

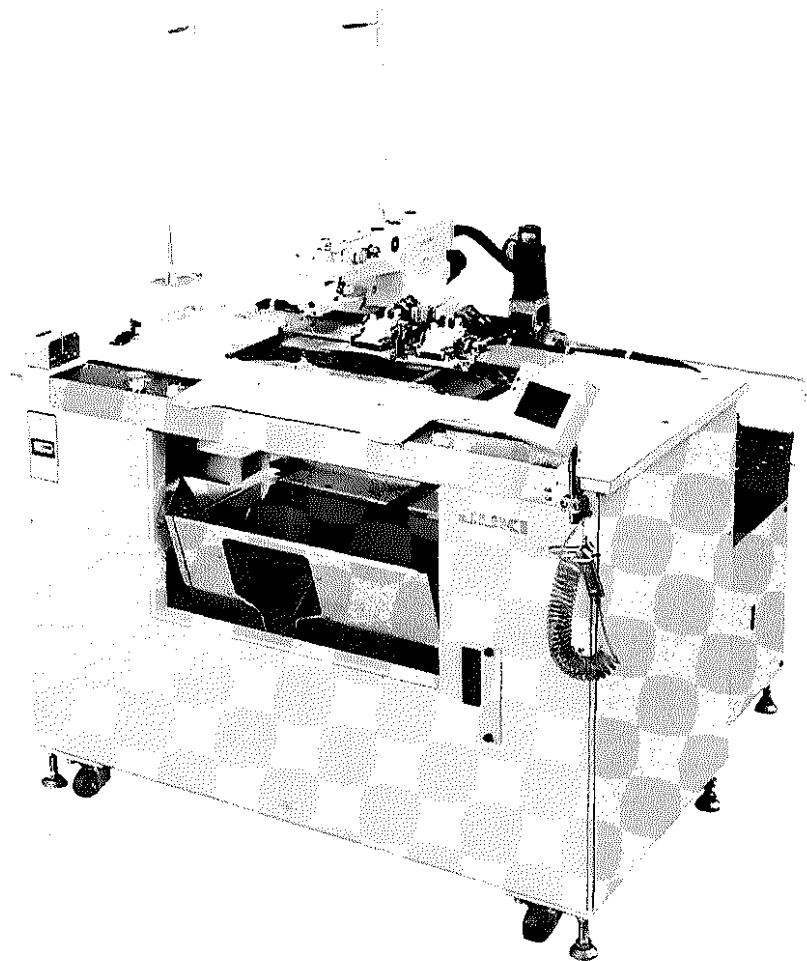
**JUKI**

Automatic Collar Runstitching Machine

**AVP-880** (Hardware volume)

# ENGINEER'S MANUAL

---

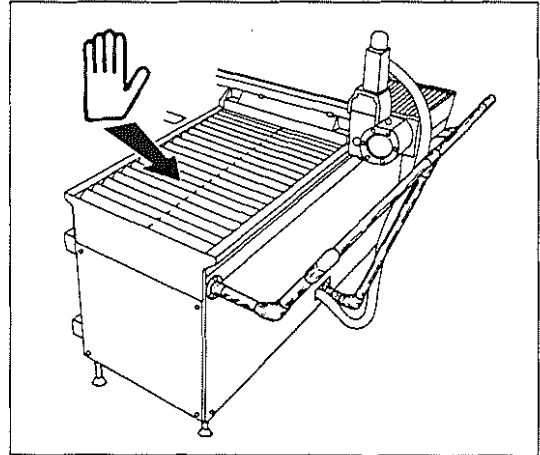


## PREFACE

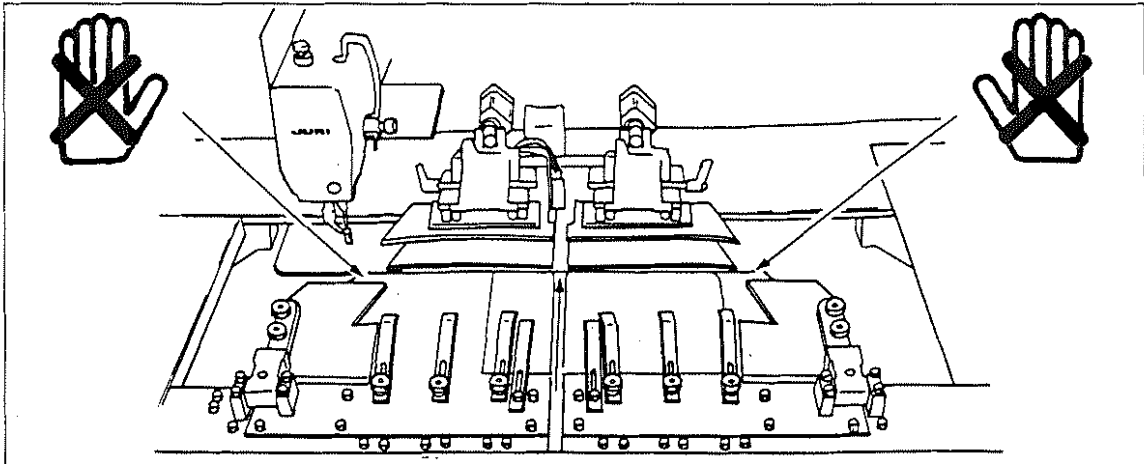
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines. The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains detailed operating instructions. And this manual describes "How to Adjust", "Results of Improper Adjustment", and other information which are not covered by the Instruction Manual. It is advisable to use the pertinent Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines. This manual mainly consist of three sections; the first section presents "Standard Adjustment", the second section, "How to Adjust", and the third, "Results of Improper Adjustment". Regarding the sewing machine head, please refer to the separate "AVP-870/880 Machine head Volume".

## CAUTION

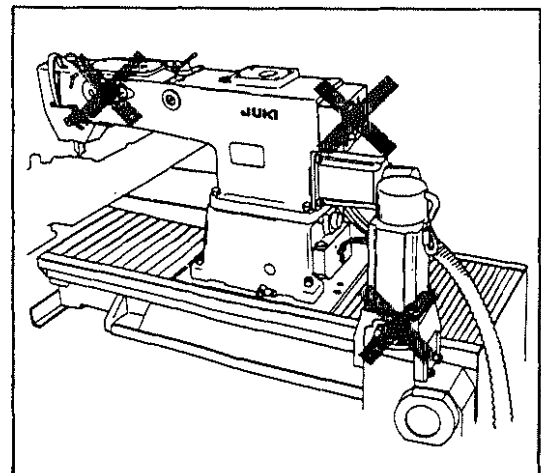
- 1) Do not step inside the guard pipe on the rear of the machine while the machine is operating.
- 2) Do not put your hands on the top face of the X-Y cover.



- 3) The setting device automatically moves during material loading, so take care not to put your hands or anything else near the setting device.



- 4) During operation, be careful not to allow your or any other person's head or hands to come close to the handwheel, motor coupling and the intermediate presser driving knob. Also, do not place anything near any of these parts while the machine is in operation. Doing so may be dangerous.

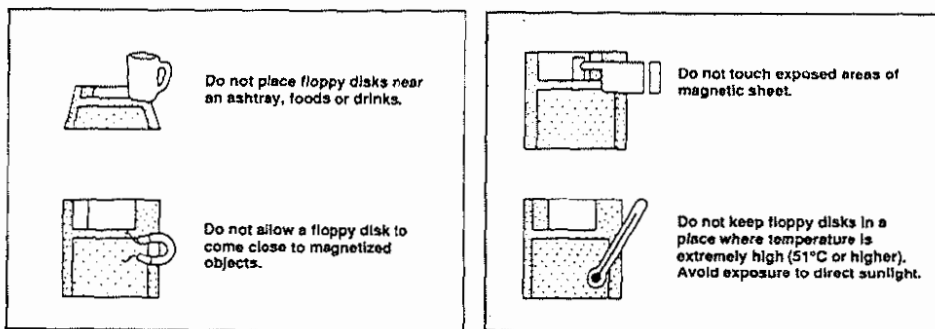


- 5) Do not turn ON the power to the sewing machine when any of the operation switches or panel switches are pressed.

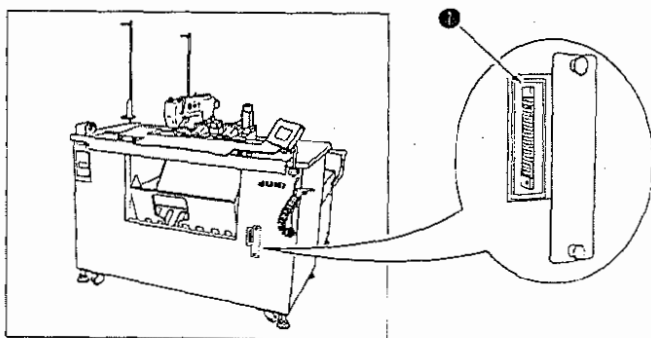
## BEFORE OPERATION

- 1) When you change the sewing pattern with a new one, be sure to confirm that the work clamp up/down plate, left and right set gauges and sewing pattern match one another.  
Refer to the description of the pattern confirmation mode in the Instruction Manual (Main unit volume) for AVP-880 for the matching between the pattern board and sewing patterns.
- 2) When an error indication lights up, always check the cause and take appropriate action.
- 3) Always turn the power off before opening the cover of the control box.
- 4) If dirt gets in to the control box, it can cause misoperation and 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) 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.
- 9) 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.
- 10) If the oil inside the X-Y motor gear box becomes noticeably dirty, replace it. The frequency of replacement depends on how frequently the machine is used, but as a rule the oil will have to be changed once a year. Use JUKI New Defrix Oil No. 3.
- 11) 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.

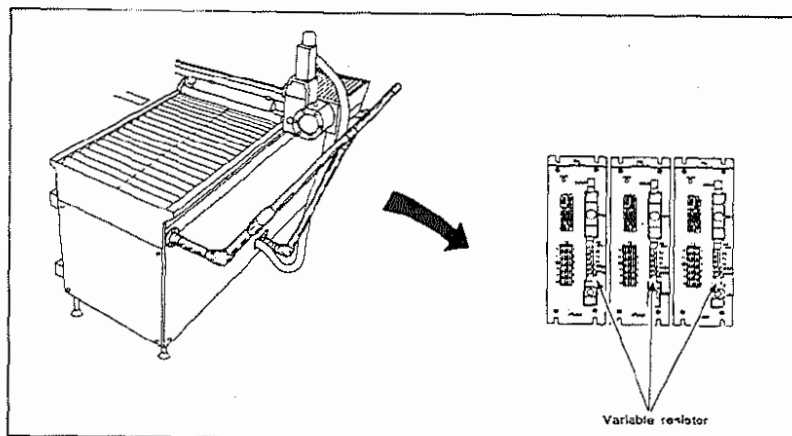
### 12) Prohibitions precautions when handling floppy disks



- 13) Load/unload floppy disk **1** while the power to the machine is ON.  
Turning ON/OFF the power to the machine with floppy disk **1** mounted may destroy data stored on the floppy disk.



- 14) Never turn the variable resistors of the servo-driver.



## CONTENTS

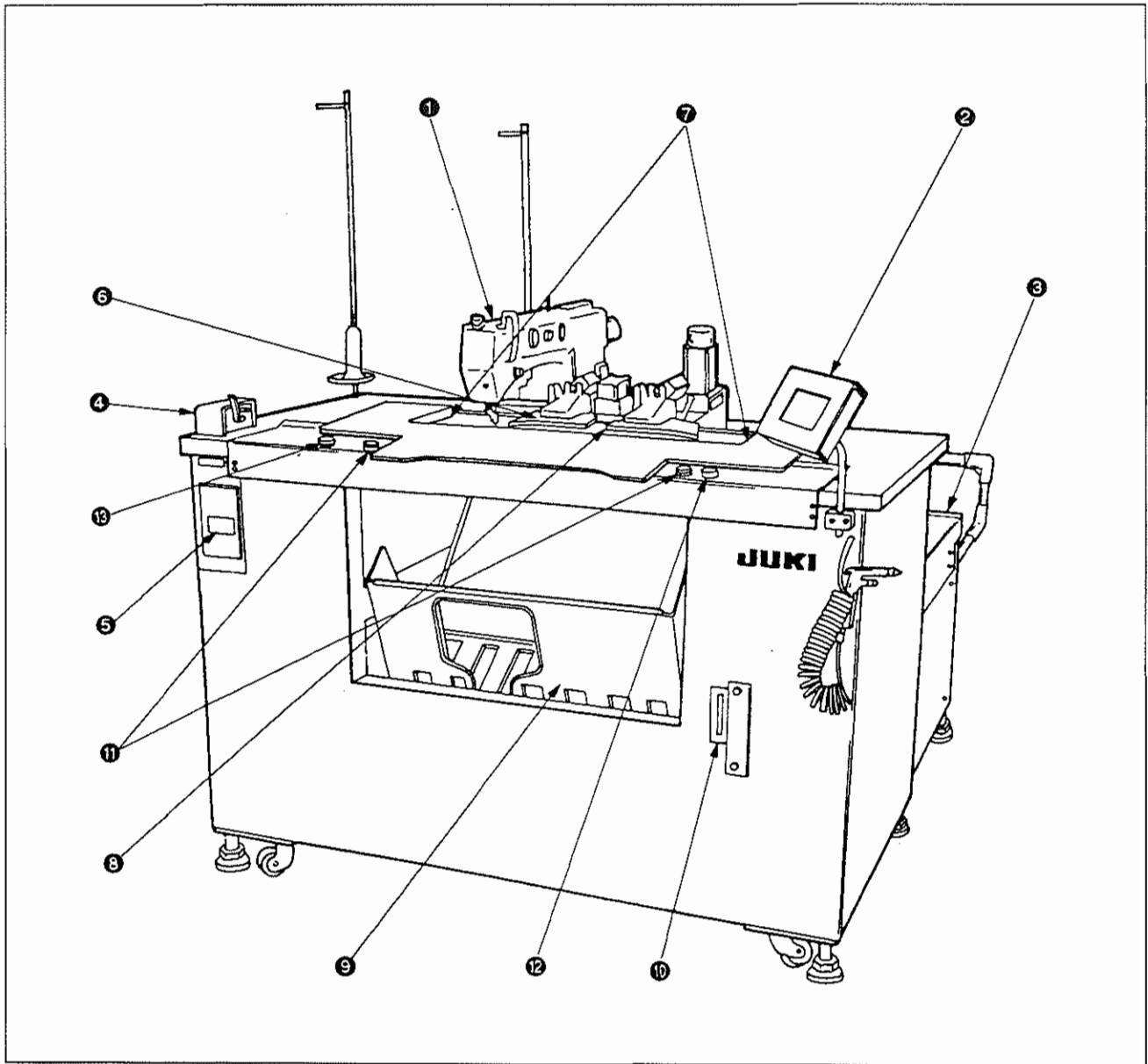
1.	SPECIFICATIONS .....	1
2.	CONFIGURATION .....	2
3.	INSTALLATION .....	4
	(1) Setting up the machine .....	4
	(2) Removal of the X and Y stoppers used for transport .....	5
	(3) Installing the thread stand .....	6
	(4) Power supply connection .....	7
	(5) Operation panel mounting .....	7
	(6) Air gun mounting .....	8
	(7) Lubrication .....	8
	(8) Air hose attachment and pressure adjustment .....	9
	(9) Installing the work clamps .....	11
	(10) Attaching the set gauges .....	13
	(11) Adjusting the position of the set clamps .....	14
4.	CONSTITUENT PARTS AND THEIR ROLES .....	15
	(1) Work clamp mechanism .....	15
	(2) Setting mechanism .....	16
	(3) Loader mechanism .....	17
	(4) Size adjusting mechanism .....	18
	(5) Stacker .....	19
	(6) Solenoid valve unit section A .....	20
	(7) Solenoid valve unit section B .....	21
5.	EXPLANATION OF OPERATION PANEL FUNCTIONS .....	22
	(1) Operation mode .....	22
	(2) Maintenance mode I .....	22
	(3) Maintenance mode II .....	23
	(a) 16. Origin Adj. ....	24
	(b) 17. Size Origin Adj. ....	26
	(c) 19. H. Point Adj. ....	26
	(d) 20. Head S. Drive ....	27
	(e) 21. Trimming Adj. ....	27
	(f) 22. Aging ....	28
	(g) 23. Gain Adj. ....	28
6.	ADJUSTMENTS OF PARTS .....	29
	(1) X-Y origin adjustment .....	29
	(2) Adjusting the position of the X-Y movement limit sensor .....	35
	(3) Adjusting the loader speed .....	43
	(4) Adjusting the height of the setting clamp at the lowest position .....	47
	(5) Adjusting the set gauge lowering pressure .....	47
	(6) Adjusting the set gauge and setting table lowering speed .....	49
	(7) Adjusting the position of the set gauge cylinder sensor .....	49
	(8) Adjusting the position of the sensor on the setting table cylinder, left .....	51
	(9) Adjusting the tension of the size adjusting belt .....	53
	(10) Adjusting clamping allowance of the work clamp upper plate .....	55
	(11) Adjusting the work clamp pressure .....	55

(12)	Adjusting the work clamp upper plate lifting/lowering speed .....	57
(13)	Adjusting the ball catch spring pressure .....	57
(14)	Adjusting the position of the work clamp cylinder sensor .....	59
(15)	Adjusting the position of the material sensor .....	59
(16)	Adjusting the lifting/lowering speed of the chute plate No. 1 .....	61
(17)	Adjusting the position of the stacker up/down cylinder sensor .....	63
7.	ELECTRICAL EQUIPMENT .....	65
(1)	Names and functions of parts .....	65
(a)	Servo motor driver .....	65
(b)	Control circuit board .....	65
(2)	Explanation of terminal post input and output ports .....	67
8.	FLOW CHARTS .....	74
(1)	Workpiece setting control .....	74
(2)	Loading control .....	75
(3)	Sewing .....	76
(4)	Stacker control .....	77
9.	SERVO DRIVER ADJUSTMENT .....	78
10.	LIST OF ERROR CODES .....	81
11.	MECHANICAL TROUBLES AND CORRECTIVE MEASURES .....	85
12.	ELECTRICAL TROUBLES AND CORRECTIVE MEASURES .....	90
13.	NEUMATIC DIAGRAM .....	128
14.	ELECTRICAL CIRCUIT DIAGRAM .....	129
15.	BLOCK DIAGRAM (1) .....	130
	BLOCK DIAGRAM (2) .....	131
	BLOCK DIAGRAM (3) .....	132

## 1. SPECIFICATIONS

- 1) Sewing area: Max. 610 mm in the X (lateral) direction; 150 mm in the Y (longitudinal) direction (when a partial shirring device A is used: 120 mm)
- 2) Maximum sewing speed: 3,500 s.p.m.
- 3) Stitch length: 0.1 to 3.4 mm (adjustable in 0.1 mm steps)
- 4) Main shaft of machine head drive unit: AC servo motor
- 5) Feed drive mechanism: Continuous feed (AC servo motor, 2-shaft drive)
- 6) Needle bar stroke: 30.7 mm
- 7) Needle and thread: DELTA-U1515-01 #9/spun #80 (needle thread), tetron #80 (bobbin thread)
- 8) Intermediate presser stroke: 3 mm
- 9) Hook: Full-rotary exclusive hook (forced lubrication)
- 10) Bobbin case: Full-rotary standard bobbin case for hook (with idling prevention spring)
- 11) Bobbin: Aluminum bobbin (exclusive-use aluminum bobbin when the optional bobbin thread remaining amount device is used)
- 12) Lubricating oil: Machine head: New Defrix oil No.1  
X-Y: New Defrix oil No.3
- 13) Thread trimming method: Scissors cutting mechanism using a counter knife and a moving knife (grooved cam method)
- 14) Intermediate presser lifting mechanism: Driven by an air cylinder
- 15) Pattern data stored in memory: 2DD 3.5" floppy disk 691 patterns/disk
- 16) Collar size adjustable range: 0 to 130 mm
- 17) Outer dimensions: 1460 mm (W) × 1630 mm (L) × 1200 mm (H) (excluding the thread stand unit)
- 18) Total weight: 490 kgf
- 19) Power consumption: 800 VA
- 20) Temperature range in use: 5°C to 40°C
- 21) Humidity range in use: 20% to 80% (no condensation)
- 22) Power supply voltage: Rating ±10%; 50/60 Hz (Single-phase 200, 220, 240, 380, 415, 440V)
- 23) Operating air pressure: 5 kgf/cm<sup>2</sup> (0.5 MPa)
- 24) Air consumption: 67 Nℓ/cycle

## 2. CONFIGURATION



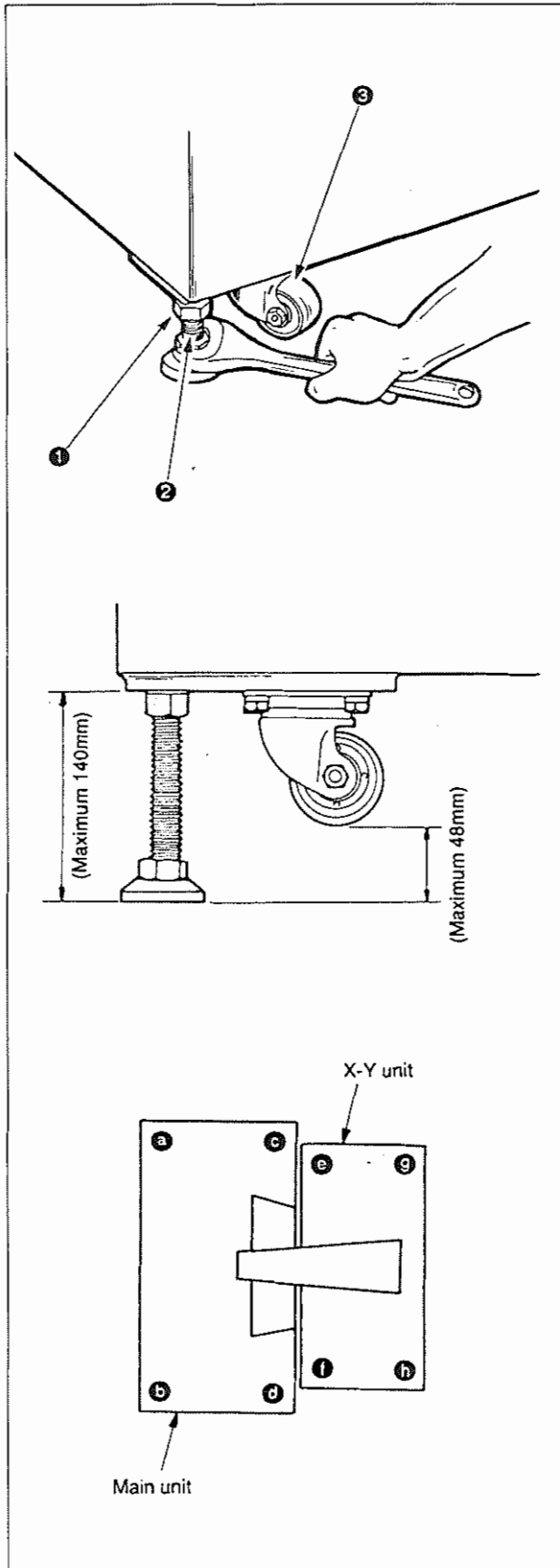
- |                       |                             |
|-----------------------|-----------------------------|
| ① Sewing machine head | ⑧ Setting clamp             |
| ② Operation panel     | ⑨ Stacker                   |
| ③ X-Y unit            | ⑩ Floppy disk driver        |
| ④ Bobbin winder       | ⑪ Setting completion switch |
| ⑤ Power switch        | ⑫ Setting release switch    |
| ⑥ Work clamp unit     | ⑬ Pause switch              |
| ⑦ Set gauge           |                             |

- ① Sewing machine head  
This is a high-speed 1-needle lockstitch machine head; it is driven by a servo motor and performs high-speed sewing.
- ② Operation panel  
This is a liquid crystal type operation panel containing a display for various data, touch keys and buzzer.
- ③ X-Y unit  
This is the X-Y drive section, which acts in accordance with the input sewing pattern by means of the servo motor drive.
- ④ Bobbin winder  
This bobbin winder is independent of the sewing machine drive.
- ⑤ Power switch  
This is the power switch for the sewing machine motor, control section and operation panel.
- ⑥ Work clamp unit  
This is used to clamp the collar cloth during sewing.
- ⑦ Set gauge  
Drop-in type butting gauge that is used for reference standard when setting the collar cloth.
- ⑧ Setting clamp  
This clamp is used to secure the collar cloth which has been positioned.
- ⑨ Stacker  
The first-in first-out type stacker that is used for stacking workpieces which have been sewn.
- ⑩ Floppy disk driver  
This unit is used to write data on a floppy disk or read data from it.
- ⑪ Setting completion switch  
This switch is for the purpose of automatically loading and starting to sew the collar cloth that has been set on the machine.
- ⑫ Setting release switch  
This switch is used to release the positioned collar cloth from the secured state.
- ⑬ Pause switch  
This is used to halt the series of actions while sewing is in progress.



### 3. INSTALLATION

#### (1) Setting up the machine



- 1) Install the machine horizontally on a strong, level floor.
- 2) Loosen nut ①, turn level adjuster ② to raise until caster ③ turns freely.
- 3) After installation, tighten nut ① to fix level adjuster ② in place.

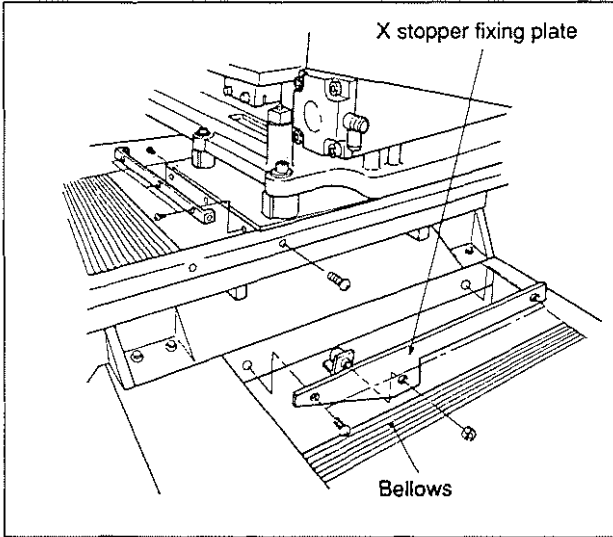
\* { The adjuster moves a maximum of 48 mm; }  
so adjust within that range.

- (Caution) 1. There are eight level adjusters (a through h). First, gradually turn level adjusters a, b, g and h which are located on the four corners of the machine so as to equally raise the machine in whole. Then, adjust level adjusters c, d, e and f located at the linkage between the X-Y unit and the main unit so that they slightly come in contact with the floor.
2. If one of the adjusters is turned by many revolutions at a time, the linkage between the X-Y unit and the main unit may dislocate.

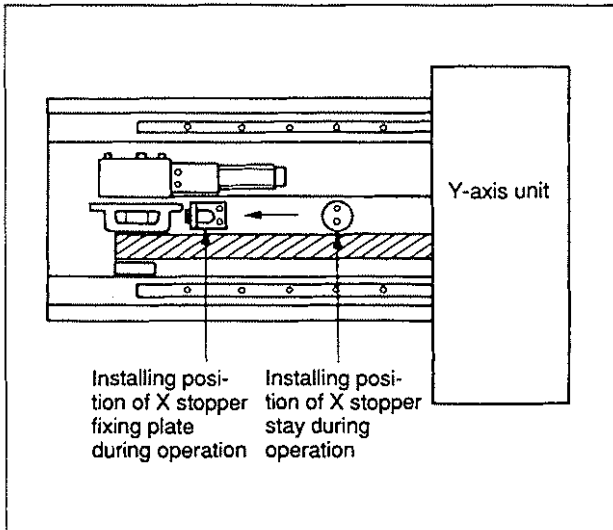
## (2) Removal of the X and Y stoppers used for transport

Remove the X stopper fixing plate and the Y stopper fixing plate that are attached for transport.

### X stopper fixing plate



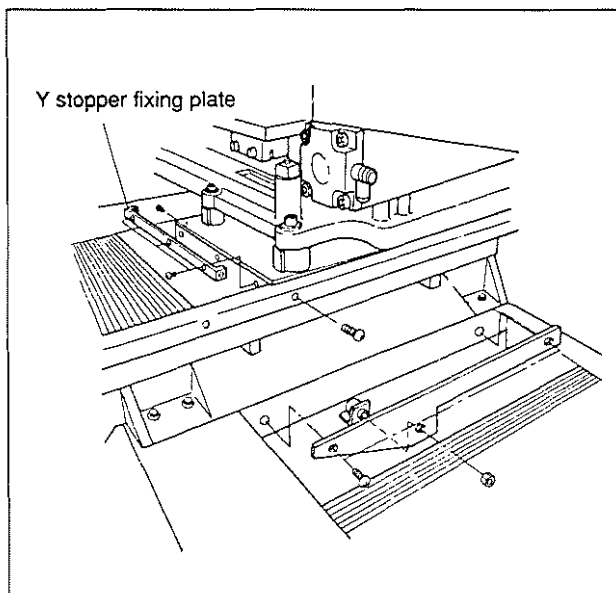
Loosen the two screws and nuts which are used to secure the X stopper fixing plate, and you can remove the fixing plate.



After you have removed the X stopper fixing plate, move the X stopper stay as illustrated in the figure on the left.

**(Caution)** If you forget to properly move the X stopper stay, troubles such as dislocation of the origin will be caused. So, be sure to move it without fail.

### Y stopper fixing plate

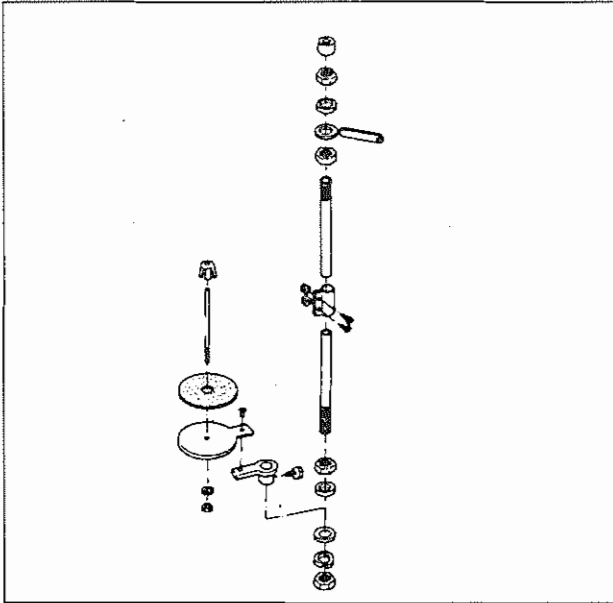


Loosen the five screws which are used to secure the Y stopper fixing plate, and you can remove the fixing plate.

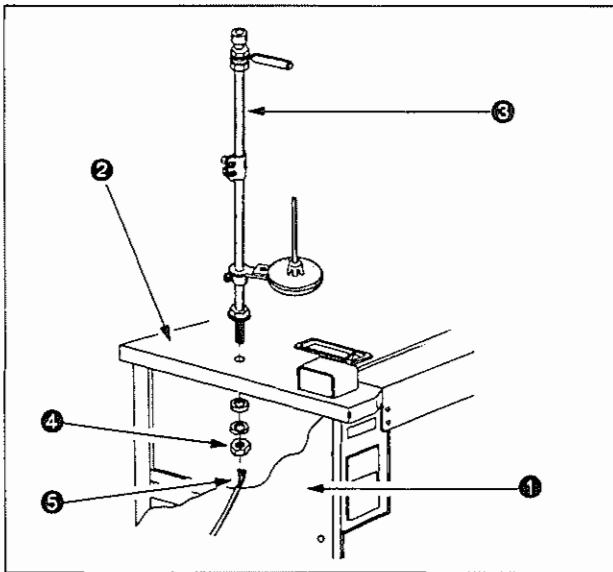
- \* Replace the screws which have been removed from X and Y stopper fixing plates with standard screws. Then, fix the respective bellows with them. The standard screws are supplied in the accessory box.

### (3) Installing the thread stand

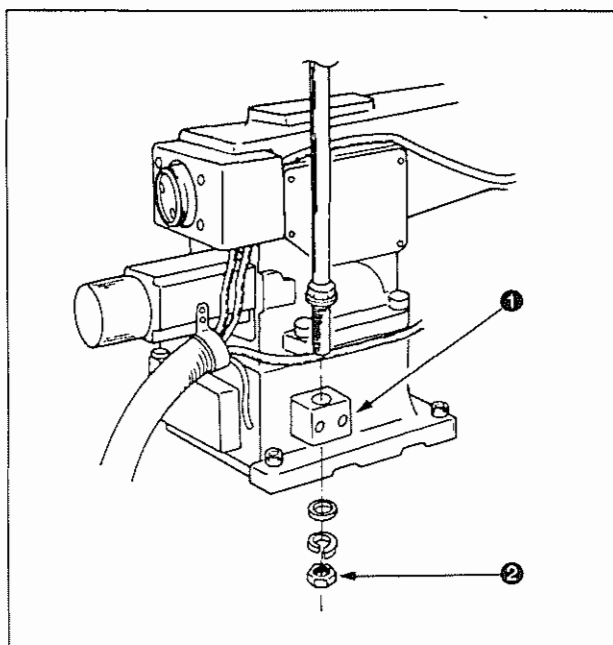
Two different thread stand units are necessary, one is the thread stand for the sewing machine head and the other is the thread stand for the table.



- 1) Assemble the two thread stand units as illustrated in the figure.

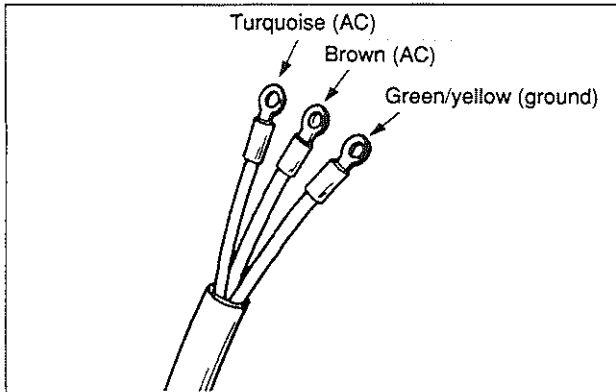


- 2) To install the thread stand for the table, remove cover ①, and insert the thread stand in the hole in table ②. Then tighten nut ④ to an extent where thread stand ③ does not fluctuate.
- 3) For ceiling wiring, pass power cable ⑤ through thread stand ③.

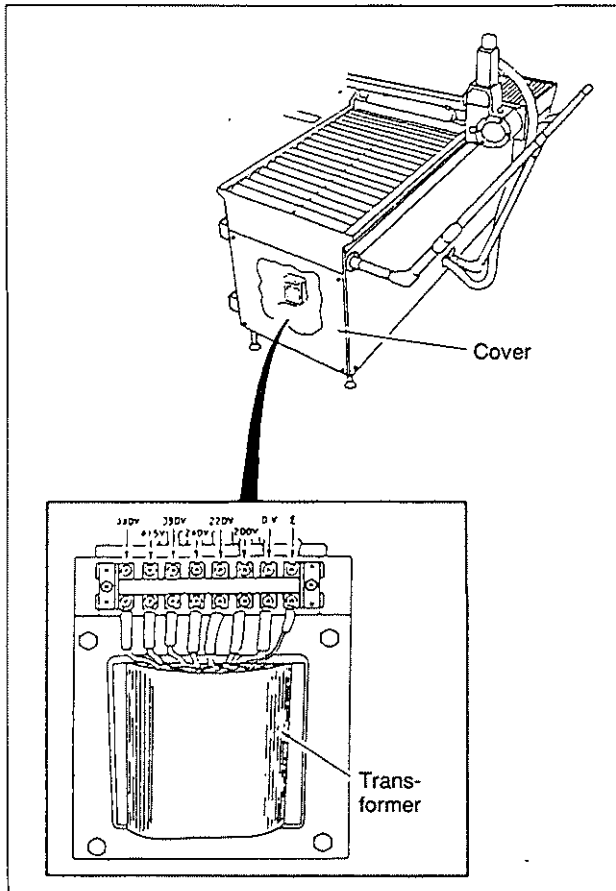


- 4) To install the thread stand for the sewing machine, pass thread stand through the hole in thread stand block ①, and tighten nut ②.

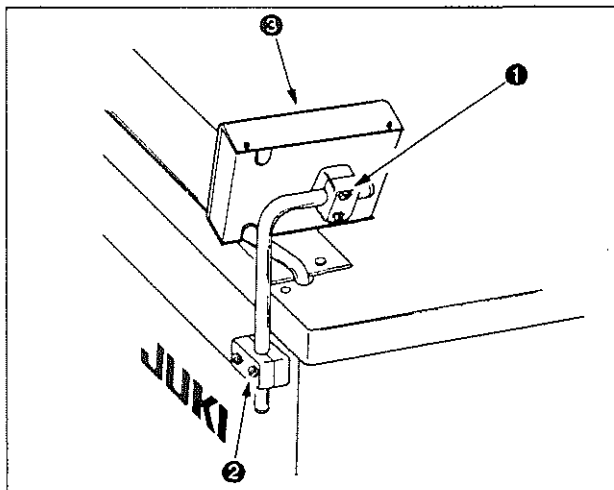
#### (4) Power supply connection



- 1) This machine is not equipped with a power plug at the time of delivery, so when connecting it to a power supply first fit a plug that matches the outlet to be used to the power cord.
- 2) This machine uses a single-phase power supply. If there is no single-phase power supply available that matches the voltage specification, use two 3-phase power supplies.
- 3) Remove the cover and confirm that the voltage matches the indication on the transformer tap. The specification is for single-phase, but not for 100V, so use caution.
- 4) An AC servo motor is used, so the sewing machine will not turn in the reverse direction on account of the way the power supply is connected.

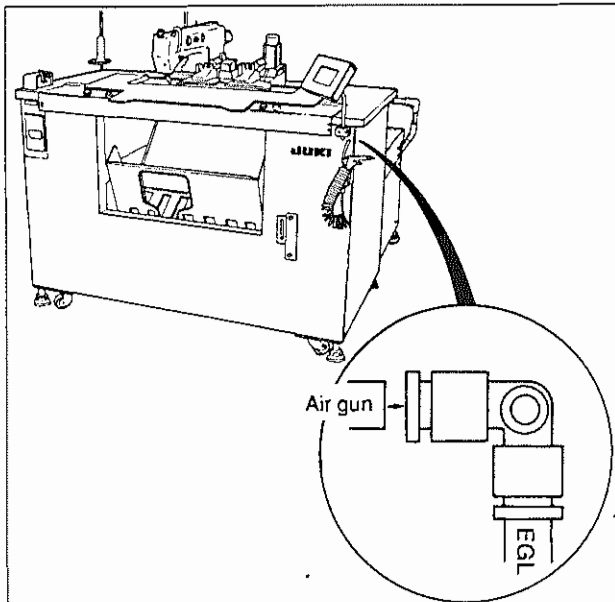


#### (5) Operation panel mounting



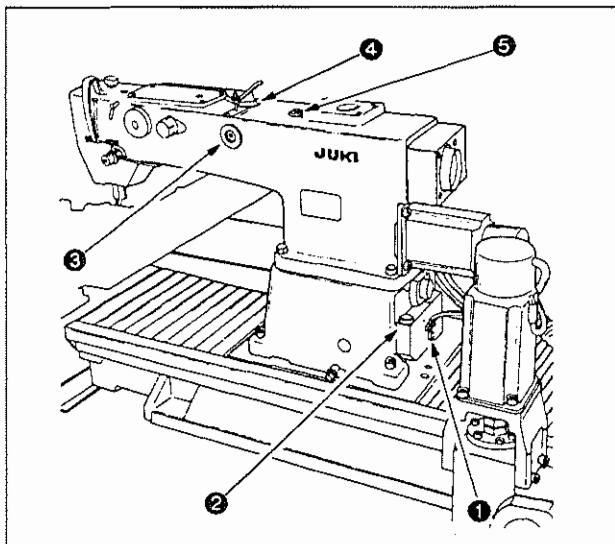
- 1) Loosen operation panel setscrew ① and support column setscrew ②, adjust the operation panel ③ direction, inclination and height, then retighten screws.  
**(Caution)** The operation panel surface is made of glass. So, do not give a great impact to it.

## (6) Air gun mounting



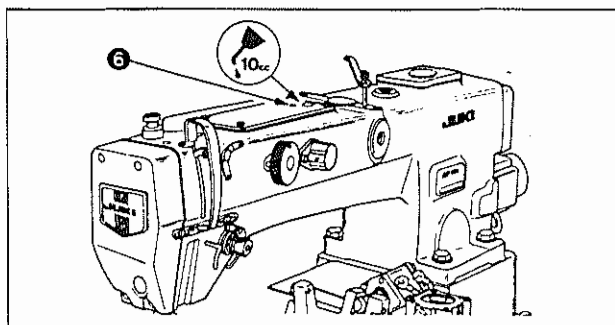
- 1) Insert the air gun spiral tube into the L-joint located on the rear side of the cover.
- 2) Hand the air gun on the hook as illustrated in the figure on the left.

## (7) Lubrication

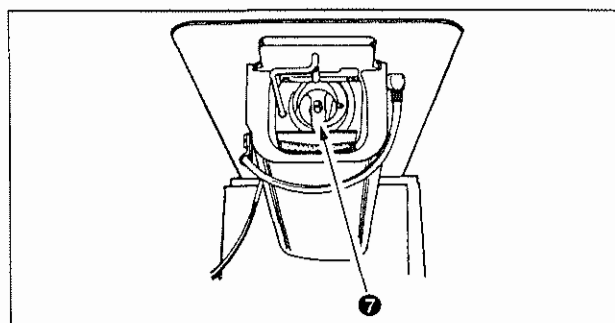


- 1) Pour oil in through lubrication hole ② up to the middle of oil gauge ① .  
Confirm that the oil surface reaches the center of oil gauge ③ . If the oil amount is insufficient, pour additional oil in through lubrication hole ④ .  
After the oil is poured in, when the sewing machine is operated if the lubrication is normal oil will be seen flowing in the oil sight window ⑤ . The exact amount of oil flowing does not affect the operation.

- (Caution) 1. Always operate the sewing machine after pouring oil into it.  
2. Use JUKI New Defrix Oil No.1.

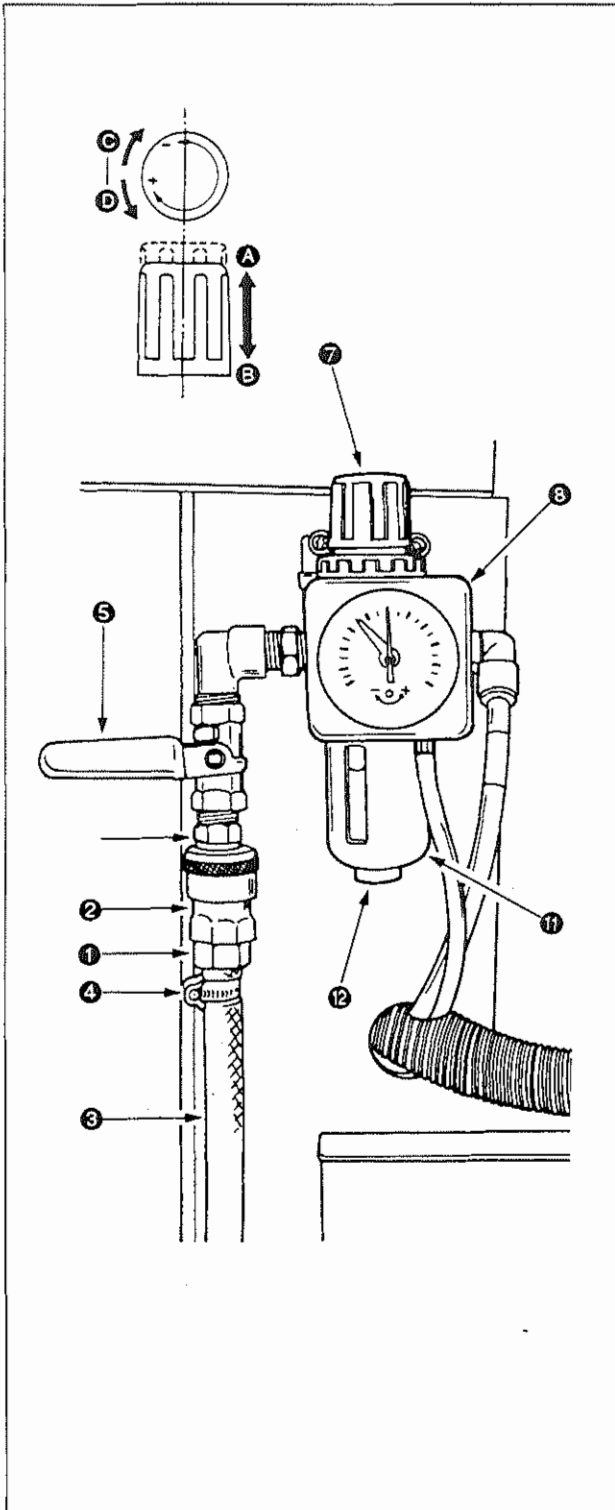


- 2) When using the sewing machine for the first time, or when using the sewing machine after not using it for a long time, apply oil (approximately 10 cc) to intermediate presser gear drive component ⑥ .



- 3) When using the sewing machine for the first time, or when using the sewing machine after not using it for a long time, apply a drop of oil onto shuttle race surface ⑦ to the extent that a little amount of oil spreads over the surface.

## (8) Air hose attachment and pressure adjustment

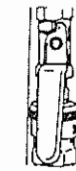


### 1) Air hose connection

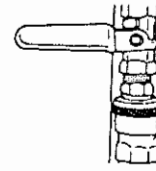
- ① Couple pipe fitting ① to plug ②. At this time, wrap sealing tape around the threaded section.
- ② Insert air hose ③ into pipe joint ① and tighten it in place with hose band ④.

### 2) Coupling to the quick-coupling joint

Close valve ⑤, then couple plug ② to joint ⑥.



(Open)



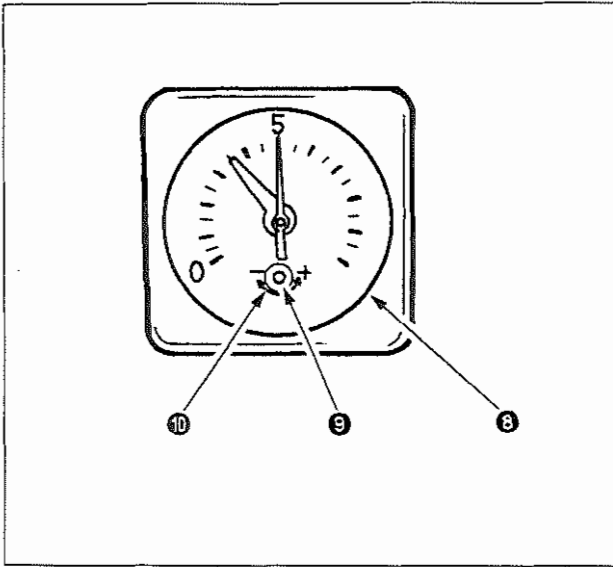
(Closed)

**(Caution)** Turn the valve to the position (90°) at which it is completely closed.

### 3) Supply pressure adjustment

- ① Use an air pressure of 5 kgf/cm<sup>2</sup> (0.5 MPa).
- ② Open valve ⑤ slowly.
- ③ The supply pressure can be varied by pulling regulator knob ⑦ up in direction A and turning it. Turn the knob in direction C (+) or direction D (-) so that the black needle of pressure gauge ⑧ points to 5 kgf/cm<sup>2</sup> (0.5 MPa). Then lower knob ⑦ in direction B and lock it securely in place.

**(Caution)** When air is supplied, parts of the sewing machine mechanism, the stacker unit and the setting mechanism operate.



#### 4) Setting the lowest pressure of the compressed air

- ① The lowest pressure of the compressed air should be set to 3.5 kgf/cm<sup>2</sup> (0.35 MPa).
- ② Apply a small screwdriver to the screw in cap ⑩ of pressure gauge ⑧, and turn screw ⑨ with the screwdriver to make the red pointer indicates 3.5 kgf/cm<sup>2</sup> (0.35 MPa).

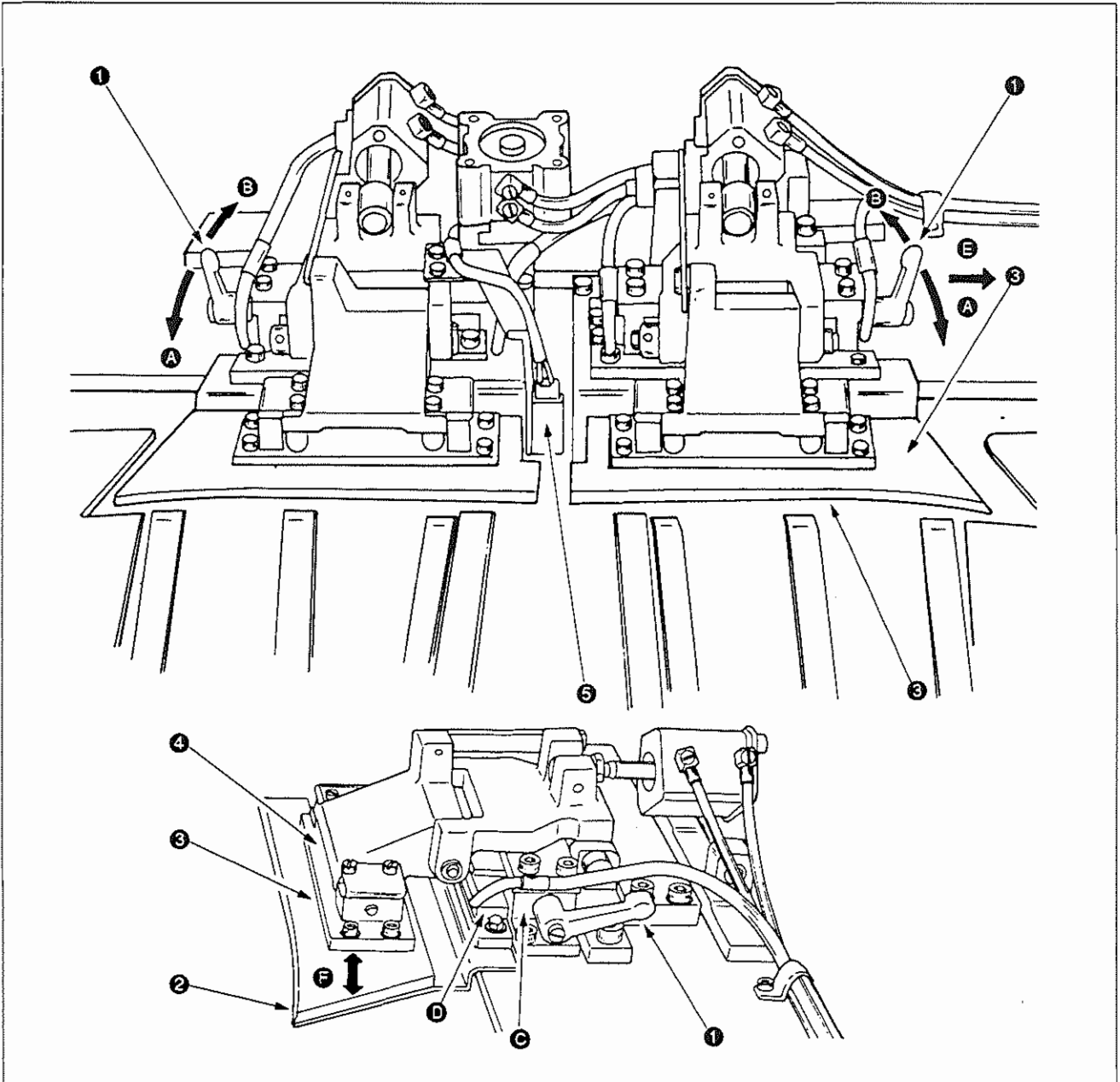
#### 5) Draining

- ① Water may gather in lower section of the regulator ⑪. If this section is not drained for a long time, water may gather in the pipes located inside the sewing machine. Press drain push-button ⑫ up with fingers to drain the regulator at regular intervals.

**(Caution)** It is recommended to drain the regulator before and after operating the machine.

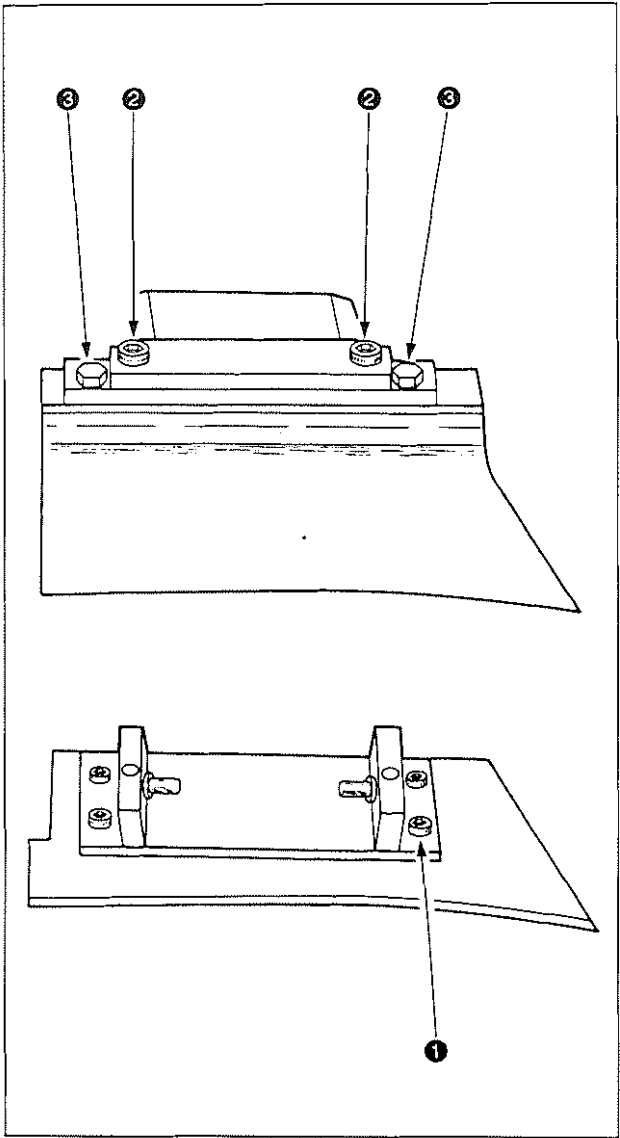
- ⑥ If it is necessary to let air out of the sewing machine when adjusting the sewing machine mechanisms, shut valve ⑤, and press drain push-button ⑫ up to make the black pointer of the pressure gauge indicate 0 as in the case of draining the regulator.

(9) Installing the work clamps



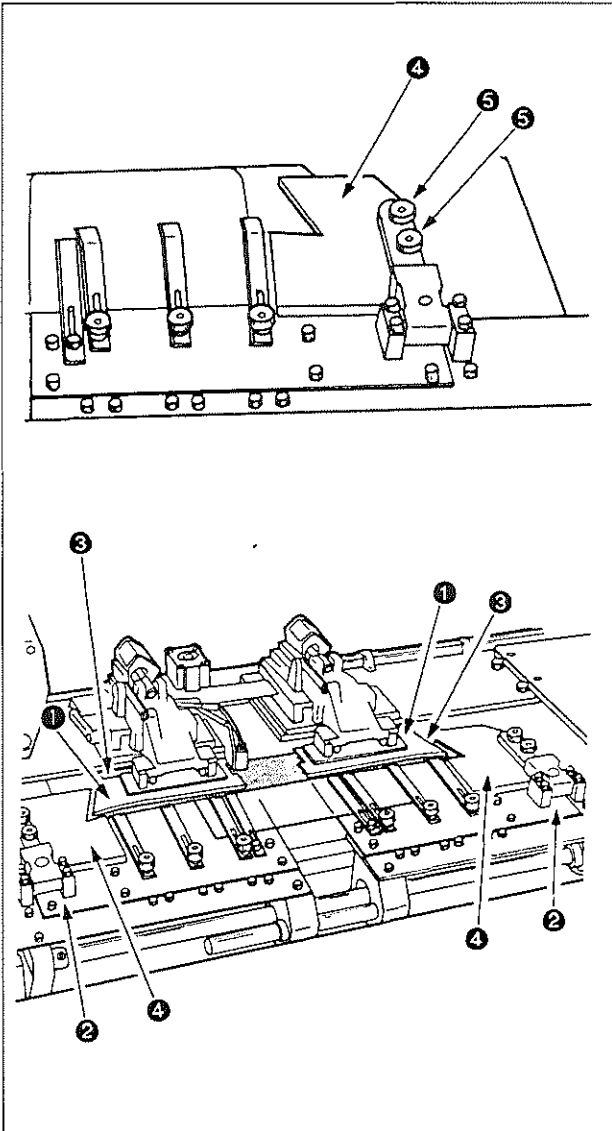
- 1) Turn lock lever ① toward you (in direction ① ), and work clamp lower plate ② can be installed or removed.
- 2) Turn lock lever ① away from you (in direction ② ), and work clamp lower plate ② can be fixed.  
When fixing the work clamp lower plate, securely press the work clamp lower plate until section ④ comes in contact with section ⑤ .
- (Caution) Set lock lever ① so that it is nearly leveled when turning it in direction ② .  
Drawing lock lever ① out in direction ② will allow the lock lever to rotate freely as desired.
- 3) Work clamp upper plate ③ is fixed by ball catch ④ . It means that the upper plate can be installed or removed in direction ③ by a finger tip control.





- (Caution)
1. When removing or installing the work clamp plate, carefully watch material detection sensor ⑤. (Refer to the previous page.)
  2. Do not loosen screws ①, ② and ③ in the work clamp lower plate and work clamp plate.

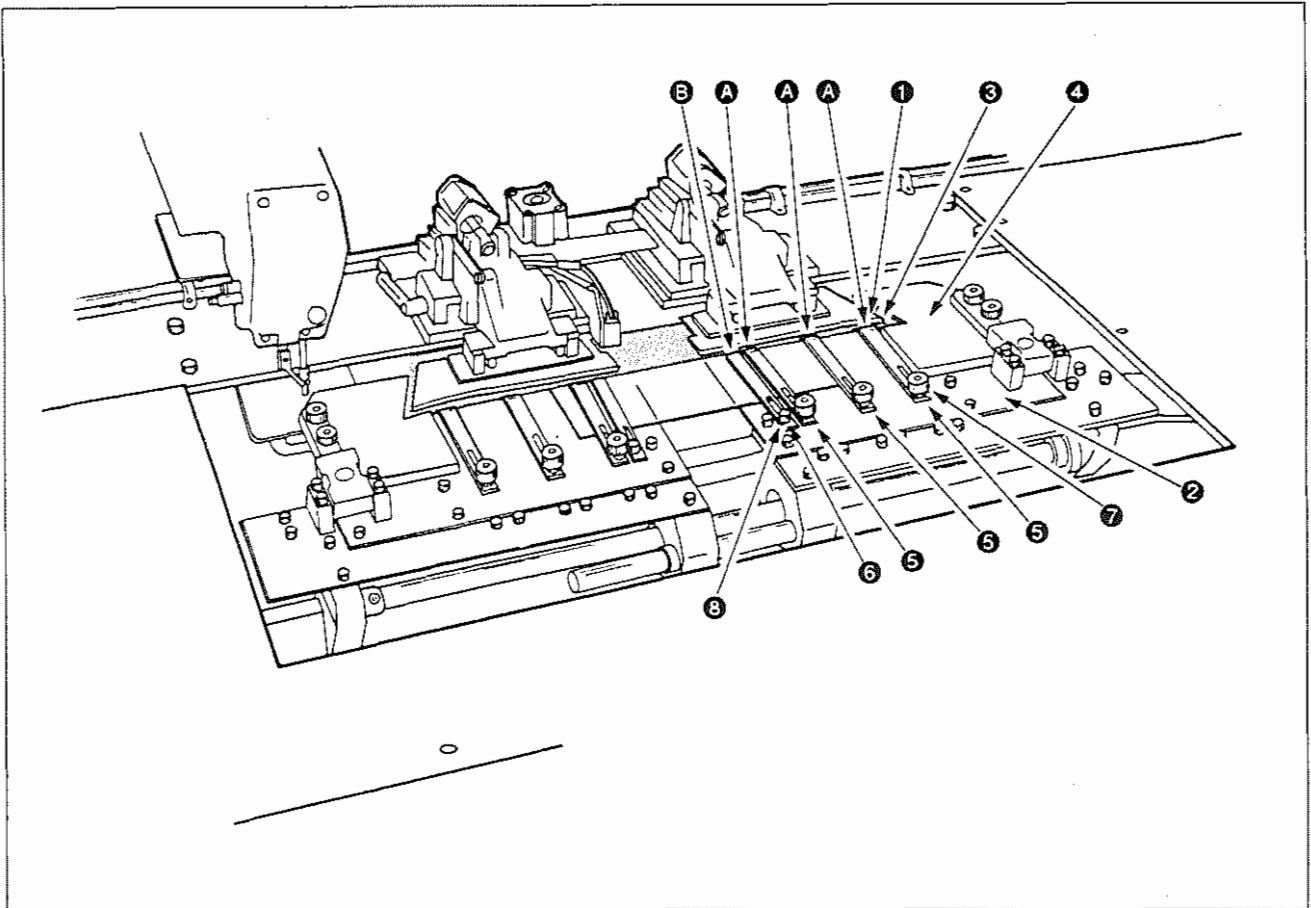
## (10) Attaching the set gauges



- 1) Turn OFF the power to the sewing machine.
- 2) Let air out of the machine.
- 3) Lift work clamp upper plate ① of the work clamp mechanism, and move set loader mechanism ② to the position where the material is delivered.
- 4) Set material ③ to be actually sewn on the machine in accordance with the shape of the work clamp upper plate and stitch diagram. This position of the material determines the edge width and etc. of the collar to be finished.
- 5) Position set gauge ④ according to the shape of material ③. After the set gauge has been positioned, fix it with thumb screws ⑤.
- 6) This machine has been designed to use a left collar as reference for sewing collars. Consequently, when positioning the set gauge, determine the left-hand side position of the set gauge first, then the right-hand side position of it.

**(Caution)** The set gauge is positioned taking the shape of collar to be sewn. So, if the collar materials are not cut uniformly, it may be necessary to re-position the set gauge in accordance with the change in size of the materials.

## (11) Adjusting the position of the set clamps



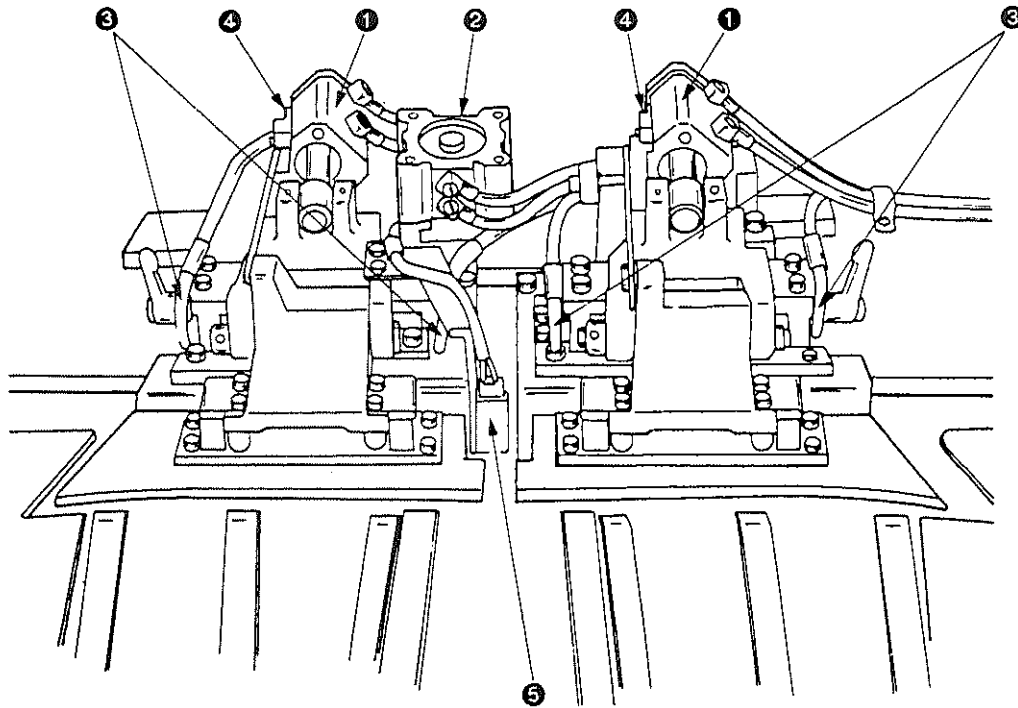
- 1) Turn OFF the power to the sewing machine.
- 2) Let air out of the machine.
- 3) Lift work clamp upper plate ① of the work clamp mechanism, and move set loader mechanism ② to the position where the material is delivered.
- 4) Place material ③ to be actually sewn on the machine according to set gauge ④. Then lower work clamp upper plate ① to make it secure the material.
- 5) In this state, provide a clearance of approximately 2 mm between work clamp upper plate ① and the top end of ① of respective set clamps ⑤, and fix the set clamps with thumb screws ⑦.
- 6) Fix center gauge ⑥ with screw ⑧ while positioning the top end of ③ of the center gauge according to the material shape.

\* The operation panel functions provided by the newly developed software includes a pattern change mode. If your AVP-880 is provided with this mode, the position of the setting clamp can be adjusted following the steps described below.

- 1) Set the indication of **Run** shown on the lower right portion of the standard screen to **Standby**.
- 2) Press the **Select** so as to specify **4. Change PTN**.
- 3) Press the **Confirm PTN** on the pattern change mode screen.
- 4) The machine retrieves the origin and the operating air supply to the cylinder of setting loader mechanism ② stops. Now, move the setting loader mechanism to the material delivery position as illustrated in the figure above. Then, properly position setting clamp ⑤ and center gauge ⑥.
- 5) After the completion of the adjustment, return setting loader mechanism ② toward you and press the **End** on the operation panel screen. This completes the adjusting procedure.

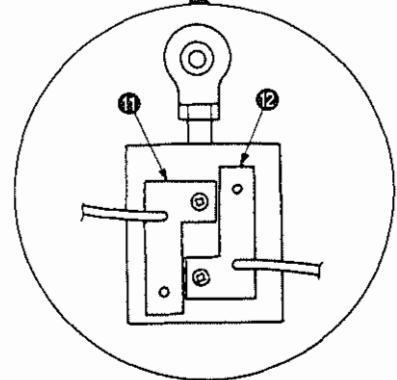
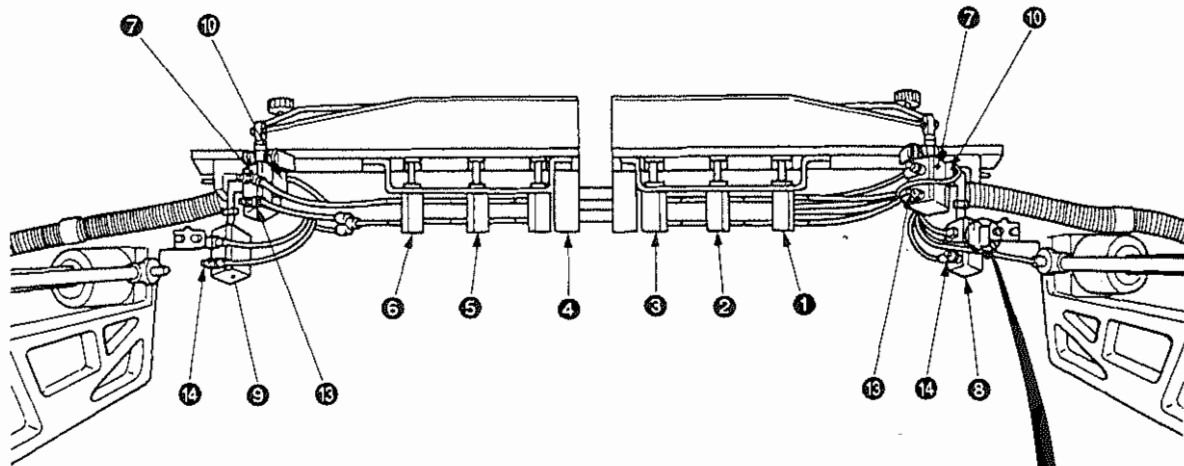
#### 4. CONSTITUENT PARTS AND THEIR ROLES

##### (1) Work clamp mechanism



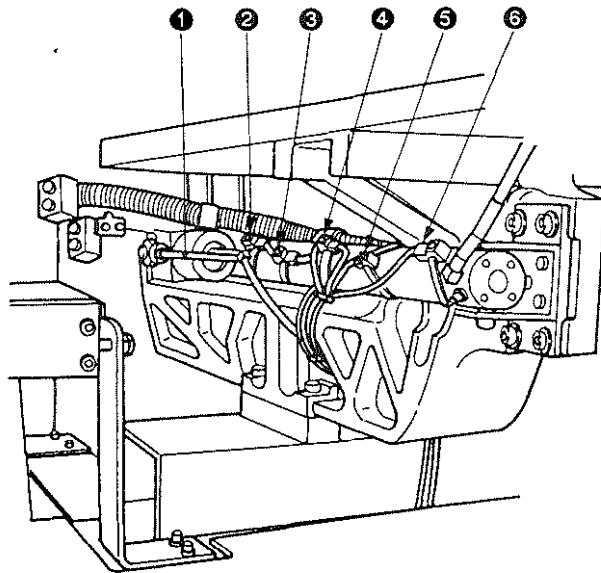
- ① Work clamp cylinder  
Used to raise/lower the work clamp.
- ② Rock cylinder  
Used to raise/lower the thrust pad.
- ③ Work clamp air purge  
Used to blow the workpiece down onto the chute plate.
- ④ Work clamp lowering sensor  
This sensor detects "ON" when the work clamp is descending.
- ⑤ Material detecting sensor  
This sensor detects "ON" when the work clamp clamps the material on the machine.

## (2) Setting mechanism



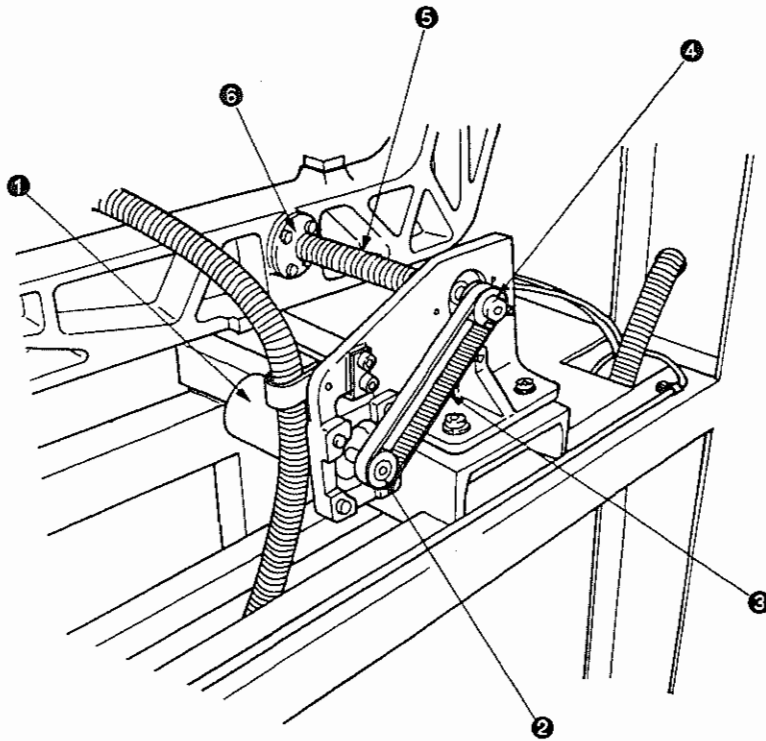
- ① Clamp cylinder 1  
Used to raise/lower setting clamp 1.
- ② Clamp cylinder 2  
Used to raise/lower setting clamp 2.
- ③ Clamp cylinder 3  
Used to raise/lower setting clamp 3.
- ④ Clamp cylinder 4  
Used to raise/lower setting clamp 4.
- ⑤ Clamp cylinder 5  
Used to raise/lower setting clamp 5.
- ⑥ Clamp cylinder 6  
Used to raise/lower setting clamp 6.
- ⑦ Set gauge cylinder  
Used to raise/lower the set gauge.
- ⑧ Setting table cylinder, left  
Used to raise/lower the setting table.
- ⑨ Setting table cylinder, right  
Used to raise/lower the setting table.
- ⑩ Set gauge lifting sensor  
This sensor detects "ON" when the set gauge is ascending.
- ⑪ Setting clamp switch sensor  
This sensor detects "ON" when the setting table is slightly lowered.
- ⑫ Setting table lowering sensor  
This sensor detects "ON" when the setting table is descending.
- ⑬ Set gauge speed controller  
Used to regulate the speed at which the set gauge lowers.  
Tightening the speed controller decreases the speed.
- ⑭ Setting table speed controller  
Tightening the speed controller decreases the speed at which the setting table descends.

### (3) Loader mechanism



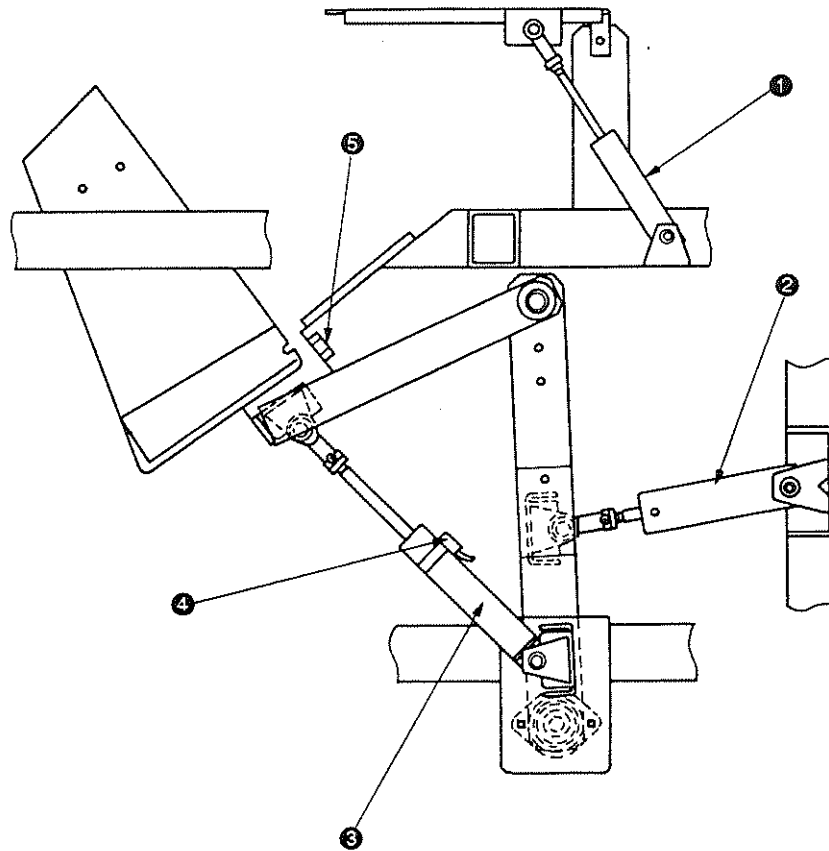
- ① Loader cylinder  
Used to move the setting mechanism back or forth.
- ② End face sensor on the setting mechanism  
This sensor detects "ON" when the setting mechanism retracts toward the operator until it will go no further.
- ③ Brake sensor on the setting mechanism  
When this sensor detects "ON" while the setting mechanism is moving back, the brakes are applied to the setting mechanism to decrease the retraction speed of the setting mechanism.
- ④ Center sensor  
This sensor, located at the middle of the cylinder stroke, detects "ON" when the loader returns toward the operator. The "ON" detection of the sensor is used as a signal to make the setting gauge start to come down and the setting table start to go up.
- ⑤ Brake sensor on the sewing machine  
When this sensor detects "ON" while the setting mechanism is moving forward, the brakes are applied to the setting mechanism to decrease the speed at which the mechanism moves forward.
- ⑥ End face sensor on the sewing machine  
This sensor detects "ON" when the setting mechanism moves forward to the sewing machine until it will go no further.

#### (4) Size adjusting mechanism



- ① Size adjusting motor  
Used as a drive source for turning the size adjusting screw.
- ② Drive sprocket  
Used to transmit the size adjusting motor force to the size adjusting belt.
- ③ Size adjusting belt  
Used to transmit the drive sprocket force to the follower sprocket.
- ④ Follower sprocket  
Used to transmit the size adjusting belt force to the size adjusting screw.
- ⑤ Size adjusting screw  
Turning this screw slides the position of the size adjusting nut.
- ⑥ Size adjusting nut  
Sliding this nut changes the size of the work clamp mechanism and setting mechanism.

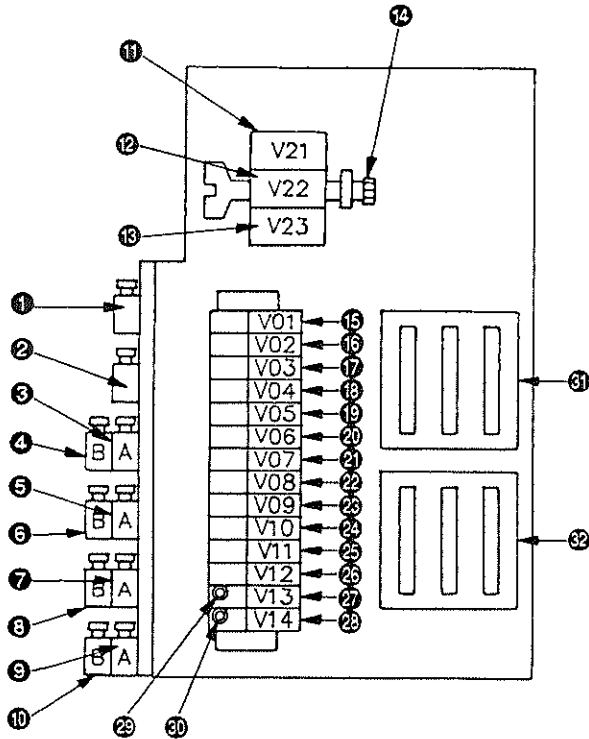
## (5) Stacker



- ① Chute cylinder  
Used to raise/lower the chute plate.
- ② Stacker forward/backward cylinder  
Used to move the tandem blade back or forth.
- ③ Stacker up/down cylinder  
Used to raise/lower the tandem blade.
- ④ Tandem blade lift sensor  
This sensor detects "ON" when the tandem blade is ascending.
- ⑤ Workpiece passage sensor  
This sensor detects "ON" when the collar cloth passes it while the stacker is in operation.



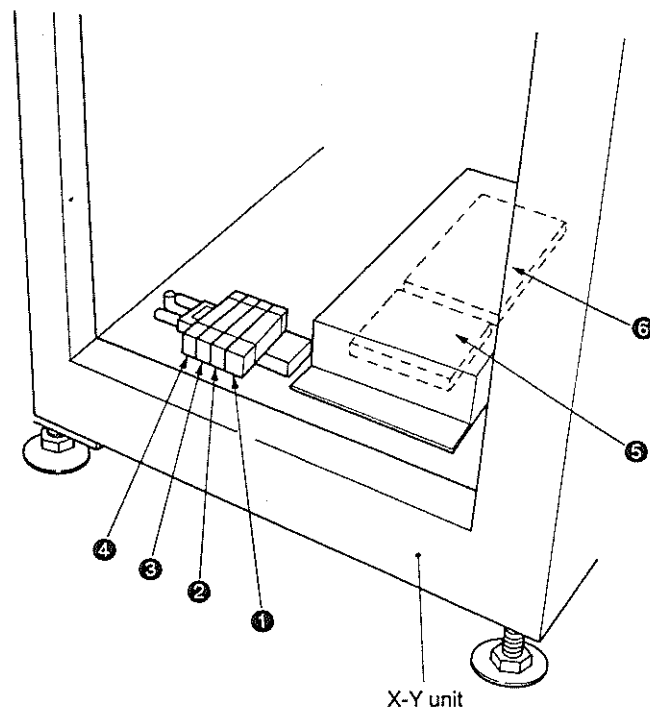
## (6) Solenoid valve unit section A



- (Caution)**
- Speed controllers ① to ⑩, ⑭ are adjusted to the optimum speeds. Do not tamper with them except in special cases.
  - Refer to page 128 for pneumatic diagrams for components ① through ⑳.
  - Refer to the electrical circuit diagram on page 129 when wiring terminal block ⑳ and ㉑.

- Loader cylinder speed controller  
When this is tightened, the loader retraction speed is slowed down.
- Work clamp air purge speed controller  
When this is tightened, the air purge force is decreased.
- Chute plate speed controller A  
When this is tightened, the chute plate ascending speed is slowed down.
- Chute plate speed controller B  
When this is tightened, the chute plate descending speed is slowed down.
- Stacker up/down cylinder speed controller A  
When this is tightened, the tandem blade descending speed is slowed down.
- Stacker up/down cylinder speed controller B  
When this is tightened, the tandem blade ascending speed is slowed down.
- Stacker forward/backward cylinder speed controller A  
When this is tightened, the tandem blade retraction speed is slowed down.
- Stacker forward/backward cylinder speed controller B  
When this is tightened, the tandem blade advance speed is slowed down.
- Work clamp cylinder speed controller A  
When this is tightened, the work clamp descending speed is slowed down.
- Work clamp cylinder speed controller B  
When this is tightened, the work clamp ascending speed is slowed down.
- Loader advance drive solenoid valve (V21)  
When the solenoid valve comes ON, the loader advances.
- Loader brake drive solenoid valve (V22)  
When the solenoid valve comes ON, the brakes are applied to the loader while the loader is engaged in loading.
- Loader retraction drive solenoid valve (V23)  
When the solenoid valve comes ON, the loader retracts.
- Loader brake throttle valve  
When the throttle valve is tightened, the brake force increases.
- Rock cylinder drive solenoid valve (V01)  
When the solenoid valve comes ON, the rock cylinder extrudes.
- Air purge drive solenoid valve (V02)  
When the solenoid valve comes ON, the operating air is blown out from the nozzle.
- Chute cylinder drive solenoid valve (V03)  
When the solenoid valve comes ON, the chute plate comes down.
- Stacker up/down cylinder drive solenoid valve (V04)  
When the solenoid valve comes ON, the tandem blade comes down.
- Stacker forward/backward cylinder drive solenoid valve (V05)  
When the solenoid valve comes ON, the tandem blade retracts.
- Clamp No. 6 cylinder drive solenoid valve (V06)  
When the solenoid valve comes ON, the clamp No. 6 comes down.
- Clamp No. 5 cylinder drive solenoid valve (V07)  
When the solenoid valve comes ON, the clamp No. 5 comes down.
- Clamp No. 4 cylinder drive solenoid valve (V08)  
When the solenoid valve comes ON, the clamp No. 4 comes down.
- Clamp No. 3 cylinder drive solenoid valve (V09)  
When the solenoid valve comes ON, the clamp No. 3 comes down.
- Clamp No. 2 cylinder drive solenoid valve (V10)  
When the solenoid valve comes ON, the clamp No. 2 comes down.
- Clamp No. 1 cylinder drive solenoid valve (V11)  
When the solenoid valve comes ON, the clamp No. 1 comes down.
- Setting table cylinder drive solenoid valve (V12)  
When the solenoid valve comes ON, the setting table comes down.
- Set gauge cylinder drive solenoid valve (V13)  
When the solenoid valve comes ON, the set gauge goes up.
- Work clamp cylinder drive solenoid valve (V14)  
When the solenoid valve comes ON, the work clamp upper plate goes up.
- Set gauge cylinder pressure reducing valve  
When the pressure reducing valve is tightened, the set gauge cylinder lowering force increases.
- Work clamp cylinder pressure reducing valve  
When the pressure reducing valve is tightened, the pressing pressure of the work clamp cylinder increases.
- Terminal block B  
This is a relay circuit board for solenoid valves, sensors, switches, etc.
- Terminal block A  
This is a relay circuit board for solenoid valves, sensors, switches, etc.

## (7) Solenoid valve unit section B



- ① Thread trimming and tension release solenoid valve  
When the solenoid valve comes ON, the thread trimmer actuates and the thread tension is released.
- ② Intermediate presser lift solenoid valve  
When the solenoid valve comes ON, the intermediate presser goes up.
- ③ Machine head air purge solenoid valve  
When the solenoid valve comes ON, the operating air in the hook is purged.
- ④ Solenoid valve for optional devices
- ⑤ Terminal block C  
The cable terminal board for the machine head and X-Y components.
- ⑥ Power supply circuit board  
This produces DC +5 V and +24 V.

## 5. EXPLANATION OF OPERATION PANEL FUNCTIONS

As shown below, the operation panel has 9 screens, including the standard screen. These screens are the standard screen; the No. 1 and No. 2 screens for operation mode; the No. 3, No. 4 and No. 5 screens for maintenance mode I; and the No. 6, No. 7 and No. 8 screens for maintenance mode II. This Engineer's Manual mainly describes the maintenance mode II since the operation mode and maintenance I are described in the Instruction Manual for AVP-880.

### (1) Operation mode

```

P a t t e r n      S i z e
      0 0 1          3 9 0 0
P C S / C N T    B B N / C N T
      0 1 2 3        1 2 3 4
M a n u a l      S e l e c t
                  S t a n d b y
    
```

Standard screen

```

M o d e S e l e c t      + -
1 S e w i n g S p e e d
2 S w i t c h M o d e
3 T h r e a d i n g
    
```

Mode selection No. 1 screen

```

M o d e S e l e c t      + -
4 C h a n g e P T N.
5 C o n f i r m P T N.
6
    
```

Mode selection No. 2 screen

- 1) When power is turned ON the standard screen appears.
- \* For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

- 2) When  is pressed on the standard screen, the No. 1 screen appears.
- \* For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

- 3) When  is pressed on the No. 1 screen, the No. 2 screen appears.
- \* For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

### (2) Maintenance mode I

To display the No. 3 and subsequent screens, first display the No. 1 screen and then press     . If these are pressed in the wrong sequence, this mode cannot be called; in case of a mistake return to the standard screen and then repeat the above operation.

```

Mode Select      + -
7 Running Mode
8 Thread Mode
9

```

**Mode selection No. 3 screen**

```

Mode Select      + -
10
11 STD Size Change
12 Write Size

```

**Mode selection No. 4 screen**

```

Mode Select      + -
13 Head Adj.
14 Test Sewing
15

```

**Mode selection No. 5 screen**

1) For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

2) After calling the No.3 screen, press  to call the No. 4 screen.

\* For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

3) After calling the No. 3 screen, press   to call the No. 5 screen.

\* For explanation of the individual functions, please refer to the section on "Operation" in the Instruction Manual.

### (3) Maintenance mode II

To select this mode, turn the power OFF and set DIP switch SW1-2 on the CPU circuit board to ON. After completing these settings, turn the power ON, call the No. 1 screen and then press      to call the No. 3 screen; then when  is pressed the No. 6 and subsequent screens shown below can be called.

< Indication on the screen >

```
Mode Select      + -  
16 Origin Adj.  
17 Size Adj.  
18
```

Mode selection No. 6 screen

```
Mode Select      + -  
19 H. Point Adj.  
20 Head S. Drive  
21 Trimming Adj.
```

Mode selection No. 7 screen

```
Mode Select      + -  
22 Aging  
23 Gain Adj.  
24
```

Mode selection No. 8 screen

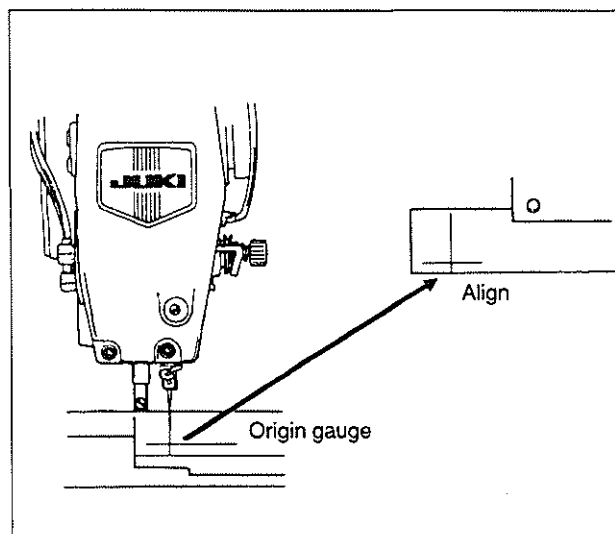
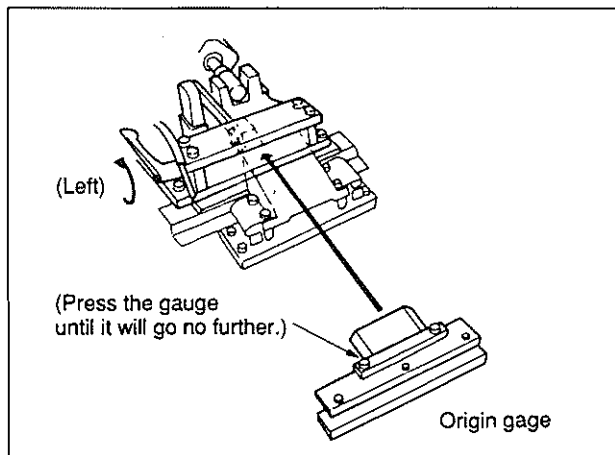
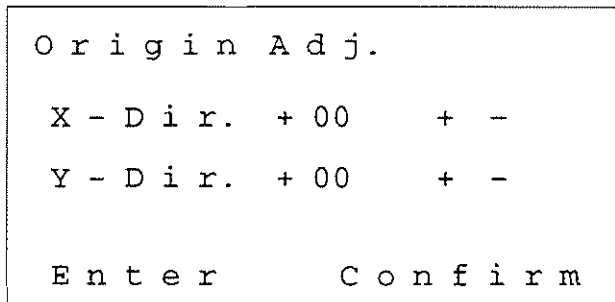
(Caution) Maintenance mode II functions other than "Aging" can only be selected when the **Run/Standby** item on the standard screen is **Standby**.

(a) **16. Origin Adj.**

This mode is used for fine adjustment of the origin for needle entry of the sewing machine and the origin for the sewing area. The following conditions must be satisfied in order for this mode to be used.

- Mechanical origin adjustment must have been completed.  
(Please refer to page 29 of this manual.)
- Origin gauge must be used.

## XY origin adjustment screen



- 1) Press "16" on the mode selection No. 6 screen to display the XY origin adjustment screen.

When the **Confirm** is pressed on this screen, the machine head searches for the origin, then the screen shown on the left will appear.

- 2) Install the origin gauge to the set position of the work clamp lower plate (left). Press the **+** or **-** key to adjust so that the needle entry point coincides with the intersection of the gauge lines both in terms of X and Y directions.

**(Caution)** Adjustment can be done within the limits of  $-20$  to  $+20$  ( $\pm 2.0$  mm). If the adjustment cannot be done within these limits, recheck the mechanical adjustment.

- 3) When this adjustment is completed, press **Enter**. This stores the settings in memory.

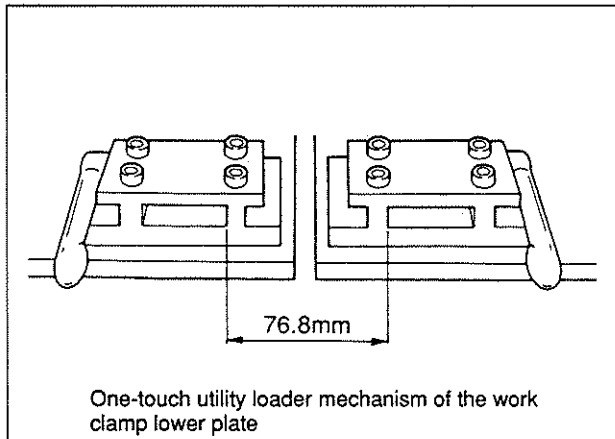
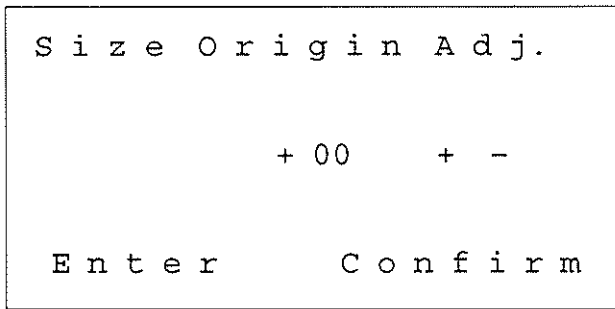
**(Caution)** 1. If the standard screen returns without **Enter** having been pressed the settings will not be stored in memory, so use caution.

2. After the adjustment, confirm the relation between your pattern board and the needle entry of the sewing pattern.

(b) **17. Size Origin Adj.**

This mode is used to adjust the lateral clearance between the work clamp and the loader setting mechanism at the time of the minimum size (size adjustment value = 0).

**Size origin adjustment screen**

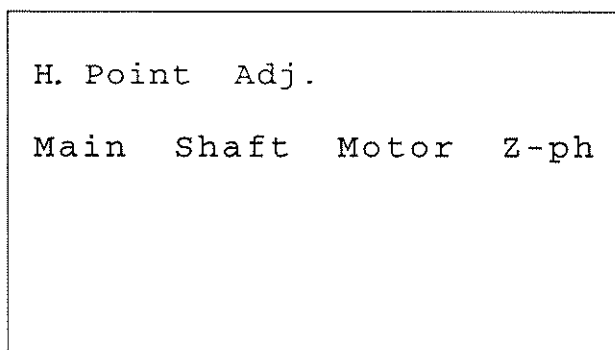


- 1) Press "17" on the mode selection No. 6 screen to display the size origin adjustment screen.
  - 2) When the **Confirm** is pressed, the size adjusting motor searches for the origin. Then, **+** and **-** are shown on the screen as illustrated in the figure on the left.
  - 3) The lateral clearance between the loader and the setting mechanism increases in increments of 0.1 mm by pressing the **+** key.
  - 4) Press the **Enter** key, and the data on the clearance between the loader and the setting mechanism is stored in memory.
  - 5) Press the **Size Origin Adj.** key, and the input data is rendered ineffective and the screen returns to the standard screen.
- \* When performing the adjustment, use the lateral clearance between the one-touch utility lock mechanisms of the work clamp lower plate for reference standard.
  - \* If "+00" is shown on the screen, the **-** key is invalid.

(c) **19. H. Point Adj.**

This mode is used for the adjustment of the origin (highest dead point) when replacing the main shaft motor and timing belt.

**Highest dead point adjustment screen**

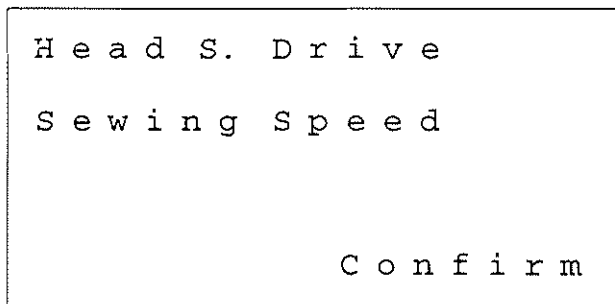


- 1) Press "19" on the mode selection No. 7 screen to display the highest dead point adjustment screen as shown on the left.
  - 2) When the **Z-ph** is pressed, the motor turns clockwise by a full revolution (or less) as viewed from the axial direction and stops when the Z phase is detected. At this time, the motor is locked. Now, adjust the highest dead point.
  - 3) Press the **H. Point Adj.** key, and the screen will return to the standard screen.
- \* Refer to "4-(10) Adjusting the initial position (Z phase) of the main shaft motor" in the Engineer's Manual for AVP-870/-880 (Machine head volume) for detailed explanation of the highest dead point adjusting procedure.

(d) **20. Head S. Drive**

The 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 in actual sewing.

**Head S. Drive screen**



- 1) When "20" is pressed on the mode selection No. 7 screen, the Head S. Drive screen appears.
- 2) When **Confirm** is pressed, a search for origin is carried out, the work clamp plate is lowered to the sewing start position, and the machine head goes onto standby. At this time **Confirm** disappears from the screen and **Sewing speed** appears.
- 3) When the release settings switch is pressed, the machine head starts to move. When the sewing pattern has been completed, it waits 2 seconds and then starts up again. To end the action press the pause switch.
- 4) Pressing **Head S. Drive** returns to the standard screen.

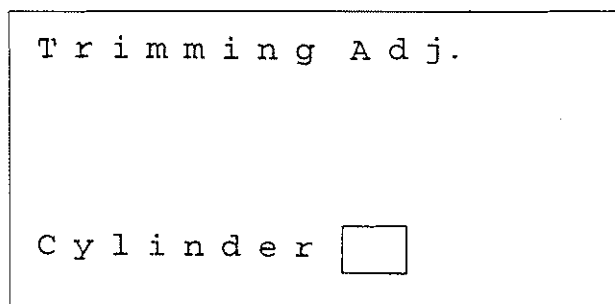
**(Caution)** When driving the machine head in this mode, remove the bobbin and the needle thread from the machine head.

\* Refer to "4-(12) Adjusting the amount of oil" in the Engineer's Manual for AVP-870/-880 (Machine head volume) for the detailed explanation of the oil amount adjusting procedure.

(e) **21. Trimming Adj.**

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 and OFF.

**Thread trimmer adjustment screen**

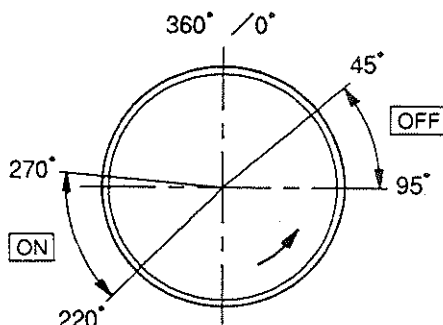


- 1) When "21" is pressed on the mode selection No. 7 screen, the thread trimmer adjustment screen appears. At this time, the main head shaft is in free condition.
- 2) When the handwheel is turned in the positive direction, **ON** appears in the rectangle . When **ON** is pressed at this time, the thread trimmer solenoid valve comes ON, the roller enters the thread trimmer cam groove, and the display changes from **ON** to **OFF**.

**(Caution)** When **OFF** appears on the screen, it is not possible to return to the standard screen.

- 3) If the handwheel is now turned, the display in the rectangle changes from **OFF** to **--**. At this time, the thread trimmer action and timing can be checked.
- 4) With the status is 3), if the handwheel is now turned again the display in the rectangle changes back from **--** to **OFF**. At this time, press **OFF** to turn the solenoid valve OFF, and remove the roller from the thread trimmer cam groove.
- 5) When the series of checks has been completed, press **Trimming Adj.** to return the standard screen to the operation panel and end the adjustments.

\* Refer to "4-(16) Adjusting the thread trimming cam" in the Engineer's Manual for AVP-870/-880 (Machine head volume) for detailed explanation of the thread trimming cam adjusting procedure.



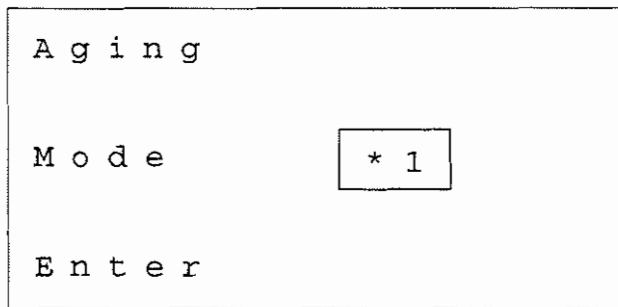


(f) **22. Aging**

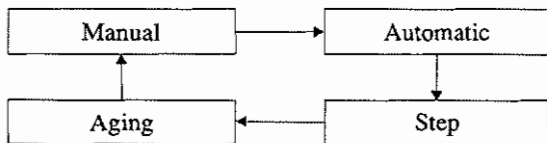
Select continuous operation for aging.

This function can be used to measure the machine's cycle time, but when using it, it is necessary to remove the work clamp upper plate and set gauge.

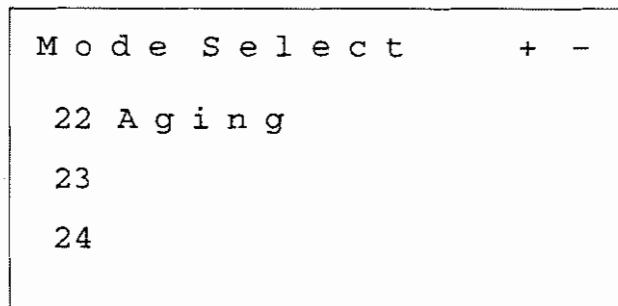
**Aging screen**



The display in \*1 changes as follows.



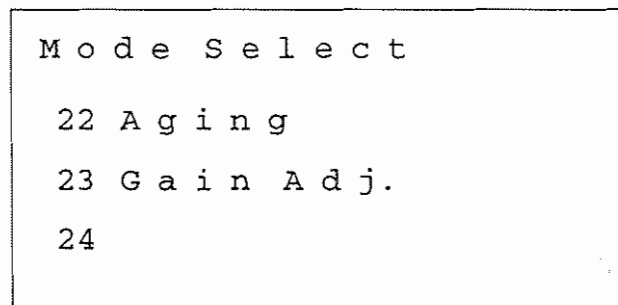
**Aging mode selecting screen**



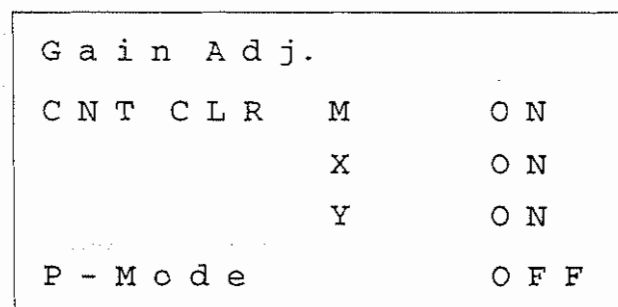
(g) **23. Gain Adj.**

This mode is used for motor gain adjustment.

**Mode changing screen**



**Gain adjustment screen**



- 1) When "22" is pressed on the mode selection No. 8 screen, the aging screen appears.
- 2) Press \*1 in the figure at left to select **Aging**; then when **Enter** is pressed the standard screen returns.
- 3) Press the **Run/Standby** key to set the machine in the operation state.
- 4) Press the setting table and lower the setting clamp.
- 5) When the settings completed switch is turned ON, continuous operation is carried out.
- 6) Press the setting release switch, and the machine stops aging.
- 7) Pressing **Aging** cancels the settings; the standard screen returns with the old settings, and the aging operation is completed.

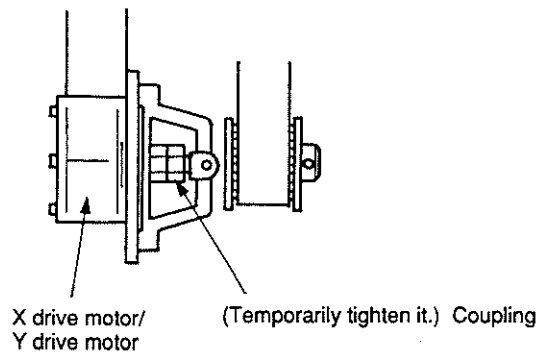
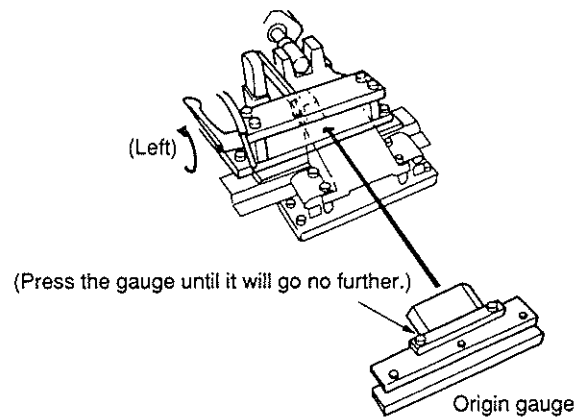
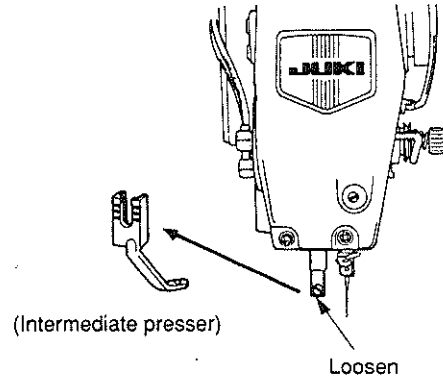
- 1) When "23" is selected on the mode selection No. 8 screen, the gain adjustment screen appears.

- 1) When count clear M/X/Y **ON** is pressed, the deviation counter for each servo driver is cleared and the display changes to OFF. When **OFF** is pressed, the counter clear is released, and the display changes to ON.
  - 2) When P-mode **OFF** is pressed, the P-mode goes OFF for all of the servo drivers, M, X and Y, and the display changes to ON. When **ON** is pressed the P-modes come ON and the display changes to OFF.
  - 3) When **Gain Adj.** is pressed, the standard screen returns.
- \* Refer to "9. Servo driver adjustment" for the detailed explanation of the gain adjusting procedure.

## 6. ADJUSTMENTS OF PARTS

### STANDARD ADJUSTMENT

#### (1) X-Y origin adjustment



HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ol style="list-style-type: none"> <li>1) Make the machine retrieve the origin, then turn OFF the power to the machine.</li> <li>2) Set the DIP switch SW1-2 mounted on the CPU circuit board to the ON state.               <ul style="list-style-type: none"> <li>* Carry out the aforementioned operation so as to make the machine enter the maintenance mode II.</li> </ul> </li> <li>3) Remove the intermediate presser.</li> <li>4) Remove the work clamp upper plate (left) and lower plate (left). Then, set the origin gauge in position.               <ul style="list-style-type: none"> <li>* Expel the operating air, and the aforementioned step of procedure can be carried out with ease. Properly supply the machine with the operating air before proceeding to the next step of procedure.</li> </ul> </li> <li>5) Temporarily tighten the couplings of the X drive motor and Y drive motor.</li> <li>6) Turn ON the power to the machine.</li> </ol>	

## STANDARD ADJUSTMENT

(Standard screen)

Pattern	Size
PCS/CNT	BBN/CNT
Manual	Select
	Standby

Standby  
↓  
Mode select

(Mode selection screen)

Select	+ -
1. Sewing Speed	
2. Switch Mode	
3. Threading	

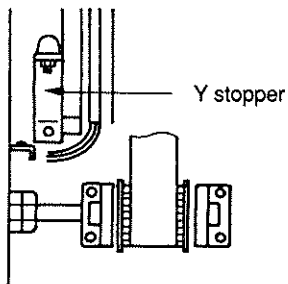
+ → Twice  
- → Once  
→ Press "+".  
16. Origin Adj.

Origin Adj.		
X-Dir.	+ 00	+ -
Y-Dir.	+ 00	+ -
Enter		Confirm

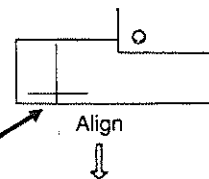
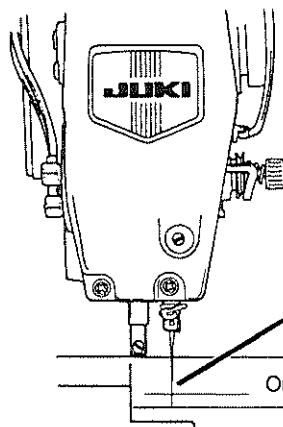
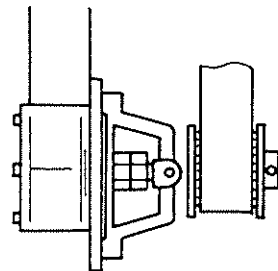
Confirm ←  
(Origin)

(X-Y housing)

(Y drive motor coupling)



(X drive motor coupling)



Origin Adj.		
X-Dir.	+ 00	+ -
Y-Dir.	+ 00	+ -
Enter		Confirm

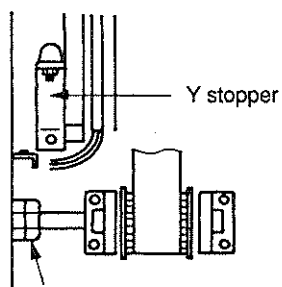
\* Press the "Confirmation" several times to confirm the XY origin.

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<p>7) Press the <b>Select</b> key on the standard screen to display the mode selection screen.</p> <p>8) Press the <b>+</b> and <b>-</b> keys as <b>+</b>, <b>+</b>, <b>-</b>, <b>+</b>, <b>+</b>, <b>+</b>, <b>+</b> and <b>+</b> in the written order, and the mode selection No. 6 screen will be shown on the display.</p> <p>9) Press the <b>16. Origin Adj.</b> key to make the machine enter the XY origin adjustment mode.</p> <p>10) Press the <b>Confirm</b> key. Then, set the XY origin adjustment value in the X direction to "+00" and that in Y direction to "+00" by operating the <b>+</b> and <b>-</b> keys.</p> <p>11) Fully loosen the couplings in the X drive motor and Y drive motor.</p> <p>12) Adjust so that the needle tip meets the intersection of origin gauge lines by moving the machine head by hand.</p> <p>13) Temporarily tighten the coupling in the X drive motor and Y drive motor.</p> <p>14) Press the <b>Confirm</b> key to confirm that the needle tip is aligned with the intersection of the origin gauge lines after the origin is retrieved. (Repeat this procedure twice or three times.)</p> <p>* If the difference between the standard adjustment and the actually adjusted value is <math>\pm 2</math> mm or less, it can be corrected on the operation panel. So, proceed to the next step.</p> <p>* If the aforementioned difference exceeds <math>\pm 2</math> mm, re-perform the adjustment from step 11).</p>	

# STANDARD ADJUSTMENT

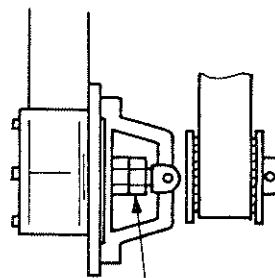
(X-Y housing)

(Y drive motor coupling)



Tighten with a load of 670 kgf/cm.

(X drive motor coupling)



Tighten with a load of 670 kgf/cm.

Mode

16. XY origin adjustment

Origin Adj.		
X-Dir.	+ 00	+ -
Y-Dir.	+ 00	+ -
Enter		Confirm

Confirm → Enter → Standard screen

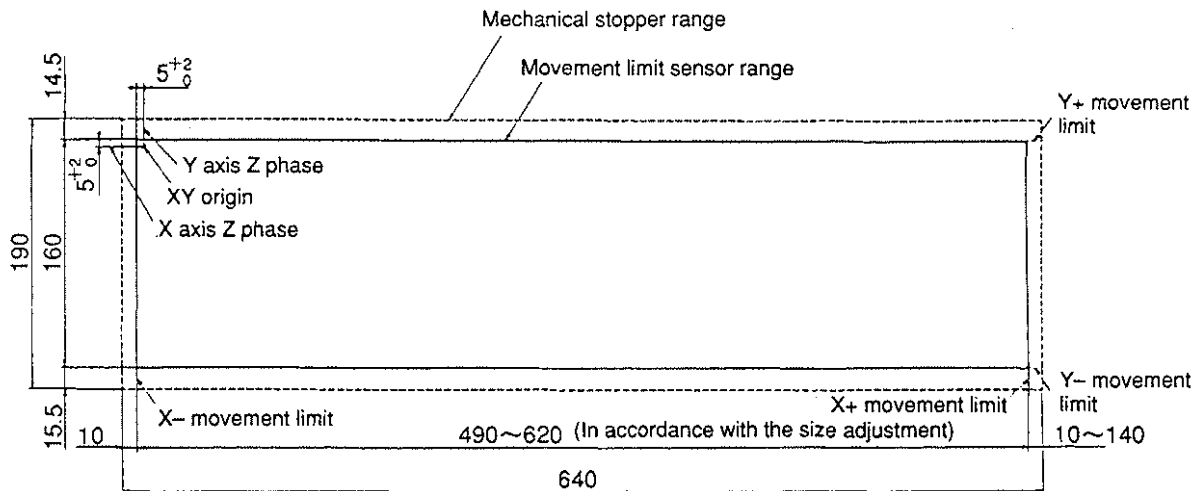
HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<p>15) Securely tighten the couplings in the X drive motor and Y drive motor with a load of 670 kgf/cm.</p> <p>16) Press the <input type="button" value="Confirm"/> key to retrieve the origin.</p> <p>17) If the needle tip is aligned with the intersection of the origin gauge lines, press the <input type="button" value="Enter"/> key. In this case, the standard screen appears on the display. Now, proceed to step 20).</p> <p>18) If the difference between the needle tip and the intersection of the origin gauge lines is <math>\pm 2</math> mm or less, press the <input type="button" value="+"/> or <input type="button" value="-"/> key in terms of X/Y direction until the needle tip is aligned with the intersection of the origin gauge lines.</p> <p>19) Press the <input type="button" value="Confirm"/> key. If the needle tip meets the intersection of the origin gauge lines, press the <input type="button" value="Enter"/> key. Now, the standard screen appears on the display.</p> <p>20) Turn OFF the power to the machine.</p> <p>21) Set the DIP switch 1-2 mounted on the CPU circuit board to the OFF state.</p> <p>22) Remove the origin gauge. Then, attach the intermediate presser, work clamp upper plate (left) and work clamp lower plate (left) in position. This completes the adjustment of the origin.</p>	

## STANDARD ADJUSTMENT

### (2) Adjusting the position of the X-Y movement limit sensor

#### (a) Standard type

Definition of X-Y coordinate (standard type)

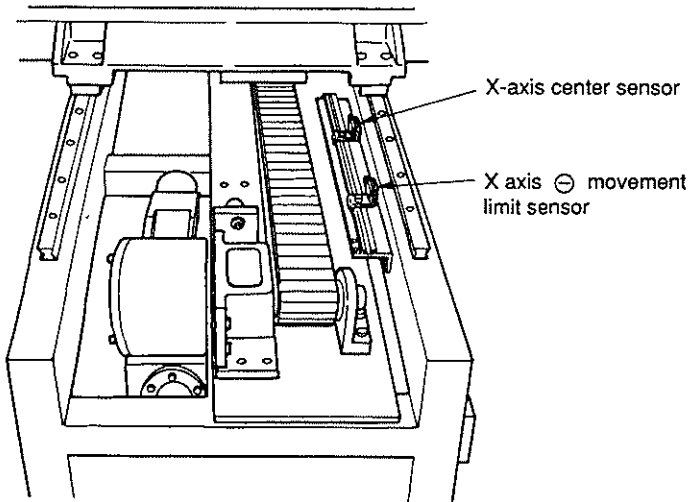




## HOW TO ADJUST

Connect the PGM-6, and select jump feed. At this time, the needle entry point is the origin position, so move the needle entry point from here to each indicated position, position the X and Y + and - sensors, and fix in place.

1) Adjustment the X-axis ⊖ movement limit



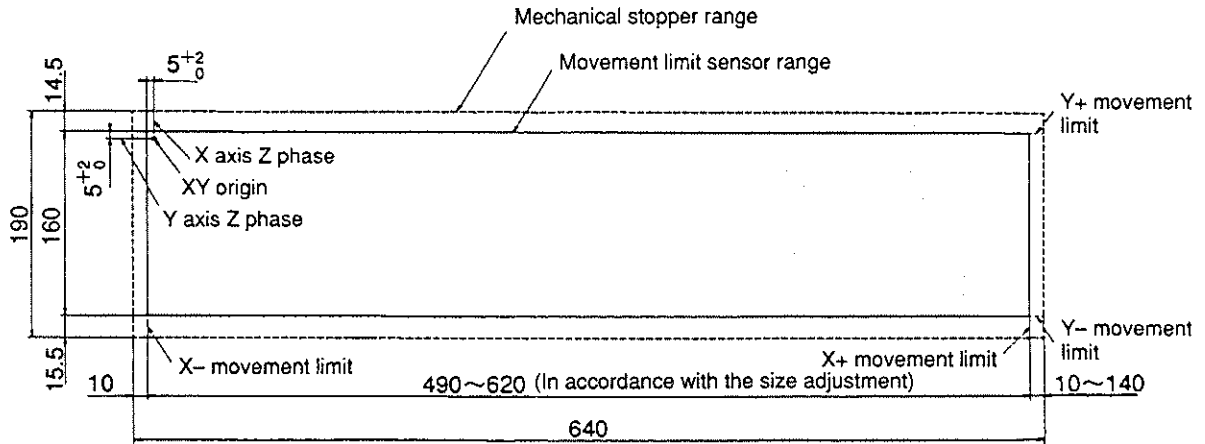
Adjust the position of the sensor by sliding the X-axis ⊖ movement sensor. Adjust so that  $(-60 \pm 10)$  is shown on the display of the PGM-6.

## RESULT OF IMPROPER ADJUSTMENT

- Movement limit error and origin error will occur.

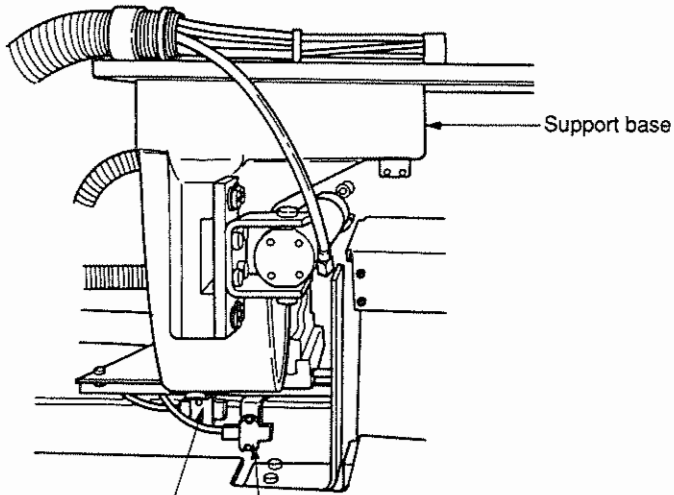
# STANDARD ADJUSTMENT

Definition of X-Y coordinate (standard type)



## HOW TO ADJUST

2) Adjustment the X-axis ⊕ movement limit



Size adjustment origin sensor

X axis ⊕ movement limit sensor

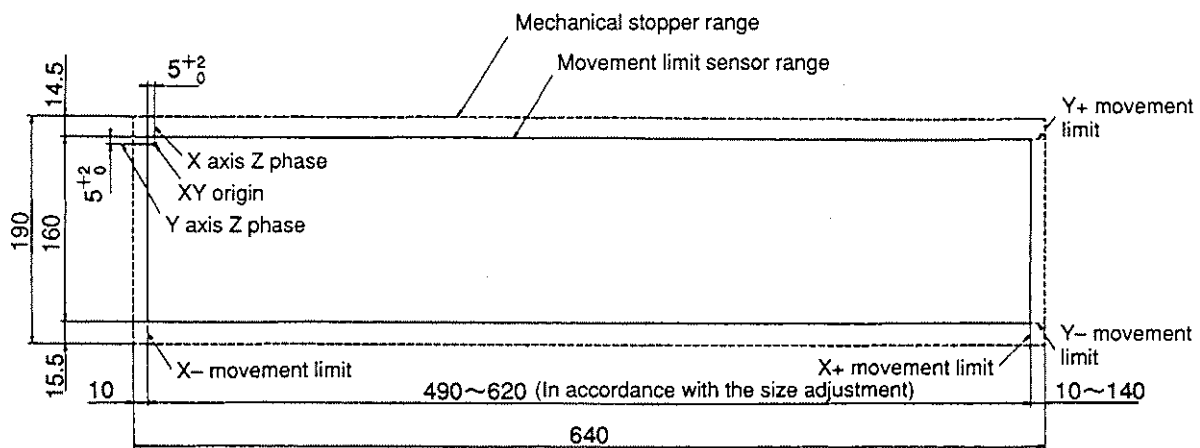
Adjust the position of the sensor by sliding the X-axis ⊕ movement sensor. Adjust so that  $(+ 4860 \pm 10)$  is shown on the display of the PGM-6.

## RESULT OF IMPROPER ADJUSTMENT

○ The X-Y table interferes with the support base.

# STANDARD ADJUSTMENT

Definition of X-Y coordinate (standard type)

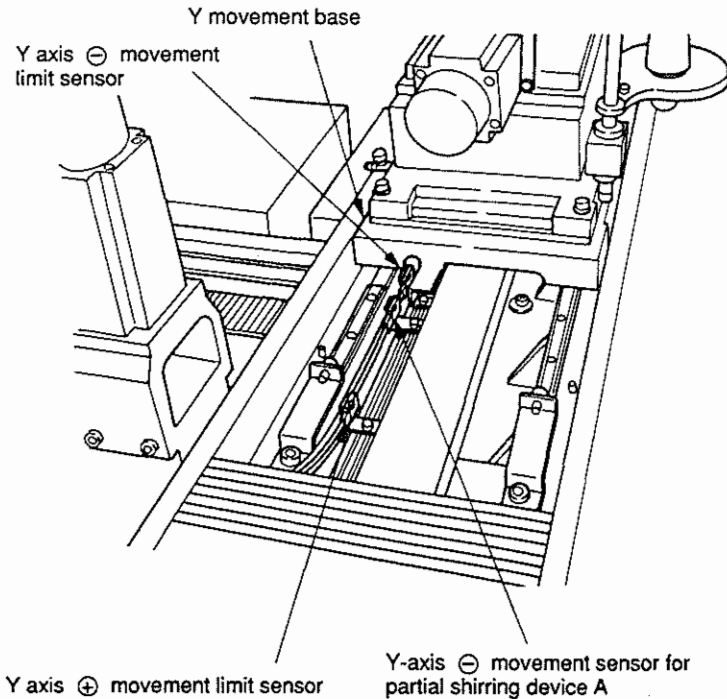


## HOW TO ADJUST

## RESULT OF IMPROPER ADJUSTMENT

- 3) Adjustment the Y-axis  $\oplus$  movement limit

- The Y movement base interferes with the mechanical stopper.

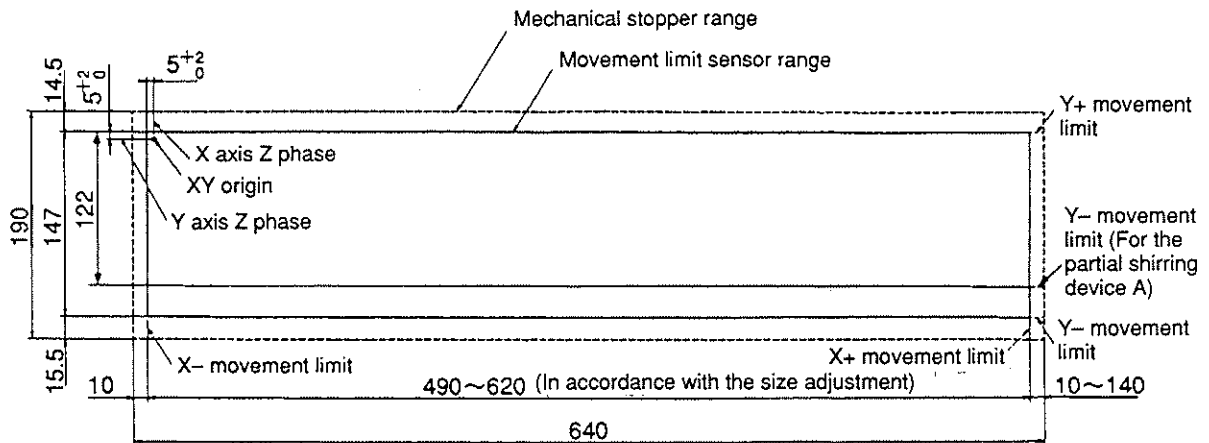


- 4) Adjust the position of the sensor by sliding the Y-axis  $\oplus$  movement sensor. Adjust so that  $(+ 60 \pm 10)$  is shown on the display of the PGM-6.
- 5) Adjustment the Y-axis  $\ominus$  movement limit  
Adjust the position of the sensor by sliding the Y-axis  $\ominus$  movement sensor. Adjust so that  $(- 1560 \pm 10)$  is shown on the display of the PGM-6.

## STANDARD ADJUSTMENT

### (b) For the machine with the partial shirring device A

Definition of X-Y coordinate (partial shirring device A)

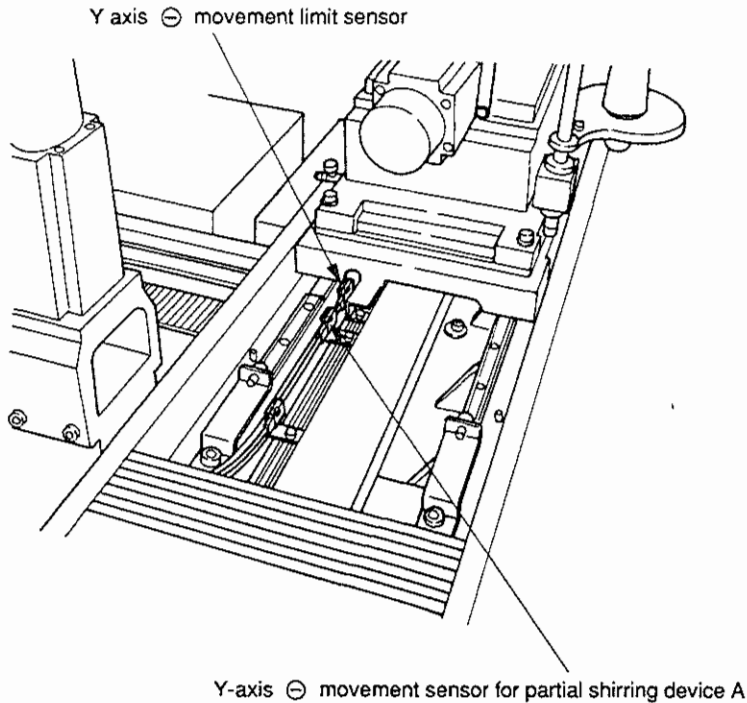


\* For the machine to which the partial shirring device A is attached, the Y-axis ⊖ movement limit is smaller than that for the standard type machine.

	Sewing area in Y direction (longitudinal)
When the partial shirring device A is used	120 mm
When the partial shirring device A is not used	145 mm

## HOW TO ADJUST

- 1) Make the machine enter the partial shirring mode to render the partial shirring A function effective.
- 2) Adjust the Y-axis ⊖ movement limit for the partial shirring device A.



Adjust the position of the sensor by sliding the partial shirring A ⊖ movement limit sensor.

Adjust so that  $(- 1160 \pm 10)$  is shown on the display of the PGM-6.

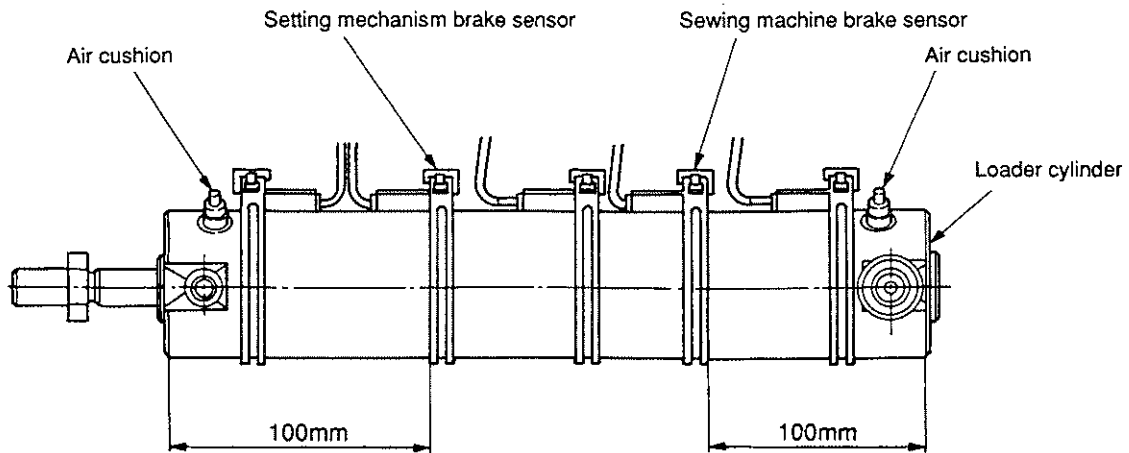
- 3) Adjust the Y-axis ⊖ movement limit  
Adjust the position of the sensor by sliding the Y-axis ⊖ movement limit sensor.  
Adjust so that  $(- 1410 \pm 10)$  is shown on the display of the PGM-6.

## RESULT OF IMPROPER ADJUSTMENT

- The machine head interferes with the partial shirring device A.

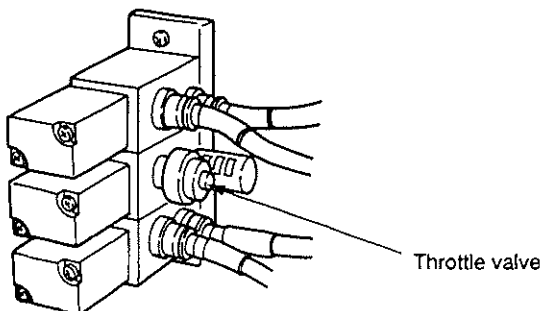
## STANDARD ADJUSTMENT

### (3) Adjusting the loader speed



- The sewing machine brake sensor on the loader cylinder should be positioned 100 mm away from the end face toward the cylinder head and the setting mechanism brake sensor should be positioned 100 mm away from the end face toward the rod. (Reference standard)
- Fix the air cushion with the adjusting screw fully turned counterclockwise. (Fully opened state)

- To adjust the throttle valve, fully turn the knob first clockwise (fully closed state) and turn it counterclockwise by a 1/3 revolution. Now, fix the throttle valve.
- ★ The length of time for advancing/retracting the loader is approx. one second.







## STANDARD ADJUSTMENT

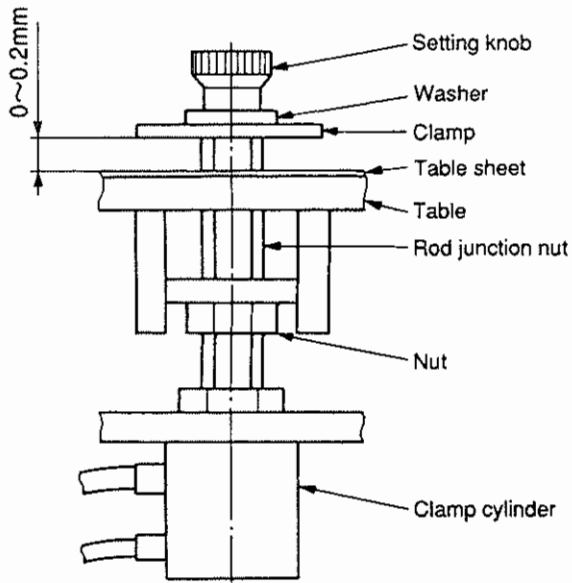
	Signal being checked	Time limit (accumulated)
When the loader advances	Loader advance drive solenoid valve ON	0 ms
	Setting mechanism end face sensor OFF	410 ms
	Setting mechanism brake sensor ON	540 ms
	Center sensor ON	600 ms
	Sewing machine brake sensor ON	680 ms
	Sewing machine end face sensor ON	830 ms
When the loader retracts	Loader retracts drive solenoid valve ON	0 ms
	Setting mechanism end face sensor OFF	320 ms
	Setting mechanism brake sensor ON	450 ms
	Center sensor ON	520 ms
	Sewing machine brake sensor ON	620 ms
	Sewing machine end face sensor ON	830 ms

Time limit table

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<p><b>(Caution)</b> So as to check whether the loader normally advances/retracts, the signals output from the loader cylinder sensors are controlled by the length of time. If the respective sensors fail to output the signal within the predetermined length of time, the machine presumes that a maloperation occurs and release the operating air supplied by the loader cylinder.</p>	

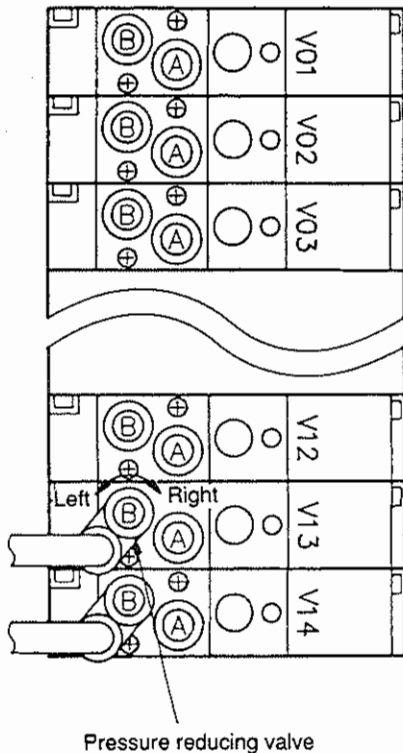
## STANDARD ADJUSTMENT

### (4) Adjusting the height of the setting clamp at the lowest position



- When the clamp cylinder rod comes down to its lowest position, a clearance of 0.1 to 0.2 mm should be provided between the top end of rod junction nut and the top surface of table sheet.

### (5) Adjusting the set gauge lowering pressure

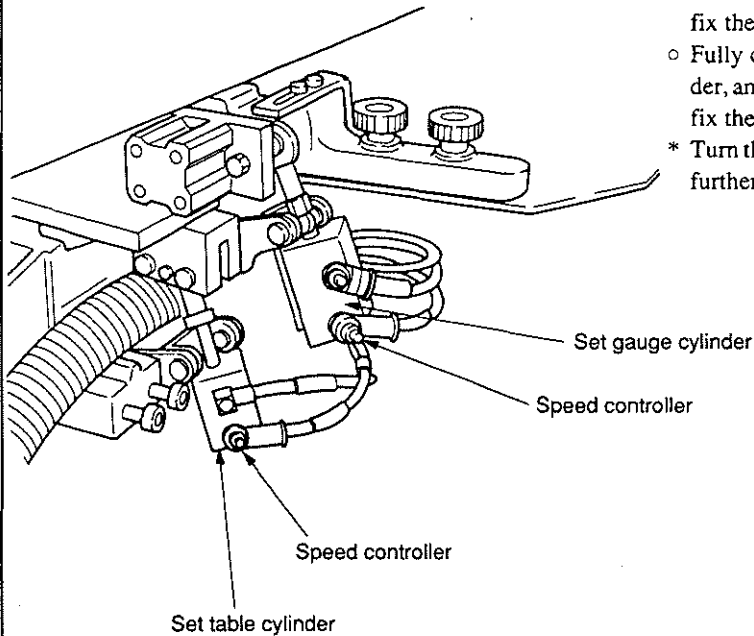


- Adjust the operating air supplied to the set gauge cylinder to 1.2 kgf/cm<sup>2</sup> by using the pressure reducing valve on B port of valve No. 13.

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ol style="list-style-type: none"> <li>1) Remove the setting knob, washer and clamp.</li> <li>2) Loosen the nut and adjust the position of the rod junction nut.</li> <li>3) Tighten the nut. Then attach the clamp, washer and setting knob in position.</li> </ol>	<ul style="list-style-type: none"> <li>○ If the clearance provided between the top end of rod junction nut and the top surface of table sheet is larger than the specified value, the clamping force will be reduced at the time of material setting.</li> <li>○ If the clearance is smaller than the specified value, the setting clamp may break.</li> </ul>
<p>Turn the knob of the pressure reducing valve clockwise to increase the pressure, or counterclockwise to decrease it.</p>	<ul style="list-style-type: none"> <li>○ If the pressure of the operating air supplied to the set gauge cylinder is higher than the specified value, the cylinder rod may break.</li> </ul>

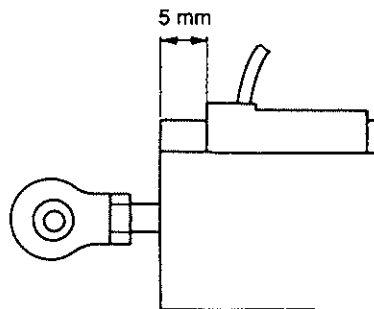
## STANDARD ADJUSTMENT

### (6) Adjusting the set gauge and setting table lowering speed



- Fully close the speed controller of the set gauge cylinder, and turn it counterclockwise by two revolutions. Now, fix the cylinder at that position.
- Fully close the speed controller of the setting table cylinder, and turn it counterclockwise by two revolutions. Now, fix the cylinder at that position.
- \* Turn the speed controller knob clockwise until it will go no further, and the speed controller will be fully closed.

### (7) Adjusting the position of the set gauge cylinder sensor



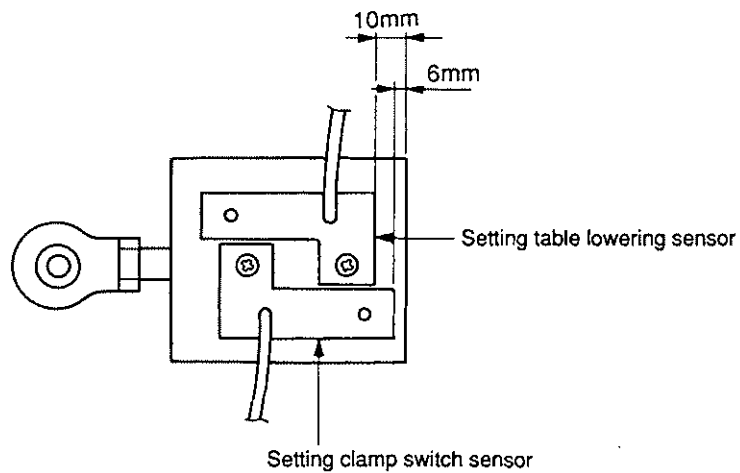
- Adjust so that the end face of the cylinder toward the rod is spaced 5 mm from the end face of the sensor toward the rod.
- \* There are two set gauge cylinders on the right- and left-hand sides. Adjust them equally.

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<p>When the speed controller knob is turned clockwise, the set gauge and setting table lowering speed is slowed down. When the knob is turned counterclockwise, the speed is increased.</p>	
<ul style="list-style-type: none"> <li>◦ Loosen the screw in the sensor and slide the sensor until it is properly positioned. Then, tighten the screw to fix the sensor.</li> </ul>	

## STANDARD ADJUSTMENT

### (8) Adjusting the position of the sensor on the setting table cylinder, left

- Adjust the setting clamp switch sensor so that an end-to-end clearance of 6 mm is provided between the cylinder and the sensor.
- Adjust the setting table lowering sensor so that an end-to-end clearance of 10 mm is provided between the cylinder and the sensor.



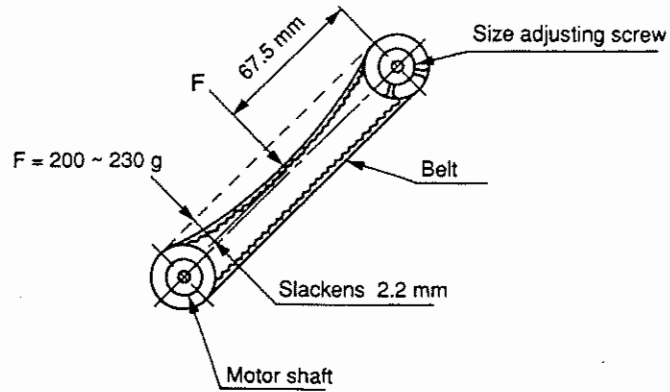


<b>HOW TO ADJUST</b>	<b>RESULT OF IMPROPER ADJUSTMENT</b>
<p>◦ Loosen the screw in the sensor and slide the sensor until it is properly positioned. Then, tighten the screw to fix the sensor.</p>	

## STANDARD ADJUSTMENT

### (9) Adjusting the tension of the size adjusting belt

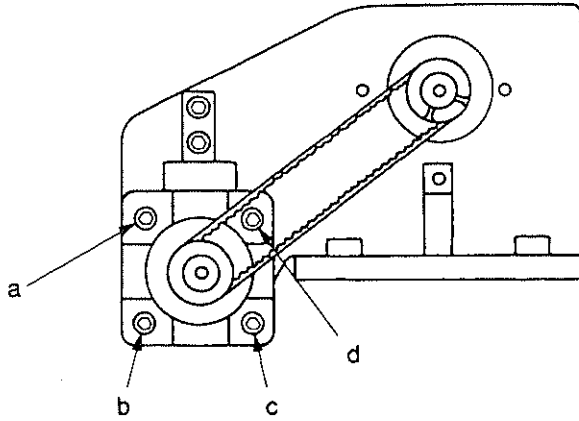
Adjust the tension of the size adjusting belt, when a 200 to 230 g load is applied to the belt at the point that is 67.5 mm away from the center of the size adjusting screw, so that it slackens by 2.2 mm.



## HOW TO ADJUST

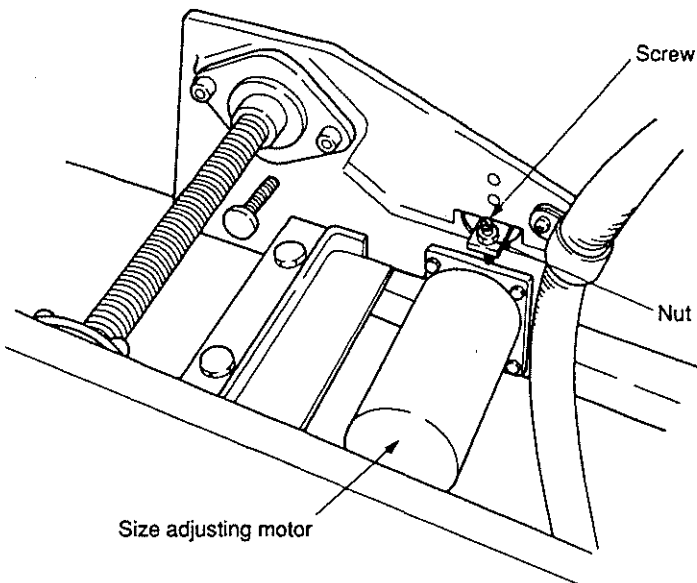
## RESULT OF IMPROPER ADJUSTMENT

1)



The size adjusting motor has four screws a through d. Temporarily tighten screw a and fully loosen screws b through d.

2)

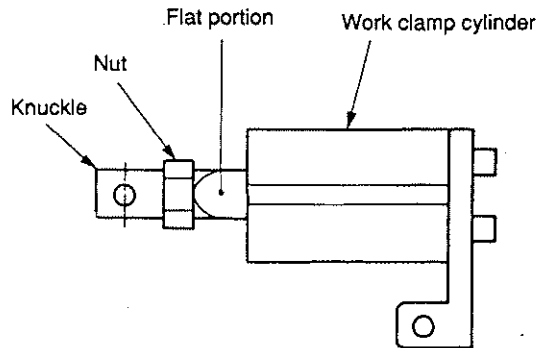
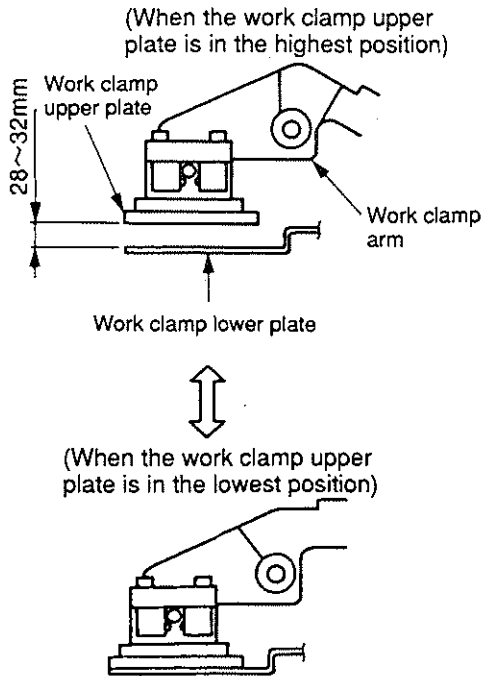


In the state described in 1), loosen the nut shown in the figure above and turn the screw clockwise to increase the belt tension, or counterclockwise to decrease it.

3) After the completion of the adjustment, tighten the nut. Then, tighten screws a through d in the size adjusting motor.

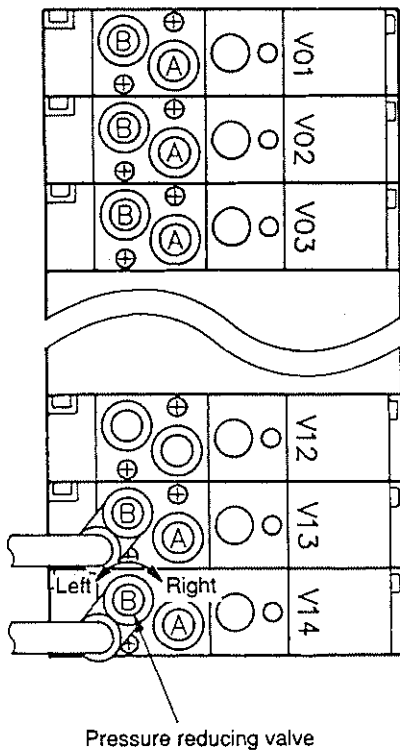
## STANDARD ADJUSTMENT

### (10) Adjusting clamping allowance of the work clamp upper plate



- When the work clamp is in the highest position, a clearance of 28 to 32 mm should be provided between the under surface of the work clamp upper plate and the top surface of the work clamp lower plate.
- \* When the work clamp is in the lowest position, place a sewing material under the work clamp to confirm that the work clamp securely clamps the material with an sufficient clamping force.

### (11) Adjusting the work clamp pressure

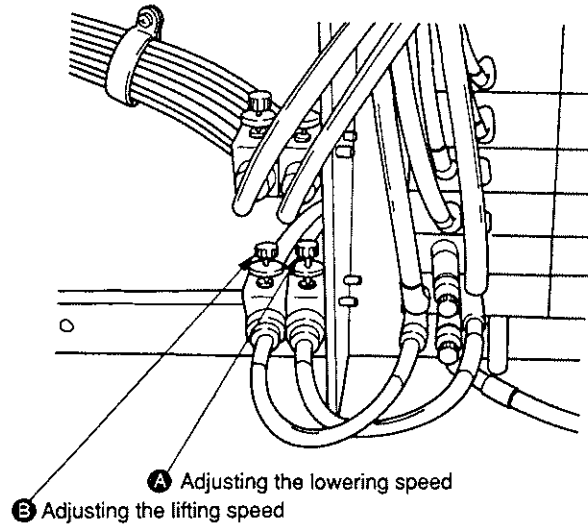


- Adjust the pressure of the operating air supplied by the work clamp cylinder to 1.8 kgf/cm<sup>2</sup> by using the pressure reducing valve on B port of valve No. 14.

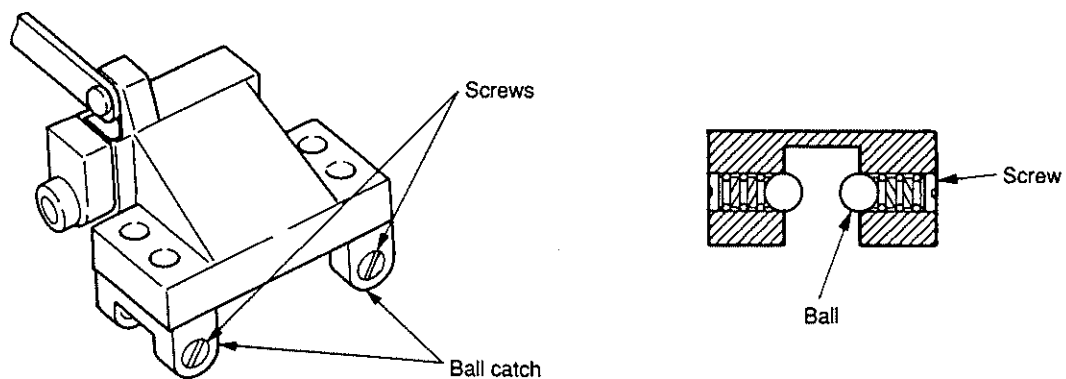
HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> <li>○ Loosen the nut and turn the flat portion of work clamp cylinder to change the highest position and lowest position of the work clamp arm.</li> </ul>	<ul style="list-style-type: none"> <li>○ If there is a gap between the work clamp upper plate and the work clamp lower plate when the work clamp is in the lowest position, the material slippage will result.</li> <li>○ If the clearance provided between the upper plate and the lower plate is too small when the work clamp is in the highest position, the material that is being fed will be caught by the upper plate.</li> </ul>
<ul style="list-style-type: none"> <li>○ Turn the knob of the pressure reducing valve clockwise to increase the clamping pressure of the work clamp or counterclockwise to decrease it.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the clamping pressure of the work clamp is too high or too low, the material slippage will result.</li> </ul>

## STANDARD ADJUSTMENT

### (12) Adjusting the work clamp upper plate lifting/lowering speed



### (13) Adjusting the ball catch spring pressure

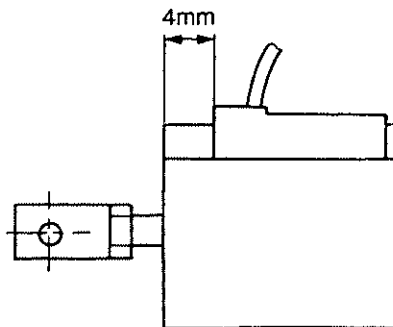


HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> <li>○ When the knob of speed controller A is turned clockwise, the work clamp lowering speed will be decreased. When the knob is turned counterclockwise, the speed will be increased.</li> <li>○ When the knob of speed controller B is turned clockwise, the work clamp lifting speed will be decreased. When the knob is turned counterclockwise, the speed will be increased.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the work clamp lowering speed is too low, Error No. 26 "No material error" occurs.</li> <li>○ If the work clamp lifting speed is too low, the work clamp air purge failure is likely to occur.</li> </ul>
<ul style="list-style-type: none"> <li>○ Turn the screw in the ball catch clockwise to increase the spring pressure or counterclockwise to decrease it.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the ball catch spring pressure is too low, the work clamp upper plate may drop.</li> </ul>

## STANDARD ADJUSTMENT

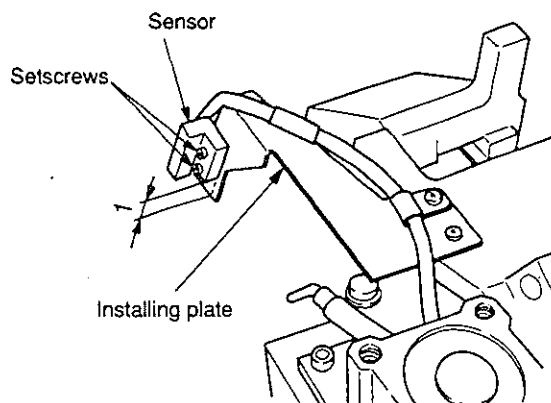
### (14) Adjusting the position of the work clamp cylinder sensor

- The end-to-end distance between the cylinder and the sensor should be adjusted to 4 mm.



### (15) Adjusting the position of the material sensor

- The bottom end face of the sensor should be spaced approximately 1 mm from the bottom end face of the installing plate.
- \* The aforementioned distance slightly changes according to the machines.

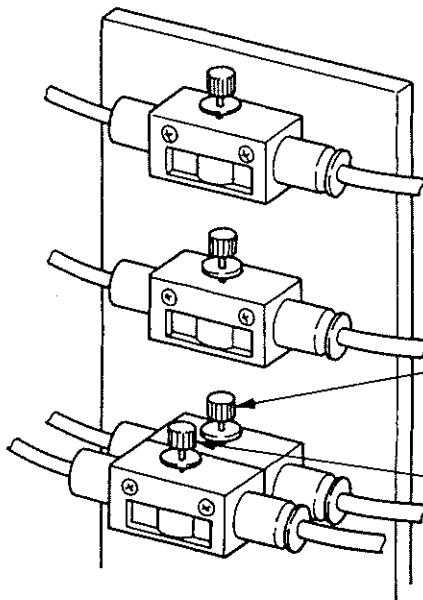
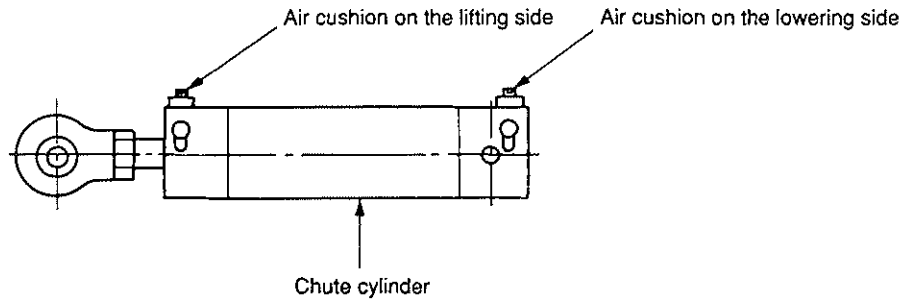




HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> <li>◦ Loosen the screw in the sensor and slide the sensor until it is properly positioned. Then, fix the sensor at that position by tightening the screw.</li> </ul>	
<ul style="list-style-type: none"> <li>◦ Loosen the two screws in the sensor and slide the sensor up or down until the sensor is properly positioned.</li> </ul>	<ul style="list-style-type: none"> <li>◦ If the sensor is excessively spaced from the installing plate, Error No. 26 "No material error" occurs.</li> </ul>

## STANDARD ADJUSTMENT

### (16) Adjusting the lifting/lowering speed of the chute plate No. 1



The third speed controllers, as counted from the top, of the speed controllers mounted on the solenoid valve installing plate are used for controlling the speed of chute plate No. 1. The speed controller mounted near the installing plate is used for controlling the lifting speed and the one mounted away from the installing plate is used for controlling the lowering speed of the chute plate No. 1.

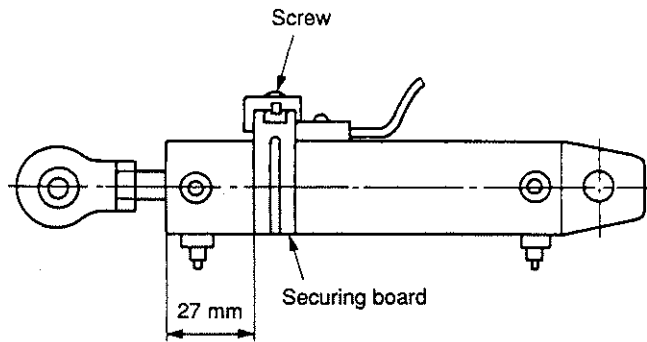
**A** For controlling the lifting speed

**B** For controlling the lowering speed

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> <li>○ The cushioning force provided at the stroke end of the cylinder is increased by turning the air cushion adjusting screw clockwise or decreased by turning it counterclockwise.</li> <li>○ The lifting speed of the chute plate No. 1 is reduced by turning the knob of speed controller A clockwise or increased by turning it counterclockwise.</li> <li>○ The lowering speed of the chute plate No. 1 is reduced by turning the knob of speed controller B clockwise or increased by turning it counterclockwise.</li> <li>* If the sewing product fails to smoothly enter the tandem blade, first adjust the lower speed of the chute plate No. 1 to the best-suited speed using speed controller B. Then, adjust the impact using the air cushion on the lowering side.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the lifting speed of the chute plate No. 1 is too high, the chute plate No. 1 will deform, causing a stacking failure.</li> <li>○ If the lowering speed of the chute plate No. 1 is too high, the workpiece will bound, causing a stacking failure.</li> <li>○ If the lowering speed of the chute plate No. 1 is too low, the workpiece will drop from the chute plate before the chute plate is fully lowered, causing a stacking failure.</li> </ul>

## STANDARD ADJUSTMENT

### (17) Adjusting the position of the stacker up/down cylinder sensor



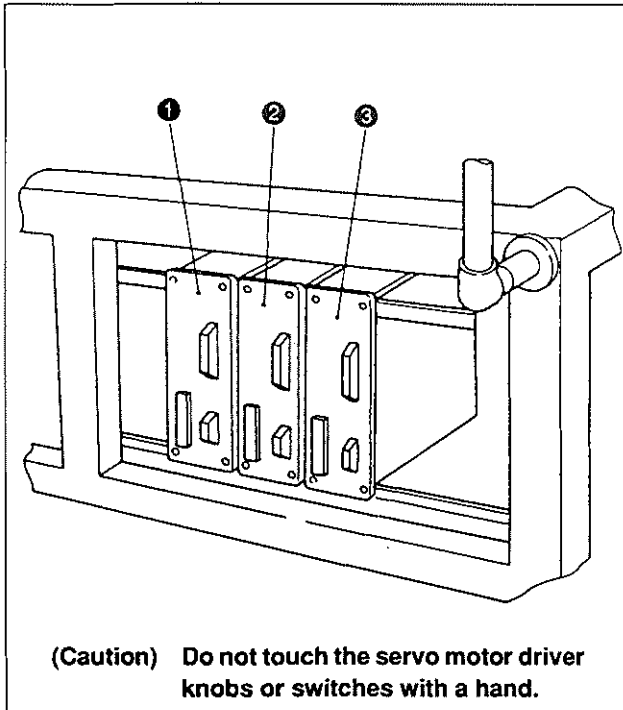
- The securing band should be spaced 27 mm from the end face of the cylinder.

HOW TO ADJUST	RESULT OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> <li>○ Loosen the screw in the securing band, and adjust the position of the sensor by sliding the sensor together with the securing band.</li> </ul>	<ul style="list-style-type: none"> <li>○ If the sensor is improperly positioned, Error No. 53 will be shown on the display and the machine will not actuate.</li> </ul>

## 7. ELECTRICAL EQUIPMENT

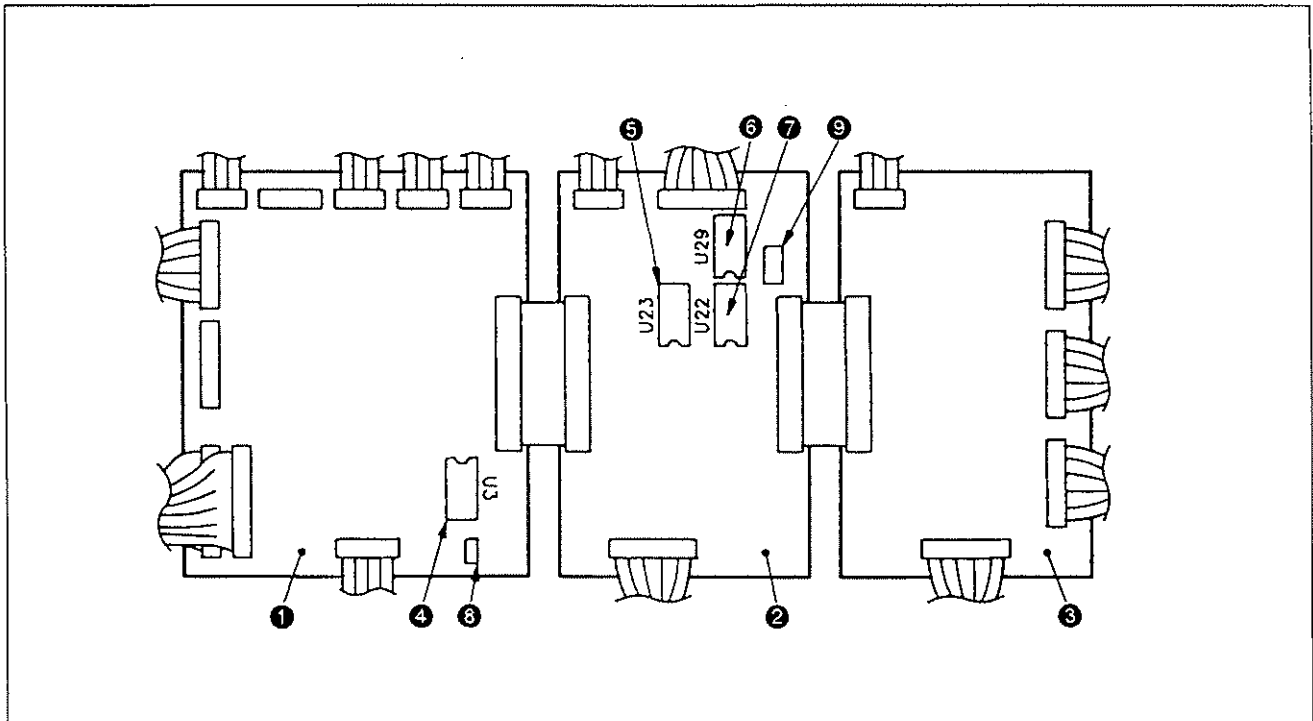
### (1) Names and functions of parts

#### (a) Servo motor driver



- 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 drive servo motor.

#### (b) Control circuit board



- ① 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 receives signals from sensors, switches, etc. in various parts of the system and processes them for sending to the CPU. The DC12V power supply for use by the interface to the PGM-6 is also produced here. Controls the needle thread detector and bobbin thread detector (optional). Supplies electric power to the CPU, S and L circuit boards and the PGM-6.

- ② CPU circuit board  
Performs processing for the various devices, sewing machine, floppy disk, data, etc. by means of a microprocessor. Acts as the interface to the PGM-6.
- ③ S. L circuit board  
Acts as the interface to the sewing machine and the X-Y axis drive servo drivers, and controls the three axis motors. Controls driving of and display on the liquid crystal control panel.
- ④ Thread detector (needle thread breakage and bobbin thread breakage detectors) control ROM  
This E-ROM contains the programs for the actuation and control of the needle thread breakage detector the control of bobbin thread consumption detector (optional).
- ⑤ System ROM2  
This E-PROM contains the programs for the input device and for pattern creation.
- ⑥ Data ROM  
This E-PROM contains the origin adjustment value, bobbin thread potentiometer value and folding position adjustment value (AVP-880).
- ⑦ System ROM1  
This E-PROM contains the program for operating the system as a whole.

**(Caution)** When the CPU circuit board has been replaced, also replace PROMs ⑤ , ⑥ and ⑦ . Be careful to insert the PROMs in the correct direction.

- ⑧ DIP switches (on I/O circuit board)

Switch No.	Function	Remarks
SW1-1	Unused.	
SW1-2		
SW1-3		
SW1-4	Factory-check mode at the time of delivery	Be sure to use this mode with the power to the machine turned OFF.

\* All are OFF at the time of factory shipment.

- ⑨ DIP switches (on CPU circuit board)

Switch No.	Function	Remarks
SW1-1	Operation panel language	OFF ... Japanese ON ... English
SW1-2	Selection the maintenance mode	When this switch is set to the ON position, the mode select No. 16 and beyond can be called on the operation panel.
SW1-3	Unused.	
SW1-4	Selection of the partial shirring function	When this switch is set to the ON position, the partial shirring devices A asm. and C asm. can be used.
SW1-5	Unused.	
SW1-6		
SW1-7		
SW1-8		

\* SW1-1 is ON at the time of factory shipment.  
SW1-2 to SW1-8 are OFF at the time of factory shipment.

## (2) Explanation of terminal block input and output ports

### Input ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TLP521-4 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
Loader setting side detector	LOSDT	TPA-1	0070(PA0)	L	0	U5	5	PC3	10	
Loader intermediate detector	LODCDT	TPA-2		L	1		4		12	
Loader sewing machine side detector	LODMDT	TPA-3		L	2		3		14	
Setting base lower detector	STBADT	TPA-4		L	3		2		16	
Left set gauge upper detector	STGLDT	TPA-5		L	4		1	PC2	10	
Right set gauge upper detector	STGRDT	TPA-6		L	5		64		12	
Loader setting side brake detector	LDSBDT	TPA-7		L	6		63		14	
Loader sewing machine side detector	LDMBDT	TPA-8		L	7		62		16	
Material setting switch detector	SETSDT	TPA-9	0071(PB0)	L	0		44	PC5	10	
Material detector	CLTHDT	TPA-10		L	1		45		12	
Left work clamp plate lower detector	HLDLDT	TPA-11		L	2		46		14	
Right work clamp plate lower detector	HLDRDT	TPA-12		L	3		47		16	

**(Caution)** The above TLP521-4 terminal is a TTL (DC+5V) level input terminal.  
When viewing each signal, use one of pins 9, 11, 13, 15 as GND (+5 Vdc).



## Input ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TLP521-4 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
X axis positive movement limit detector	LMTXP	TPB-1	0071(PB0)		4	U5	48	PC4	10	
		TPB-2			5		49		12	
Size adjustment movement limit detector	SIZLMT	TPB-3			6		50		14	
		TPB-4			7		51		16	
Loading is impossible. (Area sensor is shielded.)	LODDIS	TPB-5	0072(PC0)		0		13	PC7	10	
		TPB-6		H	1		14		12	
Material passage 2 detector	STC2DT	TPB-7		H	2		15		14	
↑ 1 detector	STC1DT	TPB-8		H	3		16		16	
Stacker full detector	STKFUL	TPB-9		L	4		12	PC6	10	
		TPB-10			5		11		12	
Air pressure detector	AIRSW	TPB-11		L	6		10		14	
Stacker upper detector	STKUDT	TPB-12		L	7		9		16	

**(Caution)** The above TLP521-4 terminal is a TTL (DC+5V) level input terminal.  
When viewing each signal, use one of pins 9, 11, 13, 15 as GND (+5 Vdc).

Input ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TLP521-4 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
		TPC-1	0080(PA1)	L	0	U5	24	PC9	10	
		TPC-2		L	1		23		12	
		TPC-3		L	2		22		14	
X axis intermediate detector (H=Positive, L=Negative)	CENTRX	TPC-4		*	3		21		16	
X axis negative movement limit detector	LMTXM	TPC-5		H	4		20	PC8	10	
Y axis positive movement limit detector	LMTYP	TPC-6		H	5		19		12	
		TPC-7			6		18		14	
Y axis negative movement limit detector	LMTYM	TPC-8		H	7		17		16	
Main shaft position detector (H= 50° ~ 180°)	NDLPOS	TPC-9	0081(PB1)	*	0		35	PC11	10	
Y axis movement limit detector for partial shirring	ISLMTY	TPC-10		H	1		36		12	
		TPC-11		L	2		37		14	
		TPC-12		L	3		38		16	

**(Caution)** The above TLP521-4 terminal is a TTL (DC+5V) level input terminal.  
When viewing each signal, use one of pins 9, 11, 13, 15 as GND (+5 Vdc).

Input ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TLP521-4 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
		TPD-1	0081(PB1)		4	U5	39	PC10	10	
		TPD-2			5		40		12	
		TPD-3			6		41		14	
		TPD-4			7		42		16	
		TPD-5	0082(PC1)		0		31	PC13	10	
		TPD-6			1		32		12	
		TPD-7			2		33		14	
		TPD-8			3		34		16	
		TPD-9			4		30	PC12	10	
		TPD-10			5		29		12	
		TPD-11			6		28		14	
		TPD-12			7		27		16	

**(Caution)** The above TLP521-4 terminal is a TTL (DC+5V) level input terminal.  
 When viewing each signal, use one of pins 9, 11, 13, 15 as GND (+5 Vdc).

Output ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TD62385 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
Setting clamp 6 lowering	SETCL6	TPA-13	0050(PA0)	L	0	U13	5	U6	8	V06
↑ 5 lowering	SETCL5	TPA-14		L	1		4		7	V07
↑ 4 lowering	SETCL4	TPA-15		L	2		3		6	V08
↑ 3 lowering	SETCL3	TPA-16		L	3		2		5	V09
↑ 2 lowering	SETCL2	TPA-17		L	4		1		4	V10
↑ 1 lowering	SETCL1	TPA-18		L	5		64		3	V11
Setting base lowering	SETBAS	TPA-19		L	6		63		2	V12
Set gauge lifting	SETGAU	TPA-20		L	7		62		1	V13
Holder plate lifting	CLTHLD	TPA-21	0051(PB0)	L	0		44	U7	8	V14
Loader movement brake	LOADBR	TPA-22		L	1		45		7	V22
Loader sewing machine side movement	LOADM	TPA-23		L	2		46		6	V21
Loader setting side movement	LOADS	TPA-24		L	3		47		5	V23

**(Caution)** The above TD62385 terminal is a TTL (DC+5V) level input terminal.  
 When observing each signal, connect the circuit board test pin to GND (DC + 5V).  
 TD62385 pin 9 is the GND terminal for DC + 24V, so use caution.

Output ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TD62385 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
Partial shirring A lifting	ISESET	TPB-13	0051(PB0)	L	4	U13	48	U7	4	
Area sensor projection	AREASN	TPB-14		L	5		49		3	
Partial shirring C strength	ISEKOM	TPB-15		L	6		50		2	
		TPB-16		L	7		51		1	
		TPB-17	0052(PC0)	L	0		13	U8	8	
		TPB-18		L	1		14		7	
		TPB-19		L	2		15		6	
Size adjustment lock lifting	SIZADJ	TPB-20		L	3		16		5	V01
Stacker workpiece draw-out blower	STKBLW	TPB-21		L	4		12		4	V02
Stacker workpiece receiver lowering	STKRDW	TPB-22		L	5		11		3	V03
Stacker lifting	STKUP	TPB-23		L	6		10		2	V04
Stacker advancing	STKFWD	TPB-24		L	7		9		1	V05

**(Caution)** The above TD62385 terminal is a TTL (DC+5V) level input terminal.  
 When observing each signal, connect the circuit board test pin to GND (DC + 5V).  
 TD62385 pin 9 is the GND terminal for DC + 24V, so use caution.

Output ports

Used for	Signal name	Terminal block number	82C255 port address			82C255 pin assignment		TD62385 pin assignment		Hot marker (display)
			Port	Logical		Unit	Pin number	Unit	Pin number	
Thread trimmer	TRIMER	TPC-13	0060(PA1)	L	0	U13	24	U14	8	V31
Lint blower	DSBLOW	TPC-14		L	1		23		7	V33
		TPC-15		L	2		22		6	
Intermediate presser raise	MINPRE	TPC-16		L	3		21		5	V32
		TPC-17		L	4		20		4	
Needle cooler	NDLCOL	TPC-18		L	5		19		3	
		TPC-19		L	6		18		2	
		TPC-20		L	7		17		1	
		TPD-13	0061(PB1)	L	0		35	U11	8	
		TPD-14		L	1		36		7	
		TPD-15		L	2		37		6	
		TPD-16		L	3		38		5	
		TPD-17		L	4		39		4	
		TPD-18		L	5		40		3	
		TPD-19		L	6		41		2	
		TPD-20		L	7		42		1	

**(Caution)** The above TD62385 terminal is a TTL (DC+5V) level input terminal.  
 When observing each signal, connect the circuit board test pin to GND (DC + 5V).  
 TD62385 pin 9 is the GND terminal for DC + 24V, so use caution.

## 8. FLOW CHARTS

### (1) Workpiece setting control

A workpiece is set in position.

This processing overlaps (3) sewing and (4) stacker control.

An outline of the operation sequence is given below.

Workpiece setting

Press the setting switch.

Setting clamps 1 through 6 come down.

Setting completion indicator lamps 1 and 2 light up.

(Loading possible condition)

Depending on specified data on sewing, the setting switch controls the setting clamps 1 through 6 until all of them come down.

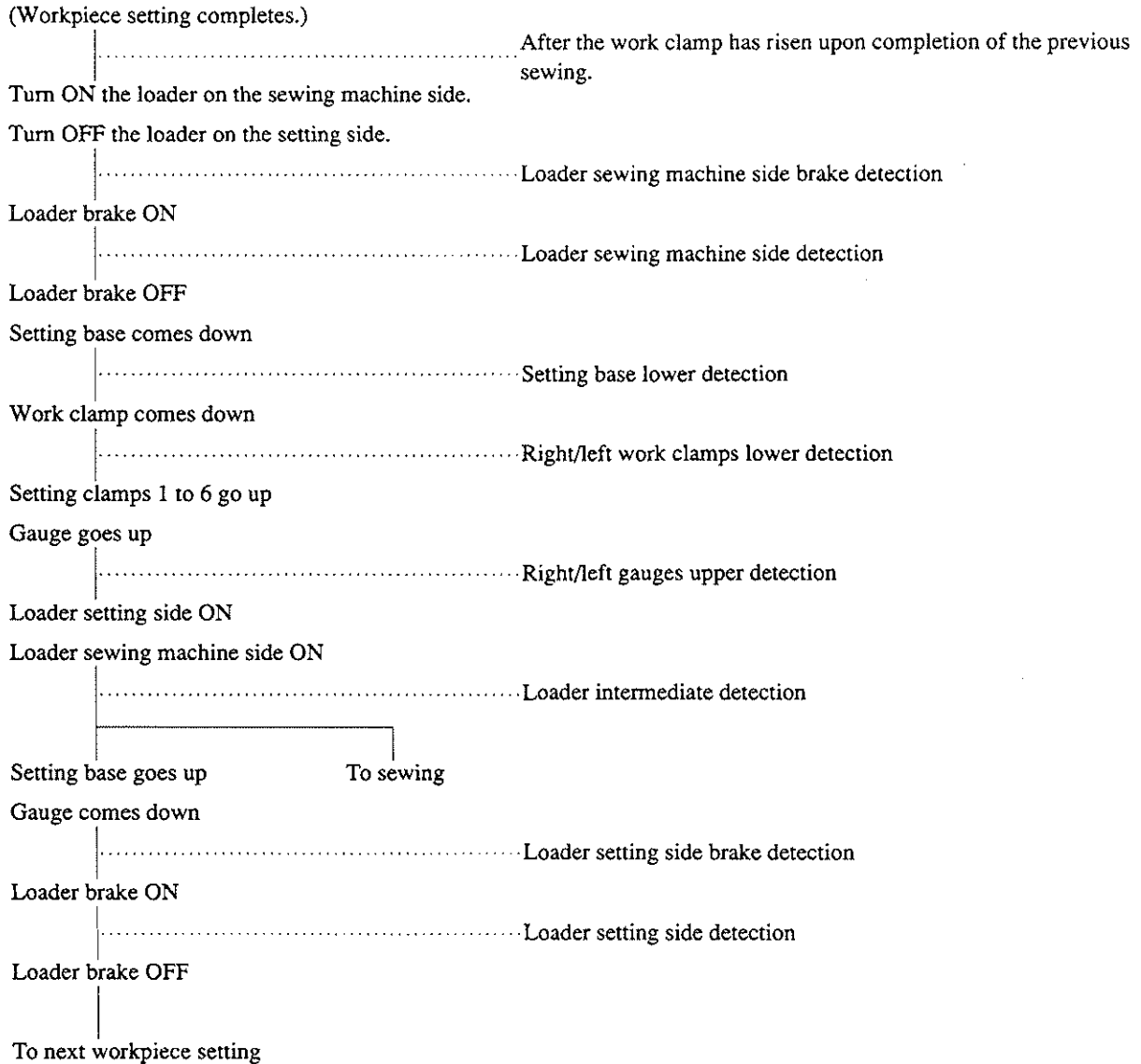
Press setting completion switches 1 and 2 together.

## (2) Loading control

After "(1) Workpiece setting" and previous sewing have been completed and the work clamp has risen, the loading control starts.

This processing overlaps "(4) Stacker control."

An outline of this operation sequence is described below.





### (3) Sewing

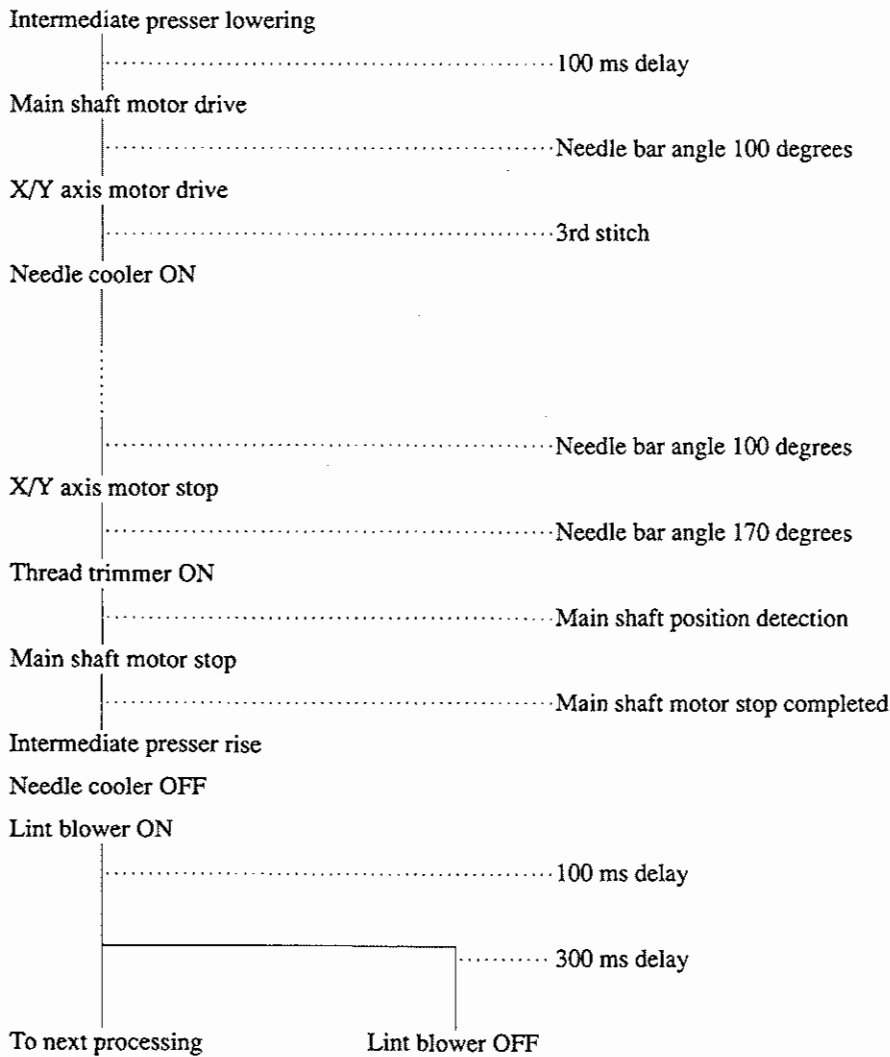
Sewing is performed in accordance with pattern data.

- According to jump data, the sewing machine is not driven but only the work clamp is actuated.
- According to sewing data, the sewing machine and the feed mechanism of the machine head are synchronized (main shaft motor and the X/Y axis motors are synchronized) to form stitches.
- The sewing speed specified by operating the operation panel is employed, or limited by the speed control data contained in pattern data.

The intermediate presser is lowered before the sewing machine start to rotate and raised when the sewing machine stops. The needle cooler blows air from the time when the sewing machine completes three stitches after the start to the time when the sewing machine stops.

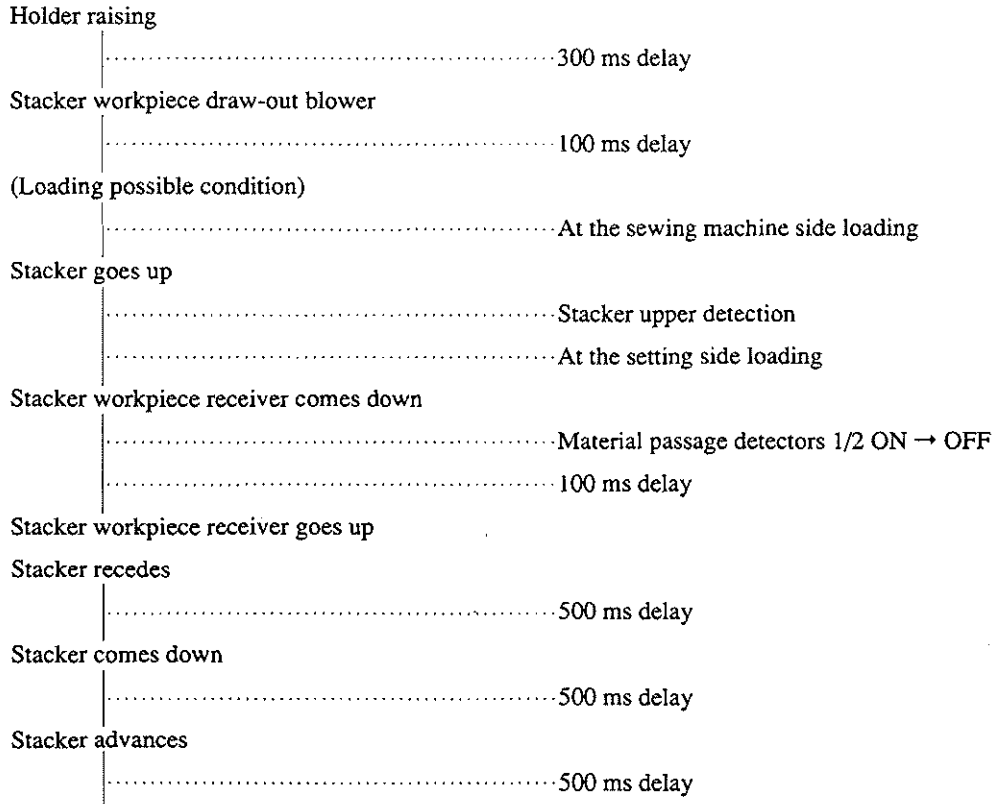
- According to thread trimming data, the sewing machine performs thread trimming and stops. (The sewing machine performs thread trimming when the main shaft angle becomes 190° before the stop.)
- In addition, temporary stop data, one-rotation of sewing machine data, external input data, external output data and delay data are to be supported. (It is assumed that these types of data are not likely to be used at the present.)

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



#### (4) Stacker control

After the completion of sewing, the stacker is actuated to stack the finished workpiece during the next loading performance. An outline of the operation sequence is given below.



## 9. SERVO DRIVER ADJUSTMENT

The servo driver adjustments on the front panel are three variable resistors, Kp, Ti and Kv, and ZERO (V) and ZERO (P) for offset adjustment.

Have a tachometer ready before starting these adjustments.

Stick a P-ROM label, etc. to the main shaft pulley to measure the machine head rpm.

1) Select No. 13 sewing machine adjustment on the mode selection screen.

2) Before adjusting Kp, set Kv to 6 and Ti to 1.5.

3) Run the sewing machine head at a steady speed to 3500 spm.

At this time measure the actual rpm with the tachometer, and adjust Kp so that it becomes  $3500 \pm 10$  spm.

Turn Kp counterclockwise to increase the speed, clockwise to decrease it.

**(Caution) Another way to measure the rpm, besides using a tachometer, is to connect an oscilloscope to servo driver front panel monitor output terminal V and to com (GND). At this time, the output signal is about 1.2 V for each 1000 spm. Consequently, it is about 4.2 V for 3500 spm.**

4) Next, adjust Ti and Kv.

This adjustment normally requires a jig, so only a rough adjustment can be done at this time.

First set Ti and Kv in the positions shown in the figure below.

Set Kv to 6 and Ti to 1.5.

At this time, one of the following conditions will occur, depending on the gain adjustment.

① If the gain is too high

The sewing machine will stop suddenly and oscillate.

(This condition is called hunting.)

⇒ Immediately turn the power off.

⇒ Reduce the Kv setting by 1 scale division.

② If the gain is inadequate

The sewing machine goes into pulsating motion. (It rattles.)

⇒ Increase the Kv setting by 1 scale division.

The result of the above adjustment will be to put Kv in the range 5 to 8.

5) When adjustment of the three potentiometers, Kp, Kv and Ti is completed, set the mode to "20. Head S. Drive", and run the sewing machine through the same pattern that will be used in actual sewing.

At this time, check whether abnormal noise or hunting occurs when the sewing machine is accelerated or decelerated.

6) Next, perform zero adjustment of the speed.

Set the mode to "23. Gain Adj."

Set counter clear M to ON.

At this time, when the motor starts to turn, turn ZERO (V) on the servo driver so that the motor will not turn.

It sometimes that the motor stops turning only temporarily and then starts to turn intermittently. If the motor does not turn for 10 seconds or more, the adjustment is completed.

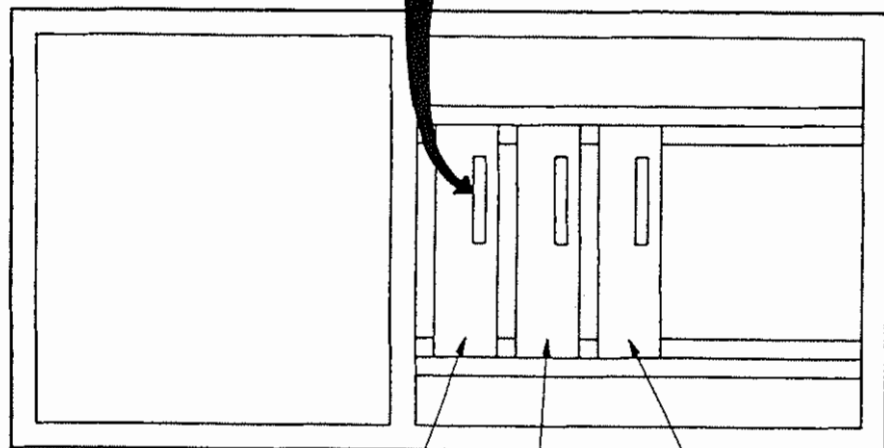
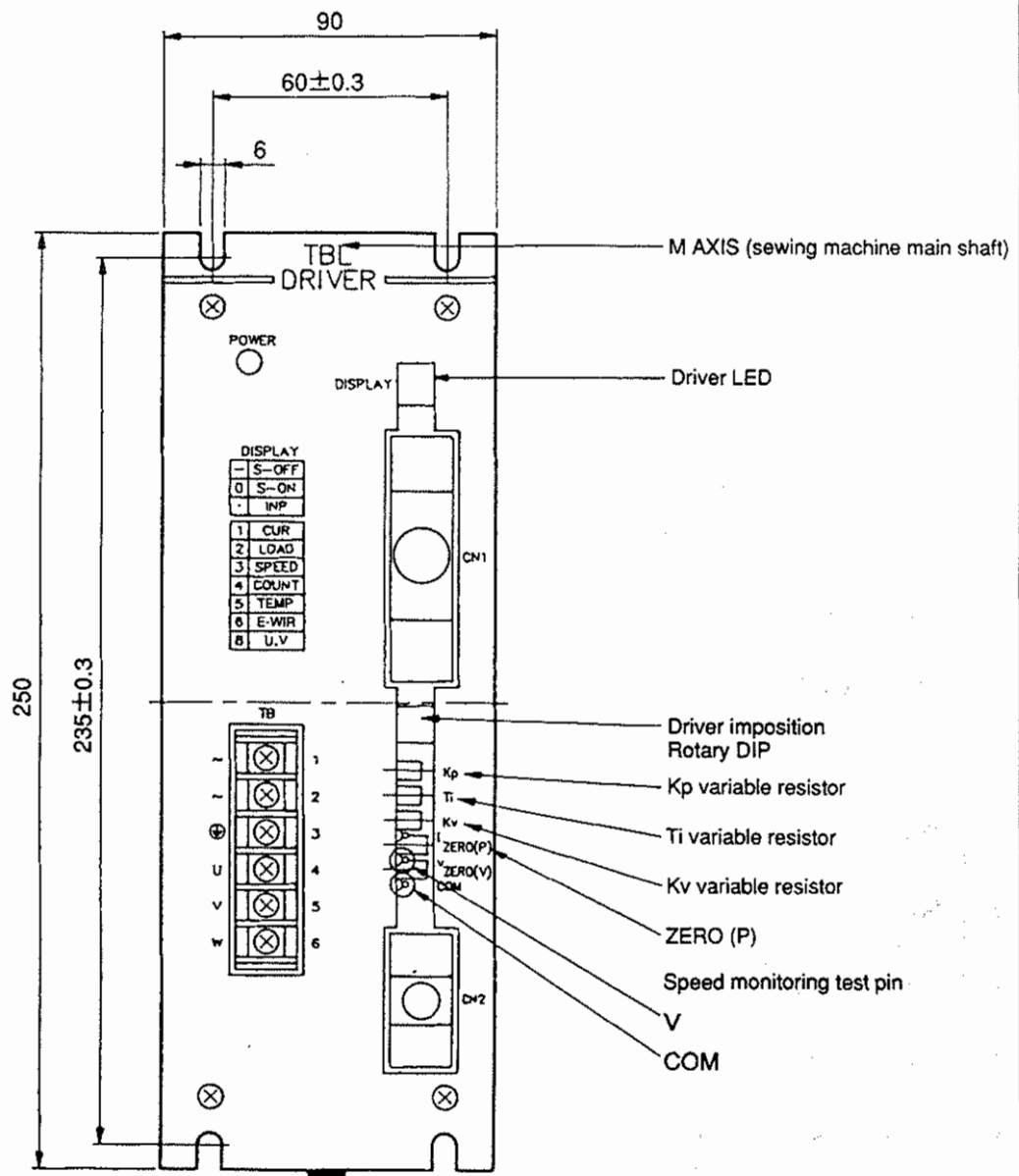
7) Finally, adjust zero at that position (in-position adjustment).

Set the driver in-position rotary DIP to "0", then adjust the ZERO (P) variable resistor so that the "." display on the driver LED lights up.

After the adjustments are completed, set the rotary DIP to F.

**(Caution) If this position adjustment is incorrect, when normal sewing is completed an "02 Main shaft motor error (imposition error)" will occur.**

8) Finally, perform trial stitching.



## 10. LIST OF ERROR CODES

No.	Error
1	Main shaft motor driver alarm
2	Main shaft motor driver imposition error
3	Main shaft motor driver Z phase error
4	X axis motor driver alarm
5	X axis motor driver imposition error
6	X axis motor driver Z phase error
7	Y axis motor driver alarm
8	Y axis motor driver imposition error
9	Y axis motor driver Z phase error
10	Air pressure drop
11	Pause switch ON
12	Touch panel switch ON
13	Set release switch ON
14	Right set completion switch ON
15	Left set completion switch ON
16	Garment body set switch ON
17	
18	
19	
20	No pattern at time of standby key input
21	Needle thread broken
22	No bobbin thread (when option used)
23	Inadequate bobbin thread (when option used)
24	Stack full

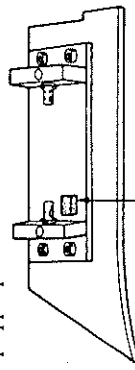
No.	Error
25	Stack full failure
26	Loading workpiece no-detection
27	Setting base lowering
28	No mark 1 in pattern
29	Size adjustment value is out of data setting range
30	X movement limit
31	Y movement limit
32	
33	Obstacle is detected
34	
35	Loader initial position error
36	
37	
38	
39	
40	Sub CPU error
41	Main shaft sensor error
42	Loader setting side sensor error
43	Loader setting side brake sensor error
44	Loader center sensor error
45	Loader sewing machine side brake sensor error
46	Loader sewing machine side sensor error
47	Setting base lower sensor error
48	Set gauge left sensor error
49	Set gauge right sensor error

No.	Error
50	Work clamp left sensor error
51	Work clamp right sensor error
52	Size adjustment sensor error
53	Stacker upper sensor error
54	
55	
56	
57	
58	
59	
60	
61	
62	
63	
64	
65	
66	
67	
68	
69	
70	
71	
72	
73	
74	

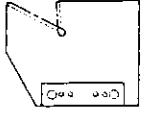



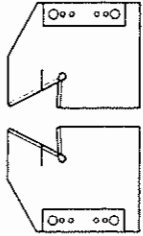
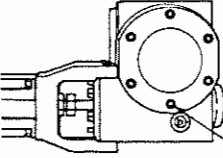
No.	Error
75	
76	
77	
78	
79	
80	Floppy disk not inserted
81	Floppy disk write protect
82	No pattern at time of floppy disk read or write
83	Patterns do not agree at time of floppy disk write.
84	Data error at time of floppy disk read
85	Inadequate memory at time of floppy disk read
86	Inadequate floppy disk write volume
87	
88	
89	
90	FDD seek error
91	FDD read error
92	FDD write error
93	Floppy disk file structure error
94	
95	
96	
97	
98	
99	



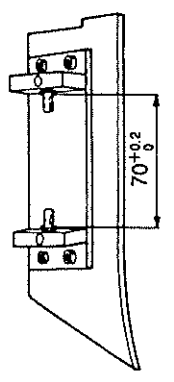
# 11. MECHANICAL TROUBLES AND CORRECTIVE MEASURES

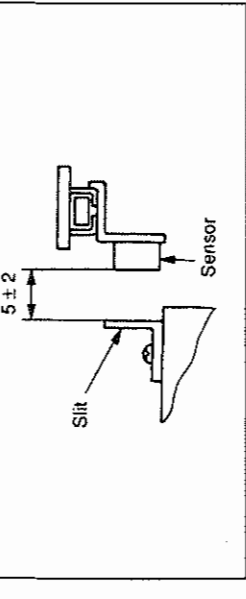
Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
1. Width of collar edge is not correct.	1. The workpiece is not fed with accuracy.	The blade point portion of the work clamp fails to provide a sufficient clamping force.	<p>Adhere a piece of nonslip material onto the blade point portion of the work clamp upper plate.</p>  <p>A piece of hard rubber as thick as 3 mm (approx. 10 mm square)</p> <p>Adhere a piece of hard rubber that is 3 mm thick and approximately 10 mm square onto the work clamp upper plate as illustrated in the sketch above.</p> <p>Adjust the pressure of the work clamp.</p>
		An excessive impact is given to the workpiece when the loader advances.	Adjust the speed of the loader properly.
		An excessive impact is given to the workpiece when the setting table comes down.	Adjust the lowering speed of the setting table cylinder. (See page 16 for the position of the speed controller.)
	2. Irregular stitches	The work clamp fails to give a sufficient clamping force.	Adhere a piece of nonslip material onto the work clamp upper plate.
		The lowest position of the intermediate presser is so low that it pushed against the workpiece, causing irregular stitches.	Adhere a piece of hard rubber as thick as 3 mm onto the work clamp upper plate. (Same as the aforementioned hard rubber)
		Both the needle thread tension and bobbin thread tension are excessively high.	Adjust the pressure of the work clamp.
		The pattern board is positioned too far from the pattern.	Adjust the height of the intermediate presser.
		3. Workpiece is not accurately set at the predetermined position.	Minimize the thread tension as long as the threads are sufficiently tensed.
			Adjust the position of the work clamp upper plate and lower plate.
			When setting the workpiece, position first the workpiece, then press the setting table taking care not to allow the workpiece to shift from the correct position and lower the work clamp.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	4. Shape of the set gauge is defective.		<p>Additionally machine the butting plane of the set gauge using a file or tape.</p>  <p>* --- : Additional machining in part</p>
	5. Shape of the pattern is defective.		Properly correct the pattern.
	6. The set gauge is not fixed at the correct position.		Adjust the position of the set gauge.
	7. The center gauge is not properly adjusted.		Properly adjust the position of the center gauge.
	8. The size adjustment value is not correct.		Re-input a correct size adjustment value.
2. The needle tip is drawn.	1. Needle thread tension and bobbin thread are poorly balanced.		Properly adjust the thread tension.
3. The tip of the needle becomes blunt	1. Needle thread tension or bobbin thread tension is excessive.		Adjust the thread tension.
4. The loader returns to the home position with the workpiece set on it instead of starting sewing.	1. The material sensor is improperly positioned. 2. The work clamp cylinder sensor is improperly positioned.		Adjust the position of the sensor.
5. The operating air supplied to the loader stops during loading, causing the loader to meander.	1. The advancing speed or receding speed of the loader is too low, preventing the loader from operating within the predetermined length of time.		Adjust the position of the sensor.
			Adjust the speed of the loader properly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
6. Pattern matching failure	<p>1. Cutting error (Patterns are not in parallel to the periphery of workpiece.)</p> 		 <p>Draw a marking-off line or adhere a piece of adhesive tape on the set gauge which is used for reference in the pattern matching procedure.</p> <p>Cut the material with a higher degree of accuracy.</p>
7. The pattern is shifted equally in the X or Y direction.	<p>1. X-Y origin is not correct.</p>	<p>1. The mechanical lock in the X-Y drive sprocket has slipped out of position.</p> <p>2. The coupling which joins the X-Y gear box output shaft and X-Y drive sprocket shaft slips out of position.</p>	<p>Fix the mechanical lock at the correct position, then adjust the origin.</p> <p>Adjust the origin and re-tighten the coupling.</p>
8. Oil leaks from the gear box.	 <p>The oil seal for this screw does not work sufficiently.</p>		<p>Apply oil sealing agent to the screw.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
9. The X-Y table comes in contact with the mechanical stopper.	<ol style="list-style-type: none"> <li>1. Movement limit sensor failure</li> <li>2. Sensor is not properly installed on the machine.</li> <li>3. Mechanical stopper on the  side of X-axis has not been shifted by mistake at the time of send-in.</li> </ol>	<p>Imperfect contact of the connector.</p> <p>Function of the sensor is defective.</p>	<p>Replace the sensor cord with a new one.</p> <p>Replace the sensor with a new one.</p> <p>Fix the sensor so that it is in parallel to the slip plate.</p>
10. The workpiece fails to properly drop from the work clamp down to the first chute board after the completion of sewing.	<ol style="list-style-type: none"> <li>1. Amount of air drawn out from the work clamp air purge.</li> <li>2. The work clamp air purge nozzle is faced toward the wrong direction.</li> </ol>		<p>Properly adjust speed controller  located on the solenoid valve unit A. (Refer to page 20)</p> <p>Adjust the inclination angle of the nozzle.</p>
11. The work clamp upper plate fails to go up.	<ol style="list-style-type: none"> <li>1. The work clamp cylinder rod has extraordinarily worn out.</li> <li>2. The work clamp sponge and the work clamp lower plate are glued to each other.</li> </ol>		<p>Replace the cylinder with a new one.</p> <p>Replace the sponge with a new one.</p>
12. The work clamp upper plate fails to be attached/removed smoothly.	<ol style="list-style-type: none"> <li>1. The ball in the ball catch has extraordinarily worn out.</li> <li>2. The edges of removing/attaching portion of the work clamp plate are not sufficiently spaced from each other.</li> </ol> 	<p>The ball catch spring pressure is too high.</p>	<p>Replace the ball in the ball catch with a new one.</p> <p>Adjust so that edges are spaced (70 + 0.2/0 mm) from each other.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
13. The setting clamp fails to come down even when the setting table is pressed down.	<ol style="list-style-type: none"> <li data-bbox="252 1189 300 1621">1. The switch mode setting failure</li> <li data-bbox="308 1189 363 1621">2. The upper sensor of the setting table cylinder, left is improperly positioned.</li> </ol>		<p data-bbox="252 389 284 712">Confirm the switch mode setting.</p> <p data-bbox="308 389 339 712">Adjust the position of the sensor.</p>
14. A sensor error occurs when adjusting the size.	<ol style="list-style-type: none"> <li data-bbox="387 1189 443 1621">1. Installing angle of the size adjustment origin sensor is not correct.</li> <li data-bbox="467 1189 523 1621">2. The distance between the sensor and the slit is improper.</li> </ol>		<p data-bbox="387 143 443 712">Install the sensor so that the light receiving plane of the sensor is in parallel to the slit.</p> <div data-bbox="467 114 738 712">  </div> <p data-bbox="762 219 794 712">Replace the sensor or the sensor cord with a new one.</p>
15. At the time of stacking the workpiece, the leftmost and rightmost end of the workpiece are not equally stacked.	<ol style="list-style-type: none"> <li data-bbox="818 1189 874 1621">3. The sensor or the sensor cord is defective.</li> <li data-bbox="818 1189 874 1621">1. The amount of air drawn out from the work clamp air purge is insufficient.</li> <li data-bbox="898 1189 954 1621">2. The work clamp air purge nozzle is faced toward the wrong direction.</li> </ol>		<p data-bbox="818 165 874 712">Properly adjust speed controller ② located on the solenoid valve unit A. (Refer to page 20)</p> <p data-bbox="898 322 930 712">Adjust the inclination angle of the nozzle.</p>
16. When the stacker actuates, the workpiece fails to enter the tandem blade.	<ol style="list-style-type: none"> <li data-bbox="978 1189 1026 1621">1. The lowering speed of the first chute board is too high or too low.</li> </ol>		<p data-bbox="978 277 1010 712">Adjust the lowering speed of the chute cylinder.</p>

## 12. ELECTRICAL TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
1. The power lamp (green) on the operation panel is not lit.	1. DC +5V power is not being supplied to the operation panel.	1. Power is not being supplied overall.	Check whether power is arriving between L1 and L3 on the power switch.
		2. The power switch is not ON.	Turn the power switch ON.
		3. The power switch is defective.	If there is no power arriving between T2 and T3 even when the power switch is turned ON, replace the power switch.
		4. Only output voltages less than 200 V appear at the 200 V output at TB2 on the secondary side of the transformer.	Check the wiring to TB1 on the primary side of the transformer; change the tap connection to match the supply voltage.
		5. Power is not supplied to the switching power supply.	If 200 V power is not arriving between pins 3 and 4 of the switching power supply J1, check the switching power supply cord set.
		6. The switching power supply is defective.	With switching power supply connector P2 unplugged, if DC +5 V does not appear between pins 1 and 5 on J2, replace the switching power supply.
		7. DC +5V is shorted out somewhere.	Disconnect and then reconnect each connector in sequence (*absolutely do not disconnect connectors J12 and J32 connected to the CPU circuit board and the I/O circuit board) to find out where the short circuit is. Turn the power OFF before disconnecting and then reconnecting these connectors.
		8. 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 J40.
		9. DC +5V does not appear at the S.L circuit board check pin.	Check the connections of the S.L circuit board power supply cord set to J42 on the I/O circuit board assembly and J26 on the S.L circuit board assembly.
		10. DC +5V does not appear at both ends of capacitor C1 on the panel circuit board.	Check the connections of the panel cord set to J25 on the S.L circuit board assembly and CN10 to the panel cord set and the panel cable set.
	2. There is a defect inside the operation panel.	1. There is a defect in the green LED assembly.	With connector P53 on the green LED assembly unplugged, if DC +5V appears at J53 replace the green LED assembly.
		2. The panel circuit board assembly is defective.	With connector P53 on the green LED assembly unplugged, if +5V does not appear at J53 replace the panel circuit board assembly or the operation panel assembly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
2. The display does not appear on the operation panel.	<ol style="list-style-type: none"> <li>1. The contrast variable resistor is not adjusted correctly.</li> <li>2. The correct voltage is not being supplied.</li> <li>3. The signal does not arrive at the operation panel.</li> </ol>	<ol style="list-style-type: none"> <li>1. The screen is dark so the display is unclear.</li> <li>2. The screen is too pale, or nothing appears at all.</li> </ol>	<p>Remove the rubber stopper on the rear of the operation panel and adjust the brightness by turning the contrast adjustment variable resistor counterclockwise (the direction that gives a lighter screen).</p> <p>Remove the rubber stopper on the rear of the operation panel and adjust the brightness by turning the contrast adjustment variable resistor clockwise (the direction that gives a darker screen).</p> <p>Make the connection to the input tap on the primary side of the transformer to match the voltage being supplied.</p> <p>Check the connections of J11 and J21 to the signal cord set, of J25 and CN10 to the panel cord set and of J54 to the LCD module assembly.</p> <p>If the servo driver operation indicator lamp is "–," when power is turned ON and does not become "0," when the servo comes ON, replace the CPU circuit board assembly or the S.L circuit board assembly.</p>
4. The panel circuit board assembly is defective.	4. The panel circuit board assembly is defective.	1. The DC-DC converter is defective.	If 10 to 15V does not appear at pin 8 on the DC-DC converter UI (SC17661SC), replace the panel assembly.
5. The LCD module assembly is defective.	5. The LCD module assembly is defective.	<ol style="list-style-type: none"> <li>1. The LCD cord set is defective.</li> <li>2. The LCD module is defective.</li> </ol>	<p>Check the connection of the LCD cord set to the LCD module assembly.</p> <p>When the power is turned ON with the touch panel being pressed, if a display does not appear even though the red error lamp lights up, and if checks 2-1-1 to 2-5-1 have been completed, replace the LCD module assembly or the operation panel assembly.</p>
3. The red error lamp does not light up although an error indication is given.	<ol style="list-style-type: none"> <li>1. The signal does not reach the panel circuit board.</li> <li>2. The panel circuit board assembly is defective.</li> <li>3. There is a defect in the red LED assembly.</li> </ol>	<ol style="list-style-type: none"> <li>1. The cable connections are wrong.</li> <li>2. The S.L circuit board assembly is defective.</li> <li>1. Transistor Q1 is defective.</li> <li>1. The connectors are not connected correctly.</li> <li>2. The red LED is defective.</li> </ol>	<p>Perform check 2-3-1.</p> <p>When an error indication is given, if pin 7 on the S.L circuit board assembly U2 (HC244) is not LOW, replace the S.L circuit board assembly.</p> <p>When an error indication is given or an error condition has been released, if the voltage at R5 does not switch from HIGH to LOW or vice versa when the voltage at R2 switches from HIGH to LOW or vice versa, replace the panel circuit board assembly or the operation panel assembly.</p> <p>Check the connection of J55.</p> <p>When an error indication is given or an error condition has been released, if the red LED does not light up when the voltage at R5 switches from HIGH to LOW or vice versa, replace the LED assembly.</p>



Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
4. When the standby key on the operation panel is pressed, the operation indication is not given.	1. Regardless of where the touch panel is pressed, the key input is not received.	1. A connector is not connected correctly.	Check the connections of J51 and J52.
		2. The panel circuit board is defective.	With the touch panel being pressed, turn power ON. If error No. 12 does not occur, replace the panel circuit board assembly or the operation panel assembly.
	2. Only the standby key input is not received.	1. The touch panel is defective.	Replace the LCD module assembly or the operation panel assembly.
5. Error No. 01: Main shaft motor error	1. Excess current error with servo driver operation indication of "1"	1. The servo driver gain is too high.	Slightly increase the tension of the timing belt that connects the servo motor to the main shaft.
		2. The load is excessive.	Turn the power OFF, remove the sewing machine pulley by hand and check whether there is a place where there is an excessive load.
		3. Noise is getting into the servo driver.	Check whether the servo motor encoder signal cable has a ferrite core. Also check whether it is grounded.
		4. The servo driver is broken.	Replace the servo driver.
		5. The servo motor is broken.	Replace the servo motor.
	2. Excess load error with servo driver operation indication of "2"	1. The load is excessive.	Turn the power OFF, remove the sewing machine pulley by hand and check whether there is a place where there is an excessive load.
		2. The connection to the tap on the primary side of the transformer is wrong.	Check the connection to the transformer tap.
		3. The power supply voltage is lower than the rating.	Check the power supply voltage.
		4. The servo driver is broken.	Replace the servo driver.
		5. The servo motor is broken.	Replace the servo motor.
	3. Excess speed error with servo driver operation indication of "3"	1. The S.L. circuit board is defective.	Replace the S.L. circuit board.
		2. The CPU circuit board is defective.	Replace the CPU circuit board.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	4. Counter overflow error, with main shaft servo driver operation indication of "4"	1. The S.L circuit board is defective.	Replace the S.L circuit board.
		2. The CPU circuit board is defective.	Replace the CPU circuit board.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.
	5. Overheating error, with main shaft servo driver operation indication of "5"	1. The ambient temperature is too high.	Remove the cover at the bottom of the X-Y table to decrease the temperature around the servo driver.
		2. The load is excessive for the frequency of use.	Check the load system.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.
	6. Encoder signal broken wire error, with main shaft servo driver operation indication of "6"	1. The servo motor encoder signal connector is unplugged.	Plug the connector in.
		2. The servo driver is broken.	Replace the servo driver.
		3. The encoder signal wire is broken.	Replace the servo motor.
	7. A power supply voltage drop error occurs with a main shaft servo driver operation indication of "8".	1. The power supply voltage has dropped 30% below the rating.	Check the power supply voltage.
		2. The servo driver has broken.	Replace the servo driver.
	8. Sending signals to and receiving them from servo driver M is not possible.	1. The servo cord M set connections are wrong, or a wire is broken.	Check the connections of the servo cord M set to CN1N and J22, and check the servo M assembly for broken wires.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
6. Error No. 02: Main shaft motor error	1. The imposition signal does not come from the main shaft servo driver.	1. The main shaft transmission system is locked so that imposition does not come.	With power OFF, check the transmission system.
		2. The imposition setting is not "F".	Set the rotary DIP switch on the servo driver front panel to "F".
		3. The servo cord M set connections are wrong, or a wire is broken.	Check the connections of the servo cord M set to CN1M and J22, and check the servo cord M set for broken wires.
		4. The machine head upper detection sensor is defective, or the sewing machine sensor cord set connections are wrong, or there is bad contact, or a wire is broken.	Check the machine head upper detection and check the connections of the sewing machine sensor cord set connections.
		5. The servo driver gain adjustment is incorrect.	Refer to the 10. 4) gain adjustment.
7. Error No. 03: main shaft 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.	Check the connection of the servo driver to the motor encoder connector CN2M.
		2. The servo cord M set connections are wrong, or a wire is broken.	Check the connections of the servo cord M set to CN1M and J22, and check the servo M assembly for broken wires.
8. Error No. 04: Main shaft motor error	1. An excess current error occurs when the X axis servo motor driver operation indication is "I".	1. The servo driver gain is too high. 2. The load is too great.	Readjust the gain. Turn the power OFF, turn the coupling between the motor and gear box by hand and check for places where the load is too great.
		3. The movement limit sensor fails to act and feed block hits the stopper.	Refer to the sections starting with 31-1-2 on the movement limit sensor.
		4. Noise is getting into the servo driver.	Check whether the servo motor encoder signal cable has a ferrite core. Also confirm that the servomotor is grounded.
		5. The servo driver is broken.	Replace the servo driver.
		6. The servo motor is broken.	Replace the servo motor.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	2. An excess load error occurs with an X axis servo driver operation indication of "2".	1. The load is excessive.	Turn the power OFF; then turn the coupling between the motor and the gear box by hand, and check for places where the load is too great.
		2. The movement limit sensor fails to act, and feed block hits the stopper.	Refer to the sections starting with 3 I-1-2 on the movement limit sensor.
		3. The connection to the tap on the primary side of the transformer is wrong.	Check the connection to the transformer tap.
		4. The power supply voltage is lower than the rating.	Check the power supply voltage.
		5. The servo driver is broken.	Replace the servo driver.
		6. The servo motor is broken.	Replace the servo motor.
	3. An excess speed error occurs, with an X axis servo driver operation indication of "3".	1. The S.L. circuit board is defective.	Replace the S.L. circuit board.
		2. The CPU circuit board is defective.	Replace the CPU circuit board.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.
	4. A counter overflow occurs with an X axis servo driver operation indication of "4".	1. The S.L. circuit board is defective.	Replace the S.L. circuit board.
		2. The CPU circuit board is defective.	Replace the CPU circuit board.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	5. An overheating error occurs with an X axis servo driver operation indication of "5".	<ol style="list-style-type: none"> <li>1. The ambient temperature is too high.</li> <li>2. The load is too great relative to the frequency of use.</li> <li>3. The servo driver is broken.</li> <li>4. The servo motor is broken.</li> </ol>	<p>Remove the cover at the lower part of the X-Y table to lower the temperature around the servo driver.</p> <p>Check the load system.</p> <p>Replace the servo driver.</p> <p>Replace the servo motor.</p>
	6. An encoder signal broken wire error occurs with an X axis servo driver operation indication of "6".	<ol style="list-style-type: none"> <li>1. The servo motor encoder signal connector is disconnected.</li> <li>2. The servo driver is broken.</li> <li>3. The encoder signal wire is broken.</li> </ol>	<p>Connect the connector.</p> <p>Replace the servo driver.</p> <p>Replace the servo motor.</p>
	7. A power supply voltage drop error occurs with an X axis servo driver operation indication of "8".	<ol style="list-style-type: none"> <li>1. The power supply voltage has dropped to 30% or more below the rating.</li> <li>2. The servo driver is broken.</li> </ol>	<p>Check the power supply voltage.</p> <p>Replace the servo driver.</p>
	8. Signals cannot be sent to or receiver from servo driver X.	<ol style="list-style-type: none"> <li>1. The servo cord X set connections are incorrect, or a wire is broken.</li> </ol>	<p>Check the connections of the servo cord X set to CN1X and J23, and check the servo cord X set for broken wires.</p>
9. Error No. 05 X axis motor error	1. The imposition signal does not come from the X axis servo driver.	<ol style="list-style-type: none"> <li>1. The X axis transmission system is locked, so imposition does not come.</li> <li>2. The imposition setting is not "F".</li> <li>3. The servo cord X set connections are incorrect, or a wire is broken.</li> </ol>	<p>With the power OFF, check the X-Y mechanical system transmission system.</p> <p>Set the rotary DIP switch on the servo driver front panel to "F".</p> <p>Check the connections of the servo cord X set to CM1X and J23, and check the servo cord X set for broken wires.</p>
10. Error No. 06 X axis motor error	1. The Z phase signal does not come from the X axis motor driver.	<ol style="list-style-type: none"> <li>1. The signal does not come from the motor encoder.</li> <li>2. The servo cord X set connections are incorrect, or a wire is broken.</li> </ol>	<p>Check the connection between the servo driver and the motor encoder connector CN2X.</p> <p>Check the connections of the servo cord X set to CN1X and J23, and check the servo cord X set for broken wires.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
11. Error No. 07: Y axis motor error	1. An excess error occurs with a Y axis servo driver operation indication of "1".	1. The servo driver gain is too high. 2. The load is too great.	Readjust the gain. Turn the power OFF, then turn the coupling between the motor and the gear box by hand, and check for places where the load is too great.
		3. The movement limit sensor fails to act, and feed block hits the stopper.	Refer to the sections starting with 31-1-2 on the movement limit sensor.
		4. Noise is getting into the servo driver.	Check whether the servo motor encoder signal cable has a ferrite core. Also check whether it is grounded.
		5. The servo motor driver is broken.	Replace the servo driver.
		6. The servo motor is broken.	Replace the servo motor.
	2. An excess load error occurs with a Y axis servo driver operation indication of "2".	1. The load is too great.	Turn the power OFF, then turn the coupling between the motor and the gear box by hand, and check for places where the load is too great.
		2. The movement limit sensor fails to act, and feed block hits the stopper.	Refer to the sections starting with 31-1-2, on the movement limit sensor.
		3. The connection to the tap on the primary side of the transformer is incorrect.	Check the connection to the transformer tap.
		4. The power supply voltage is below the rating.	Check the power supply voltage.
		5. The servo driver is broken.	Replace the servo driver.
		6. The servo motor is broken.	Replace the servo motor.
	3. An excess speed error occurs with a Y axis servo driver operation indication of "3".	1. The S.L circuit board is defective.	Replace the S.L circuit board.
		2. The CPU circuit board is defective.	Replace the CPU circuit board.
		3. The servo driver is broken.	Replace the servo driver.
		4. The servo motor is broken.	Replace the servo motor.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	4. A counter overflow occurs with a Y axis servo driver operation indication of "4".	<ol style="list-style-type: none"> <li>1. The S.L. circuit board is defective.</li> <li>2. The CPU circuit board is defective.</li> <li>3. The servo driver is broken.</li> <li>4. The servo motor is broken.</li> </ol>	<p>Replace the S.L. circuit board.</p> <p>Replace the CPU circuit board.</p> <p>Replace the servo driver.</p> <p>Replace the servo motor.</p>
	5. An overheating error occurs with a Y axis servo driver operation indication of "5".	<ol style="list-style-type: none"> <li>1. The ambient temperature is too high.</li> <li>2. The load is too great relative to the frequency of use.</li> <li>3. The servo driver is broken.</li> <li>4. The servo motor is broken.</li> </ol>	<p>Remove the cover at the lower part of the X-Y table, to lower the temperature around these parts.</p> <p>Check the load system.</p> <p>Replace the servo driver.</p> <p>Replace the servo motor.</p>
	6. An encoder signal broken wire error occurs with a Y axis servo driver operation indication of "6".	<ol style="list-style-type: none"> <li>1. The servo motor encoder signal connector is disconnected.</li> <li>2. The servo driver is broken.</li> <li>3. The encoder signal wire is broken.</li> </ol>	<p>Connect the connector.</p> <p>Replace the servo driver.</p> <p>Replace the servo motor.</p>
	7. A power supply voltage drop error occurs with a Y axis servo driver operation indication of "8".	<ol style="list-style-type: none"> <li>1. The power supply voltage is 30% or more below the rating.</li> <li>2. The servo driver is broken.</li> </ol>	<p>Check the power supply voltage.</p> <p>Replace the servo driver.</p>
	8. Signals cannot be sent to or received from servo driver Y.	<ol style="list-style-type: none"> <li>1. The servo cord Y set connections are incorrect or a wire is broken.</li> </ol>	<p>Check the servo cord Y set connections to CN1Y and J24, and check the servo cord Y set for broken wires.</p>
12. Error No. 08: Y axis motor error	1. The imposition signal does not come from the Y axis servo driver.	<ol style="list-style-type: none"> <li>1. The Y axis transmission system is locked, so imposition does not come.</li> <li>2. The imposition setting is not "F".</li> <li>3. The servo cord Y set connections are incorrect, or a wire is broken.</li> </ol>	<p>With the power OFF, check the transmission system.</p> <p>Set the rotary DIP switch on the servo driver front panel to "F".</p> <p>Check the servo cord Y set connections to CN1Y and J24, and check the servo cord Y set for broken wires.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
13. Error No. 09: Y axis motor error	1. The Z phase signal does not come from the Y axis servo driver.	1. The signal does not come from the motor encoder. 2. The servo cord Y set connections are incorrect, or a wire is broken.	Check the connection of the servo driver to the motor encoder connector CN2Y. Check the connections of the servo cord Y set to CN1Y and J24, and check the servo cord Y set for broken wires.
<p>* There are also some special problems that can occur in connection with the servo motor driver. If you have cannot find trouble in the mechanical drive system and cannot find any broken wires, please contact your nearest JUKI agent. ***** Do not touch the variable resistor on the servo driver front panel except when replacing the servo driver. *****</p>			
14. Error No. 10: Air pressure drop	1. An air pressure drop has been detected.	1. The air pressure has dropped.	Check the air supply system.
		2. The air pressure drop detection setting is incorrect.	Set the air pressure drop detection setting to 3.5 kgf/cm <sup>2</sup> .
		3. The air pressure drop detection function is broken.	With +24 V applied between the red and black wires of the manometer wire bundle at the terminal block B assembly terminals, if the air pressure detection lamp fails to light up even when the air pressure drop detector red needle falls below the air pressure indicator black needle, then replace the manometer assembly.
		4. The manometer assembly wiring is incorrect.	Connect the red wire to the terminal block B assembly +24 V terminal No. 11, the white wire to the SIGNAL terminal No. 11 and the black wire to the GND terminal No. 11.
		5. The terminal block B assembly or the I/O circuit board is defective.	With +24 V applied between the red and black wires of the manometer bundle connected to the terminal block B assembly terminal posts, if the air pressure drop detection lamp lights up when the air pressure drop detector red needle falls below the air pressure indicator black needle, replace the terminal block B assembly or the I/O circuit board assembly.
		6. The cable connections are incorrect or the cable is defective.	Check the connections of the terminal block B cord set to J34 on the I/O circuit board assembly, of the terminal block B cord set to CN29 on the terminal block B cable set, and of the terminal block B cable set to CN12 on the terminal block B assembly.



Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
15. Error No. 11: Stop while sewing is in progress	1. The stop switch was pressed during operation.		After the stop, resume operation by pressing the "reset" key on the operation panel.
	2. The pause switch was pressed when power was turned ON.	1. The pause switch was pressed.	Turn the power ON again without pressing the pause switch.
		2. The pause switch is defective.	Check the opening and closing of the contact at the terminal on the rear of the pause switch. If opening and closing of the contact cannot be detected, replace the pause switch.
		3. The wiring to the pause switch is incorrect.	Check the wiring, following the operation switch circuit diagram.
		4. The I/O circuit board is defective.	Check the opening and closing of the contact at the terminal on the rear of the pause switch. If, although opening and closing of the contact can be detected, the "pause" occurs immediately, replace the I/O circuit board.
16. Error No. 12	1. When power is turned ON, pressing of the operation panel touch panel is detected.	5. The cable connections are incorrect, or the cable is defective.	Check the connections of the operation switch cord set to J37 on the I/O circuit board assembly and CN26 on the operation switch cable set.
		1. The touch panel was pressed when power was turned ON.	Turn the power ON again without pressing the touch panel.
		2. The touch panel is defective.	With J51 and J52 removed from the touch panel, turn the power ON. If "error No. 12" does not occur, replace the LCD module assembly or the operation panel assembly.
	3. The panel circuit board is defective.		With J51 and J52 removed from the touch panel, turn the power ON. If "error No. 12" occurs, replace the panel circuit board assembly or the operation panel assembly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
17. Error No. 13	1. When power is turned ON, pressing of the setting release switch is detected.	1. The settings completed switch was pressed. 2. The setting release switch is defective.	Turn power ON again without pressing the setting release switch. Check the opening and closing of the contact at the terminal on the rear of the setting release switch. If opening and closing of the contact is not detected, replace the setting release switch.
		3. The wiring to the setting release switch is incorrect.	Check the wiring, following the operation switch circuit diagram.
		4. The I/O circuit board is defective.	Check the opening and closing of the contact at the terminal on the rear of the setting release switch. If, although opening and closing of the contact can be confirmed, "error No. 13" occurs again, replace the I/O circuit board.
		5. The cable connections are defective, or the cable is defective.	Check the connections of the operation switch cord set to J37 on the I/O circuit board assembly and CN26 on the operation switch cable set.
18. Error No. 14	1. When power is turned ON, pressing of settings completed switch 2 (right side) is detected.	1. Settings completed switch 2 was pressed. 2. Settings completed switch 2 is defective.	Turn the power ON again, without pressing settings completed switch 2. Check the opening and closing of the contact at the terminal on the rear of settings completed switch 2. If opening and closing of the contact cannot be detected, replace settings completed switch 2.
		3. The wiring to settings completed switch 2 is incorrect.	Check the wiring, following the operation switch circuit diagram.
		4. The I/O circuit board is defective.	Check the opening and closing of the contact at the terminal on the rear of settings completed switch 2. If, although opening and closing of the contact can be confirmed, "error No. 14" occurs again, replace the I/O circuit board.
		5. The cable connections are incorrect, or the cable is defective.	Check the connections of the operation switch cord set to J37 on the I/O circuit board assembly and CN26 on the operation switch cable set.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
19. Error No. 15	1. When power is turned ON, pressing of settings completed switch 1 (left side) is detected.	<ol style="list-style-type: none"> <li>1. Settings completed switch 1 was pressed.</li> <li>2. Settings completed switch 1 is defective.</li> <li>3. The wiring to settings completed switch 1 is incorrect.</li> <li>4. The I/O circuit board is defective.</li> <li>5. The cable connections are incorrect, or the cable is defective.</li> </ol>	<p>Turn the power ON again, without pressing settings completed switch 1.</p> <p>Check the opening and closing of the contact at the terminal on the rear of settings completed switch 1. If opening and closing of the contact cannot be detected, replace settings completed switch 1.</p> <p>Check the wiring, following the operation switch circuit diagram.</p> <p>Check the opening and closing of the contact at the terminal on the rear of settings completed switch 1. If, although opening and closing of the contact can be confirmed, "error No. 15" occurs again, replace the I/O circuit board.</p> <p>Check the connections of the operation switch cord set to J37 on the I/O circuit board assembly and CN26 on the operation switch cable set.</p>
20. Error No. 16	1. When power is turned ON, pressing of the garment body switch is detected.	<ol style="list-style-type: none"> <li>1. The garment body switch was pressed.</li> <li>2. The garment body switch is in the wrong position.</li> <li>3. The garment body switch is defective.</li> <li>4. The wiring of the garment body switch is incorrect.</li> <li>5. The terminal block B assembly or the I/O circuit board is defective.</li> <li>6. The cable corrections are incorrect, or the cable is defective.</li> </ol>	<p>Turn the power ON again without pressing the garment body switch.</p> <p>Readjust the garment body switch position.</p> <p>Turn the garment body switch ON and OFF and check the opening and closing of the contact. If opening and closing of the contact cannot be detected, replace the garment body switch.</p> <p>Connect the red cord to the SIGNAL terminal No. 9 and connect the black cord to the GND terminal No. 9 on the terminal block A asm.</p> <p>When a +24 V is developed between the red and black cords of the garment body setting switch at the terminals on the terminal block A asm., turn ON/OFF the garment body switch. If the indicator lamp of the garment body switch lights up, replace the terminal block A asm. or the I/O circuit board asm. with a new one.</p> <p>Check the connections of the connector J33 on the I/O circuit board and connector CN11 on the terminal block A asm. to the terminal block A asm.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
21. Error No. 20: No pattern	1. The preparation key was pressed without a pattern being read in from a floppy disc. * When the system is not used for a long time, backup data will sometimes be lost. * When the system is used after connecting the PGM-6 and performing operations, the previous pattern data will be lost.		Press the reset key to return to the standard screen. Then press the pattern No. key to switch to the pattern No. setting screen, and read a pattern in from a floppy disk.
22. Error No. 21: Needle thread broken	1. The needle thread broke. 2. Continuity exists between the thread breakage detecting plate and the machine arm in the state where the thread take-up spring does not come in contact with the thread breakage detecting plate. 3. During sewing, the thread take-up spring is constantly in contact with the thread breakage detecting plate. 4. Although the contact between the thread take-up spring and the thread breakage detection plate is normal, a needle thread breakage error does not occur.	1. The thread was threaded incorrectly. 2. Thread was not knotted at the start of sewing. 1. The thread breakage detection plate is in contact with the thread tension disc No. 2 or arm section. 2. The thread breakage detection plate insulation bushing is cracked. 3. The sewing machine cord connections are incorrect. 1. The take-up spring tension is too strong. 2. There is no bobbin thread. 1. The I/O circuit board is defective.	Check the thread tension and threading route, then press the reset key and rethread the needle thread in threading mode. In sewing machine speed change mode, reduce the sewing speed at the start of sewing, or lengthen the amount of needle thread remaining in the thread tension No. 1 and the thread tension No. 3. Adjust the thread breakage detection plate mounting position. Replace the insulation bushing. Check the connections to the sewing machine ground and the needle thread breakage detection wire (thread breakage detection plate). Adjust the take-up spring tension. Check the bobbin thread. Replace the I/O circuit board assembly.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
23. Although the needle thread is broken, the needle thread breakage detector does not move.	<ol style="list-style-type: none"> <li>1. The needle thread breakage detector is in inoperative status.</li> <li>2. The thread take-up spring and the thread breakage detection plate fail to make contact.</li> <li>3. The signal fails to arrive.</li> </ol>	<ol style="list-style-type: none"> <li>1. The thread detection mode was changed so that the needle thread breakage detector is inoperative.</li> <li>2. The I/O circuit board DIP switch settings are wrong.</li> <li>1. The thread breakage detection plate is not mounted correctly.</li> <li>2. The thread take-up spring stroke is short so that it does not contact the thread breakage detection plate.</li> <li>1. The cable is not connected, or the cable is defective.</li> </ol>	<p>Put the needle thread breakage detector into operative status in thread detection mode.</p> <p>Set all of the I/O circuit board DIP switch SW1 settings to OFF.</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 +24 V 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>
24. Error No. 24: Stack full (Optional)	<ol style="list-style-type: none"> <li>1. The stack full auto switch detected a full stack.</li> </ol>	<ol style="list-style-type: none"> <li>1. Workpieces are piled up too high in the stacker.</li> <li>2. When the stacker is rising, the operator's hand or any other thing shield the optical axis of the stack full sensor.</li> <li>3. The stack full sensor is mounted in the wrong position.</li> <li>4. The stack full sensor is defective.</li> <li>5. The cable connections are incorrect, or the cable is defective.</li> <li>6. The connections to terminal block B are in error.</li> </ol>	<p>Remove some of the workpieces, then press the reset key to restore the system.</p> <p>Press the reset key to restore the system.</p> <p>Adjust the mounting position of the stack full sensor.</p> <p>When a +24 V appears between the red and black cords of the stack full sensor, turn ON/OFF the stack full sensor. If the output of the white cord does not turn ON/OFF, replace the stack full sensor with a new one.</p> <p>Check the connections of the terminal block cord set to J34 on the I/O circuit board assembly, of the terminal block B cord set to CN29 on the terminal block B cable set, and of the terminal block B cable set to CN12 on the terminal block B assembly.</p> <p>Connect the red and black wires to the terminal block B assembly SIGNAL and GND terminals No. 12, respectively.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
25. The stack full sensor fails to work.	1. Signal from the stack full sensor fails to arrive.	1. The stack full sensor is mounted in the wrong position. 2. The stack full sensor is defective.	Adjust the mounting position of the stack full sensor.
		3. The cable connection is incorrect or the cable is defective.	When a +24 V appears between the red and black cords of the stack full sensor, turn ON/OFF the stack full sensor. If the output of the white cord does not turn ON/OFF, replace the stack full sensor with a new one.
		4. The wiring of the stack full sensor to the terminal block B is incorrect.	Check the connections of the connector J34 on the I/O circuit board and connector CN12 on the terminal block B to the terminal block cord A asm.
26. Error No. 25: Stack full error	1. The workpiece fails to pass the material passage sensors 1 and 2 on the second chute board.	1. The workpiece is taken out by hand from the first chute board. 2. The workpiece has failed to enter the stacker. 3. The workpiece is caught in some components located on the way to the sensors. 4. The workpiece has passed obliquely in between the material passage sensors.	Connect the red cord to the +24 V terminal No. 9, connect the white cord to the SIGNAL terminal No. 9 and connect the black cord to the GND terminal No. 9 on the terminal block B asm. Press the reset key to restore the system.
	2. An error is output though the workpiece has passed the material passage sensors 1 and 2.	1. The material passage sensors 1 and 2 are defective. 2. The cable connection is incorrect or the cable is defective. 3. The wiring of the material passage sensors to the terminal block B is incorrect.	Adjust the direction of the nozzle of the workpiece draw-out air blower and the speed controller. Adjust the speed controller and air cushion of the first chute board. Adjust the direction of the nozzle of the workpiece draw-out air blower and the speed controller.
		2. The connectors of the material passage 1 and 2 sensors and the material passage 1 signal cord asm.	Confirm first that a +24 V appears between the red and black cords of the material passage sensors 1 and 2 signal cords. Then, turn ON/OFF the sensor. If the output of the white cord fails to turn ON/OFF, replace the material passage sensors with new ones.
		3. For the material passage 1 sensor, connect the red cord to the +24 V terminal No. 8, connect the white cord to the SIGNAL terminal No. 8 and connect the black cord to the GND terminal No. 8 on the terminal block B asm. For the material passage 2 sensor, connect the black cord to the +24 V terminal No. 7 on the terminal block B asm.	The connectors of the material passage 1 and 2 sensors and the material passage 1 signal cord asm.

\* If you set the material detecting function to the inoperative state in the "7. Running mode," the stack failure detecting function will be rendered ineffective.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
27. Error No. 26: No material	1. The material sensor has judged that there is no material on the machine.	1. The material has not been delivered to the work clamp during loading. 2. The material sensor has been improperly adjusted.	Press the reset key to restore the system. Obtain the proper timing of the material sensor by adjusting the speed controller and stopper of the cylinder. Select the step operation mode in "7. Running mode" and check the operation of the material sensor and adjust it. If the material sensor operates normally, check the position of the work clamp lower sensor. If the operating timing of the work clamp lower sensor is excessively advanced, the material sensor may fail to detect the material.
		3. The workpiece is too small and is not placed under the material sensor.	Select "7. Running mode," set the material detecting function to the inoperative state and enter the state.
		4. The cable connection is incorrect or the cable is defective.	Check the connections between the sensor connector of the material sensor and the material detection signal cord asm. and between the connector CN11 on the terminal block A asm. and the terminal block A board asm.
		5. The wiring of the material sensor to the terminal block B is incorrect.	Connect the red cord to the +24 V terminal No. 10 on the terminal block A asm., white cord to the SIGNAL terminal No. 10 and the black cord of the material detection signal cord asm. to the GND terminal No. 10 on the terminal block A asm.
		6. The material sensor is defective.	When a +24 V appears between the red and black cords of the material detection signal cord asm., turn ON/OFF the sensor. If the red indicator lamp of the operation monitor fails to flash on and off, replace the sensor with a new one.
28. Error No. 27: Setting base lowering	1. When the setting completion switches 1 and 2 are pressed after setting the workpiece under the automatic mode, the lowering state of the setting device is detected. When the loader starts to advance under the manual mode, the lowering state of the setting device is detected.	1. An excessive load is applied to the setting device. 2. The setting device has been lowered by hand. 3. Air piping is incorrect. 4. Failed operation of the solenoid valve of the setting base.	Close the air valve and lift/lower the setting table to check for any point to which an excessive load is applied. Press the reset key to restore the system after the setting device has returned to the initial position. Check the air piping. Select the step operation in "7. Running mode," and check the voltage of the solenoid valve when the base is descending. Confirm that the voltage appearing between the +24 V terminal No. 19 and SIGNAL terminal No. 19 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the setting base. If the voltage changes over between HIGH and LOW, replace the solenoid valve with a new one. If it does not change, replace the I/O circuit board with a new one.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page		5. The setting base is mounted in the wrong position.	Adjust the mounting position of the setting base lower detection sensor while checking it using the operation indicator lamp of the setting base lower detection sensor.
		6. The setting base lower detection sensor is defective.	If the operation indicator lamp or the signal between the SIGNAL terminal No. 4 and GND terminal No. 4 on the terminal block A asm. fail to turn ON/OFF, replace the sensor with a new one.
		7. The cable connection is incorrect or the cable is defective.	Check the connection of the connector J33 on the I/O circuit board and the connector CN11 on the terminal block circuit board A to the terminal block A cord asm.
		8. The wiring of the setting base lower detection sensor to the terminal block A S is incorrect.	Connect the red cord to the +24 V terminal No. 19 and the black cord to the SIGNAL terminal No. 19 on the terminal block A asm.
29. Error No. 28: No mark 1 data	1. Size adjustment has been carried out using the pattern of which pattern data does not have mark 1 data.		Add mark 1 data to the pattern data using the PGM-6.
30. Error No. 29: Size over	1. The adjusted size is smaller than the standard size value.		Use the machine with the size adjustment value that is equal to or larger than the standard size value.
	2. The difference between the size adjustment value and the standard size value is set to 130.1 mm or more.		Re-specify the size adjustment value so that it does not exceed 130.0 mm.

\* In case of the solenoid valve failure or the I/O circuit board failure, also check the resistance value of the solenoid valve.



Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
31. Error No. 30: X movement limit	1. Movement to the limit in the X-axis direction has been detected.	1. The sewing pattern is too large.	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 490x160 mm.
		2. The movement limit sensor is not in the correct position.	Connect the PGM-6 and adjust the movement limit sensor position.
		3. The sensor is defective.	Confirm that +24 V is supplied between + V and 0 V on the sensor connector; then pass a reflecting object in front of the sensor detection section and confirm that the operation indicator lamp switches ON and OFF.
		4. The signal cord is not connected correctly.	Connect the red, white and black wires from the X+ movement limit sensor to the terminal block B assembly +24 V, SIGNAL and GND No. 1 terminals, respectively. Connect the red, white and black wires from the X- movement limit sensor to the terminal block C assembly +24 V, SIGNAL and GND No. 5 terminals, respectively. Connect the red, white and black wires from the X- movement limit sensor to the terminal block C assembly +24 V, SIGNAL and GND No. 4 terminals, respectively.
	5. When the power is turned ON, the X+ and X- movement limit sensors detect movement to the respective limits at the same time.	5. The cable is not connected correctly, or the cable is defective.	Check the connections between the sensor and the sensor connector, between the connector J34 on the I/O circuit board asm., and the connector CN12 on the terminal block B asm. cord asm., and between the connector J35 on the I/O circuit board and the connector CN13 on the terminal block C.
		1. Power was turned ON with the X+ movement limit sensor in an abnormal state and with the X- movement limit sensor detecting movement to the limit, for example in an origin search.	Refer to 31-1-3.
		2. Power was turned ON with the X- movement limit sensor in an abnormal state and with the X+ movement limit sensor detecting movement to the limit, for example in an origin search.	Refer to 31-1-3.
		3. Abnormal states occurred in the X; and X- movement limit sensors at the same time.	Refer to 31-1-3.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
32. Error No. 31: Y movement limit	1. Movement to the limit in the Y-axis direction has been detected.	1. The sewing pattern is too large.  2. The movement limit sensor is not in the correct position.  3. The sensor is defective.  4. The signal cord is not connected correctly.  5. The cable is not connected correctly, or the cable is defective.	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 460x160 mm.  Connect the PGM-6 and adjust the movement limit sensor position.  Confirm that +24 V is supplied between + V and 0 V on the sensor connector; then pass a reflecting object in front of the sensor detection section and confirm that the operation indicator lamp switches ON and OFF.  Connect the red, white and black wires from the X+ movement limit sensor to the terminal block C assembly +24 V, SIGNAL and GND No. 8 terminals, respectively. Connect the red, white and black wires from the X- movement limit sensor to the terminal block C assembly +24 V, SIGNAL and GND No. 5 terminals, respectively.
	2. When the power is turned ON, the Y+ and Y- movement limit sensors detect movement to the respective limits at the same time.	1. Power was turned ON with the Y+ movement limit sensor in an abnormal state and with the Y- movement limit sensor detecting movement to the limit, for example in an origin search.  2. Power was turned ON with the Y- movement limit sensor in an abnormal state and with the Y+ movement limit sensor detecting movement to the limit, for example in an origin search.  3. Abnormal states occurred in the Y+ and Y- movement limit sensors at the same time.	Check the connections between the sensor and the sensor connector and between the connector J35 on the I/O circuit board asm. and connector CN13 on the terminal block C and the terminal block B asm. cord asm.  Refer to 31-1-3.  Refer to 31-1-3.  Refer to 31-1-3.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
33. Error No. 22: Work clamp lowering	1. The state in which the work clamp does not rise when is detected when the workpiece is being fed.	<ol style="list-style-type: none"> <li>1. The pressure reducing valve of the work clamp cylinder is improperly adjusted.</li> <li>2. The wiring of the work clamp solenoid valve to the terminal block A is incorrect.</li> <li>3. The cable is not connected properly or the cable is defective.</li> <li>4. The work clamp solenoid valve is defective.</li> <li>5. The cable is not connected properly or the cable is defective.</li> </ol>	<p>Re-adjust the pressure reducing valve.</p> <p>Connect the red cord of the work clamp solenoid valve to the +24 V terminal and black cord to the SIGNAL terminal No. 21 on the terminal block C asm.</p> <p>Check the connection of the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A asm. to the terminal block A cord asm.</p> <p>Select the step operation in "7 Running mode." Confirm that the voltage appearing between the +24 V terminal and SIGNAL terminal No. 21 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the work clamp.</p> <p>Check the connection of the connector J35 on the I/O circuit board asm. and connector CN13 on the terminal block C asm. to the terminal block C cord asm.</p>
34. Error No. 35: Loader initial position error	1. The state in which the loader is not in its origin is detected when turning ON the power to the machine.	<ol style="list-style-type: none"> <li>1. The loader is not in its origin when turning ON the power to the machine.</li> <li>2. The loader setting side is not installed at the correct position.</li> <li>3. The loader setting side sensor is defective.</li> <li>4. The wiring of the loader setting side sensor to the terminal block A asm. is not correct.</li> <li>5. The cable connections are incorrect, or the cable is defective.</li> </ol>	<p>Move the loader back to the initial position by hand. Then press the reset key to restore the system.</p> <p>Adjust the position of the loader in the initial position so that the sensor operation indicator lamp lights up when the loader is pressed against the setting side.</p> <p>Confirm at the SIGNAL terminal and GND terminal No. 1 on the terminal block A asm. that the voltage appearing between the red and black cords changes over between HIGH and LOW when approaching the sensor to the magnet on the cylinder rod side.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL terminal and GND terminal No. 1 on the terminal block A asm.</p> <p>Check the connections of the terminal block A cord set to J33 on the I/O circuit board assembly and to CN11 on the terminal block A assembly.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
35. Error No. 40: Sub-CPU error	1. The initial settings of sub-CPU8749 on the I/O circuit board cannot be performed.	1. The setting of DIP switch SW1 on the I/O circuit board is wrong. 2. Sub-CPU8749 is not mounted on the I/O circuit board. 3. Sub-CPU8749 on the I/O circuit board is defective. 4. The I/O circuit board is defective.	Set DIP switch SW1 to OFF.  By pressing the reset key, the system can be used without the thread detection function.  Remove CPU8749, then press the reset key to use the system without the thread detection function.  There are cases in which the system can still be used without the thread detection function by pressing the reset key. If it cannot be used that way, replace the I/O circuit board.  Check the top position sensor.
36. Error No. 41: Main shaft sensor	1. The machine head main shaft top position cannot be detected.	1. Foreign matter is adhering to the detection surface. 2. The top position detection sensor is not mounted in the correct position. 3. The top position detection sensor is defective. 4. The cable connections are incorrect, or the cable is defective.	Adjust the top position detection sensor mounting position, and confirm that the operation indicator lamp is lit.  Confirm that +24 V is being supplied between + V and 0 V on the sensor connector, then pass a reflecting object in front of the sensor detection section and confirm that the operation lamp switches ON and OFF.  Check the connections between the sensor and the sensor connector and between the connector J31 on the I/O circuit board and the sewing machine cord asm.
37. Error No. 42: Loader setting side sensor	1. The sensor fails to return to the loader setting side or the sensor takes much time to return there.	1. The load is extremely excessive. 2. The speed controller is not adjusted correctly. 3. The brake operates too quickly. 4. The loader brake solenoid valve is defective or the connection of the loader to the terminal block A is incorrect.	Turn OFF the power to the sewing machine to set the loader free. Then, move the loader by hand to check whether an excessive load is applied to the loader.  Check whether the speed controller is turned down too low.  Check the installing position of the loader setting side brake sensor.  Select mode "7. Running mode" on the operation mode change screen. Confirm that the voltage appearing between the +24 V and SIGNAL terminals No. 22 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the loader. If the voltage changes, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
38. Sensor error No. 43: Loader setting side brake	1. The sensor fails to return to the loader setting side or the sensor takes much time to return there.	<ol style="list-style-type: none"> <li>1. The load is extremely excessive.</li> <li>2. The speed controller is not adjusted correctly.</li> <li>3. The brake acts too quickly.</li> <li>4. The loader brake solenoid valve is defective or the connection of the loader to the terminal block A is incorrect.</li> </ol>	<p>Turn OFF the power to the sewing machine to set the loader free. Then, move the loader by hand to check whether an excessive load is applied to the loader.</p> <p>Check whether the speed controller is set too low.</p> <p>Check the installing position of the loader setting side brake sensor.</p> <p>Select "7 Running mode" on the operation mode change screen. Check whether the voltage appearing between the +24 V and SIGNAL terminals No. 22 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the loader. If the voltage changes, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.</p>
39. Sensor error No. 44: Loader center sensor	1. The signal from the loader center sensor is not received.	<ol style="list-style-type: none"> <li>1. The load is extremely excessive.</li> <li>2. The speed controller is not adjusted correctly.</li> <li>3. The brake acts too quickly.</li> <li>4. The wiring to terminal block A is incorrect.</li> <li>5. The cable connections are incorrect, or the cable is defective.</li> </ol>	<p>Turn OFF the power to the sewing machine to set the loader free. Then, move the loader by hand to check whether an excessive load is applied to the loader.</p> <p>Check whether the speed controller is set too low.</p> <p>Move the loader away from the initial position, then turn ON the power to the sewing machine to set the loader free with the power turned ON. Check whether the voltage appearing between the SIGNAL and GND terminals No. 2 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 2 on the terminal block A asm.</p> <p>Check the connections of the terminal block A cord set to J33 on the I/O circuit board assembly and CN11 on the terminal block A assembly.</p>

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
From previous page	2. The loader setting side sensor is detected first.	1. The loader setting side sensor is defective.	<p>Move the loader away from the initial position, then turn ON the power to the sewing machine to set the loader free with the power turned ON.</p> <p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 1 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.</p>
	3. The loader setting side brake sensor is detected first.	1. The loader setting side brake sensor is defective.	<p>Move the loader away from the initial position, then turn ON the power to the sewing machine to set the loader free with the power turned ON.</p> <p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 7 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.</p>
	4. The loader setting side solenoid valve fails to work.	1. The loader setting side solenoid valve is defective or the connection of the solenoid to the terminal block is incorrect.	<p>Select the step operation in "7 Running mode." Confirm the voltage of the solenoid valve when the loader is advancing.</p> <p>Check whether the voltage appearing between the +24 V terminal No. 24 and the SIGNAL terminal No. 24 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the loader.</p> <p>If the voltage changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
40. Sensor error No. 45: Loader sewing machine side brake	1. The sensor fails to return to the loader setting side or the sensor takes much time to return there.	1. The load is extremely excessive.	Turn OFF the power to the sewing machine to set the loader free. Then, move the loader by hand to check whether an excessive load is applied to the loader.
		2. The speed controller is not adjusted correctly.	Check whether the speed controller is set too low.
		3. The brake acts too quickly.	Check the installing position of the loader sewing machine brake sensor.
	2. The signal from the loader sewing machine side brake sensor is not received.	1. Loader sewing machine side brake sensor is defective.	Move the loader away from the initial position, then turn ON the power to the sewing machine to set the loader free with the power turned ON. Check whether the voltage appearing between the SIGNAL and GND terminals No. 8 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.
		2. The connections to terminal block A are incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 8 on the terminal block A asm.
		3. The cable connections are incorrect, or the cable is defective.	Check the connections of the terminal block A cord set (oo J33 on the I/O circuit board assembly and CN11 on the terminal block A assembly).
	3. The loader sewing machine side sensor is detected first.	1. The loader sewing machine side sensor is defective.	Move the loader from the initial position, then turn ON the power to the machine to set the loader free with the power turned ON. Check whether the voltage appearing between the SIGNAL and GND terminals No. 3 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.

To next page

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
41. Sensor error No. 46: Loader sewing machine side sensor	From previous page 5. The loader setting side solenoid valve continues to work without stopping.	1. The loader setting side solenoid valve is defective, or the connection of the solenoid valve to the terminal block is incorrect.	Select the step operation in "7 Running mode." Confirm the voltage of the solenoid valve when the loader is advancing. Check whether the voltage appearing between the +24 V terminal No. 24 and the SIGNAL terminal No. 24 on the terminal block A asm. changes over between HIGH and LOW in accordance with the operation of the loader. If the voltage changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.
	1. The sensor fails to advance to the loader sewing machine side, or it takes much time to advance.	1. The load is extremely excessive. 2. The speed controller is not adjusted correctly. 3. The brake acts too quickly.	Turn OFF the power to the sewing machine to set the loader free. Then, move the loader by hand to check whether an excessive load is applied to the loader.  Check whether the speed controller is set too low.  Check the installing position of the loader sewing machine brake sensor.
	2. The signal does not come from the loader sewing machine side sensor.	1. The loader sewing machine side sensor is defective.	Move the loader from the initial position, then turn ON the power to the machine to set the loader free with the power turned ON. Check whether the voltage appearing between the SIGNAL and GND terminals No. 3 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the loader back and forth. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the loader back and forth.
		2. The connections to terminal block A are incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 8 on the terminal block A asm.
		3. The cable connections are incorrect, or the cable is defective.	Check the connections of the terminal block A cord set too J33 on the I/O circuit board assembly and CN11 on the terminal block A assembly.
		4. The setting base sensor is not installed in the correct position.	Adjust the installing position of the setting base sensor by moving the setting base up or down while observing the operation indicator lamp.



Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
42. Sensor error No. 47: Setting base lower sensor	1. After the workpiece has been delivered to the sewing machine side, the setting base lowering signal is not detected.	<ol style="list-style-type: none"> <li>1. The setting base lower sensor is defective.</li> <li>2. The wiring of the sensor to the terminal block A is incorrect.</li> <li>3. The cable connection is incorrect, or the cable is defective.</li> <li>4. The setting base lower sensor is not mounted in the correct position.</li> </ol>	Check whether the voltage appearing between the SIGNAL and GND terminals No. 4 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the setting base up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the setting base up and down.
43. Error No. 47: Setting base lower sensor	1. The setting base lowering state is detected when turning ON the power to the machine.	<ol style="list-style-type: none"> <li>1. The setting base lower sensor is defective.</li> <li>2. The wiring of the sensor to the terminal block A is incorrect.</li> <li>3. The cable connection is incorrect, or the cable is defective.</li> <li>4. The setting base lower sensor is not mounted in the correct position.</li> <li>1. The setting base solenoid valve is defective.</li> <li>2. The air piping connections are reversed.</li> <li>3. The solenoid valve connections to the terminal block are reversed.</li> </ol>	<p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 4 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the setting base lower sensor by moving the setting base up or down while observing the operation indicator lamp.</p> <p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 4 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the setting base up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the setting base back and forth.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 4 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the setting base lower sensor by moving the setting base up or down while observing the operation indicator lamp.</p> <p>Select the step operation in "7 Running mode." Check whether the output between the +24 V and SIGNAL terminals No. 19 on the terminal block A asm. changes over between HIGH and LOW while the setting base is in operation. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.</p> <p>Reverse the solenoid valve or the cylinder air pipe connections.</p> <p>Connect the red and black cords respectively to the +24 V and SIGNAL terminals No. 19 on the terminal block A asm.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
44. Sciting error No. 48: Left set gauge upper sensor	<ol style="list-style-type: none"> <li>1. The left set gauge lifting signal is not detected after the workpiece has been delivered to the sewing machine side.</li> </ol>	<ol style="list-style-type: none"> <li>1. The left set gauge upper sensor is defective.</li> <li>2. The wiring of the sensor to the terminal block A is incorrect.</li> <li>3. The cable connection is incorrect, or the cable is defective.</li> <li>4. The left set gauge upper sensor is not mounted in the correct position.</li> </ol>	<p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 3 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the set gauge up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the set gauge up and down.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 5 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the left set gauge upper sensor by moving the set gauge up or down while observing the operation indicator lamp.</p>
45. Error No. 48: Left set gauge upper sensor	<ol style="list-style-type: none"> <li>2. The set gauge fails to go up.</li> </ol>	<ol style="list-style-type: none"> <li>1. The connection of the set gauge solenoid valve to the terminal block A is incorrect.</li> <li>2. The cable connection is incorrect, or the cable is defective.</li> <li>3. The set gauge solenoid valve is defective.</li> </ol>	<p>Connect the red and black cords of the set gauge solenoid valve respectively to the SIGNAL and GND terminals No. 20 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block are properly connected to the terminal block A cord asm.</p> <p>Select the step operation in "7 Running mode" and check the operation in the single step operation mode.</p> <p>Check whether the output between the +24 V and SIGNAL terminals No. 20 on the terminal block A asm. changes over between HIGH and LOW in accordance with the set gauge timing. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.</p>
45. Error No. 48: Left set gauge upper sensor	<ol style="list-style-type: none"> <li>1. The raised state of the left set gauge is detected when turning ON the power to the machine.</li> </ol>	<ol style="list-style-type: none"> <li>1. The left set gauge upper sensor is defective.</li> <li>2. The wiring of the sensor to the terminal block A is incorrect.</li> <li>3. The cable connection is incorrect, or the cable is defective.</li> <li>4. The left set gauge upper sensor is not mounted in the correct position.</li> </ol>	<p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 5 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when raising the set gauge. Or, alternatively, check whether the operation indicator lamp flashes on and off when lifting set gauge.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 5 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the left set gauge upper sensor by moving the set gauge up or down while observing the operation indicator lamp.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
46. Sensor error No. 49: Right set gauge upper sensor	<ol style="list-style-type: none"> <li>The right set gauge lifting signal is not detected after the workpiece has been delivered to the sewing machine side.</li> <li>The set gauge fails to go up.</li> </ol>	<ol style="list-style-type: none"> <li>The right set gauge upper sensor is defective.</li> <li>The wiring of the sensor to the terminal block A is incorrect.</li> <li>The cable connection is incorrect, or the cable is defective.</li> <li>The right set gauge upper sensor is not mounted in the correct position.</li> </ol>	<p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 6 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the set gauge up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the set gauge up and down.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 6 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the right set gauge upper sensor by moving the set gauge up or down while observing the operation indicator lamp.</p> <p>Connect the red and black cords of the set gauge solenoid valve respectively to the SIGNAL and GND terminals No. 20 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A asm. are properly connected to the terminal block A cord asm.</p> <p>Select the step operation in "7 Running mode" and check the operation in the single step operation mode. Check whether the output between the +24 V and SIGNAL terminals No. 20 on the terminal block A asm. changes over between HIGH and LOW in accordance with the set gauge timing. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.</p>
47. Error No. 49: Right set gauge upper sensor	<ol style="list-style-type: none"> <li>The raised state of the right set gauge is detected when turning ON the power to the machine.</li> </ol>	<ol style="list-style-type: none"> <li>The right set gauge upper sensor is defective.</li> <li>The wiring of the sensor to the terminal block A is incorrect.</li> <li>The cable connection is incorrect, or the cable is defective.</li> <li>The right set gauge upper sensor is not mounted in the correct position.</li> </ol>	<p>Check whether the voltage appearing between the SIGNAL and GND terminals No. 6 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when raising the set gauge. Or, alternatively, check whether the operation indicator lamp flashes on and off when lifting set gauge.</p> <p>Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 6 on the terminal block A asm.</p> <p>Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.</p> <p>Adjust the installing position of the left set gauge upper sensor by moving the set gauge up or down while observing the operation indicator lamp.</p>

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
48. Sensor error No. 50: Left work clamp lowering sensor	1. The left work clamp lowering signal is not detected after the workpiece has been delivered to the sewing machine side.	1. The left work clamp lowering sensor is defective.	Check whether the voltage appearing between the SIGNAL and GND terminals No. 11 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the left work clamp up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the left work clamp up and down.
		2. The wiring of the sensor to the terminal block A is incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 11 on the terminal block A asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.
		4. The left work clamp lowering sensor is not mounted in the correct position.	Adjust the installing position of the left work clamp lowering sensor by moving the set gauge up or down while observing the operation indicator lamp.
49. Error No. 50: Left work clamp lowering sensor	1. The left work clamp lowering state is not detected when the power to the machine is turned ON.	1. The left work clamp lowering sensor is defective.	Check whether the voltage appearing between the SIGNAL and GND terminals No. 11 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the left work clamp up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the left work clamp up and down.
		2. The wiring of the sensor to the terminal block A is incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 11 on the terminal block A asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.
		4. The left work clamp lowering sensor is not mounted in the correct position.	Adjust the installing position of the left work clamp lowering sensor by moving the set gauge up or down while observing the operation indicator lamp.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
50. Sensor error No. 51: Right work clamp lowering sensor	1. The right work clamp lowering signal is not detected after the workpiece has been delivered to the sewing machine side.	1. The right work clamp lowering sensor is defective.	Check whether the voltage appearing between the SIGNAL and GND terminals No. 12 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the left work clamp up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the right work clamp up and down.
		2. The wiring of the sensor to the terminal block A is incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 12 on the terminal block A asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.
		4. The right work clamp lowering sensor is not mounted in the correct position.	Adjust the installing position of the right work clamp lowering sensor by moving the set gauge up or down while observing the operation indicator lamp.
51. Error No. 51: Right work clamp lowering sensor	1. The right work clamp lowering state is not detected when the power to the machine is turned ON.	1. The right work clamp lowering sensor is defective.	Check whether the voltage appearing between the SIGNAL and GND terminals No. 12 on the terminal block A asm. and between the red and black cords of the sensor changes over between HIGH and LOW when moving the right work clamp up and down. Or, alternatively, check whether the operation indicator lamp flashes on and off by moving the right work clamp up and down.
		2. The wiring of the sensor to the terminal block A is incorrect.	Connect the red and black cords of the sensor respectively to the SIGNAL and GND terminals No. 12 on the terminal block A asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J33 on the I/O circuit board asm. and connector CN11 on the terminal block A are properly connected to the terminal block A cord asm.
		4. The right work clamp lowering sensor is not mounted in the correct position.	Adjust the installing position of the right work clamp lowering sensor by moving the set gauge up or down while observing the operation indicator lamp.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
52. Sensor error No. 52: Size adjustment origin sensor	<ol style="list-style-type: none"> <li data-bbox="252 1169 306 1617">1. The size adjustment origin signal is not received when adjusting the size.</li> </ol>	<ol style="list-style-type: none"> <li data-bbox="252 721 306 1169">1. The size adjustment origin sensor is not mounted in the correct position.</li> </ol>	Adjust the installing position of the size adjustment origin sensor while observing the operation indications on the display.
		<ol style="list-style-type: none"> <li data-bbox="328 721 383 1169">2. The cable connection is incorrect, or the cable is defective.</li> </ol>	Confirm that the sensor is properly connected to the sensor connector, that the connector J34 on the I/O circuit board asm. and connector CN12 on the terminal block B are properly connected to the terminal block B cord asm.
		<ol style="list-style-type: none"> <li data-bbox="405 721 459 1169">3. Connection of the size adjustment origin sensor to the terminal block is incorrect.</li> </ol>	Connect the red, white and black cords of the size adjustment + cord asm. respectively to the +24 V, SIGNAL, and GND terminals No. 3 on the terminal block B asm.
		<ol style="list-style-type: none"> <li data-bbox="481 721 536 1169">4. The size adjustment origin sensor is defective.</li> </ol>	Confirm that +24 V is supplied between the +V and 0V of the sensor connector. Then, let a reflective material pass on the detecting section of the sensor to confirm that the operation indicator lamp lights up and goes out.
	<ol style="list-style-type: none"> <li data-bbox="679 1169 734 1617">2. The setting base fails to move at the time of size adjustment.</li> </ol>	<ol style="list-style-type: none"> <li data-bbox="679 721 734 1169">1. Because of an excessive load, the stepping motor fails to move the setting base.</li> </ol>	Turn OFF the power to the machine. Check whether an excessive load is applied to the size adjustment stepping motor by turning the motor shaft by hand.
		<ol style="list-style-type: none"> <li data-bbox="756 721 810 1169">2. The size adjustment lock cylinder fails to be locked at the time of size adjustment.</li> </ol>	Confirm that the output between the +24 V and SIGNAL terminals No. 20 on the terminal block B asm. changes over between HIGH and LOW at the time of size adjustment. If the output changes, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.
		<ol style="list-style-type: none"> <li data-bbox="833 721 887 1169">3. The connection of the stepping motor is incorrect.</li> </ol>	Measure the coil resistance of the stepping motor to confirm it is $1.45\Omega \pm 10\%$ . If not, replace not only the stepping motor but also the I/O circuit board with a new one.
		<ol style="list-style-type: none"> <li data-bbox="909 721 963 1169">4. The connection of the stepping motor is incorrect.</li> </ol>	Check the connection of the stepping motor connector and connector J39 on the I/O circuit board to the PMI cord asm.
		<ol style="list-style-type: none"> <li data-bbox="986 721 1040 1169">5. The I/O circuit board is defective.</li> </ol>	Replace the defective I/O circuit board with a new one.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
53. Error No. 53: Body garment presser sensor	1. The stacker lifting signal is not received when changing the order of workpieces.	1. The stacker is too heavy to move.  2. The stacker lifting solenoid valve fails to operate.	Turn OFF the air to the machine. Check whether an excessive load is applied to the stacker by moving the stacker up and down.  Confirm whether the output between the +24 V and SIGNAL terminals No. 23 on the terminal block B asm. changes over between HIGH and LOW when the stacker actuates. If the output changes, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.
		3. The stacker upper auto switch is not mounted in the correct position.	Turn OFF the air to the machine. Move the stacker up and down to find the position where the operation indicator lamp lights up. Then, adjust the installing position of the switch.
		4. The stacker upper auto switch is defective.	Confirm whether the output between the SIGNAL and GND terminals No. 12 on the terminal block B asm. changes over between HIGH and LOW when the stacker actuates.
		5. The connection of the stacker upper auto switch to the terminal block is incorrect.	Connect the red and black cords of the auto switch respectively to the SIGNAL and GND terminals No. 12 on the terminal block B asm.
		6. The cable connections are incorrect, or the cable is defective.	Check the connections of the terminal block A cord set too J24 on the I/O circuit board assembly and CN12 on the terminal block B assembly.
54. 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 reinsert the floppy disk.
	2. The floppy disk was inserted into the FDD, but was not detected to have been inserted.	1. The floppy disk case is broken.  2. The FDD is defective.	Replace the floppy disk with a good one.  Replace the FDD.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
55. 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.
56. Error No. 82: No pattern	1. There is no pattern of the specified number on the floppy disk.		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.
2. The pattern of the specified number cannot be found on the floppy disk.		1. The floppy disk is defective.	Replace the floppy disk with a good one.
		2. The FDD is defective.	Replace the FDD.
* Floppy disks sometimes break, so always prepare a backup.			
57. Error No. 83: Pattern disagreement	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.	1. A floppy disk having a different pattern assigned to the specified number was inserted.	Restore the system with the reset key, then check the floppy disk and repeat the operation.
		2. The data in the sewing machine were destroyed in some way.	Replace the CPU circuit board.
		3. The data on the floppy disk were destroyed in some way.	Replace the floppy disk with another one onto which data were copied from the backup disk, then resume processing.
58. Error No. 84: Data error	1. When the floppy disk is read, the do not satisfy the standards.	1. The data on the floppy disk were destroyed in some way.	Replace the floppy disk with another one onto which data were copied from the backup disk, then resume processing.
59. Error No. 85: Memory overflow	1. When data are read in from a floppy disk, the memory becomes full because the data exceed the available memory.	1. There are too many stitches in the pattern.	The number of stitches allowed varies somewhat depending on various factors, but in general keep the number of stitches within 8,000 and the memory required within 16 K bytes.



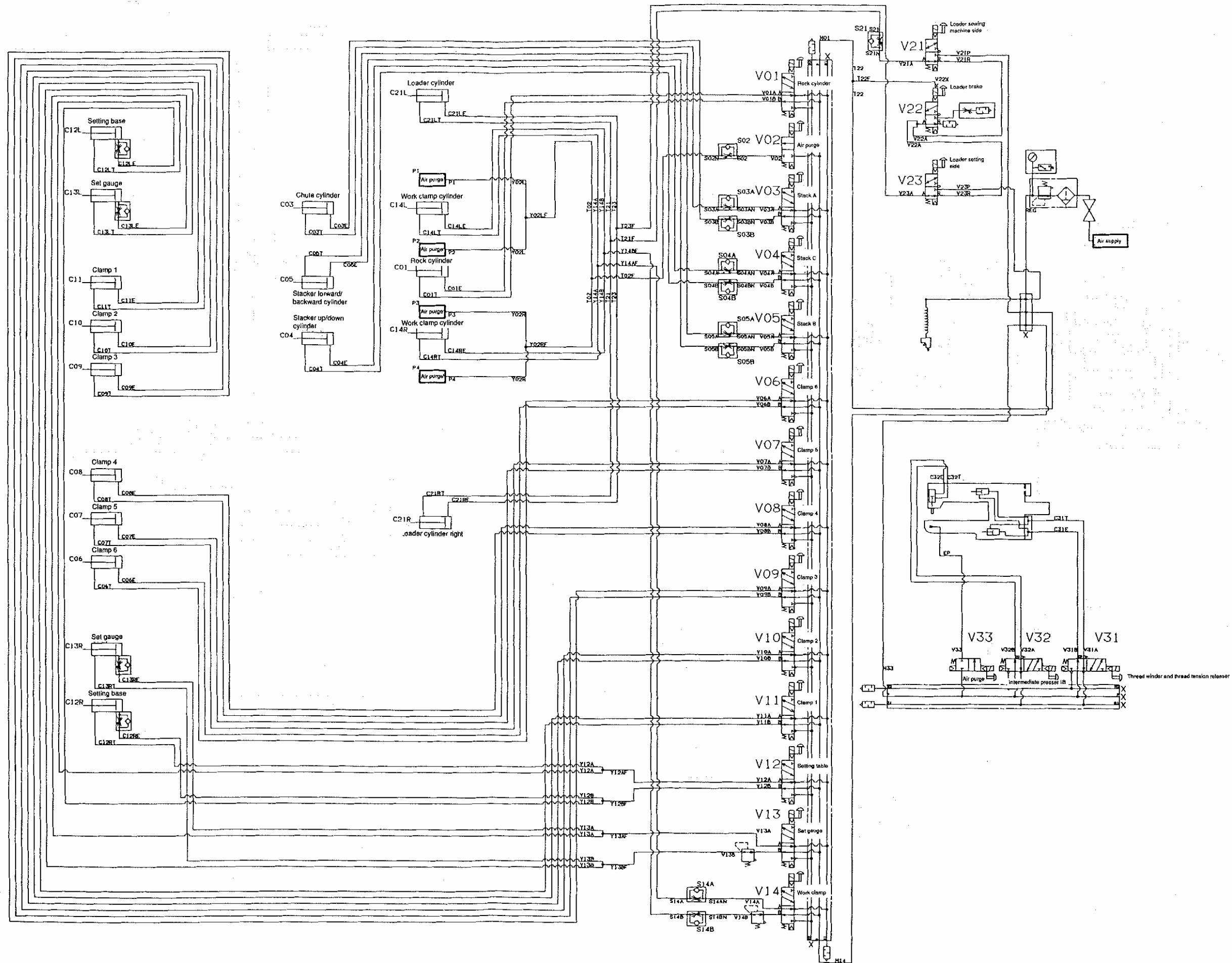
Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
60. Error No. 86: Inadequate volume	1. When a pattern is written onto a floppy disk, the data cannot all be stored on the disk.	1. The floppy disk empty area is less than the quantity of data to be stored.	Replace the floppy disk with a new one.
61. Error No. 90: Seek error	1. Seek operation (reading in the FDD head and then transferring to the track where writing is to be done) cannot be done.	1. The FDD is defective.	Replace the FDD with a good one.
62. Error No. 91: Read error	1. Data cannot be read from 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.
63. Error No. 92: 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.
64. Error No. 93: File structure error	1. The floppy disk format is different.	1. The format is not MS-DOS 2DD. 2. The floppy disk is not formatted.	Use a disk in MS-DOS 2DD format. Format the disk before using it.
65. The workpiece fails to be drawn out after the completion of sewing.	1. The draw-out air blower fails to operate.	1. The speed controller is not properly adjusted. 2. The inclination angle of the nozzle is incorrect.	Adjust the speed controller properly. Adjust the inclination angle of the nozzle correctly.
		3. The connection of the draw-out solenoid valve to the terminal block B is incorrect.	Connect the red and black cords of the draw-out solenoid valve respectively to the +24 V and SIGNAL terminals No. 21 on the terminal block B asm.
		4. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J34 on the I/O circuit board asm. and connector CN12 on the terminal block B are properly connected to the terminal block B cord asm.
		5. The draw-out solenoid valve is defective.	Select the step operation in "7 Running mode" and check the operation in the single step operation mode. Check whether the output between the +24 V and SIGNAL terminals No. 21 on the terminal block B asm. changes over between HIGH and LOW in accordance with the draw-out air blower operation timing. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
66. The thread is not trimmed.	1. The thread trimming cylinder does not move.	<ol style="list-style-type: none"> <li>1. The wiring to the thread trimmer solenoid valve terminal block C is incorrect.</li> <li>2. The cable connections are incorrect, or the cable is defective.</li> <li>3. The thread trimmer solenoid valve is defective.</li> </ol>	<p>Connect the thread trimmer solenoid valve red and black wires to the terminal block C +24 V and SIGNAL No. 13 terminals, respectively.</p> <p>Check the connections of the terminal block C cord set too J35 on the I/O circuit board assembly and CN13 on the terminal block C assembly.</p> <p>Select "13 Head adj.", then check whether the output between the terminal block A assembly +24 V and SIGNAL No. 13 terminals switches between HIGH and LOW when the thread trimmer switch is pressed. If it does, replace the solenoid valve. If it does not, replace the I/O circuit board assembly.</p>
67. The air blow fails to operate after thread trimming.	1. The air blow solenoid valve fails to operate.	<ol style="list-style-type: none"> <li>1. The wiring to air blow solenoid valve terminal post B is incorrect.</li> <li>2. The cable connections are incorrect, or the cable is defective.</li> <li>3. The air blow solenoid valve is defective.</li> </ol>	<p>Connect the air blow solenoid valve red and black wires to the terminal post B assembly +24 V and SIGNAL No. 21 terminals, respectively.</p> <p>Check the connections of the terminal block C cord set too J35 on the I/O circuit board assembly and CN13 on the terminal block C assembly.</p> <p>Select "13. Head adj.", then check whether the output between the terminal block C assembly +24 V and SIGNAL No. 14 terminals switches between HIGH and LOW when the thread trimmer switch is pressed. If it does, replace the solenoid valve. If not, replace the I/O circuit board assembly.</p>
68. The clamp fails to move.	1. The clamp cylinder fails to move.	<ol style="list-style-type: none"> <li>1. The wiring of the clamp solenoid valves to the terminal block A is reversed.</li> <li>2. The cable connection is incorrect, or the cable is defective.</li> <li>3. The clamp solenoid valves are defective.</li> </ol>	<p>Confirm that the red and black cords of solenoid valves V6 through V11 are connected respectively to the +24 V and SIGNAL terminals No. 13 through No. 19 on the terminal block A asm. in the numeric order.</p> <p>Confirm that the connector J35 on the I/O circuit board and connector CN13 on the terminal block C asm. are properly connected to the terminal block C cord asm.</p> <p>Check whether the outputs between the +24 V and SIGNAL terminals No. 13 through No. 18 on the terminal block A asm. change over between HIGH and LOW in accordance with the timing specified in "2. Switch mode." If the outputs change over between HIGH and LOW, replace the solenoid valves with new ones. If not, replace the I/O circuit board asm. with a new one.</p>

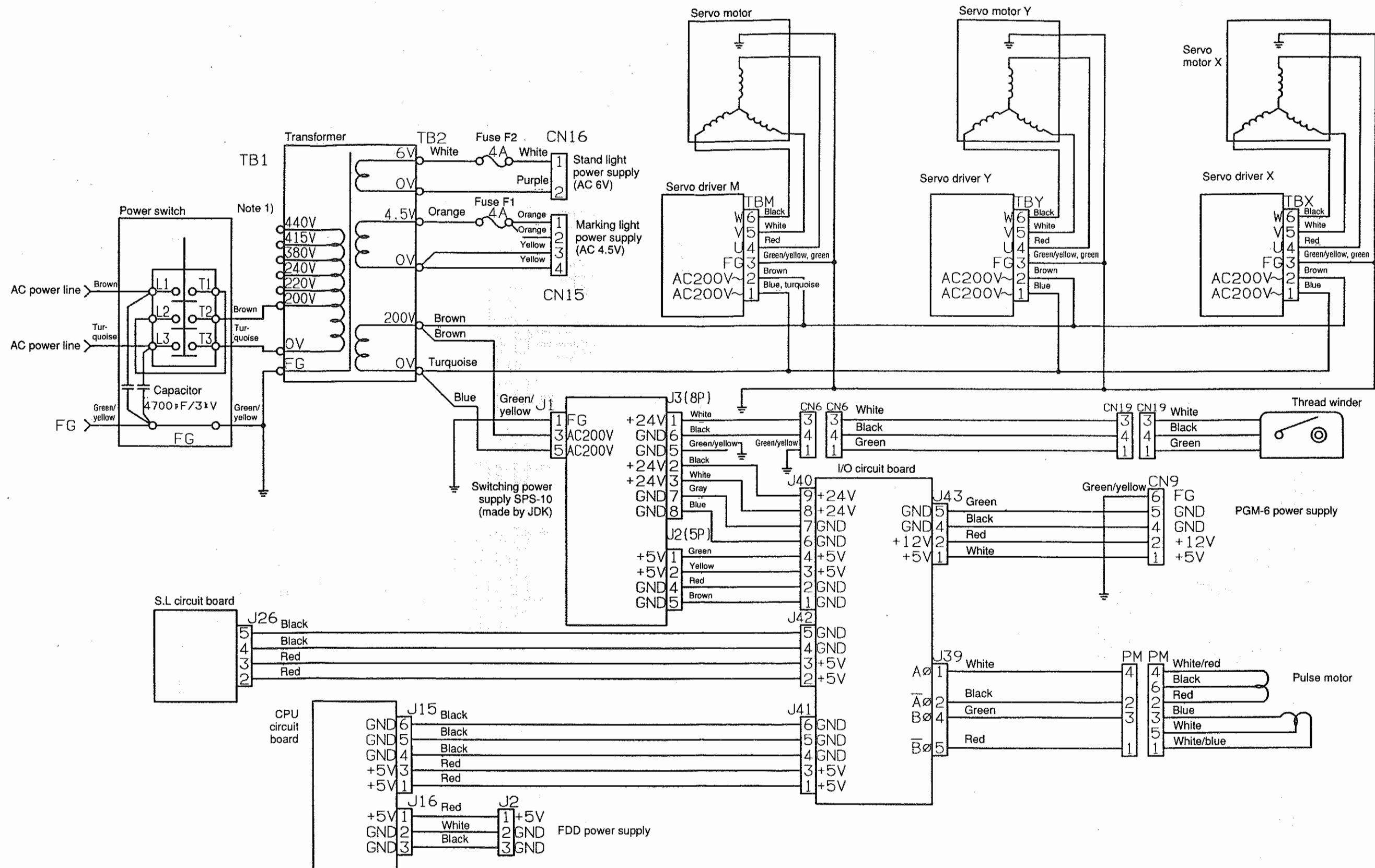
Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
69. The 1st chute board fails to operate.	1. The chute cylinder fails to operate.	1. The speed controller of the chute cylinder is not properly adjusted.	Re-adjust the speed controller properly.
		2. Wiring of the chute solenoid valve to the terminal block B is incorrect.	Connect the red and black cords of the chute solenoid valve to the +24 V and SIGNAL terminals No. 22 on the terminal block B asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J34 on the I/O circuit board and connector CN12 on the terminal block B asm. are properly connected to the terminal block B cord asm.
		4. The chute solenoid valve is defective.	Select the step operation in "7 Running mode" and check the operation in the single step operation mode. Check whether the output between the +24 V and SIGNAL terminals No. 22 on the terminal block B asm. changes over between HIGH and LOW in accordance with the chute board operation timing. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.
70. The stacker fails to stack the workpiece.	1. The stacker front cylinder fails to operate.	1. The speed controller of the stacker front cylinder is not properly adjusted.	Re-adjust the speed controller properly.
		2. Wiring of the stacker front solenoid valve to the terminal block B is incorrect.	Connect the red and black cords of the stacker front solenoid valve to the +24 V and SIGNAL terminals No. 24 on the terminal block B asm.
		3. The cable connection is incorrect, or the cable is defective.	Confirm that the connector J34 on the I/O circuit board and connector CN12 on the terminal block B asm. are properly connected to the terminal block B cord asm.
		4. The stacker front solenoid valve is defective.	Select the step operation in "7 Running mode" and check the operation in the single step operation mode. Check whether the output between the +24 V and SIGNAL terminals No. 24 on the terminal block B asm. changes over between HIGH and LOW in accordance with the stacker front operation timing. If the output changes over between HIGH and LOW, replace the solenoid valve with a new one. If not, replace the I/O circuit board asm. with a new one.

Trouble	Cause (1)	Cause (2)	Inspection order and adjusting procedure
71. The intermediate presser fails to rise when the power is turned ON.	1. The intermediate presser cylinder fails to operate.	<ol style="list-style-type: none"> <li>1. The wiring to the intermediate presser solenoid valve terminal block B is incorrect.</li> <li>2. The cable connections are defective, or the cable is defective.</li> <li>3. The intermediate presser solenoid valve is defective.</li> </ol>	<p>Connect the intermediate presser solenoid valve red and black wires to the terminal block B assembly +24 V and SIGNAL No. 19 terminals, respectively.</p> <p>Check the connections of the terminal block B cord set to J34 on the I/O circuit board, of the terminal block B cord set to CN29 on the terminal block B cable set, and of the terminal block B cable set to CN12 on the terminal block B assembly.</p> <p>Select "13. Head adj.," then check whether the output between the terminal block B assembly +24 V and SIGNAL No. 19 terminals switches between HIGH and LOW when the thread trimmer switch is pressed. If it does, replace the solenoid valve. If not, replace the I/O circuit board assembly.</p>

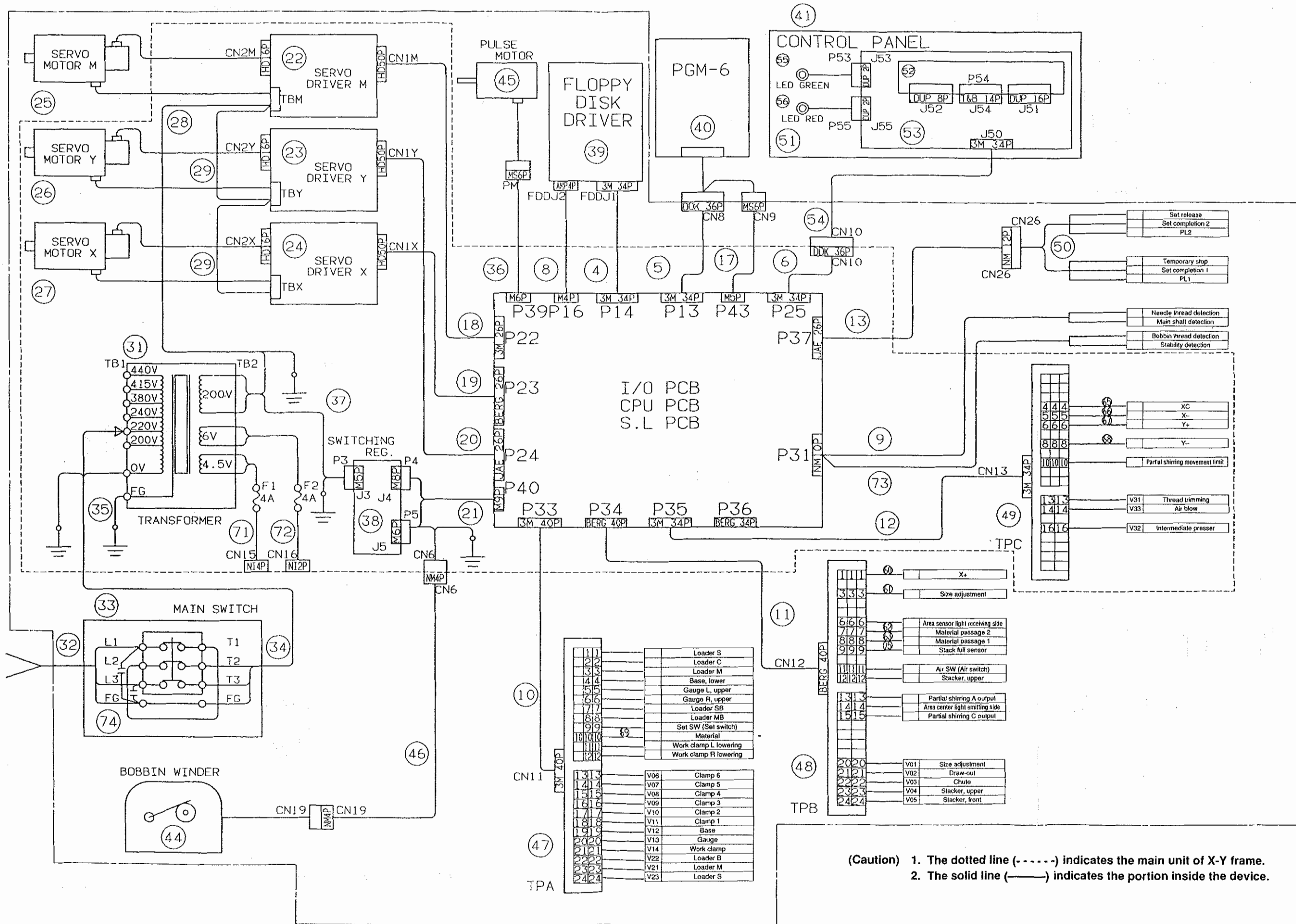
13. NEUMATIC DIAGRAM



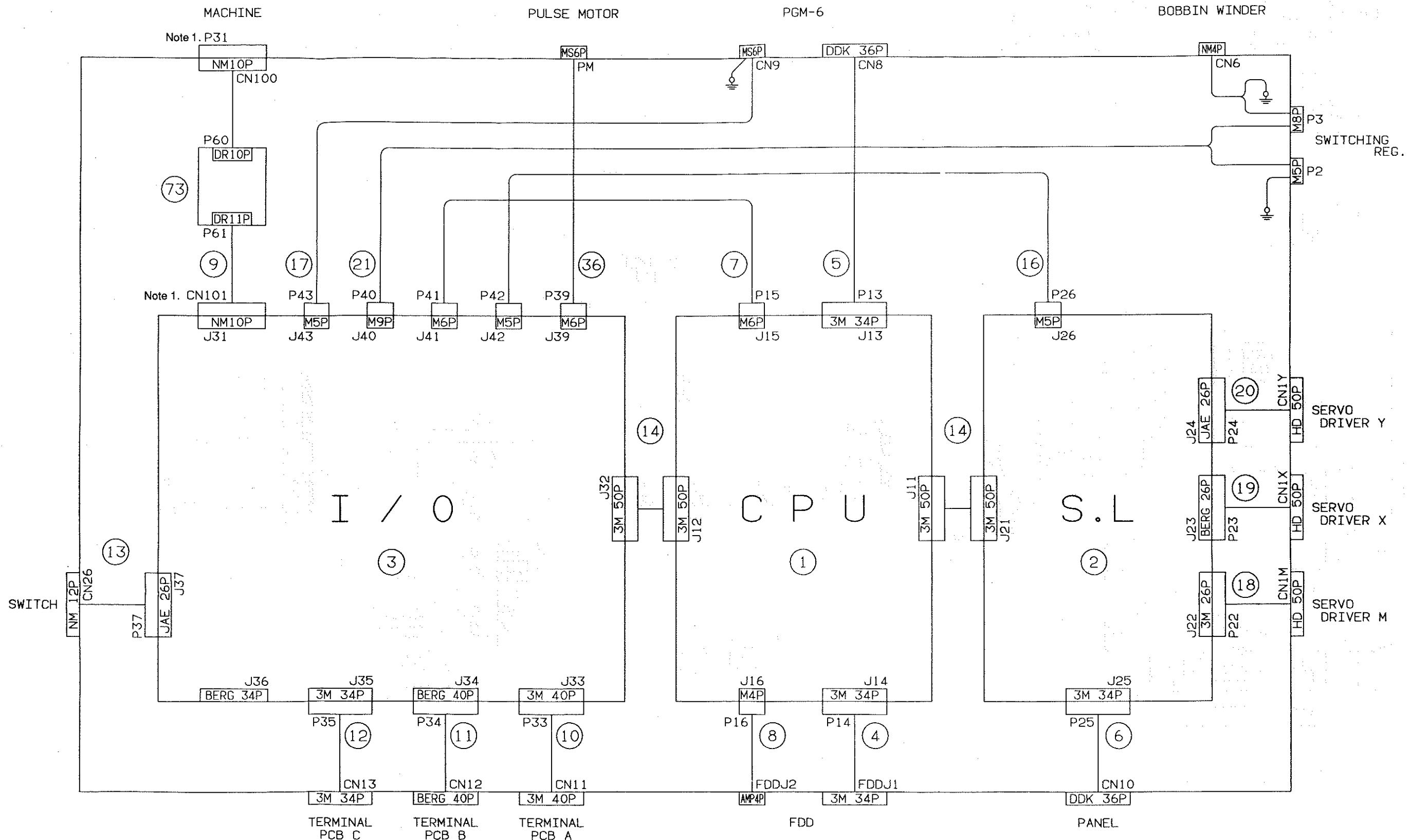
14. ELECTRICAL CIRCUIT DIAGRAM



(Caution) 1. The connection of the transformer to the terminal block (TB1) should be changed in accordance with the destination of the machine.



(Caution) 1. The dotted line (- - - - -) indicates the main unit of X-Y frame.  
 2. The solid line (—) indicates the portion inside the device.



(Note) 1. The bobbin thread detector assembly (73) is optional; if it is not used, P31 comes to the location of CN101.



**BLOCK DIAGRAM (3)**

No.	Part number	Part name	Block diagram No.	Remarks
1	M8601570BA0	CPU circuit board BA assembly	M9402570010	
2	M86025700A0	S.L circuit board assembly	M9403570010	
3	M8603570AB0	I/O circuit board AB assembly	M9404571010	
4	M85925710A0	FDD cord set		
5	M8591571AA0	Input device cord set		
6	M8591571BA0	Panel cord set		
7	M85045700A0	CPU circuit board power cord set	M9408571010	
8	M85055710A0	FDD power cord set	M9408571010	
9	G12228800A0	Sewing machine cord set	M9409571010	
10	M85905710AA	Terminal block A cord set		
11	M85905710AB	Terminal block B cord set		
12	M8591570AA0	Terminal block C cord set		
13	M85115700A0	Operation switch cord set	M9413571010	
14	M85105700A0	Signal cord set		
15				
16	M85135700A0	S.L circuit board power cord set	M9408571010	
17	M85145710A0	Input device power cord set	M9408571010	
18	M8515570MA0	Servo cord M set	M9414570010	
19	M8515570XA0	Servo cord X set	M9414570010	
20	M8515570YA0	Servo cord Y set	M9414570010	
21	M85165700A0	DC power cord set	M9408571010	
22	M8903570000	Servo driver M		
23	M8905570000	Servo driver Y		
24	M8904570000	Servo driver X		
25	G12218700A0	Servo motor M	M9414570010	
26	G50248700A0	Servo motor Y	M9414570010	
27	G50238700A0	Servo motor X	M9414570010	
28	M85175700A0	Servo power cord A set	M9408571010	
29	M85185700A0	Servo power cord B set	M9408571010	
30				
31	M89015700A0	Transformer assembly	M9408571010	
32	M85245710A0	Power cable set	M9408571010	
33	M890*570000	Power switch	M9408571010	*7: For JE 6: Except JE
34	M85255710A0	Power supply internal cable set	M9408571010	
35	M85225700A0	Ground cord set	M8408571010	
36	M85125710A0	PM cord set	M9408571010	
37	M85195700A0	Switching power supply cord set	M9408571010	
38	M8908570000	Switching power supply		
39	HX002980000	3.5-inch FDD		
40	01150697	Input device (PGM-6)		
41	M10025700A0	Operation panel assembly		
42				
43				
44	G80338700A0	Bobbin winder asm.	M9412570010	
45	B25292050BB	Stepping motor asm.		
46	M85315710A0	Bobbin winder power cable asm.	M9407571010	
47	M8605570AA0	Terminal block A assembly	M9407570010	
48	M8605570BA0	Terminal block B assembly	M9407570010	
49	M8605570CA0	Terminal block C assembly	M9406570010	
50	M85235710A0	Operation SW (switch) cable asm.	M9413571010	

No.	Part number	Part name	Block diagram No.	Remarks
51	M10035700A0	Operation panel cover asm.		
52	M85265700A0	Liquid crystal module asm.		
53	M86045700A0	PANEL circuit board asm.	M9405570010	
54	M8591570CAA	Panel cable asm.		
55	M85285700A0	LED, green asm.		
56	M85295700A0	LED, red asm.		
57				
58				
59				
60	M85305710AA	X + signal cord asm.		
61	M85305710AF	Size adjustment + signal cord asm.		
62	M85305710AJ	Material passage 2 signal cord asm.		
63	M85305710AH	Material passage 1 signal cord asm.		
64				
65	M85305710AF	X+ signal cord set		
66	M85305710AB	X- signal cord set		
67	M85305710AC	Y+ signal cord set		
68	M85305710AD	Y- signal cord set		
69	M85305710AG	Material signal cord set		
70				
71	M85205700A0	Marking light cord set	M8508570010	
72	M85215700A0	Marking light assembly	M8508570010	
73	M85485710A0	Bobbin thread detector device asm.	M9415570010	Optional
74	M85155100A0	Capacitor asm.	M8508570010	
75	M85505710B0	Stack full sensor B asm.		Optional
76				
77				
78				
79				
80				
81				
82				
83				
84				
85				
85				
87				
88				
89				
90				
91				
92				
93				
94				
95				
96				
97				
98				
99				
100				

C

C

C

C

C

**JUKI**

**JUKI CORPORATION**  
BUSINESS OFFICE  
1-23-3 KABUKI-CHO  
SHINJUKU-KU, TOKYO 160, JAPAN  
PHONE : 03(3205)1188, 1189, 1190  
FAX : 03(3203)8260, 03(3205)9131  
TELEX : J22967, 232-2301

To order or for further information, please contact :