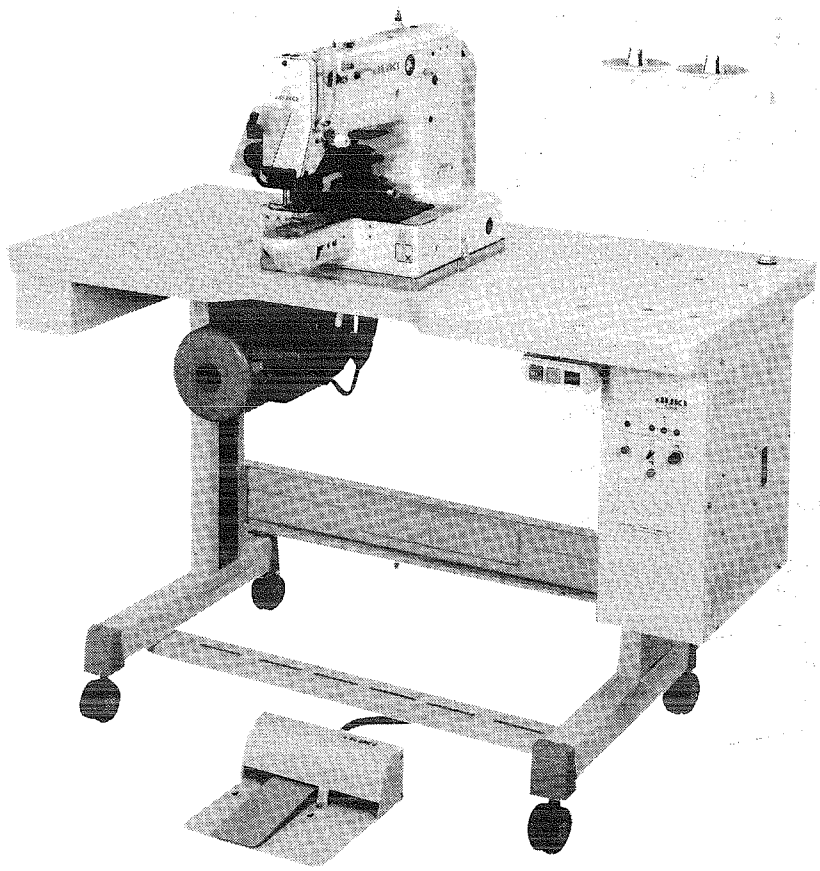
JUKI

Compact-type computer-controlled cycle machine series

AMS-205C
AMS-206C

ENGINEER'S MANUAL



No. IV-63
1992. 12

PREFACE

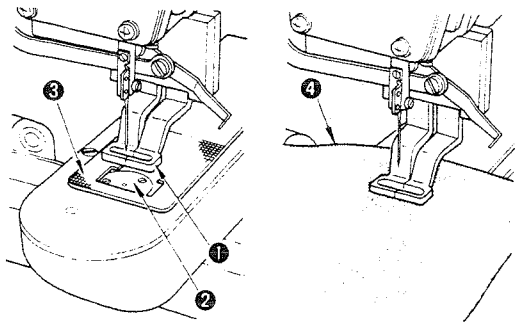
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines.
The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered by the Instruction Manual. It is advisable to use the relevant Instruction Manual and Parts list together with this Engineer's Manual when carrying out the maintenance of these machines.

This Engineer's Manual explains about the AMS-205C Series and AMS-206C Series. For simplified description, the subclass model names are briefly given as follows (unless otherwise the subclass model name is specified, the description is common to all the models):

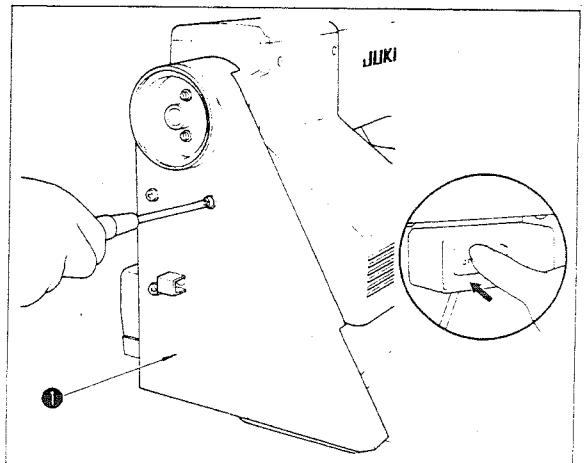
- AMS-205CSS (CHS) } S type
- AMS-206CSS (CHS) } (Magnet standard monolithic feeding frame type)
- AMS-206CSL (CHL, CGL) L type
  (Pneumatic double-stepped feeding frame type)
- In the case of limited use for sewing heavy-weight materials
  AMS-206 CGL (Pneumatic double-stepped feeding frame type for heavy-weight materials) GL type

CAUTIONS

AMS-205C Only

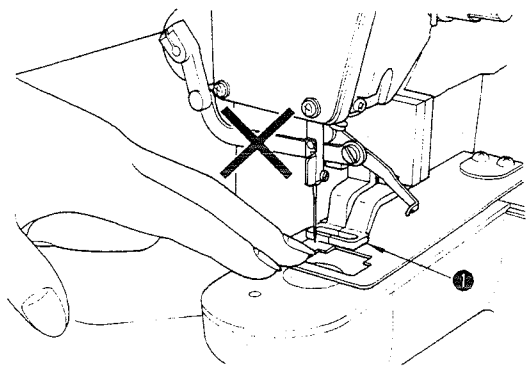


1. When a sewing pattern is being read, the needle threading switch is turned ON, or the bobbin winder switch is turned ON, work clamp foot ❶ might come into contact with throat plate ❷ and might make some scratches on the throat plate. Be sure to insert a piece of cloth ❹ or alike as a buffer between work clamp foot ❶ and feed plate ❸ to prevent scratches on the throat plate.

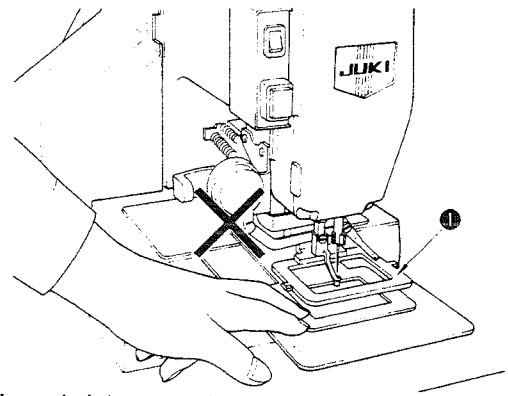


2. Be sure to turn the power switch OFF before removing belt cover ❶ .
   Do not operate the machine with the belt cover removed.

AMS-205C

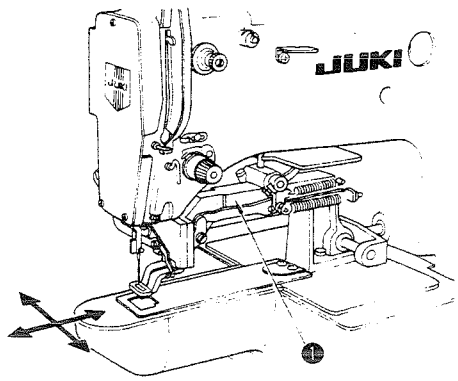


AMS-206C

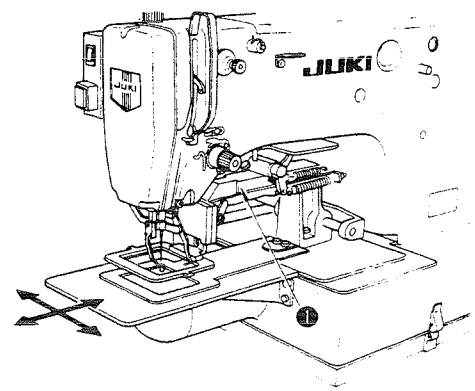


3. When a sewing pattern change is made, the needle threading switch is turned ON, the bobbin winder switch is turned ON, or the foot switch is turned ON, the work clamp foot ❶ comes down automatically. Be sure not to place your fingers under the work clamp foot. Keep your fingers away from the work clamp foot while the machine is in operation.

AMS-205C



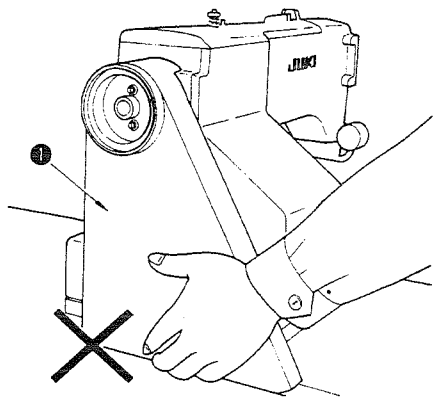
AMS-206C



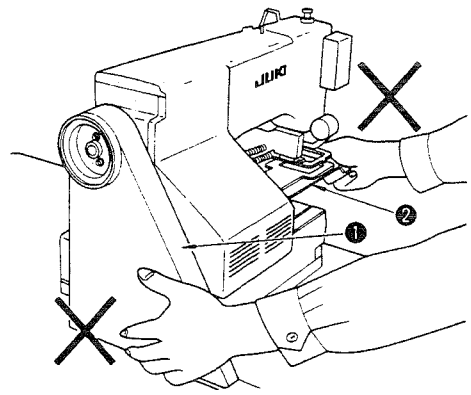
4. To assure accurate pattern sewing, push feed plate ❶ by hand fully forward and backward, then fully to the right and left once every day before turning the power ON. Never do this after the machine has been powered up.

CAUTIONS BEFORE OPERATION

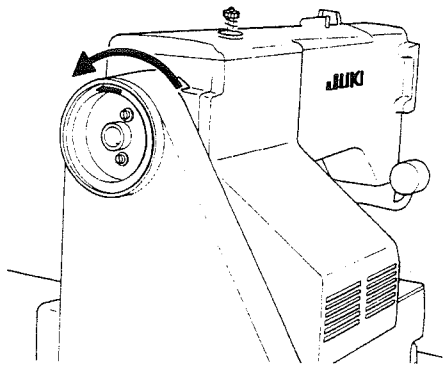
AMS-205C



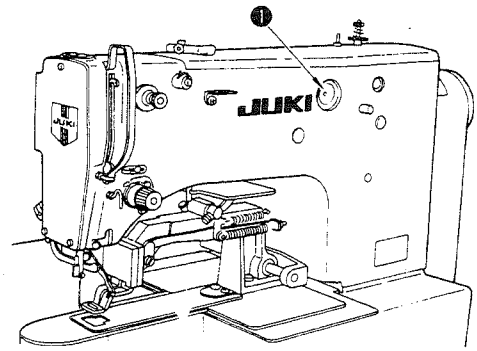
AMS-206C



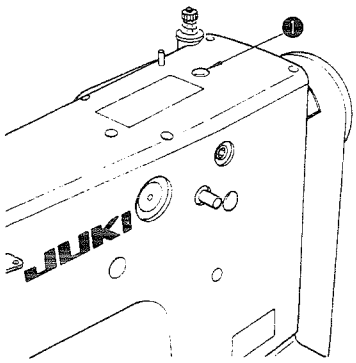
1. Do not hold belt cover ❶ or throat plate auxiliary cover ❷ (in case of Model AMS-206C) when carrying your AMS-205C/206C.

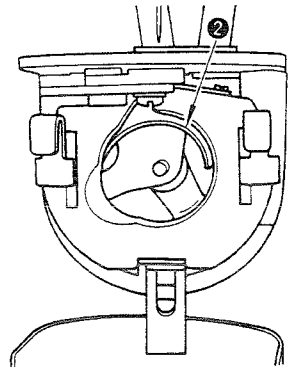


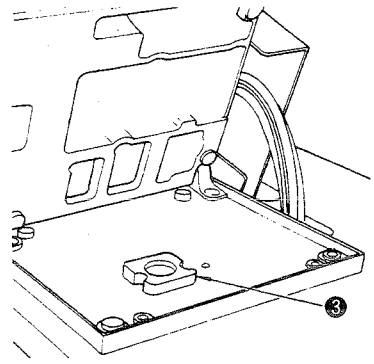
2. The sewing machine should run counterclockwise (in the direction of the arrow) as observed from the pulley side. Never allow the machine to run in the reverse direction.



3. Be sure to supply oil until the oil level reaches the red mark of oil gauge ❶. After that, refill the machine with oil up to the red mark once a day.







4. Before starting the machine which has been newly set up or has not been used for a long period of time, apply a few drops of the lubricating oil to the crank assembly through hole ❶, one drop to racing surface ❷, and infiltrate sufficient amount of the lubricating oil to machine bed oil felt ❸.

CONTENTS

1. FEATURES

1. Easy pattern change
   The work holder is driven by a stepping motor. A stitching pattern change can be completed simply by specifying the pattern number affected.
2. Wide range of pattern scale
   The X scale and Y scale can be independently set from 0.01 to 2.55 times the size of the original pattern and this permits highly flexible pattern enlargement and reduction.
3. Easy pattern input
   Pattern data can be easily entered using JUKI compact programming devices (PGM-1, PGM-2B, PGM-5) which are available as options. On-line is possible.
4. EEP-ROM to memorize pattern
   EEP-ROM is used for memory storage. The EEP-ROM can store 32 patterns with the maximum stitches of 3000 for pattern.
5. Easy operation and better design
   Push switches and rotary switches are used for easier operation. The operation section is installed in the control box which is located under the table so that users can take advantage of more space and appreciate easier operation.
6. Consistent sewing quality
   A stepping motor is used for material feed, so minute control is possible. The most appropriate feed timing can be selected according to the material by DIP switches in the control box.
7. Toggle switches employed for higher production
   The toggle switch for the starting speed of the sewing machine will increase the productivity depending on the combination of material and thread.
8. Provided with safety and testing facilities
   The AMS-205C and AMS-206C are designed to give error indication upon detection of troubles, enabling the operator to identify the problem at a glance. In addition, the machine incorporates facility for testing the switches and other functions. This facility is useful for quick troubleshooting.
9. Easy workpiece setting
   The second origin can be set as desired, so the operator does not have to care about the position of the needle point when setting another workpiece.
10. Assures stable stitch length regardless of sewing speed changes
    The AMS-205C and AMS-206C are designed to adjust the sewing speed for each stitch before feeding the material in order to provide the optimum feed timing for the sewing speed. This ensures consistent stitch lengths for any sewing speeds.
11. Allows cylinder bed sewing (AMS-206C)
    The AMS-206C can be used for cylinder bed sewing by removing the throat plate auxiliary cover.
12. Capable of quickly responding to material changes
    A needle of DP x 17 is used for sewing heavy-weight materials, and a DP x 5 for sewing light-weight materials. However, this needle change requires no needle bar change.
13. Permits easy bobbin winding
    The bobbin winder is easily accessible to allow easy bobbin winding.
14. Enhanced sewing performance
    Sewing operation is greatly improved with the detector for the breakage of needle thread.
15. Shortage sewing cycle
    The work clamp foot will automatically return to the sewing start position upon completion of a sewing cycle, resulting in a shortened sewing cycle.
16. Allows a variety of pattern sewings
    Twelve different instructions can be stored in the EEP-ROM that enables various bartackings.
17. Accommodates an LK-980 work clamp foot
    A work clamp foot for LK-980 can be used for the AMS-205C and AMS-206C by using an auxiliay feed plate.
18. Reliable feeding frame
    The stroke of the feeding frame solenoid plunger stays consistent regardless of any changes in fabric thickness. This eliminates magnetic loss, leading to reliable operation of the solenoid. Further, by adjusting the feeding frame mechanism, a constant pressure can be obtained.
19. Consistent sewing speed
    A 400W, 4-pole and 550W 2-pole (GL-type) motor used for driving the sewing machine allows the use of a standard pulley and also assures consistent sewing speed.
20. Easy needle threading
    The needle threading switch makes the needle threading easy and safe; even when the start switch is turned ON, the main shaft will not rotate if the threading switch is activated.
21. Improved safety
    Reverse detector prevents from troubles caused when rotating in reverse.

22. Sewing speed is increased.
    A high-torque stepping motor enables the sewing machine to run at a speed as high as 2,000 s.p.m. (when the stitch length is set to 3 mm or less)
23. The lifting amount of the right- and left-hand sections of the feeding frames can be separately adjusted. (Only for the L type)
    The lifting amount of the right- and left-hand sections of the feeding frame can be separately adjusted in accordance with the shape of the sewing product. You can change the settings required to operate the feeding frame including which one of the right- and left-hand sections of the feeding frame comes down earlier than the other.
24. The compressor unit can be attached to the sewing machine after the set-up. (Only for the L type)
    The compressor unit is optionally available. You may attach it to your AMS-206CSL, AMS-206CHL and AMS-206CGL with no additional machining.

• For sewing heavy-weight materials (GL type)

25. The machine incorporates a semi-rotary, double-capacity shuttle.
    The machine comes with a semi-rotary, double-capacity shuttle, thereby further reducing the frequency of replacing the bobbin.
26. The machine is ideally suited for sewing heavy-weight materials.
    Thanks to the improved thread take-up lever, the machine is capable of sewing heavy-weight materials more smoothly.
27. The machine is equipped with a thread trimming device which is designed to cut thick threads.
    The thread trimming device is capable of cutting thick needle thread and thick bobbin thread. (Thick thread equivalent to Spun #2, Ticket #6 or Tex #440 by English yarn count)
28. The machine comes with a large silicon oil tank.
    The machine is equipped with a large silicon oil tank as a standard accessory.

2. SPECIFICATIONS

The specifications of the AMS-205C and AMS-206C (compact electric cycle machines) are as shown below:

1) Seam length ..... X(lateral) direction: 50mm (1.968")
Y(longitudinal) direciton: 40mm (1.574")

2) Max. sewing speed ..... 2,000 s.p.m. (provided the stitch length is 3mm (0.118) or less)

3) Stitch length ..... Max. 6.2mm (0.244") (Adjustable in 0.2mm (0.007") increments)

4) Feed by work clamp foot ..... Intermittent feed (2-shaft drive by stepping motor)

5) Needle bar stroke ..... 41.2mm (1.622")

6) Needle ..... DP x 5 (AMS-205C),
DP x 5 and DP x 17 (AMS-206C)

7) Lift of feeding frame ..... 205C: 12mm (0.472") (standard),
18mm (0.708") (maximum)
206C: 17mm (0.669") (standard),
18mm (0.708) (maximum)

8) Stroke of intermediate presser ..... 6mm (0.236")

9) Lift of intermediate presser ..... 9.5mm (0.374") 14mm (0.551") (GL type only)

10) Shuttle ..... Semi-rotary, large shuttle, self-lubricated type (Models excluding the GL type)
Semi-rotary, double-capacity shuttle self-lubricated type (GL type only)

11) Bobbin case ..... Bobbin case for semi-rotary, large shuttle (Models excluding the GL type)
Bobboin case for semi-rotary, double- capacity shuttle (GL type only)

12) Bobbin ..... Designed for large shuttle (Models excluding the GL type)
Bobbin for double-capacity shuttle (GL type only)

13) Lubricating oil ..... New Defrix Oil No. 2 (supplied by oiler)

14) Thread trimmer ..... Consists of moving knife and counter knife (driven by grooved cam)

15) Wiper ..... Magnetically driven (with release switch)

16) Intermediate presser lifting method

.... S type: Magnetically lifted (with the reset switch)
.... L type: Air cylinder-driven vertical movement
(with the reset switch)

17) EEP-ROM memory storage, for storing pattern data

.... Memory capacity: 8K bytes
.... Memory pattern : Maximum of 32 different patterns can be stored with 3000 stitches per pattern/ EEP-ROM

18) Sewing start/end ..... The machine starts or ends at the sewing start point or the 2nd origin.

19) Actuation of feeding frame ..... Pressing on the pedal switch 1 (PK-57) to level-1 moves the feeding frame down and releasing the switch moves the feeding frame up.
(For the S type only. For the function of foot pedal switch of the L type machine, separately refer to the description of the foot pedal switch.)

20) Starting the machine ..... The machine is started by pressing on the pedal switch 1 (PK-57) to level-2 and turning on the threading switch.
(For the S type only. For the function of foot pedal switch of the L type machine, separately refer to the description of the foot pedal switch.)

21) Stop facility (AMS-206C)

.... Used to stop machine operation during a stitching cycle.
After a stop, the work clamp foot can be started along the stitching line by operating the "Backward" or "Forward" switch.
The interrupted stitching cycle can be completed by pressing the start switch.
Alternatively, the "Return to origin" switch may be pressed for quick movement to the sewing start point or the 2nd origin after trimming a thread after a stop.

22) Enlarging/reducing facility ..... Allows a pattern to be enlarged or reduced on the X axis and Y axis, independently when sewing a pattern.
Scale: 0.01 to 2.55 (adjustable in 0.01 steps)

23) Enlarging/reducing method ..... Pattern enlargement/reduction can be done by increasing/decreasing stitch length.
The reference point for enlargement/reduction of a pattern can be set to the sewing start point or the 2nd origin as well as the mechanical origin.

24) Max. sewing speed limitation ..... If necessay, the max. sewing speed can be limited to any desired value within a range of 180 to 2,000 s.p.m., using the externally accessible control knob.

25) Pattern selection ..... 1 to 99 patterns (1EEP-ROM 32 patterns) can be selected by specifying the desired pattern number(s).
26) Pattern checking facility ..... A pattern configuration can be checked by operating the "Backward" or "Forward" switch when the work clamp foot lowering switch is on.
27) Error indication ..... Three LED indicates 11 kinds of errors.
28) Programming ..... Involves point numeral data, pause, thread trim, jump data, sewing speed data.
29) Second origin ..... Can be set by inputting as part of the pattern data.
30) Sewing machine motor ..... 400W, 4-pole electronic-stop motor (Models excluding the GL type)
550W, 2-pole electronic-stop motor (only GL type)

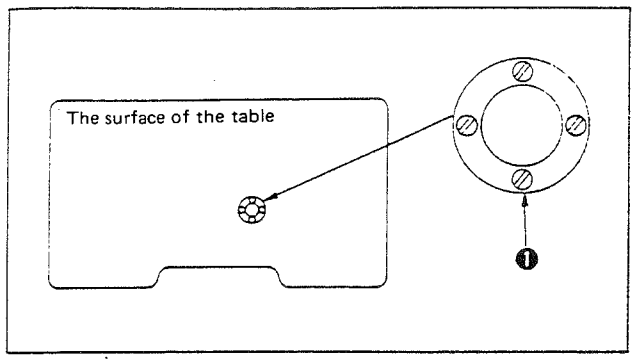
31) Dimensions (excluding the thread stand)
.... 205C: 1200mm (47.244") (W) x 675mm (26.574") (L) x 1130mm
.... (44.488") (H: without casters) 1210mm (44.637") (H: with casters)
.... 206C: 1200mm (47.244") (W) x 705mm (27.755") (L) x 1130mm
.... (44.488") (H: without casters) 1210mm (47.637") (H: with casters)
32) Gross weight 205C: 120kg 206C: 125kg
33) Power consumption 900VA
34) Compressed air pressure ..... L type models (pneumatic feeding frame type)
excluding the GL type: 2 to 2.5 kg/cm^2
GL type only: 5 to 5.5 kg/cm^2
35) Air consumption ..... L type models (pneumatic feeding frame type)
excluding the GL type: 0.8 ℓ /min.
GL type only: 1.8 ℓ /min.
36) Power requirements ..... Rating ± 10 % 50/60 Hz

3. HOW TO USE THE AMS-205C AND AMS-206C

3-1 Installation of the sewing machine

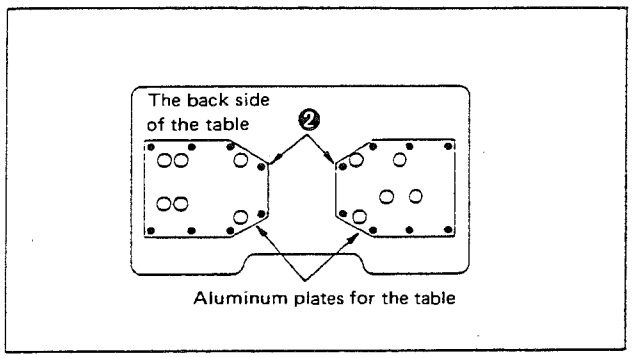
(1) Installation of the legs

1) Oil-drain



1) Insert the oil-drainer into the hole for the drainer in the center of the table surface.
2) Fix the oil-drainer onto the table with the wooden screws ❶. (4 holes)

2) Aluminum plates for the table

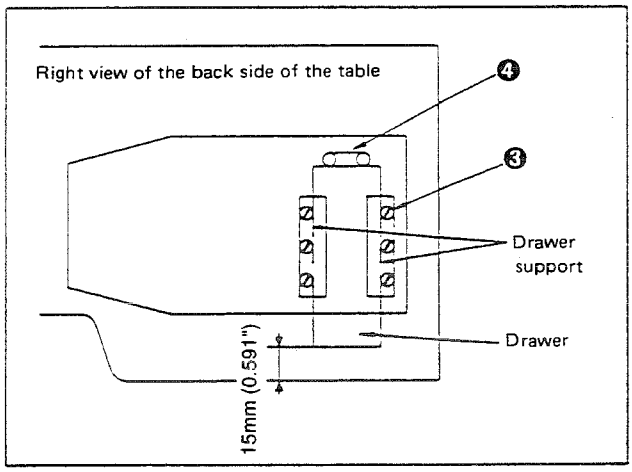


1) Place 2 pieces of the aluminum plates on the back side of the table.

(Note) Make sure that the outline circle-indicated holes of the plates are aligned with the corresponding holes of the table.

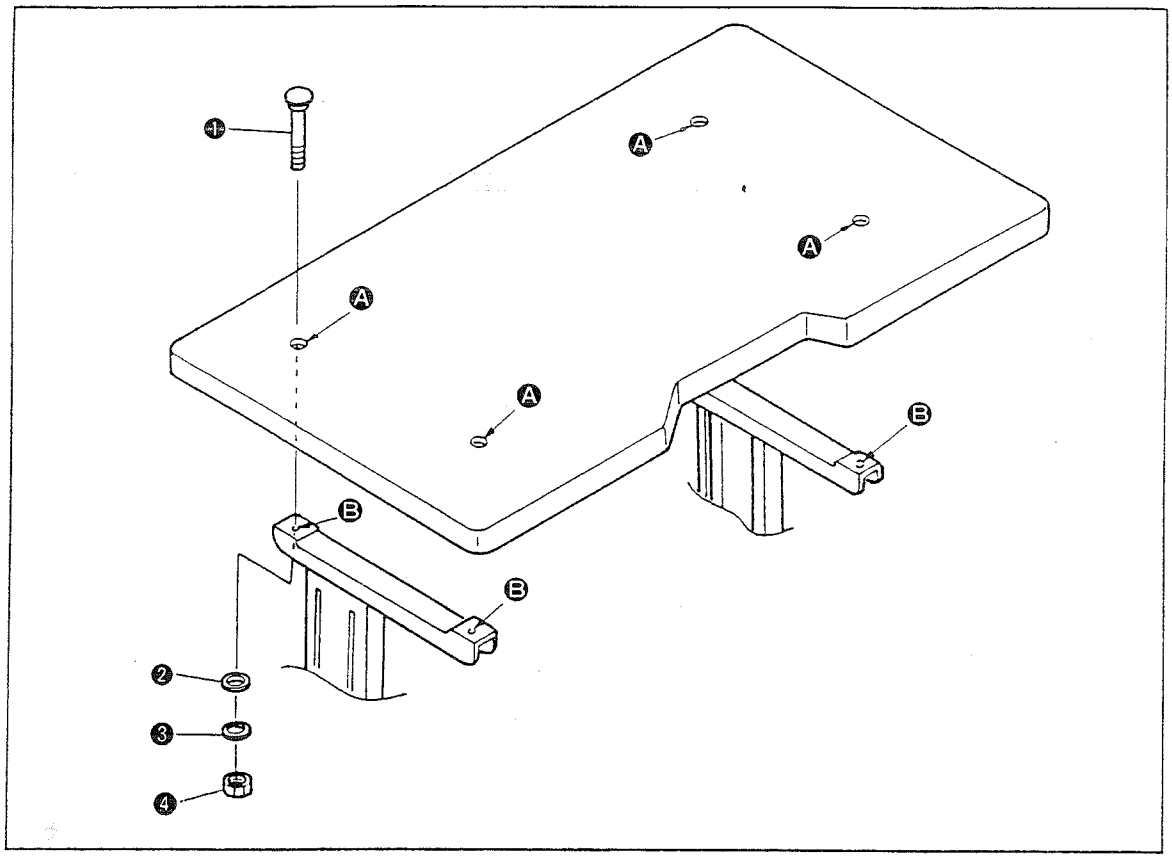
2) Fix the aluminum plates with nails ❷. The nailing position is indicated with black dotts in the chart. (Nine holes on each side, left and right)

3) Drawer



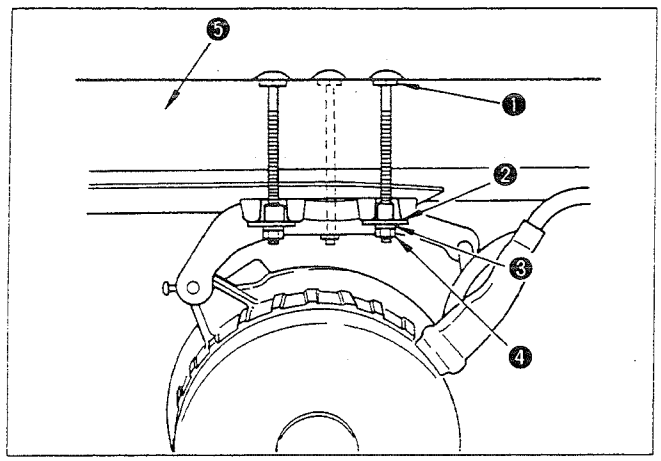
1) Set the drawer support under the right side of the table by aligning the holes of the drawer support with the holes of the aluminum plate.
2) Fix the drawer support with the wooden screw ❸. Then confirm that the drawer moves smoothly.
3) Place the drawer stopper ❹ so that it is aligned with the holes on the aluminum plate and hammer it in.
The drawer should stay 15 mm (0.590") inside from the front side of the table when the drawer is touching the stopper.

4) Installation of the legs



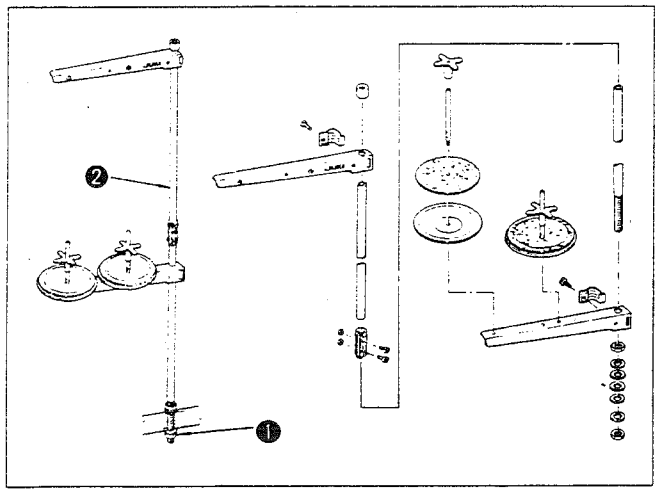
1) Match the holes Ⓐ on the table and the holes Ⓑ on the legs.
2) Insert four joint bolts ❶ into the table and hammer them in lightly.
3) Screw in the washer ❷, spring ❸ and nut ❹.

(2) Installing the motor



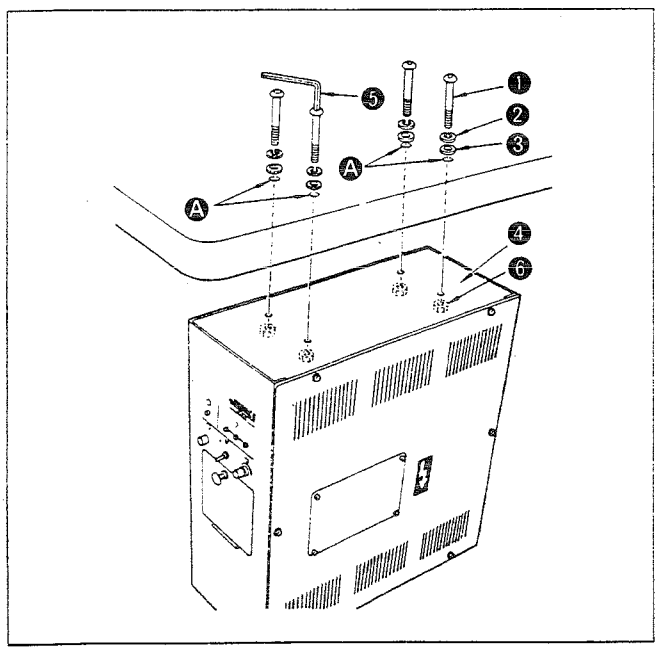
1) Attach the motor to the machine table ❺, using bolt ❶, flat washer ❷, spring washer ❸, and hexagon nut ❹ as shown in the figure.
2) When tightening the locknut, be sure that the motor pulley V groove meets the hand-wheel V groove.

(3) Installing the thread stand



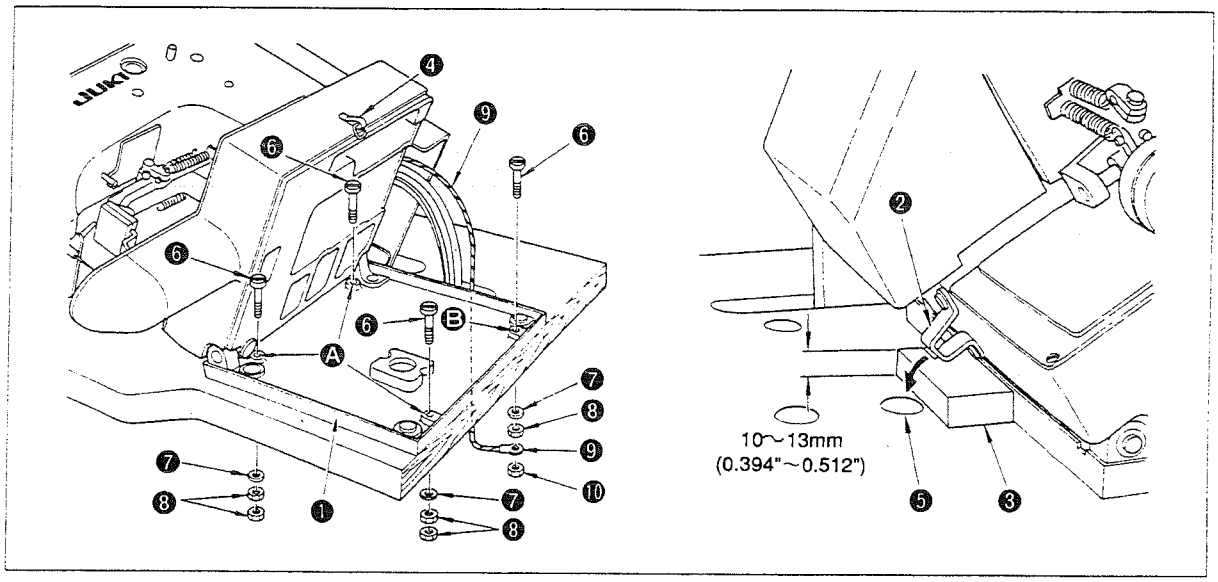
Assemble the thread stand, and put it in the hole in the top right corner of the machine table.
Tighten locknut ❶ to fix the thread stand.
When ceiling wiring is possible, pass the power cord through spool rest rod ❷.

(4) Installing the control box



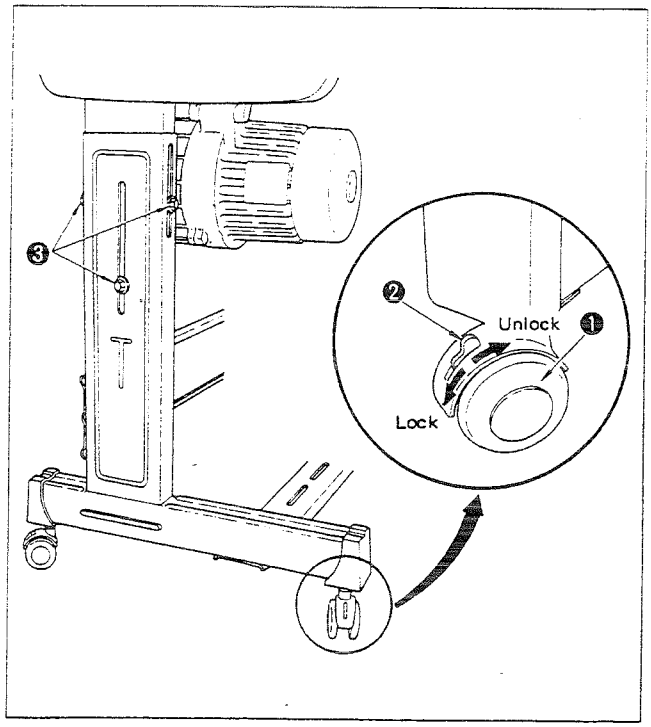
1) Attach bolts ❶, spring washers ❷, flat washers ❸ to four holes Ⓐ in the machine table.
2) Align four holes in the surface of control box ❹ with bolts ❶, and fix the bolts with hexagonal wrench (4 mm (0.157")) ❺ from the surface head of the bolts ❶.
3) Fix the bolts from the inside of control box ❹ with nuts ❻.

(5) Installing the machine head



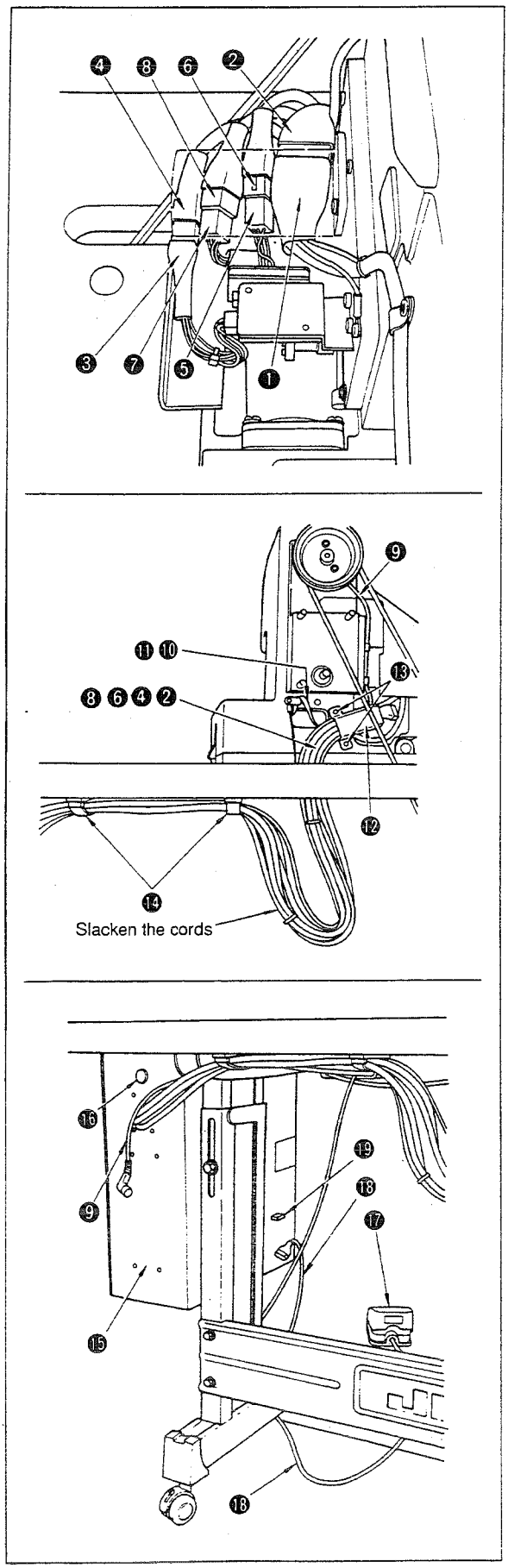
1) Align holes Ⓐ and Ⓑ in bed mounting base ❶ with the four holes in the machine table, and fix the sewing machine on the machine table.
2) Place "pad" ❸ which is 10mm (0.394") to 13mm (0.512") thick under machine head supporter ❷.
3) Release snap lock ❹, and tilt the machine head down, as illustrated. Make sure that machine head supporter ❷ touches motor attaching bolt ❺.
   Note : Take enough care to tilt the machine head, since the bed mounting base has not been fixed yet.
4) Insert bolts ❻ supplied with the machine into the holes in the bed mounting base, then fix each bolt with a washer ❼ and nuts ❽ from under the machine table.
5) Attach the end of the grounding cord ❾ pulled out under the table to bolt ❻ of point Ⓑ (marked with ⏚) with inserting nut ❿.

(6) Installing the machine stand



1) Install the machine stand on a flat place.
2) Move down lever ❷ to lock caster ❶.
3) Use six bolts ❸ to adjust the table height. Be sure to remove the machine head for safety before adjusting the table height.
4) Loosen the nuts to level the stand.

(7) Connecting the cords



❶ **Solenoid head side connector**
(15P, Connector cover color : Black)

❷ **Solenoid relay cord side connector**
(15P, Connector cover color : Black)

❸ **Sensor head side connector**
(15P, Connector cover color : Blue)

❹ **Sensor relay cord side connector**
(15P, Connector cover color : Blue)

❺ **X-stepping motor head side connector**
(6P, Connector color : Blue)

❻ **X-stepping motor relay cord side connector**
(6P, Connector cover color : Blue)

❼ **Y-stepping motor head side connector**
(6P, Connector color : White)

❽ **Y-stepping motor relay cord side connector**
(6P, Connector cover color : White)

★ **Head side**

1) Insert to connect each of the individual connectors ❶ ~ ❽ until it would not go any further, matching each color as mentioned above.

2) Bind cords ❷, ❹, ❻, ❽, synchronizer cord ❾, X-sensor cord ❿, and intermediate presser magnet cord ⓫ together, put them into cord cover ⓬, and fix cord cover to bed with setscrews ⓭.
Make sure that no cord is caught between the cord cover and the bed, when fixing the cord cover to the bed.

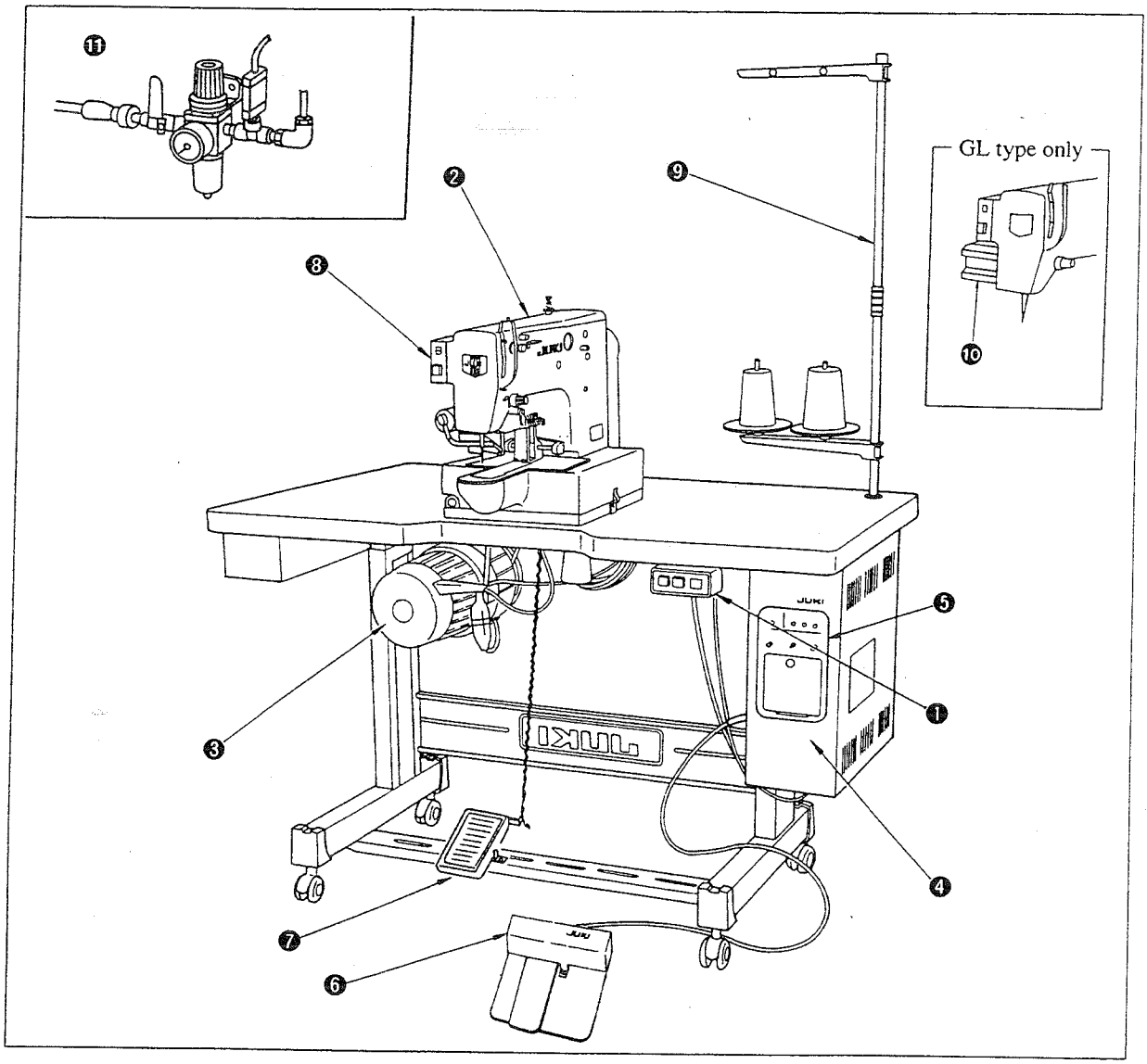
3) Slacken the cords which has been bound, and pass them through two cable clips ⓮.

★ **Control box side**

4) Insert synchronizer cord ❾ into connector ⓰ on cotrol box ⓯.

5) Insert cord ⓲ of foot switch ⓱ into connector ⓳.

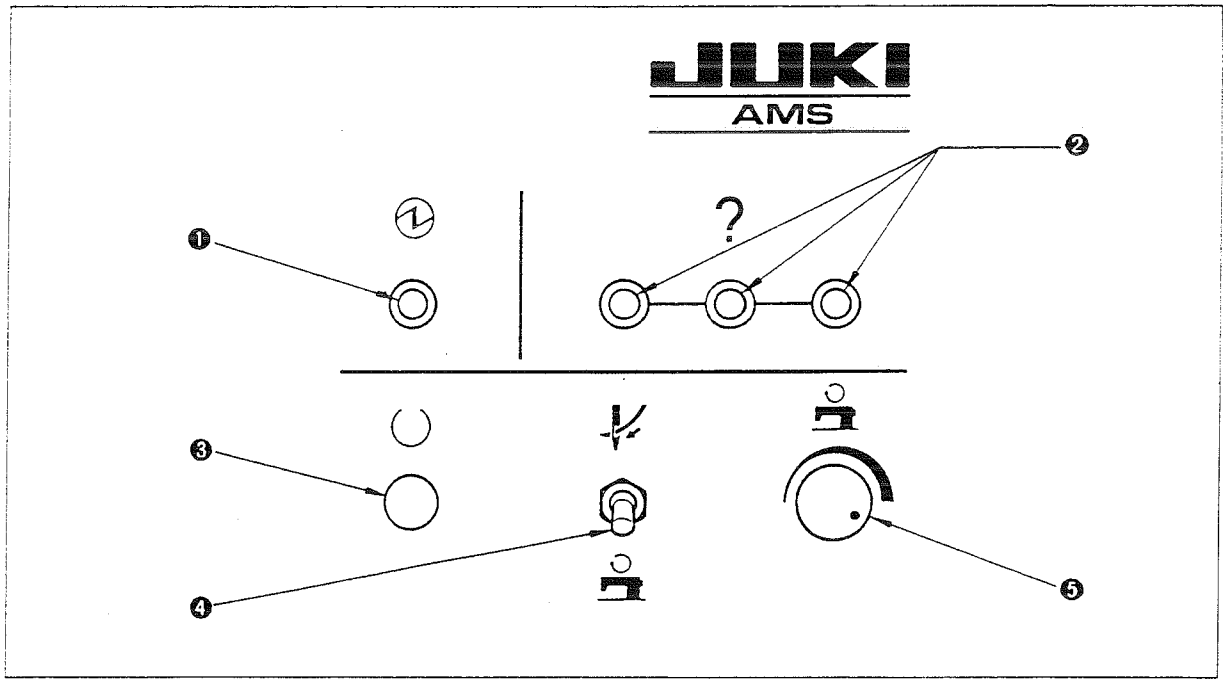
3-2 Names of main component units

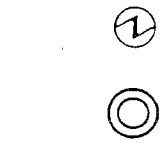
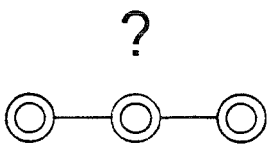


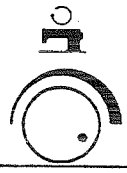
❶ Power ON/OFF switch
❷ Machine head
❸ Sewing machine motor
❹ Control box
❺ Operation section
❻ Foot switch PK-57 (L type uses the 3-pedal unit (PK-47))
❼ Feeding frame lowering pedal (Optionally prepared for the S type machine)
❽ Stop switch (only AMS-206C)
❾ Thread stand
❿ Intermediate presser lifting cylinder (GL type only)
⓫ Air control unit (L type only)

3-3 Control box

(1) Operation panel

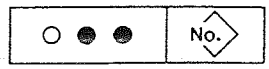
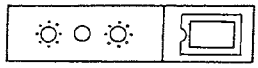
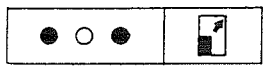
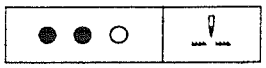
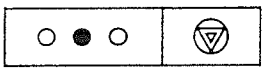
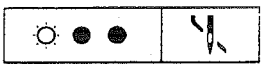
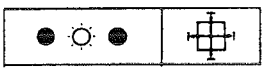
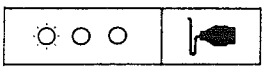
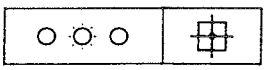
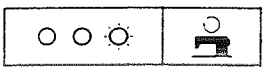
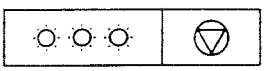
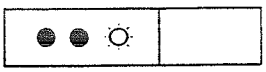


Panel indication	Function and operation
	❶ **Power indicator lamp LED (Green)** Pilot lamp indicating ON/OFF of the power switch. Lights when the power switch is turned ON.
	❷ **Error LED (Red)** These three LED indicate incorrect operation, incorrect pattern setting, and disorder of the machine unit. See "Error indications" for details. When sewing operation is performed in good order, the three LED lamps do not light.

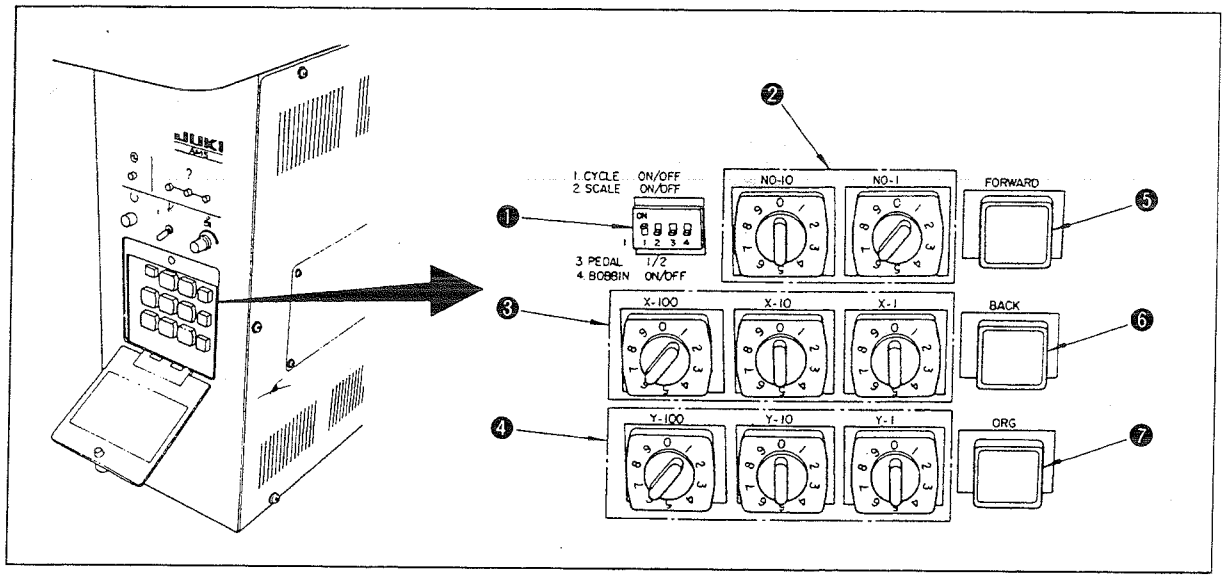
Panel indication	Function and operation
	❸ **Set Ready switch** Enables the machine to perform sewing work by reading pattern numbers and other conditions which have been set for sewing. Be sure to press the Set ready switch when turning the power switch ON, or after having set the pattern numbers for operation and enlarging/reducing scale of the original pattern size on X-Y axis. By pressing this switch, the following procedures will be performed. 1. Check whether data EEP-ROM stores the data of selected pattern No. 2. Check whether the stitch length exceeds maximum of 6.2 mm (0.244") through arithmetical operation using enlarging/reducing scale on X-Y axis. 3. The feeding frame comes down from a desired position, refers the origin, moves to the sewing start point, then lift up. 4. Put out all the lamps of Error LED, and permit the machine to perform the sewing operation. **(Notes) ① Be sure not to put your fingers under the feeding frame, for the feeding frame comes down automatically after completing 1. and 2. procedures mentioned above.** **② In case there is no change of pattern No. or enlarging/reducing scale on X-Y axis when turning the power switch ON, the patterns which have been set for the previous sewing operation will be performable by turning the Set ready switch ON.** **③ If there is something wrong with the procedures 1., 2. and 3., Error LED will light up and the following jobs shall be interrupted.** **See "Error indications" for the release from the error.** **④ In case the foot switch is treadled without turning the Set ready switch ON, in spite that the set data for operation has been changed after turning the power switch ON or during sewing, three lamps of Error LED will light up to indicate to turn the Set ready switch ON.**
	❹ **Needle threading switch (Intermediate presser lowering switch)** 1. Intermediate presser lowering mechanism When sewing operation is performable, the feeding frame and intermediate presser comes down to make needle threading work easier by pressing the switch . Then pressing the switch lifts up the feeding frame and intermediate presser to make sewing operation performable. 2. Thread trimming mechanism In case the operation is forced to be stopped with stop switch, thread trimming control function will not be effective. By pressing these switches / , thread trimming will be performed and make the switches of Forwarding, Backwarding, Return to origin, effective. 3. Upper position reset mechanism In case that the intermediate presser is moved from its standard upper position after the Set ready switch has been turned ON and all the lamps of Error LED has been turned OFF, pressing the switches / returns the intermediate presser to its standard upper position.
	❺ **Max. sewing speed limiting knob** Sewing speed is automatically limited in accordance with the input data of stitch length or sewing patterns. In case that lower sewing speed is required, turn the knob counterclockwise.

★ **Error indications**

● .....light OFF　　○ .....light ON　　☼ .....Flicker

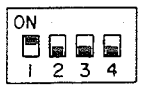
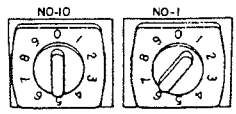
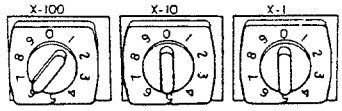
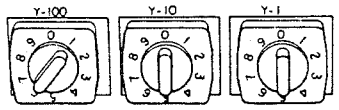
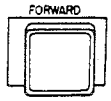
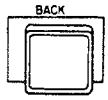
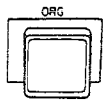
No.	Error indication	Description of error	How to reset
1	Pattern No. error 	Appears when EEP-ROM have not stored the data for the pattern No. which is selected to be set. Appears when some trouble has resulted in a read error.	Set a correct pattern. No. Check EEP-ROM of MAIN circuit board in control box. (Check whether direction of pin is right, or set securely.)
2	Pattern data error 	Appears when the data EEP-ROM comes off the receptacle or it is improperly connected to the receptacle during sewing.	Turn OFF the power switch. Then connect the data EEP-ROM to the receptacle in the correct manner.
3	Enlargement error 	Appears when the stitch length exceeds 6.2 mm (0.244") or when enlargement scale exceeds 255 times.	Correctly reset the enlarging scale on X and/or Y axis.
4	Needle up error 	Appears when the needle is not in its highest position.	1. Turn the handwheel until the error indication disappears. 2. When sewing operation is performable, the machine will rotate automatically until the needle stops in its highest position by pressing the needle threading switch. (Be sure not to place anything under the needle because the machine rotate automatically.)
5	Stop error (Stop switch is supplied with AMS-206C as a standard equipment.) 	Appears when the stop switch is turned ON. turned ON.	1. Turn the start switch ON again. 2. Press the needle threading switch.
6	Thread breakage error 	Appears when the needle thread has broken.	Re-thread the machine head, press Return to origin switch and Forward or Backward switch before pressing the start switch.
7	Travel limit error 	Appears when the maximum sewing area 50 mm (1.968") x 40 mm (1.574"), during sewing operation or confirming job.	Releases by pressing Return to origin switch.
8	Solenoid connector error 	Appears when some poor connection of a solenoid connector has been detected.	Turn the power switch OFF, and check for loose solenoid connectors.
9	Retrieving origin error 	Appears when the origin cannot be retrieved after the Set ready has been turned ON.	Check the X and/or Y sensors. (check input and output of the sensors) Check the connectors of X and/or Y stepping motor and the stepping motor.
10	Reverse rotation error 	• Appears when the sewing machine rotate to the reverse direction. • Appears when the sewing machine will not rotate, or some trouble has been detected in the synchronizer.	1. Change the motor rotaing direction. 2. Check the synchronizer.
11	Machine lock synchronizer error 	Appears when the sewing machine will not rotate, or some trouble has been detected in the synchronizer.	1. Check whether the belt comes off the pulley. 2. Turn the power switch OFF. Check the parts for those out of order, to replace with good ones. Check for the trouble causing the machine locked, and remove it. Then turn the power switch ON.
12	 Air pressure drop error (for the sewing machine using pneumatic components)	The compressed air is not supplied to the machine. Or the air pressure drops under the specified value.	Supply the normal compressed air to the machine.

(2) Operation panel switches and functions

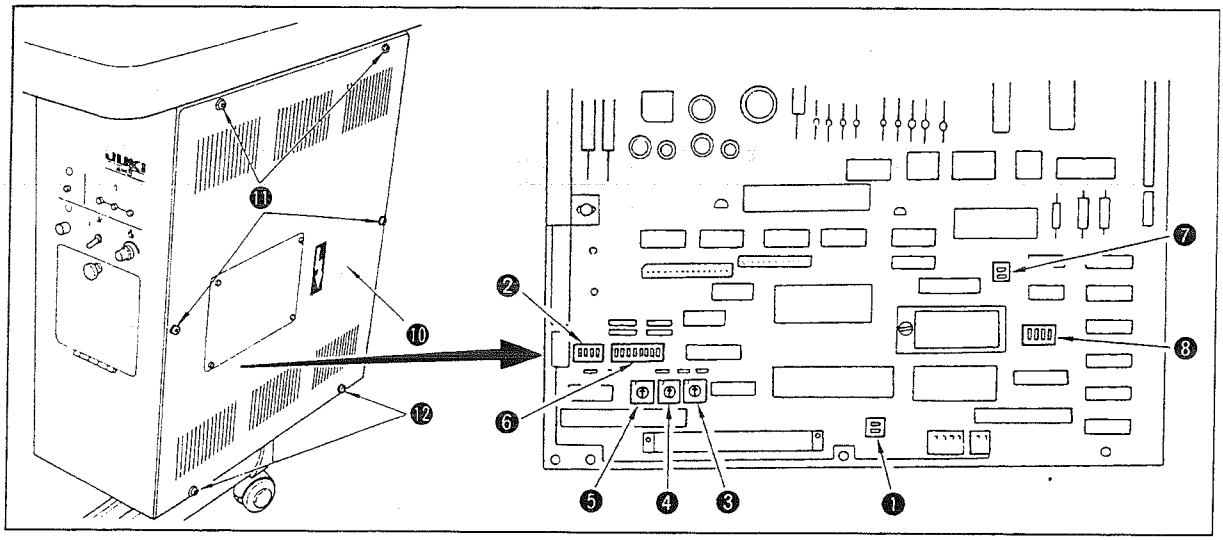


Open the lid of the control box, there are switches ❶ - ❼ on the operation panel. The function of switches are as follows:

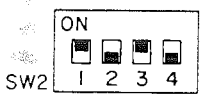
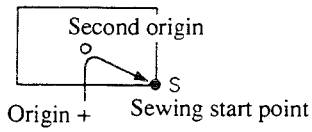
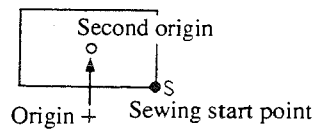
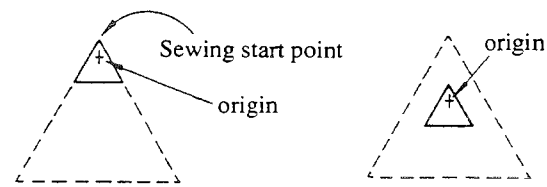
Name of switch		Function
❶ **DIP switches** 1. CYCLE ON/OFF 2. SCALE ON/OFF ON 1 2 3 4 3. PEDAL 1/2 4. BOBBIN ON/OFF	1	• **Cycle sewing ON/OFF switch** Selects either lifting the feeding frame or keeping it lowered up on an order of pause in a pattern data. ON ..... Feeding frame goes up when a pattern sewing operation is temporarily stopped. (Factory-set) This function permits a replacement of workpieces. It will lead to higher productivity. The sewing operation re-starts by pressing the presser start switch. OFF ... Feeding frame stays lowered when a pattern sewing operation is temporarily stopped.
	2	• **Scale ON/OFF switch** Selects whether scale setting switch is effective, or ineffective. ON .... Scale setting is ineffective. If you try to set scale for a pattern, the pattern remains its original size. OFF ... Scale setting is effective on X and/or Y axis. (Factory-set)
	3	• **Pedal selector switch** To be selected depending on the type of foot switches. ON .... In case of using optional a- pedal switch asm. (M85905100A0), select ON side of this switch. Work clamp foot will stay lowered, when you release the pedal. (Two-pedal method) OFF ... In case of using standard foot switch. (Factory set) One treadle on the pedal lowers the work clamp foot. Another treadle on the pedal actuates the machine.

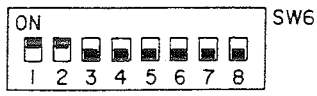
Name of switch		Function
❶ **DIP switches** 1. CYCLE ON/OFF 2. SCALE ON/OFF  3. PEDAL 1/2 4. BOBBIN ON/OFF	4	• **Bobbin thread winder ON/OFF switch** Selects either normal sewing operation or bobbin thread winding. ON .... Bobbin winding. When this switch is set to "ON" while the sewing machine is not engaged, the feeding frame and the intermediate presser will automatically come down. Then the sewing machine starts running at a constant speed to wide the bobbin when the start switch is depressed. To stop the bobbin winding, depress the start switch again, or set the bobbin winder switch to "OFF", or press the stop switch "ON". (Note) Prior to bobbin winding, make sure that there is nothing under the needle. OFF ... Normal sewing operation. (Factory-set)
❷ **Pattern No. setting switch** 		Selects a pattern or patterns which have been stored in the EEP-ROM.
❸ **X Scale setting switch**  ❹ **Y Scale setting switch** 		Taking a pattern written in the EEP-ROM as 100%, the original pattern can be enlarged or reduced in the X-axis and/or Y-axis independently within a range of 1%~255%. Two kinds of references; one is the origin, another is sewing start point, which are to be selected by the DIP switches on the MAIN printed circuit board in the control box. **(Note) 1. Whenever a pattern has been enlarged/reduced, make sure that the needle will not hit the work clamp foot by checking the motion of the needle with FORWARD/BACKWARD switch.** **2. With the Scale switch set to "Increase/decrease of stitch length",pattern enlargement cannot be done if the stitch length exceeds 6.2 mm (0.244"). Maximum limit for enlarging scale is 255%.**
❺ **FORWARD switch**  ❻ **BACKWARD switch** 		When the FORWARD switch is pressed with the feeding frame down, the material is fed forward by one stitch. When the BACKWARD switch is pressed with the feeding frame down, the material is fed backward by one stitch. If these switches are kept depressed, the material is fed slowly for the first one stitch, after which it is automatically fed quickly. • Check the operation Make sure that needle does not hit work clamp foot, after setting of switches on the operation panel (Pattern No. X and/or Y scale) have been changed.
❼ **Return to origin switch** 		When this switch is pressed when checking the shape of a pattern, in the case of thread breakage or when turning ON the stop switch , the feed will automatically move to the sewing start position and the feeding frame go up and stop. **(Caution) When you wish to press the Return to Origin switch after turning ON the Stop switch, be sure to operate the Needle threading switch in advance.**

(3) DIP switches on the main printed circuit board



Remove four setscrews ⓫ on lid ⓭ of the control box, loosen two pieces of screws ⓬. Then remove lid ⓭ of the control box.
There are DIP switches ❶ - ❽ mounted on the MAIN printed circuit board.
The functions of the switches are as follows:

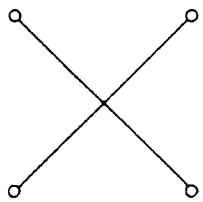
Name of switch	Function
❶ **DIP switch 1 (SW 1)** 	• **SW1-1** ..... Thread breakage detector ON/OFF ON .... The thread breakage detector does not work. OFF ... The thread breakage detector works. (Factory- set)
	• **SW1-2** ..... Not used.
❷ **DIP switch 2 (SW 2)** 	• **SW2-1** ..... Changes start point ON : Move to sewing start point (Factory-set) OFF : Move to the second origin  
	• **SW-2-2** ..... Actuates/stops the intermediate presser (AMS-206C only) ON .... The intermediate presser stops (*Be sure to remove the intermediate presser.) OFF ... The intermediate presser actuates. (Factory- set) ※ **AMS-205C ... Turning the SW2-2 ON shortens cycle time.**
	• **SW-2-3** ..... Enlarging/reducing the standard sewing start point and the standard origin. ON (Factory-set) OFF 
	• **SW-2-4** ..... Actuate/stops the wiper ON .... The wiper stops OFF ... The wiper actuates (Factory-set)

Name of switch	Function
⑥ DIP switch 6 (SW6) 	• **SW6-1, 2** ..... Selects cloth feed timing.

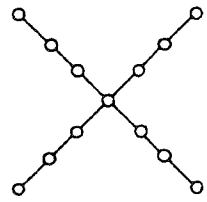
6-1	6-2	Material thickness
ON	ON	Below 2 mm (0.078") (Factory-set) (except GL type)
OFF	OFF	2 mm (0.078") or more but below 3 mm (0.118")
ON	OFF	3 mm (0.118") or more but below 4 mm (0.157")
OFF	OFF	4 mm (0.157") or more (GL type factory - set)

• **SW6-7** ..... Selects basting stitch
The needle enters into a material only at inflection points.
(This function enables to make stitches of which length is more than 6.2 mm (0.244"))

ON : Basting stitch



OFF : Normal stitch



(Factory-set)

• **SW-6-5,6** ..... Selects direction of a pattern, lengthwise and crosswise

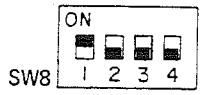
6-5	6-6	Direction of a pattern
OFF	OFF	Sewing start point, Origin Standard (Factory-set)
ON	OFF	Turn a pattern to the right direction by 90° around a sewing start point.
OFF	ON	Turn a pattern to the right direction by 90° around a sewing start point.
ON	ON	Turn a pattern by 180° round the origin.

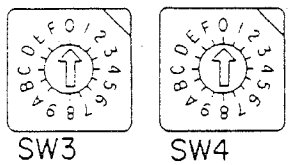
• **SW6-8** ..... Selects adequate sewing speed when sewing operation is started.

ON .... High speed : Set the switch to ON, when you require higher sewing speed for cycle sewing. It is to be noted that the high speed sewing might cause some troubles at sewing start, as a stitch skipping, or a thread slipping-off from the needle. Be careful in programming a new pattern, for such troubles depend on handling of a needle for a pattern, or a combination of a material cloth and a thread.

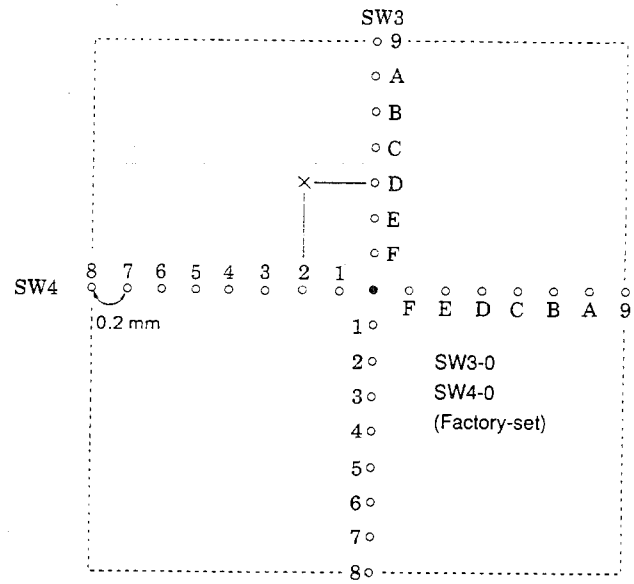
OFF ... Standard speed (Factory-set)

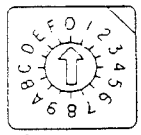
※ **Refer to SW8-3.**

Name of switch	Function
	● **SW6-3,4** Selects the thread tension releasing point (in trimming thread) **6-3** / **6-4** / **Thread tension releasing start point** ON / ON / Main shaft degree approx. 335° OFF / ON / approx. 343° ON / OFF / approx. 350° OFF / OFF / approx. 358° This function is to change the length of the needle thread which will remain on the needle. This is used with thread tension controller number 1 and the remaining length of the needle thread varies according to the thread kinds. Generally, the faster the point is reached, the longer the remaining needle thread is.
❼ **DIP switch 7 (SW7)** 	● **SW7–1** To select the type of EEP-ROM to be used. ON . . . For the 32K byte. Not used. OFF . . For the 8K byte. (Factory-set)
	● **SW7–2** Not used.
❽ **DIP switch 8 (SW8)** 	● **SW8-1** To select whether the air pressure detecting function is to be used. ON .... The air pressure detecting function will not work. OFF ...The air pressure detecting function will work. When the air pressure detecting function is used for the machine with the pneumatic double-step work clamp it will detect any drop in the air pressure, and the corresponding error will be displayed. Be sure to set this switch to its OFF position for a sewing machine with the pneumatic double-step work clamp.
	● **SW8-2** To switch over to the pneumatic double-step work clamp. ON .... The machine controls the pneumatic double-step work clamp. (L type factory-set) OFF .. Standard type (S type factory-set) { If the pressure of the work clamp is inadequate, set this switch to its OFF position to allow the air to increase the pressure. Both the left and right sides of the work clamp simultaneously go up and come down. **(Caution) If the air pressure is increased too much, an out-of-step error may result.**
	● **SW8–3** Initial sewing speed can be increased by using the SW8–3 in combination with the SW6–8. **6–8** / **8–3** / 1st stitch / 2nd stitch / 3rd stitch / 4th stitch / 5th stitch / 6th stitch OFF / OFF / 200 → / 600 → / 1000 → / 1400 → / 1800 → / 2000 → ON / OFF / 600 → / 600 → / 1000 → / 1400 → / 1800 → / 2000 → OFF / ON / 200 → / 2000 → ON / ON / *2000 →
	● **SW8-4** Used to change the action of the feeding frame at the sewing end between its ON state and OFF state. { ON ..... The feeding frame is kept lowered at the sewing end. (Turning ON the feeding frame switch raises the feeding frame.) OFF ... The feeding frame goes up at the sewing end. (This switch has been factory-set to the OFF position at the time of delivery.)

Name of switch	Function
❸ **Rotary DIP switch 3 (SW3)** ❹ **Rotary DIP switch 4 (SW4)**  	• **SW3** ····· Moves the sewing start point on the Y-axis. • **SW4** ····· Moves the sewing start point on the X-axis. Both SW3 and SW4 are set at "zero" as factory-set. Setting the switches when the power switch is ON moves the sewing start point, set to "zero" at the factory, within +1.6 mm (0.062") and −1.4 mm (0.055") in increments of 0.2 mm (0.007"). The sewing start point can be moved within the dashed lines illustrated by combining SW3 and SW4.

Switch setting	Compensation pulse number	Compensation amount (mm)
0	0	0
1	+1	0.2 (0.007")
2	+2	0.4 (0.015")
3	+3	0.6 (0.023")
4	+4	0.8 (0.031")
5	+5	1.0 (0.039")
6	+6	1.2 (0.047")
7	+7	1.4 (0.055")
8	+8	1.6 (0.062")
9	−7	−1.4 (−0.055")
A	−6	−1.2 (−0.047")
B	−5	−1.0 (−0.039")
C	−4	−0.8 (−0.031")
D	−3	−0.6 (−0.023")
E	−2	−0.4 (−0.015")
F	−1	−0.2 (−0.007")

Name of switch	Function
	 (Example) Set SW3 to "D" and SW4 to "2" when you want to move the sewing start point to the X point (as shown in the diagram). **(Note) This function is only intended for making temporary minute adjustments when the origin is wrong or the work clamp is not pressed properly. Therefore, leaving these switches at positions other than "zero" when sewing other patterns or making patterns will cause problems such as hitting the work clamp foot or non-indication of the position. Please exercise caution when using these switches.**

Name of switch	Function
❺ Rotary DIP switch 5 (SW5)  SW5	● **SW5-1 to -5** Checking input Checks each switch and sensor. 1) Set SW5 from "1" to "5" on the dial, and turn the power switch ON. 2) While the individual signals are inputted, SW5, in each step of the set value, serves to check the inputs of the signals by lighting up the error LED. The details of the signals to be checked are shown in the following chart. 3) After checking the input, be sure to set SW5 to the "zero" position on the dial.

Display LED / Set value of SW5	?		
1	Air detection signal	X origin sensor	± X limit sensor
2	± Y limit sensor	Y origin sensor	Switch of work clamp 2
3	Forward switch	Backward switch	Return to origin switch
4	Switch of work clamp 1	Start switch	Thread breakage detection signal
5	Up detection signal	Down detection signal	Stop switch

● **SW5–6** Checking speed

Check the sewing speed according to the length of stitches.

1) Set SW5–6 then turn the power switch ON.
2) Set the Pattern number switch on the operation circuit board as the chart shown below.
3) Let the sewing machine rotate by lowering the work clamp foot with the foot switch.
4) Stop the sewing machine using the foot switch. (The AMS - 206C model of the sewing machine also stops running when the Stop switch is turned ON.)
5) Measure the speed by repeating 2) to 4).

Pattern No.	Revolution
02	180 spm ±2 spm
06	600 spm $^{+0}_{-150}$ spm
10	1000 spm $^{+0}_{-150}$ spm
12	1200 spm $^{+0}_{-150}$ spm
14	1310 smp $^{+45}_{-60}$ spm
16	1600 spm $^{+0}_{-150}$ spm
18	1800 spm $^{+0}_{-150}$ spm
21	1910 spm $^{+45}_{-60}$ spm

※ A tachometer is nescessary to measure the sewing speed.

Name of switch	Function
	• **SW5–7** Checking the origin For checking the position of the origin 1) Set SW5 to "7" on the dial with the power switch OFF. Then turn the power switch ON. 2) Treading the foot switch lowers the feeding frame, automatically refers to the origin, stops at the origin, and raises the feeding frame. 3) After checking the position of the origin, be sure to set the SW5 to "zero" on the dial. **(Note) Run the sewing machine for normal sewing operation, with SW5 at "zero."** • **SW5–8** Continuous operation 1) Set SW5 to "8" on the dial and turn the power switch ON. 2) Start the machine exactly as in normal sewing operation. 3) After stopping for 3 seconds after finishing sewing, it automatically starts continuous sewing. 4) Turn on the Stop switch or the foot switch ON to finish the continuous sewing. • **SW5–9, A** Adjusting the electric current of the stepping motor (9: X side, A: Y side) Adjusts exciting current of the stepping motor. An ammeter and relay cable are necessary for adjustment. • **SW5–C to F** Selecting the thread tension release start Turn on the thread tension releasing solenoid for an instant at the start of machine rotation.

Setting of SW5	Time of the thread tension releasing "ON"
C	200 ms
D	150 ms
E	100 ms
F	50 ms

This function prevents the thread, when the sewing is begun, from slipping through the needle due to the different kinds of threads used.

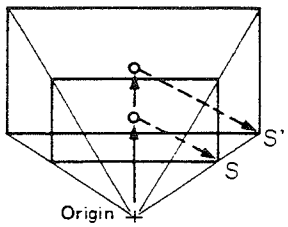
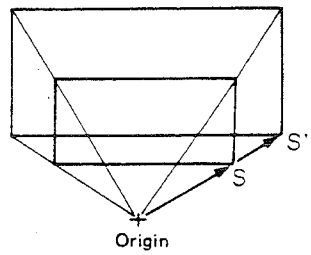
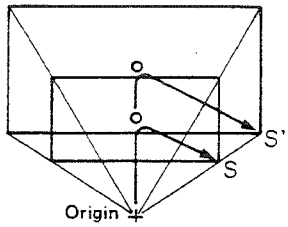
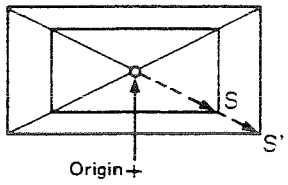
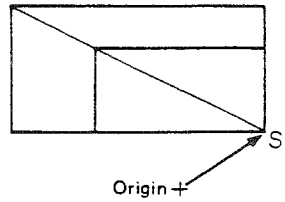
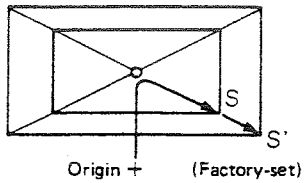
(Note) Rotary DIP switch SW5 is basically for test-programming and is usually set to "zero."
Carefully change the thread tension releasing switch whenever you specify the timing to start releasing the thread tension.

• **SW5–B** When the power to the sewing machine is turned ON, the data of the pattern specified is simultaneously read out and the sewing machine stops at the sewing start after the origin retrieval.
(This function is adopted while presuming special cases of usage including the case when an AMS-205 or -206 is used as a sewing machine head of an automatic machine.)

★ **Kinds of enlargement and reduction**

The following enlargement and/or reduction can be performed by combining the functions of DIP switches SW2–1 and SW2–3, or by setting or not setting, the second origin at the time of data input.
(Data can be input data with optional programming devices, PGM-2Band PGM-1, PGM-5, which you may purchase separately.)

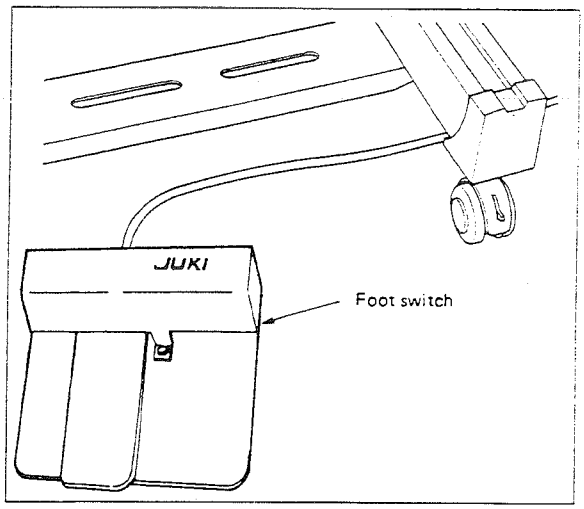
* 1. **The figure below illustrates a standard pattern and an enlarged pattern.**
2. **Sewing start point S is indicated as S' after the enlargement.**
3. When enlarging/reducing a pattern using the origin as a reference point, the second origin changes its position.
4. When enlarging/reducing a pattern using a sewing start point as a reference point, the second origin keeps its position.

<table>
<tr><th>SW2–1</th><th>Pattern with 2nd origin</th><th>Pattern without 2nd origin</th><th>SW2–3</th></tr>
<tr><td>OFF</td><td>Reference point for enlarging/reducing is the origin
Stops at the 2nd origin, starts from the 2nd origin, and completes at the 2nd origin.
  </td><td rowspan="2">Reference point for enlarging/reducing is the origin
  </td><td rowspan="2">OFF</td></tr>
<tr><td>ON</td><td>Reference point for enlarging/reducing is sewing start point
Stops at sewing start point, starts from the sewing start point, and completes at the sewing start point.
  </td></tr>
<tr><td>OFF</td><td>Reference point for enlarging/reducing is the 2nd origin
Stops at the 2nd origin, starts from the 2nd origin, and completes at the 2nd origin.
  </td><td rowspan="2">Reference point for enlarging/reducing is sewing start point
  </td><td rowspan="2">ON</td></tr>
<tr><td>ON</td><td>Reference point for enlarging/reducing is the 2nd origin
Stops at a sewing start point, starts from the sewing start point, and completes at the sewing start point.
  </td></tr>
</table>

3-4 Other switches

(1)-1 Foot switch (S type)

This foot switch (PK-57) has two switches inside, and is two-steps. The first switch is the feeding frame switch, and the second one is the start switch.



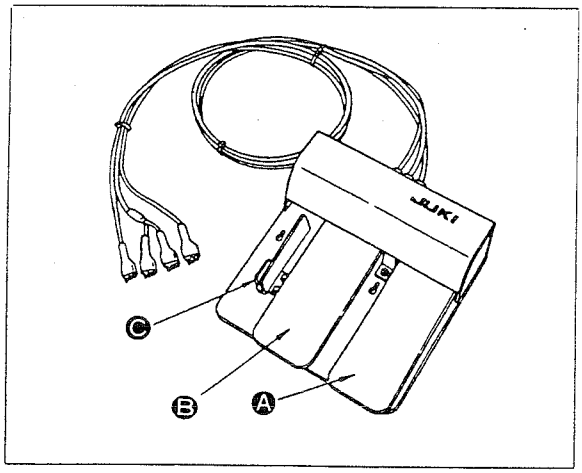
1) When the first switch (the feeding frame switch) is treadled, the feeding frame comes down. Releasing the switch raises the feeding frame.

2) Keep treadling the first switch, and treadle the foot switch (the start switch) to give it another press for turning the power switch ON. Turning the start switch ON starts sewing operation.

(Note) **You may treadle the first switch and the second switch with different pressure and stroke. Be careful not to treadle the foot switch too excessively, for an excessively strong treadle on the foot switch lowers the feeding frame and actuate the sewing machine at once.**

(1)-2 3-pedal foot switch (L type)

The PK-47 (3-pedal unit) is used as the foot switch for the AMS-206CSL/-206CHL/-206CGL.



The switches correspond to the connectors as stated below.

Ⓐ is the single-stepped pedal switch : Connector No.1

Ⓑ is the double-stepped pedal switch.

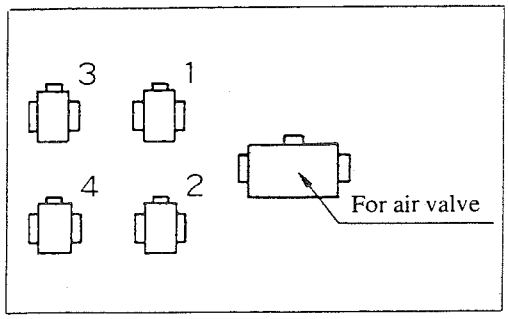
First step : Connector No. 2

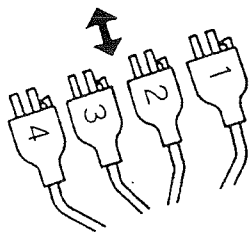
Second step : Connector No. 3

Ⓒ is the single-stepped lever switch :

Connector No.4

You can operate the 3-pedal unit with a desired combination of switch functions by changing the connection of the connectors.





Example of connector connection and switch allocation

(Connector side) — (Cable side)	Feeding frame 1 SW	Feeding frame 2 SW	Start SW
1 ——— 1 2 ——— 2 3 ——— 3 4 ——— 4	Ⓐ	Ⓑ 1st step	Ⓑ2nd step
1 ——— 1 2 ——— 2 3 ——— 4 4 ——— 3	Ⓐ	Ⓑ 1st step	Ⓒ
1 ——— 2 2 ——— 3 3 ——— 4 4 ——— 1	Ⓑ1st step	Ⓑ2nd step	Ⓒ

(Caution)

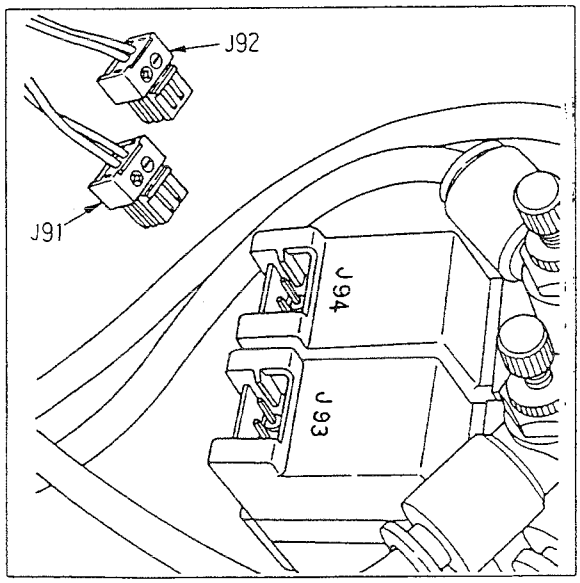
- **The PK-47 operates in the different ways depending on the setting of DIP SW ❶-3 (pedal selection) on the operation circuit board. (Refer to "3-3 (2) Function of the operating switches.")**

DIP SW ❶ -3

ON : Depress the pedal once, and the feeding frame will come down.
Depress the pedal again, and the feeding frame will go up.

OFF :The feeding frame will keep coming down as long as the pedal is depressed.

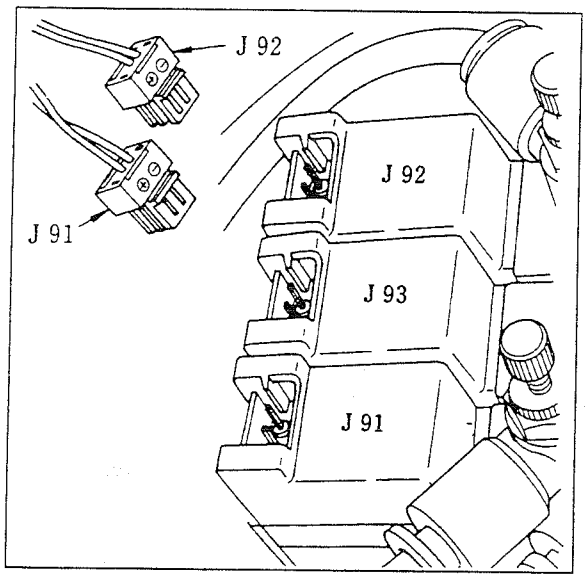
After the right- and left-frames of the feeding frame come down, the sewing machine starts running by depressing pedal Ⓑ to its second step or depressing pedal Ⓒ. Pedal Ⓐ is exclusively used to raise/lower the feeding frame.



When using an L type (AMS-206CSL, AMS-206CHL) and PK-47 or PK-48 with the sewing machine, the actions of the foot switch and the right/left work clamp feet change in accordance with the connection of the solenoid valve connectors. Change the connection of the solenoid valve connectors adapting to the application of your machine.

(Caution) After the right- and left-frames of the feeding frame come down, the sewing machine starts running by depressing pedal Ⓑ to its second step or depressing pedal Ⓒ. Pedal Ⓐ is exclusively used to raise/lower the feeding frame.

Method of connecting the connectors	PK-47	PK-48
J93-J91 J94-J92	Right pedal - Left work clamp foot goes up/comes down. Left pedal - Right work clamp foot goes up/comes down. 1st step	1st step - Left work clamp foot goes up/comes down. 2nd step - Right work clamp foot goes up/comes down.
J93-J92 J94-J91	Right pedal - Right work clamp foot goes up/comes down. Left pedal - Left work clamp foot goes up/comes down. 1st step	1st step - Right work clamp foot goes up/comes down. 2nd step - Left work clamp foot goes up/comes down.



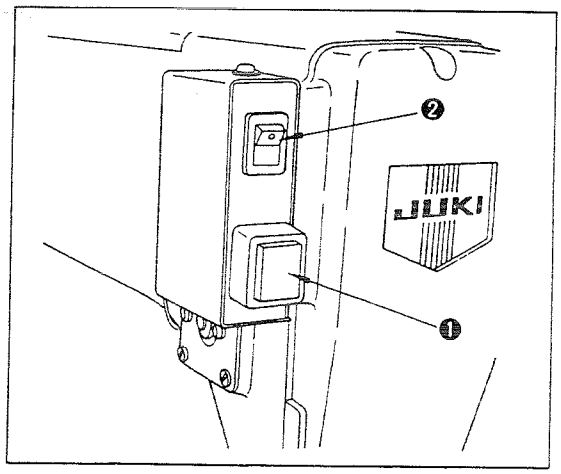
When using a AMS-206CGL and PK-47 or PK-48 with the sewing machine, the actions of the foot switch and the right/left work clamp feet change in accordance with the connection of the solenoid valve connectors. Change the connection of the solenoid valve connectors adapting to the application of your machine.

(Caution) After the right- and left-frames of the feeding frame come down, the sewing machine starts running by depressing pedal Ⓑ to its second step or depressing pedal Ⓒ. Pedal Ⓐ is exclusively used to raise/lower the feeding frame.

(Caution) J93 is the solenoid valve for lifting the intermediate presser in the GL type of the sewing machine. Other L type of the sewing machine than the GL are not provided with it.

Method of connecting the connectors		PK-47	PK-48
❶	J91-J91 J92-J92	Right pedal- Right work clamp foot goes up/comes down. Left pedal - Left work clamp foot goes up/comes down. 1st step	1st step - Left work clamp foot goes up/comes down. 2nd step - Right work clamp foot goes up/comes down.
❷	J91-J92 J92-J91	Right pedal - Left work clamp foot goes up/comes down. Left pedal - Right work clamp foot goes up/comes down. 1st step	1st step - Right work clamp foot goes up/comes down. 2nd step - Left work clamp foot goes up/comes down.

(2) Stop switch and Wiper ON/OFF switch (These switches are provided with AMS-206C as standard equipments.)



❶ Stop switch

Press this switch to stop the cloth feed or sewing mechanisms of the machine during operation.

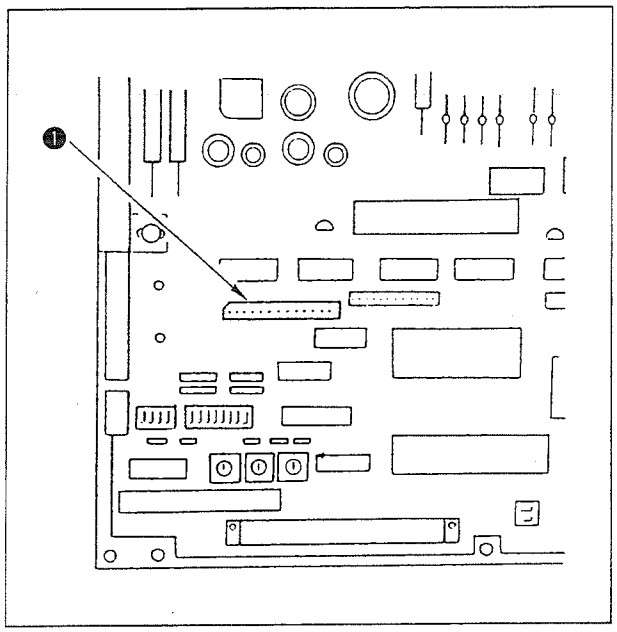
❷ Wiper ON/OFF switch

Turning the wiper switch OFF, the wiper stops its job.

For normal sewing operations, turn the wiper switch ON to perform the job.

3-5 External output signals

Sewing machine signals



Various signals are output so as to check the state of the sewing machine.
The following signals are output to connector J17 ❶.

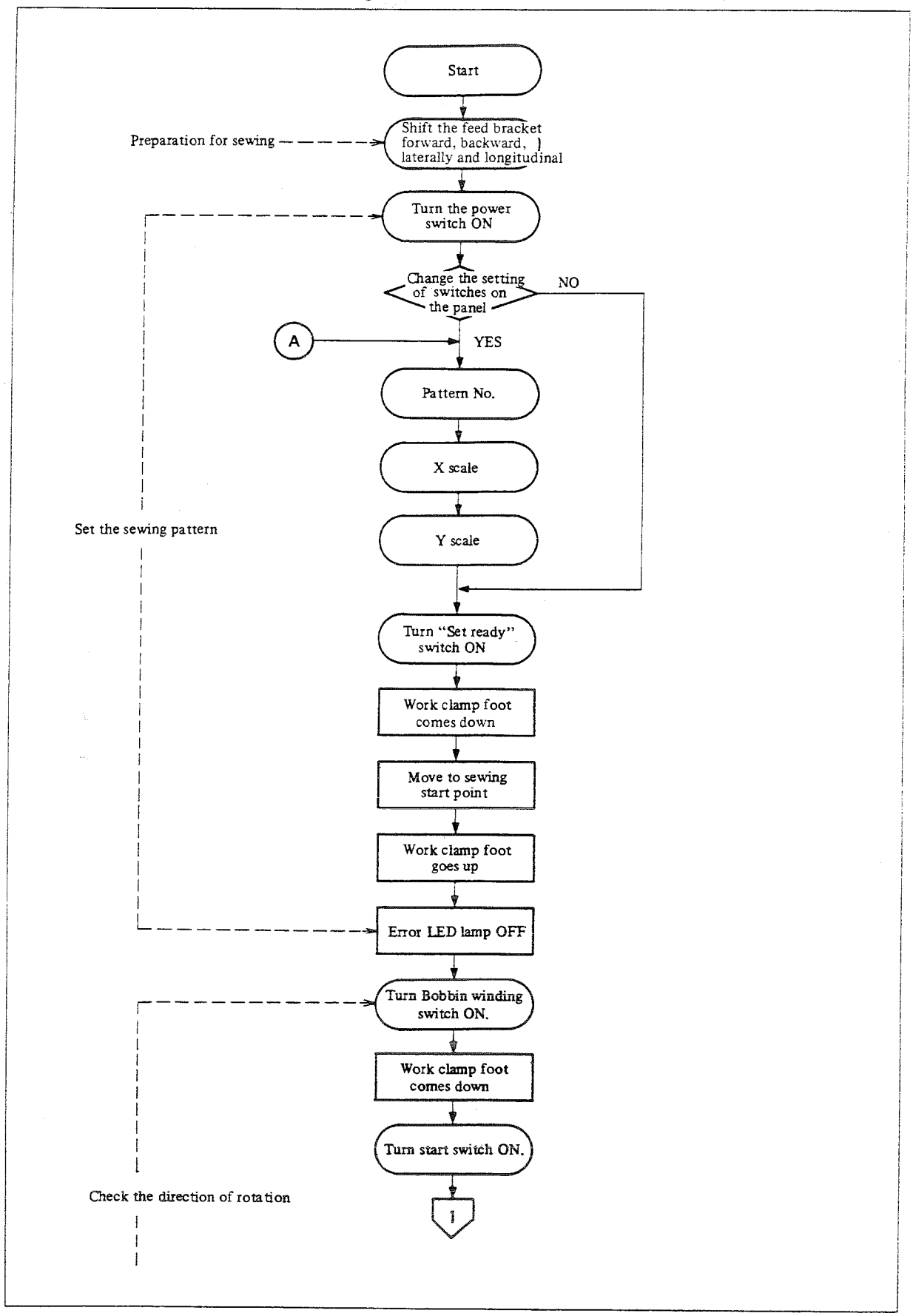
J17-1: Sewing signal	J17-9: Starting switch
J17-2: Feeding frame signal	J17-10: Stop switch
J17-3: Up position signal	J17-11: +5V
J17-4: Down position signal	J17-12: GND
J17-5: Motor stop signal	J17-13: GND
J17-6: Error signal	J17-14: GND
J17-7: Blank	J17-15: Blank
J17-8: Switch of the feeding frame 1	

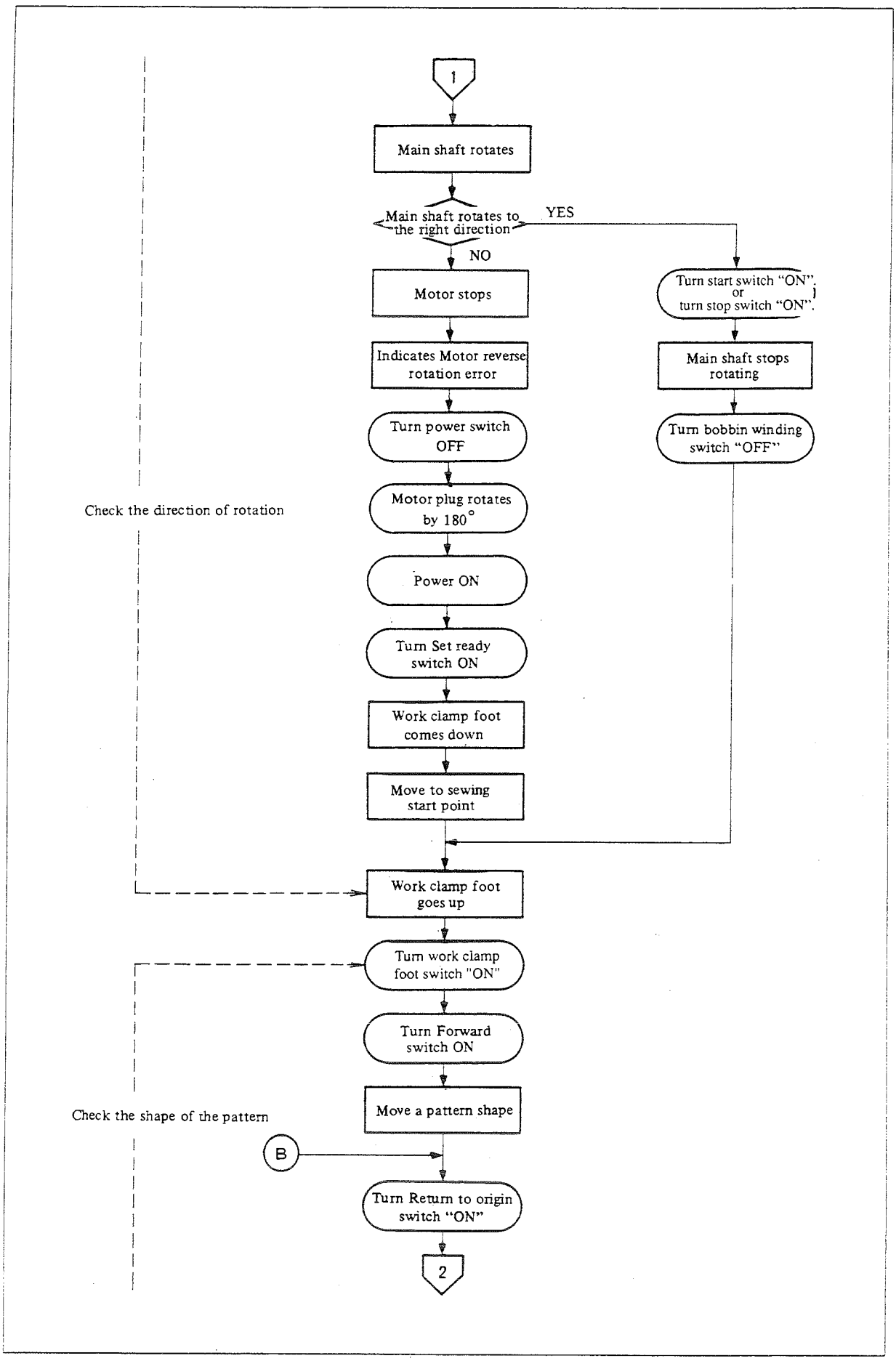
Use the following connectors to output the signals.
Conector 15P : MITSUMI M36M87-15
(HK005210150)
Pin terminal : MITSUMI M31C89-4
(M9647110000)
Contact your nearest dealer for further information, if necessary .

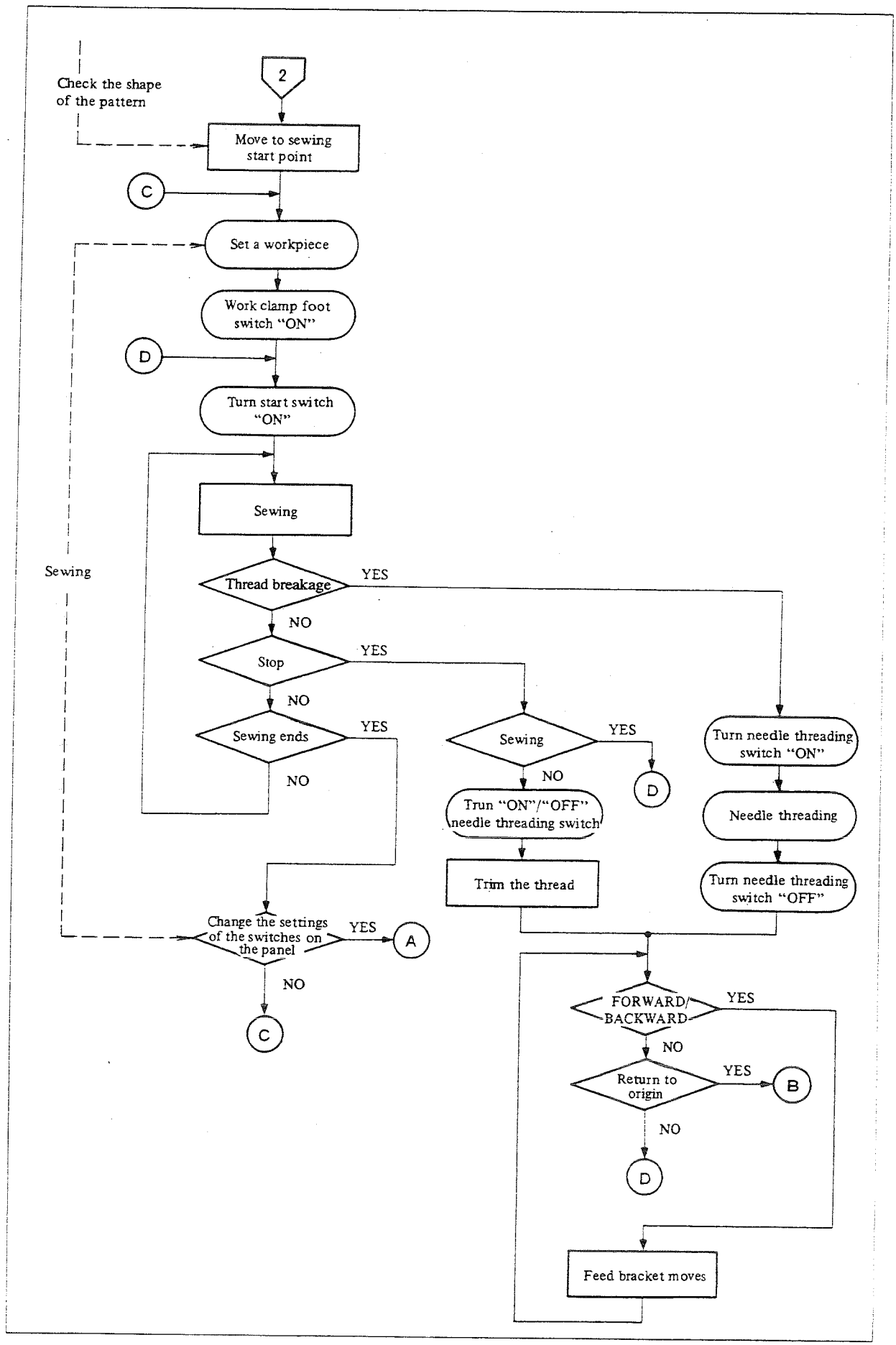
Sewing signal	: Output when the start switch is turned ON until the sewing operation is completed and the feeding frame is turned OFF.
Feeding frame signal	: Output as long as the feeding frame is turned ON.
Up position signal	: Output when the needle is in its highest position.
Down position signal	: Output when the needle is in its lowest position.
Motor stop signal	: Output as long as the electronic-stop motor is stopped.
Error signal	: Output when a sewing machine error occurs simultaneously with the corresponding error message.
Switch of the feeding frame 1	: When this switch is turned ON (set to the 0V position), the feeding frame will come down.
Start switch	: When this switch is turned ON (set to the 0V position), the sewing machine will start running. The functions of these switches are same as those of the pedal switches.
Stop switch	: When this switch is turned ON (set to the 0V position), the sewing machine will stop sewing. The function of this switch is the same as that of the stop switch mounted on the sewing machine head.

3-6 Operating procedure

Follow the operation procedure flow chart given below.



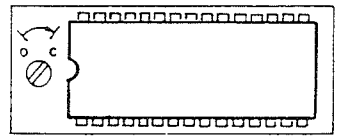

1
Main shaft rotates
Main shaft rotates to the right direction
YES
NO
Motor stops
Indicates Motor reverse rotation error
Turn power switch OFF
Motor plug rotates by 180°
Power ON
Turn Set ready switch ON
Work clamp foot comes down
Move to sewing start point
Turn start switch "ON" or turn stop switch "ON".
Main shaft stops rotating
Turn bobbin winding switch "OFF"
Check the direction of rotation
Work clamp foot goes up
Turn work clamp foot switch "ON"
Turn Forward switch ON
Move a pattern shape
Check the shape of the pattern
B
Turn Return to origin switch "ON"
2


Check the shape of the pattern
2
Move to sewing start point
C
Set a workpiece
Work clamp foot switch "ON"
D
Turn start switch "ON"
Sewing
Sewing
Thread breakage
YES
NO
Stop
YES
NO
Sewing ends
YES
NO
Change the settings of the switches on the panel
YES
A
NO
C
Sewing
YES
D
NO
Trun "ON"/"OFF" needle threading switch
Trim the thread
Turn needle threading switch "ON"
Needle threading
Turn needle threading switch "OFF"
FORWARD/ BACKWARD
YES
NO
Return to origin
YES
B
NO
D
Feed bracket moves

3-7 Preparation and matters to be attended before operation

1. Check that the line voltage is appropriate for the machine table.
2. Move the feed bracket manually to position the needle inside the work clamp foot or inside the feeding frame.
3. Check that the intermediate presser is set properly so that the needle comes down in the center of the intermediate presser.
4. Place the cloth between the work clamp foot or work clamp frame and the feed plate when pressing the Set ready switch.
5. Check the rotating direction of the sewing machine. When starting the sewing machine by treadling the start switch, if the rotation is in reverse direction, the rotation will stop within the completion of one circle and the Error lamp will indicate ○○ ☼ (● light-off, ○ light-on, ☼ flicker).
   Insert, turning 180 degrees, the motor's power plug.
   (Note) Make sure to turn the power switch "OFF" before pulling out the motor's power plug. Also make sure to insert the plug securely and deeply into the socket.
6. Check the oil for the sewing machine.
   Supply oil up to the red mark in the center of the oil gauge. Apply a couple drops of oil to the crank, a drop to the shuttle race and a touch to the bed mounting base felt (just enough to slightly stain it) when using the sewing machine for the first time or using after a long break.
7. Check the inserting direction of the data EEP-ROM.
   Check that the EEP-ROM is installed in the correct direction, according to the diagram.
   The notch of the EEP-ROM must face the ⊏ .

(Note) There is a possible danger of destroying EEP-ROM if the power switch is turned on with the EEP-ROM inserted in the wrong direction.
The AMS-205C/-206C has adopted "EEP-ROM" as its "P-ROM" for data. To save sewing pattern data in the EEP-ROM, use a PGM-2B or PGM-5. Note that a PGM-2 is not capable of writing data in the EEP-ROM.
If you force to write data in it, the EEP-ROM may break.



Interchangeability of the data ROM and data programming device

Programming device / P-ROM	PGM-5	PGM-2B	PGM-2
AMS-205A/-206A for EP-ROM	×	○	○
AMS-205B,C/206B,C for EEP-ROM	○	○	×

How to delete data stored in the data ROM
- EP-ROM ..... By PGM-2B or an eraser that is commercially available
- EEP-ROM ... By PGM-5 or PGM-2B

3-8 Cautions in operation

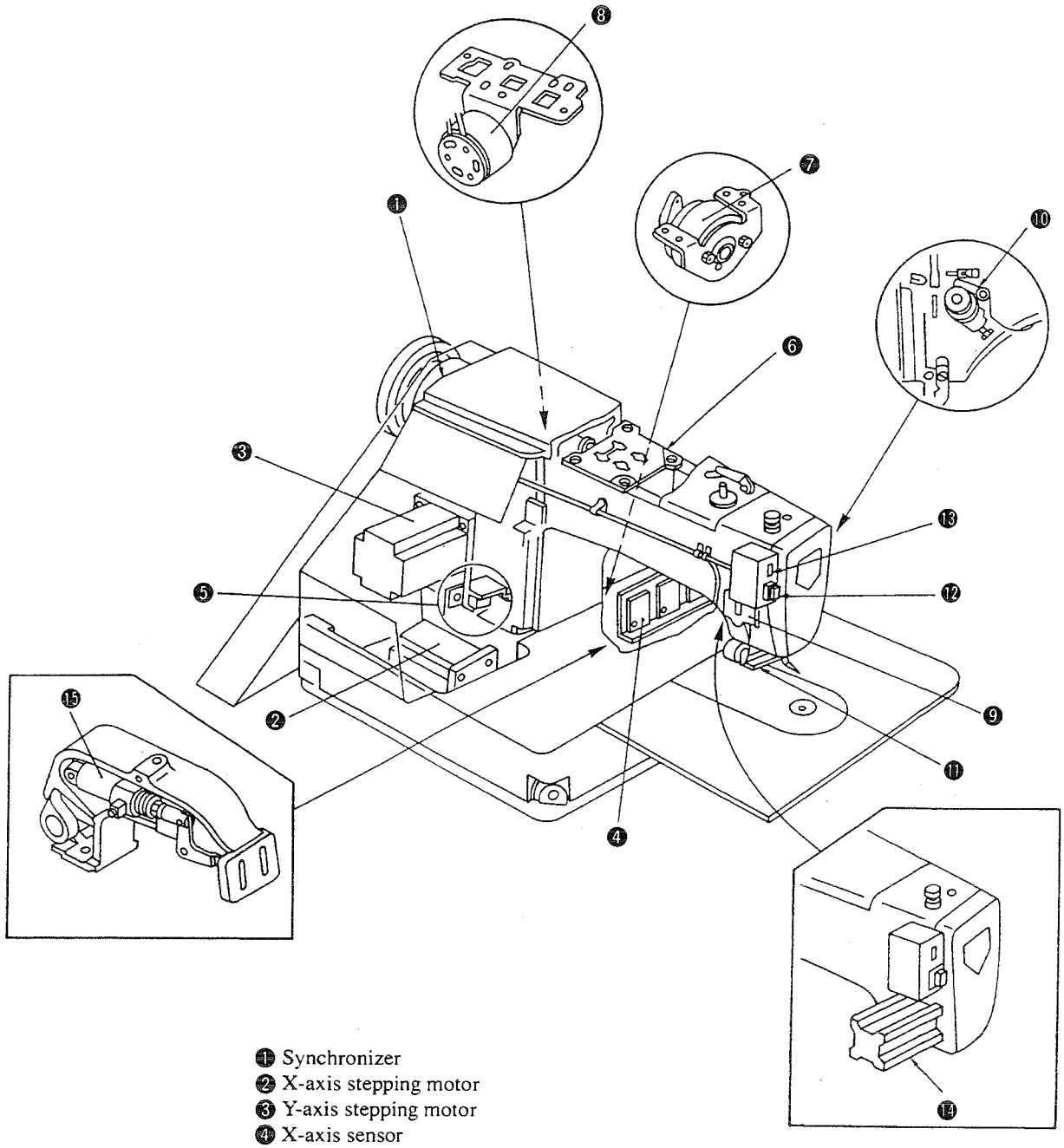
1. Before sewing a new pattern or a newly enlarged pattern, be sure to carry out a trial sewing to check the pattern size with respect to the work clamp foot.
2. The maximum sewing speed varies according to the stitch length.
   The maximum sewing speed is automatically limited as shown in the table below according to the stitch length.
   If necessary, the maximum sewing speed can also be limited manually using the max. speed limit control knob.

Stitch length (mm)	Max. sewing speed (s.p.m.)
4.8 - 6.2 (0.189" - 0.244")	800
4.0 - 4.6 (0.157" - 0.181")	1100
3.4 - 3.8 (0.134" - 0.149")	1600
3.2 (0.126")	1800
3.0 (0.118") or less	2000

3. When an error indication is given, be sure to identify the cause and take corrective action.
4. Prior to operation, be sure to close the control box cover in order to prevent dust from getting into the control box. Dust into the control box may lead to malfunctions or failures.
5. Be sure to turn the power OFF before opening the control box cover.
6. Avoid checking the control circuitry by a tester, or else the tester voltage may be applied to a semiconductor component, and the component may be damaged.
7. Be sure that there is no obstacle under the needle before depressing the start switch to wind a bobbin.
8. Avoid pulling the workpiece while sewing. This may prevent correct needle entry. If X or Y needle entry point should be dislocated, press the Set Ready switch twice to go back to the sewing start point.

4. DESCRIPTION OF EACH MAIN COMPONENT UNIT

4-1 Sewing machine



❶ Synchronizer
❷ X-axis stepping motor
❸ Y-axis stepping motor
❹ X-axis sensor
❺ Y-axis sensor
❻ Work clamp foot solenoid (S type only)
❼ Intermediate presser solenoid (Only for the 206C excluding the GL type)
❽ Thread trimmer solenoid
❾ Thread tension release solenoid
❿ Thread breakage detector
⓫ Wiper solenoid
⓬ Stop switch (AMS-206C only)
⓭ Wiper switch (AMS-206C only)
⓮ Intermediate presser lifter cylinder (GL type only)
⓯ Work clamp foot air cylinder (L type only)

❶ Synchronizer
Mainly consists of a generator stator and position detecting solenoid included in the sewing machine pulley. It detects whether the needle is in its upper position or lower position, and also detects the sewing speed, then sends input signals based on the detection results to the control box.

❷ X-direction stepping motor
Synchronizes with the pulses received from the feed pulse generator, and feeds material in the X direction according to the pattern data given by the control box.

❸ Y-direction stepping motor
Synchronizes with the pulses received from the feed pulse generator, and feeds material in the Y direction according to the pattern data given by the control box.

❹ X-direction sensor
Mainly consists of an X-direction slit disk, X-direction origin sensor, and X-direction travel limit sensor. It functions to detect the origin in the X direction within the sewing area and the boundary of the limited sewing area. It sends the input signals based on the detection results to the control box.

❺ Y-direction sensor
Mainly consists of a Y-direction slit disk, Y-origin sensor, and Y-travel limit sensor. It functions to detect the origin in the Y direction within the sewing area and the boundary of the limited sewing area. It sends input signals based on the detection results to the control box.

❻ Work clamp foot solenoid (S type only)
Moves the feeding frame up or down as the feeding frame switch is turned ON or OFF. While sewing, the solenoid is activated to hold a workpiece in place.

❼ Intermediate presser solenoid (Only for the 206C excluding the GL type)
While sewing, the solenoid is activated to move the intermediate presser up or down.

❽ Thread trimmer solenoid
Actuates the thread trimming clutch mechanism to link the thread trimming cam to the thread trimming mechanism according to the commands received from the synchronizer.

❾ Thread tension release solenoid
Release the thread tension controller number 2 when trimming the thread.

❿ Thread breakage detector
Detects the connection between the thread takeup spring and the thread breakage detector disk each time a stitch is formed, and sends the result in terms of input signal to the control box. When needle thread breakage is detected, the sewing machine will slow down, trim the thread, and stop.

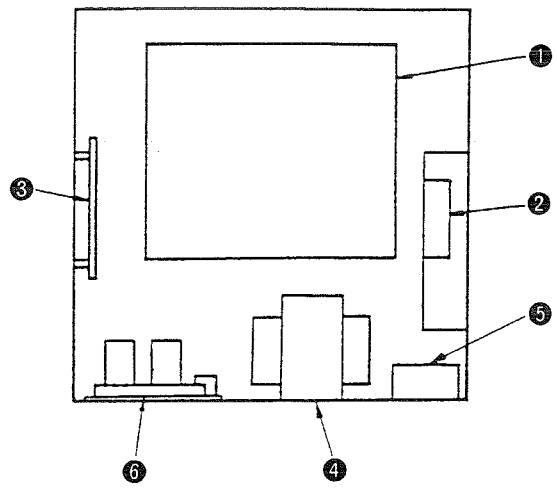
⓫ Wiper solenoid
Actuates the wiper after thread trimming.

⓬ Stop switch (AMS-206C only)
Used to stop the sewing machine and the feed mechanism during a sewing cycle. When this switch is pressed, the machine will slow down, trim the thread, and stop.

⓭ Wiper switch (AMS-206C only)
Used to specify the actuation of the wiper after thread trimming.

⓮ Intermediate presser lifting cylinder (GL type only)
To increase the lifting amount of the intermediate presser, the machine comes with an air cylinder.

4-2 Control box



❶ MAIN circuit board
❷ PMDC circuit board
❸ Operation circuit board
❹ Transformer
❺ Cooling fan
❻ Power circuit board

❶ MAIN circuit board
Acts as the center of the control unit. When the power switch is turned ON, the initial resetting circuit is actuated, and the microcomputer control is automatically engaged. It mainly consists of a microcomputer and electronic parts, including ICs. Circuits mounted on the main circuit board include:

- Sewing speed control circuit
- Microcomputer control circuit
- Switch signal input circuit
- Display output circuit
- Solenoid actuating output circuit
- Detection signal input circuit

❷ PMDC circuit board
Drives the stepping motor by receiving excitation signals of various phases and current toggling signals from the MAIN circuit board.

- Current control circuit
- Driving stepping motor circuit are installed

❸ Operation circuit board
Orders switch information of pattern number and enlargement/reduction of the pattern to the MAIN circuit board.

❹ Transformer
When impressing input voltage, it outputs the following:

- 24V AC for solenoid
- 30V AC for stepping motor
- 7.5V AC for control
- 24V AC for fan, ±12V

❺ Cooling fan
Exhausts internal air in order to avoid heat of elements and units inside the control box.

❻ Power circuit board
Rectifies alternating current for the output solenoid from the transformer and the stepping motor, and switches to direct current. 7A time lag fuse is installed for protection for each voltage.

4-3 Motor

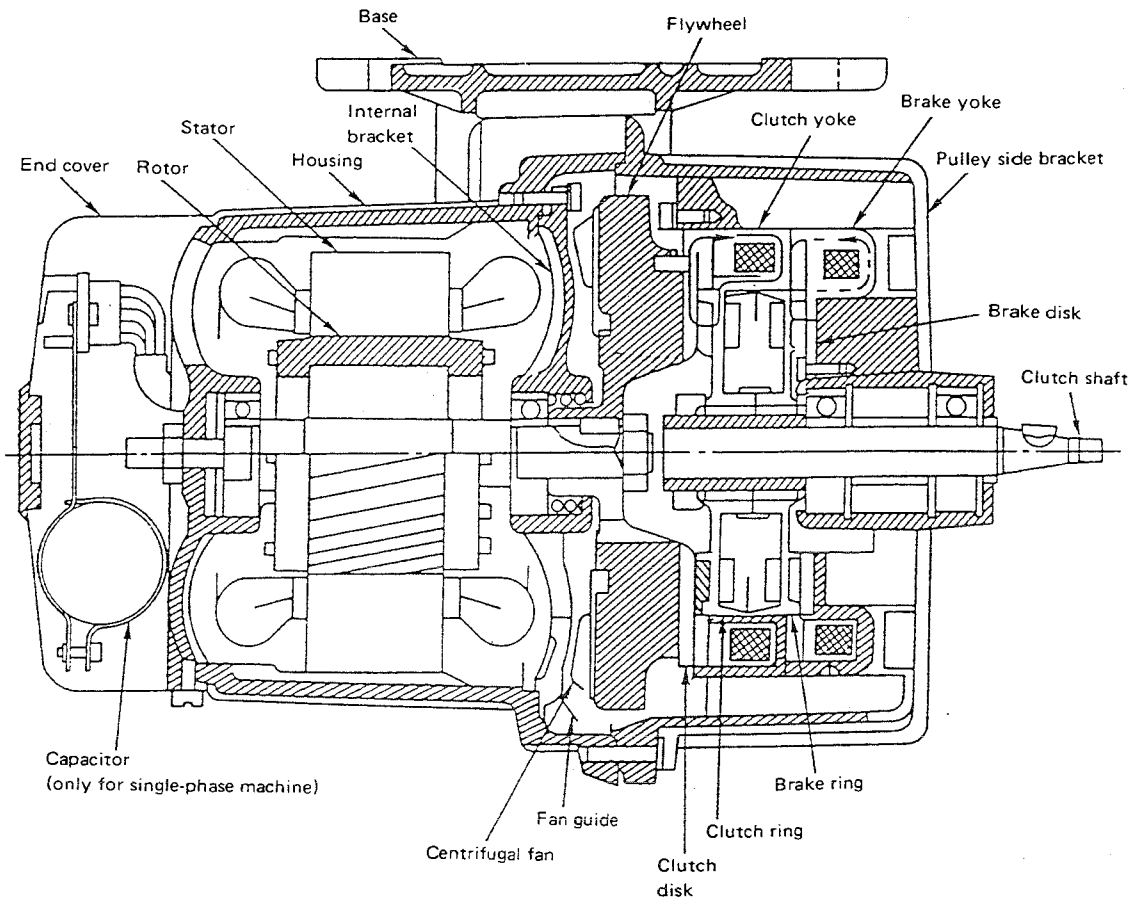
A 400W, 4-pole electronic-stop motor (only the GL type uses a 550W, 2-pole motor) is used for the sewing machine motor. The clutch brake disk components are compatible with a general lockstitch sewing machine motor.
The clutch brake disk components are compatible with a general lockstitch sewing machine motor.

1. Structure of the motor and how the motor speed is changed

The following diagram shows the structure of the electronic-stop motor. As long as the power of the machine stays ON, the motor (rotor, flywheel, and clutch disk) runs constantly. The clutch ring is connected to the output shaft through the splines, so it rotates together with the output shaft, and can slide crosswise.

When the clutch coil is energized, lines of magnetic force are produced as shown by the solid line arrow, and the clutch ring is pressed against the clutch disk, thereby transmitting the motor rotation to the output shaft. When the brake coil is energized, lines of magnetic force are produced as shown by the broken line arrow, and the brake ring is pressed against the brake disk (constructed integral with the pulley side bracket, and does not turn), thus stopping the rotation of the output shaft.

At medium speed, the clutch coil and the brake coil are energized for a short period of time alternately for rotation.



Structure of Electronic-stop Motor

5. ADJUSTMENT

5-1 Mechanical parts

STANDARD ADJUSTMENTS

(1) Checking the rotational direction of the handwheel

After confirming that the error LED is unlit, set the Bobbin Winder switch to "ON," then depress the start switch. At this time, the handwheel should be turned counterclockwise as observed from the handwheel side.

(Caution)

Be sure to check the direction of rotation of the handwheel after completing the power wiring of the machine.
When the handwheel rotates in reverse direction, the reverse rotation error indicator will light ○ ○ ☼ and operation will stop automatically.

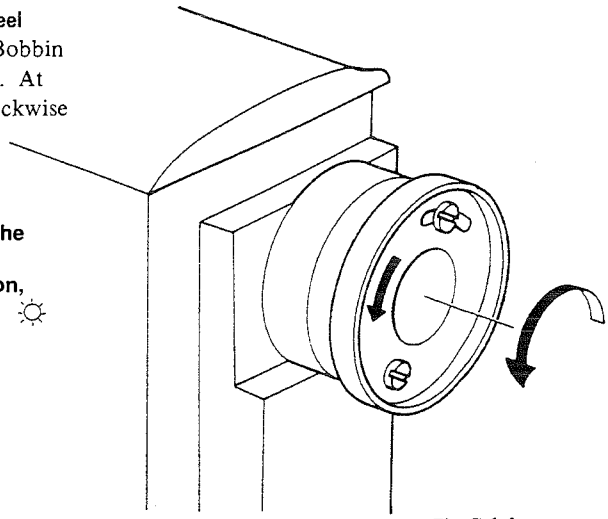
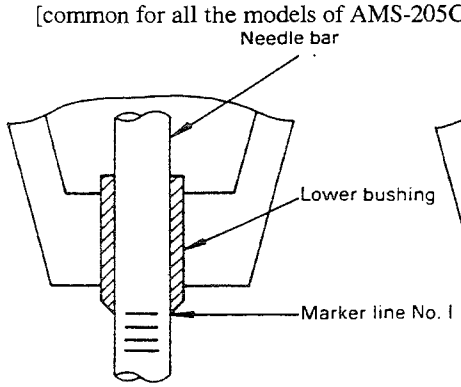


Fig. 5-1-1

(2) Height of the needle bar

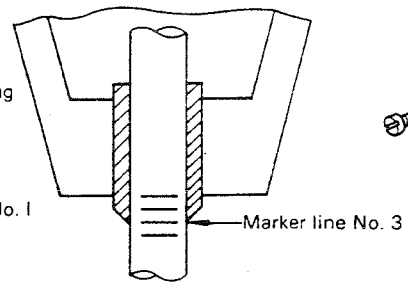
Bring the needle bar to the lowest point of its stroke. Make adjustments so that the bottom end of the needle bar lower bushing aligns with the marker line number 1 for a DP×5 needle, or with the marker line number 3 for a DP×17 needle. (For 206C)

[common for all the models of AMS-205C,-206C]



For DP x 5 needle

Fig. 5-2-1



For DP x 17 needle

Fig. 5-2-2

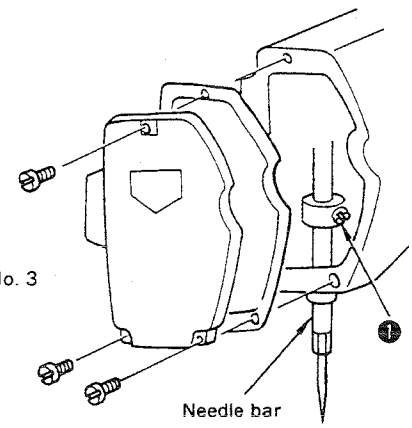


Fig. 5-2-3

[For GL type]

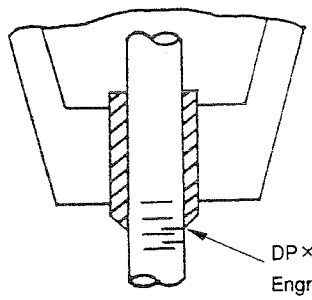
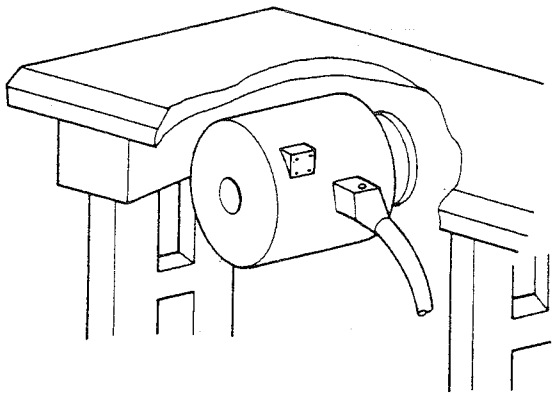
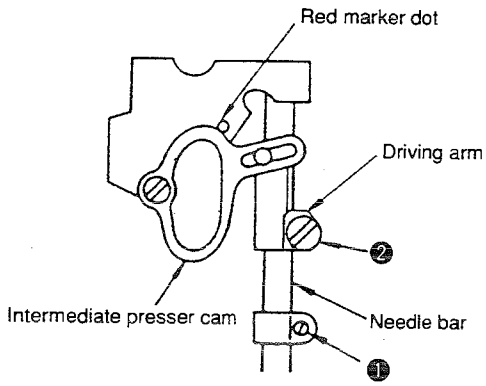


Fig. 5-2-4

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ If the handwheel turns in the reverse direction, correct it by disconnecting the motor power plug then reversing it before reconnecting it.  Fig. 5-1-2	○ If the handwheel turns in the wrong direction, stitch knots will not be formed.
1) Turn the handwheel by hand until the needle bar reaches the lowest point of its stroke. 2) Remove the face plate. 3) Loosen setscrew ❶ and setscrew ❷ (206C type only), and move the needle bar up or down to adjust the height of the needle bar. 4) After adjustment, securely tighten setscrew ❶. The below - stated step 5) through 7) are given only for the AMS-206C. 5) Turn the handwheel by hand to bring the needle bar up to the highest point of its stroke. 6) Move the intermediate presser driving arm up or down so that the red marker dot contacts the periphery of the intermediate presser cam. 7) After adjustment, securely tighten setscrew ❷.  Fig. 5-2-5 **(Caution)** **When tightening setscrew ❷, be sure that the roller of the intermediate presser driving arm does not stick against the slot in the intermediate presser cam. Also, turn the main shaft by hand to check for smooth rotation. (206C type only)**	○ Stitch skipping or thread breakage may occur.

(3) Stop position of the main shaft

When the main shaft stops the marker dot on the machine arm should be between the marker dots No.1 and No.2 on the handwheel.

(Note)

Use trial procedure for this adjustment.

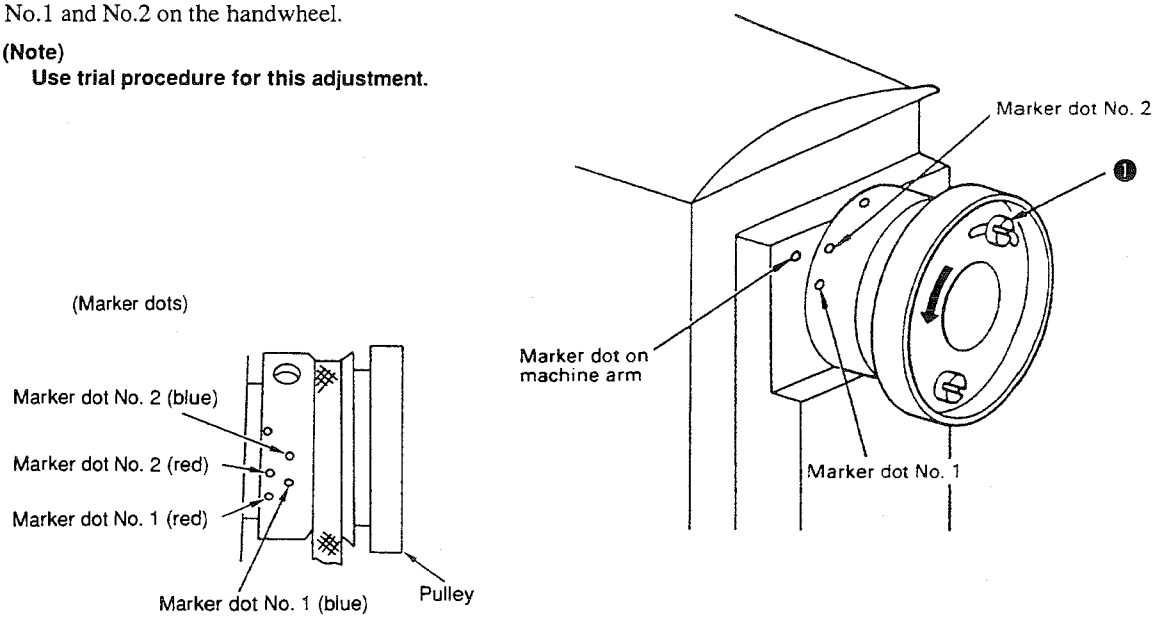


Fig. 5-3-1

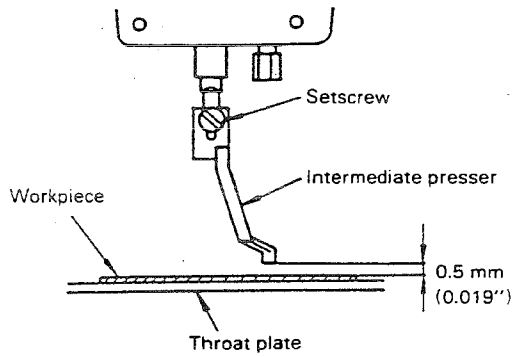
- For the models excluding the GL type, the red marker dots are used.
- For the GL type machine, the blue marker dots are used.

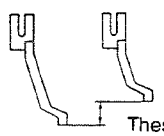
(4) Height of the intermediate presser (206C only)

1) Be sure that the sewing pattern has been read and the Error LED is unlit before setting the workpiece.
2) Set the Threading needle switch to ON, and lower the feeding frame and the intermediate presser.
3) Turn the handwheel manually until the needle bar reaches the lowest position of its stroke. Make adjustments so that the clearance between the end of the intermediate presser and the workpiece is 0.5 mm (0.019"), which is a standard adjustment.
(For fluttering material adjust the clearance between the end of the intermediate presser and the workpiece from 0.2 (0.007") to 0.3 mm (0.011") to prevent the material from fluttering.)

(Caution)

The intermediate presser of the GL type machine is as long as that of the AMS-220, -224 and -229 types of sewing machine.
If a wrong intermediate presser is used, it may break during sewing.



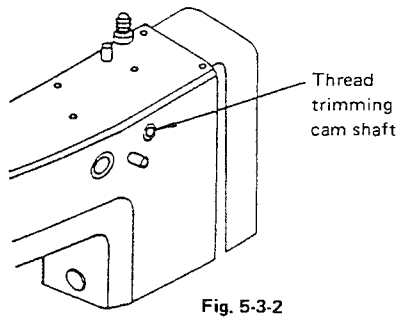


AMS-206, -210, -212

AMS-220, -224, -229, and G type of AMS-206, -210, -212

These two intermediate presser are different in length.

Fig. 5-4-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Loosen setscrew ❶. 2) If the main shaft stops prematurely before the marker dot No. 1 reaches the marker dot on the machine arm, move setscrew ❶ to the right and tighten it in that position. On the contrary, if the main shaft stops after the marker dot No. 2 passes beyond the marker dot on the machine arm, move setscrew ❶ to the left and tighten it in that position. 3) Repeat steps 1) and 2) until the marker dot on the machine arm is located between the marker dots No. 1 and No. 2 when the main shaft stops. 4) Securely tighten the solenoid mounting base setscrew. Direction of rotation → Right: The handwheel stops before marker dot No. 1 engraved on the handwheel reaches the marker dot engraved on the machine arm. Direction of rotation ← Left: The handwheel stops after marker dot No. 1 engraved on the handwheel has passes the marker dot engraved on the machine arm.	○ If the main shaft is allowed stop before the marker dot No. 1 reaches the marker dot on the machine arm, the thread trimming cam shaft will fail to return to its home position after thread trimming. (Fig. 5-3-2) This may lead to thread trimming failure, loose stitch at the sewing start, or machine lock.  Fig. 5-3-2 ○ If the main shaft is allowed to stop after the marker dot No. 2 passes beyond the marker dot on the machine arm, the wiper will come into contact with the needle when the wiper is actuated. This may lead to thread wiping failure needle bend or breakage.
○ Loosen the intermediate presser setscrew, and perform adjustment according to the procedure described at the left. (Adjust according to the material thickness and the type of thread used so as not to allow a workpiece to flutter while sewing.)	○ If an excessive clearance is provided, stitch skipping may result. ○ If an inadequate clearance is provided, loose stitches may result.

(5)-1 Adjustment of the feed bracket (S type)

o Height of work clamp foot

Adjust the height of the work clamp foot by sliding the work clamp foot adjusting plate backward and forwards. (The height is fixed at 12 mm (0.472") for 205C and at 17 mm (0.669") for 206C as part of the factory settings.)

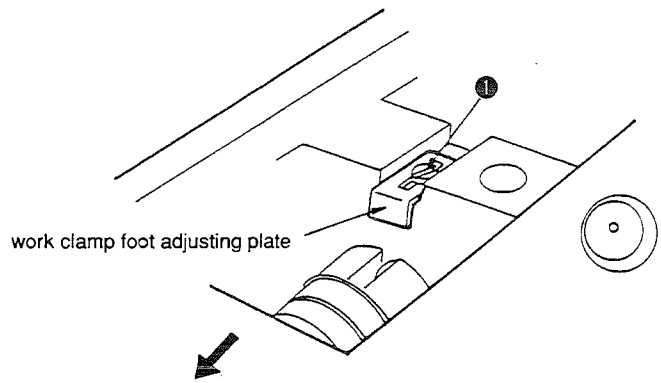


Fig. 5-5-1

○ work clamp foot pressure

Fix the spring hook nuts in the middle position.

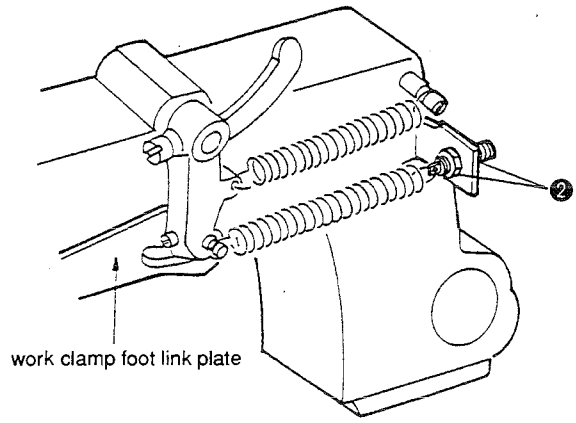


Fig. 5-5-2

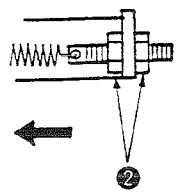


Fig. 5-5-3

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Remove the top cover and loosen the setscrew ❶. 2) Set the feeding frame to the desired height. Pull the feeding frame solenoid and the plunger in the direction of arrow unit the end of the plunger touches the work clamp foot adjusting plate, then tighten the setscrew ❶. (Moving in the direction of the arrow decreases the height and the opposite direction increases the height.)	
1) Loosen the two nuts ❷ .Work clamp foot pressure is descreased by moving the spring hook in the direction of the arrow. Work clamp foot pressure is increased by moving the spring hook in the opposite direction.	○ Look of work clamp foot pressure Standard work clamp foot pressure 3.5 kgf/cm^2

(5)-2. Adjusting the feed bracket (pneumatic double-stepped feeding frame type, L type)

o The standard lifting amount of feeding frame ❶ is 17mm (0.669") above the top surface of throat plate. (Max. 18mm) (0.709")

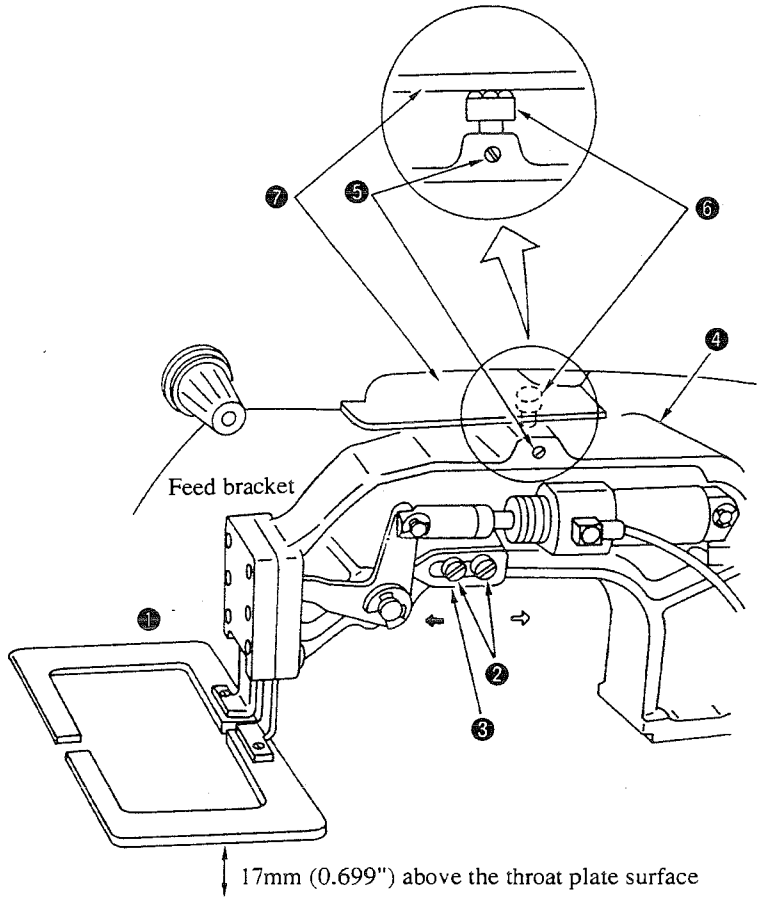


Fig. 5-5-4

o Adjust the feed bracket so that the ball of work clamp slider ❻ comes in light contact with presser plate ❼ when feed bracket ❹ is positioned at the center of its traveling range.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Loosen screw ❷ in the work clamp stopper. Move work clamp stopper ❸ in the direction of the arrow ⇨ to increase the lifting amount of feeding frame ❶ or in the direction of the arrow ⇦ to decrease it. 2) After the adjustment, tighten screw ❷. * The lifting amount of the feeding frame is insufficient.	o Inadequate lift of the feeding frame will result.
1) Move feed bracket ❹ to the center of its traveling range. 2) Loosen screw ❺ in the work clamp slider. Adjust the height of the work clamp slider so that the ball of work clamp silder ❻ comes in light contact with presser plate ❼. 3) After the height of the work clamp slider has been properly adjusted, tighten screw ❺. (There is a flat part on the shaft of work clamp slider ❻. Tighten the screw with the flat part faced toward the screw ❺.)	o Feeding failure (step-out) of the stepping motor will result. o The X-Y table is applied with an overload, resulting in breakage of the X-Y table.

(6) Adjusting the heavy-weight material (excluding the L type)

Fix the screw ❶ at the face plate side of the oval shaped holes. (Standard adjustment)

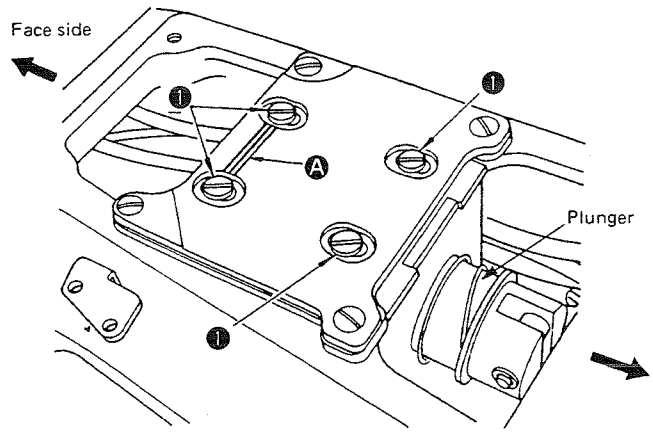


Fig. 5-6-1

(7) Shuttle race spring

The shuttle race spring should be positioned equidistantly on the right and left.

The shuttle race spring should be positioned longitudinally so that the trailing edge of the needle meets corner Ⓐ.

(Caution)

Scratches within area Ⓑ would cause bobbin thread breakage.
So, eliminate scratches if any.

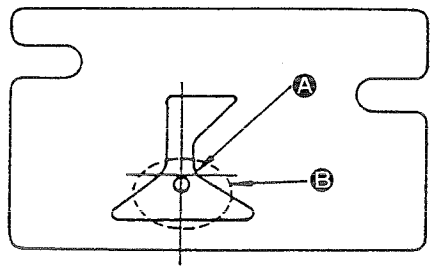
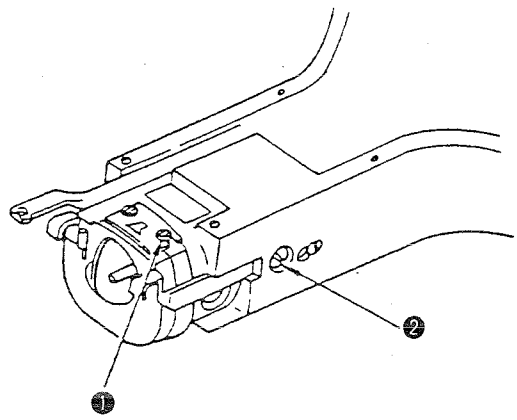


Fig. 5-7-1

(Caution)

The shape of the shuttle race spring for the GL type is different from the shape of the spring for the other types of sewing machine.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ Move the feeding frame solenoid by loosening the 4 screws ❶. Under the standard factory settings, it cannot press workpieces thicker than 6 mm (0.236"). Align the screws ❶ to the marker line Ⓐ when sewing workpieces thicker than 6 mm (0.236"). **(Caution)** **There is a possibility that the material will not be fed well if the solenoid is installed tilted when loosening the screws. So tighten the screws ❶ while the plunger is pushed down in the direction indicated by the arrow, then make sure that the plunger does not stick.**	○ Inadequate feeding frame clamp pressure will result. ○ Inadequate feed of the feeding frame will result.
Remove the feed bracket, feed plate, and throat plate, and perform adjustment using screw ❶. **(Note)** **The lateral position also depends on the fixing position of shuttle race setscrew ❷.**  Fig. 5-7-2	○ Lateral or longitudinal dislocation will cause the needle thread to bite into the shuttle. ○ If the shuttle race spring is located too deep, the moving knife may fail to hook the needle thread.

(8) Timing between the needle and the shuttle

1) Needle bar timing
The bottom end of the needle bar lower bushing aligns with the lower marker line (The position of the marker line changes by the needle size) on the needle bar as the needle bar goes up. (Fig.5-8-1)

2) Shuttle timing
Under the condition described in the above step 1), the center of the needle meets the point of the shuttle. (Ⓐ in Fig. 5-8-2)

3) Clearance between the needle and the shuttle driver
Under the condition described in the above step 2), the clearance between the needle and the shuttle driver is 0 mm. (Fig. 5-8-3)

4) Clearance between the needle and the point of the shuttle driver
Under the condition described in the above step 2), clearance Ⓑ between the needle and the point of the shuttle is 0.05 (0.002″) to 0.1 mm (0.003″). (Fig. 5-8-4)

5) Clearance between the needle and the shuttle race
The clearance between the edge of the needle and the shuttle race is 7.5 mm (0.295″). (Fig. 5-8-5)

6) Clearance between the shuttle and the shuttle driver
The clearance between the shuttle and the shuttle driver is 0.5 (0.019") to 0.7 (0.028"). (Fig. 5-8-2)

1) Needle bar timing

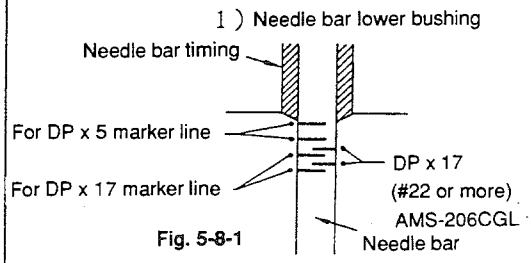
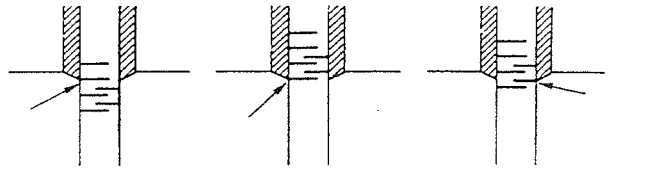


Fig. 5-8-1



The marker line located at the lower position between the pair of lines is taken as the lower marker line.

2) Shuttle timing

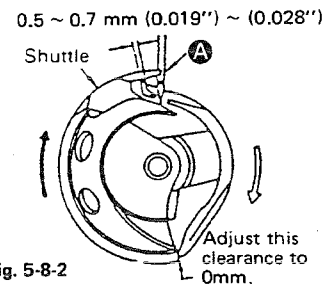


Fig. 5-8-2

3) Clearance between the needle and the shuttle driver

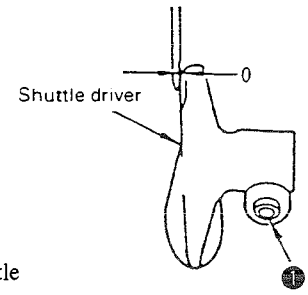


Fig. 5-8-3

4) Clearance between the needle and the point of the shuttle

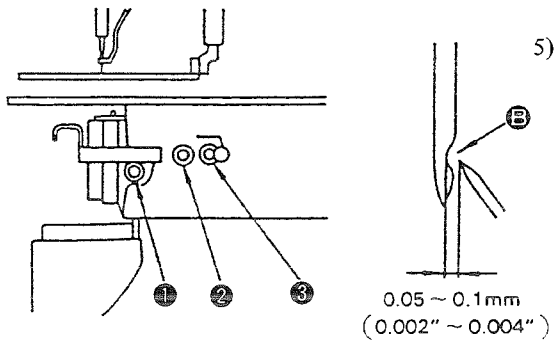


Fig. 5-8-4

5) Clearance between the needle and the shuttle race

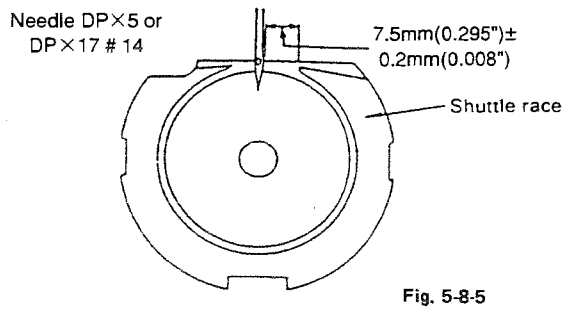
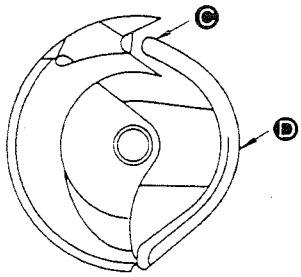
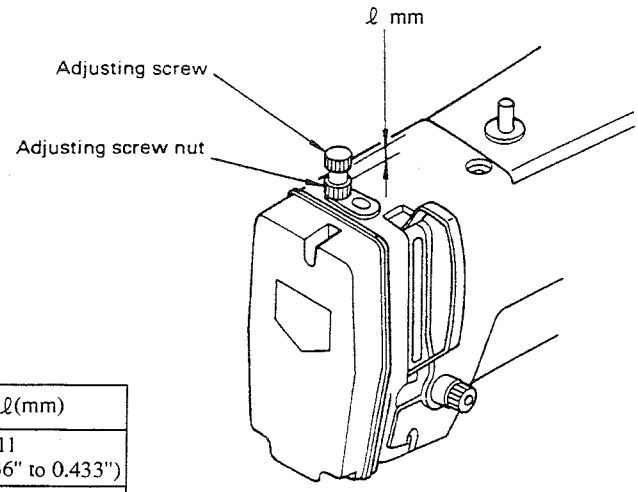


Fig. 5-8-5

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Refer to Standard Adjustment, (2) Height of the needle bar, and adjust so that the bottom end of the needle bar lower bushing aligns with the lower marker line. 2), 3) Loosen setscrew ❶ , and adjust the direction of rotation of the hook and the longitudinal direction. **(Coution)** **When adjusting the shuttle timing, be sure to turn the shuttle in the direction of the arrow shown in Fig. 5-8-2.** 4) Loosen setscrew ❷ , and turn eccentric shaft ❸ to adjust the clearance between needle and the point of the shuttle. 5) Use great care when adjusting the clearance between the needle and the point of the shuttle described in step 4). **Strike portion Ⓓ to adjust the clearance between the shuttle and the shuttle driver to 0.5 (0.019") to 0.7 mm (0.027").** **After adjustment, be sure that portion Ⓒ is equidistantly positioned vertically with respect to the shuttle.**  Fig. 5-8-6	1),2) Slightly reduce the shuttle timing for sewing floppy materials, or slightly increase it for sewing heavy-weight materials to adjust the shuttle timing. (Preventing stitch skipping) 3) If the clearance is more than 0 mm. the needle is bent by the point of the shuttle, resulting in scratches on the point of the shuttle and the needle. On the contrary, if the needle comes in excessive contact with the shuttle driver, stitch skipping may occur. 4) If the clearance exceeds the specified range (0.05 (0.002") to 0.1 mm (0.003")), stitch skipping may occur. If the clearance is inadequate, the needle hits the point of the shuttle, causing scratches on the needle and the shuttle point. The scratches may cause the thread to break or split finely. 5) If the clearance is less than 7.5 mm (0.295"), poor needle thread spreading may result, often leading to needle thread biting into the shuttle. ○ The clearance between the shuttle driver and the shuttle exceeds the specified range (0.5 (0.019") to 0.7 mm (0.027")), the shuttle produces loud noises. On the contrary, the clearance is inadequate, the needle thread fails to smoothly leave the shuttle when sewing with a thick thread. The result is loose stitches.

(9) Height of the intermediate presser adjusting screw (206C only)

The clearance between the bottom of the intermediate presser adjusting screw and the top of the intermediate presser adjusting screw nut is ℓ mm.



Type	ℓ(mm)
S, H	6 to 11 (0.236" to 0.433")
GL	0 to 11 (0" to 0.433")

Fig. 5-9-1

(10) Position of the wiper

1) With the sewing machine in a stop state with its needle up, confirm that the error LED lamp is OFF, and set the needle threading switch to "ON" to lower the feeding frame and the intermediate presser.
2) Adjust so that the clearance between the end of the wiper and the needle point or intermediate presser is 1mm (0.039") or more. (SW 6-7 is set to its OFF position.)

(Caution)
Whenever the height of the intermediate presser has been changed, reposition the wiper. Proper operation of the wiper is prevented if the clearance is less than 1mm (0.039").

3) Make sure to have more than 41mm (1.614") clearance between the end of the wiper and the needle point. Refer to Fig. 5-10-2 (SW 6-7 ON)

[Caution] For the GL type, the wiper passes under the intermediate presser. (SW6-7 is set to its ON position.) See Fig. 5-10-2

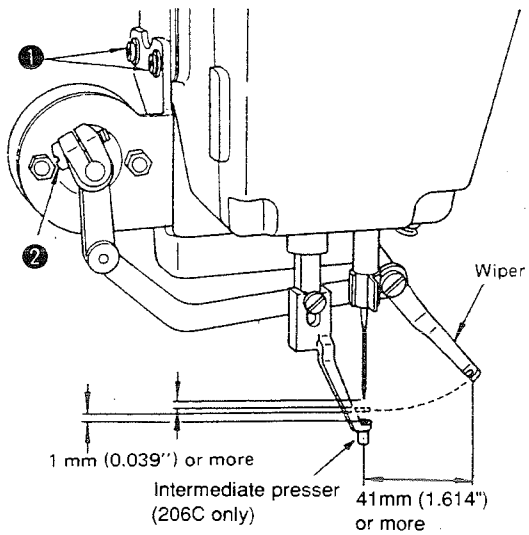


Fig. 5-10-1

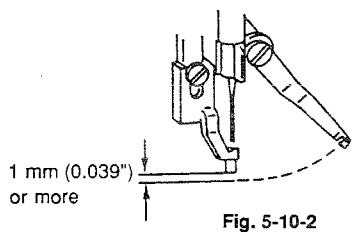


Fig. 5-10-2

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ Loosen the adjusting nut, and turn the adjusting screw to make adjustment. After adjustment, securely tighten the adjusting nut.	○ Stitch skipping will occur. ○ The intermediate presser will fail to go up upon completion of a sewing cycle.
○ Loosen setscrew ❶ and ❷, and make adjustment according to the procedure given at left. After adjustment, securely tighten the setscrew.	○ The end of the wiper may come in contact with the needle or the intermediate presser preventing proper thread wiping. ○ The needle may break or bend.

(11) Length of thread remaining on the needle

The length of the thread which remains on the needle after thread trimming is 35 (1.378") to 40 mm (1.574") measured from the needle eye.

For synthetic thread, the length of thread which remains on the needle should be increased.

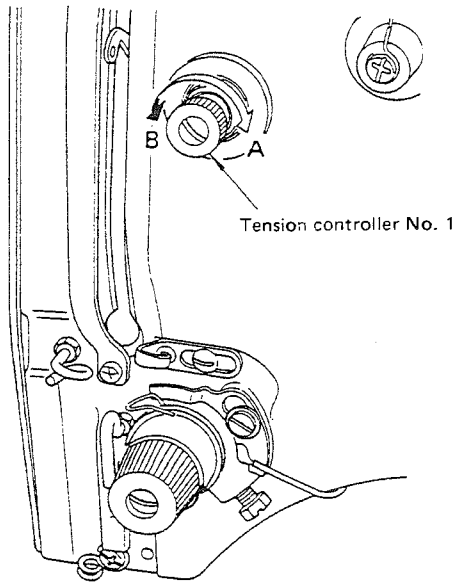


Fig. 5-11-1

(12) Thread take-up spring

Stroke : 6 (0.236") to 8 mm (0.315") (10 (0.394") to 15 mm (0.591") only for the GL type) from the horizontal L-shaped thread guide.

Tension : Should be adjusted while checking the sewing results.
(Adjust the tension of the thread take-up spring, using the trial and error procedure.)

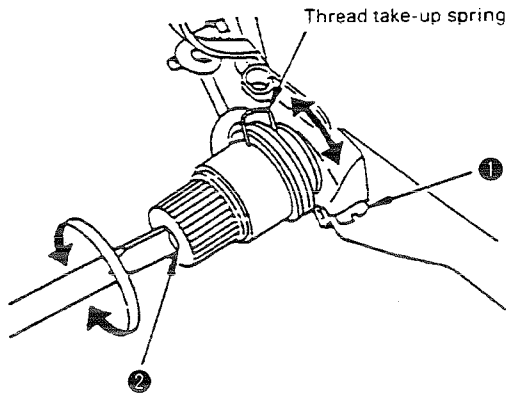


Fig. 5-12-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
Adjust the tension controller No. 1. ○ Turning it in the direction A decreases the length of the thread which remains on the needle. ○ Turning it in the direction B increases the length of the thread which remains on the needle. **(Caution)** **If the tension release timing is delayed at the time of thread trimming, the thread which will remain on the needle will be cut too short.**	○ If the thread remaining on the needle is too short, the thread may slip off the needle at sewing start. ○ If the thread remaining of the needle is too long, the needle thread may appear on the right side of the material, or make the wrong side of the material look messy.
1) Adjusting the stroke Loosen setscrew ❶, and insert a screwdriver into tension controller No. 2 ❷ and turn it to adjust the stroke. 2) Adjusting the stroke Loosen setscrew ❶ , and insert a screwdriver into tension controller No.2 ❷ , and turn it to adjust the tension. **(Caution)** **Be sure that the L-shaped thread guide is not touching the thread take-up spring.** **(When they are touching each other, tilt the L-shaped thread guide to the left side a little bit.)**	○ If the stroke is too large the thread remaining on the needle will be too short, resulting in the thread slipping off the needle at sewing start. ○ When the L-shaped thread guide and the thread take-up spring are touching each other, sewing with thin thread low tension will cause irregular and loose stitching.

(13) Thread breakage detector

1) The thread breakage detecting disc should be always in contact with the thread take-up spring in the absence of thread on the machine head.
(The slack of the thread take-up spring should be about 0.5 mm (0.019").
2) The thread breakage detecting disc should not be in contact with any other metallic parts except the thread take-up spring.

(Caution)

Whenever the stroke of the thread take-up spring has been changed, the thread breakage detecting disc must be readjusted.

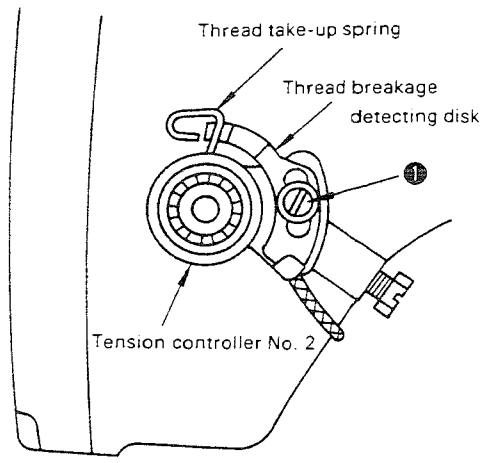


Fig. 5-13-1

(14) Moving knife and counter knife

1) When the sewing machine is in a stop state with its needle up, the clearance between the thread spreading point of the moving knife and the edge of the needle hole is 3.5 mm (0.138") (5 mm (0.197") for GL type), provided play has been eliminated by pushing the thread trimming lever in the direction of the arrow (⇦).
2) The clearance between the counter knife and the needle hole guide is 0.8 mm (0.031") to 1 mm (0.039") (1.5 mm (0.059") for GL type).

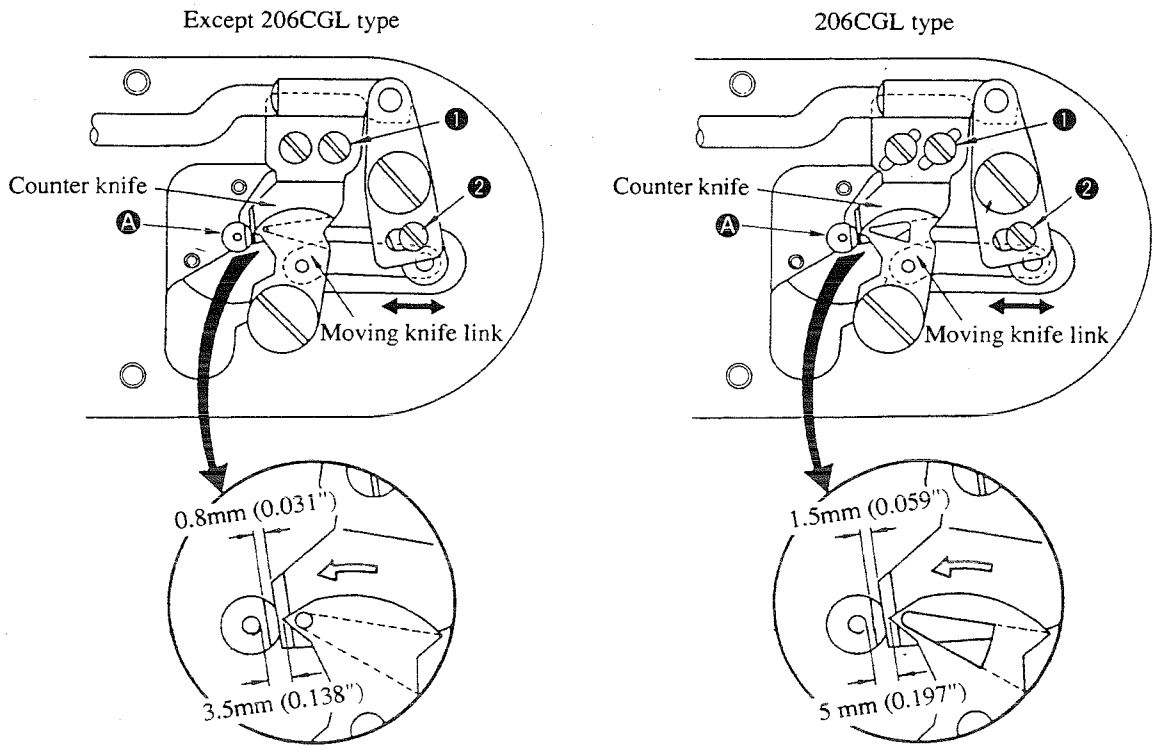


Fig. 5-14-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Loosen setscrew ❶. 2) Move the thread breakage detecting disc to achieve adjustment as described at left. After adjustment, tighten the setscrew.	1) If the thread breakage detecting disk is not in proper contact with the thread take-up spring, the sewing machine would fail to stop even when the thread breaks. 2) If the thread breakage detecting disk is falsely in contact with a metallic part other than the thread take-up spring, the sewing machine would immediately stop even when it is started.
1) Positioning the counter knife. Loosen setscrew ❶, and perform adjustment. 2) Positioning the moving knife. Loosen screw ❷, and perform adjustment. After adjustment, manually actuate the thread trimmer twice or three times to check for proper positioning. **(Note)** **Be sure that the moving knife follows the correct path indicated by needle hole guide Ⓐ.**	○ If the clearance between the counter knife and the needle hole guide is smaller than the specifid range, the threads may be falsely trimmed by the blade point of the counter knife when they are pulled by the moving knife. As a result, both the needle and bobbin threads would be trimmed too short. ○ If the clearance between the counter knife and the needle hole guide exceeds the specified range, longer thread may be left on the fabric after thread trimming. ○ If the clearance between the needle hole guide and the moving knife is the specified range, thread trimming failures may result. The needle thread may be caught on the end of the moving knife preventing the proper stitch formation. The needle may hit the moving knife and may break. ○ The bobbin increasingly runs idle.

(15) Height of the moving knife and the counter knife

(Excluding GL type)

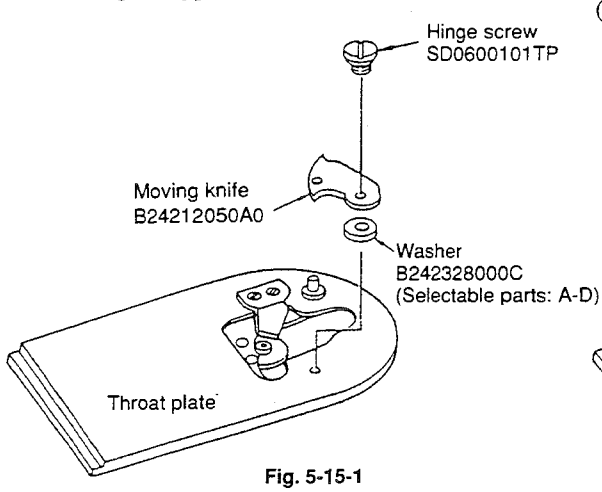


Fig. 5-15-1

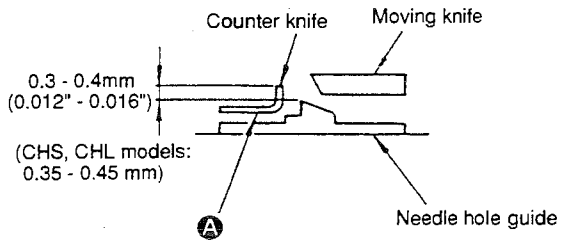


Fig. 5-15-2

(GL type)

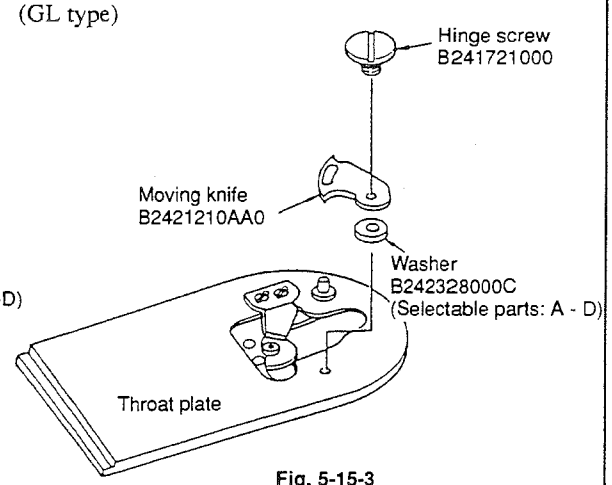


Fig. 5-15-3

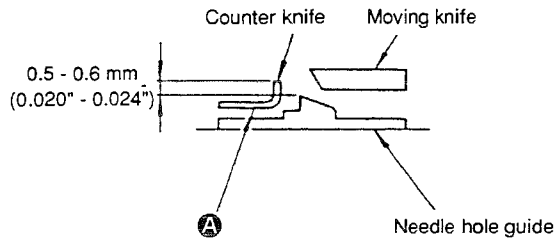


Fig. 5-15-4

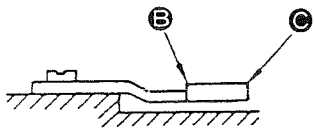


Fig. 5-15-5

Parallelism of the counter knife blade point

The counter knife blade should be parallel to the throat plate mounting surface in order to cut a pair of threads (needle and bobbin threads) evenly.
(The difference in level between Ⓑ and Ⓒ is within 5/100.)

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) After the trial thread trimming : A) If the outer thread as observed from the moving knife pivot cannot be trimmed, replace the washer with a thicker one. B) If the inner thread as observed from the moving knife pivot cannot be trimmed, replace the washer with a thinner one.	Thread trimming failures may occur.

Part No.	Name of part	Thickness
B24232800A	Moving knife washer	0.4mm (0.016")
B24232800B	"	0.5mm (0.020")
B24232800C	"	0.6mm (0.024")
B24232800D	"	0.7mm (0.028")

* If you need a washer of which plate thickness is 0.8mm (0.031") or more for the GL type of sewing machine, select two washers from among the available ones in the aforementioned table in accordance with the thickness desired and use them with overlapped.

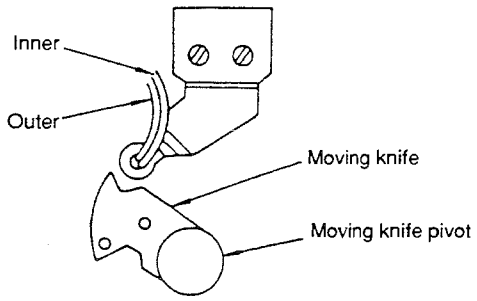


Fig. 5-15-6

2) If the above adjustment fails to correct the thread trimming failure :

A) If the specified difference in height is not obtained between the needle hole guide and the counter knife blade, pry part Ⓐ (Figs. 5-15-2, 5-15-4) out using a screwdriver to adjust the height of the needle hole guide with respect to the counter knife blade.
(At this time, be sure that the blade point is parallel to the throat plate mounting surface).

B) If the angle of the counter knife blade illustrated below is larger than 90 degrees, cut the blade.

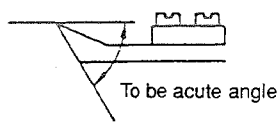


Fig. 5-15-7

3) If the corrective measures described in 1) and 2) above fails to correct the trouble, replace the moving knife or the counter knife.

(16) Thread trimming cam

1) When part Ⓐ of the cam follower is pushed down to maximize the clearance between the follower stopper and the cam follower, the clearance should be 0.2 mm (0.007"). (Fig. 5-16-2)
2) The marker line on the thread trimming cam should align with the marker dot on the main shaft. (Fig. 5-16-1)
3) At the time of thread trimming, the thread trimming cam shaft moves in the direction of the arrow. Upon completion of the thread trimming, the thread trimming cam shaft goes back to its home position with its left end surface flush with the machine arm.

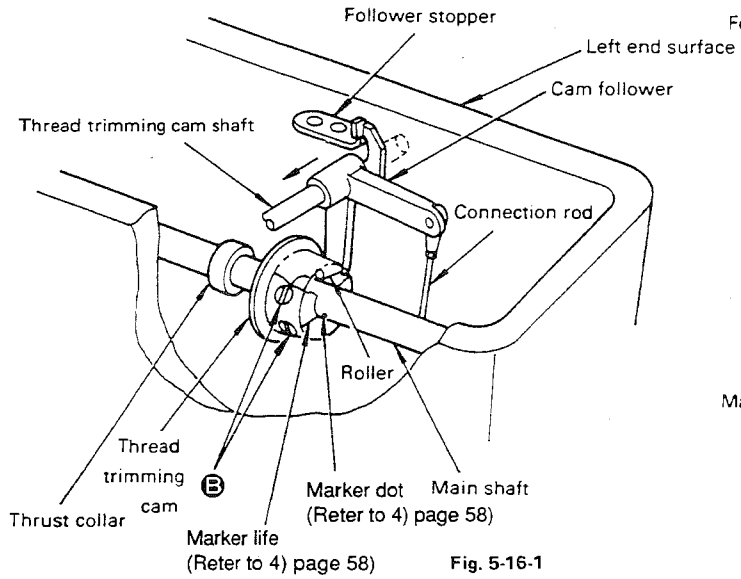


Fig. 5-16-1

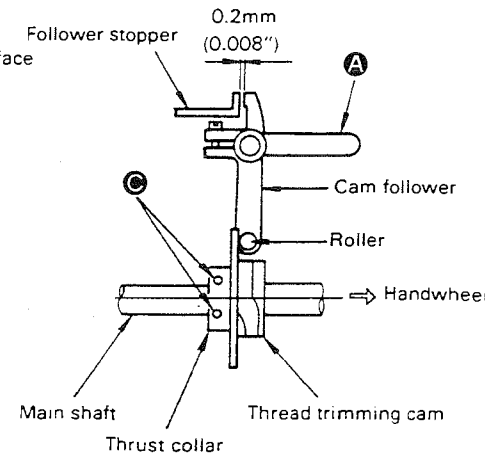


Fig. 5-16-2

(17) Amount of release of the tension disks

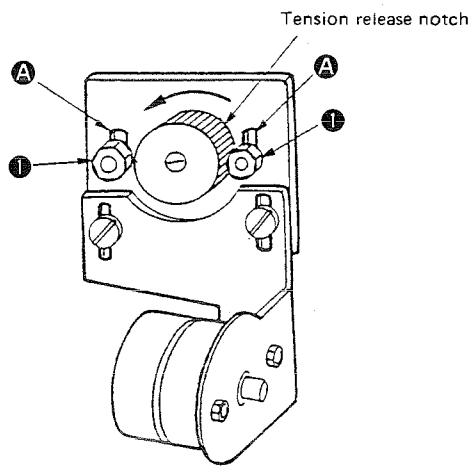


Fig. 5-17-1

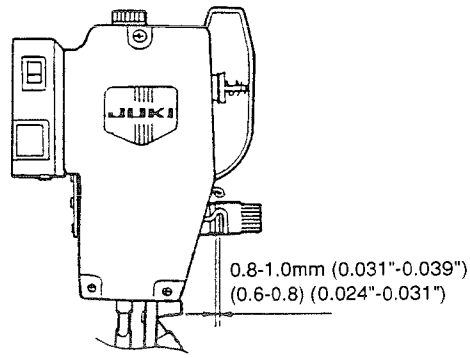
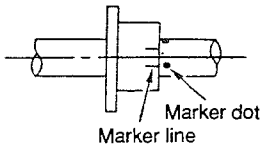
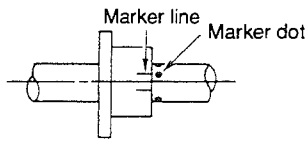


Fig. 5-17-2

Set the releasing amount of the tension disks of the tension release notch to the left (the direction indicated by the arrow) while pulling it toward you, and the tension disks of the tension controller No. 2 should be released by 0.8 (0.031") to 1.0 mm (0.039").

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Loosen setscrew Ⓑ and setscrew Ⓒ. 2) Insert a 0.2 mm (0.007") spacer between the follower stopper and the hook of the cam follower, and pull up portion Ⓐ of the cam follower so that the follower stopper, spacer, and the cam follower will come in close contact. 3) Press the thread trimming cam and the thrust collar against the cam follower roller in the direction of the handwheel. Screw the thrust collar onto the main shaft. (The main shaft has a flat section, be careful.) 4) Align the marker line on the thread trimming cam with the marker dot on the main cam. Screw the thread trimming cam onto the main shaft while pressing the thread trimming cam against the thrust collar. (Excluding GL type)  (GL type)  	1) Thread trimming failure may occur. 2) The machine may lock at the time of sewing start of thread trimming. 3) The thread trimming cam shaft will fail to return, resulting in loose stitch at the sewing start.
○ Loosen the two thread tension releasing magnet nuts ❶, adjust the tension disks to leave a space of 0.8 (0.031") to 1.0 mm (0.039") by rotating the magnet, then tighten the nuts ❶. (Follow the directions of Diassembly/Assembly Procedures (43) to perform adjustments when it is out of the adjustable range.) **(Caution)** **When power is ON, there is approximately 0.2mm (0.007") difference from the manual setting and the releasing amount will be 0.6 (0.023") to 0.8 mm (0.031"). Adjust the disks to release 0.6 (0.023") to 0.8mm(0.031") when power is ON by loosening the nuts ❶, and rotating the magnet along the oval shaped holes Ⓐ.** *** For the GL type, increase the rising amount of approximately by 0.2 mm (0.008") if you want to use a thick thread.** **(0.8 to 1.0 mm (0.031" to 0.039") when the machine is in the energized state.)**	1) The length of thread which remains on the needle after thread trimming would be too short. 2) The length of thread would be inconsistent.

(18)-1 Intermediate presser (206C type excluding the GL type)

1) After having confirmed that the error LED is OFF, repeat turning the threading switch ON and OFF several times to check the intermediate presser going up and down smoothly.
2) The edge surface of the lifting guide plate extends 2.5mm ± 0.1mm (0.098" ± 0.004") beyond the edge surface of the machine arm. (Fig. 5-18-3).
3) The bottom face of the intermediate link guide is flush with the bottom face of the intermediate presser bracket. (Fig. 5-18-4).
4) The intermediate presser bar projects 4mm ± 0.5mm (0.157 ± 0.019") - from the top end of the intermediate presser bracket. (Fig. 5-18-4).
5) The spring hook is fixed at an angle of 45 degrees against the lifting link. (Fig. 5-18-6).
6) Clearance a provided between the intermediate presser link guide and the hinge screw of the intermediate presser lifter equals to clearance b provided between the intermediate presser link guide and the intermediate presser lifting link. (Fig. 5-18-7)
7) The needle should enter the center of the hole in the intermediate presser. (Fig. 5-18-5)
8) When the main shaft is turned by hand until it reaches its highest position, the periphery of the intermediate presser cam should meet the bottom edge of the marker dot. (Fig. 5- 18-2)
9) When the main shaft is turned by hand, the intermediate presser cam should not stick against the driving arm.
10) The clearance between the adjusting screw and the adjusting nut should be 6 (0.236") to 11mm (0.433"). (Fig. 5-18-2)

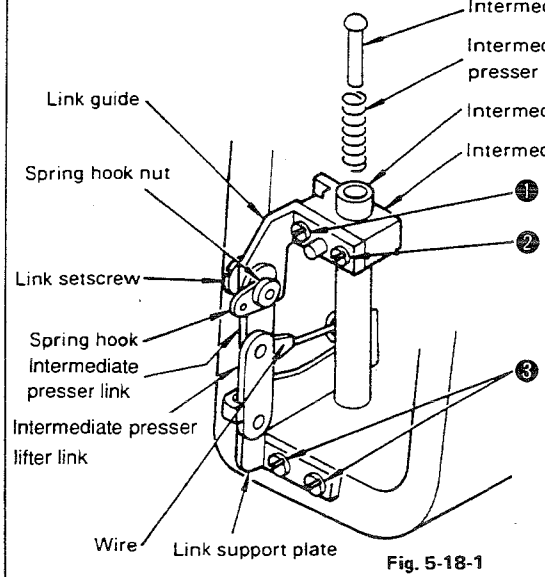


Fig. 5-18-1

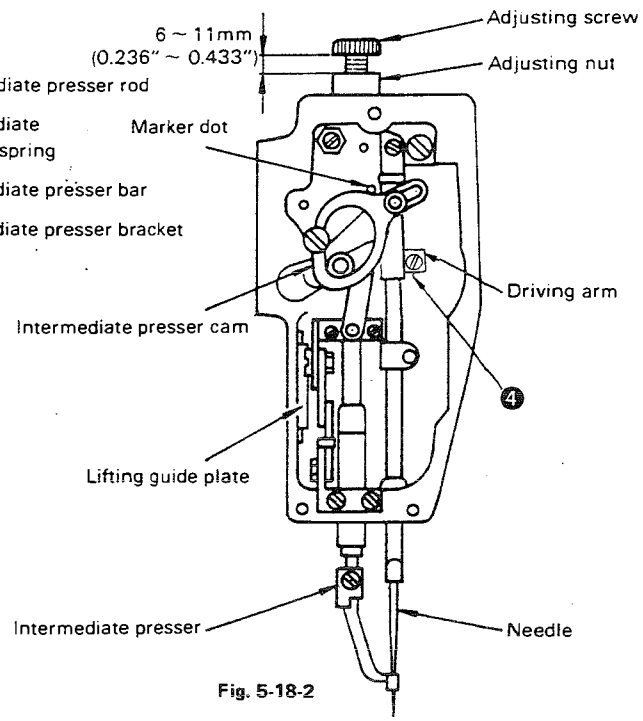


Fig. 5-18-2

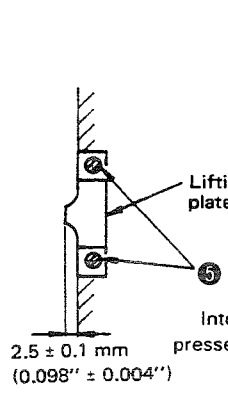


Fig. 5-18-3

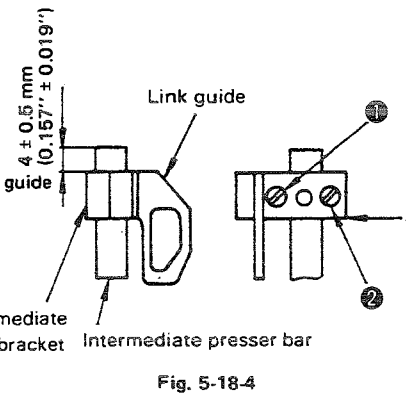


Fig. 5-18-4

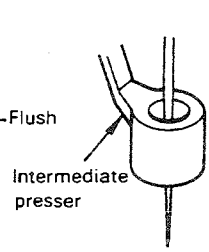


Fig. 5-18-5

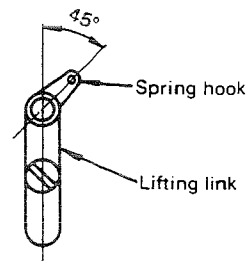


Fig. 5-18-6

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
2) Loosen setscrew ❺ , and adjust so that the front edge of the lifting guide plate extends 2.5mm ± 0.1mm (0.098" ± 0.004") beyond the machine arm. After adjustment, tighten setscrew ❺. **(Fig. 5-18-3)** 3) Loosen setscrew ❶ and ❷ , and adjust so that the bottom face of the link guide becomes flush with the bottom face of the intermediate presser bracket. Tighten setscrew ❷ . **(Fig. 5-18-4)** 4) 7) Further adjust so that the intermediate preser bar protrudes 4mm ± 0.5mm (0.157" ± 0.019") from the top edge of the intermediate presser bracket and also the needle point enters the center of the hole in the intermediate presser foot. After adjustment, tighten setscrew ❶ . **(Fig. 5-18-4, 5-18-5)** 5) Loosen the spring hook fixing nut. Adjust so that the spring hook is set at 45 degrees against the link, then tighten the nut. **(Fig. 5-18-6)** 8) 9) Loosen setscrew ❹. Turn the main shaft by hand until the needle bar reaches its highest position. Move the driving arm up or down to make the periphery of the intermediate presser cam contact the lower edge of the red marker dot. After adjustment, tighten setscrew ❹ . **(Fig. 5-18-2)** **(Caution)** **When tightening setscrew ❹ , be sure that the roll of the driving arm does not stick against the slot in the intermediate presser cam. Also, check the main shaft for smooth rotation by turning it by hand after adjustment.** 10) Adjust to provide a clearance of 6 (0.236") to 11 mm (0.433") between the adjusting screw and the adjusting nut. **(Fig. 5-18-2)** **(Caution)** **When performing the adjustments described in steps 1) through 6), be very careful never bend the wire, or else the wire may be damaged.**	o The intermediate presser may fail to go up after completion of a sewing cycle. o The needle would fail to enter the center of the hole in the intermediate presser, resulting in formation of loose stitches or the needle touching the intermediate presser. o Inadequate pressure of the intermediate presser would lead to stitch skipping trouble.

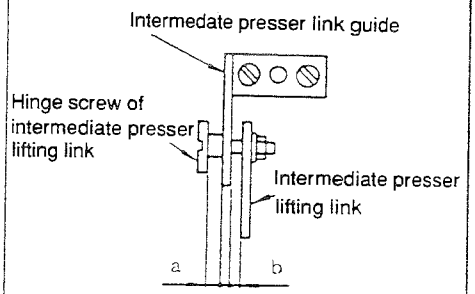


Fig. 5-18-7

(18)-2 Adjusting the intermediate presser mechanism (for the GL type only)

1) After confirming that the error LED lamp is OFF, turn the bobbin winder switch ON and OFF several times, and check that the intermediate presser smoothly moves up and down.
2) The bottom face of the intermediate presser link guide is flush with the bottom face of the intermediate presser bracket.
(Fig. 5-18-10)
3) The intermediate presser bar projects 0.5 to 1 mm (0.020" to 0.039") from the top end of the intermediate presser bracket.
(Fig. 5-18-10)
4) The needle should enter the center of the hole in the intermediate presser.
(Fig. 5-18-11)
5) Turn the main shaft by hand to bring the intermediate presser to its highest dead point. At this time, the periphery of the intermediate presser cam should meet the bottom edge of the marker dot.
(Fig. 5-18-9)
6) When the main shaft is turned by hand, the turning load torque that is generated when the intermediate presser cam is pushed against the intermediate presser driving arm, does not fluctuate greatly.
7) The clearance between the adjusting screw of the intermediate presser and the nut of the adjusting screw is 0 to 11 mm (0.433").
(Fig. 5-18-9)
8) Clearance is provided between the bottom face of the intermediate presser bracket and the intermediate presser lifting link shaft when the intermediate presser is in its lowest dead point.
(Fig. 5-18-8)
9) The lifting amount of the intermediate presser measured from its lowest dead point to its highest position (the air cylinder projects) should be 14 mm (0.551").
10) When the intermediate presser is brought to its highest position (the air cylinder projects), the intermediate presser cam fixing plate should not interfere with the intermediate presser follower arm.
(Fig. 5-18-9)

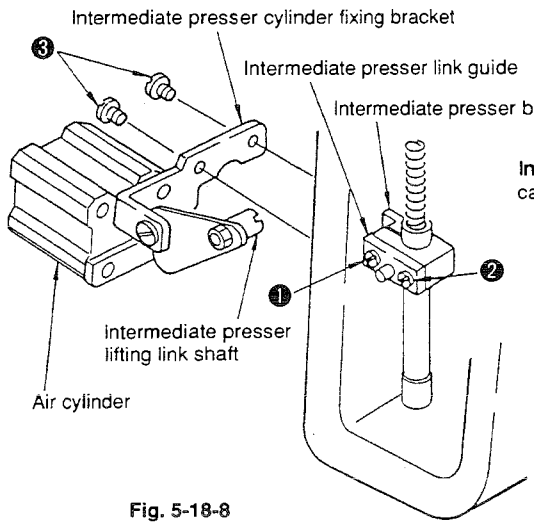


Fig. 5-18-8

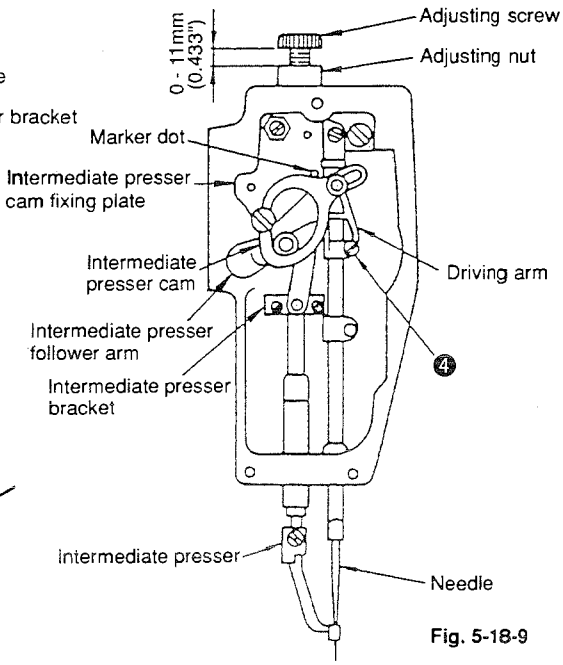


Fig. 5-18-9

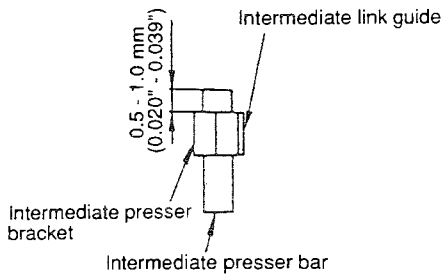


Fig. 5-18-10

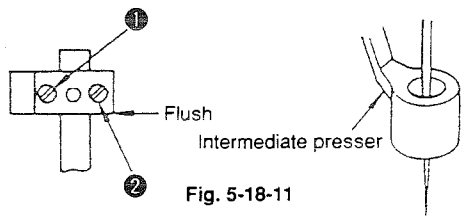


Fig. 5-18-11

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
2) Loosen screws ❶ and ❷ in the intermediate presser link guide, and adjust so that the bottom face of the intermediate presser link guide is flush with the bottom end of the intermediate presser bracket. Then, tighten screw ❷ . **(Fig. 5-18-10)** 3) 4) Further adjust so that the intermediate presser bar protrudes 0.5 to 1 mm (0.020" to 0.039") from the top face of the intermediate presser bracket and that the needle enters the center of the needle hole in the intermediate presser. Then tighten screw ❶ in the intermediate presser link guide. **(Fig. 5-18-10) (Fig. 5-18-11)** 5) 6) Loosen screw ❹ . Turn the main shaft by hand to bring the needle bar to its highest dead point. Move the intermediate presser driving arm up or down to adjust so that the periphery of the intermediate presser cam aligns with the lower edge of the red marker dot. Then tighten the screw. **(Fig. 5-18-9)** 7) Adjust so that a clearance of 0 to 11mm (0.433") is provided between the intermediate presser adjusting screw and the nut of the adjusting screw. **(Fig. 5-18-9)** 8) Loosen screws ❸ , and adjust the attaching position of the intermediate presser cylinder fixing bracket so that the bottom of the intermediate presser bracket does not come in contact with the intermediate presser lifting link shaft when the intermediate presser is in its lowest dead point. **(Fig. 5-18-8)** 9) Loosen screw ❸ , and adjust the attaching position of the intermediate presser cylinder fixing bracket so that the max. lifting amount of the intermediate presser becomes 14 mm (0.551"). **(Fig. 5-18-8)** **[Note]** **The max. lifting amount of the intermediate presser is the difference in height between the lowest dead point and the highest point of the intermediate presser.** 10) Loosen screw ❸ , and adjust the attaching position of the intermediate presser cam fixing plate so that the intermediate presser cam fixing plate does not come in contact with the intermediate presser follower arm when the intermediate presser is brought to its highest position. **(Fig. 5-18-8)**	o The intermediate presser may fail to go up after the completion of a sewing cycle. o The needle would fail to enter the center of the needle hole in the intermediate presser, resulting in formation of loose stitches or the needle touching the intermediate presser. o Inadequate pressure of the intermediate presser would lead to stitch skipping. o Oil would leak from the wiper link plate. o The lifting amount of the intermediate presser is insufficient. o Metallic noise (like click-clack) is heard while the intermediate presser actuates.

(19) Intermediate presser wire (excluding the GL type)

The clearance between the lifting link and the link support plate should be 0.5 (0.020") to 1.0 mm (0.040"). (Fig. 5-19-1)

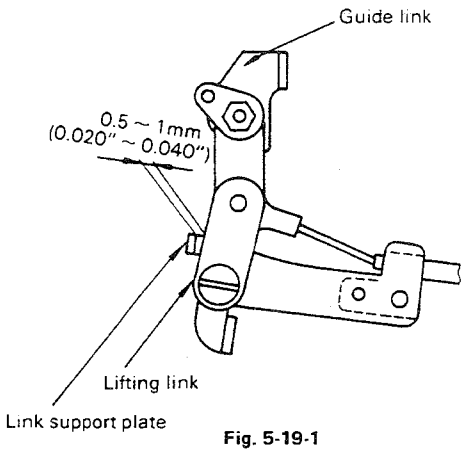


Fig. 5-19-1

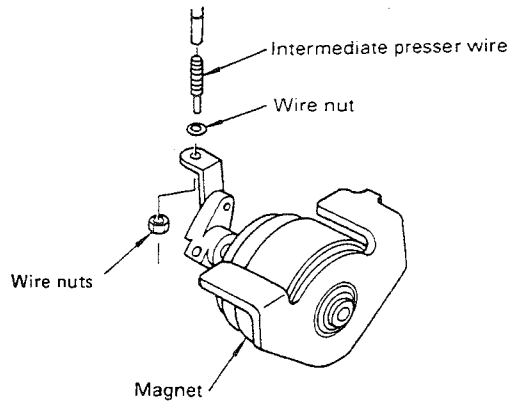


Fig. 5-19-2

(20) Feeding frame lowering (Only for the machine with the feeding frame lowering pedal)

Feeding frame goes down when the feeding frame lowering pedal is pressed down in the direction of the arrow (↓).

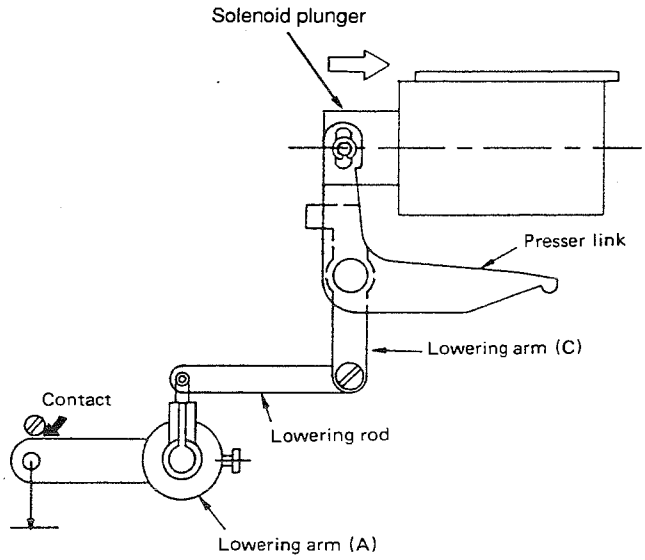


Fig. 5-20-1

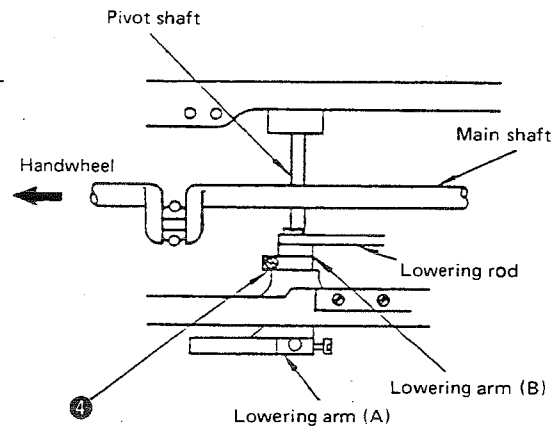


Fig. 5-20-2

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ Loosen the wire nuts connected to the intermediate presser solenoid located at the bottom of the machine bed. Adjust so that a clearance of 0.5 (0.020") to 1.0 mm (0.040") is provided between the lifting link and the link support plate. Tighten the nuts.	○ The guide link hits the guide link hinge screw, preventing proper vertical motion of the intermediate presser. As a result, stitches may be skipped. (Abnormal sound would be heard. The wire may be damaged.)
1) Loosen the setscrew ❹ on the lowering arm (B). 2) Press the solenoid plunger to the arrow (⇨) direction. Press the lowering arm (C) to the presser link. 3) Press the lowering arm (A) to the end surface of the arm, and tighten the lowering arm (B) and setscrew ❹. At this time, be sure that the pivot shaft is not loose.	○ When the feeding frame lowering pedal is depressed: 1) It does not operate immediately 2) The feeding frame fails to come in close contact with the feeding plate. ○ When the feeding frame lowering pedal is released: 1) The lift of the feeding frame will be inadequate.

(21) Bobbin winding

○ The bobbin holder should release the bobbin when the bobbin has been wound 80% full.

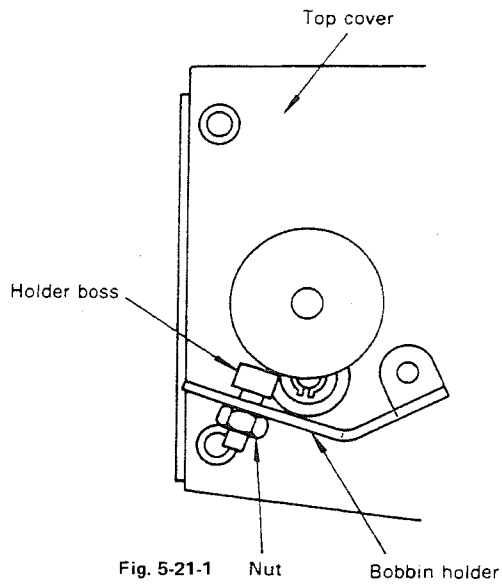


Fig. 5-21-1

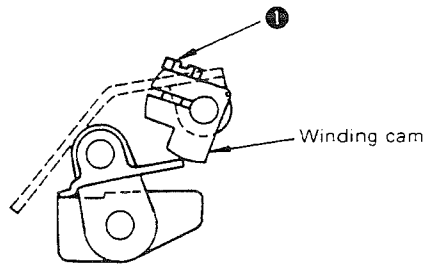


Fig. 5-21-2

(22) Bobbin winder driving wheel

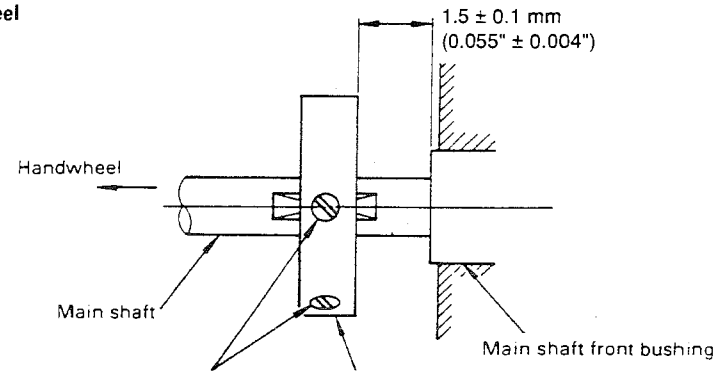


Fig. 5-22-1

(23) Height of the throat plate auxiliary cover (206C only)

The throat plate surface should be flush with the top surface of the throat plate auxiliary cover.

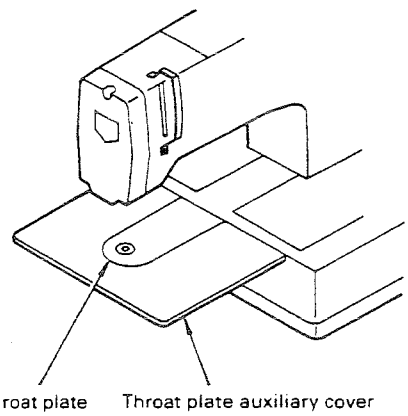


Fig. 5-23-1

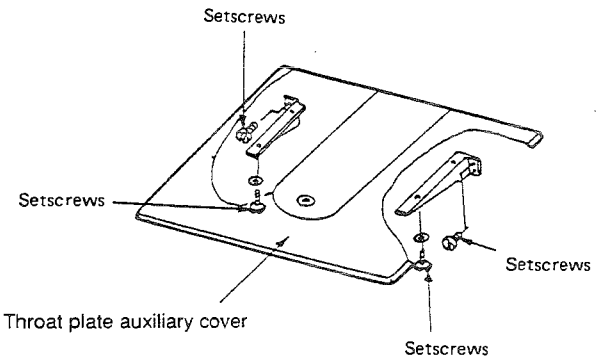


Fig. 5-23-2

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Loosen the bobbin holder boss nut. Turn the bobbin holder boss to adjust so that the bobbin holder releases the bobbin when the bobbin has been wound 80% full. After adjustment, tighten the nut. 2) If the above adjustment does not work, loosen setscrew ❶ at the rear of the top cover, and adjust the angle of the bobbin holder. After adjustment, tighten setscrew ❶.	○ Improper amount of thread would be wound on the bobbin.
Loosen the setscrews. Adjust to provide a clearance of 1.5 mm ± 0.1 mm (0.055" ± 0.004") between the edge face of the bobbin winder driving wheel and the edge face of the main shaft front bushing.	○ The bobbin fails to spin even if it is set on the bobbin winder.
1) Loosen the setscrews of the throat plate auxiliary cover supports and the setscrews of the throat plate auxiliary cover. 2) Move the throat plate auxiliary cover up or down to adjust so that the throat plate surface becomes flush with the top face of the throat plate auxiliary cover. Tighten the setscrews.	The feed plate would be caught by the stepped part formed by the throat plate and the throat plate auxiliary cover, resulting in deformed pattern.

(24) Height of the presser plate (S type only)

The clearance between the presser plate bearing and the presser plate should be 1 mm (0.039").

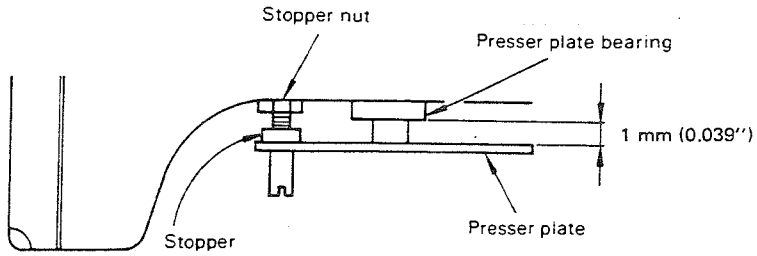


Fig. 5-24-1

(25) Feed bracket auxiliary cover

When the feed bracket is moved laterally and longitudinally by hand, the feed bracket should move smoothly without sticking against the feed bracket auxiliary cover, and the throat plate auxiliary cover should not stick against the feed bracket auxiliary cover. At this time, the Y movable cover moves smoothly with no hindrance.

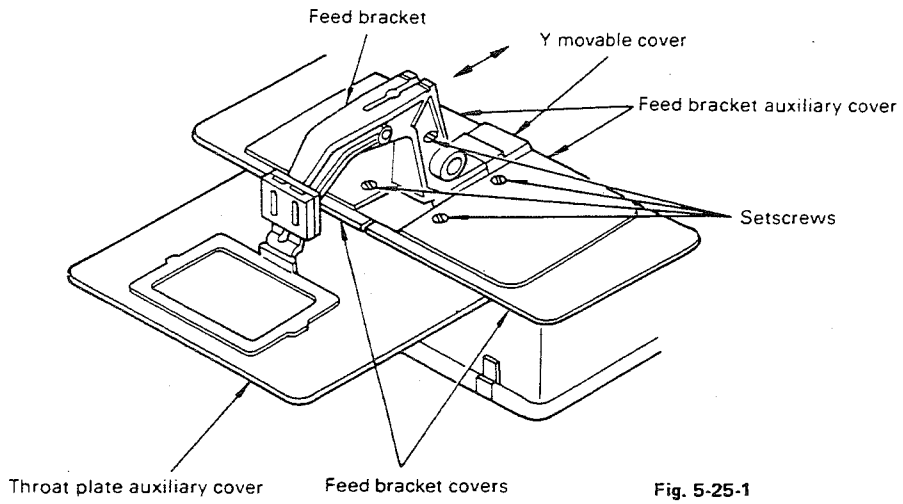


Fig. 5-25-1

(26) X guide shaft support

When the feed bracket is moved laterally by hand, both ends of the X guide shaft support should not move up and down.

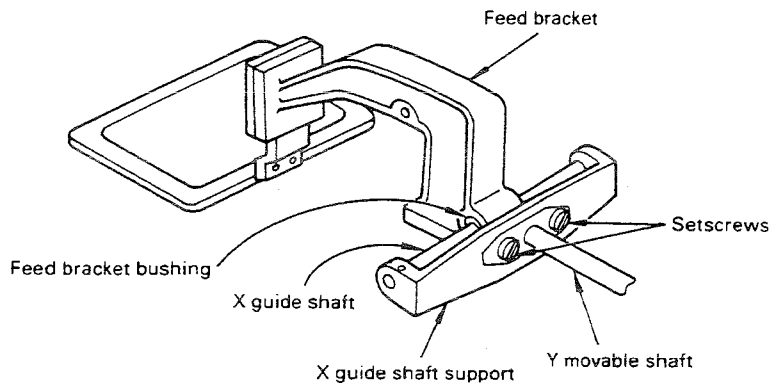
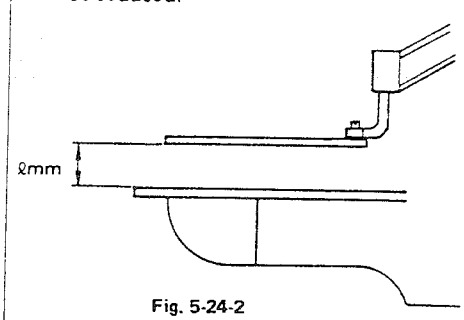


Fig. 5-26-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ Loosen the stopper nut. Turn the stopper to adjust the clearance between the presser plate bearing and the presser plate to the specified value. Tighten the nut.	○ Lift ℓ mm of the feeding frame will be reduced.  Fig. 5-24-2
○ Loosen the setscrews of the feed bracket auxiliary cover. Move the feed bracket auxiliary cover to achieve the adjustment as described at left. After adjustment, tighten the setscrews.	The pattern may be deformed.
○ Loosen the setscrews of the Y movable shaft. Adjust to make the X guide shaft parallel to the hole in the feed-bracket bushing. Tighten the setscrews.	The pattern may be deformed.

(27) X-direction feed belt tension

Move the feed bracket fully to the left. Adjust so that the X-direction feed belt slacks 1.3 mm (0.051") when a load of 800 g is applied to the middle (shown by the arrow) of the right belt.

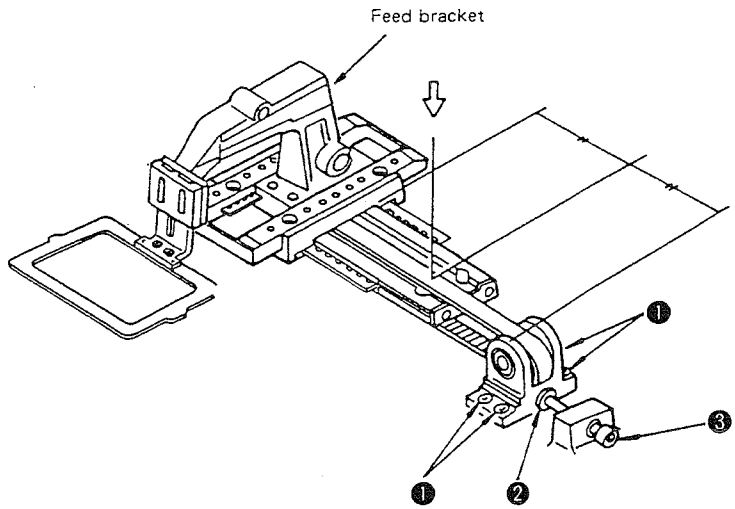


Fig. 5-27-1

(28) Y-direction feed belt tension

Adjust so that the Y-direction feed belt slacks 1.4 mm (0.055") when a 800 g load is applied to the middle (indicated by the arrow) of the Y-direction feed belt located inside the machine arm.

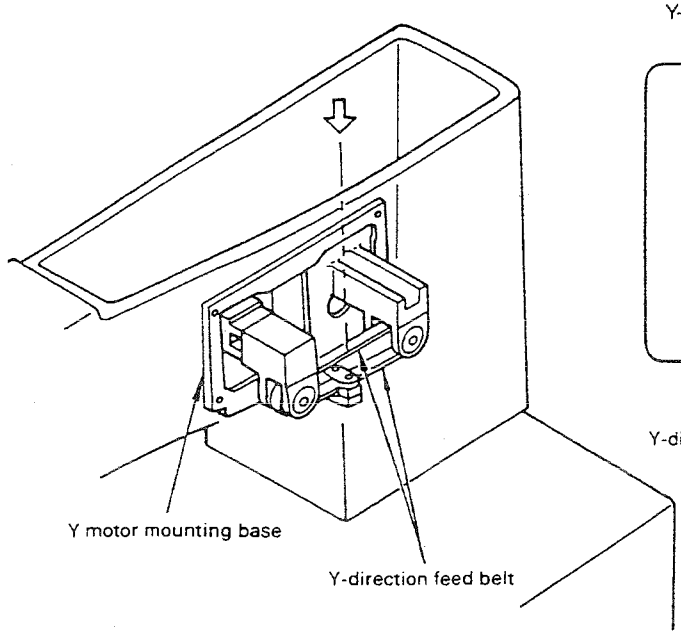


Fig. 5-28-1

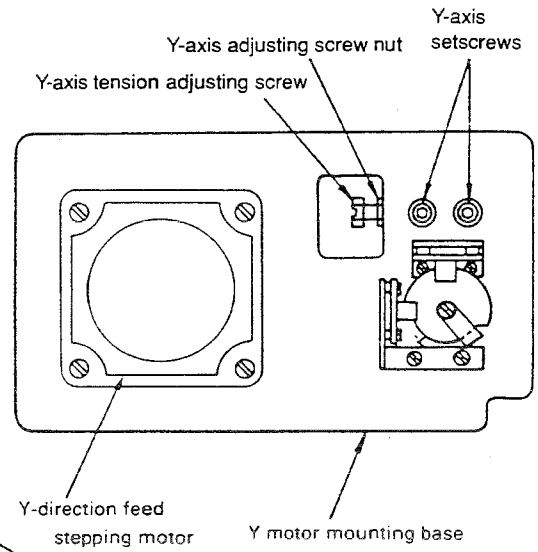


Fig. 5-28-2

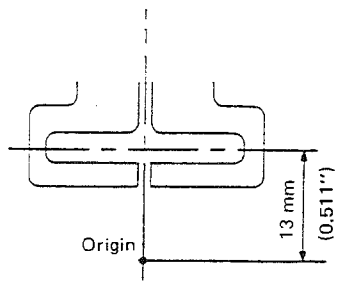
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
Loosen screw ❶ and nut ❷. Turn tension adjusting screw ❸ to adjust the belt tension. Tighten screw ❶ and nut ❷. **(Caution)** **Tightening screw ❶ will affect the belt tension. So, check the belt slack again after tightening the screw ❶.**	**The pattern would be deformed.** (If the belt tension is adjusted to a value that exceeds the adjustment value given on the left column, the belt may break.)
1) Remove the Y motor mounting base cover. 2) Loosen the Y-axis bracket setscrews and Y-axis tension adjusting screw, turn the Y-axis belt tension adjusting screw using a spanner to adjust the belt tension. 3) Tighten the Y-axis bracket setscrews and Y-axis belt tension adjusting screw nut. Reinstall the Y motor mounting base cover. **(Caution)** **Tightening the bracket setscrews will affect the belt tension. So, check the belt slack again after tightening the bracket setscrews.**	**The pattern would be deformed.** (If the belt tension is adjusted to a value that exceeds the adjustment value given on the left column, the belt may break.)

(29) X/Y origins and travel limit sensor

(A) Adjusting the X-axis origin and travel limit sensor

1) Open the control box cover. Set the arrow of the rotary DIP switch (SW5) in the left bottom on the MAIN circuit board to "7."
2) Turn the power switch ON. Step on the foot switch. The feed bracket will refer to the origin and the work clamp will rise.

(205C)



There is 13 mm (0.511") clearance between the center of the work clamp foot and the origin.

Fig. 5-29-1

(206C)

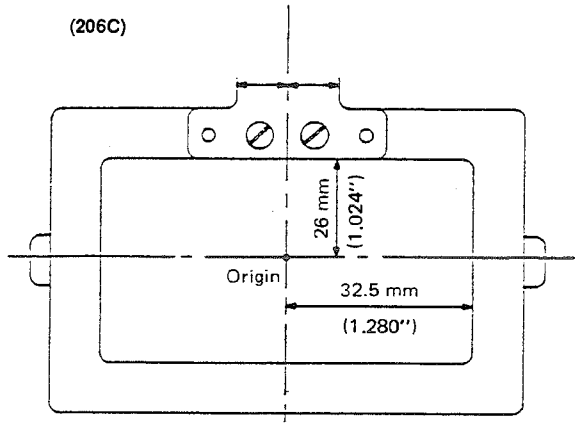
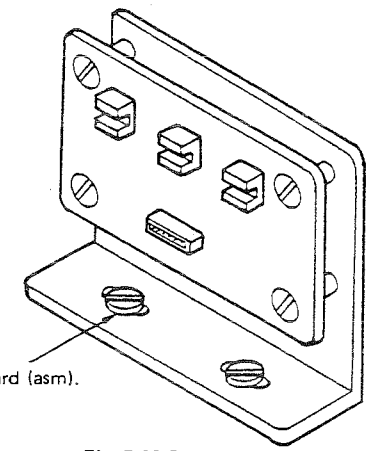


Fig. 5-29-2

(Note) The origin and the center of the feeding frame are not aligned.



Setscrew of the X sensor circuit board (asm).

Fig. 5-29-3

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
(A) Adjusting the X-axis origin and travel limit sensor 1) Remove the feed bracket auxiliary cover (right) and the feed bracket cover (right). 2) Remove the control box cover. 3) Set the SW5 to "1" and turn the power switch ON. 4) Loosen the pair of setscrews (Fig. 5-29-3) on the X sensor circuit board. 5) Move the feed bracket as Fig. 5-29-1 and Fig. 5-29-2 indicate. 6) Slide the X sensor circuit board between right and left. Tighten the pair of set screws (Fig. 5-29-3) on the X sensor circuit board at the point when the error LED (on the front side of the control box) lights ●●●⇔●○●. 7) Turn the power switch OFF. 8) Set SW5 to "7." 9) Turn the power switch ON. 10) Press down the foot switch. 11) The feeding frame goes down to the origin. When it finds the origin, it goes up. 12) Lower the needle by rotating the main shaft to confirm that the position of the work clamp foot, feeding frame and the origin are as indicated in Fig. 5-29-1 and the Fig. 5-29-2. * The travel limit is automatically set when the origin is adjusted.	

(B) Adjusting the Y-axis origin travel limit sensor

1) Set the SW5 to "2."
2) Turn on the power switch ON, then slide the feed bracket backward. The error LED changes from ● ○ ● to ○ ○ ● and the clearance between the travel limit and the feeding frame is 10 mm (0.393") as shown in Fig. 5-29-4.
3) Slide the feed bracket forward. The error LED changes from ● ● ● to ○ ● ● and the clearance between the travel limit point and the feeding frame is 5 mm (0.196") as shown in Fig. 5-29-5.

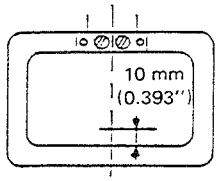


Fig. 5-29-4

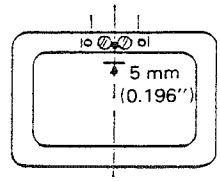


Fig. 5-29-5

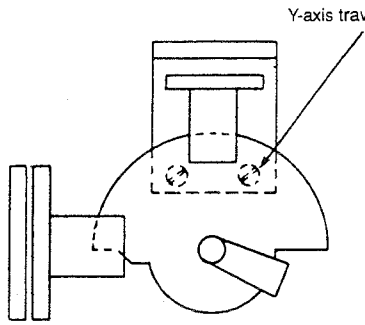


Fig. 5-29-6

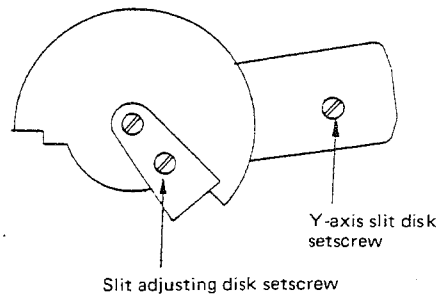


Fig. 5-29-7

(30) Shuttle race ring

If the shuttle point wears out severely, remove the shuttle race ring and check whether or not the hatched portion illustrated has a dimension of 0.2 mm x 8 mm (0.008" x 0.035").

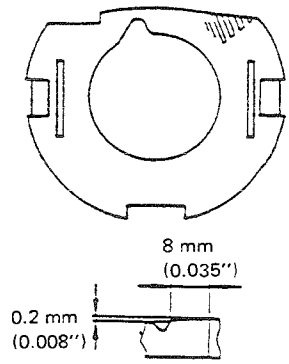


Fig. 5-30-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
(B) Adjusting the Y-axis origin and travel limit sensor 1) Set SW5 to "2." 2) Turn the power switch ON. Set the feed bracket as shown in Fig. 5-29-1, for 205C and Fig. 5-29-2 for 206C. 3) Loosen the Y-axis slit disk setscrew (Fig. 5-29-6). Fix the Y-axis slit disk by tightening the setscrew when the error LED changes from ●●● to ●○●. 4) Loosen the Y-axis travel limit setscrew. 5) Slide back the feed bracket to the position indicated in Fig. 5-29-4. Tighten the Y-axis travel limit sensor setscrew when the error LED changes to ●○● ⇄ ○○●. 6) Tighten the slit adjusting disk setscrew. 7) Slide the feed bracket forward. Move the slit adjusting disk in the position of Fig. 5-29-5, so that the error LED changes to ●●● ⇄ ●○● then tighten the slit adjusting disk setscrew. **(Caution)** **Since 205C is only for bartacking, adjust only the origin position. For the travel limit make sure that the setscrews are well tightened. Set the SW5 to "zero" after completing the adjustment.**	
·○ If the hatched portion does not have the 0.2 mm x 8 mm (0.008" x 0.035") dimension, correct it using an oilstone.	

(31) Removing the play from the shuttle driver shaft

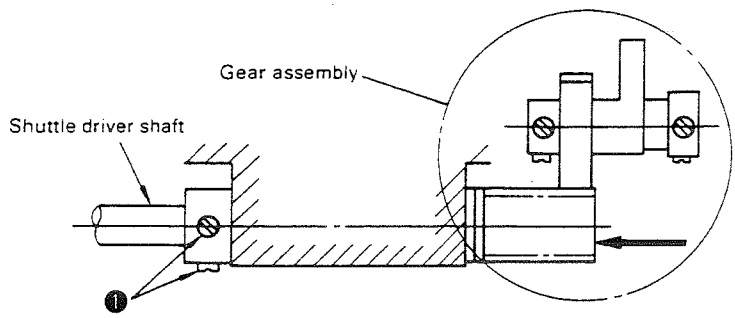


Fig. 5-31-1

(32) Providing the main shaft with proper play

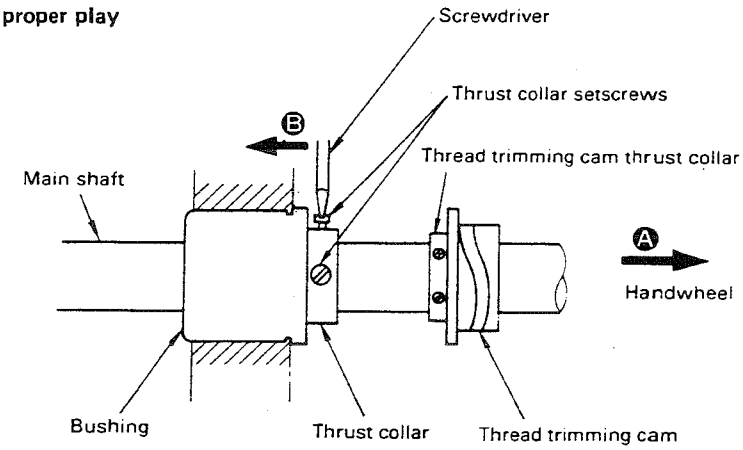


Fig. 5-32-1

(33) Belt tension

The middle of the belt shown by the arrow should slack 10 mm (0.393") when it is subjected to a 1 kg load.

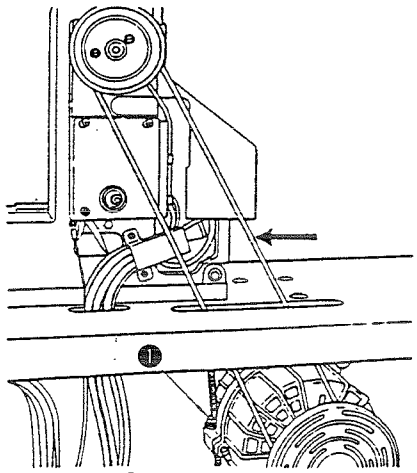


Fig. 5-33-1

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ Axial play Loosen two setscrews ❶, and push the shuttle driver shaft in the direction of the arrow, then tighten the setscrews. ○ Rotational play Select the proper shuttle driver shaft gear assembly from those listed below:	
○ Push the thrust collar in the direction Ⓑ while pulling the handwheel in the direction of Ⓐ, then fix the thrust collar.	
Loosen nuts ❶, and move the motor up or down to obtain the proper belt tension. After adjustment, tighten the nuts.	○ The vibration of the belt may increase, resulting in larger vibration of the sewing machine.

Part Name	Part No.
Shuttle driver shaft gear asm. (Y) (0.2mm dia. small)	B18112050AY
Shuttle driver shaft gear asm. (Z) (0.1mm dia. small)	B18112050AZ
Shuttle driver shaft gear asm. (A) (Standard)	B18112050AA
Shuttle driver shaft gear asm. (B) (0.1mm dia. large)	B18112050AB
Shuttle driver shaft gear asm. (C) (0.2mm dia. large)	B18112050AC

(34) Adjusting the pneumatic components

(A) Adjusting the air supply (L type only)

1) Connect quick-coupling socket joint plug ❶ to the air source. When you open air cock ❷, pressure gauge ❹ will indicate value A. (Fig. 5-34-1)

2) If pressure gauge ❹ indicates a value smaller than B, the machine will stop lighting up the error LED on the operation panel. (Fig. 5-34-1)

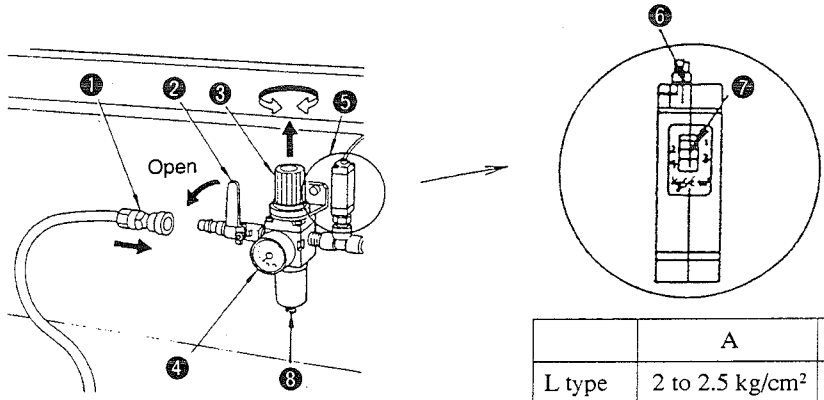


Fig. 5-34-1

	A	B
L type	2 to 2.5 kg/cm²	1 kg/cm²
GL type	5 to 5.5 kg/cm²	4 kg/cm²

(B) Adjusting the pressure reducing valve (GL type only)

1) The compressed air on the push-out side of the work clamp cylinder is reduced to 2 to 2.5 kg/cm².

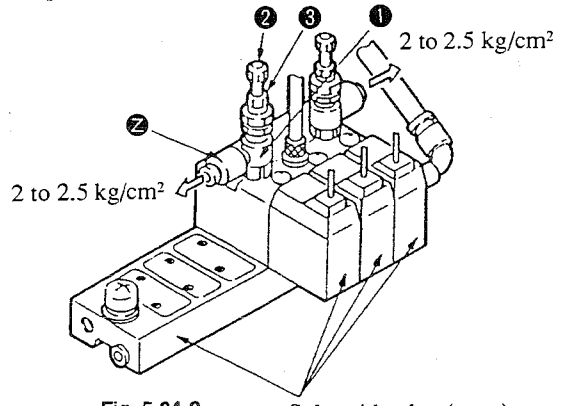
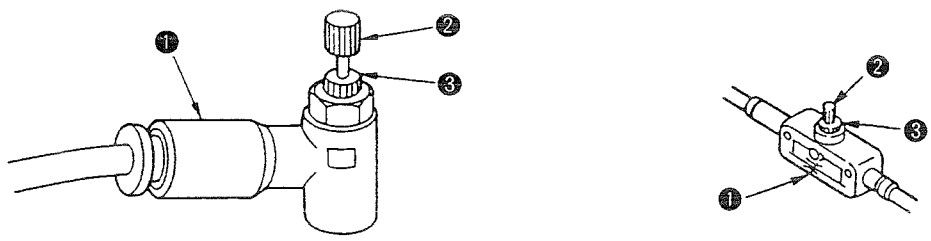


Fig. 5-34-2 Solenoid valve (asm.)

(C) Adjusting the speed controller (L type only)

1) Adjust the lifting/lowering speed of the feeding frame properly.

2) If using your machine with a double stepped feeding frame, adjust the lifting/lowering speed of the right- and left-hand sections of the feeding frame to an equal value.



L type (Excluding the GL type) GL type

Fig. 5-34-3

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1) Open air cock ❷. Then pull up air regulator knob ❸ and turn it until pressure gauge ❹ indicates value A. Then push the knob down to fix it at that position. (Fig. 5-34-1) 2) Adjust so that the pressure gauge indicates a value lower than B following the procedure same as 1). Turn adjusting screw ❻ of pressure switch ❺ until point ❼ indicates value B. (Fig. 5-34-1) Turn ON the power to the sewing machine. Press the Set Ready switch on the operation panel, and confirm that error ● ● ○ is indicated on the panel when making the machine read out a pattern. **(Caution)** **After the adjustment, re-set the value indicated on pressure gauge ❹ to value A and confirm that error ● ● ○ is no longer indicated on the panel.**	1) Malfunction related to the feeding frame or the intermediate presser will result. The sewing machine stops while indicating error ● ● ○ on the operation panel. 2) The machine fails to detect a drop of the compressed air pressure. The sewing machine stops showing error ● ● ○ on the operation panel even if the normal operating pressure (value A) is obtained. ※ To set the air pressure to 0 kg/cm², close air cock ❷ and push-button ❽.
1) Under the sewing state, remove the air hose by pressing section ❼ of pressure reducing valve ❶ that is fixed on the solenoid valve (asm.). Then connect a pressure gauge which is commercially available. (Fig. 5-34-2) Depress the feeding frame switch five times or more, and turn needle knob ❷ of pressure reducing valve ❶ until the pressure gauge connected to the pressure reducing valve indicates a pressure of 2 to 2.5 kg/cm². Then fix the needle knob at the adjusted position with nut ❸. Then, securely connect the air hose to the solenoid valve (asm.) that has been removed before the adjustment. (Fig. 5-34-2)	1) An adequate clampling pressure will not be provided. 2) The feeding frame may fail to go up to the highest position of its stroke.
1) Adjust needle knob ❷ of speed controller (A)❶, then fix the knob at the adjusted position with nut ❸.	1) The lifting/lowering speed of the feeding frame will be too fast or too slow. 2) The intermediate presser may fail to go up smoothly. High-pitch metallic noise may sound when the intermediate presser actuates.

(35) Removing the handwheel and generator stator

1) Loosen two setscrews ❸ , and remove the handwheel.
2) Remove two setscrews ❹ of the generator stator, and loosen the two inner setscrews ❺ .
3) Remove the generator stator.

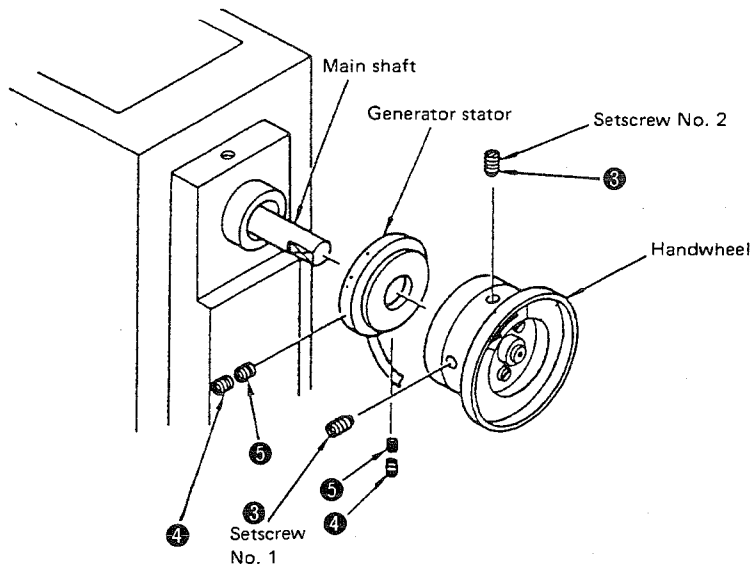


Fig. 5-35-1

(36) Removing the shuttle driver shaft

1) Loosen shuttle driver setscrew ❶ , and remove the shuttle driver.
2) Loosen two thrust collar setscrews ❷ , and draw the shuttle driver shaft off arrow direction.

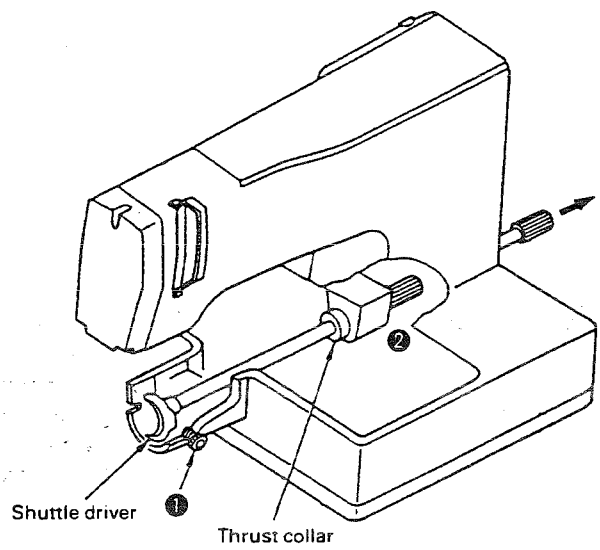
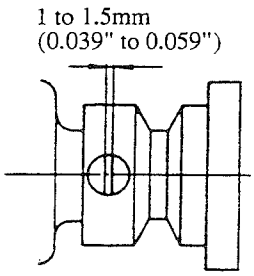
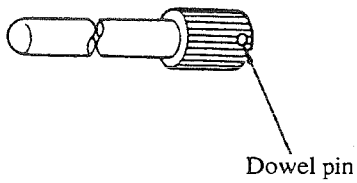


Fig. 5-36-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ LOCK-TITE is applied to screw ❹ in the generator stator.	○ When installing the generator stator, be sure that its setscrews face just to the left side and just below. ○ When fixing the handwheel, be sure that the setscrew No. 1 is located on the flat part of the main shaft. Adjust so that a clearance of 1 to 1.5 mm (0.039" to 0.059") is provided between the generator stator and the handwheel. (Fig. 5-35-2)  **Fig. 5-35-2**
○ When removing the shuttle driver shaft, never remove the dowel pin from the shuttle driver shaft gear, otherwise the shuttle driver shaft needle bearing will be damaged.  **Fig. 5-36-2**	○ When assembly the same gear assembly, be sure to assembly it so that the teeth contact exactly in the same manner as before in order to prevent loud gear noise.

(37) Removing the oscillating rock and crank rod

1) Loosen setscrew ❶.
2) Loosen two setscrews ❷ and two setscrews ❸.
3) Remove the oscillating rock backward.
4) Remove setscrews ❹, and remove the crank rod and oscillating rock.

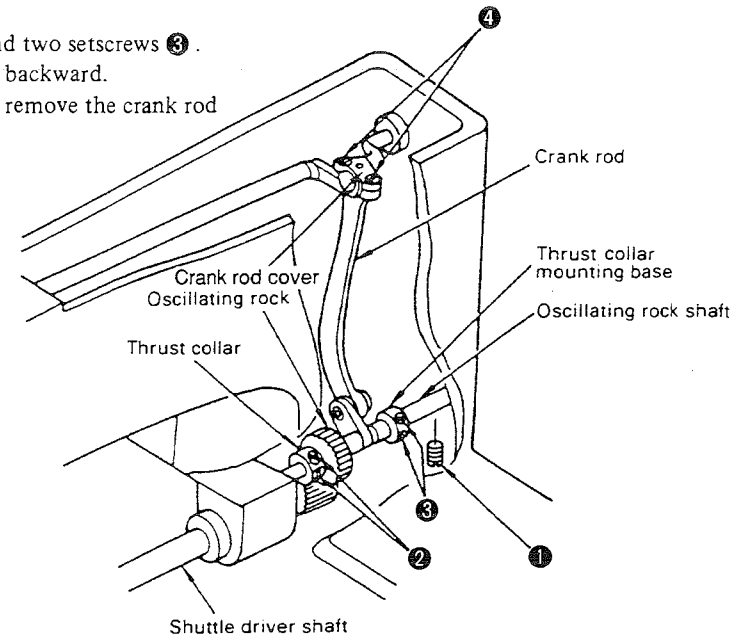


Fig. 5-37-1

(38) Removing the thread trimmer mounting base and solenoid

1) Remove setscrews ❶.
2) Remove the thread trimmer mounting base.
3) Loosen setscrew ❸ to release the solenoid bracket.
4) Remove the solenoid bracket.
5) Remove lock nuts ❷ to release the thread trimming solenoid.
6) Remove the thread trimming solenoid.
7) Remove the lead of thread trimming solenoid from the connector.

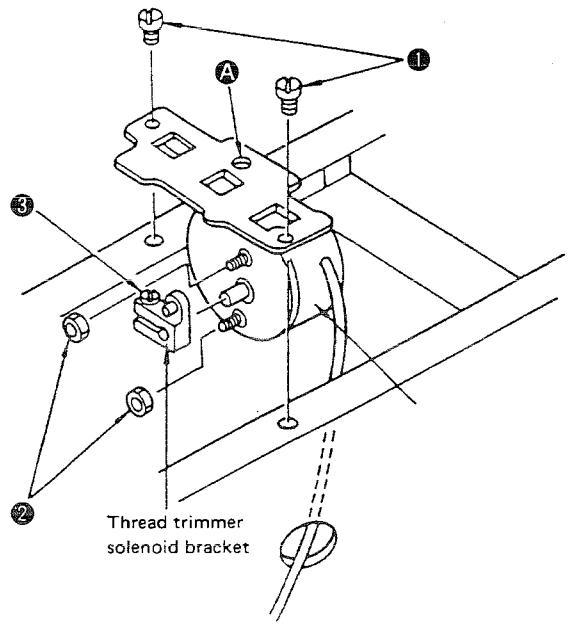
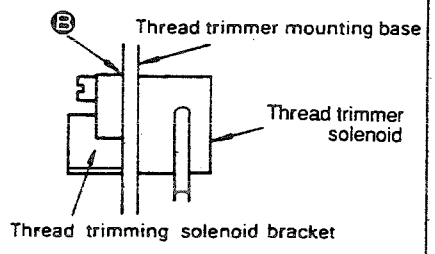


Fig. 5-38-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ Pay attention to the orientation of the cap of the crank rod. Oscillating rock B1805980000 — CSS, CSL D1805MLBH00 — CHS, CHL, CGL	○ Be sure that the oscillating rock is free from axial play. ○ If the main shaft does not turn smoothly, correct the mounting position of the thrust collar and the thrust collar mounting base.
○ Note that the thread trimming solenoid lock nuts are fixed using the LOCK-TITE paint. ○ When you want to remove the connector pin of the thread trimming magnet from the connector, refer to "9-9. Solenoid circuit diagram (TRIMMER SOL)."	○ Fix the thread trimming solenoid lock nuts ❷ by applying LOCK-TITE No. 601 after defatting them. ○ To fix the thread trimming solenoid bracket, press the cam shaft thrust collar against the cam follower after fixing the thread trimmer mounting base. Then, insert a screwdriver through Ⓐ of the thread trimmer mounting base, and tighten setscrew ❸ (Fig. 5-38-2). At this time, adjust the clearance Ⓑ between the trimming solenoid bracket and the thread trimmer mounting base to 0 mm.  Fig. 5-38-2 ○ The ⊕ and ⊖ are not designated at all for the two magnet leads.

(39) Removing the thread trimming cam shaft

1) Loosen both of the thrust collar setscrews ❶.
2) Remove the E ring ❷.
3) Draw out the thread trimming cam shaft in the direction of the arrow. Remove the resetting spring and the thrust collar.

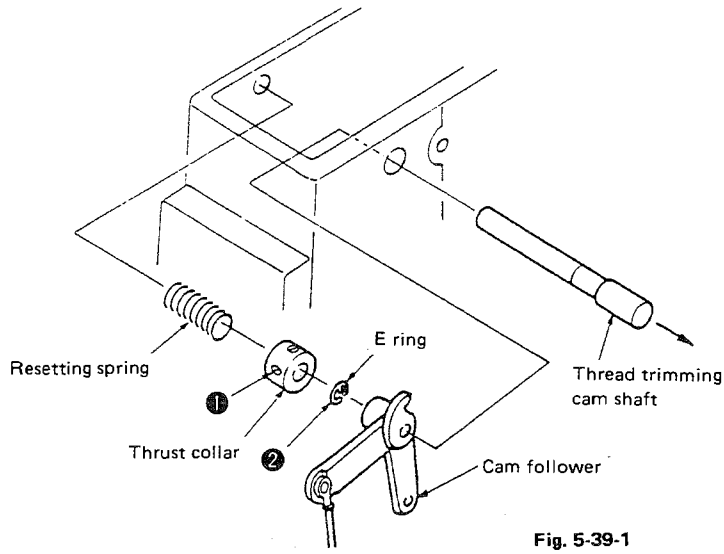


Fig. 5-39-1

(40) Removing the feeding frame solenoid (S type only)

1) Remove the solenoid link shaft stopper ring, and draw out the solenoid link shaft.
2) Loosen the setscrew of the vinyl pipe holder, and move the vinyl pipe holder to remove the vinyl pipe.
3) Remove the four setscrews of the feeding frame solenoid mounting plate, and remove the feeding frame solenoid.
4) Disconnect the lead wire of the feeding frame solenoid from the connector.

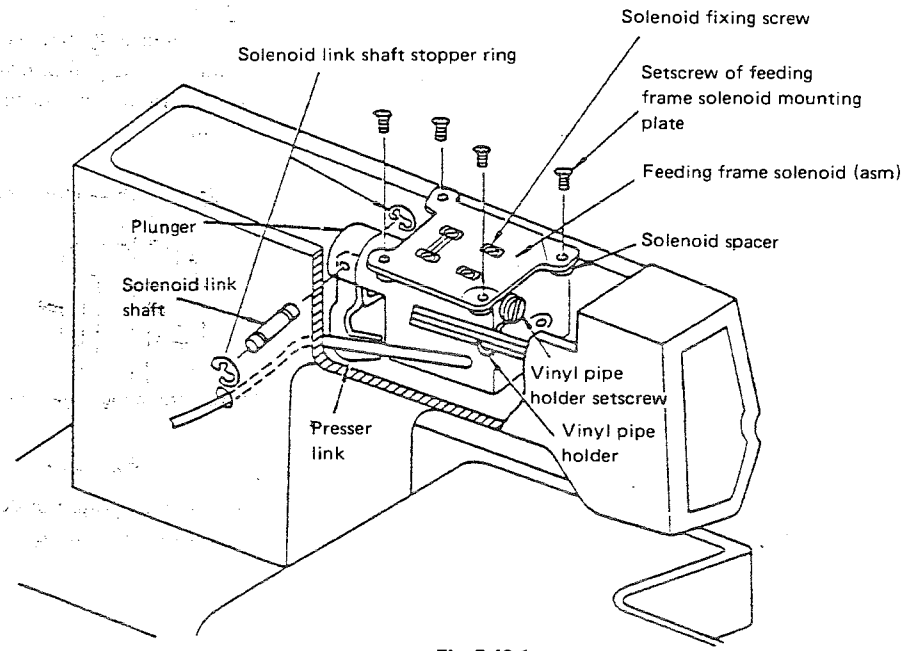
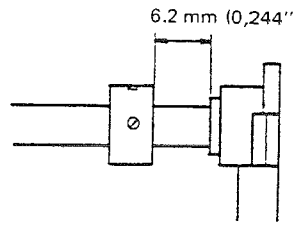
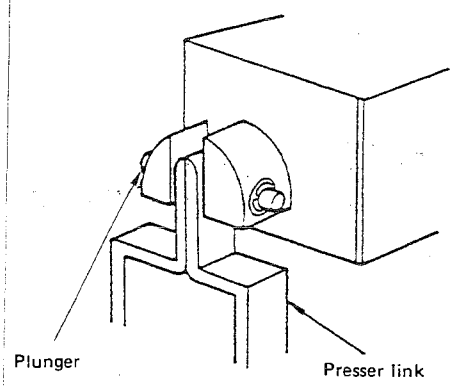


Fig. 5-40-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ Do not drop the E-ring.	○ Ensure a clearance of 6.2 mm (0.244") between the thrust collar and the E ring in installation.  Fig. 5-39-2
○ Be careful not to lose the solenoid link shaft stopper ring. ○ When you want to remove the connector pin of the feeding frame solenoid from the connector, refer to "9-9. Solenoid circuit diagram (OUT PRESSURE SOL)."	○ Be sure that the cut face of the plunger faces downward.  Fig. 5-40-2 ○ The ⊕ and ⊖ are not designated at all for the two magnet leads.

(41) Removing the intermediate presser solenoid (only for the 206C excluding the GL type)

1) Remove the intermediate presser wire setting screw nuts.
2) Remove the setscrews of the solenoid mounting base.
3) Remove the lead of intermediate presser solenoid from the connector.
4) Loosen the setscrews of the intermediate presser solenoid bracket, and remove the solenoid bracket.
5) Remove the lead of the intermediate presser solenoid from the connector.

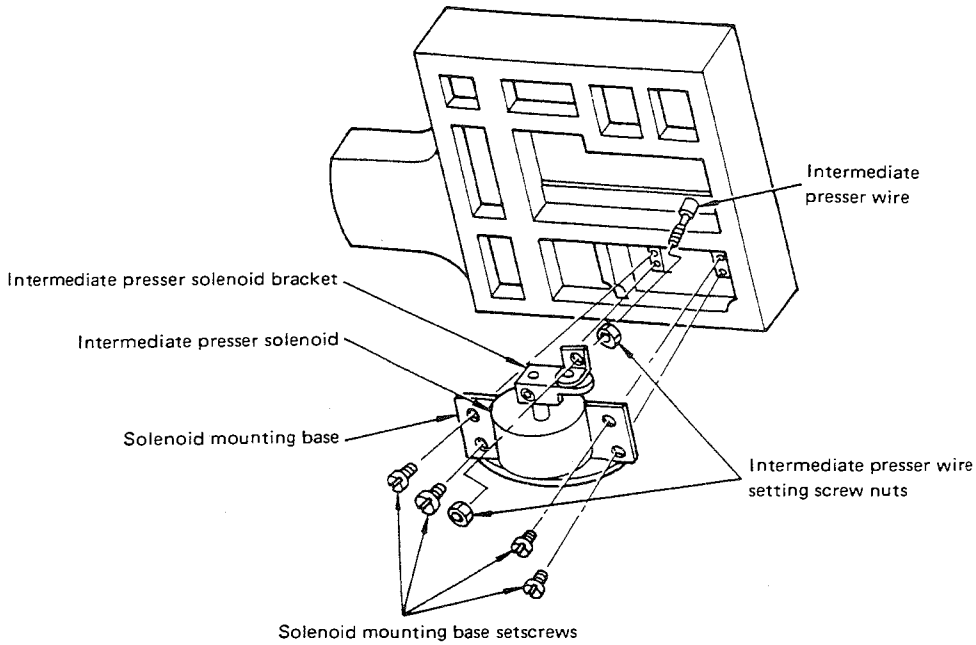
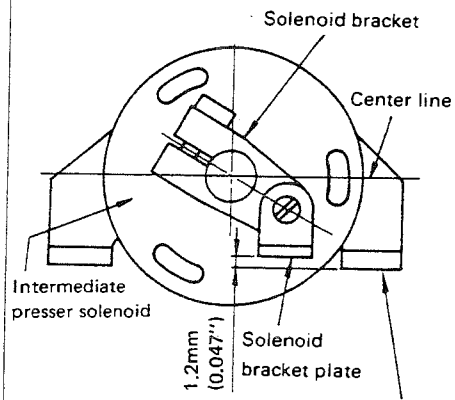


Fig. 5-41-1

(Caution)

The GL type machine incorporates an air cylinder which moves the intermediate presser up and down. So, this type of machine is not equipped with the intermediate presser solenoid.

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
1) When remoing the wire setting screw nuts, be careful not to bend the intermediate presser wire. 2) When you want to remove the connector pin of the intermediate presser magnet from the connector, refer to "9-9. Solenoid circuit diagram (IN PRESSURE SOL)."	○ The rotational angle of the intermediate presser is 45 degrees. In the initial state, the difference in level between the solenoid bracket plate and the solenoid bracket fixing plate is 1.2 mm (0.047") as illustrated. ○ For the locking position of the wire setting screw nuts, refer to step (20) of STANDARD ADJUSTMENT. ○ When tightening the wire setting screws, be careful not to bend the intermediate presser wire.  Fig. 5-41-2 ○ The ⊕ and ⊖ are not designated at all for the two magnet leads.

(42) Removing the intermediate presser wire (only for the 206C excluding the GL type)

A) How to remove the wire mounting plate

1) Remove the wire setting screw nuts.
2) Remove the setscrews of the wire mounting plate, and remove the wire mounting plate.
3) Loosen the wire clamp setscrew, and remove the intermediate presser wire.

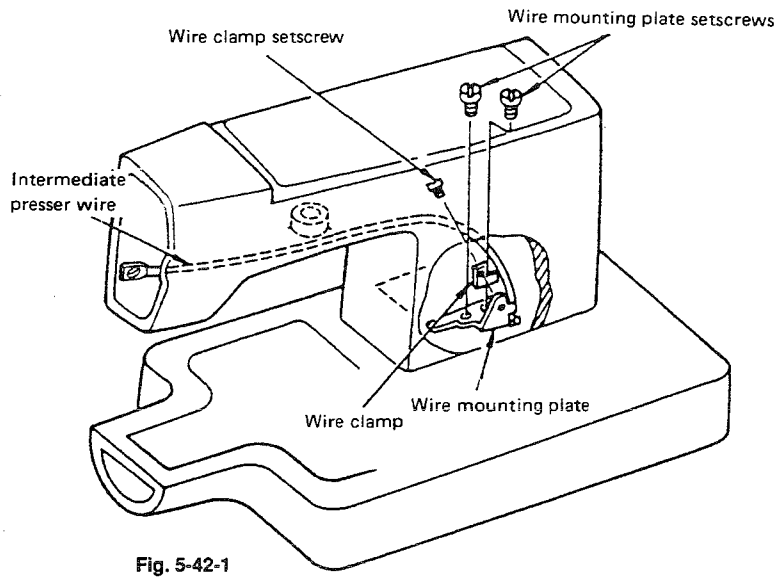


Fig. 5-42-1

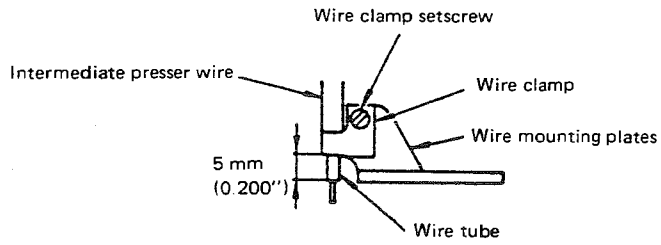


Fig. 5-42-2

(Caution)

The GL type machine incorporates an air cylinder which moves the intermediate presser up and down. So, this type of machine is not equipped with the intermediate presser wire.

CAUTIONS IN DIASSEMBLY	CAUTIONS IN ASSEMBLY
○ Be careful not to allow the portion near the wire terminal to bend.	○ When fixing the intermediate presser wire to the fixing plate, allow the end of the wire tube to extrude 5 mm (0.2") from the wire clamp before fixing it. (Fig. 5-42-2)

B) How to remove the intermediate presser cam and wire (only for the 206C excluding the GL type)

1) Remove the presser spring regulator, and detach the guide bar and spring.
2) Remove the lifting spring.
3) Remove snap ring ❹ .
4) Loosen nut ❷, remove screw ❶, setscrew ❸, then detach the intermediate presser cam (asm).
5) Remove snap ring ❽, hinge screw ❺, and detach the presser follower arm.
6) Remove setscrew ⓫, clamp screw ❿, and setscrew ❾, then detach the connecting link plate.
7) Remove hinge screw ❼, and setscrew ❻, and detach the wire.

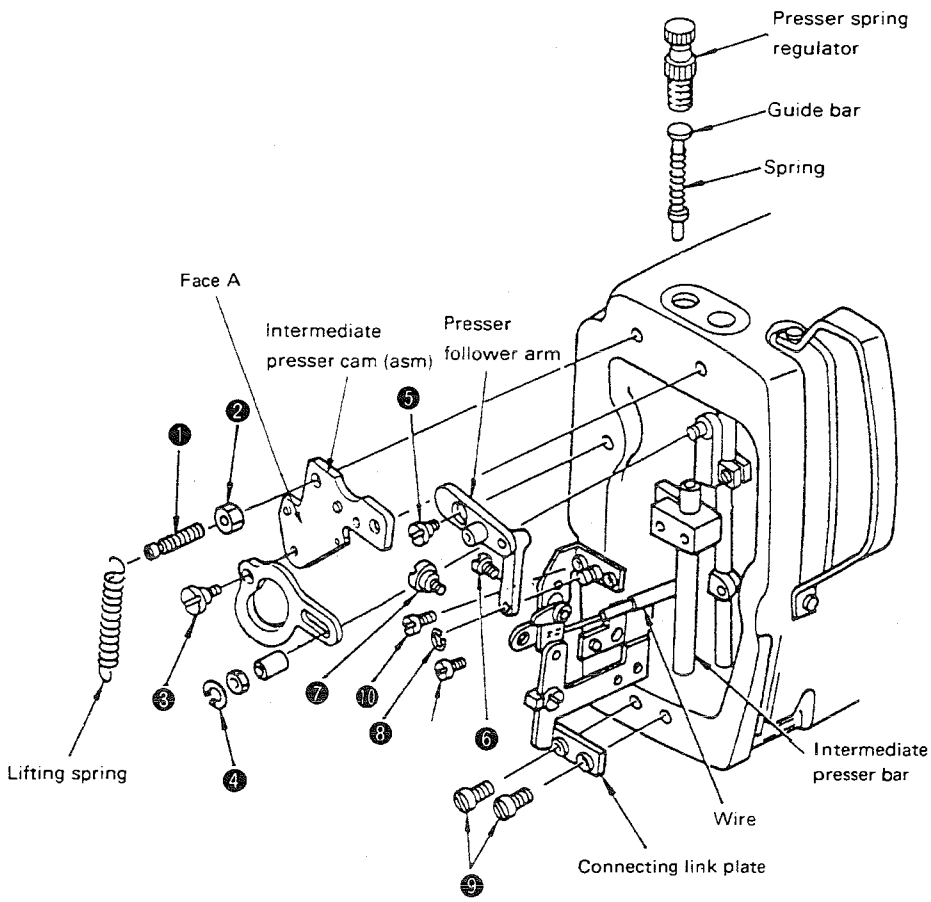
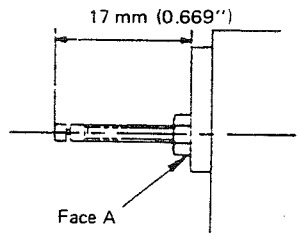


Fig. 5-42-3

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
Be careful not to bend the part near the wire terminal, otherwise the wire may be damaged when it is in service. **(Caution)** **The GL type machine incorporates an air sylinder which moves the intermediate presser up and down. So, this type of machine is not equipped with the intermediate presser cam and the intermediate presser wire.**	○ For the adjustment after reassembly, refer to Satandard Adjustment (18) and (19). ○ Dimensions of the intermediate presser foot are as follows; 

(43) Removing the wiper solenoid

1) Disconnect the wiper solenoid lead wire from the connector.
2) Loosen the setscrews ❶.

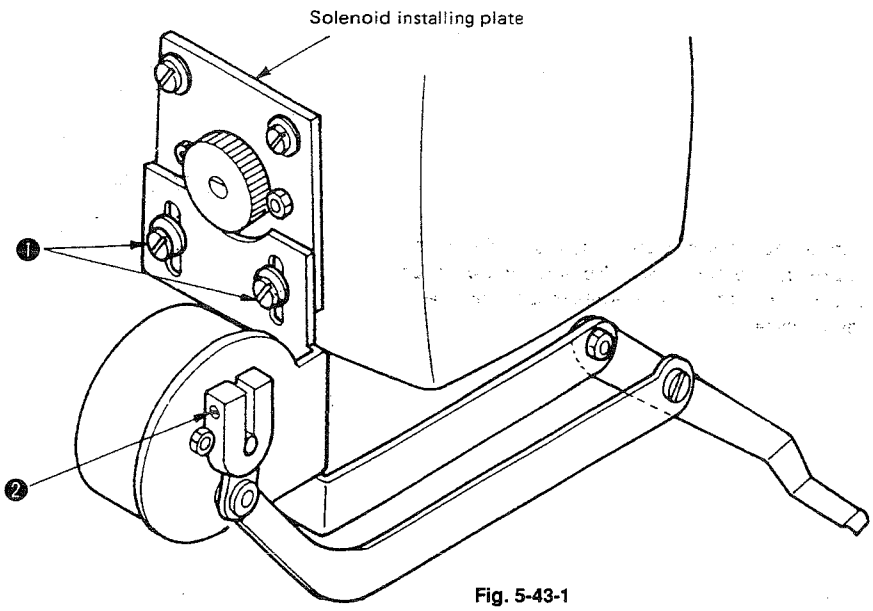


Fig. 5-43-1

(44) Removing the tension release solenoid

1) Remove the setscrew ❶.
2) Disconnect the tension release solenoid lead wire from the connector.
3) Remove the tension release arm by loosening the screw ❷.
4) Draw out the tension release pin.

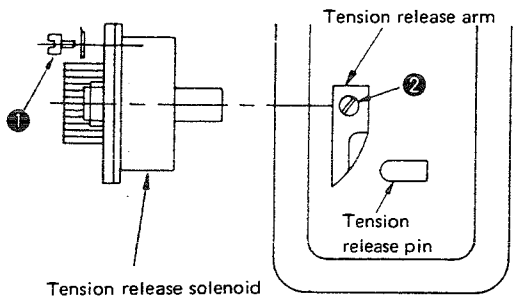
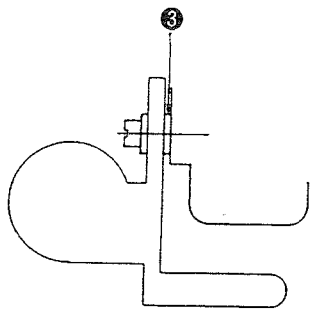
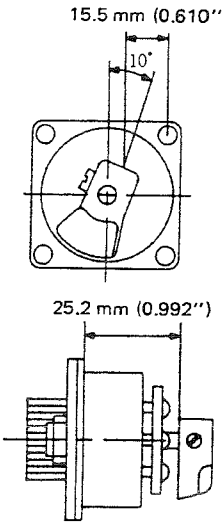


Fig. 5-44-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ Be careful not to drop the washer ❸ between the solenoid installing plate and the wiper installing plate when removing the setscrews ❶.  Fig. 5-43-2 ○ When you want to remove the connector pin of the wiper magnet from the connector, refer to "9-9. Solenoid circuit diagram (WIPER SOL)."	○ Adjust with the setscrews ❶ and ❷ so that the needle center and wiper center match and that the wiper does not touch the needle when the wiper operates. ○ The ⊕ and ⊖ are not designated at all for the two magnet leads.
○ When you want to remove the connector pin of the tension releasing magnet from the connector, refer to "9-9. Solenoid circuit diagram (TENSION RELEASE)."	○ Follow the installation position shown in the diagram.  Fig. 5-44-2 ○ The ⊕ and ⊖ are not designated at all for the two magnet leads.

(45) Disassembly/assembly of the coupling

1) Remove the connector from both the X motor and Y motor.
2) Remove the three fixing screws ❶ of the X motor and the four fixing screws ❷ of the Y motor.
3) Pull out the motors.
4) Remove the two setscrews ❸.

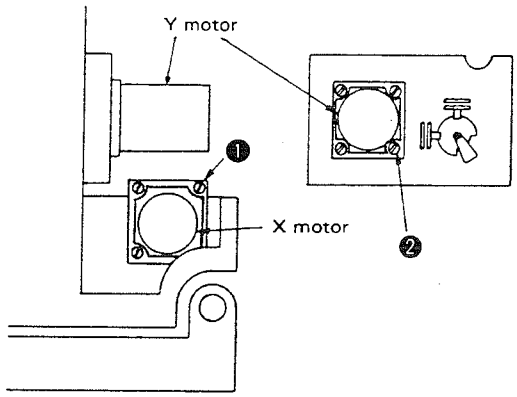


Fig. 5-45-1

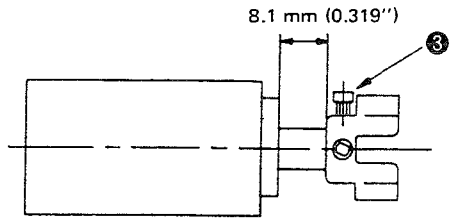
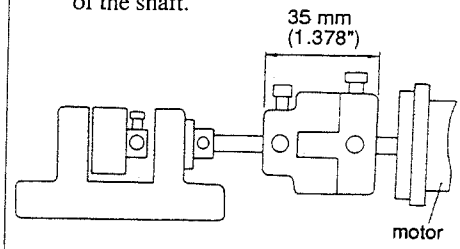
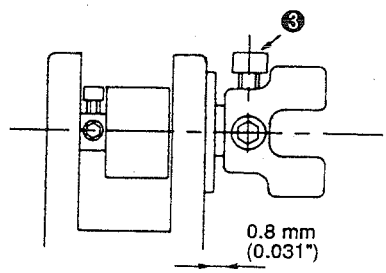


Fig. 5-45-2

CAUTION IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ To remove screw ❸ , fit a hexagon wrench key over the screw so that the head of screw is securely fitted in the hole in the head of the wrench key, then turn the wrench key to loosen the screw until it comes off. (The screw has been fixed with LOCK TITE paint.)	○ Assemble the coupling on the shaft side motor with a space of 8.1mm (0.318") from the motor. (Fig. 5-45-2) ○ After the driving shaft has been jointed with the X motor, carefully tighten the screw on the flat section of the shaft.  Fig. 5-45-3 ○ With respect to the Y motor side, tighten the screw while providing a clearance of 0.8 mm (0.031") between motor and shaft side.  Fig. 5-45-4

(46) Removing the X-Y table

1) Remove the shuttle driver shaft. (See Disassembly/Assembly Procedure (36).)
2) Remove the feed bracket from the X-Y table. (two setscrews)
3) Remove eight bracket fixing screws ❶, four setscrews ❷, belt tension adjusting screw ❹, and belt tension adjusting nut ❸.
4) Remove the X-Y table in the direction of the arrow so that the bottom of the X-Y table timing belt passes under the thread trimming link rod.

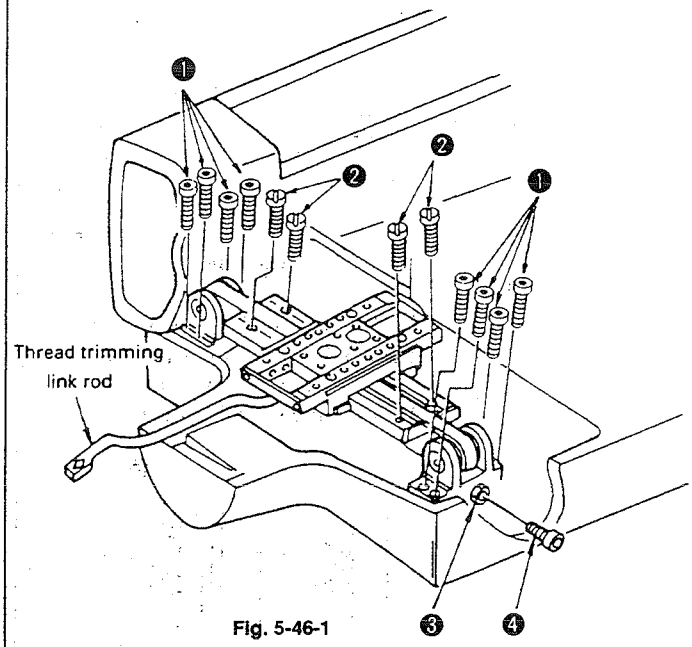


Fig. 5-46-1

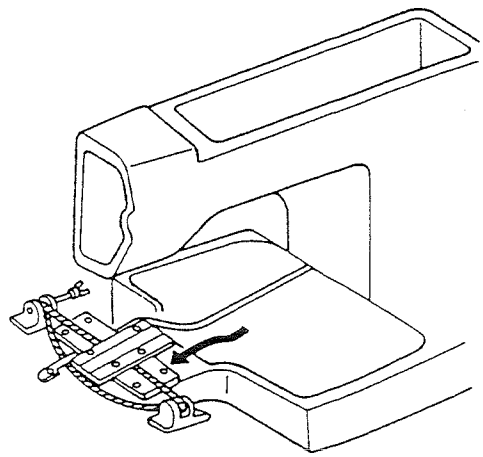


Fig. 5-46-2

(47) Removing the cam follower assembly

1) Remove the thread trimming cam shaft.
   (See Disassembly/Assembly Procedure (39).)
2) Remove the throat plate.
3) Remove the X-Y table.
   (See Disassembly/Assembly Procedure (46).)
4) Remove the thread trimming link hinge screw.
5) Pass the cam follower under the machine bed while slightly bending it.

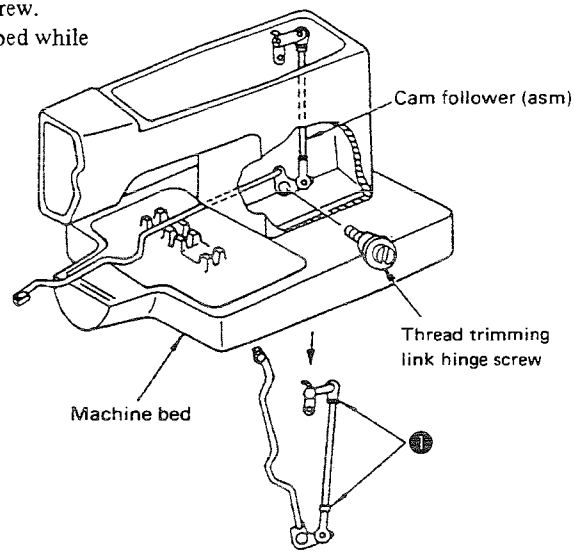
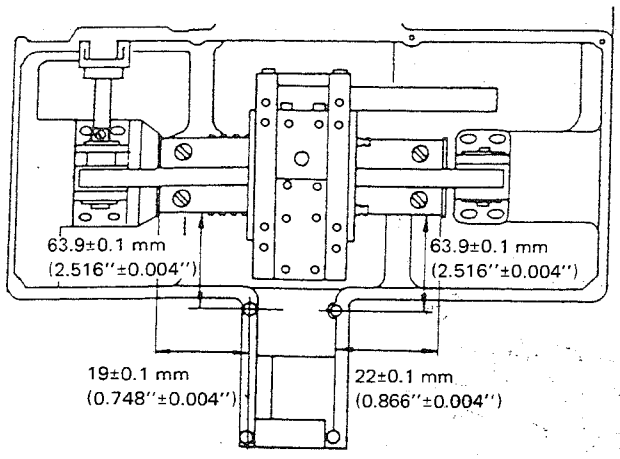
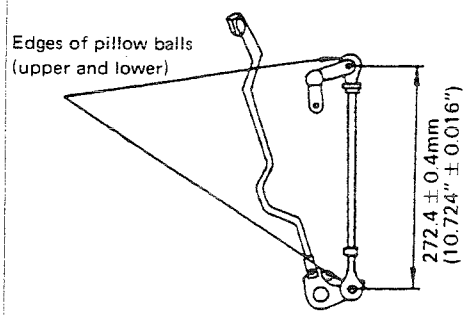


Fig. 5-47-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
1) Be careful not to scratch or lose the X-Y table bearing.  Fig. 5-46-3	○ Position and fix the X-Y table according to Fig. 5-46-3 (Standard throat plate setscrew hole dia. :Setscrew hole dia. 11/64 pitch 40) ○ Pass the lower section of the timing belt under the thread trimming link rod. ○ For the belt tension adjustment, see Standard Adjustment (27), (28).)
○ Do not loosen rod length adjusting screw nut ❶.	○ When the cam follower assembly has been disassembled, be sure to adjust the center-to-center distance of the pillow balls to 272.4 ± 0.4 mm (10.724" ±0.016"). (At this time, make sure that the edges of the upper and lower pillow balls are in parallel.)  Fig. 5-47-2

(48) Removing the Y motor base

1) Remove the two setscrews of the feed bracket.
2) Loosen X guide shaft setscrews Ⓑ, remove the X guide shaft, and remove the feed bracket.
3) Loosen clamp screw Ⓐ, and remove the X guide shaft support.
4) Remove the crank rod. (See Disassembly/Assembly Procedure (37).)
5) Remove the cam follower. (See Disassembly/Assembly Procedure (39).)
6) Remove six Y-motor fixing screws Ⓒ, and detach the Y motor base.

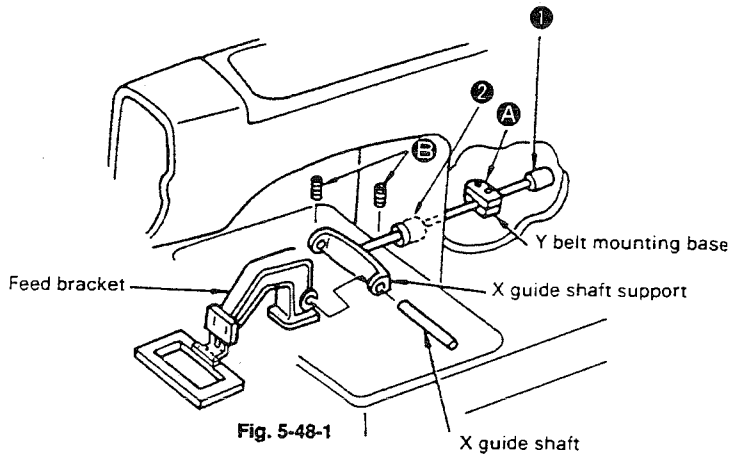


Fig. 5-48-1

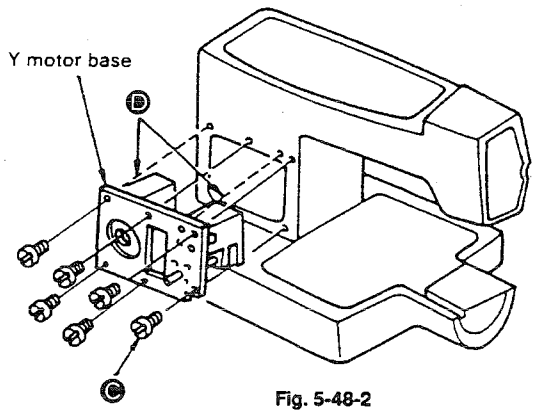
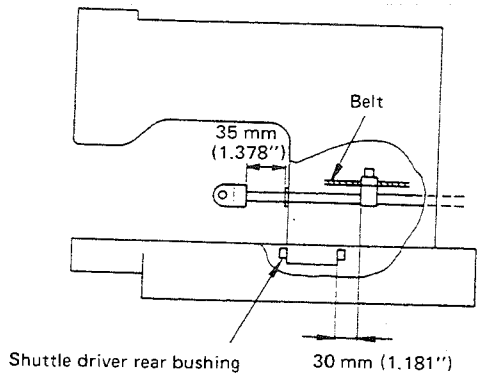


Fig. 5-48-2

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
○ When removing the X guide shaft and the X guide shaft support, be careful not to allow the steel balls in shaft bearings ❶ to fall.  **Fig. 5-48-3**	○ When fixing the Y-motor base, be sure to align positioning pins ⓫ with the positioning holes. ○ Before passing the X guide shaft and X guide shaft support through feed bracket bearing and Y travel shaft bearing ❶, apply grease to the inside of the bearings to prevent the steel ball from slipping out from the bearings. ○ When fixing the Y belt mounting base to the X guide shaft support, be sure to provide a 30 mm (1.181") clearance between shuttle driver shaft rear bushing edge and Y belt base edge, and a 35 mm (1.378") clearance between X guide shaft support edge and Y travel shaft front bushing edge. (Fig. 5-48-3) Also, make sure that the X guide shaft support is levelled. ○ After mounting the feed bracket, perform fine adjustment of the horizontality of the X guide shaft support according to Standard Adjustment (26). ○ Make certain that no grease touches the inside of the Y travel shaft front bushing ❷.

(49) Removing the crank balancer

1) Remove the setscrews ❶ and remove the crank balancer.

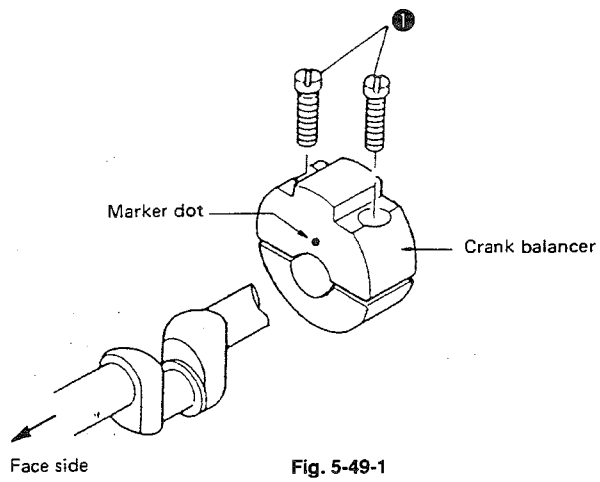


Fig. 5-49-1

(50) Removing the main shaft

1) Remove the handwheel and the generator stator. (See Disassembly/Assembly Procedure (35).)
2) Remove two setscrews ❶ of the counterweight.
3) Remove the crank rod cover. (See Disassembly/Assembly Procedure (37).)
4) Loosen two setscrews ❷, two setscrews ❸, two setscrews ❹, two setscrews ❺ and two setscrews ❻.
5) Apply a brass rod to portin Ⓐ , and tap portion Ⓐ lightly to remove the main shaft together with the main ear shaft rear bushing.

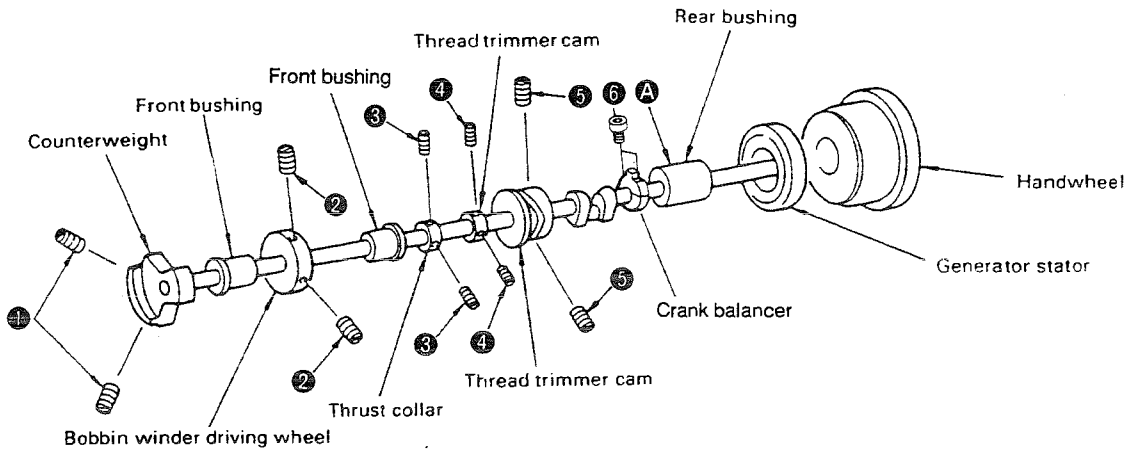
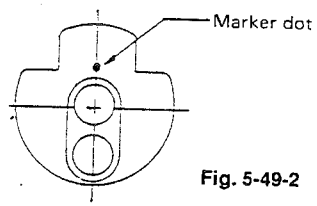
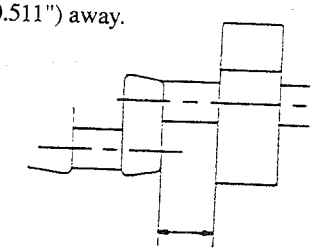
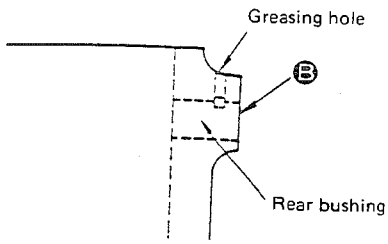


Fig. 5-50-1

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
	1) The crank balancer should be assembled in opposite phase to the counterweight.  Fig. 5-49-2 2) As Fig. 5-49-2 indicates, the crank balancer has to be assembled 13mm (0.511") away.  Fig. 5-49-3 13 mm (0.511")
○ Be sure to use a soft metal like a brass rod for tapping portion Ⓐ.  Fig. 5-50-2	1) When driving the rear bushing in, be sure to align the greasing hole in the machine arm with the greasing hole in the rear bushing. Also, be sure that the end face of the rear bushing is flush with the end face of the machine arm at face Ⓑ. 2) See Standard Adjustment (22) for the mounting position of the bobbin winder driving wheel. 3) See Standard Adjustment (32) for the installation of the main shaft thrust collar. 4) See Standard Adjustment (16) for the installation of the thread trimmer cam and the thread trimmer cam thrust collar. 5) See Disassembly/Assembly Procedure (37) for the installation of the crank rod cover.

(51)-1 How to assemble the pneumatic circuits (L type excluding the GL type)

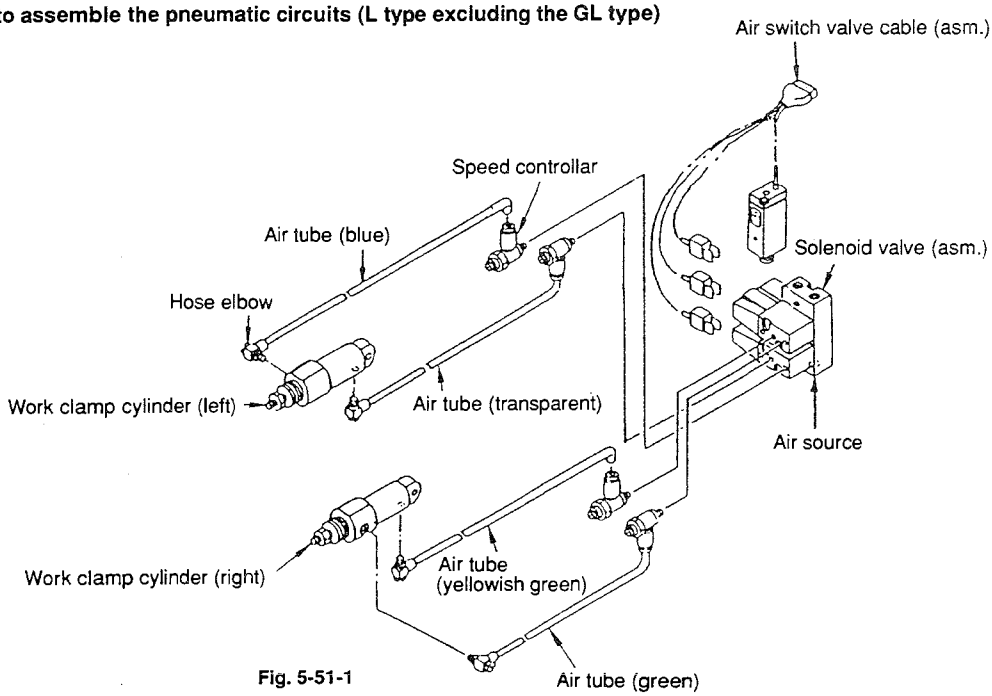


Fig. 5-51-1

(51)-2 How to assemble the pneumatic circuits (GL type)

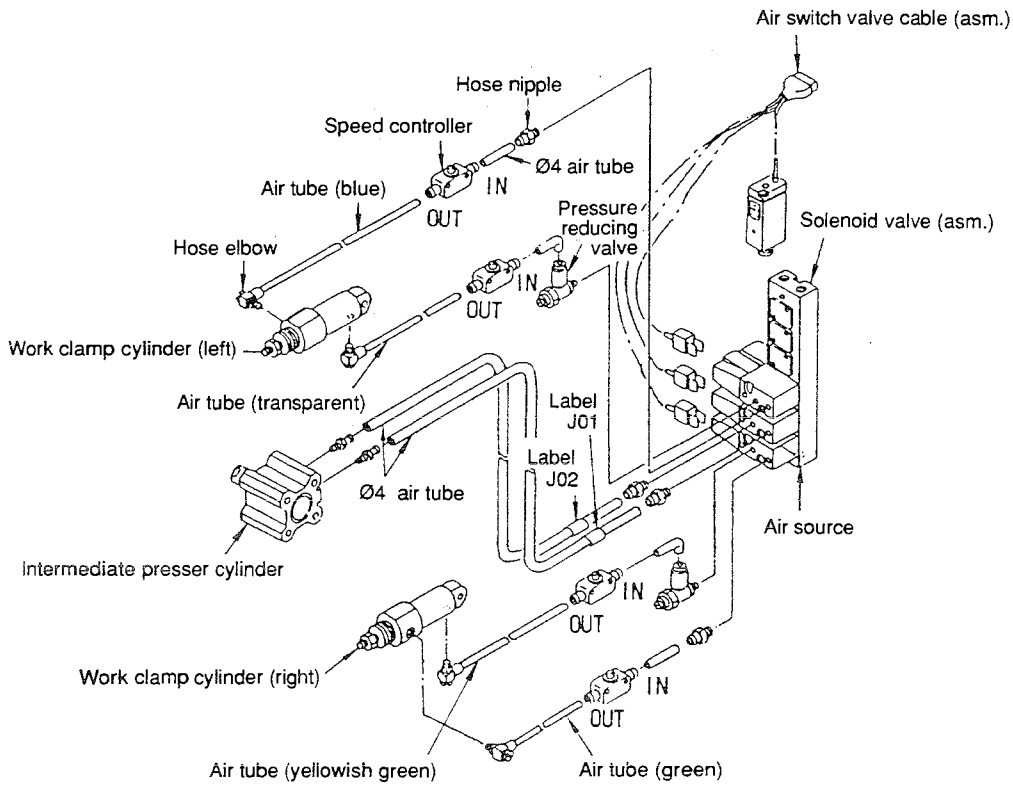
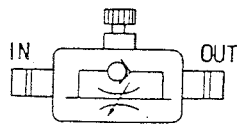


Fig. 5-51-2

CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
	○ One of the connectors of the air switch valve cable (asm.) will remain unused. Do not take this as a failure. ○ Refer to "3-4-(1)-2. 3-pedal foot switch" for how to connect the air switch valve cable (asm.) to the solenoid valve.
	○ Refer to "3-4-(1)-2. 3-pedal foot switch" for how to connect the air switch valve cable (asm.) to the solenoid valve. ○ The attaching direction of the speed controller is as shown in Fig. 5-51-3.  Fig. 5-51-3

Parts to be fixed by LOCK-TITE paint

The machine is subjected to frequent start and stop, therefore, LOCK-TITE paint is used to securely fix the screws which are likely to loosen easily.
When an assembly which includes the above-mentioned has been disassembled, remove the residual paint thoroughly using paint thinner, and assemble it using LOCK-TITE No. 601, No. 242 and RC75 after removing the moisture from the formerly attached surfaces.
If the screw which has been fixed using the paint is hard to remove, it is advisable to warm it using a torch lamp.
The following components use the LOCK-TITE paint:

(1) X-Y table components (Use LOCK-TITE No. 601)

- Coupling setscrews
- Drive sprocket setscrews
- Follower sprocket setscrews

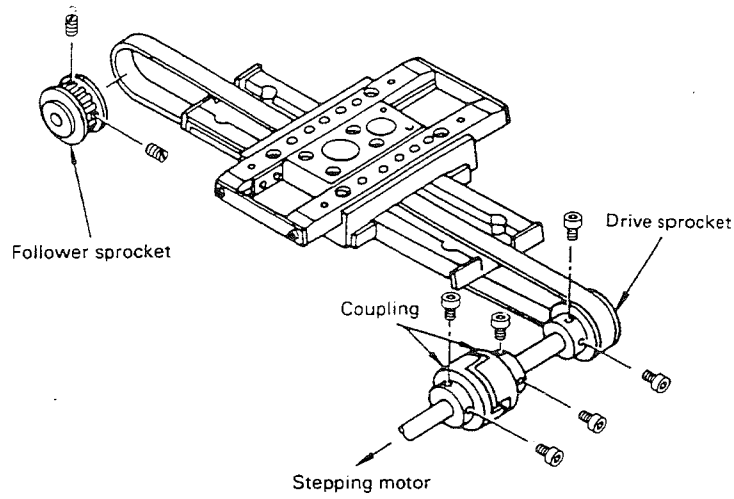


Fig. 1

(2) Y motor base components (Use LOCK-TITE No. 601)

- Coupling setscrews
- Drive sprocket setscrews
- Follower sprocket setscrews

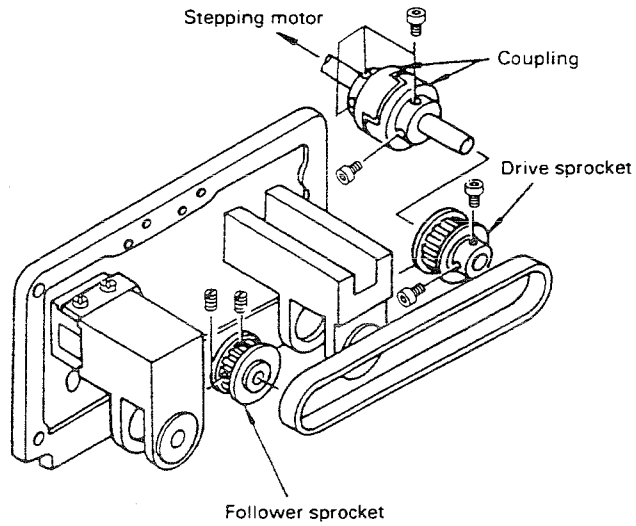


Fig. 2

(3) Shuttle driver shaft gear

- Gear dowel pin assembly (Use LOCK-TITE No. RC75)

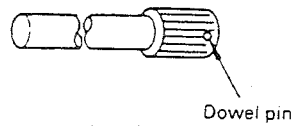


Fig. 3

(4) X guide shaft setscrews (Use LOCK-TITE No. 242)

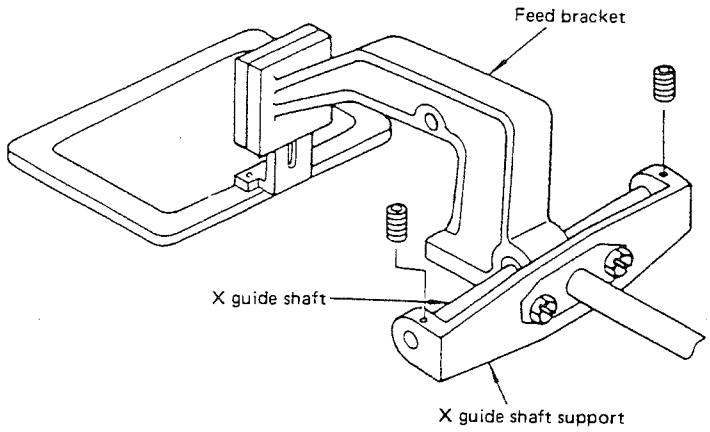


Fig. 4

(5) Bearing components (Use LOCK-TITE No. 242)

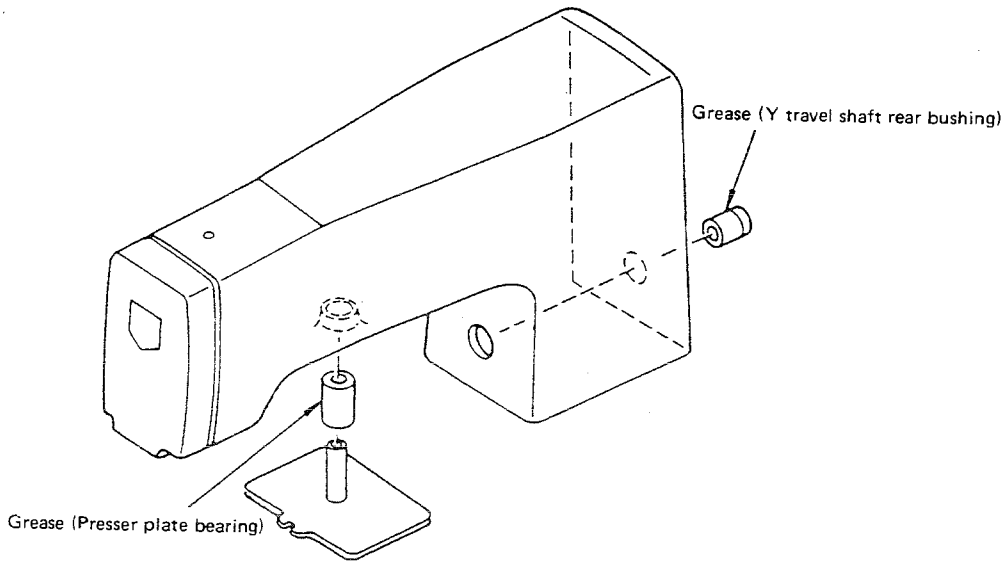


Fig. 5

(Caution)

Never allow the LOCK-TITE paint to get into the bearings, or else the proper function of the bearings may be prevented.

(6) Thread trimmer solenoid lock nut
(Use LOCK-TITE No. 601)

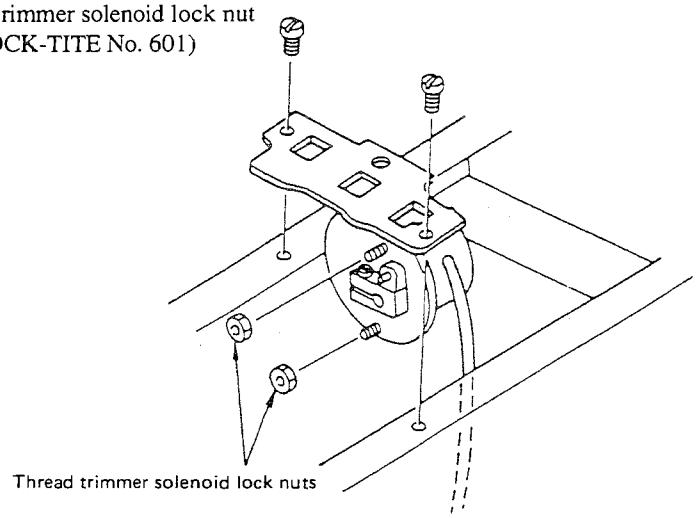


Fig. 6

(7) Lowering arm stopper (Use LOCK-TITE No. 242)

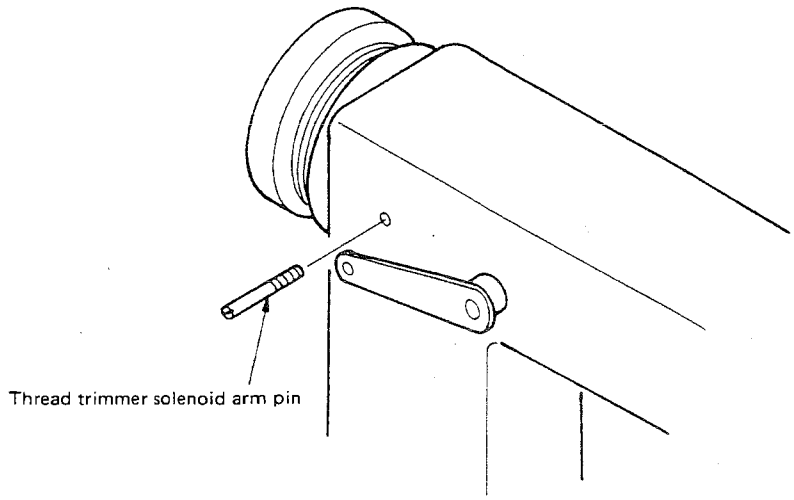


Fig. 7

Greasing parts

- Supply grease when a grease-involving part has been disassembled or one every other year.
- Grease to be used

  Lithium-based grease No. 2

Manufacturer	Name of grease
ESSO	Listan 2, Beacon 2
SHELL	Albania
NIPPON SEKIYU	Multinock 2, Epinock 2
KYODO SEKIYU	Rezonix 2
IDEMITSU KOSAN	Koronex 2

- Parts to be greased

  If no grease pump is available, it is advisable to use a plastic oiler or an injector with the needle removed.

(1) Screw stud and the bottom face of the feed plate carrier bar (S type only)

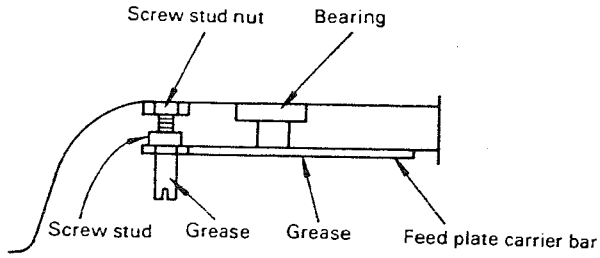


Fig. 1

(2) X-Y table retainer assembly

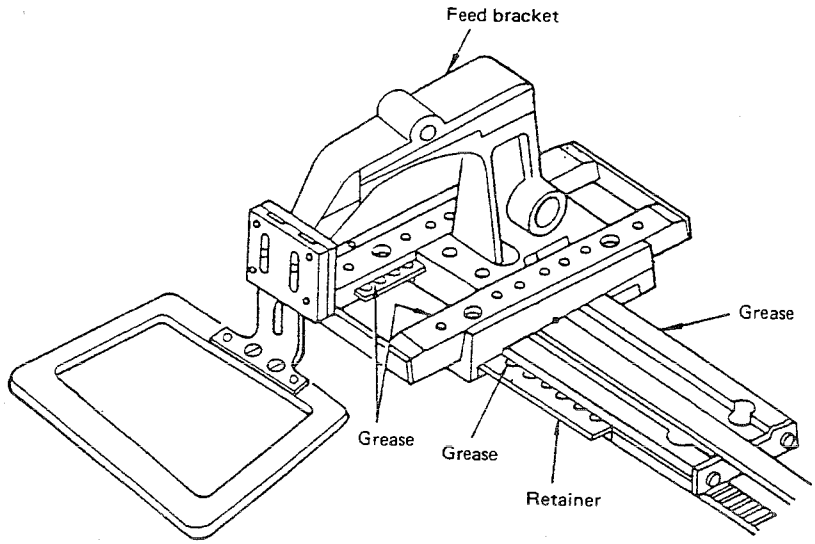
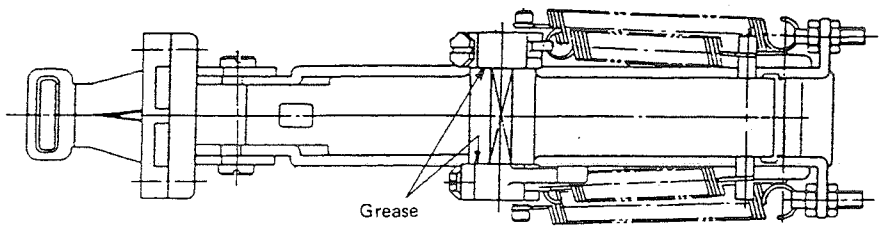


Fig. 2

(3) Feed bracket (S type only)



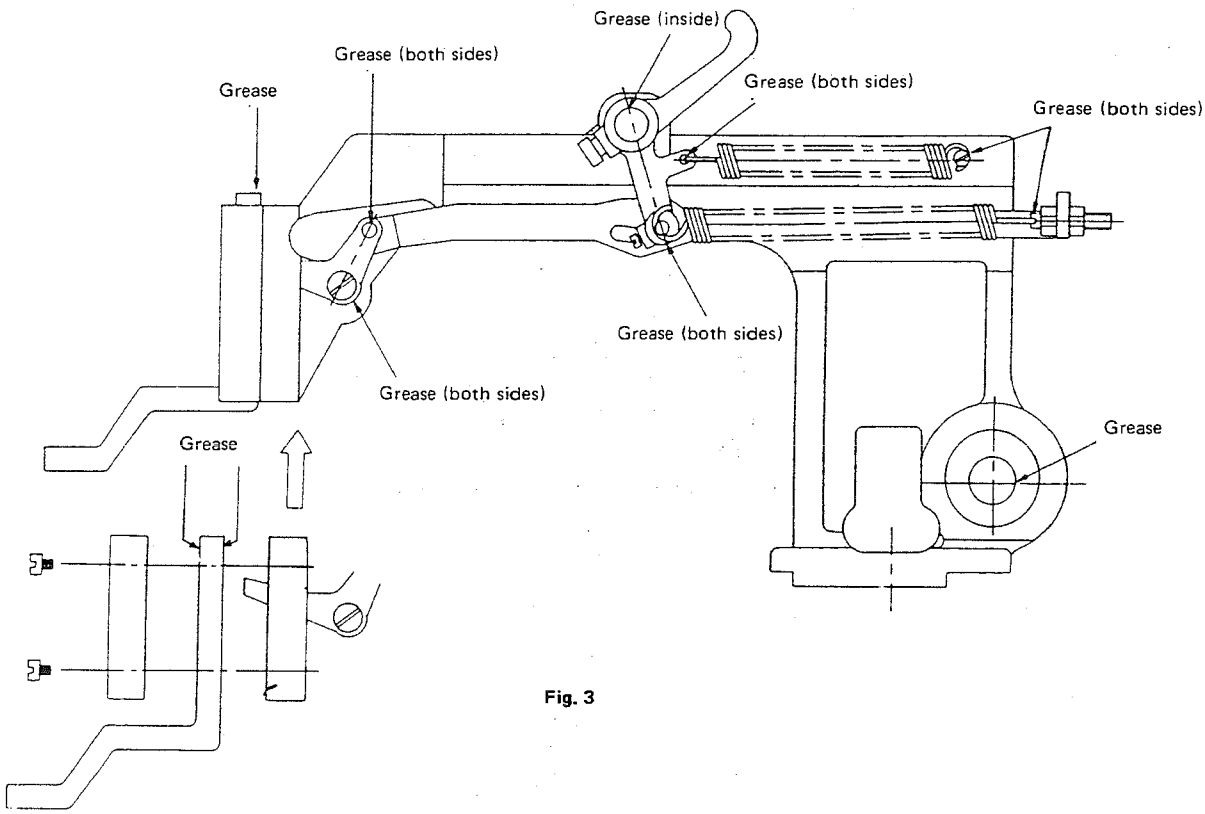
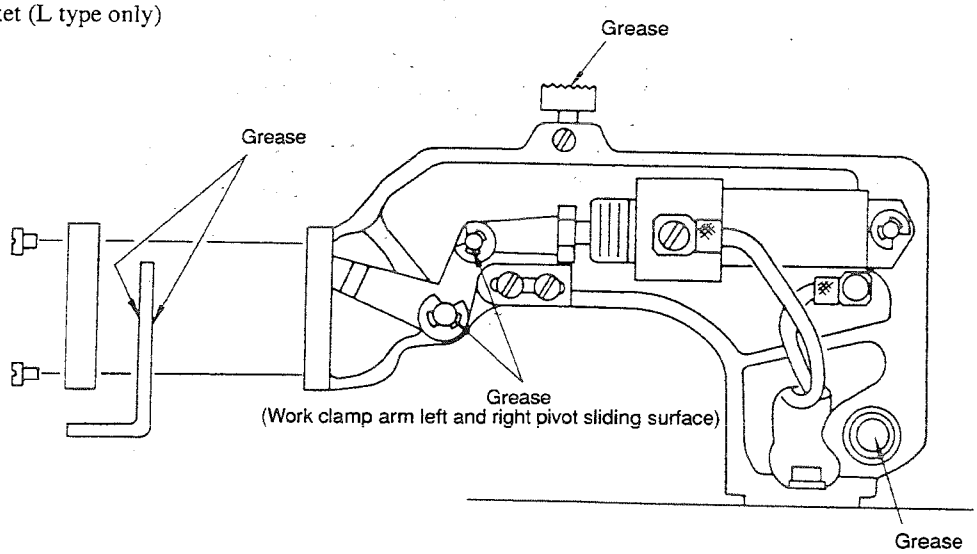


Fig. 3

(4) Feed bracket (L type only)



(5) Intermediate presser cam (206C only)

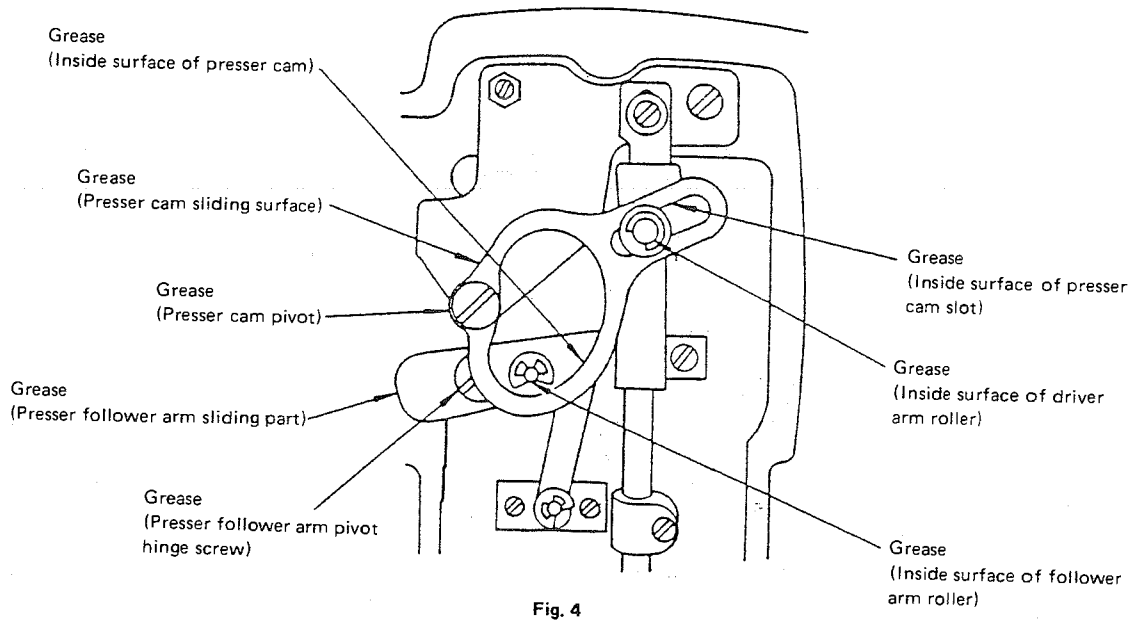
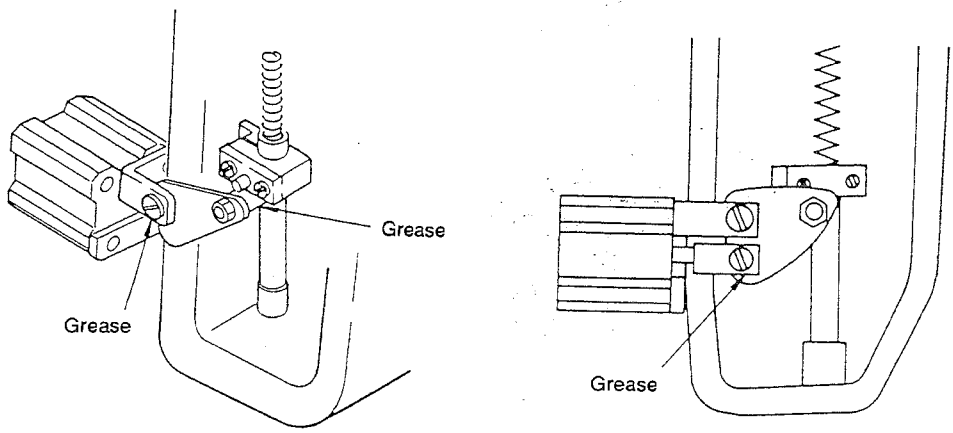


Fig. 4

(6) Intermediate presser foot (GL type only)



(7) Main shaft rear bushing

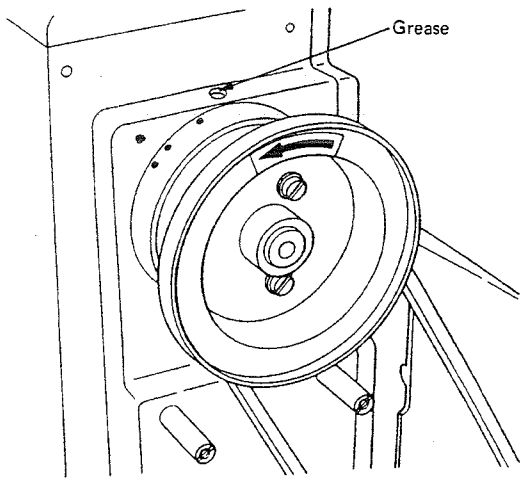


Fig. 5

(8) Bobbin winder base bearing of bobbin winder

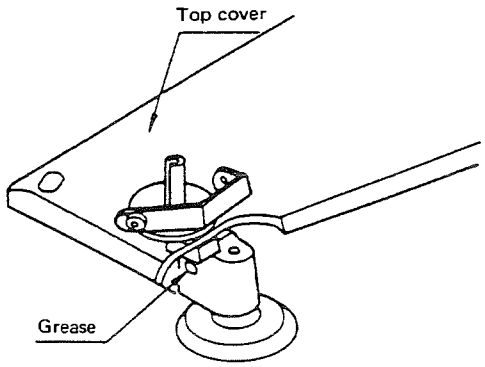


Fig. 6

(9) Solenoid plunger (S type only)

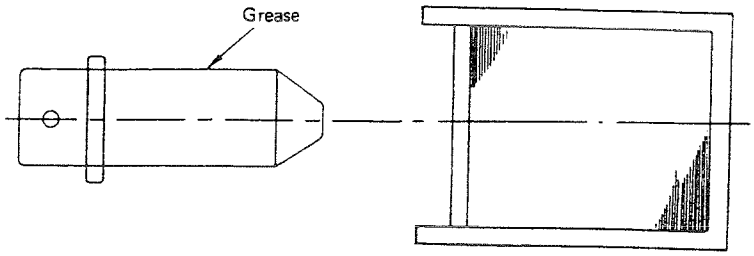


Fig. 7

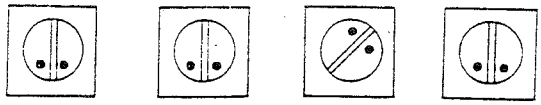
6. MAINTENANCE AND INSPECTION OF ELECTRICAL PARTS

6-1 Adjustment of sewing speed

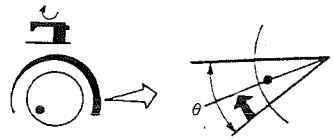
Sewing speed changes according to the length of the stitch. When the sewing speed is faster than the set speed, poor feeding (deformation) will be caused. At this time, check the speed using the speed checking function while setting the rotary DIP switch 5 (SW 5) to "6." If the speed is too high, re-adjust the speed properly. (A tachometer is necessary to measure the speed.)

adjusting the speed.

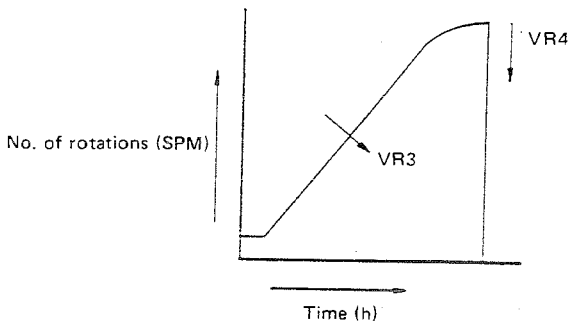
2) Set Rotary DIP switch SW5 on the MAIN circuit board to "6."
3) Turn the Maximum speed control volume outside of the control box in a clockwise direction as far as it will go.
4) Set the VR1, 2 and 3 in the middle position and turn the VR4 counterclockwise as shown in the diagram below.



5) Turn the power switch ON.
6) Set the Pattern number switch on the operation circuit board to "02" and let the sewing machine start by turning the foot switch ON.
7) Adjust the sewing speed at 180 ± 2 spm with VR1.
8) Stop the sewing machine by using the foot switch.
9) Turn the max. speed limiting knob counterclockwise until it will go no further (where the knob is set to the lowest speed) first. Then return the volume to the position illustrated in the figure.



10) Set the pattern number switch to "21," start the sewing machine by the foot switch and adjust the sewing speed to 185 ± 3 spm with VR4.
11) Turn the maximum speed control volume fully clockwise, then adjust the sewing speed to 1,910 ± 5 spm with VR2.
12) Stop the sewing machine in the same way as 8), set the pattern number switch to "14," start the machine and adjust the speed to 1,310 ± 5 spm with VR3.



Adjustment is now completed.

When decreasing the speed as a whole, turn VR3 counter-clockwise and VR4 clockwise to adjust.

6-2 Adjustment and maintenance of motor

1. Adjusting the clutch gap

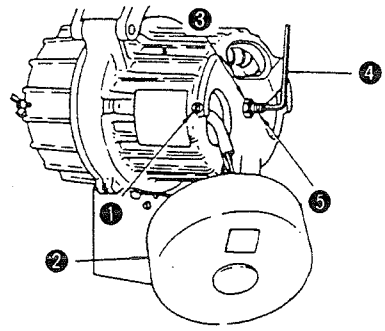
The clutch gap is factory-adjusted to 0.5 mm (0.020"). Readjust the clutch gap.

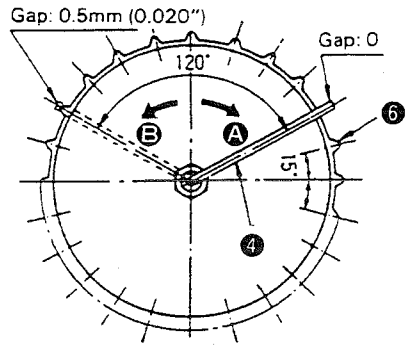
- When the clutch ring or brake ring has been replaced.
- When the clutch gap is too small, causing constant friction between the clutch and brake with any of the following results:
  a) The main motor is overheated.
  b) The motor fails to run smoothly.
  c) A scorching smell of wood is produced (from an overheated cork).
  d) Even when the needle is stopped, it immediately starts to move by itself and fails to remain stationary.

(Adjusting Procedures)

(1) For HITACHI motor

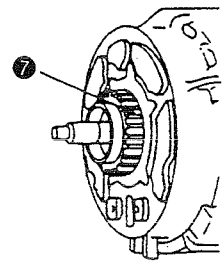
1) Turn the power OFF, confirm that the flywheel of the motor has completely stopped, then loosen setscrew ❶ to remove end cover ❷ of the motor.
2) Remove the pulley cover, and then the V belt.
3) Loosen lock nut ❺ using a spanner, insert L-shaped wrench key ❹ supplied with the motor into the hexagonal hole of setscrew ❸.
4) Screw in the L-shaped wrench key in direction Ⓐ as illustrated while turning the pulley by finger until the inertia of the pulley can not longer driver the pulley (in other words, until the pulley's resistance is felt: 0 mm gap). Then, screw out the L-shaped wrench key in direction Ⓑ for eight cooling fins ❻ of the motor.
   (120 degrees = 0.5 mm (0.019") gap
5) With the wrench key held in the position mentioned above, tighten lock nut ❺ by a spanner with care taken not to move setscrew ❸.
6) After adjustment, manually turn the pulley to check it for smooth rotation. Turn the power switch ON, check the motor for proper operation, and carry out test run for 20 to 30 times.





(2) For MATSUSHITA motor

First, turn adjustment screw ❼ fully counterclockwise. Then, slowly turn it clockwise until resistance is felt. Further turn the adjusting screw clockwise by 8 steps (120 degrees).

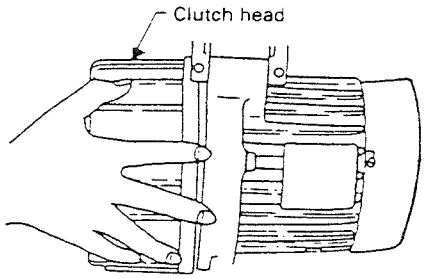


2. Replacing the clutch ring and brake ring

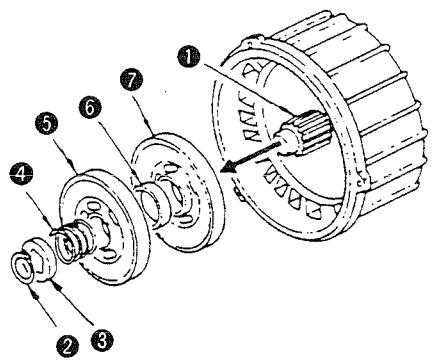
When the clutch noise or brake noise has changed to a metallic noise after a long period of use, or when the motor has come to run unsmoothly, it is a sign of service life expiry of the frictional parts. Replace the clutch ring and brake ring as follows:

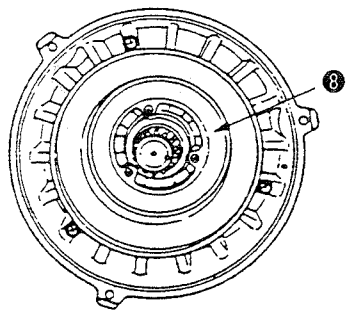
Turn the power OFF, and be sure that the motor has completely stopped before starting the replacement. (Wait for 3 to 5 minutes after turning the power OFF.)

(1) For HITACHI motor

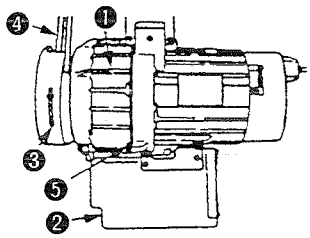


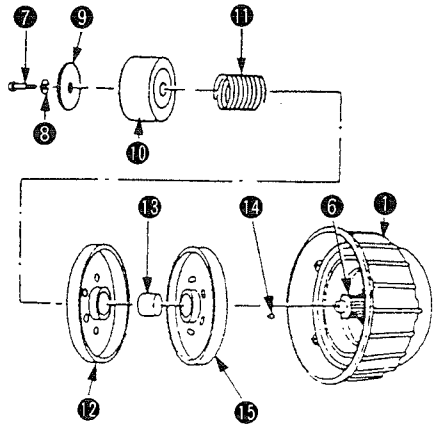
1) Remove the connector, 4P from the controller.
2) Remove the pulley cover and the V belt.
3) Unscrew the three mounting screws of the clutch head to remove the clutch head from the main body.
(At this time, take care not to allow the clutch head to fall.)
4) Remove C ring ❷.
5) Take out spring bearing ❸ , clutch resetting spring ❹ , clutch ring ❺ , spline cap ❻ , and brake ring ❼ .
6) Using a rag moistened with benzine, clean the surfaces of brake disk ❽ and the clutch disk, and spline shaft ❶ . If the surfaces look brown, burnish the surfaces using a commercially available metal cleaner, then wipe them with a rag moistened with benzine. (Do not touch the surface of the clutch or brake ring by hand, or do not clean it with benzine.)





(2) For MATSUSHITA motor





1) Remove pulley cover ❸ and belt ❹.
2) Remove screw ❺, and remove the clutch bracket from the motor.
3) Remove screw ❼ washer ❽, presser disk ❾, housing cover ❿, spring ⓫, clutch ring ⓬, brake ring ⓯. and cushion ⓭ from clutch shaft ❻ of the clutch bracket.

(Caution)

Be careful not to lose cylindrical key ⓮ which fits in the clutch shaft.

4) Replace with a new movable disk, then adjust the clutch clearance.

(3) Cleaning the spline assembly

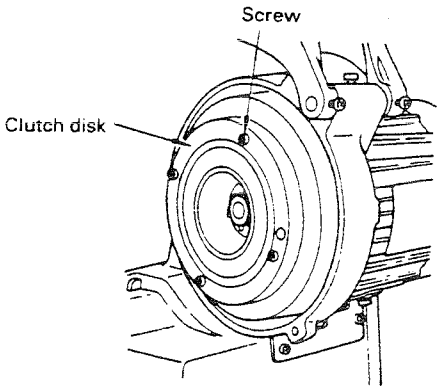
Clean the splines with a rag if they are dirty. Apply the grease supplied with the motor to a new ring. Use only "MOLY PS265" grease, and never use any other grease. At the time of reassembly, remember to reinstall the spline cap, and to attach the connector from the clutch head to the PSC box. Adjust the gap whenever the rings have been replaced.

3. Replacing the clutch disk

Replace the clutch disk;

- If the lining of the clutch ring has worn out to such an extent that the clutch disk comes in contact with the metal part of the clutch ring, and burnishing with a commercially available metal cleaner can no longer correct it.
- When the clutch disk has worn out unevenly due to partial contact with the clutch ring.

(Replacement procedure)



① Remove the clutch head according to the previous paragraph, "Replacing the clutch ring and brake ring".

② Loosen the four screws (M5x12) retaining the clutch disk, and remove the clutch disk.

③ Taking the faucet joint inside the vanes of the flywheel as the reference, fix a new clutch disk by alternately tightening the four screws (M5x12) gradually. At this time, be very careful not to scratch the clutch disk surface to be in contact with the friction plate.

④ Upon completion of the above step, turn the power switch ON, and check motor vibration before reinstalling the clutch head. If the vibration is severe, remove the fixing screws again, turn the clutch disc 90 degrees against the flywheel, and reinstall the clutch disk so that the motor vibration is reduced to a minimum.

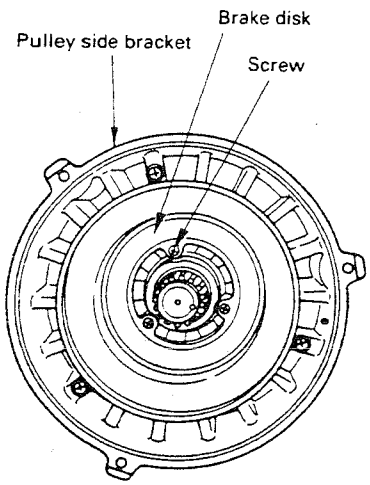
⑤ After the motor has completely stopped, reinstall the clutch head, using the three screws.

4. Replacing the brake disk

Replace the brake disk;

- When the lining of the brake ring has worn out to such an extent that the brake disk comes in contact with the metallic part of the brake ring, and burnishing with a commercially available metal cleaner can no longer correct it.
- When the brake disk has worn out unevenly due to partial contact with the brake ring.

(Replacement procedure)



① Remove the clutch head.

② Pull out the ring.

③ Unscrew the three screws (M4x12) retaining the brake disk on the pulley side bracket to remove the brake disk.

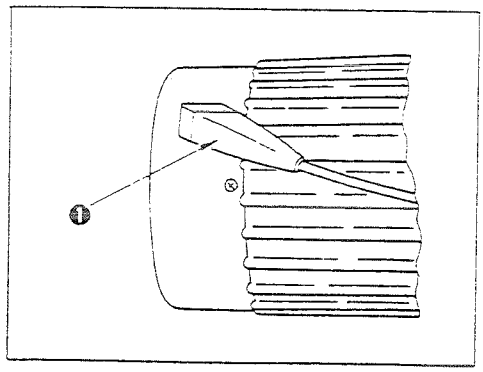
④ Install a new brake disk on the pulley side bracket by gradually tightening the three fixing screws alternately. At this time, be very careful not to scratch the brake disk surface which will contact the friction surface.

⑤ Finally, reinstall the ring before attaching the clutch head to the main body.

5. Cleaning the filter

If the filter is left clogged with fibrous wastes, the motor is likely to overheat, resulting in considerably shorted life of the lining. Clean the filter once a month or every other month.

6-3 Changing the direction of rotation of the sewing machine

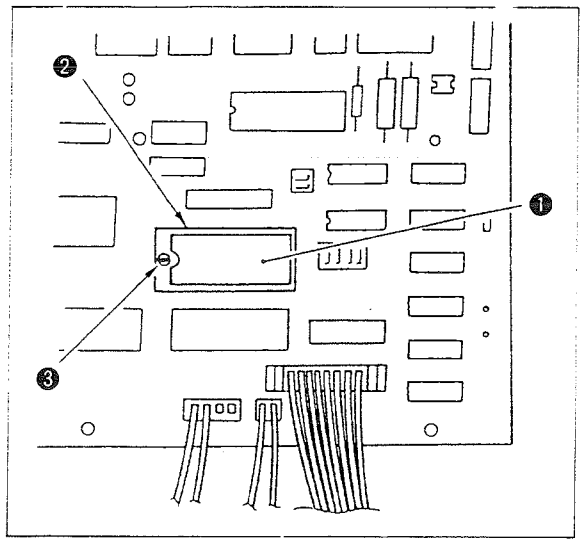


1) Turn the power switch OFF.

2) Remove connector ⓵ from the rear of the motor (on the opposite side from the handwheel).

3) Reverse the connector (turn it 180 degrees) and reconnect it securely.

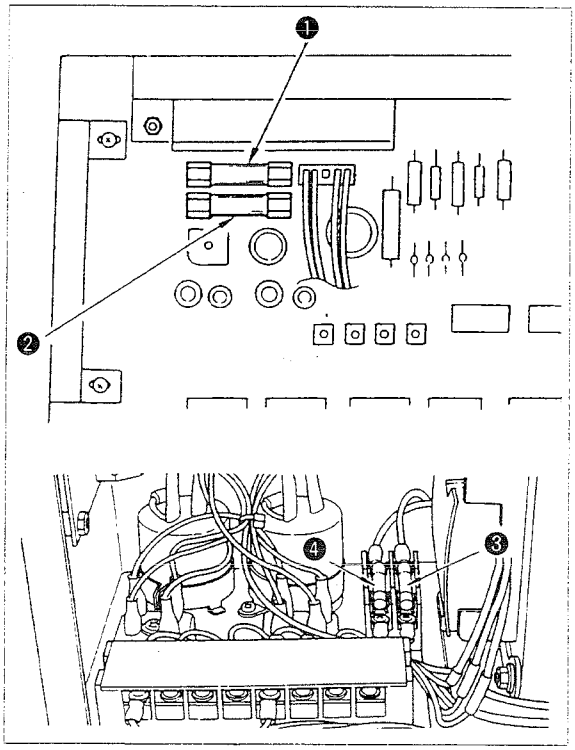
6-4 Replacing data EEP-ROM



1. Data EEP-ROM ❶ is fixed on IC socket ❷ on the MAIN circuit board in the control box.
2. Turn cam ❸ of IC socket ❷ counterclockwise, and EEP-ROM ❶ can be removed.
3. Insert a new EEP-ROM into IC socket ❷ , then turn cam ❸ of the IC socket clockwise to fix the EEP-ROM.

(Caution) **When replacing EEP-ROM, be sure to turn the power switch OFF.**
The EP-ROM used with your AMS-205A / -206A is also applicable to an AMS-205C/ -206C.

6-5 Replacing the fuse



The machine uses the following four fuses:

❶ **3A standard melting fuse for circuit board power supply A protection** (Circuit board F1)

❷ **1A standard melting fuse four circuit board power supply B protection** (Circuit board F2)

❸ **7AT time-lag fuse for solenoid power supply protection** (Power supply F1)

❹ **7AT time-lag fuse for stepping motor protection** (Power supply F2)

(Caution) **To replace blown fuse, turn the power switch OFF, open the control box cover, and replace it with a new fuse with the specified capacity.**

6-6 Changing printed circuit board

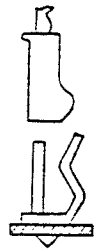
Types of printed circuit boards

❶ Main printed circuit board (MAIN PCB)
❷ Stepping motor drive control printed circuit board (PMDC PCB)
❸ Operating printed circuit board (OPERATE PCB)

❶ MAIN circuit board

Controls input/output, stepping motor, sewing speed and operation etc. It also includes a power circuit, such as ones of +5 V and ±12 V, for controlling. It analyzes troubles by running various testing programs. If problems cannot be solved even after troubleshooting has been executed using various test programs, replace this circuit board according to the following procedure:

(1) Turn the power switch OFF and remove the cover from the control box.
(2) Remove J1, J4 to J11, and J13 to J15 on the circuit board. (Also remove J18 and J19 for the L type)
(3) Remove the three circuit fixing screws.
(4) Remove the four circuit supporters and replace the circuit board.
(5) Assemble in the reverse order of the disassembly process. Replace the connectors checking the right direction.



❷ Stepping motor drive control printed circuit board (PMDC PCB)

Receives stepping motor drive pulses from the CPU on the main circuit board to drive the stepping motors. It is united with the heat sink. If feed-related troubles occur, replace this circuit board according to the following procedure:

(1) Turn the power switch OFF and remove the cover off the control box.
(2) Remove J21 to J23 on the circuit board.
(3) Remove the four outside screws which fix the heat sink to the control box.
(4) Exchange with a new circuit board.
(5) The position at which J23 is located, is the top side of the heat sink. Assemble in the reverse order of the disassembly process. Replace the connectors checking the right direction.

❸ Operating printed circuit board

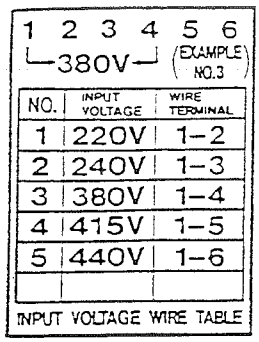
Controls the setting of the pattern number and enlargement/reduction of the pattern size etc. It also relays the signals sent from the switches, LEDs, and so on installed on the control box.

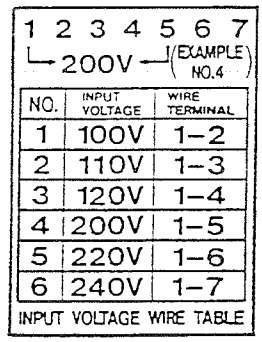
(1) Put the power switch OFF. Remove the cover from the control box.
(2) Remove the connectors J31 and J32 from the circuit board.
(3) Remove the four circuit board fixing nuts then replace with a new circuit board.
(4) Assemble in the reverse order of the disassembly process. Replace the connectors checking the right direction.

6-7 How to measure the line voltage

If any trouble occurs, first check the line voltage.

1) There are two kinds of transformers according to the voltage specification.



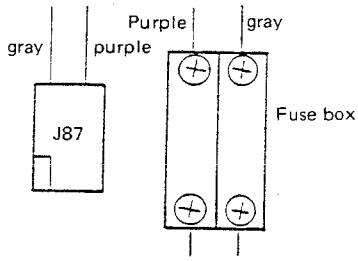


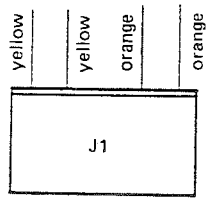
Voltage selection can be made by selecting an appropriate tap. Make sure to measure the line voltage before selecting the tap.

2) Transformer secondary output voltage (Alternating current: AC)

Transformer 24VAC (purple-purple)	Approx. 30VAC
Transformer 24VAC (gray-gray)	Approx. 24VAC
Transformer 24VAC (yellow-yellow)	Approx. 24VAC
Transformer 7.5VAC (orange-orange)	Approx. 7.5VAC

Disconnect the connector J1 on the Main printed circuit board and disconnect the connector J87 of the transformer. Measure the voltage in each line.

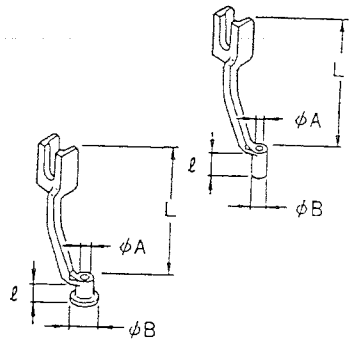
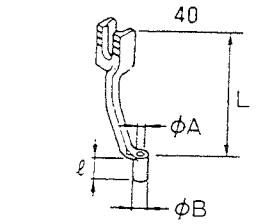
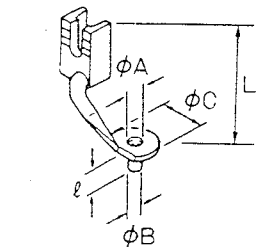
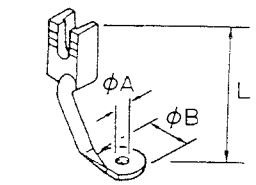
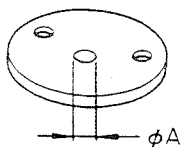


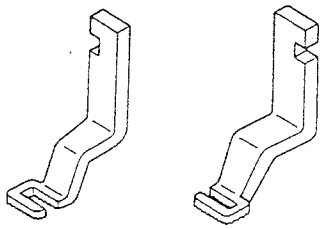
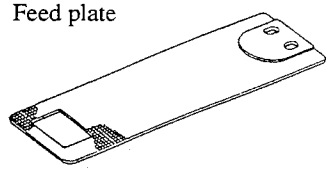
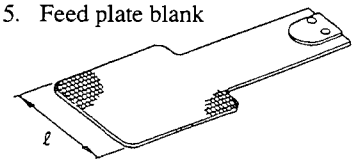
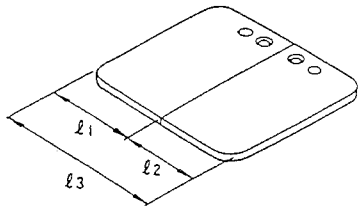
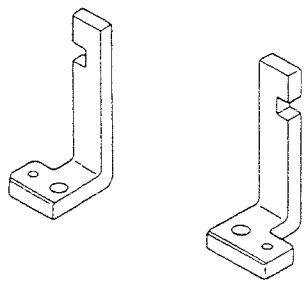
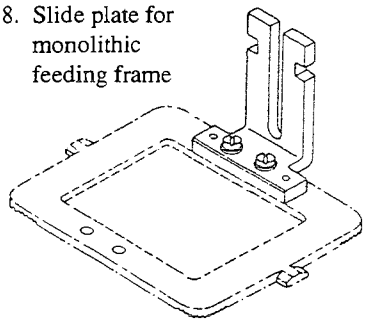


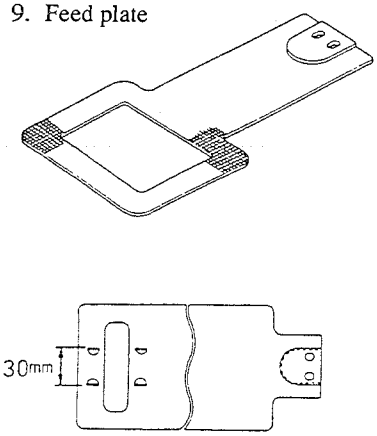
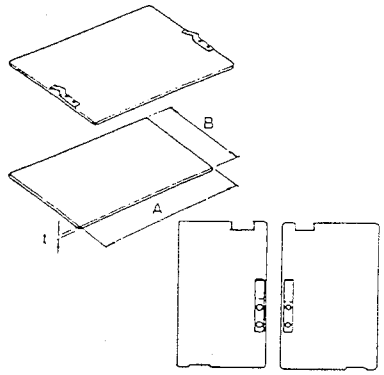
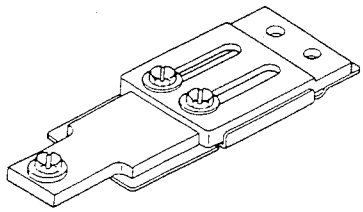
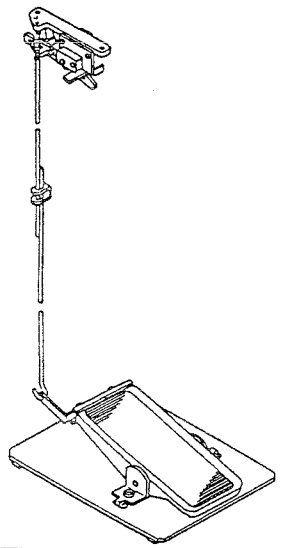
3) Measuring the DC line voltage (direct current: DC)

Printed circuit board	Tester (red)	Tester (black)	Voltage (DC)
MAIN circuit board	Test pin +5V	Test pin GND	DC+5V
	J14 –1	Test pin GND	DC+12V
	J14 –2	Test pin GND	DC–12V
	J14 –1	J14 –2	DC+24V
	J5 –4	Test pin GND	DC+33V
PMDC circuit board	Test pin +5V	Test pin GND	DC+5V
	Test pin +42V	Test pin GND	DC+42V

7. Options

Name of part	Type	Part No.	Size (mm)
1-1. Intermediate presser (excluding GL type) 	Intermediate presser (A)	B1601 210 000	φA×φB×ℓ×L 3.5×5.5×4×42.5
	Intermediate presser (B)	B1601 210 00B	φA×φB×ℓ×L 3.5×5.5×6×40.5
	Intermediate presser (D)	B1601 210 00D	φA×φB×ℓ×L 2.2×3.6×6×40.5
	Intermediate presser (E)	B1601 210 00E	φA×φB×ℓ×L 1.6×2.6×6×40.5
	Intermediate presser (G)	B1601 210 00G	φA×φB×ℓ×L 3×5×8×40.5
	Intermediate presser (C)	B1601 210 00C	φA×φB×ℓ×L 3.5×10×5×41.5
1-2. Intermediate presser (GL type only)   	Intermediate presser (A)	B1601 220 000	φA×φB×ℓ×L 2.2×3.6×6×29.5
	Intermediate presser (B)	B1601 220 00B	φA×φB×ℓ×L 3.5×5.5×6×29.5
	Intermediate presser (E)	B1601 220 00E	φA×φB×ℓ×L 1.6×2.6×6×29.5
	Intermediate presser (F)	B1601 220 00F	φA×φB×ℓ×L 2.2×3.6×9×29.5
	Intermediate presser (G)	B1601 220 00G	φA×φB×ℓ×L 2.7×4.1×5×29.5×19.5
	Intermediate presser (C)	B1601 220 00C	φA×φB×φC×ℓ×L 2.2×3.6×12×6×29.5
	Intermediate presser (D)	B1601 220 00D	φA×φB×L 2.2×12×34.5
2. Needle hole guide 	Needle hole guide (A) for light-weight materials	B2426 210 00A	φA = 1.6
	Needle hole guide (B) for medium-weight materials	B2426 210 00B	φA = 2.0
	Needle hole guide (C) for knitted materials	B2426 210 00C	φA = 1.6
	Needle hole guide (D) for heavy-weight materials	B2426 210 00D	φA = 2.4
	Needle hole guide (F) for heavy-weight materials	B2426 210 00F	φA = 3.0
	Needle hole guide (G)	B2426 210 00G	φA = 3.0 (Provided with a countersinking section)

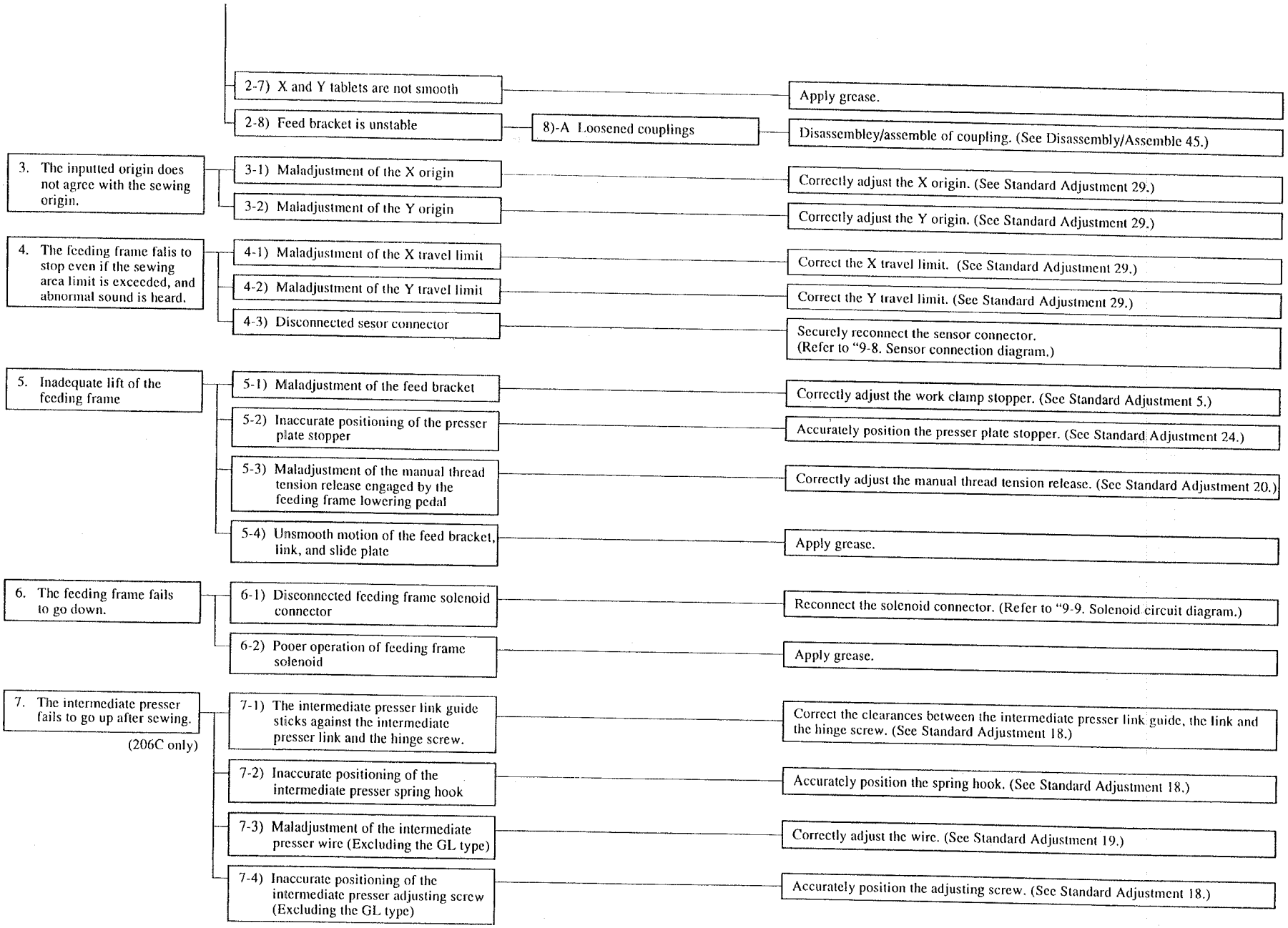
Name of part	Type	Part No.	Size (mm)
3. Work clamp foot 	Work clamp foot (right) Work clamp foot (left) Work clamp foot (right) for small bartacking Work clamp foot (left) for small bartacking Work clamp foot (right) for knitted materials Work clamp foot (left) for knitted materials	B2551 205 000 B2552 205 000 B2551 205 B00 B2552 205 B00 B2551 205 C00 B2552 205 C00	
4. Feed plate 	Feed plate Feed plate for small bartacking Feed plate for bartacking of knitted material	B2556 205 000 B2556 205 B00 B2556 205 C00	
5. Feed plate blank 	Feed plate blank without knurl Feed plate blank with knurl	B2556 206 0X0 B2556 206 0Y0	ℓ = 104 ℓ = 104
6. Feeding frame blank 	Feeding frame assembly blank without knurl Feeding frame assembly blank with knurl Feeding frame blank (right) without knurl Feeding frame blank (right) with knurl Feeding frame blank (left) without knurl Feeding frame blank (left) with knurl	B2553 206 0X0 B2553 206 0Y0 B2572 206 0X0 B2572 206 0Y0 B2573 206 0X0 B2573 206 0Y0	ℓ_3 = 94 ℓ_3 = 94 ℓ_1 = 50.5 ℓ_1 = 50.5 ℓ_2 = 43.5 ℓ_2 = 43.5
7. Slide plate 	Right slide plate Left slide plate	B2570 206 0A0 B2571 206 0A0	
8. Slide plate for monolithic feeding frame 	Slide plate assembly for monolithic feeding frame	B2551 206 0A0	

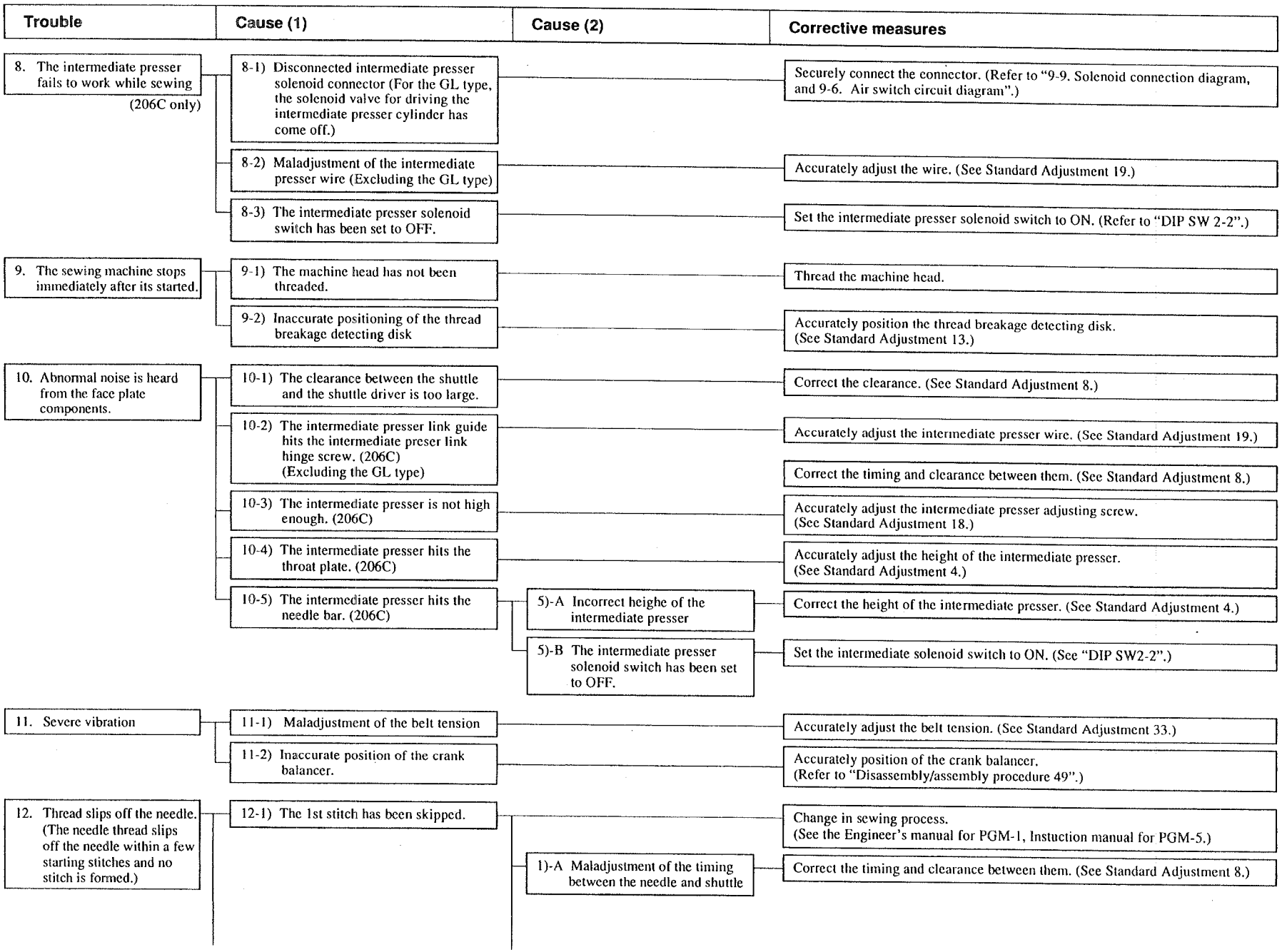
Name of part	Type	Part No.	Size (mm)
9. Feed plate 	Feed plate	B2556 206 000	
	Feed plate (30mm (1.181"))	D2557 206 H0H	
10. Plastic blank 	Large plastic feeding frame (asm.)	B2557 206 0A0	
	Feeding frame material (A)	B2587 210 000	A×B×t= 210×150×1
	Feeding frame material (B)	B2588 210 000	A×B×t= 210×150×1.5
	Plastic feeding frame, left (asm.)	B2557 206 0AA	
	Plastic feeding frame, right (asm.)	B2557 206 0AB	
11. Auxiliary feed plate (asm.) 	Auxiliary feed plate (asm.)	B2564 210 0A0 Used with LK subclass feed plate	
12. 3-pedal switch (PK-48) 	3-pedal switch (asm.)	GPK- 48001 0AA	

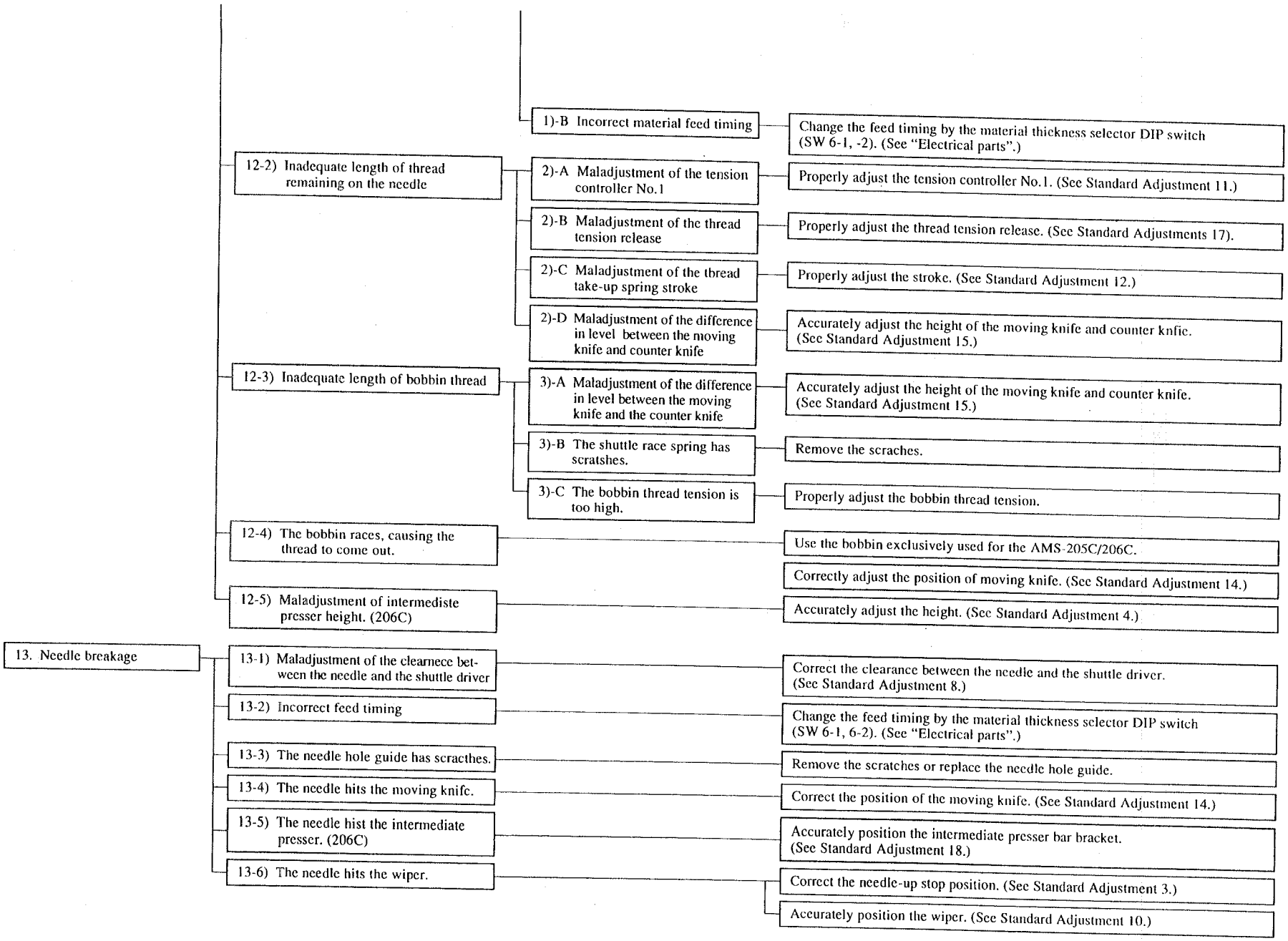
8. TROUBLES AND CORRECTIVE MEASURES

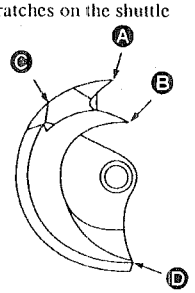
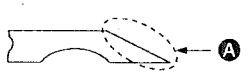
8-1 Mechanical parts

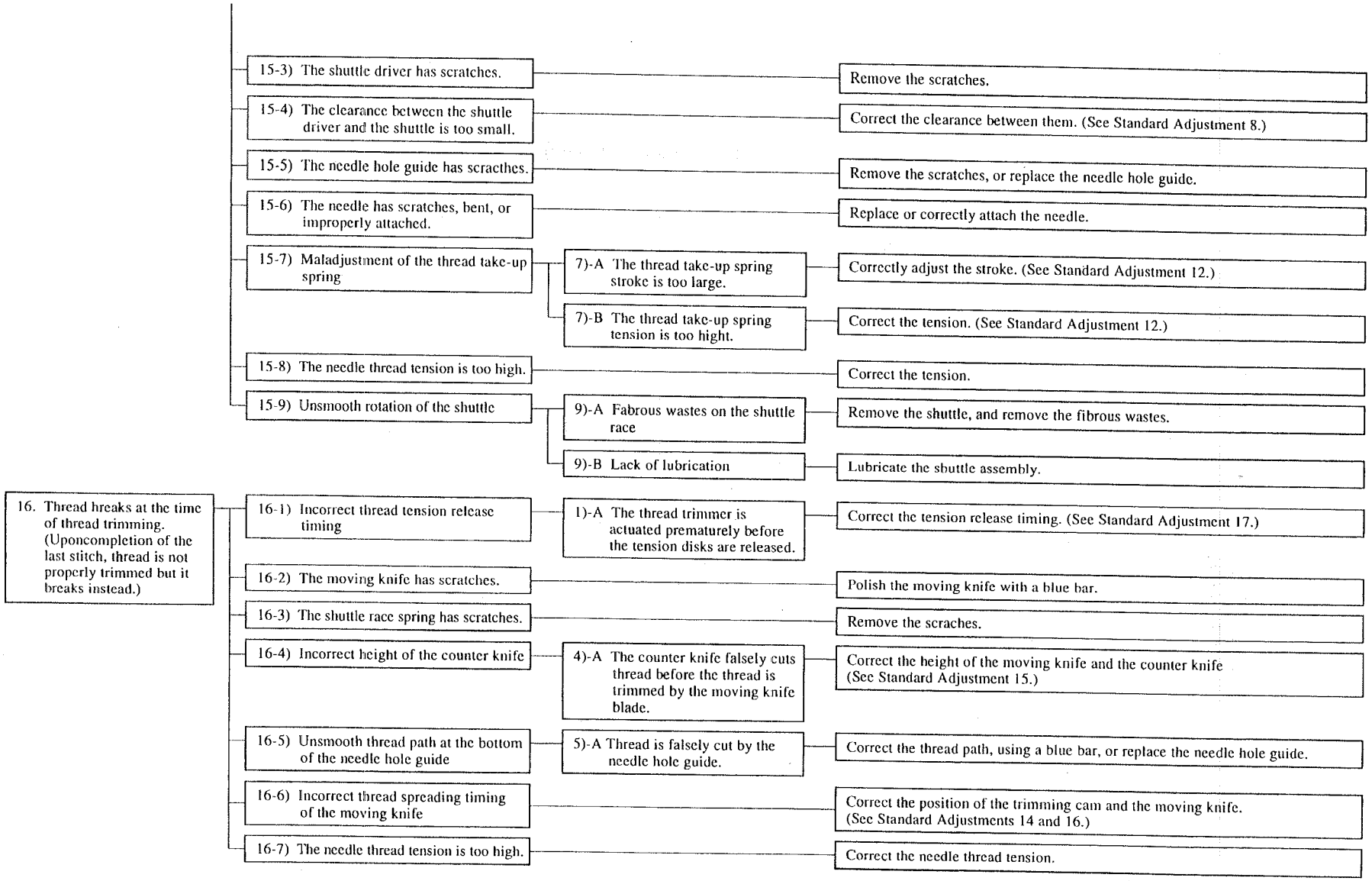
Trouble	Cause (1)	Cause (2)	Corrective measures
1. Mechanical lock	1-1) Improper needle-up stop position		Correct the stop position of the main shaft. (See Standard Adjustment 3.)
	1-2) Incomplete return the of thread trimmind cam shaft	2)-A The thread trimmer follower stickes against the follower stropper.	Correct the clearance between the thread trimmer follower stopper. (See Standard Adjustment 16.)
	1-3) Inaccurate positioning of the thread trimming cam	3)-A The marker line on the thread trimming cam is not aligned with the marker dot on the main shaft.	Accurately position the thread trimming cam. (See Standard Adjustment 16.)
	1-4) Inaccurate positioning of the thread trimmer solenoid bracket	4)-A The thread trimmer solenoid bracket comes into contact with the thread trimming cam	Accurately position the thread trimmer solenoid bracket. (See Disassembly/Assembly 38.)
	1-5) The moving knife fails to move smoothly.		Correct the blade pressure of the moving knife. (See Standard Adjustment 15.)
	1-6) Inaccurate positioning of the generator stator		Accurately position the generator stator. (See Disassembly/Assembly 35.)
	1-7) Inaccurate positioning of the handwheel		Accurately position the handwheel. (See Disassembly/Assembly 35)
2. Deformation in sewn patterns * The major cause is considered to be the vibration of the feed mechanism components.	2-1) Maladjustement of the X-direction feed belt tension		Correct the belt tension. (See Standard Adjustment 27.)
	2-2) Maladjustment of the Y-direction feed belt tension		Correct the belt tension. (See Standard Adjustment 28.)
	2-3) The feed in the X-direction is unsmooth.	3)-A Improper height of the throat plate auxiliary cover	Correct the height of the throat plate auxiliary cover. (See Standard Adjustment 23.)
		3)-B Improper height of the X guide shaft support	Properly position the X guide shaft support. (See Standard Adjustment 26.)
	2-4) The feed in the Y direction is unsmooth.	4)-A The feed bracket sticks against the feed bracket auxiliary cover.	Correctly position the feed bracket auxiliary cover. (See Standard Adjustment 25.)
	2-5) Maladjustment of clamp pressure		Correctly adjust the clamp pressure. (See Standard Adjustment 5 and 34.)
	2-6) Work clamp does not go down completely.		Adjust according to the thickness of the workpiece. (See Standard Adjustment 6.)

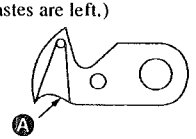

2-7) X and Y tablets are not smooth
Apply grease.
2-8) Feed bracket is unstable
8)-A Loosened couplings
Disassembley/assemble of coupling. (See Disassembly/Assemble 45.)
3. The inputted origin does not agree with the sewing origin.
3-1) Maladjustment of the X origin
Correctly adjust the X origin. (See Standard Adjustment 29.)
3-2) Maladjustment of the Y origin
Correctly adjust the Y origin. (See Standard Adjustment 29.)
4. The feeding frame fails to stop even if the sewing area limit is exceeded, and abnormal sound is heard.
4-1) Maladjustment of the X travel limit
Correct the X travel limit. (See Standard Adjustment 29.)
4-2) Maladjustment of the Y travel limit
Correct the Y travel limit. (See Standard Adjustment 29.)
4-3) Disconnected sesor connector
Securely reconnect the sensor connector. (Refer to "9-8. Sensor connection diagram.)
5. Inadequate lift of the feeding frame
5-1) Maladjustment of the feed bracket
Correctly adjust the work clamp stopper. (See Standard Adjustment 5.)
5-2) Inaccurate positioning of the presser plate stopper
Accurately position the presser plate stopper. (See Standard Adjustment 24.)
5-3) Maladjustment of the manual thread tension release engaged by the feeding frame lowering pedal
Correctly adjust the manual thread tension release. (See Standard Adjustment 20.)
5-4) Unsmooth motion of the feed bracket, link, and slide plate
Apply grease.
6. The feeding frame fails to go down.
6-1) Disconnected feeding frame solenoid connector
Reconnect the solenoid connector. (Refer to "9-9. Solenoid circuit diagram.)
6-2) Pooer operation of feeding frame solenoid
Apply grease.
7. The intermediate presser fails to go up after sewing.
(206C only)
7-1) The intermediate presser link guide sticks against the intermediate presser link and the hinge screw.
Correct the clearances between the intermediate presser link guide, the link and the hinge screw. (See Standard Adjustment 18.)
7-2) Inaccurate positioning of the intermediate presser spring hook
Accurately position the spring hook. (See Standard Adjustment 18.)
7-3) Maladjustment of the intermediate presser wire (Excluding the GL type)
Correctly adjust the wire. (See Standard Adjustment 19.)
7-4) Inaccurate positioning of the intermediate presser adjusting screw (Excluding the GL type)
Accurately position the adjusting screw. (See Standard Adjustment 18.)

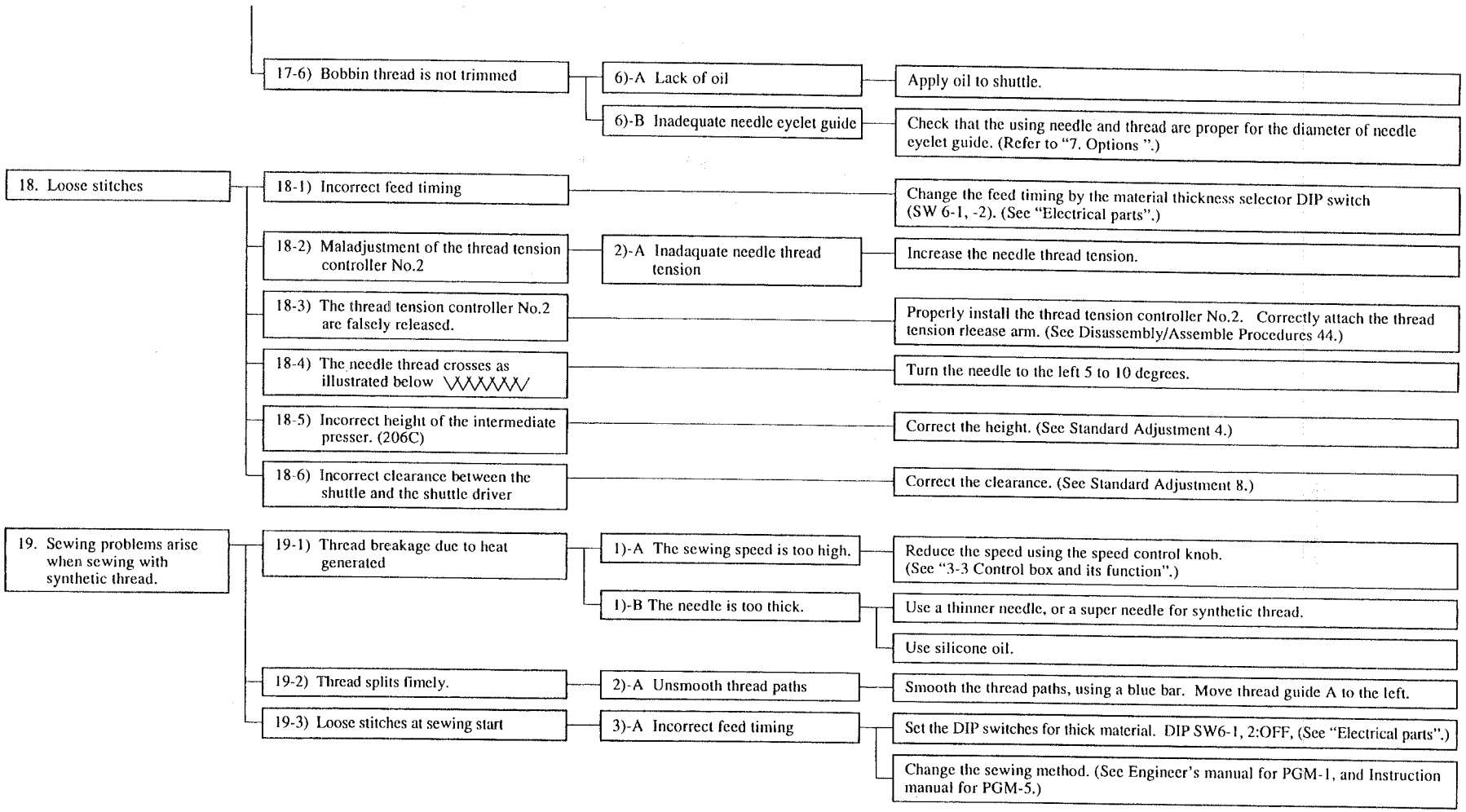

Trouble
Cause (1)
Cause (2)
Corrective measures
8. The intermediate presser fails to work while sewing (206C only)
8-1) Disconnected intermediate presser solenoid connector (For the GL type, the solenoid valve for driving the intermediate presser cylinder has come off.)
Securely connect the connector. (Refer to "9-9. Solenoid connection diagram, and 9-6. Air switch circuit diagram".)
8-2) Maladjustment of the intermediate presser wire (Excluding the GL type)
Accurately adjust the wire. (See Standard Adjustment 19.)
8-3) The intermediate presser solenoid switch has been set to OFF.
Set the intermediate presser solenoid switch to ON. (Refer to "DIP SW 2-2".)
9. The sewing machine stops immediately after its started.
9-1) The machine head has not been threaded.
Thread the machine head.
9-2) Inaccurate positioning of the thread breakage detecting disk
Accurately position the thread breakage detecting disk. (See Standard Adjustment 13.)
10. Abnormal noise is heard from the face plate components.
10-1) The clearance between the shuttle and the shuttle driver is too large.
Correct the clearance. (See Standard Adjustment 8.)
10-2) The intermediate presser link guide hits the intermediate preser link hinge screw. (206C) (Excluding the GL type)
Accurately adjust the intermediate presser wire. (See Standard Adjustment 19.)
Correct the timing and clearance between them. (See Standard Adjustment 8.)
10-3) The intermediate presser is not high enough. (206C)
Accurately adjust the intermediate presser adjusting screw. (See Standard Adjustment 18.)
10-4) The intermediate presser hits the throat plate. (206C)
Accurately adjust the height of the intermediate presser. (See Standard Adjustment 4.)
10-5) The intermediate presser hits the needle bar. (206C)
5)-A Incorrect heighe of the intermediate presser
Correct the height of the intermediate presser. (See Standard Adjustment 4.)
5)-B The intermediate presser solenoid switch has been set to OFF.
Set the intermediate solenoid switch to ON. (See "DIP SW2-2".)
11. Severe vibration
11-1) Maladjustment of the belt tension
Accurately adjust the belt tension. (See Standard Adjustment 33.)
11-2) Inaccurate position of the crank balancer.
Accurately position of the crank balancer. (Refer to "Disassembly/assembly procedure 49".)
12. Thread slips off the needle. (The needle thread slips off the needle within a few starting stitches and no stitch is formed.)
12-1) The 1st stitch has been skipped.
Change in sewing process. (See the Engineer's manual for PGM-1, Instuction manual for PGM-5.)
1)-A Maladjustment of the timing between the needle and shuttle
Correct the timing and clearance between them. (See Standard Adjustment 8.)


1)-B Incorrect material feed timing
Change the feed timing by the material thickness selector DIP switch (SW 6-1, -2). (See "Electrical parts".)
12-2) Inadequate length of thread remaining on the needle
2)-A Maladjustment of the tension controller No.1
Properly adjust the tension controller No.1. (See Standard Adjustment 11.)
2)-B Maladjustment of the thread tension release
Properly adjust the thread tension release. (See Standard Adjustments 17).
2)-C Maladjustment of the tbread take-up spring stroke
Properly adjust the stroke. (See Standard Adjustment 12.)
2)-D Maladjustment of the difference in level between the moving knife and counter knfie
Accurately adjust the height of the moving knife and counter knfie. (See Standard Adjustment 15.)
12-3) Inadequate length of bobbin thread
3)-A Maladjustment of the difference in level between the moving knife and the counter knife
Accurately adjust the height of the moving knife and counter knife. (See Standard Adjustment 15.)
3)-B The shuttle race spring has scratshes.
Remove the scraches.
3)-C The bobbin thread tension is too high.
Properly adjust the bobbin thread tension.
12-4) The bobbin races, causing the thread to come out.
Use the bobbin exclusively used for the AMS-205C/206C.
Correctly adjust the position of moving knife. (See Standard Adjustment 14.)
12-5) Maladjustment of intermediste presser height. (206C)
Accurately adjust the height. (See Standard Adjustment 4.)
13. Needle breakage
13-1) Maladjustment of the clearnece between the needle and the shuttle driver
Correct the clearance between the needle and the shuttle driver. (See Standard Adjustment 8.)
13-2) Incorrect feed timing
Change the feed timing by the material thickness selector DIP switch (SW 6-1, 6-2). (See "Electrical parts".)
13-3) The needle hole guide has scracthes.
Remove the scratches or replace the needle hole guide.
13-4) The needle hits the moving knifc.
Correct the position of the moving knife. (See Standard Adjustment 14.)
13-5) The needle hist the intermediate presser. (206C)
Accurately position the intermediate presser bar bracket. (See Standard Adjustment 18.)
13-6) The needle hits the wiper.
Correct the needle-up stop position. (See Standard Adjustment 3.)
Accurately position the wiper. (See Standard Adjustment 10.)

Trouble	Cause (1)	Cause (2)	Corrective measures
14. Stitch skipping	14-1) Incorrect timing between the needle and the shuttle		Correct the timing and the clearance between the needle and the shuttle. (See Standard Adjustment 8.)
	14-2) The needle is bent, or the needle point is crushed, or the needle has been improperly attached.		Replace the needle, or correctly attach the needle.
	14-3) Incorrect feed timing		Change the timing by the material thickness selector DIP switch (SW6-1, 6-2). (See "Electrical parts".)
	14-4) Maladjustment of the clearance between the needle and the shuttle driver		Correct the clearance between them. (See Standard Adjustment 8.)
	14-5) Maladjustment of the intermediate presser height. (206C)		Correct the height. (See Standard Adjustment 4.)
15. Thread breakage	15-1) Scratches on the shuttle 	1)-A A scratch on portion A (The needle hits the shuttle.)	Smooth the shuttle point using an oilstone, then polish the shuttle point with a blue bar. Adjust the clearance between the needle and shuttle. (See Standard Adjustment 8.)
		1)-B A scratch on portion B (produced when the needle bends or breaks)	Smooth the scrached portion, using an oilstone, then polish it with a blue bar.
		1)-C A scratch on potrtion C (scratched by the needle when removing the shuttle)	Smooth the scratched portion, using an oilstone, then polish it with a blue bar.
		1)-D A scratch on portion D	Smooth the scratched portion, using an oilstone, then polish it with a blue bar.
	15-2) Thread bites into the shuttle.	2)-A Inaccurate positioing of the shuttle race spring	Accurately position the shuttle race spring. (See Standard Adjustment 7.)
		2)-B Portion A of the shuttle point is dull. 	Replace the shuttle.
		2)-C Inaccurate positioning of the shuttle race	Accurately position the shuttle race. (See Standard Adjustment 8.)
		2)-D The needle thread tension is not high enough.	Correct the needle thread tension.
		2)-E Lack of grease	Apply grease to shuttle.

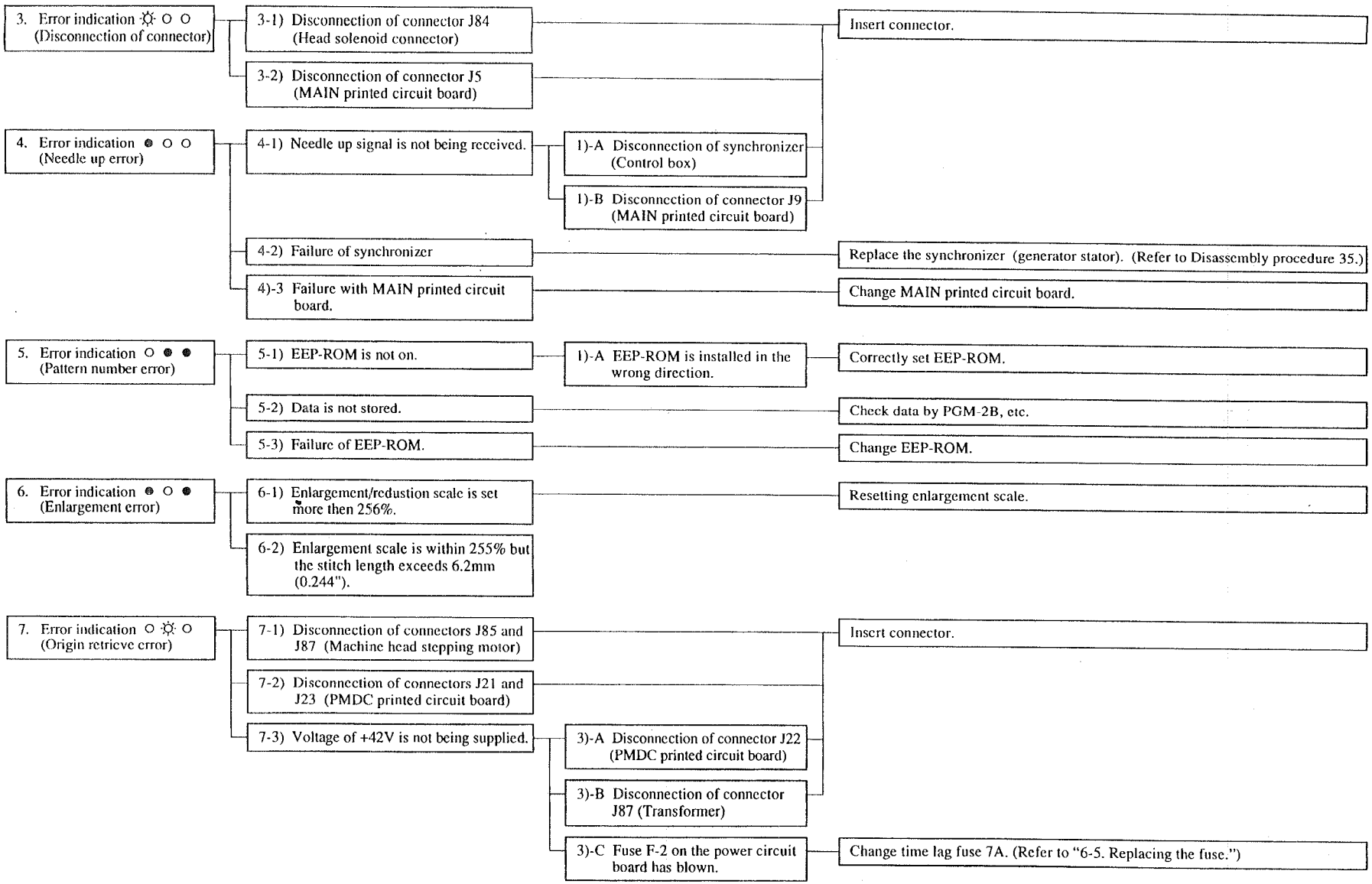

15-3) The shuttle driver has scratches.
Remove the scratches.
15-4) The clearance between the shuttle driver and the shuttle is too small.
Correct the clearance between them. (See Standard Adjustment 8.)
15-5) The needle hole guide has scracthes.
Remove the scratches, or replace the needle hole guide.
15-6) The needle has scratches, bent, or improperly attached.
Replace or correctly attach the needle.
15-7) Maladjustment of the thread take-up spring
7)-A The thread take-up spring stroke is too large.
Correctly adjust the stroke. (See Standard Adjustment 12.)
7)-B The thread take-up spring tension is too hight.
Correct the tension. (See Standard Adjustment 12.)
15-8) The needle thread tension is too high.
Correct the tension.
15-9) Unsmooth rotation of the shuttle
9)-A Fabrous wastes on the shuttle race
Remove the shuttle, and remove the fibrous wastes.
9)-B Lack of lubrication
Lubricate the sbuttle assembly.
16. Thread breaks at the time of thread trimming. (Uponcompletion of the last stitch, thread is not properly trimmed but it breaks instead.)
16-1) Incorrect thread tension release timing
1)-A The thread trimmer is actuated prematurely before the tension disks are released.
Correct the tension release timing. (See Standard Adjustment 17.)
16-2) The moving knife has scratches.
Polish the moving knife with a blue bar.
16-3) The shuttle race spring has scratches.
Remove the scraches.
16-4) Incorrect height of the counter knife
4)-A The counter knife falsely cuts thread before the thread is trimmed by the moving knife blade.
Correct the height of the moving knife and the counter knife (See Standard Adjustment 15.)
16-5) Unsmooth thread path at the bottom of the needle hole guide
5)-A Thread is falsely cut by the needle hole guide.
Correct the thread path, using a blue bar, or replace the needle hole guide.
16-6) Incorrect thread spreading timing of the moving knife
Correct the position of the trimming cam and the moving knife. (See Standard Adjustments 14 and 16.)
16-7) The needle thread tension is too high.
Correct the needle thread tension.

Trouble	Cause (1)	Cause (2)	Corrective measures
17. Thread trimming failure (Upon completion of sewing, the thread trimmer fails to trim the needle thread or the bobbin thread, or the needle thread after it is trimmed is extremely long or short.)	17-1) The thread trimmer is dull.	1)-A The moving knife and/or counter knife has worn out.	Replace the moving knife and/or counter knife.
		1)-B The moving and counter knife fail to overlap properly.	Correct the height of the moving knife and counter knife. (See Standard Adjustment 15.)
		1)-C The counter knife blade is not parallel.	Parallel the counter knife blade point. (See Standard Adjusment 15)
	17-2) Thread wastes are left in the shuttle cover.	2)-A Presence of a burr on portion Ⓐ of the moving knife (The shape of trimmed thread will be " ⟶ ", and thread wastes are left.) 	Remove the burr(s) using a blue bar, or replace the moving knife.
		2)-B Presence of a scratch on the shuttle race spring (The shape of trimmed thread will be " ⌒ ", and thread wastes are left.)	Remove the scratches.
	17-3) The moving knife fails to spread the thread.	3)-A Incorrect positioning of the moving knife	Accurately position the moving knife. (See Standard Adjustment 14.)
		3)-B Incorrect path of the moving knife	Replace the moving knife or throat plate. (See Standard Adjustments 14 and 15.)
		3)-C Inaccurate positioning of the thread trimming cam	Accurately position tbe thread trimming cam. (See Standard Adjustment 16.)
		3)-D Inaccurate positioning of the shuttle race spring	Accurately position the shuttle race spring. (See Standard Adjustment 7.)
	17-4) Skipping of the last stitch	4)-A Incorrect timing between the needle and the shuttle	Correct the timing and clearance between them. (See Standard Adjustment 8.)
		4)-B Incorrect height of the intermediate presser. (206C)	Correct the height. (See Standard Adjustment 4.)
	17-5) Incorrect needle-up stop position		Correct the needle-up stop position. (See Standard Adjustment 3.)
			Change the sewing method. (Refer to Engineer's manual for PGM-1, and Instruction manual for PGM-5.)

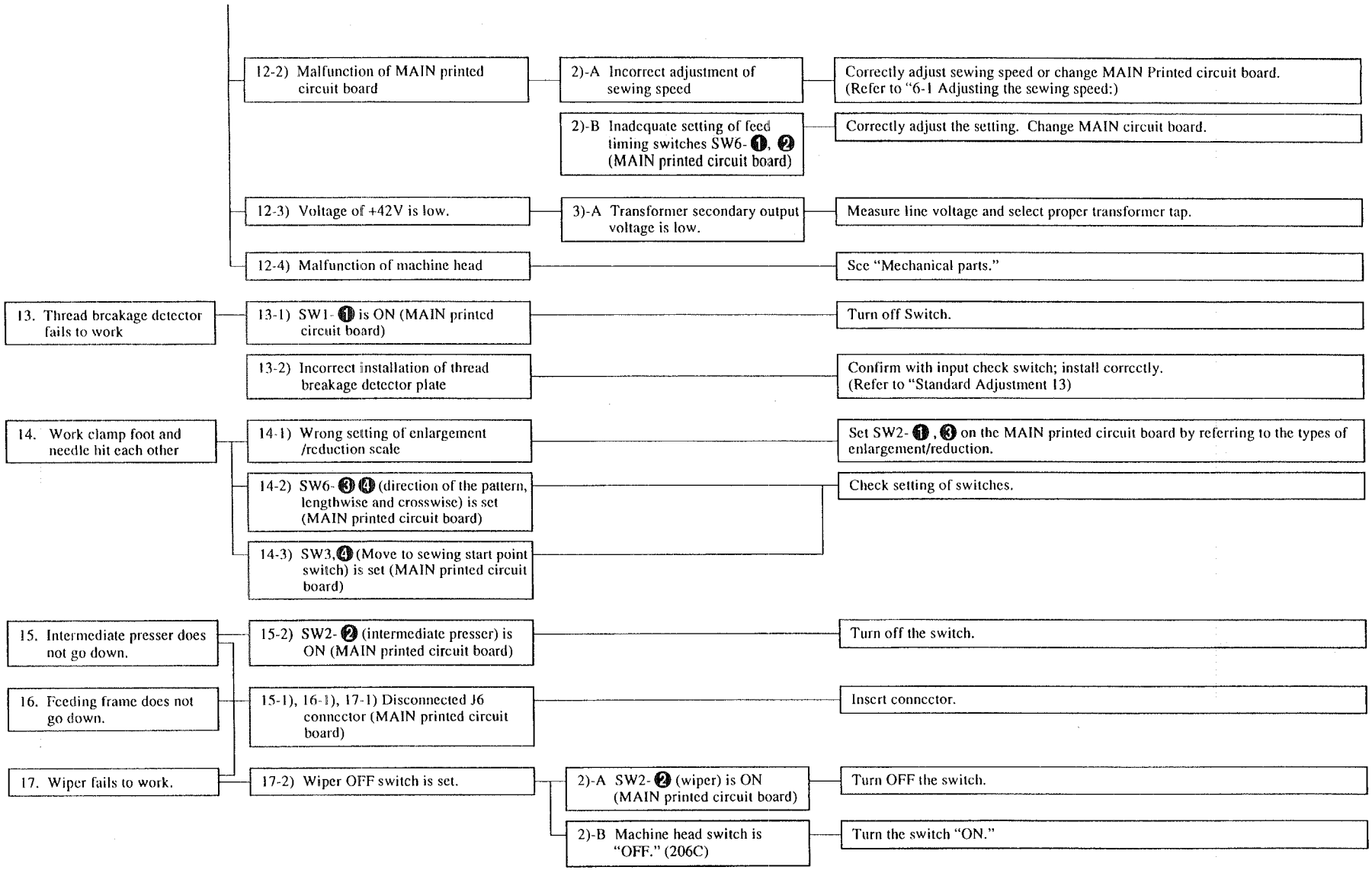

17-6) Bobbin thread is not trimmed
6)-A Lack of oil
Apply oil to shuttle.
6)-B Inadequate needle eyelet guide
Check that the using needle and thread are proper for the diameter of needle eyelet guide. (Refer to "7. Options ".)
18. Loose stitches
18-1) Incorrect feed timing
Change the feed timing by the material thickness selector DIP switch (SW 6-1, -2). (See "Electrical parts".)
18-2) Maladjustment of the thread tension controller No.2
2)-A Inadaquate needle thread tension
Increase the needle thread tension.
18-3) The thread tension controller No.2 are falsely released.
Properly install the thread tension controller No.2. Correctly attach the thread tension rleease arm. (See Disassembly/Assemble Procedures 44.)
18-4) The needle thread crosses as illustrated below
Turn the needle to the left 5 to 10 degrees.
18-5) Incorrect height of the intermediate presser. (206C)
Correct the height. (See Standard Adjustment 4.)
18-6) Incorrect clearance between the shuttle and the shuttle driver
Correct the clearance. (See Standard Adjustment 8.)
19. Sewing problems arise when sewing with synthetic thread.
19-1) Thread breakage due to heat generated
1)-A The sewing speed is too high.
Reduce the speed using the speed control knob. (See "3-3 Control box and its function".)
1)-B The needle is too thick.
Use a thinner needle, or a super needle for synthetic thread.
Use silicone oil.
19-2) Thread splits fimely.
2)-A Unsmooth thread paths
Smooth the thread paths, using a blue bar. Move thread guide A to the left.
19-3) Loose stitches at sewing start
3)-A Incorrect feed timing
Set the DIP switches for thick material. DIP SW6-1, 2:OFF, (See "Electrical parts".)
Change the sewing method. (See Engineer's manual for PGM-1, and Instruction manual for PGM-5.)

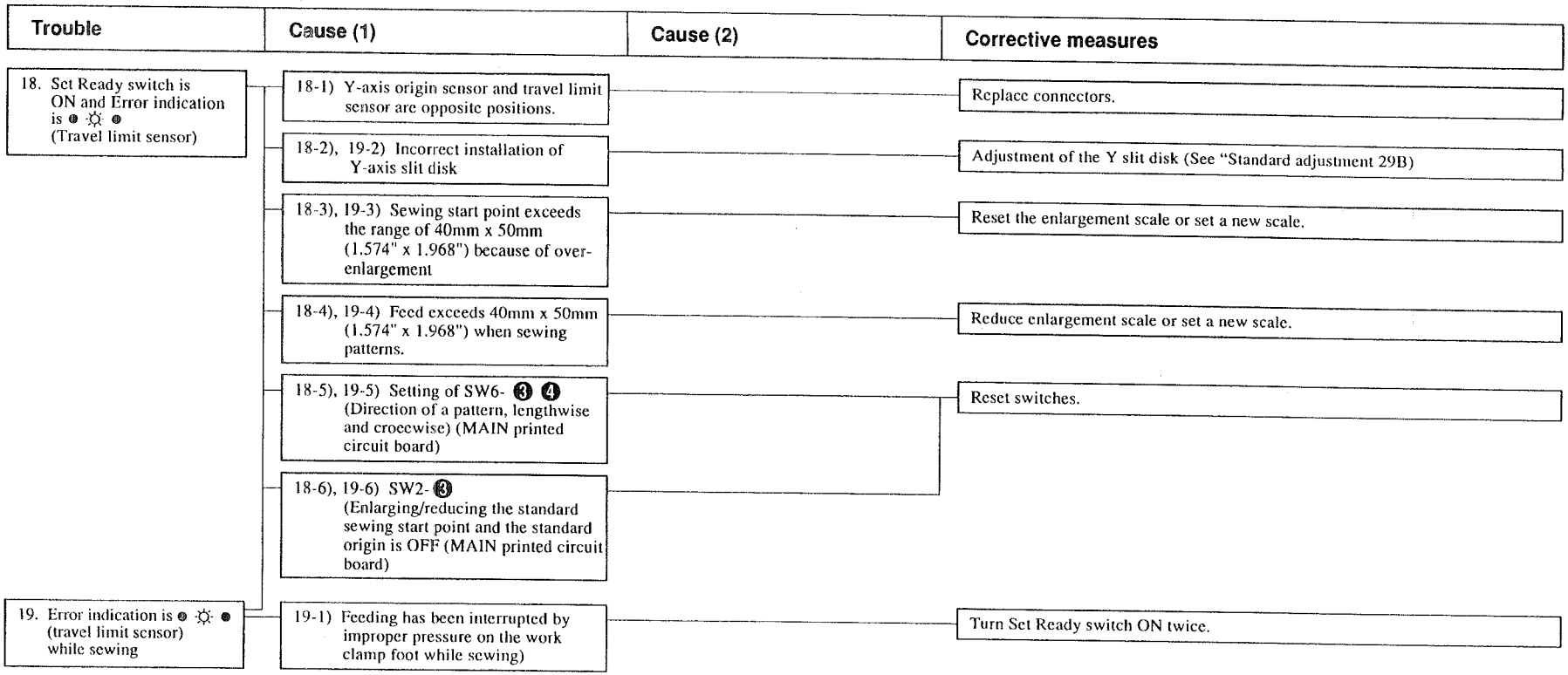
8-2 Troubles and corrective measures (Electrical parts)

Trouble	Cause (1)	Cause (2)	Corrective measures
1. LED fails to light	1-1) Voltage of +5 is not being supplied.	1)-A Fuse F-1 has blown. (MAIN printed circuit board)	Change fuse 3A. (Refer to "6-5. Replacing the fuse.")
		1)-B Failure of power circuit (MAIN printed circuit board)	Change MAIN printed circuit board; change broken parts.
		1)-C Disconnection of connector J1 (Main printed circuit board)	Insert connector. (Refer to "9-7. Power supply connection diagram.)
	1-2) Signal is not being sent.	2)-A Disconnection of connector J11 (Main printed circuit board)	
		2)-B Disconnetion of connector J31 (Operating printed circuited board)	
		2)-C Disconnection of connector J32 (Operating printed circuit board)	
	1-3) Test mode is currently active.		Set the SW5 on the Main printed circuit board to "zero."
2. Set Ready switch fails to work	2-1) Failure of switch		Change switch/change operating printed circuit board.
	2-2) Singnals are not being received.	2)-A Bad element	Change operating printed circuit board or MAIN printed circuit board.
		2)-B Disconnection of connectors J32 pin	Insert the pin.
	2-3) Voltage of +33 is not being supplied.	3)-A Disconnection of connetors J8 (MAIN printed circuit board)	Insert the connector.
		3)-B Disconnection of connector J87 (transformer)	
		3)-C Fuse F-1 on the power circuit board has blown.	Change time lag fuse 7A. (Refer to "6-5. Replacing the fuse.")
	2-4) Failure of stop switch		Determination whether stop switch is good or bad by conductiong an input check.
	2-5) Test mode is currently active.		Set SW5 on the MAIN printed circuit board to "zero."


3. Error indication ☼ O O
(Disconnection of connector)
3-1) Disconnection of connector J84
(Head solenoid connector)
3-2) Disconnection of connector J5
(MAIN printed circuit board)
Insert connector.
4. Error indication ● O O
(Needle up error)
4-1) Needle up signal is not being received.
1)-A Disconnection of synchronizer
(Control box)
1)-B Disconnection of connector J9
(MAIN printed circuit board)
4-2) Failure of synchronizer
Replace the synchronizer (generator stator). (Refer to Disassembly procedure 35.)
4)-3 Failure with MAIN printed circuit board.
Change MAIN printed circuit board.
5. Error indication O ● ●
(Pattern number error)
5-1) EEP-ROM is not on.
1)-A EEP-ROM is installed in the wrong direction.
Correctly set EEP-ROM.
5-2) Data is not stored.
Check data by PGM-2B, etc.
5-3) Failure of EEP-ROM.
Change EEP-ROM.
6. Error indication ● O ●
(Enlargement error)
6-1) Enlargement/redustion scale is set more then 256%.
Resetting enlargement scale.
6-2) Enlargement scale is within 255% but the stitch length exceeds 6.2mm (0.244").
7. Error indication O ☼ O
(Origin retrieve error)
7-1) Disconnection of connectors J85 and J87 (Machine head stepping motor)
Insert connector.
7-2) Disconnection of connectors J21 and J23 (PMDC printed circuit board)
7-3) Voltage of +42V is not being supplied.
3)-A Disconnection of connector J22
(PMDC printed circuit board)
3)-B Disconnection of connector J87 (Transformer)
3)-C Fuse F-2 on the power circuit board has blown.
Change time lag fuse 7A. (Refer to "6-5. Replacing the fuse.")

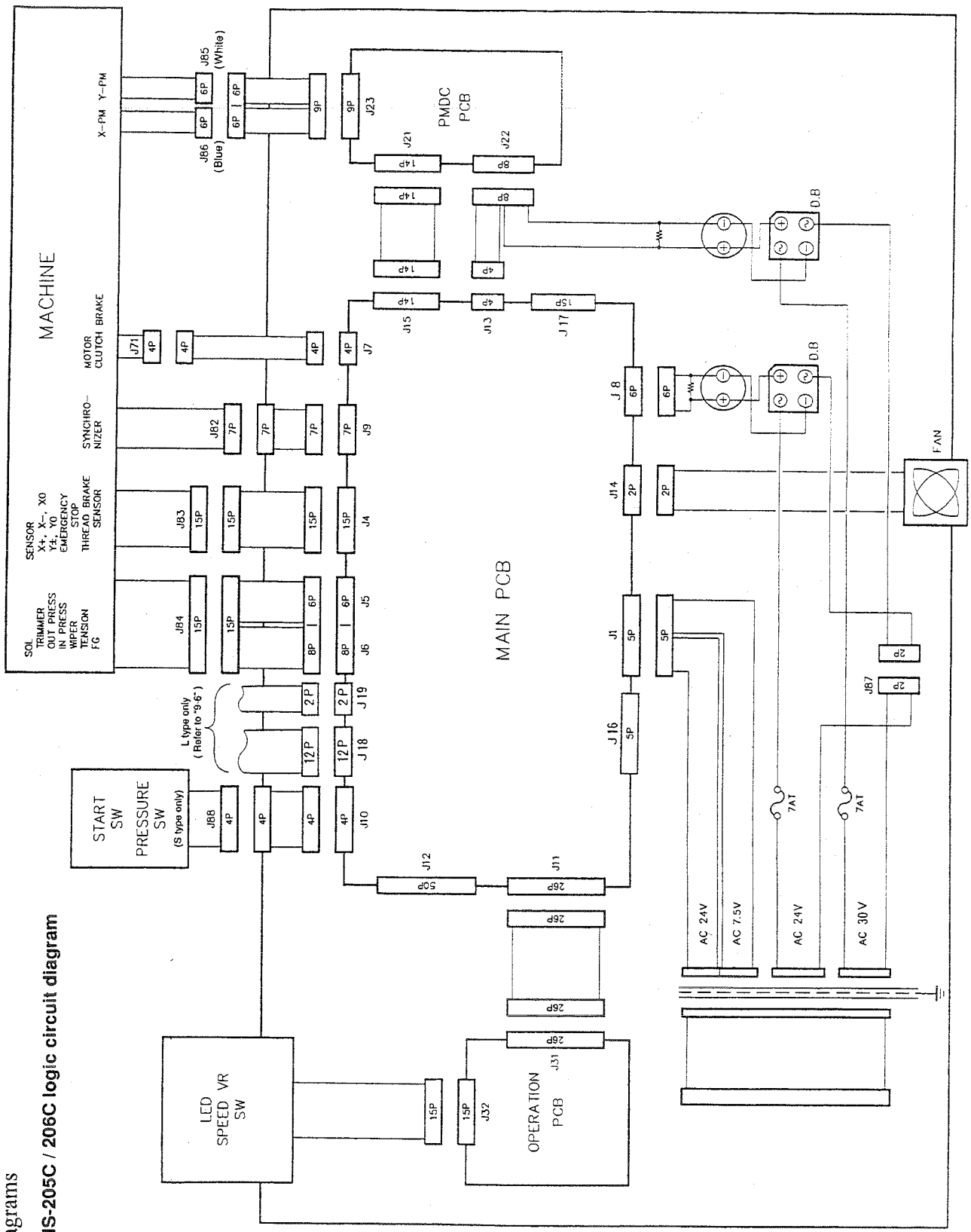
Trouble	Cause (1)	Cause (2)	Corrective measures
	7-4) Voltage +5 is not being supplied.	4)-A Disconnection of connector J13 (MAIN printed circuit board)	Insert connector.
	7-5) Poor running of stepping motor though it is excited.	5)-A Failure of PMDC printed circuit board.	Change PMDC printed circuit board.
		5)-B Failure of stepping motor	Change stepping motor
		5)-C Wrong connection of X and Y	Insert the same color connectors.
	7-6) Origin signals is not being put.	6)-A Failure with origin sensor circuit board	Confirm by input check, change circuit board.
		6)-B Y-axis slit disk is not fixed.	Match the origin position with origin gauge.
8. Error indciation ○ ○ ☼ (Reverse rotetion error)	8-1) Main shaft of sewing machine rotates in reverse direction.		Insert the motor power connector and turn 180 degrees. (Refers to "6-3. Changing the direction of rotation of the sewing machine".)
9. Error indication ☼ ☼ ☼ (Machine lock synchroizer error)	9-1) V balt of motor is off		Put on V belt.
	9-2) Failure of synchronizer		Change synchronizer. (generator stator) (See Disassembly/Assembly 35.)
	9-3) Disconnected motor power connector		Insert connector.
	9-4) Disconnected J7 connector (MAIN printed circuit board)		
10. Feeding frame does not go up at sewing start point.	10-1) Needle threading switch is ON.		Turn switch OFF.
	10-2) Bobbin thread winder switch is ON.		
11. Foot switch fails to work.	11-1) Failure of pedal switch		Confirm with input check switch; change switch.
	11-2) Failure of start switch		
	11-3) Disconnected J10 connector (MAIN printed circuit board)		Insert connector.
12. Deformation in sewn pattern	12-1) Malfuncition of PMDC printed circuit board	1)-A Trouble with cooling fan	Change cooling fan, change PMDC printed circuit board.
		1)-B Incorrect adjustment of electrical current	Adjust electrical current or change PMDC Printed circuit board.


12-2) Malfunction of MAIN printed circuit board
2)-A Incorrect adjustment of sewing speed
Correctly adjust sewing speed or change MAIN Printed circuit board. (Refer to "6-1 Adjusting the sewing speed:)
2)-B Inadequate setting of feed timing switches SW6-❶, ❷ (MAIN printed circuit board)
Correctly adjust the setting. Change MAIN circuit board.
12-3) Voltage of +42V is low.
3)-A Transformer secondary output voltage is low.
Measure line voltage and select proper transformer tap.
12-4) Malfunction of machine head
See "Mechanical parts."
13. Thread breakage detector fails to work
13-1) SW1-❶ is ON (MAIN printed circuit board)
Turn off Switch.
13-2) Incorrect installation of thread breakage detector plate
Confirm with input check switch; install correctly. (Refer to "Standard Adjustment 13)
14. Work clamp foot and needle hit each other
14-1) Wrong setting of enlargement /reduction scale
Set SW2-❶, ❸ on the MAIN printed circuit board by referring to the types of enlargement/reduction.
14-2) SW6-❸❹ (direction of the pattern, lengthwise and crosswise) is set (MAIN printed circuit board)
Check setting of switches.
14-3) SW3,❹ (Move to sewing start point switch) is set (MAIN printed circuit board)
15. Intermediate presser does not go down.
15-2) SW2-❷ (intermediate presser) is ON (MAIN printed circuit board)
Turn off the switch.
16. Feeding frame does not go down.
15-1), 16-1), 17-1) Disconnected J6 connector (MAIN printed circuit board)
Insert connector.
17. Wiper fails to work.
17-2) Wiper OFF switch is set.
2)-A SW2-❷ (wiper) is ON (MAIN printed circuit board)
Turn OFF the switch.
2)-B Machine head switch is "OFF." (206C)
Turn the switch "ON."

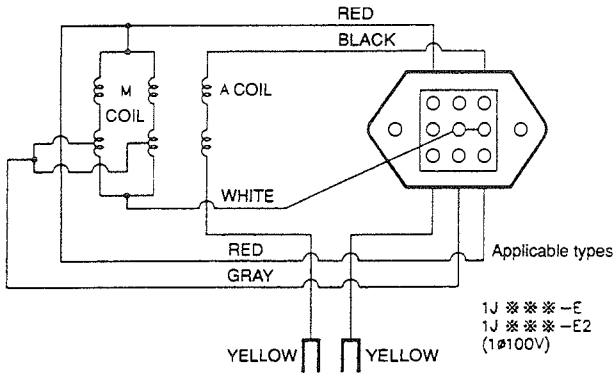

Trouble
Cause (1)
Cause (2)
Corrective measures
18. Set Ready switch is ON and Error indication is ● ☼ ● (Travel limit sensor)
18-1) Y-axis origin sensor and travel limit sensor are opposite positions.
Replace connectors.
18-2), 19-2) Incorrect installation of Y-axis slit disk
Adjustment of the Y slit disk (See "Standard adjustment 29B)
18-3), 19-3) Sewing start point exceeds the range of 40mm x 50mm (1.574" x 1.968") because of over-enlargement
Reset the enlargement scale or set a new scale.
18-4), 19-4) Feed exceeds 40mm x 50mm (1.574" x 1.968") when sewing patterns.
Reduce enlargement scale or set a new scale.
18-5), 19-5) Setting of SW6- ❸ ❹ (Direction of a pattern, lengthwise and crocewise) (MAIN printed circuit board)
Reset switches.
18-6), 19-6) SW2- ❸ (Enlarging/reducing the standard sewing start point and the standard origin is OFF (MAIN printed circuit board)
19. Error indication is ● ☼ ● (travel limit sensor) while sewing
19-1) Feeding has been interrupted by improper pressure on the work clamp foot while sewing)
Turn Set Ready switch ON twice.

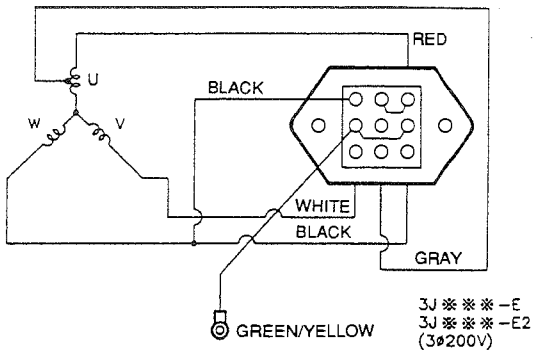
9. Diagrams

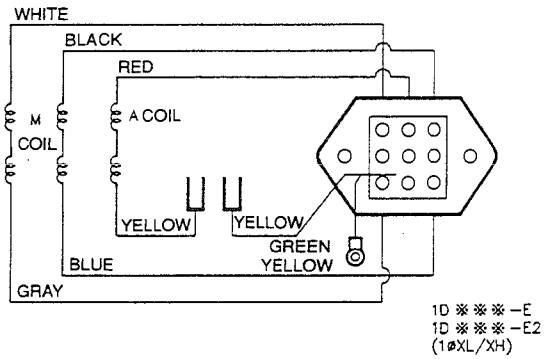
9-1 AMS-205C / 206C logic circuit diagram

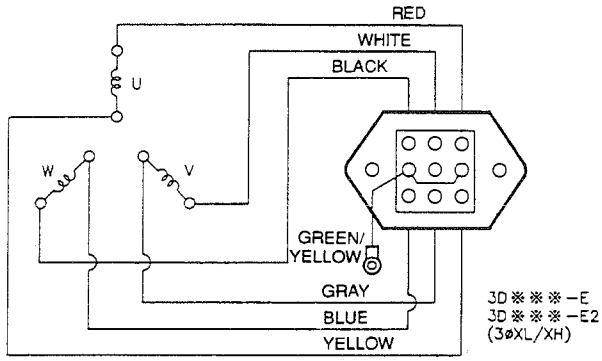


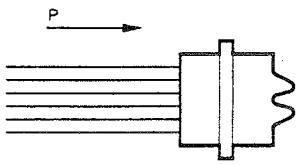
9-2 Motor connection diagram

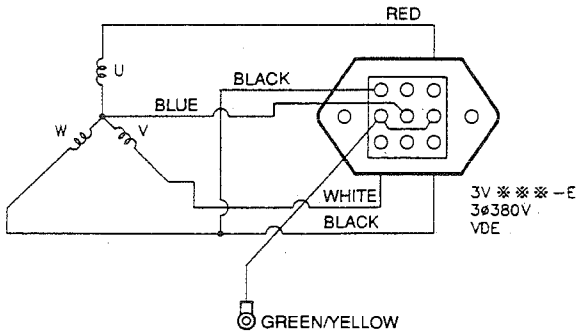


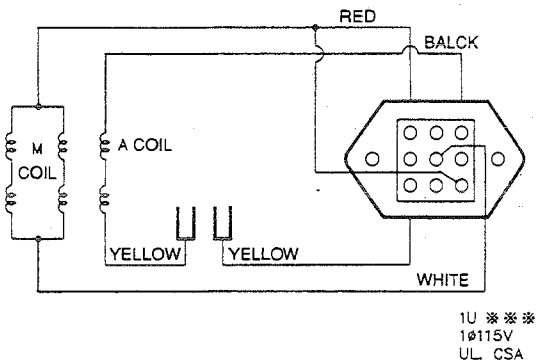


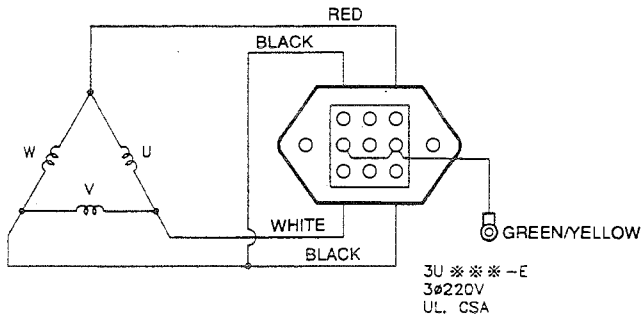




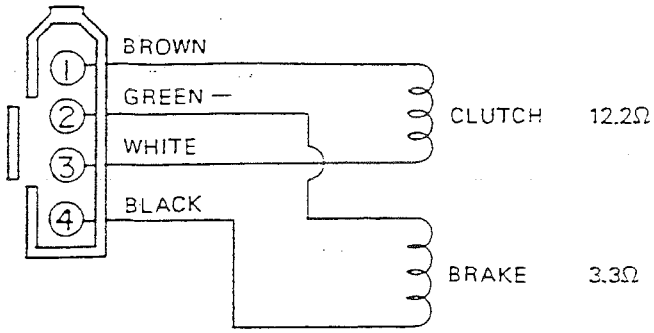




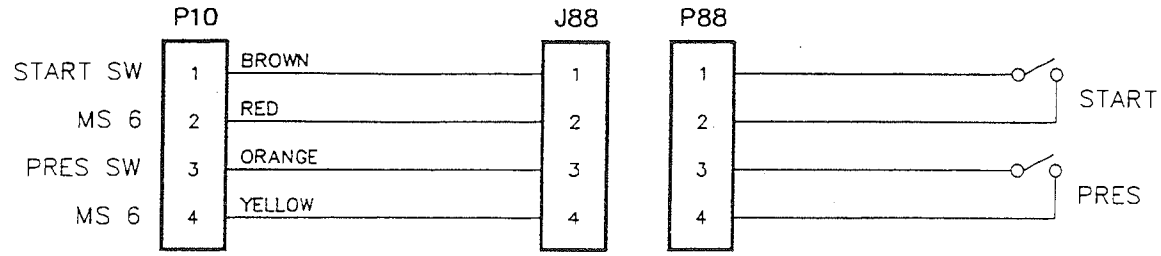




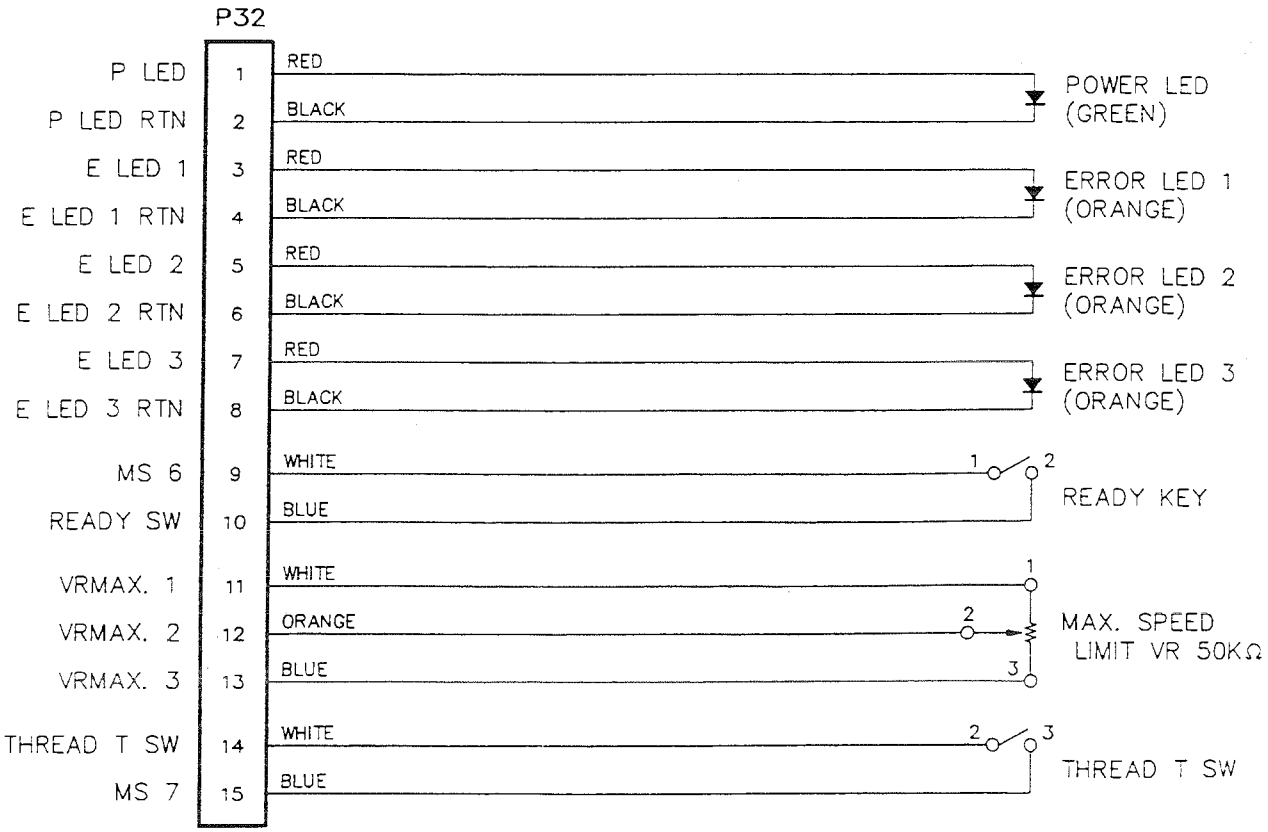
9-3 Clutch brake connection diagram



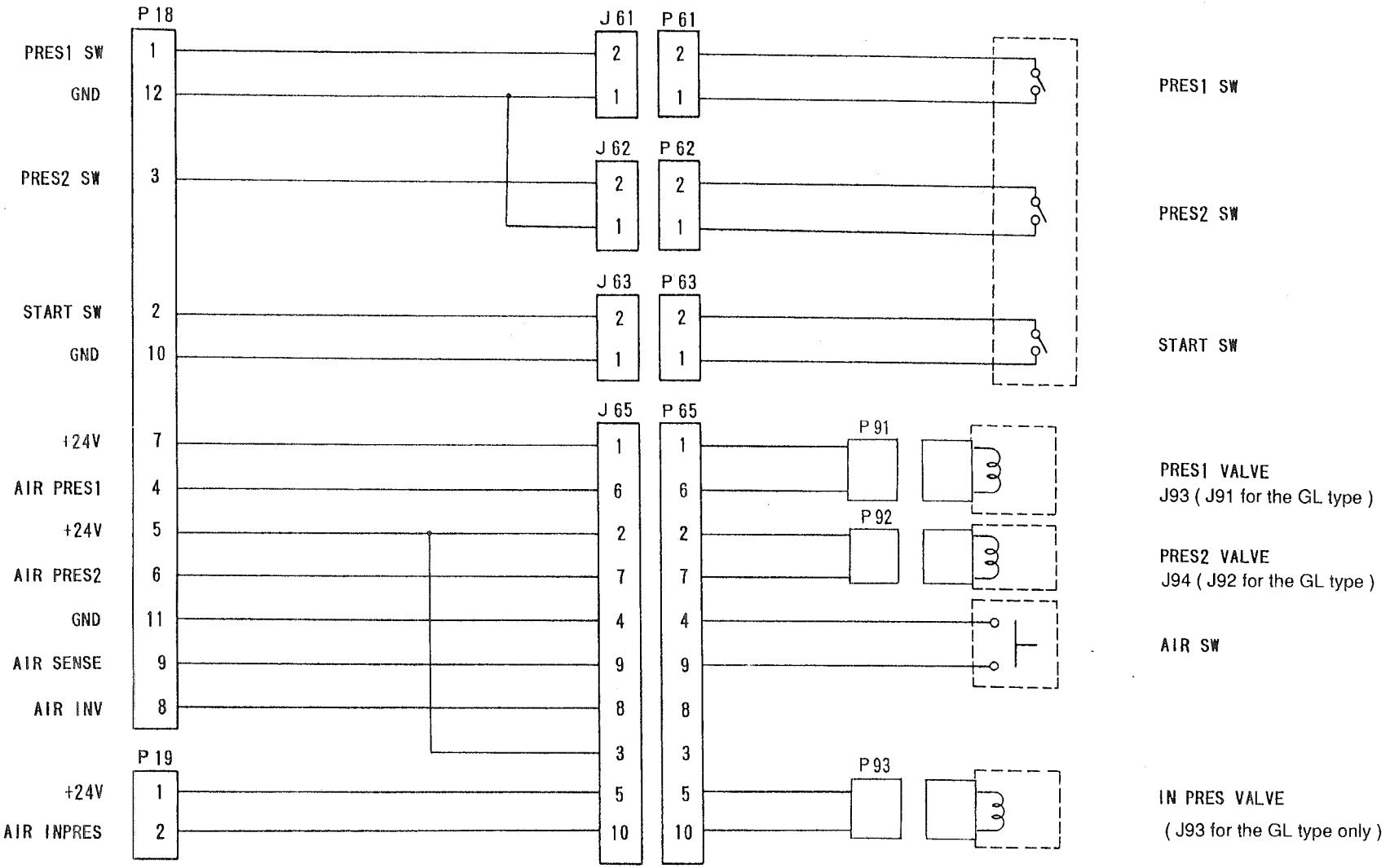
9-4 Pedal-switch sircuit diagram (S type only)



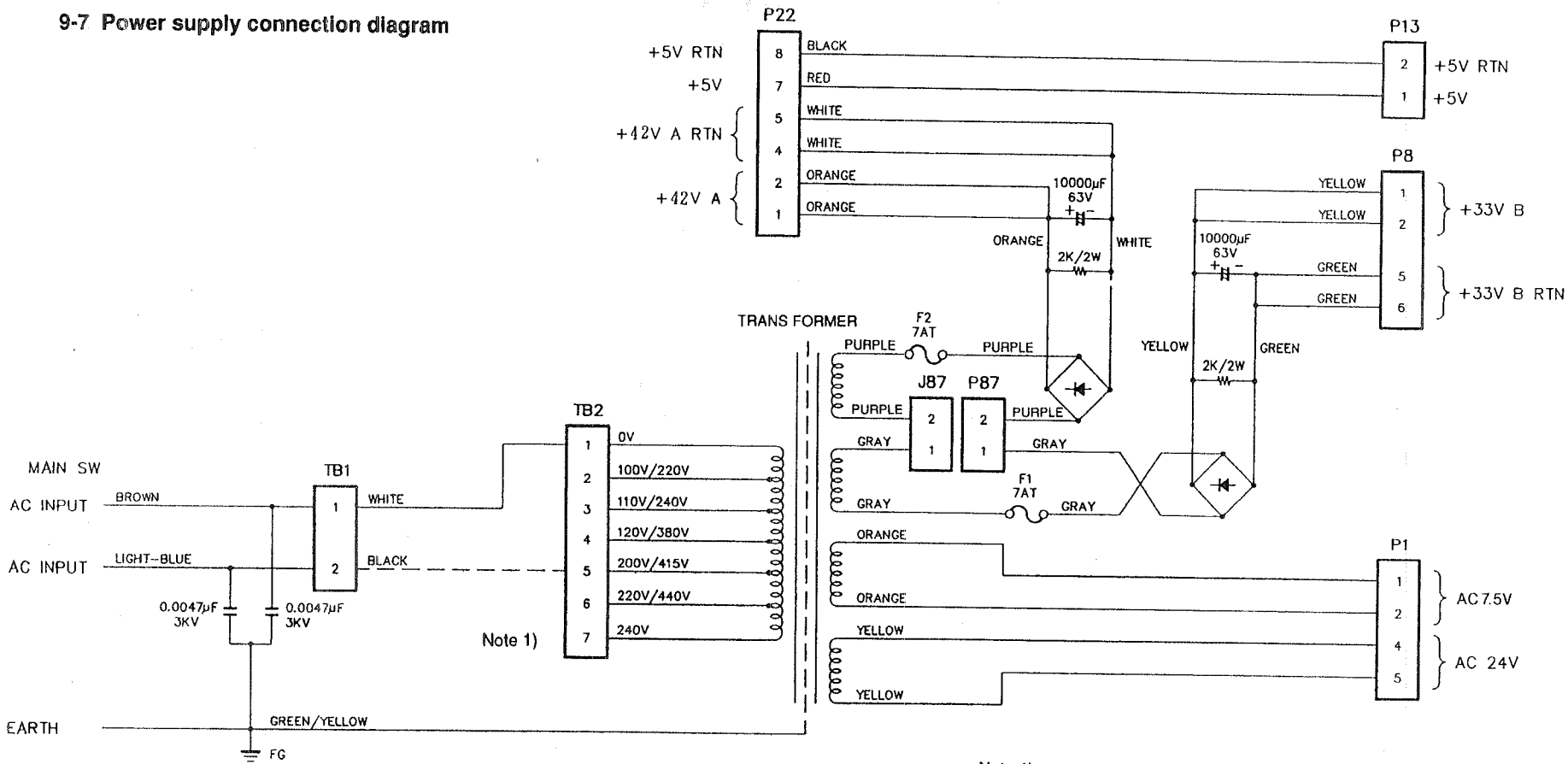
9-5 LED Switch circuit diagram



9-6 Air switch circuit board (L type only)



9-7 Power supply connection diagram

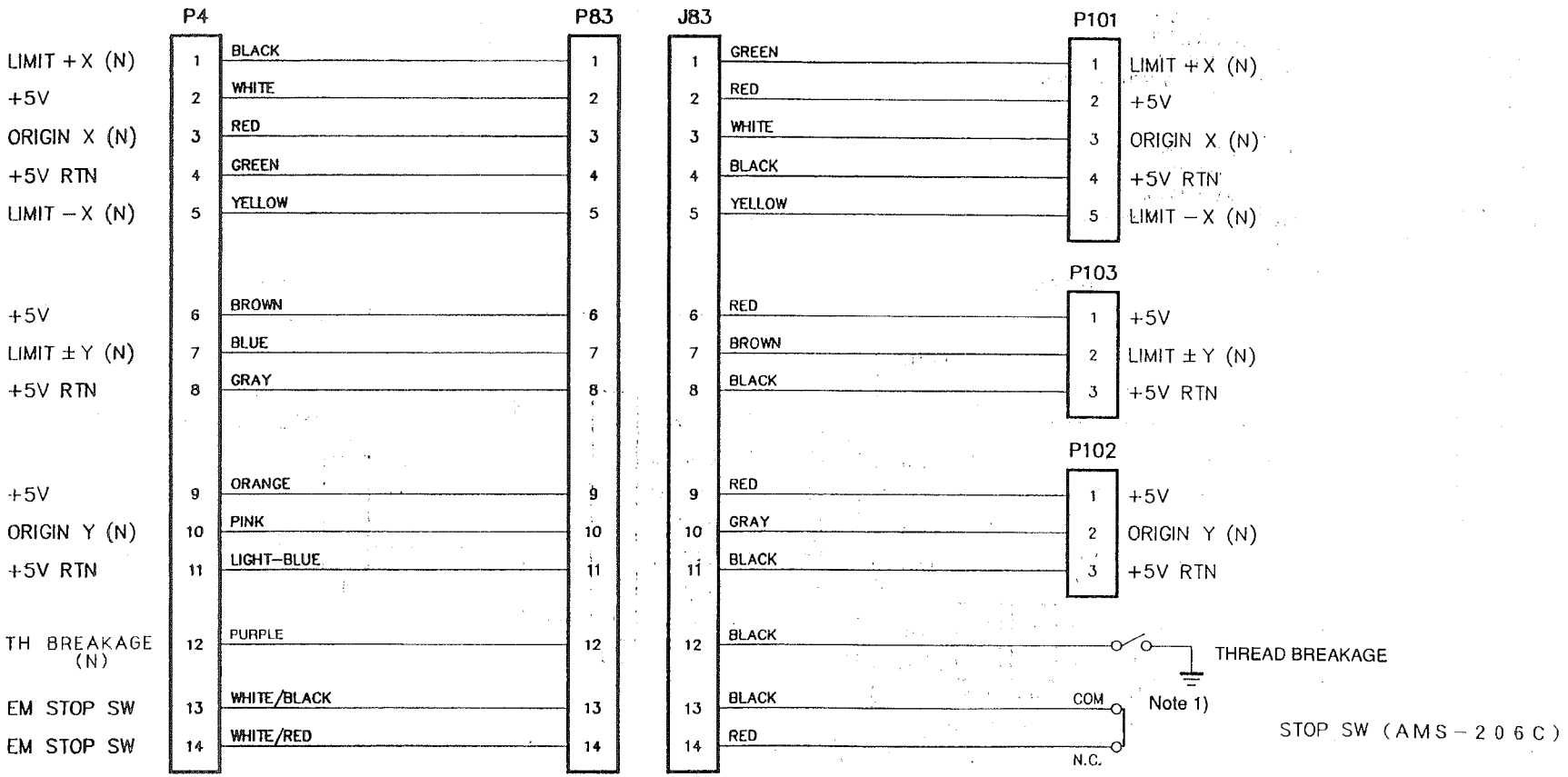


Note 1)

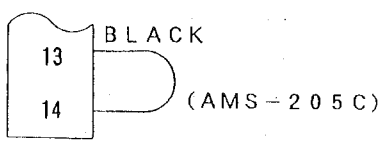
	VOLT (V)	TB2
TRANSFORMER A (M9601519A00) [M8532519AA0] 100~240 V	100	(WHITE) 1-2 (BLACK)
	110	1-3 (BROWN)
	120	1-4 (RED)
	200	1-5 (YELLOW)
	220	1-6 (BLUE)
	240	1-7 (PURPLE)
TRANSFORMER B (M9601519B00) [M8532519BA0] 220~440 V	220	(WHITE) 1-2 (BLACK)
	240	1-3 (BROWN)
	380	1-4 (RED)
	415	1-5 (YELLOW)
	440	1-6 (BLUE)

* ( ) indicates the part No. of the transformer.
[ ] indicates the part No. of the transformer assembly.

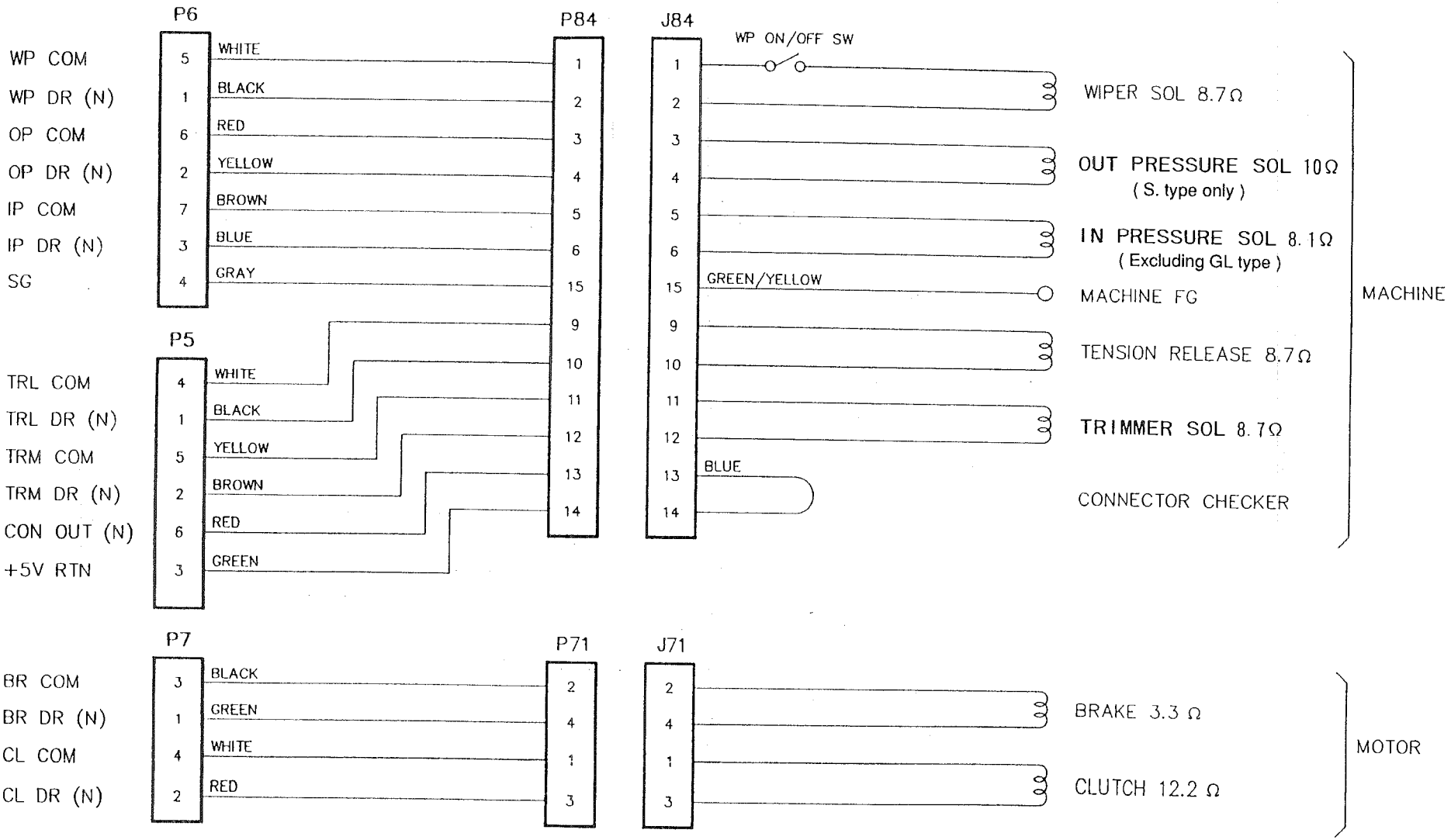
9-8 Sensor connection diagram



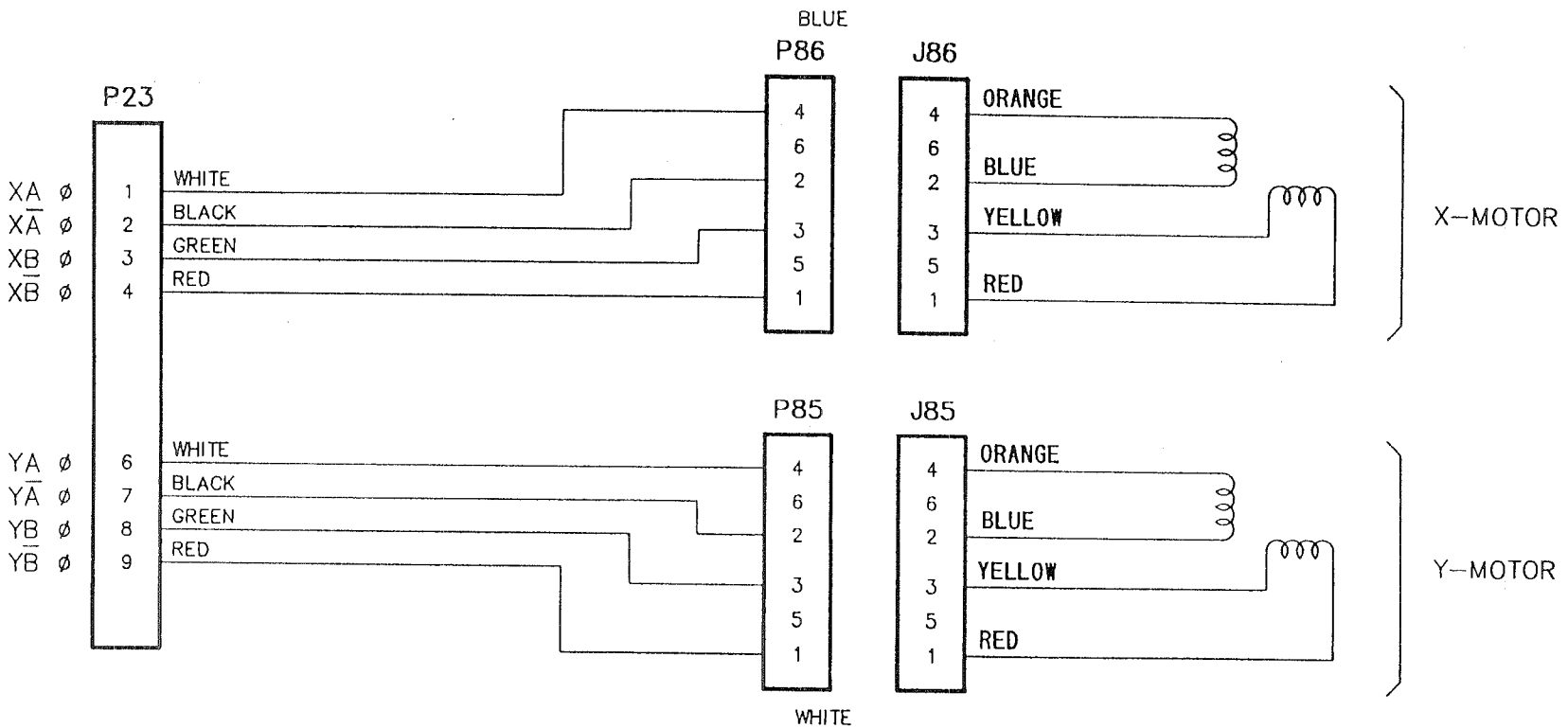
Note 1)



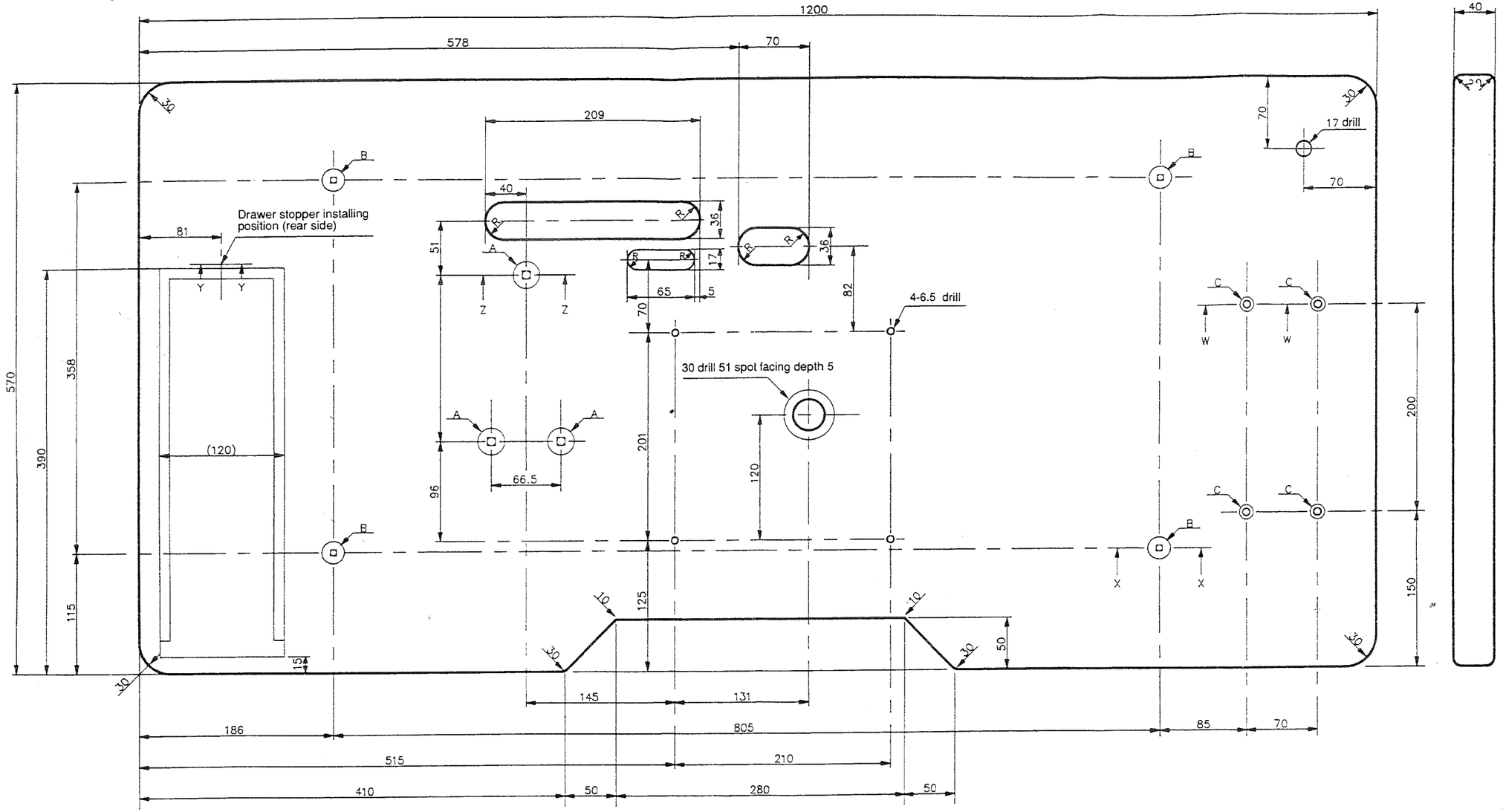
9-9 Solenoid connection diagram

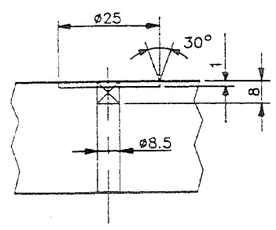


9-10 Stepping motor connecition diagram

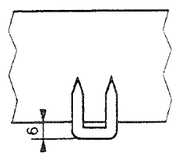


9-11 Table diagram

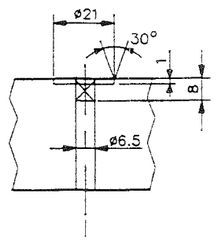




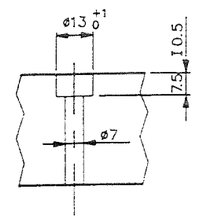
A section ZZ (1/1)



Section YY (1/1)



B section XX (1/1)



C section WW (1/1)

Caution: Be sure not tear off the protection sheet.

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