

# Baby Lock *Jewel* Service Manual



## Provisional

## Table of Contents

<b>About the Baby Lock Jewel Quilting Machine .....</b>	<b>4</b>
About the Manual .....	4
Service Manual General Rule .....	4
<b>General Specifications .....</b>	<b>5</b>
<b>Assembly Torque Specification .....</b>	<b>5</b>
<b>Lubrication of the Hook .....</b>	<b>6</b>
<b>General Observation of the Front Frame Cover, Mast and Hand Wheel.....</b>	<b>6</b>
Replacement of cover .....	8
Removal of the Front Cover .....	9
<b>Machine Cross Section .....</b>	<b>11</b>
<b>Axial Play Check and Adjustment .....</b>	<b>14</b>
<b>Adjusting the Base Plate Feet and Rollers.....</b>	<b>15</b>
Adjustment of Base Plate Rollers: .....	15
<b>Adjusting the motor belt Tension.....</b>	<b>16</b>
<b>Adjusting Transmission Gear Lash (play) .....</b>	<b>17</b>
<b>Adjusting the Timing Belt Tension .....</b>	<b>18</b>
<b>Adjusting the Presser Foot (Sewing Foot) .....</b>	<b>19</b>
<b>Needle Position, Check, &amp; Adjustment.....</b>	<b>20</b>
Adjustment for Y axis:.....	20
Adjustment for X axis:.....	20
<b>Adjustment of the Loop Lift and Needle Distance.....</b>	<b>21</b>
<b>Adjusting the Needle Bar Height.....</b>	<b>23</b>
<b>Adjustment of the Stop Finger.....</b>	<b>24</b>
<b>Adjusting the Needle Height with Cylinder Tool.....</b>	<b>25</b>
Needle Height with Cylinder Tool.....	25
<b>Baby Lock Jewel Trouble Shooting Guide .....</b>	<b>27</b>
Loop Lift .....	27
Needle Hook Reference .....	28
Loop Lift, Hook, Tension Illustration.....	29
Bobbin Case Tension Adjustment .....	30
Understanding Top Tension.....	31
Some things to check - Visual checks of the top tension assembly:.....	31
Thread Shredding & Breaking Issues .....	32
Skipped Stitches.....	33
Proper Stitch formation:.....	33
Four major causes of skipped stitches: .....	33
More Causes of Skipped Stitches: .....	33
Four things required for proper machine timing setting: .....	34
Stitch length in Manual & Stitch Regulation Mode.....	34
Manual Mode - user selects motor speed.....	34
Stitch Regulation Mode - user selects Stitch Length = # of stitches per inch .....	34
<b>Stitch Regulator .....</b>	<b>36</b>
Stitch Regulator Basic Theory:.....	36
The Regulator will do the desired stitches per inch if: .....	36

Possible Misunderstandings:.....	36
Setup and Mechanical Problems:.....	36
Operation Problems: .....	37
<b>Stitch Regulator – Methodical Check .....</b>	<b>38</b>
Stitch Regulator Trouble shooting:.....	39
Setup Errors: .....	39
Operation Errors: .....	39
Mechanical Problems:.....	39
<b>Electronic Problems: .....</b>	<b>39</b>
<b>LCD Screen Operation.....</b>	<b>40</b>

## **About the Baby Lock Jewel Quilting Machine**

The Baby Lock Jewel Quilting Machine utilizes high-tech electronics and an innovative touch-pad user interface to offer greater functionality and ease of operation to home quilters than ever before conceived in the quilting industry. The Baby Lock Jewel Quilting Machine is a high quality machine that incorporates very robust design features and is very easy to service.

The Baby Lock Jewel Quilting Machine is constructed following a specific sequence of operations - similar to the construction of a house. Walls cannot be erected until the foundation is in place. Similarly, this service manual has been written with an adjustment logic that is driven by the construction processes used to create the machine. If the service technician carefully follows the adjustment steps in the order presented, a fine running sewing machine is possible each and every time.

### ***About the Manual***

The purpose of this service manual is to help the technician complete a repair on a machine accurately and quickly. The manual is complete with photographs and explanations that we hope will aid you in your repair efforts. In addition to the teaching aids found herein, you will also find all of the tools listed that are necessary for adjustments. If you need help in locating these tools for purchase, please contact the company.

### ***Service Manual General Rule***

- Adjustments shown in the manual should only be made if a setting deviates from the tolerance specified in the manual.
- Adjustments should be made only in the logical sequence shown and described in the manual.
- Safety must be considered when working on any machine. Safety warnings are included throughout this manual where appropriate, but these warnings do not address all possible safety concerns that might confront the service technician.
- When working on or near any live electrical assemblies, the power cable must be removed from the machine.
- We urge you to observe the cautions in the manual.
- Please note that the hand wheel must always be turned in the direction of normal rotation unless otherwise instructed. This is especially true when making the loop lift timing and needle height adjustment.

## General Specifications

Dimensions:	(210 X 410 mm) 8.25" X 16.00"
Sewing Speed:	(Min 150spm, Max, 1500 spm)
Needle System:	134R (135 X 7)
Needle Sizes, (recommended):	14/90 - 19/120
Hook System:	(Rotary, custom made, Cerliani, Type FA, Vertical, M Bobbin)
Bobbin Type:	Aluminum, Class M
Bobbin Case:	Cerliani, Type MF
Motor Type:	Brushless DC, internal encoding
Needle Positioning:	Up and down, full and half stitch
Electrical Power:	120 V, 60Hz, 150 W
LED Power Consumption:	20 W
Sew Foot Stroke/Lift:	5 mm
Needle Bar Stroke:	35.3 mm
Take-Up Stroke:	73 mm

## Assembly Torque Specification

The Torque Specifications apply to all internal fasteners in sizes 4.0, 5.0, and 6.0mm in general at ISO 4762 Screw class 8.8. The torque specifications are also generally classified as soft jointed and are listed according to size and placement in the machine.

1. 4 mm Allen Socket Head Cap Screws, Class 8.8 @2.5Nm
  - Head-frame, and main bearing retainers
2. 5mm Allen Socket Head Cap Screw Class 8.8@ 5.6Nm
  - Motor Frame Mounting
  - Pulleys
  - Collars
3. 6mm Allen Socket Head Cap Screws Class. 8.8 @ 9.9Nm.
  - An exception must be observed here since the screws are considered soft jointed and shallow threaded and are used externally. It is therefore advised that this torque specification not exceed 6Nm.

## Lubrication of the Hook



Figure 1

Apply one drop of oil to the raceway of the bobbin case support two to three times per day. This application is based upon sewing for 8 hours of machine time. If the machine is used less, lubricate the hook less frequently. After the lubrication of the hook, it is recommended that one momentarily sew on scrap material before resuming the sewing of the quilt. Failure to do so may result in oil stains on the quilt piece.

## General Observation of the Front Frame Cover, Mast and Hand Wheel

The following observations, accompanied by necessary adjustments, will ensure trouble-free thread passage. Failure at any of these points will significantly affect thread tension.

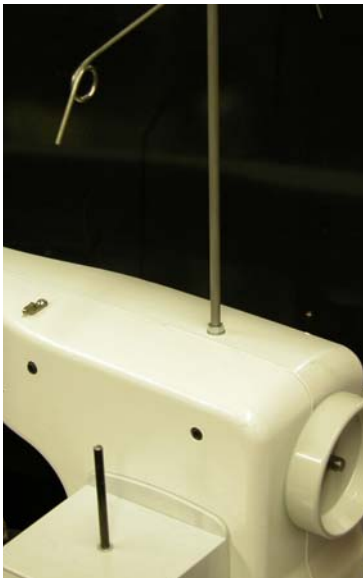


Figure 2

**Tools required: (2mm, 2.5mm handle Allen, 8mm open end wrench)**

### Check:

1. The Spool Stand (*mast*) should be adjusted so that the eyelet loops are centered directly over the spool pins.
  - If a correction is necessary, loosen the jam nut, reposition and tighten the jam nut.



Figure 3

2. Make sure that a gap of 1.0mm to 1.5mm exists between the frame and the hand wheel. **(Note: This can only be adjusted when the front frame cover has been removed.)** See Figure 3.
  - If a correction is necessary, loosen the hand wheel set screw, **(Note: this can only be done after removing the front cover)** position the hand wheel and retighten the screw. **(3mm handle Allen**

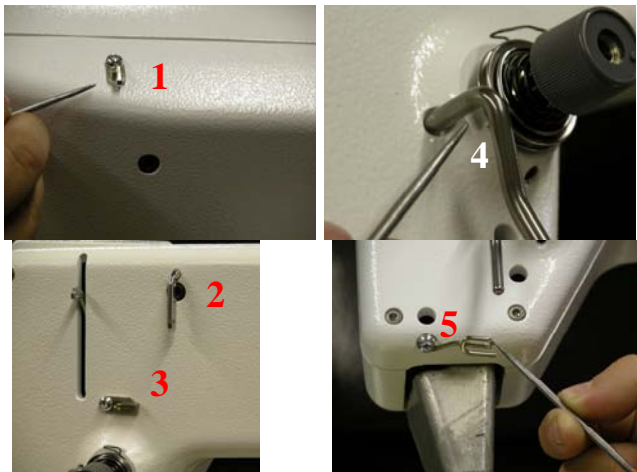


Figure 4

3. Inspect the condition of the thread guides 1, 2, and 3, and thread stirrup 4, and thread guide 5 for any abrasions, cuts, or electroplating blistering. Replace any damaged parts as shown in Figure 4.

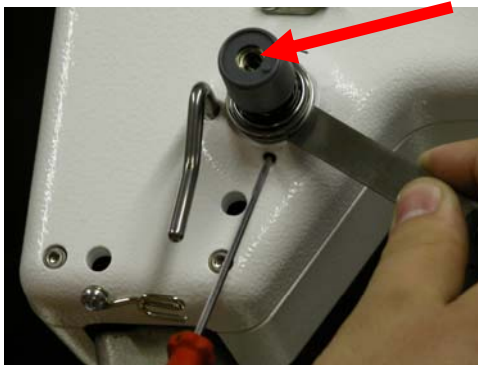


Figure 5

4. Check the top tension assembly for the following:
  - A gap of 1.0mm to 1.5mm exists between the frame boss and the back disk of the tension assembly, see figure 1.4. If a correction is necessary: loosen screw. **(2mm handle Allen)**, adjust the gap between the front cover and the rear tension disk, and retighten screw.
  - Check between the tension disks for any foreign material that could prevent the disks from functioning properly. If a correction is necessary, remove the knob, tick washer, tension disks, and core spring. Clear and reassemble.

- Check that the take up spring has a normal torsion tension and inspect the spring for any cut or abrasions. Adjust or replace if necessary.
- Check that the top tension knob has resistance and can not vibrate loose while sewing. To correct: remove the knob, tick washer and core spring, adjust the split bolt by spreading with a #3 flat-slot screw driver until the knob has adequate resistance to keep its setting.
- Check that the take-up spring is positioned to 11:00. if not loosen **(2mm handle Allen)** and rotate split shaft.



## Replacement of cover

Replace the front cover in the reverse order that it was disassembled.

**Note:** See torque specifications chart in the specification section for torque values.

### C Print/Pod Cables



### D Print/Pod Cables



### **CAUTION:** DANGER OF ELECTRICAL SHOCK – DANGEROUS VOLTAGES

**Do not plug main power or run the sewing machine with the p-pod off of the machine and or open so that human body part comes in contact with electrical energy.**

**Note 1:** The C-Pod and the P-Pod are **STATIC SENSITIVE** parts and should not be handled without special discharge tools. For this reason, all C and P Prints will be exchanged in the pod covers. Do not remove the Printed Circuit Boards (PCBs) from the pods.

**Note 2:** The colored edge of the ribbon cable is always located on pin 1 of a plug socket. The motor, opto-interrupter, and handle bar cable plugs are keyed.

**Note 3:** After installing the cables through the service hole on the front cover, carefully take out any excess cable through the hole and fold inside of the pod covers. This will prevent any pinching or subsequent damage to the cables by moving parts.



## Removal of the Front Cover

Tools required: 2mm, 3mm, 4mm handle Allen, 4mm L Allen, #3 flat-slot screwdriver, and #2 Phillips screw driver.

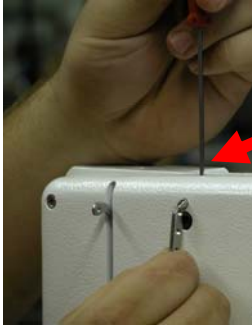


Figure 6

1. Loosen the set screw A in Figure 6, rotate the thread guide to allow access to the frame screw, then re-snug. (**2mm handle Allen tool**)

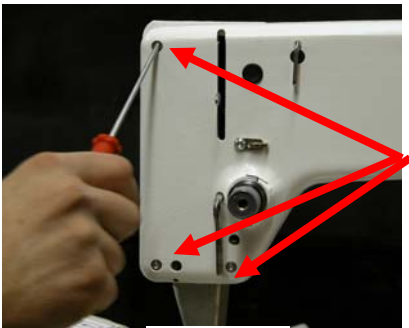


Figure 7

2. Remove the three frame screws as shown in Figure 7. (**3mm handle Allen tool**)

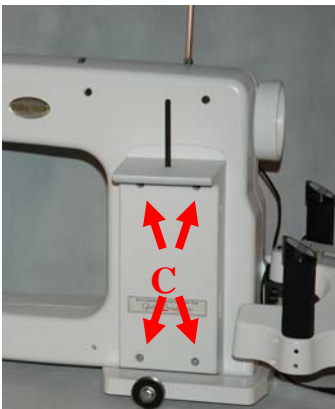


Figure 8

3. Remove the "C-pod" by unscrewing the 4 screws "C" in Figure 8. (**#2 Phillips screwdriver**)

4. Carefully unplug the cables from the C-print and pod. **Be careful not to touch the C-print.** Figure 9. See plug configuration on page 8.



Figure 9



Figure 10

5. Remove the needle plate. Figure 10. (**#3 flat-slotted screwdriver**)

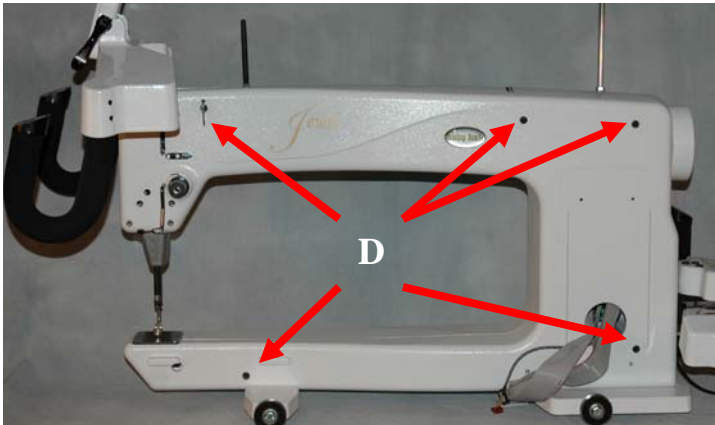
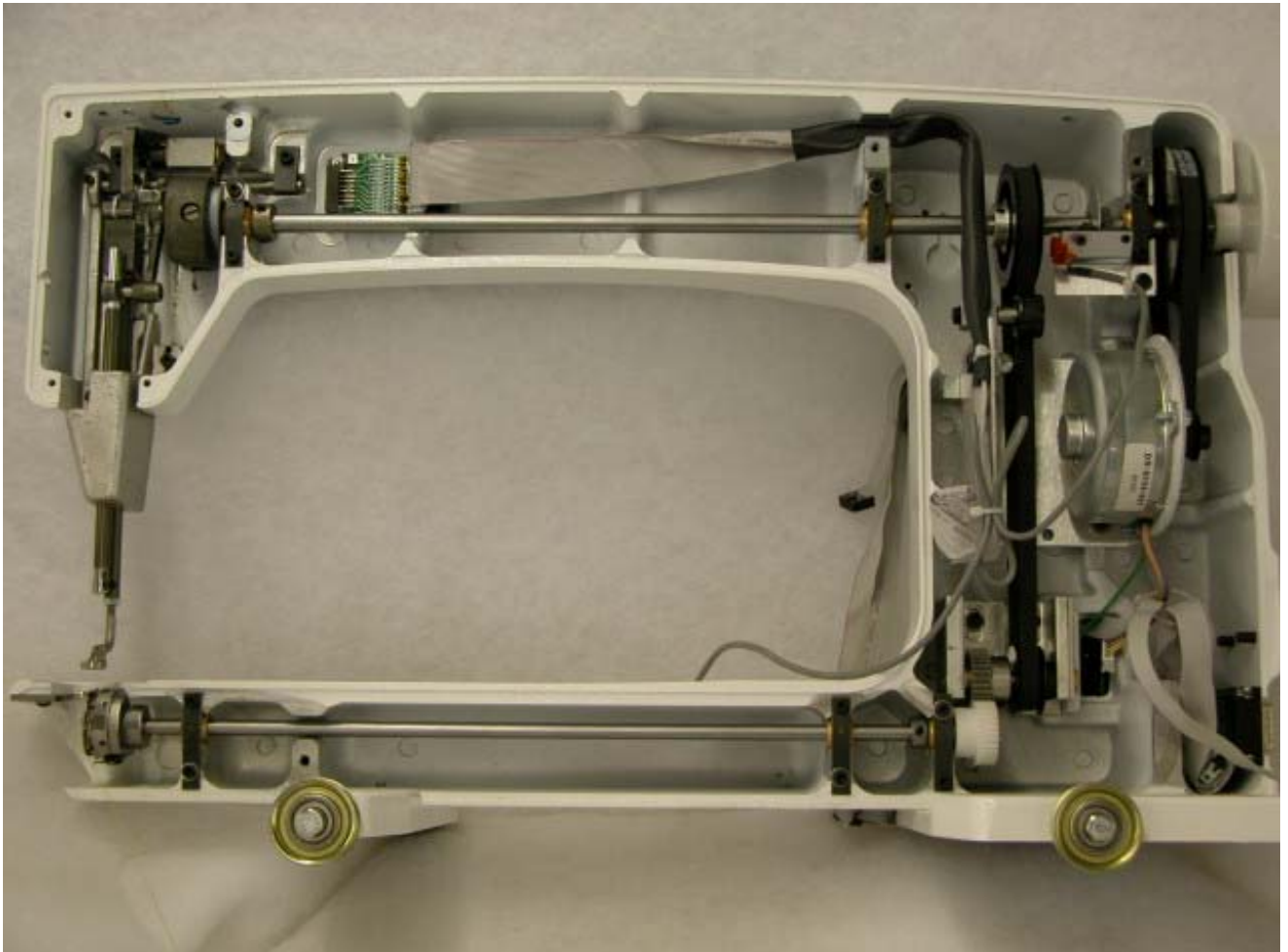


Figure 11

6. Remove the 5 frame screws "D" in Figure 11. Note: The fifth screw is behind the C-print removed in step 4. (**4mm handle Allen – may need 4mm L Allen tool to break loose screws**)

7. Separate the Front Frame Cover. ***Make sure the take up lever does not get caught in the frame slot.***  
*Note: If the frame cover is not easily removed, loosen the front base plate screws. (5mm handle Allen)*

## Machine Cross Section



## Checking and Securing Flats & Screws

This machine has been designed using flats and special screws so that loop lift timing cannot slip.

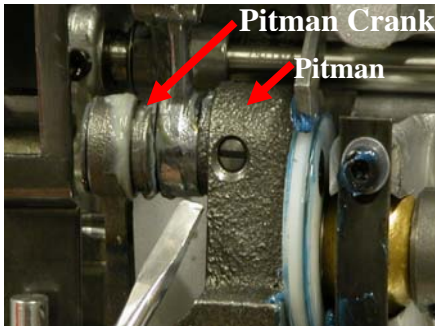


Figure 12

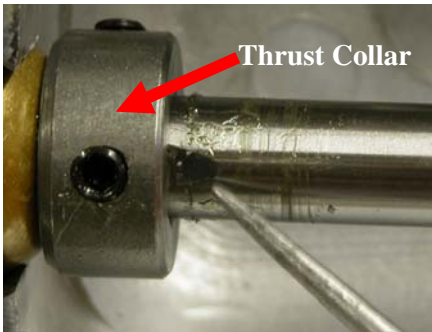


Figure 13

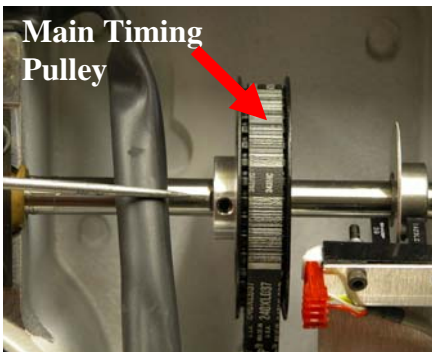
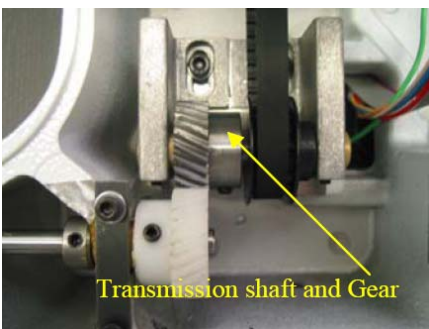


Figure 14



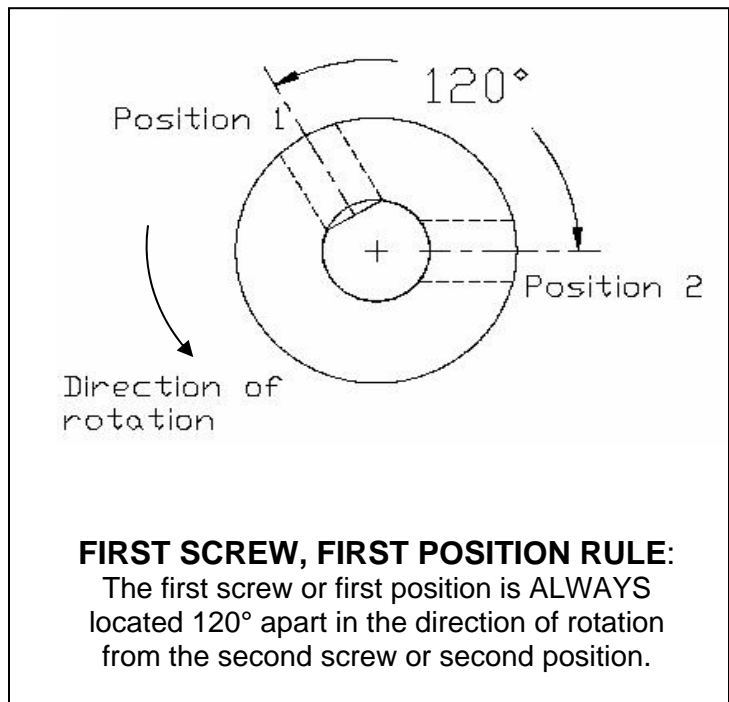
**Tools required: (2.0 and 2.5mm handle Allen)**

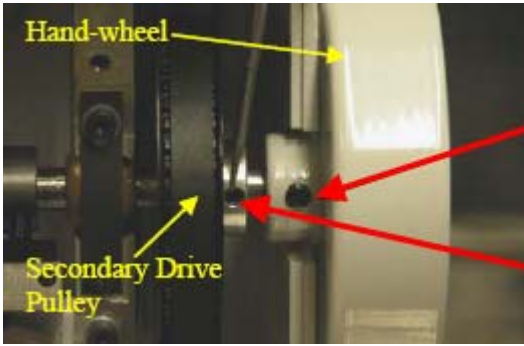
Check the following locations, making sure that the first screw of a timed component has been fixed firmly on the respective flats on shafts.

**Note: The screws are generally positioned 120 degrees apart. When the first screw (Position 1) has been located and tightened on a flat, the second screw is then tightened, compounding the tightness of the first screw, thus securing and assuring that timing will not change. (See Figure 12)**

**Note: See torque specifications chart in the specification section for torque values.**

**NOTE: The thrust collar flat is inclined. The first screw (shown in Figure 13) must be provisionally tightened. The second screw is then fully tightened. The first screw is then fully tightened. It is important to check that this collar tightening procedure did not create a tight arm shaft condition. If so, readjust the collar again.**

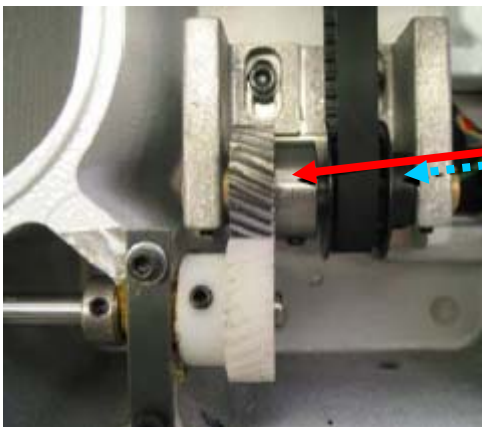




Hand wheel screw – inside frame (**3mm handle Allen**)

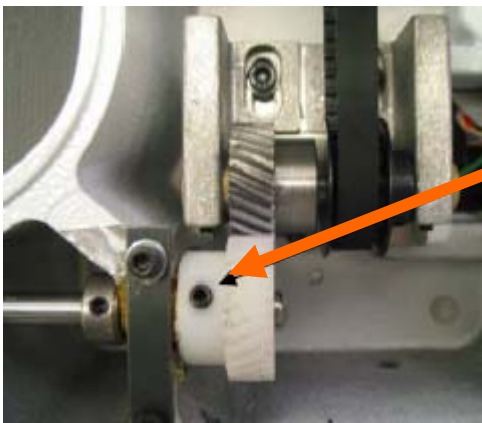
Drive pulley screws (**2.5mm handle Allen**)

Figure 15



Transmission gear & pulley screws – (**2.5mm handle Allen**)

Figure 16



Hookshaft gear screws (**2.5 handle Allen**)

Figure 17



## Axial Play Check and Adjustment

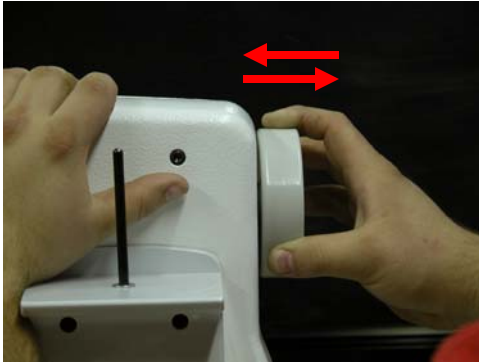


Figure 18

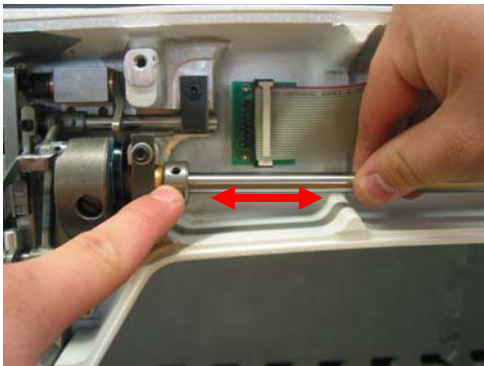


Figure 19

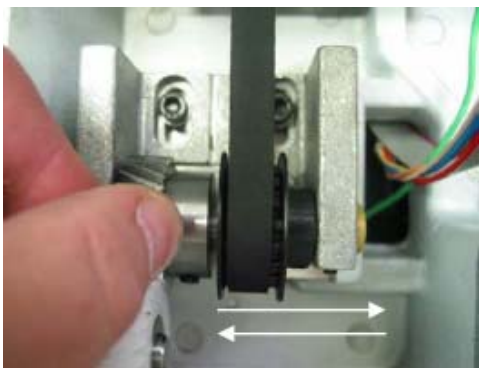


Figure 20



Figure 21

Axial or end play on shafting can result in noise, wear, and faulty sewing.

**Tools required: (2, and 2.5mm handle Allen)**

**Check:**

1. Check the arm-shaft by pushing and pulling on the hand wheel. See Figure 18. If a correction is necessary:
  - Loosen the thrust collar (See Figure 19)
  - Adjust so that no play is detected. **Care must be taken on the first screw that is fixed on an inclined flat so as not to tighten too tight at first.**
  - Provisionally set the first screw, tighten the second screw fully tight.
  - Tighten the first screw.
2. Check the transmission shaft by pushing and pulling axially on the gear as shown in Figure 20. If a correction is necessary:
  - Loosen the 2nd screw on the gear first and use the first screw (on the flat) to adjust any play by moving the gear outwards towards the bushing.
  - Tighten the first screw on the flat and then tighten the second screw.
3. Check the hook shaft by pushing and pulling the hook as shown in Figure 20. If a correction is necessary:
  - Remove the play by loosening the hook shaft thrust collar and adjusting out any axial play as shown in Figure 22. (*Note: No shaft flat is located here.*)

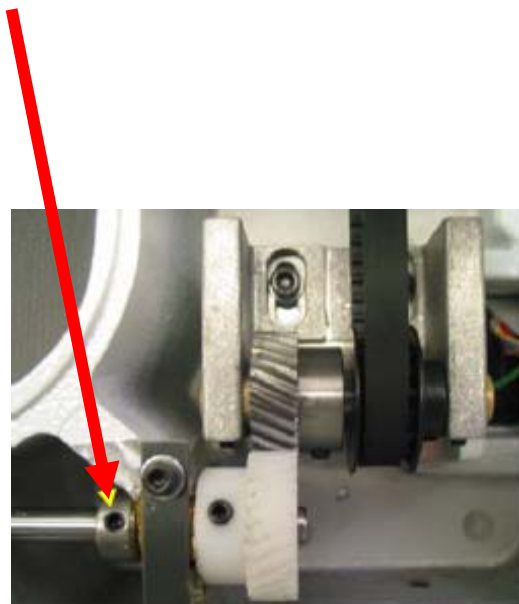


Figure 22

## Adjusting the Base Plate Feet and Rollers

Tools required: (5mm handle Allen)



Figure 23

### Check:

1. The Base Plate must be adjusted so that the rubber feet will sit flat on a planed surface.

If a correction is necessary: 0.012" shim washers may be used as shown in Figures 23 and 24.



Figure 24

### ***Adjustment of Base Plate Rollers:***



Figure 25

The base plate rollers must be equally spaced in their respective positions.

If a correction is necessary:

- Slightly loosen the front base plate screws.
- Shift the front base plate until the front and rear wheels are equidistant as shown in Figure 25.



## Adjusting the motor belt Tension

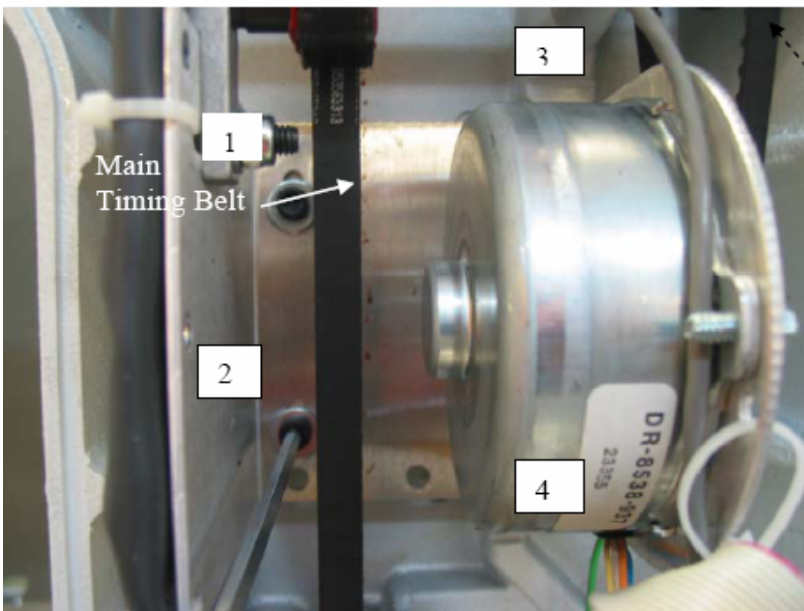
*NOTE: The motor belt tension need not be tightened as tightly as the main timing belt. See Figure 26.*

Check the belt tension for tautness by pressing it with the index finger (see Figure 26). Proper belt tension provides for some belt flexibility under light finger pressure, but should not be so tight as to bind the machine. If correction is necessary:

- Loosen the motor frame screws 1,2,3 and 4 shown in figure 27



Figure 26



*Note: screw # 3 and #4 are behind the motor on the right side (use the 4mm ball allen tool) for tightening)*

Motor belt

Figure 27

## Adjusting Transmission Gear Lash (play)

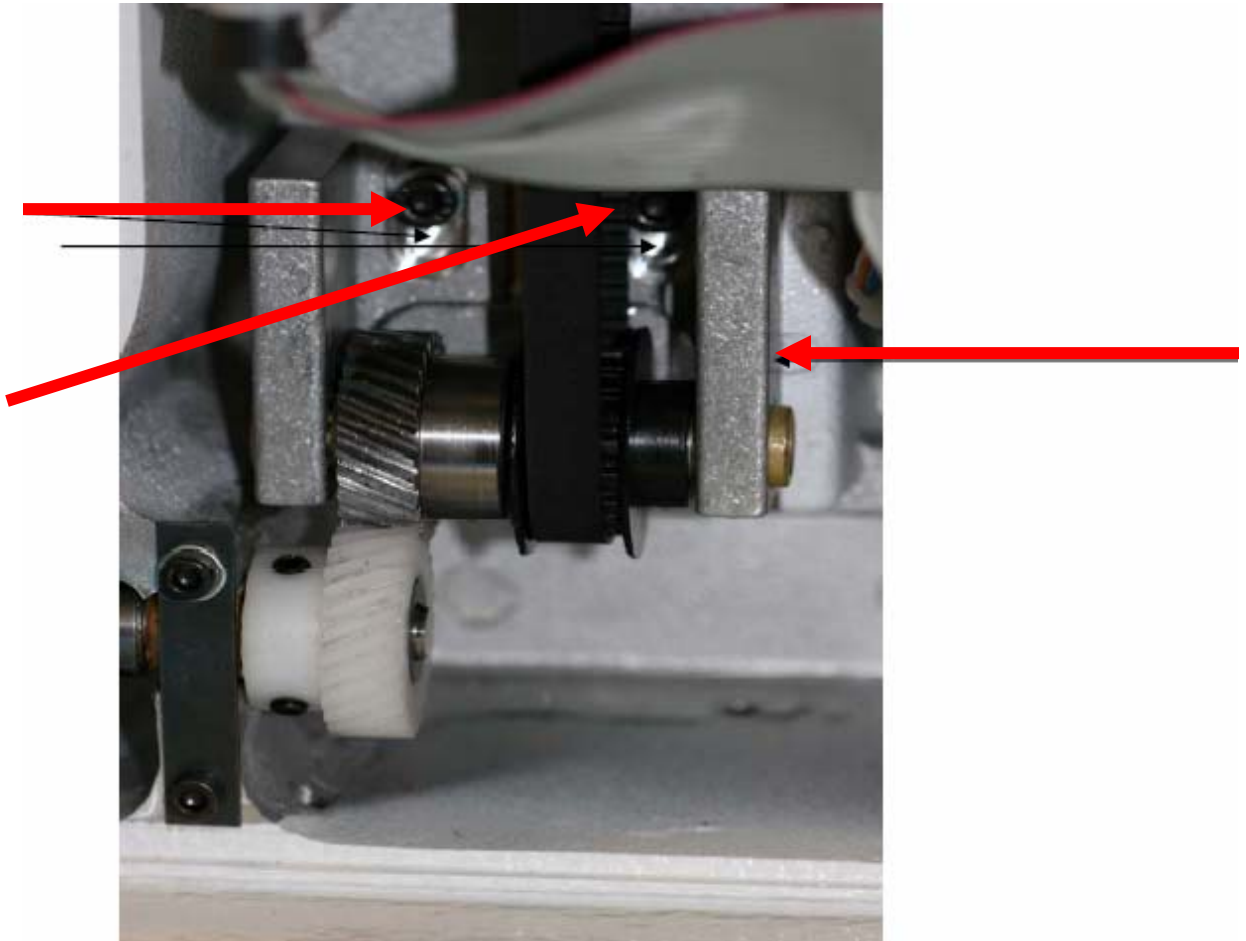
Check the transmission gear lash, between the metal transmission gear and the delrin hook shaft gear.

Note: Do not adjust this unless you are sure it needs adjusting. This will affect the timing of the machine. There should be little or no lash between the two gears. If correction is necessary:

- Loosen the two screws in the elongated slots on the transmission housing above the gear.  
**(4mm Allen tool)**
- Adjust the transmission mount with elongated slots up (for more lash) and down (for less lash) until has the least amount of gear lash and noise.

NOTE: The transmission housing is pushed to the right towards the hand wheel end of the machine, until flush with the machined edge while being adjusted.

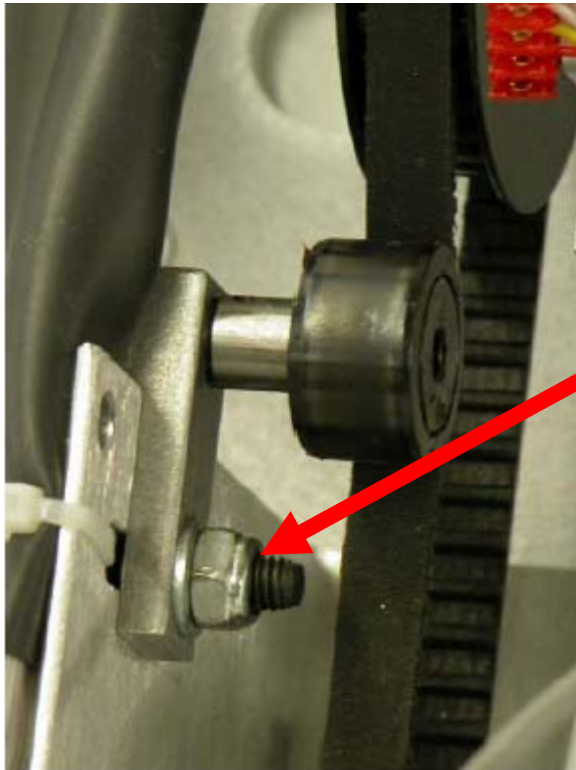
- Tighten the two transmission housing screws.
- NOTE: Improper adjustments of this setting will cause timing and noise problems.



## Adjusting the Timing Belt Tension

Check the timing belt for tautness by holding the transmission pulley and rocking the hand wheel. You should not be able to feel play between the belt teeth and the transmission timing pulley teeth. *NOTE: if you tighten the belt too much you will create a bind or extra noise in the machine. If a correction is necessary:*

- Loosen the idler pulley screw and locknut – the bracket has an elongated hole in the motor housing for idler adjustment. **(5mm Allen tool and 10mm wrench)**
- Adjust the idler pulley in or out until the timing belt has the proper tautness.



## Adjusting the Presser Bar Height

Tools required: (3 mm handle Allen, 0.5mm feeler gauge)



Figure 28

### Check:

When the needle bar is in its lowest position, the sewing foot should be no higher than 0.5mm above the needle plate as shown in Figure 28. **Note: the factory default on the sewing foot is with it screwed into the presser bar 7 revolutions. Check the foot without removing it by looking to see that there are about 13-15 threads of the foot exposed below the hopping foot jam nut.** It is important to check this before resetting the presser bar height in case the end user has changed the foot height. Improper setting of the presser bar height and foot height can cause stitch problems, including skipped stitches.

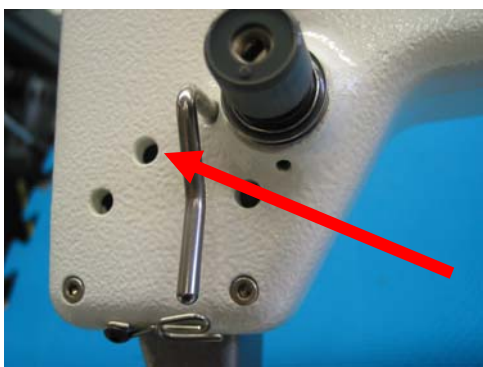


Figure 29

### If a correction is necessary:

- Turn the hand wheel until the needle bar is at its lowest position.
- Place the **(0.5mm feeler gauge)** under the hopping foot. Figure 28
- Loosen screw C through the machine front cover **(3mm Allen driver)** Figure 29
- Rotate the presser bar while raising the presser bar up or down to the desired position.
- Tighten screws C. Figure 29– push down lightly on the tool blade towards table while tightening.

## Adjusting the Presser Foot (Sewing Foot)

This machine features a hopping mechanism, allowing the sewing foot to move (hop) up, down, and dwell on the fabric when the needle is in the fabric. This allows fabric to move through the machine similar to a normal sewing machine with a feed dog. The dwell time allows for a longer hesitation of the foot on the fabric and completion of the stitch cycle. The results are better tension, less needle breakage, and increased hook life.



Figure 30

### If a correction is necessary:

- Install the loop lift clamp onto the right angle bend of the sewing foot as shown in Figure 30. While holding the clamp and foot, loosen the jam nut. Screw the foot shaft to the desired height. Tighten the jam nut. **(clamp, 8mm open end wrench)**

**Note: Under NO circumstance loosen or tighten the jam nut without HOLDING the sewing foot as indicated**

## Needle Position, Check, & Adjustment

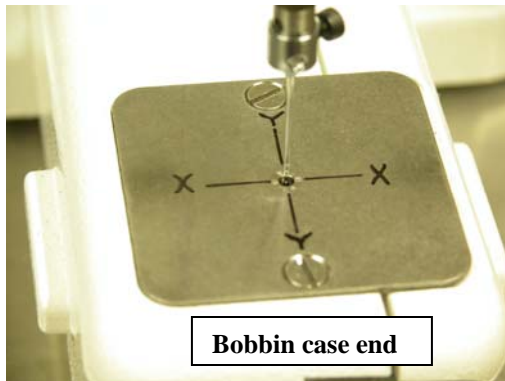


Figure 31

The needle position adjustment is the most important of all adjustments in the machine. Needle Position provides the foundation for which all other settings are made. Once the needle position has been completed, great care must be maintained to keep this setting. It is important that the sewing instrument is transported in a most careful manner so as not to allow bumping or dropping.

**Tools required: 2mm, 3mm handle Allen**

**Check:**

- Use a new 134R (135 x 7) needle. The needle must be centered in the stitch hole of the needle plate as shown in figure 31. **(2mm and 3mm handle Allen)**

### Adjustment for Y axis:

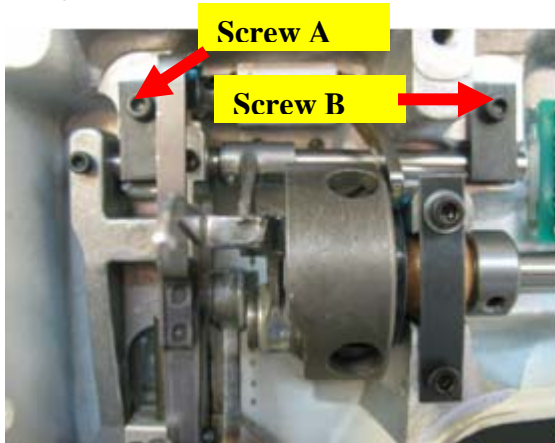


Figure 32

Note that adjustment is done with the front frame cover off.

- Loosen first the screws G and D in figure 33 **(3mm handle Allen)**
- Loosen screws A and B in figure 32. **(3mm handle Allen)**
- While pushing the head frame back into the main casting, gently slide the head frame left or right to correct as necessary.
- Tighten screws A and B in figure 32.

**(Note: If needle position changes, repeat the process.)**

### Adjustment for X axis:

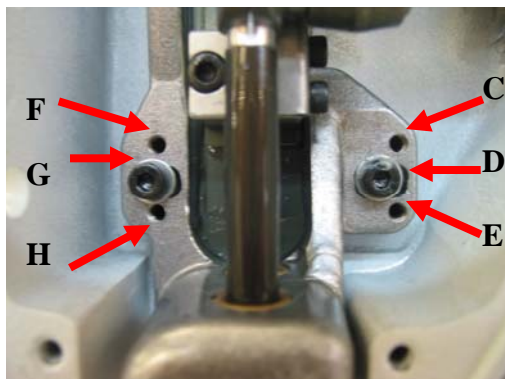


Figure 33

**Note that adjustment is done with the front frame cover on. Important Note: The picture shows the cover off for illustration purposes only!**

The primary adjustment is accomplished using the right side of the head frame shown in Figure 26. The screws on the left side are loosened to allow movement of the head frame.

- If a correction is necessary, loosen screws F, H, **(2mm handle Allen)** and G **(3mm handle Allen)**.
- Loosen screw D **(3mm handle Allen)** and back off screw E **(2mm handle Allen)**.



- Push the head frame back against the main frame so that screw C touches the main frame. Adjust screw C (**2mm handle Allen**) to bring the needle to center in the needle plate.
  - Gently tighten screw E until it lightly touches the main frame.
  - Tighten screw D.
  - Repeat process on the left side of the head frame.
- (Note: If needle position has changed, repeat process)

7.0

## Adjustment of the Loop Lift and Needle Distance

“Loop Lift” is a universal hook and timing term for all lock stitch sewing machines. When the needle lifts a specified distance from the **BDC (bottom dead center)**, the hook point is set to coincide with the needle as shown in figures 8.4 and 8.5



Figure 34



Figure 35



Figure 36

**Tools required: (loop lift clamp, a 2.2mm forked feeler gauge, and a #3 x 150 flat-slot screwdriver)**  
**NOTE: The loop lift clamp used must have a plastic protective compression pad, so as not to damage the coating of the needle bar.**

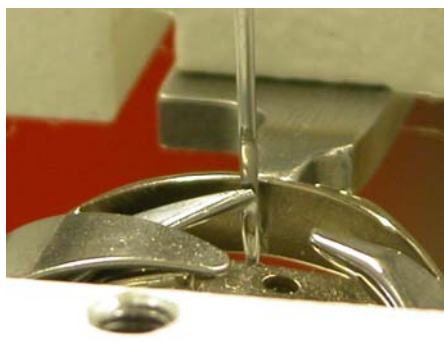
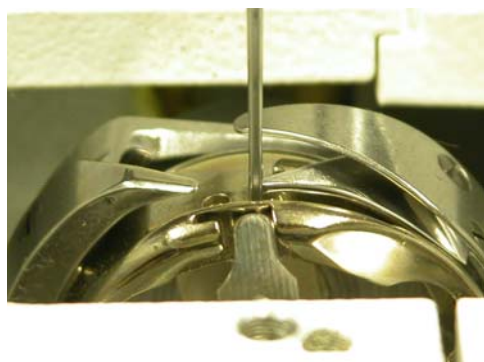
### Check: (observe the following)

- Turn the hand wheel until the needle bar is at its lowest position or **BDC**.
- Place the loop lift clamp (special protective clamp) on the needle bar and set the thumbscrew lightly.
- Place the 2.2mm feeler gauge between the clamp and the projected bearing in the head frame (see Figure 34).
- Raise and reset the clamp, pinching the 2.2 feeler gauge in between the clamp and projected bearing. **This step may be repeated a few times to remove all excess play between the clamp and gauge.**
- Remove the 2.2 feeler gauge (see Figure 35).
- Rotate the hand wheel in the direction of motion until the clamp touches the bearing (see Figure 36).
- Check the position of the hook point relative to the needle. (See Figures 37 A & B).

**Note: When the hook screws have been loosened, the adjustments of the loop lift and needle distance are possible since the hook can be moved radically as well as axially.**

If a correction is needed: 1st rotate basket down, see Figure 41 in *Adjusting Needle Height* section.

- Loosen the screws on the hook base and set the hook to the correct positions by sliding the hook axially on its shaft, as well as radically, setting the hook point relative to the needle (needle distance).



See note next page.

Figure 37 A & B



Figure 38

**Rotating basket down** - Note: With the bobbin case basket in the normal position, the basket needle guard deflects the needle and makes it difficult to accurately adjust the needle distance between the hook point and the back of the needle scarf. It is important that the basket needle guard be rotated down out of the way to allow correct adjustment of the needle distance setting. Figure 38 shows the stop finger engaged with the bobbin case, installed from down below.

Stop finger engaged with bobbin case installed from below. Figure 38



Figure 39

Stop finger engaged without bobbin case from above – Figure 39



Figure 40

Rotate the basket out of the way to facilitate the needle distance adjustment - **Important: after moving stop finger you need to hold basket in place when turning hand wheel to prevent needle from hitting basket.**

- Loosen the stop finger screw with the **(2.5mm handle Allen tool)**.
- Slide the stop finger out of the basket groove, until the basket can be rotated.
- Snug the stop finger screw.
- Rotate the basket 180 degrees until large cutout is up towards needle as shown in figure 40 (**you will now need to hold the basket in that position - see important note above**)



## Adjusting the Needle Bar Height

Tools required: (#2 or #3 Flat-slot screwdriver x 150mm)



Figure 41

### Check:

**This adjustment must be completed with the front frame cover on. Important note: shown with cover off for illustration purposes only!**

The needle height must be set so that when viewed from behind as shown, the hook point is flush with right side of the needle. The bottom of the hook point should be 1.0mm above the top of the needle eye. (See figure 41).

If a correction is necessary:

- Lower the needle bar to its highest position.
- Insert a screw driver through the access hole. (See figure 42.)
- Loosen the screw slightly so that the needle bar can be wiggled up or down to the correct position.

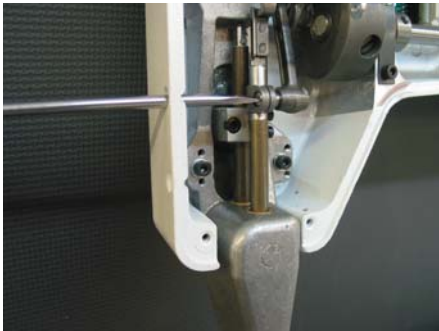


Figure 42

**Note: Under NO circumstance should the needle bar clamp screw be completely loosened. Failure to observe this caution can result in the uncoupling of the needle bar from the needle bar driver. If this happens, do not run the machine. Remove the front frame cover, reassemble the needle bar to the needle bar driver and readjust.**

## Adjustment of the Stop Finger

Tools required: (2.5mm handle Allen)



Figure 43

### Check:

The engagement of the Stop Finger and throat of the bobbin case support basket must have a clearance of 0.8mm to 1.0mm. ***(This clearance ensures that adequate space exists for thread escapement during the sewing process).***

If an adjustment is necessary:

- Loosen screw A, in Figure 43 and adjust the stop finger so the proper clearance is achieved as shown in Figures 43 and 44.
- Tighten screw.

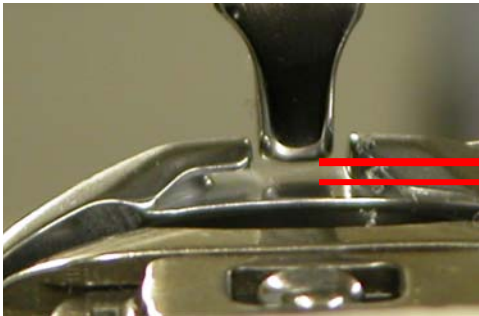


Figure 44

0.8mm to 1.0mm



Figure 45

Stop finger engaged

## Adjusting the Needle Height with Cylinder Tool

**Note:** *The adjustment with the cylinder tool requires that the hook be removed, so loop lift and needle distance will have to be reset afterwards.*

**Tools required:** (#2 or #3 flat slot screwdriver x 150mm, Needle Height Cylinder tool)

**Check:** Turn the hand wheel in the direction of motion until the hook point becomes even with the right side of the needle as shown in (Fig 46). The hook point should be 1.0mm above the needle eye. If the height of the needle appears to be out, install the Loop Lift Clamp and 2.2mm feeler gauge as shown in the Adjustment of Loop Lift and Needle Distance Section, check loop lift. If the machine requires a Loop Lift adjustment, remove the stop finger and hook body from the machine. Follow the steps using the Needle Height Cylinder tool:

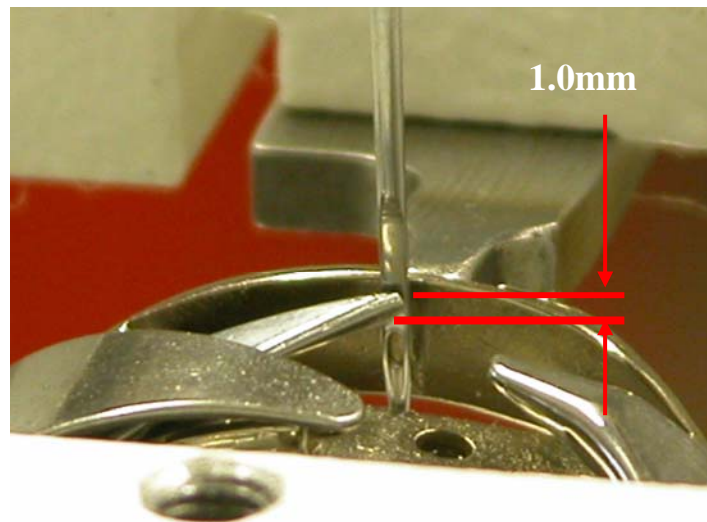
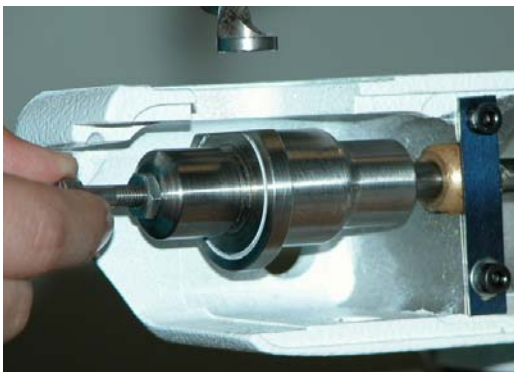


Figure 46

### ***Needle Height with Cylinder Tool***

**This adjustment can be completed with the front frame cover on or off.**

The height of the needle must be set from the front side of the machine as shown. The eye of the needle must align exactly to the trepan groove as shown in Figure 51.



1. Install the Cylinder Tool with the flat side up. (Figure 47)

Figure 47

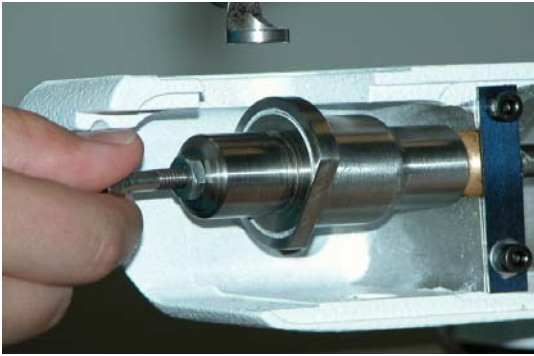


Figure 48

2. Rotate the Cylinder Tool so that the flat side is down. (Figure 48)



Figure 49

3. Bring the needle to the lowest point by rotating the hand wheel. (Figure 49)



Figure 50

4. Slide the Cylinder tool gently against the needle. (Figure 50)

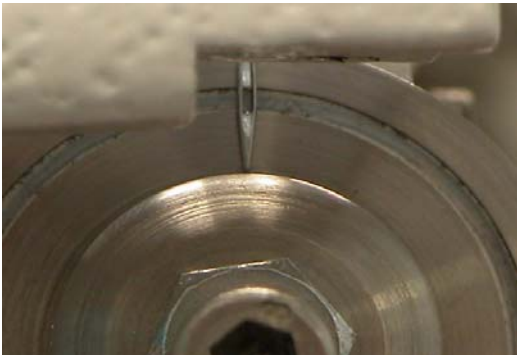
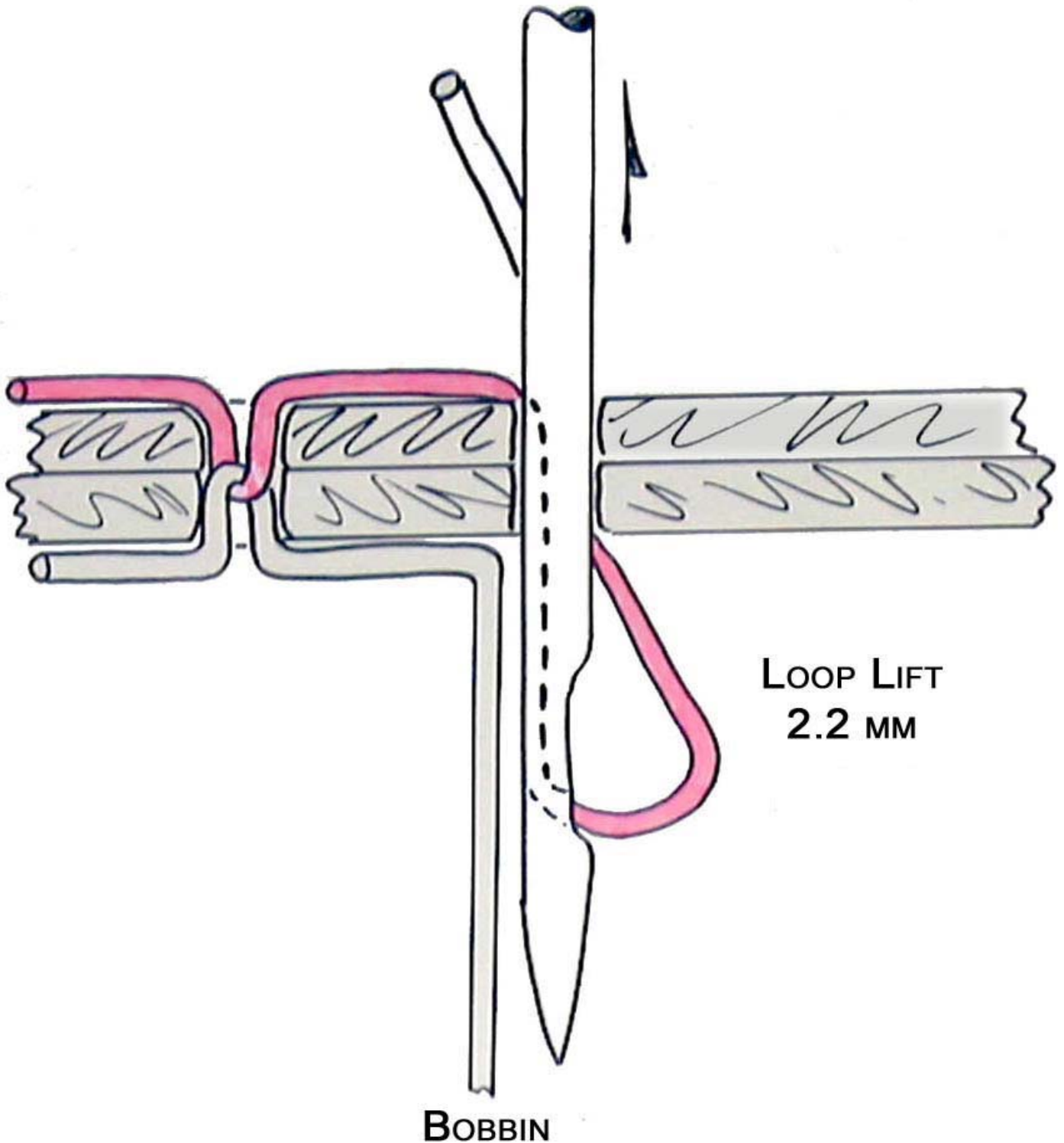


Figure 51

5. Sight through the needle eye and compare the upper and lower levels of the eye with the Cylinder tool groove. If an adjustment is necessary, loosen the needle bar driving clamp slightly and raise or lower the needle bar. (#3 Flat-slot screwdriver x 150mm)
6. Reinstall the hook and set loop lift at 2.2mm and reset needle distance. (See *Adjustment of the Loop Lift and Needle Distance* Section)

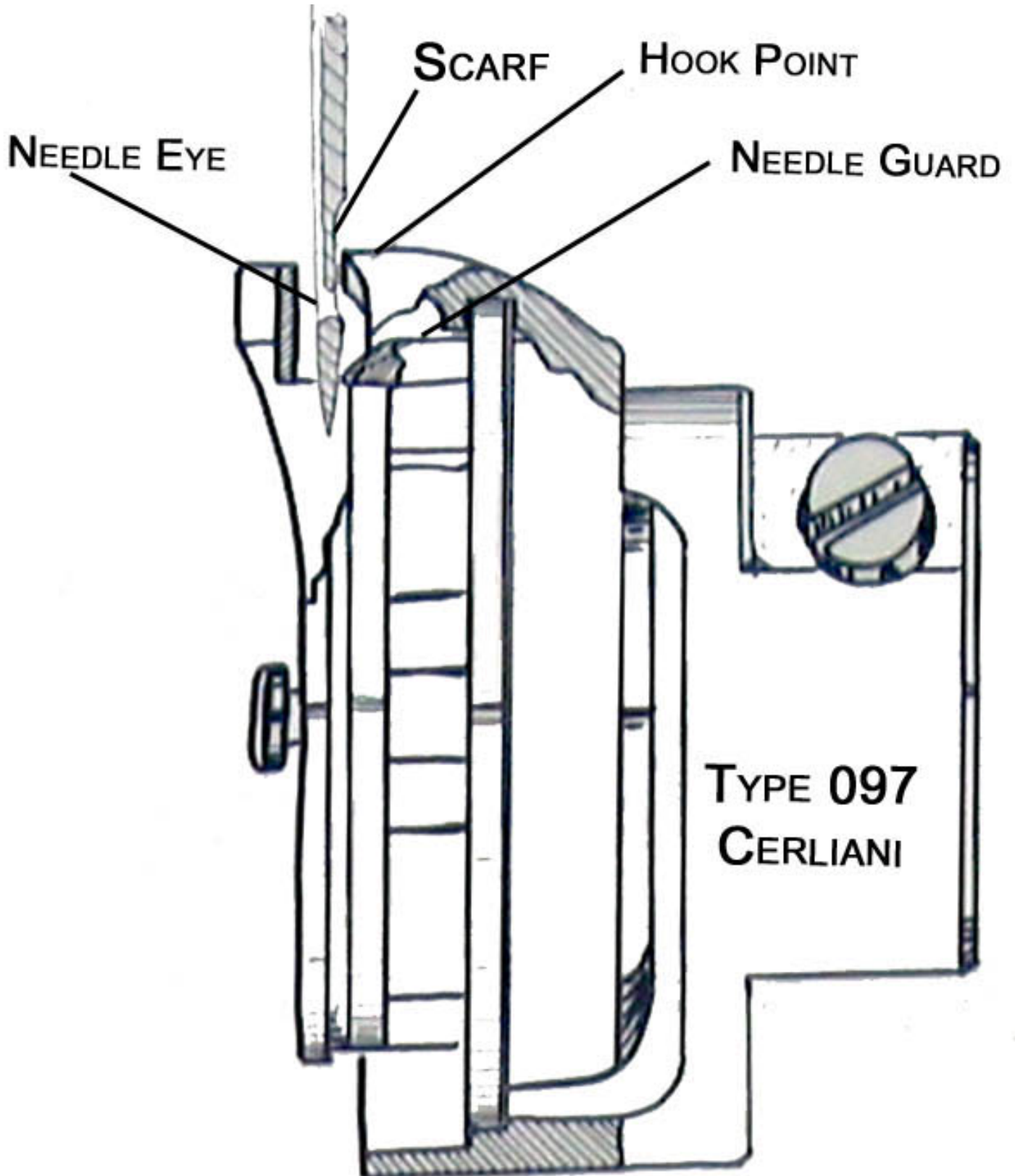
## Baby Lock Jewel Trouble Shooting Guide

### *Loop Lift*

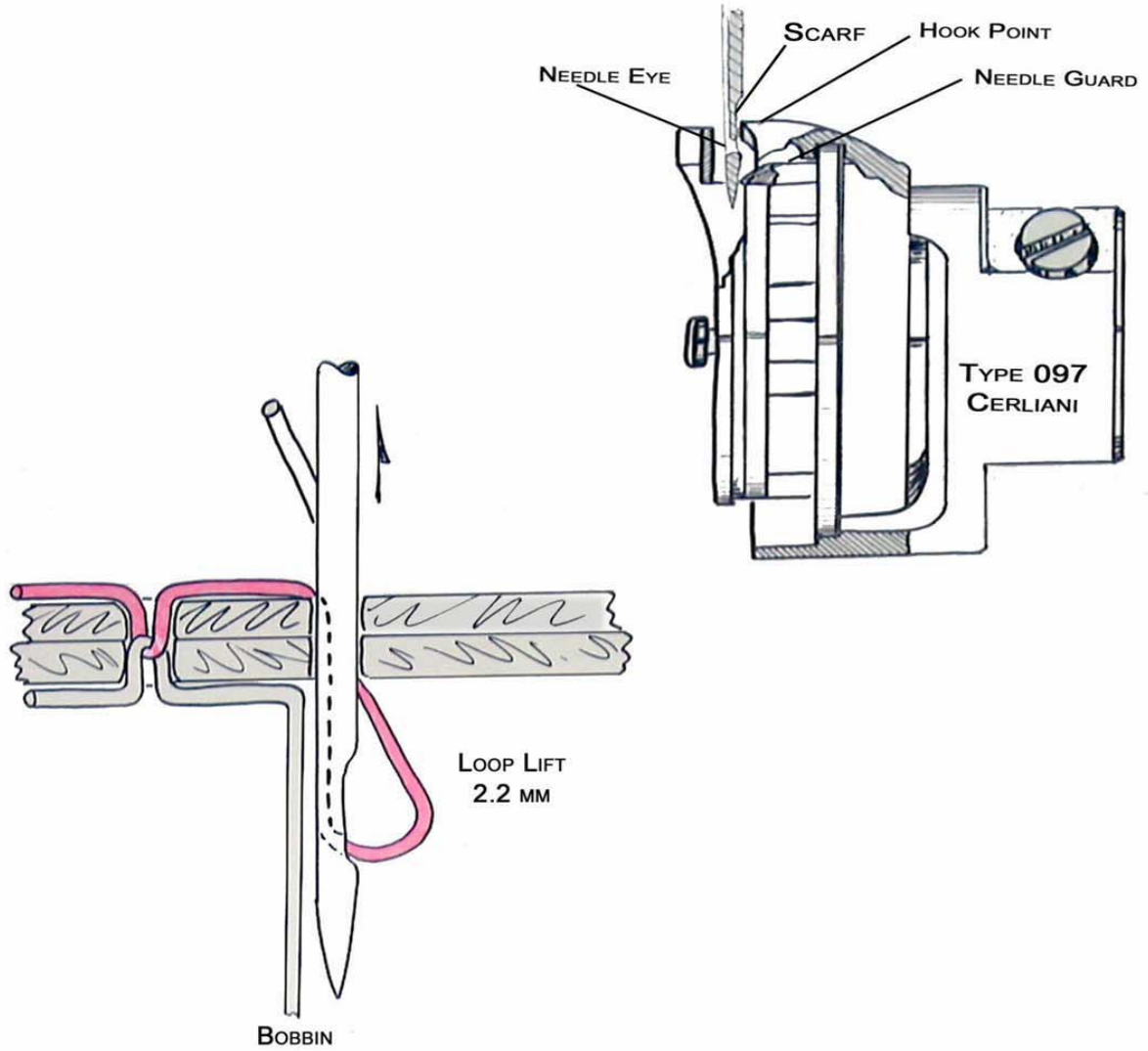




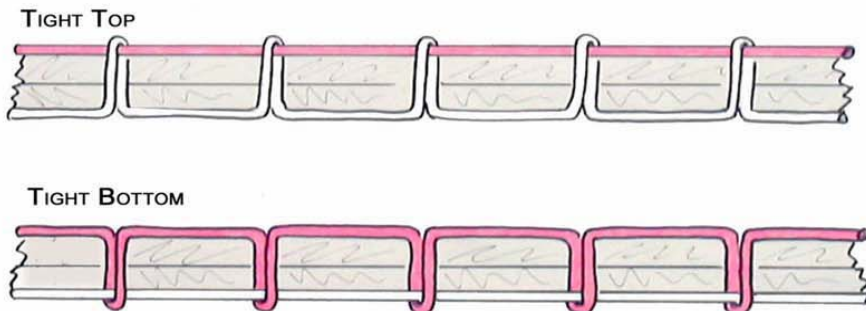
***Needle Hook Reference***



## Loop Lift, Hook, Tension Illustration



### TENSION IMBALANCE





## ***Bobbin Case Tension Adjustment***

- Paradigm shift from “Never touch the bobbin case tension.” Wound too tight or too loose or inconsistent problems with bobbin winder. If bobbin is wound poorly the tension will not be able to be set correctly. Warped bobbin case from dropping. Warped bobbin from winding too tight (pretension set too tight).
- Foundation - -bottom like a house – foundation crack story - -it will never be right until the foundation is corrected or the true cause of the problem is corrected.
- Bobbin case - -foundation to top tension – spring location – lint built up. With factory set bobbin thread loaded, you should achieve a 20-25 gram pull.
- Built in backlash spring – with small screw on the face of the bobbin case, adjust the backlash spring. It should put slight pressure on the bobbin to prevent the bobbin from spinning after a customer comes to a sudden stop.



## ***Understanding Top Tension***

Normal domestic sewing machines have a presser foot lifting lever with a top tension releasing mechanism. When this lever is raised the top tension is released taking pressure off from between the two tension disks of the top tension mechanism. This makes the top thread loose so the thread does not resist when the fabric is pulled away or out of the machine. It also makes it easier to thread the machine because the disks are loose when the thread is pulled into the top tension.

The quilting machine does not have a presser foot lifting lever or a top tension release mechanism. Therefore the top tension disks always have tension between them. If the top tension is tightened too much it will become almost impossible for the top thread to be pulled deep in between the tension disks which will result in significant tension problems.

One sign that the thread is not in between the tension disks is when the thread can be seen on the outside of the tension assembly between the two disks. This has the appearance that the thread is in the correct position while it is not. When the thread is deep in between the disks - all the way, it will not be visible. Thread floating on the outside radius of the tension disks will result in little to no top tension and consequently frustration. The end user will not be able to see any difference in the stitch quality as they adjust the top tension – because the thread is not in the top tension. This will make the machine “seem” inconsistent.

### **Some things to check - Visual checks of the top tension assembly:**

- The gray knob has a round dot to help determine how much the knob is turned.
- A starting point for the top tension knob is when approximately 3-5 internal metal threads inside the knob center hole are visible before the end of the split center bolt onto which it is threaded. Approximately 60-65 grams while pulling straight up from the tension disc with gram meter. If the knob is screwed on too much, it will become difficult if not impossible for the top thread to enter in between the tension disks. If the end of the split bolt is almost flush with the tension knob it will be too tight for the thread to be threaded in between the two tension disks. On the other hand if many more than 3 to 5 internal threads are showing, i.e. the end of the bolt is “way inside” the knob, then the tension will be way too loose – resulting in looped stitches or thread nests on the bottom of the quilt.
- The center split bolt should not turn. (This indicates that the center bolt retaining screw is loose – located on the back side of the top tension assembly –seen only when the entire tension assembly is removed from the machine).
- The entire mechanism should not turn. (This indicates that the retaining screw on the machine front casting – under the tension assembly is loose).
- The take up spring should be up at 11:00 – 12:00 o'clock position and should rest without thread against the right side cutout. Note: the position is set so that when the top of the needle eye meets the top of the fabric the take up spring releases the top thread.
- The back tension disk should not touch the machine casting – it should have about a 1mm gap between the disk and the casting.

## ***Thread Shredding & Breaking Issues***

- Loop lift - set incorrectly
- Needle bar height – set incorrectly
- Needle distance - set incorrectly
- Bent needle
- Damaged needle – needle has been damaged – hit or deflected off something and now has a small burr which catches and damages the thread.
- Defective needle – a needle that in manufacturing ended up with a small burr, deformity, or defect that catches the thread and damages it on the needle point. See note below.
- Bad thread – old, rotten, cheap, weak, poor quality, etc.
- Note: because we are doing freehand sewing – moving the machine over fabric held in place on the frame – it is possible to pull or push the thread under the needle - thereby “sewing over or into the thread”. The needle point actually hits and pierces the thread damaging it. A needle with a good or polished point can greatly help reduce this problem.
- Pushing the machine too fast or too slow causing fabric damage, needle damage or needle collisions.
- Defective lower paper clip type thread guide – nick in chrome which damages the thread.
- Defective lower needle bar clamp thread guide – cracked chrome which damages the thread.
- Other thread guides with defect, nick or groove which might cause thread damage.
- Thread must not over center of cone.
- Cone moving around on spool pin.
- Thread catching on cone, spool or anything causing momentary thread tension changes

## ***Skipped Stitches***

### **Proper Stitch formation:**

- The needle goes down through the fabric to its lowest position.
- The needle is the proper size for the fabric being sewn and the thread being used.
- The needle has a long groove down the front and an eye that fits the thread appropriately. The bigger the needle the bigger the long groove down the front of the needle and the bigger the eye of the needle.
- The fabric presses the top thread against the back of the needle but not at the front because the long groove protects the thread in the front.
- The hopping foot holds the fabric down firmly as the needle rises to form the loop.
- The top thread is pressed to the back of the needle by the fabric when the needle rises slightly. The top thread then forms a loop on the back of the needle, using the principle of friction.
- The hook rotates into the top thread loop just formed and continues to rotate as the top thread goes across the hook and bobbin case and is wrapped around the bobbin case thread.
- The take up lever then pulls the excess top thread back up completing the stitch.
- Proper tension settings on the bobbin case (bottom thread) and the top tension assembly (top thread) along with a little help from the take up spring, insure the stitch is balanced and locked in the fabric.
- When the stitch is locked in the fabric properly it will be strong and nice looking because the knots will be locked up in the fabric with proper friction.

### **Four major causes of skipped stitches:**

- Improper loop formation: out of time, poor friction due to slippery fabric and or thread, poor friction due to wrong size needle for fabric and thread – needle makes too big of a hole to have proper friction for stitch formation, fabric trampolines due to hopping foot being set too high, – loop does not form.
- Improper loop position: out of time, needle installed improperly eye rotated, needle installed improperly too low.
- Improper hook position: out of time, improper distance between needle and hook, damaged hook or broken hook point.
- Improper needle position: out of time, improper needle bar height setting, bent needle, wrong needle system, improper needle position setting.

### **More Causes of Skipped Stitches:**

- If one moves too fast, too slow or too broad it can cause skipped stitches even if everything else is correct. This happens because the needle is deflected by the operator while in the quilt fabric and this effectively changes the timing between the hook and the needle.
- Too much tension can cause skipped stitches – even if top and bottom are balanced.
- Tensions that are too loose can cause skipped stitches – as well as thread locks.
- If the tensions are too imbalanced, then one thread will be straight with no knots in the fabric and therefore there will be no fabric friction between each stitch. This makes it possible to pull the straight thread out of the fabric because of no friction on the thread at each stitch knot.

- Pro Frame side arms assembled in the wrong holes.
- Too much fabric tension on the poles can cause it to trampoline or flag.
- Improper threading – missed thread guides or thread not pulled up into the top tension assembly disks.
- Bobbin case spring dislocated or full of lint.

#### **Four things required for proper machine timing setting:**

- Needle – straight proper size and system.
- Needle height.
- Needle distance.
- Loop lift.
- Note: it is critical that there not be excess play in the hook shaft or needle bar in order to set the above correctly.

### ***Stitch length in Manual & Stitch Regulation Mode***

#### **Manual Mode - user selects motor speed**

In manual mode you can select the desired motor speed and then the speed of your movement determines the stitch length. Consequently, consistent movement/speed is very critical to a consistent stitch length. The faster you move the longer the stitches will be. The slower you move the shorter the stitches will be.

#### **Stitch Regulation Mode - user selects Stitch Length = # of stitches per inch**

In Stitch Regulation Mode you can select the desired stitch length - but cannot select the motor speed on the controls. The motor speed is then controlled only by your movement/speed. The faster you move the faster the machine sews. The slower you move the slower the machine sews. If you move too slow, the machine will sew in the same place - causing broken stitches and other problems. If you do not move at all the machine will stop. If you move too fast you will exceed the Stitch Regulator's capability to keep up thereby defeating the Stitch Regulation capability and also the selected stitch length. The machine will go into Overspeed Mode (the operator is moving across the quilt faster than the machine can keep up – even at 100% speed). In Overspeed Mode the machine sews 100% speed in an attempt to keep up - it can not sew any faster than 100%. When the operator moves a little faster in Overspeed Mode the stitches will be longer and if the Operator moves a little slower in Overspeed Mode the stitches will be shorter. In either case in Overspeed Mode the stitches will not be the length the operator selected ***“Because the operator was moving faster than the machine could physically keep up”***. When the operator slows down to where the machine can keep up and regulate, it will automatically start regulating again, and produce the selected number of stitches per inch.

In both modes an even speed brings the best and most consistent stitch length results.

Summary:

The operator must move the machine within the physical parameters and capability of the machine for the Stitch Regulator to perform correctly. If the operator does not move – or moves across the quilt too fast, the stitch regulator will not perform as the operator desires. The more stitches per inch the operator selects the slower the operator will be able to move across the quilt – because the machine has to sew faster to do more stitches per inch. The minimum is 4 stitches per inch and the maximum is 15 stitches per inch. For example the operator must move the machine much slower with 15 Stitches per Inch selected than with 4 Stitches per Inch selected.

## Stitch Regulator

### ***Stitch Regulator Basic Theory:***

***In Manual Mode*** the operator selects the desired % of machine motor speed on the display and the stitch length is determined by how fast the operator moves the machine across the quilt. The faster one moves the longer the stitch – the slower one moves the shorter the stitch.

***In Regulation Mode*** the operator selects the desired stitches per inch – from 4 to 15 Stitches Per Inch (SPI) and the machine motor speed is controlled by the stitch regulator which responds to the speed of the operator's movement of the machine across the quilt. The machine will then maintain the selected SPI, if the motion is within the stitch regulator's capability or parameters. *Note: In Regulator Mode the operator cannot select the % of machine motor speed on the display – because it is controlled by how fast they move the machine across the quilt only.*

### **The Regulator will do the desired stitches per inch if:**

- The regulator is installed, connected, activated, and selected properly.
- The machine is not moved too slowly.
- The machine is not moved too fast.
- The machine speed is not too erratic - changed radically or too quickly.
- Regulation mode works best when the operator is smooth and consistent

### **Possible Misunderstandings:**

- Misunderstanding that – One can move the machine any speed and the machine will do the same size stitch in Regulation Mode. The following is not true - "The machine will do the same size stitch no matter how fast you move".
- Not knowing that: One can move faster than they really should in Regulated Mode. Note: the fewer Stitches per Inch selected the faster one can move – the more Stitches per Inch the slower they must move to stay in Regulation Mode. If one moves too fast the machine will go into "Overspeed Mode" rendering the Regulation Mode ineffective until the operator slows down under the Overspeed Mode.

### **Setup and Mechanical Problems:**

- Improper installation of the SR encoder wheels - bracket too tight or too loose.
- No spring on rear machine encoder wheel.
- Encoder wheel mounted in wrong place/position on carriage. Note: both encoder assemblies are mounted on the left side – as seen by the operator from the front handle bar – one on the power cord side of the machine and one on the front of the carriage – carriage front is the side with the long overhang on the carriage.
- Improper connection of the encoder cables. Single cable to front carriage encoder – double cable to back machine encoder.
- Regulator not activated properly. Note: make sure done in Setup / Regulated, - not Setup / Serial – which is 1 line above Regulated on the LCD display.



- Carriage on backwards – long overhang goes to the machine front by needle.
- Rubber wheel has come off encoder assembly: was peeled off the encoder assembly when the machine was removed from box, came off because machine was slid sideways on a surface before machine was placed on carriage
- Ran over encoder cable with the machine metal wheel before connecting it damaging it.
- Cables not plugged into the two encoders and the c-pod..
- Rear machine encoder bracket bent by sliding the machine sideways.
- Rear machine encoder stop bent down holding wheel up off carriage track.
- Carriage encoder bracket bent.
- Small rubber wheel not riding on bottom plastic part of track.
- Wheel not on track – bracket bent.
- Encoder wheel loose on axle – 1/16” Allen tool screw loose.
- Spring came out partially or completely from under base plate on rear encoder wheel assembly.

### **Operation Problems:**

- Moving too fast or slow or with too much irregularity or quick speed variations.
- Did not hit “select” the 2<sup>nd</sup> time to fully activate the stitch regulator.
- Not aware that they must move slower with more stitches per inch (SPI), e.g. 15 SPI and that they can move faster with less SPI, e.g. 4.SPI

## Stitch Regulator – Methodical Check

1. Usually start with theory of how the Regulator works and what it will and wont do.
2. Check the mechanical things to make sure installed and connected correctly.
3. Have them unthread the machine all the way – place the spool on another table and remove the bobbin case.
4. Make sure the regulator is activated correctly.
5. Make sure they are hitting select the 2<sup>nd</sup> time to fully activate the regulated mode.
6. Have them check if the machine will do about 3 or 4 stitches and stop in regulated mode if the machine is not moved. (Have them hit start and not move)
7. Ask them how many stitches they think the machine will do if they just stop moving in Regulated Mode (It will also be about 3 or 4). Make sure they understand why the machine sews a few more stitches if they just stop moving the machine and that if they want to stop fast they must hit the stop button.
8. Have them move slow like a snail from front to back and gradually speed up – does the machine sound like it is responding to their increase and decrease in speed? Ask them if it is responding?
9. Do the same check left to right. Can you hear the machine responding to their speed? Ask them if it is responding.
10. Have them do a 10” circle – listen and determine if the machine responds to both encoder wheels at the same time and respond to their speed? Ask them if it responded.
11. Have them move too fast so they see and hear what the machine does when it goes into “Overspeed Mode”.

If the machine will do these things then it will respond to the regulator.

.

## ***Stitch Regulator Trouble shooting:***

### **Setup Errors:**

- Over selling the SR capability: “The machine will do the same size stitch no matter how fast you move”.
- Improper installation of the SR encoder wheels - too tight or too loose – bind because they are too tight so they wont spring up and down
- No spring on encoder wheels or improperly installed or at the wrong place on carriage. Note: Both encoder wheels are on the left as seen by the user from the front handles.
- Improper connection of the encoder cables.
- Regulator not activated properly.

### **Operation Errors:**

- Ran over encoder cable with the machine metal wheel before connecting it.
- Moving too fast or slow or with too much irregularity or quick speed variations.
- Did not hit select the 2nd time to fully activate the regulator.
- Do not have encoders and 9 pin cable plugged in.
- Not aware that they must move the machine much slower with more stitches per inch, e.g. at 15 SPI. They can move faster with 4 SPI.

### **Mechanical Problems:**

- Wheels mounted too tight and wont spring down to track
- Wheel not on track – bracket bent.
- Encoder wheel loose on axle – 1/16” screw loose.
- Spring came out from under base plate on rear encoder wheel.
- Wheel mounted in wrong place/position on carriage.
- Black rubber wheel came of encoder wheel

### **Electronic Problems:**

- Bad brain/c-pod
- Bad encoder
- Bad connections

## LCD Screen Operation

Press	Selection Type	Function
<b>Select</b>	Quilt Mode	Screen for Manual and Regulated Modes
↓	<b>Regulated Mode</b>	Allows the user to select a specified stitch length and the machine regulates the motor speed. The machine will maintain an appropriate motor speed for the selected stitch length if the mover moves the machine in a consistent manner. The <b>stitch length range is 4-15 SPI.</b>
<b>Select</b>	<b>Regulated Mode</b>	Use the arrows to select the number of stitches per inch <b>Set at 12 SPI</b> (range 4-15)
<b>Select</b>		Takes you back to Quilt Mode
↓	<b>Needle Up/Down</b>	Programs machine to automatically return to the up or down position when stopped. Press <b>Select</b> to toggle back and forth between needle up and needle down. <b>Set for Needle Down</b>
↓	<b>Stitch Half/Full</b>	Programs the needle to take a half or full stitch when the Needle Up/Down button on the handlebars is pressed Press <b>Select</b> to toggle back and forth between Stitch Half and Stitch Full <b>Set for Full Stitch</b>
↓	<b>Lights On/Off Spot/Part</b>	Lighting consists of multiple LED light clusters (bulbs) mounted on the underside of the handlebars. Twelve clusters are included. Up to eight additional cluster can be purchased and inserted into expansion light ports. Press <b>Select</b> to toggle through four lighting options. <b>Lights on</b> – turns all bulbs on <b>Lights off</b> – turns all bulbs off <b>Lights spot</b> – Engages spot lighting which are the four bulbs closest to the machine (two on each side of the handlebars) All other lights are turned off <b>Lights part</b> – Engages partial lighting by turning on all bulbs except the spot lights

Press	Selection Type	Function
↓	<b>Diagnostic Mode</b>	Allows an authorized representative to run Diagnostics on the Jewel
↓	<b>Set Up</b>	
<b>Select</b>	Alarm Mode	Allows the user to set overspeed alarm Overspeed – alarm beeps to indicate that the machine is no longer in sewing regulation mode because the machine is being moved too fast. Press Select to toggle between Y (the alarm is on) and N (the alarm is off) <b>Set on Y (the alarm is on)</b>
↓	Exit Menu	Press <b>Select</b> to exit Alarm mode and returns to the Set Up menu
↓	My Speed Press Select	Allows the user to select their preferred speed which will become the default speed each time the machine is turned on. Press the up/down arrows to select the speed. NOTE: the Jewel speed is 1500 SPM. If you set the new speed to 50%, that would be 750 SPM. <i>The speed easy to over ride when you are in Manual Mode by using Speed Up or Speed Down on the handlebars.</i> <b>Set the speed for 70% =1050 SPM</b>
<b>Select</b>		Returns to Set Up menu
↓	Light Mode Press Select	Used to selectively turn on/off two LED light clusters nearest to the machine on each side of the handlebars. Use the up/down arrows to the light positions which correspond to the bulb position on the handlebar. Press Select to turn a bulb off/on. An asterisk indicates the bulb is on. The small circle indicates the bulb is off.
↓	Exit menu	<b>Press Select</b> to exit Light Mode and return to the Set Up menu
↓	Counters Press Select	Counts the total number of stitches on the machine over the life of the machine and during a time period set by the user. L (Lifetime) Stitch count over the life of the machine – can not be reset T (Trip) Can be used to count the number of stitches over a specific time frame defined by the user. To reset the trip stitch, use the up/down arrow keys to point to <b>Reset</b> and <b>press Select</b> .

<b>Press</b>	<b>Selection Type</b>	<b>Function</b>
↓	Exit menu	<b>Press Select</b> to Exit Counters and return to Set up.
<b>Press</b>	<b>Selection Type</b>	<b>Function</b>
↓	Walking On/Off	When the Needle Up/Down button on the handlebar is pressed and held, the machine will make slow stitches until the button is released. This feature is great for tie offs at the beginning and ending of quilting or used for a basting stitch. NOTE: It's best to leave the Walking Stitch <b>on</b> all the time. <b>Set to On.</b>
↓	Exit Menu	<b>Press Select</b> to Exit Walking and return to Set up.
↓	Quilt Mode	<b>Press Select to Exit set up menu</b> <b>NOTE:</b> Anytime you need a quick exit out of the Set Up menu, just press the Needle Up on the handlebar. <b>You are now back in the Quilt Mode</b>
<b>Select</b>		
↓	Manual Mode	Allows the user to manually operate the machine at a selected needle speed.
<b>Select</b>	Manual Mode	The speed default % that you set in the “My Speed” setting appears at the top of the screen. If you need to over ride this setting, simply press the Speed – Down or the Speed + Up buttons on the handle bars. <ul style="list-style-type: none"> <li>• If you over ride the “My Speed” setting, <b>DO NOT</b> press Select or the setting will default back to the “My Speed” setting.</li> </ul>