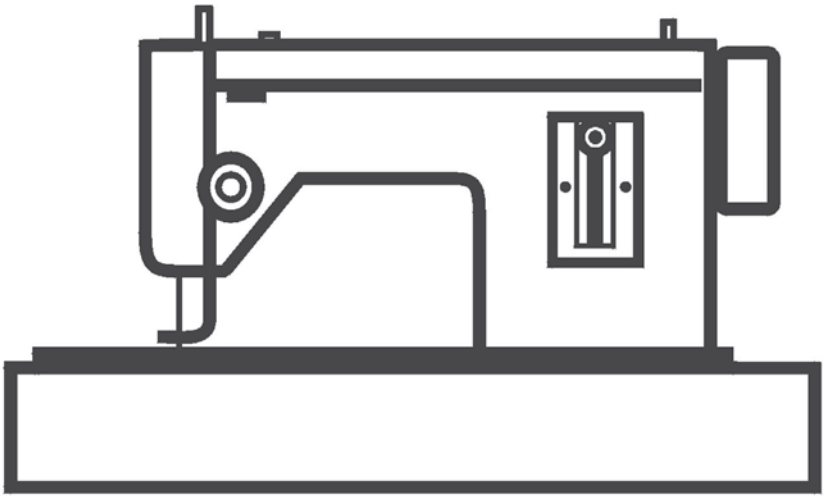
The ULTRAFEED™ LSZ-1 Guidebook

Set Up, Fine Tuning, Use



The Ultimate in Feeding Ability

NAUTILUS BLUE™ an LSZ-1 Ultrafeed™ trademark

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Ultrafeed™ LSZ-1 PATENTED TECHNOLOGY
patent #6499415
POSI-PIN PATENT PENDING

CAUTIONS

Please read and observe the following cautions when using your Sailrite sewing machine:

1. Do not operate in conditions where you or the machine are or may become wet.
2. Operate the machine on a firm, level surface where there is adequate room for safe operation.
3. Observe caution when placing your hands or other parts of your body or clothing near any moving parts including but not limited to the following: the walking foot, the needle, the balance wheel and any of its parts.
4. Do not run the machine without its covers.
5. Do not stop the movement of the balance wheel with your hands.
6. Do not leave the handcrank in place on the optional MONSTER II balance wheel when operating in electric mode.
7. Use caution in tilting the machine backwards in its case and in lowering it back into the case.
8. Always latch the case securely before lifting.
9. Use proper lifting techniques when moving the machine.
10. When using the optional light do not touch the bulb or cover. They may be hot.
11. When changing the light bulb unplug the machine and observe the maximum 40 watt bulb recommendation for the optional Baby Lock light.
12. Always use the proper voltage required for the motor.
13. Do not drop the machine.
14. Wear protective eyewear when sewing.
15. Wear shoes when operating the foot pedal.
16. Provide supervision when allowing others to use the machine—particularly children and those who are unfamiliar with the machine's operation.
17. Do not use the machine around flammable materials.
18. Do not use a plug adapter or extension cord which bypasses the ground pin.

Before using your Ultrafeed™ read pages i and 2-16

Table of Contents

Preface

The Ultrafeed™ LSZ-1 is a highly unusual semi-industrial sewing machine. It is a single needle, lock stitch machine with a high lift independent upper and lower feed mechanism for the ultimate in feeding ability.

Most machines accomplish feeding with a single, bottom feed dog. The presser foot simply holds the fabric down. The Ultrafeed™ LSZ-1 uses a top driven "WALKING" presser foot which moves forward and back in time with the lower feed dog to ensure that the layers of fabric are consistently moving together through the machine. Since it feeds so well, the stitch length stays very consistent. And, because the walking foot is designed with a high lift, it better accommodates thick fabric assemblies.

This machine is well suited for sewing medium, heavy and extra heavy materials including canvas, sail, upholstery materials and light weight leather. It can also be used for home sewing. A 1/4 inch welting tunnel in the presser foot allows for piping installation (for welting application see page 16).

2 Year Limited Warranty

All parts (excluding bobbins, belts, needles, retaining ring cap springs, needle plates and feed dogs) are fully guaranteed for two years from the date of purchase. Upon return they will be replaced at no charge except for return delivery.

Labor for repairs is provided at no charge for two years but delivery both ways is your responsibility. It is our goal to enable you to maintain and repair your own machine. We believe that with the aid of this *Guidebook* and, perhaps a little phone support, that is a realistic goal.

Preparing the Ultrafeed™ for Use

The Packaging

The Ultrafeed™ head comes in a custom designed shipping container which protects it from damage. (**NOTE:** The thread stand and white plastic accessory box are packaged on the outside of the styrofoam which protects the head. Or, on some units an accessory bag is placed within one of the inside cavities of the styrofoam.) Save this container. It must be used if the machine is sent in for service. Carriers will not pay insurance claims on improperly packaged machines **even if they are insured**.

Ultrafeed™ sewing machines usually ship in one box although sometimes two or more boxes are used depending upon accessories purchased.

The Carrying Case

Remove the sewing machine case from the shipping container and open it by unlatching the hasps on both ends. (**NOTE:** *The case top and bottom are tightly fitted. It may be necessary to gently pry them apart. Use a screwdriver to apply a little pressure between the two parts of the latches.*) Remove any items inside the case (other small items which have been purchased may also be found in the case). Check all other boxes for assembly parts and accessories.

Remove the sewing machine head from its shipping container. Check to be sure that the holes on the back of the machine into which the hinges will be placed are not obstructed by the screws used to lock the hinges in place. Then, slide the Ultrafeed onto the two hinges found on the backside of the case and secure it in place with the screw found on the tongue of each hinge. This operation is most easily accomplished with a helper.

The thread post, shown on page 8 and discussed on page 4, must be removed in order to put on the case lid. Case size is: width 21", height 14 1/4", depth 10 3/4".

NOTE: *We do not recommend shipping a machine in its case. Always use the box and styrofoam packaging in which it was originally shipped.*

Read this section for foot control wiring that looks like the photograph below. Otherwise skip to the next photograph.

Mounting the Electrical Outlet Block

Find the piece of Dual Lock Velcro which was packaged inside the case. To install the machine head in this case you must first install the power/light outlet block. Remove the paper backing on one piece of the 3M Dual Lock included with the case and place this piece of Dual Lock in the smaller, right hand opening in the bottom of the case. Now remove the backing on the second piece of Dual Lock and place it on the bottom of the power/light outlet block. (**NOTE:** *the Dual Lock may already be secured on the bottom of the case and the power/light outlet block when the machine arrives.*) Press the two pieces together to hold the block firmly in place.

If more power cord length is needed, you can skip this step or simply separate the block from the case bottom when needed and let it hang down over the edge of the case.

The 110 Power System (Set-Up A)

To set up the 110 volt power system simply plug the cord for the motor into the power/light block in the bottom of the case. The two sockets are marked (one motor and the other light). Trace the cord coming from the motor to the plug end. This cord plugs into the motor outlet.

The maximum speed recommended for this machine is 800 RPM, i.e., 800 stitches per minute. Regular household current should be used (115 volts, 50-60 HZ). The machine's one-tenth (1/10th) HP motor provides excellent power.

Read this section for foot control wiring that looks like the photograph below.

The 110 Power System (Set-Up B)

To set up the 110 volt power system simply plug the cord from the foot control into the socket wired to the motor. The plug can only be inserted one way. If you have purchased a light, it will have a plug on the end to plug into an electrical outlet.

The maximum speed recommended for this machine is 800 RPM, i.e., 800 stitches per minute. Regular household current should be used (115 volts, 50-60 HZ). The machine's one-tenth (1/10th) HP motor provides excellent power.

The 220 Power System (Set-Up B)

If a 220 volt power system has been selected, plug the cord from the foot control into the socket wired to the motor. The plug can only be inserted one way. If you have purchased a light, it will have a plug on the end to plug it into an electrical outlet or it will be permanently wired to the socket. Be sure to use an appropriate light bulb for your voltage.

The maximum speed recommended for this machine is 800 stitches per minute. Regular household current should be used (220 volts, 50/60 HZ). The machine's one-tenth (1/10th) HP motor provides excellent power.

Securing the Electrical Cords

Two cord clips are used to keep all electrical cords clear of the drive belts. One is located on the top of the motor housing and the other is found near the right hand back corner of the case. If your machine has a light (optional), use both clips.

Balance Wheel

The Ultrafeed sewing machines are shipped without the balance wheel installed. Locate the plastic PowerPlus balance wheel and the 18.6" timing belt.

Belts

The Ultrafeeds™ all arrive with the Posi-Pin bushing, nut and spring-pin installed on the upper shaft of the sewing machine. One belt is already installed on the machine which connects the idler pulley to the motor pulley. The small cog pulley of the idler pulley will need to be connected to the balance wheel with a larger belt mentioned above. To install the belt, the large diameter balance wheel must first be connected to the Posi-Pin bushing.

To install the balance wheel first remove the spring-pin and then unscrew the knurled nut which is threaded into the bushing. This is reverse threaded, so turn it clockwise to loosen the nut. Next slip the balance wheel onto the bushing. Thread the nut back into the bushing and tighten it by hand to finish the installation.

To engage the wheel and bushing: Rotate the balance wheel until the hole in the balance wheel is aligned with one of the four bushing holes (select any of three holes which are available to use in the PowerPlus balance wheel). Once aligned push the spring pin through the holes to lock the balance wheel to the bushing. Rotation of the balance wheel will now cause the machine to function.

To disengage the clutch (for bobbin winding): Pull the spring pin out of the balance wheel. The balance wheel will now rotate without operation of the machine. The spring pin can be stored in the Posi-Pin nut. Just push it into the hole at the center of the nut.

To install the balance wheel belt:

To complete the installation of the balance wheel the large belt must be installed. The belt does not stretch so it is necessary to slide it on and off. To put the belt on, place it inside the large balance wheel and over the small cogged pulley of the idler pulley first and then turn the balance wheel while guiding it into place around the large wheel from the inside (just like a bicycle chain).

The drive system is now complete with two belts in place. This arrangement slows the machine down and gives the machine more power.

Installing the Belt Cover

Note: The belt cover may already be installed by Sailrite. If not, follow the information below.

This step is often easier to accomplish if the Balance Wheel is removed. The screws can be difficult to access with the wheel installed. However, leave the belt in position on the small cog pulley of the idler pulley. Otherwise it is difficult to get the belt on this smaller cog with the belt cover in place.

Step 1: Remove the two screws that are located above and below the pulley drive.
Step 2: Install the belt cover by positioning it so that there is clearance all around the underside of the wheel making sure that the belt does not rub on the cover. If needed the cover can be bent to fit properly.
Step 3: Replace the two screws tightly to secure the belt cover in place. Do not over tighten as this component must be removed to make any belt adjustments.

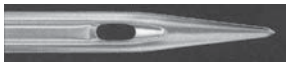
Thread Post

Find the thread post (silver threaded rod about 2" long) in the accessory box or bag. See page 8 step 2 for positioning and thread the post into the top of the machine.

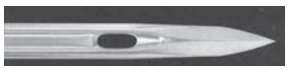
The Needles

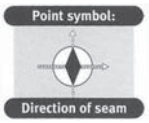
135x17 needles sizes 12 to 22 or 135x16 leather needles should be used. A size 20 needle is used for most medium to heavy sewing. These needles are available in Sailrite's catalog. Ultrafeed™ needles are round on top, unlike home sewing machine needles, as a result care must be exercised to insert them properly (*see "Proper Needle Installation" this page*).

Note that the needle has two distinct sides. One side has a long channel or groove (you can locate this groove with your finger nail if you cannot see it). The opposite side has a scarf, i.e., a carved out area just above the needle eye. When the needle is installed, the side with the groove should be facing outward or to the left as you face the machine. If the needle is inserted the wrong way the Ultrafeed™ will skip stitches and break thread.

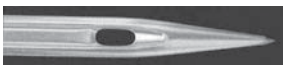


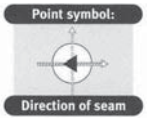
Round Point Needle-
For standard sewing





DI Needles-
For hard to penetrate leather

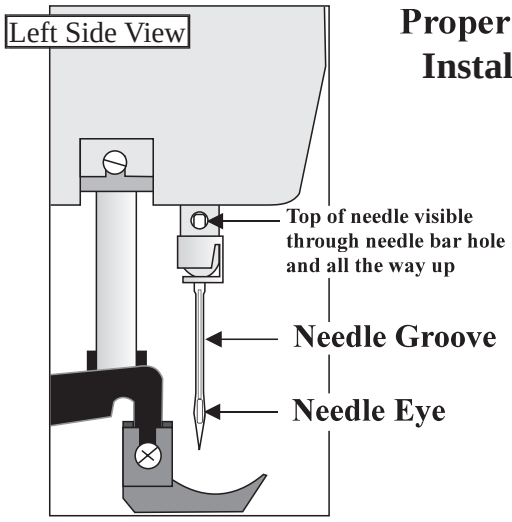




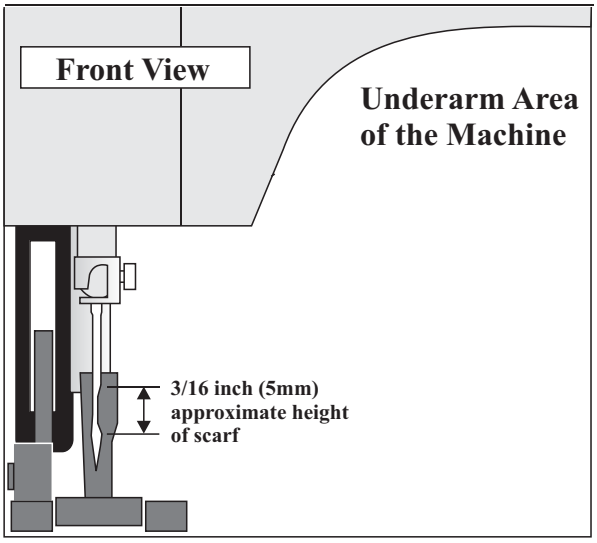
SD1 Needles-
For leather and thick dacron sailcloth assemblies

Serv7 Needle-
Reinforced needles for minimizing skipping and needle deflection in heavy assemblies.

Proper Needle Installation



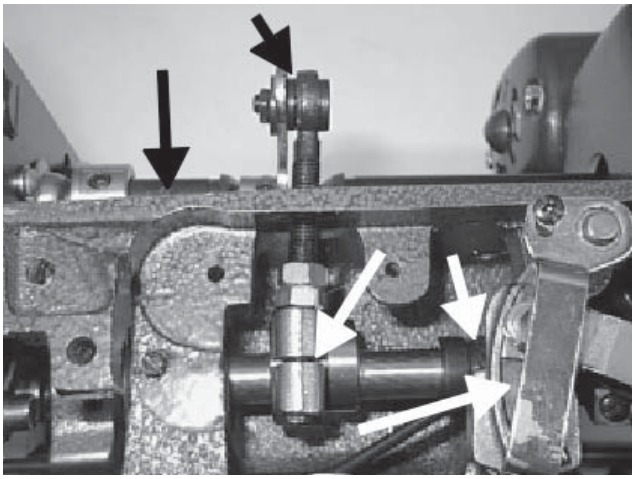
Improperly installed needles are the main reason users call for help. Please be sure that the needle eye is not twisted.



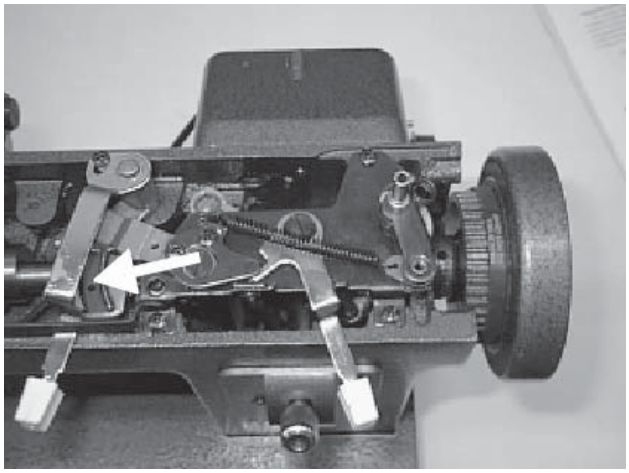
Machine Lubrication

The machine was thoroughly oiled prior to shipment. It should be oiled frequently. Oil all metal to metal working parts as shown in the photographs which follow. After oiling, sew briefly with some scrap material to prevent soiling your work.

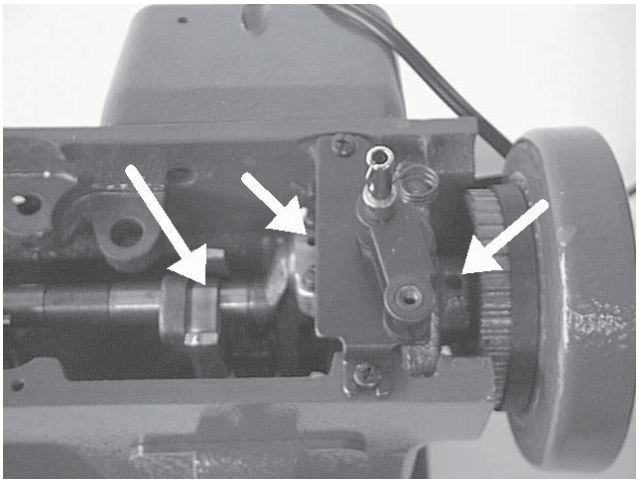
Black and white arrows indicate lubrication points. Only use sewing machine oil!



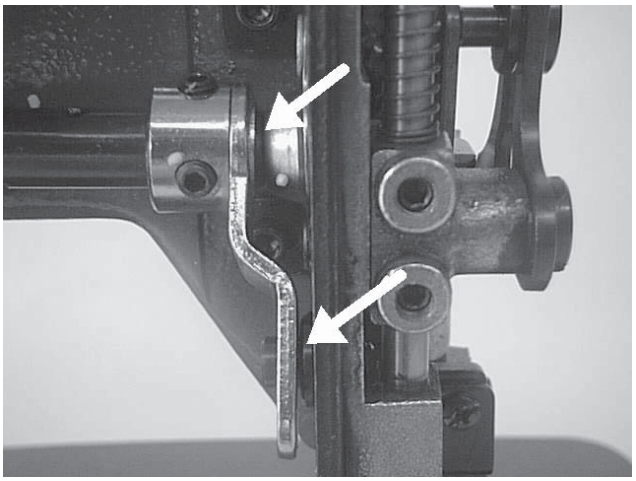
View from top of machine.



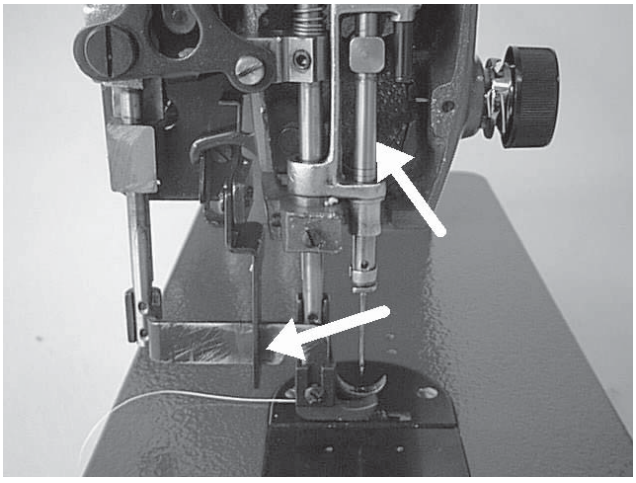
View from top of machine.



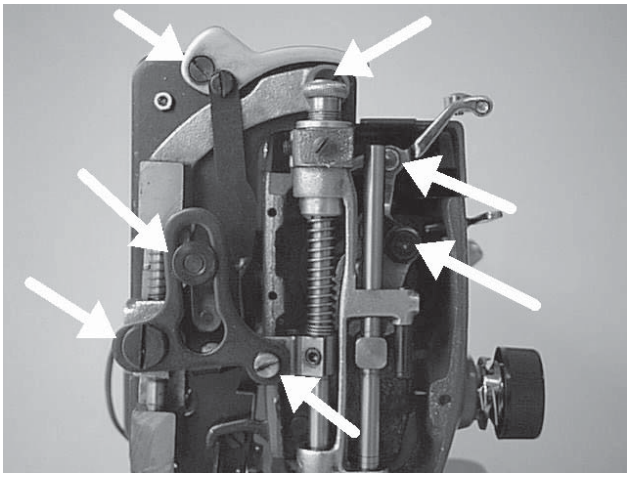
View from top of machine.
Shows oil points under bobbin winder assembly.
Bobbin winder assembly shown not LSZ-1's.



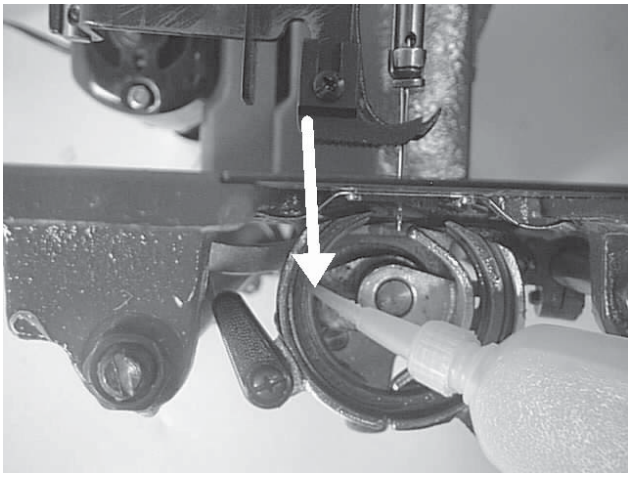
View from back of machine.



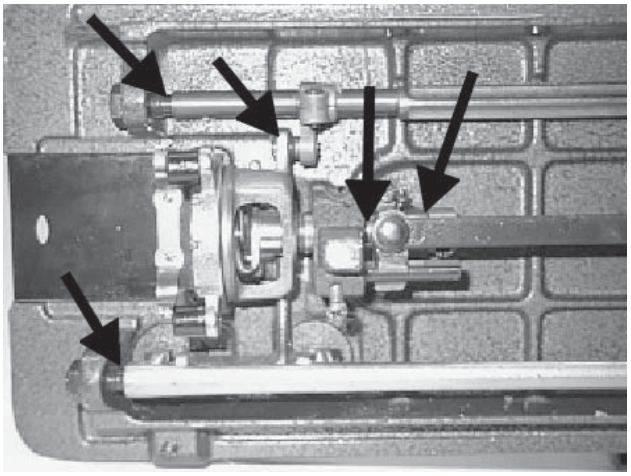
View from left side of machine.



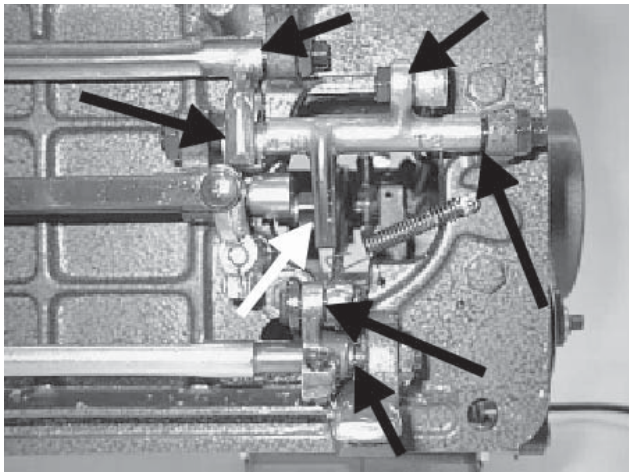
View from left top side of machine.



View from bottom left side of machine.



View from left bottom of machine.



View from right bottom of machine

Marine Use and the Potential for Rust

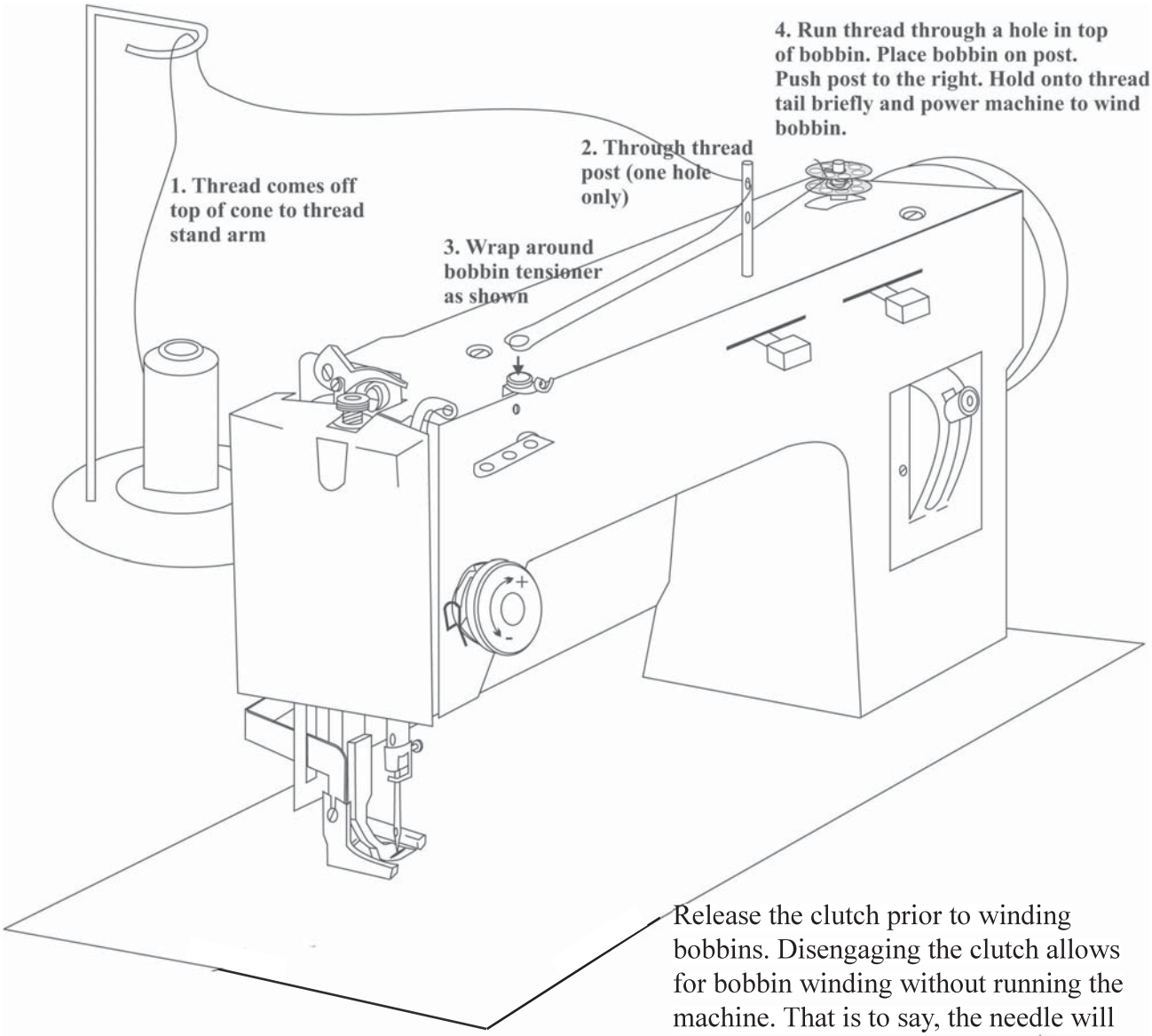
If the machine will be used or stored in a harsh environment, it is wise to lubricate the working parts of the machine with regular sewing machine oil. Do this prior to storage and before each use.

Protectants like Boeshield's T-9 are recommended to protect metal surfaces and control knobs. Even the painted surfaces and "blued" metal parts like the needle plate and presser feet can be coated with T-9. This paraffin based product leaves a thin protective layer of wax.

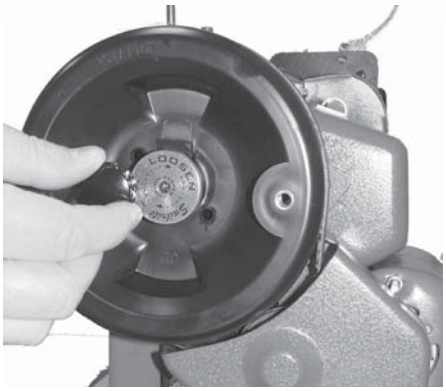
Use T-9 or products like T-9 sparingly as a lubricant. Wax buildup can create gumming friction over time.

Preparing to Sew

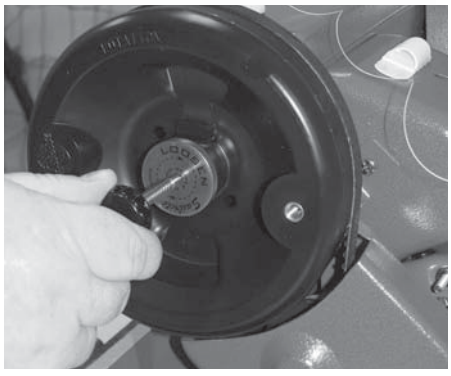
Winding Bobbins



Release the clutch prior to winding bobbins. Disengaging the clutch allows for bobbin winding without running the machine. That is to say, the needle will not move up and down.



Posi-Pin Clutch engaged.



Posi-Pin Clutch disengaged.

The Thread

For sail and canvas work we recommend using V-30, V-46, V-69, V-92 and V-138 Dacron® sailmaker's thread or Tenara M1000 or Profilen thread. These threads are available in the Sailrite Catalog.

Choose from 5 Dacron® thread weights:

V-30 with a No. 12 needle and fabric less than 1 1/2 ounces.

V-46 with No. 14 or 16 needle and fabric less than three ounces.

V-69 with No. 16 or 18 needle. Best for fabrics up to six ounces and with acrylic cover fabrics (Sunbrella®).

V-92 with 18 or 20 needle, fabric up to ten ounces. Also used for acrylic cover fabric (Sunbrella®).

V-138 with a No. 22 needle and fabric over 10 ounces. **Note:** this heavy thread requires frequent bobbin changes.

(**Note** that needle sizes recommended for Ultrafeed™ machines are roughly one size larger than those recommended for household machines.)

With GORE-TEX® \ Tenara™ M1000 or Profilen Thread use a #16 needle. Use for sewing canvas—Sunbrella®, Stamoid, Boat Top, etc.

Continuous filament, spun and monofilament threads can be used in the Ultrafeed™. Nylon and polyester continuous filament threads have a wide variety of uses from the sheerest lingerie to the heaviest canvas, leather and automotive applications. They feature superior strength, stretch and recovery properties and excellent resistance to chemicals, bacteria, mildew, wear and abrasion. Polyester continuous filament thread stands up to the weather better than nylon and is many times better than natural fibers for outdoor applications. It is highly recommended for marine use.

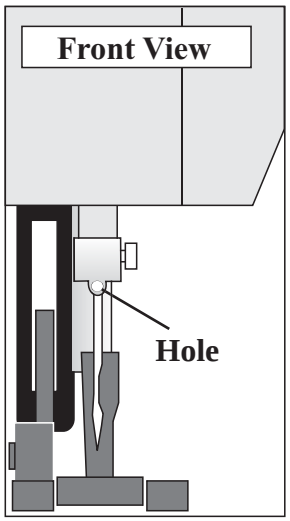
Spun thread which is sold in home sewing centers is not as durable as continuous filament thread. It is best used for sewing clothing. Sewability is very good because the soft surface tends to make tension adjustment easy and consistent.

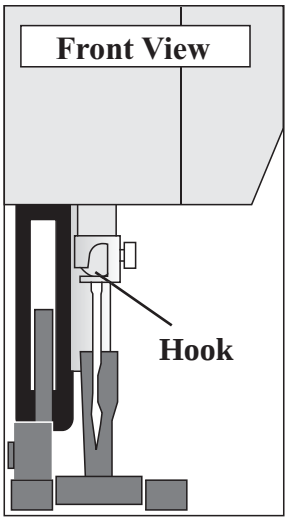
Monofilament thread is often used in upholstery because of its clear color.

Std.	Gov.	Tex	Tensile (lbs)	Needle Size	Fabric Weight Rec.
V-30	**AA**	**30**	**4.5**	**12 or 14**	**< 1.5 oz.**
V-46	**B**	**45**	**7.1**	**14 or 16**	**< 3 oz.**
V-69	**E**	**70**	**10.6**	**16 or 18**	**3 - 6 oz. & Sunbrella**
V-92	**F**	**90**	**14.2**	**18 or 20**	**6 - 10 oz. & Sunbrella**
V-138	**FF**	**135**	**21.2**	**20 or 22**	**> 10 oz.**

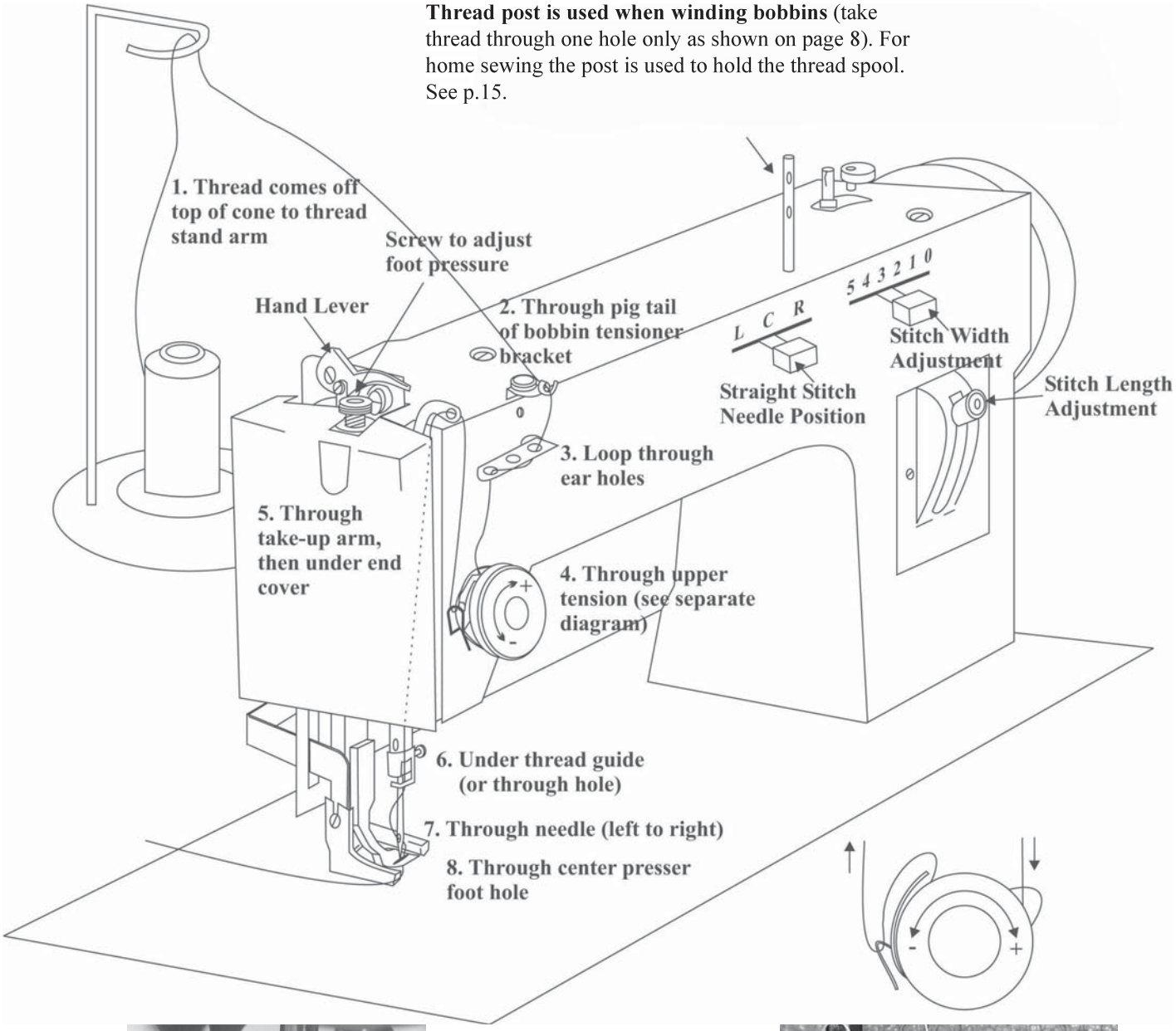
Threading the Machine

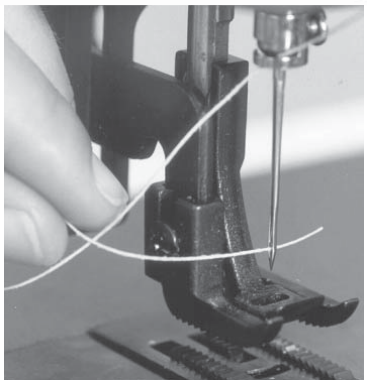
Proper threading of the machine is shown in the drawings and photos on page 10. In one instance threading may vary due to differences in the needle bar thread guide. Some machines will have a hole through which the thread must be passed before it is inserted into the eye of the needle where others will have a hook.



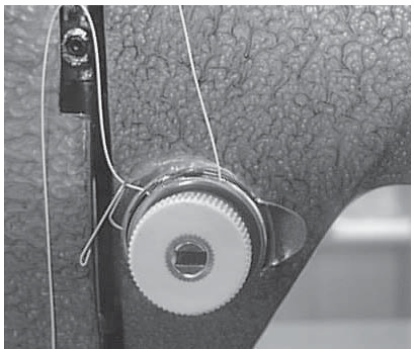


Thread post is used when winding bobbins (take thread through one hole only as shown on page 8). For home sewing the post is used to hold the thread spool. See p.15.



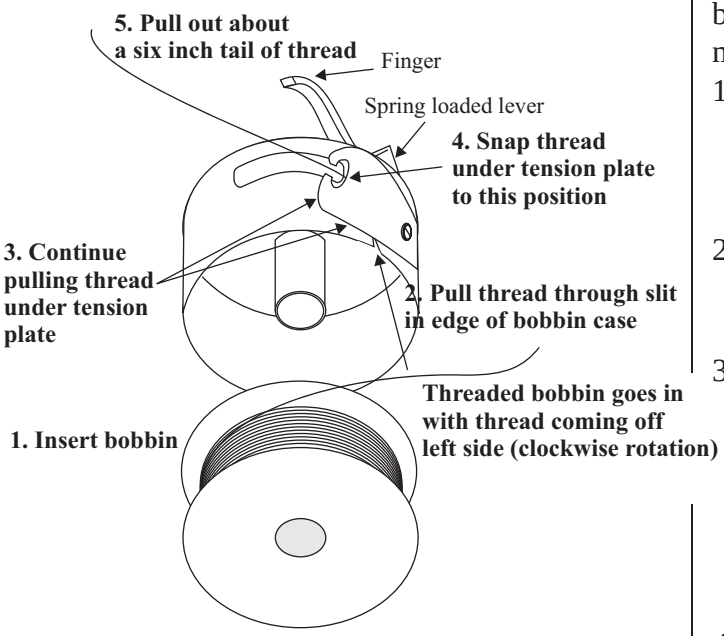


Note that the thread guide (#6 in the drawing above and shown here as a hook) is sometimes a hole rather than a hook. See drawings on preceding page.



Shown with outer cover knob removed.

Installing Bobbin in Bobbin Case



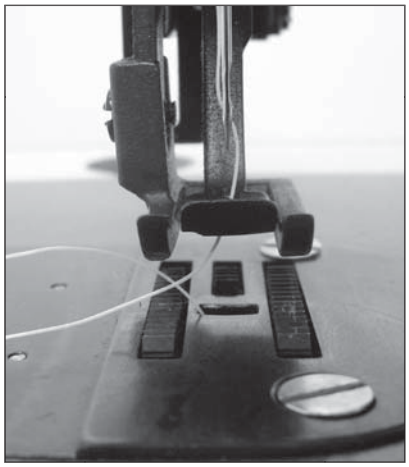
Removing and Installing the Bobbin Case

1. To remove the bobbin case grasp and lift the spring loaded lever and pull the bobbin case out. With the lever held open the bobbin is captive in the bobbin case. Release the lever and the bobbin will fall out.
2. To install the bobbin case pull and hold outward its spring loaded lever (this keeps the bobbin from falling out) and push the case onto the axle of the gib hook. The finger of the bobbin case should be pointing upward. **NOTE:** If you hold onto the spring loaded lever until the bobbin case is completely installed, upon releasing the lever there will be no clicking noise. It will simply lock onto the axle. If you release the spring loaded lever before the bobbin case is pushed completely in place, you will hear a click as you push it all the way on.

Picking Up the Bobbin Thread

After the machine is threaded and the bobbin/bobbin case is installed, the bobbin thread must be picked up as follows:

1. Hold the needle thread loosely in your left hand and rotate the balance wheel toward you until the needle moves down and then up to its highest point.
2. Now pull the needle thread gently. The bobbin thread should come up with it in the form of a loop through the needle hole.
3. Grasp this loop and pull until the end of the bobbin thread appears. If the bobbin thread does not appear when the needle is lowered and raised, check to be sure that at least 5 or 6 inches of bobbin thread is hanging loosely from the bobbin case and go through the procedure again.
4. When the bobbin thread is exposed, run the needle thread through the hole in the center of the presser foot and lay it back on the throat plate.
5. Here is what it looks like when your ready to go — see photo below.



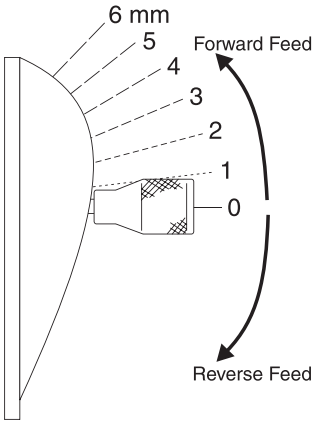
Starting to Sew

1. Place the material to be sewn under the presser foot and use the hand lever to lower the presser foot onto the material (*see "Hand Lever" page 10*).
2. The thread from the needle and the bobbin should be behind the foot as you start to sew. Hold them down with your finger.
3. Press the foot control pedal to begin sewing and release the trapped threads after the first couple of stitches are made. **If the thread ends are not held down for the first few stitches a rats nest at the beginning of sewing may occur.**

   Always turn the balance wheel of the machine toward you (from the top) to reduce the possibility of a thread jam in the lower mechanism. And never operate the machine (when threaded) without material under the presser foot. If you do, the machine will most likely "lock up" and be inoperable until the thread jam is cleared *(see "Removing the Hook to Clean the Race and Free Jams" pages 17 & 18).*

Regulating the Stitch Length

A thumb nut is used to provide a limit to the stitch length. To adjust the stitch length loosen the thumb nut and raise or lower the stitch length lever to the desired stitch length and tighten the nut. The stitch will be approximately the same length in forward and reverse. See illustration.



Keep in mind that in order to go back to maximum stitch length you may have to loosen the thumb nut to move the lever to the top of its travel.

Stitch Width Adjustment

The stitch width adjustment lever is located on the arm of the machine (*see the lever with numbers 5 thru 0 page 10*). To the right at "0" the machine is in straight stitch. Move the lever to the left to produce a zigzag stitch. At "1" a 1mm zigzag stitch is made, etc. A 5mm zigzag stitch is the widest that can be made.

The position of the stitch width lever should not be changed when the needle is penetrating the cloth. If it is the needle may be bent.

Straight Stitch Needle Positioning

In straight stitch mode, i.e., with the stitch width adjustment lever at "0" the needle can be moved left, right or center (*see Straight Stitch Needle Position in illustration on p. 10*). This is helpful in certain operations such as when installing a zipper since it is best to get the needle close to the zipper teeth.

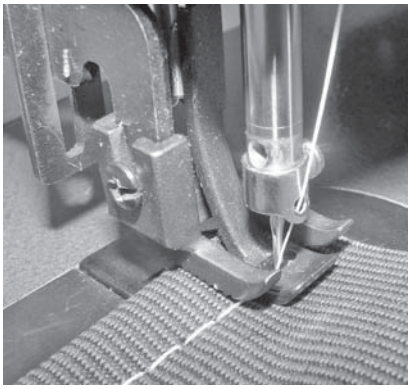
Once again, be careful not to change needle positioning when the needle is in the fabric or the needle may be bent. **Also be sure to gently push down on the lever before moving it to left, right or center.** It sometimes is also helpful to move the balance wheel a little while attempting to move the lever.

Sewing in Reverse

To sew in reverse:

1. Lower the stitch length lever to the bottom of its travel. Note: When reversing be sure the needle is either all the way down or all the way up before pushing the lever down. When the machine is operating at 1/4 speed or faster, reverse can be engaged on the fly.
2. Although the lever is spring loaded, it will generally stay at the bottom of its travel. If it does not, hold it there until reverse sewing is completed.
3. Return the lever to the forward position.

Changing Directions — 4 steps



1. Turn flywheel toward you and penetrate fabric with needle.

2. Lift presser foot.

3. Turn material to new direction while the needle acts as the axis.

4. Drop foot and start in new direction.

Tension Adjustment

Understanding the tension adjustment on a sewing machine is very important. Tension adjustment refers to the combination of tension on both the upper thread and the bobbin thread. The correct combination of thread tension (upper and bobbin) results in a stitch that looks identical on both sides of the material. That is, the knots of the stitches are pulled into the fabric and are no more visible on the top than on the bottom.

The primary problem when using a heavy thread is incorrect upper thread tension. When stitch tension is a problem, it is usually a consequence of too much or too little tension on the upper thread.

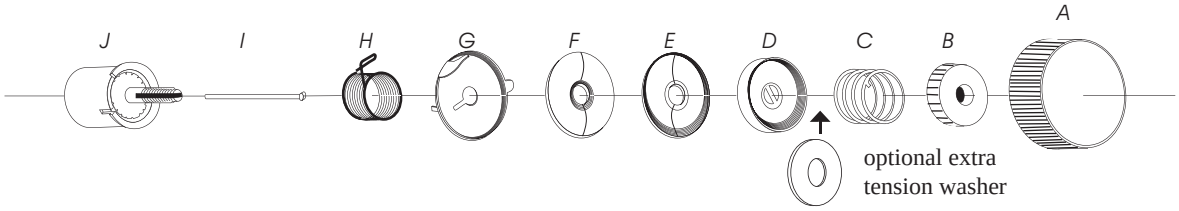
Tension changes to the bobbin thread should only be made if adjustment to upper tension still leaves room for improvement (*see p. 14*). Note: in general bobbin tension requires just a two ounce or so drag on the thread (a drag similar to the one you feel when you pull dental floss off a spool).

The Ultrafeed™ has a thread tensioning knob on the front through which the upper thread runs (*see "Adjusting Thread Tension" page 14*). The upper tension knob can be turned through a range of about five revolutions to compress a spring that squeezes two disks together. Note that when the presser foot is lifted the upper tension disks are pushed apart. This is to release the top thread tension so that fabric can be removed from under the machine foot without fighting thread tension. If your upper tension is tightened all the way down and you raise the presser foot, you may bend the lever inside the machine that separates the disks. This will prevent them from opening correctly. **Avoid lifting the presser foot when the upper tension knob is more than approximately 1/2 turn from maximum (maximum being turned snugly clockwise)**. A drawing of the components of the tension assembly is shown below. **NOTE:** Knob "A" will pull straight off (wiggle it a bit). The white knob "B" beneath should be set so that its outer surface is flush with the end of the post upon which it is threaded. This is a good starting thread tension point for sewing heavy canvas. However, when the "extra tension washer" is in position set the outer surface of the white knob so that it is approximately 1/8" out from flush.

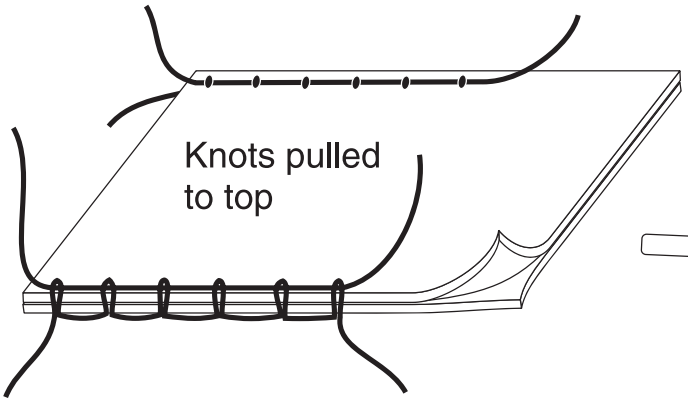
The illustration below details the proper order of the tension assembly. Core "J" will not come out of the machine housing unless the set screw to the left of the assembly is loosened. To access the screw remove the left end cover. It should not ever be necessary to remove the core. However, if the screw comes loose and the core pulls away from the casting, thread tension may not be eased when the hand lever (see illustration page 10) is raised. To correct this problem, push the core back in all the way until it stops and retighten the set screw.

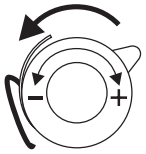
Spring "H" must be pretensioned to function properly. Put the spring in the core so that the arm/loop extension is at 6 o'clock (straight down). Be sure to push it in all the way. When done properly, the spring's small bent hook will engage a gear notch deep within the core. Next

Upper Tension Assembly Detail

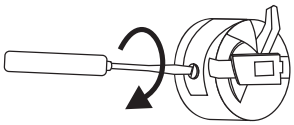


Adjusting Thread Tension





Decrease upper tension



Increase bobbin case tension

Note: Bobbin case tension should only be adjusted when upper tension changes alone do not solve stitch tension

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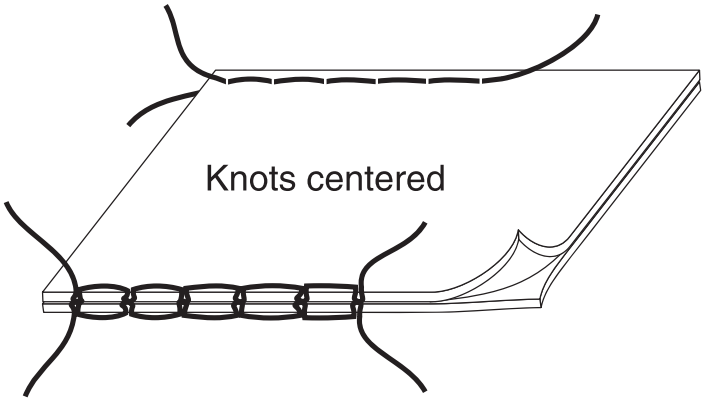
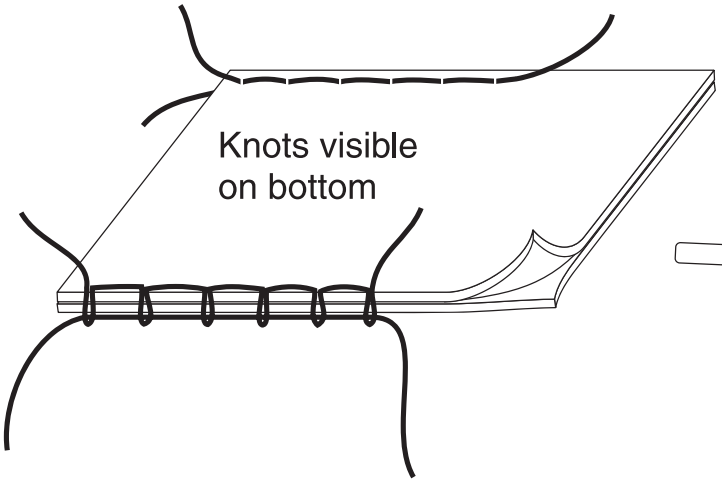
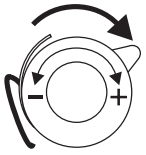
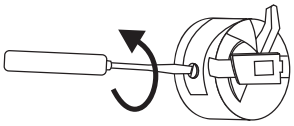


Perfect stitch





Increase upper tension



Decrease bobbin case tension

Note: Bobbin case tension should only be adjusted when upper tension changes alone do not solve stitch tension

wind the arm/loop clockwise and hold it at 10 o'clock. While holding it in place, put part "G" on the core's threaded post aligned as shown in the illustration. Release the spring and it will rest on the metal tab of part G.

The only other parts which require some instruction are the tension plates ("F" and "E") and the spring holder "D". The tension plates must be opposite one another so that their outer edges curve away from one another forming a 'V' for the thread to pull into. Finally the opening of the spring holder should face the operator.

Removing Material from Under the Presser Foot

1. Stop the machine with the needle at its upward most position.
2. Lift the hand lever to raise the presser foot.
3. Pull the material straight back to remove it from under the foot. Note: it sometimes helps to rock the balance wheel forward and back to free the thread from the tension assembly.

Understanding and using these techniques will enable you to use and enjoy your Sailrite Ultrafeed™ Sewing Machine to its fullest potential. Doing sail and canvas work has advantages far beyond the money saved — it also provides a confidence and satisfaction that comes from self-reliance. And it is surprisingly easy to move from simple repair work to recutting to sailmaking itself. Each step in this progression is an important step on the way to becoming a better canvas worker.

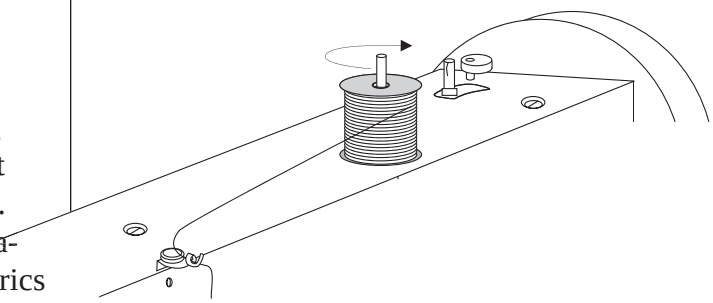
Using the Ultrafeed™ for General Sewing

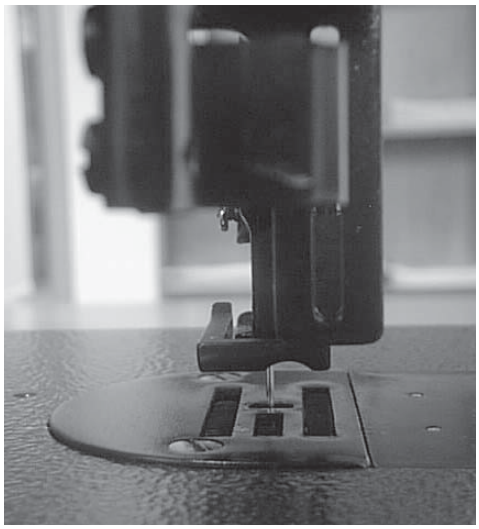
Your machine is also excellent for home, auto and RV upholstery work. A 1/4" welting tunnel is a part of the standard presser foot. It makes the installation of cushion piping easy. And the same capabilities that make the Ultrafeed™ so good for heavy sail and canvas fabrics also make it great for heavy upholstery fabrics.

Those who like to do crafts, quilting and even general sewing will appreciate the Ultrafeed™. This is a machine that is easy to use and very versatile.

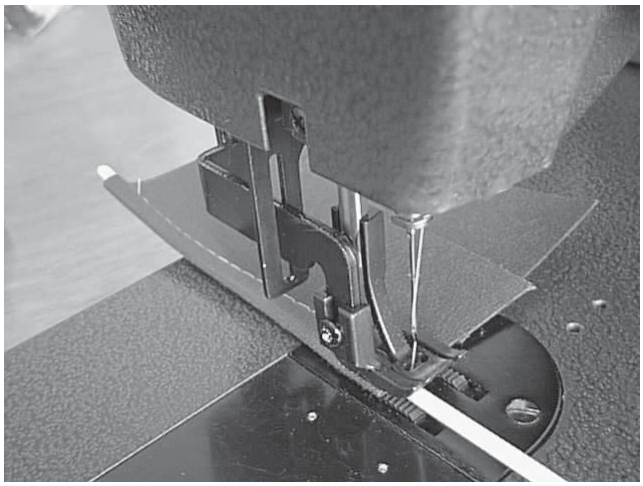
When sewing in light to moderate weight fabrics, be sure to:

1. Use an appropriate thread. Home sewing machine thread should be used for making clothing or items for the home. Nylon thread is often preferred for interior upholstery.
2. Select an appropriately sized needle, i.e. match the fabric and thread weight to the needle size.
3. Decrease pressure on the foot. In heavy fabrics a great deal of pressure aids in feeding. In lighter fabrics too much foot pressure may scuff the fabric. On p.10 see the location of the thumb screw to adjust the foot pressure. Do not be afraid of loosening the screw too much. If it comes out, just screw it back in a few turns.
4. Decrease the upper thread tension and, if necessary, increase the bobbin tension. Too much upper thread tension will cause puckering of the fabric. It may actually be necessary to increase pressure on the bobbin case spring when using light weight thread since the spring will not clamp down on the smaller diameter thread like it does on heavier thread. If thread tension is hard to control, more bobbin tension is indicated.
5. And, last but not least, when placing home sewing machine spools on the thread post, be sure the thread spool is turning in a clockwise manner. This will insure that the post that it rides on is tightened as opposed to loosened. See illustration below.

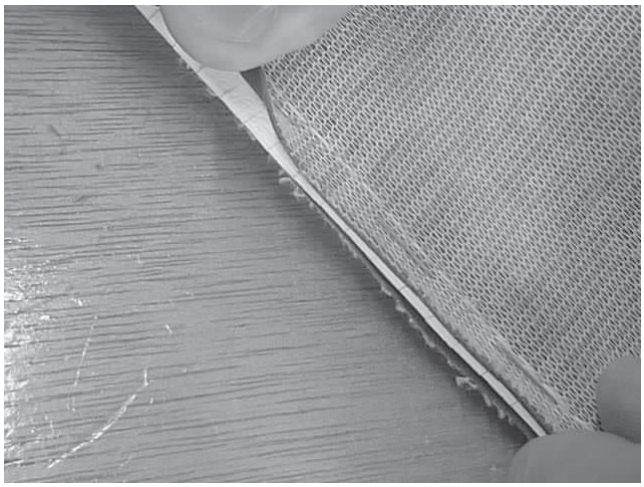




Welting tunnel in presser foot (viewed from the back)



Making welting or cording (needle is at far left here)



Installation of premade vinyl cording in fabric
(notice staples along edge just outside stitches)

Welting \ Cording Application

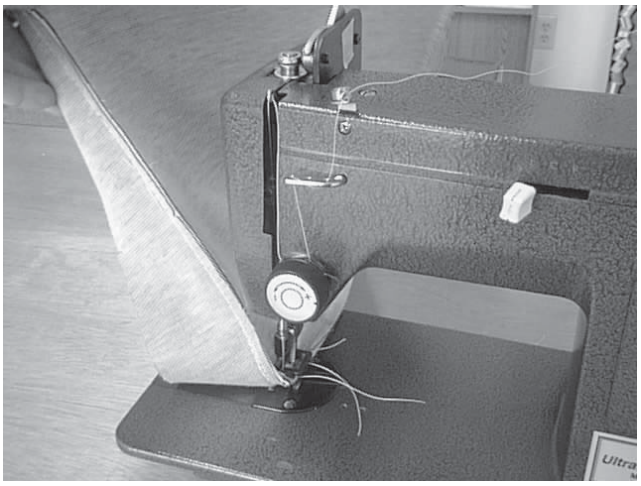
You will notice, if you look from the back of the upper presser foot, that there is a groove (tunnel) under the foot just to the right of the needle. This groove is intended to make the sewing of welting (cording) easier and more accurate.

To use the welting groove put the machine in straight stitch and center the needle bar. (With smaller welting you may want the needle bar to the left—experiment on a sample.) Put the welting assembly under the groove so that the lump of cord is accommodated by the groove. It will be helpful to use a few staples at critical points.

When sewing a fabric tape around welting cord, the assembly will resemble the figure below as it is sewn.

When sewing a boxing (the narrow fabric strip that goes all around a cushion) in place along a plate (the top or bottom cushion fabric), with welting between them, it will look something like this:

Note that the tunnel under the foot to the left of the needle works to keep the bulk of the material outside the arm of the machine. If you go clockwise round your welting edge it should be possible to keep the bulk of the material out from under the arm of the machine and to the left. At corners, hold the plate vertically so that the "boxing" tends to roll through the machine.



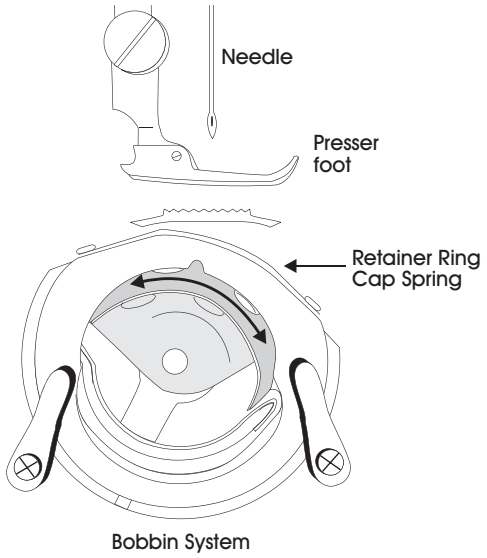
A reenactment of "rolling" the piece around a corner—there would, in reality, be no stitches forward of the needle and here the staples have already been removed.

Fine Tuning the Ultrafeed™

The more we understand our machines, the better they work for us. It is surprising that sewing machine companies do not make information concerning their machines' mechanical needs available. Their handbooks are written as though companies expect that mechanical skills are completely beyond the user. The fact is that sewing machines are relatively simple. Their adjustment is easy for the average user willing to acquire a little knowledge. The following will help in this regard.

The Class 15 Machine

The Ultrafeed™ has a class 15 shuttle hook system. The gib hook in the bottom of the machine moves around the bobbin case back and forth (*see Illustration).* It oscillates half way round and then back the other way a half turn. The purpose of the hook is to pick up the upper thread at the needle and carry it down around the bottom of the bobbin case where the upper thread loop is pulled up and tight by the take up arm above the needle bar. Once this task is completed, the oscillating hook reverses its direction and returns to its original location. This movement is created by a simple yoke and cam arrangement on the top shaft of the machine. It is a relatively inexpensive design but quite reliable and wholly satisfactory for canvas work.

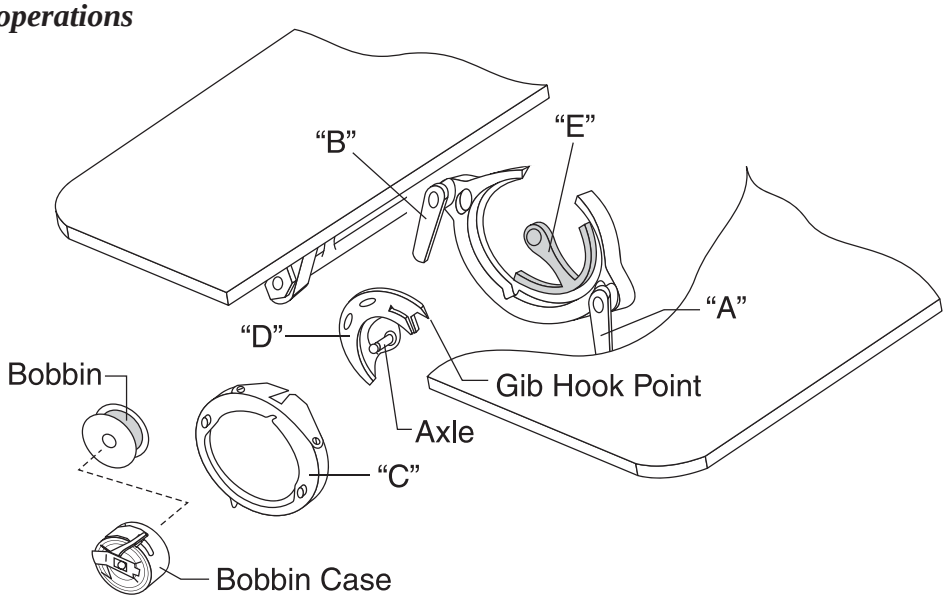


Bobbin System

Removing the Hook to Clean the Race and Free Jams

In preforming these operations do not use too much force.

1. Move the needle to its highest point by turning the balance wheel toward you.
2. Remove the bobbin and bobbin case.
3. Turn lever (A) one half turn toward you.
4. Turn lever (B) one half turn away from you.
5. Grasp the axle of the hook and pull on it to remove retaining ring (C) and hook (D).



Removing the Hook continued—

6. Carefully eliminate the accumulated lint and thread from retaining ring (C), hook (D), and driver (E). Gently pull out accumulated thread, use a small brush to clean the parts or blow on them.
7. Replace hook (D) in driver (E). The hook just rests in place. Be sure the axle is facing out.
8. Replace retaining ring (C) so that both pins are under the black levers (A) and (B) when turned. The polished side of C should be facing out.
9. Replace the bobbin and bobbin case before beginning to sew.

If the Clutch does not Disengage

1. Remove the Posi-Pin nut which secures the balance wheel.
2. Remove the Balance Wheel.
3. Polish & lubricate the Posi-Pin Bushing shaft.
4. Slide the balance wheel back on and screw the Posi-Pin nut down.

Common Sewing Machine Problems

No matter how good the machine is there will be times when adjustments are necessary. When this happens just pick up these instructions and let us help.

Skipped stitches, for example, are an indication that something needs adjustment. There are a number of mechanical adjustments that can overcome this problem. In order to utilize them properly, let us review the fundamental operation of a lock stitch sewing machine.

A sharp "hook" (the gib hook) rotates around the cage that holds the bobbin thread under the machine. This hook passes right next to the rising needle and catches a loop formed in the upper thread by the needle as it comes up. After catching this loop, the hook pulls it down until it circles around the entire bobbin of lower thread. The two threads are thus interlocked and a stitch is formed. As the needle continues to rise, a "take up arm" also rises to pull the excess thread up from the bottom of the fabric. The thread comes up out of the cloth because of the tension disks that tightly clamp the thread on the spool side of the take up arm.

Skipped Stitches

If your machine is skipping stitches your zigzags may appear like a straight stitch on either the right or left side with a proper zig stitch being formed only once in a while.

We know from the discussion above that the hook is not catching the thread consistently. It is usually because either the thread is not being held down by the fabric as the needle is withdrawn and, thus, a loop of thread is not formed for the hook as it passes the needle. Or the hook may not be passing the needle at the proper time, i.e., it may be passing the needle before a loop is formed or, at the opposite extreme, after the thread has been pulled upward out of the path of the hook.

Six Ways to Eliminate Skipped Stitches

1) Change the Needle

The first thing to do is simply change the needle. A bent needle will cause skipped stitches because the loop is not where the hook "expects" it to be. The needle could also have become fouled with adhesive if you are using basting tape or sewing insignia cloth. In either case, the

new needle will resolve these problems.

Also make sure that the needle is in correctly (*see p. 5*). And, check the upper thread path. At the needle the thread should pass from left to right through the needle eye.

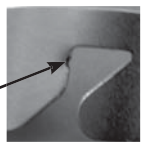
2) Adjust the Foot Pressure

Next check for adequate foot pressure. Heavy, closely-woven materials like sailcloth and canvas can make the withdrawal of the needle from the fabric difficult. If the presser foot is lifting as the needle comes out of the cloth the effect is the same as if the needle were not going far enough into the cloth — the loop that it forms will be too small.

To solve this problem more downward pressure must be placed on the center presser foot. The presser foot is spring loaded and it is adjustable. There is a roughly 1 inch threaded screw that protrudes out of the top of the machine just above the presser foot. Turn the knurled head clockwise to increase presser foot pressure by compressing the spring underneath. Most sail and canvas work will benefit from a good deal of pressure.

3) Check the Retaining Ring Cap Spring:

The top of part "C" on page 17 has a thin curved plate (shaped like a leaf spring) screwed to it. If this "Retaining Ring Cap Spring" is struck by the needle, a bur may be created on an edge of spring's "triangular" opening (the opening where the needle enters). The thread pulls up through this opening and, when the thread comes up through this opening, it can snag on these burs. Remove any burs by polishing them with emery paper or a fine file.



Left: Retaining ring cap spring in place.
Above: Damaged retaining ring cap spring removed.
Below Left: Close up of damaged cap spring.

4) Reset the Needle Bar Height

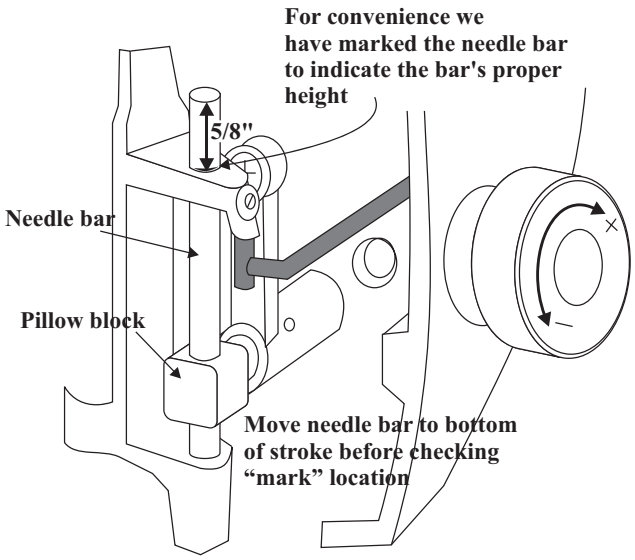
If skipped stitches continue to be a problem, it is almost certainly a matter of the machine's having gone out of time.

The timing of a class 15 machine is checked by determining the relationship of the needle to the gib hook point.

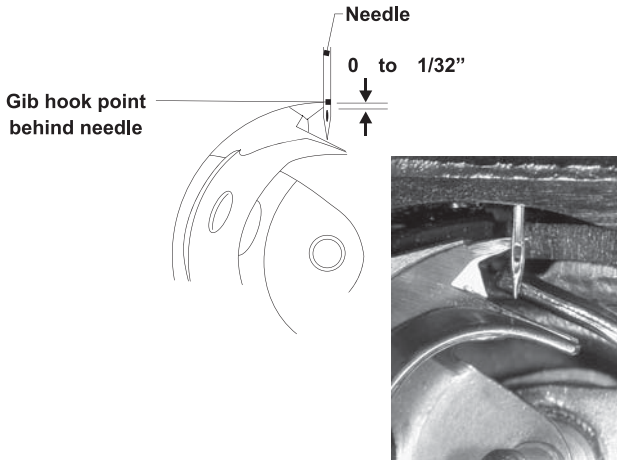
The "height" of the needle bar should be checked and adjusted first. Remove the machine's left end cover plate and lower the needle bar to its lowest position by turning the balance wheel toward you. To determine the proper height of the needle bar measure from the top of the needle bar to the top surface of the upper needle bar guide (*see Illustration "End Cover Plate Removed" page 20*). This measurement should be about 5/8 inch. **Because this measurement varies we indicate the proper height for your machine by putting a small scratch on the needle bar.** An alternate technique is to measure the distance between the top of the needle eye and the gib hook when the gib hook is directly behind the needle and the needle is on its way up. This distance should be between 0 and 1/32 of an inch as shown in illustration *"Proper Needle Bar Height" page 20*.

The needle bar is locked into its drive collar with a single set screw that can be found in one of two places on the pillow block—the front or the side (see *"Unlocking the Drive Collar" page 20*). To loosen this screw to make adjustments, first remove the machine's left end cover plate to find the pillow block. Now move the needle bar to the bottom of its stroke (needle all the way down). If the screw is on the front of the pillow block, it can be easily seen as shown on illustration on the next page. If the screw is on the side of the pillow block it will be accessed through a hole in the machine's casting as illustrated. This screw will be slot headed. Use a good quality 1/8" flat blade screwdriver for this work. Do not use the screwdriver which comes with the machine—it does not fit properly for this application.

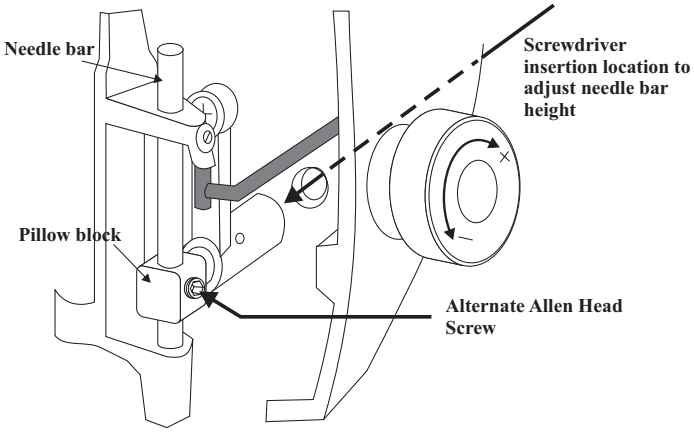
End Cover Plate Removed



Proper Needle Bar Height



Unlocking the Drive Collar



Five Step Review of Setting the Needle Bar:

a. Remove left end cover of sewing machine.

b. Turn balance wheel to lower needle bar to lowest position.

c. Check to see if the mark on the needle bar is level with the top surface of the upper needle bar guide *(Illustration "End Cover Plate Removed"*). If it is then the needle bar is set correctly. If not go to step "d".

d. Reposition needle bar so that the mark lines up with the top surface of the upper needle bar guide. Unlock the drive collar by loosening a single screw. This screw is on the pillow block either in the front or to the side. See illustrations *Unlocking the Drive Collar*.

e. Gently twist the needle bar up or down to set the mark at the top of the needle bar guide surface. After moving the bar be sure to twist it so that the screw which secures the needle is facing the inside of the sewing machine arm. Now tighten the drive collar set screw. Remember that you must have the needle bar at the lowest point of its travel prior to resetting the bar.

5) Check the Timing

If the needle bar height is set properly as described above, and poor stitching still results, then, turn to the timing or the positioning of the gib hook. It is possible to move the whole shuttle assembly left or right to keep it close to the right hand side of the needle.

NOTE: The shuttle assembly rarely moves. What follows should only be done if all else fails and is probably best performed with the phone support of a Sailrite technician.

Before changing the timing of your machine you should check it visually. The best way to see the clearance of the gib hook and the needle is to remove the presser foot, needle plate and the feed dog. A flashlight to illuminate the area is also helpful. As you turn the machine over with the balance wheel, you will see the gib hook swing back past the needle and then forward past it. As you look down through the feed dog from the top of the machine, the hook should be as close as possible to the needle on its right side but it should not deflect the needle at all (*see Illustration "Gib Hook and Needle from Top with Feed Dog Removed" p.22*). It is best to check

timing in straight stitch with the needle centered.

Another way to look at the hook position relative to the needle is to remove only the bobbin and gib hook retainer ring. Now with your left hand hold the gib hook in place and with your right hand rotate the balance wheel. You should be able to judge the distance between them by looking at the needle and hook from the bottom. Again they should be as close as possible without causing needle deflection. (*See Illustration "Gib Hook and Needle with Shuttle Cage Removed" page 22*).

If the gap between the needle and the hook is too large, the hook must be moved to the left to close the gap. If the needle is being deflected by the hook, then the hook must be moved to the right.

Timing and Shuttle Rotation

First set the machine to straight stitch. To provide a reference point, make a mark on the bearing surface just to the left of the large oil hole in the shuttle shaft. Now, if the shaft accidentally rotates, you can realign the mark with the oil hole (*see Illustration "The Underside of the Machine" page 22*). Adjustment of the gib hook is carried out by loosening the screw on the compressible clamp that drives the entire assembly back and forth with the zigzag movement of the needle. See illustration (page 22). Once the screw is loosened, light taps will move the shuttle assembly in either direction. Get the hook as close to the needle as possible without actually touching it. Note that the entire shuttle cage can be rotated through 10 degrees or so when the clamp screw is loose. Take care to keep it oriented so that the needle moves down through the center of the triangular opening in the top of the shuttle cage or match up your mark on the bearing surface with the oil hole. Note that in some situations the rotation may be part of the problem. To check the rotation simply remove the hook and bobbin case. Insert and clip the retainer ring into place (*see p. 17 parts C, B, A*). Rotate the machine's balance wheel until the needle enters the shuttle and look from below to see if the needle is roughly in the center of the triangular opening. If not, adjust the rotation of the shuttle in the clamp to create equal clearance front and back. Now create a new mark reflecting this improved position. Once this adjustment has been made, it will remain constant even when larger or smaller needles are used.

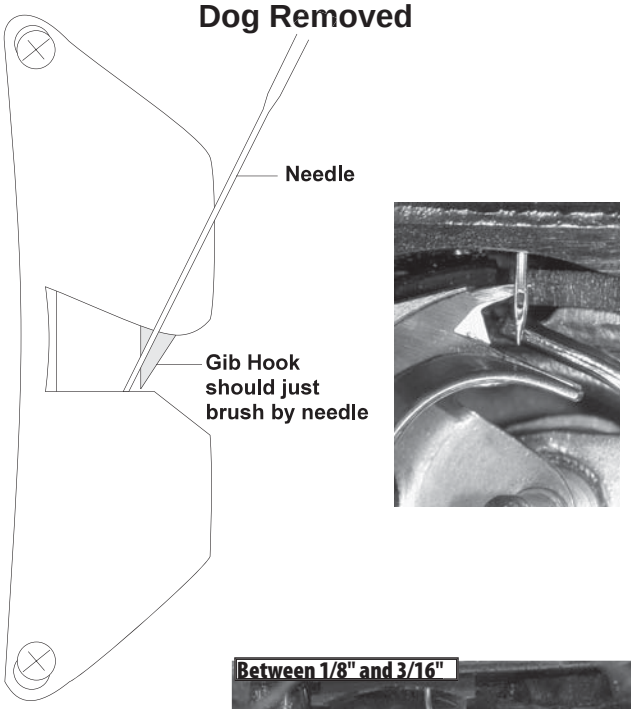
6) Check the Rotational Timing

If the machine is still not performing properly after confirming the left and right position of the hook, check the hook rotation. The hook (*Group 3, key #16. See schematics on following pages.*) is driven by the shuttle driver (*Group 3, key #15*). To change the rotation of the hook the driver must be repositioned on the lower shaft (*Group 3, key #14*). The driver is secured to the lower shaft with two set screws. Rotating the driver on its shaft is done by loosening the screws and twisting the shuttle driver. The fit is often tight and sometimes it is necessary to use a screwdriver as leverage. Be gentle and keep the driver from sliding left or right on the shaft. The shuttle driver is correctly positioned when the gib hook point (sharpest point on the hook) is between 1/8" and 3/16" counterclockwise of the needle (*see "Rotational Timing" photo on page 22*). Check the spacing only when the machine balance wheel has been turned so that the gib hook point is at its furthest position counterclockwise. Obviously the tolerance for the hook rotation is not too critical. The range for rotation is large but if set too far outside this range the machine will skip stitches or not sew at all.

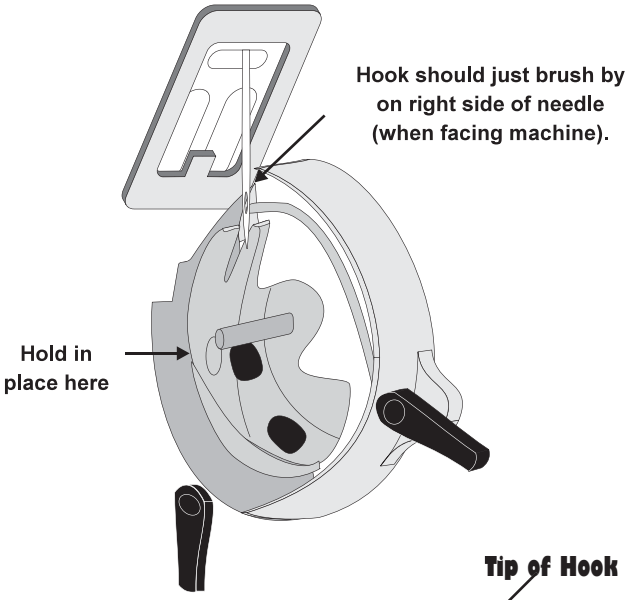
When the hook point is set too close to the needle, the point cannot catch the loop of thread formed by the needle. Every occurrence results in a skipped stitch. In fact, with the hook so close to the needle the thread loop created is in its early stages (a very small loop) so there is not much of a loop to catch when the hook attempts to swing by prematurely. Conversely, if the hook is too far from the needle, by the time the hook point gets to the loop the thread is too high to be caught. If properly timed, the hook will catch the loop consistently.

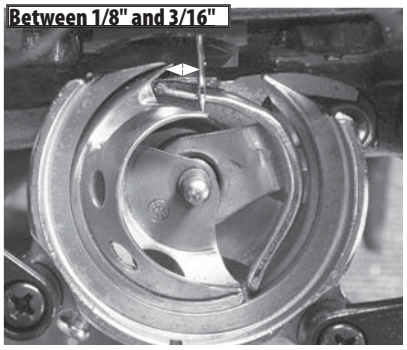
Using these instructions you should be able to handle all but the most difficult sewing machine adjustments and become quite self-reliant.

Gib Hook and Needle from top with Feed Dog Removed

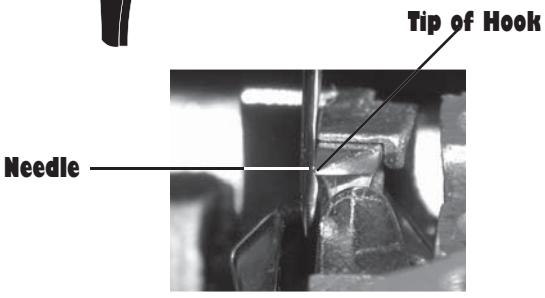


Gib Hook and Needle with Shuttle Cage Removed



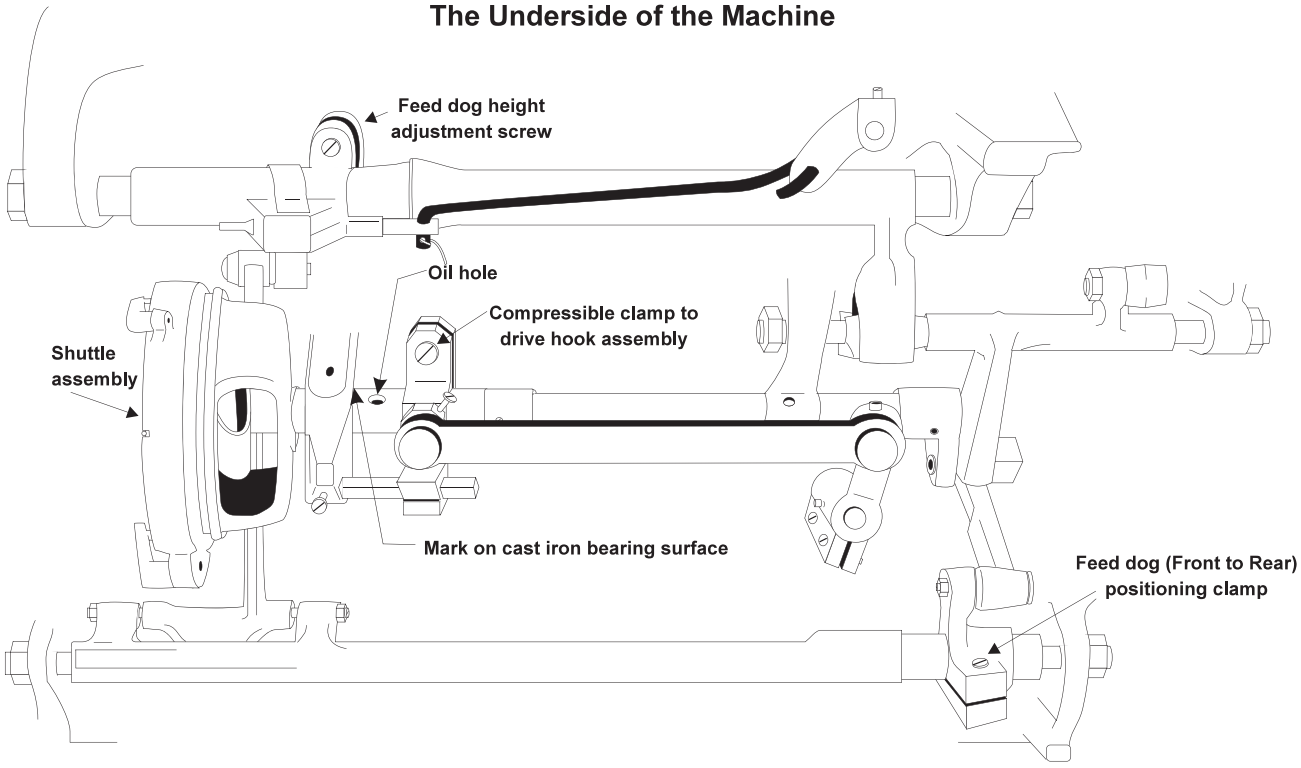


Rotational Timing



Correct Needle Position vs. Gib Hook

The Underside of the Machine



TROUBLE SHOOTING

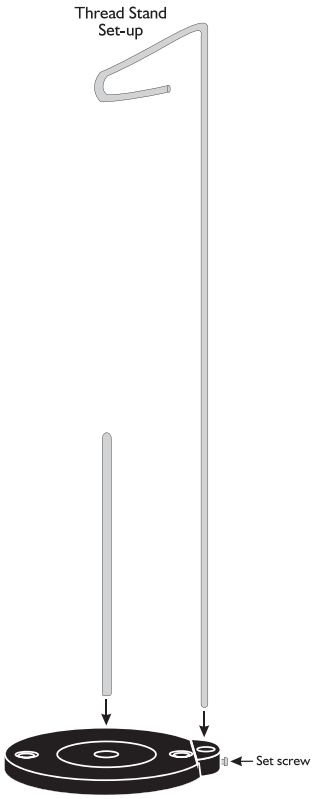
1. *The machine does not seem to be getting any electrical power.*
   Read sections *The 110 Power System or 220 Power System* on p. 3 to be sure all cords are plugged in properly.
2. *The thread is balling at the needle or breaking.*
   To troubleshoot this problem start with "a" below and stop as soon as the problem is solved.
   a. First check for **the most common problem—incorrect needle insertion** (*see p. 5*). Also be sure the needle is not twisted. When viewed from the top of the machine, the eye of the needle should be on the axis from 3 o'clock to 9 o'clock.
   b. If the needle is inserted correctly, be sure the needle size and thread weight are compatible. (*Use the thread selection guide found on p. 9.)*
   c. The top of part "C" on page 17 has a thin curved plate (shaped like a leaf spring) screwed to it. If this "Retaining Ring Cap Spring" is struck by the needle, a bur may be created on an edge of spring's "triangular" opening (the opening where the needle enters). The thread pulls up through this opening and, when the thread comes up through this opening, it can snag on these burs. Remove any burs by polishing them with emery paper or a fine file. If the cap spring is badly damaged it should be replaced. The cap spring is part number #1603.
   d. If you have been sewing through one of the double sided basting tapes, gumming of the needle may have occurred. Clean the needle with rubbing alcohol.
   e. Be sure that there is not too much thread tension. To check—sew in two layers of the material being used and loosen the upper thread tension until the thread knots become visible on the bottom side of the fabric. Now tighten the upper thread tension just enough to draw the knots into the material. Go back to the sewing project and test to see if the problem is solved.
   f. Check for a bur on the gib hook (*see Illustration p. 22 "Gib Hook and Needle from Top with Feed Dog Removed"*). Look for burs on the pointed hook which catches the thread. Smooth any burred areas with an emery board.
   g. Check your needle bar height (*see pp. 19-20*). Sewing in heavy materials can pound the needle bar upward. Reposition the needle bar and test the machine to see if the problem is solved.
   h. Check the timing, i.e., the positioning of the gib hook (*see p. 22*).
3. *There are loops on the underside of the fabric.*
   If there is a tangle on the bottom side of the fabric, there is not enough upper tension. More than likely the thread has not been pulled snugly between the tension disks on the upper tension assembly or it is not between them at all. Lift the presser foot (this will push the two disks apart) and firmly pull the thread against the center shaft between the disks. Now, when the presser foot is dropped, you should see the disks close on the thread and there should be a good deal of tension on the thread when you pull on it.

   If this does not solve the problem, check to make sure that the tension knob has been tightened sufficiently. We like to start our tension adjustments by pulling the knob off the upper tension assembly and, then, turning the white knurled plastic knob found underneath down to the point where its outer surface is flush with the end of the tension post.

   Also see #2c. This situation could cause thread loops.

Tension Assembly Shown Without Cover

4. *How does the thread stand go together?*
   See illustration this page.
5. *When starting to sew the thread pulls out of the needle eye.*
   Simply pull out a longer thread tail and trap it with your finger (*see p. 12 "Starting to Sew" nos. 2 & 3*). Also confirm that the needle eye is threaded from left to right.
6. *A rat's nest is formed in the first few inches of sewing and then it clears itself.*
   This can be eliminated by trapping the thread tails from the needle and the bobbin as you start to sew (*see p. 12 "Starting to Sew" nos. 2 & 3*).
7. *When stopping to turn a corner even with the needle buried the machine skips a stitch at the turn.*
   Bury only the needle tip in the cloth. This allows the machine to create the appropriately sized loop for the hook to pickup.
8. *The needle hits the needle throat plate when reversing sewing directions.*
   To eliminate this problem, be sure to change sewing direction, i.e., forward or reverse, when the machine is stopped with the needle either out of the material or in the fully down position in the material, i.e., at the bottom of its stroke.



   In the needle up position, the foot moves the material but it cannot bend the needle which may cause it to hit the throat plate. In the needle fully down position, the outer portion of the walking presser foot is up and, thus, does not move the fabric which would bend the needle and cause it to hit the throat plate.
9. *When using Tenara (Gore-Tex) or Profilen(PTFE) thread the machine skips stitches.*
   PTFE thread is very slippery and often requires the use of a smaller needle. We recommend using a No.14 or No. 16 needle with Tenara M1000 and Profilen.
   The problem which occurs with a too large needle is that the shaft of the needle does not hold the slippery thread firmly enough against the fabric to enable the formation of a proper loop and, so, the hook cannot catch it and form a stitch. If all else fails, lower the needle bar slightly. This will have a tendency to increase the size of the loop.
   Sewing with Tenara/Gore-Tex thread can be difficult and frustrating at times. However, there are a few easy adjustments that you can make to your Ultrafeed™ in order to improve the stitch quality and greatly reduce issues such as skipped stitches. When sewing with Tenara/Gore-Tex the suggestions below can be used if problems arise.

   Material puckers, stitch knots are pulled to the upper side of the material or the thread is breaking.

   - Increase bobbin case tension by approximately a ½ turn.
   - Decrease upper tension by approximately a ½ turn.

   Stitches are skipped in straight or zigzag operation.

   - Rotate needle in a clockwise direction to roughly the 10 o'clock position. The long vertical groove in the needle should be facing the left as always but should now be angled more towards the back of the machine.
   - When you pull the thread off the top of the cone, you put a twist in it for every turn that you pull off. Eventually, these twists add up and you get an erratic

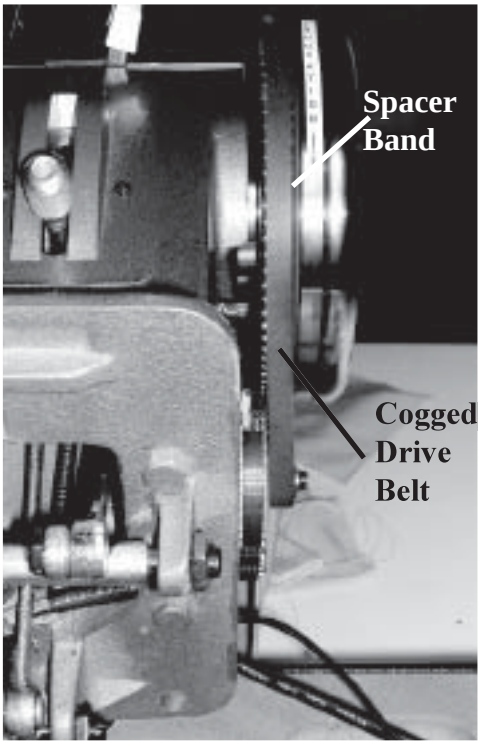
loop at the hook. When the hook misses catching the thread loop a skipped stitch occurs. The solution for this is rather simple. Make a roller out of a dowel or an old coat hanger that will support your spool horizontally and mount the spool on it. By pulling the thread off this way, you are not getting twists and kinks. This may resolve the problem if all else fails.

These are general guidelines. Feel free to experiment with these adjustments in order to fine-tune the stitch quality.

10. *The needle is breaking.*
    Needles often break when the needle is left in the fabric and you switch from straight to zigzag or zigzag to straight stitching or switch the straight stitch needle position from the Left, Center or Right positions. Be sure to raise the needle out of the fabric before making these changes.
11. *The needle positioning lever (Left, Center, Right) does not move freely.*
    Push it down first and it will move easily from one position to another.
12. *There is no penetration power. The Balance wheel rotates but the needle does not penetrate the fabric.* It is not possible for the Posi-Pin clutch to slip unless the pin is not pushed all the way into the bushing hole thereby locking the bushing to the balance wheel. First make sure the spring-pin is properly inserted. If slipping still occurs, remove the knurled nut at the end of the balance wheel and bushing. Pull out the spring-pin and slide the balance wheel off the bushing. The bushing is attached to the machine's upper shaft with two set screws in the rim flange of the bushing. Make sure that these screws are set as tight as possible. Use a 3/32" allen wrench. Reinstall the balance wheel and check again for proper operation.
13. *The bobbin is not filling evenly—there is too much thread on the top or on the bottom.*
    Turn to p. 8 "Winding Bobbins" and locate the "bobbin tensioner" (#3 in drawing). If the bobbin is filling with too much thread on the top move the tensioner down by loosening the screw just under the tensioner on the front of the machine. If there is too much thread on the bottom, move the tensioner up. Tighten the screw once the correct position is found.
14. *When winding bobbins, the bobbin winder stops before the bobbin is full or it does not stop in time and the bobbin has too much thread.*
    There is a bobbin stop (a white lobe) right next to the bobbin winder. It disengages the bobbin winder when a certain thread level is reached. To change the thread level simply loosen the screw found on top of the white lobe and turn it (it is eccentric). Turning it will either push the bobbin away sooner or not so soon. Tighten the screw once the correct position is found.
15. *When removing fabric from under the machine it pulls hard and three strands of thread come up through the throat plate.*
    This happens when removal is attempted with a partial stitch in process. The hook under the machine has a loop of thread round it. To solve the problem be sure to turn the machine forward by hand after stopping until the take up arm has just passed the top of its travel. At this point the hook will have released its last loop of thread and proper upper tension will have been applied, finishing the stitch.
16. *The large cogged drive belt rides up over the spacer band of the Monster II balance wheel and the drive belts are not in direct alignment (with optional Monster II balance wheel).*
    An 1/8" round, black o-ring spacer band has been placed to the right of the balance wheel's drive teeth. If the large cogged drive belt rides up over of this spacer band, cut or pry the spacer band off. The cogged drive belts will not be in direct alignment. Sailrite takes great care to set them up properly with just enough angle to keep the belts running true. There should be no need for

adjustment. Also note that the belt from the motor to the idler pulley (the small belt) should be quite loose in order to minimize wear on the motor bearings.

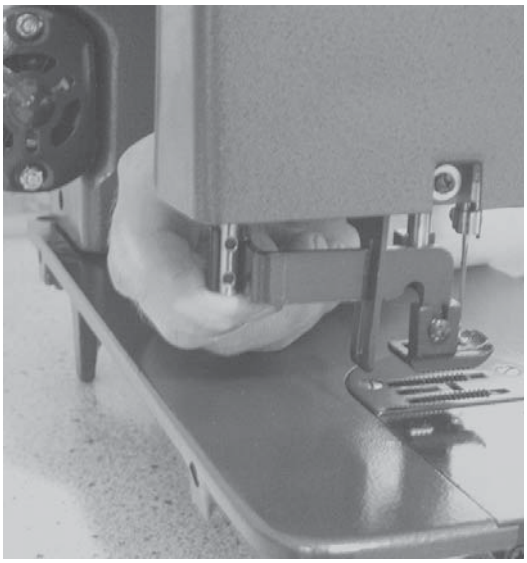
17. *The belts (s) slip or come off the pulleys.*
The machine's belts may require tension adjustment. The longer of the two belts should be tensioned to deflect ¼" when pressed down by finger using a little pressure. Tension on the belt can be adjusted by loosening the bolt located directly below the balance wheel. This bolt attaches the idler pulley to the machine. Move the idler pulley up or down to properly tension the belt and, then, tighten the bolt.
The short belt appears to be much looser. Its deflection should also be about ¼". Adjustment of this belt should not be necessary unless adjustment of the longer belt has been made. If adjustment is ever required, however, it can be accomplished by sliding the idler pulley forward and backward in its slotted bracket. The pulley shaft of the idler pulley is pressed flat at its outer end so that it may be rotated (loosened) with a small wrench. After loosening the shaft, the pulley may be moved to re-tension the belt. Tighten the shaft to complete the adjustment.



Helpful Hints

Owners sometimes ask if there is a way to get more fabric under the foot?

When more presser foot height is needed for extra bulky fabric assemblies, try this trick. First, set the "Stitch Length Adjustment" lever (see p. 10) at maximum, i.e., at the top of its travel. Then, raise the presser foot (see "Hand Lever" p. 10) as you would when taking fabric from under the presser foot. Now, rotate the balance wheel until the inside and outside presser feet of the walking foot are even with one and another. This allows for the insertion of a bit more fabric under the presser feet.



You can also gain temporary presser foot height for inserting boltropes and other thick assemblies by pushing up on the black bar which holds the presser foot in place. This bar is located at the rear of the machine behind the needle bar and is spring loaded.

It is faster to wind bobbins while you sew.
This can be done by running thread to the bobbin winder from an extra cone of thread. Simply place the second cone beside the primary cone and lead the thread up through the same guides. Follow the bobbin winding instructions on page 8 but do not disengage the clutch.

Add-ons for the Ultrafeed™ LSZ-1

If you have purchased an accessory, please read the appropriate section(s) below.

The Ultrafeed™ Light

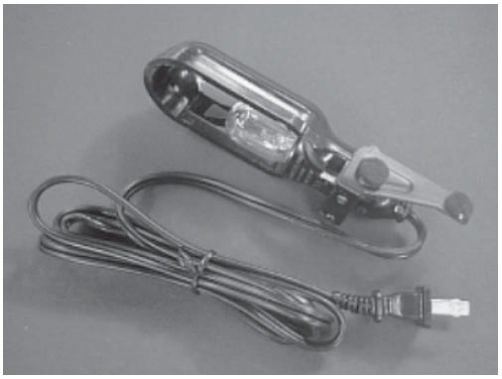
To install this handy Ultrafeed™ light:

1. First locate the screw which has been installed in the left end cover. (This is the cover which protects the needle bar assembly.) The screw is located near the top of this metal cover.
2. Remove the screw from the metal cover. Note that there are 3 washers under the screw. When installing the light, the lock washer and the flat washer should be placed on the outside of the light bracket and the rubber washer should go between the bracket and the machine.
3. Position the light facing forward and insert the screw into the screw hole and tighten it down after deciding at what angle the light is most effective. (Turning on the light will help in this determination.)
4. Plug the light cord into the outlet marked "light" in the sewing machine case. Or, if there is no case outlet plug the light into any electrical outlet.

The Baby Lock Light

The Baby Lock Light has an adjustable neck so that light can be focused right where it is needed. To install this light:

1. First locate the screw which has been installed in the left end cover. (This is the cover which protects the needle bar assembly.) The screw is located near the top of this metal cover. Three washers have been placed under the screw for purposes of installing the Ultrafeed™ Light described above. For the Baby Lock Light they are not needed. So, unscrew the screw, remove and discard the washers; then, put the screw back in the cover.
2. The light's bracket is in two pieces. Take the piece with the key hole slot in it and position it so that the screw comes through the hole. Then slide the bracket down so that the screw goes into the slotted portion of the bracket. When the lip at the top of the bracket rests on the top of the machine, tighten the screw down.
3. Now slide the portion of the bracket attached to the light into the portion attached to the machine.
4. Plug the light cord into the outlet marked "light" in the sewing machine case and adjust the light to whatever position is needed. Or, if there is no case outlet plug the light into any electrical outlet.



Ultrafeed™ Light

Baby Lock Light

Securing the Electrical Cords

Two cord clips are used to keep all electrical cords clear of the drive belts. One is located on the top of the motor housing and the other is found near the right hand back corner of the case. If your machine has a light (optional), use both clips.

Monster II Balance Wheel - Handcranking

The MONSTER II balance wheel also makes handcranking practical and fun. The wheel has a hole in its rim which provides a means by which the hand crank is attached (*see photo, this page*). To use the hand crank simply install the handle. Place the large bolt through the center of the plastic hand grip and tighten it in place with the Allen wrench included. **To operate the handcrank pull it forward toward you through the top of its stroke.** (Counter clockwise as you face the machine from the right). If it is turned backwards, thread may jam in the shuttle hook assembly.

The MONSTER II Balance Wheel Conversion Kit

We recommend removing the balance wheel timing belt when you want to use the handcrank. (If it is left in place, you will have to exert extra effort to spin the motor as you handcrank). To remove the belt push it to the side of the large balance wheel and rotate the wheel to twist it off. To put the belt on, place it inside the large wheel and over the small pulley of the idler pulley first and then turn the balance wheel while guiding it into place around the large wheel from the inside (just like you would a bicycle chain).

Remember that under electrical power the hand crank handle should be removed. It could cause injury. And, it does throw the wheel out of balance slightly.

The Motor Belt

The Ultrafeed™ with a large balance wheel uses a 18.6" cogged timing belt. The belt between the idler pulley and the motor pulley is 8". Replacement belts are available from Sailrite.

Ultrafeed Table Top & Stand

Sailrite offers an industrial sewing machine stand for Ultrafeed sewing machines.

The Table Top and Stand (#100547) is a convenient stationary work center for your Ultrafeed machine. Measuring 20” deep and 48” wide, this table top has a cut out section with hinges that allows you to slip the Ultrafeed out of its case and directly onto the table top. Table height is adjustable from 28 to 34 inches.

Ultrafeed Table Top & Stand

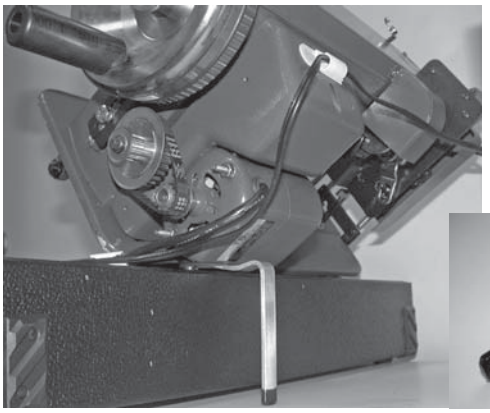
An adhesive yard stick ruler is fastened to the front table edge and there is a handy drawer for storage. Table is also fashioned with a predrilled hole for an optional industrial light.

The table is sent unassembled with step-by-step directions for easy construction.

Ultrafeed Kickstand

This kickstand (#100990A) supports the Ultrafeed machine when hinged back in its portable case. The kickstand also keeps the case from toppling over. Installs on any Ultrafeed sewing machine in the deluxe carrying case.

Kickstand comes complete with installation direction.



Ultrafeed Kickstand in place.

Ultrafeed Kickstand

Roping/Zipper Presser Feet for the Ultrafeed™ LSZ-1 (left foot and right foot)

Zipper Feet

Left and right zipper feet are available for the Ultrafeed™. They make it possible to place a row of straight stitches within roughly 1/16" of a row of zipper teeth or boltrope. Without these feet that distance will be about 3/16" on the right and 1/4" on the left. These latter distances are OK for the large zippers that we normally use in canvas work but they can be a bit too much for the smaller zippers used in clothing. Note that the built-in welting tunnel makes a zipper foot unnecessary for the installation of welting/cording.

The right foot places stitches close to a zipper on the left of the needle and the left foot is for stitches close to the zipper when it is on the right.

Leather Foot

Ultrafeed™ LSZ-1 Leather Presser Foot

Use this foot when working with leather and delicate fabrics. For leather work its higher lift increases room under the foot and its reduced tooth surface minimizes tracking. This surface also reduces scuffing when working with delicate fabrics.

Sewing Swing Gauge

This handy swing away gauge serves just like a fence in a tabletop saw to keep the stitches uniformly spaced from the edge of the fabric. Note that it is useful only along the edges of an assembly. It would help in the creation of a semi-flat felled seam.

Needle Assortment Pack for Ultrafeeds

40 needles, 10 each of sizes #14, #16, #18 & #20, a Deluxe seam ripper and a maintenance brush.

Binder Attachments

Two different styles of binders are available. One is stationary and must be removed to continue normal sewing. The other is a “swing away” style that can be left attached to the machine at all times and swung into position to apply binding tape to a fabric edge. Three binder sizes are available. One is used with 3/4" binding tape, one is used with 1" binding tape and the other with 2"facing / binding tape. A 1” binder can also be used to apply 7/8” centerfold acrylic binding tape.

Installing and Using the Binder

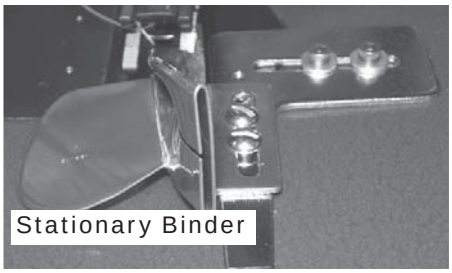
Two screws are used to attach the binder to the bed of the machine. Line up the binder's bracket slot (see Photo A, p.30) with the two predrilled holes in the bed of the machine shown in Photo B. Place a washer (for the “swing away” binder a single rectangular washer with two holes is used) on each of the attachment screws, insert the screws into the bracket slot and then into the holes in the bed of the machine. Tighten the screws.

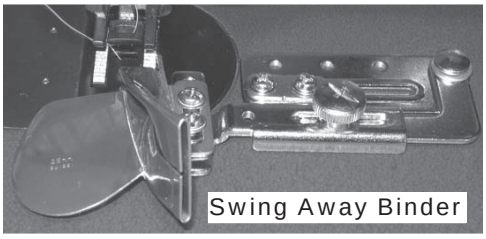
In general a binder should be installed so that the “feeder ledge” (see ledge in photo A) is positioned close to the right toe of the feed dog or right outside of the presser foot. Angle the binder slightly toward the presser foot before it is tightened down to better feed the binding under the foot. For the “swing away” binder final left and right adjustment can be fine tuned by loosening the large thumb screw and sliding the binder head into position. Tighten the thumb screw when satisfied with the positioning.

The two screws found near the feeder plate can be used to slide the plate back and forth. The mouth of the feeder must be very close to the feed dogs in order to keep stitch placement consistent. On the **Ultrafeed™ LSZ-1** position the feeder mouth right at the front edge of the needle plate slot opening. You may need to move the location of the screws in the plate to find the proper setting. When the binder is installed properly, rotating the sewing machine will not result in any contact between the binder, the feet, or the feed dog.

If using an **Ultrafeed™ LSZ-1** sewing machine, set the needle position lever in the “right” side position. This will offset the needle bar to the right side of the foot when the machine is in straight stitch mode.

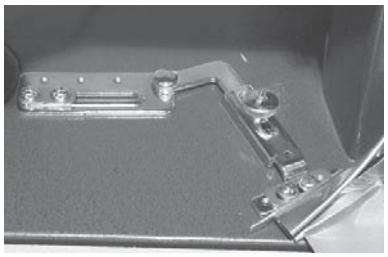
Now feed proper sized binding tape into the “wide” end of the slot on the feeder plate. Push it in as far as you can. Finish the insertion by using a screwdriver blade to push the binding completely through the slot. Then push the raw edge of the mate-





rial requiring binding into the crease of the binding as it exits the binder mouth and start sewing. As long as the material is fed tightly into the crease of the binding the result will be a perfectly finished edge.

Full streaming video instructions on the installation and use of the 2" Swing Binder may be viewed at http://www.sailrite.com/binder-attachment-2 .



Swing Away Binder swung away

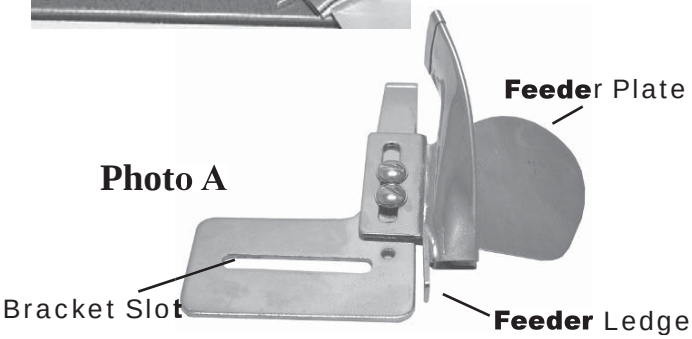
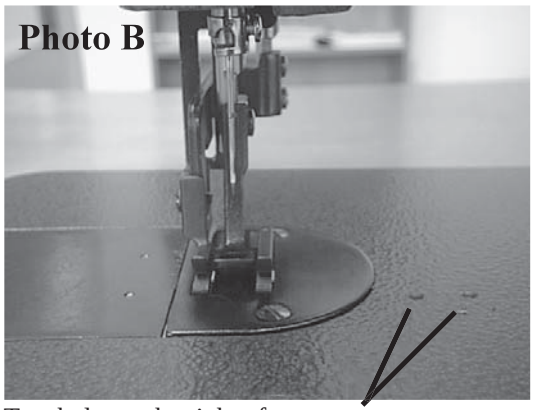
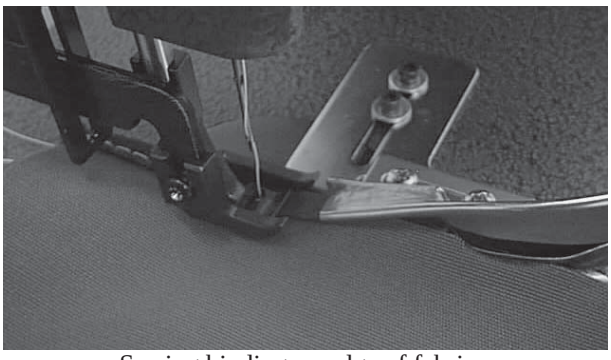


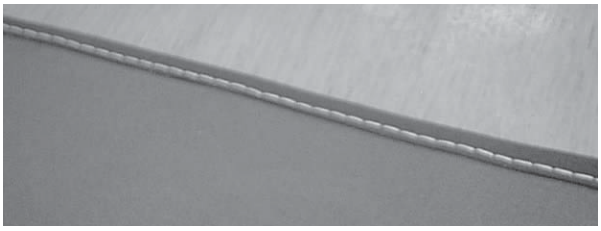
Photo A shows the binder from the back to make the feeder ledge more visible.



Two holes to the right of presser foot used to attach the binder.



Sewing binding on edge of fabric.

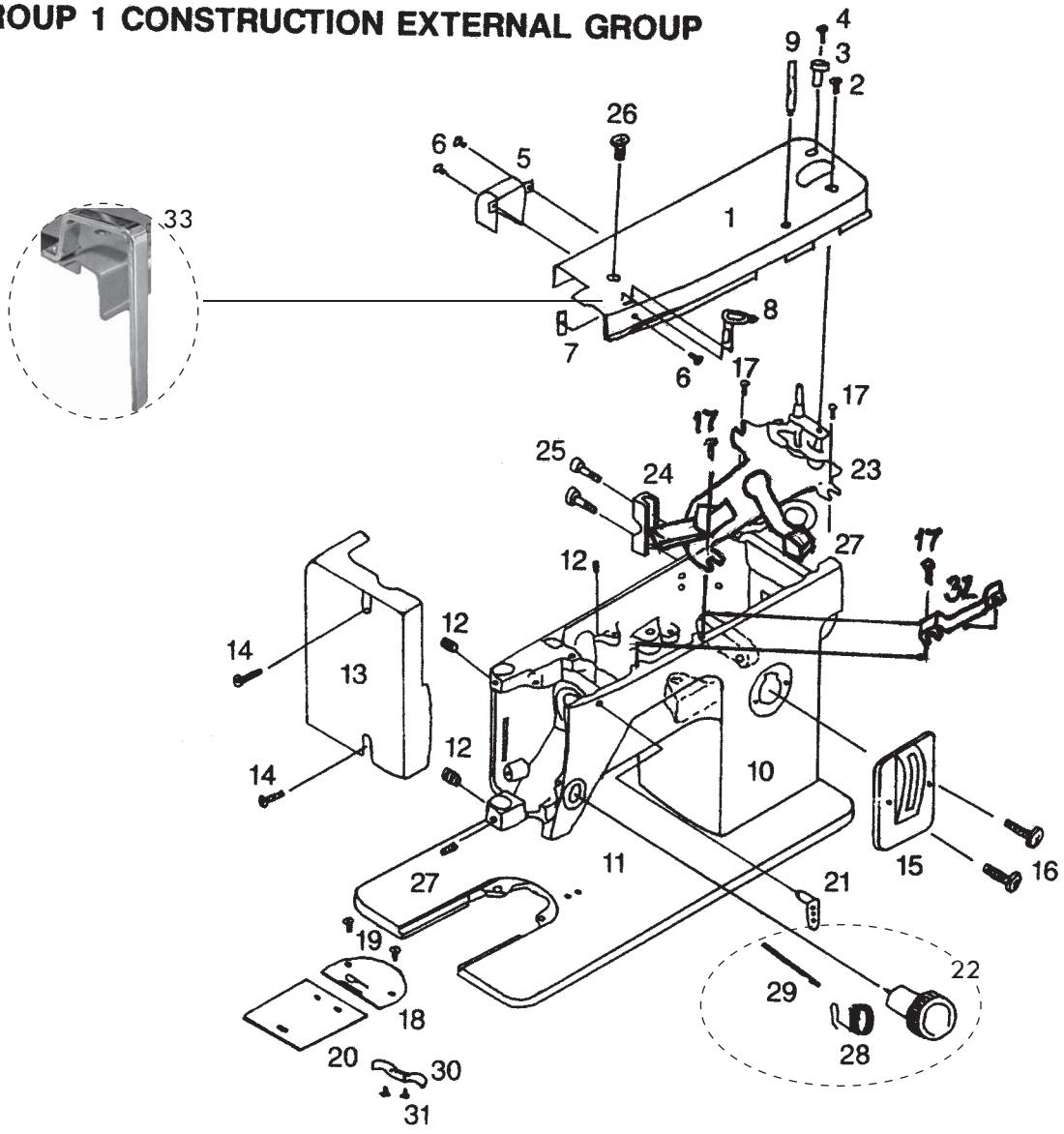


Binding sewn in place on edge of fabric.

Ultrafeed™ LSZ-1 SCHEMATICS

These schematics are handy for identifying machine parts for repair, replacement or reassembly.

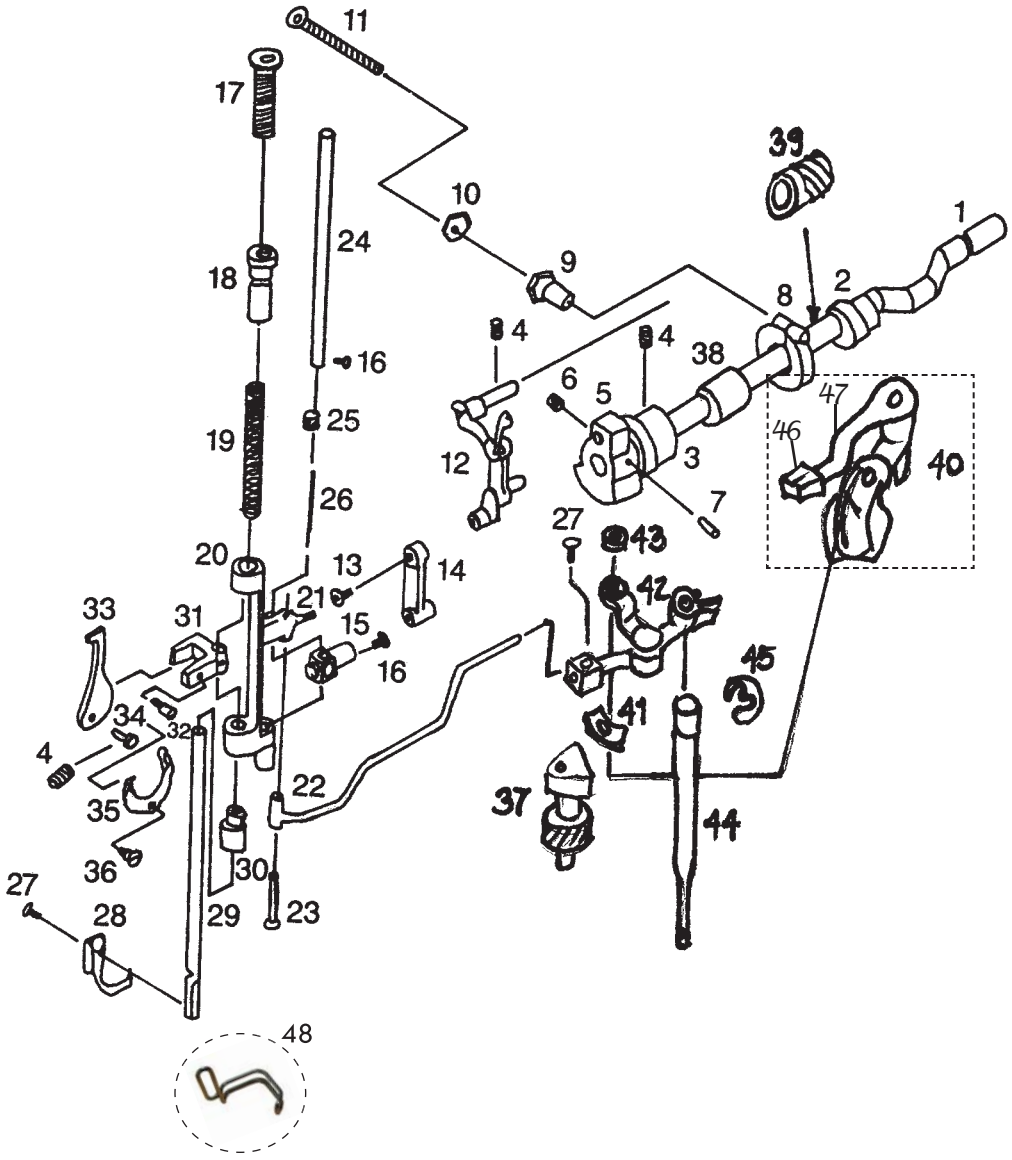
GROUP 1 CONSTRUCTION EXTERNAL GROUP



GROUP 1

Key #	Sailrite #	Part Name	Qty.	Model#
1	W047Z	TOP PLATE	1	W047Z
2	B071	TOP PLATE SET SCREW	1	B071
3	E066	BOBBIN WINDER STOPPER	1	E066
4	E066-2	BOBBIN WINDER STOPPER SET SCREW	1	E066-2
5	W047-1Z	SMALL PLATE COVER	1	W047-1Z
6	100577	SMALL PLATE COVER SET SCREW	2	100577
6	100577	BOBBIN WINDER ASSEMBLY SET SCREW	1	100577
7	E070-1	BOBBIN WINDER TENSION ASSEMBLY SET NUT	1	E070-1
8	E070	BOBBIN WINDER TENSION ASSEMBLY	1	E070
9	149	SPOOL PIN	1	W047-2
10	NA	ARM BODY	1	NA
11	NA	BED	1	NA
12	D097	NEEDLE BAR SUPPORT SET SCREW	2	D097
12	D097	THREE HOLE THREAD GUIDE SET SCREW	1	D097
13	W048Z	FACE PLATE	1	W048Z
14	C097	FACE PLATE SET SCREW	2	C097
15	W125	STITCH LENGTH PLATE	1	W125
16	5321	STITCH LENGTH PLATE SET SCREW	1	A075
17	B010	BOBBIN WINDER SET SCREW	4	B010
18	W032Z	NEEDLE PLATE (5mm)	1	W032Z
19	A052	NEEDLE PLATE SET SCREW	2	A052
20	A048-B	SHUTTLE RACE SLIDE	1	A048-B
21	W029	THREE HOLE THREAD GUIDE	1	W029
22	8511	DIAL TENSION ASSEMBLY	1	W184-1
23	W030Z	BOBBIN WINDER	1	W030Z
24	W025	CRANK ROD BEARING SET BASE	1	W025
25	W025-1	CRANK ROD BEARING SET BASE SET SCREW	2	W025-1
26	E072	TOP PLATE SET SCREW	1	E072
27	120181	BOBBIN WINDER RUBBER RING	1	A117
28	5332	THREAD TAKE-UP/CHECK SPRING	1	W184-3
29	W184-2	TENSION RELEASE PIN	1	W184-2
30	A049	SHUTTLE RACE SLIDE SPRING	1	A049
31	A050	SHUTTLE RACE SLIDE SPRING SET SCREW	1	A050
32	W001Z	STRAIGHT STITCH POSITION LEVER GUIDE	1	W001Z
33	102626	TAKE UP ARM GUARD	1	102626

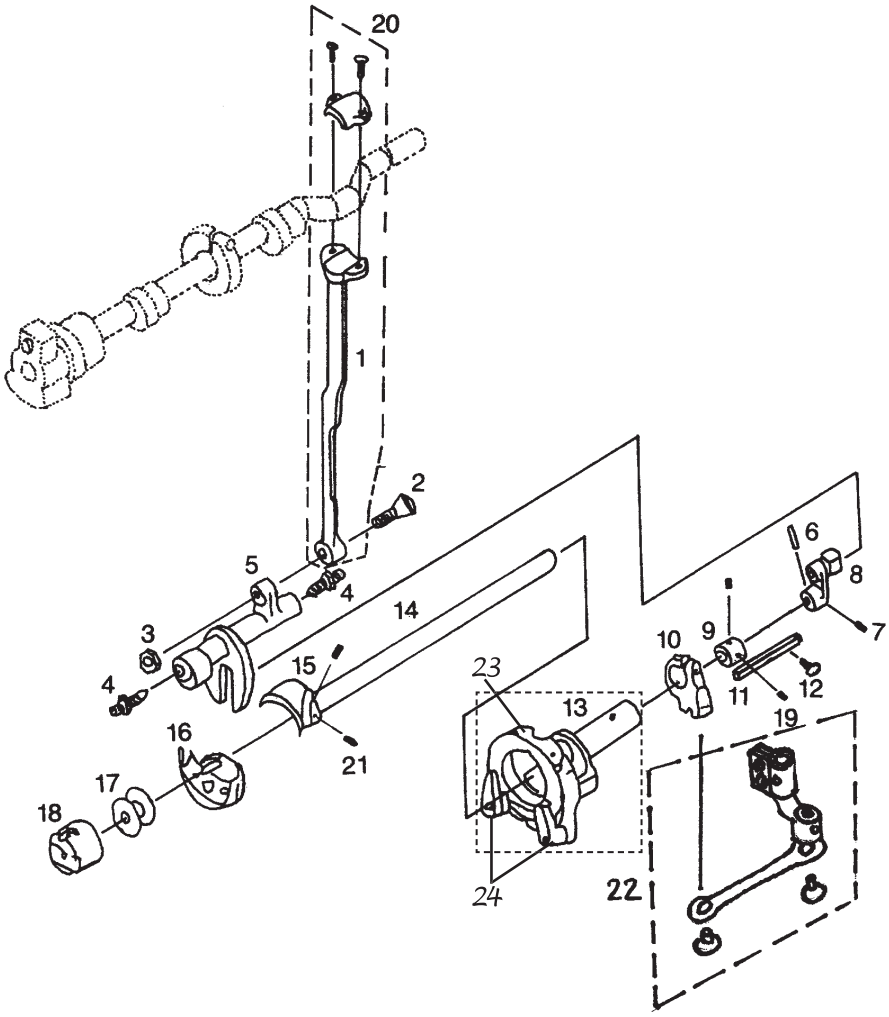
GROUP 2 SEWING TRANSMISSION GROUP



GROUP 2

Key #	Sailrite #	Part Name	Qty.	Model#
1	E053	ARM SHAFT	1	E053
2	B007	FEED CAM	2	B007
3	B051	ARM SHAFT BUSHING	1	B051
4	A012	THREAD TAKE-UP ASSEMBLY SET SCREW	1	A012
4	A012	ARM SHAFT BUSHING SET SCREW	1	A012
4	A012	TENSION RELEASE LEVER DRAG LINK PIN SET SCREW	1	A012
5	B048	THREAD TAKE-UP LEVER CAM	1	B048
6	A029	THREAD TAKE-UP ASSEMBLY SET SCREW	1	A029
7	E048-1	THREAD TAKE-UP LEVER CAM SET PIN	1	E048-1
8	W048-4	CRANK ROD LEVER CAM FOLLOWER	1	W028-4
9	W028-2	CRANK ROD LEVER CAM FOLLOWER ADJUST NUT	1	W028-2
10	W028-3	CRANK ROD LEVER CAM FOLLOWER LOCK SCREW	1	W028-3
11	W028-1	CRANK ROD LEVER CAM FOLLOWER LOCK NUT	1	W028-1
12	E020	THREAD TAKE-UP ASSEMBLY	1	E020
13	E020-2	NEEDLE BAR CONNECTING ROD SET SCREW	1	E020-2
14	B018	NEEDLE BAR CONNECTING ROD	1	B018
15	A042	NEEDLE BAR CONNECTING STUD	1	A042
16	A092	NEEDLE SET SCREW	1	A092
17	A031	PRESSER REGULATING THUMB SCREW	1	A031
18	W010	PRESSER REGULATING THUMB SET SCREW	1	W010
19	A032	PRESSER BAR SPRING	1	A032
20	B016	NEEDLE BAR SUPPORT	1	B016
21	A021	NEEDLE BAR CONNECTING JOINT SET SCREW	1	A021
22	W015	ZIGZAG CONNECTING ROD	1	W015
23	B099	NEEDLE BAR CONNECTING JOINT PIN	1	B099
24	W066	NEEDLE BAR	1	W066
25	W067	NEEDLE THREAD GUIDE	1	W067
26	7010	NEEDLE #20 (135X17)	1	W008
27	A036	PRESSER FOOT SET SCREW	1	A036
28	W012Z	INSIDE PRESSER FOOT	1	W012Z
29	A035-1	PRESSER BAR	1	A035-1
30	B028	PRESSER BAR LOWER BUSHING	1	B028
31	W039	PRESSER BAR BRACKET	1	W039
32	A046	PRESSER BAR ACTUATOR GUIDE SCREW	1	A046
33	W043	TENSION RELEASE LEVER DRAG LINK	1	W043
34	D020	TENSION RELEASE LEVER DRAG LINK SET PIN	1	D020
35	W045	TENSION RELEASE LEVER	1	W045
36	B046	TENSION RELEASE LEVER SET SCREW	1	B046
37	W016Z	ZIGZAG DRIVE GEAR/CAM	1	W016Z
38	W065	PRESSER BAR ACTUATOR "CAM"	1	W065
39	W000Z	HELICAL GEAR	1	W000Z
40	W003Z	NEEDLE DISPLACEMENT REGULATOR ASSEMBLY	1	W003Z
41	W004Z	BLOCK SLIDE	1	W004Z
42	W005Z	ZIGZAG CONNECTING LINK	1	W005Z
43	W006Z	COLLAR FOR ZIGZAG CONNECTING LINK	1	W006Z
44	W007Z	ZIGZAG VERTICAL SHAFT	1	W007Z
45	W008Z	SNAP RING FOR ZIGZAG VERITCAL SHAFT	1	W008Z
46	W003ZC	L,R,C LEVER CAP	1	W003ZC
47	W003ZL	L,R,C LEVER	1	W003ZL
48	102627	NEEDLE GUARD (220 VOLT ULTRAFEED ONLY)	1	102627

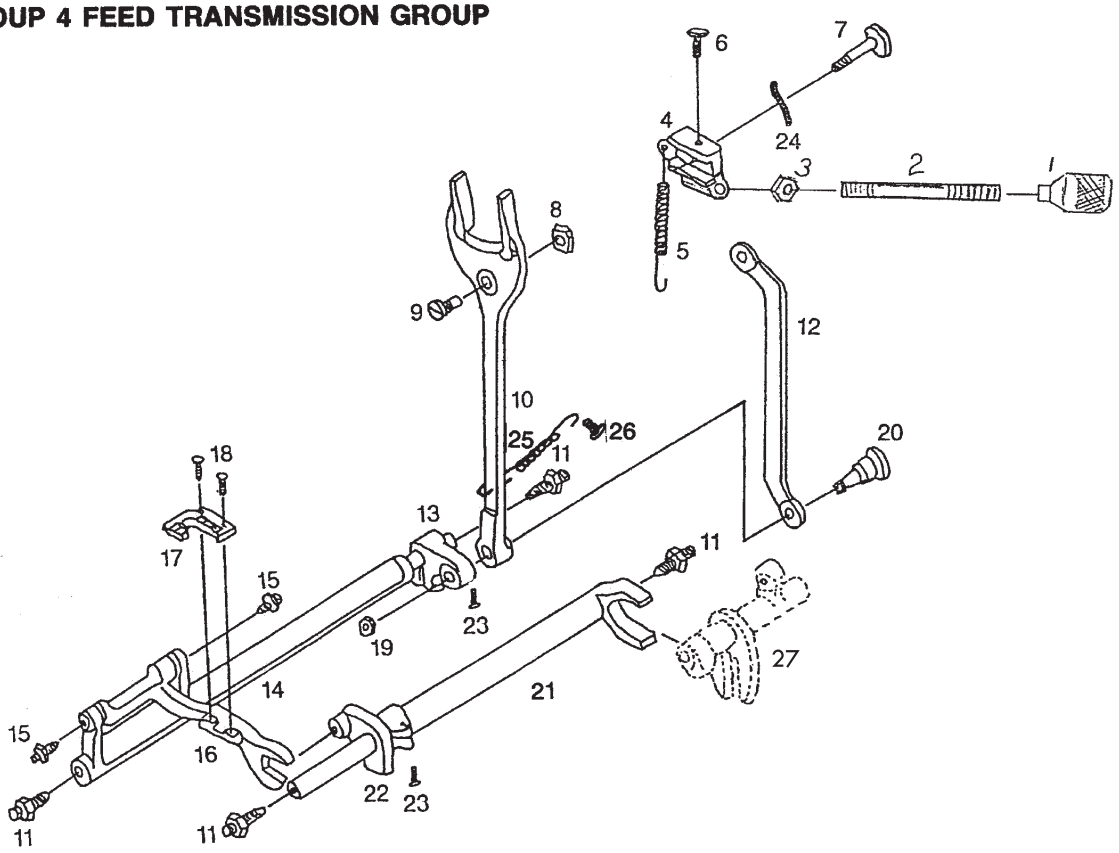
GROUP 3 SHUTTLE TRANSMISSION GROUP



GROUP 3

Key #	Sailrite #	Part Name	Qty.	Model#
1	B139	CRANK CONNECTING ROD	1	B139
2	A027A	CRANK CONNECTING ROD SET SCREW	1	A027A
3	A027B	CRANK CONNECTING ROD SET NUT	1	A027B
4	A023	OSCILLATING SHAFT SET SCREW & NUT	2	A023
5	A024	OSCILLATING SHAFT	1	A024
6	A018	OSCILLATING SHAFT CRANK SET PIN	1	A018
7	A021	OSCILLATING SHAFT CRANK SET SCREW	1	A021
8	B179	OSCILLATING SHAFT CRANK WITH SLIDE BLOCK	1	B179
9	B177	LOWER SHAFT COLLAR	1	B177
10	B155	SHUTTLE RACE GUIDE	1	B155
11	A084	SHUTTLE RACE GUIDE SHAFT	1	A084
12	B153	SHUTTLE RACE GUIDE SHAFT SET SCREW	1	B153
13	B170	SHUTTLE RACE GUIDE SHAFT COMPLETE	1	B170
14	B172	LOWER SHAFT	1	B172
15	W172	SHUTTLE DRIVER	1	W172
16	9601	SHUTTLE HOOK	1	D099
17	123100	BOBBIN	1	A107
18	1232	BOBBIN CASE ASSEMBLY	1	D100
19	B177-1	LOWER SHAFT COLLAR SET SCREW	4	B177-1
20	B139-2	CRANK CONNECTING ROD CAP SET SCREW	2	B139-2
21	W172U	SHUTTLE DRIVER SET SCREW	2	W172U
22	W002Z	ZIGZAG DRIVE ASSEMBLY FOR SHUTTLE ASSEMBLY	1	W002Z
23	1603	RETAINING RING CAP SPRING	1	1603
24	123011	RETAINING RING CLIPS RIGHT & LEFT	1	011

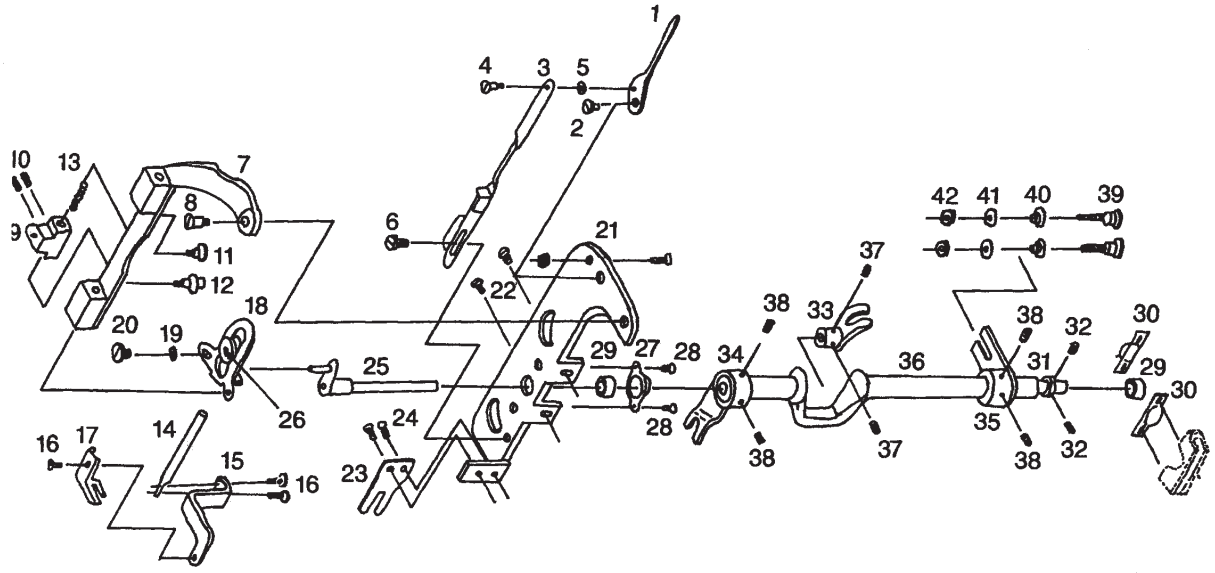
GROUP 4 FEED TRANSMISSION GROUP



GROUP 4

Key #	Sailrite #	Part Name	Qty.	Model#
1	W109	FEED REGULATOR THUMB NUT	1	W109
2	W105	FEED REGULATOR LEVER	1	W105
3	A053B-2	FEED REGULATOR LEVER NUT	1	A053B-2
4	W107	FEED REGULATOR	1	W107
5	W106	FEED REGULATOR SPRING	1	W106
6	B010	FEED REGULATOR SCREW SET SCREW	1	B010
7	W108	FEED REGULATOR SCREW	1	W108
8	A069B	FEED CONNECTION SLIDE BLOCK	1	A069B
9	A069A	FEED CONNECTION SLIDE BLOCK STUD	1	A069A
10	B103	FORKED ROD	1	B103
11	A023	FEED ROCK SHAFT CENTER SCREW & NUT	2	A023
11	A023	FEED LIFTING ROCK SHAFT SCREW & NUT	2	A023
12	W046	DRIVING CRANK	1	W046
13	A071B	FEED ROCK SHAFT CRANK	1	A071B
14	A071A	FEED ROCK SHAFT	1	A071A
15	A076	FEED BAR CENTER SCREW & NUT	2	A076
16	A075	FEED BAR	1	A075
17	W011Z	FEED DOG	1	W011Z
18	A078	FEED DOG SCREW	2	A078
19	W046-1	DRIVING CRANK GUIDE NUT	1	W046-1
20	A061	DRIVING CRANK GUIDE SCREW	1	A061
21	A072	FEED LIFTING ROCK SHAFT	1	A072
22	A073	FEED LIFTING ROCK SHAFT CRANK	1	A073
23	A071B-1	FEED ROCK SHAFT CRANK SET SCREW	1	A071B-1
23	A071B-1	FEED LIFTING ROCK SHAFT CRANK SET SCREW	1	A071B-1
24	A067	FEED REGULATOR SCREW WASHER	1	A067
25	B103U	FORKED ROD SUPPORT SPRING	1	B103U
26	B103US	FORKED ROD SUPPORT SPRING SCREW	1	B103US
27	A024	OSCILLATING SHAFT	1	A024

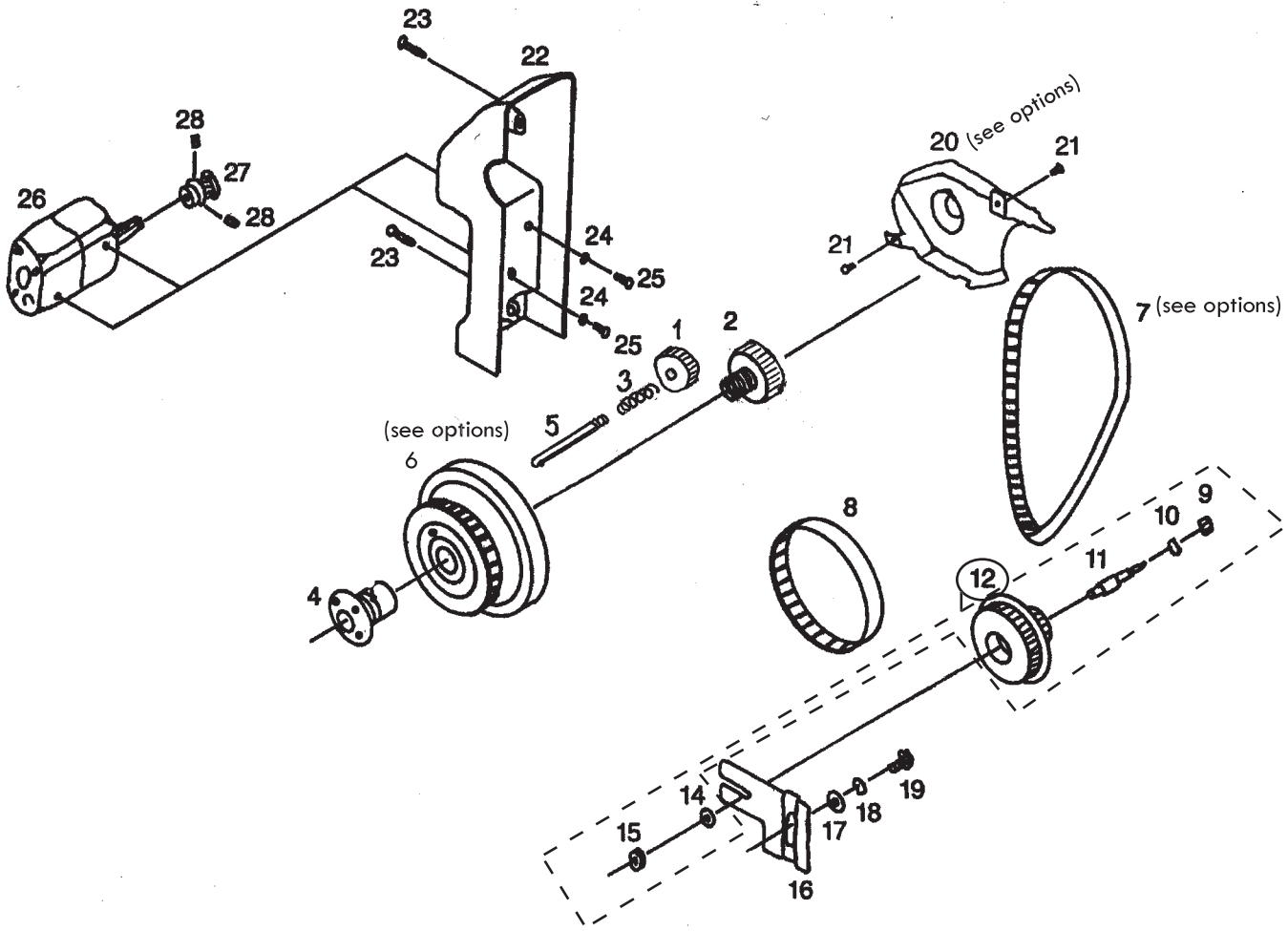
GROUP 5 DRIVING & REVERSING MECHANISM GROUP

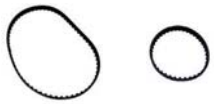
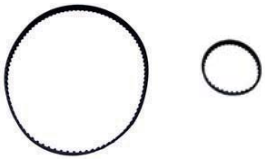
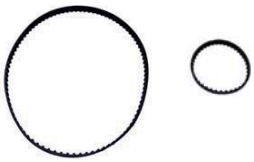


GROUP 5

Key #	Sailrite #	Part Name	Qty.	Model#
1	W042	PRESSER BAR LIFTER	1	W042
2	W042-3	PRESSER BAR LIFTER HINGE SCREW	1	W042-3
3	W026	LIFT BAR	1	W026
4	W042-2	UPPER LIFT BAR SCREW	1	W042-2
5	W042-1	SPACER	1	W042-1
6	W026-1	LIFT BAR GUIDE SCREW	1	W026-1
7	W018	PRESSER BAR TRACK	1	W018
8	W018-1	PRESSER BAR TRACK HINGE SCREW	1	W018-1
9	W020	REAR PRESSER BAR BRACKET	1	W020
10	A029	REAR PRESSER BAR SET SCREW	2	A029
11	W018-2	PRESSER BAR TRACK GUIDE SCREW	1	W018-2
12	W018-3	PRESSER BAR TRACK FEED STUD	1	W018-3
13	W019-1	PRESSER BAR LOAD SPRING (REAR)	1	W019-1
14	W019	REAR PRESSER BAR	1	W019
15	W017	OUTSIDE PRESSER FOOT BRACKET	1	W017
16	B010	OUTSIDE PRESSER FOOT BRACKET SCREW	2	B010
16	B010	OUTSIDE PRESSER FOOT SET SCREW	1	B010
17	W013Z	OUTSIDE PRESSER FOOT	1	W013Z
18	W024	PRESSER BAR ACTUATOR	1	W024
19	W020-2	FEED SCREW RING	1	W020-2
20	W020-1	PRESSER BAR ACTUATOR FEED SCREW	1	W020-1
21	W041	END PLATE	1	W041
22	W041-1	END PLATE SET SCREW	2	W041-1
23	W014	OUTSIDE PRESSER FOOT BRACKET LIMITER	1	W014
24	C097	BRACKET LIMITER SET SCREW	2	C097
25	W036	PRESSER BAR FEED ROD	1	W036
26	W024-1	PRESSER BAR ACTUATOR SPACER	1	W024-1
27	W022	END PLATE BEARING SET PLATE	1	W022
28	W041-2	RIVET	3	W041-2
29	W021	BEARING BRACKET BUSHING	2	W021
30	W023	LIFT CRANK ROD BEARING BRACKET PLATE	2	W023
31	W052	ROCKER END SET RING	1	W052
32	W052-1	ROCKER SET RING SET SCREW	2	W052-1
33	W033	PRESSER BAR ACTUATOR UP-DOWN ROCKER	1	W033
34	W034	PRESSER BAR ACTUATOR FEED ROCKER	1	W034
35	W035	CRANK ROD ROCKER	1	W035
36	W053	CRANK ROD	1	W053
37	D097	PRESSER BAR ACTUATOR UP-DOWN ROCKER SET SCREW	2	D097
38	W034-3	CRANK ROD ROCKER SET SCREW	2	W034-3
38	W034-3	PRESSER BAR FEED ROCKER SET SCREW	2	W034-3
39	W046-2	CRANK ROD ROCKER GUIDE SCREW	1	W046-2
39	W046-2	UP-DOWN ROCKER GUIDE SCREW	1	W046-2
40	W046-3	CRANK ROD ROCKER LOCK SPACER	1	W046-3
40	W046-3	UP-DOWN ROCKER LOCK SPACER	1	W046-3
41	W046-4	CRANK ROD ROCKER LOCK WASHER	1	W046-4
41	W046-4	UP-DOWN ROCKER LOCK WASHER	1	W046-4
42	A061-B	CRANK ROD ROCKER LOCK NUT	1	A061-B
42	A061-B	UP-DOWN ROCKER LOCK NUT	1	A061-B

GROUP 6 ELECTRIC POWER & DYNAMIC TRANSMISSION



Balance Wheel (6)	*Belt Cover (20)*	*Belts (7)*
Small Diameter Balance Wheel #W060Z 	102631 	56535, 5265 
Power Plus Balance Wheel #10081 	100871 	56539, 5265 
Monster II Balance Wheel #604U 	100871 	56539, 5265 

GROUP 6

KEY #	SAILRITE#	PART NAME	QUANITY	MODEL#
1	100540	POSI-PIN KNOB FOR SHAFT	1	100540
2	100536	POSI-PIN NUT	1	100536
3	100539	POSI-PIN SPRING	1	100539
4	100537	POSI-PIN WHEEL BUSHING	1	100537
5	100538	POSI-PIN QUICK RELEASE SHAFT 3/16″	1	100538
6	100181	POWERPLUS WHEEL	1	100181
6	604U	MONSTER II BALANCE WHEEL	1	604U
6	W060Z	SMALL DIAMETER BALANCE WHEEL	1	W060Z
7	56535	BELT (18.6")	1	56535
7	5265	BELT (13")	1	5265
8	56539	BELT(80XL0.25)-8"	1	W007
9	D116	E5 RING	1	D116
10	W061-5	IDLE PULLEY SHAFT WASHER	1	W061-5
11	W061-1	IDLE PULLEY SHAFT	1	W061-1
12	W061-A	IDLE PULLEY	1	W061-A
14	W061-6	IDLE PULLEY LOCK WASHER	1	W061-6
15	W061-2	IDLE PULLEY SET NUT	1	W061-2
16	W059	PULLEY BRACKET	1	W059
17	LT-2M-4	MOTOR BRACKET SET WASHER	1	LT-2M-4
18	LT-2M-3	MOTOR BRACKET SET LOCK WASHER	1	LT-2M-3
19	LT-2M-2	MOTOR BRACKET SET SCREW	1	LT-2M-2
20	100871	BELT COVER FOR LARGE DIAMETER BALANCE WHEEL	1	100871
20	102631	BELT COVER FOR SMALL DIAMETER BALANCE WHEEL	1	102631
21	100576	BELT COVER SET SCREW	2	A092
22	W049Z	MOTOR BASE (REAR COVER)	1	W049Z
23	W049-1	MOTOR BASE SET SCREW	2	W049-1
24	W049-2	MOTOR SET WASHER	2	W049-2
25	C097	MOTOR SET SCREW	2	C097
26	W003Z-26	MOTOR-BLUE	1	W003Z-26
26	W003	MOTOR-RED	1	W003
27	W062-1	MOTOR PULLEY	1	W062-1
28	D097	MOTOR PULLEY SET SCREW	2	D097

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