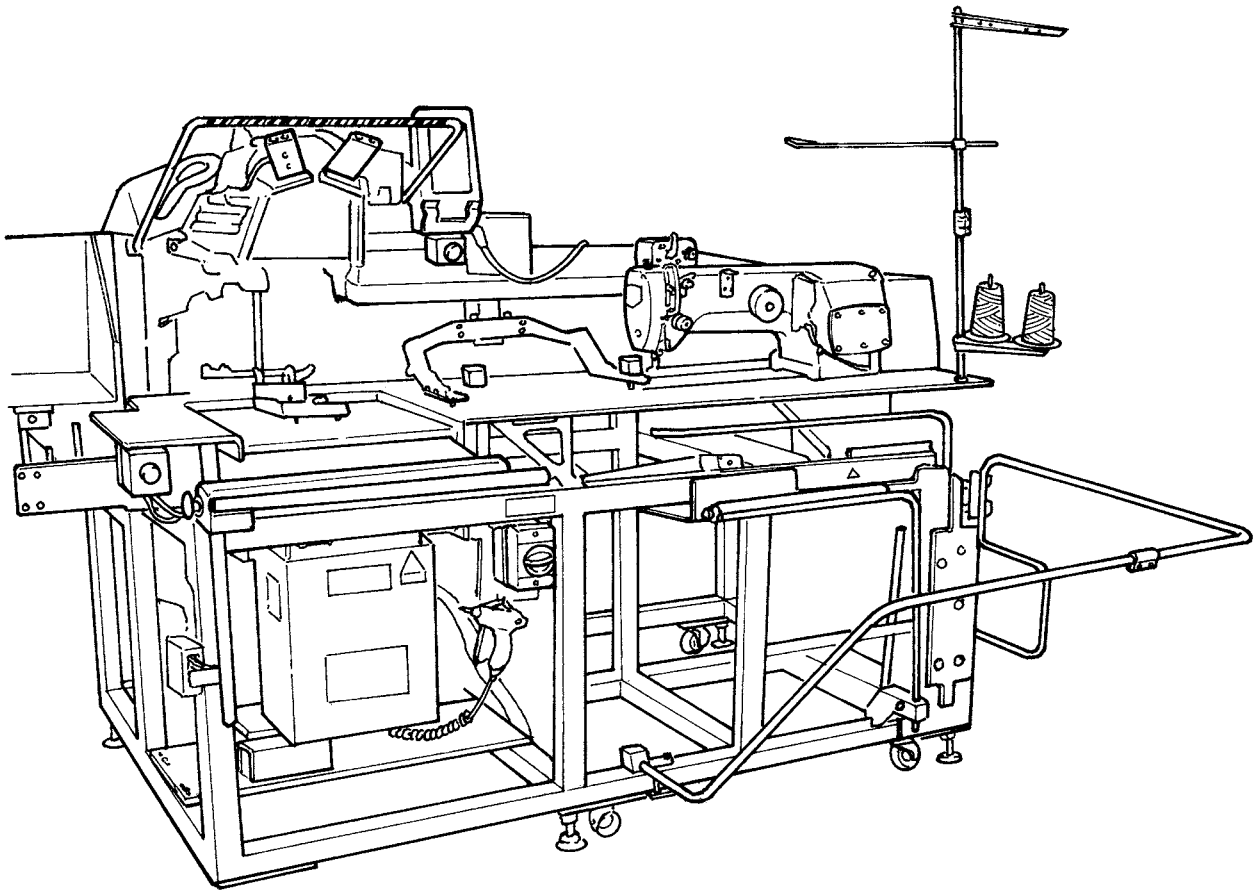
JUKI®

Automatic Pocket Setter (For Jeans)

AP-876

ENGINEER'S MANUAL



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PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machine.
The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instruction in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered in the Instruction Manual.
When carrying out the maintenance work on the sewing machine, be sure to refer also to the Instruction Manual and the Parts List.
In addition, for the motor for the sewing machine with thread trimmer, refer to the separate Instruction Manual or This manual gives the "Standard Adjustment" on the former page under which the most basic adjustment value is described, and on the latter page "Results of Improper Adjustment" under which stitching errors and troubles arising from mechanical failures and "How to adjust" are described.

TO ENSURE SAFE USE OF YOUR SEWING MACHINE

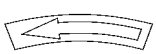
Adjustment :
It means replacement of parts, disassembly, and repair assembly.

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** of this engineer's manual before using/maintaining the machine. The content of the **Safety precautions** of this engineer's manual 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 of this engineer's manual and the product. Be sure to fully understand the following description and strictly observe the instructions.

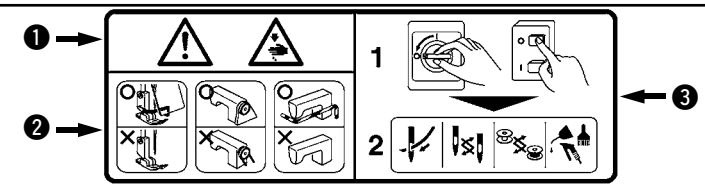
(Ⅰ) Explanation of risk levels

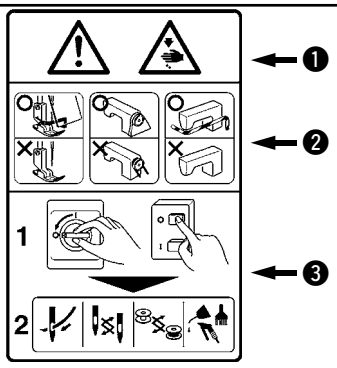
	**DANGER :** **This indication is given where there is an immediate danger of death or serous injury if the person in charge or any third party mishandles the machine or does not avoid the dangerous situation when operating or maintaining the machine.**
	**WARNING :** **This indication is given where 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.**	Pictorial warning indication		**Be aware that holding the sewing machine during operation can hurt your hands.**
		**There is a risk of electrical shock if contacting a high-voltage section.**			**There is a risk of entanglement in the belt resulting in injury.**
		**There is a risk of a burn if contacting a high-temperature section.**			**There is a risk of injury if you touch the button carrier.**
		**Be aware that eye deficiency can be caused by looking directly at the laser beam.**	Indication label		**The correct direction is indicated.**
		**There is a risk of contact between your head and the sewing machine.**			**Connection of a earth cable is indicated.**

Warning label





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.**

Electrical-shock danger label

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 engineer's manual and other explanatory documents supplied with accessories of the machine before using the machine. Carefully keep the engineer's 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 engineer's 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 engineer's 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 engineer's 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.**
9. **Disposal of products and packages and treatment of used lubricating oil should be carried out properly according to the relevant laws of the country in which the sewing machine is used.**

PRECAUTIONS TO BE TAKEN IN VARIOUS OPERATION STAGES

Electrical components

CAUTION

Transportation

1. **Be sure to lift this machine with two or more workers and use a carriage for moving it in order to prevent personal injury.**
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. **Installation is described in the Instruction Manual. Be sure to fully understand the description before putting the machine into operation.**

Replacement of parts

1. **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 replacement of electrical components.**
2. **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 caused by unfamiliarity with the machine or electrical-shock accident. In addition, do not carry out replacement work with wet hands in order to prevent electrical-shock accident.**
3. **Be sure to replace parts according to the instructions given in this Engineer's Manual and in the Instruction Manual in order to protect against accident that can result in personal injury.**
4. **Be sure to carry out replacement work after having installed the machine in a stable state in order to protect against accident that can result in personal injury.**
   In addition, be sure to select appropriate tools.
5. **Make sure, after the completion of replacement work, that there is no loose soldering, no contact with other parts, inadequate contact between connectors and receptacles, and loose screws/nuts in order to protect against accident that can result in personal injury.**
6. **Make sure, after the completion of replacement work, that neither connectors nor cables are damaged, slipped off or loosened in order to protect against accident that can result in personal injury.**
   It should be remembered that some parts have been factory-insulated with tubes or tapes, or floated above the PWB for safety's sake. In addition, internal wiring has been factory-routed or -clamped in such a way that it does not come close to high-voltage parts. Be sure to re-place those parts as they are at the time of delivery.
7. **Be sure to use JUKI genuine parts when replacing any of the machine parts.**
   JUKI assumes no responsibility for any accident caused by any part other than JUKI genuine one.
   In addition, in the event you cannot replace parts within the specified range, immediately stop the replacement work and ask JUKI or distributor in your area for replacement of the parts.
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.**

Adjustment

1. **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 adjustment of electrical components.**
2. **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 caused by unfamiliarity with the machine or electrical-shock accident. In addition, do not carry out adjustment work with wet hands in order to prevent electrical-shock accident.**
3. **In prevention of accident that can result in personal injury, adjust adjustment variable resistor or the like installed on PWB within the specified range given in this Engineer's Manual and in the Instruction Manual.**
4. **Be sure to carry out replacement work after having installed the machine in a stable state in order to protect against accident that can result in personal injury.**
   In addition, be sure to select appropriate tools.
5. **In prevention of accident that can result in personal injury, make sure, after the completion of adjustment work, that neither screws nor nuts are loosened or come in contact with other parts.**
6. **Make sure, after the completion of replacement work, that neither connectors nor cables are damaged, slipped off or loosened in order to protect against accident that can result in personal injury.**
7. **In prevention of accident that can result in personal injury or entanglement accident, be sure to ensure safety at the time of test run. In addition, be sure to take care not to allow hair or cloths to come in contact with the machine belt.**

Disassembly/assembly

1. **In prevention of accident that can result in personal injury, be sure to carry out disassembly/assembly work within the specified range given in this Engineer's Manual and in the Instruction Manual.**

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 disassembly/assembly of electrical components.**
3. **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 caused by unfamiliarity with the machine or electrical-shock accident. In addition, do not carry out disassembly/assembly work with wet hands in order to prevent electrical-shock accident.**
4. **Be sure to carry out replacement work after having installed the machine in a stable state in order to protect against accident that can result in personal injury.**
   In addition, be sure to select appropriate tools.
5. **In prevention of accident that can result in personal injury, be sure to tighten screws and nuts in assembly work with a specified torque, if specified, or with an appropriate torque, if not specified.**
   After the completion of assembly work, be sure to check that screws and nuts are not loosened before starting test run.
6. **In prevention of accident that can result in personal injury, make sure, after the completion of adjustment work, that neither screws nor nuts are loosened or come in contact with other parts.**
7. **Make sure, after the completion of replacement work, that neither connectors nor cables are damaged, slipped off or loosened in order to protect against accident that can result in personal injury.**
   It should be remembered that some parts have been factory-insulated with tubes or tapes, or floated above the PWB for safety's sake. In addition, internal wiring has been factory-routed or -clamped in such a way that it does not come close to high-voltage parts. Be sure to re-place those parts as they are at the time of delivery.
8. **In prevention of accident that can result in personal injury, be sure to check whether the direction of rotation is correct at the time of test run.**
9. **In prevention of accident that can result in personal injury or entanglement accident, be sure to ensure safety at the time of test run. In addition, be sure to take care not to allow hair or cloths to come in contact with the machine belt.**

Precautions to be taken so as to use the AP-876 more safely

1. To avoid electric shock hazards, neither open the' cover of the electrical box nor touch any of the components mounted inside the electrical box with the machine energized.

1. To avoid personal injury, never operate the machine with any of the belt cover, finger guard or safety devices removed.
2. To prevent possible personal injuries caused by being caught in the machine, keep your fingers, head and clothes away from the handwheel, V belt and the motor while the machine is operation. In addition, place nothing around them.
3. To avoid personal injury, never put your hand under the needle when you turn "ON" the power switch or operate the machine.
4. To avoid personal injury, never put your fingers into the thread take-up cover while the machine is in operation.
5. The motor rotates at a high speed while the machine is in operation. So as to avoid possible injuries to hands, keep your hands away from the area near the cloth cutting knife. In addition, turn OFF the power to the machine when replacing the bobbin.
6. To avoid possible personal injuries, be careful not to allow your fingers to be caught in the machine head when lowering/lifting the machine head.
7. Never turn off the power and air to the machine while it is in operation.
8. To avoid possible accidents due to abrupt start of the machine, remove the cloth guide when the machine is ready for operation after the completion of preparation.
9. To avoid electrical shock hazards, never operate the sewing machine with the ground wire for the power supply removed.
10. 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.
11. In time of thunder and lightening, stop your work and disconnect the plug from the receptacle for safety's sake so as to prevent possible accidents because of damaged electrical components.
12. If the machine is suddenly moved from a cold place to a warm place, dew condensation may be observed. In this case, turn ON the power to the machine after you have confirmed that there is no danger of water drops in the machine so as to prevent possible accidents arising from damaged electrical component(s).
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.
15. Carefully protect fingers and other part of your body against pinching by the stacker bar since it operates when turning off the power to the sewing machine while the stacker is in operation.
16. Carefully protect fingers and other part of your body against pinching by the work clamp since it operates when turning off the power to the sewing machine while the work clamp is in operation.
17. Be careful not to place your fingers inside the folding unit while the unit is in operation to prevent fingers from being pinched in the cylinder.

*** CompactFlash(TM)" is the registered trademark of SanDisk Corporation, U.S.A.**

Safety devices and warning labels

Safety pipe
This pipe prevents contact between the human body and the folding unit due to abrupt start of the latter.

Warning label against pinching
This label warns that there is a risk of pinching of fingers or any other part of your body when the folding unit is activated.

Warning label against pinching
This label warns that there is a risk of pinching of fingers or any other part of your body when the carriage is activated.

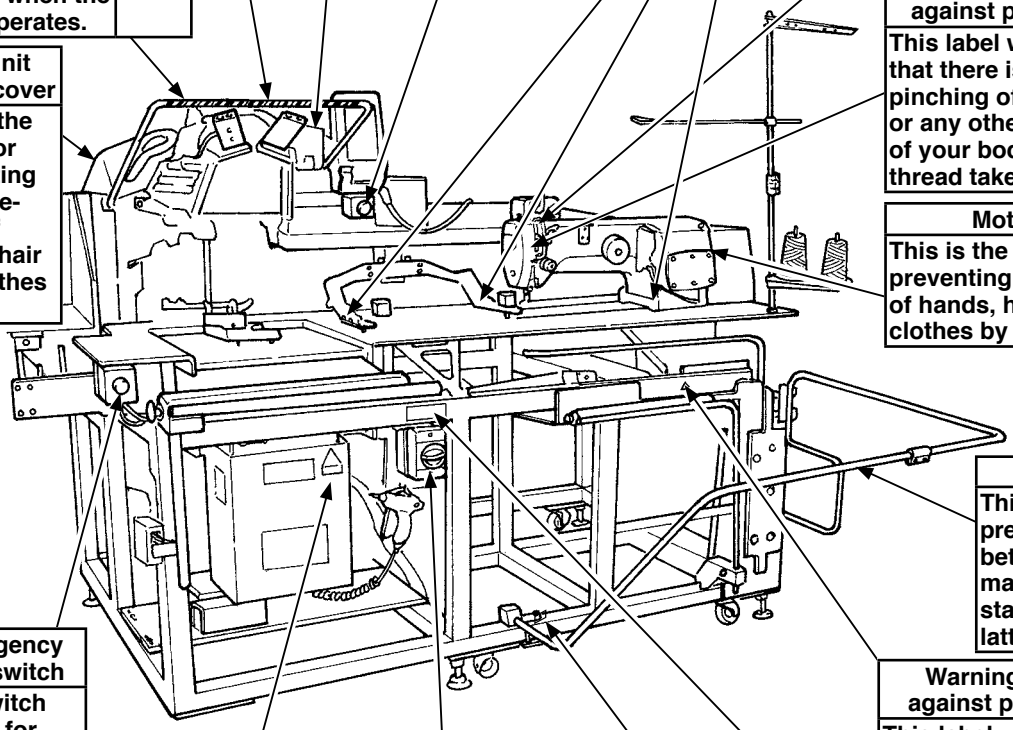
Caution tape
This label warns that there is a risk of contact between human body and the stacker when the latter operates.

Temporary stop switch
This switch is used for stopping the device temporarily.

Thread take-up lever cover
This is a cover for preventing contact between the human body and the thread take-up lever.

Warning label against pinching
This label warns that there is a risk of pinching of fingers or any other part of your body in the thread take-up lever.

X-Y unit safety cover
This is the cover for preventing entanglement of hands, hair and clothes by belt.



Motor cover
This is the cover for preventing entanglement of hands, head, hair and clothes by the motor.

Safety pipe
This is the pipe for preventing contact between the human body and the stacker when the latter operates.

Emergency stop switch
This switch is used for turning off the power to the electrical box.

Warning label against pinching
This label warns that there is a risk of pinching of hands and fingers when the stacker operates.

Power switch
This is a switch for disconnecting the power unit of the sewing machine from the power supply.

Power switch (EU type)
This switch is used for disconnecting the power unit of the sewing machine from the power supply. It is also used as the emergency stop switch.

Selection of the power switch
Use the IEC60204-1-compliant power switch with rated current of 20 A or more and short-circuit breaking capacity of 120 A or more, which has the operating section in red against the yellow background.

Electrical-shock danger label
In order to protect against electrical shock, safety precautions to be taken to avoid danger are written on this label.

(EU type)

(Refer to "Electrical-shock danger label" on page i.)

Warning label
The label gives the minimum precautions to be taken when operating the sewing machine.

(Refer to the warning label on page i.)

Load center label
This label indicates the load center of the machine.

CAUTION

In addition, be aware that the safety devices such as the "eye protection cover" and "finger guard" are sometimes omitted in the sketches, illustrations and figures included in the Engineer's Manual for the explanation's sake. In the practical use, never remove those safety devices.

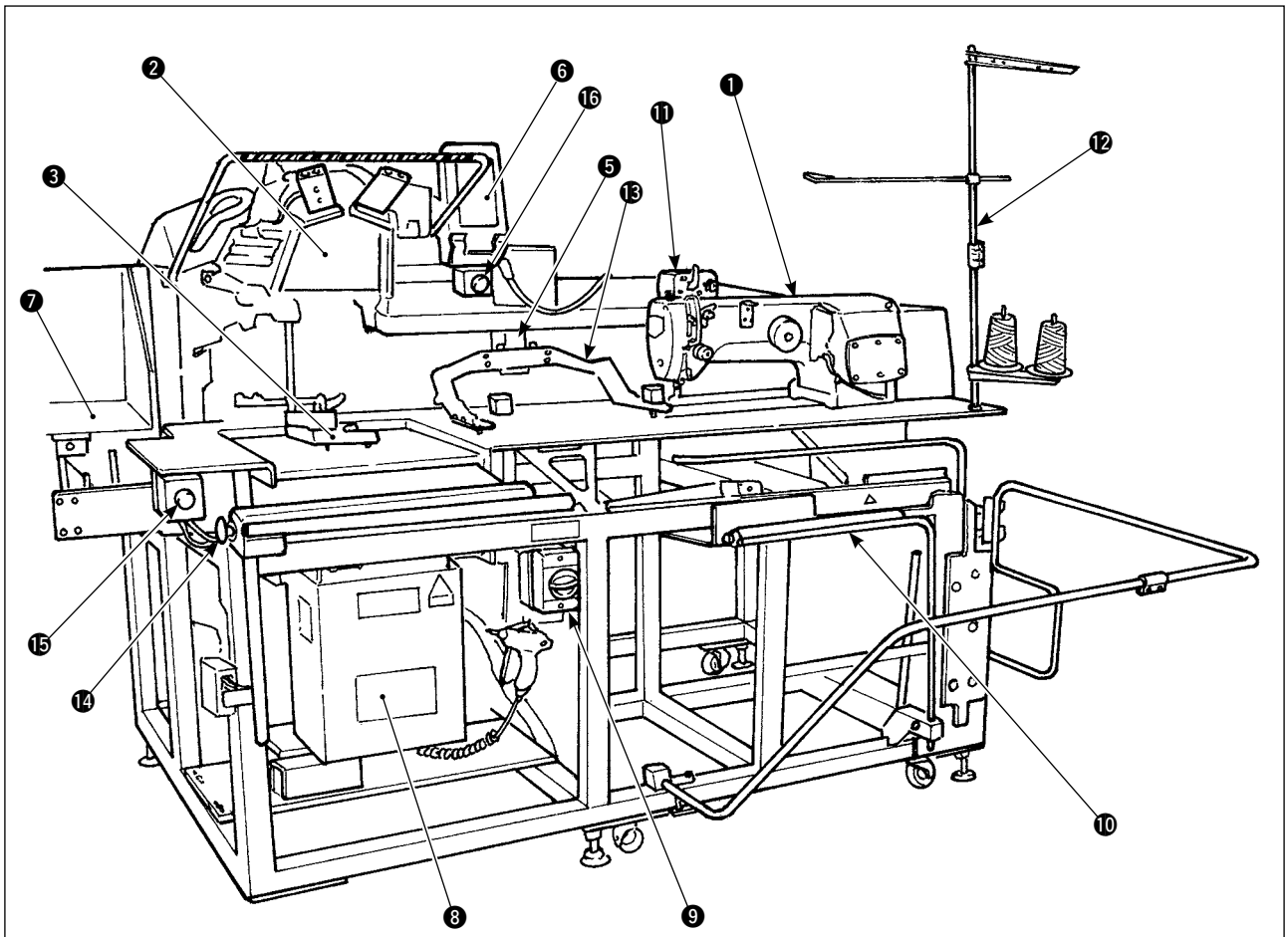
CONTENTS

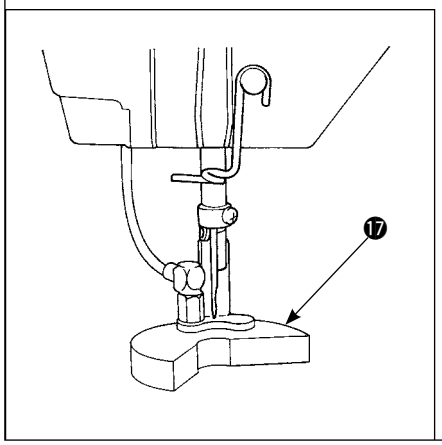
1. Specifications

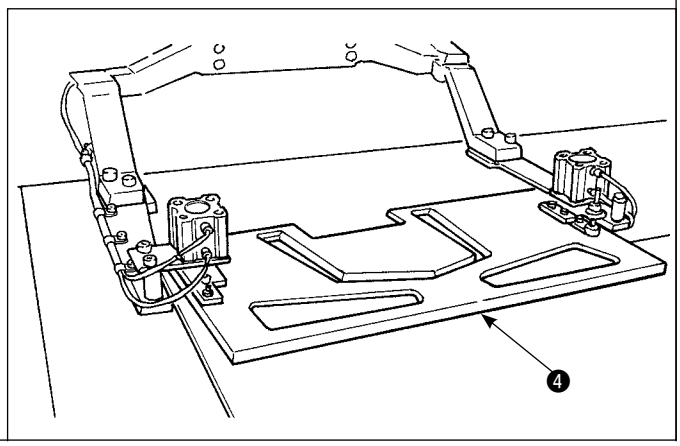
No.	Item	Application
1	Model name	Automatic Pocket Setter (For Jeans)
2	Sewing machine in use	High-speed, 1-needle, Zigzag Stitching Machine with an Automatic Thread trimmer (Exclusive machine head)
3	Sewing area	X (lateral) direction 250 mm, Y (longitudinal) direction 250 mm
4	Sewing speed	Max. 4,000 sti/min (according to sewing specifications)
5	Stitch length	0.1 to 6.0 mm (Minimum resolution: 0.05 mm)
6	Main shaft of machine head drive unit	AC servo motor
7	Presser plate travel	Continuous feed (Stepping motor with an encoder)
8	Needle bar stroke	35 mm
9	Needle	SCHMETZ 134 SERV 7 Nm : 130
10	Hook	Full-rotary exclusive hook (forced lubrication)
11	Bobbin case	Bobbin case exclusively designed for a full-rotary 1.7-fold hook (provided with an idling prevention spring)
12	Lubrication oil	Machine head : JUKI New Defrix Oil No. 1 (Equivalent ISO VG7)
13	Thread trimming mechanism	Scissors cutting mechanism using a counter knife and a moving knife (Driven by grooved cam motor)
14	Pattern data stored in memory	Main body and a media ·Main body: Max. 999 patterns ·Media: Max. 999 patterns
15	Dimensions	1,890 mm (W) x 1,784 mm (L) x 1,490 mm (H) (excluding the thread stand)
16	Temporary stop function	It is possible to stop the sewing machine during sewing.
17	Bobbin counter	Up/down method (0 to 9999)
18	Sewing counter	Up/down method (0 to 9999)
19	Stitch number counter	Up/down method (0 to 9999)
20	Memory backup amount	Patterns are automatically stored in memory at the time of power shutdown.
21	Mass (Total weight)	558 kg
22	Power consumption	Single-phase 220 V: 683.9 VA, 3-phase 200 V: 655.2 VA
23	Range of temperature / humidity that can be used	Temperature : 5 to 35°C, Humidity : 35 to 85% (dewfall none)
24	Supply voltage	Single-phase AC 220 – 240 V, 50/60 Hz 3-phase AC 200 – 240 V, 50/60 Hz Supply voltage fluctuation: Rated voltage ± 10 % or less
25	Compressed air	0.5 MPa
26	Air consumption	220 dm^3/min (ANR)

2. Configuration

(1) Main unit



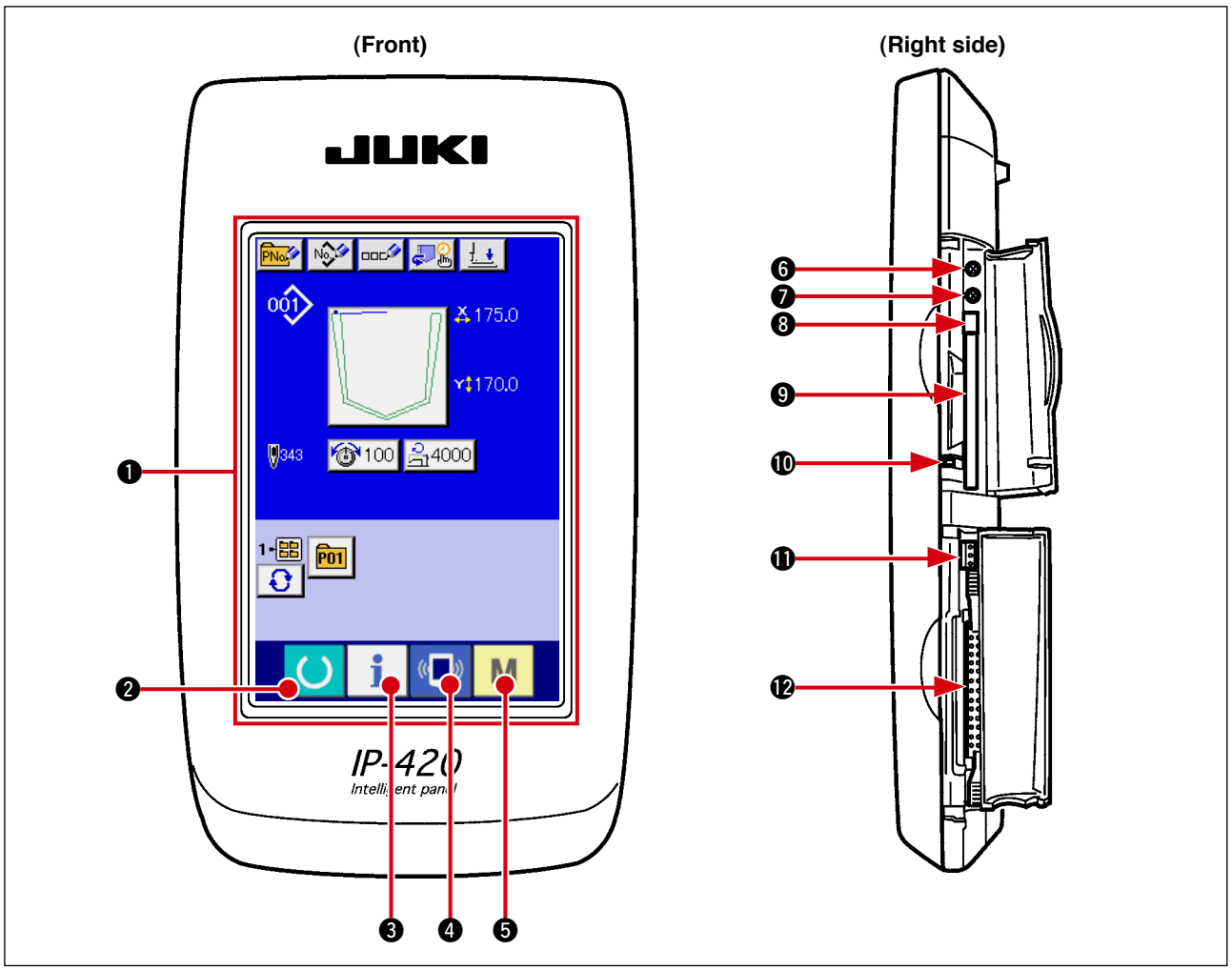




❶ Sewing machine head
❷ Crease folding unit
❸ Pattern board
❹ Presser plate
❺ Conveyor and X-Y unit
❻ Operation panel
❼ Pocket cloth holding board
❽ Control box
❾ Power switch
❿ Stacker
⓫ Bobbin winder
⓬ Thread stand
⓭ Presser arm
⓮ Start switch
⓯ Emergency stop switch
⓰ Temporary stop switch
⓱ Work clamp plunger

*** If emergency stop switch ⓯ is pressed while the device is in operation, the blower motor will not stop, but the power to the device will be turned OFF and the device will stop.**

(2) IP-420 operation panel



❶ Touch panel · LCD display section

❷ SET READY key → Changeover of the data input screen and the sewing screen can be performed.

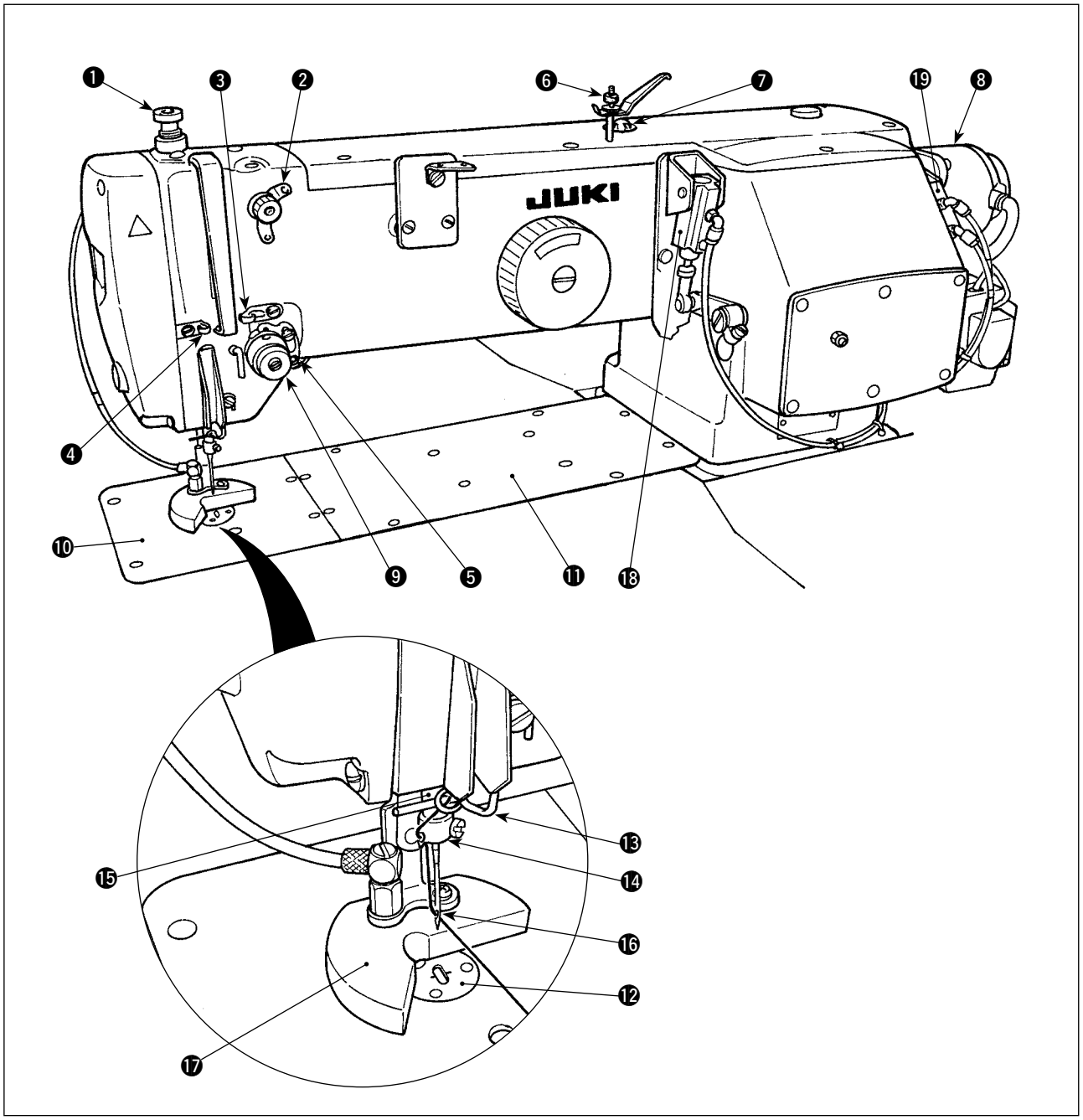
❸ INFORMATION key → Changeover of the data input screen and the information screen can be performed.

❹ COMMUNICATION key → Changeover of the data input screen and the communication screen can be performed.

❺ M MODE key → Changeover of the data input screen and the mode changeover screen which performs various detail settings can be performed.

❻ Contrast control
❼ Brightness control
❽ CompactFlash (TM) eject button
❾ CompactFlash (TM) slot
❿ Cover detection switch
⓫ Connector for external switch
⓬ Connector for control-box connection

(3) Machine head



❶ Presser spring regulator
❷ Tension controller No.1 asm.
❸ Arm thread guide A
❹ Arm thread guide B
❺ Thread breakage detecting plate
❻ Thread guide rod asm.
❼ Oil sight window
❽ Main shaft servomotor
❾ Active tension
❿ Throat plate A
⓫ Throat plate B
⓬ Needle hole guide
⓭ Needle bar thread guide
⓮ Needle bar thread eyelet
⓯ Needle bar
⓰ Needle
⓱ Work clamp plunger
⓲ Repositioning cylinder
⓳ Regulating cylinder

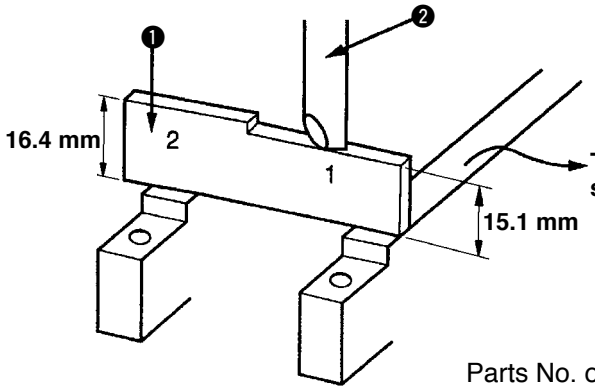
3. Standard adjustment of machine head

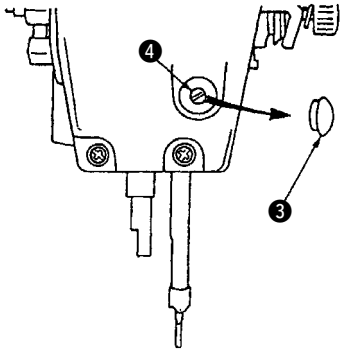
(1) Adjustment of the needle bar height

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

Standard adjustment

Adjust the height of the needle bar ❷ so that the lower end of the needle bar ❷ aligns with the upper end of the hook timing gauge ❶ on the side 1 of the hook timing gauge ❶ which is placed on the throat plate installing surface on the bed when the needle bar is in the lowest dead point of its stroke.





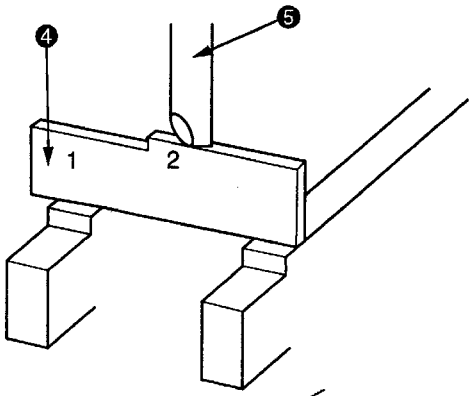
Parts No. of the hook timing gauge ❶ : G9101875000（t=2mm）

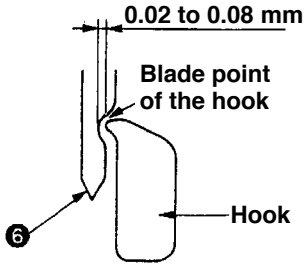
(2) Adjustment of the needle-to-hook relationship

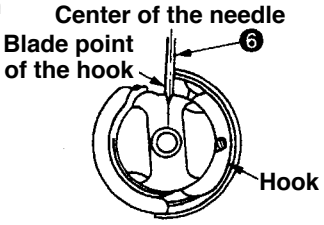
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

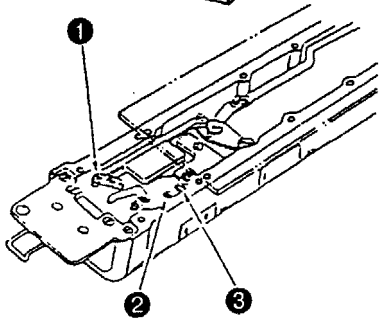
Standard adjustment

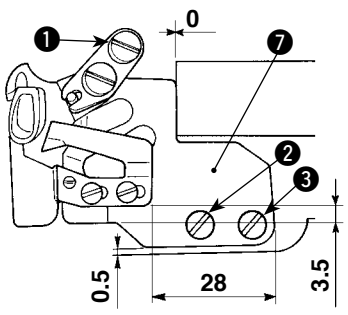
Adjust the needle-to-hook relationship, when the lower end of the needle bar ❺ is aligned with the upper end on the side 2 of the hook timing gauge ❹, so that a clearance of 0.02 to 0.08 mm is provided between the needle ❻ and the blade point of the inner hook and so that the blade point of the hook meets center of the needle ❻.

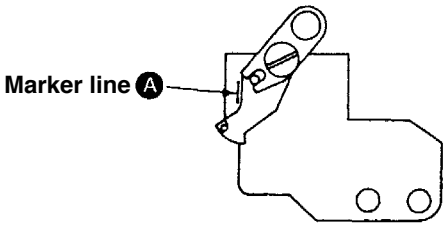












Adjustment procedures	Results of Improper adjustment
1. Remove throat plate A. 2. Remove the work clamp plunger. 3. Turn the handwheel by hand to bring the needle bar down to the lowest dead point. 4. Remove the rubber cap ❸ from the face plate cover. 5. Loosen the needle bar connection screw ❹ and properly adjust the height of the needle bar. 6. Loosen the needle bar connection screw ❹ and attach the rubber cap ❸ to the face plate cover.	o Stitch skipping or thread breakage will result.

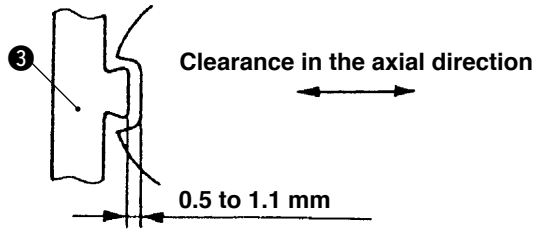
Adjustment procedures	Results of Improper adjustment
1. Remove throat plate A (the front side) from the bed surface. At this time, throat plate B should be held attached to the bed surface. 2. Remove screws ❶, ❷ and ❸ from the bed surface in the written order. Then remove knife mounting base ❼ from the bed surface. 3. Loosen three screws which are used to fix the hook. Properly adjust the relation between the needle ❻ and the blade point of the hook, then tighten the screws. 4. Attach knife mounting base ❼ to the bed surface. At this time, push the knife mounting base ❼ to the right against the processed face of the bed and provide a clearance of 0.5 mm in the lower side. Then, tighten screws ❷ and ❸. Lastly, tighten screw ❶. **(Caution) In step 4., confirm that marker line Ⓐ engraved on knife mounting base ❼ is almost aligned with the end face of the moving knife. If not, thread trimming failure may result.**	o If the clearance provided between the needle ❻ and the blade point of the hook is smaller than the specified value, the blade point of the hook will be damaged. As a result, thread splits finely or break. If the aforementioned clearance is larger than the specified value, stitch skipping will result. o If the blade point of the hook rests this side of the center of the needle ❻ (hook timing is late), thread will not be sufficiently tensed. (For spun thread, the hook timing is desired to be slightly retarded to finish higher quality seams. Frequency of occurrence of isolated idling loops and irregular stitches is reduced.) o If the blade point of the hook goes beyond the center of the needle ❻ (hook timing is early), thread will be excessively tensed. (Tetoron thread) o If the hook timing is excessively advanced or retarded, stitch skipping or thread breakage will result.

(3) Adjustment of the position of the bobbin case opening lever

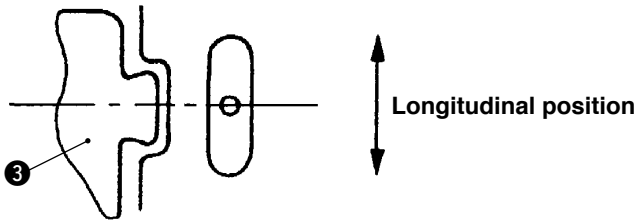
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

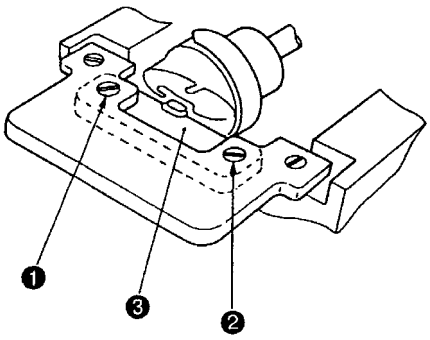
Standard adjustment

1. Adjust so that a clearance of 0.5 to 1.1 mm is provided, in axial direction, between the protruding section of the bobbin case opening lever ❸ and the slit on the inner hook.



2. Adjust the longitudinal position of the bobbin case opening lever ❸ so that the needle enters almost the center of the bobbin case opening lever ❸.



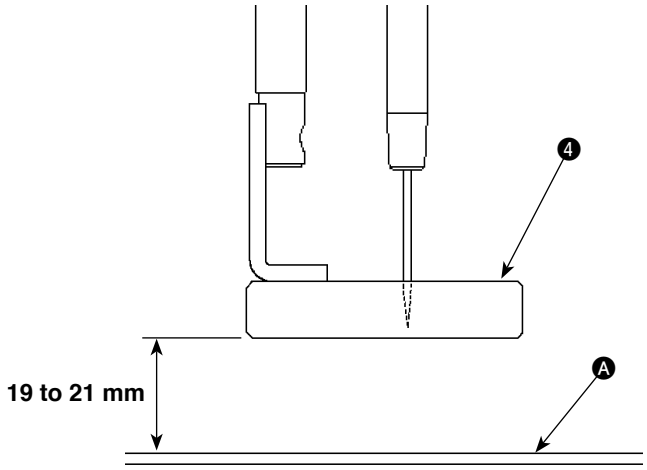
Adjustment procedures	Results of Improper adjustment
1. Remove the front side of the throat plate from the bed surface. 2. Loosen screws ❶ and ❷ and adjust the position of bobbin case opening lever ❸ by moving it back or forth and to the right or left.  	o If the clearance, in axial direction, is smaller than the specified value, thread will be not sufficiently tensed or isolated idling loops will be produced.

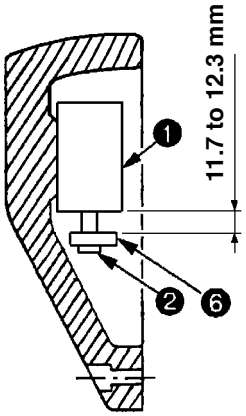
(4) Adjustment of the lifting amount of the work clamp plunger

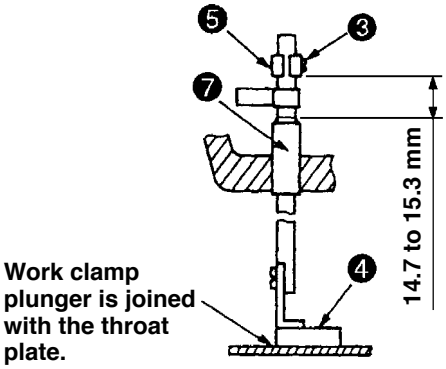
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment

Adjust so that the work clamp plunger ❹ rises 19 to 21 mm above the top surface of the throat plate Ⓐ when the power to the machine is turned ON.







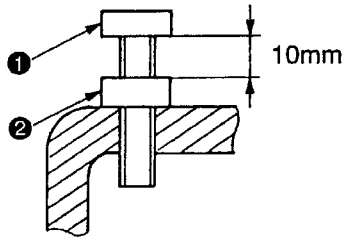
Adjustment procedures	Results of Improper adjustment
1. Turn the power ON. Press Set Ready key . 2. After the origin retrieval, the screen on which sewing is enabled appears. 3. Confirm that the bottom of the work clamp plunger ❹ is spaced 19 to 21 mm from the top surface of the throat plate Ⓐ. 4. If the work clamp plunger is not positioned, Press holder DOWN button to lower the work clamp plunger ❹. 5. Remove the face plate cover. Press holder UP button to retract cylinder ❶ inside the face plate cover. At this time, adjust the distance from metal fitting ❻ at the top of the cylinder to the underside of cylinder ❶ to 11.7 to 12.3 mm by means of screw ❷. 6. Confirm first that work clamp plunger ❹ is joined with the throat plate by the spring pressure given by the intermediate presser. Then, adjust screw ❸ so that the bottom end of presser bar position bracket ❺ is spaced 14.7 to 15.3 mm from the top end of the presser bar lower bush ❼. At this time, slot on presser bar position bracket ❺ should be faced toward you. 7. Press holder DOWN button to extend the air cylinder ❶. Then, attach the face plate cover to the machine arm. 8. Press holder UP button , and check the adjustment value.	o If the work clamp plunger ❹ fails to go up sufficiently, the holder of the conveyor will interfere with the work clamp plunger ❹. o If the work clamp plunger ❹ goes up excessively, the top end of the needle will protrude from the bottom of the work clamp plunger ❹. In this case, the needle tip will interfere with the holder of the conveyor, resulting in needle breakage. o If the face plate cove is positioned outside the specified range of dimension 11.7 to 12.3 mm, the work clamp plunger ❹ will fail to go up to the specified height with accuracy. o If the presser bar position bracket ❺ is attached to a position where the distance between the presser bar position bracket ❺ and the presser bar lower bushing exceeds 15.3 mm, the presser bar position bracket ❺ may interfere with the needle bar crank rod while the sewing machine is in operation.

(5) Adjustment of the pressure of the presser spring

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

Standard adjustment

Adjust the clearance provided between presser spring regulator ❶ and nut ❷ is 10 mm.

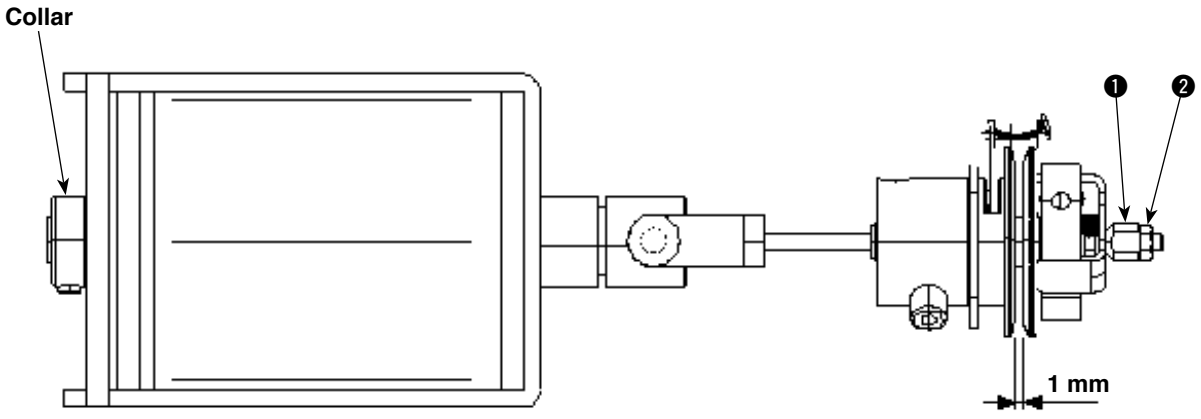


(6) Adjustment of the tension controller

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

Standard adjustment

Adjust the floating amount of the tension disk to 1 mm.



Adjustment procedures	Results of Improper adjustment
1. Loosen nut ❷ and properly adjust the pressure of the presser spring by turning presser spring regulator ❶.	o If the pressure of the presser spring is insufficient, defecive stitch pattern will be produced.

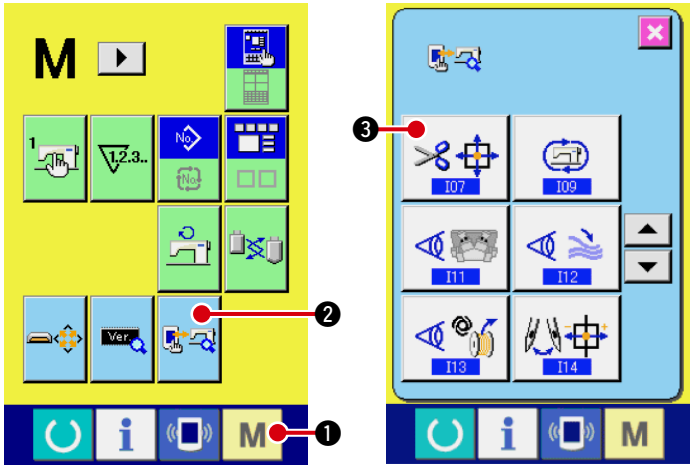
Adjustment procedures	Results of Improper adjustment
1. Loosen nuts ❶ and ❷. 2. Tighten nuts ❶ and ❷ with a spacer thickness of which is 1 mm placed between the tension disks.	o If the space between the tension disks is larger or smaller, thread tension will not be stabilized.

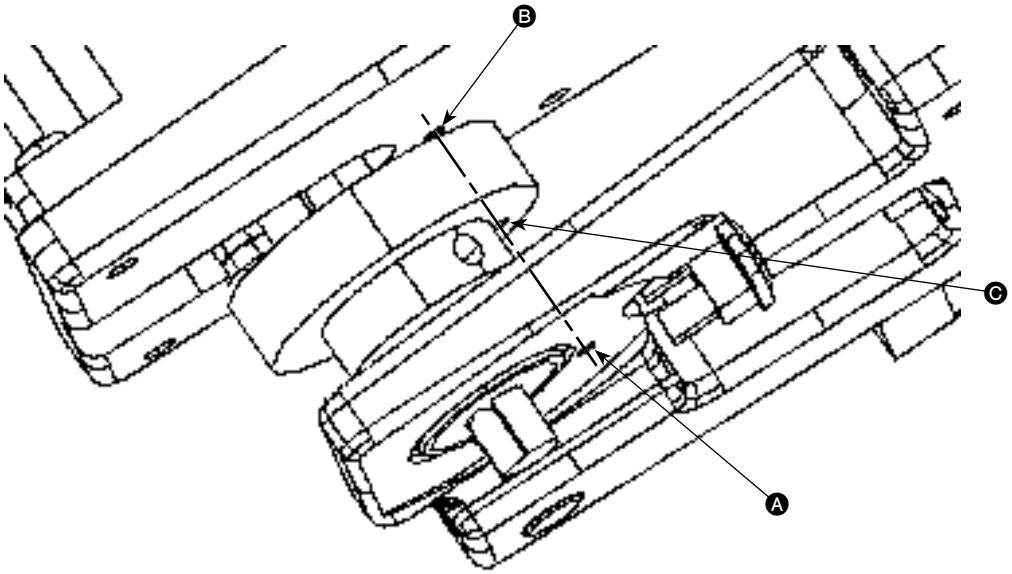
(7) Adjustment of the thread trimming cam

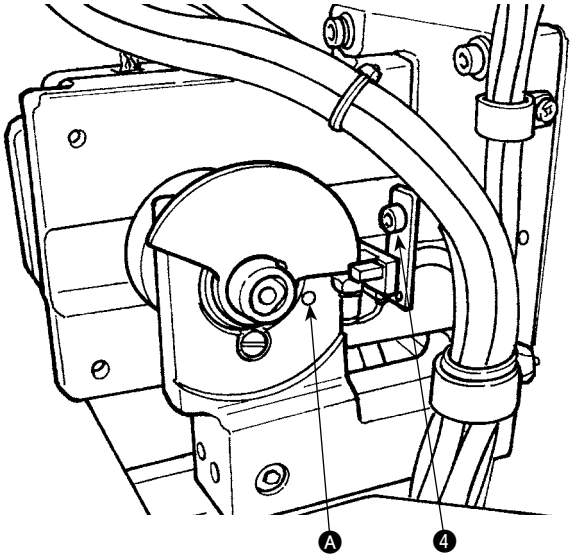
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment

When the origin retrieval is carried out, reference holes Ⓐ and Ⓑ in the motor base and reference hole Ⓒ in the thread trimming cam are in alignment with one another.





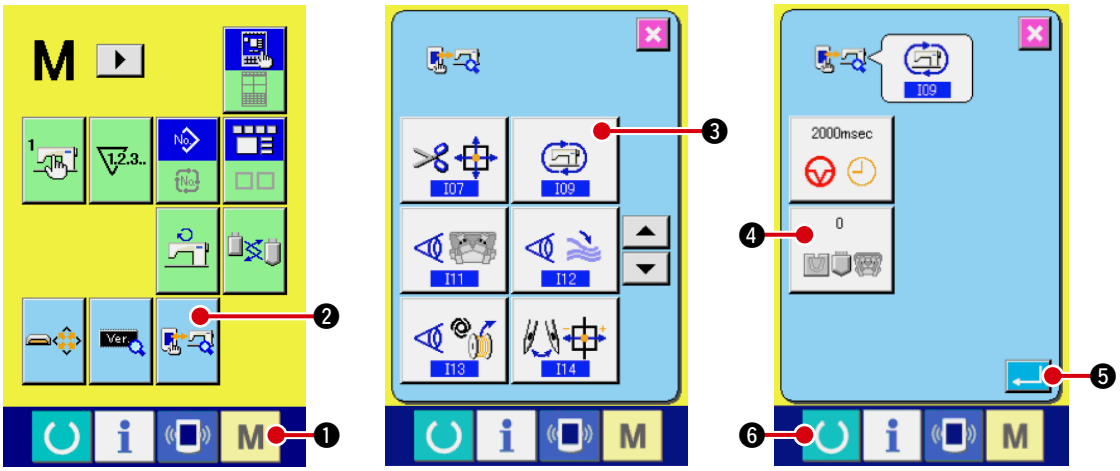


Adjustment procedures	Results of Improper adjustment
1. Turn the power ON. Then, keep M key ❶ held pressed to display the adjustment screen. 2. Press button  ❷ to select  ❸ "I07" thread trimmer origin check mode. 3. Press the START switch to carry out the origin retrieval to check that reference holes (ϕ3 mm) Ⓐ, Ⓑ and Ⓒ are aligned with one another. 4. If the reference holes are not aligned with one another, loosen setscrew ❹ of the sensor mounting plate, move the plate up or down appropriately, and press the START switch again to carry out the origin retrieval. Then, check to make sure that the reference holes are aligned with one another.	o If the reference holes are not aligned with one another, the tread trimming cam timing fault can occur, resulting in faulty thread trimming.

(8) Adjustment of the amount of oil

WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment



1. Turn the power ON. Then, keep M key ❶ held pressed to display the adjustment screen.
2. Press button ❷ to select ❸ "I09" operation mode.
3. Select "0" (continuous operation of the machine head only) ❹ and press ENTER button ❺.
4. Press Set Ready key ❻ to put the machine into operation.
5. Press the START switch to run the machine head.
6. After the sewing machine started and has completed **five or more cycles** , put a sheet of checking paper in the hook and face plate to measure trace of oil. Measure the amount of oil in the hook or face plate during the time in which the machine performs **one cycle** of sewing.

   * Figures 1 and 2 show the appropriate amount of oil in the hook and face plate.

Trace of oil on the checking paper placed in the hook

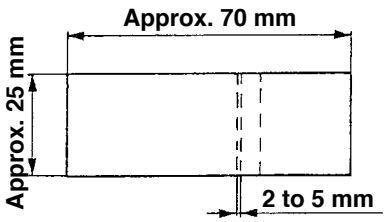


Fig. 1

Trace of oil on the checking paper placed in the face plate

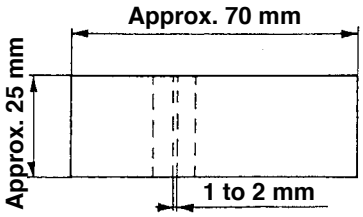
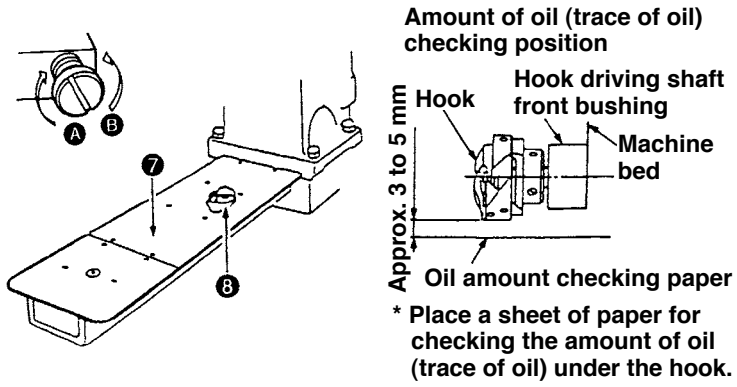
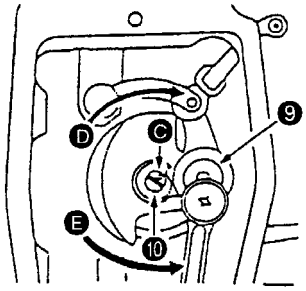


Fig. 2

(Caution)

1. **When measuring the amount of oil, take care not to allow the checking paper to come in contact with the periphery of the hook or the rotating parts in the face plate. (If the paper comes in contact with such parts, accurate data cannot be obtained.)**
2. **Confirm that the amount of oil in the oil pan is adequate.**
3. **Adjusting the amount of oil under the machine head independent operation mode will allow you to accurately adjust it in accordance with sewing patterns to be used by a customer.**
4. **To run the machine head, remove the bobbin and the needle thread in advance.**
5. **After the end of measuring the amount of oil, turn off the power supply.**

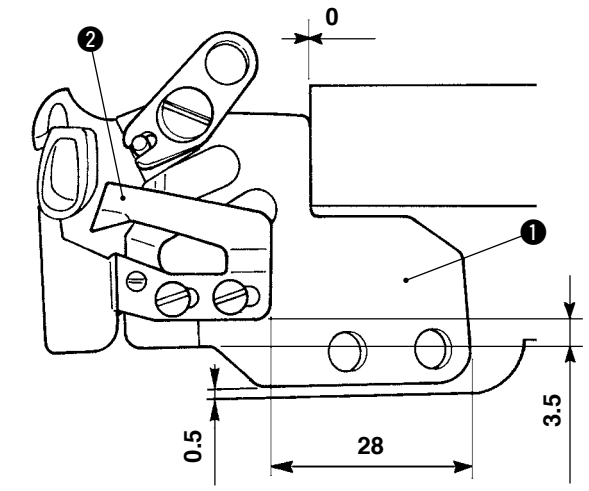
Adjustment procedures	Results of Improper adjustment
[Adjustment of the amount of oil in the hook]  1. Remove throat plate ❼. Turn oil amount adjustment screw ❽ that is mounted on the hook lubricating manifold in the "+" direction (direction Ⓐ) to increase the amount of oil (trace of oil), or in the "-" direction (direction Ⓑ) to decrease it 2. After the oil amount is adjusted using oil amount adjustment screw ❽, run the machine idle by approximately five cycles and confirm the oil amount. **(Caution) The amount of oil should be checked using three sheets of checking paper. Confirm that the trace of oil remains the same for each of the three sheets.**	o If the amount of oil in the hook is insufficient, the hook will be seized or become hot. o If the amount of oil in the hook is excessive, the sewing material will be stained with oil.
[Adjustment of the amount of oil in the face plate]  1. Adjust the amount of oil to be fed to the thread take-up lever and needle bar crank unit ❾ by turning oil amount adjustment screw pin ❿. 2. The oil amount is minimized by turning the adjusting pin in direction Ⓓ until marker dot Ⓒ engraved on the pin moves from the position in the figure and reaches near needle bar crank unit ❾. 3. The oil amount is maximized by turning the adjusting pin in direction Ⓔ from the position in the figure to the position opposite to the needle bar crank. 4. After the oil amount is adjusted using oil amount adjusting pin ❿, run the sewing machine idle by approximately five cycles and confirm the amount of oil. **(Caution) The amount of oil should be checked using three sheets of checking paper. Confirm that the trace of oil remains the same for each of the three sheets.**	o If the amount of oil to be fed to the face plate components is insufficient, the face plate components will extremely wear out or become hot. o If the amount of oil to be fed to the face plate components is excessive, the sewing material will be stained with oil.

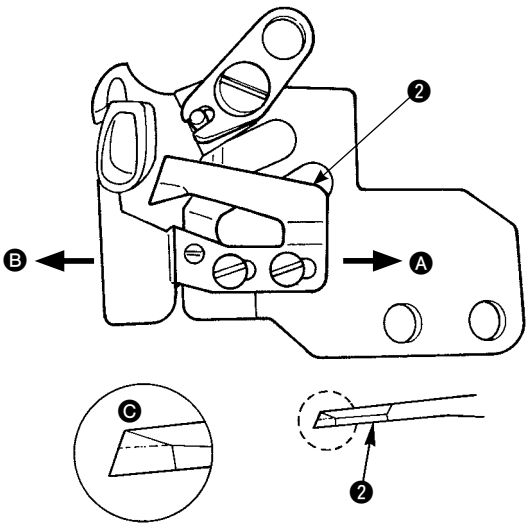
(9) Positioning the counter knife and the knife thread guide

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

Standard adjustment

1. Knife mounting base ❶ should be attached so that it is positioned 0 mm to the right against the processed section of the machine bed and 0.5 mm above the processed section of the machine bed.
2. Attach counter knife ❷ so that it is positioned 28 mm to the left and 3.5 mm above against knife mounting base ❶ that has been attached as in aforementioned step 1.



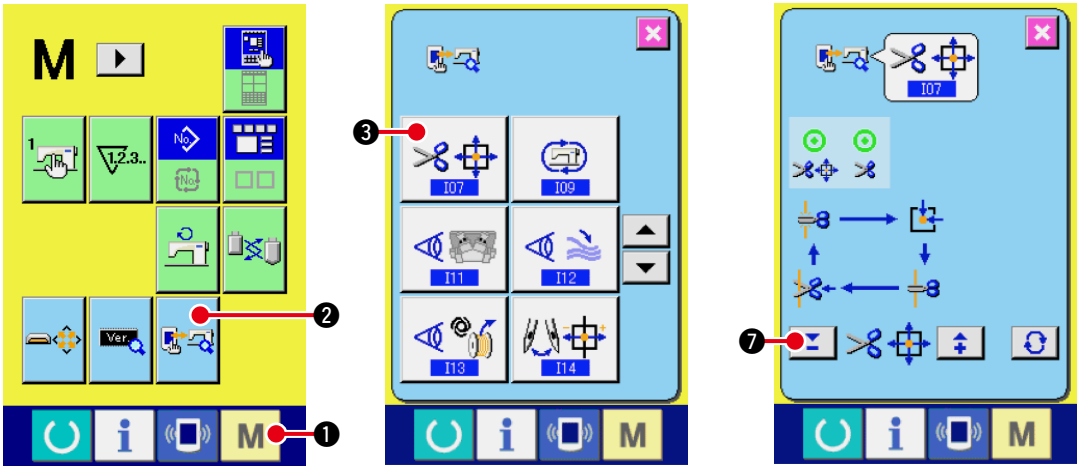


Adjustment procedures	Results of Improper adjustment
1. If the knife sharpness has deteriorated, re-sharpen counter knife ❷ soon as illustrated in Fig. Ⓒ. Then re-attach it in position. 2. If the mounting position of the counter knife ❷ is moved in the right (direction Ⓐ) from the standard mounting position, length of the thread remaining after thread trimming will be longer than the standard length by the distance between the standard position. 3. If the mounting position of the counter knife ❷ is moved in the left (direction Ⓑ), length of the thread remaining after thread trimming will be shorter than the standard length accordingly. **(Caution) If the installing angle of the counter knife ❷ blade changes, sharpness of the knife will also change. It is therefore necessary to check the knife for sharpness whenever you have adjusted the position of the counter knife ❷ or replaced the knife.**	o If the installing angle of the counter knife ❷ blade is changed, sharpness of the knife will also change. When the blade of the counter knife ❷ meets the blade of the moving knife with accuracy, the knives will cut the thread sharp.

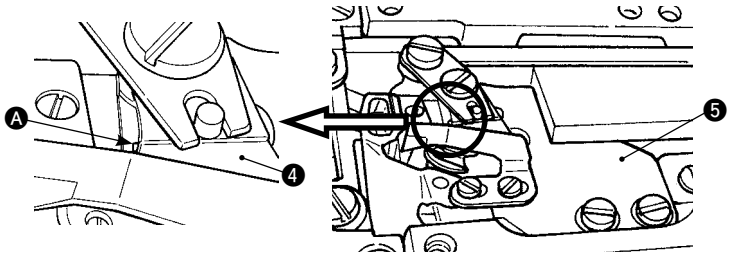
(10) Adjustment of the maximum receding amount of the moving knife

WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

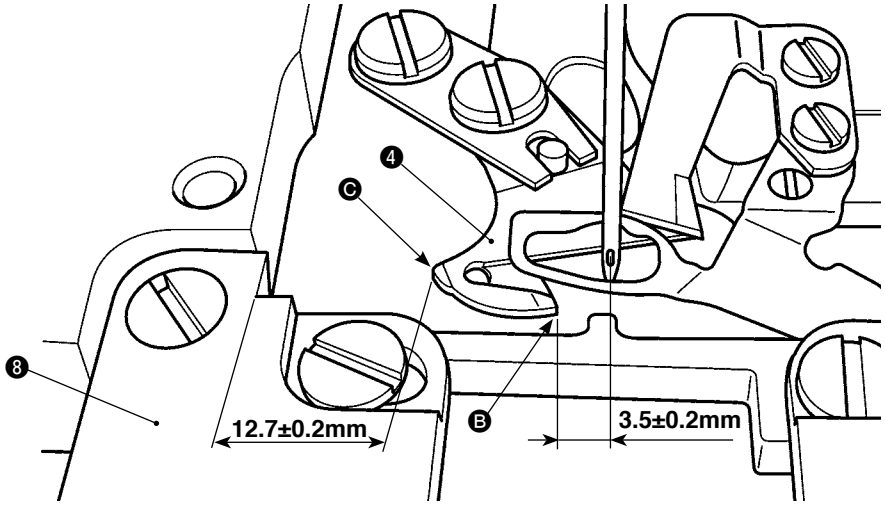
Standard adjustment



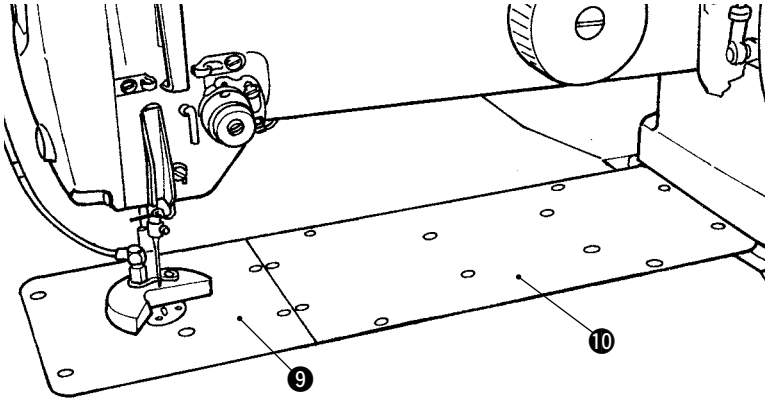
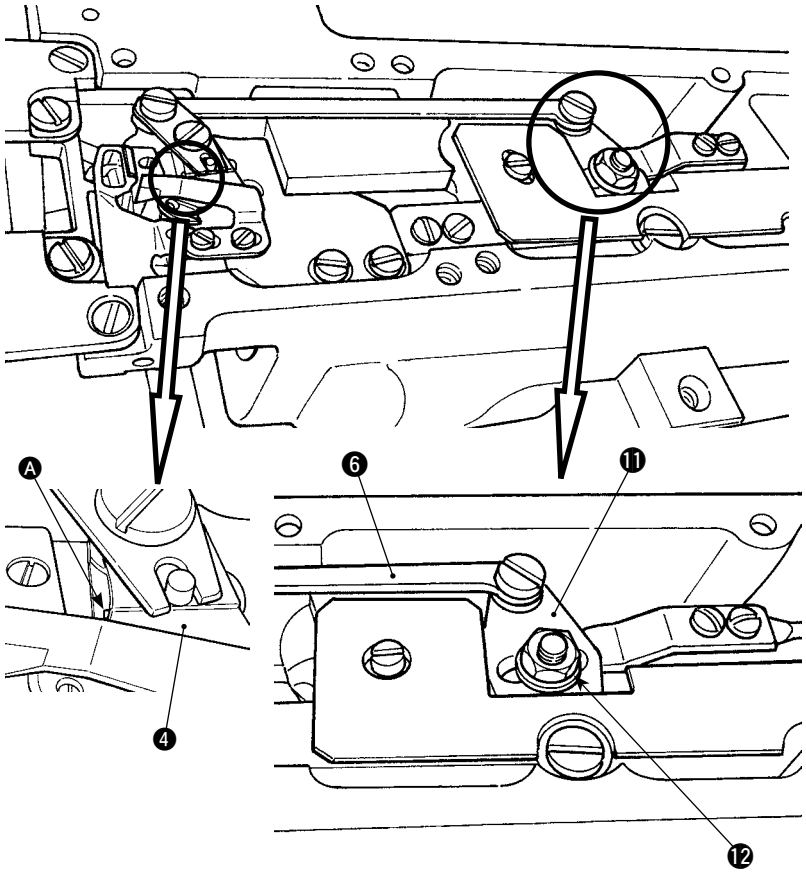
1. Turn the power ON. Then, keep M key ❶ held pressed to display the adjustment screen.
2. Press button  ❷ to select  ❸ "I07" thread trimmer origin check mode.
3. Press the START switch to carry out the origin retrieval.
4. Adjust so that the initial position of moving knife ❹ is aligned with the left end of marker line Ⓐ on knife mounting base ❺.



5. At this time, press  button ❼ to move moving knife ❹ to maximum receding position, and check to make sure that the distance from the center of needle to top end Ⓑ of moving knife ❹ is 3.5 ± 0.2 mm.



In addition, the position of moving knife ❹ can also be adjusted properly by adjusting the distance from the notch of bobbin case opening lever mounting plate ❽ to top end Ⓒ of moving knife ❹ to 12.7 ± 0.2 mm.

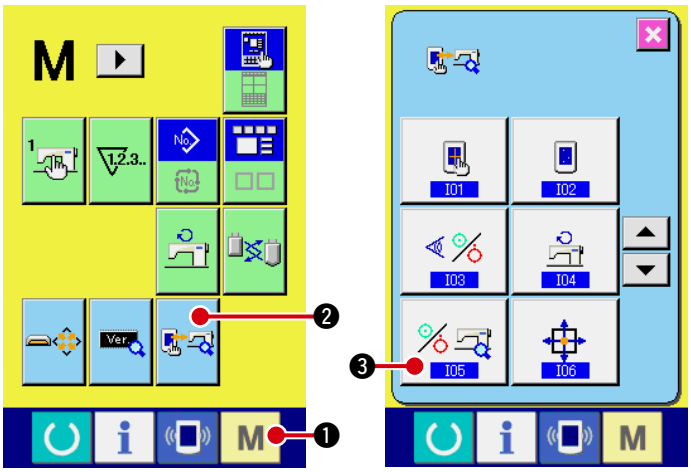
Adjustment procedures	Results of Improper adjustment
1. Remove throat plates A ❾ and B ❿.  2. Loosen nut ⓬ of moving knife link ⓫. Move moving knife link D ❻ to the right or left so that the end face of moving knife ❹ is aligned with the left end of marker line Ⓐ on knife mounting base ❺. Then, tighten nut ⓬.  	o If the stroke of the moving knife ❹ is smaller than the specified value, the knife will fail to spread the thread, resulting in thread trimming failure. o If the stroke of the moving knife ❹ is larger than the specified value, the timing of the thread spreader will be excessively advanced. This means that the moving knife ❹ begins to move before the knife thread guide separates the thread, causing the knife will fail to spread the thread, and the needle thread to be cut too short.

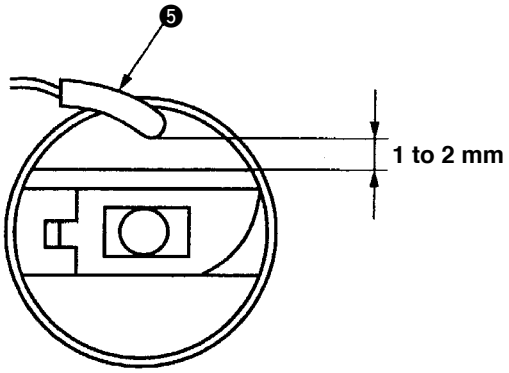
(11) Adjustment of the picker

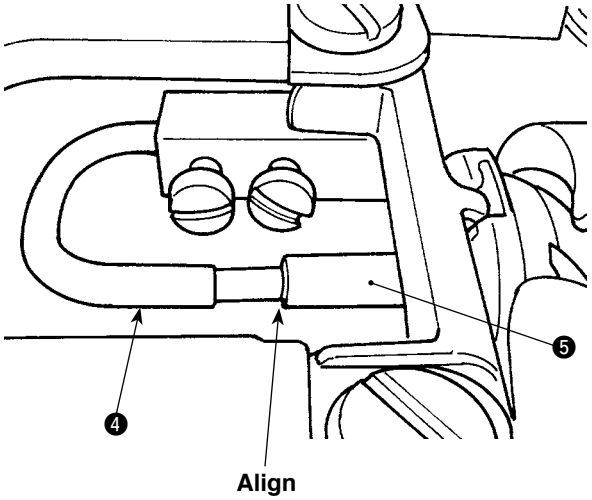
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

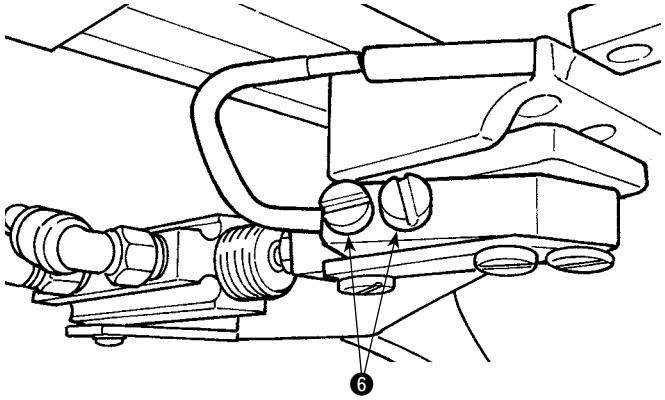
Standard adjustment

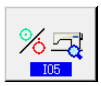
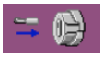
When the picker ❹ presses the bobbin, adjust the bobbin presser ❺ on the top end of the picker ❹ is spaced 1 to 2 mm from the notch at the top of the bobbin case and that the marker line engraved on the picker ❹ is aligned with the end face of the bobbin presser ❺.









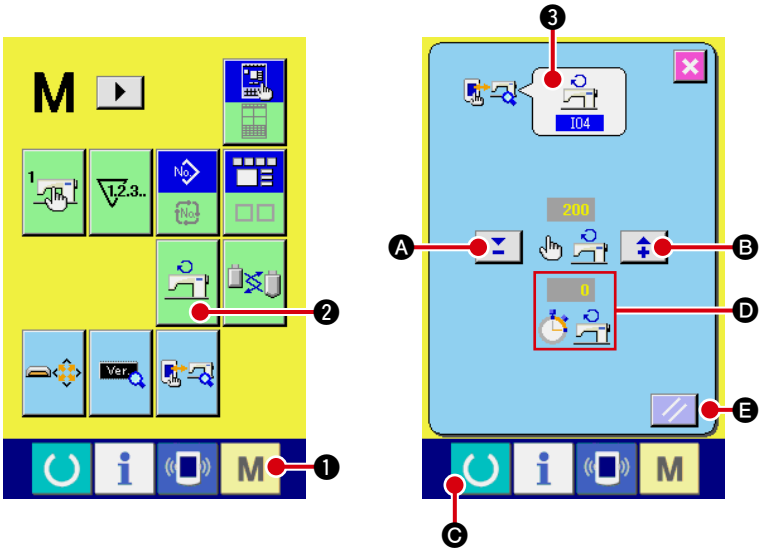
Adjustment procedures	Results of Improper adjustment
1. Turn the power ON. Then, keep M key ❶ held pressed to display the adjustment screen. 2. Press button  ❷ to select  ❸ "I05" output check mode. 3. Press the  button to activate the picker ❹. Loosen set-screw ❻ of the thread take-up finger. Adjust so that the picker ❹ is spaced (1 to 2 mm) from the bobbin case, and so that the marker line is aligned with the end face of bobbin presser ❺.	o If bobbin presser ❺ does not come in contact with the bobbin, the bobbin will run idle. This will cause the bobbin thread to be caught in the bobbin case, resulting in bobbin thread breakage or thread knot may not be formed properly at the sewing start. Furthermore, the needle thread will slip off the bobbin presser ❺ at the time of thread trimming. In this case, the length of needle thread remaining after thread trimming will be extremely shortened.

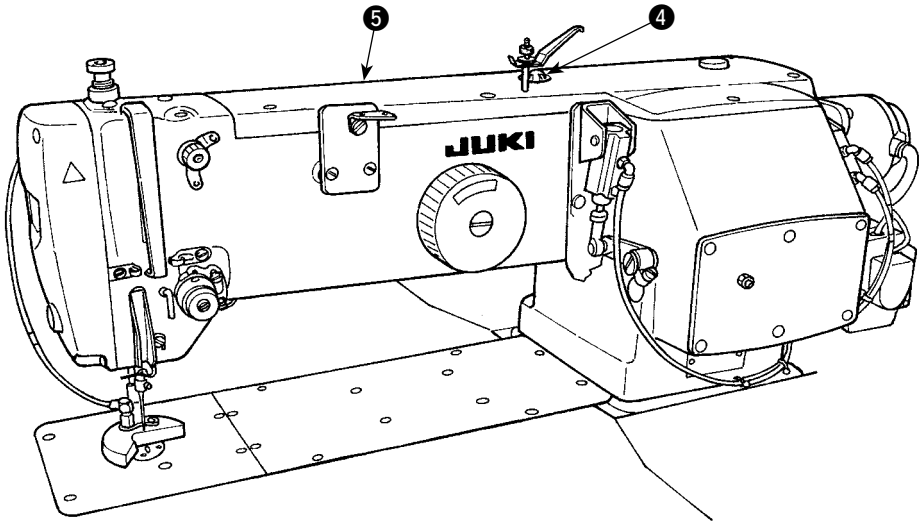
(12) Adjustment of the plunger pump

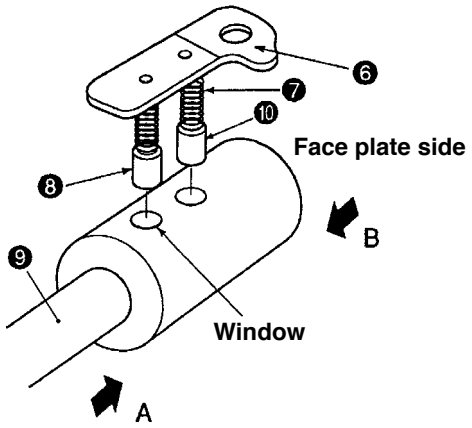
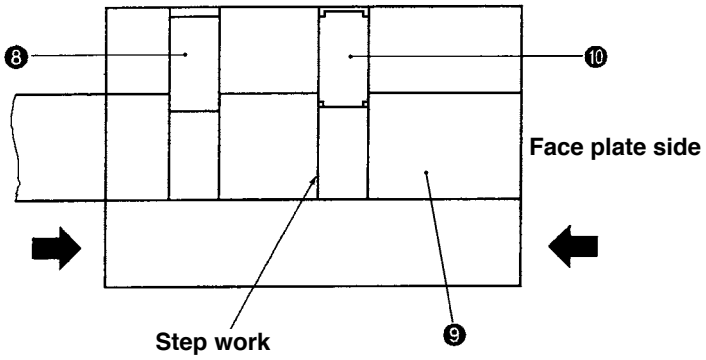
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment

1. Turn the power ON. Then, keep M key ❶ held pressed to display the adjustment screen.
2. Press button ❷ to select ❸ "I04" main motor rpm check mode.
3. Using the –/+ buttons Ⓐ • Ⓑ, gradually increase the number of rotations of the sewing machine up to approximately 2,000 sti/min.
   When the button Ⓒ is pressed, the sewing machine is operated at the preset speed. At that time, the measured rpm value is displayed at Ⓓ. When the SET button Ⓔ is pressed, the sewing machine is stopped.
4. Confirm that oil comes out through the oil sight window ❹.





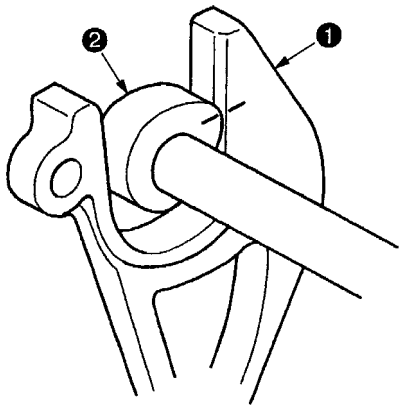
Adjustment procedures	Results of Improper adjustment
1. Remove the top cover ❺. 2. Remove plunger spring support ❻. 3. Remove plunger pressing spring ❼.  4. Rotate the main shaft ❾, and confirm that plunger ❽ moves up or down.  5. If the plunger does not move up or down, strike the bushing from direction A or direction B with a brass bar or the like so that the step work on the main shaft ❾ cannot be seen from the window. • Plunger ❽ : Without chamfering on the top end • Plunger ❿ : With chamfering on the top end	o The main shaft ❾, etc. will be seized due to the insufficient oil amount. o Stitch failure will be produced due to the insufficient oil amount.

(13) Adjustment of the timing of the needle throwing

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

Standard adjustment

When the needle throws to the left at the right side needle line, the marker line of the forked section of the needle bar rocking rod ❶ should be aligned with the engraved marker line of the needle bar rocking cam ❷ at the position where the needle bar is in its lowest point. (When the needle lowers and passes the throat plate, the needle should finish its throwing.)

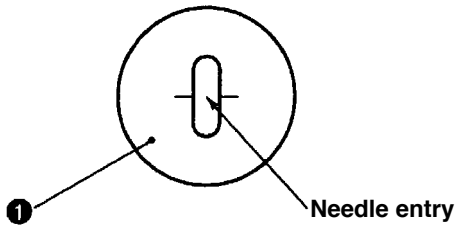


(14) Adjustment of the position of the needle entry

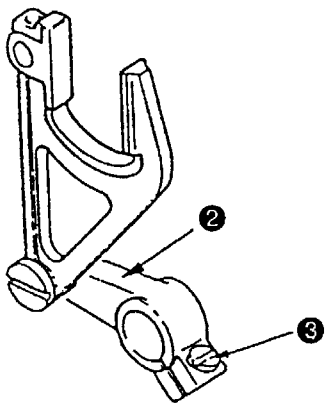
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Standard adjustment

When the needle throwing is not performed, the needle should enter the engraved marker line on the needle hole guide ❶ in the throat plate. (Tie stitch)



Adjustment procedures	Results of Improper adjustment
Adjust the timing using the needle throw gear, small. <Checking after the adjustment> Place a sheet of paper on the needle entry position, turn the hand-wheel by hand and check whether the needle sways in the lateral direction.	o When the engraved marker lines are not aligned with each other, the needle sways, causing needle breakage, stitch skipping, etc.

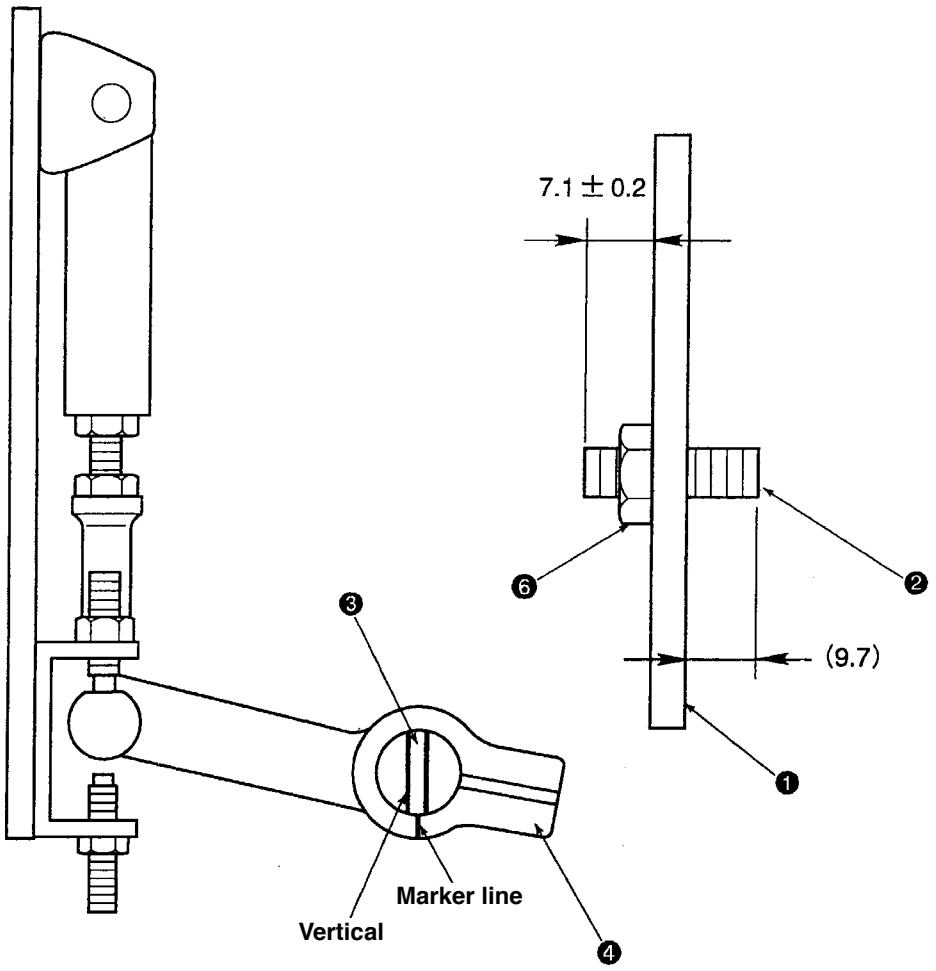
Adjustment procedures	Results of Improper adjustment
When the needle entry position is not correct even if the engraved marker line of the forked section of the needle bar rocking rod is aligned with the engraved marker line of the needle bar rocking cam when the repositioning lever is at the right side needle line and the needle bar is in its lowest point, adjust the needle entry point by loosening the screw ❸ in the needle bar rocking arm, rear ❷.  	o If the needle entry position is not correct, the one side of the needle hole guide comes in contact with the needle when the needle throw width is increased, causing needle breakage or thread breakage.

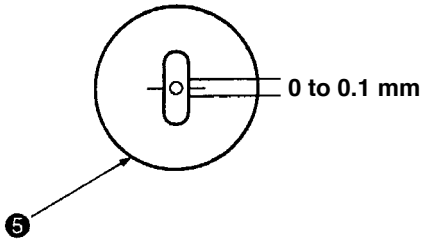
(15) 0 (zero) adjusting

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

Standard adjustment

1. When the level difference between the stopper plate ❶ and "0" pitch adjusting screw ❷ is 6.9 to 7.3 mm, the needle throw width at the tie stitch is 0 to 0.1 mm.
2. Loosen the screw in the regulating arm ❹ and adjust so that the slit of the repositioning lever shaft ❸ becomes level.

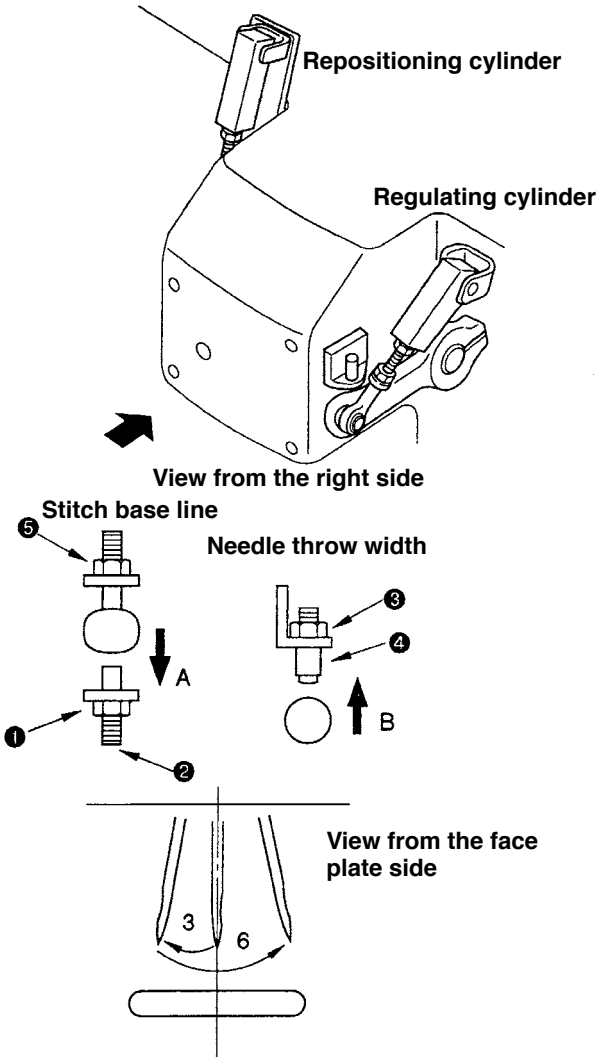


Adjustment procedures	Results of Improper adjustment
Slightly adjust the needle throw width so that the needle throw width becomes 0 to 0.1 mm at the needle set on the marker line of the needle hole guide ❺. Loosen the "0" pitch adjusting nut ❻ and adjust the needle throw width by turning the "0" pitch adjusting screw ❷.  	o If the adjustment of the "0" adjusting is not correct, causing uneven stitch length.

(16) Changing the needle throw width

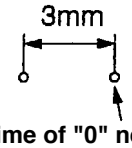
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment



Example) Changing the current 2 mm stitch base line and 4 mm needle throw width to 3 mm stitch base line and 6 mm needle throw width

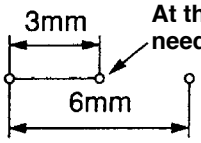
1. Loosen nut ❶ and lower stopper screw ❷. At this time, place a sheet of paper on the needle hole, turn the handwheel, and push down the repositioning lever in direction A. Then, check the needle entry position.



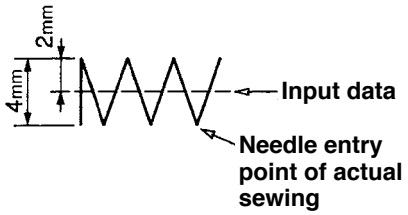
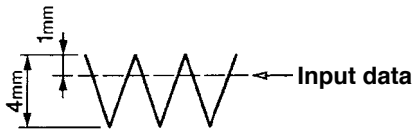
At the time of "0" needle throw width

After confirming the 3 mm, tighten nut ❶.

2. Keeping the repositioning lever push down in direction A, loosen nut ❸, and shift upward stopper screw ❹.
At this time, push up the needle throw width regulating lever in direction B, and turn the handwheel by hand. Then, checking the needle entry position, move stopper screw ❹ up or down so that the needle throw width becomes 6 mm. Then, tighten nut ❸.



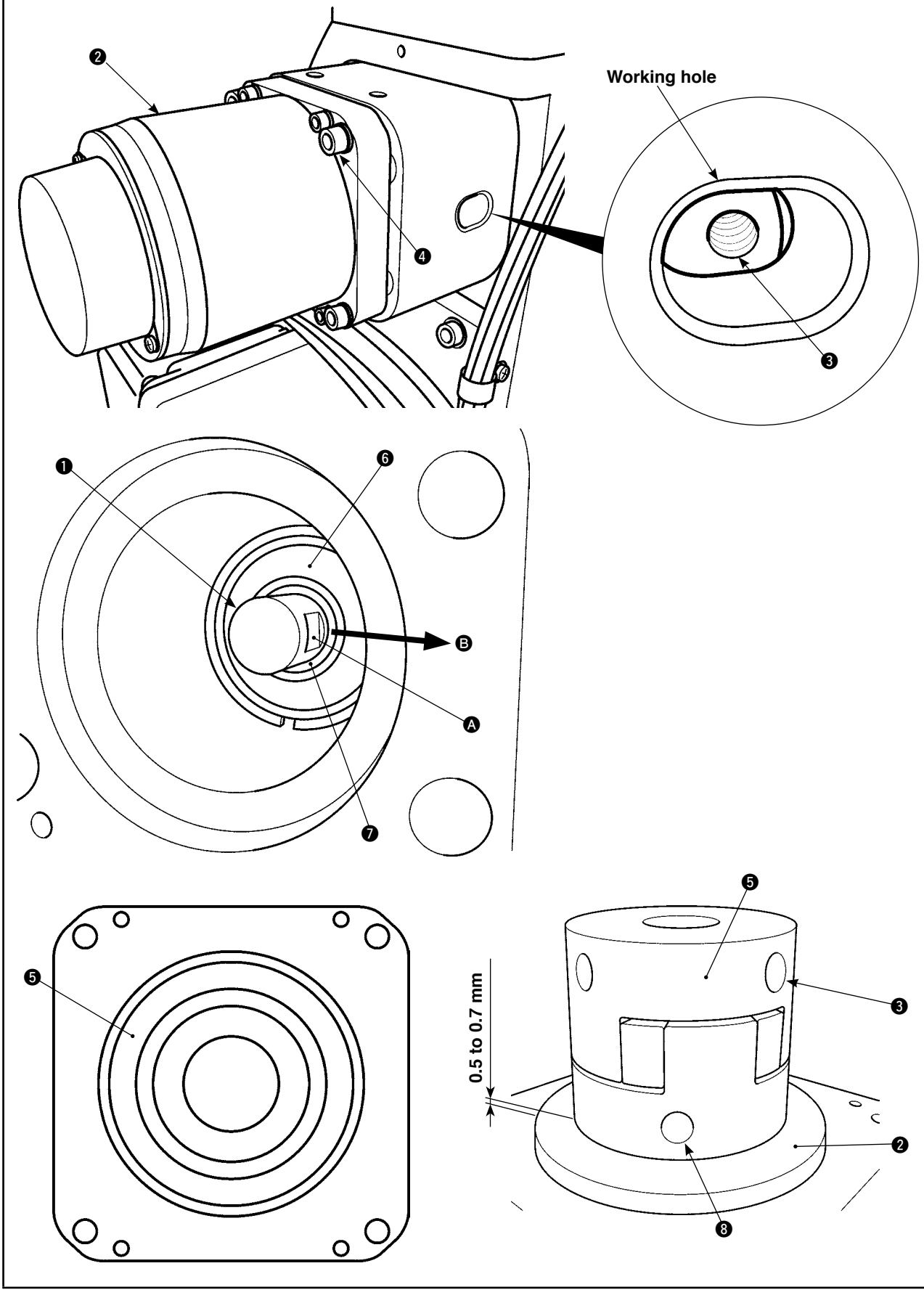
* Max. stitch base line: 3 mm
Max. needle throw width: 6 mm

Adjustment procedures	Results of Improper adjustment
(Caution) **1. Although the max. needle throw width is 6 mm same as that of the standard adjustment value, if the stitch base line and the needle throw width are changed without making a balance, the frame rock components interfere with other components, resulting in motor-lock which is linked to the damage of the parts. So, be careful.** **2. If loosening nut ❺, the origin ("0" point) will shift and the presser plate interferes with the needle, causing needle breakage. So, do not loosen nut ❺.** **3. The actual finish of sewing is smaller by approximately 1 mm than the needle throw width which was dropped on the paper. If desired to obtain the needle throw width of 4 mm, it is necessary to adjust the needle throw width of approximately 5 mm.**	In case of adjusting the stitch base line of 2 mm and the needle throw width of 4 mm, the sewing shape against the input pattern will be as shown in the figure below.  In case of adjusting the stitch base line of 1 mm and the needle throw width of 4 mm, the sewing shape will be as shown in the figure below.  Standard adjustment value at the time of delivery is set to the stitch base line of 2 mm and the needle throw width of 4 mm. However, it depends on the customer's specifications.

(17) Removing/assembling the sewing machine motor

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

Standard adjustment



Adjustment procedures	Results of Improper adjustment
<Removing the sewing machine motor> 1. Remove the motor cover. 2. Loosen coupling setscrew ❸ (screw No. 2) which is used to connect main shaft ❶ and motor ❷. **(Caution) Screw No. 2 ❸ of the coupling is located on flat section Ⓐ of main shaft ❶ in terms of the rotating direction of the machine head.** 3. Remove four motor setscrews ❹. Pull motor ❷ to remove motor ❷. **(Caution) O ring ❼ is placed between the end face of coupling ❺ and main shaft bearing ❻. Check to be sure that O ring ❼ is placed between them before assembling motor ❷.** **<Assembling the sewing machine motor>** 1. Turn the hand pulley so that flat section Ⓐ of the main shaft is oriented in direction of arrow Ⓑ (toward the working hole). 2. Fit the hole in coupling ❺ on main shaft ❶. Fix coupling setscrew ❸ (screw No. 2) on flat section Ⓐ of main shaft ❶. 3. The flat section of the motor shaft is fixed with screw No. 1 ❽ of the coupling in terms of the rotating direction of the machine head. 4. Adjust to ensure that a clearance of 0.5 to 0.7 mm is provided between coupling ❺ and motor ❷.	

4. Standard adjustment of device components

(1) Adjustment of the origin

1) Adjustment of the X origin

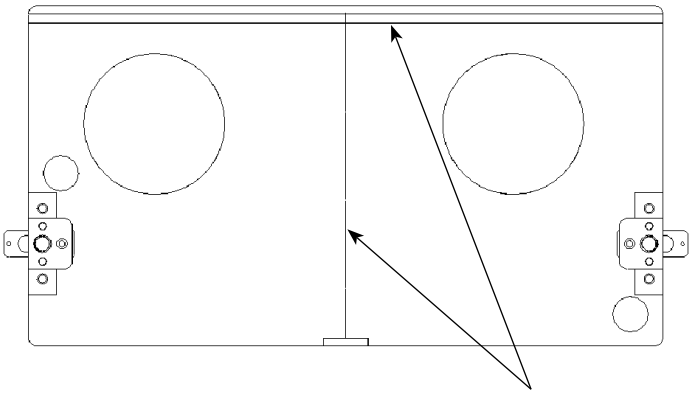
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

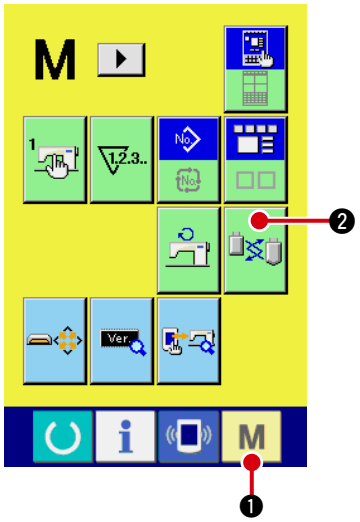
Standard adjustment

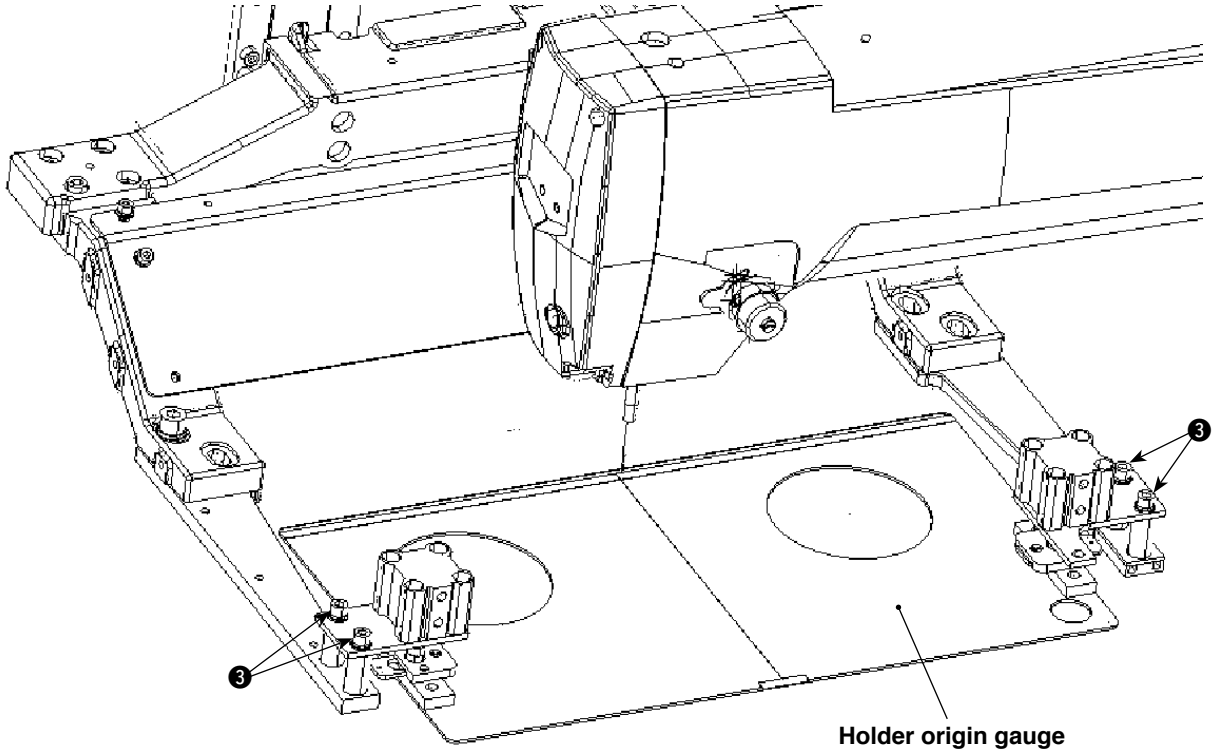
1) Adjustment of the X origin 1

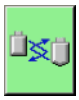
When the holder origin gauge is moved in the X-direction, the needle tip has to move along the marking-off line.

Holder origin gauge







Adjustment procedures	Results of Improper adjustment
The holder origin gauge is necessary for this adjustment. 1. Turn the power ON. 2. Keep M key ❶ on the operation panel held pressed until the adjustment screen is displayed. 3. Press button  ❷ to select the pattern change mode. Install the holder origin gauge. 4. Display the main body input screen. 5. Select JUMP to check the gauge for parallelism. Check to be sure that the marking-off line of the origin gauge is in parallel to the needle tip. If they are not in parallel to each other, loosen screws ❸ to adjust the position of the gauge. 6. Once the parallelism of the gauge in terms of X and Y directions is achieved, carry out adjustment of the origin by means of the XY origin adjustment method.	o There is variability among machines. o Positioning of the X-Y origin with respect to the pattern board has to be carried out every time the pattern board is changed.

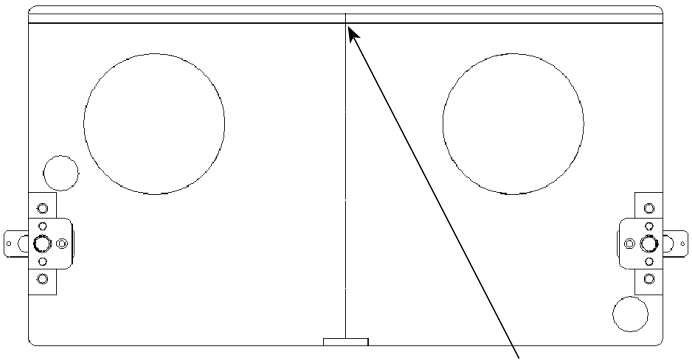
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment

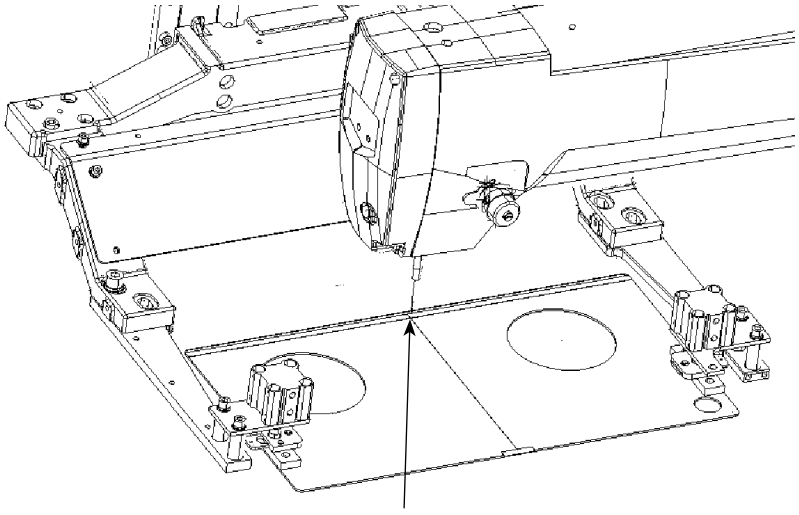
1) Adjustment of X the origin 2

The center marker dot of the holder origin gauge has to be aligned with the needle tip.

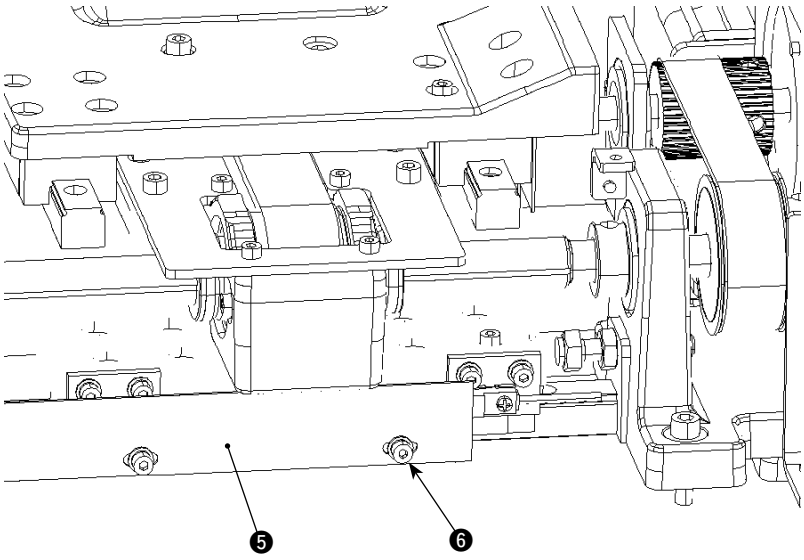
Holder origin gauge

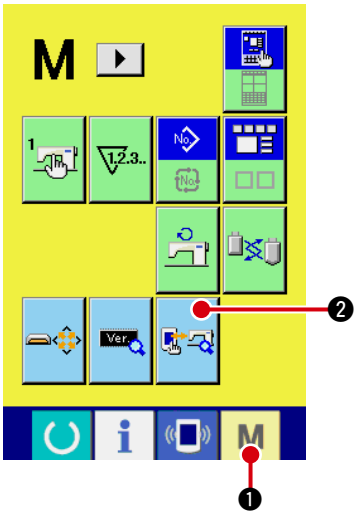


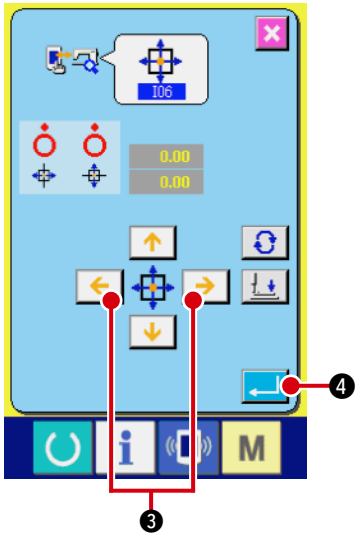
Center marker dot

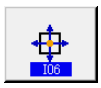


Needle tip aligns with the center marker dot.







Adjustment procedures	Results of Improper adjustment
The holder origin gauge is necessary for this adjustment. 1. Turn the power ON. Install the holder origin gauge under the pattern change mode. 2. Keep M key ❶ on the operation panel held pressed until the adjustment screen is displayed. 3. Press button  ❷ to select  "I06" X-Y motor/origin sensor check mode. 4. The "I06" X-Y motor/origin sensor check mode screen is displayed. 5. Press button  ❸ which moves horizontally to align the needle tip with the center marker dot of the holder origin gauge. 6. Press button  ❹ to terminate adjustment. Refer to "8.-7) X-Y motor/presser plate origin adjustment" for how to carry out the adjustment. 7. In the case the needle tip and the center marker dot are not aligned even if the adjustment value (-9.9 to +9.9) is exceeded, loosen setscrew ❻ of X sensor slit ❺ to move the slit to the right or left for adjustment.	o There is variability among machines.

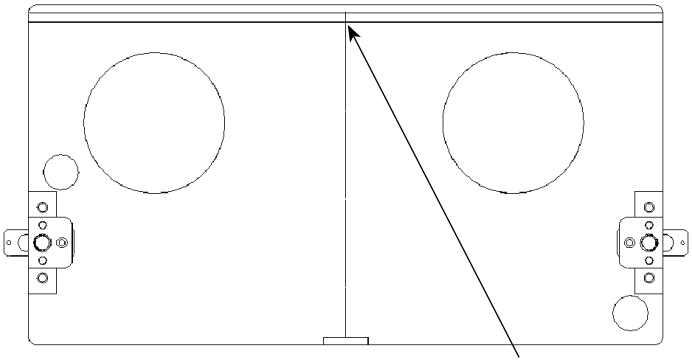
2) Adjustment of the Y origin

WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

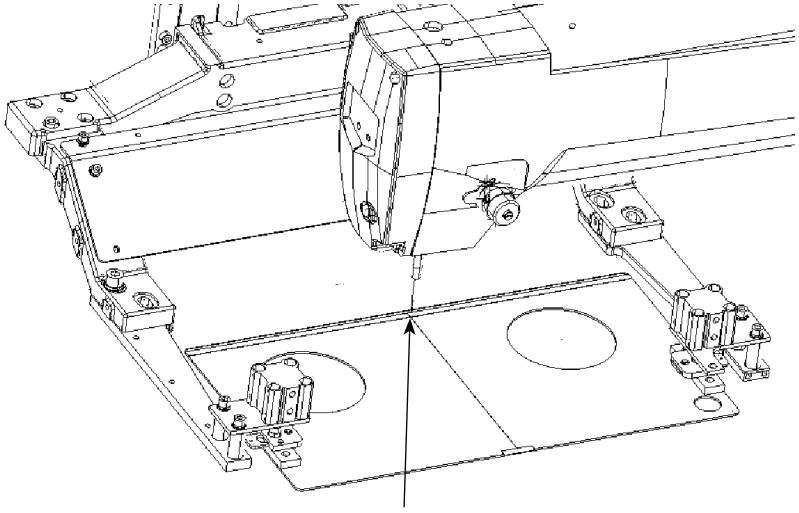
Standard adjustment

The center marker dot of the holder origin gauge has to be aligned with the needle tip.

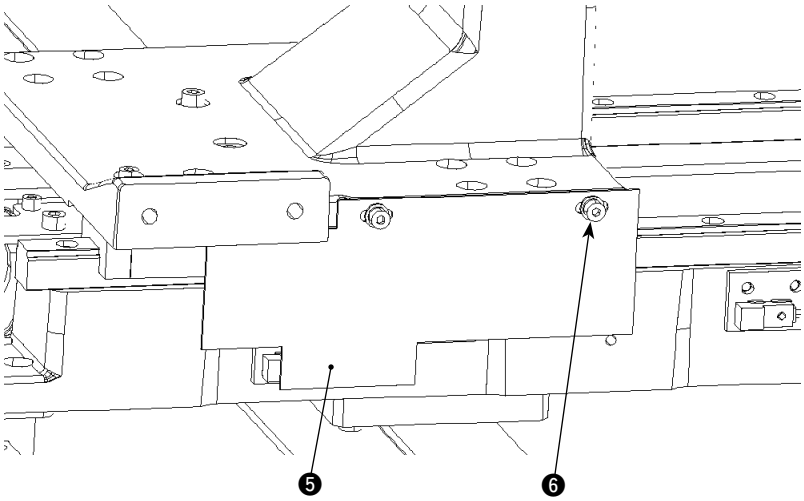
Holder origin gauge

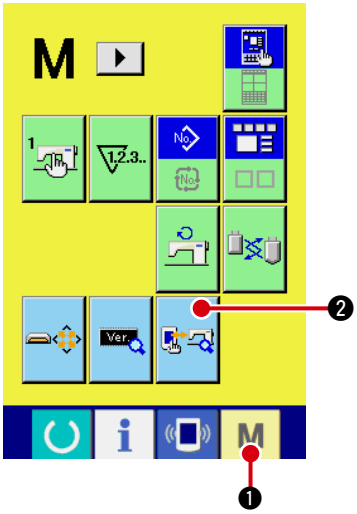


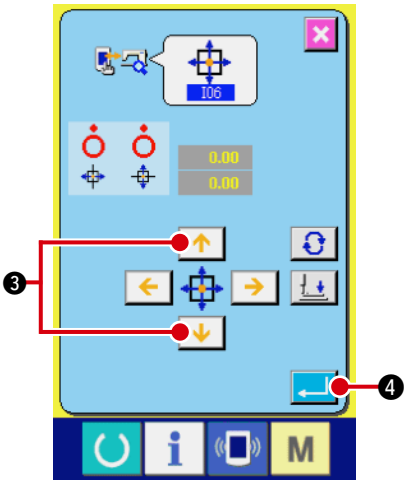
Center marker dot

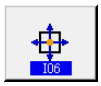


Needle tip aligns with the center marker dot.







Adjustment procedures	Results of Improper adjustment
The holder origin gauge is necessary for this adjustment. 1. Turn the power ON. Install the holder origin gauge under the pattern change mode. 2. Keep M key ❶ on the operation panel held pressed until the adjustment screen is displayed. 3. Press button  ❷ to select  "I06" X-Y motor/origin sensor check mode. 4. The "I06" X-Y motor/origin sensor check mode screen is displayed. 5. Press button  ❸ which moves vertically to align the needle tip with the center marker dot of the holder origin gauge. 6. Press button  ❹ to terminate adjustment. Refer to "8.-7) X-Y motor/presser plate origin adjustment" for how to carry out the adjustment. 7. In the case the needle tip and the center marker dot are not aligned even if the adjustment value (-9.9 to +9.9) is exceeded, loosen setscrew ❻ of Y sensor slit ❺ to move the slit to the right or left for adjustment.	o There is variability among machines.

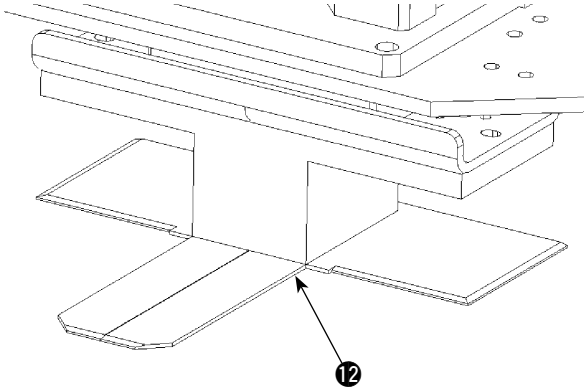
3) Adjustment of the origin of the pattern board and the folding unit

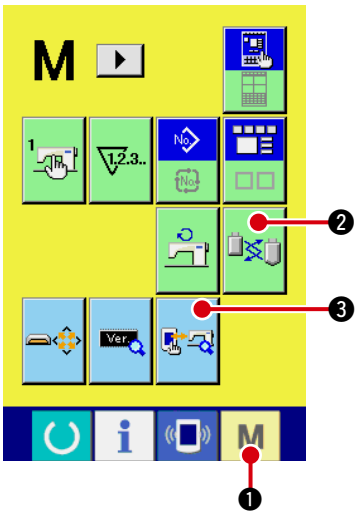
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

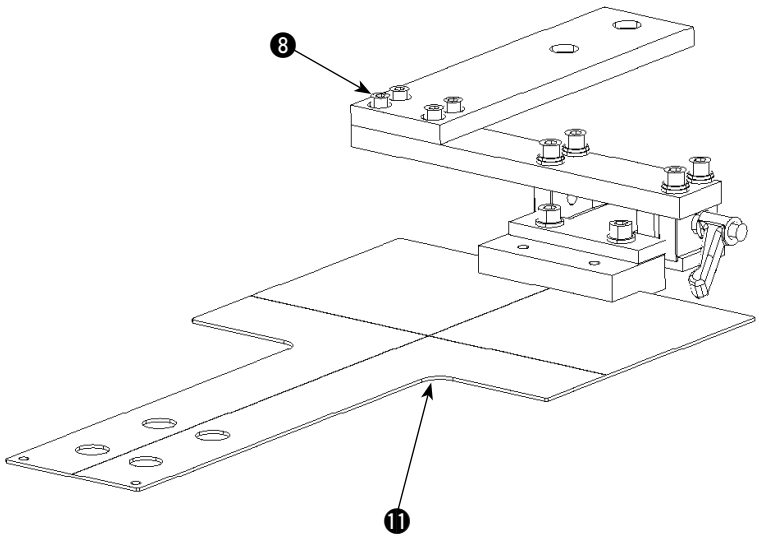
Standard adjustment

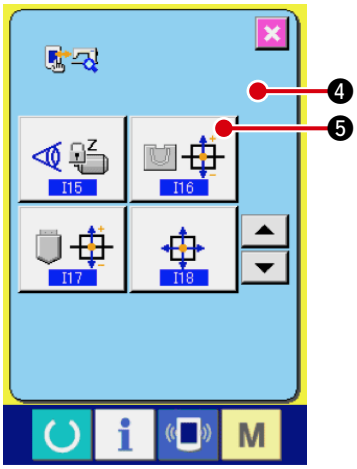
3) Adjustment of the origin of the pattern board and the folding unit 1

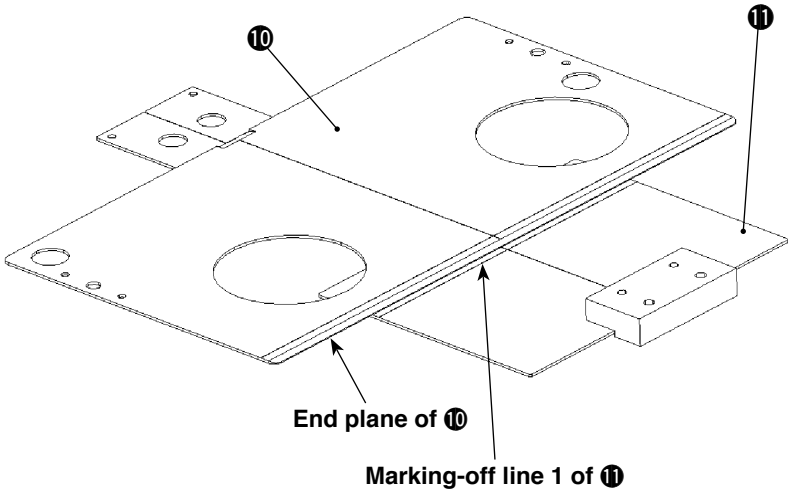
The end face of the holder origin gauge ⑩ is in parallel to the marking-off line of the pattern board origin gauge ⑪.

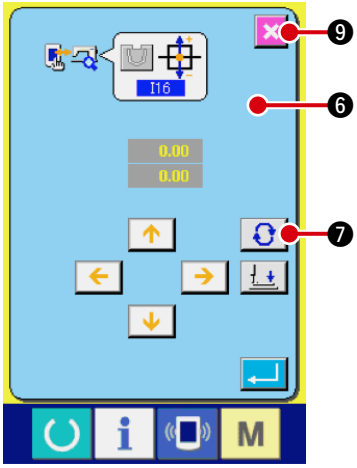


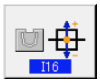










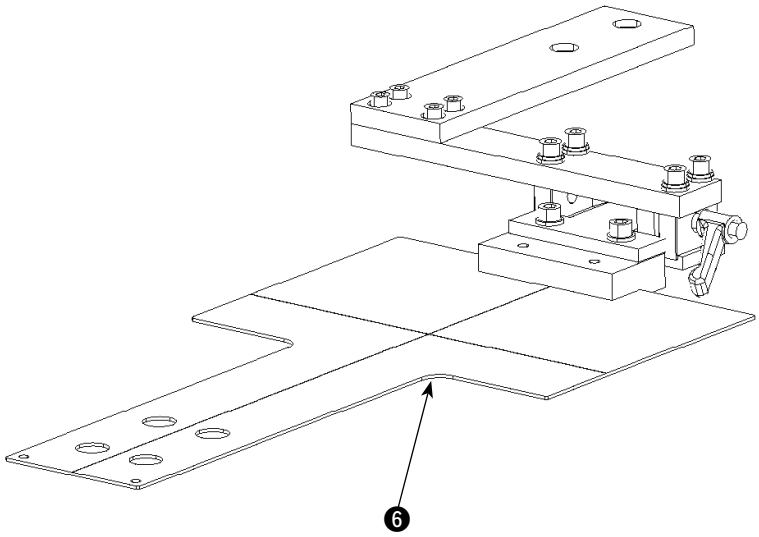
Adjustment procedures	Results of Improper adjustment
The holder origin gauge ⓾ and pattern board origin gauge ⓫ is necessary for this adjustment. 1. Turn the power ON. 2. Keep M key ❶ on the operation panel held pressed until the adjustment screen is displayed. 3. Press button  ❷ to select the pattern change mode. Install the holder origin gauge ⓾, folding unit origin gauge ⓬ and pattern board origin gauge ⓫. 4. Press M key ❶ on the operation panel, display the adjustment screen. 5. Press button  ❸ to display check program screen ❹. 6. Select button  ❺ "I16". 7. After the origin retrieval, "I16" screen ❻ is displayed. 8. When button  ❼ is pressed, the holder origin gauge ⓾ moves toward the folding unit side. 9. Loosen screw ❽ and adjust so that the end face of the holder origin gauge ⓾ is in parallel to the marking-off line 1 of the pattern board origin gauge ⓫. 10. Press button  ❾ to terminate "I16" mode.	o Since variability among machine occurs, the pattern cannot be commonized.

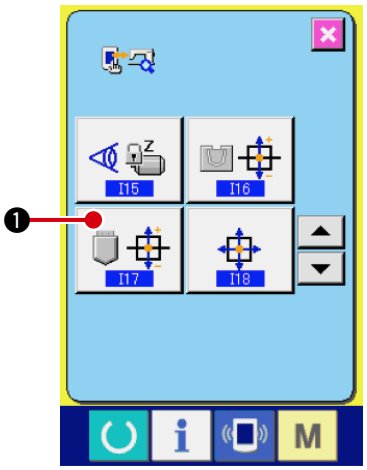
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

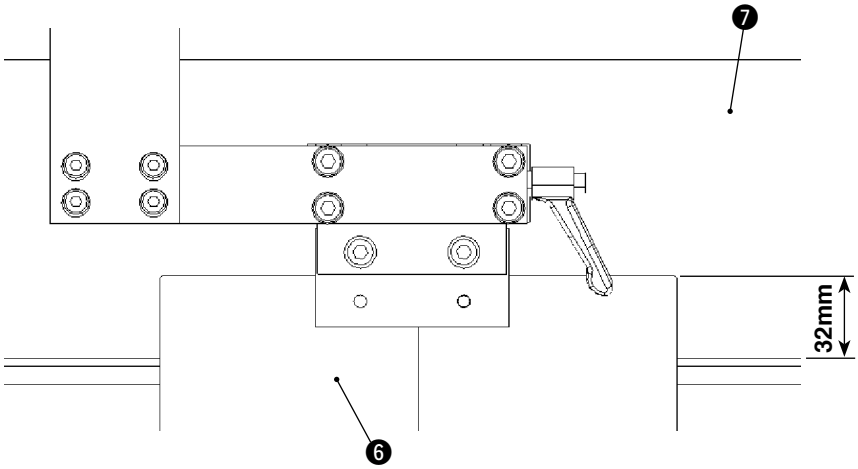
Standard adjustment

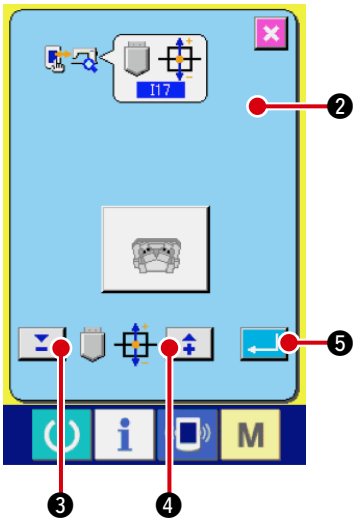
3) Adjustment of the origin of the pattern board and the folding unit 2

The distance provided between the end face of the pattern board origin gauge ❻ and table A ❼ is 32 mm.









Adjustment procedures	Results of Improper adjustment
The holder origin gauge ❻ is necessary for this adjustment. 1. Select button  ❶ "I17". 2. After the origin retrieval, "I17" screen ❷ is displayed. 3. Press button  ❸ or button  ❹ to adjust the distance provided between the pattern board origin gauge ❻ and table A ❼ to 32 mm. 4. Press button  ❺ to terminate adjustment.	o Since variability among machine occurs, the pattern cannot be commonized.

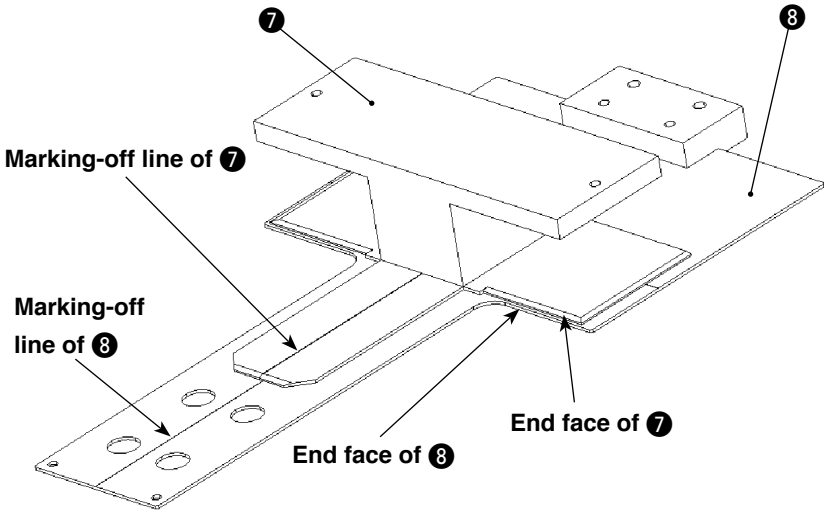
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

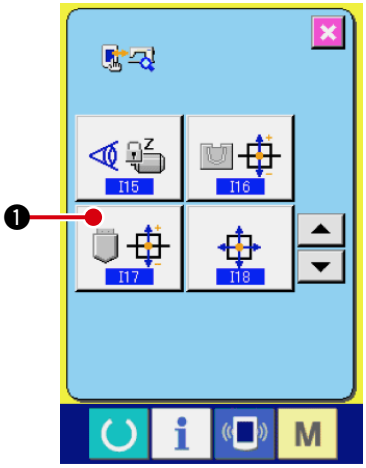
Standard adjustment

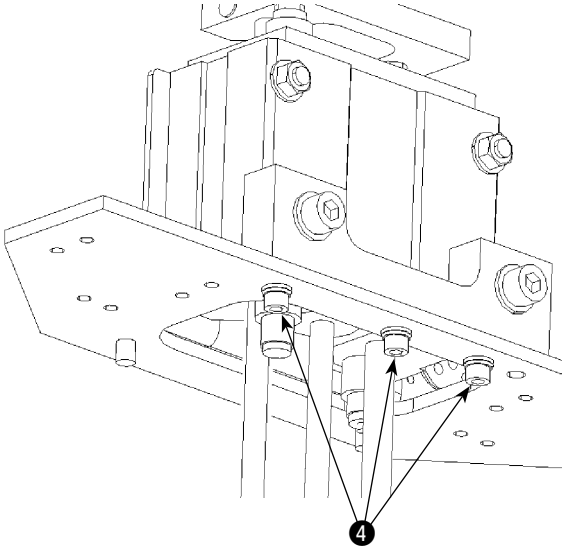
3) Adjustment of the origin of the pattern board and the folding unit 3

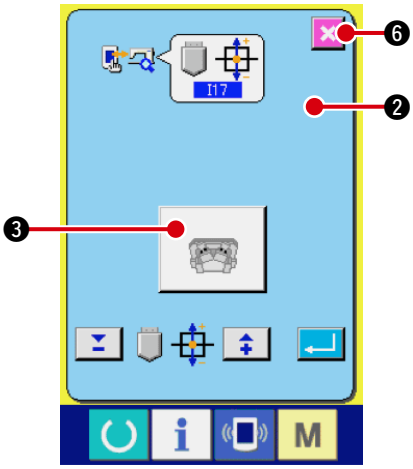
The marking-off line of the folding origin gauge ❼ is aligned with the marking-off line of the pattern board origin gauge ❽.

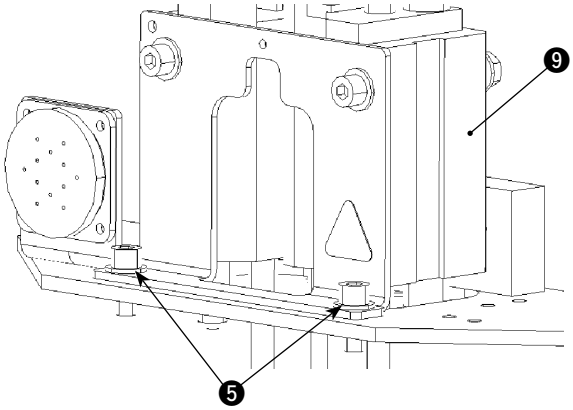
The end face of the folding unit origin gauge ❼ is aligned with the end face of the pattern board origin gauge ❽.











Adjustment procedures	Results of Improper adjustment
The holder origin gauge, folding origin gauge ❼ and pattern board origin gauge ❽ is necessary for this adjustment. 1. Select button  ❶ "I17". 2. After the origin retrieval, "I17" screen ❷ is displayed. 3. Press button  ❸. The folding origin gauge ❼ comes down. 4. Loosen setscrews ❹ of cylinder mounting base A and set-screws ❺ of cylinder mounting base B. Align the marking-off line of the folding origin gauge ❼ with the marking-off line of the pattern board origin gauge ❽ and align the end face of the folding origin gauge ❼ with the end face of the pattern board origin gauge ❽ by moving the folder vertical cylinder ❾. Then, tighten setscrews ❹ and ❺. 5. Press button  ❻ to terminate adjustment.	o Since variability among machine occurs, the pattern cannot be commonized.

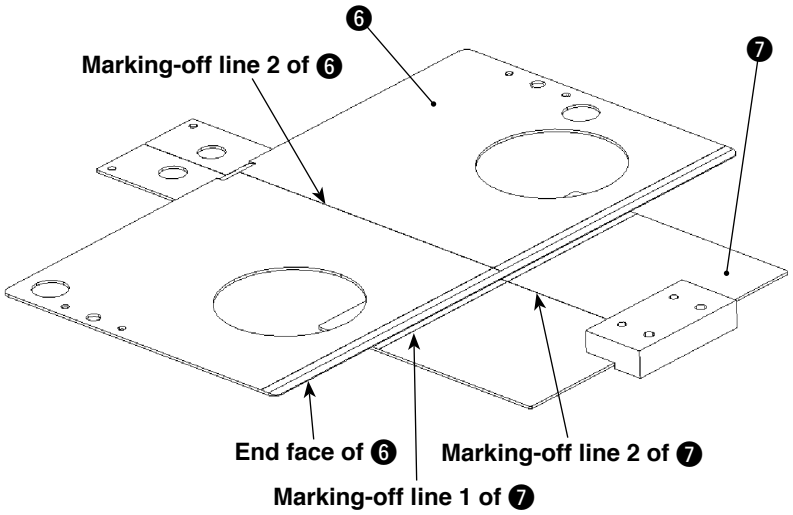
WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

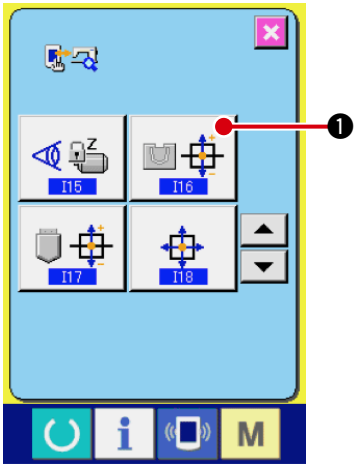
Standard adjustment

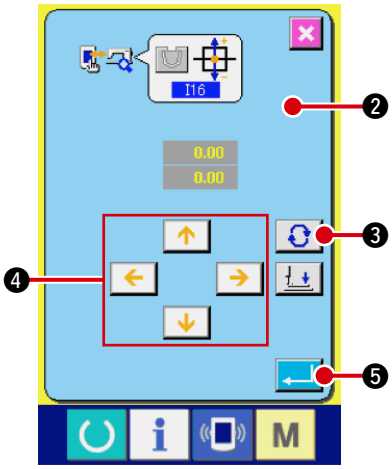
3) Adjustment of the origin of the pattern board and the folding unit 4

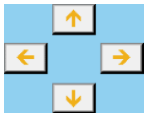
The end face of the holder origin gauge ❻ is aligned with the marking-off line 1 of the pattern board origin gauge ❼.

The marking-off line 2 of the holder origin gauge ❻ is aligned with the marking-off line 2 of the pattern board origin gauge ❼.







Adjustment procedures	Results of Improper adjustment
The holder origin gauge ❻ and pattern board origin gauge ❼ is necessary for this adjustment. 1. Select button  ❶ "I16". 2. After the origin retrieval, "I16" screen ❷ is displayed. 3. Press button  ❸. The holder origin gauge ❻ moves toward the folding unit side. 4. Press button  ❹. Align the end face of the holder origin gauge ❻ with the marking-off line 1 of the pattern board origin gauge ❼ and align the marking-off line 2 of the holder origin gauge ❻ with the marking-off line 2 of the pattern board origin gauge ❼ by moving the holder origin gauge. 5. Press button  ❺ to terminate "I16" mode.	o Since variability among machine occurs, the pattern cannot be commonized.

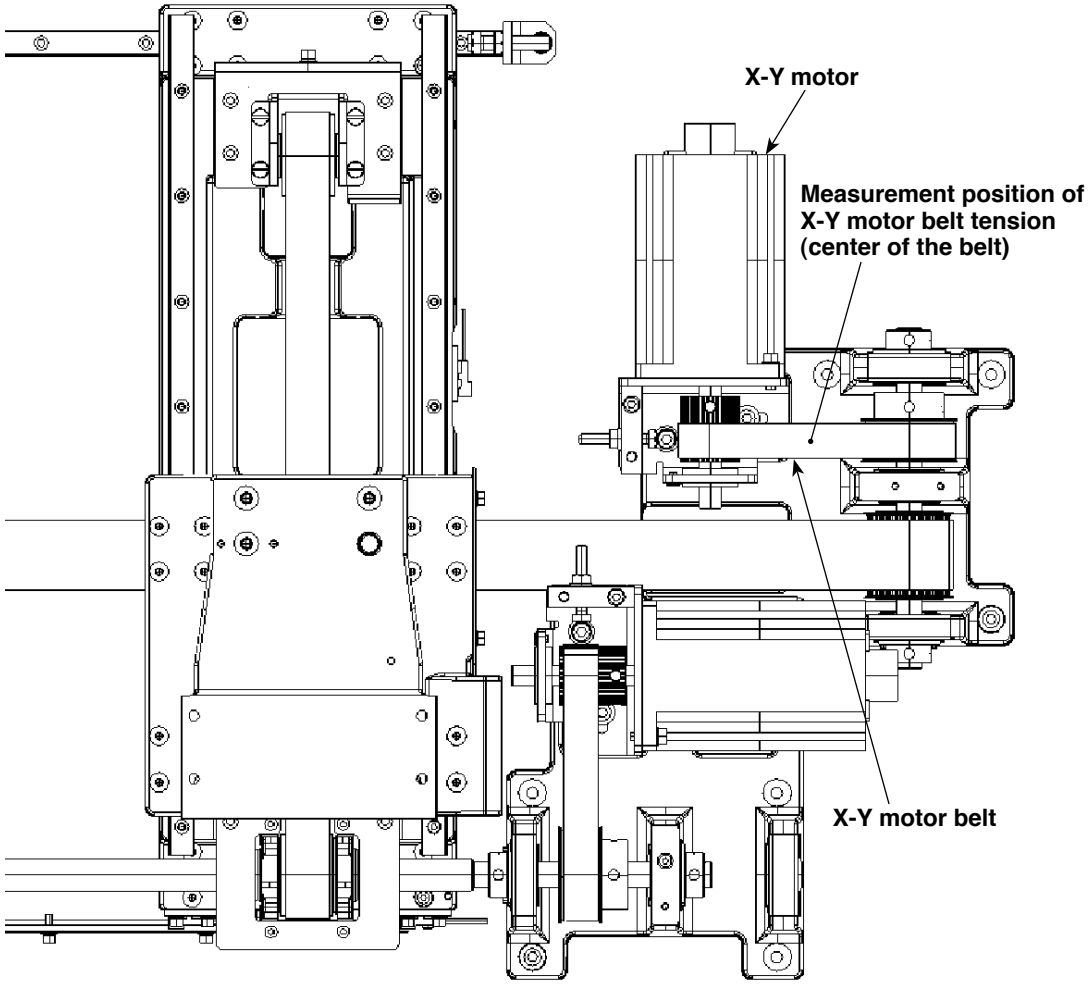
(2) X-Y mechanism

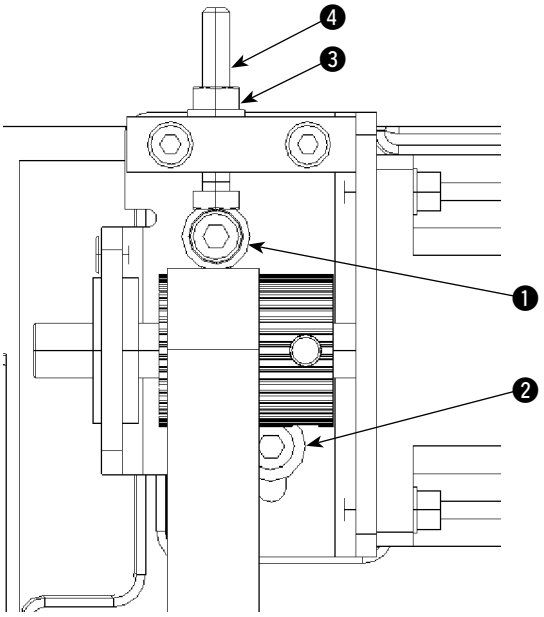
1) X-Y motor belt tension

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

Standard adjustment

X-Y motor belt tension: 100 ± 10 (N)





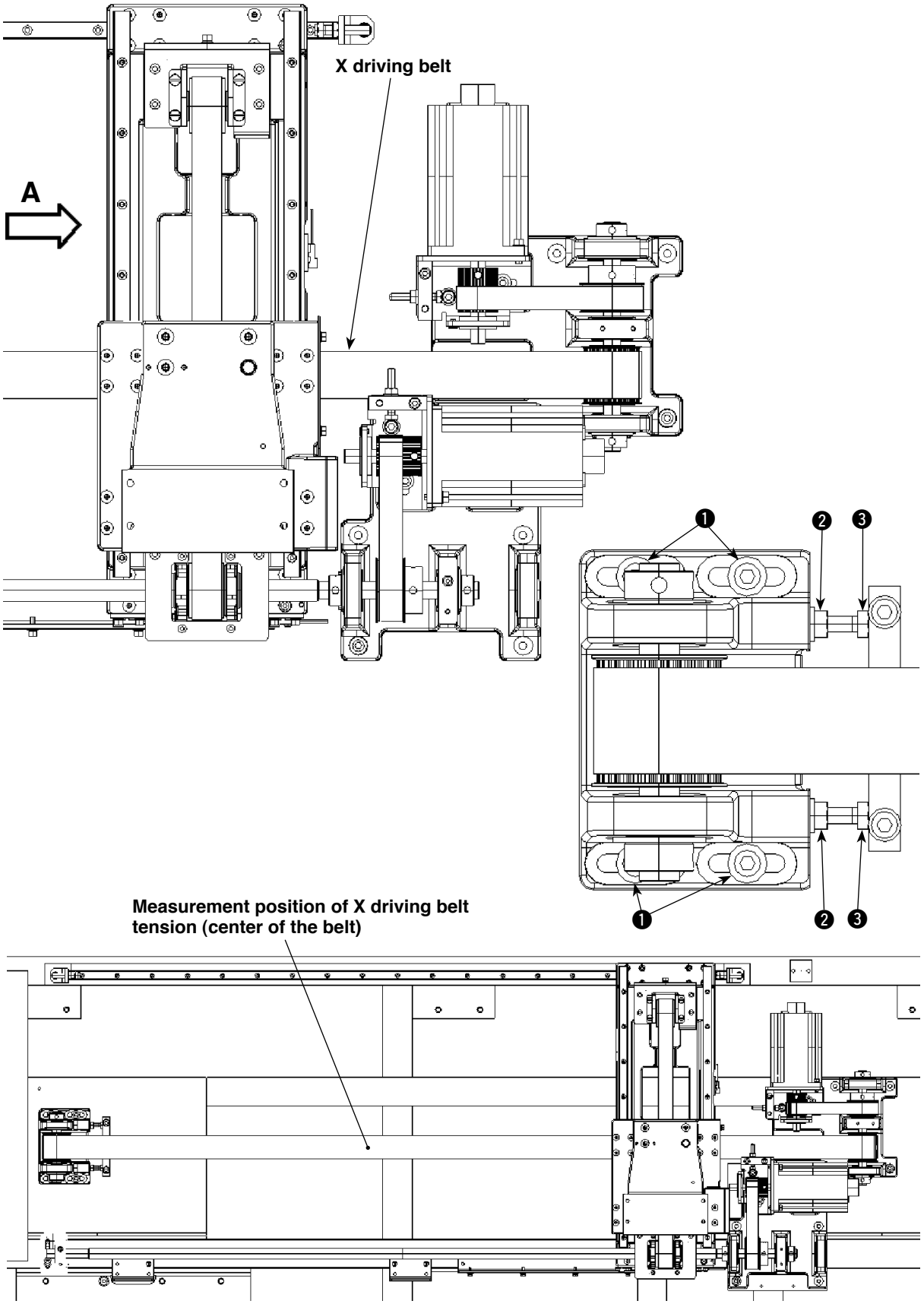
Adjustment procedures	Results of Improper adjustment
·X-Y motor belt tension: MASS: 2.5 (g/mm^2) WIDTH: 20 (mm) SPAN: 114 (mm) * Use a belt tension gauge manufactured by Gates Unitta Asia Company for measurement. → When the center of the belt is pressed with a 5 N load, the belt sags by approximately 2.5 mm. 1. Loosen screws ❶ and ❷ and nut ❸. 2. Turn screw ❹ to change the tension. Temporarily tighten screws ❶ and ❷. Measure the tension at about the center of the belt. 3. When tension reaches 100 ± 10 (N), securely tighten screws ❶ and ❷ and nut ❸.	o If the tension is too low, stitch shape deformation or the timing belt deterioration can be caused. o If the tension is too high, the timing belt deterioration or shorter bearing life can be caused.

2) X belt tension

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

Standard adjustment

X belt tension: 700 ± 30 (N)



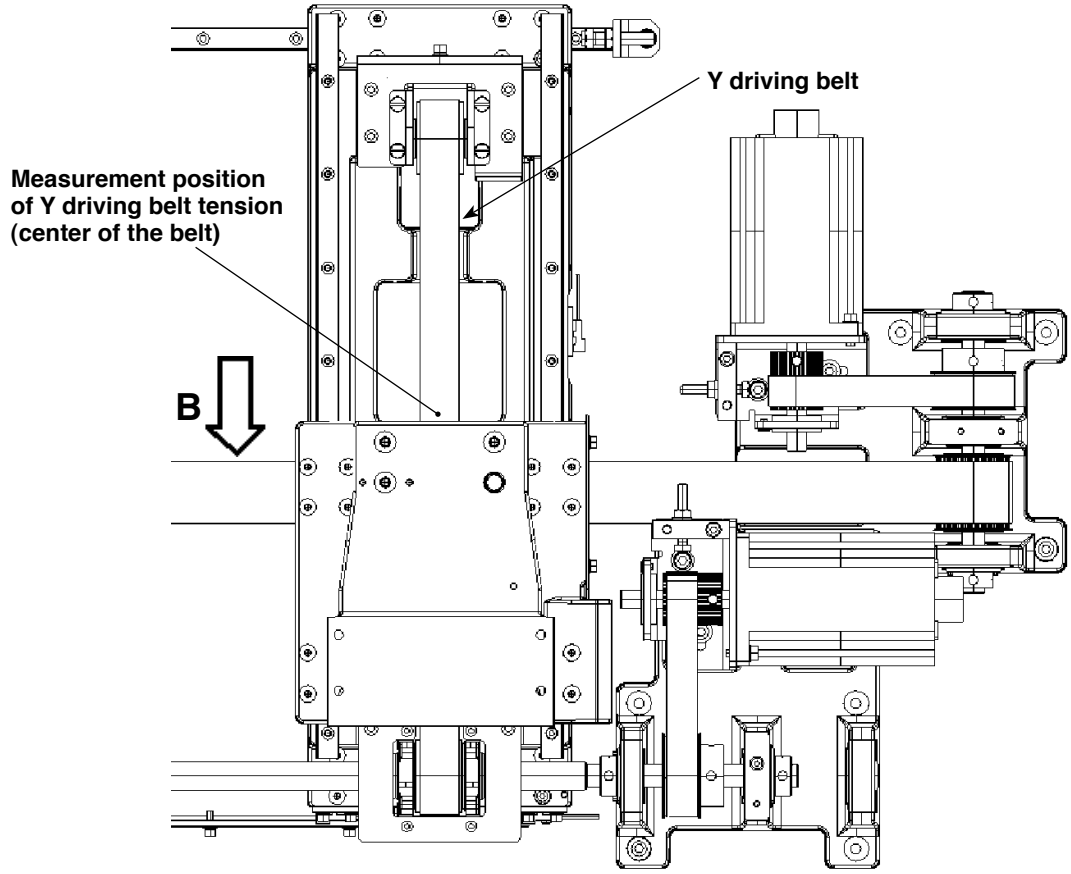
Adjustment procedures	Results of Improper adjustment
·X belt tension: MASS: 4.0 (g/mm^2) WIDTH: 40 (mm) SPAN: 1,030 (mm) → Measure the X belt tension with the X travel base pressed in direction A until it will go no further. * Use a belt tension gauge manufactured by Gates Unitta Asia Company for measurement. → When the center of the belt is pressed with a 10 N load, the belt sags by approximately 7 mm. 1. Loosen screw ❶ and nut ❷. 2. Turn screw ❸ to change the tension. Temporarily tighten screw ❶. Measure the tension at about the center of the belt. 3. When tension reaches 700 ± 30 (N), securely tighten screw ❶ and nut ❷.	o If the tension is too low, stitch shape deformation or the timing belt deterioration can be caused. o If the tension is too high, the timing belt deterioration or shorter bearing life can be caused.

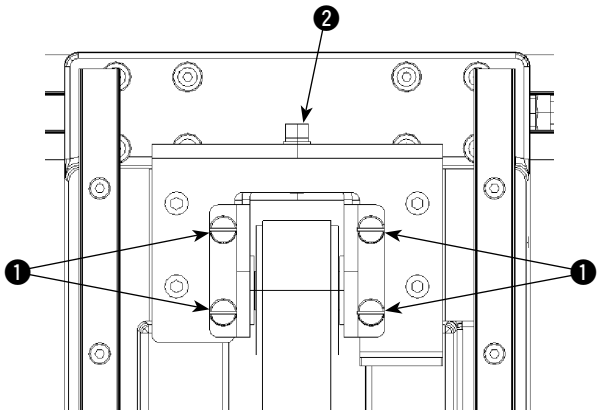
3) Y belt tension

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

Standard adjustment

Y belt tension: 400 ± 20 (N)





Adjustment procedures	Results of Improper adjustment
·Y belt tension: MASS: 4.0 (g/mm^2) WIDTH: 25 (mm) SPAN: 302 (mm) → Measure the Y belt tension with the Y travel base pressed in direction B until it will go no further. * Use a belt tension gauge manufactured by Gates Unitta Asia Company for measurement. → When the center of the belt is pressed with a 10 N load, the belt sags by approximately 3.5 mm. 1. Loosen screw ❶. 2. Turn screw ❷ to change the tension. Temporarily tighten screw ❶. Measure the tension at about the center of the belt. 3. When tension reaches 400 ± 20 (N), securely tighten screw ❶.	o If the tension is too low, stitch shape deformation or the timing belt deterioration can be caused. o If the tension is too high, the timing belt deterioration or shorter bearing life can be caused.

(3) Folding unit vertical mechanism

1) Adjustment of the parallelism of the folding unit

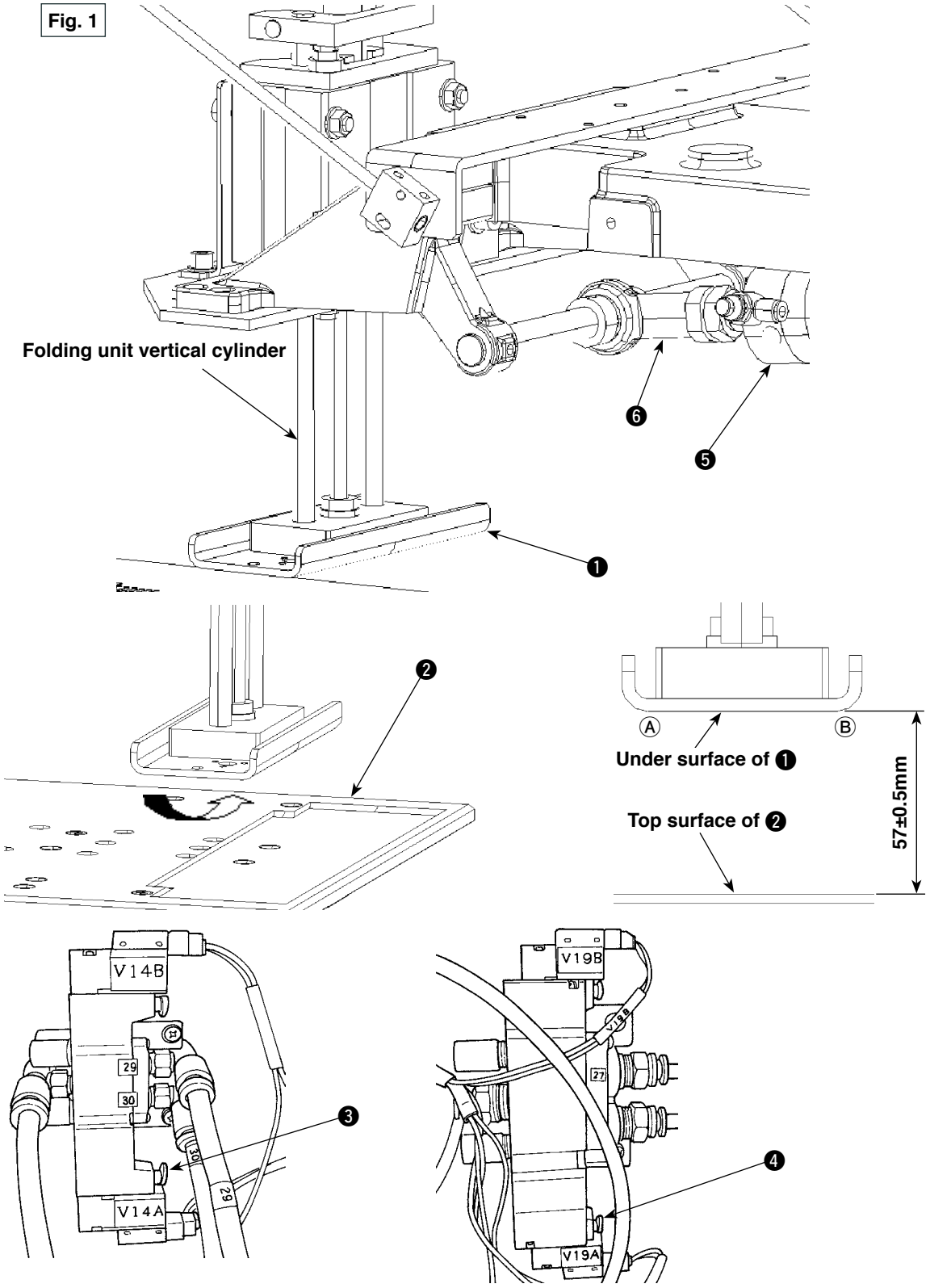
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Standard adjustment

1) Adjustment of the parallelism of the folding unit 1

The under surface of the folding unit mounting plate ❶ and the top surface of the lifting table ❷ at the time of rise should be parallel.

Fig. 1



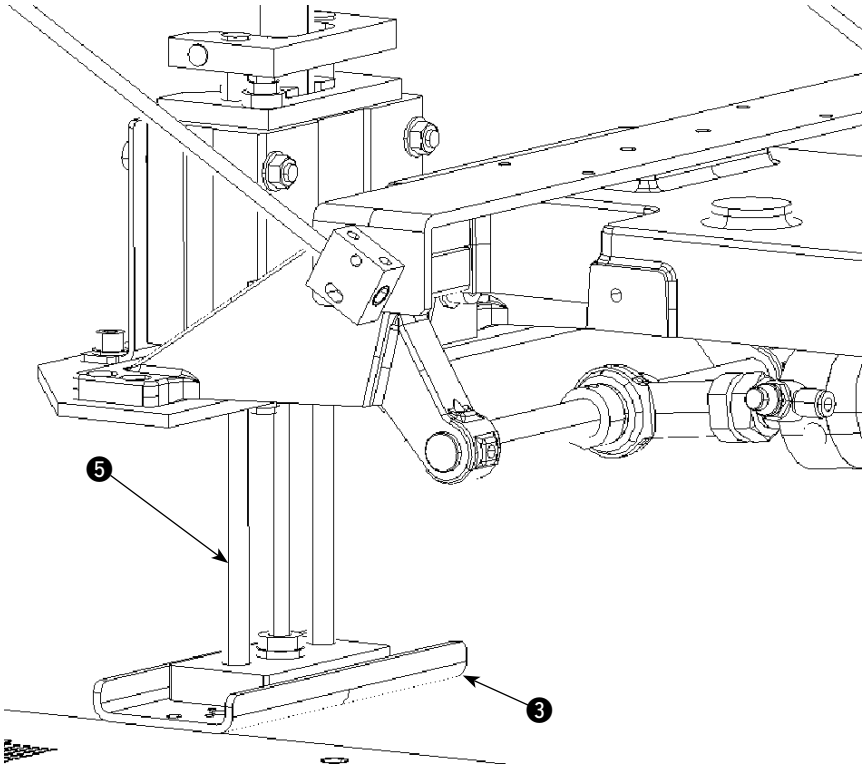
Adjustment procedures	Results of Improper adjustment
1. Press the manual switches on A side of the solenoid valves V14A ❸ and V19A ❹ of the solenoid valve unit on the left side of the main body respectively. The folding unit oscillates and turns to be in the state shown in Fig. 1. 2. Discharge air. 3. Loosen the nut of the folding unit oscillating cylinder ❺. Turn the cylinder rod ❻ to adjust so that the difference between the distances between the under surface of the folding unit mounting plate ❶ and the top surface of the lifting table ❷ measured at locations Ⓐ and Ⓑ on the former falls within 57 ± 0.5 mm. 4. After the completion of the adjustment, tighten the nut and supply air to the folding unit.	o Faulty folding can be caused.

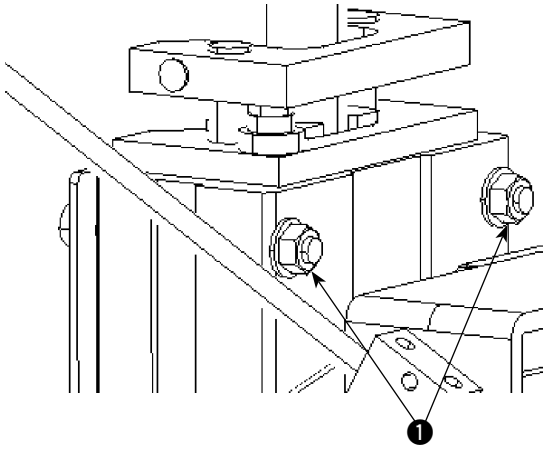
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

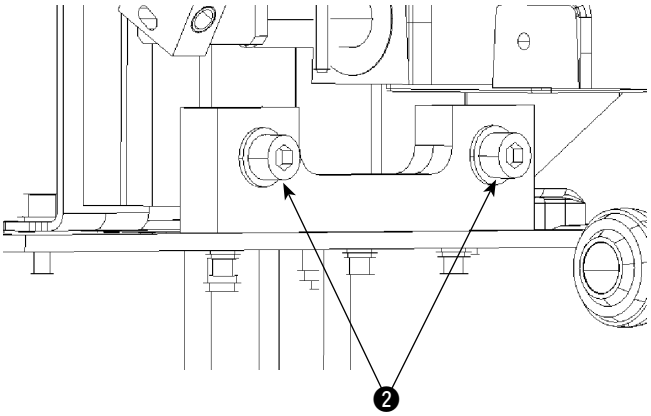
Standard adjustment

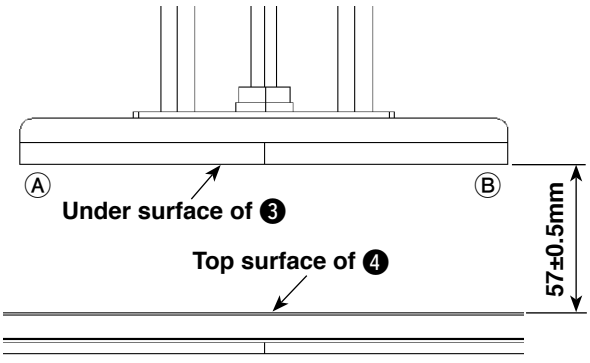
1) Adjustment of the parallelism of the folding unit -2

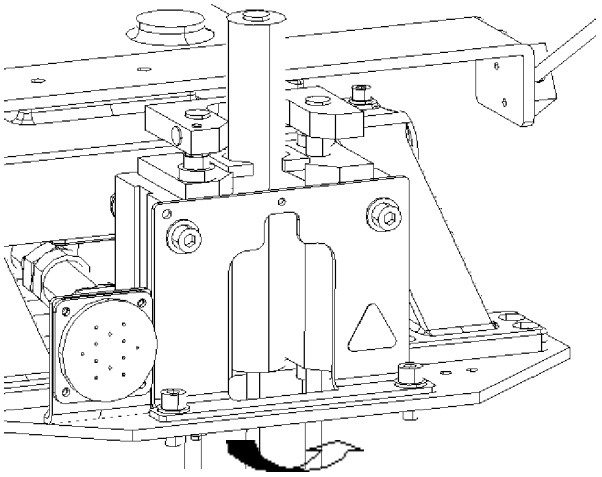
The under surface of the folding unit mounting plate ❸ and the top surface of the lifting table ❹ at the time of rise should be parallel.











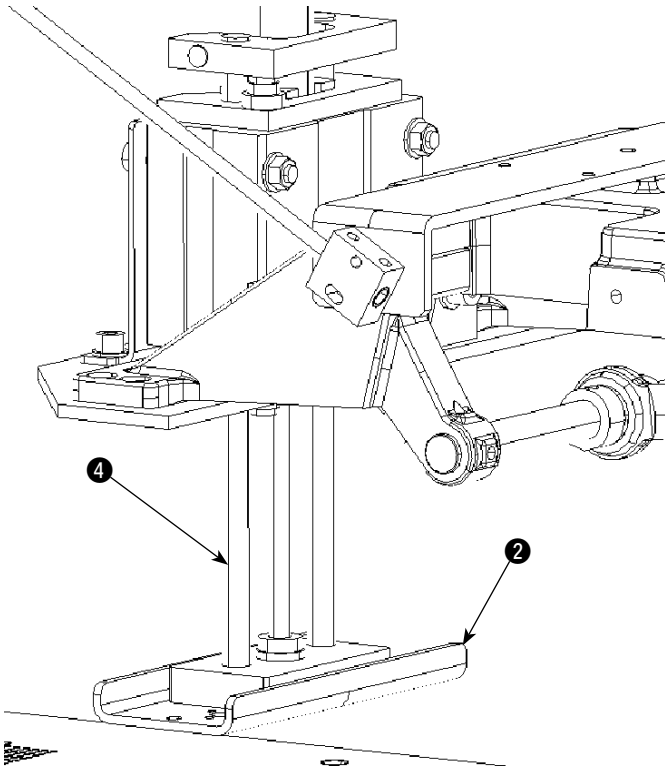
Adjustment procedures	Results of Improper adjustment
1. Loosen nuts ❶ and screws ❷ for fixing the folding unit vertical cylinder ❺. 2. Move the folding unit vertical cylinder ❺ to the right and left to adjust so that the difference between the distances between the under surface of the folding unit mounting plate ❸ and the top surface of the lifting table ❹ at the time of rise measured at locations Ⓐ and Ⓑ on the former falls within 57 ± 0.5 mm. Then, tighten screws ❷ and nuts ❶ in the written order.	o Faulty folding can be caused.

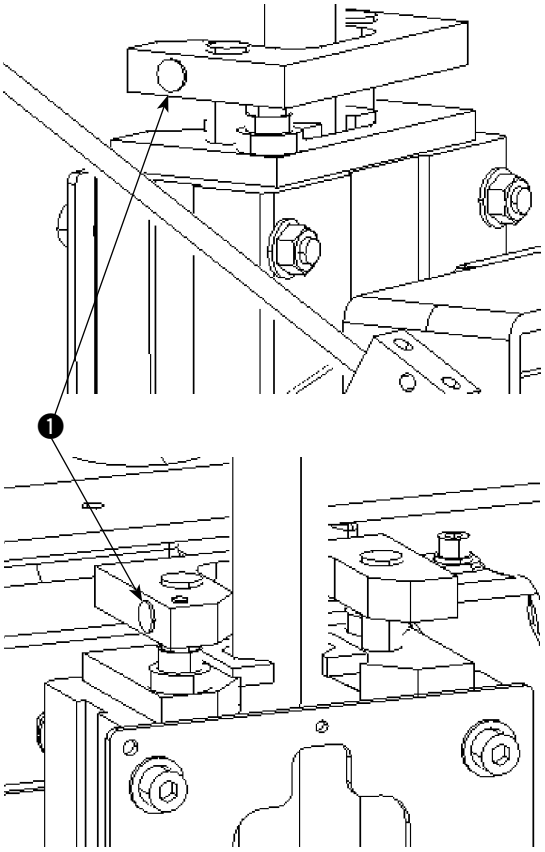
2) Adjustment of the height of the folding unit

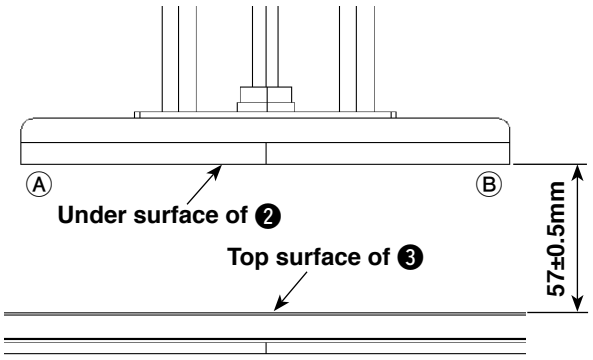
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

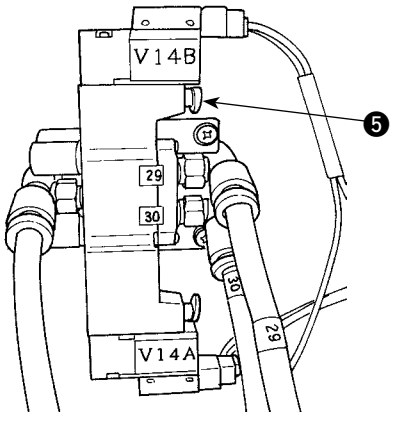
Standard adjustment

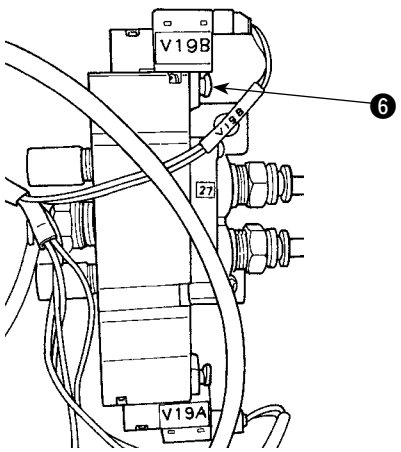
The height difference between the under surface of the folding unit mounting plate ❷ and the top surface of the lifting table ❸ at the time of rise has to be within 57 ± 0.5 mm.











Adjustment procedures	Results of Improper adjustment
1. Loosen screws ❶ of the folding unit vertical cylinder ❹ connecting bracket. 2. Move the folding unit mounting plate ❷ up and down to adjust so that the difference between the distances between the under surface of the folding unit mounting plate ❷ and the top surface of the lifting table ❸ measured at locations Ⓐ and Ⓑ on the former falls within 57 ± 0.5 mm. Then, tighten screws ❶. 3. Press the manual switches on B side of the solenoid valves V14B ❺ and V19B ❻ of the solenoid valve unit on the left side of the main body respectively. The folding unit oscillates and turns to return to its initial state.	o Faulty folding can be caused.

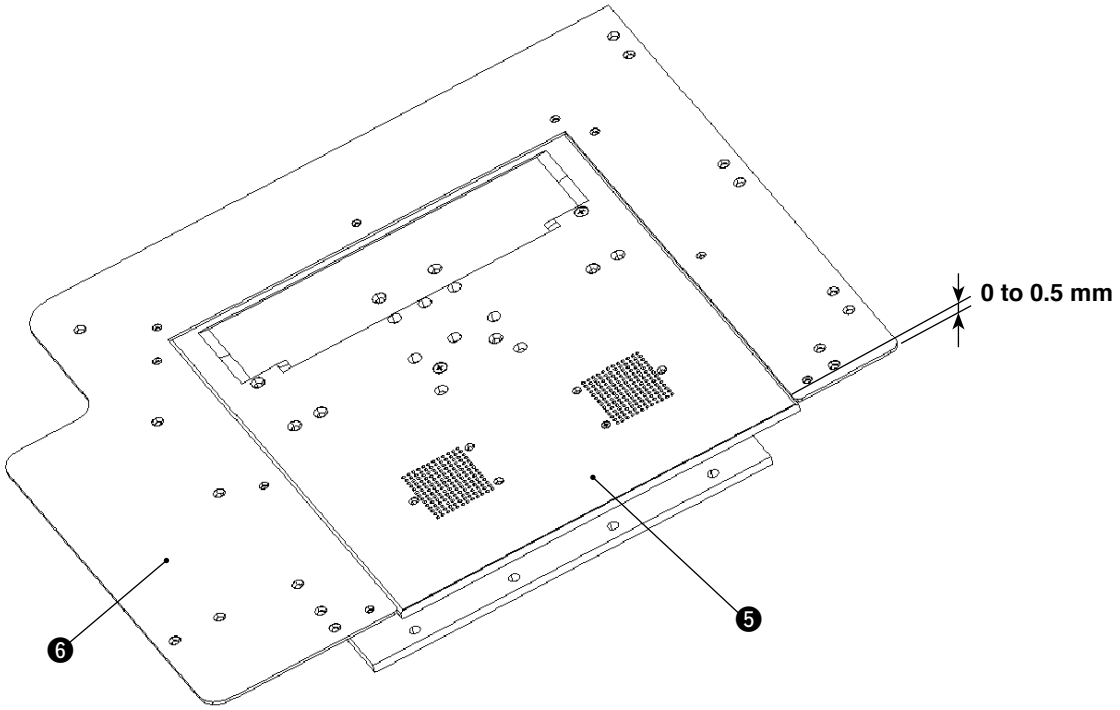
(4) Lifting table mechanism

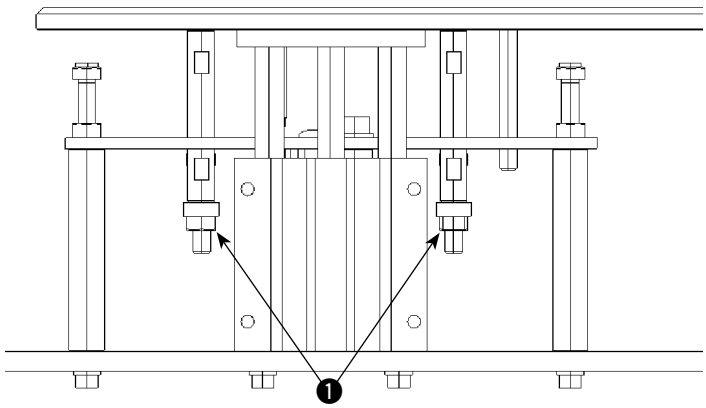
1) Adjustment of the height of the lifting table

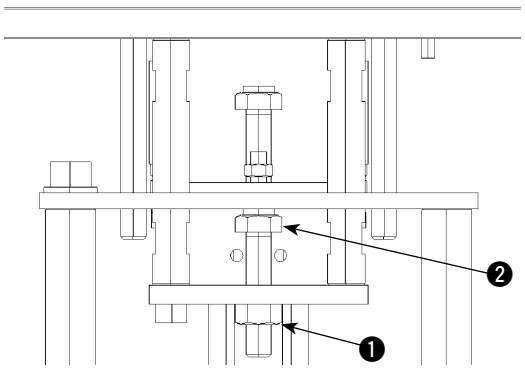
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

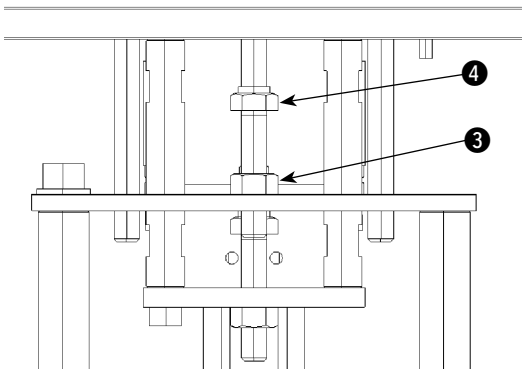
Standard adjustment

When the lifting table ❺ goes up, the difference in level between table A ❻ and the lifting table ❺ should be 0 to 0.5 mm. (Lifting table ❺ is above table A ❻.)
When the lifting table ❺ comes down, the difference in level between table A ❻ and the lifting table ❺ should be 155 mm.









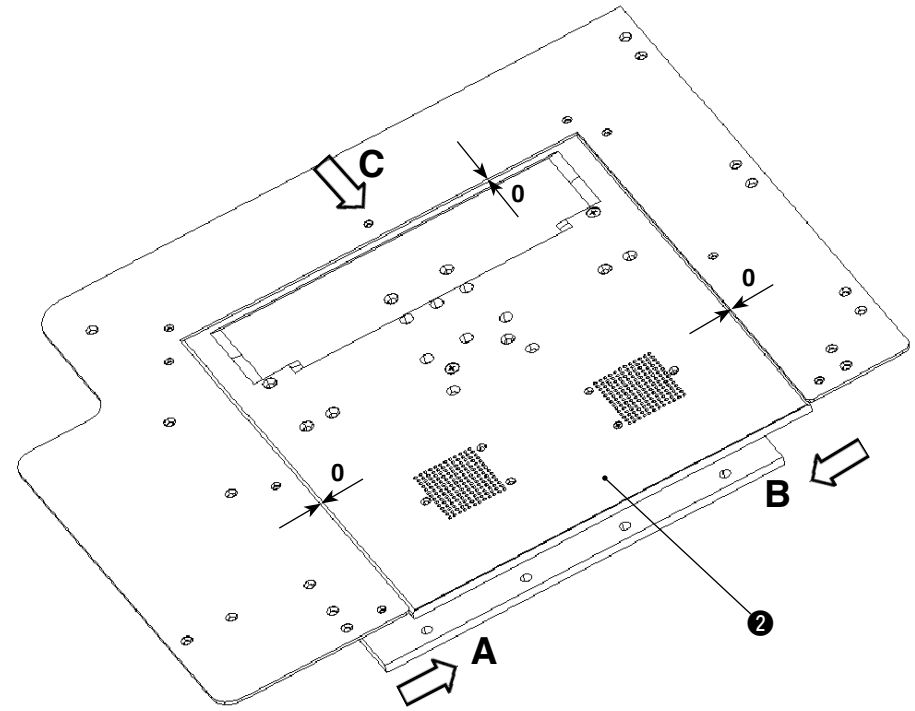
Adjustment procedures	Results of Improper adjustment
[Up side] Loosen right and left nuts ❶. Turn stopper bolt ❷ to change its height to adjust the lifting table height. [Down side] Loosen right and left nuts ❸. Turn stopper bolt ❹ to change its height to adjust the lifting table height.	o Shift of conveying can be caused.

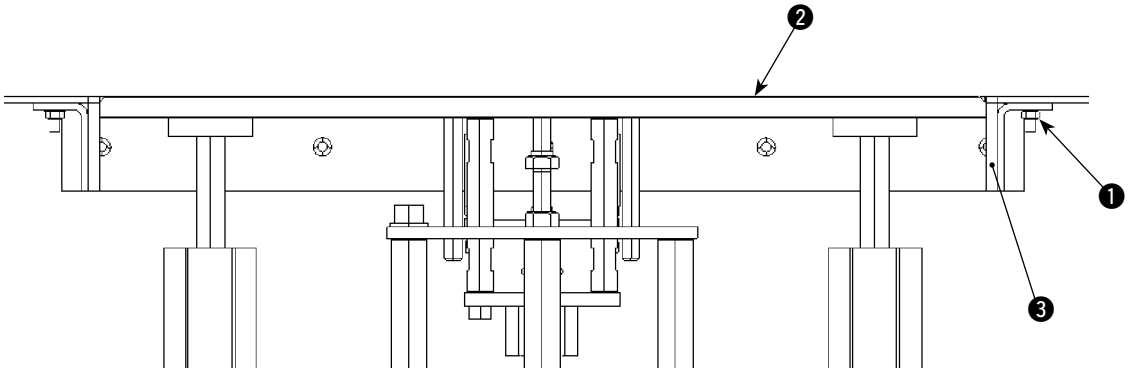
2) Adjustment of the clearance of the lifting table

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

Standard adjustment

Adjust the clearance between the lifting table ❷ and the table guide plate ❸ so that the lifting table ❷ can go up or come down smoothly.





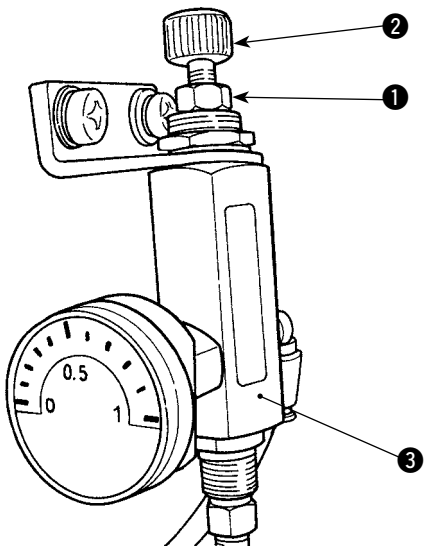
Adjustment procedures	Results of Improper adjustment
Loosen nine nuts ❶, and adjust the clearance by pressing the table guide plate ❸ to three directions A, B and C.	o If there is any clearance, when the lifting table ❷ goes up or comes down, garment bodies are caught in, shift of conveying can be caused. o If the table guide plate ❸ is excessively pressed against the lifting table ❷, the lifting table ❷ cannot smoothly go up or come down, faulty folding or shift of conveying can be caused.

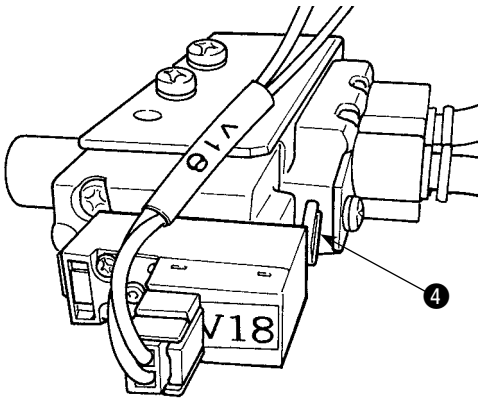
3) Adjustment of the pressure of the lifting table

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

Standard adjustment

The pressure, when the lifting table goes up, should be adjusted with the pressure reducing valve so that the pressure becomes 0.25 to 0.35 MPa.



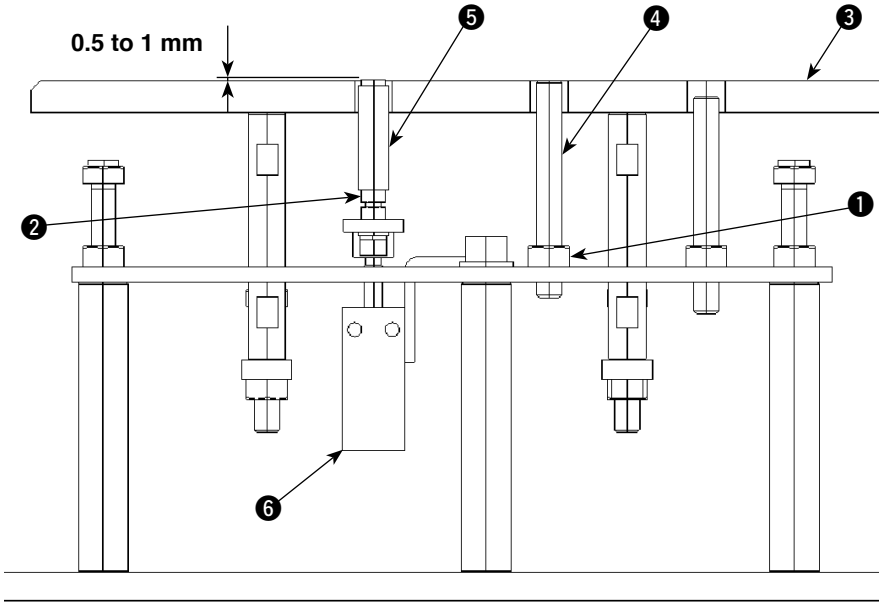


4) Adjustment of the pattern board support

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

Standard adjustment

1. When the lifting table ❸ goes up, the difference in height between the pattern board support shaft ❹ and the top surface of the lifting table ❸ is 0 mm.
2. When the lifting table ❸ goes up, the difference in height between the garment body presser pin ❺ (the garment body presser cylinder is in the extruded state) and the top surface of the lifting table ❸ is 0.5 to 1 mm.



Adjustment procedures	Results of Improper adjustment
1. Loosen the nut ❶ of pressure reducing valve ❸, and adjust the pressure by turning the knob ❷. 2. Check the pressure by pressing the manual switch of solenoid valve V18 ❹.	o If the pressure is too high, faulty folding (folded pocket will unfold) can be caused. o If the pressure is too low, lifting table does not go up.

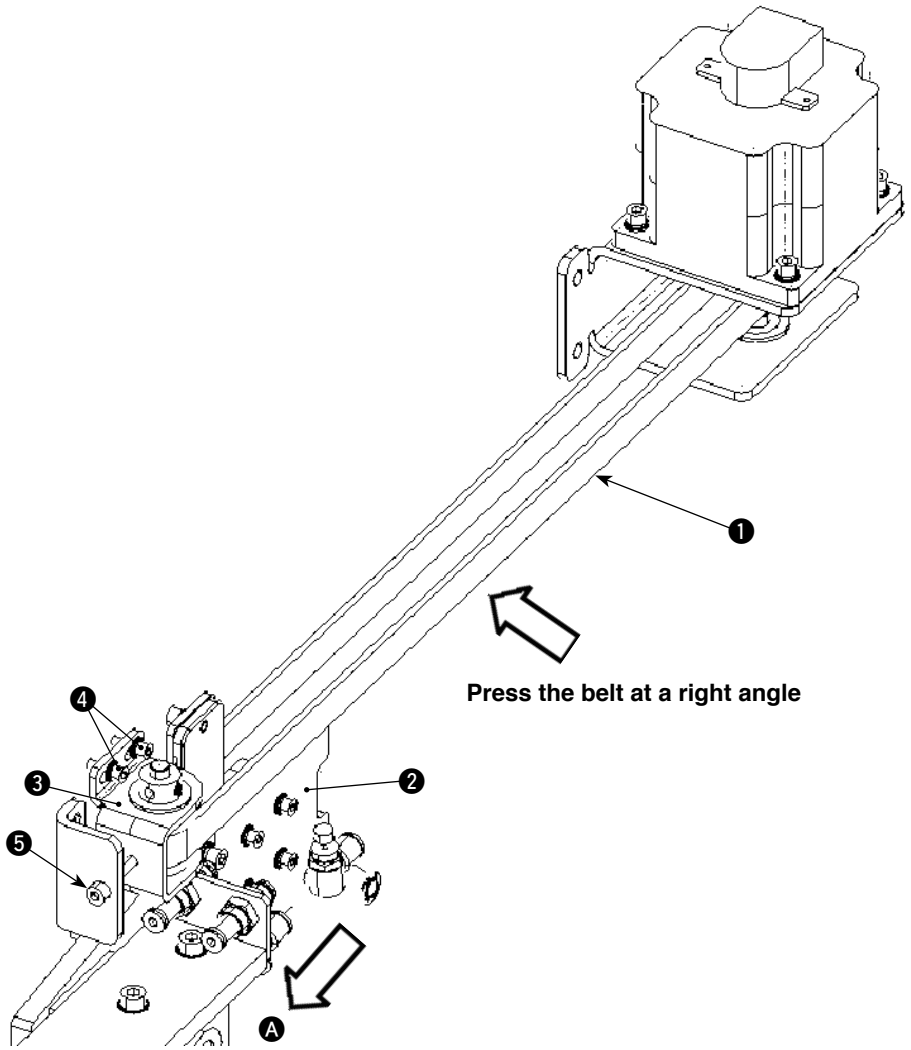
Adjustment procedures	Results of Improper adjustment
1. Loosen nut ❶ and turn the pattern board support shaft ❹ to adjust so that the pattern board support shaft ❹ should be flush with the lifting table ❸. Then, tighten the nut ❶. 2. Loosen nut ❷ and turn the garment body presser pin ❺ to adjust the difference in height between the top surface of the lifting table ❸ and the garment body presser pin ❺ to 0.5 to 1 mm. Then, tighten the nut ❷.	o If the pattern board support shaft ❹ is excessively raised, the shift of conveying can be caused. If the pattern board support shaft ❹ is excessively lowered, faulty folding can be caused. o If the garment body presser pin ❺ is excessively raised, the shift of conveying can be caused. If the garment body presser pin ❺ is excessively lowered, faulty folding can be caused.

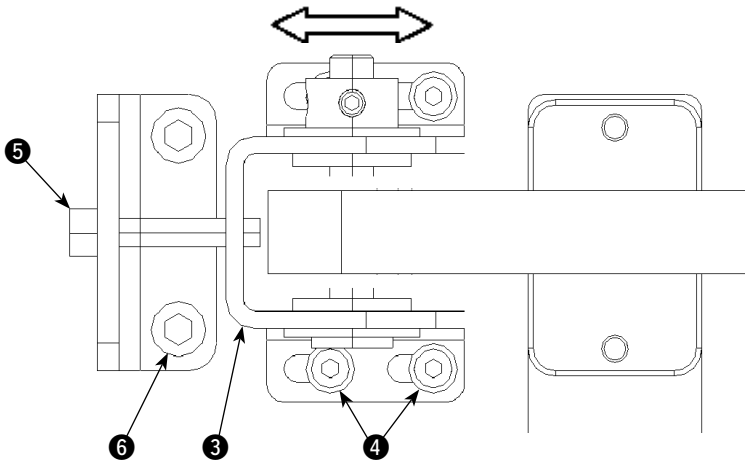
(5) Pattern board mechanism

1) Adjustment of the pattern board belt tension

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

Standard adjustment



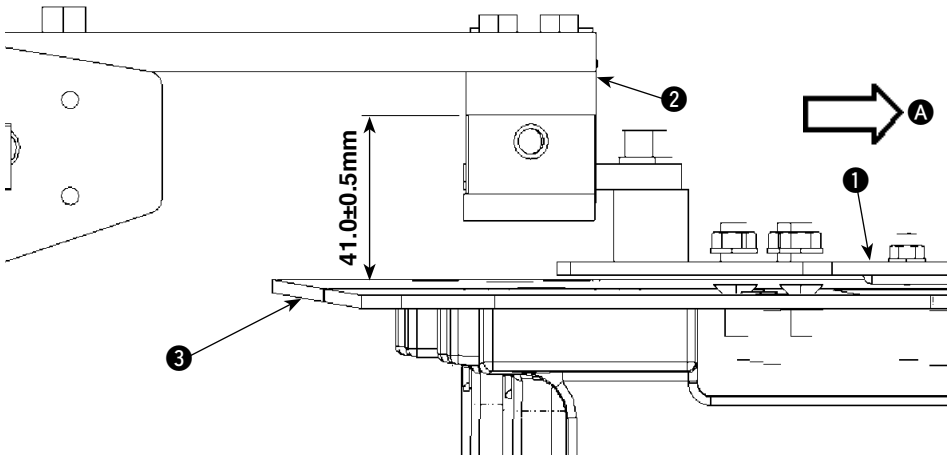


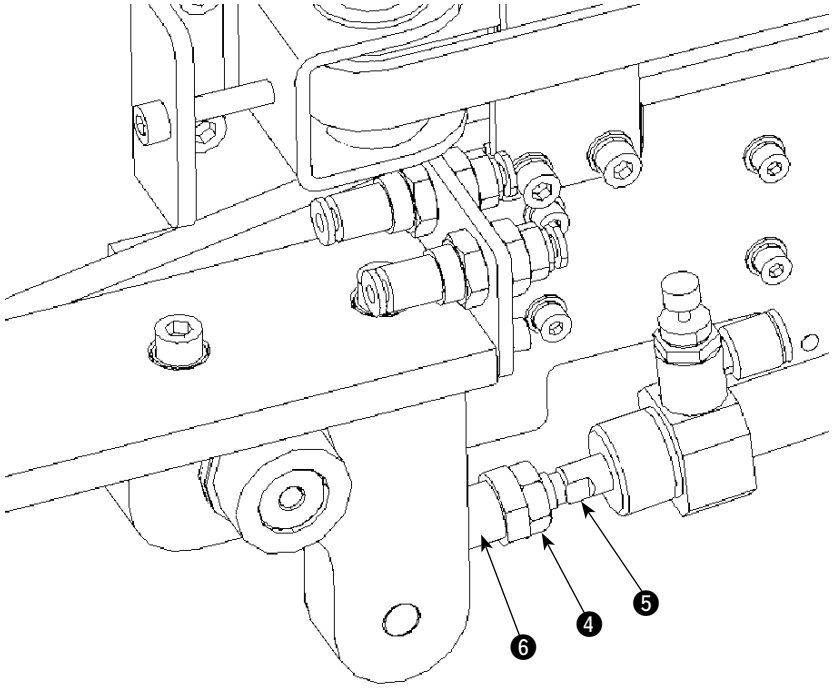
Adjustment procedures	Results of Improper adjustment
1. To check the tension of adjustment belt ❶, move slide plate ❷ toward the operator Ⓐ. Then, press the center of the adjustment belt ❶ with a 5 N load to make sure that the belt sags by approximately 2 mm. <When a belt tension gauge is used for measurement.> Adjustment belt ❶ tension: 300 ± 30 N (at the center of the adjustment belt ❶) • MASS: 4.0 (g/mm^2) • WIDTH: 15 (mm) • SPAN: 447.5 (mm) * Use a belt tension gauge manufactured by Gates Unitta Asia Company for measurement. 2. Adjustment of the belt tension is carried out by moving X driven bracket ❸. Loosen four screws ❹ which are used to fix the X driven bracket ❸ and adjust the belt tension by moving load adjusting screw ❺ within the slot. If the load adjusting screw ❺ is tightened, the belt tension will increase. **(Caution) If two setscrews ❻ of the load support plate are loosened, the adjustment belt ❶ will be dislocated. Never loosen the setscrews ❻.**	

2) Adjustment of the height of the pattern board

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

Standard adjustment





Adjustment procedures	Results of Improper adjustment
1. When pattern board ❶ is moved toward the operator Ⓐ, the height of pattern board arm ❷ from table ❸ has to be 41.0 ± 0.5 mm. 2. To adjust, loosen locknut ❹ of the cylinder shaft and turn cylinder shaft ❺. Once you have correctly position the pattern board, tighten locknut ❹ of the cylinder shaft. **(Caution) 1. If cylinder shaft ❺ is excessively turned in the direction for lifting pattern board arm ❷, cylinder shaft ❺ will come off cylinder rod ❻.** **2. Be sure to adjust the clearance provided between pattern board arm ❷ and table ❸ to 40.5 mm or more. If not, pattern board ❶ and table ❸ can interfere with each other when the pattern board ❶ is activated to move back and forth.**	

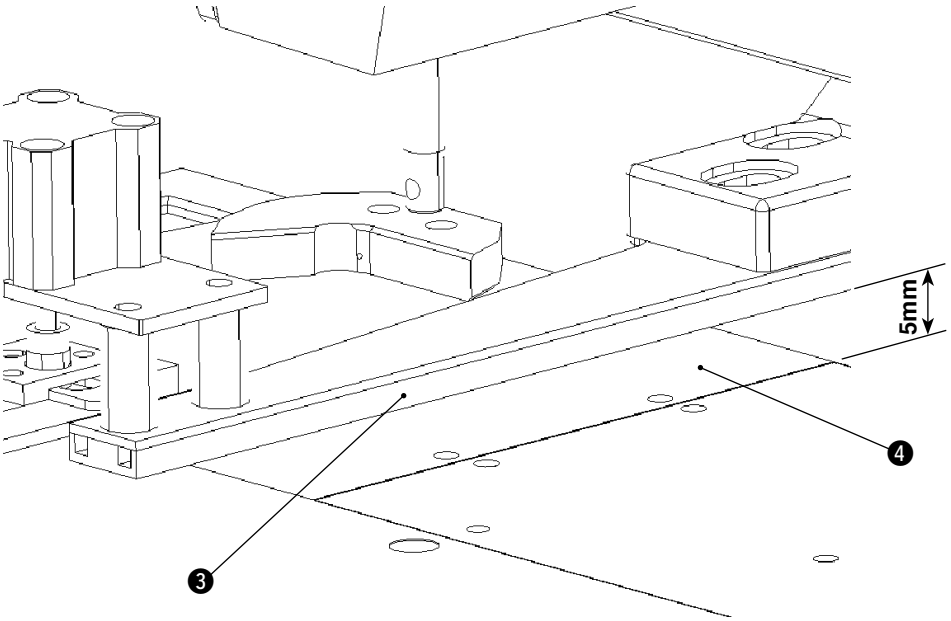
(6) Presser plate mechanism

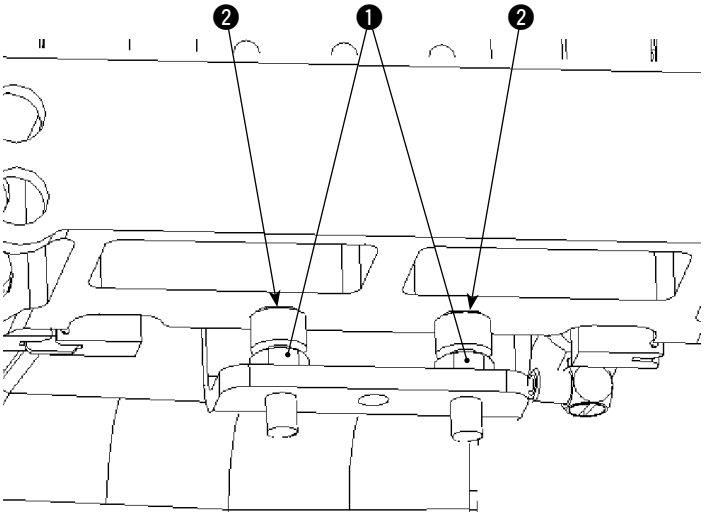
1) Adjustment of the height of the presser arm

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

Standard adjustment

Adjust the distance between the underside of the presser arm ❸ and the top surface of the throat plate ❹ to 5 mm.





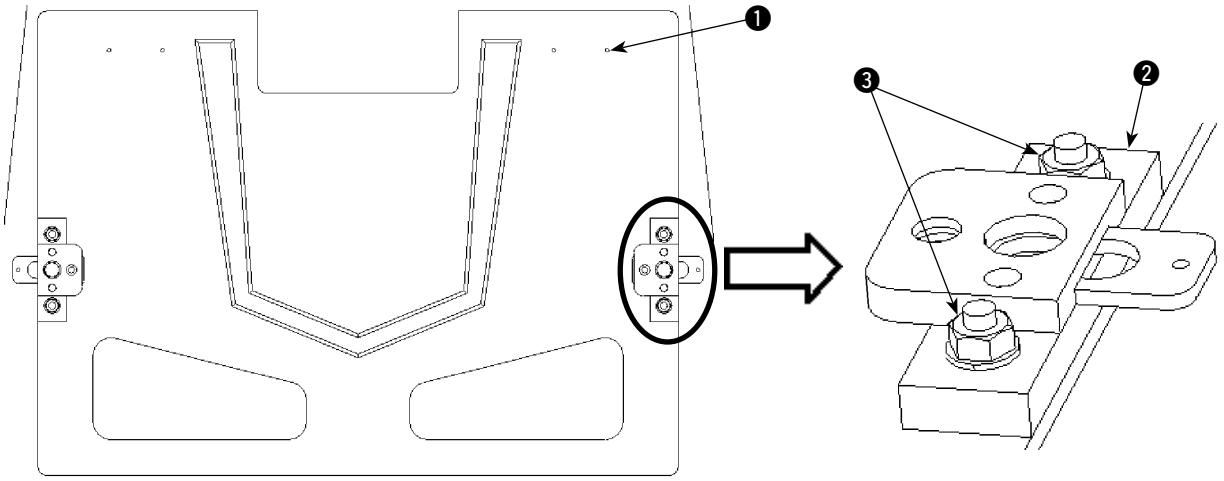
Adjustment procedures	Results of Improper adjustment
1. Loosen stopper nut ❶. Move stopper bolts ❷ up and down to adjust the distance between the underside of the presser arm ❸ and the top surface of the throat plate ❹ to 5 mm. Then, tighten stopper nut ❶. (Check the distance between them both at the right and left side of the presser arm ❸.)	o If the distance is smaller, it will be difficult to draw out the garment body material at the time of stacking. In this case, the garment body materials will not be stacked in the same position or cannot be stacked. o If the distance is larger than the specified adjustment value, the clamp pressure can decrease. As a result, the shift of conveying can be caused.

2) Adjustment of the parallelism of the presser plate

WARNING :
As the work is performed while the power is ON, never touch the switches other than the necessary one so as to prevent accidents caused by the malfunction of switches.

Standard adjustment

Adjust the installing position of the presser plate so that it is in parallel to the XY.

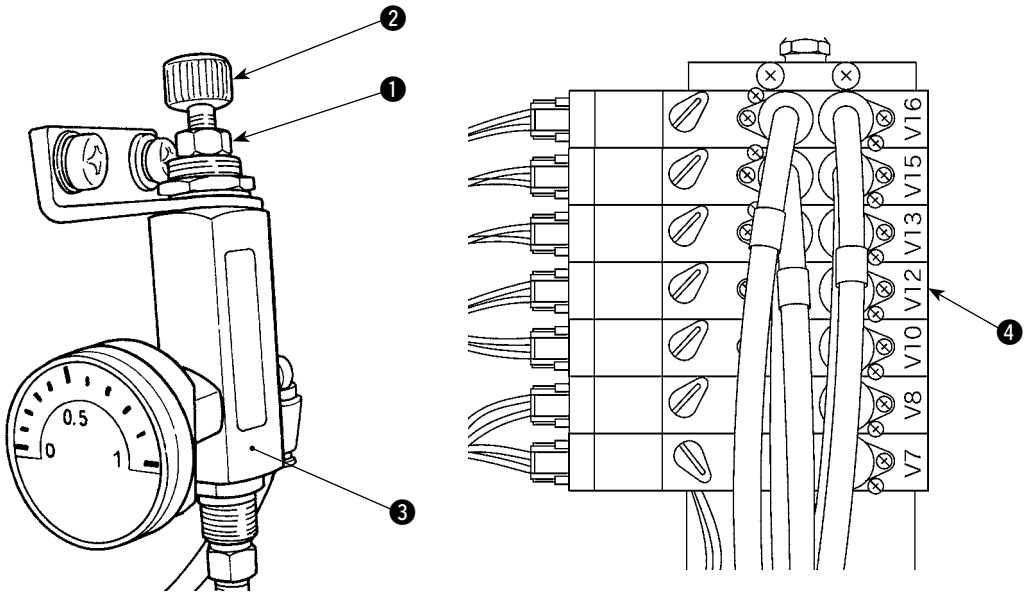


3) Adjustment of the clamp pressure

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

Standard adjustment

The pressure, when the presser plate is lowered, should be adjusted with the pressure reducing valve so that the pressure becomes 0.2 to 0.3 MPa.



Adjustment procedures	Results of Improper adjustment
1. Turn the power ON to display the main body input screen. 2. Select JUMP command to move the presser plate in X direction. Loosen locknut ❸ of the ball catch ❷. Move the presser plate to adjust so that the needle tip is placed over the drilled hole ❶ in the presser plate.	o Pocket position with respect to the garment body material can vary.

Adjustment procedures	Results of Improper adjustment
1. Loosen the nut ❶ of pressure reducing valve ❸, and adjust the pressure by turning the knob ❷. 2. Check the pressure by pressing the manual switch of solenoid valve V12 ❹. (The pressure reducing valve ❸ is connected to the solenoid valve V12 ❹.)	o If the clamp pressure is higher or lower than the specified adjustment value, the shift of conveying can be caused.

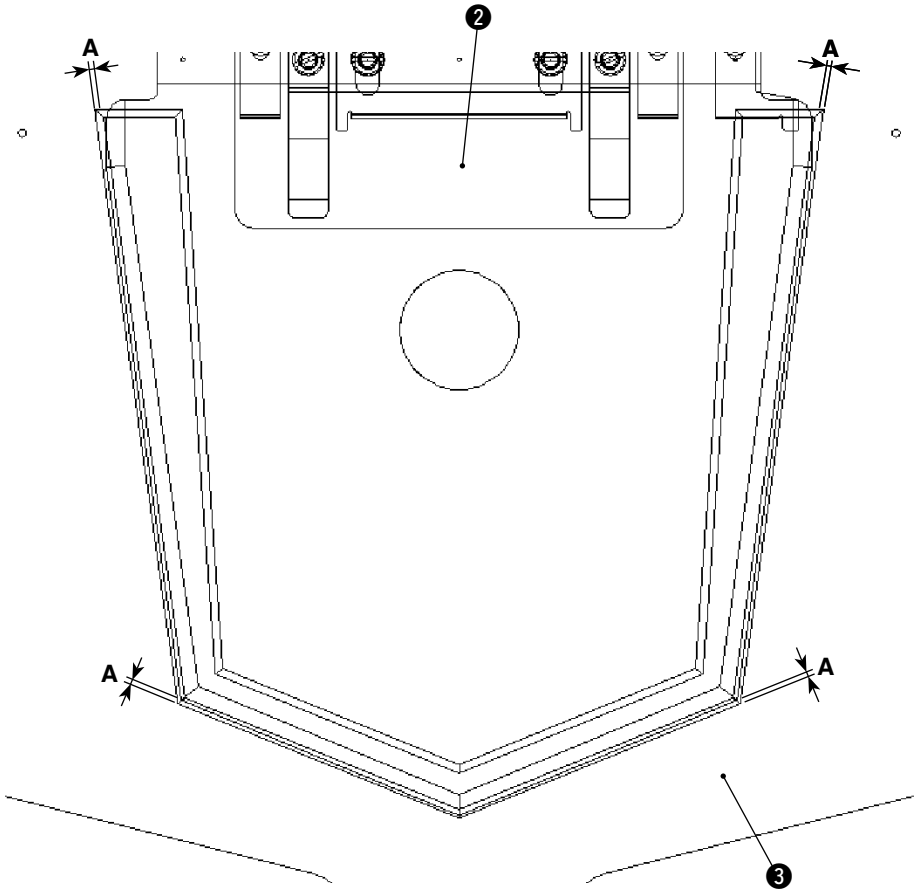
(7) Folding unit mechanism

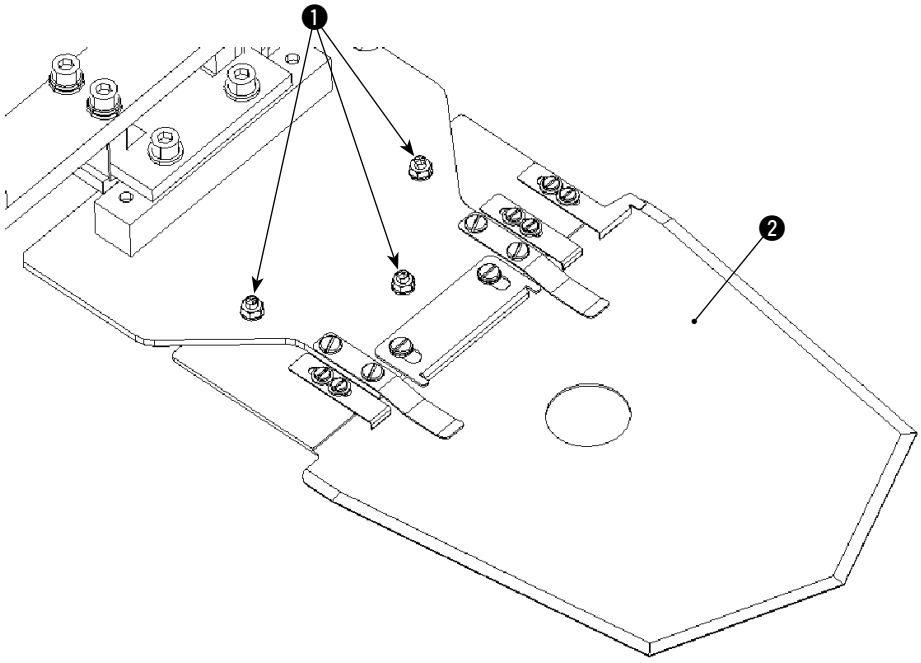
1) Adjustment of the parallelism of the pattern board and the presser plate

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

Standard adjustment

Adjust so that the outer periphery of the pattern board ❷ is in parallel to the slit in the presser plate ❸ (so that the distances A are equal).





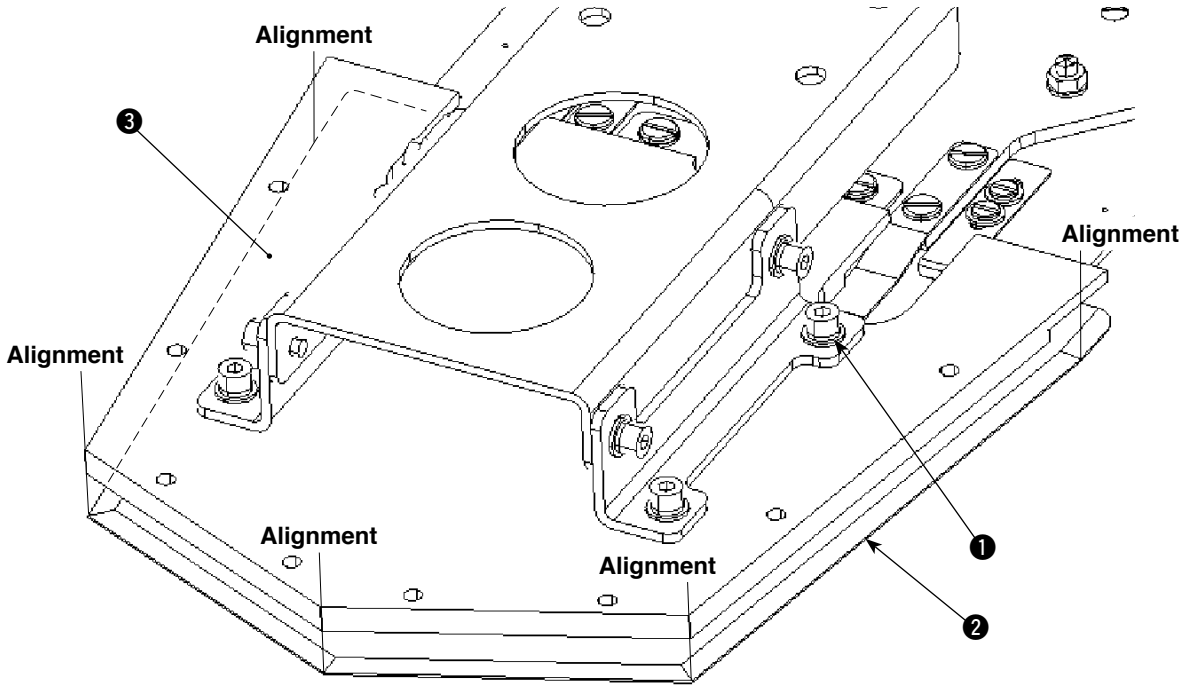
Adjustment procedures	Results of Improper adjustment
1. Loosen mounting nuts ❶ of the pattern board ❷. Adjust the pattern board ❷ so that it is in parallel to the slit in the presser plate ❸. Then, tighten nuts ❶.	o The edge width will not be uniform.

2) Adjustment of the parallelism of the pattern board and the pocket presser plate

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

Standard adjustment

Adjust so that the outer periphery of the pattern board ❷ aligns with that of the pocket presser plate ❸.



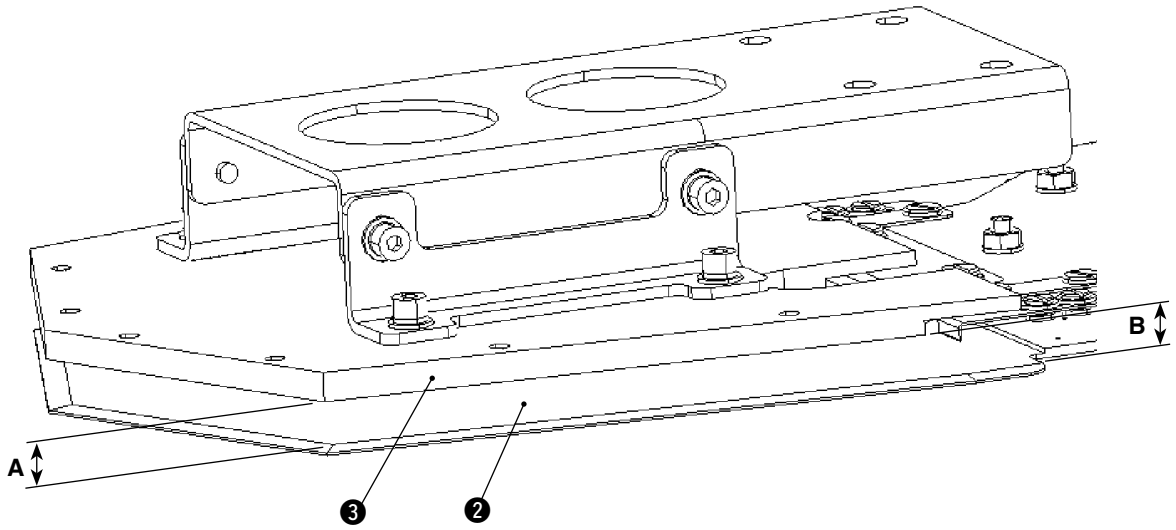
Adjustment procedures	Results of Improper adjustment
1. Loosen setscrew ❶ of the pocket presser plate ❸. Move the pocket presser plate ❸ to carry out adjustment.	o If the periphery of the pattern board does not align with that of the pocket presser plate, faulty pocket folding or bulged pocket can be caused.

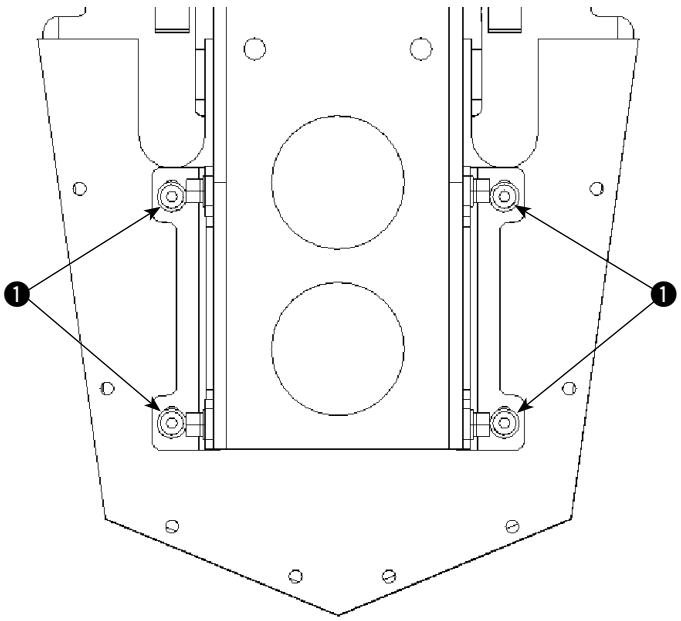
3) Adjustment of the height of the pocket presser plate

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

Standard adjustment

Adjust so that the pattern board ❷ comes in uniform contact with the pocket presser plate ❸ with no clearance provided between them. (Both A and B are “0”.)





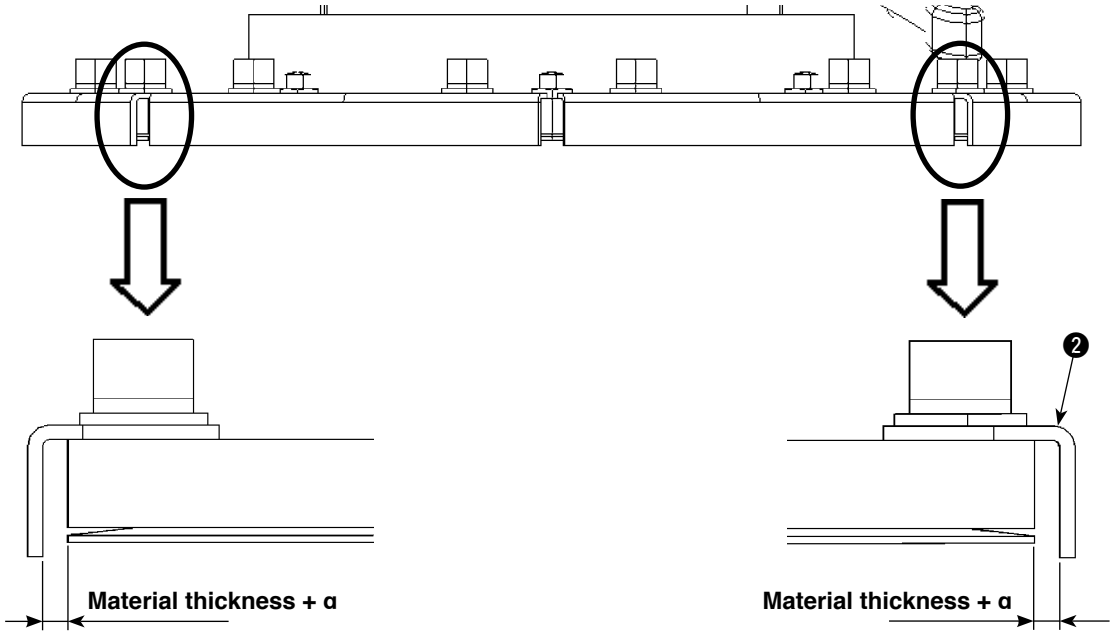
Adjustment procedures	Results of Improper adjustment
1. Loosen setscrews ❶ of the pocket presser plate ❸. Adjust so that the pocket presser plate ❸ holds the pattern board ❷ uniformly. Then, tighten setscrews ❶.	o The edge width will not be uniform. o If there is a clearance between the pocket presser plate and the pattern board, faulty pocket folding or bulged pocket can be caused.

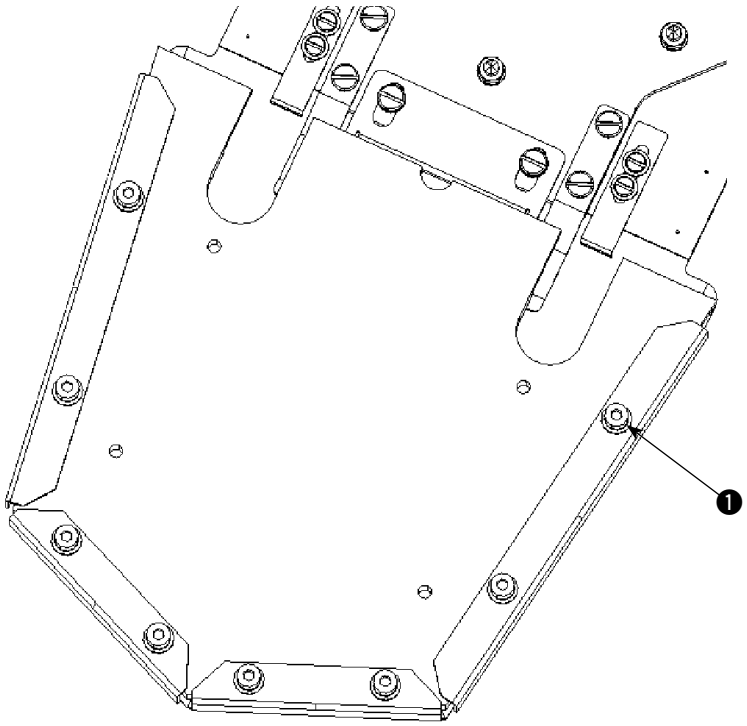
4) Adjustment of the position of the pattern board and the longitudinal folding plate

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

Standard adjustment

Adjust the clearance provided between the pattern board and the longitudinal folding plate ❷ to the "material thickness + α".





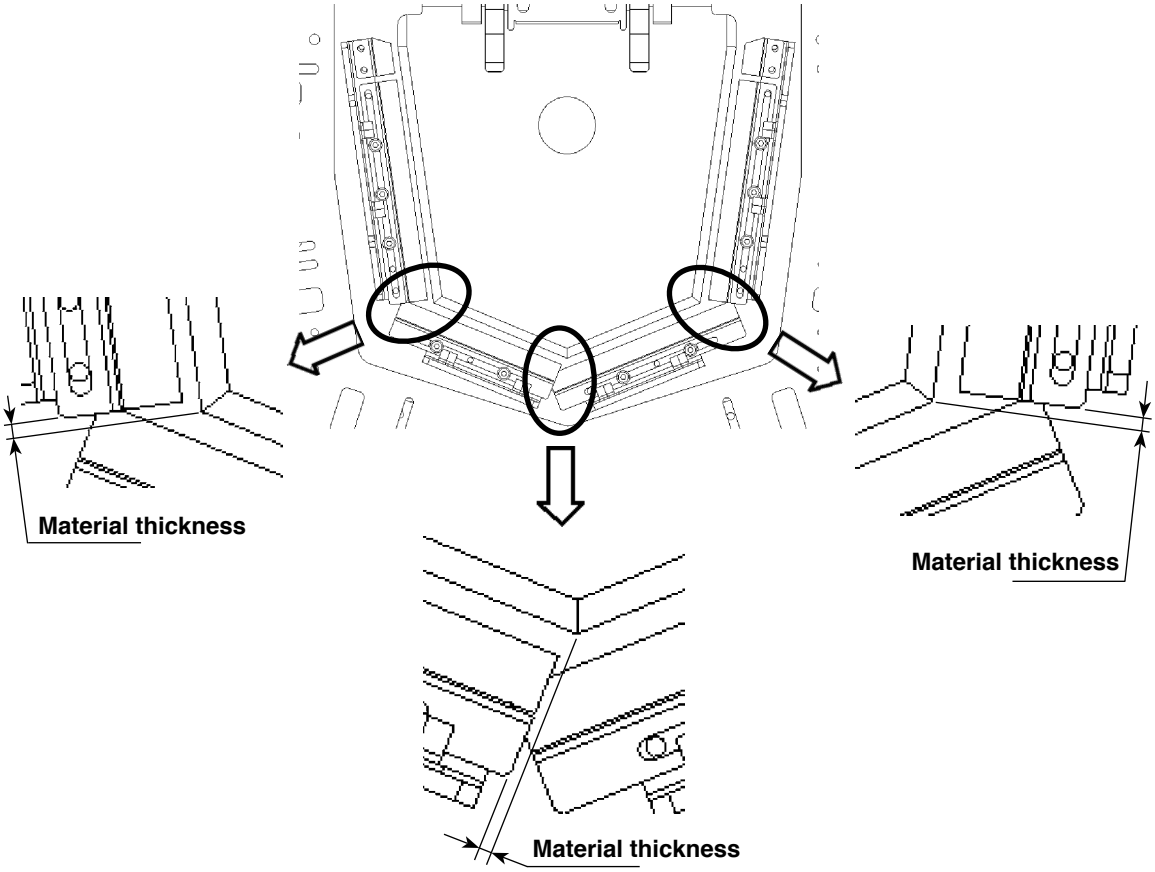
Adjustment procedures	Results of Improper adjustment
1. Loosen setscrew ❶ of the longitudinal folding plate ❷. Move the longitudinal folding plate ❷ to adjust so that it is spaced slightly larger than the material thickness from the outer periphery of the pattern board. Then, tighten setscrew ❶.	o Faulty pocket folding or bulged pocket can be caused.

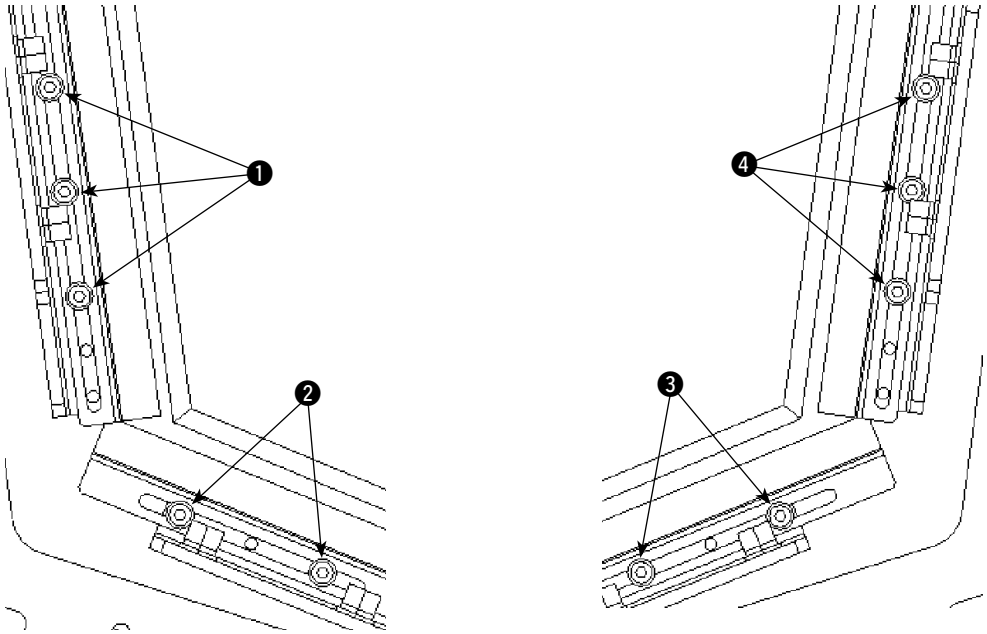
5) Adjustment of the position of the pattern board and the folding blade

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

Standard adjustment

Adjust the distance between the top of the pattern board and the end face of the folding blade with the material thickness folded inside.





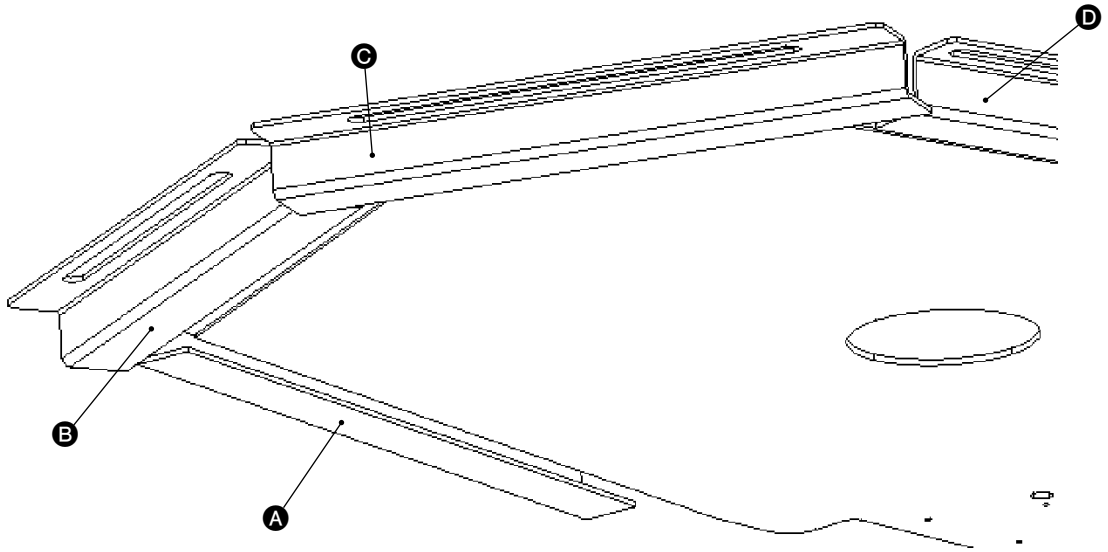
Adjustment procedures	Results of Improper adjustment
1. Loosen setscrews ❶ to ❹ of the folding blade. Move the folding blade to carry out adjustment. Then, tighten setscrews ❶ to ❹ of the folding blade.	o Faulty pocket folding or bulged pocket can be caused.

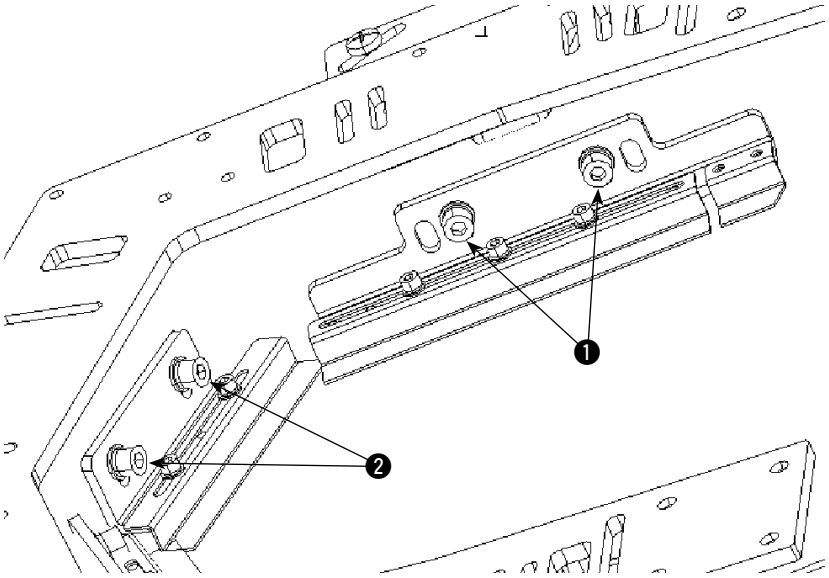
6) Adjustment of the height of the pattern board and the folding blade

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

Standard adjustment

The relation among the folding blades in terms of the vertical direction has to be adjusted so that Ⓐ and Ⓓ are brought to the highest position, Ⓑ is brought under them, and Ⓒ is brought to the lowest position.





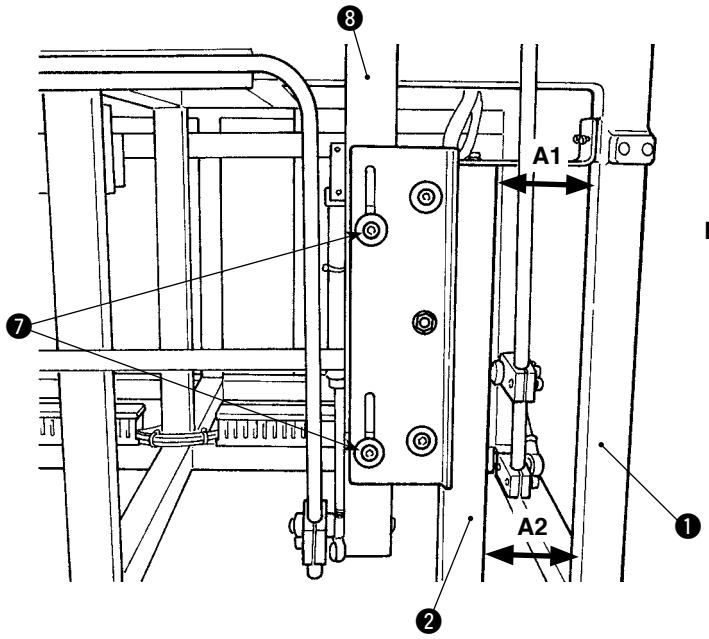
Adjustment procedures	Results of Improper adjustment
1. Loosen setscrews ❶ and ❷ of the cloth presser plate. Move the cloth presser plate to carry out adjustment. Then, tighten setscrews ❶ and ❷ of the cloth presser plate.	o Faulty pocket folding or bulged pocket can be caused.

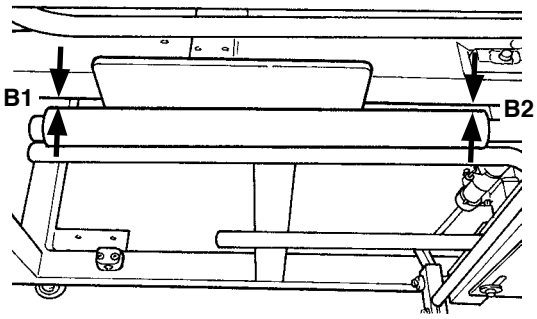
(8) Stacker mechanism

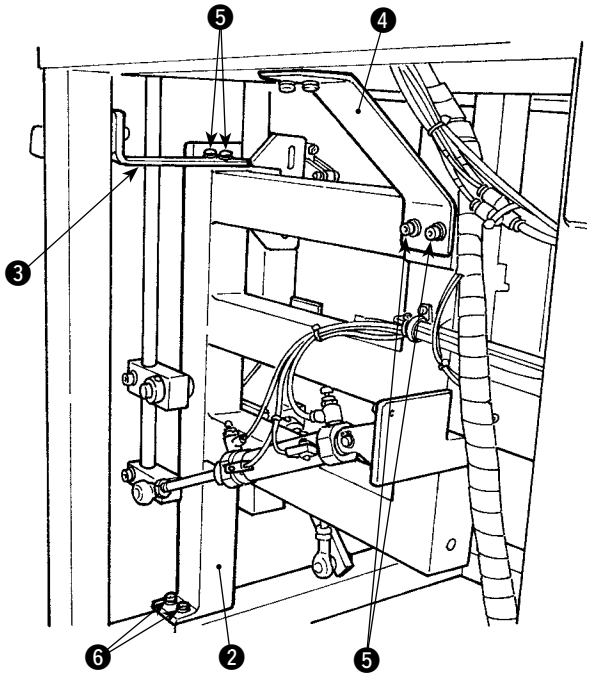
1) Adjustment of the initial position of the stacker

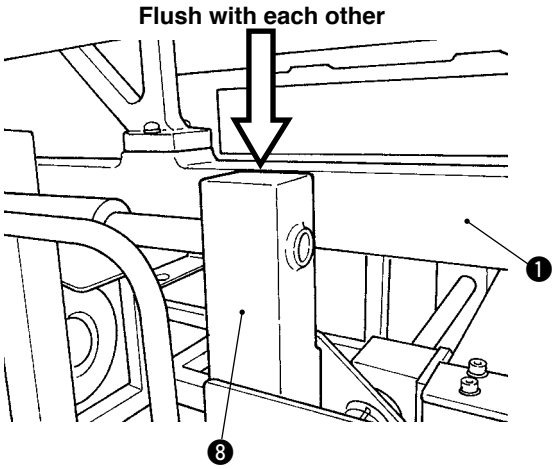
WARNING :
Turn OFF the power before starting the work so as to prevent accidents caused by abrupt start of the sewing machine.

Standard adjustment







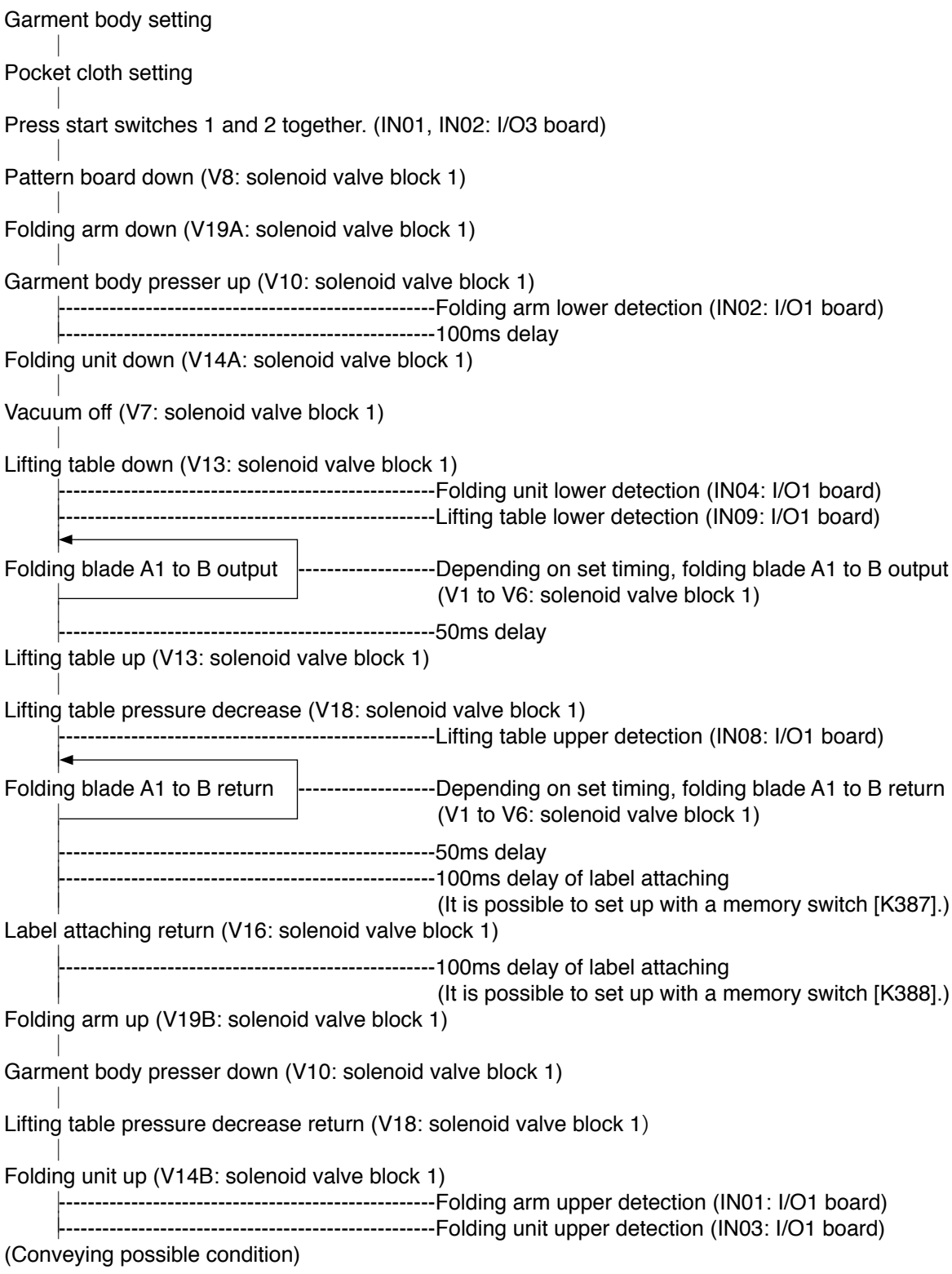


Adjustment procedures	Results of Improper adjustment
1. Assemble stacker base ❷ so that it is in parallel to main body enclosure ❶ both in terms of the longitudinal and horizontal directions. In addition, adjust the difference in dimensions between them measured at A1 section and A2 section to 0 ± 5 mm, and adjust that between them measured at B1 section and B2 section to 0 ± 2 mm. 2. Loosen four screws ❺ which are used to fix the slots in plate A ❸ and plate B ❹, and two screws ❻ which are used to fix the stacker base ❷. Adjust the aforementioned differences in dimensions within the slot. 3. Adjust the height of stand asm. ❽ so that it is in flush with main body enclosure ❶. 4. Loosen two setscrews ❼. Adjust the height of stand asm. ❽ within the slot. Then, tighten two setscrews ❼. **(Caution) When adjusting the height of stand asm. ❽, carefully check to be sure that setscrews ❼ are securely tightened after the completion of the adjustment. If they are loose, stand asm. ❽ can fall while the stacker is in operation.**	

5. Flow Charts

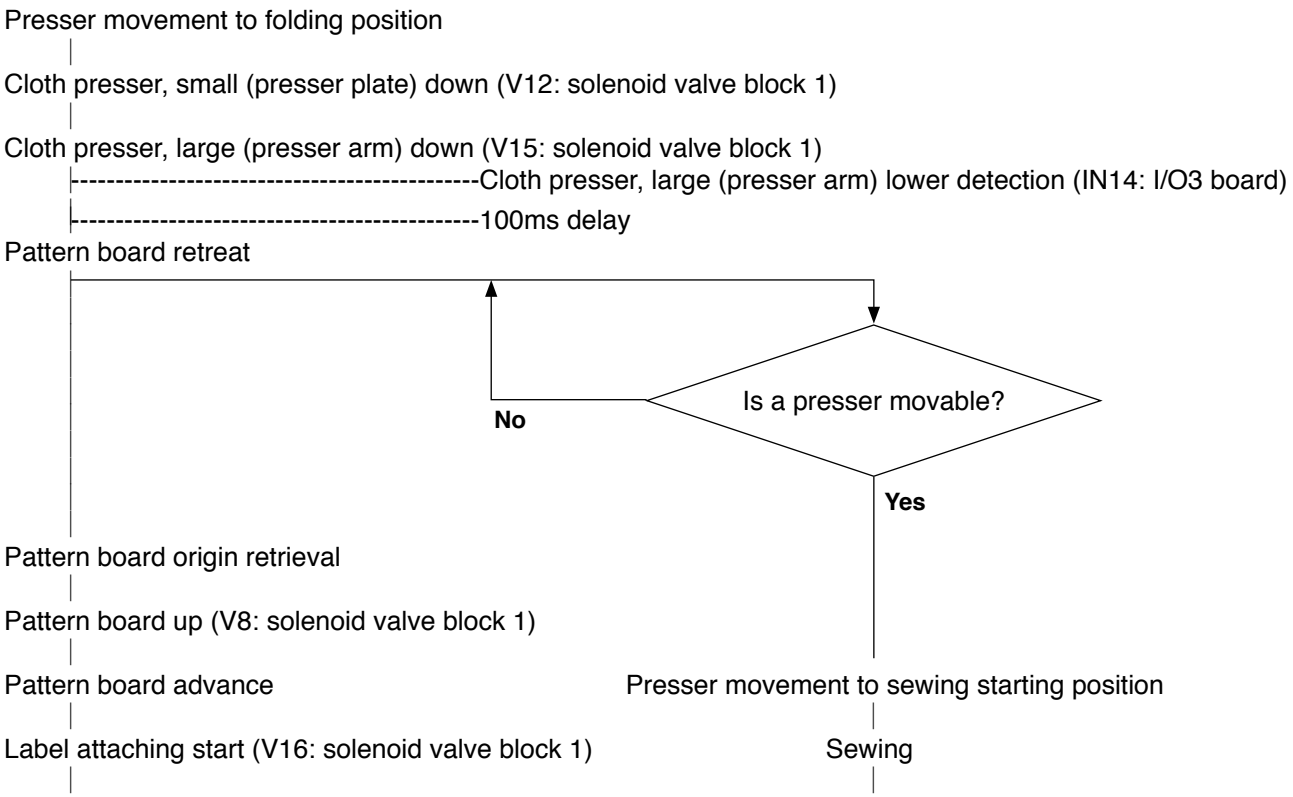
(1) Garment body setting and crease folding control of pocket cloth

This chart covers operations up through crease folding of garment body and pocket cloth.
This processing overlaps sewing and stacker control.
An outline of the operation sequence is given below.



*** Numbers in parentheses are solenoid valve numbers (Vxx) and automatic switch numbers (INxx).**

(2) Workpiece conveying control

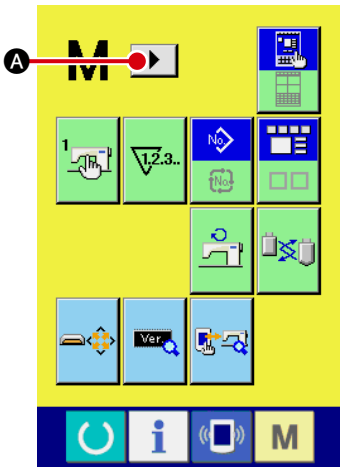


(Caution) Do similarly at the time of folding position change or folding position adjustment.

*** Numbers in parentheses are solenoid valve numbers (Vxx) and automatic switch numbers (INxx).**

6. Memory switch

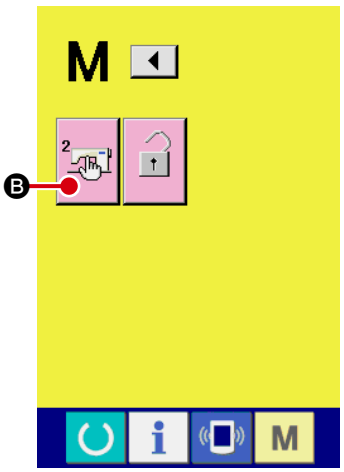
(1) Start and change

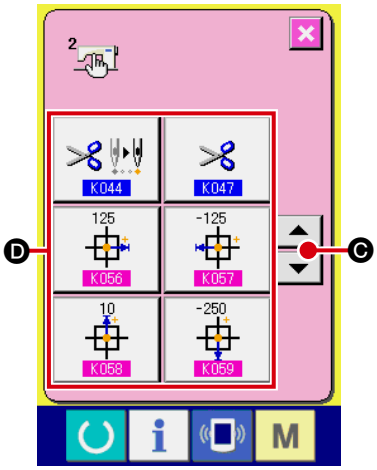


To change the memory switch (level 2):
The sewing machine operation can be changed by changing the setting of the memory switch.

(1) To call up the screen showing the memory switch data (level 2) list:

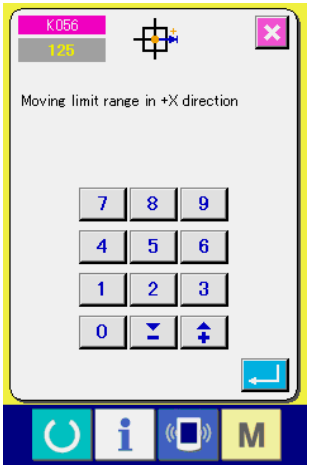
Hold down the M key for approx. 6 seconds, and the page change button ▶ Ⓐ appears at the top of the screen. Press the page change button to call up the next page, and the memory switch (level 2) button Ⓑ appears. Press the memory switch (level 2) button to call up the screen that shows the list of memory switch data (level 2).

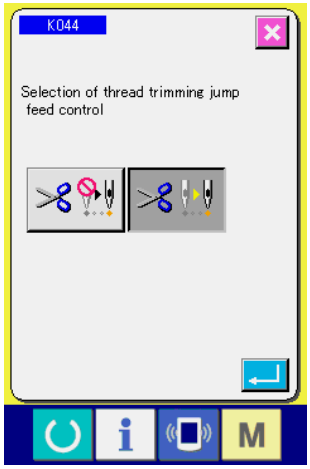




(2) To select the memory switch button to be changed:
Select the data item Ⓓ to be changed using the up and down scroll buttons ▲ ▼ Ⓒ.

(3) To change memory switch data (level 2):
Memory switch data (level 2) has 2 types of data items: one is where a value is changed, and the other is where a pictograph is selected. The data items where a value is changed are colored pink and numbered such as K056 and the value can be changed with + and – buttons shown on the screen. The data items where a pictograph is selected are colored blue and numbered such as K044 and pictographs shown on the screen where data items are changed are selectable.
Refer to "6.-(2) Function list" for further information about memory switch data (level 2).

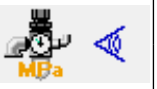
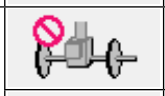
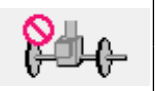
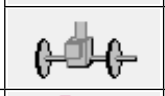


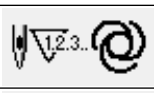
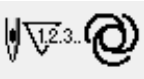
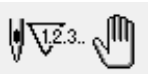
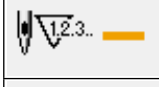
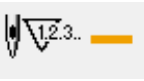
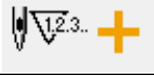


(2) Function list

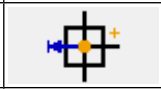
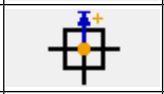
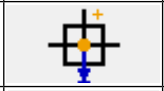
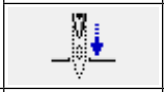
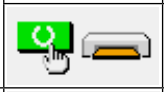
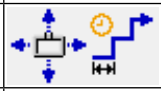
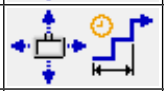
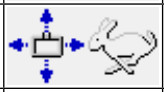
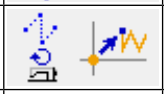
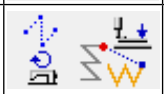
1) Level 1 (Refer to the instruction manual for changing procedure.)

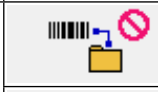
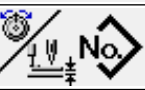
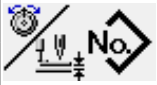
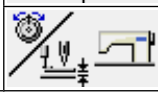
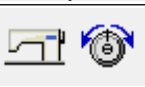
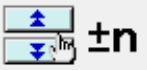
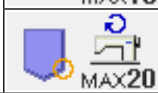
No.		Item		Setting range	Edit unit	Initial value
1	U001	**Maximum sewing speed**		500 to 4000	100 sti/min	4000
2	U002	**Sewing speed of 1st stitch**		200 to 900	100 sti/min	400
3	U003	**Sewing speed of 2nd stitch**		500 to 4000	100 sti/min	800
4	U004	**Sewing speed of 3rd stitch**		500 to 4000	100 sti/min	3000
5	U005	**Sewing speed of 4th stitch**		500 to 4000	100 sti/min	4000
6	U006	**Sewing speed of 5th stitch**		500 to 4000	100 sti/min	4000
7	U007	**Thread tension of 1st stitch**		0 to 200	1	200
8	U008	**Thread tension setting at the time of thread trimming**		0 to 200	1	0
9	U009	**Thread tension changeover timing setup at the time of thread trimming**		-6 to 4	1	0
10	U032	**Selection of buzzer sound Valid/Invalid**		Without buzzer sound	–	
				Panel operating sound		
				Panel operating sound + error		
11	U046	**Selection of effective/ineffective of thread trimming drive for thread trimming command**		Normal	–	
				Thread trimming prohibited		
12	U068	**Setup of thread tension output time at needle thread tension setting**		0 to 20	1	20
13	U071	**Valid/Invalid selection of thread breakage detection**		Disabled	–	
				Enabled		
14	U072	**Selection of number of invalid stitches at the start of sewing of thread breakage detection**		0 to 15 stitches	1	8 stitches
15	U073	**Selection of number of invalid stitches during sewing of thread breakage detection**		0 to 15 stitches	1	3 stitches
16	U081	**Presser control · pedal open/close Selection of presser operation with pedal operation**		0 to 99	1	0
17	U084	**Selection of the presence of pedal switch 1 latch**		Without	–	
				With		

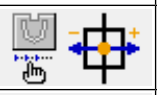
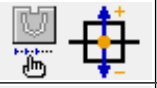
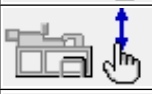
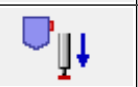
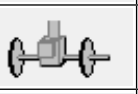
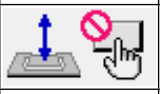
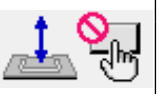
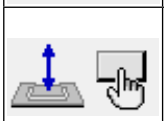
No.		Item		Setting range	Edit unit	Initial value
18	U085	**Selection of the presence of pedal switch 2 latch**		Without	–	
				With		
19	U086	**Selection of the presence of pedal switch 3 latch**		Without	–	
				With		
20	U087	**Selection of the presence of pedal switch 4 latch**		Without	–	
				With		
21	U097	**Temporary stop, thread trimming operation (Thread trimming with the use of stop switch again)**		Automatic thread trimmer	–	
				Manual thread trimmer (by pressing stop switch again)		
22	U108	**Selection of presence of air pressure detection**		Without	–	
				With		
23	U129	**Selection of valid/invalid of needle cooler control**		Without	–	
				With		
24	U376	**Stacker usage selection**		Without	–	
				With		
25	U378	**Roller stacker usage selection**		Without	–	
				With		
26	U379	**Label attaching usage selection**		Without	–	
				With		
27	U454	**Corner section sewing speed** Though the sewing speed is automatically reduced at the corner section of the material, this switch is used for further restricting the sewing speed.		1 to 10	1	7
28	U456	**Selection of conveying speed from the folding position to the sewing starting point**		High speed	–	
				Low speed		

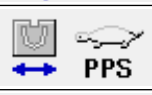
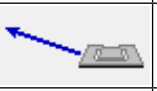
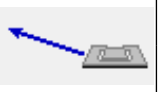
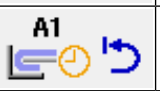
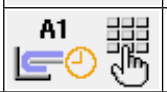
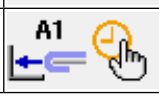
No.		Item		Setting range	Edit unit	Initial value
29	U477	**AW operation mode**		Automatic	–	
				Manual		
30	U478	**AW thread type/count selection**		Spun thread 20	–	
				Spun thread 30		
				Spun thread 40		
				Spun thread 50		
				Cotton thread 20		
				Cotton thread 30		
31	U479	**AW bobbin thread winding length selection**		2 to 35	1 m	15 m
32	U480	**AW allowance length selection**		1.0 to 3.5	0.1 m	3.5 m
33	U481	**AW counter selection** Counter selection for AW operation manual mode		Down	–	
				Up		
34	U482	**Setting of the number of stitches for AW bobbin change** Number of stitches to be sewn until the bobbin change is carried out under the AW operation manual mode Bobbin is changed after the completion of sewing during which the set number of stitches has been reached. **(Caution) The unit to be used when setting the number of stitches is the "numeric number x 10". For example, in the case "160" is displayed, the actual number of stitches is 1,600 stitches.**		0 to 9999	1	0
35	U500	**Language selection**	日本語	Japanese	–	Not selected yet (English)
			English	English		
			中文简体字	Chinese (simplified)		
			中文繁體字	Chinese (traditional)		
			Español	Spanish		
			Italiano	Italian		
			Français	French		
			Deutsch	German		
			Português	Portuguese		
			Türkçe	Turkish		
			Tiếng Việt	Vietnamese		
			한국어	Korean		
			Indonesia	Indonesian		
			Русский	Russian		
			English	English		

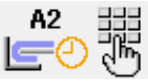
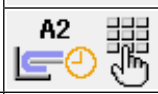
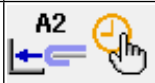
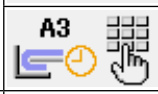
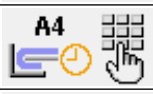
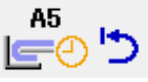
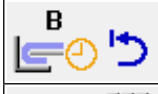
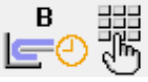
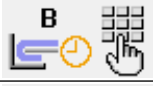
2) Level 2

No.		Item		Setting range	Edit unit	Initial value
1	K044	Enabled/disabled selection of jump feed control at thread trimmer operation		Disabled	–	
				Enabled		
2	K045	Selection of needle hole guide diameter at controlling thread trimming jump feed		1.6 to 4.0	0.2	1.6
3	K047	Enabled/disabled selection of thread trimmer device driving		Enabled	–	
				Prohibited		
4	K056	Setup of feed moving limit range (+X direction)		0 to 819	1	125
5	K057	Setup of feed moving limit range (-X direction)		-819 to 0	1	-125
6	K058	Setup of feed moving limit range (+Y direction)		0 to 819	1	5
7	K059	Setup of feed moving limit range (-Y direction)		-819 to 0	1	-250
8	K063	Enabled/disabled selection of needle bar stop holding mode		Disabled	–	
				Enabled		
9	K095	Setup of thread trimming timing		-20 to 20	1	0
10	K096	Enabled/disabled selection of media pattern reading at ready state		Disabled (backup data enabled)	–	
				Enabled		
11	K098	Rest time setup at the top position of jump command		0 to 100ms	10ms	20ms
12	K114	Setup of XY inching feed control/1st step time		100 to 20,000ms	10ms	400ms
13	K115	Setup of XY inching feed control/2nd step time		100 to 20,000ms	10ms	1,200ms
14	K116	Setup of XY inching feed control/max. speed		100 to 4,000pps	10pps	1,000pps
15	K119	XY feed moving speed/origin point → sewing starting point		100 to 20,000pps	10pps	12,000pps
16	K120	XY feed moving speed/sewing ending point → presser opening point (state of presser closed)		100 to 20,000pps	10pps	12,000pps
17	K121	XY feed moving speed/sewing ending point → conveying starting point		100 to 20,000pps	10pps	12,000pps
18	K122	XY feed moving speed (at forward/backward)		100 to 20,000pps	10pps	500pps

No.		Item		Setting range	Edit unit	Initial value
19	K123	XY feed moving speed (at return to origin)		100 to 20,000pps	10pps	1,500pps
20	K124	XY feed moving speed (at retainer compensation)		100 to 20,000pps	10pps	2,000pps
21	K125	XY feed moving speed (at origin retrieval)		100 to 20,000pps	10pps	1,500pps
22	K126	XY feed moving speed/direction dependence, 1st region (X-axis neighborhood)		100 to 20,000pps	10pps	12,000pps
23	K127	XY feed moving speed/direction dependence, 2nd region (Y-axis neighborhood)		100 to 20,000pps	10pps	12,000pps
24	K128	XY feed moving speed/direction dependence, 3rd region (45° neighborhood)		100 to 20,000pps	10pps	12,000pps
25	K130	Enabled/disabled selection of barcode mode		No barcode	–	
				Barcode mode		
26	K135	Enabled/disabled selection of common data of thread tension standard value		Disabled	–	
				Enabled		
27	K136	Common data of thread tension standard value		0 to 200	1	40
28	K139	Selection of display screen when shifting sewing mode		Sewing screen	–	
				Thread tension screen		
29	K140	Setting of changing amount of thread tension		2 to 5	1	5
30	K141	Enabled/disabled selection of linear feed button		Disabled	–	
				Enabled		
31	K142	Selection of readout code type of barcode		CODE39	–	
				All codes		
32	K161	Picker timing		-10 to 10	1	8
33	K183	Changeover of upper limit of corner section sewing speed		1 to 10	–	
				1 to 20		
34	K354	Compensation value of X-axis origin		-200 to 200	1	0
35	K355	Compensation value of Y-axis origin		-200 to 200	1	0

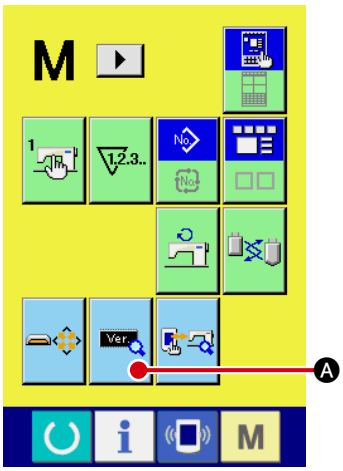
No.		Item		Setting range	Edit unit	Initial value
36	K356	**Compensation value of X-coordinate of presser plate origin**		-200 to 200	1	0
37	K357	**Compensation value of Y-coordinate of presser plate origin**		-200 to 200	1	0
38	K360	**Adjustment value of X-coordinate**		-200 to 200	1	0
39	K361	**Adjustment value of Y-coordinate**		-200 to 200	1	0
40	K372	**With/without label attaching unit**		Without	–	
				With		
41	K373	**With/without roller stacker unit**		Without	–	
				With		
42	K374	**With/without AW-2**		Without	–	
				With		
43	K377	**Selection of folding unit usage**		Stop	–	
				Operation		
44	K380	**Selection of stack full detection**		Without	–	
				With		
45	K382	**Operation of pattern board longitudinal switch**		Stop (standard)	–	
				Operation • Step on: forward • Step on again: backward		
46	K383	**Operation of vacuum ON/OFF switch**		Stop (standard)	–	
				Operation • Step on: strong • Step on again: weakness		
47	K384	**Operation of presser UP/DOWN switch**		Stop (standard)	–	
				Operation • Step on: UP • Step on again: DOWN		
48	K387	**Setting of waiting time to following operation after label attaching operation**		0 to 10,000ms	1ms	100

No.		Item		Setting range	Edit unit	Initial value
49	K388	**Setting of waiting time to following operation after label attaching retrieval**		0 to 10,000ms	1ms	100
50	K390	**Roller driving time**		0 to 10,000ms	1ms	100ms
51	K420	**Waiting time of roller rising**		0 to 10,000ms	1ms	100ms
52	K421	**Waiting time of roller descent**		0 to 10,000ms	1ms	100ms
53	K422	**Waiting time after changeover of stacker cloth presser**		0 to 10,000ms	1ms	100ms
54	K431	**Waiting time of air table pressure decrease rising**		0 to 10,000ms	1ms	100ms
55	K432	**Crease folding position of pattern board motor**		0 to 10,000	1	1,650
56	K434	**Rising time of presser plate**		0 to 10,000ms	1ms	100ms
57	K437	**Conveying speed: Low**		100 to 10,000pps	10pps	10,000pps
58	K438	**Conveying speed: High**		100 to 20,000pps	10pps	12,000pps
59	K439	**Remaining number of stitch at stack starting**		0 to 10 stitches	1	3
60	K440	**Continuation operation of folding blade at step operation**		Not continuation operation	–	
				Continuation operation		
61	K441	**Approval of needle lowering at step sewing**		Disapproval	–	
				Approval		
62	K457	**Selection of simple pocket mode**		Simple mode	–	
				Normal mode		
63	K458	**Selection of enable/disable of cloth turn-up preventing function**		Without	–	
				Operation		
64	K459	**Selection which uses initial value of folding timing A1**		Numerical value "0"	–	
				Use preset value		
65	K460	**Initial value setting of on timing of folding timing A1**		0 ～ 9,950ms	50ms	100ms
66	K461	**Initial value setting of off timing of folding timing A1**		0 ～ 9,950ms	50ms	100ms

No.		Item		Setting range	Edit unit	Initial value
67	K462	**Selection which uses initial value of folding timing A2**		Numerical value "0"	–	
				Use preset value		
68	K463	**Initial value setting of on timing of folding timing A2**		0 ～ 9,950ms	50ms	100ms
69	K464	**Initial value setting of off timing of folding timing A2**		0 ～ 9,950ms	50ms	100ms
70	K465	**Selection which uses initial value of folding timing A3**		Numerical value "0"	–	
				Use preset value		
71	K466	**Initial value setting of on timing of folding timing A3**		0 ～ 9,950ms	50ms	150ms
72	K467	**Initial value setting of off timing of folding timing A3**		0 ～ 9,950ms	50ms	50ms
73	K468	**Selection which uses initial value of folding timing A4**		Numerical value "0"	–	
				Use preset value		
74	K469	**Initial value setting of on timing of folding timing A4**		0 ～ 9,950ms	50ms	50ms
75	K470	**Initial value setting of off timing of folding timing A4**		0 ～ 9,950ms	50ms	100ms
76	K471	**Selection which uses initial value of folding timing A5**		Numerical value "0"	–	
				Use preset value		
77	K472	**Initial value setting of on timing of folding timing A5**		0 ～ 9,950ms	50ms	0
78	K473	**Initial value setting of off timing of folding timing A5**		0 ～ 9,950ms	50ms	0
79	K474	**Selection which uses initial value of folding timing B**		Numerical value "0"	–	
				Use preset value		
80	K475	**Initial value setting of on timing of folding timing B**		0 ～ 9,950ms	50ms	200ms
81	K476	**Initial value setting of off timing of folding timing B**		0 ～ 9,950ms	50ms	50ms

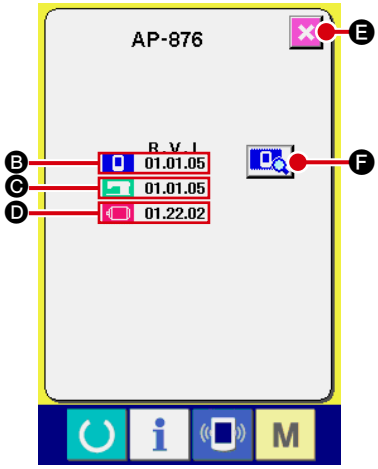
7. Supplementary explanation of the function numbers and the description of the functions

(1) Version display



1. To display the version information screen:

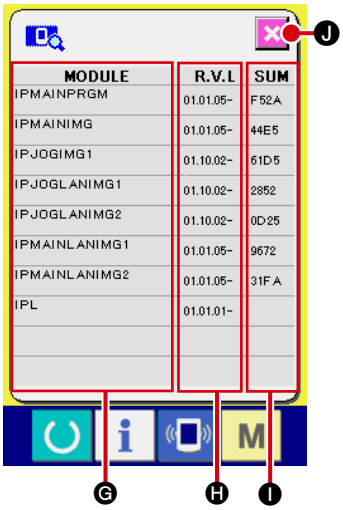
Hold down the M key for 3 seconds to call up the version information button Ver. Ⓐ on the screen. Press this button to display the version information screen.



The version information screen shows the version information of your sewing machine.

Ⓑ : Panel program version
Ⓒ : Main program version
Ⓓ : Servo program version

Pressing the cancel button Ⓔ, closes the version information screen and calls up the mode screen.



2. To display the detail screen:

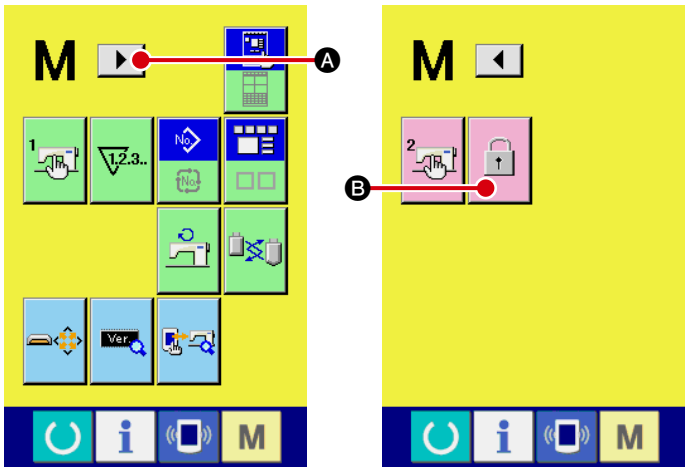
Press the detail screen button Ⓕ to call up the panel program detail screen.

Ⓖ : Module
Ⓗ : RVL
Ⓘ : Checksum

Pressing the cancel button Ⓙ, closes the detail screen and calls up the version information screen.

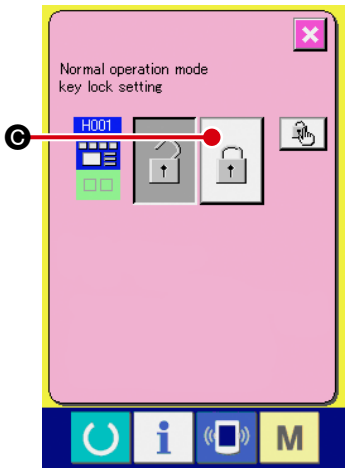
Pressing the M key closes the detail screen and calls up the data input screen which you have selected.

(2) Key look setting



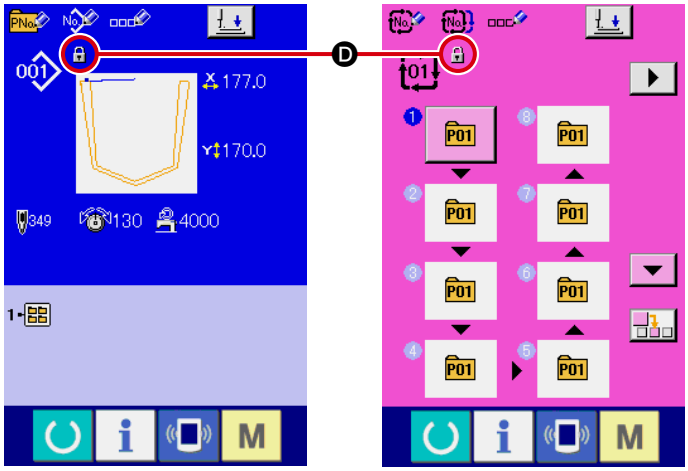
1. To call up the key lock screen:

Hold down the M key for about 6 seconds. The page shift button ▶ Ⓐ is displayed on the upper part of the screen. Press the page shift button to display the next page. Press the key lock button Ⓑ to display the key lock setting screen.



2. Define the key lock state

To change the normal operation mode to key lock state, press the button Ⓒ on the key lock setting screen. The normal operation mode is changed to the key lock state.



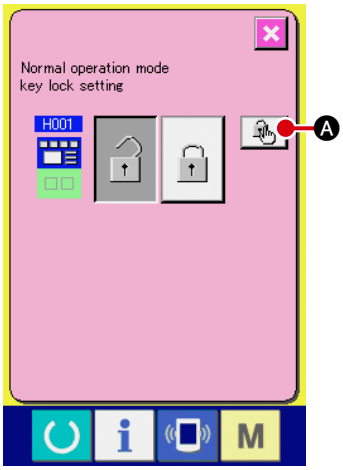
3. Close the modal screen and display the data input screen.

Close the mode screen. The data input screen is displayed and pictograph Ⓓ for indicating the key lock status is displayed on the right of pattern No. indication.

Only the buttons available even in the state of key lock are displayed.

(3) Customize function setting of key lock

The key lock customize function is used for the free setting of disabled buttons in the state of key lock as described in “7.-(2) Key lock setting”. It is possible to disable operation and also set up the absolute deletion of button pictogram and numerals.
Customized key lock data is stored in the panel.
It is also possible to copy the customize data to another panel.
(Refer to “7.-(4) Communication screens of the maintenance personnel level (Program rewrite)” for further details.)

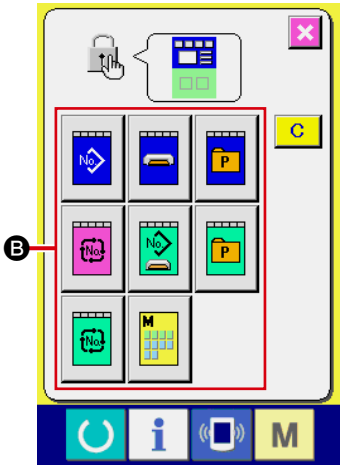


1. Procedure to customize the key lock

(1) Displaying the selection screen to customize the key lock

Press the customize button  Ⓐ on the key lock setting screen.

The selection screen to customize the key lock is displayed.



(2) Selecting the customize confirmation screen

Select the customize confirmation screen for the key lock pushing the button Ⓑ.

Customizable screen list for normal operation mode

Button	Screen
	Sewing shape data input screen (when selecting the user pattern)
	Sewing shape data input screen (when selecting the media pattern)
	Sewing shape data input screen (when selecting the direct pattern)
	Data input screen (combination sewing)
	Sewing screen (when selecting the user pattern and media pattern)
	Sewing screen (when selecting the direct pattern)
	Sewing screen (combination sewing)
	Mode changeover screen

(3) Customize setup

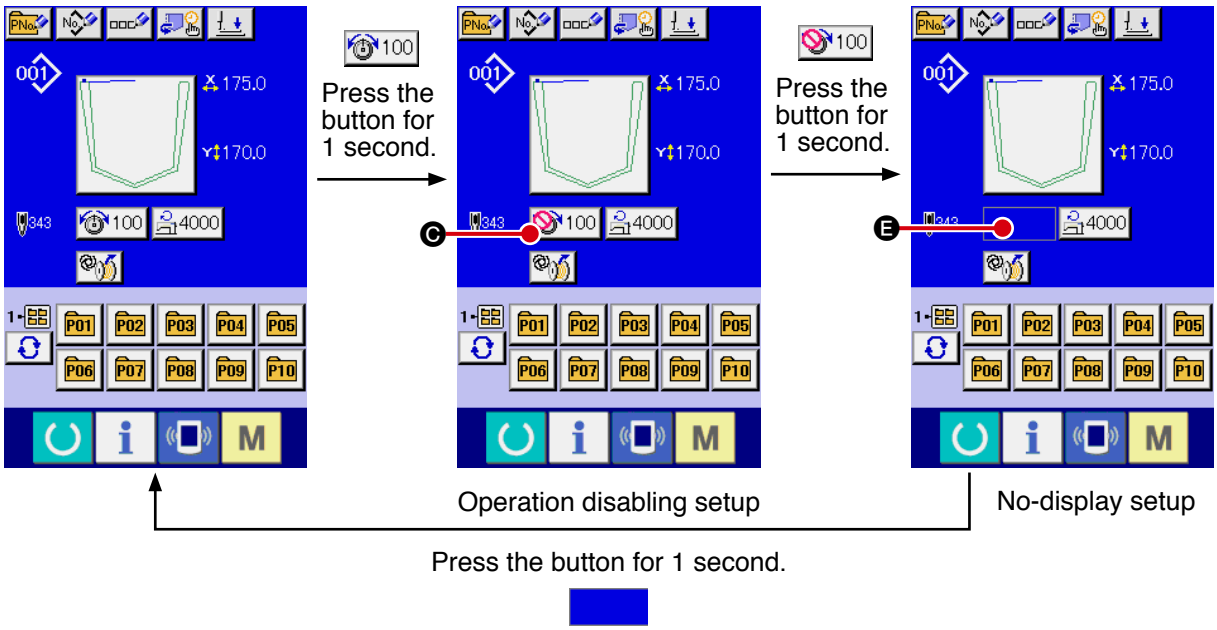
Hold down a button to disable the operation for about 1 second. The pictograph Ⓒ to indicate the operation disabling setup is displayed at top left of the button. In actual operation, the setting state is displayed as shown in the figure Ⓓ.

When the button is kept pressed for about 1 second further in the state of operation disabling setup, the button frame only is displayed as shown in the figure Ⓔ, suggesting the no-display setup. In actual operation, the setting state is displayed as shown in the figure Ⓕ.

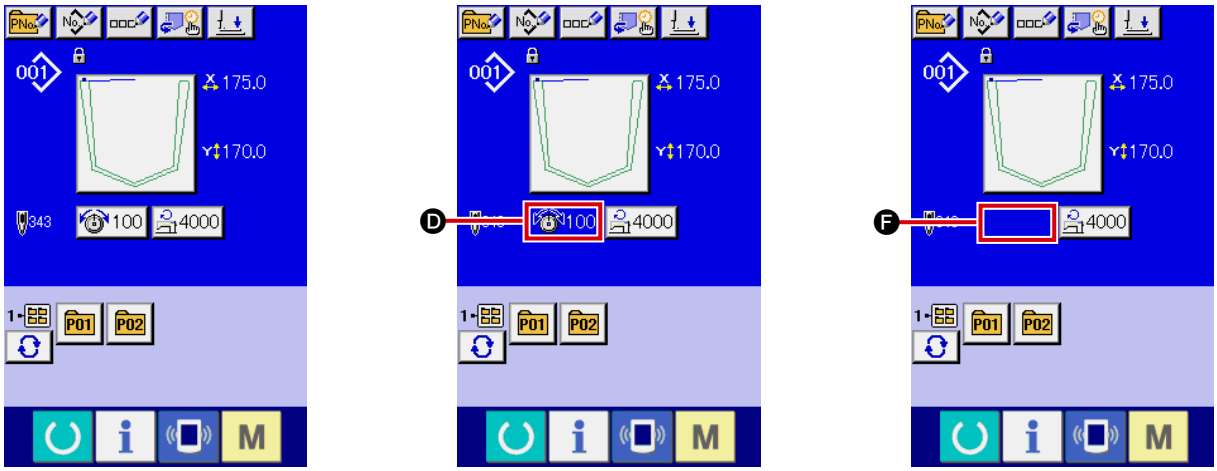
However, such buttons cannot be customized as those that may cause some problems in sewing machine operation by making the operation disabling setup or no-display setup.

When the button is pressed further for about 1 second in the state of no-display setup, the frame-only display turns into an original display and the operation enabling setup becomes available.

(Caution) When the setup conditions of a button are changed, those of other buttons having the same function are also changed. Such buttons as those having the same function may be present beyond screens.

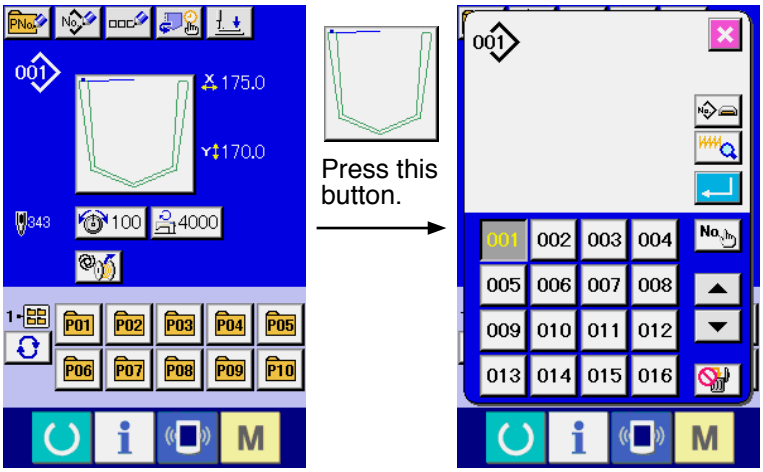


In actual operation



(4) Display of change destination screen

When a change destination button is pressed, a change destination screen can be displayed. However, a change destination screen is not displayed even though a button of operation disabling setup or no-display setup is pressed.



(5) Determine the customize setup

Press the M key after completion of customize. The customized setting is performed, and the screen returns to the selection screen to customize the key lock. The customized setting is not saved if the power supply is turned off before pressing the M key.

2. Batch customize

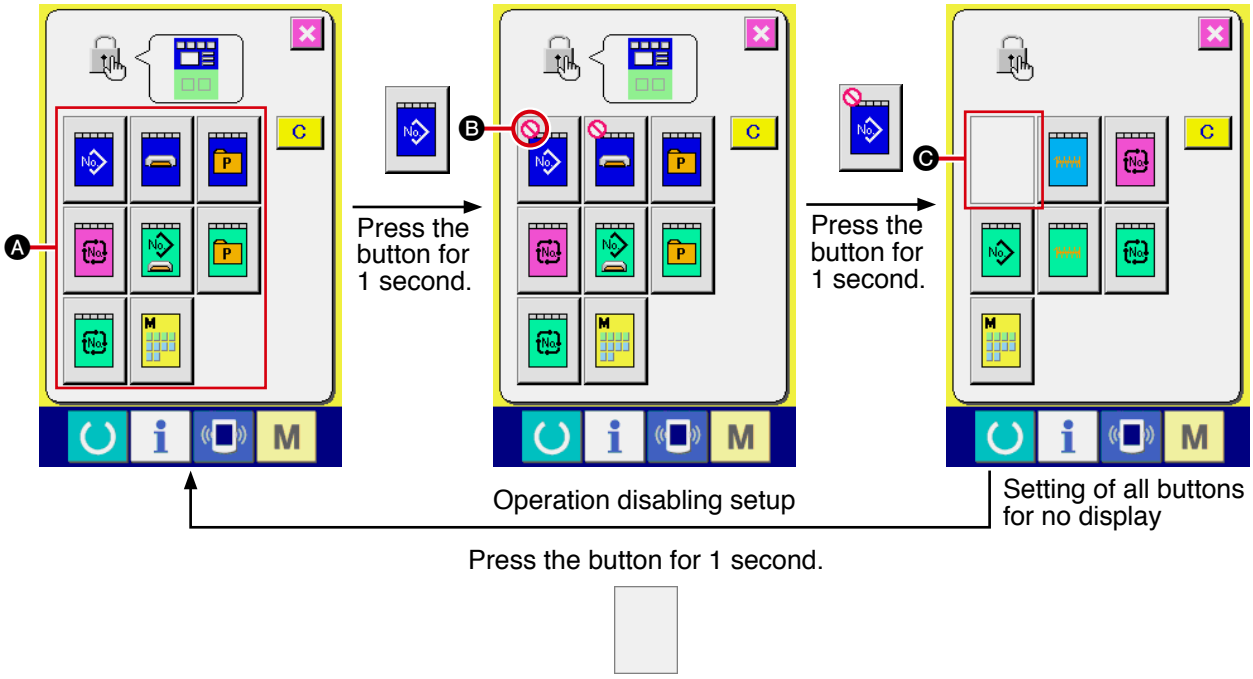
In the key lock customize selection screen, batch customize is possible.

(1) Press the button Ⓐ for about 1 second. Buttons in all the changed screens are disabled and the customize setup conditions are saved. In addition, the pictogram Ⓑ is displayed at top left of the pressed button. (***Caution**)
The pictograph Ⓑ indicates that all buttons in all the screens changed from the pressed button are disabled.

(2) When the button is kept pressed for about 1 second in the state that the pictograph Ⓑ is displayed, all buttons in all the screens transferred from the pressed button are put into the no-display setup and the customize setup conditions are saved. The pressed button stays in the frame-only display Ⓒ. (***Caution**)
This indicates that all buttons in all the screens changed from the pressed button are set to the no-display setup.

(3) If the button is kept pressed for about 1 second in the state that the frame-only button is displayed, all buttons in all the screens transferred from the pressed button are set to the factory shipment setup and the customize setup conditions are saved. (***Caution**)

(*Caution) When the setup conditions of a button are changed, those of other buttons having the same function are also changed. Such buttons as those having the same function may be present beyond screens. Therefore, the display of buttons other than the pressed button may change.

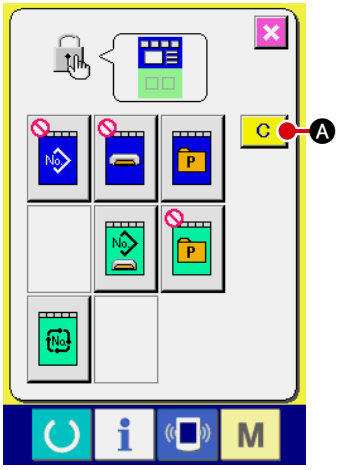


3. Initializing the customize setup

The customize setup can be initialized to the state of shipment from the factory.

(1) Display of the initialize checking screen for the key lock customize

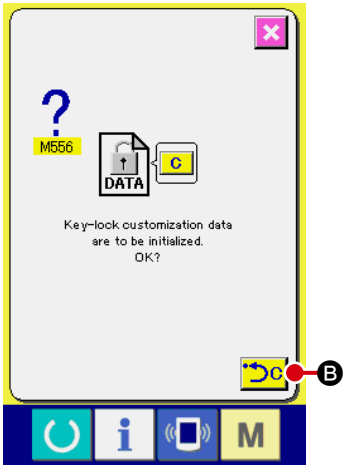
Press the button Ⓐ in the key lock customize selection screen. The checking screen for the key lock customize initialization is displayed.



Key lock customize selection screen

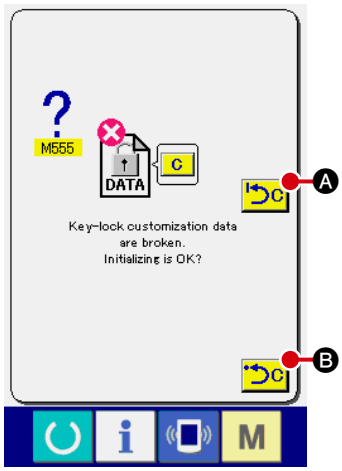
(2) Initialization

When Button Ⓑ is pressed in the key lock customize initialize checking screen, the customize setup conditions are initialized in the state of shipment from the factory and the screen returns to the key lock customize selection screen.



4. If the customize data are broken

If the backup data disappear as a result of no use of the panel for a long time or the key lock customize data are destroyed for a certain reason, the screen specified below is displayed when the power switch is turned on.



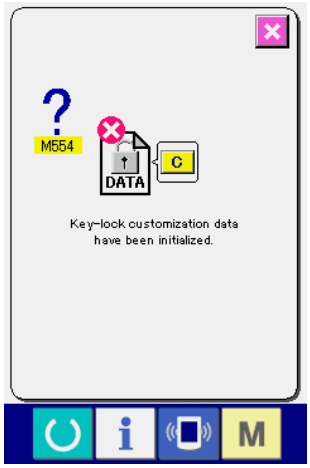
(1) When the backup data are available

The key lock customize data are provided with the backup data.

If the backup data are available, the screen shown at left is displayed.

When Button C Ⓐ is pressed, the panel is established with the backup data.

When Button C Ⓑ is pressed, the key lock customize data is initialized into the state of shipment from the factory.



(2) If the backup data are broken

If the backup data are also found to be destroyed, the screen shown at left is displayed.

When this screen is displayed, the key lock customize data is initialized into the state of shipment from the factory.

(Caution) If a panel applied to another model is used for substitute, the customize data are also initialized.

(4) Communication screens of the maintenance personnel level (Program rewrite)

The data types allowed to be handled in the communication screens can differ according to the ordinarily used levels and the specific levels that are used by the maintenance personnel.

1. Types of data that can be handled

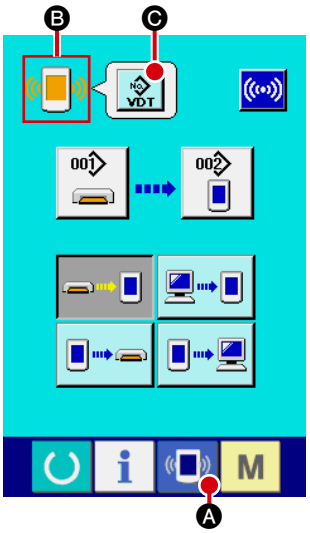
In addition to the four ordinary data types, the six more data types can be used for the maintenance personnel level. Each data type is as specified below.

Data name	Pictograph	Extension	Contents of data
Adjustment data		Model name + 00XXX.MSW Example) AP00001.MSW	Data of the memory switches 1 and 2
All sewing machine data		Model name + 00XXX.MSP Example) AP00001.MSP	All data maintained by the sewing machine
Panel program data		BP + RVL(6 digits).HED BP + RVL(6 digits).PXX BM + RVL(6 digits).IXX	Program data and display data of the panel
Main program data		MA + RVL(6 digits).PRG	Main program data
Servo program data		MT + RVL(6 digits).PRG	Servo program data
Key lock customize data		Model name + 00XXX.KDT Example) AP00001.KDT	Key lock customize data for the normal operation mode and the quick operation mode

XXX : File No.

Copying the all sewing machine data

When using the copied all sewing machine data, all user pattern data have to be copied.

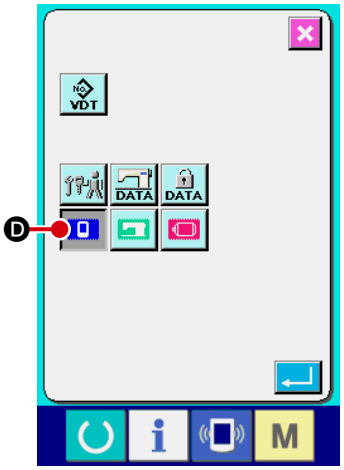


2. Reading/Writing of adjustment data and all sewing machine data

(1) Display of the communication screen of the maintenance personnel level

When the key Ⓐ is continuously pressed for 3 seconds, the top left image is turned into the orange color Ⓑ and a communication screen of the maintenance personnel level is displayed.

Ⓒ is pressed in a communication screen of the maintenance personnel level, the data selection screen is displayed.
In this state, it becomes possible to select the adjusting data and all sewing machine data.

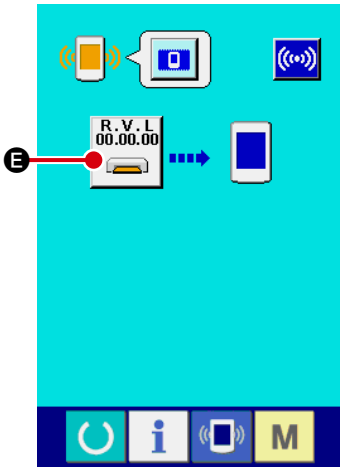


3. Program rewriting

(1) Selection of the data type

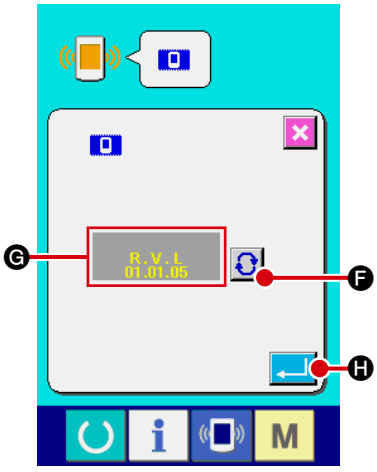
When the data classification button Ⓒ is pressed in a communication screen of the maintenance personnel level, the data selection screen is displayed.

In this state, select the panel program data Ⓓ.



(2) Selection of a file

When the file selection button Ⓔ is pressed in a communication screen, the file selection screen is displayed.

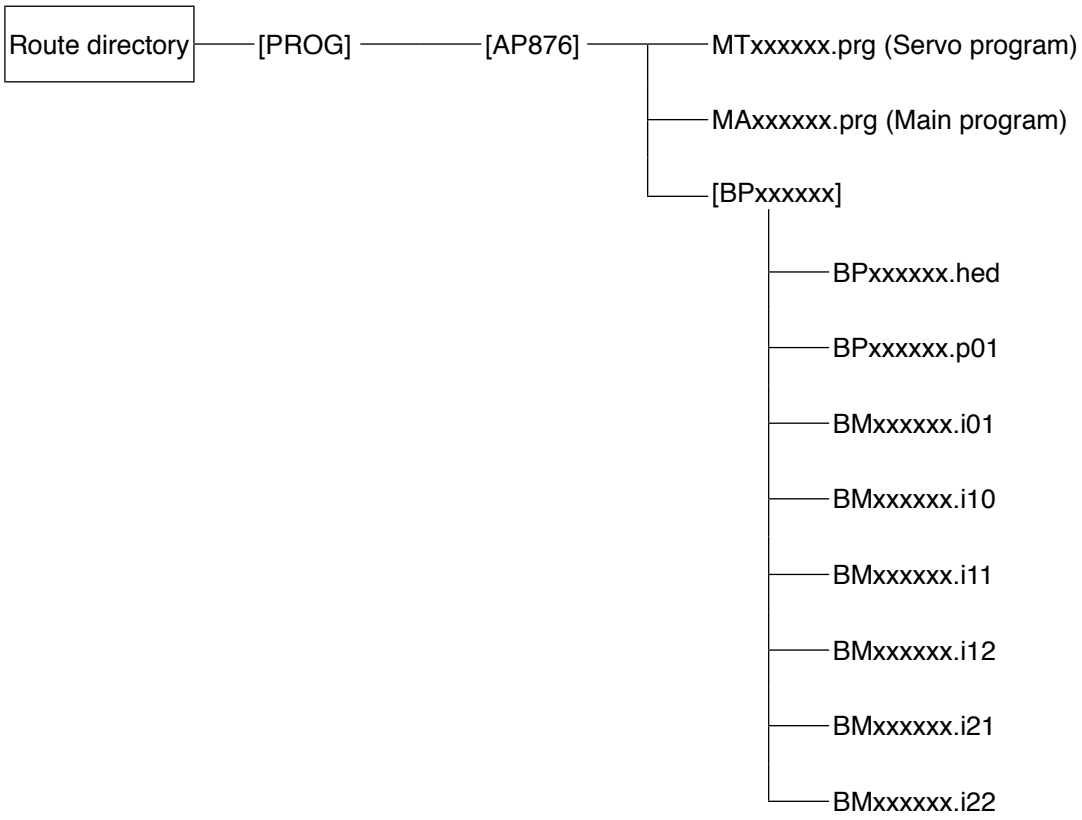


Press the file retrieval button Ⓕ to select the download program Ⓖ, and press the enter button Ⓗ.

4. Use of media other than those packed together

When the contents of the media packed together are going to be copied on another media, the media of the copying destination should be formatted with IP-420. Since then, the following directory configuration should be established with a personal computer.

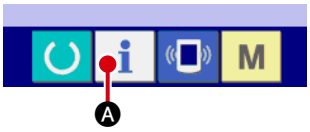
Information about the method of media card formatting is obtainable from the Instruction Manual, "2-32. Performing formatting of the media".

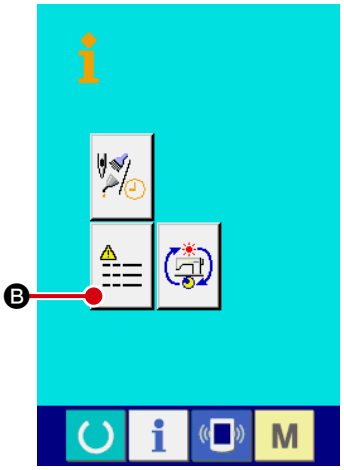


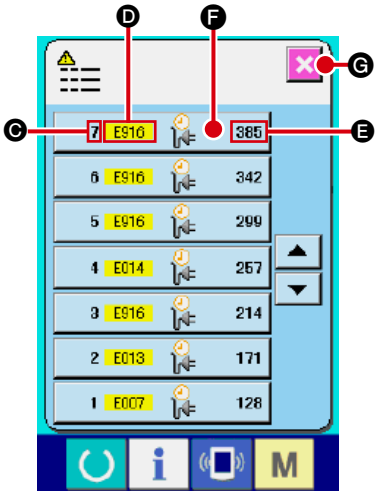
[ ] : Folder

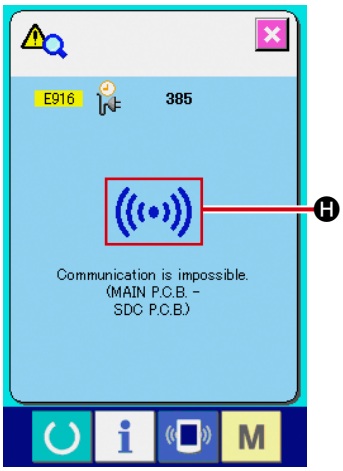
xxxxxx : RVL code (6 digits)

(5) Information screen at the maintenance personnel level









1. Error history

(1) To display the information screen at the maintenance personnel level:

Hold down the information key  Ⓐ for approx. 3 seconds in the switch sheet section on the data input screen to call up the information screen at the maintenance personnel level.
On the information screen at the maintenance personnel level, the color of PICT at the upper left changes from blue to orange, and there are 3 buttons.

(2) To call up the error history screen:

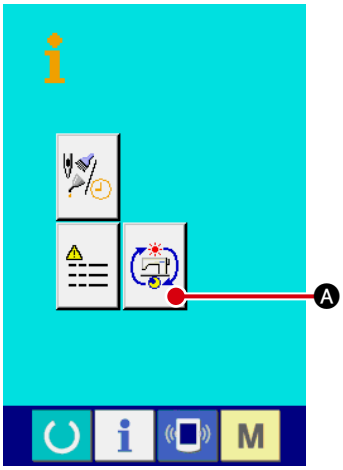
Press the error history button  Ⓑ on the information screen to call up the error history screen.
The error history screen shows the error history of your sewing machine.

Ⓒ : Chronological recording number
Ⓓ : Error code
Ⓔ : Cumulative energizing time during error (hour)

Pressing the cancel button  Ⓖ, closes the error history screen and calls up the information screen.

(3) To display details:

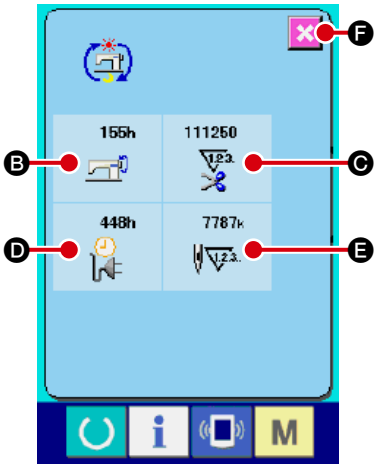
For detailed information about errors, press the error button  Ⓕ that you would like to see to call up the error detail screen.
PICT Ⓗ in response to error codes appears on the error detail screen.
→ Refer to “13. Error code list” about the error code.



2. Cumulative operating information

(1) To call up the information screen at the maintenance personnel level:

Hold down the information key [i] for approx. 3 seconds in the switch sheet section on the data input screen to call up the information screen at the maintenance personnel level.
On the information screen at the maintenance personnel level, the color of PICT at the upper left changes from blue to orange, and there are 3 buttons.



(2) To display cumulative operating information:

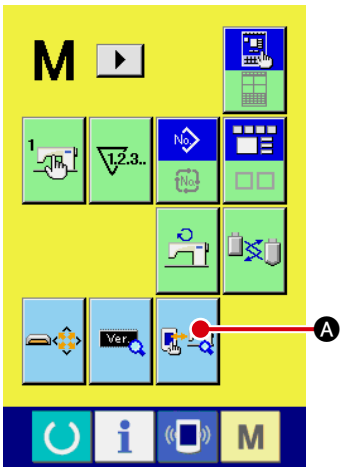
Press the cumulative operating information button [ ] Ⓐ on the information screen to call up the cumulative operating information screen.

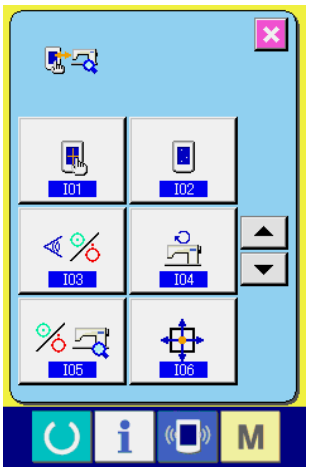
The following 4 items are indicated on the cumulative operating information screen.

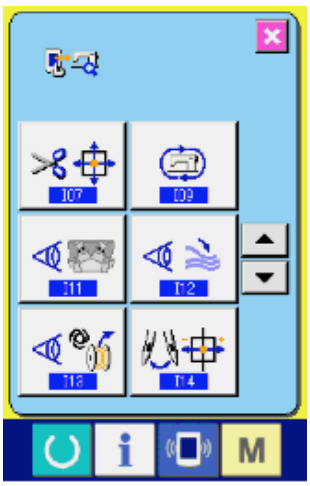
Ⓑ : Cumulative operating time (hour)
Ⓒ : Cumulative thread trimming count
Ⓓ : Cumulative energizing time (hour)
Ⓔ : Cumulative stitch count (x 1,000 stitches)

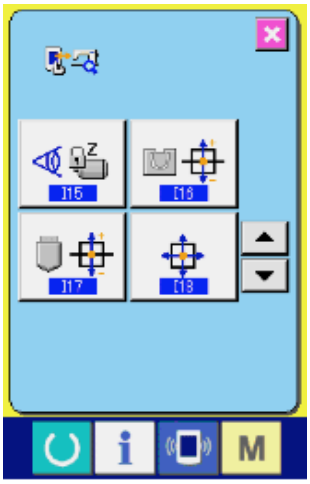
Pressing the cancel button [ ] Ⓕ, closes the cumulative operating information screen and calls up the information screen.

8. Test mode









1) Display of the check program screen

When the M key is continuously pressed for 3 seconds, the check program button  Ⓐ is displayed on the screen. When this button Ⓐ is depressed, the check program screen is displayed.

The check program comes in the sixteen items as specified below.

I01 Touch panel correction screen
→ The touch panel and button display positions are corrected.

I02 LCD check
→ Presence of any dot missing is checked for the liquid crystal display.

I03 Input signal check
→ The status of switches and sensor inputs is displayed.

I04 Main motor rpm check
→ Machine head individual operation is performed.
Use for the check of the amount of hook oil, etc.

I05 Output check
→ Solenoid valve output check is carried out.

I06 XY motor / presser plate origin adjustment
→ This program item is used to correct the position of the origin in the case it has moved out of position due to change of the machine head after the manufacture or other causes.

I07 Thread trimmer motor / origin sensor check
→ The status of inching operation of the thread trimmer motor, operation of origin retrieval, and the thread trimmer origin and thread trimmer sensor is displayed.

I09 Operation setting
→ After operation mode setup, change over to the setting of operation mode.

I11 Folding blade independent operation
→ Perform operation of the folding blade while the folding unit is raised, and the folding blade is adjusted.

I12 Stacker independent operation
→ Only stacker is operated independently.

I13 AW adjustment
→ Adjustment of each origin position and movement length of AW unit, display of an error history, and aging of AW unit are performed.

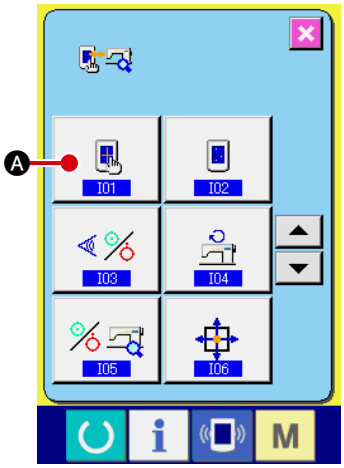
I14 Hook adjustment
→ Only needle throw mechanism is operated.
Use at carrying out hook adjustment.

I15 Main motor lock
→ Perform the needle lifting to upper dead point of main motor.

I16 Adjustment of origin of folding position
→ Adjust the origin of XY folding position.

I17 Adjustment of pattern board longitudinal position
→ Adjust the crease folding position of pattern board.

I18 XY motor / origin adjustment
→ Adjust the XY origin.

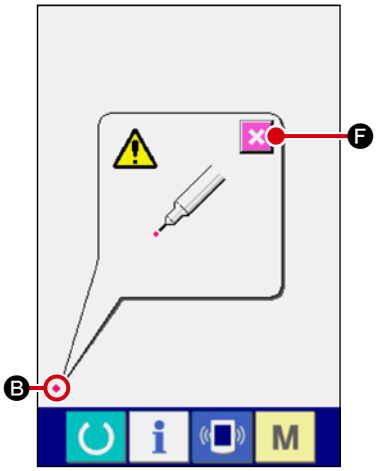


2) How to correct the touch panel (I01)

1. Display the touch panel correction checking screen.

Press touch panel correction button 

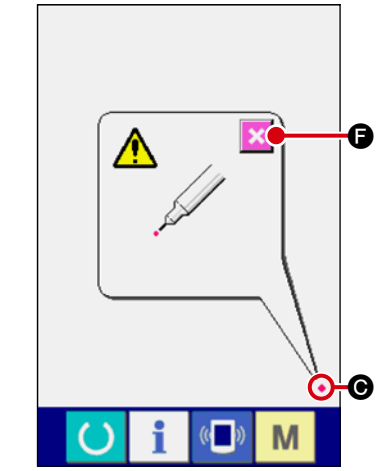
Ⓐ on the check program screen to call up the touch panel correction checking screen.



2. Pressing the bottom left position

Press the red circle ◆ Ⓑ located at the bottom left of the screen.

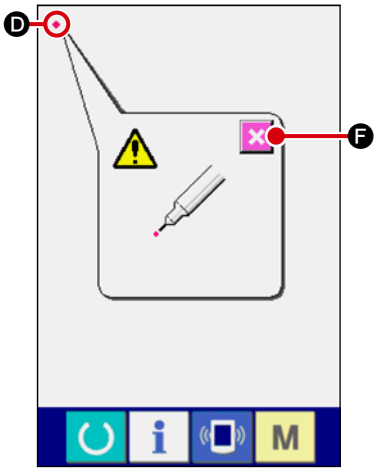
To complete correction, press the cancel button Ⓕ.



3. Pressing the bottom right position

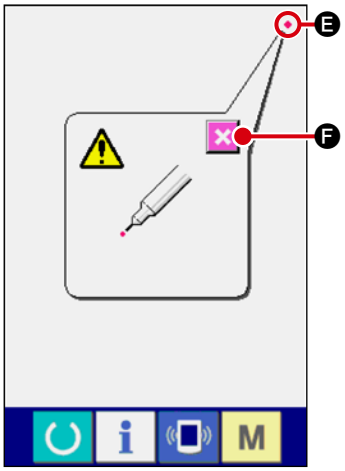
Press the red circle ◆ Ⓒ located at the bottom right of the screen.

To complete correction, press the cancel button Ⓕ.



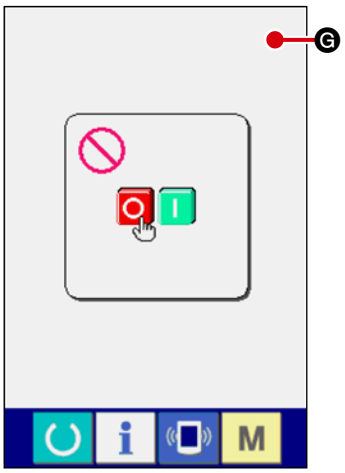
4. Pressing the top left position

Press the red circle ◆ Ⓓ located at the top left of the screen. To complete correction, press the cancel button Ⓕ.



5. Pressing the top right position

Press the red circle ◆ Ⓔ located at the top left of the screen. To complete correction, press the cancel button ✕ Ⓕ.



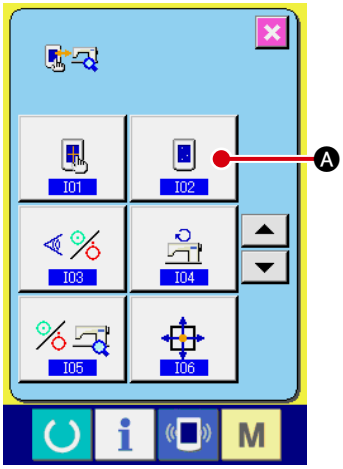
6. Data saving

When all the four points have been pressed, the correction data are saved. At that time, the Power OFF Prohibition screen Ⓖ is displayed.

The power supply must not be turned off while the above-mentioned screen Ⓖ is displayed.

If the power supply is carelessly turned off, no correction data are saved.

After data saving, the check program screen is automatically displayed.

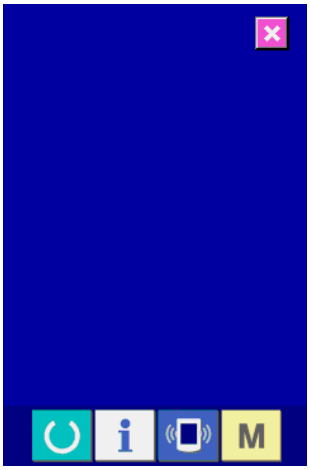


3) LCD check (I02)

1. Display of the LCD check screen

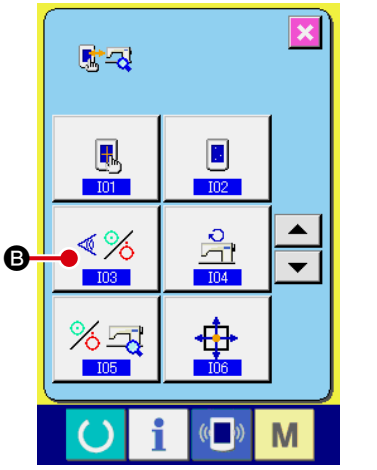
When the LCD check button 

Ⓐ is pressed on the check program screen, the LCD check screen is displayed.



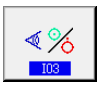
2. Confirmation of LCD dot missing

The LCD check screen is displayed only in one color.
Please check the LCD.
When the check ends, press a proper position on the screen. The LCD check screen is closed and the check program screen is displayed.

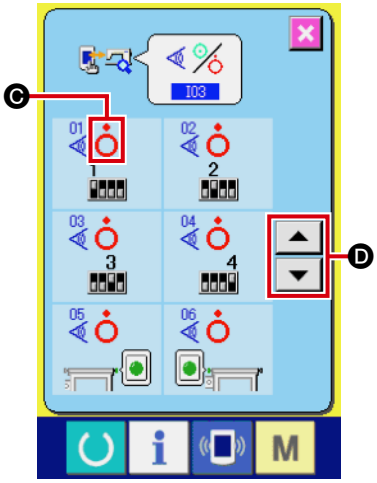


4) Method of input signal check (I03)

1. Display of the input signal check screen

When the input signal check button 

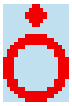
Ⓑ is pressed on the check program screen, the sensor check screen is displayed.



2. Input signal check

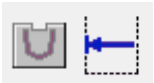
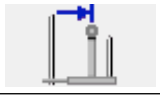
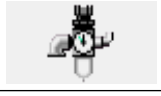
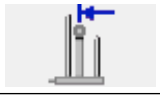
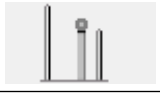
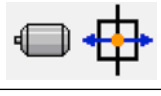
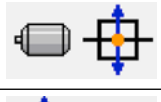
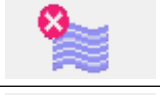
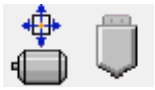
In the input signal check screen, the input conditions of various sensors can be confirmed.
For each sensor, the input status is displayed as indicated by Ⓒ.
The ON/OFF conditions are displayed as shown below.

 : ON condition

 : OFF condition

Using the UP-DOWN buttons  Ⓓ, display the sensor that has been confirmed.

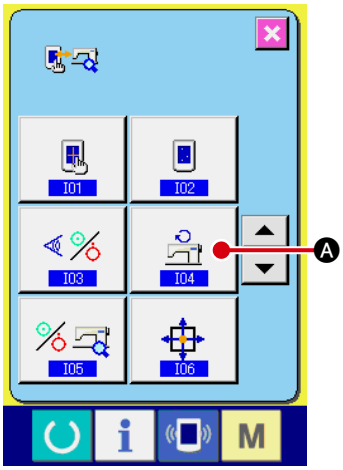
The sensors provide the following 35 types of conditions:

No.	Pictograph	Contents of sensor	No.	Pictograph	Contents of sensor
01		DIPSW3-1	19		X1 sensor
02		DIPSW3-2	20		Y1 sensor
03		Start switch 1	21		Y2 sensor
04		Start switch 2	22		Folding arm UP sensor
05		Temporary stop switch	23		Folding arm DOWN sensor
06		AUDET sensor	24		Folding unit UP sensor
07		ADDET sensor	25		Folding unit DOWN sensor
08		DDET sensor	26		Lifting table UP sensor
09		UDET sensor	27		Lifting table DOWN sensor
10		TG sensor	28		Cloth presser, large UP sensor
11		PDET sensor	29		Cloth presser, large DOWN sensor
12		SDET sensor	30		Stacker (forward) UP sensor
13		Air pressure switch	31		Stacker (backward) UP sensor
14		Thread breakage sensor switch	32		Cloth brush start sensor
15		X motor origin sensor	33		Cloth brush completion sensor
16		Y motor origin sensor	34		Stack full sensor
17		Thread trimmer motor origin sensor	35		Table OPEN/CLOSE sensor
18		Pattern board longitudinal motor origin sensor			

The DIPSW3 is the DIPSW located on the MAIN board.

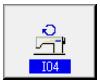
* Sensor applications

No.	Sensor data	Applications
6	AU DET sensor	For needle bar reverse revolution (5° to 30°)
7	AD DET sensor	For needle bar DOWN stop (209° to 239°)
8	D DET sensor	Not used (For thread trimmer timing of former models)
9	U DET sensor	For needle bar UP stop (40° to 62°)
10	TG sensor	ON-OFF by dividing one turn of the main shaft into 45 portions.
11	P DET sensor	For feed timing
12	S DET sensor	Not used (ON-OFF by dividing one turn of the main shaft into 2 portions.)

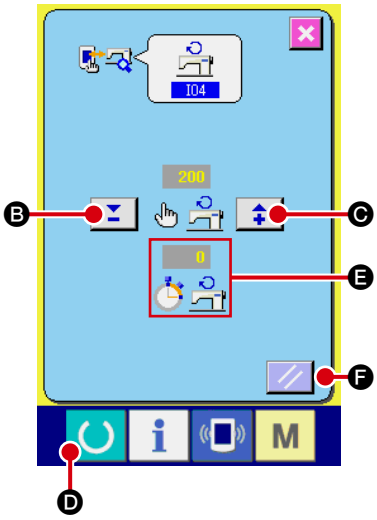


5) Main motor rpm check (I04)

1. Display of the main motor rpm check screen

When the main motor rpm check button 

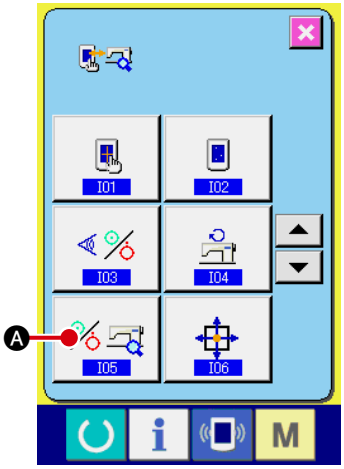
Ⓐ is pressed on the check program screen, the main motor rpm check screen is displayed.



2. Main motor operation and measured rpm value check

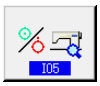
Using the –/+ buttons  Ⓑ • Ⓒ, the rpm number can be set up. When the button  Ⓓ is pressed, the sewing machine is operated at the preset speed. At that time, the measured rpm value is displayed at 

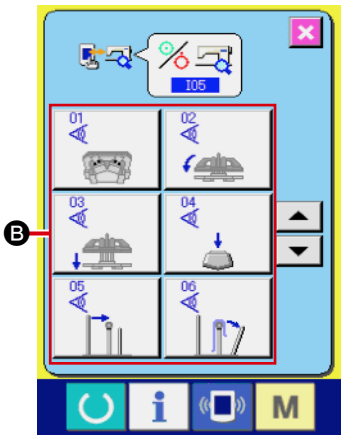
Ⓔ. When the SET button  Ⓕ is pressed, the sewing machine is stopped.



6) Method of output check (I05)

1. Display of the output check screen

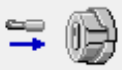
When the output check button  Ⓐ is pressed on the check program screen, the output check screen is displayed.

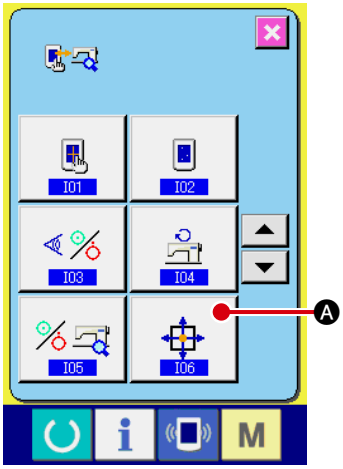


2. Output check

The output check screen can be used for the output check of each position. Try to press the output check button Ⓑ. While this button is pressed, the ON-status output is kept generated.

The output check display provides the following 21 types of positions:

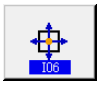
No.	Pictograph	Contents (solenoid valve No.)	No.	Pictograph	Contents (solenoid valve No.)
01		Crease folding supply (V17 of device)	12		Hook purge (V1 of machine head)
02		Folding arm UP/DOWN (V19A and V19B of device)	13		Vacuum ON/OFF (V7 of device)
03		Folding unit UP/DOWN (V14A and V14B of device)	14		Lifting table (V13 of device)
04		Pattern board UP/DOWN (V8 of device)	15		Lifting table pressure decrease (V18 of device)
05		Stacker advance/retreat (V7 and V8 of machine head)	16		Needle cooler (V9 of device)
06		Stacker cloth presser (V5 of machine head)	17		Cloth presser, large UP/DOWN (V15 of device)
07		Stacker cloth brush (V6 of machine head)	18		Cloth presser, small UP/DOWN (V12 of device)
08		Picker (V4 of machine head)	19		Garment body presser UP/DOWN (V10 of device)
09		Work clamp plunger (V2 of machine head)	20		Table OPEN/CLOSE
10		Needle throw (V3 of machine head)	21		Label attaching (Label supply) (V16 of device)
11		Thread wiper blow (V9 of machine head)			



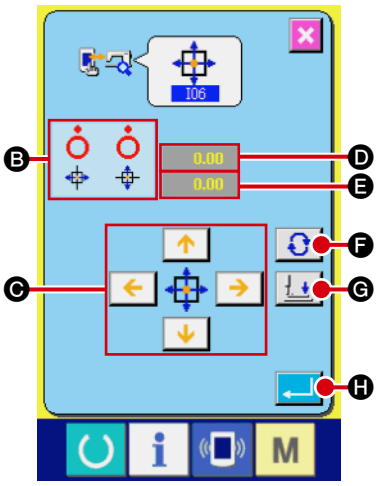
7) Method of XY motor / presser plate origin adjustment (I06)

1. Display of the XY motor / presser plate origin adjustment screen

When the XY motor / presser plate origin adjustment button



Ⓐ is pressed on the check program screen, the XY motor / presser plate origin adjustment screen is displayed.



2. Adjustment of the XY motor / presser plate origin

Ⓑ : According to the status of the X/Y origin sensor, the ON/OFF condition of the sensor is displayed.

Ⓒ : When the work clamp is origin position, the X/Y motor can be moved by 0.05 mm in the +/- direction.

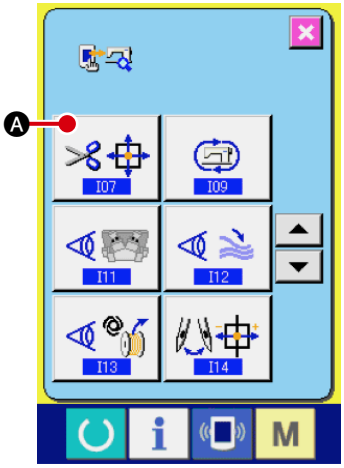
Ⓓ : The adjustment position of the direction of X is displayed.

Ⓔ : The adjustment position of the direction of Y is displayed.

Ⓕ : The button is pressed, and when the presser plate is standby position, it moves to origin position. Moreover, when the presser plate is origin position, it moves to a standby position.

Ⓖ : When the presser is origin position, work clamp (small) is made to go up and down.

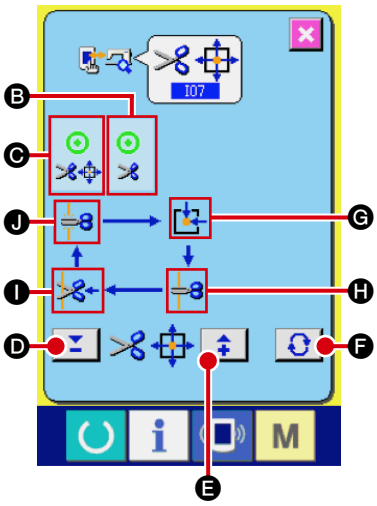
Ⓗ : The adjustment value is confirmed and the screen is restored to the check program list screen.



8) Method of thread trimmer motor / origin sensor check (I07)

1. Display of thread trimmer motor / origin sensor check screen

When the thread trimmer motor / origin sensor check button  Ⓐ is pressed on the check program screen, the thread trimmer motor / origin sensor check screen is displayed.



2. Thread trimmer motor / origin sensor check

Ⓑ : According to the status of the thread trimmer sensor, the ON/OFF condition of the thread trimmer sensor is displayed.

Ⓒ : According to the status of the thread trimmer origin sensor, the ON/OFF condition of the thread trimmer origin sensor is displayed.

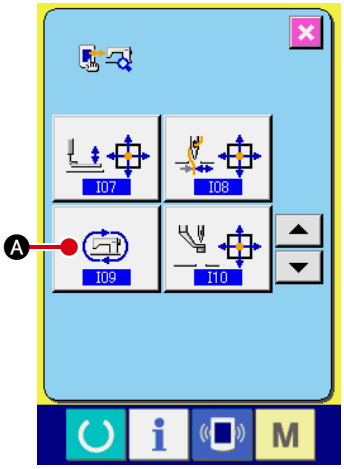
Ⓓ : The thread trimmer motor can be driven by one pulse.

Ⓔ : The thread trimmer motor can be driven by one pulse.

Ⓕ : The thread trimmer motor is driven to any of the following fixed positions. A pictograph indicating this position is displayed in gray.

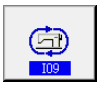
Ⓖ : Origin position
Ⓗ : Start position of thread trimmer
Ⓘ : Thread trimmer position
Ⓙ : End position of thread trimmer

Using the Start Switch, origin retrieval of the thread trimmer motor is effected.

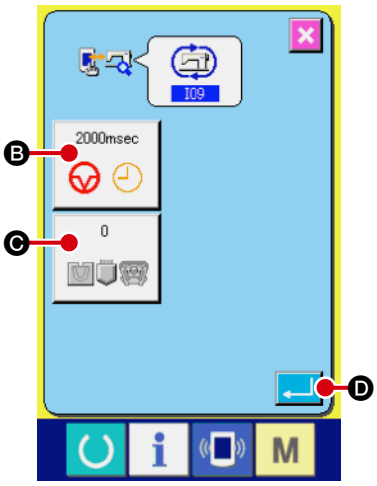


9) Method of operation mode setup (I09)

1. Display of operation mode setup screen

When the operation mode setup button 

Ⓐ is pressed on the check program screen, the operation mode setup screen is displayed.



2. Operation mode setup

In the operation setup screen, the operation mode is set up.

Ⓑ : Intervals of operation (rest time)

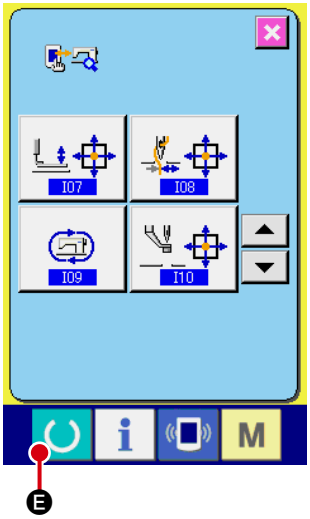
Ⓒ : Folding unit operation setup

0 : Continuous operation of machine head only

1 : One pattern operation of machine head and XY only

2 : Continuous operation of unit whole

If the button  Ⓓ is pushed, it will fix on the setting and will be set to the operation mode of the sewing machine.



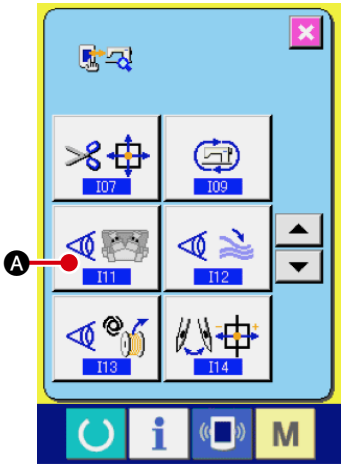
3. Perform operation

Turn on the ready key  Ⓔ, the sewing screen is displayed.

In continuous operation, the operation stops if the temporarily stop switch is pressed during rest time.

When the sewing is performed again, the continuous operation starts again.

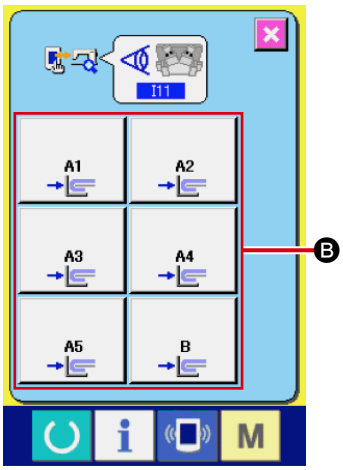
To release the continuous operation, restart the machine after turning off the power supply once.



10) Method of folding blade independent operation (I11)

1. Display of folding blade independent operation screen

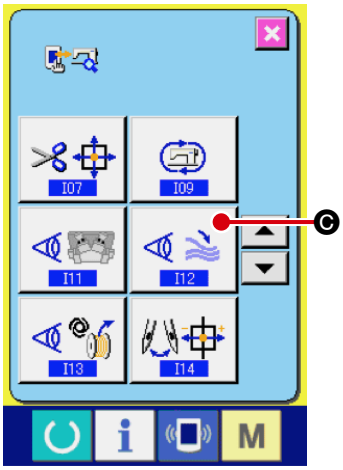
When the folding blade independent operation button  Ⓐ is pressed on the check program screen, the folding blade independent operation screen is displayed.



2. Perform the folding blade independent operation

In the folding blade independent operation screen, each folding blade can be made to turn on and off.

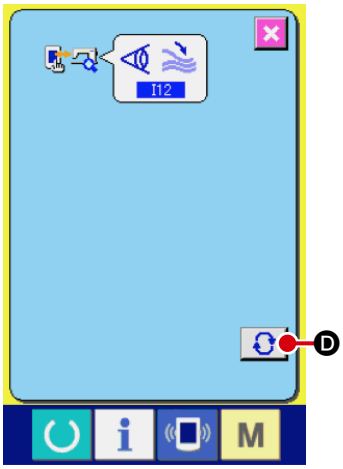
Push the folding blade button Ⓑ. Whenever it pushes, the folding blade can be turned on and off.



11) Method of stacker independent operation (I12)

1. Display of stacker independent operation screen

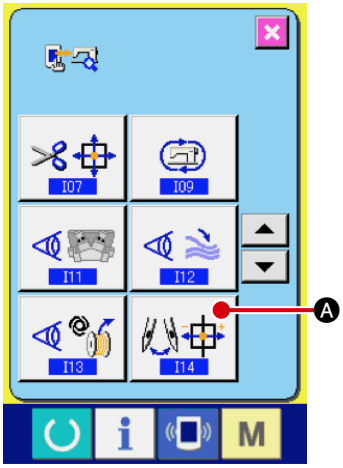
When the stacker independent operation button  Ⓒ is pressed on the check program screen, the stacker independent operation screen is displayed.



2. Perform the stacker independent operation

Push on button Ⓓ will operate the stacker.

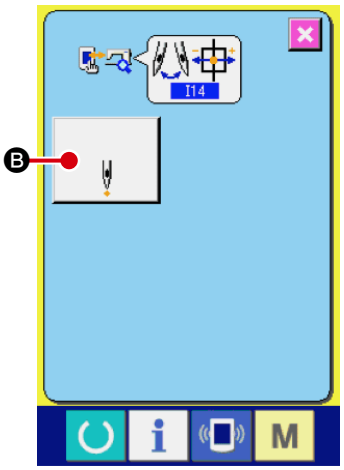
Operation of the stacker uses each value set up with memory switch.



12) Method of hook adjustment (I14)

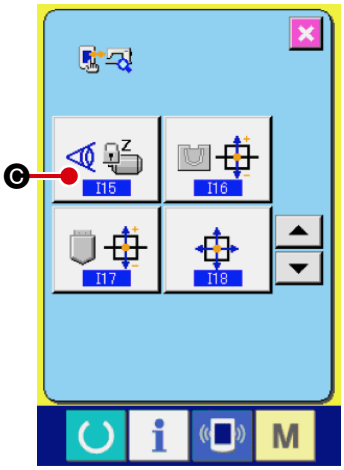
1. Display of hook adjustment screen

When the hook adjustment button  Ⓐ is pressed on the check program screen, the hook adjustment screen is displayed.



2. Perform the hook adjustment

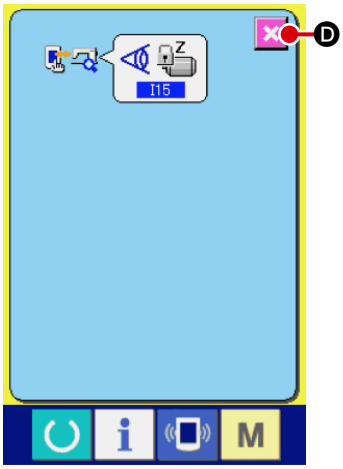
Push on button Ⓑ will operate the needle throw mechanism. Whenever push on button Ⓑ, the needle throw mechanism can be turned on and off.



13) Method of main motor lock (I15)

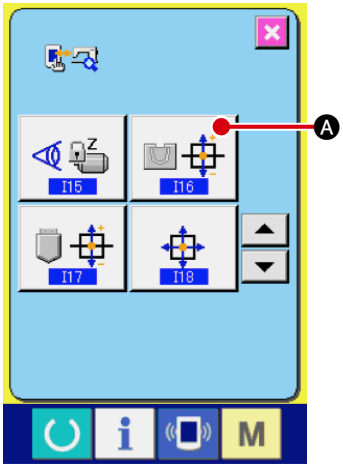
1. Display of main motor lock screen

When the main motor lock button  Ⓒ is pressed on the check program screen, the main motor lock screen is displayed.



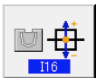
2. Perform the main motor lock operation

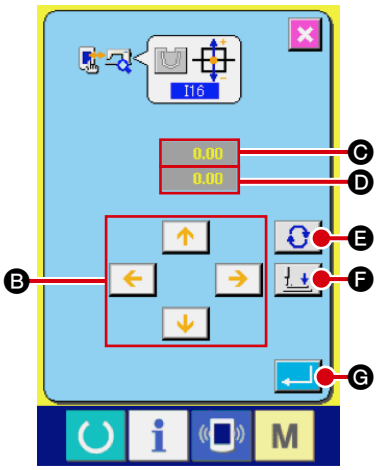
If the main motor lock screen is displayed, perform the needle lifting to upper dead point automatically.
If the button Ⓓ is pushed, it will return to the check program list screen.



14) Method of folding position origin adjustment (I16)

1. Display of the folding position origin adjustment screen

When the folding position origin adjustment button  Ⓐ is pressed on the check program screen, the folding position origin adjustment screen is displayed.



2. Adjustment of the folding position origin

Ⓑ : When the presser is origin position, the X/Y motor can be moved by 0.05 mm in the +/- direction.

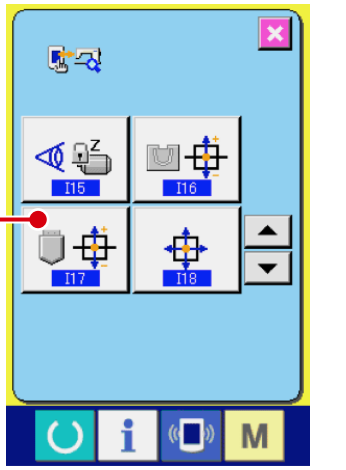
Ⓒ : The adjustment position of the direction of X is displayed.

Ⓓ : The adjustment position of the direction of Y is displayed.

Ⓔ : The button is pressed, and when the presser plate is standby position, it moves to origin position. Moreover, when the presser plate is origin position, it moves to a standby position.

Ⓕ : When the work clamp is origin position, work clam (small) is made to go up and down.

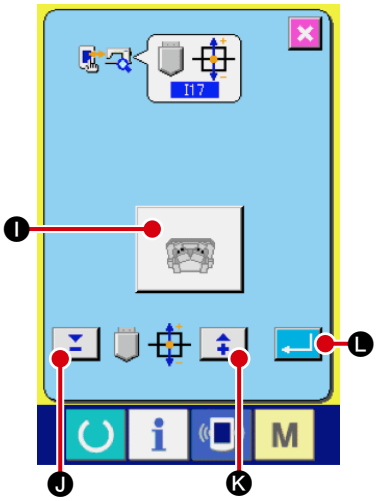
Ⓖ : The adjustment value is confirmed and the screen is restored to the check program list screen.



15) Method of the pattern board longitudinal position adjustment (I17)

1. Display of the pattern board longitudinal position adjustment screen

When the pattern board longitudinal position adjustment button  Ⓗ is pressed on the check program screen, the pattern board longitudinal position adjustment screen is displayed.



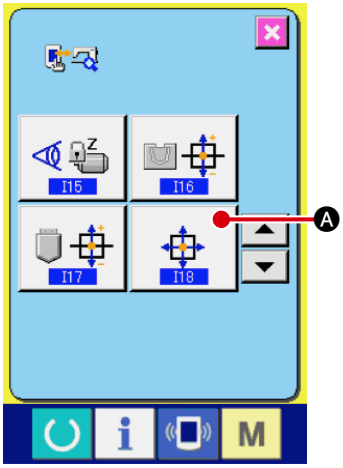
2. Adjustment of the pattern board longitudinal position

Ⓘ : Whenever it pushes, the folding unit operates.
1st time : folding arm DOWN
2nd time : folding unit DOWN
3rd time : folding unit / folding arm UP

Ⓙ : The pattern board motor can be moved by one pulse in the "-" direction.

Ⓚ : The pattern board motor can be moved by one pulse in the "+" direction.

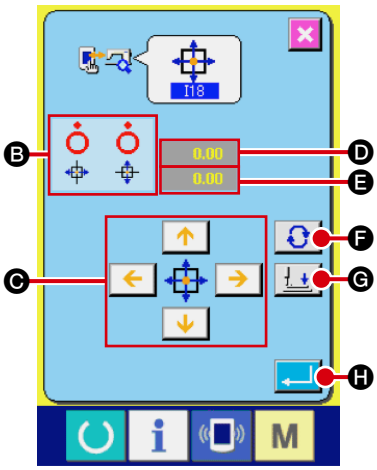
Ⓛ : The adjustment value is confirmed and the screen is restored to the check program list screen.



16) Method of XY motor / origin adjustment (I18)

1. Display of the XY motor / origin adjustment screen

When the XY motor / origin adjustment button  Ⓐ is pressed on the check program screen, the XY motor / origin adjustment screen is displayed.



2. Adjustment of the XY motor / origin

Ⓑ : According to the status of the X/Y origin sensor, the ON/OFF condition of the sensor is displayed.

Ⓒ : When the presser is origin position, the X/Y motor can be moved by 0.05 mm in the +/- direction.

Ⓓ : The adjustment position of the direction of X is displayed.

Ⓔ : The adjustment position of the direction of Y is displayed.

Ⓕ : The button is pressed, and when the presser plate is standby position, it moves to origin position. Moreover, when the presser plate is origin position, it moves to a standby position.

Ⓖ : When the work clamp is origin position, work clamp (small) is made to go up and down.

Ⓗ : The adjustment value is confirmed and the screen is restored to the check program list screen.

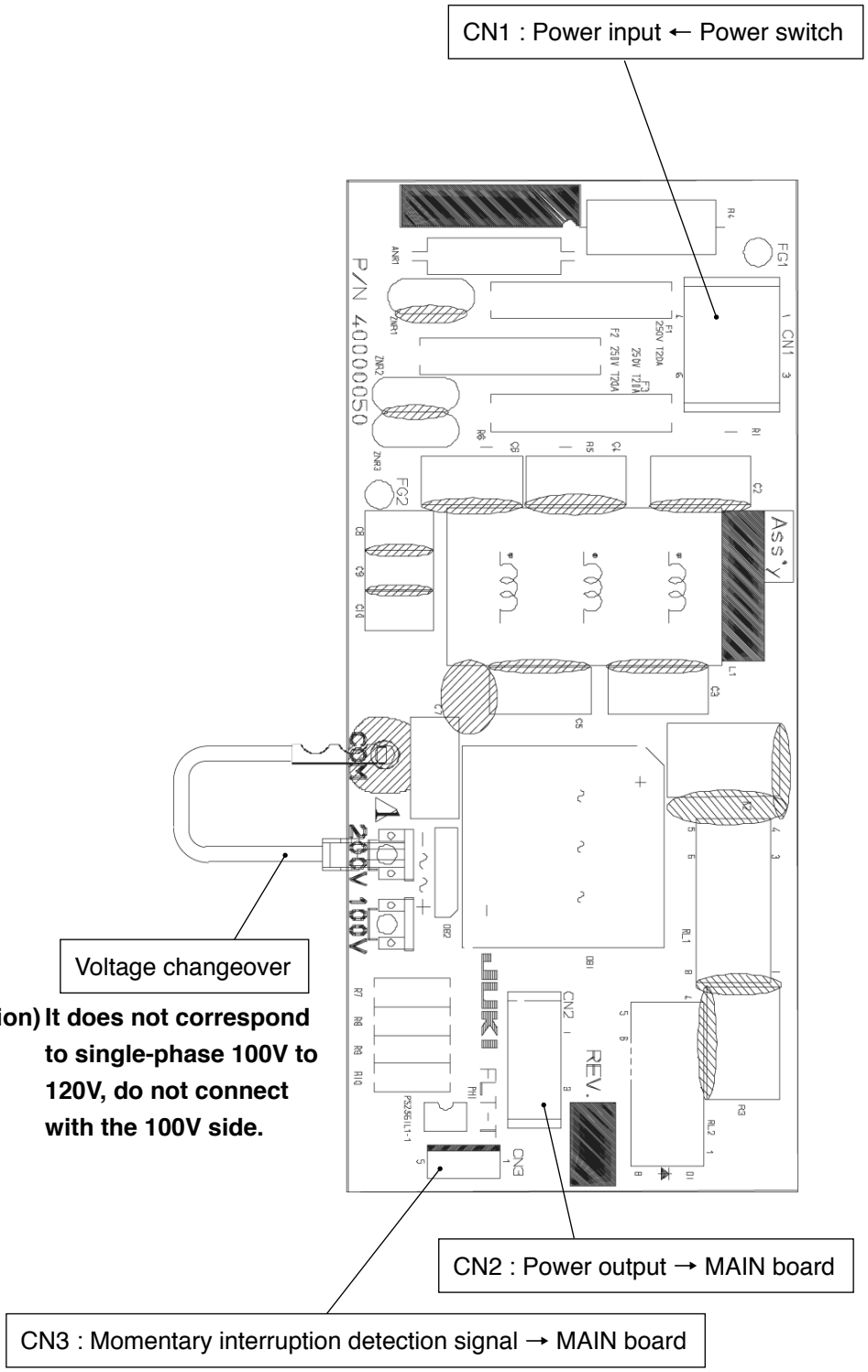
9. Printed wiring board and dip switch

(1) Various printed wiring boards

1) FLT-T board

· 3-phase 200V to 240V

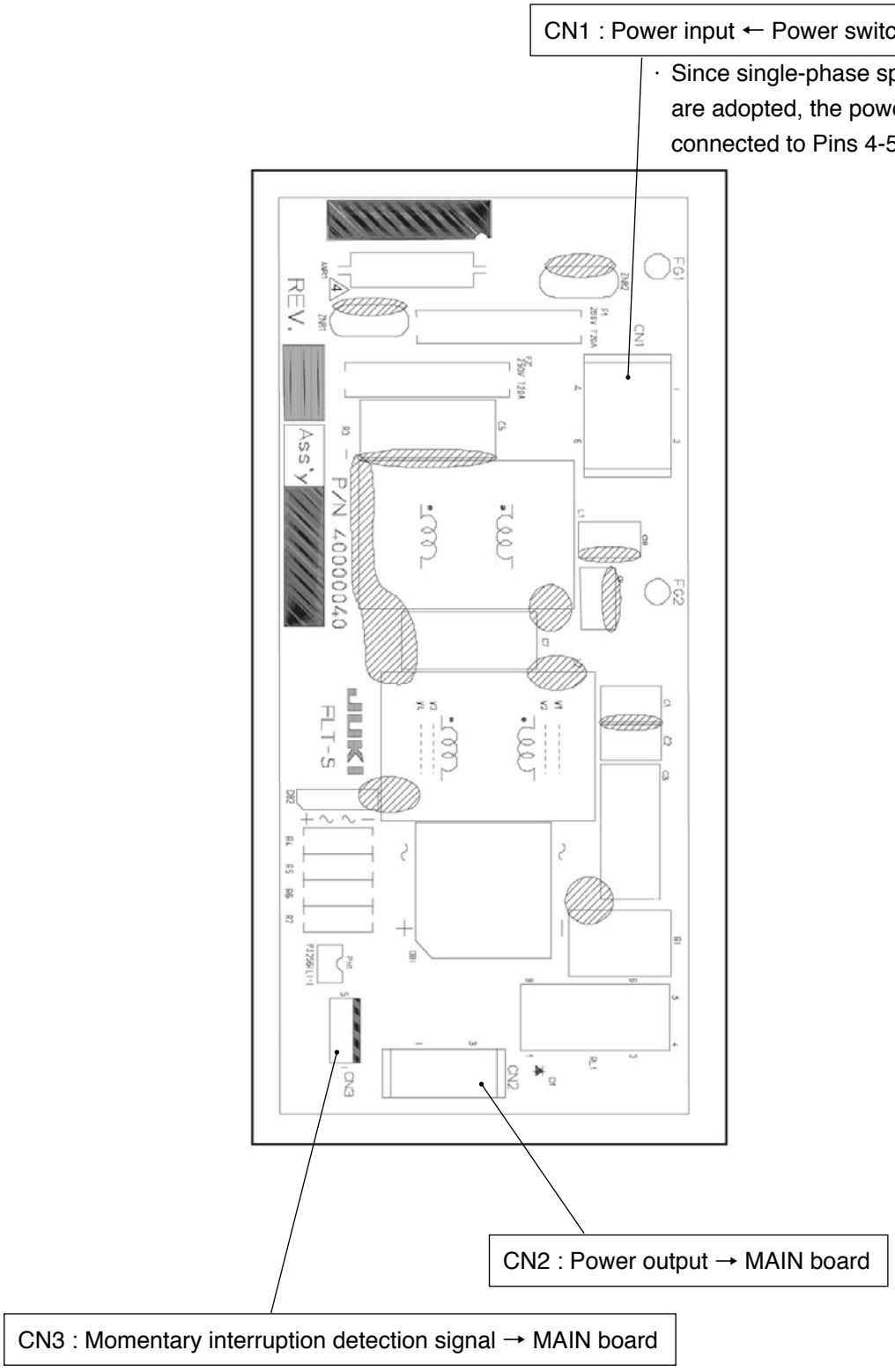
Pulse generation is carried out for the purposes of power supply rectification, noise reduction, and the detection of a momentary interruption.



2) FLT-S board

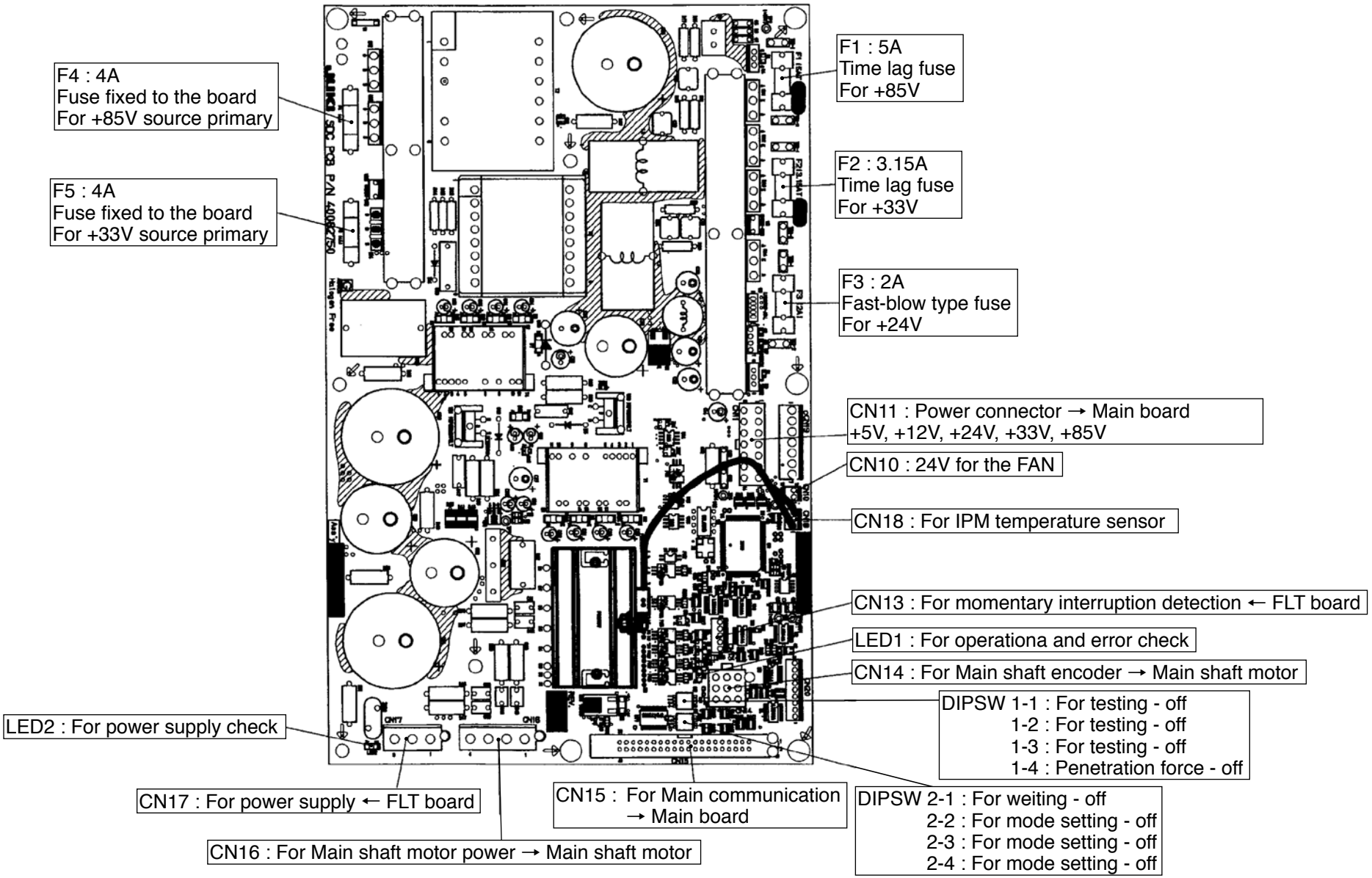
· Single-phase 200V to 240V

Pulse generation is carried out for the purposes of power supply rectification, noise reduction, and the detection of a momentary interruption.



3) SDC board

The power supply is generated and error check is carried out. Main shaft control is effected, receiving the commands from the MAIN board.



4) LED3 for SDC board error check

No. of LED3 flashes	Error description	Display of operation panel	Remarks
Turn on	Nil		Dimly turn on in ordinary state
1	Main shaft motor lock	E007	Failure in revolving for 2 seconds
2	Error in phase Z	E303	Failure in phase Z detection About 1.5 turns
3	Error in phases A and B	E730	Failure in phases A and B detection About 0.5 turns
4	Motor position sensor error	E731	Logical error in U, V, W
5	IPM error	E901	Error output generation from IPM
6	Undervoltage	E813	Source voltage -20% or more
7	Motor reverse rotation	E733	Irregular motor revolutions
8	Overvoltage	E811	Source voltage +20% or less
9	Power interruption	Display disabled	Power interruption of 40 msec or more
10	Not used		
11	+85V power system error	E903	SDC board fuse F1 blow-off
12	+33V power system error	E904	SDC board fuse F2 blow-off
13	Overheating	E905	Radiator panel of SDC board heated at 85°C or more
14	Not used		
15	Communication error	E916	Failure in communication with the MAIN board

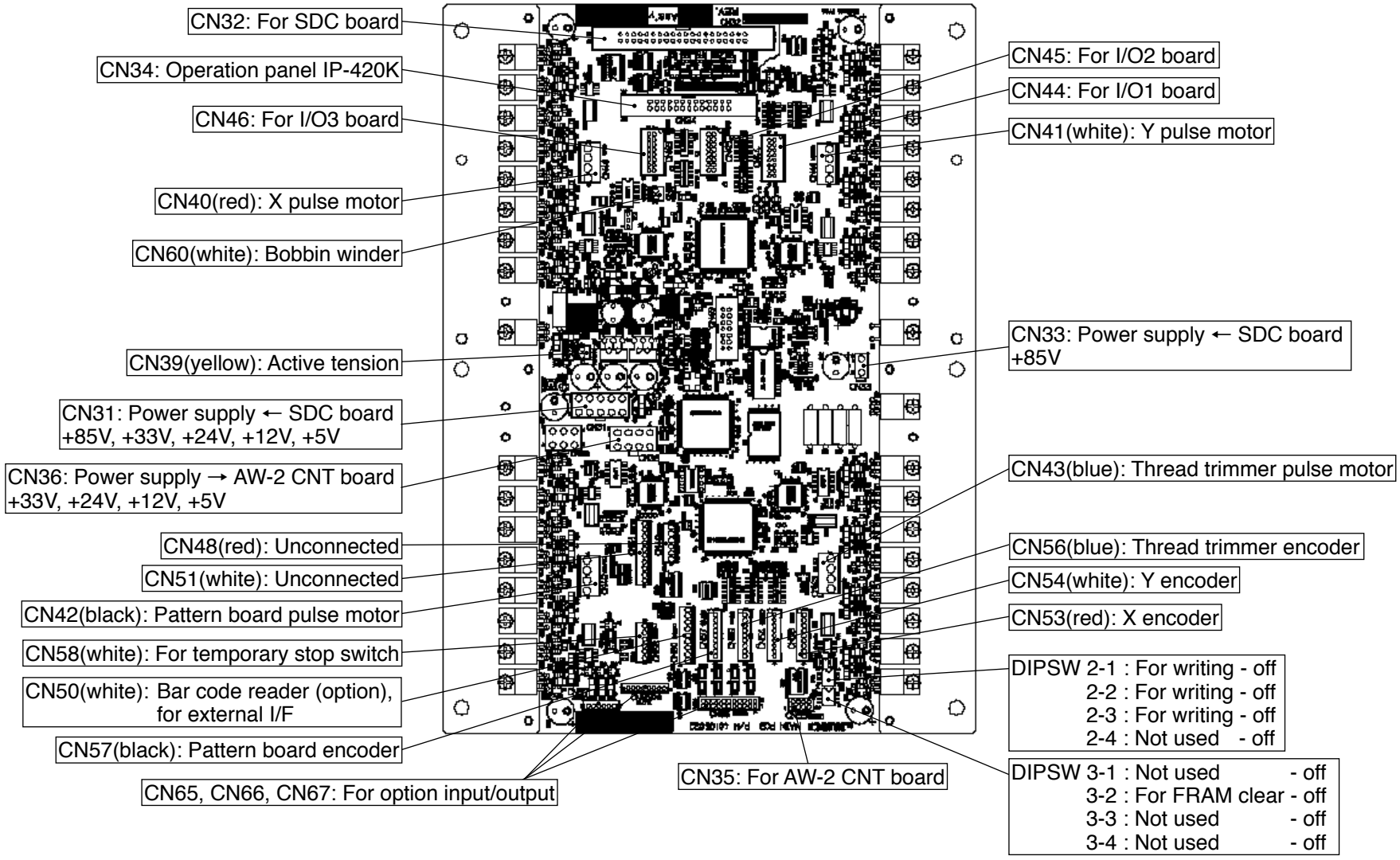
5) Initialization

1. Initialization of the sewing machine (reset to the factory-set state at the time of delivery)
   Place DIPSW3-2 on the MAIN board in ON. Then turn the power ON with held pressed the start switch 1 and 2.
   After a short time, memory switch "U500: Language selection" is displayed.
   Select the language to be used.
   Then, turn the power OFF and restore the DIPSW3-2 to the previous setting.

(Caution) Be sure to backup all important data. JUKI assumes no responsibility for loss of data caused by the initialization.
After the completion of the initialization, be sure to restore the DIPSW to the previous setting.

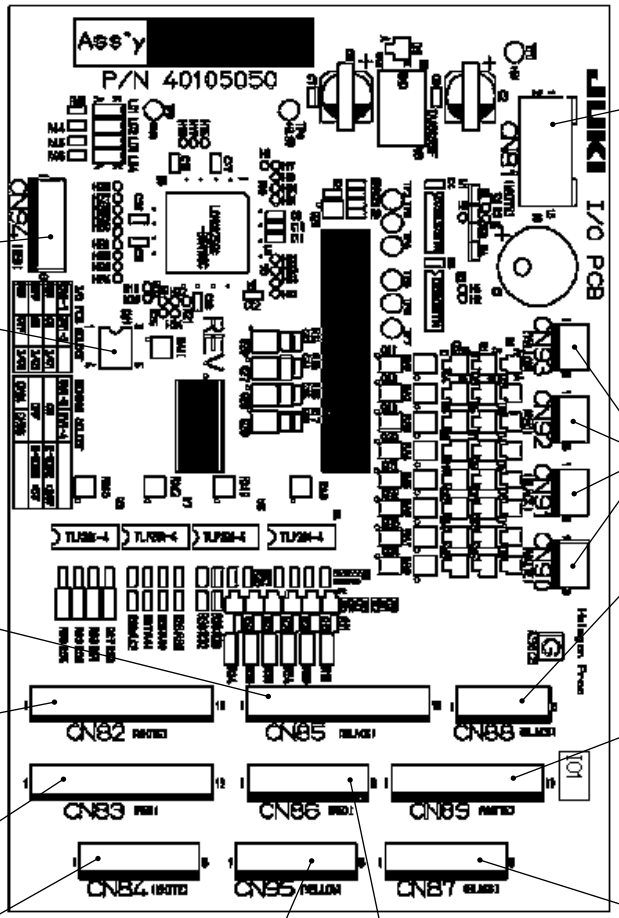
6) MAIN board

The board controls pulse motors for 4-axis separately, output of active tension, communication control with I/O board and IP-420 panel , memory switch and other functions totally.



7) I/O1 board

This board performs folding unit sensor input and solenoid valve output.



CN81: Connect to MAIN board

CN94(red): Unconnected

DIPSW 1-1 : I/O1 setting - on
1-2 : I/O1 setting - on
1-3 : Sensor setting - on
1-4 : Sensor setting - off

CN90(white), CN91(black), CN92(red), CN93(yellow): Unconnected

CN88(black): Solenoid valve output
V6 : Folding blade A5
V1 : Folding blade B
V17: Crease folding supply

CN85(black): Unconnected

CN82(white): Sensor input
IN01: Folding arm upper
IN02: Folding arm lower
IN03: Folding unit upper
IN04: Folding unit lower

CN89(white): Solenoid valve output
V8 : Pattern board
V19A: Folding arm
V14A: Folding unit down
V19B: Folding arm up
V14B: Folding unit up

CN83(red): Sensor input
IN05: Pattern board longitudinal origin

CN87(black): Solenoid valve output
V2: Folding blade A1
V3: Folding blade A2
V4: Folding blade A3
V5: Folding blade A4

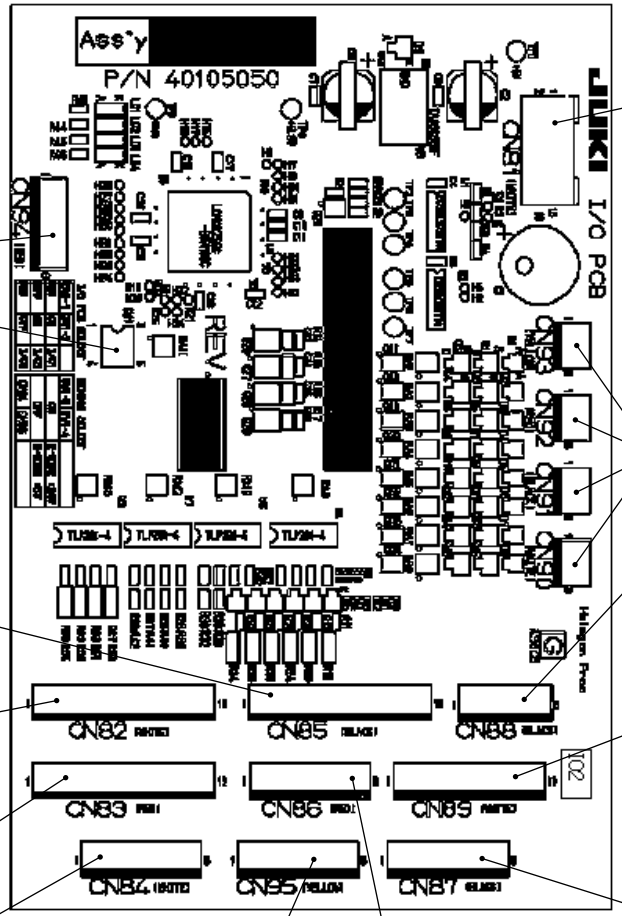
CN84(white): Sensor input
IN08: Lifting table upper
IN09: Lifting table lower

CN86(red): Unconnected

CN95(yellow): Unconnected

8) I/O2 board

This board performs machine head and stacker sensor input, and solenoid valve output.



CN81: Connect to MAIN board

CN94(red): Unconnected

DIPSW 1-1 : I/O2 setting - off
1-2 : I/O2 setting - on
1-3 : Sensor setting - on
1-4 : Sensor setting - off

CN90(white), CN91(black), CN92(red), CN93(yellow): Unconnected

CN88(black): Solenoid valve output
V4: Picker
V2: Work clamp plunger
V3: Needle throw

CN85(black): Unconnected

CN82(white): Sensor input
IN01: Cloth brush initial position
IN02: Cloth brush completion
IN03: stacker full
IN04: Needle thread detection

CN89(white): Solenoid valve output
V9: Thread wiper blow
V1: Hook purge

CN83(red): Sensor input
IN05: Table open/close (option)
IN07: Thread trimmer origin

CN87(black): Solenoid valve output
V7: Stacker presser rear
V5: Stacker cloth presser
V6: Stacker cloth brush
V8: Stacker presser front

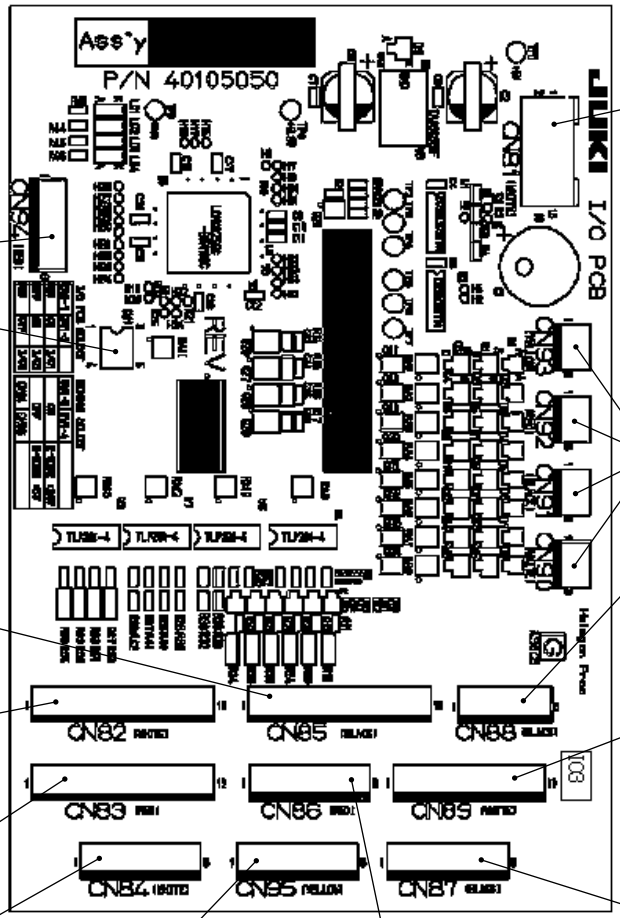
CN84(white): Sensor input
IN08: Stacker rear
IN09: Stacker front

CN86(red): Unconnected

CN95(yellow): Unconnected

9) I/O3 board

This board performs device sensor input, switch input, solenoid valve output and marking light output.



CN81: Connect to MAIN board

CN94(red): Unconnected

DIPSW 1-1 : I/O3 setting - on
1-2 : I/O3 setting - off
1-3 : Sensor setting - on
1-4 : Sensor setting - off

CN90(white), CN91(black), CN92(red), CN93(yellow):
Marking light (option)

CN85(black): Sensor input
IN10: XORG
IN11: X1

CN88(black): Solenoid valve output
V9: Needle cooler (option)

CN82(white): Switch input
IN01: start switch 1
IN02: start switch 2
IN04: Pattern board longitudinal switch (option)

CN89(white): Solenoid valve output
V15: Cloth presser, large rising
V12: Cloth presser, small rising
V10: Garment body presser
V16: Label attaching (label supply)

CN83(red): Sensor input
IN05: YORG
IN06: Y1
IN07: Y2

CN87(black): Solenoid valve output
V7 : Vacuum ON/OFF
V13: Lifting table
V18: Lifting table pressure decrease

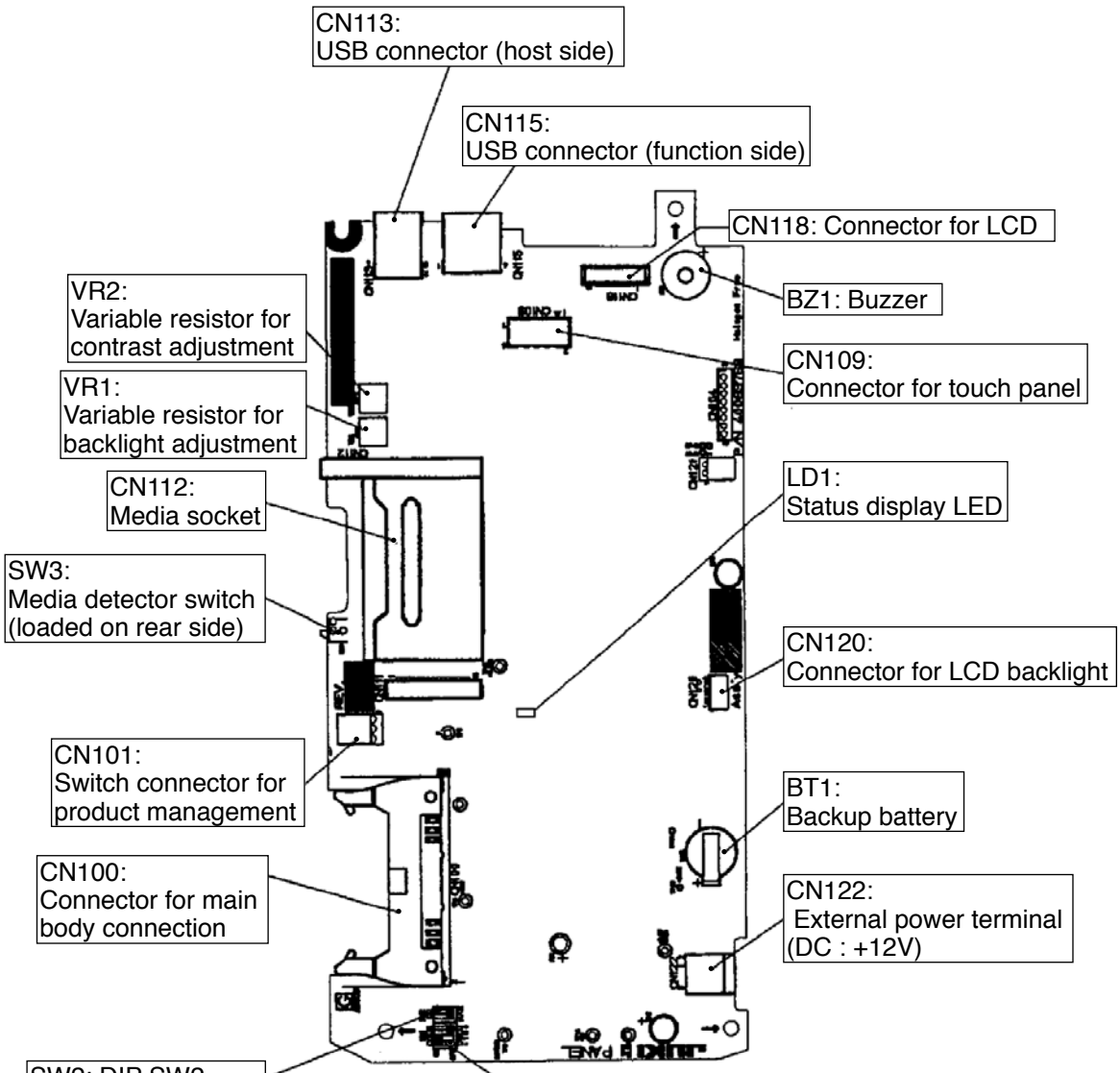
CN84(white): Sensor input
IN08: Air switch

CN86(red): Sensor input
IN13: Cloth presser, large (upper)
IN14: Cloth presser, large (lower)

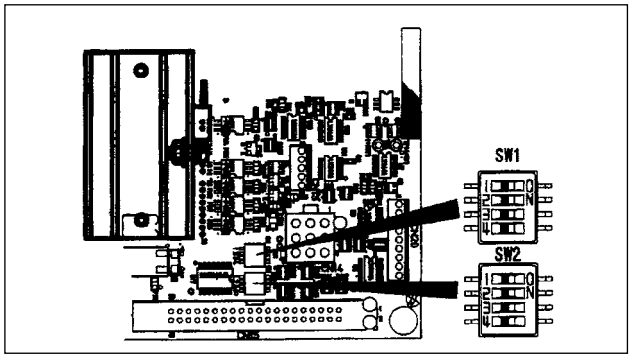
CN95(yellow): Unconnected

10) IP-420 Panel board

The color LCD driver circuit, backlight power source, CPU, memories, etc., are loaded for the management of inputs, manufacturing, and others.

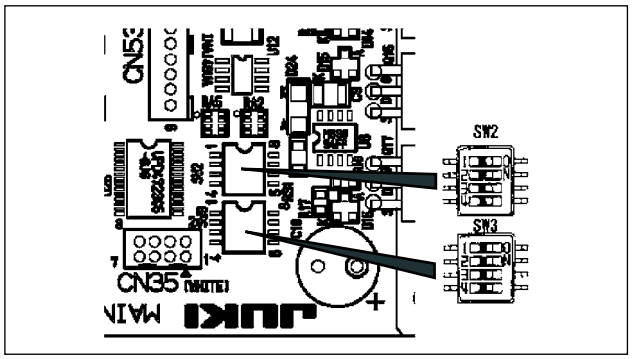


(2) Dipswitch setup



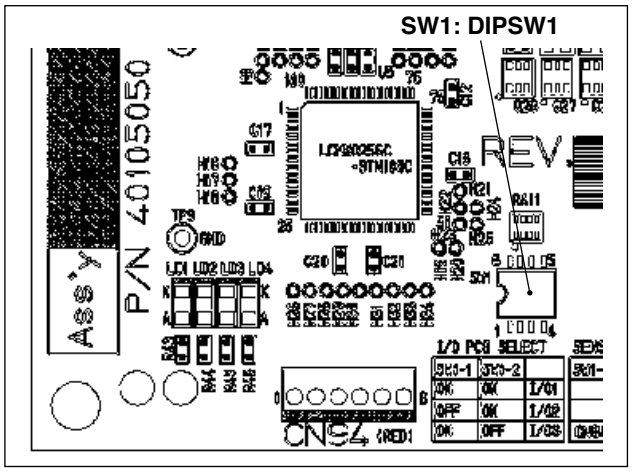
1. SDC board

All dipswitches on the SDC board are turned OFF.



2. MAIN board

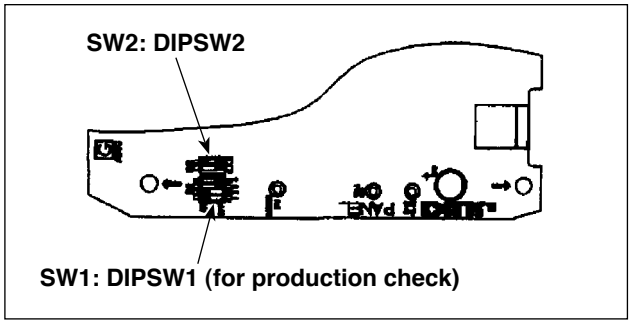
All dipswitches on the MAIN board are turned OFF.



3. I/O1 board, I/O2 board, I/O3 board

Set up SW1: DIPSW1 according to each board.

	I/O1 board	I/O2 board	I/O3 board
SW1-1	ON	OFF	ON
SW1-2	ON	ON	OFF
SW1-3	ON	ON	ON
SW1-4	OFF	OFF	OFF



4. IP-420 Panel board

SW2: DIPSW2
<Normal setting state>
1-1: OFF Disabling switch for the media detector switch **(Caution) 1.**
1-2: OFF (* Always used in OFF position)

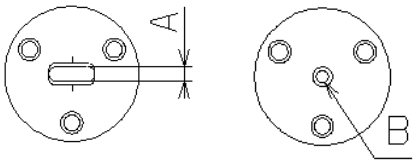
(Caution) 1. If the panel cannot be used due to an error of media cover open caused as a result of media cover destruction or the like, the media detector switch can be disabled by turning this switch ON.

SW1: DIPSW1 (for production check)
<Normal setting state>
1-1: ON
1-2: ON
1-3: OFF
1-4: OFF

(Caution) 2. Do not change the settings normally.

10. Table of exchanging gauge parts according to needle size used

	Part Number of needle	Part Number of hook	Part Number of needle hole guide (Dimension A)	Part Number of needle hole guide (Dimension B)
Standard	MC200531300 (SCHMETZ 134 SERV 7) Nm 130	40072028	G2422875000 (2.4 mm)	G930287500B (2.4 mm)
	MC200531200 (SCHMETZ 134 SERV 7) Nm 120	40077836	G242287500A (2.0 mm)	G9302875000 (2.0 mm) G930287500A (2.2 mm)
	MC200521100 (SCHMETZ 134 SES SERV7) Nm 110	G18148750AB	G242287500B (1.6 mm)	–

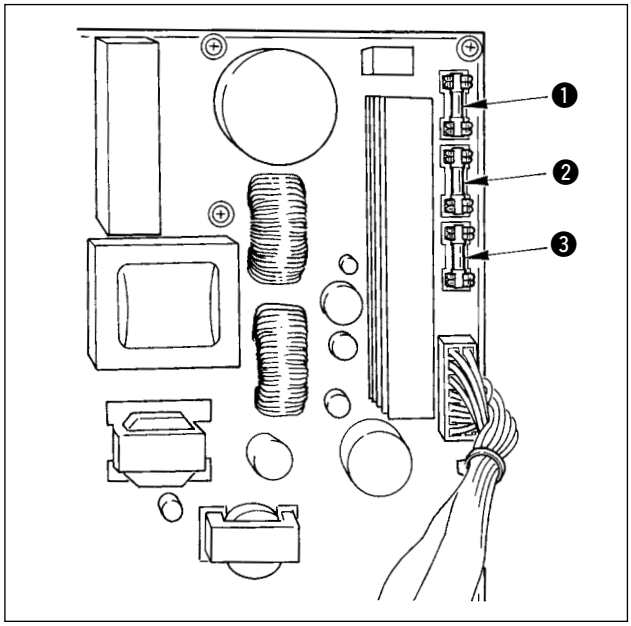


11. Maintenance

(1) Replacing the fuse

WARNING:

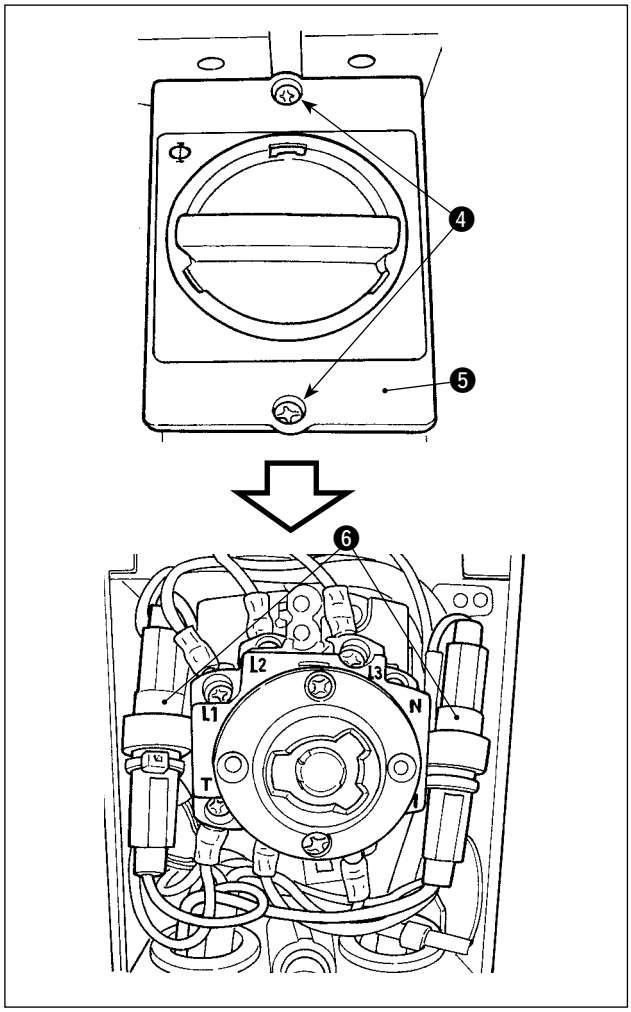
1. To avoid electrical shock hazards, turn OFF the power and open the control box cover after about five minutes have passed.
2. Open the control box cover after turning OFF the power without fail. Then, replace with a new fuse with the specified capacity.



1) Replacing the fuse in control box

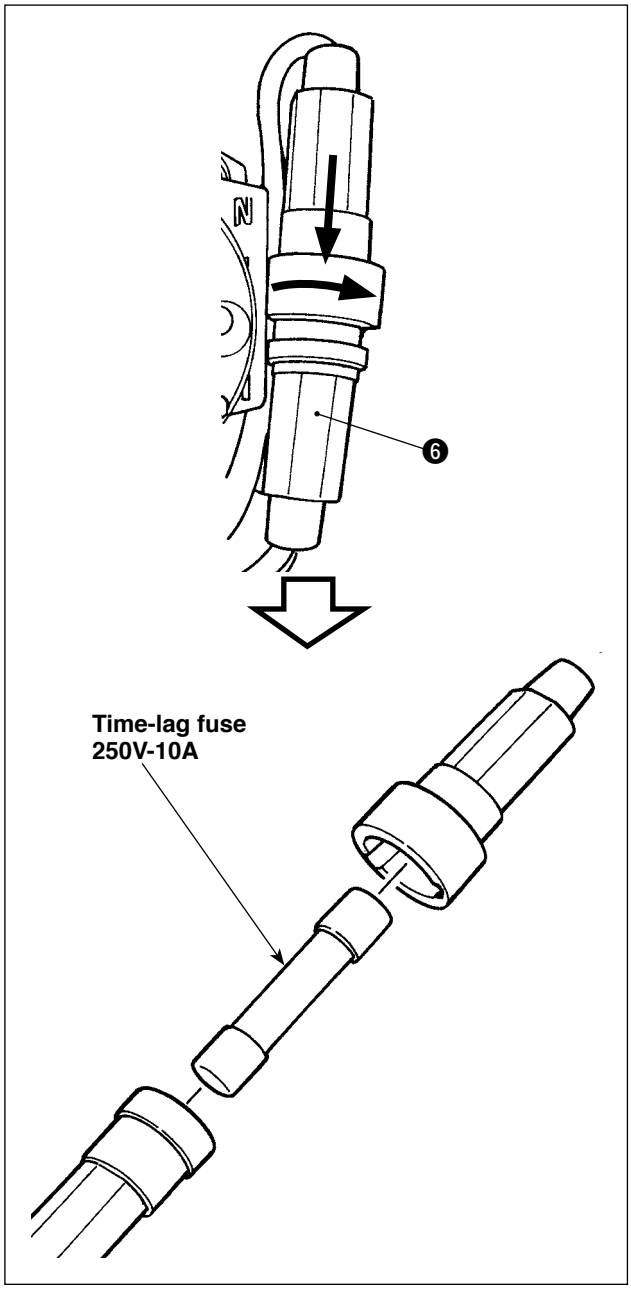
Check first that the power switch is in the OFF state, and disconnect the power cord from the wall outlet. Then, wait for five minutes or more.
Remove four screws which secure the back cover of control box. Carefully open the back cover.
There are three fuses placed on the upper right section of the SDC PWB.

❶ For stepping motor power supply protection
5A (time-lag fuse)
❷ For solenoid power supply protection
3.15A (time-lag fuse)
❸ For control power supply protection
2A (fast-blow type fuse)

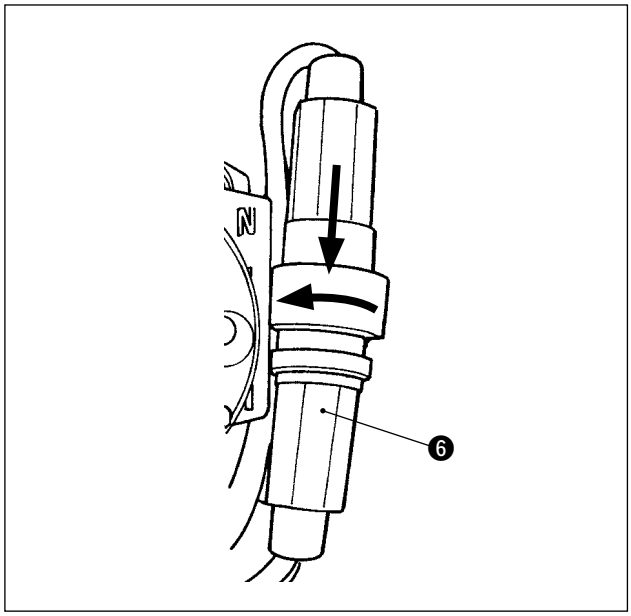


2) Replacing the fuse of blower motor

1. Loosen the power switch installing screws ❹, remove the power switch cover ❺.



2. If it turns with pushing the fuse case ❻ in the direction of the arrow, the fuse case ❻ will open.

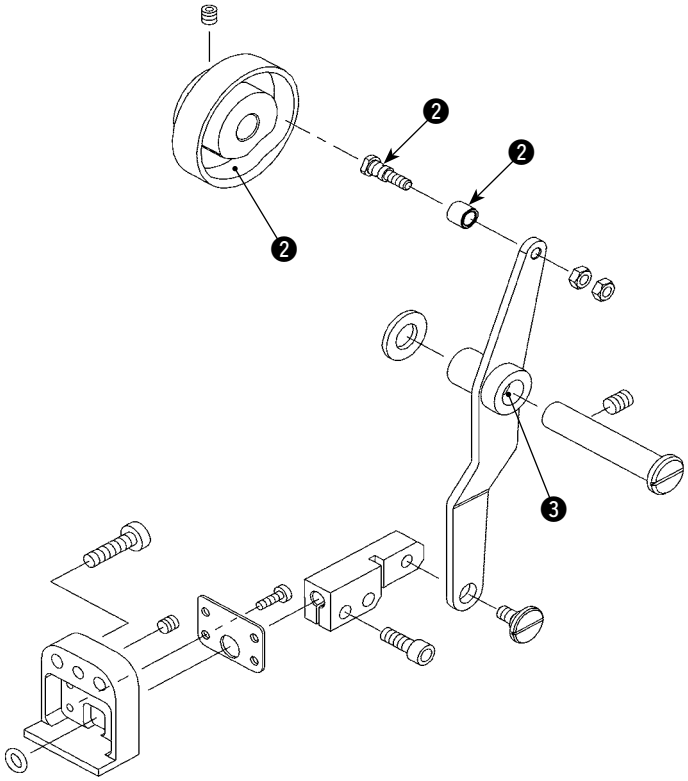


3. If the fuse has blown, exchange it.
   Set the fuse case and put in them each other.
   If it turns with pushing the fuse case ❻ in the direction of the arrow, the fuse case ❻ is locked.

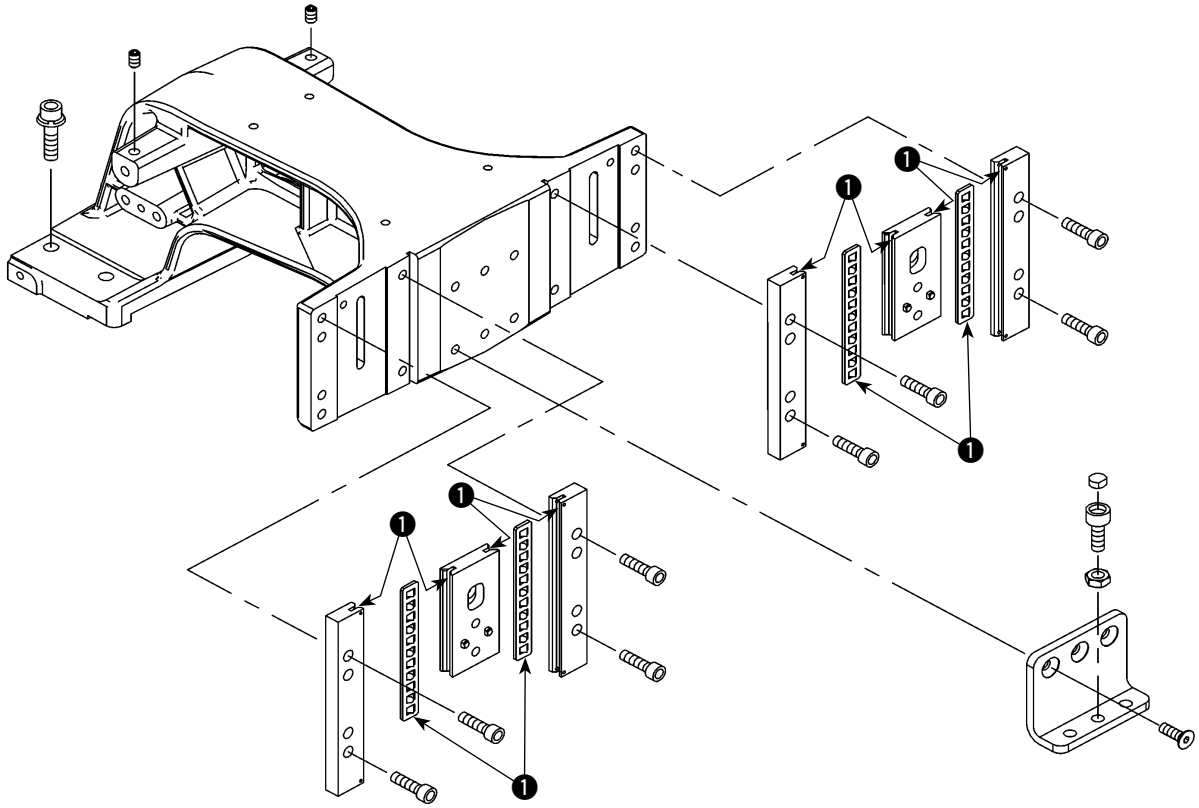
(2) Parts to which grease / loctite is applied

❶ : Templex (10g tube) JUKI Part No. : 13525506
❷ : JUKI grease A (10g tube) JUKI Part No. : 40006323
❸ : JUKIgreaseB (10g tube) JUKI Part No. : 40013640
❹ : Loctite 241
❺ : ThreeBond 1373

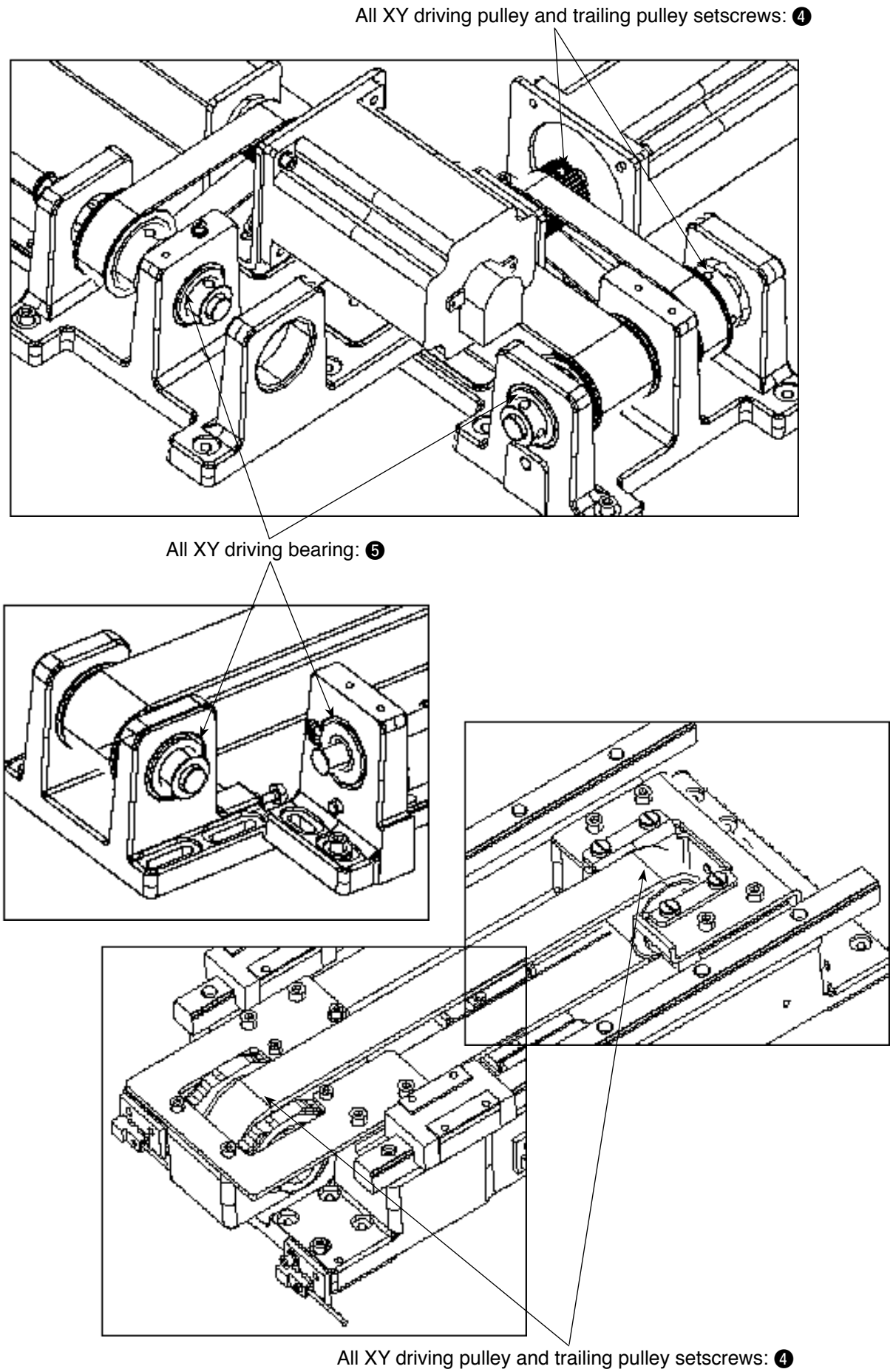
1) Thread trimmer mechanism components



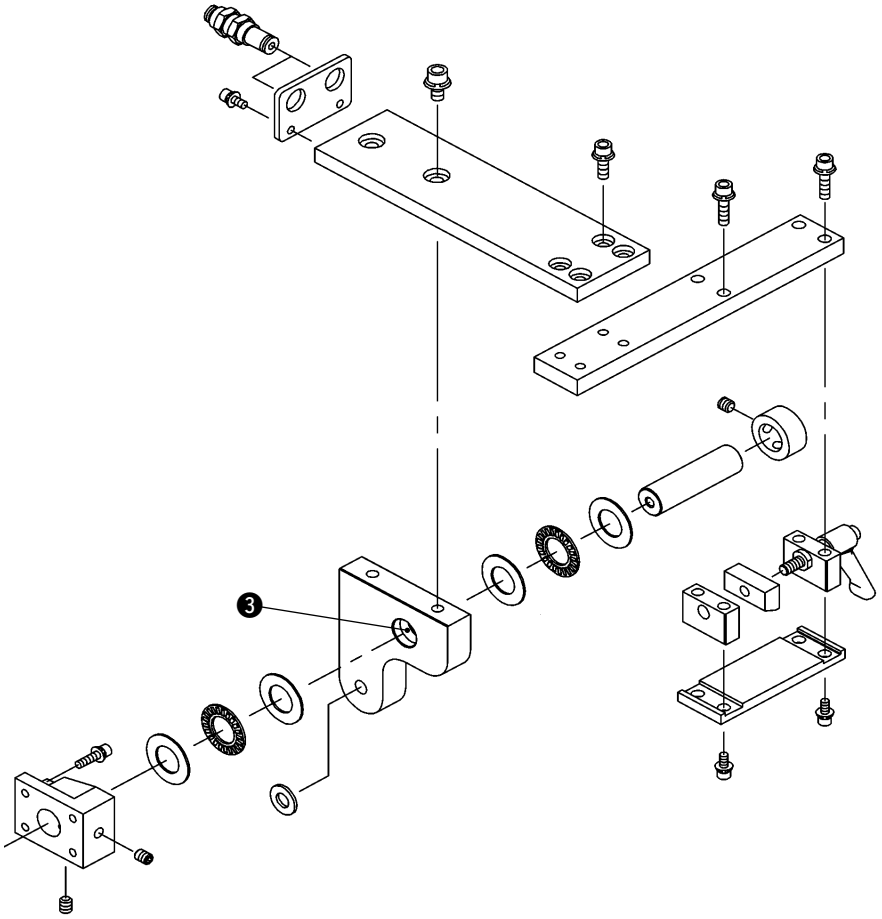
2) Cloth presser mechanism components



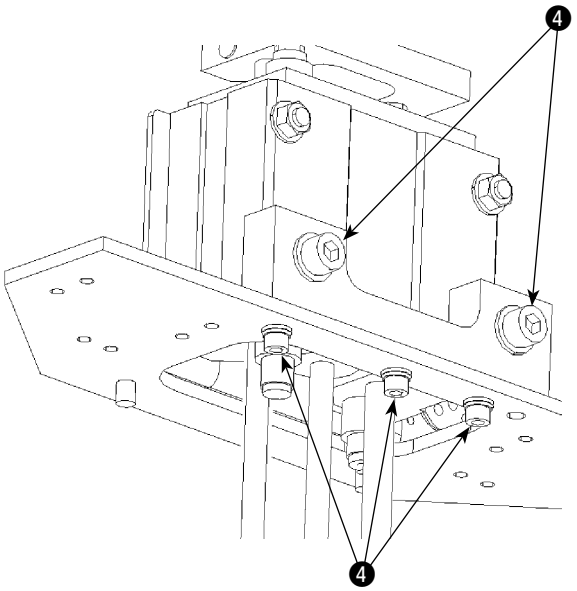
3) X-Y mechanism components



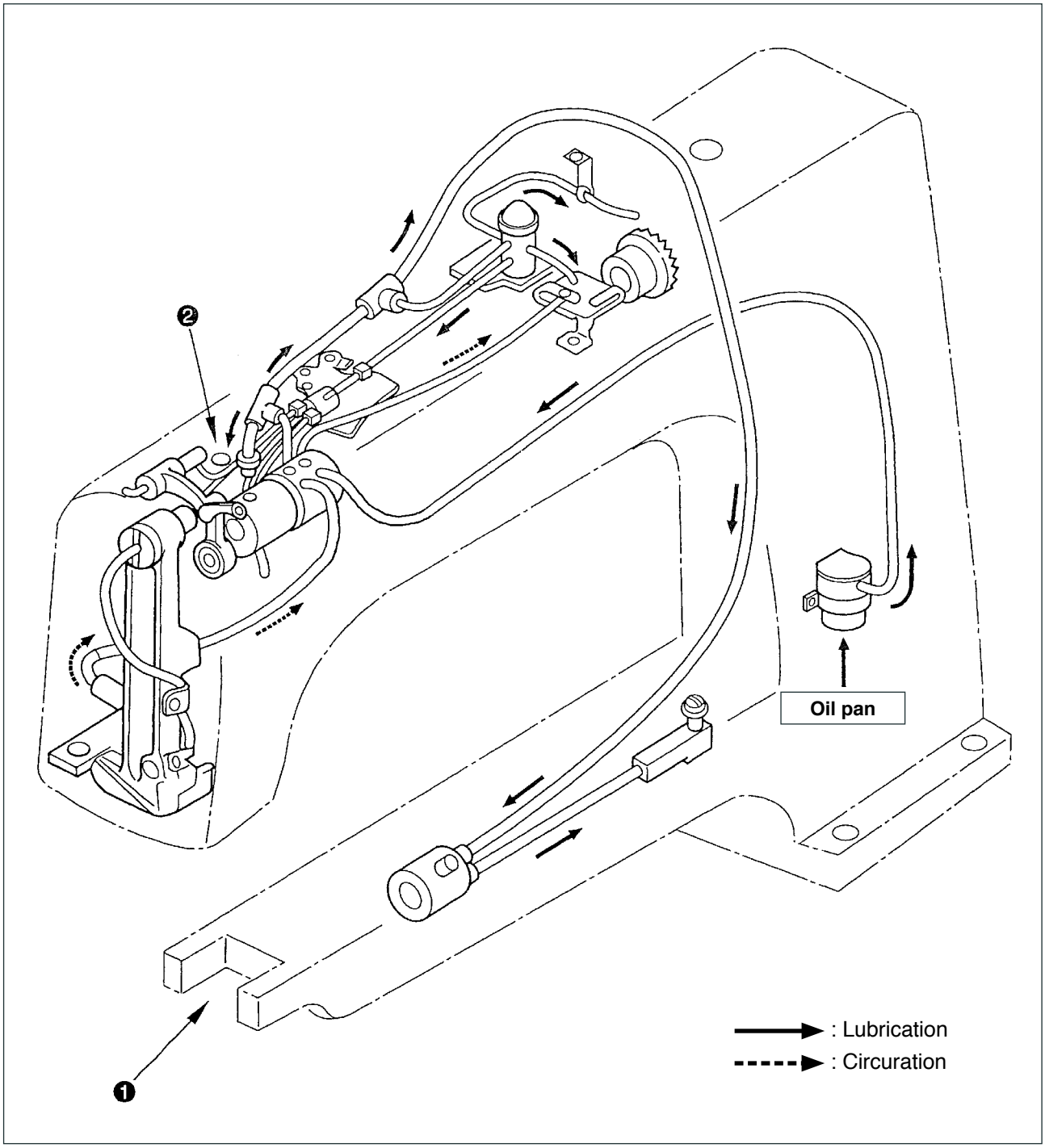
4) Pattern board mechanism components



5) Folding mechanism components

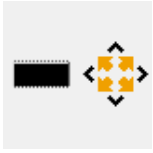
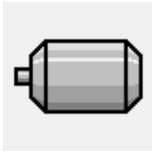
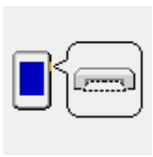
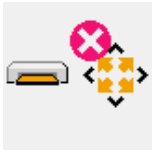


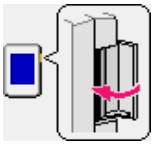
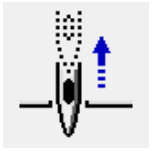
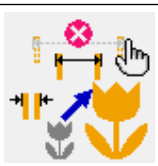
12. Lubrication of the machine head, circulation piping diagram and components to be lubricated

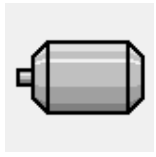
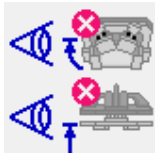
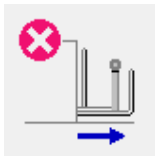
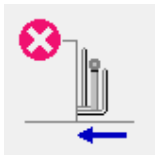
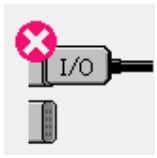


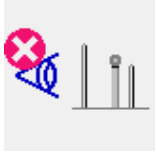
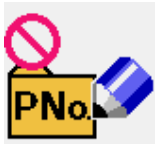
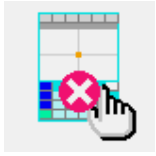
When you first use your machine after set-up or after an extended period of disuse, pour approximately 10 cc oil to hook components ❶ and oil hole (lubrication hole) ❷ of main shaft front bushing.

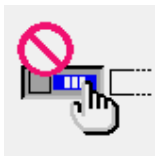
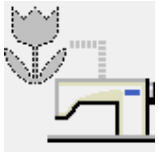
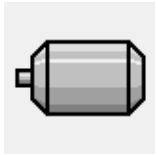
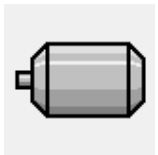
13. Error code list

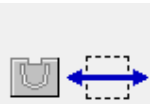
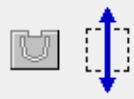
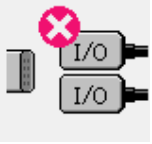
Error code	Display	Description of error	Display message	How to recover	Place of recovery
E001		**Data is initializes** (FROM of MAIN CPU)	Data is initialized.	Turn OFF the power	
E007		**Machine lock** Main shaft of the sewing machine fails to rotate due to some trouble.	Machine is locked.	Turn OFF the power	
E010		**Pattern No. error** Pattern No. which is backed up is not registered to data ROM, or setting of reading inoperative is performed.	Specified pattern does not exist.	Possible to re-enter after reset.	Previous screen
E011		**External media not inserted** External media is not inserted.	Media is not inserted.	Possible to re-enter after reset.	Previous screen
E012		**Read error** Data read from external media cannot be performed.	Data cannot be read.	Re-start after resetting is enabled.	Previous screen
E013		**Write error, external** Data write from external media cannot be performed.	Data cannot be written.	Re-start after resetting is enabled.	Previous screen
E014		**Write protect** The medium is in the write-protected state.	Writing is prohibited.	Re-start after resetting is enabled.	Previous screen
E015		**Format error** Format cannot be performed.	Formatting is impossible.	Re-start after resetting is enabled.	Previous screen
E016		**External media capacity over** Capacity of external media is insufficient.	Capacity is insufficient. (media)	Re-start after resetting is enabled.	Previous screen
E017		**Capacity over of sewing machine memory** Machine memory capacity is insufficient.	Capacity is insufficient. (Machine)	Re-start after resetting is enabled.	Previous screen
E019		**File size over** File is too large.	Pattern data is too large. (Approx 50000 stitches)	Re-start after resetting is enabled.	Previous screen

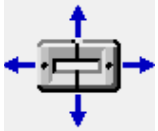
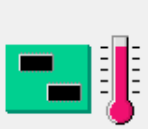
Error code	Display	Description of error	Display message	How to recover	Place of recovery
E024		**Pattern data size over** Memory size is over.	Memory capacity has run out.	Re-start after resetting is enabled.	Data input screen
E029		**Media slot release error** Lid of media slot is open.	Cover of media slot is open.	Re-start after resetting is enabled.	Previous screen
E030		**Mispositioning error of the needle bar** Needle bar is not in the predetermined position.	Needle is not in a proper position.	Turn hand pulley to bring needle bar to its predetermined position.	Data input screen
E031		**Air pressure drop** Air pressure is dropped.	Low air pressure.	Re-start after resetting is enabled.	Data input screen
E032		**File compatibility error** Incompatibility between files.	File cannot be read.	Re-start after resetting is enabled.	Data input screen
E040		**Sewing area over** When the sewing area is exceeded.	Move limit is exceeded.	Re-start after resetting is enabled.	Sewing screen
E042		**Operation cannot be performed.**	Operation cannot be performed.	Re-start after resetting is enabled.	Previous screen
E043		**Enlarging error** Sewing pitch exceeds max. pitch.	Max. Pitch is exceeded.	Re-start after resetting is enabled.	Data input screen
E045		**Pattern data error** The pattern data cannot be processed.	Pattern data no good.	Re-start after resetting is enabled.	Data input screen
E050		**Temporary stop switch** When stop switch is pressed during machine running.	Temporary stop switch is pressed.	Re-start after resetting is enabled.	Step screen
E052		**Thread breakage detection error** When thread breakage is detected.	Thread breakage is detected.	Re-start after resetting is enabled.	Step screen

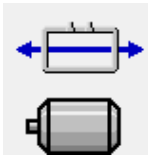
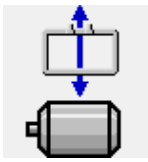
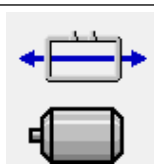
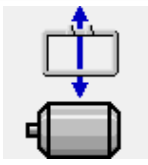
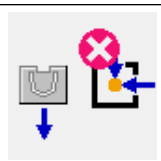
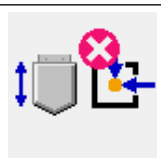
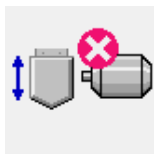
Error code	Display	Description of error	Display message	How to recover	Place of recovery
E099		**Stacking full** This error occurs when the allowable number of pieces of products to be stacked on the stacker is exceeded.	The possible number of the finished materials to be stacked is exceeded	Re-start after resetting is enabled.	Sewing screen
E204		**USB connection error** With the number of times of sewing has reached 10 or more, with a USB device connected to the sewing machine	Never connect USB storage device to the machine during sewing.	Re-start after resetting is enabled.	Sewing screen
E303		**Phase Z detection error** Detection of the upper dead point is impossible for the sewing machine.	UP position of sewing machine motor cannot be detected. (Woodruff plate signal of sewing machine motor)	Turn OFF the power	
E370		**Initial position error for the folding unit and the folding arm** Neither the folding unit nor the folding arm is positioned at their initial positions.	Folding unit/folding arm initial position error	Re-start after resetting is enabled.	Data input screen
E371		**Folding unit initial position error** The folding unit is not positioned at its initial position.	The folding unit initial position error	Re-start after resetting is enabled.	Data input screen
E372		**Folding arm initial position error** The folding arm is not at its initial position.	The folding arm initial position error	Re-start after resetting is enabled.	Data input screen
E373		**Stacker position error** The stacker is not in the opened state.	Drawing out incompleteness end of stacker	Re-start after resetting is enabled.	Data input screen
E374		**Stacker position error** The stacker is not in the closed state.	Storage incompleteness end of stacker	Re-start after resetting is enabled.	Data input screen
E390		**I/O connector connection position error** The I/O connector is connected to a wrong position.	I/O connector connecting position is wrong	Turn OFF the power	
E392		**Presser plate (large) upper sensor error**	Upper sensor fails to detect the presser arm	Re-start after resetting is enabled.	Data input screen
E393		**Presser plate (large) lower sensor error**	Lower sensor fails to detect the presser arm	Re-start after resetting is enabled.	Data input screen

Error code	Display	Description of error	Display message	How to recover	Place of recovery
E394		**Folding arm lifting sensor detection error**	The folding arm sensor (upper) of the folding unit is not detected	Re-start after resetting is enabled.	Data input screen
E395		**Folding arm lowering sensor detection error**	The folding arm sensor (lower) of the folding unit is not detected	Re-start after resetting is enabled.	Data input screen
E396		**Folding unit lifting sensor detection error**	The sensor (upper) of the folding unit is not detected	Re-start after resetting is enabled.	Data input screen
E397		**Folding unit lowering sensor detection error**	The sensor (lower) of the folding unit is not detected	Re-start after resetting is enabled.	Data input screen
E398		**Stacker cloth brush completion sensor detection error**	The stacker cloth brush completion sensor is not detected	Re-start after resetting is enabled.	Data input screen
E399		**Stacker cloth brush initial position sensor error**	The stacker cloth brush initial sensor is not detected	Re-start after resetting is enabled.	Data input screen
E401		**Copy disapproved** When trying to perform over-writing copy on the pattern No. which has been already registered	Cannot copy.	Possible to re-enter after reset.	Previous screen
E402		**Erasing disapproved** When trying to delete the pattern used in the cycle sewing	Data cannot be deleted since it is used for cycle data.	Possible to re-enter after reset.	Previous screen
E403		**New creation disapproved** When the registered pattern is selected to the new creation pattern No.	This No. is already used.	Possible to re-enter after reset.	Previous screen
E404		**Data of designated No. does not exist.** When data of designated No. does not exist in media or server	This No. cannot be found.	Possible to re-enter after reset.	Previous screen
E432		**Proper operation has not been performed.**	Proper operation has not been performed.	Re-start after resetting is enabled.	Previous screen

Error code	Display	Description of error	Display message	How to recover	Place of recovery
E433		**Number of stitches has exceeded the limit.**	Number of stitches has exceeded the limit.	Re-start after resetting is enabled.	Previous screen
E434		**Hardware error has occurred.**	Hardware error has occurred.	Re-start after resetting is enabled.	Previous screen
E435	- - -	**Erasing disapproved** When trying to erase pattern registered to direct pattern.	Set value exceeds the range.	Possible to re-enter after reset.	Previous screen
E437		**Function cannot be selected.**	Function cannot be selected.	Re-start after resetting is enabled.	Previous screen
E438		**Execution cannot be performed.**	Execution cannot be performed.	Re-start after resetting is enabled.	Previous screen
E441		**Back-up data does not exist.**	Back-up data does not exist.	Re-start after resetting is enabled.	Previous screen
E703		**Panel is connected to the sewing machine which is not supposed. (Machine type error)** When the machine type code of system is not proper in the initial communication.	Model of sewing machine is different from that of panel.	Possible to rewrite program after pressing down communication switch.	Communication screen
E704		**Inconsistency of system version** System software version is inconsistent in the initial communication.	Version of program incompatible.	Possible to rewrite program after pressing down communication switch.	Communication screen
E730		**Main shaft motor encoder defectiveness** When encoder of the sewing machine motor is abnormal.	Sewing machine motor is defective. (Encoder A and B phases)	Turn OFF the power	
E731		**Main motor hole sensor is defective or position sensor is defective.** Hole sensor or position sensor of the sewing machine motor is defective.	Sewing machine motor is defective. (Encoder U V and W phases)	Turn OFF the power	

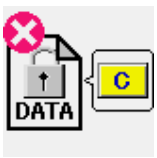
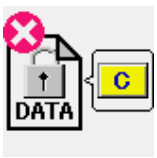
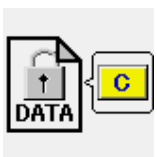
Error code	Display	Description of error	Display message	How to recover	Place of recovery
E733		**Reverse rotation of main shaft motor** When sewing machine motor rotates in reverse direction.	Sewing machine motor runs in the reverse direction.	Turn OFF the power	
E780		**Out of X-axis operation range** The operation range in X axis is exceeded.	Out of operating range in X axis	Turn OFF the power	
E781		**Out of Y-axis operation range** The operation range in Y axis is exceeded.	Out of operating range in Y axis	Turn OFF the power	
E782		**PDET signal fault** PDET signal fault is detected.	PDET signal abnormality is detected	Turn OFF the power	
E797		**No I/O connection** I/O connection is not confirmed.	I/O is not yet connected	Turn OFF the power	
E798		**I/O address duplication** I/O address duplication is detected.	I/O address overlapping	Turn OFF the power	
E802		**Power electrical discontinuity detection** When the input power supply is instantaneously turned OFF.	Power instantaneously lost.	Turn OFF the power	
E811		**Overvoltage** When input power is more than the specified value.	Input voltage is too high. (Check input voltage.)	Turn OFF the power	
E813		**Low voltage** When input power is less than the specified value.	Input voltage is too low. (Check input voltage.)	Turn OFF the power	
E901		**Main shaft motor IPM abnormality** When IPM of servo control board is abnormal.	SDC P.C.B. is defective. (IPM)	Turn OFF the power	
E903		**Stepping motor power abnormality** When stepping motor power of SERVO CONTROL board fluctuates more than ± 15%.	Power of SDC P.C.B. is defective. (Stepping motor power 85 V)	Turn OFF the power	

Error code	Display	Description of error	Display message	How to recover	Place of recovery
E904		**Solenoid power abnormality** When solenoid power of SERVO CONTROL board fluctuates more than ± 15%.	Power of SDC P.C.B. is defective. (Solenoid power 33 V)	Turn OFF the power	
E905		**Heat sink temperature for SERVO CONTROL board abnormality** Turn ON the power again after taking overheat time of SERVO CONTROL board.	Temperature of SDC P.C.B. is too high.	Turn OFF the power	
E907		**X feed motor origin retrieval error** When origin sensor signal is not inputted at the time of origin retrieval motion.	Origin of X motor cannot be found. (X origin sensor)	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.	Origin of Y motor cannot be found. (Y origin sensor)	Turn OFF the power	
E911		**Bobbin thread trimming motor origin retrieval error** In the case the origin sensor signal is not input at the time of origin retrieving operation	Bobbin thread trimming motor origin cannot be found	Turn OFF the power	
E914		**Feed defective error** Timing lag between feed and main shaft occurs.	X/Y feed trouble is detected.	Turn OFF the power	
E915		**Communication abnormality between operation panel and MAIN CPU** When abnormality occurs in data communication.	Communication is impossible. (Panel - MAIN P.C.B.)	Turn OFF the power	
E916		**Communication abnormality between MAIN CPU and main shaft CPU** When abnormality occurs in data communication.	Communication is impossible. (MAIN P.C.B. - SDC P.C.B.)	Turn OFF the power	
E917		**Communication failure between operation panel and personal computer** When abnormality occurs in data communication.	Communication is impossible. (Panel - PC)	Re-start after resetting is enabled.	Previous screen
E918		**MAIN board overheat** Overheat of MAIN board Turn ON the power again after taking time.	Main P.C.B. temperature is too high.	Turn OFF the power	

Error code	Display	Description of error	Display message	How to recover	Place of recovery
E926		**X motor position slip error**	X-feed motor position is off.	Turn OFF the power	
E927		**Y motor position slip error**	Y-feed motor position is off.	Turn OFF the power	
E928		**Thread trimming motor position slip error**	Thread trimming motor position is off.	Turn OFF the power	
E931		**X motor overload error**	X-feed motor overload is excessive.	Turn OFF the power	
E932		**Y motor overload error**	Y-feed motor overload is excessive.	Turn OFF the power	
E933		**Thread trimming motor overload error**	Thread trimming motor overload is excessive.	Turn OFF the power	
E936		**X/Y motor out of range error**	Feed motor position has exceeded the sewing area.	Turn OFF the power	
E943		**MAIN CONTROL board trouble** When data writing to MAIN CONTROL board cannot be performed	MAIN P.C.B. is defective.	Turn OFF the power	
E991		**Presser plate initial operation fault** In the case the needle bar rests on the presser plate cylinder movement path when the origin retrieval is carried out.	Presser is located at a position where the origin retrieval is disabled Move the presser plate toward you	Re-start after resetting is enabled.	Data input screen
E992		**Pattern board longitudinal motor origin retrieval error** The pattern board motor origin sensor fails to detect the origin.	The pattern board sensor is not detected	Turn OFF the power	
E994		**Pattern board longitudinal motor step-out error** Step-out of the pattern board motor is detected.	Step-out of the pattern plate longitudinal motor is detected	Turn OFF the power	

14. Message code list

Message No.	Display	Display message	Description
M520		Erasing is performed. OK ?	**Erase confirmation of Users' pattern** Erase is performed. OK ?
M521		Erasing is performed. OK ?	**Erase confirmation of pattern button** Erase is performed. OK ?
M522		Erasing is performed. OK ?	**Erase confirmation cycle pattern** Erase is performed. OK ?
M523		Pattern data is not stored. Erasing is OK?	**Erase confirmation of backup data** Pattern data is not stored in memory. Erase is OK ?
M528		Overwriting is performed. OK ?	**Overwriting confirmation of users' pattern** Overwriting is performed. OK ?
M529		Overwriting is performed. OK ?	**Overwriting confirmation of media** Overwriting is performed. OK ?
M530		Overwriting is performed. OK ?	**Overwriting confirmation of vector data of panel** Overwriting is performed. OK ?
M531		Overwriting is performed. OK ?	**Overwriting confirmation of vector data of media** Overwriting is performed. OK ?
M534		Overwriting is performed. OK ?	**Overwriting confirmation of adjustment data of media and all machine data** Overwriting is performed. OK ?
M535		Overwriting is performed. OK ?	**Overwriting confirmation of adjustment data on personal computer and all machine data** Overwriting is performed. OK ?
M537		Deleting is performed. OK ?	**Deletion confirmation of thread tension command** Deleting is performed. OK ?

Message No.	Display	Display message	Description
M542		Formatting is performed. OK ?	**Format confirmation** Formatting is performed. OK ?
M544		Data does not exist.	**Data corresponding to panel does not exist.** Data does not exist.
M545		Data does not exist.	**Data corresponding to media does not exist.** Data does not exist.
M546		Data does not exist.	**Data corresponding to personal computer does not exist.** Data does not exist.
M547		Overwriting cannot be performed since data exists.	**Overwriting prohibition on pattern data** Overwriting cannot be performed since data exists.
M548		Overwriting cannot be performed since data exists.	**Overwriting prohibition on media data** Overwriting cannot be performed since data exists.
M549		Overwriting cannot be performed since data exists.	**Overwriting prohibition on data on personal computer** Overwriting cannot be performed since data exists.
M550		There is back-up data of body input.	**Backup data information on main body input** There is back-up data of body input.
M554		Key-lock customization data have been initialized.	**Customized data initialization notice** Customized key-lock data has been initialized.
M555		Key-lock customization data are broken. Initializing is OK?	**Customized data breakage** Customized key-lock data has broken. Initialization is performed. OK?
M556		Key-lock customization data are to be initialized. OK?	**Initialization confirmation of customized data** Customized key-lock data is initialized. OK?

Message No.	Display	Display message	Description
M653		Formatting is performed.	**During formatting** Formatting is performed.
M669		Data is being read.	**During data reading** Data is being read.
M670		Data is being written.	**During data writing** Data is being written.
M671		Data is being converted.	**During data converting** Data is being converted.

15. Troubles and corrective measures

(1) Machine head components

WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
1. One or several stitches skip at the sewing start.	1-1) Length of thread remaining at the tip of the needle after thread trimming is too short.	1-A) Needle thread path is defective and needle thread tension is excessive at the time of thread trimming.	Inspect the needle thread path, remove the thread tangling round the take-up thread guide bar and correct the position of the take-up thread guide on the thread stand.
		1-B) Tension controller No. 1 or the tension controller on the take-up thread guide bar excessively tenses the thread.	Turn the tension nut of the tension controller No. 1 or the tension controller on the take-up thread guide bar counterclockwise to decrease the thread tension.
		1-C) Tension disk No. 2 fails to fully go up at the time of thread trimming.	Inspect the thread tension releasing mechanism and adjust it properly.
		1-D) Thread trimming cam timing has been excessively advanced causing the moving knife to actuate before separating the threads.	Inspect the thread trimmer cam timing and adjust it properly.
		1-E) Picker is improperly positioned causing the needle thread to move out of position at the time of thread trimming.	Check whether the screw in the picker has loosened.
		1-F) Counter knife is positioned excessively near the needle. Tip of counter knife blade is too sharp.	Remove the throat plate and check the position of the counter knife and check the moving knife for scratches. Then, properly adjust the components.
		1-G) Moving knife or hook has scratches.	Check the scratches. Buff them up when necessary. If the scratches are large, replace the failed component with a new one.
		1-H) Tension releasing cam timing has been excessively retarded. As a result, the needle thread fails to be fed.	Inspect the tension releasing components and adjust them properly.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page		
		1-I) Thread wastes have gathered in the knife mounting base, which prevents threads from being separated.	Clean up the knife mounting base and moving knife.
	1-2) Work clamp is defective.	2-A) Sponge rubber piece of the work clamp fails to clamp the material on the machine.	Remove the sponge rubber sheet from the work clamp and adhere a new sheet onto the work clamp.
			Decrease the stitch length at the sewing start.
			Adjust so that the pattern is brought to a position where the sponge rubber sheet of the work clamp securely clamps the material.
	1-3) Blade point of the hook fails to catch the needle thread.	3-A) Needle-to-hook relation is not proper.	Check the height of the needle bar and adjust it to the standard height.
		3-B) Both the tension and stroke of the thread take-up spring are excessive.	Decrease the tension of the thread take-up spring and reduce the stroke of the spring appropriately. (Standard stroke: 10 to 12 mm)
		3-C) Blade point of the hook has worn out.	Correct the blade tip of hook, or replace the hook with a new one.
		3-D) Needle has been improperly installed.	Properly adjust the inclination of the needle. If the needle has bent, replace it with a new one.
	1-4) Length of bobbin thread at the sewing start is insufficient.	4-A) Bobbin runs idle in the bobbin case causing the bobbin thread end to be drawn in the bobbin case.	Increase the pressure of the idling prevention spring.
			Increase the bobbin thread tension.
		4-B) Hook has scratches, which shorten the length of bobbin thread remaining.	Correct the scratches on the hook, or replace the hook with a new one.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	1-5) Needle thread and bobbin thread fail to smoothly interlace with each other at the sewing start.	5-A) Sewing speed at the sewing start is excessive. As a result, the needle thread and bobbin thread fail to interlace with each other.	Reduce the sewing speed at the sewing start.
			Decrease the stitch length at the sewing start.
2. Needle thread end is left on upper cloth at the sewing start.	2-1) Needle thread remaining at the needle tip after thread trimming is too long.	1-A) Thread tension controller No. 1 is too low.	Increase the thread tension controller No. 1.
		1-B) Thread trimming cam timing has been excessively retarded.	Inspect the thread trimmer cam timing and properly adjust it.
		1-C) Counter knife is positioned too far from the needle entry point.	Properly adjust the position of counter knife.
		1-D) Tension release cam timing has been excessively advanced. As a result, the needle thread is fed excessively.	Inspect the tension release cam timing and adjust it properly.
	2-2) Pattern is defective.	2-A) Material thickness is excessive at the sewing start.	Adjust the pattern so that the sewing start is brought to a thin section of the material.
		2-B) Sponge rubber piece of the work clamp is sewn in.	Cut the sponge rubber sheet of the work clamp adequately or modify the pattern so that the needle does not come in contact with the sponge rubber sheet.
	2-3) Pneumatic wiper is defective.	3-A) Pneumatic wiper fails to work. This causes the plunger to depress the needle thread.	Check whether the operating air is supplied to the wiper.
		3-B) Pneumatic wiper fails to blow air at the correct position. As a result, the operating air fails to spread the needle thread, causing the plunger to depress the needle thread.	Adjust the installing direction of the work clamp plunger.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	2-4) Needle thread is too thick for the needle used.		Use a thicker needle or a thread of higher count.
3. Wrong side of the material is poorly finished at the sewing start. (Long needle thread is left under the material.)	3-1) Length of needle thread remaining at the tip of needle after thread trimming is excessive.		Refer to "2. Needle thread end is left on upper cloth at the sewing start.".
4. Thread comes off the needle eyelet at the sewing start.	4-1) Length of needle thread remaining at the tip of needle after thread trimming is not uniform.	1-A) Failed operation of the tension release cam.	Inspect the tension release mechanism and properly adjust it.
		1-B) Thread take-up finger fails to enter the bobbin case deeply enough. So, the needle thread sometimes slips off the thread take-up finger.	Inspect the thread take-up finger and properly adjust it.
		1-C) If the counter knife blade has been improperly sharpened (counter knife blade is too sharp), the counter knife alone cuts the thread.	Properly re-grind the counter knife· or replace it with a new one.
		1-D) Moving knife or hook has scratches.	Correct the scratched component or replace it with a new one.
		1-E) Tension release cam timing has been excessively retarded. As a result, the needle thread is not fed.	Inspect the tension release cam timing and properly adjust it.
	4-2) Thread slips off the needle eyelet immediately after thread trimming.	2-A) Thread trimmer cam timing has been excessively advanced. In this case, the thread near the needle is cut.	If the needle thread slips off the needle eyelet immediately after thread trimming, suppose that the moving knife fails to spread the thread and cuts the thread which should remain at the needle. In this case, remove the throat plate and you will find the trimmed needle thread of approximately 20 mm. To correct this trouble, retard the thread trimmer cam timing.
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WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page		
		2-B) Thread tension is not released.	Inspect the tension release components and properly adjust them.
	4-3) Needle thread and bobbin thread fail to interlace with each other at the sewing start.	3-A) Sewing speed at the sewing start is excessive. As a result, the needle thread and bobbin thread fail to interlace with each other.	Reduce the sewing speed at the sewing start.
5. Loose stitches are made at the sewing start.	5-1) Needle thread tension is insufficient at the sewing start.	1-A) Bobbin thread tension is decreased at the sewing start since the bobbin runs idle.	Increase the pressure of the idling prevention spring.
		1-B) Both the bobbin thread tension and needle thread tension are insufficient.	Increase the bobbin thread tension and needle thread tension.
	5-2) The pattern used is defective.	2-A) Material thickness is excessive at the sewing start.	Modify the pattern at the thin part of material.
		2-B) Pressure of the work clamp is insufficient at the sewing start, causing the material to flop.	Remove the sponge rubber sheet from the work clamp and adhere a new piece of the sponge rubber on it, or modify the pattern to enable the work clamp to securely clamp the material.
6. Needle thread cannot be cut. (Bobbin thread can be cut.)	6-1) Last stitch skips at the sewing end.	1-A) Needle has been improperly installed.	Properly install the needle and check whether the needle has bent.
		1-B) Stroke of the thread take-up spring is too large.	Reduce the stroke of the thread take-up spring. (Standard stroke: 10 to 12 mm)
		1-C) Hook timing has been improperly adjusted.	Run the sewing machine at low speed and check whether stitches skip. Then, properly re-adjust the hook timing.
		1-D) Needle entry of the last stitch excessively approaches the previous stitch.	Correct the pattern.
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WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	6-2) Knife blade partly fails to cut the thread sharp.	2-A) Blades of the moving knife and counter knife fail to accurately meet with each other at the time of thread trimming. (Installing angle and position of the counter knife has not been properly adjusted with regard to the moving knife blade.)	Remove the knife mounting base and cut approximately three cotton thread #50 by moving the knife by hand. As far as the threads are uniformly cut, the counter knife has been properly adjusted. If not, re-grind the counter knife blade or correct the inclination angle of the top end of the counter knife.
			Properly re-adjust the mounting position of the counter knife.
	6-3) Thread waste has gathered in the moving knife and knife thread guide, resulting in thread spreading failure.		Clean up the moving knife and knife thread guide.
7. Bobbin thread cannot be cut. (Needle thread can be cut.)	7-1) Backward travel amount of the moving knife is insufficient.	1-A) Adjustment of the backward travel amount of the moving knife is defective.	Check the backward travel amount of the moving knife. Then, adjust the lateral position of moving knife link C to set the backward travel amount of the moving knife to 3 to 3.5 mm.
	7-2) Thread trimmer cam timing has been excessively retarded. As a result, the moving knife fails to spread the thread.		Properly re-adjust the thread trimmer cam timing.
	7-3) Thread waste has gathered in the moving knife and knife thread guide, resulting in thread spreading failure.		Clean up the moving knife and knife thread guide.
	7-4) Knife mounting base has been improperly positioned which reduces the backward travel amount of the moving knife.		Properly re-install the knife mounting base.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
8. Operation of the moving knife is strange.	8-1) The connector of the thread trimmer motor has separated.		Check the connector connections.
	8-2) Initial position of the thread trimmer motor is inadequate.		Adjust the initial position of the sensor slit and sensor.
	8-3) The datum hole of the thread trimmer is not correct.	3-A) Installing position of the thread trimmer control plate is defective.	Adjust the thread trimmer cam position. (Refer to "3.-(7) Adjustment of the thread trimming cam".)
	8-4) Home position of the moving knife is defective.	4-A) Thread cannot be trimmed.	Inspect the engagement between the moving knife and properly adjust it.
			Inspect the engagement between the moving knife and the counter knife and properly adjust it.
9. The sewing machine locks. (The sewing machine produces an abnormal noise.)	9-1) Presser bar lifting lever fails to properly return to the home position.	1-A) Presser bar bracket has been improperly positioned. As a result, the presser bar bracket interferes with the needle bar crank rod.	Inspect whether the presser bar bracket has been properly positioned. (Refer to "3.(4) Adjustment of the lifting amount of the work clamp plunger".)
		1-B) Air cylinder is defective.	Inspect whether the presser bar lifting cylinder normally operates.
	9-2) Tension release mechanism is defective.	2-A) AT solenoid is defective.	Inspect whether the AT solenoid normally operates at tension release.
	9-3) The pattern used is defective, causing the work clamp to interfere with the needle.		Correct the position of the pattern so that the needle does not interfere with the work clamp.
	9-4) Work clamp has been improperly installed. As a result, the work clamp interferes with the needle.		Check whether the one-touch section of the work clamp has been properly installed.
	9-5) Work clamp plunger and needle bar thread eyelet have been improperly positioned. As a result, they interfere with each other.		Inspect the installing position of the work clamp plunger and properly adjust it.

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

Trouble	Cause (1)	Cause (2)	Check and corrective measures
10. Sewing shape is deformed.	10-1) Sewing speed at corner sections of the pattern is too high.		Reduce the sewing speed at the corner sections of the pattern.
	10-2) Work clamp is defective.	2-A) Work clamp fails to clamp the material.	Remove the sponge rubber sheet from the work clamp and adhere a new sheet of the sponge rubber on it to allow the work clamp to securely clamp the material. Or, increase the pressure of the work clamp.
	10-3) Pattern data have been improperly input.	3-A) The pattern fails to match the material used. As a result, needle entries are made out of position at the overlapped section or the like.	Correct the pattern.
		3-B) Straight stitching pattern has been input to create a short seam, resulting in stitch length error.	Correct the pattern.
	10-4) Work clamp pressure is insufficient, resulting in material slippage.		Increase the pressure of the work clamp of sewing machine. Or, properly adjust the pressure of the conveyor.
	10-5) Crease folding unit has been improperly adjusted.		Refer to "Adjusting the crease folding unit".
	10-6) Stitch length is coarse, causing the needle to sway.		Fine the stitch length or use a thicker needle.
11. Face plate produces an abnormal noise.	11-1) Clearance provided between the inner hook and the bobbin case opening lever is too large.		Slightly reduce the clearance provided between the inner hook and the bobbin case opening lever.
	11-2) Plunger interferes with the needle bar crank rod.		Inspect how the lifting amount of the work clamp plunger has been adjusted.
	11-3) Hook timing has been improperly adjusted, causing the blade point of the hook to interfere with the needle.		Check whether the hook timing has been properly adjusted.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
	From the previous page		
	11-4) Work clamp interferes with the needle.	4-A) The pattern used is defective.	Correct the pattern so that the work clamp does not interfere with the needle.
		4-B) Work clamp has been improperly installed.	Check whether the one-touch section of the work clamp has been normally installed.
		4-C) Work clamp pressure has been improperly adjusted.	Increase the pressure of the work clamp of sewing machine or the pressure of the holder of conveyor.
	11-5) Needle bar rocking components interfere with the face plate.		Check whether needle bar rocking components interfere with the face plate.
	11-6) Work clamp plunger interferes with the needle bar thread eyelet.		Check whether the work clamp plunger interferes with the needle bar thread eyelet.
12. The machine vibrates heavily during sewing.	12-1) Tension of the belt of XY motor has been improperly adjusted.		Check whether the tension of the belt of XY motor is too high or too low.
	12-2) Sewing machine head has been improperly installed.	2-A) Table of the housing interferes with the throat plate.	Check whether the table of the housing interferes with the throat plate. If they interfere with each other, correctly install the table.
		2-B) Machine head fixing bolt has not been properly tightened.	Check whether the tightening torque of the machine head fixing bolt is adequate.
	12-3) Backlash in the gear is defective.	3-A) Main shaft gear	Check whether the backlash in the main shaft gear is excessive.
		3-B) Hook driving shaft gear	Check whether the backlash in the hook driving shaft gear is excessive.
	12-4) Play the main shaft, hook driving shaft or vertical shaft.	4-A) Thrust play at the main shaft	Check whether the thrust play at the main shaft is excessive.
		4-B) Thrust play at the hook driving shaft	Check whether the thrust play at the hook driving shaft is excessive.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	4-C) Thrust play at the vertical shaft	Check whether the thrust play at the vertical shaft is excessive.
	12-5) Housing has been improperly installed.	5-A) Level adjusters have been improperly installed.	Install the housing level adjusters mounted around the sewing machine securely on the floor.
		5-B) The number of points at which the housing is secured on the floor is insufficient.	Install the machine on the floor under which beams are provided or the floor located near the wall.
13. Needle breakage	13-1) Work clamp is defective.	1-A) Material flops.	Remove the sponge rubber sheet from the presser plate and adhere a new piece of the sponge rubber on it.
	13-2) The pattern used is defective.	2-A) Material thickness is excessive at the sewing start.	Modify the pattern to enable the machine to sew from the thin part of the material.
	13-3) The pattern used is defective. As a result, the needle interferes with the work clamp.		Correct the pattern so that the needle does not interfere with the work clamp.
	13-4) Work clamp has been improperly installed, causing the work clamp to interfere with the needle.		Check whether the one-touch section of the work clamp has been normally installed.
	13-5) Needle comes in contact with the moving knife.		Adjust the thread trimmer cam position. (Refer to "3.-(7) Adjustment of the thread trimming cam".)
	13-6) Thread waste has gathered around the hook.		Remove the throat plate and clean up the related components.
	13-7) Needle comes down under the work clamp plunger.	7-A) Plunger has been improperly positioned.	Check whether the lifting amount of the work clamp plunger has been properly adjusted.
	13-8) Throat plate has been improperly installed, causing the needle to interfere with the needle hole guide.		Confirm that the throat plate is positioned correctly with respect to the needle entry.

WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
14. Sewing machine stop immediately after it has been started.	14-1) The machine head has not been threaded.		Properly pass the needle thread through the machine head.
	14-2) Thread breakage detector is defective.		Confirm that the thread take-up spring properly comes in contact with the thread breakage detecting plate.
15. Holder of the conveyor interferes with the work clamp plunger of the sewing machine.	15-1) Holder of the conveyor has bent.		Correct the bending part of the holder of the conveyor.
	15-2) Height of the work clamp is insufficient.	2-A) Stopper used for adjusting the height of the holder of the conveyor has been improperly positioned.	Raise the stopper for adjusting the height of the holder of the conveyor. Then, decrease the height of the holder of the conveyor.
	15-3) Work clamp plunger has been installed too low.	3-A) Plunger has been improperly installed.	Inspect the lifting amount of the work clamp plunger and properly adjust it.
16. Puckering	16-1) Needle used is too thick.		Use a thinner needle.
	16-2) Thread tension (needle thread tension and bobbin thread tension) is excessive.	2-A) Thread path has not been smoothly finished.	Smoothly finished the thread path.
		2-B) Hook timing has been excessively retarded.	Advance the hook timing as long as stitch skipping does not occur to allow the thread to smoothly come off the hook.
		2-C) Stroke of the thread take-up lever is too large.	Move the arm thread guide to the right so as to reduce the amount of thread to be fed by the thread take-up lever.
		2-D) Stroke of the thread take-up spring is too small.	Increase the stroke of the spring.
	16-3) Work clamp failure causes the material to flop.	3-A) Sponge rubber sheet of the work clamp fails to effectively clamp the material.	Adhere a sheet of emery paper or the like on the work clamp to enable the work clamp to securely clamp the material.
		3-B) Needle entry is too far from the sponge rubber sheet end.	Correct the pattern so that the needle entry approaches the sponge rubber sheet.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page		
		3-C) Swelling on an overlapped section of the material is large and the work clamp fails to clamp it securely.	Remove the sponge rubber sheet and re-adhere it on the work clamp so as to remove swelling on the overlapped section of the material.
		3-D) Pressure of the work clamp of the sewing machine and that of the holder of the conveyor are insufficient.	Increase the pressure of each component.
	16-4) Sewing speed is too high.		Reduce the sewing speed.
	16-5) Diameter of the hole in the needle hole guide is improper.	5-A) Needle used is too thin for the diameter of the hole in the needle hole guide.	Use the needle hole guide provided with a hole of which diameter is smaller than the current one.
	16-6) Needle tip is blunt.	6-A) Needle tip catches the material, causing the material to flop.	Replace the needle with a new one.
17. Isolated idling loops (Loose stitches or looping)	17-1) Thread tension is insufficient.		Increase the thread tension.
	17-2) Thread take-up spring has been improperly adjusted.	2-A) Stroke of the thread take-up spring is too small or too large.	Increase or decrease the stroke.
		2-B) Tension provided by the spring is insufficient.	Increase the thread tension.
		2-C) Thread take-up spring fails to properly come in contact with the thread breakage detecting plate.	Adjust the thread breakage detecting plate so that the thread take-up spring comes in proper contact with the plate.
	17-3) Stroke of the thread take-up lever is too large.		Move the arm thread guide A to the right so as to reduce the amount of thread to be fed by the thread take-up lever.
	17-4) Hook components are defective.	4-A) Hook timing has been excessively advanced.	Adjust the hook timing to the standard or slightly advance it when using cotton thread or spun thread.
		4-B) Hook timing has been excessively retarded.	Adjust the hook timing to the standard or slightly advance it when using synthetic thread.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page		From the previous page	
		4-C) Clearance provided between the hook and the bobbin case opening lever is too small.	Increase the clearance to allow the thread to smoothly come off the hook.
		4-D) Amount of oil in the hook is insufficient or excessive.	Adjust the amount of oil in the hook appropriately.
		4-E) Hook is defective. (The thread is caught in the hook.)	Polish the thread passing part of the hook or replace the hook with a new one.
	17-5) Thread path is defective.	5-A) Thread path is not smooth.	Smoothly finish the thread path.
		5-B) Thread path has scratches.	Smoothly finish the thread path.
		5-C) Thread is caught in the thread path.	Properly correct the thread path.
	17-6) Bobbin or bobbin case is defective.	6-A) Bobbin fails to properly engage with the bobbin case, the bobbin thread to be caught in the bobbin or bobbin case.	Replace the bobbin or bobbin case with a new one.
		6-B) Bobbin has not been properly wound with thread.	Tension provided by the bobbin winder is too high or too low.
		6-C) Tension adjusting spring of the bobbin case is defective.	Replace the bobbin case with a new one.
		6-D) Bobbin thread runs idle in the bobbin case.	Increase the pressure of the idling prevention spring.
	17-7) AT thread tension controller is defective.	7-A) Tension disk has risen.	Adjust the tension disk so that it properly rises. (Refer to "3.-(6) Adjustment of the tension controller".)
	17-8) Needle is too thin for the thread used.		Change the needle or the thread.
	17-9) Needle is defective.	9-A) Needle tip has burrs.	Replace the needle with a new one. (For synthetic thread, it is recommended to use a ball-point needle which has a round tip.)
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	17-10) Diameter of the hole in the needle hole guide is improper.	10-A) Needle and thread are too thick for the diameter of the hole in the needle hole guide.	Use the needle hole guide provided with a hole of which diameter is larger than the current one.
18. Stitch skipping	18-1) Needle is defective.	1-A) Needle has bent.	Replace the needle with a new one.
		1-B) Installing direction of the needle is wrong.	Re-install the needle properly. Recess side  Long groove side Slightly tilt the needle so that the long groove on the needle faces the operator. **(Caution) An extreme change causes blunt of the blade point of the hook.**
		1-C) Tip of needle is blunt.	Replace the needle with a new one.
		1-D) Needle is too thin or too thick for the thread used.	Replace the needle with a new one.
	18-2) Hook components are defective.	2-A) The blade point of hook is blunt or has worn out.	Correct the blade point of the hook or replace the hook with a new one.
		2-B) Hook timing has been improperly adjusted.	Re-adjust the hook timing. (The hook timing depends on sewing conditions such as the type of material and thread used: Generally advance the hook timing when sewing a heavy-weight material with synthetic thread and retard it when sewing a light-weight material.)
		2-C) Height of the needle bar is incorrect.	Vertically adjust the needle bar with regard to the blade point of hook. (When using spun thread, raise the needle bar by approximately 0.3 to 0.5 mm.)
		2-D) Clearance provided between the blade point of the hook and the needle is not correct.	Minimize the clearance.
		2-E) Thread loops are not made with consistency.	Wind the thread round the needle.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	18-3) Tension of the tension controller No. 1 or thread guide pin is insufficient, causing the thread to flap heavily.		Particularly, increase the tension of the thread guide pin so as to prevent the thread from flapping.
	18-4) Needle thread tension is excessive.	4-A) Thread tension is too high.	Decrease the thread tension.
	18-5) Sewing speed is too high.		Decrease the sewing speed. Or, modify the pattern to change the sewing speed at the section at which stitches skip so as to partly reduce the sewing speed.
	18-6) Thread take-up spring has been improperly adjusted.	6-A) Stroke of the thread take-up spring is too large.	Decrease the stroke of the thread take-up spring.
		6-B) Tension of the thread take-up spring is too high.	Decrease the tension of the thread take-up spring.
		6-C) Thread take-up spring fails to properly come in contact with the thread breakage detecting plate.	Adjust the thread breakage detecting plate so that it properly comes in contact with the thread take-up spring.
	18-7) Hook driving shaft has an excessive play.		Remove the play in the hook driving shaft.
	18-8) The material flops.		Refer to the description of "Work clamp failure causes the material to flop" given under "16. Puckering".
	18-9) Stitch length is coarse.	9-A) Stitch length is coarse, causing the needle to sway.	Use a thicker needle or fine the stitch length.
	18-10) Diameter of the hole in the needle hole guide is improper.	10-A) Diameter of the hole in the needle hole guide is too large for the thread and needle used.	Use the needle hole guide provided with a hole of which diameter is smaller than the current one.
	18-11) Needle is too thin for the thread used.		Replace the needle or thread.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
19. Needle thread breakage	19-1) Thread path is defective.	1-A) Thread path is not smooth.	Smoothly finish the thread path.
		1-B) Thread path has scratches.	Smoothly finish the thread path.
		1-C) Thread is caught in the thread path.	Properly thread the thread path.
	19-2) Needle thread tension is inadequate.	2-A) Needle thread tension is too high or too low.	Adjust the thread tension to an adequate value.
		2-B) Tension regulated by the tension controller No. 1 and that of thread guide pin are insufficient.	Adjust the thread tension so that the thread does not flap.
	19-3) Thread take-up spring has been improperly adjusted.	3-A) Stroke of the thread take-up spring is too large or too small.	Properly adjust the stroke of the thread take-up spring. (Standard stroke: 10 to 12 mm)
		3-B) Tension of the thread take-up spring is too high or too low.	Properly adjust the tension of the thread take-up spring.
	19-4) Needle is defective.	4-A) The needle has bent.	Replace the needle with a new one.
		4-B) The needle has scratches.	Replace the needle with a new one.
		4-C) The needle tip is blunt.	Replace the needle with a new one.
		4-D) Installing direction of the needle is not correct.	Re-install the needle properly.
		4-E) The needle is too thin or too thick for the thread used.	Replace the needle with a new one.
		4-F) The tip of needle is too sharp.	Use a ball-point needle.
	19-5) The material flops.		Refer to the description of "Work clamp failure causes the material to flop" given under "16. Puckering".
	19-6) Hook components are defective.	6-A) Thread path of the hook has scratches.	Smoothly finish the thread path.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	6-B) The blade point of hook is blunt or has worn out.	Correct the blade point of hook or replace the hook with a new one.
		6-C) Clearance provided between the hook and the bobbin case opening lever is too small.	Increase the clearance to allow the thread to smoothly come off the hook.
		6-D) Amount of oil in the hook is insufficient.	Adjust the amount of oil in the hook appropriately.
		6-E) Longitudinal position of the hook and bobbin case opening lever is defective, causing the needle to interfere with the corner of "U" groove on the inner hook.	Adjust the installing position of the bobbin case opening lever.
	19-7) The pattern used is defective.	7-A) The end of the groove on the work clamp interferes with the needle.	Correct the pattern so that the work clamp does not interfere with the needle.
	19-8) The needle has been improperly installed.	8-A) The needle has been installed with inclined. Long groove side  Recess side	Install the needle so that the long groove on the needle faces exactly to the left. Or, install the needle with slightly inclined so that the groove on the needle faces the operator.  Wind the thread round the needle.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
20. Wobbling	20-1) Needle thread tension is too high or too low.		Adjust the thread tension to an adequate value.
	20-2) Needle is defective.	2-A) Needle has been improperly installed.	Refer to the description of "Needle has been improperly installed" given under "19. Needle thread breakage".
		2-B) The needle has bent.	Replace the needle with a new one.
		2-C) The tip of needle is blunt.	Replace the needle with a new one.
		2-D) The needle is too thin.	Replace the needle with a thicker needle.
	20-3) Sewing speed is too high.		Reduce the sewing speed.
	20-4) Failed threading	4-A) Needle thread has been improperly passed through the machine head.	Thread the machine head correctly.
		4-B) Needle bar thread eyelet has been improperly threaded.	Refer to the description of "Needle bar thread eyelet is defective" given under "19. Needle thread breakage".
	20-5) Stitch length is coarse.	5-A) Stitch length is coarse, causing the needle to sway.	Use a thicker needle or fine the stitch length.
21. Fabric yarn breakage	21-1) Needle is defective.	1-A) The needle is hot.	Reduce the sewing speed.
		1-B) The needle is too thick.	Use a thinner needle.
		1-C) The tip of needle is blunt.	Replace the needle with a new one.
		1-D) Shape of the tip of needle is not appropriate. (Type of needle)	Use a ball-point needle.
	21-2) Sewing speed is too high.		Reduce the sewing speed. (To prevent the needle from becoming hot)

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
22. Irregular stitches	22-1) Hook components are defective.	1-A) Amount of oil in the hook is too excessive or too insufficient.	Adjust the amount of oil in the hook appropriately.
		1-B) The hook is defective. (The thread is caught in the hook, the thread path is defective, etc.)	Replace the hook, or correct the thread path.
	22-2) Bobbin or bobbin case is defective.	2-A) Bobbin fails to properly engage with the bobbin case, the bobbin thread to be caught in the bobbin or bobbin case.	Replace the bobbin or bobbin case with a new one.
		2-B) Bobbin has not been properly wound with thread, the bobbin thread to be caught in the bobbin or bobbin case.	Adjust the tension of the bobbin winder thread tension or adjust the position of the bobbin winder thread tension controller.
		2-C) Bobbin thread runs idle in the bobbin case.	Increase the pressure of the idling prevention spring.
		2-D) Tension adjusting spring of the bobbin case is defective.	Replace the bobbin case with a new one.
		2-E) Setting direction of bobbin into bobbin case is improper.	Refer to "Bobbin case with idle-prevention spring".
	22-3) Needle thread or bobbin thread tension is too low.		Increase the tension.
	22-4) Thread take-up spring has been improperly adjusted.	4-A) Thread take-up spring fails to properly come in contact with the thread breakage detecting plate.	Adjust the thread breakage detecting plate so that the thread take-up spring comes in proper contact with the plate.
		4-B) Stroke of the thread take-up spring is too small or too large.	Adjust the stroke.
		4-C) Tension of the thread take-up spring is too high or too low.	Adjust the tension.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	22-5) Thread path is defective.	5-A) Thread path is not smooth.	Smoothly finish the thread path.
		5-B) Thread path has scratches.	Smoothly finish the thread path.
		5-C) Thread is caught in the thread path.	Properly thread the thread path.
	22-6) The material flops.		Refer to the description of "Work clamp failure causes the material to flop" given under "16. Puckering".
	22-7) Stroke of the thread take-up lever is too large.		Move the arm thread guide A to the right so as to reduce the amount of thread to be fed by the thread take-up lever.
	22-8) Sewing speed of rise is too high.	8-A) Sewing speed at the sewing start is too high.	Preset value of sewing speed at the sewing start is lowered.

(2) Electrical components

WARNING :
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. If the work is performed while the power is ON, never touch other than necessary parts.

Trouble	Cause (1)	Cause (2)	Check and corrective measures
1. No display at the operation panel.	1-1) DC power (+5V, +24V) is not supplied to the operation pane.	1-A) AC power is not supplied.	Examine if a power supply is available at the power switch. When the blower motor is operating, check whether the emergency stop switch is pushed.
		1-B) The FLT board has no power supply.	Check the voltage of pins 4-5 of CN1 of the FLT board. If no voltage is found, check the connections around the power switch or the power plug.
		1-C) The SDC board has no power supply. (The power supply is is available so long as LED2 of the SDC board is lit.)	Check the connection of CN1 of FLT board.
			Check the connection between CN2 of the FLT board and CN17 of the SDC board.
			Check the resistance of the protection circuit of the FLT board. FLT-T board : R2, R3 FLT-S board : R1
		1-D) The MAIN board has no power supply.	Check the voltage of CN31 of the MAIN board. 1 : +85V 2 : +33V 3 : +24V 4 : +12V 5 : +5V 6, 7, 8, 9, 10 : GND Check if there is short circuit in the +5V power system for the MAIN board.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	1-E) The operation panel has no power supply.	Check if there is short circuit in the +24V power system for the MAIN board.
			Check the connection between CN34 of the MAIN board and the operation panel.
	1-2) Detection of a momentary interruption in the SDC board. LED1 on SDC board: Flashing 9 times	2-A) No momentary interruption sensor signal input is entered in the SDC board.	Check the connection between CN3 of the FLT board and CN13 of the SDC board.
		2-B) No AC voltage is available between Pins 4-5 of CN1 in the FLT board. (In case of FLT-T board)	When a sewing machine for 3-phase specifications is used in a 1-phase system, connect the power supply to black and white of the power cord led from the box.
2. Key malfunction on the operation panel It does not function so effectively.	2-1) There is no signal from the IP-420 touch panel.	1-A) Connector connection defective	Check the connection between the touch panel and CN109 of the IP panel board.
		1-B) The switch position of the touch panel is displaced.	Start the Check Program I01 and readjust the switch position.
		1-C) Touch panel fault	Replacement of the LCD asm. (40086541)
3. Error E007 Machine lock LED1 on SDC board: Flashing 1 times	3-1) The main shaft motor of the sewing machine cannot rotate.	1-A) No power is fed to the motor.	Check the connection of CN16 of SDC board. Check the connection of the relay connector CN101.
		1-B) The mechanism is locked.	Turn it by hand in the state that the power supply is turned OFF. Confirm whether the upper shaft is locked. If there is any abnormality, remove it.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
		1-C) The driver circuit is out of order.	Replace the SDC board.
		1-D) The motor is out of order.	Measure the resistance of the motor winding. If there is any abnormality to 2.03Ω of rated resistance of the winding, replace the motor.
4. Error E029 Media slot open error	4-1) The switch signal is not received.	1-A) The slot OPEN-CLOSE switch is not pressed.	Check the cover to examine whether the switch pin can be pressed. If there is any abnormality, replace the cover.
5. Error E030 Needle bar position missing error	5-1) It cannot stop in upper position.	1-A) The servo lock is not effective.	Turn it by hand in the state that the power supply is turned OFF. Confirm if there are large variations in the load.
			Replace the SDC board or the MAIN board.
6. Error E031 Air pressure drop	6-1) The air sensor switch is not turned ON.	1-A) Air pressure variation or drop	Check the air pressure and the air source.
			Check the pressure setup value of the air sensor. (0.34 MPa)
		1-B) Switch defective	Check the air switch by means of a circuit tester.
			Connector check : CN84 of the I/O3 board
7. Error E050 Temporary stop switch	7-1) The switch contact point is open.	1-A) Connector connection defective	Check CN58 of MAIN board.
		1-B) Switch defective or disconnection	Confirm the condition of the switch by using the tester. (Normal closure)

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
8. Error E303 Upper shaft motor Phase Z sensor error LED3 on SDC board: Flashing 2 times	8-1) Phase Z signal (upper shaft motor) is not received.	1-A) The encoder cord is broken or the motor encoder circuit is out of order.	Confirm whether each signal is delivered to CN14 of the SDC board. CN14_9 : Phase Z CN14_2 : GND Replace the motor if there is no signal change as a result of manual turning. (Refer to "17.-(5) Servo motor circuit diagram".)
		1-B) The detector circuit is out of order.	Replace the SDC board.
9. Error E370 Initial position error of folding unit and folding arm	9-1) Folding arm UP sensor is not detected and folding unit UP sensor is not detected.	1-A) Folding arm and folding unit is not in a normal position.	If the release button "//" of panel is pushed, the folding arm and the folding unit will return to a normal position.
		1-B) Folding arm UP sensor and folding unit UP sensor mounting position is inadequate.	Turn ON the solenoid valves V14B and V19B. Move the folding arm UP sensor and the folding unit UP sensor up and down sequentially to adjust the mounting position of the sensors while observing each sensor position with the operation indicator lamp.
		1-C) Connection of the relay cord of folding arm UP sensor and folding unit UP sensor is defective.	Check the connection of the relay cord of folding arm UP sensor and folding unit UP sensor. I/O1 board side: CN82 Sensor side: Folding arm UP sensor CN125 Folding unit UP sensor CN127
			Check whether the relay cord is disconnected.
		1-D) Folding arm UP sensor and folding unit UP sensor is defective.	Move the sensors up and down with the folding arm and the folding unit moved up to their upper positions to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor(s) remains OFF or ON at all times, replace the sensor(s) with new one(s). When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
10. Error E371 Initial position error of folding unit	10-1) Folding unit UP sensor is not detected.	1-A) Folding unit is not in a normal position.	If the release button "//" of panel is pushed, the folding unit will return to a normal position.
		1-B) Folding unit UP sensor mounting position is inadequate.	Turn ON the solenoid valve V14B. Move the folding unit UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-C) Connection of the relay cord of folding unit UP sensor is defective.	Check the connection of the relay cord of folding unit UP sensor. I/O1 board side: CN82 Sensor side: Folding unit UP sensor CN127
			Check whether the relay cord is disconnected.
		1-D) Folding unit UP sensor is defective.	Move the sensors up and down with the folding unit moved up to their upper position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
11. Error E372 Initial position error of folding arm	11-1) Folding arm UP sensor is not detected.	1-A) Folding arm is not in a normal position.	If the release button "//" of panel is pushed, the folding arm will return to a normal position.
		1-B) Folding arm UP sensor mounting position is inadequate.	Turn ON the solenoid valve V19B. Move the folding arm UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-C) Connection of the relay cord of folding arm UP sensor is defective.	Check the connection of the relay cord of folding arm UP sensor. I/O1 board side: CN82 Sensor side: Folding arm UP sensor CN125
			Check whether the relay cord is disconnected.
		1-D) Folding arm UP sensor is defective.	Move the sensor up and down with the folding arm moved up to their upper position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
12. Error E373 Stacker position error (Stacker is not opened.)	12-1) Stacker FRONT sensor is not detected.	1-A) The stacker is not opened in its initial state when the stacker is placed in the "USE" mode.	If the release button "//" of panel is pushed, the stacker will return to a normal position.
		1-B) Stacker FRONT sensor mounting position is inadequate.	Turn ON the solenoid valve V8. Move the stacker FRONT sensor back and forth to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-C) Connection of the relay cord of stacker FRONT sensor is defective.	Check the connection of the relay cord of stacker FRONT sensor. I/O2 board side: CN84 Sensor side: Stacker FRONT sensor CN138
			Check whether the relay cord is disconnected.
		1-D) Stacker FRONT sensor is defective.	Move the stacker FRONT sensor back and forth when the stacker FRONT and the stacker REAR is opened to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O2 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
13. Error E374 Stacker position error (Stacker is not closed.)	13-1) Stacker REAR sensor is not detected.	1-A) The stacker is not closed in its initial state when the stacker is placed in the "NOT USE" mode.	If the release button "//" of panel is pushed, the stacker will return to a normal position.
		1-B) Stacker REAR sensor mounting position is inadequate.	Turn ON the solenoid valve V7. Move the stacker REAR sensor back and forth to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-C) Connection of the relay cord of stacker REAR sensor is defective.	Check the connection of the relay cord of stacker REAR sensor. I/O2 board side: CN84 Sensor side: Stacker REAR sensor CN137
			Check whether the relay cord is disconnected.
		1-D) Stacker REAR sensor is defective.	Move the stacker REAR sensor back and forth when the stacker FRONT and the stacker REAR is opened to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O2 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
14. Error E390 Connecting position error of I/O connector	14-1) Connection of I/O board communication cord and MAIN board is wrong.	1-A) Connection of CN44, CN45 and CN46 of MAIN board is wrong.	Check the connection of CN44, CN45 and CN46 of MAIN board in the state that the power supply is turned OFF.
		1-B) Connection of CN81 of I/O1 board, I/O2 board and I/O3 board is wrong.	Check the connection of CN81 of I/O1 board, I/O2 board and I/O3 board in the state that the power supply is turned OFF.
	14-2) Setting of the ID cord of I/O board is wrong.	2-A) Setting of the DIPSW1 of I/O board is wrong.	Check the setting of DIPSW1_1 and SW1_2 of I/O board. I/O1: SW1_1 ON, SW1_2 ON I/O2: SW1_1 OFF, SW1_2 ON I/O3: SW1_1 ON, SW1_2 OFF
15. Error E392 Detection error of presser arm UP sensor	15-1) Cloth presser (large) UP sensor is not detected.	1-A) Cloth presser (large) UP sensor mounting position is inadequate.	Turn ON the solenoid valve V15. Move the cloth presser (large) UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of cloth presser (large) UP sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of cloth presser (large) UP sensor. Sensor side: CN132 I/O3 board side: CN86
		1-C) Cloth presser (large) UP sensor is defective.	Move the sensor up and down with the presser (large) moved up to their upper position to check whether the operation indicator lamp lights up and goes out.
	15-2) Cloth presser (large) does not move or a motion of cloth presser (large) is late.	2-A) Adjustment of the speed controller of cloth presser (large) cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of cloth presser (large) solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V15 are connected to 1-pin and 2-pin of I/O3 board CN89.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	2-C) Cloth presser (large) solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V15 with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 2-pin with CN89 of the I/O3 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O3 board with a new one.
	15-3) Cloth presser DOWN sensor has detected.	3-A) Cloth presser DOWN sensor is defective.	Move the cloth presser DOWN sensor up and down with the cloth presser (large) moved up to lower position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O3 board with a new one.
16. Error E393 Detection error of presser arm DOWN sensor	16-1) Cloth presser (large) DOWN sensor is not detected.	1-A) Cloth presser (large) DOWN sensor mounting position is inadequate.	Turn ON the solenoid valve V15. Move the cloth presser (large) UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of cloth presser (large) DOWN sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of cloth presser (large) DOWN sensor. Sensor side: CN133 I/O3 board side: CN86
		1-C) Cloth presser (large) DOWN sensor is defective.	Move the sensor up and down with the presser (large) moved up to their lower position to check whether the operation indicator lamp lights up and goes out.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	16-2) Cloth presser (large) does not move or a motion of cloth presser (large) is late.	2-A) Adjustment of the speed controller of cloth presser (large) cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of cloth presser (large) solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V15 are connected to 1-pin and 2-pin of I/O3 board CN89.
		2-C) Cloth presser (large) solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V15 with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 2-pin with CN89 of the I/O3 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O3 board with a new one.
	16-3) Cloth presser DOWN sensor has detected.	3-A) Cloth presser DOWN sensor is defective.	Move the cloth presser DOWN sensor up and down with the cloth presser (large) moved up to lower position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O3 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
17. Error E394 Detection error of folding arm UP sensor	17-1) Folding arm UP sensor is not detected.	1-A) Folding arm UP sensor mounting position is inadequate.	Turn ON the solenoid valve V19B. Move the folding arm UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of folding arm UP sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of folding arm UP sensor. Sensor side: CN125 I/O1 board side: CN82
		1-C) Folding arm UP sensor is defective.	Move the sensor up and down with the folding arm moved up to their upper position to check whether the operation indicator lamp lights up and goes out.
	17-2) Folding arm does not move or a motion of folding arm is late.	2-A) Adjustment of the speed controller of folding arm cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of folding arm UP solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V19B are connected to 7-pin and 8-pin of I/O1 board CN89.
		2-C) Folding arm UP solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V19B with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 8-pin with CN89 of the I/O1 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	17-3) Folding arm DOWN sensor has detected.	3-A) Folding arm DOWN sensor is defective.	Move the folding arm DOWN sensor up and down with the folding arm moved up to lower position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.
18. Error E395 Detection error of folding arm DOWN sensor	18-1) Folding arm DOWN sensor is not detected.	1-A) Folding arm DOWN sensor mounting position is inadequate.	Turn ON the solenoid valve V19A. Move the folding arm DOWN sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of folding arm DOWN sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of folding arm DOWN sensor. Sensor side: CN126 I/O1 board side: CN82
		1-C) Folding arm DOWN sensor is defective.	Move the sensor up and down with the folding arm moved up to their lower position to check whether the operation indicator lamp lights up and goes out.
	18-2) Folding arm does not move or a motion of folding arm is late.	2-A) Adjustment of the speed controller of folding arm cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of folding arm DOWN solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V19A are connected to 3-pin and 4-pin of I/O1 board CN89.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	2-C) Folding arm DOWN solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V19A with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 4-pin with CN89 of the I/O1 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O1 board with a new one.
	18-3) Folding arm UP sensor has detected.	3-A) Folding arm UP sensor is defective.	Move the folding arm UP sensor up and down with the folding arm moved up to upper position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.
19. Error E396 Detection error of folding unit UP sensor	19-1) Folding unit UP sensor is not detected.	1-A) Folding unit UP sensor mounting position is inadequate.	Turn ON the solenoid valve V14B. Move the folding arm UP sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of folding unit UP sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of folding unit UP sensor. Sensor side: CN127 I/O1 board side: CN82
		1-C) Folding unit UP sensor is defective.	Move the sensor up and down with the folding unit moved up to their upper position to check whether the operation indicator lamp lights up and goes out.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	19-2) Folding unit does not move or a motion of folding unit is late.	2-A) Adjustment of the speed controller of folding unit cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of folding unit UP solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V14B are connected to 9-pin and 10-pin of I/O1 board CN89.
		2-C) Folding unit UP solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V14B with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 10-pin with CN89 of the I/O1 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O1 board with a new one.
	19-3) Folding unit DOWN sensor has detected.	3-A) Folding unit DOWN sensor is defective.	Move the folding unit DOWN sensor up and down with the folding unit moved up to lower position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
20. Error E397 Detection error of folding unit DOWN sensor	20-1) Folding unit DOWN sensor is not detected.	1-A) Folding unit DOWN sensor mounting position is inadequate.	Turn ON the solenoid valve V14A. Move the folding unit DOWN sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of folding unit DOWN sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of folding unit DOWN sensor. Sensor side: CN128 I/O1 board side: CN82
		1-C) Folding unit DOWN sensor is defective.	Move the sensor up and down with the folding unit moved up to their lower position to check whether the operation indicator lamp lights up and goes out.
	20-2) Folding unit does not move or a motion of folding unit is late.	2-A) Adjustment of the speed controller of folding unit cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of folding unit DOWN solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V14A are connected to 5-pin and 6-pin of I/O1 board CN89.
		2-C) Folding unit DOWN solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V14A with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 6-pin with CN89 of the I/O1 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O1 board with a new one.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	20-3) Folding unit UP sensor has detected.	3-A) Folding unit UP sensor is defective.	Move the folding unit UP sensor up and down with the folding unit moved up to upper position to check whether the operation indicator lamp lights up and goes out. If the operation indicator lamp of the sensor remains OFF or ON at all times, replace the sensor with a new one. When the sensor operation indicator lamp is able to light up and go out, replace the I/O1 board with a new one.
21. Error E398 Detection error of stacker cloth brush completion sensor	21-1) Stacker cloth brush completion sensor is not detected.	1-A) Stacker cloth brush completion sensor mounting position is inadequate.	Turn ON the solenoid valve V6. Move the stacker cloth brush completion sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of stacker cloth brush completion sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of stacker cloth brush completion sensor. Sensor side: CN135 I/O2 board side: CN82
		1-C) Stacker cloth brush completion sensor is defective.	Move the sensor up and down with the stacker cloth brush bar moved up to cloth brush end position to check whether the operation indicator lamp lights up and goes out.
	21-2) Stacker cloth brush bar does not move or a motion of stacker cloth brush bar is late.	2-A) Adjustment of the speed controller of stacker cloth brush cylinder is defective.	Adjust the speed controller.
		2-B) Connection of the relay cord of stacker cloth brush solenoid valve is defective or disconnect.	Check that the red and black lines of the solenoid valve V6 are connected to 5-pin and 6-pin of I/O2 board CN87.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
		2-C) Stacker cloth brush solenoid valve is defective.	Measure the resistance value between the terminals of the solenoid valve V6 with the power turned OFF. In the case the resistance value is 0.2 kΩ to 2 kΩ, turn the power ON and select the step operation. In this state, check the voltage of the 6-pin with CN87 of the I/O2 board connected. In the case the voltage changes at the time of output, replace the solenoid valve with a new one. In the case, the voltage does not change, replace the I/O2 board with a new one.
22. Error E399 Detection error of stacker cloth brush initial position sensor	22-1) Stacker cloth brush initial position sensor is not detected.	1-A) Stacker cloth brush initial position sensor mounting position is inadequate.	Turn OFF the solenoid valve V6. Move the stacker cloth brush initial position sensor up and down to adjust the mounting position of the sensor while observing sensor position with the operation indicator lamp.
		1-B) Connection of the relay cord of stacker cloth brush initial position sensor is defective or disconnect.	Check the connection and disconnection of the relay cord of stacker cloth brush initial position sensor. Sensor side: CN134 I/O2 board side: CN82
		1-C) Stacker cloth brush initial position sensor is defective.	Move the sensor up and down with the stacker cloth brush bar moved up to cloth brush initial position to check whether the operation indicator lamp lights up and goes out.
23. Error E703 Panel is connected to the sewing machine which is not supposed. (Machine type error)	23-1) In MAIN board, panel board and SDC board, the board in which the program of a different model was written was connected.		Rewrite program after pressing down communication switch.
24. Error E704 Inconsistency of system version	24-1) There is no compatibility in the version of the panel program, the main program, and the servo program.		Rewrite program after pressing down communication switch.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
25. Error E730 Main shaft motor encoder error A LED3 on SDC board: Flashing 3 times	25-1) No signal entry in phase A and phase B of main shaft motor.	1-A) The motor is out of order.	Check the connection of connector CN102 of encoder relay cord. Confirm whether each signal is delivered to CN14 of the SDC board. CN14_6: Phase A CN14_7: Phase B CN14_2: GND Replace the motor if there is no signal change as a result of manual turning.
		1-B) The signal input circuit is out of order.	Replace the SDC board.
26. Error E731 Main shaft motor hole sensor/position sensor error LED3 on SDC board: Flashing 4 times	26-1) No signal entry in phase U, phase V, and phase W of main shaft motor.	1-A) The motor is out of order.	Check the connection of connector CN102 of encoder relay cord. Confirm whether each signal is delivered to CN14 of the SDC board. CN14_3: Phase U CN14_4: Phase V CN14_5: Phase W CN14_2: GND Replace the motor if there is no signal change as a result of manual turning.
		1-B) The signal input circuit is out of order.	Replace the SDC board.
27. Error E733 Main shaft motor reverse turn error LED3 on SDC board: Flashing 7 times	27-1) The main shaft motor is reversing.	1-A) Motor revolutions are unstable.	Check whether coupling for connection of main shaft and motor is loose.
			Replace the motor.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
28. Error E782 PDET signal fault	28-1) The PDET signal was received except nearly 0° of "TG".	1-A) Connection of the communication cord of SDC board and MAIN board is defective or disconnect.	Check the connection of SDC board CN15 and MAIN board CN32. Check the disconnection of the communication cord.
		1-B) The SDC board is out of order.	Replace the SDC board.
29. Error E797 I/O board is not connected.	29-1) The connecting cord is not connected to I/O board or disconnect.		Check the connection of CN44, CN45, CN46 of MAIN board. Check the connection of CN81 of I/O1 board, I/O2 board and I/O3 board.
	29-2) The I/O board is out of order.		Replace the I/O1 board, I/O2 board and I/O3 board sequentially.
	29-3) The MAIN board is out of order.		Replace the MAIN board.
30. Error E798 I/O address duplication	30-1) The ID code setup of the I/O board has overlapped.	1-A) Setting of the DIPSW of I/O board is wrong.	Check the setting of DIPSW of I/O board. IO1: SW1_1 ON, SW1_2 ON IO2: SW1_1 OFF, SW1_2 ON IO3: SW1_1 ON, SW1_2 OFF
	30-2) The I/O board is out of order.		Replace the I/O1 board, I/O2 board and I/O3 board sequentially.
	30-3) The MAIN board is out of order.		Replace the MAIN board.
31. Error E802 Power electrical discontinuity detection	31-1) Electrical discontinuity of AC power supply input is detected.	1-A) There is electrical discontinuity of AC power supply input.	Check the cause which electrical discontinuity generated to AC power supply input.
32. Error E811 Overvoltage error LED3 on SDC board: Flashing 8 times	32-1) Power source voltage is beyond AC 280V.	1-A) There are variations or unusual rise in the AC input power line.	Check the AC input power line.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
33. Error E813 Low voltage error LED3 on SDC board: Flashing 6 times	33-1) The source voltage is AC 160V or below.	1-A) There are variations or unusual drop in the AC input power line.	Check the AC input power line.
		1-B) 100V input is entered where the FLT-T board has been set for 200V.	Check the preset voltage for the FLT-T board.
34. Error E901 IPM Error LED3 on SDC board: Flashing 5 times	34-1) Error output generation from IPM in the SDC board	1-A) IPM control voltage drop	Replace the SDC board.
		1-B) IPM overcurrent is detected.	Measure the resistance of the motor winding. If there is any abnormality to 2.03Ω of rated resistance of the winding, replace the motor.
			Replace the SDC board.
35. Error E903 Abnormality of pulse motor power source LED3 on SDC board: Flashing 11 times	35-1) No +85V power output of the SDC board available.	1-A) Blown-out of the F1 fuse of the SDC board.	Check if there is short circuit in the +85V power system for the MAIN board. Replace the MAIN board.
		1-B) Blown-out of the F4 fuse of the SDC board.	Replace the SDC board.
	35-2) +85V power supply of SDC board is changed not less than ±15%.	2-A) The power supply circuit is out of order.	Replace the SDC board.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
36. Error E904 Abnormality of solenoid power source LED3 on SDC board: Flashing 12 times	36-1) No +33V power output of the SDC board available.	1-A) Blown-out of the F2 fuse of the SDC board.	Check if there is short circuit in the +33V power system for the MAIN board. Replace the MAIN board.
		1-B) Blown-out of the F5 fuse of the SDC board.	Replace the SDC board.
37. Error E905 Abnormality temperature of heat sink on SDC board LED3 on SDC board: Flashing 13 times	37-1) Heat sink temperature for power supply on SDC board has exceeded 85°C.	1-A) Cooling is not effective.	Check for any clogging at the suction port or examine the conditions in the fan, etc.
	37-2) Temperature of main shaft IPM has exceeded 90°C.	2-A) Cooling is not effective.	Check for any clogging at the suction port or examine the conditions in the fan, etc.
		2-B) Sensor connection defective	Check CN18 of SDC board.
		2-C) The main shaft motor is out of order.	Measure the resistance of the upper shaft motor winding. Replace the motor.
38. Error E907 X feed motor origin retrieval error	38-1) Irregular motor rotations	1-A) There are irregularities in the mechanism, such as overloading, etc.	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
		1-B) The motor is out of order or the motor leads are broken.	Check the resistance of the motor winding. Replace the motor, as required.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	1-C) Connection of the relay cord of the motor or the encoder is defective.	Check the MAIN board CN53 ⇔ the X motor encoder. Check the connection of the relay connector CN103.
			Check the MAIN board CN40 ⇔ the motor. Check the connection of the relay connector CN104.
		1-D) The driver circuit is out of order.	Replace the MAIN board.
	38-2) Either "X origin" or "X1 sensor" is not inputted.	2-A) The sensor is out of order or broken.	Check the item 15 and item 19 by the sensor check mode "I03" of the panel.
		2-B) Connector connection defective	Check the connection of the relay cord. X origin sensor: CN143 X1 sensor: CN144 I/O3 board side: CN85
		2-C) Input circuit is out of order.	Replace the I/O3 board.
39. Error E908 Y feed motor origin retrieval error	39-1) Irregular motor rotations	1-A) There are irregularities in the mechanism, such as overloading, etc.	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
		1-B) The motor is out of order or the motor leads are broken.	Check the resistance of the motor winding. Replace the motor, as required.
		1-C) Connection of the relay cord of the motor or the encoder is defective.	Check the MAIN board CN54 ⇔ the Y motor encoder. Check the connection of the relay connector CN105.
			Check the MAIN board CN41 ⇔ the motor. Check the connection of the relay connector CN106.
		1-D) The driver circuit is out of order.	Replace the MAIN board.
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	39-2) Either "Y origin" or "Y1 sensor" or "Y2 sensor" is not inputted.	2-A) The sensor is out of order or broken.	Check the item 16, item 20 and item 21 by the sensor check mode "I03" of the panel.
		2-B) Connector connection defective	Check the connection of the relay cord. Y origin sensor: CN140 Y1 sensor: CN141 Y2 sensor: CN142 I/O3 board side: CN83
		2-C) Input circuit is out of order.	Replace the I/O3 board.
40. Error E911 Bobbin thread trimming motor origin retrieval error	40-1) Irregular motor rotations	1-A) There are irregularities in the mechanism, such as overloading, etc.	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
		1-B) The motor is out of order or the motor leads are broken.	Measure the resistance of the motor winding. If there is any abnormality to 0.45Ω of rated resistance of the winding, replace the motor.
		1-C) Connection of the relay cord of the motor or the encoder is defective.	Check the MAIN board CN56 ⇔ the thread trimming motor encoder. Check the connection of the relay connector CN109.
			Check the MAIN board CN43 ⇔ the motor. Check the connection of the relay connector CN110.
		1-D) The driver circuit is out of order.	Replace the MAIN board.
	40-2) Bobbin thread trimming motor origin sensor is not detected.	2-A) The sensor is out of order or broken.	Check the item 17 by the sensor check mode "I03" of the panel.
		2-B) Connector connection defective	Check the connection of the relay cord. Thread trimming origin sensor: CN124 I/O2 board side: CN83
		2-C) Input circuit is out of order.	Replace the I/O2 board.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
41. Error E915 Communication error between the PANEL and MAIN boards	41-1) Data cannot be received from the MAIN board.	1-A) Connection of the relay cord of the panel and the MAIN board is defective.	Check the connection of the MAIN board CN34.
		1-B) MAIN board fails to work.	All the DIPSW of the MAIN board shall be set at OFF.
		1-C) Board defective	Replace the MAIN board or PANEL board.
42. Error E916 Communication error between the SDC and MAIN boards LED3 on SDC board: Flashing 15 times	42-1) Data cannot be received from the SDC board.	1-A) Connection of the relay cord of the SDC board and the MAIN board is defective.	Check the connection of the MAIN board CN32 and the SDC board CN15.
		1-B) MAIN board fails to work.	All the DIPSW of the MAIN board shall be set at OFF.
		1-C) SDC board fails to work.	All the DIPSW2 of the SDC board shall be set at OFF.
		1-D) Board defective	Replace the MAIN board or SDC board.
43. Error E918 MAIN board overheat	43-1) Heat sink temperature on MAIN board has exceeded 85°C.	1-A) Cooling is not effective.	Check for any clogging at the suction port or examine the conditions in the fan, etc.
		1-B) The FAN motor does not operate.	Check the operation of the two FAN motors. Replace the FAN motor, as required.
44. Error E928 Thread trimming motor position slip error	44-1) The deviation of the motor position and an instruction position exceeded tolerance level.	1-A) Irregular motor rotations	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
			Measure the resistance of the motor winding. If there is any abnormality to 0.45Ω of rated resistance of the winding, replace the motor.
			Replace the MAIN board.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
		1-B) The motor position cannot be read correctly.	Replace the MAIN board.
			Replace the encoder.
45. Error E931 Overload error of X motor	45-1) The deviation of the motor position and an instruction position exceeded tolerance level.	1-A) Irregular motor rotations	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
			Measure the resistance of the motor winding. If there is any abnormality to 0.46Ω of rated resistance of the winding, replace the motor.
			Replace the MAIN board.
		1-B) The motor position cannot be read correctly.	Replace the MAIN board.
			Replace the encoder.
46. Error E932 Overload error of Y motor	46-1) The deviation of the motor position and an instruction position exceeded tolerance level.	1-A) Irregular motor rotations	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
			Measure the resistance of the motor winding. If there is any abnormality to 0.46Ω of rated resistance of the winding, replace the motor.
			Replace the MAIN board.
		1-B) The motor position cannot be read correctly.	Replace the MAIN board.
			Replace the encoder.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
47. Error E933 Overload error of thread trimming motor	47-1) The deviation of the motor position and an instruction position exceeded tolerance level.	1-A) Irregular motor rotations	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
			Measure the resistance of the motor winding. If there is any abnormality to 0.45Ω of rated resistance of the winding, replace the motor.
			Replace the MAIN board.
		1-B) The motor position cannot be read correctly.	Replace the MAIN board.
			Replace the encoder.
48. Error E943 MAIN board failure			Replace the MAIN board.
49. Error E992 Pattern board longitudinal motor origin retrieval error	49-1) Irregular motor rotations	1-A) There are irregularities in the mechanism, such as overloading, etc.	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
		1-B) The motor is out of order or the motor leads are broken.	Measure the resistance of the motor winding. If there is any abnormality to 0.45Ω of rated resistance of the winding, replace the motor.
		1-C) Connection of the relay cord of the motor or the encoder is defective.	Check the MAIN board CN57 ⇔ the thread trimming motor encoder. Check the connection of the relay connector CN107.
			Check the MAIN board CN42 ⇔ the motor. Check the connection of the relay connector CN108.
		1-D) The driver circuit is out of order.	Replace the MAIN board.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	49-2) Pattern board origin sensor is not detected.	2-A) The sensor is out of order or broken.	Check the item 18 by the sensor check mode "I03" of the panel.
		2-B) Connector connection defective	Check the connection of the relay cord. Thread trimming origin sensor: CN129 I/O1 board side: CN83
		2-C) Input circuit is out of order.	Replace the I/O1 board.
50. Error E994 Pattern board longitudinal motor step-out detection	50-1) The deviation of the motor position and an instruction position exceeded tolerance level.	1-A) Irregular motor rotations	Check the mechanism and look for the section that is particularly overloaded or that is any holdup, etc.
			Measure the resistance of the motor winding. If there is any abnormality to 0.45Ω of rated resistance of the winding, replace the motor.
			Replace the MAIN board.
		1-B) The motor position cannot be read correctly.	Replace the MAIN board.
			Replace the encoder.

(3) Folding components

WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
1. The pocket cloth cannot be folded in.	The folding blade operates at the upper side of the pattern board.		
	1-1) Folding can be done in step mode.	1-A) The folding base plate damping is too large.	Adjust the folding arm cylinder speed controllers and air cushions to suppress the damping. <How to check> Remove the pattern board and changed into the state of origin position and turn off the power supply. In this condition, press the orange button on solenoid valve V19A and V19B to move the folding unit up and down and check the damping.
		1-B) The folding arm cylinder auto switch is in the wrong position.	Move the auto switch to the lower position. If it is moved too far to the rear, it will not be possible for the cylinder rod end to be detected causing a sensor error (Error E397) to occur, so use caution.
	1-2) Folding cannot be done in step mode.	2-A) Position of the pocket cloth presser plate is improperly.	If the pocket cloth presser plate is not in the correct position with respect to the pattern board, loosen the pocket holder positioning plate setscrews and re-adjust it to the correct position.
			Adjust the pocket cloth presser plate position so that the pocket cloth presser plate will not contact the longitudinal folding plate.

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WARNING :
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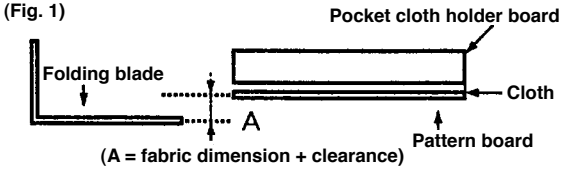
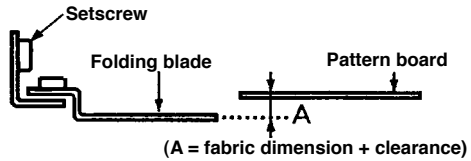
Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page	From the previous page	2-B) The pattern board is pushed down too far by the pocket cloth presser.	Loosen the pocket holder positioning plate setscrews, then adjust the pocket cloth presser plate in the following diagram. (Fig. 1)  **(Caution) When loosening screws and nuts, match the outer circumferences of the pattern board and the pocket cloth presser plate. If these are not matched, the bulged pocket and out of shape can be caused.**
		3-A) The folding cylinder fails to operate.	Check the crease folding timing by "folding unit setting button" on the sewing screen of IP panel.
		3-B) The pattern board and folding blade heights are not matched.	Loosen the setscrew, and lower the folding blade. (Fig. 2)  If dimension "A" is too small, the cloth might be damaged, so use caution.
		3-C) The folding blades contact each other	Adjust the position so that they will not contact each other.
		3-D) The pattern board is bent downward.	Straighten the pattern board and set to the dimensions shown in Fig. 2.

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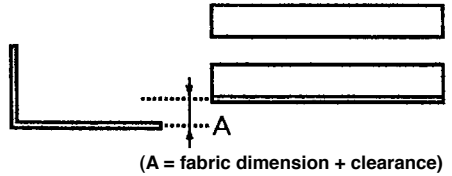
Trouble	Cause (1)	Cause (2)	Check and corrective measures
2. Folding fails to produce the desired shape.	2-1) The gap between the pattern board and the folding blades is too large.		Loosen the setscrew, and raise the folding blades. (Fig. 3)  (A = fabric dimension + clearance) Set so as to reduce dimension "A". **(Caution) If dimension "A" is too small, faulty folding can be caused.**
			Loosen the pocket holder positioning plate setscrews, then adjust the height of the pocket cloth presser plate.
	2-2) The folding blades are catching on something.		Remove all objects catching on both upper and lower blades, then buff.
	2-3) The presser plate is out of position.		Loosen the work clamp mounting plate setscrew and match the pattern board to the outer circumference.
			Loosen the folding positioning setscrews and the one-touch lock plate setscrews, and adjust the gap between the pattern board and the cloth presser plate and match the outer circumference of the pattern board and the presser plate.
	2-4) The folding margin is too large or too small.		Set the folding margin to 12 to 15 mm. ★ Folding margin is too large : Folding not possible; problems such as sticking out of the fold at the R section, etc. will occur. ★ Folding margin is too small : The edge width at the R section tends to broaden.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures

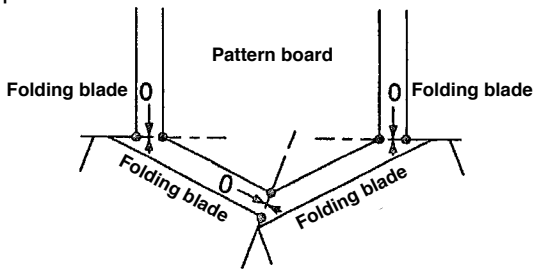
From the previous page

2-5) The relation between the heights of the 2 folding blades is not proper.

Check the crease folding timing by "folding unit setting button" on the sewing screen of IP panel.

2-6) The positions of the pattem board and the folding blades are not matched.

Consider the case of a pointed end pattem. If the dimensions are not as shown below, it will be difficult to produce a sharp fold.



Loosen the folding blade setscrews or the folding cylinder setscrews and adjust so that the relations between the pattern board and the folding blades are as shown above.

2-7) There is a gap between the folding blades.

Close the gap between the folding blades as small as possible so that they come in contact in a plane.

2-8) The folding timing is not matched.

Check the crease folding timing by "folding unit setting button" on the sewing screen of IP panel.

WARNING :
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Trouble	Cause (1)	Cause (2)	Check and corrective measures
3. The pocket cloth is swollen.	3-1) The folding margin is too small.		Set the folding margin to 12 to 15 mm.
	3-2) There are burrs on the foloding blades.		Buff the folding blades.
	3-3) The presser plate position and the pattern board position is not proper.		Loosen the presser plate mounting plate setscrews, and adjust the position.
	3-4) The folding timing is not correct.		Check the crease folding timing by "folding unit setting button" on the sewing screen of IP panel.
	3-5) The pattern board is bent.		Straighten the pattern board, and adjust so that it is parallel to the table surface.
4. The pocket opening folding is defective. (cannot be folded.)	4-1) The folding margin is too small.		Loosen the pocket opening folding cylinder setscrew, and increase the folding blade insertion amount.
	4-2) The pocket opening folding plate is out of position.	2-A) The pocket opening folding cylinder is not mounted in the correct position.	Loosen the pocket opening folding cylinder setscrew, and increase the folding blade insertion amount.
		2-B) The pocket opening folding plate initial position is incorrect.	Loosen the cylinder rod set nut, and advance the pocket opening folding plate initial position to increase the folding blade insertion amount.
	4-3) The pocket opening folding cylinder fails to operate.		Check the folding sequence.
	4-4) The folding sequence is incorrect.		Check the folding sequence.
	4-5) The pocket opening folding plate contacts the pattern board.		Check the folding blade heights.

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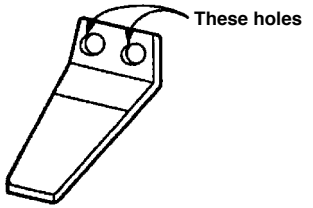
Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	4-6) The pocket opening folding blade is mounted in the wrong position in the left-right direction.		Loosen the folding blade setscrew and move the folding blade toward the operator. Loosen the folding cylinder for folding blade setscrew, and move the cylinder toward the operator. If these adjustments are insufficient, make the screw holes for the folding blade setscrews shown in the figure below long holes to expand the adjustment range. 
5. Pocket opening folding is defective (the fold goes too far).	5-1) The folding margin is too large.		Set the folding margin to 12 to 15 mm.
	5-2) The relation between the positions of the folding blade and the pocket opening folding blade is incorrect.	2-A) The relation between the positions of the folding blade and the pocket opening folding blade in the longitudinal direction is incorrect.	Loosen the folding blade setscrew and move the folding blade toward the folding unit. If this is insufficient, loosen the folding blade cylinder setscrew, and move the cylinder toward the folding unit side.
		2-B) The relation between the heights of the folding blade and the pocket opening folding blade is incorrect.	Loosen the pockect opening folding blade setscrew, and widen the gap with the folding blade.

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Trouble	Cause (1)	Cause (2)	Check and corrective measures
6. The edge width is not uniform.	6-1) The pattern is not set in the correct position.		Push the cloth presser plate in all the way, and lock.
			Push the pattern board in all the way, and lock.
	6-2) The pattern board and presser plate positions are not matched.		Select "Fold position" mode on IP panel, and adjust the edge width.
	6-3) The folding margin is too large or too small.		Setthe folding margin to 12 to 15 mm.
	6-4) The program is incorrect.		Correct the program.
7. Shift of conveyor	7-1) The cloth presser pressure is too high or too low.		Adjust the holder pressure regulator in the solenoid valve board of the case left rear to 0.2 to 0.3 MPa. (2 to 3kgf/cm^2) At this time, it is convenient to check in the threading mode. •If the pressure is too high: When the pattern board is pulled out, the garment body will be pulled out with it. In addition, during conveying the friction between the cloth and the table surface will increase, causing the cloth to be displaced out of position. •If the pressure is too low: During conveying, only the pocket cloth will be transported.
	7-2) The pattern board is catching on something.		Remove the object on which the pattem board is catching, and buff.
	7-3) The garment body is catching on something on the table surface.		Remove the object on which the table surface is catching, and buff. As a temporary measure, attach thin fluorocarbon resin tape.

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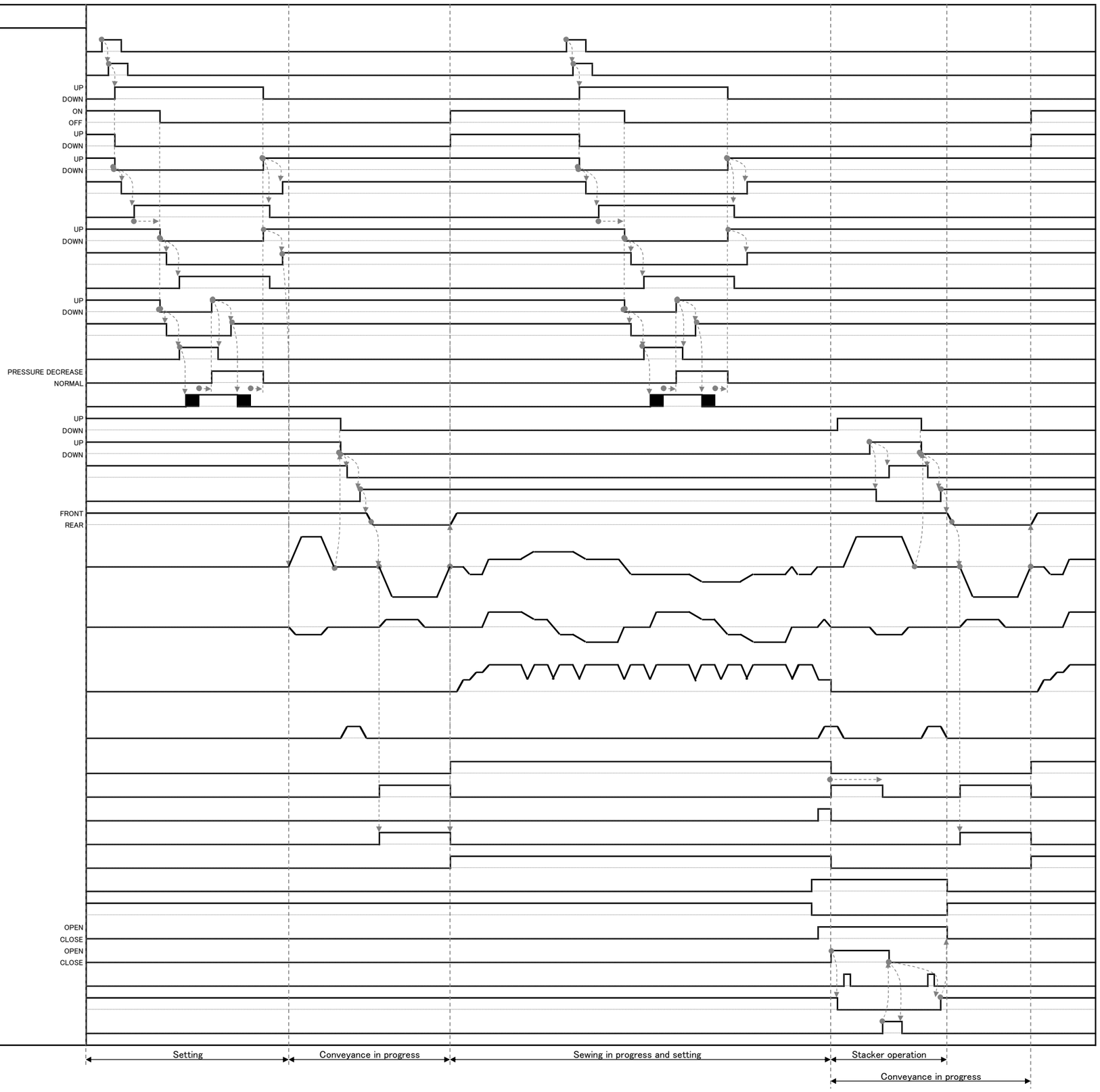
Trouble	Cause (1)	Cause (2)	Check and corrective measures
From the previous page			
	7-4) The pattern board is not completely held down by the presser plate.	4-A) The cloth presser plate is not holding the pattern board down in front.	Correct the cloth presser plate position. (If anything, the front should be pressed down a bit more strongly.)
		4-B) The cloth presser plate is not lowered far enough.	Adjust the presser plate adjustment plate height. After this adjustment, check the origin position.
8. The pocket opening folding section edge width is too wide.	8-1) The pattern board pocket positioning plate is not in the correct position.		Loosen the positioning plate setscrew, and adjust the position.
	8-2) Pocket cloth is closed down too much at the pockect opening fold.		Adjust the back-forth and up-down positions of the pocket opening folding blade so that the fold becomes loose.
			Attach fluorocarbon resin tape to the pattern board pocket opening folding section.
	8-3) The pattern is incorrect.		Correct the pattern.

16. Timing chart

Item	Input/Output	Port/Connector/ Solenoid valve No.	Board/ Solenoid valve block
Start switch 1	(Input)	IN01	I/O3 board
Start switch 2	(Input)	IN02	I/O3 board
Garment body presser	(Output)	V10	Solenoid valve block 1
Vacuum ON/OFF	(Output)	V7	Solenoid valve block 1
Pattern board	(Output)	V8	Solenoid valve block 1
Folding arm	(Output)	V19A, V19B	Solenoid valve block 1
Folding arm UP	(Input)	IN01	I/O1 board
Folding arm DOWN	(Input)	IN02	I/O1 board
Folding unit	(Output)	V14A, V14B	Solenoid valve block 1
Folding unit UP	(Input)	IN03	I/O1 board
Folding unit DOWN	(Input)	IN04	I/O1 board
Lifting table	(Output)	V13	Solenoid valve block 1
Lifting table UP	(Input)	IN08	I/O1 board
Lifting table DOWN	(Input)	IN09	I/O1 board
Lifting table pressure decrease	(Output)	V18	Solenoid valve block 1
Folding blade A1 to B	(Output)	V1 to V6	Solenoid valve block 1
Cloth presser, small (presser plate)	(Output)	V12	Solenoid valve block 1
Cloth presser, large (presser arm)	(Output)	V15	Solenoid valve block 1
Cloth presser, large (presser arm) UP	(Input)	IN13	I/O3 board
Cloth presser, large (presser arm) DOWN	(Input)	IN14	I/O3 board
Pattern board position	(Output)	CN42	MAIN board
X-axis speed	(Output)	CN40	MAIN board
Y-axis speed	(Output)	CN41	MAIN board
Machine head speed	(Output)	CN16	SDC board
Thread trimmer	(Output)	CN43	MAIN board
Work clamp plunger	(Output)	V2	Solenoid valve block 2
Thread wiper blow	(Output)	V9	Solenoid valve block 2
Picker	(Output)	V4	Solenoid valve block 2
Hook purge	(Output)	V1	Solenoid valve block 2
Needle cooler	(Output)	V9	Solenoid valve block 1
Stacker presser, rear (CLOSE)	(Output)	V7	Solenoid valve block 2
Stacker presser, front (OPEN)	(Output)	V8	Solenoid valve block 2
Stacker cloth presser	(Output)	V5	Solenoid valve block 2
Stacker cloth brush	(Output)	V6	Solenoid valve block 2
Stack full	(Input)	IN03	I/O2 board
Stacker cloth brush initial position	(Input)	IN01	I/O2 board
Stacker cloth brush completion	(Input)	IN02	I/O2 board

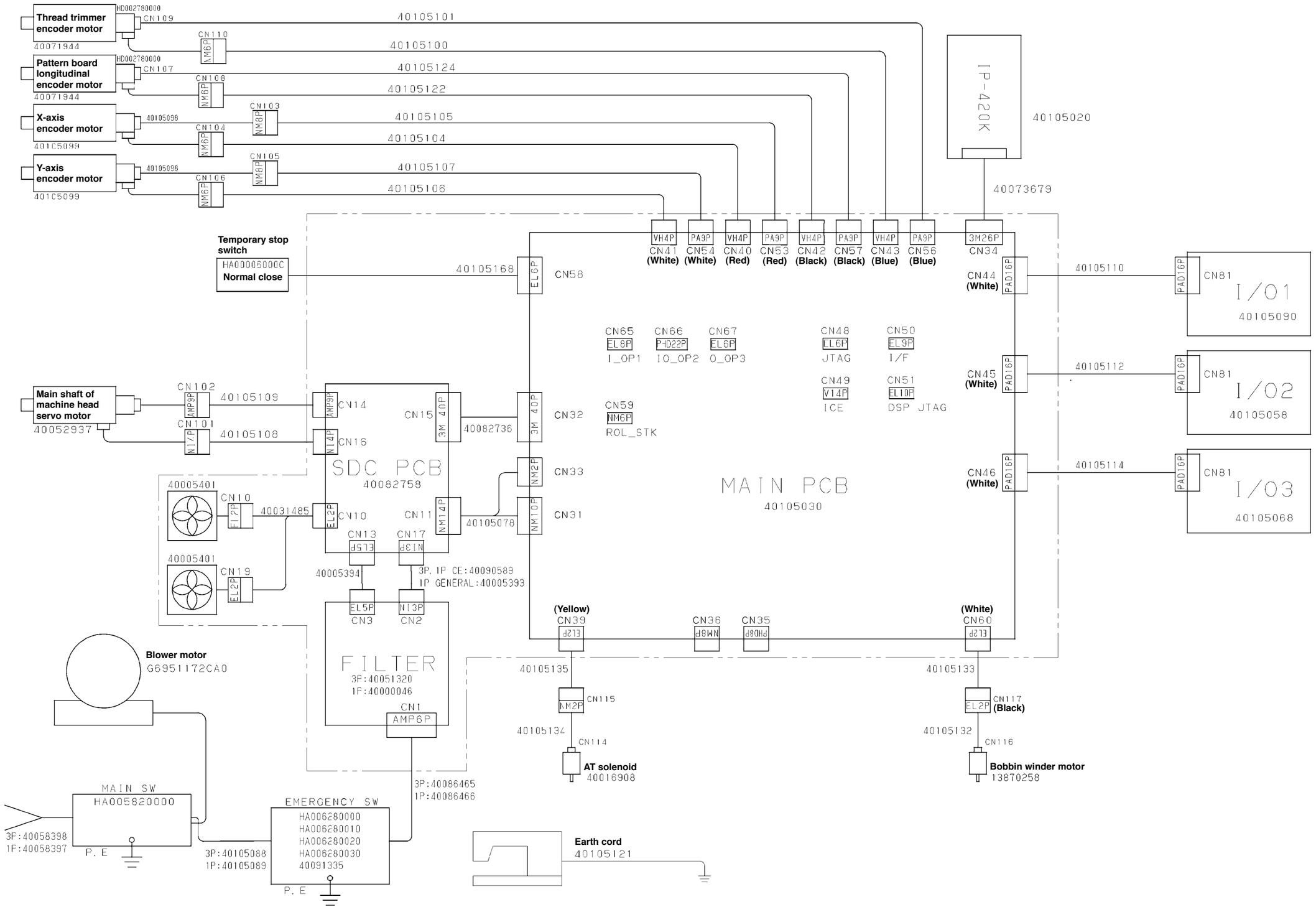


(Solenoid valve block 1 : Solenoid valve of device)
(Solenoid valve block 2 : Solenoid valve of mechine head)

17. Circuit diagrams

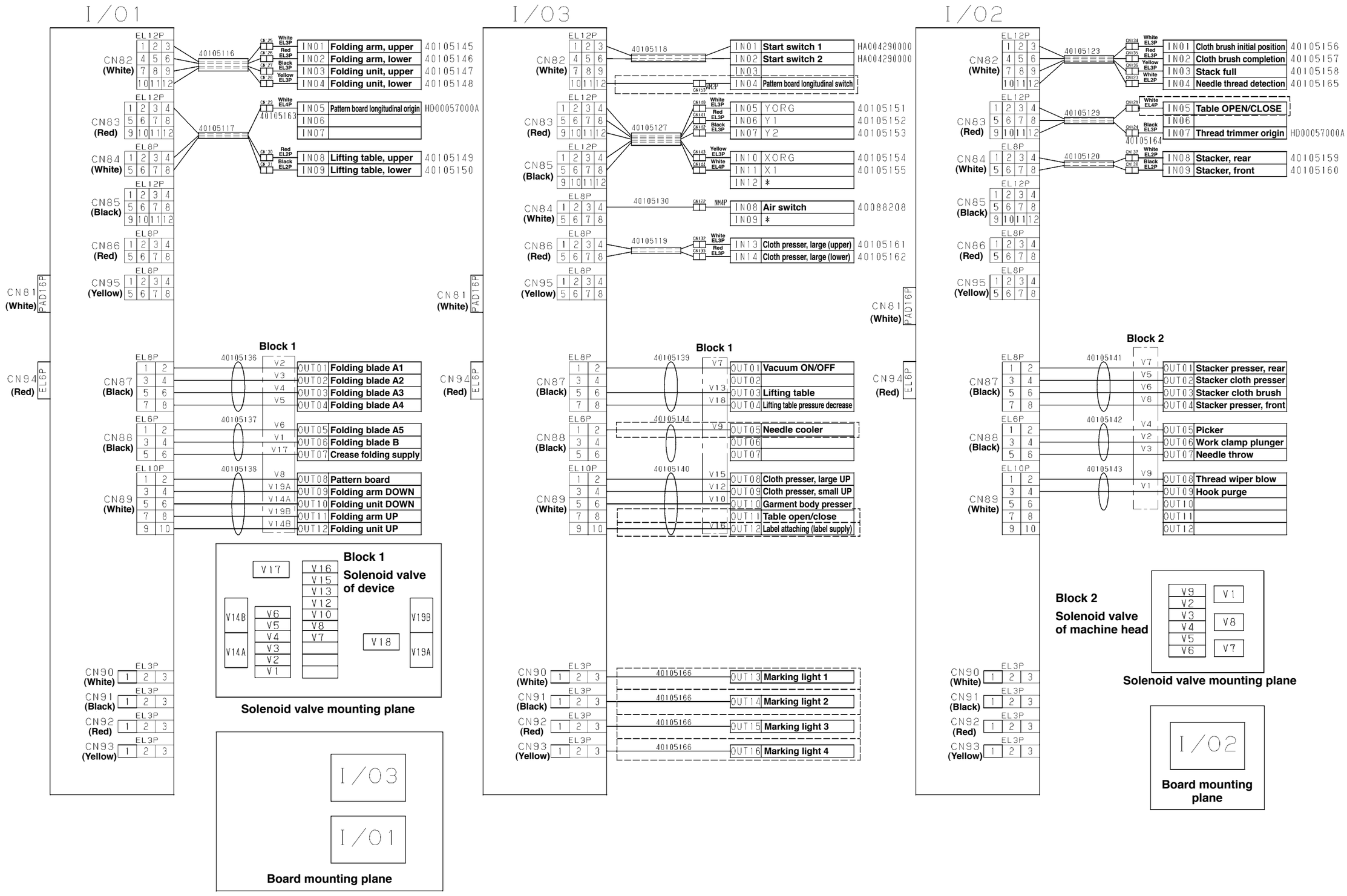
(1) Block diagram

Block diagram (1)



(Caution) 1. Inside of the 2-dotted lines shows the components inside the control box.

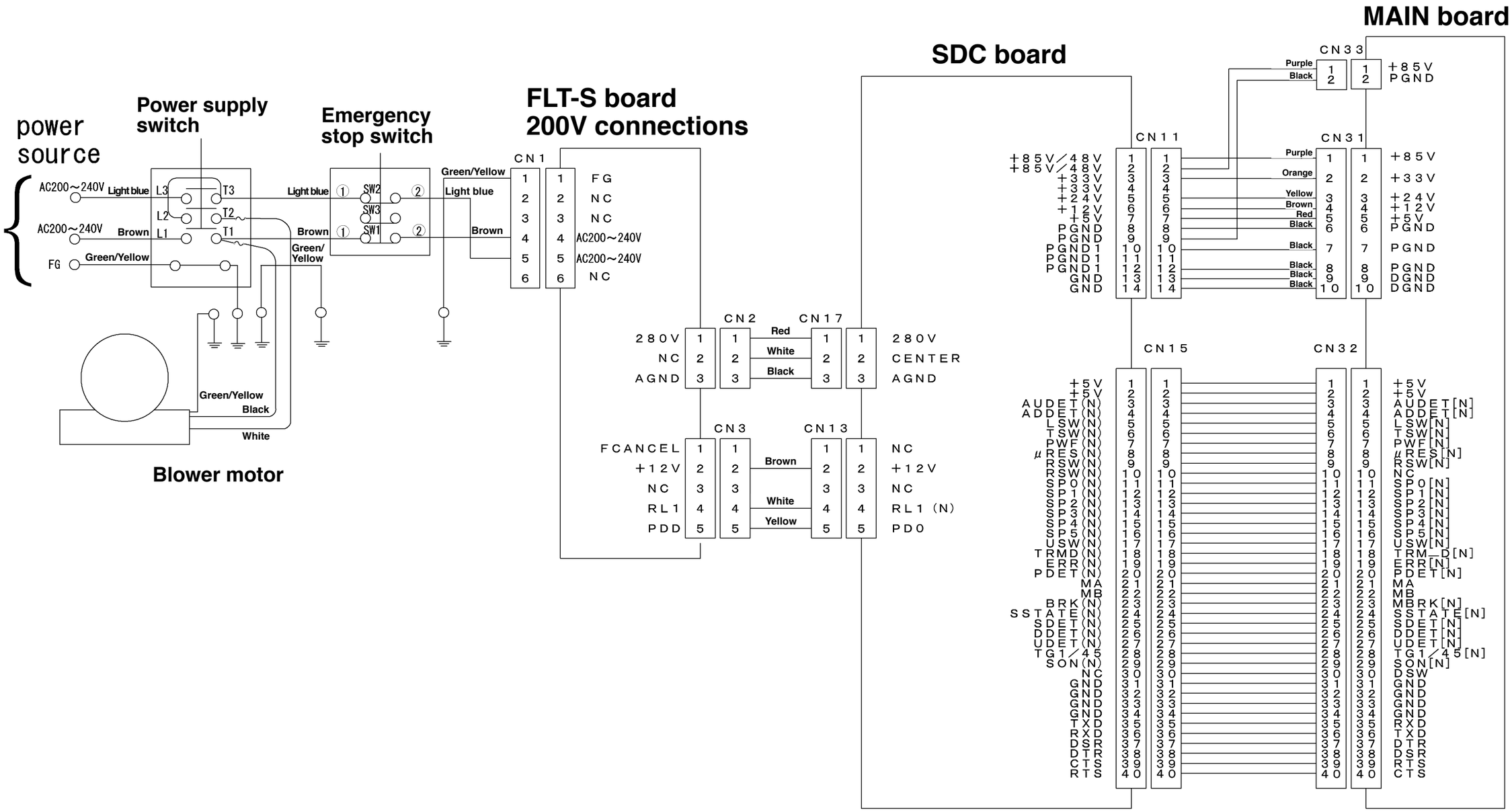
Block diagram (2)



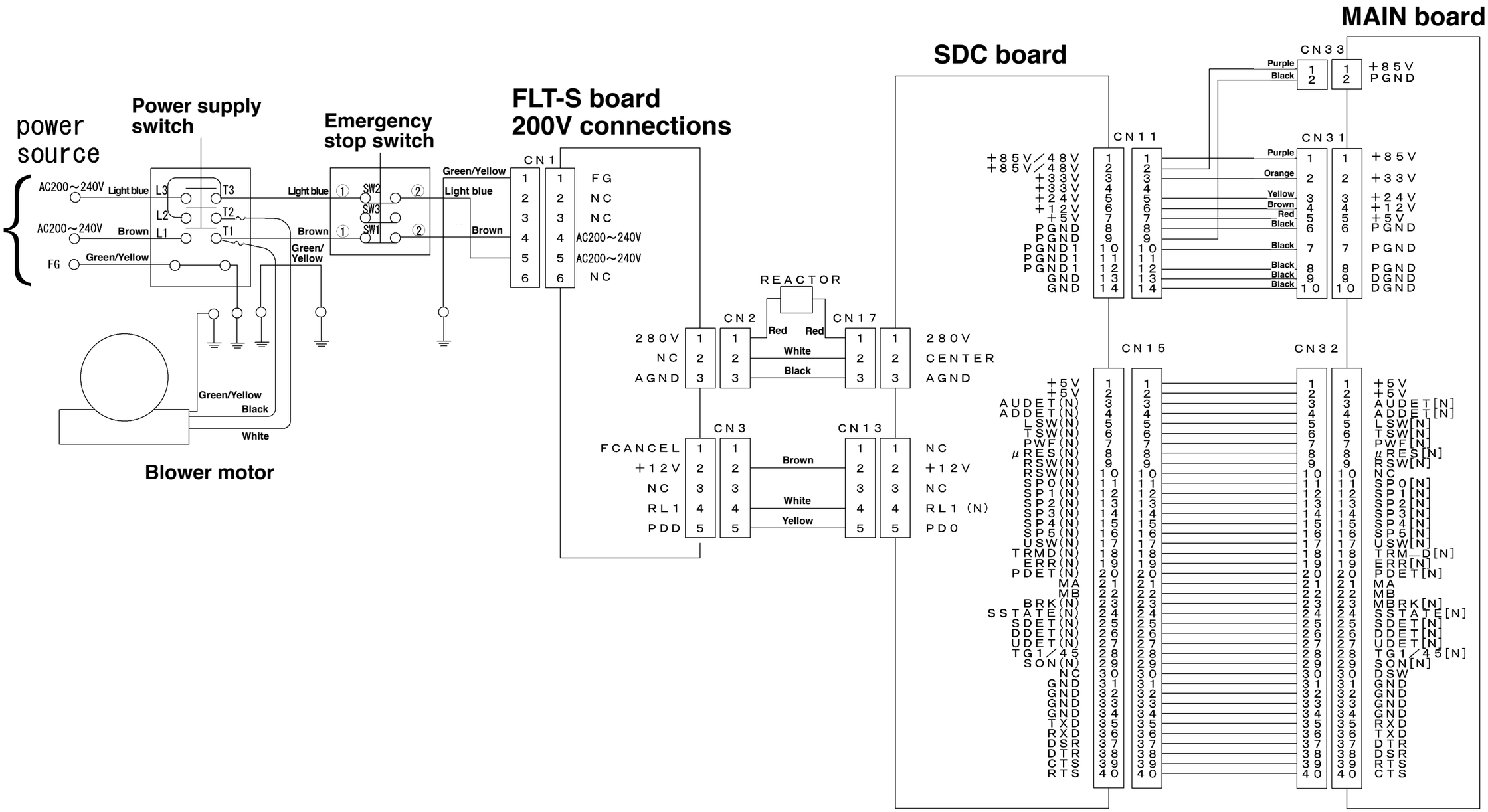
(Caution) 1. [- - - -] : Option

2. [_____] : Same solenoid valve block

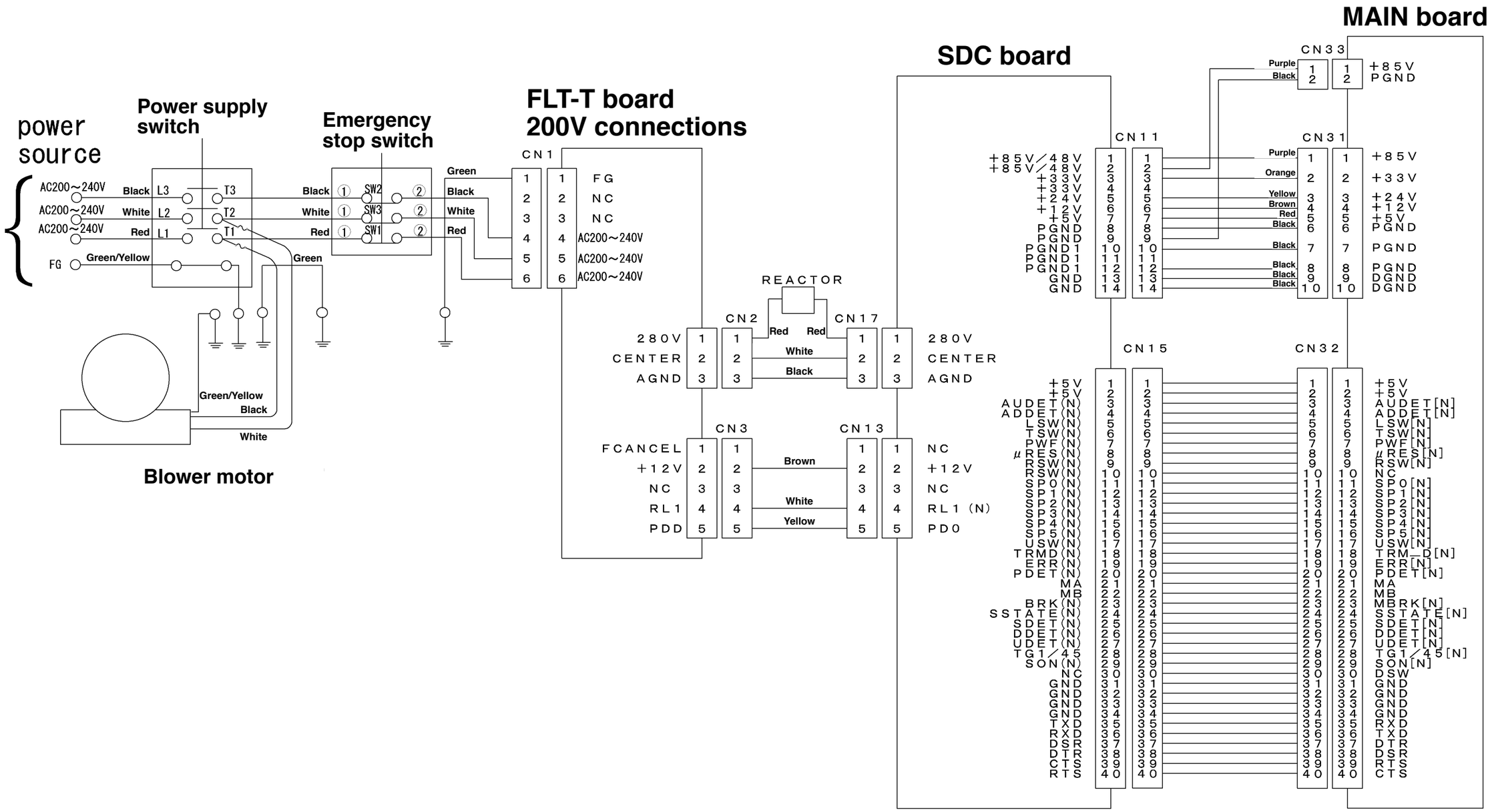
(2) Power supply circuit diagram A



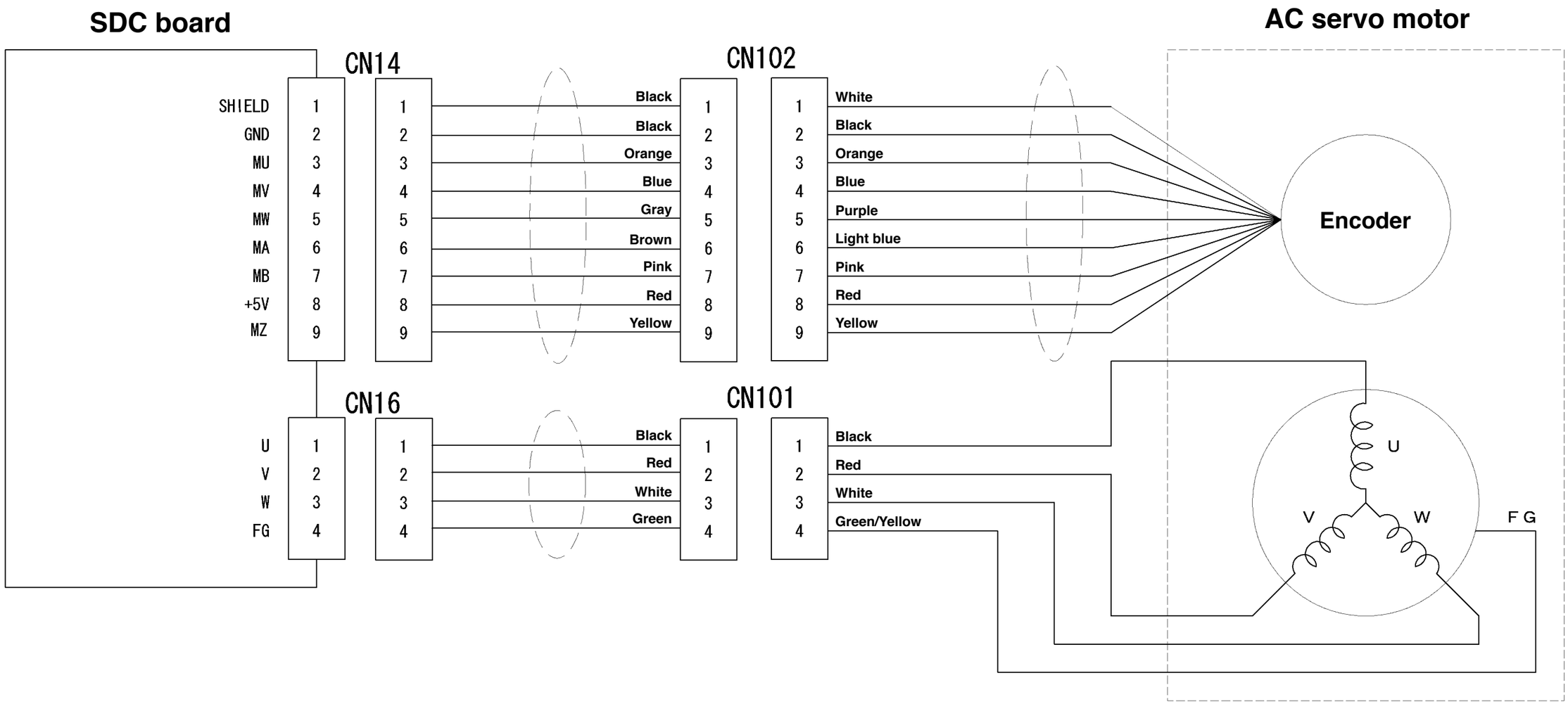
(3) Power supply circuit diagram B



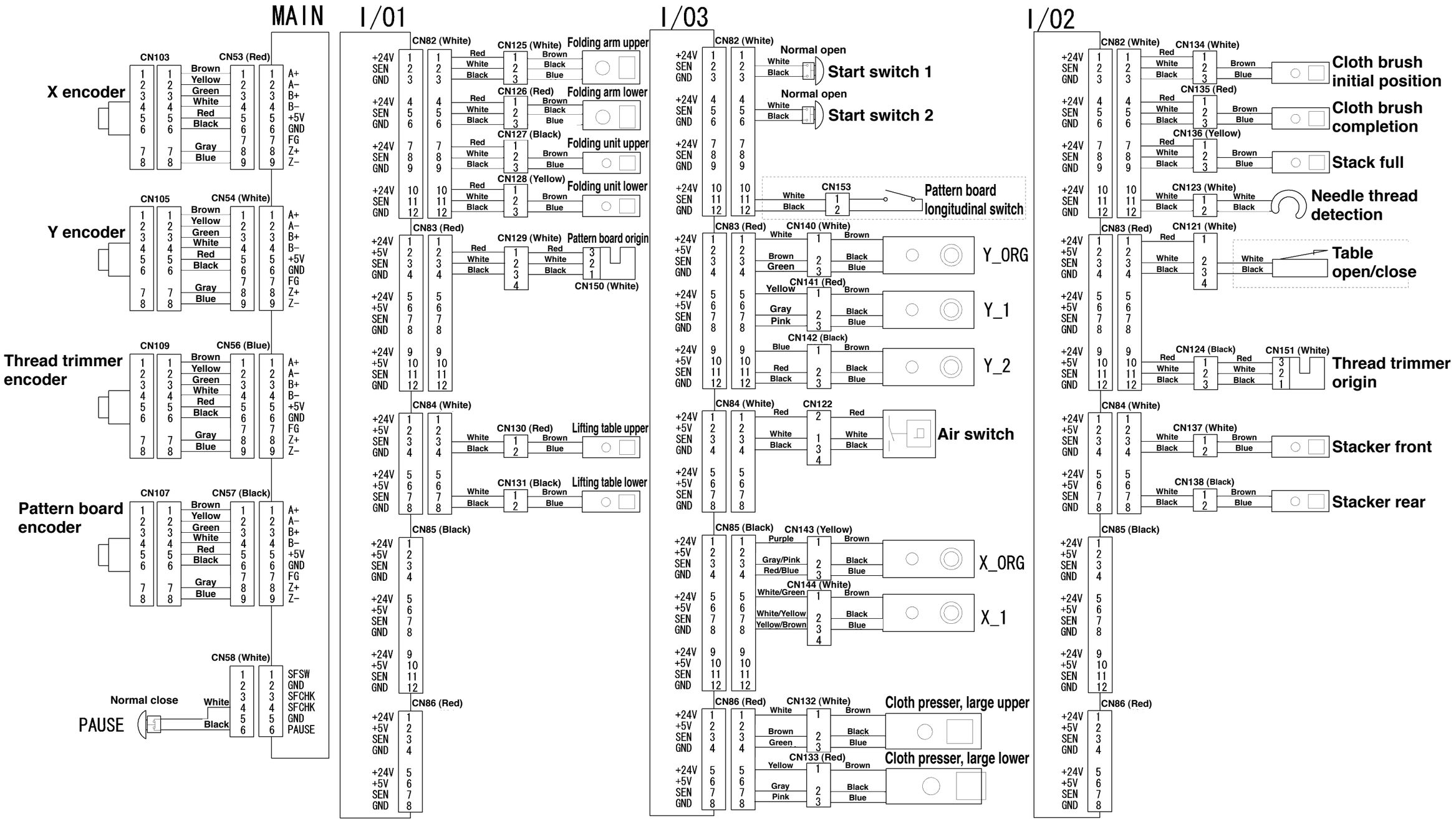
(4) Power supply circuit diagram C



(5) Servo motor circuit diagram

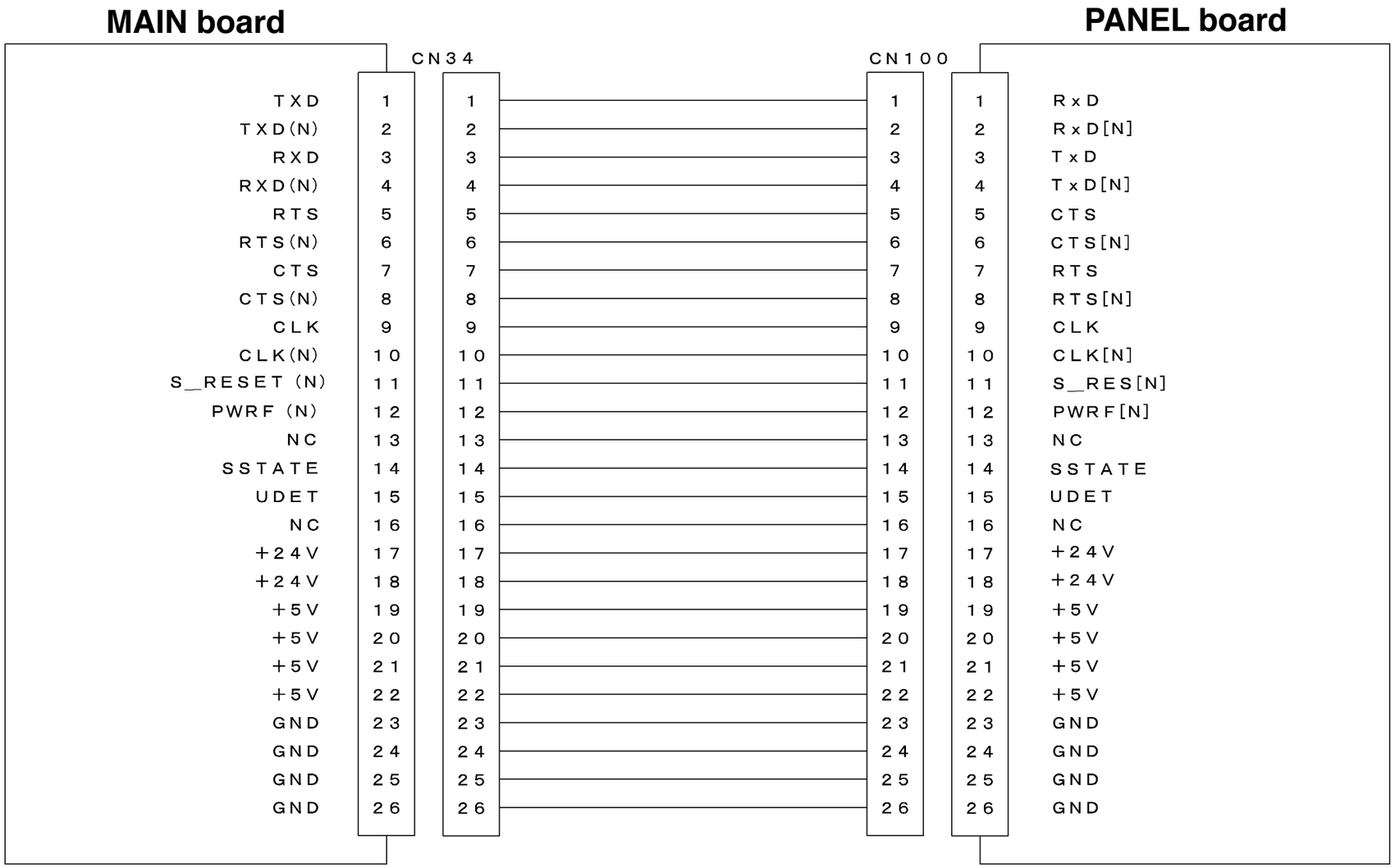


(6) Sensor · switch circuit diagram

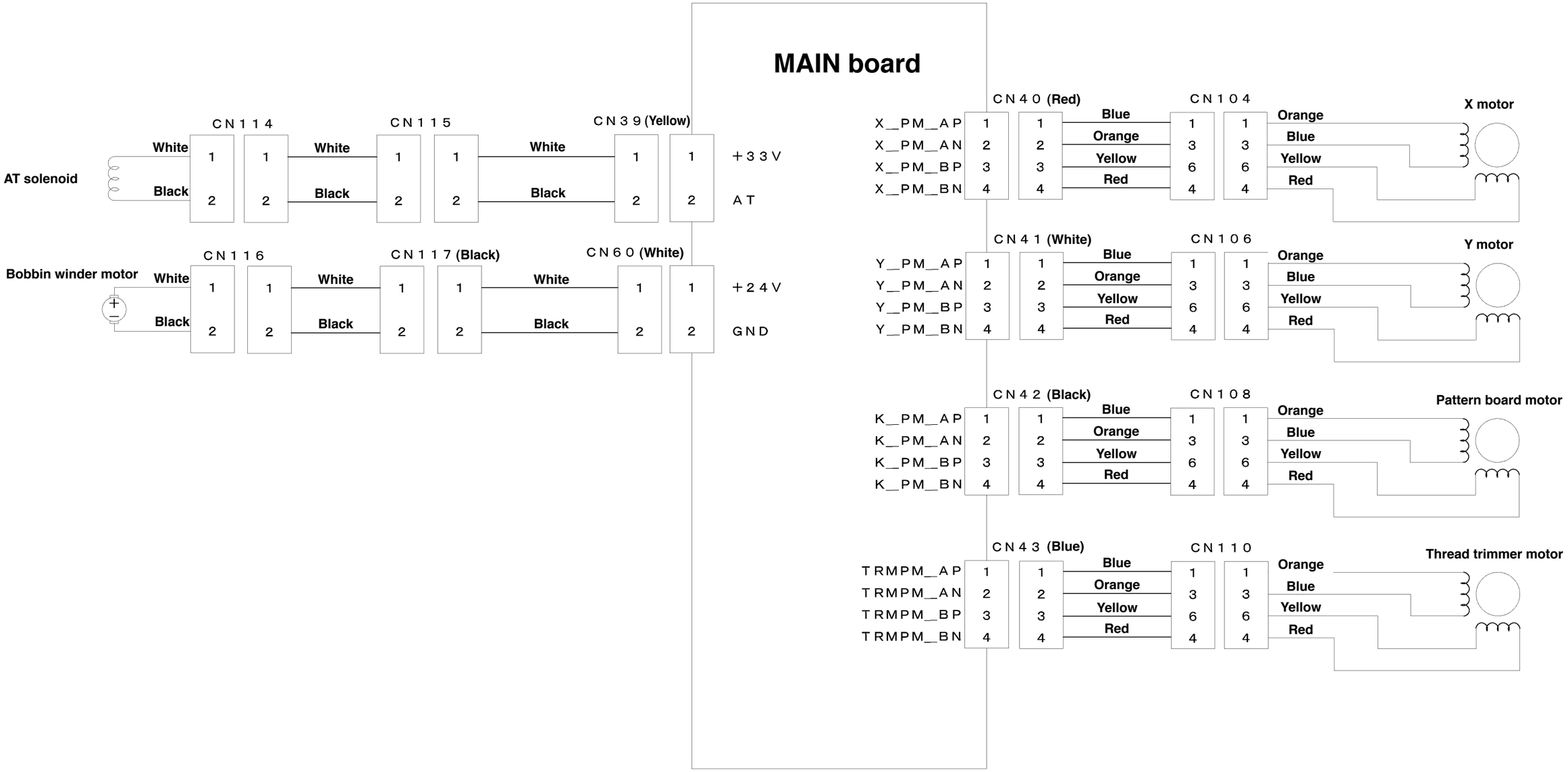


(Caution) 1. ⬚: Option

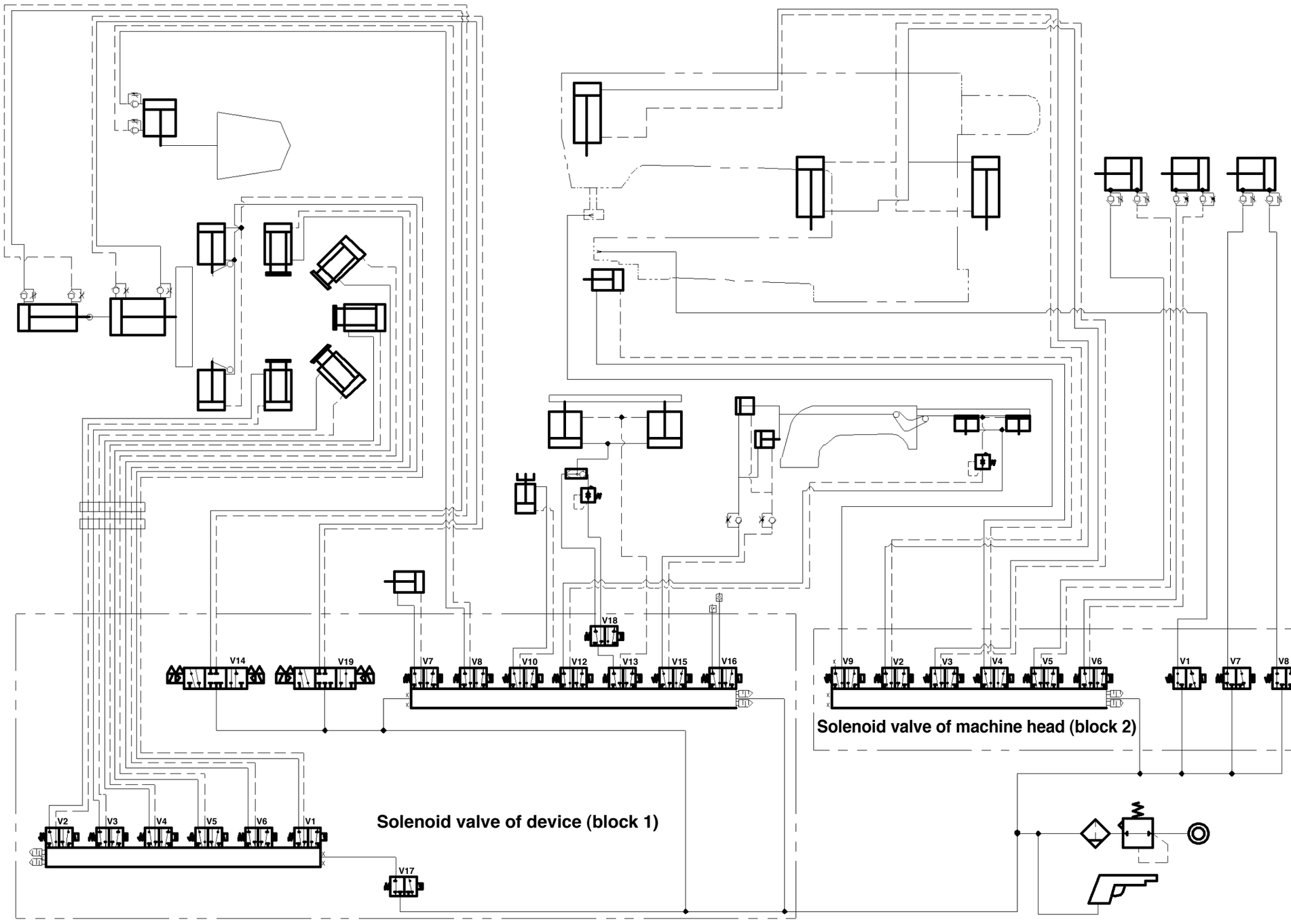
(7) MAIN · PANEL board circuit diagram



(8) Motor · solenoid circuit diagram



(9) Air system circuit diagram



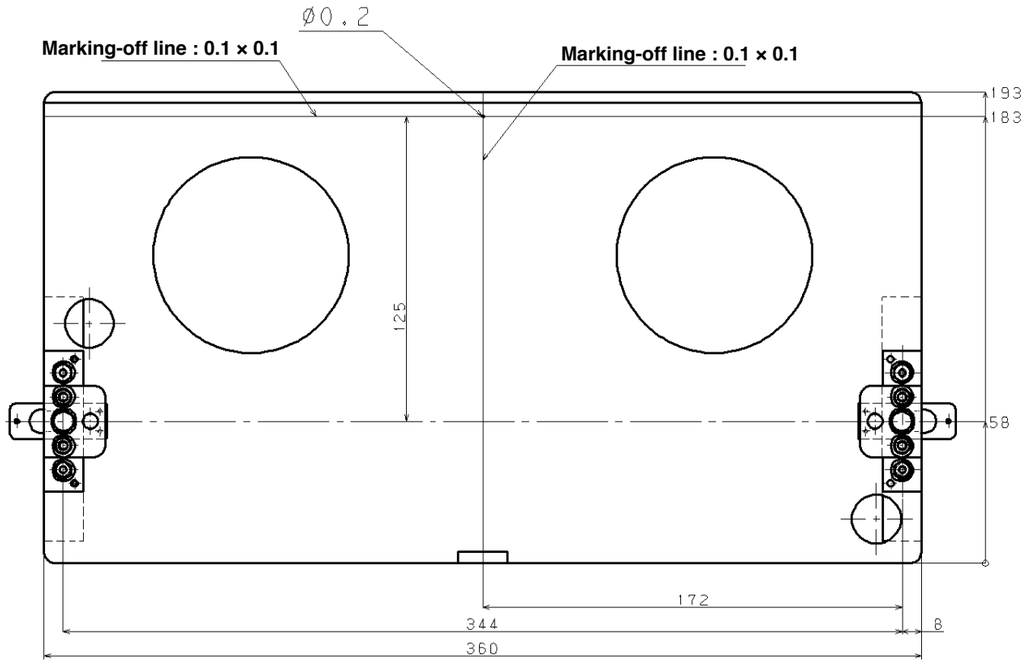
Solenoid valve lists

Solenoid valve of device (block 1)	
V1	Folding blade B
V2	Folding blade A1
V3	Folding blade A2
V4	Folding blade A3
V5	Folding blade A4
V6	Folding blade A5
V7	Vacuum ON/OFF
V8	Pattern board UP/DOWN
V10	Garment body presser
V12	Cloth presser, small
V13	Lifting table
V14	Folding unit UP/DOWN
V15	Cloth presser, large
V16	Label attaching (label supply)
V17	Crease folding supply
V18	Lifting table pressure decrease
V19	Folding arm UP/DOWN

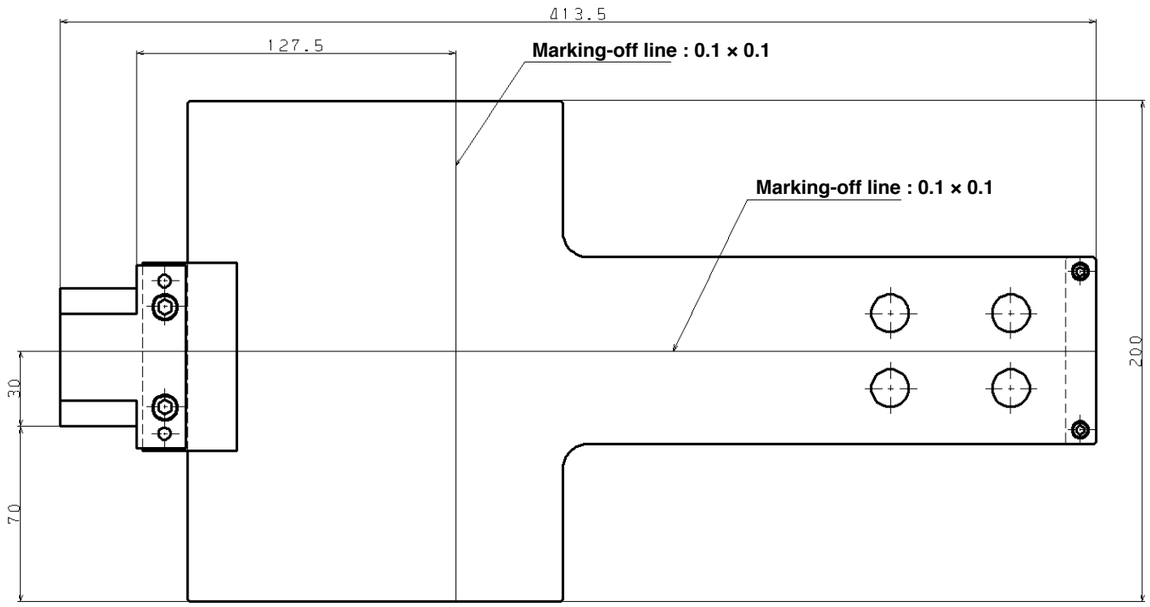
Solenoid valve of machine head (block 2)	
V1	Hook purge
V2	Work clamp plunger
V3	Needle throw
V4	Picker
V5	Stacker cloth presser
V6	Stacker cloth brush
V7	Stacker presser, rear
V8	Stacker presser, front
V9	Thread wiper blow

18. Various origin gauge dimensional drawings

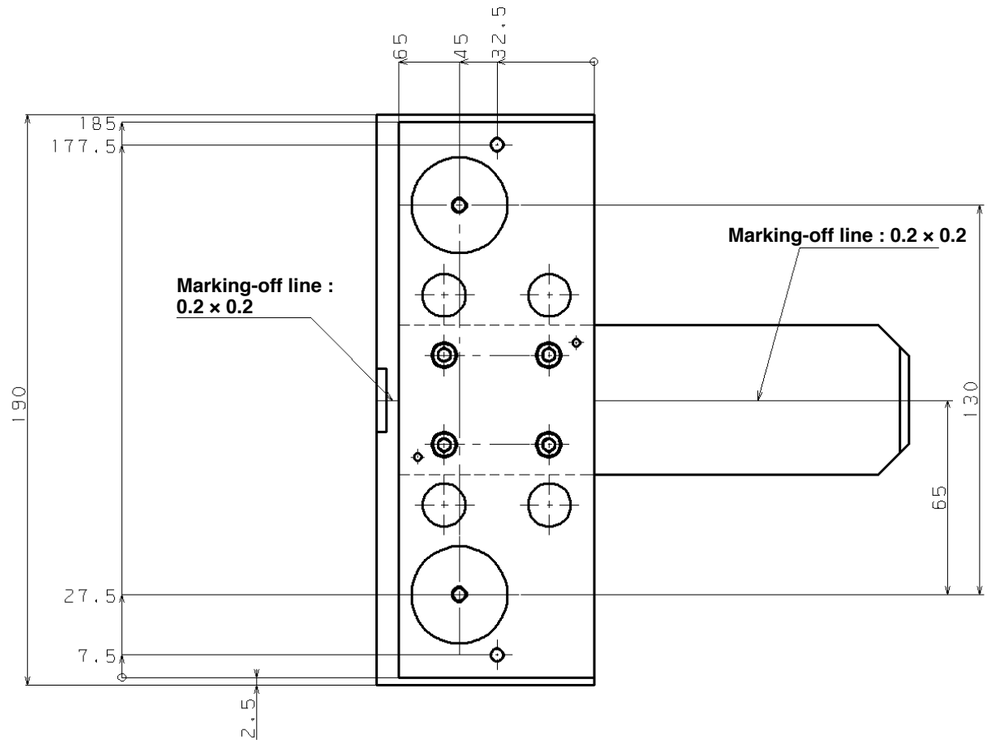
(1) Holder origin gauge



(2) Pattern board origin gauge



(3) Folding origin gauge



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