MITSUBISHI
Industrial Sewing Machine
INSTRUCTION MANUAL

Model PLK-0303

Single-Needle Lockstitch
Electronic Bar Tack Machine

MITSUBISHI ELECTRIC

In order to operate the sewing machine in the best condition at all times, please read this Insturction Manual carefully and properly handle and maintain the sewing machine.

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1. CONSTRUCTION

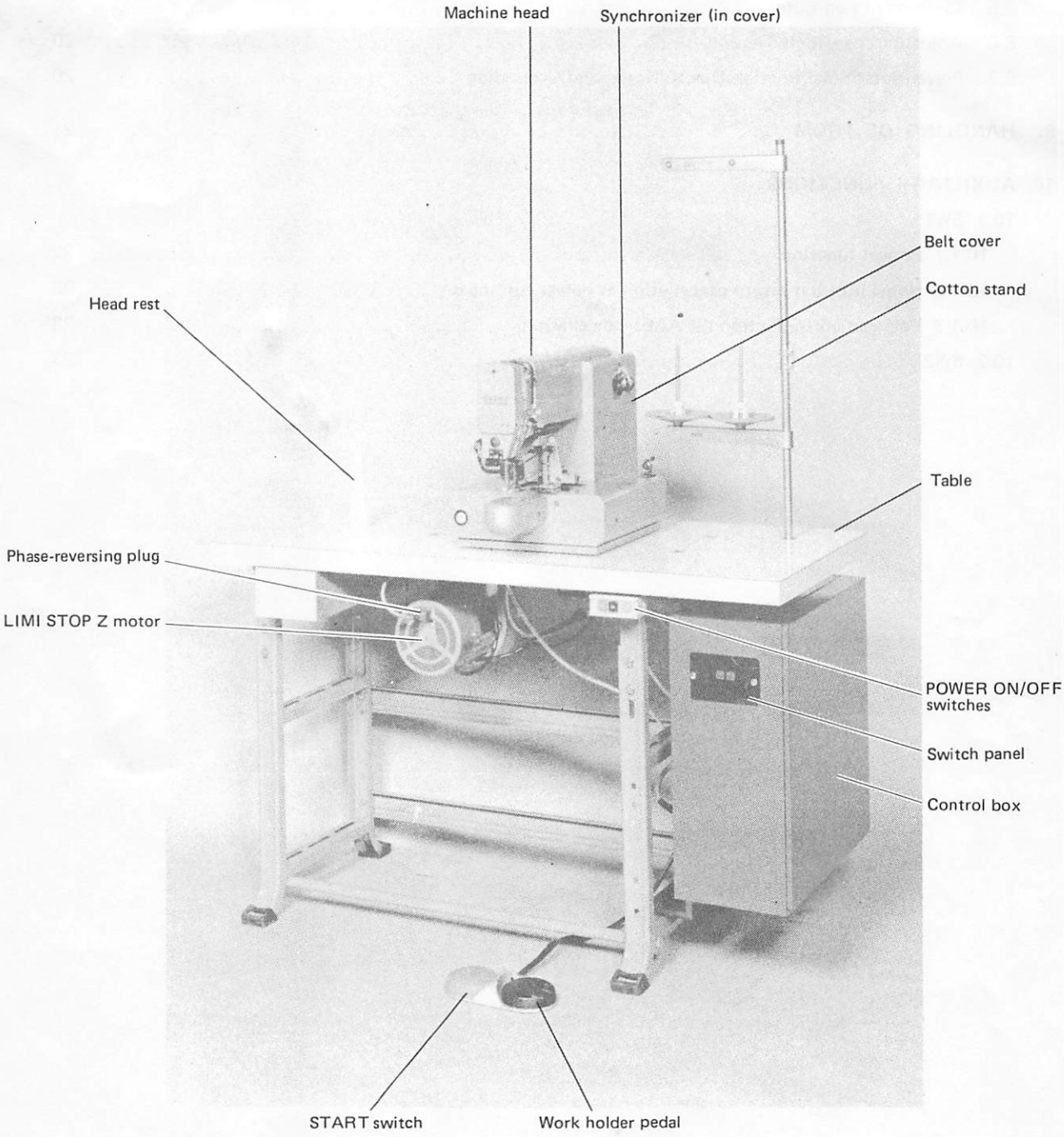


Fig. 1 Construction

2. SPECIFICATIONS

Table 1

Machine head		Oscilating hook, cylinder head, single-needle lockstitch, bartack machine
Needle bar stroke		41.2 mm
Applicable needle		DP x 5 #16 (Standard)
Work holder lift		15 mm
Control system		Full-electronic, microcomputer incorporated control
Sewing area		30 x 30 mm (X-Y dual axial drive by stepping motors)
Max. sewing speed		2,000 spm (intermittent feed) . . . . (for feed length less than 2 mm)
Stitch length		0.2 ~ 6.2 mm
Sewing pattern		Sewing pattern is reproduced with data stored in PROM. PROM is replaceable and two PROMs are incorporated in the control box (stitching pattern data have been stored in one of PROM). Maximum 2,000 stitches can be stored in each PROM (2732A).
Sewing operation		Operation starts from home position and ends at the home position.
Return to home position		This function is used when X and/or Y positions deviate during sewing. After the needle stops at UP position, the work holder returns to the home position in X axis and Y axis directions simultaneously. Every after turning on the power, the work holder returns to the home position.
Operation START		Stitching starts from the home position when START switch (foot switch) is depressed.
Sewing speed setting		Sewing speed can be set in nine steps within a range from 200 spm to 2,000 spm at about 2000 spm increment.
Test function		Operation check and test stitching are possible.
Scale function (Enlargement/Reduction)		Pattern stored in PROM can be enlarged or reducted in X axis direction and Y axis direction independently within a range from 0% (real scale) to 199% (full scale) at 1% increment.
Pattern selection function		Any one of 20 patterns can be selected. (10 patterns have been stored)
Error indicator		Trouble or failure is alarmed.
Power source	Permissible voltage regulation	±10% of rated voltage
	Maximum input power source	800 VA
Dimensions		535 mm (width) x 1,200 mm (length) x 1,110 mm (height) (cotton stand is not included in the height)
Weight		125 kg (Total weight including weights of head and table)

3. INSTALLATION

3.1 Installing the Machine Head

3.1.1 Install the furnished head rest to the table. (See Fig. 1)

3.1.2 Put each one rubber pad into four recesses found in the table.

3.1.3 Take out the machine head from the shipping case and place it on the table, as shown in Fig. 2. Set each one rubber pad into recess at four corners of base bottom.

3.1.4 Using furnished two wood screws, secure the base to the table.

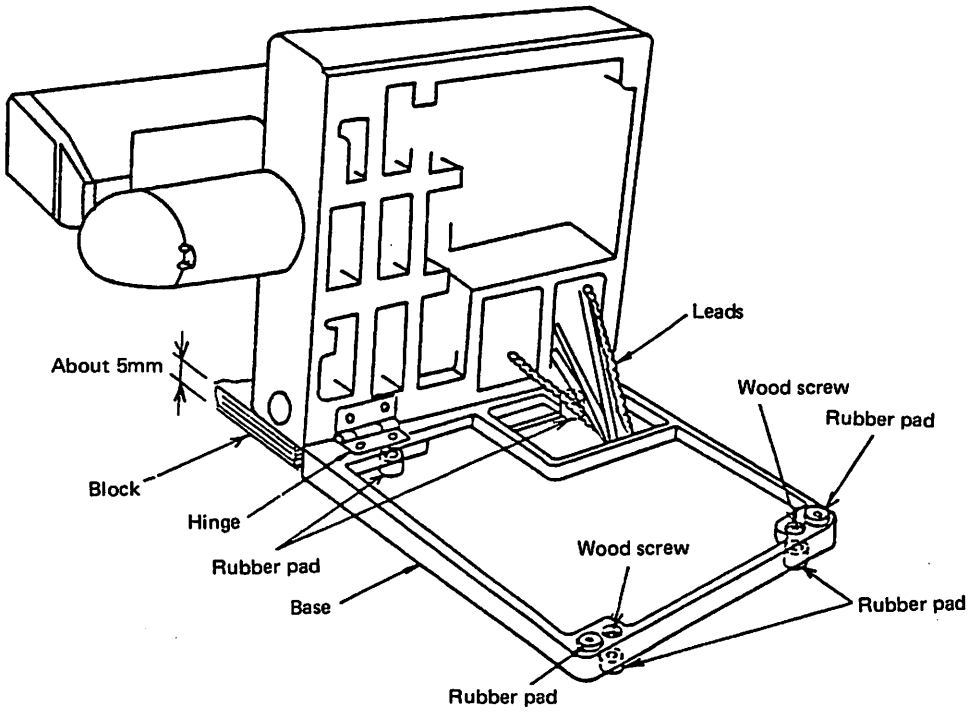


Fig. 2

Notes: (1) If the table is not secured to the table with wood screws, it may spring up, due to gravity of the head, when the head is leaned.

(2) For prevention of spring up of the base, it is recommended to install a block of about 5 mm thick below the head, as shown in Fig. 2.

3.2 Connection of Leads

3.2.1 Pass the leads from the head through the hole provided in the table and connect them to the corresponding connectors of control box. (See Fig. 5.)

3.2.2 Bundle the leads with lead clamp.

3.2.3 Install the belt to the pulleys.

3.2.4 Raise upright the machine head.

3.2.5 Install the belt cover.

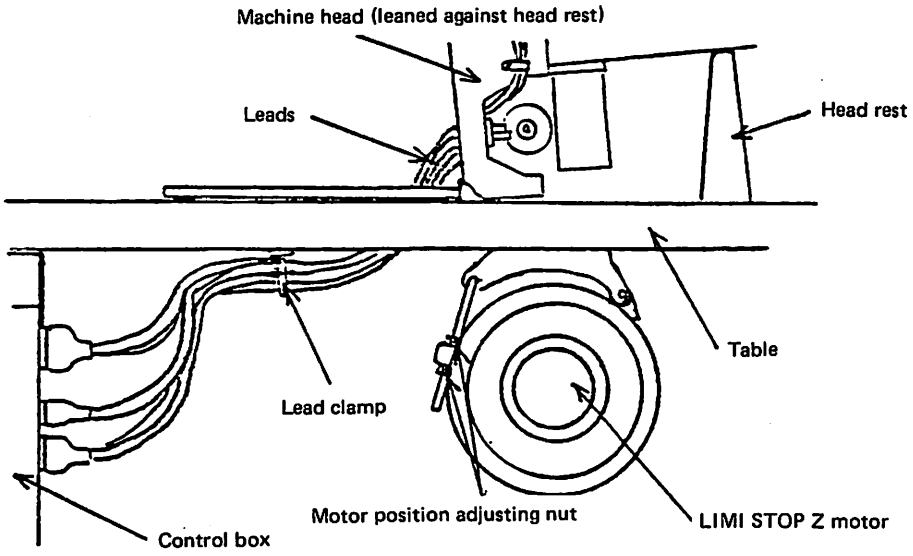


Fig. 3 Connection of machine head to control box

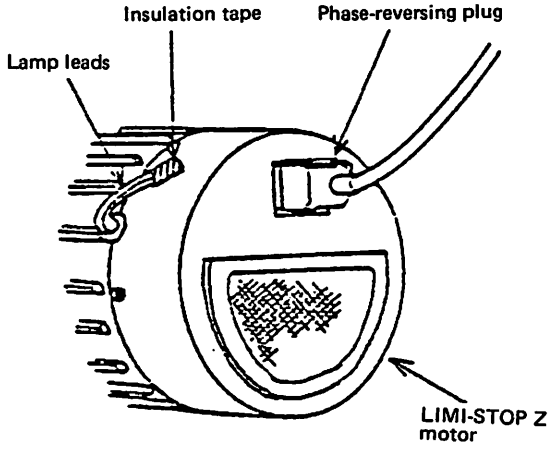
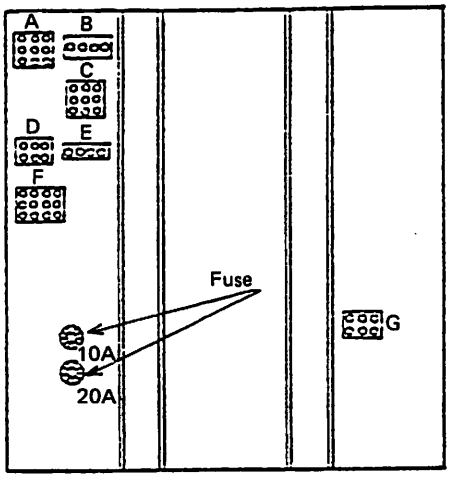


Fig. 4 Lamp leads



Back view of control box

A : Thread trimmer connector
B : Motor, clutch and brake connector
C : Home position detector connector
D : Synchronizer connector
E : Work holder lift switch, START switch connector
F : Stepping motor connector
G : Control box power source connector
O Shows the leads from the machine head.

Fig. 5

Notes: (1) Use care not to allow any lead to come into contact with the belt.
(2) Securely set each connector.
(3) Keep the power cord unplugged when the leads are connected.

3.3 Work Lamp Leads

To install a work lamp, draw out the lamp leads found at the back of the motor, remove the insulation tape, strip each lead and join them to the cord from the lamp. Apply the insulation tape after the connection. For lamp, use that having the specified rating.

When a work lamp is not used, the two leads should be kept insulated by tape. (See Fig. 4).

3.4 Power Cable Connector

The power source capacity should be large enough for the motor rating and the power cable should be selected with sufficient allowance to the power source requirement.

When a three-phase motor is used, connect the power source in the following phase sequence:

"U" phase . . . . . Red lead
"V" phase . . . . . White lead
"W" phase . . . . . Black lead

Connect the green lead in the three-phase power cable to the ground terminal. For safety, do not fail to ground. Be sure to leave the grounding work to a qualified electrician.

When a single-phase motor is used, do not plug the power cord to a branch socket, but plug to a wall outlet.

3.5 Changing the Power Phase Sequence

Direction of rotation of the motor can be reversed by changing 180° setting of the phase-reversing plug. When changing the plug setting, use care to fully insert the plug into its socket.

Since the motor stops in about 5 minutes after the power is turned off (when a single-phase motor is used), turn on the power after the motor completely stops. (If the power is turned on while the motor is still rotating, direction of rotation does not change.)

4. HANDLING THE SEWING MACHINE HEAD

4.1 Installation of Needle

4.1.1 Before installing and removing the needle, turn off the power for safety.

4.1.2 Insert the needle into the needle socket unit it stops at the bottom of needle socket.

4.1.3 With the needle prime groove turned to the front, tighten the needle set screw to secure the needle.

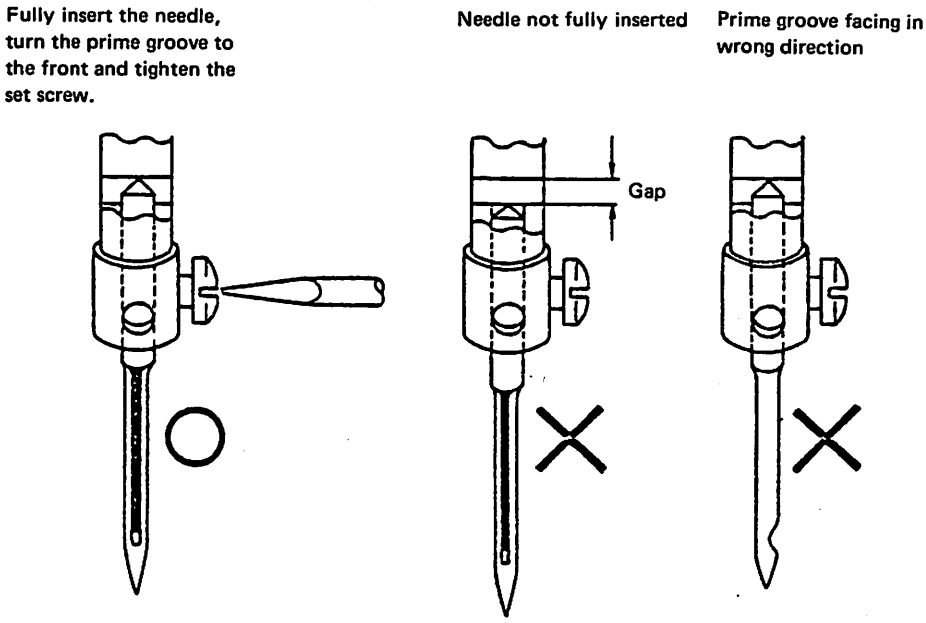


Fig. 6

4.2 Threading the Needle Thread

The needle thread should be threaded, as shown in Fig. 7, with the thread end extended about 4 cm from the needle.

4.3 Threading the Bobbin Thread

The bobbin thread should be passed through the horn of bobbin case as, shown in Fig. 11, and inserted into the hook with the needle end extended 2.5 cm from the horn hole.

4.4 Removing the Inner Hook

The inner hook can be removed by moving the hook clamp in the direction of arrow to horizontal position, as shown in Fig. 13.

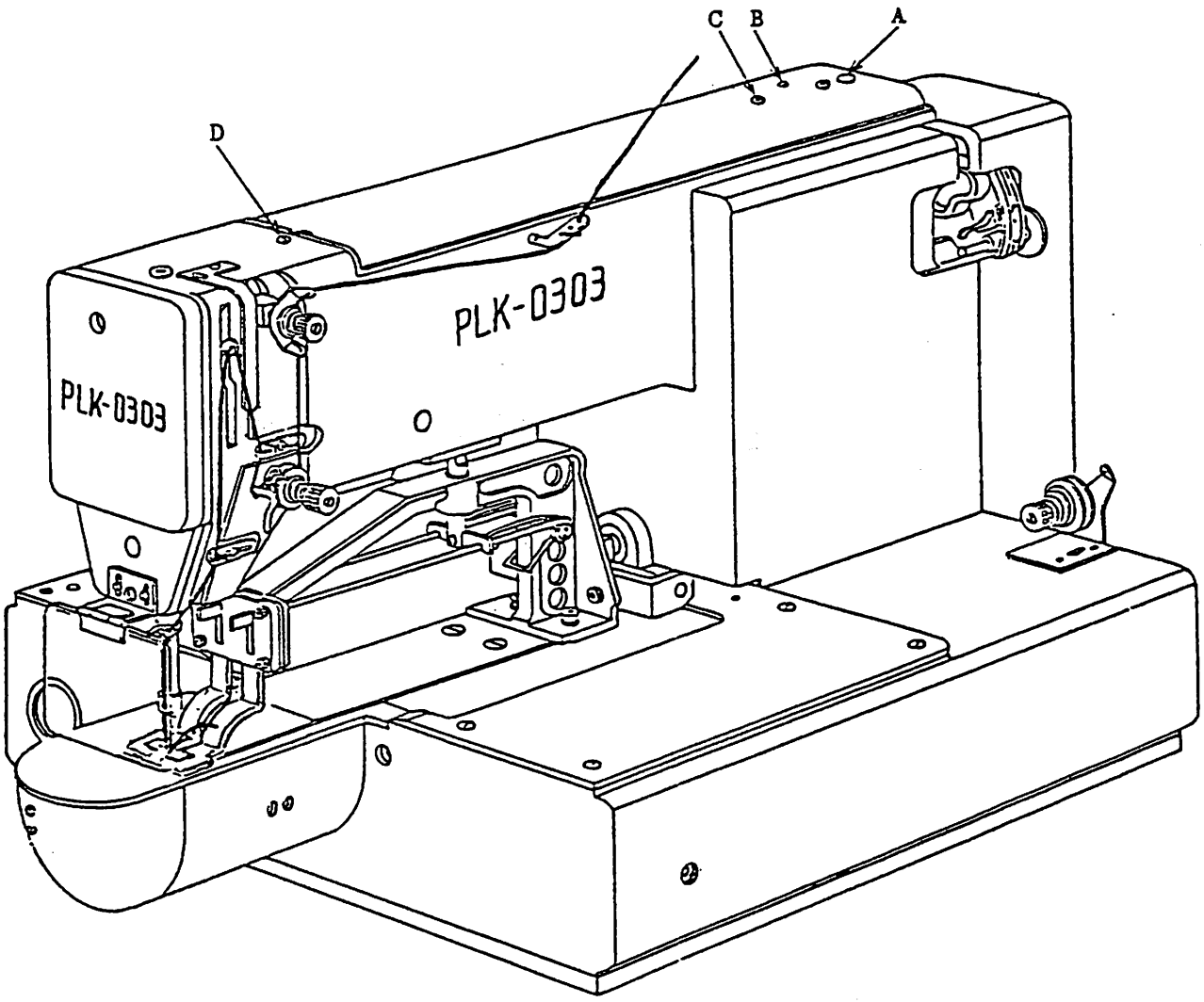


Fig. 7

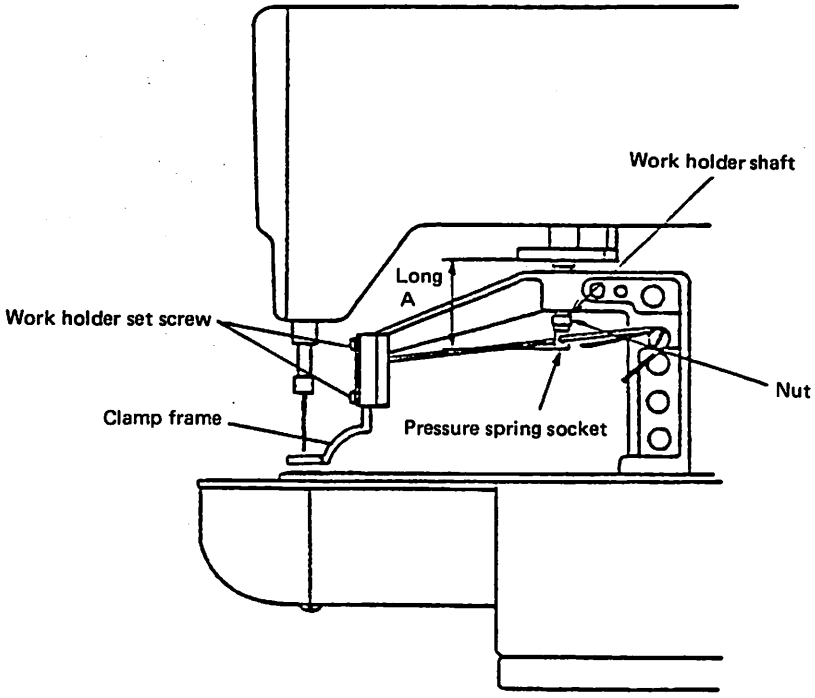


Fig. 8

4.5 Adjusting the Work Holder Pressure

4.5.1 To increase pressure, loosen the nut shown in Fig. 8 and turn the work holder shaft counter-clockwise using a spanner (thereby length "A" becomes larger).

4.5.2 To decrease pressure, turn the work holder clockwise.

4.5.3 With the standard adjustment, fabric(s) thicker than about 6 mm may not be held down by the work holder. In this case, decrease the pressure.

4.5.4

4.6 Replacing the Work Holder Clamp Frame

To replace the clamp frame, remove the set screws shown in Fig. 8, remove the clamp frame and install a desired clamp frame.

4.7 Winding the Bobbin Thread

4.7.1 Pass the thread drawn out from the cotton stand, as shown in Fig. 9.

4.7.2 Set the STOP/MOVE switch to "STOP" position and depress the START switch. (Refer to para. 5.6.)

4.7.3 When the thread is wound up, set the STOP/MOVE switch to "MOVE" position.

4.7.4 If the thread is wound up conically, move the thread guide toward smaller diameter of wound thread layers.

4.7.5 It is recommended that polyester thread or nylon thread is wound with low tension.

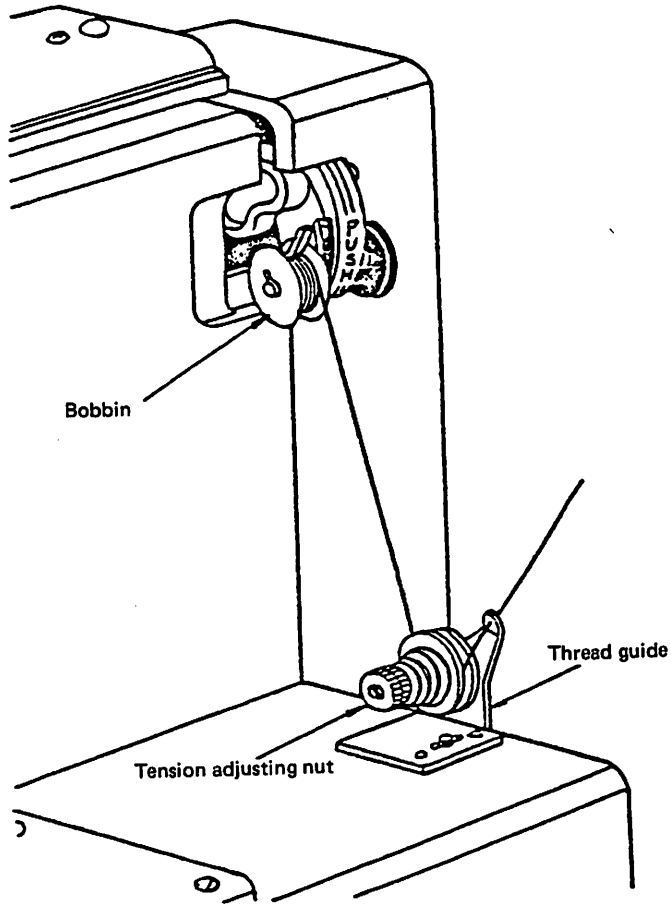
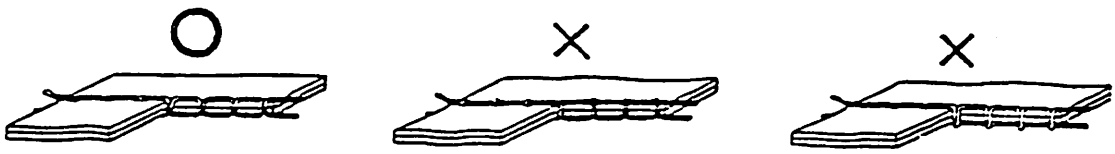


Fig. 9

4.8 Thread Tension (Fig. 10)

Needle thread tension should be balanced with the bobbin thread as shown below.



Balanced needle thread tension and bobbin tread tension

Tight needle thread tension or loose bobbin thread tension

Loose needle thread tension or tight bobbin thread tension

Fig. 10

4.8.1 Bobbin thread tension (Fig. 11)

The standard bobbin thread tension for cotton thread #60 is that the bobbin case gradually goes down when the thread end is held by fingers and the bobbin case is released.

To adjust tension, turn the thread tension adjust screw shown in Fig. 11.

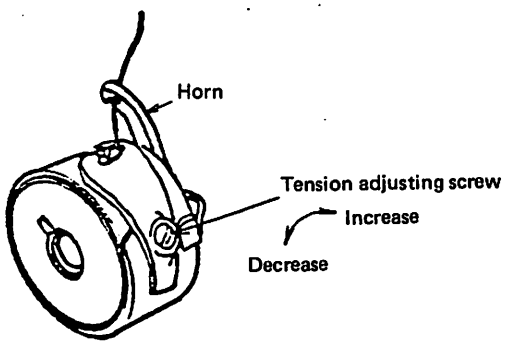


Fig. 11

4.8.2 Needle thread tension (Fig. 12)

The needle thread tension should be adjusted in reference to bobbin thread tension.

To adjust, turn the tension regulator thumb nut shown in Fig. 12.

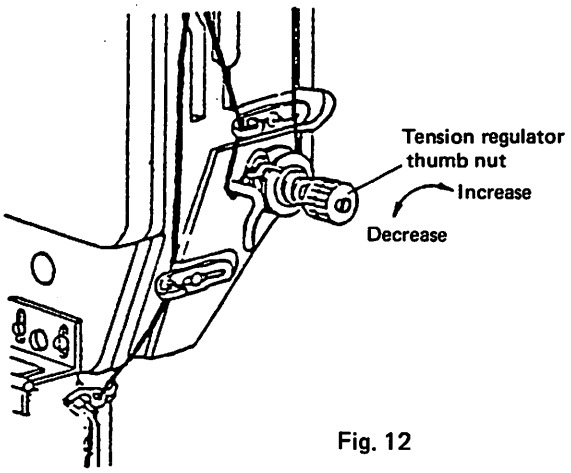


Fig. 12

4.9 Lubrication

Apply several drops of lubricating oil to "A", "B", "C" and "D" shown in Fig. 7 everyday.

Pour lubricating oil through the oil filler hole in the bed, shown in Fig. 13, until the oil level reaches the red mark on the oil gauge.

Note that too much oil may spill when the head is leaned.

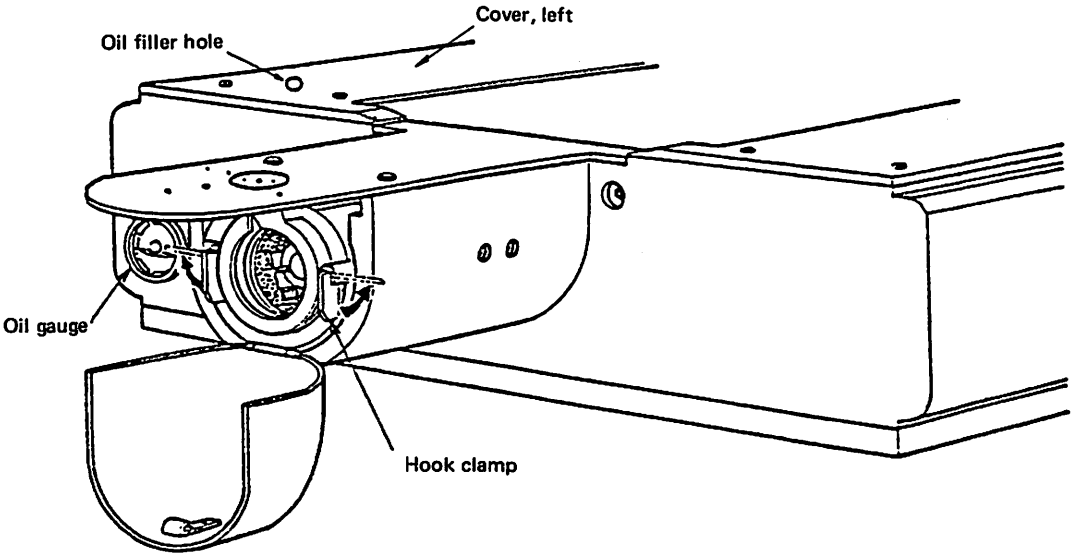


Fig. 13

5. CONTROL SWITCHES AND THEIR FUNCTIONS

5.1 Switch Panel

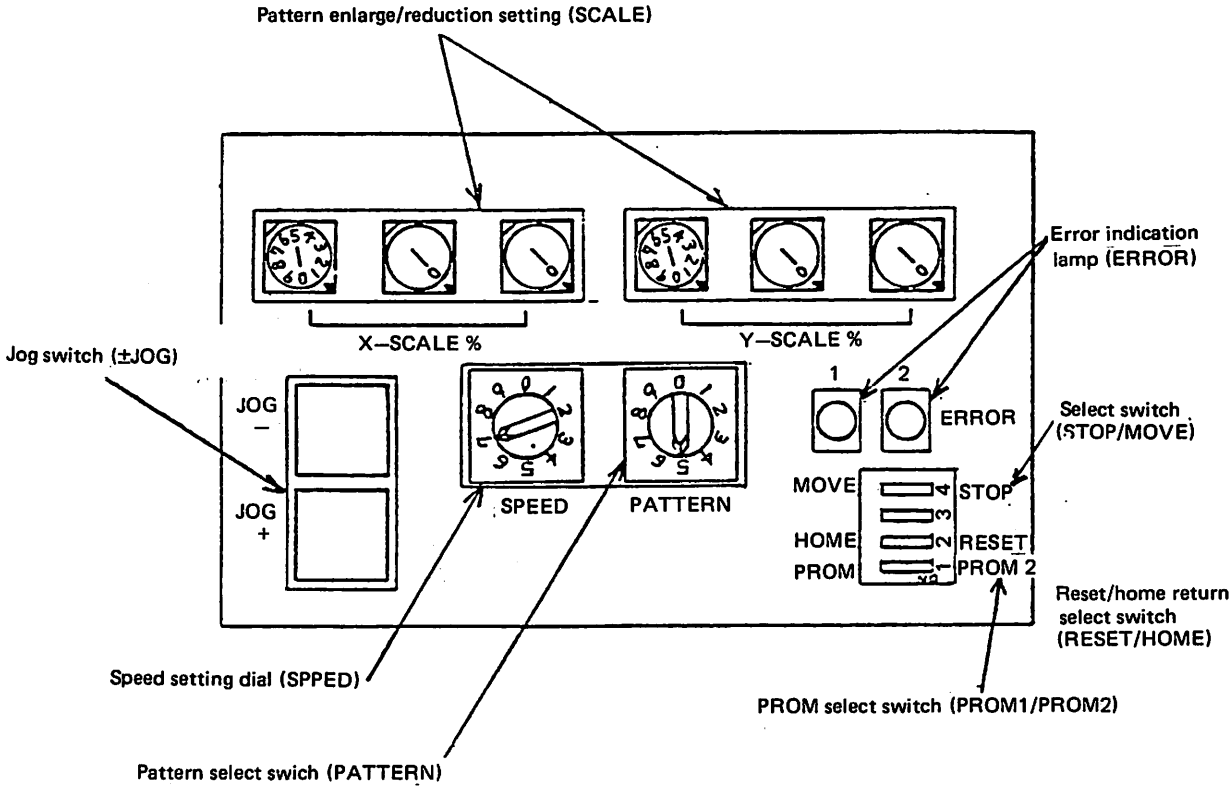


Fig. 14

5.2 SCALE Switch

(1) Let the patterns stored in PROM be 100% in size, they can be enlarged or reduced within a range from 0% to 199% in X axis and Y axis independently (stitch length is enlarged or reduced).

(2) Pattern is enlarged or reduced in reference to the home position.

Ex.:

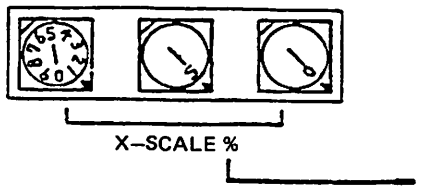


Fig. 15 SCALE switch setting

Notes: (1) When pattern is enlarged, it should be verified that the enlarged pattern is within the range of sewing area. (Refer to para. 5.5.1.)

(2) Machine speed RPM may be decreased when enlarged pattern is stitched. (Refer to Table 2.)

5.3 PATTERN Switch

Desired pattern can be selected by this switch (patterns are stored from "0" in PROM).

5.4 SPEED Switch

The maximum speed (regular stitching speed) is set by this switch. Speed cannot be changed in mid course of stitching.

5.5 ±JOG Switch

5.5.1 Test function

After the work holder returns to the home position and is lowered,

(1) Only the work holder advances in the stitching direction at a fixed speed while the JOG switch is held at "+" position. When the switch is set at "—" position, the work holder moves in opposite direction.

(2) When the switch is held at "+" position and the work holder reaches the end of pattern, the work holder goes up, and then returns to the home position. When the switch is held at "—" position, the work holder returns to the home position and remains stopped there, thus permitting start of stitching by depressing the START switch, or permitting test by operating the (+) JOG switch.

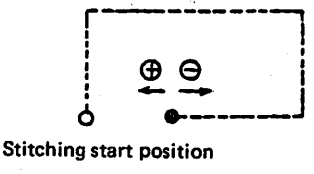


Fig. 16 Direction of inching operation

5.6 STOP/MOVE Switch

The switch is set at "STOP" position mostly for bobbin winding.

(1) Bobbin winding

When the START switch is depressed after lowering the work holder with this switch set at "STOP" position, the sewing machine runs at about 600 spm, but the work holder does not move at all. In usual operation, the switch is set at "MOVE" position.

5.7 RESET/HOME Switch

(1) "RESET" . . . . . When the switch is set rightward ("RESET" position), all machine movement is reset.
When the switch is set to this position during stitching operation, the machine stops with the needle stopped at UP position and all machine movement is reset.

(2) "HOME" . . . . . When the switch is set leftward ("HOME" position), the work holder automatically returns to the home position.
(When the needle is at a position other than UP position, it goes up and the work holder returns to the home position.)
In usual operation, the switch is set at "HOME" position.

5.8 PROM1/PROM2 Select Switch

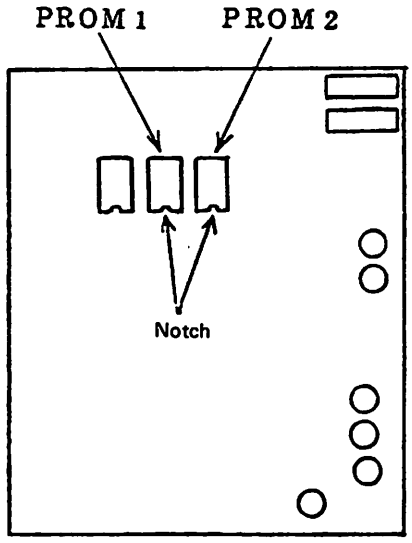
(1) PROMs are found at the places shown in Fig. 17.

(2) 10 patterns have been stored by us in the PROM1.

(3) If further patterns must be stored, remove the PROM2 and store the desired patterns in it.
(When the sewing machine is shipped, no pattern is stored in the PROM2.)

(4) This switch is used to select PROM between PROM1 and PROM2. Stitching is made with pattern stored in the selected PROM.

(5) Before PROM is loaded or unloaded, read "9. HANDLING OF PROM". without fail.



P.C board

Fig. 17

5.9 Error Indication

The following "error" lamps light and operation stops when the following troubles occur.

(1) ERROR 1

Green . . . . . No pattern data is stored or stored data are improper.

Red . . . . . Pattern is enlarged excessively and stitch length exceeds 6.2 mm.

(2) ERROR 2

Green . . . . . The work holder runs over its movable range
→ Scale down the pattern.

(3) ERROR1, ERROR 2

Two red lamps (ERROR 1 and ERROR 2) lights on . . . . . The needle is not at UP position when the power is turned on.
→ Set the RESET/HOME switch to "RESET" and then "HOME" position. The goes up to UP position, and the work holder returns to the home position.

Two red lamp (ERROR 1 and ERROR 2) flickering	. . . . . The LIMI-STOP Z motor or sewing machine itself is locked or the belt is out of pulley → Turn off the power, eliminate the cause of trouble and turn on the power again.

5.10 Work Holder Lift Switch

The work holder goes down when this switch (pushbutton) is depressed, and goes up when it is depressed again. (See Fig. 1)

5.11 START Switch (Foot Switch)

When this switch is depressed, sewing starts from the home position. (See Fig. 1)

6. OPERATION

6.1 Switch Setting on Switch Panel

In order to check each function, set each switch on the switch panel as follows:

Set the SCALE switches (both for X axis and Y axis) to "100", the PATTERN switch to any position ranging from "0" to "9", and SPEED switch to "4".

As for the RESET/HOME switch, the STOP/MOVE switch and the PROM1/PROM2 switch, set them at the left position (setting at shipping).

6.2 Switch Function Checking

When the above-instructed preparatory operation has been completed, turn on the power and check each function as follows:

(1) Home return: Set the RESET/HOME switch to "RESET", and then to "HOME" to make sure the work holder returns to the home position. (Refer to para. 5.7.)

(2) Work holder lowering motion: The work holder should go down when the work holder lift switch is depressed (it will lift when the switch is depressed again).

(3) Work holder movement: The work holder should move tracing the given pattern when the JOG switch is set at "+" position. When the work holder reaches the end of the pattern, it should lift to the UP position, and return to the home position (the work holder stops and it does not go up when the switch is set to "NEUTRAL" position while the work holder is tracing the pattern). (Refer to para. 5.5)

When the above-mentioned test is made, only the work holder moves and stitching motion does not occur.

By performing the test, check the dimensions and location of the work holder.

To check stitching condition, set stitching speed to "low switch" and proceed as instructed in para. 6.3.

Note: In order to make yourself familiar with each switch function, it is recommended to operate switches on the switch panel without needle thread before starting sewing work.

6.3 Sewing Operation

(1) Referring to Fig. 14, properly set switches on the switch panel.

(2) Set up a fabric and depress the work holder lift switch to let down the work holder. Then depress the START switch, the sewing machine will start stitching.

Once stitching starts, it continues even when the START switch is released, and stops with the work holder at UP position after thread trimming.

7. CAUTIONS ON USE

(1) Before replacement of PROM in PROM cassette, carefully read section 8. "HANDLING OF PROM".

(2) If any alarm (ERROR) lamp lights, trace its cause referring to the description in para. 5.9.

(3) When a new pattern is stitched for the first time, or pattern is enlarged, be sure to perform test to check relationship between the work holder movement and the pattern.

(4) Sewing maximum speed depends on stitch length.
The maximum speed automatically changes depending on stitch length.
However, it should be properly set for individual fabric. (Refer to para. 5.4.)

Table 2 Relationship between maximum sewing speed and stitch length

Stitch length	Max. speed
5.4 ~ 6.2 mm	600 spm
4.8 ~ 5.2	850
4.0 ~ 4.6	1100
3.4 ~ 3.8	1300
2.8 ~ 3.2	1550
2.2 ~ 2.6	1800
Less than 2.0	2000

(5) Dust entered in the control unit might cause malfunction or trouble. During operation, the control box cover should be kept close.

(6) When the power is turned on, foot should not be placed on the START switch.

(7) When adjustment is made on the sewing machine, be sure to turn off the power before gaining access to the mechanisms or control box interior.

(8) Do not apply a multimeter to the control circuit for checking or adjustment. Otherwise semiconductors in the circuit might be damaged due to voltage from the multimeter.

(9) When single-phase motor is used, do not immediately depress the START switch, but wait for about 10 sec. until the motor running is stabilized after switching on the power.

8. CHECKING AND MAINTENANCE

8.1 Adjusting the Needle Bar Stop (UP) Position (Fig. 18)

(1) Adjust needle bar stop (UP) position so that the thread hole of takeup lever is aligned with the mark on the arm when the sewing machine is stopped.

(2) If the adjustment is out of alignment over 1 mm, loosen the synchronizer shaft coupling set screw and turn the coupling to adjust the needle bar stop (UP) position.

Stopping timing delays when the coupling is turned clockwise,and advances when turned counter-clockwise.

(3) If the needle bar stops too early, the needle threed may leave the needle eye at start of stitching.

If the needle stop timing delays, the needle stops at a lower position and the wiper might be caught by the needle, or the movable knife does not move since the cam follower roller of thread trimmer cannot enter the cam groove.

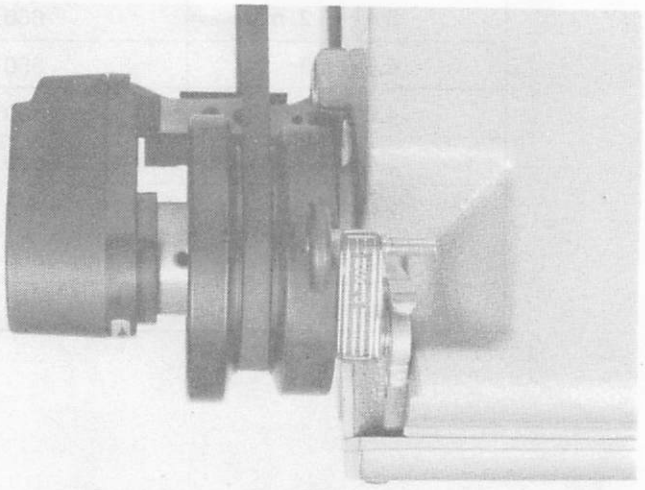


Fig. 18

Notes: Although the needle stop (DOWN) position is not required to be adjusted for usual operation, it is recommended to make the following checking:

1. Draw out the synchronizer cover toward the cable (See Fig. 18).
2. There are three position detecting discs in the synchronizer: the first one (red) is for detection of needle DOWN position, the second one (black) is for detection of UP position, and the third one (blue) is not in use.
3. Turn the first disc (red) to align the matching holes (hold the first disc on its circumference to rotate the disc).

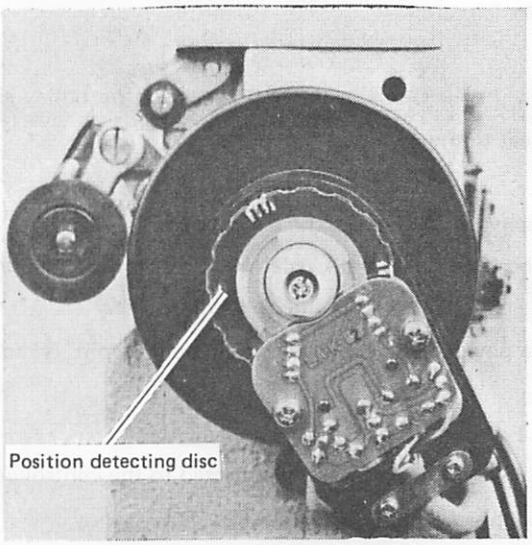


Fig. 19

8.2 Adjusting the Home Position

(1) Install the home position detecting disc so that it does not come into contact with the X-Y detector.

(2) The home position should be established so that the stepped portion of the detecting disc meets the center of X-Y detector (small).

(3) The X-Y detector (large) is for detection at the limits of work holder movable range.

When notch shownes in Fig. 22 is provided in the home position detecting disc, the sewing machine stops and "ERROR" lamp lights when the notch is sensed.

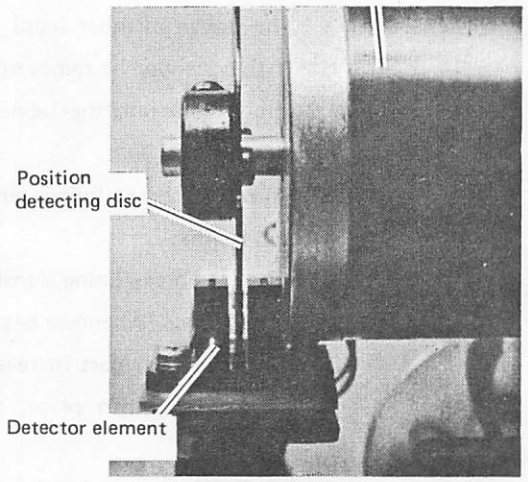


Fig. 20

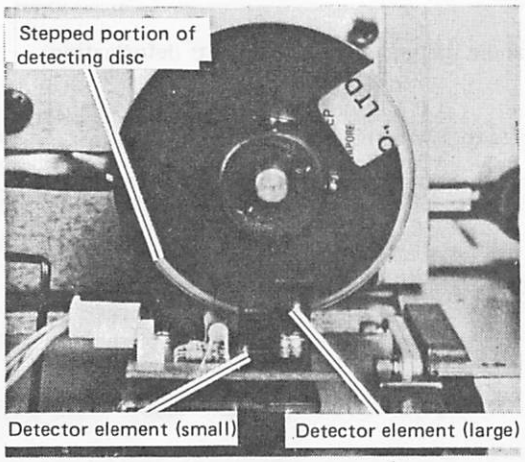


Fig. 21

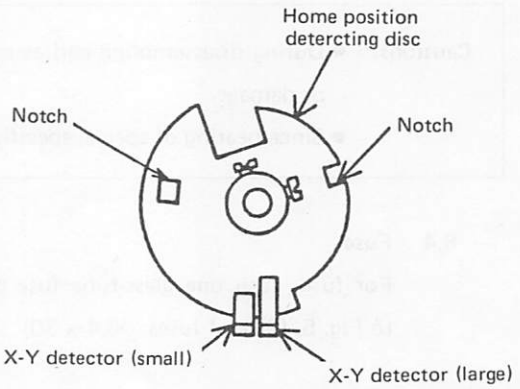


Fig. 22

8.3 LIMIT-STOP Z Motor

8.3.1 Filters

Periodically clean the air filters at the end cover and on pulley side. (Note that clogged air filter may cause overheat to the motor).

8.3.2 Motor

The motor is usually not required to be overhauled.

If stop position becomes inaccurate, rotation becomes unstable, or metallic sound occurs when the motor is braked, check the motor in the following order:

(1) Turn off the power to stop the motor. (About 2 min. is required until the motor stops completely).

(2) Remove the belt and motor pulley.

(3) Remove the cable plug (for brake) connected to the control box from the bracket.

(4) Remove three bracket mounting screws.

(5) Remove the bracket. The brake assembly will be removed together with the bracket.

(6) Check the brake lining and brake disc for condition. If the brake lining is found worn out, replace it.

(7) Holding the clutch shaft by hand, carefully pull it.
The driven member (cup) and brake lining can be removed together with the clutch shaft. If they cannot be removed, prepare two bolts (M5 x 0.8 thread length of min. 45 mm) and screw them into the tapped holes in the cup and boss (made of aluminum) to remove the clutch shaft.

(8) To replace brake lining, remove the bearing on the pulley side and install a new brake lining and bearing.
When the brake lining is installed, align the tapped hole mentioned at step (7) with holes in the brake lining. (Whenever bearing is removed, install a new bearing.)

(9) Assemble each part in reverse steps to the disassembling. In assembling, if the clutch shaft cannot be set in place, lightly tap the clutch shaft end with mallet. (Do not tap it strongly.)

(10) When the brake lining is replaced, turn the clutch shaft by hand after assembling to make sure it can smoothly rotate and try operation for matching.
To match the brake lining, start the motor and depress the pedal at least 100 times.

Cautions:
- During disassembling and assembling, carefully handle the brake cup avoiding its deformation or damage.
- Since bearing of special specification is used, address to us when it is replaced.

8.4 Fuse

For fuse, each one glass-tube fuse of 10A rating and 20A rating is used. For location of fuses, refer to Fig. 5. (Size of fuses: ϕ6.4 x 30)

8.5 Cleaning of Fan Filter

The cooling fan filter is located on the bottom of control box. Remove the filter by levering it out with a screwdriver and clean the filter from time to time.

8.6 Adjusting the V-Belt Tension

If tension of the LIMI-STOP Z motor V-belt is too small, the belt may largely flatter when the sewing machine is operated at high speed.

In this case, tighten the V-belt by moving the motor position adjusting nut shown in Fig. 3.

8.7 Prevention of Malfunction Due to Noise, and Grounding

(1) Malfunction caused by noise may be eliminated to a certain extent by grounding the control box, synchronizer and sewing machine head. (When the source voltage is larger than AC 150V, grounding is indispensable for safety. Leave the grounding work to qualified electrician.)

(2) Do not locate the sewing machine near equipment that generates intense noise, such as high-prequency welders.

9. HANDLING OF PROM

The PROMs are installed as shown in Fig. 17.

They should be handled with the following cautions:

(1) Before loading and unloading PROM, be sure to turn off the power.

(2) When a screwdrive is used to remove PROM, take care not to damage the P. C. board pattern, nor to bend pins of PROM.
It is recommended to use an IC remover (ex.: TAKARA TOOL S/S, Type P-63) for removal of PROM.

(3) Do not directly touch the PROM pins and PROM sockets on the P.C. board. Otherwise contact trouble might occur.

(4) Do not place the P.C. board and PROM on statically charged cloth or plastic, but place on a metallic sheet or aluminum foil.

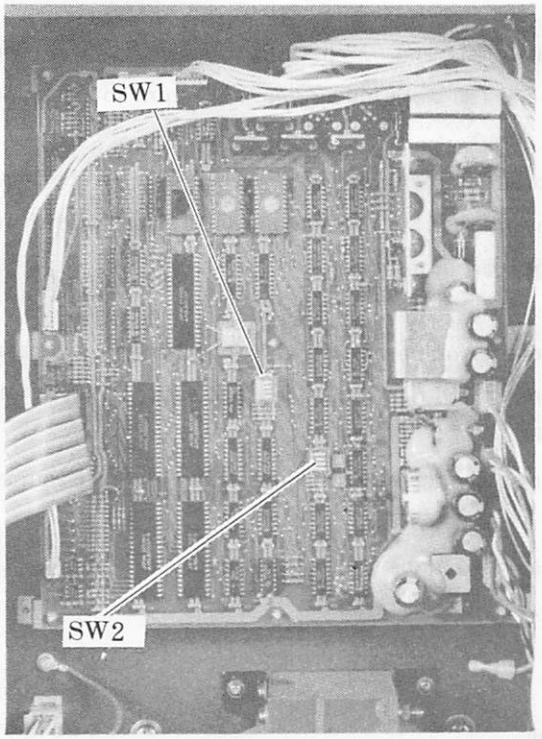
(5) PROMs should be installed in the control box, so that notch is downward as shown in Fig. 17. If PROM is installed in wrong direction, it might be damaged.

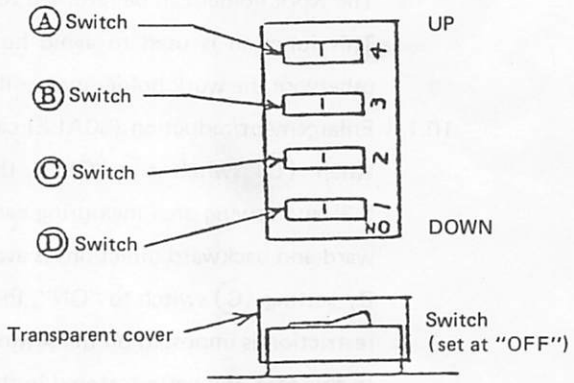
(6) For entering new patterns into PROM, an optional PROM writer (PTN-4000) must be used (PROM writer PT-100 or 100A can be used when MB8516 or MB8516H (Fujitsu) is used for PROM.

(7) For erasure of patterns stored in PROM, PROM eraser (incorporated in PROM writer) must be used.

10. AUXILIARY FUNCTIONS

The DIP switches SW1 and SW2 on the CPU card in the control box have the following functions;
(The switches are protected with transparent cover. After the setting, be sure to install the cover again.)





Details of SW1 and SW2

Fig. 23

10.1 SW1

10.1.1 Repeat function

When Ⓐ switch is at "OFF" (setting at shipping), only one pattern can be stitched and the work holder stops at the UP position (even when the START switch is kept depressed.

With Ⓐ switch set at "ON", the work holder goes up when the power is turned on or when the work holder lift switch is depressed to "ON", or RESET/HOME switch is set to "RESET" position. However, the work holder remains lowered when the stitching is completed, permitting resumption of stitching by depressing the START switch again.

Therefore, stitching can be repeated with the work holder maintained at lowered position. The function is very helpful when pattern is sewn repeatedly, or when the embroidery clamp frame is used.

10.1.2 Home position return cancellation at power turning on

With (B) switch of SW1 set at "OFF", the work holder automatically returns to the home position when the POWER ON switch is depressed with the needle is at UP position.

If the needle is not at UP position, however, the ERROR lamps "1" and "2" (red) light and the sewing machine does not start when the START switch is depressed.

In this case, let return the work holder by operating the RESET/HOME switch (refer to para. 5.7). The ERROR lamps will go out and the work holder will return to the home position after the needle goes up.

With (B) switch set at "ON", the ERROR lamps "1" and "2" (red) light, no matter where the needle is located, when the power is turned on. The work holder does not return to the home position and the machine does not start.

The work holder can be returned to the home position when the RESET/HOME switch is operated. This function is used to avoid home position return at the time the power is turned on (when, otherwise the work holder may collide with other part of machine).

10.1.3 Enlargement/reduction (SCALE) cancellation

When (C) switch is at "OFF", the enlargement/reduction of parttern is possible (refer to para. 5.2) and sewing area measuring each 25 mm in left and right directions, and each 15 mm in forward and backward directions is available.

By setting (C) switch to "ON", the enlargement/reduction function can be reset, and no electrical restriction is impossed on the sewing area.

In this case, the pattern stored in the PROM is stitched in the real size (100%).

(D) switch is provisional, and has no funciton.

10.2 SW2

These DIP switches are used to set fabric feed timing.

Table 3 shows timing at each switch setting.

(A), (C) and (D)switches are set at "OFF" when the sewing machine is shipped, thereby feeding of fabric starts when the arm shaft rotates by 11 pulses (one pulse corresponds to 5.6° of arm shaft rotating angle) after the synchronizer detects the needle DOWN position.

When (A), (B) and (D) switches are set to "OFF", for example, number of pulses becomes equal to 13 pulses and therefore feeding start timing delays by 2 pulses (equivalent to 11.2° of arm shaft rotating angle).

Table 3

Switch/Setting	Timing
(A) "OFF"	8 pulses
(B) "OFF"	4 pulses
(C) "OFF"	2 pulses
(D) "OFF"	1 pulse

Fabric feed timing can be checked as follows:

(1) With the needle at UP position, turn on the power.

(2) Depress the work holder lift switch to lower the work holder.

(3) Operate the JOG switch and depress the HALT switch to suspend the machine operation.

(4) While the operation is suspended, lean the machine head and remove the V-belt.

(5) Without the V-belt, return the head.

(6) Depress the START switch to "ON".

(7) By turning the balance wheel by hand, the work holder is driven by the stepping motor.

(8) Sicne the work holder movement corresponds to fabric feed timing, visually check the timing in reference to height of the needle.

(9) Inseveral seconds after the START switch is set to "ON", the ERROR (alarm) lamp lights (indicating that the V-belt is out of position) and the LIMIT-STOP Z motor clutch will be disengaged. However, checking can be continued by turning the balance wheel by hand.

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