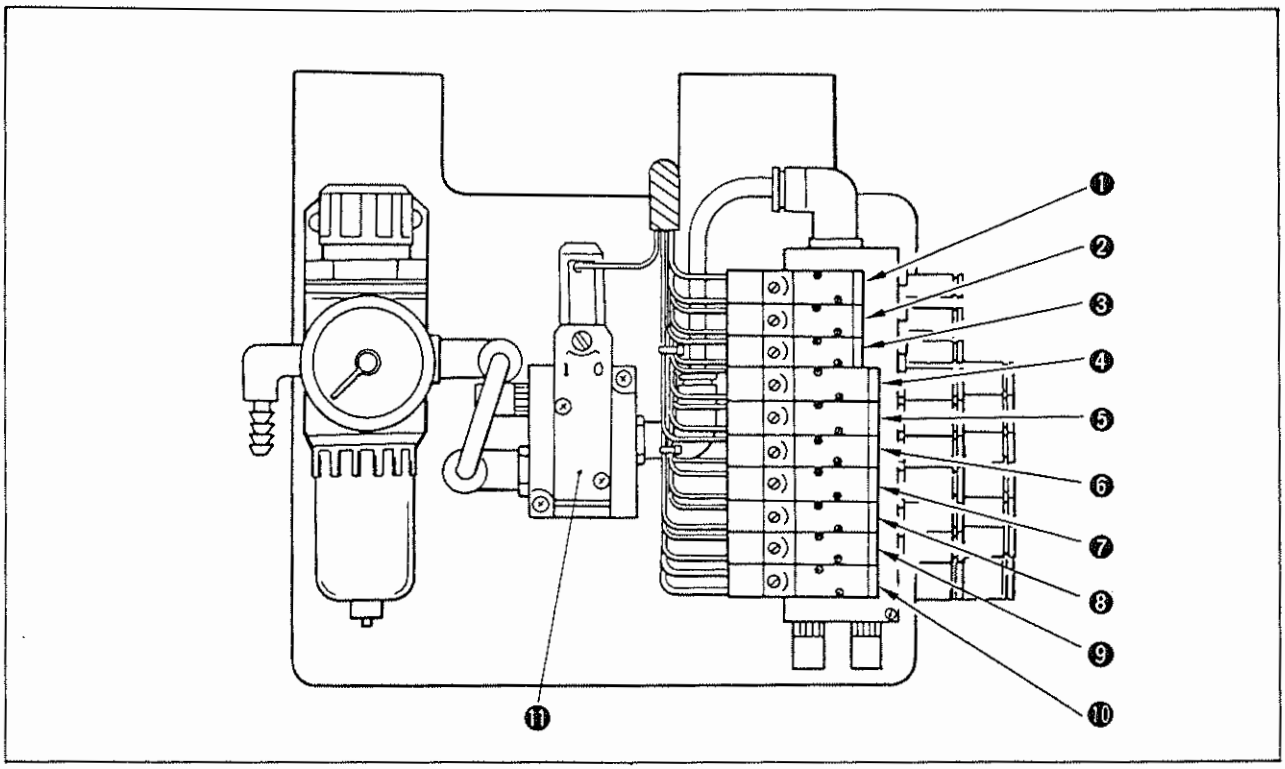


Fig. 5-1

❶ Cylinder to fix the tongue (single acting)
❷ Cylinder to release the tongue (single acting)
❸ Cylinder to clamp the cloth (single acting)
❹ Cylinder to change over thread tension (double acting)
Cylinder to change over thread tension in two-steps (double acting)
❺ Cylinder to feed thread (double acting)
❻ Cylinder for thread trimmer (double acting)
❼ Cylinder to raise/lower the button chuck (double acting)
Cylinder to fix the button chuck (single acting)
❽ Cylinder to rotate the button chuck (double acting)
❾ Cylinder to invert neck wrapping (double acting)
❿ Cylinder for the wiper (double acting)
⓫ Solenoid valve to turn off the main power

(2) How to confirm the actuation of the solenoid valve

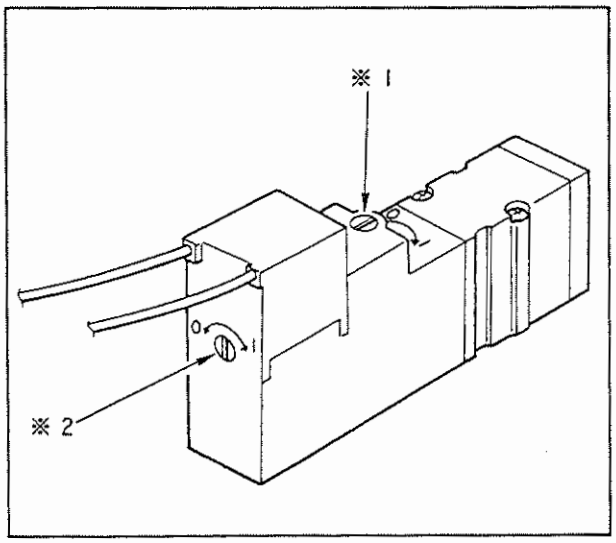


Fig. 5-2

*1. Pressing the orange knob will change over the solenoid valve.
If you wish to maintain the solenoid valve in a certain state, turn the knob from 0 to 1 with pressed.
*2. The solenoid valve changes over only by turning this knob.

(Caution) 1. Be sure to return all the knobs to their "0" position after confirming the performance of the solenoid valves.
2. The thread trimmer, chuck rotating mechanism and neck wrapping inverting mechanism functionally interfere with each other. So be sure to carefully check these mechanisms for proper performance.

6. EXPLANATION OF THE SEWING MACHINE

(1) Attaching the needle

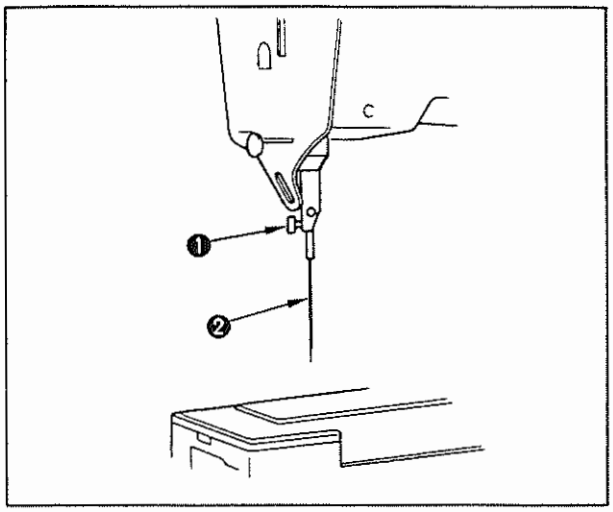


Fig. 6-1

1) Loosen screw ❶, and hold needle ❷ with its long grooved faced toward you.
2) Insert needle ❷ until the top of the needle hole in the needle bar is reached.
3) Securely tighten screw ❶.

(Caution) When attaching the needle, turn OFF the power to the motor.
The standard needle to be used for button sewing with neck wraps: ORGAN SM332LG #16
The standard needle to be used for button sewing without neck wraps: SCHMETZ 332LGH KSP#100

(2) Threading the machine head

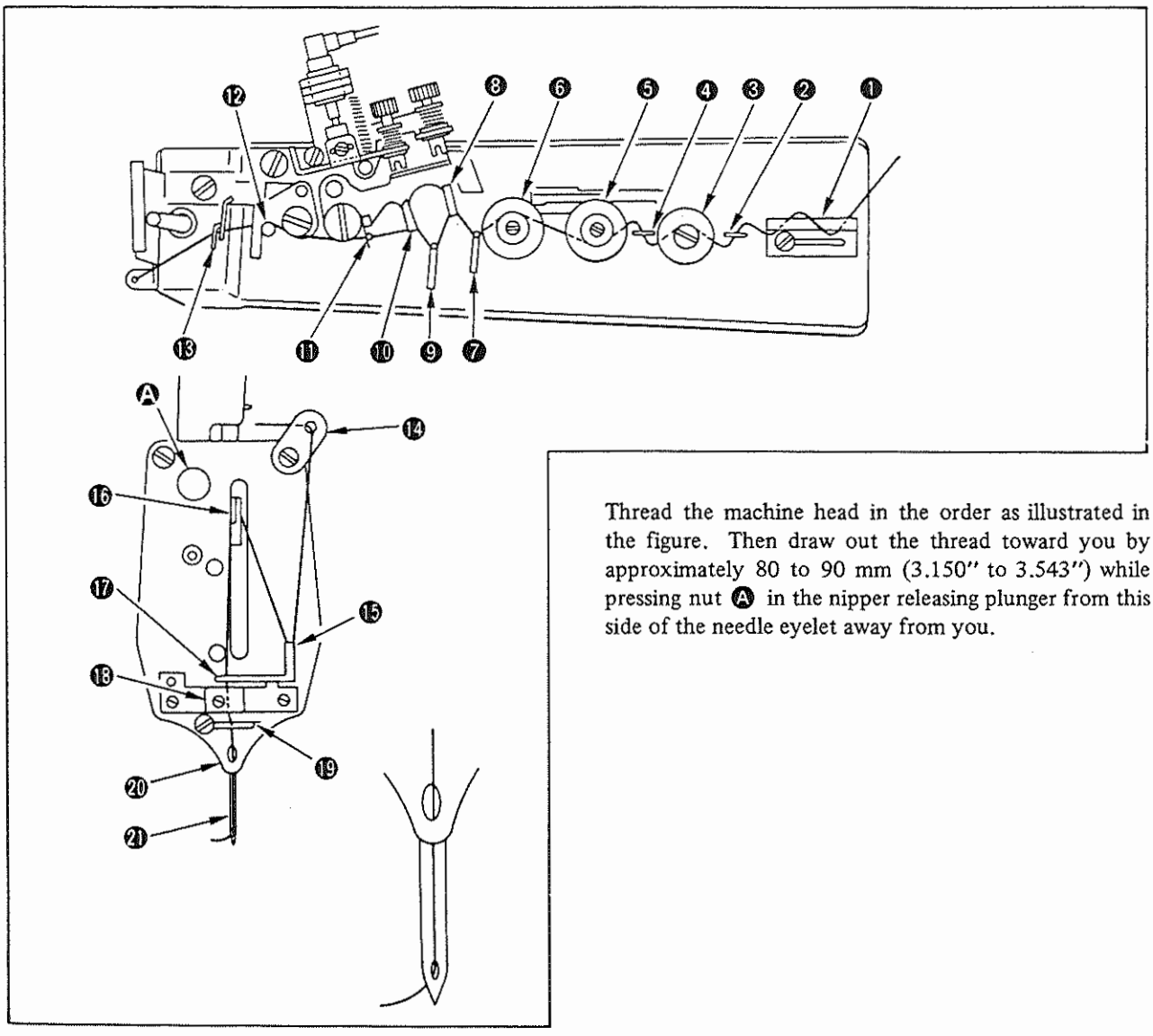


Fig. 6-2

Thread the machine head in the order as illustrated in the figure. Then draw out the thread toward you by approximately 80 to 90 mm (3.150" to 3.543") while pressing nut Ⓐ in the nipper releasing plunger from this side of the needle eyelet away from you.

(3) Aligning the timing to release the thread tension

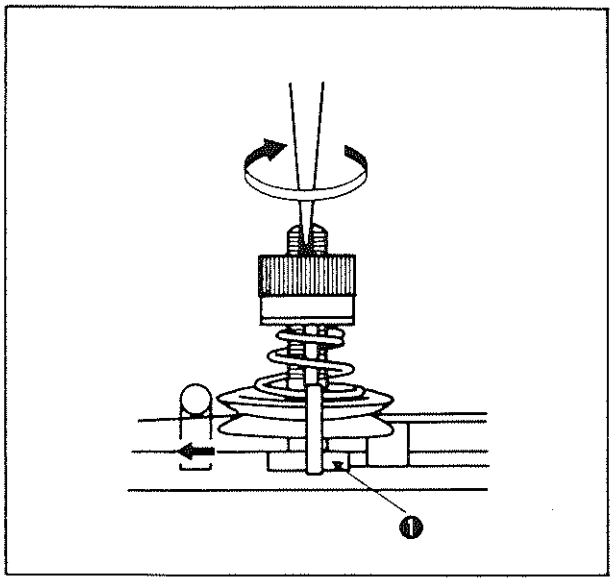


Fig. 6-3

Pulling the thread in the direction of the arrow, turn the handwheel until you find the position where the tension disc No. 2 comes up to allow the thread to draw out with ease. At this time, the standard distance of 49 to 52 mm (1.929" to 2.047") should be provided between the surface of the needle bar upper bushing and the top end of the needle bar.

The below-stated adjustment is necessary especially when the following phenomena frequently occur.

Loosen nut ❶. Fit a screwdriver into the tension post No. 2, and turn it in the direction of the arrow to lower the needle bar or in the opposite direction of the arrow to raise the needle bar.

Phenomenon and when changing thread	Height of the needle bar
1) Loose stitches are observed on the wrong side of the material.	Slightly raise the needle bar.
2) Thread breakage frequently occurs.	Slightly lower the needle bar.
3) When the thread is changed for thicker one.	Slightly lower the needle bar.

(4) Adjusting the needle and the looper

1. Adjusting the height of the needle bar

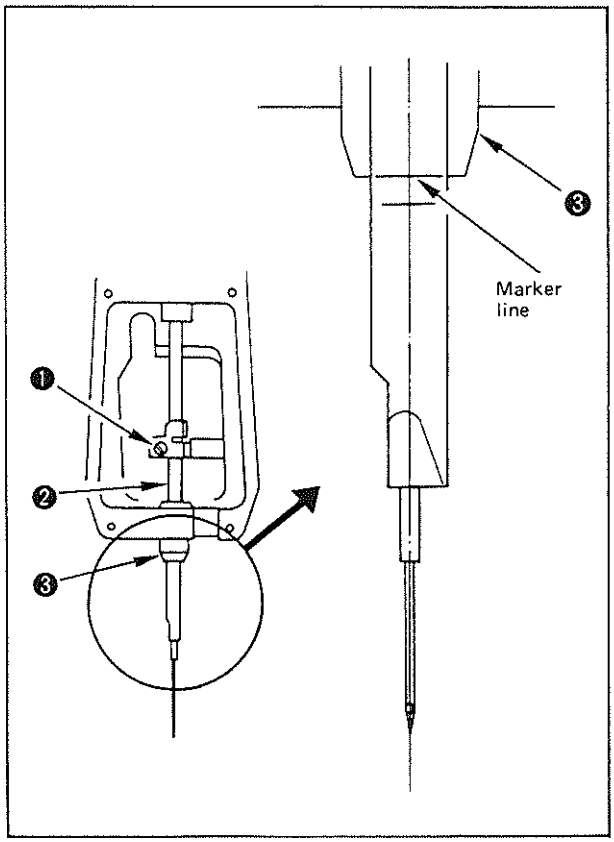


Fig. 6-4

1) Turn the handwheel in the normal rotational direction to make the needle bar come down to the lowest position of its stroke. Now loosen screw ❶.
2) Align the 2nd marker line engraved on needle bar ❷ as counted from the bottom with the bottom end with needle bar lower bushing ❸. Then tighten screw ❶.

2. Adjusting the position of the needle and that of the looper

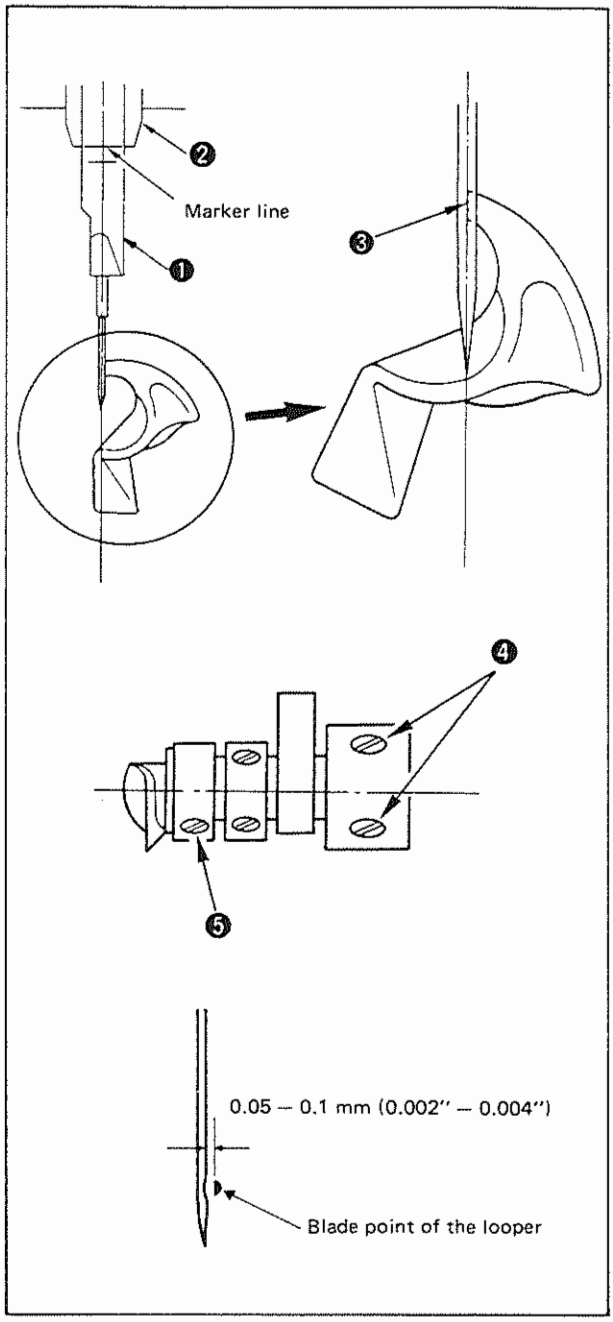


Fig. 6-5

1) Loosen screws ❹, and turn the handwheel until the lower marker line engraved on needle bar ❶ is aligned with the bottom end of needle bar lower bushing ❷.

2) At this time, align looper point ❸ with the center of the needle, and tighten screws ❹.

3) Loosen screw ❺, and adjust so that a clearance of 0.05 to 0.1 mm (0.002" to 0.004") is provided between the looper and the needle. Then tighten screw ❺.

(5) Adjusting the needle and the needle guide

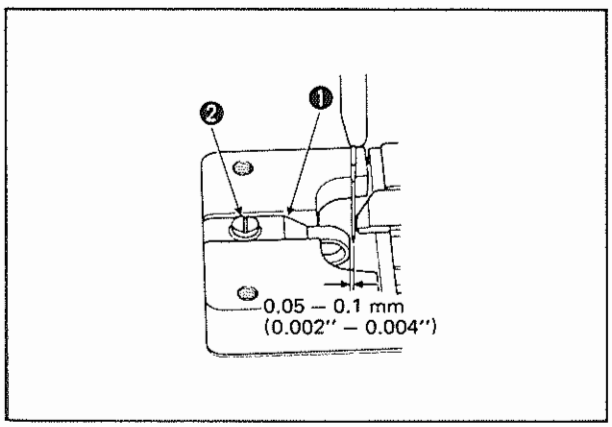


Fig. 6-6

Bring the needle bar to the lowest position of its stroke, and loosen screw ❷. Move needle guide ❶ to the left or right to adjust the clearance between the needle and needle guide ❶ to 0.05 to 0.1 mm (0.002" to 0.004"). Then tighten screw ❷.

(6) How the yoke slide support base are attached

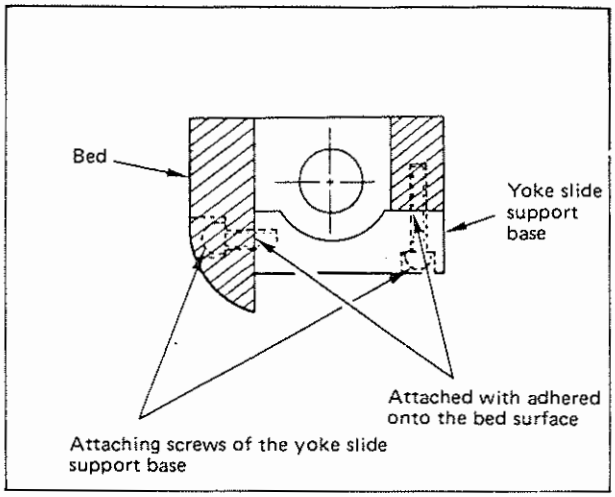


Fig. 6-7

The yoke slide support base is attached on the bed using two attaching screws so that its two surfaces adhered onto the bed.
It the support base is not attached on the bed as described above, the yoke slide may fail to actuate normally.

(7) Protruding amount of the work clamp slider

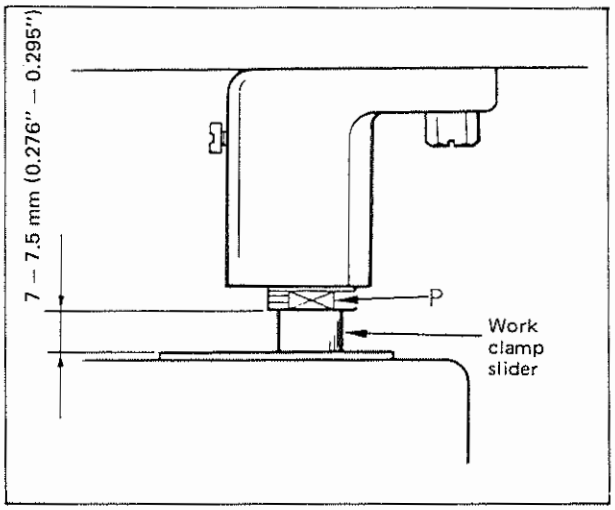


Fig. 6-8

The work clamp slider is attached on the sewing machine with its protruding amount adjusted to 7 to 7.5 mm (0.276" to 0.295").
To adjust the protruding amount of the work clamp slider, fit a wrench to section P, and adjust the protruding amount of the slider to 7 to 7.5 mm (0.276" to 0.295") by turning the wrench. If the protruding amount of the work clamp slider is insufficient/excessive, the XY motor may step out due to the defective sliding resistance of the XY.

(8) Assembling position of the thread guide No. 1

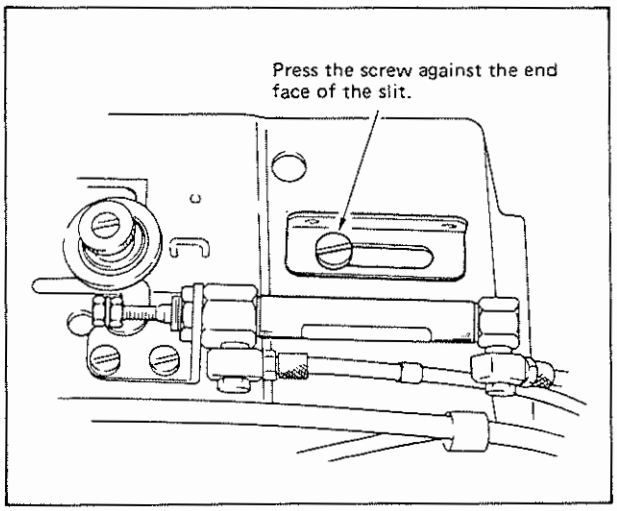


Fig. 6-9

The thread guide No. 1 should be in parallel to the center of the arm. It is attached with its screw pressed against the end face of the slit in the needle bar side.

(9) Position of the needle bar bushing

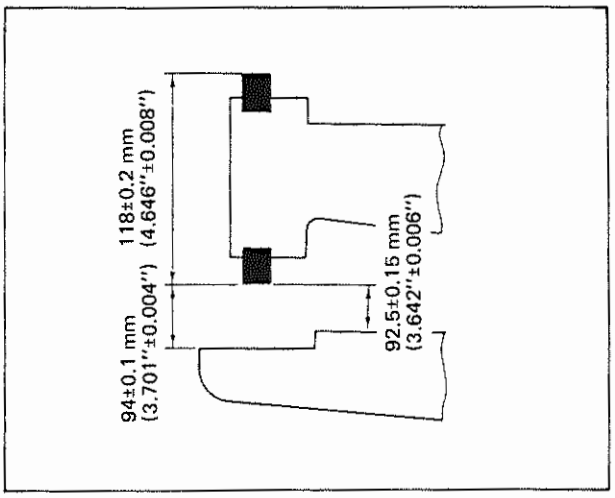


Fig. 6-10

The needle bar lower bushing should be positioned so that its bottom end face is 92.5 ± 0.15 mm (3.642" ± 0.006") away from the joining plane of the arm and the bed and 94 ± 0.1 mm (3.701" ± 0.004") away from the throat plate attaching plane. The needle bar upper bushing should be attached providing a distance of 118 ± 0.2 mm (4.646" ± 0.008") between its top end face and the bottom end face of the lower bushing.
If the above-state dimensions are not provided, the adjustment of the upper stop position of the machine, the looper timing and the timing to release the tension disc No. 2 may be carried out improperly.

(10) Position of the tension disc selector plate

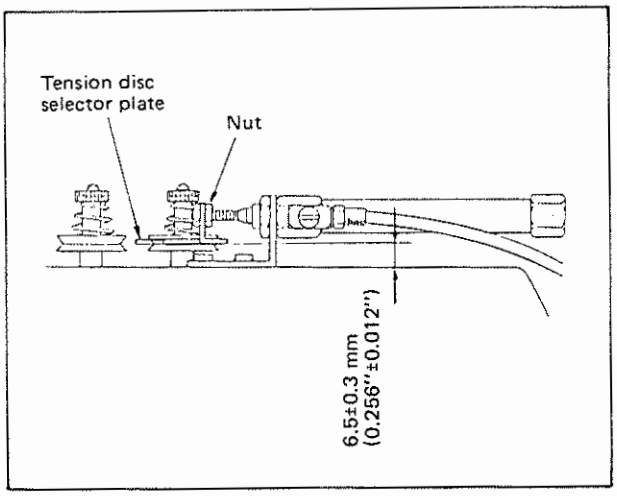


Fig. 6-11

The tension disc selector plate is attached on the arm providing a distance of 6.5 ± 0.3 mm (0.256" ± 0.012") between the arm and the bottom face of the selector plate. Loosen the nut in the tension disc selector plate, and adjust the position of the tension disc selector plate properly.
If the above-stated distance is not provided between the arm and the selector plate, tension disc may fail to be normally released or the selector plate may fail to actuate normally.

(11) Position of the needle bar connection slide block and machine arm

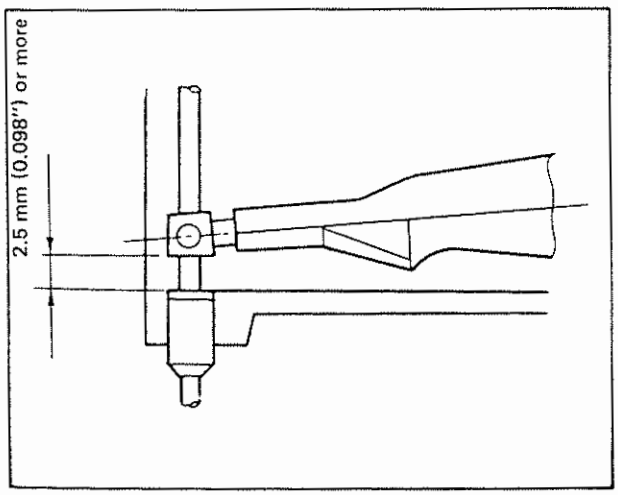


Fig. 6-12

The needle bar connection slide block is attached on the arm so that a clearance of 2.5 mm (0.098") or more is provided between the block and the arm when the needle bar is in the lowest position of its stroke.

(12) Quality characteristic value of the crank rod joint

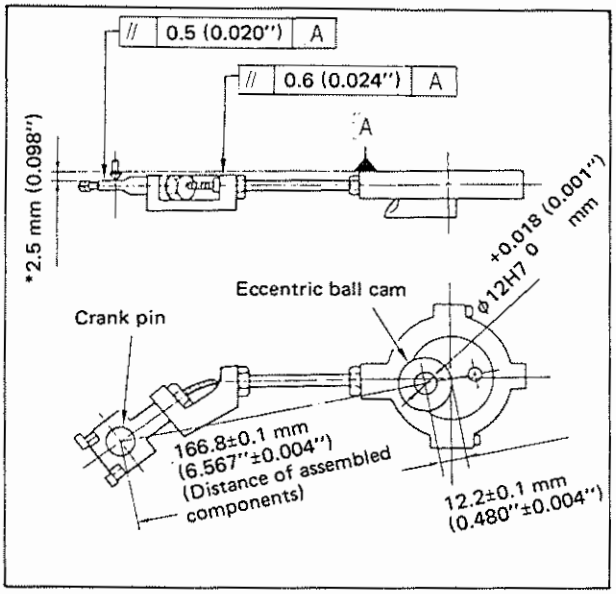


Fig. 6-13

The crank pin and the eccentric ball cam are assembled providing a center-to-center distance of 166.8 ± 0.1 mm (6.567" ± 0.004").
And they are assembled so that two points [A] are in parallel to each other when "*2.5 mm (0.098")" is taken as reference.

(13) Adjusting the position of the slide yoke

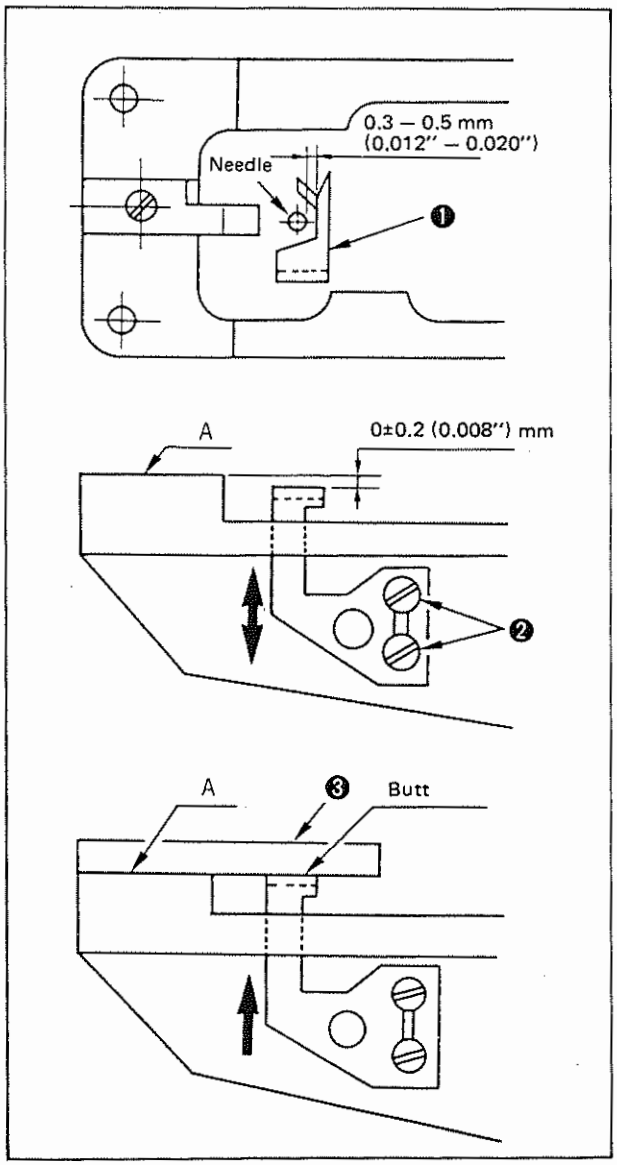


Fig. 6-13

1) The longitudinal position of yoke slide ❶ is where the clearance of 0.3 to 0.5 mm (0.012" to 0.020") is provided between the yoke slide and the needle when the needle bar is in its lowest position.
Regarding the vertical position of yoke slide ❶, it has been assembled so that a distance of 0 ± 0.2 (0.008") mm is provided between the throat plate mounting plane A on the bed and the top face of yoke slide ❶.
2) To adjust the vertical position of the yoke slide, loosen screws ❷ in yoke slide ❶, place chuck gauge ❸ on plane A as illustrated in the figure, and press yoke slide ❶ against chuck gauge ❸. Then tighten screws ❷.

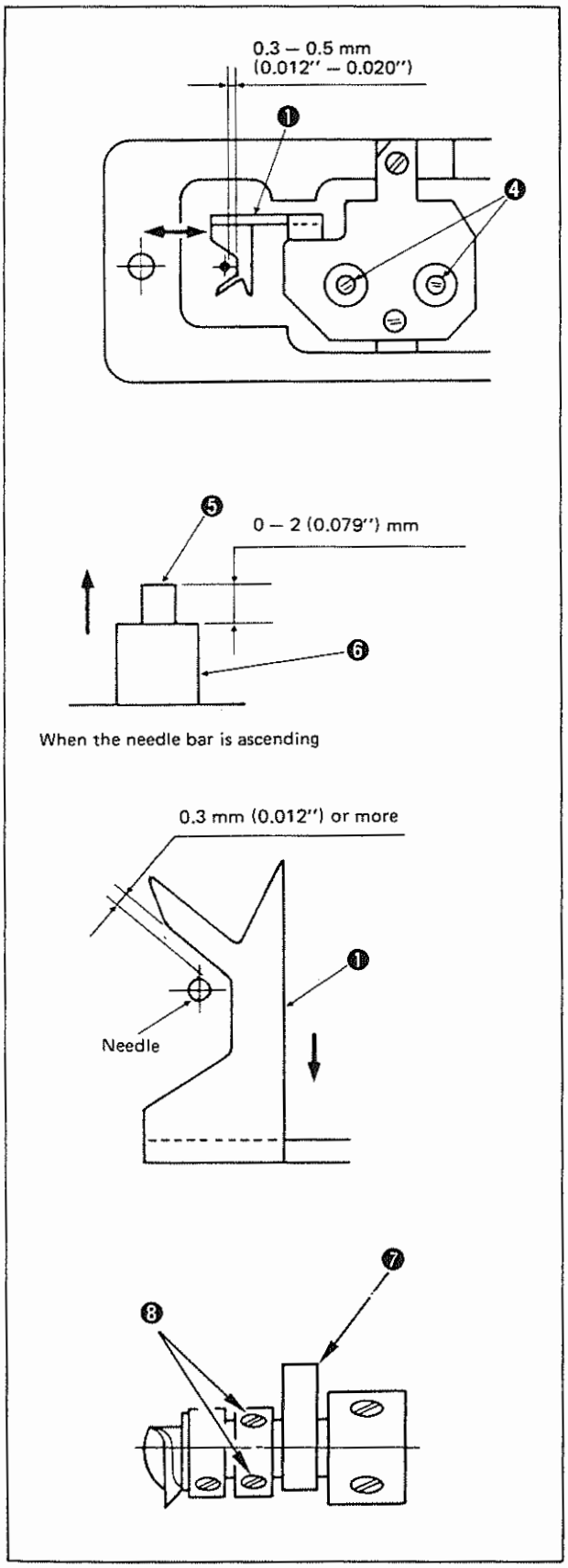


Fig. 6-15

3) To adjust the longitudinal position of the yoke slide, loosen screws ❹ and adjust the clearance between yoke slide ❶ and the needle to 0.3 to 0.5 mm (0.012" to 0.020") by moving yoke slide ❶ back and forth.

4) The needle bar is assembled so that the height of needle bar ❺ when yoke slide ❶ returns from the leftmost position to the rightmost position should be 0 to 2 (0.079") mm above needle bar upper bushing ❻, and so that a clearance of 0.3 (0.012") mm or more is provided between the yoke slide and the needle when the needle comes off the top face of the yoke slide.

5) Loosen screws ❽ in yoke slide triangular cam ❼, and adjust the timing to make yoke slide ❶ return from the leftmost position to the rightmost position so that the above-stated conditions are satisfied by turning triangular cam ❼ in the rotational direction.

(14) Adjusting the nipper bar

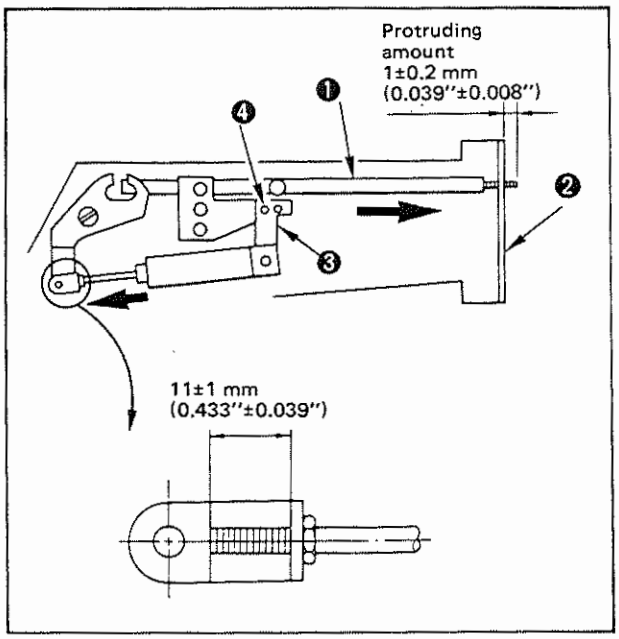


Fig. 6-16

1) Nipper bar ❶ is assembled so that it is 1 ± 0.2 mm (0.039" ± 0.008") away from the face plate when it reaches its stroke end.
2) Loosen two screws ❹ in thread tension guide base B ❸ and move thread tension guide B ❸ to the left or right to adjust the position of the nipper bar.
3) The air cylinder to feed the thread is attached on the 2-ridge knuckle joint so that the top end of the air cylinder is 11 ± 1 mm (0.433" ± 0.039") away from the joint.

(15) Adjusting the position of the tension disc releasing plate and the tension disc

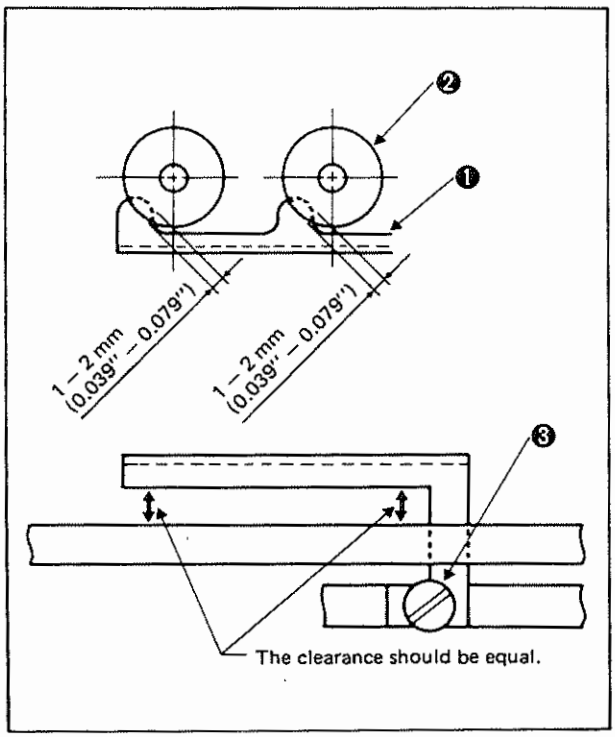


Fig. 6-17

1) Tension disc releasing plate ❶ and tension disc ❷ are longitudinally assembled so that they are spaced equidistantly with respect to the arm when the plate and disc are engaged with each other by 1 to 2 mm (0.039" to 0.079").
2) Loosen screw ❸ in tension disc releasing plate ❶, and move tension disc releasing plate ❶ to the left or right so that the plate and the disc are properly positioned.

(16) Adjusting the nipper

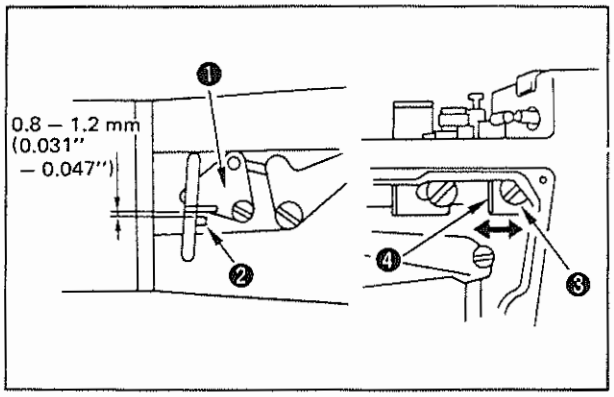


Fig. 6-18

1) The nipper is assembled so that a clearance of 0.8 to 1.2 mm (0.031" to 0.047") is provided between nipper block ❷ and nipper ❶ in order to prevent nipper ❶ from pressing the thread during sewing.
2) Loosen screw ❸, and move nipper bar block ❹ to the left or right so that the nipper is properly positioned.

(17) Positioning the needle and the throat plate chip

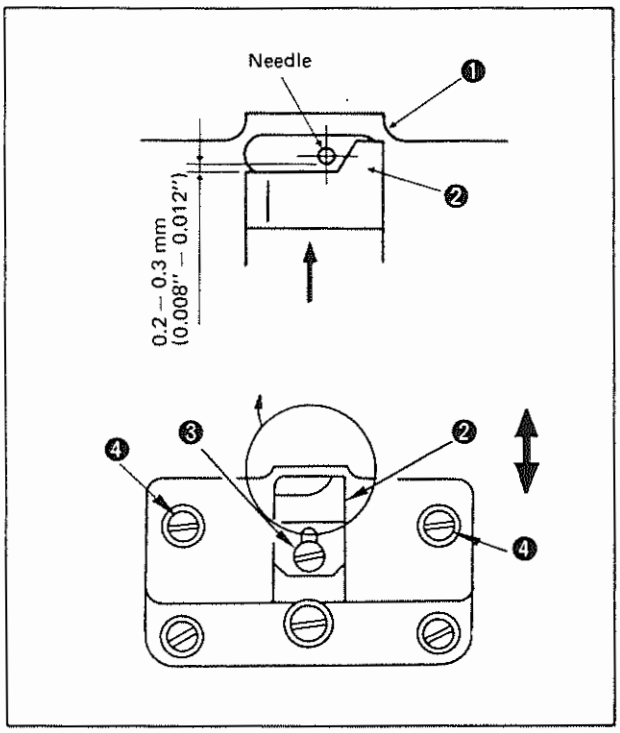


Fig. 6-19

1) When sewing buttons with neck wraps, the needle and throat plate chip ❷ of throat plate ❶ are assembled so that a clearance of 0.2 to 0.3 mm (0.008" to 0.012") is provided between them.
2) Loosen screw ❸, and move throat plate chip ❷ toward the needle until it butts screw ❸. Then tighten screw ❸.
Now loosen screw ❹ in throat plate ❶, and move throat plate ❶ back or forth so that a clearance of 0.2 to 0.3 mm (0.008" to 0.012") is provided between the needle and throat plate chip ❷.

(18) Adjusting the moving knife and replacing it

1. Position of the moving knife

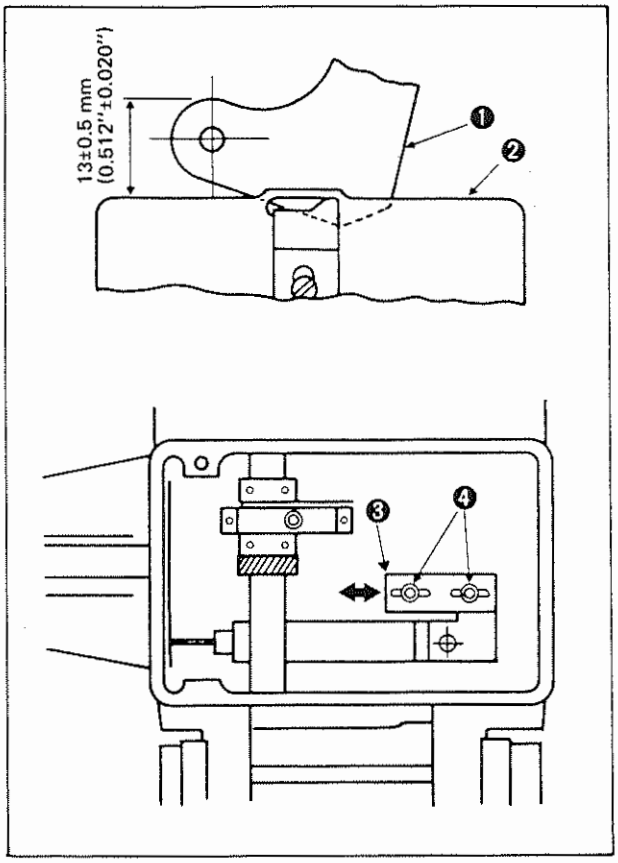


Fig. 6-20

1) Moving knife ❶ is assembled so that a distance of 13 ± 0.5 mm (0.512" ± 0.020") is provided from throat plate ❷ to moving knife ❶ when moving knife ❶ reaches its stroke end.

2) Tilt the machine head (see Fig. 6-21), loosen screws ❹ in cylinder installing plate B ❸, and move the plate to the left or right so that the moving knife is properly positioned.

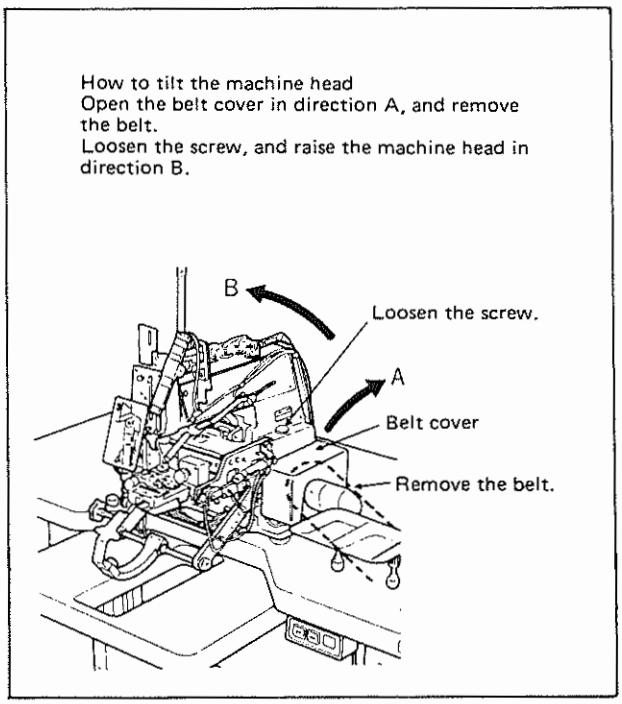


Fig. 6-20

2. How the air cylinder (asm.) for thread trimming is assembled

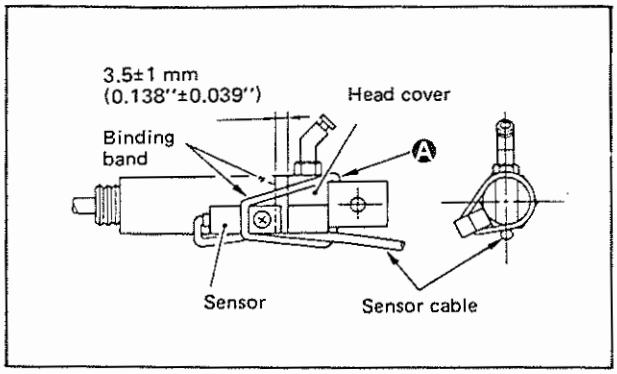


Fig. 6-22

The position of the sensor is 3.5 ± 1 mm (0.138" ± 0.039") (same as the width of the binding band) away from the end face of the head cover for the air cylinder. One of the binding bands (Ⓐ in the figure) binds the cables aslant in order to prevent the sensor from dislocating.

3. Assembling position of the thread trimmer connecting plate

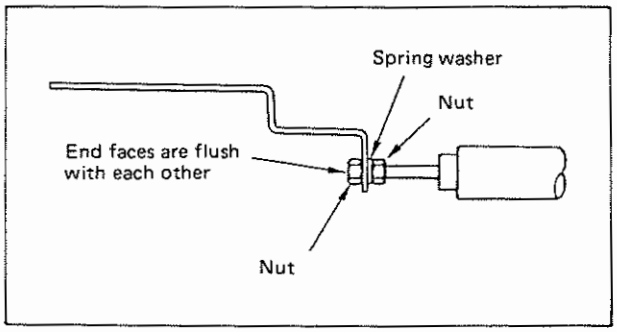


Fig. 6-23

The thread trimmer connecting plate is attached on the air cylinder for thread trimmer so that the end face of the nut is flush with the end face of the top end of the cylinder.

4. Replacing the moving knife

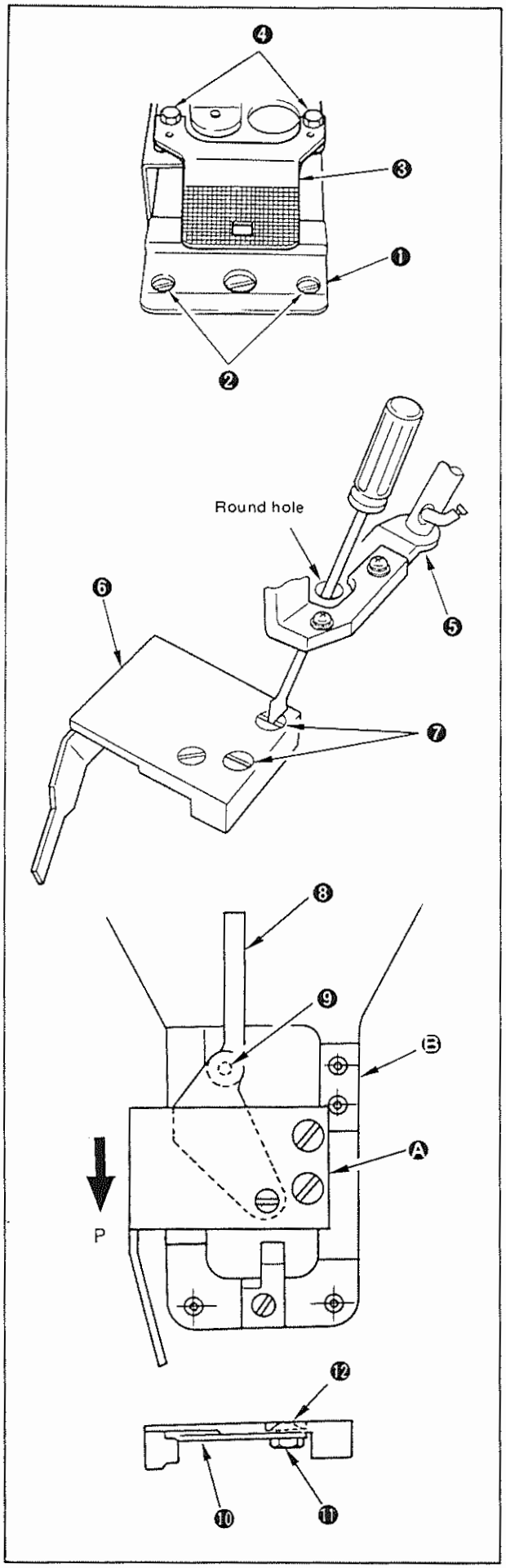


Fig. 6-24

1) Turn OFF the power switch.
2) Loosen screws ❷ in throat plate ❶, and remove throat plate ❶.
3) Loosen screws ❹ in feed plate ❸, and remove feed plate ❸.
4) Pass a screwdriver in the round hole in wiper mounting plate ❺ to loosen screws ❼ in moving knife mounting plate ❻.
5) Draw out moving knife mounting plate ❻ in the direction of arrow P in the figure (toward you), raise the plate and remove it from thread trimmer connecting plate ❽.
6) Loosen nut ⓫ and screw ⓬. Now remove moving knife assembly ⓾ and replace it.
   To assemble the moving knife, securely tighten nut ⓫ using a wrench.
7) When assembling moving knife assembly ⓾ after the replacement, fit pin ❾ of moving knife assembly ⓾ into the hole in thread trimmer connecting plate ❽ without fail.
   At this time, tighten screws ❼ with end face Ⓐ on the right-hand side of moving knife mounting plate ❻ in parallel to end face Ⓑ on the right-hand side of the bed.

(19) Thread tension

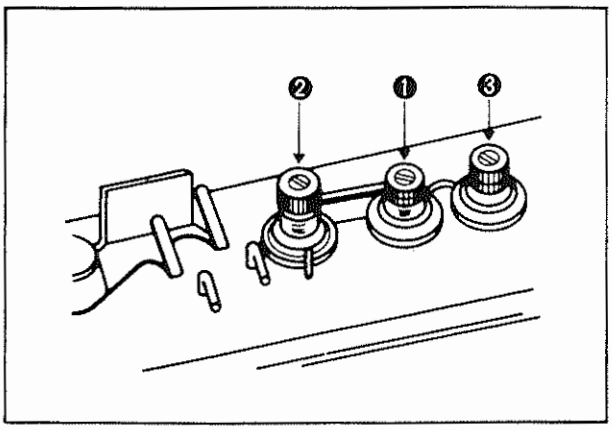


Fig. 6-25

Table 6-1

Name of thread tensioner	No.	Process	Function
Tension adjustment nut No. 1 for button sewing	❶	First process of button sewing	Used to adjust the thread tension to be applied when tying the button to the material.
Tension adjustment nut No. 1 for neck wrapping	❸	Second process of button sewing	Used to adjust the thread tension for button neck wrapping.
Tension adjustment nut No. 2	❷	First and second process for button sewing	Used to adjust the tension of thread sewn on the wrong side of the material for button sewing and button neck wrapping.

- Turning each adjustment nut clockwise will increase the thread tension or counterclockwise will decrease it.
- The tension adjustment nut No. 2 is capable of adjusting the thread tension to a higher value than the tension adjustment nut No. 1. The thread tension obtained by adjusting the nut No. 2 depends on the thread, thickness of the material or button to be used.

(20) Adjusting the length of the remaining thread

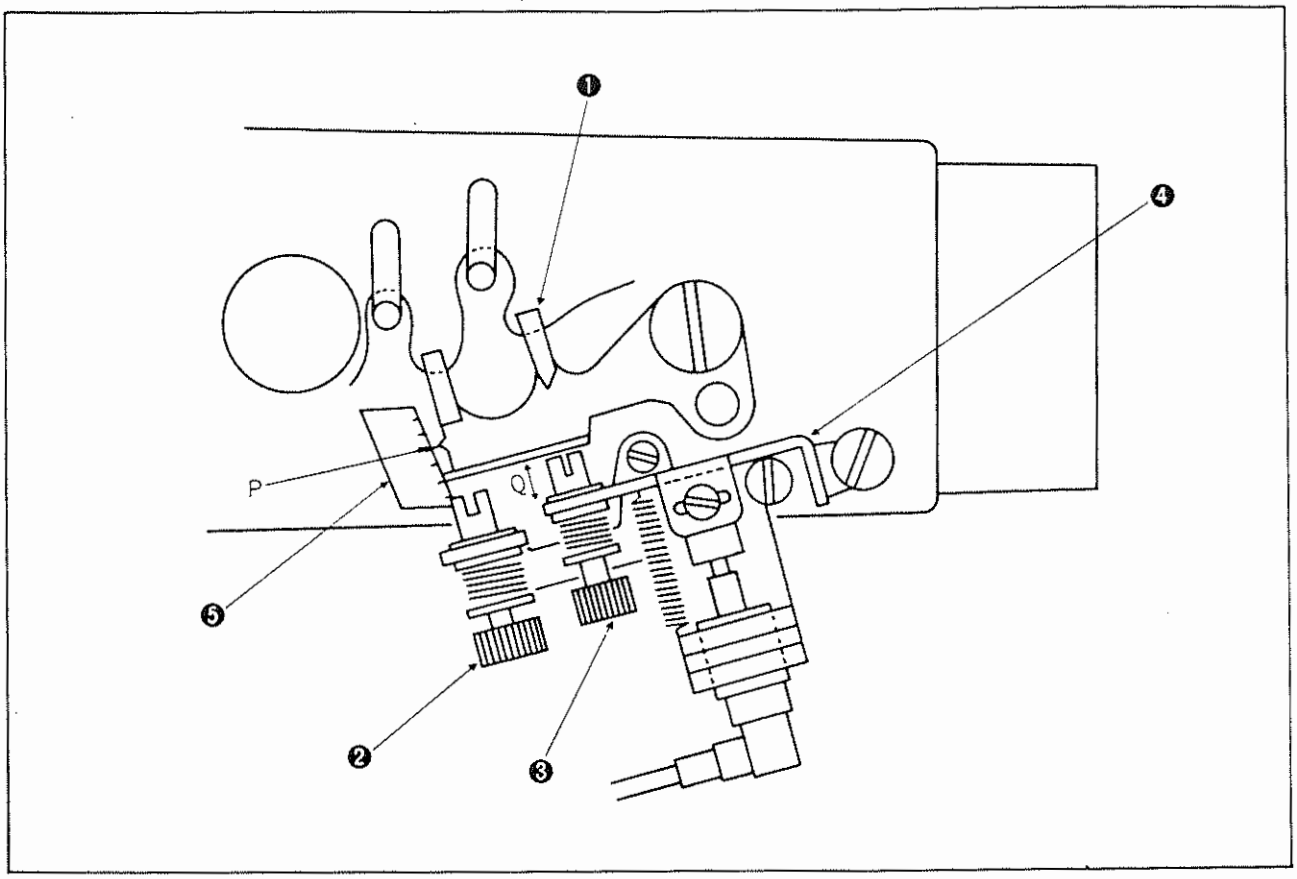


Fig. 6-26

1. Name of parts and function

Table 6-2

No.	Name of part	Function
❶	Thread adjustment lever	The lever controls feeding of the thread.
❷	Knob A to adjust the feeding amount of the thread	It is the stopper of the thread adjustment lever, and is used to specify the rotating angle of the lever.
❸	Knob to adjust the feeding amount of the thread	It is the stopper of the thread adjustment lever, and is used to specify the rotating angle of the lever. Make the adjustment using this knob when thread adjusting link ❹ is actuated.
❹	Thread adjusting link	It rotates in direction Q and is used at the time of neck wrapping.
❺	Thread feeding amount indicator label	It is used as a reference for feeding amount of the thread (point P is the marker for reference).

2. Purpose

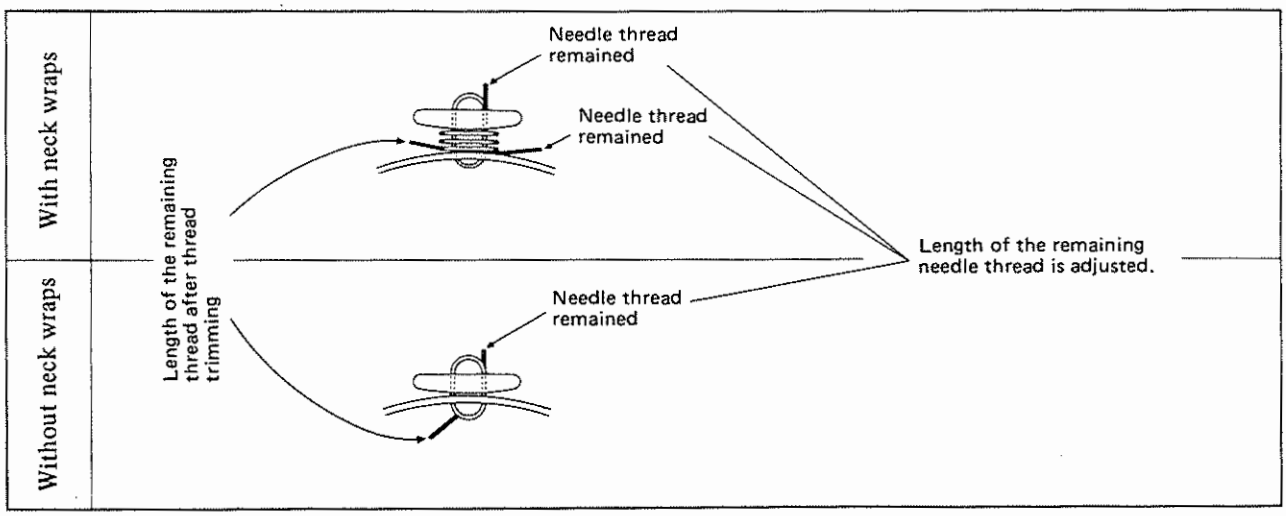
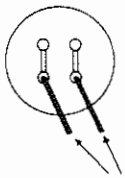
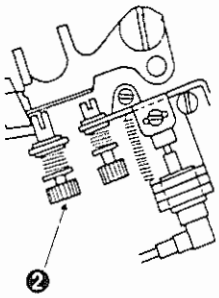
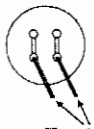
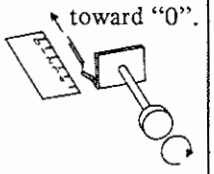
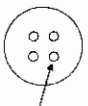
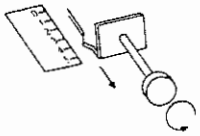
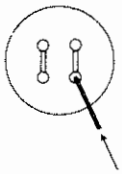
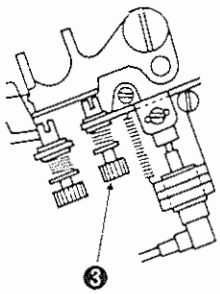
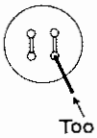
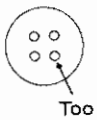
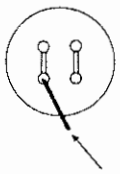
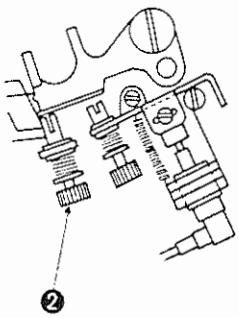
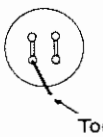
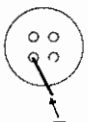
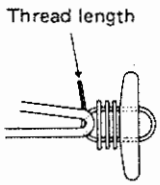
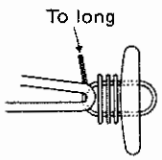
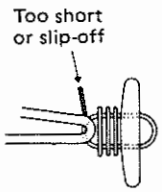


Fig. 6-27

3. Length of remaining thread and the corrective measures

Table 6-3

Sewing specification	Parts to be adjusted		Related knob and its adjustment	Troubles and corrective measures	
				Trouble	Corrective measures
Without neck wraps (without the button neck)			 Adjust the length of the remaining thread using knob ❷.		Turn the knob toward "0". 
					Turn the knob toward "5". 
With neck wraps	Right-hand side holes in the button		 Adjust the length of the remaining thread using knob ❸.		Turn the knob toward "0".
					Turn the knob toward "5".
	Left-hand side holes in the button		 Set the mode selector switch to "without neck wraps" to make the machine enter into its stand-by state. Or, set the mode selector switch to "with neck wraps" and manually operate the machine to make the machine enter into the state immediately before its starts neck wrapping. Then, adjust the length of the remaining thread using knob ❷.		Turn the knob toward "0".
					Turn the knob toward "5".
	First stitch of neck wrapping				Turn the knob toward "0".
					Turn the knob toward "5".

(21) Installing position of the handwheel

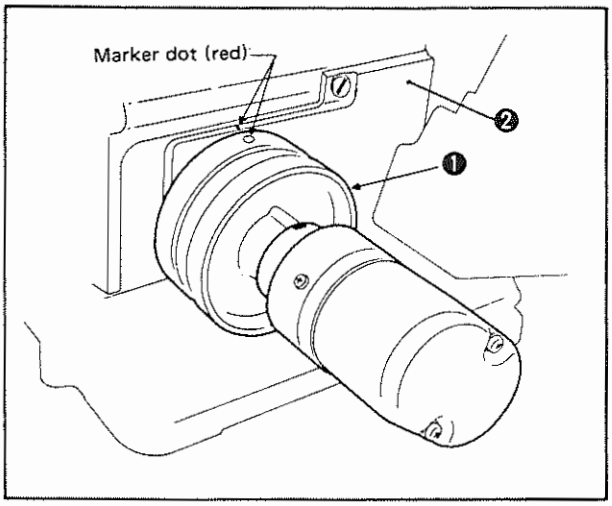


Fig. 6-28

The handwheel is assembled so that the marker dot (red) engraved on handwheel ❶ is aligned with the marker dot (red) engraved on handwheel cover installing plate ❷.
When the handwheel is positioned as stated above, the needle bar is in the highest dead point of its stroke.
Refer to page 61 for how to adjust the installing position of the handwheel.

(22) Installing position of the synchronizer

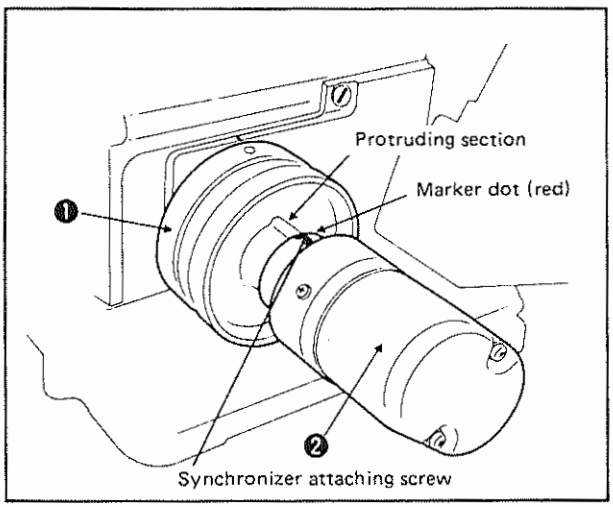


Fig. 6-29

The synchronizer is assembled so that the marker dot (red) engraved on synchronizer ❷ is aligned with the protruding section of handwheel ❶.
The synchronizer is fixed using the attaching screw.
The highest stop position and lowest dead point of the needle are ensured by correctly positioning the synchronizer.

(23) Position of the driving shaft

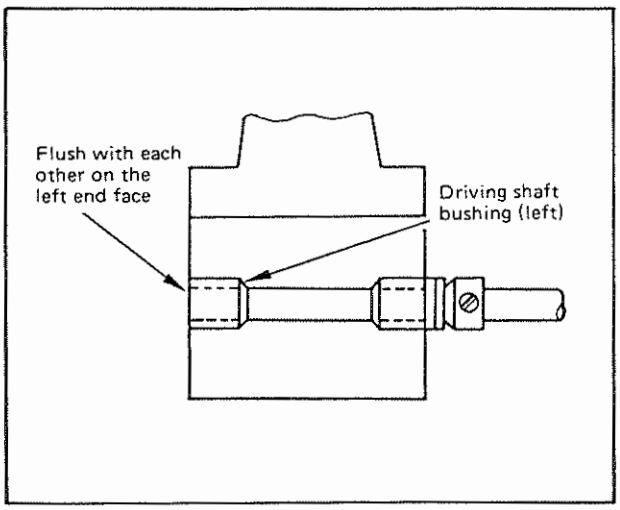


Fig. 6-30

The driving shaft is assembled so that its left-hand end face is flush with the left-hand end face of the driving shaft bushing (left).

7. EXPLANATION OF THE DEVICES

(1) Explanation of the button chuck unit

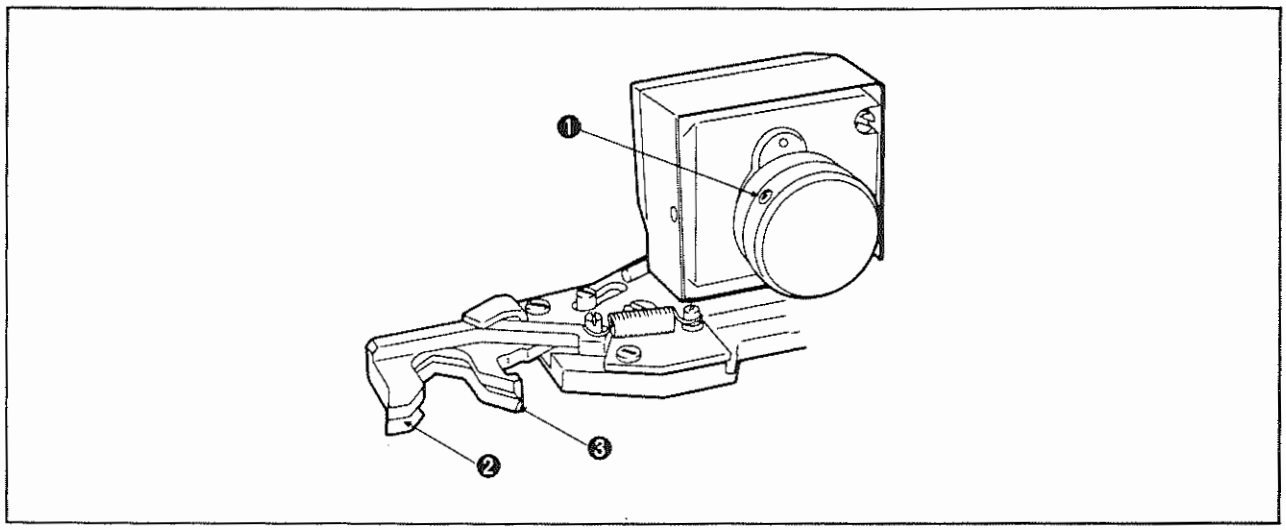


Fig. 7-1

1. Name of parts and function

Table 7-1

No.	Name of part	Function
❶	Knob to adjust the neck wrap height	It is used to change the height of the neck wraps (mechanically). (Chucks ❷ and ❸ go up and come down.)
❷ ❸	Button chuck, left Button chuck, right	The button is held between chucks ❷ and ❸.

2. Classification between "with neck wraps" and "without neck wraps"

Table 7-2

Scale	With/without neck wraps
0	Without neck wraps
2.5 ~ 6	With neck wraps

The scale of the knob should be used as reference of the neck wrap height. The actual neck wrap height may change depending on the stitch diagram, cloth, number of stitches, thickness of the button and the depth of tie stitches.

3. Stitch diagram (neck wrapping) according to the scale → The distance between the cloth and the button should be uniform (distance a)

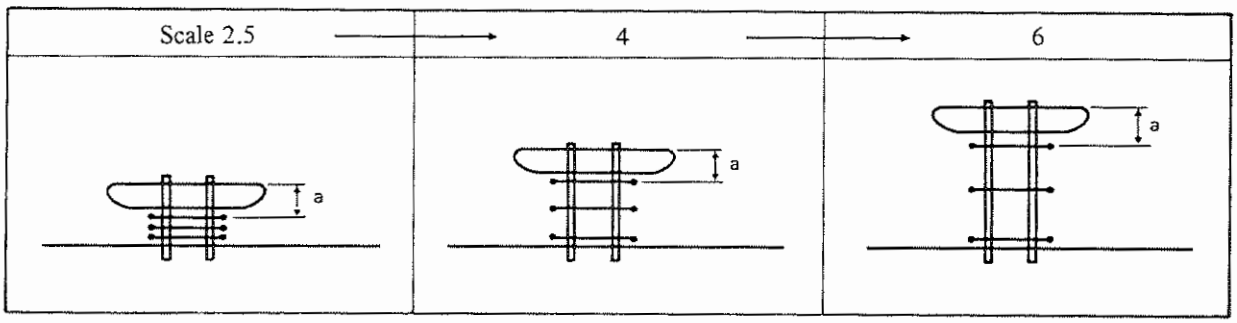


Fig. 7-2

4. Adjusting the control panel to the thickness of the button

The neck wrap height may change depending on the thickness of the button to be used. So, the set value specified on the control panel should be changed when changing the type of button to be sewn.

① How to check

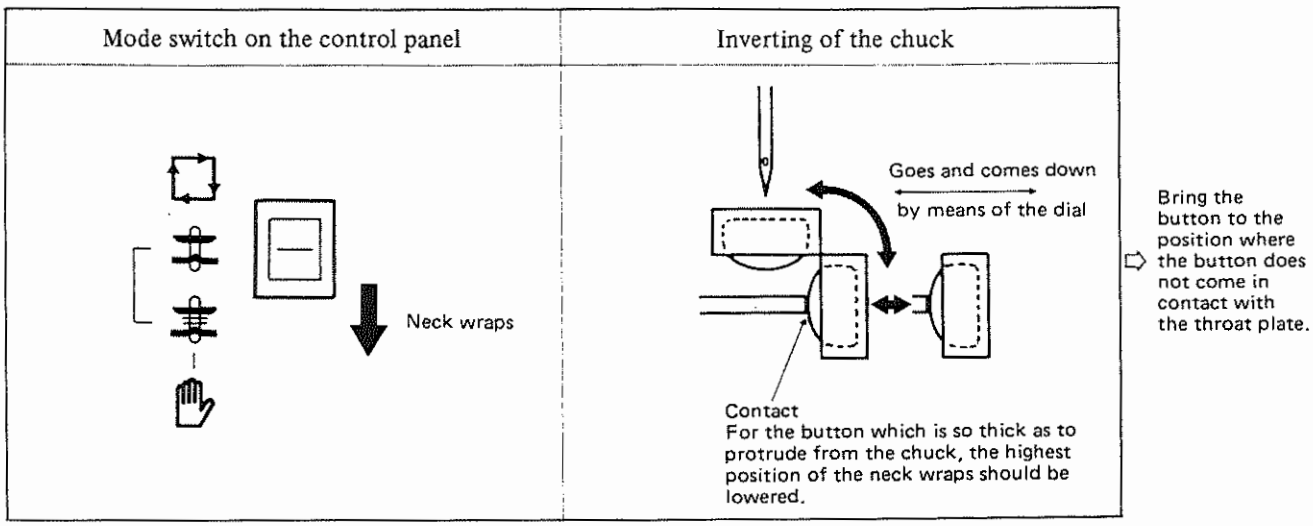


Fig. 7-3

② Shape of the button and the switch operation

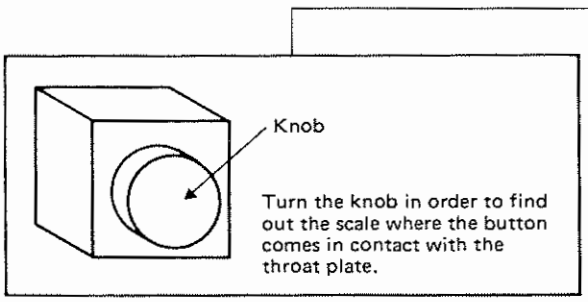


Fig. 7-4

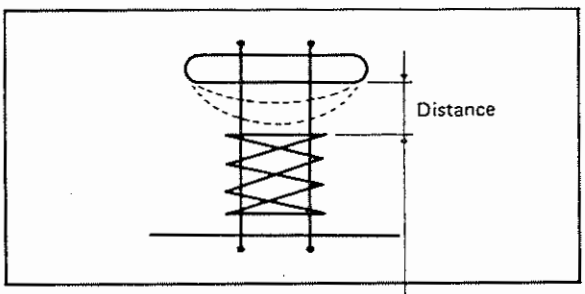


Fig. 7-5

Table 7-3

	Shape of button	Scale for reference	SW6	Min. scale
❶		2 or less	7 or more	2.5
❷	0.5–1 mm (0.020"–0.039")	2	7 or more	2.5
❸	2 mm (0.079")	2.5	9	3
❹	3 mm (0.118")	3.5	14	4

Adjust the highest position of the neck wraps.

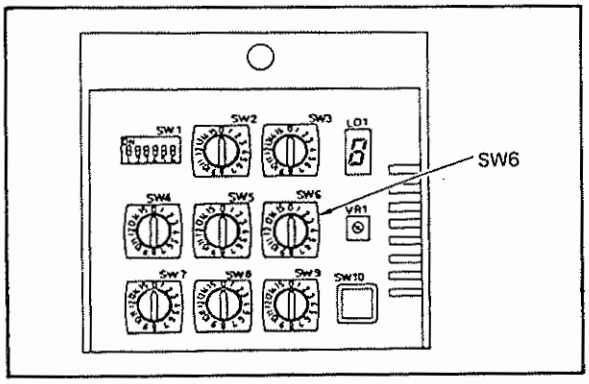


Fig. 7-6

③ Selecting neck wraps height (the number of stitches and the actual neck wrap height)

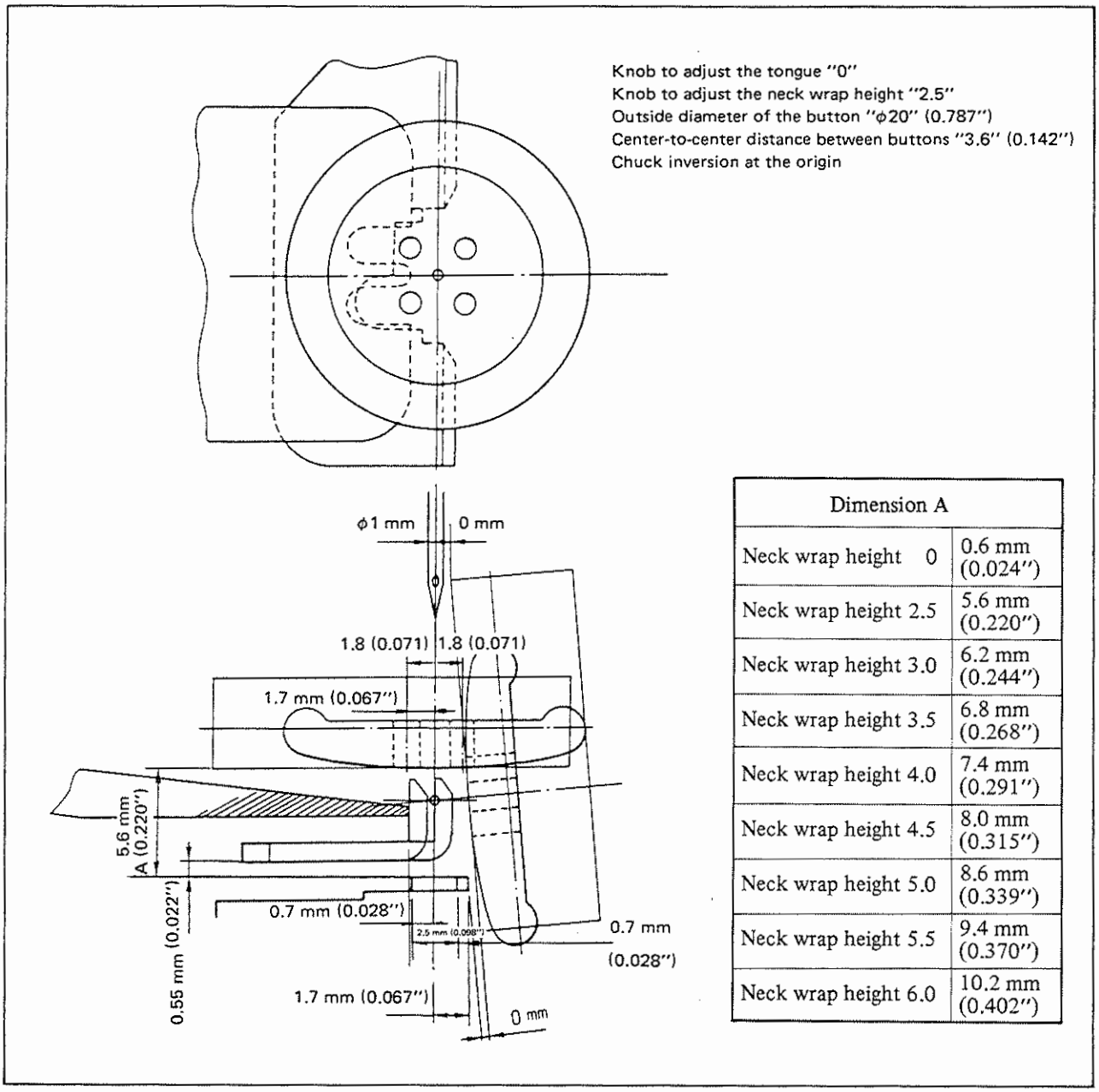
The actual neck wrap height changes depending on the kind of the thread, kind of the material, depth of tie stitches, kind of the button, stitch diagram and thread tension. Refer to Table 7-4 when selecting the neck wrap height.

For the button of which shape is ❶ or ❷ described in 2):

Table 7-4 (Reference value)

Scale	Number of neck wraps		Actual height h
	Spun thread #30	Spun thread #50	
6	16 – 24 stitches	32 – 40 stitches	4.5 – 5.5 (0.177″ – 0.217″)
5	12 – 20 stitches	24 – 32 stitches	3.5 – 4.5 (0.138″ – 0.177″)
4	10 – 16 stitches	16 – 24 stitches	3 – 4 (0.118″ – 0.157″)
3	6 – 12 stitches	10 – 16 stitches	2 – 3 (0.079″ – 0.118″)

Dimensions related to the chuck unit



Dimension A	
Neck wrap height 0	0.6 mm (0.024″)
Neck wrap height 2.5	5.6 mm (0.220″)
Neck wrap height 3.0	6.2 mm (0.244″)
Neck wrap height 3.5	6.8 mm (0.268″)
Neck wrap height 4.0	7.4 mm (0.291″)
Neck wrap height 4.5	8.0 mm (0.315″)
Neck wrap height 5.0	8.6 mm (0.339″)
Neck wrap height 5.5	9.4 mm (0.370″)
Neck wrap height 6.0	10.2 mm (0.402″)

Fig. 7-7

5. Adjusting the button chuck unit

Adjust the button chuck unit in the following procedure.
1. Adjusting the height of the chuck unit → 2. Adjusting the inclination of the chuck unit → 3. Adjusting the longitudinal position of the chuck unit

① Adjusting the height of the chuck unit

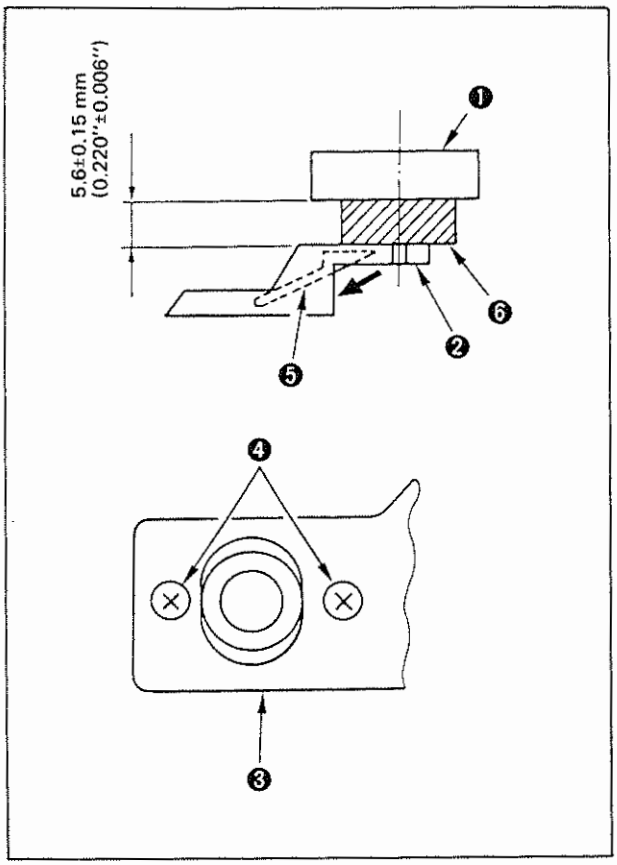


Fig. 7-8

1) Set the knob to adjust neck wrap height to 2.5.
2) Lower throat plate chip ❺ which is assembled in throat plate ❷ until it is brought under the top face of the throat plate.
3) Place chuck height gauge ❻ on throat plate ❷, and adjust so that a height of 5.6 ± 0.15 mm (0.220" ± 0.006") is obtained using screws ❹ in right-hand frame ❸.

② Adjusting the inclination of the chuck unit

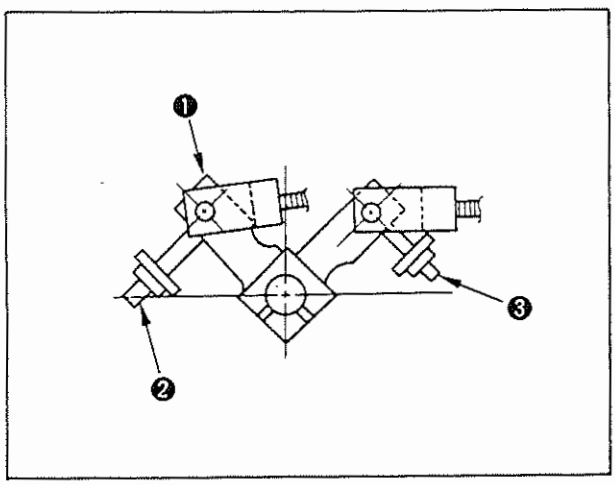


Fig. 7-9

1) Level the chuck unit at the button sewing position using inverting stopper screw ❷ which retains chuck inverting link ❶ in place. Then adjust the inclination of neck wraps using screw ❸.

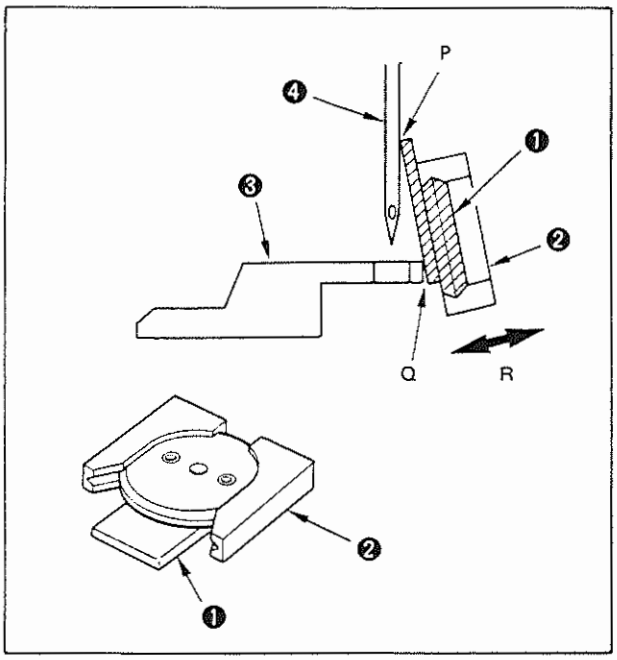


Fig. 7-10

1) Insert button gauge ❶ into button chuck ❷, and adjust the inclination of the neck wraps properly.
2) Adjust so that Q of throat plate ❸ and P of needle ❹ come in contact with button gauge ❶ using inverting stopper screw ❸ in Fig. 7-9).
3) Turn the knob to adjust neck wrap height to make button chuck unit ❷ move in direction of R. Then confirm the inclination of the neck wraps.

③ Adjusting the longitudinal position of the chuck unit

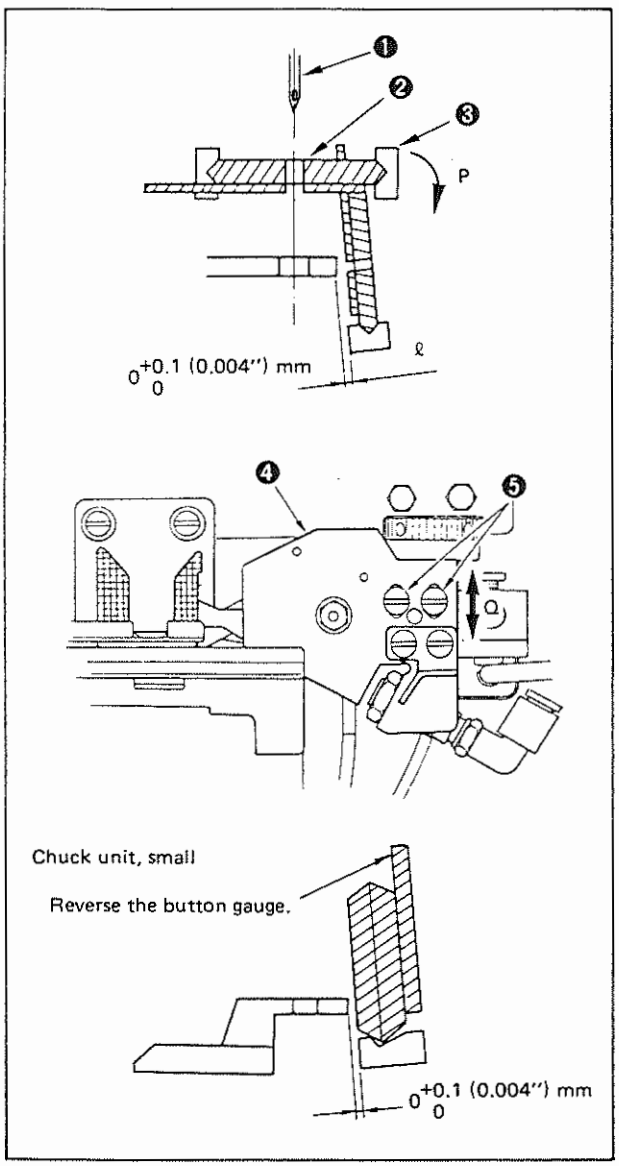


Fig. 7-11

1) Set the knob to adjust neck wrap height to 2.5.
2) Move the XY table until needle ❶ enters the hole in button gauge ❷.
3) Let chuck ❸ invert in direction P, loosen screws ❺ which fix slide base ❹ in place and move the slide base in direction Q so that clearance ℓ is adjusted to $0^{+0.1}_{0}$ (0.004") mm.
   - If clearance ℓ is inadequate, move slide base ❹ upward.
   - If clearance ℓ is excessive, move slide base ❹ downward.
4) Move the XY table again until needle ❶ enters the hole in button gauge ❷, and confirm clearance ℓ.
5) Repeat steps 2), 3) and 4) until clearance ℓ is adjusted to $0^{+0.1}_{0}$ (0.004") mm.

(Caution) When using a small chuck unit, confirm the clearance with the button gauge reversed.

(2) Adjusting the material holder (tongue)

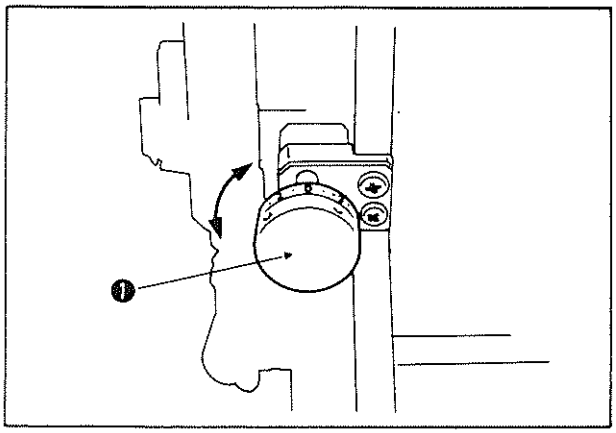
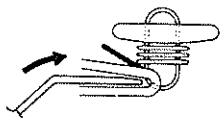
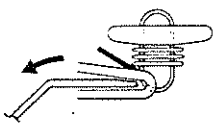


Fig. 7-12

Adjust the depth of tie stitches using knob ❶ to adjust the depth of tie stitches.
Turning the knob clockwise will make the tongue approach the tongue, thereby increasing the depth of the stitches. Turning the knob counterclockwise will make the tongue move away from the tongue, thereby decreasing the depth of tie stitches.

- **Depth of tie stitches and the scale**

Table 7-5

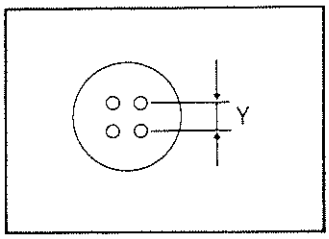
← 4 · 2 · 0 · – 2 · – 4	→ 4 · 2 · 0 · – 2 · – 4
Increases the depth of tie stitches	Decrease the depth of tie stitches
	

- The tongue shift 0.1 mm (0.004″) for every 1 graduation on the scale.

- **Reference (set value on the scale) of the depth of tie stitches . . . Use the values given in the following table as reference when specifying the depth of tie stitches.**

Table 7-6

Material \ Material thickness \ Distance between the holes in the button Y	2.8 mm (0.110″) 3.0 mm (0.118″) 3.2 mm (0.126″)	3.4 mm (0.134″) 3.6 mm (0.142″) 3.8 mm (0.150″)	4.0 mm (0.157″) 4.2 mm (0.165″) 4.4 mm (0.173″)
Light-weight	t0.5 mm (0.020″)	–1 ~ –2	–3 ~ –4	–5 ~ –6
	t1 mm (0.039″)	2 ~ 3	0 ~ 1	–1 ~ –3
Heavy-weight	t1.2 mm (0.047″)	4 ~ 5	2 ~ 3	0 ~ 1



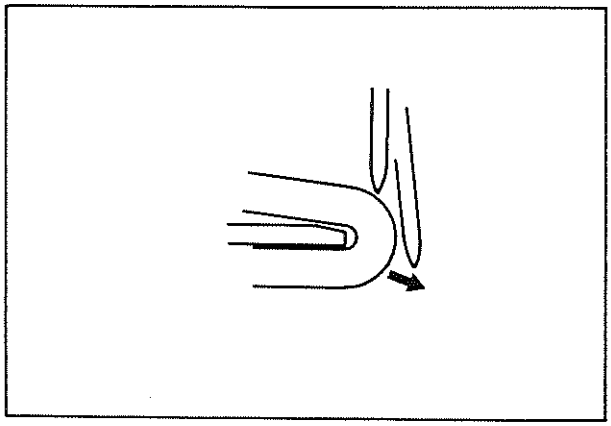


Fig. 7-13

(Caution) The needle may likely to fail to catch the stiff material. So when using such a material, increase the depth of tie stitches.

1. Adjusting the tongue

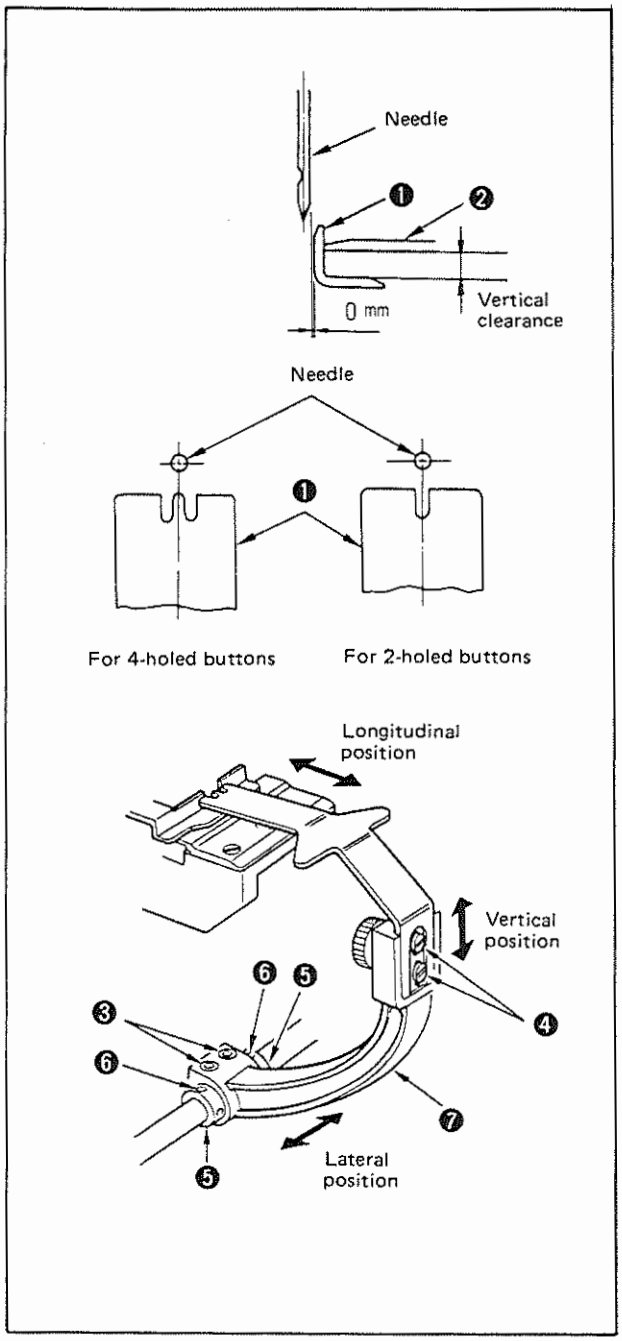


Fig. 7-14

1) The knob to set the thrust depth of tongue ❷ is set to 0. Tongue ❷ is assembled so that the clearance of 0 mm is provided between the needle and feed plate ❶ used when sewing buttons with neck wrapping.
The tongue is laterally assembled so that the needle comes to the center of tongue ❷.

2) Loosen screws ❸, and adjust the clearance between the needle and feed plate ❶ used when sewing buttons with neck wrapping by moving tongue ❷ back and forth.
Then, loosen screws ❹, and adjust the vertical clearance between tongue ❷ and feed plate ❶ used when sewing buttons with neck wrapping. Adjust the vertical clearance between ❶ and ❷ to a value same as the thickness of the sewing product on which the buttons are to be attached.
Loosen screw ❻ in collar ❺, and adjust the lateral position of the needle and tongue ❷. Then press collar ❺ against tongue installing arm ❼, and tighten screw ❻.

(3) Adjusting the marker lamp

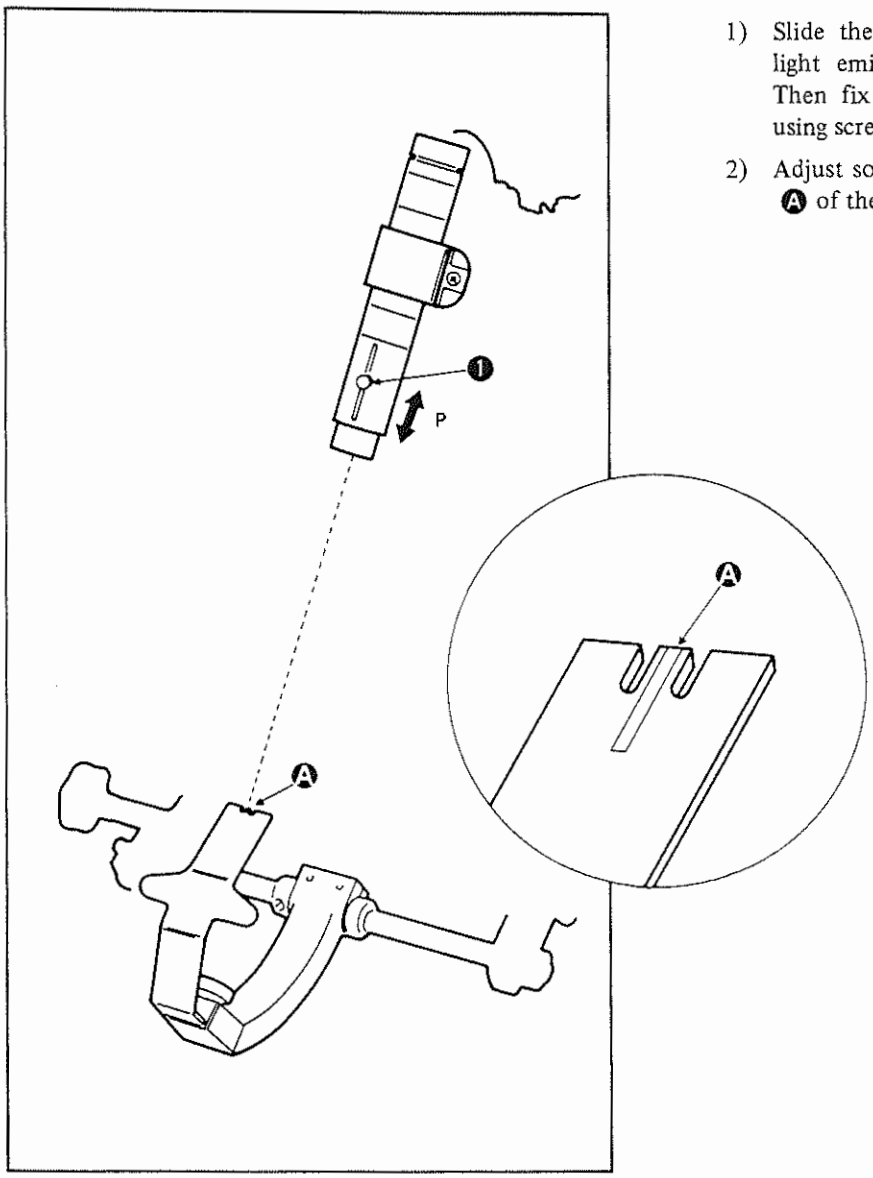


Fig. 7-15

1) Slide the marker lamp in direction P so that the light emitted from the marker lamp is in focus. Then fix the marker lamp in the correct position using screw ❶.

2) Adjust so that the lamp throws light on top surface Ⓐ of the tongue.

(4) Selection between with/without neck wraps

This machine is provided with the feature to select either "with neck wraps" or "without neck wraps".

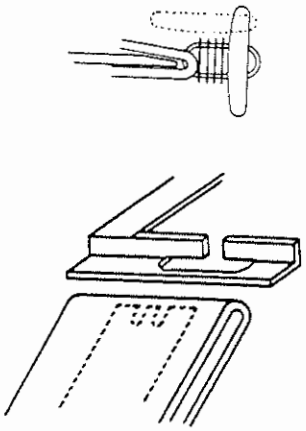
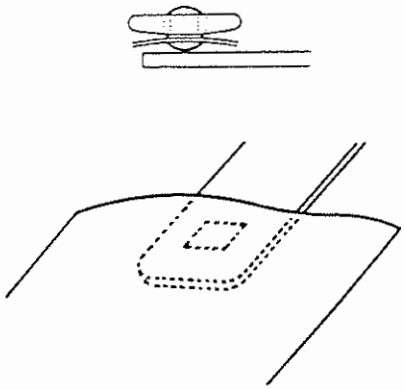
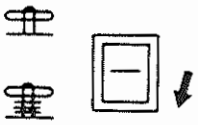
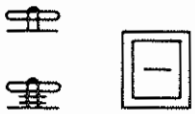
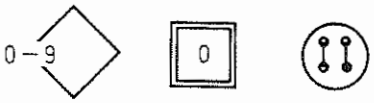
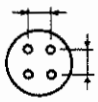
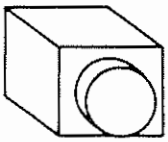
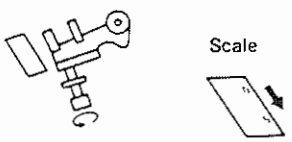
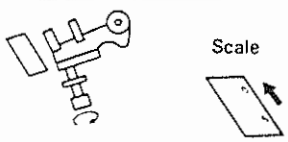
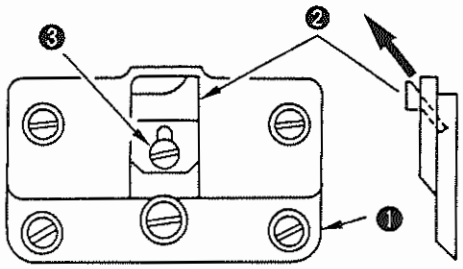
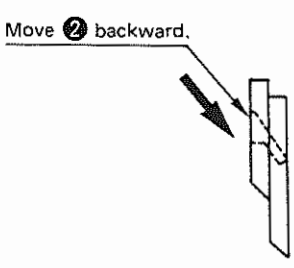
With neck wraps	Without neck wraps (without button neck)
	

Fig. 7-16

1. Change-over procedure

Table 7-7

Operation	With neck wraps	Without button neck
Mode switch	 Set to its lower position.	 Set to its upper positon.
Pattern No. (only when changing the pattern No.)	 0 – 9 0	 4
Button pitch (only when changing the button pitch)	 Example 4.0–4.0 mm (0.157"–0.157") 3.8–3.8 mm (0.150"–0.150") 3.6–3.6 mm (0.142"–0.142")	 Example 3.6–3.6 mm (0.142"–0.142") 3.4–3.4 mm (0.134"–0.134") 3.2–3.2 mm (0.126"–0.126")
Scale for neck wrap height	 Scale 6, 5, 4, 3, 2.5 ← 0 (2.5 or more)	6, 5, 4, 3, 2.5 → 0
Adjustment of length of remaining needle thread	 Scale	 Scale
Moving the throat plate chip backward (This adjustment should be carried out with the power to the machine turned OFF.) Loosen screw ❸, slide throat plate chip ❷ appropriately and tighten screw ❸.	 ❸ ❷ ❶	 Move ❷ backward.
Replacement of the needle	ORGAN SM332LG	SCHMETZ 332LGH KSP

2. Avoiding the tongue

If the tongue unit becomes a hindrance to the button sewing without neck wraps (without the button neck), shift the tongue properly in the following procedure.

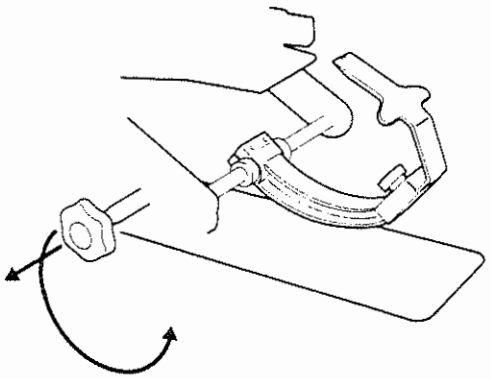
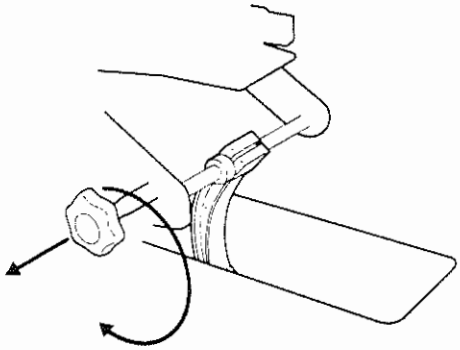
	With neck wraps	Without neck wraps (without the button neck)
Operation	Make the tongue face upward.	Make the tongue face downward.
		
		Pulling the knob, turn it in the direction of the arrow (↻).

Fig. 7-17

3. Adjustment (feed plate)

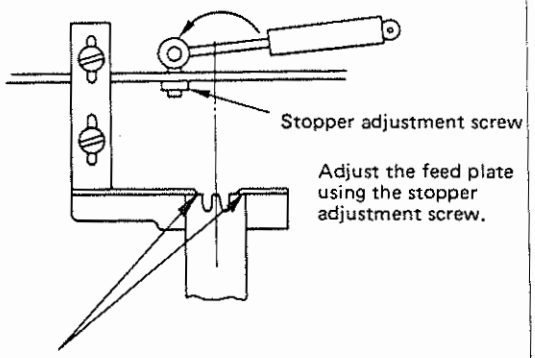
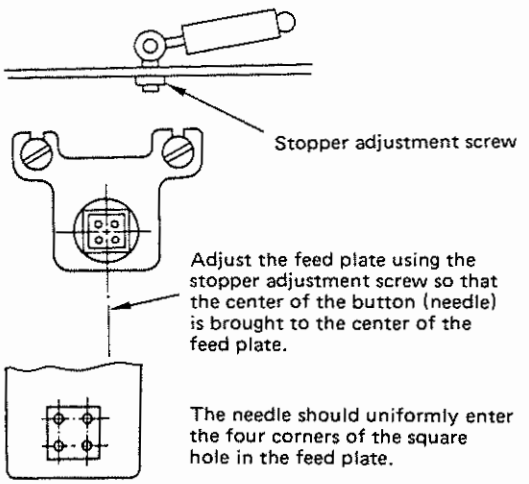
Feed plate for the button sewing with neck wraps	Feed plate for the button sewing without neck wraps
	
Stopper adjustment screw Adjust the feed plate using the stopper adjustment screw. Adjust the feed plate so that the top end of the tongue is closely pressed against the feed plate.	Stopper adjustment screw Adjust the feed plate using the stopper adjustment screw so that the center of the button (needle) is brought to the center of the feed plate. The needle should uniformly enter the four corners of the square hole in the feed plate.

Fig. 7-18

(5) Adjusting the tuck-in state of the first stitch of neck wraps

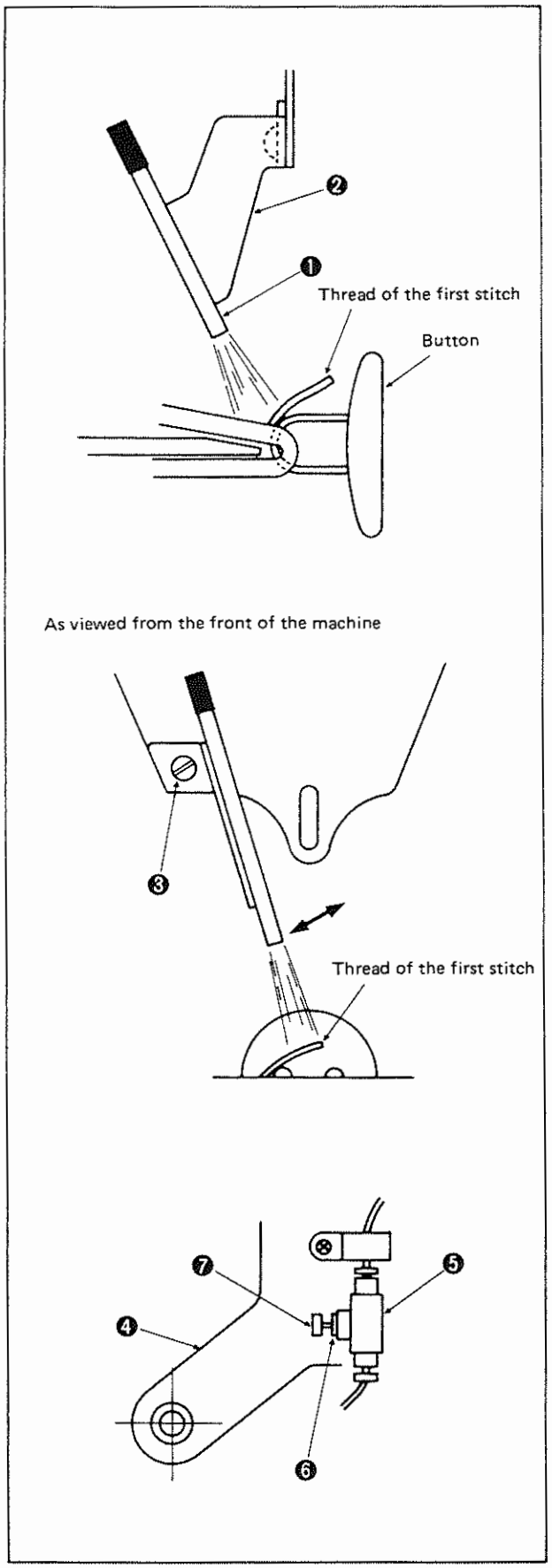


Fig. 7-19

1) In the neck wrapping process, air nozzle ❶ blows air to the thread of the first stitch of neck wrapping stitch to help make it enter the neck wraps to be made.

2) To adjust the air blowing direction, loosen screw ❸ in air nozzle installing plate ❷, and rotate the plate in its rotational direction until the air blows to make the thread of the first stitch faces toward the button. Then tighten screw ❸.
The strength of air to be blown from air nozzle ❶ is adjusted using knob ❼. To adjust, loosen nut ❻ of speed controller ❺ mounted on the outside of right-hand frame ❹ and turn knob ❼ appropriately.

(6) Dimensions related to the XY feed mechanism

1. Position of the Y moving shaft

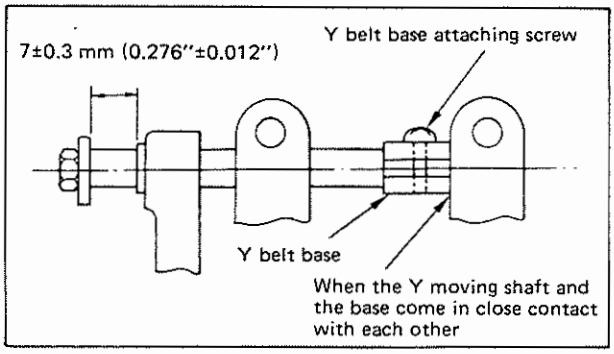


Fig. 7-20

The Y moving shaft is assembled so that a distance of 7 ± 0.3 mm (0.276" ± 0.012") is provided as illustrated in the figure when the Y belt base comes in close contact with the Y moving shaft.
The Y belt base attaching screw is used to secure the Y belt base in place. The said distance should be obtained to ensure the moving amount of the shaft in the Y direction.

2. Tension of the Y timing belt

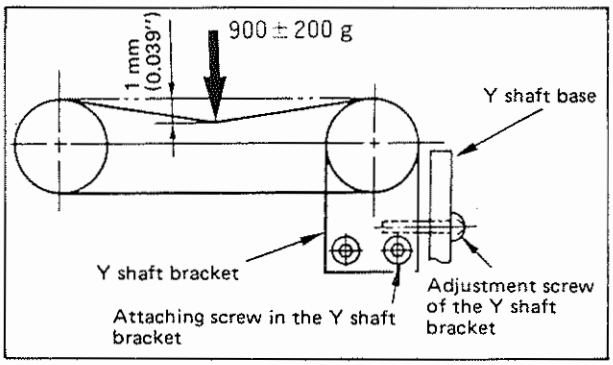


Fig. 7-21

The Y timing belt is assembled so that the center of the Y timing belt slackens by 1 mm (0.039") by applying a load of 900 ± 200g.
Loosen the attaching screw in the Y shaft bracket, and move the Y shaft bracket using the adjustment screw of the Y shaft bracket so that the tension to be applied to the Y timing belt is properly adjusted.
If the load applied to the Y timing belt is excessive, the Y motor may step out. On the other hand, if the load is inadequate, the XY table may rattle, thereby making the needle come in contact with the button.

3. Position of the coupling

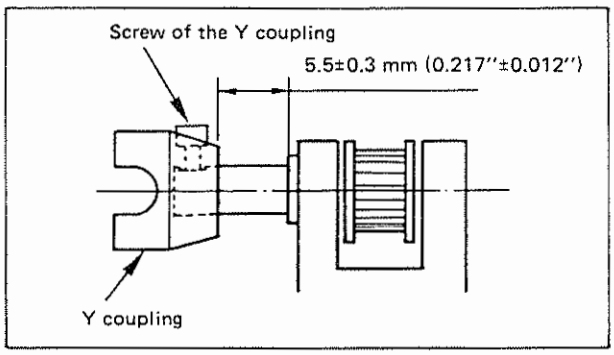


Fig. 7-22

The coupling is assembled so that the coupling is 5.5 ± 0.3 mm (0.217" ± 0.012") away from the end face of the bearing.
The Y coupling is fixed in place using the screw of the Y coupling.
The said distance should be obtained to ensure the relationship between the Y motor and the Y coupling with respect to the thrust direction.

4. Stroke of the Y moving shaft motion

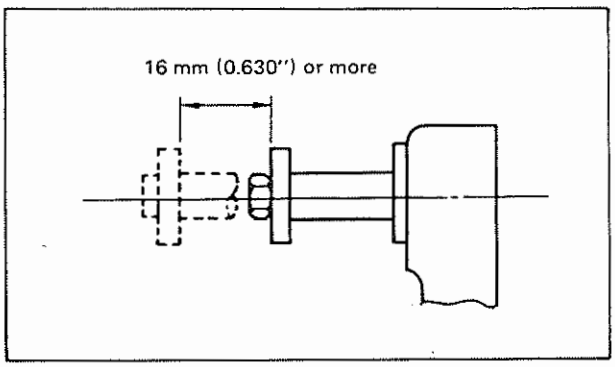


Fig. 7-23

The stroke of the Y moving shaft motion is 16 mm (0.630") or more. The Y moving shaft should smoothly travel over the entire stroke.
The stroke of the said value should be obtained to ensure the operating range of the XY table.

5. Assembling position of the Y shaft mounting base (asm.)

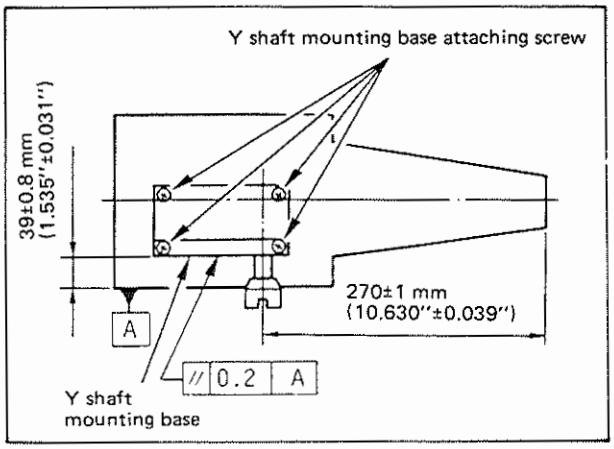


Fig. 7-24

The Y shaft mounting base is assembled so that a distance of 39 ± 0.8 mm (1.535" ± 0.031") is provided between the end face of the bed and the end face of the Y shaft mounting base and that a distance of 270 ± 1 mm (10.630" ± 0.039") is provided between the front end face of the bed and the center of the X-Y driving shaft. When the base is installed at that position, a degree of parallelization of 0.2 mm (0.008") is obtained with respect to plane A.
The Y shaft mounting base is fixed at the aforementioned position using the four Y shaft mounting base attaching screws.
The distance of 39 ± 0.8 mm (1.535" ± 0.031") ensures the engagement depth of the Y shaft mounting base and the Y motor. The distance of 270 ± 1 mm (10.630" ± 0.039") ensures the position of the Y shaft mounting base with respect to the radial direction.

6. Tension of the X timing belt

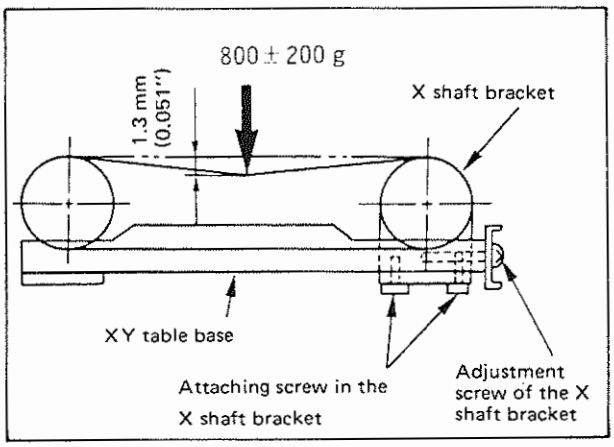


Fig. 7-25

The X timing belt is assembled so that the center of the X timing belt slackens by 1.3 mm (0.051") by applying a load of 800 ± 200g.
Loosen the attaching screw in the X shaft bracket, and move the X shaft bracket using the adjustment screw of the X shaft bracket so that the tension to be applied to the X timing belt is properly adjusted.
If the load applied to the X timing belt is excessive, the X motor may step out. On the other hand, if the load is inadequate, the XY table may rattle, thereby making the needle come in contact with the button.

7. Sliding load of the XY table

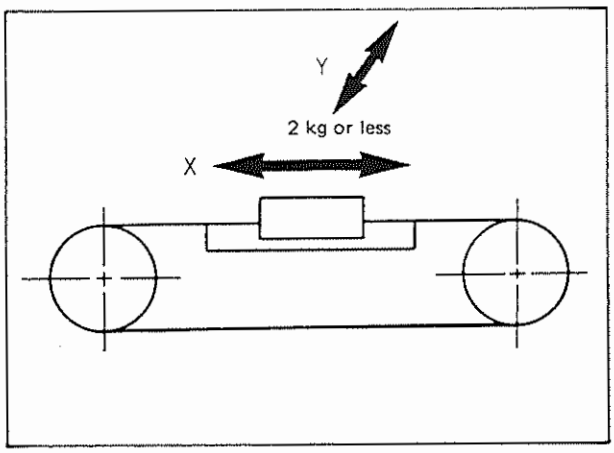


Fig. 7-26

The XY table is assembled so that a sliding load of 2 kg or less is provided both in the X and Y directions.
To adjust the sliding load, refer to "(7) Protruding amount of the work clamp slider" on page .
If the sliding load is excessive, the X and Y motors may step out.

8. Position of the X coupling

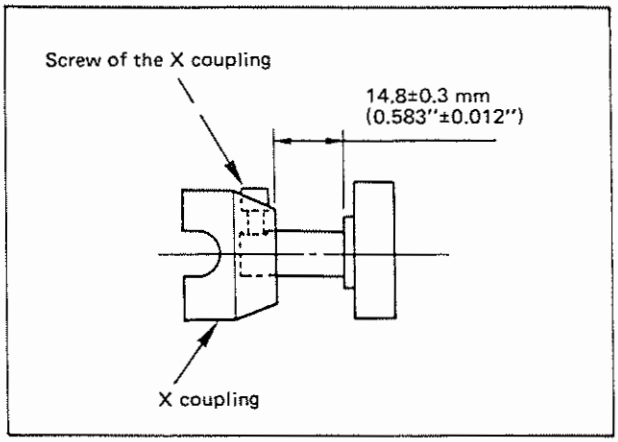


Fig. 7-27

The coupling is assembled so that the coupling is 14.8 ± 0.3 mm (0.583" ± 0.012") away from the end face of the bearing.
The X coupling is fixed in place using the screw of the X coupling.
The said distance should be obtained to ensure the relationship between the Y motor and the X coupling with respect to the thrust direction.

9. Position of the XY table base

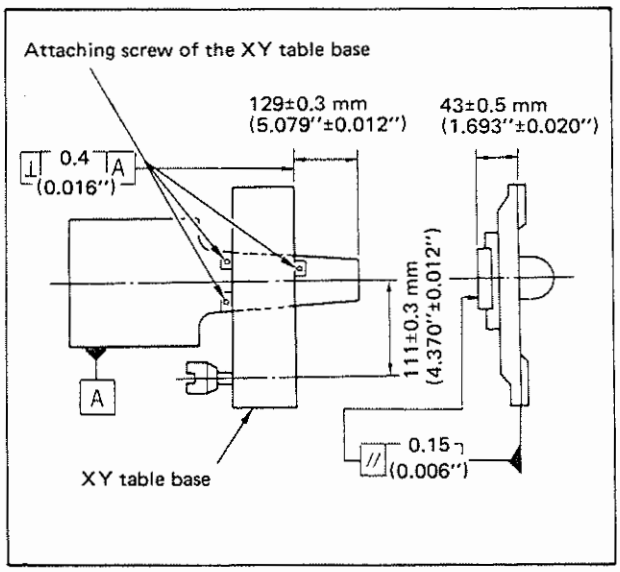


Fig. 7-28

The XY table is assembled with respect to the bed so that the dimensions given in the figure on the left are satisfied.
The Y shaft mounting base is fixed in place using the three attaching screws of the XY table base.
The distance of 129 ± 0.3 mm (5.079" ± 0.012") ensures the engagement depth of the X motor and XY table base in the thrust direction, and the distance of 111 ± 0.3 mm (4.370" ± 0.012") ensures the position of the XY table base in the radial direction.

10. X slit plate

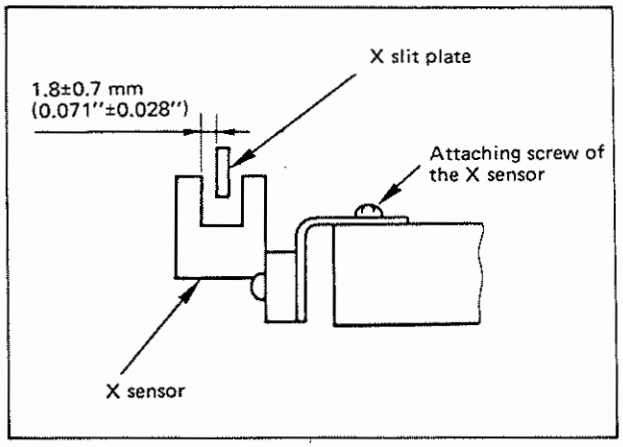


Fig. 7-29

The X slit plate is assembled so that a clearance of 1.8 ± 0.7 mm (0.071" ± 0.028") is provided between the X sensor and the X slit plate.
The X sensor is fixed in place using the attaching screw of the X sensor.
The said distance ensures the clearance between the X sensor and the X slip plate.

11. Y slit plate

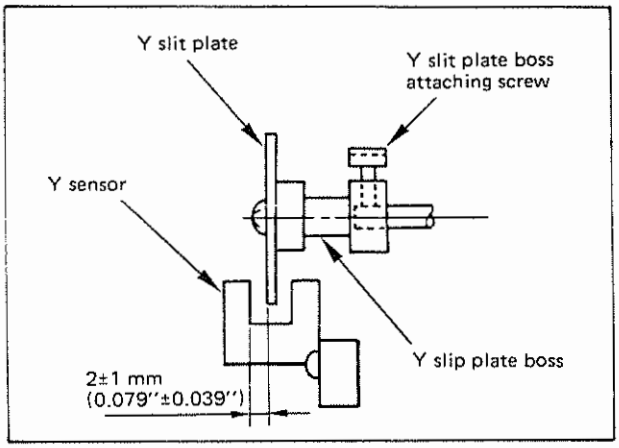


Fig. 7-30

The Y slit plate is assembled so that a clearance of 2 ± 1 mm (0.079" ± 0.039") is provided between the Y sensor and the Y slit plate.
The said distance ensures the clearance between the Y sensor and the Y slip plate.

(7) Dimensions related to button chuck unit

1. Assembling dimensions of the adjustment slide and adjustment guide

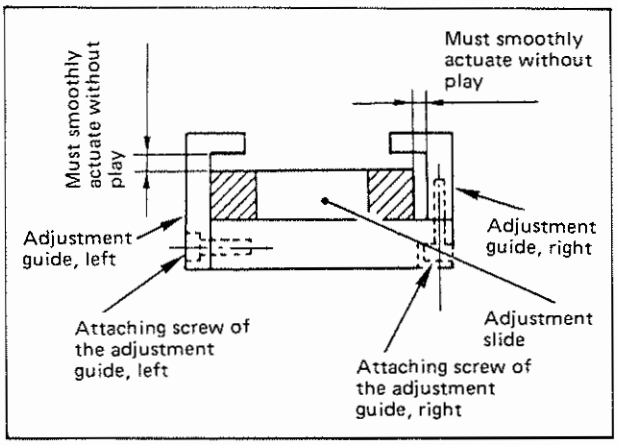


Fig. 7-31

The adjustment slide is assebled so that no clearance is provided between the slide and the adjustment guides, right or left. The adjustment slide should vertically move without being pushed against the guides.
The adjustment slide is guide on the both sides by the attaching screws of the adjustment guide, left and right. If the adjustment slide fails to move smoothly, defective vertical thrust of the chuck may occur and a play in the button chuck unit may result. In this case, when the button is set in place on the machine, the needle may fail to accurately enter the holes in the button, resulting in needle breakage.

2. Assembling position of the knob to adjust the neck wrap height

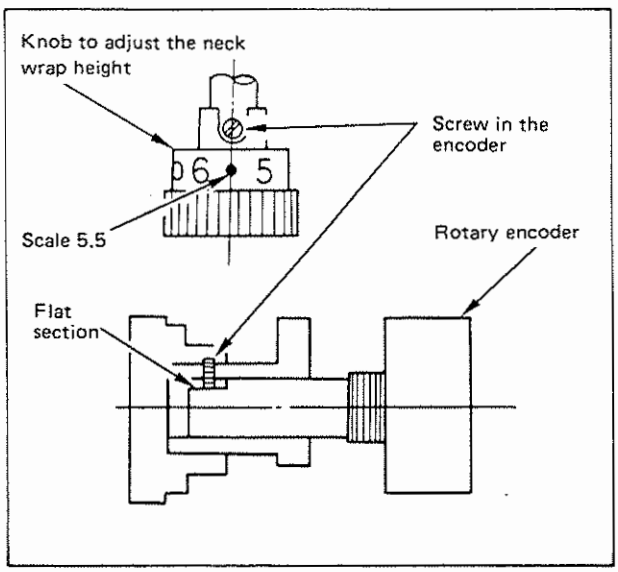


Fig. 7-32

The knob to adjust the neck wrap height is assembled so that the screw in the encoder is fixed in the flat section of the rotary encoder shaft when the knob to adjust the neck wrap height is set to 5.5 on its scale.
The aforementioned components should be positioned correctly in accordance with the figure in order to ensure the respective click positions of the rotary encoder and knob to adjust the neck wrap height, and to ensure the relationship between the scale value and the rotary encoder.

3. Thrust play in the chuck inverting shaft

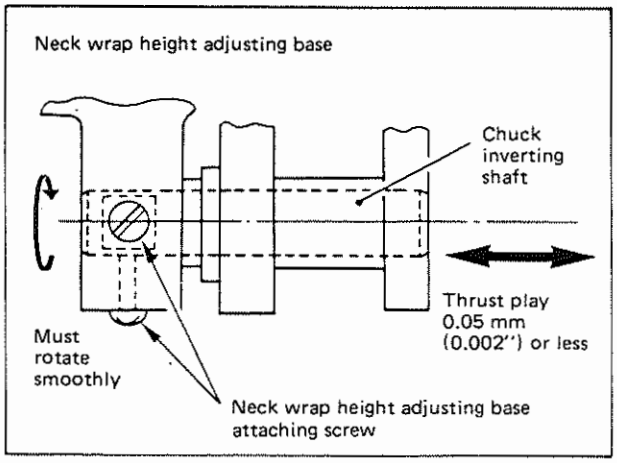


Fig. 7-33

The thrust play in the chuck inverting shaft should not exceed 0.05 mm (0.002"). The chuck inverting shaft should rotate it its rotational direction without a hindrance.
The amount of thrust play is ensured by the neck wrap height adjusting base using the neck wrap height adjusting base attaching screw.
If the thrust play is excessive, a lateral play in the button chuck unit may result.
This may prevent the needle from correctly entering the holes in the button, resulting in needle breakage. At the same time, malfunction of the button chuck unit may fail to invert properly.

(8) Dimensions related to the tongue and the work clamp components

1. Position of the tongue arm installing shaft

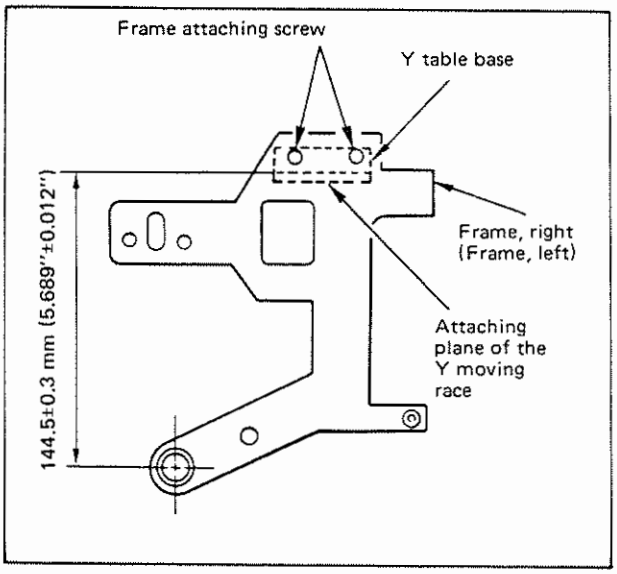


Fig. 7-34

The tongue arm installing shaft is assembled so that a distance of 144.5 ± 0.3 mm (5.689" ± 0.012") is provided from the attaching plane of the Y table base to the center of the shaft.
The position of the frame, right (frame, left) is secured using the frame attaching screws respectively.
The tongue arm installing shaft should be correctly positioned in order to ensure the relationship between the bed surface and the button chuck, feed plate or tongue with respect to vertical direction.

2. Thrust play in the tongue arm installing shaft

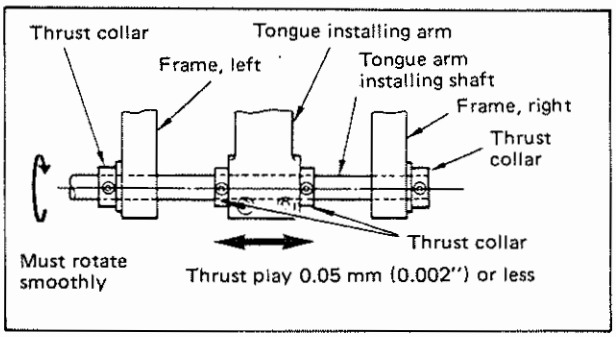


Fig. 7-35

The tongue arm installing shaft is assembled so that the thrust play does not exceed 0.05 mm (0.002") and that the shaft smoothly rotate in its rotational direction.
The thrust play is secured using the thrust collars on the right and left frames and the thrust collars on the both sides of the tongue installing arm.
If the play is excessive, the material may flap resulting in defective seam. At the same time, the excessive play prevent the tongue arm installing shaft from rotating smoothly, resulting in failed operation of the tongue.

3. Assembling position of the knob to adjust the thrusting amount

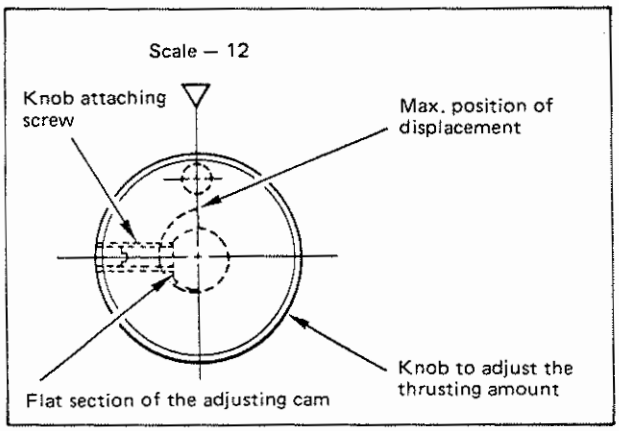


Fig. 7-36

The knob to adjust the thrusting amount is assembled so that the displacement of the adjusting cam is maximized when the knob to adjust the thrusting amount is set to "–12" on its scale.
The knob to adjust the thrusting amount is attached on the flat face of the adjusting cam using the attaching screw of the knob.
This knob changes the thrusting amount of the tongue along with the tie stitch depth changing within the range of 12 to –12 and ensures it in accordance with the tie stitch depth specified within the said range.

4. Assembling position of the tongue

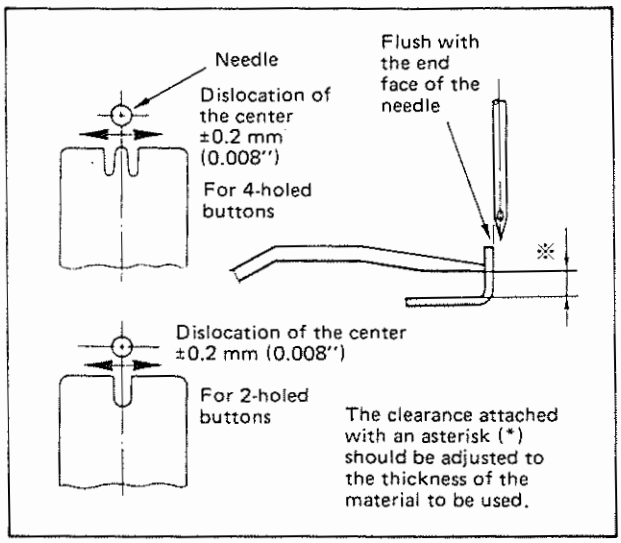


Fig. 7-37

The tongue is laterally positioned to allow the needle to come just the center of the tongue. At this time, the dislocation of the needle with respect to the center of the tongue is ±0.2 mm (0.008").
The tongue is vertically positioned so that a clearance equivalent to the thickness of the material to be used is provided as illustrated in the figure.
The tongue is longitudinally positioned so that the end face of the needle is flush with the lower work clamp for 4-holed buttons when the knob to adjust the thrusting amount is set to "0" on its scale.
Refer to "1) Adjusting the tongue" on page 47 for how to adjust the position of the tongue.
The lateral position of the tongue determines the location of the tongue with respect to the needle, and the longitudinal position of the tongue determines its location with respect to the work clamp.

5. Assembling position of the work clamp

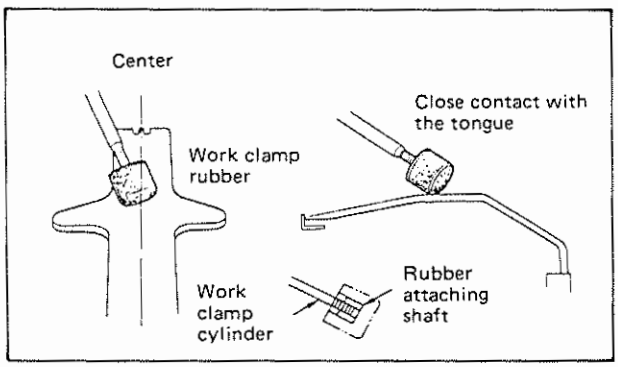


Fig. 7-38

The work clamp rubber mounted on the top of the work clamp is located at the center of the tongue while coming in close contact with the tongue.
Move the rubber attaching shaft mounted on the cylinder shaft of the work clamp cylinder back or forth so that the rubber is correctly positioned.
The rubber should be correctly assembled to allow the work clamp to secure the material in place.

6. Assembling position of the lower work clamp for neck wrapping

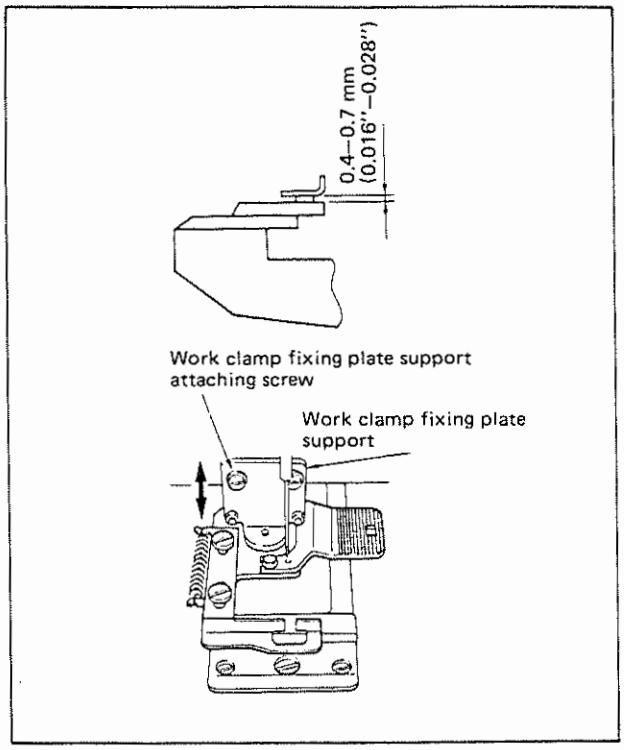


Fig. 7-39

The lower work clamp for button sewing with neck wraps is assembled so that a clearance of 0.4 to 0.7 mm (0.016" to 0.028") is provided between the throat plate and the lower work clamp.
The work clamp fixing plate support is securely fixed in its correct position using the attaching screw of the support, thereby ensuring the correct position of the lower work clamp for neck wrapping.
If the clearance between the throat plate and the lower work clamp for neck wrapping is incorrect, improper depth of the tie stitches may result.

7. Assembling position of the feed plate for button sewing

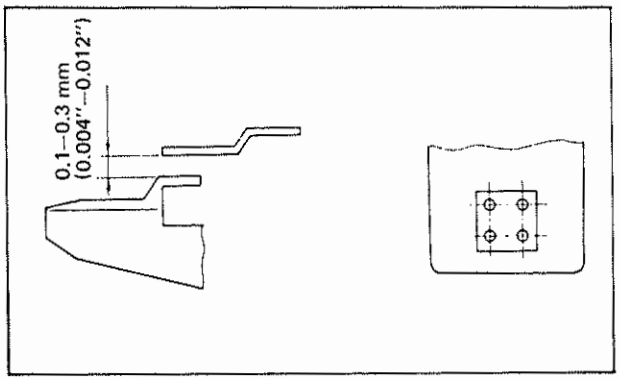


Fig. 7-40

The feed plate is assembled so that it is 0.1 to 0.3 mm (0.004" to 0.012") away from the throat plate. The needle should uniformly enter the corners of the four square holes in the feed plate.
Refer to "6. Assembling position of the lower work clamp for neck wrapping" for how to adjust the position of the feed plate.
If the clearance between the throat plate and the feed plate is excessive, loose stitches may result.

(9) Assembling position of the wiper

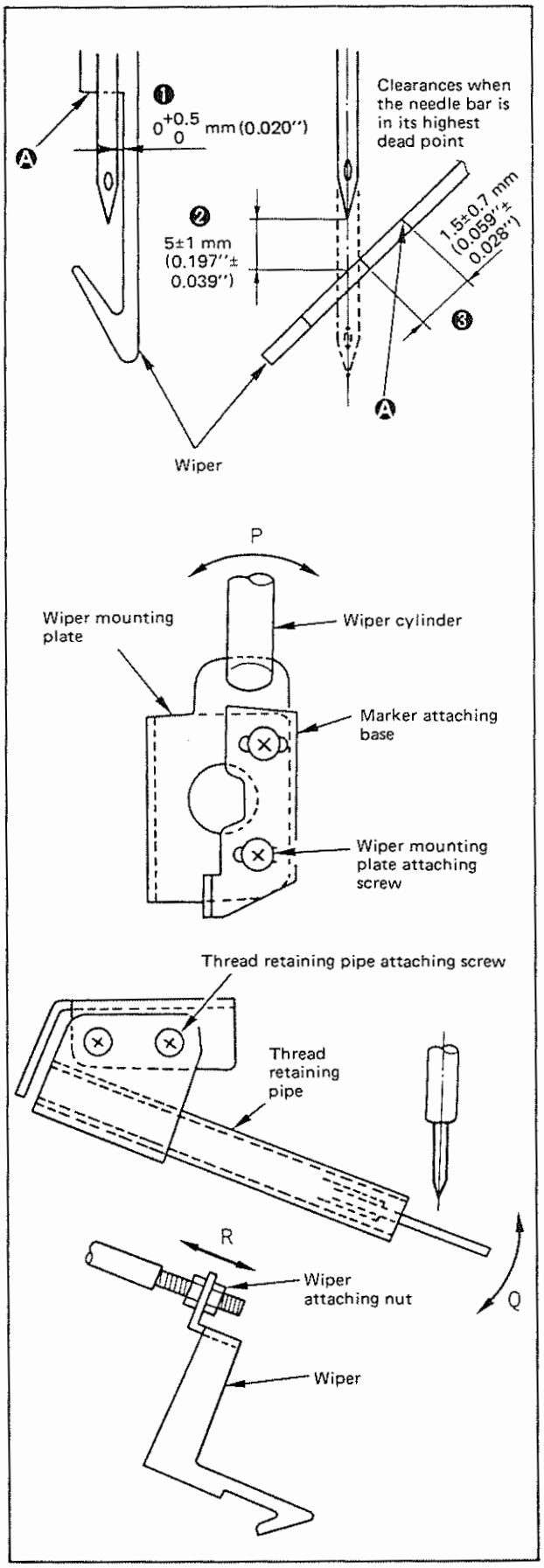


Fig. 7-41

The wiper is assembled so that lateral clearance ❶ of $0^{+0.5}_{0}$ (0.020") mm and vertical clearance ❷ of 5 ± 1 mm (0.197" ± 0.039") between the wiper and the needle and so that clearance ❸ of 1.5 ± 0.7 mm (0.059" ± 0.028") is provided in section Ⓐ.

1) The wiper mounting plate is fixed on the marker attaching base using the wiper mounting plate attaching screw. Clearance ❶ is adjusted in direction P.
   This clearance should be correctly adjusted in order to secure the position to allow the wiper to take up the thread.

2) Adjust clearance ❷ in direction Q using the thread retaining pipe attaching screws which are used to attach the thread retaining pipe in place.
   This clearance should be correctly adjusted to ensure the appropriate contact between the wiper and the needle as well as the position to allow the wiper to take up the thread.

3) Clearance ❸ is adjusted in direction R using the wiper attaching nut which is used to attach the wiper in place.
   This clearance should be correctly adjusted in order to secure the clearance between the needle bar and the thread retaining pipe or the position to allow the wiper to take up the thread.

(10) Adjusting the lowest dead point and upper stop position of the needle bar

1. Adjusting the lowest dead point of the needle bar

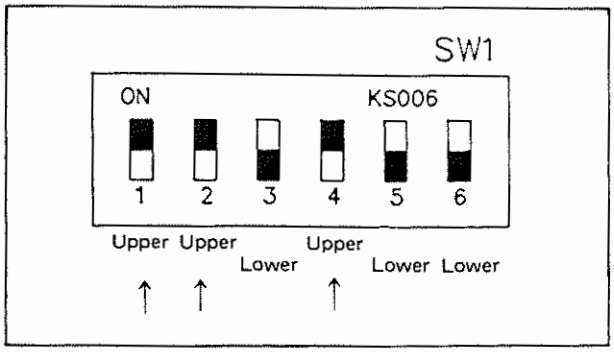


Fig. 7-42

1) Set the No. 1, No. 2 and No. 4 of the DIP switch 1 on the CPU circuit board in the control box to their ON positions (upper position). Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

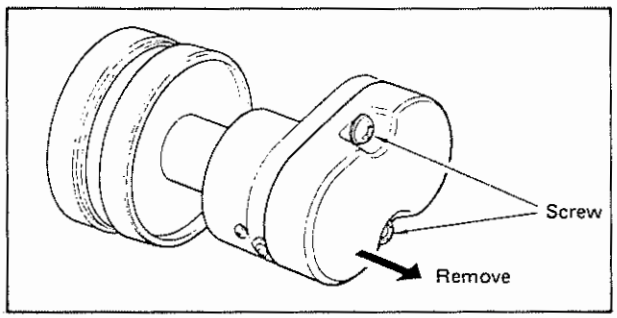


Fig. 7-43

2) Loosen the two screws in the cover of the synchronizer, and remove the cover.

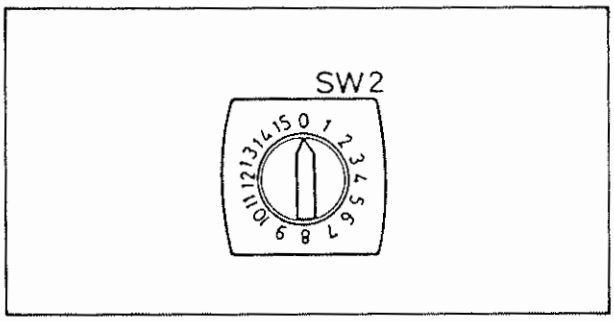


Fig. 7-44

3) Set the SW2 (rotary switch) on the control panel to "0".

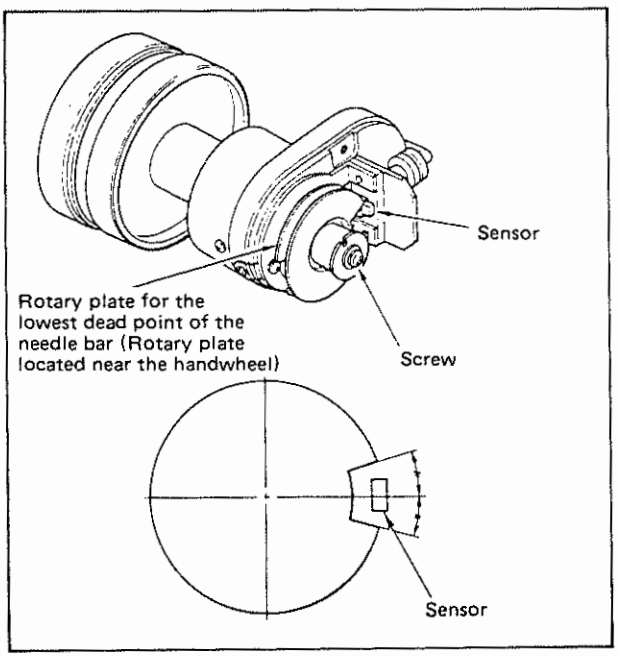


Fig. 7-45

4) Turn the handwheel to bring the needle bar to its lowest dead point.
Properly position the sensor and rotary plate for the lowest dead point of the needle bar in the synchronizer by turning the rotary plate so that the sensor is located at the center of the notch of the rotary plate.
At the time of the adjustment, keep the needle bar in its lowest dead point. After the adjustment, temporarily fix the screw.

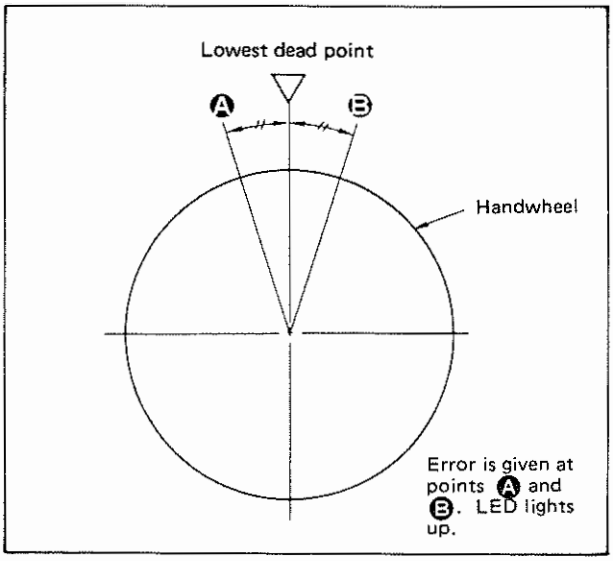


Fig. 7-46

5) For your confirmation, turn the handwheel from the position to make the needle bar rest in its lowest dead point toward you or away from you, and confirm that the error indicating LED in the control box goes out when the needle bar is brought to its lowest dead point and lights up at points Ⓐ and Ⓑ (as illustrated in the figure) where the needle bar passes before and after it reaches its lowest dead point.
Adjust so that a uniform rotating angle is provided between the lowest dead point and the front and rear points where the LED lights up.

2. Upper stop position of the needle bar

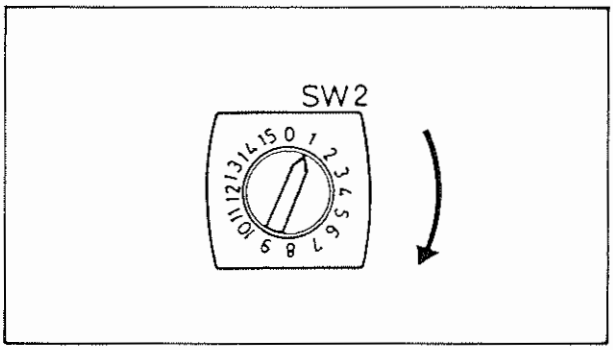


Fig. 7-47

1) Set the SW2 (rotary switch) on the control panel to "1".

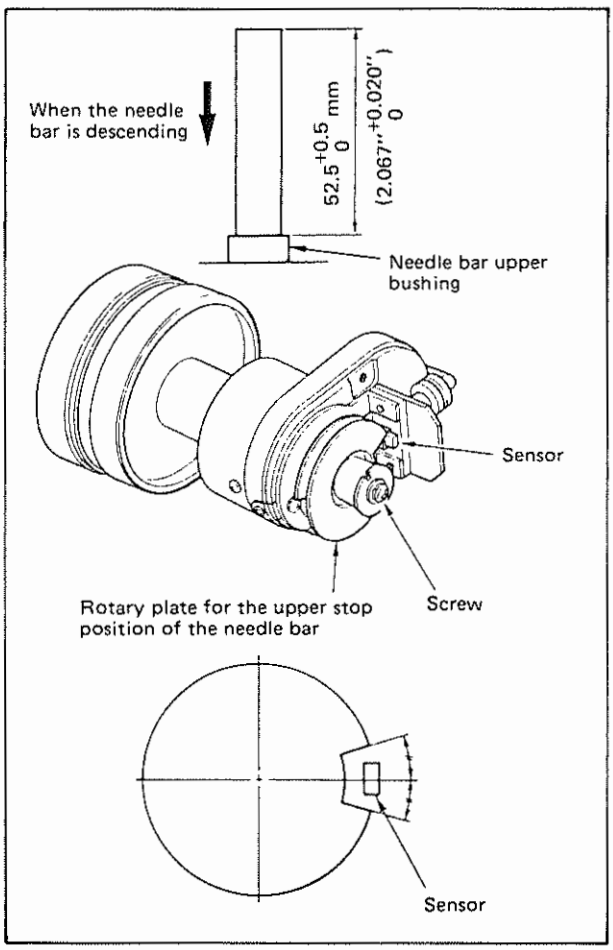


Fig. 7.48

2) Turn the handwheel to make the needle bar descend from its highest dead point until it is $52.5^{+0.5}_{0}$ mm ($2.067''^{+0.020''}_{0}$) away from the needle bar upper bushing.
This is the upper stop position of the needle bar.
Properly position the sensor and rotary plate for the upper stop position of the needle bar in the synchronizer by turning the rotary plate so that the sensor is located at the center of the notch of the rotary plate.
At the time of the adjustment, keep the needle bar in its upper stop position and also hold the rotary plate for the lowest dead point of the needle bar at the position where it has been retained at the time of its adjustment. After the adjustment, securely fix the screw.

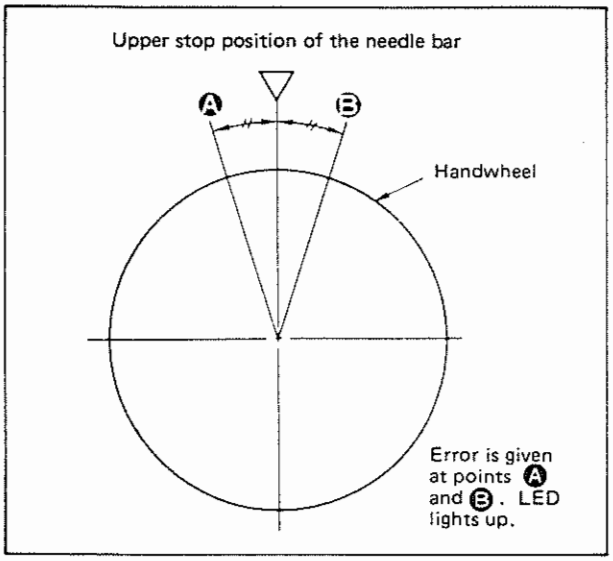


Fig. 7-49

3) For your confirmation, turn the handwheel from the position to make the needle bar rest in its upper stop position toward you or away from you, and confirm that the error indicating LED in the control box goes out when the needle bar is brought to its upper stop position and lights up at points Ⓐ and Ⓑ (as illustrated in the figure) where the needle bar passes before and after it reaches its upper stop position.
Adjust so that a uniform rotating angle is provided between the upper stop position and the front and rear points where the LED lights up.

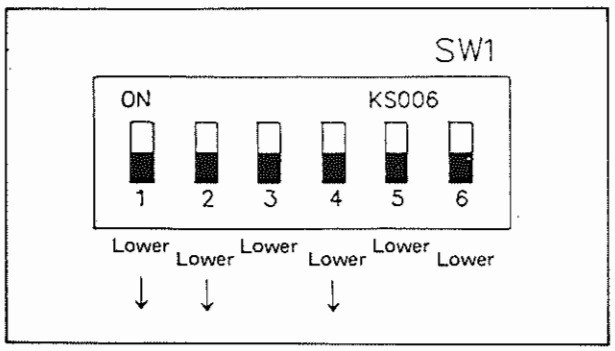


Fig. 7-50

4) After the completion of the adjustment of the upper stop position and lowest dead point of the needle bar, return the No. 1, No. 2 and No. 4 of the DIP switch 1 to their "OFF" positions. Now turn OFF the power switch and then re-turn ON it, or press the Reset switch.
Re-set the SW2 to the previous value on its scale.

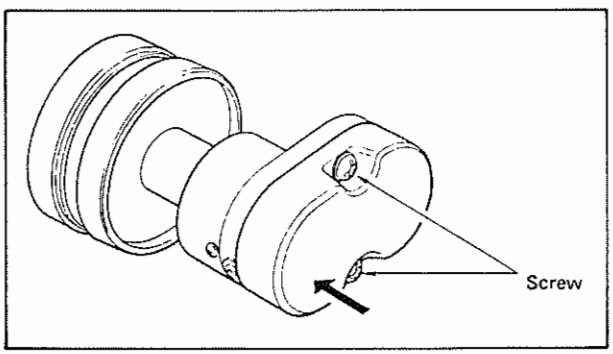


Fig. 7-51

5) Attach the cover of the synchronizer in place.

(11) Adjusting the maximum rotational speed of the sewing machine

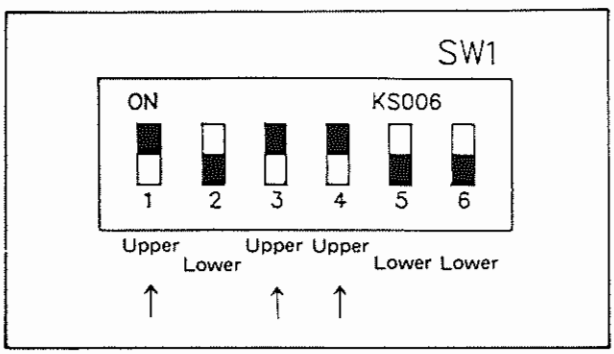


Fig. 7-52

1) Set the No. 1, No. 3 and No. 4 of the DIP switch 1 on the CPU circuit board in the control box to their ON positions (upper position). Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

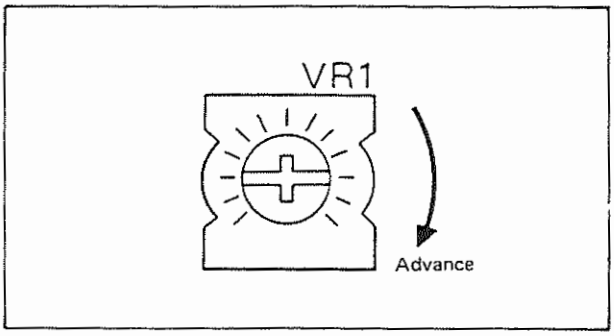


Fig. 7-53

2) Turn the VR1 (variable resistor) on the control panel clockwise until it will go no further using a screwdriver.

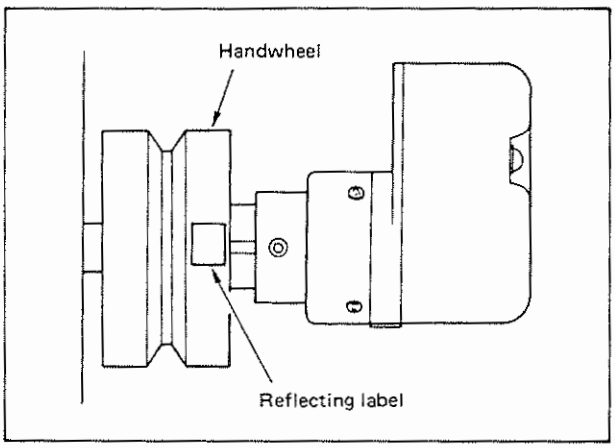


図7-54

3) Stick a reflecting label on the periphery of the handwheel. Turning ON the foot pedal will make the sewing machine independently rotate.
In this state, measure the number of revolutions of the circumference of the handwheel using a tachometer.

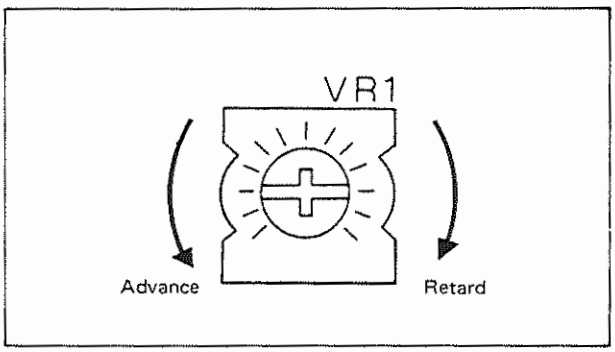


Fig. 7-55

4) Turn the VR1 (variable resistor) on the CPU circuit board in the control box using a screwdriver so that the number of revolutions is adjusted to 680 to 700 s.p.m. The number of revolutions of the sewing machine is shown on the error code indicating LED as reference.
After the adjustment, remove the reflecting label adhered on the periphery of the handwheel.

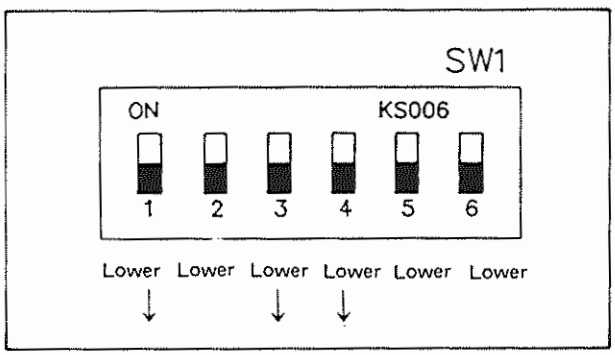


Fig. 7-56

5) After the adjustment, set the No. 1, No. 3 and No. 4 of the DIP switch 1 to their OFF (lower) positions. Now turn OFF the power switch and then re-turn ON it, or press the Reset switch.

(12) Adjusting the origin of the XY unit

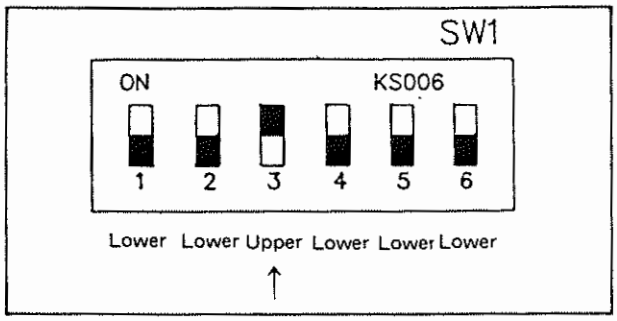


Fig. 7-57

Set the No. 3 the DIP switch 1 on the CPU circuit board in the control box to its ON (upper) position. Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

1. Adjusting the origin in the X direction

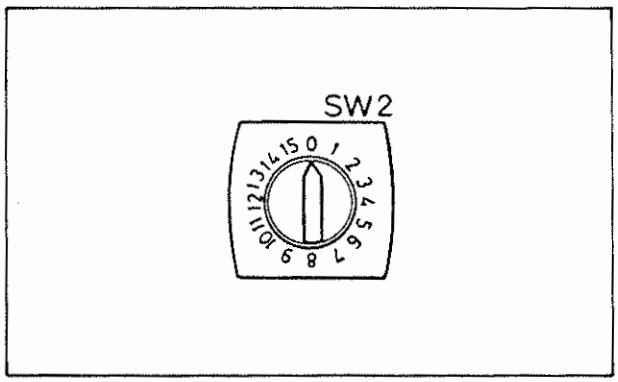


Fig. 7-58

1) Set the SW2 (rotary switch) on the control panel to "0".

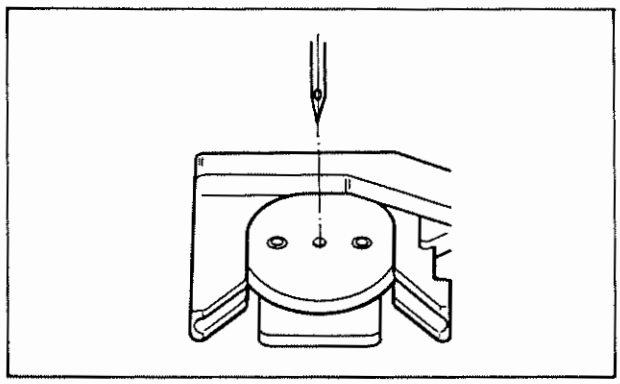


Fig. 7-59

2) Turn OFF the power switch.
Place the button gauge in the button chuck unit, and move the X-Y unit by hand so that the needle is brought to the center of the gauge.

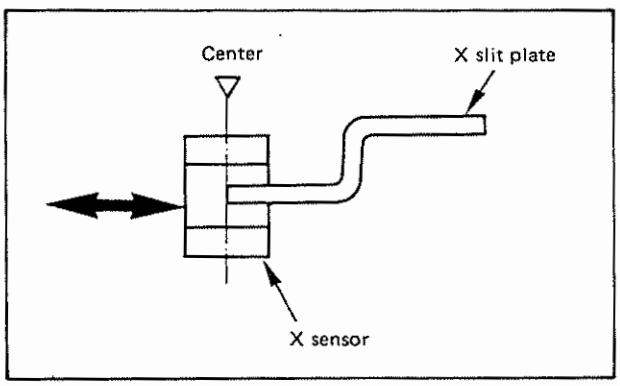


Fig. 7-60

3) Move the X sensor so that the top end of the X slit plate is brought to the center of the X sensor. Then, turn ON the power switch.

4) Move X sensor so that "2-Note" is indicated on the error code indicating LED.
Whenever the X sensor is moved, be sure to confirm the indication given on the LED by pressing the Reset switch on the control panel.

(Caution) The "Note" appearing on the LED is given for the purpose of adjustment of the origin in the Y direction.

2. Adjusting the origin in the Y direction

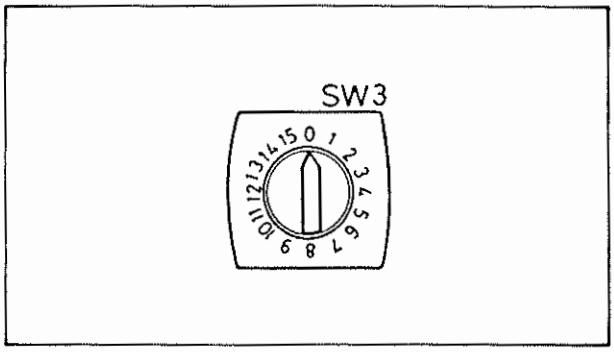


Fig. 7-61

1) Set the SW3 (rotary switch) on the control panel to "0".

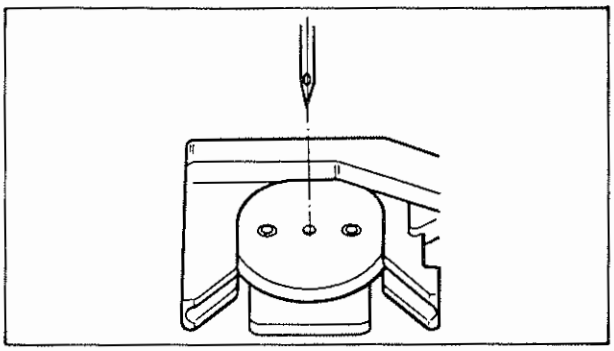


Fig. 7-62

2) Turn OFF the power switch.
Place the button gauge in the button chuck unit, and move the X-Y unit by hand so that the needle is brought to the center of the gauge.

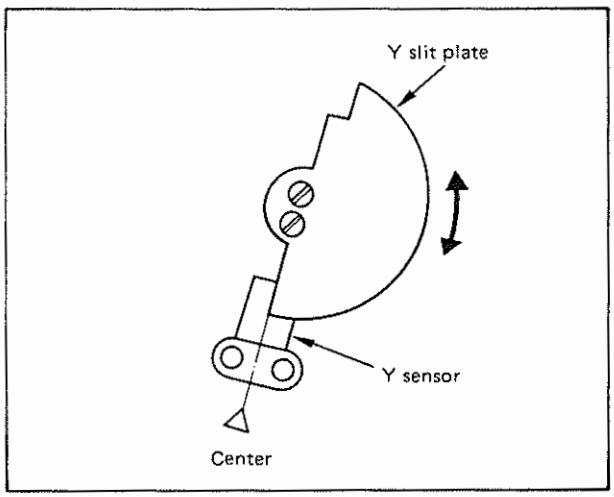


Fig. 7-63

3) Move the Y sensor or the Y slip plate so that the top end of the Y slit plate is brought to the center of the Y sensor. Then, turn ON the power switch.

4) Move Y slit plate so that "Note-2" is indicated on the error code indicating LED.
Whenever the Y slip plate is moved, be sure to confirm the indication given on the LED by pressing the Reset switch on the control panel.

(Caution) The "Note" appearing on the LED is given for the purpose of adjustment of the origin in the X direction.

3. Fine adjustment after the completion of the adjustment of the origin in the X/Y direction

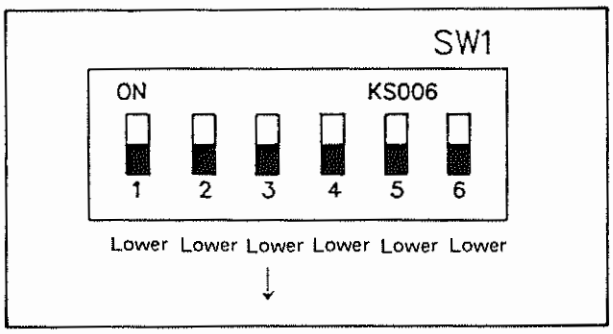


Fig. 7-64

1) After the completion of the respective adjustments of the origin in the X direction and in the Y direction, set the No. 3 the DIP switch 1 on the CPU circuit board in the control box to its OFF (lower) position. Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

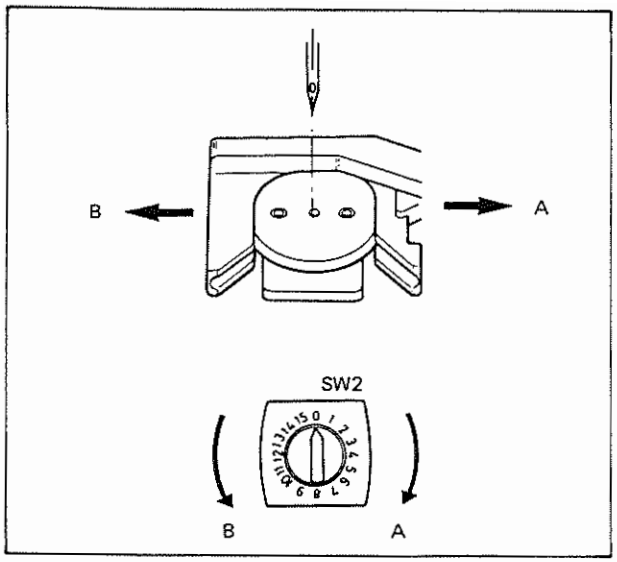


Fig. 7-65

2) Finely adjust the origin in the X direction using the SW2 on the control panel so that the needle aligns with the center of the button gauge.

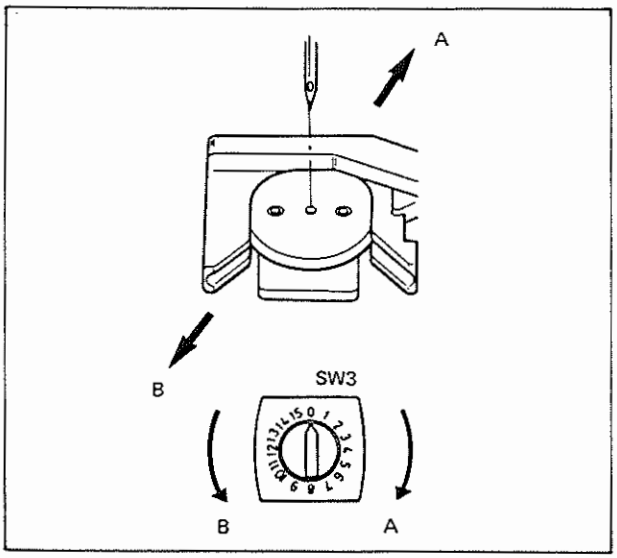


Fig. 7-66

3) Finely adjust the origin in the Y direction using the SW3 on the control panel so that the needle aligns with the center of the button gauge.

(13) Function of checking sensors and switches

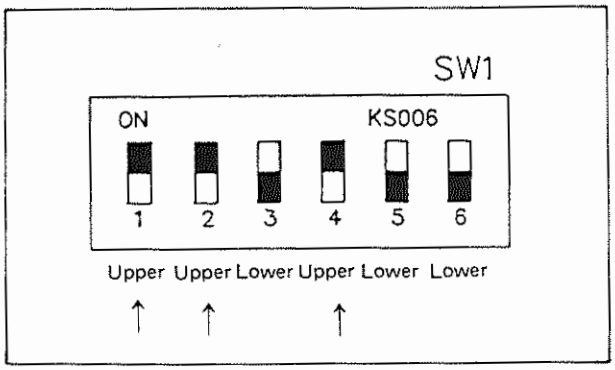


Fig. 7-67

1) Set the No. 1, No. 2 and No. 4 of the DIP switch 1 on the CPU circuit board in the control box to their ON (upper) positions. Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

2) Set the SW2 (rotary switch) on the control panel to the scale value as shown in Table 7-8, and check whether the indicator lamp of the related switch lights up to confirm that the switch normally works.

Table 7-8

Scale of SW2	Sensor or switch	Error indicator lamp
5	Foot pedal	Lights up when the switch is turned ON
6	Emergency stop switch	Goes out when the switch is turned ON
8	Sensor of button chuck raising/lowering cylinder	Lights up when the sensor detects the highest position of the button chuck
9	Sensor of neck wrap inverting cylinder	Lights up when the sensor detects the neck wrapping position
10	Sensor of tongue securing cylinder	Lights up when the sensor detects the tongue set in position
11	Sensor of thread trimming cylinder	Goes out when the thread trimmer actuates
12	Sensor of button chuck rotating cylinder	Goes out when the sensor detects button chuck in the neck wrapping position
13	Knee switch	Lights up when the switch is turned ON
14	Y origin sensor	Lights up/goes out according to the state of the lamp of the Y origin sensor
15	X origin sensor	Lights up/goes out according to the state of the lamp of the X origin sensor

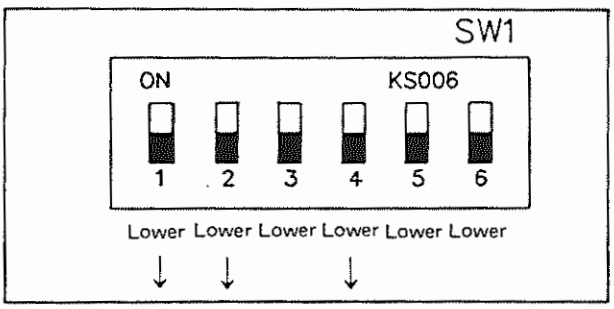


Fig. 7-68

3) After the completion of the checking procedure, return the No. 1, No. 2 and No. 4 of the DIP switch 1 to their OFF (lower) positions. Now turn OFF the power switch and then re-turn ON it, or press the Reset switch. Re-set the SW2 (Rotary switch) to the previous value on its scale.

(14) Function of checking the cylinder driving mechanism

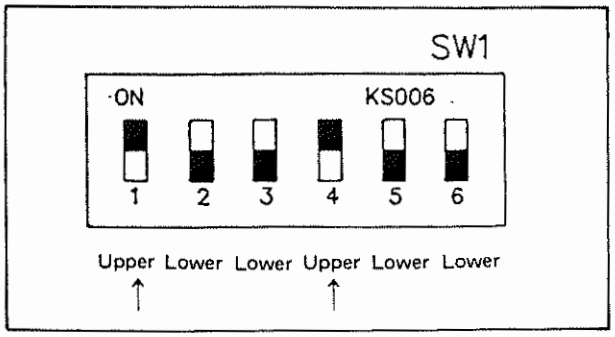


Fig. 7-69

1) Set the No. 1 and No. 4 of the DIP switch 1 on the CPU circuit board in the control box to their ON (upper) positions. Now, turn OFF the power switch and then re-turn ON it, or press the Reset switch.

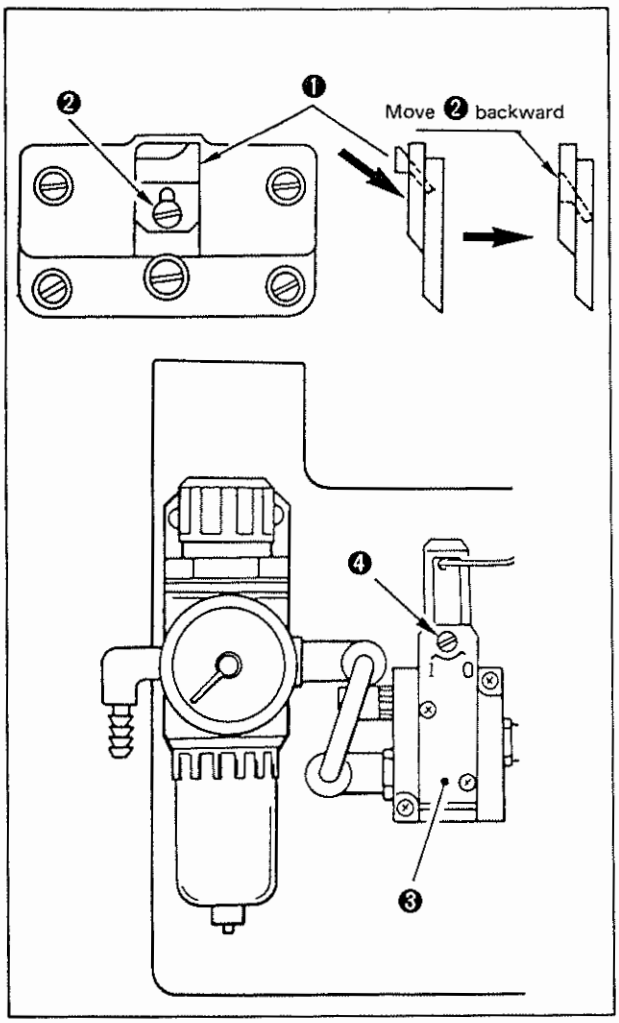


Fig. 7-70

2) Loosen screw ❷ in throat plate chip ❶, and move the screw backward.

3) Turn change-over knob ❹ of main air supply disconnecting solenoid valve ❸ from "0" to "1" using a screwdriver.

4) Set the neck wrap adjusting knob to 2.5 or larger value on its scale.

4) The cylinders can be driven by setting the SW2 (rotary switch) on the control panel to the scale value shown in Table 7-9 and pressing the Reset switch.

Table 7-9

Scale of SW2	Description of cylinder performance
1	Securing the tongue
2	Releasing the tongue
3	Work clamping
4	Changing over thread tension
5	Feeding thread
6	Thread trimming
7	Lifting/lowering the button chuck
8	Rotating the button chuck
9	Inverting the feed plate
10	Main air supply
11	Wiper
13	Rotating the motor fan

(Caution) The button chuck mechanically comes in contact with the feed plate when the button chuck is rotating, so do not leave the Reset switch kept pressed.

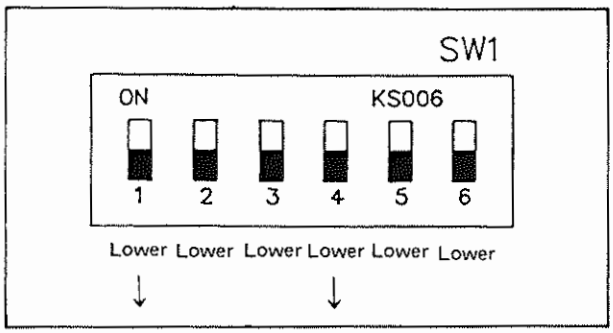


Fig. 7-71

5) After the completion of the checking procedure, return the No. 1 and No. 4 of the DIP switch 1 to their OFF (lower) positions. Now turn OFF the power switch and then re-turn ON it, or press the Reset switch.
Return the change-over knob of the main air supply disconnecting solenoid valve from "1" to "0". Let the throat plate chip appear above the throat plate surface when sewing the button with neck wraps.
Start your sewing work after confirming the scale value of the SW2 (rotary switch) and the neck wrap adjusting knob.

(15) Checking the function of the CPU circuit board and rotary encoder

Check the CPU circuit board following the below-stated procedure.

1. Turn ON the power to the machine. (Memory check)

Turn ON the power to the machine, and the CPU circuit board reads/writes the data from/in memory. If any defect is found, the CPU circuit board stops reading/writing performance indicating "E" on the LED of the control circuit board.

2. Indication of numbers of the setting switches (checking the control circuit board, digital switch and encoder)

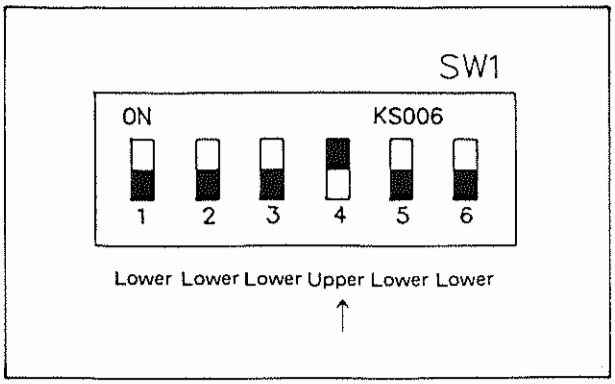


Fig. 7-71

1) Set the No. 4 of the DIP switch 1 on the CPU circuit board in the control box to its ON (upper) position.

2) Turn the rotary switch 2 (SW2) on the control circuit board, and the set value is indicated on the 7 segment LED (LD1) on the control circuit board.
If the set value is 10 to 15, the indication given on the LED will be A to F.
3) Press the Reset switch 10 (SW10) to indicate the set value of the rotary switch 3 (SW3) on the LED.

Table 7-10 shows the order of indication.

Table 7-10

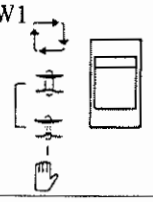
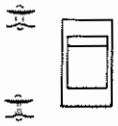
Reset switch (SW10)

No.	Location	Name of switch	Indication
1	Control circuit board	Rotary switch (SW2)	0 to F
2		Rotary switch (SW3)	0 to F
3		Rotary switch (SW4)	0 to F
4		Rotary switch (SW5)	0 to F
5		Rotary switch (SW6)	0 to F
6		Rotary switch (SW7)	0 to F
7		Rotary switch (SW8)	0 to F
8		Rotary switch (SW9)	0 to F
9		DIP switch (SW1)	"1" is indicated when setting only the No. 1 of the SW1 to its ON position. "2" is indicated when setting only the No. 2 of the SW1 to its ON position. "4" is indicated when setting only the No. 4 of the SW1 to its ON position.
10		TACT switch (SW10)	0
11	Control box	Digital switch (DSW2)	0 to 9
12	(J31)	Digital switch (DSW1)	0 to F
13		Digital switch (DSW4)	Lower digit 0 to 9
14		Digital switch (DSW3)	Upper digit 0 to 9
15		Digital switch (DSW6)	Lower digit 0 to 9
16		Digital switch (DSW5)	Upper digit 0 to 9
17	Control box	See-saw switch (SSW1, 2)	See the next page (page 71).
18	(J31)	Digital switch (DSW7)	0 to F
19		(No switch)	
20	Machine head (J33)	Rotary encoder	See the next page (page 71).

To No. 1

Check the see-saw switch No. 17 referring to Table 7-11.

Table 7-11

No.	Name of switch	Condition for checking	Indication
17	See-saw switch SSW1 	Set the see-saw switch SSW2 to the " " position (with neck wraps).	→ 6 → 4 → 5
	See-saw switch SSW2 	Set the see-saw switch SSW1 to the " " position.	→ 2 → 6

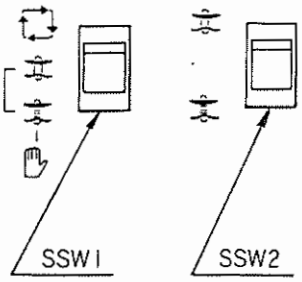


Table 7-12

Scale value of neck wrap height adjusting knob	Indication
0	2
2.5	7
3	8
3.5	9
4	A
4.5	b
5	C
5.5	d
6	E

Check the rotary switch No. 20 (on page 70) referring to Table 7-12.
After the completion of all the checking procedure, set the No. 4 of the DIP switch 1 to its OFF (lower) position.
Start your sewing work after confirming the set value of the switches.

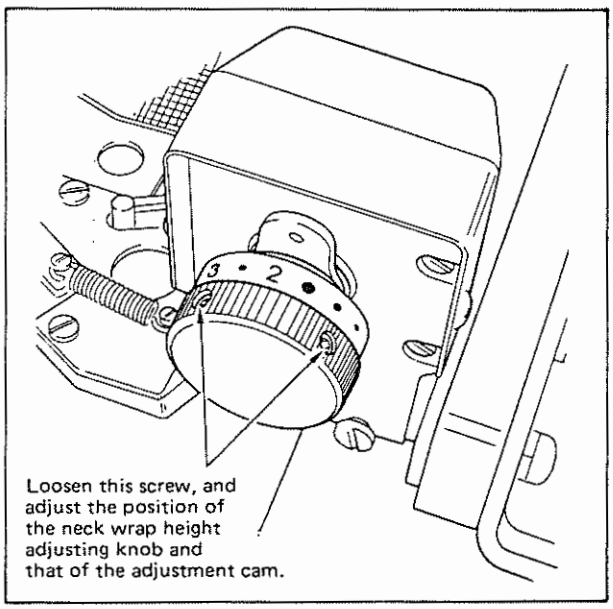


Fig. 7-74

If the set value of the switches are different from the data shown on the above-stated table, adjust the position of the neck wrap height adjusting knob and that of the adjustment cam.

8. LIST OF ERROR CODE

When any of the following phenomena occurs, error code is shown on the indicator of the control circuit board as "AL?" (the relevant number is shown at the "?" position).

Table 8-1 (1/3)

Error code	Description of error	How to reset	Time of detection	Remarks
0	Number of stitches is set to "0".	Find the specified number of stitches referring to the number of stitches indicator label, and set the number of stitches properly.	When the setting the number of button sewing stitches.	Display only
1	When sewing buttons without neck wraps, "with neck wraps" mode is selected.	Correctly select the button sewing mode from among "automatic operation mode", "manual operation mode" and "with neck wraps".	When changing the button sewing mode between "with neck wraps" and "without neck wraps" or changing the sewing mode among "automatic operation mode", "manual operation mode" and "manual button sewing with neck wraps"	Display only
2	When sewing the button with neck wraps, no relevant button sewing pattern is specified.	Select the "without neck wraps" mode or specify the proper pattern.	When changing the sewing pattern	Display only
3	Data X for the button hole is outside the range of data.	Specify the data X within the range of 2.0 to 5.0 mm. When using pattern 7, set the data X to "0".	When changing the data X	Display only
4	Data Y for the button hole is outside the range of data.	Specify the data Y within the range of 2.0 to 5.0 mm. When using pattern 8, set the data Y to "0".	When changing the data Y	Display only
5	Start position of neck wrapping is too close to the cloth.	Set the start position of neck wrapping to the position closer to the button using the SW4 on the control circuit board.	When changing the data Y	Display only
6	Start position of neck wrapping is too close to the button.	Set the start position of neck wrapping to the position closer to the cloth using the SW4 on the control circuit board.	When changing the data Y or when changing the setting of the chuck raising/lowering dial.	Display only
7	Neck wrap width is outside the range of data.	Decrease the total of the data X and set value of SW8 and SW9 (set value of neck wrap width) to 8 mm or less.	When changing data X or when changing the neck wrap width	Display only
8	Number of stay stitches is outside the range of data.	Specify the number of stay stitches to 0 to 2 using No. 1 and No. 2 of the SW1 on the control circuit board.	When changing the number of stay stitches	Display only
10	When sewing buttons with neck wraps, the chuck up/down position is outside the range of data.	Set the chuck raising/lowering dial to 2.5 or larger value.	When selecting the "with neck wraps" or when changing the setting of the chuck raising/lowering dial	Display only
11	When sewing buttons without neck wraps, the chuck up/down position is outside the range of data.	Set the chuck raising/lowering dial to 0.	When selecting the "without neck wraps" or when changing the setting of the chuck raising/lowering dial	Display only
12	Emergency stop	Bring the needle bar to its upper stop position, and press the reset switch (SW10 on the control circuit board).	When the emergency stop switch is turned ON.	All the functions of the machine are inoperative.

Table 8-1 (2/3)

Error code	Description of error	How to reset	Time of detection	Remarks
13	Needle-up stop position error	Bring the needle bar to its upper stop position, and press the reset switch (SW10 on the control circuit board). (When the automatic operation mode is selected)	When turning ON the power to the machine or when starting sewing	Emergency stop
		Bring the needle bar to its upper stop position. (When the manual operation mode or manual neck wrapping mode is selected)	When changing the setting of the switches or when starting sewing	Display only
14	Tongue is set to the operating position when sewing buttons without neck wraps.	Move the tongue away from the operating position.	When starting sewing	Display
15	Failure of the emergency stop function on the CPU circuit board	Replace the CPU circuit board.	When turning ON the power to the machine.	All the functions of the machine are inoperative.
16	Defective emergency stop switch (The switch is turned ON.)	Correct the emergency stop switch.	When turning ON the power to the machine	Emergency stop
17	Defective synchronizer signal	Correct the synchronizer.	When starting sewing	Emergency stop
18	Defective rotation of the motor	Correct the sewing machine motor. Correct the synchronizer.	When starting sewing	Emergency stop
19	Defective stop of motor rotation	Correct the sewing machine motor. Correct the synchronizer.	During sewing	Emergency stop
20	Defective needle-down signal	Correct the synchronizer.	During sewing	Emergency stop
21	Defective needle-up stop position	Correct the sewing machine motor.	During sewing	Emergency stop
22	Defective detection of the X origin	Correct the X origin sensor and the X stepping motor.	When turning ON the power to the machine	All the functions of the machine are inoperative.
23	Defective detection of the Y origin	Correct the X origin sensor and the Y stepping motor.	When turning ON the power to the machine	All the functions of the machine are inoperative.
24	Improper adjustment of the X origin sensor	Adjust the position of the X origin sensor.	When turning ON the power to the machine.	All the functions of the machine are inoperative.
25	Improper adjustment of the Y origin sensor	Adjust the position of the Y origin sensor.	When turning ON the power to the machine.	All the functions of the machine are inoperative.
26	Improper installing position of the encoder	Correct the installing position of the encoder.	When changing the setting of the chuck raising/ lowering dial	Display only
27	Rotating speed of the sewing machine motor exceeds the limit.	Set the max. rotating speed of the motor to 680 to 700 s.p.m. using the adjusting variable resistor (VR1 on the CPU circuit board).	During sewing	Emergency stop

Table 8-1 (3/3)

Error code	Description of error	How to reset	Time of detection	Remarks
28	Defective installing position of the tongue set sensor	Adjust the installing position of the tongue set sensor.	When setting the tongue.	All the functions of the machine are inoperative.
29	Chuck is not leveled at the time of thread trimming	Confirm the air supply, and correct the chuck leveling sensor, solenoid valve and related mechanism.	When trimming the thread during sewing	Emergency stop
30	Cutter fails to return to its origin.	Confirm the air supply, and correct the cutter origin sensor, solenoid valve and related mechanism.	When starting sewing or trimming the thread during sewing	Emergency stop
31	Chuck is not leveled.	Confirm the air supply, and correct the chuck leveling sensor, solenoid valve and related mechanism.	When turning ON the power to the machine or when completing neck wrapping	Emergency stop
32	Chuck fails to be perpendicular.	Confirm the air supply, and correct the chuck leveling sensor, solenoid valve and related mechanism.	When starting neck wrapping	Emergency stop
33	Tongue fails to be released.	Confirm the air supply, and correct the tongue setting sensor, solenoid valve and related mechanism.	When turning ON the power to the machine or when completing the sewing	Emergency stop
34	Cutter fails to actuate.	Confirm the air supply, and correct the cutter origin sensor, solenoid valve and related mechanism.	When trimming the thread during sewing	Emergency stop
35	Button sewing "without neck wraps" cannot be specified.	Confirm the air supply, and correct the sewing mode change-over sensor, solenoid valve and related mechanism.	When turning ON the power to the machine or when specifying the button sewing "without neck wraps"	All the functions of the machine are inoperative.
36	Button sewing "with neck wraps" cannot be specified.	Confirm the air supply, and correct the sewing mode change-over sensor, solenoid valve and related mechanism.	When turning ON the power to the machine or when specifying the button sewing "with neck wraps"	All the functions of the machine are inoperative.
37	Chuck fails to go up.	Confirm the air supply, and correct the chuck raising/ lowering solenoid valve and related mechanism.	When turning ON the power to the machine or when completing the sewing	Emergency stop
38	Chuck fails to come down.	Confirm the air supply, and correct the chuck raising/ lowering sensor, solenoid valve and related mechanism.	When starting sewing	Emergency stop

When the error cannot be reset taking the corrective measures shown in the list of error code or when the same error frequently occur, check the function of the sewing machine following the procedure stated below.

Table 8-2 (1/2)

Error code	Item to be check
13	• Turn OFF the power to the machine, and check the connection of the control box and synchronizer. • Check the connector on the CPU circuit board (J10) for disconnection. • Check the relationship between the needle bar and the synchronizer needle-up signal. (Refer to the relevant adjusting procedure.)
18 19 20 21	• Turn OFF the power to the machine, and check the connection of the power cable of the sewing machine motor. • Check the connection of the sewing machine motor and the clutch brake cable. • Check the connector on the CPU circuit board (J12) for disconnection. • Check whether the fuse F1 on the power board has blown. • Check the synchronizer same as in the case of error code 13.
22	• Turn OFF the power to the machine, and check whether the X-Y table smoothly moves or whether it comes in contact with the related parts. • Check the connectors on the PMDC circuit board (J21, J22 and J23) for disconnection. • Check the connectors on the CPU circuit board (J4, J8 and J3) for disconnection. • Check the connection of the X-axis motor and the stepping motor relay cable. • Check whether the X origin sensor normally turns ON and OFF. • Check the position of the X origin sensor and sensor shielding plate. • Check the X origin sensor signal. (Refer to the relevant adjusting procedure.) • Check whether the fuse F2 on the power board has blown out.
23	• Turn OFF the power to the machine, and check whether the X-Y table smoothly moves or whether it comes in contact with the related parts. • Check the connectors on the PMDC circuit board (J21, J22 and J23) for disconnection. • Check the connectors on the CPU circuit board (JA, J8 and J3) for disconnection. • Check the connection of the Y-axis motor and the stepping motor relay cable. • Check whether the Y origin sensor normally turns ON and OFF. • Check the position of the Y origin sensor and sensor shielding plate. • Check the Y origin sensor signal. (Refer to the relevant adjusting procedure.) • Check whether the fuse F2 on the power board has blown out.
24	• Turn OFF the power to the machine, and check whether the X-Y table smoothly moves or whether it comes in contact with the related parts. • Check the position of the X origin sensor and sensor shielding plate. • Check whether the installing point of the sensor shielding plate has become loose. • Check whether the installing point of the X-axis motor has become loose. • Check whether the installing point of the X origin sensor has become loose.
25	• Turn OFF the power to the machine, and check whether the X-Y table smoothly moves or whether it comes in contact with the related parts. • Check the position of the Y origin sensor and sensor shielding plate. • Check whether the installing point of the sensor shielding plate has become loose. • Check whether the installing point of the Y-axis motor has become loose. • Check whether the installing point of the Y origin sensor has become loose.
26	• Check the relationship between the chuck raising/lowering dial and the encoder signal. (Refer to the relevant adjusting procedure.)

Table 8-2 (2/2)

Error code	Item to be check
28	• Let air out of the machine, and check the motion of the tongue. • Check whether the air pressure is set to an appropriate value. • Check the relationship between the position of the tongue and the tongue setting sensor. (Refer to the relevant adjusting procedure.) • Check whether the tongue setting solenoid valve normally actuates. (Refer to the relevant adjusting procedure.) • Check the connectors on the CPU circuit board (J2 and J6) for disconnection. • Check whether the fuse on the CPU circuit board (FU1) has blown out.
33	• Let air out of the machine, and check the motion of the tongue. • Check whether the air pressure is set to an appropriate value. • Check the relationship between the position of the tongue and the tongue setting sensor. (Refer to the relevant adjusting procedure.) • Check whether the tongue releasing solenoid valve normally actuates. (Refer to the relevant adjusting procedure.) • Check the connectors on the CPU circuit board (J2 and J6) for disconnection. • Check whether the fuse on the CPU circuit board (FU1) has blown out.
29 31 32	• Let air out of the machine, and check how the chuck rotates. • Check whether the air pressure is set to an appropriate value. • Check the relationship between the position of the chuck and the chuck leveling sensor. (Refer to the relevant adjusting procedure.) • Check whether the chuck rotating solenoid valve normally actuates. (Refer to the relevant adjusting procedure.) • Check the connectors on the CPU circuit board (J2 and J6) for disconnection. • Check whether the fuse on the CPU circuit board (FU1) has blown out.
35 36	• Let air out of the machine, and check the performance of the machine when changing over with/without neck wraps. • Check whether the air pressure is set to an appropriate value. • Check the relationship between the position to change over with/without neck wraps and sewing mode change-over sensor. (Refer to the relevant adjusting procedure.) • Check whether the with/without neck wraps change-over solenoid valve normally actuates. (Refer to the relevant adjusting procedure.) • Check the connectors on the CPU circuit board (J2 and J6) for disconnection. • Check whether the fuse on the CPU circuit board (FU1) has blown out.
37 38	• Let air out of the machine, and check the vertical motion of the chuck. • Check whether the air pressure is set to an appropriate value. • Check the relationship between the vertical position of the chuck and the chuck raising/lowering sensor. (Refer to the relevant adjusting procedure.) • Check whether the chuck raising/lowering solenoid valve normally actuates. (Refer to the relevant adjusting procedure.) • Check the connectors on the CPU circuit board (J2 and J6) for disconnection. • Check whether the fuse on the CPU circuit board (FU1) has blown out.

9. CHANGING THE SEWING MODE BETWEEN THE 4-HOLED BUTTON TO THE 2-HOLED BUTTON

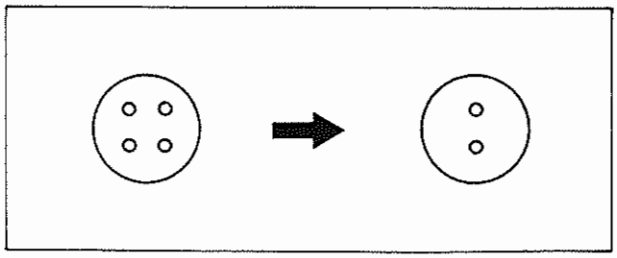
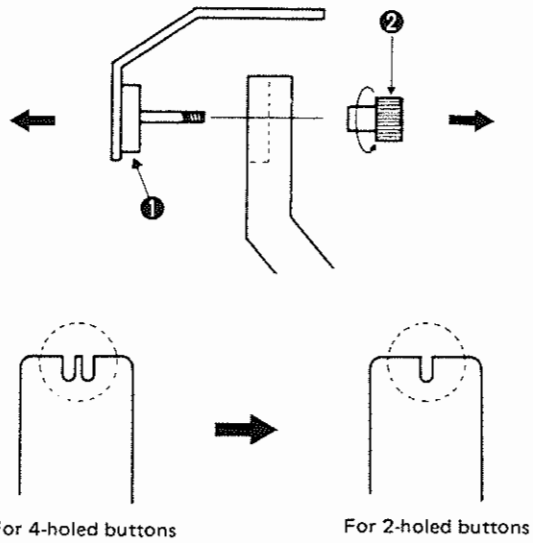
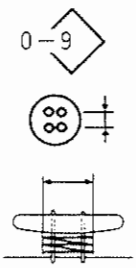


Fig. 9-1

When changing the sewing mode from the 4-holed button to the 2-holed button, follow the procedure shown on Table 9-1.

(1) Parts to be replaced and the operation procedure

Table 9-1

No.	Item	Sketch
1	Loosen knob ❷ which fixes tongue ❶ in place, and replace the tongue for the 4-holed buttons with the tongue for 2-holed buttons.	
2	Change the data, and confirm the data entered. a) Change the sewing pattern. b) Specify the center-to-center distance between the holes in the button. c) Specify the neck wrap width.	

(2) Operation required to change the data

Table 9-2

0	
1	
2	
3	
4	
5	
7	→ Set the switch to specify the center-to-center distance between the holes in the button in the X direction to 0.
8	→ Set the switch to specify the center-to-center distance between the holes in the button in the Y direction to 0.

1) Change the pattern number.
When sewing 4-holed buttons with neck wraps:
Specify the pattern number 0, 1, 2 or 3
When sewing 2-holed buttons with neck wraps:
Specify the pattern number 7.

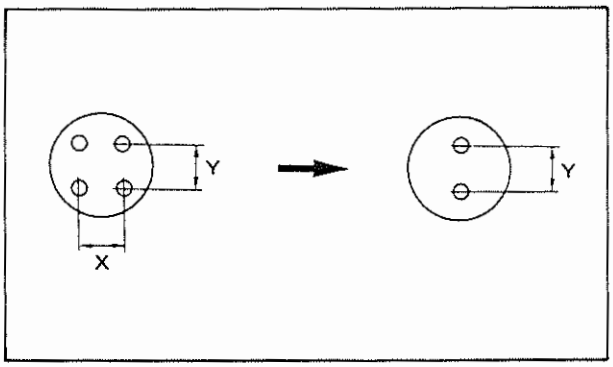
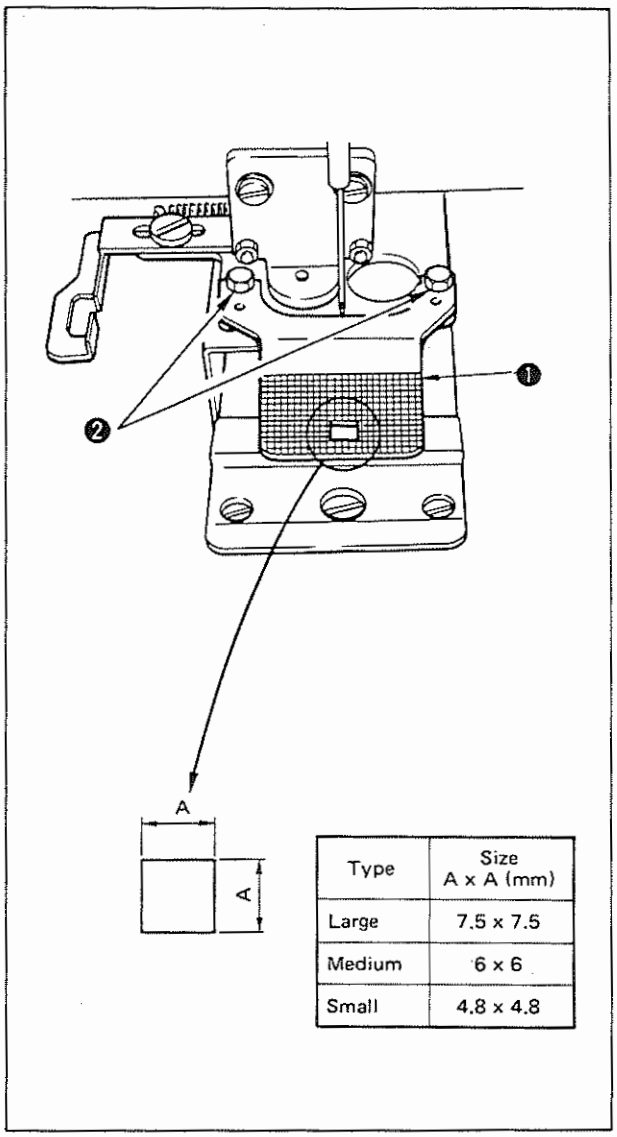


Fig. 9-2

2) Confirm the center-to-center distance between holes in the button, and change the data correctly.

3) Neck wrap width
The neck wrap width to be specified for 2-holed buttons is different from that for 4-holed buttons. So specify the correct neck wrap width accordingly.

10. REPLACING THE FEED PLATE



Type	Size A x A (mm)
Large	7.5 x 7.5
Medium	6 x 6
Small	4.8 x 4.8

Fig. 10-1

If the currently used feed plate is not suited to the center-to-center distance of the holes in the button to be used, loosen screws ❷ and replace feed plate ❶ properly.

The size of the square-shaped hole in each type of the feed plate is as follows:

Large: 7.5 mm x 7.5 mm
Medium: 6 mm x 6 mm
Small: 4.8 mm x 4.8 mm

11. REPLACING THE BUTTON CHUCK UNIT

(1) Explanation of the large- and small-sized button chuck units

The size of the button chuck unit to be used should be determined in accordance with the size of the button to be sewn.

For buttons with outside diameter of ϕ14 to ϕ28 mm: Large button chuck unit
For buttons with outside diameter of ϕ8 to ϕ16 mm: Small button chuck unit

(2) Removing the chuck unit

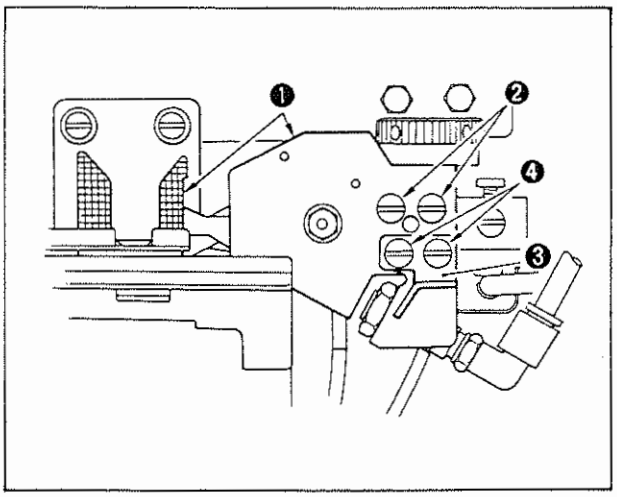


Fig. 11-1

1) Turn OFF the power to the machine.
2) Invert the button chuck unit by hand. Loosen screws ❹ used to fix button fixing cylinder base and chuck top and bottom cover ❸, and detach the above-stated parts from button chuck unit ❶.
3) Loosen screws ❷ used to fix the button chuck unit ❶ in place, and remove button chuck unit ❶.

(3) Attaching the chuck unit

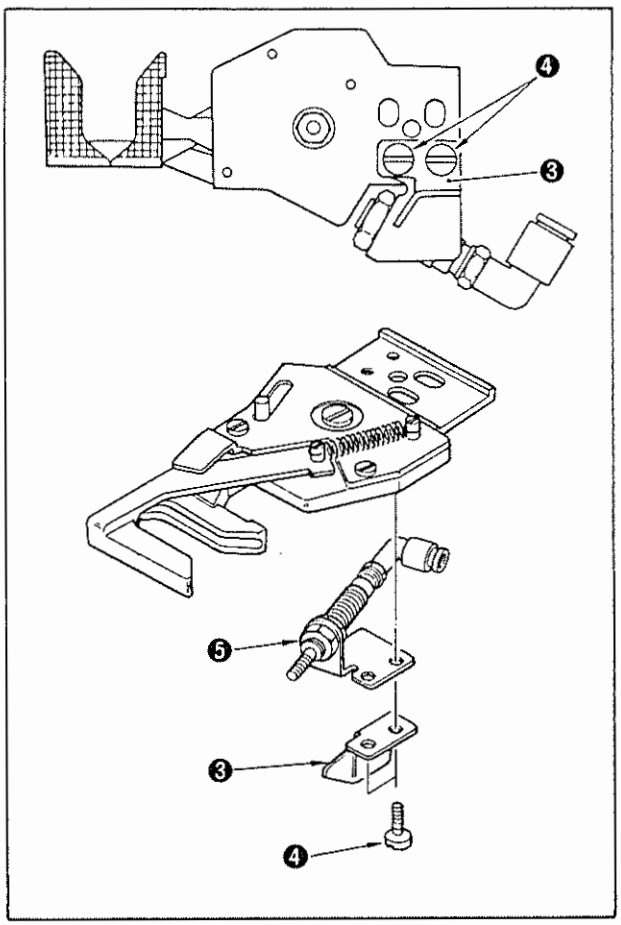


Fig. 11-2

1) Install the chuck unit and attach top and bottom cover ❸ and button fixing cylinder ❺ which have been detached from the button chuck unit using screws ❹.

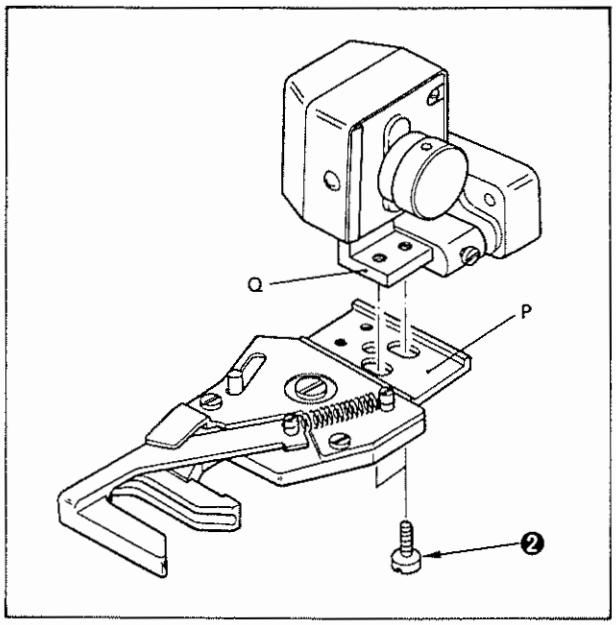


Fig. 11-3

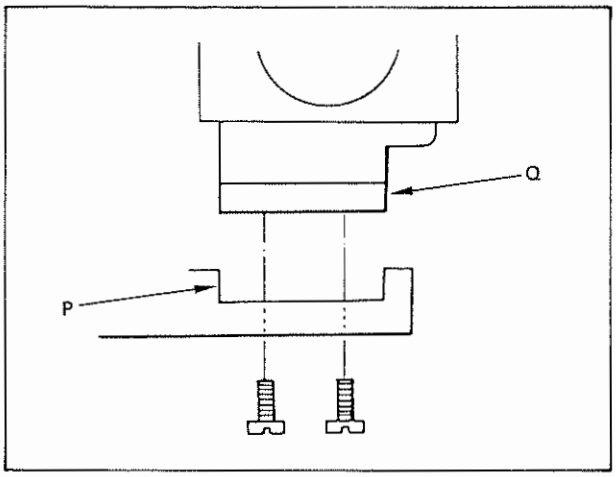


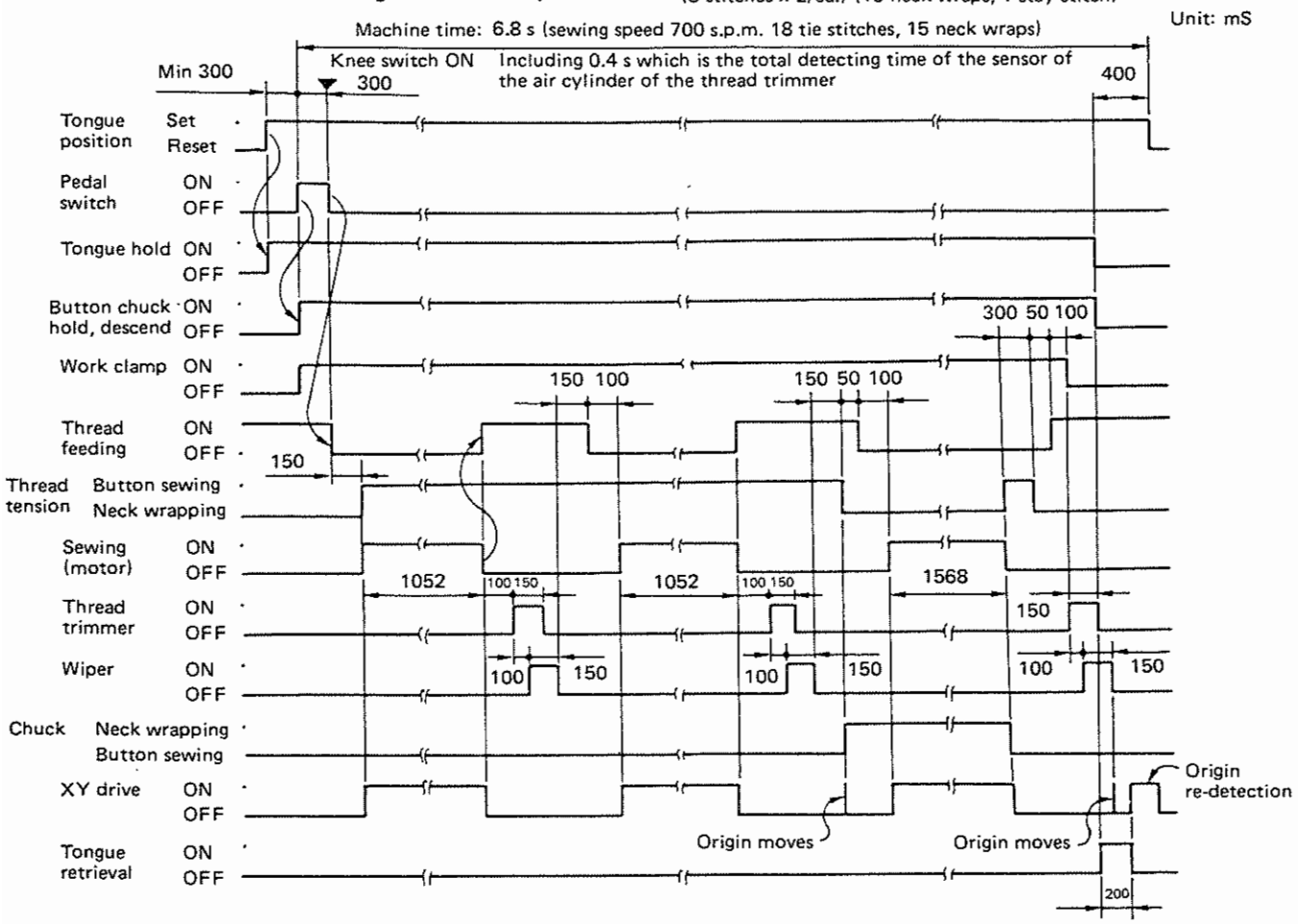
Fig. 11-4

2) Fit the protruded section of Q in the indented section of P, and temporarily assemble them using screw ❷.

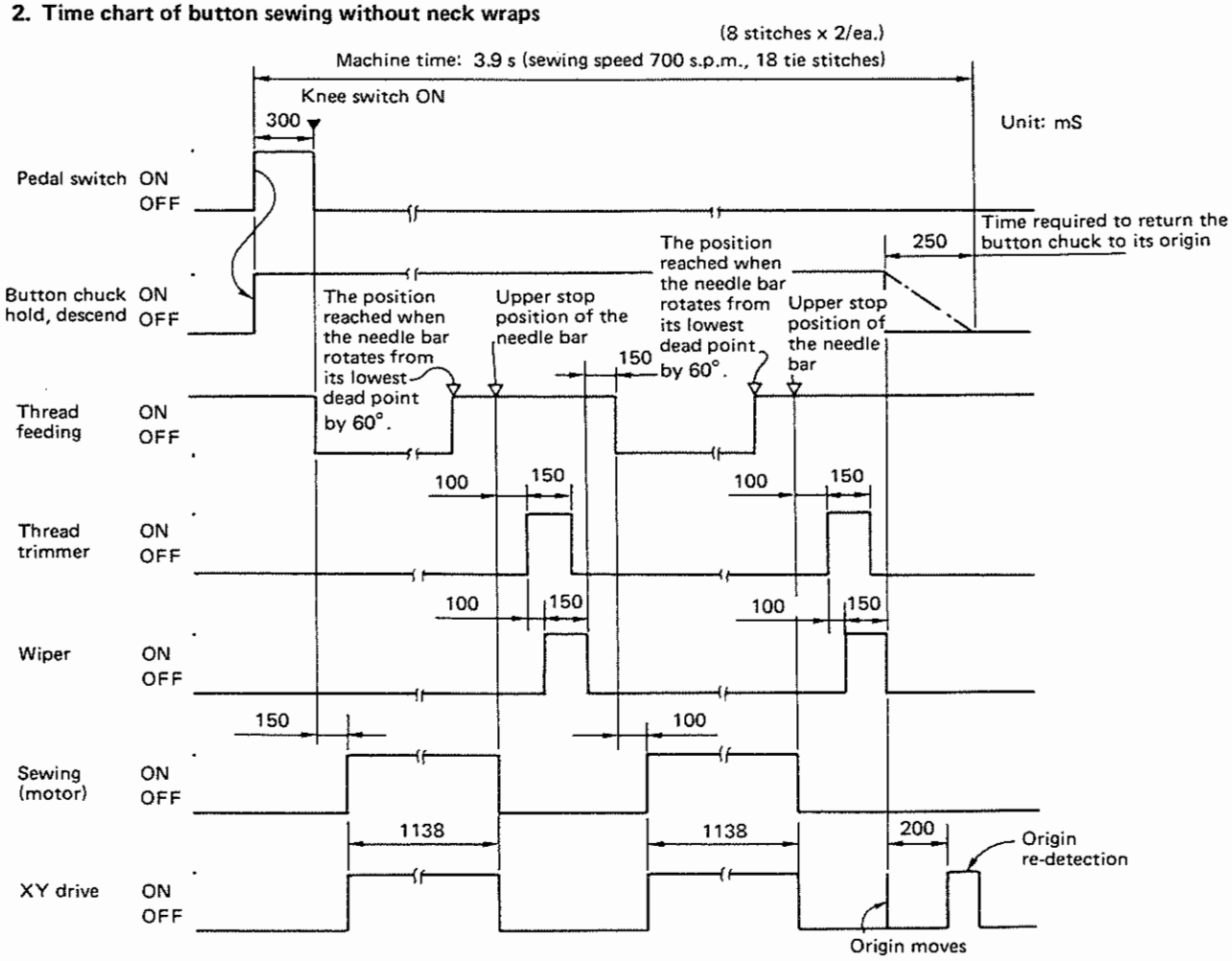
(Caution) Adjust the chuck unit referring to the "Adjusting the button chuck unit" on page 44.

12. TIME CHART

1. Time chart for button sewing with neck wraps



2. Time chart of button sewing without neck wraps



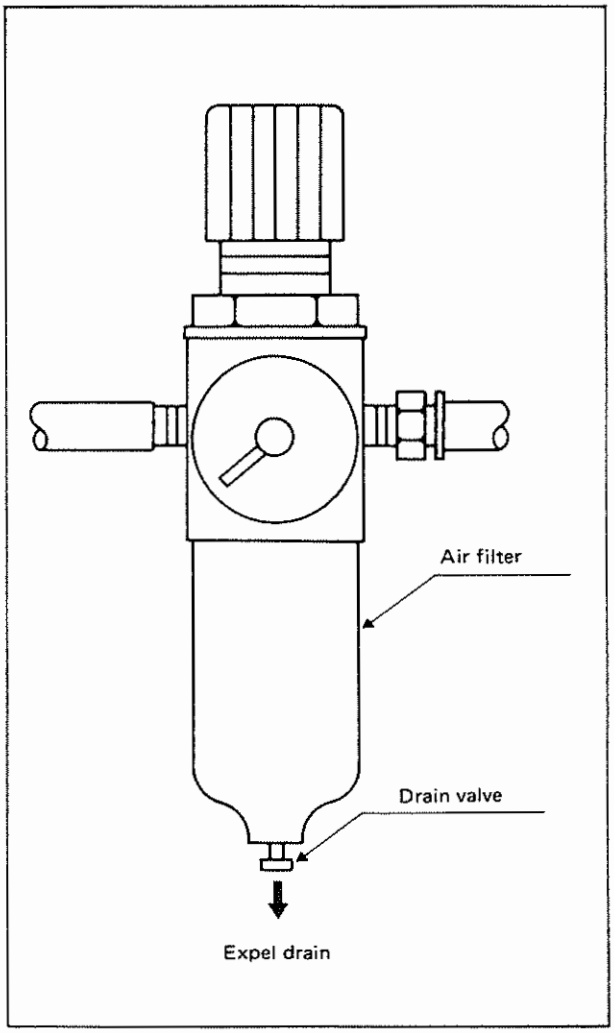


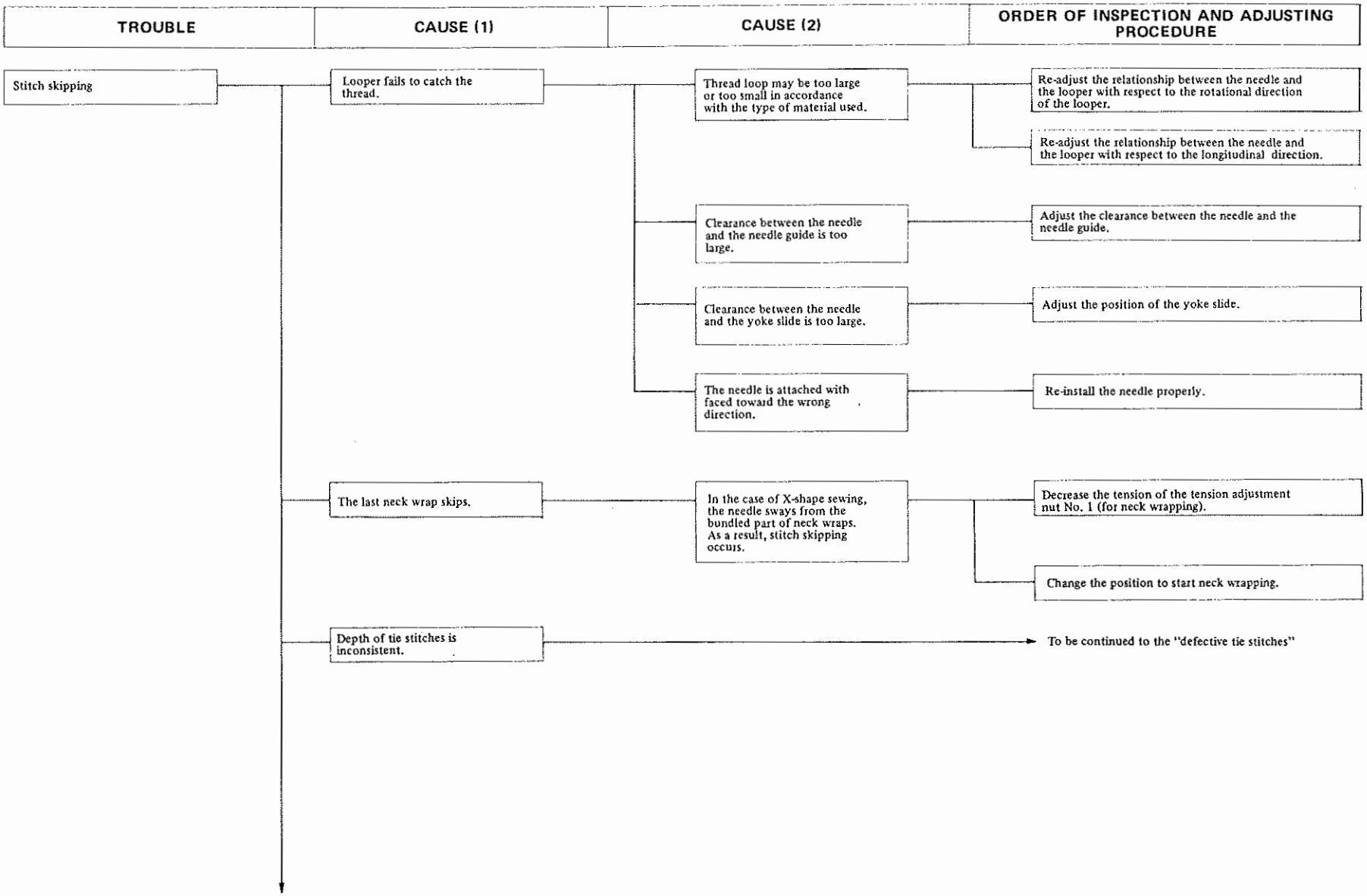
Fig. 13-1

After the completion of an operation, be sure to carry out the following maintenance.

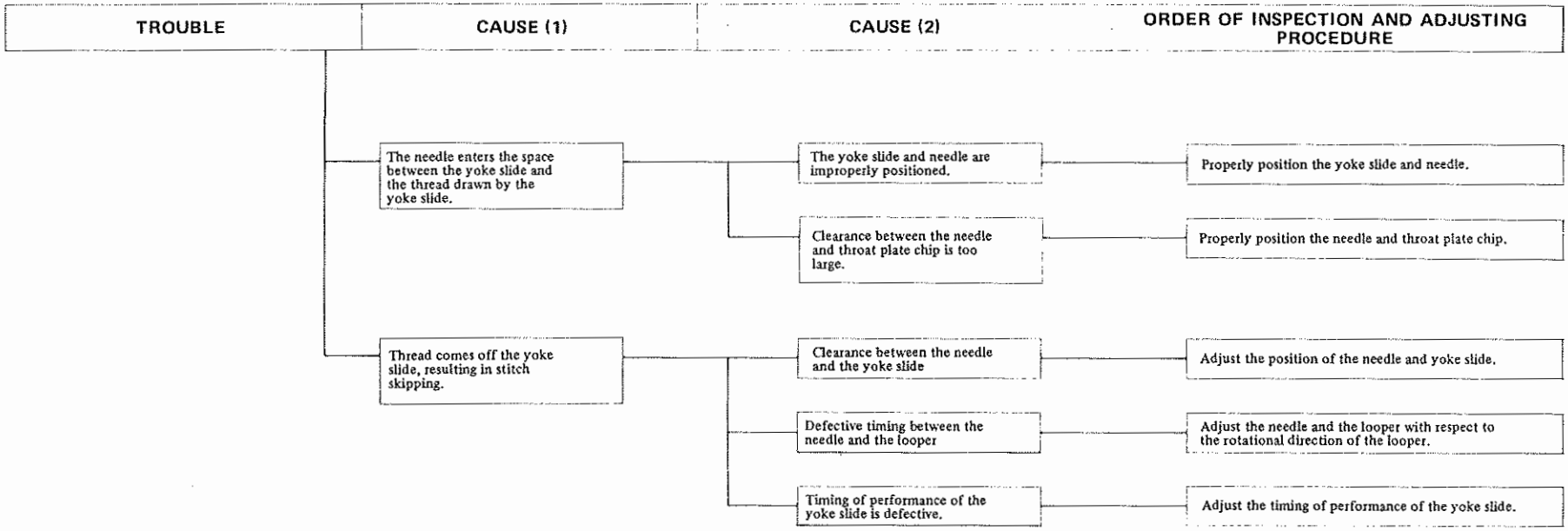
1) Turn OFF power to the machine.
   After turning OFF the power switch, turn OFF the main switch of the power to the machine.
2) Turn OFF the air supply, and press the drain valve on the air filter to expel drain from the air filter.
3) Clean up the looper unit.

14. TROUBLES AND CORRECTIVE MEASURES

(1) Sewing components

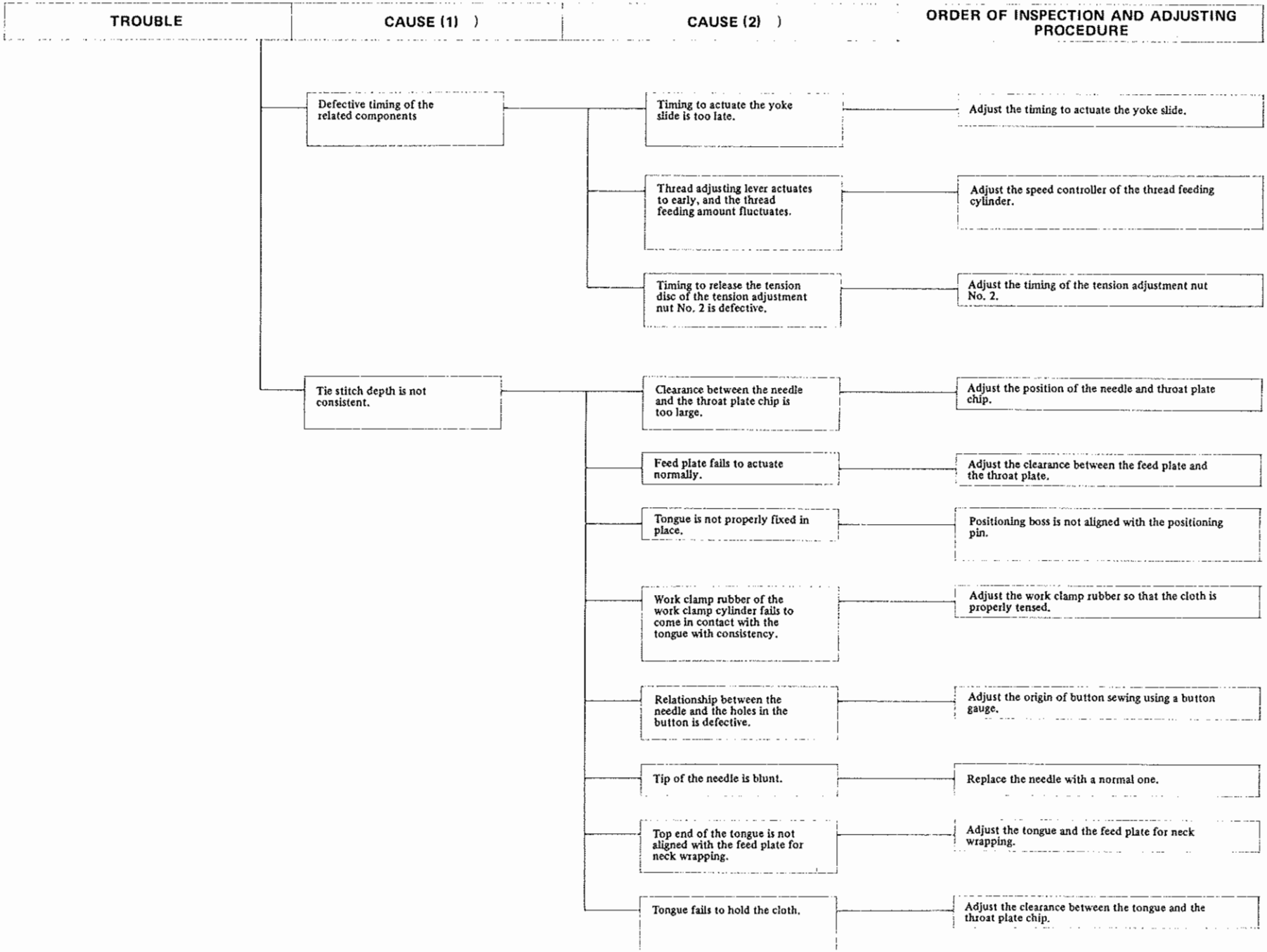


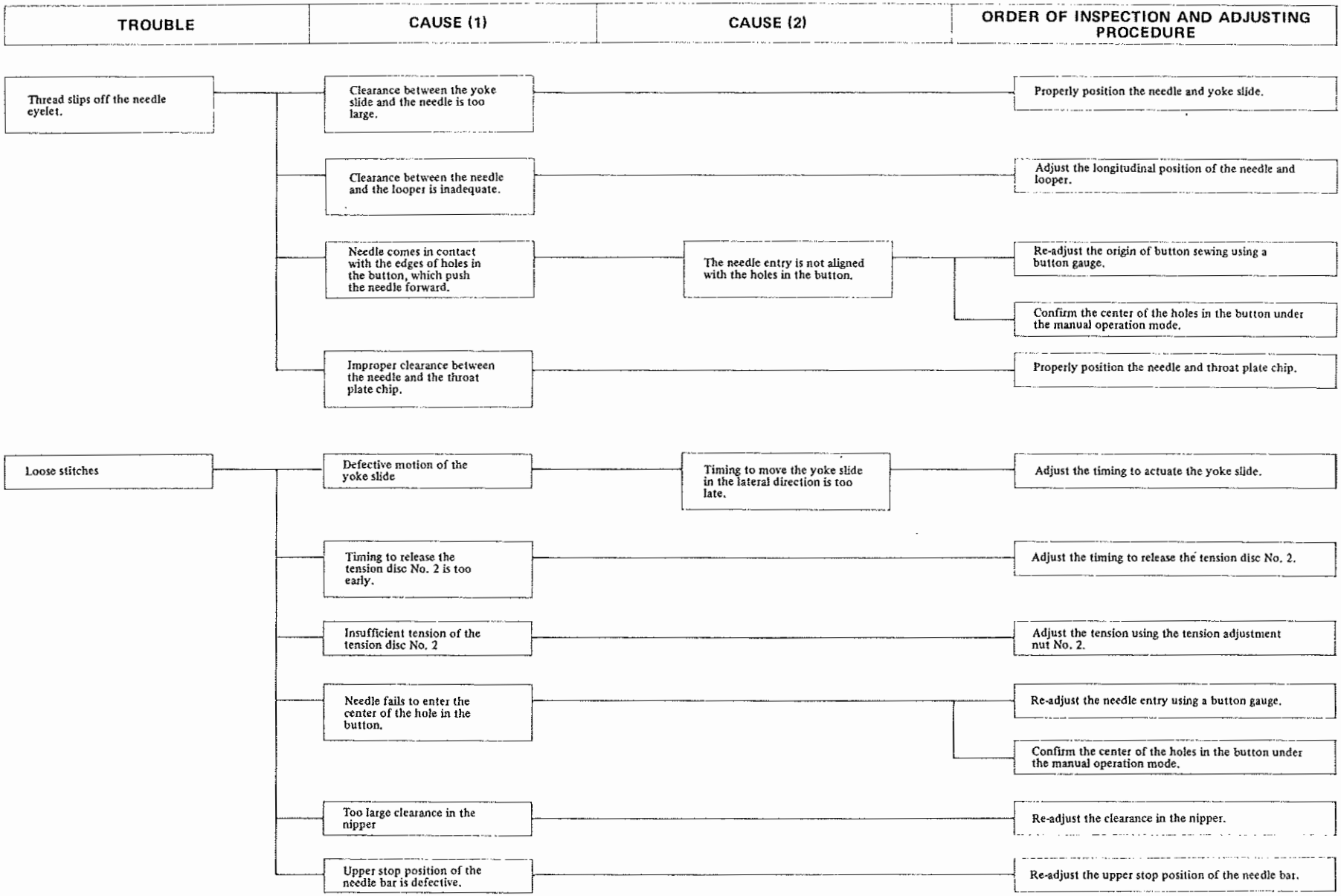
To be continued to the next page.

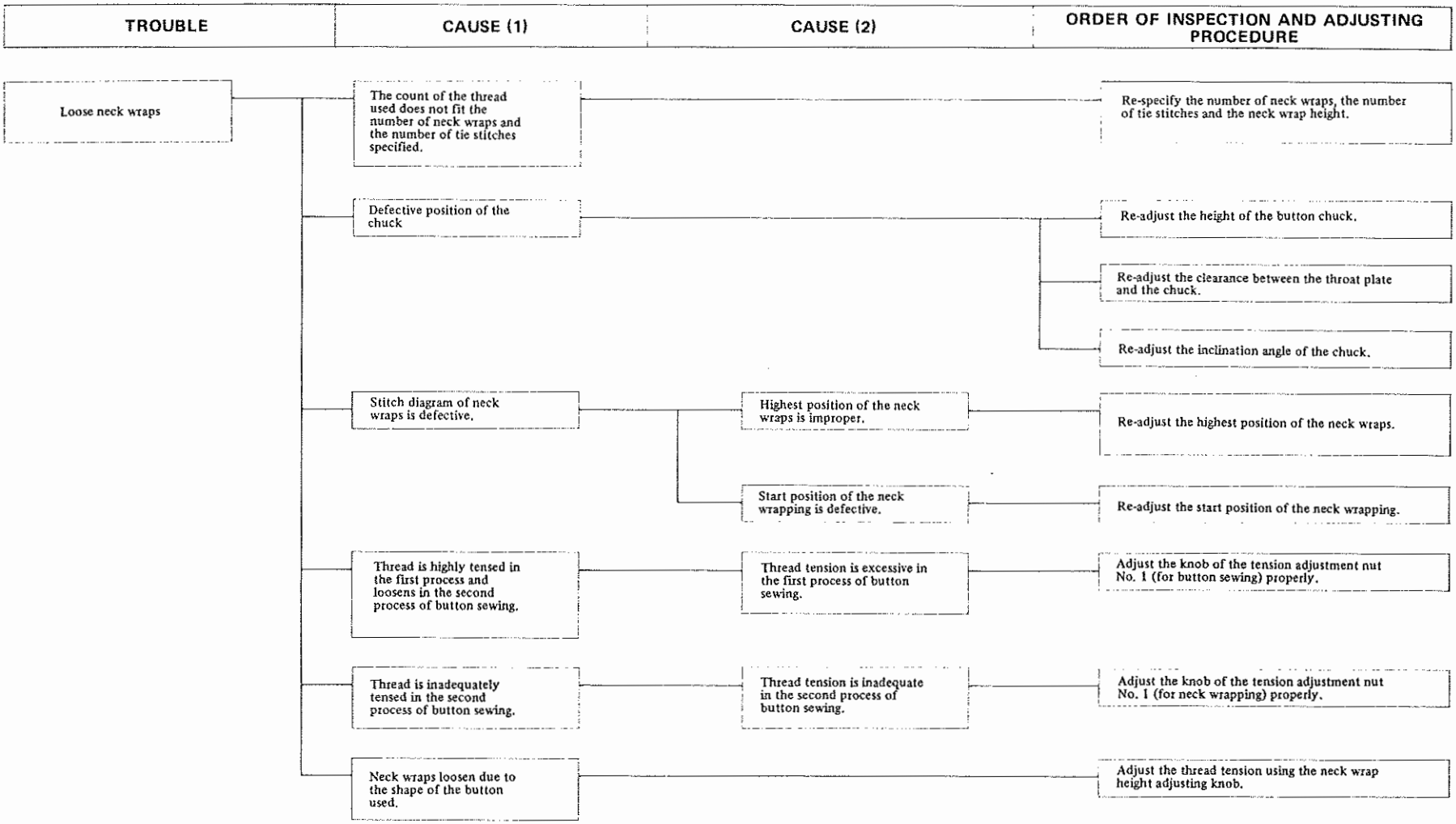


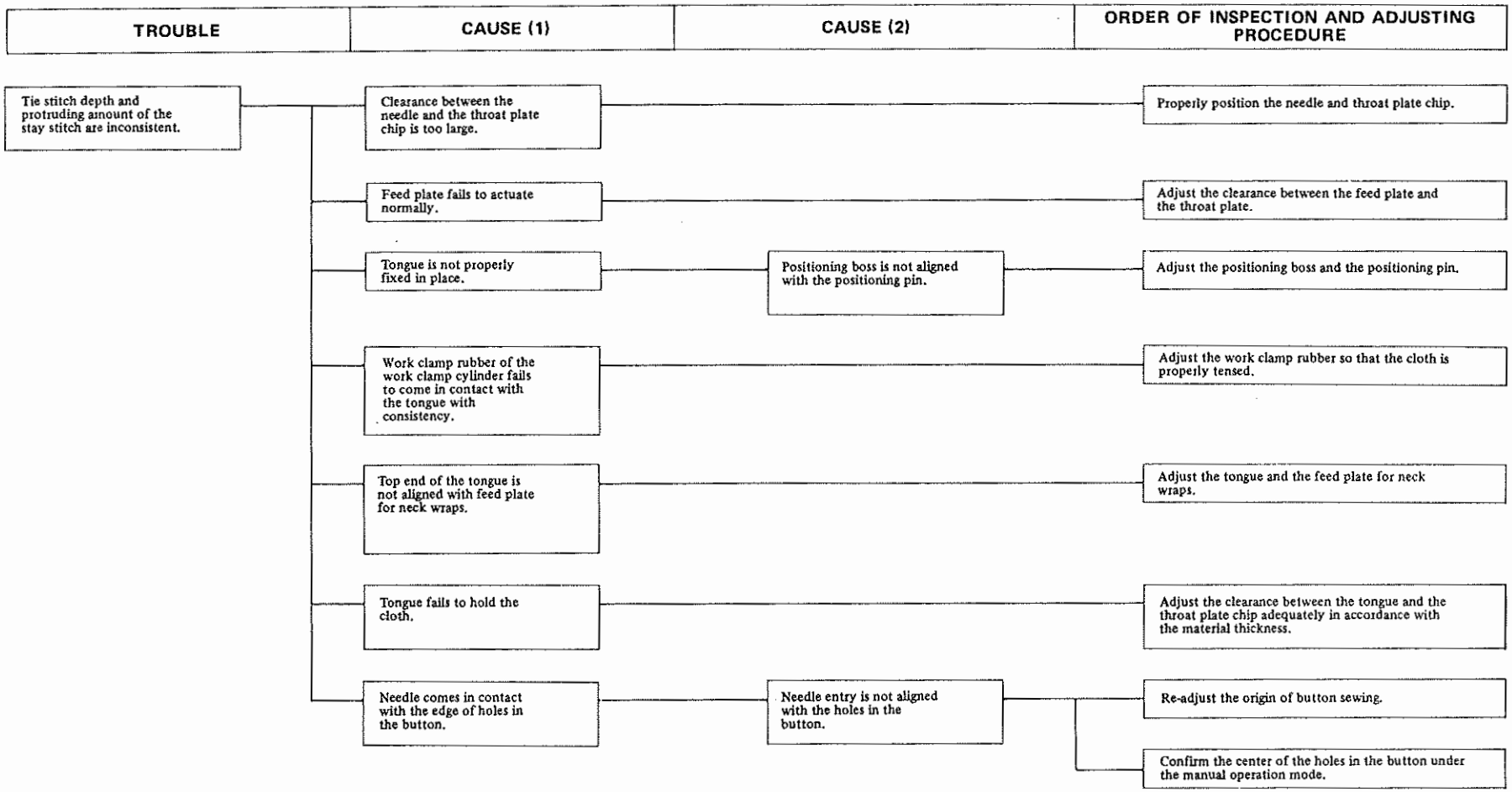
TROUBLE	CAUSE (1)	CAUSE (2)	ORDER OF INSPECTION AND ADJUSTING PROCEDURE
Length of remaining thread is inconsistent and the timing to release the needle from the cloth is inconsistent.	Defective thread path	Improper threading	Check how the machine head is threaded according to the figure indicating the threading procedure.
		Inconsistent timing to release the tension disc of the tension adjustment nut No. 1 (change-over of thread tension)	Readjust the tension change-over plate.
		Inconsistent timing to release the tension adjustment nut No. 2	Readjust the timing to release the tension adjustment nut No. 2 properly.
		Surface of the thread hole in the thread guide is not smoothly finished.	Burnish the surface of the thread guide.
		Surface of the thread hole in the thread guide No. 3 is not smoothly finished.	Burnish the surface of the thread guide.
		Tension of the tension adjustment nut No. 3 is not consistent.	Increase the spring pressure of the tension adjustment nut No. 3.
			Burnish the flat surface and the other surface of the needle thread presser plate.
		Surface of the yoke slide is not smoothly finished.	Burnish the surface of the yoke slide.
		Surface of the looper is not smoothly finished.	Burnish the surface of the looper.
		Blade point of the wiper is not smooth.	Burnish the surface of the wiper.
		Top end of the thread retaining pipe is not smoothly finished.	Burnish the surface of the thread retaining pipe.

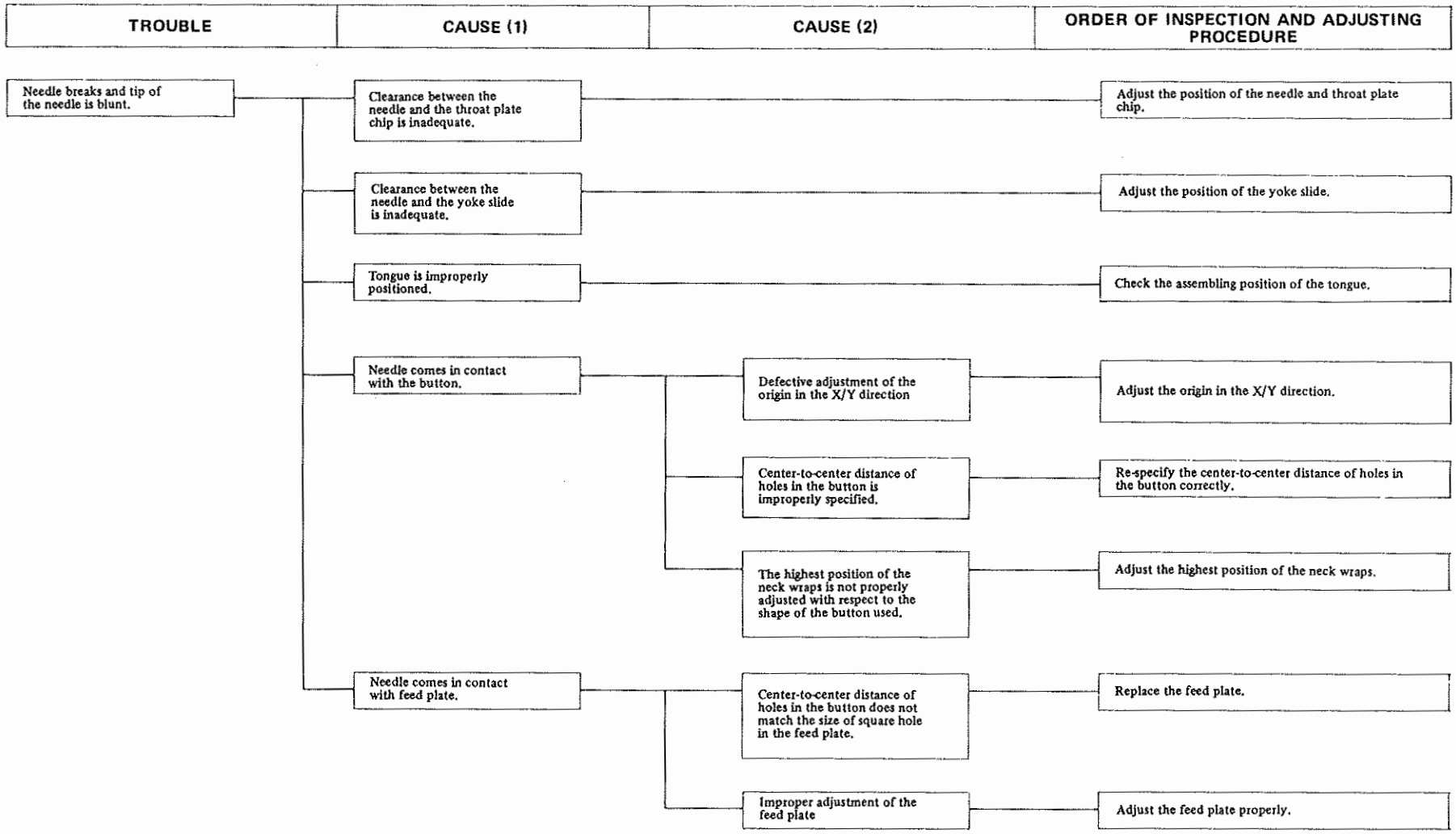
To be continued to the next page.

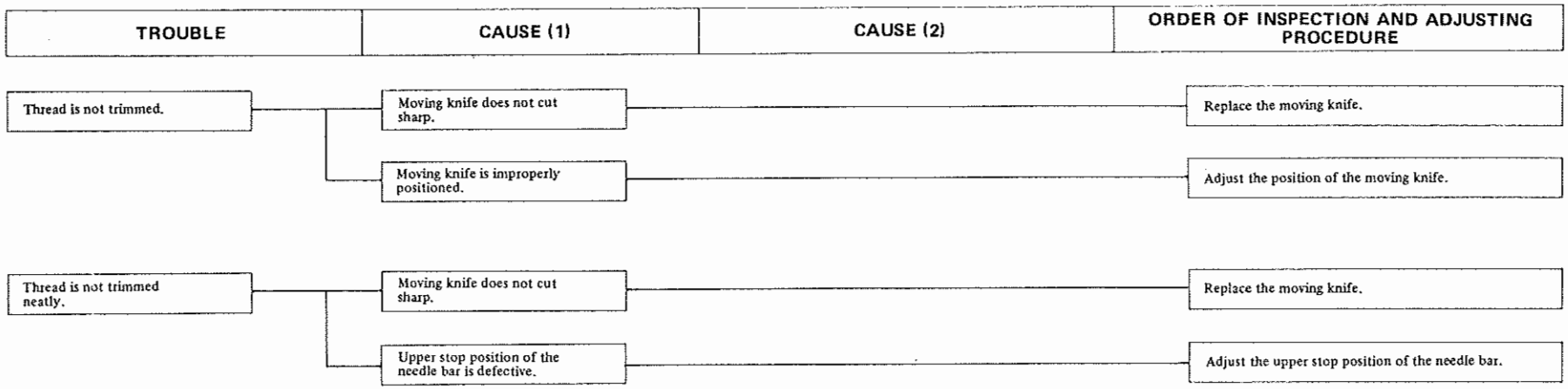




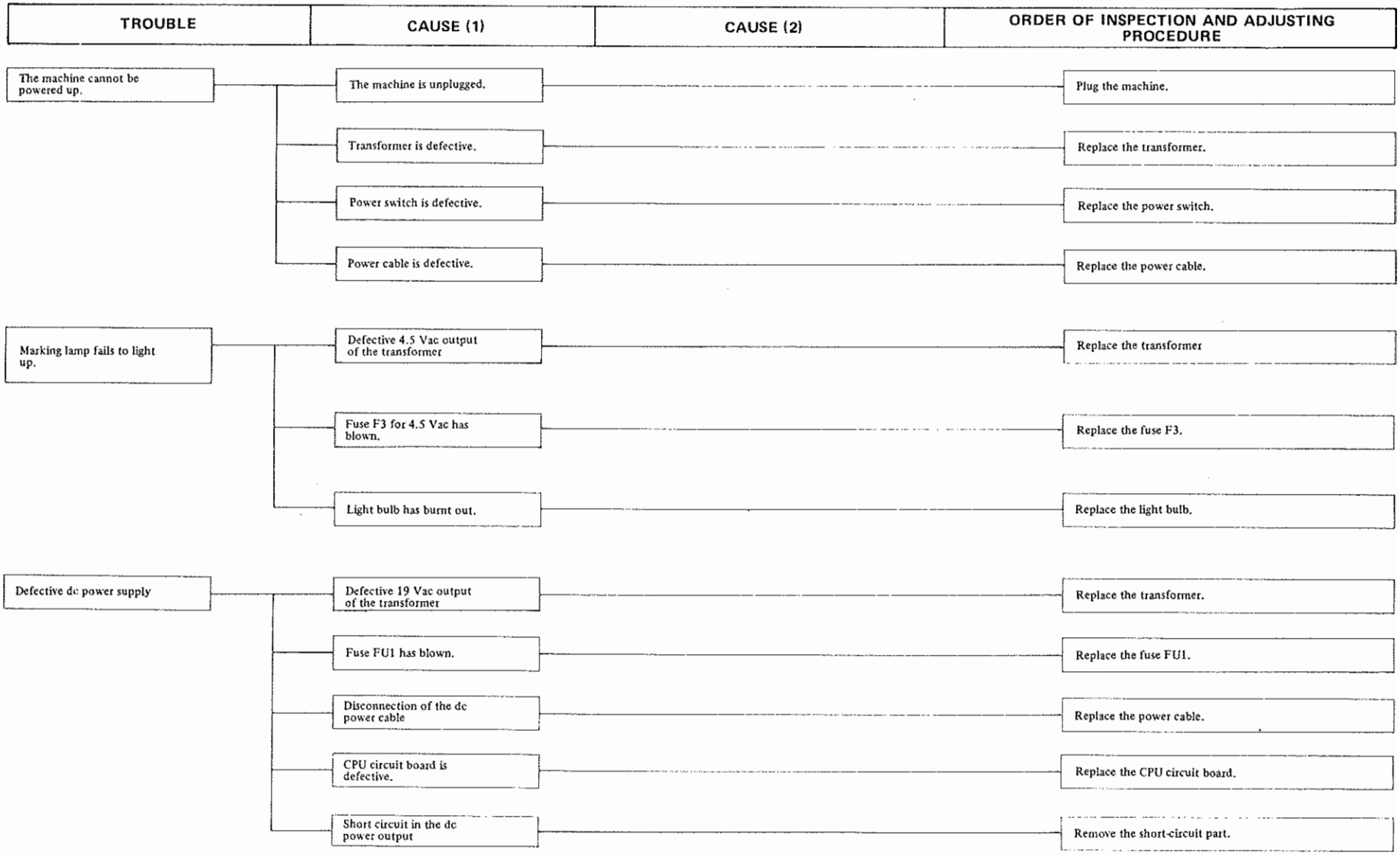


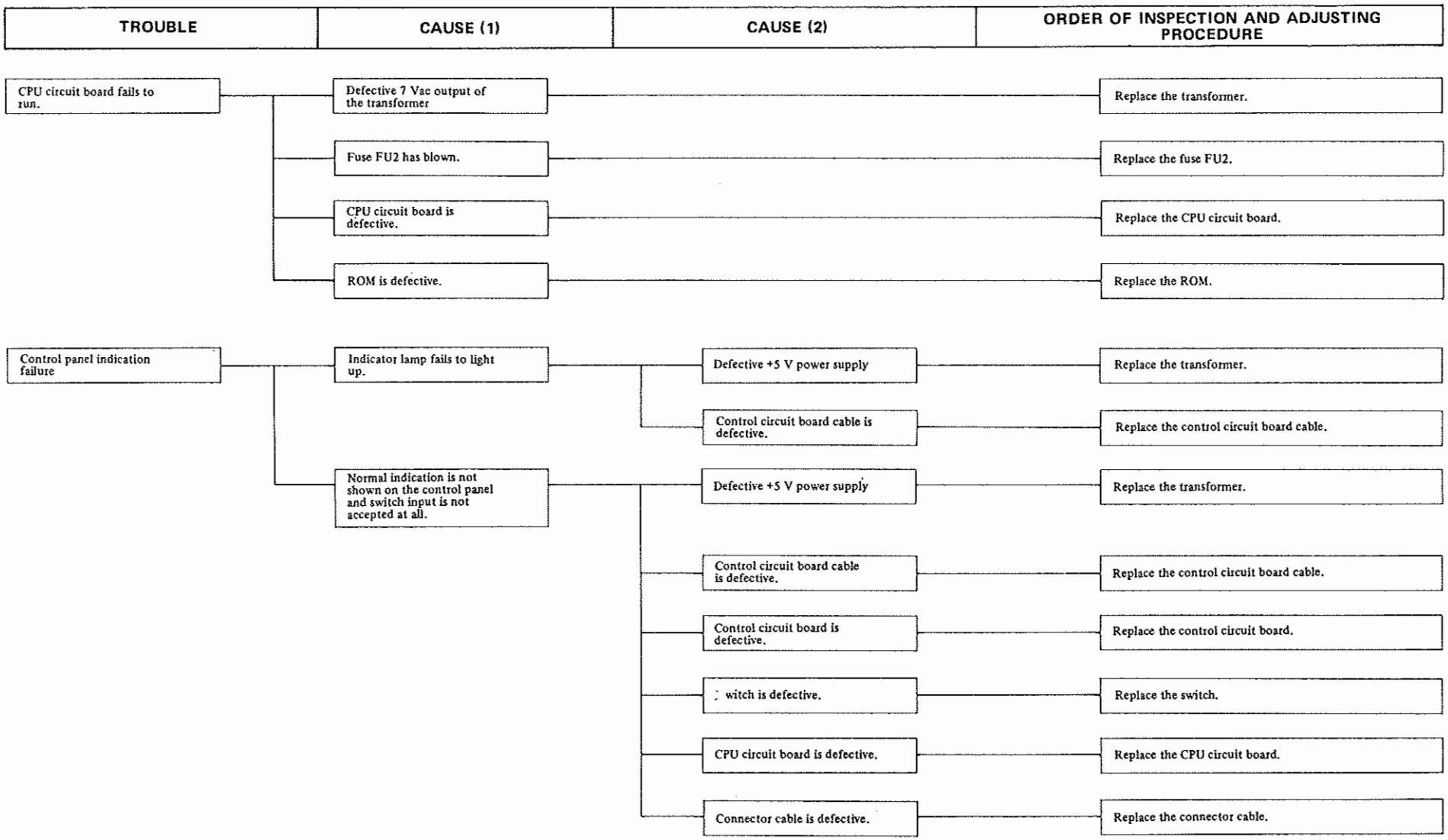


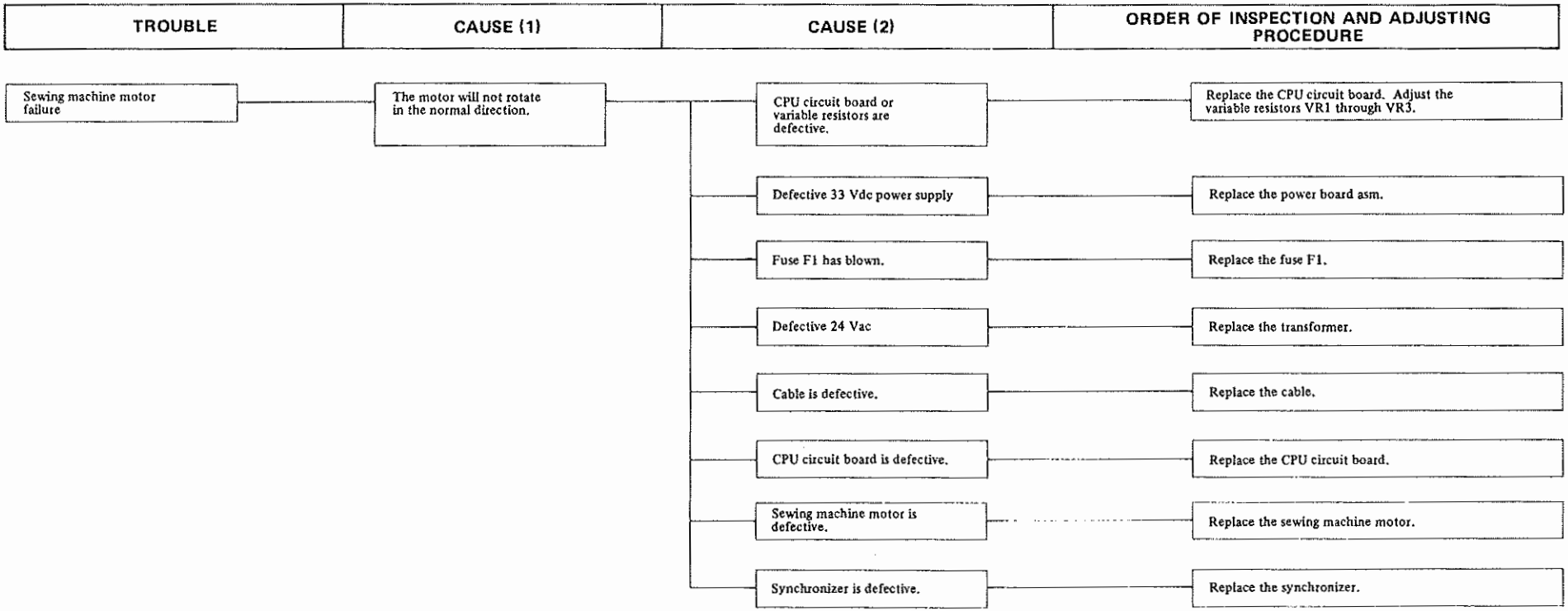


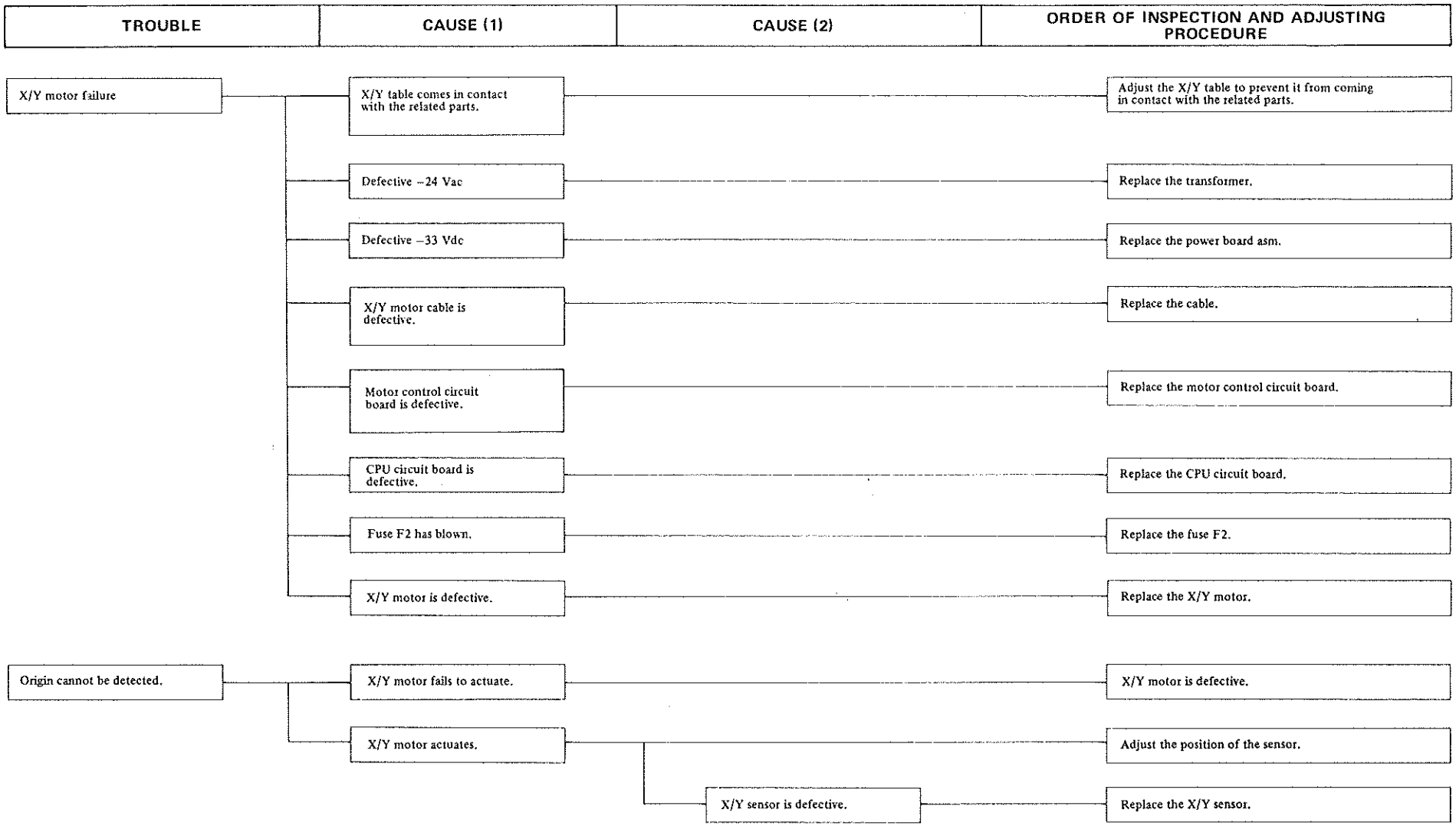


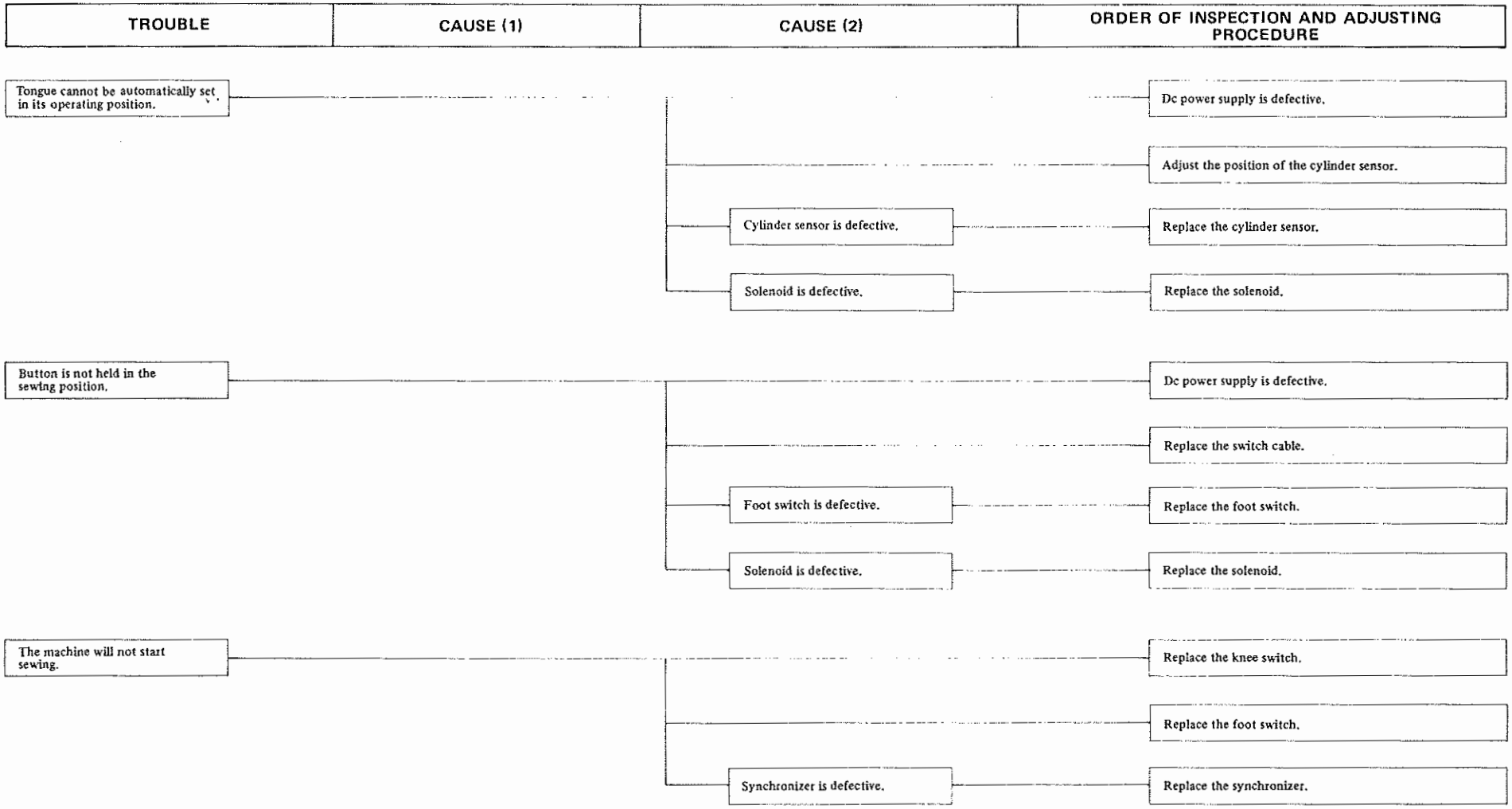
(2) Electrical components

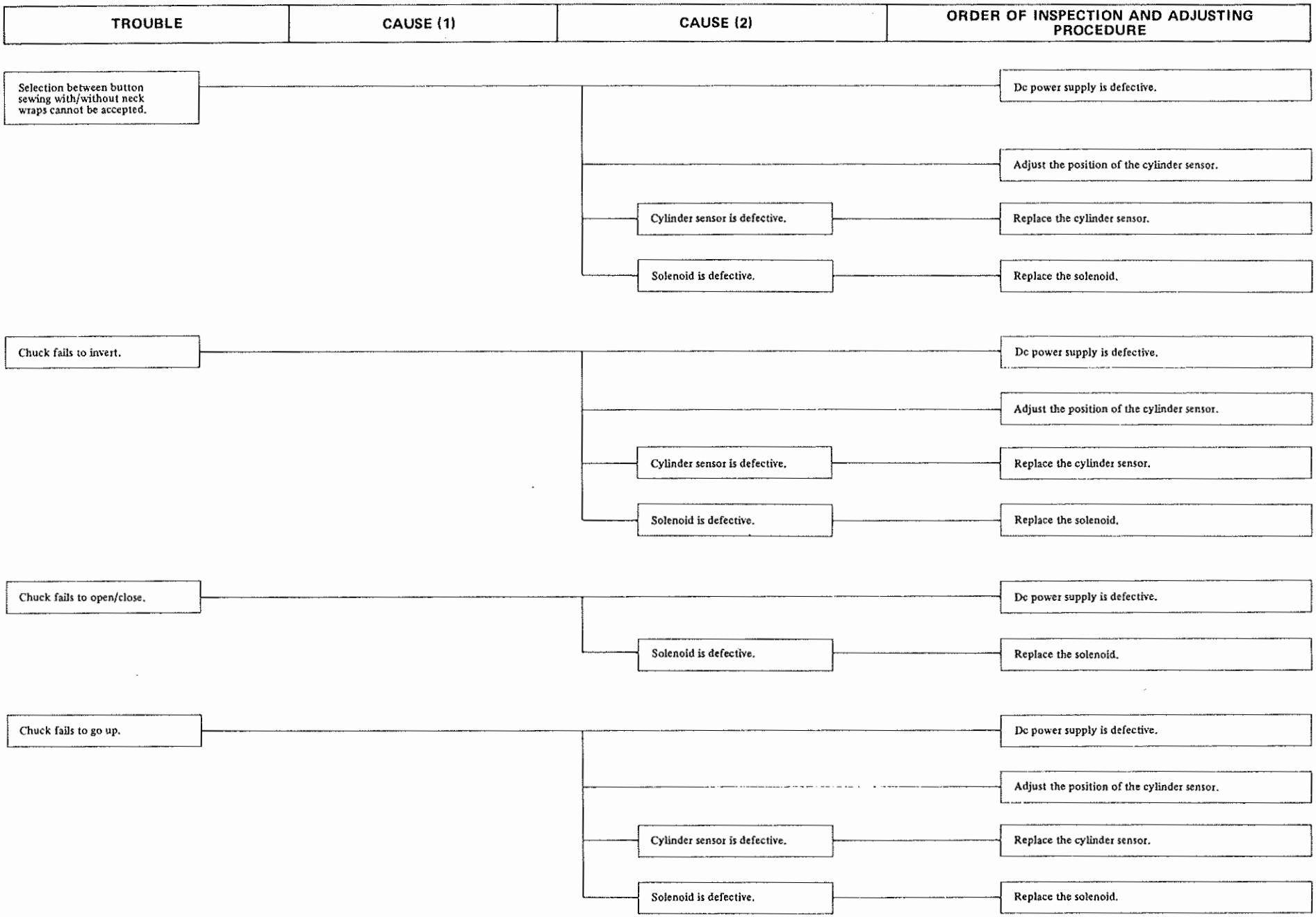


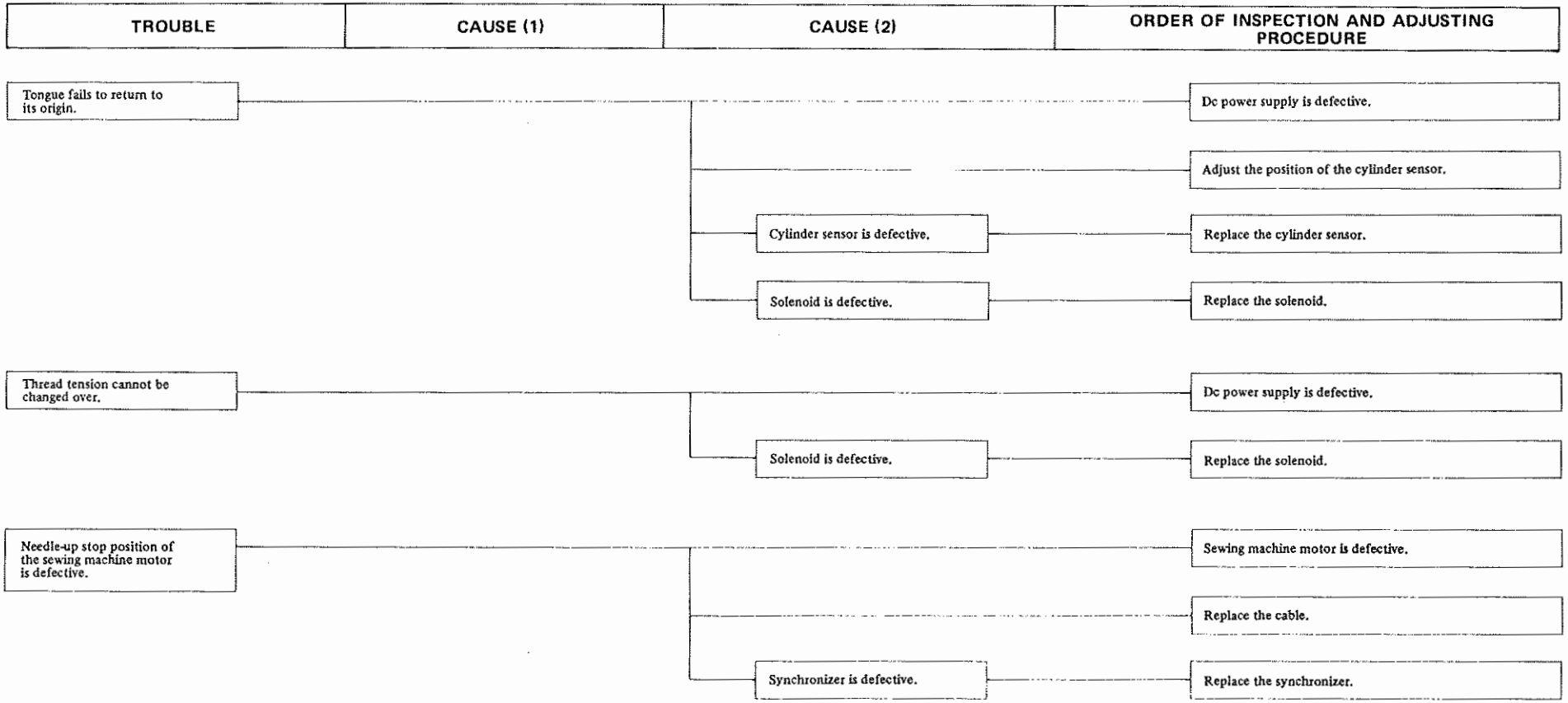




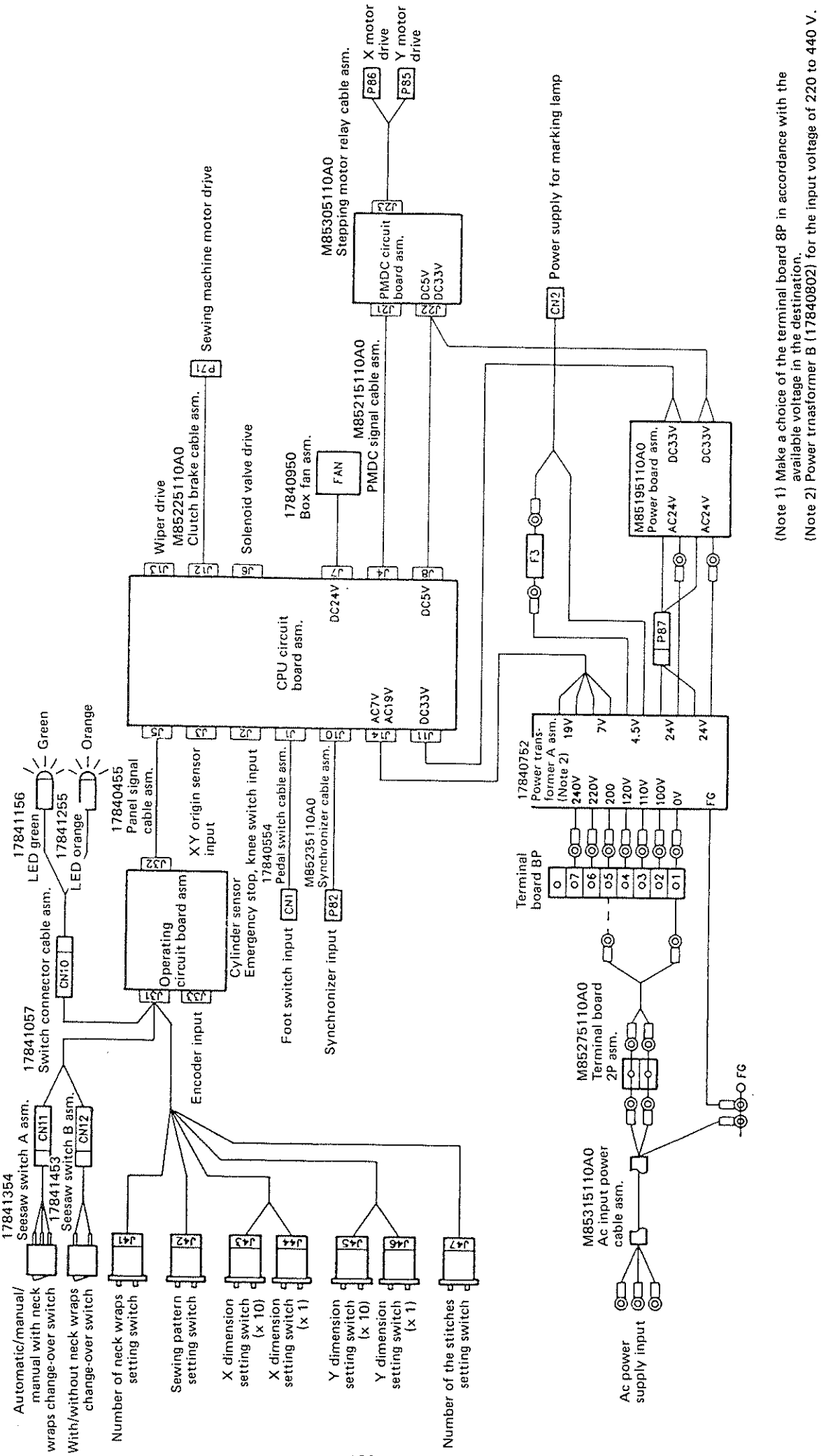








15. ELECTRIC CIRCUIT DIAGRAM

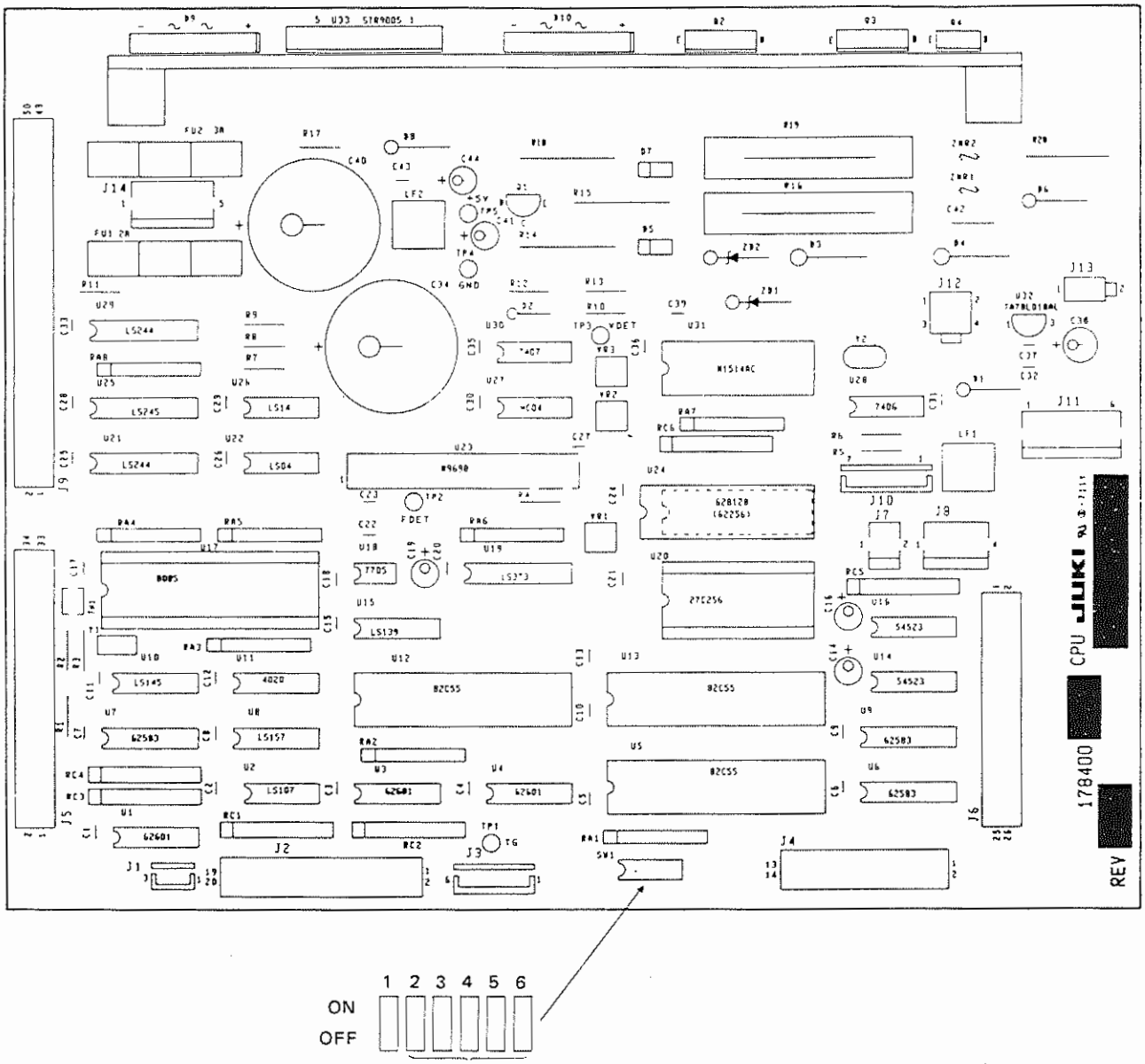


(Note 1) Make a choice of the terminal board 8P in accordance with the available voltage in the destination.
(Note 2) Power trnasformer B (17840802) for the input voltage of 220 to 440 V.

16. CHANGING THE METHOD TO START SEWING

The switch to be used to start sewing can be selected by changing the setting of the DIPSW (SW1)-1 on the CPU circuit board.

(Caution) Do not change the setting of the DIP switches other than the DIP SW (SW1)-1.



Switches 2 through 6 are set to the OFF position.

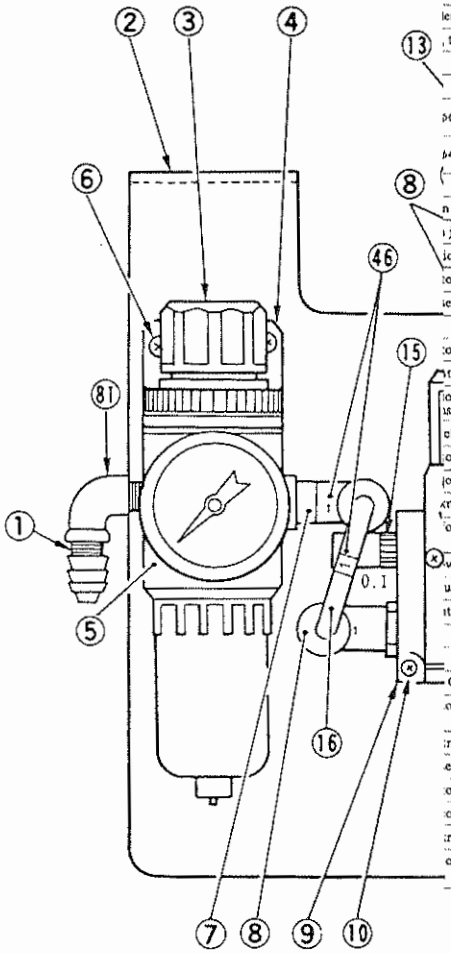
When the switch is set to its ON position:

1. Turning ON the foot switch will make the machine chuck the button. Then turning OFF the switch will make the machine start sewing.

When the switch is set to its OFF position:

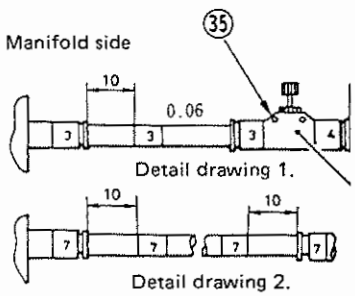
1. Turning ON the foot switch will make the machine chuck the button. Then turning ON the foot switch again will make the machine release the button chucked.
2. Turning ON the knee switch when the button is chucked will make the machine start sewing.

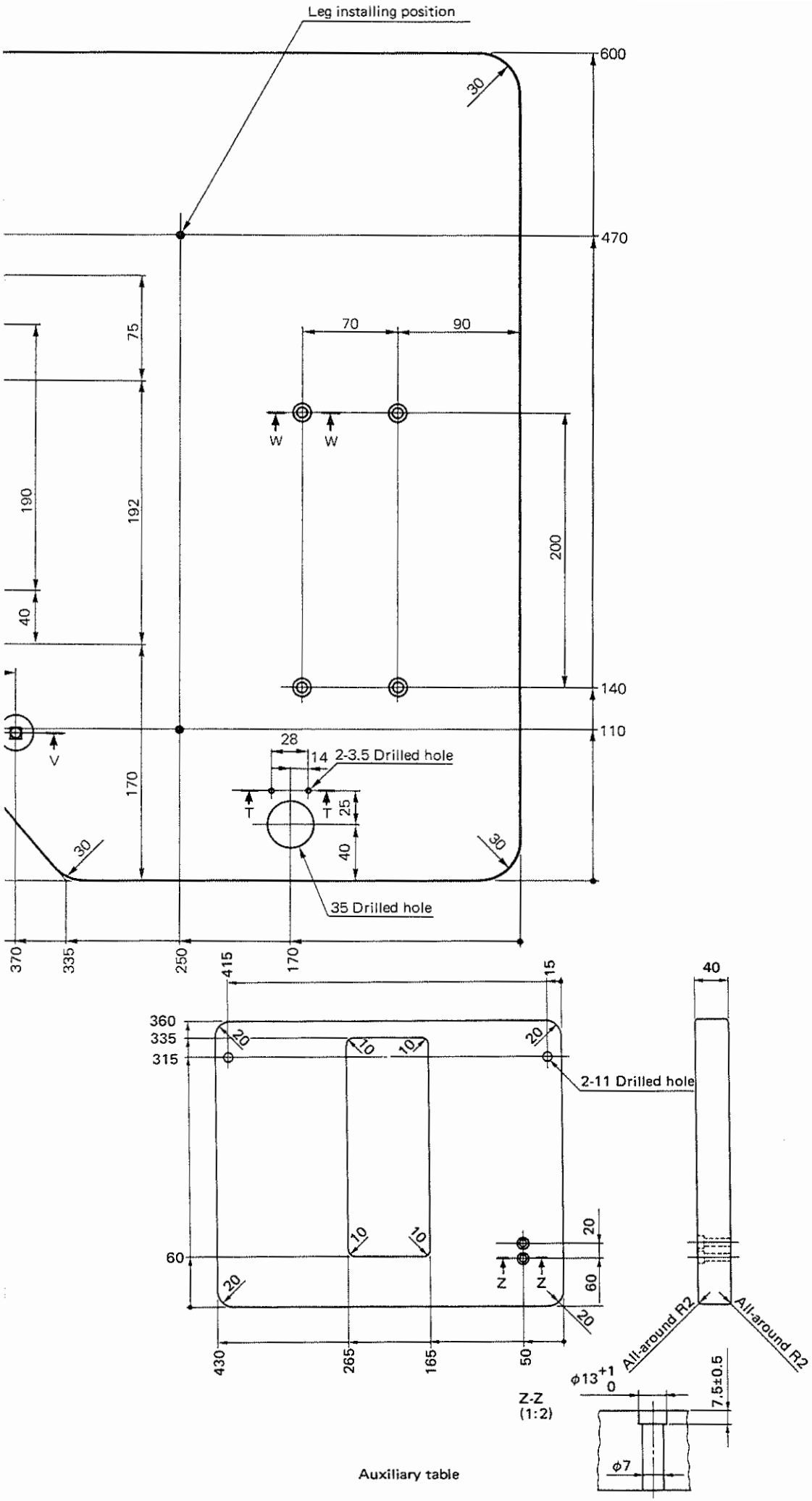
17. PNEUMATIC PIPING DIAGR



ne of part	Q'ty	Remarks
	1	
	1	
ulator	1	
	1	
	1	
	2	
ion φ6 x 1/4	1	
ion φ6 x PT1/8	3	
lenoid valve	1	
	2	
lenoid valve	3	
lenoid valve	7	
ten-way	1	
	2	
	3	
φ6	M 0.23	
φ4	M 25.96	
	3	
n φ1 x M5	17	
joint	7	
ion	4	
o fix tongue	1	
ensor	3	
	3	
o clamp cloth	1	
troller	6	
o change over sion	1	
elbow	4	
o adjust thread	1	
o feed thread	1	
nuckle joint	1	
or thread	1	
w union	1	
union	1	
troller	6	
	2	
	1	
C	2	
o raise/lower	1	
nuckle joint	1	
ensor	2	
o fix chuck	1	
o rotate chuck	1	
nuckle joint	1	
o invert neck	1	

Num-ber	Part number	R / N	Name of part	Q'ty	Remarks
46	1 8 0 3 5 0 0 6		Wire marker No. 1	3	
47	1 8 0 3 5 1 0 5		Wire marker No. 2	3	
48	1 8 0 3 5 2 0 4		Wire marker No. 3	3	
49	1 8 0 3 5 3 0 3		Wire marker No. 4	4	
50	1 8 0 3 5 4 0 2		Wire marker No. 5	3	
51	1 8 0 3 5 5 0 1		Wire marker No. 6	4	
52	1 8 0 3 5 6 0 0		Wire marker No. 7	4	
53	1 8 0 3 5 7 0 9		Wire marker No. 8	4	
54	1 8 0 3 5 8 0 8		Wire marker No. 9	4	
55	1 8 0 3 5 9 0 7		Wire marker No. 10	4	
56	1 8 0 3 6 0 0 4		Wire marker No. 11	4	
57	1 8 0 3 6 1 0 3		Wire marker No. 12	3	
58	1 8 0 3 6 2 0 2		Wire marker No. 13	4	
59	1 8 0 3 6 3 0 1		Wire marker No. 14	4	
60	1 8 0 3 6 4 0 0		Wire marker No. 15	4	
61	1 8 0 3 6 5 0 9		Wire marker No. 16	4	
62	1 8 0 3 6 6 0 8		Wire marker No. 17	4	
63	1 8 0 3 6 7 0 7		Wire marker No. 18	3	
64	1 8 0 3 6 8 0 6		Wire marker No. 19	4	
65	1 8 0 3 6 9 0 5		Wire marker No. 20	4	
66	1 8 0 3 7 0 0 2		Wire marker No. 21	4	
67	1 8 0 3 7 1 0 1		Wire marker No. 22	2	
68	1 8 0 3 7 2 0 0		Wire marker No. 23	3	
69	1 8 0 3 7 3 0 9		Wire marker No. 24	3	
70	1 8 0 3 7 4 0 8		Wire marker No. 25	4	
71	1 8 0 3 7 5 0 7		Wire marker No. 26	3	
72	1 8 0 3 7 6 0 6		Wire marker No. 27	4	
73	1 8 0 3 7 7 0 5		Wire marker No. 28	3	
74	1 8 0 3 7 8 0 4		Wire marker No. 29	4	
75	1 8 0 3 7 9 0 3		Wire marker No. 30	4	
76	1 8 0 3 8 0 0 0		Wire marker No. 31	4	
77	1 7 8 1 5 1 5 0		Air nozzle	1	
78	P A 1 0 0 8 0 0 3 A 0		Cylinder for wiper	1	
79	P J 0 4 6 0 5 2 5 0 3		Hose elbow	2	
80	P A 9 0 0 0 2 2 0 0 0		1-thread knuckle joint	1	
80	P J 0 4 2 5 2 0 0 0 2		Tube fitting	1	





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1991. 6 Printed in Japan