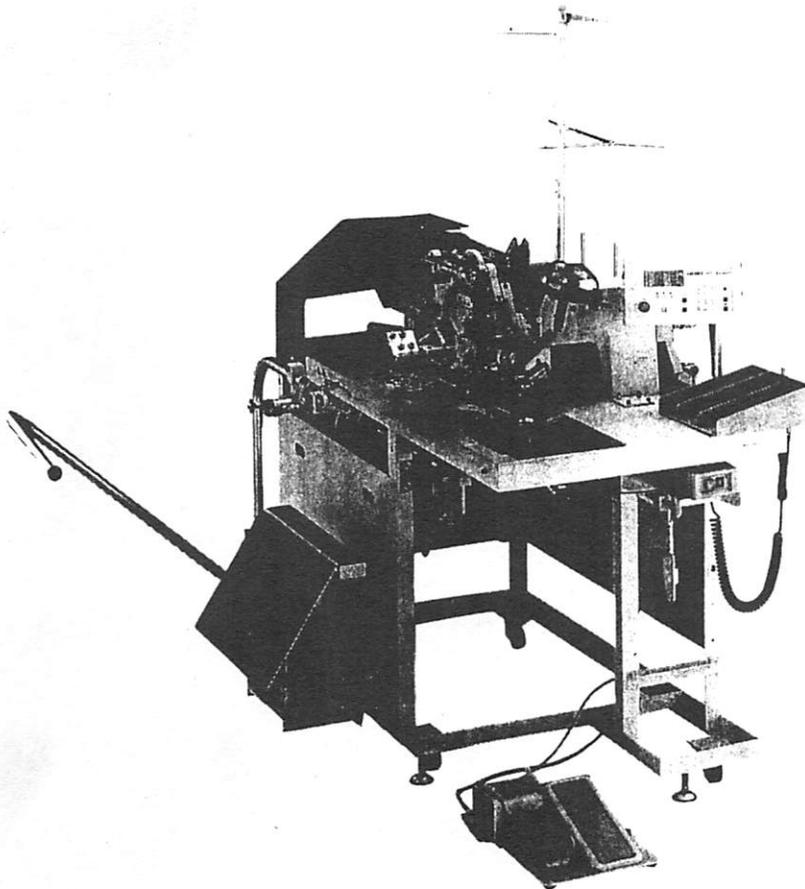


JUKI

**Automatic Lockstitch Welting Machine
(Simplified Operation Type)**

APW-193N

ENGINEER'S MANUAL



IV-71
1994. 9

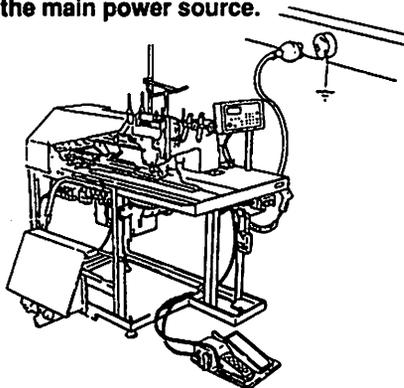
PREFACE

This Engineer's manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machines. This manual presents detailed explanation of the adjusting procedures, etc. which are not covered by the Instruction Manual intended for the maintenance personnel and operators at a garment factory.

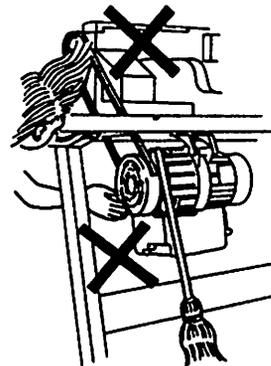
It is advisable to use this Engineer's manual in combination with the pertinent Instruction Manual and Parts List when servicing the sewing machines of these models.

CAUTION

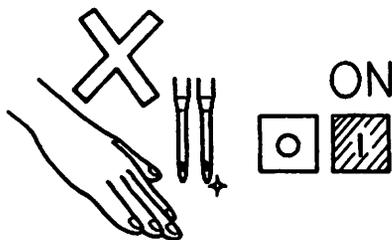
1. Be sure to connect FG wires of the power cables to an earth of the main power source.



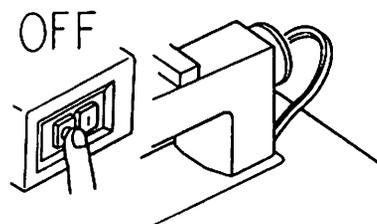
2. During operation, be careful not to allow your or any other person's head or hands to come close to the handwheel, V belt, bobbin winder, motor or any other driving components. Also, do not place anything close to them. Doing so may be very dangerous.



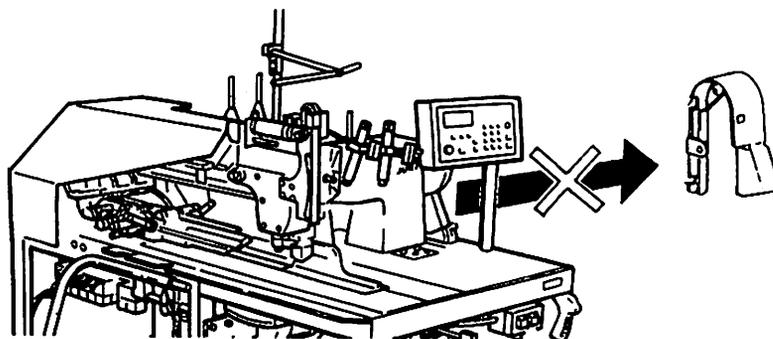
3. Keep your hands away from the needle when you turn ON the power switch or while the machine is running.



4. Be sure to turn OFF the power switch before removing the V belt.



5. Do not operate the machine with the belt cover removed.



BEFORE OPERATION

1. Be sure not to move the clamp foot with the sewing table open.
2. When removing the oil pan, take care not to allow oil in the oil pan to run out.
3. Be sure not to turn CLAMP FOOT TRAVEL switch ON, with the backside of the rear end detecting switch of the clamp foot removed.
4. Do not place such things that might generate an intense heat or a high humidity around the electric control panel.
5. Do not turn OFF the power switch or do not stop air supply during operation.

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1. SPECIFICATIONS

(1) Mechanical Specifications

- Sewing machine: LH-571N-2, -3 model of 2-needle, lockstitch machine with a center knife and a needle stop mechanism (exclusive for the APW-193N)
- Sewing speed: 2,200 s.p.m. (standard)
- Stitch length: Lockstitch: 2.0 to 3.4 mm (standard: 2.0 mm)
Condensation stitch: 0.5 to 1.5 mm (standard: 1.0 mm) } Condensation/Back tack stitch
Back tack stitch: 1.0 to 3.4 mm (standard: 2.0 mm) } selectable
- Types of welt: Parallel double welt, parallel single welt, slant } Each with/without flap with welt pocket
double welt, slant single welt } (only the left garment body)
Trapezoidal stitching
- Types of welts: Parallel double welt, parallel single welt, parallel variant double welt,
combined single welt, each without flap
- Pocket lip length (Welt length): Possible to set in 1 mm unit within the range of 35 mm (min.) to 180 mm (max.) (needle gauge 8 to 12 mm)
Possible to set in 1 mm unit within the range of 50 mm (min.) to 180 mm (max.) (needle gauge 14 to 20 mm)
- Welting width (needle gauge): 8, 10, 12, 14, 16, 18, 20 mm
- Needles: ORGAN DP × 17 #16 through #18 (standard: #16)
SCHMETZ SY3355 #100 through #110 (standard: #100)
- Thread: Exclusively used with the automatic sewing machines
- Hook: Full rotary, vertical-axis, self-lubrication hook
- Thread take-up lever: Slide thread take-up lever
- Needle bar stroke: 34.36 mm
- Cloth feed mechanism: Driven by servomotor
- Control: By a micro-computer
- Safety mechanism: Machine operation is automatically stopped if the cloth feed mechanism error detector, the needle thread breakage detector or any of the various safety devices is actuated.
- Lubricating oil: JUKI New Defrix Oil No.2
- Operating air pressure: 0.5 MPa (5.0 kgf/cm²)
- Air consumption: Approx. 40 Nℓ/min.
- Dimensions of the machine: 735 mm (width) × 1,250 mm (length) × 1,200 mm (height)
(1,400 mm ... when including the stacker) (1,500 mm ... when including the thread stand)
- Weight: Approx. 200 kg

(2) Electrical Specifications

A built-in micro-computer allows the machine to easily specify five different kinds of sewing dimensions and to change-over the sewing mode between with/without flap through the keyboard. Once the data is set, it can be stored in memory (for 100 hours) using a built-in battery even after turning OFF the power to the machine unless the data is canceled.

- Input power: 3-phase 200, 220, 230, 240, 380, 400, 415, 440 }
Single-phase 100, 220, 230, 240 } 50/60Hz
Voltage fluctuation should not exceed ±10% of the rated voltage.
- Power consumption: 500 W

2. CONFIGURATION OF THE MACHINE

The APW-193N consists mainly of the following units;

- Ⓐ Frame and structural components
(Frame, sewing table, covers, foot switch etc.)
- Ⓑ Clamp foot unit and feed mechanism
- Ⓒ Corner knife unit
- Ⓓ Binder unit (Binder components and its driving components)
- Ⓔ Pneumatic control unit (Pneumatic control devices and pipings)
- Ⓕ Stacker unit
- Ⓖ Sewing machine head
- Ⓗ Electric control unit (Control box)
- Ⓘ Oil pan
- Ⓣ Operation panel
- Ⓚ Power switch

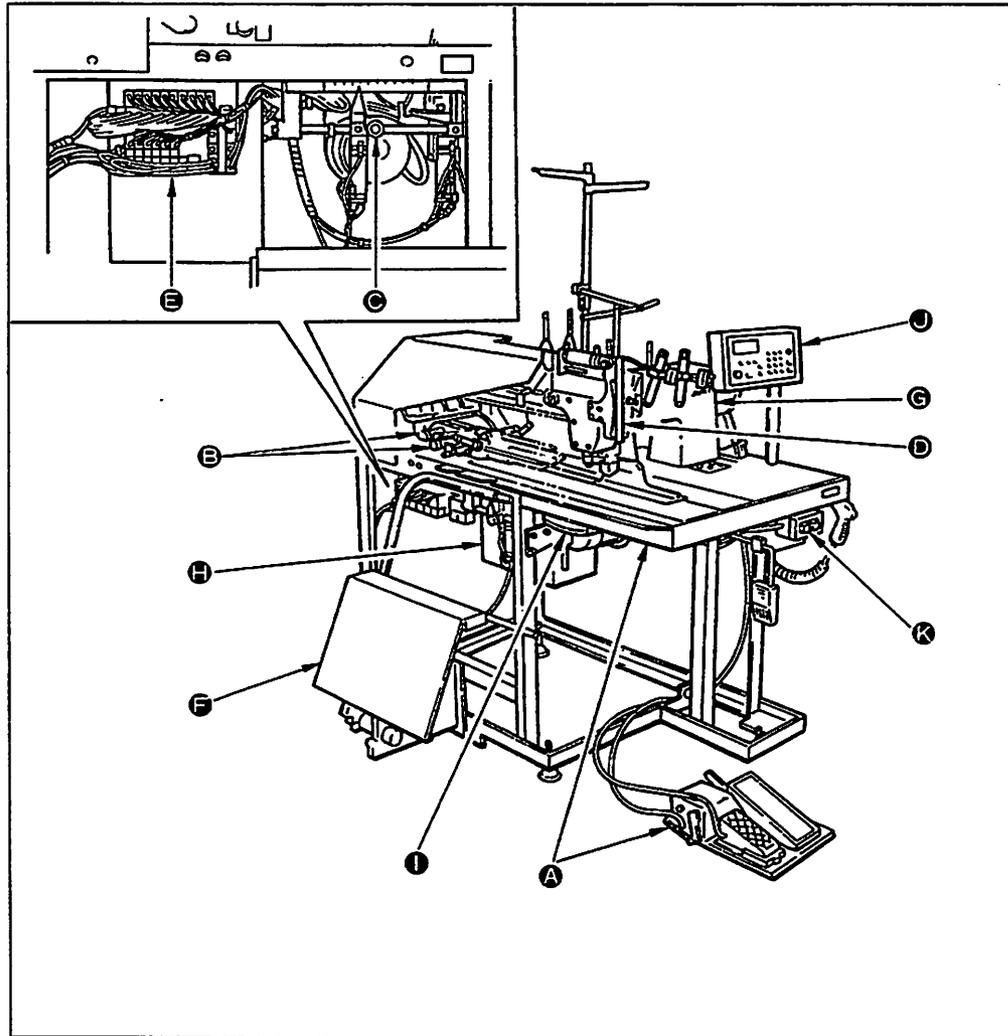


Fig. 1

With this machine, you can do desired welting work simply by setting materials (garment body, interlining piece, welting patch etc.) in place and operating the switches on the operation panel.

3. INSTALLATION

(1) Levelling the machine

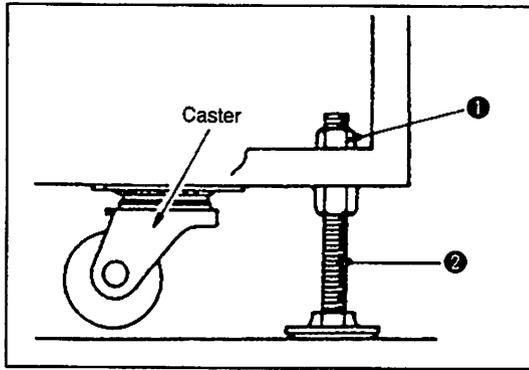


Fig. 2

Install the machine on a flat and vibration-free floor. Loosen four locknuts ① of adjusting bolts ② at the bottom of the machine frame and level the machine. Do not forget to retighten the locknuts after adjusting the bolts. Make sure that the casters do not contact with the floor, except when the machine is moved.

(2) Installing the accessory components

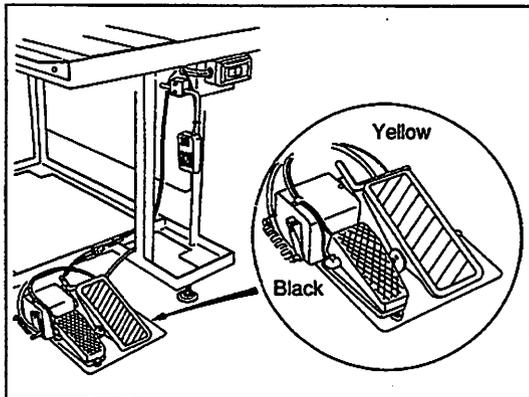


Fig. 3

1. Connect the electric cords and air tubes of the foot switch unit.

* Electric cords ①

* Air tubes ②

Place the foot switch unit on the floor for the operator's convenience.

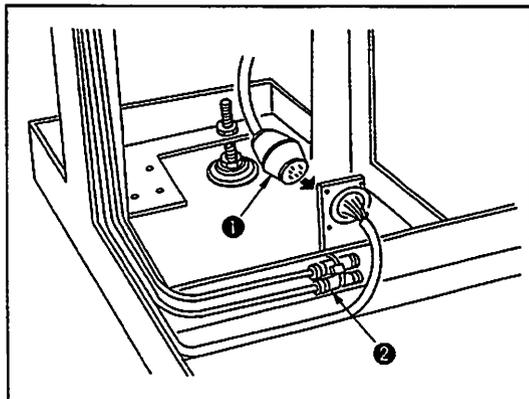


Fig. 4

2. Set up the spool thread stand at the fixed position on the table and fix it using the screws supplied with it.

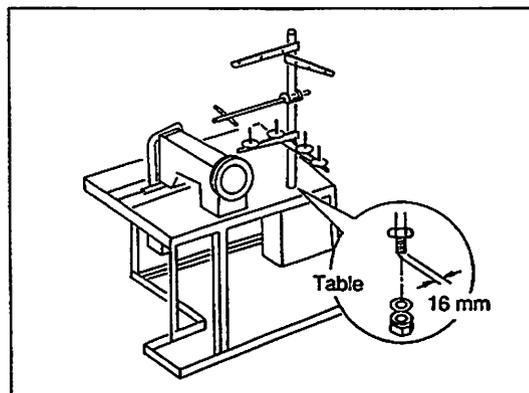


Fig. 5

(3) Installing the stacker and adjusting it.

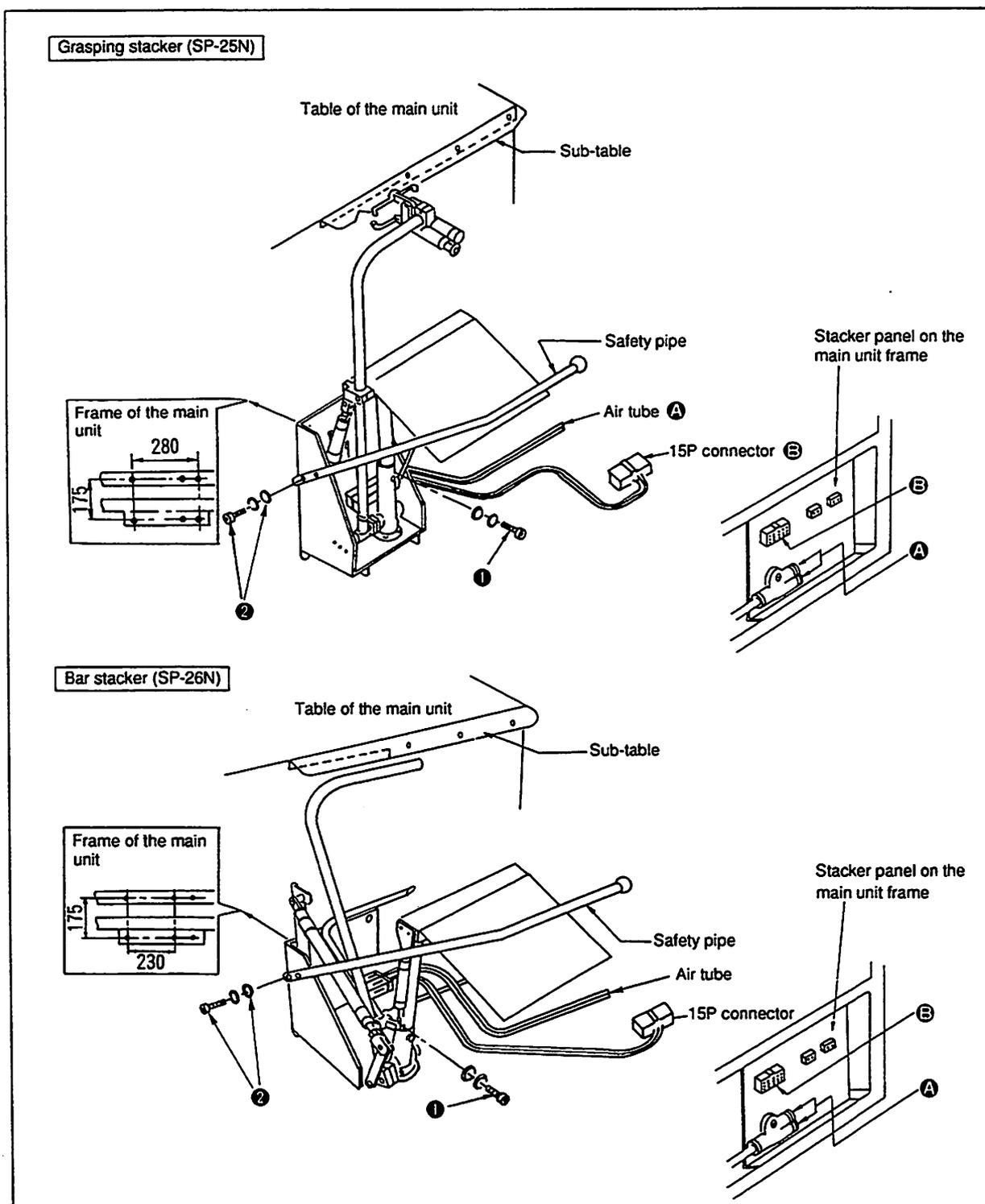


Fig. 6

1) Installing the grasping stacker or bar stacker

1. Install the stacker to the fixed position on the left side of the machine observed by the operator, with bolts ① (4 ea).
2. Fix the stacker safety pipe to the fixed position with bolts and nuts ② (2 ea.).
3. Connect 15P connector ③ of solenoid valves for cylinders to the stacker panel of the main unit frame.
4. Connect air tube ④ of solenoid valves for cylinders to the stacker panel of the main unit frame.

2) Adjusting the grasping stacker (SP-25N)

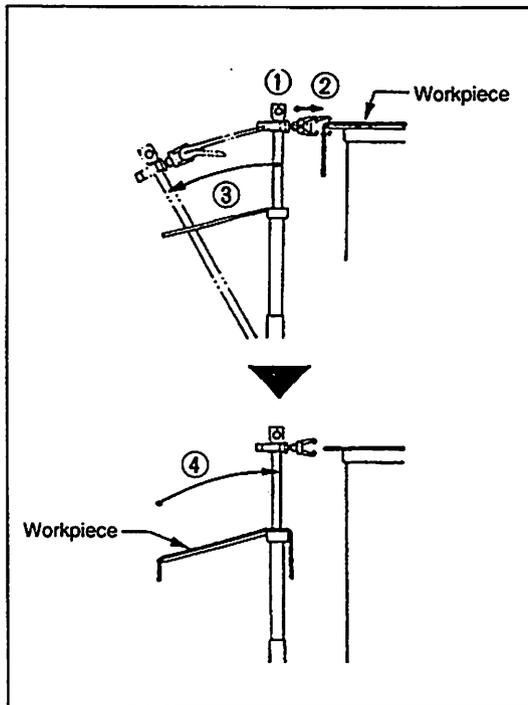


Fig. 7

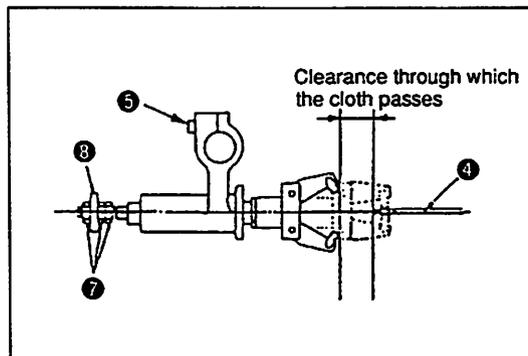


Fig. 8

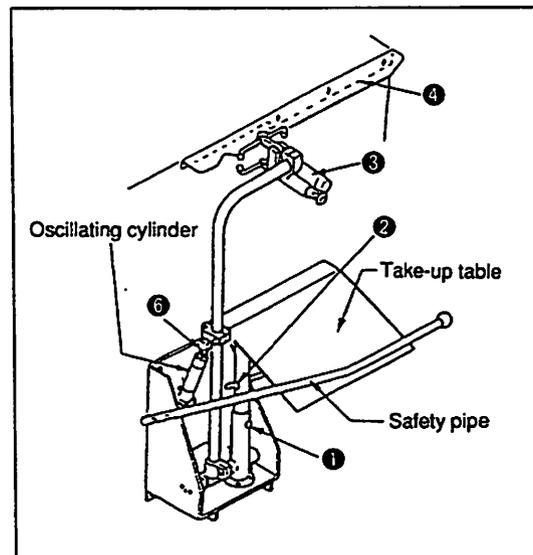


Fig. 9

The grasping stacker operates in the following order.

- ① The corner knife comes down, then the workpiece grasping cylinder actuates.
- ② The workpiece grasping cylinder moves to its front end and grasps a workpiece at that position.
- ③ The oscillating cylinder actuates to place the cloth on the take-up table.
- ④ The workpiece grasping hand is released, and the oscillating cylinder returns to its home position.

1. Adjusting the position of take-up table

Adjust the height of the take-up table using set bolt ① . Adjust the inclination of the take-up table using set bolt ② . (Fig. 9) Adjust the height and inclination of the take-up table according to the size of the workpiece to be stacked.

2. Adjusting the workpiece grasping position

Adjust the position of the grasping hand using set bolt ⑤ so that it clamps sub-table ④ at the center when the workpiece grasping cylinder ③ reaches the front end of its stroke. Loosen locknut ⑥ and adjust the cylinder rod to provide an adequate clearance between the top end of the workpiece grasping hand and the end face of sub-table ④ to permit the workpiece to freely pass through when the workpiece grasping cylinder stays in its resting position. (Fig. 8, Fig. 9)

3. Adjusting the grasping force

The grasping hand must have a suitable force to grasp a workpiece and take it out from the sub-table when workpiece grasping cylinder ③ reaches the front end of its stroke. Loosen locknuts ⑦ , and adjust the grasping force using chuck seat ⑧ . (Fig. 8, Fig. 9)

After the adjustment, confirm the grasping force by placing a workpiece on the table.

3) Adjusting the bar stacker (SP-26N)

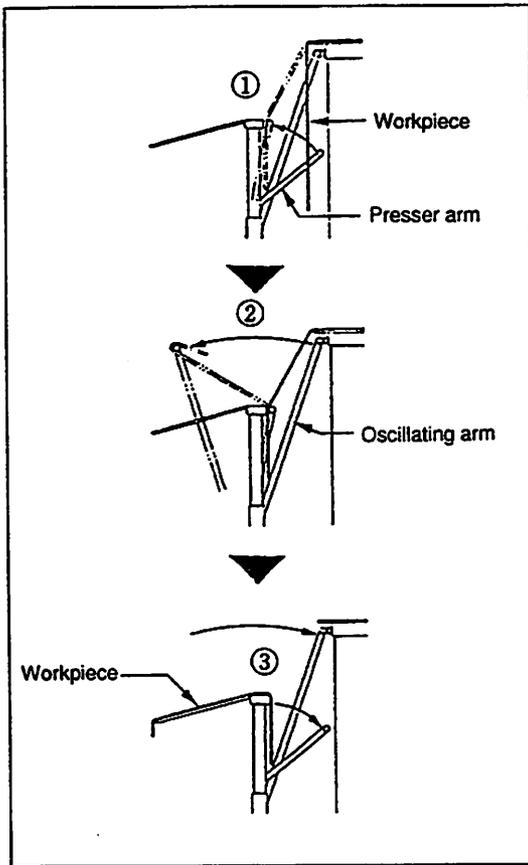


Fig. 10

The bar stacker operates in the following order:

- ① The presser cylinder actuates the presser arm to press a workpiece after the corner knife has been lowered.
- ② The oscillating cylinder actuates to place the workpiece on the take-up table.
- ③ The presser arm and oscillating arm return to their home position.

1. Adjusting the position of take-up table

Adjust the height of the take-up table using set bolt ① . Adjust the inclination of the take-up table using set bolt ② . Adjust the height and inclination of the take-up table according to the size of the workpiece to be stacked. (Fig. 11)

2. Adjusting the pressing force

Loosen locknut ③ , and adjust the end of the presser cylinder to provide a proper pressure on the workpiece between the presser arm and the take-up table. (Fig. 11)

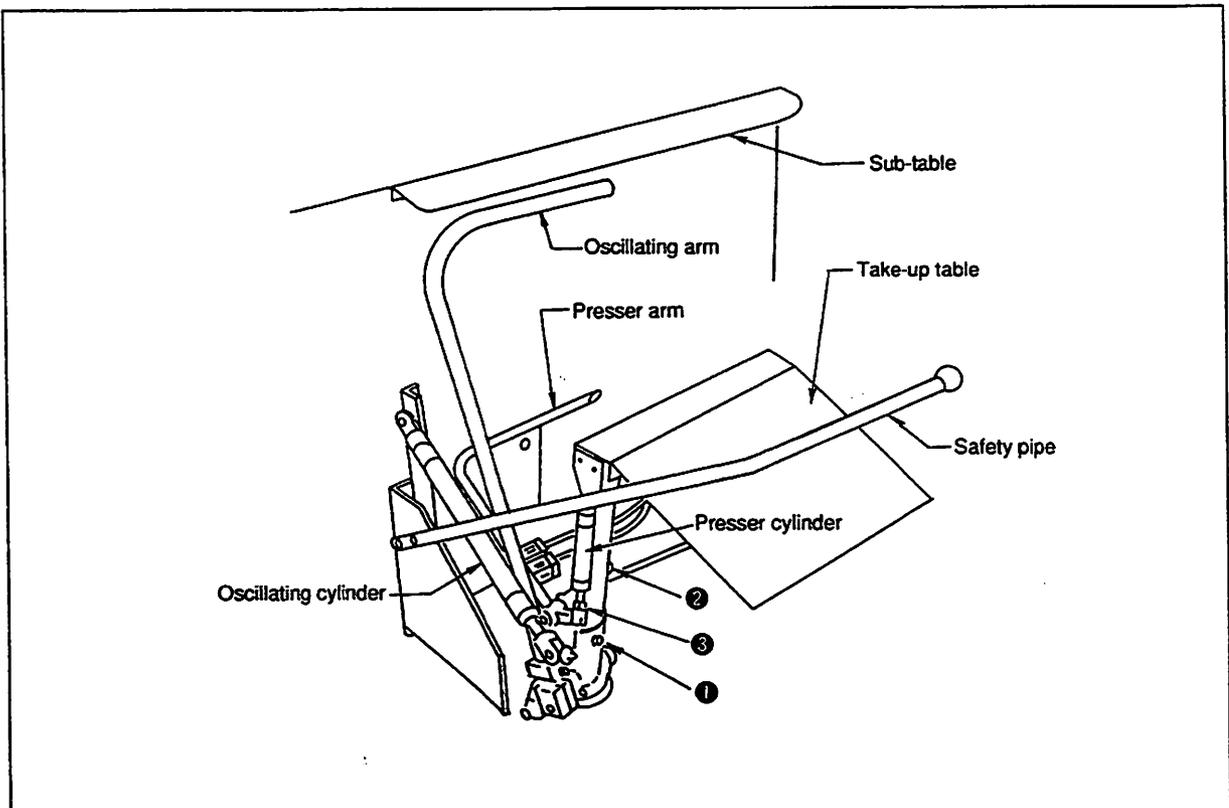


Fig. 11

4) Attaching the roller stacker (SP-36N)

1. Attach the roller stacker on the left-hand side face of the main unit frame, and fix it with three screws taking care to set the roller in parallel to the main unit table.

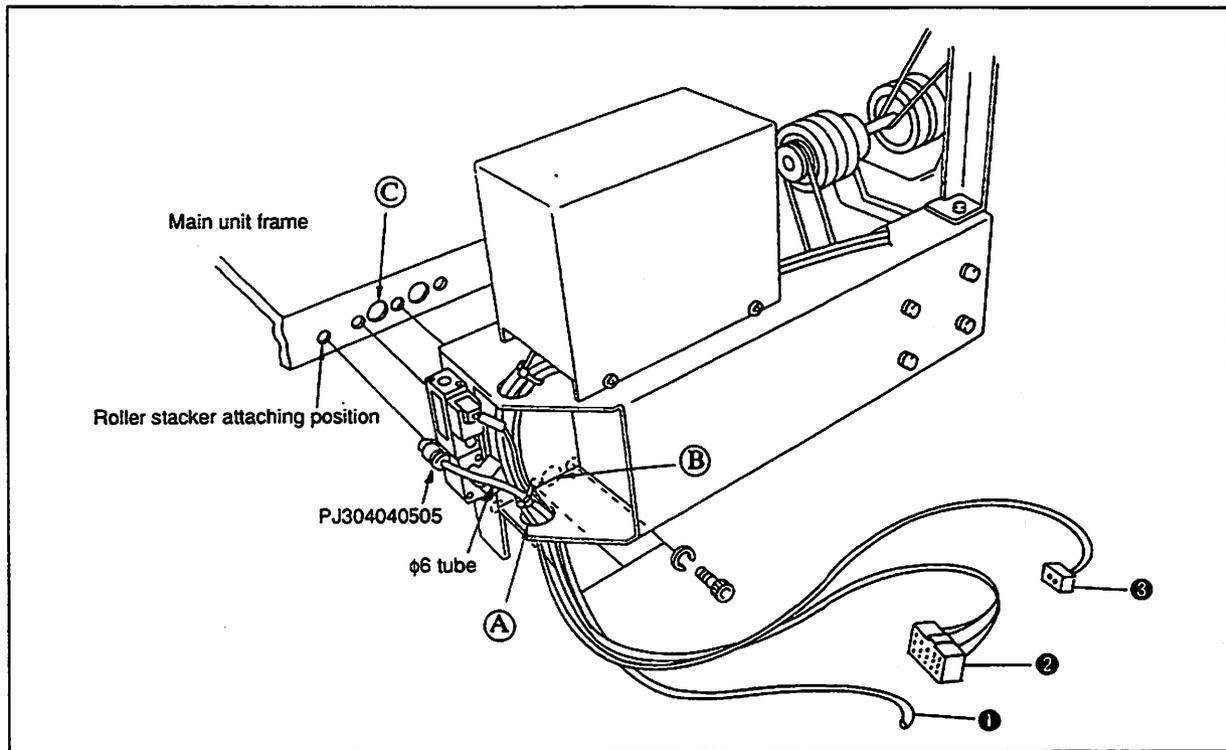


Fig. 12

2. Pass the air tube ① for roller oscillating solenoid valve, output cable for driving roller, the upper detection sensor cable of the connector ② for roller oscillating cylinder and the motor power cable of the 2P connector ③ through holes A, B and C in Fig. shown above in the written order.
3. Connect air tube ①, 15P connector ② and 2P connector ③ respectively to the stacker panel of the main unit frame as illustrated in the figure below.

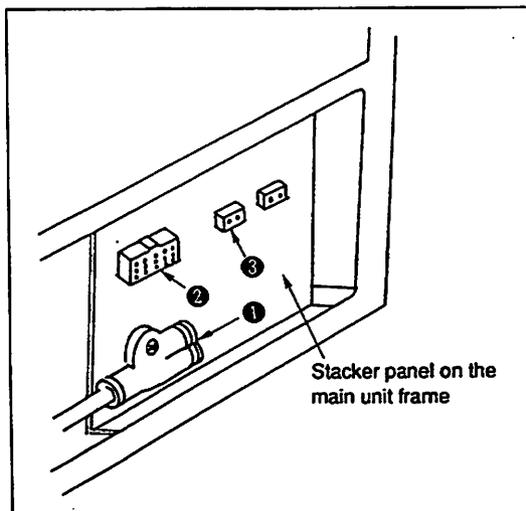


Fig. 13

- * When attaching the roller stacker to the machine, put a plug to one side of the hole for quick-coupling joint.

5) Adjusting the position of the roller stacker (SP-36N)

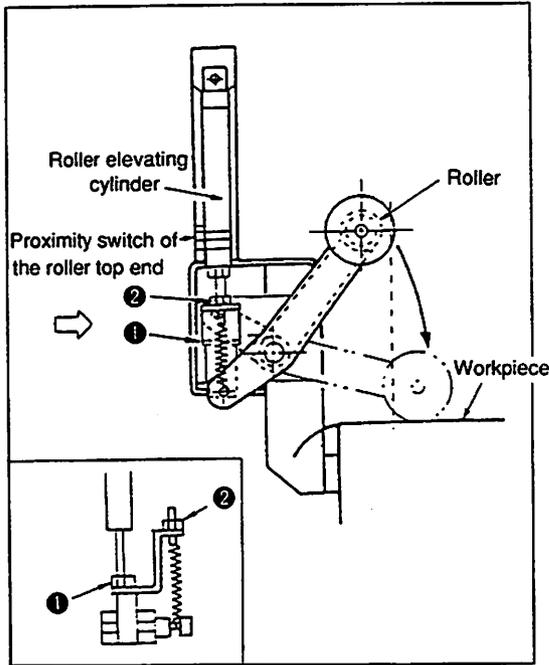


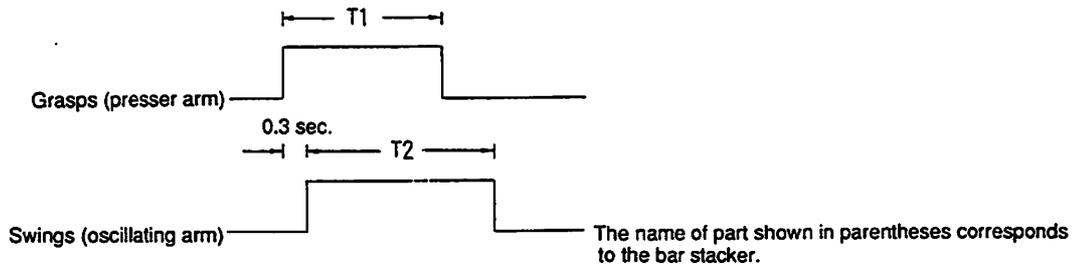
Fig. 14

Loosen locknut ①, and turn the cylinder rod to adjust so that the material is smoothly rolled down from the sewing table by the rotation of the roller.

Position the roller so that roller lightly comes in contact with the sewing table at the pulling end of the roller elevating cylinder. Adjust the pressing force of the roller in accordance with the thickness of material to be used. Loosen locknut ②, and adjust the spring pressure by moving the spring hook up and down.

6) Adjusting the stacker operating timing

- The stacker operating timing is determined as described below.



The length of time for T_1 , is specified through the pictograph No. [BE] .



0.80 ← Specified using numeric keys within the range of 0.00 to 9.99 seconds.

The length of time for T_2 is specified through the pictograph No. [BF] .



0.80 ← Specified using numeric keys within the range of 0.00 to 9.99 seconds.

- Setting the length of time during which the roller of the roller stacker rotates
Length of time during which the roller rake out the material is specified through the pictograph No. [BE] .



0.80 ← Specified using numeric keys within the range of 0.00 to 9.99 seconds.

(4) Attaching the optional devices and adjusting them

1) Attaching the shim unit SA54N and adjusting it

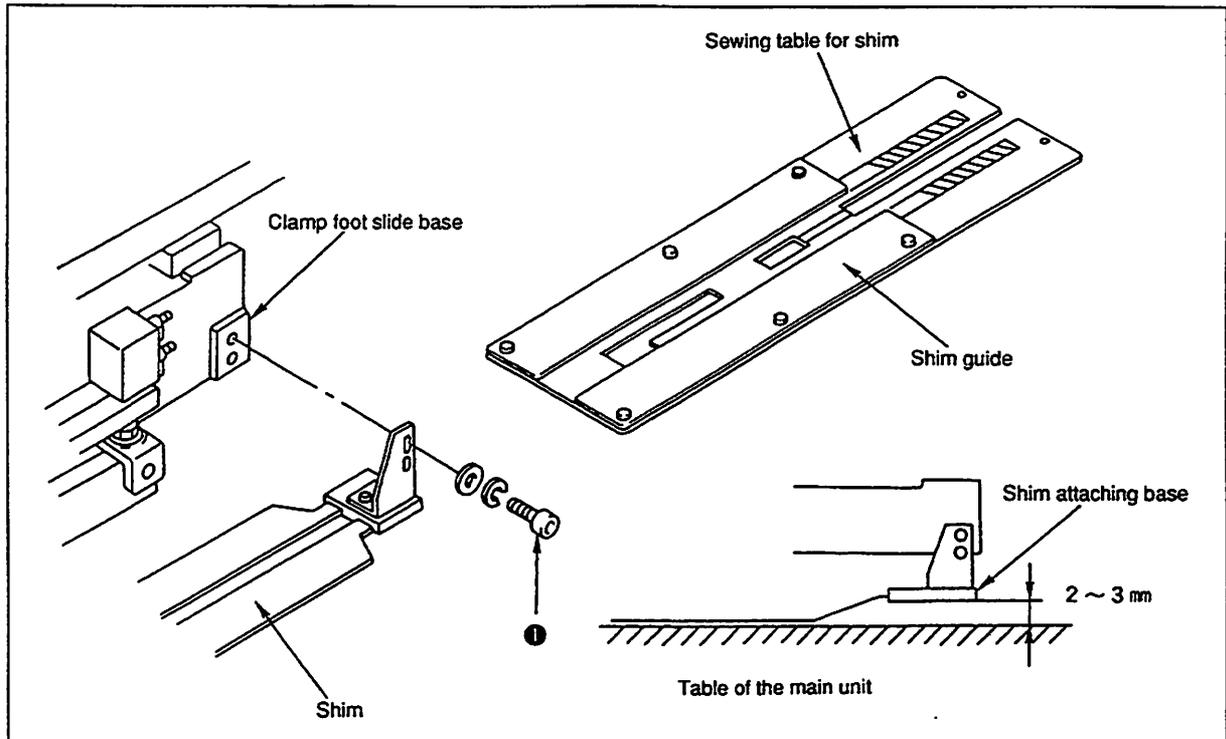


Fig. 15

1. Replace the regular sewing table with the sewing table exclusive for the shim unit.
2. Install the shim to the predetermined position on the right-hand side face of the clamp foot slide base with screw ①. The shim should be in parallel to the top face of the table of the main unit. (At this time, the clearance provided between the shim attaching base and the table of the main unit should be approximately 2 to 3 mm. Do not position the shim attaching base excessively high.)
3. Set the shim so that it fits in the shim guide.

2) Attaching the dart stretcher SA55N and adjusting it

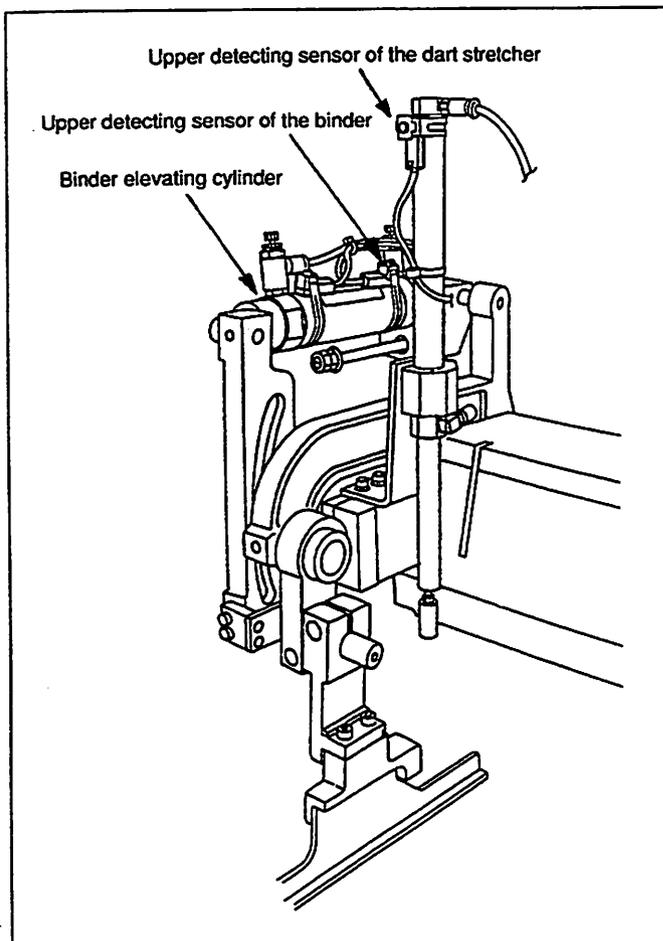


Fig. 16

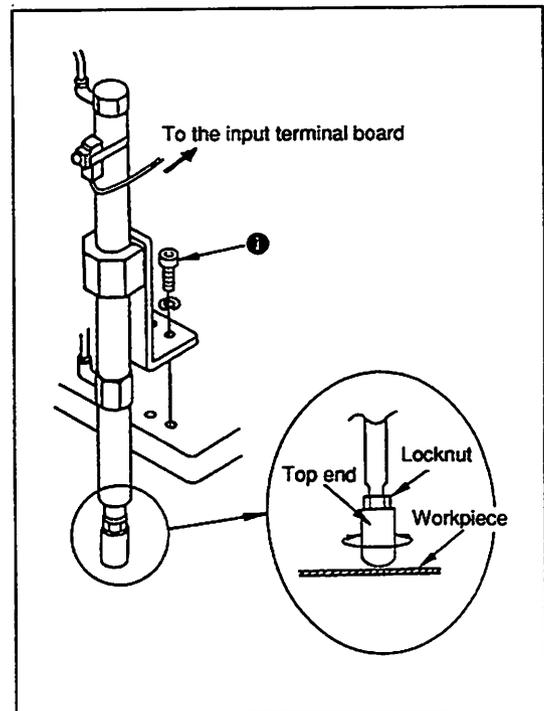


Fig. 17

(Note) Refer to the Parts List for detailed description of the parts.

1. Install the dart stretcher to the predetermined position on the binder with screw ① .
At this time, set the dart stretcher upright taking care not to allow the dart stretched to interfere the vertical motion of the binder. (Also take care not to allow the dart stretcher to come in contact with the wiper of the sewing machine.)
2. Attach the solenoid valve to the predetermined position, and connect the air tube to the cylinder. (Refer to the circuit diagram of the pneumatic devices on page 108 for the attaching position of the solenoid valve.)
3. Connect the solenoid valve cable to the output terminal board. (See Fig. 18 for the position of the terminal board and terminal numbers.)
4. Connect the upper detecting sensor to the input terminal board. (See Fig. 18 for the position of the terminal board and terminal numbers.)
5. Attach the upper detecting sensor of the binder to the binder elevating cylinder, and connect the sensor to the input terminal board. Position the sensor near the top end of the cylinder body, and confirm that the LED on the input terminal board lights up when the binder goes up. (See Fig. 104 for the position of the LED.)
6. Adjust the height of the top end of cylinder so that it provides an adequate pressure on the workpiece by loosening the locknut.

7. Connect the upper detecting cable asm. of the dart stretcher, upper detecting cable asm. of the binder and output cable asm. of the dart stretcher to the input/output terminal board on the control circuit board. (Fig. 18)
 - Dart stretcher cable asm. Input ... I-11, GND (J2)
 - Upper detecting cable asm. of the binder Input ... I-12, GND (J2)
 - Output cable asm. of the dart stretcher Output ... 0-1, 24 V (J2)
8. Specify the darts stretching function through the operation panel.

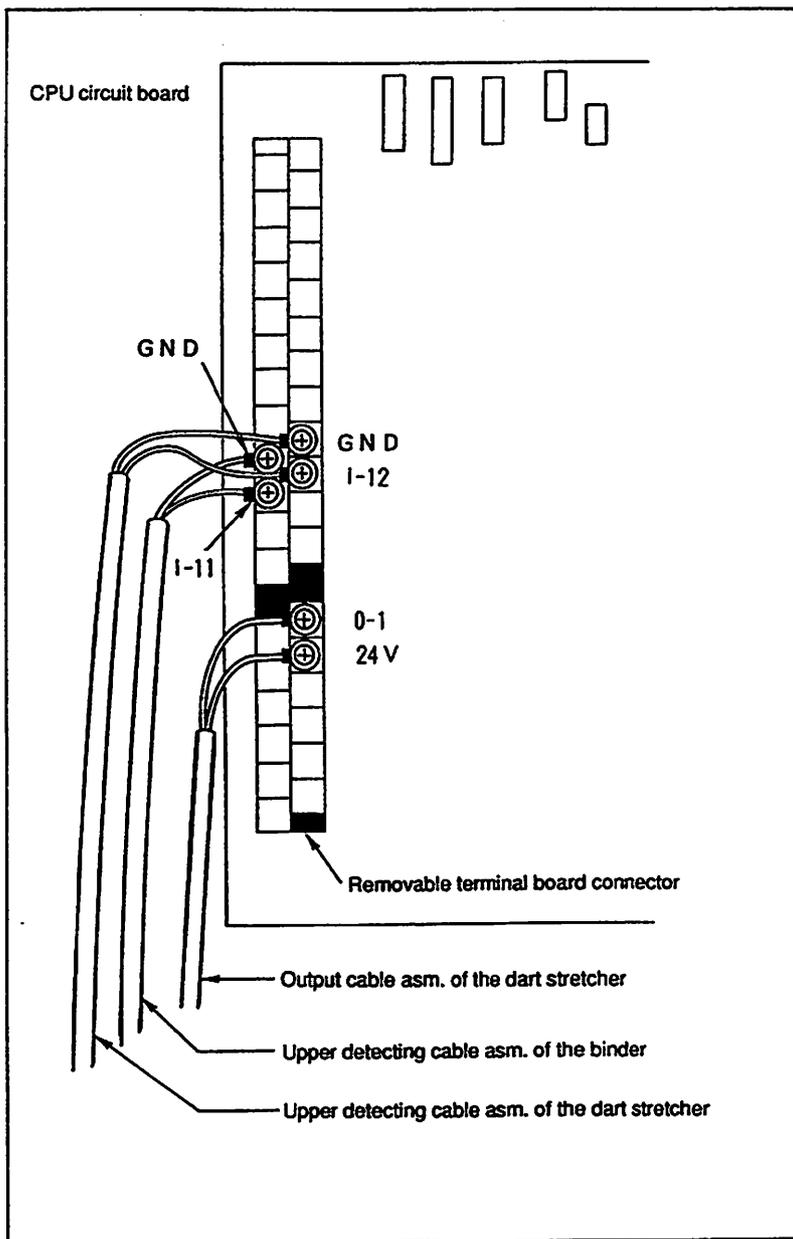


Fig. 18

4. CONNECTION OF ELECTRIC POWER SOURCE AND AIR SUPPLY SOURCE

(1) Connection of electric power source

Connect the power supply cord of the operation panel to the power source outlet (R.S.T.E.). When connecting the lead wires, make sure that the sewing machine rotates in the correct direction.

[Rotating direction]

Turn the handwheel to let the needle down to its lowest dead point and turn the power supply switch "ON" as you watch the rotating direction of the handwheel. When the wire connection is correct, the handwheel will rotate in the counterclockwise direction (viewed from the handwheel's side) to stop the needle in its highest dead position. If not, alternate the connection of two wires out of three wires (R.S.T.).

[Precaution in the electric connection]

1. Connect the ground wire to the earth without exception.
2. Quality of power
 - Voltage fluctuation must not exceed $\pm 10\%$ of the rated voltage.
 - Rapid change of power voltage may stop the machine.
 - Surge current or electromagnetic induction in power may lead the machine to malfunction.

(2) Connection of the air supply source

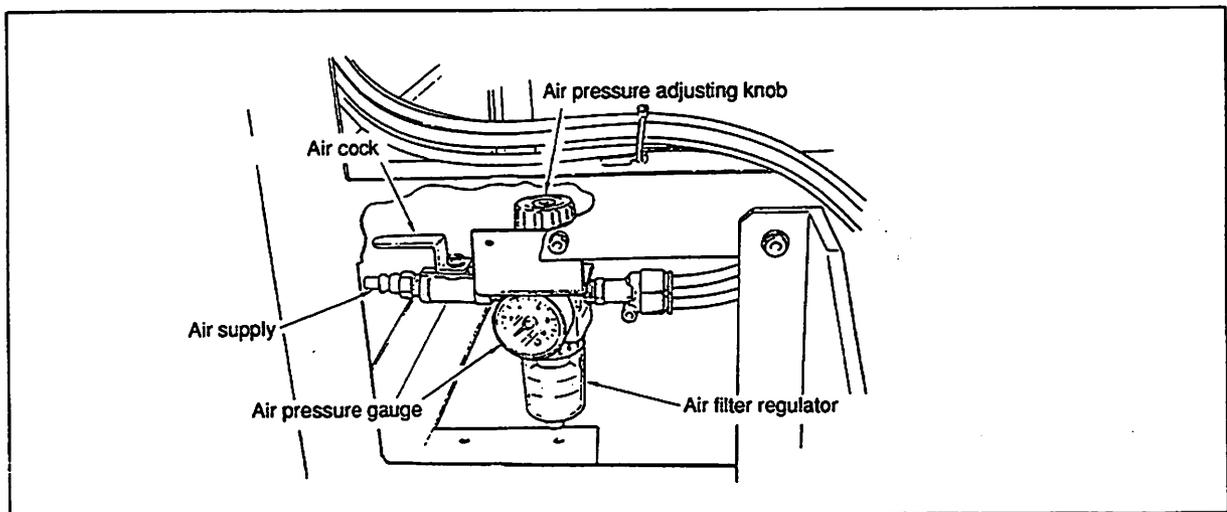


Fig. 19

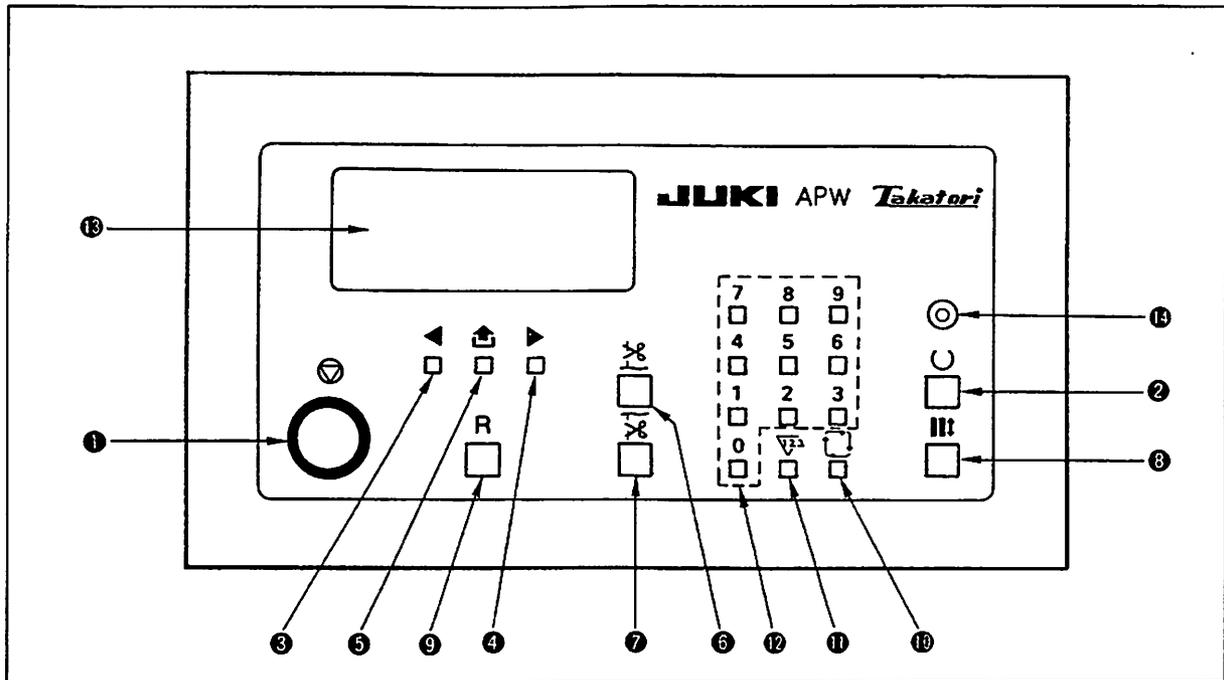
1. Securely connect the air supply hose (1/4") to the air cock located on the rear face of the machine.
2. Open the air cock and adjust the air pressure so that the air pressure gauge indicates 5.0 kgf/cm² (0.5 MPa) by the air pressure adjusting knob.

[Precautions for the air supply source]

Refer to the article [(4) Precautions for the compressed air supplying (the air supply source) devices] of Inspection and maintenance. (Page 80)

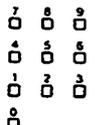
5. OPERATION PANEL SWITCHES AND INDICATOR LAMPS

(1) Operation panel switches



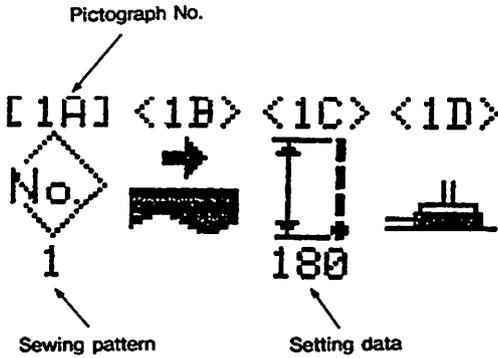
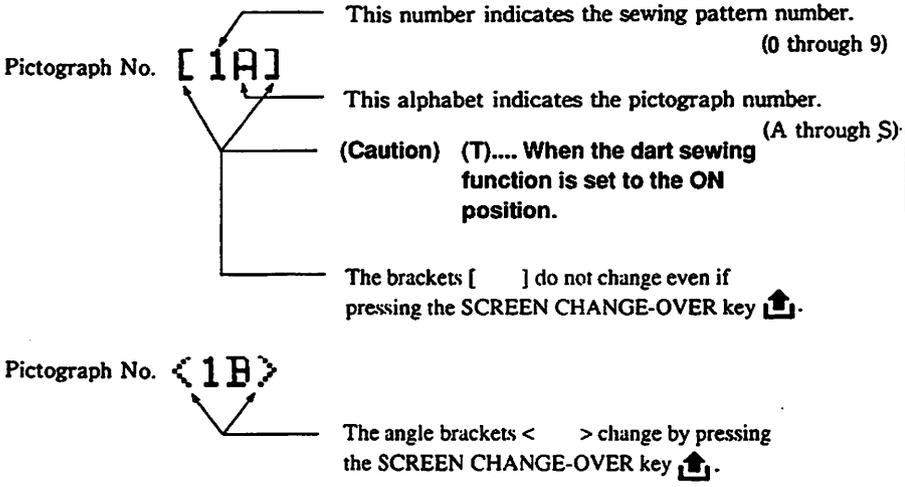
Panel indication	Function and operation
① TEMPORARY STOP switch 	<p>Press this push-button switch whenever an abnormal noise is heard or you want to stop the sewing machine in an emergency.</p> <ul style="list-style-type: none"> • The machine stops with its needle up. • The clamp foot feed mechanism stops in its lowest position. • “*AL-01*” is indicated on the LCD. <p>In the above state, the machine stops operating.</p>
② MACHINE READY key 	<p>Used to change over the operation mode between the “manual mode” and the “automatic mode”. Under the “manual mode”, this key is used for specifying data required, trimming needle thread and bobbin thread and making the clamp foot travel forward/backward.</p> <p>Under the “automatic mode”, this key is used for starting sewing.</p> <p>The machine checks whether the sensors normally work. If any of the sensors is not normal, the machine outputs an alarm. At the same time, the machine checks the range of data required for sewing. If any of the data is out of the setting range, the machine outputs an alarm.</p> <p>Mode indicator LED ⑬ goes out under the “manual mode”. Mode indicator LED ⑭ lights up under the “automatic mode”.</p>

Panel indication	Function and operation
<p>③ Jog key to shift data correcting position to the left</p> 	<p>Used to shift the pictograph that is flashing on and off to the left. (If this key is kept pressed for 0.7 sec. or longer, the pictograph will automatically keep moving to the left.)</p>
<p>④ Jog key to shift data correcting position to the right</p> 	<p>Used to shift the pictograph that is flashing on and off to the right. (If this key is kept pressed for 0.7 sec. or longer, the pictograph will automatically keep moving to the right.)</p>
<p>⑤ SCREEN CHANGE-OVER key</p> 	<p>Used to change-over the screen shown on the display or the setting mode. (Under the "manual mode")</p>
<p>⑥ NEEDLE THREAD TRIMMING key</p> 	<p>The needle thread trimming knife descends only when this key is kept pressed. Note that the needle thread trimming knife does not actuate in the following cases.</p> <ul style="list-style-type: none"> 1. The clamp foot is not in its rear end. 2. The machine does not operate under the "manual mode".
<p>⑦ BOBBIN THREAD TRIMMING key</p> 	<p>The bobbin thread is released only when this key is kept pressed. Note that the bobbin thread is not released in the following cases.</p> <ul style="list-style-type: none"> 1. The clamp foot is not in its rear end. 2. The machine does not operate under the "manual mode".
<p>⑧ CLAMP FOOT TRAVEL key</p> 	<p>Each time you press this key, the clamp foot alternately repeats forward travel and backward travel. Note that the clamp foot travels only when the sewing machine operates under the "manual mode".</p> <ul style="list-style-type: none"> When the clamp foot is in its rear end → It travels to its front end. When the clamp foot is not in its rear end → It travels to its rear end.
<p>⑨ RESET key</p> 	<p>Used in the following cases.</p> <ol style="list-style-type: none"> 1. To release the machine from the alarm state. (When the alarm screen is shown on the display.) 2. To reset the NUMBER OF PIECES COUNTER. (When the counter screen is shown on the display.) (When the count-up screen is shown on the display.) 3. To reset the TOTAL COUNTER. (When the counter screen is shown on the display.) 4. To finish the check program. (When the check screen is shown on the display.)

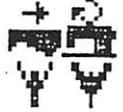
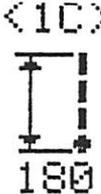
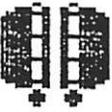
Panel indication	Function and operation
<p>⑩ CYCLE key</p> 	<p>If pressing the "0" key from the ten keys with the CYCLE key kept pressed, the maintenance screen is shown on the display screen.</p>
<p>⑪ COUNTER key</p> 	<p>Used to call the counter screen on the display. (Under the "manual mode")</p>
<p>⑫ Numeric keys (ten keys)</p> 	<p>Used to specify data.</p>
<p>⑬ LCD display unit</p>	<p>Indicates specified data, state of the machine and function used.</p>
<p>⑭ Mode indicator LED</p> 	<p>Used to indicate either *1 the "manual mode" or *2 the "automatic mode". The LED goes out under the "manual mode" or lights up under the "automatic mode".</p> <p>*1 Manual mode When turning ON the power to the machine, or when resetting the alarm state, the sewing machine is set to the "manual mode". At this time, mode indicator LED ⑭ goes out. LCD display unit ⑬ is equipped with the four different pictographs 1 through 4. One of these pictographs always flash on and off. At this time, data can be set or modified.</p> <p>*2 Automatic mode MACHINE READY key ② is used to change over the operation mode between the "manual mode" and the "automatic mode". Mode indicator LED ⑭ lights up under the automatic mode. The sewing pattern used and the number of pieces of garment finished are indicated on the leftmost section of LCD display unit ⑬, and the state of the sewing machine, etc. are shown on the right section of the display. No indication on the LCD display unit flash on and off. Sewing is possible under this mode.</p>

(2) Manual mode and automatic mode

Panel indication	Function and operation
<p>① Operating procedure of the LCD (Under the manual mode)</p>	<p>1. Cycle screen</p> <div style="text-align: center;"> <p>Pattern (1) to be sewn first</p> <p>Pattern (5) to be sewn next</p> <p>Pattern (6) to be sewn after next</p> <p>L size sewing 150 mm</p> <p>Left-flap sewing</p> <p>Right-flap sewing</p> <p>Cycle screen 1</p> </div> <p>(The LCD shows the cycle sewing consisting of the L size sewing (150 mm) left flap sewing and right flap sewing.)</p> <ul style="list-style-type: none"> ● The screen shown above is given on the display when turning ON the power to the machine or when changing over the operation mode from the automatic mode to the manual mode. ● Pressing the RESET key (R) shifts the order of cycle sewing steps. This function is used to sew the pattern which has been sewn again in the cycle sewing. ● Pressing the SCREEN CHANGE-OVER key () makes the LCD indicate the sewing pattern whose number is shown by the flashing pictograph. ● Pressing the CYCLE key () make the LCD show the screen next to any current screen. (Excluding the cases where the sewing machine operates under the automatic mode, an alarm occurs, the bobbin thread is counted up and the sewing machine operates under the independent operation mode.) <div style="text-align: center;"> <p>[*]: on</p> <p>Cycle screen 2</p> </div> <p>* Mark indicating that the cycle edition is possible.</p> <p>When the mark telling that "cycle edition is possible" (the asterisk mark (*) in the figure above), the cycle sewing patterns can be changed.</p> <ul style="list-style-type: none"> ● Cycle sewing patterns can be changed by inputting another sewing pattern you wish to sew with the relevant numeric key (0 through 9). ● If you have made any mistake when editing data on cycle sewing, press the CYCLE key (), then input the numbers of the correct sewing patterns with the numeric keys from the very start. ● As many as five cycles can be specified.

Panel indication	Function and operation
	<p>2. Sewing pattern screen</p> <ul style="list-style-type: none"> ● The sewing pattern screen can be shown on the display by pressing the SCREEN CHANGE-OVER key  when the cycle screen is indicated on the display. Ten different sewing patterns (0 through 9) are prepared. All the data required for sewing are specified on the sewing pattern screen. <div style="text-align: center;">  <p>Example of the sewing pattern screen 1</p> </div> <ul style="list-style-type: none"> ● Four different pictographs are shown on the single screen. ● The pictograph numbers are shown above the respective pictographs. <div style="margin-top: 20px;">  <p>Pictograph No. [1 A]</p> <ul style="list-style-type: none"> This number indicates the sewing pattern number. (0 through 9) This alphabet indicates the pictograph number. (A through S) (Caution) (T).... When the dart sewing function is set to the ON position. The brackets [] do not change even if pressing the SCREEN CHANGE-OVER key . <p>Pictograph No. < 1 B ></p> <ul style="list-style-type: none"> The angle brackets < > change by pressing the SCREEN CHANGE-OVER key . </div>

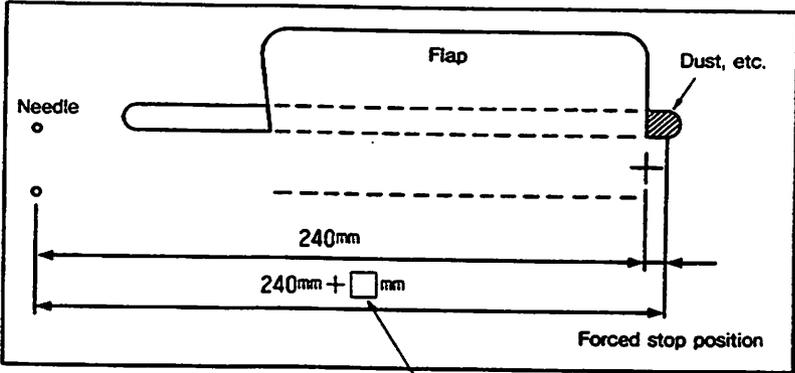
Panel indication	Function and operation
	<p>[1A] No 1</p> <p>Pattern No.</p> <p><1B> → → → → → Change-over of operation</p> <p><1C> → → → → → L-size flap</p> <p>188</p> <p><1D> → → → Standard welt pocket</p> <p><1E> → → → Stacker operates</p> <p>[1F] 30.0</p> <p>Left-flap concealed stitching at the sewing start</p> <p>[1G] 30.0</p> <p>Left-flap concealed stitching at the sewing end</p> <p>[1H] 30.0</p> <p>Right-flap concealed stitching at the sewing start</p> <p>[1I] 30.0</p> <p>Right-flap concealed stitching at the sewing end</p> <p>[1J] 1</p> <p>Flap forced stop</p> <p><1K> → → → Sewing start difference</p> <p><1L> → → → Sewing end difference</p> <p>[1M] 7</p> <p>Center knife (sewing start)</p> <p>[1N] 7</p> <p>Center knife (sewing end)</p> <p><1O> → → → Corner knife (sewing start)</p> <p><1P> → → → Corner knife (sewing end)</p> <p>[1Q] 2.0</p> <p>Lockstitch pitch</p> <p><1R> → → → Condensation/back tack (sewing start)</p> <p>1.0 2.0</p> <p><1S> → → → Condensation/back tack (sewing end)</p> <p>1.0 2.0</p> <p><1T> → → → Change-over of operation</p> <p>Parts (L) ON OFF</p> <p>(Pictographs marked by arrows (→, ↔) can be changed over using the SCREEN CHANGE-OVER key ())</p> <p>(Specified data are the standard values. [Only the L size sewing uses the maximum value.])</p>
	<p>[1A] No 1</p> <p>: Sewing pattern number (0 through 9) being shown is indicated. If a numeric key (0 through 9) is pressed, the sewing pattern number being shown is changed.</p> <p>1 → Sewing pattern number being indicated</p>

Panel indication	Function and operation
	<p>  : Operation mode change-over : Material feed mode (At this time, the tension disks are closed.) </p> <p>  : Material feed mode, sewing machine thread trimming mode </p> <p>  : Material feed, sewing machine thread trimming, center knife mode </p> <p>  : Material feed, sewing machine thread trimming, center knife, corner knife mode </p>
	<p>  : L size sewing L size length is specified using the numeric keys. (Unit : mm) </p> <p>  L size data specified * 1 (35 mm to 180 mm) (1.378" to 7.087") </p> <p>  : Right-flap sewing </p> <p>  : Left-flap sewing </p> <p>  : Flap sewing priority mode Either left or right sensor which detects a flap first will be effective. </p> <p> * 1 { <ul style="list-style-type: none"> • The minimum length is 18 mm under the operation mode where the corner knife is not used. • When the corner knife separately operates (pictograph No. <BD>) and the distance between the corner knife blades to 60 mm, the corner knife can be used by setting the L size length to 24 mm. See page 72. </p>
	<p>  : Sewing is performed with the binder lowered. (Normal welting mode) </p> <p>  : Sewing is performed with the binder raised. (Welt pocket sewing mode) * See page 39. </p>

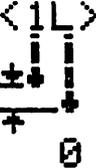
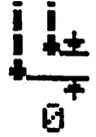
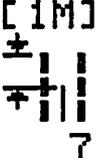
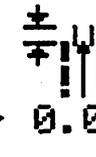
Panel indication	Function and operation
	 : Stacker operation mode is specified.  : Stacker non-operation mode is specified.
	<p>Note [1 F] : Left-flap concealed stitching at the sewing start (Data setting range : 0.0 to 99.9 mm Note that the specified value should exceed the front difference.)</p>  <p>* → 30.0</p>
	<p>Note [1 G] : Left-flap concealed stitching at the sewing end (Data setting range : 0.0 to 99.9 mm Note that the specified value should exceed the rear difference.)</p>  <p>* → 30.0</p>
	<p>Note [1 H] : Right-flap concealed stitching at the sewing start (Data setting range : 0.0 to 99.9 mm Note that the specified value should exceed the front difference.)</p>  <p>* → 30.0</p>
	<p>Note [1 I] : Right-flap concealed stitching at the sewing end (Data setting range : 0.0 to 99.9 mm Note that the specified value should exceed the rear difference.)</p>  <p>* → 30.0</p>

* Specified data (Input with the numeric keys)

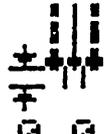
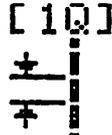
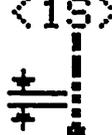
Note: Pictograph No. <1C> is not shown on the display when the L-size sewing is specified.

Panel indication	Function and operation
	<p>Note [1 J] : Flap forced stop (Data setting range : 0 to 10 mm)</p>  <p>* → </p> <p>Specified value of flap forced stop position</p> <p>This is the switch for setting a position at which the machine forcibly stops flap sewing after the origin to prevent the center knife from cutting the sewing product when the rear end of the flap is not detected by the sensor because of dust, etc. in the flap sewing. The switch can be specified within the range of 0 to 10 mm. The forced stop position is set to a position that is away from the origin (240 mm away from the needle) by the specified distance.</p> <p>(Caution) If the sewing position does not change after having changed the setting of flap concealed stitching, suppose that the flap forced stop function works preferentially. So, check the value specified for flap forced stop position.</p> <p>① When the flap forced stop mechanism works, the corner knife does not actuate. (Even when the corner knife actuation has been specified.) In this case, the LCD display unit gives the indication telling that the flap forced stop mechanism has worked.</p> <div data-bbox="509 1255 798 1400" style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>FLAP SENSOR STOP</p> </div> <p style="text-align: center;">Indication on the LCD</p> <p>② The flap forced stop indicator lamp goes out by pressing the MACHINE READY key () or depressing the foot pedal or pressing SCREEN CHANGE-OVER key ().</p>

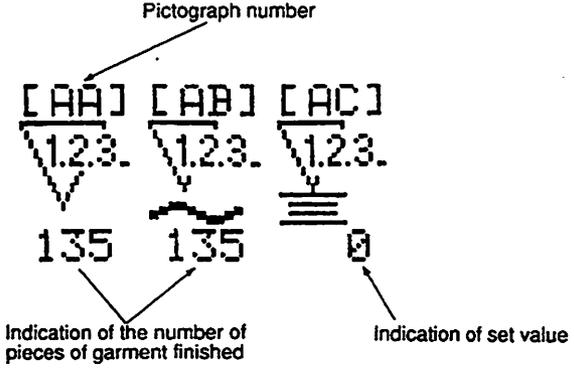
* Specified data (input with the numeric keys)

Panel indication	Function and operation
	 <p><1K> : Sewing start difference (The right-hand side seam is shorter than the left-hand side one.) (Data setting range : 0 to 20 mm) (When this data is set to zero (0), the left-hand seam and right-hand seam are made in parallel with each other.) * → 0</p>  <p><1K> : Sewing start difference (The left-hand side seam is shorter than the right-hand side one.) (Data setting range : 0 to 20 mm) (When this data is set to zero (0), the left-hand seam and right-hand seam are made in parallel with each other.) * → 0</p>
	 <p><1L> : Sewing end difference (The left-hand side seam is shorter than the right-hand side one.) (Data setting range : 0 to 20 mm) (When this data is set to zero (0), the left-hand seam and right-hand seam are made in parallel with each other.) * → 0</p>  <p><1L> : Sewing end difference (The right-hand side seam is shorter than the left-hand side one.) (Data setting range : 0 to 20 mm) (When this data is set to zero (0), the left-hand seam and right-hand seam are made in parallel with each other.) * → 0</p>
	 <p>[1M] : Center knife actuating position on the sewing start (Data setting range : 0 to 15 mm) [The center knife starts operating at the position that is away from the shorter seam by the specified distance.] * → 7</p>
	 <p>[1N] : Center knife actuating position on the sewing end (Data setting range : 0 to 15 mm) [The center knife starts operating at the position that is away from the shorter seam by the specified distance.] Recommendable data setting range : 7 to 15 mm * → 7</p>
	 <p><1O> : Corner knife actuating position on the sewing start (Data setting range : 0.0 to 10.0 mm) [The setting value is effective only when the corner knife actuates separately. (Refer to page 30)] The corner knife actuates at the position inside the shorter seam by the specified distance. * → 0.0</p>  <p><1O> : Corner knife actuating position on the sewing start (Data setting range : 0.0 to 10.0 mm) [The setting value is effective only when the corner knife actuates separately. (Refer to page 30)] The corner knife actuates at the position outside the shorter seam by the specified distance. * → 0.0</p>

* Specified data (Input with the numeric keys)

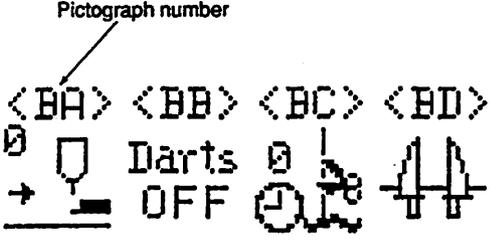
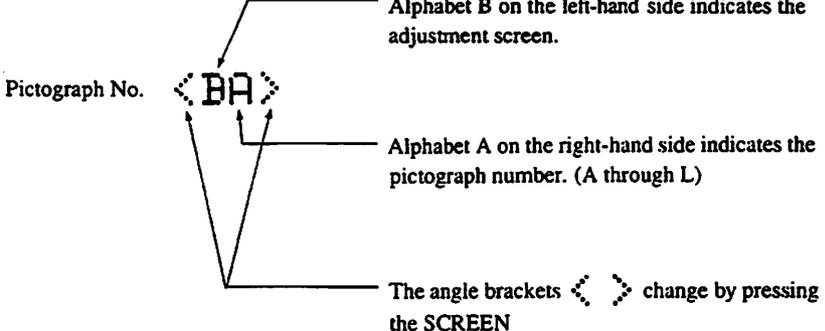
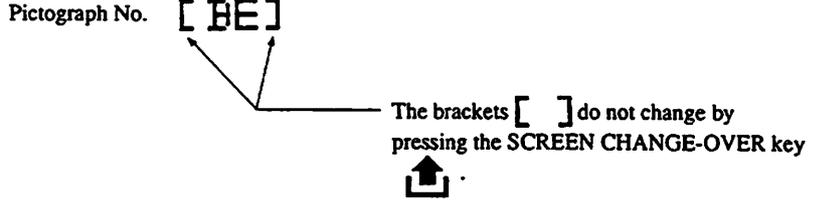
Panel indication	Function and operation
	 <p><1P> : Corner knife actuating position on the sewing start (Data setting range : 0.0 to 10.0 mm) [The setting value is effective only when the corner knife actuates separately. (Refer to page 30)]</p> <p>* → 0.0 : The corner knife actuates at the position inside the shorter seam by the specified distance.]</p>  <p><1P> : Corner knife actuating position on the sewing start (Data setting range : 0.0 to 10.0 mm) [The setting value is effective only when the corner knife actuates separately. (Refer to page 30)]</p> <p>* → 0.0 : The corner knife actuates at the position outside the shorter seam by the specified distance.]</p>
	 <p>[1Q] : Lockstitch pitch (Data setting range: 2.0 to 3.4 mm)</p> <p>* → 2.0</p>
	 <p><1R> : Sewing start condensation stitching and condensation pitch are specified. (Data setting range: 0.5 to 1.5 mm)</p> <p>* → 1.0</p>  <p><1R> : Sewing start back tack stitching and back tack pitch are specified. (Data setting range: 1.0 to 3.4 mm. Note that the back tack pitch should not exceed the lockstitch pitch.)</p> <p>* → 2.0</p>
	 <p><1S> : Sewing end condensation stitching and condensation pitch are specified. (Data setting range: 0.5 to 1.5 mm)</p> <p>* → 1.0</p>  <p><1S> : Sewing end back tack stitching and back tack pitch are specified. (Data setting range: 1.0 to 3.4 mm. Note that the back tack pitch should not exceed the lock stitch pitch.)</p> <p>* → 2.0</p>
	<p>(Caution) This indication is not shown when the dart stretcher is not specified for <BB> on the adjustment screen.</p> <p><1T> Darts SEWING ON : Dart stretcher is set to operate.</p> <p>Darts SEWING OFF : Dart stretcher is set to inoperative.</p>

* Specified data (Input with the numeric keys)

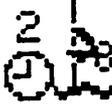
Panel indication	Function and operation (APW-234N)
	<p>3. Counter screen</p> <ul style="list-style-type: none"> If the COUNTER key  is pressed, the following screen will appear regardless of the current screen. (Excluding the case where the sewing machine operates under the "automatic mode", an alarm occurs, the bobbin thread is counted up and the sewing machine independently operates.) <div style="text-align: center;">  <p>Pictograph number</p> <p>Indication of the number of pieces of garment finished</p> <p>Indication of set value</p> <p>Counter screen</p> </div>
	<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <p>: Total counter</p> <p>Total number of pieces finished is indicated.</p> <p>To clear the figures currently shown, press the RESET key R.</p> <p>(In this case, the numeric keys cannot be used to input a number.)</p> </div> </div>

Panel indication	Function and operation
	<p>[AB] : Number of pcs. counter</p> <p>The number of the sewn workpieces is indicated. To clear the figures currently shown, press the RESET key R. (In this case, the numeric keys cannot be used to input a number.)</p> <p>Every one workpiece has been sewn, it adds one on the counter. Finally when the figures on the number of pieces counter becomes equal to the figures displayed on the bobbin thread counter, the number of pieces counter stops counting. At this time, the clamp foot moves to its rear end, the LCD display units gives the COUNT-UP SCREEN, and sewing cannot be performed any longer. The COUNT-UP state is reset by pressing the RESET key R.</p>
	<p>[AC] : BOBBIN THREAD COUNTER</p> <p>The predetermined number of pieces to be sewn is specified. If this counter is set to "0", the COUNT-UP state of the bobbin thread counter is prevented.</p>

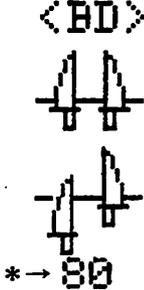
* Specified data (Input with the numeric keys)

Panel indication	Function and operation
	<p>4. Adjustment screen</p> <ul style="list-style-type: none"> The following screen appears if pressing the "0" of the numeric keys with the CYCLE key  kept pressed. This screen is used to specify and adjust the mechanisms of sewing machine. <div style="text-align: center;">  <p>Pictograph number</p> </div> <p style="text-align: center;">Example of the Adjustment screen 1</p> <ul style="list-style-type: none"> Four different pictographs are shown on the single screen. The pictograph numbers are shown above the respective pictographs. <div style="text-align: center;">  <p>Pictograph No. < BA ></p> <p>Alphabet B on the left-hand side indicates the adjustment screen.</p> <p>Alphabet A on the right-hand side indicates the pictograph number. (A through L)</p> <p>The angle brackets < > change by pressing the SCREEN</p> </div> <div style="text-align: center;">  <p>Pictograph No. [BE]</p> <p>The brackets [] do not change by pressing the SCREEN CHANGE-OVER key</p>  </div>

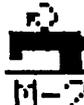
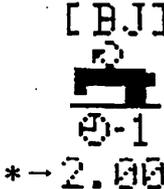
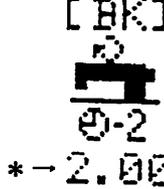
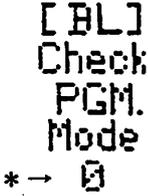
Panel indication	Function and operation
	<div style="display: flex; justify-content: space-between; font-size: small;"> <BA> <BB> <BC> <BD> [BE] [BF] [BG] [BH] <BI> [BJ] [BK] [BL] </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-top: 5px;"> 0 → Darts OPTION OFF 0 1 4-4 0.80 0.80 High 2200 Low 1500 M-0 2.00 0-1 2.00 0-2 Check PGM. Mode 0 </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>1 → Darts OPTION ON</p> <p>1 1 4-4</p> <p>80</p> <p>2 → </p> <p>2 1 4-4</p> <p>1</p> <p>3 → </p> <p>3 2 4-4</p> <p>1</p> <p>Returns to the initial state</p> <p>Returns to the initial state</p> </div> <div style="width: 45%;"> <p>M-1</p> <p>M-2</p> <p>M-3</p> <p>M-4</p> <p>Returns to the initial state</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px; font-size: x-small;"> <div style="width: 45%;"> <p>The clamp foot return mode</p> <p>Setting of dart stretcher operation</p> <p>Timing of needle thread trimming</p> <p>Corner knife simultaneous operation → Separate operation</p> <p>Stacker timer 1</p> <p>Stacker timer 2</p> <p>Setting the sewing speed for high speed operation</p> <p>Setting the sewing speed for low speed operation</p> <p>Sewing machine independent operation mode</p> <p>Sewing machine independent operation ON time</p> <p>Sewing machine independent operation OFF time</p> <p>Check program</p> </div> <div style="width: 45%;"> <p>(Pictographs marked by arrows (↑ • ↓) can be changed over using the SCREEN CHANGE-OVER key)</p> <p>(Specified data are the standard values.)</p> </div> </div>

Panel indication	Function and operation
	<p>: The position of the clamp foot is changed over after the completion of sewing. = Stops at the front end (Data setting range: 0.00 to 9.99 sec.) * Length of time during which the clamp foot stops at the sewing end position is set.</p> <p>1 → </p> <p>2 → </p> <p>3 </p>
<p><BB> Darts OPTION OFF</p>	<p>: Darts stretcher is not equipped.</p>
<p>Darts OPTION ON</p>	<p>: Darts stretcher is equipped. (Optionally available)</p>
<p><BC></p>   	<p>: Timer of the thread trimmer (standard timing)</p> <p>: Timer of the thread trimmer (intermediate timing: (Length of thread remaining in the needle) Standard position + Approx. 10 mm)</p> <p>: Timer of the thread trimmer (latest timing: Thread trimmer actuates when the clamp foot stops at the position of the corner knife.)</p>

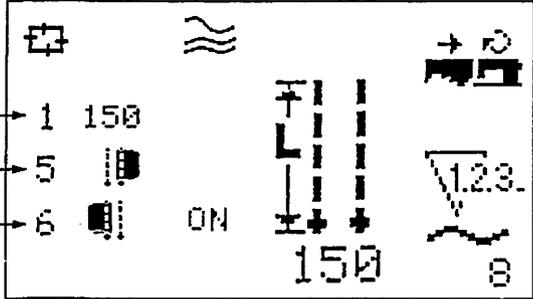
* Specified data (Input with the numeric keys)

Panel indication	Function and operation
	<p>: Corner knife simultaneous operation designated mode (standard) (Caution) In this case, fix the corner knife unit in accordance with the sewing length. (Refer to page 72 for the procedure.)</p> <p>: Corner knife separate operation designated mode under which the distance between the corner knife blades is specified (Data setting range for gauge size 8 to 12 mm : 35 to 180 mm) (Data setting range for gauge size 14 to 20 mm : 50 to 180 mm)</p> <p>(The corner knife can be operated in the way similar to the case where it automatically opens, by separately operating the fixed side and moving side of the corner knife.)</p> <p>(Caution) In this case, the corner knife unit (the moving side) should be fixed in accordance with the specified data marked with an asterisk (*). (Refer to page 72 for the procedure.)</p>
	<p>: Stacker timer (unit: second) (Data setting range: 0.00 to 9.99 sec.)</p> <ul style="list-style-type: none"> • For a grasping stacker: The period of time during which the stacker grasps the workpiece is specified. • For a bar stacker: The period of time during which the stacker grasps the workpiece is specified. • For a roller stacker: The period of time during which the roller actuates is specified. (Specify 9.99 sec. when the cloth sensor is used.)
	<p>: Stacker timer (Data setting range: 0.00 to 9.99 sec.)</p> <ul style="list-style-type: none"> • For a grasping stacker: The period of time during which the stacker swings is specified. • For a bar stacker: The period of time during which the stacker swings is specified. • For a roller stacker: Not used
	<p>: Setting the sewing speed for high speed operation of the sewing machine (lockstitching speed) Recommended set value 2,200 s.p.m. (Data setting range 1,000 to 2,200 s.p.m.)</p>
	<p>: Setting the sewing speed for low speed operation of the sewing machine (condensation stitching speed and back tack stitching speed) Recommended set value 1,500 s.p.m. (Data setting range 500 to 1,500 s.p.m.)</p>

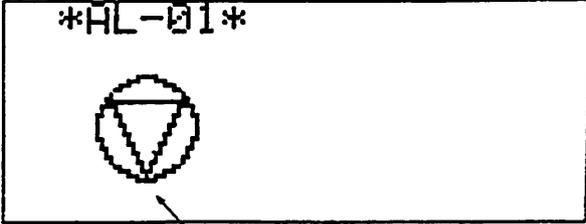
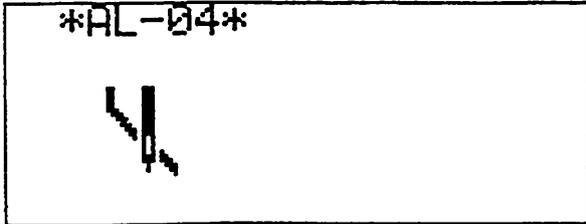
* Specified data (Input with the numeric keys)

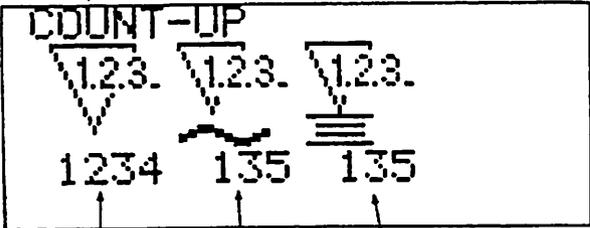
Panel indication	Function and operation
	<p>: Sewing machine independent operation mode is set. To start the sewing machine independent operation, specify first the independent operation mode and set the DIP switch appropriately.</p> <p> : No operation</p> <p> : Continuous high-speed operation of sewing machine</p> <p> : Continuous low-speed operation of sewing machine</p> <p> : Intermittent high-speed operation of sewing machine</p> <p> : Intermittent low-speed operation of sewing machine</p>
	<p> : The period of time during which the sewing machine is in its "ON" state in the sewing machine independent operation mode or in the intermittent operation mode. (Data setting range: 1.00 to 9.99 sec.) The sewing machine independent operation mode starts up using the DIP switch. (If the specified value is 1.00 sec. or smaller, the sewing machine does not operate.)</p>
	<p> : The period of time during which the sewing machine is in its "OFF" state in the sewing machine, independent operation mode or in the intermittent operation mode. (Data setting range: 1.00 to 9.99 sec.) The sewing machine independent operation mode starts up using the DIP switch. (If the specified value is 1.00 sec. or smaller, the sewing machine does not operate.)</p>
	<p> : Check program mode is specified. (Available modes are 0, 1, 2, 3 and 4.) The check program is started up by pressing the SCREEN CHANGE-OVER key </p>

* Specified data (Input with the numeric keys.)

Panel indication	Function and operation
<p>② LCD indication under the automatic mode</p>	<p>1) The following screen is given under the automatic mode.</p> <div style="text-align: center;">  <p>The diagram shows a rectangular LCD screen with several elements: <ul style="list-style-type: none"> Top left: A square icon with a cross inside, labeled 'Indication of cycle sewing'. Top center: A wavy line icon, labeled 'Indication of stacker operation'. Top right: An icon of a sewing machine with a plus sign and a circular arrow, labeled 'Sewing mode indication'. Left side: A list of patterns: '1 150', '5', and '6', with arrows pointing to them from the text 'Pattern to be sewn first', 'Pattern to be sewn next', and 'Pattern to be sewn after next' respectively. Center: The text 'ON' and a vertical bar with a cross at the bottom, labeled 'Detailed operation of the sewing is indicated.'. Bottom center: The number '150', labeled 'Number of pcs. counter indication'. Bottom right: A small diagram of a sewing machine with the number '1.2.3.' and '8' below it. </p> </div> <p>• If the screen shown above is given on the LCD, only the MACHINE READY key (○) is operative.</p>

Panel indication	Function and operation
	<p>2) Example of the indication showing detailed operation of sewing</p> <p>Example 1) • Parallel L size sewing L size = 120 mm</p>  <p>Example 2) • Right-slant L size sewing L size = 120 mm</p>  <p>Example 3) • Left trapezoidal stitching L size = 120 mm</p>  <p>Example 4) • Right parallel flap sewing</p>  <p>Example 5) • Right-slant, right-flap sewing</p>  <p>Example 6) • Left trapezoidal flap sewing (Welt pocket sewing)</p> 

Panel indication	Function and operation
<p>③ Alarm indication</p>	<p>When an alarm occurs, the machine immediately stops. The alarm number corresponding to the alarm occurred flashes on and off on the LCD display unit to show that the machine stops in the alarm state.</p> <p>1) Temporary stop</p> <div style="text-align: center;"> <p>Alarm number</p>  <p>Pictograph corresponding to the temporary stop</p> </div> <p>Pressing the RESET key R releases the machine from the alarm state.</p> <p>2) Thread breakage detection</p> <div style="text-align: center;"> <p>Alarm number</p>  </div> <p>Pressing the RESET key R releases the machine from the alarm state.</p> <p>3) The thread take-up lever is not in its highest dead position.</p> <div style="text-align: center;"> <p>Alarm number</p>  </div> <p>(Caution) The AL-12 is reset following the procedure described below.</p> <ol style="list-style-type: none"> 1. Turn the handwheel to make the thread take-up lever go up to its highest dead point when the clamp foot is in its front end or rear end. At this time, the machine is automatically released from the alarm. 2. Turn the handwheel to make the thread take-up lever go up to its highest dead point when the clamp foot is in its intermediate position. Then press the RESET key R.

Panel indication	Function and operation
<p>④ Bobbin thread count-up indication</p>	<p>1) When the figures on the number of pieces counter becomes equal to the figures displayed on the bobbin thread counter, the following screen appears.</p> <p>Press the RESET key R, and the figures shown on the number of pieces counter will be cleared (number = 0) and the cycle screen will be shown on the LCD display unit.</p> <p>The message of "COUNT-UP" flashes on and off.</p>  <p>The diagram shows an LCD display with the text "COUNT-UP" at the top. Below it are three columns of numbers. The first column shows "1.2.3." above "1234". The second column shows "1.2.3." above "135". The third column shows "1.2.3." above "135". Arrows point from the labels "Total counter", "Number of pcs. counter", and "Bobbin thread counter" to the respective numbers in the columns.</p> <p>Total counter Number of pcs. counter Bobbin thread counter</p>

(3) Example of setting data on cycle sewing

Let's set data on the following example.

Pattern No. 1

L size 150 mm. trapezoidal sewing (difference 5 mm)

Pattern No. 5

Left-flap parallel sewing with the stacker actuated.

Pattern No. 6

Right-flap parallel sewing with the stacker actuated.

Step 1. Specify data on cycle sewing.

Under the manual mode (when the mode indicator LED goes out), press the CYCLE key , then press 1, 5 and 6 numeric keys in the written order successively. This completes the setting of data on cycle sewing (1, 5 and 6).

Step 2. Specify data on sewing pattern.

- After step 1, press the SCREEN CHANGE-OVER key  (when the cycle screen is shown on the LCD). Then the sewing pattern screen will appear on the LCD.

- Then, press the 1 of the numeric keys, and the sewing pattern of pattern No. 1 will be shown on the LCD.

2-1 Changing the sewing pattern corresponding to pattern No. 1

- Press the CURSOR shift key  to change the flashing pictograph (item that can be modified). Then press the SCREEN CHANGE-OVER key , and the flashing pictograph will be changed to another (the specified data will be changed to another).

- Operate the SCREEN CHANGE-OVER key  and the numeric keys to set data to the values same as those of pattern 1 to the described on the next page.

2-2 Change the sewing pattern of pattern No. 5

- Keep pressing the CURSOR shift key  until the pictograph number [1A] flashes on and off. Then, press the 5 of numeric keys.

- Operate the CURSOR shift key , SCREEN CHANGE-OVER key  and numeric keys to set data to the values same as those of pattern 5 to the described on the next page.

2-3 Changing the sewing pattern of pattern No. 6

- Keep pressing the CURSOR shift key  until the pictograph number [5A] flashes on and off. Then, press the 6 of numeric keys.

- Operate the CURSOR shift key , SCREEN CHANGE-OVER key  and numeric keys to set data to the values same as those of pattern 6 to the described on the next page.

• Set values of pattern 1

[1A]	<1B>	<1C>	<1D>	<1E>	<1K>	<1L>	[1M]	[1N]	<1O>	<1P>	[1Q]	<1R>	<1S>
													
1		150			5	5	0	0	0.0	0.0	2.0	1.0	1.0

Trapezoidal sewing with the difference set to 5 mm

• Set values of pattern 5

[5A]	<5B>	<5C>	<5D>	<5E>	[5F]	[5G]	[5H]	[5I]	[5J]	<5K>	<5L>	[5M]	[5N]	<5O>	<5P>	[5Q]	<5R>	<5S>
																		
5					30.0	30.0	30.0	30.0	1	0	0	7	7	0.0	0.0	2.0	1.0	1.0

Change the data on flap concealed stitching in accordance with the flap to be sewn.

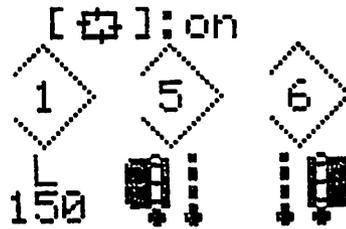
• Set values of pattern 6

[6A]	<6B>	<6C>	<6D>	<6E>	[6F]	[6G]	[6H]	[6I]	[6J]	<6K>	<6L>	[6M]	[6N]	<6O>	<6P>	[6Q]	<6R>	<6S>
																		
6					30.0	30.0	30.0	30.0	1	0	0	7	7	0.0	0.0	2.0	1.0	1.0

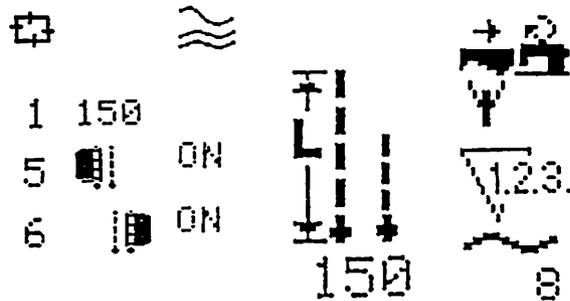
Change the data on flap concealed stitching in accordance with the flap to be sewn.

Step 3. Confirming data on cycle sewing

Press the CYCLE key , and confirm that the following indication is given on the LCD.

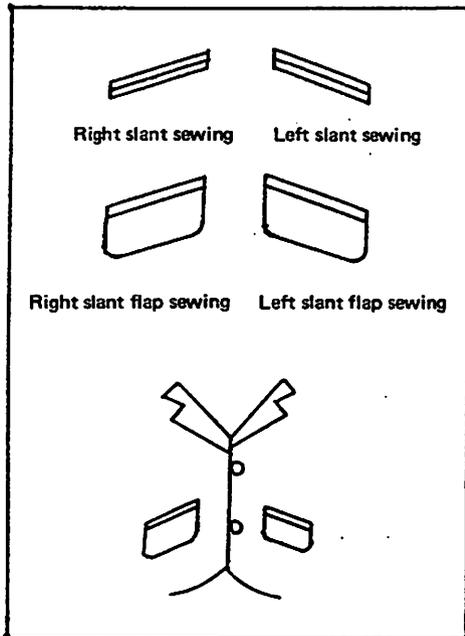


Press the MACHINE READY key , and the machine will operate under the automatic mode. Now, the sewing machine can start sewing.



(4) Example of setting data on slant flap sewing

① Right slant sewing and left slant sewing

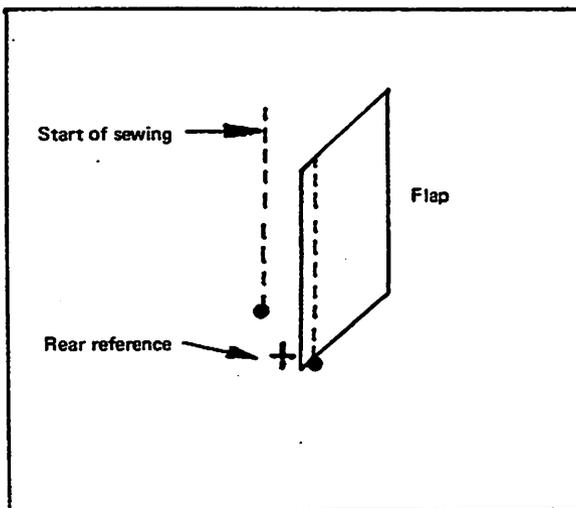


Observe a pocket from the front after sewing to check which end of the pocket is up.

A pocket with its right end up ... Right slant sewing

A pocket with its left end up Left slant sewing

In addition, the above designation applies also to the flap sewing.



To sew a right slant flap, use the right flap sewing mode.

[The flap forced stop function (in prevention of cutting) will not work unless the sewing end of the flap is aligned with the rear reference.]

[How to set a right slant flap]

If the left slant flap sewing mode is specified for the sewing of a right slant flap, "AL-50" will occur.

[If you set the DIP-1 SW-1 to its ON position, the occurrence of the aforementioned "AL-50" can be prevented.

Set the DIP switch to the ON position when only right or left flaps are sewn continuously.]

6. HOW TO SET THE MATERIAL TO BE SEWN ON THE MACHINE AND OPERATE THE SWITCHES DURING SEWING

(1) How to perform wetting and sewing welts with flaps

For the standard operation, set the workpieces and operate the switches in the following order:
Before starting operation, check for the related setting keys, switch-over keys, and indicators.

1) Depress the foot valve switch.

The interlining clamping air cylinder will operate to push up the interlining clamp leaf spring.

2) Set an interlining piece.

Place an interlining piece under the interlining clamp leaf spring in alignment with the cross-marks and release the foot valve switch.
Now the interlining piece is firmly held by the clamp leaf spring and the sewing table surface.

3) Set a body of garment material.

Place a garment material in a correct position using the cross-mark light, and check the parallelism of the garment material using the cross-mark light on the far side.

4) Depress the pedal switch to the 1st step.

The work clamp foot travels forward and then the work clamp foot (right) will come down to clamp one side of the garment material.
Remove wrinkles, if any, by hand from the clamped garment material.

5) Depress the pedal switch to the second step.

The work clamp foot (left) will come down to clamp the garment material firmly in place.

6) Set a wetting patch.

Place a wetting patch in between the left and right clamp feet utilizing the cross-mark light.

7) Depress the pedal switch to the third step.

The binder will come down to clamp the wetting patch and then fold it.

8) Flap setting

Set the flap to be sewn to the predetermined position on the left- or right-hand side of the clamp foot.

9) Depress the pedal switch to the 4th step.

The flap presser (right) comes down to clamp the right flap. (To sew the left flap, the flap presser (right) clamps the pocket bag.)

10) Depress the pedal switch to the 5th step.

The flap presser (left) comes down to clamp the left flap. (To sew the right flap, the flap presser (left) clamps the pocket bag.)

11) Depress the knee switch.

The rapid feed begins a travel and the work clamp foot will travel to the sewing position.

12) Release the pedal switch after the rapid feed begins a travel.

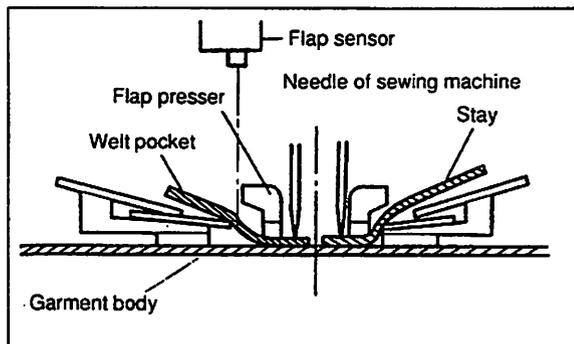
The pedal switch must be released at the moment, otherwise the machine will directly go into the next clamping action immediately after it has reached the sewing position.

(Caution) The pedal switch will be operated in a different way when a dart stretching flap presser is installed in option.

(2) How to sew a welt pocket with the binder raised

This machine is capable of sewing a welt pocket while setting it directly on the garment body without lowering binder (welt patch ruler). (The sensor detects the welt pocket to allow the machine to sew it.)

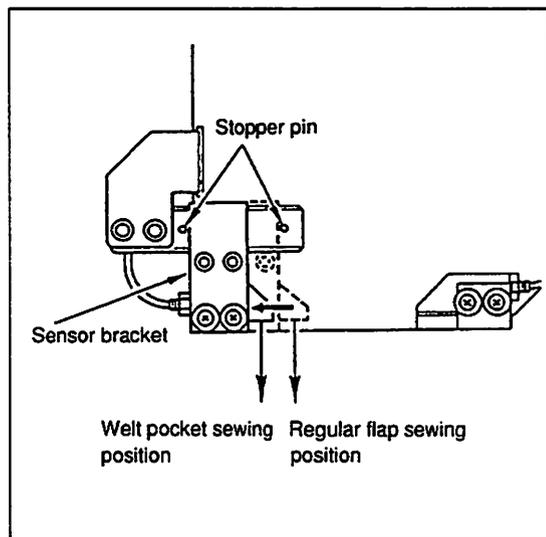
This sewing procedure can be carried out under the cycle sewing mode together with regular flap sewing and welting procedures.



- 1) The allowance of the welt pocket is half of or smaller than the gauge size. (Example : 6 mm or less when the needle gauge is 12 mm) So, perform sewing by the regular flap sewing method so as to ensure allowance when sewing a loose fabric such as linen.
- 2) When sewing a welt pocket with inclined (with a difference), the inclination can be corrected by inputting concealed stitching data. If the welt pocket shape (inclination) is not uniform, however, the concealed stitches will vary. So, be careful. (Same rule applies to the regular flap sewing.)

3) How to operate the flap sensor

Under the welt pocket sewing mode, the flap sensor detects the welt pocket to allow the machine to perform sewing. In this case, attention should be given to the following.



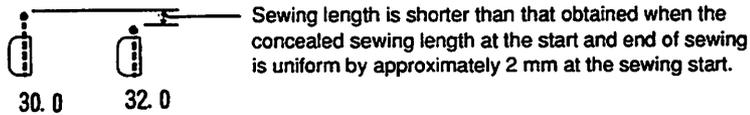
The irradiating position of the sensor for the regular flap sewing is different from that for the welt pocket sewing.

Holding the sensor bracket (left) by hand, move the bracket to the welt pocket sewing position located on the left of the regular flap sewing position.

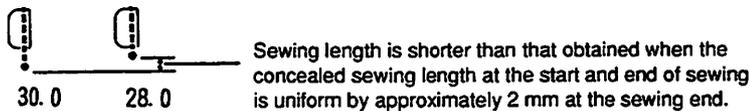
(Caution) Be sure to move the sensor until the sensor bracket comes in contact with the stopper pin without fail. Be sure to take care not to allow the photoelectric cell to remain in the projecting state when the welt pocket sewing mode is changed over to the regular flap sewing mode.

4) Adjusting the flap concealed sewing

1. Increase the data setting value when the length of concealed sewing at the start of sewing is longer than that of at the sewing end.
(Example)



2. Decrease the data setting value when the length of concealed sewing at the start of sewing is shorter than that of at the sewing end.
3. Decrease the data setting value when the length of concealed sewing at the end of sewing is longer than that of at the sewing start.
(Example)



4. Increase the data setting value when the length of concealed sewing at the end of sewing is shorter than that of at the sewing start.

5) How to set the material on the machine

Create a welt pocket sewing pattern in accordance with the operating procedure of the operation panel. Call the sewing pattern and press the MACHINE READY key. (Refer to the description of pictograph No. <1D> for how to change over the performance of the binder.)

① Press the MACHINE READY key.

The sewing pattern to be sewn is shown on the display board of the operation panel, the binder is fixed at the highest position and the left-hand clamp foot moves 10 mm outward.

② Depress the foot valve switch.

The air cylinder for securing an interlining actuate to lift up the leaf spring for securing an interlining.

③ Set the interlining in position.

Put the interlining under the leaf spring for securing an interlining while taking the cross-mark for setting the sewing reference as a guide, and release the foot valve switch. This secures the interlining in between the leaf spring and the sewing table.

④ Set the garment body in position.

Set the interlining at the predetermined position while taking the cross-mark for setting the sewing reference as a guide. Check the parallelism of the material with the cross-mark on the far side.

⑤ Depress the pedal switch to the first step.

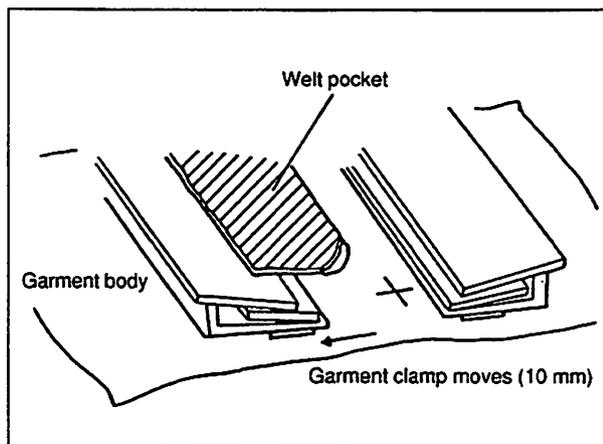
The clamp foot moves forward, the clamp foot (right) comes down to clamp the single garment body. If the garment body has many creases on darts, tense the garment body to remove creases.

⑥ Depress the pedal switch to the second step.

The clamp foot (left) comes down. This completes the garment body clamping procedure.

⑦ Set a welt pocket in position.

Using the space provided after the clamp foot has moved outward, set the welt pocket to the predetermined position while matching patterns on the welt pocket with those on the garment body placed under the welt pocket.



⑧ Depress the pedal to the 3rd step.

The flap presser (left) presses the welt pocket on the garment body.

⑨ Depress the pedal to the 4th step.

The folding plate (right) comes forward. (Only when the needle gauge is 8 or 10 mm.)

⑩ Set the stay in position.

Set the stay on the right of the welt pocket.

⑪ Depress the pedal to the 5th step.

The flap presser (right) presses the stay.

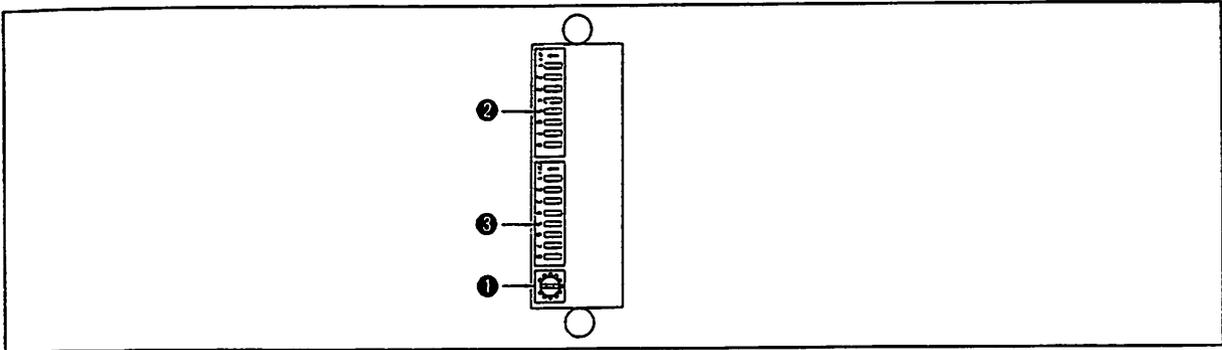
⑫ Press the knee switch.

The rapid feed starts and the entire unit of the clamp foot moves to the sewing position.

⑬ After the rapid feed starts, release the pedal switch.

Be sure to release the pedal switch. If the pedal is held depressed, the machine will start the subsequent clamping action immediately after the machine returns to the home position.

7. EXPLANATION OF VARIABLE RESISTORS AND DIP SWITCHES

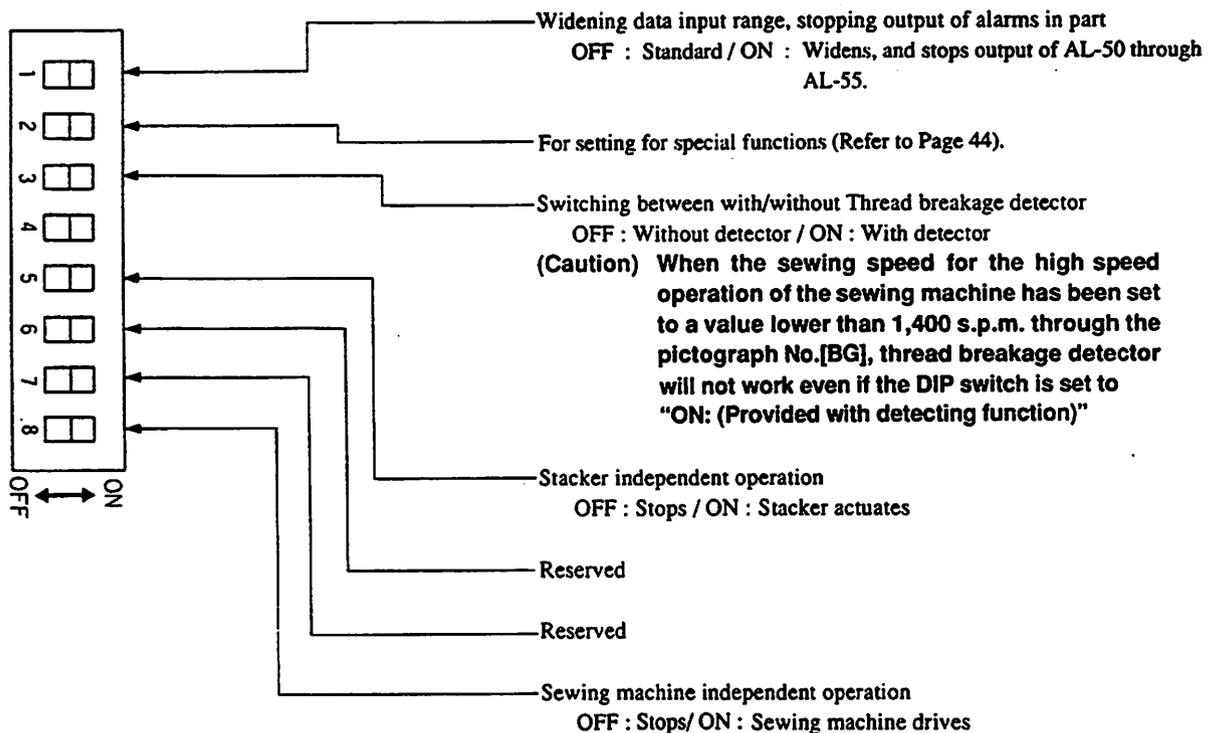


(1) Explanation of function

① VR (Variable Resistor)

This variable resistor is used to adjust clearness of the liquid crystal display screen. The clearness of the liquid crystal display screen subtly changes in accordance with the viewing angle and ambient temperature. So adjust it with this variable resistor.

② DIP 1



(Caution) The data specified using the DIP switches are read at the time when the MACHINE READY key is pressed (change-over from the manual mode to the automatic mode). Consequently, the data will remain even if the setting of the DIP switches are changed when the machine is in the automatic mode.

How to use the DIP switches

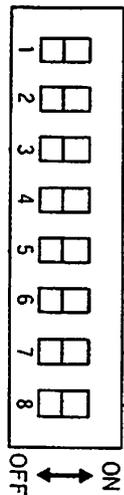
- **DIP-1 SW-5 (stacker independent operation)**

Setting the DIP switches to its ON position under the "manual mode" will actuate the stacker.

- **DIP-1 SW-8 (sewing machine independent operation)**

The machine can be operated independently for adjustment. Independent operation of the sewing machine is possible when the clamp foot is in its rear end position under the "manual mode".

③ DIP 2

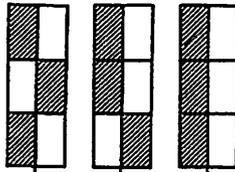


Selection of the position of clamp foot when the grasping stacker or bar stacker actuates.

 : The clamp foot goes backward until it is approximately 130 mm away from the needle bar.

 : The clamp foot does not move at all.

Setting of stackers



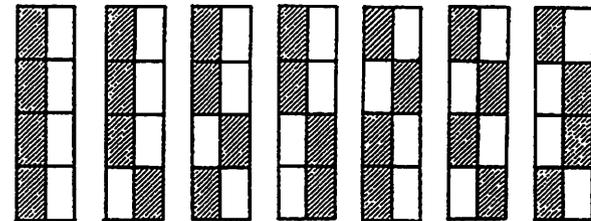
: Already reserved

: Roller stacker

: Grasping stacker/Bar stacker

Setting gauge size

: 8 mm : 10 mm : 12 mm : 14 mm : 16 mm : 18 mm : 20 mm

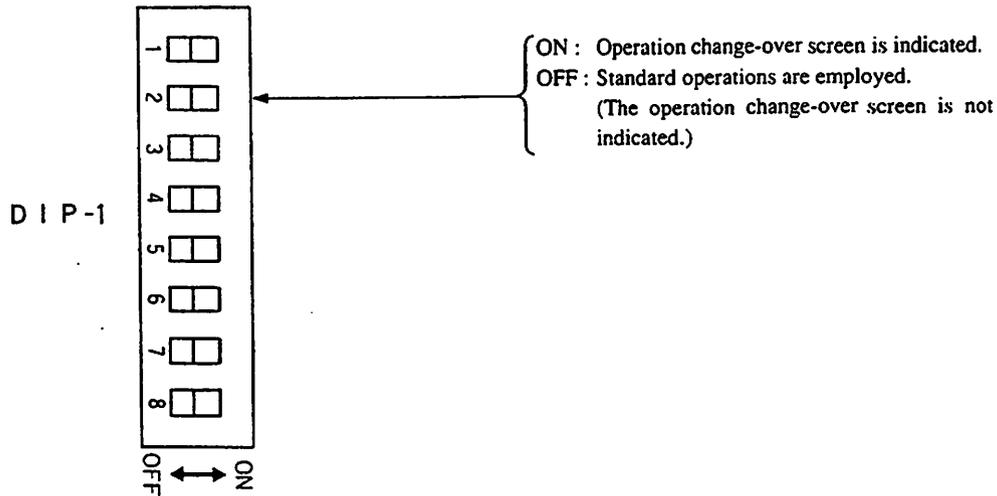


(Caution) The data specified using the DIP switches are read at the time when the power to the machine is turned ON. So, be sure to change the setting of the above-stated DIP switches, if necessary, while the power to the machine is turned OFF.

(2) Setting for special-purpose functions using DIP switches

1) Setting the DIP-SW

Operations of the sewing machine can be selected by setting the switch 2 of the DIP switches 1 (DIP1-SW2).



2) Pressing the cycle key, press the numeric key [1].

At this time, the "operation change-over screen" appear to allow the operator to select the operation of the unit.

(Caution) If the "operation change-over screen" does not appear, suppose that the DIP switch has been set to the OFF position. When the switch is set to the OFF position, all the operations will be set to the standard state.

Panel indication	Function and operation																																																																								
	<p>The operation of the unit can be selected by setting the switch 2 of the DIP switch 1 (DIP1-SW2).</p> <ul style="list-style-type: none"> Pressing the cycle key , press the numeric key [1]. Now, the following screen will appear. 																																																																								
	<table border="0" style="width: 100%; text-align: center;"> <tr> <td><CA></td> <td><CB></td> <td><OC></td> <td><CD></td> <td><CE></td> <td><CF></td> </tr> <tr> <td>FLAP MODE</td> <td>BIND MODE</td> <td>Darts MODE</td> <td>CLMP MODE</td> <td> M-0</td> <td>CORO MODE</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>R+L</td> <td></td> <td>0</td> </tr> <tr> <td>↓</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> <td>↕</td> </tr> <tr> <td>FLAP MODE</td> <td>Darts MODE</td> <td>BIND MODE</td> <td>CLMP MODE</td> <td> M-1</td> <td>CORO MODE</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>L+R</td> <td></td> <td>1</td> </tr> <tr> <td>↓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FLAP MODE</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>↓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td colspan="5">Returns to the initial state.</td> </tr> </table>	<CA>	<CB>	<OC>	<CD>	<CE>	<CF>	FLAP MODE	BIND MODE	Darts MODE	CLMP MODE	 M-0	CORO MODE	0	0	0	R+L		0	↓	↕	↕	↕	↕	↕	FLAP MODE	Darts MODE	BIND MODE	CLMP MODE	 M-1	CORO MODE	1	1	1	L+R		1	↓						FLAP MODE						2						↓													Returns to the initial state.				
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FLAP MODE																																																																									
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↓																																																																									
	Returns to the initial state.																																																																								
	<p style="text-align: center;">Flap presser operation mode</p> <p style="text-align: center;">Darts mode</p> <p style="text-align: center;">Binder mode</p> <p style="text-align: center;">Change-over of clamp foot lowering order</p> <p style="text-align: center;">Change-over of back tack stitching operation</p> <p style="text-align: center;">ON/OFF setting of the operation of folding plate when the corner knife actuates</p>																																																																								
	<p>(The arrows(↑•↓)means that the pictograph given above and below the arrows can be changed over using the screen change-over key () .)</p> <p>(The specified data are the standard values.)</p>																																																																								

Panel Indication	Function and operation
	<p> <CA> FLAP MODE 0 </p> <p style="text-align: center;">↑ ↓</p> <p> FLAP MODE 1 </p> <p style="text-align: center;">↓</p> <p> FLAP MODE 2 </p> <p> <CA> : The flap pressers perform the standard operation. The flap presser (right) actuates first. </p> <p> FLAP MODE 1 : The flap presser (left) actuates first. (When the flap presser (optional) is installed.) </p> <p> FLAP MODE 2 : When sewing a right flap, the flap presser (right) operates first. When sewing a left flap, the flap presser (left) operates first. (This is the standard operation in the L-size sewing mode or the welt pocket sewing mode.) </p>
	<p> <CB> Darts MODE 0 </p> <p style="text-align: center;">↓</p> <p> Darts MODE 1 </p> <p> <CB> : The machine performs standard operations. </p> <p> Darts MODE 1 : The foot pedal actuates the following operations. </p> <p> 1st step Darts stretcher operates. 2nd step Clamp foot travels forward. ↓ Clamp feet (right) (left) come down. 3rd step Binder comes down. 4th step Flap presser (right) comes down. 5th step Flap presser (left) comes down. Knee switch ... Rapid feed </p> <p> (Caution: The standard operations are carried out when sewing machine operates coincidentally under the "darts stretching mode" and "welt pocket sewing mode.") </p>

Panel indication	Function and operation
	<p data-bbox="518 155 646 321"> <CC> BIND MODE 0 </p> <p data-bbox="574 362 598 507">↓</p> <p data-bbox="534 559 646 683"> BIND MODE 1 </p> <p data-bbox="678 207 1053 238">: The standard operations are carried out.</p> <p data-bbox="678 538 1356 663">: The binder will not go up even by releasing the foot pedal after the binder has come down and folding plates have been closed. To make the binder go up, press either the "knee switch" or the "reset switch".</p>
	<p data-bbox="534 942 654 1118"> <CD> CLMP MODE R+L </p> <p data-bbox="678 984 1356 1067">: Performs standard operation The clamp foot (right) comes down first, then the clamp foot (left) comes down next.</p> <p data-bbox="542 1274 662 1398"> CLMP MODE L→R </p> <p data-bbox="678 1315 1364 1408">: Changes the clamp foot lowering order The clamp foot (left) comes down first, then the clamp foot (right) comes down next.</p>

Panel indication	Function and operation
	<p>  </p> <p> : Performs the standard operation (The sewing machine stops once when the back tack stitching direction is changed over.) </p> <p>  </p> <p> : The sewing machine performs back tack stitching without stopping. (For condensation stitching, the operation of the sewing machine does not change.) </p>
	<p>  </p> <p> : Performs standard operation (Folding plate and flap presser are held closed when the corner knife actuates.) </p> <p>  </p> <p> : Folding plate and flap presser are opened before the corner knife actuates. </p>

8. CROSS MARK LAMPS

(1) Cross (+) mark lamps for setting sewing

There are two cross (+) mark lamps. A lamp closer to the operator is used to determine the point (rear reference and seam ends) and the other lamp on the far side is used to determine the point at which a seam starts (front reference) and adjust the parallelism of workpiece.

1) How to adjust the irradiation position of the cross (+) mark lamps

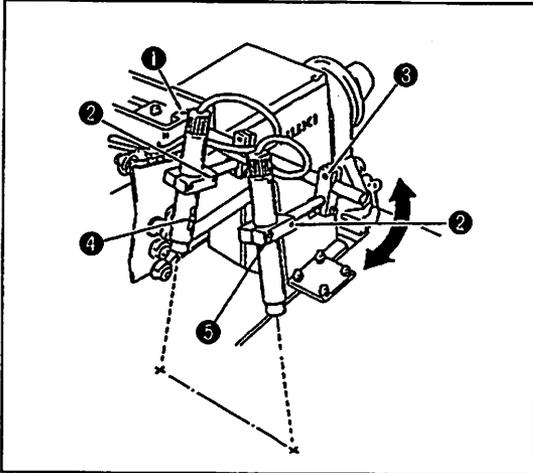


Fig. 20

Adjust the cross (+) mark lamps irradiation point in the following steps of procedure.

1. Set the machine to its predetermined position, and turn ON the power switch. (The cross (+) mark lamps light up.)
2. First adjust the lateral position of the cross (+) mark lamps referring to parallelism checking cross mark lamp light **A**. Loosen setscrew **1**, and slide the entire unit of the cross mark lamps in the direction of the arrow until cross mark lamp **A** on the far side irradiates the middle point between two needles. Now re-tighten setscrew **1**.

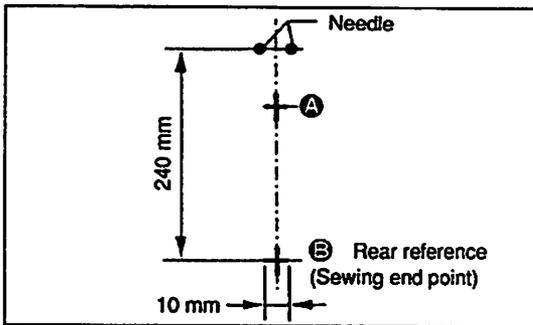


Fig. 21

3. Loosen setscrews **2** and **3** in the cross mark lamp on the near side. This cross mark lamp is used to determine the rear reference for sewing. Now adjust the position of lamp so that it irradiates point **B** as illustrated in Fig. 21. The distance from the needle to the lamp should be 240 mm.
4. Lastly, loosen mark lamp clamp screws **5** and setscrew **4**, and adjust the height of the lamps to bring the cross mark images into the sharpest focus having the width of 10 mm. Now firmly tighten clamp screw **5** and setscrew **4**.
5. After the adjustment of the focus, be sure to confirm that the proper distance (240 mm) is provided between the needle and the lamp and that the cross mark images projected by the lamps are aligned with the middle line between the needles.

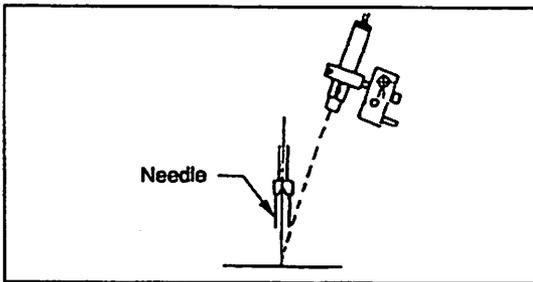


Fig. 22

2) How to replace the bulb in the cross mark clamp

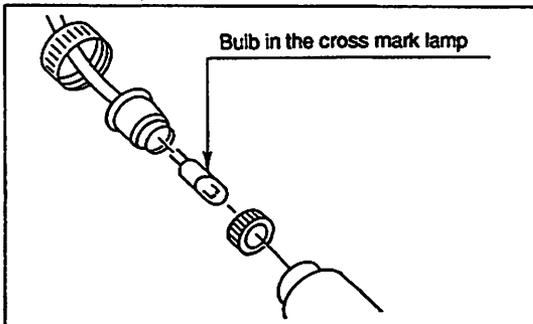


Fig. 23

Disassemble the lamp unit as illustrated in Fig. 23.

Replace the bulb with a new one, and then reassemble the lamp unit accordingly.

9. AIR CONTROL SWITCHES

(1) Foot valve switch

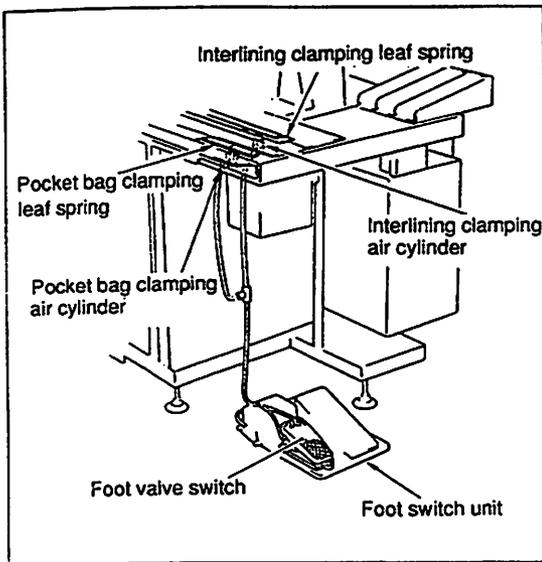


Fig. 24

The foot valve switch is used to actuate the interlining clamping leaf spring as shown in Fig 24. Depress the foot valve switch, and it will permit the interlining clamping air cylinder to operate causing the leaf springs to rise.

While you are depressing the foot valve switch, insert an interlining piece between the sewing table and the leaf spring and accurately position them using the cross-mark light, then release the foot valve switch.

When attached the pocket bag clamping device, it performs the same operation as interlining by the foot valve switch.

(2) Points requiring special attention when operating the air cylinder independently (Manual operation of the solenoid valve)

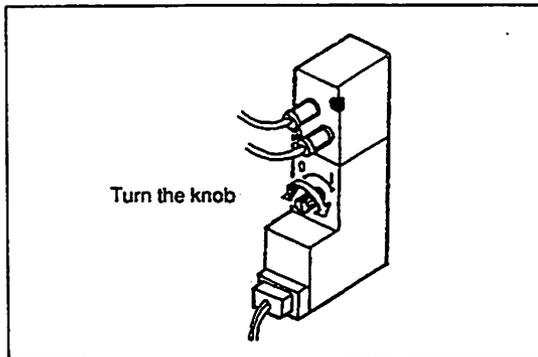


Fig. 25

Turn the knob on the solenoid valve of the corner knife elevating cylinder and center knife in the direction of the arrow as shown in Fig. 25, and each air cylinder can be manually operated independently.

Use each air cylinder independently to adjust the related components and to check them for correct operations. For the normal sewing operation, set the knob at 0.

(Caution) Be sure to manually operate the corner knife or the center knife after moving the clamp foot to its rear end. If you operate the corner knife by hand when the clamp foot is in the front end of its stroke, the clamp foot may interfere with the corner knife, causing the knife to be damaged.

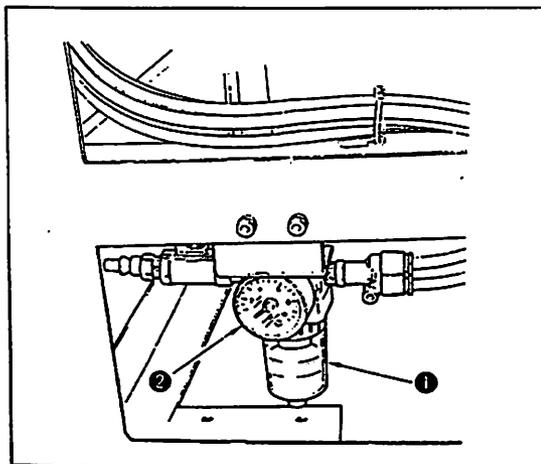


Fig. 26

This machine is not provided with the air pressure detector switch. Before operating the sewing machine, check the air pressure on gauge (2) for air filter regulator (1).

10. PEDAL SWITCH AND KNEE SWITCH OPERATION

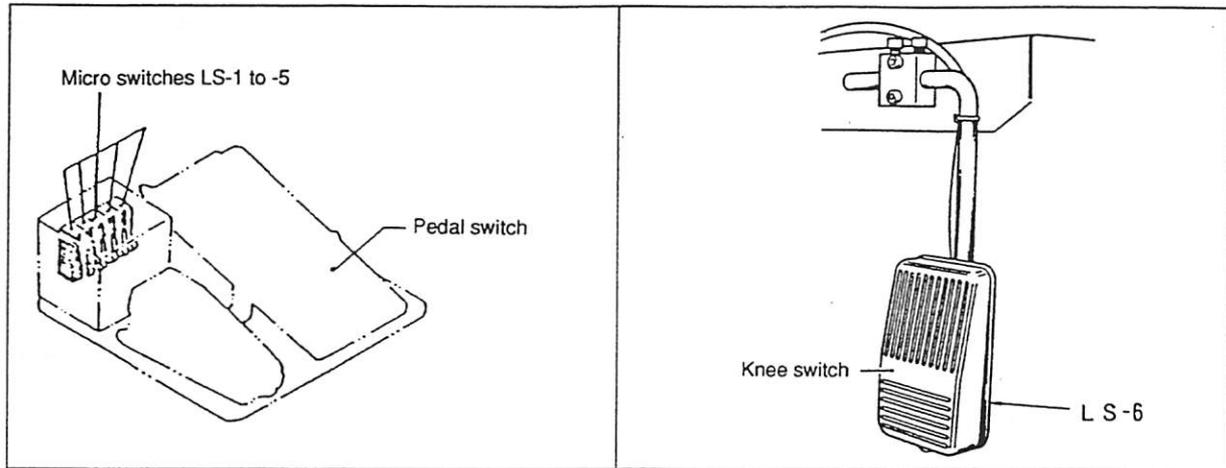


Fig. 27

Sewing preparation from the clamp foot forwarding to the rapid feed of the material is all performed by operating this pedal switch.

[Standard specifications]

- | | |
|-----------------------|---|
| 1st step (LS-1) | Clamp foot forward |
| | ↓ (After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.) |
| | Clamp foot, right comes down |
| 2nd step (LS-2) | Clamp foot, left comes down |
| 3rd step (LS-3) | Binder comes down |
| | ↓ (Clamp foot comes down 0.2 sec. after the binder lowest end sensor is turned ON.) |
| | Folding plate closes |
| 4th step (LS-4) | Flap presser, right comes down. |
| 5th step (LS-5) | Flap presser, left comes down. |
| Knee switch | |
| (LS-6) | Rapid feed |

[When the darts stretcher is installed] (Optional)

- | | |
|-----------------------|---|
| 1st step (LS-1) | Darts stretcher operated |
| | Clamp foot goes forward (After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.) |
| 2nd step (LS-2) | Clamp foot, right comes down |
| 3rd step (LS-3) | Clamp foot, left comes down |
| | Darts stretcher returns |
| 4th step (LS-4) | Binder comes down |
| | ↓ (Clamp foot comes down 0.2 sec. after the binder lowest end sensor is turned ON.) |
| | Folding plate closes |
| 5th step (LS-5) | Flap pressers (right and left) comes down |
| Knee switch | |
| (LS-6) | Rapid feed |

[Under the welt pocket sewing mode]

- 1st step (LS-1) Clamp foot moves forward.
↓ (After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.)
- 2nd step (LS-2) Clamp foot (left) comes down.
- 3rd step (LS-3) Clamp foot (left) comes down.
- 4th step (LS-4) Folding plate closes (for gauge size of 12 mm or smaller).
- 5th step (LS-5) Flap presser (right) comes down.
- Knee switch
(LS-6) Rapid feed

[Under the welt pocket with a darts stretcher installed]

- 1st step (LS-1) Darts stretcher operates.
Clamp foot moves forward (After the front end sensor is turned ON, the clamp foot moves forward as far as 5 mm, and then stops there.)
- 2nd step (LS-2) Clamp foot (right) comes down.
- 3rd step (LS-3) Clamp foot (left) comes down.
Darts stretcher returns.
- 4th step (LS-4) Flap presser (left) comes down.
Folding plate closes (for gauge size of 12 mm or larger).
- 5th step (LS-5) Flap presser (right) comes down.
- Knee switch
(LS-6) Rapid feed

11. POINTS TO BE NOTED BEFORE OPERATION

- Make sure the following points before starting operation of the machine or day-to-day work.
 - 1) Check that the electric supply cord and other electric connectors are firmly connected.
Turn the power switch ON and check that the indicator figures or indicator lamps on the operation panel are both lighting. Also make sure that the motor of the machine properly rotates.
 - 2) Check for the connection of each air supply hose including those to the stacker and ensure that the pressure gauge indicates 5.0 kgf/cm² (0.5 MPa). When necessary, adjust the pressure (5.0 kgf/cm²) by the air regulator knob.
 - 3) Check for the lubrication.
Fill the oil reservoir of the machine head with lubricating oil.
 - 4) Check that the remainings of the needle thread and bobbin thread are enough for the operation.
 - 5) Make sure that the machine is in the standby position;
 1. The binder is in its upper position.
 2. The clamp foot is in its upper position.

- How to remove the sewing table when winding the bobbin thread

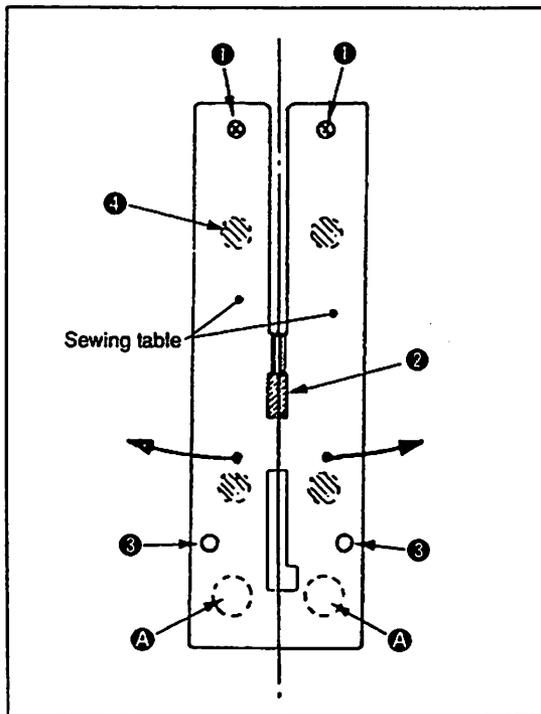


Fig. 28

1. Move the clamp foot to the rear end.
2. Insert your fingers in holes **A** in the under side of the sewing table and push up the sewing table with your fingers.
3. In this state, move the left and right sewing table, taking positioning boss **1** as the center, respectively in the direction of the arrow, and you can observe the bobbin case.

(Note) Be careful in moving the sewing table so as not to contact the needle.

4. After the completion of winding the bobbin thread, securely fit the sewing table to throat plate **2** and positioning pins **3** by following to the procedure for removing the sewing table inversely. The sewing table is attracted by magnets **4** at four points.

(Note) Follow the same procedure to remove the sewing table when changing the needle gauge.

12. TEMPORARY STOP

The machine will immediately stop with the relevant error code on the operation panel display when the temporary stop mechanism is actuated by one of the following causes.

(1) Temporary stop by manual operation

If an abnormal noise is heard during an operation or when the machine needs to be stopped in an emergency, press the temporary stop switch mounted on the top of the operation panel.

- The machine stops with the needle stopped in its upper position.
- The feeding mechanism stops with the clamp foot lowered.

The function of the machine will stop in the above conditions and error code "AL-01" will be displayed.

[How to reset]

Correct the cause to have made the sewing machine temporarily stop, then press the reset key.

The clamp foot will travel to the rear end, and then the clamp foot and binder will return to home position. The set ready indicator lamp will go off and manual mode will start to function.

(2) Automatical temporary stop

The automatical temporary stop mechanism will be actuated by one of the following reasons;

See [(3) "List of alarm codes"]

(3) List of alarm codes

Alarm code	Description	Corrective measure	Time of detection	Remarks
AL-01	Temporary stop switch is turned ON.	Press the reset key.	Anytime	
AL-02	An abnormal load is applied to the servomotor, resulting in defective feed. In this case, the AL-02 is shown on the screen.	Press the reset key. 1. Check the load applied to the clamp foot travel components. If any load is applied to them, eliminate it. 2. Check whether the servomotor driver is defective.		
AL-04	Thread breakage is detected. AL-04 is shown when the needle thread breaks.	Check whether the needle thread is broken. Then, press the reset key.	During sewing	
AL-09	Failure in detection of the corner knife being in the lower end position.	Press the reset key. 1. Check whether the corner knife has come down. 2. Confirm that the cylinder sensor has detected the corner knife in the lower end position.	1. When the clamp foot travels 2. When the foot pedal switch is depressed to the 1st step.	
AL-10	Failure in detection of the center knife being in the upper end position.	Press the reset key. 1. Check whether the center knife has gone up. 2. Confirm that the cylinder sensor has detected the center knife in the lower end position.	1. When the clamp foot travels 2. When the foot pedal switch is depressed to the 1st step.	
AL-11	The binder is not in the correct home position. 1. The air pressure has dropped. This prevents the binder from going up. 2. When the darts stretcher has been specified, the binder being in the upper end position is not detected.	Press the reset key. 1. Check the air pressure and also confirm that the binder has raised. If the darts stretcher is not installed on the machine, confirm that the darts stretching mode has not been specified. 2. If the darts stretcher is specified, check the upper detection sensor for the binder.	1. When the power to the machine is turned ON 2. When the clamp foot travels 3. When the machine ready key is turned ON.	

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Alarm code	Description	Corrective measure	Time of detection	Remarks
AL-12	The thread take-up lever is not in its highest dead point.	Set the thread take up lever to the highest dead point of its stroke.	1. When the clamp foot travels 2. When the machine ready key is turned ON 3. When the foot pedal is operated	
AL-13	Dust gathers on the front end of the flap.	Remove dust from the reflection plate, and press the RESET key.	When the clamp foot feeds the material.	Only under the flap sewing mode.
AL-14	Front end of the flap is not detected.	Press the RESET key, and place the flap properly on the machine.	When the clamp foot feeds the material.	Only under the flap sewing mode.
AL-15	Corner knife cannot move from the current position.	Press the RESET key. (Decrease the opening amount of the corner knife, and re-specify data on it.)	When the MACHINE READY key is pressed. When a short flap is finished.	Only under the flap sewing mode.
AL-16	The flap sensor fails to receive light.	Remove dust from the reflection plate, and press the RESET key.	When the clamp foot starts feeding action.	Only under the flap sewing mode.
AL-17	Failure in detection of the roller stacker being in the upper end position	Press the reset key. 1. Confirm that the roller has raised. 2. Check the roller stacker upper detection sensor.	While the clamp foot travels	Only when the roller stacker is used with the sewing machine
AL-18	Failure in detection of the darts stretcher being in the upper end position	Press the reset key. 1. Confirm that the darts stretching cylinder has raised. 2. Check that the cylinder sensor has detected the darts stretcher being in the upper end position.	When the machine ready key is turned ON.	To be detected only when the darts stretcher is used with the sewing machine.
AL-21	Size, outside the range of data	Press the reset key, and input the correct data.	When the machine ready key is pressed	Gauge size: 8 mm to 12 mm 35 mm to 180 mm Gauge size: 14 mm to 20 mm

Alarm code	Description	Corrective measure	Time of detection	Remarks
AL-26	Lockstitch pitch, outside the range of data	Press the reset key, and input the correct data.	When the machine ready key is pressed	2.0 to 3.4 mm
AL-27	Condensation pitch, outside the range of data			0.5 to 1.5 mm
AL-28	Back tack pitch, outside the range of data			1.0 mm to the lockstitch
AL-29	Dara on the flap concealed stitching (front right) is outside the data setting range.			The set value should be larger than the front difference of the corner knife.
AL-30	Dara on the flap concealed stitching (rear right) is outside the data setting range.			The set value should be larger than the rear difference of the corner knife.
AL-31	Center knife (front), outside the range of data			0 to 15 mm
AL-32	Center knife (rear), outside the range of data			0 to 15 mm
AL-34	Dara on the flap concealed stitching (front left) is outside the data setting range.			The set value should be larger than the front difference of the corner knife.
AL-35	Dara on the flap concealed stitching (rear left) is outside the data setting range.			The set value should be larger than the rear difference of the corner knife.
AL-36	Dara on the corner knife cutting length (front) is outside the data setting range.			0 to 10 mm
AL-37	Dara on the corner knife cutting length (rear) is outside the data setting range.			0 to 10 mm
AL-38	Data on the front difference is outside the data setting range.			0 to 20 mm
AL-39	Data on the rear difference is outside the data setting range.			0 to 20 mm

Alarm code	Description	Corrective measure	Time of detection	Remarks
AL-40	Data on the flap forced stop is outside the data setting range.	Press the RESET key, and input the correct data.	When the MACHINE READY key is pressed	0 to 10 mm
AL-41	Error in setting the stacker			
AL-43	Error in setting the gauge size			Set the gauge properly again.
AL-44	RAM error check	Turn OFF the power to the machine, then re-turn it ON again.		It is necessary to check the CPU circuit board. (This type of error will not occur in ordinary sewing works.)
AL-45	Error of the sensors to detect the front end and the rear end of the clamp foot travel	Press the RESET key, then press the MACHINE READY key again.	When the clamp foot travels to its front/rear end.	
AL-49	Needle thread breakage upper detection failure	Check the needle thread breakage detecting sensor, then press the RESET key.	When the MACHINE READY key is pressed.	
AL-50	Error in setting the flap slant sewing mode	Press the RESET key, and input the correct data again.	When the MACHINE READY key is pressed.	
AL-51	In the cycle sewing mode, the opening amount of the corner knife is set to an incorrect value.	In the sewing mode, change the data to perform sewing without using the corner knife.		This error occurs only under the corner knife simultaneous operation mode.
AL-52	In the cycle sewing mode, the slant at the sewing start is set to a wrong direction.			
AL-53	In the cycle sewing mode, the front difference is set an incorrect value.			
AL-54	In the cycle sewing mode, the slant at the sewing end is set to a wrong direction			
AL-55	In the cycle sewing mode, the rear difference is set an incorrect value.			

Alarm code	Description	Corrective measure	Time of detection	Remarks
AL-61	Data on the distance between the corner knife blades (from the fixed side to the moving side) is outside the data setting range.	Set the distance between the corner knife blades to the standard value [gauge size of 8 to 12 mm = 35 mm to 180 mm or less, gauge size of 14 mm or larger = 50 mm to 180 mm or less], and input the value with the relevant keys.	When the MACHINE READY key is pressed.	This error occurs only under the corner knife separate operation mode.
AL-70	Sewing machine motor is defective. Synchronizer TG is defective.	Check the sewing machine motor. Check the synchronizer.	When the power to the machine is turned ON or when starting sewing	Turn OFF the power to the machine.
AL-71	Needle up/down signal of synchronizer	Check the synchronizer.		
AL-72	Reverse rotation of the sewing machine	Reverse the motor power connector and reconnect it.	When starting sewing.	
AL-75	Sewing speed for high speed operation has not been properly specified.	Press the reset key, and input the correct data.	When the machine ready key is pressed or when the sewing machine independent operation is actuated	1000 to 2200 s.p.m.
AL-76	Sewing speed for low speed operation has not been properly specified.		When the machine ready key is pressed.	500 to 1500 s.p.m.
			When the sewing machine independent operation is actuated	500 to 2200 s.p.m.
AL-77	Length of time during which the sewing machine independent intermittent operation is ON state is improperly specified.		When the sewing machine independent operation is actuated	1.00 to 9.99 sec.
AL-78	Length of time during which the sewing machine independent intermittent operation is OFF state is improperly specified.		When the sewing machine independent operation is actuated	1.00 to 9.99 sec.

(4) List of check codes

In the series of operation of the APW-193N, the machine waits for a change in the relevant sensor state and proceeds to the next step of operation. If any of the sensors, does not change its state for a certain period of time, one of the following indications will be given on the panel. So, check the related sensor.

Alarm codes	Description	Corrective measures	Time of detection	Remarks
CH-02	Servomotor positioning signal is not detected.	Check the load applied to the clamp foot travel components. If any load is applied to them, eliminate it. Servomotor [Check the servomotor driver].	When the clamp foot travels. When an alarm is reset.	
CH-11	Binder positioning signal is not detected.	Check the binder sensor.	When the binder actuates.	
CH-12	Needle-up/needle-down signal is not detected.	Check the upper and lower detection of the synchronizer.	When the sewing machine actuates.	
CH-18	Darts stretcher positioning signal is not detected.	Check the darts stretcher sensor.	When the darts stretcher actuates.	

13. ADJUSTMENTS

(1) Binder mechanism

When you depress the pedal switch to the third step, the air cylinder will actuate and binder will be lowered between the left and right clamp feet.

After a welt has been made, the corner knife has completed its cutting operation, the air cylinder raises the binder to its upper position.

1) Position of the binder when lowered

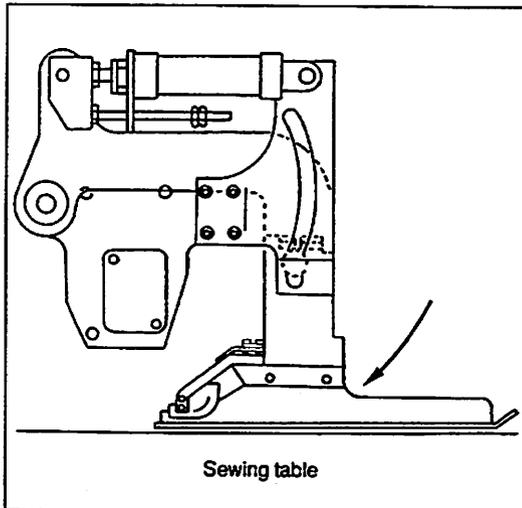


Fig. 29

1. Turn the power switch off and lower the binder pressing it to the direction of the arrow manually.

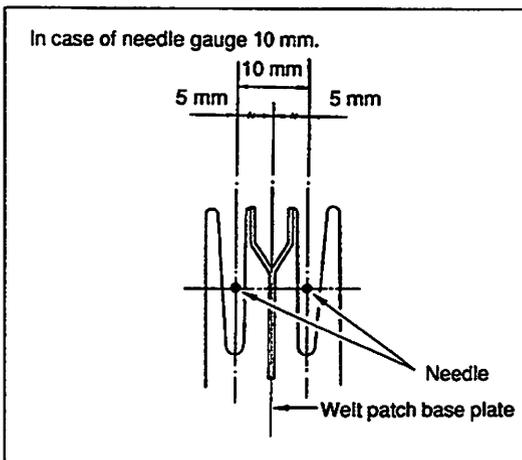


Fig. 30

2. The correct lowest position of the binder is obtained when the binder comes down to reach the position just in the middle of the two needles and that both needles do not come in contact with the welt patch base plate as shown in Fig. 30.

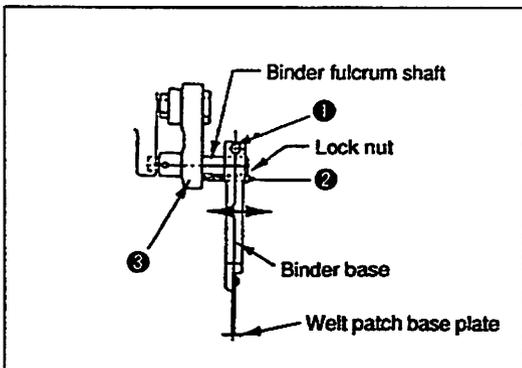


Fig. 31

3. When the binder will not be lowered to its lowest position shown in Fig., loosen setscrew ① and adjust the position of the binder by moving the binder unit to the direction of arrow along with the welt patch scale supporting pin. Fit positioning bolt ② securely on to the side face of the binder lever No. 1 ③ and tighten with the lock nut.

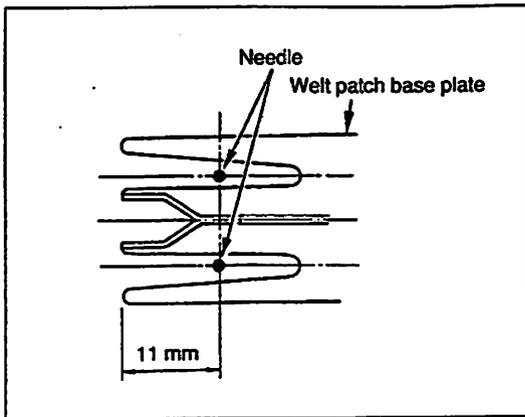


Fig. 32

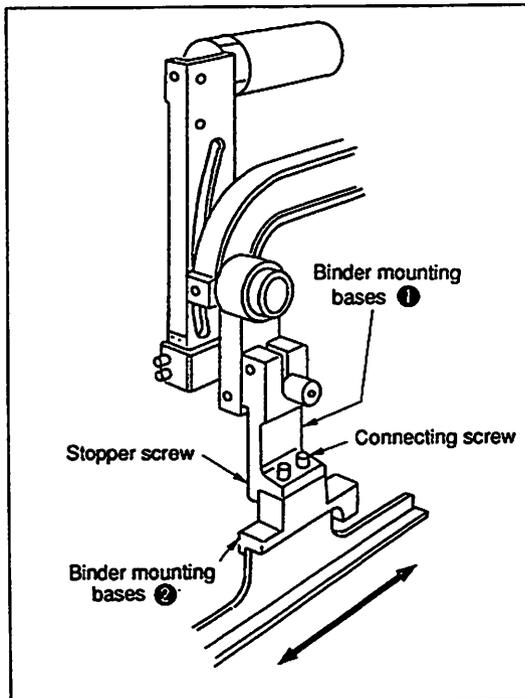


Fig. 33

4. Provide about 11 mm clearance between the needle entry point and the rear end of welt patch base plate.

(Caution) Confirm that the center knife does not come into contact with the knife cover of the binder board.

5. When the dimension shown in Fig. 32 is not obtained, loosen two screws which are used to join binder mounting bases 1 and 2 shown in Fig. 33 and adjust the dimension by moving the binder circuit board in the direction of the arrow.

When the binder circuit board has been moved, tighten the connecting screws while pressing binder mounting base 2 against the stopper screw in binder mounting base 1.

(Caution) Don't forget to set the thread take-up to its upper stop position before you start sewing on trial. Alternatively, you can set the machine with the thread take-up its highest point simply by turning power "OFF" and then "ON".

2) Concentricity between welt patch base plate and center of the needle

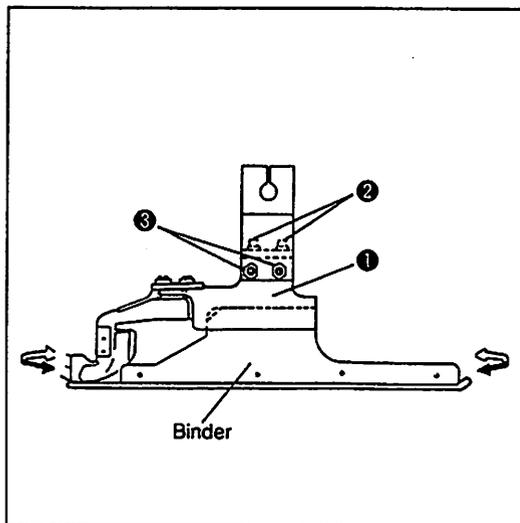


Fig. 34

1. Loosen bolt ② which fix binder mounting base ① in position.
2. Slide base can be swung to each direction of the arrows by tightening/loosening adjusting bolt ③ .
3. Provide proper concentric angles between welt patch base plate and the center of the needle and then tighten locknut of adjusting bolt ③ and securely fix binder mounting base ① with bolt ②.

(Caution) If the concentricity of the binder and the clamp foot with regard to the direction of travel of the clamp foot is not obtained, adjust the position of the binder with regard to the clamp foot following the procedure described above. (Do not loosen the screw in the installation support (fixed on the machine head) for the clamp foot rail.)

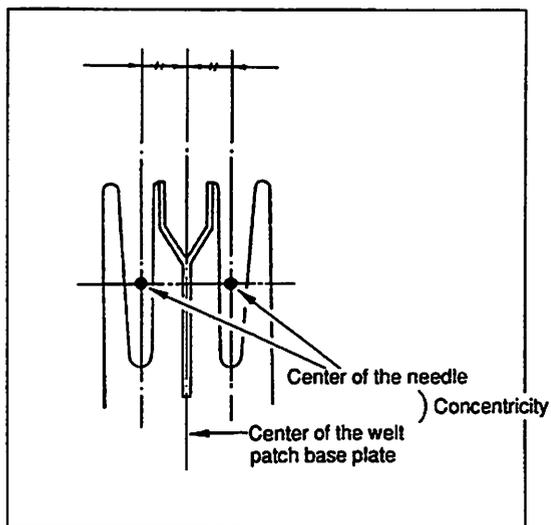


Fig. 35

3) Horizontal of the binder

Check and adjust the horizontal of the binder (the welt patch base plate is attached in parallel to the table surface), as well as the lower position of the binder and concentric angles.

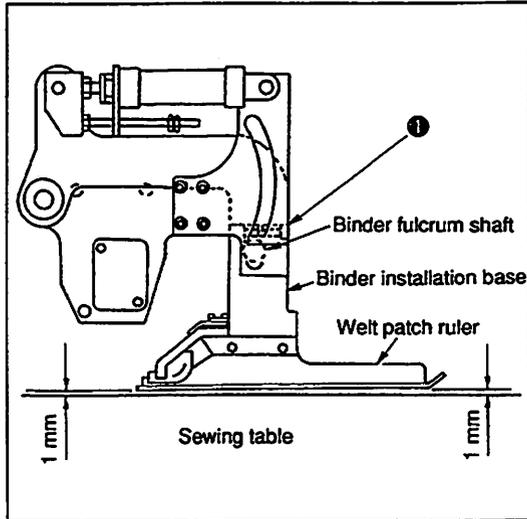


Fig. 36

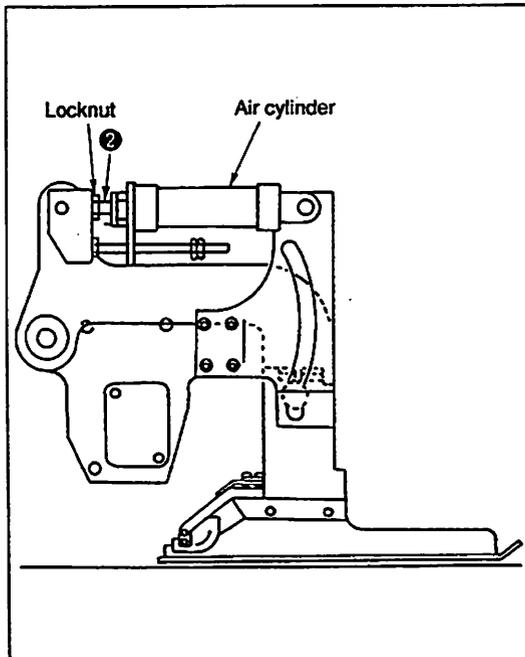


Fig. 37

1. Lower the binder manually in the same way as it is lowered when its lower position is adjusted.
2. Provide about a 1.0 mm clearance between the reverse side of the welt patch base plate and upper surface of the sewing table and make the clearance constant all the way between them (Be sure that the difference between the front and rear end of the welt patch base plate does not exceed 0.2 mm).
3. Adjust the horizontalness of the binder first. Loosen screw ① which fixes the binder installing base. Then sewing the whole unit in the direction of the arrow centering the binder fulcrum shaft until the horizontalness of the binder is obtained. After the adjustment of the horizontalness of the binder, securely tighten screw ① .
4. Adjust so that a clearance of 1 mm is provided between the bottom face of the welt patch base plate and the surface of the sewing table by turning cylinder rod ② as shown in Fig. 37. Loosen the locknut, and turn cylinder rod ② in the direction which tightens it to lower the welt patch base plate, or in the direction which loosens it to raise the welt patch base plate. Adjust the clearance to 1 mm, then firmly tighten the locknut.

4) How to use the binder stopper nut

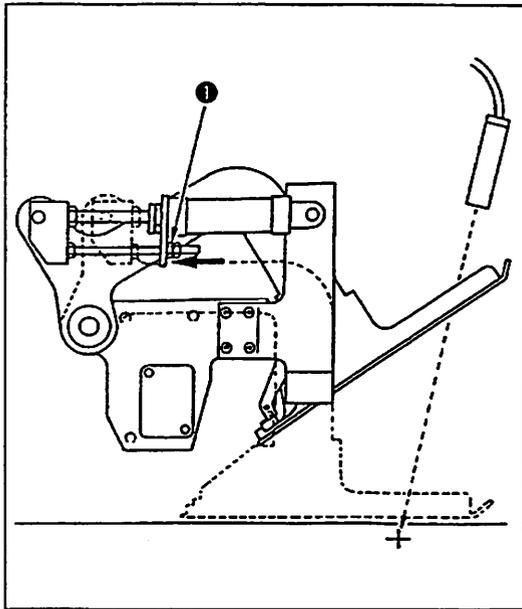


Fig. 38

The machine has been designed to stop the binder at its intermediate position to help enhance productivity.

To use this function, operate the sewing machine with stopper nut ① fixed at the deepest end of stopper as illustrated in Fig. 38.

(Caution) The lifting amount of the binder should be reduced while confirming that there is enough light emitted from the cross marking lamp.

5) Cloth guide finger

The cloth guide finger stabilizes the welt patches while they are being sewn.

(Caution) Be sure to carry out this adjustment when you have changed the needle gauge.

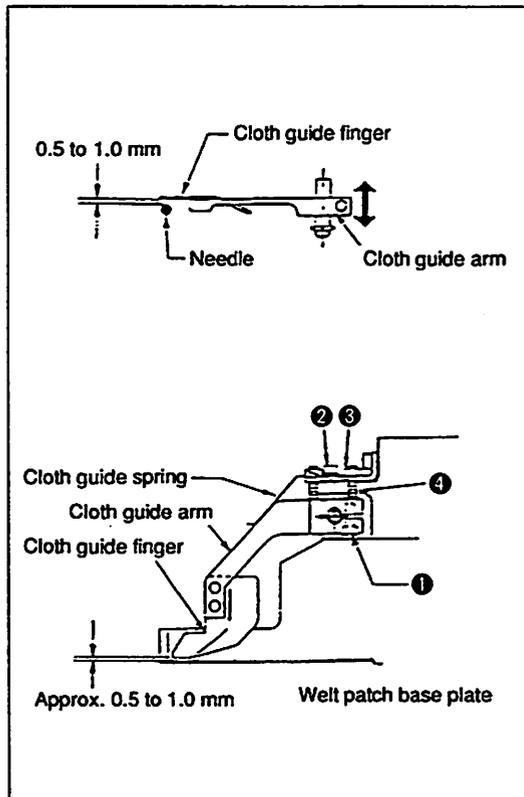


Fig. 39

1. Loosen cloth guide arm setscrew ① and move the cloth guide finger close to the needle so that approx. 0.5 to 1.0 mm clearance is provided between the side faces of the needle and the cloth guide finger.

2. Adjust the cloth guide spring so that it lightly presses the cloth guide arm. Be careful not to give an excessive pressure on the workpiece while being fed.

The pressing pressure of the cloth guide spring can be adjusted by screw ②.

3. Provide approx. 0.5 to 1.0 mm (thickness of a welt patch) between the cloth guide finger and welt patch base plate. When adjusted, loosen locknut ③ and provide a proper clearance with screw ④. After adjusted, securely tighten locknut ③.

(2) Adjusting clamp foot traveling mechanism

1) Tension of the clamp foot traveling belt

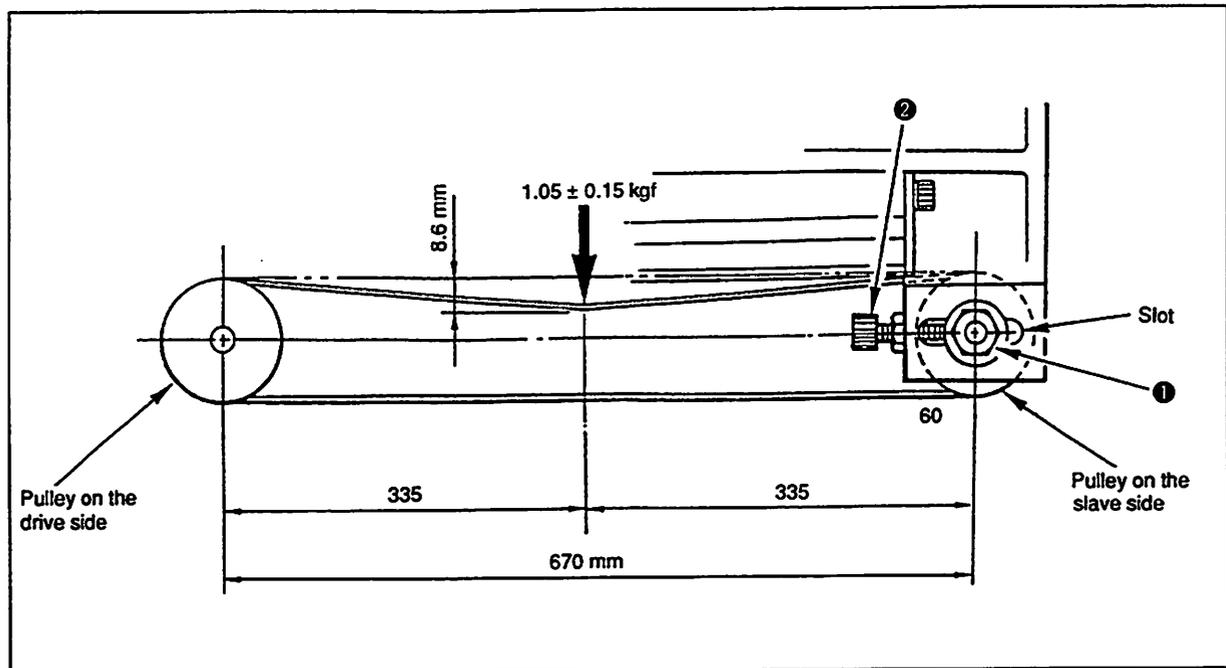


Fig. 40

The tension of the clamp foot traveling belt can be adjusted by loosening locknut ❶ and shifting the slave side pulley inside the slot in the base. (The pulley can be shifted by moving adjustment screw ❷ back and forth.) The tension on the belt should be adjusted so that the middle of the belt slackens by 8.6 mm when a pressure of 1.05 ± 0.15 kgf is applied.

After making the adjustment, tighten up locknut ❶ .

2) Tension of the clamp foot driving belt

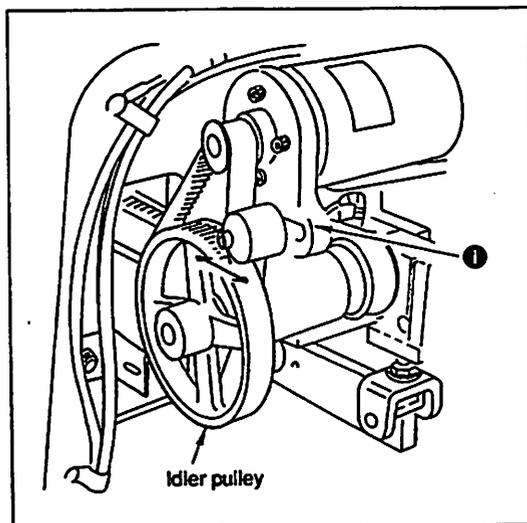


Fig. 41

Loosen setscrew ❶ , and the tension of the clamp foot driving belt can be adjusted by the idler pulley. If the belt tension is proper, when 0.4 to 0.5 kgf pressure is applied on the belt at the middle of the pulleys, the belt will bend down approx. 1.5 mm.

After adjusted, be sure to tighten setscrew ❶ securely.

3) Clamp foot front end stop position and rear end stop position

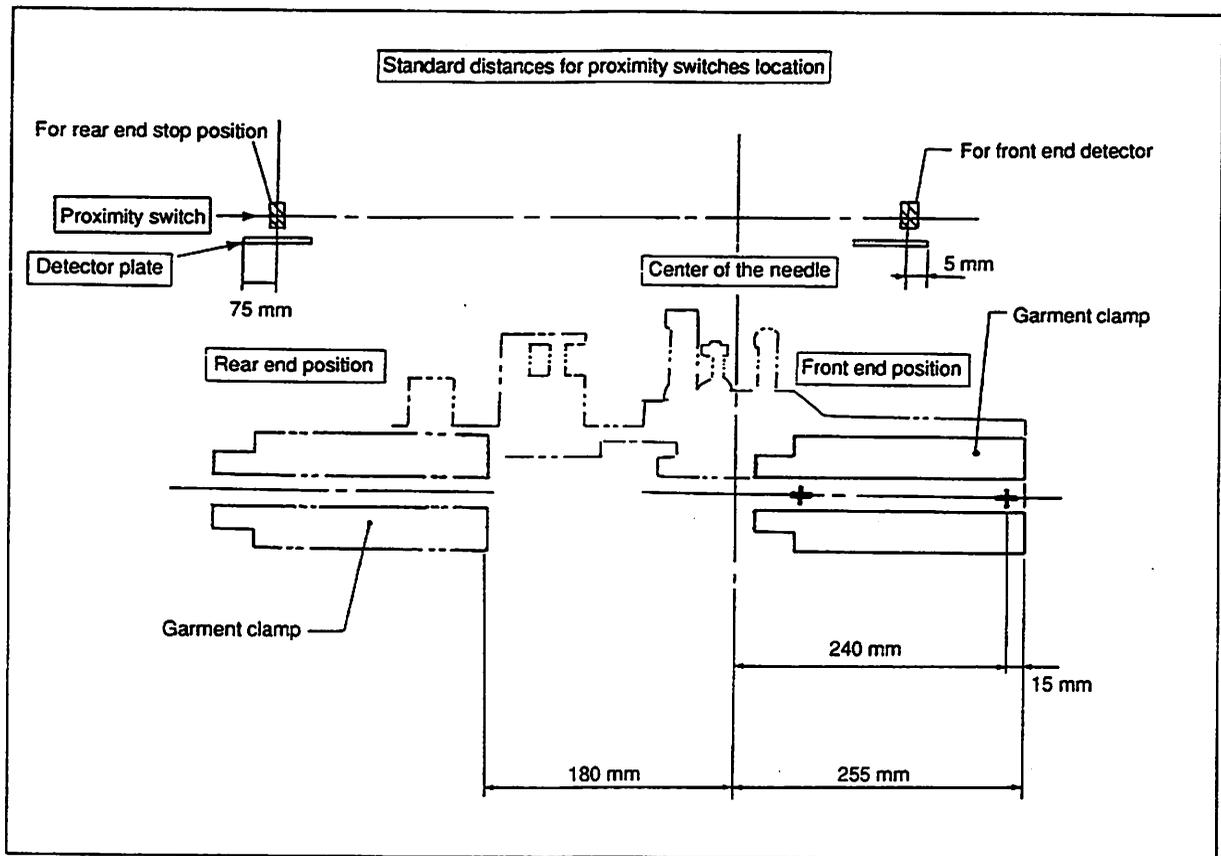


Fig. 42

Clamp foot front end stop position and rear end stop position are to be determined by the position of the proximity switches. Determine the stop position of the clamp foot as shown in Fig.42 referring to the standard distance for proximity switches.

- Clamp foot front end is where tip of the garment clamp is 255 mm away from the center of the needle.
- Clamp foot rear end is where tip of the garment clamp is 180 mm away from the center of the needle.

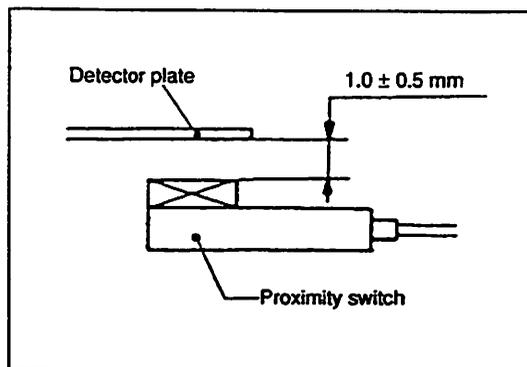


Fig. 43

Provide the clearance of 1.0 ± 0.5 mm between the proximity switch and the detector plate.

(3) Clamp foot, welting patch folding plate and flap presser mechanism

1) Parallelism of the clamp feet

The left and right clamp feet must travel in parallel with needles and the welt patch base plate while switches are made. The parallelism of the clamp foot has already been adjusted in factory before shipment.

If readjustment is necessary for operation; adjust referring to “(1) Binder mechanism 2) Concentricity between welt patch base plate and center of the needle.”

2) Adjusting the lateral position of the garment clamp

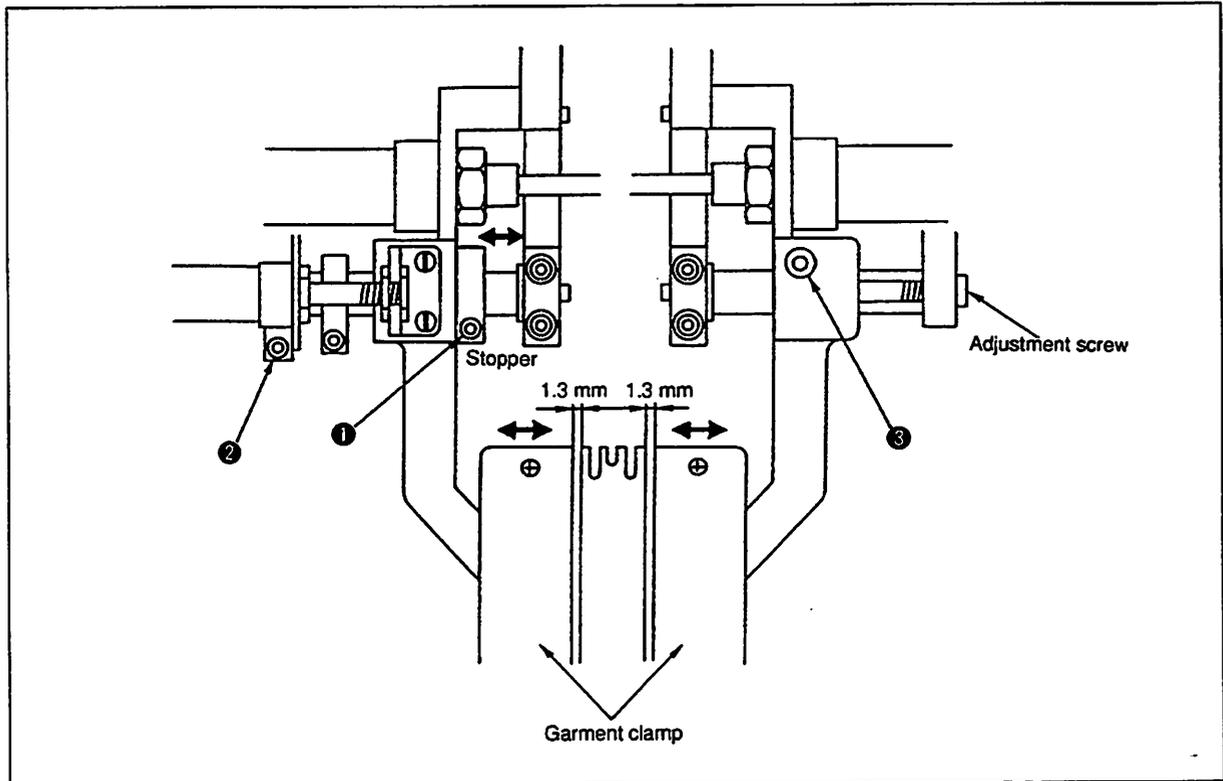


Fig. 44

Adjust the position of the garment clamp depending on the sizes of the respective rulers. Move the garment clamp taking the below-stated steps of procedure so that a 1.3 mm clearance is provided between each garment clamp.

① Adjusting the position of the garment clamp (left)

The position of the garment clamp (left) is determined by the stopper. To adjust the position of the garment clamp, loosen screw ①, and move the stopper to the right or left. (Let air out of the cylinder to set it free, then perform the adjustment.)

Be sure to take care not to excessively shorten the stroke of the cylinder when moving the stopper. Note that the position of the garment clamp (left) is considerably changed when replacing the gauge or other occasions, re-adjust the fixing position of the cylinder. (Loosen screw ②, and the position of the cylinder can be changed.)

Adjust the clearance between the garment clamp and the welt patch base plate in the aforementioned way when changing the double welt sewing mode over to the single welt sewing mode.

② **Adjusting the position of the garment clamp (right)**

Adjust the garment clamp (right) by turning the adjustment screw.

Loosen screw ③ and turn the adjustment screw using a hexagon wrench key.

(Turning the adjustment screw clockwise will move the garment clamp outward. Turning it counterclockwise will move the garment clamp inward.)

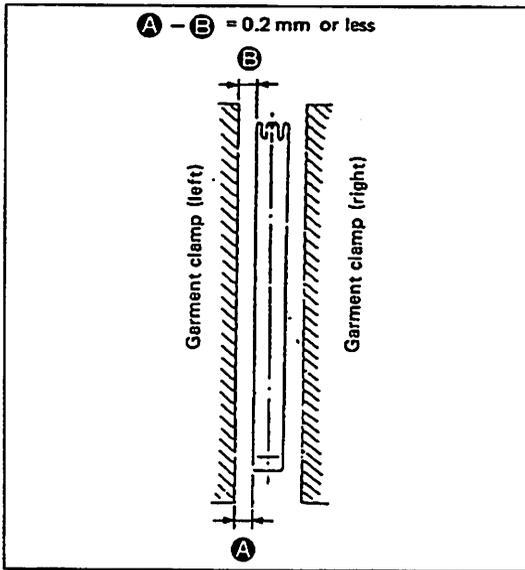


Fig. 45

The clearance shown in Fig. 45 must be kept in parallel to the welt patch base plate. Make sure that the difference between the front and rear ends of each garment clamp must not exceed 0.2 mm.

If not, loosen screws ②, and move the garment clamp in the direction of the arrow using the welt patch base plate as reference until the garment clamp (right) is in parallel to the welt patch base plate.

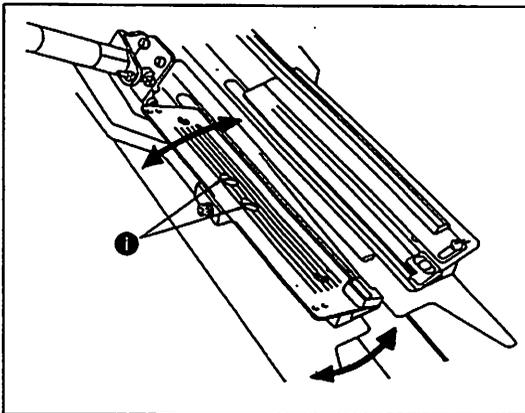


Fig. 46

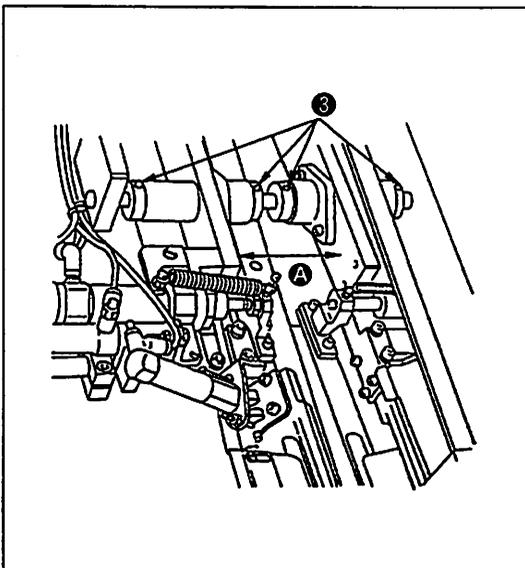


Fig. 47

When replacing the gauge, adjust the inside distance between the clamp foot arms (right) (left) as shown in the table below. Loosen screw ③, and adjust the clearance between the clamp foot arms by separating them uniformly.

Gauge size G (mm)	Inside distance between the clamp foot arms A (mm)
8	83
10	85
12	87
14	89
16	91
18	93
20	95

(Caution) Tighten screws ③ while pressing the collar against the clamp foot arm so as to prevent loose fitting of the clamp foot arm.

3) Garment clamp lift

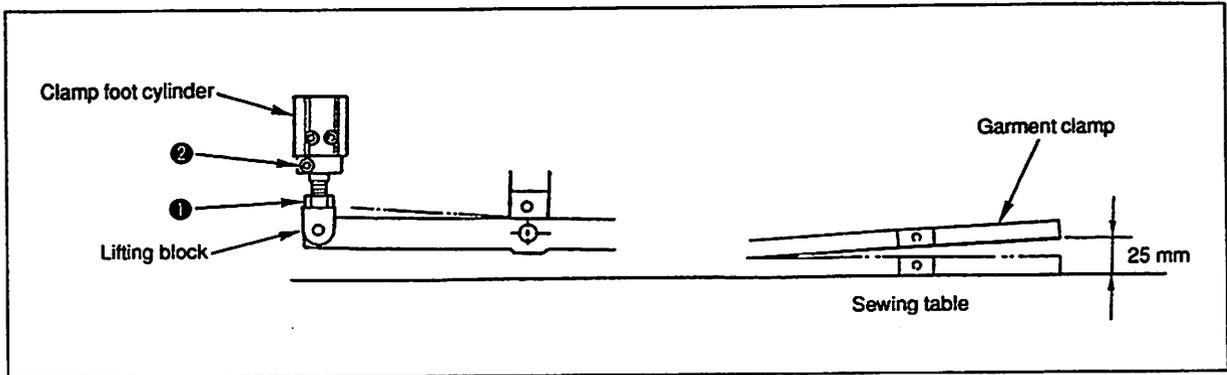


Fig. 48

The garment clamp always goes up at the time of emergency.

The standard lifting amount of the garment clamp at the time of emergency is obtained by providing a 25 mm distance between the surface of the sewing table and top end of the garment clamp. If it is necessary to adjust the lifting amount of the garment clamp, loosen locknut ① located at the top end of the clamp foot cylinder rod and screw ② in the guide, and change the screwing depth of the locknut ① in the lifting block to adjust the lifting amount of the garment clamp as desired.

After adjustment, be sure to tighten locknut ① and screw ② securely.

(Note) When adjusting the lift, make sure that the garment clamp does not contact the sewing machine.

4) Adjusting the welt patch folding plate and the flap presser

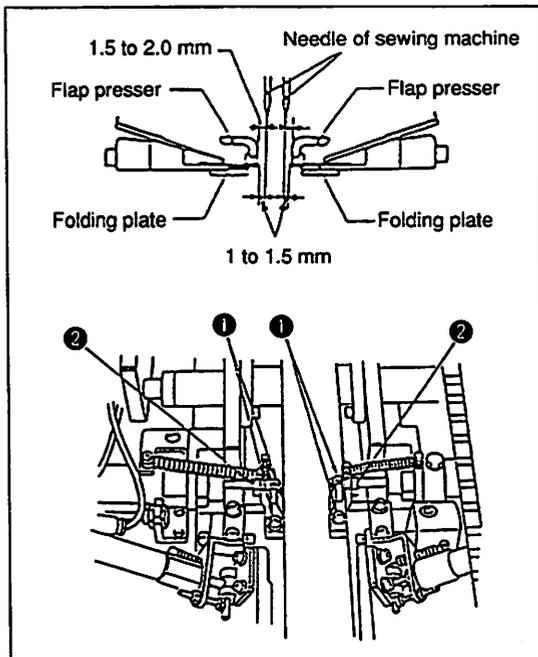
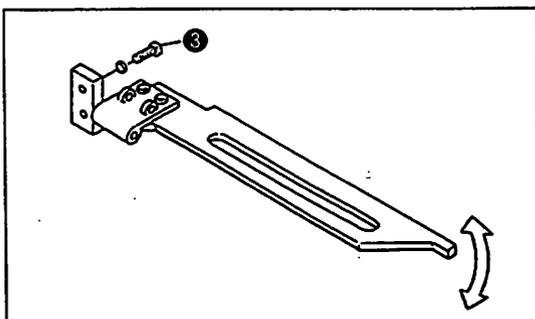


Fig. 49

Adjust so that a clearance of approximately 1 to 1.5 mm is provided between the folding plate and the needle of the sewing machine as shown in Fig. 62 and so that they are in parallel to each other when the welt patch folding cylinder is in the forward travel end.

To adjust the parallelism between the folding plate and the needle, loosen folding plate fixing screw ① and perform the adjustment. To adjust the front/rear of the welt patch folding plate, loosen locknut ② located at the top of the cylinder rod and turn the cylinder rod appropriately.

After the adjustment, securely tighten locknut ②.



Loosen two screws ③ and properly adjust the pressure at the front and rear of the flap presser.

5) Adjusting the flap scale and the flap presser

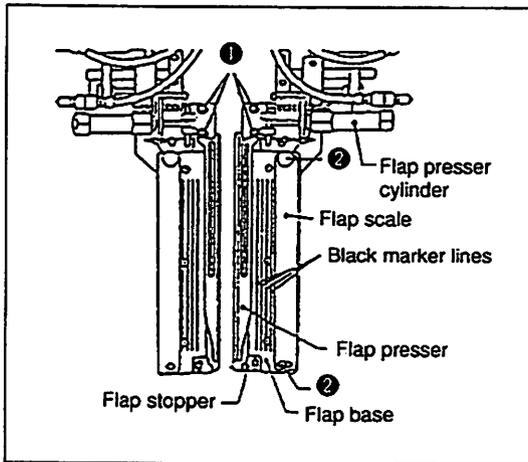


Fig. 51

Loosen screw ② in the flap scale and adjust the flap scale depending on the flap width. Note that the black marker lines engraved on the flap base are used as reference to check the parallelism of the flap scale. Adjust the flap presser, using screws ①, so that it is spaced approximately 1.5 to 2.0 mm from the center of the needle of the sewing machine.

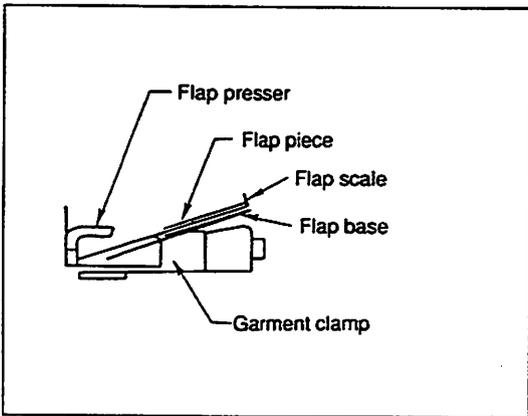


Fig. 52

Confirm that the flap presser securely presses the flap piece in position.

6) Adjusting the flap stopper

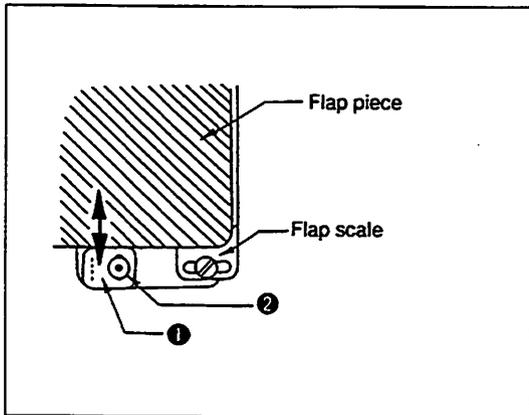


Fig. 53

Loosen screw ② and adjust flap stopper ① installed at the top of the flap base so that the end of the flap is aligned with the sewing end position.

(4) Adjusting the corner knife

1) Changing the pocket lip length

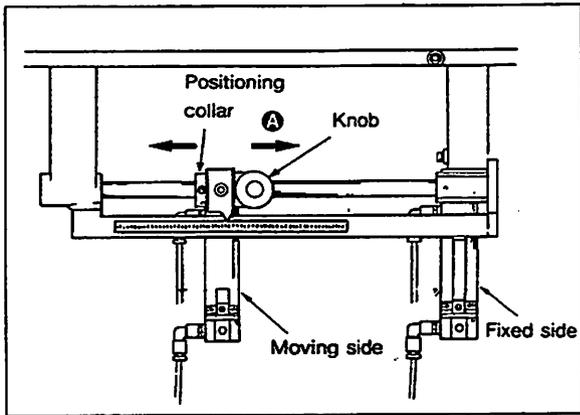


Fig. 54

① When the corner knife simultaneous operation designated mode is specified

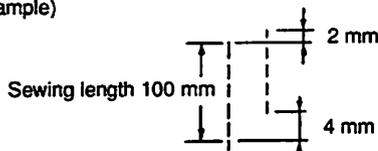
When the pocket lip length is not frequently changed, the corner knife on the fixed side and that on the moving side can be simultaneously actuated for the sake of productivity. In this case, the position of the corner knife should be adjusted whenever changing the sewing length. The knife mounting base is moved by turning the knob illustrated in the figure counterclockwise. So, adjust the position of the corner knife properly using the divisions on the scale plate as reference.

- (Caution)
1. Be sure to closely press the positioning collar against the corner knife mounting base and fix the collar to the base. (The collar should be fixed in place with the two screws loosened.)
 2. Adjust the blade of the corner knife by moving the corner knife in the moving side toward the corner knife on the fixed side. (After the adjustment, return the corner knife on the driving side to the positioning collar, and fix the knife at that position.)
 3. In the sewing mode under which front/rear difference is specified, it is necessary to move the corner knife on the moving side in the direction of arrow A in accordance with the two different cases shown below.

a) For the slant sewing

Loosen the knob, and move the corner knife on the moving side in the direction of arrow A by the amount of front difference or rear difference whichever larger.

(Example)

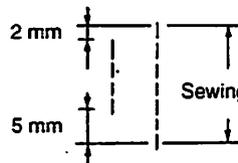


In this case, set the corner knife to the scale of "100 - 4 = 96 mm."

b) For the trapezoidal sewing

Loosen the knob, and move the corner knife on the moving side in the direction of arrow A by the total amount of the front and rear differences.

(Example)



In this case, set the corner knife to the scale of "100 - (2 + 5) = 93 mm."

② When the corner knife separate operation designated mode is specified

It is necessary to fix the corner knife at the position corresponding to the data on distance input. Move the corner knife along with the divisions on the scale plate until the position showing the figure same as the input data is reached. Then fix the corner knife at that position by tightening the knob.

- For standard adjustment, the distance between the knife on the moving side and the knife on the fixed side should be set to 80 mm.
- * Under this mode, the knife on the moving side actuates independently from the knife on the fixed side. Consequently, it is not necessary to adjust the position of the corner knife in accordance with the pocket lip length. Furthermore, it is not necessary to move the knife in accordance with the difference as described in "Caution) 3" of 1 described above. Note that, however, the machine uses only one kind of the corner knife, which means that the corner knife blade should be adjusted, or the corner knife unit (optional) should be replaced in the case of slant sewing or trapezoidal sewing.

(Caution) If the position where the corner knife cuts the material fluctuates due to the material slippage during sewing, use the shim type corner knife.

2) Positional relationship of the corner knife, + marking lamp, needle and garment clamp

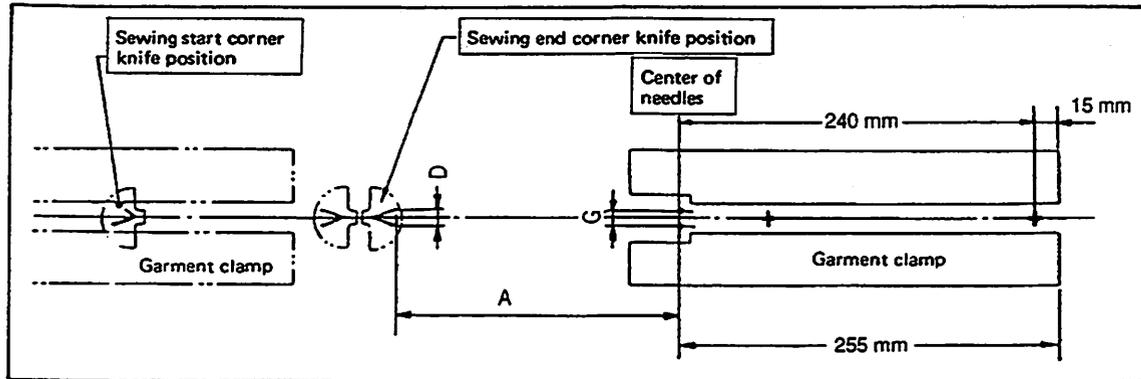


Fig. 55

G	Gauge width	8	10	12	14	16	18	20	
A	Dimensions of assembly	134.5	135	133.5	131.5	130	128	126.5	
	D	7	9	11	13	15	17	19	
	Min. sewing length when L-size has been input	Under the corner knife simultaneous operation setting mode 35 to 180			Under the corner knife simultaneous operation setting mode 50 to 180				
		Under the corner knife separate operation setting mode 35 to 180			Under the corner knife separate operation setting mode 35 to 180				

3) Adjusting the height of the corner knife

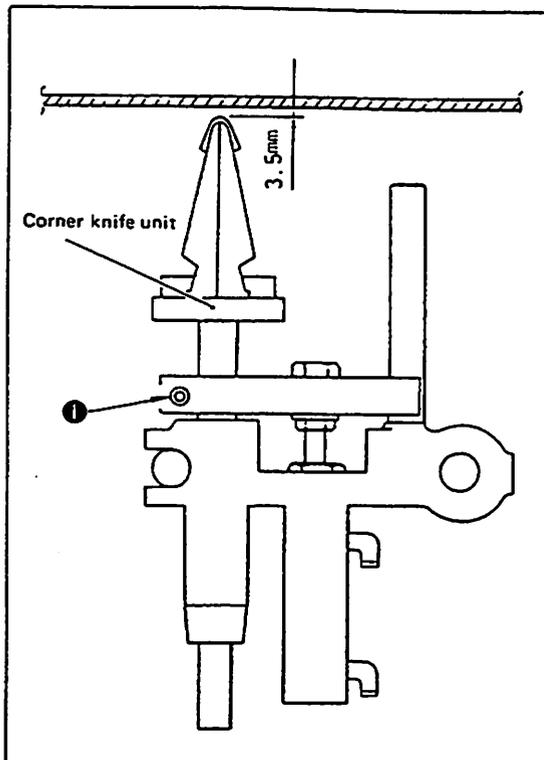


Fig. 56

When the corner knife elevating cylinder reaches its lowest position, there must be a clearance of approx. 3.5 mm between the top ends of both moving side corner knife and fixed side corner knife and the top face of the table as illustrated in the figure on the left. Loosen screw ①, and adjust the height of the corner knife by moving the entire unit of the corner knife up or down.

4) Center of the corner knife

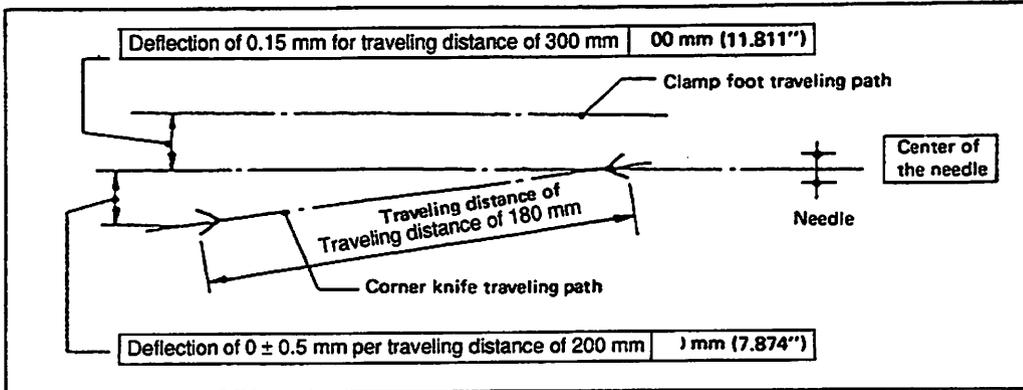


Fig. 57

The center of the corner knife should be aligned with the center of the needle when the corner knife moves.

Although the alignment is correctly adjusted at the time of delivery, in the event that the corner knife bracket is moved due to an external impact, loosen the bolt fixing the corner knife frame in place, and shake the whole corner knife bracket so that the clearance between the moving corner knife and the center of the needle is 0.5 mm or less when the moving knife is moved by approximately 200 mm.

Before adjusting the clearance by moving the corner knife bracket, be sure to loosen screw in the fixed bracket supporting the opposite side of the shaft.

5) Adjusting the deflection and distortion of the corner knife

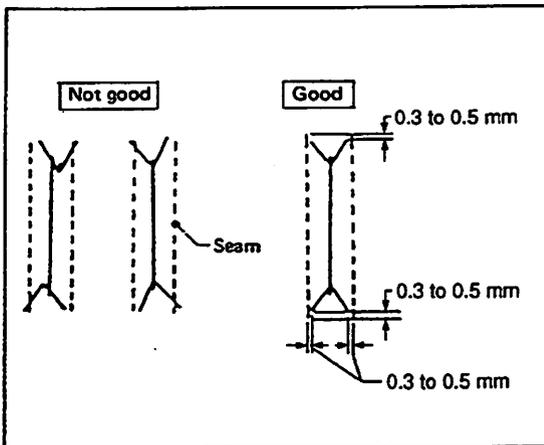


Fig. 58

If the corner knife is attached with deflected to right or left, or distorted, defective state of the cut part may result as illustrated in the figure on the left. The corner knife should cut the center of the seams and should not cut the stitches. Once the corner knife has been correctly centered in terms of the seams, finely adjust the corner knife when attaching a corner knife blade.

6) Adjusting the knife

When replacing or adjusting the corner knife, firstly move the clamp foot to its backward travel end using the CLAMP FOOT TRAVEL key on the operation panel, secondly remove the sewing table and operate the corner knife elevating solenoid valve by hand to allow the corner knife to go up. Then, take the below-stated steps of procedure.

After the adjustment, carry out thoroughgoing tests to confirm no faulty cut product is finished. Then, start the sewing work.

① Adjusting the corner knife for parallel sewing

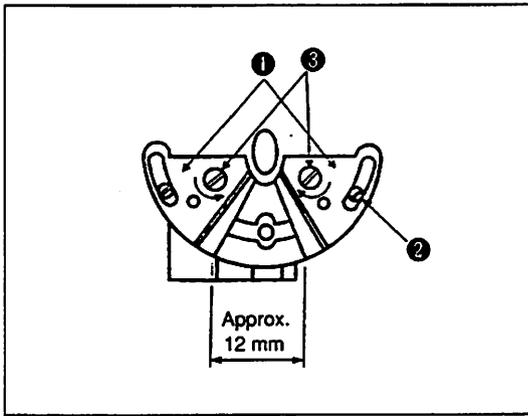


Fig. 59

The following description explains the adjusting method for the corner knife for parallel sewing which is the standard type of sewing.

- 1) Adjust the opening amount of the corner knife holders ① in the figures on the left to 12 mm and temporarily tighten screw ②.

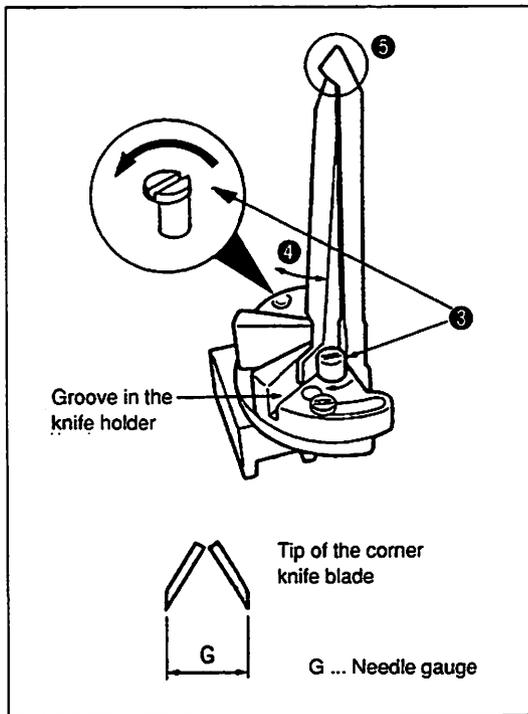


Fig. 60

- 2) Fit the corner knife in the groove in the corner knife holder. Position the corner knife so that the distance almost same as the needle gauge is provided between the blades. Then fix the knife there by turning eccentric pin ③ in the direction of the arrow. This temporarily fixes the corner knife. Then perform a trial stitching using the material to be sewn in the actual sewing, and re-adjust the installing position of the corner knife so that the notch matching the seam is obtained.

② Fine adjustment of the corner knife in terms of seams

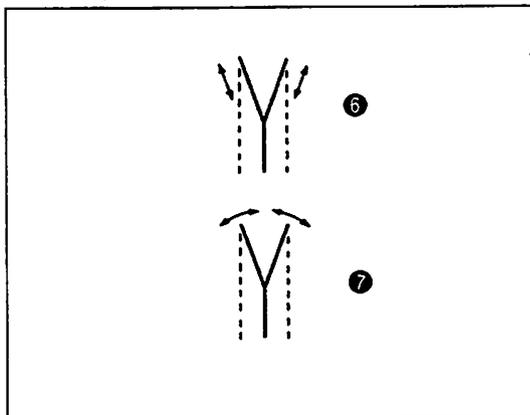


Fig. 61

- 1) Loosen eccentric pin ③ shown in the figure given at the top of this page, and adjust the cutting length ⑥ shown in the figure by moving the corner knife in the direction of arrow ④.
- (Caution) When moving the corner knife, top end ⑤ of the knife should be covered.**
- 2) Loosen screws ② shown in the figure at the top of this page, and adjust the angle of notch ⑦ shown in the figure by changing the opening amount of the corner knife holders.

③ Adjusting the corner knife for slant sewing

When using the corner knife in the slant sewing with a difference, adjust the corner knife following the instructions described below, based on the temporarily fixed position of the corner knife for parallel sewing as explained on the previous page.

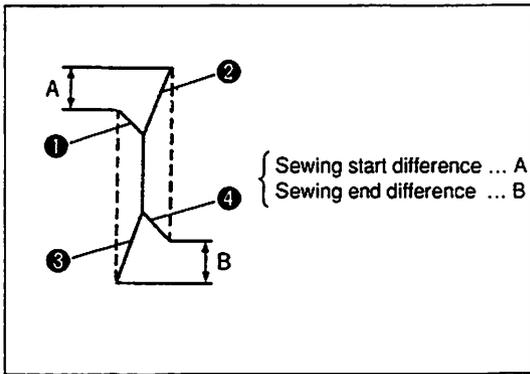


Fig. 62

As an example, the adjusting procedure of corner knife adapting to the following sewing pattern is described.

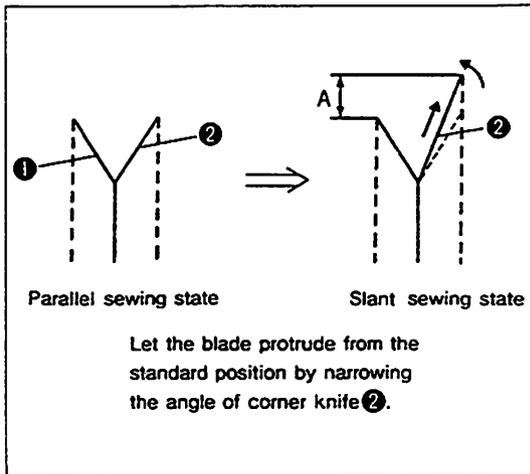


Fig. 63

- 1) To adjust the corner knife to sewing start difference A, corner knife blade ① on the left-hand side should be kept at the standard position as illustrated in the sketch on the left, and corner knife blade ② should be moved to extend the cutting length in accordance with the difference as illustrated in the sketch on the right.
(Follow the procedure same as that described on the previous page.)

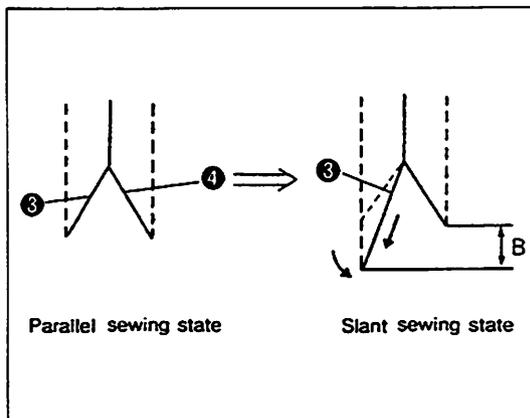


Fig. 64

- 2) The corner knife is adjusted to rear difference B in the similar manner. Only corner knife blade ③ should be moved to extend the cutting length in accordance with the sewing end difference.
After the completion of the adjustment, finely adjust knife blades ① . ② . ③ and ④ in accordance with the seam in the procedure same as that described on the previous page. The corner knife can be adjusted by extending the cutting length of the longer seam regardless of the kinds of slant sewing.

7) Replacing the corner knife unit (optional)

After adjusting the corner knife in accordance with the respective differences following the instructions described on the previous page, the entire unit of the corner knife can be replaced.

① Removing the corner knife unit

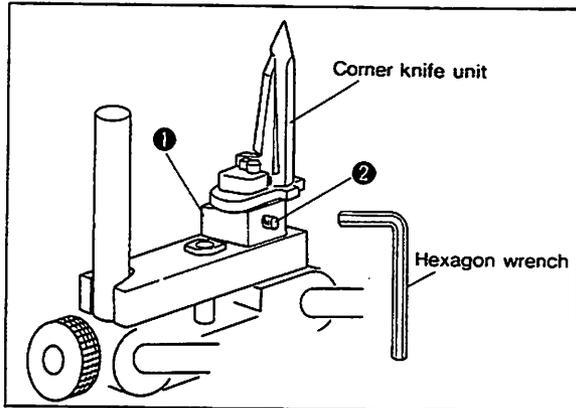


Fig. 65

- 1) First, fully loosen screw ② in mounting base ① of the corner knife unit with a hexagon wrench key supplied with the unit.

Part No. of the corner knife unit

Fixed side ... 18303453

Moving side .. 18303552

(Note that the knife is excluded.)

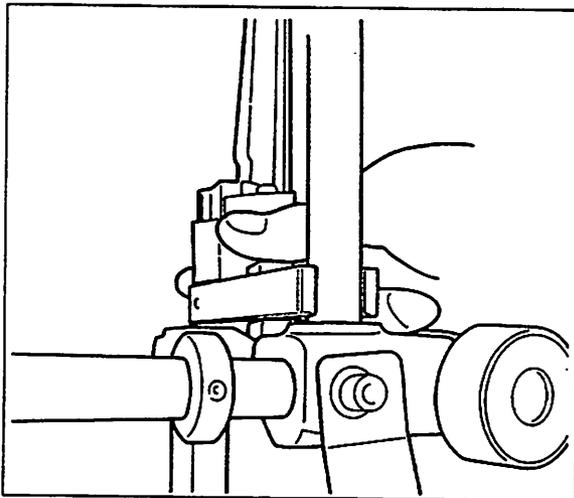


Fig. 66

- 2) Then, securely holding the mounting base, raise the unit straight until it comes off.

(Caution) Be sure to keep your hands away from the corner knife blades when removing the corner knife unit.

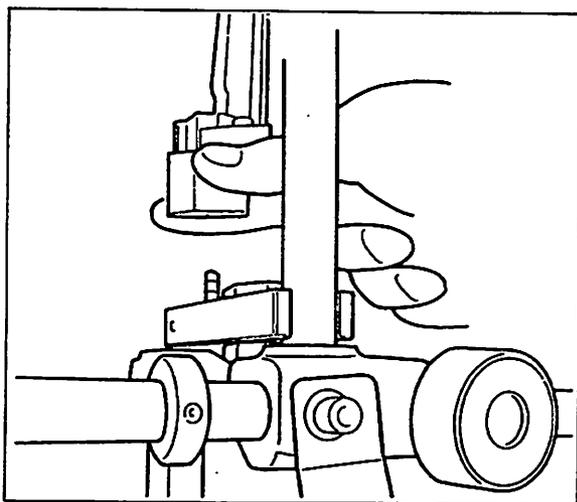


Fig. 67

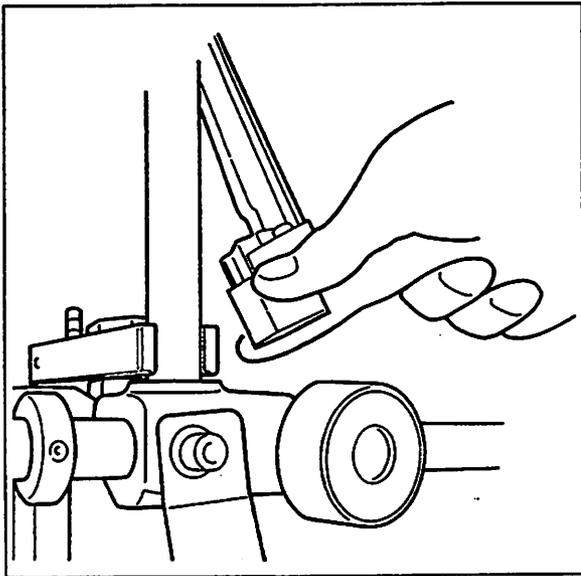


Fig. 68

② Installing the corner knife unit

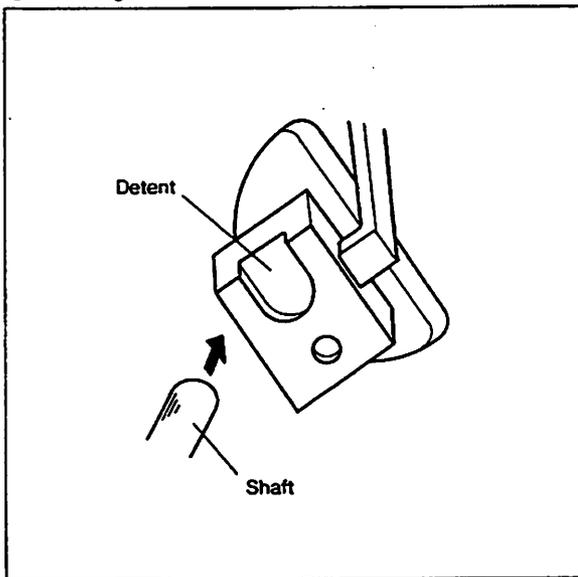


Fig. 69

As same as in the case of removing the unit, securely holding the mounting base, insert the unit straight down into the predetermined position.

(Caution) At this time, take care of the direction of the unit so that the shaft fits in the detent (in the figure on the left).

After fitting the unit in place, securely tighten the screw with a hexagon wrench key.

14. MAINTENANCE AND INSPECTION

Inspect your machine periodically and maintain it in the following ways in order to maintain the machine in good conditions at all times.

If not, mechanical failures may result. So be sure to inspect and perform maintenance work periodically.

(1) Pneumatic systems

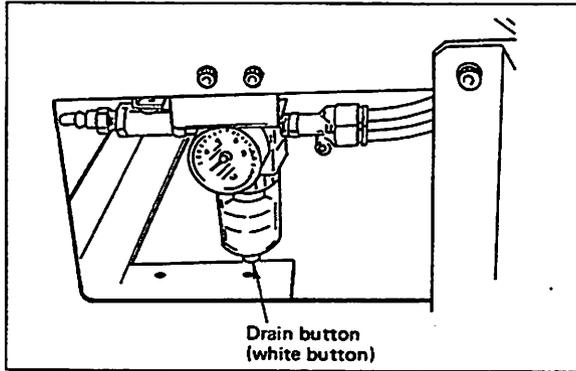


Fig. 70

Press the drain button (white button) on the bottom of the air filter, and water gathered in it will come out.

(2) Sewing machine head

- Clean up the sewing components including the clamp foot every day before the operation. Remove dust and wastes from the oil reservoir at least once every week.
- Before you start welting, check if the center and corner knives sharply cut the material. Replace the dull knife even if it is still serviceable.
- Inspect the oil level in the oil reservoir regularly once every month.

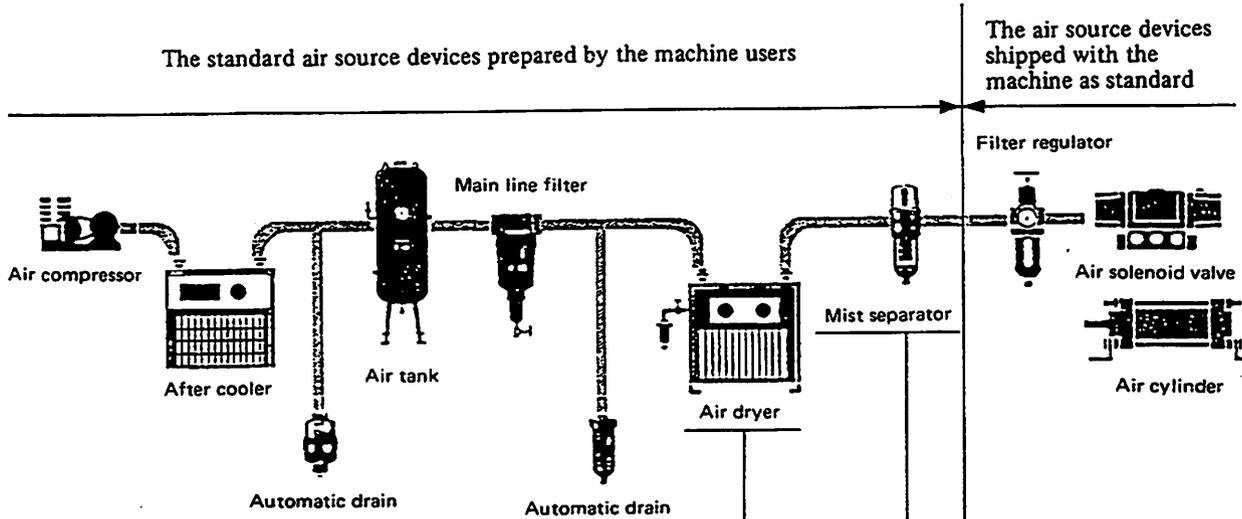
(3) Maintenance and inspection of the electrical systems

- Connectors are subject to loosen due to the mechanical vibration transmitted from the machine head. So be sure to check the connectors for tight connection once month. If dust has gathered on the surface of the control box, clean it up to remove dust.
- Attach and detach the printed circuit board after turning OFF the power switch.
- Do not touch the connection of the printed circuit board.

(4) Precautions for the compressed air supplying (the air supply source) devices

90% of the troubles of the pneumatic equipments are caused by "the polluted air". The compressed air polluted by various kinds of the impurities as water, dust, inferior oil, or carbon particles. Therefore using this "polluted air" might cause various troubles and result in a disorder of your machine. It will reduce the working ratio and then reduce productivity.

When you install pneumatic equipments to your factory, be sure to apply standard air source supplying devices for them as follows;



- The quality of the air source

When the watery air is supplied

- The environment of the machine

When you install the machine in the place where the temperature is not constant within a day, or the temperature often drops to freezing cold.
Be sure to install the air dryer.

When the compressed air is polluted by a large amount of carbon particles or dust.
 (Most of the troubles of the air solenoid valve are caused by carbon.)
Be sure to install the mist separator.

-----{ Precaution: Main piping work }-----

- Be sure to provide a 1 cm descending inclination for every 1 m of the air pipe to the direction of the air flow.
- When the main pipe is divided into some branch pipes, equip a tee for the outlet of the compressed air from the main pipe so that the water in the main pipe does not come out with the air to the branch pipes.
- Install the automatic drain devices to all the lower parts or dead end of the pipe to prevent water gathering.

15. SEWING MACHINE HEAD

Maintain and adjust the sewing machine head in the following order;

(1) Removing the oil pan

Remove the oil pan before replacing the gauges or carrying out maintenance work on the machine bed.

Remove the oil pan following the procedure described below.

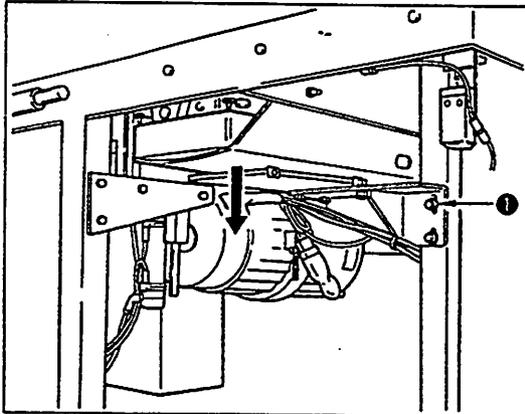


Fig. 71

Loosen screw ① fixing the metal fittings of the oil pan receptacle to the machine frame and remove the metal fittings together with the oil pan in the direction of the arrow.

- (Caution)
1. Remove the oil pan taking care not to allow the oil in the oil pan to spill.
 2. Install the oil pan after raising it until both ends of the oil pan fits inside the frame as illustrated in Fig. 72.

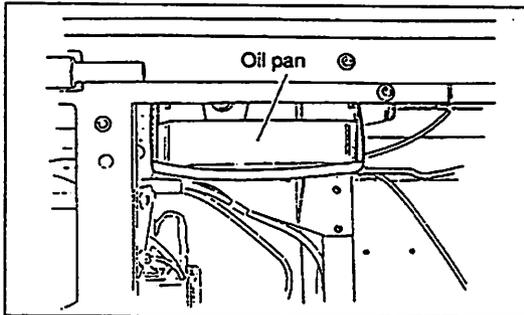


Fig. 72

(2) Lubrication and the timing belt

1) Lubrication of the oil reservoir inside the face plate

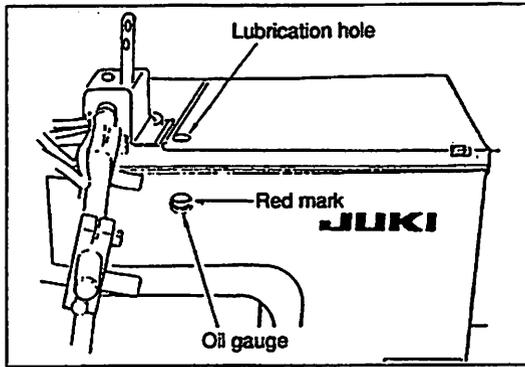


Fig. 73

Pour the lubricating oil in the reservoir through the oil hole up to the red mark of the oil gauge. Use the industrial machine oil (JUKI New Defrix Oil No.2)

(Caution) When you operate the machine which is newly set up or has not been used for a long period of time, apply a few drops of oil through the oil hole.

2) Lubrication of the hooks

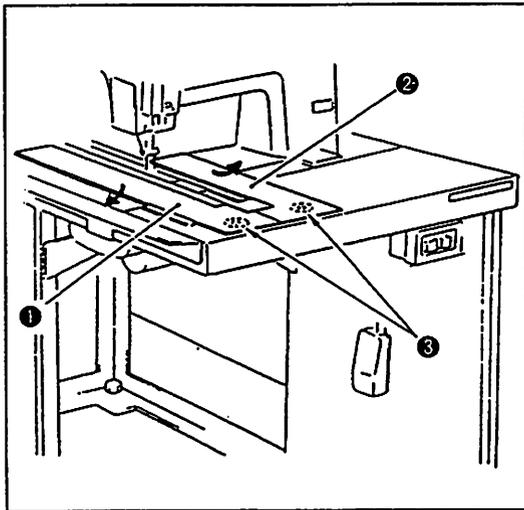


Fig. 74

1. Set the AUTO STEPS selector switch on the operation panel to "cloth feeding" operation.
2. Depress the clamp foot travel key and travel the clamp foot to its rear end position.
3. Insert your finger into openings ③ in the bottom of the sewing table ①, ② and push up the sewing tables. Then open each sewing table in each direction of the arrows and remove them.

(Caution) Only the oil reservoir and the hooks need to be lubricated. The oil pan does not need to be lubricated.

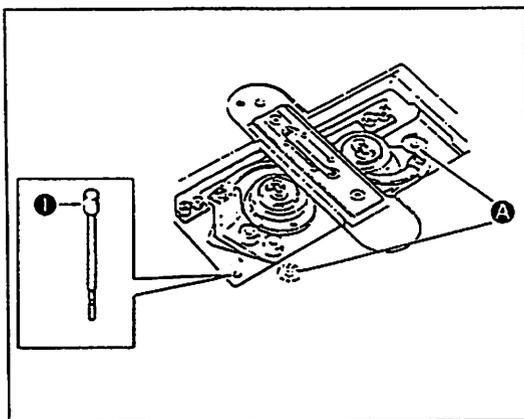


Fig. 75

Supply the lubricating oil through lubrication holes ① with the oil feeder as shown in Fig. 75.

* Confirm the amount of oil in the hook by checking hook oil gauge ①.

(Caution) If the oil is too low to be seen on the oil gauge, stop operating the sewing machine, and supply the machine with an appropriate amount of oil.

3) Adjusting the amount of oil in the hooks

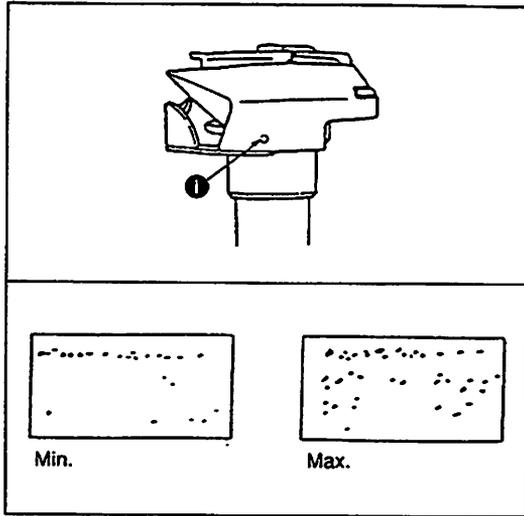


Fig. 76

The hooks are automatically lubricated. Adjust the amount of oil lubricated by screw ❶ located outside of the hooks. Turning the screw to the clockwise will reduce and to the counterclockwise will increase the amount of oil. Hold a piece of paper about 1 cm away from the hook and operate the machine for about 10 seconds, and the splash of oil will gather on the paper as shown in Fig. 78 if the adequate amount of oil is lubricated to the hooks.

(3) Needles

Use DP×17 needle for the APW-193N sewing machine. Choose a suitable size of the needles for the thickness of the threads or the types of material to be sewn.

1) How to attach the needles

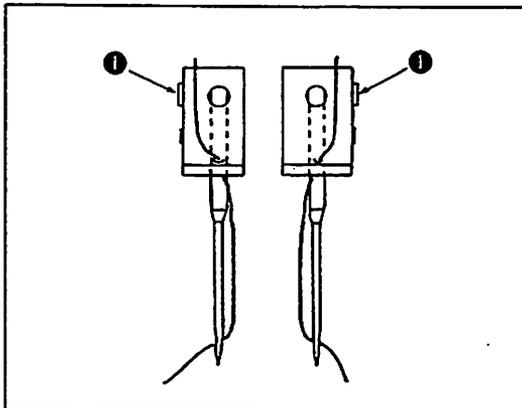


Fig. 77

Insert the left and right needles as far as they will go pointing their long grooves at each other and tighten screw ❶.

(4) Threading the machine head and winding a bobbin

1) Type of threads

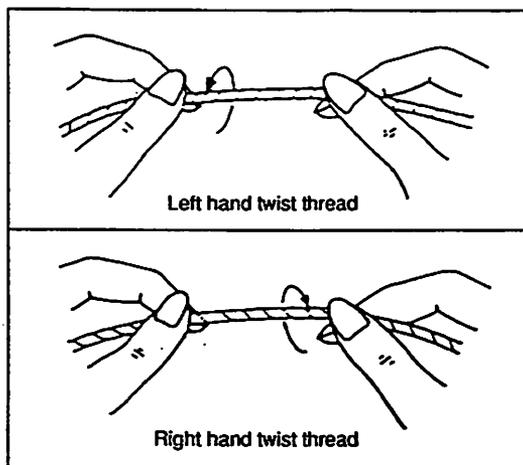


Fig. 78

Use a new thread of even thickness. If not, it may fail to make fine stitches or may be broken while being stitched. Use the right hand twist thread (Z twist) for the needle but either twist will do for the bobbin.

2) Threading the machine head

Thread the machine head in the order illustrated in Fig. 79.

The left needle thread viewed from the operator's side → A

The right needle thread viewed from the operator's side → B

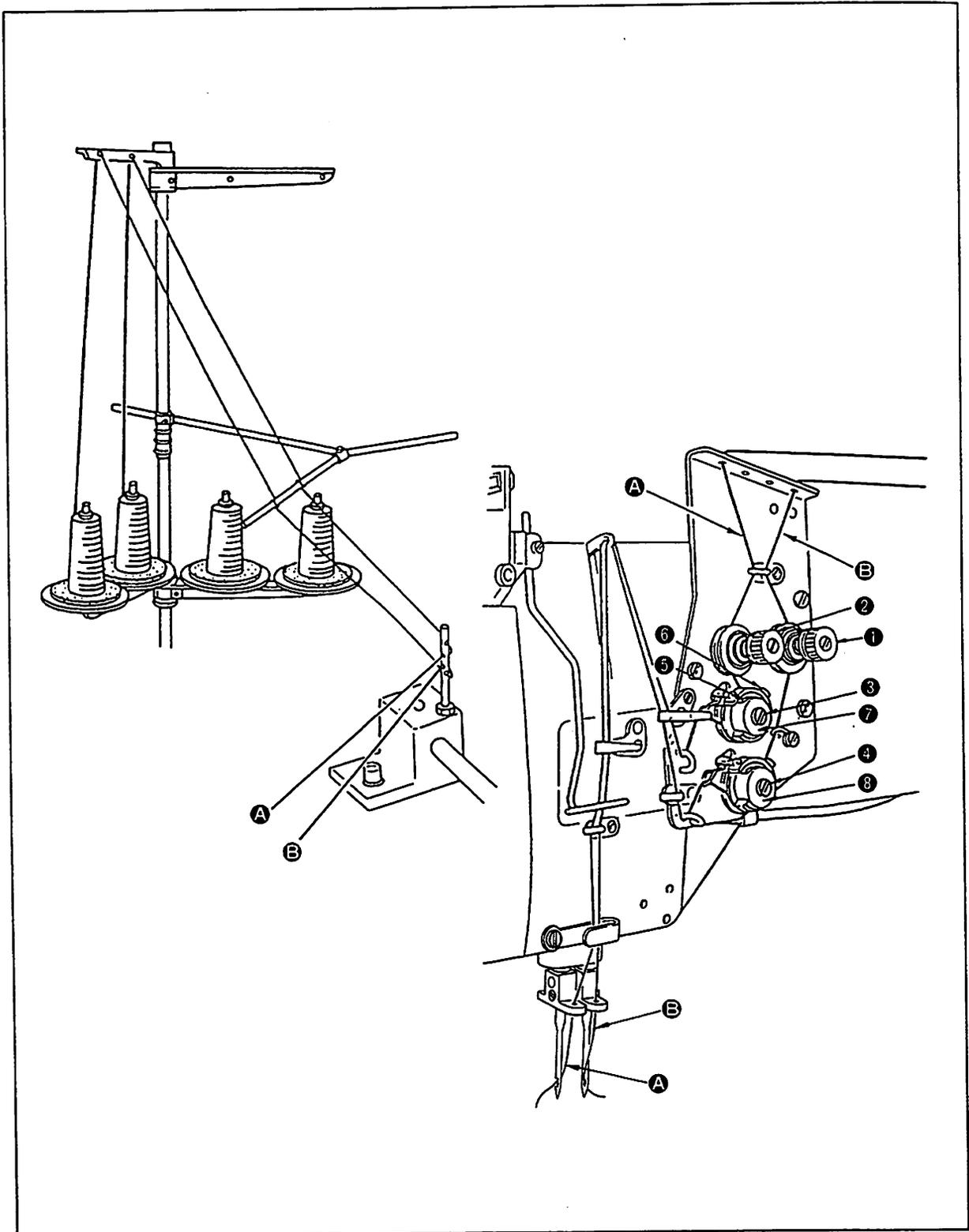


Fig. 81

3) Winding bobbin

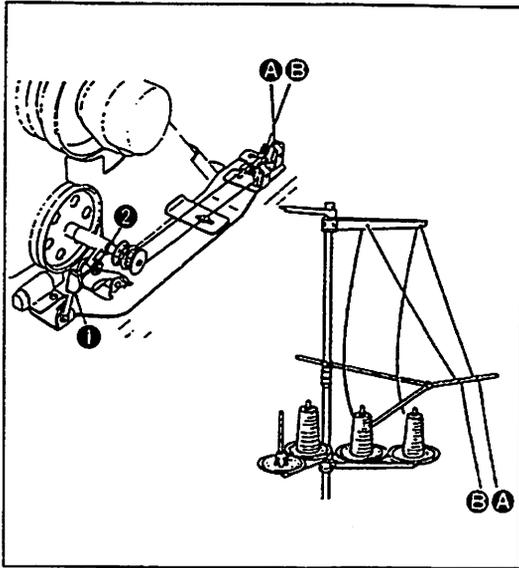


Fig. 80

You can wind two bobbins at a time.

1. Put two bobbins into the thread winder shaft as far as they will do.
2. Thread the winder in the order as illustrated in Fig. 80 and wind the thread on to each bobbin four or five turns.
3. Press winder thread guide ① .
4. The thread winder will automatically stop as soon as it has wound up the bobbins to a predetermined amount.

4) Adjusting the thread winder

It is recommendable to wind the bobbin about 80% of its full capacity with the cotton thread or 60 to 70% with the synthetic thread. This can be adjusted by tightening screw ② (Fig. 80) to increase or loosening to reduce the amount of thread to be wound.

5) Threading the bobbin case

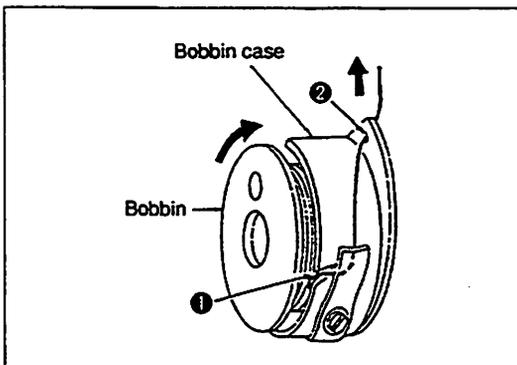


Fig. 81

1. Hold in hand a bobbin in the way that it spins clockwise and put it into the bobbin case.
2. Pass the thread through slot ① in the bobbin case.
3. Pull the thread to pass it under the tension spring.
4. Pass it through hole ② on the bobbin case.

6) How to install the bobbin case

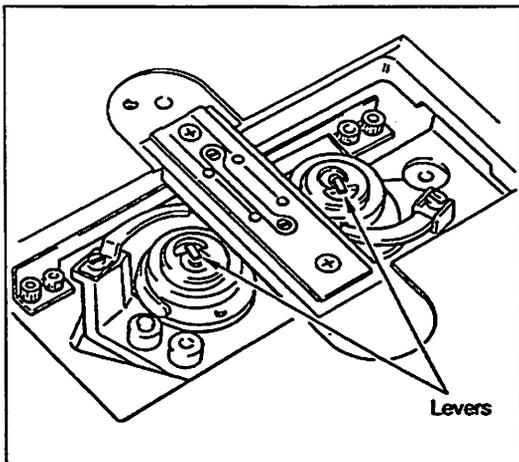


Fig. 82

Fit the bobbin cases into the hook driving shaft, and tilt the hook lever.

(5) Thread tension

1) Needle thread tension

First, adjust the tension of right and left bobbin threads. (The standard tension is 30 to 35 g.)

1. Then, adjust the right needle thread tension by nut ❶ and the left needle thread tension by nut ❷ according to the right and left bobbin thread tension respectively. Turn the respective nuts clockwise to increase the tension or counterclockwise to decrease it. (Fig. 81)
2. Set the operation selector key to the "feed" side, and the thread tension controller will be closed.

2) Bobbin thread tension

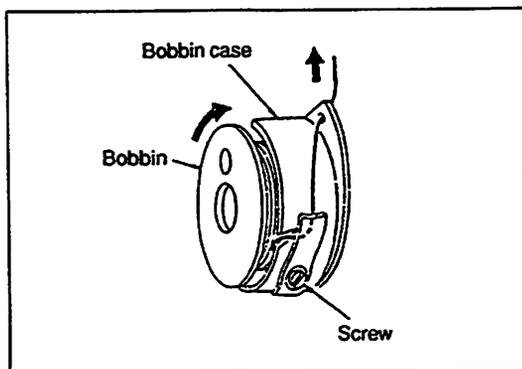


Fig. 83

Turn to screw clockwise to increase the bobbin thread tension or turn the screw counterclockwise to decrease it. Standard bobbin thread tension is 30 to 35 g.

3) Adjusting the thread take-up spring

For adjusting the tension of the left needle thread take-up spring, loosen screw ❸ and turn ❷. Turning ❷ clockwise will increase the tension of the left needle thread take-up spring, or counterclockwise will decrease it.

For adjusting the tension of the right needle thread take-up spring, loosen screw ❹ and turn ❸. Turning ❸ clockwise will increase the tension of the right needle thread take-up spring, or counterclockwise will decrease it.

For adjusting the stroke of the left needle thread take-up spring, loosen screw ❹, and turn ❺.

Turn ❺ clockwise to increase the stroke of the thread take-up spring or counterclockwise to decrease it.

Adjust the stroke of the right needle thread take-up spring in the same procedure as mentioned above. (Fig. 79)

(6) Adjusting the position of the needle bar frame

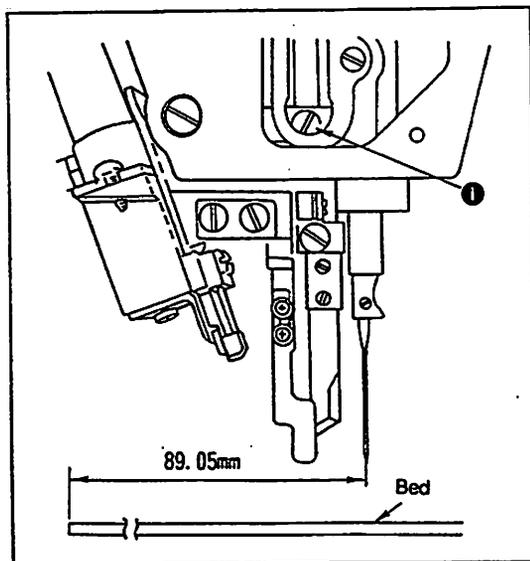


Fig. 84

Loosen screw ❶, and adjust the longitudinal position of the needle bar frame to allow the needle to enter the center of the needle hole in the throat plate. Then secure the needle bar frame tightening the screw.

5) Adjusting the bobbin case opening lever

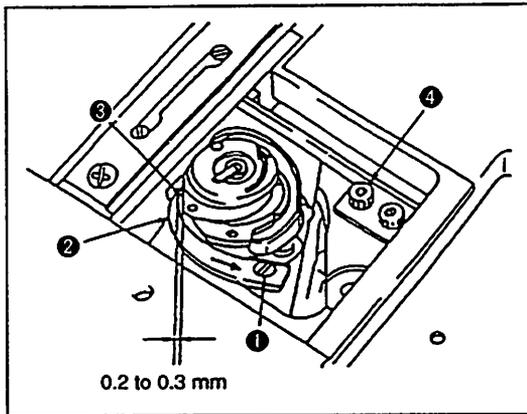


Fig. 88

Turn the handwheel by hand in the regular direction to let bobbin case opening lever ② withdraw to the end of its stroke (as arrow shows) and make sure that there is a clearance of 0.2 to 0.3 mm between the bobbin case opening lever and projection ③ of the bobbin case (turn the bobbin case in the arrow direction and hold it in place by your hand). This can be adjusted by loosening screw ①.

(8) Adjusting the needle thread knife, center knife and bobbin thread knife.

These cutting devices are operated by the air cylinders. When you make adjustment, reduce the air pressure to apply.

1) Attaching and removing the needle thread knife

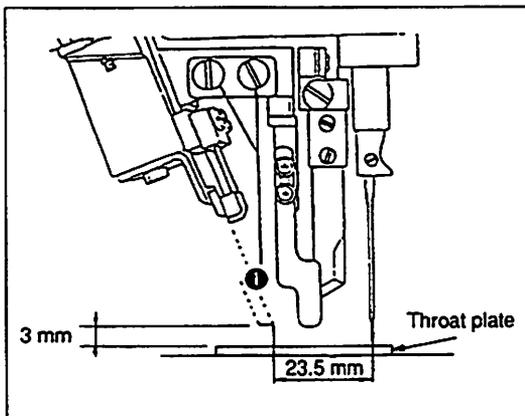


Fig. 89

1. Remove screw ①, and remove the needle thread trimming knife unit.
2. Loosen screw ②, and pull out pin ③. (As the pin has a spiral ridge, turn the pin to pull out.)
3. Replace the needle thread knife with a new one.
At this time, press the unchamfered face of portion ④ (Fig. 90) against the counter knife.

2) Height of the needle thread knife

Provide a 3 mm clearance between the bottom face of the needle thread knife and the throat plate when the needle thread trimming cylinder comes to its stroke end. Loosen nut ⑤ and adjust the height of the needle thread knife by raising or lowering it. Loosen screw ①, and adjust the distance from the center of the needle to the bottom face of the needle thread knife to 23.5 mm.

3) Sharpness of the needle thread knife

The sharpness of the needle thread knife depends on how it interlocks with the counter knife. Loosen counter knife setscrew ⑥ and adjust the position of the counter knife so that both the left and right blades even interlock 1 mm with the blade of the needle thread knife. Ensure that the needle knife completely cut the thread when the needle thread trimming cylinder is operated by pressure under 1.9 kg (when the air pressure is 0 kg/cm²). Choose an appropriate spacer and assemble it in position so that the right- and left-hand side needle thread nippers hold the needle thread with a pressure of 300 g or higher after the thread has been cut.

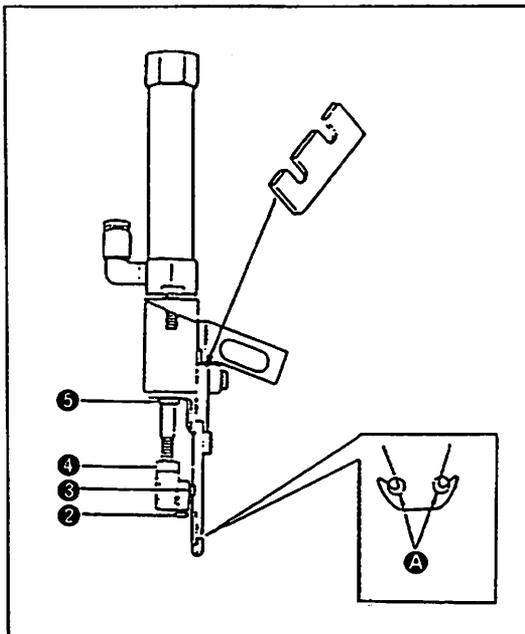


Fig. 90

(9) Adjusting the center knife

1) Stroke of the center knife

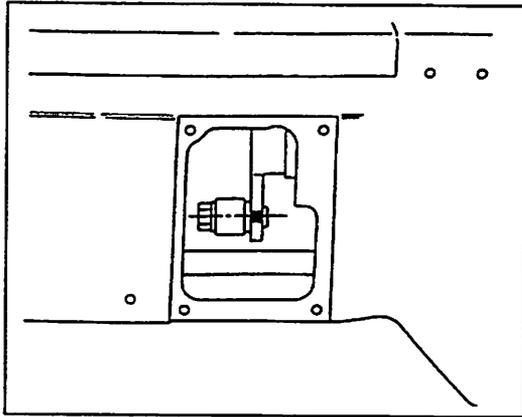


Fig. 91

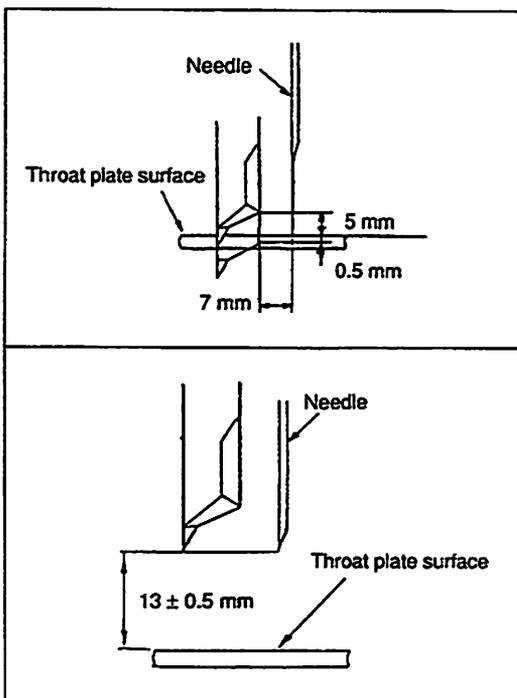


Fig. 92

1. Actuate the center knife driving cylinder coming to its stroke end.
2. Remove the center knife selector switch cover.

3. Align the center of the hinge screw with the white marker line. (At this time, the stroke of the center knife is 5.5 mm.)
4. Turn the handwheel by hand until the center knife reaches its highest position, and adjust the height of the center knife to obtain the relevant distances shown in Fig. 92.

- (Caution)**
1. Make sure that the center knife stops at the position 13 ± 0.5 mm above the surface side of the throat plate.
 2. When the center knife is in its lowest dead point, the center knife and the counter knife should be engaged with each other by a depth of 0.5 mm.

2) How to adjust the distance from the needle to the center knife

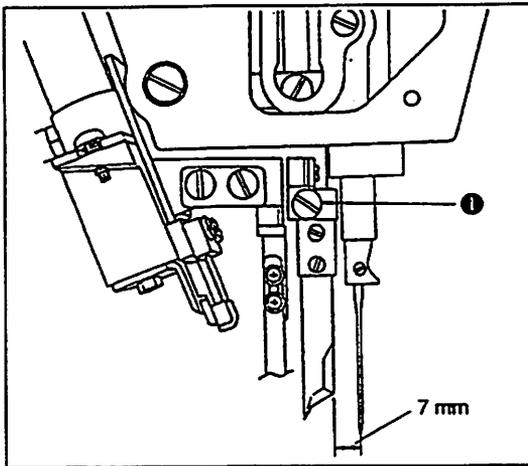


Fig. 93

Loosen screw ① and correctly adjust the position of the center knife by moving it forward or backward.

3) Sharpness of the center knife

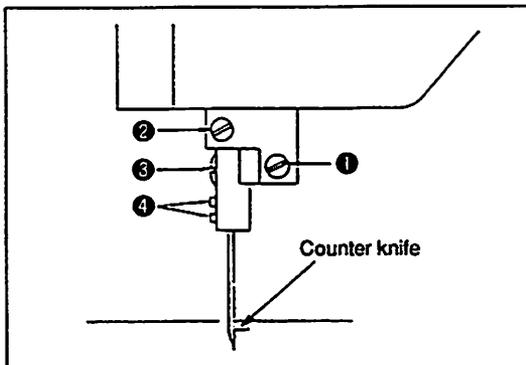


Fig. 94

The sharpness of the center knife is adjusted by pressing the side face of the center knife to the blade section of the corner knife of the throat plate.

Move the center knife laterally by screw ① or rotate it by screw ② to obtain the suitable pressing force.

Be sure to adjust the pressing force as light as possible so that the center knife completely cuts the two plies of the fabric.

4) Removing and attaching the center knife

○ Removing the center knife

Loosen screw ③ in Fig. 94, and remove the center knife.

Loosen screw ④ in Fig. 94, and attach the center knife. At this time, push the center knife to the base until it will go no further and fix at that position.

(10) Position of the thread tension release rod

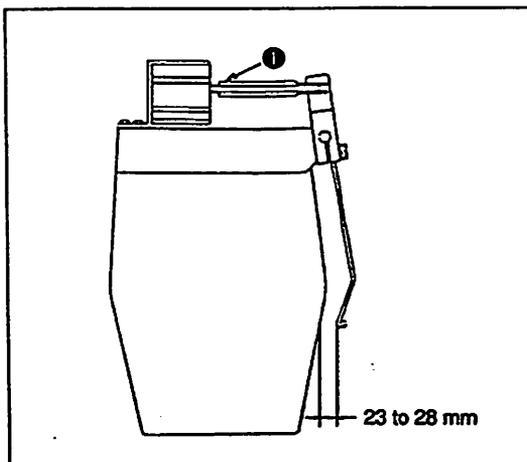


Fig. 95

Loosen nut ① and adjust to obtain a 23 mm to 28 mm clearance between the bottom end face of the wiper and the face plate of the machine head when the cylinder actuates.

(11) Adjusting the bobbin thread knife

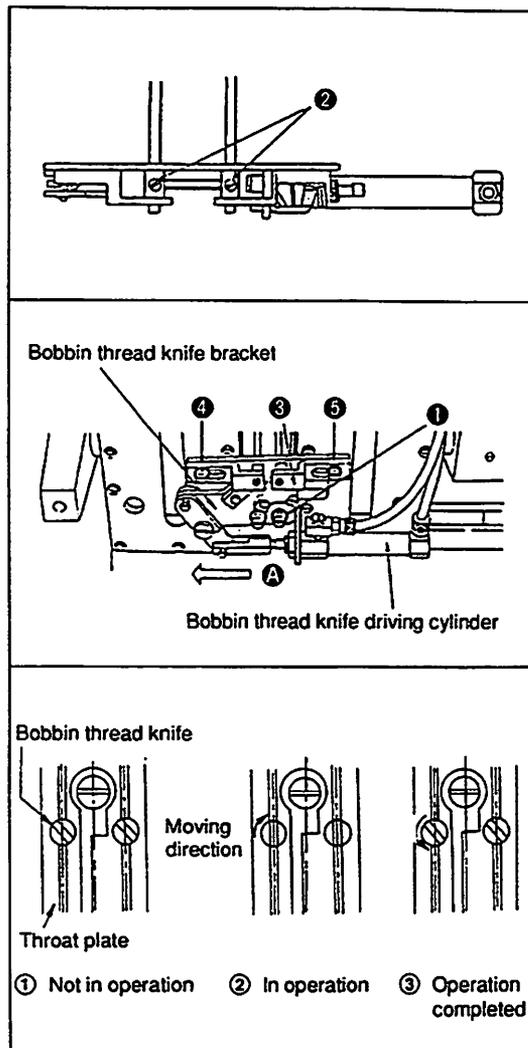


Fig. 96

- 1) Position of the bobbin thread knife to the throat plate
In order to prevent the bobbin thread knife from being pinched in the throat plate while cutting the thread, it is important to set the knife perpendicular to the throat plate.
 1. Loosen screws ① and operate the bobbin thread knife driving cylinder.
 2. Set the bobbin thread knife bracket so that the knife is not pinched in the throat plate and firmly tighten screw ①.
- 2) Position and height of the bobbin thread knife
The top ends of both left and right knives must be even with the throat plate surface, and the grooves in the knives must be parallel to the grooves the throat plate when the knives actuate.
 1. Loosen setscrew ② and adjust so that the top end of the knives are even with the throat plate surface.
 2. Press bobbin thread knife driving cylinder toward A and adjust so that the grooves in the knives are parallel to the grooves in the throat plate.
 3. Securely tighten setscrew ②.
- 3) How to adjust the position of the bobbin thread knife in replacing gauges
Loosen setscrew ④, ⑤ of bobbin thread knife presser plate ③, and the bobbin thread knife moves to the right or left together with the bobbin thread knife presser plate.
- 4) How to replace the bobbin thread knife
Loosen setscrews ②, and you can pull out the knife downward. You can use both blade edges on a knife. When a knife is replaced, it must be adjusted according to the above procedures.
- 5) Adjusting the sharpness of the bobbin thread
Adjust the sharpness of the bobbin thread knife, while properly pressing thread grasping presser spring ④ (Fig. 89) against the bobbin thread knife. The force with which the spring is pressed against the knife should be minimized as far as the knife cuts the thread without fail. This helps lengthen the life of the knife.

(12) Position of the synchronizer

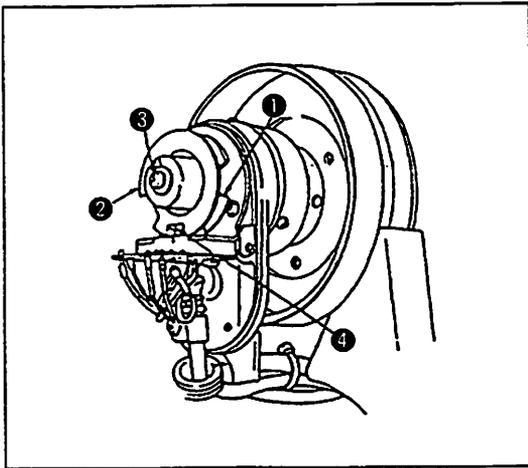


Fig. 97

1. Loosen setscrew ③ and align the notch of synchronizer ② with point ④ at the upper dead point of the thread take-up lever.
2. Turn the handwheel in the normal direction to bring the needle to its lowest dead point: At this time align the notched part of synchronizer ① with section ④.

(13) Timing of the thread tension disc to start "floating"

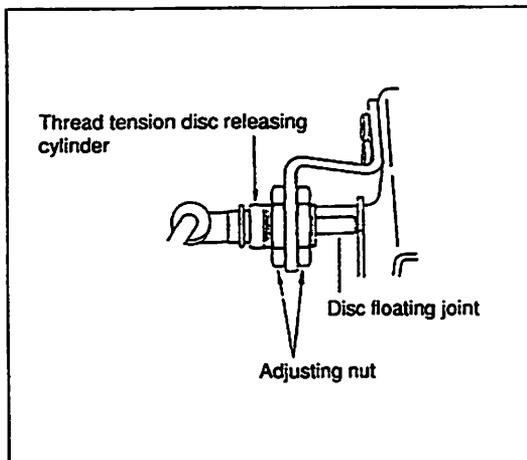


Fig. 98

Adjust the disc floating joint so that both the left and the right tension discs start to float simultaneously when the thread tension disc releasing cylinder has actuated.

Adjust the floating distance within the range from 1.0 mm to 1.5 mm.

(14) How to change over the flap presser of the folding plate

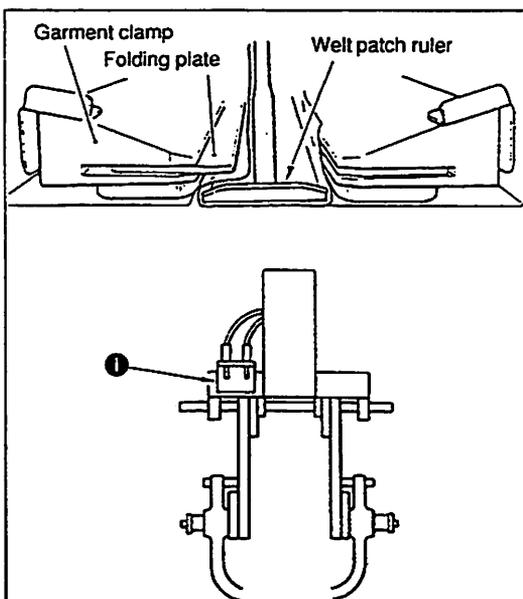


Fig. 99

To sew a single welt without using the folding plate as shown in Fig. 99, be sure to switch over mechanical valve ① (Fig. 99).

16. ELECTRICAL CONTROL COMPONENTS

(Caution)

1. Remove/connect the printed circuit boards after turning OFF the power to the machine.
2. Keep your hands away from the connecting sections of the terminal board in the control box and operation box.
3. Open the power supply box after removing the power plug.

(1) Electrical control components

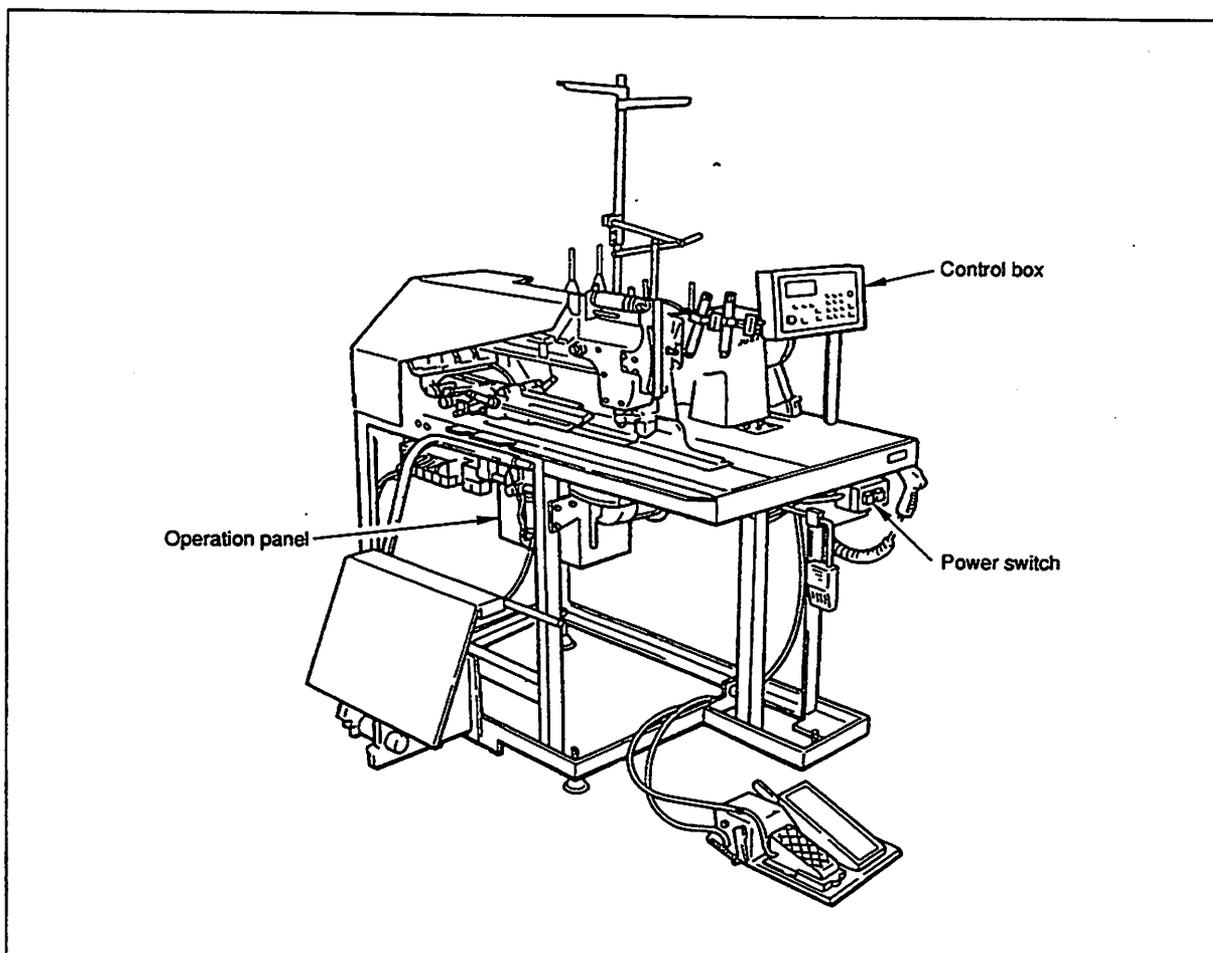


Fig. 100

1) Control box layout

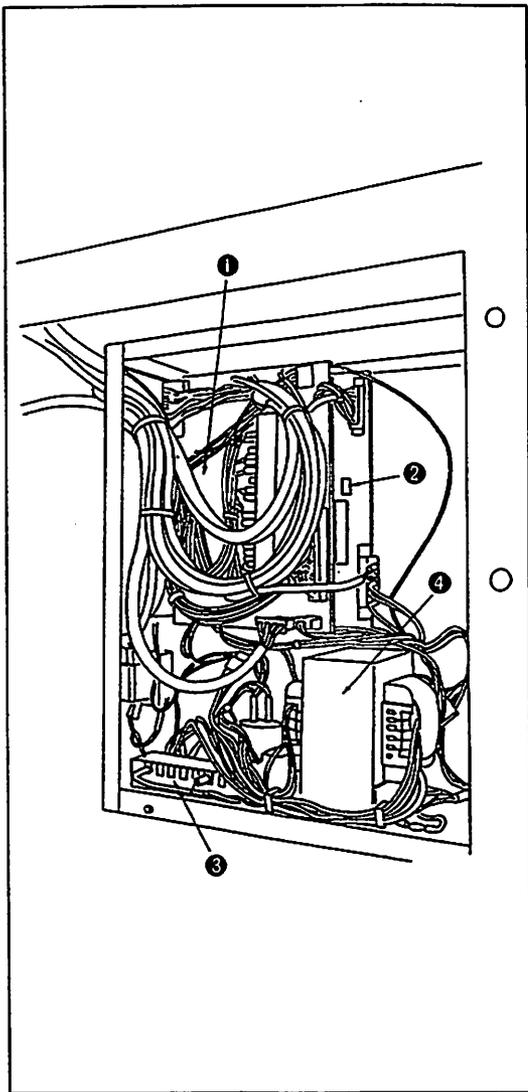


Fig. 101

No.	Name of part	Part No.
①	CPU circuit board asm.	G86011920A0
②	Servo driver	G9604193000
③	Power circuit board asm.	M85195110A0
④	Power transformer A asm.	G96011920A0

2) Operation panel layout

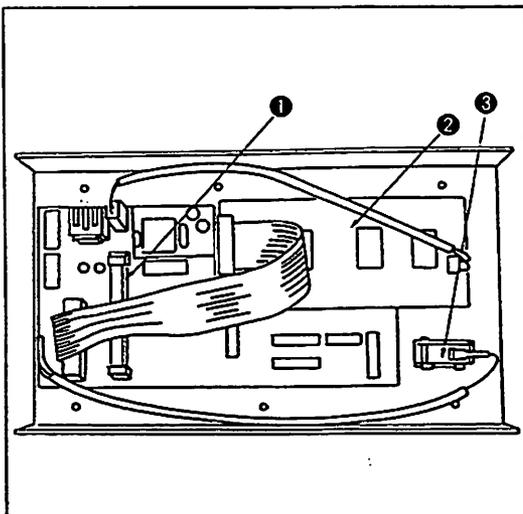


Fig. 102

No.	Name of part	Part No.
①	Panel circuit board asm.	G86021920A0
②	LCD circuit board asm.	G85251920A0
③	Stop switch asm.	M85271920A0

(2) Indication of the operation of the needle thread breakage detecting circuit

Chek	THREAD - CK
Program	L - * R - *
Mode = 0	
key <R>	BINDER
= return	SENSOR -

Pressing the cycle key  of the operation panel switches, press the numeric key "0" to make the display give the adjustment screen [B L]. Now, select the check program mode "0." The indication shown in the figure on the left will appear on the display of the operation panel.

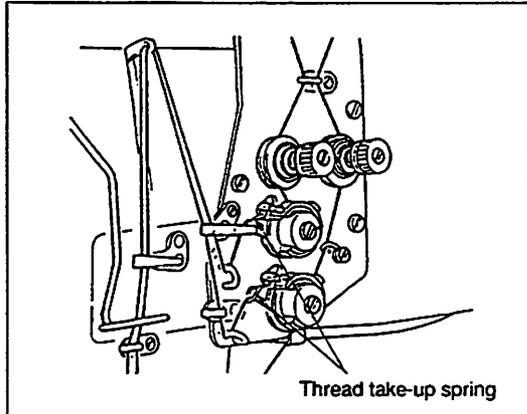
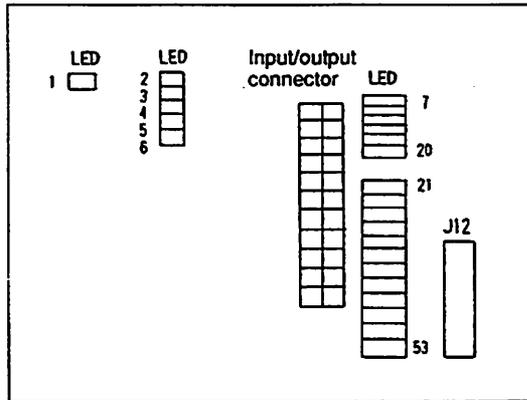


Fig. 103

Actuate the thread take-up spring of the sewing machine. At this time, "L-*" will flash on and off for the left-hand side thread take-up spring and "R-*" will flash on and off for the right hand side one.

(3) Relation between LEDs and input/output of the CPU circuit board



- LED 1 Start
- LED 2 Pedal 5
- LED 3 Pedal 4
- LED 4 Pedal 3
- LED 5 Pedal 2
- LED 6 Pedal 1

- | LED | Input connector | |
|-----|-----------------|---|
| 7 | --- | I-1 Reserved |
| 8 | --- | I-2 Needle thread trimming upper detection |
| 9 | --- | I-3 Lowest end of binder |
| 10 | --- | I-4 Lower detection of corner knife (fixed side) |
| 11 | --- | I-5 Lower detection of corner knife (moving side) |
| 12 | --- | I-6 Upper detection of center knife |
| 13 | --- | I-7 Lower detection of corner knife (fixed side) |
| 14 | --- | I-8 Lower detection of corner knife (moving side) |
| 15 | --- | I-9 Reserved |
| 16 | --- | I-10 (Origin detection of roller stacker) |
| 17 | --- | I-11 (Upper detection of darts stretcher) |
| 18 | --- | I-12 Upper detection of binder |
| 19 | --- | I-13 (Workpiece sensor) |
| 20 | --- | I-14 (Origin detection of bar clamp stacker) |

- | LED | J12 connector | |
|-----|---------------|--|
| 21 | --- | J12-50 Reserved |
| 22 | --- | J12-48 Reserved |
| 23 | --- | J12-46 Reserved |
| 24 | --- | J12-44 Corner knife (moving side) |
| 25 | --- | J12-42 Folding plate 2 |
| 26 | --- | J12-40 Folding plate 2 |
| 27 | --- | J12-38 Horizontal shifting of the work clamp |
| 28 | --- | J12-36 Tension release |
| 29 | --- | J12-34 Needle bar, left |
| 30 | --- | J12-32 Needle bar, right |
| 31 | --- | J12-30 Reserved |
| 32 | --- | J12-28 Reserved |
| 33 | --- | J12-26 Corner knife (fixed side) |
| 34 | --- | J12-24 Thread tension |
| 35 | --- | J12-22 Needle thread trimmer (goes up) |
| 36 | --- | J12-20 Needle thread trimmer |
| 37 | --- | J12-18 Bobbin thread trimmer |
| 38 | --- | J12-16 Folding plate |
| 39 | --- | J12-14 Center knife |
| 40 | --- | J12-12 Clamp foot (left) comes down |
| 41 | --- | J12-10 Clamp foot (left) goes up |
| 42 | --- | J12-8 Clamp foot (right) comes down |
| 43 | --- | J12-6 Clamp foot (right) goes up |
| 44 | --- | J12-4 Binder comes down |
| 45 | --- | J12-2 Binder goes up, Interlining presser |
| 46 | --- | 0-8 Reserved |
| 47 | --- | 0-7 Reserved |
| 48 | --- | 0-6 Flap presser, left |
| 49 | --- | 0-5 Flap presser, right |
| 50 | --- | 0-4 (Stacker 3/bar clamp stacker) |
| 51 | --- | 0-3 (Stacker 2/oscillating) |
| 52 | --- | 0-2 (Stacker 1/grasping and roller stacker) |
| 53 | --- | 0-1 (Dart stretcher) |
- Output connector () shows optional device

Fig. 104

(4) Explanation of the servo driver

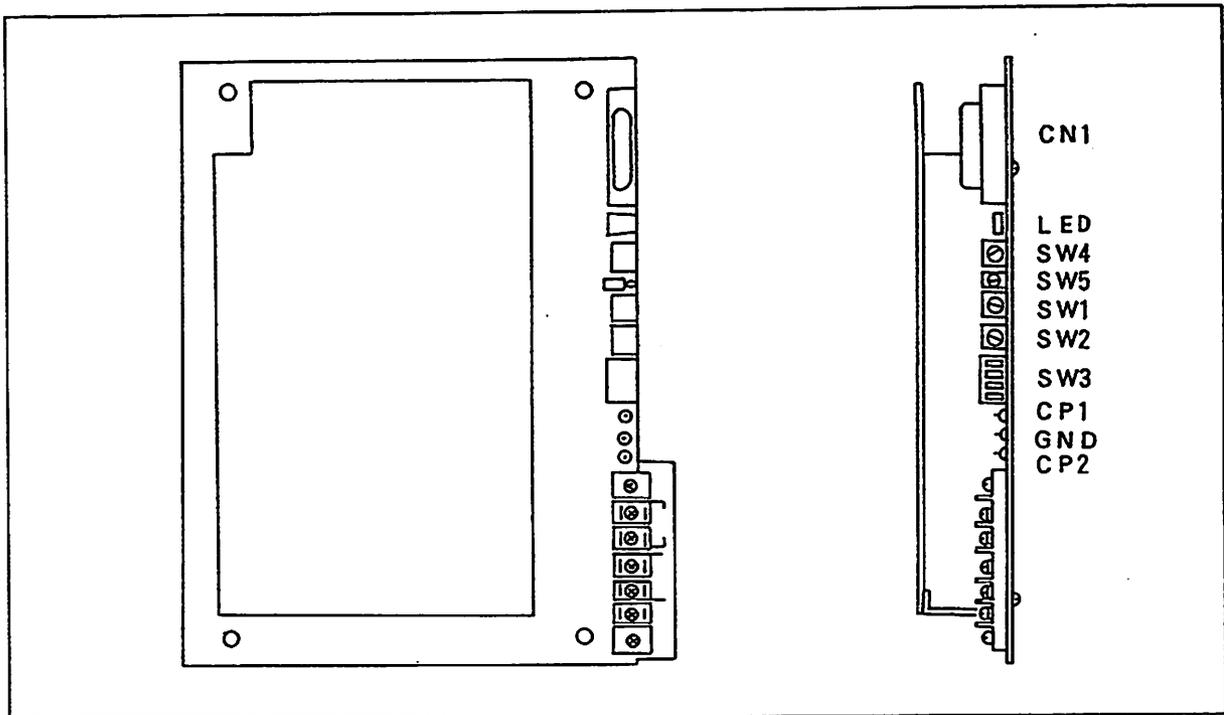


Fig. 105

1) Setting the switches

Switch No.	SW 1	SW 2	SW 3				SW 4
			Bit 1	Bit 2	Bit 3	Bit 4	
Set value	1	2	OFF	OFF	OFF	ON	F

(Caution) The switches have been factory-set properly at the time of delivery. So, it is necessary to re-set them.

2) Measure to be taken when the servo alarm occurs

When a servo alarm occurs, AL-02 will appear on the operation panel. In this case, there may be three different causes ① through ③. So, remove the cause and press the reset key.

- ① The front end or rear end sensor has failed or the sensors have been improperly positioned. This causes the clamp foot to come in contact with the LM guide stopper, resulting in the servo alarm.
- ② When the clamp foot is in operation, an abnormal overload has been applied to the clamp foot, resulting in the servo alarm.
- ③ Servo driver or the servomotor has failed, resulting in the servo alarm.

If you cannot find a cause of the servo alarm, refer to the servo driver error analysis shown on the next page.

3) Servomotor error analysis

To perform the servomotor error analysis, set the switch 1 of the DIP switch 1 (SW1 of DIP1) on the operation panel to the ON side. This will allow you to confirm the detail of the servo driver alarm if a servo alarm has occurred during operation.

The detail of the alarm can be seen in accordance with the number of times of flashing on/off of the red LED on the servo driver.

- ① Flashes on and off once.....Overload
- ② Flashes on and off twice.....Difference counter has overflowed.
- ③ Flashes on and off three times.....Excessive speed
- ④ Flashes on and off four times.....Feedback sensor is defective.
(Defective connection of the encoders A and B)
- ⑤ Flashes on and off five times.....Over regeneration
- ⑥ Flashes on and off six times.....Driver overheat
(Occurs when the components inside the circuit board become too hot)
- ⑦ Flashes on and off seven times.....Short-circuit of the motor cord

(5) How to adjust the photoelectric cell of the flap sensor

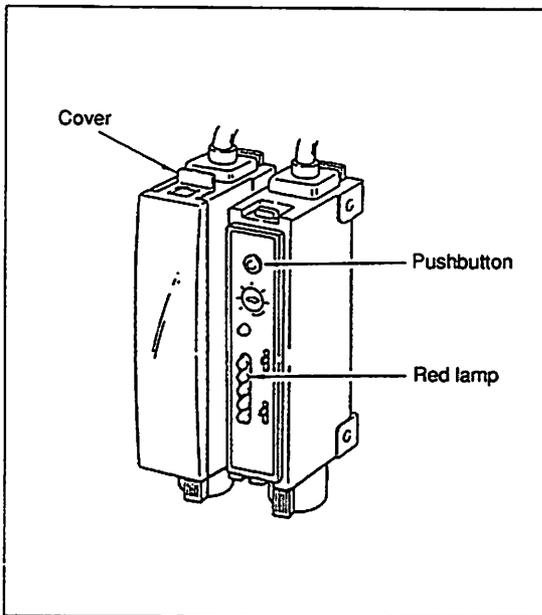


Fig. 106

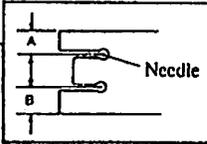
- 1) Confirm that the flap sensor light securely reaches the reflecting plate of the folding plate.
 - 2) Remove the cover from the flap sensor amplifier and press the pushbutton.
 - 3) Completely shielding the irradiated portion of the reflecting plate of the folding plate with a flap piece or the like, press the pushbutton again. This completes the adjustment.
- (Caution) It is recommended to use a flap piece whose color is white.**
- 4) Reflect the flap sensor light and shield it alternately in repetition so as to confirm that the red lamp flashes on and off.

17. TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Corrective measures	
1. Thread breakage (needle thread)	1-1) The surface of the thread path burrs or scratches.		Smooth the thread path (using a fine sandpaper and buff).	
	1-2) Needle thread tension is too high.	2)-A The tension of the thread tension discs is too high.	Decrease the tension. (See item "Needle thread tension.")	
		2)-B The tension of the thread take-up spring is too high.	Decrease the tension. (See item "Adjusting the tension of the thread take-up spring.")	
		2)-C The stroke of the thread take-up spring is too large or small.	Correct the stroke. (See item "Adjusting the tension of the thread take-up spring.")	
	1-3) The clearance between the bobbin case opening lever and the projection of the bobbin case is not correct.		Provide a clearance of 0.2 to 0.3 mm between them. (See item "Adjusting the bobbin case opening lever.")	
	1-4) The hooks have been improperly installed.	4)-A The needle hits the hook blade.	Correct the clearance between them. (See item "How to adjust the clearance between the needle and the hook blade point.")	
		4)-B The timing between the needle and hook is bad.	Correct the timing. (See item "Adjusting the hook to the needle.")	
	1-5) The hooks are lubricated insufficiently.		Adjust the amount of oil. (See item "Adjusting the amount of oil in the hooks")	
	2. Thread breakage (bobbin thread)	2-1) The bobbin thread is subjected to excessive tension.	1)-A The bobbin thread tension is too high.	Decrease the bobbin thread tension. (See item "Bobbin thread tension.")
			1)-B The bobbin case bites waste thread or dust.	Remove waste thread and clean up the bobbin case.
1)-C The bobbin is defective in configuration and fails to spin smoothly.			Replace the bobbin.	
3. Stitch skipping	3-1) The hooks have been positioned improperly.	1)-A The clearance between the needle and hook is too large.	Correct the clearance. (See item "How to adjust the clearance between the needle and the hook blade point.")	
		1)-B The timing between the needle and hook is bad.	Correct the timing. (See item "Adjusting the hook to the needle.")	

Trouble	Cause (1)	Cause (2)	Corrective measures
	3-2) The needle guard has been positioned improperly.	1)-C The pointed end of the hook blade is not sharp enough.	Take out the hook and sharpen the blade point.
		2)-A The clearance between the needle and needle guard is too large.	Correct the clearance. (See item "Adjusting the hook to the needle.")
	3-3) The needle bar frame has been positioned improperly.	2)-B The needle and needle guard are in excessive contact.	Correct the clearance between them. (See item "Adjusting the hook to the needle.")
			Correct its position. (See item "Adjusting the position of the needle bar frame.")
	3-4) The needle is defective.	4)-A The needle is bent or has blunt point.	Replace the needle.
		4)-B The needle No. is not proper.	Replace the needle with a thicker one.
	3-5) The clearance between the sewing plate and the binder is not correct.		Correct the height of the binder. (See item "Horizontal of the binder.")
	3-6) The work clamp feet do not clamp the garment properly.	6)-A The clamping pressure is not high enough.	Adjust the compressed air pressure to 5.0 kgf/cm ² (0.5 MPa).
	3-7) The lockstitching speed is not correct.		Set stitch length to 2.0 mm.
	4. Loose stitches	4-1) The needle thread tension is not high enough.	
4-2) The thread take-up spring has been maladjusted.		2)-A The thread take-up spring tension is not high enough.	Increase the tension. (See item "Adjusting the tension of the thread take-up spring.")
		2)-B The stroke of the thread take-up spring is too small.	Correct the stroke. (See item "Adjusting the tension of the thread take-up spring.")
4-3) The clearance between the bobbin case opening lever and the projection of the bobbin case is not correct.			Provide a clearance of 0.2 to 0.3 mm between them. (See item "Adjusting the bobbin case opening lever.")
4-4) The clearance between the sewing plate and the binder is too large.			Correct the lower position of the binder. (See item "Horizontal of the binder.")

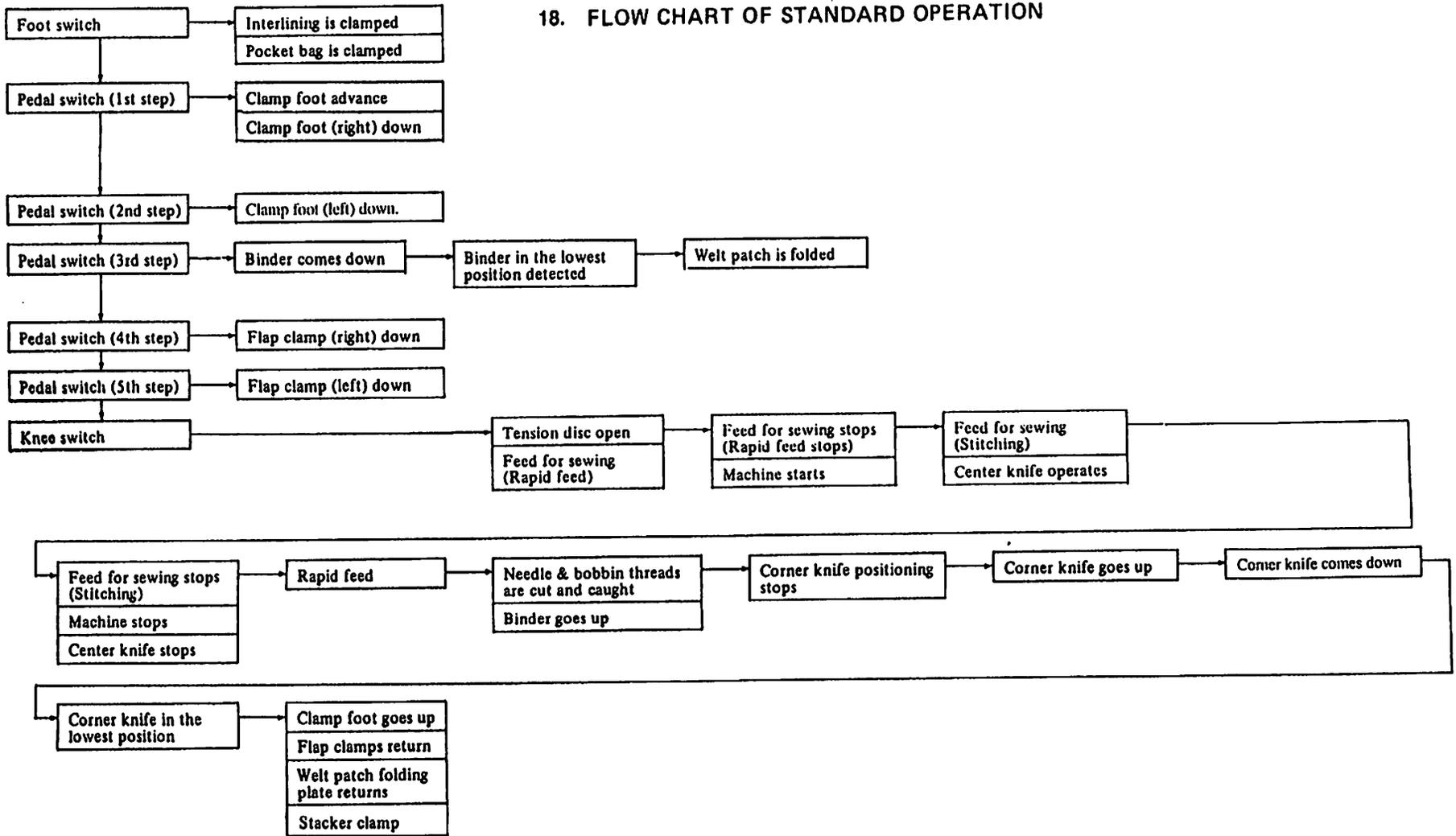
Trouble	Cause (1)	Cause (2)	Corrective measures	
5. Needle breakage	5-1) The needle strikes the hook blade point.		Correct the clearance between them. (See item "How to adjust the clearance between the needle and the hook blade point.")	
	5-2) The needle strikes the needle guard.		Correct the clearance between them. (See item "Adjusting the hook to the needle.")	
	5-3) The needle fails to enter the needle hole in the throat plate and hits the vicinity.		Correct the position of the needle bar frame. (See item "Adjusting the position of the needle bar frame.")	
	5-4) The needle strikes a component.	4)-A The needle strikes the binder.		Correct the position of the binder. (See item "Position of the binder when lowered.")
		4)-B The needle strikes the welt patch folding plate.		Correct the position of the welt patch folding plate. (See item "Welt patch folding plate.")
	5-5) The lockstitching speed is too high.		Set the stitch length to 2.0 mm.	
5-6) The needle is too thin for the material.		Replace it with a thicker needle.		
6. Irregular stitch	6-1) Threading is wrong.	1)-A The threading route of the needle thread is wrong.	Correct the threading. (See item "Threading the machine.")	
		1)-B The threading route of the bobbin thread is wrong.	Correct the threading. (See item "Threading the bobbin case.")	
	6-2) The needle or bobbin thread tension is not correct.		Correct the needle or bobbin thread tension.	
	6-3) The tension or stroke of the thread take-up spring is not correct.		Properly adjust the thread take-up spring. (See item "Adjusting the tension of the thread take-up spring.")	
	6-4) The bobbin is wound up too tight.		Rewind the bobbin under proper tension.	
	6-5) The bobbin thread feeding tension varies.	5)-A Waste thread exists between the bobbin and the bobbin case.		Remove the waste thread.
		5)-B The bobbin has been deformed and does not spin smoothly.		Replace the bobbin.

Trouble	Cause (1)	Cause (2)	Corrective measures
7. Frequent puckering	7-1) Both the needle and bobbin thread tensions are too high.		Decrease the thread tensions.
	7-2) The needle is too thick for the material.		Replace the needle with a thinner one.
	7-3) The clearance between the welt patch base plate and the sewing plate is not proper.		Properly adjust the clearance according to the material thickness. (See item "Horizontal of the binder.")
8. The thread slips off the needle at welting start.	8-1) The thread tension release rod has been improperly positioned.		Correct its position. (See item "Position of the thread tension release rod.")
	8-2) The needle thread is not held properly.		Correct the position. (See item "Adjusting the needle thread knife, center knife and bobbin thread knife.")
9. Several stitches are skipped at welting start.	9-1) The bobbin thread is too short.	1)-A The bobbin runs idle.	Increase the bobbin thread tension. Place a cloth under the bobbin to prevent it from running idle.
		1)-B The thread tension release rod has been improperly positioned.	Position it properly. (See item "Position of the thread tension release rod.")
10. Welt widths on the right and left are not the same.	10-1) The clearance between the binder and garment clamp plate is not correct.		Correct the clearance. (See item "Garment clamps positioning.")
	10-2) The clearance between the needle and the welt patch folding plate is not correct.		Correct the clearance. (See item "Welt patch folding plate.")
	10-3) The binder has been improperly positioned laterally.	3)-A The position of the binder with respect to the needles has been maladjusted.	 <p>The needles shall enter the centers of the needle entry holes in the binder, and $A = B$</p>
11. Welt widths at start and end are not the same.	11-1) The work clamp feet fail to travel in parallel to the needles.		Correct the parallelism of the work clamp feet. (See item "Parallelism of the work clamp feet")

Trouble	Cause (1)	Cause (2)	Corrective measures
12. The machine fails to welt to the garment point. (This failure occurs in every welting.)	12-1) The position of the cross-mark lamps is wrong.		Space them 240 mm from the needle entry point. (See item "How to adjust the position of the cross-mark lamps.")
	12-2) The garment gets out of position during welting.	2)-A The work clamp foot pressure is not high enough.	Set the pressure to 5.0 kgf/cm ² (0.5 MPa).
		2)-B The clearance between the welt patch base plate and the sewing table is defective.	Correct the clearance according to the material. (See item "Horizontal of the binder.")
	13. Pillings are produced on garment or welting patch. (Throughout the welting seam)	13-1) The center knife is dull.	1)-A The center knife is defective.
1)-B The center knife has been installed improperly.			Install it correctly. (See item "Sharpness of the center knife.")
13-2) The needle is too thick or the needle point is blunt.			Use a thinner needle or replace the needle.
14. Needle threads are not trimmed.		14-1) The "UP" stop position of the synchronizer is not correct.	
	14-2) The needle thread knife fails to work properly.	2)-A The needle thread knife has not been installed properly.	Correctly install the needle thread knife. (See item "Height of the needle thread knife.")
		2)-B The thread trimming cylinder fails to work properly.	Expel the compressed air from the cylinder to check whether the cylinder works under approx. 1.9 kg or not. If the cylinder does not work smoothly, replace the cylinder. (Check the drain)
	15. Bobbin threads are not trimmed.	15-1) The bobbin thread knife is faulty.	1)-A The pressure of the bobbin thread spring is not high enough.
1)-B The bobbin thread knife blade is not sharp enough.			Replace the knife. Turn the knife upside down.
15-2) The bobbin thread knife driving cylinder fails to work properly.			Check the drain within the cylinder or replace the cylinder if necessary.

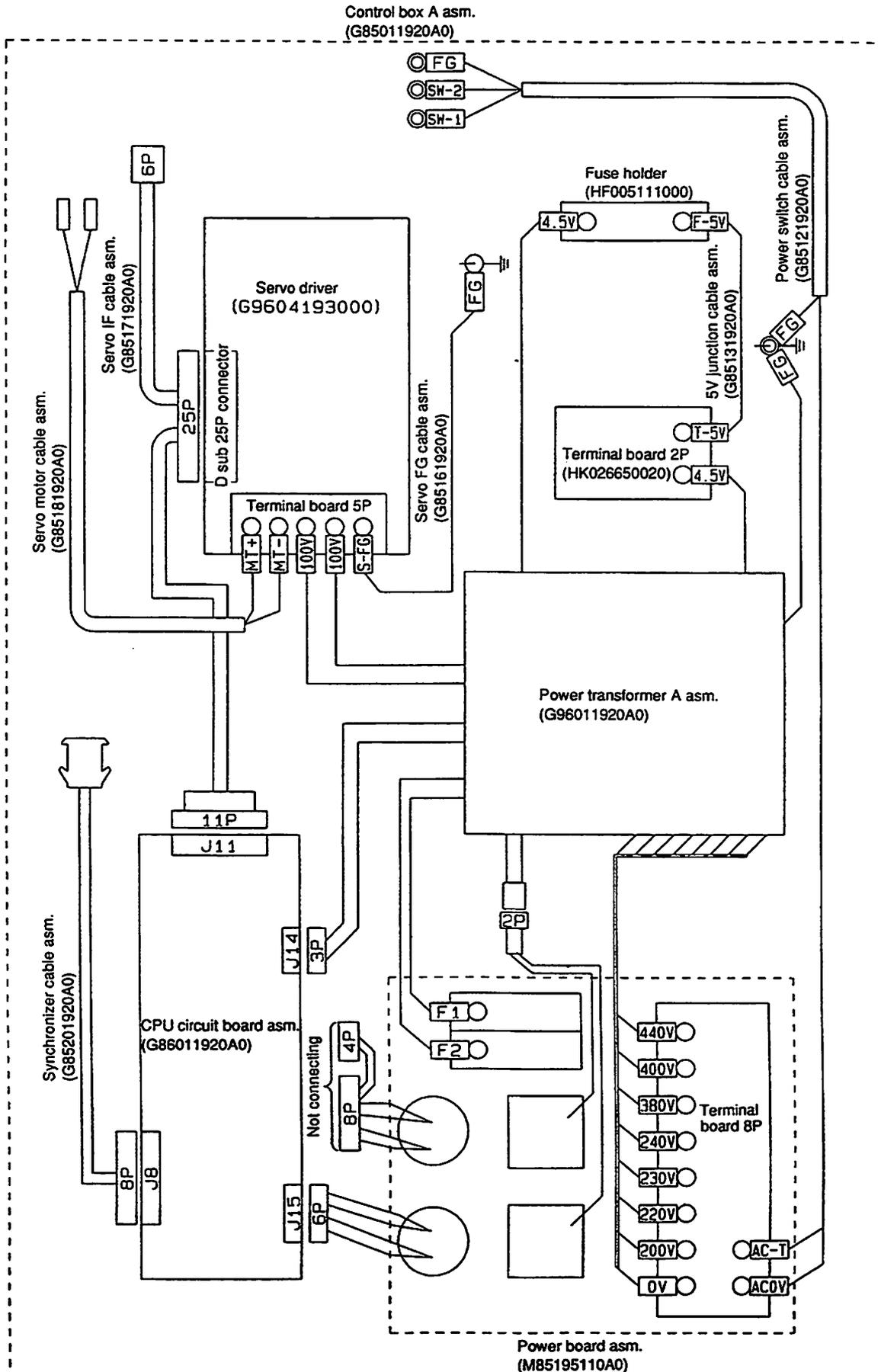
Trouble	Cause (1)	Cause (2)	Corrective measures
16. No power is supplied to the machine even when the main switch is turned on.		1)-A Fuse on the power circuit board has blown.	Replace Fuse.
		1)-B Fuse on the CPU circuit board has blown.	Replace Fuse.
17. The cross-mark lamps do not light.	17-1) The lamp bulb connection is loose.		Screw in the bulbs securely.
	17-2) The lamps are disconnected.		Replace them.
	17-3) Fuse has blown.		Replace Fuse.
18. The 100 Vac line voltage for the servomotor does not appear.	18-1) The 100Vac out put is not being supplied from the power transformer secondary.	1) Transformer is faulty.	Replace transformer.
19. Cylinders do not work.	19-1) The power transformer is supplying 18Vac, but the cylinders do not work.	1) The DC power supply unit is faulty.	Replace the DC power supply unit.
	19-2) The power transformer is not supplying 18Vac.	2) Transformer is faulty.	Replace transformer.
20. The machine fails to do normal material feed during operation.	20-1) The servomotor driver is defective.		Replace the servomotor driver.
20-1) The feeding speed is not normal.	20-2) The servomotor is defective.		Replace the servomotor.

18. FLOW CHART OF STANDARD OPERATION

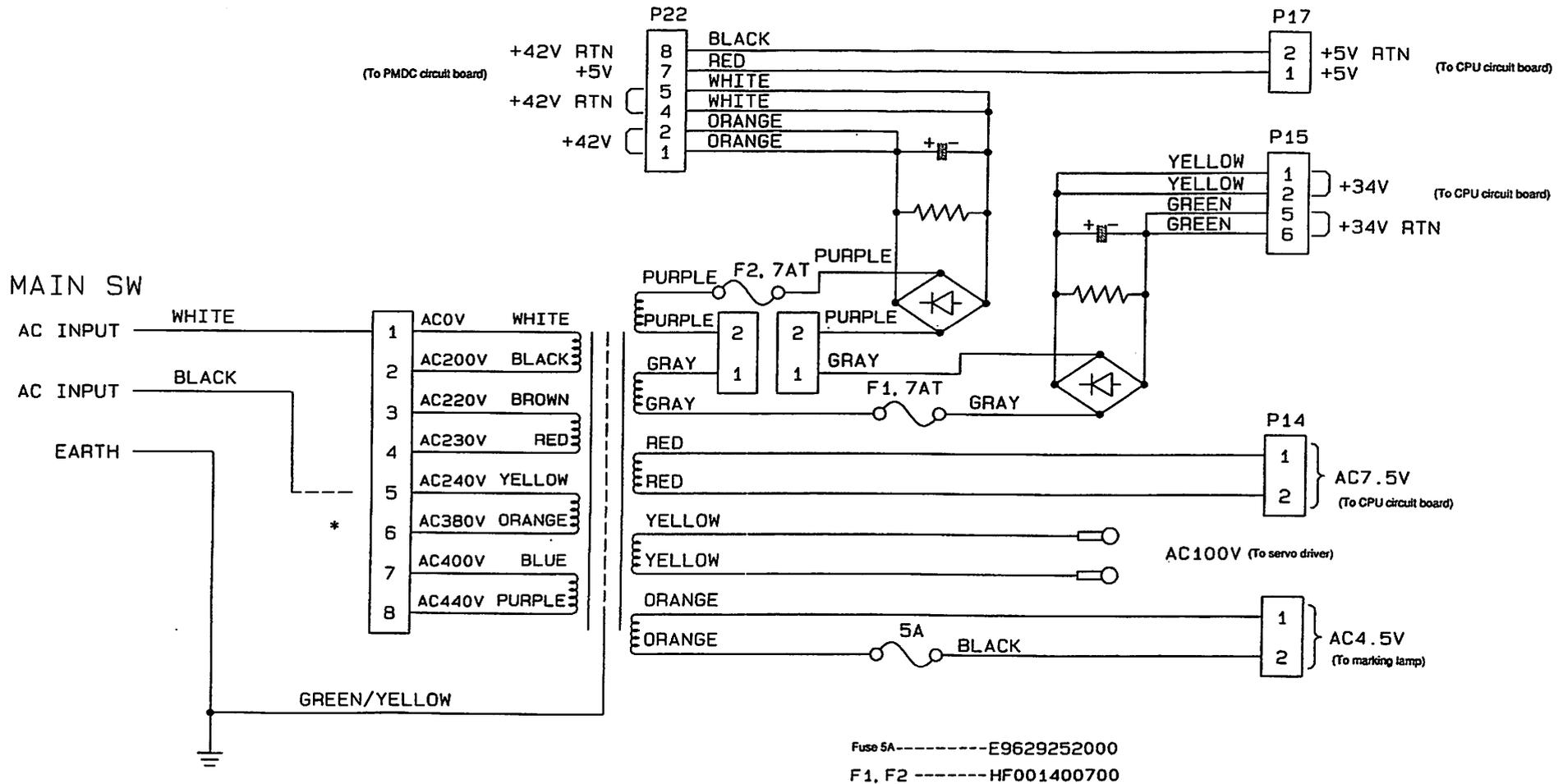


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19. ATTACHED MATERIALS
 (1) Control box connection diagram

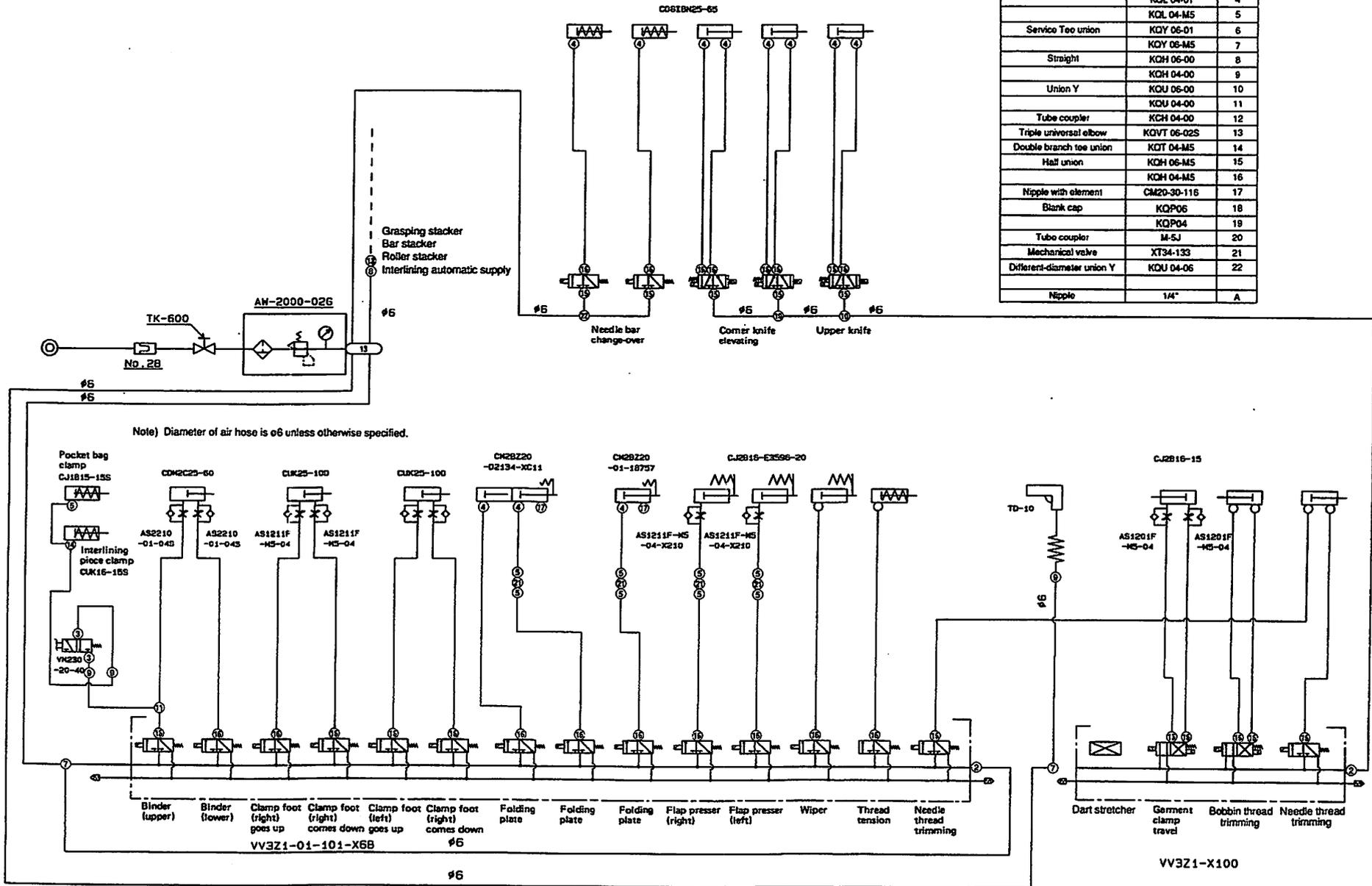


(2) Power circuit diagram



* Optional

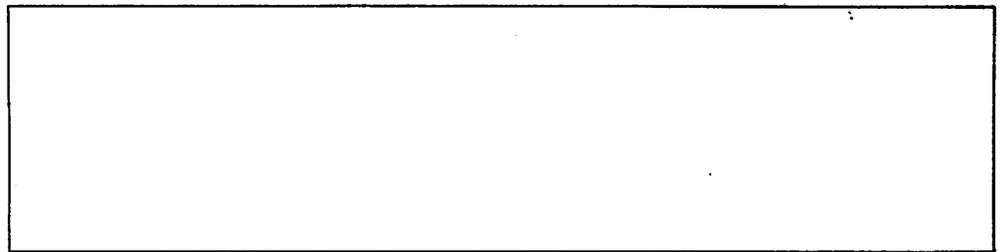
(3) Pneumatic circuit diagram



Name of part	Type	Symbol
Elbow union	KDL 06-01	1
	KDL 06-M5	2
	KDL 04-02	3
	KDL 04-01	4
	KDL 04-M5	5
Service Tee union	KDY 06-01	6
	KDY 06-M5	7
Straight	KDH 06-00	8
	KDH 04-00	9
Union Y	KDU 06-00	10
	KDU 04-00	11
Tube coupler	KCH 04-00	12
Triple universal elbow	KQVT 06-02S	13
Double branch tee union	KDT 04-M5	14
Half union	KOH 06-M5	15
	KOH 04-M5	16
Nipple with element	CM20-30-116	17
Blank cap	KQP06	18
	KQP04	19
Tube coupler	M-5J	20
Mechanical valve	XT34-133	21
Different-diameter union Y	KDU 04-06	22
Nipple	1/4"	A

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JUKI CORPORATION
INTERNATIONAL SALES DIVISION
8-2-1, KOKURYO-CHO,
CHOFU-SHI, TOKYO 182, JAPAN
PHONE : 03(3430)4001~5
FAX : 03(3430)4903-4909-4914
TELEX : J22967



Please do not hesitate to contact our distributors in your area for further information when necessary.
* The specifications and appearance are subject to change without notice.

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