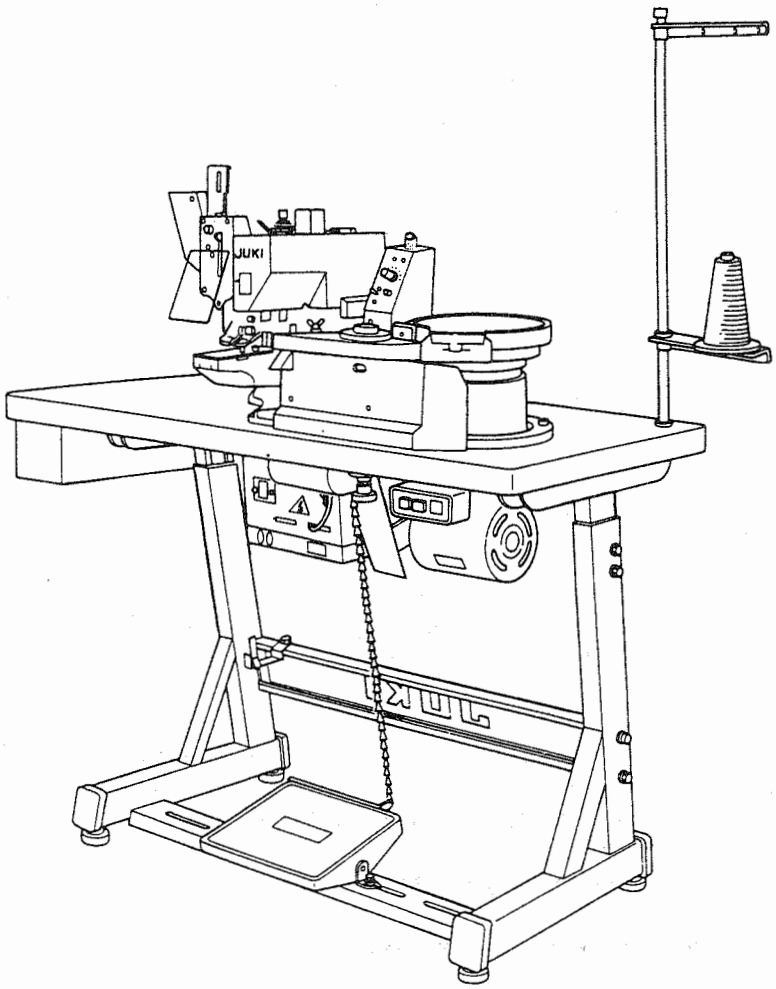
High-Speed, Single Thread Chainstitch Button Attaching Machine with Automatic Button Feeder

MB-373N/BR10

INSTRUCTION MANUAL



NOTE : Read safety instructions carefully and understand them before using your MB-373N/BR10.
Retain this Instruction Manual for future reference.

No. 04
29003506

IMPORTANT SAFETY INSTRUCTIONS

Congratulations on your purchase of a JUKI machine.
To get the most out of the many functions of this machine and operate it in safety, it is necessary to use this machine correctly.
Please read this Instruction Manual carefully before use. We hope you will enjoy the use of your machine for a long time.Please remember to keep this manual in a safe place.

1. Observe the basic safety measures, including, but not limited to the following ones, whenever you use the machine.
2. Read all the instructions, including, but not limited to this Instruction Manual before you use the machine. In addition, keep this Instruction Manual so that you may read it at anytime when necessary.
3. Use the machine after it has been ascertained that it conforms with safety rules/standards valid in your country.
4. All safety devices must be in position when the machine is ready for work or in operation. The operation without the specified safety devices is not allowed.
5. This machine shall be operated by appropriately-trained operators.
6. For your personal protection, we recommend that you wear safety glasses.
7. For the following, turn off the power switch or disconnect the power plug of the machine from the receptacle.
   7-1 For threading needle(s), looper, spreader etc. and replacing bobbin.
   7-2 For replacing part(s) of needle, presser foot, throat plate, looper, spreader, feed dog, needle guard, folder, cloth guide etc.
   7-3 For repair work.
   7-4 When leaving the working place or when the working place is unattended.
   7-5 When using clutch motors without applying brake, it has to be waited until the motor stopped totally.
8. If you should allow oil, grease, etc. used with the machine and devices to come in contact with your eyes or skin or swallow any of such liquid by mistake, immediately wash the contacted areas and consult a medical doctor.

9. Tampering with the live parts and devices, regardless of whether the machine is powered, is prohibited.
10. Repair, remodeling and adjustment works must only be done by appropriately trained technicians or specially skilled personnel. Only spare parts designated by JUKI can be used for repairs.
11. General maintenance and inspection works have to be done by appropriately trained personnel.
12. Repair and maintenance works of electrical components shall be conducted by qualified electric technicians or under the audit and guidance of specially skilled personnel.
    Whenever you find a failure of any of electrical components, immediately stop the machine.
13. Before making repair and maintenance works on the machine equipped with pneumatic parts such as an air cylinder, the air compressor has to be detached from the machine and the compressed air supply has to be cut off. Existing residual air pressure after disconnecting the air compressor from the machine has to be expelled. Exceptions to this are only adjustments and performance checks done by appropriately trained technicians or specially skilled personnel.
14. Periodically clean the machine throughout the period of use.

15. Grounding the machine is always necessary for the normal operation of the machine. The machine has to be operated in an environment that is free from strong noise sources such as high-frequency welder.
16. An appropriate power plug has to be attached to the machine by electric technicians. Power plug has to be connected to a grounded receptacle.

17. The machine is only allowed to be used for the purpose intended. Other used are not allowed.
18. Remodel or modify the machine in accordance with the safety rules/standards while taking all the effective safety measures. JUKI assumes no responsibility for damage caused by remodeling or modification of the machine.

19. Warning hints are marked with the two shown symbols.

Danger of injury to operator or service staff

Items requiring special attention

1. Don't put your hand under the needle when you turn "on" t1. To avoid electric shock hazards, never open the cover of the motor, button feeder, or electrical box while the machine is powered, and never touch any of the components mounted inside the electrical box.

1. To avoid possible personal injuries, be careful not to allow your fingers or any other part of your body to be caught in the spinner oscillating arm that operates to feed buttons while the machine is in operation.
2. To avoid an accident where the machine starts rotating simultaneously with the turning-on of the power to the machine, ascertain that the cloth feed cam on the machine head is in its stop-motion position in prior to the turning-on of the power to the machine.
3. To avoid personal injury, never operate the machine with any of the belt cover, eye protection cover, or safety devices removed.
4. To prevent possible personal injuries caused by being caught in the machine, keep your fingers, head and clothes away from the handwheel, V belt and the motor while the machine is operation. In addition, place nothing around them.
5. To avoid personal injury, never put your hand under the needle when you turn "ON" the power switch or operate the machine.
6. To avoid personal injury, never put your fingers into the take-up cover while the machine is in operation.
7. The hook rotates at a high speed while the machine is in operation. So as to avoid possible injuries to hands, keep your hands away from the area near the hook. In addition, turn OFF the power to the machine when replacing the bobbin.
8. To avoid possible personal injuries, be careful not to allow your fingers in the machine when tilting/raising the machine head.
9. To avoid possible accidents because of abrupt start of the machine, turn OFF the power to the machine when tilting the machine head or removing the belt cover and the V belt.
10. To avoid electrical shock hazards, never operate the sewing machine with the ground wire for the power supply removed.
11. To prevent possible accidents because of electric shock or damaged electrical component(s), turn OFF the power switch in prior to the connection/disconnection of the power plug.
12. In time of thunder and lighting, stop your work and disconnect the plug from the receptacle for safety's sake so as to prevent possible accidents because of damaged electrical component.
13. If the machine is suddenly moved from a cold place to a warm place, dew condensation may be observed. In this case, turn ON the power to the machine after you have confirmed that there is no danger of water drops in the machine so as to prevent possible accidents arising from damaged electrical component(s).

CONTENTS

1) Mechanical specifications

(1) Machine head	:	MB-373N (exclusively used with the button feeder)
(2) Sewing speed	:	Max. 1500 s.p.m.
(3) Needle	:	TQ × 7 #16 (standard)
(4) Number of stitches	:	8, 16, 32
(5) Buttons		
Shape	:	Round buttons (2-holed, 4-holed)
Size	:	ø10 to ø15 mm ø16 to ø18 mm (for subclass)
Thickness	:	t 1.8 to t 3.5 mm
(6) Feed amount		
Lateral feed	:	2.2 to 6.5 mm
Longitudinal feed	:	0 to 6.5 mm
(7) Selection of buttons to be fed	:	By vibration system using a piezoelectric feeder
(8) Button setting	:	Buttons are loaded from the rear
(9) Individual button feeding method	:	By the index method
(10) Detection of a failure of feeding buttons	:	Provided with two detectors o One detector detects a button at the section where the button is correctly positioned. o Another detector checks whether the button is correctly inserted into the carrier pin.
(11) Driving source for the feeder	:	DC motor (24 Vdc)
(12) Function of sewing buttons without cross-over stitch	:	Provided
(13) Automatic button discharging function	:	Provided
(14) Independent operation of the sewing machine	:	Possible
(15) Small-lot sewing function	:	Provided
(16) Time required to feed a button	:	0.5 sec./pc.
(17) Weight	:	85 kg

2) Electrical specifications

(1) Power requirements		
3-phase	:	200 V, 220 V, 380 V, 415 V, 440 V
Single-phase	:	100 V, 110 V, 220 V, 230 V, 240 V
Power fluctuation	:	Rated value ±10% or less
(2) Power consumption	:	300 W

2. PREPARATION AND OPERATION

1) Motor pulley and belt

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

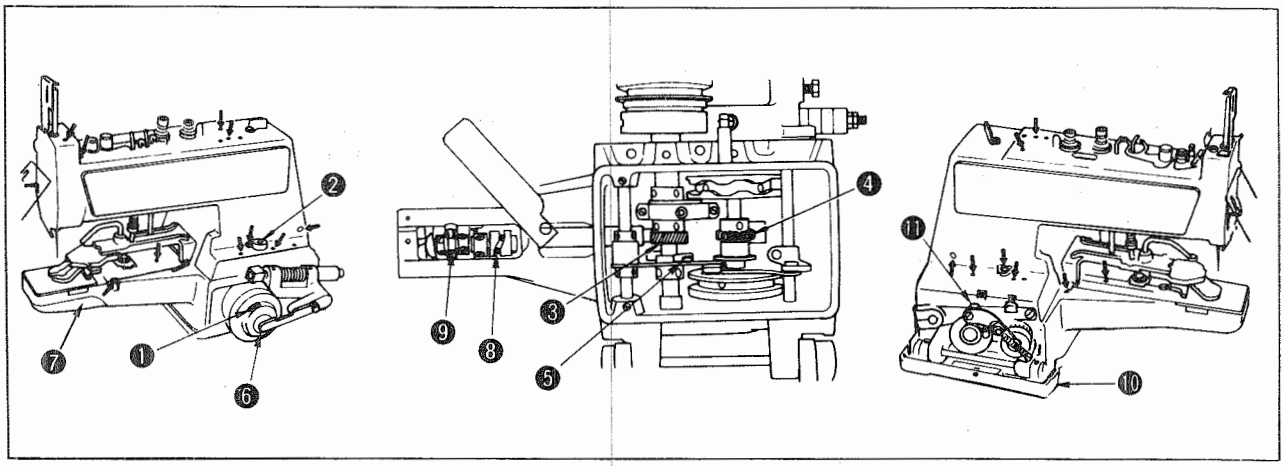
1) For this machine a single-phase or 3-phase 200 watts (1/4 HP) universal motor is used.
2) A V rope (MTJVM00000) belt is used.
3) The sewing speed depends on the diameter of the motor pulley as listed below:

Frequency	Sewing speed	Motor pulley Part No.	Motor pulley Outer diameter
50 Hz	1500 s.p.m.	B7101373N00	76 mm
60 Hz	1500 s.p.m.	B7102373N00	64.5 mm

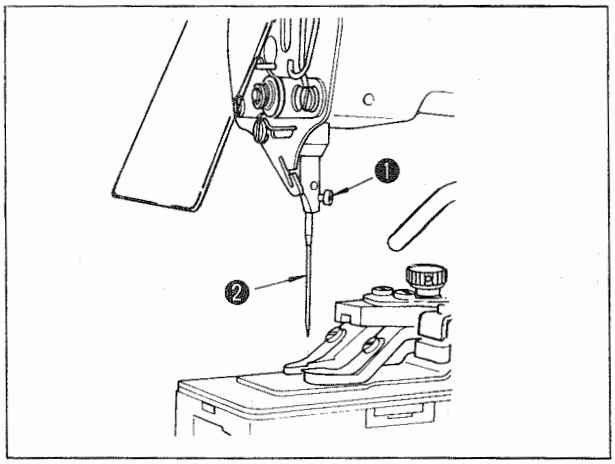
* The motor must rotate counterclockwise when viewed from the motor pulley side. Take care not to let it run in the reverse direction.
* The correct rotational direction of the motor is indicated by the arrow on the motor pulley. Check the rotational direction of the motor referring to the direction of the arrow.

2) Lubrication

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) Apply JUKI New Defrix Oil No. 1 to the components shown by the arrows.
(Be sure to apply oil to the components once a week.)
2) Remove screw ❶ in the driving pulley, and apply some grease. Apply grease also to driving ball ❻ .
3) Loosen connecting screws ❷, remove the V-belt and tilt the head backward. Apply some grease to gear ❸, worm gear ❹ and hinge screw ❺ in the pull-up hook.
4) Open looper cover ❼, and apply some grease to yoke slide fork ❾ and groove ❽ in the yoke slide longitudinal cam.
5) Open the left side cover ❿ , and apply some grease to number of stitch adjustment roller ⓫ .
6) Ensure that the oil felt in the bed mounting base is fully saturated with the lubricating oil. If the oil is not enough, add JUKI Defrix Oil No. 1.

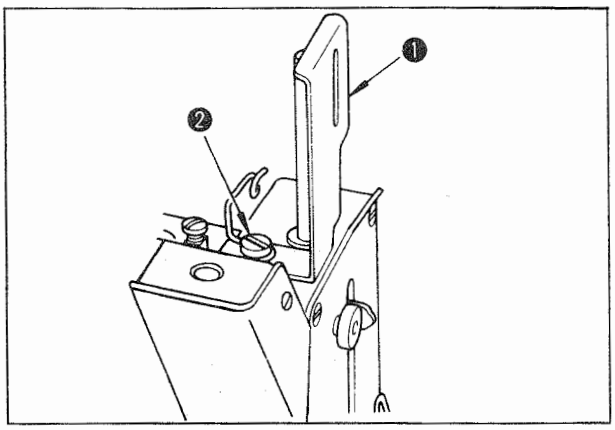


WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

★ Use a standard needle of TQ x 7 #16.

1) Loosen screw ❶ , and hold needle ❷ so that the long groove on it faces toward you.
2) Insert needle ❷ into the needle hole of the needle bar until the upper end of the hole is reached.
3) Tighten screw ❶ firmly.

4) Attaching the needle bar guard



WARNING :
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★ Attach the needle bar guard onto the wiper magnet base.

1) Loosen screw ❷ and remove it.
2) Place needle bar guard ❶ under the thread guide No. 2.
3) Fix the needle bar guard using screw ❷ .

5) Threading the machine

WARNING :
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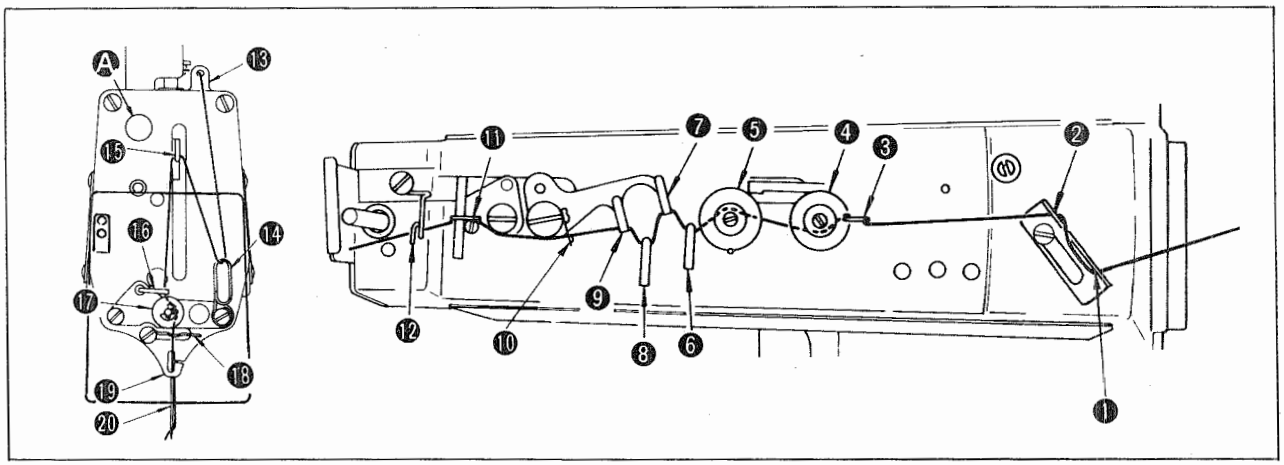

Thread the machine in the order of ❶ to ⓴ as illustrated and pass the thread through the needle eye from the front for 60 to 70 mm as you depress nipper releasing knurled thumb nut Ⓐ.

6) Thread tension adjustment

WARNING :
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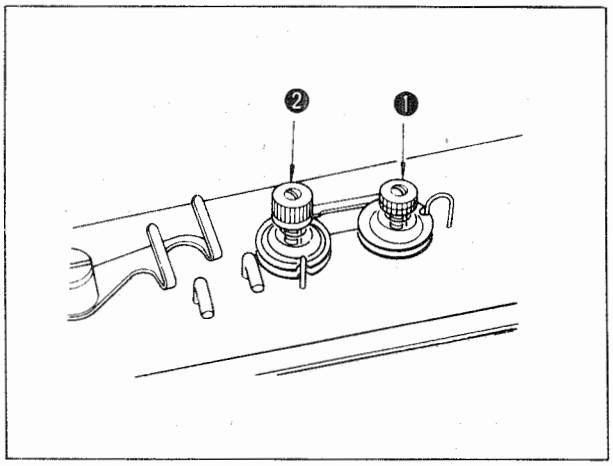
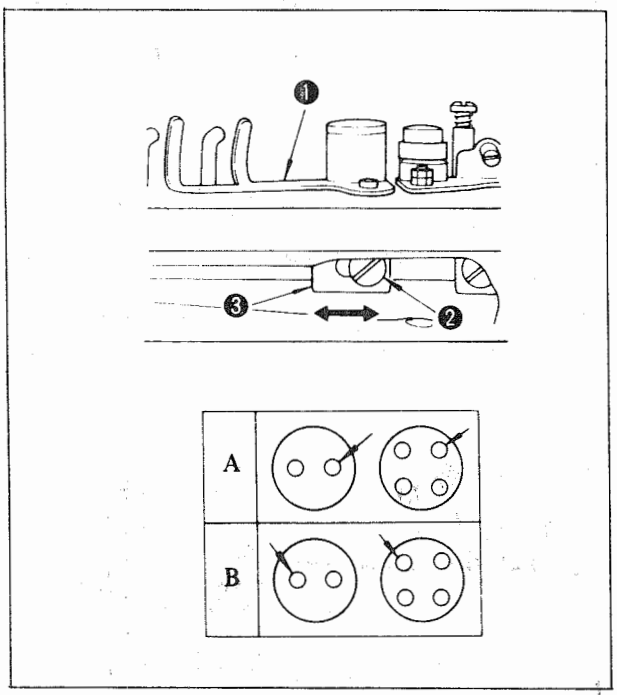


Tension post No. 1 ❶ is used to adjust the thread tension to sew on the button and a relatively low tension will be enough. Tension post No. 2 ❷ is used to adjust the thread tension applied to the root of the button sewing stitches. This tension must be determined according to the type of thread, fabric and thickness of the button and must be higher than that of tension post No. 1 ❶ . Turn the tension post clockwise to increase or counterclockwise to reduce the thread tension.

7) Adjustment of the thread pull-off lever

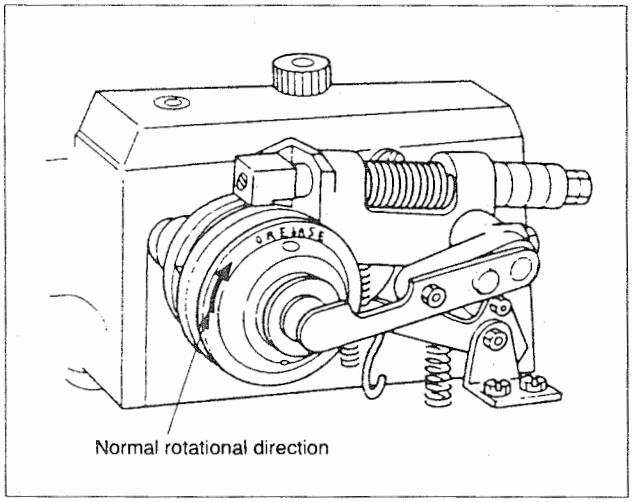
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

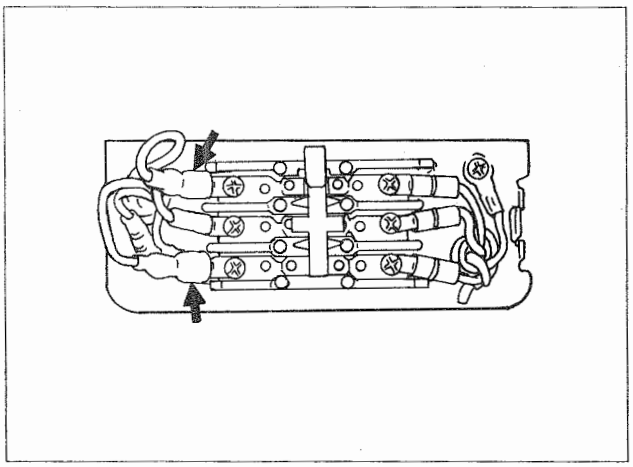


Adjustment of the thread pull-off lever ❶ , insert a screwdriver through an opening in the machine arm side cover (left), loosen screw ❷ and adjust the position of thread pull-off lever block ❸ to the left or the right.
If the end of thread is drawn from arrow hole A in the buton after sewing, change the position of thread pull-off lever block ❸ to the left. Move the lever to the right when the thread end comes out from arrow hole B.

DANGER :
So as to avoid electric shock hazards, turn off the power switch and detach the power plug from the receptacle before starting the works.

Connect the power cable coming from the control box of the button feeder to the power supply (R.S.T.E.). When connecting the power to the button feeder, be sure to confirm that the sewing machine turns in its normal rotational direction.





★ **How to check the normal direction of rotation of the sewing machine**

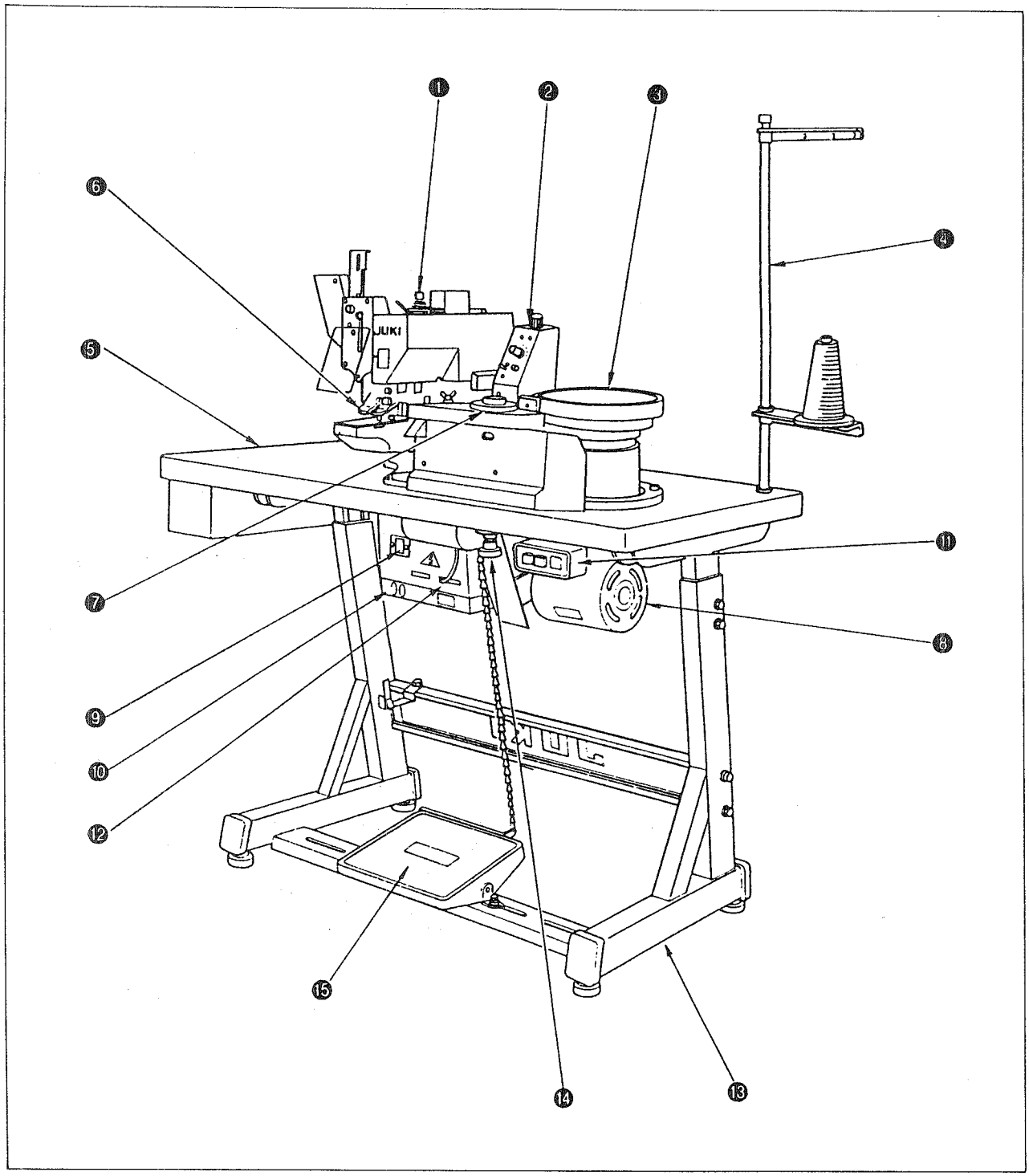
The machine turns clockwise as viewed from the handwheel side. If the machine turns in the reverse direction, change round the two wires marked with an arrow (→) of the power cord.

★ Cautions to be taken when the button feeder is connected to the power supply.

1) Be sure to ground the wire.
2) Cautions regarding power supply
   - ○ The fluctuation of voltage of power supply must not exceed the rated value ±10%.
   - ○ Abrupt fluctuation of power voltage might stop the machine.
   - ○ If an excessive current load or an electro-magnetic induction by solenoid or the like is applied to the power line, malfunction of the button feeder may result.

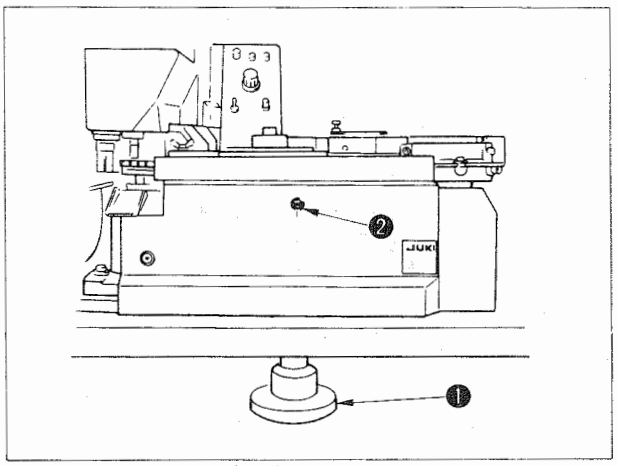
(Caution) For the sake of explanation, the illustration shows the state of the machine with the belt cover and the power switch cover removed.

9) Name of each component



1. Sewing machine
2. Operation panel (1)
3. Button feeder
4. Thread stand
5. Table
6. Button clamp unit
7. BR unit
8. Motor
9. Operation panel (2)
10. B/F controller
11. Power switch
12. Control box (CPU)
13. Pedestal
14. Arm motor knob
15. Pedal

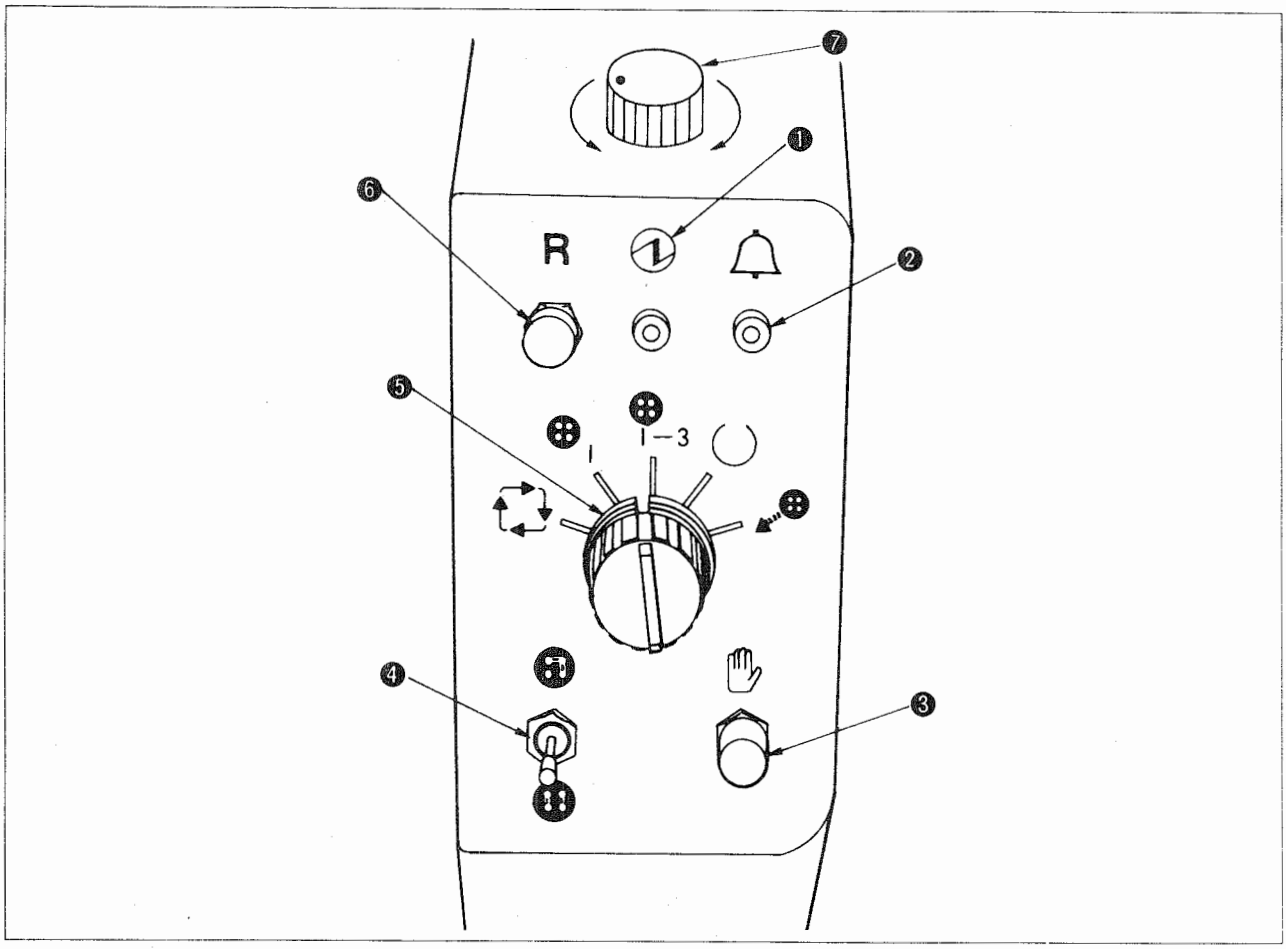
1. When the device is set to the "2-holed button sewing" mode, the device cannot sew 4-holed buttons and vice versa. Be careful when starting sewing buttons.
2. When changing buttons to be sewn to those have holes in different positions from the button used at present, replace the carrier pin with the one suitable for the buttons to be sewn.
   Refor to the description of "OPTIONAL PARTS" for the kinds of button carrier.
3. Use the feed plate which matches the size of button to be used.
4. Use only buttons specified for the device.
5. The terminal board is located on the back of the sewing machine motor mounted at the rear section of the unit.
6. Before tilting the machine, be sure to confirm that the carrier arm is in its origin (the position where the button position is determined). If not, turn arm motor knob ❶ until the carrier arm is brought to its origin.



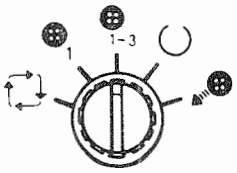
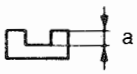
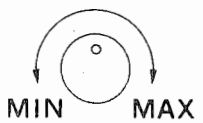
7. When Error "4" indicating an occurrence of a swing arm failure or Error "5" indicating an occurrence of an index unit failure is given, the Reset switch will be inoperative in order to protect the mechanical components. In this case, turn OFF the power to the machine once, and then return ON the power.
8. This machine is equipped with the continuous cycle sewing feature. When you keep depressing the pedal, therefore, the buttons will be continuously fed from the button feeder. So be careful.
9. You can check the function of sensors and respective driving sources.
10. If an error occurs during sewing, the machine will stop running upon completion of the sewing. In this case, the work clamp will be kept lowered. So, press the Reset switch to release the work clamp before you taking out the material from the machine. If the work clamp is not released by pressing the Reset switch, be sure to raise the work clamp by hand.
11. If tightening screws too firmly in the resin when adjusting the height of the adjusting plate, or feed plate etc., resin breakage may occur. So be careful.
12. Apply grease on the worm gear and cam periodically (every six months.)
13. The work attachment comes in two different types, the standard type and the large-button type (optionally available). Whenever you have replaced the work attachment, be sure to adjust the fine positioning completion switch.
14. If a button clogs in the index unit, turn first manual spinner oscillating shaft ❷ counterclockwise using a screwdriver until it is released.
15. Sensitivity of the button feeder is very delicate, so be sure to adjust it carefully.
16. Connect the connectors while checking the correct direction of the respective connectors.

3. OPERATION

1) Operation panel



Symbol and name of switch	Function
❶ Power indicator lamp (green)	Lights up when the power switch is turned ON. If it fails to light up, check the power plug for secure connection and re-turn ON the power switch.
❷ Alarm indicator lamp (red)	This lamp operates in two different ways. It slowly flashes on and off when a failure of the device occurrs. (Refer to "3. Error message and inspection".) It quickly flashes on and off when the button sensor mounted on the index unit continuously detects button feeding failure over 10 times.
❸ MANUAL operation switch	Used to manually actuate the series of operations under respective operation modes (2. Independent sewing mode is excluded) which can be selected using mode selector switch ❺.
❹ Cross-over stitch selector switch	Used to change over "with/without cross-over stitches" function. When it is set to its upper side . . . . . With cross-over stitches When it is set to its lower side . . . . . Without cross-over stitches (Refer to "(3) Operating the switches for normal sewing work" for how to select either "with" or "without" cloth-over stitches.)

⑤ Mode selector switch 	1. Automatic sewing mode The sewing machine and the button feeder operate with interlocked. Under this operation mode, depressing the pedal lowers the button clamp and makes the sewing machine start sewing a button. When the machine completes sewing of the button, the thread trimmer actuates, then the button feeder actuates to feed next button to be sewn. This series of operations is repeated under the automatic sewing mode.
	2. Independent sewing mode ●1 This mode allows the sewing machine to independently operate. Under this mode, the operator sets the button to be sewn in place on the machine by hand. Then, depressing the pedal lowers the button clamp and makes the machine start sewing the button. When the machine completes sewing of the button, the thread trimmer actuates then the button clamp goes up.
	3. Small-lot sewing mode ●1-3 Basically, series of operations performed under this mode is same as that under the automatic sewing mode. The parts feeder, however, does not operate under this mode. The operator manually feeds buttons by the number desired to be sewn to the gear of index unit and let the machine perform button sewing.
	4. Prospective button feeding mode ○ Under this mode, the fine positioning completion sensor function is stopped and the machine performs fine positioning of a button in a predetermined period of time (set by DEG-SW-2.).  a = Suited to buttons of which is 1 mm or more
	5. Button discharging mode Under this mode, buttons in the index unit are automatically discharged by pressing manual operation switch ③. In this case, the button is discharged to the discharging chute located at the lower section of the button positioner. So, place a pan to receive the discharged buttons at the exit area. Do not touch the button clamp since the spinner oscillating arm actuates.
⑥ Reset switch R	Press this switch to reset the machine from its emergency stop state to its normal operative state. (Note that alarms No. 4 and No. 5 cannot be reset using the reset switch. Turn OFF the power once, eliminate the cause of the trouble and re-turn ON the power to the machine.)
⑦ Button feeder (B/F) adjusting variable resistor 	Used to adjust the flow of buttons in the feeder bowl.

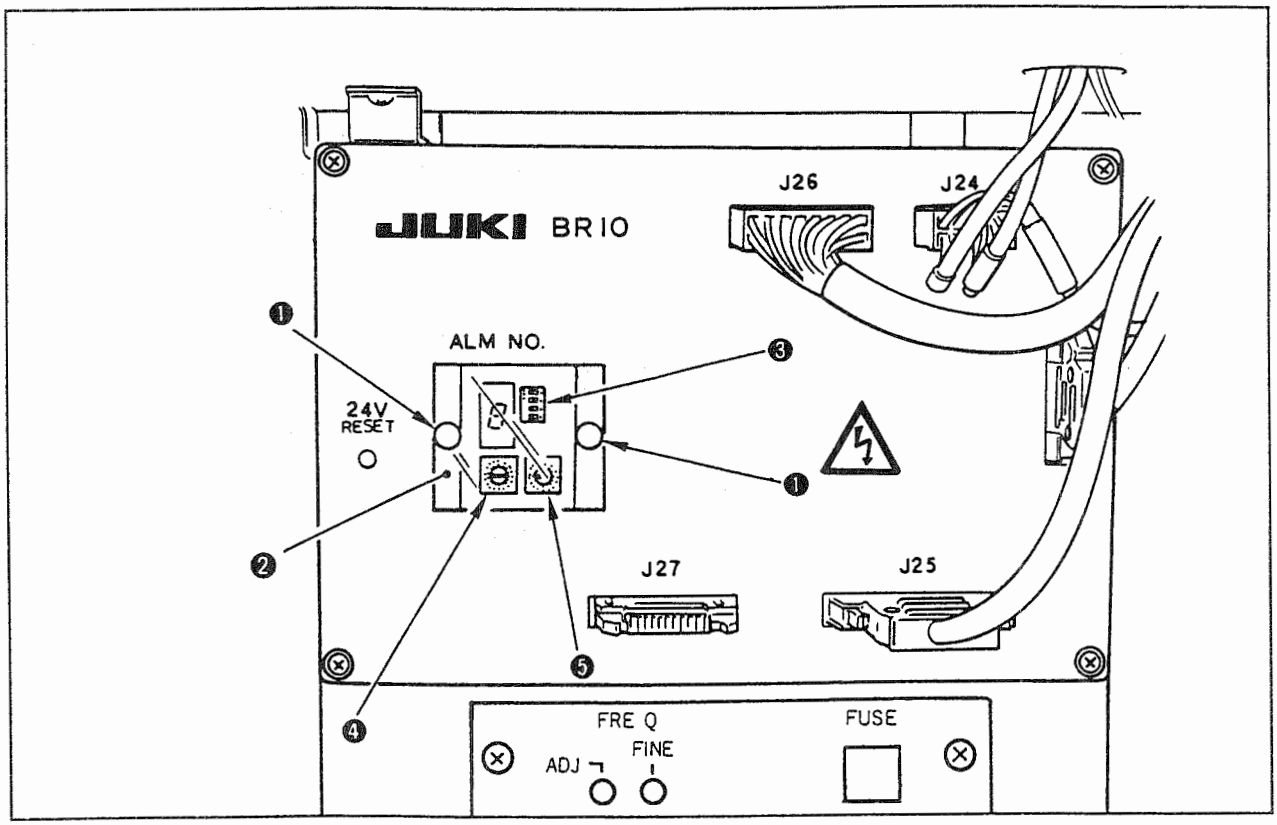
2) Operating the switches for normal sewing work

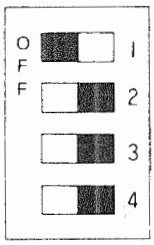
1) Turn ON the power to the main unit of the sewing machine.
2) Set the mode selector switch on the operation panel to the "automatic sewing" mode.
3) Select with/without cross-over stitch.
   ① For 2-holed buttons, select "with cross-over stitch."
   ② For 4-holed buttons, set the number of stitches to "16" on the sewing machine if you wish for "with cross-over stitch" mode, or to "8" if you wish for "without cross-over stitch."
   (Refer to "17. Setting a number of stitches" for how to change the number of stitches.)
4) Press the manual operation switch, and confirm that a button rest on the button clamp on the main unit of the sewing machine. If the button is not held on the button clamp, press the manual operation switch again.
5) Fully depress the foot pedal, and the sewing machine will start running. Release your foot from the pedal as soon as the sewing machine starts. If you keep depressing the pedal, the machine will enter into the continuous sewing mode. The machine will not enter into the continuous sewing mode, however, as long as the continuous sewing selector switch (DIP switch 1) is set to its OFF position.

3) How to set the digital switches and dip switches

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Loosen two screws ❶ , and open panel ❷ as illustrated in the figure. Now, change the setting of digital switches.





The switches have been factory-set as shown above at the time of delivery.

Function	DIP switch			
	1	2	3	4
Continuous cycle mode	○	×	△	△
Double-stepped action of the button clamp	△	○	△	△
Adjustment mode	×	×	○	×
Action without button	×	×	×	○

○ . . . . . ON × . . . . . OFF

△ . . . . . The machine performs the operations described in next page and beyond in accordance with combinations of the DIP switches.

1) Continuous cycle mode
Buttons are continuously sewn by keeping the pedal depressed.
Refer to the next page and beyond for the detailed description of the sewing machine operating intervals and the length of time during which the machine performs fine positioning of a button.

2) Double-stepped action of the work clamp
Depress the pedal to its middle position to make the work clamp come down.
This function is used in this state to automatically raise the work clamp by returning the pedal to its home position. The sewing machine starts running when the pedal is fully depressed.
Refer to the next page and beyond for the detailed description of the timing at which the button carrier moves after the operation of the sewing machine and the time during which the machine performs fine positioning of a button.

3) Adjustment mode
This function is used to make each of the driving sources independently actuate in combination with the operation switches. Under this mode, the indicator of "ALM ON" indicates ON/OFF of sensors using the numbers corresponding to the respective sensors.

4) Action without button
The button detecting sensors are ineffective, and the functions of the sewing machine excluding the button feeder are operative.
This function is used to check the performance of the sewing machine.
(Do not place a button on the sewing machine.)

Note) To change the functions of the sewing machine by changing over the setting of DIP switch ❸ and digital switches ❹ and ❺, turn OFF the power to the machine first, change the switch setting and turn ON the power to the machine. Change over the setting position of DIP switches between ON and OFF without fail.

No.	Function	Application	Automatic sewing mode Note 3)	Prospective button feeding mode Note 8)	Set position of	
					1	2
1	**Continuous sewing mode** Note 1)	Applicable to many different kinds of button. (Buttons are not rarely locked in the button feeder.)	• Normal operation function Note 4) • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function Note 5) • Stitching timing adjusting function Note 6) • Function of adjusting the length of time during which the fine positioning of a button is performed. Note 7)	• Normal operation function • Prospective button feeding function (Not provided with a sensor which detects completion of fine position of a button.) • Stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	○	×
2		Suited to a single type of button (flat buttons). Buttons are likely to be lockes in the button feeder as compared with the aforementioned No.1.	• High-speed operation function Note 9) • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function • Stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	— Ditto —	○	×
3		— Ditto —	— Ditto —	• High-speed operation function • Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.) • Stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	○	×
4		Two different kinds of point stitching such as continuous sewing and sewing hip pockets can be performed alternately.	• Normal operation function • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function • Function of adjusting the length of time during which the button carrier operates Note 11) • Function of adjusting the length of time during which the fine positioning of a button is performed.	• Normal operation function • Prespective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.) • Function of adjusting the length of time during which the button carrier operates • Function of adjusting the length of time during which the fine positioning of a button is performed.	○	×
5	**Double-step operation of the work clamp** Note 2)	Standard specification at the time of delivery. Applicable to many different kinds of button (Buttons are not rarely locked in the button feeder.)	• Normal opertion function Note 4) • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function Note 5) • Not provided with the stitching timing adjusting function Note 10) • Function of adjusting the length of time during which the fine positioning of a button is performed. Note 7)	• Normal operation function • Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.) • Not provided with the stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	×	○
6		Suited to a single type of button (flat buttons). Buttons are likely to be locked in the button feeder as compared with the aforementioned No.5	• High-speed operation function • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function • Not provided with the stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	— Ditto —	×	○
7		— Ditto —	— Ditto —	• High-speed operation function • Prospective button feeding function (Note provided with a sensor which detects completion of fine positioning of a button.) • Not provided with the stitching timing adjusting function • Function of adjusting the length of time during which the fine positioning of a button is performed.	×	○

3	4	DEG. SW-1	DEG. SW-2	Cautions
○	○	Note 6): Stitching timing • The length of time during which the button carrier operates and the button clamp jaw lever is in its highest position waiting for a button. 0 → 0.05SEC 8 → 0.05 1 → 0.10 9 → 0.10 2 → 0.15: standard A → 0.15 3 → 0.20 B → 0.20 4 → 0.25 C → 0.25 5 → 0.30 D → 0.30 6 → 0.35 E → 0.35 7 → 0.40 F → 0.40 (The length of time during which the indexer operates is fixed at the following values.) 0 ~ 7 → 0.08SEC 8 ~ F → 0.16 * Longer the aforementioned length of time is specified, better the overall timing of the sewing machine will become.	Note 7): The longest time during which the fine positioning of a button is performed. 0 → 0.20SEC 8 → 0.20SEC 1 → 0.30: standard 9 → 0.30 2 → 0.50 A → 0.50 3 → 0.80 B → 0.80 4 → 0.20SEC C → 0.20SEC 5 → 0.30 D → 0.30 6 → 0.50 E → 0.50 7 → 0.80 F → 0.80 (Length of time during which the triple pawl is held closed) 0 ~ 3 → 0.10SEC 4 ~ 7 → 0.15 8 ~ B → 0.20 C ~ F → 0.25	Note 1): The coutinuous cycle mode is a state where the sewing machine is operated with the pedal held depressed. This means that the button clamp jaw lever is in the standby state with held depressed. In this case, however, the button clamp jaw lever can be lifted by releasing the pedal. Note 2): When the double-stepped action function of the work clamp is selected, depress the pedal every time to operate the work clamp. The button clamp jaw lever stands ready for operation in its highest position. Note 3): Automatic stitching mode • When the automatic stitching mode is specified, the fine positioning completion detecting sensor will function. This means that the sewing machine will not start unless a button is supplied to the button clamp jaw lever. Note 4): Normal operation function • Function to place no button on the shutter plate • A load is not likely to be applied to the shutter plate and the carrier. As a result, the related components do not easily break. Note 5): Automatic button discharing function • If the fine positioning completion sensor fails to detect the completion of fine positioning of button to feed a button, and the predetermined time to perform fine positioning is exceeded, the machine will automatically release the shutter plate to make the button carrier actuate. If the button discharging function is performed three times continuously, ERROR 3 will result. To reset the ERROR, press the MANUAL operation switch. If the automatic discharging occurs frequently, suppose that some mechanical trouble has occurred and check the mechanical components for failure. Note 6): Stitching timing adjusting function (DEG.SW-1) • This function is effective only when the continuous stitching function is specified (Nos. 1 to 4). • When one to four buttons are continuously sewn, the sewing speed will gradually decrease by staged and the length of time required to sew the buttons will change. As a result, the operator's constant sewing rhythm will be disturbed. To achieve a constant sewing speed, this function is used to adjust the length of time required to sew the first to third buttons to that is required to sew the fourth button. Note 7): Function to adjust the length of time required to finely position a button (DEG.SW-2) • This function is used to set the time to actuate the automatic button discharging function. • This function is also used to set the length of time during which the fine positioner operates when the prospective button feeding function is specified. Note 8): Prospective button feeding function • Use this function when sewing a button which has a recess on the surface (the difference in height between the bottom of recess and edge is 1 mm (0.039) or more). • When this function is used, the fine positioning completion detecting sensor becomes inoperative. So, the machine performs fine positioning of a button for the length of time set using the DEG.SW-2, and the machine, every time, opens the shutter plate and actuates the button carrier constantly at the predetemined time. This means that the length of time required for sewing is likely to change when compared with the sewing under the automatic sewing mode. When this function is used, the fine positioning completion detectiong detecting sensor becomes inoperative. Consequently, the sewing machine starts even when a button is not fed to the button clamp jaw lever. When this function is used, ERROR 3, which occurs when the automatic button discharging function is used, will never occur.
×	×			
○	×			
×	○	Releasing the pedal while the sewing machine is in operation will retard the time at which the button carrier actuates by one second.		
○	○	*Note 10): Since the function of adjusting the stitching timing is not provided, DEG-1 has the function of setting the length of time at which the triple pawl actuates after the indexer has operated. (Index time: DEG-1) 0 ~ 7 → 0.08SEC (Standard specification "2" at the time of delivery.) 8 ~ F → 0.16		
×	×			
○	×			

No.	Function	Application	Automatic sewing mode Note 3)	Prospective button feeding mode Note 8)	Set position of	
					1	2
8	**Double-step operation of the work clamp**	Suited to be used exclusive for point stitching such as sewing hip pockets	• Normal operation function • Provided with a sensor which detects completion of fine positioning of a button. • Automatic button discharging function • Function of adjusting the length of time during which the button carrier operates Note 11) • Function of adjusting the length of time during which the fine positioning of a button is performed.	• Normal operation function • Prospective button feeding function (Not provided with a sensor which detects completion of fine position of a button.) • Function of adjusting the length of time during which the button carrier operates • Function of adjusting the length of time during which the fine positioning of a button is performed.	×	○

3	4	DEG. SW-1	DEG. SW-2	Cautions
×	○	Note 8): Length of time during which the button carrier operates 0 → 0.20SEC 8 → 0.20SEC 1 → 0.50 9 → 0.50 2 → 0.80 A → 0.80 3 → 1.20 B → 1.20 4 → 1.60 C → 1.60 5 → 2.00 D → 2.00 6 → 3.00 E → 3.00 7 → SW stand-by F → SW stand-by ⇨ Note 12) (Length of time during which the indexer operates) 0 ~ 7 → 0.08SEC 8 ~ F → 0.16		Note 9): High-speed operating function • This function means that a button always rests on the shutter plate. • Since the button carrier operates with the shutter plate closed, a load is likely to be applied to the shutter plate and the button carrier when the machine is locked. Note 10):Not provided with the stitching timing adjusting function • In the double-stepped action of the work clamp (Nos. 5 to 7), the stitching timing adjusting function is not necessary. So, the DEG.SW-1 is used only to set the length of time required to make the triple pawl actuate after indexing a button. Note 11):Function to adjust the button carrier operating timing • If the sewing product may be caught in the button carrier when attaching buttons to hip pockets or the like, this function can be used to delay the actuation of the button carrier in accordance with the length of time specified by the DEG.SW-1. Note 12):SW (Switch) stand-by • The button carrier operates when the manual operation switch on the operation panel is pressed. • If the knee switch is used, connect it to J24 ⑨ and ⑩ on the control box. Then the "switch stand-by" function can be used. This feature is available by a special order. Note) : • For all the functions controlled by the DIP switches, it is possible to stop the subsequent action of the button carrier by pressing the manual operation switch or the knee switch (optionally available) while the sewing machine is in operation, and to actuate the button carrier by pressing it again. • If a button comes off the index unit, the machine make the button carrier actuate, with no button, once after the completion of sewing to allow the operator to remove the material from the machine with ease. • If, when the automatic button discharging function works, the predetermined length of time for fine positioning of a button has passed before a button is placed on the button carrier, the shutter plate will be opened and the button will be discharged. At this time, it is possible that the discharged button is accidentally placed on the button carrier. In this case, the button carrier will be actuated twice. As a result, two buttons will be fed to the button carrier, causing needle breakage. To prevent this, the time for starting the sewing machine is retarded by 0.5 sec. if the automatic button discharging function has actuated. (It is possible to decrease the frequency of actuation of the automatic button discharging function by increasing the length of time during which the machine performs fine positioning of a button.) • When the double-stepped action of the work clamp is selected and the operator operates the pedel too quickly, the button clamp jaw lever will go up before it opens after the completion of sewing. In this case, the operator cannot smoothly move the material on the machine. To prevent this, the time for turning ON the button clamp jaw lever lifting magnet is delayed by 0.2 sec. to give priority to mechanical actions.

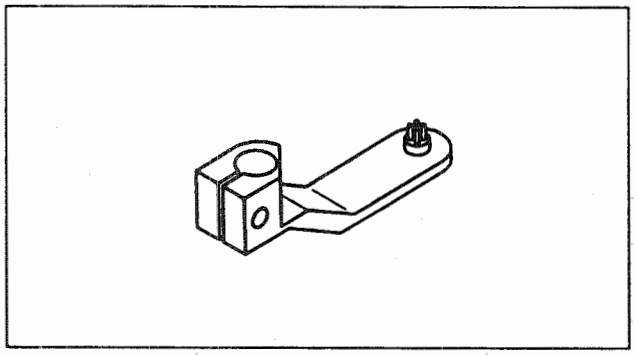
4. MAINTENANCE

1) How to replace the buttons (on the button feeder side)

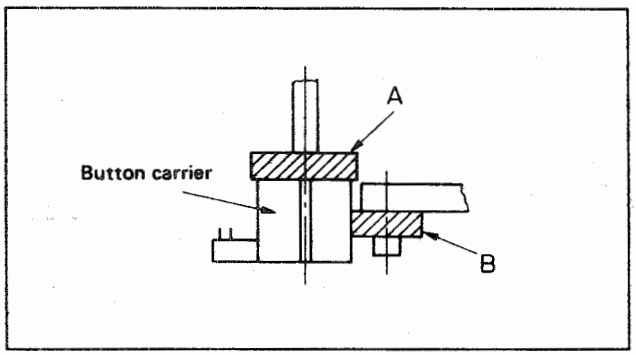
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

* The following briefly describes the important points to be checked when replacing the buttons.

(1) When the number of holes in a button changes (⇄)

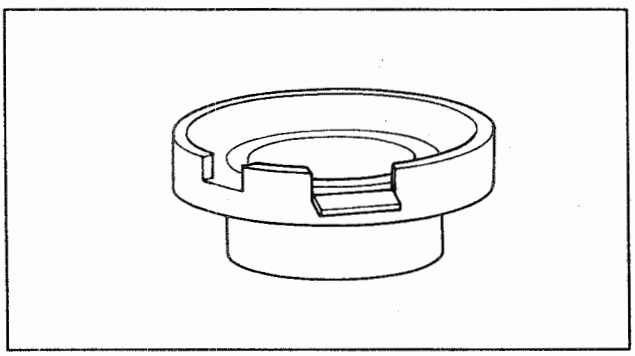


1) The button carrier needs to be changed accordingly.
2) Select the button feeder suited to the button to be used in terms of the number of holes in a button and the distance between the center of holes in a button (hole-to-hole distance).

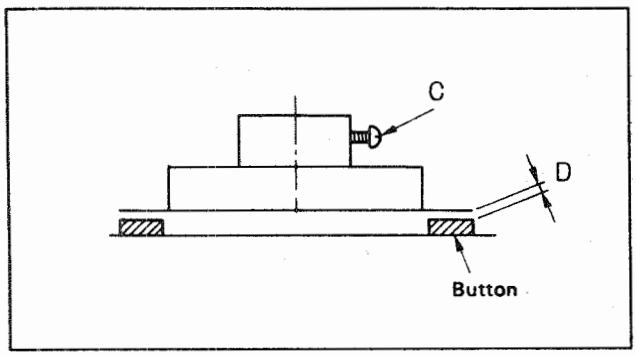


1) The button carrier can be replaced with another one at the origin of the button carrier (the position where a button is placed in the button carrier).
2) Set the button carrier in place while pressing it against stoppers A and B.

(2) When the button thickness changes (⇄)

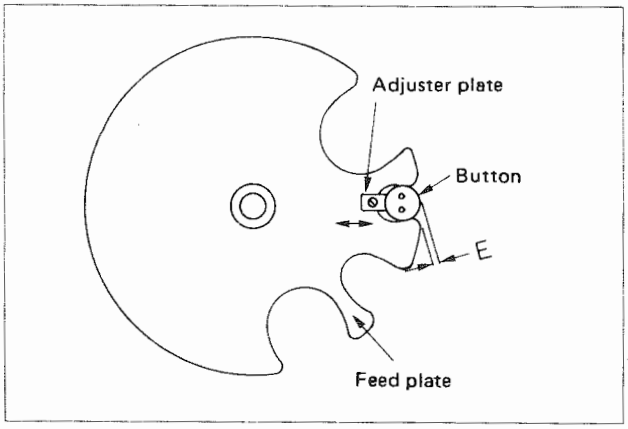


1) Adjust so that buttons in the feeder bowl smoothly flow and the separation plate discriminates the right-sided buttons from the wrong-sided buttons without fail.



2) Adjust the feed plate (a component made of plastic) in accordance with the thickness of the button to be used. To adjust the feed plate in the vertical direction, loosen screw C and set dimension D approximately to 0.7 mm.

○ Adjust so that buttons in the feeder bowl smoothly flow and the separation plate discriminates the right-sided buttons from the wrong-sided buttons without fail.
○ Adjust the feed plate (a component made of plastic) in the radial direction.

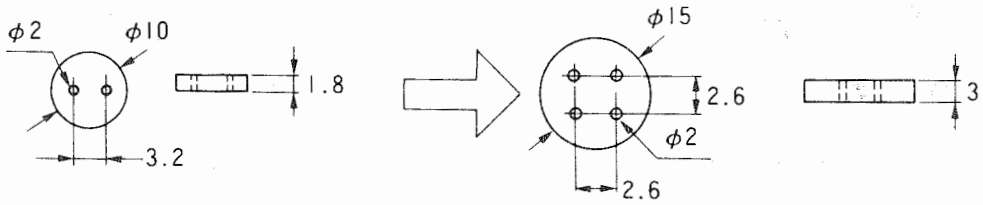


● The feed plate has three holes with different diameters, i.e., large, medium and small.

1) The small hole is used for buttons of which outside diameter is ϕ10 to ϕ11.5 mm.
   The medium hole is used for buttons of which outside diameter is ϕ13 to ϕ15 mm.
2) Adjust the adjuster plate so that E becomes 0 when setting a button in the hole.
3) When changing over the hole to be used between the small one and the medium one, move the frame of the feed plate (◯) accordingly to allow the button to be used fits in the hole selected.

(Caution) Be sure not to excessively tighten the screw in the feed plate (made of plastic).

[Example]



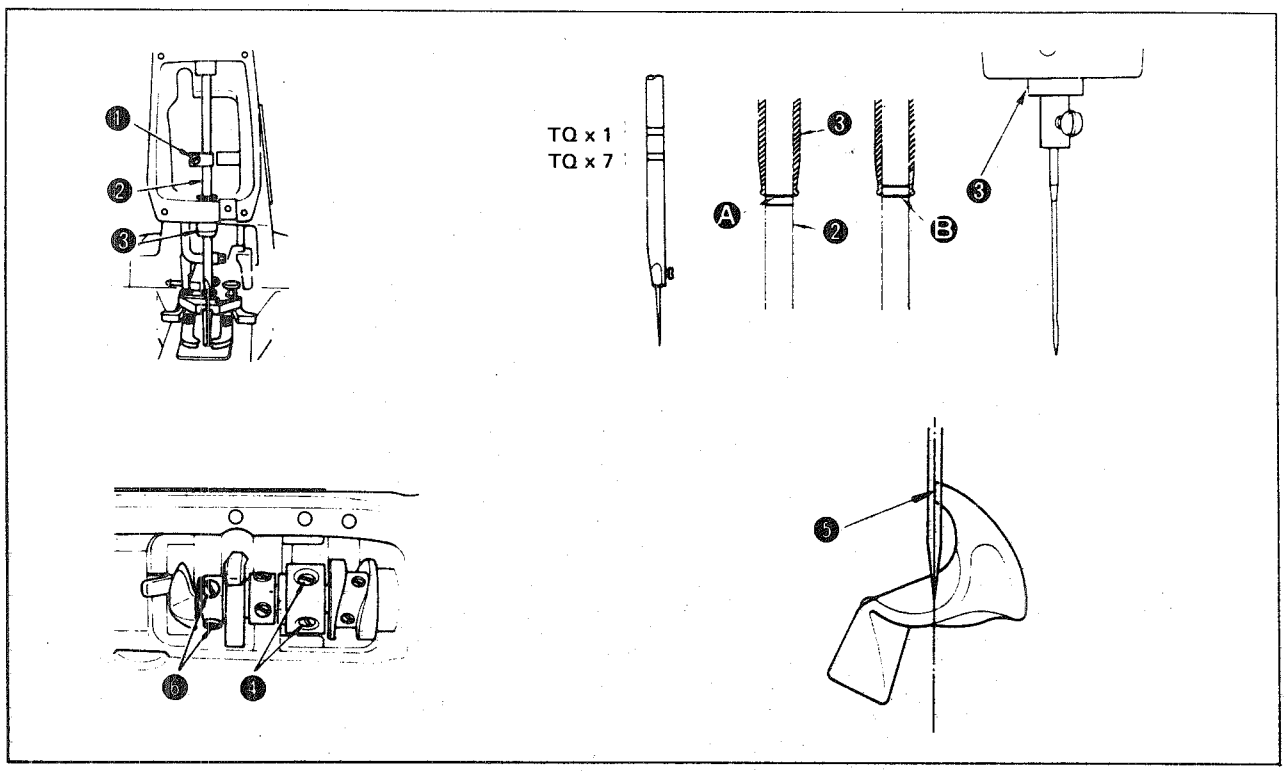
How to adapt the button feeder components to the following button changing

A. First, the button carrier needs to be changed since the distance between the center of holes (3.2 → 2.6) in a button and the number of holes in a button (2 → 4) of the two buttons are different.
B. The feed plate needs to be adjusted in the vertical direction since the button thickness changes from 1.8 to 3.
C. The hole of the feed plate to be used needs to be changed from the small hole to the medium hole, and the adjuster plate should be adjusted since the outside diameter of button changes from ϕ10 to ϕ15 mm.

* Whenever changing the button to be used, check first whether or not the aforementioned changes in the components or adjustments of them are necessary. Then change or adjust the components, if necessary.

2) Needle-to-looper relation

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

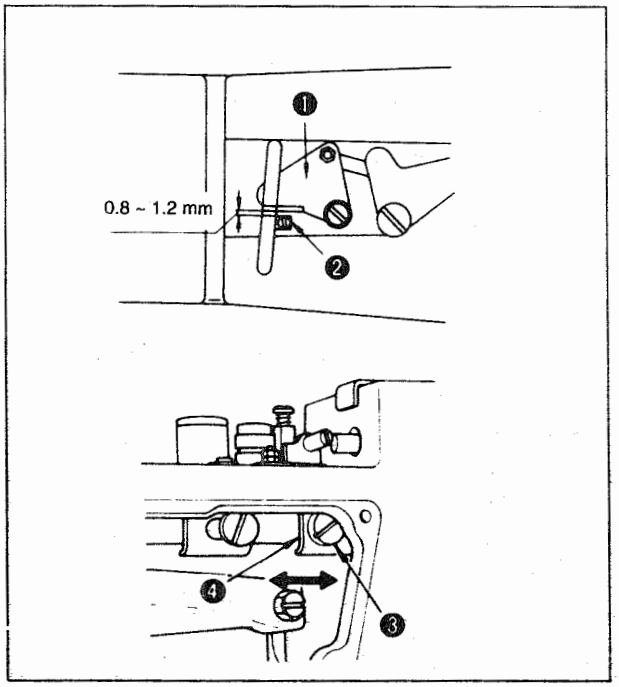


★ Adjust the needle-to-looper relation as follows:

1) Raise the stop-motion lever by hand, and turn the driving pulley in the normal direction to make the needle bar to come down to the lowest position of its stroke. Then loosen screw ❶.
2) Determine the needle bar height. Adjust the height of the needle bar using top two lines engraved on the needle bar for the TQ x 1 needle and using the bottom two lines for the TQ x 7 needle. Align upper line Ⓐ with the bottom end face of needle bar lower bushing ❸ and tighten screw ❶.
3) Then determine the position of the looper. Loosen screws ❹ and turn by hand the needle driving pulley until lower line Ⓑ of two lines in the needle bar ❷ aligns with the bottom end face of needle bar bushing (lower) ❸.
4) By keeping the machine in this state, align looper blade ❺ with the center of the needle and tighten screws ❹.
5) Loosen screw ❻ and provide a 0.05 to 0.1 mm clearance between the looper and the needle. Tighten screw ❻.

(Caution) For the sake of explanation, the illustration shows the state of the machine with the belt cover and the power switch cover removed.

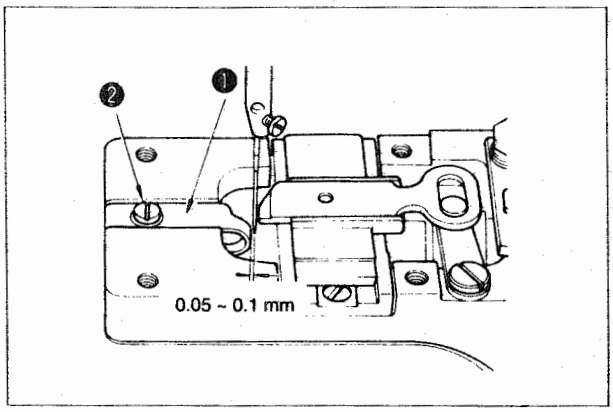
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



Provide a 0.8 to 1.2 mm clearance between nipper ❶ and nipper block ❷ to prevent the nipper ❶ from nipping the thread while stitching. Loosen screw ❸ and move nipper bar block ❹ to the left or the right.

4) Position of the needle guide

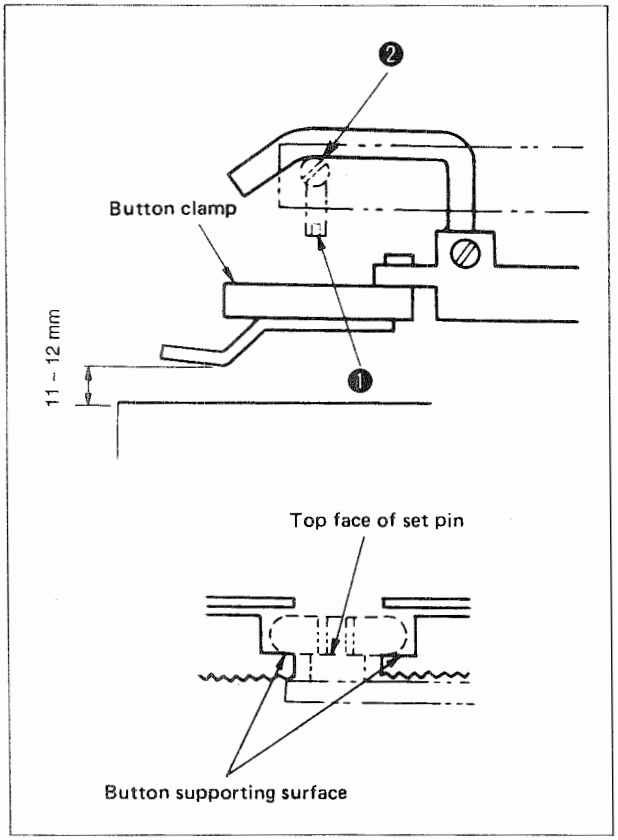
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



Loosen screw ❷ and provide a 0.05 to 0.1 mm clearance between the needle guide ❶ and the needle by moving the needle guide ❶ to the left or the right when the needle bar is in the lowest position.

5) Height of the button clamp

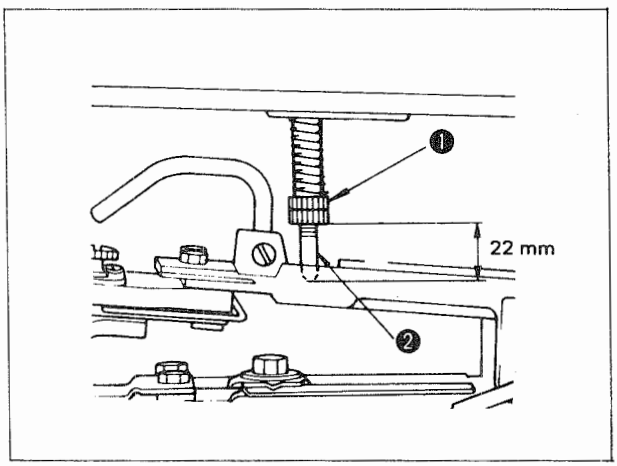
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



The standard height of the button clamp is obtained when the button supporting surface of the button clamp is flush with the top face of the set pin of button carrier.
Loosen screw ❶ , and adjust the height of the button clamp using eccentric screw ❷ .
Adjust so that a button smoothly rest on the button clamp.

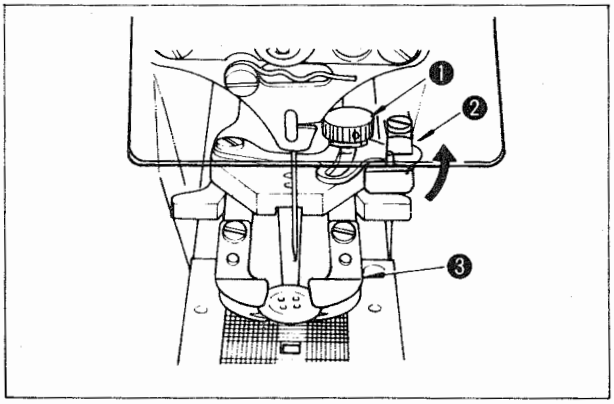
6) Work pressing force

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



The standard work pressing force is obtained turning nut ❶ so that a 22 mm clearance is provided between the bottom face of the two nuts and the top end of pressure adjusting bar ❷ .

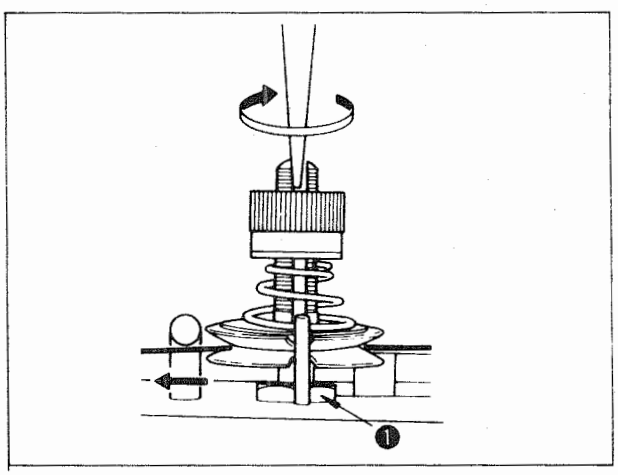
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



Set the machine for stop-motion state, loosen clamp screw ❶, place a button correctly in the sewing position and adjust button clamp jaw lever ❷ to permit the button properly to rest on button clamp ❸. Adjust so that the button is placed in position smoothly. Then tighten screw ❶.

8) Timing of thread tension release

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

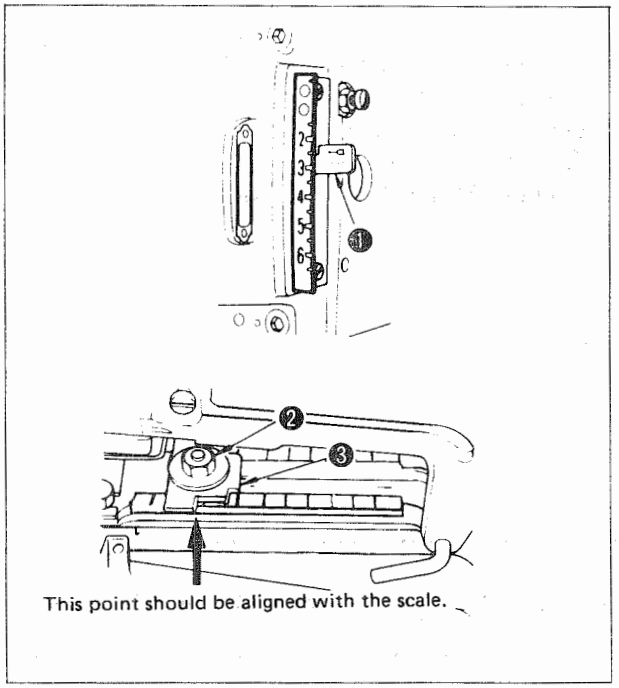


Turn the needle driving pulley as you draw the thread in the direction of the arrow as illustrated, and you will find a point at which the tension disc on the tension post No. 2 release the thread. At this moment, the standard distance from the top end of the needle bar down to the top end of the needle bar bushing (upper) is 54 to 56 mm.) Your adjustment is required when the following troubles as shown in the table are frequency:
Loosen nut ❶, insert the blade of a screwdriver to the top slot of the tension post No. 2 and turn it in the direction of the arrow to lower the position of the needle bar when the tension disc No. 2 is released, and vise versa.

Trouble	Adjustment
1. When the stitch made on the wrong side of the workpiece is too loose;	Make the needle bar slightly higher.
2. When the thread is broken at the time of stop-motion;	Make the needle bar slightly higher.
3. When the thread is broken frequently;	Make the needle bar slightly lower.

9) Setting for 2- or 4-hole buttons

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



Measure the distance between two holes in a button and set equally crosswise and lengthwise feed regulators for 4-hole buttons.

1. Lengthwise feed

Push down lengthwise feed adjusting lever ❶ and set it to "0" for 2-hole buttons or a corresponding amount for 4-hole buttons.

2. Crosswise feed

Crosswise nut ❷ and set pointer ❸ to a corresponding amount indicated by the crosswise feed graduation plate. Tighten firmly nut ❷.

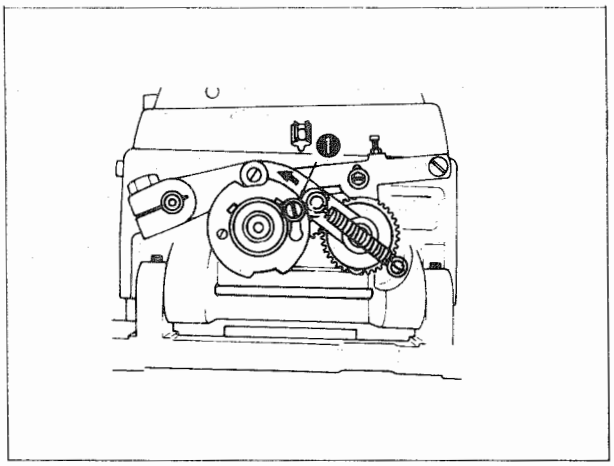
(Caution) Before operating the machine, ensure that the needle enters the center of each hole in the button.

10) Setting a number of stitches

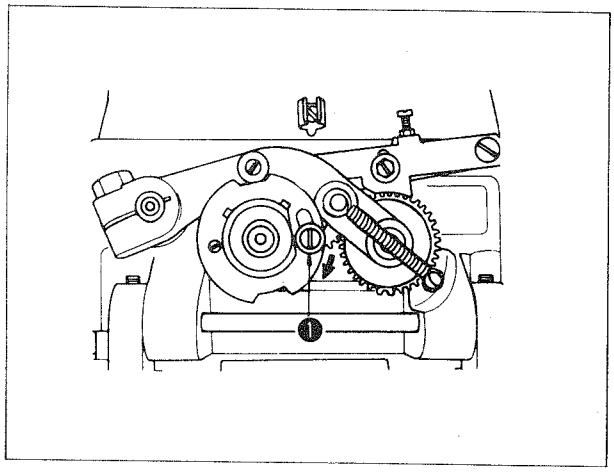
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

A number of stitches to sew a button is set by stitch adjusting cam knob ❶, stitch selecting lever (small) ❹, adjusting screw ❺ and clamp screw ❻ which are accessible by opening the left-hand cover.

(1) 8 stitches (6 stitches)

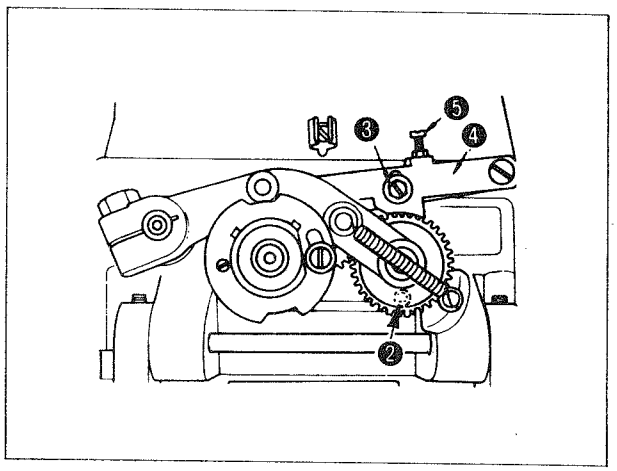


Pull stitch adjusting cam knob ❶ and set it as shown in the illustration.



When stitch cam knob ❶ being set for "8 stitches" has arrived at the right end as illustrated, set knob ❶ in the illustrated position.

(3) 32 stitches (24 stitches)

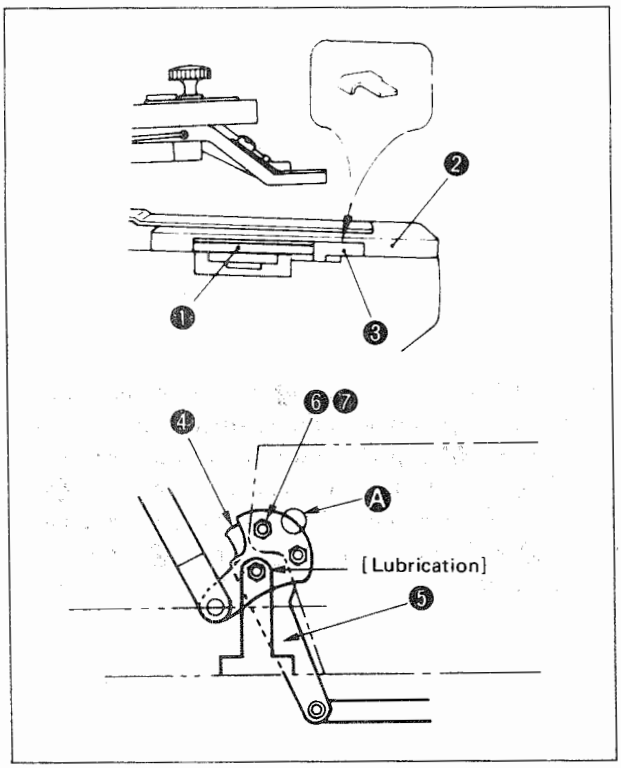


When stitch adjusting roller ❷ arrived at the lowest point of its trajectory with the 16-stitch setting, loosen clamp screw ❸ , push down stitch selecting lever (small) ❹ with your fingers and retighten screw ❸ . If the machine does not make 32 stitches, loosen clamp screw ❸ and turn adjusting screw ❺ until 32 stitches are made.

11) Automatic thread trimmer

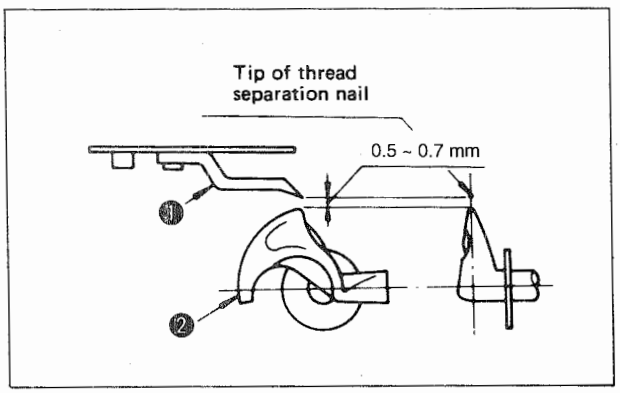
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

(1) Position of the moving knife



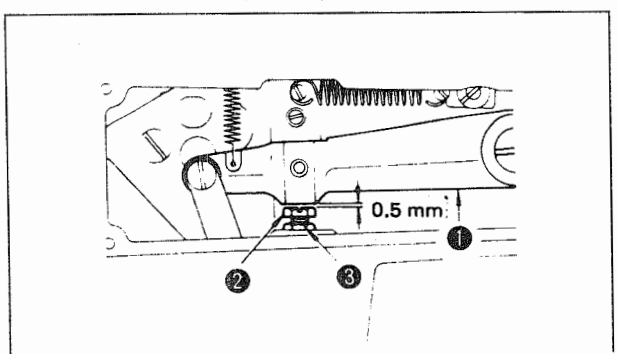
Turn the handwheel by hand to make the machine completely stop in the state of "stop-motion" and its button clamp assembly rest in the highest position. At this time, there must be a standard clearance of 12.4 mm between thread trimming connecting link (front) ❶ and the end of the slit in throat plate ❷ .
Adjust the clearance to 12.4 mm using moving knife positioning gauge ❸ stored in the accessory box. Loosen screw ❻ and nut ❼ which are used to fix thread trimmer adjustment plate ❹ and thread trimming lever ❺ , and move thread trimming lever ❺ back and forth using aligning marker line Ⓐ as reference until the correct clearance is provided.
Apply some grease to the point to which the indication of [Lubrication] is attached in the figure.

(2) Height of the moving knife thread separation nail

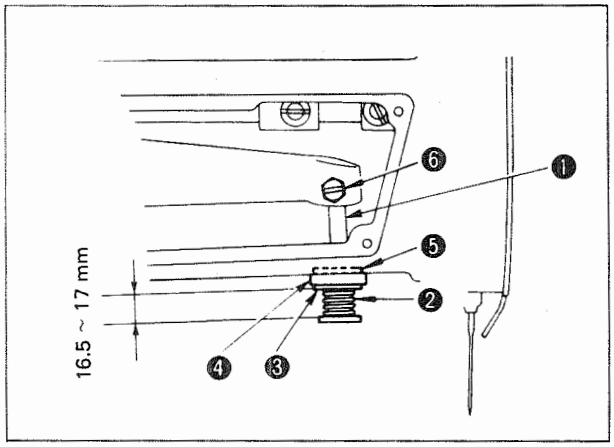


There must be a 0.5 to 0.7 mm clearance between looper ❷ and thread separation nail ❶ . If thread separation nail ❶ does not provide the necessary clearance, bend the thread separation nail slightly and adjust the clearance.

(3) Clearance between the button clamp lifting lever and the adjusting screw



Provide a 0.5 mm clearance between button clamp lifting lever ❶ and adjusting screw ❷ and then tighten nut ❸ .

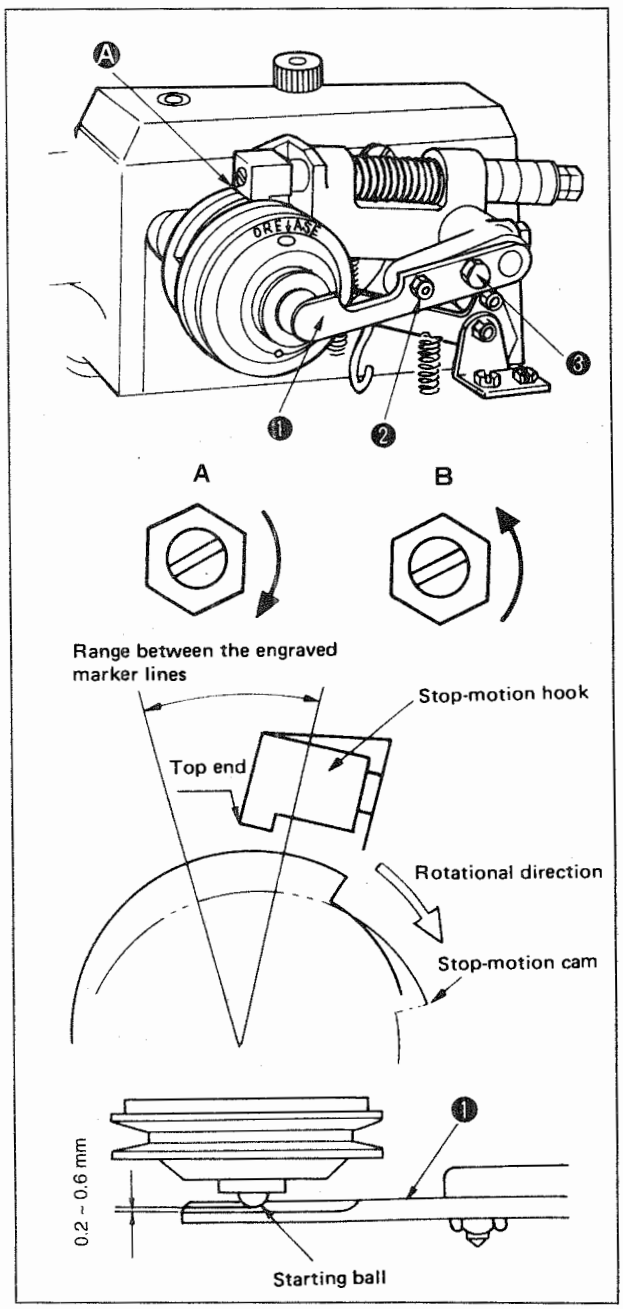


Install stop-motion rubber cushion spring ❷, stop-motion rubber cushion washer ❸, stop-motion rubber cushion ❹ and stop-motion rubber cushion washer ❺ in the written order on spring supporting rod ❶. After making sure that the stop-motion mechanism has engaged completely, fix the spring supporting rod by tighten screw ❻ making the end face of the stop-motion rubber cushion washer to come in close contact with the jaw of the machine arm without play.

The stop-motion rubber cushion spring should be compressed to the standard length of 16.5 to 17 mm at the time of stop-motion.

12) Adjusting the clutch timing

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



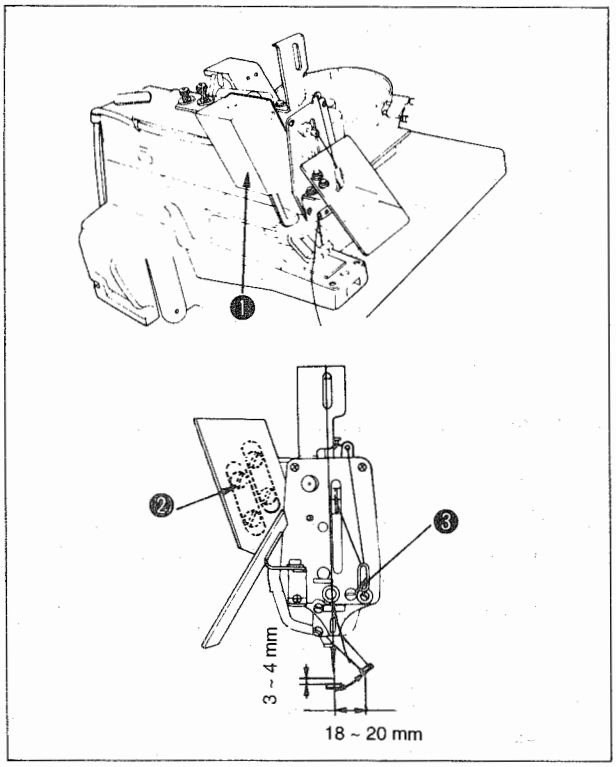
1) First, bring the sewing machine correctly to its stop-motion position. At this time, turn OFF the power to the sewing machine.
   (Under the correct stop-motion position, the stop-motion lever is securely lowered and it is aligned with claw Ⓐ.)
2) Adjust the clutch timing using adjustment screw ❷ in driving pulley pushing plate ❶.
   A. Tighten the adjustment screw to turn OFF the clutch earlier. (Carry out this adjustment when the stop-motion noise is large.)
   B. Loosen the adjustment screw to turn OFF the clutch later. (Carry out this adjustment when the stop-motion failure occurs.)
3) Turn the sewing machine by hand. Slowly turn it until the last stitch is reached, then the clutch will be turned OFF.
4) When the clutch is turned OFF, confirm the position of the marker lines engraved on the periphery of the stop-motion cam and the position of top end of the stop-motion hook. As long as the top end of the stop-motion hook rests on the area between the marker lines, the clutch timing is correct. (In the case of 1,500 s.p.m.)
   If the number of revolutions of the sewing machine is decreased, the top end of the stop-motion hook may go out of the area between the marker lines. In this case, however, the most important point to remember is to prevent a stop-motion failure.
5) Run the sewing machine. Check the stop-motion of the sewing machine for a stop-motion failure or an abnormal noise.

(Caution) Carry out the above-stated adjustment with a clearance of 0.2 to 0.6 mm provided between the starting ball and the driving pulley pushing plate ❶ at the time of the stop-motion. If not, troubles including overheated clutch and interrupted operation of the sewing machine may occur.

6) If a V belt is installed on the sewing machine, loosen screw ❸ and remove it.

13) Adjusting the wiper

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) The wiper unit ❶ is installed on the machine as illustrated in the figure.
2) The thread catching point at the top end of the wiper should be 3 to 4 mm away from the tip of the needle and 18 to 20 mm away of the center of the needle.
   Make the adjustment using four screws ❷ which fixes the wiper magnet in place and screw ❸ which fixes the wiper mounting base.

14) Adjusting the control box (fuse)

DANGER :
So as to avoid electric shock hazards, turn off the power switch and detach the power plug from the receptacle before starting the works.

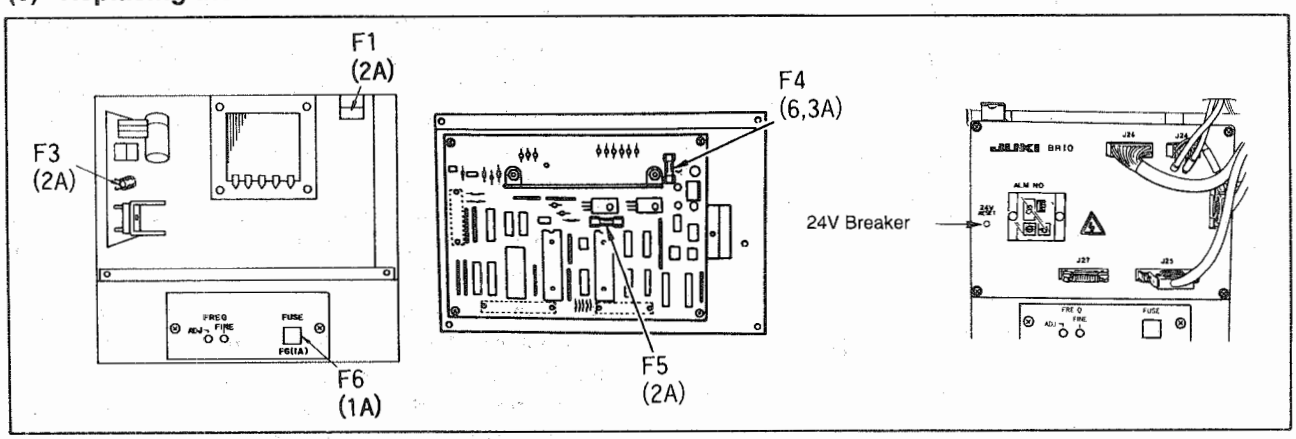
(1) 24V trip

An overcurrent of the 24 V dc line will trip the breaker mounted on the front face of the control box. To reset, press the white part of the breaker using a thin pin or the like until the part clicks.

(2) Confirm the input power terminal of the transformer

(Change round the terminal in accordance with the service voltage of the market where the sewing machine is to be used.)

(3) Replacing the fuse



You may find five fuses (F1, F3 through F6) as illustrated in the figure. (Remove the frame cover on the front face of the control box, and replace the fuses.)

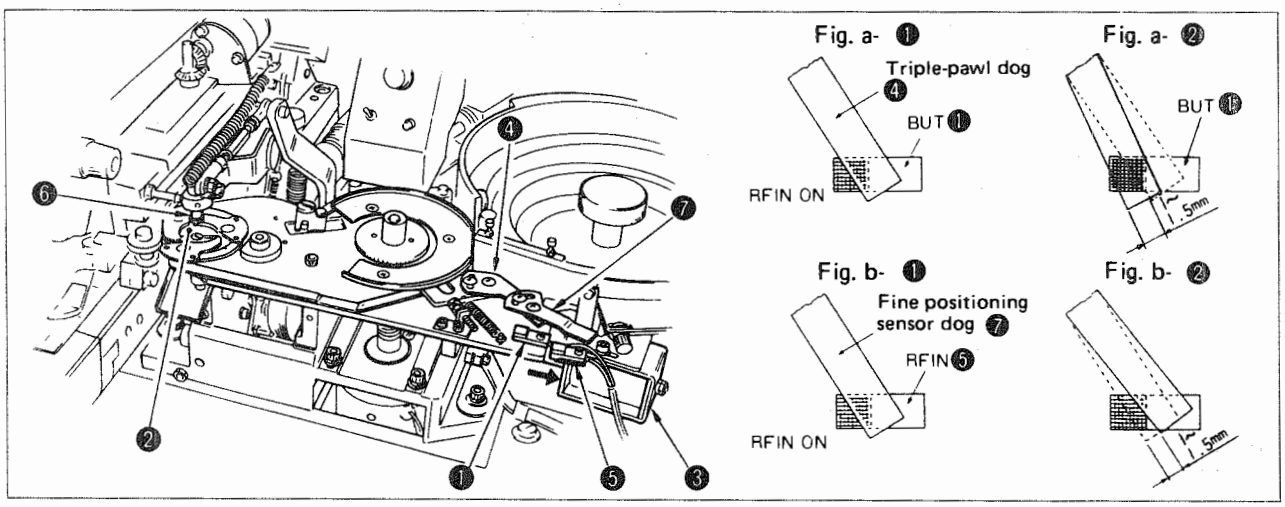
(1) Adjusting the button positioning detection switch (BUT)

Button positioning detection switch ❶ (hereinafter called BUT) which incorporates a proximity sensor (GXL-8F) is a sensor to detect whether a button exists within positioner ❷ when actuating the positioner (triple pawl).
(It turns OFF when a button exists in the positioner or turns ON when it does not detect any button there.)
Draw the iron core of positioning solenoid ❸ when there is no button in positioner ❷ , and the triple pawl will be closed. In this state, loosen the fixing screw of triple pawl dog ❹ , and move triple pawl dog until BUT which has been in the OFF state turns ON. Then further move the triple pawl dog forward from the aforementioned position (Fig. a- ❶) by 1 to 1.5 mm (Fig. a- ❷), and tighten the fixing screw of the triple pawl dog.
Then, confirm that BUT turns OFF when the triple pawl clamps a ø10 mm button. Also confirm that BUT turns ON when the triple pawl is closed after taking out the button from it.
Be sure to remember that adjustment (2) should be carried out whenever the aforementioned adjustments have been carried out.

(2) Adjusting the fine positioning completion switch (RFIN)

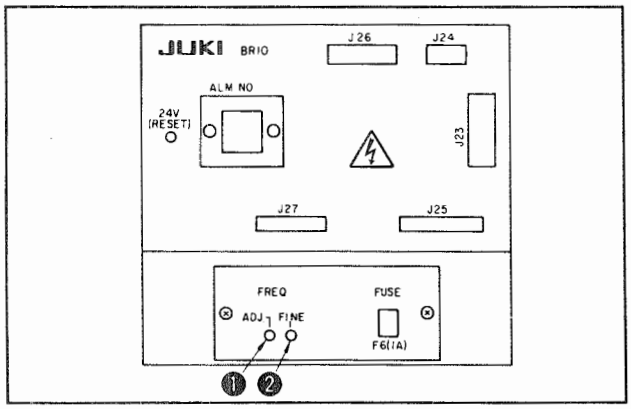
Fine positioning completion switch ❺ (hereinafter called "RFIN") which incorporates a proximity sensor (GXL-8F) is the sensor to detect a button when the button is set on the carrier pin.
Place a ϕ10 mm button in triple pawl ❷ , draw the iron core of positioning solenoid ❸ toward you to make the triple pawl clamp ❷ the periphery of the button. In this state, loosen fixing screw of fine positioning sensor dog ❼ , and move the RFIN to the position where the RFIN changes from its OFF state to ON state (Fib. b- ❶).
Then move back the RFIN from the aforementioned position by 1 to 1.5 mm (Fig. b-❷), and tighten the fixing screw.
Then confirm first that the RFIN turns OFF when the triple pawl clamps a ϕ10 mm button. Remove the button from the triple pawl, and confirm that the RFIN turns ON when the triple pawl clamps the periphery of the lower section of the work attachment.
Note that adjustment (1) should have been completed before starting this adjustment.

(Caution) **The RFIN functions to detect a button when the button is completely set on the carrier pin by turning itself ON/OFF in accordance with the difference between the outside diameter of the button and that of the work attachment and to open/close the shutter.**
It is not necessary to re-adjust switches (1) and (2) when the current button is replaced with a button of which diameter is different from that of the current button.



16) Adjusting the button feeder

Operation of the operation panel (2)

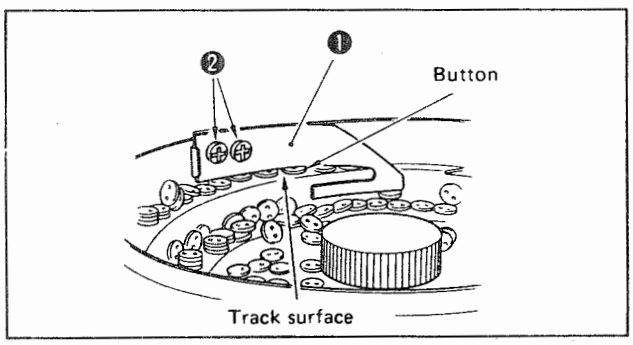


1) The button feeder is energized by turning ON the power to the device.
2) Set button feeder adjusting variable resistor to its intermediate position.
3) If the feeder does not vibrates adequately, turn sensitivity adjustment variable resistor ❶ until it reaches the position to allow the feeder to vibrate most. Then turn sensitivity adjustment variable resistor ❷ and make a fine adjustment so that vibration of the feeder is maximized.
4) Adjust the flow of buttons using the button feeder adjusting variable resistor.

(Caution) Sensitivity adjusting variable resistors ❶ and ❷ are very delicate. It is advisable to place buttons with flat bottom in the feeder bowl, and adjust the flow of buttons while checking the actual flow of the buttons.

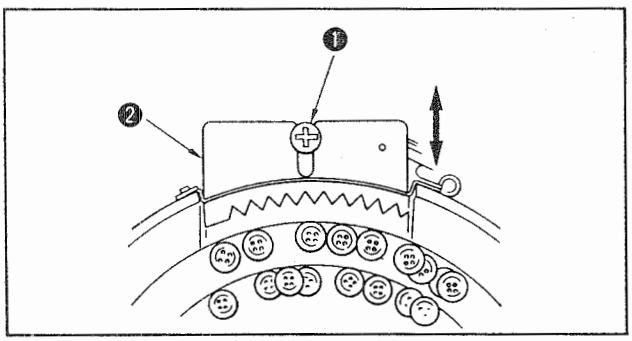
17) Adjusting the attachments in the feeder bowl

(1) Guide plate



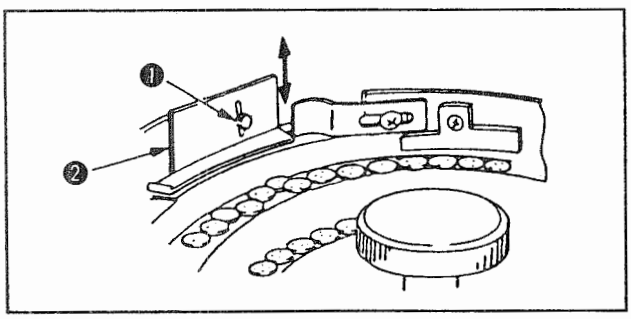
The appropriate clearance between the button top face and the guide plate ❶ is approximately 0.7 mm. Loosen screws ❷, and move guide plate ❶ up and down to adjust the clearance appropriately.

(2) Separation plate

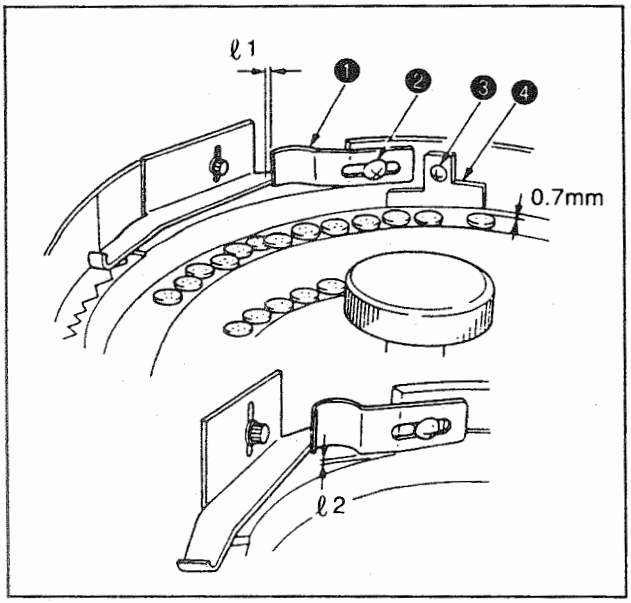


This plate sorts the right-sided buttons from the wrong-sided buttons and feeds only the right-sided ones to the index unit. To adjust the selector plate, loosen screw ❶, and move selector plate ❷ back or forth until it is properly positioned. Then tighten screw ❶. The selector plate comes in two different sizes, medium and small. Select an appropriate one from among the two different types of selector plate in accordance with the size of buttons to be used.

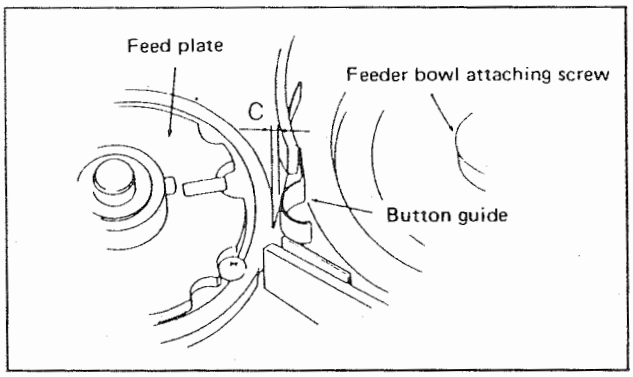
(3) In-line arrangement plate



This plate prevents buttons which have passed the separation plate from piling up.
The appropriate clearance between in-line arrangement plate ❷ and the top face of a button is approximately 0.7 mm.
Loosen screw ❶, and move the in-line arrangement plate ❷ up or down to adjust the clearance to the correct value.

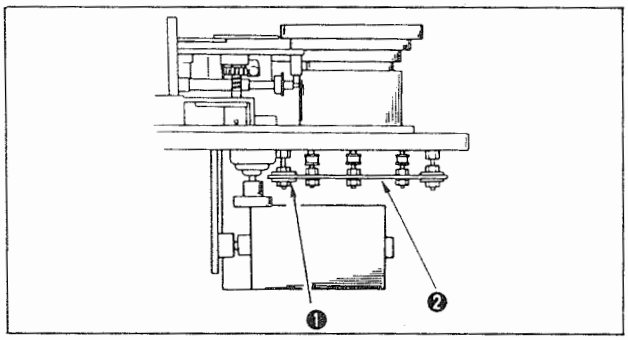


Appropriate clearance ℓ1 between the button guide ❶ and the button is approximately 3 to 4 mm . Loosen screw ❷, and adjust the clearance to the correct value.
Appropriate clearance ℓ2 between the lower surface of the button guide and the track surface of the feeder bowl is 0.3 to 0.5 mm. A clearance which is larger than the value twice as thick as a button by approximately 0.7 mm should be provided between overflow prevention plate ❹ and the button. Loosen screw ❸ , and adjust the clearance to the correct value.



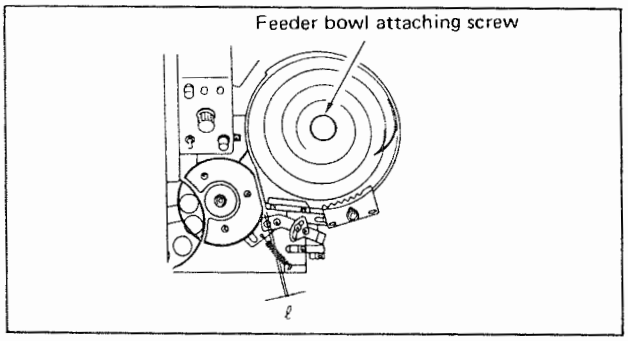
Adjust clearance C between the button guide and the feed plate to 2 ± 0.5 mm.
Adjust clearance C by bending the button guide appropriately.

(5) Adjusting the height of the feeder bowl



Loosen six locknuts ❶ of feeder base ❷ , and adjust height difference ℓ between the outlet for buttons and the feeder bowl to 0.5 mm or less while the feeder bowl is positioned higher than the outler for buttons.
If an excessive difference in height is provided, two buttons may enter the notch of the feed plate with overlapped.
So be careful.

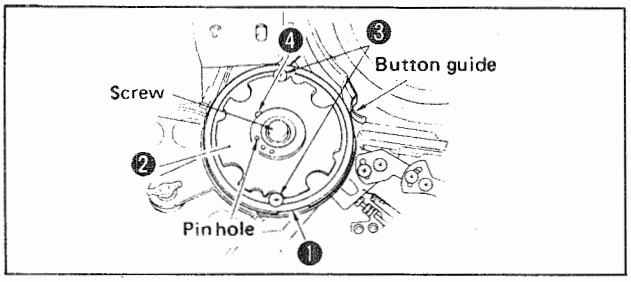
(6) Adjusting the position of the feeder bowl

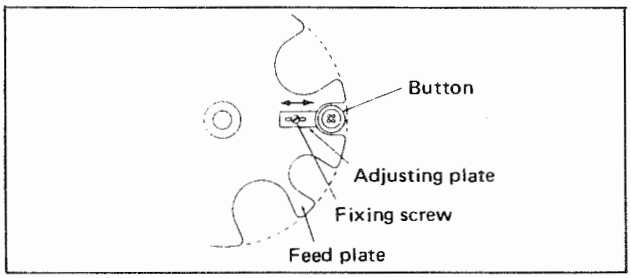


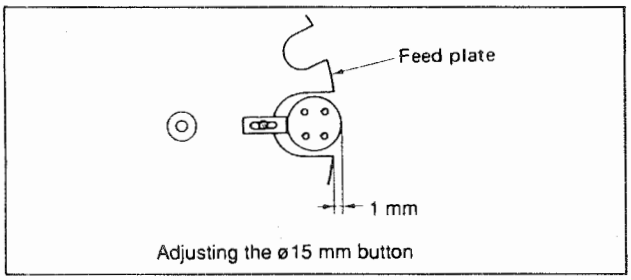
Adjust clearance ℓ between the feeder bowl and the disk to approximately 1 to 1.5 mm.
Loosen nut ❶ (above figure) and move the entire unit of the button feeder until it is properly positioned.
The position of the feeder bowl can be finely adjusted by loosening the feeder bowl attaching screw and changing the position of the feeder bowl.

18) Adjusting the feed plate of the index unit

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.







Adjusting the ø15 mm button

Adjusting the feed plate of the index unit

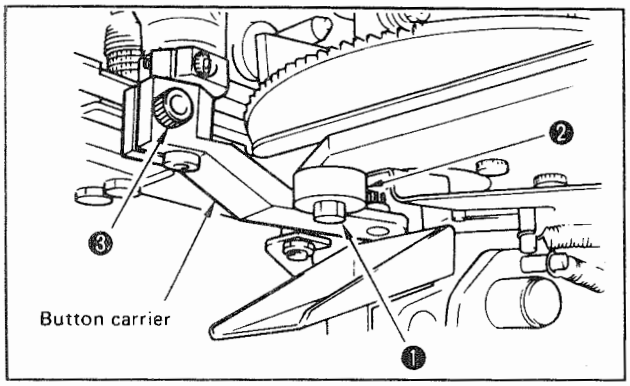
1) Confirm first that the index unit is in its origin.
2) Remove the screw which is used to fix the feed plate.
3) Loosen screws ❸ , and match the notch in ehoicc ring ❶ to one of the holes (large, medium or small) in the feed plate in accordance with the diameter of buttons to be used. Then tighten screws ❸.
4) Adjust the clearance into which the button is placed using adjusting plate ❷ . Loosen screw ❹ , and adjust the height of the adjusting plate so that a clearance in which only one piece of button can be put is obtained. The clearance should not be widened to allow two buttons to enter with overlapped. Now, tighten screw ❹.
5) Finely adjust the feed plate, using the adjusting plate só that the button to be used is exactly fitted in the hole selected. Loosen the fixing screw with a screwdriver through the screwdriver hole in the feed plate. Adjust the adjusting plate so that the periphery of the feed plate is flush with that of the button. Then fix the adjusting plate by tightening the fixing screw. Attach the feed plate which has been properly adjusted to the button feeder. At this time, install the feed plate to the button feeder so that the hole in the feed plate is brought to the exit of the feeder bowl.

(Caution) **Carefully tighten the screws since the aforementioned components easily break.**

- **When sewing buttons of which diameter of ø15 mm, move the adjusting plate outward from the above-stated position by 1 mm. (This allows the button to fall smoothly down to the index gear.)**

WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

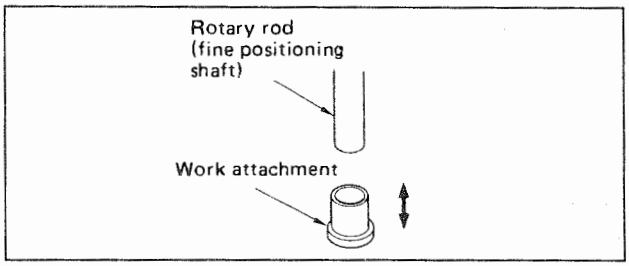
(1) Replacing the button carrier and positioning it



To replace the button carrier, loosen screw ❸, then remove the button carrier. Replace the button carrier with one with a proper center-to-center distance, and fit the button carrier with a proper center-to-center distance to the eccentric cam, and simultaneously make the top face of the carrier come in contact with the nut. Now fix the carrier by screw ❸

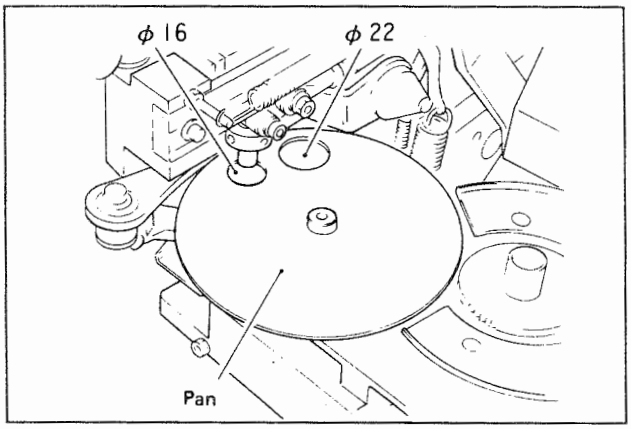
(Caution) The above-stated positioning procedure should be carried out with the sewing machine set to the origin.

(2) Replacing the work attachment



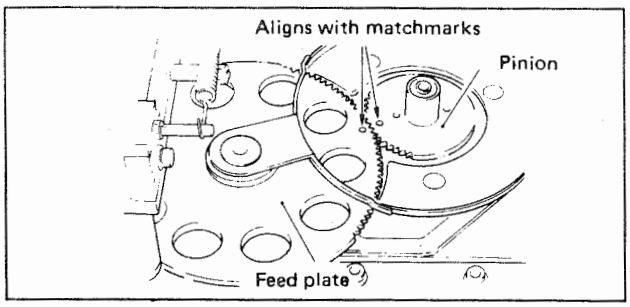
Remove the work attachment currently attached on the sewing machine from the rotary rod. Then attach the work attachment of another type on the machine. At this time, be sure to confirm that the work attachment securely fits in position.

(3) Replacing the feed plate and positioning it

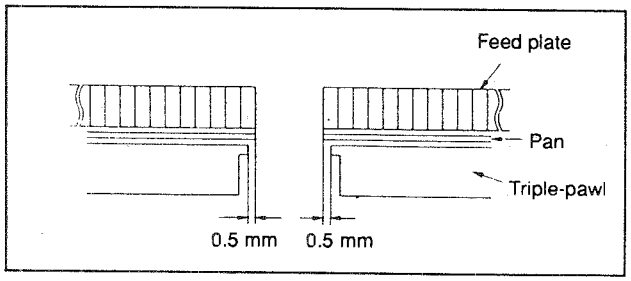


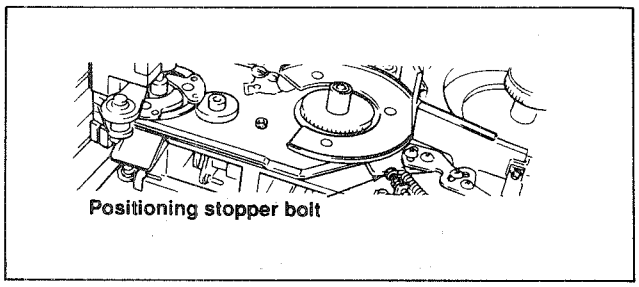
* A ϕ22 feed plate is also applicable by turning the pan over.

1) Pan
Use the feed plate of ϕ16 mm (standard) when sewing buttons of which outside diameter is ϕ10 mm to ϕ15 mm. If the outside diameter of the button is ϕ16 mm to ϕ18 mm, use the feed plate of ϕ22 mm (optional). At this time, it is necessary to adjust the pan located under the feed plate to the diameter of the hole in the feed plate. The pan is provided with two holes, one is ϕ16 mm hole and the other is ϕ22 mm hole. When using the feed plate of ϕ16 mm, attach the pan so that its ϕ16 mm hole comes this side with respect to the rotational direction of the feed plate. On the other hand, if using the feed plate of ϕ22 mm, attach the pan so that its ϕ22 mm hole comes this side with respect to the rotational direction of the feed plate.



2) To adjust the position of the feed plate, confirm first that the pinion is in its origin and attach the feed plate at the position where the matchmark (countersinking) on the pinion aligns with the matchmark on the feed plate. At this time, align the hole in the pan with the hole in the feed plate on the triple pawl.





3) Adjust the initial diameter of the triple-pawl taking the value which is obtained by adding 1 mm to the diameter of the button hole in the feed plate used as reference.
Make the adjustment using the positioning stopper bolt.

Alarm No. indication

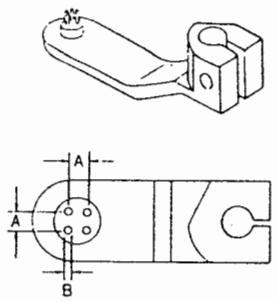
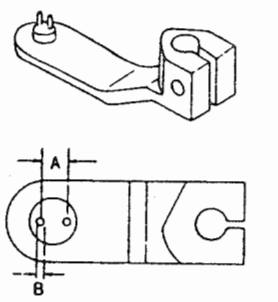
If the alarm indicator lamp on the operation panel starts flashing on and off slowly, the relevant alarm number indicated on the front face of the control box will be shown on the operation panel.

No.	Indication	Troubles	Causes	Corrective measures	How to reset
0	0	Normal operation (given during the normal stand-by state of the sewing machine)	———	———	———
1	1	RAM check error CPU error	• RAM in the CPU circuit board is defective. • Self-diagnosis error	Replace the CPU circuit board.	Re-turn ON the power to the machine.
2	2	Sewing machine starter is defective.	• If the machine can start up: L-SW is defective or disconnected. • If the machine cannot start up: 24 Vtrip. The starting magnet is defective or disconnected.	Replace the L-SW. Replace the starting magnet.	Press the Reset button. Press the 24 V RESET button.
3	3	Fine positioning error Occurs when the automatic button discharging function continuously works three times.	• The button carrier does not match the distance between holes in the button. • The fine positioning completion sensor is defective. (Malfunction) • The center of the fine positioning rod and that of the triple pawl and button carrier are not aligned with each other.	Replace the button carrier. Replace the RFIN sensor. (Adjust the RFIN sensor) Align the center of the rod with that of the triple pawl and button carrier.	Press the Reset button.
4	4	Spinner oscillating arm error (The motor is kept turned ON over a predetermined period of time.)	• Overload of the motor (A button is caught in the spinner oscillating arm or the motor is mechanically locked.) • F4 (6.3 A) fuse has blown.	Remove the button. (Refer to "14" of "Cautions during operation.") Replace the fuse.	Turn OFF the power to the machine, remove the cause of the trouble and return ON the power to the machine.
5	5	Index unit error (The motor is kept turned ON over a predetermined period of time.)	• Overload of the motor (A button is caught in the index unit or the motor is mechanically locked.) • F5 (2 A) fuse has blown.	Remove the button. Replace the fuse.	Turn OFF the power to the machine, remove the cause of the trouble and return ON the power to the machine.
6	6	Sewing machine belt error	• The sewing machine belt slips out of the predetermined position or has broken.	Install the belt on the machine properly and make the machine head to its initial state. (Turn OFF the power to the machine.)	Press the Reset switch.
7	7	When the power switch is turned ON, the stop-mechanism is in its OFF state.	———	Set the machine head to its initial state.	Press the Reset switch.
8	8	Push-button switch for the positioning of button is defective.	———	Re-adjust the Button positioning switch. Replace the Button positioning switch.	Press the Reset switch.
9	9	Start switch is defective.	———	Re-adjust the Start switch. Replace the Start switch.	Press the Reset switch.
10	C	The sewing machine start condition error (The spinner oscillating arm motor origin switch has not been turned ON.)	• The origin of the spinner oscillating arm has not been properly adjusted. • The motor used to control the spinner oscillating arm is defective.	Re-adjust the origin sensor properly. Replace the motor for the spinner oscillating arm.	Press the Reset switch.
11	J	Button clamp lifter operating condition error (Spinner oscillating arm motor origin switch will not be turned ON.) (The stop motion switch has not been turned ON.)	• The motor used to control the spinner oscillating arm is defective. • The machine is not in its initial position when lifting the button clamp jaw lever.	Replace the motor for the spinner oscillating arm. Set the machine to the initial state.	Press the Reset switch.
12	U	Spinner oscillating arm condition error (The stop-motion switch has not been turned ON.)	• The machine is not in its initial position when actuating spinner oscillating arm.	Set the machine to the initial state.	Press the Reset switch.
13	E	Fine positioning performance condition error (The index switch has not been turned ON.)	• The index unit is not in its origin. (The machine overruns due to a defective motor.)	Replace the motor for the index unit.	Press the Reset switch.

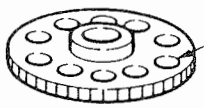
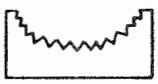
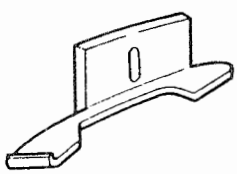
6. TROUBLES AND CORRECTIVE MEASURES

TROUBLES	CAUSES	CORRECTIVE MEASURES
1. Thread breakage.	(1) The yoke slide does not move in the correct way. (2) The thread tension disc No.2 fails to release the thread at correct timing. (3) The thread nipper catches the thread. (4) The needle does not enter the center of the holes in the button. (5) The needle is too thick for the diameter of the hole in the button.	○ Adjust the timing of the motion of the yoke slide at each end. ○ Make the thread release timing slightly earlier. ○ Adjust the nipper bar block. ○ Adjust the button clamp holder. ○ Replace the needle by a thinner one.
2. Buttons are not sewn tightly.	(1) The yoke slide does not move in the correct way. (2) The thread tension disc No.2 fails to release the thread at correct timing. (3) The thread tension disc No.2 dose not give sufficient tension. (4) The needle does not enter the center of the holes in the button. (5) The work pressing force is too high or too low.	○ Adjust the timing of the motion of the yoke slide at each end. ○ Make the thread release timing slightly later. ○ Adjust the tension disc No. 2. ○ Adjust the button clamp holder. ○ Adjust the work pressing force properly.
3. The first stitch trails relatively long thread from the right side of the button.	(1) The thread pull-off lever does not work properly.	○ Adjust the thread pull-off lever by the nipper bar block.
4. Thread trimming failure.	(1) The moving knife does not separate the thread on the fabric with its thread separation nail. (2) The needle does not enter the center of the holes in the button. (3) The last stitch skips. (4) The moving knife thread separation nail is too high or too low.	○ Adjust the position of the moving knife. ○ Adjust the button clamp holder. ○ Adjust the looper. ○ Adjust the height of the moving knife thread separation nail.
5. The needle thread is cut in two places on the wrong side of the fabric.	(1) The moving knife is set in wrong place. (2) The moving knife thread separation nail is too high or too low.	○ Adjust the position of the moving knife when the machine is in the stop-motion state. ○ Adjust the height of the thread separation nail.
6. Buttons trials too long thread after thread trimming.	(1) Timing of the moving knife motion is wrong.	○ Adjust the position of the moving knife.
7. Stop-motion failure occurs.	Clutch is turned OFF too early.	○ Retard the timing to allow the clutch to turn OFF.
8. Stop-motion noise is too large.	Clutch is turned OFF too late.	○ Quicken the timing to allow the clutch to turn OFF.

(1) Button carrier

	For 4-holed button				For 2-holed button			
Shape of button carrier								
	Dimensuon A (mm)	Dimensuon B (mm)	Part No.	Code	Dimensuon A (mm)	Dimensuon B (mm)	Part No.	Code
Standard type	2.6	1.0	165-57902	A	3.2	1.2	165-58009	B
Special-order type	2.0	1.0	165-90507	Q	2.0	1.0	165-87305	E
	2.2	1.0	165-90606	R	2.2	1.0	165-87404	F
	2.4	1.0	165-87501	S	2.4	1.0	165-87503	G
	2.4	1.2	165-87600	T	2.4	1.2	165-87909	L
	2.6	1.2	165-87709	U	2.6	1.0	165-87602	H
	2.8	1.2	165-87808	V	2.6	1.2	165-88006	M
	3.0	1.2	165-87907	W	2.8	1.0	165-87701	J
	3.0	1.5	165-88806	F1	2.8	1.2	165-88105	N
	3.1	1.0	165-87206	D	3.0	1.0	165-87800	K
	3.1	1.2	165-89004	X	3.0	1.2	165-88204	P
	3.1	1.4	165-89202	Z	3.8	1.2	165-87107	C
	3.6	1.2	165-90705	H1				
	4.0	1.2	165-89707	E1				

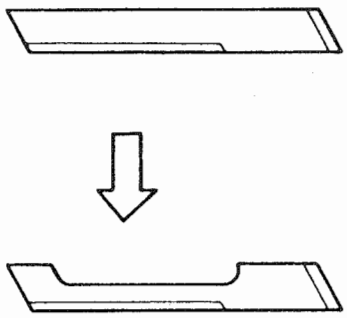
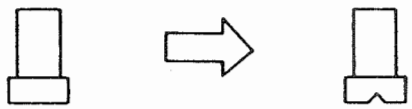
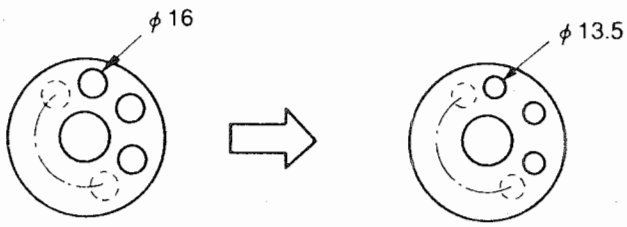
(2) Optional parts

Part No.	Name of part	Shape
16557704	Work attachment, large	 9.5mm
18257006	Work attachment (with a groove)	Bottom surface   8mm
18257105	Work attachment (with a recessed end)	 8mm
18257204	Work attachment (with a recessed end)	 9.5mm
18200956 18201103 (16568651)	Feed plate asm., ø13.5 mm Pan, small (Feed plate asm., ø22 mm)	 Hole diameter ϕ 13.5
18251553 (GBR01424000)	Separation plate asm., extra-small (Separation plate, large)	
18213207	In-line arrangement plate A	
16558207	Centering ring, large	

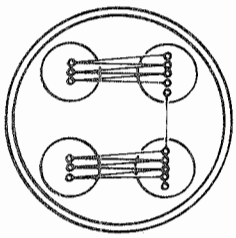
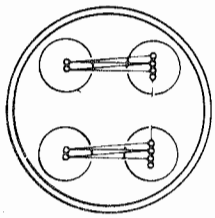
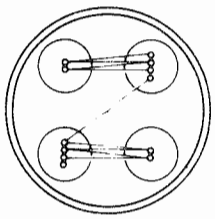
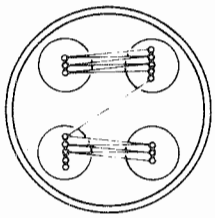
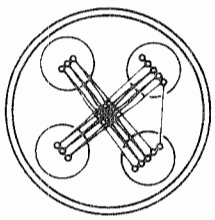
Application
The shape of this work attachment is as same as that of thc standard type of work attachment and has a large bottom diameter. It is suited to large buttons of which diameter is approximately ø18 mm. When replacing the standard work attachment with this work attachment, re-adjust the fine positioning completion switch .
This work attachment has bottom of which diameter is standard but is provided with a cross groove. It is suited to special-shape buttons (such as marble buttons) which do not smoothly rotate when using the standard attachment.
This work attachment has a bottom of which diameter is standard but has a conic recess. It is suited to the buttons, such as marble buttons, which has a protruded top face.
This work attachment is same as 18257105 in shape but has a larger bottom diameter. When replacing the standard work attachment with this work attachment, re-adjust the fine positioning completion switch .
This feed plate has a smaller holes (ø13.5 mm) for carrying buttons when compared with the standard feed plate. When a small button (shell button, in particular) of which diameter is ø10 mm is to be fed, the button may be reversed when it is delivered to the triple pawl or crack when the triple pawl is closed, in accordance with the shape of the button. To prevent the aforementioned troubles, this feed plate is used in combination with the ferrule disk (small). If using buttons of which diameter is ø16 mm or more, use the feed plate asm., ø22 mm. In this case, the standard pan can be used.
This separtion plate is smaller than the selection plate, small (GBR011220A0). It is suited to the flat buttons (shell buttons, in particular) of which diameter is approximately ø10 mm since, when using such buttons, the separation plate (small) cannot discriminate the right-sided buttons from the wrong-sided ones with consistency. When using large buttons, use the separation plate, large.
This in-line arrangement plate is suited when sewing buttons including marble-shaped buttons which are likely to be clogged in the standard in-line arrangement plate. This plate is designed to prevent buttons from being clogged.
Use this ring when centering the origin of the button carrier, E, F, G or H.

(3) Sewing marble buttons or the like

The BR10 has been designed for the sewing of flat buttons including buttons for men's shirts. If you want to sew marble buttons or some other special-shaped buttons, replace the parts listed below to improve effectiveness of the button feeder.
Shape of buttons (marble button ⬭, semi-marble button ⬭, shell button)

No.	Name of part (part No.)	Caution to be taken at the time of replacement
1.	In-line arrangement plate A (18213207)	 It is adjusted in the same way as in the case of the standard part.
2.	Work attachment, small (with a groove) (18257006)	 No adjustment is required.
3.	Feed plate asm. (18200956) ø13.5 mm	 No adjustment is required. When this feed plate is used for sewing buttons of which outside diameter is ø10 or ø11.5 mm, effectiveness of the button feeder will be improved.
3.	Pan, small (18201103)	No adjustment is required.

In addition, be sure to use the triple pawl asm. that is provided with a collar.

MB-373N	MB-373N-4	MB-373N-5	MB-373N-10	MB-373N-11
8, 16, 32 stitches	6, 12, 24 stitches	6, 12, 24 stitches	8, 16, 32 stitches	8, 16, 32 stitches
				

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