

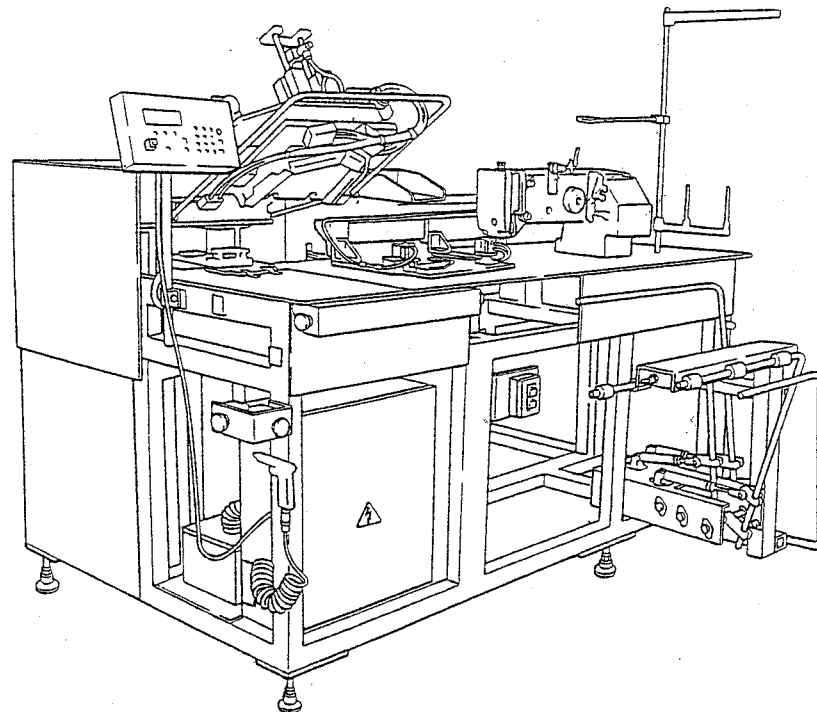
JUKI®

Jeans Pocket Setter

AVP-875

(Hardware volume)

ENGINEER'S MANUAL



29311503

No.00

PREFACE

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

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

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

This manual gives "Standard adjustment" on the former page under which the most basic adjustment value is described and on the latter page the "Results of improper adjustment" under which stitching errors and troubles arising from mechanical failures and "Adjustment procedures" are described.

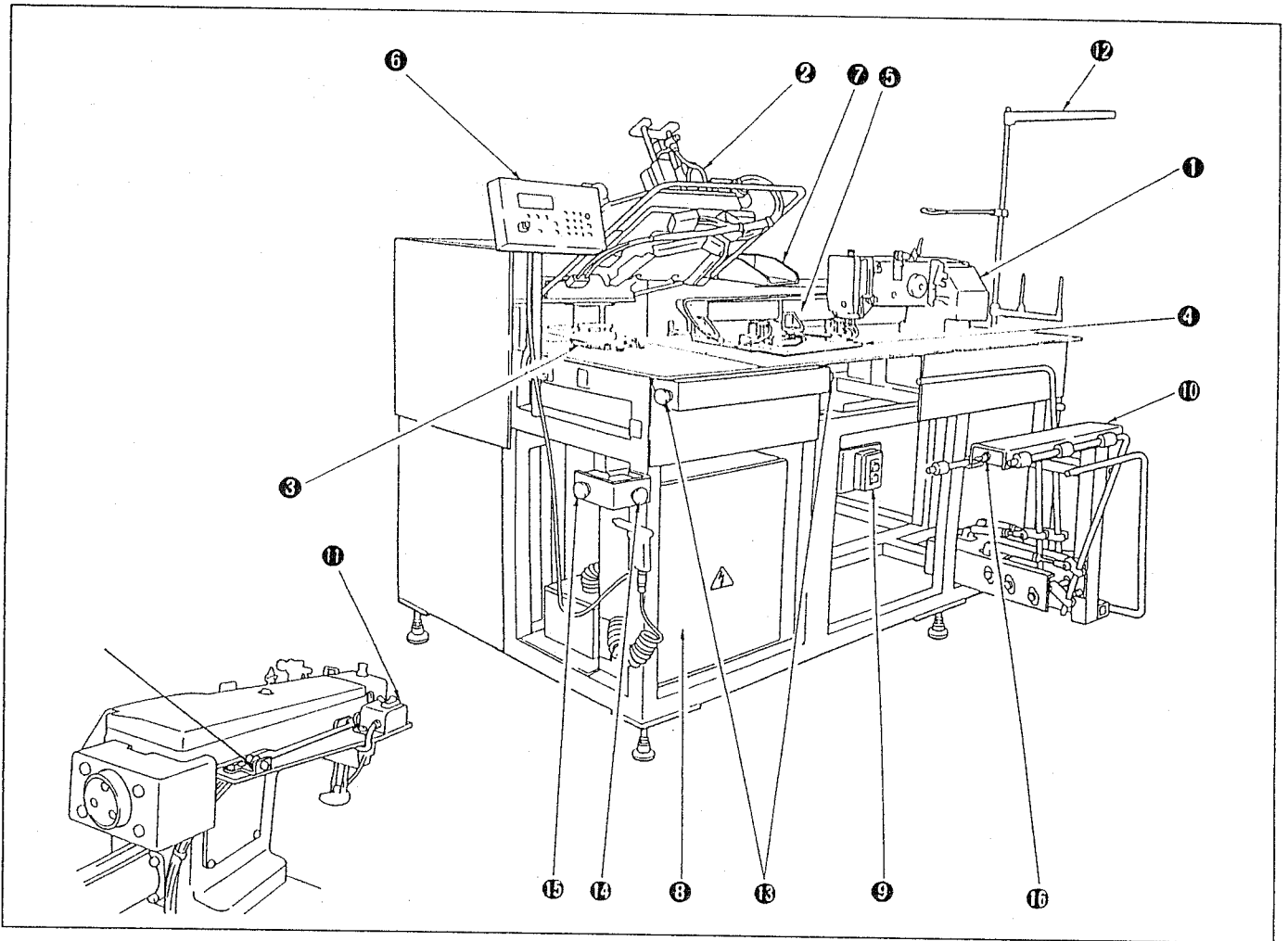
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1. SPECIFICATIONS

- 1) Sewing area : 240 mm in the X (lateral) direction, 250 mm in the Y (longitudinal) direction
- 2) Maximum sewing speed : 4,000 r.p.m. (depends on the stitch length and sewing pattern.)
- 3) Stitch length : 0.1 to 6.0 mm (adjustable in 0.1 mm steps)
- 4) Main shaft of machine head drive unit : AC servo
- 5) Feed drive mechanism : Continuous feed (AC servo motor, 2-shaft drive)
- 6) Needle bar stroke : 35 mm
- 7) Needle used : SCHMETZ 134 SERV7 #130
- 8) Hook : Full-rotary exclusive hook ((forced lubrication)
- 9) Bobbin case : Full-rotary exclusive bobbin case for hook (with idling prevention spring)
- 10) Bobbin : Aluminum bobbin
- 11) Lubricating oil : Machine head : JUKI New Defrix Oil No. 1
- 12) Thread trimming method : Scissors cutting mechanism using a counter knife and a moving knife (grooved cam method)
- 13) Sewing pattern data storage : 2DD 3.5 inch floppy disk ; 691 patterns/disk
- 14) Outer dimensions : 1,850 mm (W) x 1,600 mm (L) x 1,200 mm (H)
(not including the thread stand and the stacker)
- 15) Total weight : 600 kg
- 16) Power consumption : 600 W
- 17) Temperature range in use : 5°C to 40°C
- 18) Operating humidity range : 20% to 80% (No dew condensation)
- 19) Power supply voltage : Rating±10%, 50/60 Hz
- 20) Air pressure used : 0.5 N {5.5 kgf/cm²}
- 21) Operating air pressure : 20 N ℓ /cycle

2. CONFIGURATION



- | | |
|------------------------------|--------------------------------|
| ① Sewing machine head | ⑨ Power switch |
| ② Crease folding unit | ⑩ Stacker |
| ③ Pattern board | ⑪ Bobbin winder |
| ④ Holder plate | ⑫ Thread stand unit |
| ⑤ Conveyor and X-Y unit | ⑬ Setting completion switch |
| ⑥ Operation panel | ⑭ Temporary stop switch |
| ⑦ Pocket cloth holding board | ⑮ Setting release switch |
| ⑧ Control box | ⑯ Stack presser release switch |

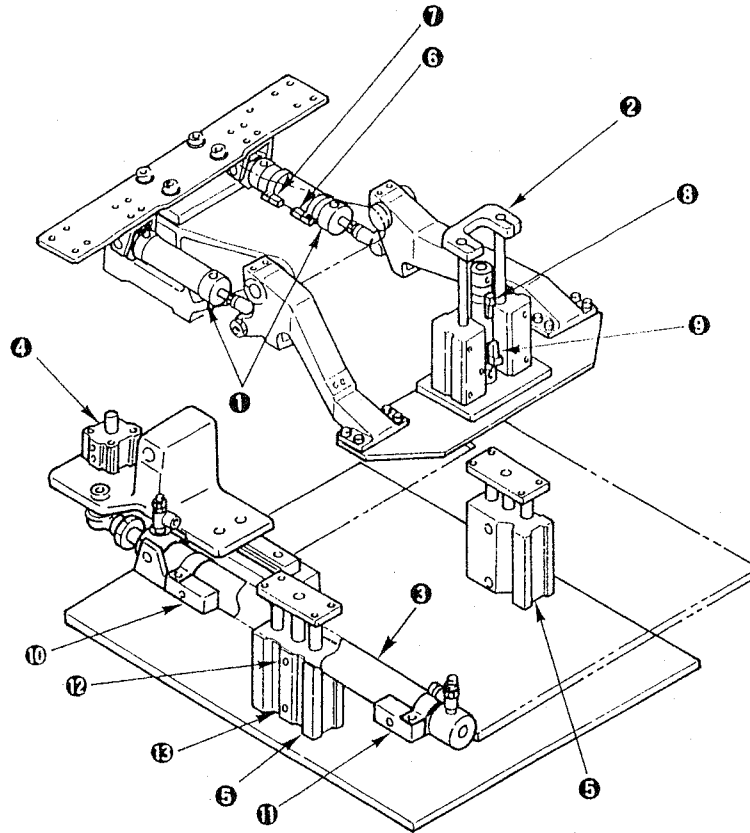
- ① Swing machine head**
This is a high-speed 1-needle lockstitch zigzag stitching machine head. It is driven by a servo motor and performs high-speed sewing.
- ② Crease folding unit**
This folds pocket that has been set in place, and then lowers it onto the garment body in the preset position.
- ③ Pattern board**
This is the gauge that provides the standard for folding pocket cloth.
It has the same shape as the final completed shape of the pocket.
- ④ Holder plate**
This transports folded and set pocket cloth and the garment body from the folding position to the sewing position.
- ⑤ Conveyor and X-Y unit**
This is the X-Y drive section, which acts in accordance with the input sewing pattern by means of the holder plate drive source mechanism and the servo motor drive.
- ⑥ Operation panel**
This is a liquid crystal type operation panel containing a display for various data and buzzer. The operating section performs input/output of various information.
- ⑦ Pocket cloth holding board**
This holding board can be set in a position from where it is easy to take the the pocket cloth.
- ⑧ Control box**
This control box is composed of the CPU printed circuit board, I/O printed circuit board, servo driver, switching power source, floppy disk driver, transformer, etc. This control box can control the whole machine units.
- ⑨ Power switch**
This is the power switch for the sewing machine motor, control section and operation panel.
- ⑩ Stacker**
This stacks garment bodies on which sewing has been completed. This stacker has a large capacity.
- ⑪ Bobbin winder**
This bobbin winder is independent of the sewing machine drive.
- ⑫ Thread stand unit**
This unit can set the needle thread and bobbin thread.
- ⑬ Setting completion switch**
This switch is for the purpose of automatically folding and starting to sew the set garment body and pocket cloth.
- ⑭ Temporary stop switch**
This is used to stop the series of actions while sewing is in progress.
- ⑮ Setting release switch**
This is used to restore a folded pocket cloth to the unfolded condition.
- ⑯ Stack presser release switch**
This is used when removing the stacked garment bodies.

3. CAUTIONS BEFORE OPERATION

- 1) When changing to a new sewing pattern, check the pattern on the operation panel (as instructed in the Instruction Manual) to confirm that the patterns of the crease folding unit, the pattern board and the holder plate are matched, and also confirm that the needle and the holder plate do not interfere with each other.
- 2) When an error indication lights up, always check the cause and take an appropriate action.
- 3) Always turn OFF the power before opening the cover of the control box.
- 4) If dust gets into the control box, it can cause misoperation or breakdown, so normally keep the control box cover closed.
- 5) When the control circuit is checked with a multimeter, there is a danger that abnormal current will run through the semiconductor components, causing breakdown, so absolutely do not do this.
- 6) Do not disassemble the motors used for the sewing machine drive and the X-Y drive.
- 7) Use a neutral detergent to clean the surface of this machine. Absolutely do not use lacquer or thinner.
- 8) Do not place a hand or object on the top surface of the X-Y cover.
- 9) When keeping the patterns, place them on the level and do not place any thing on them.
- 10) Clean dust out of the inside of the hook once a day with an air gun. If you are using a thread such as spun that easily produces lint, clean with an air gun at the time of every bobbin replacement.
- 11) Check the amount of oil remaining in the sewing machine periodically (once a week). If the level has declined, add JUKI New Defrix Oil No. 1.
- 12) If the LM guide (pattern board, X-Y) is used unlubricated, its lifetime will be shortened, so lubricate it as necessary. As a rule, there is no problem if the rail surface has oil on it, but it is necessary to apply grease from the grease nipple about once a year, or to apply oil drops directly onto the rail surface. Use a lithium-type grease.

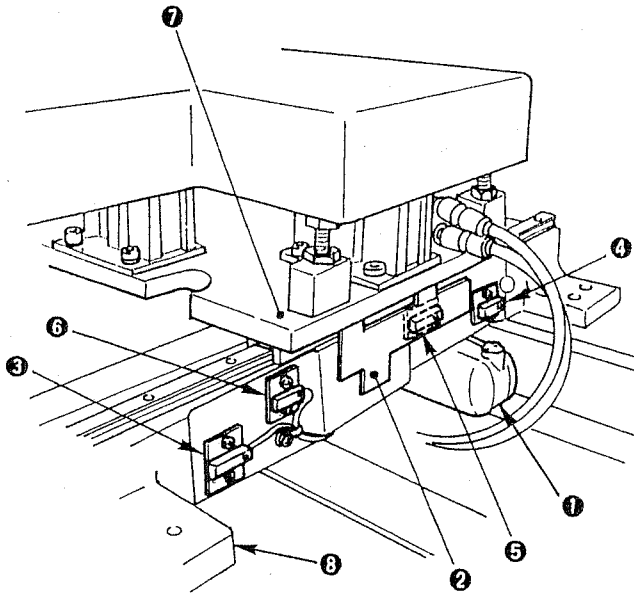
4. CONSTITUENT PARTS AND THEIR ROLES

(1) Crease folding unit

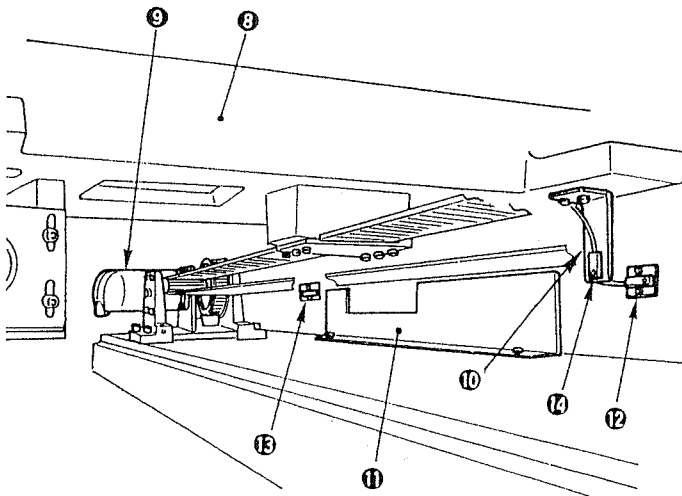


- ❶ Folding arm cylinders These raise and lower the folding arms.
- ❷ Crease folding unit cylinder This raises and lowers the crease folding unit.
- ❸ Pattern board cylinder This drives the pattern board forward and backward.
- ❹ Pattern board lifting cylinder This drives the pattern board upward and downward.
- ❺ Table cylinder
 This drives the table upward and downward.
- ❻ Folding arm raising sensor
 This comes ON when the folding arm is in the raising state.
- ❼ Folding arm lowering sensor
 This comes ON when the folding arm is in the lowering state.
- ❽ Crease folding unit raising sensor
 This comes ON when the crease folding unit is in the raising state.
- ❾ Crease folding unit lowering sensor
 This comes ON when the crease folding unit is in the lowering state.
- ❿ Pattern board (rear) detection sensor
 This comes ON when the pattern board passes by the sensor position while being retracted, and provides the timing for actuating the brake.
- ⓫ Pattern board (front) detection sensor
 This comes ON when the pattern board is in the forward position.
- ⓬ Table raising sensor
 This comes ON when the table is in the raising state.
- ⓭ Table lowering sensor
 This comes ON when the table is in the lowering state.

(2) X-Y

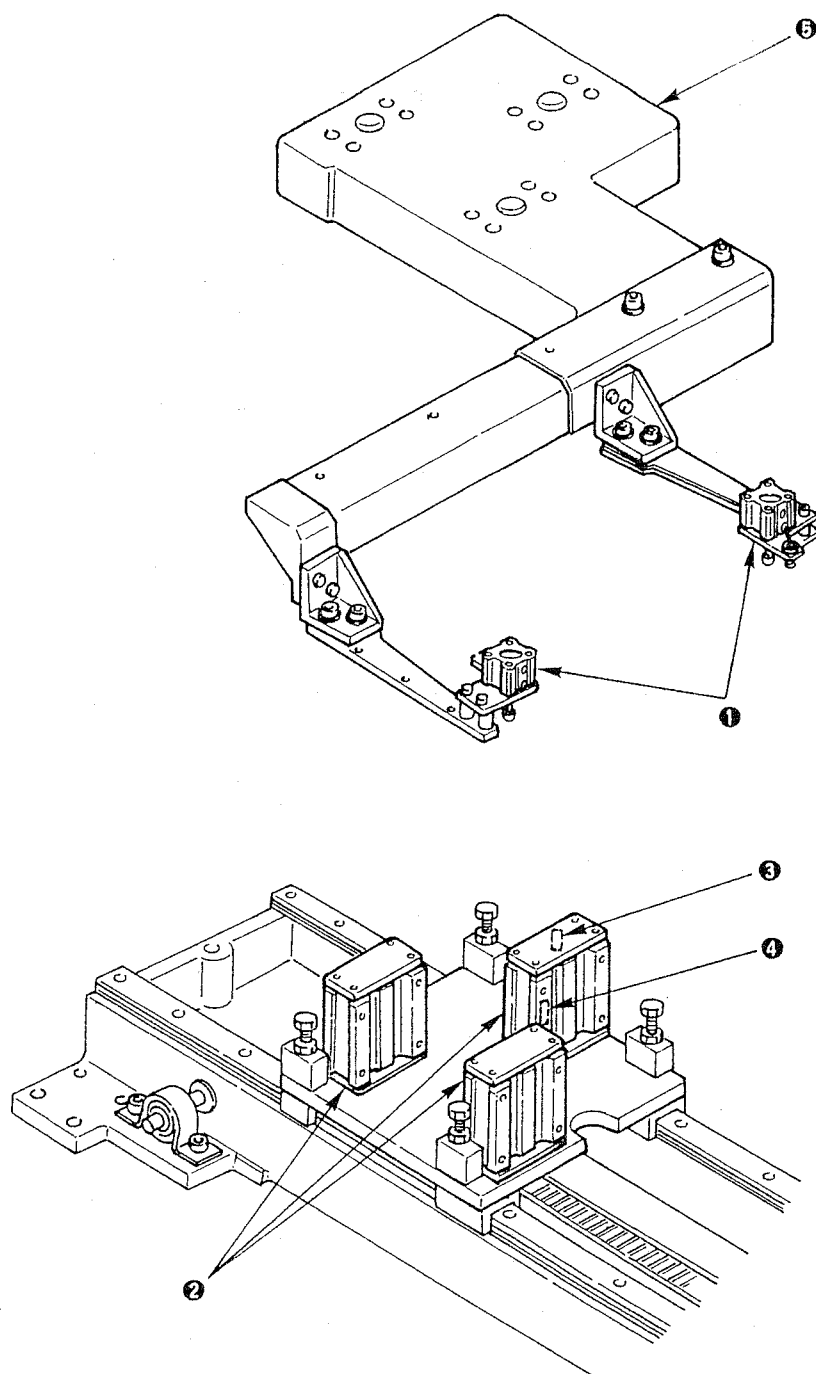


- ① Y axis servo motor
This motor drives the Y moving base.
- ② Y sensor slit
This is a slit to determine the moving limit of the Y moving base and the invasion prohibiting area of the X-Y.
- ③ Y+ moving limit sensor
This comes ON when the Y moving base comes to the moving limit in the Y+ direction.
- ④ Y- moving limit sensor
This comes ON when the Y moving base comes to the moving limit in the Y- direction.
- ⑤ Y1 moving limit sensor
This comes ON when the Y moving base comes to the moving limit in the Y1 position.
- ⑥ Y2 moving limit sensor
This comes ON when the Y moving base comes to the moving limit in the Y2 position.
- ⑦ Y moving base
This is a slider to move the cloth presser unit in the Y direction.



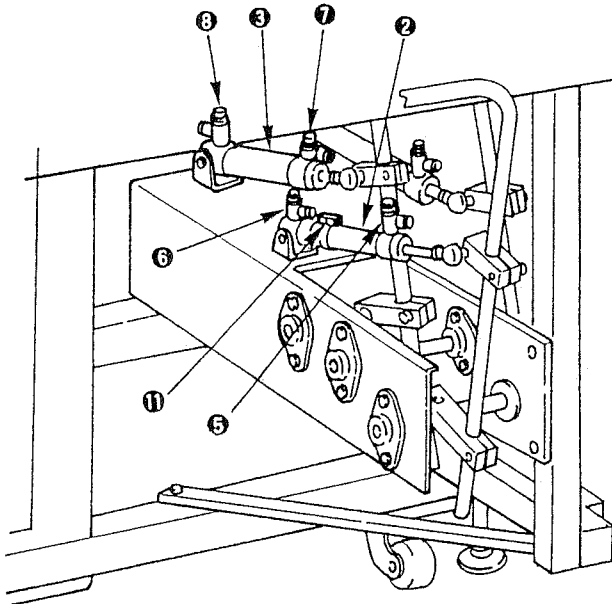
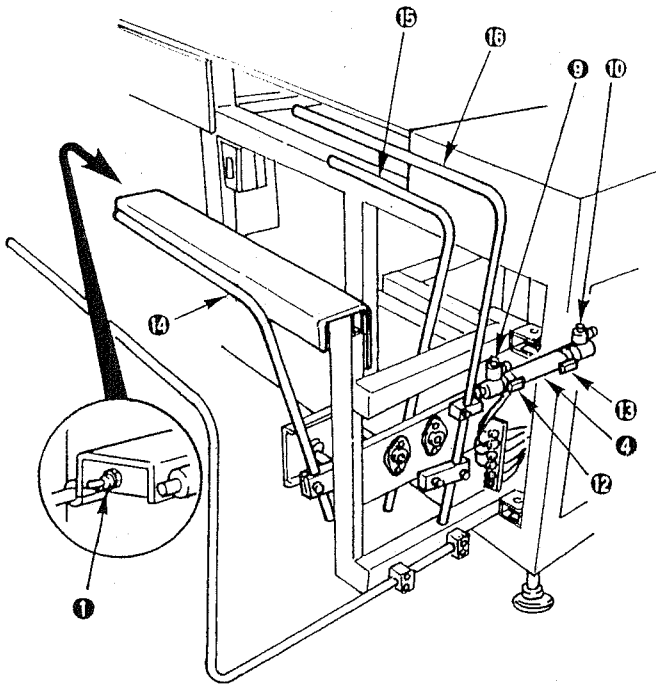
- ⑧ X moving base
This is a slider to move the cloth presser unit in the X direction.
- ⑨ X axis servo motor
This is a motor to move the X moving base.
- ⑩ X moving limit sensor slit
This is a slit to determine the moving limit of the X moving base.
- ⑪ X1 sensor slit
This is a slit to determine the invasion prohibiting area of the X-Y.
- ⑫ X+ moving limit sensor
This comes ON when the X moving base comes to the moving limit in the X+ direction.
- ⑬ X- moving limit sensor
This comes ON when the X moving base comes to the moving limit in the X- direction.
- ⑭ X1 moving limit sensor
This comes ON when the X moving base comes to the moving limit in the X1 position.

(3) Cloth presser



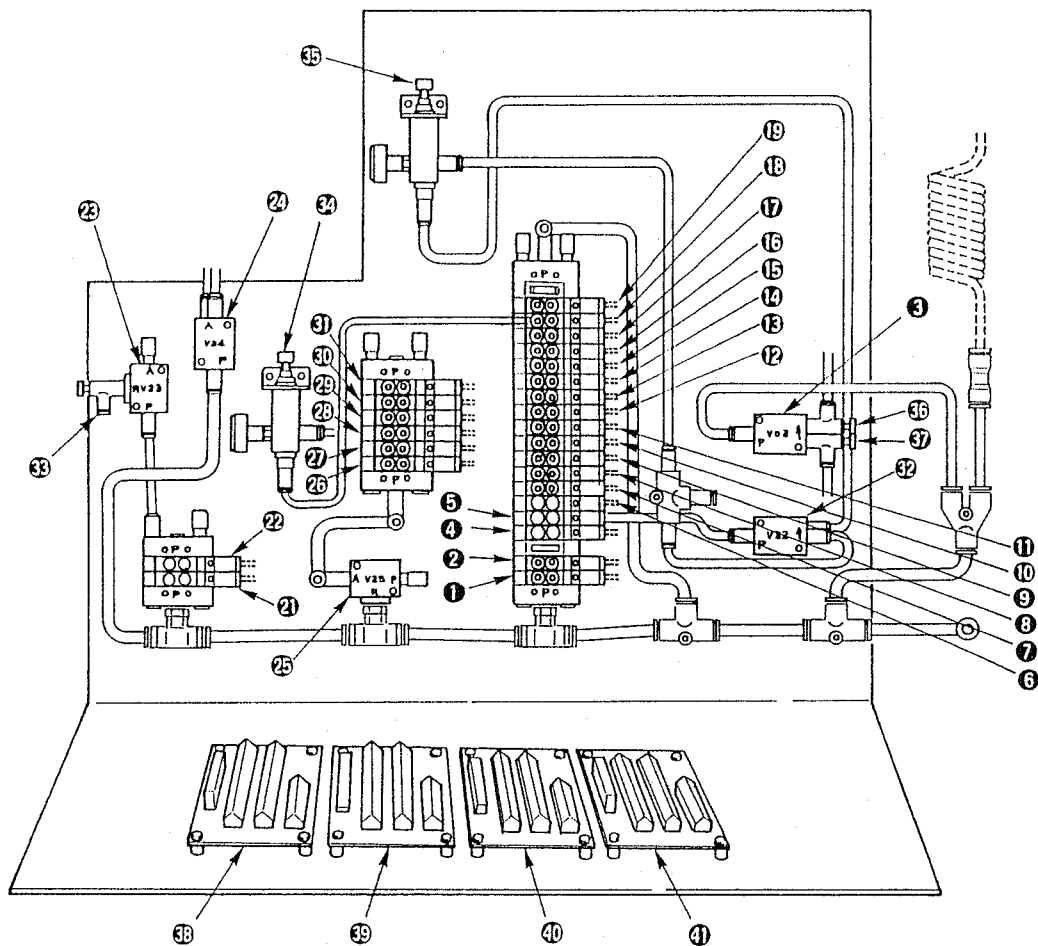
- ❶ Cloth presser cylinders
These raise and lower the cloth presser.
- ❷ Z cylinders
These raise and lower the Z moving base.
- ❸ Z moving base raising sensor
This comes ON when the Z moving base is in the raised state.
- ❹ Z moving base lowering sensor
This comes ON when the Z moving base is in the lowered state.
- ❺ Z moving base

(4) Stacker



- ❶ Stack presser release switch
This is used when removing the stacked garment bodies.
- ❷ Cloth presser arm cylinder 1
When the solenoid valve comes ON the cloth presser arm 1 is opened.
- ❸ Cloth presser arm cylinder 2
When the solenoid valve comes ON the cloth presser arm 2 is closed.
- ❹ Cloth brush cylinder
When the solenoid comes ON the cloth brush arm retracts.
- ❺ Cloth presser arm 1 retracting speed controller
When this is tightened the retracting speed of the cloth presser arm 1 is slowed down.
- ❻ Cloth presser arm 1 advancing speed controller
When this is tightened the advancing speed of the cloth presser arm 1 is slowed down.
- ❼ Cloth presser arm 2 retracting speed controller
When this is tightened the retracting speed of the cloth presser arm 2 is slowed down.
- ❽ Cloth presser arm 2 advancing speed controller
When this is tightened the advancing speed of the cloth presser arm 2 is slowed down.
- ❾ Cloth brush arm retracting speed controller
When this is tightened the retracting speed of the cloth brush arm is slowed down.
- ❿ Cloth brush arm advancing speed controller
When this is tightened the advancing speed of the cloth brush arm is slowed down.
- ⓫ Stack full sensor
This comes ON when the loading capacity of the stacker is maximized.
- ⓬ Cloth brush arm retracting sensor
This comes ON when the cloth brush arm is in the retracted position.
- ⓭ Cloth brush arm advancing sensor
This comes ON when the cloth brush arm is in the advanced position.
- ⓮ Cloth presser arm 1
This presses the stacked material.
- ⓯ Cloth presser arm 2
This presses the material at the time of stack action.
- ⓰ Cloth brush arm
This brushes away the material at the time of stack action.

(5) Solenoid valve unit section




- | | |
|---|--|
| ① V01 garment body presser solenoid valve | : When the solenoid valve comes ON the force to suck the garment bodies is strengthened. |
| ② V02 pattern board lowering solenoid valve | : When the solenoid valve comes ON the pattern board gauge comes down. |
| ③ V03 folding arm lowering solenoid valve | : When the solenoid valve comes ON the folding arm comes down. |
| ④ V04 folding gauge lowering solenoid valve | : When the solenoid valve comes ON the folding gauge comes down. |
| ⑤ V05 elevating table lowering solenoid valve | : When the solenoid valve comes ON the elevating table comes down. |
| ⑥ V06 thread trimmer cylinder drive solenoid valve | : When the solenoid valve comes ON the thread trimmer roller enters the cam groove. |
| ⑦ V07 needle thread wiper solenoid valve | : When the solenoid valve comes ON the air purge actuates and wipes the needle thread. |
| ⑧ V08 presser plunger lowering solenoid valve | : When the solenoid valve comes ON the plunger comes down. |
| ⑨ V09 needle cooler solenoid valve (Optional) | |
| ⑩ V10 oil lubrication solenoid valve (Optional) | |
| ⑪ V11 oil pump base lowering solenoid valve | : When the solenoid valve comes ON the base comes down. |
| ⑫ V12 tension controller No. 3 drive solenoid valve | : When the solenoid valve comes ON the tension controller No. 3 closes. |

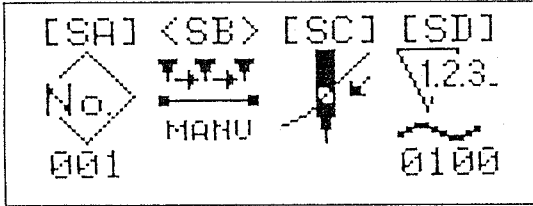
- 13 V13 Needle throw solenoid valve : When the solenoid valve comes ON the sewing is changed over to the needle throw sewing.
- 14 V14 hook air purge solenoid valve : When the solenoid valve comes ON the hook section is air purged and thread waste is removed.
- 15 V15 cloth presser arm 1 raising solenoid valve : When the solenoid valve comes ON the cloth presser arm of the stacker on the sewing machine side goes up.
- 16 V16 cloth presser arm 2 lowering solenoid valve : When the solenoid valve comes ON the cloth presser arm of the stacker on the operator side comes down.
- 17 V17 cloth brush arm raising solenoid valve : When the solenoid valve comes ON the cloth brush arm of the stacker goes up.
- 18 V18 cloth presser gauge lowering solenoid valve : When the solenoid valve comes ON the cloth presser gauge comes down.
- 19 V19 label retracting solenoid valve : When the solenoid valve comes ON the section of set label retracts.
- 21 V21 pattern board advancing solenoid valve : When the solenoid valve comes ON the pattern board gauge advances.
- 22 V22 pattern board retracting solenoid valve : When the solenoid valve comes ON the pattern board gauge retracts.
- 23 V23 pattern board brake solenoid valve : When the solenoid valve comes ON braking is applied to the pattern board at the time of its advance or retract.
- 24 V24 Z moving base raising solenoid : When the solenoid valve comes ON the Z moving base goes up.
- 25 V25 folding gauge replacement solenoid valve : When the solenoid valve comes ON air supply to the folding gauge is stopped.
- 26 V26 folding blade drive solenoid valve : When the solenoid valve comes ON the left and right folding blades advance.
- 27 V27 folding plate 5 drive solenoid valve : When the solenoid valve comes ON the folding plate 5 advances.
- 28 V28 folding plate 4 drive solenoid valve : When the solenoid valve comes ON the folding plate 4 advances.
- 29 V29 folding plate 3 drive solenoid valve : When the solenoid valve comes ON the folding plate 3 advances.
- 30 V30 folding plate 2 drive solenoid valve : When the solenoid valve comes ON the folding plate 2 advances.
- 31 V31 folding plate 1 drive solenoid valve : When the solenoid valve comes ON the folding plate 1 advances.
- 32 V32 elevating table pressure reducing solenoid valve : When the solenoid valve comes ON the raising force of the elevating table is reduced.
- 33 Pattern board brake speed controller : When this is tightened the brake force is increased when the pattern board advances or retracts.
- 34 Cloth presser gauge pressure reducing valve : When this is tightened pressing pressure of the cloth presser gauge is increased.
- 35 Elevating table pressure reducing valve : When this is tightened raising force of the elevating table, at the time of pressure reduction (V32/ON), is increased.
- 36 Folding arm raising speed controller A : When this is tightened raising speed of the folding arm is slowed down.
- 37 Folding arm raising speed controller B : When this is tightened lowering speed of the folding arm is slowed down.
- 38 Terminal post A : This is a relay circuit board for solenoid valves, sensors, switches, etc.
- 39 Terminal post B : This is a relay circuit board for solenoid valves, sensors, switches, etc.
- 40 Terminal post C : This is a relay circuit board for solenoid valves, sensors, switches, etc.
- 41 Terminal post D : This is a relay circuit board for solenoid valves, sensors, switches, etc.

5. EXPLANATION OF OPERATION PANEL FUNCTIONS



As shown below, the operation panel has two screens, standard screen and mode selection screen.
The mode selection screen has two modes, maintenance mode I and maintenance mode II (maintenance mode II is explained in this manual.).

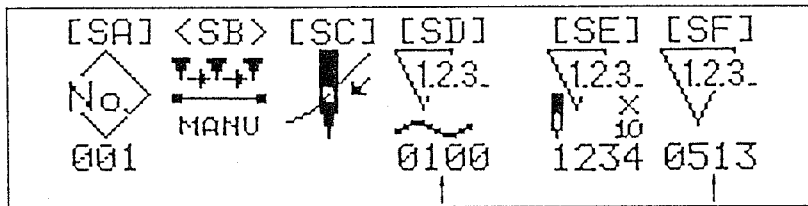
(1) Standard screen

Press the  standard screen key on the operation panel to indicate the standard screen.



Standard screen


Furthermore, many pictographs can be indicated by operating the   data modified position travel key.



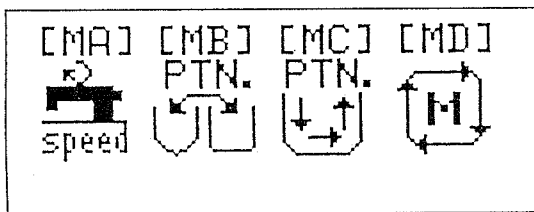
Standard whole screen

* For explanation of the individual functions, please refer to the Instruction Manual.

(2) Mode selection screen

Press the  mode selection screen key on the operation panel to indicate the mode selection screen.

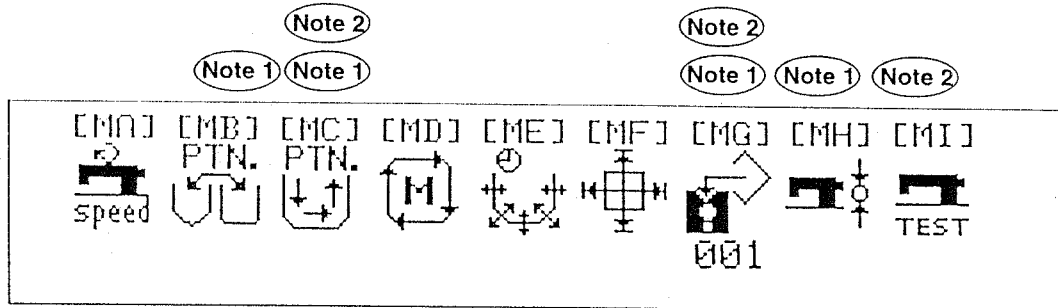


Mode selection screen

Furthermore, many pictographs can be indicated by operating the ◀▶ data modified position travel key.

① **Maintenance mode I**

For explanation of the individual functions, please refer to the Instruction Manual.

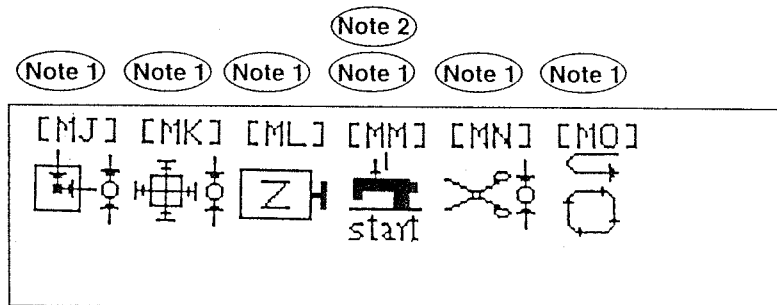


Mode selection screen (Maintenance mode I)

② **Maintenance mode II**

Furthermore, this mode can be indicated when selected with the DIP switch SW1-1 inside the operation panel (refer to the Instruction Manual on page 50.).

This function is set for adjustment at the time of manufacturing.



Mode selection screen (Maintenance mode II)

Note 1 : These are not indicated at the time of the "OPERATION MODE".

Note 2 : These are not indicated unless the sewing pattern is input.

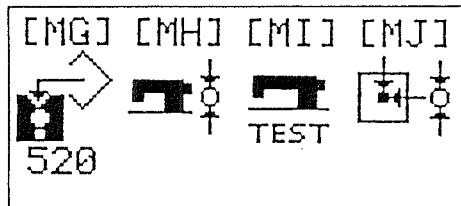
(3) X-Y origin adjustment (part 1)

This adjustment is mainly used for the assembly adjustment at the time of manufacturing.

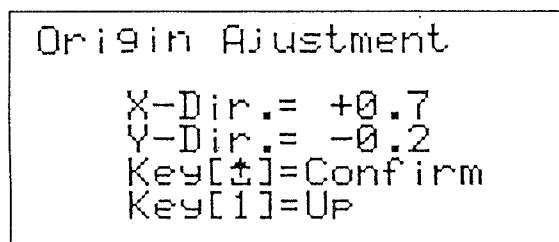
The position of the needle entry point and the holder plate can be laterally and longitudinally adjusted in 0.1 mm steps in the range of 9.9 mm.

The following conditions must be satisfied in order for this mode to be used.

- Mechanical origin adjustment must have been completed. (Refer to page 19.)
- A holder plate origin gauge must be used.
- DIP switch SW2-6 must be OFF.

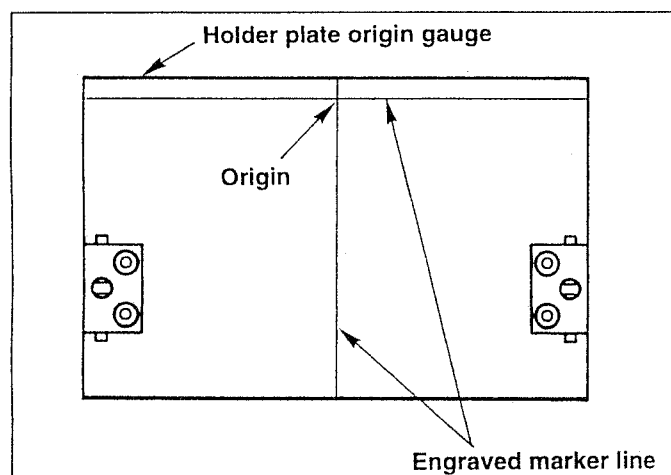


Mode selection screen

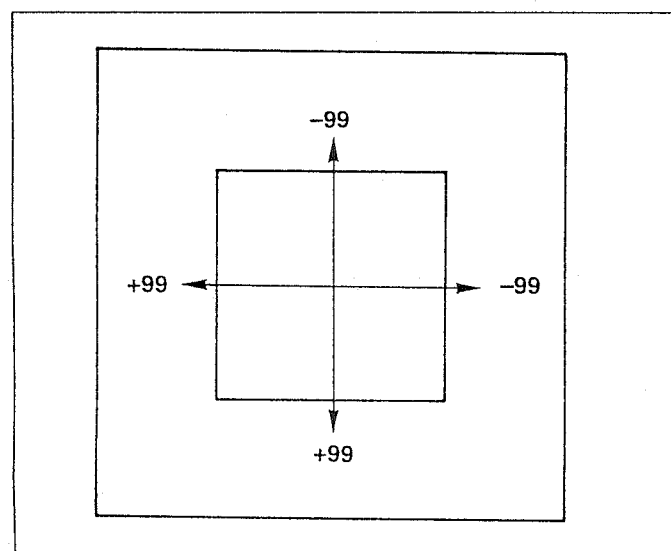


X-Y origin adjustment screen

Holder plate origin gauge



Relation of the range of adjustment



- Make the pictgraph No.[MJ] being modifying (flash on and off) in the mode selection screen, and press the \$\$\$ screen change over key.
- The screen is changed over to the X-Y origin adjustment screen. When the screen change over key is pressed, the X-Y unit searches for the origin and stays at stand-by position.

(Caution) The table automatically moves. Do not place your hands or any thing on the table.

- In this state, press following switches. Then, the respective switches perform following operations.

Numeric key : Holder plate origin gauge moves 0.1 mm to the normal direction (left) in direction X.

Numeric key : It moves 0.1 mm to the reverse direction (right) in direction X.

Numeric key : It moves 0.1 mm to the normal direction (this side) in direction Y.

Numeric key : It moves 0.1 mm to the reverse direction (rear) in direction Y.

Numeric key 1 Key [1] = Up

: If pressing this key when the indication is in "UP" state, the cloth presser goes up, and the indication is changed to "DOWN". If pressing this key when the indication is in "DOWN" state, the cloth presser comes down, and the indication is changed to "UP".

key Key [↑] = Confirm

: Cloth presser goes up, and moves to the folding position after moving to the stand-by position.

- When the enter key is pressed, the settings are stored in memory, and the holder plate moves to the stand-by position.

- When the **R** reset key is pressed without having pressed the enter key, the settings are cancelled, and the holder plate moves to the stand-by position.

(Caution) After performing this adjustment, the relative position of the folding position changes. Check whether there is any change in the folding position adjustment or the folding position and check whether needle entry of the sewing pattern comes in contact with the holder plate.

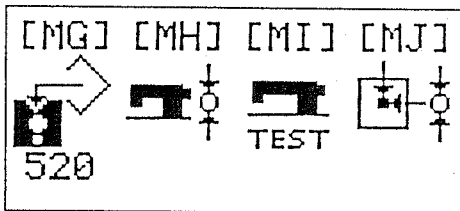
(4) X-Y origin adjustment (part 2)

This mode is used for the adjustment of the origin shift caused by re-mounting the sewing machine head or the like after the manufacturing. The position of the needle entry point and the holder plate can be laterally and longitudinally adjusted in 0.1 mm steps in the range of 9.9 mm.

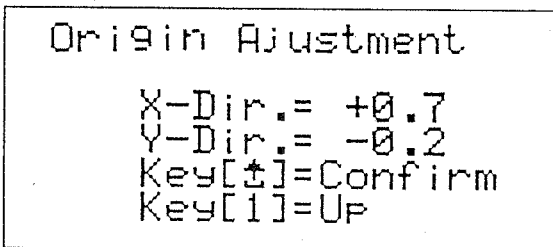
Contrary to the part 1, the holder plate origin gauge is not necessary. Adjustment is done at the off-set position (0, -50) from the position of origin in the part 1.

The following conditions must be satisfied in order for this mode to be used.

- Mechanical origin adjustment must have been completed. (Refer to page 19.)
- DIP switch SW2-6 must be ON.



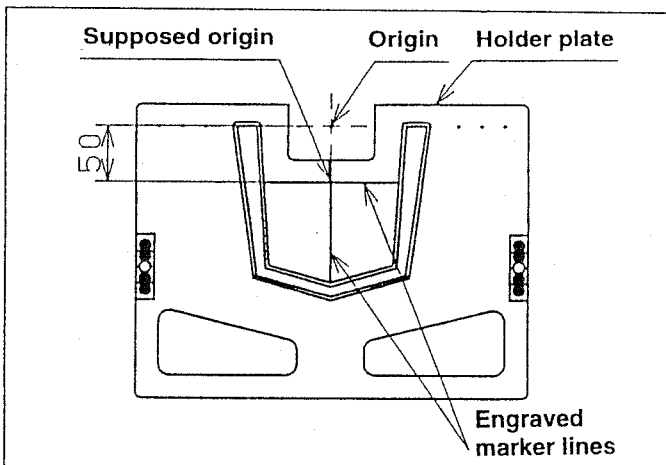
Mode selection screen



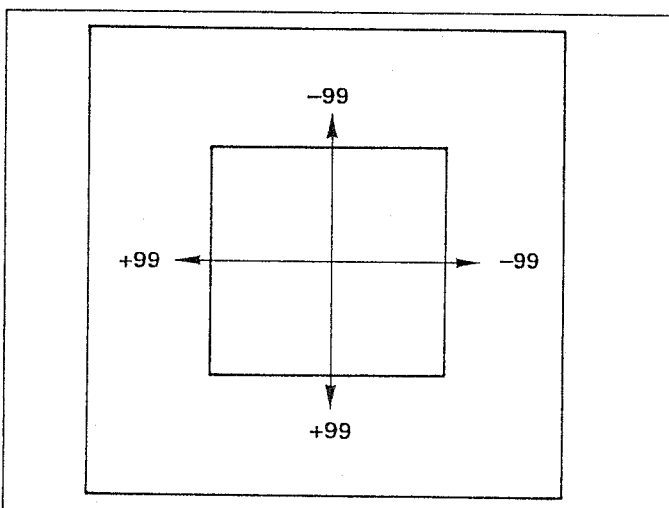
X-Y origin adjustment screen

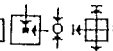


Holder plate

There is a mark of the position of origin of the part 2 only on the holder plate.











Relation of the range of adjustment



- Make the pictograph No. [MJ]  being modifying (flash on and off) in the mode selection screen, and press the  screen change over key.
- The screen is changed over to the X-Y origin adjustment screen. When the  screen change over key is pressed, the X-Y unit searches for the origin, and moves to the position where the position of origin in the part 1 has off set. Then, it stays at the stand-by position.

(Caution) The table automatically moves. Do not place your hands or any thing on the table.

- When following switches are pressed in this state, they perform following operations.
 - Numeric key  : Holder plate moves 0.1 mm to the normal direction (left) in direction X.
 - Numeric key  : It moves 0.1 mm to the reverse direction (right) in direction X.
 - Numeric key  : It moves 0.1 mm to the normal direction (this side) in direction Y.
 - Numeric key  : It moves 0.1 mm to the reverse direction (rear) in direction Y.
- Numeric key 1 Key [1] = Up
 - : When this key is pressed in the state that the indication is "UP", the cloth presser goes up, and the indication changes to "DOWN". When this key is pressed in the state that the indication is "DOWN", the cloth presser comes down, and the indication changes to "UP".
-  key Key [↑] = Confirm
 - : Cloth presser goes up, and moves to the folding position after moving to the stand-by position.
- When pressing the  enter key, the settings are stored in memory, and the holder plate moves to the stand-by position.
- When pressing the  set key without having pressed the  enter key, the settings are cancelled, and the holder plate moves to the stand-by position.

(Caution) After performing this adjustment, the folding position adjustment value is automatically selected so that the relative position of the folding position does not change. However, re-check whether there is any change in the folding position adjustment or the folding position and check whether the needle entry of the sewing pattern comes in contact with the holder plate.

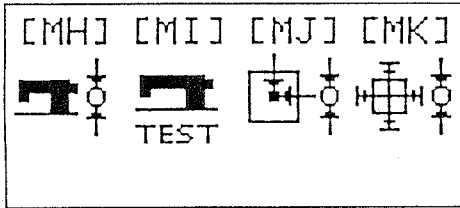
(5) Fold position adjustment

This adjustment is mainly used for the assembly adjustment at the time of manufacturing.

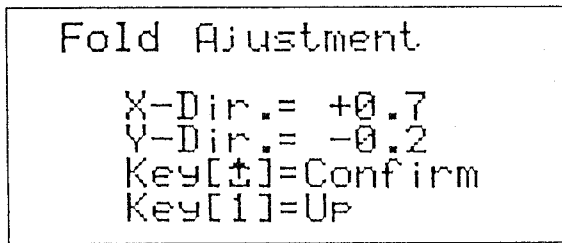
The position of the pattern board and the holder plate can be laterally and longitudinally adjusted in 0.1 mm steps in the range of 9.9 mm.

The following conditions must be satisfied in order for this function to be used.

- Origin adjustment must have been completed.
- The pattern board must be parallel to the holder plate. (Refer to page 23.)
- A holder plate origin gauge and a pattern board origin gauge must be used.

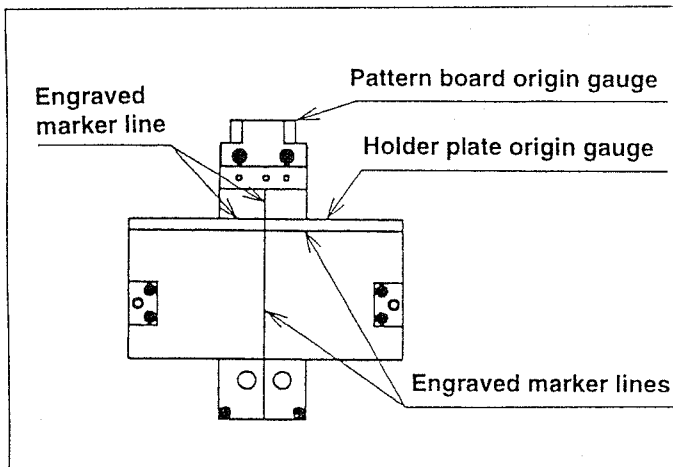


Mode selection screen

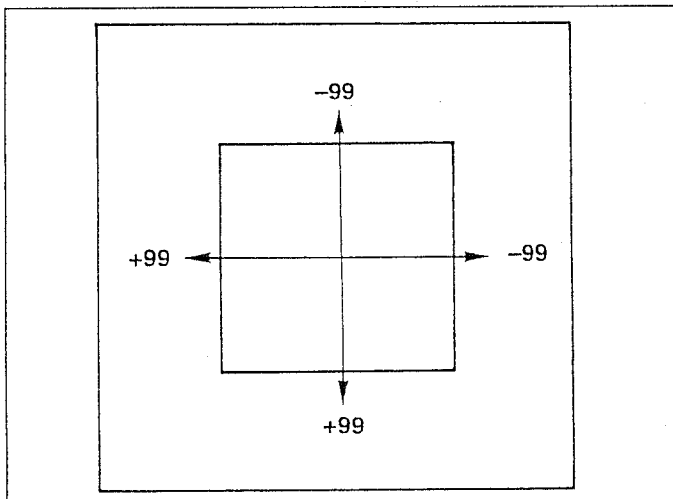





Fold position adjustment screen

Relation between the engraved marker lines of holder plate origin gauge and pattern board origin gauge




Relation of the range of adjustment





- 1) Make the pictograph No. [MK]  being modifying (flash on and off) on the mode selection screen, and press the  screen change over key.
- 2) The screen is changed to the fold position adjustment screen. When pressing the  screen change over key, the holder plate searches for the origin. After the origin retrieval the holder plate moves to the folding position and stays in the stand-by position.


(Caution) The table automatically moves. Do not place your hands or any thing on the table.

- 3) When following switches are pressed in this state, they perform following operations.

Numeric key  : The holder plate moves 0.1 mm to the normal direction (left) in direction X.

Numeric key  : It moves 0.1 mm to the reverse direction (right) in direction X.

Numeric key  : It moves 0.1 mm to the normal direction (this side) in direction Y.


Numeric key  : It moves 0.1 mm to the reverse direction (rear) in direction Y.


Numeric key "1"

: When pressing this key in the state that the indication is "UP", the cloth presser goes up and the indication is changed to "DOWN". When pressing this key in the state that the indication is "DOWN", the cloth presser comes down and the indication is changed to "UP".

 key

: The cloth presser goes up and moves to the folding position after moving to the stand-by position.

- 4) When pressing the  enter key, settings are stored in memory, and the holder plate moves to the stand-by position.

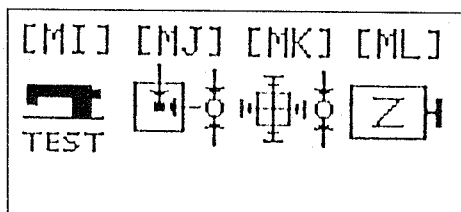
- 5) If pressing the **R** key without having pressed the  enter key, the settings are cancelled, and the holder plate moves to the stand-by position.

(Caution) After performing this adjustment, re-check to see if the folding position has changed.

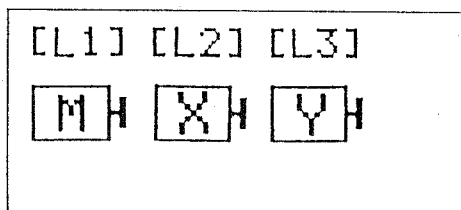
(6) Motor Z phase lock

This mode is used for origin adjustment.









Turn the main shaft motor, the X axis motor and the Y axis motor to the Z phase ((the motor encoder home position) and lock them there.



Mode selection screen



Motor Z phase lock screen

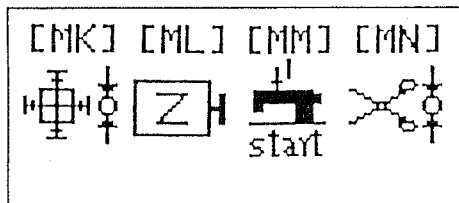
- 1) Make the pictograph No. [ML]  being modifying (flash on and off) on the mode selection screen, and press the  screen change over key.
- 2) The indication will be changed to the motor Z phase lock screen.
- 3) Main shaft motor
Make the pictograph No. [L1]  being modifying (flash on and off), and press the  screen change over key.
The motor is turned one full turn (or less) clockwise as seen from the shaft direction and stops when the Z phase is detected.
This mode is used for the initial position adjustment or the like when the main shaft motor timing belt is replaced.
- 4) X axis motor
Make the pictograph No. [L2]  being modifying (flash on and off), and press the  screen change over key.
The motor is turned one full turn (or less) clockwise as seen from the shaft direction and stops when the Z phase is detected.
One full turn of this motor moves the X unit <conveyor> 30.0 mm to the right.
This mode is used at the time of X axis motor, gear box, X timing belt or drive sprocket replacement, and at the time of origin adjustment.
- 5) Y axis motor
Make the pictograph No. [L3]  being modifying (flash on and off), and press the  screen change over key.
The motor is turned one full turn (or less) clockwise as seen from the shaft direction and stops when the Z phase is detected.
One full turn of this motor moves the Y unit <conveyor> 30.0 mm to the right.
This mode is used at the time of Y axis motor, gear box, Y timing belt or drive sprocket replacement and at the time of origin adjustment.
- 6) If the **M** mode key is pressed, the screen returns to the mode selection screen.

(7) Thread trimmer adjustment




This mode is used for the adjustment and confirmation of thread trimmer timing.

Refer to the Engineer's Manual "AVP-875 (machine head volume)" together with this section.

To adjust the thread trimmer knife, the main shaft motor can be put into free condition and the thread trimmer solenoid valve can be switched ON/OFF.

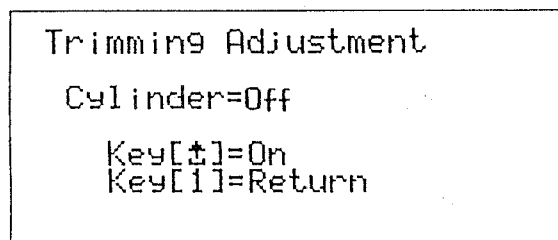


Mode selection screen

- 1) Make the pictograph No. [MN]  being modifying (flash on and off) on the mode selection screen, and press the  screen change over key.
- 2) The indication will be changed to the thread trimmer adjustment screen. At this time, the main shaft of the machine head is in free condition.
- 3) Turning the handwheel to the normal direction by hand, actuate the thread trimmer solenoid valve using the  screen change over key. At this time, check the thread trimmer action and timing.

(Caution) The thread trimmer solenoid valve can be switched ON/OFF at any angle of the handwheel. So, be careful.

- 4) In case of the state 3) (thread trimmer solenoid valve is ON.), the solenoid valve is automatically switched OFF when the handwheel reaches the position of 50°.
- 5) If the **M** mode key or the "1" key is pressed, the screen is returned to the mode selection screen.

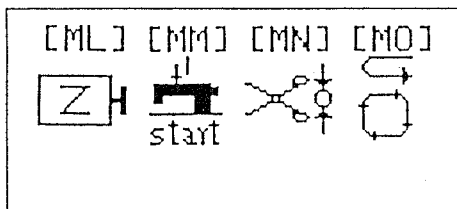


Thread trimmer adjustment screen



(8) Aging

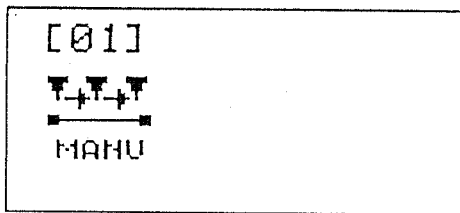
Select continuous operation for aging.

This function can be used to measure the machine's cycle time, but when using it, it is necessary to remove the crease folding unit, the pattern board and the holder plate.



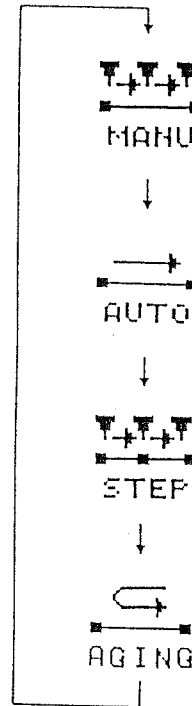
Mode selection screen

- 1) Make the pictograph No. [MO]  being modifying (flash on and off), and press the  screen change over key.



Aging screen

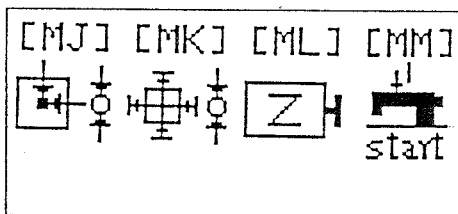
- The screen is changed to the aging screen. At this time, press the screen change over key, and the screen changes in the following order.



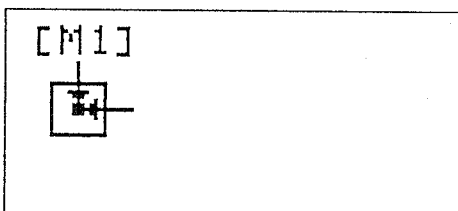
- When the enter key is pressed, the screen returns to the mode selection screen.

(9) Independent machine head operation

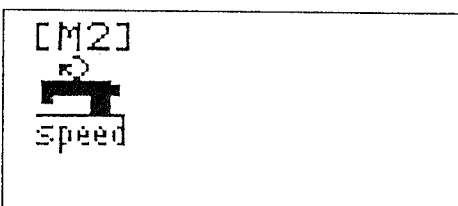
The machine head can be driven independently along the sewing pattern, without driving the X and Y motors. This function makes it possible to check the amount of oil supplied to the hook section in actual sewing.



Mode selection screen



Independent machine head operation screen (1)



Independent machine head operation screen (2)

- Make the pictograph No. [MM] being modifying (flash on and off) on the mode selection screen, and press the screen change over key.
- The indication will be changed to the independent machine head operation screen (1). When the screen change over key is pressed, the holder plate moves to the stand-by position after the origin retrieval. The screen is changed to the independent machine head operation screen (2).
- Press the set switches, right and left, and the machine head starts driving along the sewing pattern. When one cycle of the sewing pattern is completed, after two seconds again the head starts driving. This operation is performed continuously. To complete the operation, press the temporary stop switch.
- Press the **M** mode key, and the screen returns to the mode selection screen.

(Caution) Remove the bobbin and the needle thread from the machine head when driving the machine head under this mode.

6. ADJUSTMENTS OF PARTS

(1) Origin components

Standard Adjustment

1) X-Y origin adjustment

Holder origin gauge

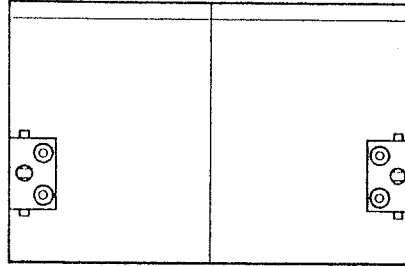


Fig. 1

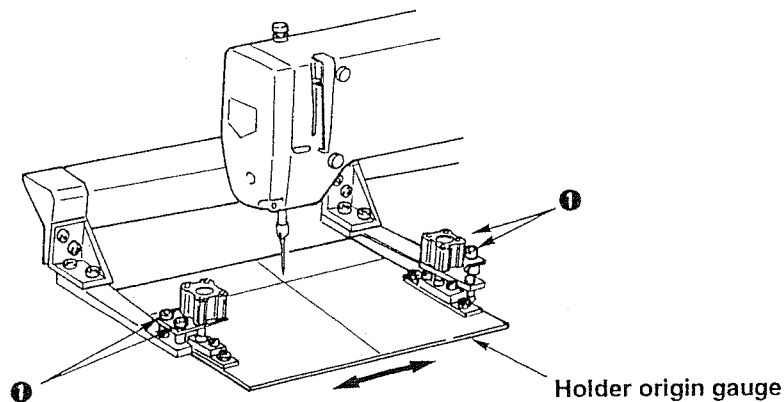
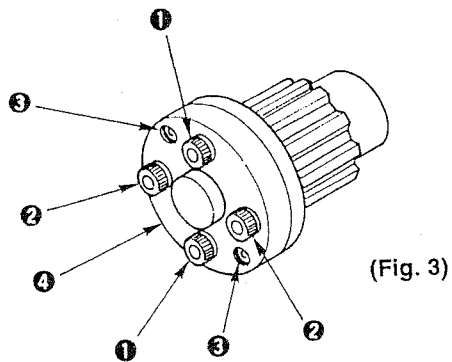



Fig. 2




(Fig. 3)

- (1) Remove screw ①, and temporarily tighten it in the tapped hole ③.
- (2) Loosen screw ②.
- (3) Tighten screw ① inserted in tapped hole ③, then coupling ④ becomes loose.
- (4) Return screw ① to the home hole, and tighten it together with screw ②. Then, the coupling can be again fixed.

Adjustment Procedures	Results of Improper Adjustment
<p>1) The following adjustments must be completed first in order for this adjustment to be performed.</p> <p>① The X and Y movement limit sensors must act before the mechanical stoppers.</p> <p>The X-Y origin adjustment mode () should be set to X=0 and Y=0.</p> <p>2) The following gauge is necessary for this adjustment. (Fig. 1) * Holder origin gauge</p> <p>3) Confirm that the gauge is attached and is in parallel. (Fig. 2) Connect the PGM-6, perform a jump, and check whether the engraved marker line on the gauge is parallel to the needle tip. When the gauge is not parallel, adjust it by loosening screw ① in the figure on the left.</p> <p>4) Keeping the PGM-6 with connected, the holder plate returns to the origin.</p> <p>5) As shown in the figure on the left, loosen the motor couplings of the X axis and the Y axis. (Fig. 3)</p> <p>6) Align the crossing point on the origin gauge with the needle entry point of the machine head, and tighten the couplings on the X axis side and the Y axis side. (Tightening torque of the coupling set screw is 4.12 Nm.)</p>	<p>The holder plate slit and the sewing pattern will become displaced from each other, causing needle breakage.</p> <p>X-Y movement limit error will be caused.</p>

Standard Adjustment

 Advance prohibiting area

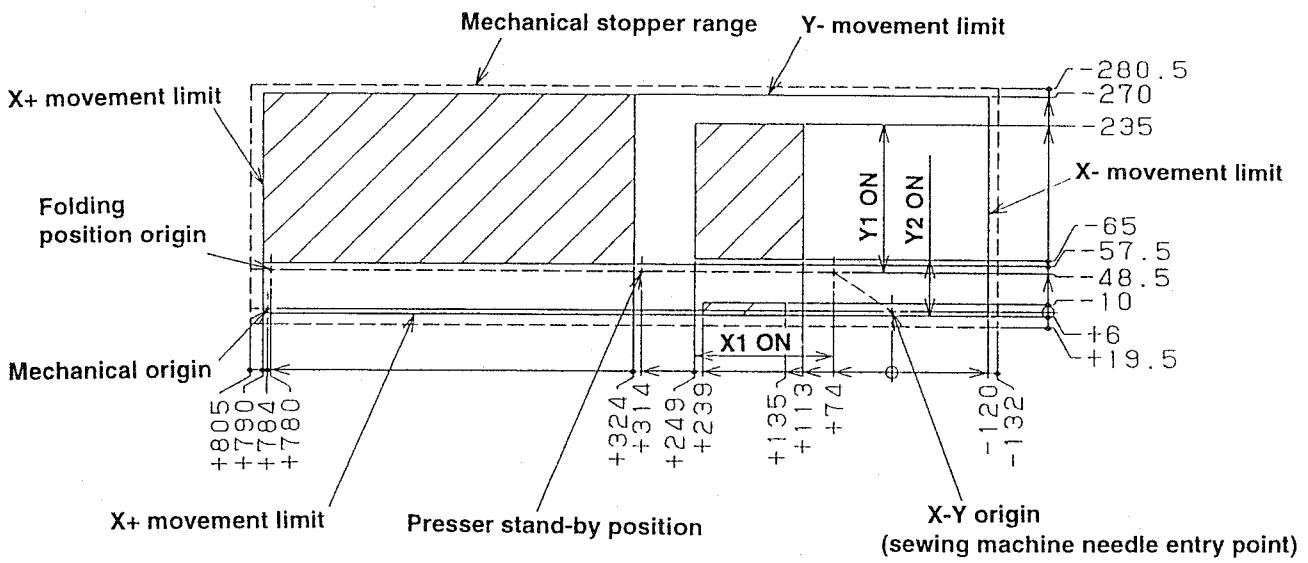


Fig. 4

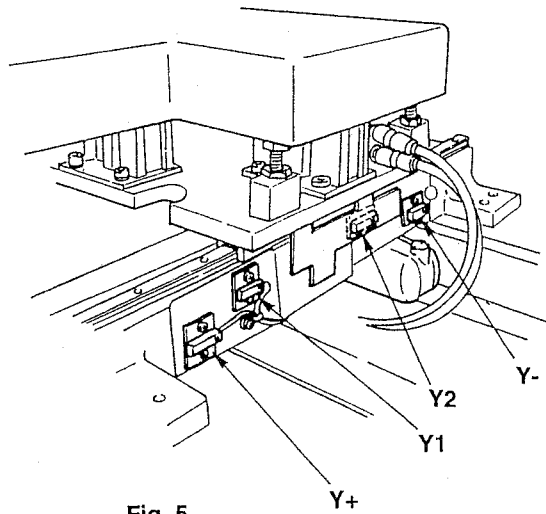


Fig. 5

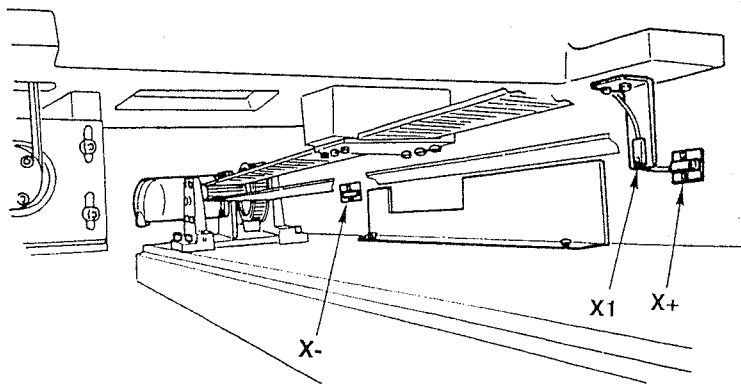


Fig. 6

Adjustment Procedures	Results of Improper Adjustment
<p>7) Keeping the PGM-6 in the connected state, select the jump feed.</p> <p>At this time, the needle entry point is at the position of origin. Move the needle entry point from this position to each numeric value, and determine the position of each sensor and fix each sensor.</p> <p>(Fig. 4, 5 and 6)</p>	<p>Movement limit error will cause the origin to shift.</p>

Standard Adjustment

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

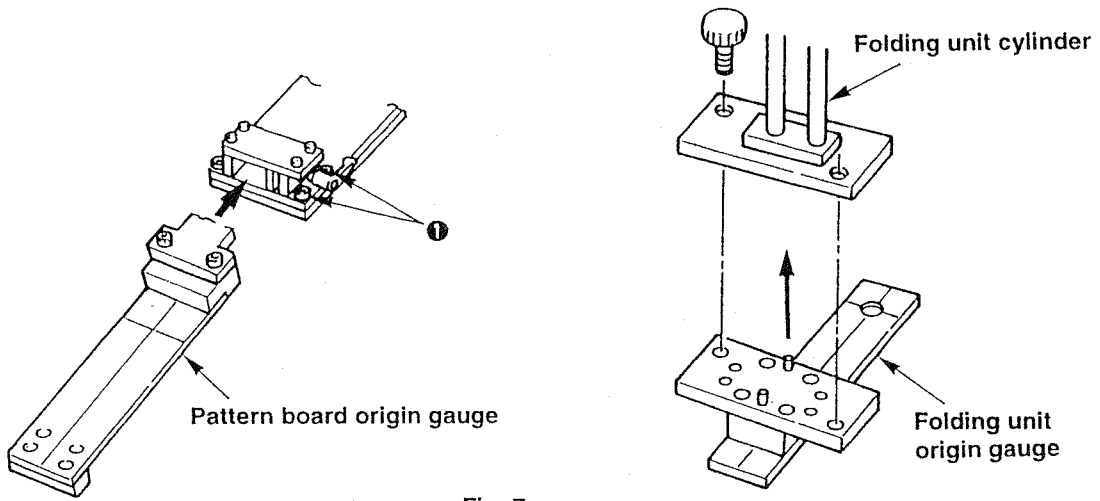


Fig. 7

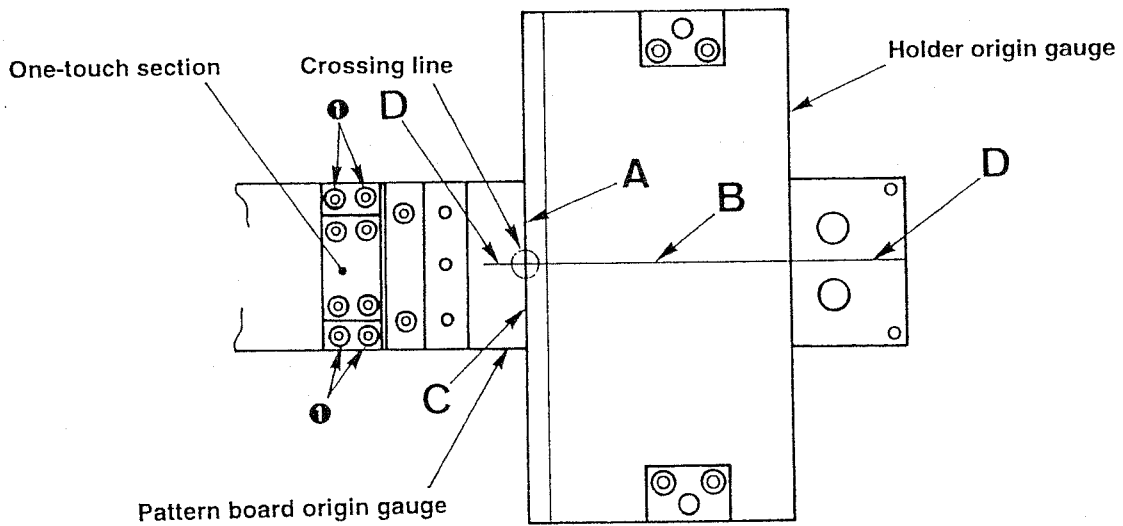


Fig. 8

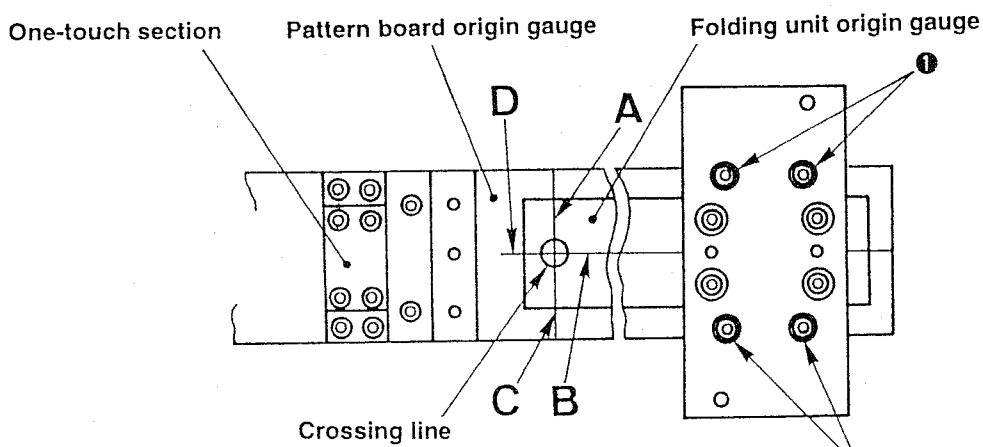





Fig. 9

Adjustment Procedures	Results of Improper Adjustment
<p>1) Attach the pattern board origin gauge and the folding unit gauge under the pattern replacement () mode. (Fig. 7)</p> <p>2) Bring the holder origin gauge on the pattern board origin gauge under the folding position adjustment mode (). (Fig. 8)</p> <p>(Note) The folding position adjustment mode should be set to X=0 and Y=0.</p> <p>3) Loosen screw ❶, and determine the position of the one-touch section so that crossing lines A and B on the holder origin gauge are aligned with crossing lines C and D on the pattern board origin gauge. (Fig. 8)</p> <p>4) Enter to the step mode (), and bring the folding unit to the lowering position.</p> <p>5) Loosen screw ❶, and determine the position of the folding unit installing plate so that crossing lines A and B on the folding unit origin gauge are aligned with crossing lines C and D on the pattern board origin gauge. (Fig. 9)</p> <p>6) Turn OFF the power to the machine.</p>	<p>Pocket folding will not be done correctly, and the edge widths will not be uniform.</p>

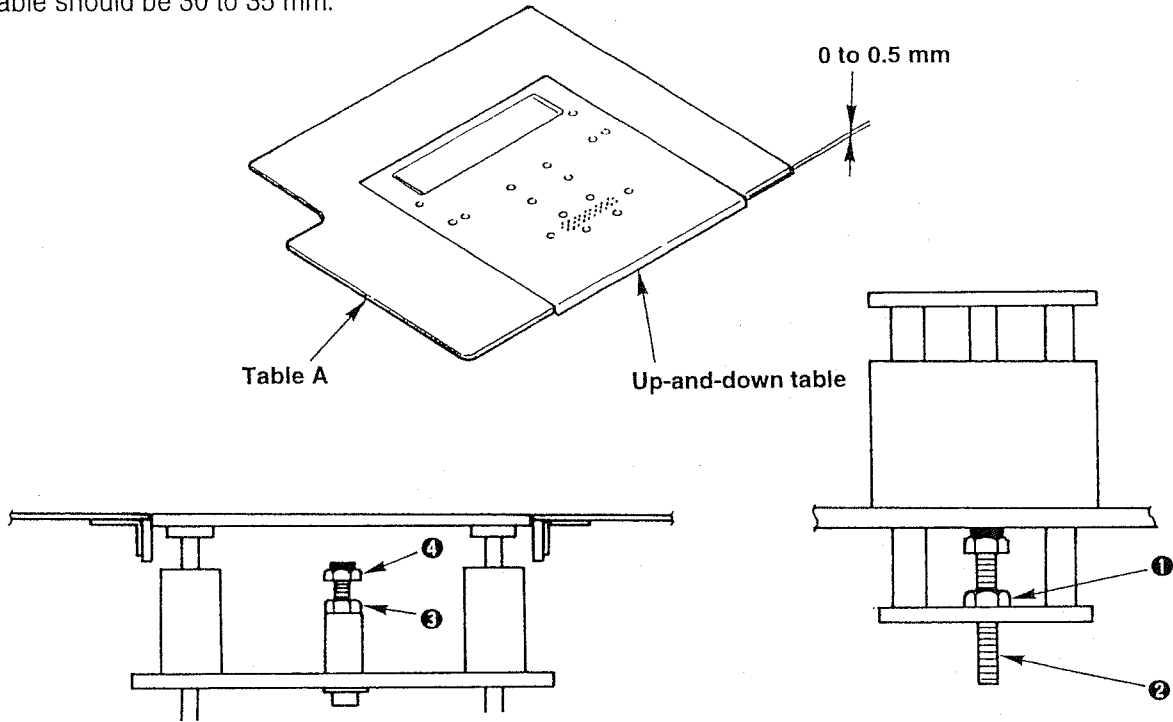
(2) Adjustments related to the folding unit

Standard Adjustment

1) Height of the up-and-down table

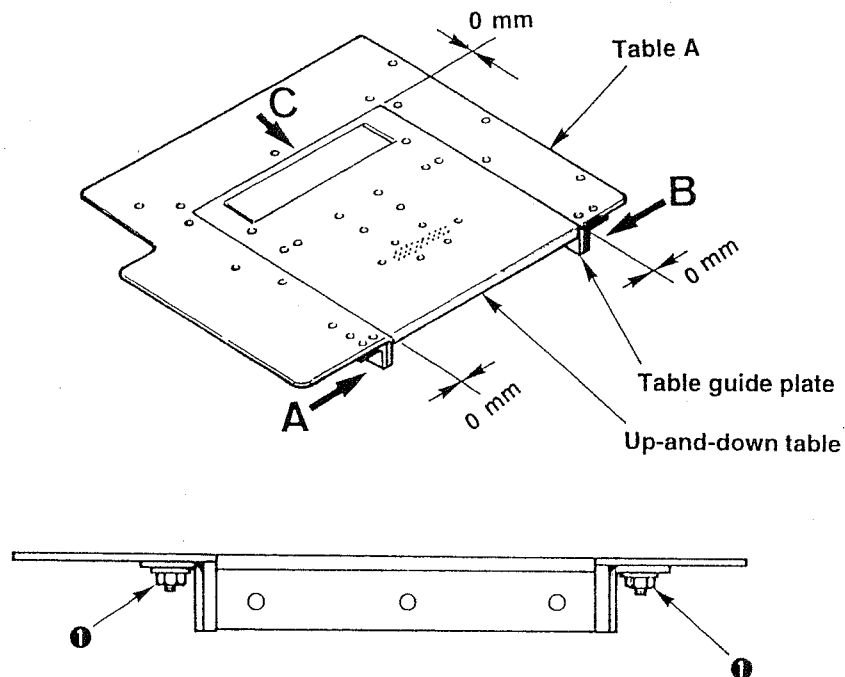
When the up-and-down table goes up, the difference in level between table A and the up-and-down table should be 0 to 0.5 mm. (Up-and-down table is above table A.)

When the up-and-down table comes down, the difference in level between table A and the up-and-down table should be 30 to 35 mm.



2) Clearance between the up-and-down table and the table guide plate

Adjust the clearance between the up-and-down table and the table guide plate (3 directions) so that the up-and-down table can go up or come down smoothly.

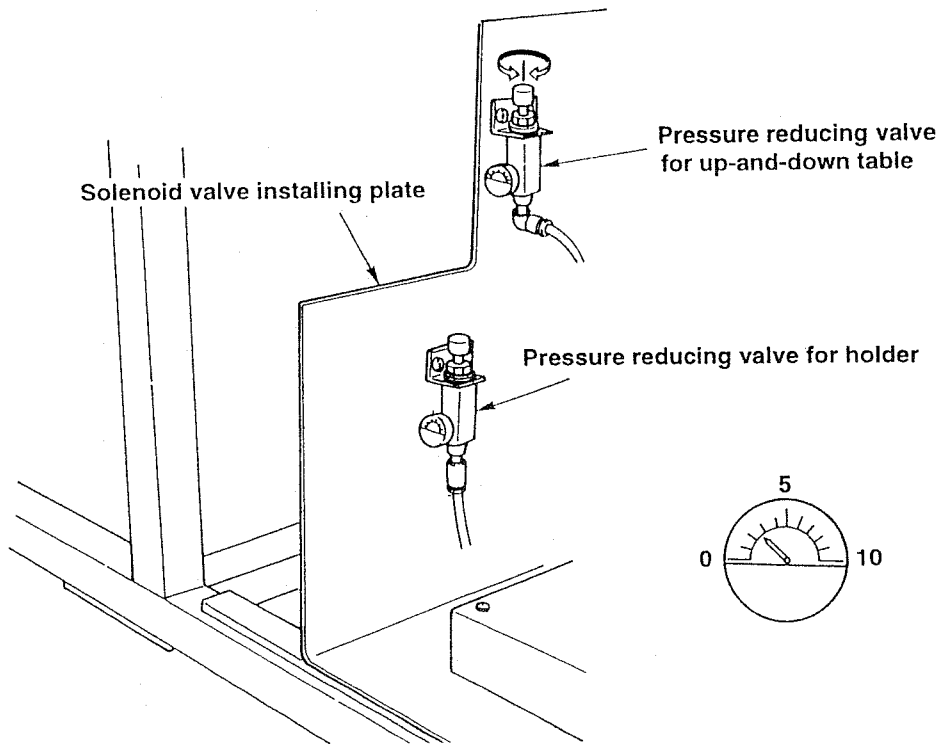


Adjustment Procedures	Results of Improper Adjustment
<p>① Up side Loosen each nut ❶ in the left and right cylinders, and adjust the height by turning stopper screw ❷ up or down.</p> <p>② Down side Loosen the two front and rear nuts ❸, and adjust the height by turning stopper screw ❹ up or down.</p> <p>(Caution) When lifting and lowering the table, make the work in the laterally equal condition. If not, a lot of load is applied to the one side cylinder, causing the service life of the cylinder to be shortened and the up-and-down movement of the table not to smoothly be performed.</p>	<p>If it is excessively lifted or lowered, causing incorrect folding or shift of conveying.</p>
<p>Loosen nine set nuts ❶, and adjust the clearance by pressing the table guide plate to three directions A, B and C.</p>	<p>If there is any clearance, when the up-and-down table goes up or comes down, garment bodies are caught in, causing shift of conveying.</p> <p>If the table guide plate is excessively pressed against the table, the up-and-down table cannot smoothly go up or come down, causing incorrect folding or shift of conveying.</p>

Standard Adjustment

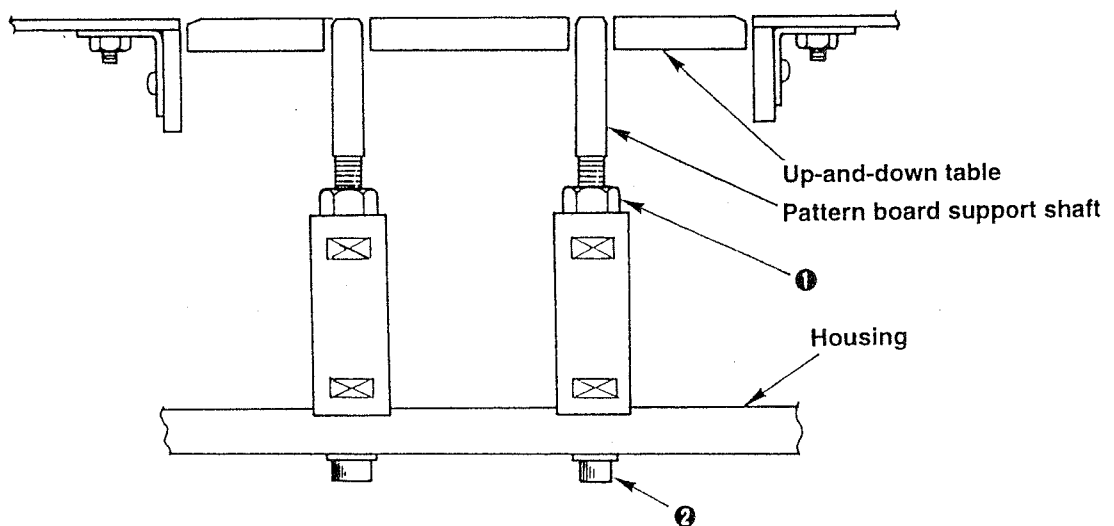
3) Pressure adjustment of the up-and-down table

The pressure, when the up-and-down table goes up, should be adjusted with the pressure reducing valve so that the pressure becomes 0.2 to 0.25 MPa (2 to 2.5 kgf/cm²).



4) Height adjustment of the pattern board support shaft

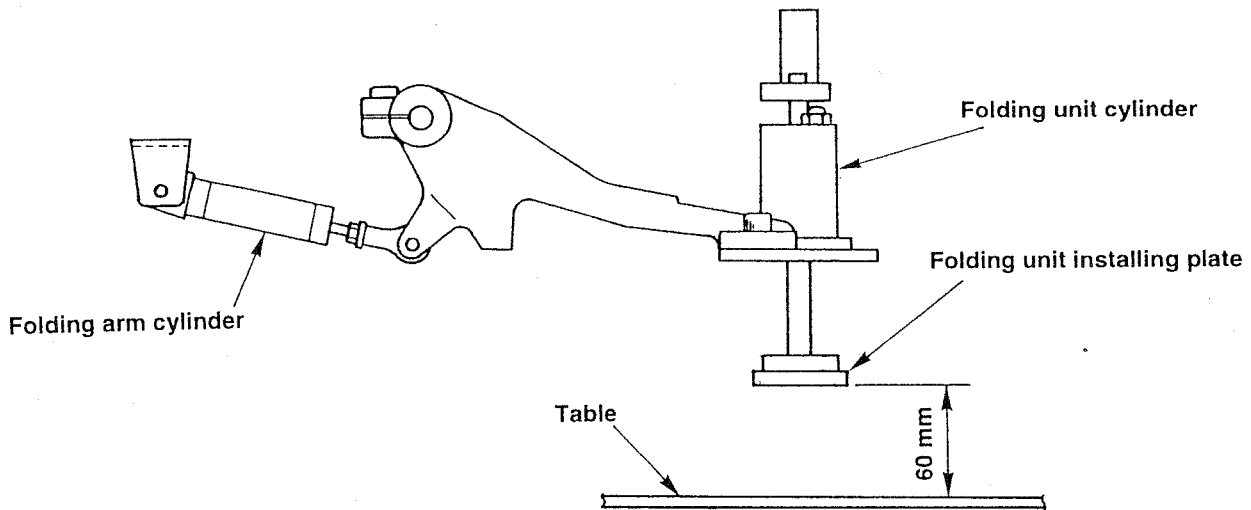
Difference in level between the pattern board support shaft and the upper surface of up-and-down table, when the up-and-down table goes up, should be "0" (flush). The support shaft should be placed in the hole center (center) of the up-and-down table.



Adjustment Procedures	Results of Improper Adjustment
<p>Loosen the nut of pressure reducing valve, and adjust the pressure by turning the knob.</p>	<ul style="list-style-type: none"> • When the pressure is excessively low : Up-and-down table does not go up, or goes up very slowly. • When the pressure is excessively high : An excessive load of up-and-down table is applied to the folding blade, resulting in defective returning.
<p>Loosen nut ❶ , and adjust so that the pattern board support shaft should be flush with the up-and-down table. Loosen nut ❷ , and adjust so that the pattern board support shaft should come to the hole center of up-and-down table.</p>	<ul style="list-style-type: none"> • When the support shaft is excessively raised, the shift of conveying will occur. • When the support shaft is excessively lowered, the pattern board is bent, resulting in defective folding.

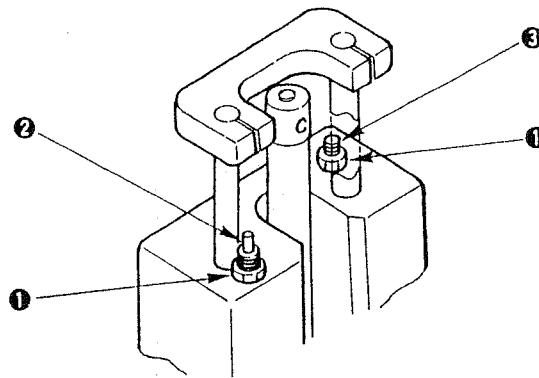
Standard Adjustment

5) Folding unit height adjustment



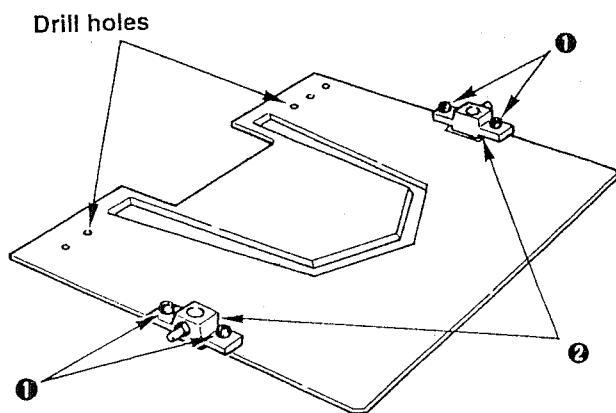
Adjust so that the distance between the lower face of folding unit installing plate and the upper face of table should be 60 mm.

Folding unit cylinder



6) Holder plate parallelism adjustment

Connect the PGM-6, and check the parallelism while confirming the drill holes of holder plate under the jump feed.



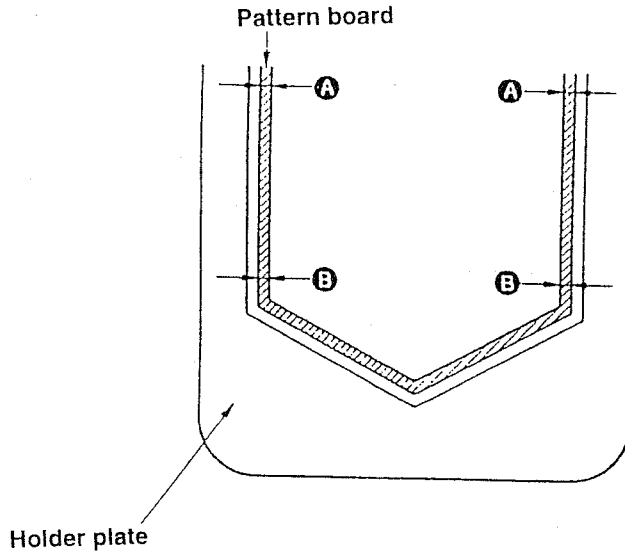
(Take for granted that the X-Y origin adjustment has been performed.)

Adjustment Procedures	Results of Improper Adjustment
<p>Loosen nut ❶ of folding unit cylinder, and perform an up/down adjustment with shock absorber ❷ and stopper screw ❸ .</p>	<p>If the adjustment value is not correct, the folding unit may not reach the pattern board, or it excessively contacts the table, causing the folding to be defective.</p>
<p>Loosen four nuts ❶ located on the left and right sides, and adjust the parallelism by moving ball catches ❷ .</p>	<p>If the holder plate is inclined, the edge width will not be uniform, and the needle will strike the holder plate, causing needle breakage.</p>

Standard Adjustment

7) Pattern board and holder plate parallelism adjustment

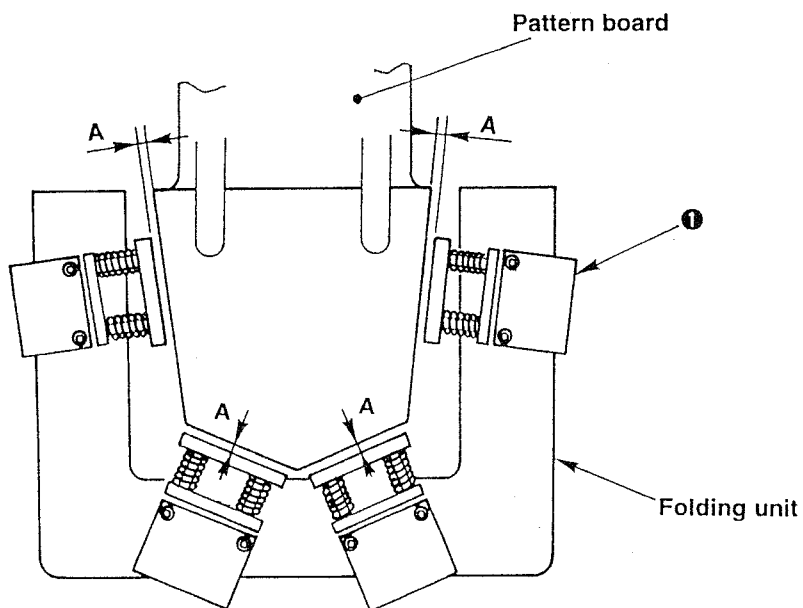
When the holder plate moves to the folding unit side, the pattern board outer circumference and the holder plate slit should be parallel ($A = B$), as shown in the figure below.

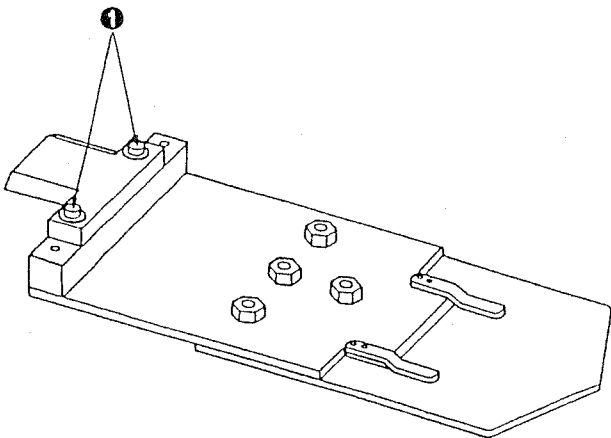


(Caution) This state is when the holder plate is parallel, and the pattern board moves vertically back and forth.

(Take for granted that the X-Y origin adjustment and the folding position adjustment should have been completed before this adjustment.)

8) Pattern board and folding blade agreement

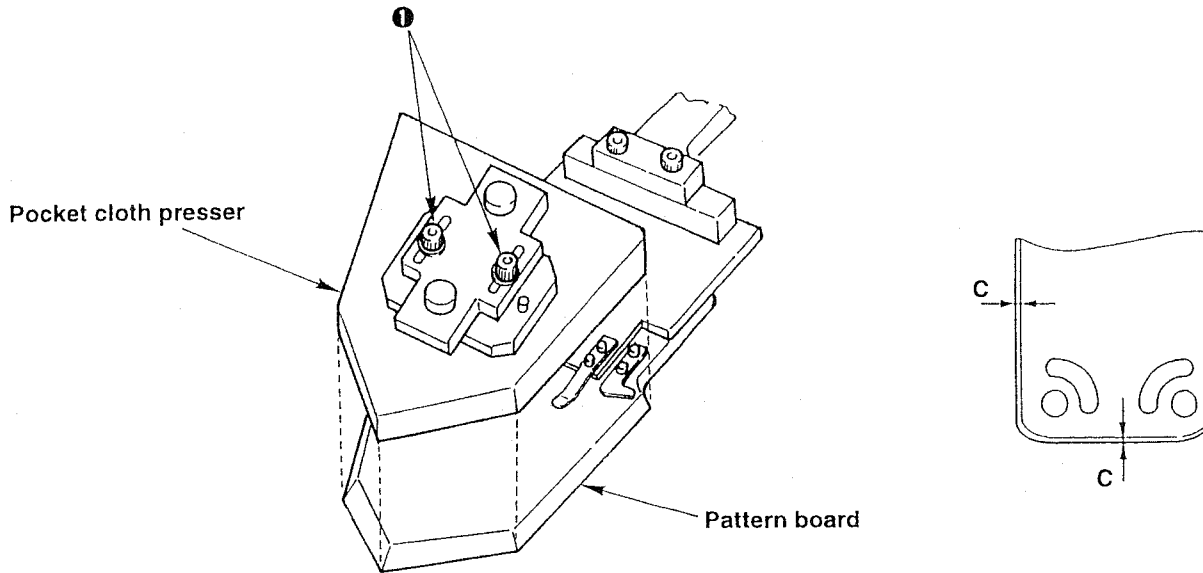


Adjustment Procedures	Results of Improper Adjustment
<p>Loosen the holder plate one-touch lock plate setscrews and adjust the inclination.</p> <p>(Caution) When the pattern one-touch installing plate one-touch section setscrews are loosened and an adjustment is performed, there will be an effect on other patterns, so do not perform this adjustment.</p> 	<ul style="list-style-type: none"> ○ The edge width will not be uniform. ○ When the pattern board is removed, the pocket shape will be deformed.
<p>Put the machine into the step mode, and adjust by loosening cylinder setscrews ❶.</p>	<ul style="list-style-type: none"> ○ If the gap with the pattern board is not uniform, the insertion of the folding blade will no longer be uniform, causing folding to be uneven, and the edge width will no longer be uniform. In addition, if the gap is too narrow, the pocket cloth will no longer be folded.

Standard Adjustment

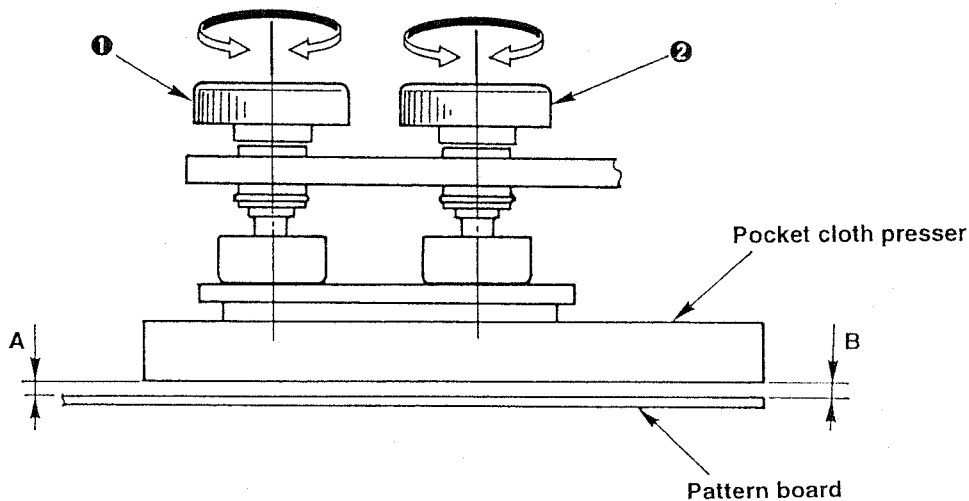
9) Agreement between the pattern board and the pocket cloth presser

The outer circumferences of the pattern board and the pocket cloth presser should be aligned with each other.



10) Pattern board and the pocket cloth presser parallel adjustment

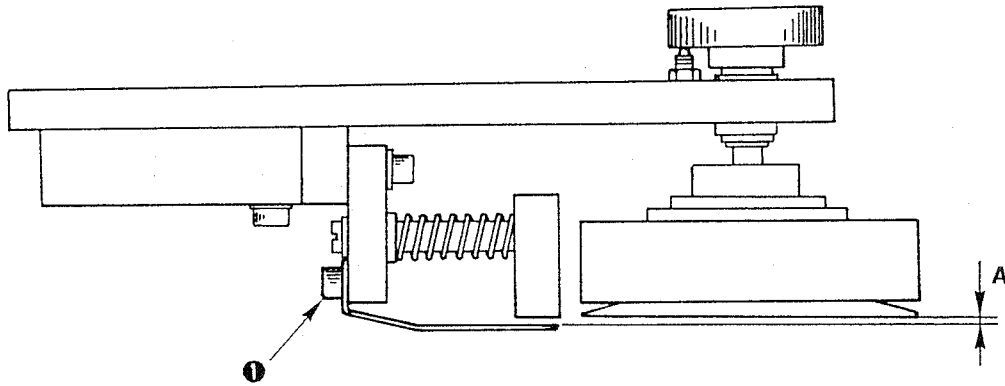
Adjust so that there is no gap between A and B, and they should be in uniform contact.



Adjustment Procedures	Results of Improper Adjustment
<p>Put the machine into the step mode, then loosen screws ❶, and adjust.</p>	<ul style="list-style-type: none"> ○ If the pattern board and the pocket cloth presser is not aligned with each other, the pocket folding blade and the pattern board positions will not be matched, causing uneven edge width, bulging, puncturing, etc.
<p>Put the machine into the step mode, and adjust the height of the pocket cloth presser by turning knobs ❶ and ❷. Both of knobs ❶ and ❷ go up or come down approximately 1 mm when they make one turn.</p>	<ul style="list-style-type: none"> ○ When the pocket cloth is folded, the cloth will slip out of place and bulge up, causing faulty folding.

Standard Adjustment

11) Pattern board and the folding blade height adjustment



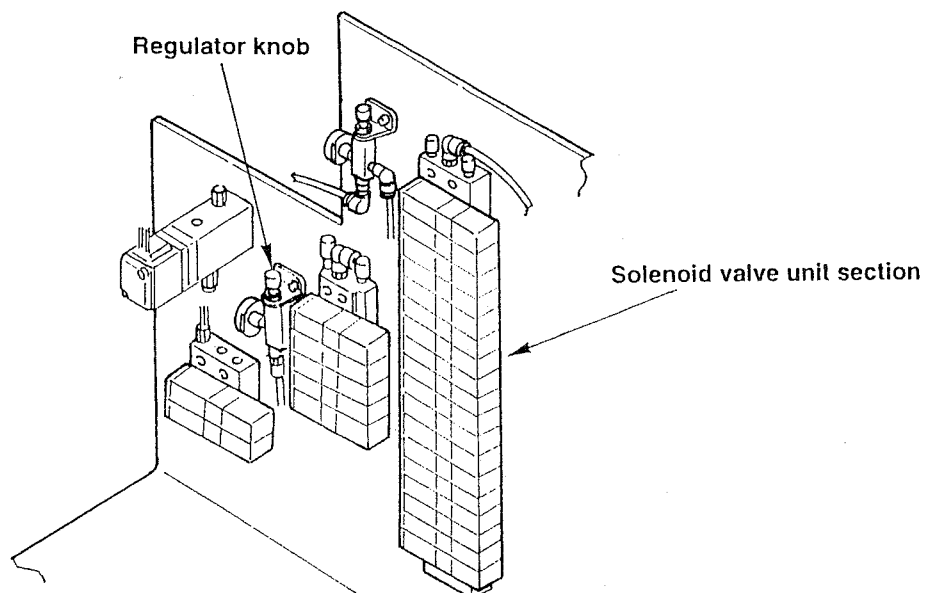
(2) Folding unit components

Standard Adjustment

1) Pressing pressure adjustment

Adjust the pressing pressure with the regulator for adjusting the pressing pressure located inside the solenoid valve unit as shown in the figure below.

Adjustment value is 0.2 to 0.5MPa.

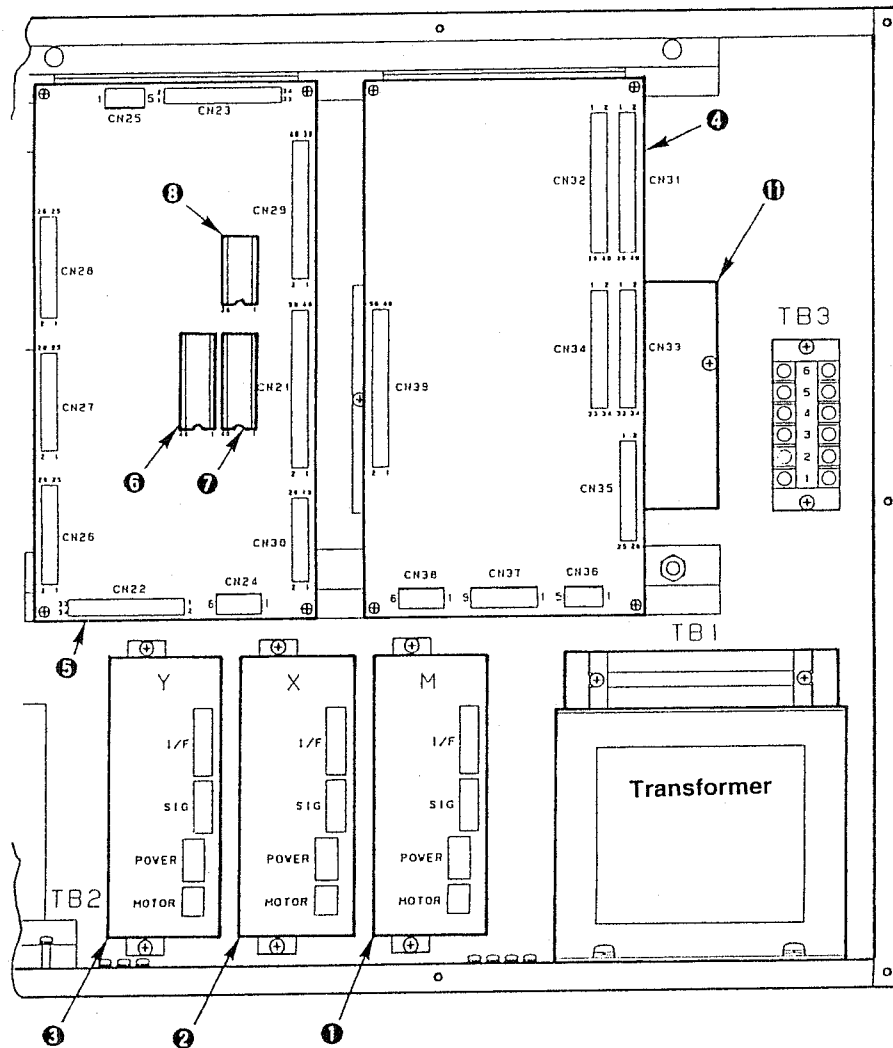


Adjustment Procedures	Results of Improper Adjustment
<p>Put the machine into the step mode, and adjust the height of the folding blade by turning the knob.</p> <p>Loosen two folding blade setscrews ❶, and adjust gap A by moving the folding blade up or down</p>	<ul style="list-style-type: none"> ○ If the gap is too narrow, it will cause faulty folding (or no folding). ○ If the gap is too wide, the pocket will bulge, causing uneven edge width.

Adjustment Procedures	Results of Improper Adjustment
<p>Turn the regulator adjusting knob clockwise to increase the pressure, or turn it counterclockwise to decrease the pressure.</p>	<ul style="list-style-type: none"> ○ If the pressing pressure is too low : Folding unit cannot press the material, and slip of garment body, pattern unmatching, puncturing, etc. will occur. ○ If the pressing pressure is too high : Friction between the garment body and the surface of table will become large, resulting in slip of garment body.

7. ELECTRICAL EQUIPMENT

(1) Names and functions of parts



- ① Servo motor driver for sewing machine control
This provides drive control of the servo motor that drives the sewing machine.
- ② Servo motor driver for X axis control
This provides drive control of the sewing pattern X direction drive servo motor.
- ③ Servo motor driver for Y axis control
This provides drive control of the sewing pattern Y direction driver servo motor.

④ I/O circuit board

This produces output signals for the cylinder drive solenoid valve, magnet, etc. upon receipt of commands from the CPU circuit board. Also, this receives signals from sensors, switches, etc. in various parts of the system and processes them for sending to the CPU or the like. The DC12V power supply for use by the interface to the PGM-6 is also produced here. This controls the needle thread detector and bobbin thread detector (optional). This supplies electric power to the CPU, S and L circuit board and the PGM-6.

⑤ CPU circuit board

This performs processing for the various devices, sewing machine, floppy disk, data, etc. by means of a microcomputer. In addition, this acts as the interface to the PGM-6.

This acts as the interface to the sewing machine and X-Y axis drive servo drivers, and controls the three axis motors. This controls driving of and display on the liquid crystal control panel.

⑥ System ROM1

This E-PROM contains the program for operating the system as a whole.

⑦ System ROM2

This E-PROM contains the programs for the input device and for pattern creation.

(Caution) 1. When the CPU circuit board has been replaced, also replace PROM ⑧.

It is not necessary to input the origin adjustment value or the like.

2. Be careful to insert the PROM in the correct direction.

⑧ Data RAM

This EE-PROM contains the origin adjustment value, folding position adjustment value, etc.

⑨ 3.5 inch floppy disk driver

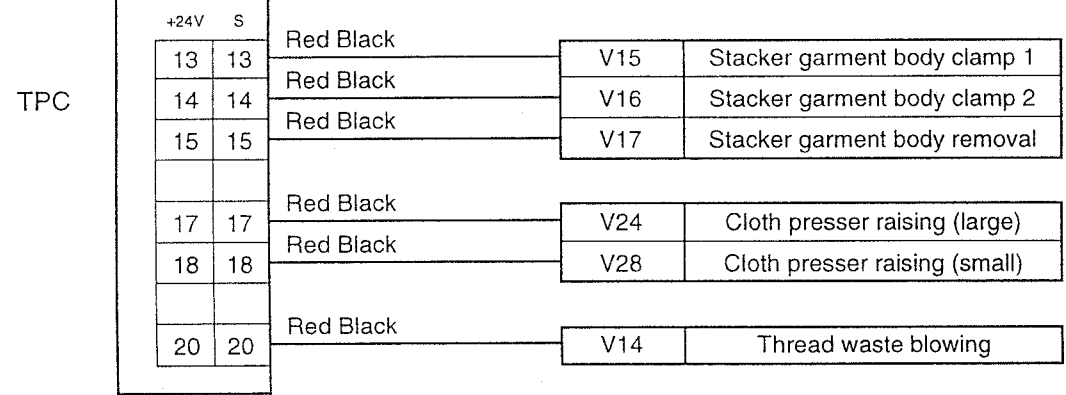
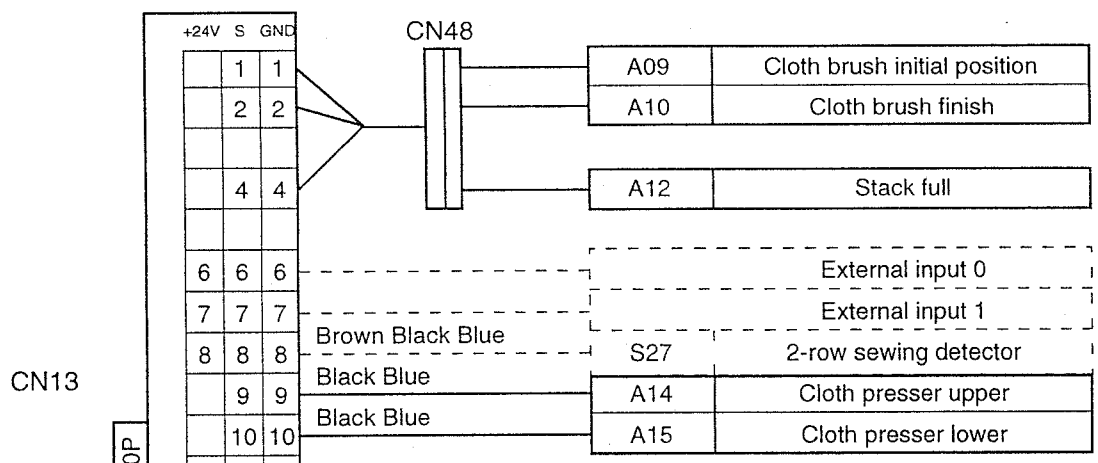
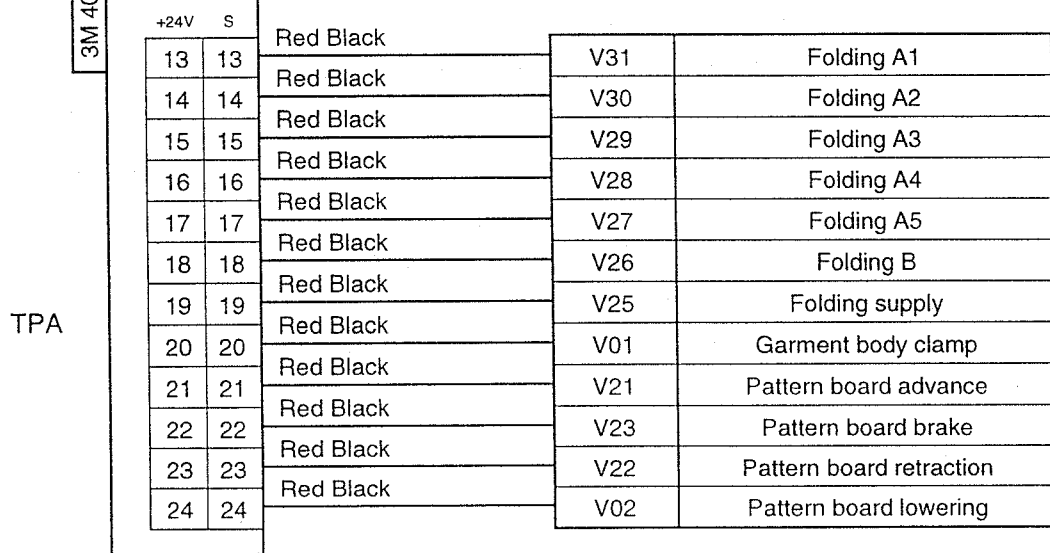
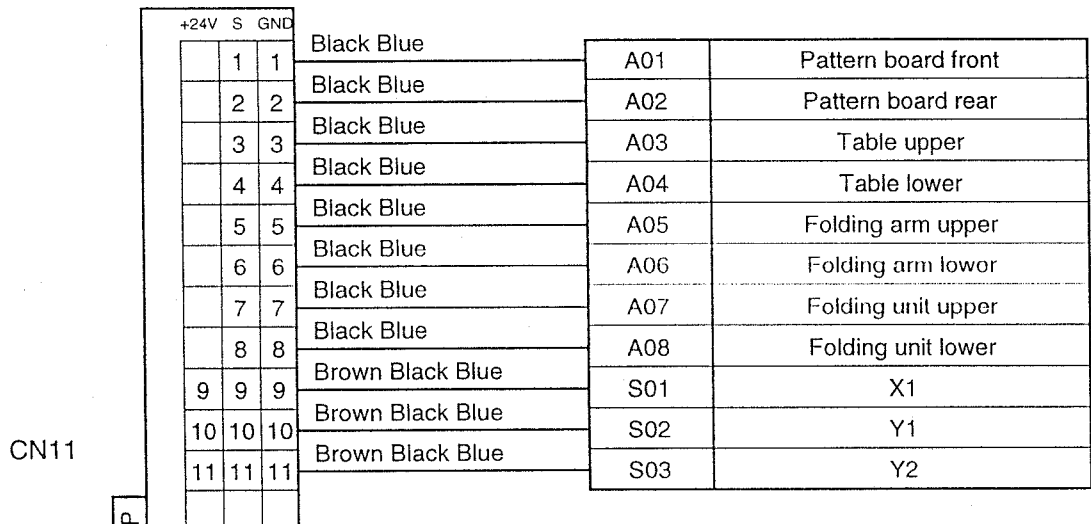
This is used for reading the pattern data and writing the pattern information, and the pattern creation when the PGM-6 is connected.

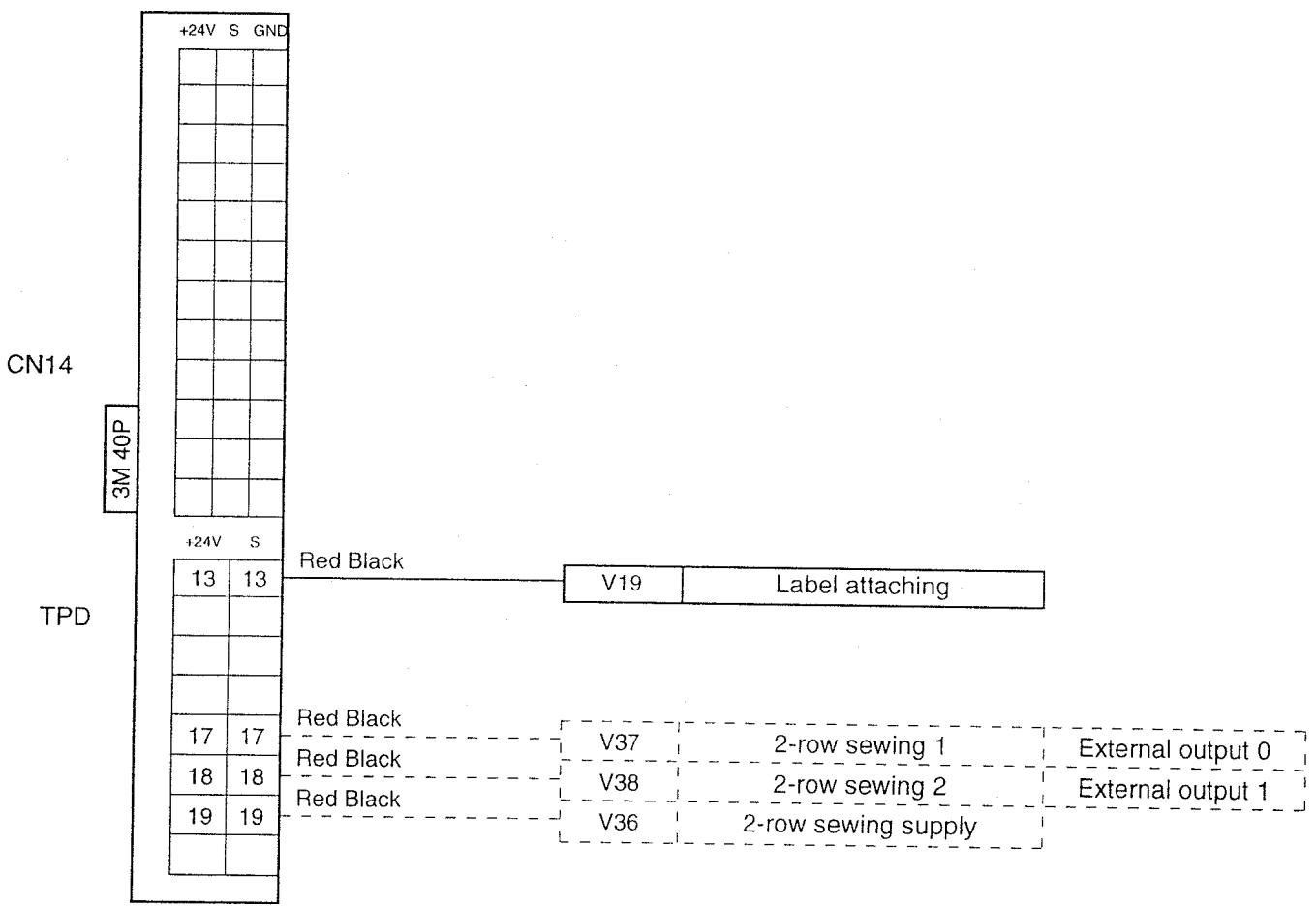
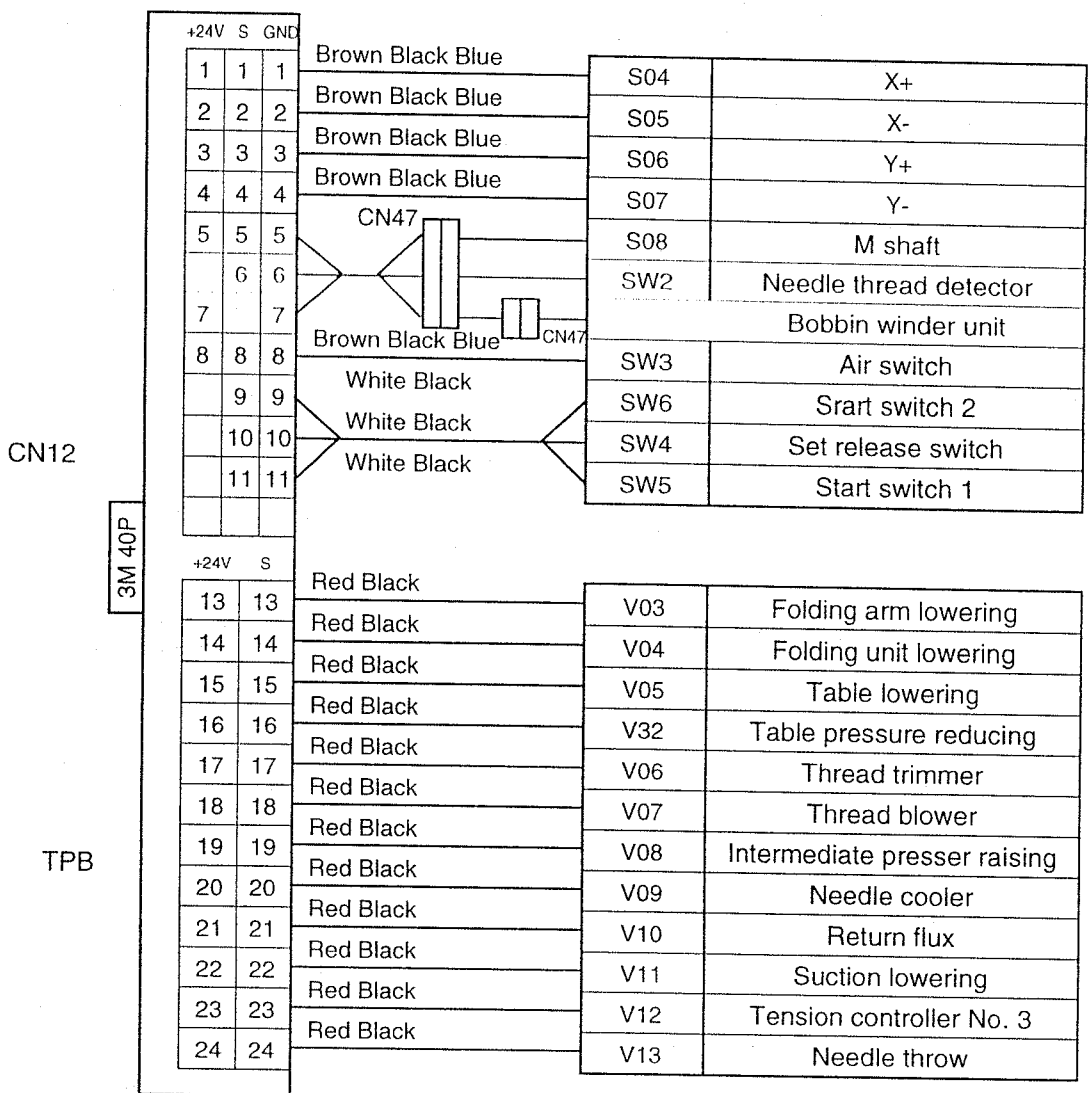
⑩ Connector for PGM-6

This is a connector for connecting the PGM-6.

⑪ Switching power source

Power source for +5V and +24V.



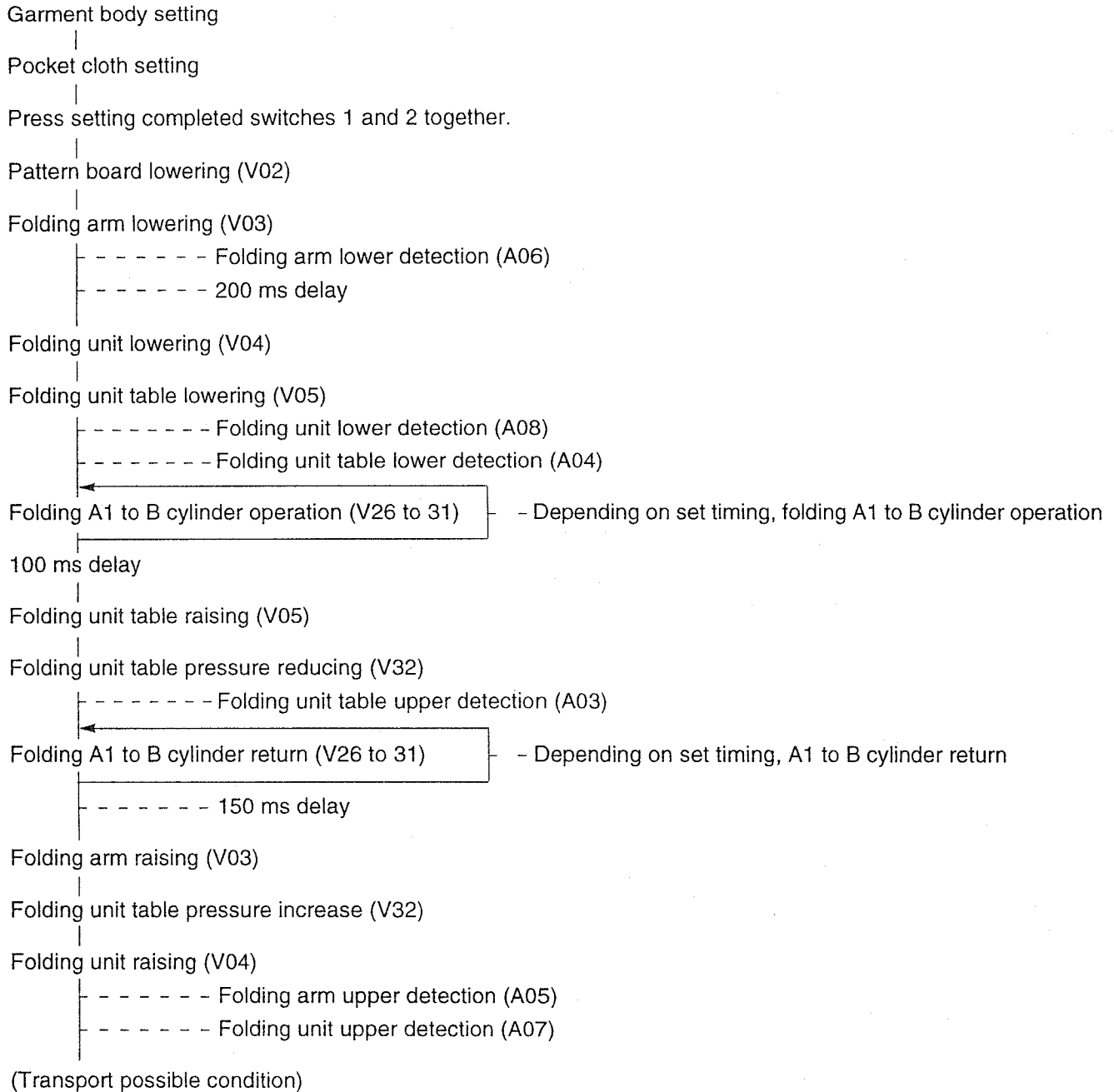


8. FLOW CHARTS

(1) Garment body setting and pocket cloth fold-in control

This chart covers operations up through garment body and pocket cloth fold-in.
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 (Sxx).

(2) Workpiece transport control

The cloth presser is raised to its highest position only after the transport of the cloth presser, when the cloth presser is above the pattern board. At other times, it is in a raised position (to prevent interference between the cloth presser and the work clamp plunger).

X-Y drive movement to folding position

Cloth presser, small, lowering (V28)

Cloth presser, large, lowering (V24)

----- Cloth presser, large, lower detection (A15)

----- Cloth presser, large, lowering delay (Selection by DIP switch SW2-2 inside operation panel)

Pattern board retraction (V22)

----- Pattern board, rear, detection (A02)

Pattern board brake ON (V23)

Pattern board raising (V02)

X-Y drive movement to start of sewing position

----- Stand-by position detection

Pattern board brake OFF (V23)

Pattern board advance (V21)

----- Pattern board, front, detection (A01)

Sewing

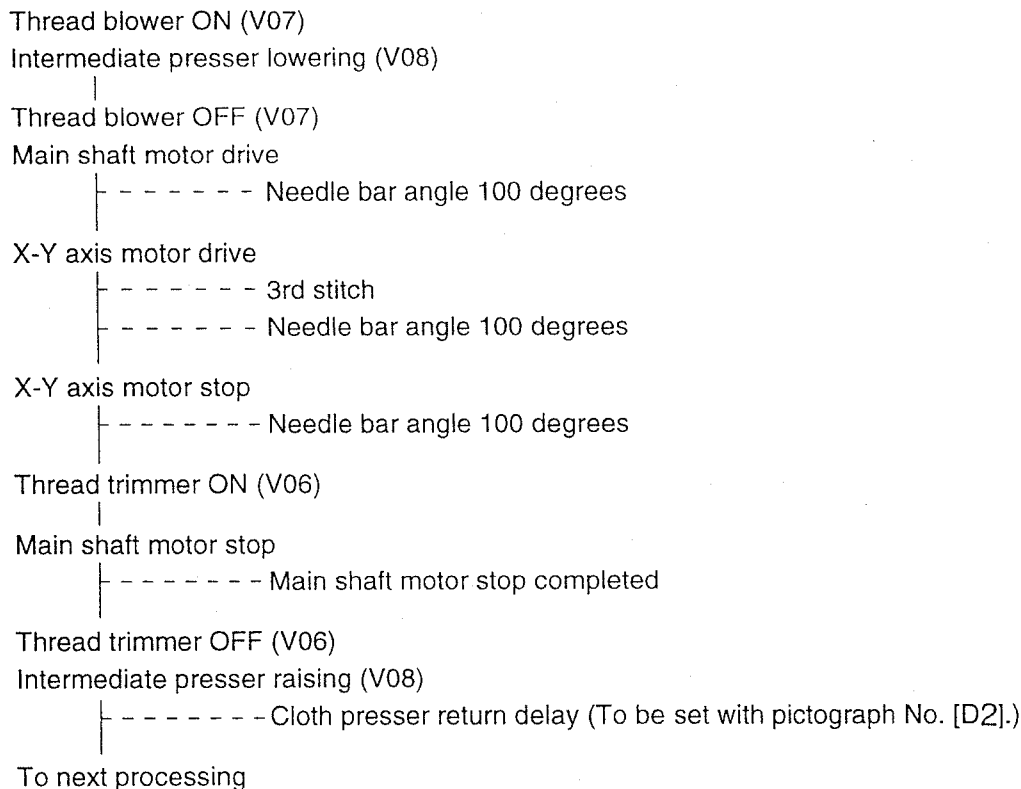
(Caution) Do similarly at the time of a folding position change or folding position adjustment.

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

(3) Sewing control

Sewing is performed in accordance with pattern data.

The following is an outline of the operation sequence at the time of sewing machine drive/stop.

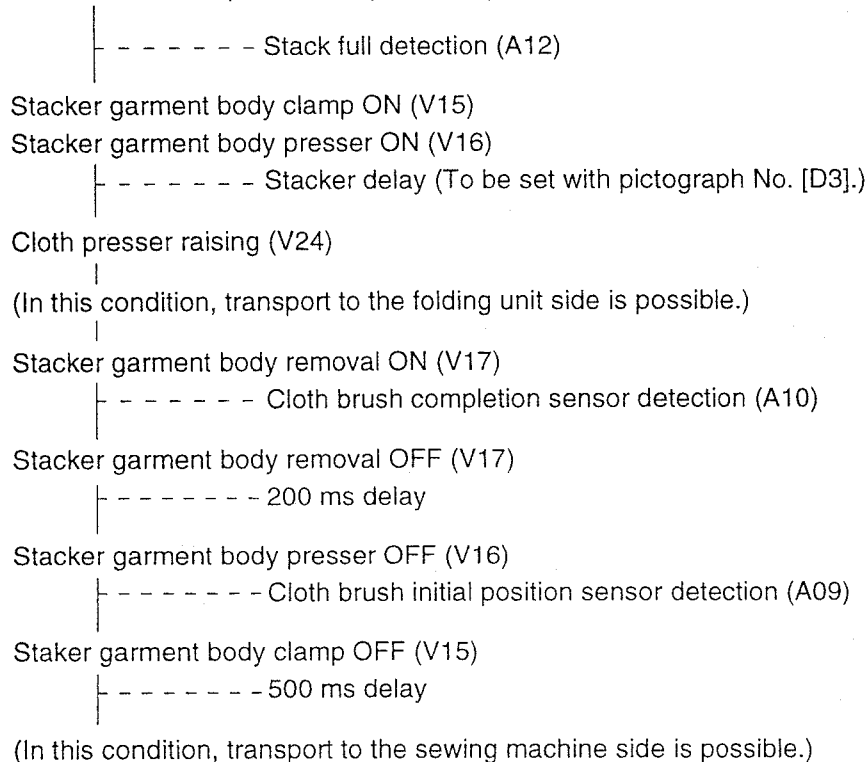


* Numbers in parentheses are solenoid valve numbers (Vxx) and automatic switch numbers (Sxx).

(4) Stacker control

After sewing is completed, the stacker is operated and the workpieces are stacked.

An outline of the operation sequence is given below.



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

9. SERVO DRIVER COMPONENTS TROUBLES AND CORRECTIVE MEASURES

Configuration

Installing section

Radiator (metal frame)

LED for display

Connector for SER

Connection with personal computer

Connector for I/F

For connecting various signals on user side

Connector for SIG

Connection with rotary encoder

Connector for POWER

R.S.T. : Power input

P.B : Terminal for regenerative resistance extension

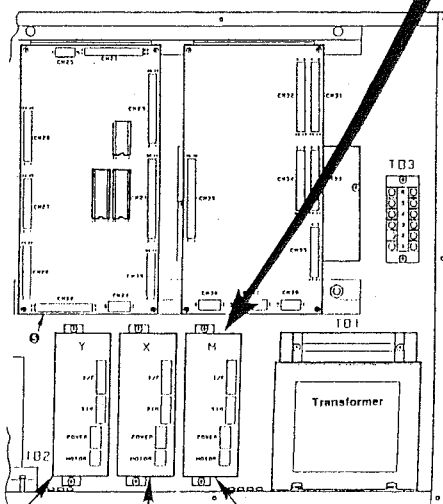
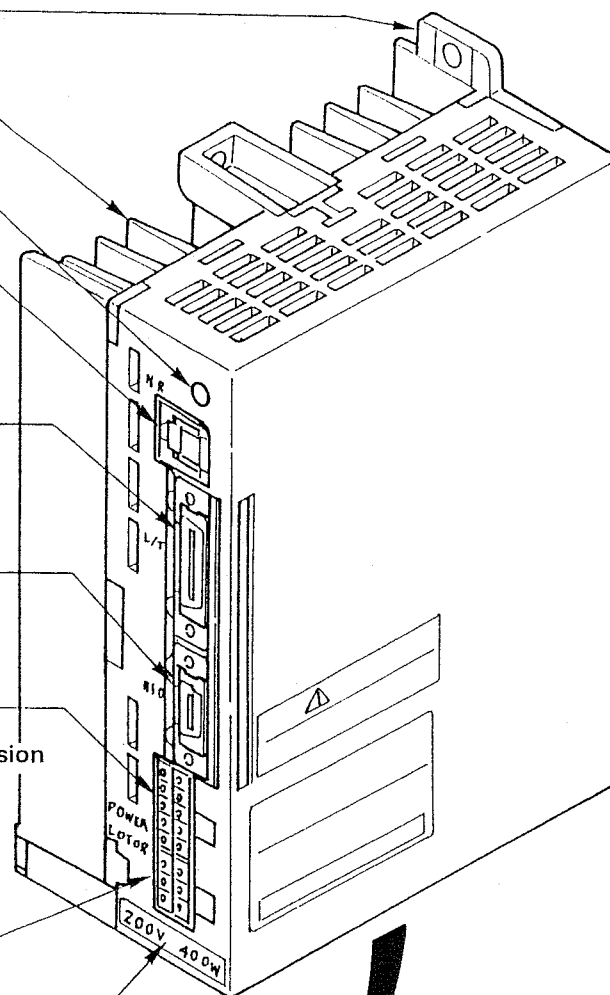
E : Grounding

Connector for MOTOR

U.V.W : Connection with motor

E : Grounding

Panel face



Y axis driver

X axis driver

M axis driver

(1) Protective functions

MSD*EX has following protective functions. When these protective functions work, the servo driver trips (motor-free state) while an alarm output signal (ALM) is turned OFF from ON.

Displaying the conditions

If the protective function of MSD*EX works, the abnormal state will be indicated by the LED's lighting or flashing (color and number of times of flashing) on the control panel.

Abnormal state indications by means of the LED for display of the driver main unit are as follows.

① When the state is normal. (LED lights up.)

Green : Servo ON

Orange : Servo OFF and servo inside the driver is ready to operate.

② When the protective function works. (LED flashes or lights up.)

■ When error recovery is possible. (It can be cleared by A-CLR signal.)

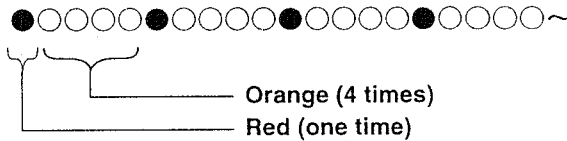
Number of flashing of the red and orange LEDs indicates the Error Nos.

(As for the Error Nos., refer to the item (2) "Details of protective functions".)

Flashing orange the unit digit

Flashing red the tens digit

Example) When the Error No. 14 (overcurrent protection trouble) has occurred, the LEDs continuously flash as follows.



Exception) However, errors relating to the wiring of encoder cannot be cleared by the A-CLR signal.

■ When error recovery is not possible. (Cannot be cleared by A-CLR signal.)

When following error protective functions work, the LED displays high-speed red flashing, or red lighting.

In these cases, turn ON the power again to reset the error.

System error protection

CPU error protection

Other error protections

2) Details of protective functions

Protective function	Error No.	LED indicator	Description	Corrective measure
Overvoltage protection	12	No. flashes.	<ul style="list-style-type: none"> ○ Voltage at the converter exceeds 400VDC or more for 200V model. Or 200VDC or more for 100V model due to regenerative energy. 	<ul style="list-style-type: none"> ○ Extend deceleration time. Or, reduce the load inertia. <p>Note) This cannot be applied to continuous use of the regenerative braking.</p>
Undervoltage protection	13	No. flashes.	<ul style="list-style-type: none"> ○ Power supply voltage drops due to instantaneous power shut off or lack of power capacity. 	<ul style="list-style-type: none"> ○ Check if the power supply voltage is within permissible range. <p>Note) Check volatage drop due to lack of power capacity, or rush current when the power is ON. In addition, check open phase of power supply.</p>
Overcurrent protection	14	No. flashes.	<ul style="list-style-type: none"> ○ Output current of the converter section has excessively increased. 	<ul style="list-style-type: none"> ○ Check short of each of motor leads U, V, and W after shutting off the power. ○ Verify the insulation resistance between the motor leads, U, V and W, and the motor ground E., and check any deterioration of insulation resistance. ○ If this protection recurs, even after checking and turning ON the power again, it represents malfunction. Shut OFF the power immediately.
Overload protection	16	No. flashes.	<ul style="list-style-type: none"> ○ Driver has been continuously used with current which exceeds ratings. 	<ul style="list-style-type: none"> ○ Make the accelerating or decelerating time longer, or reduce load. Or, extend the capacity of the motor or driver.
Detector error	17	No. flashes.	<ul style="list-style-type: none"> ○ Hardware trouble of the power supply sensor is detected. 	<ul style="list-style-type: none"> ○ Turn OFF the power, and turn it ON again.
Position error limit protection	24	No. flashes.	<ul style="list-style-type: none"> ○ Position error pulse exceeds permissible range set through the parameter No. 23 (Position error limit setting). 	<ul style="list-style-type: none"> ○ Check if the motor runs in accordance with the position command pulse. ○ Check saturation of output torque at torque monitor. ○ Set the user parameter No. 06 "Torque limit setting" to the maximum value. Verify the gain adjustment in accordance with the adjustment procedures. ○ If there is no problem on the above points, make the accelerating or decelerating time longer, reduce the load, and decrease the speed.
Deviation counter overflow protection	29	No. flashos.	<ul style="list-style-type: none"> ○ Position error pulse exceeds $2^{27} = 134217728$ or more. 	<ul style="list-style-type: none"> ○ Check as same as above.

Protective function	Error No.	LED indicator	Description	Corrective measure
Overspeed protection	26	No. flashes.	<ul style="list-style-type: none"> Motor speed exceeds a limit set through the parameter. 	<ul style="list-style-type: none"> Check whether you input excess speed command. Or, check input frequency of command pulse and division/multiplication ratio of command pulso. Check whether overshoot occurs at acceleration due to mis-adjustment of gain.
Rotation inhibit input error protection	38	No. flashes.	<ul style="list-style-type: none"> Driver trips when CW and CCW rotation inhibit input turns to OFF, interpreting this as an error. 	<ul style="list-style-type: none"> Check any errors of switch, wire, or power supply connected to CW/CCW rotation inhibit input. Especially, check start-up delay of power supply for control signal (12 to 24VDC).
Command pulse division error protection	27	No. flashes.	<ul style="list-style-type: none"> Driver trips when division/multiplication ratio which you set through parameter Nos. 25 and 26 is not proper. (too high). 	<ul style="list-style-type: none"> Set division/multiplication ratio so that command pulse frequency after division/multiplication becomes less than the max. input pulse frequency (500kpps).
Encoder connection error	21	No. flashes.	<ul style="list-style-type: none"> If there is an error on the encoder connection when the power is turned ON (normal receiving cannot be performed at all.), tripping occurs. 	<ul style="list-style-type: none"> Check the wiring and connection between the driver and the encoder and connecting condition of the connector SIG. Check the voltage of the power supply (5V±5%) on the encoder side.
Encoder communication error	22	No. flashes.	<ul style="list-style-type: none"> If there occurs an error like disconnection on the encoder connection after the power is turned ON, tripping occurs. 	<ul style="list-style-type: none"> Check the wiring and connection between the driver and the encoder and connecting condition of the connector SIG. Check the voltage of the power supply (5V±5%) on the encoder side.
EEPROM parameter error protection	36	No. flashes.	<ul style="list-style-type: none"> Shows EEPROM parameter error if the data is damaged, when you read it from EEPROM upon the power ON. 	<ul style="list-style-type: none"> Set all the parameter again and write into EEPROM.
System error protection	98	Red flashes.	<ul style="list-style-type: none"> Driver trips by judging some possible error by self-diagnosis function. 	<ul style="list-style-type: none"> Turn OFF the power once, then turn ON again. If driver still trips, showing the left display, this may represent some malfunction. Shut OFF the power immediately.
CPU error protection	30	Red flashes.		
Other error protection	99	Red flashes.		

(Note) 1. In order to restart the driver after the trip, remove the trip factor by turning OFF the power. Then turn ON the power again, or enter an alarm clear signal (A-CLR). Note, however, that you cannot reset by entering A-CLR signal when the following protective functions (when error protection concerning high speed flashing of the red or the orange LEDs of lighting trouble and encoder connection) are activated.

- Encoder connection error
- Encoder communication error
- System error protection
- CPU error protection
- Other error protection

In these cases, turn ON the power again for resetting.

2. When EEPROM parameter error protection has worked, turn ON the power again. Then check all parameters and reset them.
3. As for the overload error, the driver can be recovered by the A-CLR in 10 or more seconds after the alarm occurs.

Errors

Details of the errors are described in each instruction manual. As a supplement, the errors which will comparatively occur often, the point of consideration and the corrective measures are mainly described in this item.

There are two error returning methods, the one is possible to return the error with the alarm clear signal, and the other is necessary to reset the power.

(Classification varies somewhat in accordance with the machine series, the EX series can reset with the clear signals more than other series.)

It is convenient if all errors can be reset with the clear signals. However, please understand that it should be avoided to reset systematically the sections which are very dangerous.

In addition, be careful that some errors do not remain the history.

Encoder error

⇒ ① When the error occurs at the same time of turning ON the power.

- ⇒ • Encoder error (breakage)
- Broken wire of cable or the like (misconnection)
- Strong applied surge voltage from the controller or the like
- Drop of the encoder power voltage

Above troubles can be considered. Check and perform the work after checking which side of the motor, cable or driver is caused. In addition, check the power voltage.

② When the error occurs after turning ON the power and during operation.

- ⇒ • Partial breakage of encoder
- Defective contact of cable or the like
- Strong external noise
- Power voltage of encoder is almost a limit.

Above troubles can be considered. Check and perform the work after checking which side of the motor, cable or driver is caused. In addition, check the power voltage.

* For the EX series, the abovementioned two kinds of encoder errors can be distinguished.

Overload

⇒ Normally, this does not occur as the motor, driver trouble.

Many cases occur when the shortage of capacity (shortage of torque) or oscillation during the adjustment. In addition, if the electromagnetic brake is used for the vertical shaft or the like and the servo motor is turned ON or a command is given without releasing the brake, the machine runs a little and becomes overloaded.

Excess current error

⇒ ① When the error occurs simultaneously at the time of turning ON the power or servomotor is ON.

- ⇒ • There is a big possibility of the driver trouble.
- There is a possibility that the wire of motor made a short-circuit inside the motor or at the connection part.

② The error occurs during operation (during stop)

- ⇒ • Check the motor same as above for safe sake.

③ Dynamic brake is made due to the oscillation during the adjustment or temporary stop.

- ⇒ • Normally, there is no particular problem.

Overvoltage error

⇒ This error occurs mostly as over regeneration when the vertical shaft comes down or the horizontal shaft reduces rapidly the speed. Check the regeneration capacity.

Undervoltage error

⇒ It sometimes occurs if the time to turn ON again is short when the power is reset. The more the output capacity of the driver becomes, the more it takes time to turn ON again. As a reference, check the time until the front panel display or lamp goes off.

10. LIST OF ERROR MESSAGE

Error No.	Error message	Description of error
01	Main shaft motor error	Alarm is output from main shaft driver unit.
02	Main shaft motor error	In-position signal does not enter from main shaft driver unit.
03	Main shaft motor error	Z-phase signal cannot be detected from main shaft driver unit.
04	X axis motor error	Alarm is output from X axis motor driver unit.
05	X axis motor error	In-position signal does not enter from X axis motor driver unit.
06	X axis motor error	Z-phase signal cannot be detected from X axis motor driver unit.
07	Y axis motor error	Alarm is output from Y axis motor driver unit.
08	Y axis motor error	In-position signal does not enter from Y axis motor driver unit.
09	Y axis motor error	Z-phase signal cannot be detected from Y axis motor driver unit.
10	Air pressure drop	Air pressure is under the specified value.
11	Temporary stop	Temporary stop switch is pressed during operation. Or, when the power is ON, temporary stop switch is broken.
13	(Set release switch ON)	When the power is ON, set release switch has been pressed.
14	(Right set completion switch ON)	When the power is ON, right set completion switch has been pressed.
15	(Left set completion switch ON)	When the power is ON, left set completion switch has been pressed.
20	No pattern	This is displayed when standby key is pressed while the pattern is not read from floppy disk.
21	Needle thread broken	This is displayed when needle thread breaking.
24	Stack full	Stacker exceeds its capacity to stack.
30	X movement limit	Detected X movement limit. (S04, S05)
31	Y movement limit	Detected Y movement limit. (S06, S07)
32	X1 origin sensor error	When origin retrieving, X1 origin sensor cannot be detected. (S01)
33	X1 origin sensor error	When origin retrieving, Y1 origin sensor cannot be detected. (S02)
34	Y2 origin sensor error	When origin retrieving, Y2 origin sensor cannot be detected. (S03)
37	Cloth presser lifting place passing error	When transporting from sewing end position to folding position, cloth presser does not pass the lifting position.
38	Cloth presser stand-by position passing error	When transporting from sewing end position to folding position, cloth presser does not pass the standby position.
39	External input error	External input signal cannot be detected. (TPC 6, 7)
41	Sensor error	Main shaft position sensor cannot be detected. (S08)
42	Sensor error	Cloth presser, upper sensor cannot be detected. (A14)
43	Sensor error	Cloth presser, lower sensor cannot be detected. (A15)
44	Sensor error	Folding unit table, upper sensor cannot be detected. (A03)
45	Sensor error	Folding unit table, lower sensor cannot be detected. (A04)

46	Sensor error	Folding arm, upper sensor cannot be detected. (A05)
47	Sensor error	Folding arm, lower sensor cannot be detected. (A06)
48	Sensor error	Folding unit, upper sensor cannot be detected. (A07)
49	Sensor error	Folding unit, lower sensor cannot be detected. (A08)
50	Sensor error	Pattern board, front sensor cannot be detected. (A01)
51	Sensor error	Pattern board, rear sensor cannot be detected. (A02)
61	Sensor error	Stacker cloth brush completion sensor cannot be detected. (A10)
80	Floppy disk not inserted	Floppy disk is not set to FDD at the time of floppy disk read or write.
81	Floppy disk write protect	Floppy disk write cannot be made due to floppy disk write protect.
82	No pattern	No pattern at time of floppy disk read or write
83	Patterns do not agree.	Pattern in floppy disk and pattern in the sewing machine are different at the time of floppy disk write of folding timing or folding position.
84	Data error	Data error at time of floppy disk read
85	Memory is over.	Data cannot be stored in floppy disk at time of floppy disk read.
86	Volume is over.	Data cannot be stored in floppy disk at time of floppy disk write.
90	Floppy disk error	Floppy disk sequence error
91	Floppy disk error	Floppy disk data read cannot be made.
92	Floppy disk error	Floppy disk write cannot be made.
93	Floppy disk error	Floppy disk file structure error
94	Floppy disk error	File already exists in floppy disk.
95	Floppy disk error	Formatting type of floppy disk is different.

11. ELECTRICAL TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
1. The back light on the operation panel is not lit.	1. DC+24V power is not supplied to the operation panel.	1. Power is not being supplied overall.	Check whether power is arriving at the power switch.
		2. The power switch is not ON.	Turn the power switch ON.
		3. Temporary stop switch is ON.	Release temporary stop switch.
		4. Only output voltages less than 220 V appear at the 220 V output on the secondary side of the transformer.	Check the wiring to TB1 on the primary side of the transformer, and change the tap connection to match the supply voltage.
		5. Power is not supplied to the switching power supply.	If 220V power is not arriving between pins 3 and 5 of the switching power supply P3, replace the transformer asm. with a new one.
		6. The switching power supply is defective.	With switching power supply connector P5 unplugged, if DC+24V does not appear between pins 1 and 5 on J5, replace the switching power supply.
		7. DC+24V has made a short-circuit somewhere.	Disconnect and then connect each connector in sequence to find out where the short circuit is. Turn the power OFF before disconnecting and then reconnecting these connectors.
		8. DC+24V does not appear at the I/O circuit board check pin.	Check the connection of the DC power supply cord set and the I/O circuit board assembly to CN37.
		9. DC+24V does not appear at both ends of capacitor C4 on the panel circuit board.	Check the connection of the panel cord to CN29 and J1.
	2. There is a defect inside the operation panel.	1. Defective back light	Replace the LCD circuit board asm. or operation panel asm.
		2. Defective inverter	Replace the panel circuit board A asm., or operation panel asm.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
2. The display does not appear on the operation panel.	1. The contrast variable resistor is not adjusted correctly.	1. The screen is white, so the display is unclear.	Open the switch cover on the right side of the operation panel and adjust the brightness by turning the contrast adjustment variable resistor counterclockwise (the direction that colour becomes blue.).
		2. The screen is blue, or nothing appears at all.	Open the switch cover on the right side of the operation panel and adjust the brightness by turning the contrast adjustment variable resistor clockwise (the direction that colour becomes white.).
	2. The signal does not arrive at the operation panel.	1. The cable connection is wrong or the cable is defective.	Check the connections of CN29 and J1 to the panel cord set and of J2 to the LCD circuit board assembly.
		2. The CPU circuit board is defective.	If the servo driver operation indicator LED is orange when power is turned ON and does not become green when the servo comes ON, replace the CPU circuit board assembly.
	3. The operation panel asm. is defective.	1. The LCD circuit board is defective.	If the green on the standby key is flashing, replace the LCD circuit board assembly or panel circuit board A assembly.
	4. DC+5V power is not supplied to the operation panel.	1. The switching power supply is defective.	With switching power supply connector P4 unplugged, if DC+24V does not appear between pins 1 and 5 on J4, replace the switching power supply.
			2. DC+5V is shorted out somewhere.
		3. DC+5V does not appear at the I/O circuit board check pin.	Check the connection of the DC power supply cord set and the I/O circuit board assembly to CN37.
		4. DC+5V does not appear at the CPU circuit board check pin.	Check the connections of the CPU circuit board power cord set to CN38 and CN24.
		5. DC+5V does not appear at both ends of capacitor C8 on the panel circuit board.	Check the connections of the panel cord set to CN29 and J1.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
3. When the standby key is pressed, the mode indication LED does not light up.	<ol style="list-style-type: none"> 1. Regardless of where the switch on the operation panel is pressed, the key input is not received. 2. Only the standby key input is not received. 3. Mode indication LED does not light up. 	<ol style="list-style-type: none"> 1. A connector is not connected correctly. 2. The panel circuit board is defective. 	<p>Check the connections of CN29 and J1 to the panel cord set.</p> <p>Replace the panel circuit board assembly or the operation panel assembly.</p> <p>Replace the panel circuit board assembly or the operation panel assembly.</p> <p>When the origin retrieval operation is performed while the mode indication LED does not light up, replace the panel circuit board assembly or operation panel assembly.</p>
4. Error No. 01 : Main shaft motor error	<ol style="list-style-type: none"> 1. Indication LED of the main shaft servo driver is flashing. 2. Indication LED of the main shaft servo driver is not flashing. 	<ol style="list-style-type: none"> 1. Protection function of the servo driver has worked. 1. The signal does not come from the servo driver. 2. The signal to the servo driver does not go out, or the signal from the servo driver cannot be read. 	<p>Refer to the servo driver components.</p> <p>Check the connections of the servo cord set to M/F and CN26, and check the servo cord set for broken wires.</p> <p>Replace the CPU circuit board.</p>
5. Error No. 02 : Main shaft motor error	<ol style="list-style-type: none"> 1. The in-position signal does not come from the main shaft servo driver. 	<ol style="list-style-type: none"> 1. Main shaft transmission system is locked so that in-position does not come. 2. The signal does not come from the servo driver. 3. The signal from the servo driver cannot be read. 4. The signal does not go out from the servo driver. 	<p>Replace the servo driver.</p> <p>With power OFF, check the transmission system.</p> <p>Check the connections of the servo cord set to M/F and CN26, and check the servo cord set for broken wires.</p> <p>Replace the CPU circuit board.</p> <p>Replace the servo driver.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
6. Error No. 03 : X axis motor error	1. The Z phase signal does not come from the main shaft servo driver.	1. The signal does not come from the motor encoder. 2. The signal does not come from the servo driver. 3. The signal from the servo driver cannot be read. 4. The signal is not sent from the servo driver.	Check the connections of the encoder cord set to MSIG and CN41, and check the encoder cord set for broken wires. Check the connections of the servo cord set to M/F and CN26, and check the servo cord set for broken wires. Replace the CPU circuit board assembly. Replace the servo driver.
7. Error No. 04 : X axis motor error	1. Indication LED of the X axis servo driver is flashing. 2. Indication LED of the X axis servo driver is not flashing.	1. Protection function of the servo driver has actuated. 2. The signal does not come from the servo driver. 3. The signal to the servo driver is not sent, or the signal from the servo driver cannot be read.	Refer to the servo driver components. (P.44) Check the connections of the servo cord X set to X/F and CN27, and check the servo cord X set for broken wires. Replace the CPU circuit board assembly. Replace the servo driver.
8. Error No. 05 : X axis motor error	1. The in-position signal does not come from the X axis servo driver.	1. The X axis transmission system is locked, so in-position does not come. 2. The signal does not come from the servo driver. 3. The signal from the servo driver cannot be read. 4. The signal is not sent from the servo driver.	With the power OFF, check the transmission system. Check the connections of the servo cord X set to X/F and CN27, and check the servo cord X set for broken wires. Replace the CPU circuit board. Replace the servo driver.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
9. Error No. 06 : X axis motor error	1. The Z phase signal does not come from the X axis servo driver.	1. The signal does not come from the motor encoder.	Check the connections of the encoder cord X set to XSIG and CN43, and check the encoder cord X set for broken wires.
		2. The signal does not come from the servo driver.	Check the connections of the servo cord X set to XI/F and CN27, and check the servo cord X set for broken wires.
		3. The signal from the servo driver cannot be read.	Replace the CPU circuit board.
		4. The signal is not sent from the servo driver.	Replace the servo driver.
10. Error No. 07 : Y axis motor error	1. Indication LED of the Y axis servo driver is flashing.	1. Protection function of the servo driver has actuated.	Refer to the servo driver components.
	2. Indication LED of the Y axis servo driver is not flashing.	1. The signal does not come from the servo driver.	Check the connections of the servo cord Y set to YI/F and CN28, and check the servo cord Y set for broken wires.
		2. The signal to the servo driver is not sent, or the signal from the servo driver cannot be read.	Replace the CPU circuit board.
			Replace the servo driver.
11. Error No. 08 : Y axis motor error	1. In-position signal does not come from the Y axis servo driver.	1. The Y axis transmission system is locked, so in-position does not come.	With the power OFF, check the transmission system.
		2. The signal does not come from the servo driver.	Check the connections of the servo cord Y set to YI/F and CN28, and check the servo cord Y set for broken wires.
		3. The signal from the servo driver cannot be read.	Replace the CPU circuit board.
		4. The signal does not come from the servo driver.	Replace the servo driver.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
12. Error No. 09 : Y axis motor error	1. The Z phase signal does not come from the Y axis servo driver.	<ol style="list-style-type: none"> 1. The signal does not come from the motor encoder. 2. The signal does not come from the servo driver. 3. The signal from the servo driver cannot be read. 4. The signal is not sent from the servo driver. 	<p>Check the connections of the encoder cord Y set to YSIG and CN45, and check the encoder cord Y set for broken wires.</p> <p>Check the connections of the servo cord X set to Y1/F and CN28, and check the servo cord X set for broken wires.</p> <p>Replace the CPU circuit board assembly.</p> <p>Replace the servo driver.</p>
13. Error No. 10 : Air pressure drop	1. An air pressure drop has been detected.	<ol style="list-style-type: none"> 1. The air pressure has dropped. 2. The air pressure drop detection setting is incorrect. 3. The cable connections are incorrect or the cable is defective. 4. Wiring of the pressure gauge is incorrect. 5. The air pressure drop detection function is broken. 6. The terminal post B assembly or the I/O circuit board is defective. 	<p>Check the air supply system.</p> <p>Set the air pressure drop detection setting to 0.35MPa. Set the setting value to a little lower value if the air supply pressure varies to a high degree in such a case that a big device which consumes a great deal of air is used near-by.</p> <p>Check the connections of the terminal post cord B set to CN32 and CN12, and check the terminal post cord B set for broken wires.</p> <p>Connect the red wire to the terminal post B set +24V terminal No. 8, the white wire to the SIGNAL terminal No. 8 and the black wire to the GND terminal terminal No. 8.</p> <p>When the air pressure drop detector red needle falls below the air pressure indicator black needle, and the air pressure detection lamp does not light up, replace the pressure gauge set.</p> <p>When the air pressure drop detector red needle falls below the air pressure indicator black needle, and the air pressure drop detection lamp lights up, replace the terminal post B set or the I/O circuit board.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
14. Error No. 11 : Stop while the sewing is in progress.	<ol style="list-style-type: none"> <li data-bbox="165 1265 225 1641">1. The temporary stop switch was pressed during operation. <li data-bbox="236 1265 320 1641">2. When the power is turned ON, pressing of the temporary stop switch is detected. 	<ol style="list-style-type: none"> <li data-bbox="236 786 295 1193">1. The temporary stop switch was pressed. <li data-bbox="306 786 344 1193">2. The temporary stop switch is defective. 	<p data-bbox="165 129 201 701">Release by pressing the "reset" key on the operation panel.</p> <p data-bbox="236 129 295 701">Turn the power ON again without pressing the temporary stop switch.</p> <p data-bbox="306 129 368 701">Replace the panel circuit board assembly or the operation panel assembly.</p>
15. Error No. 13	<ol style="list-style-type: none"> <li data-bbox="405 1265 491 1641">1. When the power is turned ON, pressing of the set release switch is detected. 	<ol style="list-style-type: none"> <li data-bbox="405 786 440 1193">1. The set release switch was pressed. <li data-bbox="480 786 539 1193">2. The cable connections are incorrect or the cable is defective. <li data-bbox="579 786 630 1193">3. The wiring to the set release switch is incorrect. <li data-bbox="651 786 686 1193">4. The set release switch is defective. <li data-bbox="699 786 730 1193">5. The I/O circuit board is defective. 	<p data-bbox="405 129 459 701">Turn the power ON again without pressing the set release switch.</p> <p data-bbox="480 129 560 701">Check the connections of the terminal post cord B set and the operation switch cord set to CN32 and CN12, and check both cord sets for broken wires.</p> <p data-bbox="579 129 630 701">Check the wiring following the operation switch circuit diagram.</p> <p data-bbox="651 129 686 701">Replace the set release switch.</p> <p data-bbox="699 129 730 701">Replace the I/O circuit board.</p>
16. Error No. 14	<ol style="list-style-type: none"> <li data-bbox="767 1265 853 1641">1. When the power is turned ON, pressing of the start switch 2 (right side) is detected. 	<ol style="list-style-type: none"> <li data-bbox="767 786 802 1193">1. The start switch 2 was pressed. <li data-bbox="842 786 901 1193">2. The cable connections are incorrect or the cable is defective. <li data-bbox="941 786 992 1193">3. The wiring to the start switch 2 is incorrect. <li data-bbox="1013 786 1048 1193">4. The start switch 2 is defective. <li data-bbox="1061 786 1093 1193">5. The I/O circuit board is defective. 	<p data-bbox="767 129 821 701">Turn the power ON again without pressing the start switch 2.</p> <p data-bbox="842 129 922 701">Check the connections of the terminal post cord B set and the operation switch cord set to CN32 and CN12, and check both cord sets for broken wires.</p> <p data-bbox="941 129 992 701">Check the wiring following the operation switch circuit diagram.</p> <p data-bbox="1013 129 1048 701">Replace the start switch 2.</p> <p data-bbox="1061 129 1093 701">Replace the I/O circuit board.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
17. Error No. 15	1. When the power is turned ON, pressing of the start switch 1 (left side) is detected.	<ol style="list-style-type: none"> 1. The start switch 1 was pressed. 2. The cable connections are defective or the cable is defective. 3. The wiring to the start switch 1 is incorrect. 4. The start switch 1 is defective. 5. The I/O circuit board is defective. 	<p>Turn the power ON again without pressing the start switch 1.</p> <p>Check the connections of the terminal post cord B set and the operation switch cord set to CN32 and CN12, and check both cord sets for broken wires.</p> <p>Check the wiring following the operation switch circuit diagram.</p> <p>Replace the start switch 1.</p> <p>Replace the I/O circuit board.</p>
18. Error No. 20 : No pattern	1. The standby key was pressed without a pattern being read in from a floppy disk.		<p>Read a pattern in from a floppy disk.</p> <p>* When the system is not used for a long time, backup data will sometimes be lost.</p> <p>* When the system is used after connecting the PGM-6 and performing operations, the previous pattern data will be lost.</p>
19. Error No. 21 : Needle thread broken	<ol style="list-style-type: none"> 1. Needle thread breakage is detected. 2. Thread take-up spring comes in contact with the thread breakage detection plate. 3. During sewing, the thread take-up spring is constantly in contact with the thread breakage detection plate. 4. Although the contact between the thread take-up spring and the thread breakage detection plate is normal, a needle thread breakage error appears. 	<ol style="list-style-type: none"> 1. The thread tension is defective. 2. Thread was not knotted at the sewing start. 1. With the thread breakage detection plate and the tension disk No. 2 not in contact, there is conduction between the thread breakage detection plate and the machine arm. 2. The thread breakage detection plate insulation bushing is cracked. 3. Connection of the sewing machine sensor cord is incorrect. 1. The thread take-up spring tension is too strong. 1. The I/O circuit board is defective. 	<p>Check the thread tension and the thread path.</p> <p>In sewing machine speed change mode, reduce the sewing speed at the sewing start, or lengthen the amount of needle thread remaining.</p> <p>Adjust the thread breakage detection plate mounting position.</p> <p>Replace the insulation bushing.</p> <p>Check the connection of the needle thread breakage detection wire (thread breakage detection plate).</p> <p>Adjust the thread take-up spring tension.</p> <p>Replace the I/O circuit board.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
20. Although the needle thread is broken, the needle thread breakage detector does not work.	<ol style="list-style-type: none"> 1. The needle thread breakage detector is in inoperative state. 2. The thread take-up spring and the thread breakage detection plate fail to make contact. 3. The signal fails to arrive. 	<ol style="list-style-type: none"> 1. The DIP switch of the CPU circuit board is wrongly set. 1. The thread breakage detection plate is not mounted correctly. 2. The thread take-up spring stroke is short, and it does not contact the thread breakage detection plate. 1. The cable connections are incorrect or the cable is defective. 	<p>Check the setting of the DIP switch SW1 on the CPU circuit board.</p> <p>Adjust the thread breakage detection plate mounting position.</p> <p>Adjust the thread take-up spring stroke.</p> <p>With the thread breakage detection plate not in contact, check whether +24V appears between the thread breakage detection plate and the I/O circuit board GND check pin, and whether there is conduction between it and metal parts in the sewing machine head.</p>
21. Error No. 24 : Stack full	<ol style="list-style-type: none"> 1. The stack full auto switch detected a full stack. 	<ol style="list-style-type: none"> 1. Number of workpieces of the stacker is set to the set value. 2. Number of workpieces of the stacker is not set to the set value. 3. The stack full auto switch is defective. 4. The cable connections are incorrect or the cable is defective. 5. The connections to terminal post C are in error. 1. The stack release switch is set to the release side. 2. Speed controller of the stack presser cylinder is not properly adjusted. 	<p>Release with the reset key.</p> <p>Adjust the stack full auto switch mounting position.</p> <p>Turn the air OFF, then, letting the output between the terminal post C set SIGNAL and GND No. 4 terminal move the stacker cloth presser 2, and confirm that the voltage alternates HIGH and LOW, or confirm that the operation indicator lamp lights up.</p> <p>Check the connections of the terminal post C set and the terminal post C set to CN33 and CN13, and of the stacker sensor cord set to CN48.</p> <p>Check the wiring following the stacker circuit diagram.</p> <p>Place the stack release switch on the hold side, and return with the release key.</p> <p>Re-adjust the speed controller.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
22. Stack full is not indicated.	1. The signal fails to arrive from the stack full auto switch.	<ol style="list-style-type: none"> 1. Setting of the number of workpieces of the stacker is too many. 2. The stack full auto switch is defective. 3. The cable connections are incorrect or the cable is defective. 4. The connections to the terminal post C are in error. 	<p>Adjust the stack full auto switch mounting position.</p> <p>Turn the air OFF, then, letting the output between the terminal post C set SIGNAL and GND No. 4 terminal move the stacker cloth presser 2, and confirm that the voltage alternates HIGH and LOW or confirm that the operation indicator lamp lights up.</p> <p>Check the connections of the terminal post cord C set and the terminal post C set to CN33 and CN13, and of the stacker sensor cord set to CN48.</p> <p>Check the wiring following the stacker circuit diagram.</p>
23. Error No. 30 : X movement limit	1. Movement to the limit in the X axis direction has been detected.	<ol style="list-style-type: none"> 1. The sewing pattern is too large. 2. The movement limit sensor is not in the correct position. 3. The cable is not connected correctly or the cable is defective. 4. The signal cord is not connected correctly. 5. The sensor is defective. 	<p>Check the size which the sewing machine is capable of sewing, and correct the pattern on the PGM-6. With standard specifications, the sewing area is 270X240 mm.</p> <p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Check the connections of the terminal post cord B set to CN32 and CN12.</p> <p>Connect the brown, black and blue wires from the X+ movement limit sensor to the terminal post B set +24V, SIGNAL and GND No. 1 terminals respectively. Connect the brown, black and blue wires from the X- movement limit sensor to the terminal post C set +24V, SIGNAL and GND No. 2 terminals respectively.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
24. Error No. 31 : Y movement limit	1. Movement to the limit in the Y axis direction has been detected.	<ol style="list-style-type: none"> 1. The sewing pattern is too large. 2. The movement limit sensor is not in the correct position. 3. The cable is not connected correctly or the cable is defective. 4. The signal cord is not connected correctly. 5. The sensor is defective. 	<p>Check the size which the sewing machine is capable of sewing, and correct the pattern on the PGM-6. With standard specifications, the sewing area is 270X240 mm.</p> <p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Check the connections of terminal post cord B set to CN32 and CN12.</p> <p>Connect the brown, black and blue wires from the Y+ movement limit sensor to the terminal post B set +24V, SIGNAL and GND No. 3 terminals respectively. Connect the brown, black and blue wires from the Y- movement limit sensor to the terminal post C set +24V, SIGNAL and GND No. 4 terminals respectively.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>
25. Error No. 32 : X1 origin sensor error	1. At the time of the origin retrieval, X1 origin sensor has not been detected.	<ol style="list-style-type: none"> 1. The X1 origin sensor is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The signal cord is not connected correctly. 4. The sensor is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Connect the brown, black and blue wires from the X1 origin sensor to the terminal post A set +24V, SIGNAL and GND No. 9 terminals respectively.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
26. Error No. 33 : Y1 origin sensor error	1. At the time of the origin retrieval, Y1 origin sensor has not been detected.	<ol style="list-style-type: none"> 1. Y1 origin sensor is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The signal cord is not connected correctly. 4. The sensor is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Connect the brown, black and blue wires from the Y1 origin sensor to the terminal post A set +24V, SIGNAL and GND No. 10 terminals respectively.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>
27. Error No. 34 : Y2 origin sensor error	1. At the time of the origin retrieval, Y2 origin sensor has not been detected.	<ol style="list-style-type: none"> 1. Y2 origin sensor is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The signal cord is not connected correctly. 4. The sensor is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Connect the brown, black and blue wires from the Y2 origin sensor to the terminal post A set +24V, SIGNAL and GND No. 11 terminals respectively.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>
28. Error No. 37 : Cloth presser lifting position passing error	1. At the time of transport from the sewing end position to the folding position, the cloth presser lifting position has not been passed.	<ol style="list-style-type: none"> 1. The origin sensor is not in the correct position. 2. The CPU circuit board is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Replace the CPU circuit board.</p>
29. Error No. 38 : Cloth presser standby position passing error	1. At the time of transport from the sewing end position to the folding position, the cloth presser standby position has not been passed.	<ol style="list-style-type: none"> 1. The origin sensor is not in the correct position. 2. The CPU circuit board is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Replace the CPU circuit board.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
30. Error No. 39 : External input error	1. From the sewing end position to the folding position cannot be detected.	<ol style="list-style-type: none"> 1. The origin sensor is not in the correct position. 2. The CPU circuit board is defective. 	<p>Connect the PGM-6 and adjust the movement limit sensor position.</p> <p>Replace the CPU circuit board assembly.</p>
31. Error No. 41 : Main shaft position sensor	1. Main shaft position sensor cannot be detected.	<ol style="list-style-type: none"> 1. The main shaft position sensor is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The wiring to the terminal post B set is incorrect. 4. The upper position detection sensor is defective. 	<p>Adjust the main shaft position detection sensor position and confirm that the operation indicator lamp lights up.</p> <p>Check the connections of the terminal post cord B set to CN32 and CN12, and of the sewing machine cord set and sewing machine sensor cord set to CN47.</p> <p>Check the wiring following the sewing machine sensor circuit diagram.</p> <p>Pass a piece of metal in front of the sensor detection section and confirm that the operation indicator lamp lights up.</p>
32. Error No. 42 : Cloth presser upper side sensor	<ol style="list-style-type: none"> 1. Cloth presser upper side sensor cannot be detected. 2. Cloth presser does not move or moves slowly. 	<ol style="list-style-type: none"> 1. The cloth presser upper auto switch is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The wiring to the terminal post C set is incorrect. 4. The cloth presser upper auto switch is defective. 	<p>Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the mounting position.</p> <p>Check the connections of the terminal post cord C set to CN33 and CN13.</p> <p>Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post C set SIGNAL and GND No. 9 terminals respectively.</p> <p>Move the cloth presser up or down, or move the auto switch and confirm that the operation indicator lamp lights up.</p> <p>Adjust the speed controller.</p>
		<ol style="list-style-type: none"> 1. The speed controller of the cloth presser large cylinder is not adjusted correctly. 2. The connections to the cloth presser lifting large solenoid valve terminal post are incorrect. 3. The cloth presser lifting large solenoid valve is defective. 	<p>Connect the red and blue wires of the cloth presser lifting large solenoid valve to the terminal post C set +24V and SIGNAL No. 17 terminals respectively.</p> <p>Select the step mode and confirm that the output of the terminal post C set No. 17 appears when the cloth presser operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
33. Error No. 43 : Cloth presser lower side sensor	1. Cloth presser lower side sensor has not been detected.	<ol style="list-style-type: none"> 1. The cloth presser lower auto switch is not in the correct position. 2. The cable is connected incorrectly or the cable is defective. 3. Wiring to the terminal post C set is incorrect. 4. The cloth presser lower auto switch is defective. 	<p>Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the mounting position.</p> <p>Check the connections of the terminal post cord C set to CN33 and CN13.</p> <p>Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post C set SIGNAL and GND NO. 10 terminals respectively.</p> <p>Move the cloth presser up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.</p> <p>Adjust the speed controller.</p>
34. Error No. 44 : Folding unit table upper side sensor	1. Folding unit table upper side sensor has not been detected.	<ol style="list-style-type: none"> 1. The table upper auto switch is not in the correct position. 2. The cable is connected incorrectly or the cable is defective. 3. The wiring to the terminal post A set is incorrect. 4. The table upper auto switch is defective. 	<p>Move the auto switch up or down, and confirming with the operation indicator lamp, adjust the mounting position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 3 terminals respectively.</p> <p>Move the folding unit table up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.</p> <p>Adjust the speed controller.</p>
	2. Folding unit table moves slowly.	1. Speed controller of the table lowering cylinder is not adjusted correctly.	Adjust the speed controller.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
35. Error No. 45 : Folding unit table lower side sensor	1. The folding unit table lower side sensor has not been detected.	1. The table lower auto switch is not in the correct position.	Move the auto switch up or down, and confirming with the operation indicator lamp, adjust the mounting position.
		2. The cable is not connected correctly or the cable is defective.	Check the connections of the terminal post cord A set to CN31 and CN11.
		3. The wiring to the terminal post A is not correct.	Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 4 terminals respectively.
		4. The table lower auto switch is defective.	Move the folding unit table up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.
			Adjust the speed controller.
	2. The folding unit table does not move or moves slowly.	1. Speed controller of the table lowering cylinder is not adjusted correctly.	Connect the red and black wires of the table lowering solenoid valve to the terminal post B set +24V and SIGNAL No. 15 terminals respectively.
		2. The connections to the table lowering solenoid valve terminal post are incorrect.	Select the step mode and confirm whether the output of the terminal post B set No. 15 appears when the folding arm operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.
		3. The table lowering solenoid valve is defective.	
36. Error No. 46 : Folding arm upper side sensor	1. The folding arm upper side sensor has not been detected.	1. The folding arm up auto switch is not in the correct position.	Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the mounting position.
		2. The cable is not connected correctly or the cable is defective.	Check the connection of the terminal post cord A set to CN31 and CN11.
		3. The wiring to the terminal post A is not correct.	Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 5 terminals respectively.
		4. The folding arm up auto switch is defective.	Move the folding arm up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.
			Adjust the speed controller.
	2. The folding arm moves slowly.	1. Speed controller of the folding arm lowering cylinder is not adjusted correctly.	

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
37. Error No. 47 : Folding arm lower side sensor	1. The folding arm lower side sensor has not been detected.	<ol style="list-style-type: none"> 1. The folding arm down auto switch is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The wiring to the terminal post A is incorrect. 4. The folding arm down auto switch is defective. 	<p>Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the mounting position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A SIGNAL and GND No. 6 terminals respectively.</p> <p>Move the folding arm up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.</p> <p>Adjust the speed controller.</p>
	2. The folding arm does not move or moves slowly.	<ol style="list-style-type: none"> 1. Speed controller of the folding arm lowering cylinder is not adjusted correctly. 2. The connections to the folding arm lowering solenoid valve terminal post are incorrect. 3. The folding arm lowering solenoid valve is defective. 	<p>Adjust the speed controller.</p> <p>Connect the red and black wires of the folding arm lowering solenoid valve to the terminal post B set +24V and SIGNAL No. 13 terminals respectively.</p> <p>Select the step mode, and confirm that the output of the terminal post B set No. 13 appears when the folding arm operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.</p>
38. Error No. 48 : Folding unit upper side sensor	1. The folding unit upper side sensor has not been detected.	<ol style="list-style-type: none"> 1. The folding unit up auto switch is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The wiring to the terminal post A is incorrect. 4. The folding unit up auto switch is defective. 	<p>Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the amounting position.</p> <p>Check the connections of the terminal post cord A set to CN31 and CN11.</p> <p>Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 7 terminals respectively.</p> <p>Move the folding unit up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.</p> <p>Adjust the speed controller.</p>
	2. The folding unit moves slowly.	<ol style="list-style-type: none"> 1. Speed controller of the folding unit lowering cylinder is not adjusted correctly. 	<p>Adjust the speed controller.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
39. Error No. 49 : Folding unit lower side sensor	1. The folding unit lower side sensor has not been detected.	1. The folding unit down auto switch is not in the correct position.	Move the auto switch up and down, and confirming with the operation indicator lamp, adjust the mounting position.
		2. The cable is not connected correctly or the cable is defective.	Check the connections of the terminal post cord A set to CN31 and CN11.
		3. The wiring to the terminal post A is incorrect.	Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 8 terminals respectively.
		4. The folding unit down auto switch is defective.	Move the folding unit up or down, or operate the auto switch and confirm that the operation indicator lamp lights up.
2. The folding unit does not move or moves slowly.		1. Speed controller of the folding unit lowering cylinder is not adjusted correctly.	Adjust the speed controller.
		2. The connections to the folding unit lowering solenoid valve terminal post are incorrect.	Connect the red and black wires of the folding unit lowering solenoid valve to the terminal post B set +24V and SIGNAL No. 14 terminals respectively.
		3. The folding unit lowering solenoid valve is defective.	Select the step mode, and confirm that the output of the terminal post B set No. 14 appears when the folding arm operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
40. Error No. 50 : Pattern board front sensor	1. The pattern board front sensor has not been detected.	1. The pattern board front auto switch is not in the correct position.	Move the auto switch back and forth, and confirming with the operation indicator lamp, adjust the mounting position.
		2. The cable is not connected correctly or the cable is defective.	Check the connections of the terminal post cord A set to CN31 and CN11.
		3. The wiring to the terminal post A is incorrect.	Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 1 terminals respectively.
		4. The pattern board front auto switch is defective.	Move the pattern board back and forth, or operate the auto switch and confirm that the operation indicator lamp lights up.
			Adjust the speed controller.
	2. The pattern board does not move or moves slowly.	1. Speed controller of the pattern board advance cylinder is not adjusted correctly.	
		2. The connections to the pattern board advance solenoid valve terminal post are incorrect.	Connect the red and black wires of the pattern board advance solenoid valve to the terminal post A set +24V and SIGNAL No. 21 terminals respectively.
		3. The pattern board advance solenoid valve is defective.	Select the step mode, and confirm that the output of the terminal post A set No. 21 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.
			Connect the red and black wires of the pattern board brake solenoid valve to the terminal post A set +24V and SIGNAL No. 22 terminals respectively.
		4. The wiring to the pattern board brake solenoid valve terminal post A is incorrect.	Select the step mode, and confirm that the output of the terminal post A set No. 22 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.
		5. The pattern board brake solenoid valve is defective.	Select the step mode, and confirm that the output of the terminal post A set No. 22 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure	
1. 41. Error No. 51 : Pattern board rear sensor	1. The pattern board rear sensor has not been detected.	1. The pattern board rear auto switch is not in the correct position.	Move the auto switch back and forth, and confirming with the operation indicator lamp, adjust the mounting position.	
		2. The cable is not connected correctly or the cable is defective.	Check the connections of the terminal post cord A set to CN31 and CN11.	
		3. The wiring to the terminal post A is not correct.	Check the connections of the brown (red) and blue (black) wires of the auto switch to the terminal post A set SIGNAL and GND No. 2 terminals respectively.	
		4. The pattern board rear auto switch is defective.	Move the pattern board back and forth, or operate the auto switch and confirm that the operation indicator lamp lights up.	
			Adjust the speed controller.	
	2. The pattern board does not move or moves slowly.		1. Speed controller of the pattern board retraction cylinder is not adjusted correctly.	
			2. The connections to the pattern board retraction solenoid valve terminal post are not correct.	Connect the red and black wires of the pattern board retraction solenoid valve to the terminal post A set +24V and SIGNAL No. 23 terminals respectively.
			3. The pattern board retraction solenoid valve is defective.	Select the step mode, and confirm that the output of the terminal post A set No. 23 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.
			4. The wiring to the pattern board brake solenoid valve terminal post A is incorrect.	Connect the red and black wires of the pattern board brake solenoid valve to the terminal post A set +24V and SIGNAL No. 22 terminals respectively.
			5. The pattern board brake solenoid valve is defective.	Select the step mode, and confirm that the output of the terminal post A set No. 22 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.

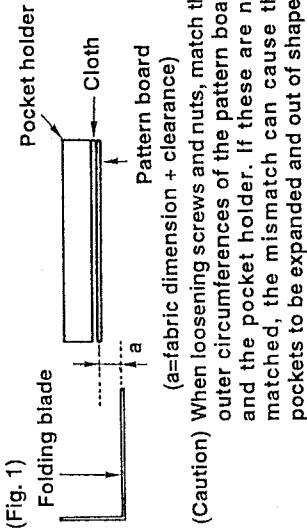
Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
42. Error No. 61 : Stacker cloth brush completion sensor	1. The stacker cloth brush completion sensor has not been detected.	<ol style="list-style-type: none"> 1. The cloth brush completion auto switch is not in the correct position. 2. The cable is not connected correctly or the cable is defective. 3. The wiring to the terminal post C is incorrect. 4. The stacker cloth brush completion auto switch is defective. 	<p>Move the auto switch back and forth, and confirming with the operation indicator lamp, adjust the mounting position.</p> <p>Check the connections of the terminal post C set to CN33 and CN13, of the terminal post C set to CN48, and of the stacker sensor cord set.</p> <p>Check the wiring following the stacker circuit diagram.</p>
	2. The stacker cloth brush does not move or moves slowly.	<ol style="list-style-type: none"> 1. Speed controller of the stacker cloth brush cylinder is not adjusted correctly. 2. The connections to the stacker cloth brush solenoid valve terminal post are incorrect. 3. The pattern board retraction solenoid valve is defective. 	<p>Adjust the speed controller.</p> <p>Connect the red and black wires of the stacker cloth brush solenoid valve to the terminal post A set +24V and SIGNAL No. 15 terminals respectively.</p> <p>Select the step mode, and confirm that the output of the terminal post A set No. 15 appears when the pattern board operates. If it appears, replace the solenoid valve. If not, replace the I/O circuit board assembly.</p>
43. Error No. 80 : The floppy disk was not inserted.	1. The floppy disk is not set in the FDD at the time of a read from or write on a floppy disk.	1. The floppy disk was not inserted, or did not go in all the way.	Restore the system with the reset key, then re-insert the floppy disk.
	2. The floppy disk was inserted into the FDD, but was not detected to have been inserted.	<ol style="list-style-type: none"> 2. The floppy disk case is broken. 3. The FDD is defective. 	<p>Replace the floppy disk with a good one.</p> <p>Replace the FDD.</p>
44. Error No. 81 : Floppy disk write protect	1. Write protect is applied to the floppy disk.	1. The floppy disk write protect tab is ON.	Slide the floppy disk write protect tab to close the hole, then restore the system with the reset key and repeat the operation.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
45. Error No. 82 : No pattern	<ol style="list-style-type: none"> 1. There is no pattern of the specified number on the floppy disk. 2. The pattern of the specified number cannot be found on the floppy disk. 	<ol style="list-style-type: none"> 1. The floppy disk is defective. 2. The FDD is defective. 	<p>Restore the system with the reset key, then check the pattern and pattern number, display the list of pattern numbers to confirm that there is a pattern of that number, then repeat the operation.</p> <p>Replace the floppy disk with a good one.</p> <p>Replace the FDD.</p>
46. Error No. 83 : Pattern disagreement	<p>* Floppy disks sometimes break, so always prepare a backup.</p> <ol style="list-style-type: none"> 1. In floppy disk write mode, when an attempt is made to write sewing information, the pattern on the floppy disk does not agree with the pattern in the sewing machine. 	<ol style="list-style-type: none"> 1. A floppy disk having a different pattern assigned to the specific number was inserted. 2. The data in the sewing machine were destroyed in some way. 3. The data on the floppy disk were destroyed in some way. 	<p>Restore the system with the reset key, then check the floppy disk and repeat the operation.</p> <p>Replace the CPU circuit board.</p> <p>Replace the floppy disk with another one onto which data were copied from the backup disk, then resume processing.</p>
47. Error No. 84 : Data error	<ol style="list-style-type: none"> 1. When the floppy disk is read, the data do not satisfy the standards. 	<ol style="list-style-type: none"> 1. The data on the floppy disk were destroyed in some way. 	<p>Replace the floppy disk with another one onto which data were copied from the backup disk, then resume processing.</p>
48. Error No. 85 : Memory overflow	<ol style="list-style-type: none"> 1. When data are read in from a floppy disk, the memory becomes full because the data exceed the available memory. 	<ol style="list-style-type: none"> 1. There are too many stitches in the pattern. 	<p>The number of stitches allowed varies somewhat depending on various factors, but in general keep the number of stitches within 15,000 and the memory required within 32 K bytes.</p>
49. Error No. 86 : Inadequate volume	<ol style="list-style-type: none"> 1. When a pattern is written onto a floppy disk, the data cannot all be stored on the disk. 	<ol style="list-style-type: none"> 1. The floppy disk empty area is less than the quantity of data to be stored. 	<p>Replace the floppy disk with a new one, and perform the operation.</p>
50. Error No. 90 : Floppy error Seek error	<ol style="list-style-type: none"> 1. Seek operation (reading in the FDD head and then transferring to the track where writing is to be done) cannot be done. 	<ol style="list-style-type: none"> 1. The FDD is defective. 	<p>Replace the FDD with a good one.</p>
51. Error No. 91 : Floppy error Read error	<ol style="list-style-type: none"> 1. Data cannot be read from a floppy disk. 	<ol style="list-style-type: none"> 1. The floppy disk is defective. 2. The FDD is defective. 	<p>Replace the floppy disk with a good one.</p> <p>Replace the FDD with a good one.</p>

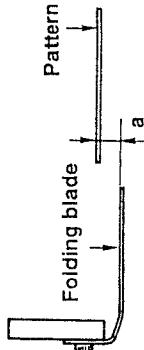

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
52. Error No. 92 : Floppy error Write error	1. Data cannot be written onto a floppy disk.	1. The floppy disk is defective. 2. The FDD is defective.	Replace the floppy disk with a good one. Replace the FDD with a good one.
53. Error No. 93 : File structure error Floppy error	1. The floppy disk format is different.	1. The format is not MSD-DOS 2DD. 2. The floppy disk is not formatted.	Use a disk in MS-DOS 2DD format. Format the disk before using it.
54. The thread is not trimmed.	1. The thread trimming cylinder does not move.	1. The wiring to the thread trimmer solenoid valve terminal post B is incorrect. 2. The cable is not connected correctly or the cable is defective. 3. The thread trimmer solenoid valve is defective.	Connect the red and black wires of the thread trimmer solenoid valve to the terminal post B set +24V and SIGNAL No. 17 terminals respectively. Check the connections of the terminal post B set to CN32 and CN12. Select the pictograph No. NM "Head adj.", then check whether the output between the terminal post B set +24V and SIGNAL No. 17 terminals switches between HIGH and LOW when the cylinder is turned ON or OFF. If it does, replace the solenoid valve. If it does not, replace the I/O circuit board assembly.

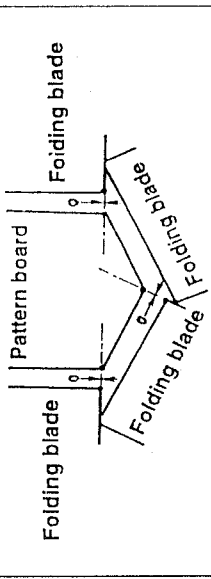
12. FOLDING TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
1. The pocket cloth cannot be folded in.	The folding blade operates at the upper side of the pattern board.	The folding base plate damping is too large.	Adjust the left and right folding arm cylinder speed controllers and air cushions to suppress the damping. Speed controller position :Remove the left side machine cover; rear side of the 3rd speed controller from the rear of the speed controllers lined up on the upper side. <How to check> Remove the pattern board and set the garment body presser. In this condition, press the red button on solenoid valve V03 to move the folding unit up and down and check the damping.
	Folding can be done in step mode.	The folding arm cylinder auto switch is in the wrong position.	Move the auto switch to the rear, as seen from the operator's 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 No. 47) to occur, so use caution.
	Folding cannot be done in step mode.	With the pocket holder (plastic plate), the pocket holder spring attached to the pattern board is pushed down.	If the pocket holder is not in the correct position with respect to the pattern board, loosen the pocket holder mounting plate setscrews and re-adjust it to the correct position.
		The pattern board is pushed down too far by the pocket holder (plastic plate).	Loosen the pocket holder spring mounting screw and adjust the spring position so that the spring will not contact the pocket holder.
			Loosen the knobs holding the pocket holders A and B in place, then adjust pocket holders A and B in the following diagram.



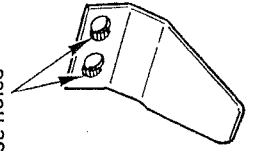
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Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From the previous page			
	The folding cylinder fails to operate.		Check the folding sequence. Refer to separate sheet. (Table 1)
	The pattern board and folding blade heights are not matched.		Loosen the 2 folding blade setscrews, and lower the folding blade. (Fig. 3)
			 <p>Folding blade setscrew (a=fabric dimension+clearance) If dimension "a" is too small, the cloth might be damaged, so use caution.</p>
			Adjust the position so that they will not contact each other.
			Straighten the pattern board and set to the dimensions shown in Fig. 3.
2. Folding fails to produce the desired shape.	The gap between the pattern board and the folding blades is too large.		Loosen the folding blade screws, and raise the folding blades. (Fig. 4)
			 <p>a=fabric dimension+clearance</p>
			Set so as to reduce dimension "a". (Caution) If dimension "a" is too small, it can cause the folding to be defective.
			Loosen the plastic holder knob, and increase the amount that the pattern board is pushed down by the plastic holder plate. Adjust as shown in Fig. 4.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From the previous page	The folding blades are catching on something.	The plastic holder plate is out of position.	Remove all objects catching on both upper and lower blades, then buff.
		The folding margin is too large or too small.	Loosen the plastic holder mounting plate setscrew and match the pattern board to the outer circumference. Loosen the folding position setscrews and the one-touch lock plate setscrews, and adjust the gap between the pattern board and the holder plate and match the outer circumference of the pattern board and the plastic holder plate.
		The relation between the heights of the 2 folding blades is not proper.	Set the folding margin to 10 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.
	The positions of the pattern board and the folding blades are not matched.		See Table 1 (page 79).
			Consider the case of a pointed end pattern. If the dimensions are not as shown below, it will be difficult to produce a sharp fold.
	There is a gap between the folding blades.		 <p>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.</p>
	The folding timing is not matched.		Close the gap between the folding blades as small as possible so that they come in contact in a plane. Folding blade
			See Table 1 (page 79).

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure	
3. The pocket cloth is swollen.	The folding margin is too small.		Set the folding margin to 12 to 15 mm.	
	There are burrs on the folding blades.		Buff the folding blades.	
	The plastic holder plate is sticking up, and the pattern board position is not proper.			Loosen the plastic holder plate mounting plate setscrews, and adjust the position.
	The folding timing is not correct.			See Table 1 (page 79).
	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.)	The folding margin is too small.		Loosen the pocket opening folding cylinder setscrew, and increase the folding blade insertion amount.
The pocket opening folding plate is out of position.		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.	
The pocket opening folding cylinder fails to operate.		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.
The folding sequence is incorrect.				Check the folding sequence.
The pocket opening folding plate contacts the pattern board.				Check the folding sequence.
The pocket opening folding blade is mounted in the wrong position in the left-right direction.				Check the folding blade heights.
				Loosen the folding blade setscrew and move the folding blade toward the operator. Loosen the folding blade folding cylinder 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.

These holes

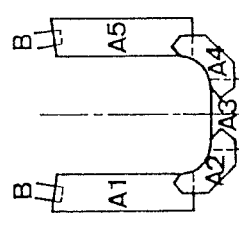
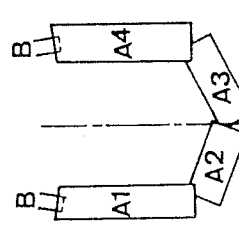
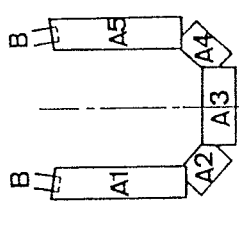
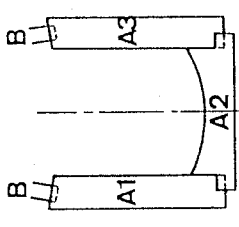
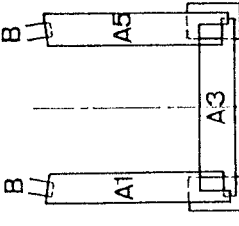
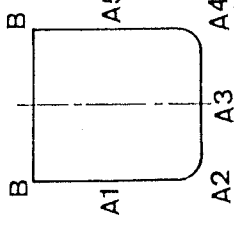
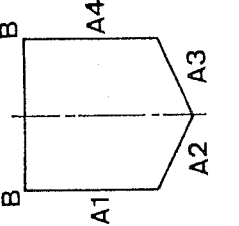
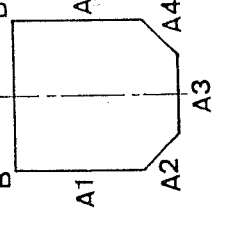
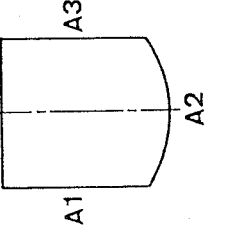
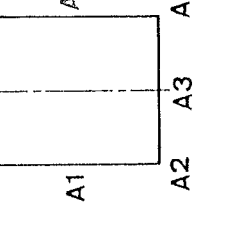


Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
5. Pocket opening folding is defective (the fold goes too far).	<p>The folding margin is too large.</p> <p>The relation between the positions of the folding blade and the pocket opening folding blade is incorrect.</p>	<p>The relation between the positions of the folding blade and the pocket opening folding blade in the forward-rear direction is incorrect.</p> <p>The relation between the heights of the folding blade and the pocket opening folding blade is incorrect.</p>	<p>Set the folding margin to 12 to 15 mm.</p> <p>Loosen the folding blade setscrew and move the folding blade toward the folding unit. If this is insufficient, loosen the folding blade A cylinder setscrew, and move the cylinder toward the folding unit side.</p> <p>Loosen the pocket opening folding blade setscrew, and widen the gap with the folding blade.</p>
6. The edge width is not uniform.	<p>The pattern is not set in the correct position.</p> <p>The pattern board and holder plate positions are not matched.</p> <p>The folding margin is too large or too small.</p> <p>The program is incorrect.</p>		<p>Push the holder plate in all the way, and lock.</p> <p>Push the pattern board in all the way, and lock.</p> <p>Select "Fold position" mode on the operation panel, and adjust the edge width.</p> <p>Set the folding margin to 12 to 15 mm.</p> <p>Correct the program.</p>
7. Transport is displaced out of position.	<p>The holder pressure is too high or too low.</p>		<p>Remove the frame head side cover, and adjust the holder pressure regulator to 0.2 to 0.3 MPa. At this time, it is convenient to check in the threading mode.</p> <p>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 transport the friction between the cloth and the table surface will increase, causing the cloth to be displaced out of position.</p> <p>If the pressure is too low : During transport, only the pocket cloth will be transported.</p>

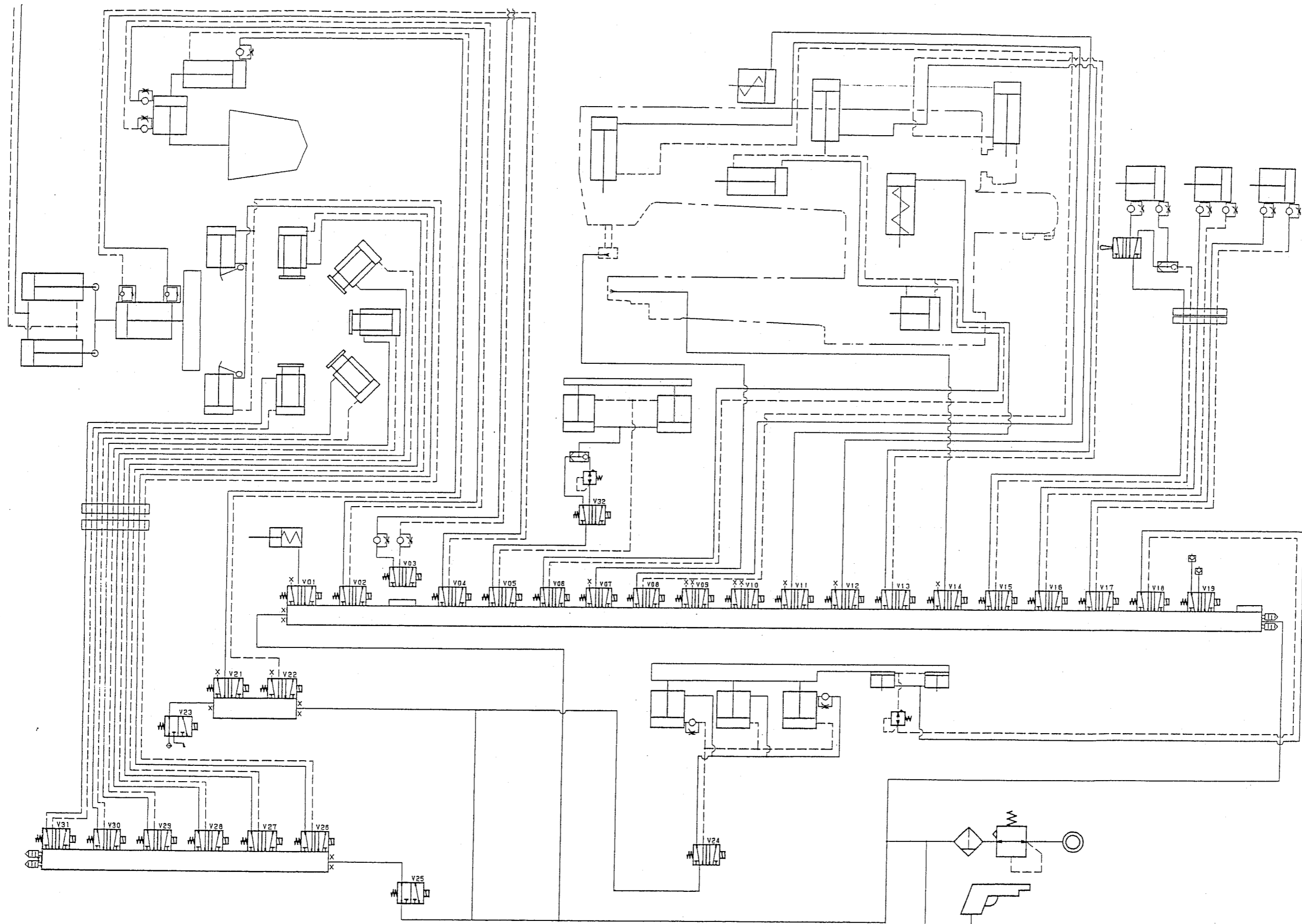
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Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From the previous page	The garment body stacker bar is in contact with the feed block.		To remove the contact, adjust the bar position. If this adjustment is inadequate, attach a guide for the garment body passage position.
	The pattern board is catching on something.		Remove the object on which the pattern board is catching, and buff.
	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 teflon tape.
	The pattern board is not completely held down by the holder plate.	The holder plate is not holding the pattern board down in front.	Correct the holder plate position. (If anything, the front should be pressed down a bit more strongly.)
		The holder plate is not lowered far enough.	Adjust the holder plate adjustment plate height. After this adjustment, check the origin position.
			Loosen the positioning plate setscrew, and adjust the position.
8. The pocket opening folding section edge width is too wide.	The pattern board pocket positioning plate is not in the correct position.		Adjust the forward-backward and up-down positions of the pocket opening folding blade so that the fold becomes loose.
	Pocket cloth is closed down too much at the pocket opening fold.		Attach teflon tape to the pattern board pocket opening folding section.
	The pattern is incorrect.		Correct the pattern.

(Table 1) Folding sequence (reference value)

Round section	Pointed end	Rounding of corners	Sole	Corners
				
<p>ON OFF</p> <p>A1 100 200</p> <p>A2 200 100</p> <p>A3 200 100</p> <p>A4 200 100</p> <p>A5 100 200</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 300</p> <p>A2 200 200</p> <p>A3 300 100</p> <p>A4 100 300</p> <p>A5 - -</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 200 100</p> <p>A2 100 200</p> <p>A3 200 100</p> <p>A4 - -</p> <p>A5 - -</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 200</p> <p>A2 300 0</p> <p>A3 200 100</p> <p>A4 300 0</p> <p>A5 100 200</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 200</p> <p>A2 300 0</p> <p>A3 200 100</p> <p>A4 300 0</p> <p>A5 100 200</p> <p>B 0 0</p>
				
<p>ON OFF</p> <p>A1 100 200</p> <p>A2 200 100</p> <p>A3 200 100</p> <p>A4 200 100</p> <p>A5 100 200</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 300</p> <p>A2 200 200</p> <p>A3 300 100</p> <p>A4 100 300</p> <p>A5 - -</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 200 100</p> <p>A2 100 200</p> <p>A3 200 100</p> <p>A4 - -</p> <p>A5 - -</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 200</p> <p>A2 300 0</p> <p>A3 200 100</p> <p>A4 300 0</p> <p>A5 100 200</p> <p>B 0 0</p>	<p>ON OFF</p> <p>A1 100 200</p> <p>A2 300 0</p> <p>A3 200 100</p> <p>A4 300 0</p> <p>A5 100 200</p> <p>B 0 0</p>

13. AIR SYSTEM BLOCK DIAGRAM



14. TIME CHART

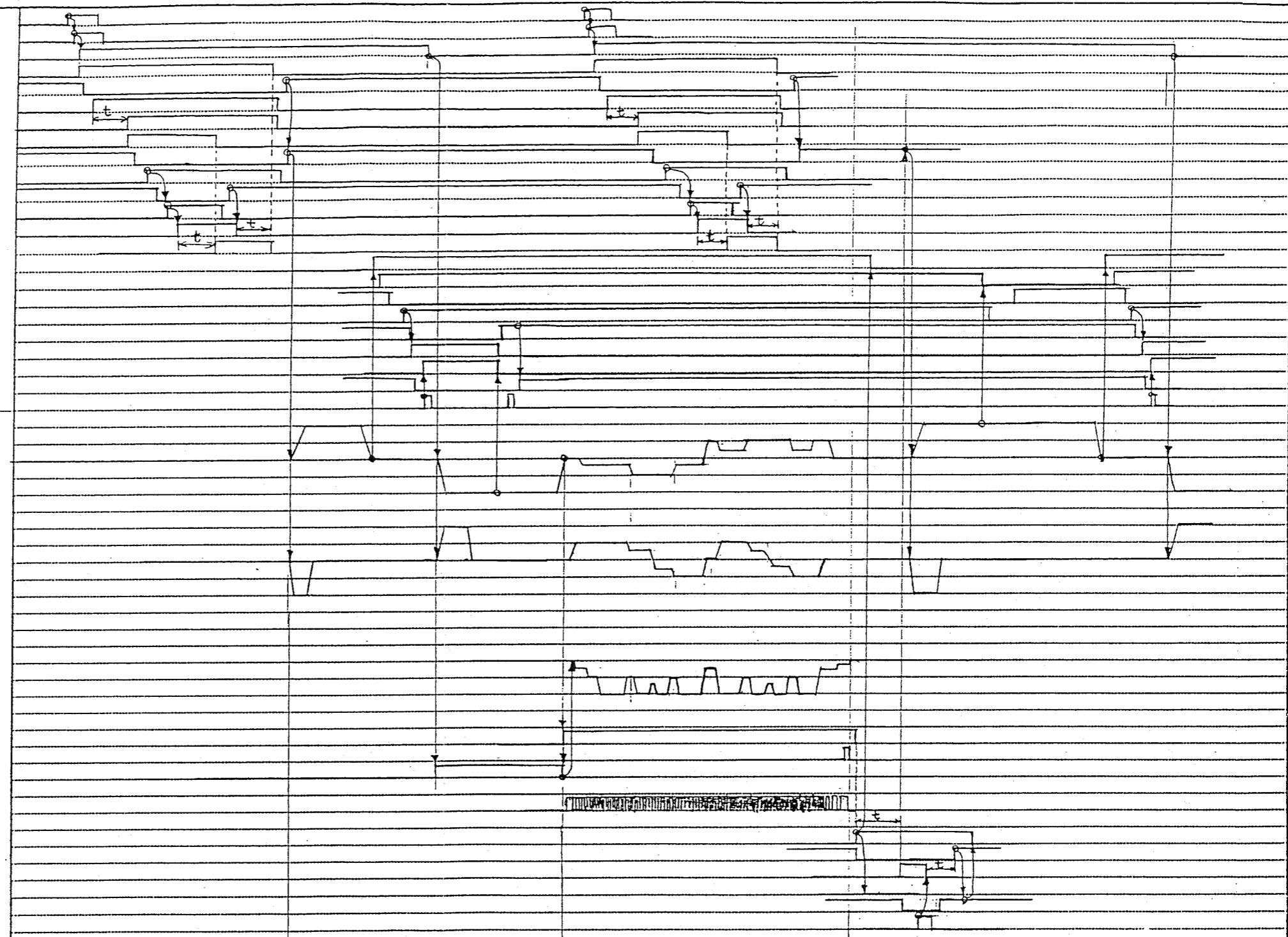
- I. STESW1 (Setting end switch SW1)
- I. STESW2 (Setting end switch SW2)
- O. PBODUP (Folding unit pattern board)
- O. PFLDDW (Folding unit folding arm)
- I. FLDDDT (Folding unit folding arm UP)
- I. FLDDDT (Folding unit folding arm DOWN)
- O. BASEUP (Folding unit)
- O. TBLUP1 (Folding unit table)
- I. BASUDT (Folding unit UR)
- I. BASDDT (Folding unit DOWN)
- I. TBLUDT (Folding unit table UP)
- I. TBLDDT (Folding unit table DOWN)
- O. FOLDA1 to B (Folding blade A1 to B)
- O. TBLUP2 (Folding unit table pressure reduction)
- O. CLTHDS (Cloth presser, small)
- O. CLTHDL (Cloth presser, large)
- I. CLPUDT (Cloth presser, large UP)
- I. CLPDDT (Cloth presser, large DOWN)
- O. PBODFW (Folding unit pattern board advance)
- O. PBODBK (Folding unit pattern board retraction)
- O. PBBKBR (Folding unit pattern board brake)
- I. PBDFDT (Folding unit pattern board forward)
- I. PBDBDT (Folding unit pattern board rear)

X. MOTOR SPEED

Y. MOTOR SPEED

M. MOTOR SPEED

- O. MINPRE (Intermediate presser)
- O. TRIMER (Thread trimmer)
- O. THDBLW (Thread wiper blow)
- O. THDUDT (Upper position detection)
- O. STCLP1 (Stacker garment body clamp)
- O. STCLP2 (Stacker garment body presser)
- O. STSWG (Stacker garment body clearing)
- I. SSTFUL (Stacker full)
- I. SSWSDT (Stacker cloth brush initial position)
- I. SSWEDT (Stacker cloth brush end)



Setting

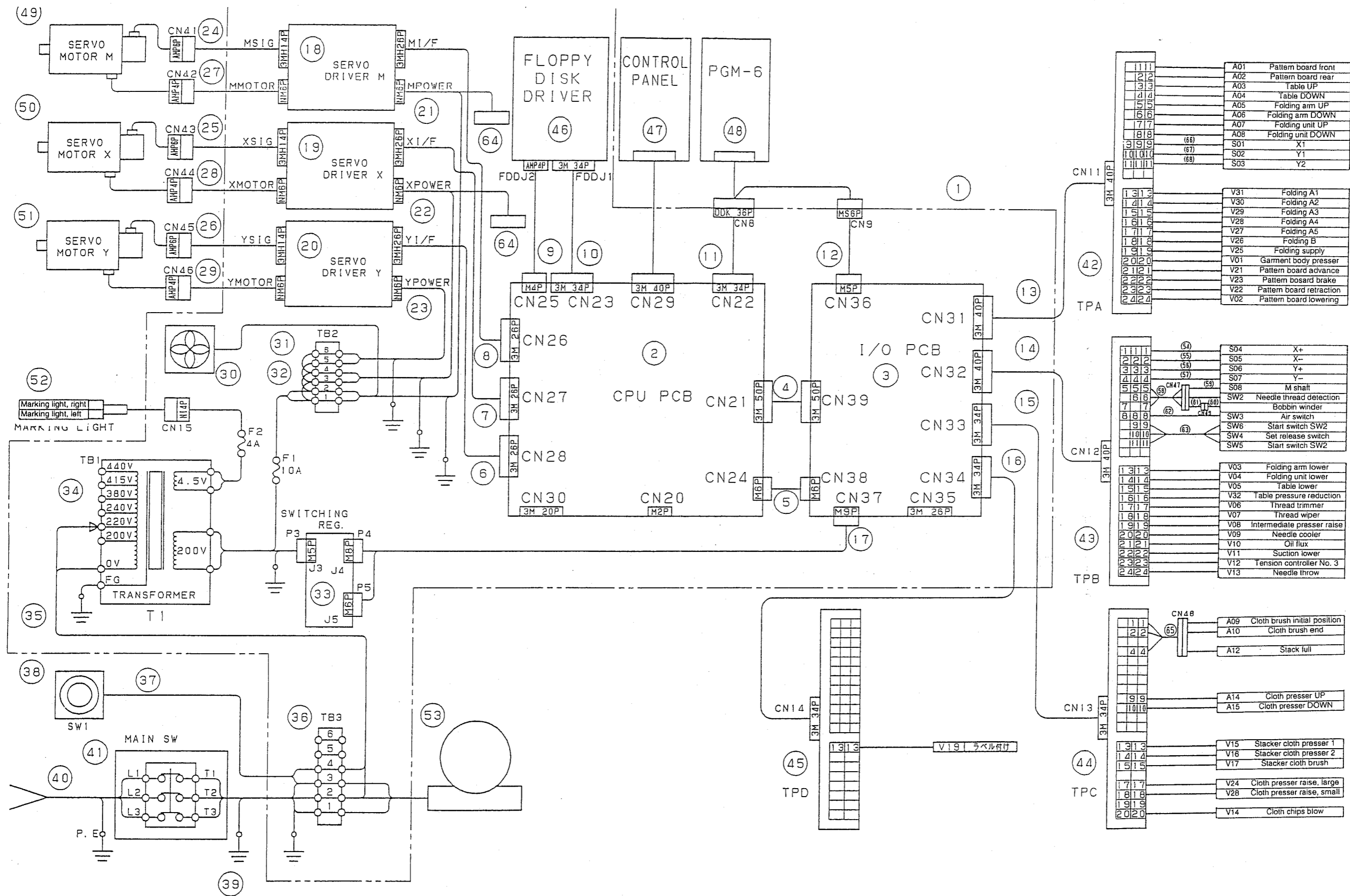
Transport in progress

Sewing in progress and setting

Stacker operation in progress

Transport in progress

15. BLOCK DIAGRAM

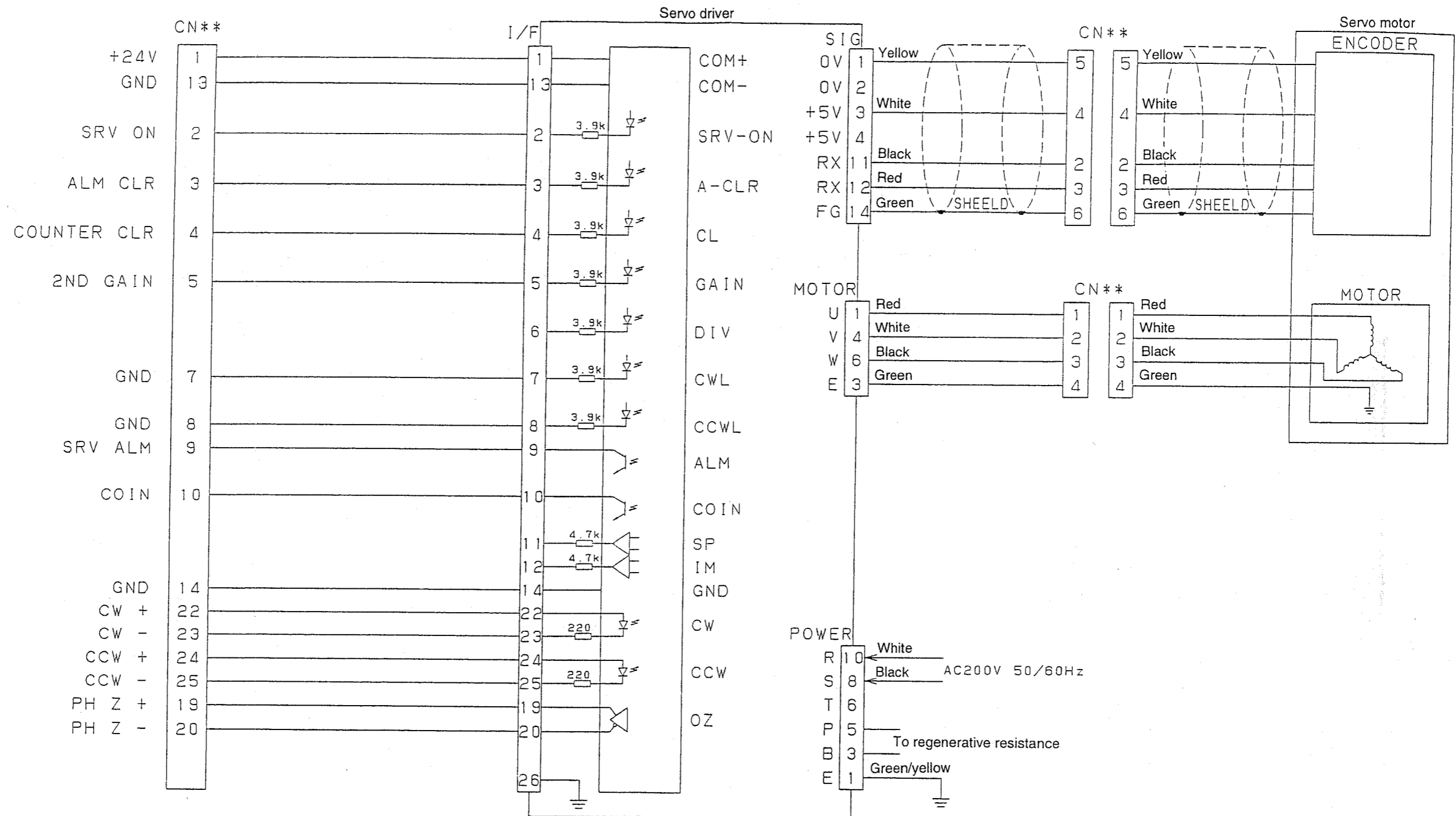


(Note) 1. Inside of the 2-dotted lines shows the components inside the control box.

No.	Part No.	Description	Circuit diagram No.	Remarks
1	M10015750B0	Control box asm.	M9401575010	
2	M8601575AA0	CPU circuit board asm.	M9402575010	
3	M86025750A0	I/O circuit board asm.	M9403575010	
4	M85015750A0	Signal cord set		
5	M85025750A0	CPU circuit board power cord set	M9404575010	
6	M85045750A0	Servo cord set	M9405575010	
7	M85045750A0	Servo cord set	M9405575010	
8	M85045750A0	Servo cord set	M9405575010	
9	M85075750A0	FDD power cord set	M9404575010	
10	M85085750A0	FDD cord set		
11	M85105750A0	Input device cord set		
12	M85115750A0	Input device power cord set	M9404575010	
13	M85125750A0	Terminal post A cord set		
14	M85135750A0	Terminal post B cord set		
15	M85145750A0	Terminal post C cord set		
16	M85155750A0	Terminal post D cord set		
17	M85165750A0	DC power cord set	M9404575010	
18	M8913570000	Servo driver 400W	M9405575010	
19	M8913570000	Servo driver 400W	M9405575010	
20	M8913570000	Servo driver 400W	M9405575010	
21	M85175750A0	Servo power cord set	M9404575010	
22	M85185750A0	Servo power cord X set	M9404575010	
23	M85195750A0	Servo power cord Y set	M9404575010	
24	M85205750A0	Motor cord set	M9405575010	
25	M85215750A0	Motor cord X set	M9405575010	
26	M85225750A0	Motor cord Y set	M9405575010	
27	M85235750A0	Encoder cord set	M9405575010	
28	M85245750A0	Encoder cord X set	M9405575010	
29	M85255750A0	Encoder cord Y set	M9405575010	
30	M85425750A0	AC fan set	M9404575010	
31	HK045550060	Terminal post 6P	M9404575010	
32	M85265750A0	Jumper cord set	M9404575010	
33	HX003360000	Switching power supply	M9404575010	
34	M89015750A0	Transformer asm.	M9404575010	
35	M85435750A0	Transformer power cord set	M9404575010	
36	HK045550060	Terminal post 6P	M9404575010	
37	M85415750A0	Temporary stop power cord set	M9404575010	
38	HA012345678	Temporary stop switch	M9404575010	
39	M85275750A0	Power internal cable set	M9404575010	
40	M85285750A0	Power cable set	M9404575010	
41	HA003970000	Power switch	M9404575010	
42	M8605570AA0	Terminal post A set		
43	M8605570AA0	Terminal post B set		
44	M8605570CA0	Terminal post C set		
45	M8605570CA0	Terminal post D set		
46	S9622710000	FDD 3.5 inch		
47	M10105750A0	Operation panel asm.	M9402192010	
48	011506**	Input device (PGM-6)		** Domestic 89, Export 97
49	G1221875000	Servo motor M	M9405575010	
50	G5023875000	Servo motor X	M9405575010	

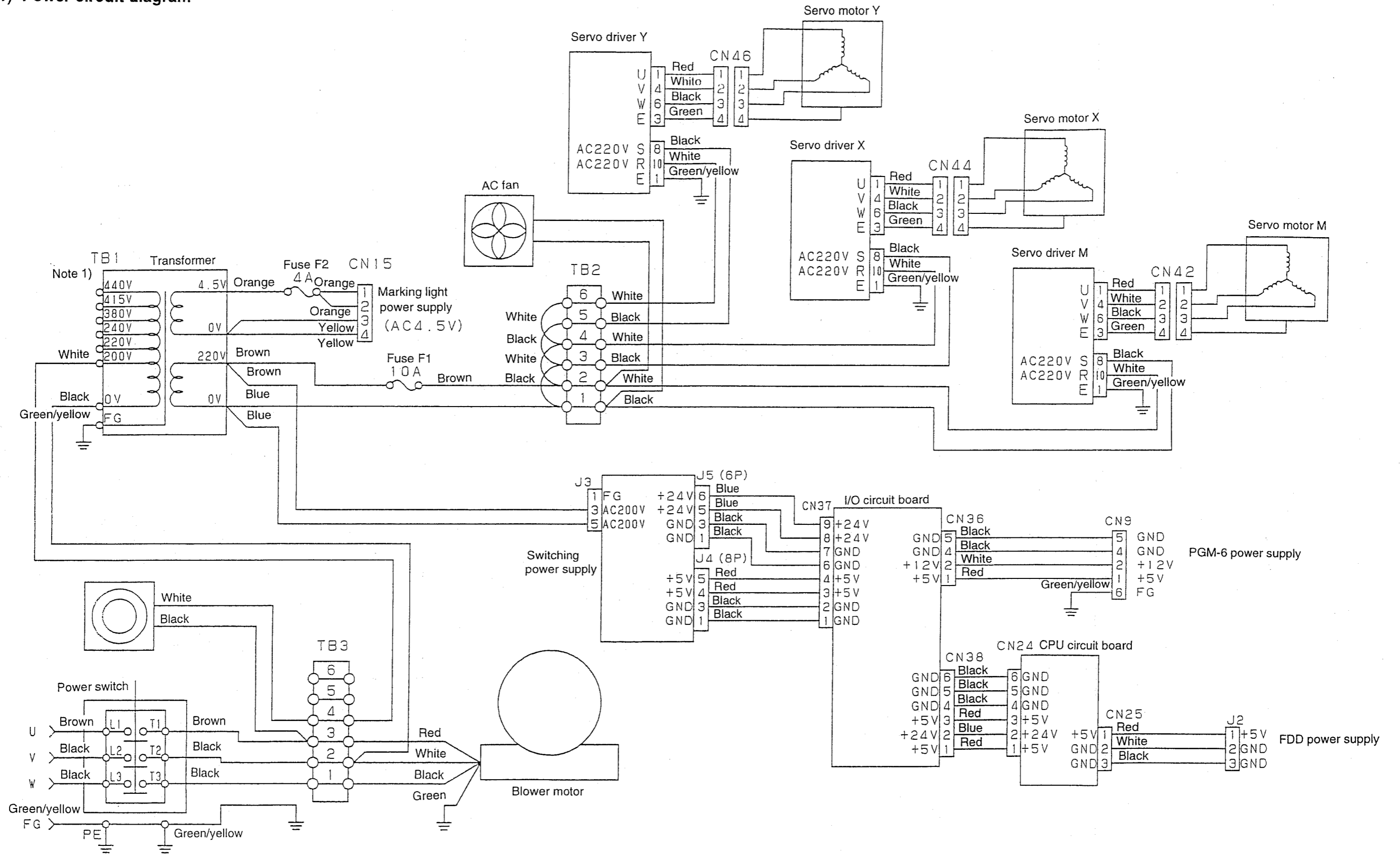
No.	Part No.	Description	Circuit diagram No.	Remarks
51	G5024875000	Servo motor Y	M9405575010	
52	M85295750A0	Marking light set	M9404575010	
53	G****875000	Blower motor	M9404575010	
54	M85305750A0	X+ signal cord set		
55	M85315750A0	X- signal cord set		
56	M85325750A0	Y+ signal cord set		
57	M85335750A0	Y- signal cord set		
58	M85345750A0	Sewing machine cord set	M9406575010	
59	G12228750A0	Sewing machine sensor cord set	M9406575010	
60	*G80348750A0	Bobbin winder cord set	M9406575010	
61	*G80338750A0	Bobbin winder set	M9406575010	
62	G8124270000	Air switch		
63	M85355750A0	Operation switch cord set		
64	M85445750A0	Regerative resistance asm.	M9405575010	
65	M85365750A0	Stacker sensor cord set	M9407575010	
66	M85385750A0	X1 signal cord set		
67	M85395750A0	Y1 signal cord set		
68	M85405750A0	Y2 signal cord set		
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(2) Servo driver circuit diagram

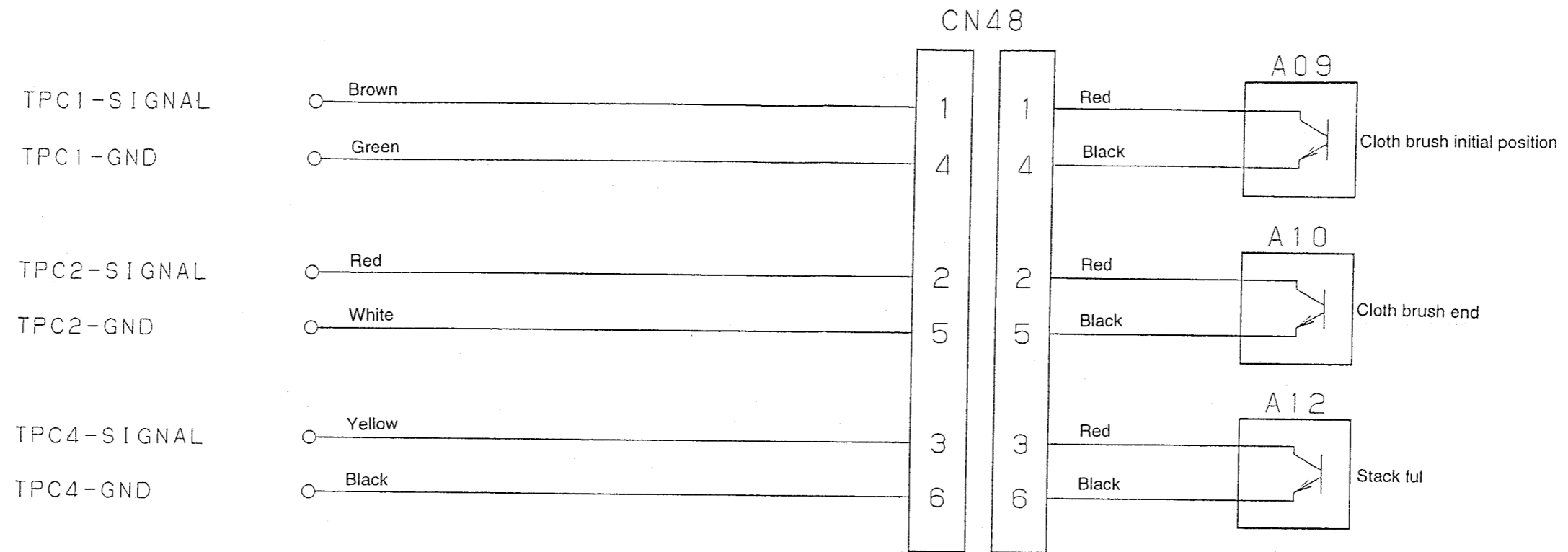


16. ELECTRICAL CIRCUIT DIAGRAM

(1) Power circuit diagram



(4) Stacker circuit diagram



(3) Sewing machine sensor circuit diagram

