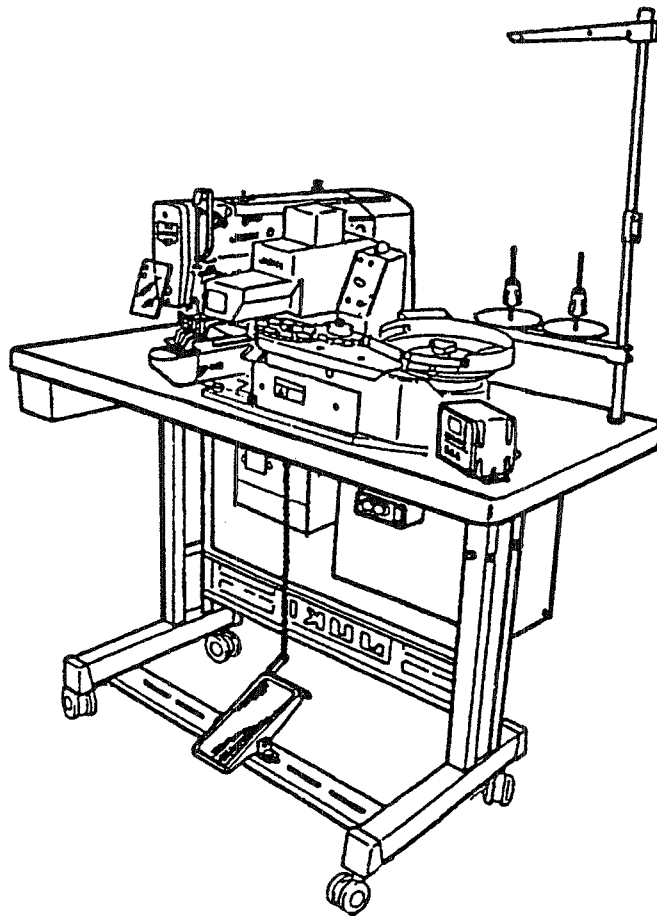


**JUKI®**

Computer-controlled High Speed Lockstitch Button  
Sewing Machine with Automatic Button Feeder

**LK-1903 / BR25**

**ENGINEER'S MANUAL**



29315504  
No.00

## **PREFACE**

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of this machine. The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains operating instructions in detail. And this manual describes "Standard Adjustment", "Adjustment Procedures", "Results of Improper Adjustment", and other important information which are not covered in the Instruction Manual.

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

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

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# 1. SPECIFICATIONS

## 1. Specifications

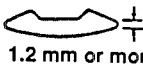
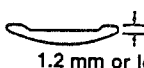
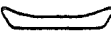
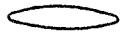

Different specifications from those of the LK-1900 only are described.

- |   |  |
|---|--|
| 1. Sewing speed :                                 | Max. 2,300 rpm   |
| 2. Needle bar stroke :                            | 45.7 mm  |
| 3. Needle :                                       | DPX17 #14  |
| 4. Lifting lever method :                         | Joint use of electromagnetic solenoid and cam (BR side)  |
| 5. Lifting amount of button clamp :               | Max. 11 mm   |
| 6. Number of standard patterns :                  | 33 kinds   |
| 7. Wiper method :                                 | Solenoid drive type  |
| 8. Memory of data :                               | EP-ROM (32K bytes) (Exclusive)   |
| 9. Sewing speed limit :                           | Can be limited freely to 400 to 2,300 s.p.m. (adjustable in a unit of 100 s.p.m.).   |
| 10. Buttons used : Type :                         | Round-shaped flat buttons (4-holed, 2-holed)   |
| Size :  | ø10 mm to ø18 mm   |
| 11. Selection of buttons to be fed :              | <b>(Note) For buttons of which diameter is ø16 mm or more, use the button clamp jaw lever for large buttons.</b>   |
| 12. Button setting :                              | By vibration system using a piezoelectric feeder   |
| 13. Button feeding method :                       | Buttons are loaded from the rear. (Manual loading possible)  |
| 14. Detection of a failure of feeding buttons :   | Horizontal forced feed mechanism<br>Provided with two detectors <ul style="list-style-type: none"> <li>• One detector detects a button at the section where the button is correctly positioned.</li> <li>• Another detector checks whether the button is correctly inserted into the carrier pin.</li> </ul> |
| 15. Driving source for the feeder :               | DC motor (24Vdc)   |
| 16. Automatic button discharging function :       | Provided   |
| 17. Independent operation of the sewing machine : | Possible   |
| 18. Small-lot sewing function :                   | Provided   |
| 19. Time required to feed a button :              | 0.5sec / pc.   |
| 20. Outer dimension :                             | W : 1,200 mm L : 660 mm H : 1,155 mm<br>(Standard table and stand used)  |
| 21. Weight (complete set) :                       | 133 kg   |
| 22. Power fluctuation :                           | Rated value ±10%50 / 60 Hz   |
| 23. Power consumption :                           | 600 W  |

## 2. Model classification according to the button size

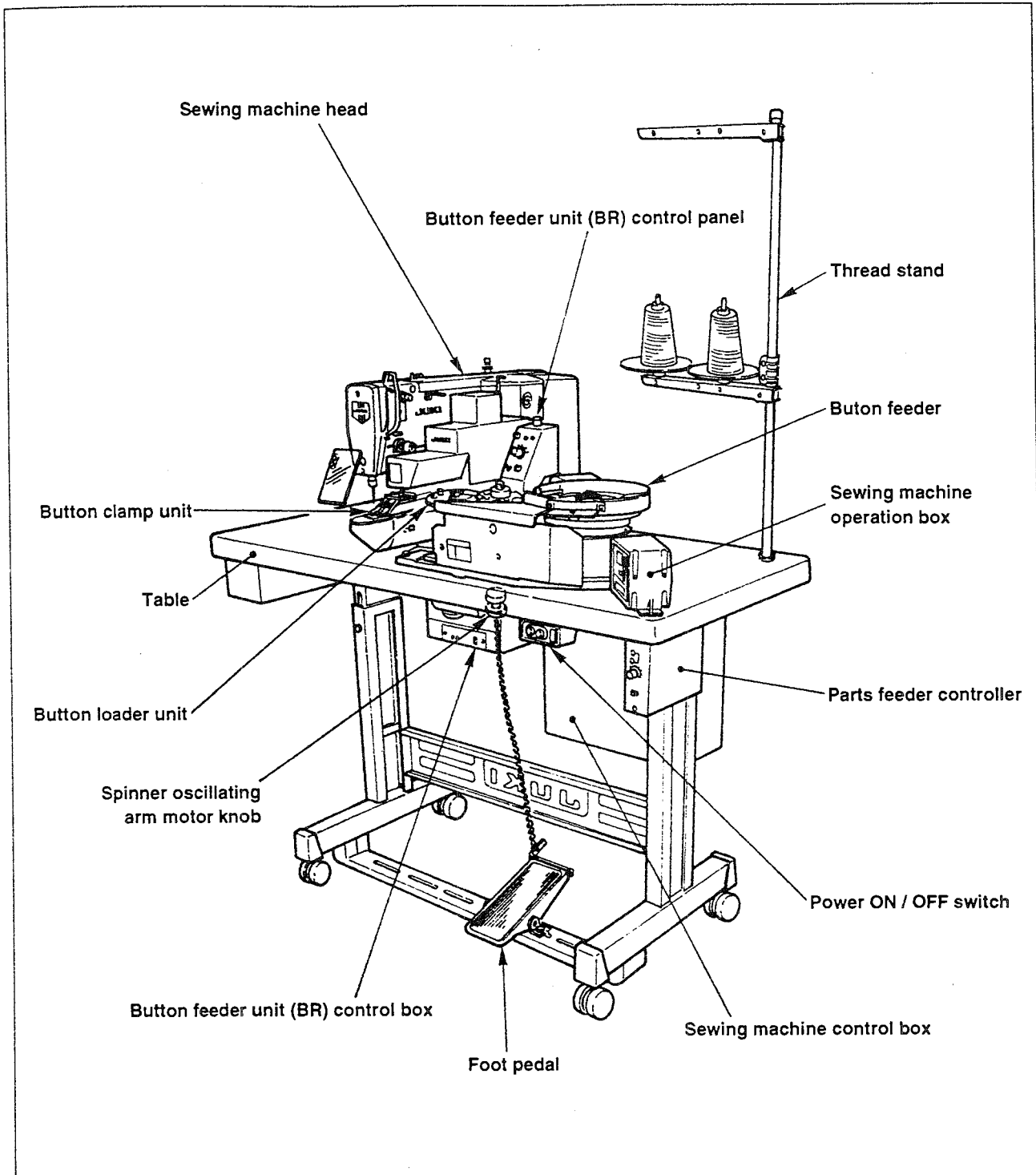
| Model                                       |                | LK-1903-311              | LK-1903-312                |
|---|----------------|--------------------------|----------------------------|
| Button size classification                  |                | For small -sized buttons | For medium - sized buttons |
| Outside diameter of applicable buttons (mm) |                | ø10 - 15                 | ø12 - 18                   |
| Sewing size                                 | Length         | 0 - 3.5                  | 0 - 4.5                    |
|   | Width          | 0 - 3.5                  | 0 - 4.5                    |
| Button clamp jaw lever                      | Thickness (mm) | 2.2                      | 2.7                        |
| Button clamp jaw lever Part No.             | Right          | MAZ165070B0              | MAZ166070B0                |
|   | Engraved mark  | H                        | J                          |
|   | Left           | MAZ165080B0              | MAZ166080B0                |
|   | Engraved mark  | H                        | J                          |
| Needle hole guide                           |                | MAZ15501000              | MAZ15601000                |
| Feed plate                                  |                | MAZ15502000              | MAZ15602000                |

## 3. Shape of buttons

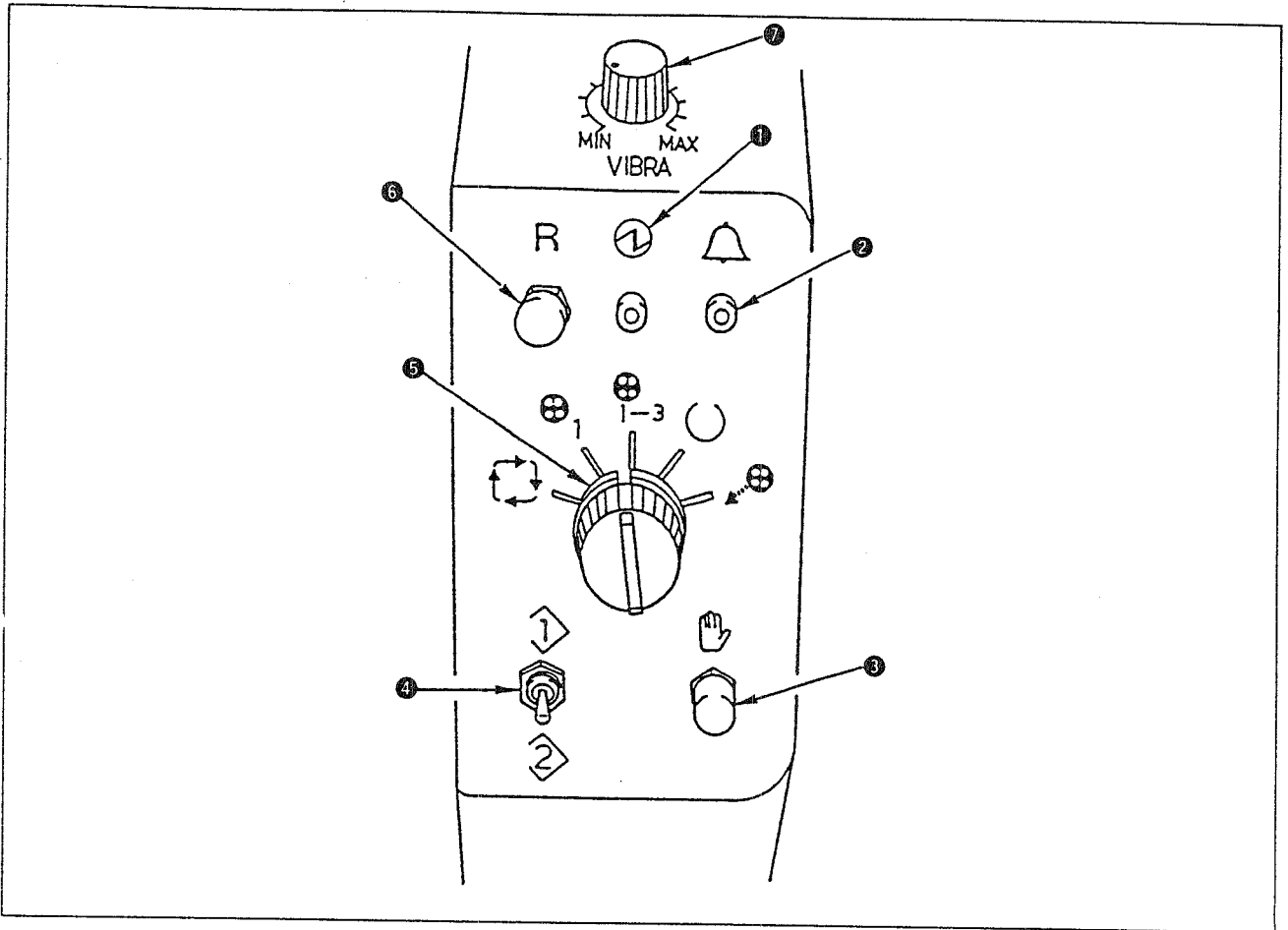
|                  | Applicable buttons  | Non-applicable buttons  |
|------------------|---|---|
| Shape of buttons | <br>1.2 mm or more | <br>1.2 mm or less |
|                  |                    |                    |
|                  |                    | <b>Button without recess on the surface</b>   |
| Remarks          | Thickness of button : 1.8 to 3.5 mm   | Button of which edge is thin is likely not to be fed smoothly.  |










## 2. NAME OF EACH COMPONENT

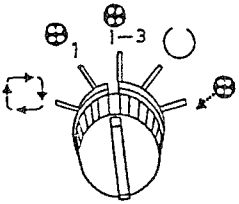




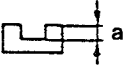




This machine is composed of the following components.



### 3. BUTTON FEEDER UNIT(BR) CONTROL PANEL



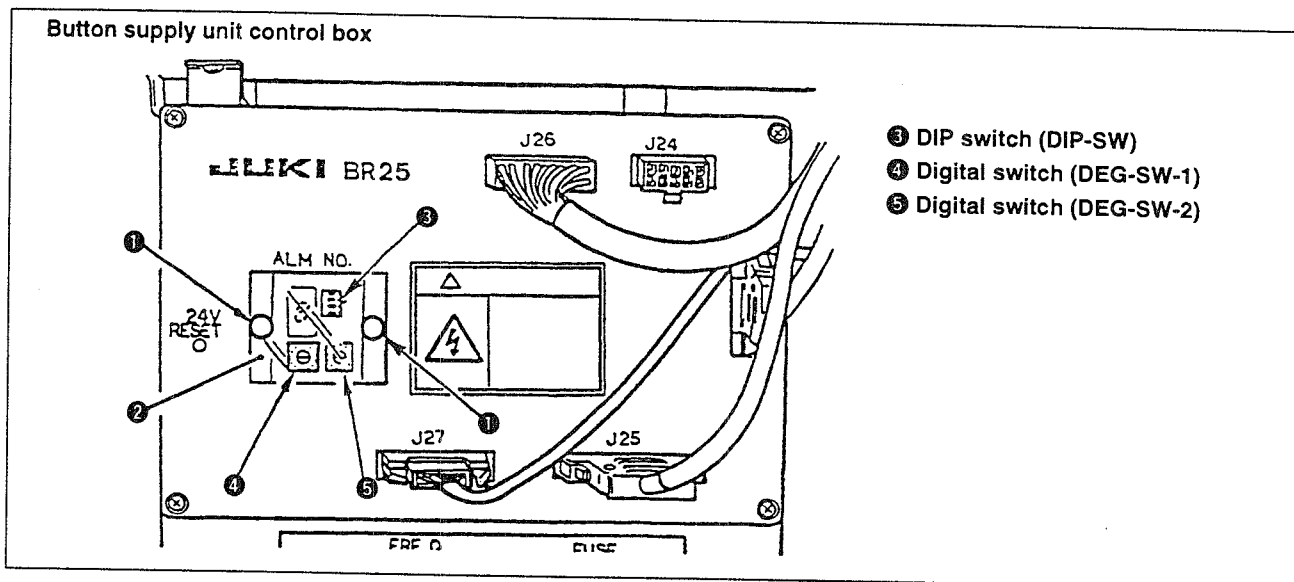
| Symbol and name of switch  | Function  |
|--|---|
| <p>① Power indicator lamp (green)</p>    | <p>Indicates that the power to operation box, control box, etc is turned ON. Lights up when the power is turned ON. If it fails to light up, check the power plug for secure connection and re-turn ON the power switch.</p>  |
| <p>② Alarm indicator lamp (red)</p>    | <p>Lamp to inform of the trouble when a failure of operation occurs.<br/>                     It slowly flashes on and off. : When a failure of operation occurs.<br/>                     (Refer to "Alarm No. indication" on page 34 for the cause of trouble.)<br/>                     It quickly flashes on and off. : Buttons are not fed to the index unit and button checking (button sensing) has been performed 10 times or more.<br/>                     (Note) Alarm lamp flashes on and off after the power has been turned ON. Press the "Ready" key on the sewing machine operation box to go out the lamp.</p> |
| <p>③ MANUAL operation switch</p>     | <p>Used to manually actuate the series of operations under respective operation modes. Selection of the operation mode can be performed by the mode selector switch. (However, the independent sewing mode is excluded.)</p>  |
| <p>④ Inspection switch</p>    | <p>Normally, this switch does not function.<br/>                     It is used to inspect the drive source and the sensors.</p>  |

| Symbol and name of switch   | Function  |
|---|---|
| <p>⑤ Mode selector switch</p>                                | <p><b>1. Automatic sewing mode</b> </p> <p>The sewing machine and the button feeder operate with interlocked. Under this operation mode, depressing the foot pedal lowers the button clamp and makes the sewing machine start sewing a button. When the machine completes sewing of the button, the thread trimmer actuates, then the button feeder actuates to feed next button to be sewn. This series of operations is repeated under the automatic sewing mode.</p> <p><b>2. Independent sewing mode</b> </p> <p>This mode allows the sewing machine to independently operate. Under this mode, the operator sets the button to be sewn in the button clamp on the machine by hand. Then, depressing the foot pedal lowers the button clamp and makes the machine start sewing the button. When the machine completes sewing of the button, the thread trimmer actuates then the button clamp goes up.</p> <p><b>3. Small-lot sewing mode</b>  1-3</p> <p>Basically, series of operations performed under this mode is the same as that under the automatic sewing mode. The parts feeder, however, does not operate under this mode. The operator manually feeds buttons by the number desired to be sewn to the gear of index unit and let the machine perform button sewing.</p> <p><b>4. Prospective button feeding mode</b> </p> <p>Under this mode, the fine positioning completion sensor function is stopped and the machine performs fine positioning of a button in a predetermined period of time (set by DEG-SW-2.).</p>  <p>a = Suited to buttons of which is 1 mm or more.</p> <p><b>5. Button discharging mode</b> </p> <p>Under this mode, buttons in the index unit are automatically discharged by pressing manual operation switch . In this case, the button is discharged to the discharging chute located at the lower section of the button positioner. So, place a pan or the like to receive the discharged buttons at the exit area. At this time, do not place your fingers around the button clamp unit until the operation completes since the button carrier actuates.</p> |
| <p>⑥ Reset switch</p> <p>R</p>                             | <p>Press this switch to reset the machine from its error stop state to its normal operative state. (Note that alarm Nos. 4 and 5 cannot be reset using the reset switch. Turn OFF the power once, eliminate the cause of the trouble and re-turn ON the power to the machine.)</p>  |
| <p>⑦ Parts feeder (P / F) adjusting variable resistor</p>  | <p>Used to adjust the flow of buttons in the feeder bowl.</p>   |



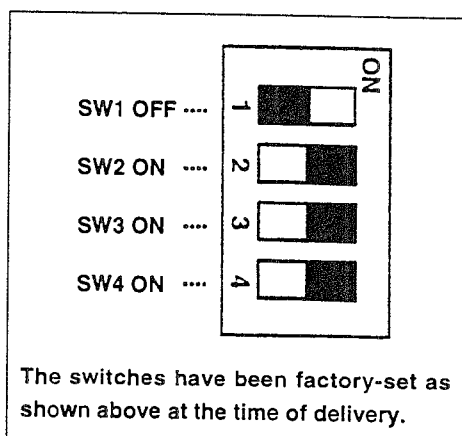
## 4. HOW TO SET THE DIP SWITCHES AND THE DIGITAL SWITCHES

Loosen two screws ①, and open panel ② as illustrated in the following figure to change the setting of the respective switches.



- ③ DIP switch (DIP-SW)
- ④ Digital switch (DEG-SW-1)
- ⑤ Digital switch (DEG-SW-2)

### (1) DIP switch function



| Function                                  | DIP switch |     |     |     |
|---|------------|-----|-----|-----|
|   | SW1        | SW2 | SW3 | SW4 |
| Continuous cycle mode                     | ○          | ×   | △   | △   |
| Double-stepped action of the button clamp | ×          | ○   | △   | △   |
| Adjustment mode                           | ×          | ×   | ○   | ×   |
| Action without button                     | ×          | ×   | ×   | ○   |

○ .... ON    × .... OFF

△ .... The machine performs the operations described in next page and beyond in accordance with combination of the DIP switches.

#### SW1 Continuous cycle mode

Buttons are continuously sewn by keeping the pedal depressed. Refer to the next page and beyond for the detailed description of the sewing machine operating intervals and the length of time during which the machine performs fine positioning of a button.

#### SW2 Double-stepped action of the button clamp

Depress the pedal to its middle position to make the button clamp come down. This function is used in this state to automatically raise the button clamp by returning the pedal to its home position. The sewing machine starts running when the pedal is fully depressed.

Refer to the next page and beyond for the detailed description of the timing at which the button carrier moves after the operation of the sewing machine and the time during which the machine performs fine positioning of a button.

#### SW3 Adjustment mode



This function is used to make each of the driving sources independently actuate in combination with the operation switches. Under this mode, the indicator of "ALM No." indicates ON / OFF of sensors using the numbers corresponding to the respective sensors.

#### SW4 Action without button

The button detecting sensors are ineffective, and the functions of the sewing machine excluding the button feeder are operative. This function is used to check the performance of the sewing machine. (Do not place a button on the sewing machine.)



**(Note)** To change the functions of the sewing machine by changing over the setting of DIP switch ③ and digital switches ④ and ⑤, turn OFF the power to the machine first, change the switch setting and turn ON the power to the machine. Change over the setting position of DIP switches between ON and OFF without fail.

(2) List of functions and setting of the DIP switch and the digital switch (part 1)

| No. | Function   | Application   | Automatic sewing mode (Note 3)    | Prospective button feeding mode (Note 8)   | Set position of ③ DIP-SW |   |   |   |
|-----|--|---|--|---|--------------------------|---|---|---|
|     |  |   |  |   | 1                        | 2 | 3 | 4 |
| 1   | Continuous cycle mode (Note 1)                     | Applicable to many different kinds of button.<br><br>(Buttons are rarely locked in the button feeder.)  | <ul style="list-style-type: none"> <li>Normal operation function</li> <li>Provided with a sensor which detects completion of fine positioning of a button.</li> <li>Automatic button discharging function</li> <li>Stitching timing adjusting function (Note 6)</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>   | <ul style="list-style-type: none"> <li>Normal operation function</li> <li>Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>Stitching timing adjusting function</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>  | ○                        | × | ○ | ○ |
|     |  | Suited to a single type of button (flat buttons).<br><br>Buttons are likely to be locked in the button feeder as compared with the aforementioned No. 1.    | <ul style="list-style-type: none"> <li>High-speed operation function (Note 9)</li> <li>Provided with a sensor which detects completion of fine positioning of a button.</li> <li>Automatic button discharging function</li> <li>Stitching timing adjusting function</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>   | Ditto   | ○                        | × | × | × |
|     |  | Ditto   | Ditto  | <ul style="list-style-type: none"> <li>High-speed operation function</li> <li>Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>Stitching timing adjusting function</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>  | ○                        | × | ○ | × |
|     |  | Two different kinds of continuous sewing and point stitching such as sewing hip pocket can be performed alternately.  | <ul style="list-style-type: none"> <li>Normal operation function</li> <li>Provided with a sensor which detects completion of fine positioning of a button.</li> <li>Automatic button discharging function</li> <li>Function of adjusting the length of time during which the button carrier operates. (Note 11)</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>     | <ul style="list-style-type: none"> <li>Normal operation function</li> <li>Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>Function of adjusting the length of time during which the button carrier operates.</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul> | ○                        | × | × | ○ |
| 5   | Double-stepped action of the button clamp (Note 2) | <b>Standard specifications at the time of delivery</b><br>Applicable to many different kinds of button<br>(Buttons are rarely locked in the button feeder.) | <ul style="list-style-type: none"> <li>Normal operation function (Note 4)</li> <li>Provided with a sensor which detects completion of fine positioning of a button.</li> <li>Automatic button discharging function. (Note 5)</li> <li>Not provided with the stitching timing adjusting function. (Note 10)</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed. (Note 7)</li> </ul> | <ul style="list-style-type: none"> <li>Normal operation function</li> <li>Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>Not provided with the stitching timing adjusting function.</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>                         | ×                        | ○ | ○ | ○ |
|     |  | Suited to a single type of button (flat buttons).<br>Buttons are likely to be locked in the button feeder as compared with the aforementioned No. 5.        | <ul style="list-style-type: none"> <li>High-speed operation function</li> <li>Provided with a sensor which detects completion of fine positioning of a button.</li> <li>Automatic button discharging function</li> <li>Not provided with the stitching timing adjusting function.</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>                                   | Ditto   | ×                        | ○ | × | × |
|     |  | Ditto   | Ditto  | <ul style="list-style-type: none"> <li>High-speed operation function</li> <li>Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>Not provided with the stitching timing adjusting function.</li> <li>Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul>                     | ×                        | ○ | ○ | × |

|  | DEG, SW-1         | DEG, SW-2  | Cautions      |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
|--|-------------------|--|---------------|----------|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------|---------------|--|--------------|----------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------|---------------|---------------|---------------|---|
| <p>Stitching timing (Note 6)</p> <ul style="list-style-type: none"> <li>The length of time during which the button carrier operates and the button clamp jaw levers are in their highest position waiting for a button.</li> </ul> <table border="0"> <tr><td>0 → 0.05 SEC</td><td>8 → 0.05</td></tr> <tr><td>1 → 0.10</td><td>9 → 0.10</td></tr> <tr><td>2 → 0.15 : Standard</td><td>A → 0.15</td></tr> <tr><td>3 → 0.20</td><td>B → 0.20</td></tr> <tr><td>4 → 0.25</td><td>C → 0.25</td></tr> <tr><td>5 → 0.30</td><td>D → 0.30</td></tr> <tr><td>6 → 0.35</td><td>E → 0.35</td></tr> <tr><td>7 → 0.40</td><td>F → 0.40</td></tr> </table> <p>(The length of time during which the index operates is fixed at the following values.)</p> <table border="0"> <tr><td>0 to 7 → 0.08 SEC</td></tr> <tr><td>8 to F → 0.16</td></tr> </table> <p>The longer the aforementioned length of time is specified, the better the overall timing of the sewing machine will become.</p> | 0 → 0.05 SEC      | 8 → 0.05   | 1 → 0.10      | 9 → 0.10 | 2 → 0.15 : Standard   | A → 0.15 | 3 → 0.20 | B → 0.20 | 4 → 0.25 | C → 0.25 | 5 → 0.30 | D → 0.30 | 6 → 0.35 | E → 0.35 | 7 → 0.40 | F → 0.40 | 0 to 7 → 0.08 SEC | 8 to F → 0.16 | <p>The longest time during which the fine positioning of a button is performed. (Note 7)</p> <table border="0"> <tr><td>0 → 0.20 SEC</td><td>8 → 0.20</td></tr> <tr><td>1 → 0.30 : Standard</td><td>9 → 0.30</td></tr> <tr><td>2 → 0.50</td><td>A → 0.50</td></tr> <tr><td>3 → 0.80</td><td>B → 0.80</td></tr> <tr><td>4 → 0.20</td><td>C → 0.20</td></tr> <tr><td>5 → 0.30</td><td>D → 0.30</td></tr> <tr><td>6 → 0.50</td><td>E → 0.50</td></tr> <tr><td>7 → 0.80</td><td>F → 0.80</td></tr> </table> <p>(Length of time during which the triple pawl is held closed.)</p> <table border="0"> <tr><td>0 to 3 → 0.10 SEC</td></tr> <tr><td>4 to 7 → 0.15</td></tr> <tr><td>8 to B → 0.20</td></tr> <tr><td>C to F → 0.25</td></tr> </table> | 0 → 0.20 SEC | 8 → 0.20 | 1 → 0.30 : Standard | 9 → 0.30 | 2 → 0.50 | A → 0.50 | 3 → 0.80 | B → 0.80 | 4 → 0.20 | C → 0.20 | 5 → 0.30 | D → 0.30 | 6 → 0.50 | E → 0.50 | 7 → 0.80 | F → 0.80 | 0 to 3 → 0.10 SEC | 4 to 7 → 0.15 | 8 to B → 0.20 | C to F → 0.25 | <p>(Note 1) The continuous cycle mode is a state where the sewing machine is operated with the pedal held depressed. This means that the button clamp jaw levers are in the standby state with held lowered. In this case, however, the button clamp jaw levers can be lifted by releasing the pedal.</p> <p>(Note 2) When the double stepped action function of the button clamp is selected, depress the pedal every time to operate the button clamp. The button clamp jaw levers stand ready for operation in their highest position.</p> <p>(Note 3) Automatic stitching mode</p> <ul style="list-style-type: none"> <li>When the automatic stitching mode is specified, the fine positioning completion detecting sensor will function. This means that the sewing machine will not start unless a button is supplied to the button clamp jaw levers.</li> </ul> <p>(Note 4) Normal operation function</p> <ul style="list-style-type: none"> <li>Function to place no button on the shutter plate excluding fine positioning of a button.</li> <li>A load is not likely to be applied to the shutter plate and the carrier. As a result, the related components do not easily break.</li> </ul> <p>(Note 5) Automatic button discharging function</p> <ul style="list-style-type: none"> <li>If the fine positioning completion sensor fails to detect the completion of the fine positioning of button to feed a button, and the predetermined time to perform fine positioning is exceeded, the machine will automatically release the shutter plate to make the button carrier actuate. If the button discharging function is performed three times continuously, ERROR 3 will result. To reset the ERROR, press the MANUAL operation switch. If the automatic discharging occurs frequently, suppose that some mechanical trouble has occurred and check the mechanical components for failure.</li> </ul> |
| 0 → 0.05 SEC   | 8 → 0.05          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 1 → 0.10   | 9 → 0.10          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 2 → 0.15 : Standard  | A → 0.15          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 3 → 0.20   | B → 0.20          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 4 → 0.25   | C → 0.25          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 5 → 0.30   | D → 0.30          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 6 → 0.35   | E → 0.35          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 7 → 0.40   | F → 0.40          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 0 to 7 → 0.08 SEC  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 8 to F → 0.16  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 0 → 0.20 SEC   | 8 → 0.20          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 1 → 0.30 : Standard  | 9 → 0.30          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 2 → 0.50   | A → 0.50          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 3 → 0.80   | B → 0.80          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 4 → 0.20   | C → 0.20          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 5 → 0.30   | D → 0.30          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 6 → 0.50   | E → 0.50          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 7 → 0.80   | F → 0.80          |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 0 to 3 → 0.10 SEC  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 4 to 7 → 0.15  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 8 to B → 0.20  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| C to F → 0.25  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| <p>Releasing the pedal while the sewing machine is in operation will retard the time at which the button carrier actuates by one second.</p>   |                   | <p>(Note 6) Stitching timing adjusting function (DEG, SW-1)</p> <ul style="list-style-type: none"> <li>This function is effective only when the continuous stitching function is specified (Nos. 1 to 4).</li> <li>When one to four buttons are continuously sewn, the sewing speed will gradually decrease by stages and the length of time required to sew the buttons will change. As a result, the operator's constant sewing rhythm will be disturbed. To achieve a constant sewing speed, this function is used to adjust the length of time required to sew the first to third buttons to that is required to sew the fourth button.</li> </ul> |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| <p>Since the function of adjusting the stitching timing is not provided, DEG-1 has the function of setting the length of time at which the triple pawl actuates after the index has operated. (Note 10)</p> <p>(Index time : DEG-1)</p> <table border="0"> <tr><td>0 to 7 → 0.08 SEC</td></tr> <tr><td>(Standard specification is "2" at the time of delivery.)</td></tr> <tr><td>8 to F → 0.16</td></tr> </table>   | 0 to 7 → 0.08 SEC | (Standard specification is "2" at the time of delivery.)   | 8 to F → 0.16 |          | <p>(Note 7) Function to adjust the length of time required to finely position a button (DEG, SW-2)</p> <ul style="list-style-type: none"> <li>This function is used to set the time to actuate the automatic button discharging function.</li> <li>This function is also used to set the length of time during which the fine positioner operates when the prospective button feeding function is specified.</li> </ul> <p>(Note 8) Prospective button feeding function</p> <ul style="list-style-type: none"> <li>Use this function when sewing a button which has a recess on the surface (the difference in height between the bottom of recess and edge is 1 mm or more.).</li> <li>When this function is used, the fine positioning completion detecting sensor becomes inoperative. So, the machine performs fine positioning of a button for the length of time set using the DEG, SW-2, and the machine, every time, opens the shutter plate and actuates the button carrier constantly at the predetermined time. This means that the length of time required for sewing is likely to change when compared with the sewing under the automatic sewing mode. When this function is used, the fine positioning completion detecting sensor becomes inoperative. Consequently, the sewing machine starts even when a button is not fed to the button clamp jaw levers. When this function is used, ERROR 3, which occurs when the automatic button discharging function is used, will not occur.</li> </ul> |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 0 to 7 → 0.08 SEC  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| (Standard specification is "2" at the time of delivery.)   |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |
| 8 to F → 0.16  |                   |  |               |          |   |          |          |          |          |          |          |          |          |          |          |          |                   |               |  |              |          |                     |          |          |          |          |          |          |          |          |          |          |          |          |          |                   |               |               |               |   |

**(3) List of functions and setting of the DIP switch and the digital switch (part 2)**

| No. | Function                                  | Application  | Automatic stitching mode (Note 3)   | Prospective button feeding mode (Note 8)   | Set position of DIP, SW |   |   |   |
|-----|---|--|--|---|-------------------------|---|---|---|
|     |   |  |  |   | 1                       | 2 | 3 | 4 |
| 8   | Double-stepped action of the button clamp | Suited to be used exclusive for point stitching such as sewing hip pockets | <ul style="list-style-type: none"> <li>• Normal operation function</li> <li>• Provided with a sensor which detects completion of fine positioning of a button.</li> <li>• Automatic button discharging function</li> <li>• Function of adjusting the length of time during which the button carrier operates. (Note 11)</li> <li>• Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul> | <ul style="list-style-type: none"> <li>• Normal operation function</li> <li>• Prospective button feeding function (Not provided with a sensor which detects completion of fine positioning of a button.)</li> <li>• Function of adjusting the length of time during which the button carrier operates.</li> <li>• Function of adjusting the length of time during which the fine positioning of a button is performed.</li> </ul> | ×                       | ○ | × | ○ |

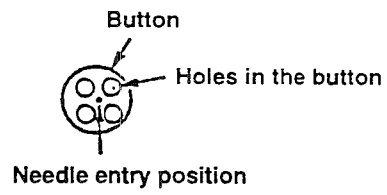
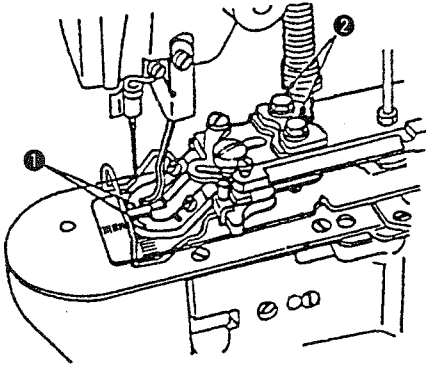
|  | DEG, SW-1   | DEG, SW-2 | Cautions   |
|--|---|-----------|--|
|  | <ul style="list-style-type: none"> <li>• Length of time during which the button carrier operates.</li> <li>0 → 0.20 SEC      8 → 0.20</li> <li>1 → 0.50          9 → 0.50</li> <li>2 → 0.80          A → 0.80</li> <li>3 → 1.20          B → 1.20</li> <li>4 → 1.60          C → 1.60</li> <li>5 → 2.00          D → 2.00</li> <li>6 → 3.00          E → 3.00</li> <li>7 → SW stand-by    F → SW stand-by</li> <li>(Length of time during which the index operates.) (Note 12)</li> <li>0 to 7 → 0.08 SEC</li> <li>8 to F → 0.16</li> </ul> |           | <p>(Note 9) High-speed operating function</p> <ul style="list-style-type: none"> <li>• This function means that a button always rests on the shutter plate.</li> <li>• Since the button carrier operates with the shutter plate closed, a load is likely to be applied to the shutter plate and the button carrier when the machine is locked.</li> </ul> <p>(Note 10) Not provided with the stitching timing adjusting function. In the double-stepped action of the button clamp (Nos. 5 to 7), the stitching timing adjusting function is not necessary. So, the DEG, SW-1 is used only to set the length of time required to make the triple pawl actuate after the index operated.</p> <p>(Note 11) Function to adjust the button carrier operating timing</p> <ul style="list-style-type: none"> <li>• If the sewing product may be caught in the button carrier when attaching buttons to hip pockets or the like, this function can be used to delay the actuation of the button carrier in accordance with the length of time specified by the DEG, SW-1.</li> </ul> <p>(Note 12) SW (Switch) stand-by</p> <ul style="list-style-type: none"> <li>• The button carrier operates when the manual operation switch on the operation panel is pressed.</li> <li>• If the knee switch is used, connect it to the pins 9 and 10 of J24 on the control box. Then the "switch stand-by" function can be used. (This feature is available by a special order.)</li> </ul> <p>(Caution)</p> <ul style="list-style-type: none"> <li>• For all the functions controlled by the DIP switches (DIP-SW), it is possible to stop the subsequent action of the button carrier by pressing the manual operating switch or the knee switch (special order part) while the sewing machine is in operation, and to actuate the button carrier by pressing it again.</li> <li>• If a button comes off the index unit, the machine makes the button carrier actuate, with no button, once after the completion of sewing to allow the operator to remove the material from the machine with ease.</li> <li>• If, when the automatic button discharging function works, the predetermined length of time for fine positioning of a button has passed before a button is placed on the button carrier, the shutter plate will be opened and the button will be discharged. At this time, it is possible that the discharged button is accidentally placed on the button carrier. In this case, the button carrier will be actuated twice. As a result, two buttons will be fed to the button carrier, causing needle breakage. To prevent this, the time for starting the sewing machine is retarded by 0.5 sec. if the automatic button discharging function has actuated. (It is possible to decrease the frequency of actuation of the automatic button discharging function by increasing the length of time during which the machine performs fine positioning of a button.)</li> <li>• When the double-stepped action of the button clamp is selected and the operator operates the pedal too quickly, the button clamp jaw levers will go up before it opens after the completion of sewing. In this case, the operator cannot smoothly move the material on the machine. To prevent this, the time for turning ON the button clamp jaw lever lifting magnet should delay by 0.2 sec. to give priority to mechanical actions.</li> </ul> |

## 5. ADJUSTMENT

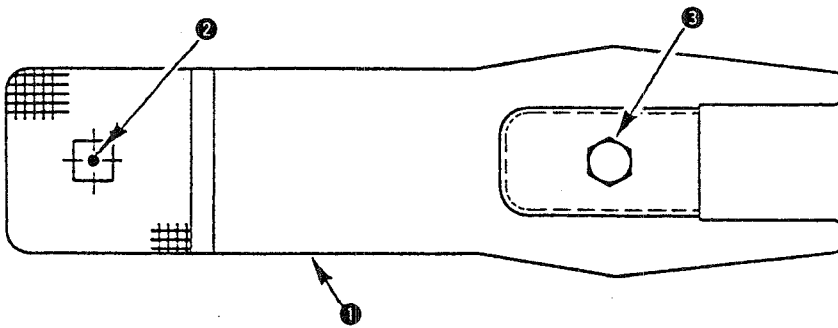
[LK-1903-31 △ components]

### Standard Adjustment

- (1) Adjusting the position of the button clamp jaw lever  
(adjusting the position of the origin)



- (2) Adjusting the feed plate



| Adjustment Procedures   | Results of Improper Adjustment   |
|---|--|
| <p>(1) Select the pattern No. 99 using the operation panel.</p> <p>(2) Press the [Ready] key on the operation panel. Then the button clamp unit will go up and travel to the position of the origin.</p> <p>(3) Place a button in button clamp jaw levers ❶.</p> <p>(4) Depress the pedal to the first step. When the button clamp unit has come down, turn the hand pulley until the digital indication on the operation panel shows "E3".</p> <p>(5) Detach the foot from the pedal.</p> <p>(6) Turn the hand pulley and check that the center of the needle enters the center of the button.</p> <p>(7) If the center of the needle is not located in the center of the button, loosen setscrews ❷ in the button clamp jaw lever base to adjust so that the center of the needle enters the center of the button.</p> <p>(8) After the adjustment, make sure of the shape of the sewing pattern. Also, make sure that the needle securely enters the holes in the button.</p> <p><b>As for the way of confirmation, refer to "Checking the contour of a sewing pattern" in the Instruction Manual for the LK-1900.</b></p> | <ul style="list-style-type: none"> <li>• If the center of the button is not located in the position of the origin, the needle comes in contact with the hole of the button, causing needle breakage or button breakage. In addition, thread knotting by needle feeding may not be made.</li> </ul>   |
| <p>(1) Select the pattern No. 99 using the operation panel.</p> <p>(2) Press the [Ready] key on the operation panel. Then, the button clamp unit will go up and travel to the position of the origin.</p> <p>(3) Press again the [Ready] key to go out the sewing LED.</p> <p>(4) Adjust feed plate ❶ by loosening screw ❸ so that needle hole guide ❷ comes to the center of the recessed part of feed plate ❶.</p>  | <ul style="list-style-type: none"> <li>• Even if the needle hole guide is located in the center of the recessed part of the feed plate, the needle is likely to come in contact with the feed plate when the sewing size becomes large. In this case, replace the feed plate with another one corresponding to the sewing size.</li> </ul> |

### Standard Adjustment

#### (3) Adjusting the lifting amount of the button clamp

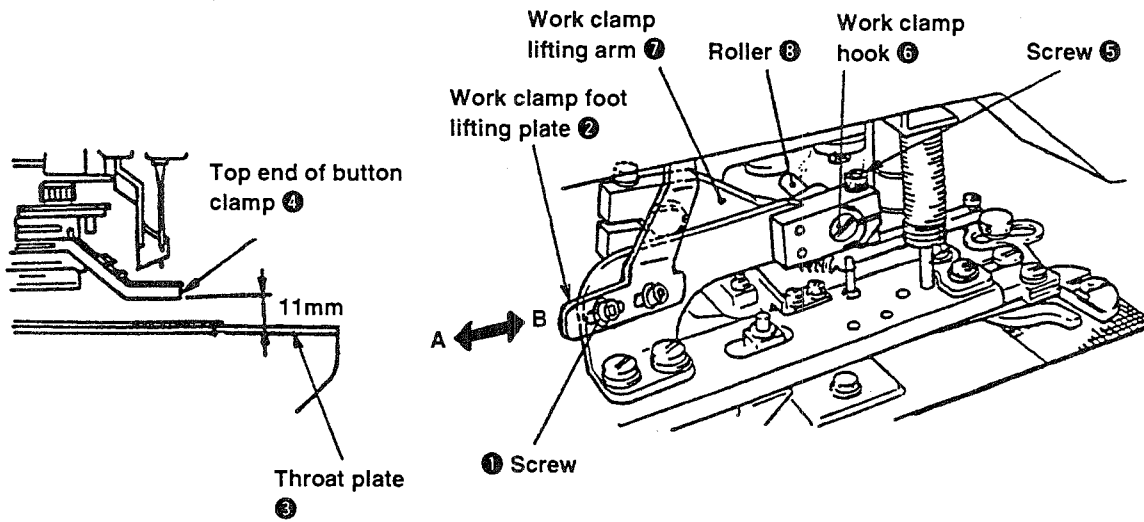


Fig. 1

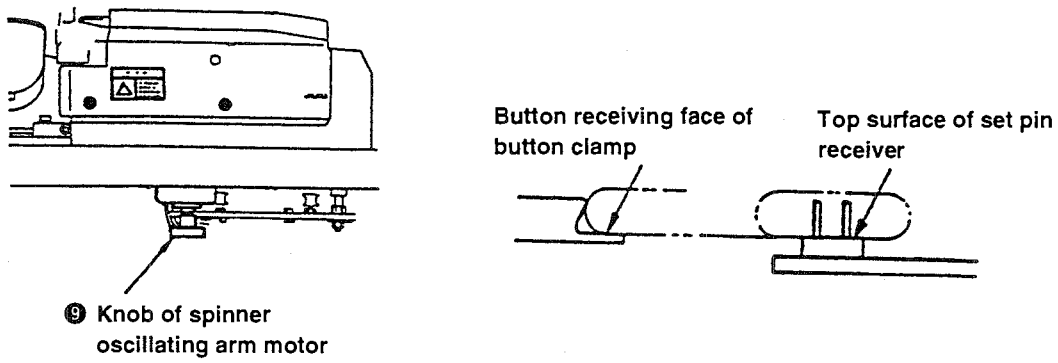


Fig. 2

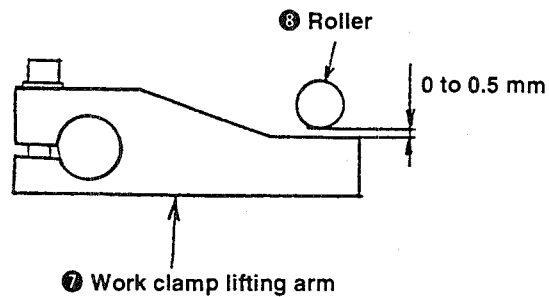


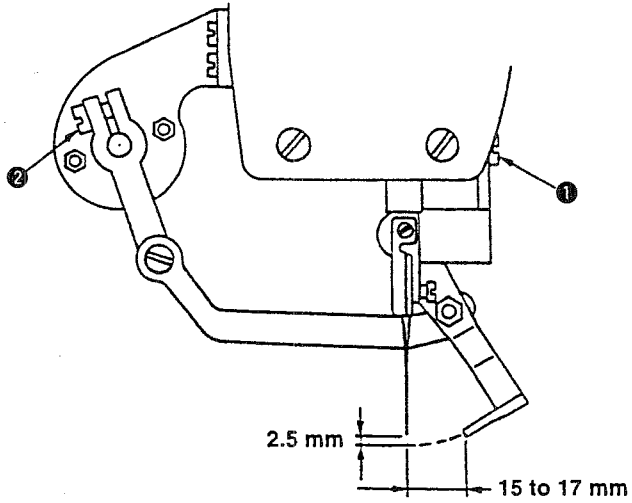
Fig. 3



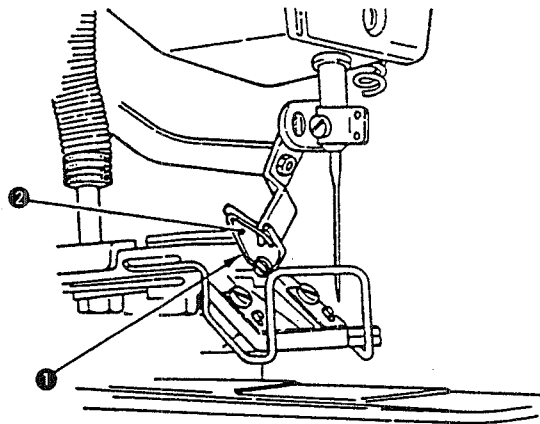
| Adjustment Procedures  | Results of Improper Adjustment   |
|--|--|
| <p>(1) Select the pattern No. 99 using the operation panel.</p> <p>(2) Press the [Ready] key. Then the button clamp will go up and come to the position of the origin.</p> <p>(3) Press again the [Ready] key to let the sewing LED go out.</p> <p>(4) Loosen two screws ①, and move work clamp foot lifting plate ② back and forth in the direction of arrow to adjust so that the top end of button clamp ④ is 11 mm above throat plate ③. Move work clamp foot lifting plate ② in direction A to decrease the lifting amount, and move it in direction B to increase the lifting amount. (Fig. 1)</p> <p>(5) Turn knob ⑨ of the spinner oscillating arm motor, and confirm that the button receiving face of button clamp is almost flush with the top surface of set pin receiver. (Fig. 2)</p> <p>(6) Turn knob ⑨ of the spinner oscillating arm motor, and when work clamp lifting arm ⑦ has stopped its lifting once, loosen screw ⑤ and turn work clamp hook ⑥ which has an eccentric shaft to adjust so that a clearance of 0 to 0.5 mm is provided between roller ⑧ and work clamp lifting arm ⑦. (Figures.1 and 3)</p> <p>(7) After the adjustment, check that the buttons are securely supplied to the button clamp.</p> | <ul style="list-style-type: none"> <li>• There is a case that the lifting amount of the button clamp may be more or less than the standard adjustment value in accordance with the shape of button.</li> </ul> |

Standard Adjustment

(4) Adjusting the wiper



(5) Adjusting the wiper spring



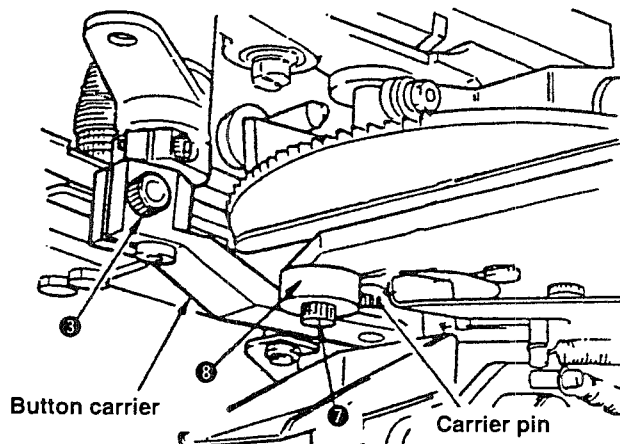
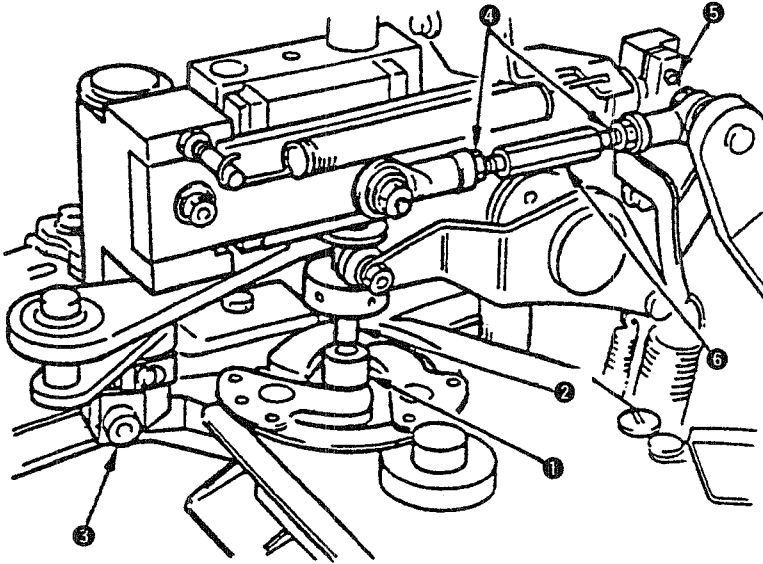
| Adjustment Procedures  | Results of Improper Adjustment  |
|--|---|
| <p>(1) Bring the needle to the stop position of the end of sewing.</p> <p>(2) Loosen screw ① to adjust so that a clearance of 2.5 mm or more is provided between the wiper and the needle.</p> <p>(3) Loosen screw ② to adjust so that a distance of 15 to 17 mm is provided between the end face of the wiper and the center of the needle.</p> | <ul style="list-style-type: none"> <li>• If the distance, 15 to 17 mm, is excessive or too small, thread cannot be retained.</li> </ul>   |
| <p>(1) Measure the retaining force of the wiper spring, and perform the works after step (2) if the tension is not 20 to 30g.</p> <p>(2) Remove screw, and remove wiper spring ① from wiper ②.</p> <p>(3) Correct properly wiper spring ①, and attach it to the wiper.</p>   | <ul style="list-style-type: none"> <li>• If the retaining force is too high, thread is likely to protrude above the button.</li> <li>• If the retaining force is too low, the needle thread is likely to slip off.</li> <li>• If the position of the wiper spring is not proper, it will not retain the thread, causing needle breakage.</li> </ul> |

## 6. ADJUSTMENT OF THE FINE POSITIONING COMPONENTS

[BR25 COMPONENTS]

### Standard Adjustment

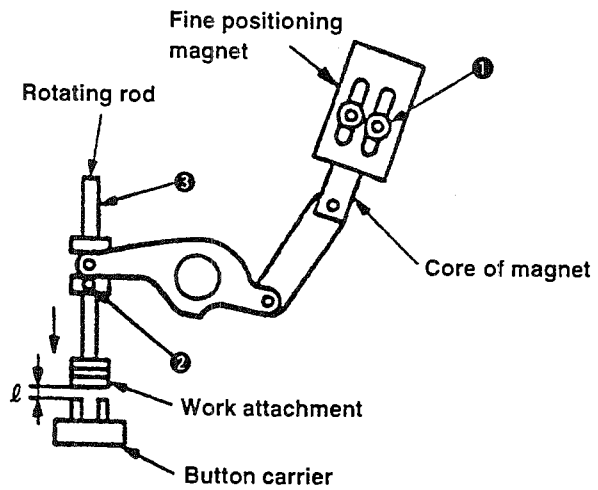
#### (1) Adjusting centering of the carrier pin



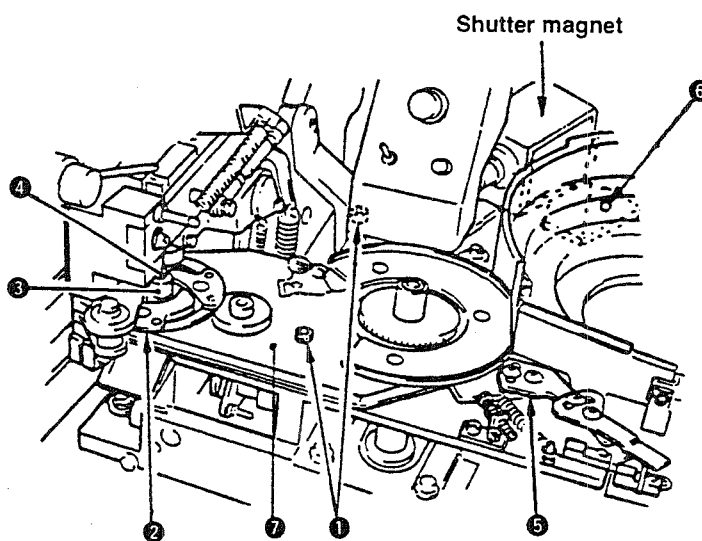
| Adjustment Procedures   | Results of Improper Adjustment   |
|---|--|
| <p><b>1. Remove the work attachment from rotating rod ②, and insert centering ring ① to the carrier pin.</b></p> <p><b>(Note) When using the centering ring, place the side of small inner diameter to the upper side.</b></p> <p><b>2. Centering in the lateral direction</b></p> <p>(1) Loosen screw ③ and setscrew ⑦ in the eccentric cam.</p> <p>(2) Find a place where rotating rod ② smoothly enters centering ring ①, and tighten screw ③.</p> <p>(3) Fit eccentric cam ③ to the button carrier, and tighten setscrew ⑦ in the eccentric cam with attention so that the button carrier does not move.</p> <p><b>3. Centering in the longitudinal direction</b></p> <p>When the centering is not made by the item 2, perform following adjustment while keeping screw ③ held loosened.</p> <p>(1) Loosen two rod end nuts ④. (The nut in the rear is a left-handed screw.)</p> <p>(2) Loosen screw ⑤, and separate urethane rubber from the end face of LM guide.</p> <p>(3) Turn connecting rod ⑥, find a place where rotating rod ② smoothly enters centering ring ①, and fit urethane rubber to LM guide. Then avoid the play in the longitudinal direction.</p> <p>(4) After confirming that the center is not shifted, tighten nut ④ so that connecting rod ⑥ does not turn. Then tighten screw ⑤.</p> <p>(5) After fixing the carrier pin in the longitudinal direction, tighten screw ③ to fix it in the lateral direction.</p> <p>(6) Take out centering ring ①, and turn the knob of spinner oscillating arm motor to check whether the pin smoothly moves.</p> <p><b>(Note)</b></p> <p><b>Perform the adjustment in the longitudinal direction only when the centering in the lateral direction is not made. When performing the adjustment, be sure to confirm following points.</b></p> <ol style="list-style-type: none"> <li>1. There is no play in the longitudinal direction when the spinner oscillating arm is in the position of the origin.</li> <li>2. Centering of the spinner oscillating arm is made at the position of the origin.</li> <li>3. The spinner oscillating arm is actuated, and the button is set to the button clamp jaw levers.</li> <li>4. The center of the button clamp jaw levers is aligned with the center of the button carrier.</li> </ol> | <ul style="list-style-type: none"> <li>• If urethane rubber hits strongly against LM guide, the motion of carrier pin is likely to be tight when the knob of spinner oscillating arm motor is turned.</li> </ul> |

### Standard Adjustment

#### (2) Adjusting the clearance between the work attachment and the carrier pin



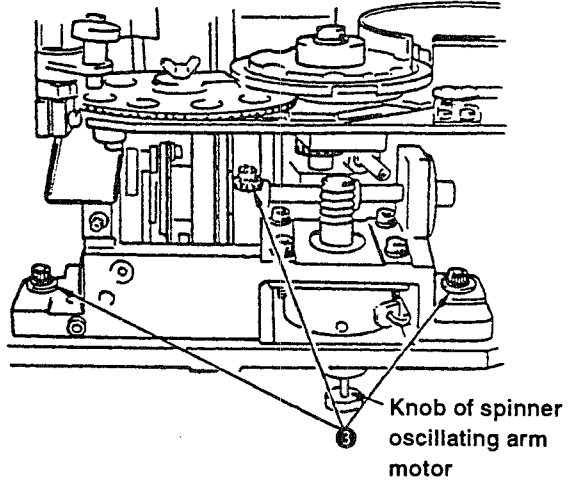
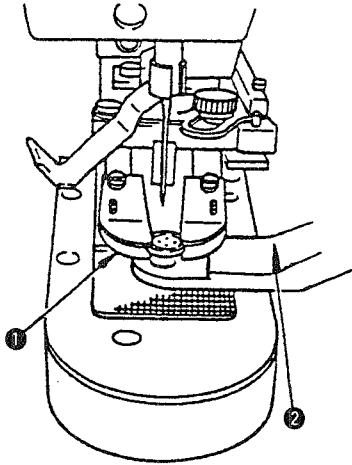
#### (3) Adjusting centering of button positioning components



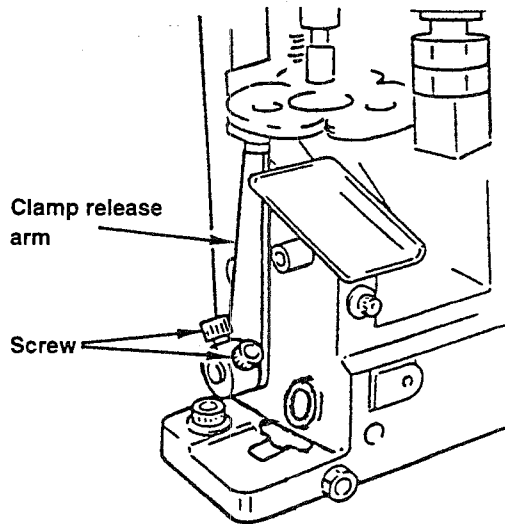
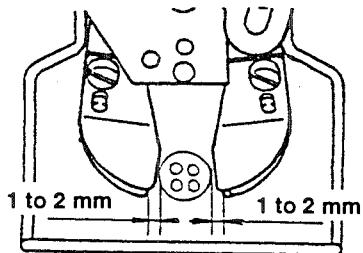
| Adjustment Procedures   | Results of Improper Adjustment |
|---|--------------------------------|
| <p>(1) Loosen screw ① .</p> <p>(2) Draw the core of fine positioning magnet to bring the work attachment to its lowest position.</p> <p>(3) Adjust so that the clearance between the work attachment and the button carrier is 0.1 mm or less and so that they do not interfere with the carrier pin.</p> <p><b>(Note) Open the shutter plate, and perform the adjustment.</b></p>  |                                |
| <p>(1) Remove the work attachment from rotating rod ④ .</p> <p>(2) Loosen setscrews ① in the top plate and setscrew ⑥ in the shutter magnet support plate.</p> <p>(3) Insert centering ring ③ into the center of triple pawl ② .</p> <p>(4) Draw triple pawl dog ⑤ , and insert centering ring ③ into it.</p> <p>(5) Lower rotating rod ④ , and move top plate ⑦ so that the rotating rod smoothly enters centering ring ③ .</p> <p>(6) When the centering is performed, tighten screws ① and ⑥ .</p> |                                |

Standard Adjustment

(4) Adjusting centering the button clamp jaw levers and the button carrier



(5) Adjusting opening of the button clamp jaw levers

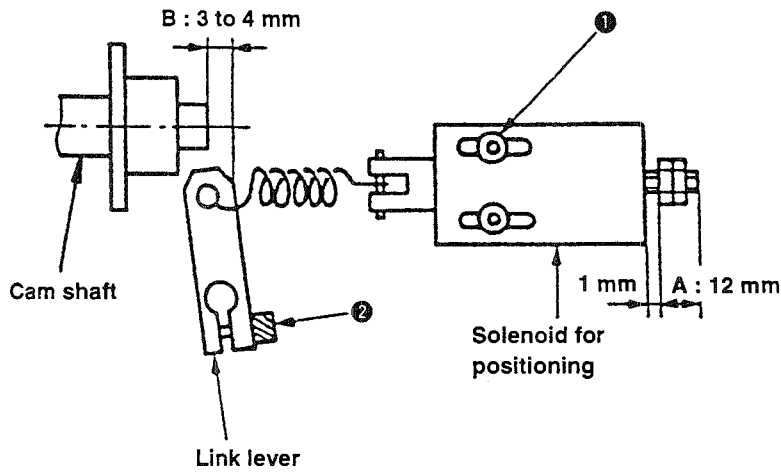




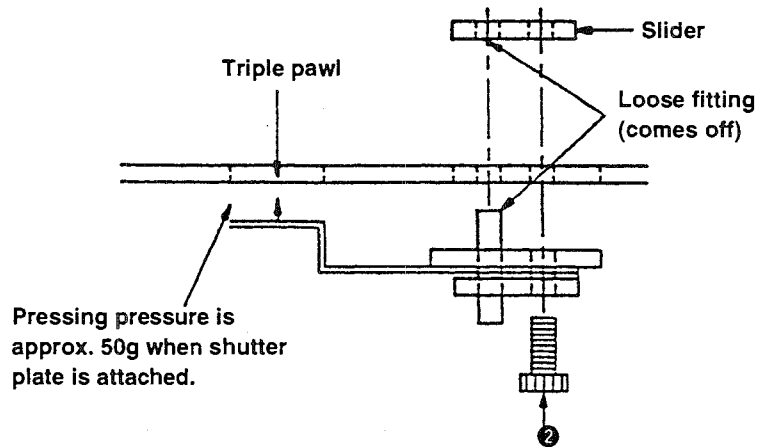
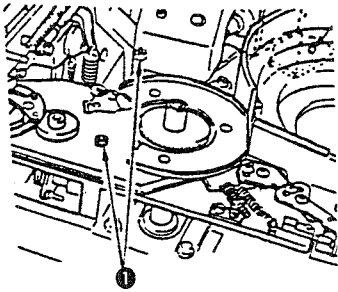
| Adjustment Procedures  | Results of Improper Adjustment   |
|--|--|
| <p>(1) Bring button carrier ② to the origin and tilt the sewing machine.</p> <p>(2) Loosen setscrews ③ in the machine frame and setscrew ((3)-⑥) in the shutter magnet support plate.</p> <p>(3) Raise the sewing machine, and set a button to button carrier ②.</p> <p>(4) Turn the knob of spinner oscillating arm motor, and stop button carrier ② at the position where it most protrudes.</p> <p>(5) Move the machine frame to adjust so that the button set in button carrier ② fits the button retaining portions of the button clamp jaw levers.</p> <p>(6) After the adjustment of the position is completed, return button carrier ② to its origin.</p> <p>(7) Tilt again the sewing machine, and tighten setscrews ③ and ((3)-⑥).</p> <p><b>(Note) This adjustment should be performed after “(3) Adjusting centering of button positioning components” has been completed.</b></p> |  |
| <p>(1) Turn the knob of spinner oscillating arm motor to bring the clamp release arm to a state where it will go no further.</p> <p>(2) Loosen the screws and adjust the clamp release arm so that a clearance of 1 to 2 mm is provided between the button and each of the button clamp jaw levers respectively.</p> <p>(3) Tighten the screws with attention so that the position of clamp release arm does not shift.</p>  | <ul style="list-style-type: none"> <li>• If the clamp release arm comes in contact from the beginning, clamping pressure of button is low, causing failure of button setting or needle breakage.</li> <li>• If the clamp release arm is separated too far, button may not automatically come off even after the button has been sewn.</li> </ul> |

Standard Adjustment

(6) Adjusting output of the solenoid for positioning



(7) Replacing and positioning of the shutter plate



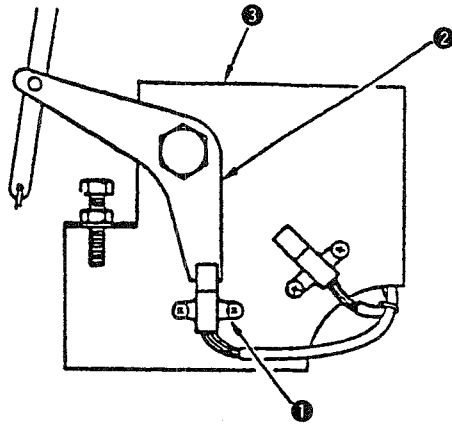
| Adjustment Procedures   | Results of Improper Adjustment   |
|---|--|
| <p>(1) Loosen the double nut located in the rear of the solenoid to adjust so that dimension A should be 12 mm.</p> <p>(2) Loosen screws ❶ and move the solenoid back and forth to adjust so that there is a play of approximately 1 mm on the spring hooked at the top end of the core of solenoid.</p> <p>(3) Confirm that dimension B (dimension between the cam shaft and the link lever) is 3 to 4 mm.<br/>If the dimension is outside the range, loosen screw ❷ and adjust the link lever.</p> <p><b>(Note) Perform this adjustment at the opening position of the triple pawl of the feed plate ø16 (standard part).</b></p> | <ul style="list-style-type: none"> <li>• If output of the solenoid for positioning is excessive, the button is likely to stand when the button is retained. On the contrary, the output is too low, the button is not retained.</li> </ul> |
| <p>(1) Remove screws ❶ fixing the top plate, and raise the top plate.</p> <p>(2) Remove screw ❷ fixing the slider of shutter plate, replace the shutter plate, and tighten screw ❷.</p> <p>(3) Perform the adjustment of centering the triple pawl. (Refer to item (3).)</p> <p>(4) Fix the top plate with screws ❶.</p> <p><b>(Note)</b></p> <ul style="list-style-type: none"> <li>• Bend and attach the shutter plate so as to apply approximately 50g of the pressing pressure of the shutter plate to the triple pawl.</li> <li>• Finally, confirm that the triple pawl smoothly moves.</li> </ul>                             | <ul style="list-style-type: none"> <li>• If there is a clearance between the shutter plate and the triple pawl, it will be a cause of button supply failure.</li> </ul>  |

## 7. ADJUSTMENT OF THE SENSORS

### Standard Adjustment

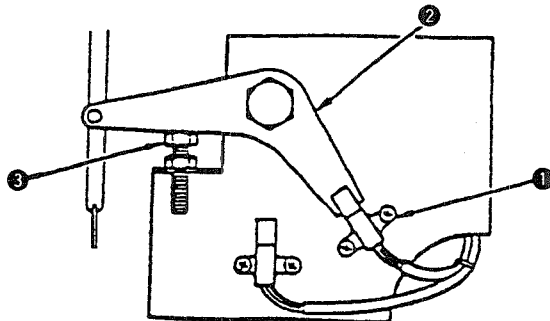
#### (1) Adjusting the switch for start origin (SORG)

- Switch for start origin ❶ is the sensor to detect the returning of foot pedal.



#### (2) Adjusting the switch for start (START)

- Switch for start ❶ is the sensor to detect the depressing of foot pedal.

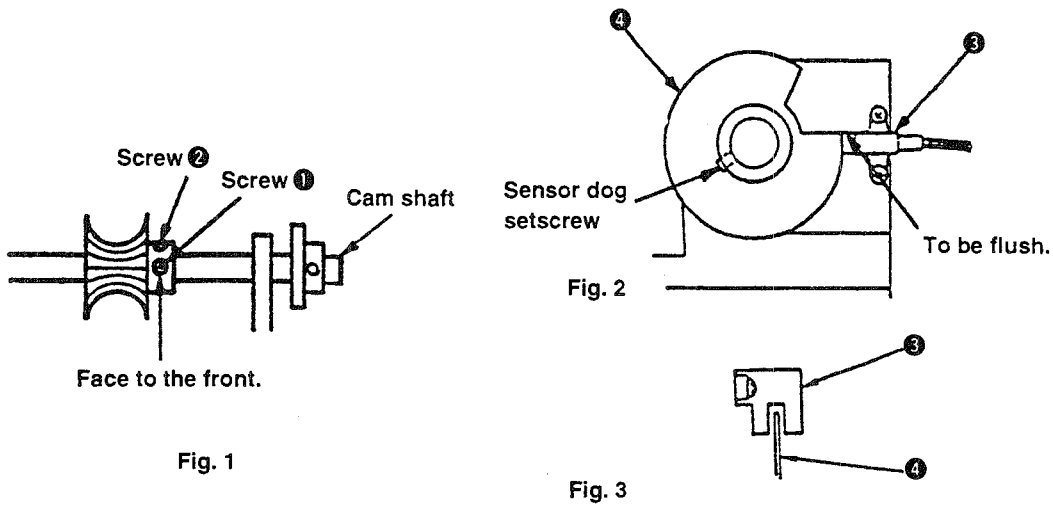


| Adjustment Procedures   | Results of Improper Adjustment  |
|---|---|
| <p>(1) Turn ON the power.</p> <p>(2) Adjust the position of switch ① so that the LED of switch ① goes off when depressing the pedal and returning it.<br/>At this time, confirm that switch ① does not come into contact with 2-step switch lever ② , and that the LED goes off.</p>  | <ul style="list-style-type: none"> <li>• If the attaching of the 2-step switch bracket ③ is bent, and the 2-step switch lever does not smoothly work, LED is likely not to go off.</li> </ul> |
| <p>(1) Turn ON the power.</p> <p>(2) Adjust stopper bolt ③ so that 2-step switch lever ② comes to the center of switch ① when depressing the pedal.<br/>At this time, confirm that switch ① does not come in contact with 2-step switch lever ② and that LED goes off.</p> <p>(3) Adjust the position of switch ① in case they come in contact with each other in step (2).</p> |   |

## Standard Adjustment

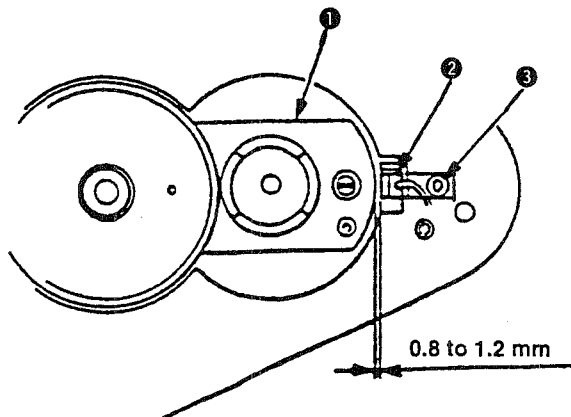
### (3) Adjusting the spinner oscillating arm origin switch (AORG)

- Spinner oscillating arm origin switch ① is the sensor to detect the origin against the cam shaft.



### (4) Adjusting the index origin switch (IORG)

- Index origin switch ① is the sensor to detect the feed-stop of the feed plate.

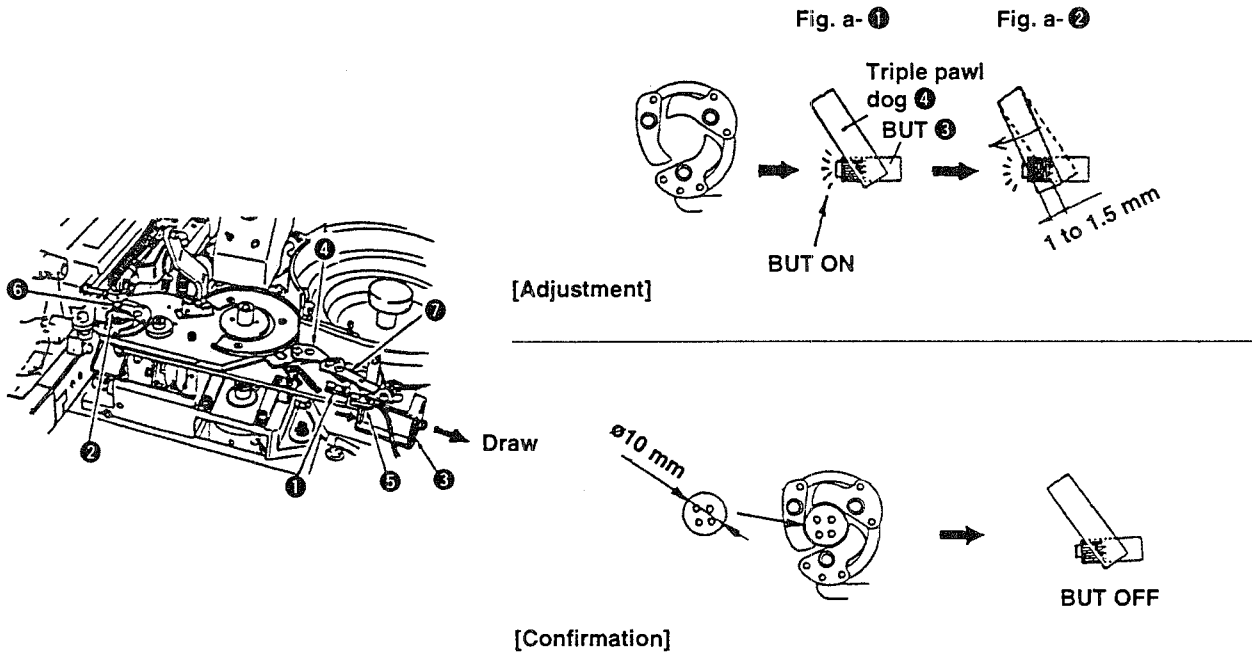


| Adjustment Procedures  | Results of Improper Adjustment |
|--|--------------------------------|
| <ol style="list-style-type: none"> <li>(1) Turn the knob of spinner oscillating arm motor until screw ① of the worm gear faces to the front. (Fig. 1)</li> <li>(2) Loosen sensor dog setscrew ④.</li> <li>(3) Turn the sensor dog so that the upper face of switch ③ is flush with the lower part of the recess of sensor dog ④. (Fig. 2)</li> <li>(4) Bring sensor dog ④ to the center of the slit of switch ①. (Fig. 3)</li> <li>(5) Tighten sensor dog setscrew ④.</li> <li>(6) When the adjustment is completed, turn the knob of spinner oscillating arm motor to return the button carrier to the position of origin.</li> </ol> |                                |
| <ol style="list-style-type: none"> <li>(1) Loosen screw ③.</li> <li>(2) Adjust so that a clearance of 0.8 to 1.2 mm should be provided between the detecting face of switch ② and the outer periphery of Geneva wheel ①.</li> <li>(3) Tighten screw ③.</li> </ol>  |                                |

## Standard Adjustment

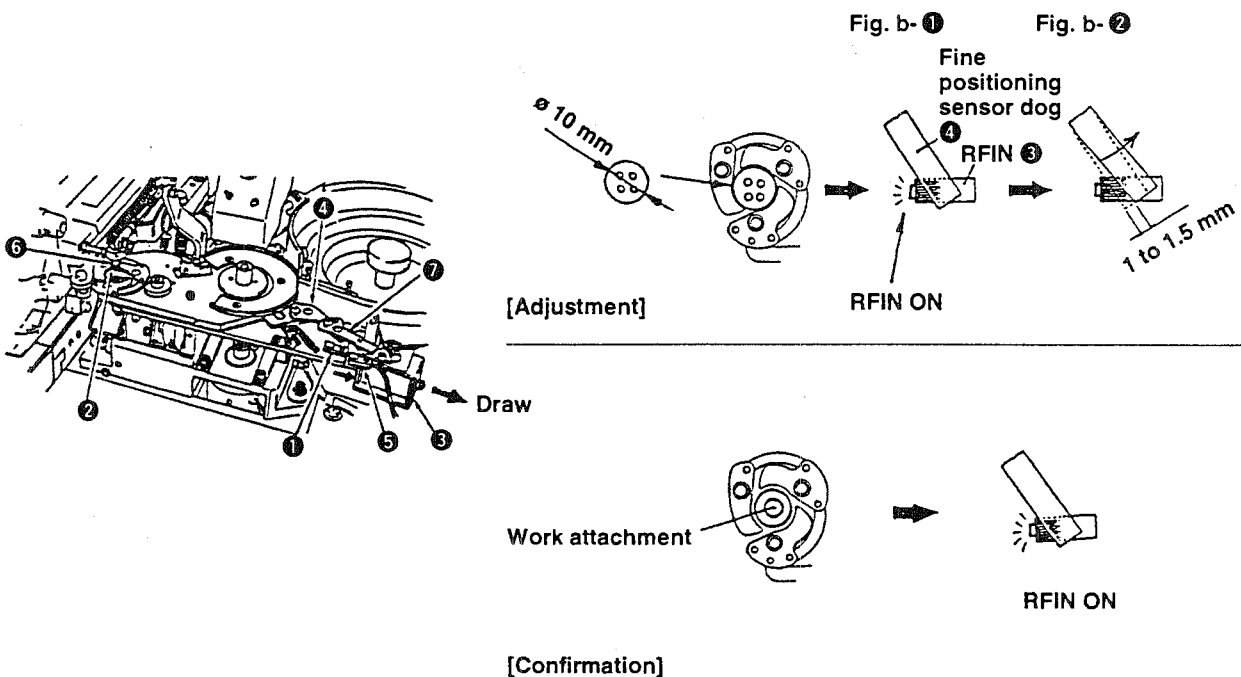
### (5) Adjusting the output of the button positioning detection switch (BUT)

- Button positioning detection switch ① is the sensor to detect whether a button exists within positioner ② when actuating the positioner (triple pawl).  
(It turns (OFF) when a button exists within the positioner, and turns (ON) when a button does not exist.)



### (6) Adjusting the fine positioning completion switch (RFIN)

- Fine positioning completion switch ⑤ is the sensor to confirm the button when the button is set on the carrier pin.  
(It turns (OFF) when a button is set on the carrier pin, and turns (ON) when a button is not set.)



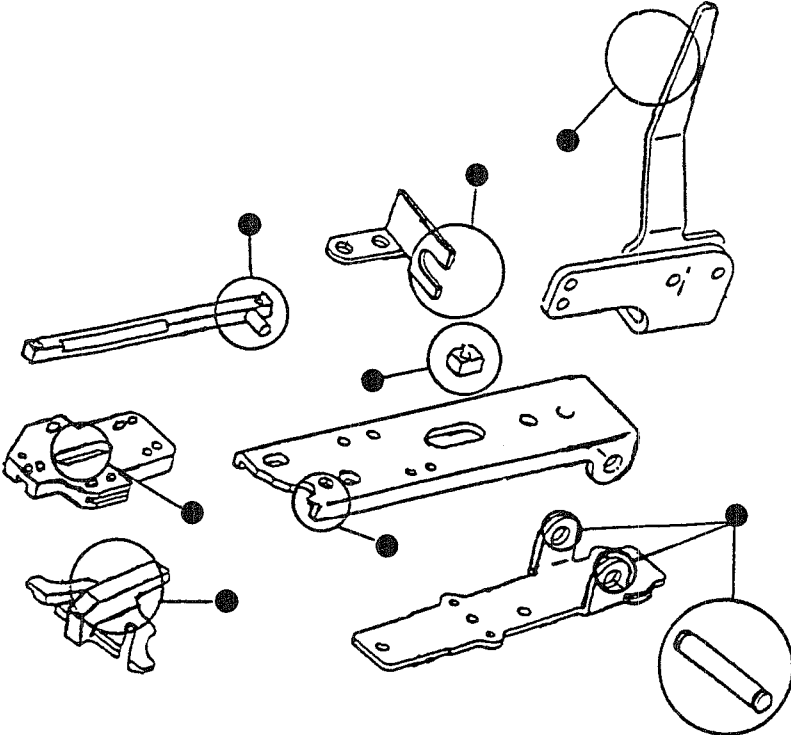


| Adjustment Procedures  | Results of Improper Adjustment |
|--|--------------------------------|
| <p>(1) Draw the core of positioning solenoid ③ by hand to close the triple pawl in a state that there is no button within positioner ② .</p> <p>(2) In a state of the above step (1), loosen the fixing screw of triple pawl dog ④ , and move the triple pawl dog forward by 1 to 1.5 mm (Fig. a-②) from the position where switch ① changes from OFF to ON (Fig. a-①). Then, tighten the fixing screw.</p> <p>(3) Place a ø10 mm button within positioner ② .<br/>Close the triple pawl the same as in the above step ① . At this time, confirm that switch ① turns OFF.</p> <p>(4) Perform again the above step (1) and confirm that switch ① turns ON.</p> <p><b>(Note) It is necessary to adjust the fine positioning completion switch when the aforementioned adjustment has been performed.</b></p>   |                                |
| <p>(1) Place a ø10 mm button within the positioner ② , and draw the core of positioning solenoid ③ to close the triple pawl.</p> <p>(2) In a state of the above step (1), loosen the fixing screw of fine positioning sensor dog ④ , and move the fine positioning sensor dog backward by 1 to 1.5 mm (Fig. b-②) from the position where switch ① changes from OFF to ON (Fig. b-①). Then, tighten the fixing screw.</p> <p>(3) Perform again the above step (1) and confirm that switch ① turns ON.</p> <p>(4) Remove the button, lower work attachment ⑤ , draw the core of positioning solenoid ③ by hand, and confirm that switch ① turns ON when the triple pawl retains the outer periphery of work attachment ⑤ .</p> <p><b>(Note) It is necessary to complete adjusting the button positioning detection switch before performing the aforementioned adjustment.</b></p> |                                |

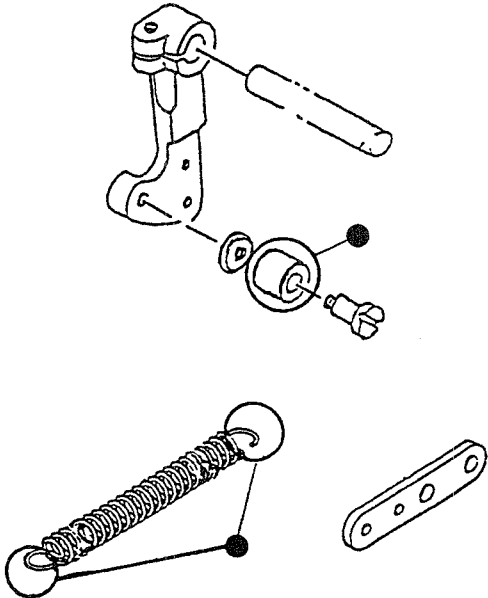
# 8. GREASING PARTS

Grease is applied to the portions with ● mark.

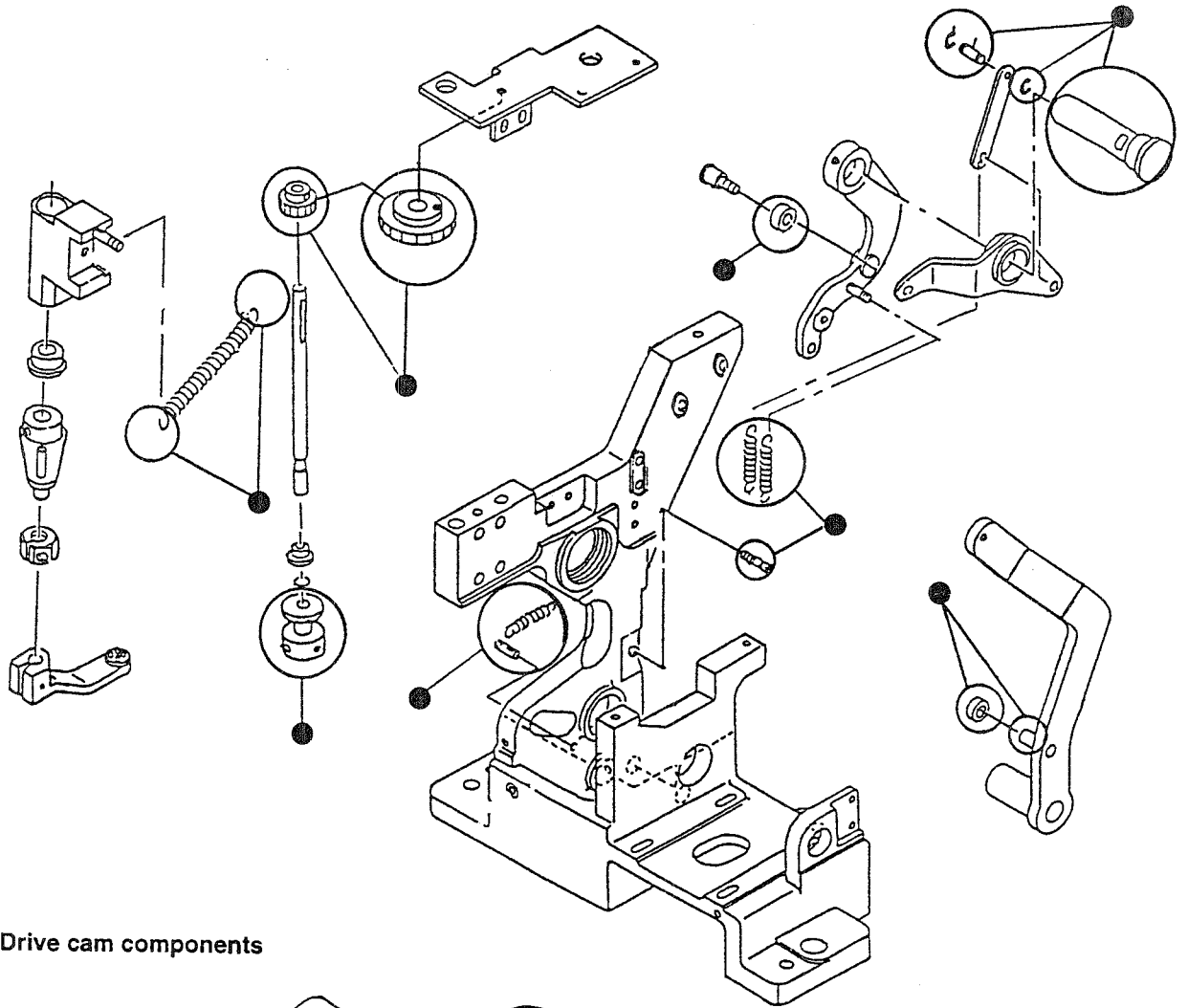
## Button clamp components



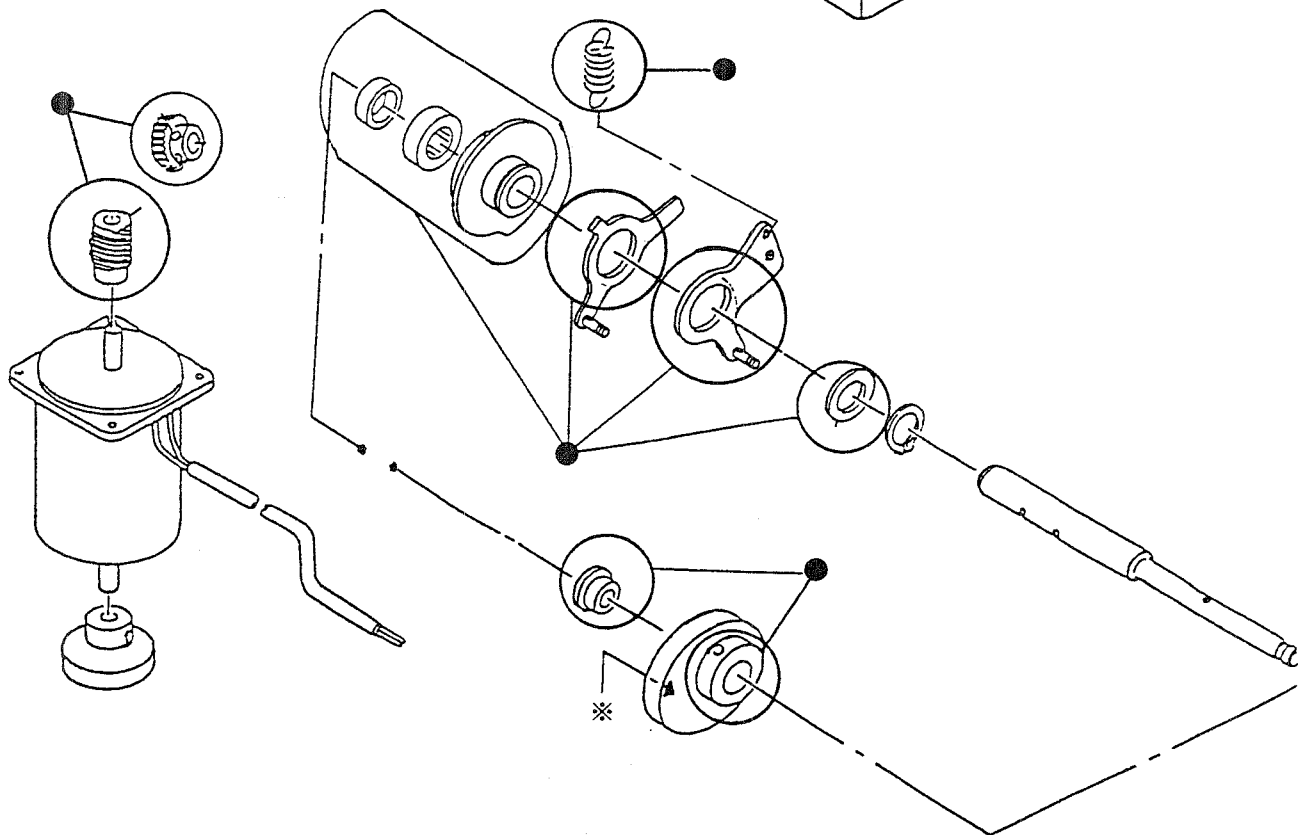
## Work clamp foot components



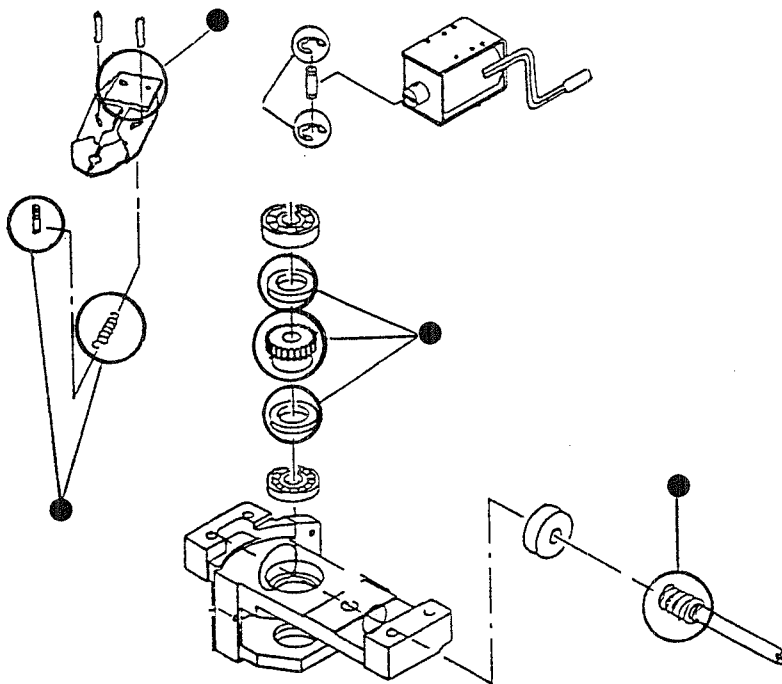
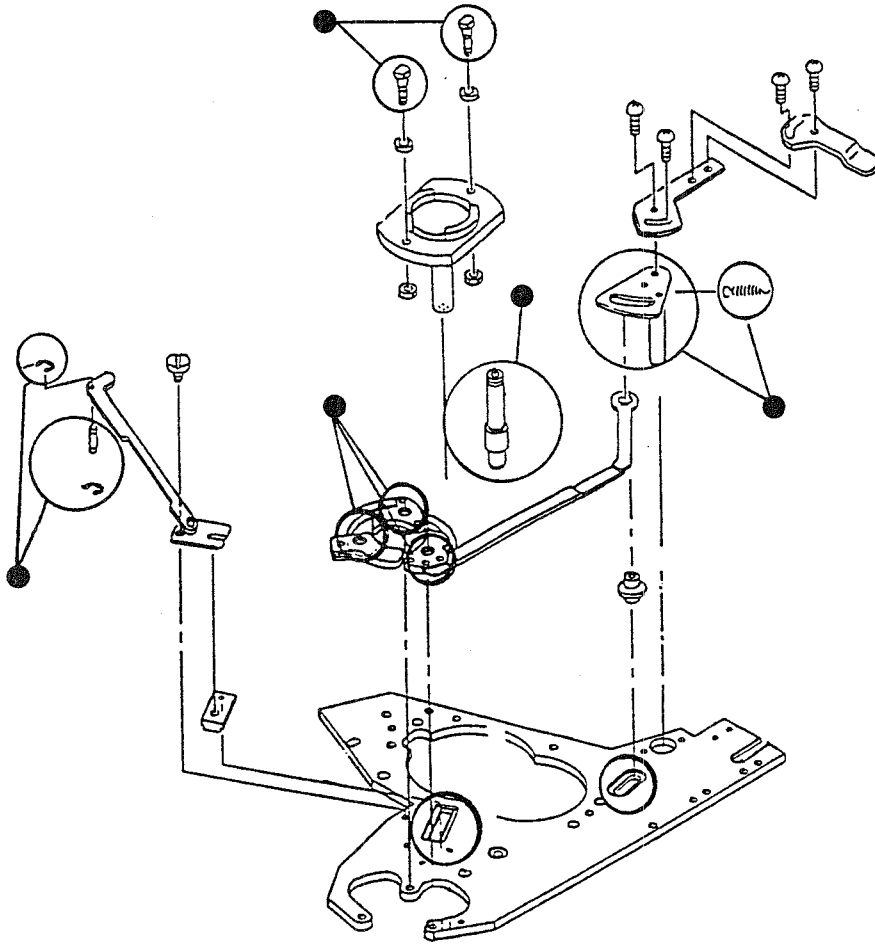
Fine positioning of buttons components



Drive cam components



Index components



## 9. INSPECTION OF THE DRIVE SOURCE AND THE SENSOR

Turn ON the power after setting the mode to the adjustment mode (turn ON the DIP switch 3.), and perform following operations for the respective inspections.

### 1. Inspection of the motion of drive source

Inspection of the motion of each actuator can be performed by combining the mode selector switch with the inspection switch and pressing the manual operation switch.

| NO. | Mode selector switch | Inspection switch | Actuator                            | Description   |
|-----|----------------------|-------------------|-------------------------------------|---|
| 1   |                      |                   | Sewing machine (Note) 1.            | (Note 1)  |
| 2   |                      |                   | Fine positioning                    | Fine positioning magnet : ON                            |
| 3   |                      |                   | Shutter                             | Shutter magnet : ON                                     |
| 4   |                      |                   | Positioning                         | Positioning magnet : ON                                 |
| 5   |                      |                   | Spinner oscillating arm             | One cycle motion of spinner oscillating arm             |
| 6   |                      |                   | Index                               | Motion of one index                                     |
| 7   |                      |                   | Rotation of fine positioning, P / F | Rotation of fine positioning, P / F vibration (Note) 2. |
| 8   |                      |                   | Motion of fine positioning          | Motion of button inserting (Note) 3.                    |

- (Note) 1. Sewing machine makes one cycle motion in a state that the sewing LED lights up. So, be careful.  
 (When the pattern No. 99 is pressed, the button clamp jaw levers go up and come down.)
2. Press the manual operation switch to rotate, and press again to stop.
  3. The motion finishes after 2.6 seconds.

### 2. Inspection of the sensors

The state of each sensor is indicated by numeral on the ALM No. indicator of the button feeder unit control box

| Inspecting position (symbol)                 | Inspecting manner                               | State                       | No. indication |
|--|---|-----------------------------|----------------|
| 2-step switch origin (SORG)                  | Depress pedal to 1st step.                      | Sensor LED lights up. (Red) | 3              |
| 2-step switch start (START)                  | Depress pedal to 2nd step.                      | Sensor LED goes off.        | 4              |
| Fine positioning completion switch (RFIN)    | Perform motion inspection No. 4.                | Sensor LED lights up. (Red) | 5              |
| Button positioning detection switch (BUT)    |   | Sensor LED lights up. (Red) | 6              |
| Spinner oscillating arm origin switch (AORG) | Perform motion inspection No. 5.                | Sensor LED goes off.        | 7              |
| Index origin switch (IORG)                   | Perform motion inspection No. 6.                | Sensor LED lights up. (Red) | 8              |
| Sewing machine one-cycle signal (CYCLE)      | Perform motion inspection No. 1.                | -                           | 9              |
| Sewing machine error signal (MS ERR)         | Turn ON power switch.<br>(Sewing LED goes off.) | -                           |                |

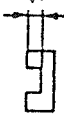

## 10. ALARM NO. INDICATION (on the button feeder unit (BR) side)

If the alarm indicator lamp on the control panel starts flashing on and off slowly, the relevant alarm number will be indicated on the indicator in front of the control box.

| No. | Indication   | Troubles   | Causes   | Corrective measures  | How to reset  |
|-----|--------------|--|--|--|---|
| 0   | 0            | Normal operation (given during the normal stand-by state of the sewing machine)  | -  | -  | -   |
| 1   | 1            | RAM check error<br>CPU check error   | <ul style="list-style-type: none"> <li>RAM in the CPU circuit board is defective.</li> <li>Self-diagnosis error</li> </ul>   | Replace the CPU circuit board.   | Re-turn ON the power to the machine.  |
| 2   | 2<br>(Flash) | Sewing machine starter is defective.   | <ul style="list-style-type: none"> <li>If the sewing machine can start up : LK-BR relay cord is disconnected.</li> <li>If the sewing machine cannot start up : 24V breaker trip</li> </ul>   | Replace the relay cord.  | Press the reset switch. Press the 24V RESET button.   |
| 3   | 3            | Fine positioning error<br>Occurs when the automatic button discharging function continuously works three times.          | <ul style="list-style-type: none"> <li>The button carrier does not match the distance between holes in the button.</li> <li>The fine positioning completion sensor is defective (malfunction).</li> <li>The centers of the fine positioning rod, of the triple pawl and of the button carrier are not aligned with one another.</li> </ul> | Replace the button carrier.<br><br>Replace the RFIN sensor. (Adjust the RFIN sensor.)<br>Align the center of the rod with those of the triple pawl and the button carrier. | Press the reset switch.   |
| 4   | 4            | Spinner oscillating arm error (The motor is kept turned ON over a predetermined period of time.)                         | <ul style="list-style-type: none"> <li>Overload of the motor (A button is caught in the spinner oscillating arm or the motor is mechanically locked.)</li> <li>F4 (6.3A) fuse has blown.</li> </ul>  | Remove the button. (Refer to "Cautions during operation".)<br><br>Replace the fuse.  | Turn OFF the power to the machine, remove the cause of trouble and re-turn ON the power to the machine. |
| 5   | 5            | Index unit error (The motor is kept turned ON over a predetermined period of time.)                                      | <ul style="list-style-type: none"> <li>Overload of the motor (A button is caught in the spinner oscillating arm or the motor is mechanically locked.)</li> <li>F5 (2A) fuse has blown.</li> </ul>  | Remove the button.<br><br>Replace the fuse.  | Turn OFF the power to the machine, remove the cause of trouble and re-turn ON the power to the machine. |
| 6   | 6            | Not used.  | -  | -  | -   |
| 7   | 7            | Not used.  | -  | -  | -   |
| 8   | 8            | Switch for the positioning of button is defective, or performs malfunction.  | -  | Re-adjust the button positioning switch.<br>Replace the button positioning switch.   | Press the reset switch.   |
| 9   | 9            | Start switch is defective, or performs malfunction.  | -  | Re-adjust the start switch.<br>Replace the start switch.   | Press the reset switch.   |
| 10  | 0            | The sewing machine start condition error (The spinner oscillating arm motor origin switch has not been turned ON.)       | <ul style="list-style-type: none"> <li>The origin of the spinner oscillating arm has not been properly adjusted.</li> <li>The motor used to control the spinner oscillating arm is defective.</li> </ul>   | Re-adjust the origin sensor properly. Replace the motor for the spinner oscillating arm.   | Press the reset switch.   |
| 11  | 0            | Button clamp lifting operating condition error (The spinner oscillating arm motor origin switch has not been turned ON.) | <ul style="list-style-type: none"> <li>The motor used to control the spinner oscillating arm is defective.</li> <li>The sewing machine is not in the initial position at the time of button clamp lifting operation.</li> </ul>  | Replace the motor for the spinner oscillating arm.<br>Set the sewing machine to the initial state.   | Press the reset switch.   |
| 12  | U            | Not used.  | -  | -  | -   |
| 13  | 0            | Fine positioning operating condition error (The index switch has not been turned ON.)                                    | The index unit is not in its origin. (The motor overruns due to a defective motor.)  | Replace the motor for the index unit.  | Press the reset switch.   |
| 14  | 0<br>(Flash) | Sewing machine error<br>State that the power is turned ON.   | Sewing machine side error<br>Preparation of the operation box has not been completed.  | -  | Release of the sewing machine error<br>Press the Ready key  |


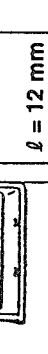
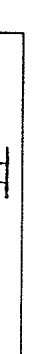
# 11. TROUBLES AND CORRECTIVE MEASURES

1. Unit components As for the machine head components, refer to the Engineer's Manual for LK-1900.

| Troubles  | Causes  | Inspecting order and corrective measures       |
|---|---|--|
| Button carrier pins are not inserted even when fine positioning of button is performed.   | Center of rotating rod is shifted from center of button carrier pins.   | Perform centering. (Refer to page 16.)         |
|   | Center of rotating rod is shifted from center of positioning portion.   | Perform centering. (Refer to page 18.)         |
|   | Position of button carrier pin button insertion check sensor is incorrect.  | Adjust position of sensor. (Refer to page 24.) |
| Button does not turn due to an insufficient grip force of work attachment. (Oil or the like attached to work attachment)                  | Replace work attachment with a new one.   |  |
|   | Wipe grip face.   |  |
| Clearance between shutter plate and button carrier pins is excessive.   | Adjust height of button carrier pins.   | (Refer to page 22.)                            |
| Top ends of button carrier pins are not equal.  | Use button carrier, pins of which are equal at top end.   |  |
| Button carrier pins are bent.   |   |  |
| Center distance of the button used does not match center distance of button carrier pins.   | Use a button matching center distance of button carrier pins.   |  |
| Position of work attachment height is incorrect.  | Re-adjust height. (Refer to page 18.)   |  |
| Force of triple pawl to retain button is excessive.   | Check output of triple pawl solenoid. (Refer to page 22.)   |  |
| Shutter plate is not opened, or insufficiently opened.  | Check that shutter plate smoothly moves and that opening amount is 22 mm when shutter plate is opened at its maximum. |  |
| Hole of holding plate is not aligned with position of triple pawl. 17.  | Align holding plate with center of triple pawl.   |  |
| Setting of period of time for fine positioning is too short.  | Lengthen period of time for fine positioning. (Refer to page 7.)  |  |
| <br>1 mm button as given in the left figure is used. | Use  mode. (Refer to page 4.)      |  |
| Two or more buttons are inserted.   | Position of button positioning detection sensor is incorrect. (Refer to page 28.)                                     |  |

| Troubles   | Causes   | Inspecting order and corrective measures                                    |
|--|--|---|
| Fine positioning of button is not performed although a button exists in triple pawl section. Or, fine positioning is performed although a button does not exist. | Sensor does not detect button due to incorrect position of triple pawl dog.    | Adjust position of button positioning detection sensor. (Refer to page 28.) |
|  | Triple pawl does not move smoothly.  | Replace triple pawl (asm.) (18202150).                                      |
|  | Motion of triple pawl solenoid is not normal.                                  | Check adjustment of triple pawl solenoid. (Refer to page 22.)               |
| Two buttons enter the recess of feed plate.  | Difference in level between feed plate and exit of button feeder is excessive. | Lower button feeder.  |
|  | Clearance of adjusting plate against thickness of button is excessive.         | Adjust the clearance suited to thickness of button.                         |
|  | Diameter of recess of feed plate against diameter of button is excessive.      | Select the recess suited to diameter of button.                             |
|  | Vertical play of feed plate is excessive.                                      | Adjust lock screw to reduce play.   |
| When a button is supplied from button carrier to button clamp levers, the button is purged.  | Height of button carrier and button clamp levers is not proper.                | Properly adjust height. (Refer to page 12.)                                 |
|  | Opening amount of button clamp levers does not fit button.                     | Adjust opening amount to the button used.                                   |
|  | Centering of button carrier and button clamp levers is incorrect.              | Perform centering (Refer to page 16.)                                       |
|  | Standard button clamp levers are used for large button (ø16 or more) sewing.   | Replace it with large button clamp levers.                                  |



| Troubles  | Causes  | Inspecting order and corrective measures   |
|---|---|--|
| Button stands when triple pawl grasps button at positioning section.    | Triple pawl moves at high speed, and output of solenoid is excessive.   | Check whether adjustment state of solenoid is same state as shown in Fig. 9-1 (As for the details of adjustment, refer to page 22.)  |
| Triple pawl does not grasp button at positioning section.               | Force of solenoid is too weak to move triple pawl.  |  <p>Fig. 9-1</p>   |
| Button turns wrong side out at triple pawl section when it drops.       | Sewing marble (⇔) button, semi-marble (⇔) button or shell button.<br>Drop of button to triple pawl is unstable.<br>Hole in shutter plate is defective, or there are scratches or burrs around hole. | Replace with feed plate $\phi 13.5$ (asm.) (18200956) and holding plate (small) (18201103).<br> Correct with buff or the like if there are scratches or rough parts on section A of holding plate (16568404), or replace it.<br>Correct the parts, or replace shutter plate. |
| Button is caught in between feed plate of index unit and button feeder. | Center of triple pawl section, holding plate and feed plate is shifted.   |  There are scratches or rough parts on section A of holding plate (16568404).<br>Perform centering of holding plate and triple pawl section.<br>Correct with buff or the like, or replace holding plate.   |
|   | Feed plate and button feeder are excessively separated.   | Adjust position of button feeder.  |
|   | Button stays when it enters feed plate.   | Slightly raise position of button feeder.  |
|   | Position of button guide is incorrect.  | Adjust position of button guide.   |
|   | Clearance between button guide and track face of button feeder is too small.  | Slightly raise position of button guide.   |
|   | Flow of button is too late.   | Increase variable resistor on the operation panel.   |
|   | There is a vertical play of feed plate.   |  |

Corrective measure when a button is caught.

Insert a slit-screwdriver into hole (●) (Fig. 9-2) on front cover and turn it counterclockwise when a button is caught.

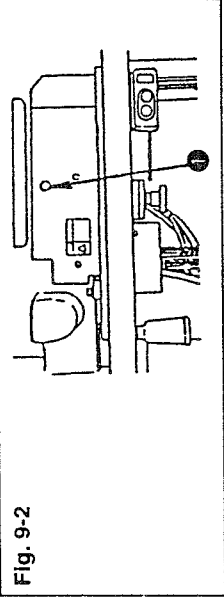


Fig. 9-2

Buttons in parts feeder do not flow.

Feeder bowl fixing screw (●) is loose.

Securely tighten feeder bowl fixing screw (●).

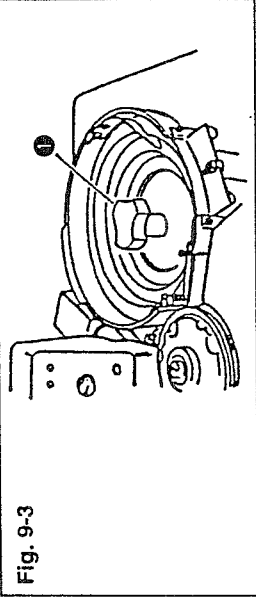


Fig. 9-3

Position of sensitivity control variable resistor is incorrect.

Adjust the position.

Feeder bowl hits something and does not vibrate.

Adjust position of feeder bowl so that it does not hit anywhere.

Buttons do not enter from feeder bowl to feed plate.

Position of feeder bowl is incorrect.

Adjust the position.

Position of button guide is incorrect.

Adjust the position.

Adjustment of feed plate is incorrect.

Adjust the position.

Adjustment of in-line arrangement plate is incorrect.

Adjust the position.

Sewing marble (←) button, semi-marble (⇔) button, or shell button.

Use optional in-line arrangement plate A (18213207).

Buttons drop in between feeder bowl, and feed plate and holding plate.

Position of feeder bowl is incorrect.

Adjust position of feeder bowl.

Shutter opens when a button does not enter button carrier pins in a state of fine positioning of buttons.

Adjustment of fine positioning completion sensor is incorrect.

Adjust fine positioning completion sensor.

Clearance between button carrier pin and shutter is excessive.

Adjust the clearance. (Refer to page 22.)

## 2. Electrical components

| Troubles   | Cause (1)  | Cause (2)   | Inspecting order and corrective measures   |
|--|--|---|--|
| (1) Turning power ON   |  |   |  |
| Power cannot be turned ON.                                     | Power plug is disconnected.  |   | Connect power plug.  |
| Power indicator lamp on the operation panel does not light up. | Power AC is not supplied to transformer.   | Fuse (F1 : 2A) has blown.   | Replace fuse F1.   |
|  | +5V is not supplied to CPU circuit board.  | Connector (P21) of CPU circuit board is disconnected.             | Connect P21.   |
| Power indicator lamp is lit.                                   |  | Connectors (P11 and P12) of POWER circuit board are disconnected. | Connect P11 and P12.   |
|  |  | AC 7.5V is not supplied to POWER circuit board.                   | Check connection of transformer tap and AC input voltage.  |
|  |  |   | Check output voltage (AC 7.5V) of transformer, and replace transformer when output is not made.                                  |
|  |  | Fuse (F3 : 2A) of POWER circuit board has blown.                  | Replace fuse.  |
| Power indicator lamp is not lit.                               |  | POWER circuit board is defective.                                 | Replace POWER circuit board.   |
|  | +5V is not supplied to power indicator lamp.                                     | Connector (P23) of CPU circuit board is disconnected.             | Connect P23.   |
|  |  | Indicator lamp cable has broken.                                  | Connect cable.   |
|  |  | CPU circuit board is defective.                                   | Replace CPU circuit board.   |
| Power indicator lamp is lit.                                   | Power indicator lamp is defective.   |   | Replace power indicator lamp.  |
|  |  |   |  |
| Numeral is not indicated on alarm indicator lamp.              | P-ROM of CPU circuit board is wrongly mounted.                                   | Pin is not securely inserted.                                     | Strongly press P-ROM and securely insert it.   |
|  |  | Direction of pin is oppositely inserted.                          | Replace P-ROM with a new one, and mount it paying attention to the direction.  |
| When power is turned ON, following errors are indicated.       | +5V is not supplied to CPU circuit board.  |   | Perform pursuit following preceding clause.  |
| Flashing on and off of error indication "0" is not indicated.  | Solder of connector portion (J12) of POWER circuit board is broken.              |   | Replace POWER circuit board, or perform soldering connector again.   |
|  | Contact of connector from POWER circuit board to CPU circuit board is defective. |   | Replace power cord (asm.) of CPU circuit board, or repeat connecting / disconnecting connector several times to improve contact. |
| Error "1" is indicated.<br>(RAM check error, CPU error)        | +5V is not supplied to CPU circuit board.  |   | Perform pursuit following preceding clause.  |
|  | RAM or action of CPU circuit board is defective.                                 | CPU circuit board is defective.                                   | Replace CPU circuit board.   |

| Troubles  | Cause (1)                                 | Cause (2)  | Inspecting order and corrective measures   |
|---|---|--|--|
| (2) Normal action (sewing machine)<br>Sewing machine does not work. | Mode is incorrect.                        |  | Correct mode, and start again.   |
|   | DIP3 is not turned ON.                    |  | Turn OFF DIP3.   |
|   | Sewing machine is not in a sewing state.  |  | Press the ready key on operation box of sewing machine to make a sewing state.   |
|   | Start signal cannot enter.                | P33 of start switch is disconnected.                 | Connect P33.   |
|   |   | Wiring of start switch has broken.                   | Connect wiring of start switch.  |
|   |   | 2-step switch components are defective.              | Repair 2-step switch components.   |
|   | Spinner oscillating arm is not in origin. | Input portion of CPU circuit board is defective.     | Replace CPU circuit board.   |
| Sewing machine does not work, and error No. "2" is indicated.       | Starter does not work.                    | +24V is not supplied to starter.                     | Return spinner oscillating arm to origin by manual operation.<br>Check P24 and P31, and connect them if they are disconnected.<br>Perform pursuit following preceding clause if +24V is not supplied to CPU circuit board. |
|   |   |  | Replace CPU circuit board since output portion of CPU circuit board is defective.  |
|   |   | Starter is defective.                                | Replace starter.   |
|   |   | Protruding amount of magnet exceeds specified value. | Set protruding amount of magnet to specified value.  |
|   |   | Protruding amount of magnet exceeds specified value. | Set protruding amount of magnet to specified value.  |
|   |   | Clutch is difficult to connect.                      | Check clutch components, and replace it with a new one if it is defective.   |
| Sewing machine works, and error No. "2" is indicated.               | It takes time to fully draw starter.      | Power voltage is lowered.                            | Measure power voltage, and set it within specified value if it exceeds specified value.  |
|   |   | Misadjustment of L-SW dog.                           | Adjust L-SW dog to specified value.  |
|   |   | L-SW is defective.                                   | Replace L-SW.  |
|   |   | Input portion of CPU circuit board is defective.     | Replace CPU circuit board.   |
|   |   |  |  |
|   |   |  |  |

| Troubles                                    | Cause (1)   | Cause (2)   | Inspecting order and corrective measures   |
|---|---|---|--|
| (3) Normal action (button feeder)           |   |   |  |
| Manual operation cannot be performed.       | Mode is incorrect.  |   | Correct mode and start again.  |
|   | DIP3 is turned ON.  |   | Turn OFF DIP3.   |
|   | Sewing machine is not in a sewing state.  |   | Set to a sewing state.   |
| Button feeder works without button.         | DIP4 is turned ON.  |   | Turn OFF DIP4.   |
| Several buttons enter positioner.           | Misadjustment of button positioning detection sensor.   |   | Adjust sensor.   |
| Error No. "3" is indicated.                 | This error occurs when automatic discharging function has worked three times in succession under automatic sewing mode. |   |  |
| When a button does not exist in positioner. | Positioner does not work.   | Misadjustment of stroke of positioning magnet             | Adjust stroke.   |
|   |   | +24V is not supplied to positioning magnet.               | Measure voltage of terminal base, and replace CPU circuit board if +24V is not supplied. Replace magnet if it is supplied. |
|   | Button positioning detection sensor is OFF.   | Misadjustment of positioning sensor                       | Adjust positioning sensor. With button ... ▶ OFF, Without button ... ▶ ON  |
|   |   | P35 is disconnected.                                      | Connect P35.   |
|   |   | Positioning sensor is defective.                          | Replace positioning sensor.  |
|   |   | CPU circuit board is defective.                           | Replace CPU circuit board.   |
| When a button exists in positioner          | Fine positioning does not rotate.   | DIP4 is turned ON.  | Turn OFF DIP4.   |
|   |   | Fine positioning shaft is locked.                         | Inspect bushing and gear components. In case of locking, motor is likely to be defective. So, be careful.                  |
|   |   | +24V is not supplied to fine positioning motor.           | Measure voltage of terminal base, and replace CPU circuit board if +24V is not supplied. Replace motor if it is supplied.  |
|   | Fine positioning does not come down.  | Fine positioning shaft does not move smoothly.            | Check fine positioning shaft.  |
|   |   | +24V is not supplied to fine positioning lowering magnet. | Measure voltage of terminal base, and replace CPU circuit board if +24V is not supplied. Replace magnet if it is supplied. |
|   | Positioner does not work.   |   | Take same actions as those in case a button does not exist.  |

To the next page

| Troubles                     | Causo (1)   | Causo (?)  | Inspecting order and corrective measures   |                                 |
|------------------------------|---|--|--|---------------------------------|
| From the previous page       | Fine positioning does not finish.                             | Misadjustment of fine positioning completion sensor        | Adjust fine positioning completion sensor. ON when a button is entered.  |                                 |
|                              |   | P34 is disconnected.                                       | Connect P34.   |                                 |
|                              |   | Fine positioning completion sensor is defective.           | Replace fine positioning completion sensor.  |                                 |
|                              |   | CPU circuit board is defective.                            | Replace CPU circuit board.   |                                 |
|                              | A button is clogged between triple pawl and shutter.          |  | Remove clogged button.   |                                 |
|                              | Returning cannot be made by reset.                            | Fine positioning completion sensor is defective.           | Replace fine positioning completion sensor.  |                                 |
|                              |   | Input portion of CPU circuit board is defective.           | Set mode to automatic mode.  |                                 |
|                              |   | Mode is incorrect.   | Set mode to automatic mode.  |                                 |
|                              |   | DIP4 is turned ON.   | Turn OFF DIP4.   |                                 |
|                              |   | Fuse 1A of B / F panel has blown.                          | Replace fuse.  |                                 |
| Button feeder does not work. | AC100V is not supplied to B / F controller.                   | P1 is disconnected.  | Connect P1.<br>Check output voltage of transformer, and replace it if output is not made.  |                                 |
|                              |   | CPU circuit board is defective.                            | Open rear cover of P / F controller, and short-circuit terminal bases 1 and 2. If they work, replace CPU circuit board, and return wiring to home position. If they do not work, replace B / F controller. |                                 |
|                              | Adjustment of fine adjustment variable resistor is incorrect. | Contact of fine adjustment variable resistor is defective. | Open rear cover of P / F controller, and short-circuit terminal bases 1 and 2. If they work, replace CPU circuit board, and return wiring to home position. If they do not work, replace B / F controller. |                                 |
|                              | BUT signal is held ON.  | Button detection sensor is defective.                      | Replace sensor.  |                                 |
|                              | Failure or malfunction of button positioning switch           |  | CPU circuit board is defective.  | Replace CPU circuit board.      |
|                              |   |  | Button is clogged between triple pawl and shutter.   | Remove clogged button.          |
|                              |   |  | 2-step switch components are defective.  | Check 2-step switch components. |
|                              | Error No. "9" is indicated.                                   | Both of 2-step switches are turned ON.                     | Start switch is defective.   | Replace start switch (asm.).    |
|                              |   |  | CPU circuit board is defective.  | Replace CPU circuit board.      |

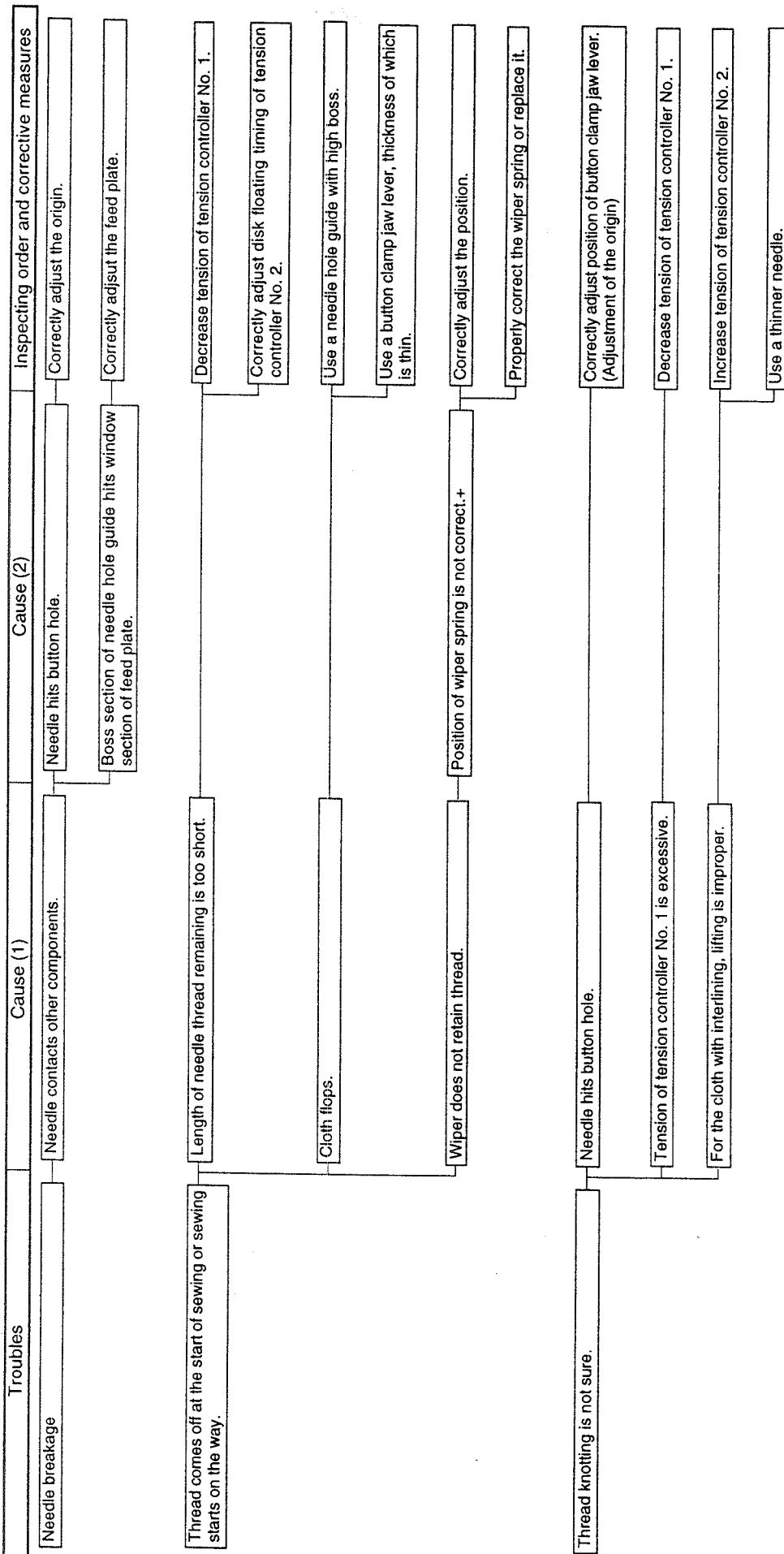
Failure or malfunction of start switch

(Remarks) 1. As for errors "4 and 5", corrective measures are same as those for (1) Turning power ON.

2. Perform inspection of sensor under the adjustment mode.

3. Terminal base is located in the rear of sewing machine motor on the backside of sewing machine.

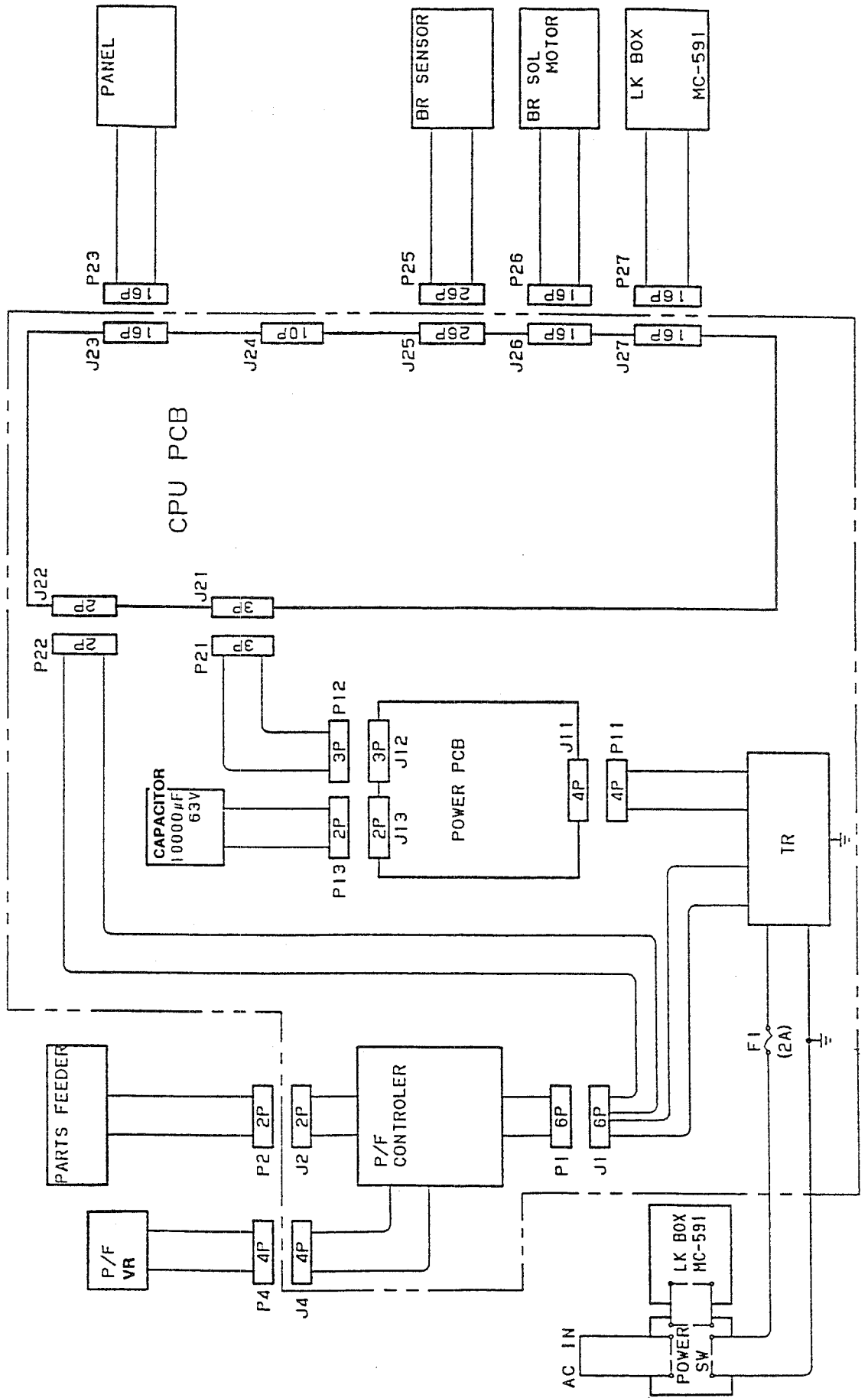
### 3. LK-1903



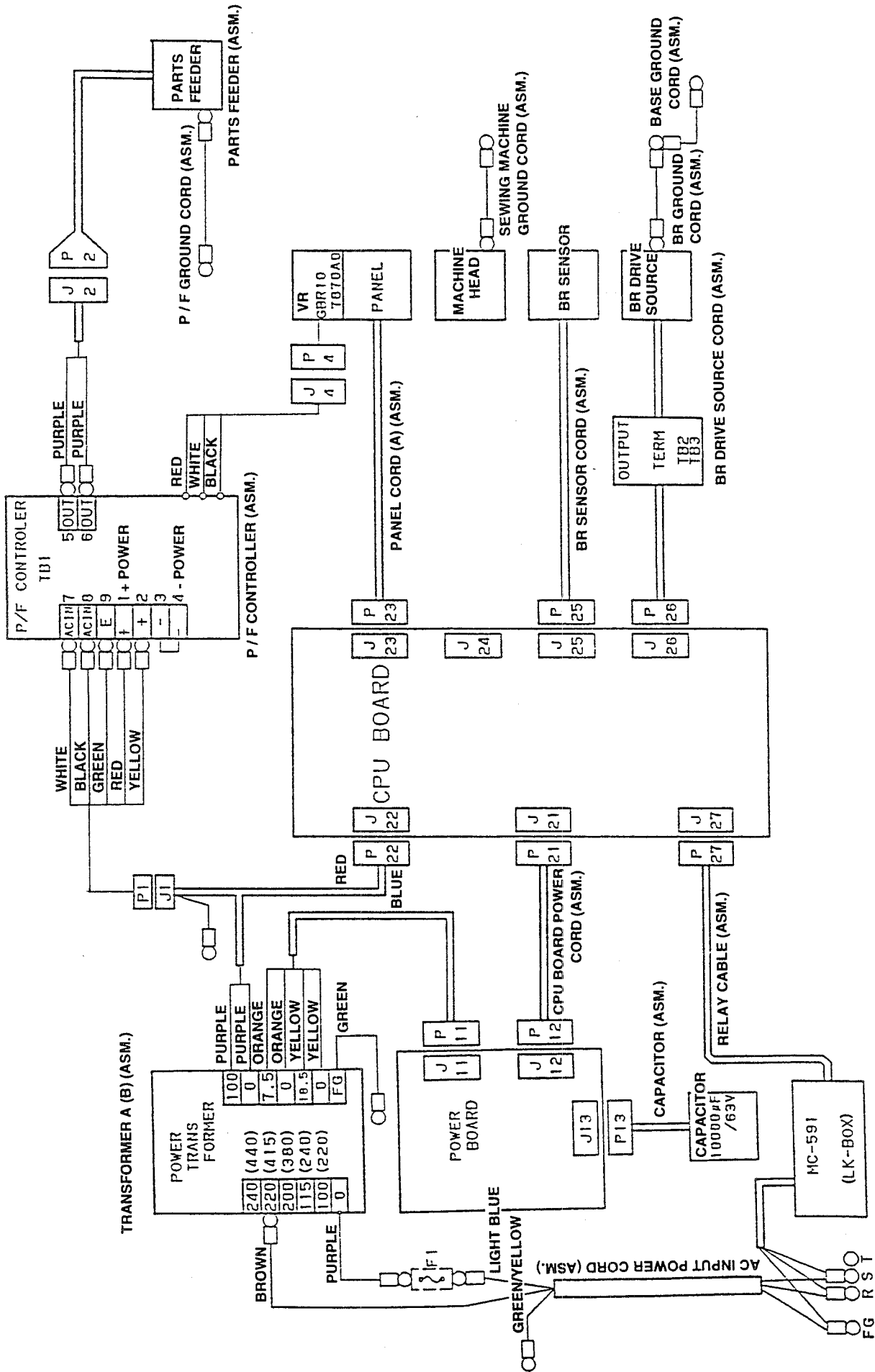
| Troubles                                     | Cause (1)  | Cause (2)  | Inspecting order and corrective measures                            |
|--|--|--|---|
| Wrong side of material is excessively dirty. | Length of needle thread remaining is too short.  |  | Increase tension of tension controller No. 1.                       |
|  | Retaining force of wiper spring is excessive.  |  | Properly adjust disk floating timing of tension controller No. 2.   |
|  | Idling amount of bobbin thread is excessive.   |  | Properly adjust wiper spring.                                       |
|  | For the button with round bottom, wrong side of material becomes like dumpling.                    |  | Strengthen idle prevention spring.                                  |
|  | Retaining button is weak.  | Action of button clamp jaw lever is defective.   | Replace with button clamp jaw lever, thickness of which is thick.   |
| Button sewing shifts.                        | Contact of button clamp leaf spring is excessive.  |  | Improve action of button clamp jaw lever.                           |
|  | Thread enters between button and boss of needle hole guide, and the button does not move smoothly. |  | Properly correct button clamp leaf spring and decrease the contact. |
|  | Wiper solenoid fails to work.  | Wiper solenoid connector or pin is disconnected. | Replace with button clamp jaw lever, thickness of which is thick.   |
| Wiper fails to work.                         |  | Wiper solenoid cord is defective. (Broken wire)  | Check connector inside control box.                                 |
|  |  | Failure with wiper solenoid                      | Replace related parts.  |
|  | Setting of wiper action is not turned ON.  |  | Replace related parts.  |
|  |  |  | Turn ON setting of wiper action using memory switch.                |



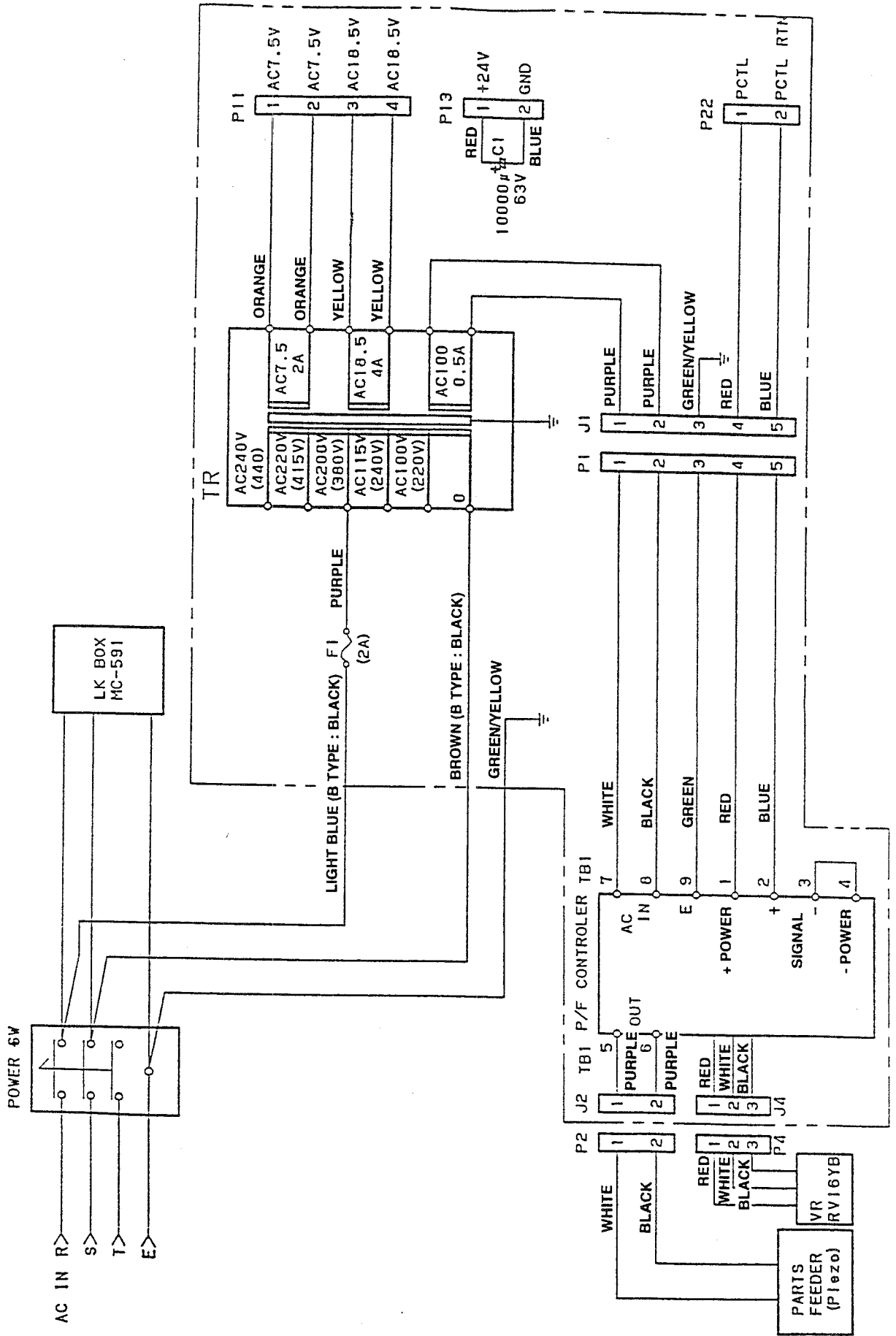
# 1. Block diagram



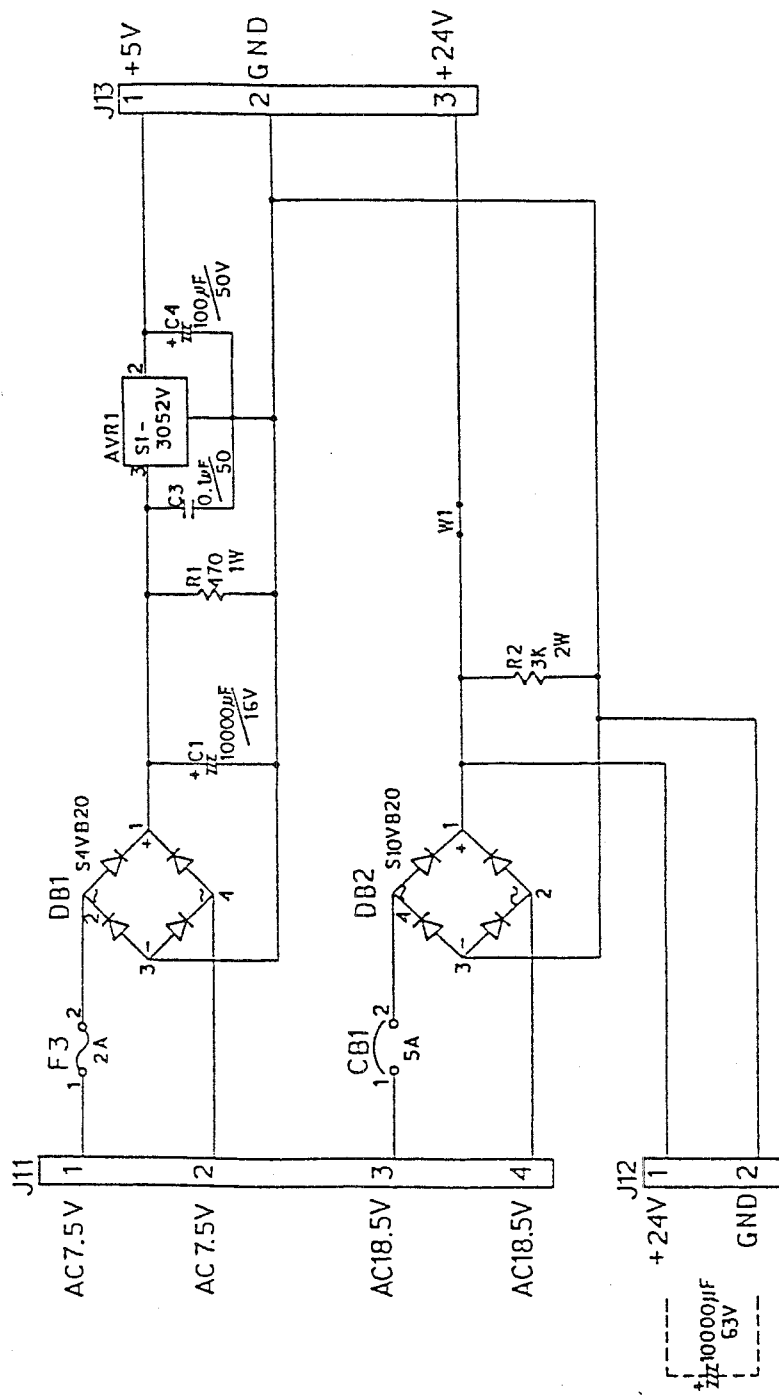
## 2. Control cable connection diagram



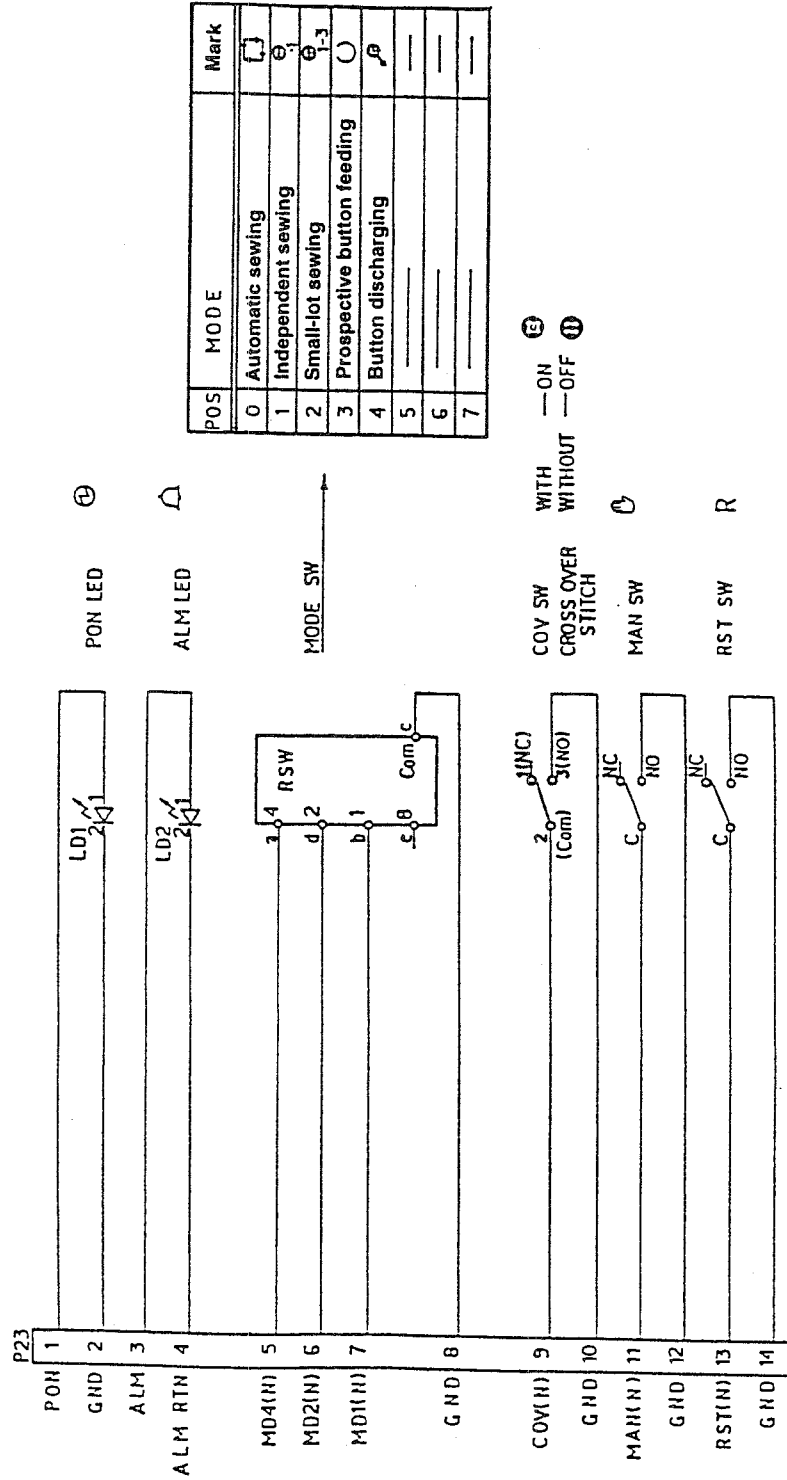
### 3. High-voltage circuit diagram



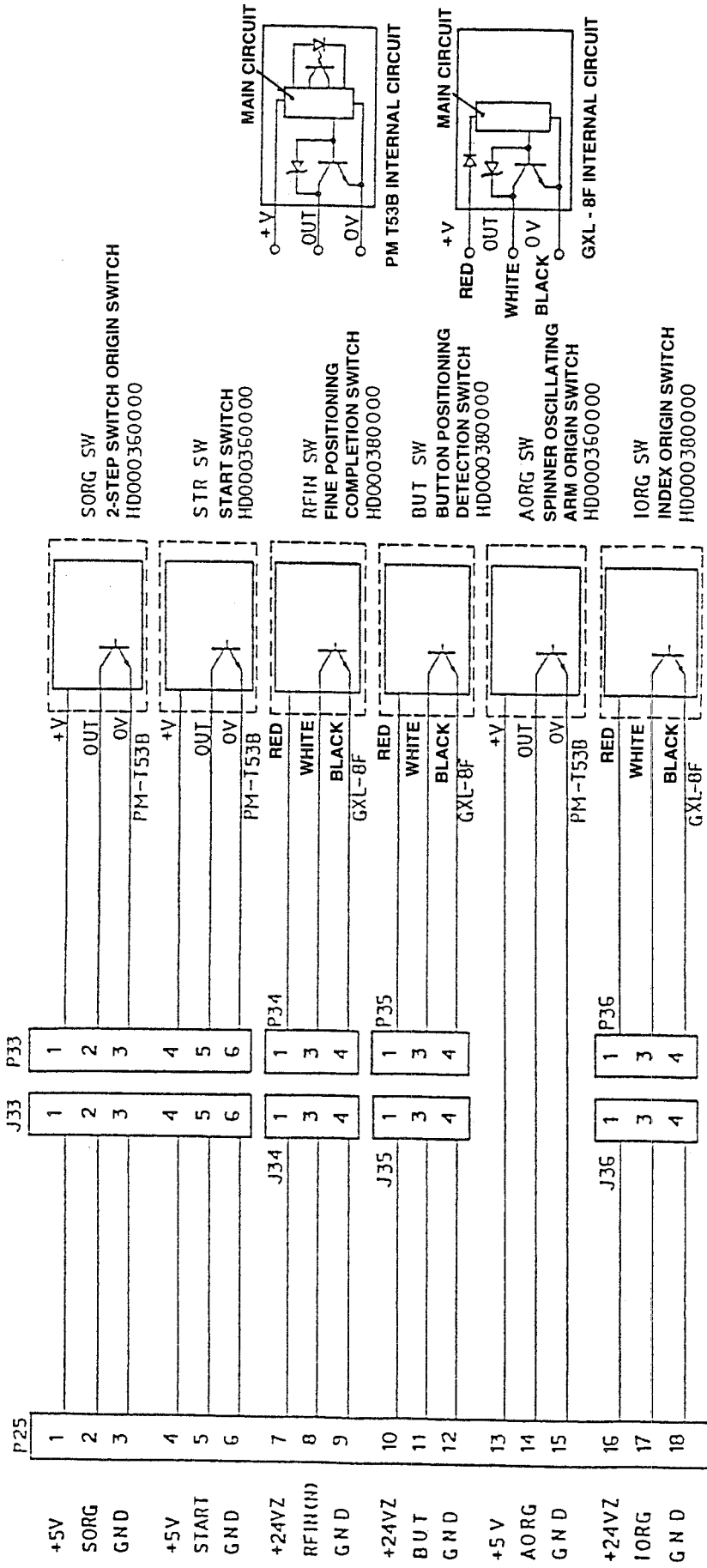
#### 4. POWER circuit diagram



### 5. PANEL circuit diagram

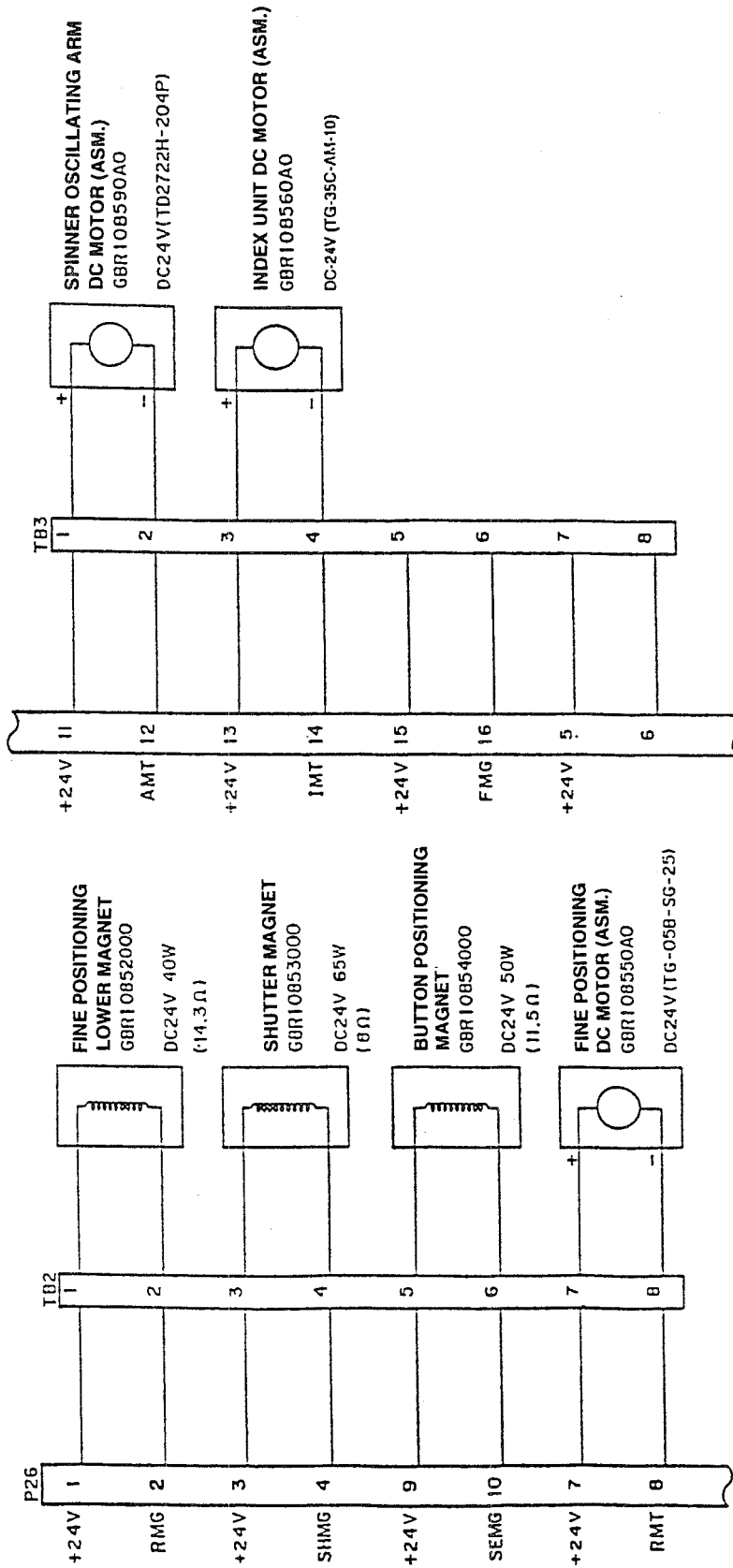


# 6. BR sensor circuit diagram



- (NOTE)
1. PM-T53B (Micro photo sensor) ..... OFF when shielding light (OUTPUT HIGH VOLT)  
ON when exposing light (OUTPUT LOW VOLT)
  2. GXL-8F (Proximity switch) ..... When switch is ON (OUTPUT LOW VOLT)  
When switch is OFF (OUTPUT HIGH VOLT)
  3. Attach sensor connector CN13 with AORG SW.
  4. "2 Pin" of P34, P35 and P36 is used for reinforcement.
  5. SORG : HIGH in normal state, LOW when pedal is depressed.
  6. START : LOW in normal state, HIGH when pedal is fully depressed.
  7. RFIN : HIGH in fine positioning, LOW when fine positioning is completed.
  8. BUT : HIGH in normal state, LOW when button positioning magnet works without button.
  9. AORG : LOW when spinner oscillating arm is in its origin.
  10. IORG : HIGH when index unit is in its origin.

## 7. Magnet motor circuit diagram

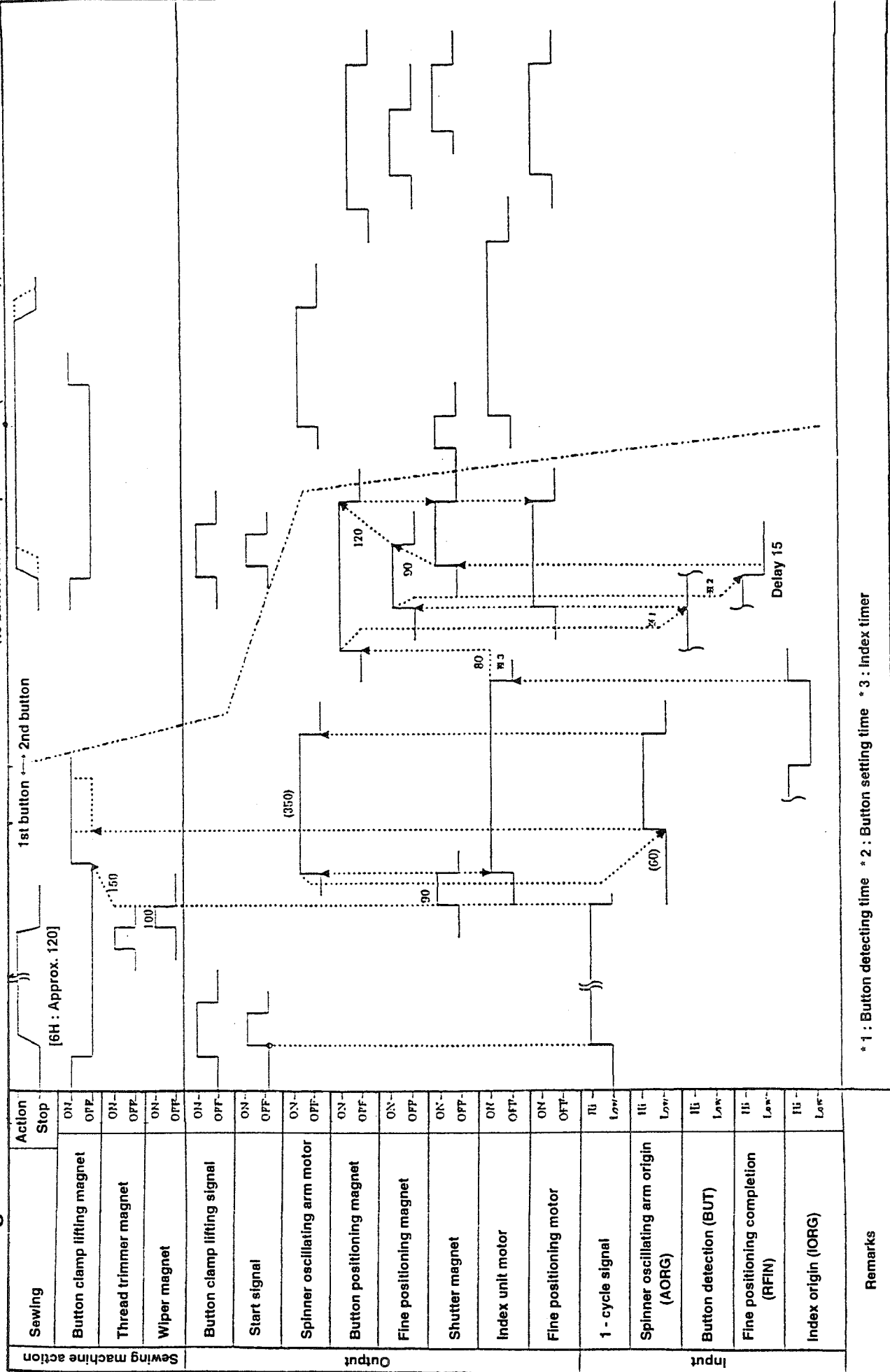


- (NOTE)
1. P-26-5 and -6 (TB-3-7 and -8) are in reserve. Possible to connect output of MAX. 2A.
  2. P-26-15 and -16 (TB-5 and -6) are output of solenoid for lifting button clamp jaw levers. (Not used.)

# 8. Timing chart

Unit [msec]

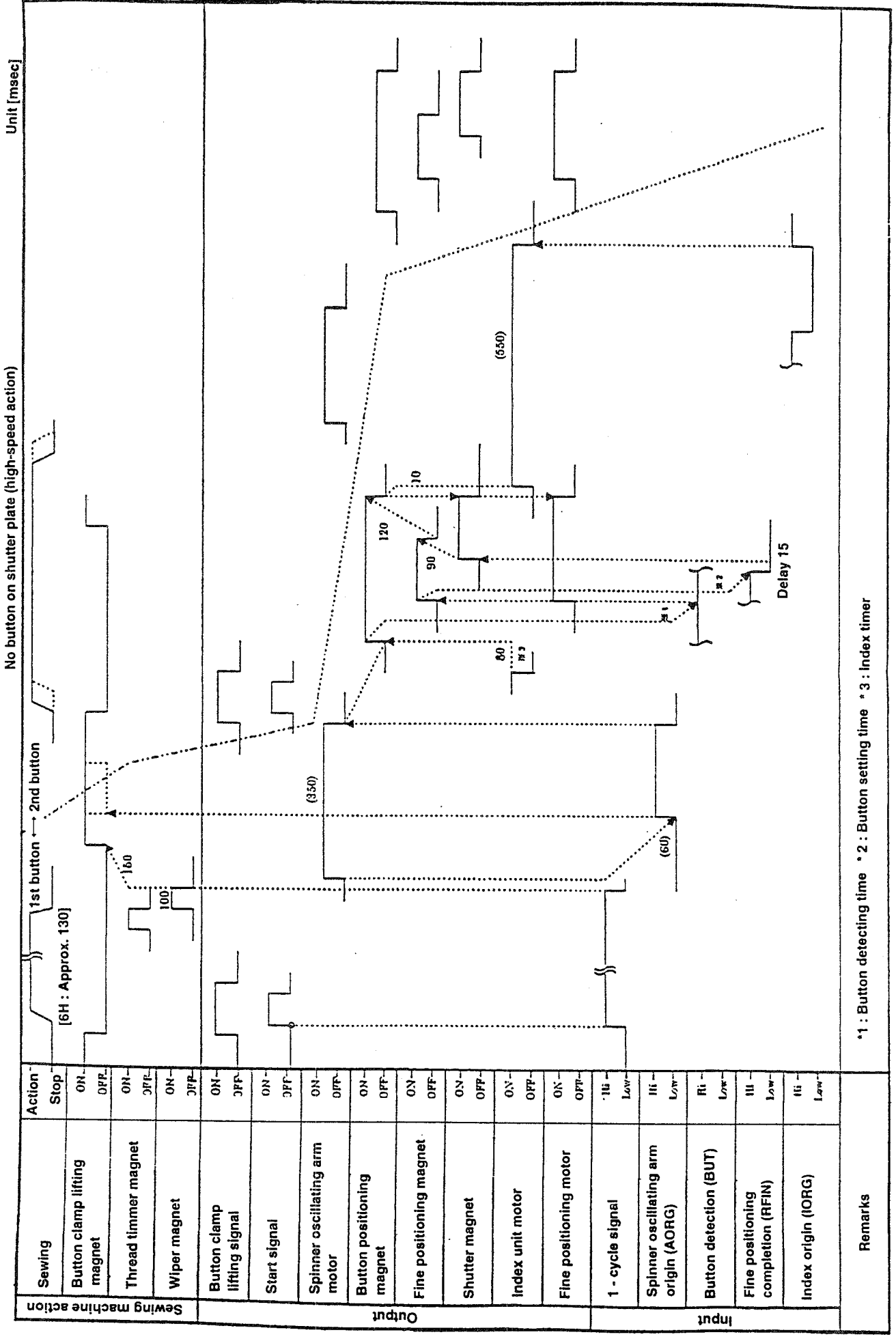
No button on shutter plate (Standard delivery)



\* 1 : Button detecting time \* 2 : Button setting time \* 3 : Index timer

Remarks





Unit [msec]

No button on shutter plate (high-speed action)

| Sewing machine action                 | Action    |
|---------------------------------------|-----------|
| Stop                                  | Stop      |
| Button clamp lifting magnet           | ON<br>OFF |
| Thread timer magnet                   | ON<br>OFF |
| Wiper magnet                          | ON<br>OFF |
| Button clamp lifting signal           | ON<br>OFF |
| Start signal                          | ON<br>OFF |
| Spinner oscillating arm motor         | ON<br>OFF |
| Button positioning magnet             | ON<br>OFF |
| Fine positioning magnet               | ON<br>OFF |
| Shutter magnet                        | ON<br>OFF |
| Index unit motor                      | ON<br>OFF |
| Fine positioning motor                | ON<br>OFF |
| 1 - cycle signal                      | Hi<br>Low |
| Spinner oscillating arm origin (AORG) | Hi<br>Low |
| Button detection (BUT)                | Hi<br>Low |
| Fine positioning completion (FIN)     | Hi<br>Low |
| Index origin (IORG)                   | Hi<br>Low |

\*1 : Button detecting time \* 2 : Button setting time \* 3 : Index timer

Remarks



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INTERNATIONAL SALES DIVISION  
8-2-1. KOKURYO-CHO.  
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