ENGLISH

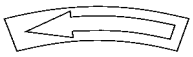
TO ENSURE SAFE USE OF YOUR SEWING MACHINE

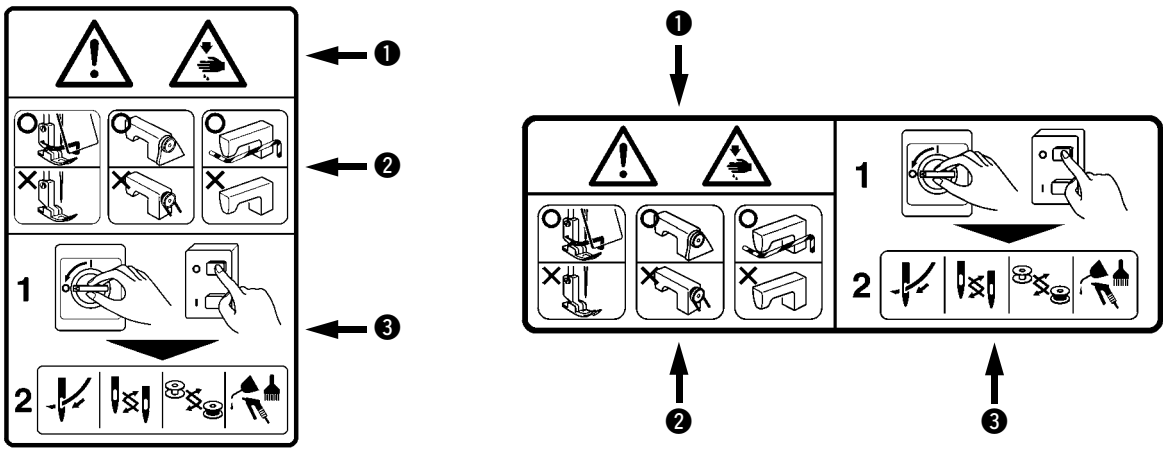
For the sewing machine, automatic machine and ancillary devices (hereinafter collectively referred to as "machine"), it is inevitable to conduct sewing work near moving parts of the machine. This means that there is always a possibility of unintentionally coming in contact with the moving parts. Operators who actually operate the machine and maintenance personnel who are involved in maintenance and repair of the machine are strongly recommended to carefully read to fully understand the following **Safety precautions** before using/maintaining the machine. The content of the **Safety precautions** includes items which are not contained in the specifications of your product.
The risk indications are classified into the following three different categories to help understand the meaning of the labels. Be sure to fully understand the following description and strictly observe the instructions.

(Ⅰ) Explanation of risk levels

	**DANGER :** **This indication is given where there is an immediate danger of death or serous injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.**
	**WARNING :** **This indication is given where there is a potentiality for death or serious injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.**
	**CAUTION :** **This indication is given where there is a danger of medium to minor injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.**
	**Items requiring special attention**

(Ⅱ) Explanation of pictorial warning indications and warning labels

Pictorial warning indication		**There is a risk of injury if contacting a moving section.**	**Indication label**		**There is a risk of entanglement in the belt resulting in injury.**
		**There is a risk of electrical shock if contacting a high-voltage section.**			**The correct direction is indicated.**
		**There is a risk of a burn if contacting a high-temperature section.**			**Connection of a earth cable is indicated.**



❶ ・There is the possibility that slight to serious injury or death may be caused.
・There is the possibility that injury may be caused by touching moving part.

❷ ・To perform sewing work with safety guard.
・To perform sewing work with safety cover.
・To perform sewing work with safety protection device.

❸ ・Be sure to turn the power OFF before carrying out "machine-head threading," "needle changing," "bobbin changing" or "oiling and cleaning."

SAFETY PRECAUTIONS

Accident means "to cause personal injury or death or damage to property."

DANGER

1. When it is necessary to open the control box containing electrical parts, be sure to turn the power off and wait for five minutes or more before opening the cover in order to prevent accident leading to electrical shock.

CAUTION

Basic precaution

1. Be sure to read the instruction manual and other explanatory documents supplied with accessories of the machine before using the machine. Carefully keep the instruction manual and the explanatory documents at hand for quick reference.
2. The content of this section includes items which are not contained in the specifications of your product.
3. Be sure to wear safety goggles to protect against accident caused by needle breakage.
4. Those who use a heart pacer have to use the machine after consultation with a medical specialist.

Safety devices and warning labels

1. Be sure to operate the machine after verifying that safety device(s) is correctly installed in place and works normally in order to prevent accident caused by lack of the device(s).
2. If any of the safety devices is removed, be sure to replace it and verify that it works normally in order to prevent accident that can result in personal injury or death.
3. Be sure to keep the warning labels adhered on the machine clearly visible in order to prevent accident that can result in personal injury or death. If any of the labels has stained or come unstuck, be sure to change it with a new one.

Application and modification

1. Never use the machine for any application other than its intended one and in any manner other than that prescribed in the instruction manual in order to prevent accident that can result in personal injury or death. JUKI assumes no responsibility for damages or personal injury or death resulting from the use of the machine for any application other than the intended one.
2. Never modify and alter the machine in order to prevent accident that can result in personal injury or death. JUKI assumes no responsibility for damages or personal injury or death resulting from the machine which has been modified or altered.

Education and training

1. In order to prevent accident resulting from unfamiliarity with the machine, the machine has to be used only by the operator who has been trained/educated by the employer with respect to the machine operation and how to operate the machine with safety to acquire adequate knowledge and operation skill. To ensure the above, the employer has to establish an education/training plan for the operators and educate/train them beforehand.

Items for which the power to the machine has to be turned off

Turning the power off: Turning the power switch off, then removing the power plug from the outlet. This applies to the following.

1. Be sure to immediately turn the power off if any abnormality or failure is found or in the case of power failure in order to protect against accident that can result in personal injury or death.
2. To protect against accident resulting from abrupt start of the machine, be sure to carry out the following operations after turning the power off. For the machine incorporating a clutch motor, in particular, be sure to carry out the following operations after turning the power off and verifying that the machine stops completely.
   2-1. For example, threading the parts such as the needle, looper, spreader etc. which have to be threaded, or changing the bobbin.
   2-2. For example, changing or adjusting all component parts of the machine.
   2-3. For example, when inspecting, repairing or cleaning the machine or leaving the machine.
3. Be sure to remove the power plug by holding the plug section instead of the cord section in order to prevent electrical-shock, earth-leakage or fire accident.
4. Be sure to turn the power off whenever the machine is left unattended between works.
5. Be sure to turn the power off in the case of power failure in order to prevent accident resulting of breakage of electrical components.

PRECAUTIONS TO BE TAKEN IN VARIOUS OPERATION STAGES

Transportation

1. Be sure to lift and move the machine in a safe manner taking the machine weight in consideration. Refer to the text of the instruction manual for the mass of the machine.

2. Be sure to take sufficient safety measures to prevent falling or dropping before lifting or moving the machine in order to protect against accident that can result in personal injury or death.
3. Once the machine has been unpacked, never re-pack it for transportation to protect the machine against breakage resulting from unexpected accident or dropping.

Unpacking

1. Be sure to unpack the machine in the prescribed order in order to prevent accident that can result in personal injury or death. In the case the machine is crated, in particular, be sure to carefully check nails. The nails have to be removed.
2. Be sure to check the machine for the position of its center of gravity and take it out from the package carefully in order to prevent accident that can result in personal injury or death.

Installation

(Ⅰ) Table and table stand

1. Be sure to use JUKI genuine table and table stand in order to prevent accident that can result in personal injury or death. If it is inevitable to use a table and table stand which are not JUKI genuine ones, select the table and table stand which are able to support the machine weight and reaction force during operation.
2. If casters are fitted to the table stand, be sure to use the casters with a locking mechanism and lock them to secure the machine during the operation, maintenance, inspection and repair in order to prevent accident that can result in personal injury or death.

(Ⅱ) Cable and wiring

1. Be sure to prevent an extra force from being applied to the cable during the use in order to prevent electrical-shock, earth-leakage or fire accident. In addition, if it is necessary to cable near the operating section such as the V-belt, be sure to provide a space of 30 mm or more between the operating section and the cable.
2. Be sure to avoid starburst connection in order to prevent electrical-shock, earth-leakage or fire accident.
3. Be sure to securely connect the connectors in order to prevent electrical-shock, earth-leakage or fire accident. In addition, be sure to remove the connector while holding its connector section.

(Ⅲ) Grounding

1. Be sure to have an electrical expert install an appropriate power plug in order to prevent accident caused by earth-leakage or dielectric strength voltage fault. In addition, be sure to connect the power plug to the grounded outlet without exceptions.
2. Be sure to ground the earth cable in order to prevent accident caused by earth leakage.

(Ⅳ) Motor

1. Be sure to use the specified rated motor (JUKI genuine product) in order to prevent accident caused by burnout.
2. If a commercially available clutch motor is used with the machine, be sure to select one with an entanglement preventive pulley cover in order to protect against being entangled by the V-belt.

Before operation

1. Be sure to make sure that the connectors and cables are free from damage, dropout and looseness before turning the power on in order to prevent accident resulting in personal injury or death.
2. Never put your hand into the moving sections of the machine in order to prevent accident that can result in personal injury or death.
   In addition, check to be sure that the direction of rotation of the pulley agrees with the arrow shown on pulley.
3. If the table stand with casters is used, be sure to secure the table stand by locking the casters or with adjusters, if provided, in order to protect against accident caused by abrupt start of the machine.

During operation

1. Be sure not to put your fingers, hair or clothing close to the moving sections such as the handwheel, hand pulley and motor or place something near those sections while the machine is in operation in order to prevent accident caused by entanglement that can result in personal injury or death.
2. Be sure not to place your fingers near the surround area of the needle or inside the thread take-up lever cover when turning the power on or while the machine is in operation in order to prevent accident that can result in personal injury or death.
3. The machine runs at a high speed. Never bring your hands near the moving sections such as looper, spreader, needle bar, hook and cloth trimming knife during operation in order to protect your hands against injury. In addition, be sure to turn the power off and check to be sure that the machine completely stops before changing the thread.
4. Be careful not to allow your fingers or any other parts of your body to be caught between the machine and table when removing the machine from or replacing it on the table in order to prevent accident that can result in personal injury or death.
5. Be sure to turn the power off and check to be sure that the machine and motor completely stop before removing the belt cover and V-belt in order to prevent accident caused by abrupt start of the machine or motor.
6. If a servomotor is used with the machine, the motor does not produce noise while the machine is at rest. Be sure not to forget to turn the power off in order to prevent accident caused by abrupt start of the motor.
7. Never use the machine with the cooling opening of the motor power box shielded in order to prevent fire accident by overheat.

Lubrication

1. **Be sure to use JUKI genuine oil and JUKI genuine grease to the parts to be lubricated.**
2. **If the oil adheres on your eye or body, be sure to immediately wash it off in order to prevent inflammation or irritation.**
3. **If the oil is swallowed unintentionally, be sure to immediately consult a medical doctor in order to prevent diarrhea or vomiting.**

Maintenance

1. **In prevention of accident caused by unfamiliarity with the machine, repair and adjustment has to be carried out by a service technician who is thoroughly familiar with the machine within the scope defined in the instruction manual. Be sure to use JUKI genuine parts when replacing any of the machine parts. JUKI assumes no responsibility for any accident caused by improper repair or adjustment or the use of any part other than JUKI genuine one.**
2. **In prevention of accident caused by unfamiliarity with the machine or electrical-shock accident, be sure to ask an electrical technician of your company or JUKI or distributor in your area for repair and maintenance (including wiring) of electrical components.**
3. **When carrying out repair or maintenance of the machine which uses air-driven parts such as an air cylinder, be sure to remove the air supply pipe to expel air remaining in the machine beforehand, in order to prevent accident caused by abrupt start of the air-driven parts.**
4. **Be sure to check that screws and nuts are free from looseness after completion of repair, adjustment and part replacement.**
5. **Be sure to periodically clean up the machine during its duration of use. Be sure to turn the power off and verify that the machine and motor stop completely before cleaning the machine in order to prevent accident caused by abrupt start of the machine or motor.**
6. **Be sure to turn the power off and verify that the machine and motor stop completely before carrying out maintenance, inspection or repair of the machine. (For the machine with a clutch motor, the motor will keep running for a while by inertia even after turning the power off. So, be careful.)**
7. **If the machine cannot be normally operated after repair or adjustment, immediately stop operation and contact JUKI or the distributor in your area for repair in order to prevent accident that can result in personal injury or death.**
8. **If the fuse has blown, be sure to turn the power off and eliminate the cause of blowing of the fuse and replace the blown fuse with a new one in order to prevent accident that can result in personal injury or death.**
9. **Be sure to periodically clean up the air vent of the fan and inspect the area around the wiring in order to prevent fire accident of the motor.**

Operating environment

1. **Be sure to use the machine under the environment which is not affected by strong noise source (electromagnetic waves) such as a high-frequency welder in order to prevent accident caused by malfunction of the machine.**
2. **Never operate the machine in any place where the voltage fluctuates by more than "rated voltage ±10 %" in order to prevent accident caused by malfunction of the machine.**
3. **Be sure to verify that the air-driven device such as an air cylinder operates at the specified air pressure before using it in order to prevent accident caused by malfunction of the machine.**
4. **To use the machine with safety, be sure to use it under the environment which satisfies the following conditions:**
   Ambient temperature during operation 5°C to 35°C
   Relative humidity during operation 35 % to 85 %
5. **Dew condensation can occur if bringing the machine suddenly from a cold environment to a warm one. So, be sure to turn the power on after having waited for a sufficient period of time until there is no sign of water droplet in order to prevent accident caused by breakage or malfunction of the electrical components.**
6. **Be sure to stop operation when lightning flashes for the sake of safety and remove the power plug in order to prevent accident caused by breakage or malfunction of the electrical components.**
7. **Depending on the radio wave signal condition, the machine may generate noise in the TV or radio. If this occurs, use the TV or radio with kept well away from the machine.**
8. **For the worker who is involved in the work to be done in the environment relevant to "noise value in the working environment is 85 dB or more and less than 90 dB", be sure to take appropriate measures, as required, such as the use of ear protection or the like to protect against health hazard. In addition, for the worker who is involved in the work to be done in the environment relevant to "noise level in the working environment is 90 dB or more," be sure to instruct him/her to wear ear protection without exceptions in order to protect against health hazard, and display a sign explaining how to use the ear protection at an easily viewable location for the worker.**

FOR SAFE OPERATION

1. To prevent possible accidents due to electric shocks, neither open the cover of motor electrical box nor touch the component(s) inside the electrical box.
2. Make sure of the needle entry after changing the pattern. Should the pattern protrude from the work clamp check, needle interferes with the work clamp check resulting in the danger of occurrence of needle breakage or the like. In addition, check that the work clamp check which has been set corresponds to that which has been installed on the sewing machine.

1. In case nothing is displayed in the operation panel even when the power switch is turned ON, turn OFF the power switch and check the power voltage and phase.
2. To prevent injuries to the human body, never bring your fingers under the presser foot and the needle when the power switch is turned ON or the machine is in operation.
3. To prevent accidents caused by abrupt start of the machine, turn OFF the power when tilting the machine or removing the motor cover.
4. To prevent accidents to the human body caused by being caught in the machine, never bring your fingers, hair, or clothes close to the drive section such as handwheel, motor, carriage, stacker, or place anything on them when the machine is in operation.
5. To prevent injuries to the human body, never operate the machine with the safety devices such as motor cover, eye guard cover,. etc. removed.
6. To avoid personal injury, be careful never to allow your fingers to go inside the machine when tilting or raising the machine head.
7. To avoid electrical shock hazards, never operate the sewing machine with the ground wire for the power supply removed.
8. 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. To avoid possible accidents because of abrupt start of the machine, turn OFF the power to the machine "when tilting the machine head", "when returning the machine head to the home position", or "when removing the motor cover".
9. During thunder and lightning storms, stop your work and disconnect the power from the outlet to ensure safety and prevent possible accidents due to damaged electrical component(s).
10. If the machine is suddenly moved from a cold place to a warm place, dew condensation may result. If this occurs, be sure to confirm that there are no potentially dangerous water drops in the machine before turning it on in order to prevent possible accidents due to damaged electrical component(s).
11. In the event of a power failure, be sure to turn OFF the power to the machine to protect against damaged electrical components.
12. This sewing machine should be used under industrial environment. Under general household environment, the machine may cause poor reception when used in proximity of the television set or radio.
13. Be careful of handling this product so as not to pour water or oil, shock by dropping, and the like since this product is a precision instrument.
14. This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to make corrective actions.

CONTENTS

Ⅰ .MACHINE OPERATION

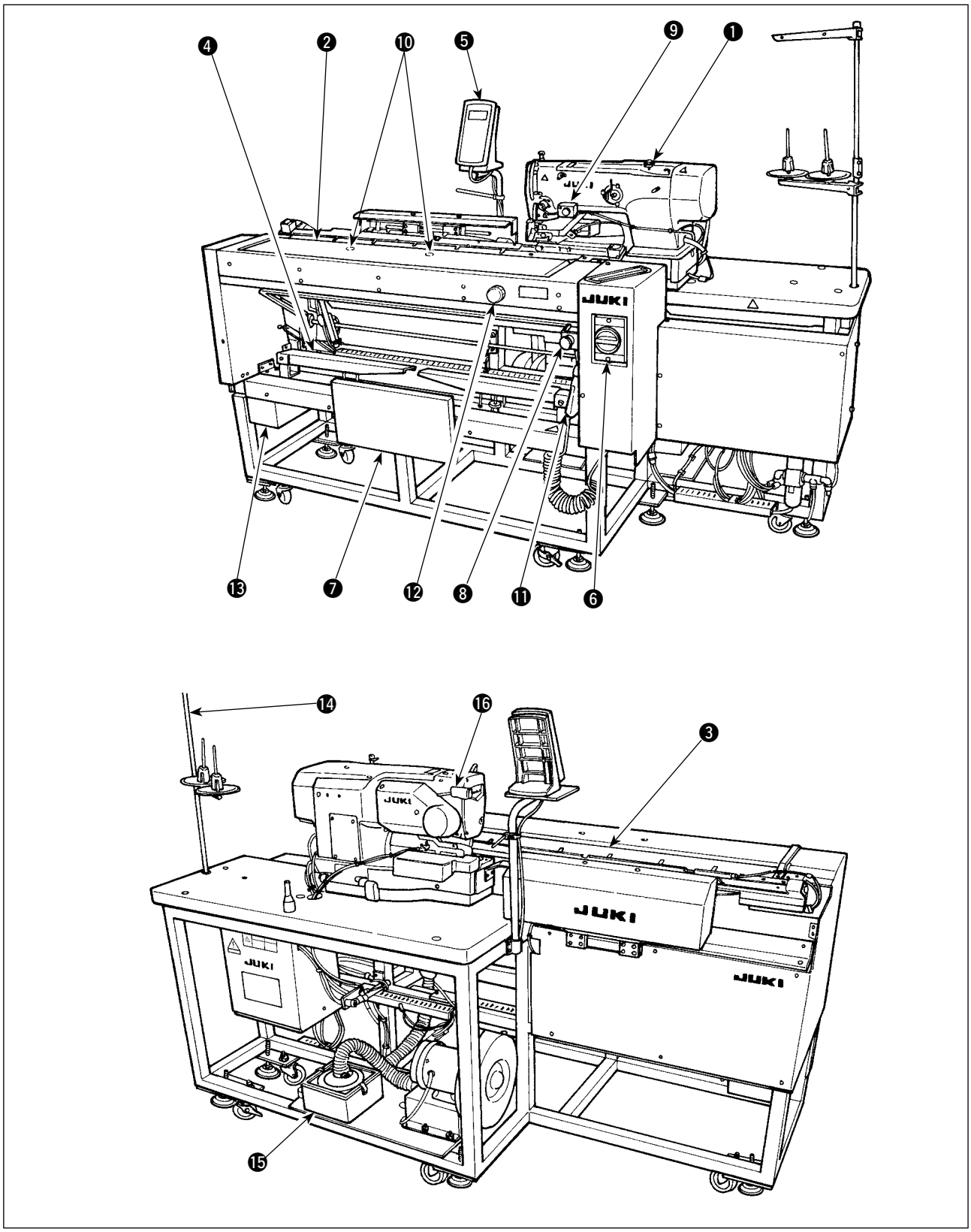
1. GENERAL

Mainly consisting of a sewing machine, preset board, carriage, stacker, the AC-172N-1790 indexer is designed to automatically carry out a series of operations starting with sewing buttonholes on the front top-center strips of men's shirts, etc. and ending with stacking of workpieces.

1-1. Features

1) The material feed mechanism allows the material to be fed quickly at accuratintervals.
2) The number of buttonholes or the feed to the sewing amount can be easily set or changed with the keys on the control panel. Twenty different patterns can be stored in memory, which enables the operator to quickly respond to the frequent setup changes.
3) The material is automatically fed to sewing position after it has been placed on the setting position. The machine automatically performs a series of operations, including sewing, thread trimming and stacking.
4) The operator can set the next material to be sewn while the machine is still sewing, allowing the operator to have enough time to attend on several machines.
5) Thanks to the presetting mechanism, it is possible for the operator to attend on four machines without causing one of them to stand idle or for the operator himself/herself to become idle when two pieces of garment are set on.
6) The clamping mechanism clamps the material securely without allowing any slippage during the sewing operation from inserting to stacking.
7) Buttonholes can be sewn also to the front to-center strips of ladies wear.
8) The sewing speed can be specified as desired using the variable resistor on the control panel.
9) The machine has various modes while enable self-diagnosis when an error occurs.
10) It is also equipped with a workpiece detector mechanism which eliminates a sewing start error.

1-2. Configuration of the main parts



❶ Sewing machine head
❷ Preset board
❸ Carriage
❹ Stacker
❺ Control panel
❻ Power switch
❼ Knee switch
❽ Pause switch
❾ Hand switch
❿ Workpiece detector switch
⓫ Air gun
⓬ Preset adjusting knob (supplied with the machine in the tool box)
⓭ Tool box
⓮ Thread stand
⓯ Filter box
⓰ Machine head pause switch

1-3. Operating precautions

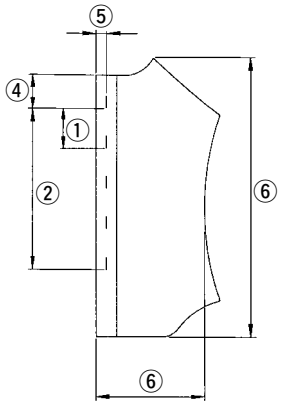
CAUTION:
To avoid malfunction and damage of the machine, confirm the following.

1. **Before you put the machine into operation for the first time after the set-up, clean it thoroughly.**
2. **This machine corresponds to the power supply voltage 200 to 240V.**
3. **Never use the machine in the state where the voltage type is different from the designated one.**
4. **Operate the machine with the air pressure set to 0.5Mpa.**

2. SPECIFICATIONS

■ Main unit

1	① Feed interval	:	0 to 610 (0. to 24”)
	② Overall feed amount	:	610 mm (24”)
	③ Number of buttonholes which can be sewn	:	1 to 20
	④ Distance from the top end of the garment body to the 1st buttonhole	:	0 to 140 mm (0 to 5.5”)
	⑤ Distance from the side end of the garment body to the buttonhole	:	7 to 21 mm (0.3 to 0.8 inch)
	⑥ Applicable garment size that can be sewn	:	Width 220 to 420 mm (8.7 to 16.5”) Length 400 to 880 mm (15.7 to 34.6”)
2	Number of patterns that can be stored in memory	:	20
3	Power supply	:	200 to 240V (3-phase/single phase) (Rated voltage ± 10% or less) (Without voltage changeover)
4	Power source frequency	:	50/60 Hz
5	Power consumption	:	1000 VA (supply voltage ± 10% or less)
6	Operating air pressure	:	0.5 MPa
7	Air consumption	:	240 Nl/ min . or less
8	Machine dimensions	:	Width 1,910mm Depth 850mm Table Height 920 mm
9	Weight	:	300 kg
10	Noise	:	- Equivalent continuous emission sound pressure level (L_{pA}) at the workstation: A-weighted value of 78.5dB; (Includes K_{pA}=2.5dB); according to ISO 10821 - C.6.3-ISO 11204 GR2 at 4200 sti/min. - Sound power level(L_{WA}); A-weighted value of 88.0dB; (Includes K_{WA} = 2.5dB); according to ISO 10821 - C.6.3-ISO 11204 GR2 at 4200 sti/min.



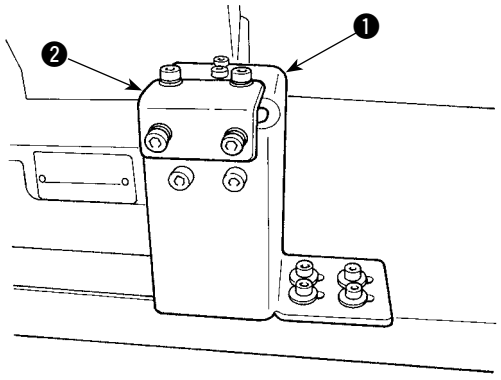
■ Sewing machine components

1	Machine head	:	LBH-1790S/AC2H
2	Sewing speed	:	Max. 4,200 sti/min (Number of revolutions at the time of delivery : 3,600 sti/min)
3	Stitch length	:	Max. 25 mm X sewing width 4 mm
4	Size (knife size)	:	6.4 to 19.1 mm (1/4 to 3/4”)
5	Needle	:	DPx5 #11J to #14J
6	Lubricating oil	:	JUKI New Defrix Oil No.1
7	Number of stitches	:	0.2 to 2.5 mm

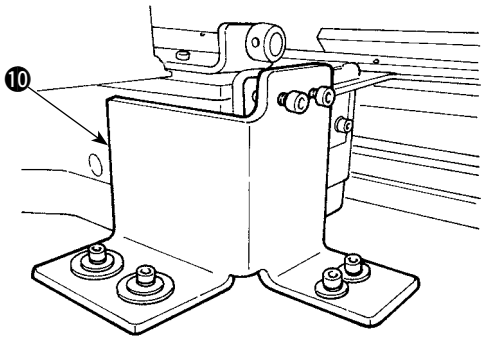
3. INSTALLATION

3-1. Removing the machine head fixing plate

The machine head fixing plate, which has been factory-installed on the sewing machine head at the time of delivery, should be removed.

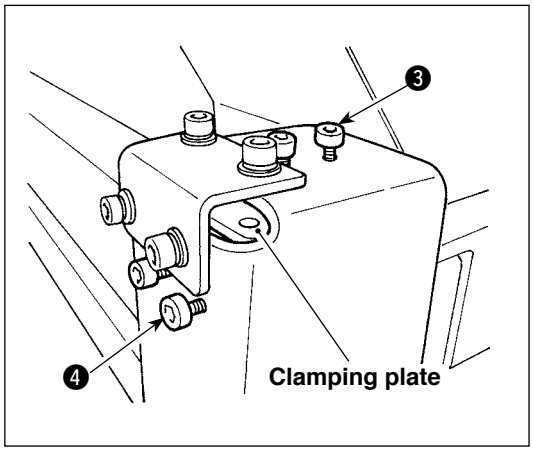


❶ Front guard
❷ Front auxiliary connecting plate for machine head

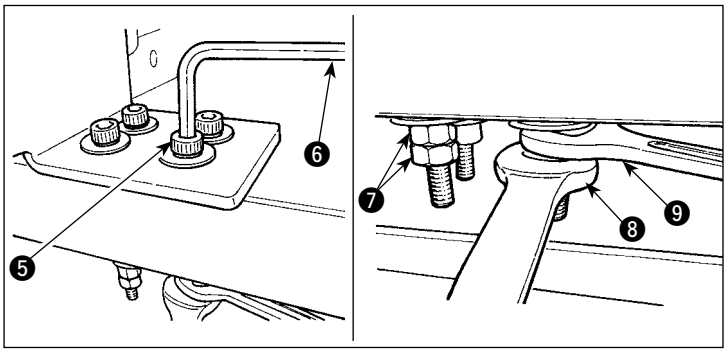


❿ Rear guard

[Removing the front guard]

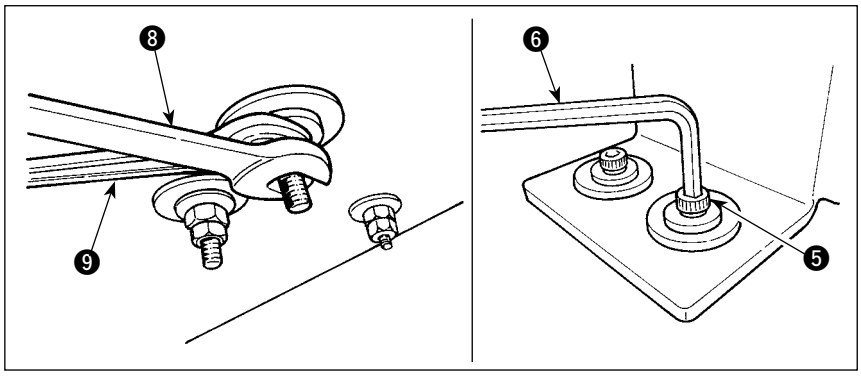


1) Loosen screws ❸ and ❹. (It is not necessary to remove them.)
The clamping plate which clamps the sewing machine head is installed under the front guard. Be sure not to forget to remove the clamping plate.



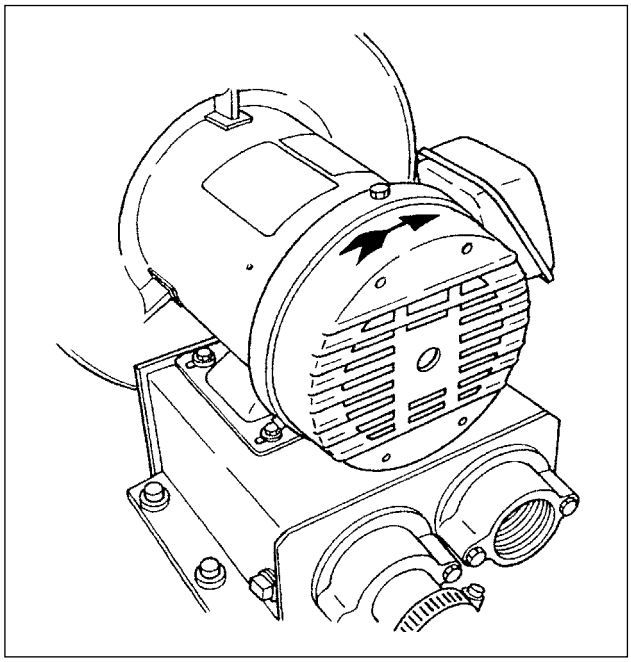
2) Remove screws ❺ which are used to secure the front guard and the table.
Fit spanners ❽ and ❾ respectively on nuts ❼ which are used to fix screw ❺. Securing spanner ❾, turn spanner ❽ clockwise. When one nut ❼ is removed, fix the remaining one with spanner ❾. Fit hexagonal wrench key ❻ on screw ❺ and turn the screw clockwise.

[Removing the rear guard]



The removal procedure for the rear guard is same as that for the aforementioned front guard.

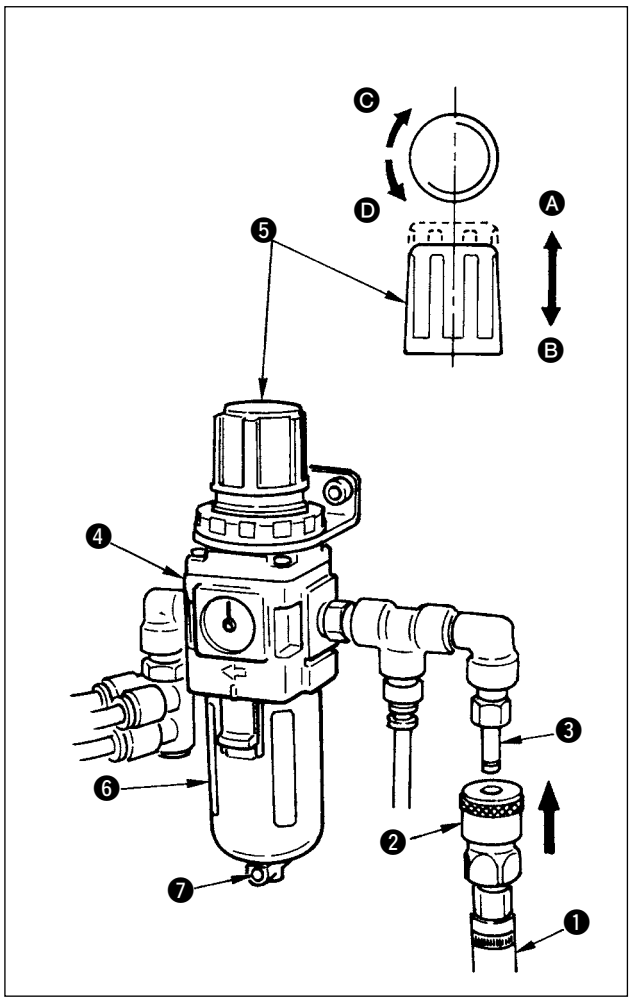
3-2. Connecting the power supply



1) Check to be sure that the power supply in use is 200 to 240 VAC.
2) First confirm that power switch in “OFF”, then connect the power cord to the power supply.
3) Turn the power ON. Check that the blower motor is rotating.

The sewing machine is not provided with a terminal block or the like for changing over the voltage. As long as the power supply in use is in the range of 200 to 240 VAC, the sewing machine can be directly connected to the power supply.

3-3. Installing the air hose

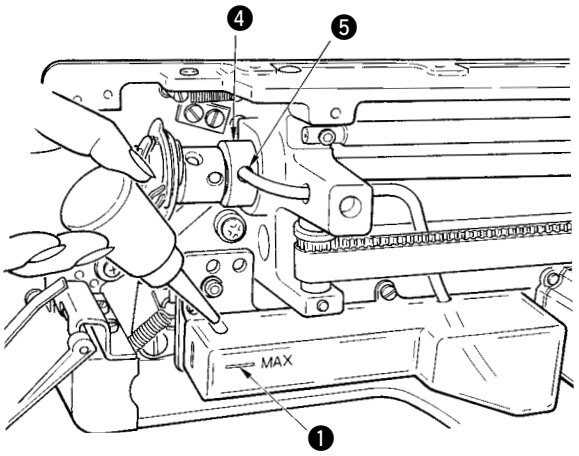


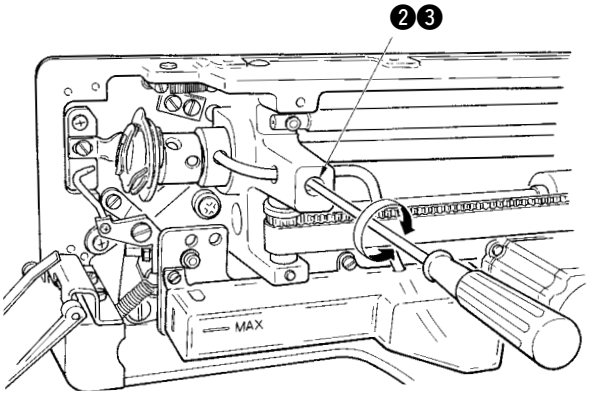
1) Insert air hose ❶ into one-touch joint ❷ supplied with this unit, and fix it using metal fittings or the like.
2) Insert one-touch joint ❷ into joint ❸ until it clicks.
3) Set the air pressure gauge to 0.5 MPa. To adjust, raise knob ❺ of regulator ❹ in direction Ⓐ, and turn knob ❺ clockwise (direction Ⓒ) to increase the air pressure, or turn the knob counter-clockwise (direction Ⓓ) to decrease the air pressure.
4) When the air pressure gauge has been set to 0.5 MPa press knob ❺ in direction Ⓑ until it clicks. The sound indicates that the gauge has locked.

When bottle ❻ is filled with water, be sure to drain off the water by removing one-touch joint ❷ from regulator ❹, and by pressing drain button ❼.
Drain off the water every time the machine is used , either before or after operation.

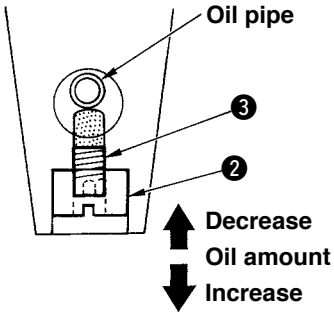
3-4. Lubrication

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.





Detailed diagram of oil amount adjusting section



1) Lubricating oil to oiling tank

○ Fill the oiling tank with New Defrix Oil No.1 up to the level indicated by "MAX" ❶.

2) Adjusting the lubrication for the sewing hook

○ Adjust the amount of oil supplied to the sewing hook by loosening lock nut ❷ and turning oil amount adjusting screw ❸.

○ Amount of supplied oil is reduced when turning the screws ❸ clockwise.

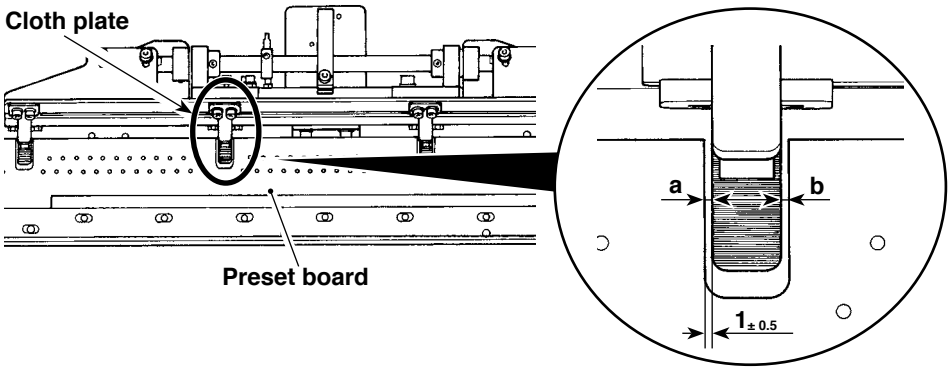
○ Fix the screw with lock nut ❷ after adjusting the lubrication for the sewing hook.

○ When you first operate your sewing machine after set-up or after an extended period of disuse, remove the bobbin case and apply a few drops of oil to the hook race. In addition, apply a few drops oil from oiling hole ❺ in hook driving shaft front metal ❹ to soak the inside felt in oil.

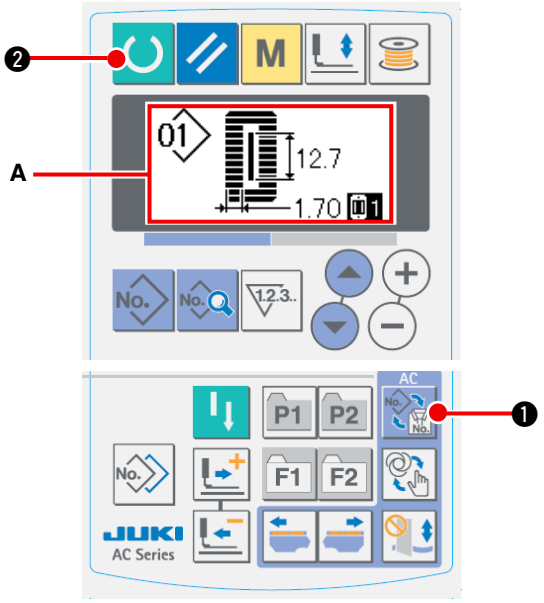
3-5. Checking the clearance provided between the preset board and the cloth plate at the time of installation

If the cloth plate is not equally spaced from the preset board at its right and left sides, at the time of installation in your plant, the adjusters should be adjusted.

Check whether the cloth plate is equally spaced from the preset board at its right and left sides by following the steps of procedure described below.

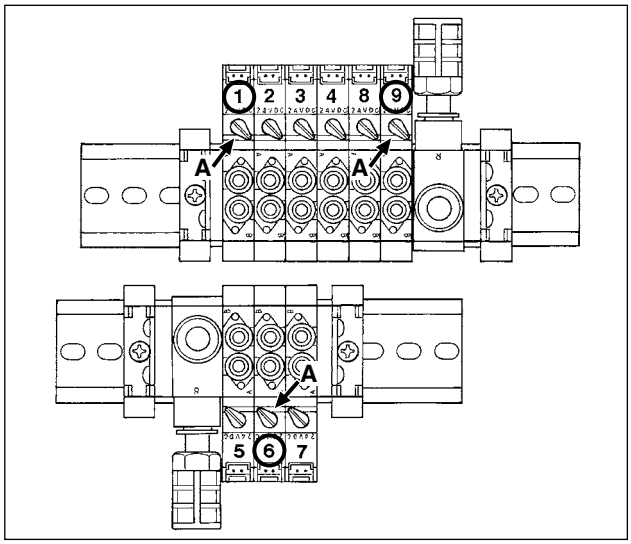


* The correct positioning of the preset board and the cloth plate is as shown in the figure.
Check to be sure that clearances a and b are equal.

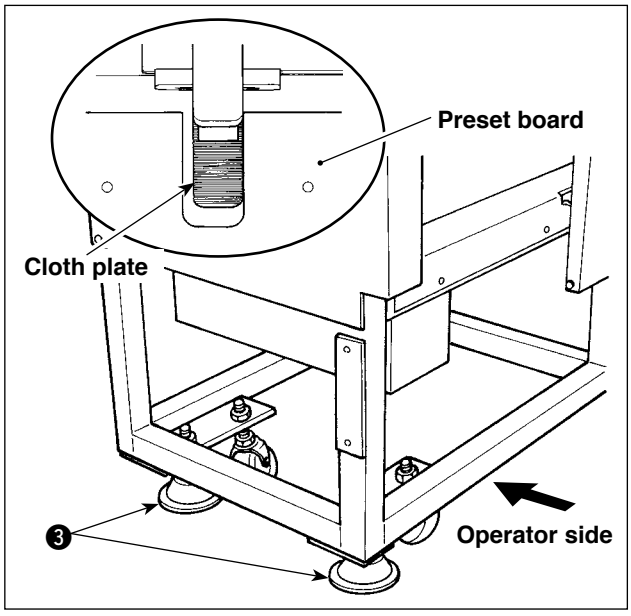


1) Turn the power ON. Press panel buttons ❶ to bring the panel display into the state shown in Fig. A. Then, press panel button ❷. Check that the presser foot of the sewing machine has gone up to its upper position.

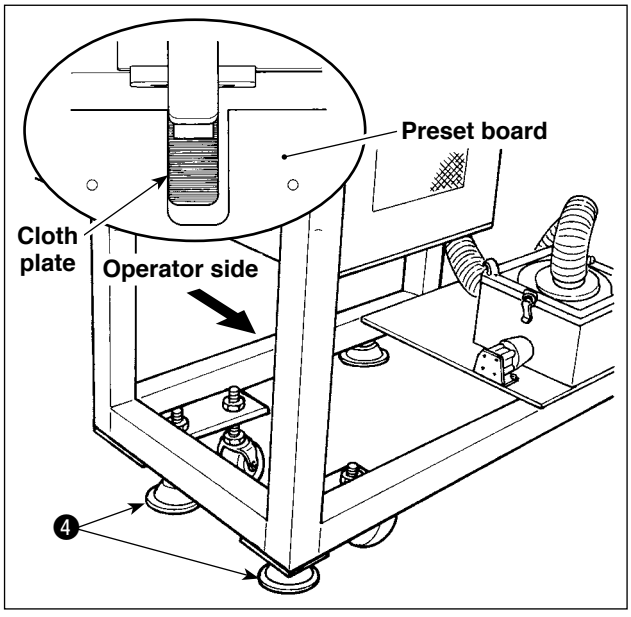
Caution :
The device starts. In order to protect against personal injury by an unintentional error in operation, operate the device following the steps of procedure described in the Instruction Manual when conducting adjustments.



2) Operate the solenoid valves No. 6, No. 1 and No. 9 in the written order to move the preset board forward.
The solenoid valves are locked to disable operation by turning lever A with held pressed.



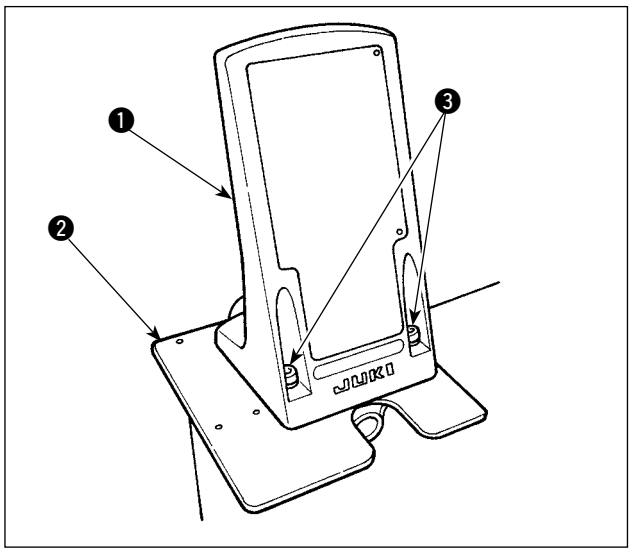
3) If the cloth plate inclines to the right against the preset board, shift adjusters ❸ upward to make adjustment in height.



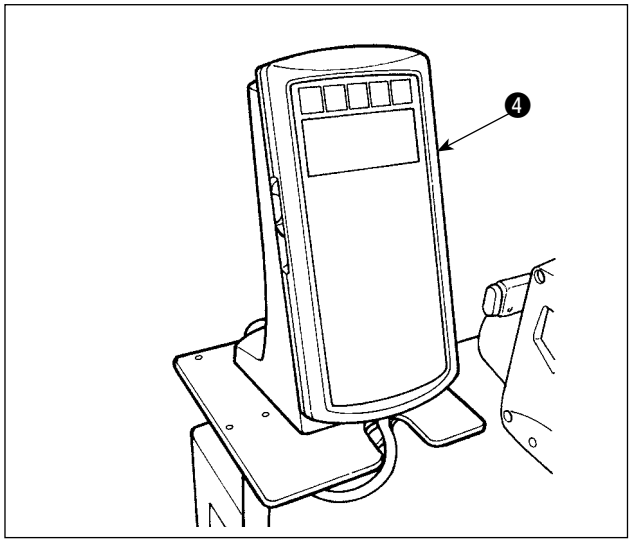
If the cloth plate inclines to the left against the preset board, shift adjusters ❹ upward to make adjustment in height.

4) After the completion of the adjustment, turn lever A with held pressed for each of the solenoid valves No. 9, No. 1 and No. 6 in the written order to unlock the solenoid valves.
After the completion of the aforementioned procedure, turn OFF the power to the device.

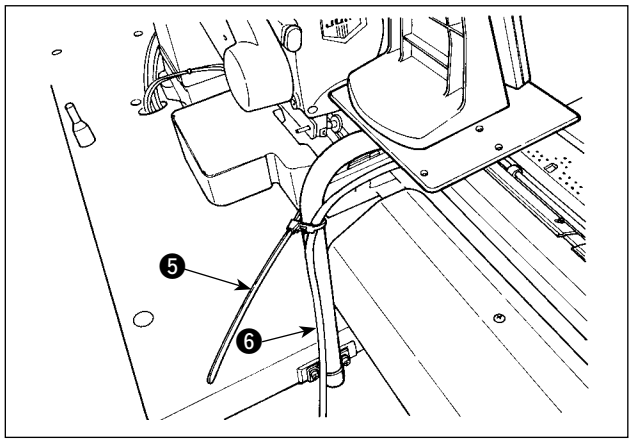
3-6. Installing the panel



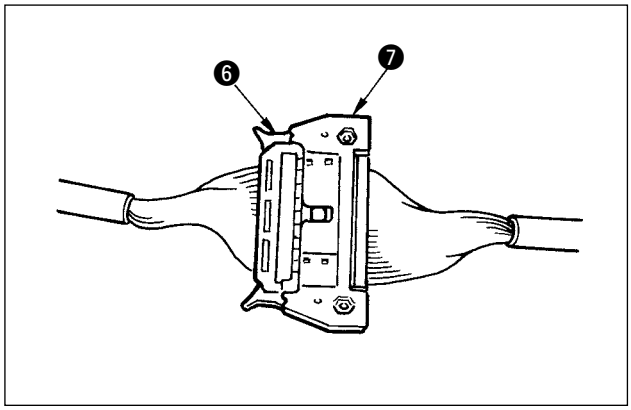
1) Fix operation panel mounting plate ❶ on base plate ❷. Use setscrews ❸ (M5 x 25) supplied with the unit.



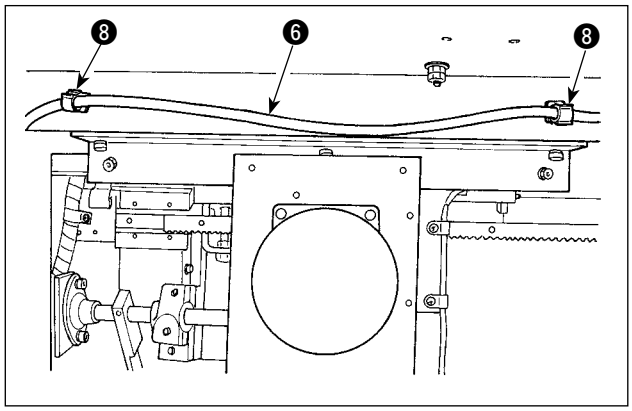
2) Install operation panel ❹.



3) Tie cord ❻ on the operation panel strut with cable clip band ❺.

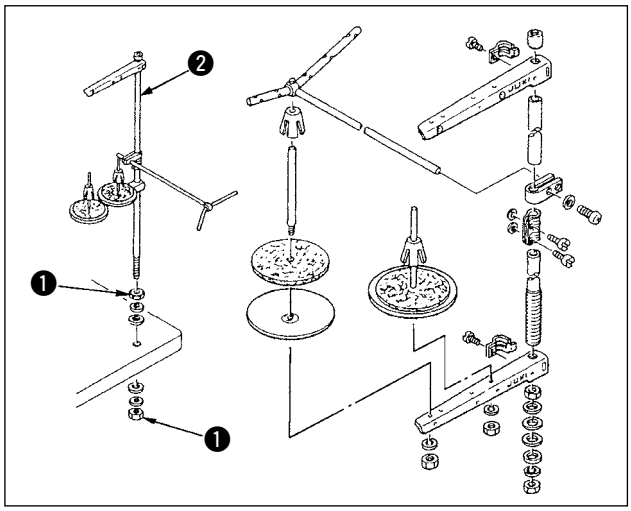


4) Connect cord ❻ to connector ❼ (CN34) coming from the control box.



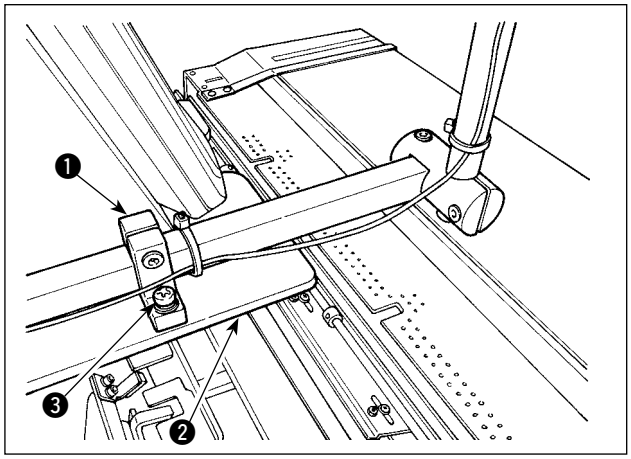
5) Fix cord ❻ at two points with clamps ❽ located under the housing.

3-7. Installing the thread stand

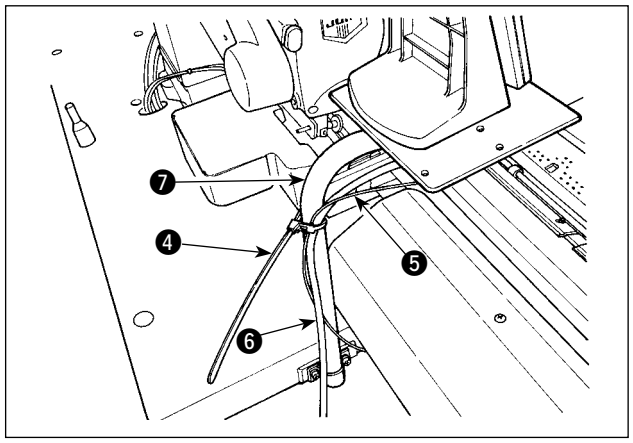


1) Assemble the thread stand unit, and fix the assembly in the hole in the table as shown in the figure.
2) Tighten locknuts ❶ so that they securely hold the thread stand assembly.
3) In the case of ceiling wiring, pass the power cable through spool rest rod ❷.

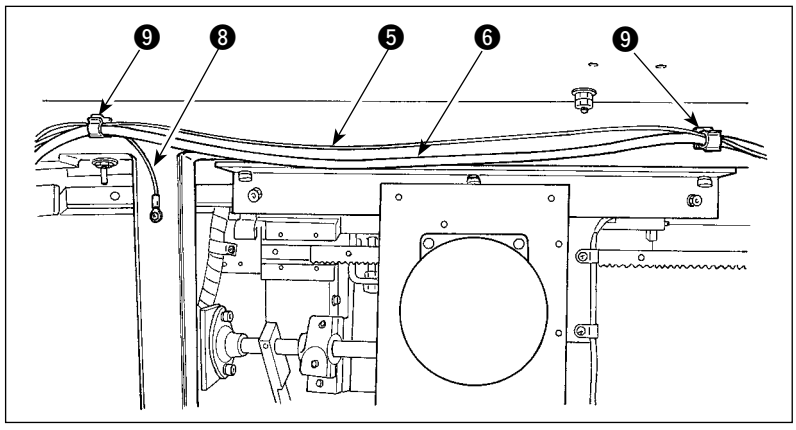
3-8. Installing the marking light



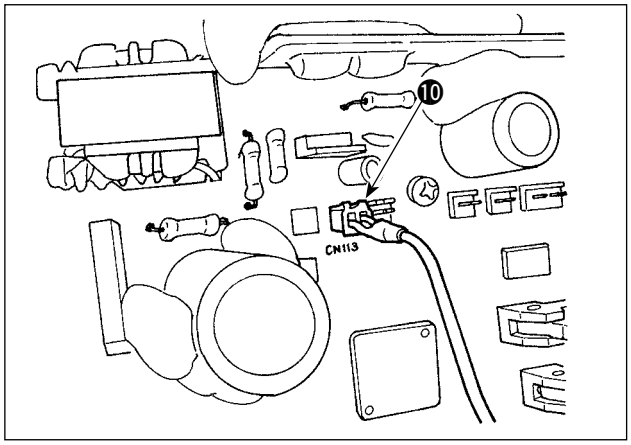
1) When installing the device, temporarily fix marking-light mounting base ❶ on base plate ❷ with setscrews ❸ (2 x M4) supplied with the unit.



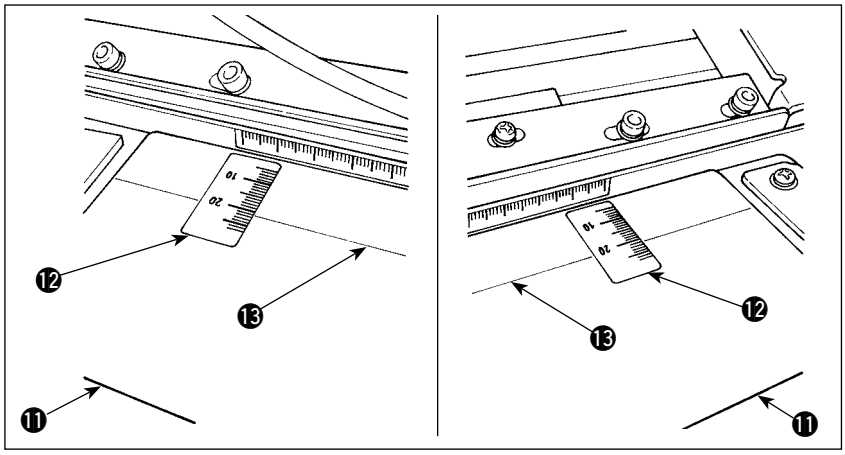
2) Secure marking-light cord ❺ and operation-panel cord ❻ on strut ❼ by means of cable clip band ❹.



3) Fix marking-light cord ❺ together with operation-panel cord ❻ and grounding cord ❽ at two locations underside the cabinet with clamps ❾.



4) Open the control box. Connect connector ❿ of the marking light to CN113.

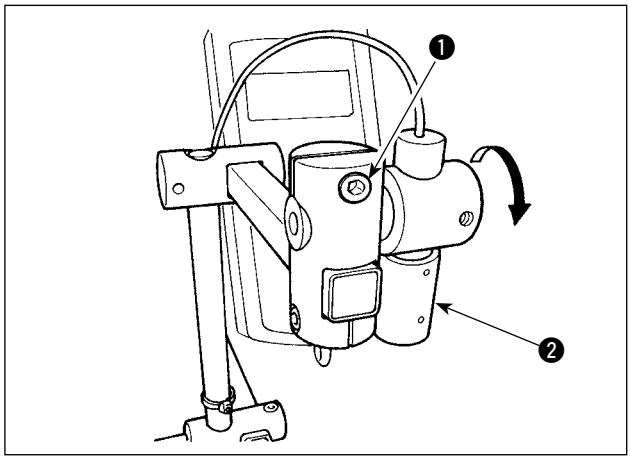


5) Adhere seal ⓬ on preset table ⓫ by affixing the right and left edges of the seal at right and left marking-off lines ⓭ on the table. The location of the seal to be adhered on the preset table can be found by aligning the scale "21" on the seal with marking-off line ⓭ on the table.

CAUTION:
The marking light is a product categorized under Class 2. Do not look into the beam irradiation orifices.

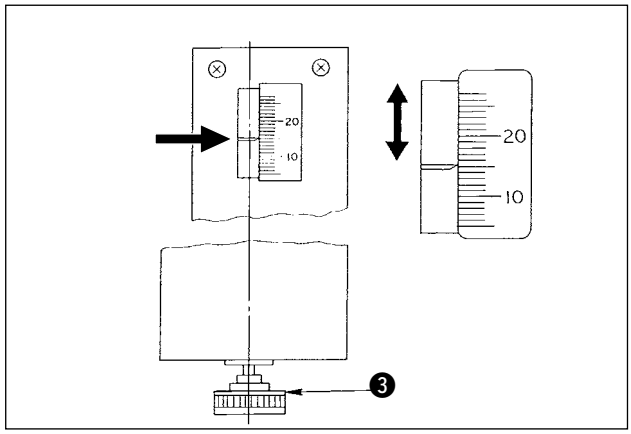
6) Turn on the power to the marking light. Then, move the entire device to align the light beams irradiated from the marking light with right and left marking-off lights ⓭ on preset table ⓫. When the device is correctly positioned, securely tighten setscrews ❸ (2 x M4).

3-9. Adjusting the marking light



* Setting procedure in the case the distance from the edge of placket material to the buttonhole is 15 mm

1) Loosen setscrews ❶.
2) Turn marking light ❷ in the direction of the arrow to adjust the pointer to "15" of the seal adhered on the preset table so that the laser light from marking light ❷ irradiates the scale "15."
3) Tighten setscrews ❶ taking care not to allow the laser light to move out of adjustment.



4) Align the pointer of the preset table at the scale "15" on the seal by means of the preset adjustment handle ❸. (See **" I -4-3. Adjusting the seam allowance" p.35** for the adjusting procedure.)

3-10. Installation and adjustment of the material edge detecting sensor (asm.)

This setting is only available under the men's garment mode. Be aware that the sewing machine carries out its normal operation even if the material edge detecting sensor is installed.

(1) Assembling the material edge detecting sensor

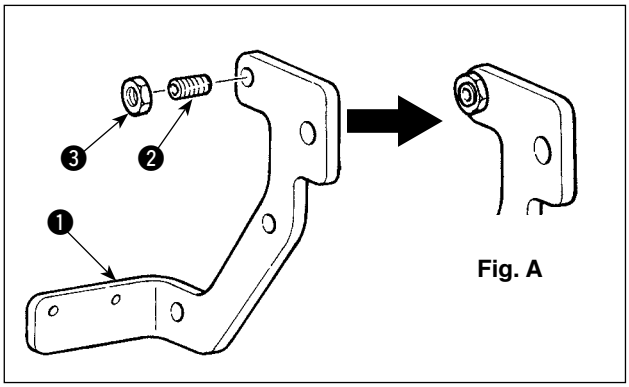
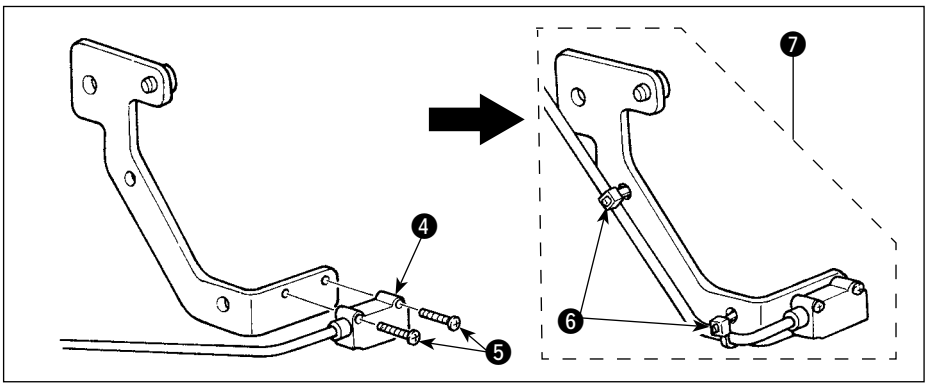


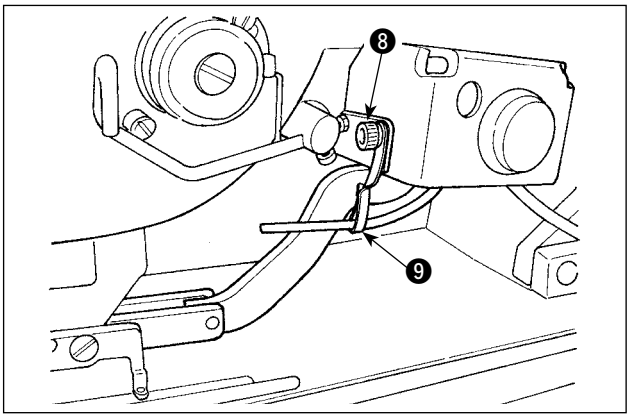
Fig. A

1) Put screw ❷ into the tapped hole in sensor mounting plate ❶.
2) Fit nut ❸ on screw ❷. Tighten the screw unit it is almost flush with the mounting plate, as shown in Fig. A, and secure with nut ❸.

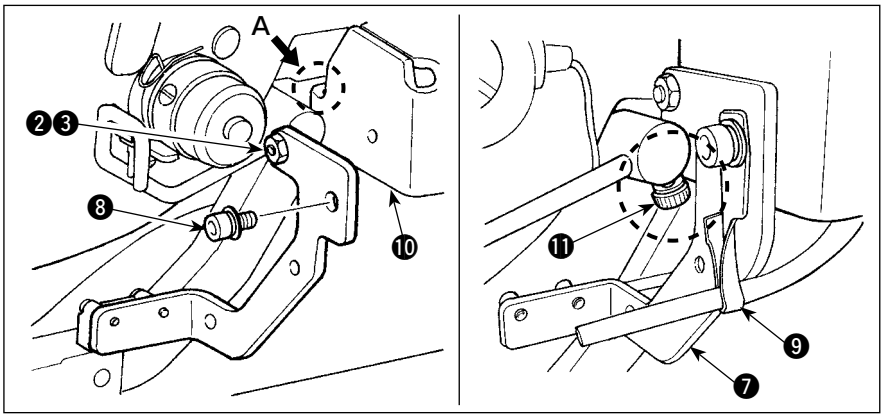


3) Install sensor ❹ on the mounting plate with screws ❺.
4) Route the sensor cord along the holes in mounting plate ❶. Secure the cord with cable clips ❻ at the holes to complete the assembly of material edge detecting sensor (asm.) ❼.

(2) Installing the material edge detecting sensor on the machine head

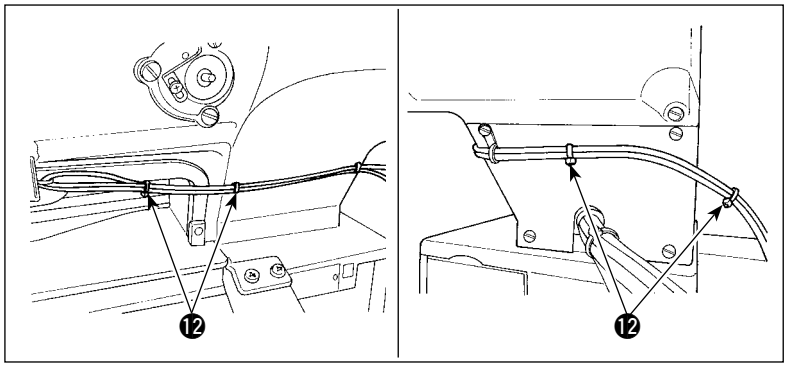


1) Loosen setscrew ❽ of the mounting bracket for the air blower to remove mounting bracket ❾.
2) Put setscrew ❷❸ of material edge detecting sensor (asm.) ❼ on section A of hand switch mounting plate ❿. Mount both material edge detecting sensor asm. ❼ and mounting bracket ❾ with air blower mounting bracket setscrew ❽.

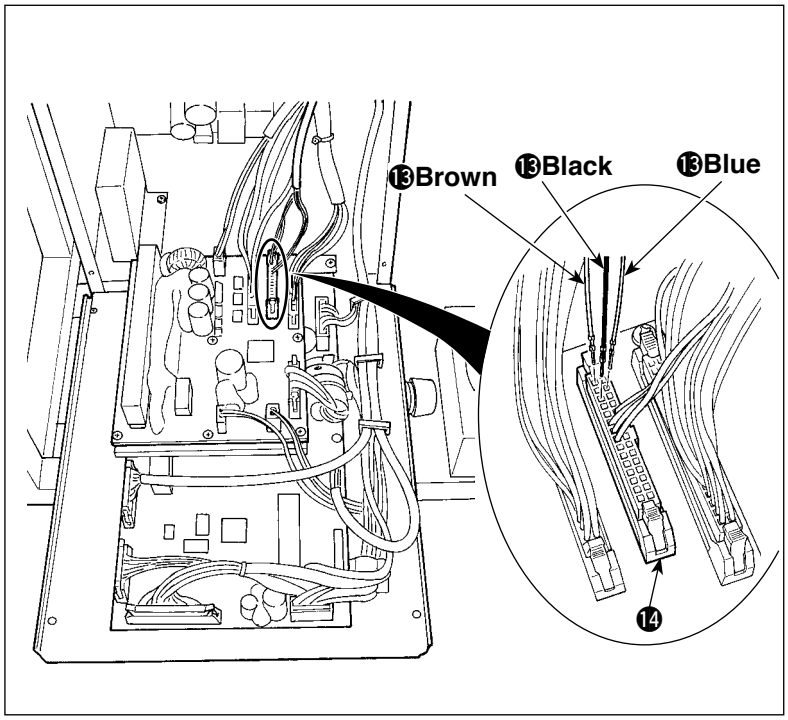


Be sure to check that the setscrew does not come in contact with hand spinner setscrew ⓫.

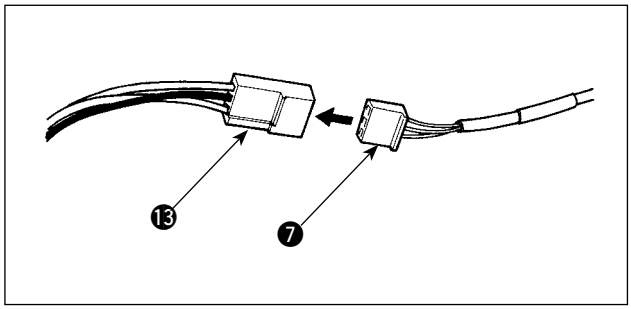
3) Turn around bracket ❾ so that the air hose faces the needle bar.



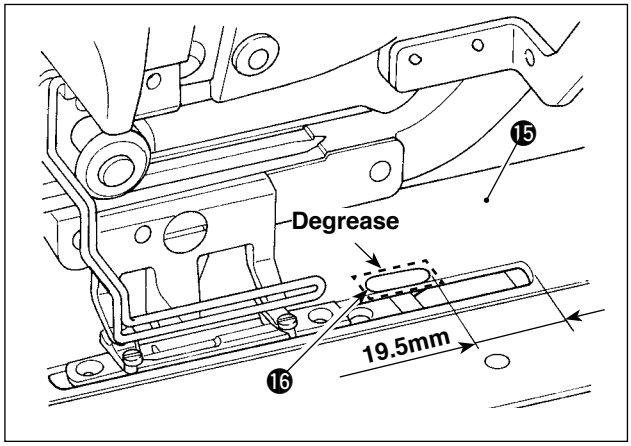
4) Secure material edge detecting sensor cord by means of cable clip ⓬ together with the hand-switch cord and the air hose.



5) Open the cover of the control box.
6) Connect brown cord (contact) of the material edge detecting sensor junction cord ⓭ to sensor junction cord B asm. ⓮ (CN105-30), black cord (contact) to sensor junction cord B asm. ⓮ (CN105-26) and blue cord (contact) to sensor junction cord B asm. ⓮ (CN105-27), respectively.



7) Insert material edge detecting sensor asm. cord ❼ into material edge detecting sensor junction cord ⓭.

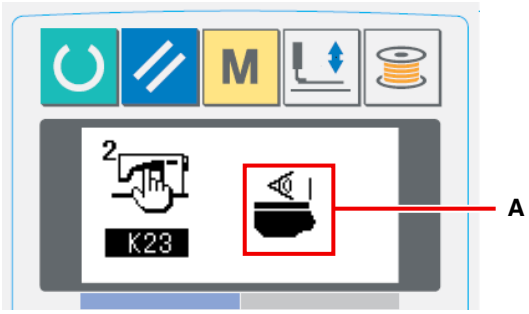


8) Degrease the top surface (at the location where reflective sheet ⓰ is to be affixed) of feed plate ⓯.
9) Affix reflective sheet ⓰ on feed plate ⓯ aligning with the end face of the slot of the feed plate.

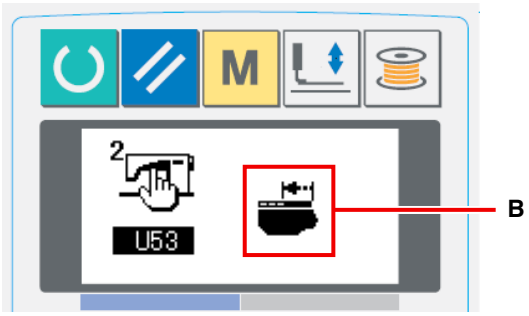
Caution
If the relevant part of the surface of feed plate ⓯ is not adequately degreased, reflective sheet ⓰ is likely to come unstuck.

(3) Adjusting the material edge detecting sensor

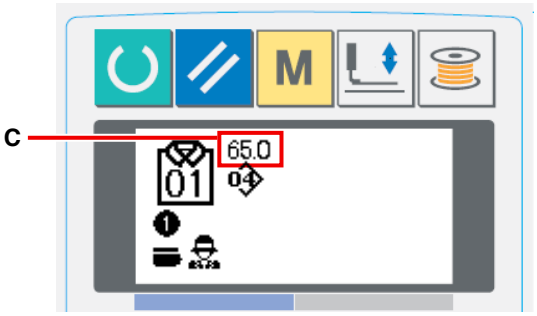
Refer to "Ⅱ-2-15. Method to change the memory switch data" p. 77 for the operation procedure of the memory switch.



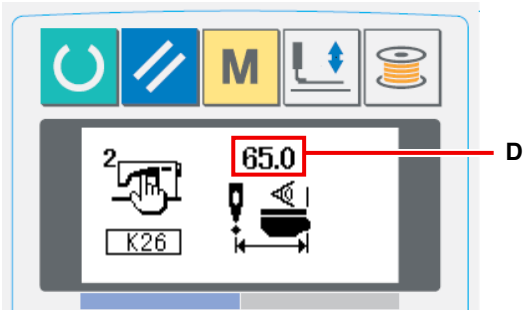
1) Turn the power ON. Set K23 (material edge detecting sensor setting) in "enable" **A**.



2) Set U53 (jump functions setting) in "enable jump" **B**.



3) Set the amount of feed from the material edge **C** at 65 mm under the AC mode.
4) Press the ready key to bring the sewing machine into the sewing state. Then, place a piece of cloth of approximately A4-size on the preset section.



5) Actuate the preset device to start sewing.
6) Measure the distance **D** from the material edge to the edge of a buttonhole. Enter the measured value in the field above the K26 pictograph. (Initial value is 65 mm.)

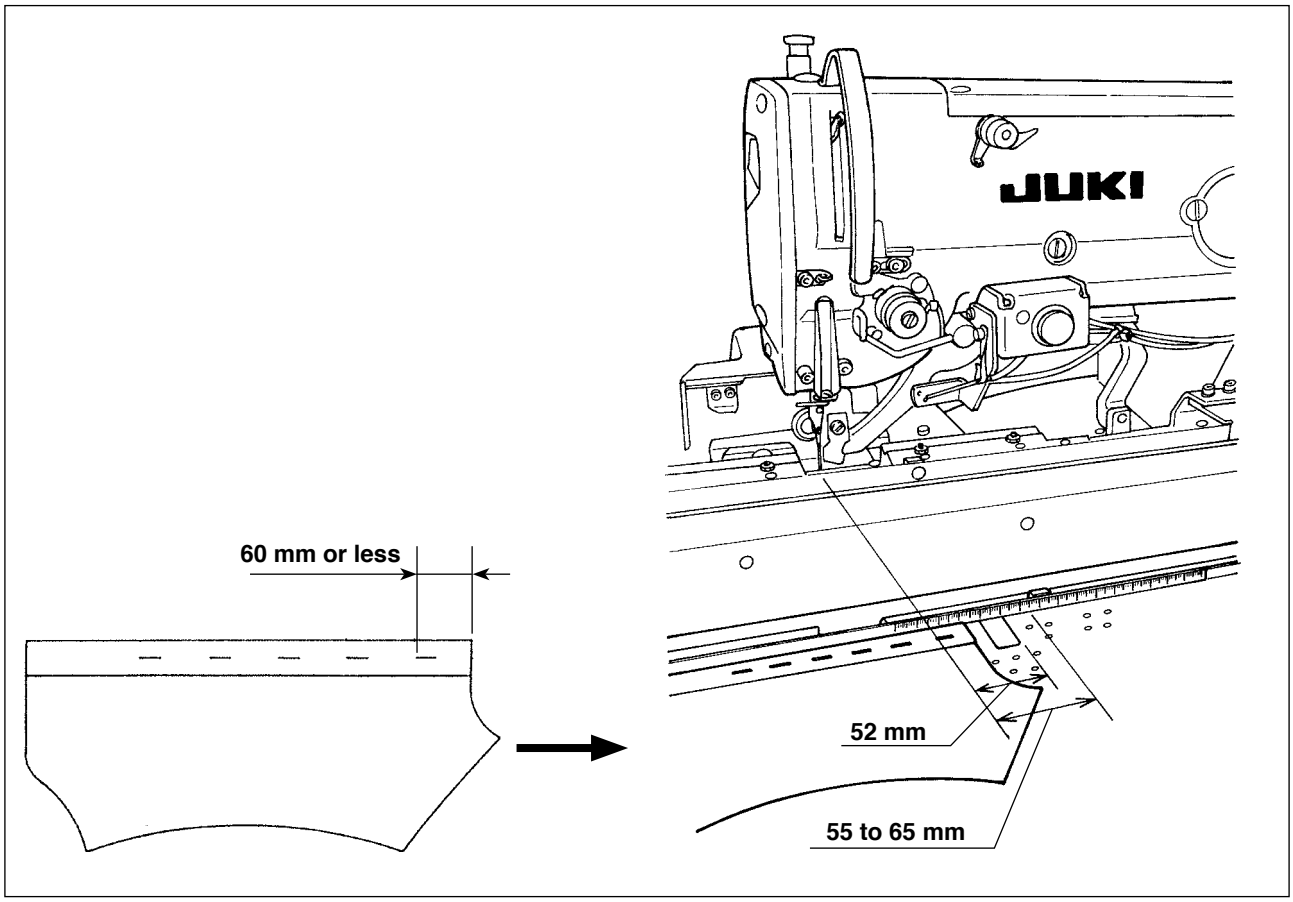
7) Now, the positioning of the sensor is completed. Enter the desired amount of feed in **C** and measure the aforementioned distance for the purpose of confirmation.

[Precautions to be taken in setting]

It is recommended to place the material at the location that is 65 ± 5 mm from the center of needle as far as possible.

In the case you want to set the amount of feed from the material edge to the first buttonhole to 60 mm or less, in particular, place the material in the range of 60 and 65 mm from the center of needle.

Sewing cannot be carried out unless the material is placed near the notch in the preset table (52 mm away from the center of needle).



Example) In the case the amount of feed from the material edge to the first buttonhole is set at 50 mm and the material is placed at the location 75 mm away from the center of needle

After the material is delivered from the preset table to the carriage, the material edge is detected by the carriage: The carriage moves to the left by 10 mm (75 - 65).

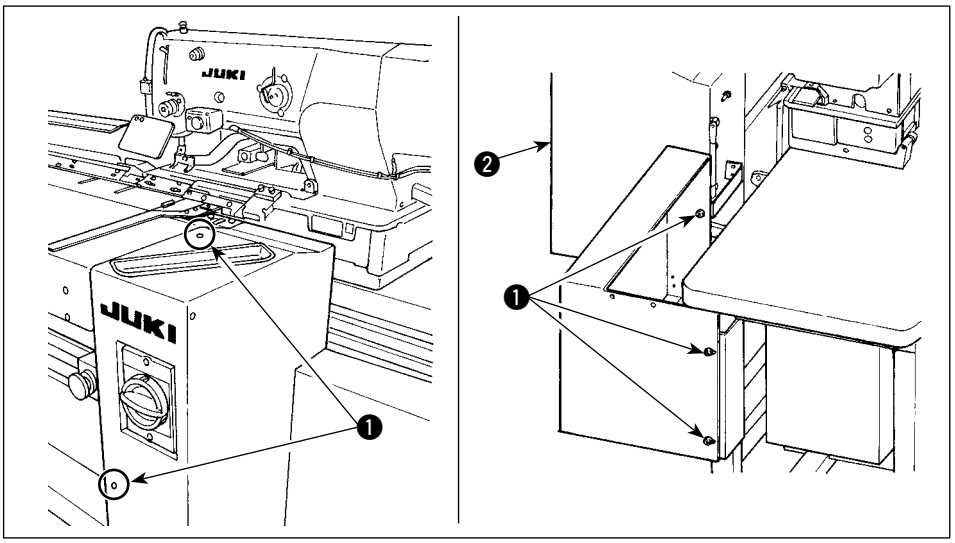
To sew the first buttonhole: The carriage moves to the left by 15 mm (65 - 50).

In all, the carriage has to move to the left by 25 mm. However, the amount of travel of the carriage is limited to 20 mm at the maximum. As a result, an error occurs in the aforementioned case.

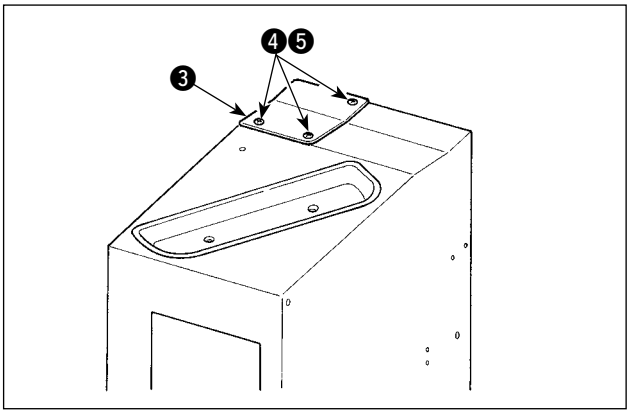
3-11. Assembly and adjustment of the auxiliary clamp

WARNING :
So as to prevent accident resulting from abrupt start of the sewing machine, be sure to turn the power OFF and discharge air before starting assembly and adjustment.

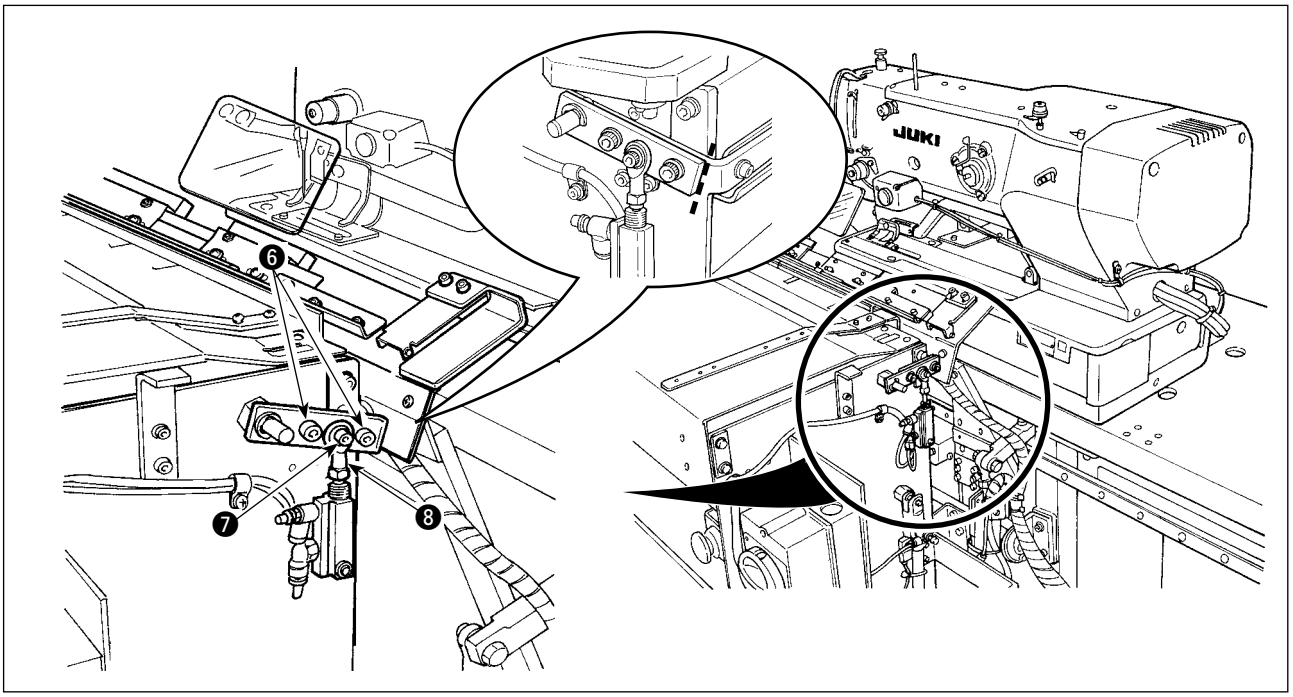
(1) Assembling the auxiliary clamp



1) Remove five screws ❶ to remove right cover ❷.

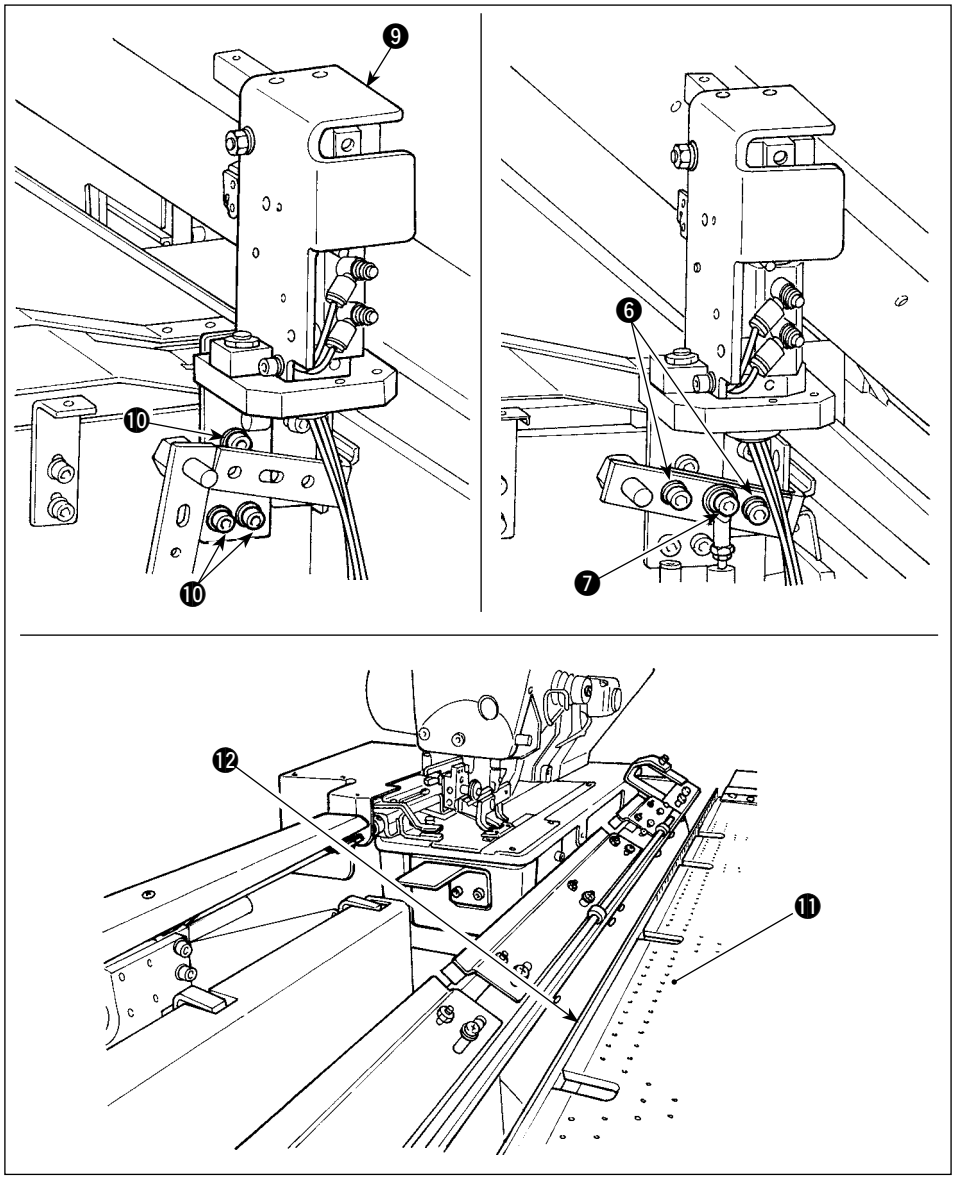


2) Remove three screws ❹ and three nuts ❺ (from the underside) to remove base plate ❸.



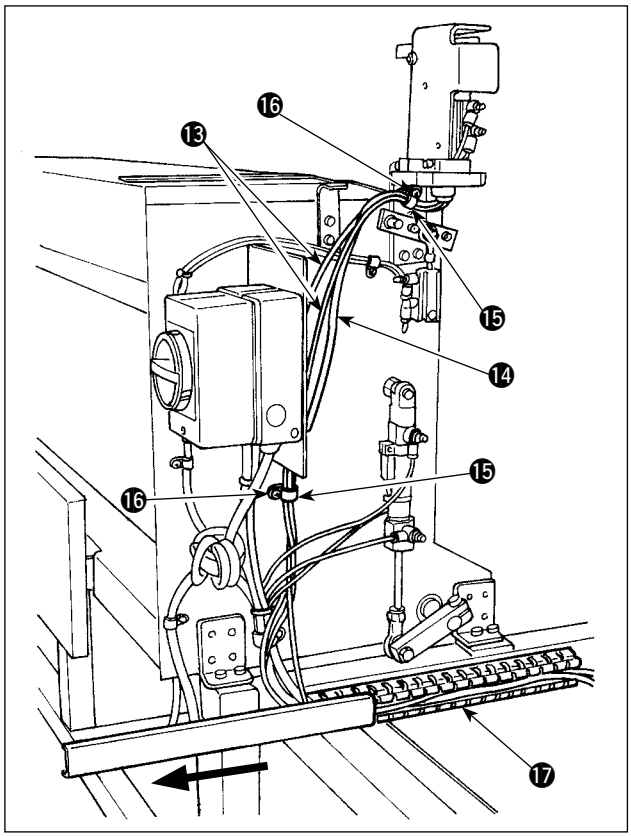
3) Write mark-off lines, with a pencil or the like, on the joining surfaces of parts to easily understand the installing position at the time of re-assembly, then remove screws ❻ and ❼.

* There is a washer on the underside of rod end ❽. Take care not to allow the washer to drop when removing screw ❼.

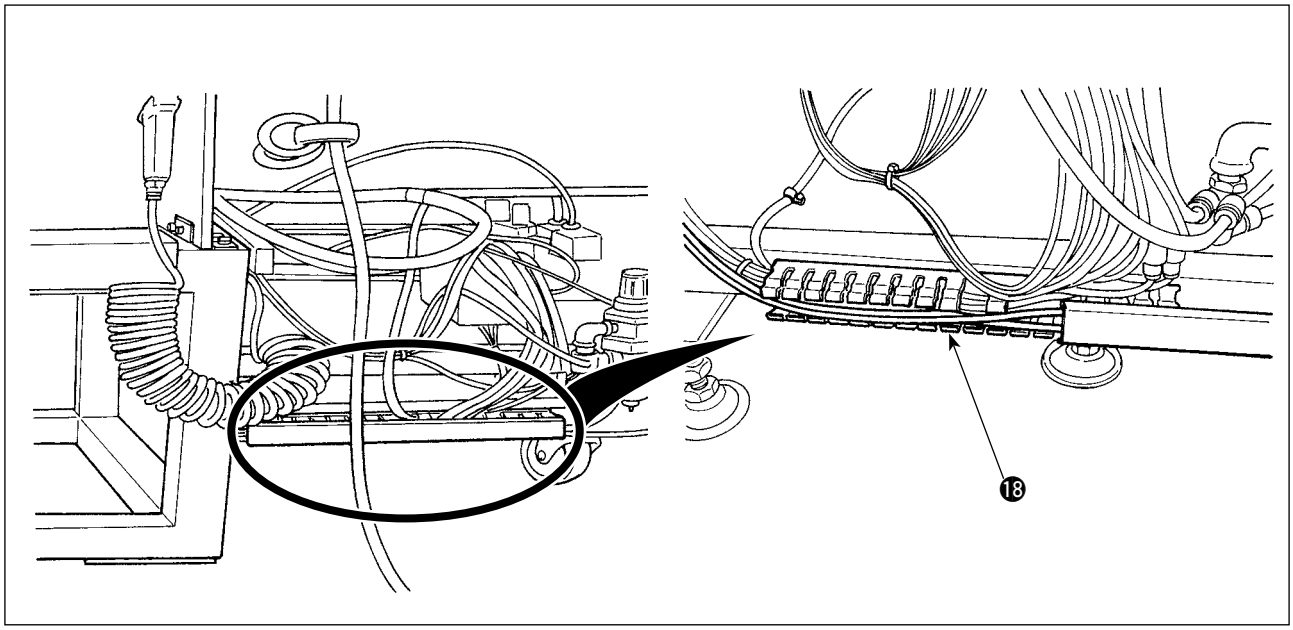


4) Fix auxiliary clamp asm. ❾ with three screws ❿. Temporarily fix screws ❻ and ❼ and the washer, removed in step 3), with aligned with the mark-off lines.

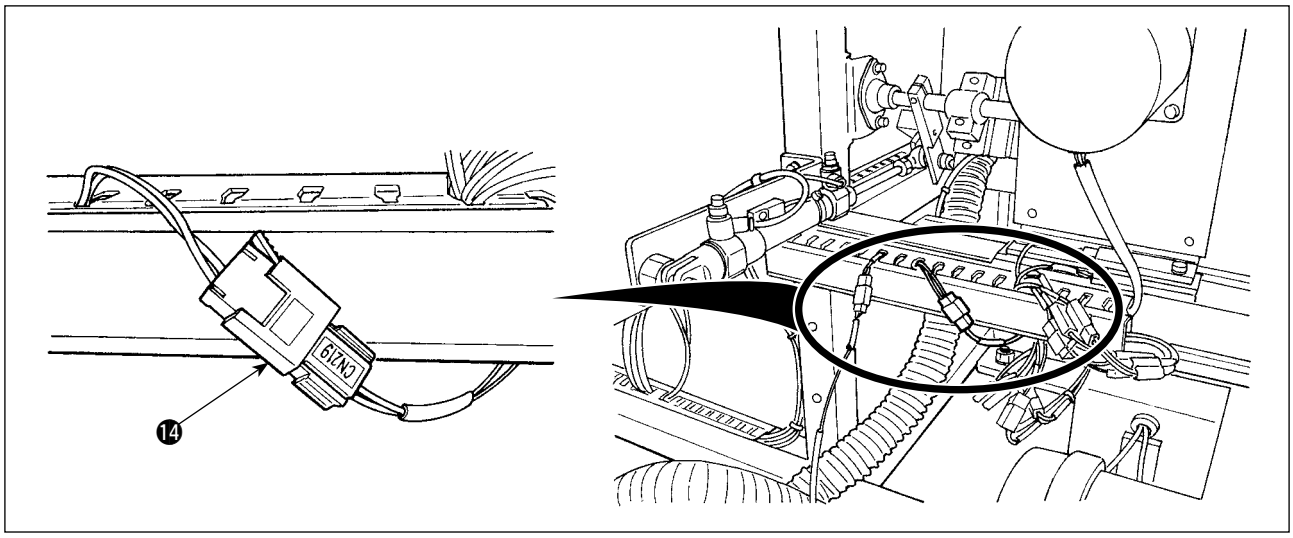
5) Supply air. Securely tighten screws ❻ and ❼ with setting plate support ⓬ pressed against preset table ⓫.



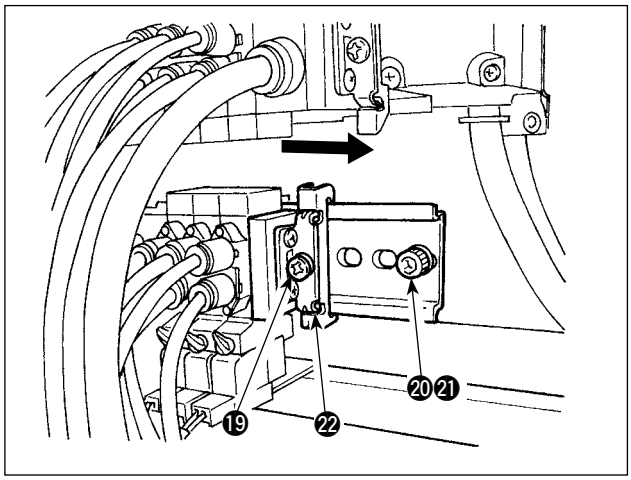
6) Bundle two air hoses ⓭ and switch cable ⓮ with clamp ⓯. Tighten screw ⓰. Then, slide the cover of duct ⓱ in the direction of the arrow. Place two air hoses ⓭ and switch cable ⓮ in the duct and close the cover of duct ⓱.



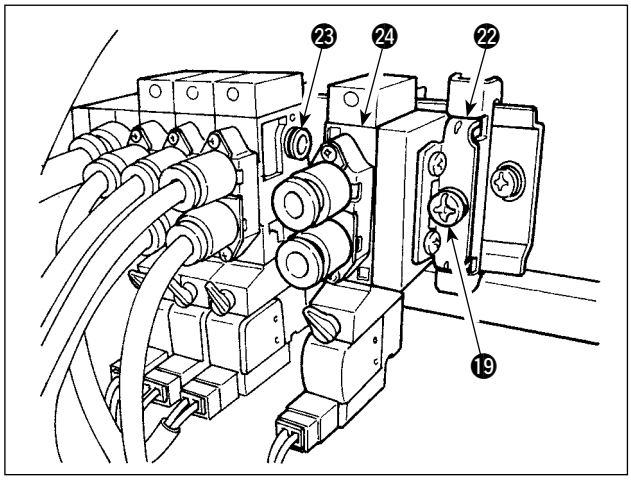
7) Slide the cover of duct ⓲ to place two air hoses ⓭ in the duct. Then, close the cover of duct ⓲.



8) Replace switch cable ⓮ with the cable which is connected to "CN219."

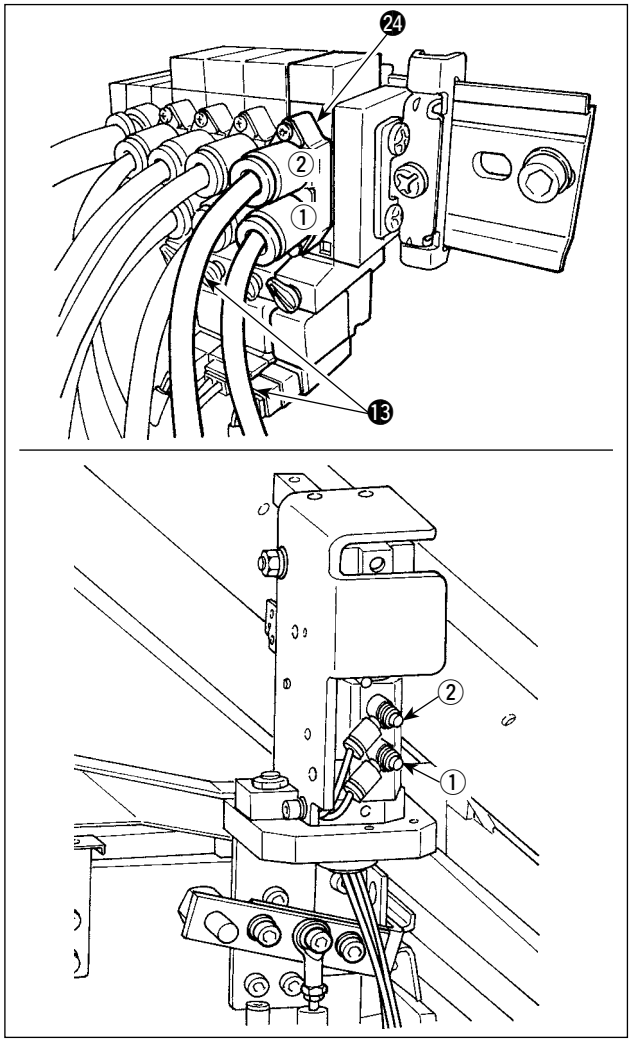


9) Discharge air. Remove screw ⓴ and nut ㉑. Then, loosen screw ⓳ to slide end block ㉒ in the direction of the arrow until it comes off.



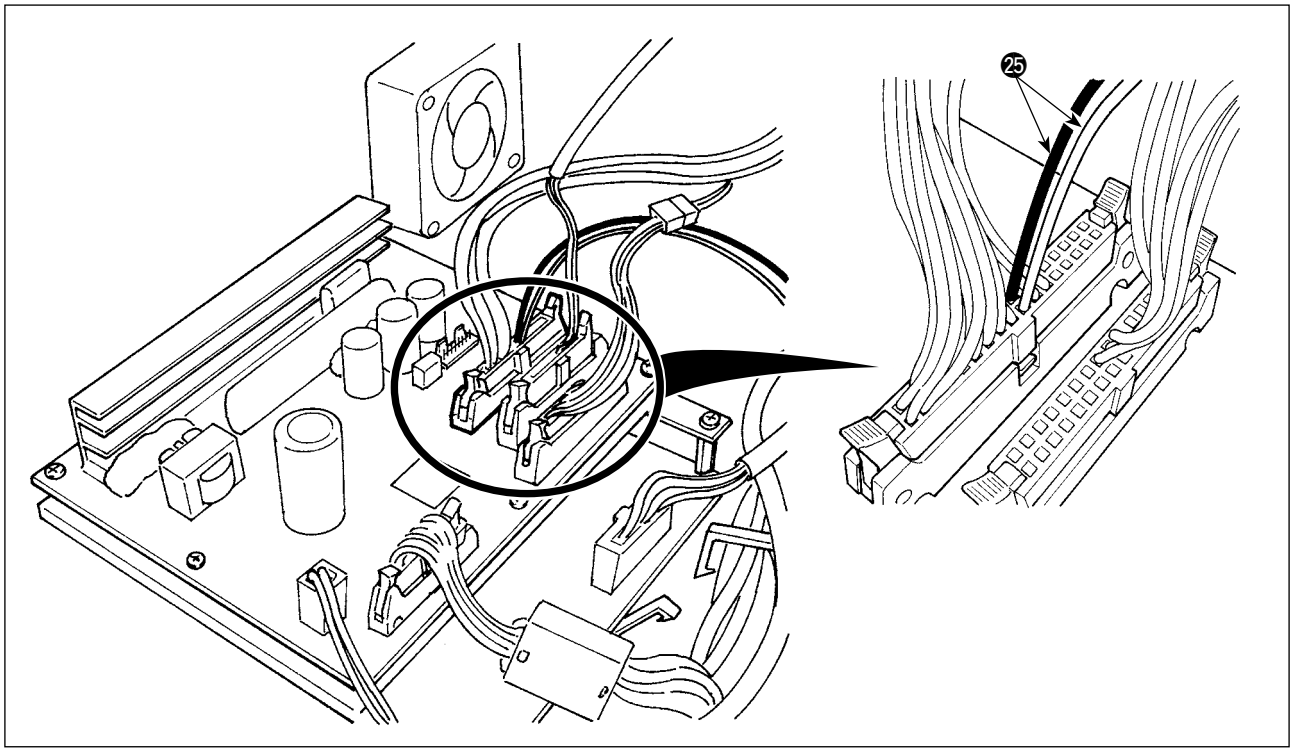
10) Install solenoid valve ㉔ and end block ㉒ by sliding them in the direction of the arrow.
At this time, check to be sure that end block ㉒ and solenoid valve ㉔ are respectively provided with three bushings ㉓ on one side.

Tighten screw ⓳ while shifting end block ㉒ in the direction of the arrow.



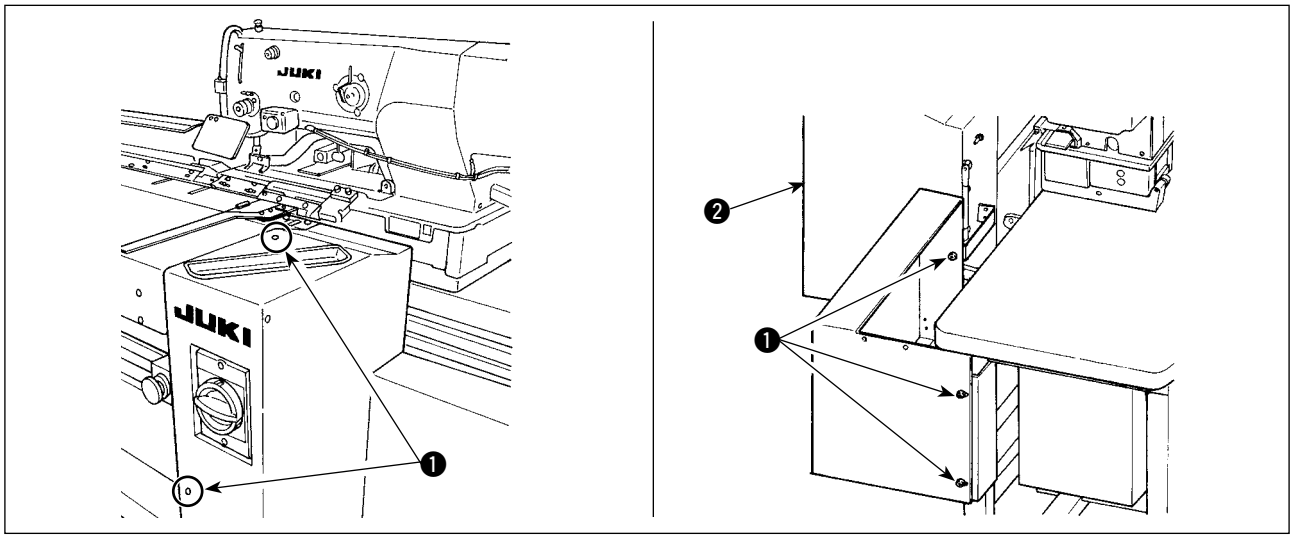
11) Tighten screw ⓴ and nut ㉑. Connect two air hoses ⓭ to solenoid valve ㉔ while matching their label numbers ❶ and ❷ those of the corresponding bushings.

* Carefully check the mounting locations of air hoses ⓭.

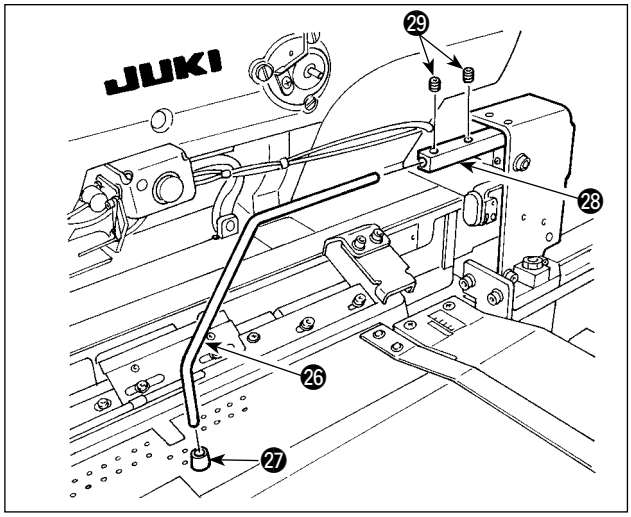


12) Open the control box. Connect solenoid valve cord ㉕ to the CN 106 connectors (red: 19-pin, black: 20-pin).

* Carefully check the wiring location of the red and black connectors.

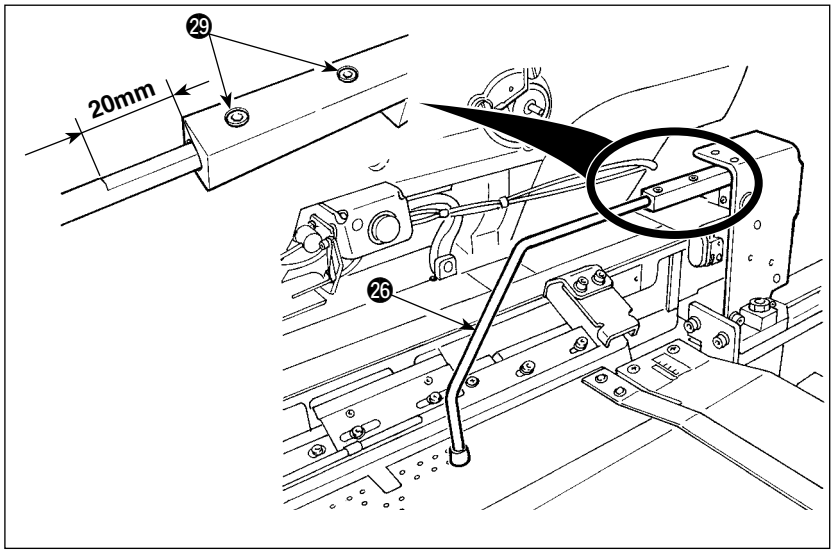


13) Install right cover ❷ and secure with screws ❶.

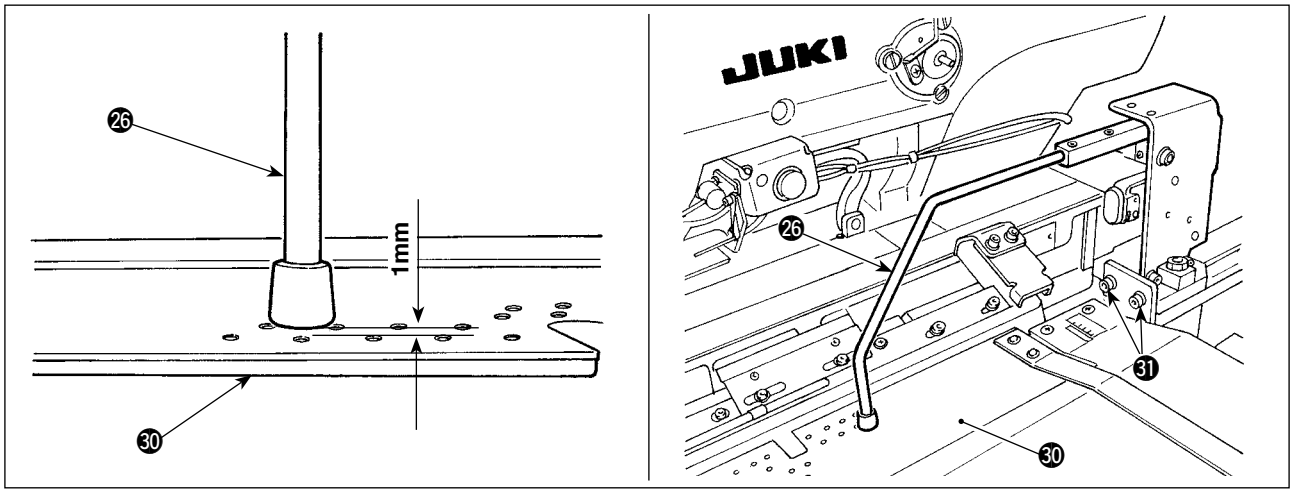


14) Fit material presser rubber cushion ㉗ on clamp ㉖. (Fit the cushion to the side which has a shorter distance from the bent section to the end face.)

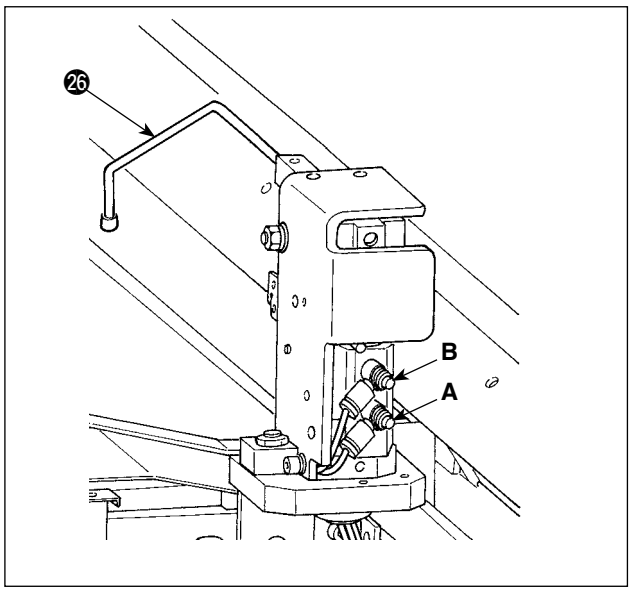
15) Insert clamp ㉖ into clamp block ㉘ and secure with two setscrews ㉙. At this time, adjust so that setscrews ㉙ are brought to the location of the slot in the top surface of clamp ㉖.



16) Tighten two setscrews ㉙ to leave a 10-mm long slot in the top surface of the clamp ㉖. When the setscrews are tightened to leave a 20-mm long slot there, clamp 26 is positioned as shown in the figure.



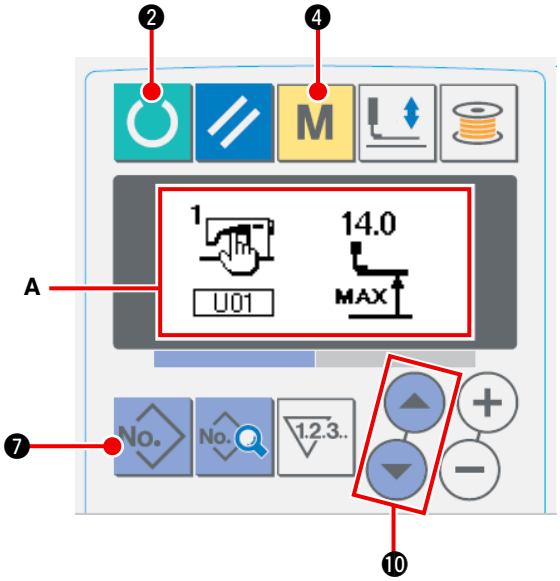
17) Loosen two screws ㉛. Adjust the height of preset table ㉚ so that it sinks by 1 mm when clamp ㉖ comes down to its lower position.



18) If you want to change the lifting/lowering speed of clamp ㉖, adjust speed controllers A and B.
To reduce the lowering speed of clamp ㉖, tighten speed controller **B**.
To reduce the lifting speed of clamp ㉖, tighten speed controller **A**.

(2) Adjusting the auxiliary clamp

Refer to "Ⅱ-2-15. Method to change the memory switch data" p. 77 for the operation procedure of the memory switch.



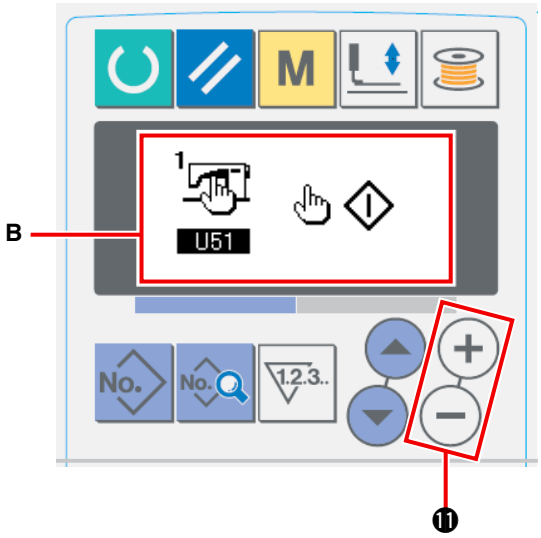
① **Placing the sewing machine into the input mode**

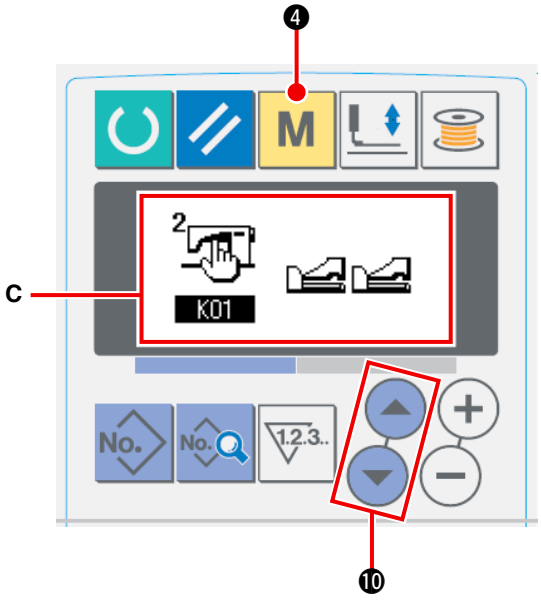
Sewing pattern changing is enabled only when the backlight of LCD is blue, i.e., under the input mode. If the backlight is green, i.e., under the sewing mode, press ready key ❷ to change over the mode to the input mode.

② **Selecting the start switch**

Press mode key M ❹ to display memory switch data (level 1) edit screen **A**. Press item select switches ❿ to select item "U51."

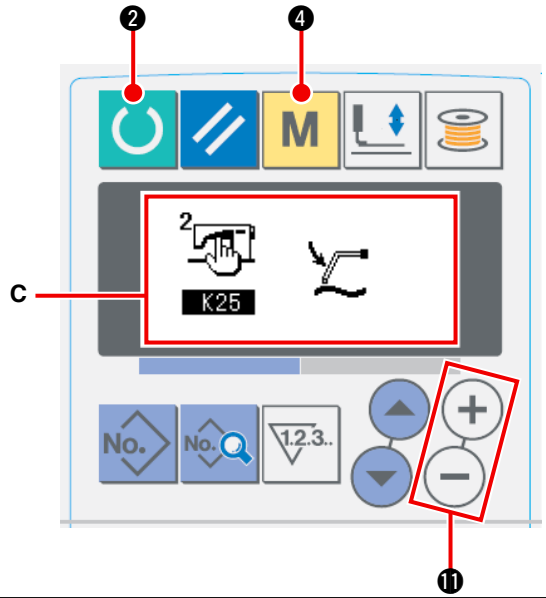
Set the start switch selection to the "hand switch" with data change keys ⓫ to display edit screen **B**.





③ **Enabling the auxiliary clamp**

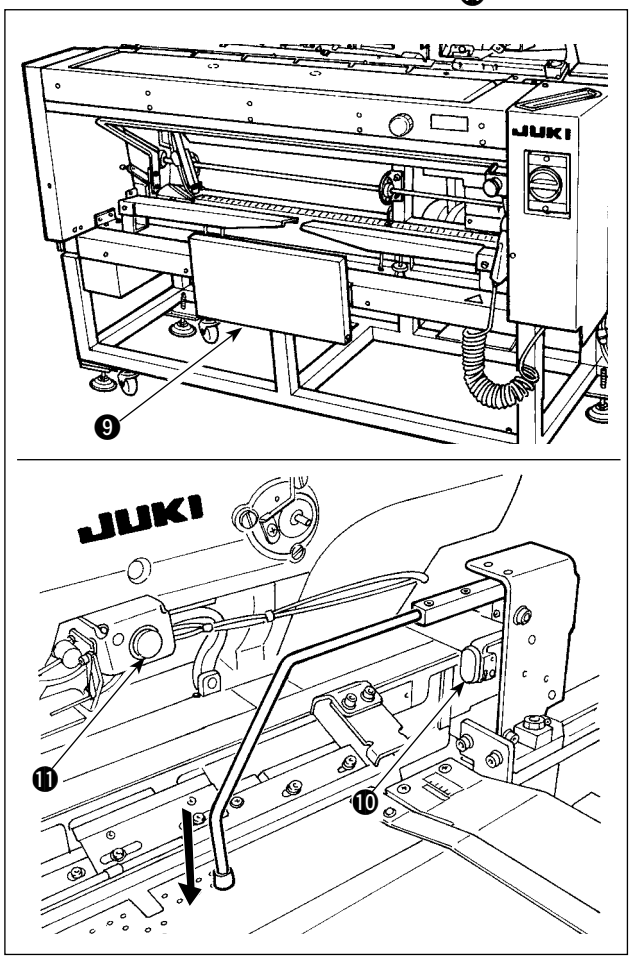
Keep mode key M ❹ held pressed on memory switch data (level 1) edit screen **B** to display memory switch data (level 2) edit screen **C**. Press item select switches ❿ to select item "K25."



Enable the auxiliary clamp setting with data change keys ⊕ ⊖ ❶❶ to display edit screen **C**.

④ **Actuating the auxiliary clamp**

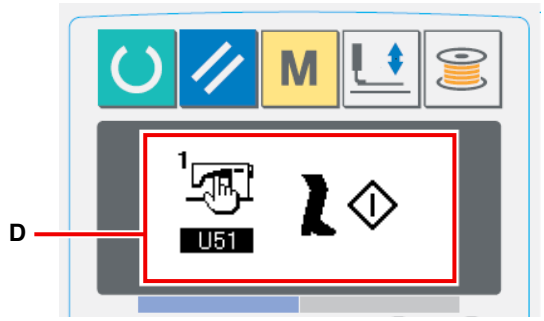
Press ready key ❷ to place the sewing machine into the sewing mode. (The state where the screen is in green)



When you press knee switch ❾, the cloth suction device starts sucking the material and the auxiliary clamp comes down.
When you press knee switch ❾ again, the cloth suction device stops sucking the material and the auxiliary clamp goes up.
When you press hand switch ⓬ and release it, cloth suction lamp ⓭ lights up, the auxiliary clamp goes up and the preset table moves toward the machine head side.

* If you press knee switch ❾ while cloth suction lamp ⓭ stays on, delivery of the material is stopped and the preset table returns to its initial position.

[In the case the knee switch is set to be the start switch]

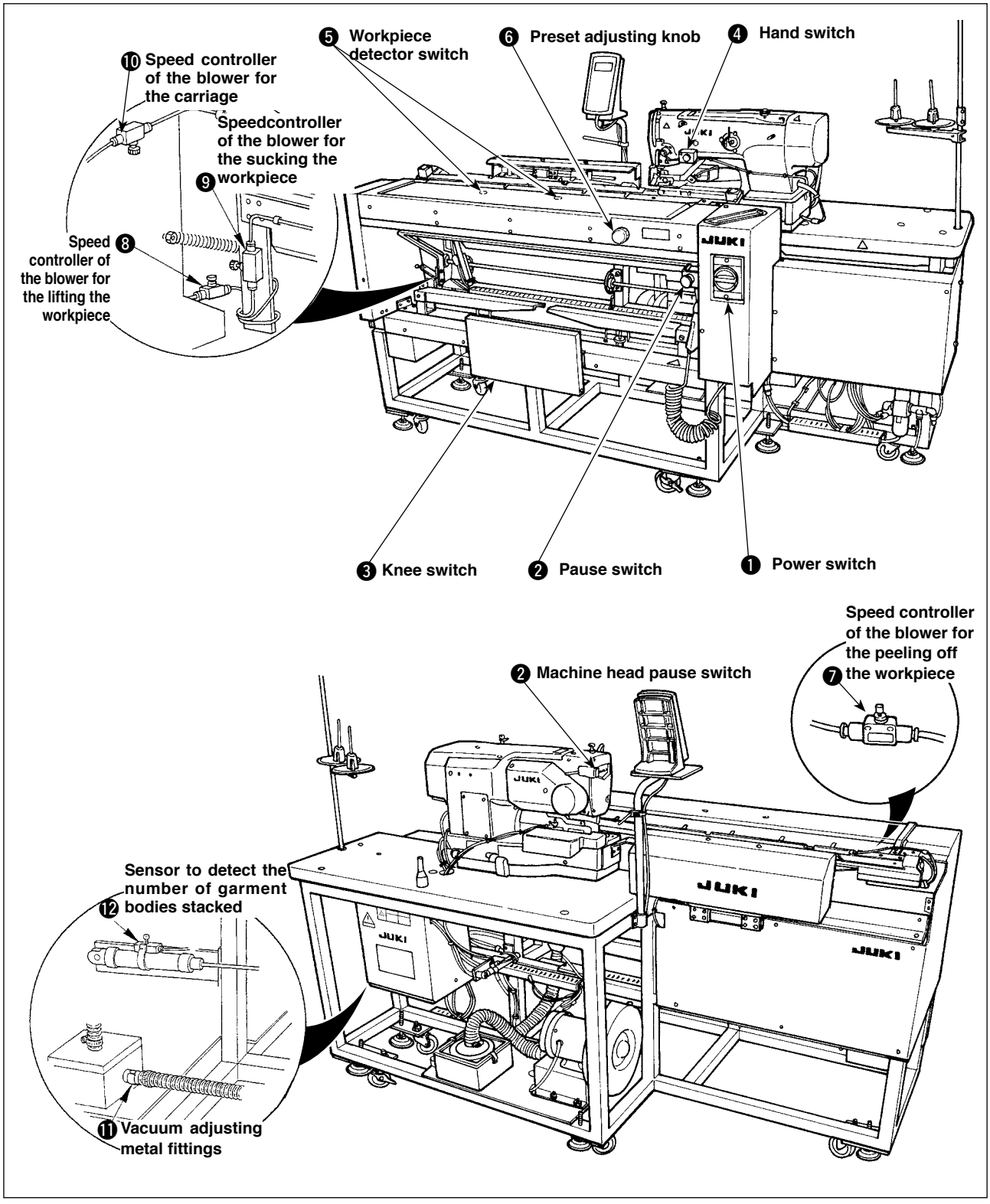


When you select item "U51" to select "knee switch" **D** as the start switch, the suction device keeps sucking the material and the auxiliary clamp keeps coming down to its lower position as long as you keep knee switch ❾ held pressed.
If you press hand switch ⓬ with knee switch ❾ held pressed, the suction device will stop sucking and, the auxiliary clamp will go up to return to the initial state. When you release knee switch ❾, the auxiliary clamp goes up and the preset table moves toward the machine head side.

4. OPERATION AND ADJUSTMENT

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

4-1. Operating switches and adjusting pneumatic components



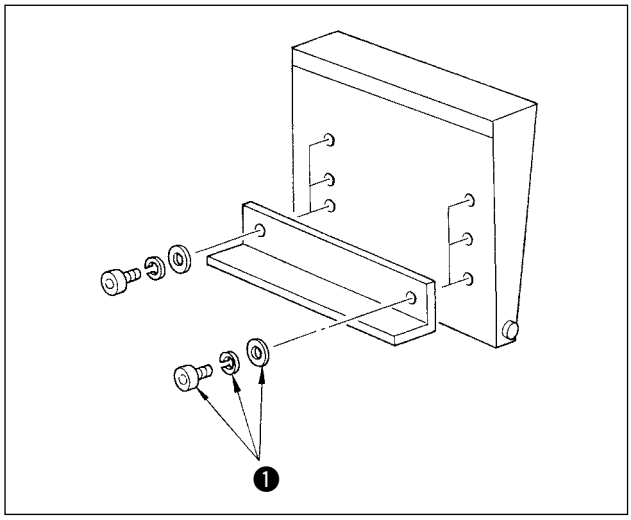
(1) Power switch

Use this switch to turn ON / OFF the power to the unit.

(2) Pause switch, Machine head pause switch

Use this switch to stop the machine from running.

(3) Knee switch



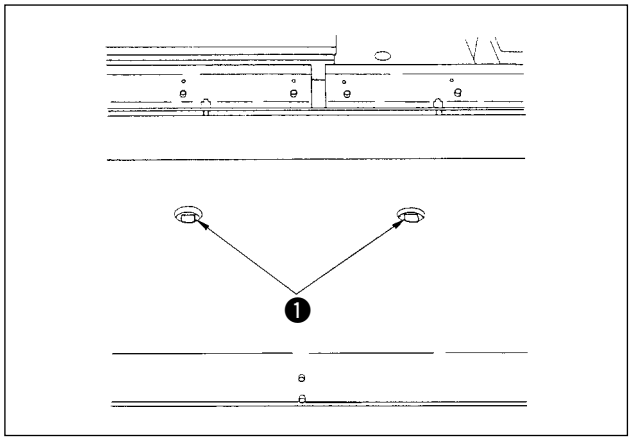
The height of the switch can be adjusted in the three stages. (It has been factory-adjusted to the middle stage at the time of delivery.) Loosen two screws ❶ in the reverse side of the knee switch, and fix the switch at a height where you can operate it with ease.
The switch is used as the start switch under the A mode, and is used as the preset cancel switch under the B mode.
Whether the knee switch or the hand switch is used as the start switch can be selected with the memory switch data U51.
(For the setting procedure of the selection of the start switch under A mode/B mode, refer to **"Ⅱ-2-15. Method of changing memory switch data" p. 77** .)

Caution **Be careful not to drop the knee switch when removing the screw.**

(4) Hand switch

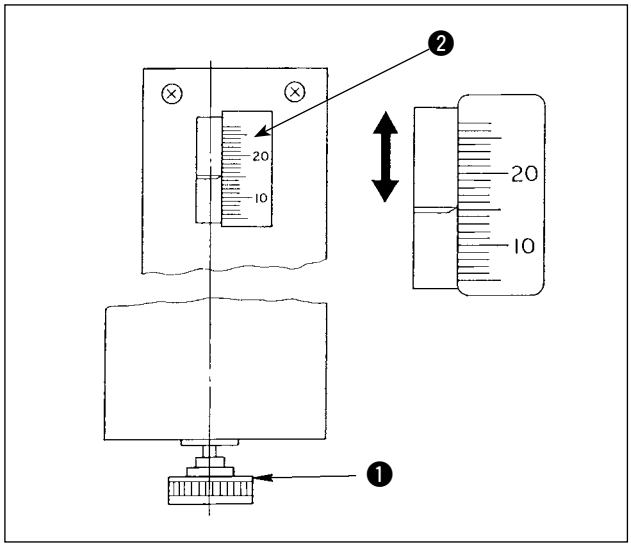
This switch is used as the start switch or the preset cancel switch.
(Refer to the aforementioned "Knee switch".)

(5) Workpiece detector switch



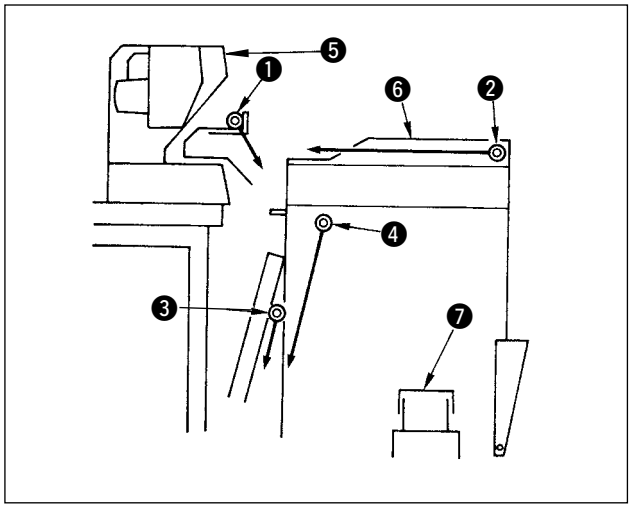
This switch prevents a malfunction when there is no workpiece set on the machine.
If either one of two detector switches ❶ detects a workpiece, the machine is actuated.
Take care not to place anything other than the sewing products or hands on detector switches ❶.
If using a piece of light absorbing black material, the detector sensor may be inoperative. In this case, the detecting function can be inoperative by selecting the memory switch No U52.
(Refer to **"Ⅱ-2-15. Method of changing memory switch data" p. 77**.)

(6) Preset adjusting knob



Use this knob to adjust the seam allowance.
Insert preset adjusting knob ❶ which is supplied in the tool box into the hole, and turn the knob to set the seam allowance to the value indicated by scale marker ❷. (Refer to **"Ⅰ-4-3. Adjusting the seam allowance" p. 35**.)
After the adjustment, return knob ❶ to the tool box to prevent it from being lost.

(7) Adjusting the air blower



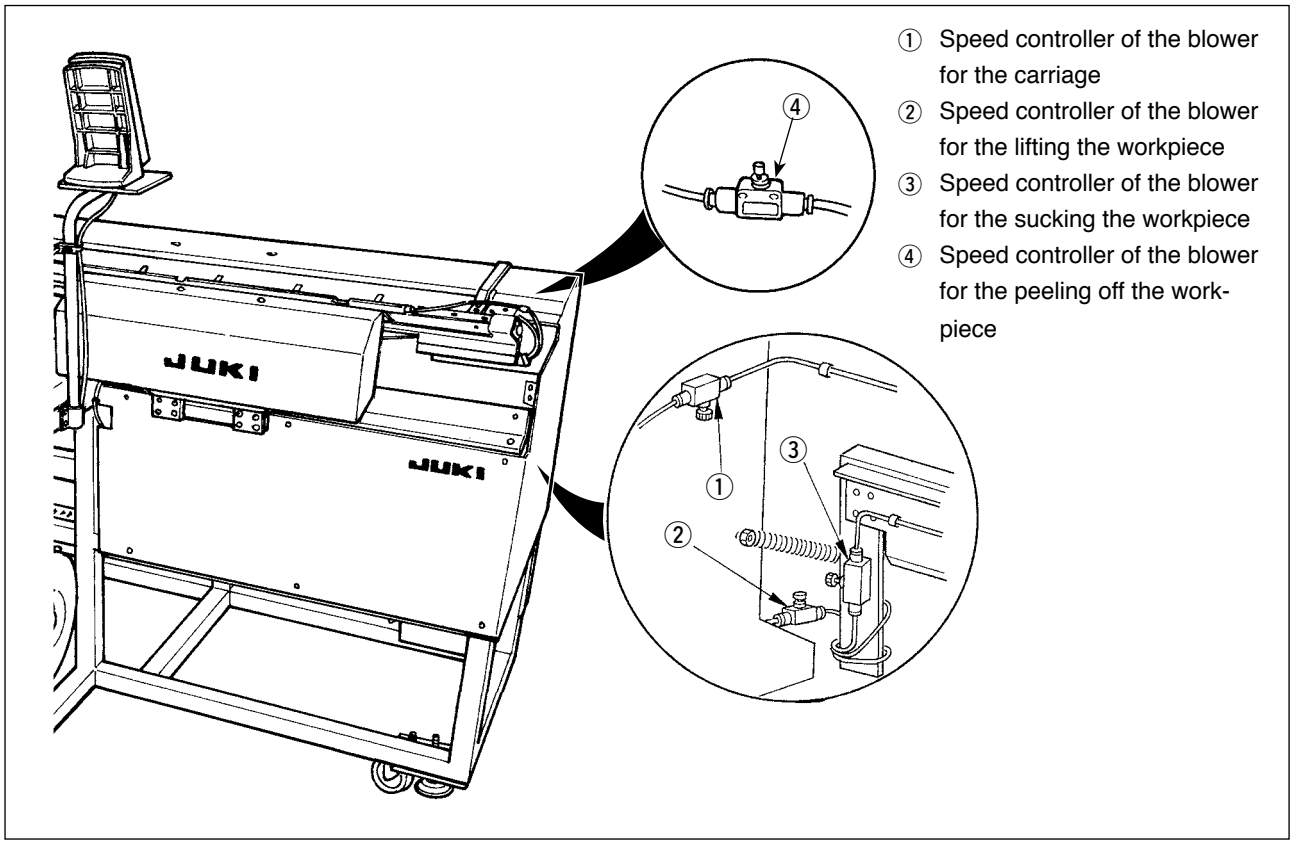
1) The air blower is provided with four blow pipes as illustrated in the figure on the left. The soled arrows show the air blowing direction of the respective pipes. The name and function of each components is as follows:

❶ Blower for the carriage
❷ Blower for lifting the workpiece
} To be used for bellowing down the workpiece

❸ Blower sucking the workpiece
❹ Blower peeling off the workpiece
} To be used for stacking the workpiece

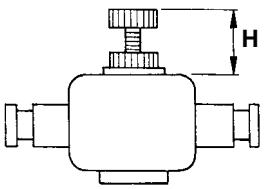
❺ Machine head
❻ Preset table
❼ Stacking board

2) The speed controllers used to adjust the air blow of air blow pipes ❶ to ❹ are those shown in the figure on the left.

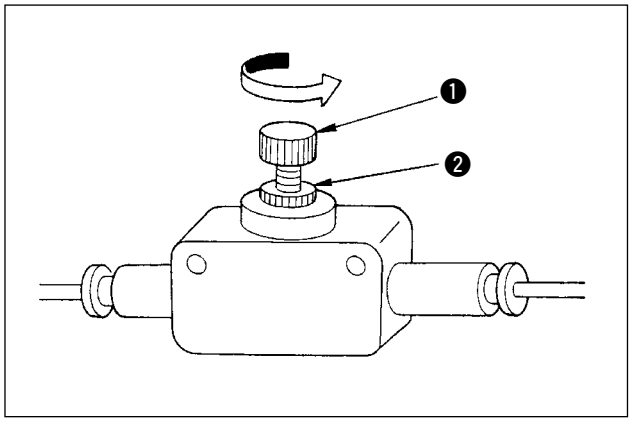


① Speed controller of the blower for the carriage
② Speed controller of the blower for the lifting the workpiece
③ Speed controller of the blower for the sucking the workpiece
④ Speed controller of the blower for the peeling off the workpiece

3) Table of relationship between the adjustment values of the speed controllers at the time of delivery and the thickness of the material



No.	H(mm)	Material Light weight small ⇔ Heavy .Large
①	14 to 15	**Amount of air to be blown** **Decrease** ▬▬▬ **Increase**
②	13 to 14	
③	14 to 15	
④	13 to 14	

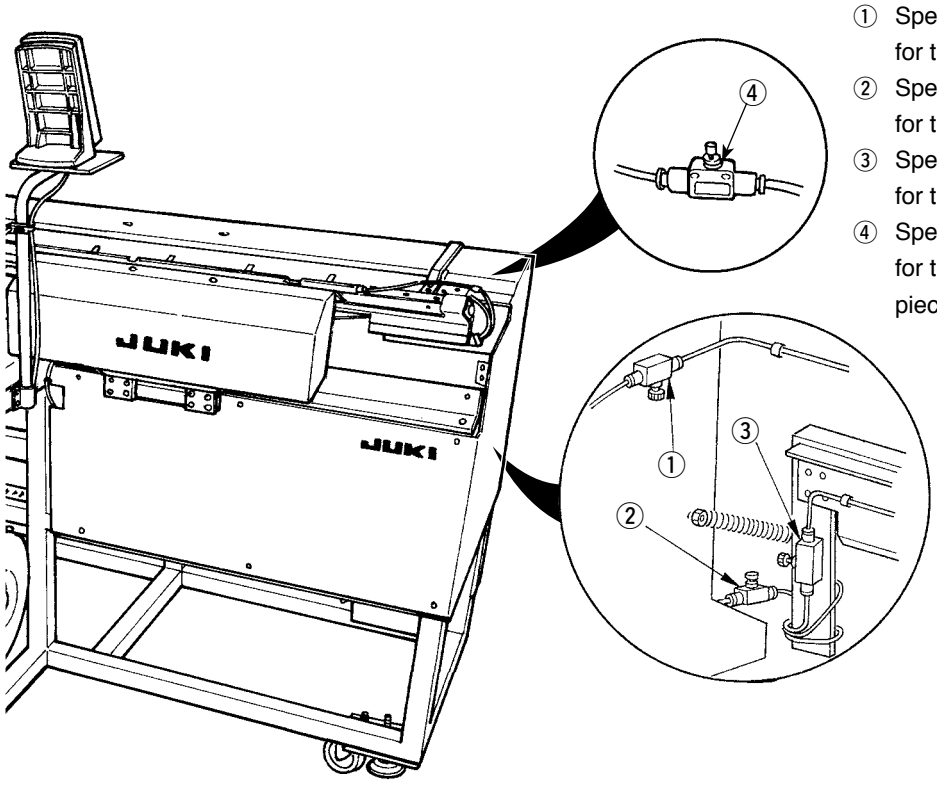


4) Turn knob ❶ of the speed controller in the direction of the arrow to increase the amount of air to be blown. After the adjustment, fix the knob at the adjusted position using locknut ❷.

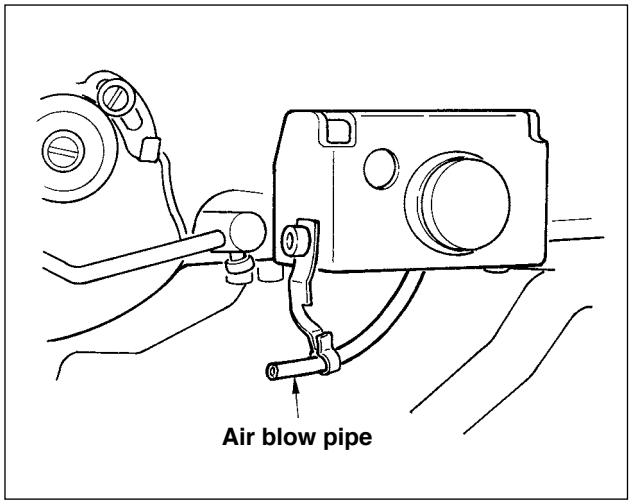
Adjusting the amount of air to be blow while the machine is in operation is very dangerous. Be sure to turn OFF the power to the machine before starting the adjustment.

5) Adjusting the air blower for blowing down the workpiece
If sewing a heavy-weight material or a large-size material, fully open speed controller ① first. If the workpiece cannot be easily blown down, gradually loosen speed controller ② to increase the amount of air to be blown properly. If sewing a light-weight material or floppy material, set speed controller ② to the value adjusted of air to be blown.

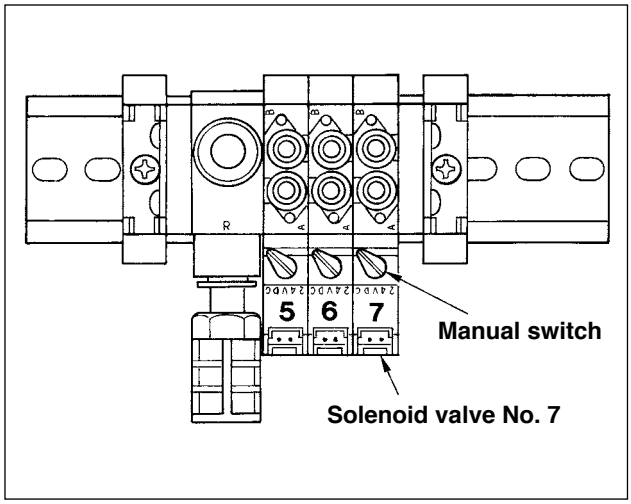
6) Adjusting the air blower for stacking the workpiece
If sewing a heavy-weight material or a large-size material, loosen speed controller ③ and ④ to increase the amount of air to be blown properly.
If sewing a light-weight material, set speed controller ③ to be the value adjusted at the time of delivery and tighten speed controller ④ to increase the amount of air to be blown.



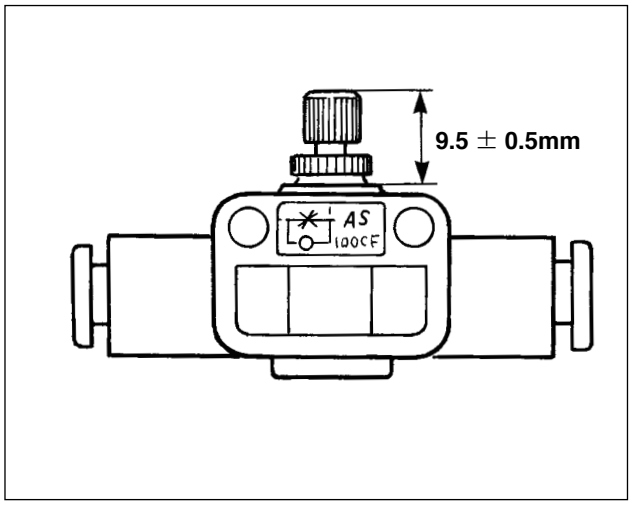
① Speed controller of the blower for the carriage
② Speed controller of the blower for the lifting the workpiece
③ Speed controller of the blower for the sucking the workpiece
④ Speed controller of the blower for the peeling off the workpiece



7) Adjusting the air blower for the needle bar
When dust collected on the needle bar area falls and is caught in the seams, adjust the direction and strength of the air blower. The air blower blows dust away and prevents dust from falling under needle. For the direction of the air blower, correct the installation of the pipe. Adjust the air blower so that air blows as near as the machine arm jaw area.

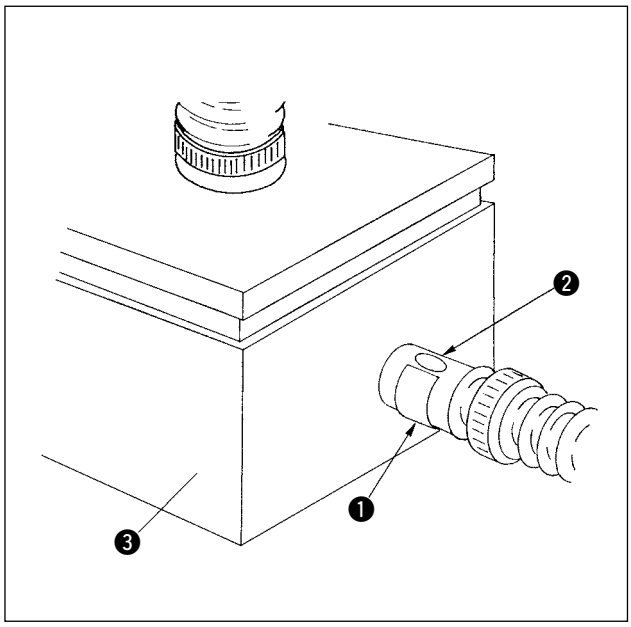


Press and turn the manual switch of solenoid valve No. 7 to check the motion. Strength of the air blow is adjusted with the speed controller. When the manual switch of solenoid valve No. 7 is pressed and turned, the pusher is actuated and simultaneously the needle bar air blower is actuated.
Return the manual switch after the adjustment since the manual switch is locked with it pressed and turned. Adjust the speed controller located on the black pipe branched from the yellow pipe connected from solenoid valve No. 7.



Air blow is actuated during machine operation when continuously performing sewing. Take care not to excessively increase the amount of air to be blown so that the sewing is not affected.
Standard adjustment value : 9.5 ± 0.5 mm

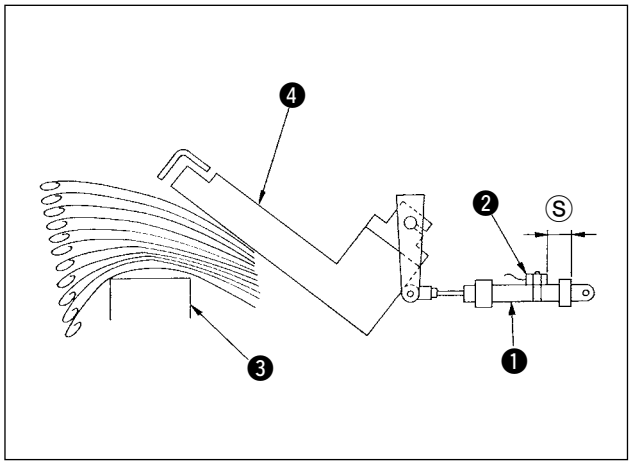
(8) Vacuum adjusting metal fittings



They are used to adjust the vacuum suction force of the preset board for sucking the workpiece. Adjustment is carried out by turning metal fitting ❶. For the normal operation, ❷ in the metal fitting should not be closed. If sewing a large-size material or a coarse texture, close the hole ❷.

Caution **To keep the appropriate suction force, clean the filter inside filter box ❸ at regular intervals. (Refer to "Ⅲ-3-3. Cleaning the vacuum filter" p. 94.)**

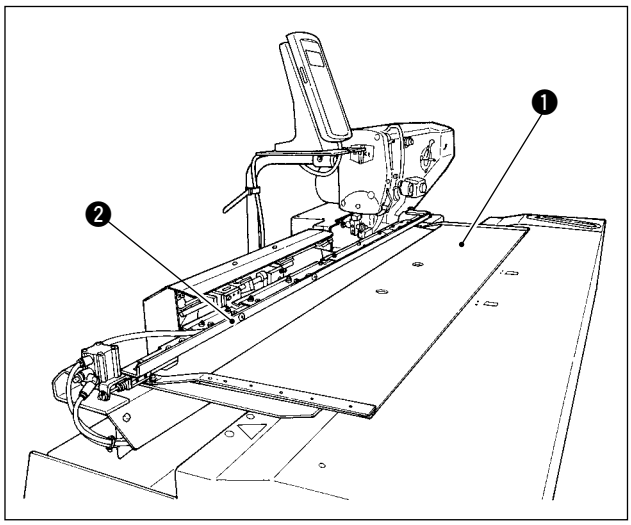
(9) Sensor to detect the number of garment bodies stacked



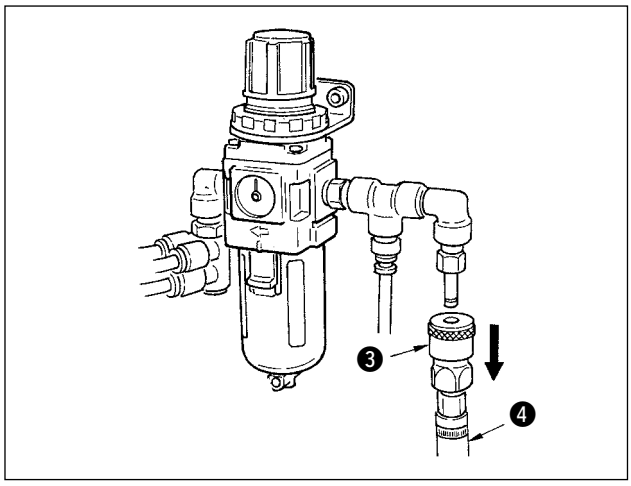
1) Sensor ❷ mounted on cylinder ❶ which driver pusher ❹ detects the thickness of garment bodies stacked on stacking board ❸ when actuating the stacker.
2) You can let the alarm occur at the time when the thickness of garment bodies stacked on the board reaches any desired value specified by change the position of sensor ❷ with a Phillips type screwdriver. (Distance Ⓢ has been factory-adjusted to 40 mm at the time of delivery. The value is equivalent to the height reached when stacking approximately 120 to 140 garment bodies made of T/C broadcloth. Moving sensor ❷ to the right will make the alarm occur earlier.)

Caution **Note that the sewing machine does not stop operation when this alarm occurs.**

(10) Measure to be taken in the case of power interruption during operation



If the electricity is cut off when material is being brought to the sewing position and preset board ❶ and carriage ❷ come in contact with each other, discharge air from the machine, slightly press preset board ❶ back ward, raise carriage ❷ by hand, and move preset board ❶ toward you to return it to its home position. Then, connect the air to the machine.

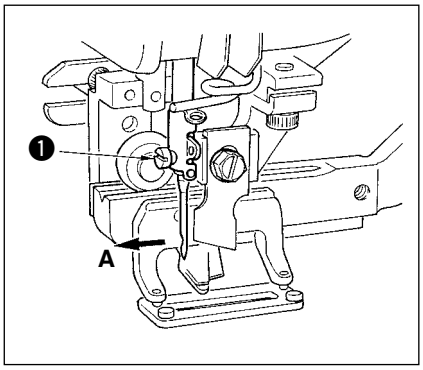


To discharge air from the unit, press one-touch joint ❸ in the direction of the arrow, and remove hose ❹. For the connecting procedure, refer to **" Ⅰ -3-3. Connecting the air hose" p. 5**.

4-2. Operation of the sewing machine

(1) Inserting the needle

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

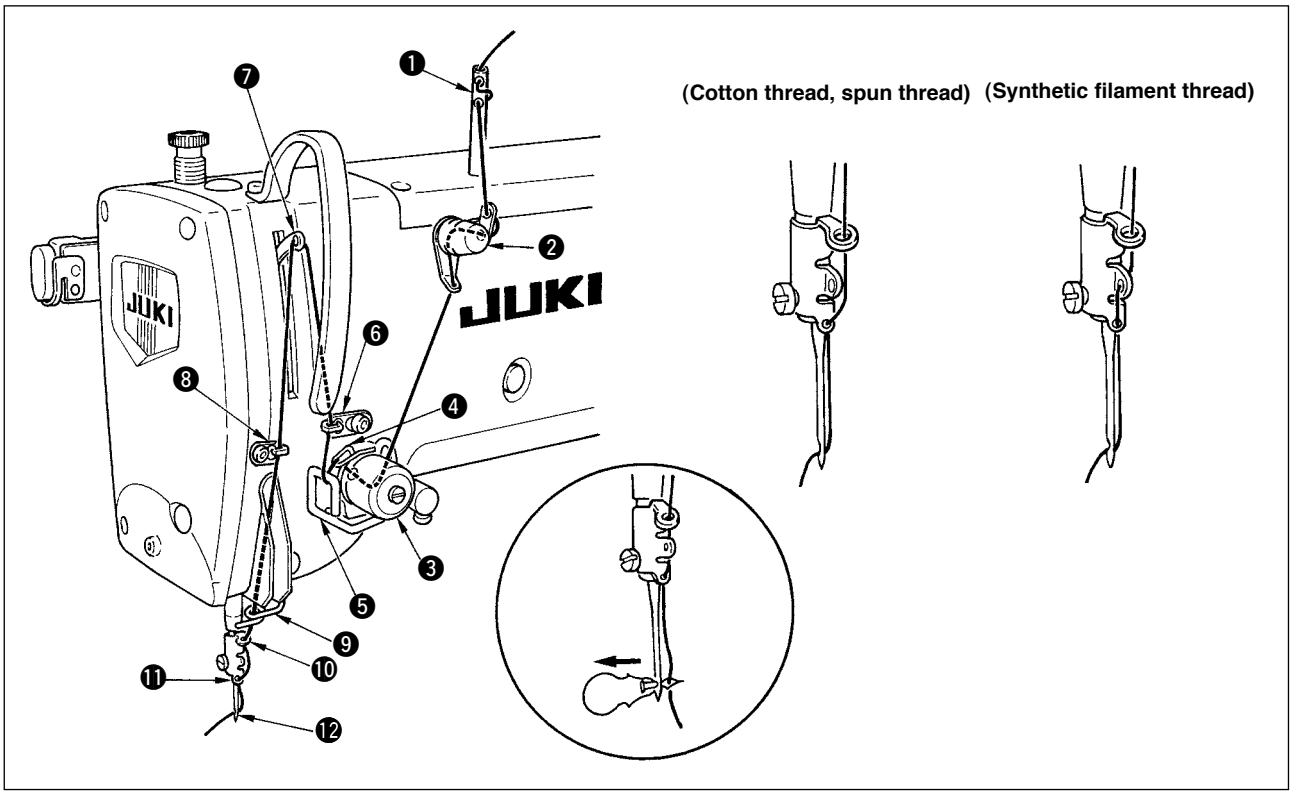


Hold needle with its recessed part facing toward the operator side A, insert the needle fully into the needle clamping hole, and tighten needle setscrew ❶. Use a DPx5-(#11J, #14J).

When attaching the needle, turn OFF the power to the motor.

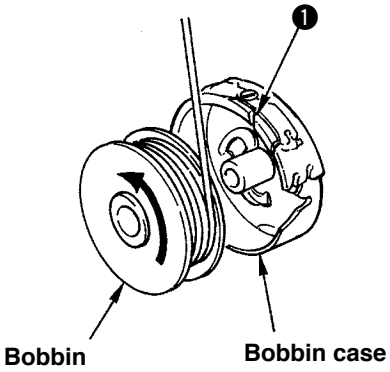
(2) Threading the needle-thread

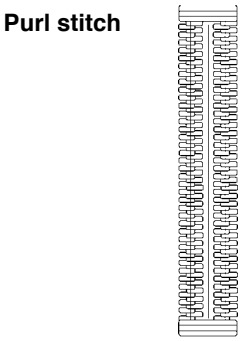
WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.

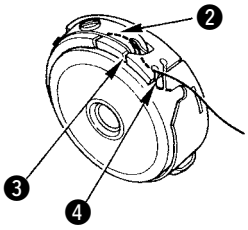


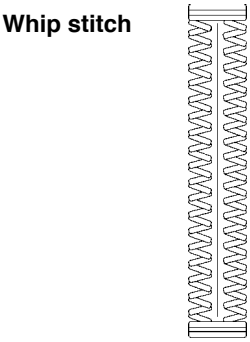
Pass the needle thread in the order ❶ to ⓬ as shown in the figures.
The threading can be done easily by using the needle threader supplied with the machine.
Change the thread guide threading method according to the thread to be used.

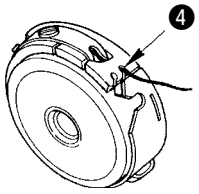
(3) Threading the bobbin case







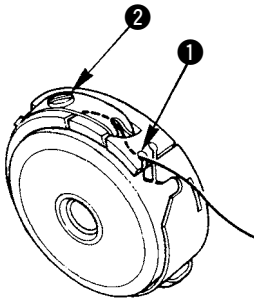




Rotating direction of bobbin and threading

1) Fit the bobbin so that it rotates in the direction of the arrow.
2) Pass the thread through thread slit ❶, then through under the tension spring ❷, again through thread slit ❸, and pull the thread from ❹.
3) Threading at ❹ for purl stitching is different from that for whip stitching. So, be careful.

(4) Adjusting the bobbin thread tension



Adjust the bobbin thread tension as given below when the bobbin thread is pulled up at the position where thread slit ❶ of bobbin case comes up.

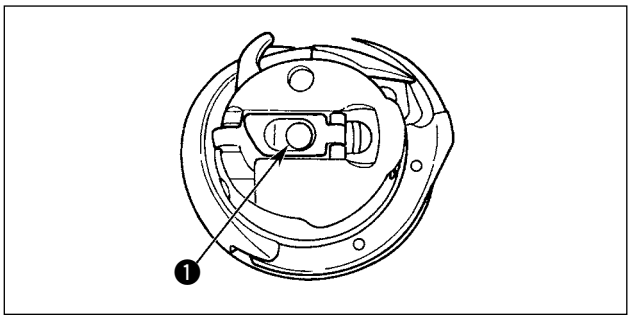
Purl stitch	0.05 to 0.15N	To such an extent that bobbin case quietly comes down when holding thread end coming from bobbin case and shaking it quietly up and down.
Whip stitch	0.15 to 0.3N	To such an extent that bobbin case barely comes down when holding thread end coming from bobbin case and shaking it somewhat strongly.

Turning tension adjust screw ❷ clockwise will increase bobbin thread tension, and turning it counterclockwise will decrease the tension.
Adjust the bobbin thread tension to lower for synthetic filament thread, and to higher for spun thread. The thread tension is higher by approximately 0.05N when the bobbin case is set to the hook since idle-prevention spring is provided.

When bobbin thread tension is adjusted, make sure of the needle thread tension setting of the memory switch. (Refer to "Ⅱ-2-3. Changing the needle thread tension" p. 59.)

(5) Installation of bobbin case

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



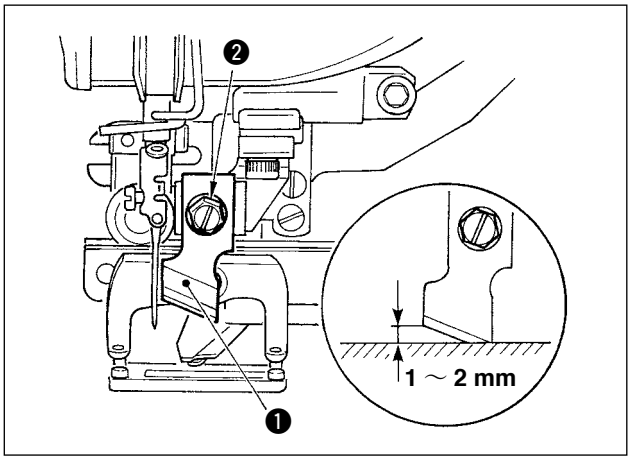
1) Lift up and hold bobbin case latch lever between two fingers.
2) Push the bobbin case into the hook so that it is supported by the hook shaft ❶ and then snap in the latch lever.
   Press the bobbin case until the predetermined position is reached, and it will click.

Caution

1. **If the bobbin case is out of the predetermined position, it can jump out from the hook to cause the needle thread to tangle on the hook shaft. Check to be sure that the bobbin case is properly installed in the correct position.**
2. **There is a difference in the shape of bobbin case between the standard hook and the dry one. They have nothing in common with each other.**

(6) Installing the knife

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



When replacing the knife with a new one, perform as follows.

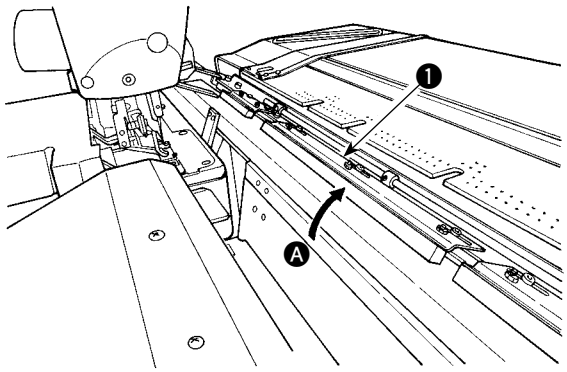
1) Knife ❶ can be easily removed together with the washer when removing knife retaining screw ❷.
2) Adjust so that the knife, when lowered the knife bar by hand, is spaced 1 to 2 mm away from the top surface of the throat plate as illustrated in the sketch. Then, be sure to place the washer and tighten the knife retaining screw.

Inch → mm CONVERSION TABLE

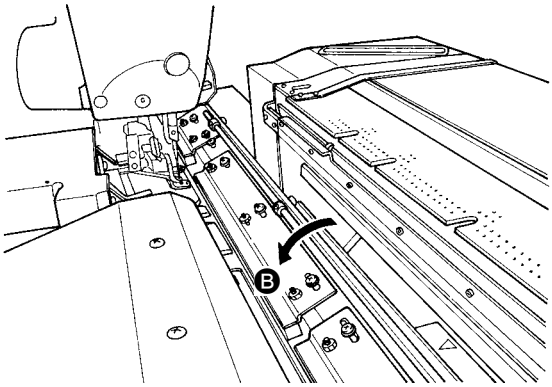
Knife size	Indication of mm
1/4	6.4
3/8	9.5
7/16	11.1
1/2	12.7
9/16	14.3
5/8	15.9
11/16	17.5
3/4	19.1
13/16	20.6
7/8	22.2
1	25.4
1 1/8	28.6
1 1/4	31.8

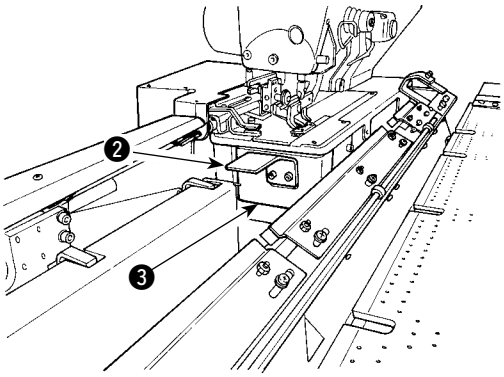
In case the cloth cutting knife on hand is indicated in inch, set the length of cloth cutting (knife size) in mm using the inch → mm conversion table on the left side.
Sewing data S02 is the length of cloth cutting.
Refer to " Ⅰ -2-7. Changing sewing data" p.63.

(7) Removing and installing the bobbin case

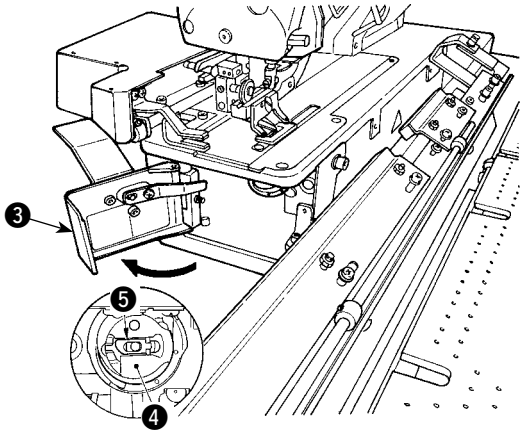


1) When the bobbin thread counter is set and the operation is performed automatically, and bobbin thread runs out, the next start is not performed. In this state, carriage table ❶ is tilted in the direction of Ⓐ, and it is simply performed to replace the bobbin. In addition, when thread breakage has occurred during sewing, perform replacing bobbin when carriage table ❶ is in the state of Ⓑ (state that the sewing machine is covered with the table).





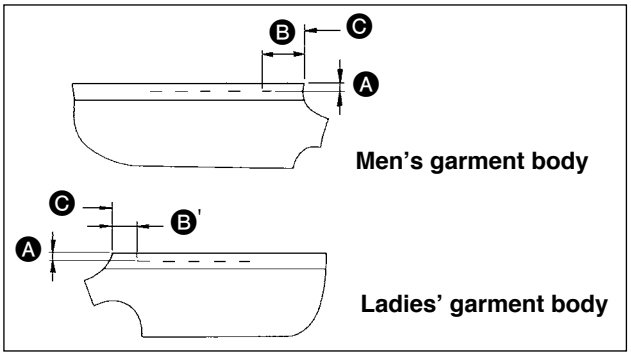
2) Holding knob ❷ open shuttle cover ❸.



3) Raise and hold latch lever ❺ of bobbin case ❹ to take it out. (The bobbin in the bobbin case will not come off provided that the latch lever is raised and held.)
4) To load the bobbin case in the shuttle, put it onto the shuttle shaft until it will go no further, and snap on the latch lever of the bobbin case.
5) Close shuttle cover ❸.

4-3. Adjusting the seam allowance

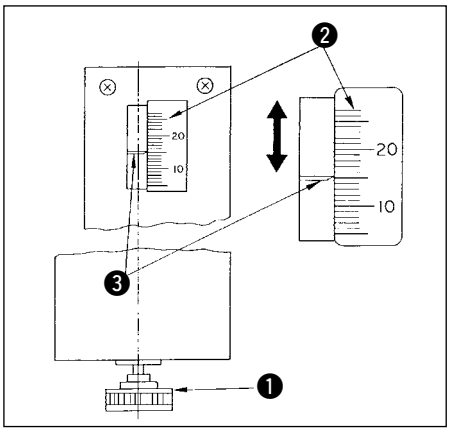
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



1) Adjust the seam allowance from the side end of the garment to the buttonhole (distance Ⓐ in the figure), and from the top end the garment to the 1st buttonhole (distance Ⓑ, Ⓑ' in the figure). The number of buttonholes and the intervals between the buttonhole can be adjusted using the panel switches.

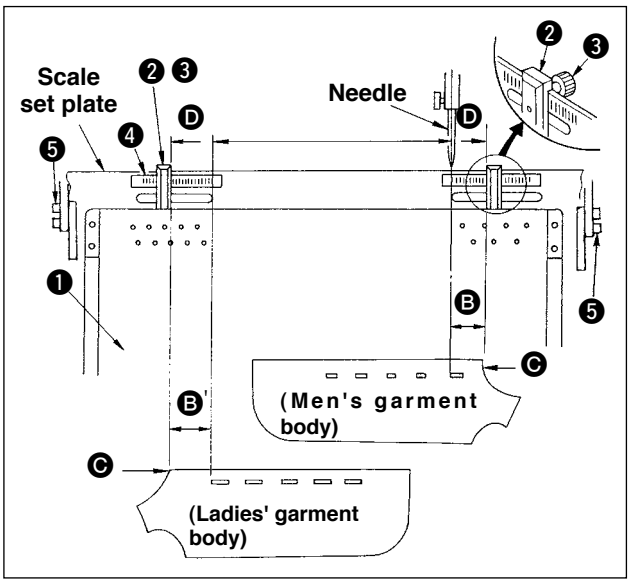
Be sure to make adjustment of the seam allowance after you have turned OFF the power switch.

■ Adjusting distance Ⓐ



1) Turning preset adjusting knob ❶ clockwise will decrease distance Ⓐ, or counter clockwise will increase it.
2) Read the required distance on scale ❷ and marker ❸. Then turn the knob until it reaches the specified value.
3) Distance Ⓐ can be adjusted with the range from 7 to 21 mm.
4) When distance Ⓐ cannot be set to the value indicated on the scale, loosen the screws ❺, which fix scale plate ❹ (the plate has a screw on both sides), and re-adjust the position of the scale plate properly. (Refer to the Fig. **"Adjustment of dimension Ⓑ."**)
5) After the adjustment, return the knob in the tool box to prevent it from being lost.

■ Adjusting distance Ⓑ



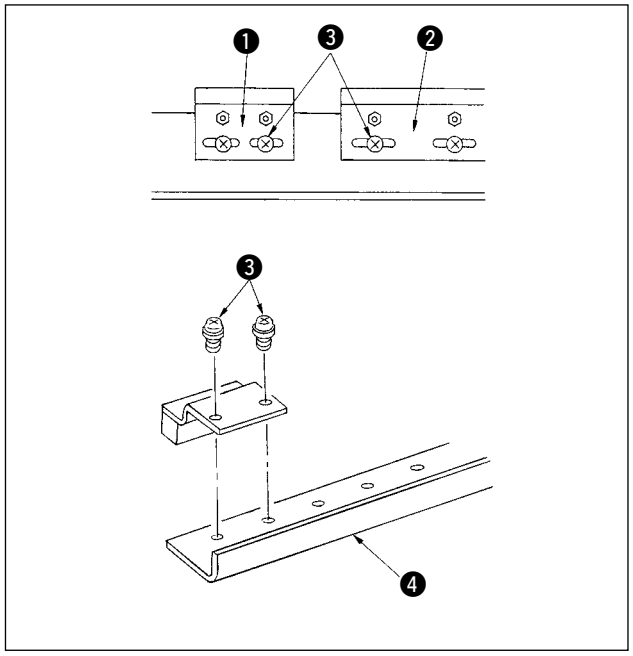
1) Loosen thumb screw ❸ of gauge ❷ on preset board ❶, and move the board to the value set on scale ❹.
2) Setting the material so that top end Ⓒ of the material comes inside Ⓓ of the marker will complete the positioning of the material. (When sewing ladies' wear, determine the position of the material using the scale marker on the left side of the preset board while following the same procedure as the above.)

1. **The line on the leftmost of the right-side scale is aligned with the center of the needle which corresponds to the sewing start position of the first buttonhole (the bottom end of the buttonhole) of garment body of men's wear.**
2. **The line on the rightmost side of the left-side scale corresponds to the sewing start position of the first buttonhole (the top end of the buttonhole) of garment body of ladies' wear.**
3. **For the changeover of men's wear / ladies' wear, refer to "Ⅱ-1-10. Changeover of men's and ladies' wear" p. 55.**
4. **For the setting procedure of the material, refer to "Ⅰ-5. OPERATION" p. 39.**

4-4. Adjusting the carriage lamp

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

(1) Adjusting the position of the clamps

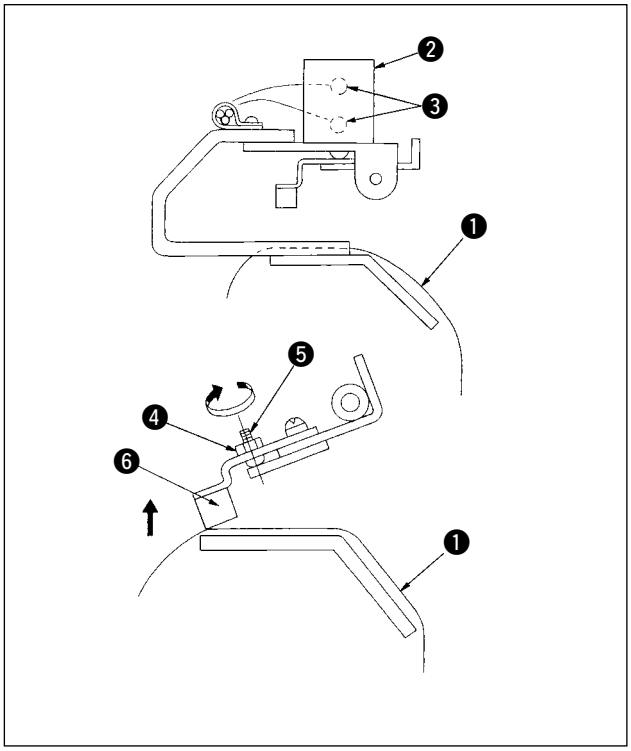


Adjust the position of the clamp only when you wish to eliminate a clearance between the clamps or you wish change the arrangement of the clamp.

1) If you wish to eliminate a clearance between the clamps, loosen screws ❸ either in clamps (small) ❶ or in clamp (large) ❷, and move the relevant one. Then tighten screws ❸.
2) If you wish to change the arrangement of clamp (small) ❶ and clamp (large) ❷, remove screws ❸, and re-position the clamps as you wish. Then fix the clamps wish the screws. (The clamps can be attached to any of the installation holes in mounting base ❹.)

Whenever you perform this adjust the clamping force of the clamps referring to "(2) Adjusting the clamping force".

(2) Adjusting the clamping force



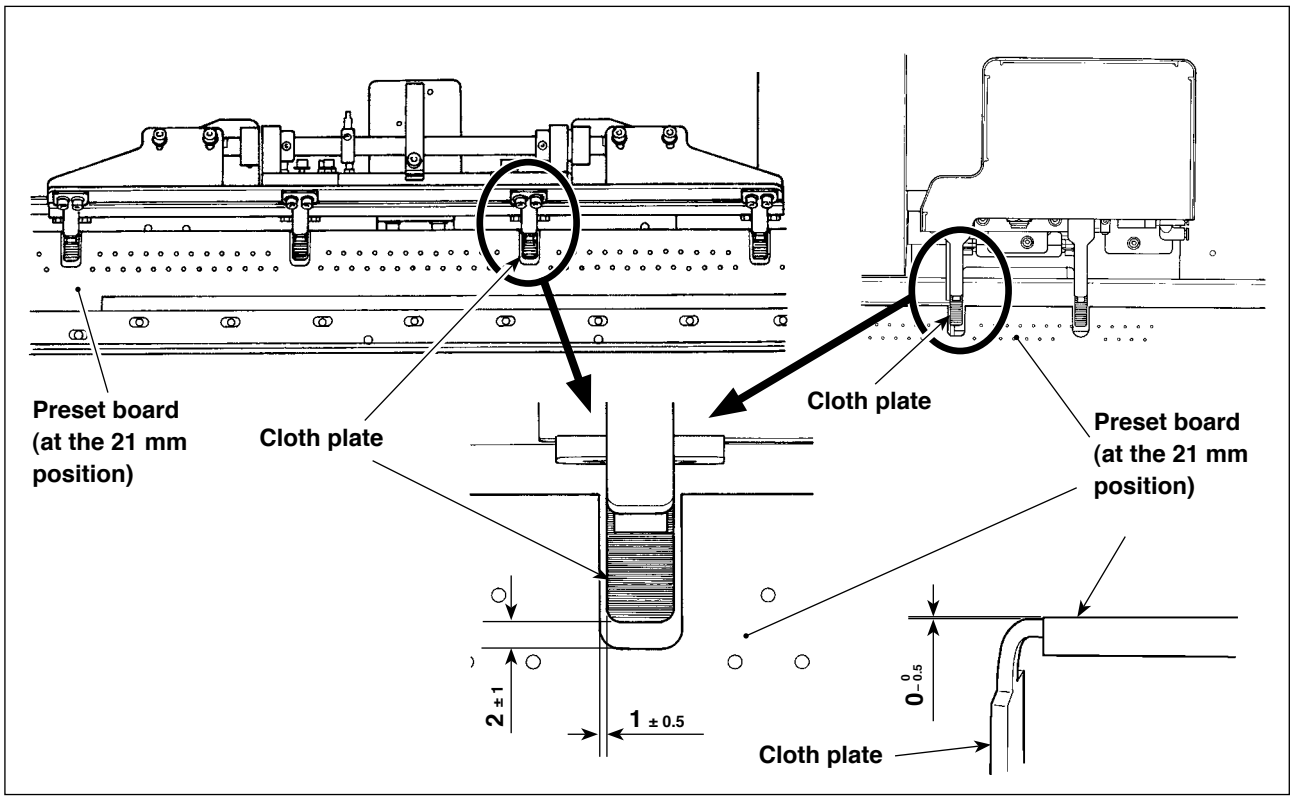
When adjusting the position of the clamps or replacing the clamp cushion, perform the adjustment below.

1) Place workpiece ❶ on the carriage as illustrated in the figure, press and turn the manual switch on solenid valve ❸ to actuate the clamp cylinder.
2) Loosen locknut ❹ and turn adjustment screw ❺ in the direction of the arrow. Then clamp cushion ❻ will be raised.
3) Adjust up or down the height of the clamp on the left first and that on the right next, so that they uniformly clamp workpiece ❶ over the length.
4) Finally, tighten the locknut and check that the clamping force of the clamps does not change.
5) Return the manual switch to its home position.

After the adjustment, be sure to return the manual switch to its home position.

4-5. Adjusting the sub clamp

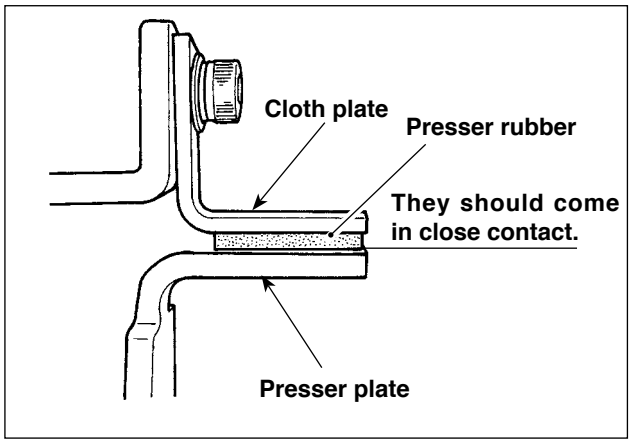
(1) Adjusting the cloth plate



Provide an equal lateral clearance between the preset board and the cloth plate. Provide a vertical clearance of 1 ± 0.5 mm or less between the preset board and the cloth plate. The longitudinal clearance between them should be 2 ± 1 mm when the preset board is placed at the 21 mm position.

For the height of the clamp catch plate, a distance of 0 $^{0}_{-0.5}$ mm shall be provided between the clamp catch plate and the preset plate when they are flush with each other.

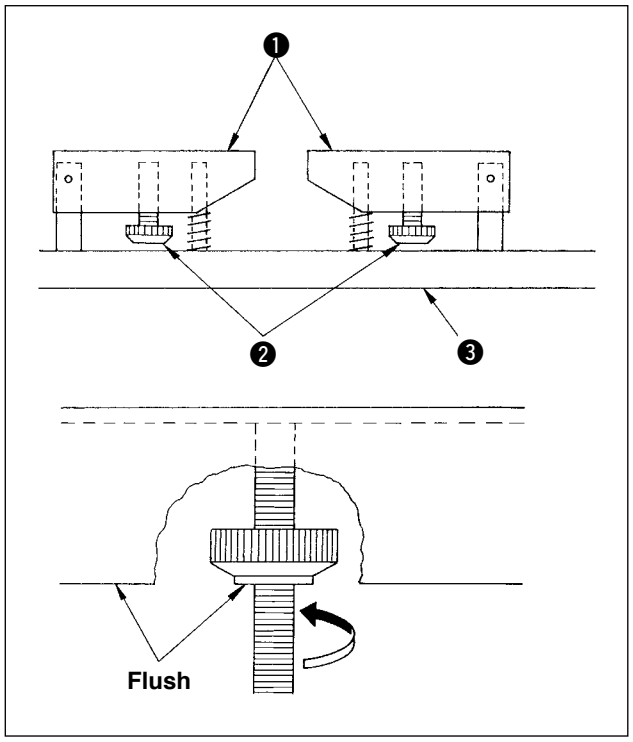
(2) Adjusting the presser plate



Adjust so that the presser rubber comes in close contact with the cloth plate when the presser plate actuates.

4-6. Adjusting the stacking board of the stacker

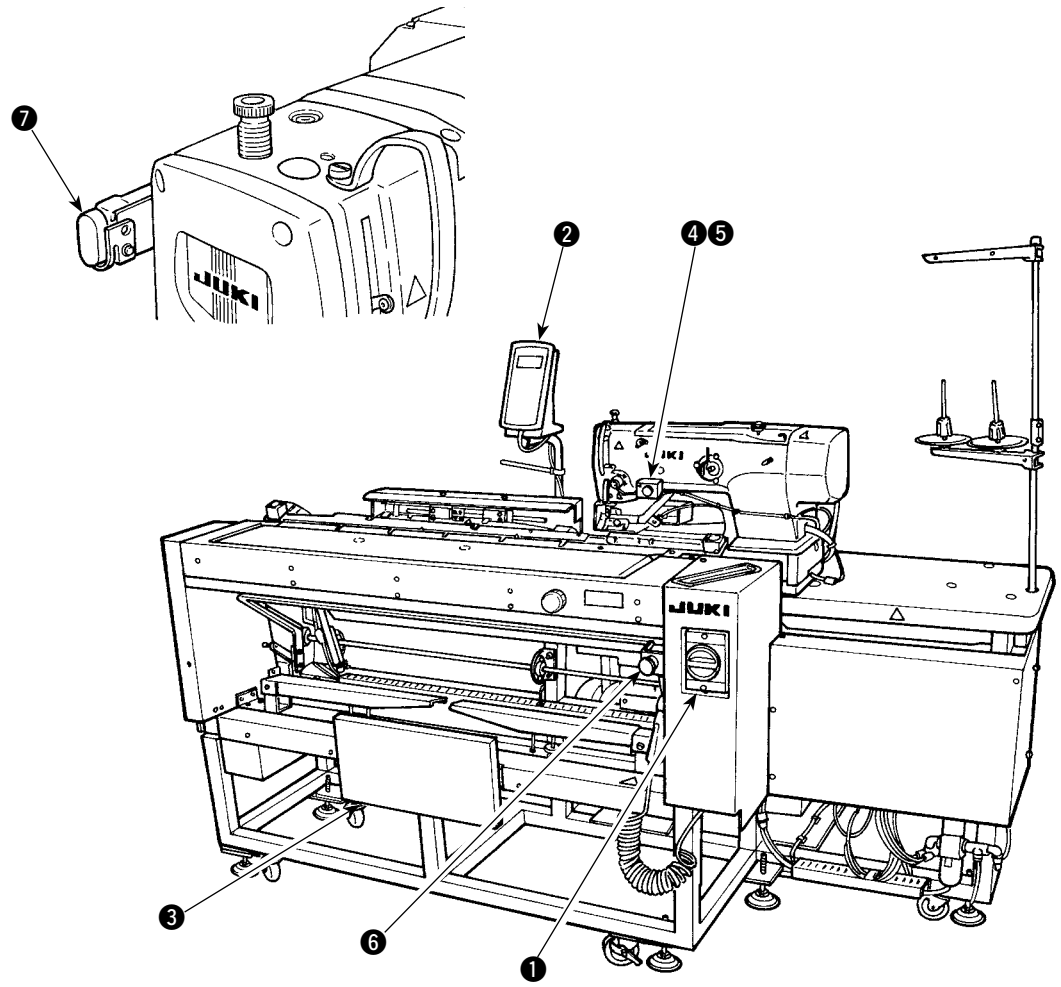
WARNING:
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.



If sewing garment bodies with pockets, adjust the stacking board following the steps described below. This adjustment allows the stacker to stack approximately 140 pieces of garment bodies with pockets (material : T/C board cloth). (When sewing garment bodies without pockets, no adjustment is required.)

1) When sewing men's wear, loosen locknuts ❷ in the reverse side of stacking board ❶ on the right side, and raise the stacking board until the reverse side of the stacking board is flush with the reverse side of the locknut.
2) When sewing ladies' wear, loosen locknuts ❷ in the stacking board on the left side as in the case of men's wear.
   (When sewing garment bodies without pockets, lower locknuts ❷ until they reach stacking board base ❸ and tighten them to the extent where stacking board ❶ is secured.)

5. OPERATION



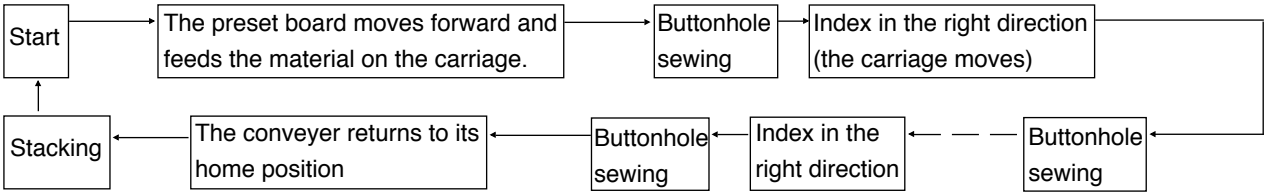
❶ Power switch
❷ Control panel
❸ Knee switch
❹ Hand switch
❺ Workpiece suction lamp
❻ Temporary stop switch
❼ Machine head pause switch

WARNING:

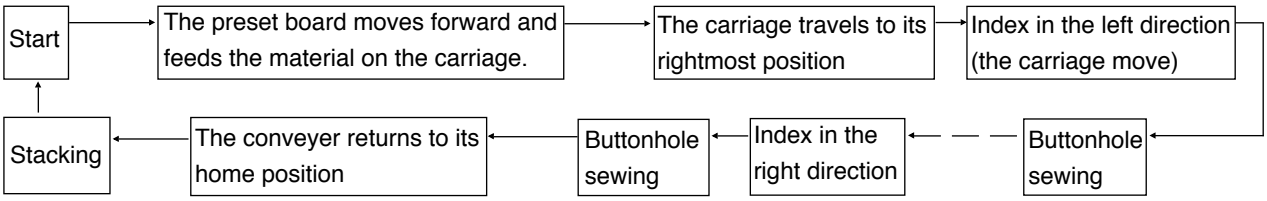
1. The machine can be started in two different methods ; A and B modes, by changing over the memory switch data U51. (Refer to "Ⅱ-2-15. Method of changing memory switch data" p.77.)
2. The knee-switch is used as start switch under the A mode and the hand-switch is used under the B mode.
3. Under both A and B modes, the machine will start when releasing the start switch. Be sure to avoid placing your hand(s) under the work clamp check and the needle with the start switch held pressed.

When the switch is pressed, the following series of operation will be performed automatically

[Series of the operation for men's wear]



[Series of operation for ladies' wear]



For the operating procedure of start and workpiece suction, operate in accordance with the type selected in "Start switch selection" of the memory switch data U51.

[Operating the A-mode (the knee switch is used to start sewing)]

1) Press READY key on the operation panel to make the ready ON state.(State that the screen is green)
2) Properly set the material on the preset board. (See the figure below.)
3) When knee switch ❸ is pressed, the material will be sucked (workpiece suction lamp ❺ lights up). When it released, the machine will start running.

* When the material is sucked (workpiece suction lamp ❺ lights up), press hand switch ❹ and the workpiece suction mechanism is released (workpiece suction lamp ❺ goes off). Then the start is released.

* If you repeat steps 2) and 3) during sewing the 1st workpiece, continuous operation can be performed.

[Operating the B-mode (the hands switch used to start sewing)]

1) Press READY key on the operation panel to make the ready ON state.(State that the screen is green)
2) Properly set the material on the preset board. (See the figure below.)
3) When knee switch ❸ is pressed, the material will be sucked and is held sucked even when it is released.
4) Press and release hand switch ❹, the sewing machine starts sewing. (Workpiece suction lamp ❺ lights up.)

* If knee switch ❸ is pressed when the material is sucked, the workpiece suction is stopped.

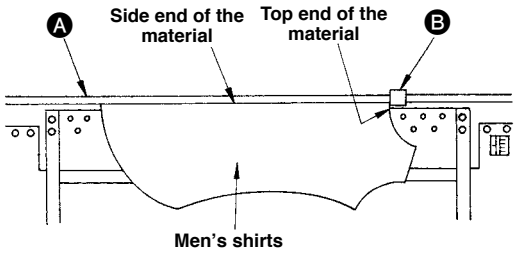
* If you repeat steps 2) to 4) while the first material is being sewing, the sewing machine is capable of performing continuous operation.

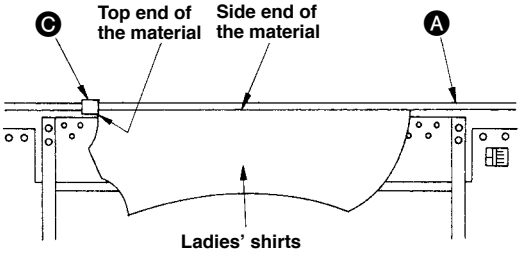
※ The mode has been factory-set to [A mode] at the time of shipment.

The proper material setting

1) Men's shirts
Place the material so that there is no clearance between the side end of the material and presetting board Ⓐ, and align the top end of the material with marker Ⓑ.

2) Ladies' shirts
Place the material so that there is no clearance between the side end of the material and presetting board Ⓐ, and align the top end of the material with maker Ⓒ.

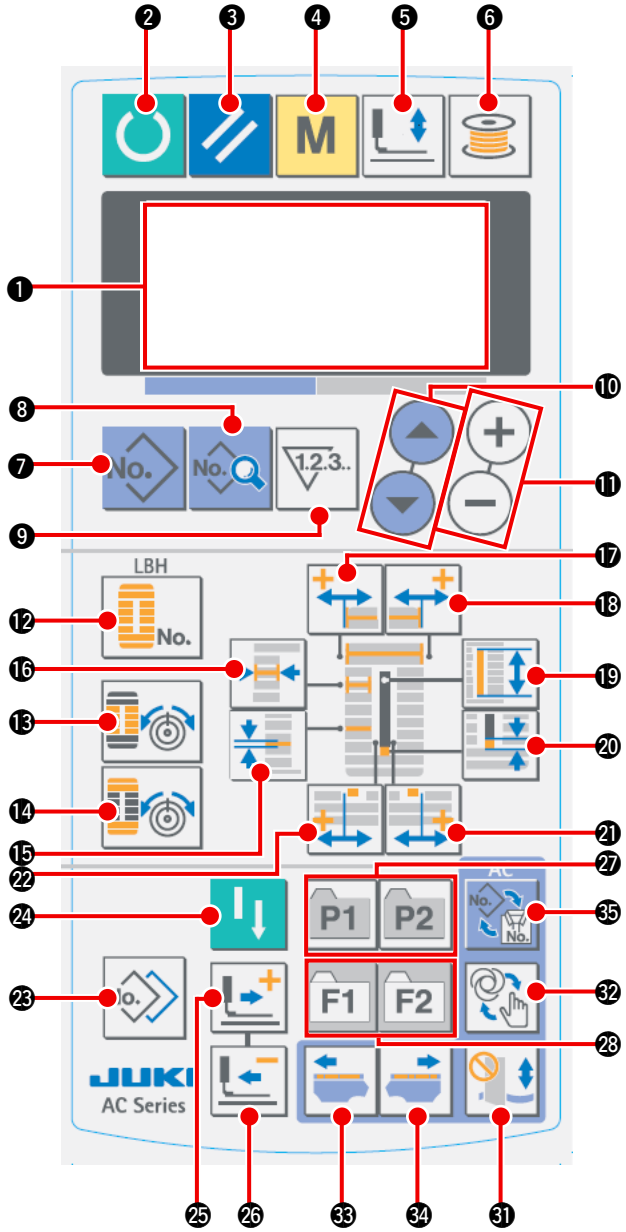


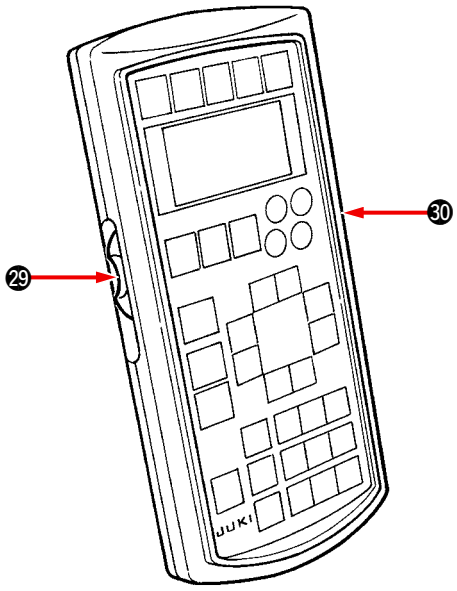


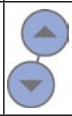
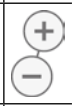
Ⅱ. OPERATION

1. How to use the operation panel

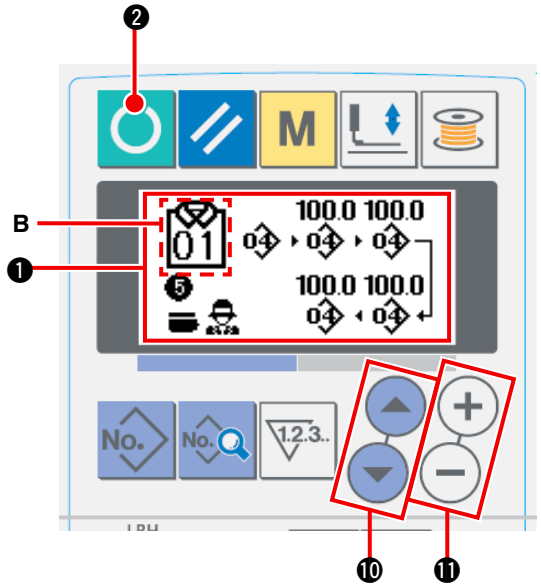
1-1. Configuration of the operation panel





No.	NAME	FUNCTION
❶	LCD display	Various data such as pattern No., shape, etc. are displayed.
❷	 READY key	Press this key when starting sewing. Every time this key is pressed, change-over of sewing ready set state and data set state can be performed.
❸	 RESET key	Press this key when releasing error, travelling the feed mechanism to its initial position, counter resetting, etc.
❹	 MODE key	Press this key when changing data of the memory switches.
❺	 PRESS-ER key	This key lifts or lowers the presser.
❻	 WINDER key	This key is pressed when performing bobbin winding.
❼	 PATTERN NO. key	This key selects pattern No. display.
❽	 DATA key	This key selects data display.
❾	 COUN-TER key	Thus key selects counter display.
❿	 ITEM SELECTION key	This key selects pattern No., data No., etc.
⓫	 DATA CHANGE key	This key changes various data.
⓬	 SHAPE key	This key selects shape display.
⓭	 THREAD TENSION AT PARAL-LEL SEC-TION key	This key selects thread tension at parallel section display.
⓮	 THREAD TENSION AT BAR-TACKING SECTION key	This key selects thread tension at bar-tacking section display.
⓯	 PITCH key	This key selects pitch of parallel sec-tion.
⓰	 OVER-EDGING WIDTH key	This key selects overedging width display.
⓱	 BAR-TACKING WIDTH, LEFT key	This key selects left side of bar-tack-ing width compensation display.
⓲	 BAR-TACKING WIDTH, RIGHT key	This key selects right side of bar-tacking width compensation display.
⓳	 CLOTH CUT LENGTH key	This key selects cloth cut length display.
⓴	 CLEAR-ANCE key	This key selects clearance display.

No.	NAME	FUNCTION
㉑	 KNIFE GROOVE WIDTH, RIGHT key	This key selects knife groove width, right compensation display.
㉒	 KNIFE GROOVE WIDTH, LEFT key	This key selects knife groove width, left compensation display.
㉓	 COPY key	Press this key when copying pattern.
㉔	 Sewing machine start key	The sewing machine starts sewing of the selected LBH pattern.
㉕	 FORWARD key	This key makes the feed mechanism travel forward stitch by stitch.
㉖	 BACK-WARD key	This key makes the feed mechanism travel backward stitch by stitch.
㉗	PATTERN REG-ISTRATION key 	This is a short cut key that pattern registration is available. Registration of shortcut to setting display of an optional pattern is possible.
㉘	PARAMETER REGISTRATION key 	This is a short cut key that parameter registration is available. Registration of shortcut to setting display of an optional pattern, sewing parameter or adjustment data is possible.
㉙	Speed variable resister	Speed increases when this is lifted upward and decreases when this is lowered downward.
㉚	LCD adjustment variable resistor	Light and shade of LCD display can be adjusted.
㉛	 Knife can-cel key	Every press on the button changes over the knife operation between "bringing the knife down" and "not bringing the knife down."
㉜	 Manual change-over key	When the button is pressed, the op-eration mode is changed over to the manual sewing mode and the manual sewing screen appears on the display. Note) The preset board is actuated.
㉝	 Material leftward feed key	For a men's garment, the carriage is moved backward to the previous sew-ing position. For a ladies' garment, the carriage is moved forward to the next LBH pattern position.
㉞	 Material rightward feed key	For a men's garment, the carriage is moved forward to the next sewing position. For a ladies' garment, the carriage is moved backward to the previous LBH pattern position.
㉟	 Mode change-over key	The sewing mode is changed over between the continuous sewing mode and the individual sewing mode.



(1) Turning on the power switch

The AC data input screen ❶ is displayed by turning on the power switch.

(2) Selecting the pattern number to be sewn

The AC pattern number which has been registered can be selected by pressing ITEM SELECT key or ❿. Refer to **"Ⅱ-1-4. Selecting the AC pattern" p.47** for how to select the AC pattern number.

* Refer to **"Ⅱ-1-3.(1) AC data input screen" p.44** for the detailed explanation of this screen.

(3) Placing the sewing machine into the sewing-enabled state

Press READY key ❷.

Once the sewing is enabled, the background color of the LCD turns green and the AC automatic sewing screen appears on the display.

(4) Starting sewing

Place the sewing product on the sewing machine. When you press the knee switch or the hand switch (either switch which has been set as the start switch), the sewing machine automatically starts sewing.

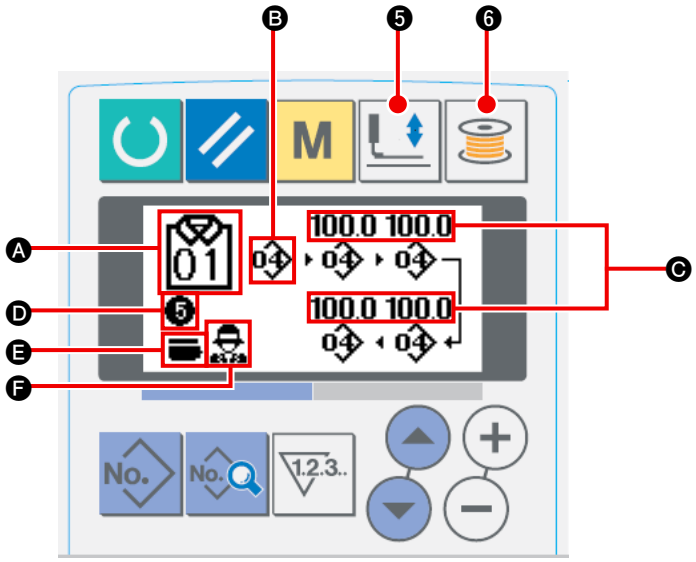
* Refer to **"Ⅱ-2-15. Changing the memory switch data" p.77** for how to set the start switch.

* Refer to **"Ⅱ-1-3. (2) Automatic sewing screen" p.45** for the detailed explanation of this screen.

* When you have edited data in the setting modes, be sure to confirm the data under the relevant setting mode.
If you exit the setting mode without confirming the data, the change you have made is not registered.

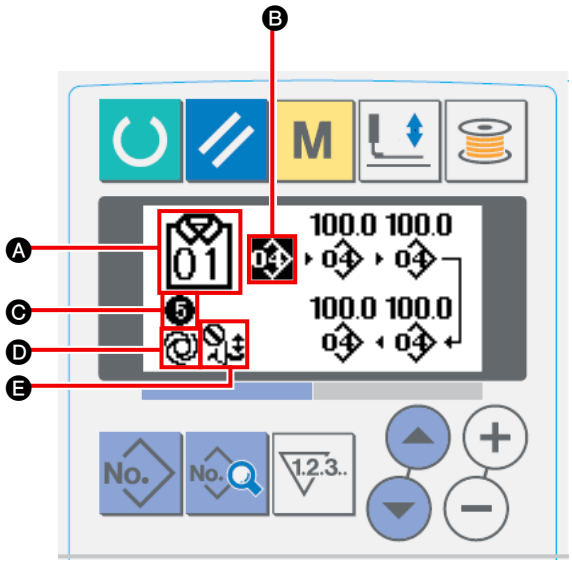
1-3. LCD under the AC mode

(1) AC data input screen



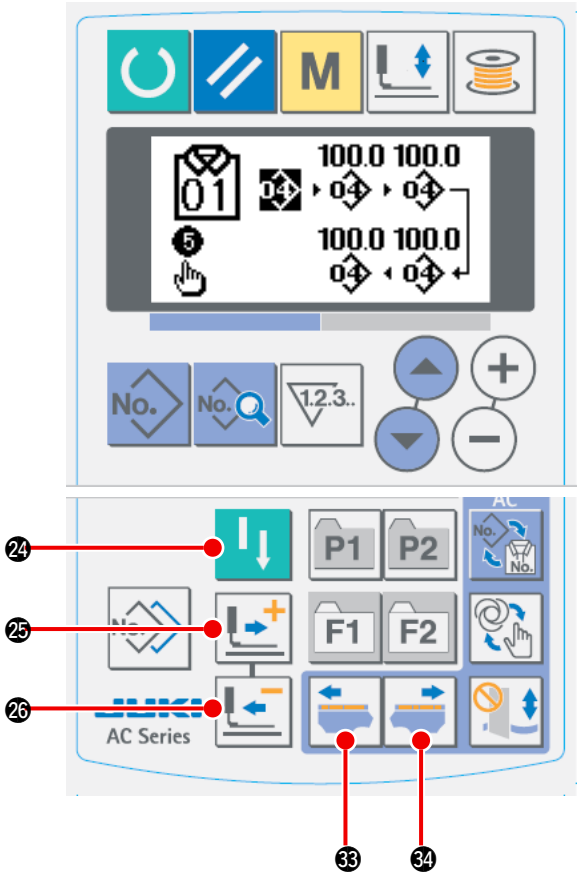
	Button and display	Description
Ⓐ	AC pattern No.	Currently-selected AC pattern number is displayed.
Ⓑ	Pattern buttonhole No.	LBH sewing data number which has been registered to the currently-selected AC pattern is displayed.
Ⓒ	Feed amount	Feed amount is displayed.
Ⓓ	Number of registered buttonholes	The number of buttonholes registered to the currently-selected AC pattern is displayed.
Ⓔ	Pair-stack ON/OFF selection	This button is only displayed when the use of the memory switch data (level 1) U54 pair-stack is set to ON. → Refer to **"Ⅱ-1-11. Changing over the pair-stack" p.56**.
Ⓕ	Men's/Ladies' garment selection	Type of garment can be changed over between men's and ladies' garments. → Refer to **"Ⅱ-1-10. Changing over between men's and ladies' garments" p.55**.
❺	Work clamp check lowering button	The work clamp check is moved down to its lower position and the work clamp check lowering screen is displayed. To move the work clamp check to its upper position, press the work clamp check lowering button again.
❻	Bobbin winding button	Bobbin winding can be carried out. → Refer to **"Ⅱ-1-6. Winding the bobbin" p.50**.

(2) Automatic sewing screen



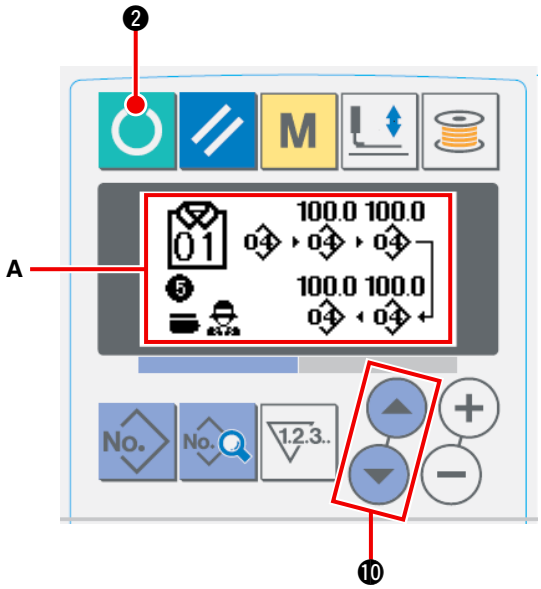
	Button and display	Description
Ⓐ	AC pattern No.	Currently-selected AC pattern number is displayed.
Ⓑ	Pattern buttonhole No.	The LBH sewing data number which has been registered to the currently-selected AC pattern is displayed.
Ⓒ	Number of registered buttonholes	The number of buttonholes which has been registered to the currently-selected AC pattern is displayed.
Ⓓ	Automatic sewing mode	This button is displayed under the automatic sewing mode.
Ⓔ	Knife cancellation	This button is displayed when the knife cancellation is effective. The knife is not actuated while the knife cancellation button is displayed.

(3) Manual sewing screen



	Button and display	Description
㉔	Sewing machine start button	When you press the button, the sewing machine starts sewing the LBH pattern data which has been set for the operation step to which the carriage is brought by means of button ㉝ or ㉞.
㉕	1-stitch forward button	The LBH pattern data set for the operation step to which the carriage is brought by means of button ㉝ or ㉞ is moved forward by one stitch.
㉖	1-stitch backward button	The LBH pattern data set for the operation step to which the carriage is brought by means of button ㉝ or ㉞ is moved backward by one stitch.
㉝	Material leftward feed button	For a men's garment, the carriage is moved forward to the next LBH pattern position. For a ladies' garment, the carriage is moved backward to the previous LBH pattern position.
㉞	Material rightward feed button	For a men's garment, the carriage is moved backward to the previous LBH pattern position. For a ladies' garment, the carriage is moved forward to the next LBH pattern position.

1-4. Selecting the AC pattern



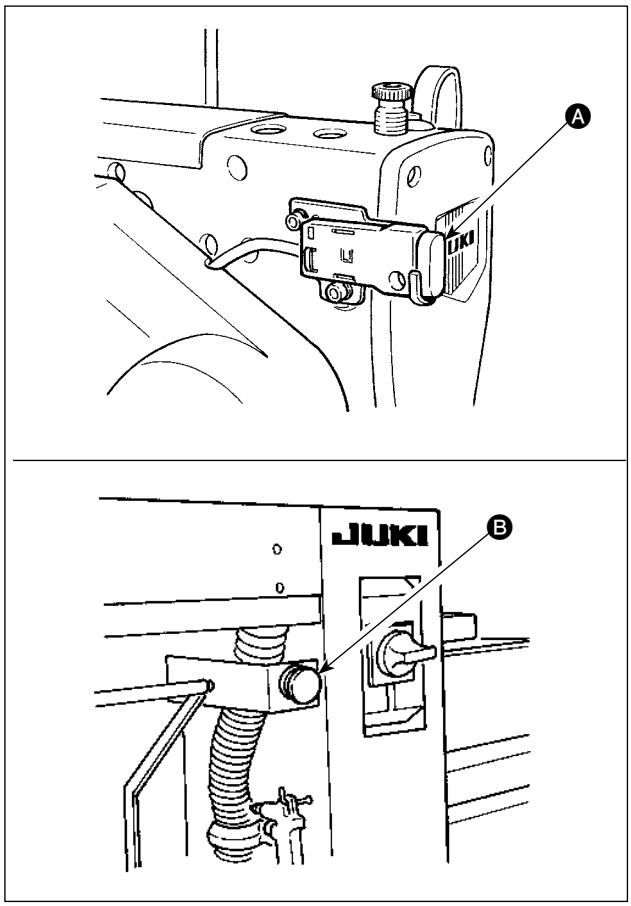
① **Displaying the data input screen**

Only when the AC data input screen (blue) **A** is displayed, the AC pattern selection is enabled. If the sewing screen (green) is displayed, press READY key ❷ to display the data input screen.

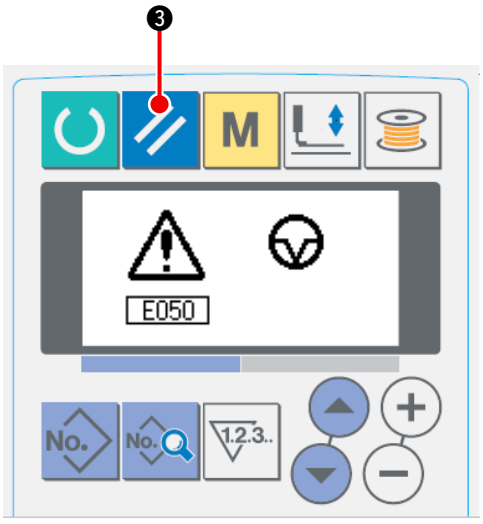
② **Selecting the pattern number**

Press ITEM SELECT key ❿ to display the target AC pattern number.

1-5. Carrying out re-sewing

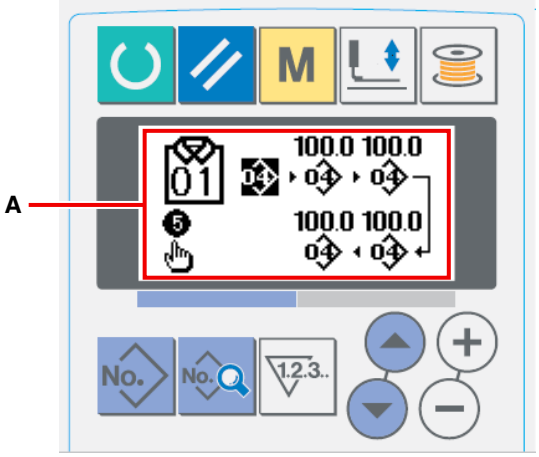


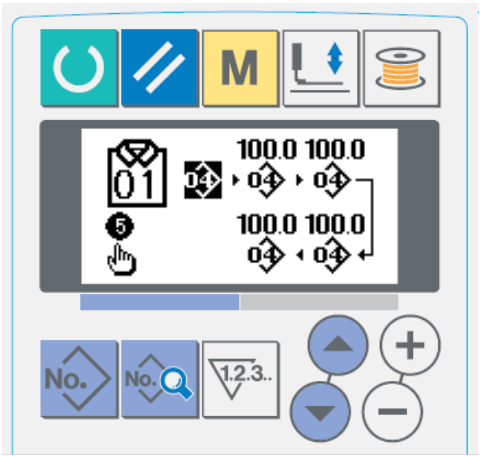
When you press PAUSE switch Ⓐ or Ⓑ while the sewing machine is in operation under the AC mode, the sewing machine stops sewing. At this time, the error screen appears to notify that the PAUSE switch has been pressed.

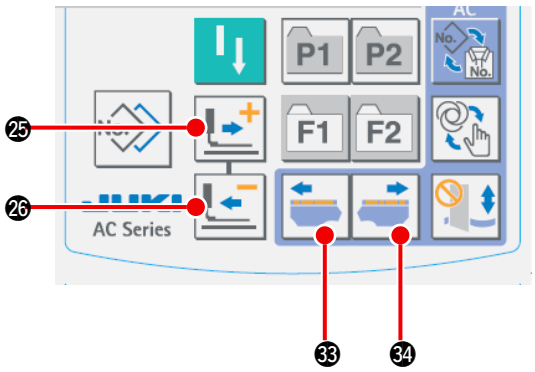


① **Resetting the error**

When the error is reset by pressing RESET key ❸, the manual sewing screen **A** appears on the display automatically.







② **Returning the needle entry**

When you press BACKWARD key  ㉖, the work clamp check is moved backward by one stitch from the current position. When you press FORWARD key  ㉕, the work clamp check is moved forward by one stitch from the current position.

When you press MATERIAL RIGHTWARD FEED  ㉞, the current needle entry point of the sewing data is brought rightward by one needle entry point. When you press MATERIAL LEFTWARD FEED  ㉝, the needle entry point of the sewing data is brought leftward by one needle entry point.

Return the work clamp check to the position to start re-sewing.

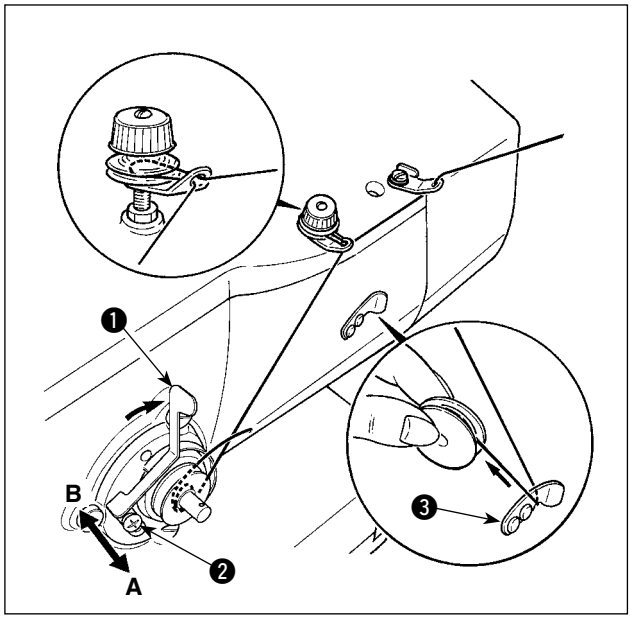
③ **Starting sewing**

When you press the knee switch or the hand switch (either switch which has been set as the start switch), the sewing machine starts re-sewing.

* Refer to **"Ⅱ-2-15. Method of changing memory switch data" p.77** for how to set the start switch.

In order to re-sew the material after having taken it out from the sewing machine, it is necessary to move the carriage forward by means of the MATERIAL RIGHTWARD  **㉞ /LEFTWARD FEED**  **㉝ until the sewing end is reached.**

1-6. Winding bobbin thread



(1) Winding the bobbin

① **Set the bobbin.**

Fit a bobbin fully onto the bobbin winder shaft. Take the thread from the spool and pass it through the guides in the numerical order as shown in the figure, and wind the end of the thread several times around the bobbin. Then push the bobbin winder trip latch ❶ in the direction of the arrow mark.

② **Set the mode to the bobbin winding mode.**

Press WINDER key ❻ from either input status or sewing status to enter the bobbin winding mode, and bobbin winding screen **C** is displayed.

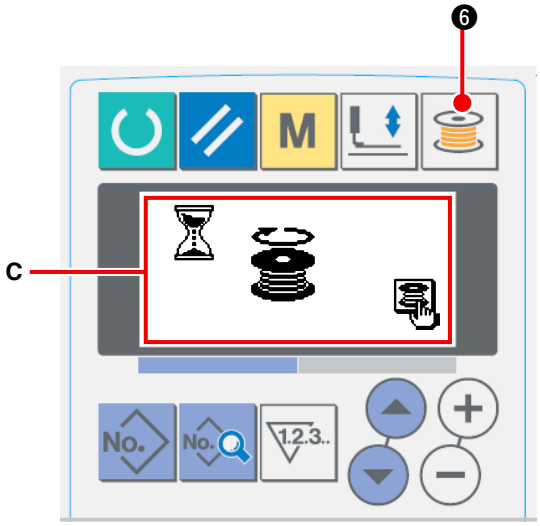
③ **Start bobbin winding.**

When you press the knee switch or hand switch (which is preset as the start switch), the sewing machine rotates to start winding the bobbin.

④ **Stop the sewing machine.**

When the bobbin is wound with a predetermined amount of thread, bobbin winding lever ❶ is released. Press bobbin winding key ❻ or press the knee switch or the hand switch to stop the sewing machine.

Then remove the bobbin and cut bobbin thread with thread trimmer retaining plate ❸.



- Press WINDER key ❻, and the sewing machine stops and returns to the normal mode.
- When you press the knee switch or hand switch, the sewing machine stops running while remaining in the bobbin winding mode. It is recommended to use this procedure for winding two or more bobbins.

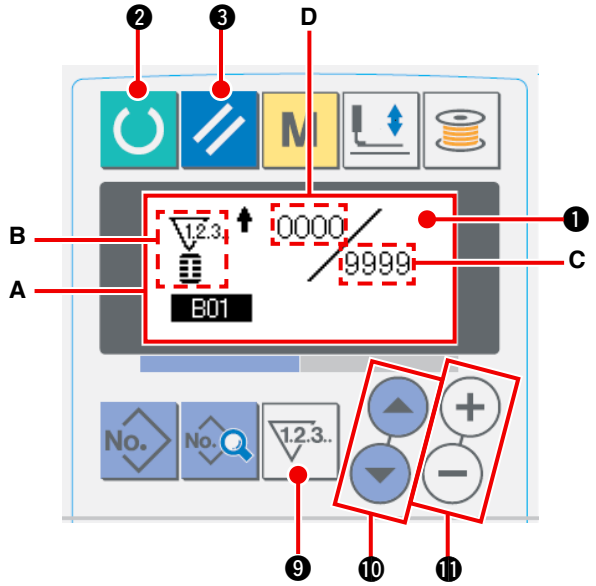
(2) Adjusting the amount to be wound on a bobbin

To adjust the bobbin thread amount to be wound on the bobbin, loosen setscrew ❷, move bobbin winding lever ❶ in direction **A** or **B** and fix setscrew ❷.

To the direction of **A** : Decrease

To the direction of **B** : Increase

1-7. Using the counter



① **Call counter setting screen.**

Press COUNTER key 1.2.3.. ❾ under the input mode, and counter screen **A** is displayed. Then setting is possible. Setting of the counter value can be performed only with the input mode (back-light of LCD display ❶ is blue). In case of the sewing mode (back-light of LCD display ❶ is green), press READY key ❷ to set the mode to the input mode.

② **Selection of kinds of counters**

Press ITEM SELECTION key ❿ to make pictograph **B** showing the kind of counter flash on and off. Press DATA CHANGE key ⓫, and select the counter you desire from among the kinds of counters below.

③ **Change of counter set value**

Press ITEM SELECTION key ❿ to make counter set value **C** flash on and off. Press DATA CHANGE key ⓫ and input the set value until count-up is reached.

④ **Change of existing counter value**

Press ITEM SELECTION key ❿ to make existing counter value **D** flash on and off.

Press RESET key ❸ and the value on the way of counting can be cleared.

In addition, it is possible to edit the numerical value with DATA CHANGE key ⓫ .

[Kind of counter]

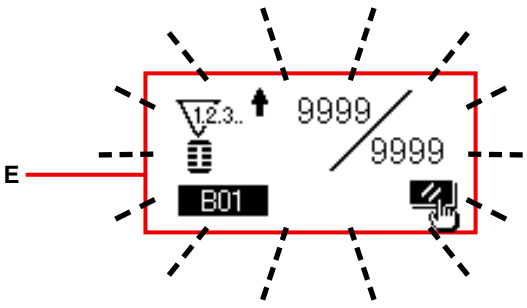
[Sewing UP counter]
Every time the sewing of one shape is performed, the existing value is counted up. When the existing value is equal to the set value, count-up screen is displayed.

[Sewing DOWN counter]
Every time the sewing of one shape is performed, the existing value is counted down. When the existing value is reached to "0", count-up screen is displayed.

[No. of pcs. UP counter]
Every time one cycle or one continuous stitching is performed, the existing value is counted up. When the existing value is equal to the set value, count-up screen is displayed.

[No. of pcs. DOWN counter]
Every time one cycle or one continuous stitching is performed, the existing value is counted down. When the existing value is reached to "0", count-up screen is displayed.

[Counter not used]



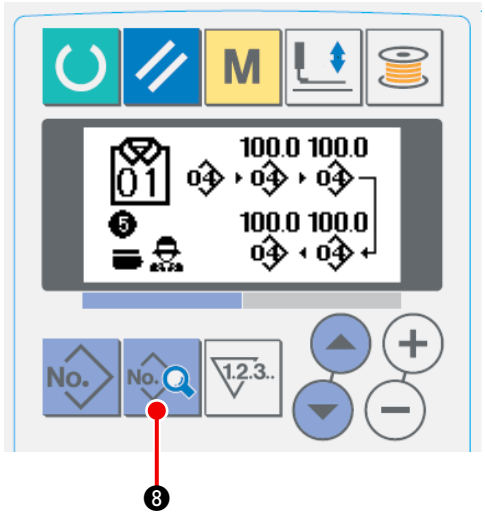
⑤ **Count-up releasing procedure**

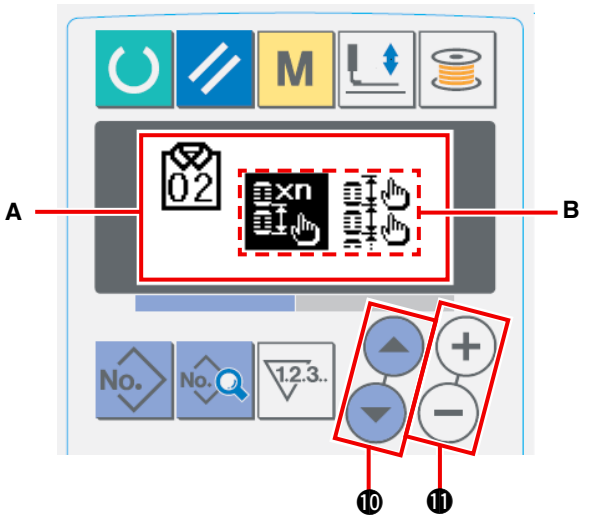
When count-up condition is reached during sewing work, the whole count-up screen E flashes on and off. Press RESET key ❸ to reset the counter, and the mode returns to the sewing mode. Then the counter starts counting again.

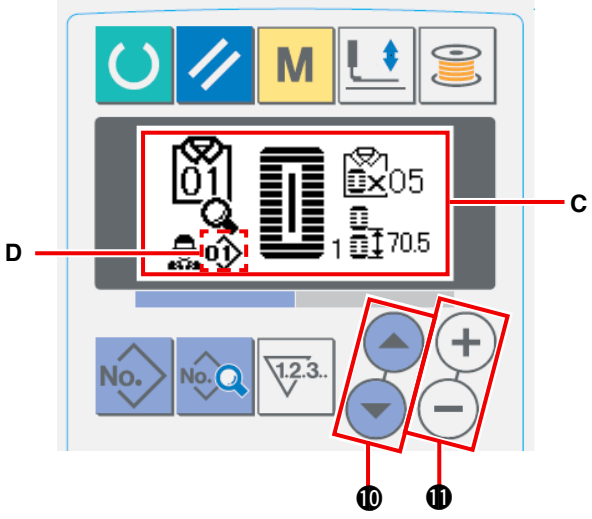
1-8. Registering a new AC pattern

There are two different methods to register a new AC pattern. One is equal-interval input method and the other is individual input method. In the case of the former, the number of buttonholes and a button interval are input. In the case of the latter, buttonhole data is input on a buttonhole-by-buttonhole basis.

(1) Carrying out the equal-interval input







① **Displaying the data input screen**
New pattern can be registered only on the AC data input screen (blue).

② **Calling the new AC pattern registration screen**
Keep DATA key ❽ held pressed until the new pattern registration screen **A** is displayed.

③ **Inputting a pattern number**
Input a new AC pattern No. to be registered by means of DATA CHANGE key ⓫. It is prohibited to register a new AC pattern to the AC pattern number which has already been registered.

> **Reference** **Twenty different patterns (1 to 20) can be used as AC patterns.**

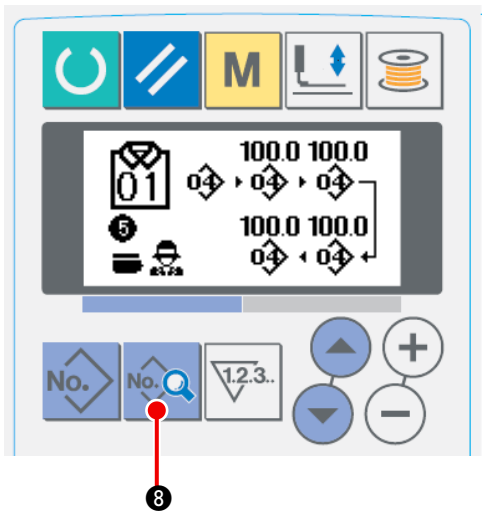
④ **Selecting the equal-interval input**
Press the ITEM SELECT key ❿ to blink the equal-interval/individual input selection **B**. Select the equal-interval input using DATA CHANGE key ⓫. Press DATA key ❽ to confirm the AC pattern number to be newly registered. Then, the equal-interval input selection screen **C** appears on the display.

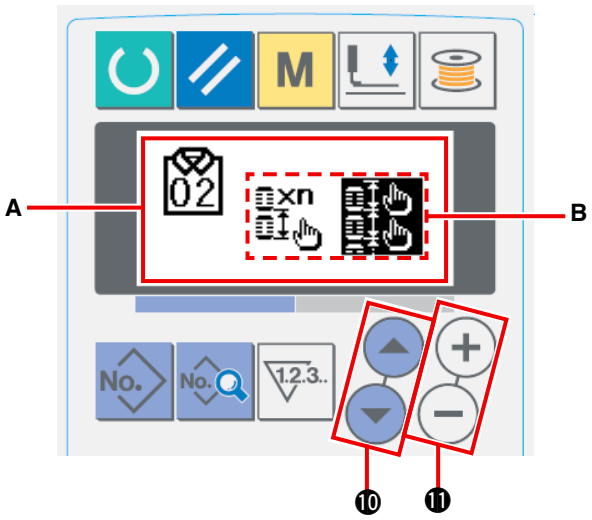
⑤ **Selecting the LBH sewing pattern number**
Press DATA CHANGE key ⓫, while the LBH sewing pattern No. **D** is flashing on and off, to select the LBH sewing pattern number.

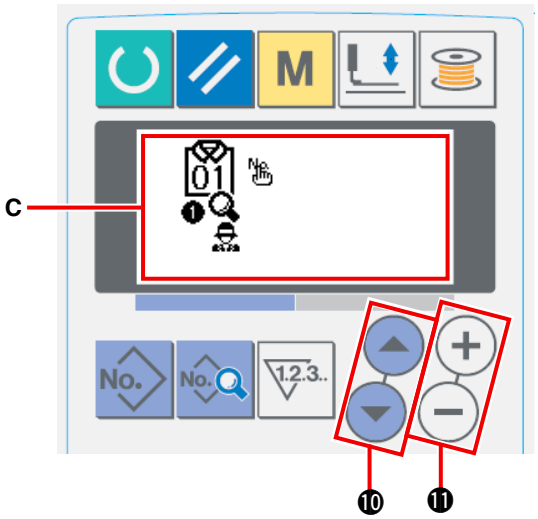
⑥ **Inputting the number of buttonholes**
Press ITEM SELECT key ❿ to change the item being selected. Input the number of buttonholes to be sewn continuously by means of DATA CHANGE key ⓫.

⑦ **Inputting the feed amount**
Press ITEM SELECT key ❿ to change the item being selected.
Input the feed amount by means of DATA CHANGE key ⓫.
Press DATA key ❽ to confirm the input data.

(2) Carrying out the individual input







① **Displaying the data input screen**
New AC pattern can be registered only on the AC data input screen (blue).

② **Calling the new AC pattern registration screen**
Keep DATA key ❽ held pressed until the new pattern registration screen **A** is displayed.

③ **Inputting a pattern number**
Input a new AC pattern No. to be registered by means of DATA CHANGE key ⓫. It is prohibited to register a new AC pattern to the AC pattern number which has already been registered.

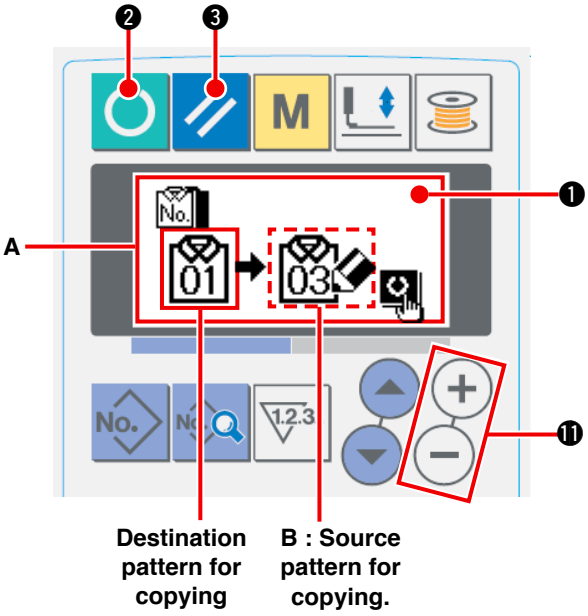
Reference **Twenty different patterns (1 to 20) can be used as AC patterns.**

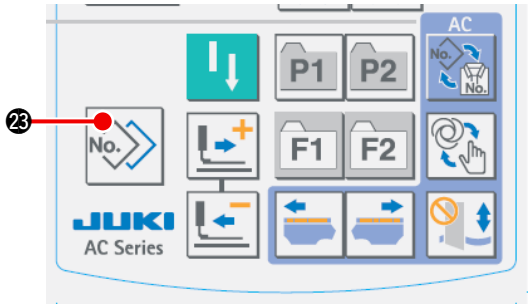
④ **Selecting the individual input**
Press the ITEM SELECT key ❿ to blink the equal-interval/individual input selection **B**.
Select individual input using DATA CHANGE key ⓫ and press DATA key ❽. Then, the AC pattern number to be newly registered is confirmed and individual input screen **C** is displayed.

⑤ **Selecting the LBH sewing pattern number**
Press ITEM SELECT key ❿ to blink the LBH sewing pattern number and the feed amount to be changed.
The LBH sewing pattern number and the feed amount data, which are flashing on and off, can be changed by pressing DATA CHANGE key ⓫.

1-9. Copying the AC pattern

The data which has already been registered to a pattern number can be copied to another pattern number which is not used. Pattern copying by overwriting is prohibited. If you want to overwrite an existing pattern, it is necessary to erase the existing pattern first.





① **Placing the sewing machine into the input mode**

Copying is enabled only when the backlight of LCD ❶ is blue, i.e., under the input mode. If the backlight is green, i.e., under the sewing mode, press READY key ❷ to change over the mode to the input mode.

② **Selecting the source pattern number for copying**

Select the source pattern number for copying on the pattern selection screen.

→ Refer to **"Ⅱ-2-2. Performing pattern selection" p.58**.

③ **Calling the copy screen**

Press COPY key ㉓ to display the copy screen **A**.

④ **Selecting the destination pattern number for copying**

Pattern No. **B** which is not used flashes on and off. Press DATA CHANGE key ⓫ to select the destination pattern number for copying.

To erase the pattern, select the Recycle Bin.

⑤ **Starting copying**

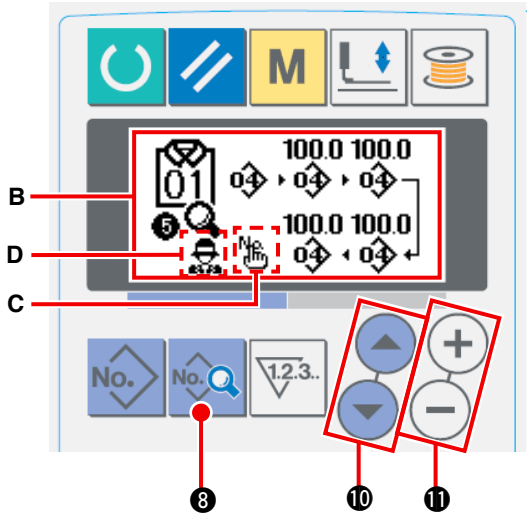
Press READY key ❷ to start copying.

Two seconds later, the screen is restored to the input screen with the pattern number created by copying selected.

If RESET key ❸ is pressed, the screen is restored to the previous one without carrying out copying.

1-10. Changing over the garment type between men's and ladies' garments

The feeding direction of the sewing product differs depending on whether the product is men's or ladies' one.

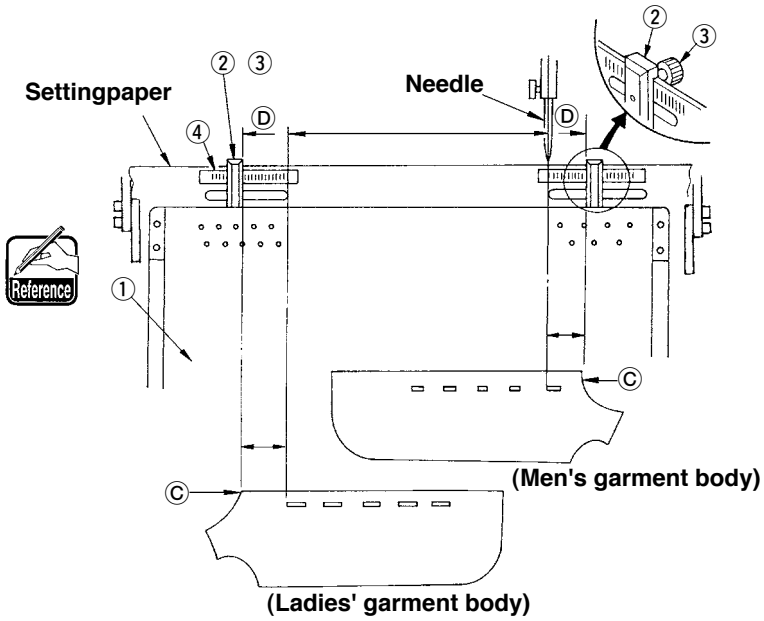


① **Displaying the AC data input screen**
Display the AC data input screen (blue) for the AC pattern number to be sewn.

② **Changing over the garment type between men's and ladies' garments**
Press DATA key ❽ to display the data changing screen **B**.
The changeover of the garment type between men's and ladies' garments can be done after having entered the last data on the LBH sewing pattern number.
Press ITEM SELECT key ❿. Then press ❿ again while the last data **C** on the LBH sewing pattern umber is flashing on and off. Then, (men's) or (ladies') **D** flashes on and off. Now, select men's or ladies' garments by means of DATA CHANGE key ⓫.

[How to place the material on the sewing machine]

For men's garments, the position at which the sewing product is preset is the sewing starting position of the first sewing pattern.
For ladies' garments, the position that is reached by moving the material toward the right by 610 mm from the position at which it has been preset is the sewing starting position of the first sewing pattern.
For both men's and ladies' garments, the sewing starting position can be moved toward the right or left before starting sewing by using the jump function.

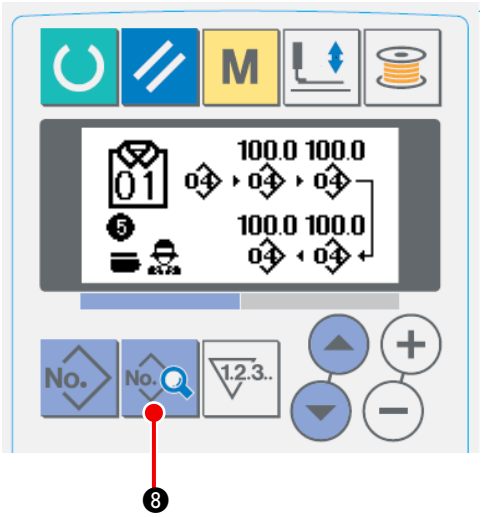


Loosen thumb-screw ③ of gauge ② of preset table ①. Move the gauge to the set point on scale ④ and fix by tightening the thumb-screw.
Then, place the material with its top end Ⓒ aligned inside of the gauge Ⓓ to position the material. (For ladies' garments, adjust the set position of the material in the similar manner using the gauge and scale located on the left side of the preset table.)

1-11. Changing over the pair-stack

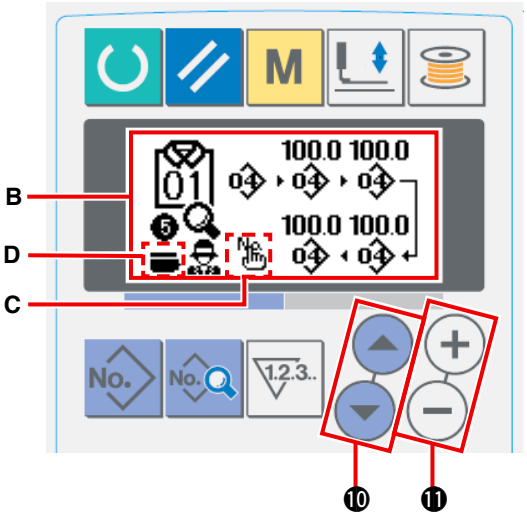
The pair-stack function is intended for stacking the right and left garment bodies alternately. The sewing machine sews buttonholes and stacks the finished right or left garment body without performing buttonholing of the other-side garment body.

Set the memory switch U54 PAIR-STACK USE to  to use the pair-stack function.



① **Displaying the AC data input screen**
Display the AC data input screen (blue) for the AC pattern number to be sewn.

② **Changing over the pair-stack**
Press DATA key  ❽ to display the data changing screen **B**.
The changeover of the pair-stacker can be done after having entered the last data on the LBH sewing pattern number.

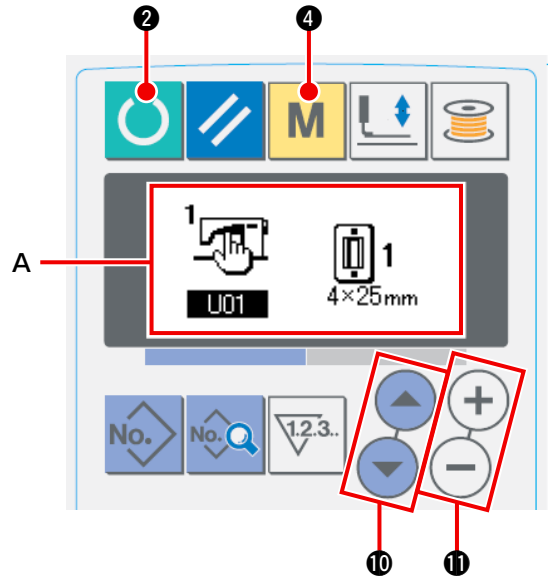


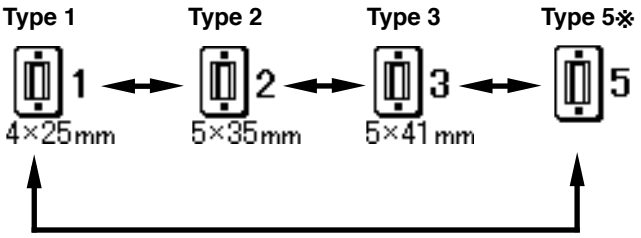
Press ITEM SELECT key  ❿. Then press ITEM SELECT key  ❿ twice while the last data **C** on the registered LBH sewing pattern number is flashing on and off. Then,  (unselect) or  (select) **D** flashes on and off. Now, select unselect or select by means of DATA CHANGE key  ⓫.

2. Operating and operation setting methods for discrete sewing machine

2-1. Input of the presser type

(1) Setting procedure of the presser type





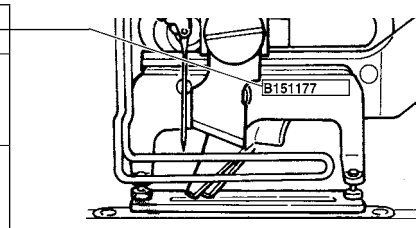
① **Call the presser type setting parameter.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to change the pattern. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

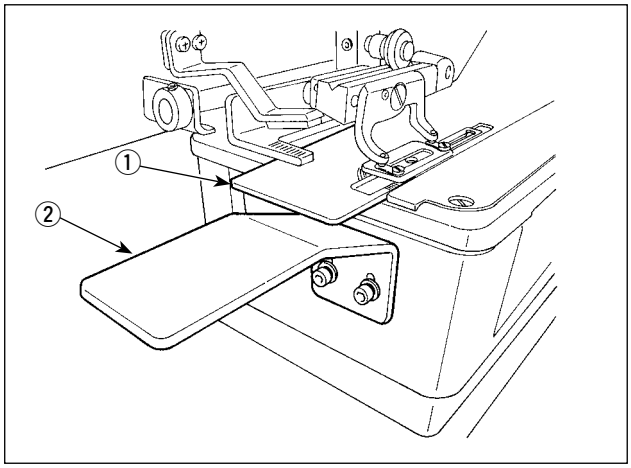
② **Select the presser type.**
Press MODE key M ❹ to display Memory switch data (level 1) edit screen **A**. Press ITEM SELECT key ❿ to call U14 Type of presser foot. Then, press DATA CHANGE key ⓫. The pictograph is displayed as shown in the figure below. Select the type of the work clamp check installed on the sewing machine referring to **"(2) Table of presser type" p. 58**.

(2) Table of presser type

Set the number in the frame of engraved part number of presser to the type of presser.

	Type	Part No. of presser foot
1 4×25mm	Type 1	B151177 1 000 *
2 5×35mm	Type 2	B151177 2 000 *
3 5×41mm	Type 3	B151177 3 000 *
5	Type 5 *	—





* Set type 5 when using the presser other than type 1 to 3. Change U15 Presser size width and U16 Presser size length of the memory switch (level 1) to adjust to the presser to be used.

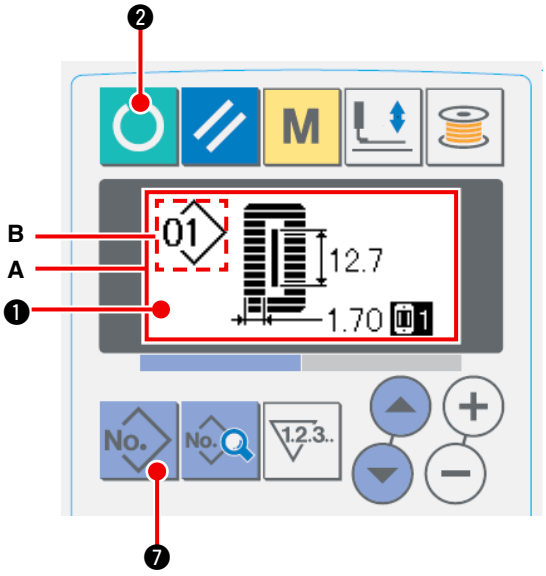
→ Refer to "Ⅱ-2-15. Method of changing memory switch data" p.77.

* When using type 5 with stitch width of 6 mm or more and 41 mm or more in length, it is necessary to replace components such as presser arm, feed plate, etc.

* When two or more types of work clamp checks are used, the height of the sub-table panel B ② so that the feed plate ① does not come in contact with the sub-table panel B ②.

2-2. Performing pattern selection

(1) Selection from the pattern selection screen



① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to change the pattern. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call the pattern selection screen.**
Press PATTERN No. key ❼, and pattern selection screen **A** is displayed.
Pattern No. **B** which is selected at present flashes on and off.

③ **Select the pattern.**
Press ITEM SELECTION key ❿, and the patterns which have been registered are changed over in order and displayed. Here, select the No. you desire to sew.

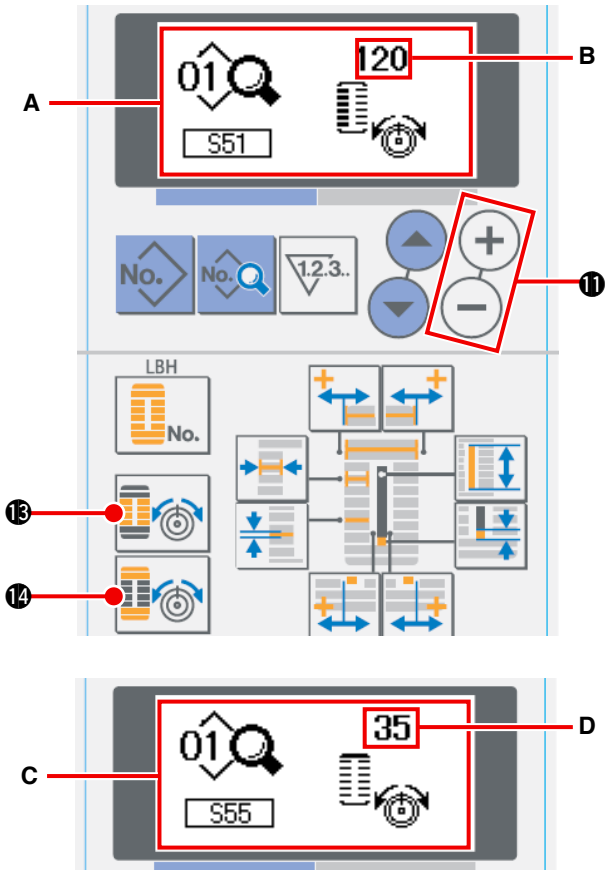
(2) Selection by means of the register key

This sewing machine can register the pattern No. you desire with the register switch. When the pattern is registered once, pattern selection can be performed by pressing only the switch.

→ Refer to "Ⅱ-2-11. Using pattern register key" p.72.

2-3. Changing needle thread tension

Needle thread tension can be changed while performing trial sewing since the data related to the needle thread tension can be set by the sewing mode as well.



① **Call thread tension at parallel section setting data.**

Press THREAD TENSION AT PARALLEL SECTION key ⓭, and sewing data edit screen **A** is displayed.

② **Change thread tension at parallel section.**

Press DATA CHANGE key ⊕ ⊖ ⓫, and set value **B** goes up or comes down and the thread tension can be changed. The relation between the finish of sewing and the set value is as shown in the illustration below. Set the value referring to the illustration.

③ **Call thread tension at bar-tacking section setting data.**

Press THREAD TENSION OF BAR-TACKING SECTION key ⓮, and sewing data edit screen **C** is displayed.

④ **Changing the needle thread tension at bar-tacking section**

Press DATA CHANGE key ⊕ ⊖ ⓫, and set value **D** goes up or comes down and the thread tension can be changed. The relation between the finish of sewing and the set value is as shown in table below. Set the value referring to the table.

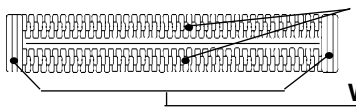
* For the tension other than that at parallel section and bar-tacking section, refer to "Ⅱ-2-7. Changing sewing data" p.63 and "Ⅱ-2-15. Method of changing memory switch data" p.77.

Set value of tension at ① parallel section and ② bar-tacking section

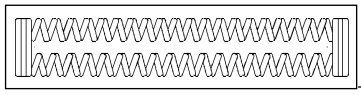
		Set value on panel		
		⊖	Initial value	⊕
Purl stitch	① Tension at parallel section	Crest is lowered.	120	Crest is raised.
	② Bar-tacking tension	Thread tension is decreased.	35	Thread tension is increased.
Whip stitch	③ Tension at parallel section	Thread tension is decreased.	60	Thread tension is increased.
	④ Bar-tacking tension	Thread tension is decreased.	60	Thread tension is increased.

For the eyelet radial shape, set the bar-tacking tension first to approximately 120 and make the balance of stitches.

Purl stitch and Whip stitch

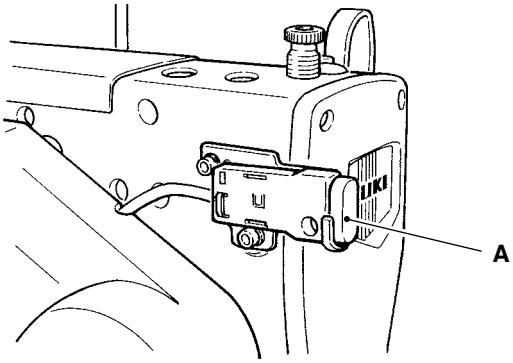


Purl stitch
When applying higher tension to the needle thread to permit it to pass straight through fabric, the purl stitch is formed by the bobbin thread which is pulled over from both sides to the center line.

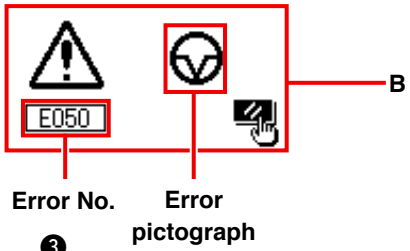


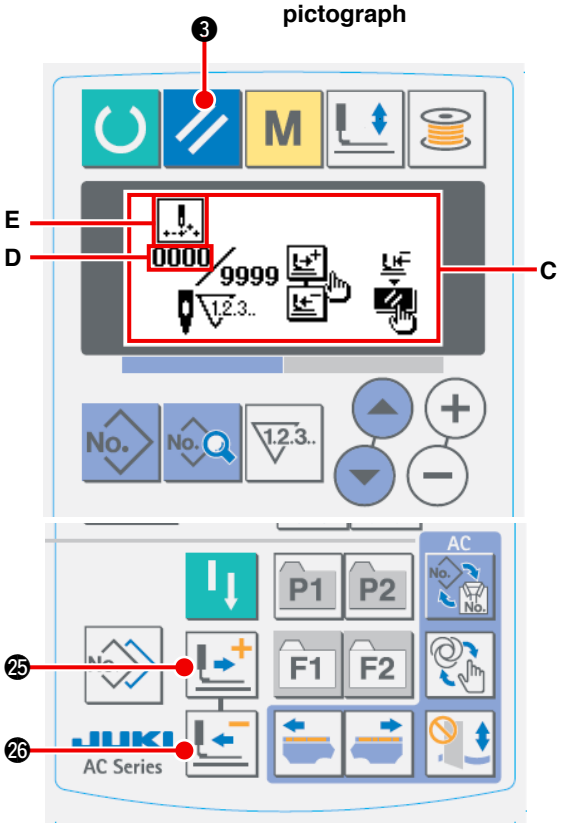
Whip stitch
The whip stitch is formed in zigzag showing the needle thread only on top of fabric, and the bobbin thread on the bottom.

2-4. Performing re-sewing



When stop switch **A** is pressed during sewing operation, the sewing machine interrupts sewing and stops. At this time, error display screen **B** is displayed to inform that the stop switch is pressed.





* **Existing number of stitches/total number of stitches are displayed in section D.**

* **Existing sewing command is displayed in section E.**

Kinds of commands are :

Sewing command

Jump feed command

Thread trimmer command

Knife command

[To continue performing sewing from some point in sewing]

Sewing motion stop status

Error display screen **B** is displayed.

① **Release the error.**

Press RESET key ❸ to release the error.

Then step motion screen **C** is displayed.

② **Return the presser.**

Press BACKWARD key ㉖ and the presser returns stitch by stitch.

Press FORWARD key ㉕ and the presser advances stitch by stitch. Return the presser to the re-sewing position.

③ **Start sewing again.**

When you press the knee switch or hand switch (which is preset as the start switch), the sewing machine re-starts sewing.

[To perform re-sewing from the start]

Sewing motion stop status

Error display screen **B** is displayed.

① **Release the error.**

Press RESET key ❸ to release the error.

Then step motion screen **C** is displayed.

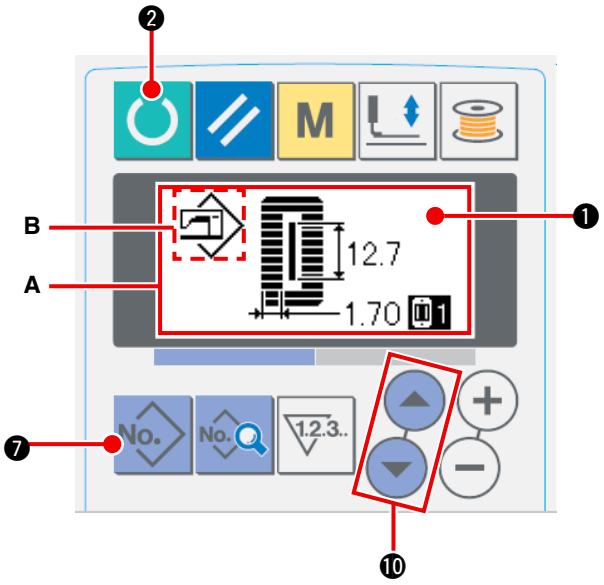
② **Return the presser to the sewing product setting position.**

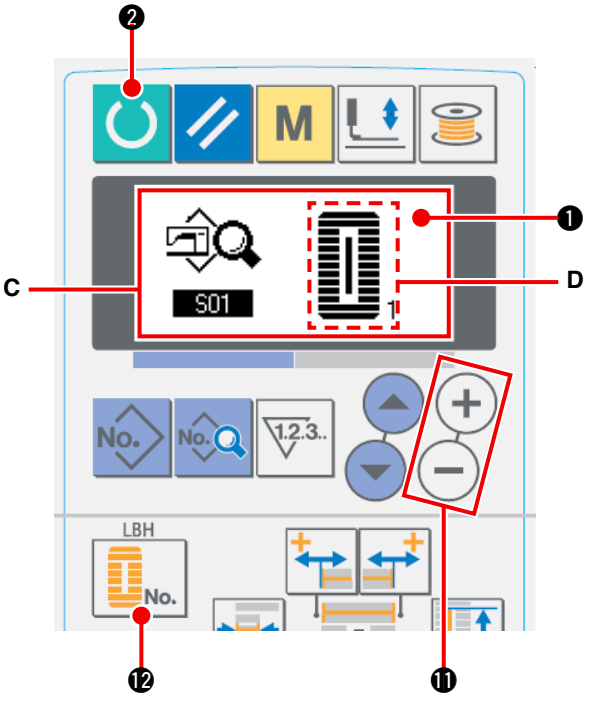
Press again RESET key ❸ and the presser returns to the sewing product setting position.

③ **Perform again the sewing work from the start.**

2-5. Using the initial value pattern

This sewing machine has the initial value to perform the optimum sewing for the sewing shapes (30 shapes).
→ Refer to "Ⅳ. INITIAL VALUE DATA FOR EACH SHAPE TABLE" p.98.
When creating sewing data newly, it is convenient to create it by copying the initial value pattern.





① **Set the mode to the input mode.**

When the back-light of LCD display ❶ shows input mode in blue color, it is possible to change the pattern. When the back-light shows the sewing mode in green color, Press READY key ❷ to change over to the input mode.

② **Call initial value pattern.**

Press PATTERN NO. key ❼, and pattern selection screen **A** is displayed.
Pattern No. **B** which is selected at present flashes on and off on the display. Press ITEM SELECTION key ❿ to select initial value pattern.

③ **Select shape.**

Press SHAPE key ⓬, and shape selection screen **C** is displayed. Shape **D** which is selected at present flashes on and off on the display. Select shape D to sew with DATA CHANGE key ⓫. It is possible to select the shape from among 12 shapes at the time of your purchase. However, it is possible to select the shape from among maximum 30 shapes by increasing the shape selection level (K04).
→ Refer to "Ⅱ-2-15. Method of changing memory switch data" p.77.

④ **Perform trial sewing.**

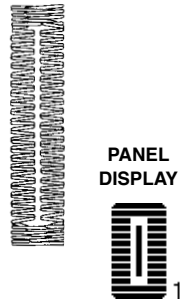
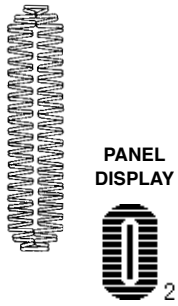
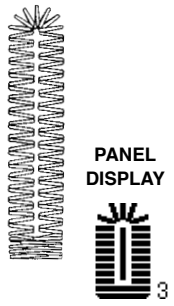
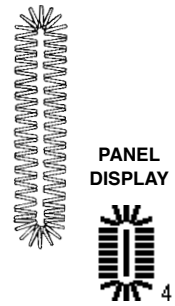
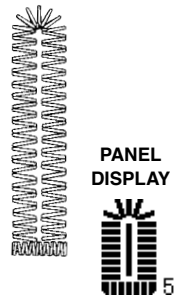
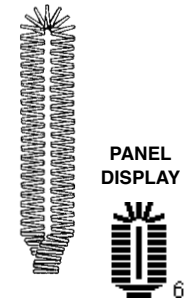
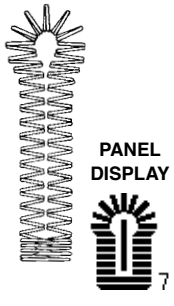
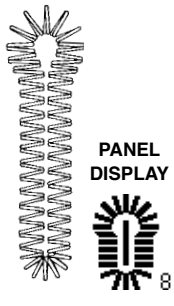
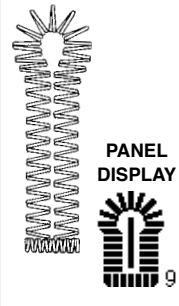
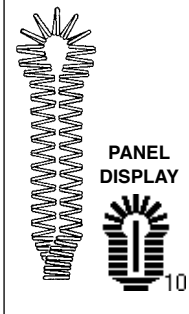
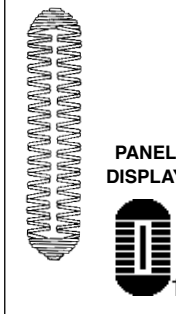
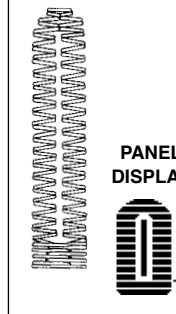
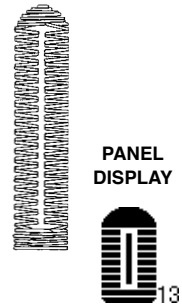
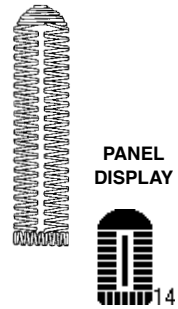
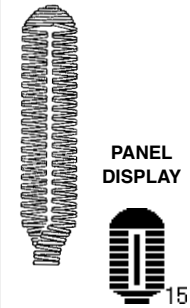
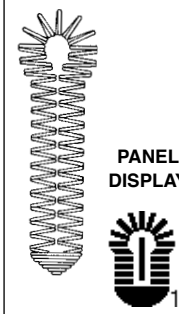
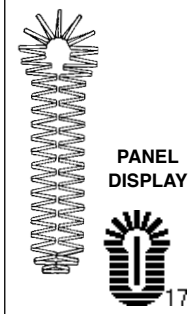
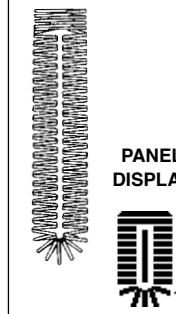
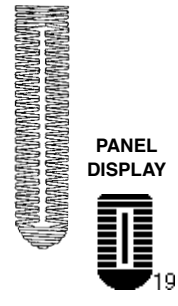
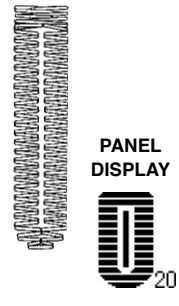
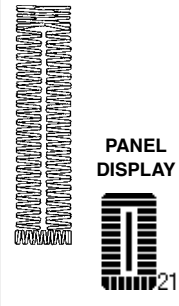
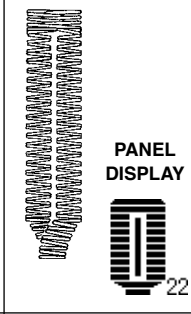
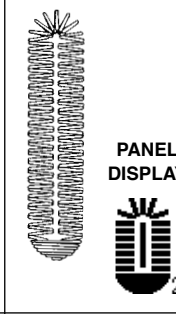
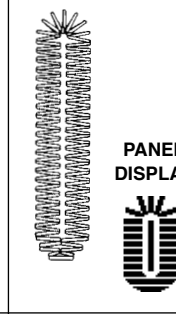
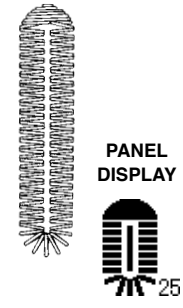
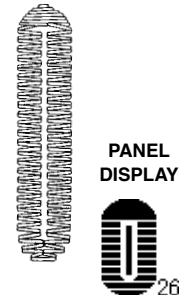
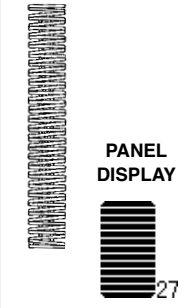
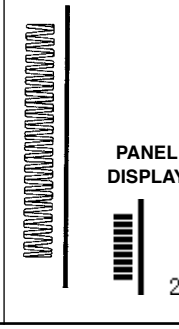
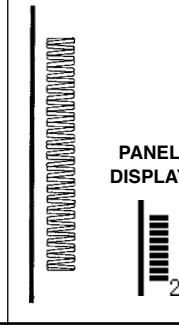
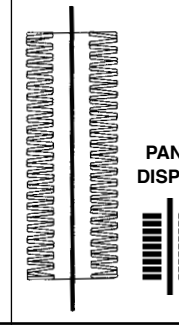
Press READY key ❷ to set the mode to the sewing mode (back-light of LCD display ❶ is green). Then it is possible to perform sewing and the selected shape can be sewn.

* Initial value pattern can edit the needle thread tension data only. However, it returns to the initial value when changing the shape or performing re-call of the pattern. So, be careful.

⑤ **Copy initial value pattern.**

Copy the pattern which has been selected and confirmed through the steps above to the normal pattern and use it.
Copying procedure → Refer to "Ⅱ-2-10. Copying sewing pattern" p.71.

2-6. Standard sewing shape list

(1) Square type	(2) Round type	(3) Radial square type	(4) Radial type	(5) Radial straight bar-tacking type	(6) Radial taper bar-tacking type
					
(7) Eyelet square type	(8) Eyelet radial type	(9) Eyelet straight bar-tacking type	(10) Eyelet taper bar-tacking type	(11) Semilunar type	(12) Round square type
					
(13) Semilunar square type	(14) Semilunar straight bar-tacking type	(15) Semilunar taper bar-tacking type	(16) Eyelet semilunar type	(17) Eyelet round type	(18) Square radial type
					
(19) Square semilunar type	(20) Square round type	(21) Square straight bar-tacking type	(22) Square taper bar-tacking type	(23) Radial semilunar type	(24) Radial round type
					
(25) Semilunar radial type	(26) Semilunar round type	(27) Bar-tacking	(28) Bar-tacking, right cut	(29) Bar-tacking, left cut	(30) Bar-tacking, center cut
					

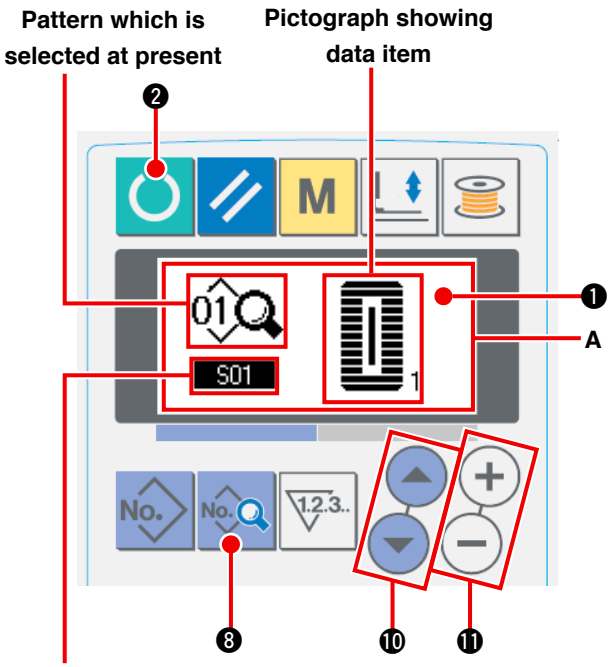
2-7. Changing sewing data

(1) Initial sewing data at the time of your purchase

Patterns from 1 to 10 have been already registered at the time of your purchase. Initial values of the square type, the cloth cutting length of which only is different from each other, have been inputted in the sewing data. → Refer to "Ⅳ. INITIAL VALUE DATA FOR EACH SHAPE TABLE" p.98.

Pattern No.	Cloth cutting length  S02	
1	6.4mm	(1/4")
2	9.5mm	(3/8")
3	11.1mm	(7/16")
4	12.7mm	(1/2")
5	14.3mm	(9/16")
6	15.9mm	(5/8")
7	17.5mm	(11/16")
8	19.1mm	(3/4")
9	22.2mm	(7/8")
10	25.4mm	(1")

(2) Changing procedure of sewing data



① **Set the mode to the input mode.**

When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to change the sewing mode.
When the back-light of shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call sewing data edit screen.**

Press DATA key ❽, and sewing data edit screen **A** of the pattern No. which is selected at present is displayed.

③ **Select sewing data to be changed.**

Press ITEM SELECTION key ❿, and select the data item you desire to change.
Data item which is not used according to the shape and data item which is set without function are skipped and not displayed. So, be careful.

→ Refer to "Ⅱ-2-8. Method of setting sewing data with/without edit" p.64.

④ **Change data.**

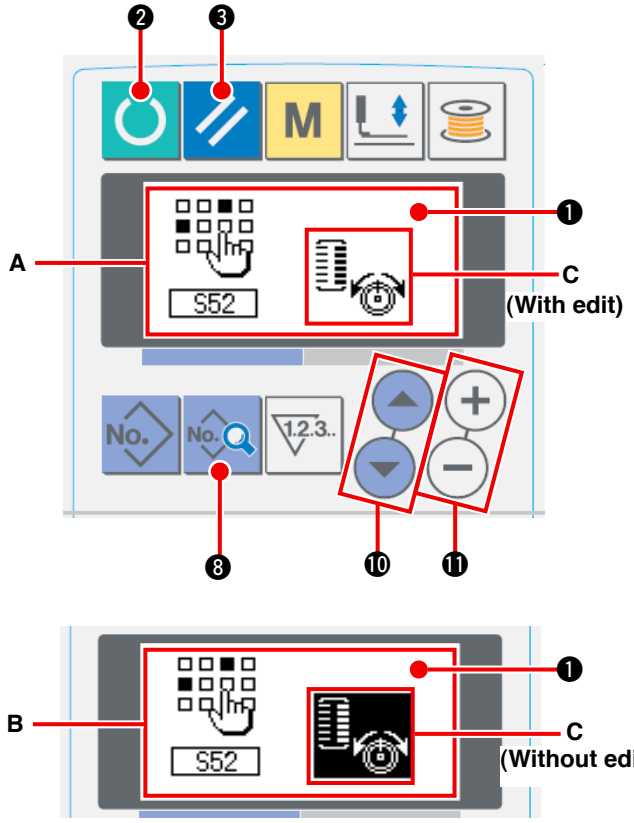
For the sewing data, there are data item which changes numerical value and that which selects pictograph.
No. such as S02 is attached to the data item which changes numerical value. Increase or decrease the set value with DATA CHANGE key ⓫ to change the value.
No. such as S01 is attached to the data item which selects pictograph. Pictograph can be selected with DATA CHANGE key ⓫.

→ For the details of sewing data, refer to "Ⅱ-2-9. Sewing data table" p.65.

2-8. Method of setting sewing data with/without edit

This sewing machine has been set so as not to be capable of editing sewing data items which are less frequently used at the time of your purchase. When you desire to set the data more closely in accordance with the sewing products, set the sewing data item to the edit possible state and use the machine.

* For the setting of sewing data with/without edit, when S52, right parallel section tension is set to without edit, sewing is performed with the data of S51 left parallel section tension. When S56, 2nd bar-tacking tension is set to without edit, sewing is performed with the data of S55, 1st bar-tacking section.
When the sewing data items other than the above ones are set to without edit, the data to be referred are the initial value data.



① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to set. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call sewing data with/without edit change-over screen.**
Press DATA key ❽ for as long as three seconds, and data with/without edit changeover screen **A** or **B** is displayed.

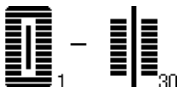
③ **Select sewing data you desire to change over.**
Press ITEM SELECTION key ❿, and select sewing data item **C** you desire to change over.
At this time, changeover possible item only can be selected.

④ **Changeover of with/without edit**
Press DATA CHANGE key ⓫, and pictograph display C of sewing data repeats reverse/non-reverse.
Non-reverse display : With edit
Reverse display : Without edit
Return to step ③, and plural sewing data items can be changed over.

⑤ **Save data which have been set.**
Press READY key ❷ , and the data in the state of being changed over can be saved. After two seconds, the screen returns to the former one.
Press RESET key ❸ , and the screen returns to the former one without saving the data.

2-9. Sewing data list

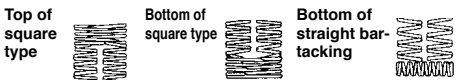
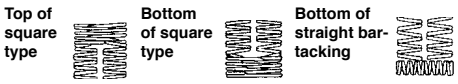
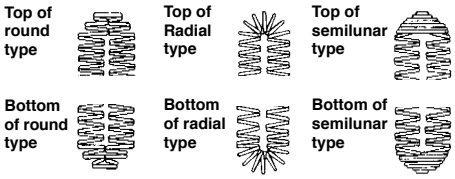
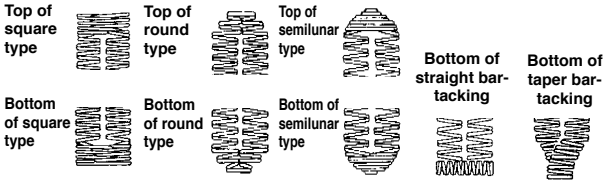
☆ Sewing data are those that can be inputted to 99 patterns from pattern 1 to 99 and can be inputted to each pattern. The sewing machine has been set in the state that the data which is necessary to set “With/without edit” cannot be selected at the time of your purchase. Change over the function to “With edit” if necessary for the use. → Refer to **"Ⅱ-2-8. Method of setting sewing data with/without edit" p.64.**

No.	Item	Setting range	Edit unit	Remarks
S01	**Sewing shape** This item selects the shape from among the sewing shapes of 30 different kinds which the sewing machine has.  **Refer to "Ⅱ-2-6. Standard sewing shape list" p.62.** * Only 12 kinds of standard sewing shapes can be selected at the time of your purchase. When increasing the kinds of shapes, perform setting of K04 Sewing shape selection level of memory switch data. → Refer to **"Ⅱ-2-16. Memory switch data list" p.78"**	1 to 30	1	–
S02	**Cloth cut length** This item sets the length of cloth that is cut by cloth cutting knife. However, in case of bar-tack shape (Nos. 27, 28, 29, and 30 of S01), sewing length is set. By making effective **U19 Function of plural motions of cloth cutting knife** of memory switch data, make the plural motions of knife by the knife size set in the item **U18 Cloth cutting knife size**, and the sewing product is cut. → Refer to **"Ⅱ-2-16. Memory switch data list" p.78"**	3.0 to 120.0	0.1mm	–
S03	**Knife groove width, right** This item sets the clearance between cloth cutting knife and right parallel section.	–2.00 to 2.00	0.05mm	–
S04	**Knife groove width , left** This item sets the clearance between cloth cutting knife and left parallel section.	–2.00 to 2.00	0.05mm	–
S05	**Overedging width, left** This item sets the overedging width of left parallel section.	0.10 to 5.00	0.05mm	–
S06	**Ratio of right and left shapes** This item sets enlargement/reduction ratio of right side shape making the knife position as the center.	50 to 150	1%	–
S07	**Pitch at parallel section** This item sets sewing pitch of left and right parallel sections.	0.200 to 2.500	0.025mm	–
S08	**2nd bar-tacking length** This item sets length of bar-tacking on the front side. Bottom of square type / Bottom of straight bar-tacking / Bottom of taper	0.2 to 5.0	0.1mm	–
S09	**1st bar-tacking length** This item sets length of bar-tacking on the rear side. Top of square type	0.2 to 5.0	0.1mm	–

*** 1 : Displayed according to the shape.**

*** 2 : Displayed when it is set to with edit. Refer to "Ⅱ-2-8. Method of setting sewing data with/without edit" p.64.**

*** 3 : Displayed when the function is selected.**

No.	Item	Setting range	Edit unit	Remarks
S10	**Compensation of bar-tacking width, right** This item adjusts right side outer shape of bar-tacking section in terms of overedging section. 	–1.00 to 1.00	0.05mm	–
S11	**Compensation of bar-tacking width, left** This item adjusts left side outer shape of bar-tacking section in terms of overedging section. 	–1.00 to 1.00	0.05mm	–
S12	**Taper bar-tacking offset, left** This item sets length to form bar-tacking section of taper bar-tacking shape.	0.00 to 3.00	0.05mm	***1**
S13	**Taper bar-tacking offset, right** This item sets length to form bar-tacking section of taper bar-tacking shape.	0.00 to 3.00	0.05mm	***1**
S14	**Eyelet shape length** This item sets upper side length from center of eyelet of eyelet shape.	1.0 to 10.0	0.1mm	***1**
S15	**Number of stitches of eyelet shape** This item sets number of stitches in the upper 90˚ of eyelet shape.	1 to 8	1	***1**
S16	**Eyelet width** This item sets crossuise size of the inside of eyelet shape. Actual needle entry point is the dimension to which **S04 Knife groove width, left** is added.	1.0 to 10.0	0.1mm	***1**
S17	**Eyelet length** This item sets lengthwise size of the inside of eyelet shape.	1.0 to 10.0	0.1mm	***1**
S18	**Round type shape length** This item sets upper length from the center of round type shape. 	1.0 to 5.0	0.1mm	***1**
S19	**Number of stitches of radial shape** This item sets number of stitches in the upper 90˚ of radial shape.	1 to 8	1	***1**
S20	**Reinforcement of radial shape** This item sets with/without reinforcement stitching of radial shape. 	–	–	***1, *2**
S21	**Pitch at bar-tacking section** This item sets sewing pitch of bar-tacking section. 	0.200 to 2.500	0.025mm	–

No.	Item	Setting range	Edit unit	Remarks
S22	**1st clearance** This item sets the clearance between 1st bar-tacking and knife groove. This item is applied to all shapes. 	0.0 to 4.0	0.1mm	-
S23	**2nd clearance** This item sets the clearance between 2nd bar-tacking and knife groove. This item is applied to all shapes. 	0.0 to 4.0	0.1mm	-
S31	**Single/double stitching** This item selects single or double stitching.  **: Single stitching**  **: Double stitching**	-	-	-
S32	**Double stitching cross selection** This item selects overlapping stitching or cross stitching at the needle entry of parallel section when setting double stitching.  **: Double stitching**  **: Cross stitching**	-	-	***3**
S33	**Compensation of double stitching width** This item sets amount to narrow overedging width of 1st cycle when setting double stitching. 	0.0 to 2.0	0.1mm	***3**
S34	**Number of times of basting** This item sets number of times of basting.  **: Without basting**  **: With basting (Setting of number of times)**	0 to 9	1 time	-
S35	**Basting pitch** This item sets pitch at the time of performing basting. 	1.0 to 5.0	0.1mm	***3**
S36	**Rolling length of basting** This item sets rolling length of needle thread when performing basting. 	2.0 to 20.0	0.1mm	***3**
S37	**Rolling pitch of basting** This item sets rolling pitch of needle thread when performing basting. 	0.2 to 5.0	0.1mm	***3**
S38	**Rolling width of basting** This item sets rolling width of needle thread when performing basting. 	0.0 to 4.0	0.1mm	***3**
S39	**Lengthwise compensation of needle entry of basting** This item sets the amount to move needle entry position back and forth when performing basting more than two cycles. 	0.0 to 2.5	0.1mm	***2, *3**
S40	**Crosswise compensation of needle entry of basting** This item sets the amount to move needle entry position to the right or left when performing basting more than two cycles. 	0.0 to 1.0	0.1mm	***3**
S41	**Compensation of left side position of basting** This item sets the amount to move the sewing reference position of basting from the center of left overedging to the right or left. 	– 2.0 to 2.0	0.1mm	***2, *3**
S42	**Compensation of right side position of basting** This item sets the amount to move the sewing reference position of basting from the center of right overedging to the right or left. 	– 2.0 to 2.0	0.1mm	***2, *3**

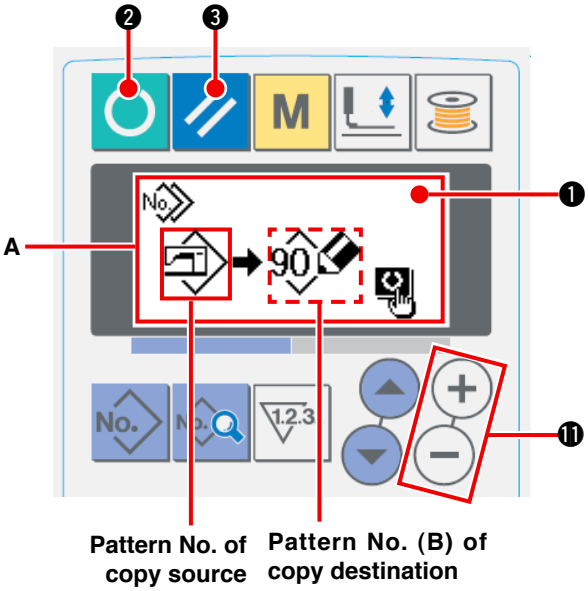
No.	Item	Setting range	Edit unit	Remarks
S44	**Speed setting of basting** This item sets speed of basting. 	400 to 4200	100sti/min	***3**
S45	**Sewing together function** This item selects the function when performing sewing together first.  **: Without sewing together**  **: With sewing together** When "With sewing together" is selected : Sewing is performed in the order of sewing together → basting → normal sewing.	–	–	–
S46	**Width of sewing together** This item sets sewing width when performing sewing together. 	1.0 to 10.0	0.1mm	***2, *3**
S47	**Pitch of sewing together** This item sets sewing pitch when performing sewing together. 	0.2 to 5.0	0.1mm	***2, *3**
S51	**Left parallel section tension** This item sets needle thread tension at left parallel section. 	0 to 200	1	–
S52	**Right parallel section tension** This item sets needle thread tension at right parallel section. 	0 to 200	1	***2**
S53	**Left parallel section tension (1st cycle of double stitching)** This item sets needle thread tension at left parallel section of 1st cycle at the time of double stitching. 	0 to 200	1	***2, *3**
S54	**Right parallel section tension (1st cycle of double stitching)** This item sets needle thread tension at right parallel section of 1st cycle at the time of double stitching. 	0 to 200	1	***2, *3**
S55	**Tension at 1st bar-tacking section** This item sets needle thread tension at 1st bar-tacking section. 	0 to 200	1	–
S56	**Tension at 2nd bar-tacking section** This item sets needle thread tension at 2nd bar-tacking section. 	0 to 200	1	***2**
S57	**Setting of needle thread tension at the start of sewing** This item sets needle thread tension of tie stitching at the start of sewing. 	0 to 200	1	–
S58	**Setting of needle thread tension of basting** This item sets needle thread tension of basting. 	0 to 200	1	***3**
S59	**ACT timing adjustment at the start of 1st bar-tacking** This item adjusts needle thread tension output start timing at 1st bar-tacking section 	– 5 to 5	1 stitch	***2**

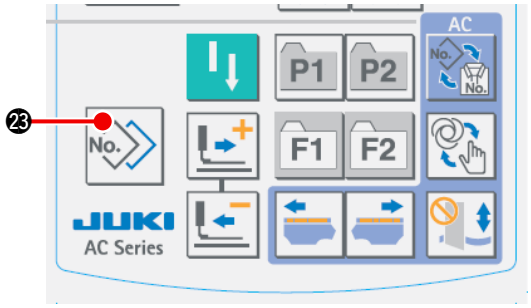
No.	Item	Setting range	Edit unit	Remarks
S60	**ACT timing adjustment at the start of right overedging** This item adjusts needle thread tension output start timing at right overedging section. 	–5 to 5	1 stitch	***2**
S61	**ACT timing adjustment at the start of 2nd bar-tacking** This item adjusts needle thread tension output start timing at 2nd bar-tacking section. 	–5 to 5	1 stitch	***2**
S62	**Number of stitches of tie stitching at the start of sewing** This item sets number of stitches of tie stitching at the start of sewing. 	0 to 8	1 stitch	-
S63	**Sewing pitch of tie stitching at the start of sewing** This item sets sewing pitch of tie stitching at the start of sewing. 	0.00 to 0.70	0.05mm	***2**
S64	**Tie stitching width at the start of sewing** This item sets tie stitching width at the start of sewing. 	0.0 to 3.0	0.1mm	-
S65	**Lengthwise compensation of tie stitching at the start of sewing** This item sets start position of tie stitching in lengthwise direction at the start of sewing. 	0.0 to 5.0	0.1mm	***2**
S66	**Crosswise compensation of tie stitching at the start of sewing** This item sets start position of tie stitching in crosswise direction at the start of sewing. 	0.0 to 2.0	0.1mm	***2**
S67	**Tie stitching width at the end of sewing** This item sets tie stitching width at the end of sewing. 	0.1 to 1.5	0.1mm	-
S68	**Number of stitches of tie stitching at the end of sewing** This item sets number of stitches of tie stitching at the end of sewing. 	0 to 8	1	-
S69	**Lengthwise compensation of tie stitching at the end of sewing** This item sets start position of tie stitching in lengthwise direction at the end of sewing. 	0.0 to 5.0	0.1mm	***2**
S70	**Crosswise compensation of tie stitching at the end of sewing** This item sets start position of tie stitching in crosswise direction at the end of sewing. 	0.0 to 2.0	0.1mm	***2**
S81	**Knife motion** This item sets "With/without motion" of normal cloth cutting knife.  **: Normal knife motion OFF**  **: Normal knife motion ON**	-	-	-
S83	**Knife motion at 1st cycle of double stitching** This item sets "With/without motion" of cloth cutting knife at 1st cycle when double stitching is performed.  **: Normal knife motion OFF**  **: Normal knife motion ON**	-	-	***2, *3**

No.	Item	Setting range	Edit unit	Remarks
S84	**Maximum speed limitation** This item sets max. speed limitation of the sewing machine. The maximum value of data edit is equal to the number of revolutions of **K07 Maximum speed limitation** of the memory switch data. → "Ⅱ-2-16. Memory switch data list" p.78" 	400 to 4200	100sti/min	-
S86	**Pitch of going** This item sets sewing pitch of going side of bar-tacking shape (Shape Nos. 27, 28, 29 and 30 of S01). 	0.200 to 2.500	0.025mm	-
S87	**Width of going** This item sets width of going side of bar-tacking shape (Shape Nos. 27, 28, 29 and 30 of S01). 	0.1 to 3.0	0.05mm	-
S88	**Pitch of coming** This item sets sewing pitch of coming side of bar-tacking shape (Shape Nos. 27, 28, 29 and 30 of S01). 	0.200 to 2.500	0.025mm	-
S89	**Width of coming** This item sets width of coming side of bar-tacking shape (Shape Nos. 27, 28, 29 and 30 of S01). 	0.1 to 3.0	0.05mm	-

2-10. Copying sewing pattern

Data of pattern No. which has been already registered can be copied to pattern No. which has not been used. Overwriting copy of the pattern is prohibited. When you desire to overwrite, perform it after erasing the pattern once.





① **Set the mode to input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to copy. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Select pattern No. of copy source.**
Select pattern No. of copy source from the pattern selection screen.
→ Refer to **"Ⅱ-2-2. Performing pattern selection" p.58**.
When creating pattern data quite newly. it is convenient to copy the initial value pattern.
→ Refer to **"Ⅱ-2-5. Using initial value pattern" p.61**.

③ **Call copy screen.**
Press COPY key ㉓ , and copy screen **A** is displayed.

④ **Select pattern No. of copy destination.**
Pattern No. **B** which is not used flashes on and off in the display. Press DATA CHANGE key ⓫, and select the No. you desire to copy.
When you desire to erase the pattern, select the garbage can.

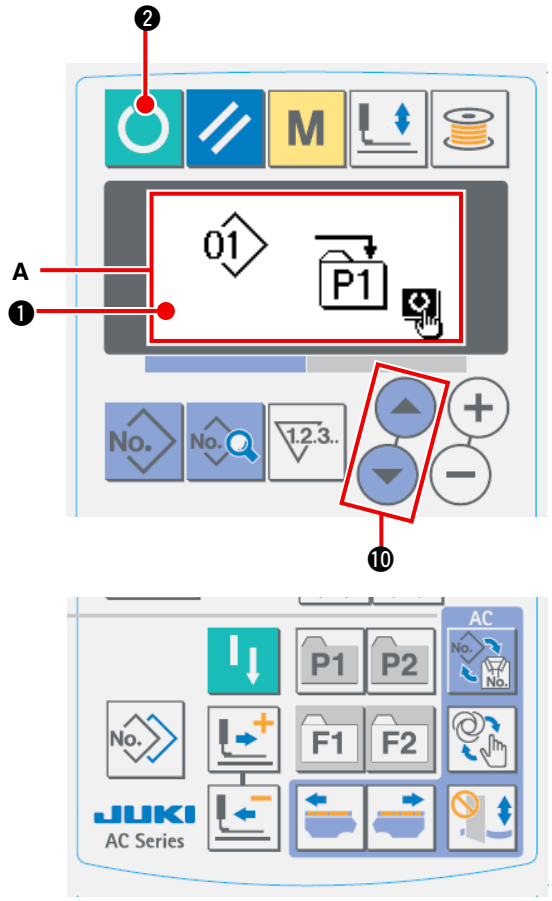
⑤ **Start copying.**
Press READY key ❷ to start copying.
After two seconds, the pattern No. which is created by copying returns to the input screen in the state of being selected.
Press RESET key ❸, and the screen returns to the former one without copying.

* **In addition, cycle data and continuous stitching data can be copied by the same method.**

2-11. Using pattern register key

Register pattern Nos. which are frequently used with the pattern register key and use them.
Patterns which have been registered can be selected by pressing only the pattern register key under the input mode.

(1) Method of register



① **Set the mode to the input mode.**

When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to register patterns.
When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call pattern register screen.**

Press key (P1 and P2) P1 to P2 ㉗ which you desire to register pattern No. for as long as 3 seconds, and pattern register screen **A** is displayed.

③ **Select pattern No.**

Pattern No. **B** which can be used at present flashes on and off in the display. Press ITEM SELECTION key ❿, and select the pattern No. you desire to register.
When trash can is selected, register can be released.

④ **Start register.**

Press READY key ❷ to start register and the screen returns to the input screen after two seconds.
Press RESET key ❸ , and the screen returns to the former one without registering.

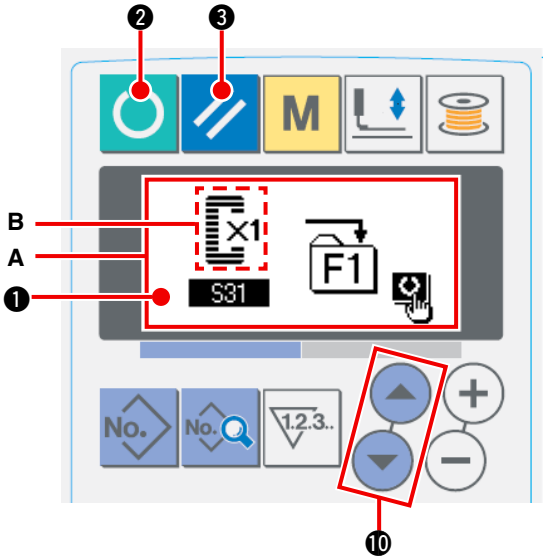
(2) Register status at the time of your purchase

Register key	Registered pattern No.
P1	Pattern No. 1
P2	Pattern No. 2

2-12. Using parameter register key

Register parameters which are frequently used with parameter register key and use them. Parameters which have been registered can be selected by pressing only the parameter register key under the input mode. In addition, this key can use the same method as that of "Ⅱ-2-11. Using pattern register key" p.72 since this key can register not only the parameters but also pattern Nos.

(1) Method of register



① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to register parameters. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call parameter register screen.**
Press key (F1 and F2) F1 to F2 ㉘ which you desire to register the parameter for as long as 3 seconds, and parameter register screen **A** is displayed.

③ **Select parameter.**
Item **B** which can be registered with the key flashes on and off. Press ITEM SELECTION key ❿ to select the item you desire to register. Items which can be registered are sewing data, parameters of memory switches (level 1) and pattern Nos.
In addition, when trash can is selected, register can be released.

④ **Start register.**
Press READY key ❷ to start register and the screen returns to the input screen after two seconds.
Press RESET key ❸ , and the screen returns to the former one without registering.

(2) Register status at the time of your purchase

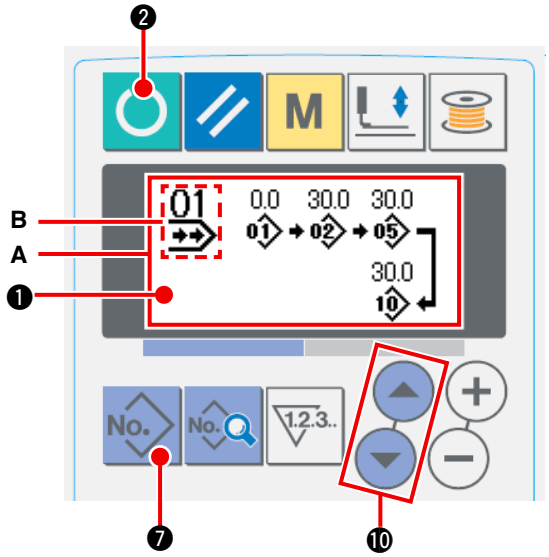
Register key	Registered parameter
F1	Changeover of single/double stitching X1 S01
F2	Basting (off/number of times) S34

2-13. Performing continuous stitching

This sewing machine can perform continuous stitching which is capable of continuously sewing plural sewing pattern data without lifting the presser foot. It is possible to automatically sew up to maximum 6 shapes in one cycle.
In addition, registration of as many as 20 data can be performed. Copy and use the data to fill the needs.
→ Refer to **"Ⅱ-2-10. Copying sewing pattern" p.71".**

*** It is necessary to change the parts from the state at tht time of your purchase according to the setting conditions.**

(1) Selection of continuous stitching data



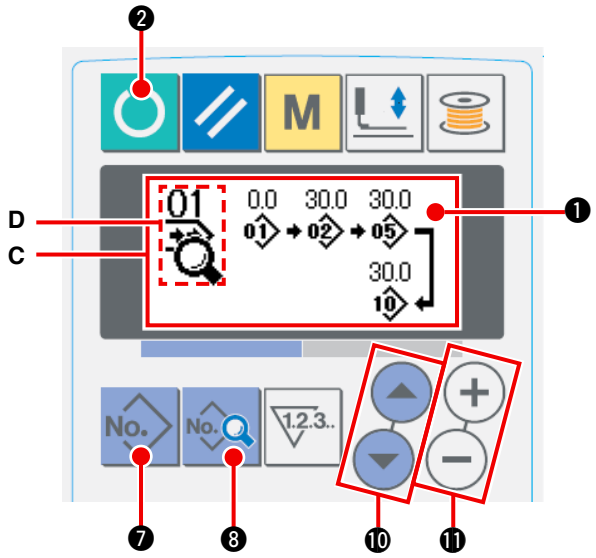
① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to select continuous stitching data. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call pattern selection screen.**
Press PATTERN NO. key ❼, and pattern selection screen **A** is displayed.
Pattern No. **B** which is selected at present flashes on and off.

③ **Select continuous stitching.**
Press ITEM SELECTION key ❿, and patterns which have been registered are changed over and displayed in order. Cycle data No. and continuous stitching data No. which have been registered after the last registered pattern No. are displayed. Here, select the continuous stitching data No. which you desire to sew.

④ **Perform sewing.**
Press READY key ❷ in the state that continuous stitching data is selected, and the back-light of LCD display ❶ shows green and it is possible to sew. Continuous stitching data No. 1 only has been registered at the time of your purchase. However, sewing status cannot be obtained since the sewing pattern has not been inputted. Perform inputting of sewing pattern referring to **"Ⅱ-2-13.(2) Method of editing continuous stitching data" p.75** on the next page.

(2) Method of editing continuous stitching data



① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to select continuous stitching data. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call continuous stitching data No. to edit.**
Press PATTERN No. key ❼ to call pattern selection screen **A**, and pattern No. **B** which is selected at present flashes on and off. Press ITEM SELECTION key ❿ , and patterns which have been registered are changed over and displayed in order. Cycle data No. and continuous stitching data No. which have been registered after the last pattern No. are displayed. Here, select the continuous stitching No. which you desire to sew.

③ **Set continuous stitching data to editing status.**
Press DATA key ❽ , and continuous stitching data editing display **C** appears. Pattern No. **D** which is sewn first flashes on and off. In this state, it is possible to edit the data.

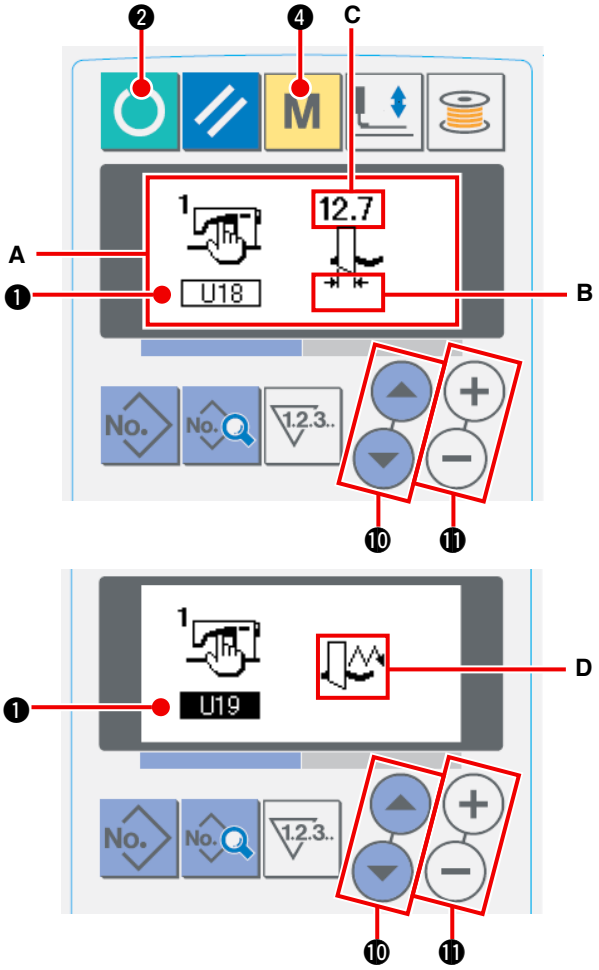
④ **Select editing point.**
Press ITEM SELECTION key ❿, and editing point moves in order of "pattern No. → jump feed mount → pattern No. → jump feed amount" and flashes on and off. When moving the editing point up to the last data, additional indication pictograph is displayed.

⑤ **Change data of selected editing point.**
Press DATA CHANGE key ⓫, and data of editing point can be changed.
When the editing point is at the pattern No. :
Pattern No. which has been registered is displayed and it is possible to select.
When the editing point is at the jump feed :
It is possible to edit numerical value within the range of ±120 mm. In addition, press RESET key ❸ and the pattern data of editing point can be deleted.
Repeat steps ④ and ⑤ to perform editing data.

* **Input is completed by the steps above. For the continuous stitching, however, input all data within the range of the presser size. Error message will be shown when the data exceeds the range. Be sure to precisely input the presser size.**
→ **Refer to "Ⅱ-2-1. Input of the presser type" p.57.**

2-14. Setting procedure of plural motions of knife

This sewing machine can automatically actuate the knife plural times and sew a buttonhole larger than the size of knife by setting the size of knife attached from the operation panel. Set and use this function when sewing various sewing shapes without replacing the knife.



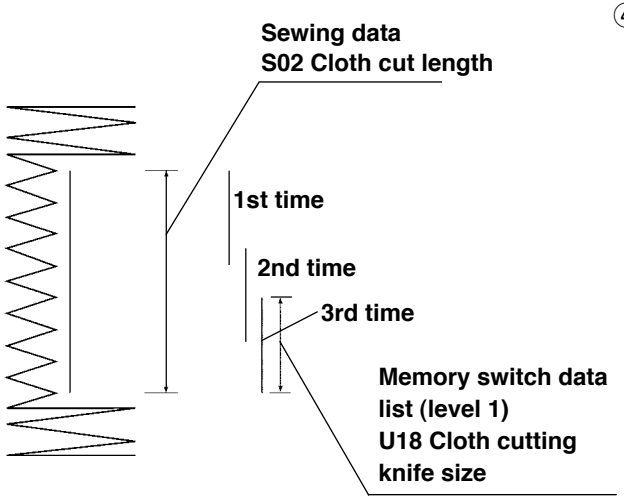
① **Set the mode to the input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to edit the memory switch data. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Input the size of cloth cutting knife**
Press MODE key M ❹ to display memory switch data (level 1) edit screen **A**. Press ITEM SELECTION key ❿ to call U18 Cloth cutting knife size **B**. Then set size **C** of knife attached with DATA CHANGE key ⓫. => For the details, refer to **" Ⅱ-2-16. Memory switch data list" p.78**.

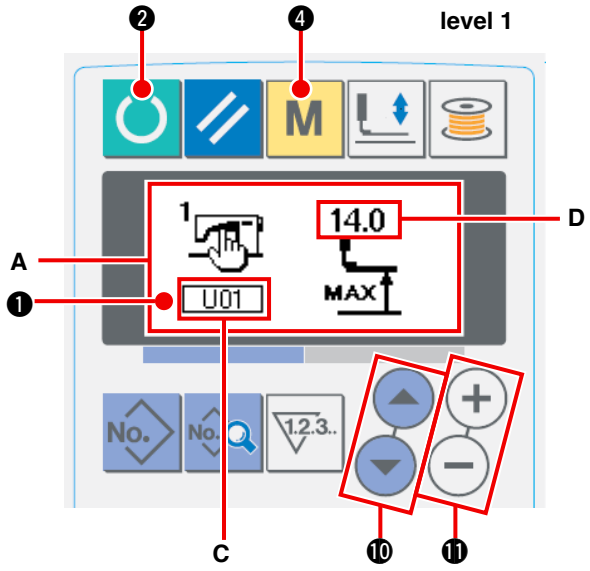
③ **Set the function of the plural motions of cloth cutting knife to effective.**
Next, press again ITEM SELECTION key ❿ to call U19 Function of the plural motions of cloth cutting knife **D** . Then set the plural motions of cloth cutting knife to the effective status with DATA CHANGE key ⓫ . For the details, refer to **" Ⅱ-2-16. Memory switch data list" p.78**.

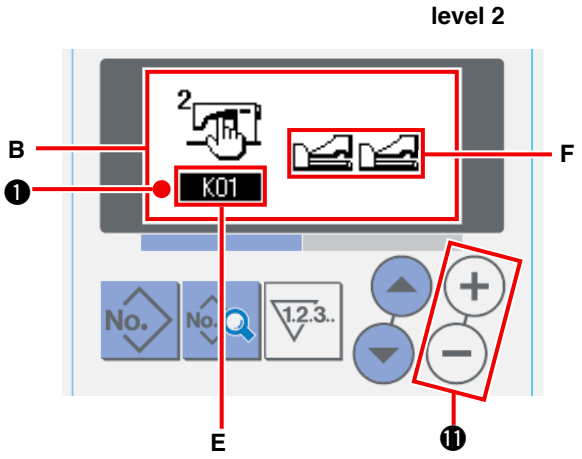
④ **Perform sewing.**
Press READY key ❷ , and the back-light of LCD display ❶ becomes green. Then it is possible to sew. At this time, when S02 Cloth cutting length is set to a size larger than U18 Cloth cutting knife size which has been set above, the plural motions of knife is automatically performed for sewing.

* If a buttonhole smaller than the size of knife attached is desired to be sewn, error 489 will be displayed.



2-15. Method of changing memory switch data





① **Set the mode to input mode.**
When the back-light of LCD display ❶ shows the input mode in blue color, it is possible to change the memory switch data. When the back-light shows the sewing mode in green color, press READY key ❷ to change over to the input mode.

② **Call memory switch data edit screen.**
Press MODE key M ❹ , and memory switch data (level 1) edit screen **A** is displayed.
Further hold pressing the key for 3 seconds, and memory switch data (level 2) edit screen **B** is displayed.

③ **Select memory switch data to change.**
Press ITEM SELECTION key ❿ and select the data item which you desire to change.

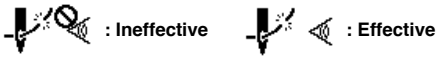
④ **Change data.**
There are one data item to change the numerical value and the other data item to select the pictograph in the memory switch data.
No. **C** such as U01 is attached to the data item to change the numerical value. Set value **D** can be changed by increasing/decreasing the value with DATA CHANGE key ⓫.
No. **E** such as K01 is attached to the data item to select the pictograph. Pictograph **F** can be selected with DATA CHANGE key ⓫.

→ For the details of memory switch data, refer to Ⅱ-2-16. Memory switch data list" p.78.

2-16. Memory switch data list

(1) Level 1

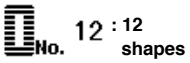
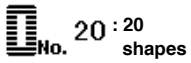
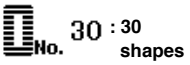
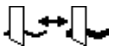
☆ Memory switch data (level 1) are the motion data that the sewing machine has in common and the data that operate on all sewing patterns in common.

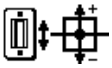
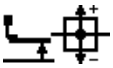
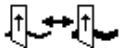
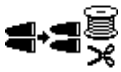
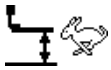
No.	Item	Setting range	Edit unit	Initial value
U01	**Presser lifter maximum position**  Height of maximum position of pedal operation is set.	0 to 17.0	0.1mm	14.0mm
U02	**Presser lifter intermediate position**  Height of intermediate position of pedal operation is set.	0 to 14.0	0.1mm	6.0mm
U03	**Presser lifter cloth setting position**  Height of cloth setting position of pedal operation is set.	0 to 14.0	0.1mm	0.0mm
U06	**Needle thread tension at sewing end setting** 	0 to 200	1	35
U07	**Needle thread tension at thread trimming setting** 	0 to 200	1	35
U08	**Needle thread tension of basting for sewing together setting** 	0 to 200	1	60
U09	**Soft-start speed setting 1st stitch** 	400 to 4200	100sti/min	800sti/min
U10	**Soft-start speed setting 2nd stitch** 	400 to 4200	100sti/min	800sti/min
U11	**Soft-start speed setting 3rd stitch** 	400 to 4200	100sti/min	2000sti/min
U12	**Soft-start speed setting 4th stitch** 	400 to 4200	100sti/min	3000sti/min
U13	**Soft-start speed setting 5th stitch** 	400 to 4200	100sti/min	4000sti/min
U14	**Kind of presser** Set the kind of the presser. → **"Ⅱ-2-1. Input of the presser type" p.57**. 	-	-	Type 1
U15	**Presser size width**  When type 5 of U14 Kind of presser is set, input the width of the presser.	3.0 to 10.0	0.1mm	3.0mm
U16	**Presser size length**  When type 5 of U14 Kind of presser is set, input the length of the presser.	10.0 to 120.0	0.5mm	10.0mm
U17	**Sewing start position (Feed direction)**  Sewing start position in terms of presser is set. Set this item when starting position is desired to be shifted due to overlapped section or the like.	2.5 to 110.0	0.1mm	2.5mm
U18	**Cloth cutting knife size**  Input knife size used.	3.0 to 32.0	0.1mm	32.0mm
U19	**Function of plural motions of cloth cutting knife Ineffective/effective** 	-	-	Ineffective
U20	**Function of thread breakage detection Ineffective/effective** 	-	-	Effective

No.	Item	Setting range	Edit unit	Initial value
U21	**Selection of presser position at the time of ON of READY key (Up/Down)** Presser foot position when READY key is pressed is set.  **: Presser up**  **: Presser down**	-	-	Presser Up
U22	**Selection of the position of presser foot at the time of the end of sewing (Up/Down)** This item sets the position of presser foot at the time of the end of sewing. (Effective only at the time of 1-pedal setting.)  **: Presser up**  **: Presser down**	-	-	Presser Up
U23	**Needle thread trimming motion start distance** Distance from the start of sewing to the start of needle thread trimmer release motion is inputted. 	0 to 15.0	0.1mm	1.0mm
U24	**Bobbin thread trimming motion start distance** Distance from the start of sewing to the start of bobbin thread trimmer release motion is inputted. 	0 to 15.0	0.1mm	1.5mm
U25	**Counter updating unit** Unit to update sewing counter is set. 	1 to 30	1	1
U26	**Total number of stitches Non-display/Display**  **: Non-display**  **: Display**	-	-	Non-display
U51	**Start switch selection**  **: Knee switch**  **: Hand switch**	-	-	Knee switch
U52	**Material presence/absence detection**  **: Not detected**  **: Detected**	-	-	Detected
U53	**Jump function selection**  **: Jump is not performed**  **: Jump is performed**	-	-	Jump is not performed
U54	**Pair-stacking usage setting**  **: Not selectable**  **: Selectable**	-	-	Not selectable

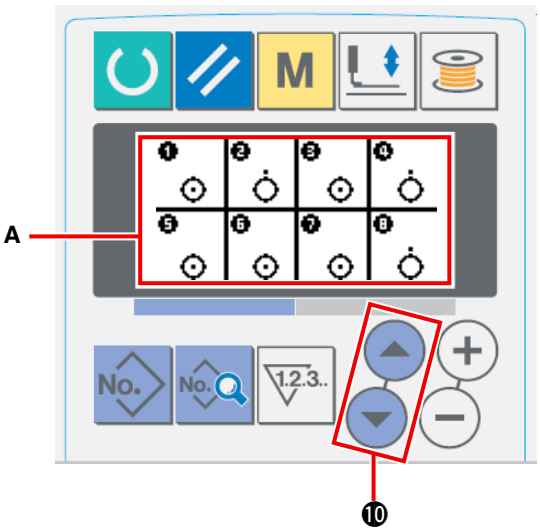
(2) Level 2

☆ Press MODE switch for as long as three seconds and it is possible to edit.

No.	Item	Setting range	Edit unit	Initial value
K02	**Parameter setting change Permitted/Prohibited** Prohibition of change of sewing data and memory switch data is set.  : Change permitted  : Change prohibited	–	–	Change permitted
K03	**Function of prohibition of selection of kind of presser Permitted/Prohibited** Prohibition of change of U14 Kind of presser is set.  : Change permitted  : Change prohibited	–	–	Change permitted
K04	**Sewing shape selection level** Number of sewing shapes which can be sewn can be increased. (Max. 30 shapes)  : 12 shapes  : 20 shapes  : 30 shapes	–	–	12 shapes
K05	**Cloth cutting knife power**  Output power of cloth cutting knife is set. 0 : Min. power → 3 : Max. power	0 to 3	1	1
K06	**Selection of machine type**  Type of sewing machine head is set. 0 : Standard type 1 : Dry head type	0 to 1	1	0 (Standard type)
K07	**Max. speed limitation speed setting**  Max. speed of sewing machine can be limited. When K06 Selection of machine type is set to dry head type, max. speed is automatically limited to 3,300 sti/min.	400 to 4200	100sti/min	3600sti/min
K08	**Compensation of unsteady needle thread tension**  Output value of needle thread tension is wholly offset and compensated.	–30 to 30	1	0
K09	**Output time of needle thread tension changed value** When data related to needle thread tension is changed, the changed value is output as long as the set-up time.  : Without output  : Output of set-up time	0 to 20	1s	0s
K10	**Function of origin retrieval each time** Origin retrieval is performed after completion of sewing or completion of cycle.  : Without  : After end of sewing  : After end of cycle	–	–	Without
K11	**Needle up by reverse run Permitted/Prohibited** When U01 Presser lifter maximum position is set to 14.0 mm or more, motion of needle up by reverse run is automatically performed and the machine stops. Prohibition of the motion can be set.  : Needle up by reverse run prohibited  : Needle up by reverse run permitted	–	–	Permitted
K12	**Knife solenoid lowering time setting** 	25 to 100	5ms	35
K13	**Knife solenoid lifting time setting** 	5 to 100	5ms	15

No.	Item	Setting range	Edit unit	Initial value
K14	**Knife cylinder lowering time (Optional)** 	5 to 300	5ms	50
K15	**Y-feed motor origin compensation** 	–120 to 400	1 pulse (0.025mm)	0
K16	**Needle-rocking motor origin compensation** 	–10 to 10	1 pulse (0.05mm)	0
K17	**Presser lifter motor origin compensation** 	–100 to 10	1 pulse (0.05mm)	0
K18	**Pattern selection function under sewing mode Ineffective/effective**  **: Ineffective**  **: Effective**	–	–	Ineffective
K19	**Thread trimming on the way in continuous stitching Permitted/Prohibited**  **: Permitted**  **: Prohibited**	–	–	Permitted
K20	**Cloth cutting knife return power** This item sets output power at the time of returning the cloth cutting knife. 	0 to 3	1	0
K21	**Release amount of bobbin thread trimmer at the start of sewing** This item sets the amount of releasing the bobbin thread trimmer at the start of sewing. 	1 to 15	1 pulse	8
K22	**Presser lifter speed** This item sets presser lifter speed. 	1 to 3	–	2
K23	**Material edge detecting sensor setting**  **: Material edge sensor is disabled**  **: Material edge sensor is enabled**	–	–	Material edge sensor is disabled
K24	**Marking light setting**  **: Marking light is disabled**  **: Marking light is enabled**	–	–	Laser marker is disabled
K25	**Auxiliary clamp setting**  **: Auxiliary clamp is disabled**  **: Auxiliary clamp is enabled**	–	–	Auxiliary clamp is disabled
K26	**Material edge detecting sensor positioning** Adjust the distance between the needle entry point and the location at which the material edge detecting sensor detects the material edge so that the jump amount equals to the set value. 	30.0 to 100.0	0.1 (0.1mm)	65.0
K51	**Needle thread trimming adjustment mode** Needle thread trimming adjustment motion starts with READY key ON. 	–	–	–
K52	**Bobbin thread trimming adjustment mode** Bobbin thread trimming adjustment motion starts with READY key ON. 	–	–	–
K53	**Sensor check mode** Sensor check starts with READY key ON. → Refer to **"K53 Sensor check mode" p.82"** 	–	–	–
K54	**Output check mode** Output check starts with READY key ON. 	–	–	–

[K53 Sensor check mode]



Under the sensor check mode **A**, the following 18 different sensors are displayed.

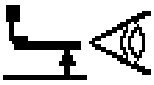
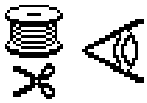
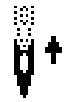
: ON state

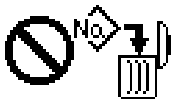
: OFF state

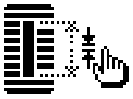
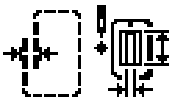
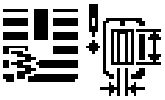
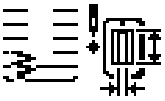
Press ITEM SELECT key ⑩ to display the sensor the state of which is to be checked.

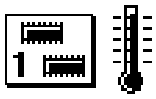
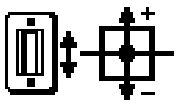
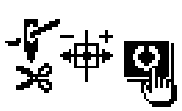
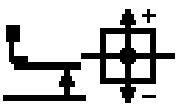
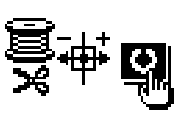
No.	Description of sensor	No.	Description of sensor
①	Thread breakage detection	⑩	Carriage origin sensor
②	Cloth cutting knife sensor	⑪	Carriage retardation position sensor
③	Head tilt sensor	⑫	Preset forward sensor
④	Stop switch (Head side switch)	⑬	Preset backward sensor
⑤	Needle rocking sensor	⑭	Temporary stop switch sensor
⑥	Sewing machine woodruff plate sensor	⑮	Carriage tilt sensor
⑦	Knee switch sensor	⑯	Cloth sweeping sensor
⑧	Hand switch sensor	⑰	No. of pcs. of stacking sensor
⑨	Cloth detection sensor	⑱	Stop switch (AC main body side switch)

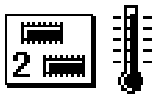
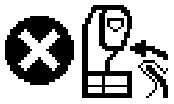
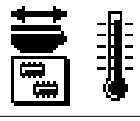
3. ERROR CODE LIST

Error code		Description of error	How to recover	Place of recovery
E001		**Contact of initialization of EEP-ROM of MAIN CONTROL p.c.b.** When data is not written in EEP-ROM or data is broken, data is automatically initialized and the initialization is informed.	Turn OFF the power.	-
E007		**Main shaft motor-lock** When large needle resistance sewing product is sewn	Turn OFF the power.	-
E017	-	**EEP-ROM capacity over** Capacity of EEP-ROM is short.	Possible to re-start after reset.	Previous screen
E018		**Type of EEP-ROM is different.** When the mounted EEP-ROM is different in type.	Turn OFF the power.	Previous screen
E023		**Detection of step-out of presser lifting motor** When step-out of motor is detected at the time when presser lifting motor passes origin sensor or starts operation.	Possible to re-start after reset.	Data input screen
E024		**Pattern data size over** When sewing cannot be performed since total size of continuous stitching data or size of downloaded data is too large.	Possible to re-start after reset.	Data input screen
E025		**Detection of step-out of needle thread trimmer motor** When step-out of motor is detected at the time when needle thread trimmer motor passes origin sensor or starts operation.	Possible to re-start after reset.	Data input screen
E026		**Detection of step-out of bobbin thread trimmer motor** When step-out of motor is detected at the time when bobbin thread trimmer motor passes origin sensor or starts operation.	Possible to re-start after reset.	Data input screen
E030		**Needle bar upper position failure** When needle does not stop at UP position even with needle. UP operation at the time of starting sewing machine.	Possible to re-start after reset.	Data input screen
E042		**Operation error** Operation of sewing data cannot be performed.	Possible to re-start after reset.	Data input screen
E043		**Enlarging error** Sewing pitch exceeds 5 mm.	Possible to re-start after reset.	Data input screen
E050		**Stop switch** When stop switch is pressed during machine running.	Possible to re-start after reset.	Step screen
E052		**Thread breakage detection error** When thread breakage has occurred during machine running.	Possible to re-start after reset.	Step screen

Error code		Description of error	How to recover	Place of recovery
E061		**Memory switch data error** When memory switch data is broken or revision is old.	Turn OFF the power.	-
E062		**Sewing data error** When sewing data is broken or revision is old.	Turn OFF the power.	-
E089		**When sewing products are stacked and passing** Remove sewing products.	Possible to re-start after reset.	Automatic sewing screen
E099		**Interference of knife lowering command with thread trimming motion** When inserting position of knife command is improper and knife command interferes with thread trimming motion in case of motion from external data.	Possible to re-start after reset.	Data input screen
E302		**Confirmation of tilt of machine head** When tilt of machine head sensor is OFF.	Possible to re-start after reset.	Data input screen
E303		**Main shaft semilunar plate sensor error** Semilunar plate of sewing machine motor is abnormal.	Turn OFF the power.	-
E304		**Cloth cutting knife sensor error** When knife is held lowered or sensor is not OFF when knife is lowered.	Turn OFF the power.	-
E401		**Copy disapproval error** When trying to perform copying to the pattern No. which has been registered.	Possible to re-start after pressing cancel button.	Pattern list screen
E402		**Pattern deletion error** When trying to perform deletion in case the remaining pattern No. which has been registered is only one.	Possible to re-start after pressing cancel button.	Pattern list screen
E410		**When sewing counter set value is smaller than the number of times of sewing of the sewing pattern which is selected at present.**	Possible to re-start after reset.	AC data input screen
E478		**Carriage movable range over error, left** Feed amount of sewing pattern is over the movable range of carriage (left side). Set the jump feed amount and sewing length so that the left traveling amount of carriage is within 25 mm.	Possible to re-start after reset.	AC data input screen
E479		**Carriage movable range over error, right** Feed amount of sewing pattern is over the movable range of carriage (right side). Set the jump feed amount and sewing length so that the right traveling amount of carriage is within 610 mm.	Possible to re-start after reset.	AC data input screen
E486		**Eyelet knife length error** When the shape is not formed since the eyelet knife length is too short in case of eyelet shape.	Possible to re-start after reset.	Sewing data input screen [S17]
E487		**Eyelet shape length error** Eyelet shape length is too short to form the shape in case of eyelet shape.	Possible to re-start after reset.	Sewing data input screen [S14]

Error code		Description of error	How to recover	Place of recovery
E488		**Flow bar-tacking compensation error** When bar-tacking length is too short to form the shape in case of flow bar-tacking shape.	Possible to re-start after reset.	Sewing data input screen [S08]
E489		**Knife size error (at the time of plural motions of knife)** When knife size is larger than cloth cutting knife size.	Possible to re-start after reset.	Sewing data input screen [S02]
E492		**Presser size over of basting** When stitching data of basting exceeds presser size.	Possible to re-start after reset.	Sewing data input screen [S40]
E493		**Presser size over of tie stitching at sewing end** When stitching data of tie stitching at sewing end exceeds presser size.	Possible to re-start after reset.	Sewing data input screen [S67]
E494		**Presser size over of tie stitching at sewing start** When stitching data of tie stitching at sewing start exceeds presser size.	Possible to re-start after reset.	Sewing data input screen [S64]
E495		**Presser size error (Width direction : right only)** When stitching data exceeds the size of right only of width direction of presser.	Possible to re-start after reset.	Sewing data input screen [S03] [S06]
E496		**Presser size error (Width direction : left only)** When stitching data exceeds the size of left only of width direction of presser.	Possible to re-start after reset.	Sewing data input screen
E497		**Presser size error (Length direction : front)** When stitching data exceeds the size of front of length direction of presser.	Possible to re-start after reset.	Sewing data input screen
E498		**Presser size error (Width direction : right and left)** When stitching data exceeds the size of both right and left of width direction of presser.	Possible to re-start after reset.	Sewing data input screen [S05]
E499		**Presser size error (Length direction : rear)** When stitching data exceeds the size of rear of length direction of presser.	Possible to re-start after reset.	Sewing data input screen [S02]
E703		**Panel is connected to the machine other than supposed. (Machine type error)** When machine type code of system is improper in case of initial communication.	Possible to rewrite program after pressing down communication switch.	Communication screen
E704		**Nonagreement of system version** When version of system software is improper in case of initial communication.	Possible to rewrite program after pressing down communication switch.	Communication screen
E730		**Main shaft motor encoder defectiveness or phase-out** When encoder of sewing machine motor is abnormal.	Turn OFF the power.	-
E731		**Main motor hole sensor defectiveness or position sensor defectiveness** When hole sensor or position sensor of sewing machine is defective.	Turn OFF the power.	-

Error code		Description of error	How to recover	Place of recovery
E733		**Reverse rotation of main shaft motor** When sewing machine motor rotates in reverse direction.	Turn OFF the power.	-
E801		**Phase-lack of power** When phase-lack of input power occurs.	Turn OFF the power.	-
E802		**Power instantaneous cut detection** When input power is instantaneously OFF.	Turn OFF the power.	-
E811		**Overvoltage** When input voltage is 280V or more.	Turn OFF the power.	-
E813		**Low voltage** When input voltage is 150V or less.	Turn OFF the power.	-
E901		**Abnormality of main shaft motor IPM** When IPM of servo control p.c.b. is abnormal.	Turn OFF the power.	-
E902		**Overcurrent of main shaft motor** When current flows excessively to sewing machine motor.	Turn OFF the power.	-
E903		**Abnormality of stepping motor power** When stepping motor power of servo control p.c.b. fluctuates ±15% or more.	Turn OFF the power.	-
E904		**Abnormality of solenoid power** When solenoid power of servo control p.c.b. fluctuates ± 15% or more.	Turn OFF the power.	-
E905		**Abnormality of temperature of heat sink for servo control p.c.b.** When temperature of heat sink of servo control p.c.b. is 85°C or more.	Turn OFF the power.	-
E907		**Zigzag width motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	-
E908		**Y-feed motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	-
E909		**Needle thread trimmer motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	-
E910		**Presser motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	-
E911		**Bobbin thread trimmer motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Turn OFF the power.	-
E915		**Abnormality of communication between operation panel and main CPU** When abnormality occurs in data communication.	Turn OFF the power.	-

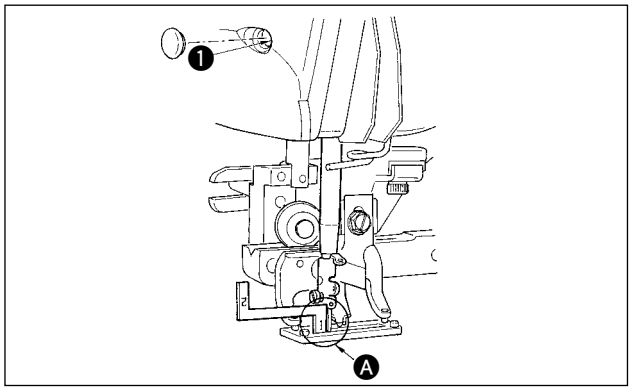
Error code		Description of error	How to recover	Place of recovery
E916		**Abnormality of communication between main CPU and main shaft CPU** When abnormality occurs in data communication.	Turn OFF the power.	-
E917		**Failure of communication between operation panel and personal computer** When abnormality occurs in data communication.	Turn OFF the power.	-
E918		**Abnormality of temperature of heat sink for main control p.c.b.** When temperature of heat sink of main control p.c.b. is 85°C or more.	Turn OFF the power.	-
E943		**Defectiveness of EEP-ROM of main control p.c.b.** When data writing to EEP-ROM is not performed.	Turn OFF the power.	-
E946		**Defectiveness of writing to EEP-ROM of head relay p.c.b.** When data writing to EEP-ROM is not performed.	Turn OFF the power.	-
E948		**Abnormality of F ROM.** When deletion or writing of F ROM is not performed at the time of downloading program.	Turn OFF the power.	-
E983		**When carriage does not pass sensor even when three seconds or more have passed from command to move carriage to machine side.**	Turn OFF the power.	-
E984		**When carriage does not pass sensor even when three seconds or more have passed from command to move carriage to preset side.**	Turn OFF the power.	-
E985		**Preset is not advanced.** Preset is not advanced even when a specified period of time has passed from the preset advance command.	Turn OFF the power.	-
E986		**Preset is not returned.** Preset is not returned even when a specified period of time has passed from the preset return command.	Turn OFF the power.	-
E987		**Motion error of cloth sweeping bar** Cloth sweeping bar does not move to the predetermined position even when a specified period of time has passed from the cloth sweeping bar motion command.	Turn OFF the power.	-
E988		**Carriage origin retrieval error** Pulses beyond the range are output at the time of carriage origin retrieval.	Turn OFF the power.	-
E989		**Carriage motor drive temperature error** Temperature of the carriage motor drive is abnormal.	Turn OFF the power.	-
E999		**When cloth cutting knife does not return** When cloth cutting knife does not return after the lapse of predetermined time.	Turn OFF the power.	-

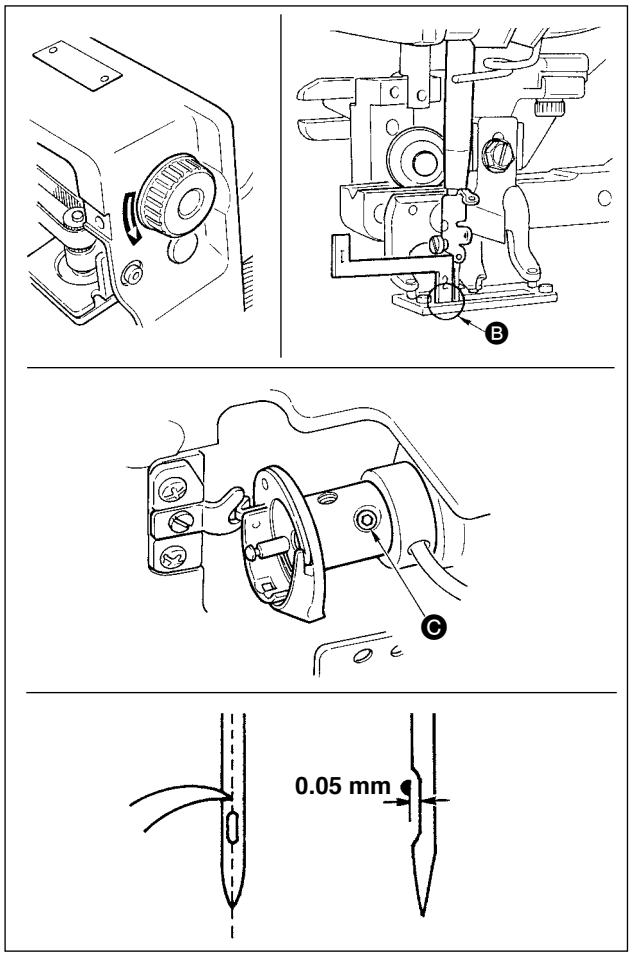
Ⅲ. MAINTENANCE OF SEWING MACHINE

1. MAINTENANCE

1-1. Adjusting the needle-to-hook relation

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.





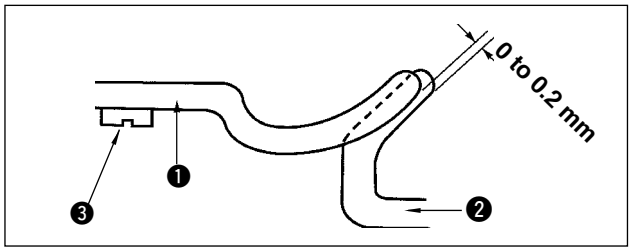
Perform adjusting the needle-to-hook relation when the needle enters the center of the needle hole in the throat plate.

(1) Needle bar height

1) Bring down the needle bar to the lowest point.
2) Insert the part [1] Ⓐ of timing gauge into the gap between the bottom end of needle bar and throat plate, where the bottom end of the needle bar touches the top of the part [1] Ⓐ of the timing gauge.
3) Loosen needle bar connection screw ❶, and adjust the height of the needle bar.

(2) Set the needle to hook relation in the following way

1) Rotate the hand pulley in the correct direction until the needle starts to go up from its lowest point.
2) Insert the part [2]Ⓑ of the timing gauge into the gap between the bottom end of the needle bar and the throat plate, where the bottom end of the needle bar touches the top of the part [2]Ⓑ of the timing gauge.
3) Loosen setscrew Ⓒ of the hook sleeve, and align blade point of the sewing hook with the center of needle hole. Make adjustment so that a clearance of approx. 0.05 mm is provided between the needle and the blade point of the hook.

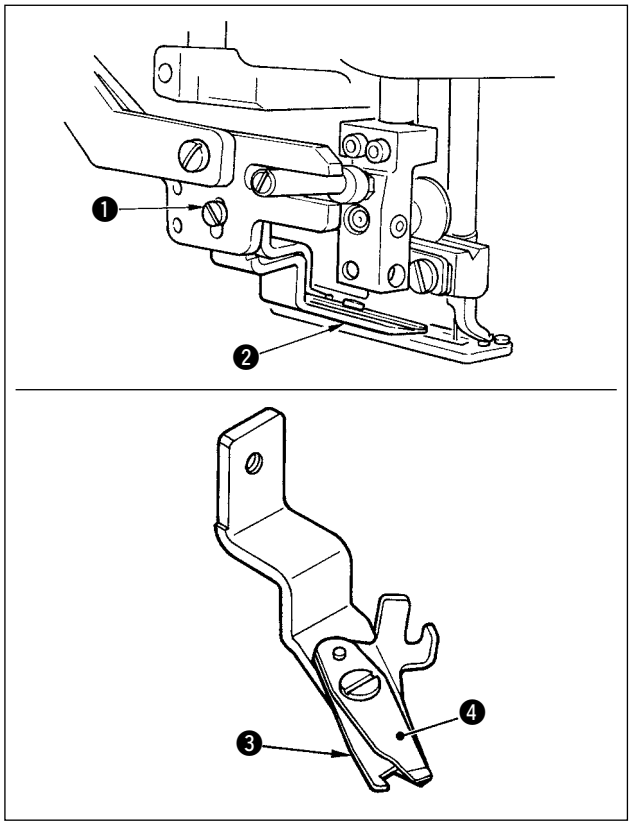


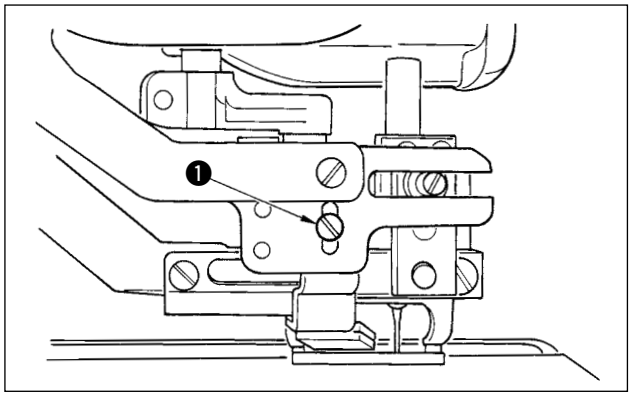
(3) Adjusting the bobbin case positioning stopper

Adjust with setscrew ❸ so that the contact of the top end of bobbin case positioning stopper ❶ and the end of inner hook ❷ is 0 to 0.2 mm.

1-2. Adjusting the needle thread trimmer

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.





■ Adjusting the thread grasping force of the needle thread trimmer

If the needle thread trimmer fails to provide consistent thread grasping force, the needle thread can slip off at the beginning of sewing.

1) If the thread grasping force of the needle thread trimmer has reduced, loosen setscrews ❶ and detach needle thread trimmer ❷.
2) Slightly bend the top end of thread presser spring ❸ so that it comes in contact with thread trimming blade of upper knife ❹ over the length with no clearance and so that the needle thread trimmer securely holds the thread regardless of the position of the thread trimming blade at which the thread is trimmed.

■ Adjusting the height of the needle thread trimmer

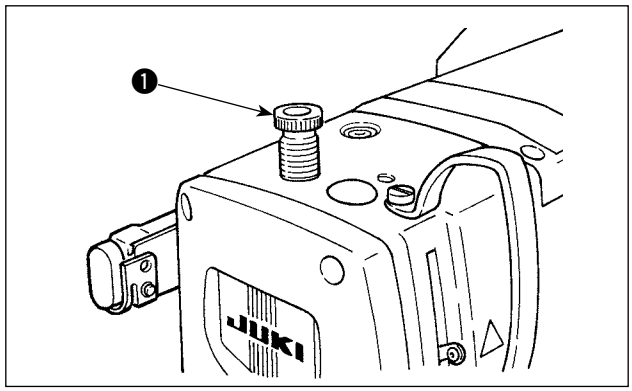
To adjust the height of the needle thread trimmer, loosen setscrew ❶. Set the height of trimmer as low as possible, provided that it does not touch work clamp check, in order to minimize the length of remaining thread on the needle after trimming.

Note that the work clamp check tilts when sewing a multi-layered portion of the material, attach the needle thread trimmer to slightly raise the installing position of the trimmer.

When replacing the needle thread trimmer, make sure that the trimmer normally works under the needle thread trimmer adjusting mode.

1-3. Adjusting the presser bar pressure

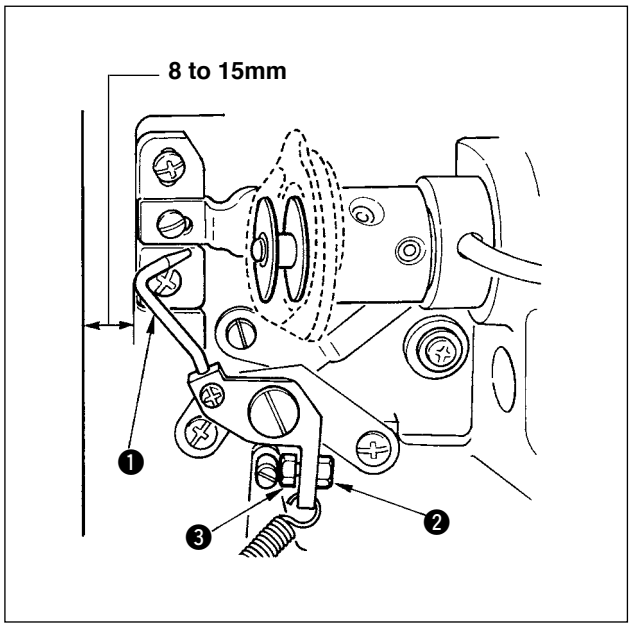
WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



To adjust the pressure applied by the presser bar to fabric, turn presser spring regulator ❶. When the pressure is not enough to prevent fabric from puckering, turn regulator ❶ clockwise.

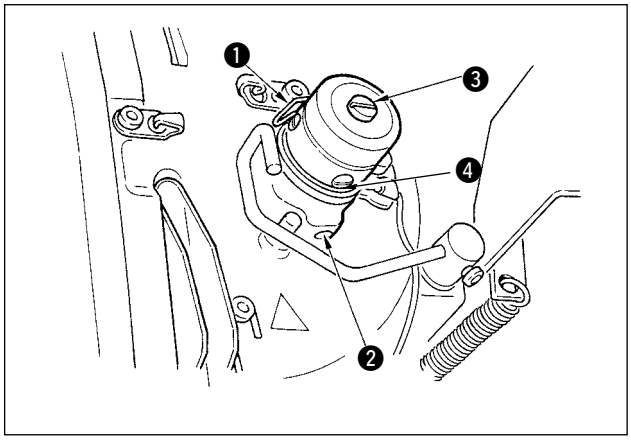
1-4. Adjustment of the bobbin presser unit

WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



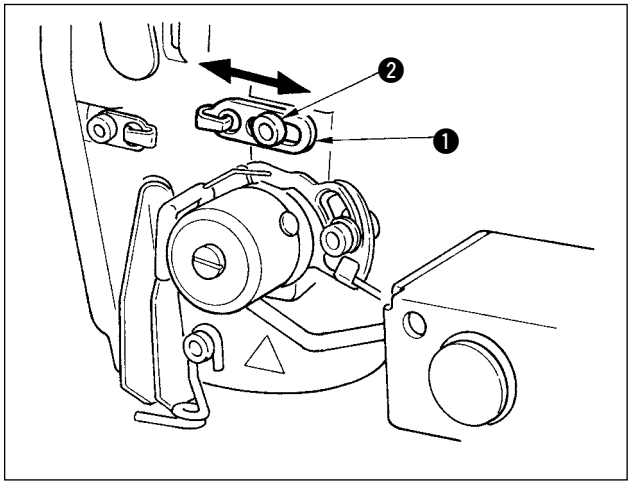
Loosen nut ❶ and adjust the position with stopper spring ❷ so that the distance from the front end of machine bed to bobbin presser ❸ is 8 to 15 mm when the sewing machine stops. Then tighten nut ❷.

1-5. Thread tension



■ **Thread take-up spring (purl stitch)**

1) The thread take-up amount of thread take-up spring ❶ is 8 to 10 mm, and the appropriate pressure at the start is approximately 0.06 to 0.1N.
2) To change the stroke of the thread take-up spring, loosen screw ❷, insert a thin screwdriver into the slot of thread tension post ❸, and turn it.
3) To change the pressure of the thread take-up spring, insert a thin screwdriver into the slot of thread tension post ❸ while screw ❷ is tightened, and turn it. Turning it clockwise will increase the pressure of the thread take-up spring. Turning it counterclockwise will decrease the pressure.

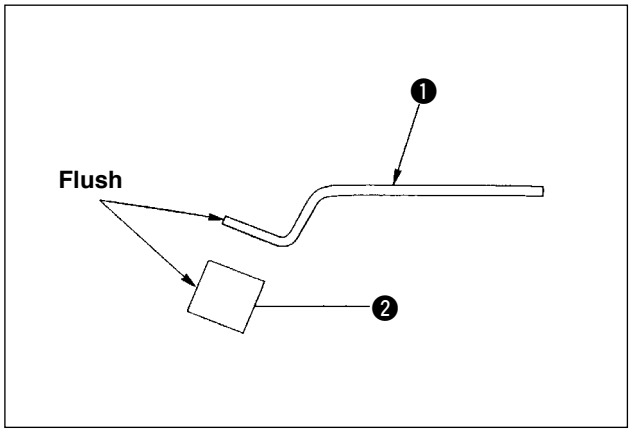


■ **Adjusting the thread take-up amount of the thread take-up lever**

The thread take-up amount of the thread take-up lever should be adjusted in accordance with the thickness of the sewing products so as to obtain well-tightened stitches.

a. For heavy-weight materials, loosen setscrew ❷ in thread guide ❶, and move the thread guide to the left. The thread take-up amount of the thread take-up lever will be increased.
b. For light-weight materials, move thread guide ❶ to the right. The thread take-up amount of the thread take-up lever will be reduced.

1-6. Replacing the clamp cushion

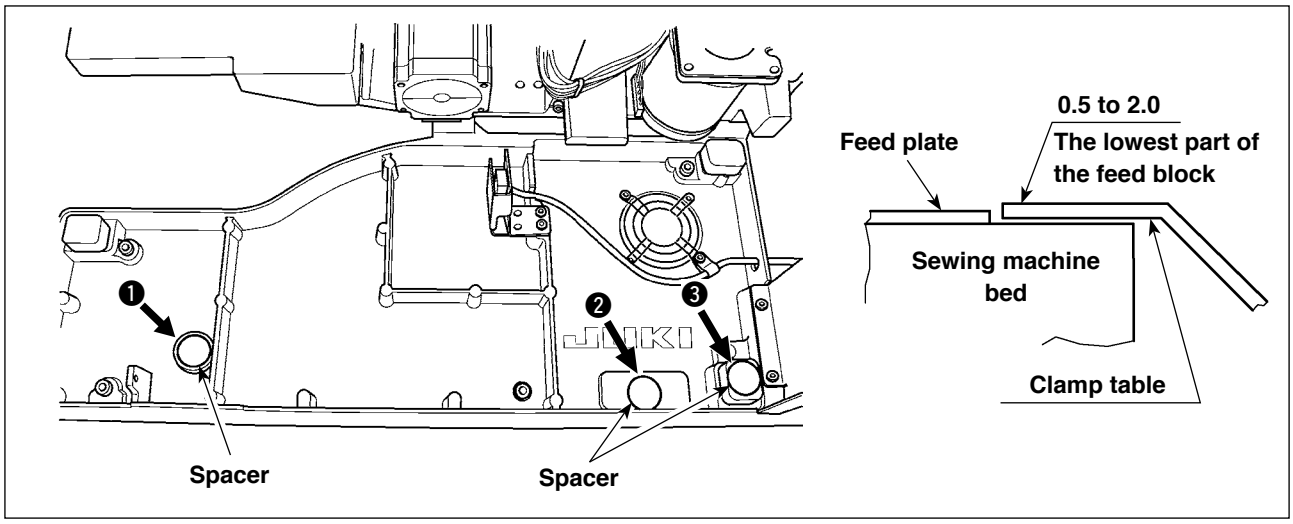


If the clamp cushion of the carriage has worn out or deformed, replace it with anew one in the following steps of procedure.

1) Remove worn out cushion from clamp ❶ ,and wipe the clamp surface cleanly.
2) Attach chshion ❷ supplied with the machine on clamp ❶ so that the cushion is positioned illustrated in the figureon the left.

Caution **After replacing the cushion, be sure to perform " Ⅰ -4-4. Adjusting the carriage clamp" p.36.**

1-7. Adjusting the machine head



If the machine head comes down from its normal position due to aged deterioration, the folded edge of the material and the seam (the edge) may not be properly aligned when placing the material position on the machine head.

If the space provided between the sewing machine bed and the feed block is 2.0 mm or more, place spacers (0.5 mm and 1.0 mm) at the places (❶, ❷ and ❸) shown in the figure to adjust so that a difference in height between the machine bed and the feed block is 2.0 mm or less.

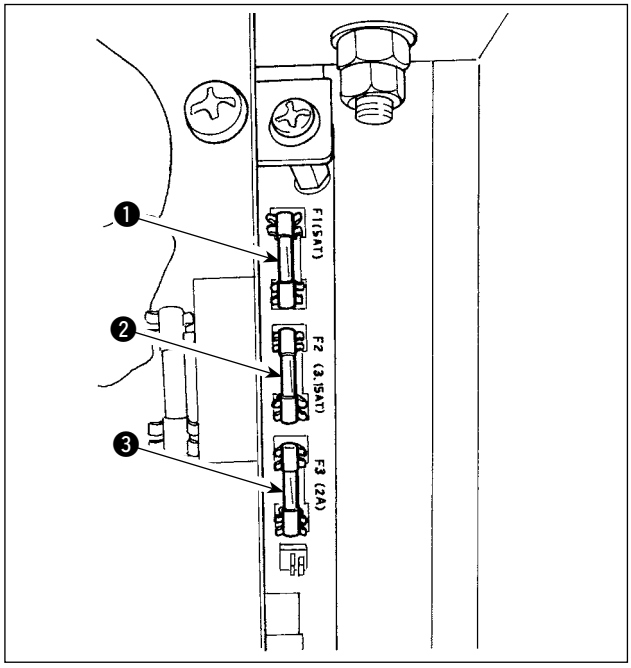
1-8. Replacing the fuse

WARNING :

1. To avoid electrical shock hazards, turn OFF the power and open the control box cover after about five minutes have passed.

2. Open the control box cover after turning OFF the power without fail. Then, replace with a new fuse with the specified capacity.

3. Open the cover. If any of the LEDs on the PCB is on, wait until the lighted LED goes out and replace the fuse with a new one. If you replace the fuse when any of the LEDs is on, you could get a shock. Never replace the fuse while any the LEDs is on for the sake of safety.



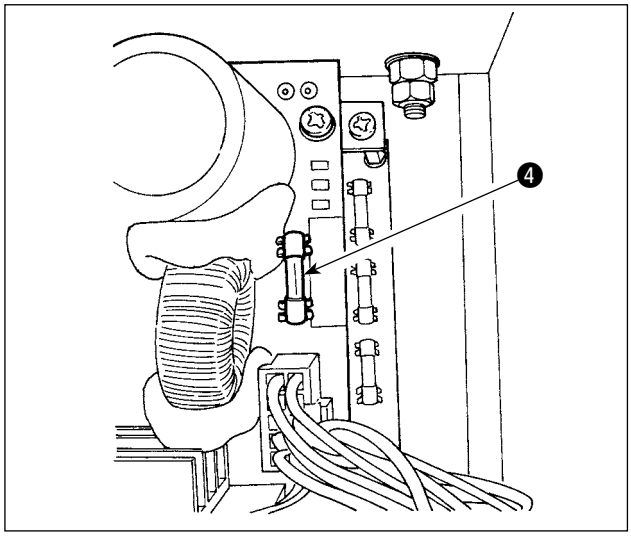
The machine uses the following four fuses.

SDC circuit board

❶ For stepping motor and knife solenoid power supply protection
5A (time-lag fuse)

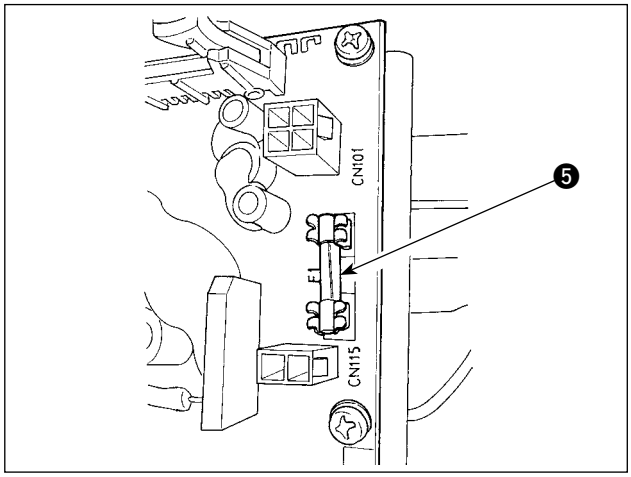
❷ For thread tension solenoid and stepping motor power supply protection
3.15A (time-lag fuse)

❸ For control power supply protection
2A (fast-blow type fuse)



PWR circuit board

❹ For carriage pulse motor power supply protection
5A (time-lag fuse)

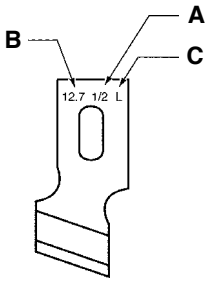


I/O circuit board

❺ For carriage pulse motor power supply protection
4A (time-lag fuse)

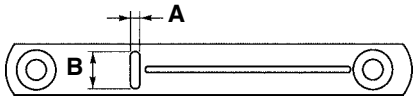
2. GAUGE COMPONENTS

■ Cloth cutting knife



A Knife size (inch)	B Knife size (mm)	C Mark	D Part No.
1/4	6.4	F	B2702047F00
3/8	9.5	K	B2702047K00A
7/16	11.1	I	B2702047I00
1/2	12.7	L	B2702047L00A
9/16	14.3	V	B2702047V00
5/8	15.9	M	B2702047M00A
11/16	17.5	A	B2702047A00
3/4	19.1	N	B2702047N00
7/8	22.2	P	B2702047P00
1	25.4	Q	B2702047Q00A
1-1/4	31.8	S	B2702047S00A

■ Throat plate



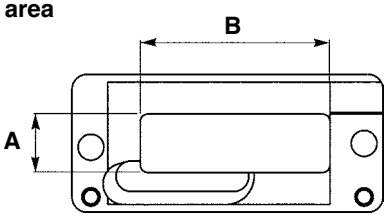
Stitch width / Type	5mm (Marking • AxB)
Standard (S)	40027553 (S5 • 1.4x6.2)
For knits (K)	40027554 (K5 • 1.2x6.2)

■ Presser

Stitch width 5 mm

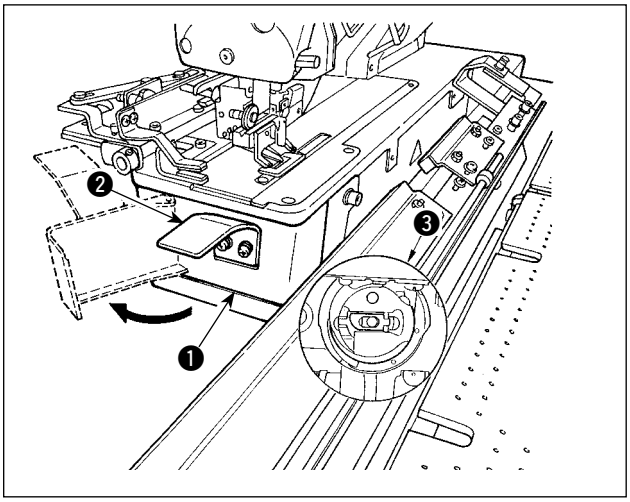
Size (AxB) / Type	1 (4x25)	2 (5x35)	3 (5x41)
Standard (S)	B1552781000A	B1552782000	B1552783000
For knits (K)	D1508771K00A	D1508772K00	D1508773K00

Sewing area



3. DAILY MAINTENANCE

3-1. Removing dust near the bobbin case

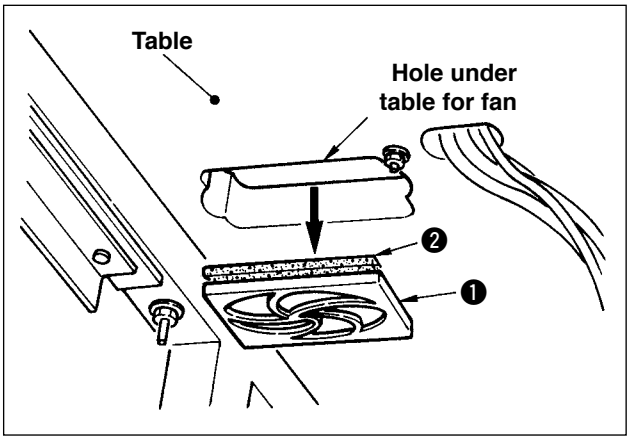


Hold knob ❷ and open hook cover ❶. Then remove dust (thread waste and cloth waste) near bobbin case ❸.

If dust collects near the bobbin case, sewing is deteriorated.

3-2. Cleaning the cooling filter

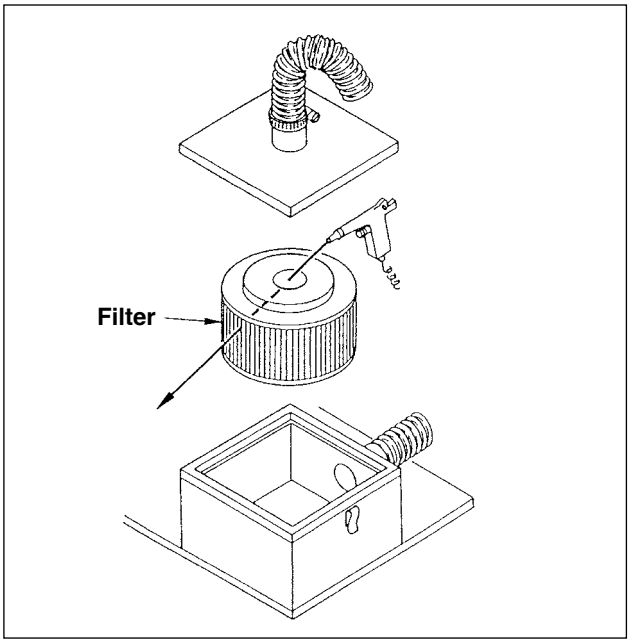
WARNING :
To protect against possible personal injury due to abrupt start of the machine, be sure to start the following work after turning the power off and ascertaining that the motor is at rest.



Clean filter ❷ of the fan located on the bottom surface of the machine table (bed base) once every week.

1) Pull the screen kit ❶ in the direction of the arrow to remove it.
2) Wash the filter ❷ under running water.
3) Reinstall the filter ❷ and the screen kit ❶.

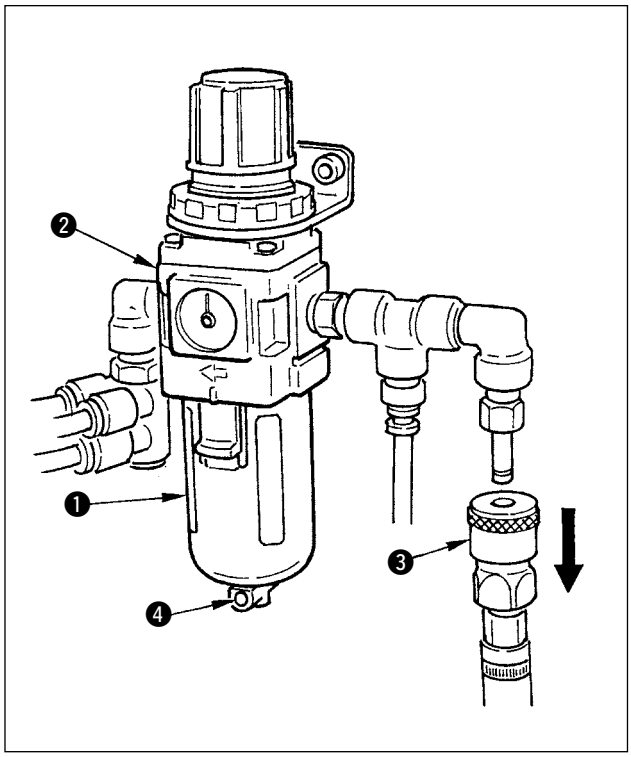
3-3. Cleaning the vacuum filter



Clean the filter element inside the filter box once every 4 months.

1. **Blow air to the elements from inside toward out side.**
2. **If the is heavily clogged, replace it with a new one.**

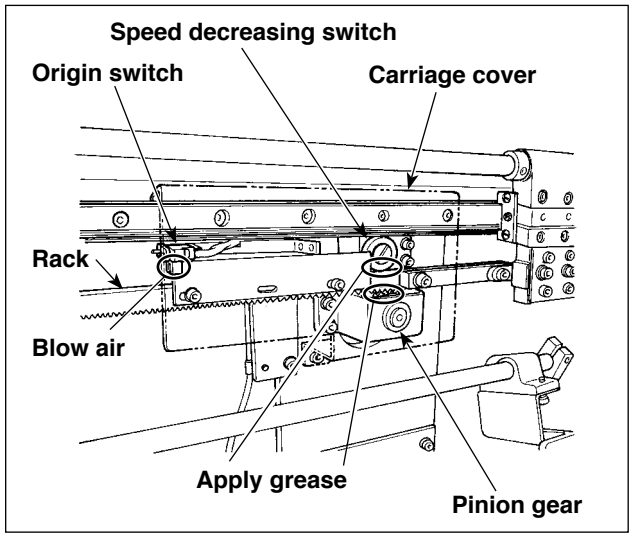
3-4. Draining of the air regulator



When bottle ❶ is filled with water, draw out one-touch joint ❸ from regulator ❷, and press drain button ❹ to perform draining.

It is recommended to perform draining each time before operating the machine or after operating.

3-5. Cleaning the carriage and lubricating to the drive section



1) Apply grease to the feed rack and pinion gear of the carriage, and apply grease to the carriage unit once every 6 months. For the grease, use ESSO LITHTAN 2 or lithium system grease (equipment to penetration No.2 and base oil viscosity 95mm^2 /s (40℃).
2) Once in every four months, blow air to the slit section of the ORIGIN switch by means of the air gun to remove dust.

4. TROUBLES AND CORRECTIVE MEASURES

Troubles	Causes	Corrective measures	Page
1. Needle thread breakage	1. Thread tension at parallel section is too high.	○ Decrease the thread tension at parallel section.	p.59
	2. Pressure or stroke of thread take-up spring is too large.	○ Decrease the tension of thread take-up spring or decrease its stroke.	p.90
	3. There is a burr or scratch on the blade point of hook.	○ Buff the blade point of hook. Or, replace the hook.	
	4. Hook timing is not proper.	○ Adjust again the hook timing with timing gauge.	p.88
	5. There is a scratch on the thread path.	○ Polish the thread path with sand paper and buff it.	
	6. Attaching needle is wrong.	○ Adjust again the direction, height, etc.	p.31
	7. Needle is too thin.	○ Replace the needle with a thicker one.	p.31
	8. Needle tip is damaged.	○ Replace the needle.	p.31
2. Needle thread slips off.	1. Needle thread trimmer opens too early.	○ Delay the opening timing of the needle thread trimmer.	p.89
	2. Whip stitching is not formed at the start of sewing. (Tension at the start of sewing is too high.)	○ Decrease tension at the start of sewing. (Sewing data S57)	p.63
	3. Threading needle thread is wrong.	○ Thread properly again.	p.31
	4. Speed at the start of sewing is too fast.	○ Set the soft-start function. (Memory switch data U09 to U13)	p.77
3. Wobbling at parallel section	1. Thread tension at parallel section is too low.	○ Increase the thread tension at parallel section.	p.59
	2. Bobbin thread tension is too high.	○ Decresase bobbin thread tension. (Purl stitching : 0.05 to 0.1N)	p.32
	3. Pre-tension is too low.	○ Increase pre-tension.	
4. Wobbling at the start of sewing	1. Thread tension at parallel section is too low.	○ Increase the thread tension at parallel section.	p.59
	2. Position of needle thread trimmer is too high.	○ Lower the needle thread trimmer to such an extent that it does not come in contact with the presser.	p.89
	3. Stroke of thread take-up spring is too large.	○ Decrease the stroke of thread take-up spring.	p.90
5. Needle thread appears on the wrong side of material at bar-tacking section in dumpling condition.	1. Bar-tacking thread tension is too low.	○ Increase the bar-tacking thread tension.	p.59
	2. Bobbin thread tension is too high.	○ Decresase the bobbin thread tension. (0.05 to 0.1N)	p.32
	3. Number of stitches of radial shape is too many.	○ Decrease the number of stitches. (Sewing data S19)	p.76
	4. Tension at the end of sewing is too low.	○ Increase tension at the end of sewing. (Memory switch data U06)	p.77
6. Stitches float.	1. Bobbin thread tension is too low.	○ Increase the bobbin thread tension.	p.32
	2. Bobbin thread comes off bobbin case.	○ Perform proper threading the bobbin case.	p.32
		○ Take care that the winding amount of bobbin thread is not excessive	p.50
7. Stitch skipping	1. Button hole is small in terms of the size of presser.	○ Replace the presser with a smaller one.	
	2. Material flops because of lightweight.	○ Delay the hook-to-needle timing. (Lower the needle bar by 0.5 mm.)	p.88
	3. Attaching needle is wrong.	○ Adjust again the direction, height, etc.	p.31
	4. Needle is bent.	○ Replace the needle.	p.31
	5. There is a burr or scratch on the blade point of hook.	○ Buff the blade top of hook. Or, replace the hook.	

Troubles	Causes	Corrective measures	Page
8. Thread frays.	1. Number of stitches of tie stitching is too small. 2. Width of tie stitching is too wide.	○ Increase the number of stitches of tie stitching at the end of sewing. (Sewing data S68) ○ Narrow the width of tie stitching at the end of sewing. (Sewing data S67)	p.63 p.63
9. Length of needle thread remaining at the end of sewing is too long.	1. Width of tie stitching is too narrow. 2. Tension of tie stitching is too low.	○ Widen the width of tie stitching at the end of sewing. (Sewing data S67) ○ Increase tension at the end of sewing. (Memory switch data U06)	p.63 p.77
10. Needle thread breaks at the start of sewing, or the wrong side of seam is dirty.	1. Tension at the start of sewing is too low.	○ Increase tension at the start of sewing. (Sewing data S57)	p.77
11. Knife drops even when needle thread is cut.	1. Thread breakage detection plate is improperly adjusted.	○ Adjust the detector plate. (Refer to the Engineer's Manual.)	
12. Needle breaks.	1. Needle is bent. 2. Needle comes in contact with the blade point of hook. 3. Needle thread trimmer comes in contact with needle when it opens. 4. Needle does not come to the center of the needle hole of throat plate. 5. Needle stop position is low and the needle comes in contact with the needle thread trimmer when it closes.	○ Replace the needle. ○ Adjust the needle-to-hook timing. ○ Adjust the installing position of needle thread trimmer. ○ Re-adjust the installing position of throat plate base.	p.31 p.88 p.89
13. Knife drops plural times.	1. Cloth cutting knife is not set to the plural times motion setting.	○ Release the plural time setting.	p.76
14. Air blows from preset.	1. Blower motor is rotating in the reverse direction.	○ Change the direction of rotation of the motor.	p.5
15. Preset does not move even when start switch is pressed.	1. Cloth is not detected since it is coarse.	○ Release the cloth detection. (Memory switch data U52)	p.77
16. Cloth is folded when cloth is delivered from preset to carriage.	1. Air blow is excessively high or low.	○ Adjust the air blow. ○ Clean the air filter.	p.26
17. Cloth slips when cloth is delivered from preset to carriage.	1. Vacuum force is excessively low. 2. Clamp force is excessively low.	○ Adjust the cloth suction force of the vacuum. ○ Adjust the clamp.	p.29 p.36, 37

Ⅳ. INITIAL VALUE DATA FOR EACH SHAPE TABLE

No.	Item	Unit	Shape selection Level 1 (12 shapes)												Shape selection Level 2 (20 shapes)										Shape selection Level 3 (30 shapes)									
S01	Sewing shape		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
S02	Cloth cutting length	mm	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	13.0	19.1	19.1	19.1
S03	Knife groove width, right	mm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	–	0.10	0.10
S04	Knife groove width, left	mm	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	–	0.10	–	0.10
S05	Overedging width, left	mm	1.70	1.70	1.70	1.70	1.70	1.70	1.4	1.4	1.4	1.4	1.70	1.70	1.70	1.70	1.70	1.4	1.4	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	1.70	–	–	–	–
S06	Left/right shape ratio (right side in terms of left side)	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	–	–	–	–
S07	Pitch at parallel section	mm	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	–	–	–	–
S08	2nd bar-tacking length	mm	1.0	–	1.0	–	1.5	3.0	1.0	–	1.5	3.0	–	1.0	1.0	1.5	3.0	–	–	–	–	–	1.5	3.0	–	–	–	–	–	–	–	–
S09	1st bar-tacking length	mm	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.0	1.0	1.0	1.0	1.0	–	–	–	–	–	–	–	–
S10	Bar-tacking width, right compensation	mm	0.0	–	0.0	–	0.0	–	0.0	–	0.0	–	–	0.0	0.0	0.0	–	–	–	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–
S11	Bar-tacking width, left compensation	mm	0.0	–	0.0	–	0.0	–	0.0	–	0.0	–	–	0.0	0.0	0.0	–	–	–	0.0	0.0	0.0	0.0	0.0	–	–	–	–	–	–	–	–
S12	Taper bar-tacking offset, left	mm	–	–	–	–	–	0.85	–	–	–	0.85	–	–	–	–	0.85	–	–	–	–	–	–	0.85	–	–	–	–	–	–	–	–
S13	Taper bar-tacking offset, right	mm	–	–	–	–	–	0.85	–	–	–	0.85	–	–	–	–	0.85	–	–	–	–	–	–	0.85	–	–	–	–	–	–	–	–
S14	Eyelet shape length	mm	–	–	–	–	–	–	2.0	2.0	2.0	2.0	–	–	–	–	–	2.0	2.0	–	–	–	–	–	–	–	–	–	–	–	–	–
S15	Number of stitches of eyelet shape	Stitch	–	–	–	–	–	–	3	3	3	3	–	–	–	–	–	3	3	–	–	–	–	–	–	–	–	–	–	–	–	–
S16	Eyelet width	mm	–	–	–	–	–	–	1.0	1.0	1.0	1.0	–	–	–	–	–	1.0	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–
S17	Eyelet length	mm	–	–	–	–	–	–	3.0	3.0	3.0	3.0	–	–	–	–	–	3.0	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–
S18	Round type shape length	mm	–	2.0	2.0	2.0	2.0	2.0	–	2.0	–	–	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	–	–	2.0	2.0	2.0	2.0	–	–	–	–
S19	Number of stitches of radial shape	Stitch	–	–	3	3	3	3	–	3	–	–	–	–	–	–	–	–	–	3	–	–	–	–	3	3	3	–	–	–	–	–
S20	Radial shape reinforcement (with/without)		–	–	Without	Without	Without	Without	–	Without	–	–	–	–	–	–	–	–	–	Without	–	–	–	–	Without	Without	Without	–	–	–	–	–
S21	Pitch at bar-tacking section	mm	0.30	0.30	0.30	–	0.30	0.30	0.30	–	0.30	0.30	0.25	0.30	0.25	0.25	0.25	0.25	0.30	0.30	0.25	0.30	0.30	0.30	0.25	0.30	0.25	0.25	–	–	–	–
S22	1st clearance	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5.	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	–	2.0	2.0	2.0
S23	2nd clearance	mm	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	–	2.0	2.0	2.0
S31	1/2 stitching		Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	Single	–	–	–	Single
S32	Double stitching cross selection		<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	<	–	–	–	<
S33	Double stitching width compensation	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–	–	–	–
S34	Number of times of basting	Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	2	–
S35	Pitch of basting	mm	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	–
S36	Rolling length of basting	mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	–
S37	Rolling pitch of basting	mm	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	–
S38	Rolling width of basting	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	–
S39	Compensation before/after needle entry of basting	mm	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	–
S40	Compensation left/right needle entry of basting	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
S41	Compensation of left side position of basting	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
S42	Compensation of right side position of basting	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–
S44	Speed setting of basting	sti/min	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	–
S45	Sewing together function (without/with)		Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	–	–	–	–
S46	Width of sewing together	mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	–	–	–	–
S47	Pitch of sewing together	mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	–	–	–	–
S51	Left parallel section tension		120	60	120	120	120	120	60	60	60	60	60	60	60	60	60	60	60	120	60	60	60	60	60	60	60	60	60	60	60	60
S52	Right parallel section tension		120	60	120	120	120	120	60	60	60	60	60	60	60	60	60	60	60	120	60	60	60	60	60	60	60	60	60	60	60	60
S53	Left parallel section tension (1st cycle of double stitching)		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	–	–	–	–
S54	Right parallel section tension (1st cycle of double stitching)		60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	–	–	–	–
S55	1st bar-tacking section tension		35	60	120	35	35	35	60	60	60	60	60	60	60	60	60	60	60	30	60	60	60	60	60	60	60	60	–	–	–	–
S56	2nd bar-tacking section tension		35	60	35	35	35	35	60	60	60	60	60	60	60	60	60	60	60	120	60	60	60	60	60	60	60	60	–	–	–	–
S57	Setting of needle thread tension at sewing start		25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
S58	Setting of needle thread tension of basting		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	---
S59	ACT timing adjustment at 1st bar-tacking start	Stitch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	–	–	–	–
S60	ACT timing adjustment at the start of right overedging	Stitch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S61	ACT timing adjustment at 2nd bar-tacking start	Stitch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	–	–	–	–
S62	Number of stitches of tie stitching at the start of sewing	Stitch	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S63	Sewing pitch of tie stitching at the start of sewing		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S64	Tie stitching width at sewing start	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
S65	Lengthwise compensation of tie stitching at the start of sewing	mm	0.0	1.5	0.0	1.5	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	1.5	1.5	1.5	1.5	1.5	0.0	0.0	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0
S66	Crosswise compensation of tie stitching at the start of sewing	mm	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S67	Tie stitching width at sewing end	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
S68	Number of stitches of tie stitching at sewing end	Stitch	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
S69	Lengthwise compensation of tie stitching at the end of sewing	mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S70	Crosswise compensation of tie stitching at the end of sewing	mm	0.9	0.9	0.9	0.9	0.0	0.7	0.9	0.9	0.0	0.7	0.9	0.9	0.9	0.0	0.7	0.9	0.9	0.9	0.9	0.9	0.0	0.7	0.9	0.9	0.9	0.9	0.0	0.0	0.0	0.0
S81	Knife motion (With/without)		With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	With	–	With	With	With
S83	Knife at 1st cycle of double stitching (Without/with)		Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	Without	–	–	–	–
S84	Max. speed limitation	sti/min	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
S86	Pitch of going	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.80	0.80	0.80	0.80
S87	Width of going	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.7	1.7	1.7	1.7
S88	Pitch of returning	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.80	0.80	0.80	0.80
S89	Width of returning	mm	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.7	1.7	1.7	1.7