

AMF[®] REECE

Better Ideas, Better Made

SERIES S104-400

EYELET BUTTONHOLE MACHINE

PARTS & SERVICE MANUAL

PART NUMBER 97.0400.1.000

TABLE OF CONTENTS

	Page
Introduction	1-1
Specifications	1-2
Safety	1-3
Belt Tension Adjustments	1-4
Thread Stand Installation	1-6
Lubrication	1-7
Principles of Sewing	1-8
Operator Controls	1-14
Operator Instructions	1-19
Programming the LCD Display	1-24
Adjustments	
Cam Buttons	1-38
Two Control Sensors	1-39
Sew Sensor Blocks and Plateaus	1-40
Magnetic Disk	1-41
Race	1-42
Adjustable Flybar Pins	1-46
The Looper and the Needle Alignment	1-48
Prick-In	1-49
Eye Shape	1-51
Cutting Space	1-52
Changing the Stitch Bite Width	1-53
Buttonhole Length	1-54
Flybar	1-55
Last Stitch Stop	1-56
Stitch Count	1-57
No Eye Buttonholes	1-57
Eye Buttonholes	1-57
Cutting Steel and Knife	1-58
Knife and Cutting Lever	1-59
Cutting Pressure	1-60
Cutting Steel Replacement	1-61
Clamps	1-62

TABLE OF CONTENTS

	Page
Adjustments	
Clamp Plate Spread	1-63
Spread Blocks	1-65
Clamp Foot Position and the Needle Entry Point	1-66
Clamp Height	1-67
Trim Knife	1-68
Trim Knife Relaxed Position	1-68
Needle to the Trim Knife	1-68
Trim Knife Height	1-68
Thread Retainer	1-68
Upper Thread Trimming	1-69
Lower Thread Draw-Off	1-70
Shear Sets	1-71
Installation of the Shears to the Clamp Plates	1-71
Shear Crossover	1-72
Gimp Pull Back	1-73
Stitch Increase and Decrease Wedges	1-74
Needle Bar Height	1-75
Loopers and Spreaders	1-76
Starting Thread Tension	1-82
Style 104-470 Adjustments	
Sensor	1-83
Trim Delay	1-84
Mechanical Shears Set-Up	1-85
Pneumatic Shears/Clamps Layout	1-85
Recommended Spare Parts List	1-86
Needle Applications	1-87
Knives and Cutting Steels Part Numbers	1-88
Pneumatic Controls	1-89
Electrical Diagrams	1-90
Preventive Maintenance	1-93

INTRODUCTION

S104-400 Eyelet Buttonhole Machine

The S104-400 eyelet buttonhole machine, incorporates reliable electronic technology to eliminate mechanical adjustments and increase the operational capabilities and productivity.

The S104-400 provides an electronic stop to simplify operation, prolong machine life, and improve reliability by reducing 40% of the moving mechanical parts.

The dual independent DC motors control the stitching and feed systems separately.

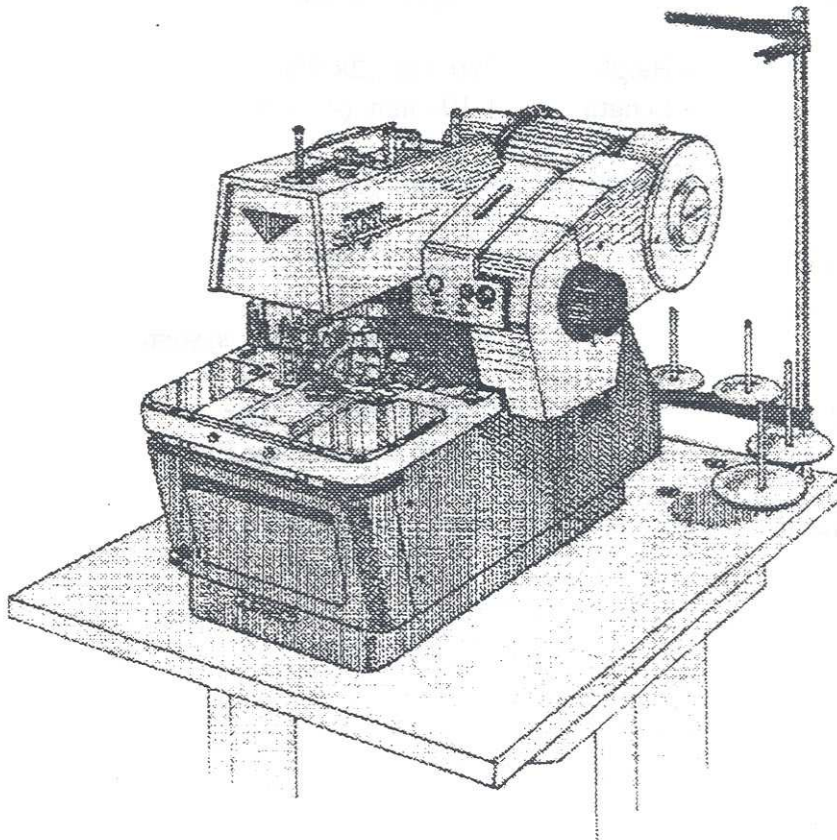
High speed sewing up to 1,950 spm is available.

The pneumatic clamping automatically adjusts to uneven material and ensures equal pressure on both sides of the buttonhole.

The selectable slow start option increases the buttonhole quality and reliability.

The speed selector allows the operator to vary the speed according to differences in the fabric.

The electrical supply requirement is 220V, 1 phase, 50 or 60 Hz.



SPECIFICATIONS

Description:	Eyelet Buttonhole Sewing Machine	
Machine Type:	S104-433	CT-CA-5/8-LE
	S104-435	CT-CA-5/8-RE
	S104-436	CT-CA-3/4-RE
	S104-437	CT-CA-7/8-RE
	S104-430	AF-CB/CA-R-RE
	S104-470	ST-CT-CA-5/8 to 7/8
Machine Speed:	Up to 1,950 stitches per minute	
Motor:	DC Drive with Logic Controls	
Pneumatics:	Clamping and Shearing, 5.6 Bar, (80 PSI) Requirement	
Machine Head:	- Height	495 mm, (19.5")
	- Length	610 mm, (24.0")
	- Width	470 mm, (18.5")
Machine Head Weight:	64 kg, (141 lbs)	
Machine Stand:	- Height	710 mm, (28.0")
	- Length	1,100 mm, (43.5")
	- Width	600 mm, (23.5")
Machine Stand Weight	68 kg, (150 lbs)	
Lubrication:	Semiautomatic wick system	
Buttonhole Cutting:	Cut Before/Cut After French Eye/Regular Eye	
Electrical Requirements:	220V 1 Phase 50/60 Hz	

SAFETY

Safety

The S104-400 eyelet buttonhole machine is carefully designed and manufactured to our high quality standards. Special attention is focused on the convenience of operation and effective hazard protection for operating and service personnel.

WARNING! Any piece of equipment may become dangerous to personnel when improperly operated or poorly maintained. It is very important all personnel expected to operate or maintain this equipment be familiar with the information contained in the parts and service manual.

It is recommended that AMF Reece service personnel supervise the installation and initial training of your mechanics and operators.

The most effective employee hazard protection is a rigidly enforced safety program which includes effective training in safe operating methods. Supplementary hazard protection, including guards and covers, are useful when attached in the correct manner and properly maintained. Operators and service staff should be required to wear safety glasses.

Safety Labels



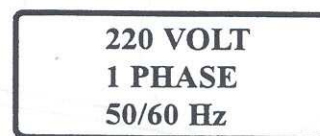
Safety glasses required.
 Located on the front of the sewing head, above the needle.



Possible shock.
 Located on the outer electrical box cover door.



Possible shock.
 Located on the outer electrical box cover door and two clear guards inside the electrical box.



Possible shock.
 Located on the outer electrical box cover door.

BELT ADJUSTMENTS

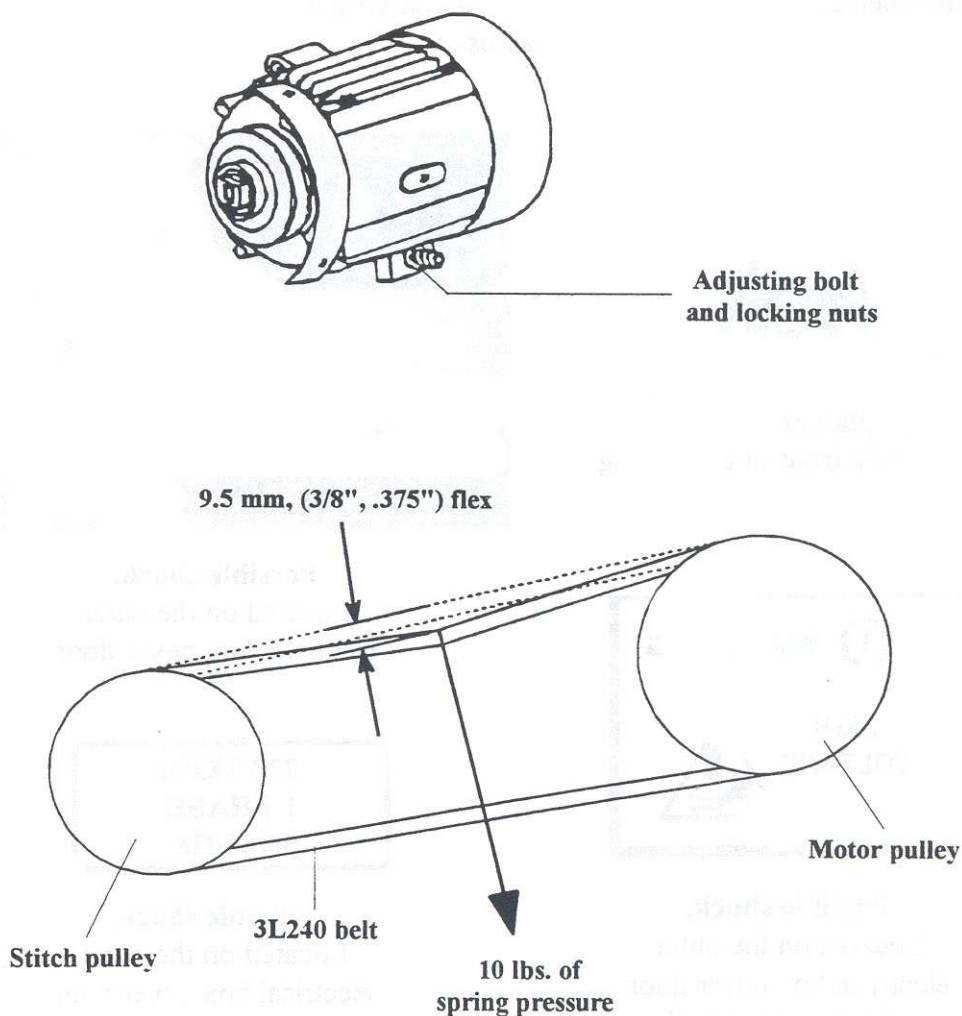
Upper Stitch Drive Belt Tension

Loosen the nuts and adjust the motor up or down the threaded rod, as needed.

Using a straight edge, ruler, and spring scale, adjust for a maximum of 9.5 mm, (3/8", .375") deflection with 1.13 Newton meters, (10 pounds) of spring pressure on the belt.

Tighten the nuts.

Note: Check to make sure the tension setting did not change while tightening the nuts.



BELT ADJUSTMENTS

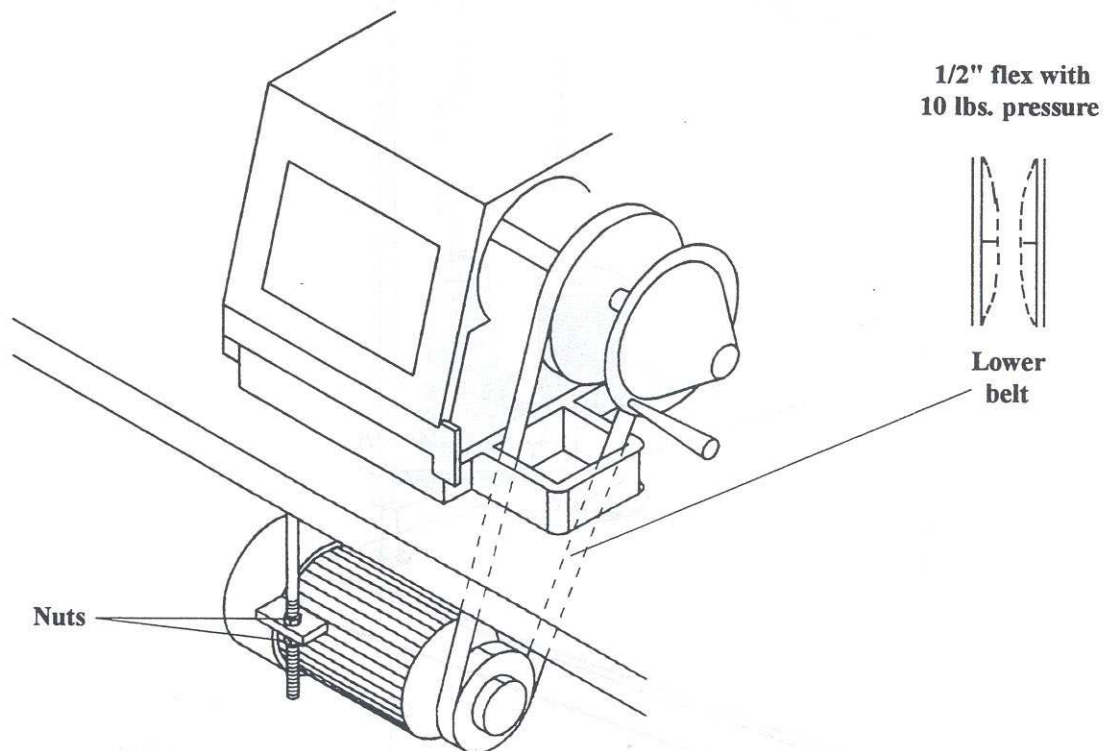
Lower Belt Tension

Loosen the nuts and adjust the motor up or down the threaded rod, as needed.

Using a straight edge, ruler, and spring scale, adjust for a maximum of 13 mm, (1/2", .500") deflection with 1.13 Newton meters, (10 pounds) of spring pressure on the belt.

Tighten the nuts.

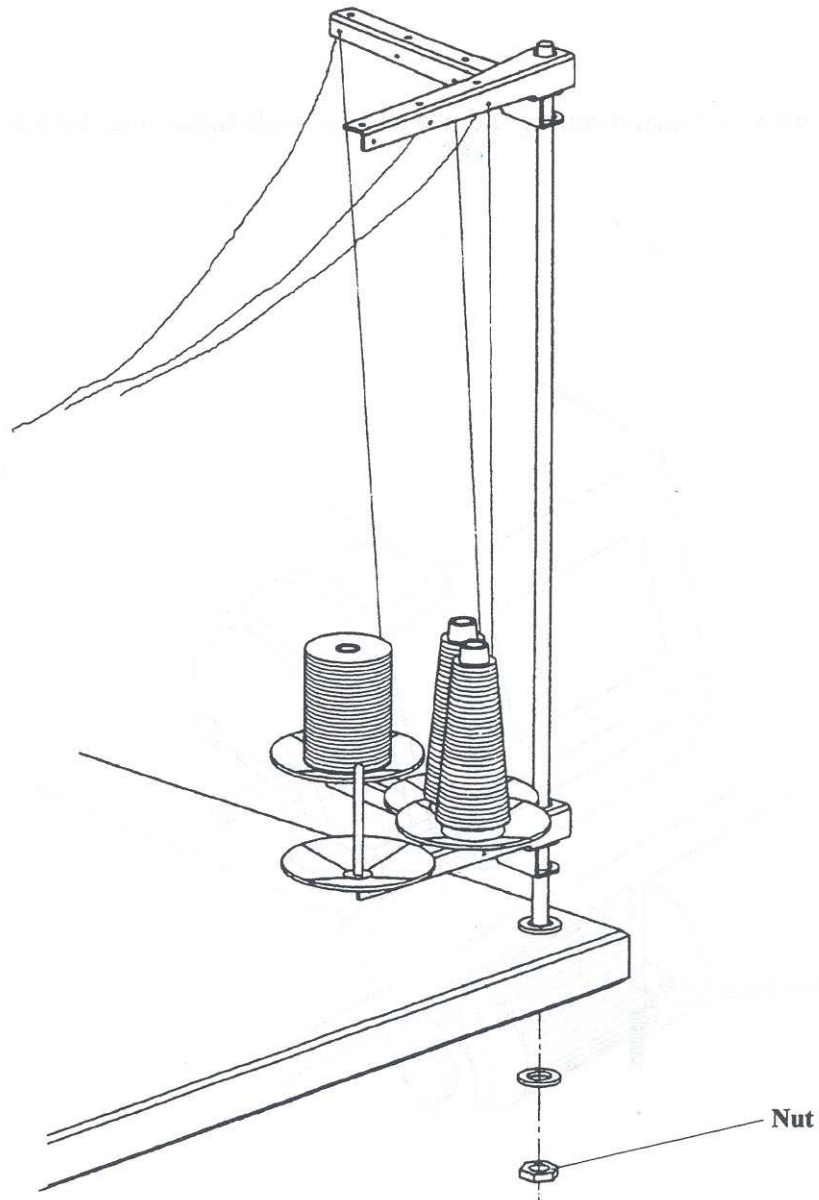
Note: Check to make sure the tension setting did not change while tightening the nuts.



THREADSTAND**Installation**

Assemble the thread stand as illustrated and insert into the hole provided in the table.

Tighten the nut.



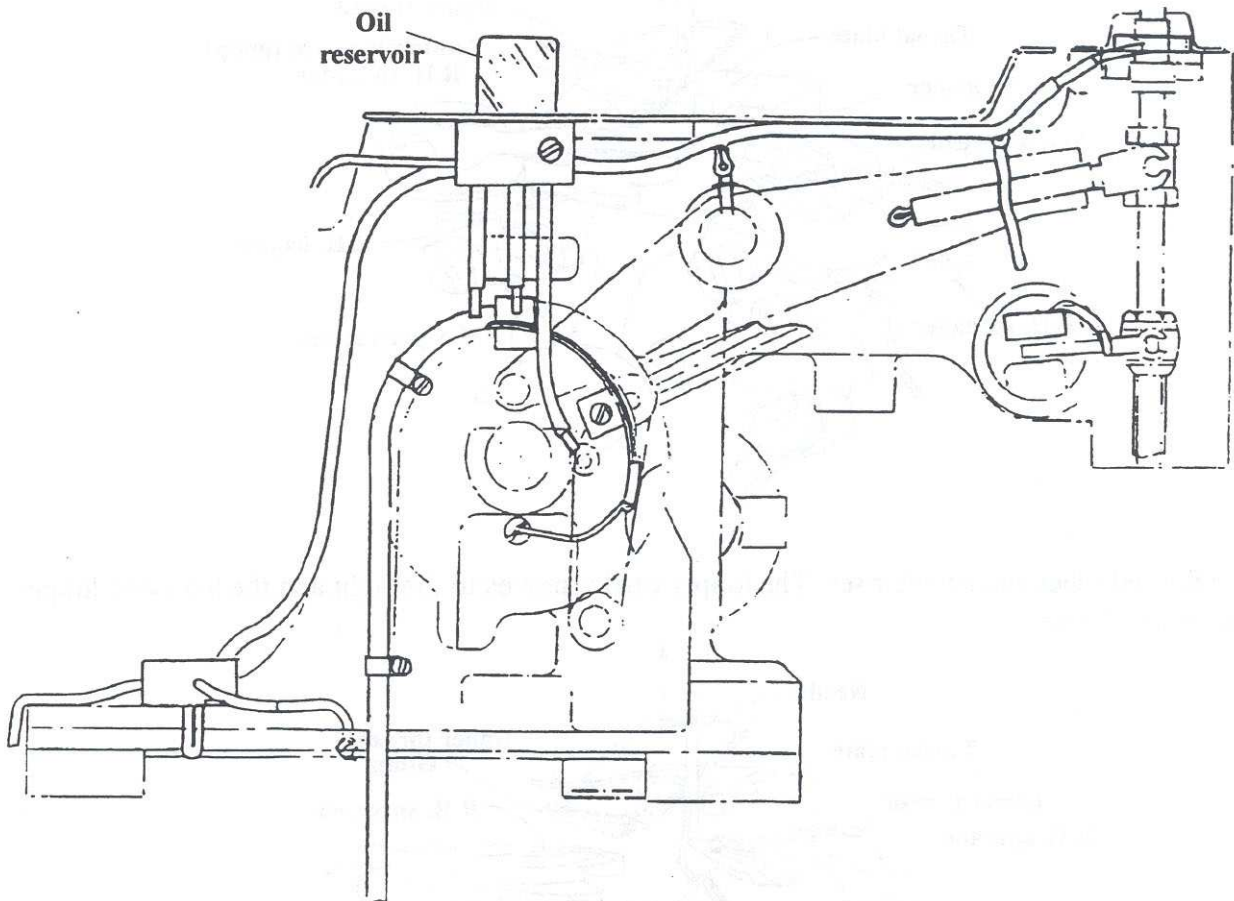
LUBRICATION

Oiling

Check the oil reservoir, located on the top of the sewing head, ensure it is full at the start of each day.

Note: The various red dots/oil stickers located on the machine must be oiled once a week.

Cycle the machine 20 or more times, on a scrap piece of fabric, to remove any excess oil.



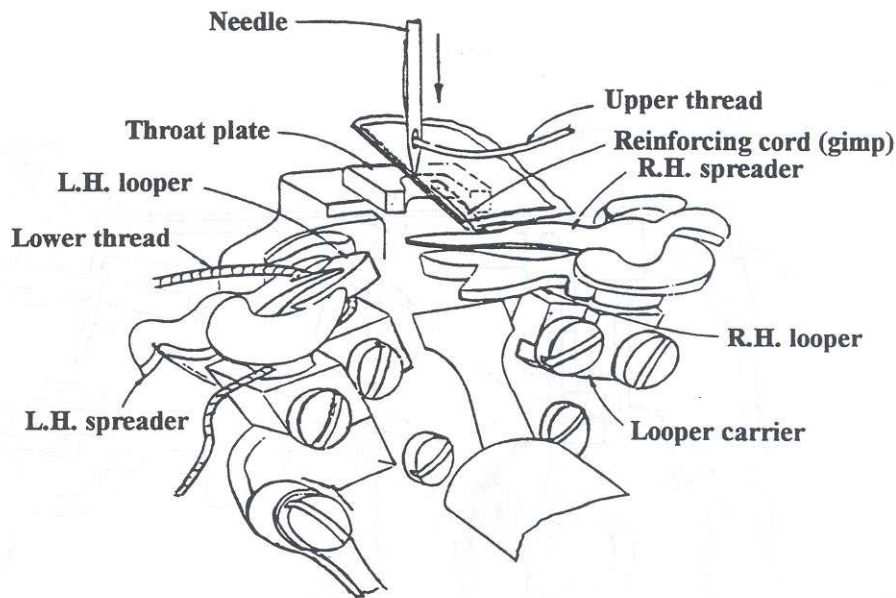
PRINCIPLES OF SEWING

Stitching

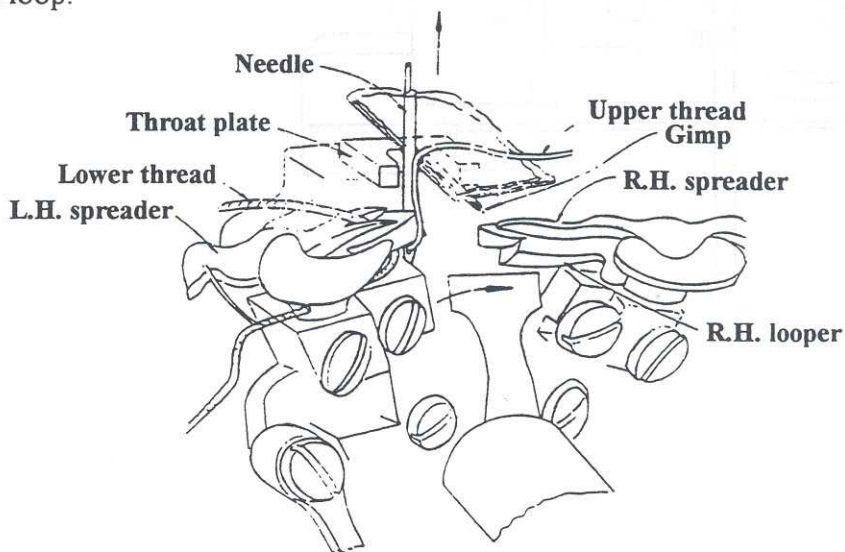
A stitch is the unit of thread formed in the production of seams and stitching.

Stitching is defined as a series of stitches embodied in a material for ornamental purposes, for finishing an edge, or both.

The type of stitch used in the eyelet buttonhole machine is a two-thread, chain lock, purl stitch enveloping a reinforcing cord. When the thread, loopers, and spreaders create a buttonhole:



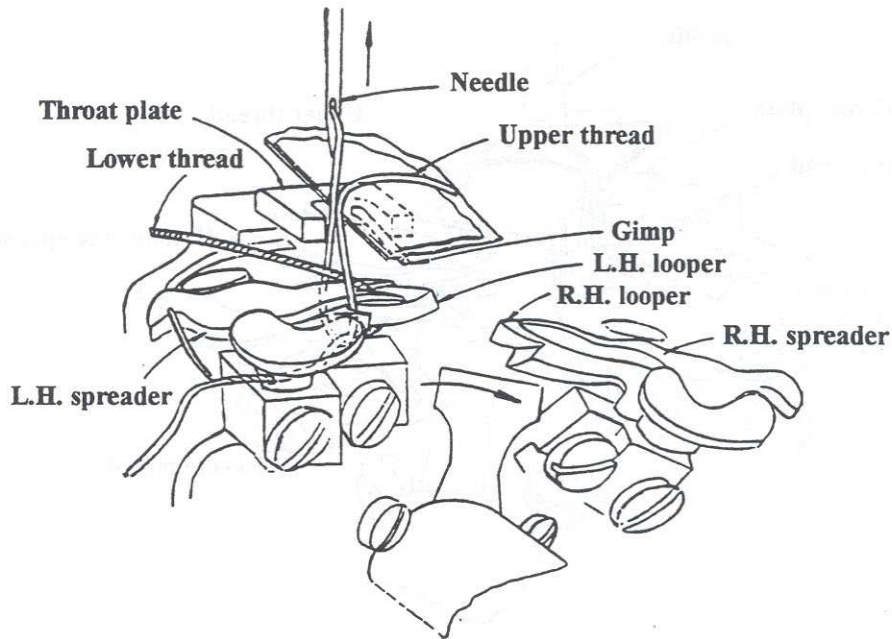
A loop is formed when the needle rises. The looper carrier moves to the right and the left-hand looper enters the formed loop.



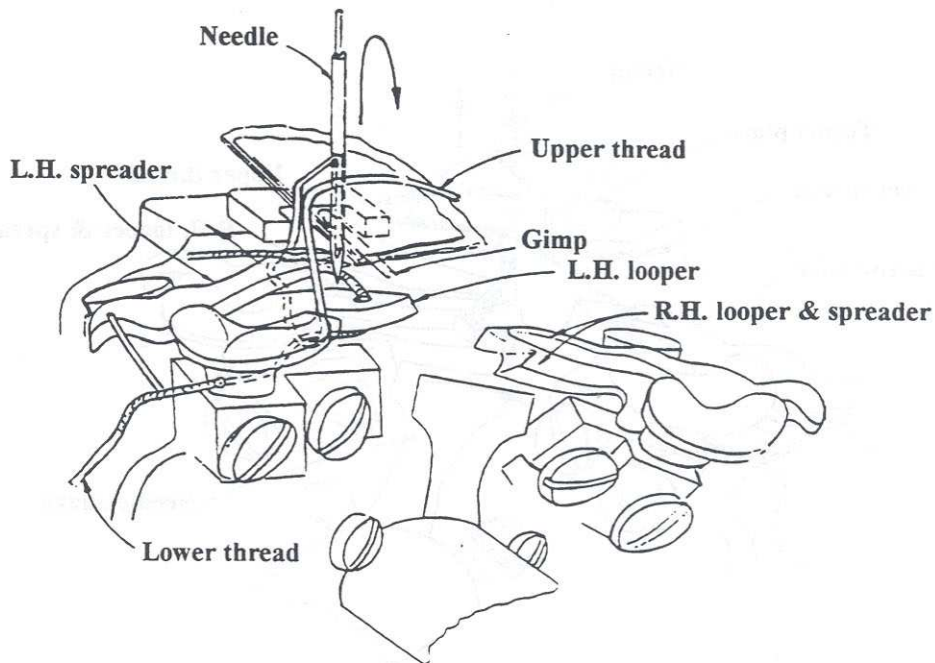
PRINCIPLES OF SEWING

Stitching

The looper carrier continues moving to the right, carrying the lower thread, the left-hand looper, and the spreader, fully enter the formed loop.



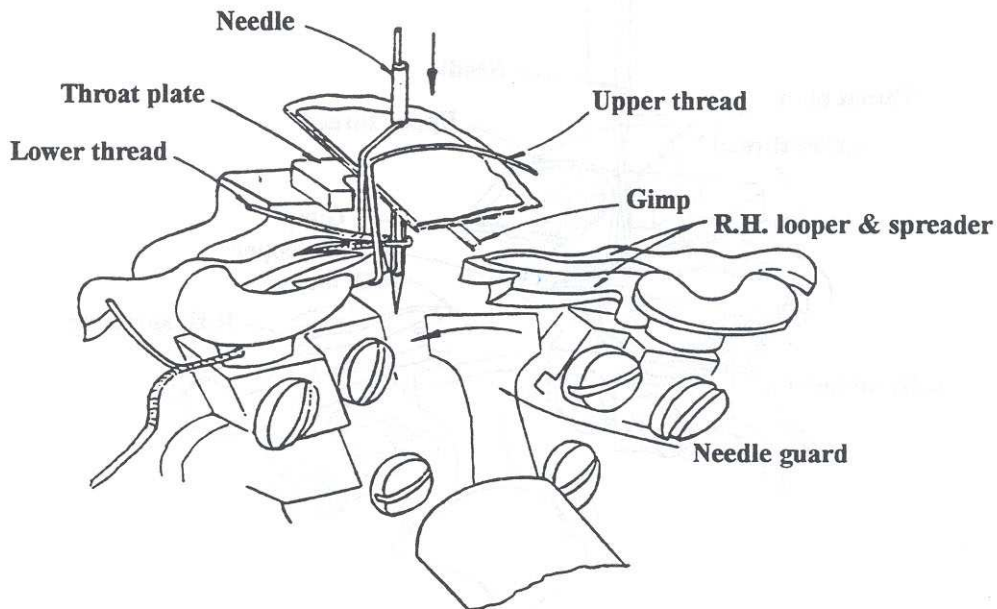
The left-hand spreader opens, making room for the needle to pass through a loop formed by the lower thread. With this penetration, the needle encompasses the cord.



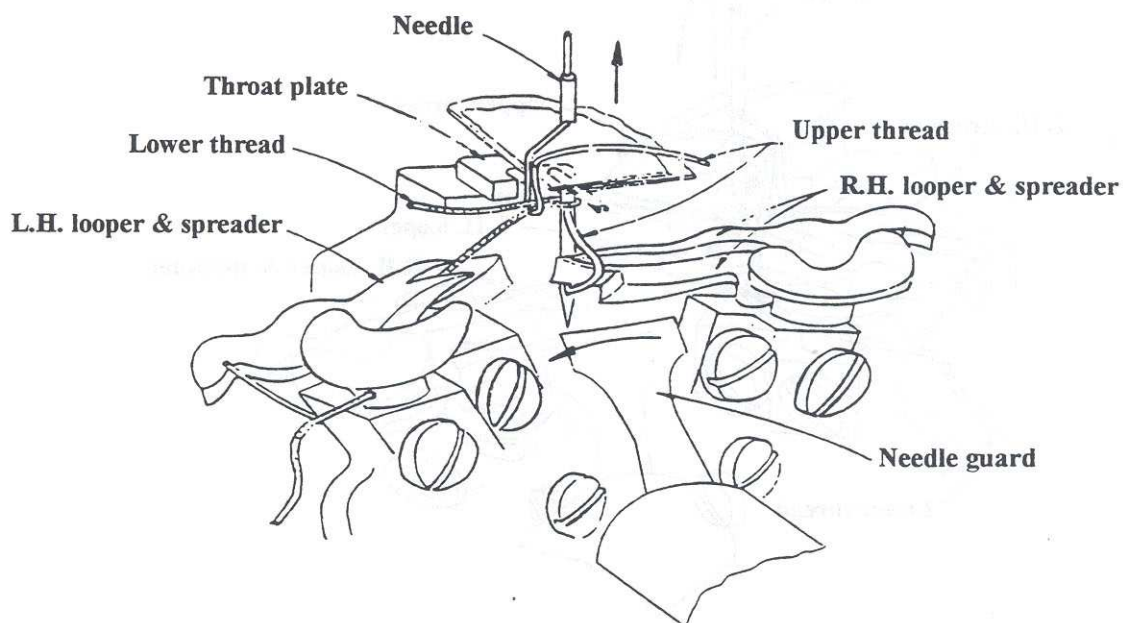
PRINCIPLES OF SEWING

Stitching

As the needle moves down to form a new loop, a take-up implement pulls the upper thread up into the material, and brings the lower thread with it.



A loop is formed as the needle rises. The looper carrier continues moving to the left and the right-hand looper, enter the new loop formed. The previous loop is pulled tight against the material.



Revised July 1999

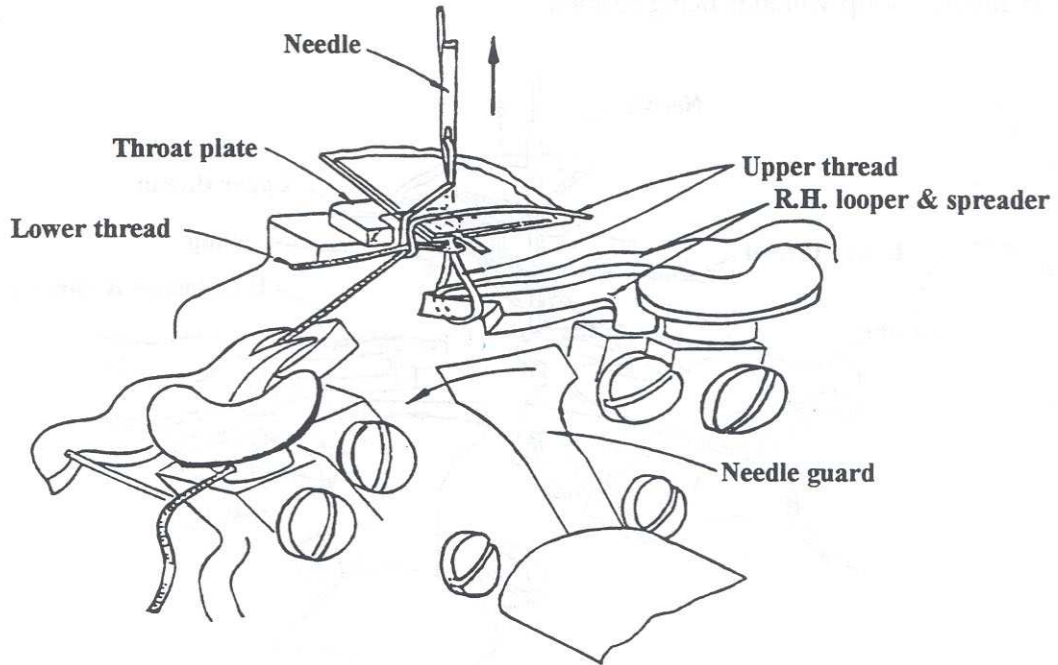
U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

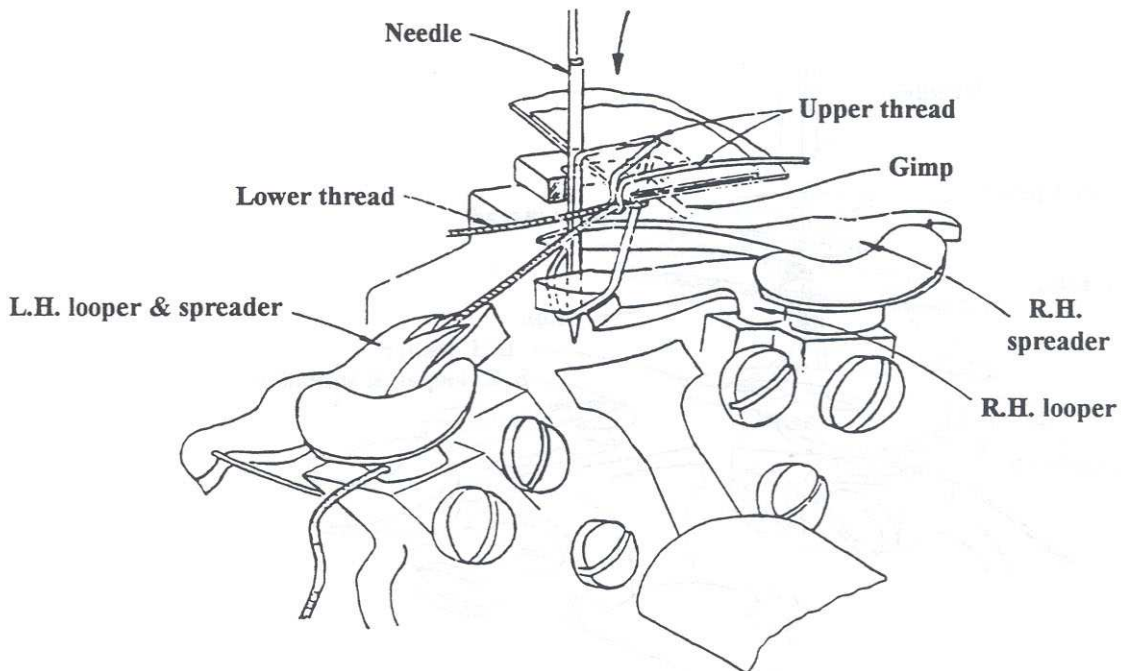
PRINCIPLES OF SEWING

Stitching

The looper carrier continues moving to the left. The right-hand looper and spreader fully enter the formed loop.



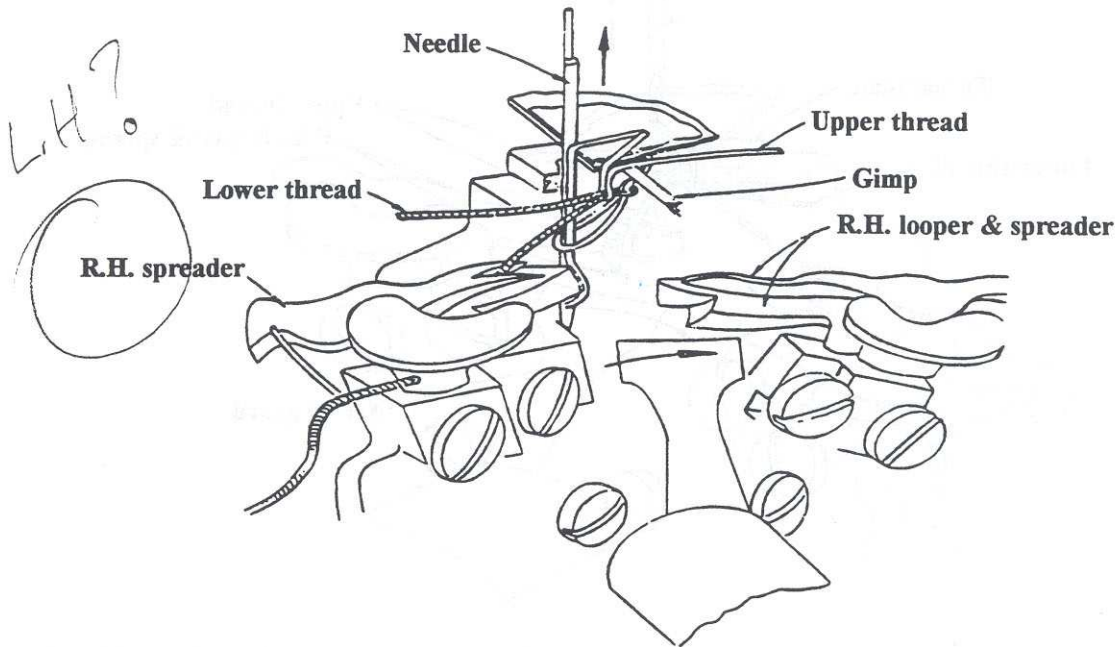
The right-hand spreader opens, making room for the needle to pass through a loop formed by the upper thread.



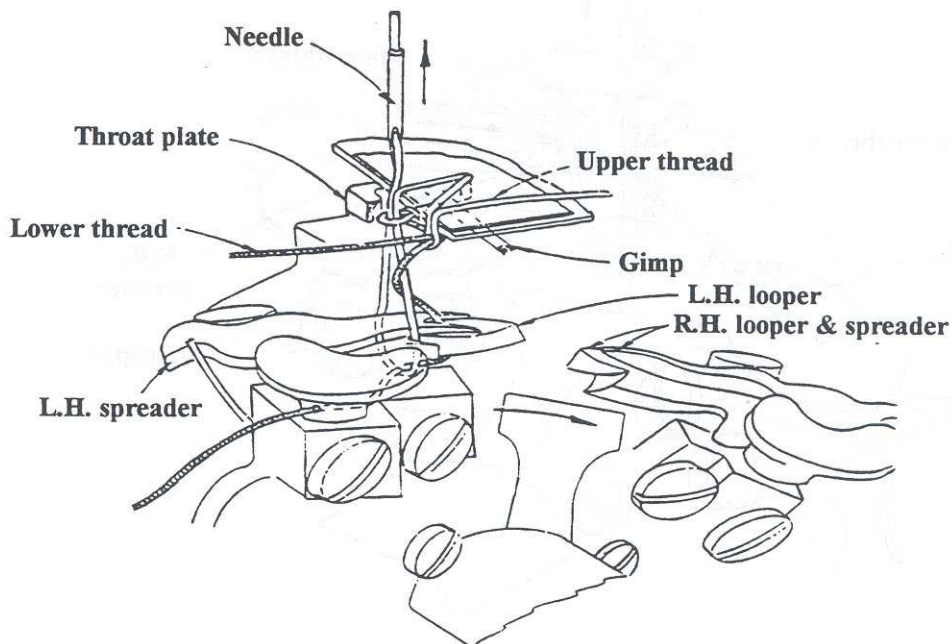
PRINCIPLES OF SEWING

Stitching

The looper carrier moves to the right as the needle "strips" the loop previously formed. The left-hand looper enters the new loop which is being formed.



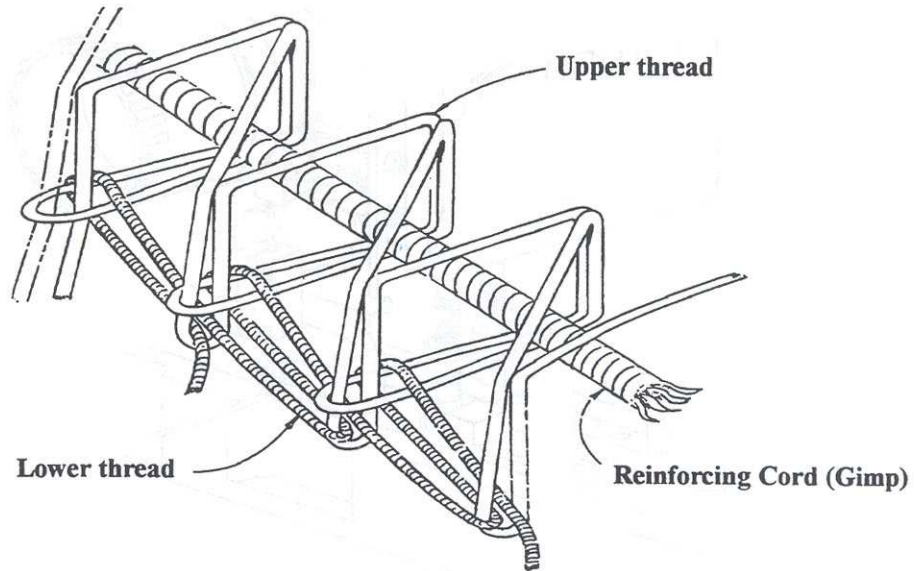
The lower thread forms a purl as it, and the previously formed thread loop, are pulled against the material. The enveloped cord provides the buttonholes with body.



PRINCIPLES OF SEWING

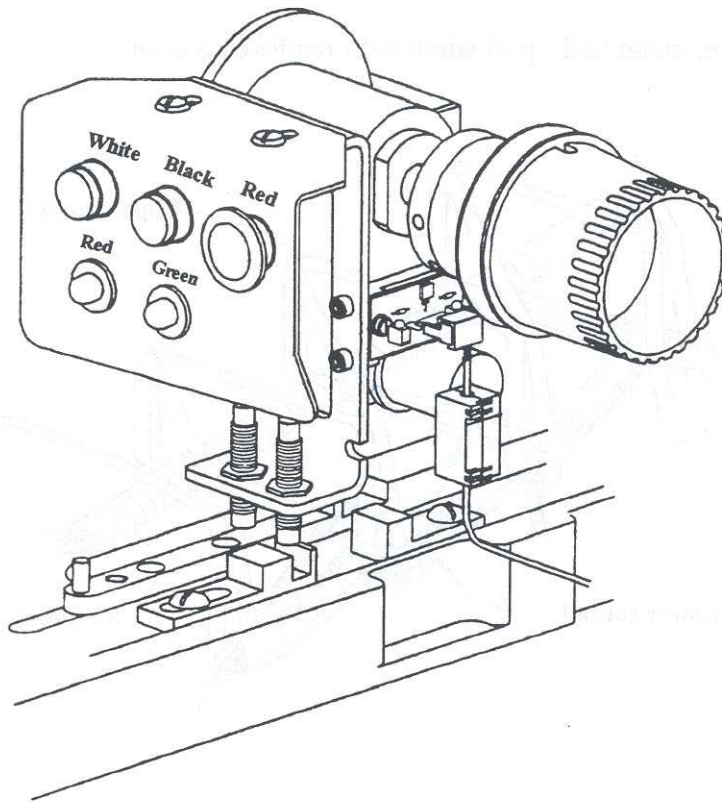
Stitching

AMF Reece two-thread, chain lock, purl stitch with reinforcing cord.



OPERATOR CONTROLS

Operator Control Panel



Red



Emergency Stop Push-button Switch

Black



Clamps Up/Down Push-button Switch

White



Home/Operator/Service Position Push-button Switch

Red Light



Needle Bar Up Indicator Light

Green Light

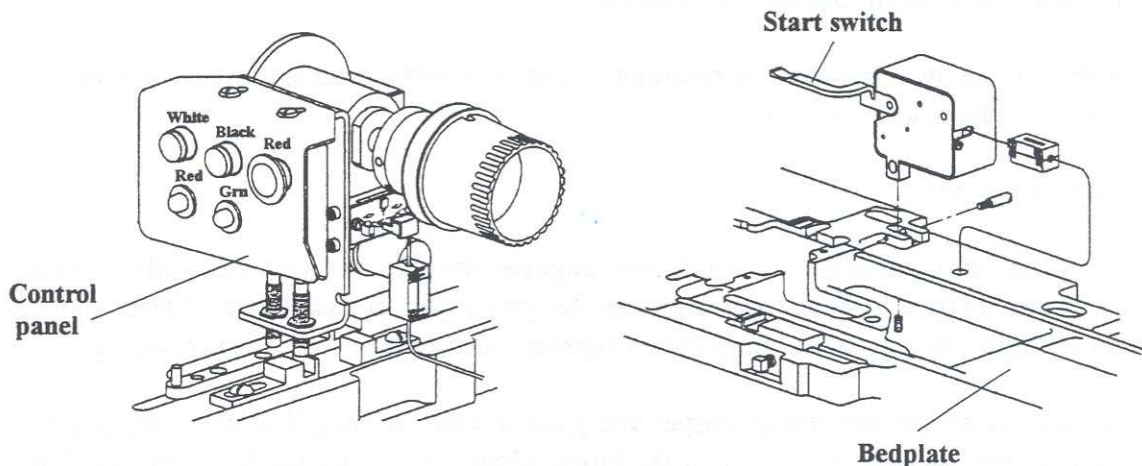


Home/Ready to Sew Indicator Light

OPERATOR CONTROLS

Machine Operation

The AMF Reece S104-400 is equipped with a micro computer controlled system designed to improve performance, and drastically reduce the maintenance required to operate an eyelet buttonhole machine. Four push-button switches and two indicator lights are supplied for easy control of each function and understanding the information provided by the system, through the LCD display.



Operating Switches

The Start Switch, located on the machine bedplate to the left of the material clamps, is a 2-stage switch, allowing two different modes of operation.

One-Step Mode: Pressing the switch all the way down automatically clamps the material and begins the sewing cycle.

Two-Step Mode: Step 1, pressed lightly (approximately halfway down), the switch lowers the clamps, allowing the operator to accurately position the garment. Releasing the switch from this halfway down position returns the clamps to the up position.

Step 2, pressed fully (all the way down), the switch starts the sewing cycle.



When pressed, the white Home/Operator/Service switch, located on the operator control panel, moves the machine table back to the **Service** position.

Note: During threading, changing the needle, or clamp plate installation, prevents accidental starting of the machine. Press a second time to return the machine to the **Home** position.



The black Clamp Switch, located on the operator control panel, is used to manually raise and lower the clamps which hold the material. Since this is a toggle switch, pressing it once lowers the clamps, pressing the switch again raises the clamps.

OPERATOR CONTROLS



EMERGENCY STOP

The Emergency Stop push-button switch, located on the right-hand side of the operator control panel, immediately stops the machine during a sewing cycle and prevents accidental starting of the machine while being serviced.

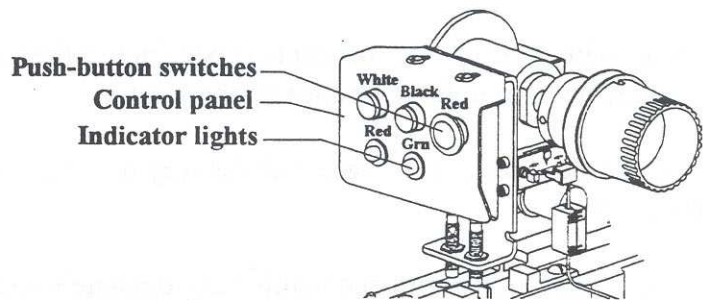
Emergency Stop is a 2-stage switch. The first time the switch is pressed, the stop is engaged. The second time the switch is pressed, the stop is released.

Note: Raising the sewing head engages the emergency stop, lower the head and press the white push-button to release the emergency stop.

Emergency Stop: First Stage

Pressing the emergency stop push-button switch once engages the stop and activates both indicator lights. This causes the red light to flash twice and then the green light to flash twice, alternating back and forth, with each light flashing twice, until the emergency push-button switch is pressed again.

WARNING! Before threading the needle, looper and gimp threads, or installing the clamp plates, press the emergency stop push-button switch or the Home/Operator/Service push-button switch to avoid accidental engagement of the machine, and possible injury to the operator.



Emergency Stop: Second Stage

Pressing the Emergency Stop push-button switch a second time releases the stop and causes the red and green indicator lights to flash once, alternating back and forth, until the home/operator/service push-button switch is pressed and held for at least one second. Pressing the home/operator/service push-button switch resets the system to the operating mode.

Exiting the Emergency Stop with the Machine in the Home/Operator/Service Position

If the emergency stop push-button switch was pressed with the machine in the home position and the needle up, this is usually the case when threading the needle or the looper:



EMERGENCY STOP

Press the Emergency Stop push-button switch a second time.



HOME POSITION

White

Press and hold the Home/Operator/Service switch until the indicator lights stop flashing. The machine is now ready to continue sewing.

OPERATOR CONTROLS

Exiting the Emergency Stop During the Sewing Cycle

Note: Material may be removed from the machine by manually rotating the hand wheel until the needle is in the up position.



Press the Clamps push-button switch to raise the clamps. The material may now be safely removed.



Press the Emergency Stop push-button switch.

If the Emergency Stop push-button was pressed, while the machine was sewing: Release the Emergency Stop push-button switch by pressing the red push-button switch a second time.



Press and hold the Home/Operator/Service push-button switch, for one full second, until the indicator lights stop flashing.



If the Needle Bar Up, (red) indicator light is not activated, slowly rotate the hand wheel counterclockwise until it activates.



Press the white push-button to return to the home position or press the starting lever to continue sewing.

Indicator Lights



The red Needle Bar Up light, located on the control panel, indicates the needle bar is in the correct up position.

Note: The machine will not operate unless the needle bar is in the up position. If this light is not activated, slowly rotate the hand wheel counterclockwise until it activates. The machine is now ready to sew.



The green Home/Ready to Sew Light, located on the control panel, signals the machine is in the home position and ready for sewing.

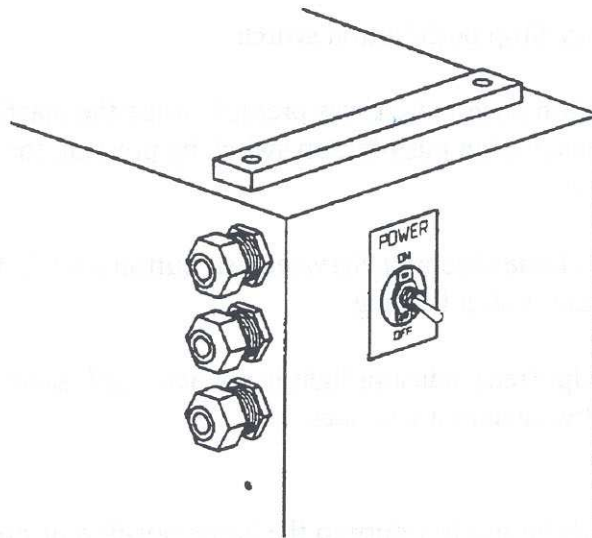
Note: If both the red and green lights are flashing at the same time, a system error has occurred. Switch off the machine power, wait 5 seconds, switch the main machine power on. The machine will clear itself, if not, a service technician will be needed.

OPERATOR CONTROLS

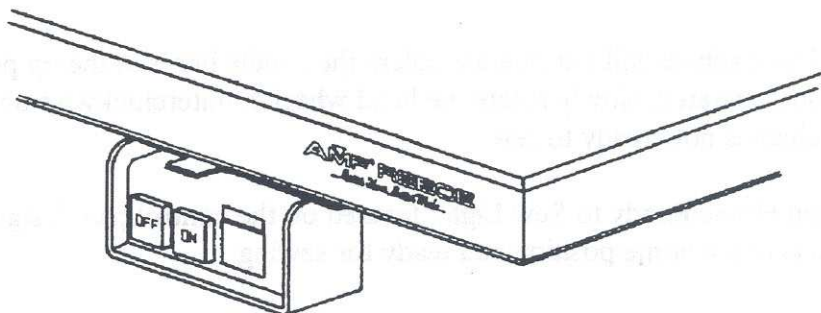
Main Electrical Power Switches

The main electrical power toggle switch engages and disengages the main electrical power to the machine.

WARNING! Disengage to eliminate all electrical power and prevent accidental machine start up while servicing the machine.



The motor controller electrical power On and Off switches, located beneath the tabletop on the right-hand side, regulate the electrical power to the S104-400 motor.



Press the On push-button switch to engage the electrical power to the motor controller.

Press the Off push-button switch to disengage the electrical power to the controller, except for the work light, for threading or servicing the machine.

OPERATOR INSTRUCTIONS

Importance of the Air Pressure

Required air pressure is 5.6 Bar, (80 PSI).

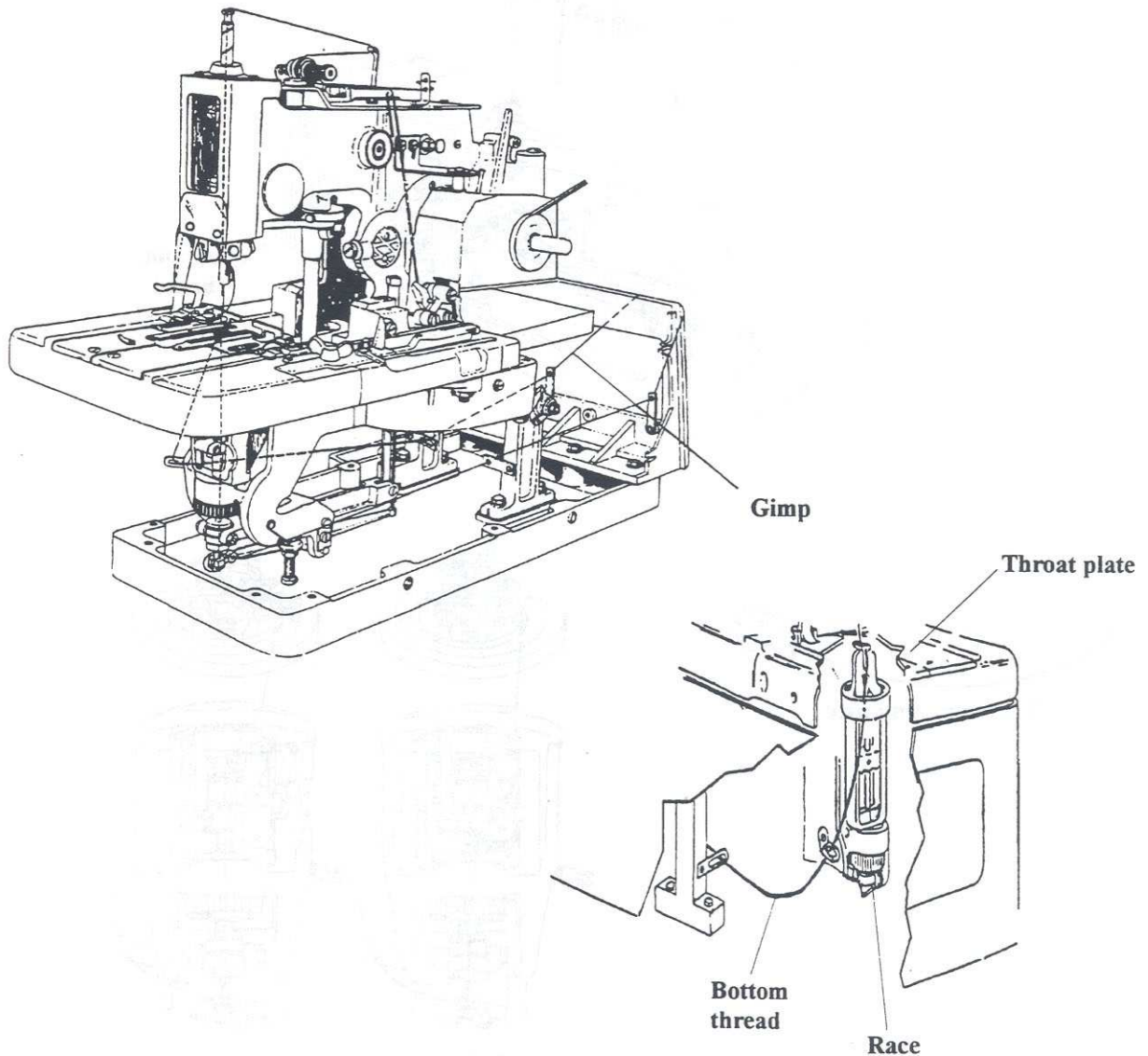
Caution! To avoid serious damage to the machine, do not operate the S104-400 without air pressure.

Threading the Machine

WARNING! Press the white push-button switch to engage the **Service** position.

Rotate the left-hand crank through a cycle until the race is facing the rear of the machine.

Thread the gimp, as illustrated.

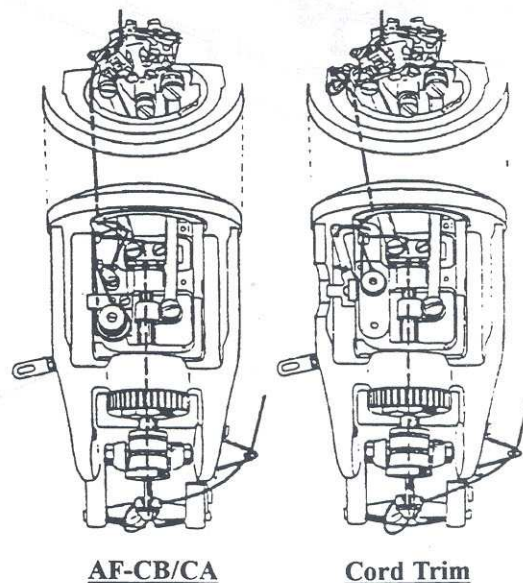
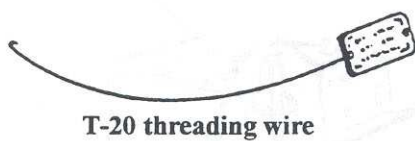
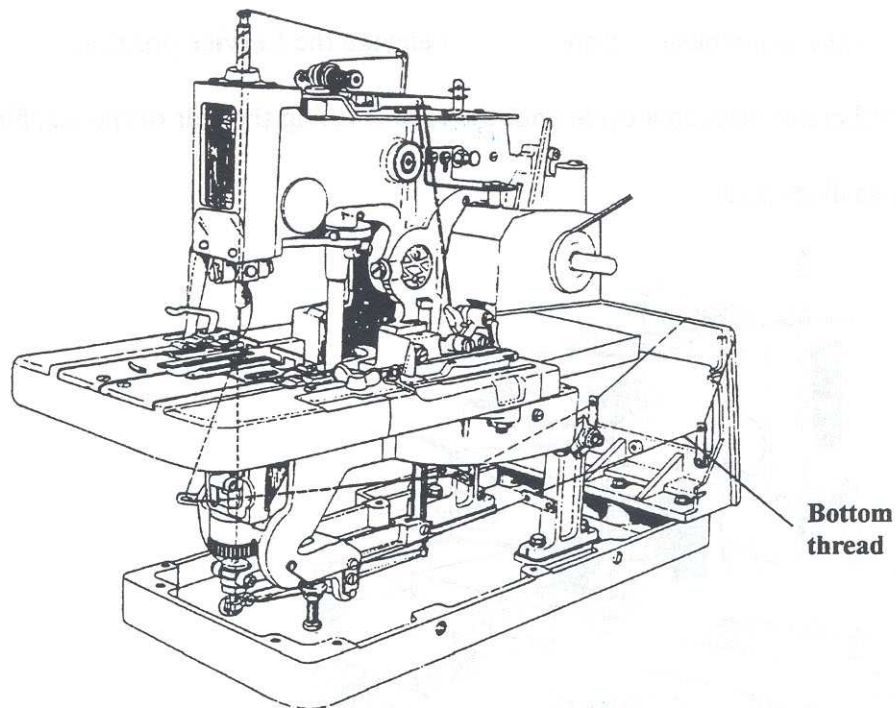


OPERATOR INSTRUCTIONS

Threading the Machine

Thread the bottom thread, as illustrated.

Note: Use the T-20 threading wire, 03-0020, for threading through the looper spindle.



Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

OPERATOR INSTRUCTIONS

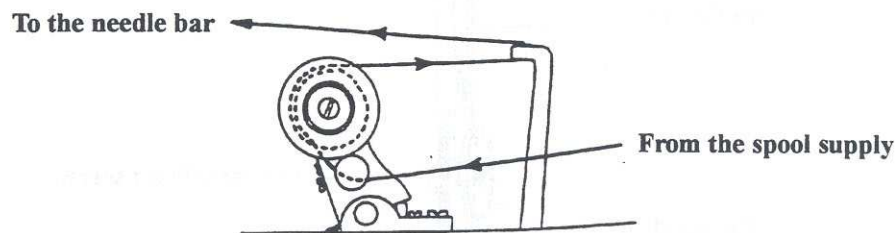
Threading the Machine

Note: When threading the S104-400 Cord Trim machine, the race will be facing the rear, when the machine is in the home position. With the Adjustable Flybar machine, the race will be facing the front, when the machine is in the home position.

On the Cord Trim machine, press the white push-button switch and the machine will travel to the **Service** position and stop, allowing threading of the machine without the possibility of accidental starting. Pressing the white push-button switch a second time returns the machine to the **Home** position.

Threading the Upper Tension - (Both Cord Trim and Adjustable Fly machines)

Pull the thread from the spool and wrap the thread around the upper tension 1-1/2 times.



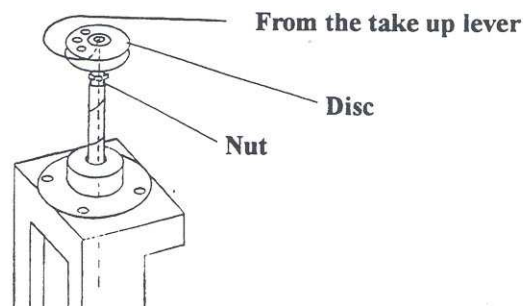
Position of the Disk - (Cord Trim machines only)

The purpose of the disk is to supply the correct amount of upper thread for the machine to begin the next buttonhole. Ensure the three locating pins are to the front left corner of the machine, when in the home position. To adjust:

Make sure the thread passes to the left side of the disk, looping around the three pins and down through the needle bar, for the cord trim only.

Loosen the nut and rotate the disc, as needed to increase or decrease the length of the starting thread..

Tighten the nut.



OPERATOR INSTRUCTIONS

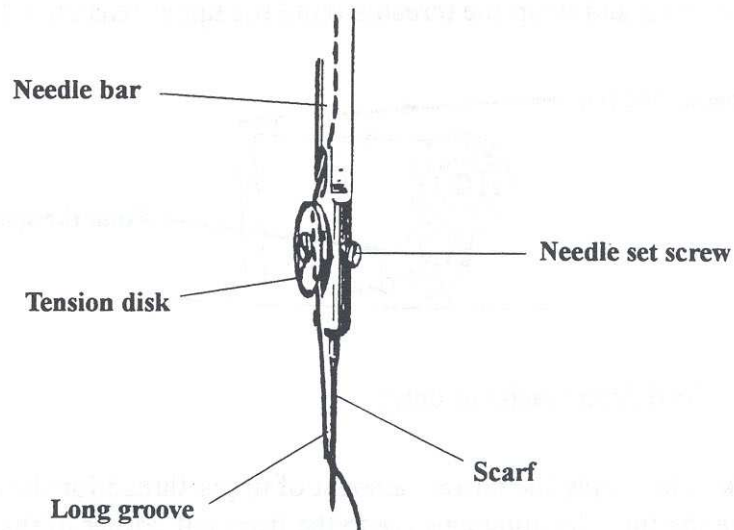
Needle Installation and Threading

Loosen the needle set screw.

With the machine in the **Service** position, the long groove of the needle, must be located on the same side as the needle bar tension disks.

Tighten the needle set screw.

Thread the needle.



OPERATOR INSTRUCTIONS

Starting the Machine

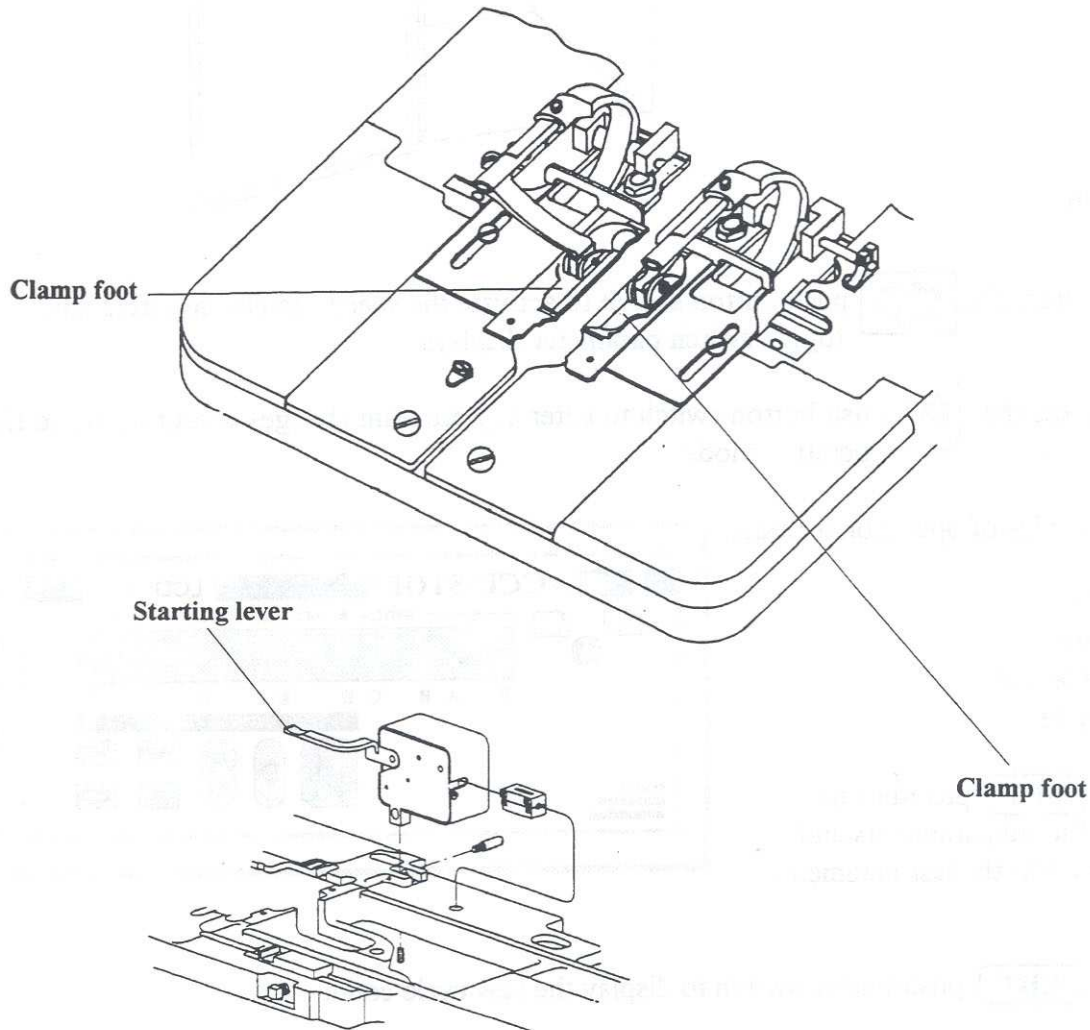
Note: To make sure the machine is sewing correctly, we recommend sewing a few buttonholes on a scrap piece of material before sewing on a quality garment.

Switch on the power to the motor controller.

Place the sewing work under the clamp feet.

Press down on the starting lever to start the machine sewing.

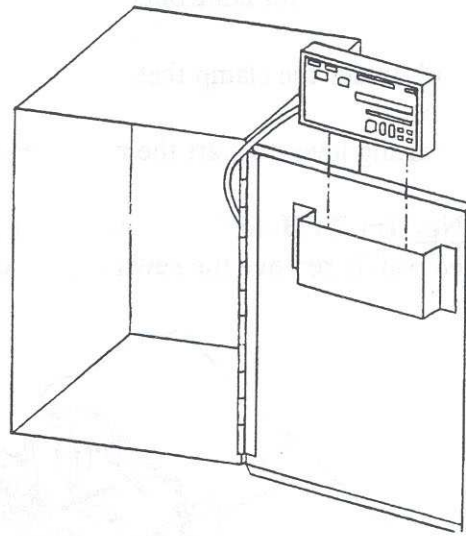
WARNING! Do Not Try To Hold Or Remove The Sewing Work With Your Hands. After the machine has stopped, safely remove the sewn work from under the clamp feet.




PROGRAMMING THE LCD DISPLAY


Location

The LCD display box is located in a pocket on the back side of the door protecting the electrical panel assembly. To access the display box, open the door and remove the display box from the door pocket. When the programming is complete, return the display box to the door pocket and close the door.




Keypad Functions


Round Arrow - press the  push-button switch to activate the speed, timers, counters, and toggle switch parameter displays.

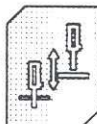
Right Arrow - press the  push-button switch to enter any program changes and/or return to the operating mode.

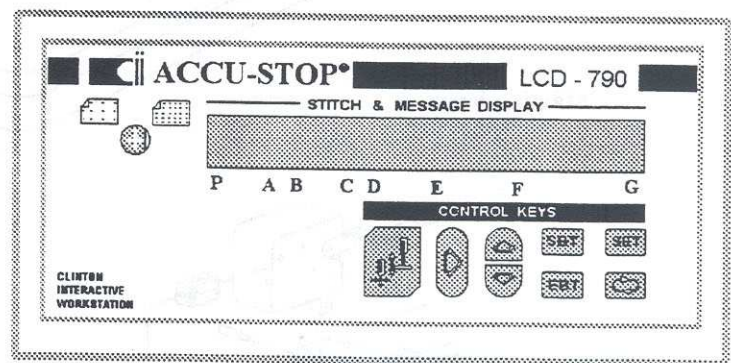
Note: The four modes of operation include:

Full Cycle
 Single Step
 Move Table Only
 Repair Cycle

SET - Press the  push-button switch to access the subparameters and automatically return to the last parameter changed.

EBT - Press the  push-button switch to display the sew cycle count.

Double Pointed Arrow - press the  push-button switch to return to home/operator/service position.




Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210



PROGRAMMING THE LCD DISPLAY

Keypad Functions

Up Arrow - press the  push-button switch to increase the parameter settings.

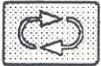
Down Arrow - press the  push-button switch to decrease the parameter settings.

Note: The Up Arrow and Down Arrow, when in any of the four operating modes, allows feathering, (raising and lowering) the clamps.

Up Arrow  and the **SBT**  Press these two push-button switches at the same time to activate the shears to check for the correct amount of shear crossover.

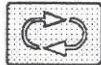
Emergency Stop Push-Button Switch

Pressing the Emergency Stop Switch causes the display message to read "EMERGENCY STOP". To exit this mode, press and release the red push-button switch on the operator control panel. Press and

hold the Double Pointed Arrow  push-button switch for a minimum of one second.

WARNING! This long button hold time is a safety device to ensure the emergency stop mode can not be exited accidentally.

The message will now read "cont. or go home". You now have the option to either 1) move the table to the home position or 2) continue the program where stopped.

Press the Double Pointed Arrow  push-button switch to move the table into the Home position.

or

Press the Start switch to continue the program from where it was stopped.

Note: If the needle is not in the Needle Up position, the table motor will not start. The display message reading "NOT NEEDLE UP" will disappear, as soon as the machine is manually rotated to the Needle Up position. There is only one true needle up position, for every two needle bar strokes.

PROGRAMMING THE LCD DISPLAY

PARAMETER CHECKLIST (Use the blank setting spaces to record installation settings for future reference)

PARAMETER	RANGE	SETTING	DEFAULT
SPEEDS			
SLOW STRT	400-1600 S.P.M.	_____	800
EYE SPD	400-1600 S.P.M.	_____	800
TIMERS			
START DEL	30-300 ms	_____	40
TRIM ON	30-250 ms	_____	150
COUNTERS			
SLOW STRT	1-5 Stitches	_____	2
EYE STRT	1-15 Stitches	_____	1
SLOW EYE	5-20 Stitches	_____	10
SLOW END	0-5 Stitches	_____	0
ENDCOUNT	1-15 Stitches	_____	5
TOGGLE SWITCHES			
SLOW EYE	On/Off	_____	Off
SLOW STRT	On/Off	_____	Off
SLOW TBL	On/Off	_____	Off
CUTTING	Before/After	_____	After
TOGG CMP	On/Off	_____	Off
START MODE	1 Step/2 Step	_____	1 Step
AIR SENS	No/Yes	_____	No
HIDDEN PARAMETERS			
****SPEEDS			
POS SPEED	200-700 S.P.M.	_____	600
SEW SPEED	600-1900 S.P.M.	_____	1840
TABL SPEED	300-1200 R.P.M.	_____	1000
****MISCEL			
CLAMP DTY	30-80%	_____	40%
CLAMP DL *	1-45 ms	_____	25 ms
TRIM DEL *	1-45 ms	_____	28 ms
NDL POS	0-40	_____	5
LANGUAGE	English/Spanish	_____	English
REL TIME	20-250 ms	_____	75 ms
****TOGGLE SWS			
EMR-ST	Closed/Open	_____	Closed

* Style S104-470, page 1-83

Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

PROGRAMMING THE LCD DISPLAY

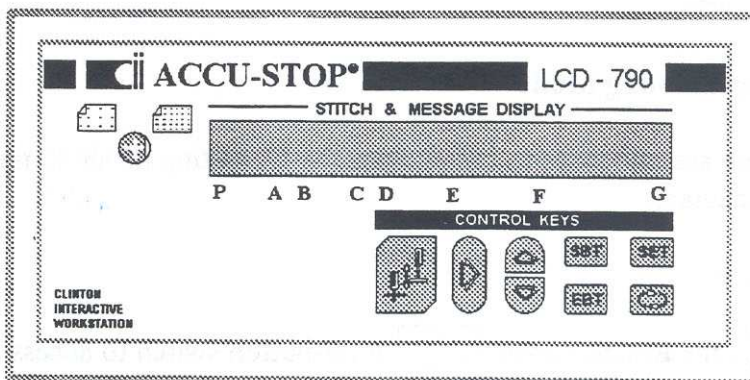
Modes of Operation

The LCD Display may be operated in three different modes, the Operating Mode, Programming Mode, and Test Mode.

Operating Modes

The four modes of operation include: Full Cycle, Single Step, Move Table Only, and Repair Cycle.

When the display is set for Full Cycle, the machine is ready to automatically sew a complete buttonhole. Press the start switch to begin the cycle and the table motor will move the table from the home position to the sew position.



Note: The table speed is adjustable.

In the sew position, the table motor stops, the sew motor starts, and the following options may be selected:

- 1) Slow start
- 2) Slow eye
- 3) Slow end

To overlap the last stitch with the first stitch, adjust the end count.

The table motor starts again and moves the table back to the home position. While traveling to the home position, the hole is punched. Once the hole is punched, the clamps may be raised before the table reaches the home position.

The **Single Step** mode provides the option of going through each operation step-by-step, for easy adjustment and maintenance. To access this mode:

Press the Start switch and the table moves to the sew position.

Press the Start switch again and the buttonhole is sewn.

Press the Start switch a third time and the table moves to the trim position.

Press the Start switch a fourth time and the table moves back to the home position, after punching the hole and lifting the clamps.

The **Move Table Only** mode, used primarily for adjusting the buttonhole puncher, moves only from the home position back to the home position.

PROGRAMMING THE LCD DISPLAY

Repair Cycle

To access the Repair Cycle, press and fully release the Start switch. The table will travel to the sew position and stop. Press the Start switch slowly to the first stage, the clamps will lower into the normal operation mode, to move the table very slowly through the cycle. Release the Start switch and the machine will stop. Press the Start switch fully down, the machine will begin sewing and complete the cycle.

Programming Mode


There are two ways to switch from the Operating Mode to the Programming Mode to change the parameters.


Either:

Press the Round Arrow  push-button switch to access the four main parameters, (speeds).

Keep pressing this push-button switch:

to step through the groups, or

Press the **SET**  push-button switch to access the last changed parameter or the subparameters within the four main parameters.

After the parameters are changed, press the Right Arrow  push-button switch to return to the Operating mode and save changes to the parameters.

PROGRAMMING THE LCD DISPLAY

Explanation of Parameters

Parameters with direct access include:

Speeds (spm, Stitches Per Minute)

SLOW STRT (Slow Start) - Allows sewing of the first stitches at the beginning and the last stitches at the end of the buttonhole with a slower speed. To adjust the number of stitches, see the parameter group **Counters**. To enable or disable this function, see the parameter group **Toggle Switches**.

Ranges: 400 to 1600 spm

Steps: 10 spm

Default Setting: 800 spm

EYE SPD (EYE SPEED) - The Slow Eye function determines the sewing speed in the eye. This feature may help to increase the number of stitches in the eye. To enable this function, set the Slow Eye toggle switch to the ON position. To adjust the number of slow eye stitches and the point where the Slow Eye begins, see the parameter group **Counters**.

Ranges: 400-1600 spm

Steps: 10 spm

Default Setting: 800 spm

Timers (ms, Milliseconds)

STRT DEL (Start Delay) - Delays the start (motor) after pushing the **Start** switch fully down and with the clamp in the **Up** position. The clamps must have time to lower and hold the material before the machine starts sewing. If the clamps are already in the **Down** position, this time will not cause any change.

Range: 30 to 300 ms

Steps: 10 ms

Default Setting: 40 ms

TRIM ON - Length of time the thread trim knife remains activated.

Range: 30 to 250 ms

Steps: 10 ms

Default Setting: 150 ms

PROGRAMMING THE LCD DISPLAY

Counters

SLOW STRT (Soft or Slow Start) - The number of stitches sewn with limited speed, after starting the sewing mode.

Range: 1 to 5 stitches

Steps: 1 stitch

Default Setting: 2 stitches

EYE STRT (Eye Start) - The **Slow Eye** sensor is stationary and no mechanical adjustments are available. The number of stitches set by this parameter determine the beginning of the slow eye. Increasing the number makes the slow eye start later.

Range: 1 to 15 stitches

Steps: 1 stitch

Default Setting: 1 stitches

SLOW EYE - The number of stitches sewn in the slow eye mode.

Range: 5 to 20 stitches

Steps: 1 stitch

Default Setting: 10 stitches

SLOW END - The number of stitches sewn in the **SLOW SPEED**, at the end of the buttonhole.

Range: 0 to 5 stitches

Steps: 1 stitch

Default Setting: 0 stitches

ENDCOUNT - Defines the number of stitches sewn after the last stitch is sensed.

Range: 1 to 15 stitches

Steps: 1 stitch

Default Setting: 5 stitches

PROGRAMMING THE LCD DISPLAY

Toggle Switches - Switches are set by the software.

SLOW EYE - Switches the **Slow Eye** mode on or off.

Default Setting: Off

SLOW STRT (Slow Start) - Switches the **Slow Start** mode on or off.

Default Setting: Off

SLOW TBL (Slow Table) - Controls the table speed.

On: The first edge of the sew sensor slows the table down to half speed.

Off: The table goes with full speed to stop.

Default Setting: Off

CUTTING - Enables Cut Before or Cut After stitching.

Default Setting: After

TOGG CMP (Toggle Clamp) - On, causes the clamps to remain in the Down position, even if the Start switch is released, the clamps remains down until the Start switch is pressed a second time. Off causes the clamps to feather (raise and lower) with the Start switch.

Default Setting: Off

START MODE - For the "Full Cycle" mode only.

1 Step: The First stage of the Start switch, automatically starts the sewing cycle.

2 Step: The First stage of the Start switch operates the clamps, the second stage starts the new sewing cycle.

Default Setting: 1 Step

AIR SENS (Air Sensor) - Not used.



Default Setting: No

PROGRAMMING THE LCD DISPLAY

Hidden Parameters

Access

Switch off the power to the motor controller.

Press the  and  push-button switches at the same time.

Switch the main machine power on while both push-button switches are pressed.

Release the buttons. The display shows stars which are counting down.

Press the push-button switch before the stars disappear.

Select the desired parameter as usual. The hidden parameters have stars in front of the group name:

Examples: Normal parameter: Hidden parameter:

Note: When the main machine power is off, access to the HIDDEN PARAMETERS is disabled.

****Speeds (Hidden Parameters)

POS SPEED (Position Speed) - Determines the speed of the trim and position cycle, both must be constant.

Range: 200 to 750 spm
 Steps: 100 spm
 Default Setting: 600 spm

SEW SPEED - Sets the buttonhole sewing speed.

Range: 600 to 1950 spm
 Steps: 10 spm
 Default Setting: 1840 spm

TABLESPD (Table Speed) - Determines the speed the table moves.

Range: 300 to 1200 spm
 Steps: 10 spm
 Default Setting: 1000 spm

PROGRAMMING THE LCD DISPLAY

****Miscel (Hidden Parameters)

CLMP DTY (Clamp Duty Cycle) - Based on the percentage of current applied to keep the solenoid energized, the duty cycle must be set to the minimum value required.

Note: Set too high, the solenoid may become excessively hot and the de-energized time is very long. Set too low, the solenoid vibrates (creating noise) and the clamps may drop.

Range: 30% to 80%

Steps: 1

Default Setting: 40%

CLMP DL (Clamp Delay) - The location where the clamps lift before the table reaches the home position, to avoid the shear cutter (cutting the threads), and catching the material.

Note: The lower the number, the sooner the clamps will rise.

Range: 1 to 45 ms

Steps: 1

Default Setting: 25 ms

TRIM DEL (Trim Delay) - Sets the delay from the time the clamp raises until the trimmer activates.

Range: 1 to 45 ms

Steps: 1

Default Setting: 28 ms

NDL POS (Needle Position) - Needle bar motor braking force.

Range: 0 to 40

Steps: 1

Default Setting: 5

LANGUAGE - The languages available are English or Spanish.

Default Setting: English

REL TIME (Relay Time) - Delays the start of the table motor after the sewing head has positioned to compensate for the delay of the relay. If this time is too short, the relay may arc (spark) and the needle may go out of position, because the start pulse for the table motor goes to the sewing motor.

Range: 20 to 250 ms

Steps: 1

Default Setting: 75 ms

PROGRAMMING THE LCD DISPLAY

******TOGGLE SWS (Hidden Parameters)**

EM-STOP (Emergency Stop) - Controls the program according to the switch wiring connections. The older program, no longer in production, utilizes a normally open emergency stop switch connection. The newer program utilizes a normally closed emergency stop switch connection.

Default Setting: Closed

PROGRAMMING THE LCD DISPLAY

Built-In Test Programs

A program is available to test the major input functions, the synchronizer, and the encoder for correct operation. To access the test program:

Press the **Right Arrow**  and the **SBT**  push-button switches at the same time.

When the message **SYSTEM TEST** is displayed, the following may be tested:

- Needle position
- Start switch
- Home and Sew sensors

With the machine in the home position, the display message must read “1-HOMESENSOR”. This indicates the processor is receiving a signal from the home sensor. If any other message is displayed, there is a malfunction in the home sensor.

Note: Only one function may be displayed at a time, if two signals are being received simultaneously, the signal with the highest priority will be the one displayed. The order of the signal priorities are:

- Home and Sew sensors
- Clamp Down and Start
- Needle Up

Testing the Home and Sew Sensors

Manually rotating the machine through its cycle causes the display to change and indicate which signal is being received.

Example: if the machine starts in the home position, the display message will read “HOME SENSOR”. As the hand wheel is rotated away from home position, the message will change to “NEEDLE UP”. If the machine is not in the Needle Up position, and no other signals are received, the message will read “TEST INPUTS”.

Continue rotating the hand wheel and the message will again read “HOME SENSOR”, as the machine reaches the cut position plateau of the Home sensor block.

Continue rotating the hand wheel until the Sew sensor reaches the first stitch plateau of the Sew sensor block. The message will now read “2-SEW SENSOR”.

PROGRAMMING THE LCD DISPLAY

Testing the Clamp Down and Start Switches

Use the hand wheel to manually rotate the machine until the display message reads either "NEEDLE UP" or "TEST INPUTS".


Lightly press the Start switch until the message reads "4-CLAMP DOWN".


Fully depress the Start switch. The message now reads "5-START".

Testing the Motors

Caution! To avoid damage to the machine, remove the belts before performing this test.

Testing the Table Motor

Press the Round Arrow  push-button switch. The display message will read "ONLY w/ adapter".

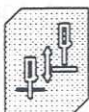
Press the Round Arrow  push-button switch again. The message now reads "TEST TABLE MOTOR".

Lightly press the Start switch to the first position. The motor will begin to rotate with a fixed low current and no speed control.

Release the Start switch. The message now reads 800 pls (pulses). Any number other than 800 indicates a failure in the system, and the machine must not be used until this failure is corrected.

Fully depress the Start switch. The motor will begin to rotate at a controlled speed of 100 rpm.

Testing the Sew Motor

Press the Double Pointed Arrow  push-button switch. The display message will read "TEST SEW MOTOR".


Test the Sew Motor by following the same procedure to test the table motor.

PROGRAMMING THE LCD DISPLAY

Testing the Shears Relay Switching


The shears relay is located in the electrical control box. To test the relay:

Access the test program by pressing the Right Arrow  push-button switch and the **SBT** push-button switch at the same time..

Press the Round Arrow  push-button switch until the display message reads “only w/adapter”.

Press the **SET** push-button switch and the message will read “Relay Test!!!”.




Note: Each time the **SET** push-button switch is pressed, you must hear a clicking of the relay. If no clicking sound is heard, the relay is not working and must be replaced.

Press the Right Arrow  push-button switch, to return to the operating modes.

Master Reset

Caution! Overrides the program memory with default settings.

Switch off the main power.

Press the  ,  and  push-button switches at the same time.

Switch on the main power, while all three buttons are pressed. The display alternates between “PUSH SET” and “FOR RESET”.

Press the **SET** push-button switch within 10 cycles. The display will read ‘PROGRAMMING’.

Note: If the **SET** push-button switch is not pressed within 10 cycles, the program goes to the main menu without executing the MASTER RESET.

ADJUSTMENTS

WARNING! Before making adjustments, switch off the main power or use the emergency stop to prevent accidental engagement of the machine.

Cam Buttons

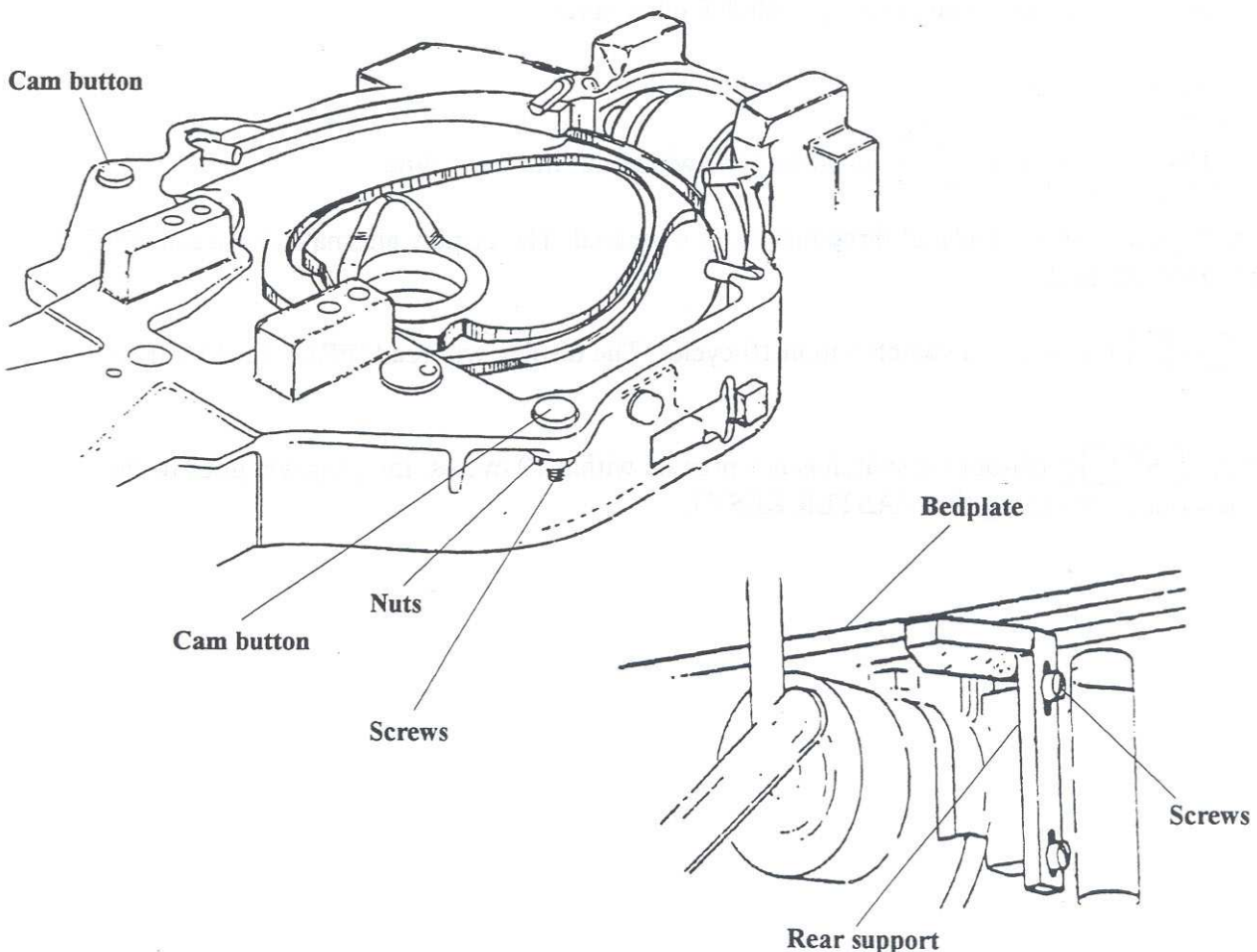
Caution! Before performing this adjustment, make sure clearance exists between the sensors and the sensor blocks to prevent sensor damage.

Adjust the cam buttons until the bedplate can move without binding and with minimum up or down movement, .001" or less. Up and down movement must be equal on both sides.

To adjust: Loosen the nuts and adjust the screws up or down as needed. Up raises the bedplate, down lowers the bedplate. Tighten the nuts.

Position the bedplate all the way forward. The rear support must be square to the bedplate.

To adjust: Loosen the screws and move the rear support up or down, as needed. Tighten the screws.



ADJUSTMENTS

The Two Control Sensors for Cord Trim Machines

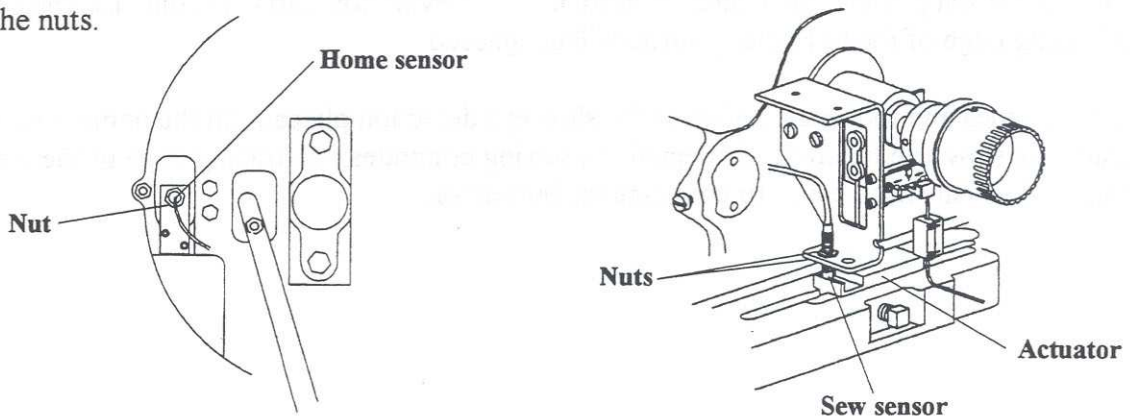
There are two control sensors with LED indicators located on the sewing head: one sensor controls the starting and stopping of the sewing; and the other sensor controls the Home position.

The clearance between the sensors and the actuator must be 0.26 mm, (.010"). To adjust:

Loosen locking nuts on both sensors.

Adjust the sensors up or down, as necessary. Use a feeler gauge to check clearance accuracy.

Tighten the nuts.



The Two Control Sensors for the Adjustable Fly Machines

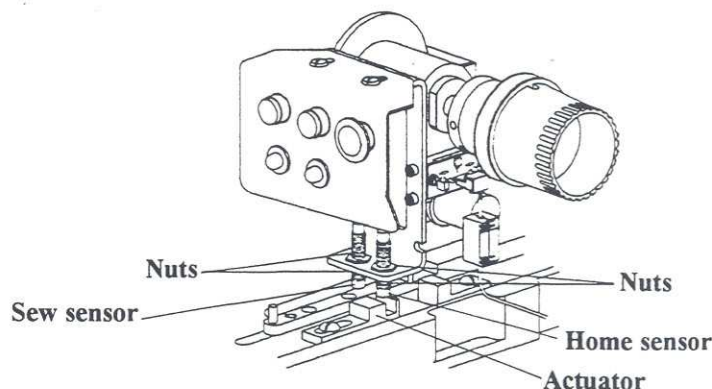
There are two control sensors with LED indicators located on the sewing head: one sensor controls the starting and stopping of the sewing; and the other sensor controls the Home position.

The clearance between the sensors and the actuator must be 0.26 mm, (.010"). To adjust:

Loosen the locking nuts on both sensors.

Adjust the sensors up or down, as necessary. Use a feeler gauge to check clearance accuracy.

Tighten the nuts.



ADJUSTMENTS

Sew Sensor Blocks and Plateaus

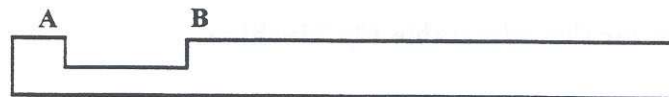
The sew sensor has two plateaus: **A** first stitch and **B** last stitch.

With the table in the home position, press the Start switch to the first stage, and the clamps lower.

Fully depress the Start Switch to the second stage to start the table moving at the table speed selected, toward the leading edge of the sew sensor.

After reaching the leading edge, the table speed will lower to half of its set parameters. At the trailing edge of the first stitch plateau, table motion stops and the sew motor starts. As the machine begins to sew, the leading edge of the last stitch plateau will be ignored.

The cycle continues and the leading edge of the slow eye detection plateau, on the home sensor block, starts the slow eye function, if selected. As sewing continues, the trailing edge of the last stitch plateau starts the final stitch count to complete the buttonhole.



ADJUSTMENTS

Magnetic Disk

The magnetic disk, which controls the position of the needle bar, must be adjusted so when the sewing is complete, the needle bar is at the top of its right-hand stroke.

To adjust:

Loosen the set screw.

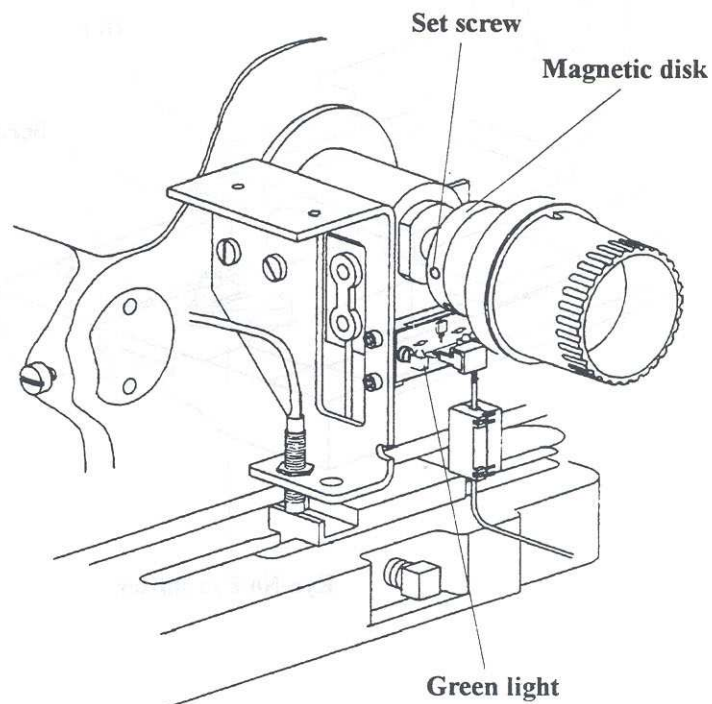
Rotate the magnetic disk counterclockwise until the green light, located on the synchronizer board, and the red light, located on the operator control panel activate.

Note: The pick-up must be set between .25 and .50 mm, (.010 and .020") from the sensor.

Tighten the set screw.

If correct:

The green Led will activate slightly before the needle is top dead center, when rotating the handwheel counterclockwise.



ADJUSTMENTS

Race

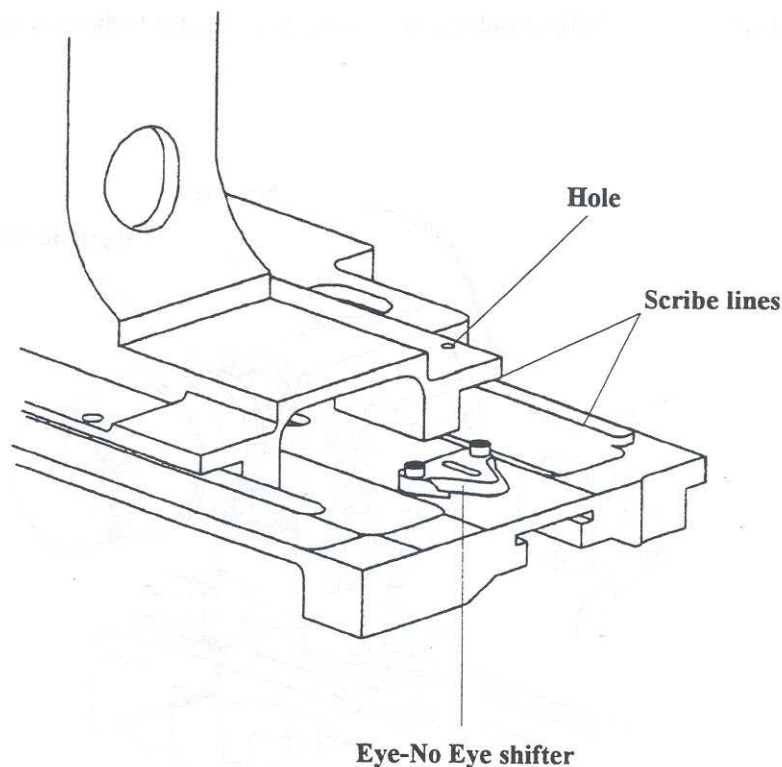
Race to the Side of the Bedplate

Remove the throat plate, loopers and spreaders.

Set the machine in the eye mode using the Eye/No-Eye shifter, located in the rear of the bedplate on the Adjustable Flybar machines only.

Rotate the left-hand crank, stopping once to make sure the holes, located on the head and bedplate, are aligned.

Locate the scribe line on the rear of the bedplate. Using a straight edge, mark a matching scribe line onto the sewing head. Slowly continue to rotate the left-hand crank until the machine has started into the eye part of the cycle. Stop rotating the left-hand crank once the scribe lines are aligned.



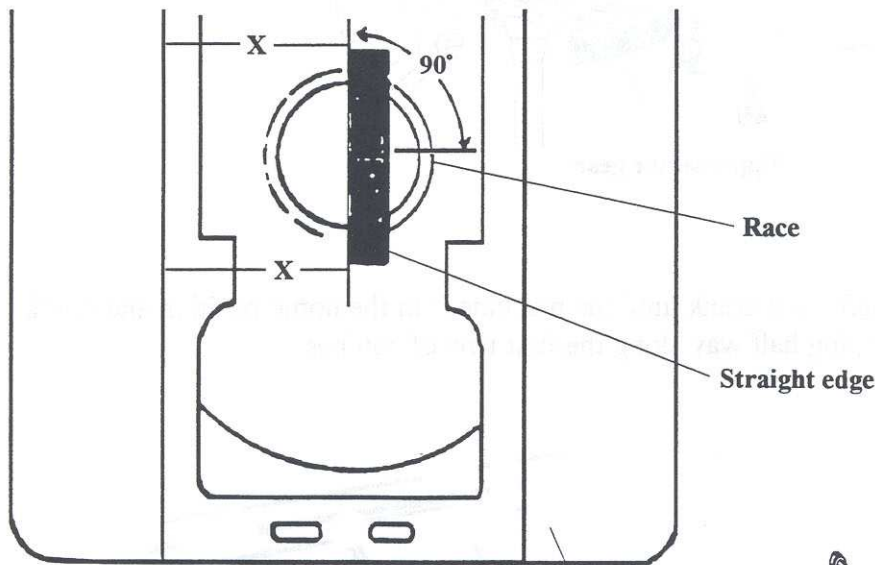
ADJUSTMENTS

Race to the Side of the Bedplate

The race will travel 90° to the bedplate, as illustrated. If the race does not travel 90°, perform the previous steps again.

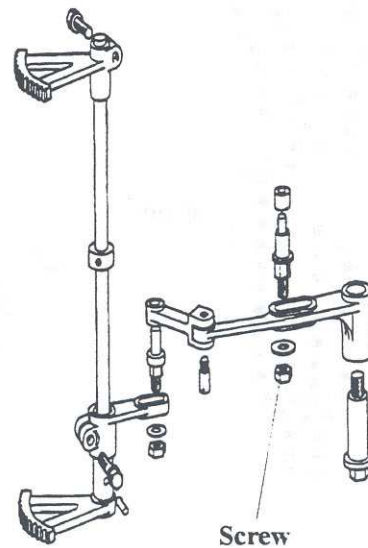
Place a straight edge across the front of the race and check the distance on both sides of the race to the side of the bedplate.

Lift the machine. Loosen the allen set screw and adjust it up or down as needed, up moves the race to the left, down moves the race to the right. Tighten the screw.



X = distance from edge of bedplate to edge of the straight edge on both ends must be equal.

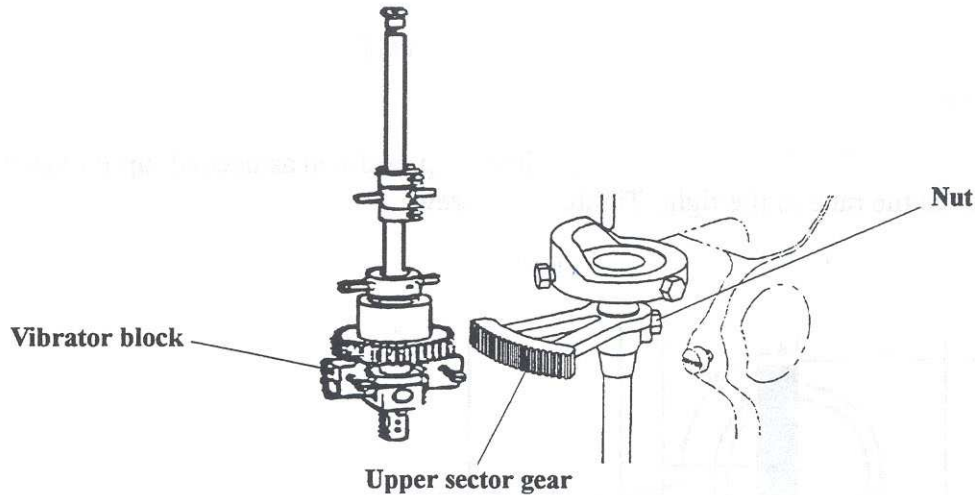
Bedplate



ADJUSTMENTS

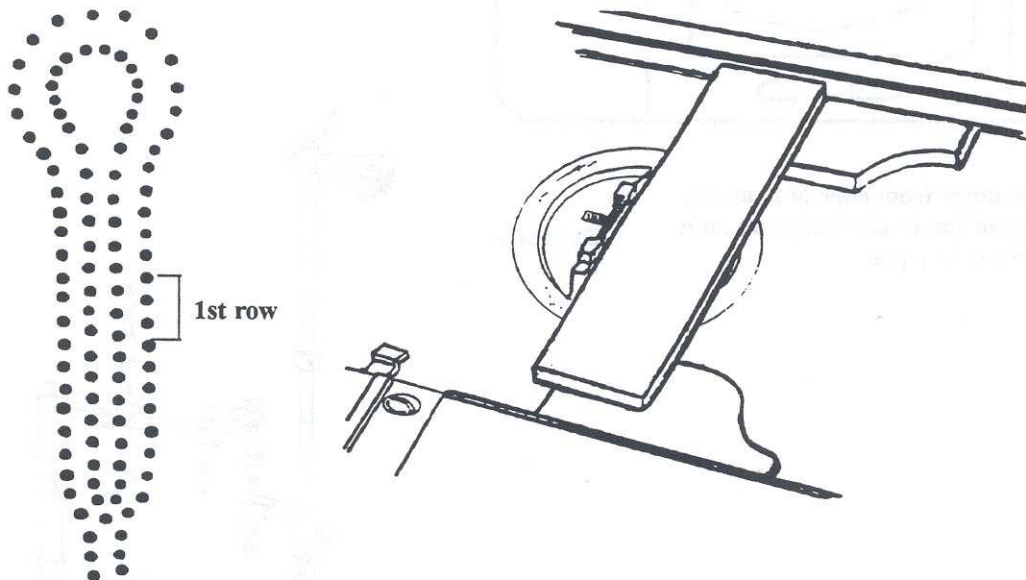
Race to the Needle Bar Gears

With the race set 90°, the upper vibrator block must be visually square to the race. To adjust: Loosen the nuts and rotate the upper sector gear to square it off. Tighten the nuts.



Race 180° Travel

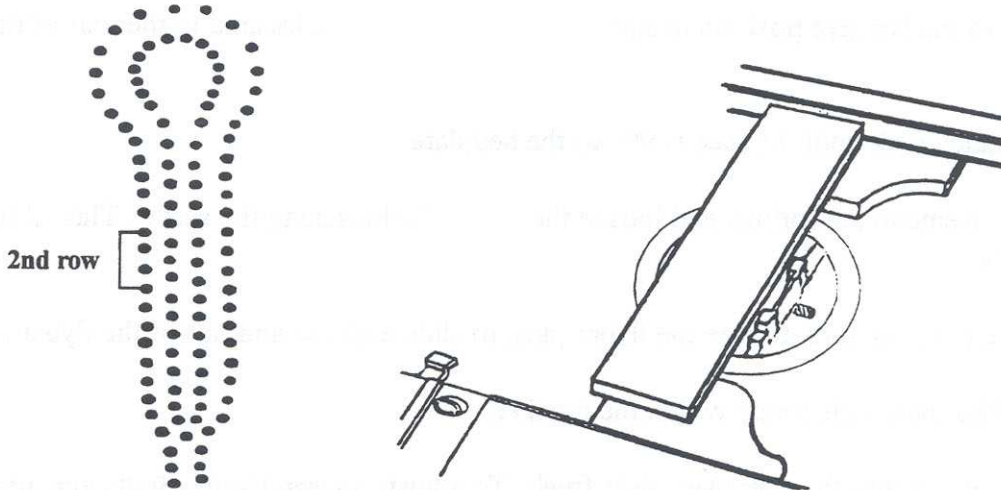
Lower the machine. Rotate the left-hand crank until the machine is in the home position and continue rotating the left-hand crank, stopping half way along the first row of stitches.



ADJUSTMENTS

Race 180° Travel

Continue rotating the left-hand crank through the eye of the buttonhole, stopping at the second row of stitches.



Place a straight edge across the front of the race. Observe the race in relation to the straight edge, note the distance, if any, between the two.

Note: If **no** distance exists between the race and straight edge on either position, the travel is correct. If there **is** a space between the race and the straight edge, perform the previous steps.

Lift the machine. Loosen the nut and adjust the nut up or down, up moves the race clockwise, down moves the race counterclockwise, equaling half the distance between the straight edge and the race. Tighten the nut.

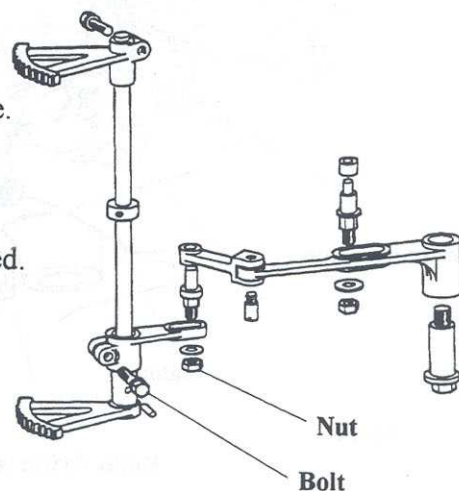
Repeat the previous steps.

Lift the machine. Loosen the nut and rotate the race either right or left, as needed, to square the race to the straight edge.

Tighten the nut.

Check the 90° and 180° movement of the race, reset if required.

Note: It is not unusual to have to repeat these steps several times.



ADJUSTMENTS

Adjustable Flybar Pins - Set in No-Eye (Adjustable Flybar Machines only)

Note: Flybar brackets have been adjusted and pinned in the factory. If pins are working freely, no adjustment is necessary. If they are not working freely:

Set the machine to the No-Eye position using the Eye/No-Eye shifter, located in the rear of the bedplate.

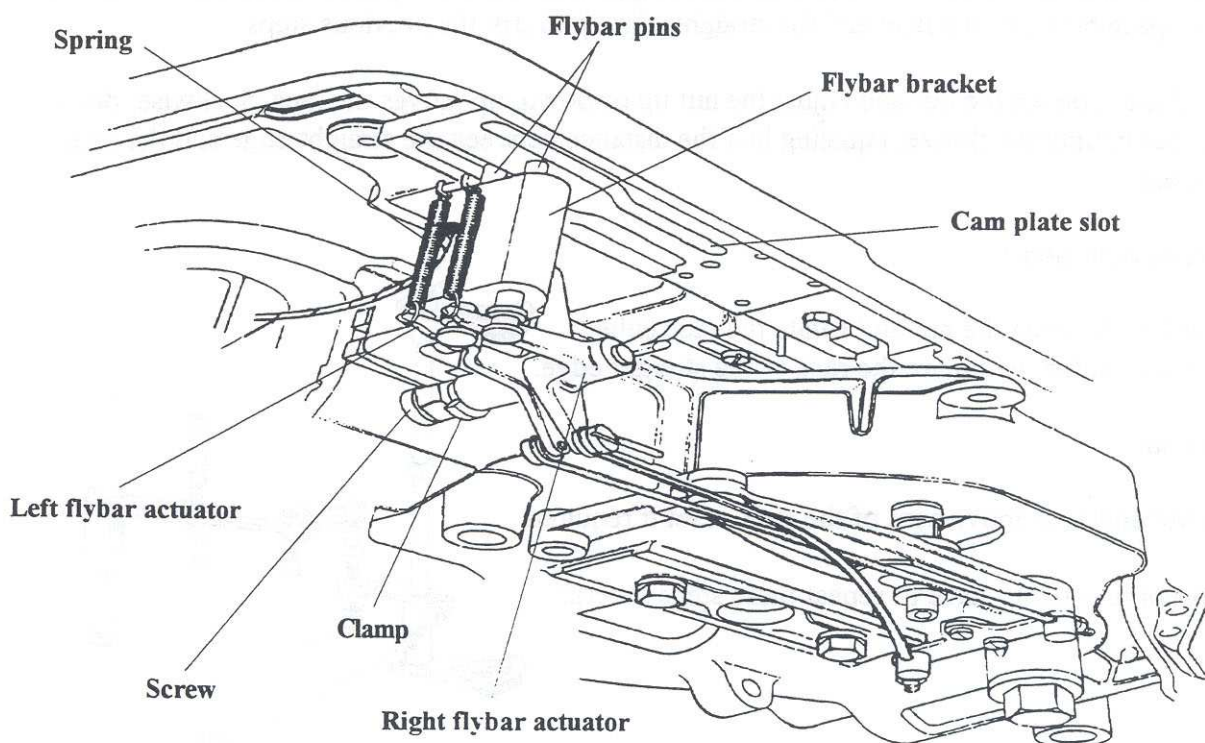
Rotate the left-hand crank until the race is 90° to the bedplate.

Lift the machine. Remove the springs and loosen the clamp, by loosening the screw. This allows the clamp to fall back.

Disengage the flybar actuators, to free the flybar pins, to slide easily in and out of the flybar bracket.

Caution! The Pins must slide freely within the bracket.

Make sure both pins fit into the cam plate slots freely. To adjust: loosen the hex bolts and attach the flybar bracket to the cam case. Remove the tapered pin located through the cam case and the flybar bracket.



ADJUSTMENTS

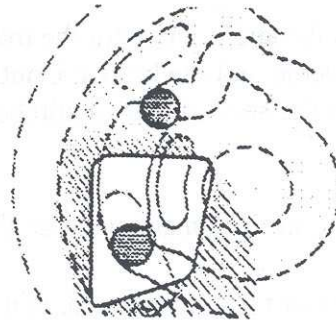
Adjustable Flybar Pins - Set in No-Eye (Adjustable Flybar Machines only)

Move the spacer wedges closer together or further apart, as needed, until the flybar pins line up in the cam plate slots. Closer moves the flybar bracket to the right, further moves the bracket to the left.

Tighten the hex bolts. Check the fit of the flybar pins in the cam plate slots. If the pins do not fit or are not working freely, repeat the previous steps. If they do fit and work freely: attach both flybar actuators and the clamp, tighten the screw, and attach the springs.

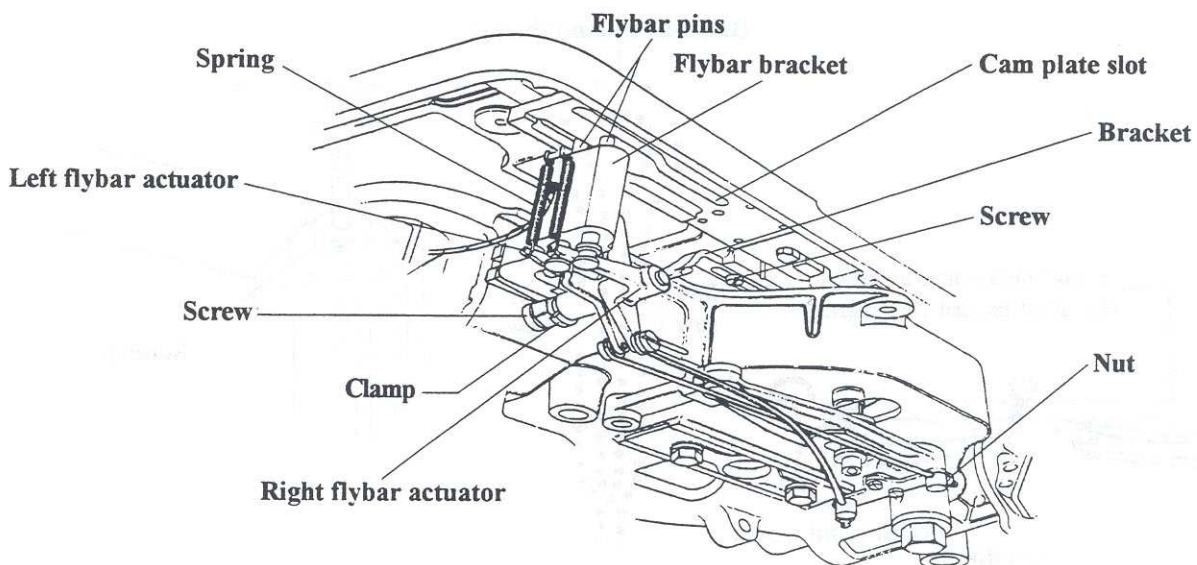
The flybar pins must enter the cam plate slots at a depth of 2.4 to 3.2 mm, (3/32 to 1/8"). To adjust: loosen the nuts and adjust in or out, as needed. In decreases the depth the pin travels into the cam plate slot, out increases the depth.

Rotate the left-hand crank until the roll on the lateral lever is captured in the peak of the main cam. The flybar pin must have withdrawn from the cam plate slot, as illustrated.



To adjust: loosen the screw and adjust the bracket up or down, as needed. Up causes the pin to exit sooner, down causes the pin to exit later. Tighten the screw.

Cycle the machine to make certain the left-hand flybar pin exits correctly. If it does not exit correctly, repeat the previous step.



ADJUSTMENTS

Looper and Needle Alignment

WARNING! Switch off the main machine power.

Rotate the left-hand crank until the machine is in the home position. Insert a needle and install the left-hand looper.

Rotate the right-hand stop wheel until the needle aligns with the tip of the left hand looper.

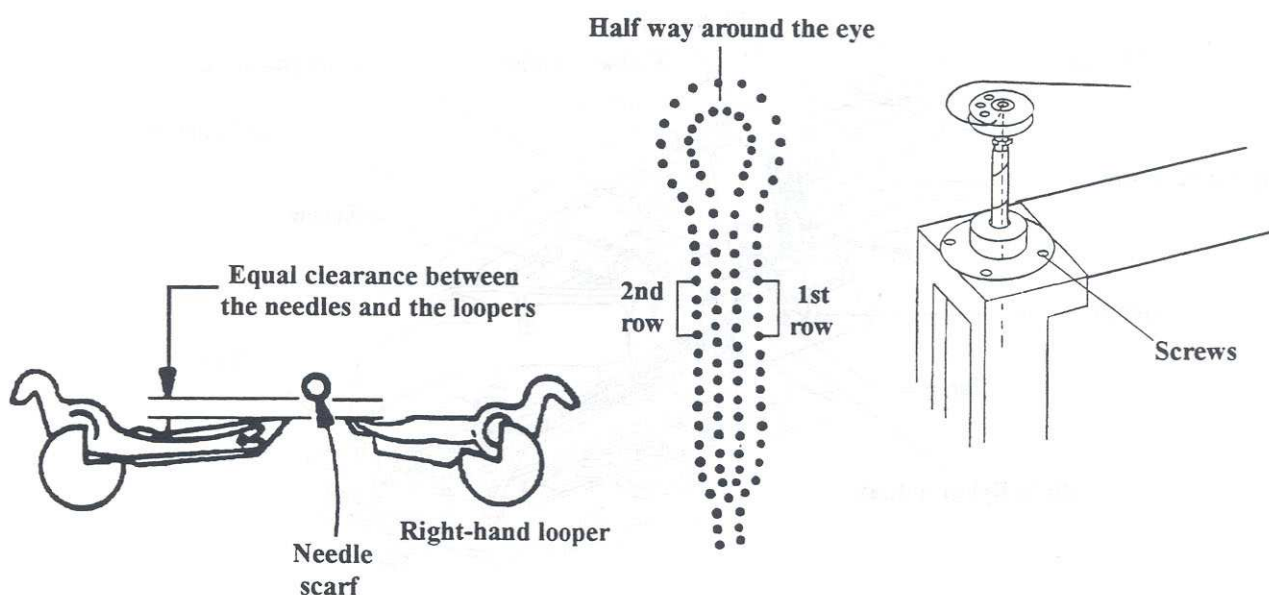
Rotate the left-hand crank until the machine cycles approximately half way through the first row of stitches. Observe the distance between the needle and the looper. (A magnifying glass may be necessary; the distance is difficult to see).

Continue rotating the left-hand crank until the machine cycles half way around the eye. Observe the distance between the needle and the looper. Continue rotating the left-hand crank until the machine cycles half way through the second row of stitches. Observe the distance between the needle and the looper.

Note: An equal distance must be maintained at all three stopping points.

If an equal distance has not been maintained, adjust by loosening the screws, located on needle bar cap, and tighten slightly. Lightly tap the top of the needle bar to align the needle with the looper, this must be done at each of the three machine stopping positions. In the starting position, the machine is half way through the first row of stitches.

Once the needle and looper are aligned in all three stopping positions, tighten the screws and check the alignment. Repeat the previous steps, if needed.



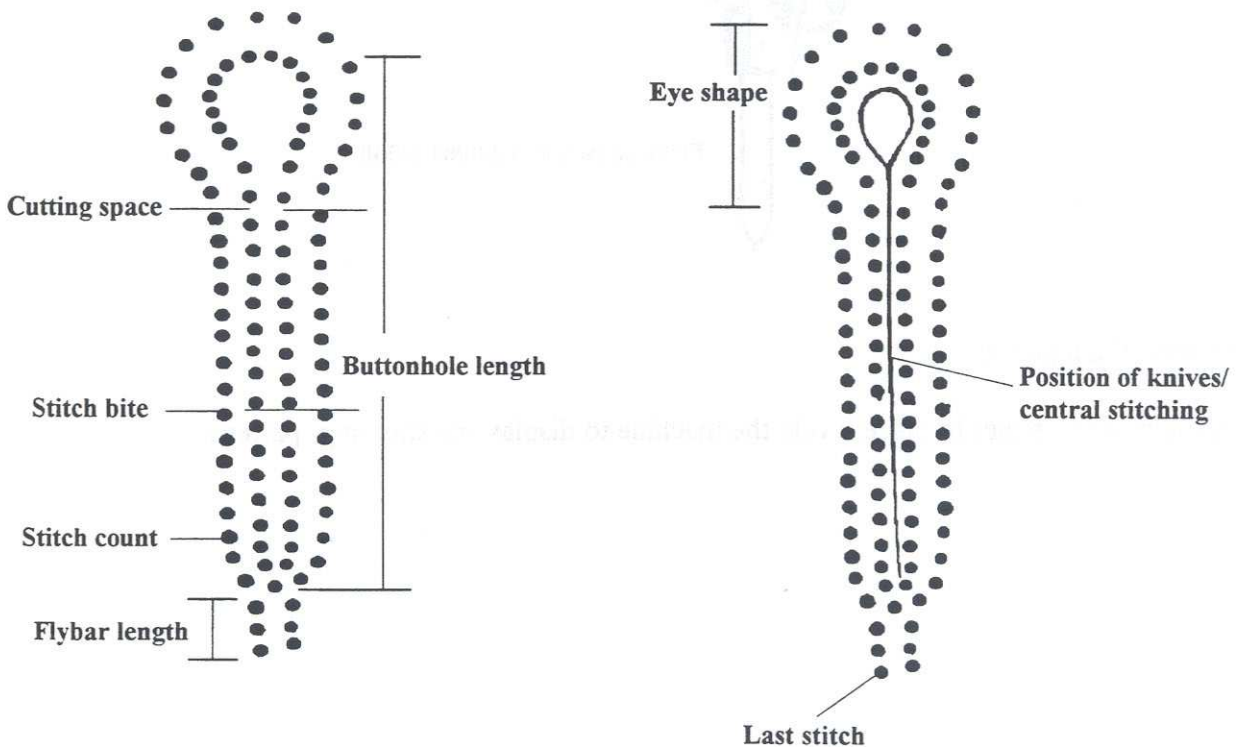
ADJUSTMENTS

Prick-In

Prick-in, is a method of viewing the outline of a buttonhole by creating a stitch pattern on a piece of paper, before actually sewing on the garment. The result of the prick-in is used as a benchmark for all adjustments.

When doing a prick-in, look for:

- Eye shape
- Cutting space
- Stitch bite
- Buttonhole length
- Flybar length
- Last stitch
- Stitch count
- Position of knives/central stitching



ADJUSTMENTS

Prick-In

Install the throat plate.

Insert the prick-in needle 02.0001.0.000 into the needle bar.

The depth of the needle into the needle bar must allow the point of the needle to just barely penetrate a piece of paper.

Place a piece of paper across the clamp area of the bedplate to check needle penetration pattern.



Prick-in Needle 02.0001.0.000

Switch on the main power.

Holding the piece of paper in place, cycle the machine to display the stitching pattern.

ADJUSTMENTS

Eye Shape

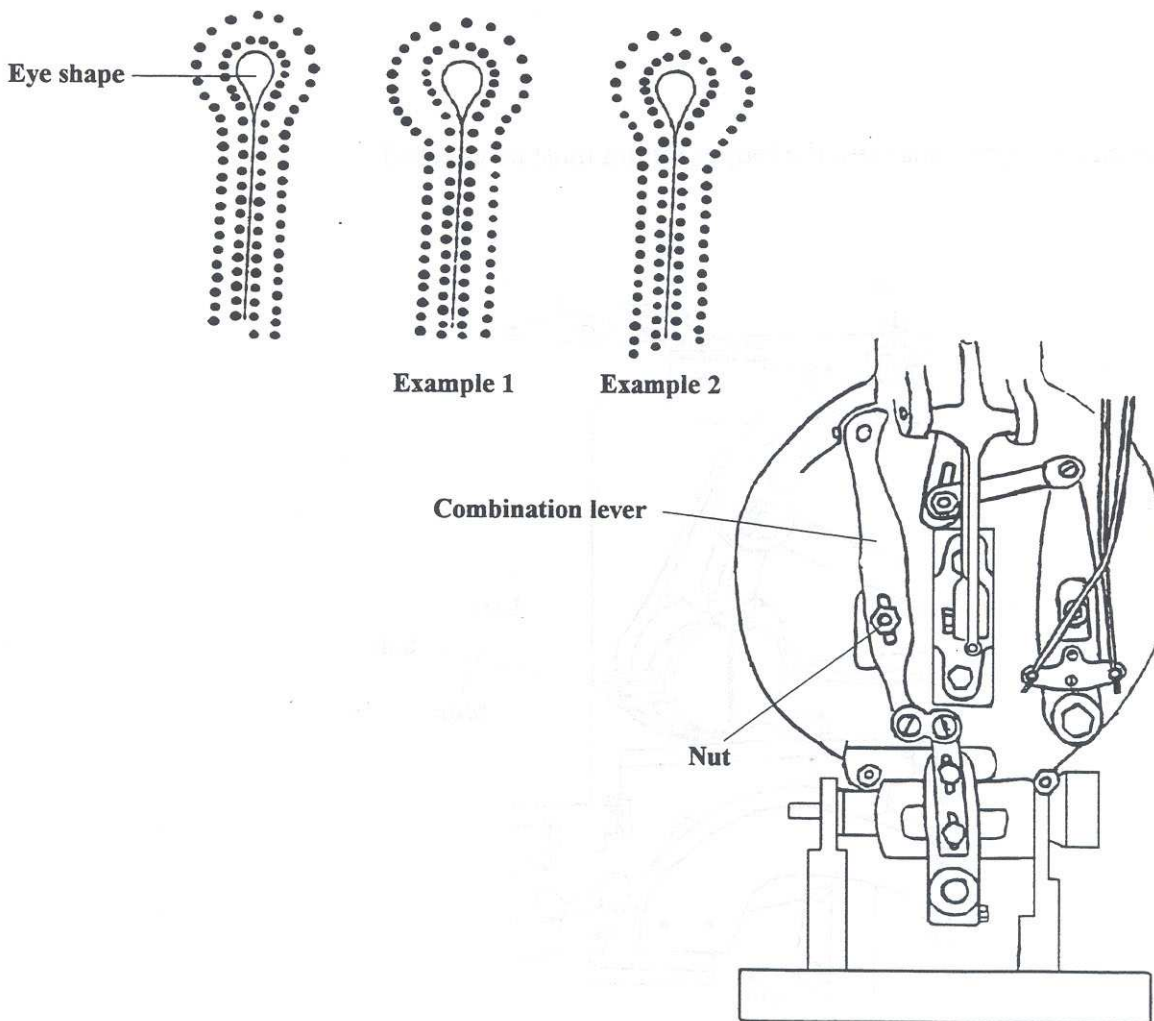
Note: After adjustments, check the race, if misaligned, set correctly.

Examine the newly created stitch pattern and determine which direction the nut must be adjusted to obtain the correct eye shape. Use the examples below as a guide.

To adjust the eye shape, loosen the nut, located on the combination lever. Adjust the nut up or down, as needed. If the eye shape looks like example 1, adjust the nut down. If the eye shape looks like example 2, adjust the nut up.

Tighten the nut. Cycle the machine to make sure the correct stitch pattern has been obtained. If the correct stitch pattern has not been obtained, repeat the above steps.

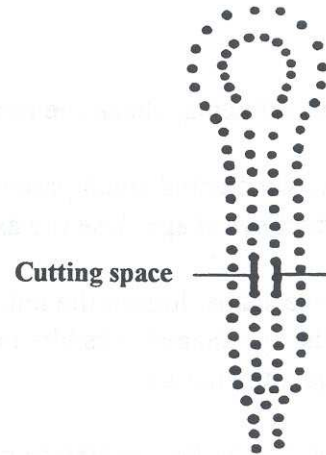
Note: It is normal to need to repeat the above steps several times.



ADJUSTMENTS

Cutting Space

The cutting space is the distance between the two rows of stitches, it varies with different types of materials. The cutting space determines the boundaries for the knife when cutting the buttonhole. The correct cutting space sets these boundaries without damage to the stitches.

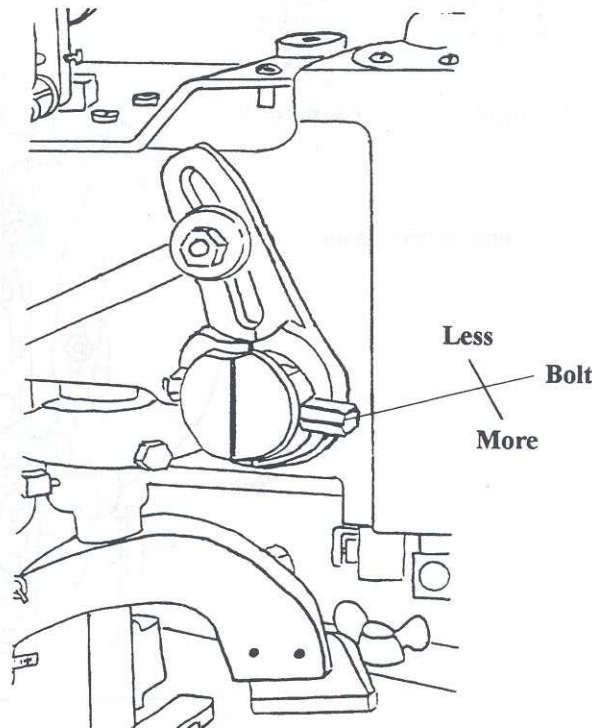


To adjust:

Loosen the bolt. Adjust the bolt down for more cutting space, or adjust the bolt up for less cutting space.

Tighten the bolt.

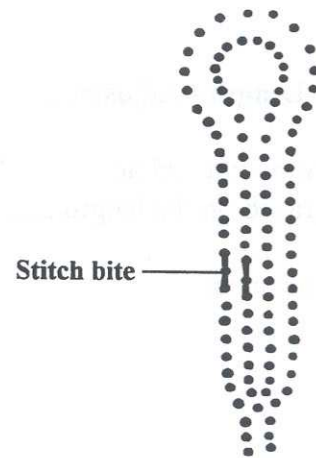
Note: When the cutting space changes, the looper timing must be checked.



ADJUSTMENTS

Changing the Stitch Bite Width

The stitch bite, or width of the stitch, varies with different types of fabric.



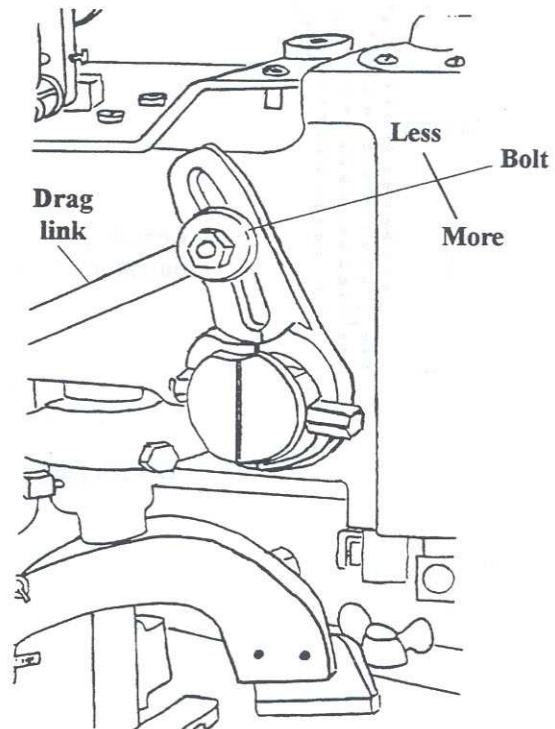
To adjust:

Loosen the nut and adjust the drag link up or down, as needed. Up decreases the stitch bite, down increases the stitch bite.

Tighten the nut.

Note: When performing this adjustment, check the position of the needle in relation to the gimp hole on the throat plate. The point of the needle must be slightly to the right of the gimp hole. This ensures the needle does not pass through the gimp during sewing.

Caution! When the stitch bite changes, the looper timing must be checked.

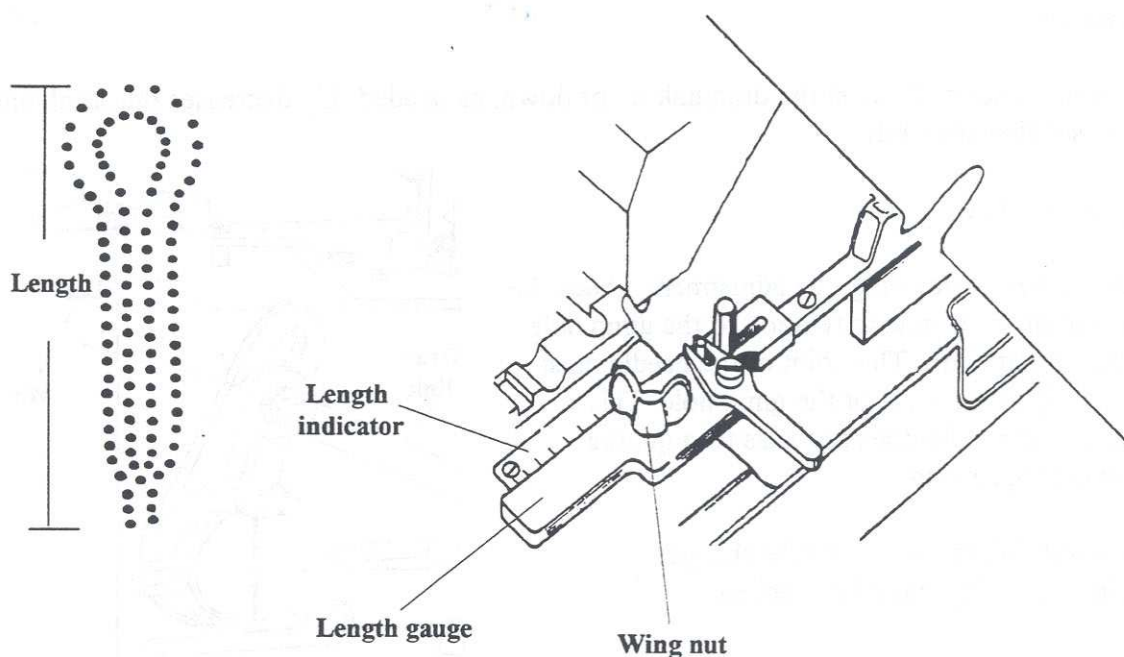


ADJUSTMENTS

Buttonhole Length - Adjustable Flybar Models Only

Loosen the wing nut and adjust the length gauge to align with the correct length of the buttonhole desired, engraved on the length indicator.

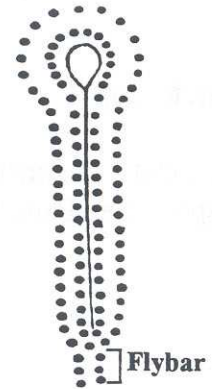
Tighten the wing nut.



ADJUSTMENTS

Flybar

The flybar exists, where the second row of buttonhole stitches cross over the first row of stitches.



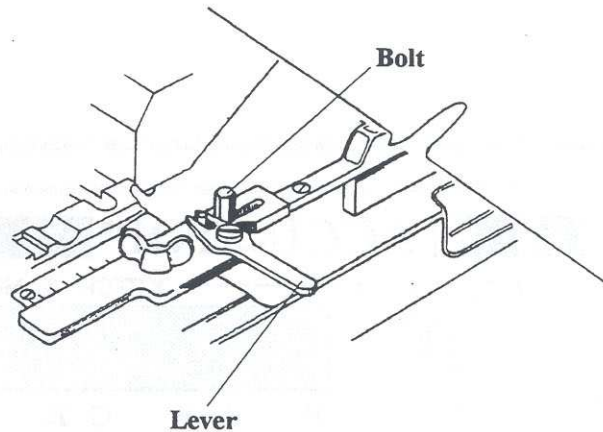
The flybar length varies according to the buttonhole length. The shorter the buttonhole, the longer the flybar length range will vary, the longer the buttonhole length, the shorter the variable flybar length varies.

Caution: If the flybar length does not correctly correspond with the buttonhole length, the needle will contact the shears.

To adjust for Adjustable Fly machines:

Loosen the bolt, and adjust the lever forward or backward, as necessary. Adjust the lever forward for a shorter flybar, adjust the lever backward for a longer flybar.

Tighten the bolt.

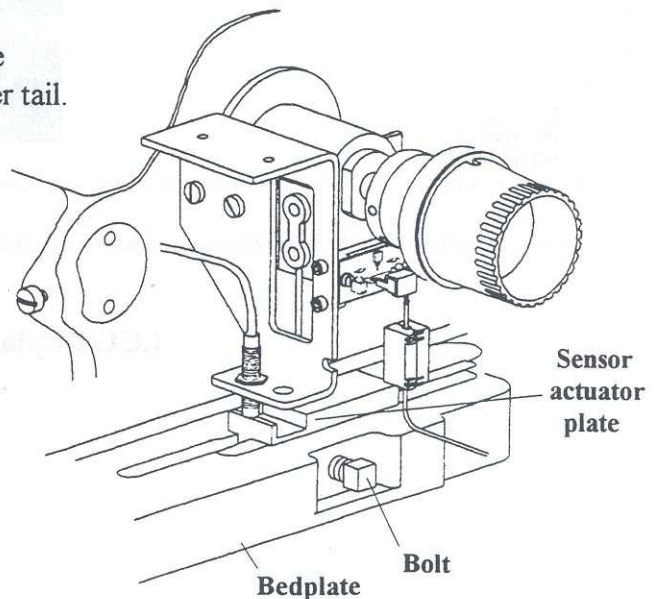


To adjust the Cord Trim machines:

Loosen the bolt and manually adjust the sensor actuator plate forward, for a longer tail. Adjust the sensor actuator plate towards the rear, for a shorter tail.

Tighten the bolt.

Note: The end stitch must be one stitch longer than the end count parameter on the Adjustable Fly and Cord Trim machines.

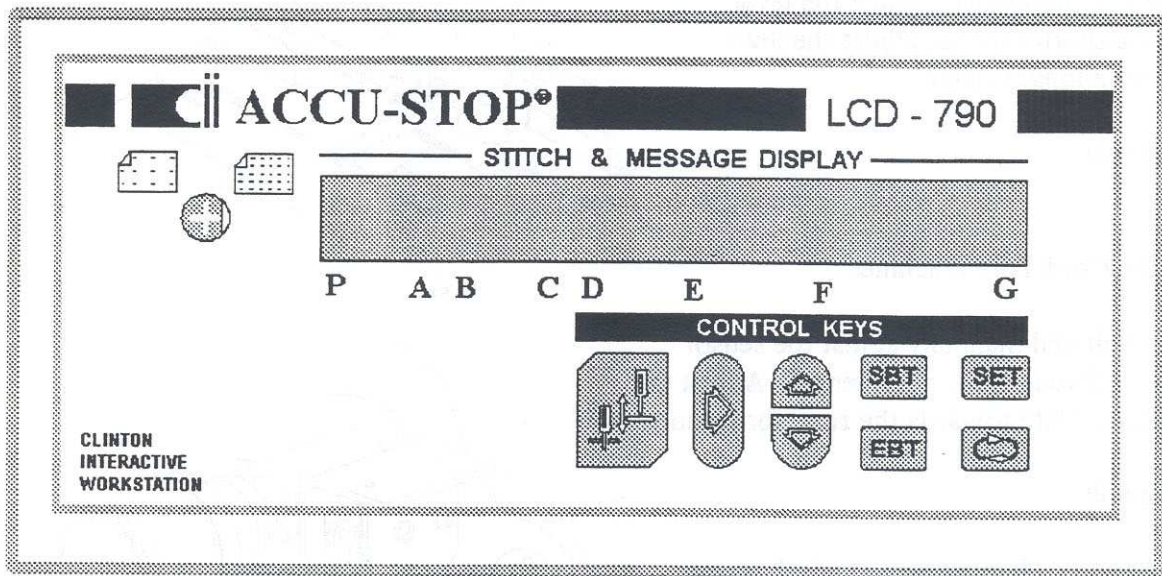
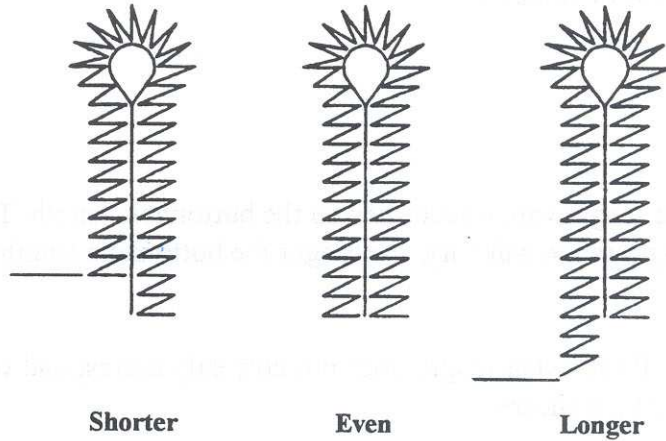


ADJUSTMENTS

Last Stitch Stop

The end count adjustment is made using the LCD display. See Page 1-30.

Stitch examples



LCD Display

ADJUSTMENTS

Stitch Count

Loosen the nut and adjust the slide link forward or backward, as necessary. Forward increases the number of stitches, backward decreases the number of stitches.

Tighten the nut.

To increase or decrease the number of stitches in the eye part of the buttonhole:

No Eye Buttonholes (Adjustable Flybar Only)

Change the selector lever, located in the rear of the bedplate, to the 'No Eye' position, by adjusting the lever forward.

Loosen the screw and position the wedge forward or backward, as needed. Forward increases the number of stitches, backward decreases the number of stitches. This adjustment controls the descent of the roller on the beveled portion of the wedge, while the race is rotating, and the buttonhole is being sewn.

Tighten the screw.

Eye Buttonholes (Adjustable Flybar Only)

Change the selector lever, located in the rear of the bedplate, to the 'Eye' position, by moving the lever backward. The desired number of stitches in the eye are obtained by the position of the stop screw.

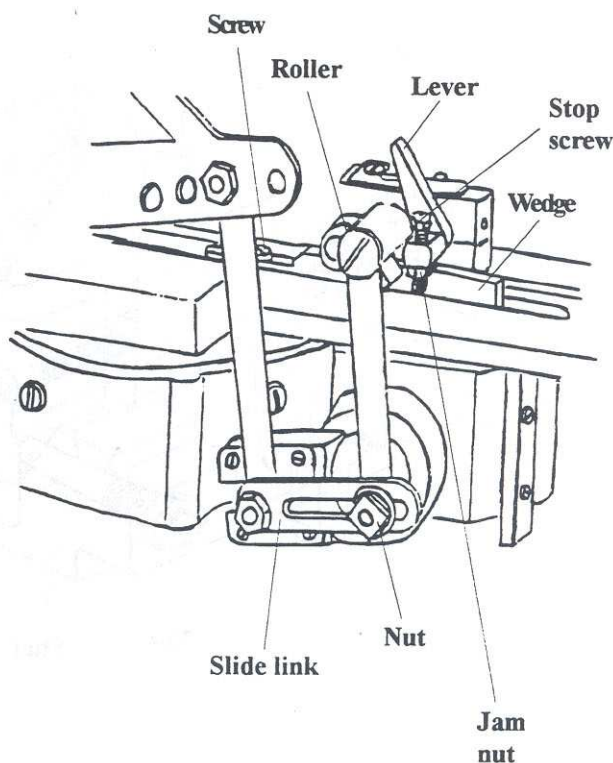
To adjust:

Loosen the jam nut and move the stop screw in or out, as necessary. In increases the number of stitches, out decreases the number of stitches.

This controls the descent of the roller on the beveled portion of the wedge.

Tighten the jam nut.

The wedge placement also determines the amount of stitches in the eye.



ADJUSTMENTS

Cutting Steel and Knife

The Knife and Cutting Lever

Make sure the cutting steel is inserted correctly into the cutting lever. To insert: loosen the screw and insert the new steel.

Note: The new steel must be square with the lever and seated all the way back to the location pin.

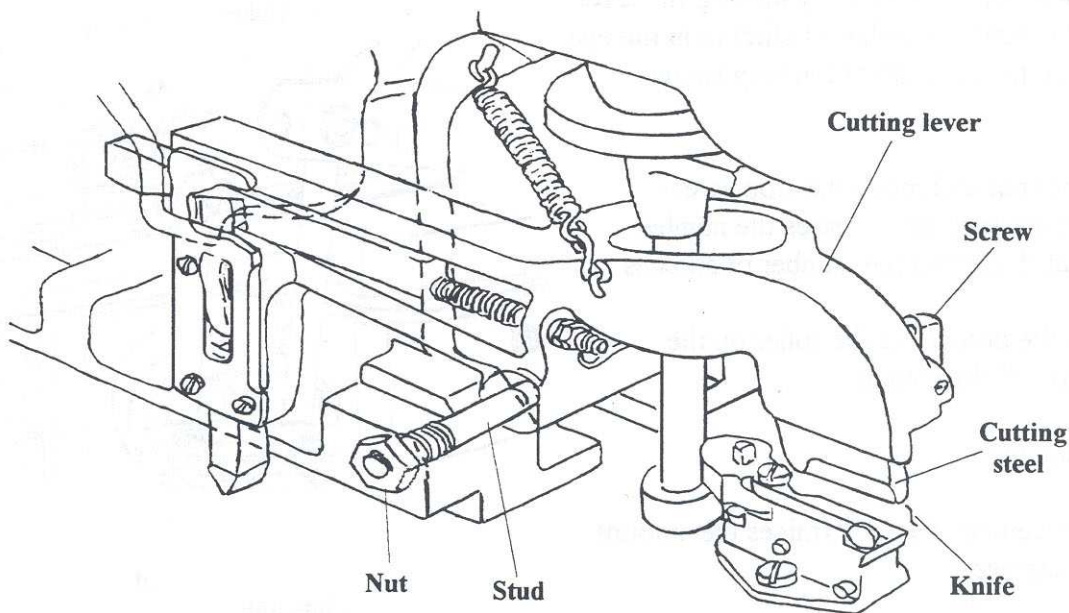
Once the new steel is in place, tighten the screw. Manually lower the cutting lever to ensure the knife and cutting steel are in alignment.

Caution! When replacing the cutting steel, release the cutting pressure described on page 1-60, then fit the cutting steel to the machine and adjust the pressure as needed.

If the knife is not centered to the cutting steel:

Loosen the nuts, located on both sides of the machine. Using the studs, adjust the cutting lever to the right or left, as needed, to center the steel to the knife. Fasten the studs in place by tightening the nuts.

After the nuts are tight, make sure the cutting lever moves freely up and down, without any side movement.



ADJUSTMENTS

The Knife and Cutting Lever

Perform a prick-in described on pages 1-49 and 1-50. Remove the cutting pressure.

Observe the newly created buttonhole pattern and check if the knife cut is centered to the buttonhole.


The knife holder, with knife inserted, must line up with the center of the prick-in.

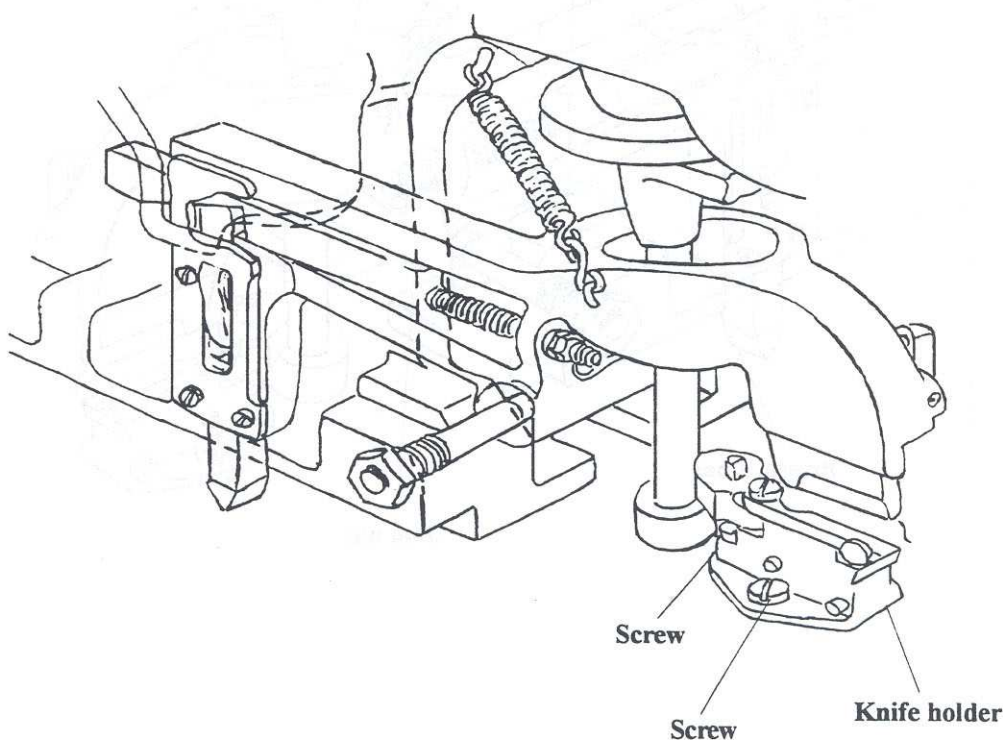
If it does not: loosen the screws, located on both sides of the knife holder, and slide the knife holder left or right, as needed. Tighten the screws.

The cutting lever must be aligned with the knife. To check, manually pull the lever down.

If not in alignment with the knife: repeat the previous steps.

Note: The knife must be aligned in the center of the cutting steel. The cutting lever must be free of binds and have no side play. To visually check the impression made by the knife onto the cutting steel, cycle the machine under power without stitching.

Press the Right Arrow  push-button switch until the display reads “Move Table Only”, press the start lever and the machine will cycle without sewing.



ADJUSTMENTS

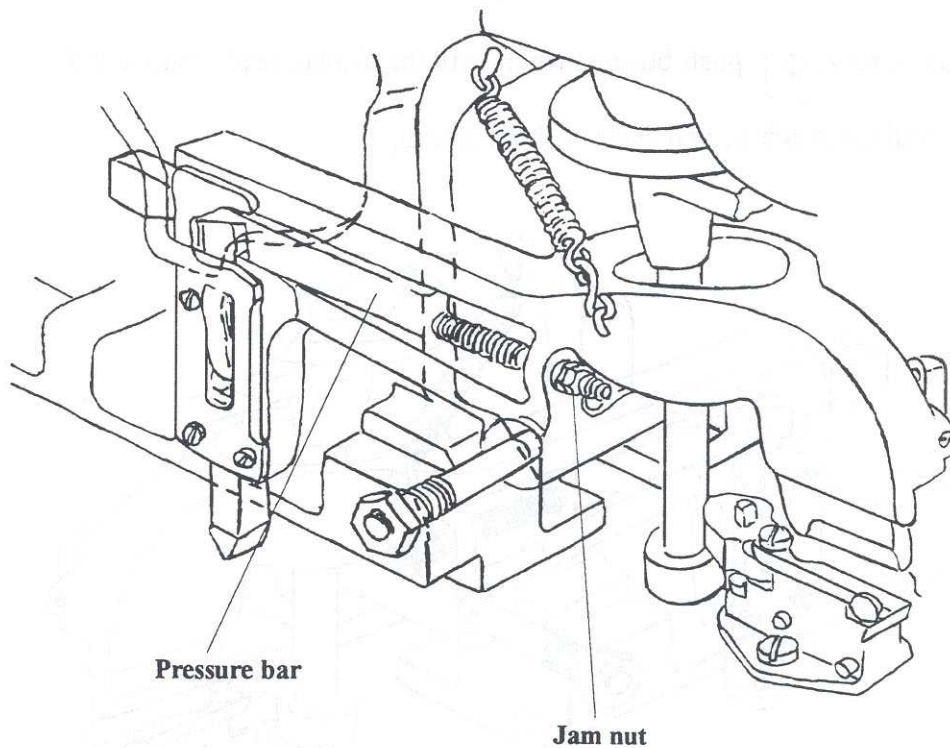
Cutting Pressure

The cutting pressure must be adjusted when the cutting steel is replaced, or the type of material being sewn has changed.

To change the cutting pressure:

Loosen the jam nuts and adjust the nuts in or out, as needed. Clockwise increases the cutting pressure, counterclockwise decreases the cutting pressure. Tighten the nuts.

Caution! Make sure the pressure is minimized. Pressure too high, may cause breakage of the castings, as well as damage to cam followers. If unable to obtain adequate cutting pressure by performing the step above, the cutting cam or cutting cam follower may need to be replaced.



ADJUSTMENTS

Cutting Steel Replacement

Install the new cutting steel into the cutting lever by loosening the screw and sliding in the new steel until seated all the way back to the locating pin. Tighten the screw.

Manually lower the cutting lever to ensure the cutting steel is centered over the knife.

If not centered: loosen the nuts, located on both sides of the machine. Using the studs, move the cutting lever to the right or left, as needed. The cutting lever must be free of binds and have no side play. Fasten the studs in place by tightening the nuts.

Relieve the cutting pressure until only a light pressure is felt, when the cutting steel contacts the knife. To adjust: loosen the jam nuts, adjust the nuts out to decrease the cutting pressure, or in to increase the cutting pressure. Rotate the left-hand crank to cycle the machine. Check for slight pressure between the cutting steel and the knife.

Note: Visually check the impression made by the knife onto the cutting steel. Press the right arrow



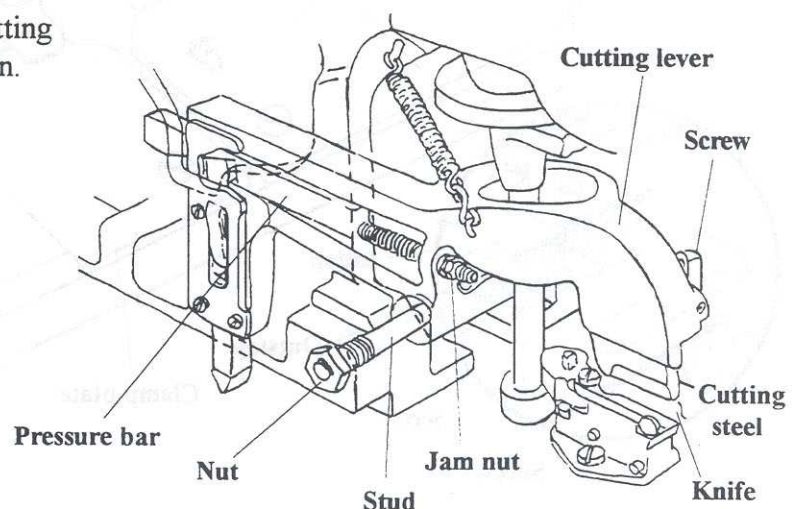
push-button switch until "Move Table Only" is shown on the display. Press the start lever

and the machine will cycle without stitching. Cycle through two or three times.

Remove the cutting steel and inspect the cut impressions on the bottom steel surface made by the knife. If an uneven impression is formed on the cutting steel, due to high spots on the knife, lightly file any high spots on the cutting steel until an even impression is formed, representing the entire length of the knife. The low spot of a cutting steel, because it did not touch the knife, does not leave an impression. The low spot should not be filed. Previous steps will need to be repeated until the desired impression is achieved.

Caution! The fuller and cleaner the impression, the cleaner the cut will be.

Install the cutting steel and adjust the cutting pressure until the cut of the fabric is clean.



Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

ADJUSTMENTS

Clamps

Clamp Plates to Bedplate Alignment

Ensure the machine is in the **Operator/Service** position.

WARNING! Keep control of all machine operating components.

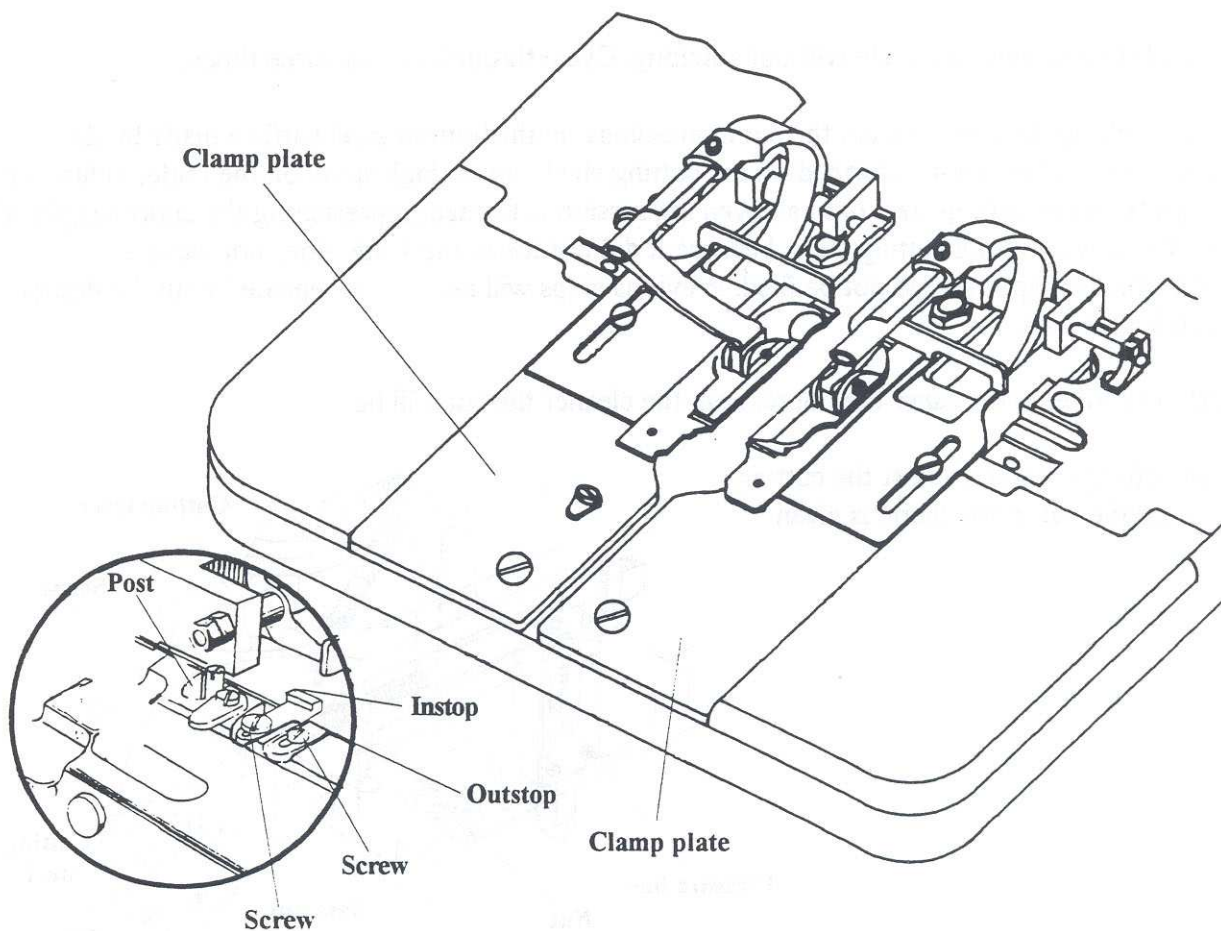
Install the clamp plates, making sure they are parallel to the bedplate on both sides. If they are not, perform the previous steps necessary.

Loosen the screw on the outstop and loosen the screw on the instop.

Manually push the right clamp toward the side of the bedplate.

To adjust: loosen the post and slide the post to the right or left, as needed. Tighten the post.

Repeat steps for the other clamp.



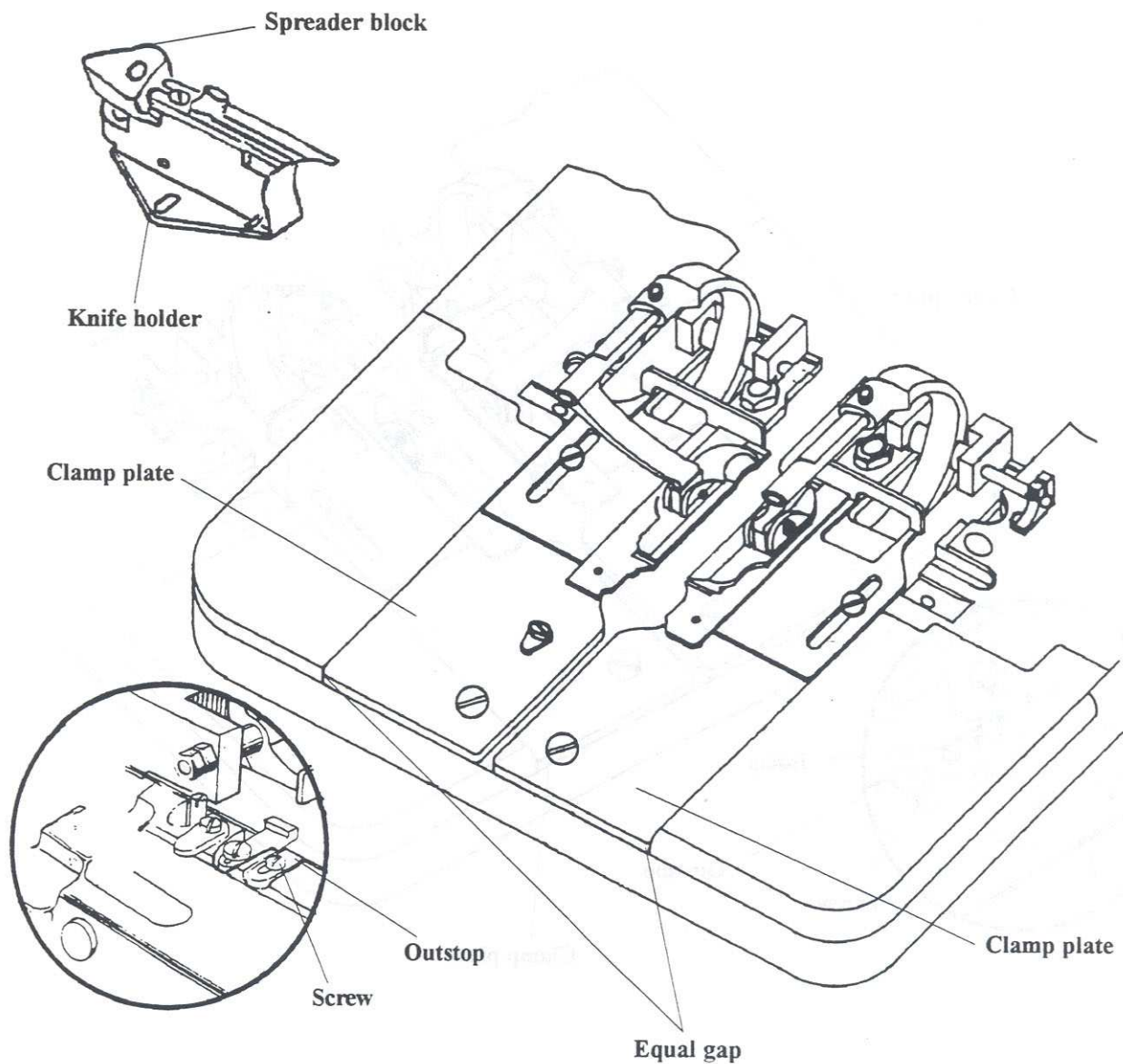
ADJUSTMENTS

Clamp Plate Spread

Rotate the left-hand crank until the rollers on the clamp plates are positioned to the widest part of the spreader block, located on the rear of knife holder. Adjust the clamp plates side-to-side to center the plates with the middle of the bedplate.

Lightly press the outstop against the side face of the clamp plate and tighten the screw.

Repeat steps for the other clamp.



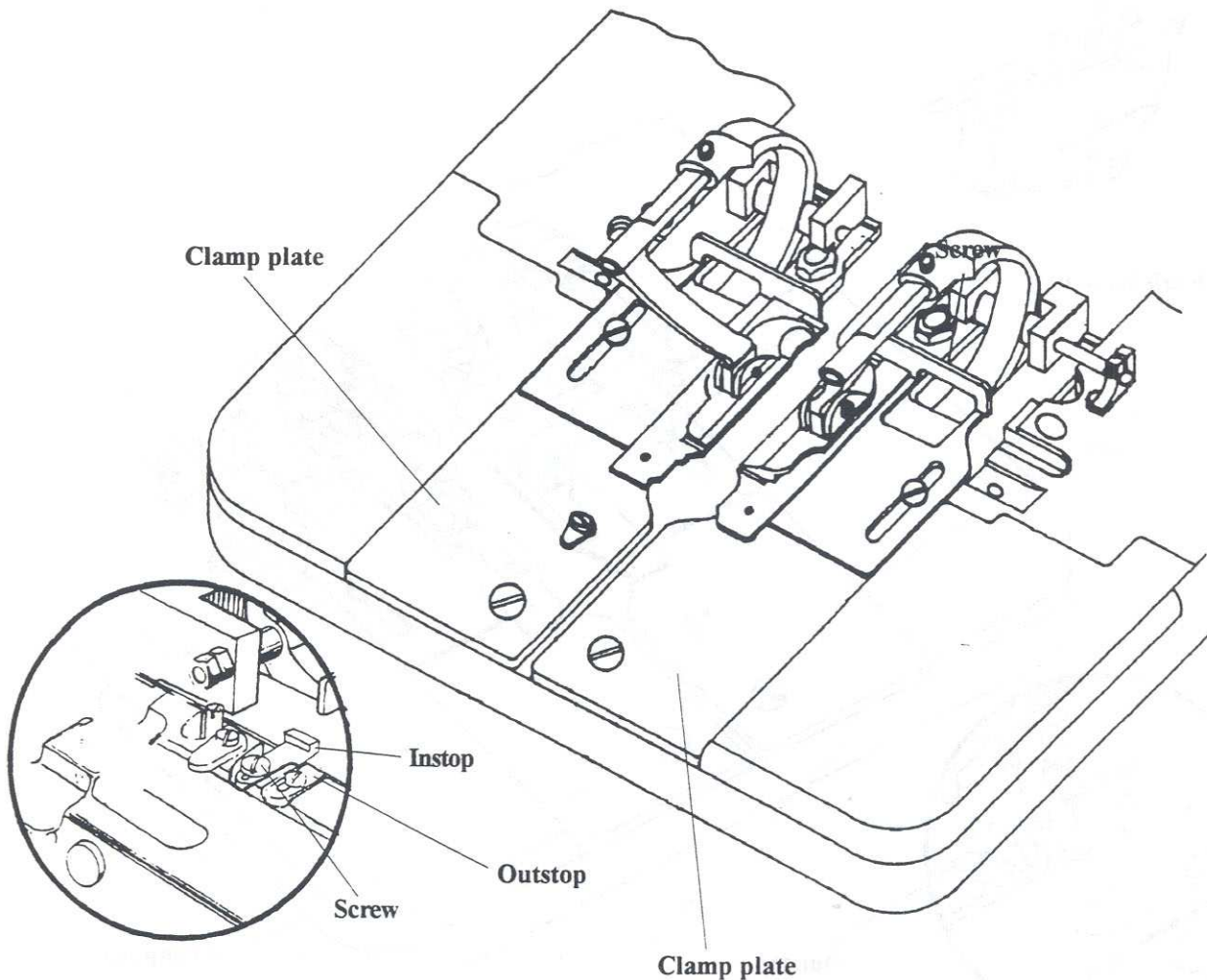
ADJUSTMENTS

Clamp Plate Spread

The distance of the clamp plate spread is determined by the sewing application. Standard clearance between the edge of the clamp plate and the outstop is 0.76 mm, (.030"). To adjust:

Rotate the left-hand crank until the clamp rolls are not resting on the spreader block. Place the 0.76 mm, (.030") feeler gauge between the edge of the clamp plate and the outstop. Slide the clamp plate towards the outstop until it can no longer move. Holding the clamp plate against the feeler gauge, use a screwdriver to slide the instop outward. When the instop is over as far as it will go, tighten the screw and remove the feeler gauge.

Repeat steps necessary to obtain the correct clearance between the other clamp plate and the outstop.



ADJUSTMENTS

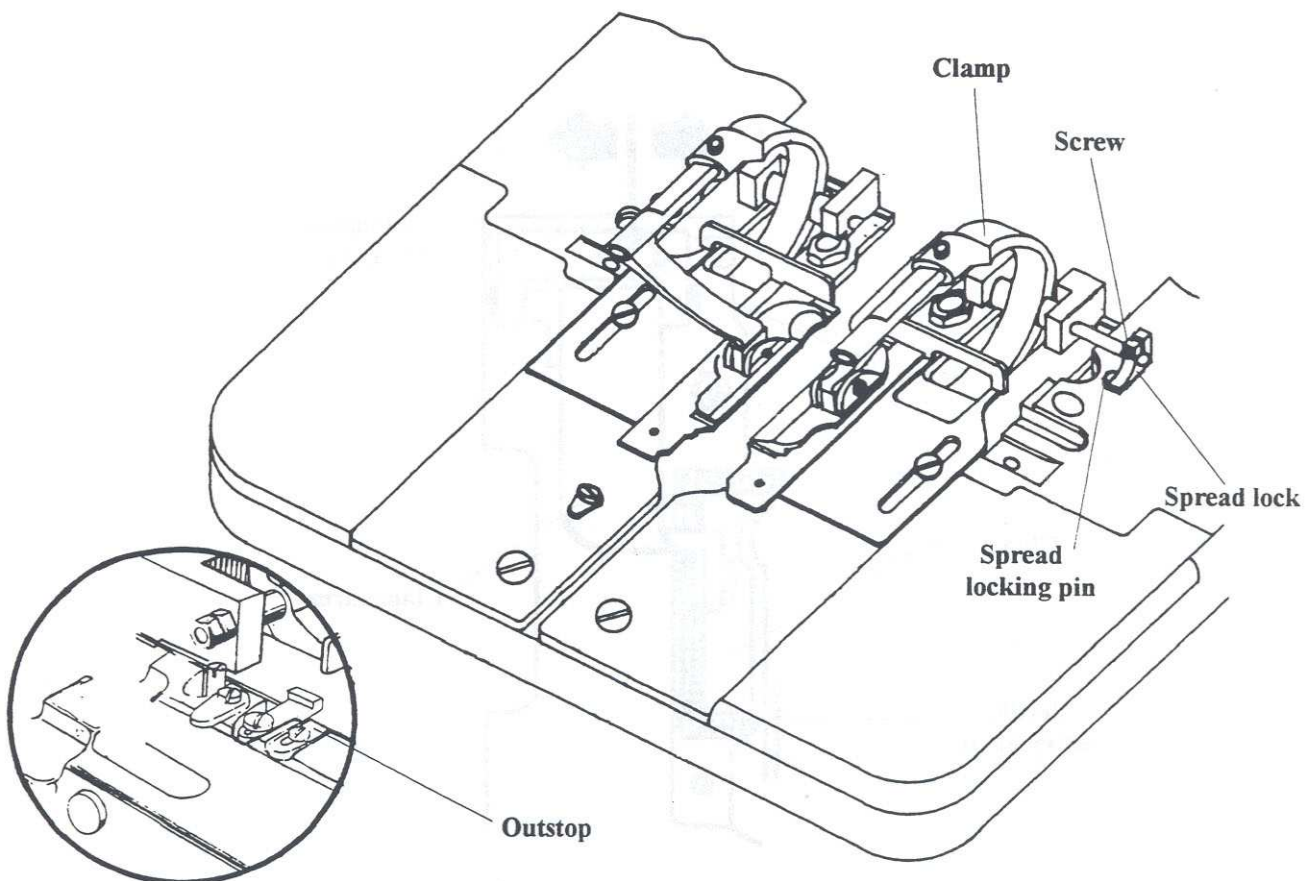
Spread Locks

When the clamps are lowered, the spread locks compress the spread locking pins. As the clamps move outward to their maximum spread, the locks move along with the clamp plates, allowing the pins to release, locking the clamps in position until they are released.

Rotate the left-hand crank until the rollers on the clamp plate are located at the widest part of the spreader block.

Engage the clamps by pressing the black clamp push-button switch, located on the operator control panel. The spread locks must lightly contact the flat side of the locking pin, without restricting the movement of the locking pin.

To adjust: loosen the screw and move the spread locks in or out, as needed. Tighten the screw.



ADJUSTMENTS

Clamp Foot Position and Needle Entry Point

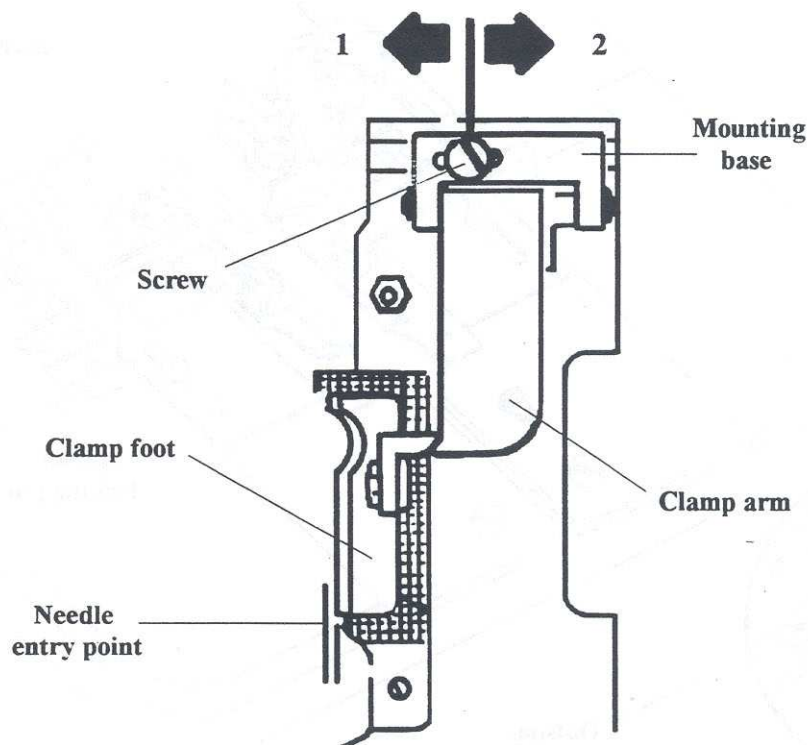
The clamp foot must be adjusted until the needle does not strike the clamp foot on the right-hand stroke of the needle bar. A standard clamp has 0.8 mm, (1/32") clearance or less from the clamp feet.

To adjust:

Loosen the screw in the mounting base of the clamp arm.

Adjust the mounting base of the clamp arm in either direction 1 or 2, direction 1 decreases the distance between the needle and the clamp foot, direction 2 increases the distance.

Fasten the mounting base of the clamp arm in place.



ADJUSTMENTS

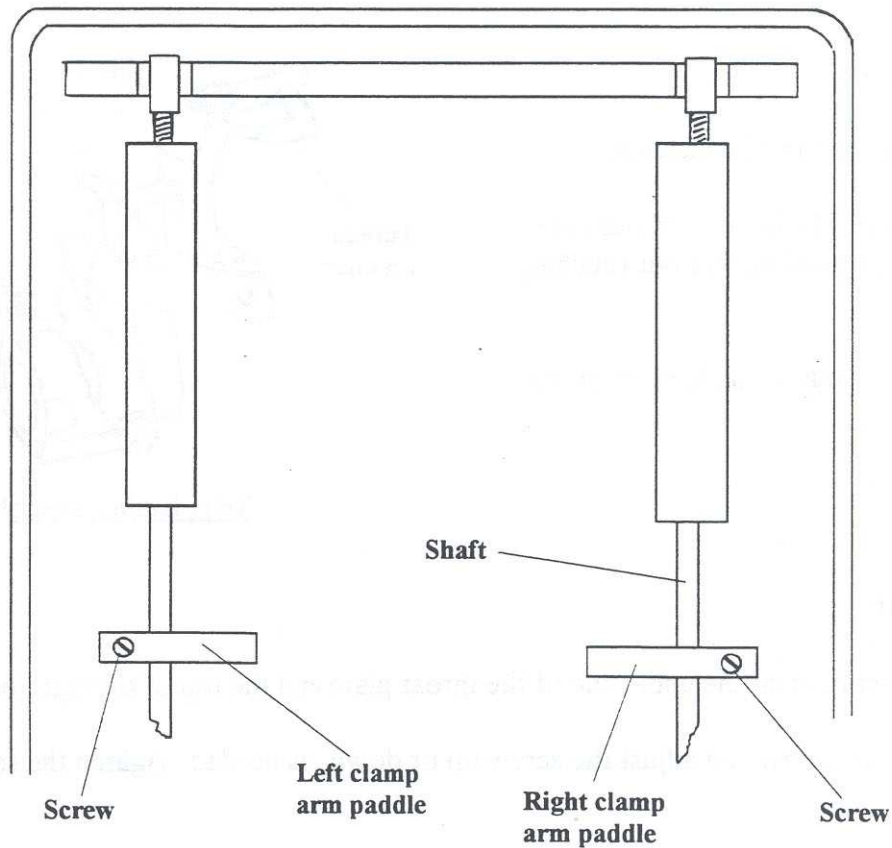
Clamp Height

Caution! If incorrect adjustment, the clamps will bind.

Loosen the screws, adjust the right clamp arm paddle and the left clamp arm paddle up or down on the shaft, as needed. Adjusting the clamp arm paddle up, increases the clamp height, adjusting the clamp down, decreases the clamp height.

Note: The manufacturer setting between the mat and the bottom heel of the clamp foot is 6.5 mm, (1/4").

Tighten the screws.



ADJUSTMENTS

Trim Knife (Cord Trim Models Only)

Relaxed Position

Note: The throat plate must be installed.

When the trim knife assembly is over the right-hand spreader stop and away from the throat plate, it is in the “relaxed” position. To adjust:

Loosen the nut and rotate the screw counterclockwise or clockwise, as needed. Counterclockwise moves the trim knife assembly to the right, clockwise moves the trim knife assembly to the left.

Tighten the nut.

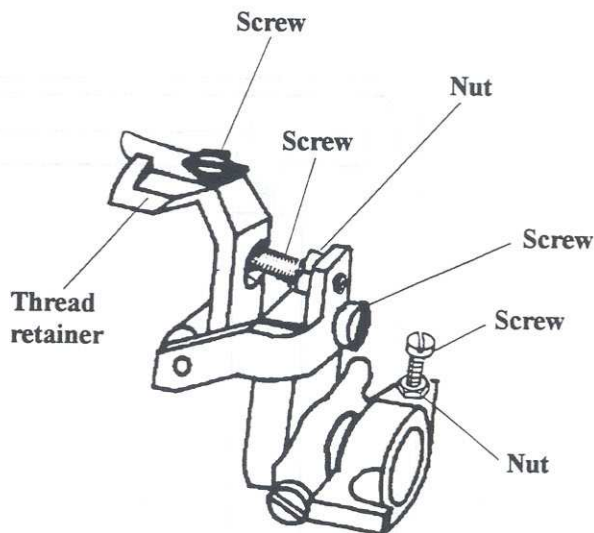
Needle to Trim Knife

Note: The throat plate must be installed.

Lower the needle bar. The knife must pass by the needle as close as possible without touching. To adjust:

Loosen the screw and adjust the knife in or out, as needed.

Tighten the screw.



Trim Knife Assembly

Trim Knife Height

The knife must be set to clear the underside of the throat plate and the top of the right-hand spreader.

To adjust: Loosen the screw and adjust the screw up or down, as needed. Tighten the screw.

Thread Retainer

The thread retainer must rest squarely on the front face of the throat plate to retain the trimmed thread for the next buttonhole. During the trim knife action, the retainer must be able to travel across the throat plate without binding.

To adjust: Loosen the nut and adjust the screw in or out, as needed. Tighten the nut.

ADJUSTMENTS

Upper Thread Trimming for the Cord Trim Machine

During the machine sewing cycle, sewing ends and the machine returns to the home/operator/service position. Before returning home, the needle thread trim action trims the front leg of the thread loop. To check for the correct timing:

With the race facing the rear of the machine, starting after the last stitch, the lower thread draw-off must start moving to the left and complete the cycle before trimming the top thread. The top thread trimming action must start its travel to the right. If travel does not begin, rotate the left-hand crank until the wedge, located on the cam, is seen through the open area of the cam case, in front of the stitch feed assembly, on the right-hand side of the machine. The trimming must occur before cutting the buttonhole.

When the wedge is seen, loosen the screws and move the wedge either forward or backward, as needed. Forward makes the trimming action happen sooner, backward delays the trimming action. Tighten the screws. Ensure the wedge contacts the lower part of the ramp, not the edge of the lever. After setting the knife, adjust the plunger clearance to 0.8 mm, (1/32"), with the screw # 01.2247.0.004.

As the machine travels through its cycle, the wedge lifts the lever, causing the downward movement of the plunger. This downward movement determines the amount of travel of the trim knife assembly. The travel must be adjusted, with the plunger, until the point of the knife does not travel beyond the point of the left hand looper.

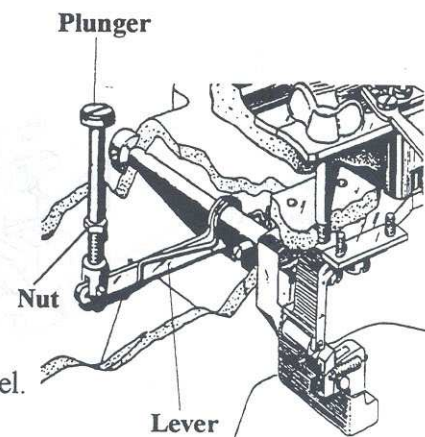
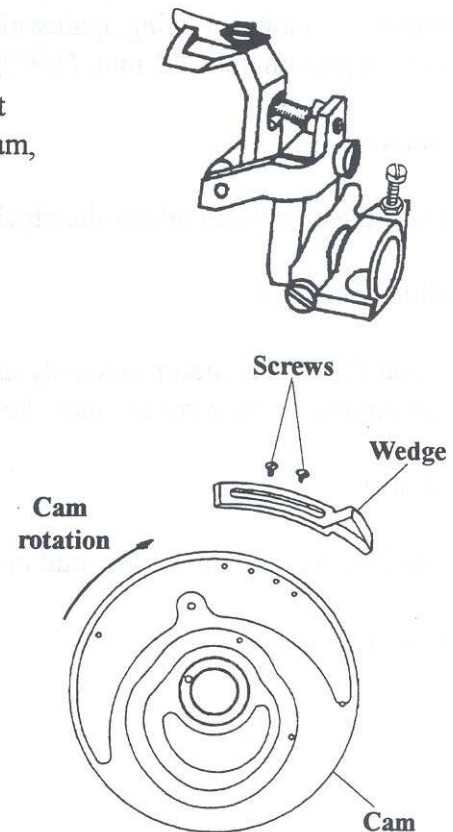
Thread Trimming for S104-470 Machines

Minimum clearance of approximately 0.8 mm, (1/32") must be maintained between the underside of the cap of the plunger and the trim knife assembly, when the trim knife assembly is positioned over the right hand spreader stop and away from the throat plate.

Loosen the screw # 01.2247.0.004 and rotate the actuator counterclockwise, for less, or clockwise, for more trim knife travel. Tighten the screw.

Note: The draw-off starts after the last stitch. The trimming of the top thread occurs after the draw-off is complete.

Trim Knife Assembly



Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

ADJUSTMENTS

Lower Thread Draw-Off

The draw-off supplies lower thread sufficient for the buttonhole, while forming the stitch, to allow the thread to be trimmed and ensure enough thread remains for the next buttonhole.

Note: The actuator assembly must have the correct tension release. The correct release is when the actuator assembly is resting against the race and the lower tension disc is closed. When the actuator is moved approximately 3.2 mm, (1/8") away from the race, the lower tension disc opens.

To adjust:

Loosen the screw and adjust the block left or right, as needed.

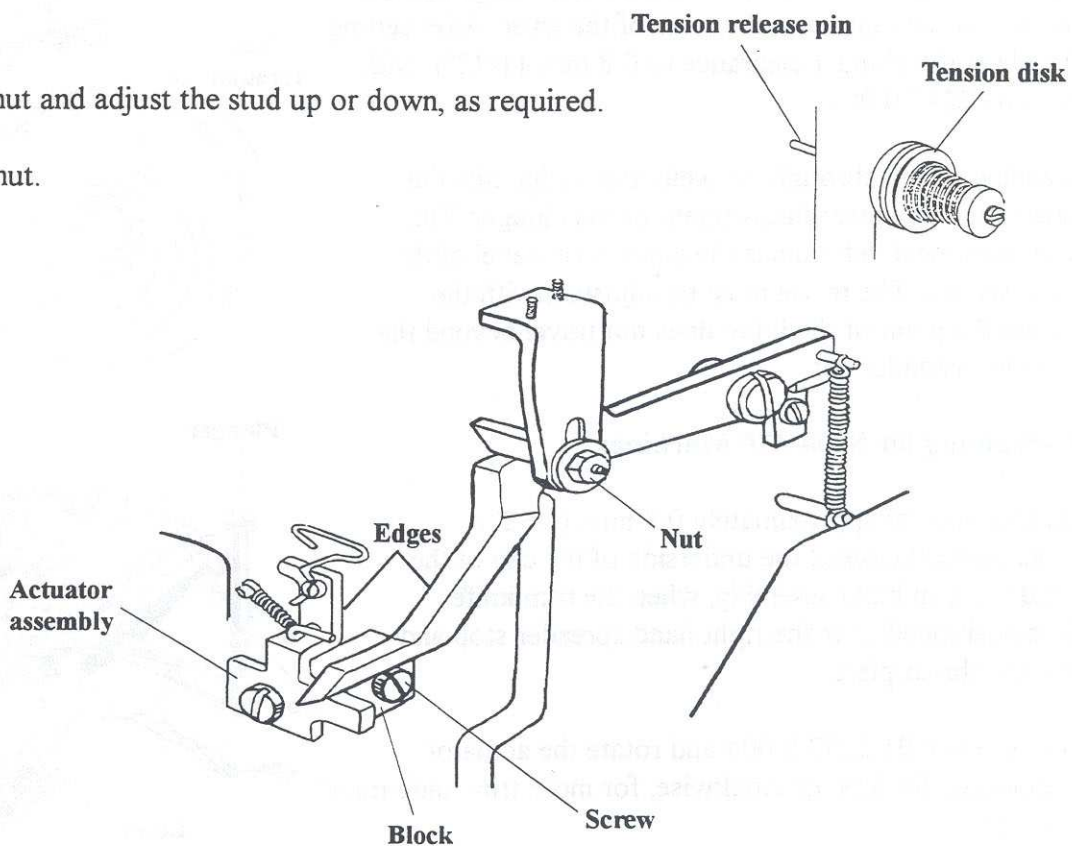
Tighten the screw.

The travel of the actuator assembly must be correct. The standard setting for the travel will have the edges parallel to each other, once the assembly has completed its full travel.

To adjust:

Loosen the nut and adjust the stud up or down, as required.

Tighten the nut.



Revised July 1999

U.S. Phone (800) 367-7332 Fax 559-5210

Outside U.S. Phone (804) 559-5000 Fax (804) 559-5210

ADJUSTMENTS

Shear Sets

Caution! Because Cord Trim shears are designed like a pair of scissors, the edges must cross-over each other. Too much crossover will cause the machine to malfunction and damage key parts.

Installation of Shears to the Clamp Plates

Note: Holding the clamp plate, insert the spring washer into the circle cutout area of the clamp plate, with the ears down.

Place the lower shear over the spring and place the upper shear on top of the lower shear.

Insert the shoulder screw in the circle cutout area of the clamp plate, through the upper and lower shears, and the spring. Turn the upper and lower shears to make sure the shoulder screw has gone through all the parts without binding.

Note: Add a few drops of oil.

Tighten the screw and attach the springs to the outside edges of the upper and lower shears.

Turn the clamp plate over and install the nut onto the screw. Using your fingers, rotate the nut as far as it will turn, without tightening.

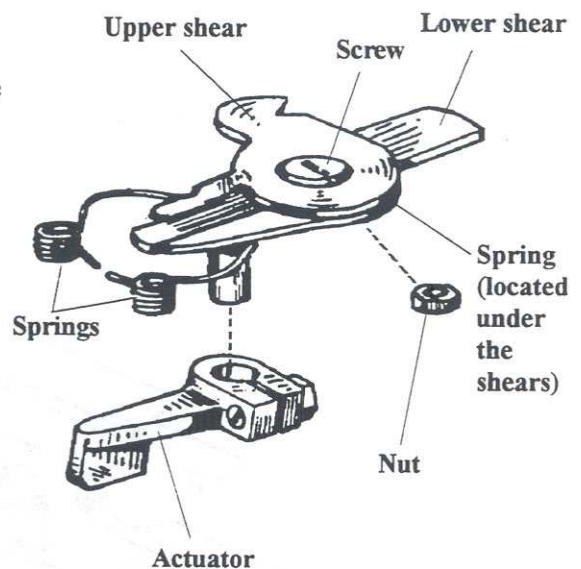
Install the actuator paddle with the centerline of the front of the clamp plate.

Turn the clamp plate top up, facing forward. Using your thumb, move the actuator to the left to close the shears.

If the shears are locked into position, rotate the screw just enough to allow the shears to open. Rotate the screw counterclockwise approximately 1/4 of a turn.

Turn the plate over.. Holding the screw in place, so it will not turn, tighten the nut. Check the shears to make sure they crossover each other, and return to the open position.

Install the cover plate. Check the shears again to make sure they crossover each other, and return to the open position. If they do not crossover and return to the open position, repeat the previous steps.



Dedicated Cord Trim

ADJUSTMENTS


Shear Crossover

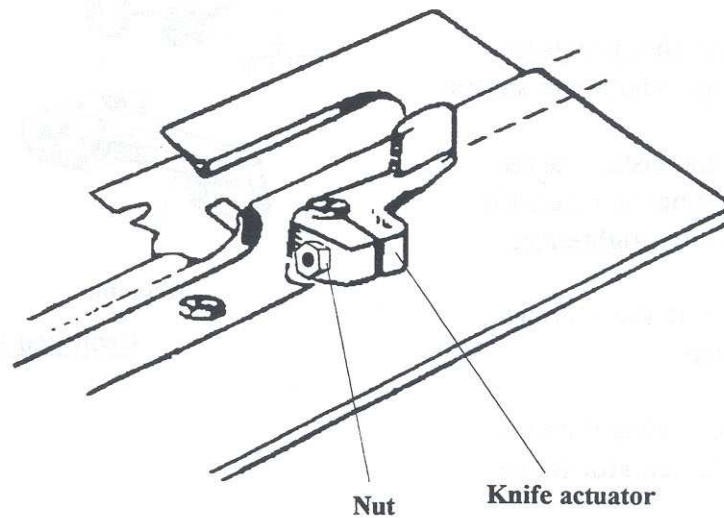
To correctly adjust:

Loosen the nut and rotate the actuator to the correct position.

Tighten the nut.

To check for the correct amount of shear crossover, .4 mm, (1/64").

Press the Up Arrow  and the **SBT** push-button switches at the same time to activate the shears.



Underside of the Clamp Plate

ADJUSTMENTS

Gimp Pull Back

The gimp pull back ensures enough gimp to start the next buttonhole. The spring acts as a clamp, in addition to applying tension to the gimp.

Caution! Before making this adjustment:

Remove the gimp pull back assembly from the machine, by pressing inward on the floating pin, located on the race.

Loosen the screw and adjust the spring up or down as needed, until the top edge is slightly under the top of the gimp hole. The gimp must slide freely through the hole, but not so freely that it may be pulled back through the hole.

If the gimp slides freely through the hole, tighten the screw.

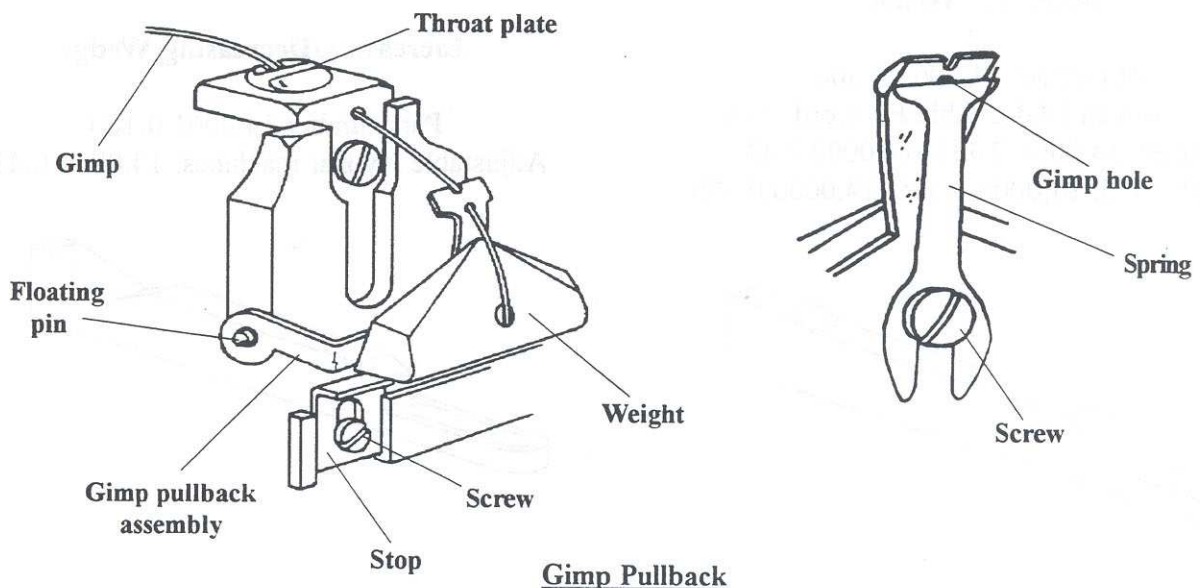
Note: If the tension is incorrect, adjust by slightly bending the spring in or out, as necessary. In creates more tension, out creates less tension.

The weight pulls the gimp back through the hole in the throat plate at the end of the cycle. If the weight is adjusted forward, it increases the amount of the starting gimp. If the weight is adjusted to sit back, it decreases the amount of the starting gimp.

To adjust the length of the starting gimp:

Loosen the screw, and adjust the stop up or down, as needed.

Tighten the screw.



ADJUSTMENTS

Stitch Increase and Decrease Wedges

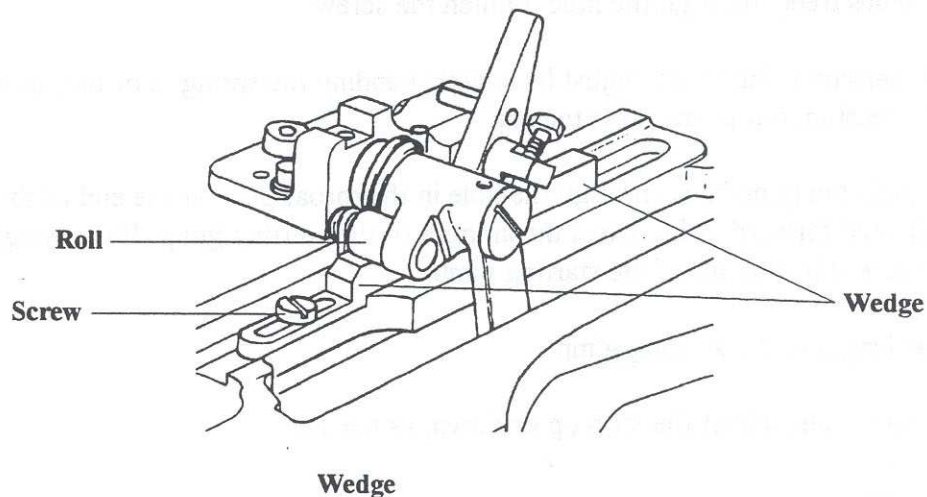
The stitch increase/decrease wedges are used to add or remove stitches to the eye of the buttonhole.

Note: Make sure the correct wedge is used for the model of machine. Sewing with Cord Trim and Adjustable Fly Cord Trim machines, use the increasing wedge part number 14.2061.0.300. Sewing with Adjustable Fly Bar machines, use the increasing/decreasing wedge part number 14.2061.0.100.

Rotate the left-hand crank until the roll is located on the ramp of the wedge.

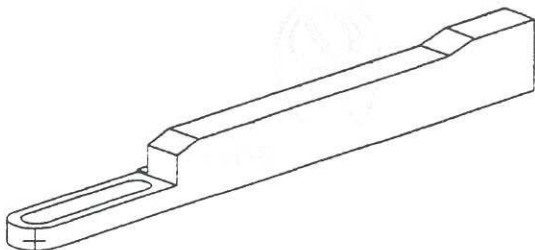
Loosen the screw and adjust the wedge forward or backward, as needed. Adjusting the wedge forward increases the number of stitches, backward decreases the number of stitches.

Tighten the screw.



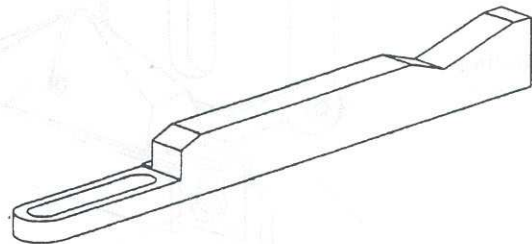
Increasing Wedge

Part number 14.2061.0.300,
 Cord Trim and Adjustable Fly Cord Trim
 machines: 14.0000.0.433, 14.0000.0.434,
 14.0000.0.435, 14.0000.0.436, 14.0000.0.470



Increasing/Decreasing Wedge

Part number 14.2061.0.100,
 Adjustable Fly Bar machines: 14.0000.0.430



ADJUSTMENTS

Needle Bar Height

WARNING! Before making adjustments, switch off the main machine power or use the emergency stop to prevent accidental engagement of the machine.

The needle bar setting is standard to most threads and fabrics. However, when certain fabrics and threads are used, changes to the needle bar height may be required. To adjust:

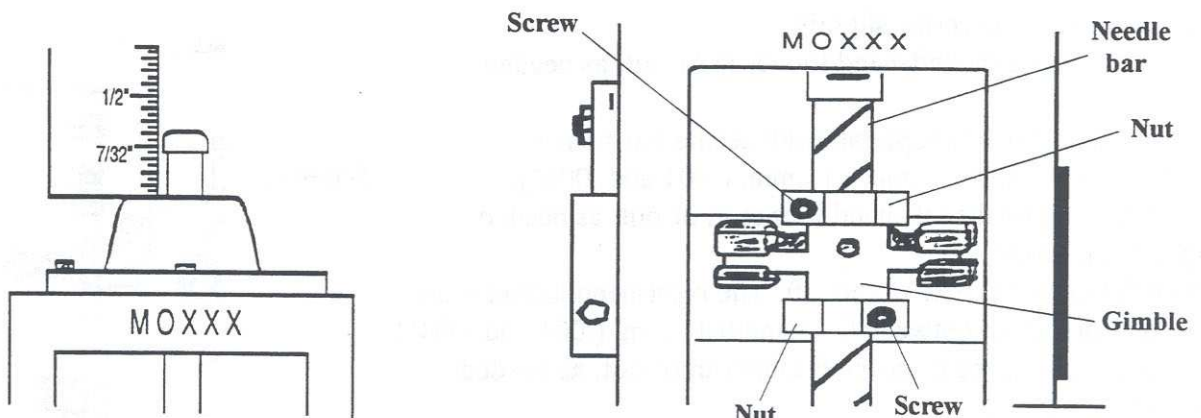
Note: Use the gauge if available.

Remove the throat plate.

Bring the needle bar down to the lowest point of the stroke by rotating the right-hand stop wheel counterclockwise. Set the needle bar height to 5.5 mm, (7/32") by loosening the screws and moving the needle bar up or down, as needed.

Tighten the set screws.

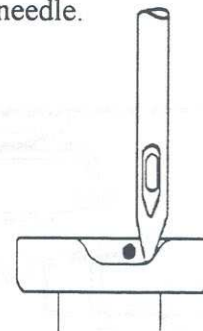
Note: Once the screws have been tightened, make sure there is no play between the nuts and the gimble.



Bring the needle bar to the highest point, install the throat plate and insert a needle.

Lower the needle bar, checking the position of the needle to the gimp hole in the throat plate. The needle must pass just to the right of the gimp hole on the right-hand stroke of the needle bar.

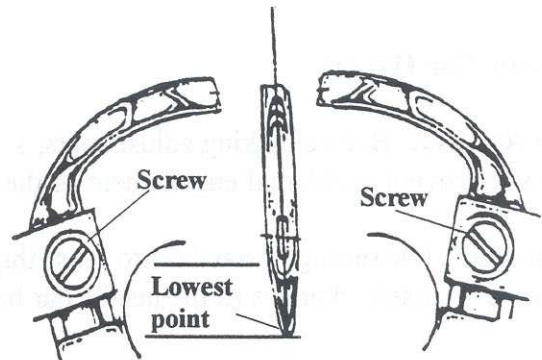
Note: If adjustment is required, refer to the Stitch Bite Adjustment, page 1-53.



LOOPERS AND SPREADERS

Looper Installation

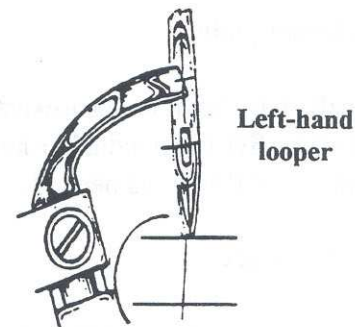
Loosen the locking screws on both loopers and install the loopers, do not tighten the screws. Rotate the right-hand stop wheel counterclockwise, to stop the needle bar in the lowest position.



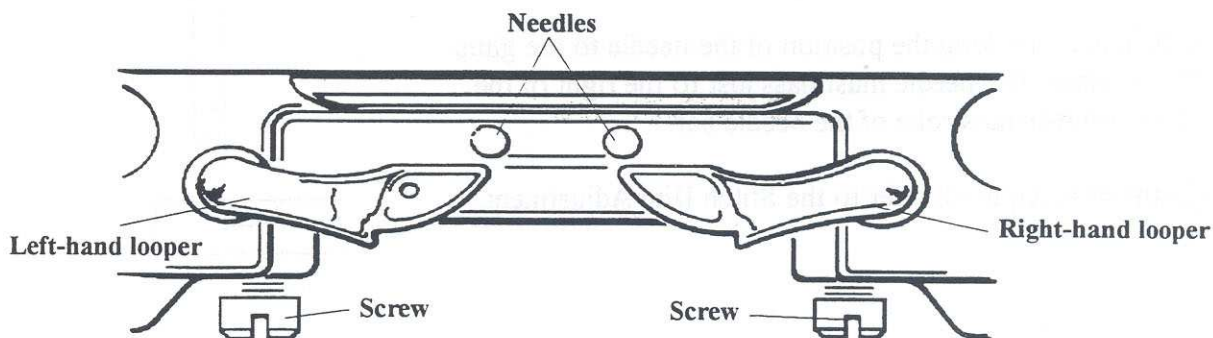
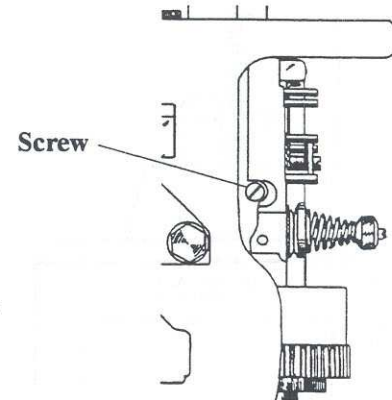
Loopers and Needle Clearance

Caution! Before making the following adjustment, make sure the looper and needle are in correct alignment, page 1-48, the throat plate has been removed and the right and left loopers have been installed.

To install the loopers: Loosen the screws and install the loopers. Do not tighten the screws at this time. Rotate the right-hand stop wheel counterclockwise and bring the needle bar down to the lowest point. Loosen the screw, located on the left rear of the race. Move the looper carrier to the right until it reaches the center of the needle. Tighten the screw slightly. To adjust: move the left-hand looper in or out, as needed.



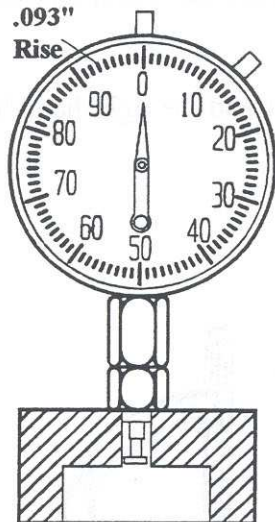
Note: The left-hand looper and the needle must have a clearance between 0.03 and 0.11 mm, (.001 and .004"). To adjust: adjust the left-hand looper in or out, as needed. Tighten the screw. Move the looper carrier to the left. The right-hand looper must have a clearance of between 0.03 and 0.11 mm, (.001 and .004"). To adjust: adjust the right-hand looper in or out, as needed. Tighten the screw. Move the looper carrier back to the right, and position the point of the left-hand looper to the center line of the needle. Tighten the screw.



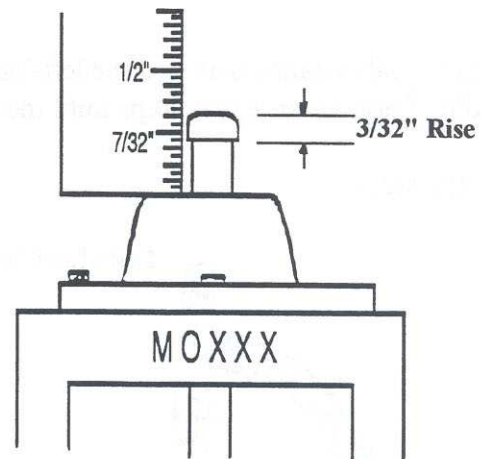
LOOPERS AND SPREADERS

Equalization of the Loopers

There are two methods used to equalize the loopers. One method uses the 6"/150 mm scale, and the other method uses the dial indicator timing gauge.



Timing Gauge (Dial Indicator) - 05.0702.0.000
 Measure rise using timing gauge, zero out gauge at lowest point of needle bar stroke, measure for rise of .093" on the timing gauge.



6"/150 mm Scale
 Measure rise using 6: scale, rise is 3/32" from the lowest point of needle bar.

Note: It is not important for the looper to reach the center of the needle at this time. It is important that both loopers are equalized after rising 2.4 mm, .093", or 3/32", on both the needle bar strokes.

With the looper carrier still loose, rotate the right-hand stop wheel, bringing the needle bar to the lowest point of the right-hand stroke. Continue rotating the right-hand stop wheel, bringing the needle bar up to a rise of 2.4 mm, .093", or 3/32", using either the timing gauge or the 6"/150 mm scale.

Adjust the looper carrier back to the right, and position the point of the left-hand looper to the centerline of the needle. Tighten the screw, located on the back of the race, illustrated page 1-78.

Continue rotating the right-hand stop wheel, bringing the needle bar to the lowest point of the right-hand stroke. Continue rotating the right-hand stop wheel, bringing the needle bar up to a rise of 2.4 mm, .093", or 3/32", using either the timing gauge or the 6"/150 mm scale.

Note the distance between the point of the looper and the needle.

Loosen the screw and move the left-hand looper, half the distance noted in the previous steps.

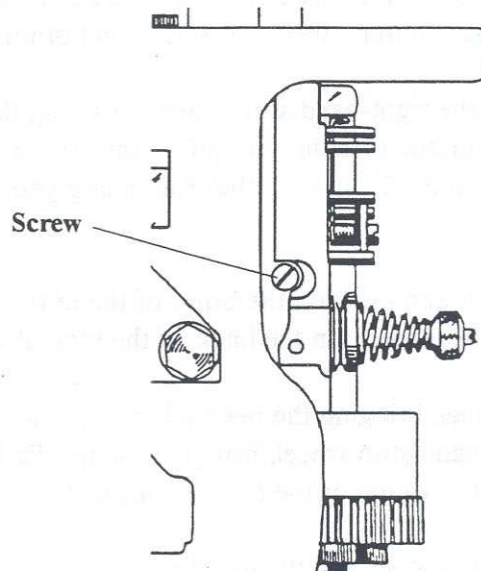
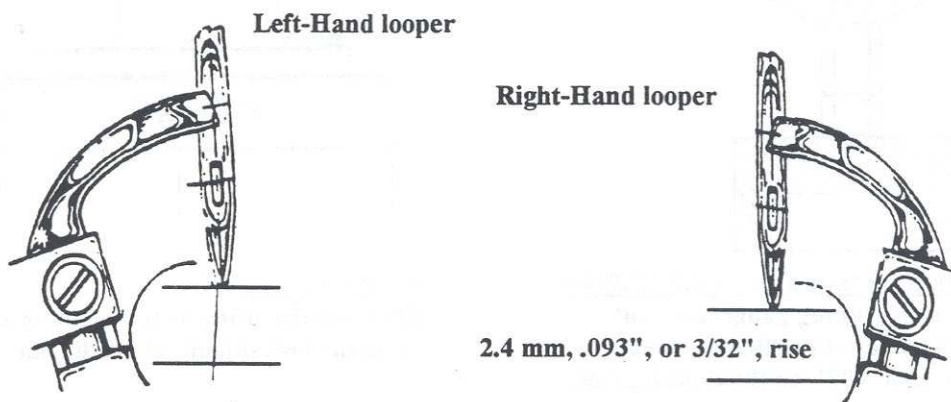
LOOPERS AND SPREADERS

Equalization of the Loopers

Note: Moving the left-hand looper away from the needle brings the right-hand looper closer to the needle. Moving the left-hand looper closer to the needle moves the right-hand looper away from the needle.

Check for equal distance between the left-hand looper and the needle and the right-hand looper and the needle, if not equal repeat steps until the distance is equal.

Tighten the screw.



LOOPERS AND SPREADERS

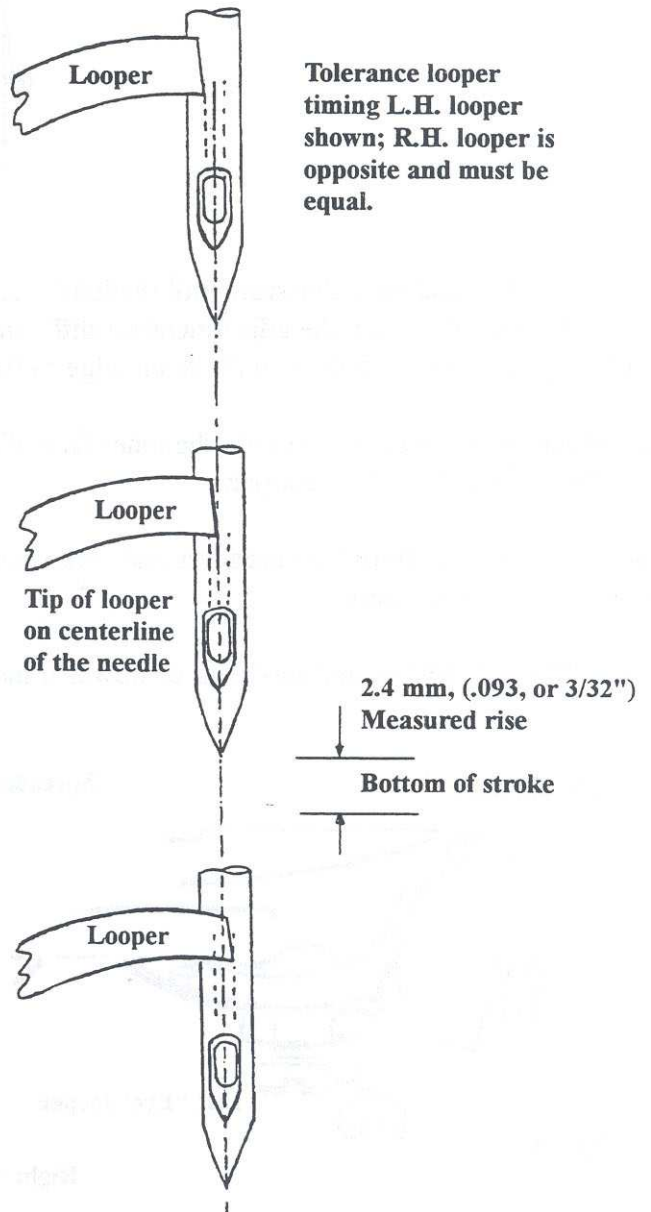
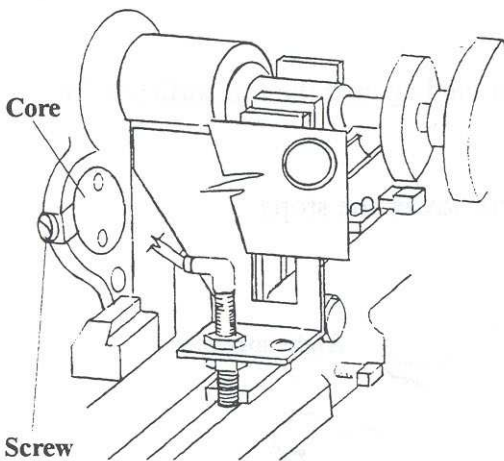
Travel of the Loper to the Center of the Needle

The loopers must travel to the center part of the needle. To adjust:

Loosen the screw and lightly rotate the core clockwise or counterclockwise, as needed. Rotating the core clockwise moves the looper toward the needle. Rotating the core counterclockwise moves the looper away from the needle. Tighten the screw.

Note: Make sure the screw is tight before continuing. If it is not tight, repeat the previous step until correct.

Note: If the travel of the loopers is not to the center of the needle, repeat equalization steps on pages 1-77 and 1-78. Repeat the previous step until correct.

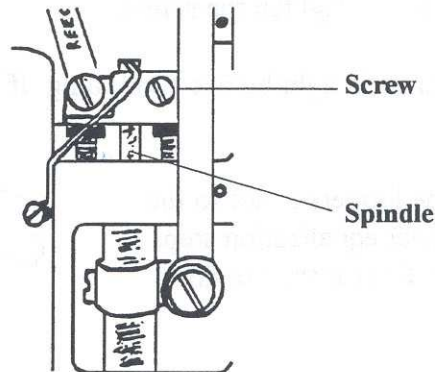


LOOPERS AND SPREADERS

Spreader Clearance

Install the left and right-hand spreaders and spreader stops.

The spreader spindle must be set to approximately 0.79 mm, (0.031") above the crosshead. To adjust: loosen the screw and adjust the spindle up or down, as needed.

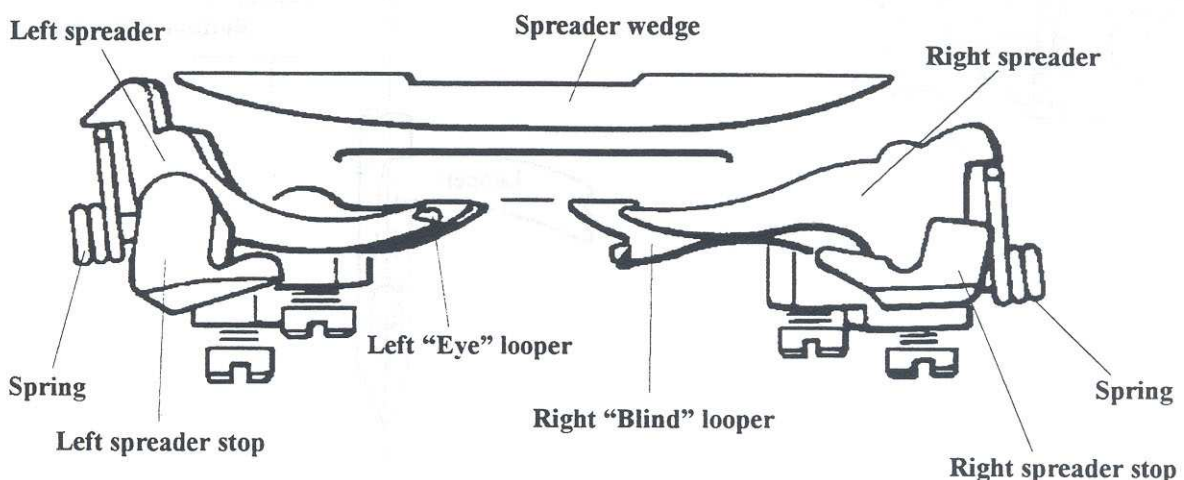


Adjust the left-hand spreader stop until the left-hand spreader fork straddles the hole in the left-hand looper. May need to vary the adjustment for different sewing applications. Align the front inside edge of the large eye looper fork with the front edge of the hole in the looper.

Adjust the right spreader stop until the inner face of the right spreader is flush with the corresponding inner face of the right-hand looper.

Check the action of both the spreaders and make sure they do not bind against the top surface of the loopers or spreader stops.

Ensure the spreaders do not move up or down. If movement exists, lower the stops.



LOOPERS AND SPREADERS

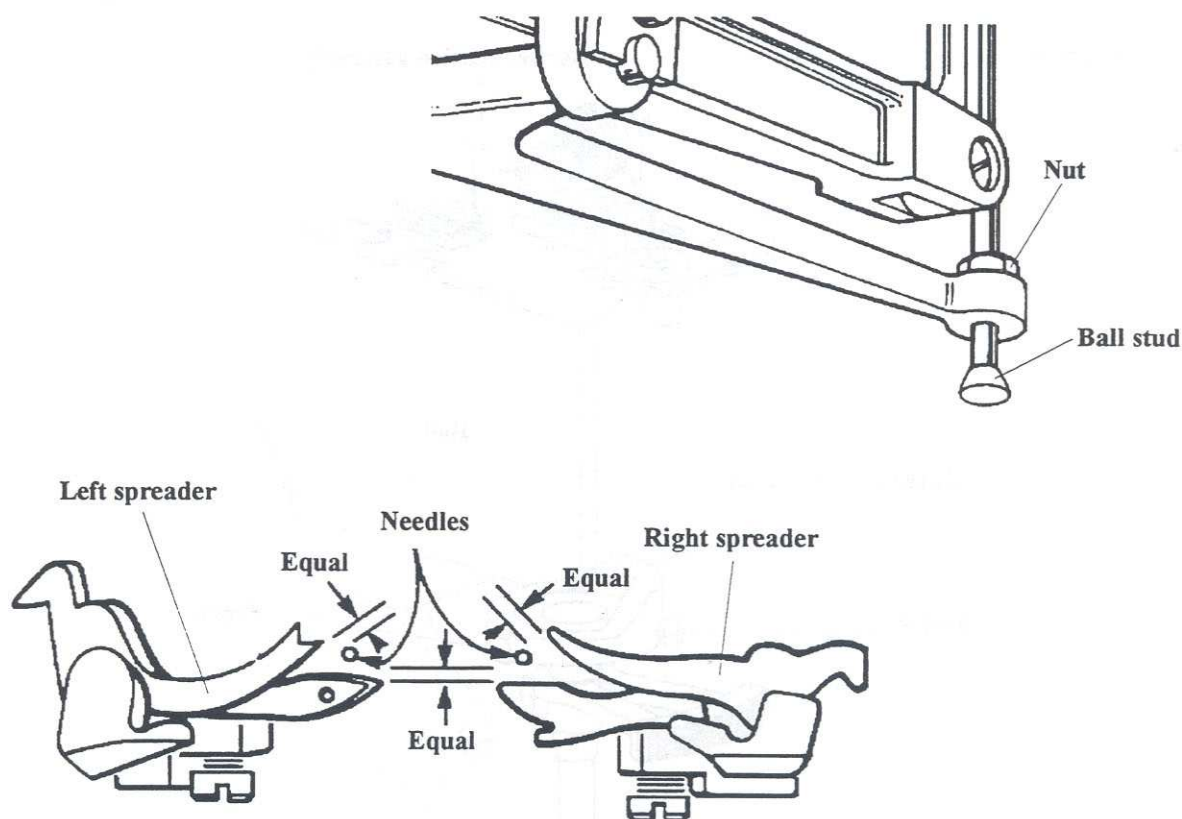
Spreader Clearance

As the needle bar moves lowers on each stroke and the loopers move away from the needle, equal clearance must be maintained between the needle and the spreaders. If the clearance is not equal:

Rotate the right-hand stop wheel until the needle bar completely lowers on the right-hand stroke. At this point, the left-hand looper is moving away from the needle and the left-hand spreader passes the needle. There must be equal clearance between the spreaders and the needles. To adjust: Loosen the nut and move the ball stud in or out, as necessary. Tighten the nut.

Continue rotating the right-hand stop wheel until the needle bar completely lowers on the left-hand stroke. Clearance between the right-hand spreader and the needle must be the same as the clearance between the left-hand spreader and the needle. If the clearance is not equal, repeat the previous step.

When clearances are correct, thread and "sew-off" the machine.



STARTING THREAD

Tension

When using the Cut-After machines, the thread draw-off cam, turning with the upper sector shaft, pivots forward with the rocker tension assembly, while the race turns to form the eye. When the stitching stops, the race reverses, allowing the rocker tension to fall back, releasing additional slack thread for starting the next buttonhole.

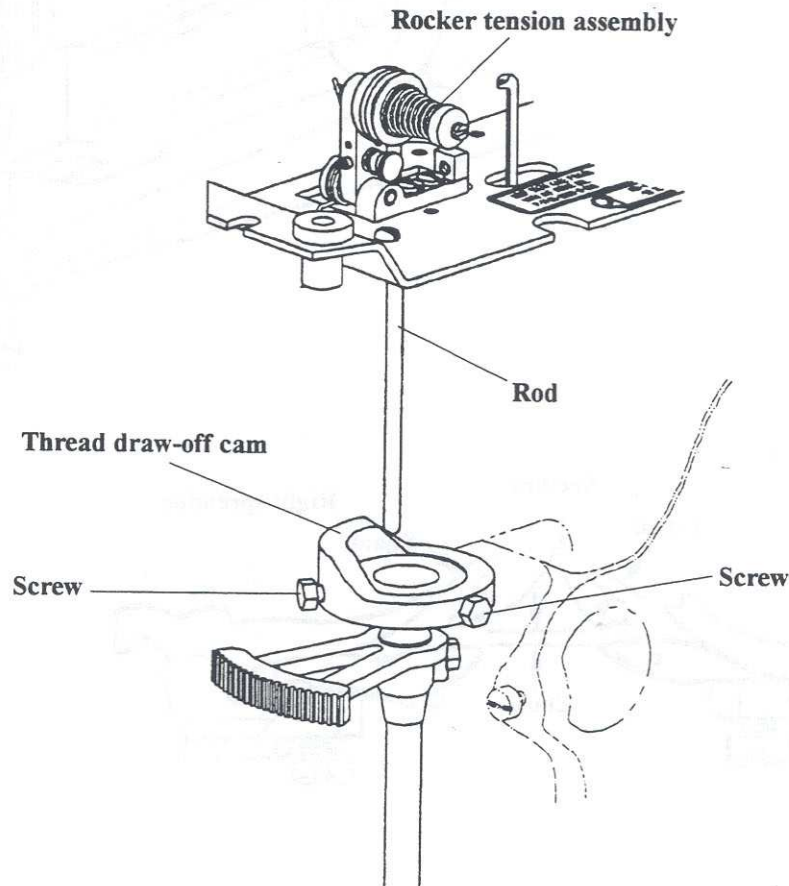
When using the Cut-Before machines, the cycle ends with the race still facing backward and the tension assembly rocked forward. At the beginning of the next buttonhole, the race turns immediately and the tension rocks backward providing additional slack thread for starting the next buttonhole.

To adjust the amount of the starting thread:

After the eye is complete and the second side of the buttonhole is stitching, stop the machine at any point.

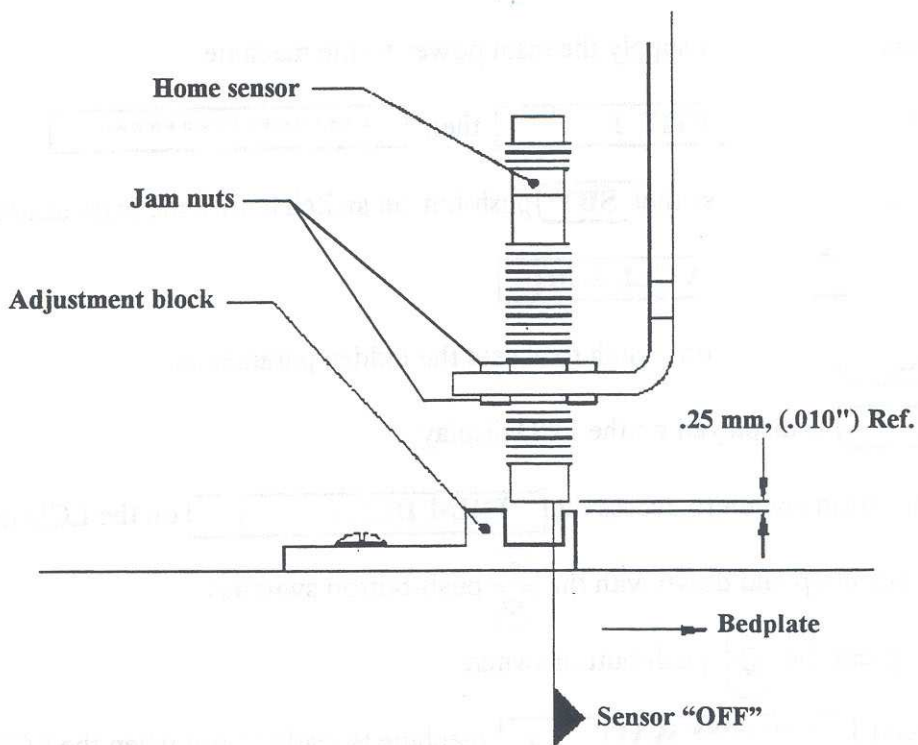
Loosen the screws and rotate the thread draw-off cam clockwise, until the rod is at the top of the rise, or counterclockwise, until the rod is at the lowest point of the rise, as needed. Clockwise increases the amount of the starting thread. Counterclockwise decreases the amount of the starting thread.

Tighten the screws.



ADJUSTMENTS FOR STYLE -470


Sensor

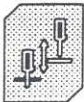




Detail: Stop Before Knife

ADJUSTMENTS FOR STYLE -470

Trim Delay

Press the  push-button to switch off the main machine power.

Press and hold the  and  push-button switches at the same time.

Press the  push-button switch to supply the main power to the machine.

The LCD display will read WAIT ! then *****


Release the two push-buttons and press the SBT push-button switch before the stars disappear.


The LCD display will read FULL CYCLE 2 step.

Press the sequence  push-button switch to access the hidden parameters.

**** MISCEL. : is displayed on the LCD display.

Press the SET push-button switch to access the "TRIM DEL ()" on the LCD display.

To change the number, scroll up and down with the  push-button switches.

To set the new number, press the  push-button switch.


The LCD display will read ***** WAIT ; machine is ready to run when the LCD

display reads FULL CYCLE 2 step

If change is necessary, press the SET push-button switch to return to the "TRIM DEL ()"

LCD display.

To return to the full menu, press the  push-button to switch off the main machine power, then

press the  push-button to switch the machine power on and prepare the machine for operation..

ADJUSTMENTS FOR STYLE -470

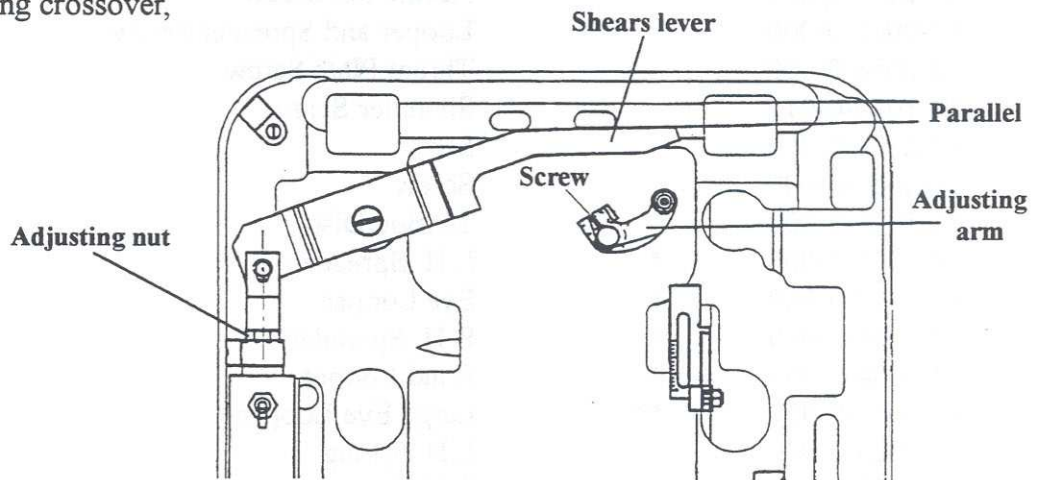
Pneumatic Shears Set-Up

Loosen the adjusting nut and rotate until the shears lever is parallel to the bedplate surfaces, with little or no threads showing.

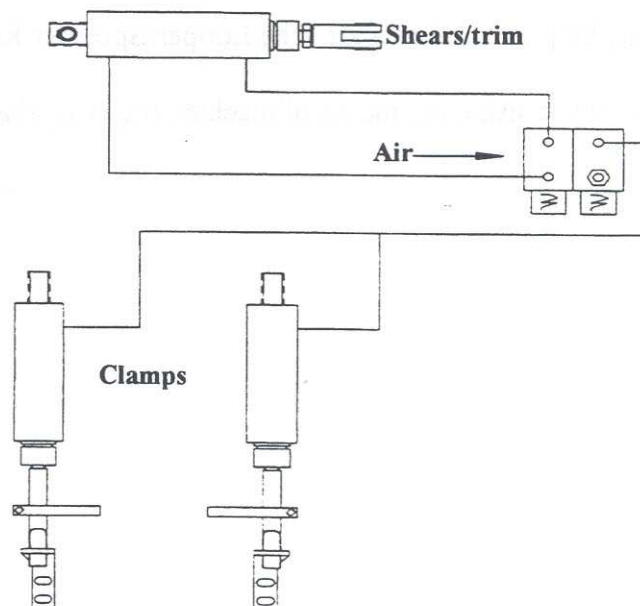
Tighten the adjusting nut.

Loosen the screw and adjust the arm to set the shears cutting crossover, .4 mm, (1/64").

Tighten the screw.



Pneumatic Shears/Clamps Layout



RECOMMENDED SPARE PARTS

Spare Parts List

For less down time and greater machine performance, it is recommended the following quantities of spare parts be kept in stock. These parts are sold individually.

Part Number		Description	Quantity
01-2193-0-000		Needle Set Screw	1
01-2001-0-000		Looper and Spreader Screw	2
01-2056-0-000		Throat Plate Screw	1
10-1030-0-017		Shoulder Screw	1
01-2102-0-000		Screw	1
01-2667-0-000		Screw	1
10-1029-1-000		Tension Disc	2
14-4009-1-000	*	L.H. Spreader	1
14-4005-0-000	*	Eye Looper	1
14-4008-1-000	*	R.H. Spreader	1
14-4004-0-000	*	Blind Looper	1
14-4005-0-030	**	Large Eye Looper	1
01-5620-0-000		L.H. Spring	2
01-5619-0-000		R.H. Spring	2
01-5167-0-000		Spring	1
14-1197-0-000		Trimmer Knife	1
14-4012-0-015	**	Cord Trim Narrow Bite Throat Plate	1

* These parts may be purchased as a kit. The Looper/Spreader Kit number is 03.5250.0.000.

** Keep in stock only if using the model of machine requiring that style part.

NEEDLES

Applications

The needles available for the AMF Reece eyelet machines, are chrome plated and of superior struck groove construction. These needles vary in size and type and may be purchased (100/box) through the AMF Reece Parts Department.

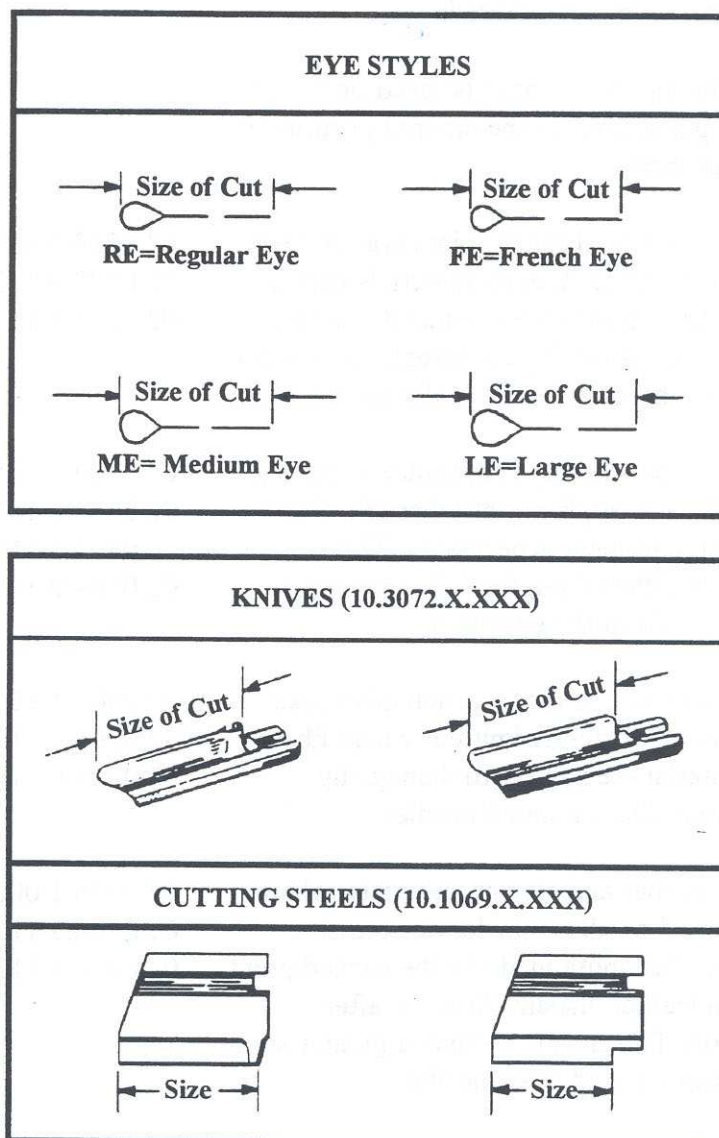
Type	Application	Part Number	Size
Round Point Long Shaft	Applicable to the majority of woven fabrics, knits, and other materials of similar consistency. Long shank needles have added stiffness in the blade which permits using a one size smaller needle than normally required.	02.0500.1.100 02.0501.0.111 02.0501.3.112 02.0501.3.113	Very Fine Medium Heavy Very Heavy
Round Point	Long shank needles cannot be used on heavy material, penetrated by the tapered portion of the needle shank.		
Round Point Dble.Groove	Use only when the looper points are set close to the needle blade. Use on materials with a tendency to trap the thread when descending into the fabric, affecting the thread take-up and causing the thread to break at the needle's eye.	02.0503.3.111 02.0503.0.112 02.0503.3.113	Medium Heavy Very Heavy
X.L.Point Ball Eye	Use for fabrics with high resistance to needle penetration and applications where the fast timing of the loopers is necessary. This needle only differs from the 501 type needle in the length from the eye point.	02.0504.3.111 02.0504.1.112 02.0504.3.113 02.0504.0.114	Medium Heavy Very Heavy Heavy Denim
Ball Point Long Shaft	Best for synthetic fabrics, particularly those tightly woven or tightly knitted, where fibers of the material are subject to damage by conventional sharp pointed needles.	02.0505.1.100 02.0505.3.110 02.0505.0.111	Very Fine Fine Medium
Rocked Point Ball Eye	Use with leather and similar materials, where sharp pointed needles may leave excessive punctures. The splite made by the rocked point needles in leather, usually close up after penetration. This needle permits a greater stitch density than a round point needle.	02.0506.1.000 02.0506.3.112 02.0506.3.113	Medium Heavy Very Heavy
Spear Point	Suggested for fabrics containing a high percentage of starch, or similar substance, causing the needle to heat up or resist the correct pulling up of the stitches.	02.0508.0.110 02.0508.0.111 02.0508.0.112 02.0508.0.113	Fine Medium Heavy Very Heavy

KNIVES AND CUTTING STEELS

Part Numbers

Each knife and cutting steel is stamped with the last four digits of its part number.

To reorder original knives or cutting steels, relate the first six digits of the part number, plus the last four digits stamped on the original part. Eye styles, knives, and cutting steel examples are illustrated.



PNEUMATIC CONTROL

Connections

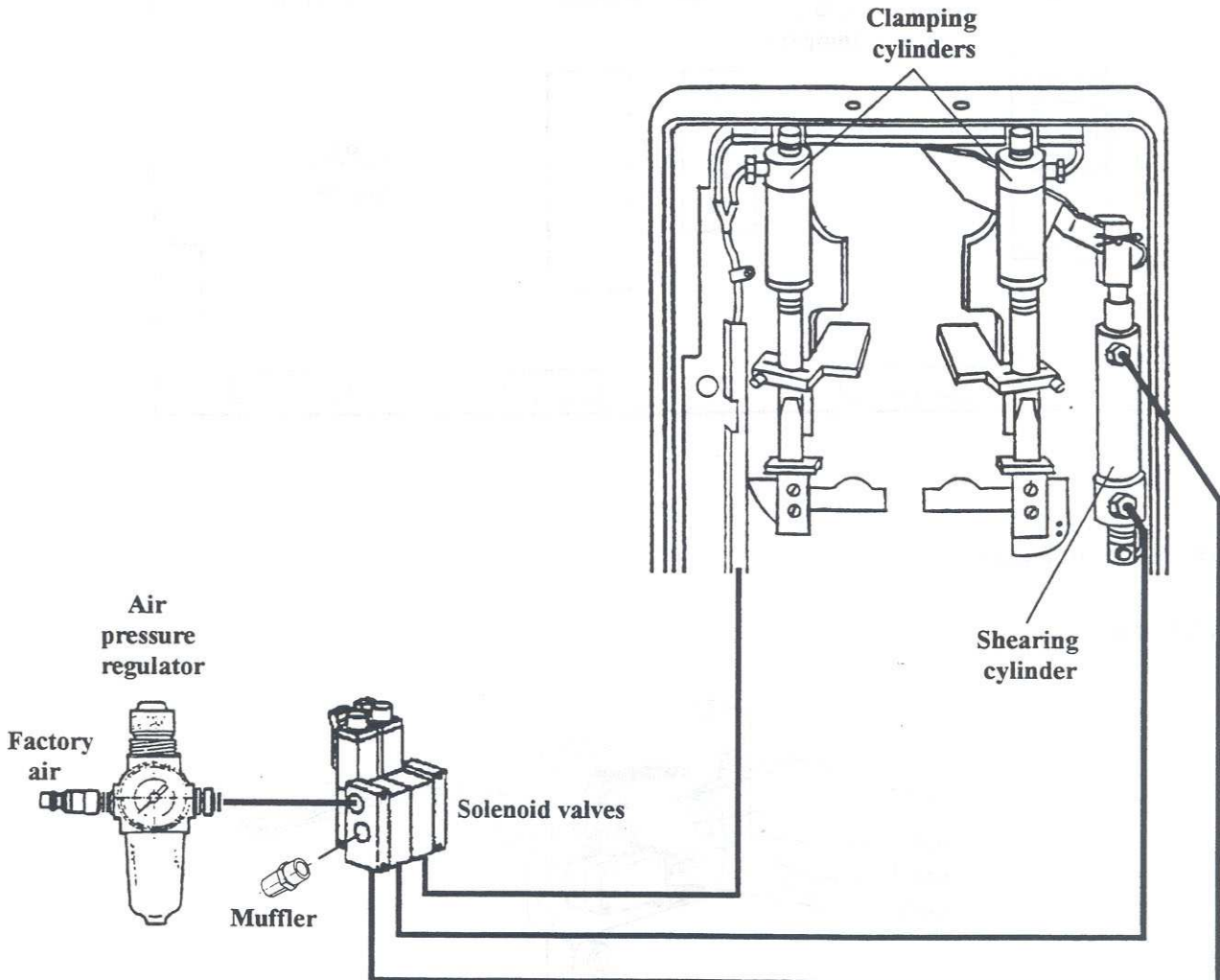
The air distribution system consists of a pressure regulator, moisture filter, solenoid valves, clamping and shearing air cylinders, and a muffler.

Connect the air hoses from the pneumatic components to the correct solenoid valves.

Connect the air hose from the solenoid valves to the regulator.

Connect the factory air to the regulator and ensure the incoming pressure is 5.5 bar, (80 PSI).

Before operating the machine, ensure correct operation of each pneumatic component.

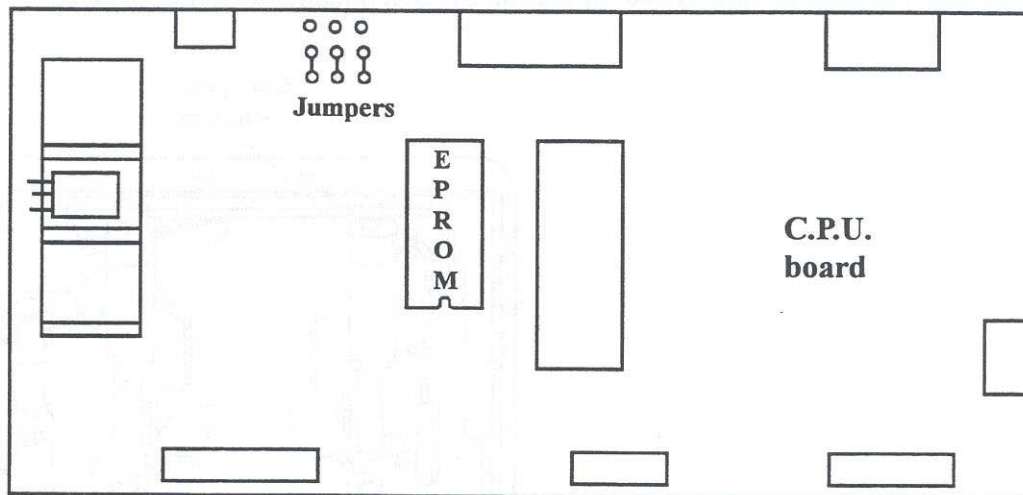


ELECTRICAL DIAGRAM

Jumper Wiring Connections

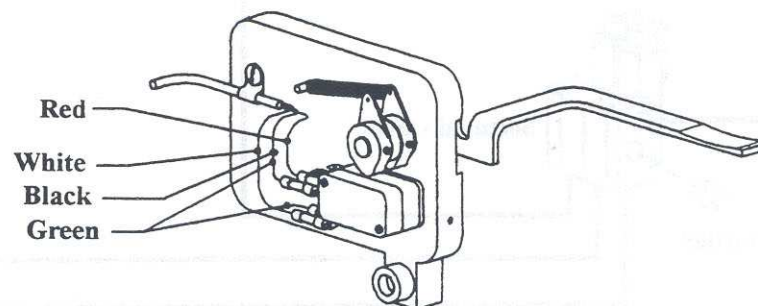
WARNING! Incorrect jumper wiring connections may damage the machine.

The S104-400 C.P.U. board utilizes the bottom jumpers, as illustrated.



Electrical Connections

Start Switch



ELECTRICAL DIAGRAM

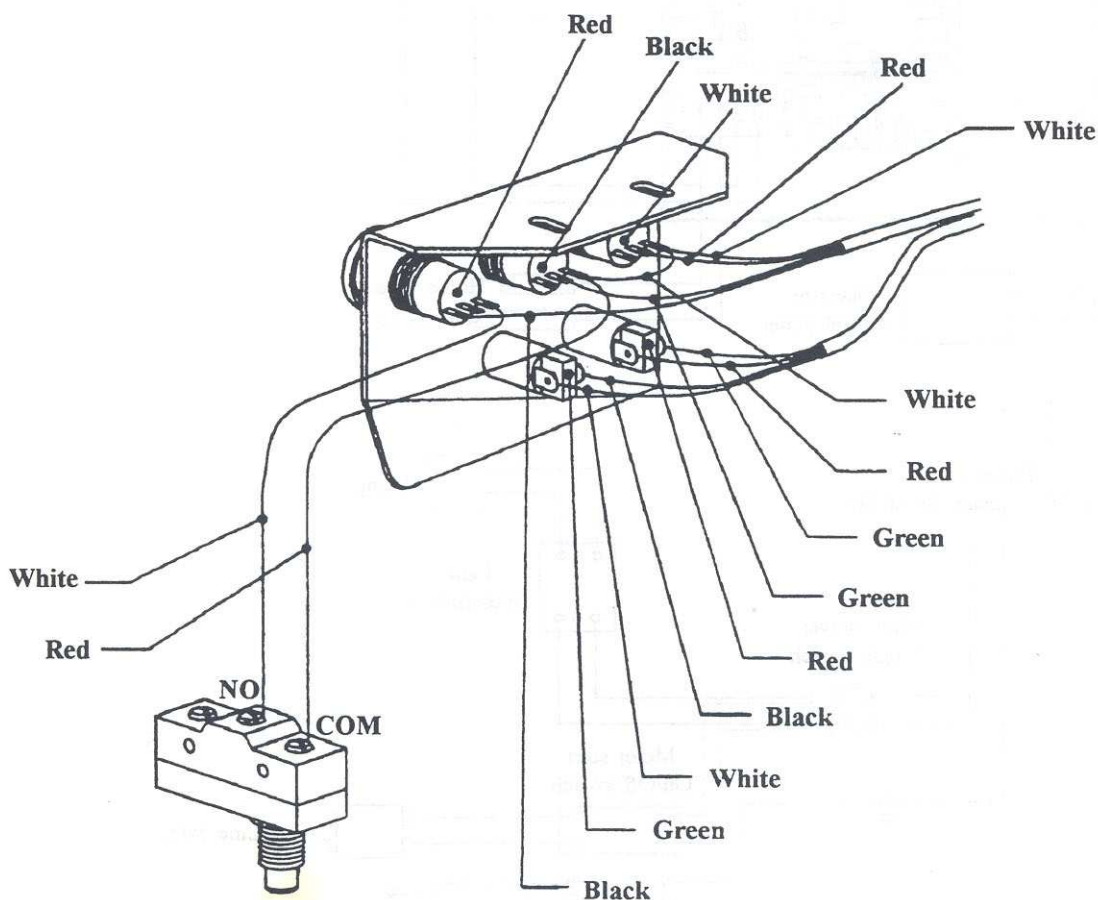
Operator Control Panel Wiring/Program Update

The revised wiring of the emergency stop push-button switch is normally closed, the “Head Tilted” interrupt switch is normally open. To accommodate the program revisions a hidden parameter, “EM-STOP” has been incorporated with a toggle switch, allowing the machine to accommodate the new normally closed, or the original normally open emergency stop switch connections. The new revision 3.3 program chips may be used in the older machines. The revision adds greater safety and detects broken connections to the emergency stop switch.

Revision 3.3 Chip Installation Into an Original Style Machine

WARNING! Switch off the main electrical machine power.

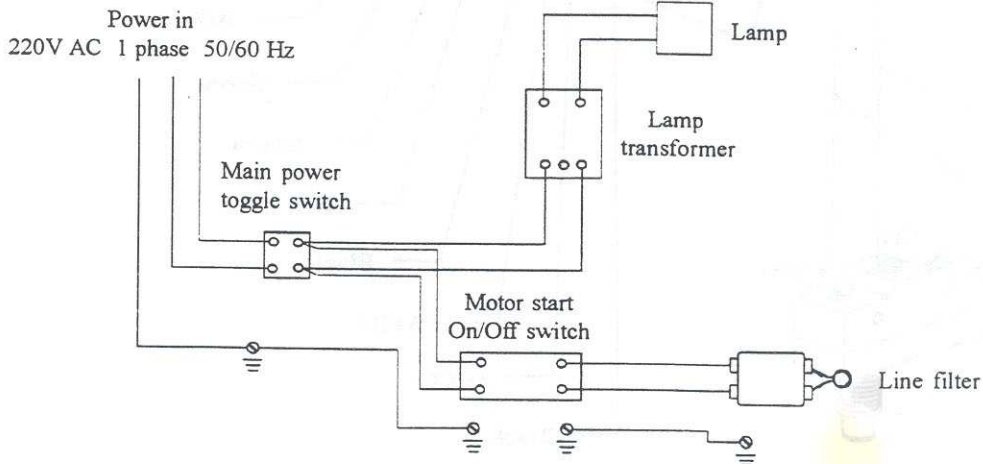
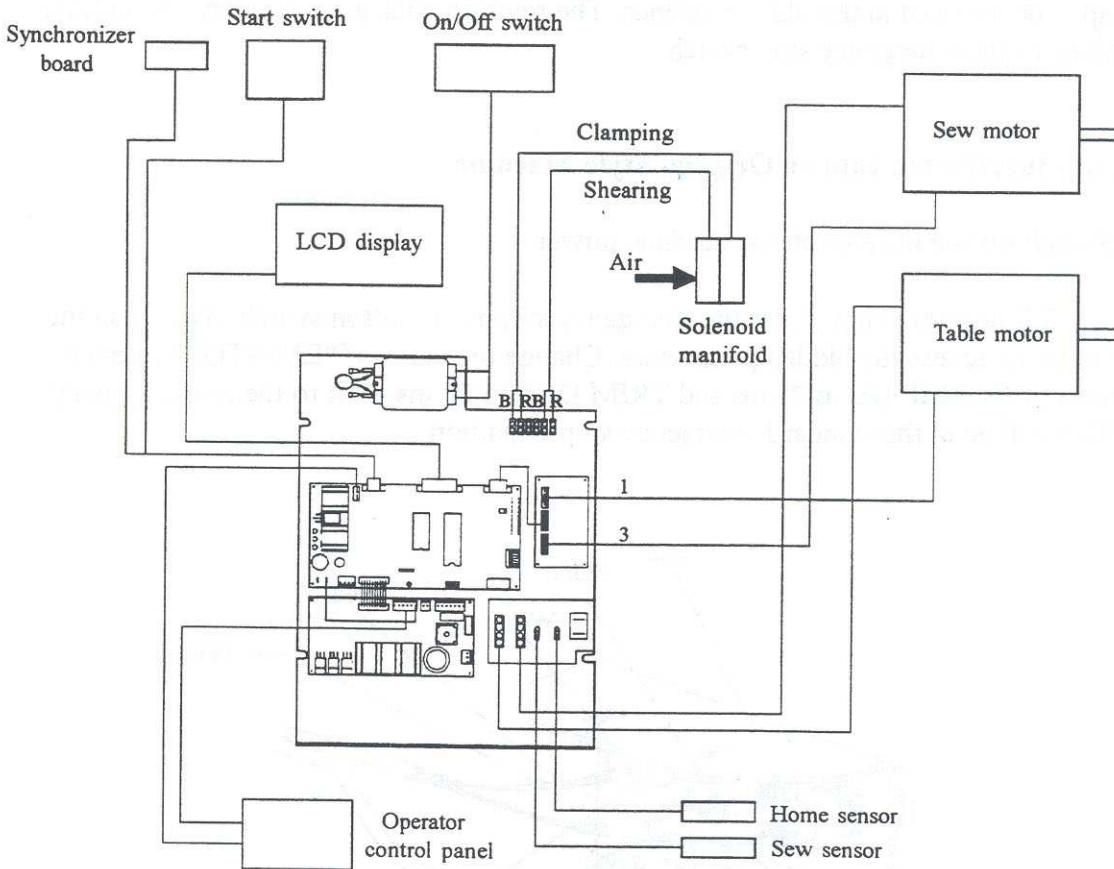
Install the revision 3.3 program chip. Press the emergency stop push-button switch. Switch on the main machine power to access the hidden parameters. Change the value of “EM-STOP” to open. Increase the values of CLAMP DL to 25 ms and TRIM DEL to 28 ms. Exit to the normal sewing mode, the machine will be in the standard emergency stop condition.



ELECTRICAL DIAGRAM

WARNING! Electrical assembly to be performed by qualified personnel.

Note: All wiring and air lines pass through the holes provided in the base and table top. Upon connecting to the electrical box, wiring and air lines will pass through the large holes located at the upper, rear or side, corner of the electrical box. See table assembly drawing for the correct path.



PREVENTIVE MAINTENANCE

Tools

WARNING! Before performing any maintenance, switch off the main power or engage the emergency stop push-button switch, to prevent accidental starting of the machine.

It is important to establish a good preventive maintenance program and use it on a regular basis.

Routine cleaning and upkeep of your machine requires:

- oil
- vacuum cleaner
- paint brush
- parts brush

WARNING! Never use an air blower in place of a vacuum. An air blower may blow particles into the cam and may cause serious damage.

Periodic Maintenance Checklist

Daily

- Oil the machine.
- Remove the lint from the loopers and spreaders.
- Check the air filter.
- Use the drain plug to empty water from the air filter, as needed.

Weekly

- Check belt tensions.
- Inspect and replace the knife and block if worn or broken.

Monthly

- Check for loose hardware.
- Replace parts as needed.
- Check the throat plate for wear, replace as needed.

TROUBLESHOOTING

	Page
Reversing the Main Cam Direction	2-1
Motor Faults	2-3
Cycle Faults	2-3
Fabric Faults	2-4
Cutting Faults	2-4
Skipping Stitches	2-5
Thread Breakage	2-7
Needle Breakage	2-8
Stitching Quality	2-8
Electrical Faults	2-10
Pneumatic Faults	2-14
Repair Cycle	2-15
Test Programs	2-16
Home and Sew Sensor	2-16
Clamp Down and Start Switches	2-17
Motors	2-17
Relay Switching	2-18
Master Reset	2-18

TROUBLESHOOTING

Reversing the Direction of the Main Cam

WARNING! To prevent accidental engagement of the machine, switch off the main machine power or engage the emergency stop, when making adjustments, not requiring power.

If an object becomes lodged between the main cam and the roller, the rotation of the main cam may be reversed to easily remove the object.

Remove the belt from the bedplate drive pulley assembly.

Remove the stitch feed, located in the lower right corner of the machine, by removing the upper and lower left-hand link nuts and washers and the right-hand link nut.

Remove the arm.

Remove the left-hand link stud, located behind the follower, and remove the left-hand link.

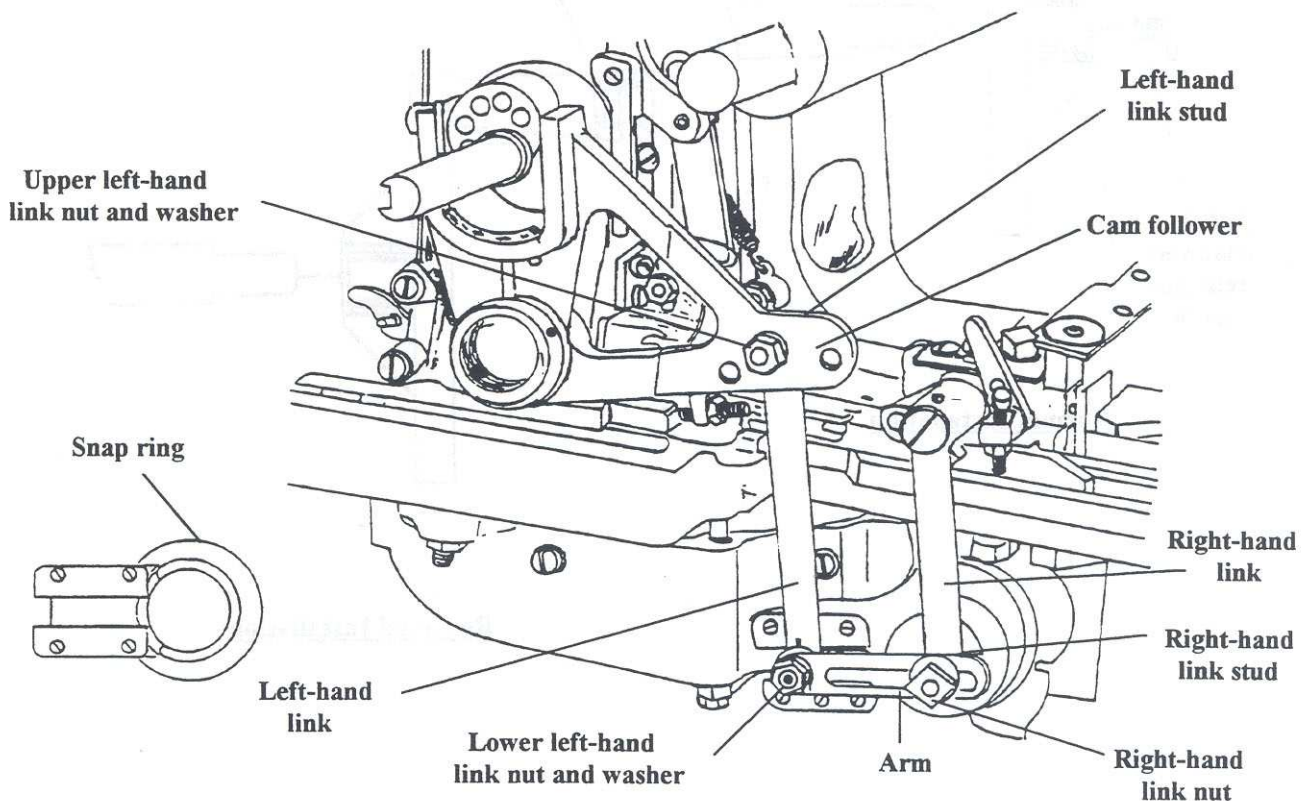
Remove the slide stud, located on the lower end of the right-hand link, from the stitch feed housing.

Remove the stud, on the lower end of the right-hand link by pushing the link forward and clearing the stitch feed assembly.

Slide the nut outward. Remove the snap ring securing the stitch feed housing to the end of the shaft.

Push the right-hand link forward and slide the housing from the shaft.

Note: While sliding the housing from the shaft, be careful not to lose the washer.



TROUBLESHOOTING

Reversing the Direction of the Main Cam

Remove the left-hand wheel, remove the retaining screw and slide the handwheel off the shaft.

Remove the handle recessed screw and remove the handle.

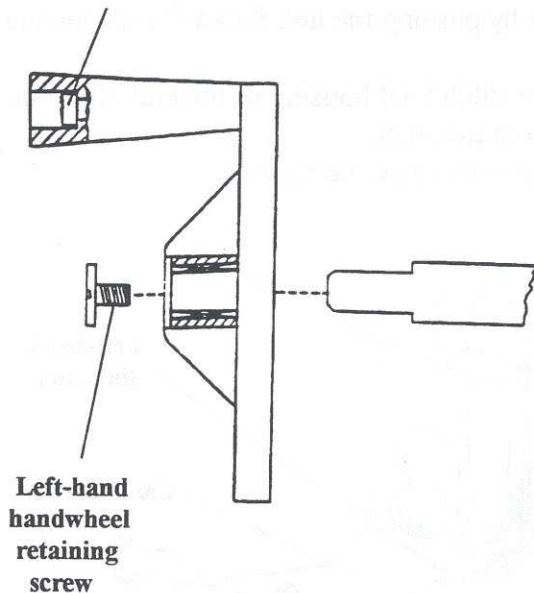
Install the handle on the opposite side of the left-hand wheel and install the handwheel reversed on the shaft, as illustrated.

When the handwheel is rotated, the rotation of the main cam will reverse and the obstruction may easily be removed.

Install the left-hand wheel and the stitch feed housing.

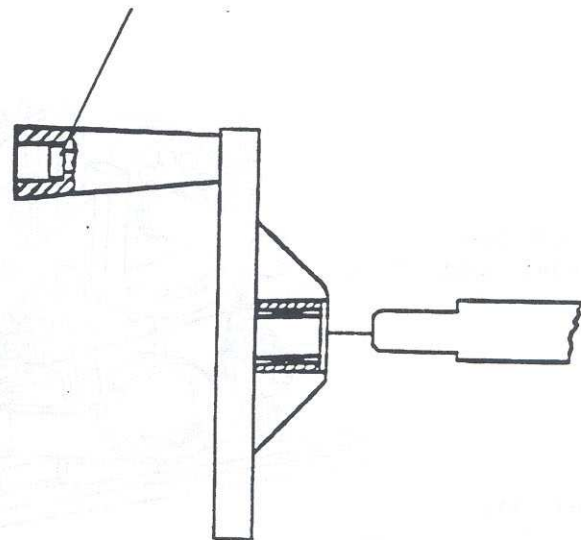
Install all components to the original positions.

Handle recessed screw



Normal Installation

Handle recessed screw



Reversed Installation

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Motor fails to start.	No power to the electrical panel.	Check the electrical plug and wiring.
	Incorrect voltage.	Check with a voltage meter.
	Defective starter switch.	Replace the starter switch.
Motors started and operated for a short time, then stopped.	Incorrect voltage.	Check the electrical plug and wiring connections.
	Excessive cutting pressure.	Decrease the cutting pressure.
	Incorrect belt tension.	Correct the belt tension.
The machine fails to cycle.	Dirt in the sector teeth.	Clean the sector teeth and test by rotating the complete assembly forward and back.
	Belt has fallen off.	Install the belt.
	Uneven feeding.	Main cam friction is too tight or too loose.
The machine fails to stop stitching.	Improperly set friction collar.	Adjust for proper compression.
	Worn feed clutch.	Replace the feed clutch.
Machine rotating hard at the eye.	Dirt lodged between the upper and lower sector teeth.	Remove the dirt.
	Adjusting collar, part number 14.4023.0.000, is too tight.	Slightly loosen the nut.
Machine fails to stop stitching.	Incorrect relay functions.	Repair or replace the relays.
Machine does not reach home position.	Drive belt incorrectly adjusted or worn.	Properly adjust or replace the belt.
	Excessive cutting pressure.	Decrease the cutting knife and the block pressure.
	Incorrect home flag adjustment.	Correct the flag adjustment.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Machine fails to stop.	Home sensor not activating.	Set the clearance between the sensor and the sensor block. Test sensor and replace if needed.
Machine does not grip the fabric, or releases too soon.	Clamp paddles incorrectly adjusted.	Adjust the clamp paddles.
	Incorrect or insufficient air pressure.	Ensure the air pressure indicates 5.6 Bar, (80 PSI), increase the pressure if needed.
Machine does not release the fabric.	Machine not reaching the home position.	Check the sensors.
	Incorrect clamp disengagement.	Check the pneumatics and the air supply line.
Machine fails to cut the fabric.	Damaged knife.	Replace the knife.
	Damaged cutting block.	Repair or replace the cutting block.
	Insufficient cutting pressure.	Increase the cutting knife and block pressure.
	Damaged cutting lever.	Replace the cutting lever.
	Damaged cutting cam.	Replace the cutting cam.
	Damaged cutting lever cam follower.	Replace the cam follower.
Cutting lever sticks and fails to return.	Faulty extension spring.	Replace the spring.
	Pins sticking.	Adjust and/or lubricate the pins.
	Excessive cutting lever pressure.	Decrease the cutting lever pressure.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Uneven cutting.	Uneven clamp spreading.	Adjust the clamp spreading.
	Cutter is not centered.	Center the cutter.
	Incorrectly installed cutting steels.	Correctly install the cutting steels.
	Cutting steel is not fitted to the knife.	Perform the replacement of the cutting steel adjustment, page 1-58.
Cutting stitches on a Cut After machine.	Loose thread tension.	Increase the thread tension.
	Clamps not holding the fabric correctly.	Adjust the clamp gripping pressure.
	Cutting knife is not centered.	Center the cutting knife.
	Stitches are being cut on both sides.	Adjust the bite cutting space.
	Incorrect buttonhole length.	Ensure correct looper and spreader timing.
	Incorrect cutting space.	Adjust for the proper length buttonhole.
Skipping at the flybar "Y" junction.	Hard and heavy cord is deflecting the needle.	Slightly increase the bite size and set the loopers and spreaders.
	Too much top thread tension.	Reduce the top thread tension.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Skipping stitches.	Incorrect needle insertion.	Correctly insert the needle.
	Bent or burred needle point.	Replace the needle.
	Needle deflection.	Ensure the needle does not contact any object.
	Excessive looper to needle clearance.	Decrease the looper to the needle clearance.
	Incorrect looper and needle timing.	Correct the looper timing.
	Excessive looper carrier end play.	Ensure correct looper carrier adjustment.
		Replace worn parts.
	Bent or worn loopers.	Replace loopers.
	Incorrect spreader timing.	Correctly adjust the spreader timing.
	Excessive clamp foot to needle entry point clearance.	Decrease the clamp foot to needle entry point clearance.
Correctly adjust the clamp spread.		
Improper threading.	Correctly thread the machine.	
Incorrect tension settings.	Correctly adjust the tension settings.	
Sew start skipped stitches.	Sew start thread length too short.	Adjust the upper tension start release.
	Fork spreader is not positioned over the eye looper hole.	Position the fork spreader over the eye looper hole.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Sew start skipped stitches.	Incorrect top thread tension.	Correct the top thread tension.
	Incorrect right-hand looper timing.	Correctly adjust the looper timing.
	Excessive clamp foot to needle entry point clearance.	Decrease the clamp foot to needle entry point clearance.
	Damaged loopers and/or spreaders.	Replace the loopers and/or spreaders.
Upper thread breakage.	Excessive upper thread tension.	Lower the upper thread tension.
	Incorrect needle to looper clearance.	Adjust the needle to looper clearance.
	Incorrect looper to spreader timing.	Correct the looper to spreader timing.
	Sharp edges along the thread path.	Eliminate the sharp edges along the thread path.
	Incorrect needle insertion, or bent needle.	Replace or correctly insert the needle.
	Incorrect threading.	Correct the machine threading.
Lower thread breakage.	Excessive lower thread tension.	Decrease the lower thread tension.
	Incorrect left-hand spreader setting.	Correct the left-hand spreader setting.
	Refer to the breakage of the upper thread possible causes.	Refer to the breakage of the upper thread possible solutions.
Thread breaking and running back out of the needle bar.	Incorrect trimming.	Correctly adjust the trimming.
	Incorrect tension.	Correctly adjust the tension.
	Incorrect threading.	Correctly thread the machine.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Needle breakage.	Incorrect needle to loopers/spreaders clearance.	Correct the needle to loopers/spreaders clearance.
	Incorrect needle to clamp foot clearance.	Correct the needle to clamp foot clearance.
	Incorrect needle to needle guard clearance.	Correct the needle to needle guard clearance.
	Incorrect needle bar height.	Correct the needle bar height.
	Needle bar vibrator block is not square with the race.	Ensure the correct sensor setting.
Inconsistent stitching on the straight portion of the buttonhole.	Incorrect machine alignment.	Correctly align the machine.
	Incorrect needle bar height.	Correct the needle bar height.
	Burr contacting needle or thread.	Eliminate the burr.
	Incorrect looper to spreader timing.	Correct the looper to spreader timing.
Incorrect eye shape.	Incorrect lateral cam timing.	Correct the lateral cam timing.
	Gimp is pulling hard through the throat plate.	Open the gimp hole, as needed, to correctly tension the gimp thread, pull through easily and does not pull back.
	Incorrect race swing.	Ensure the race swing rotates a full 180 degrees and ensure a square setting.
	Incorrect clamp spread.	Correct the clamp plates and spread adjustment. CB only.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Row of stitching is cut by the knife after the sewing cycle is complete.	Incorrect cutting width.	Correct the cutting width.
	Incorrect knife position.	Correct the knife position.
	Buttonhole length too short.	Correctly adjust the length gauge.
Decreased buttonhole quality.	The functional and aesthetic quality of a buttonhole is influenced by:	
	Incorrect upper and lower thread tensions.	Correct the upper and lower thread tensions.
	Stitch density.	Correct the stitch density.
	Number of buttonhole eye stitches.	Correct the number of buttonhole eye stitches.
	Amount of fabric spreading.	Correct the amount of fabric spreading.
	Distance between the stitch line and the buttonhole axis.	Correct the distance between the stitch line and the buttonhole axis.
	Incorrect loopers and spreaders timing.	Correct the loopers and spreaders timing.
Stitches are not pulling up.	The type of thread and fabric will affect the buttonhole appearance.	Adjust settings to accommodate thread and fabric.
	Incorrect upper and lower thread tensions.	Correct the upper and lower thread tensions.
	Incorrect loopers and spreaders timing.	Correct the loopers and spreaders timing.
	Binding in thread path or bent needle.	Remove binding or replace the needle.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Machine power is switched on, but the LCD screen is blank.	The LCD is not properly connected to the control box.	Ensure the correct connection.
	The power supply is not properly connected to the control box.	Ensure the correct connection.
	No chip or chip was replaced incorrectly positioned.	Insert new chip.
	The LCD unit has failed.	Ensure the synchronizer board red power on LCD is activated, if not activated and a power supply is present, the LCD has failed. Replace the LCD.
Machine power is switched on, but the LCD screen only displays blank boxes.	The LCD is not properly connected to the control box.	Switch off the main power and unplug the LCD from the control box. Insert the LCD connection again, switch the main power on and check the display for correct operation. If problem still exists, replace the failed LCD.
	The LCD unit has failed.	
	No chip or chip was replaced incorrectly positioned.	Insert new chip.
Machine power is switched on, the display indicates "full cycle", the start switch is pressed to the first stage, (clamps down), but the clamps do not lower.	Malfunctioning treadle start switch.	Using the "System Test" ensure the start switch is correctly operating.
	Incorrect 24V DC solenoid valve connection.	Check the clamp solenoid valve connection, inside the control box and ensure a 24V power supply is present.
	Incorrect air pressure.	Ensure correct air pressure.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
<p>Lights and switches on the operator control panel are not operating. The machine will not cycle and the display indicates "Not Needle Up".</p>	<p>Incorrect wiring.</p>	<p>Using the operator panel wiring diagram, correct the wiring.</p>
	<p>Needle is not in the up position.</p>	<p>Manually rotate the handwheel until the machine is in the needle up position.</p>
	<p>No power on the synchronizer board.</p>	<p>Ensure the synchronizer board has power and the red LED is activated.</p>
<p>The machine will not cycle and the display indicates "not home".</p>	<p>The synchronizer disk is too far from the sensor to interpret the signal.</p>	<p>Align the synchronizer disk magnet with the board sensor. If the green LED is activated, a signal is received. If the green LED is not activated, adjust the synchronizer to obtain a 1.5 mm (1/16") clearance between the disk and the sensor.</p>
	<p>The machine is not in the home position.</p>	<p>Press the display panel needle up/down push button or the operator control panel return home push button.</p>
	<p>Incorrect home sensor clearance.</p>	<p>Ensure the home sensor height is .4 to .8 mm, (.010 to .020"), above the home position sensor block.</p>
<p>The machine will not cycle and the display indicates "watch dog error".</p>	<p>The home sensor signal is not being received.</p>	<p>Using the "System Test", check the home sensor operation.</p>
	<p>The power and encoder are not properly connected between the table motor and the control box.</p>	<p>Ensure proper power and encoder connections.</p>
		<p>Remove the drive belt and perform the table test in the "Systems Test".</p>

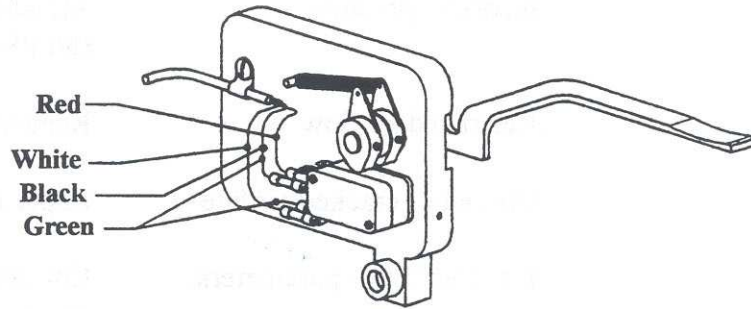
TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Pressing the start switch moves the machine bedplate, but the machine does not sew and the bedplate continuously cycles.	The first stitch sensor is not receiving a first stitch sensor block signal.	Switch on the machine power and ensure the red first stitch sensor LED is activated. Ensure the sensor and the sensor block clearance is .4 to .8 mm, (.010 to .020"). Check sensor to control box connections. Perform the "Systems Test".
	Incorrect start switch wiring.	Correct the wiring.
	Defective home sensor.	Replace the home sensor.
	The machine moves from the home position to the sew position and stops. The display indicates "watch dog error".	The power and endcoder are not properly connected between the sew motor and control box.
The machine sews a buttonhole, then stops and does not complete the cycle. The display indicates "not needle up".	Loose sewing motor drive belt.	Properly tension the drive belt.
	Incorrect positioning speed and brake force parameters.	Correct the parameter settings.
	Magnetic disk defect.	Repair magnetic disk defect.
The machine sews a buttonhole, then stops and does not complete the cycle. The display indicates "watch dog error".	Faulty synchronizer wiring.	Correct the connections.
	Malfunctioning control box relay.	Perform the "Relay Test" to ensure correct mechanical operation.
The machine sews a buttonhole, and stops while punching the buttonhole slot. The display indicates "watch dog error".	Loose table motor drive belt.	Properly tension the table motor belt.

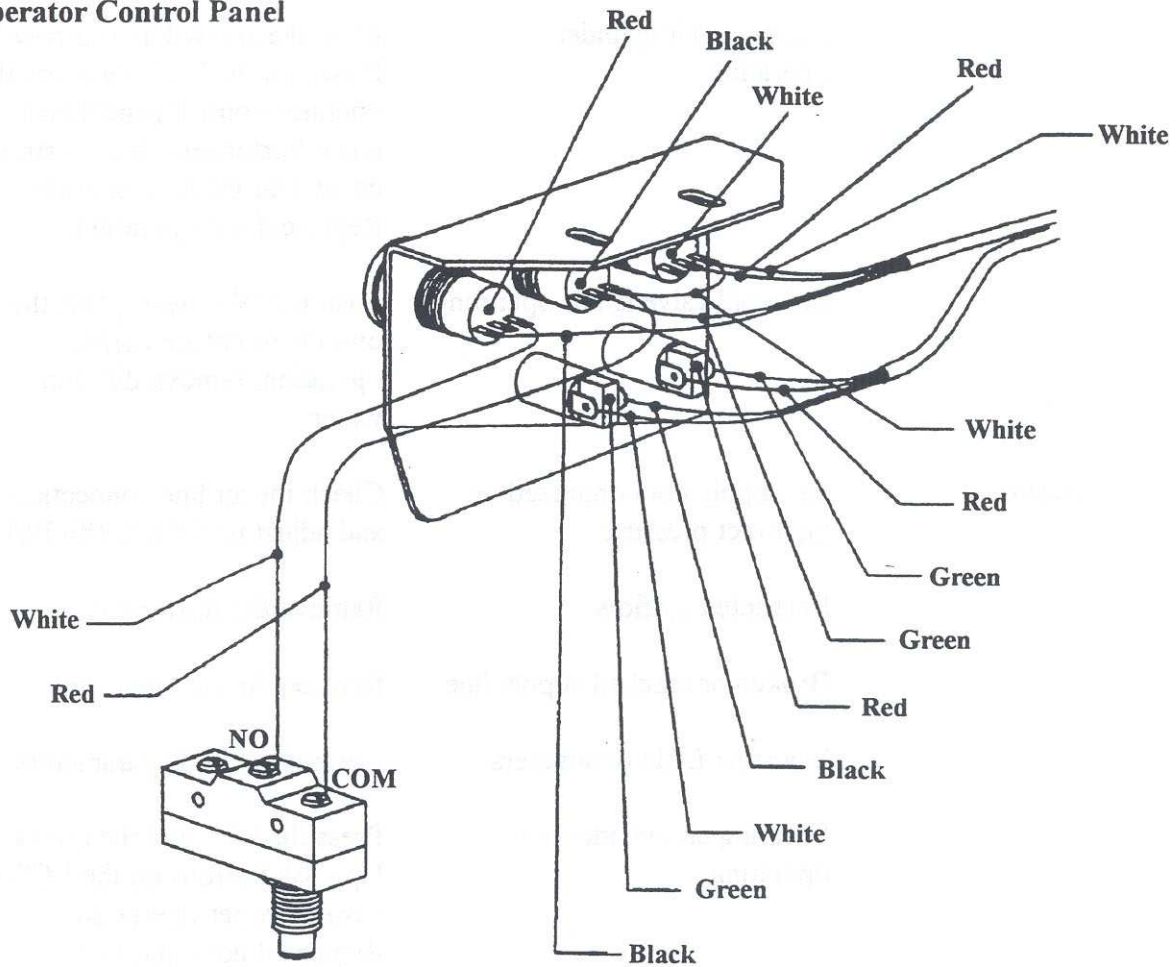
TROUBLESHOOTING

Electrical Connections

Start Switch



Operator Control Panel



TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE	PROBABLE SOLUTION
Clamping not operational.	Air supply not connected or incorrect pressure.	Check the air line connections and adjust pressure to 5.6 bar, (80 PSI).
	Restricted air flow.	Remove the restriction.
	Broken or cracked air line.	Replace the air supply line.
	Incorrect LCD parameters.	Correct the LCD parameter settings.
	Mechanism binding.	Ensure free movement of the clamp arm assembly.
	Clamping air cylinder not operating.	Press the arrow Up or arrow Down on the LCD, or press the operator control panel black push- button switch to ensure correct air cylinder operation. Replace if not operating.
	Solenoid valve is not operating.	Ensure 24V power, press the override to ensure correct operation, remove dirt and water.
Shearing not operational.	Air supply not connected or incorrect pressure.	Check the air line connections and adjust to 5.6 bar, (80 PSI).
	Restricted air flow.	Remove the restriction.
	Broken or cracked supply line.	Replace the air supply line.
	Incorrect LCD parameters.	Correct the LCD parameters.
	Shearing air cylinder not operating.	Press the SBT and the arrow Up push-buttons on the LCD to ensure proper operation. Replace if not operating.
	Solenoid valve is not operating.	Ensure 24V power.

TROUBLESHOOTING

Repair Cycle

To access the Repair Cycle, press and fully release the Start switch. The table will travel to the sew position and stop. Press the Start switch slowly to the first stage, until the clamps drop into the normal operating mode, to move the table very slowly through the cycle. Release the Start switch and the machine will stop. Press the Start switch fully down, the machine will begin sewing and complete the cycle.

Parameter Checklist

Located on page 1-26 in the service section of this manual.

TROUBLESHOOTING

Built-In Test Programs

A program is available to test the major input functions, the synchronizer, and the encoder for correct operation. To access the test program:

Press the **Right Arrow**  and the **SBT** push-button switches at the same time.

When the message **SYSTEM TEST** is displayed, the following may be tested:

- Needle position
- Start switch
- Home and Sew sensors

With the machine in the home position, the display message must read "1-HOMESENSOR". This indicates the processor is receiving a signal from the home sensor. If any other message is displayed, there is a malfunction in the home sensor.

Note: Only one function may be displayed at a time, if two signals are being received simultaneously, the signal with the highest priority will be the one displayed. The order of the signal priorities are:

- Home and Sew sensors
- Clamp Down and Start
- Needle Up

Testing the Home and Sew Sensors

Manually rotating the machine through its cycle causes the display to change and indicate which signal is being received.

Example: if the machine starts in the home position, the display message will read "HOME SENSOR". As the hand wheel is rotated away from home position, the message will change to "NEEDLE UP". If the machine is not in the Needle Up position, and no other signals are received, the message will read "TEST INPUTS".

Continue rotating the hand wheel and the message will again read "HOME SENSOR", as the machine reaches the cut position plateau of the Home sensor block.

Continue rotating the hand wheel until the Sew sensor reaches the first stitch plateau of the Sew sensor block. The message will now read "2-SEW SENSOR".

TROUBLESHOOTING

Testing the Clamp Down and Start Switches

Use the hand wheel to manually rotate the machine until the display message reads either "NEEDLE UP" or "TEST INPUTS".


Lightly press the Start switch until the message reads "4-CLAMP DOWN".


Fully depress the Start switch. The message will now read "5-START".

Testing the Motors

CAUTION! To avoid damage to the machine, remove the belts before performing this test.

Testing the Table Motor

Press the Round Arrow  push-button switch. The display message will read "ONLY w/ adapter".

Press the Round Arrow  push-button switch again. The message now reads "TEST TABLE MOTOR".

Lightly press the Start switch to the first position. The motor will begin to rotate with a fixed low current and no speed control.

Release the Start switch. The message now reads 800 pls (pulses). Any number other than 800 indicates a failure in the system, and the machine must not be used until this failure is corrected.

Fully depress the Start switch. The motor will begin to rotate at a controlled speed of 100 spm.

Testing the Sew Motor

Press the Double Pointed Arrow  push-button switch. The display message will read "TEST SEW MOTOR".

Test the Sew Motor by following the same procedure to test the table motor.

TROUBLESHOOTING

Testing the Shears Relay Switching


The shears relay is located in the electrical control box. To test the relay:

Access the test program by pressing the Right Arrow  push-button switch and the **SBT** push-button switch at the same time.

Press the Round Arrow  push-button switch until the display message reads “only w/adapter”.

Press the **SET** push-button switch and the message will read “Relay Test!!!”.




Note: Each time the **SET** push-button switch is pressed, you must hear a clicking of the relay. If no clicking sound is heard, the relay is not working and must be replaced.

Press the Right Arrow  push-button switch, to return to the operating modes.

Master Reset

Caution! Overrides the program memory with default settings.

Switch off the main power.

Press the ,  and  push-button switches at the same time.

Switch on the main power, while all three buttons are pressed. The display alternates between “PUSH SET” and “FOR RESET”.

Press the **SET** push-button switch within 10 cycles. The display will read ‘PROGRAMMING’.

Note: If the **SET** push-button switch is not pressed within 10 cycles, the program goes to the main menu without executing the MASTER RESET.