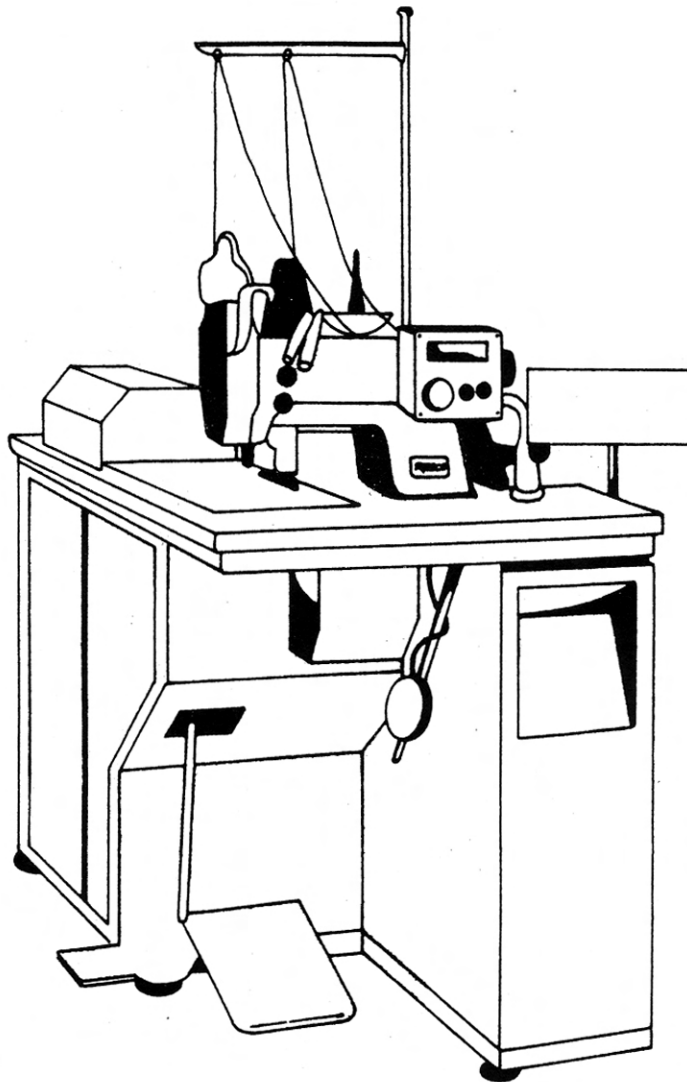




Series 46 and Series 47

Lockstitch Pocket Welting Machines



Service Manual

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IMPORTANT

No safeguard, safety appliance or device attached to or forming an integral part of this machine shall be removed or made ineffective except for the purpose of making immediate repairs or adjustments.

Any such safeguard, safety appliance or device removed or made ineffective during the repair or adjustment of such machine shall be replaced immediately upon the completion of such repair or adjustment.

No machine shall be operated until such repairs and adjustments have been made and the machine is in good working condition.

Safety glasses should be worn when operating these machines.

A. Specifications & Parts

1. General Specifications

Sewing Head Brother LT 2B-832-3

Sewing Speed 2200 SPM

Sewing Length

Minimum 40 mm (1.57")

Maximum 180 mm (7.08")

Needle Bite Sizes

Standard 8 mm (.31"), 10 mm (.39"), 12 mm (.47")

Optional 14 mm (.55"), 16 mm (.63"), 18 mm (.71"), 20 mm (.79")

Pneumatic Pressure 6 Kg./sq. cm. (85 lbs./sq. inch)

Operating Voltage Options

110 V., Single Phase, 60 Cycle

220 V., Three Phase, 60 Cycle

220 V., Single Phase, 50 Cycle

240 V., Single Phase, 50 Cycle

220 V., Three Phase, 50 Cycle

380 V., Three Phase, 50 Cycle

440 V., Three Phase, 50 Cycle

Measurements

Height 84-89 cm (33"-35")

with extension legs 99-104 cm (39"-41")

Length 135.3 cm (53 1/4")

Width 69.85 cm (27 1/2")

Weight Net 324 Kg. (700 lbs.), Gross 459 Kg. (1000 lbs.)

2. Tools & Accessories

QTY.	Part Number	Description
	46-1009-9-133	Hydraulic Press Oil (1 liter)
	46-1001-5-177	Sewing Oil
	46-1001-4-590	Flap Foot Rubber
	46-1001-4-589	Clamp Foot Rubber
	46-1001-4-478	Center Knife
	46-1001-4-244	Trimming Blade (8, 10, 12, 14 mm)
	46-1001-5-292	Trimming Blade (16, 18, 20 mm)
	46-1001-4-136	Tab Knife (8, 10, 12, 14 mm)
	46-1001-5-289	Tab Knife (16, 18, 20 mm)
	46-1001-4-689	Lamp Holder
	46-1000-6-209	Wood Screw
	46-1009-9-045	Thread Tweezers
	46-1001-5-154	Wrench (8×9 mm)
	46-1001-5-176	Oiler
	46-1009-9-134	Wrench Set (8 Wrenches)
	46-1009-9-136	Wrench (7×5.5 mm)
	46-1009-9-137	Wrench (8×7 mm)
	46-1009-9-138	Wrench (12×10 mm)

QTY.	Part Number	Description
	46-1009-9-139	Wrench (13×11 mm)
	46-1009-9-140	Wrench (17×14 mm)
	46-1001-5-081	Bobbin
	46-1001-5-151	Screwdriver (5.5×190 mm)
	46-1003-7-919	Hex Screwdriver (1.58 mm 1/16")
	46-1001-5-152	Screwdriver (3.4×70 mm)
	46-1001-5-153	Screwdriver (1.9×52 mm)
	46-1001-5-180	Hex Wrench (2 mm)
	46-1001-5-179	Hex Wrench (3 mm)
	46-1009-9-135	Accessories Box
	Sewing Oil	Esso Telesso 43 ISO VG 43 (or equivalent)
	Hydraulic Oil	Shell Telas Oil 56 ISO VG 56 (or equivalent)
	Needles	Schmetz MTX 190 # 100 Singer SY 7555-01 Groz Beckert MTX 190 SY 7555-100

3. Recommended Spare Parts

QTY.	Part Number	Description
2	46-1001-5-112	Outer Rotary Hook Assembly
4	46-1000-8-232	Screw for Bobbin Case Gib
3	46-1000-8-234	Screw for Gear (Hook Assembly)
3	46-1000-8-235	Screw for Gear (Hook Assembly)
1	46-1001-5-038	Timing Belt
3	46-1000-8-208	Mounting Screw for Sad- dle Block
1	46-1001-4-957	Jumping Guide (Right)
1	46-1001-4-958	Jumping Guide (Left)
1	46-1001-0-908	Glass Fiber Unit
4	46-1000-3-637	Needle Screw
2	46-1001-0-920	Bulb for Work Locating Light
1	46-1001-0-902	Sensing Switch
1	46-1001-5-223	Stop Pin for Slide Plates
2	46-1001-4-244	Upper Thread Trimmer Knife
1	46-1001-4-267	Throat Plate Insert
2	46-1000-1-613	Screw for Throat Plate Insert
3	46-1000-9-127	Throat Plate Screw (Front)
3	46-1000-9-142	Throat Plate Screw (Rear)
3	46-1000-4-404	Screw for Lower Thread Trim. Block
2	46-1000-4-358	Screw for Cross Cutter
3	46-1001-4-478	Center Knife
4	46-1000-9-730	Center Knife Clamp Screw
6	46-1001-4-136	Set of Tab Knives
6	46-1000-9-798	Tab Knife Screw

QTY.	Part Number	Description
1	46-1001-0-921	Magnetic Reed Switch
1	46-1001-4-970	S-47 Brush Blade (L. H.)
1	46-1001-4-969	S-47 Brush Blade (R. H.)
1	46-1001-5-231	Package of Reflective Tape
2	46-1001-4-590	Flap Clamp Rubber
2	46-1001-4-589	Clamp Foot Rubber
1	46-1001-0-929	Power Switch
1	46-1001-4-783	Hall IC Switch (90 cm cord)
1	46-1001-4-784	Hall IC Switch (70 cm cord)
1	46-1001-0-234	Pneumatic Sol. Valve (3 way)
1	46-1001-0-235	Pneumatic Sol. Valve (4 way)
1	46-1001-4-801	R. H. Clamp Arm Gauge (12 mm)
1	46-1001-4-802	L. H. Clamp Arm Gauge (12 mm)
1	46-1001-4-806	Needle/Hook Timing Gauge
1	46-1001-4-805	Needle/Hook Timing Gauge
1	46-1001-4-803	Hook Height Gauge (0.75 mm)
1	46-1001-4-804	Hook Height Gauge (0.9 mm)
1	46-1001-4-800	Needle Height Gauge
	02-0150-0-110	Needle, rd. pt., fine (0)
	02-0150-0-111	Needle, rd. pt., medium (1)
	02-0150-0-112	Needle, rd. pt., heavy (2)
	02-0150-0-113	Needle, rd. pt., very heavy (3)
	02-0150-0-114	Needle, rd. pt., extra heavy (4)

B. Installation Instructions

1. Adjusting Height

Height is changed by adjusting the four feet located on the base of the frame.

2. Carriage Shipping Lock (Figures 1 and 2)

To prevent the carriage from moving in transit, it was pushed back and fastened with a split clamp (A). Remove the screws (B) and the clamp (A). The hydraulic valve was also closed. Its lever must now be turned to its correct operating position, shown as (C).

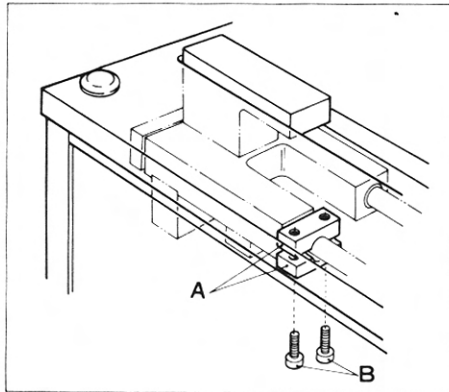


Figure 1

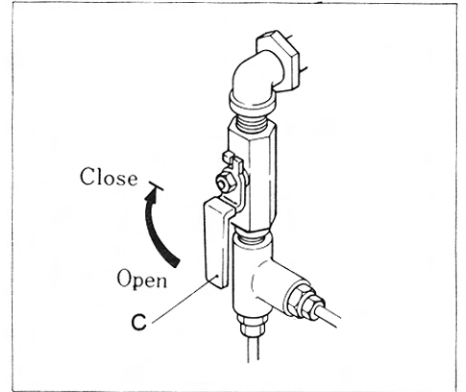


Figure 2

3. Air Supply (Figure 3)

Connect and fit the hose band with the coupler as shown in (D). Set the air pressure to 5 kg/cm² (for the entire operating system) and 4 kg/cm² (for the hydraulic system only) as shown in (E). Both the filter and oil mist separator are automatic; they therefore will automatically purge unnecessary condensation.

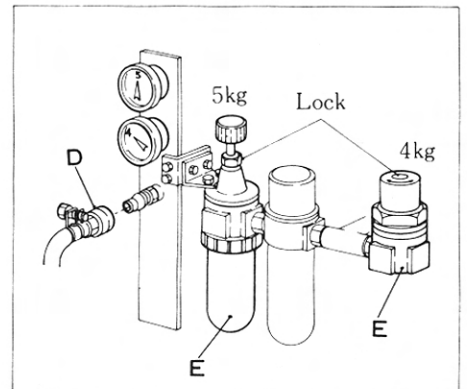


Figure 3

4. Lubricating the Sewing Head (Figure 4)

Remove the oil plug (F) and pour oil into the oil inlet (G) until the oil level in gauge (H) reaches the red mark. To start the flow of oil, turn the oil feed button (I) to the white line as shown in Figure 4. **Note:** The oil feed button must be returned to its starting position when the machine is not in use.

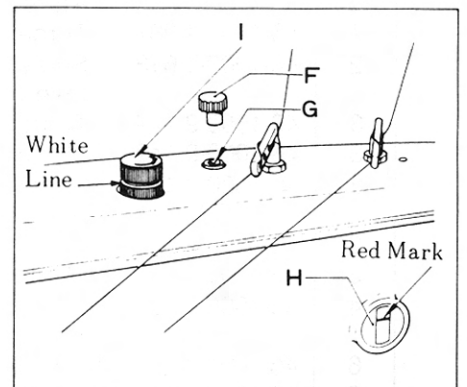


Figure 4

5. Lubricating the Rotary Hook (Figure 5)

Remove the two oil gauges (J), which act as dip sticks. The correct oil level is shown as (K). Add oil if necessary.

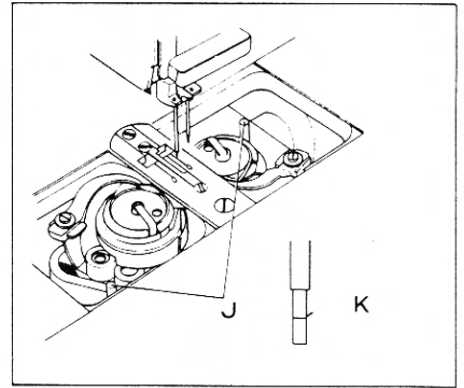


Figure 5

6. Adjusting the Rotary Hooks Oil Flow (Figures 6 and 7)

With the rotary hooks removed, place a sheet of paper over the bobbin case. Operate the machine using the button switch inside the control box. In approximately 10 seconds, the oil scattered from the rotary hooks should look like Figure 6. If it does not, adjust the screws shown as (L). The left screw adjusts the left hook; turn counterclockwise for more oil. The right screw adjusts the right hook; turn clockwise for more oil.

Note: The screw must be in the center position to fill.

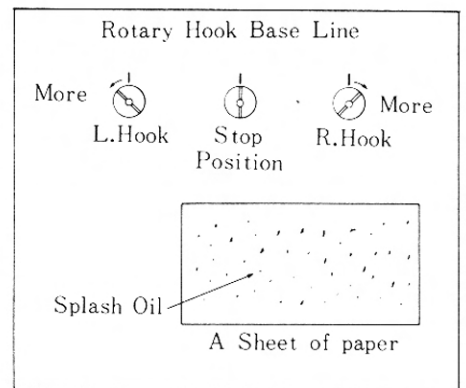


Figure 6

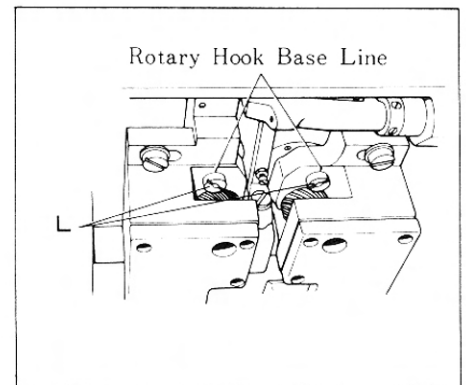


Figure 7

7. Filling the Oil Reservoir (Figures 8, 9 and 10)

With the carriage in the forward position, check the oil quantity at the Sight gauge (on the back of the oil reservoir and as shown in Figure 8). The oil level should be 2-3mm below the mark shown. If the oil level is too low, disconnect the air supply. Remove the cap (M) and add oil. Open the screws shown as (N) to bleed the air; tighten when finished.

Note: Remove the screws with caution; balls are located within.
Note: Turn valve (O) to the off position when moving the machine.

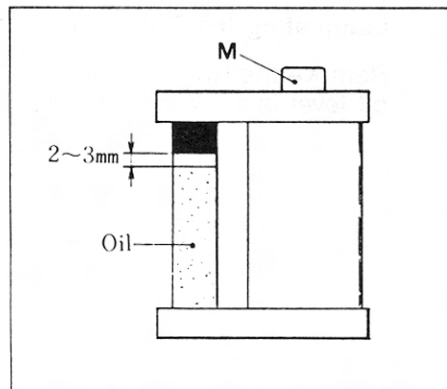


Figure 8

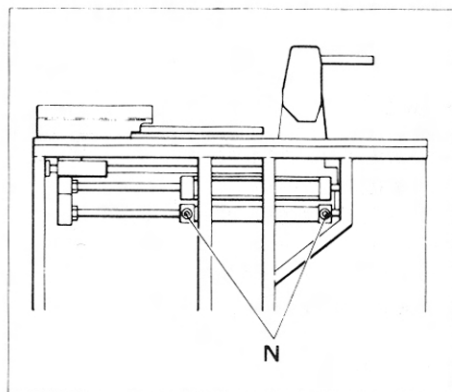


Figure 9

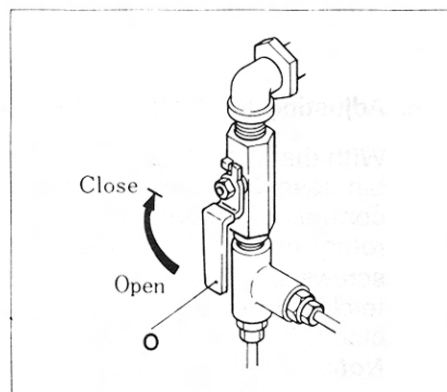


Figure 10

8. Sewing Machine Rotation (Figures 11 and 12)

To determine whether the machine head is turning correctly, take these actions. With the main power switch off, turn the hand wheel so that points (P) and (Q) are not aligned. Turn the power switch on. If the machine head turns in a counterclockwise position to align points (P) and (Q), it is turning correctly. If it does not, interchange any two of the red, black or white wires located on the end of the machine power cord.

Note: The rotation can also be checked by using the push button switch inside the control box.

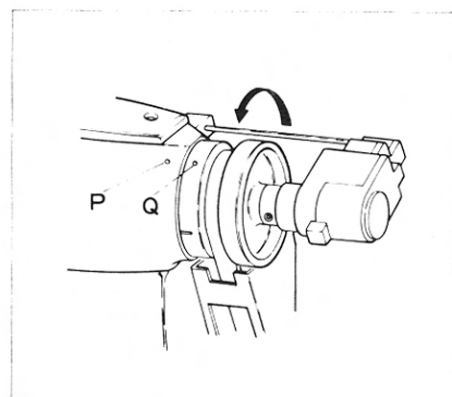


Figure 11

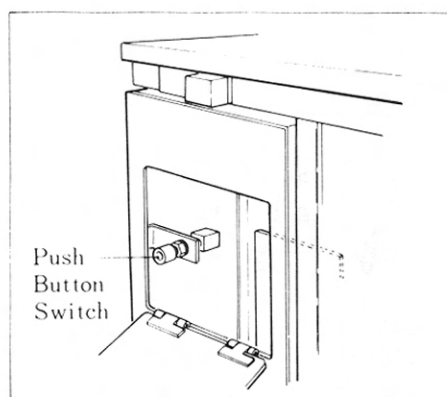


Figure 12

C. Threading Instructions

1. Installing Needles (Figure 1)

Holding the needles with the long groove facing inward, insert them all the way into the needle head and tighten the screws.

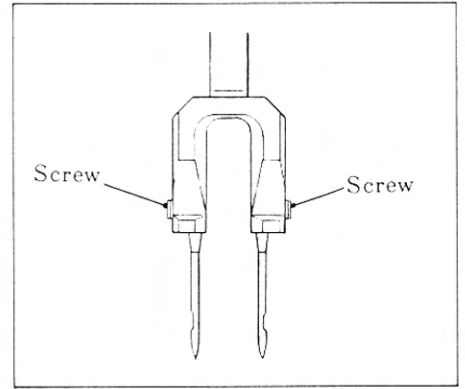


Figure 1

2. Upper Threading (Figure 2)

Raise the thread take-up to its highest position. Wind the thread around the tension springs as shown in (A). Pass the threads through the needle eyes from inside to outside as shown in (B), pulling approximately 50mm of thread through each eye.

Note: If you are using synthetic thread, be sure to also use the felt in the arm thread guide as shown in (C).

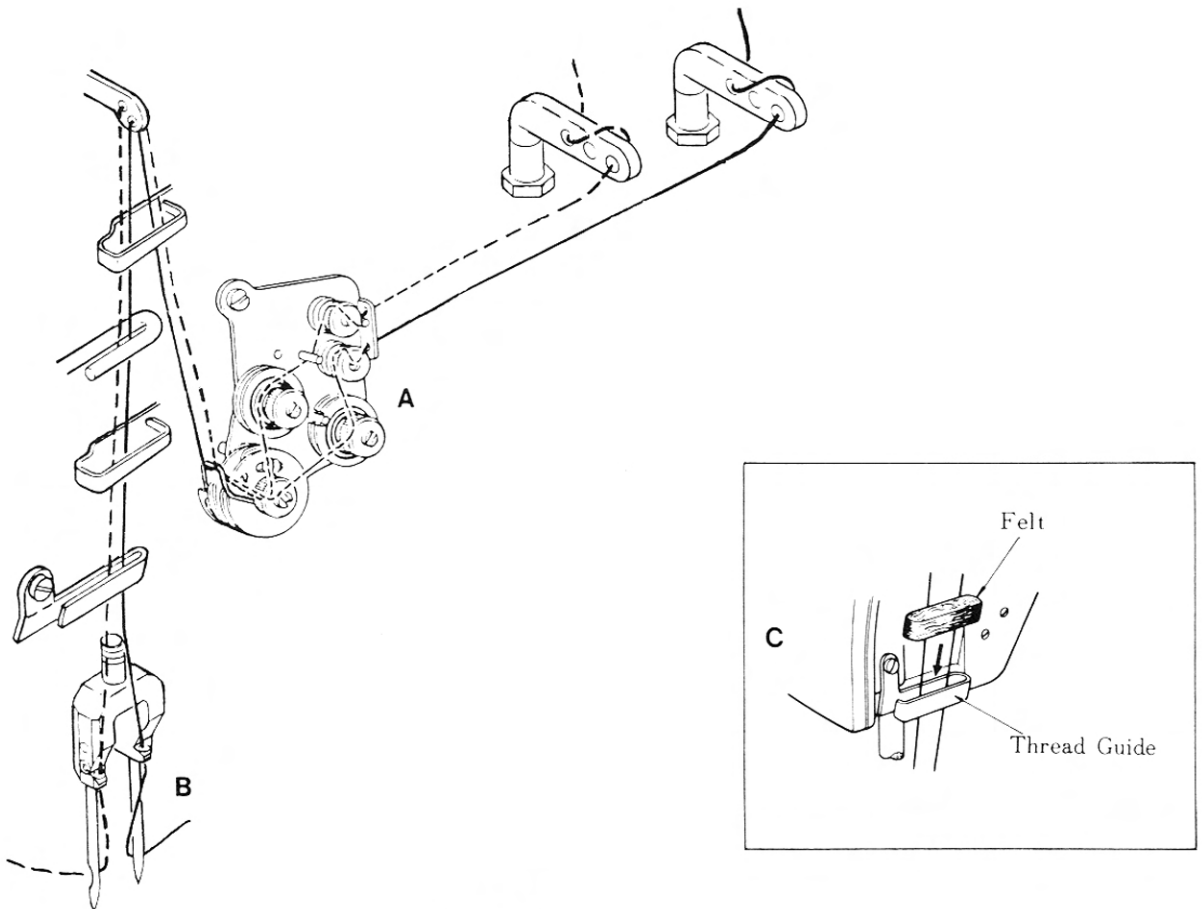


Figure 2

3. Removing Bobbins (Figure 3)

Raise the needles to their highest position and open the slide plates by moving them to the right and left as shown in Figure 3. Pull the rotary hook latches upward and remove the bobbin, also shown in Figure 3.

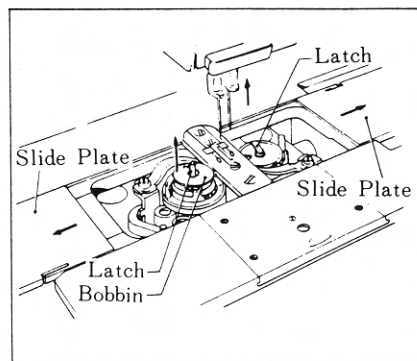


Figure 3

4. Loading Bobbins (Figures 4a and 4b)

Place the bobbin into the rotary hook as shown in Figure 4a. Close the latch of the rotary hook so that the bobbin turns to the left. Pass the thread under the tension spring. Pass the thread through the clearance between the rotary hook and the bobbin case opener. Manually turn the machine drive pulley to lower needles and bring bobbin thread through throat plate.

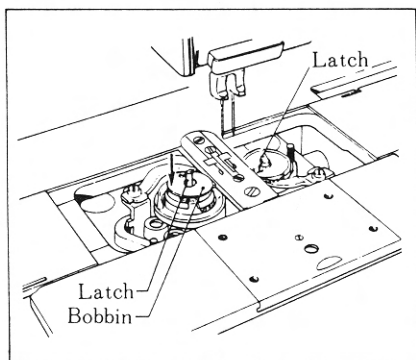


Figure 4a

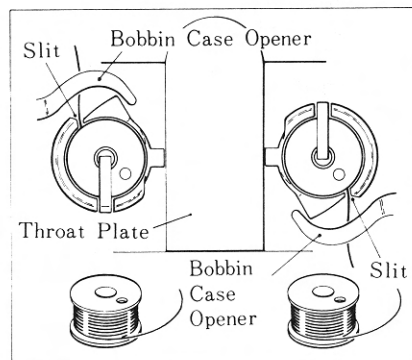


Figure 4b

5. Holding Upper and Lower Threads (Figures 5 and 6)

Align the red timing mark on the machine head with the white mark on the machine pulley. Pull the upper and lower threads approximately 152 mm (6 inches) backwards. Push in and hold the manual pick-up and trim switch [see Section D (I) Upper Control Panel to locate this switch]. The upper thread pick-ups will lower; the lower thread knife will shift to the right. Pass the two upper threads over the upper thread pick-up as shown in (D). Pass the two lower threads through the grooves in the throat plate. Release the switch; the threads will be trimmed and clamped.

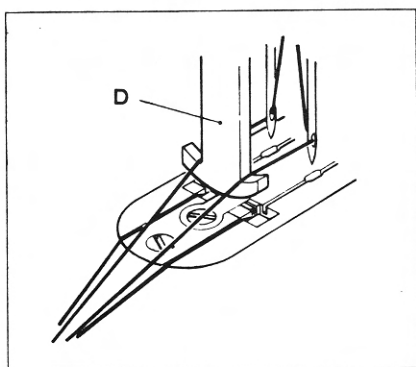


Figure 5

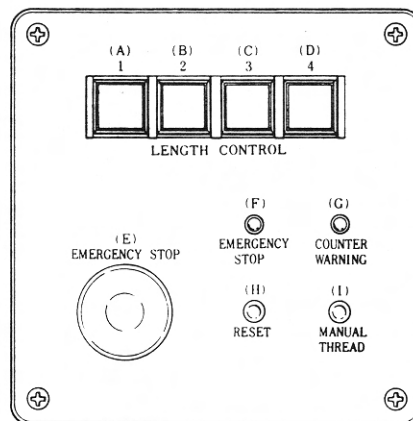


Figure 6

6. Winding Lower Thread (Figure 7)

Push the bobbin onto the bobbin winder shaft. Push the bobbin winder stop latch downward. Wind the thread around the bobbin several times in the direction of the arrow as shown in (E). Operate the machine. If the thread cannot be wound evenly, move the thread guide to the side as required.

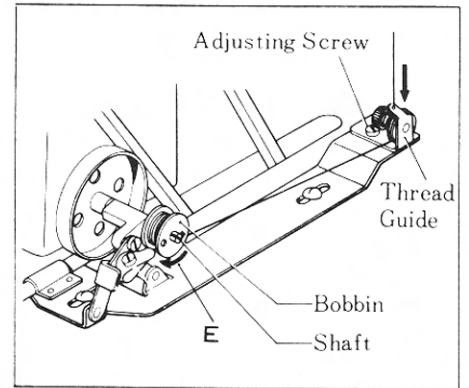


Figure 7

7. Thread Tension (Figures 8, 9 and 10)

Adjust the upper thread tension by turning the tension control nut (F). Adjust the lower thread tension by turning the tension screw (G). **Note:** Clockwise increases tension; counterclockwise decreases tension.

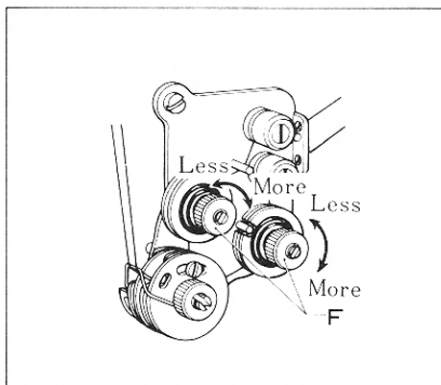


Figure 8

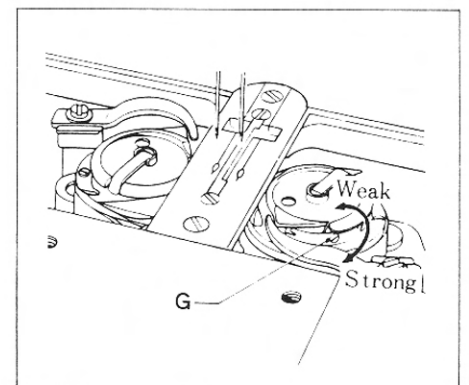


Figure 9

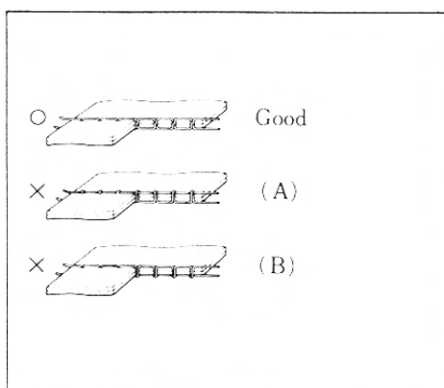


Figure 10

Note: Illustration — Figure 10
 (A) Example of top tension too strong or bobbin tension too weak.
 (B) Example of bobbin tension too strong or top tension too weak.

D. Operator Controls

Lower Control Panel (Figures 1 and 3)

(A) Main Power switch.

(B) Incremental feed switch. It moves the carriage slowly back as long as the button is depressed. The emergency stop button must be pushed before this switch is operational.

(C) Manual tab knives switch used to manually raise and lower the tab knives. To prevent accidental operation of the switch, a safety lock has been built. It requires that the switch handle be pulled outward to be operated.

(D) Carriage clearing switch. If the switch is in the rear position, the carriage moves to the rear; if it is in the front position, the carriage moves forward.

(E) Carriage feed switch. In the automatic position, the carriage returns forward after tab cut. In the manual position, the carriage remains in the back position until the knee lever is again pressed.

(F) Clamp up selector switch. In the rear position, the clamps raise when the carriage is in the rear; in the front position, the clamps raise after the carriage returns to the forward position.

(G) Counter. It downcounts from an estimate of the number of pockets that can be sewn from a full bobbin. The counter is set manually with the buttons shown. The reset button to the left of the digits returns the counter to its preset number.

Knee Switch: starts the carriage rearward to initiate the machine cycle, and returns the carriage home when the carriage feed is in manual.

Foot Pedal: movement of the pedal actuates these six functions: (Figure 2)

- Position 1 actuates bag clamps
- Position 2 neutral
- Position 3 operates one of two clamps
- Position 4 operates one or both clamps
- Position 5 operates patch guide
- Position 6 operates air blow (Series 46)
- Position 6 operates flap clamps (Series 47)

In addition to all Model 46 functions, the Model 47 has the following additions. (Figure 3)

(H) Sew start position dial. It adjusts the position of the first stitch. The right dial adjusts the position of the sew start on the right side; the left dial adjusts the position of the sew start on the left side. If the first stitch is ahead of the flap edge as shown in (I), use a lower number. If the first stitch is behind the flap edge as shown in (J), use a higher number. (Figure 4)

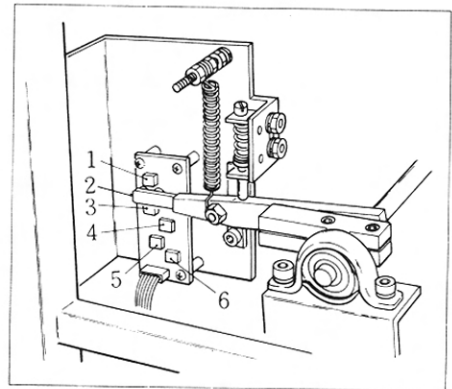
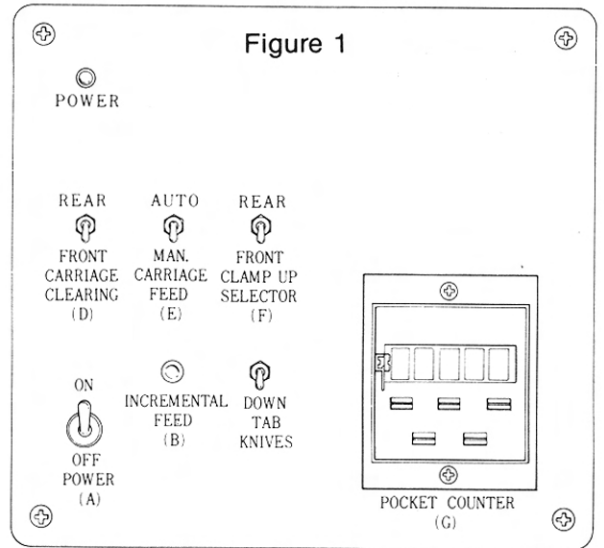


Figure 2

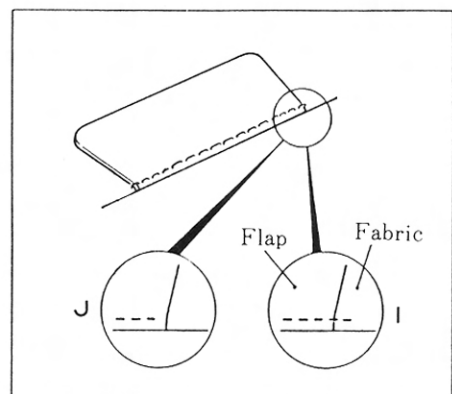
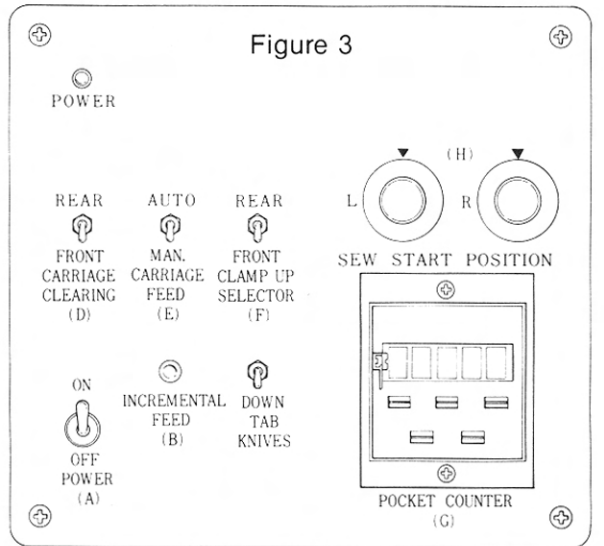


Figure 4

Upper Control Panel (Figures 5 and 6)

(A), (B), (C), and (D) are length control push buttons. They are adjustable from 40 mm to 180 mm. Lengths were factory pre-set at 180 mm, 135 mm, 90 mm, and 50 mm.

(E) Emergency stop button. It will stop all functions.

Note: This button can also be used to freeze any function.

(F) Lights when the emergency stop button has been pressed. A second function is to indicate breakage of an upper thread¹.

(G) Counter warning light. The counter will have been set to indicate the number of pockets that can be sewn from a full bobbin; it counts downward [see (G) under the Lower Control Panel section]².

(H) Reset switch that releases the conditions caused by pushing the emergency stop button.

(I) Manual thread pick-up and trim switch. Both the bobbin and upper threads are trimmed simultaneously.

Note¹: When an upper thread breaks, the machine will trim the threads and return the material to the operator for repair. The tab knives will not be operational. The machine cannot be restarted until it is reset [see (H) above].

Note²: When the light (G) comes on, it means the counter is at zero. The carriage will remain in the back position. The bobbins must be changed and the counter reset for operations to continue.

In addition to all Model 46 functions, the Model 47 has the following additions. (Figure 6)

(J) Flap push button. It puts the machine into its variable sew length mode.

(K) Flap selector switch. At the “L” position, only the left flap clamp will operate; at the “R” position, only the right flap clamp will operate. At the “L/R” position, the flap clamps will alternate from left to right at each sewing cycle.

(L) Lights when the left flap position is selected.

(M) Lights when the right flap position is selected.

(N) Is used when the machine is in the L/R position [see (N) above] to switch the starting point from left to right or from right to left.

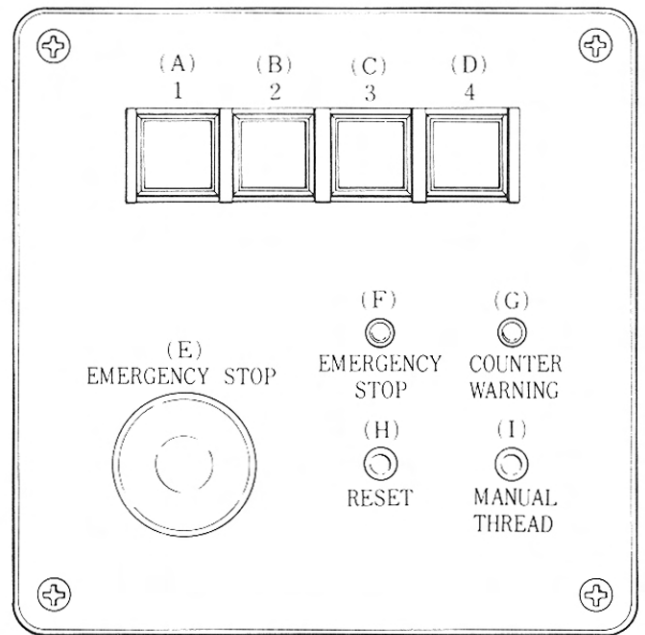


Figure 5

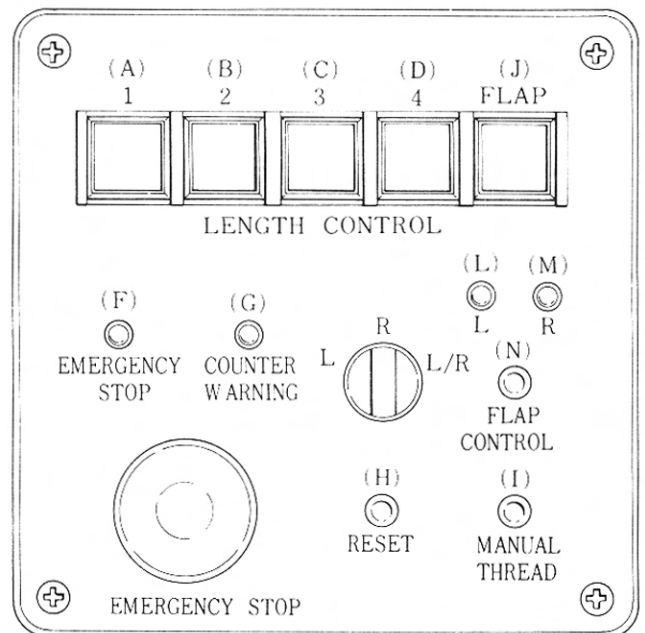


Figure 6

E. Operator Instructions

Series 46:

1. Before the machine power is turned on:
 - a. Make sure nothing is under the machine clamps.
 - b. Check the oil level in the sewing head and the rotary hook tank.
 - c. Switch on the head oiler.
 - e. Check the air pressure gauges [see Section B, Number 3, Air Supply, for more details].
 - f. Operate the flap selector switch [see Section D Upper Control Panel (K) for more details].
 - g. The carriage clearing switch must be in the rear position [see Section D Lower Control Panel (D) for more details].

The carriage feed switch must be in the auto position [see Section D Lower Control Panel (E) for more details].

The clamp up selector switch must be in the rear position [see Section D Lower Control Panel (F) for more details].

- h. Check the needles and bobbins for proper threading [see Section C, Number 4, for more details].
2. Turn the machine power on.

The carriage should be in the rear position. If it is not, it will travel to the rear position when the machine power is turned on.

Note: The carriage should always be in the rear position when the machine power is turned off.

The patch guide raises.

3. Operate the carriage clearing switch to bring the carriage to the front position.
4. Heel the foot pedal to lift the bag clamps.
5. Load the pocket bag.
6. Release the foot pedal to clamp bagging in place.
7. Load the garment panel.
8. Toe the foot pedal to activate the clamps and hold the garment.
9. Load the welt and welt patch.
10. Further toe the foot pedal to activate the patch guide and close the brushes.
11. Toe the pedal to its "limit" to actuate the air blow to hold up the welt pieces.
12. Still toeing the pedal, actuate the knee switch to begin the automatic cycle. (Release the foot pedal after the machine begins to sew.)
13. The carriage will rapid feed a short distance, then stop briefly.
14. While the carriage is stopped, the machine begins sewing in start dense and resumes its travel.
15. After the start dense, the carriage travels in center dense until it begins the end dense.
16. After completing the end dense, carriage travel stops, needles position, brushes open, and the patch guide rises.
17. The carriage again rapid travels rearward.
18. While traveling rearward, the needle and bobbin threads are trimmed and clamped.
19. When the rearward travel stops, the tab knives are actuated.
20. After the tab knives return, the clamps rise and the stacker removes the finished garment.
21. The carriage returns to the "home position" and is ready for the next cycle.

Series 47:

1. Before the machine power is turned on:
 - a. Make sure nothing is under the machine clamps.
 - b. Check the oil level in the sewing head and the rotary hook tank.
 - c. Switch on the head oiler.
 - e. Check the air pressure gauges [see Section B, Number 3, Air Supply, for more details].
 - f. Operate the flap selector switch [see Section D Upper Control Panel (K) for more details].
 - g. The carriage clearing switch must be in the rear position [see Section D Lower Control Panel (D) for more details].

The carriage feed switch must be in the auto position [see Section D Lower Control Panel (E) for more details].

The clamp up selector switch must be in the rear position [see Section D Lower Control Panel (F) for more details].
 - h. Check the needles and bobbins for proper threading [see Section C, Number 4, for more details].
2. Turn the machine power on.

The carriage should be in the rear position. If it is not, it will travel to the rear position when the machine power is turned on.

Note: The carriage should always be in the rear position when the machine power is turned off.

The patch guide raises.
3. Operate the carriage clearing switch to bring the carriage to the front position.
4. Heel the foot pedal to lift the bag clamps.
5. Load the pocket bag.
6. Release the foot pedal to clamp bagging in place.
7. Load the garment panel.
8. Toe the foot pedal to activate the clamps and hold the garment.
9. Load the welt and welt patch.
10. Further toe the foot pedal to activate the patch guide and close the brushes.
11. Load the flap and toe the foot treadle to its limit to activate the flap clamp.
12. Toe the pedal to its "limit" to actuate the air blow to hold up the welt pieces.
13. Still toeing the pedal, actuate the knee switch to begin the automatic cycle. (Release the foot pedal after the machine begins to sew.)
14. The carriage will rapid feed a short distance, then stop briefly.
15. While the carriage is stopped, the machine begins sewing in start dense and resumes its travel.
16. After the start dense, the carriage travels in center dense until it begins the end dense.
17. After completing the end dense, carriage travel stops, needles position, brushed open, and the patch guide rises.
18. The carriage again rapid travels rearward.
19. While traveling rearward, the needle and bobbin threads are trimmed and clamped.
20. When the rearward travel stops, the tab knives are actuated.
21. After the tab knives retrain, the clamps rise and the stacker removes the finished garment.
22. The carriage returns to the "home position" and is ready for the next cycle.

F. Maintenance and Auxiliary Controls

A Motor

On (left): The machine will operate.
Off (right): The machine will not operate.

B Center Knife

Auto (left): The center knife will move in connection with the sewing operation.
Manual (right): The center knife will not move while sewing.
Off (center): The center knife will not move in any case; tab knives will not move even while sewing.

C Stacker

On (left): The stacker will operate.
Off (right): The stacker will not operate.

D Clamps

Right: Left clamp foot will lower.
Center: Right clamp foot will lower.
Left: Both the left clamp foot and right clamp foot will lower simultaneously.

E Tab Knives

Left: Automatic; knives will move in connection with the sewing operation.
Right: Off; knives will not operate.

T0 Brushes

Adjusts the time delay between lowering of the patch guide and closing of the brushes.

T1 Feed Start

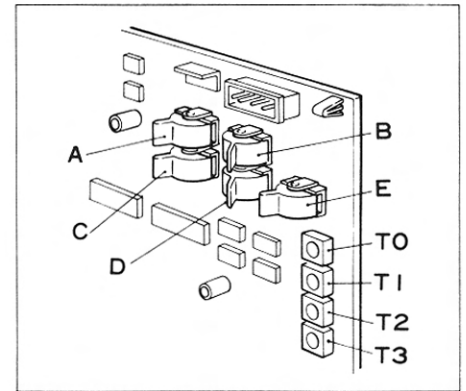
Adjusts the time delay between sewing start and movement of the carriage in end dense.

T2 Carriage Return

Adjusts the length of time the carriage stays in the rearmost position before returning home.

T3 Air Ejector

Adjusts the amount of time the air is flowing.



Daily Maintenance

1. Oil bobbin races.
2. Check the oil in the bobbin case (fill to the line on the dipsticks).
3. Clean the bobbin case.
4. Clean the underside of the machine head.
5. Oil the shafts and bearings of the patch guide and tab knife mechanisms.
6. Check the oil reservoir gauge on the machine head. Fill as required.

Weekly Maintenance

1. Clean the motor filter.
2. Check the hydraulic system oil level.

Note: Properly fill the hydraulic fluid system. The level should remain within the red marks on the sight glass as the carriage moves forward and backward.

To Fill the Hydraulic Reservoir:

With the carriage in the front position, disconnect the air. Open the filler on the top of the tank and fill to 1-3mm below the top mark.

To Bleed the Hydraulic System:

With the carriage in the rear position, loosen the bleed screw at the front end of the drive cylinder. With the carriage in the forward position, loosen the bleed screw at the rear end of the drive cylinder.

G. Sewing Head Adjustments

1. Needle Head to Throat Plate Alignment (Figures 1 and 2)

The throat plate is self centering on the machine bed. The needle head screws into the needle bar. Using the needle bar height and alignment gauge, check for parallel alignment of the needles and for proper needle bar height (see Figure 1). Corrective adjustments are made by removing the plug in the access hole in the side of the machine head, loosening the clamp screw and repositioning the needle bar (see Figure 2).

Note: Gauge Part Number 46-1001-4-800.

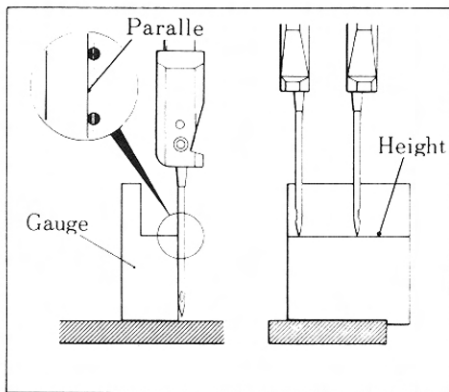


Figure 1

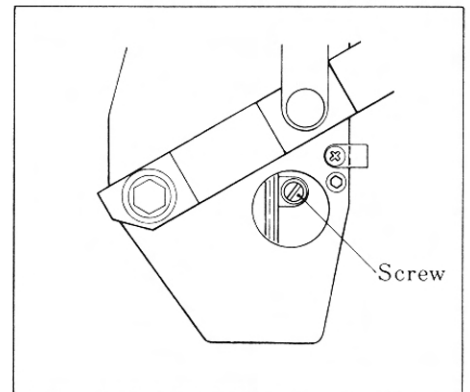


Figure 2

2. Hooks to Needles for Clearance, Timing, and Bobbin Case Height (Figures 3, 4, 5, 6a, 6b and 7)

- Manually lower the needle bar.
- Loosen the two securing screws (A) and (B) in each bobbin case support housing. (see Figure 4)
- Move the support housings as needed to obtain minimum clearance (approximately 0.05mm) between the hooks and needles (see Figure 3).

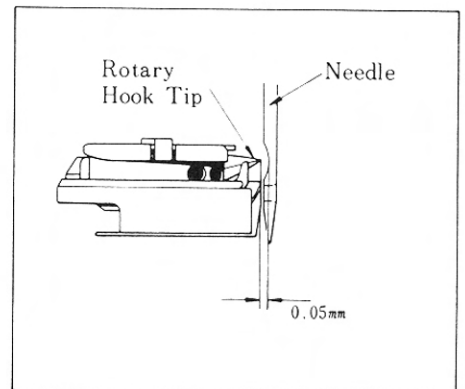


Figure 3

- Each bobbin case is driven by a vertical gear driving a horizontal gear attached to the shaft of the bobbin case. After the proper clearance is achieved (minimal clearance without needle deflection), the position of the vertical gear must be set.
- Loosen the two locking screws (C) (see Figure 4) and slide the gears outward until they touch the casting. Then move each toward the center a distance of 0.2mm. This setting will center each gear on its mating horizontal gear.

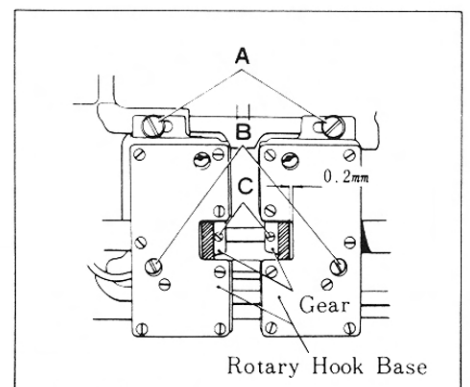


Figure 4

- (f) Loosen the locking screws on each horizontal gear (see Figure 5) to allow a timing adjustment of each hook. A two piece gauge is available for setting the hook timing.
- (g) Bring the needle bar to bottom dead center. Note that the bobbin case will continue to rotate (counterclockwise) through the dead spot at the bottom of the needle bar stroke. Allow for only half of this extra hook travel when adjusting the timing.
- (h) With the needle bar at bottom dead center, install the gauge onto the needle bar flush against the underside of the machine head (see Figure 6b). The clamping section of the gauge should be under the spacer section of the gauge.
- (i) Remove the space gauge and raise the needle bar so that the clamping gauge is now flush against the underside of the machine head. At this point, the hook points should be adjusted to the center of the needle for proper hook timing. (see Figure 6a)

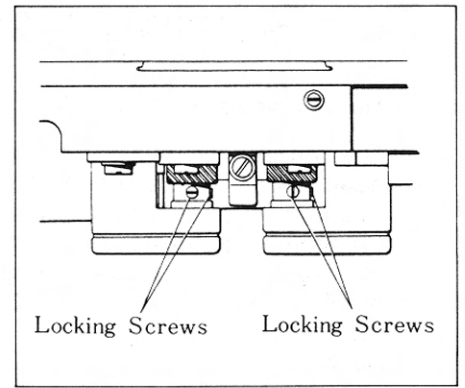


Figure 5

- (j) With the hook timing now adjusted, set the bobbin case height. A "go/no go" gauge is available for adjusting the height of each bobbin case.
- (k) Loosen the locking screws on the horizontal gears, taking care not to disturb the hook timing. The bobbin case height gauge will set on the flange of the bedplate of the sewing head (see Figure 7). The bobbin cases can be raised to the height of the gauge and the locking screws secured.

Note: Hook timing, [(f), (g), (h), and (i) above]; and bobbin case height, [(j) and (k) above], must be made simultaneously.

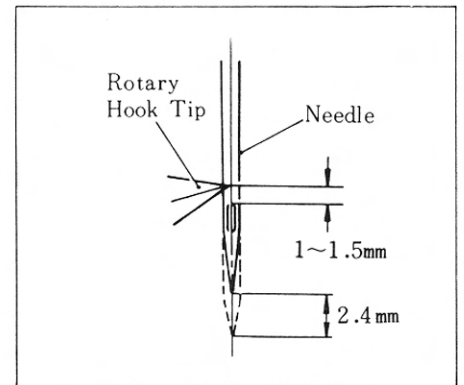


Figure 6a

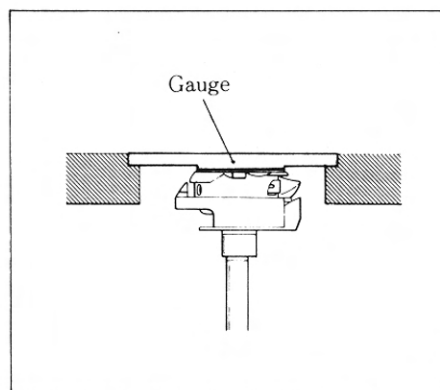


Figure 7

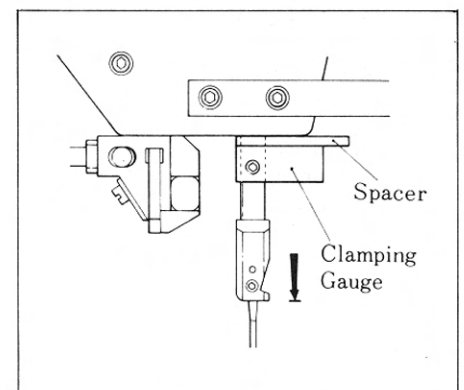


Figure 6b

3. Needle Positioner (Figure 8)

- (a) The stitch wheel pulley has two markings on it: a white dot "A" and a white line. The machine head has a red dot for line up. The "A" corresponds with top dead center of the thread take up. The line corresponds with top dead center of the needle bar.
- (b) When the sewing stops and the needles position, the dot "A" on the pulley should line up with the red dot on the machine head. To correct misalignment, loosen the collar screws on the pulley shaft, holding the collar in place. Rotate the pulley and align the "A" with the red dot on the machine head. Tighten the collar screws securely.

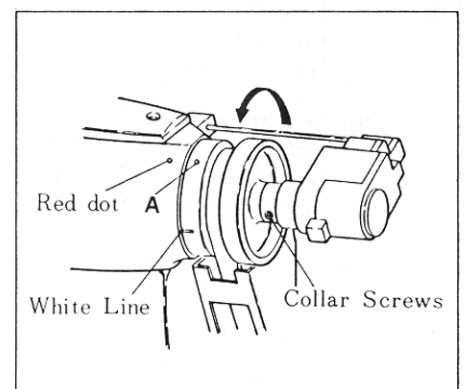


Figure 8

4. Adjustment for Bobbin Thread Cross Cutter (Figures 9a and 9b)

- (a) Remove the throat plate and the cross cutter.
- (b) Adjust the cutting blocks on the throat plate to the cross cutter to insure proper trimming and clamping of thread.
- (c) Loosen the screws which secure the cross cutter mounting bracket to the underside of the machine head. This will insure proper alignment of the cross cutter to the throat plate when parts are reinstalled.
- (d) Reattach the cross cutter to the mounting bracket.
- (e) Install the throat plate.
- (f) Tighten the screws securing the cross cutter bracket.

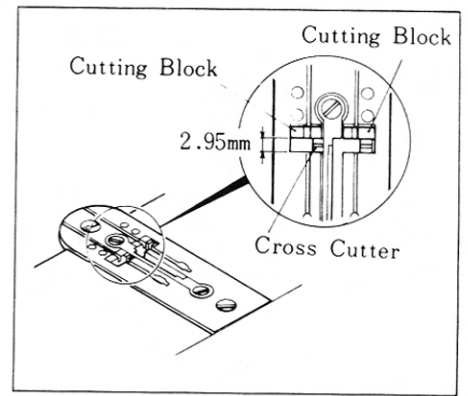


Figure 9a

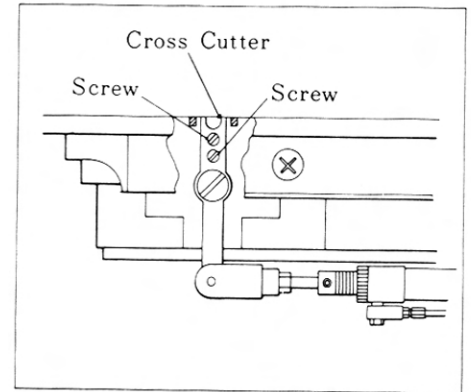


Figure 9b

5. Upper Thread Trimming (Figures 10 and 11)

The pick-up should be 2mm above the throat plate. Or, in the case of thicker material, just high enough for the pick-up to clear the material.

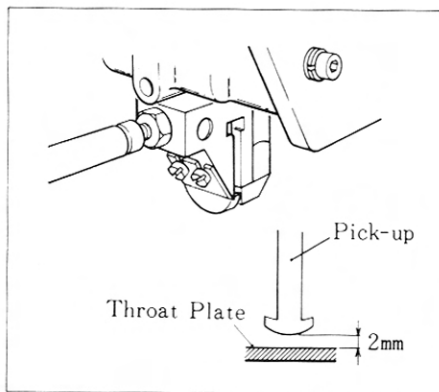


Figure 10

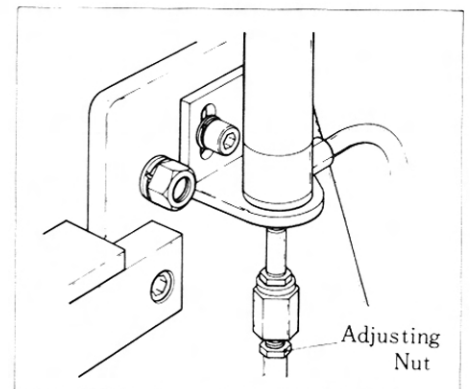


Figure 11

6. Thread Monitor (Figures 12, 13 and 14)

Position collar (A) onto shaft (B) so that the light on thread monitor control board is "ON" when the white mark on the handwheel is positioned 20mm (.79") before the red mark on the sewing head.

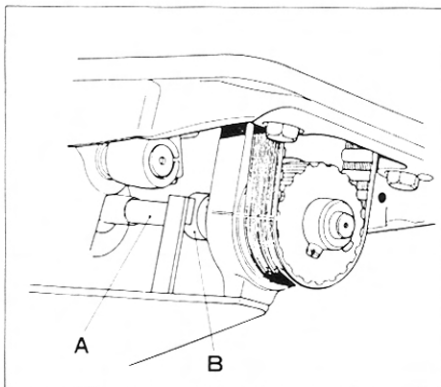


Figure 12

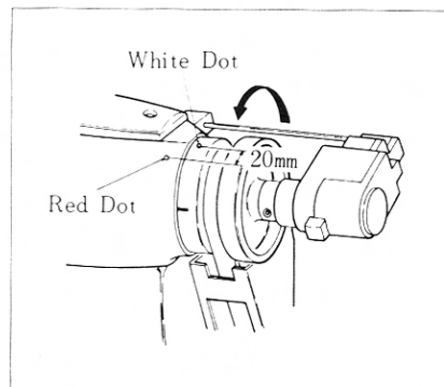


Figure 13

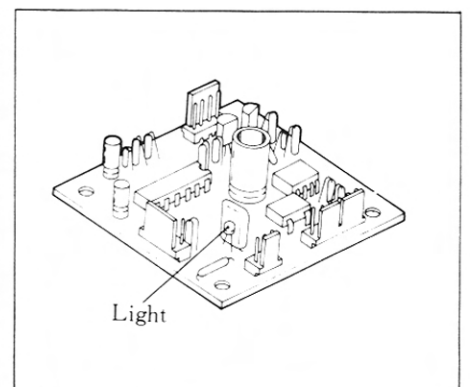


Figure 14

H. Clamping and Folding Adjustments

1. Carriage and Clamp Foot Alignment (Figures 1, 2, 3, 4, 5 and 6)

- (a) The clamp arms must be closed tightly against the carriage. (For 10mm Needle bite only.)
The clamp foot jacking collars must be backed out, allowing the clamp foot to rest flush with the clamp arm.
For needle gauge over 10mm, install spacer # 1 (see Illustrated Parts Manual for correct Part No.) between the carriage and clamp arm.
- (b) Install carriage alignment spacer # 2 (see Illustrated Parts Manual for correct Part No.) between the clamp foot and clamp arm (next to the standard spacer on the left hand side).
- (c) Manually moving the carriage back and forth, align the left clamp foot to the left needle for parallelism by loosening the carriage alignment studs and adjusting the carriage jacking screws.
- (d) When the clamp foot is aligned to the needle, tighten the carriage alignment studs and remove spacer # 1 from the clamp foot.
- (e) Tighten the allen screws securing the clamp foot (keeping upward pressure on the front of the clamp foot while tightening).
- (f) Align the patch guide to the left hand clamp foot for parallelism.
- (g) Center the patch guide.
- (h) Using the clamp foot jacking collars, adjust the left hand clamp foot to the patch guide for parallelism and proper clearance (approximately 1mm).
- (i) Tighten the locknuts on the jacking collars of the left hand clamp foot.
- (j) Using the jacking collars on the right hand clamp foot, adjust the right hand clamp foot to the patch guide for proper clearance (approximately 1mm), taking care to retain parallelism.

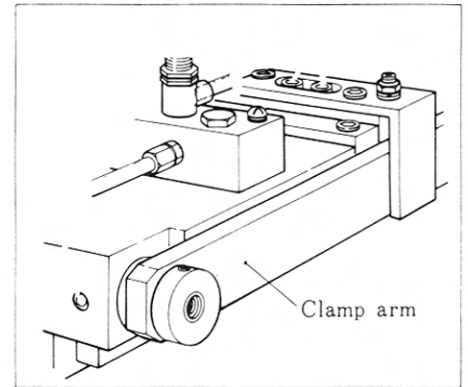


Figure 1

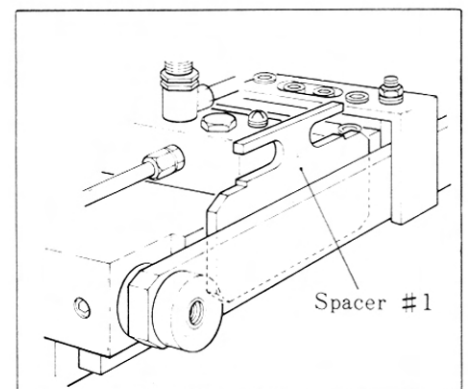


Figure 2

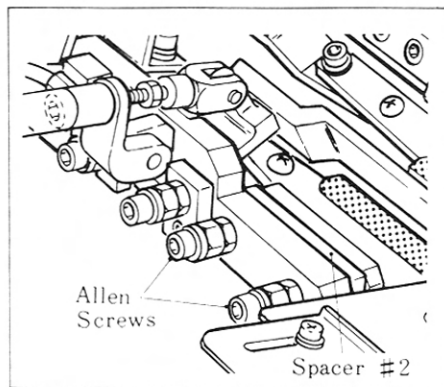


Figure 3

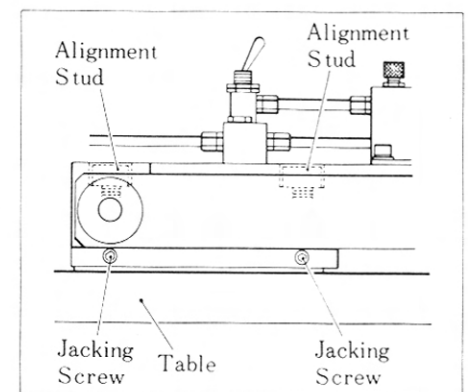


Figure 4

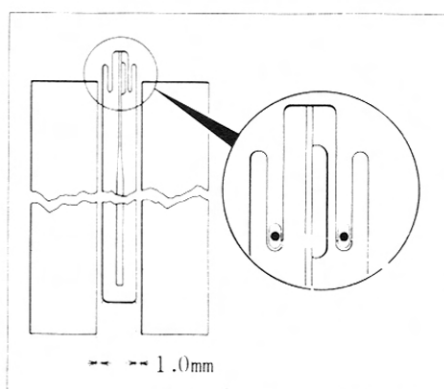


Figure 5

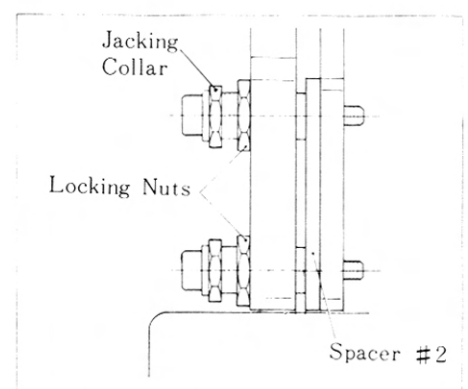


Figure 6

2. Patch Guide Adjustments (Figures 7, 8 and 9)

- To adjust the patch guide pivot arm tension, disconnect the air cylinder piston rod from the pivot arm. Loosen the front and rear collars on the pivot arm shaft(s). Tightening the adjusting stud will increase pressure on the bearings. The patch guide should drop freely, but not slam, downward.
- To align the patch guide so that it is parallel to the clamp feet, loosen the two allen screws (see Figure 7) on top of the patch guide bracket. This will allow the patch guide to pivot for proper alignment. Spacing between the patch guide and the clamp foot should be approximately 1mm.
- To center the patch guide to the needles, loosen the collars on the front of the patch guide pivot arm. To move the patch guide to the right, screw the jacking nut (left side of the left collar) counterclockwise. To move to the left, turn the jacking nut clockwise and tighten the bolt at the shaft right end (see Figure 7).
- With the patch guide down (on top of the appropriate thickness of material), the patch guide height is adjusted by the drive cylinder clevis. To adjust the patch guide parallel to the bedplate, loosen the two locking screws in the patch guide cam plate and tilt as required the cam plate. (see Figures 8 and 9)

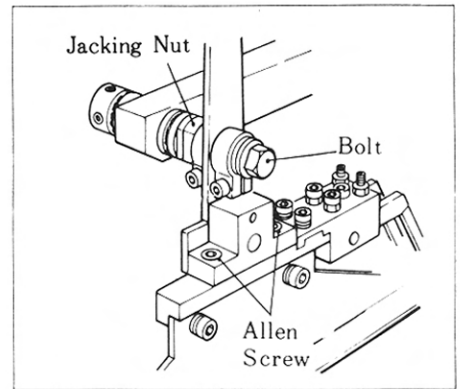


Figure 7

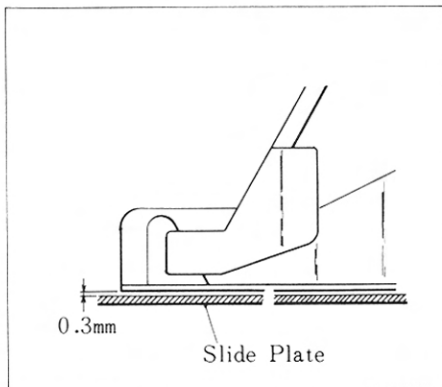


Figure 8

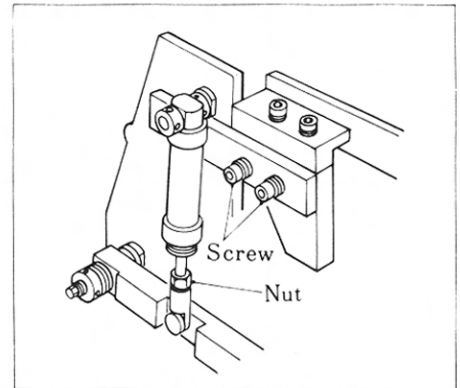


Figure 9

3. Clamp Foot Adjustments (Figures 10, 11 and 12)

- To level the clamps, loosen the two large allen screws on the side of each clamp arm (see Figure 10). Loosen the screws and position the clamps evenly. Lower the clamps and check for even clamping pressure.
- Series 46:** The clamp height may be approximately 34mm (see Figure 11) from the bedplate to the bottom of the clamp foot. The clamp height adjusting screws are at the rear of the clamp arms.
Series 47: The clamp height may be approximately 28mm (see Figure 11); caution must be exercised to avoid raising the clamps too high which would cause interference between the flap clamps and the underside of the machine head (see Figure 12).

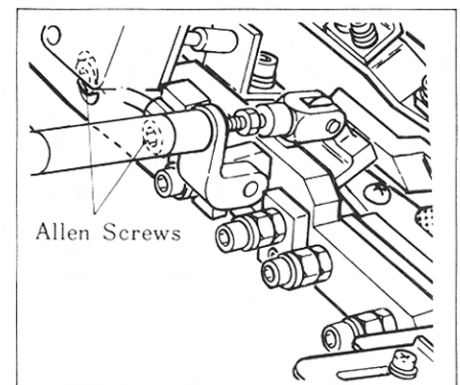


Figure 10

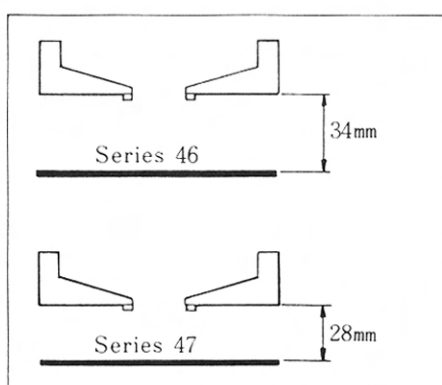


Figure 11

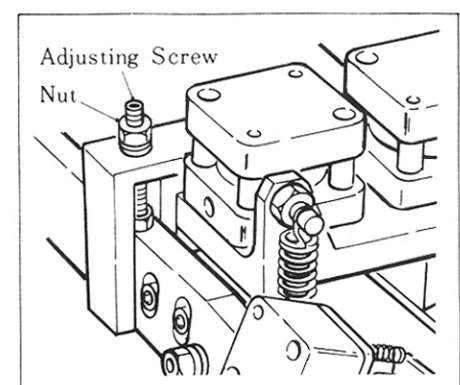


Figure 12

4. Brush Adjustments (Figures 13 and 14)

- (a) With the carriage in the forward position, lower the clamps and patch guide with the brushes closed.
- (b) Activate the emergency stop push button.
- (c) Rotate the needles downward.
- (d) Jog the carriage backward (using the incremental feed) until the brushes are next to the needles. Proper clearance should be approximately 1mm for the entire length of the blade (see Figure 13).
- (e) The brush stroke is adjusted by altering the position of the bracket attached to the brush arm. This bracket is driven by the brush air cylinder.
- (f) The parallel adjustment for the brushes is made by loosening the two allen screws which secure each brush to its pivot arm and by aligning the brushes to the needles.
- (g) Each brush arm has an adjustable stop to prevent the brush from hitting the lip on the forward edge of the clamp foot when the brushes open (see Figure 14).

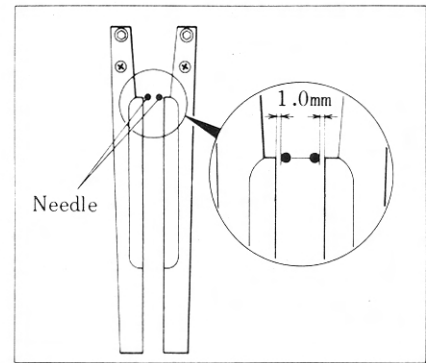


Figure 13

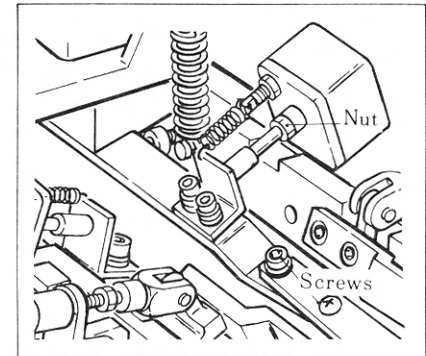


Figure 14

5. Presser Foot Adjustment (Figures 15 and 16)

- (a) The two bracket mounting screws (A) allow for side to side adjustment of both presser feet to the needles.
- (b) The presser foot height is adjusted using the two long allen screws (B) on the mount bracket. The presser foot must be adjusted to rest on the folded welt. This is achieved by adjusting the two short allen screws (C) on the mount bracket.
Note: The presser foot must not strike the needle head when the needle bar is at bottom dead center.
- (c) These screws (C) should be adjusted for minimum pressure on the material.

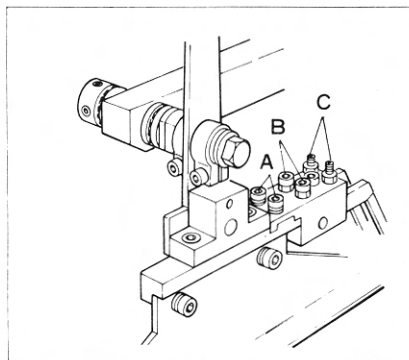


Figure 15

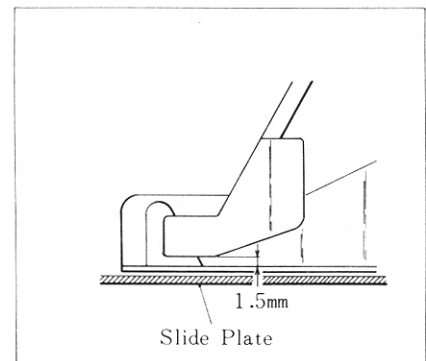


Figure 16

6. Alignment of Flap Clamp (Figure 17)

- (a) All adjustments are made on the two double screws holding the linkages onto the clamp arms.
- (b) Adjust the flap clamp to be parallel on the clamp foot and to be parallel to the patch guide.
- (c) The side clearance must be adjusted so that the photoconductor is visible on the reflector tape.

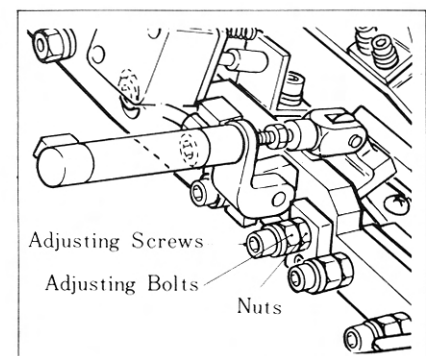


Figure 17

I. Photo Eye Adjustment

1. Photo Eye Sensitivity Adjustment (Figures 1 and 2)

Close the brush blades and adjust the photo eye brackets (A) so that the eyes are directly over the reflective tape. When the stop button (on the upper control panel) is depressed and the flap selector set to "L", the L.E.D. in the adjustment window on the left sensor should be on. To adjust photo sensitivity, turn the slotted adjustment counterclockwise to end stop. Slowly turn clockwise until the L.E.D. comes firmly on. Continue to turn clockwise one full additional gradation. Repeat the process for the right side.

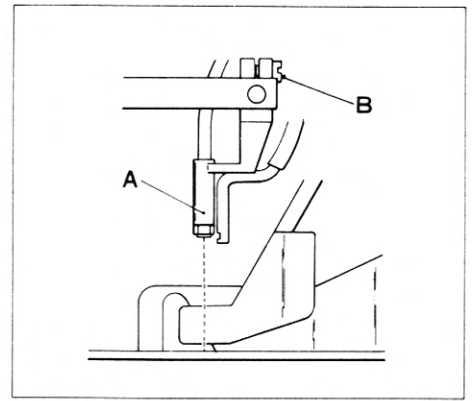


Figure 1

2. Photo Eye Position Adjustment (Figures 1 and 3)

Set both sew start potentiometers on the lower control panel to mid position ("5") and test sew a flap. If the stitching extends beyond the edge of the flap, loosen screw (B) and rotate the bracket so that the eye points further toward the needles. If the stitching stops before the end of the flap, reverse the procedure.

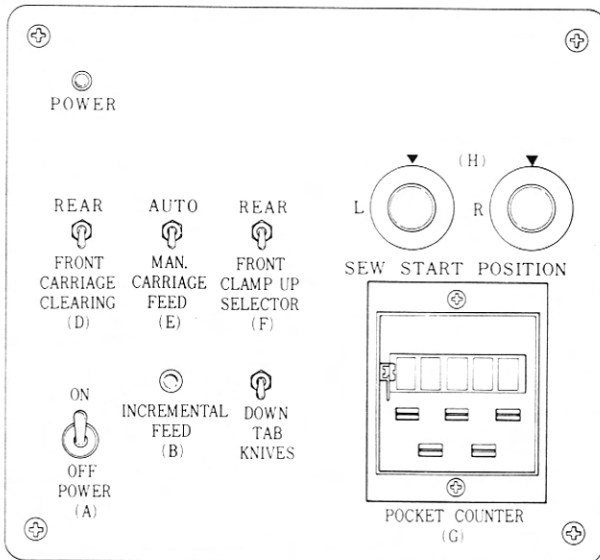


Figure 3

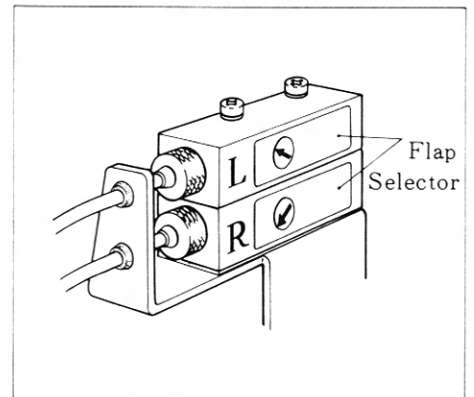


Figure 2

J. Center Knife Adjustments

1. Adjusting the Center Knife Throw (Figures 1 and 2)

Adjust the center knife throw by loosening the actuator slide bolt. The higher the bolt is moved in the slide, the more throw there is in the knife mechanism. Measuring at the lower cutting edge of the knife, the throw should be 3-4mm with the throw ending approximately 1mm below the top of the throat plate.

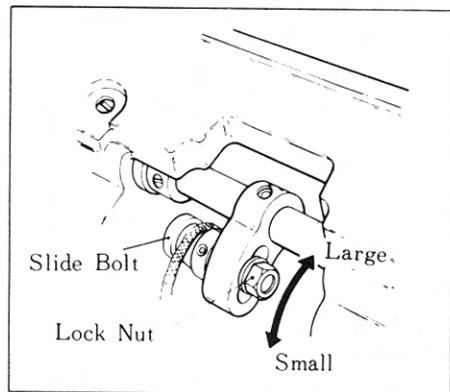


Figure 1

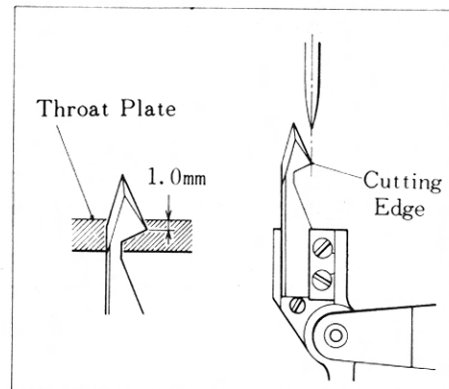


Figure 2

2. Adjusting the Center Knife Height (Figure 3)

Adjust the center knife by loosening the clamping collar on the knife drive shaft and moving the collar clockwise or counterclockwise as required.

3. Center Knife Side Adjustment (Figure 3)

To insure proper center knife cutting, the knife must rub lightly against the cutting edge of the throat plate insert. By loosening the clamping collar and the lower bracket in the center knife linkage, the knife mechanism may be adjusted side to side.

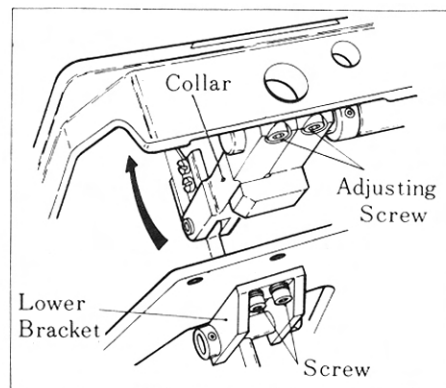


Figure 3

4. Center Cut Length (Figure 4)

The beginning point of the center cut is adjusted by moving the actuator for switch "A". Moving the actuator toward the front of the machine will delay the raising of the center knife. Adjust the finish end of the center cut by moving switch "B". Moving switch "B" rearward will delay the lowering of the center knife.

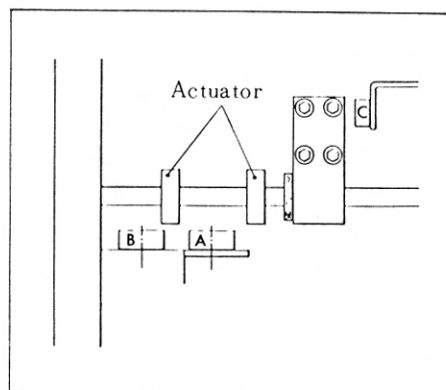


Figure 4

K. Operational Adjustments

1. Position of Sewing Finish (Figures 1a, 1b and 2)

Center the flap gauge (A) in its adjustment slot. Test sew a flap and observe the sew flap position. The last stitch should be on the edge of the flap. If it is not, make a major adjustment to switch (J) or a minor adjustment to the gauge.

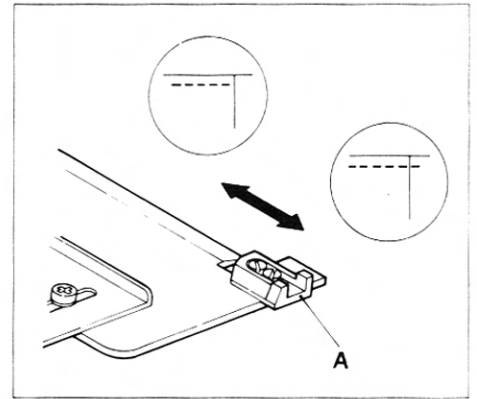


Figure 1a

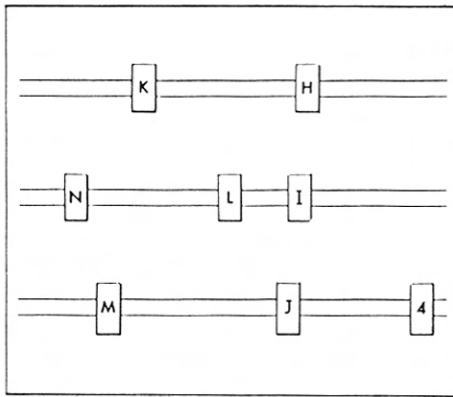


Figure 2

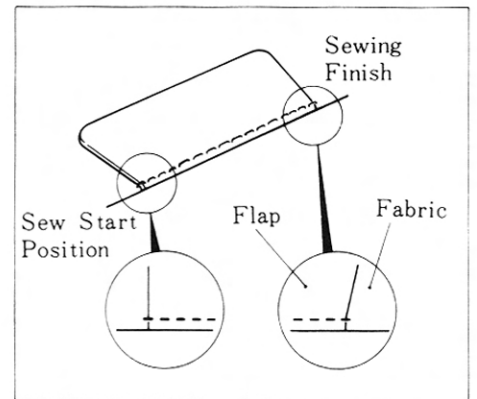


Figure 1b

2. Sewing Length (Figure 3)

The four sewing lengths may be adjusted by moving the corresponding sew start switch to any of the following number positions: 1, 2, 3, or 4. Moving the switch toward the front will result in a longer sewing length. Moving the switch toward the rear will result in a shorter sewing length.

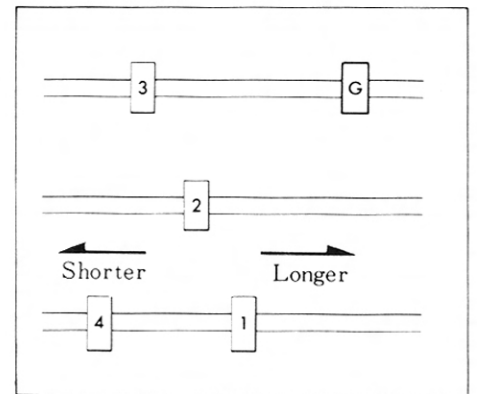


Figure 3

3. Stitch Density (Figure 4)

The end density must be adjusted prior to adjusting the center density. Alter the stitch density by adjusting the flow controls on the hydraulic solenoids. Solenoid (C) is adjusted for end density; turn clockwise for less density. Solenoid (B) is adjusted for center density; turn clockwise for less density.

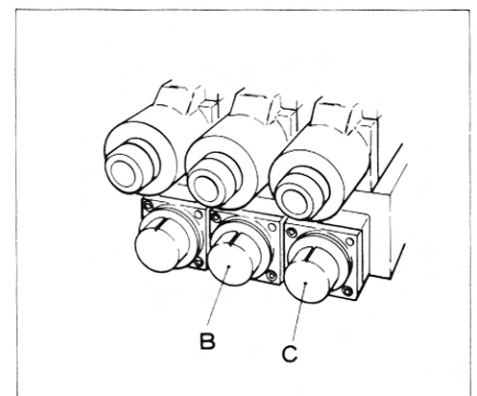


Figure 4

4. Length of End Dense (Figures 5 and 6)

- (a) The length of starting the end dense may be altered by moving the actuator for switch (B). To decrease the length, move switch (B) to the left.
- (b) The length of the second end dense may be altered by moving switch (I). To decrease the length, move switch (I) to the left.

5. Cushion (Figures 6)

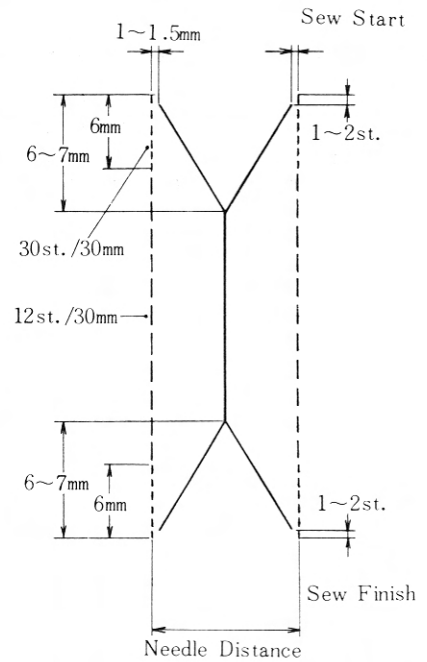
During rapid travel to tab cut, switch (M) is activated. This slows down the rapid feed prior to stopping for tab cut. Switch (K) should be set to activate 25mm before switch (M).

6. Thread Pick Up and Trim (Figure 6)

Adjust switch (L) so that the pick up plunger will catch the thread at the bottom of the stroke while leaving a minimum amount of tail thread with the product.

7. Cutting Position of Center Knife (Figures 5 and 6)

- (a) Start Position of the Center Knife
Adjust the start position of the center knife with switch (A) as shown in Figure 8. Moving the switch collar to the left will allow the knife to raise sooner.
- (b) Stop Position of the Center Knife
Adjust the stop position of the center knife with switch (H) as shown in Figure 9. Moving the switch to the left will allow the knife to stop later; the distance between sewing finish and cutting finish will be shorter.



* Above diagram indicates dimensions for average materials. Fabric weight consistence may require same variation.

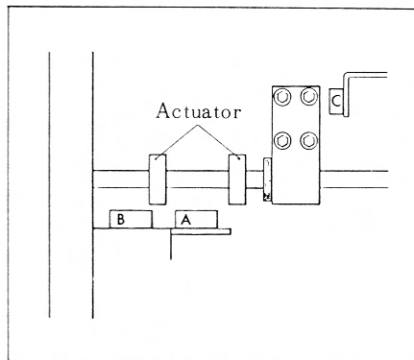


Figure 5

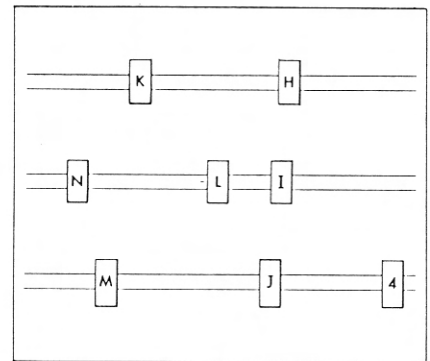


Figure 6

8. Position of Tab Knife (Figures 7, 8, 9 and 10)

- (A) Screw bumper out to correct.
- (B) Screw bumper in to correct.
- (C) (a) Adjust finish end of pocket by moving switch (M) (see Figure 6) to the right.
 - (b) This results in an incorrect start end cut; the bumper will require adjustment.
- (D) (a) Adjust finish end of pocket by moving switch (M) to the left.
 - (b) This results in an incorrect start end cut and the bumper will require adjustment.
- (E) Start end knives are at an incorrect angle to the center cut. Loosen the tab knife shaft holder and rotate to correct this condition.
- (F) Start and finish end tab knives are misaligned. Loosen screws (H) and (F), move adjusting screws (I) and (G).

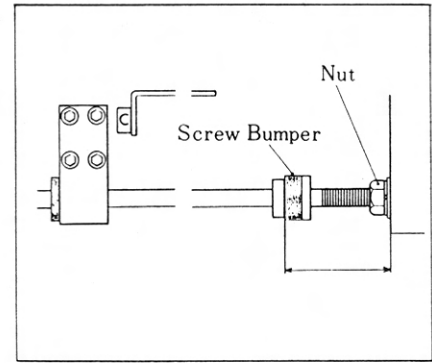


Figure 7

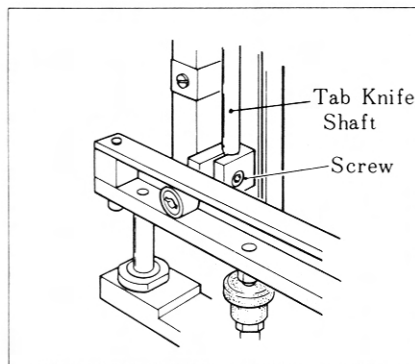
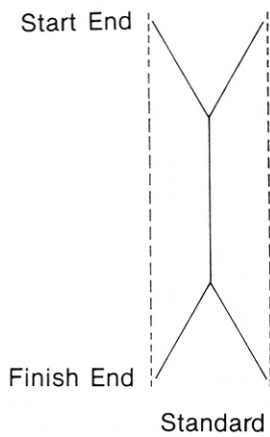


Figure 8

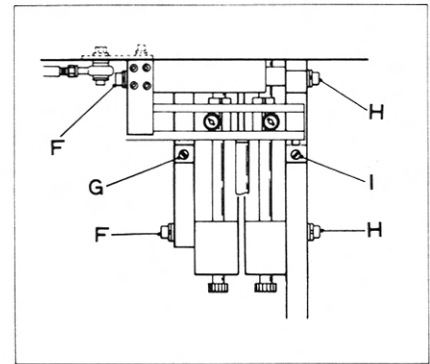
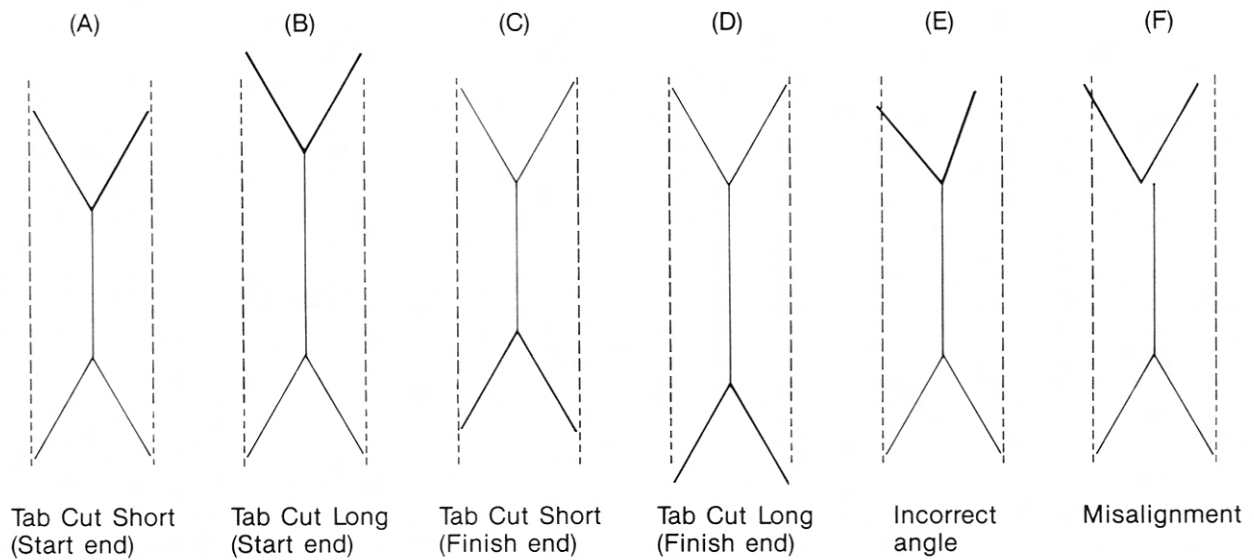


Figure 9



L. Sequence of Operation Series 47 (Flap Mode)

Footpedal (PS) Kneesw. (KS) Sewing- clutch (MK)	Operating Switch	Pneumatic Valves	Hydraulic Values	I.O-Circuit In	Sw. Board Out
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When the machine is turned "ON" and the carriage is in the rear position, the finger down safety switch (F), the tab safety switch (C), and the carriage rear limit switch (N) are all actuated. The foot pedal is in the normal position actuating pedal switch (PS) 2. The tension release solenoid (H), the photo eye air blow solenoid, and the patch guide up solenoid (J) are energized. The sewing motor starts. When the flap mode push button is depressed the photo amplifiers are energized.

When the carriage clear switch is pushed down, the carriage forward feed solenoid (C.Q.) is energized sending the carriage forward. The carriage rear limit switch (N) is deactivated; and, when the carriage comes all the way forward, the carriage forward safety switch (G) is activated.

The machine is now in the home position.

To begin the pocket making cycle, the foot pedal is "heeled" deactuating the pedal switch (PS) 2, and actuating pedal switch (PS) 1. This energizes the bagging hold down solenoid (K) opening the bag clamp as long as the foot pedal is in the "heeled" position.

Next a 1/2 forward operation of the foot pedal deactivates the pedal switch (PS) 1, and activates pedal switch (PS) 3 and 4, energizing the left (P) and right (O) clamp down solenoids closing the clamps.

Operating the foot pedal to the 3/4 position deactuates pedal switch (PS) 4 and actuates pedal switch (PS) 5, energizing the patch guide down solenoid (I) and de-energizing the patch guide "UP" solenoid (J), lowering the patch guides and operating the thread draw-off. The foot pedal operation also initiates a time delay in the circuit board. Upon completion of the time delay, the brush closed solenoid (L) is energized, closing the brushes. With the brushes closed, the photo eye will sense the reflective tape on the brush and an LED will light on the appropriate photo amplifier.

The full operation of the foot pedal deactuates pedal switch (PS) 5 and actuates pedal switch (PS) 6, energizing either the right flap clamp solenoid (W) or the left flap clamp solenoid (N).

Operating the sew start knee switch (D) de-energizes the patch guide down solenoid (I), tension release solenoid (H), and carriage forward feed solenoid (Q). It also energizes the carriage rear feed solenoid (R) and hydraulic solenoid 1. At this point the carriage rapid travels rearward and the table forward safety switch (G) is deactivated. At this point the foot pedal is released, allowing it to return to the normal position deactuating pedal switch (PS) 6 and actuating pedal switch (PS) 2.

As the carriage travels rearward, the photo eye circuit is interrupted by the start of the flap, initiating the photo eye time delay. The completion of the time delay de-energizes solenoid 1 and energizes coil 1b, stopping the carriage. The tab knife set solenoid (G) is also energized by a signal from the motor control box. The feed inhibit time delay is also activated.

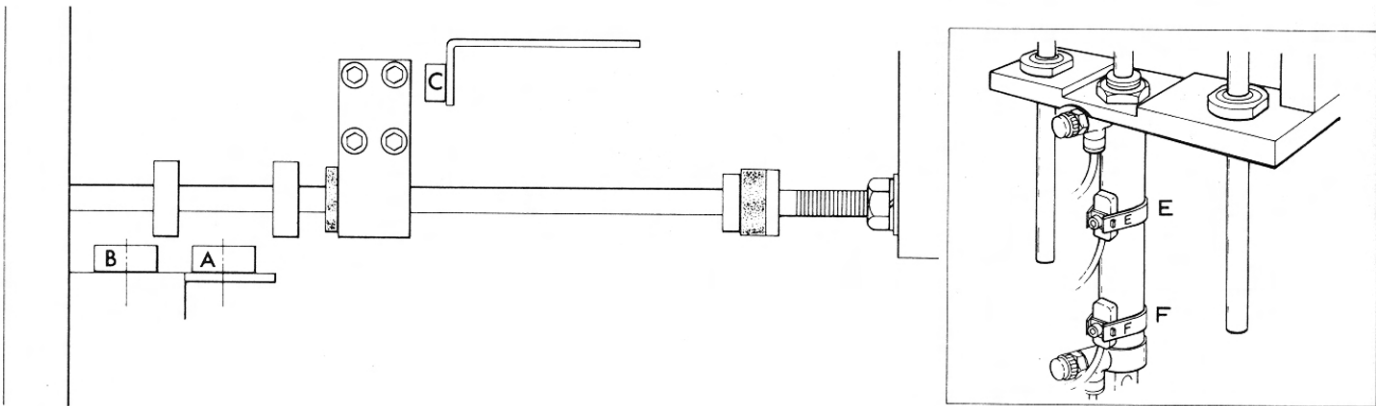
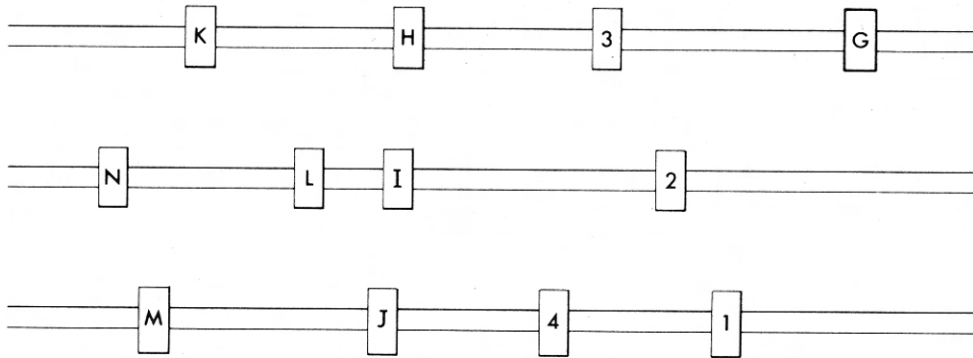
When the feed inhibit time delay times out, the bottom thread trimming solenoid (E) is energized, the upper thread clamping solenoid (Q) is de-energized, and hydraulic solenoid 3 is energized starting end dense.

			Z		
PS-2	C,F,N		H,Q,J		
			CQ,Z		
PS-2	C,F,G		G,H,Q,J		
			CQ,Z		
PS-2	C,F,G		G,H,Q,J		
			CQ,Z		
PS-1	C,F,G		G,H,Q,J,K		
			CQ,Z		
(PS-3) PS-4	C,F,G		G,H,Q,J O,P		
			CQ,Z		
P-1			H,Q,I,L		
PS-5	C,F,G		O,P		
			CQ,Z		
PS-6	C,F,G		H,Q,I,L,O P, + M or N		
			R,Z		
PS-6 KS-D	C,F		Q,L,M/N O,P		H-1A
			R,Z		
P-3 MK PS-2	C,F		G,Q,L M/N,O,P		H-1B
			R,Z		
P-2 MK PS-2	C,F		E,G,L M/N,O,P		H-1B H-3

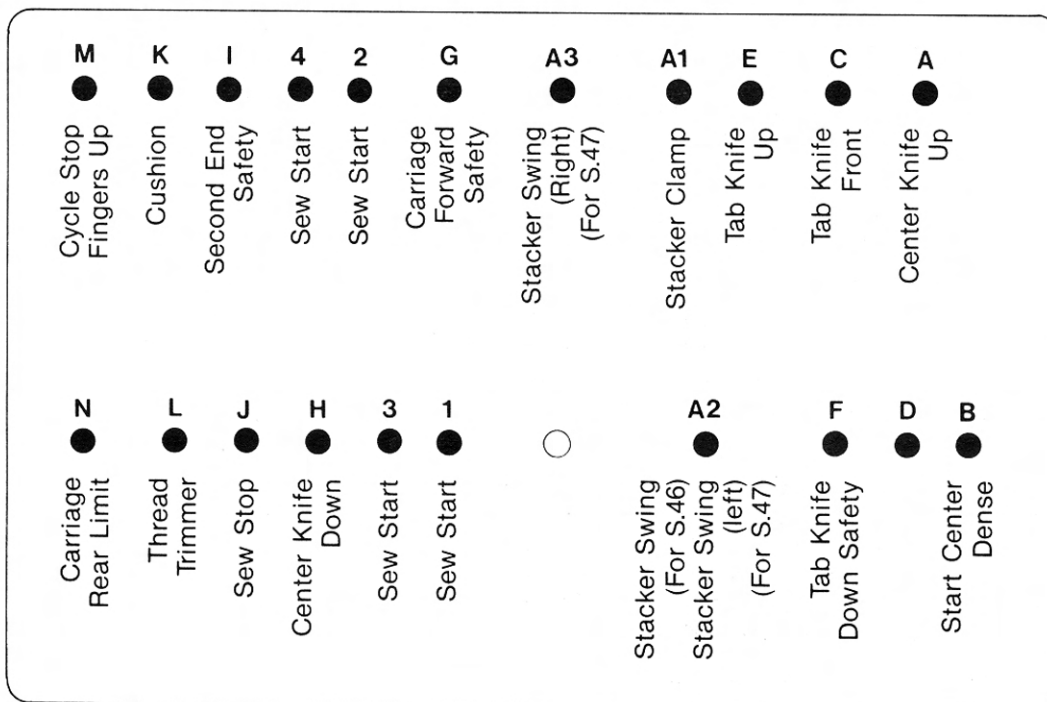
	Footpedal (PS) Kneesw. (KS) Sewing- clutch (MK)	Operating Switch	Pneumatic Valves	Hydraulic Values	I.O.-Circuit In	Sw. Board Out
As the carriage travels in end dense, the start center dense switch (B) is actuated. Hydraulic solenoid 2 is energized and coil 1b is de-energized. This starts center dense.	MK PS-2	B,C,F	R,Z E,G,L M/N,O,P	H-3 H-2		
Further carriage travel actuates the center knife up switch (A), energizing the center knife solenoid (F).			R,Z E,F,G,L M/N,O,P	H-3 H-2		
As the carriage travels rearward, and the free travel of the tab knife traction rod ends, the tab knives begin to spread. This spreading deactuates the tab knife safety switch (C).		A,C,F	R,Z E,F,G,L M/N,O,P	H-3 H-2		
The carriage travels in center dense actuating the center knife down switch (H), de-energizing the center knife solenoid (F).	MK PS-2	F	R,Z E,F,G,L M/N,O,P	H-3 H-2		
The next switch actuated is the end dense switch (I). This de-energizes hydraulic solenoid #2, starting the second end dense.	MK PS-2	F,H	R,Z E,G,L M/N,O,P	H-3 H-2		
The sew stop switch (J), actuated by continued carriage travel, de-energizes the brush solenoid (L), flap clamp solenoids (W) and (N), as well as hydraulic solenoid #3 and the sew motor clutch. It also energizes the patch guide up solenoid (J). The carriage stops briefly.	MK PS-2	F,I	R,Z E,G,L M/N,O,P	H-3		
At this point the foot pedal can be heeled to raise the bag clamp in preparation for the next cycle.	PS-2	F,J	R,Z E,G,L O,P	H-1B		
The termination of the motor rotation signal (slightly after the sew clutch is disengaged) energizes the tension release solenoid (H). Hydraulic solenoid 1 and 3 are energized to begin rapid feed rearward.	PS-2	F	R,Z E,G,H L,O,P	H-1A H-3		
Rapid travel actuates the thread pick-up and the trim switch (L), de-energizing the bottom thread trimming solenoid (E), energizing the upper thread trimming solenoid (D) and upper thread clamping solenoid (Q).	PS-2	F,L	R,Z D,H,Q J,O,P	H-1A H-3		
The cushion slow down switch (K) is then actuated by the carriage, de-energizing solenoid 1 and energizing coil 1b. The carriage is now in slow down.	PS-2	F,K	R,Z D,H,Q J,O,P	H-1B H-3		
The actuation of the cycle stop fingers up switch (M), de-energizes the hydraulic solenoid #3 stopping the carriage, energizes the tab knife solenoid (C) sending the tab knife up, and deactivates the fingers down safety switch (F).	PS-2	K,M	R,Z C,D,H,Q J,O,P	H-1B		
The upward movement of the tab knife activates the finger down switch (E) while de-energizing the tab knife solenoid (C), bringing the tab knives down.	PS-2	E,H	R,Z D,H,Q J,O,P	H-1B		
When the tab knives go down, the fingers down safety switch (F) is again actuated. This de-energizes the left (P) and right (O) clamp solenoids, sending the clamps up, and also de-energizing the carriage rear feed solenoid (R). A carriage return time delay begins at this time.	PS-2	F	Z D,H Q,J	H-1B		
When the carriage return time delay times out, the tab knife set solenoid (G) de-energizes, allowing the rear tab knife to return and actuating the tab knife safety switch (C). The hydraulic solenoid coil 1b also de-energizes. The carriage forward feed solenoid (C.Q.) energizes and the carriage moves forward toward the home position.	PS-2	C,F	CQ,Z D,H Q,J			
The machine reaches the home position activating table forward safety switch (G).	PS-2	C,F,G	CQ,Z G,H Q,J			

M. Switch and LED Locations

1. Operational Switch Location



2. Receptacle Box L.E.D. Identification



3. Pneumatic Valve Identification

Series 46: —

A	B	C	D	E	F	G	H	Q	I	J	K	L	W	O	P
Stacker Clamp	Stacker Swing	Tab Knife Up	Upper Thread Trimming	Lower Thread Trimming	Center Knife Up	Tab Knife Clamping	Tension Release	Hold Upper Thread	Patch Guide Down	Patch Guide Up	Bagging Hold Down	Brush	Air Flow	Clamp Down (Right)	Clamp Down (Left)

Series 47: —

A	B	C	D	E	F	G	H	Q	I	J	K	L	M	N	O	P
Stacker Clamp	Stacker Swing	Tab Knife Up	Upper Thread Trimming	Lower Thread Trimming	Center Knife Up	Tab Knife Clamping	Thread Release	Hold Upper Thread	Patch Guide Down	Patch Guide Up	Bagging Hold Down	Brush	Flap Clamp (Right)	Flap Clamp (Left)	Clamp Down (Right)	Clamp Down (Left)

4. I.O. Circuit Board L.E.D. Identification

High	HI	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	Count Up	
Middle	MD	<input type="radio"/>	3/4 Pedal	3	<input type="radio"/>	<input type="radio"/>	4 Full Pedal
Low	LO	<input type="radio"/>	1/4 Pedal	1	<input type="radio"/>	<input type="radio"/>	2 2/4 Pedal
Stop		<input type="radio"/>	Heel Back		<input checked="" type="radio"/>	<input type="radio"/>	Normal
Motor		<input type="radio"/>	Cycle Stop	M	<input type="radio"/>	<input type="radio"/>	N Carriage Stop Limit
Counter		<input type="radio"/>	Fingers Up		<input type="radio"/>	<input type="radio"/>	K Cushion
Backward	RV	<input type="radio"/>	Sew Stop	J	<input type="radio"/>	<input type="radio"/>	G Carriage Forward Safety
Forward	FW	<input checked="" type="radio"/>	Sew Start		<input type="radio"/>	<input type="radio"/>	B Start Center Dense
Stacker Swing	B	<input type="radio"/>	Sewing Speed	I	<input checked="" type="radio"/>	<input type="radio"/>	F Tab Knife Down
Stacker Clamp	A	<input type="radio"/>	Tab Knife Up Limit	E	<input type="radio"/>	<input type="radio"/>	C Tab Knife Front
Upper Thread Trimming	D	<input type="radio"/>	Sew Length Push button		<input type="radio"/>	<input type="radio"/>	Photo Sensor
Tab Knife Up	C	<input type="radio"/>	Thread Trimmer	L	<input type="radio"/>	<input type="radio"/>	A Center Knife Up
Center Knife Up	F	<input type="radio"/>	Center Knife Down		<input checked="" type="radio"/>	<input type="radio"/>	A1 Stacker Clamp
Lower Thread Trimming	E	<input type="radio"/>	Stacker Swing	A2	<input type="radio"/>	<input type="radio"/>	A3 Stacker Swing
Thread Release	H	<input type="radio"/>		A4	<input type="radio"/>	<input type="radio"/>	T3 Air Ejector
Tab Knife Clamping	G	<input checked="" type="radio"/>		T2	<input type="radio"/>	<input type="radio"/>	T1
Patch Guide Up	J	<input type="radio"/>		T0	<input type="radio"/>		
Patch Guide Down	I	<input type="radio"/>					
Brush	L	<input type="radio"/>					
Bagging Hold Down	K	<input type="radio"/>					
Patch Plate (Left)	N	<input type="radio"/>					
Patch Plate (Right)	M	<input type="radio"/>					
Clamp Down (Left)	P	<input type="radio"/>					
Clamp Down (Right)	O	<input checked="" type="radio"/>					
Photo Sensor (Left)		<input type="radio"/>					
Photo Sensor (Right)		<input type="radio"/>					
		<input type="radio"/>					
Hold Upper Thread	Q	<input type="radio"/>					