

E 16 PRO User Manual

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1. Copyright Notice

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- Pat. US 6,445,970 B1
- Pat. US 6,823,807
- Pat. CH 693569 A5
- Pat. US 6,736,077 B2
- Pat. US 6,732,668 B2
- Pat. US 6,871,605
- Pat. US 6,983,192 B2
- Pat. US 7,308,333 B2
- Pat. US 7,513,202
- Pat. US 8,851,001 B2
- Pat. US 9,702,070
- Other patents pending

2. Software Versions

v1.0.XXX

- Launch of Product

v1.1.XXX

- Resequenced Maintenance Walk-throughs
 - Trimmer maintenance is now in the weekly maintenance.
 - Needle drive oiling now allows additional steps before moving the needle case to allow additional steps to be completed while oil is being absorbed.
 - Added pinch roller maintenance to the end of the quarterly maintenance.
 - Altered image for warning about removing clamping devices to show that clamping devices must be removed.
- Absolute movements now better respect hoop limits
 - Dragging a design or moving a design with the numbers will show outside hoop limits on screen until the hoop arms move. Once the move is complete, the design will reposition to match the actual hoop position within the limits.
 - Jogging with the arrow buttons remains the same behavior and continues to respect hoop limits on large jogs.
- Additional support for USB devices.
 - The file structure in the OS was altered to better handle a wider range of USB flash drives.
- Slow Start / Inching added to Start / Stop Button
 - Press and hold the Start / Stop button to slow the machine sewing.
 - Release to resume normal speed.
 - Tap to Start or Stop normally.
- Improved Update Behavior
 - Updating the OS will now retain Wi-Fi settings. This update will still cause a loss of the settings, but future updates will retain them.
 - Additional dialogs and progress bars to provide more clarity to the process.
- Reset Thread Tree added

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- If you desire to clear all thread assignments to the needles on the thread tree, there is now a button to do that.
- On-screen Keyboard now has numbers added to the top row.
- Thread Break Troubleshooting has been added to the manual.
- Thread Break Sensitivity has been inverted. In the previous version, the setting was having the opposite effect of the label.
- X and Y Satin Width Adjustments are now respected upon rotation.
- Various visual adjustments, spelling corrections, bug fixes and improvements, and firmware updates and improvements.

3. Hazards of Operation & Safety Warnings

Hazards of Operation

There are risks in operating any mechanical equipment, the following is intended to elevate your awareness of both the areas of risk and the meaning of the warning signs located on the machine. Always refrain from interfering with mechanical or electromechanical parts while in operation unless otherwise specified in this manual.



Laser Beam

Do not look directly into the laser beam.



Take-up Lever Oscillation

Do not touch the take-up levers during operation.



Needles During Operation

Do not place body parts or other foreign objects under the needles during operation.



Needle Case Movements

During operation, do not place hands or other objects on or around the needle case.



Rotary Hook Rotation

Do not attempt to change the bobbin thread during operation. During operation, do not place hands or other objects in the rotary hook area. Do not operate the machine without the hook guards in place.



Cap Frame Pinch Points

Do not touch the cap frame, driver, or driver bar during operation.



Pinch Points (X-Carriage)

Do not rest hands or other objects on the tabletop during operation. Do not reach behind the x-carriage during operation with or without the tabletop in place.

Safety Warnings

The list below specifies safety warnings that you should heed during normal operation and maintenance of your machine.



Do not attempt to lubricate the machine while it is in operation.



Failure to engage the emergency stop button on the machine keypad while removing or replacing needles can result in the machine starting through machine or operator error. This can result in damage to the machine and/or serious personal injury.



Never attempt to remove or insert the bobbin while the machine is operating.



Do not operate the machine without the covers being installed. Moving parts can cause crushing and pinching injuries. In addition, fabric and other materials can get caught in the moving belts and gears and damage the machine.



Do not adjust the presser foot height while the machine is sewing. Doing so can result in serious injury.



Do not attempt to pull on or trim threads near moving needles. This can result in painful injury.



The lubricants specified in the Software and Technical manuals contain known carcinogens. Do not allow lubricants to come into contact with your eyes, mouth, or nose. Always wash your hands thoroughly after performing lubrication procedures.



When using solvents to clean components in the machine, always ensure adequate ventilation. Allow all solvents to completely evaporate before turning the machine back on to prevent shorting out electrical components. Vapors from most solvents are both toxic and flammable.

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Dispose of rags soaked with solvent properly.



You must unplug the machine before replacing the power switch fuse.

The following table lists specific safety warnings that you should heed when you perform procedures (such as repairs and technical adjustments) that extend beyond normal operation and maintenance.

Area of Machine	Warning
Entire Machine	<p>Personal injury may result if proper precautions are not observed. Remove rings, watches, and any other metallic objects from hands and wrists before servicing the machine. Remove metallic articles from shirt pockets to prevent them from falling into the machine. Do not allow loose clothing to come into contact with moving parts of the machine. Under certain conditions of machine failure, the moving parts of the machine may not be controllable by normal means. At these times, the machine may operate without notice.</p> <p>Failure to practice good maintenance and repair techniques may result in injury to personnel performing the work and/or damage to the equipment. The warranty is exclusive of, and may be VOID if poor maintenance practices have caused damage to the equipment.</p> <p>Failure to use a grounding strap, or failure to practice other good maintenance/ repair techniques may cause damage to the machine and possible personal injury. DO NOT attempt to use any grounding strap that is not specifically designed for static use. A "straight-wire" grounding device (one without built-in resistance) will place the operator in danger of exposure to dangerous voltages. It is recommended that the static strap be checked during daily use for proper resistance protection.</p> <p>DO NOT operate the machine with the lower rear cover removed, except when indicated by the instructions in the Technical Manual. Operating the machine without the covers creates a risk of severe electrical-related injury.</p>
Harnesses	<p>Always turn the power off before disconnecting or connecting any harness. At the minimum engage the emergency stop button.</p>

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36V Power Harness

Do not attempt to repair a damaged 36V power harness if the wiring insulation is damaged through chafing, nicks, or cuts, or if the wires were overheated due to an over-current machine error. Never handle the 36V power harness unless power to the machine is completely disconnected. Do not rely on the power switch to break the power supply to the machine.

Power Supply

Lethal voltages exist inside the power supply unit, at the back side of the electrical supply input connector, and in the wires between the two. If you plan to do any work with any of these components, turn the power switch off and disconnect the electrical input supply cord from the machine.

It is very important that the power cord is plugged into a properly wired electrical outlet. Failure to have a properly wired outlet may result in damage to the equipment and personal injury. It is recommended that a licensed electrician be consulted to ensure that the electrical outlet is properly wired and grounded. If a properly wired electrical outlet is not used for the source supply voltage to the system, electrical failures may result.

Do not attempt to disassemble the power supply unit for any reason. There are no user-serviceable components inside. Internal components in the power supply unit might still have residual voltage (even if power is disconnected) that can cause painful electrical shock.

Do not attempt to replace or service any component in the rear of the lower bed without disconnecting the A/C power input cord. Failure to do so will leave the power supply and power switch energized with dangerous levels of voltage even when turned off and can result in severe injury from electrical shock.

Laser Assembly

The laser assembly replacement procedure is intended to be performed only by specially trained Melco service technicians and personnel. Disassembly by untrained individuals will void any warranty protection and can result in personal injury or damage to the machine.

DO NOT install laser assembly until the machine is turned OFF!!! Failure to turn the machine off may result in personal injury or damage to the machine.

The laser light adjustment procedure is intended to be performed only by specially trained and authorized Melco service technicians and personnel. Disassembly by untrained individuals will void any warranty protection and can result in personal injury or damage to the machine.

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DO NOT allow the laser beam to be aimed at yours or anyone else's eyes. The laser emits a very concentrated light beam that can cause permanent blindness. Use extreme care in handling the laser assembly to make sure it is not going to be inadvertently aimed at someone's eyes or face. DO NOT LOOK DIRECTLY AT THE LASER LENS WHILE IT IS ENERGIZED!

LED Cluster Assembly	The LEDs may be hot to the touch when illuminated. They must be turned off for a few minutes before handling or they can cause minor burns.
Movable Knife	Keep clear of the moving parts that are exposed during the movable knife adjustment procedure.
Needle Case	During needle case removal, once you have completed the first two steps of the procedure. Do not proceed without engaging the emergency stop button or by turning the machine off. The machine may begin operating if you do not do so. This can result in severe damage to the machine and/or personal injury. You do not need to disconnect the power input cord from the machine.
Trimmer Drive Assembly	The Trimmer Drive Assembly replacement procedure requires the removal of the lower arm rear cover from the back of the machine. DO NOT place your hands into the back of the lower bed while the A/C input cord is connected to the machine. Failure to disconnect the A/C power input cord can result in potential electrical shock if you inadvertently touch the back of the power switch or the wiring to the power supply.
X/Y Home PCB	A small risk exists of unpredictable movement of internal parts when the optical sensors are disconnected. This creates a risk of personal injury if parts suddenly move. Always turn off the machine before disconnecting the optical sensors.
Y-Motor Assembly	Risk of serious personal injury exists when handling internal motors, belts, and cabling due to electrical shock and moving parts hazards. Always turn off the embroidery machine when working on or adjusting motors, belts, or gears.
Z-Home Sensor PCB	The Z-Home Sensor PCB replacement procedure requires the removal of the left and right transparent arm covers and the upper arm back cover. Do not remove the covers from the machine without either turning the machine off or engaging the emergency button. The motors might move when the sensor is removed or the harnesses are disconnected.

Safe Operating Principles

The following list contains some safe operating principles you should follow when operating the machine.

- No untrained persons should be permitted within the designated working area around the machine.
- No untrained persons should operate the machine.
- This machine will embroider stitches in a safe and controlled manner when used as outlined throughout this documentation.
- Thread break sensors stop the machine automatically when a fault changing thread feed dynamics is detected, this stoppage is normal and recovery from such a stop is explained in this manual.
- The machine will stop operating at the end of each design automatically, do not attempt to manually stop an operating machine in any way other than what is described in this manual.
- DO NOT interfere with moving machine parts during operation.
- Only after the machine has stopped should you interact with it.
- DO NOT wear loose or baggy clothing or jewelry while operating the machine.
- ALWAYS wear eye protection when operating your machine.
- Keep the working area clean and free from any objects that may interfere with the normal movements of the machine.
- Keep up on the required maintenance. This not only ensures safe operating conditions but will also maintain a quality sew-out and extend the life of the machine.
- Read the entire manual prior to operation.

4. Specifications

For indoor use only.

Number of Needles	16
Maximum Tubular Frame Size (XxY)	500mm x 430mm (19.7"x 16.9")
Maximum Tubular Frame Size (XxY)	410mm x 393mm (16.1"x15.5")
Wide Angle Cap Frame	360mm x 82mm (14.1" x 3.25")
Min/Max Sew Speed Flats	300-1400 s.p.m.
Min/Max Sew Speed (Wide Angle Driver)	300-1200 s.p.m.
Stitch Length Range	Only limited by hoop sew field.
User Interface	Connected Onscreen Touch Environment
Machine Configuration	One machine is connected to one touchscreen unit.
Self-Diagnostics Capability	Retrieves relevant machine data for troubleshooting
Touchscreen Design Memory	≈6GB, Max file size 500k
Supported Design Files	.OFM (≥v9), .ARTX, .EXP, .DST
Pre-Sew Trace	Laser
Needle to Garment, Garment to Hoop Position	Laser Positioning System
Thread Feed Technology	Patented Acti-Feed
Thread Break Detection	Upper & Lower Electronic Force Gauge Sensor
Automatic Stitch Backup	Yes
Automatic Trimmer	Yes
Lighting Type Cold Bright	Cold bright LED

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Power Supply (V)	90-260V (Single Phase, 50/60 HZ, 4A), Class I (Grounded)
Power Consumption (W)	120V AC / 240V AC (480 Watts)
Temperature Range	15-40° C
Humidity	Max 85% Relative Humidity
Installation Category (overvoltage)	II
Pollution Degree	2
Motor Type(s)	Servo, Stepping
Motor Capacity (kW)	X and Z: 100 Watts Y: 250 Watts
Machine Construction Material	Aluminum

Physical Specifications with Cart

Width	847mm (33.4")
Height	1684mm (thread tubes 130mm extended) (66.3")
Depth	848mm (33.4")
Weight	100.2kg (221 lbs)

Physical Specifications without Cart

Width	847mm (33.4")
Height	950mm (thread tubes 130mm extended) (37.4")
Depth	848mm (33.4")
Weight	75.7kg (167 lbs)

5. Machine Overview & Setup

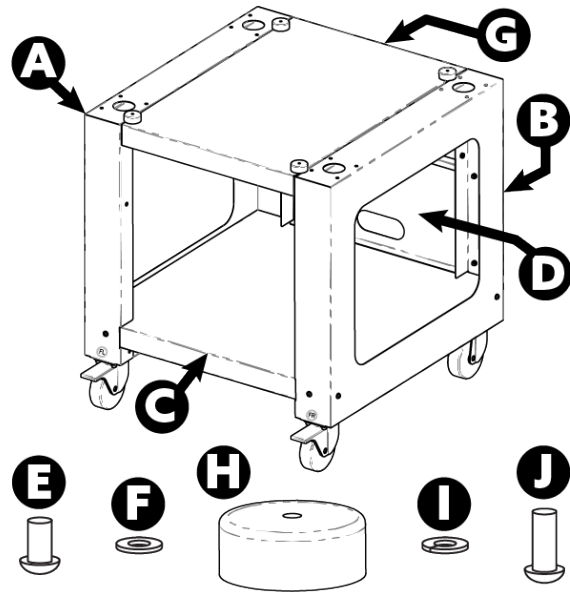


1. Thread Tree
2. Thread Feed Rollers
3. Touchscreen Control Panel
4. Needle Case
5. Left Side Cover
6. Right Side Cover
7. Hoop Arms
8. Lower Arm
9. Ethernet Inlet (On Back)
10. Power Inlet (On Back)

5.1. Cart Assembly

The cart consists of the items assembled as shown.

A	1	Left Cart Leg Assembly
B	1	Right Cart Leg Assembly
C	1	Cart Base Support
D	1	Cart Rear Support
E	14	M6 x 1.0 x 12mm Button Head Screw
F	18	M6 Flat Washer
G	1	Cart Shelf
H	4	Locator
I	4	M6 Split Lock Washer
J	4	M6 x 1.0 x 16mm Button Head Screw



Tool Required

- 4mm hex wrench (like the one included in the machine operator's kit)

Prior to assembly of the cart, place cardboard or a blanket on the floor to prevent damaging cart parts.

Assembly

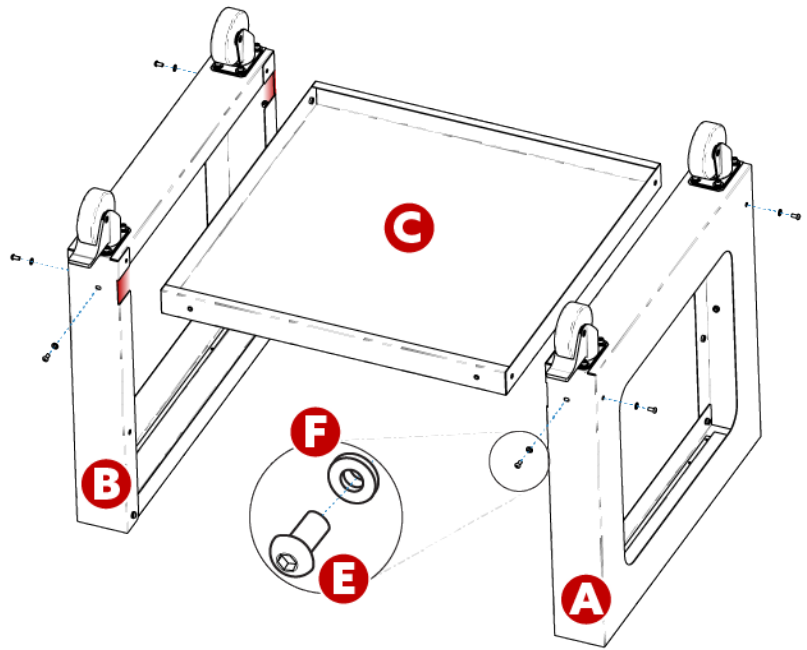
Assembly of the cart is easiest on the floor. If you are concerned with marking up the cart or floor, begin by placing down a large piece of cardboard or a blanket.

The assembly of the larger pieces may be easier with two people. One person can hold while the other attaches. It isn't necessary, but it can make assembly smoother.



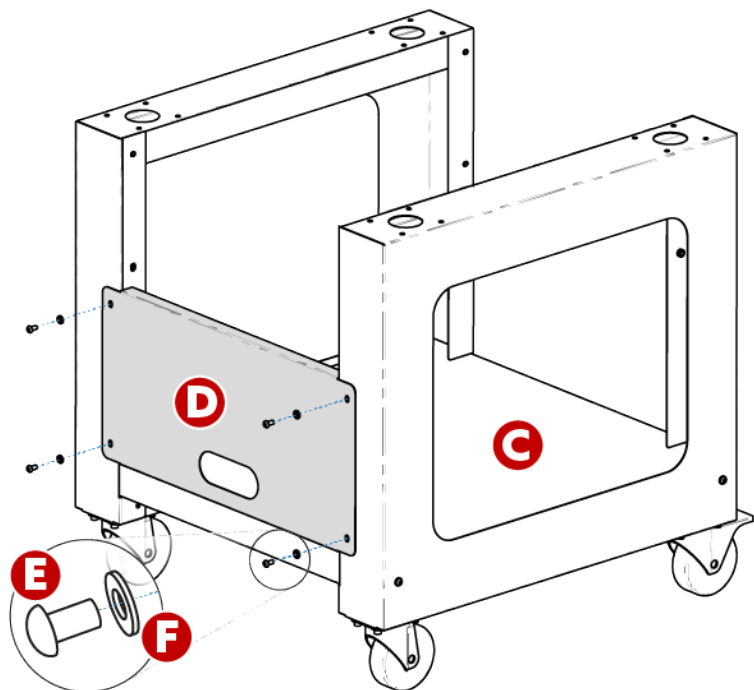
Stage 1 - Attaching the Base Support

1. Place items A and B (Cart Leg Assemblies) on the floor with the Casters facing up. The Casters with the brake face the front of the Cart.
2. Assemble Item C (Base Support) into the cutouts (see red highlights) located on each side of both Cart Legs, Items A and B, as shown.
3. Install (6 each) items E and F (M6 x 12mm Screw and M6 Washer) at the locations shown. Assemble loosely, do not tighten.
4. Fully tighten all (6) item E Screws.



Stage 2 - Installing the Rear Support

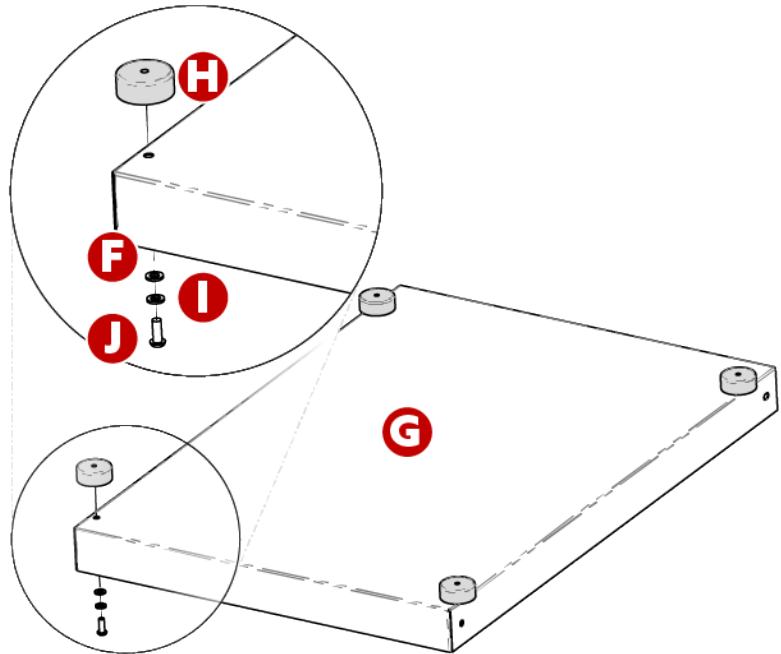
1. Rotate the Cart to its upright position.
2. Assemble Item D (Rear Support) to the rear side of the Cart resting on Item C (Base Support), with the obround opening facing towards the bottom of the Cart.
3. Install (4 each) items E and F (M6 x 12mm Screw and M6 Washer) at the locations shown. Assemble loosely, do not tighten.
4. Fully tighten all (4) item E Screws.



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Stage 3 - Installing the Machine Locators

1. Install items J, I, and F (M6 x 16mm Screw, M6 Lock Washer, and M6 Washer) from the bottom side of item G (Cart Shelf) as shown.
2. Install item H (Machine Locator) onto item J (Screw) from the top side of item G (Cart Shelf) as shown.
3. Fully tighten items H (Machine Locator) and J (Screw).
4. Repeat steps 1-3 for the (3) remaining sets of items J, I, F, and H at the (3) remaining corners of item G (Cart Shelf).

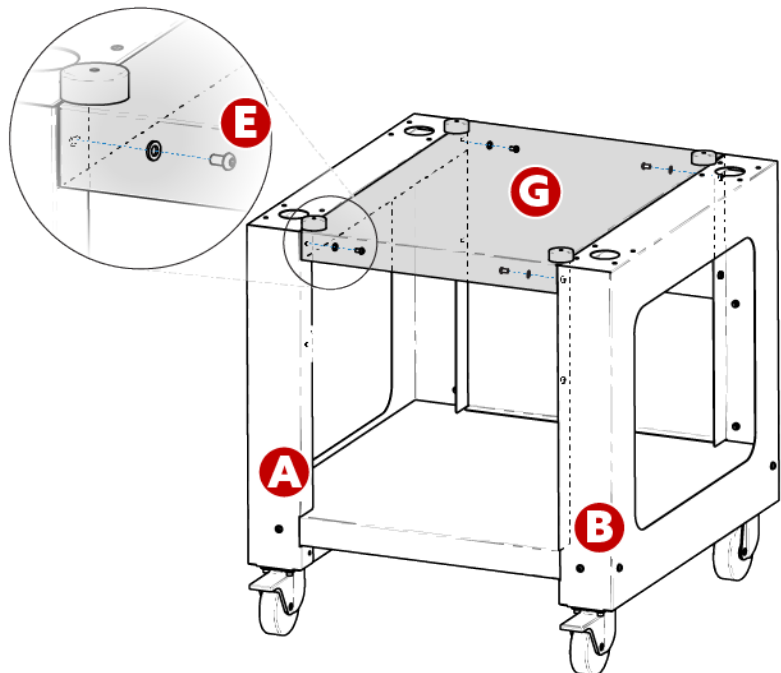


Stage 4 - Installing the Cart Shelf

1. Position item G (Cart Shelf) between the two Cart Legs, items A and B, with the (4) Machine Locators (item H) resting on the Cart Legs, items A and B.

IMPORTANT: The side of item G (Cart Shelf) labeled with the "F" sticker (with the two Machine Locators (item H) positioned closer to the edge) faces the front of the Cart.

2. Install (2 each) items E and F (M6 x 12mm Screw and M6 Washer) at locations shown towards the front of the Cart.



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Note: Lift up item G (Cart Shelf) slightly to align item E (Screw) with the threaded inserts in the Cart Legs (items A and B). Assemble loosely, do not tighten.

3. Install (2 each) items E and F (M6 x 12mm Screw and M6 Washer) at locations shown towards the back side of the Cart.

Note: Lift up item G (Cart Shelf) slightly to align item E (Screw) with the threaded inserts in the Cart Legs (items A and B). Assemble loosely, do not tighten.

4. Fully tighten all (4) item E Screws.

Cart Assembly Complete!

With two people, lift the machine onto the Cart so the (4) Machine Locators (item H) on top of the Cart are centered over the round bosses on the bottom side of the Machine.



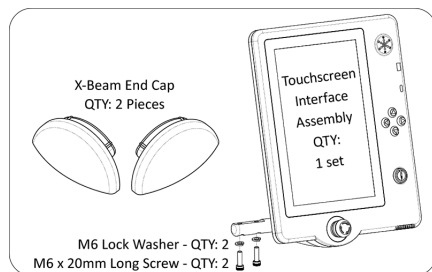
Warning!!

Do not attempt to lift the machine by yourself. Always move the machine with two people. Do not lift the machine at any points other than the Lift Handles indicated by the "LIFT HERE" stickers in the machine packaging. Otherwise, damage to sensitive parts might result.

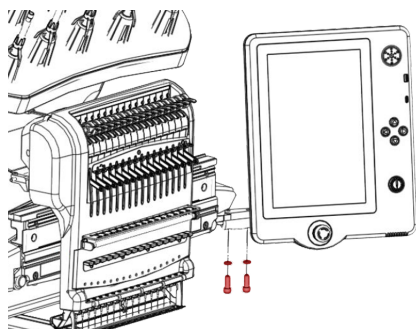
5.2. Installing & Adjusting the Screen

Installing the Touchscreen

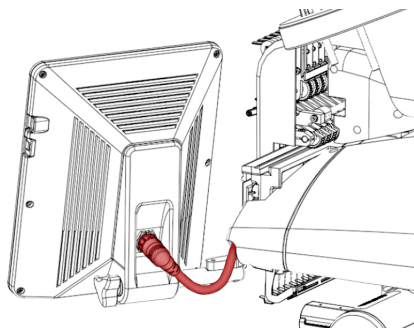
1. Locate the box containing the Touchscreen Assembly and X-Beam End Caps. The box is labeled with the following:



2. Attach the Touchscreen Assembly.
 - a. Using the two screws and two lock Washers that came with the Touchscreen Assembly, attach the Touchscreen Assembly as shown in the image using a 5mm hex wrench (provided in the Machine Operator's Kit).



- b. Route the cable (shown in red) from under the right-side Machine Cover and plug it into the back of the Touchscreen Assembly.

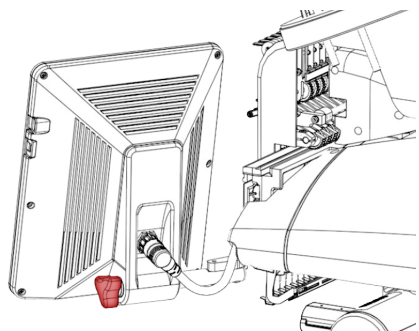


Note:

If present, the protective film can be removed from the screen after installation.

Adjusting the Touchscreen Angle

1. Locate the tightening knob on the back of the touchscreen assembly.



2. Loosen the knob by turning it counterclockwise.
3. Tilt the touchscreen to the desired angle.
4. Tighten the knob by turning it clockwise. This will hold the touchscreen angle where set.



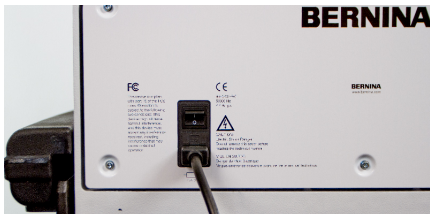
Caution!

Do not adjust the touchscreen without first loosening the adjustment knob.

5.3. Powering Up the Machine

Connecting the Power Cable

1. Locate the power cable you will be using with your machine.
2. Locate the power cable plug in the rear of the machine.
3. Make sure the machine power switch is in the OFF position. Plug the power cable into the inlet.



4. Connect the power cable to a power source.

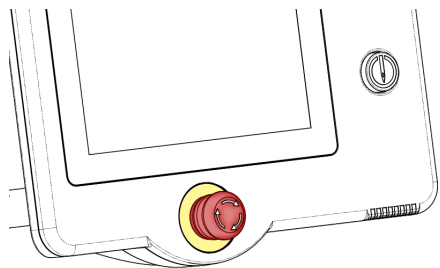


Information

It is recommended that a line conditioner or an uninterruptible power supply with a line conditioner be used with your machine. If using this, connect the power cord to the conditioner, and the conditioner to the power source.

Initial Power Up

1. Make sure the E-Stop is disengaged by turning it in the direction of the arrows.



2. Power up the machine with the power switch located on the rear of the machine (just above the power inlet).

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- The screen will power up and the machine will continue through a series of initializing movements to find the hoop arm home position, needle at head up, and needle case on a needle.
- Once this is complete, a connection should fully establish between the machine and the screen.

6. Threading the Machine

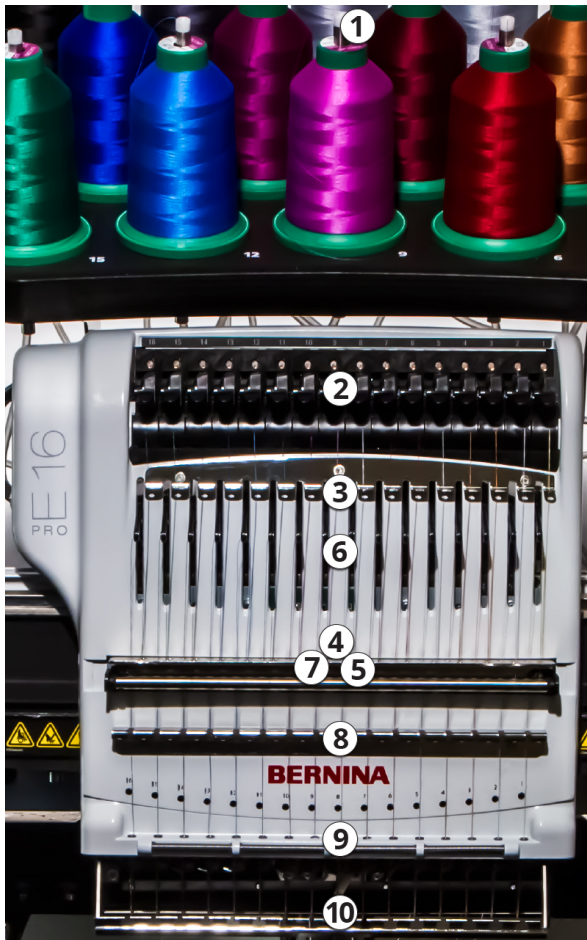
6.1. Upper Threading

The proper thread path from the cone of thread to the eye of the needle is critical in the operation of the machine. Ensuring that the thread moves along the appropriate route will help prevent thread breaks as well as increase efficiency and sew quality. Understanding the upper threading will also help in troubleshooting.

The following image displays the main components of the needle case and the upper threading system.

Threading the Machine for the First Time

When you first receive your machine, there will be thread in the system. The tops of the thread will most likely be taped to the side of the thread tree. Remove the tape and untwist the threads. New cones of thread may now be placed on the thread tree using the quick thread change method below.



Quick Thread Change



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Changing a cone of thread does not require rethreading the entire thread path. If thread is already in the system, the fastest and easiest way to change a cone of thread is to remove the old cone but leave a good length of the old thread on the machine.

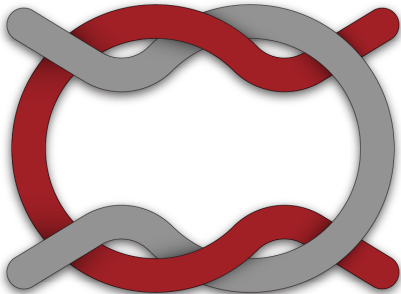
1. Place the new cone of thread on the thread tree with the old thread end sticking out of the thread tube and over the new cone.



2. Extend the thread tube $\frac{1}{2}$ to 1 inch above the cone. Neglecting to extend the thread tube $\frac{1}{2}$ to 1 inch above the cone could result in frequent thread breaks.
3. After placing the cone of thread on the machine, the old thread will be trapped on the inside and underneath the cone. From near the tube, pull the thread free and over the top of the new cone.



4. Tie the end of the old thread to the end of the new thread using a square knot.



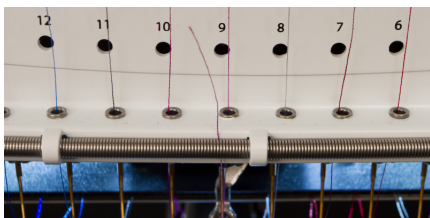
5. Lift the pinch roller and carefully pull the thread from the back of the needle. This will pull the new thread completely through the system. If the knot is tight and small enough, it will even slip




6. When finished, line up the thread under the pinch roller and press the pinch roller back down.

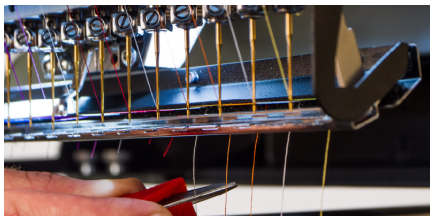


7. If desired, the thread can then be held by the retaining spring in front of the lower thread guide



or held in place using the grabber. With your hands out of the way, tap the  Grabber In / Grabber In button to close the grabber and move the thread into the holder behind the needles.

8. Trim the end to about an inch in length.



9.  Tap the Grabber Out button to open the grabber again.

Upper Thread Path

If the thread comes out of the system, you may need to thread the machine without a starter thread.



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1. To start a new cone of thread, push the plastic thread tubes up from behind the thread tree. Place the cone of thread on the thread seat. The thread tube should extend $\frac{1}{2}$ to 1 inch above the cone. Neglecting to extend the tube $\frac{1}{2}$ to 1 inch above the cone could result in frequent thread breaks.



2. Using either the mono-filament provided in the operator's kit or a can of compressed air, feed the thread through the thread tube from the cone to the small hole behind the thread feeder assembly.



- To use the monofilament, locate the small hole behind the thread feed assembly. Push the monofilament into this hole and up through the supply tube until the end extends above the cone of thread. Then, secure the end of the thread in the notch of the monofilament and slowly pull the thread through the tube.
 - If using compressed air, place the end of the thread in to the top of the thread supply tube. Feed enough that the thread will stay without holding it. Now blow the compressed air into the tube. The air will carry the thread and shoot out the front of the machine.
3. Using the black tab just in front, lift the pinch roller.

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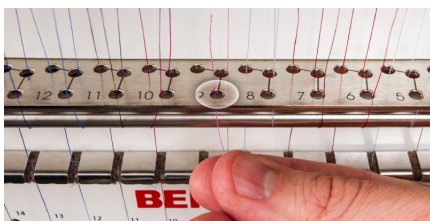
4. Pull the thread from the hole and place it under the pinch roller. Bring the thread down through the upper thread guide.



5. Pull the thread down to the middle thread guide. Of the three holes, push the thread from the top through the back right hole. Make sure the thread is on the right side of the take-up lever.



6. Bring the thread around the thread sensor from back to front and up through the front hole of the middle thread guide.

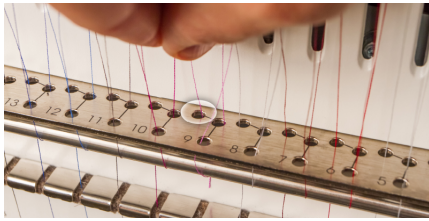


7. Pull the thread up and through the eye of the take-up lever from right to left.



8. Route the thread straight down through the back left hole in the middle thread guide.

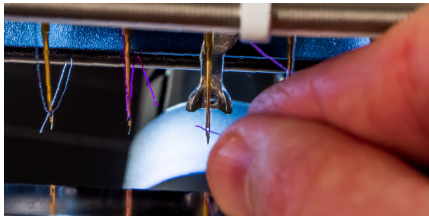
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9. Press the thread into the felt restraint and feed it down through the lower thread guide.



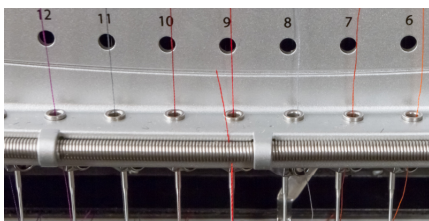
10. Thread the needle from front to back. Cutting the end of the thread may allow it to more easily pass through the eye.




11. Be sure to align the thread with the small v-notch in the thread feed cover.



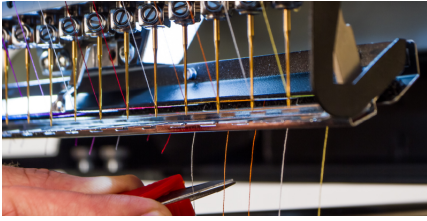
12. Press the black tab to lower the pinch roller.
13. If desired, the thread can then be held by the retaining spring in front of the lower thread guide




or held in place using the grabber. With your hands out of the way, tap the  Grabber In / Grabber Out button to close the grabber and move the thread into the holder behind the needles.

14. Trim the end to about an inch in length.

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15.  Tap the Grabber Out button to open the grabber again.

6.2. Bobbin Threading & Tensioning



The proper bobbin tension and installation also play an integral role in the quality and efficiency of an embroidery sew-out.

What Type of Bobbin?

For the best results with your machine, use Style L continuous polyester filament bobbins.

Removing the Bobbin Case



Warning!!

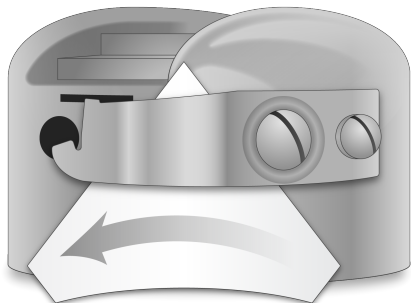
Never attempt to remove or insert the bobbin while the machine is in operation.



The bobbin case can be removed from the lower arm of the machine by locating the release lever on the bobbin case.

1. Pull forward on this lever until the case is free from the machine.
2. Remove the old bobbin from the case.

Cleaning the Bobbin Case

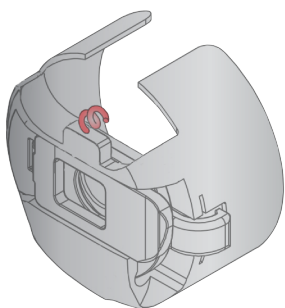
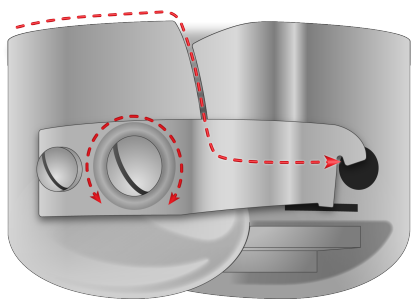
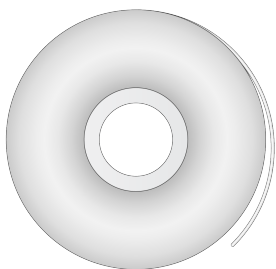
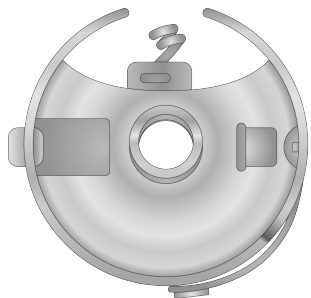


You should clean under the tension spring of your machine bobbin case every time you change the bobbin.

Lint and bobbin wax can build up under the spring, and this can affect bobbin tension. This, in turn, will impact sew quality (loose bobbin, bobbin showing on front side of sew out, thread breaks, false thread breaks). To clean under the spring, slide a corner of a small piece of paper under the tension spring in the same direction the thread travels. While cleaning under the tension spring, be careful not to bend the spring.

After cleaning the bobbin case, blow the case out with compressed air. It is also recommended that you check the bobbin tension.

Inserting a New Bobbin in the Bobbin Case & Checking the Tension



1. Hold the bobbin case with the front facing down and the open end facing up.

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2. Hold the new bobbin with the thread coming over the top and to the right in a clockwise fashion. It should look like a number nine (9).
3. Without flipping the bobbin, drop it into the bobbin case.
4. Route the thread through the thin slot opening and under the tension spring but stop before threading through the pigtail. The bobbin thread should now be releasing from the side of the case.
5. To check the bobbin tension, hold the bobbin thread with one hand. As you gently bounce the thread, the bobbin case should drop 1"-2" or 2.5 - 5cm.
6. If the tension is incorrect, use a flat-blade screwdriver to turn the larger adjustment screw clockwise to tighten or counterclockwise to loosen the tension.



Information

This test must be completed BEFORE winding the thread through the pigtail.

7. Once the tension is set, wind the thread through the pigtail.

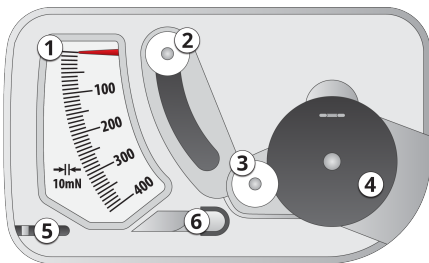


Information

For a more accurate test of the bobbin tension, use a bobbin tension gauge.

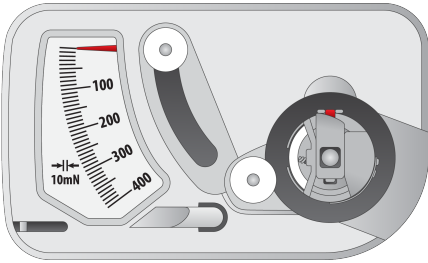
Bobbin Case Tension Gauge

Overview

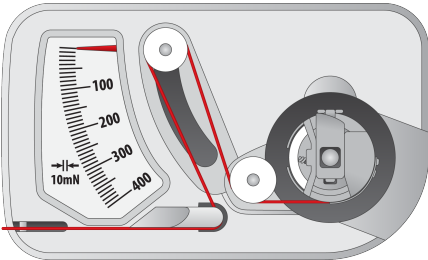


1. Indicator
2. Second Pulley
3. First Pulley
4. Bobbin Case Set Position
5. Thread Cutter
6. Thread Take-up

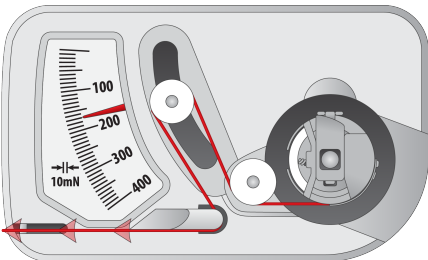
Using the Gauge



Step 3



Step 4

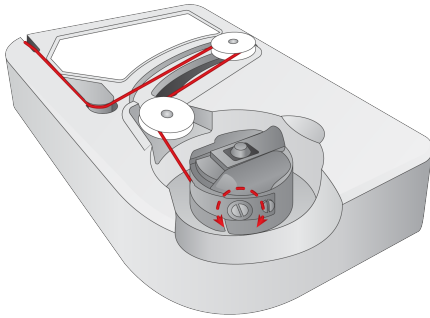


Step 5

1. Clean and thread the bobbin case as you normally would.
2. Pull the thread through the tension spring, but do not pull the thread through the pigtail.
3. Insert the threaded bobbin case into the tension gauge with the extended portion of the latch falling into the guide as shown in red.
4. Route the thread through the two pulleys and the take-up as shown in red.
5. Pull the thread gently and smoothly in the direction of the arrow at a rate of approximately an inch per second. Doing this will cause the second pulley to move down and with it, the gauge indicator.
Watch as you pull for where the indicator is when the bobbin is starting to turn.
 - The ideal setting for bobbin tension for embroidery is between 150 and 190.

Adjusting Bobbin Tension

1. To adjust the tension, access the adjustment screw (the larger of the two) on the tension spring from the recessed corner of the gauge.
2. Using a small flat-blade screwdriver, turn the adjustment screw in small increments between testing.
Small rotations can make large adjustments to the tension.
 - Clockwise: This increases the tension on the bobbin thread.
 - Counter Clockwise: This decreases the tension on the bobbin thread.

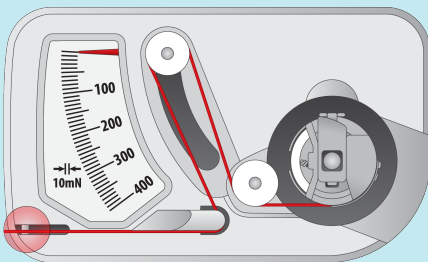


Additional Instructions



Information

Extra thread may be trimmed away using the thread cutter located below the indicator.



Warning!!

This device is a precise measuring apparatus that has been carefully tested and adjusted. Do not drop, hit against another body, or disassemble it.

Avoid gauge contact with thinner oil, benzine oil, alcohol, and/or petroleum.

Inserting the Bobbin Case



Warning!!

Never attempt to remove or insert the bobbin while the machine is in operation.

1. Insert the bobbin and case in the machine with the pigtail facing up. Push on the bobbin case until it snaps into place.
2. Test the bobbin orientation by pulling on the thread. The bobbin should rotate counter-clockwise.



3. Trim the thread to 2 - 3 inches.



Note:

If the thread is cut too short, it will not pick up on the stitch. If the thread is left too long, it may wrap into the machine.

7. Sewing a Design

Here is a general checklist for sewing a design.

- Load A Design
- Set the Color Sequence
- Select the Hoop
- Set the Speed
- Adjust Acti-Feed Settings for Fabric
- Hoop and Product
- Load Hooped Product onto the Machine
- Adjust Placement and Orientation in Hoop
- Adjust Presser Foot Height
- Trace the Design

If you have done all of the above, you are ready to press the start button and watch your design sew.

After the Design is Sewn

After the design is complete, remove the hoop from the machine by gently lifting the spring clips and pulling the hoop free of the hoop arms.



Before giving the garment to the customer, remove the stabilizer, hoop rings, and any toppings used.







8. Main Screen

View Window



The largest portion of the screen is devoted to a preview of the design in the selected hoop. This is meant to give the user an understanding of placement within the hoop and color selection.

Within the View Window, you can

- Pan (Move) the view
- Zoom the view
-  Change View Options
-  Zoom to Design
-  Zoom to Hoop
-  Trace
-  Change to Full Screen and  Restore to Normal View

Status Bar

Below the view window is the status bar.

Design Information & Progress

The status bar will display the following information.

- File Name
- Design Dimensions
- Current X/Y Location
- Time Sewn / Estimated Time Remaining
- Stitches Sewn / Total Stitch Count (Total Stitch Count may differ from stitch count listed in the file browser depending on Design Filter settings)

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The status bar will change to a progress bar as a design is sewn. It will fill in from flat to dimensional as it finishes sewing.

Machine Status

The status bar will also change colors depending on the machine's state. Additional information may appear as needed. This would include.

- Silver
 - The machine is ready to be interacted with, and a design can be loaded
- Green
 - Machine is running
- Amber
 - The machine was stopped by the user.
 - Color sequence commands like "Applique" or "Pause".
- Red
 - Hoop limits are exceeded.
 - Errors such as communication, tracking, or other critical machine errors have occurred.
 - E-Stop is engaged.

Color Sequence Bar

Just below the status bar lies the color sequence bar. This bar is a visual representation of the color sequence. As the status bar fills in with progress, the dimensional progress display above lines up with the color blocks below.

Sewing a Design



Load Design

Load Design allows you to browse for a design that you would like to load to the machine and prepare for embroidery.

This also allows you to manage the embroidery designs on your machine or flash drives.



Return to Origin

If not at design origin (start of design before any machine movements have occurred), the Load Design button will be swapped for the Return to Origin button. This button will return the machine to the very start of the design.

- This may or may not be the same as the first needle penetration. That is decided by the digitizer of the design.



Color Sequence

Color Sequence goes into the color sequence screen. This allows you to set up the sequence for all the color changes within a design. Effects and interrupt commands can be added to the color sequence to create stops for thread cone changes or bobbin checks on larger designs.

- This is only available when the machine is stopped.
- Once running, this space indicates the current color and needle.



Hoop Selection

Use hoop selection to tell the machine what hoop is being used. This will indicate if the design will fit within the selected hoop and prevent hoop strikes with the needle.

Machine Sew Speed

This reflects the maximum speed the machine will run. The machine may automatically slow for longer stitch movements in X, Y, and also Z. Longer stitches, as well as higher thread feed values, may affect speed.



Changing Machine Speed

The machine speed may be altered by clicking or tapping the plus or minus button on either side of the speed setting.

Actual Speed

The actual speed is displayed below the set maximum speed.

Acti-Feed



Acti-Feed affects the amount of thread fed to the material being embroidered. While much of Acti-Feed is automated based on sensor feedback, giving Acti-Feed guidelines such as a minimum can help create higher-quality sewouts.

Feed Chart

This chart helps monitor the feed of thread to the product. It displays the following:

- Feed - This is the amount of thread being fed to account for the detected material thickness.
- Minimum - Displayed as the lower user-adjustable line. This represents the lowest the Acti-Feed is allowed to go.
- Maximum - Displayed as the upper user-adjustable line. This represents the highest amount the Acti-Feed is allowed to go without modifiers/effects in the color sequence.

As the machine embroiders, this will show a history of the Acti-Feed. This can be used to help diagnose thread breaks, false breaks, and sew quality issues. When the minimum is set appropriately on an even material, the feed activity will only be making minor adjustments. Large adjustments in feed tend to indicate shifts in material, embroidery, or potential problems.



Information

Bobbin case cleanliness and differences in bobbin tension can affect the Acti-Feed.

Minimum

The Acti-Feed Minimum sets a lower limit for the Acti-Feed. It allows the machine to adjust the amount of thread fed as needed, but it will not allow feeding less than the specified amount.

The ideal setting for the minimum is two points less than the actual thickness of the material (and stabilizer) being sewn.

The Acti-Feed Minimum is displayed as the lower set line in the Feed Chart.

Maximum

The Acti-Feed Maximum sets an upper limit for the Acti-Feed. It allows the machine to adjust the amount of thread fed as needed, but it will not allow feeding more than the specified amount. It is uncommon to need to limit the maximum for the Acti-Feed.



Acti-Feed Suggestions

The Acti-Feed Suggestions can provide a guideline for where the minimum should be set.



Tapping any fabric/garment suggestion populates the slider and Acti-Feed Minimum to a mid-point suggestion for that material. As even the same type of garment can vary in thickness, you may wish to adjust the Acti-Feed Minimum a bit more.








Transform (Move & Rotate)

Move and rotate the design within the confines of the selected hoop. This will allow you to adjust the angle or position of the design.

Moving Through a Design








Occasionally, you will need to move forward or backward within a design. These tools allow you to do that quickly. They include:

-  Seek Back or  Seek Forward
 - Tapping this button will bring up the option to move through a design 1, 10, or 100 stitches in a move without stitching.
 - Holding the subsequent button will continue the movement at the specified speed.
-  Move to Stitch
 - Tapping this will open a window with a field for specifying the exact stitch number you wish to move to.

-  Move to Trim
 - Tapping this will bring up a scrollable area with design segments previewed.
 - These segments are divided by trims.
 - Select the segment to move to and confirm to move through the design to the desired trim command/start of segment.
-  Move to Color
 - Tapping this will bring up a scrollable area with design segments previewed.
 - These segments are divided by color change commands.
 - Select the segment and confirm to move through the design to start of the desired color block.

Machine Operations

Machine Operations will move or activate different functions of the machine often used when embroidering both during and between runs and jobs. These would include:

-  Hoop Forward/Back
 - Moves the frame forward as far as possible while leaving the needle within the sewfield of the hoop.
 - Tapping again will move the frame back in to the original position.
-  Trim Immediate
 - Causes the machine to execute a trim command.
-  Change to Needle (Move Needle case)
 - Tapping this brings up a window displaying the thread tree / needle assignments.
 - Selecting the desired needle number and confirming will move the needle case to that needle.
-  Laser On /  Laser Off
 - Activates or deactivates the laser for positioning.
-  Grabber In /  Grabber Out
 - Closes and opens the grabber.

- This is helpful when changing needles or capturing threads in the trap behind the needles.



Presser Foot Adjustment

This will bring the needle to its bottom-most rotation for a better view of the presser foot at this location. This is used for adjusting the presser foot height against the material.

Maintenance & Settings



Maintenance

Access to maintenance timers and technician screens is found within Maintenance.

- This button will flash if a maintenance procedure is due.



Settings




Here settings such as preferences, design filters, time zones, and network settings can be found.

- This button may flash if a software update is available.


Physical Buttons

Start / Stop

This button will begin or stop sewing. A green or red light will indicate when the button is available for use and what function is associated with the button.

-  Unlit - When unlit, this button has no function. This is usually due to the current screen or state of the machine.
-  Green - When lit green, tapping this button will cause the machine to begin or continue sewing the currently loaded design.
 - Slow sewing or inching - Pressing and holding this button will cause the machine to begin sewing very slowly. Releasing the button will cause the machine to resume normal speed.
-  Red - When lit red, tapping the button will cause the machine to stop sewing.

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- Slow sewing or inching - Pressing and holding this button will cause the machine to begin sewing very slowly. Releasing the button will cause the machine to resume normal speed.
-  Red while stopped - This indicates a critical error has occurred.



Warning!!

Do not confuse this button with the Emergency Stop button. The machine can still start if there is a machine fault somewhere. The stop/start button does not disconnect power from the motors or internal components.

Emergency Stop Button

The emergency stop button breaks the electrical circuit to all of the motors to prevent its operation.

Direction Buttons

On the main screen and the transform screen, the position of the hoop on the machine can be changed with these buttons. This can be used to alter where within the hoop the design sews. This function is only available in these two screens.

8.1. View Window

The view window displays much information about the following.

Design Display

The currently loaded design is displayed in the view window. The design display can show

- **Stitch Progress**
 - Before starting, the design is displayed in 3D.
 - After the design has started sewing, unsewn portions appear in 2D while sewn portions appear in 3D.
- **Position**
 - The design is shown where it will be sewn in relation to the machine and the hoop.
 - After starting a design, a change in the position is displayed as a dotted line



View Options

If you would like to change what is seen in the view window, you can alter the view options.

Background Color

A swatch of color representing the background color in the view window can be seen.

Custom Color Sliders





- Via the sliders, you can alter the background to match the material to be embroidered.
 - RGB - These sliders alter the levels of Red, Green, and Blue light used to create the background color
 - HSV - These sliders alter the following:
 - Hue - while definitions get lengthy and hard to understand, this is essentially what people think of as the base color and where along a color wheel it would fall.
 - Saturation - a numeric representation of how bright or dull a color is.
 - Value - a numeric representation of how light or dark a color is.

Presets

Preset swatches are stored background color values for later use.

Show / Hide Options

Graphic additions to the view window that can be toggled on or off depending on your preferences. These include:

-  **Colors from Design**
 - This displays the colors of the design as saved in the design file rather than the colors assigned in the color sequence.
 - Note: This can result in the embroidery on products being different in color from what appears on the screen.
-  **First and Last Stitch**
 - This shows the first and last stitch of the design. This can be helpful when the first stitch is not at the design origin.
-  **Laser Alignment Points**
 - When using Laser Alignment, the confirmation points are displayed on the screen. This can be helpful when trying to understand why a design has been rotated or moved in relation to these points.
-  **Display Origin**
 - This displays the machine's origin as a crosshair contained within the mechanical limits.
 - Note: This may or may not align with the center of the hoop or the center of the sew field. It is a display of the mechanical origin of the machine.
 - This displays the mechanical limits of the machine as a large box.
 - This displays the design origin as a small propeller shape.

Zoom & Pan

Pan

The view window allows for panning by touching and dragging in the main portion of the window.

Zoom Bar

The vertical bar on the left side of the window functions as a zoom area.

- Dragging up or down on this bar changes the zoom level.





Note!

The view will follow the current stitch while zoomed in and sewing.

Move X/Y & Rotate

When in the transform screen, the view window takes on different functions. These functions can be changed back using the switch on the right side of the screen.

-  Move / Rotate
-  Pan / Zoom

Move

The main portion of the view window allows for tapping and dragging a design to a new location in the hoop. Once let go, the hoop arms will move to accommodate the new design location.



Warning!!

Dragging or moving designs outside the hoop limits can cause damage to you or the machine.

Rotate Bar

What was the zoom bar becomes the rotate bar when in the transform screen.

- Dragging up or down on this bar rotates the design.

9. Loading a Design

Your embroidery machine can hold a large number of designs in the touchscreen panel.

Designs can also be loaded from USB flash drives or from local storage.

Supported File Types

Your embroidery machine will support the following embroidery design file types:

- **OFM - version 9 and later**
 - can contain color information
 - can contain explicit trims
 - versions older than 9 are not supported.
- **ARTX**
 - can contain color information
 - can contain explicit trims
- **EXP**
 - requires additional hidden files to store color information
 - can contain explicit trims but may rely on a jumps count to trim conversion
- **DST**
 - requires jumps count to trim conversion to create trims

Loading a Design

To load a design, you will need to:



1. Navigate to a Design

- a. To begin, tap on the Design Source from which you would like to load the design.

Tapping on any of these sources will take you to a design browsing screen of the designs contained within.



Favorites

Favorites is a collection of designs that have been marked as a favorite. Any design stored locally on the touchscreen module can be marked as a favorite. This will allow it to show in these designs to be quickly referenced from this screen.

Favorite designs are not moved from their original locations. Favoriting a design merely links it to this source for easier access. The original source location will be displayed with the file.

Favorite designs that are moved (not copied) from local storage to USB will lose their favorited status.



Local

Local is the local storage for the touchscreen module. Within here, many designs can be stored. Designs can be copied to and from local storage.



USB

USB accesses a USB flash drive currently plugged into the touchscreen module.

b. Browse to the design

After selecting a design source, you can browse the contents of that source.

Location / Breadcrumbs

At the top of the screen, the current location is displayed.



Parent Folder - Tapping on this button will navigate up a folder to the parent directory.




Search

Tapping in the search box brings up a keyboard and allows searching the contents of the current folder.





Location Contents

The contents of the current folder/directory/source will be displayed in the main portion of this screen.

-  Tapping on a folder will enter the folder/directory.
- Tapping on a design file will bring up the Design Preview window.

File / Folder Management

Functions for managing folders are located at the bottom of the screen.

-  New Folder - creates a new folder in the current location.
-  Delete Folder - deletes the current folder and its contents.
-  Rename Folder - renames the current folder.
-  Pastes a cut or copied file into the current location.

2. Preview the Design

The design preview that appears when tapping on a design file will show the following.

Design Preview Image

Here, a rendered preview image of the design will be shown in the colors saved in the file (if available).








Design Information

- Design Name . Extension
- Stitch Count (Stitch Count may differ from the total stitch count listed on the status bar depending on Design Filter settings)
- Design Size
- Color Change Count - This may be far greater than the number of thread cones required for the design as individual thread colors may be repeated throughout the design's color sequence.
- Trim Count

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Design File Management


Design file management icons are located on the right side of the window. This includes the following.

-  Favorite - On locally stored files only. Tapping this button fills the icon and marks the design as a favorite. This will create a link in the Favorites location and make it visible from that location.
 -  Design is not a Favorite. Tapping will make it a Favorite, place a link in the Favorites Design Source, and fill in the icon.
 -  Design is a Favorite. Tapping will remove the Favorite status, the link in the Favorites Design Source, and hollow out the icon.
-  Rename - This brings up the ability to rename the file.
-  Cut Design File - This prepares the current file to be moved to a new location. It essentially places the file in memory to be pasted into a new location.
 - Tapping this button will return to the Design Sources screen. From there, navigate to the desired location for the design file.
 - Once in the desired location, tap the paste design button to place the design in the new location.
-  Copy Design File - This prepares the current file to be copied to a new location. It essentially places a copy of the file in memory to be pasted into a new location.
 - Tapping this button will return to the Design Sources screen. From there, navigate to the desired location for the design file copy.
 - Once in the desired location, tap the paste design button to place the design copy in the new location.
-  Delete File - This deletes the file.

Close the Window

At the bottom of the window, there are two options.

-  Confirm - closes the window and loads the selected file to the machine.

-  Cancel - closes the window and does not load the file to the machine.

3. **Confirm to Load the Design**

10. Color Sequence





The color sequence screen is where you can do the following.

- Set the thread colors on the thread tree.
- Manually or automatically needles, interrupts, or effects in a color sequence.
- Apply interrupts or effects to the color sequence.

View Window & Status Bar

Both the view window and status bar display the design colors and color sequence bar differently depending on a setting in view options.

-  Colors from Design On - This displays the colors of the design as saved in the design file rather than the colors assigned in the color sequence.
 - This can result in the design on the screen differing greatly from the actual colors on the sewn design.
-  Colors from Design Off - This displays the colors of the design as assigned in the color sequence.
 - If a needle used in the color sequence does not yet have a thread color assigned to it, and color block in the design using that needle will display in the color saved in the file until a thread color is assigned to the needle.

Thread Tree

The thread tree can be set up to mimic the physical thread tree of the machine. Assigning the specific threads that are actually installed on the machine can help prevent mistakes and unintentional results on the embroidered product.

- Colors should be assigned to the thread tree in the software after thread cones have been physically placed on the machine and the upper threading has been completed.
- Colors should be updated on the thread tree any time a cone of thread is swapped for another on the physical thread tree.
- Selected needles/cones on the thread tree are previewed below it.




Colorize the Thread Tree

To access the screen to colorize the thread tree, either

- Double-tap on a thread cone on the thread tree display
 - OR
- Tap on the Colorize Thread Tree button

To assign a thread to a needle


1. Tap the desired needle/cone on the thread tree to select it.
 - Once selected, the circle representing the needle/cone will be ringed to highlight it.
 - If the needle is already populated and the thread exists in the selected chart, the list will automatically scroll to the selected swatch.
2. Tap the desired thread chart to select it from the list.
3. Tap to select the desired color from the contents of the selected chart.
 - The search functionality can hasten the search.
 - The swatch will highlight when selected.
 - The cone/needle will change to match the color selected.
4.  Select another cone/needle to change or tap the confirm button to exit to the Color Sequence screen.

Color Sequence






The color sequence runs through the bottom portion of the screen. This area is scrollable and may be swiped to view different sections of the sequence.

Each color change / color block is separated into two parts.

- Upper - The upper section of the color block displays
 - A background color from the assigned needle.
 - An overlay of any effects applied to that color block.

-  Normal embroidery - no effects applied



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-  Thinner 3D - adapts the Acti-Feed for use with thinner 3D embroidery foam - typically around 2mm
-  Thicker 3D - adapts the Acti-Feed for use with thicker 3D embroidery foam - typically around 3mm
-  Looping - adapts the Acti-Feed for use with thicker thread and intentionally overfeeds, creating loops in the stitches
-  Color Block - This shows the number of the color block in the design. For example, 3 means the third color to sew.
-  Needle - This shows the needle assigned to that color block.
- Lower - The lower section of the color block displays color information from the file.
 - Not all files contain color data. If no data is present, a color swatch is still shown for reference as to which portion of the design it is.

Setting the Color Sequence





To set the color sequence of the design:

1. Tap to select the color block.
 - The selected color block will be highlighted in the sequence and the stitches contained within that block will highlight in the view window.
 - The selected color block and all color blocks occurring before will be rendered three-dimensionally in the view window.
 - All color blocks occurring after the selected block will be rendered two-dimensionally.
 - The currently assigned needle thread tree will be highlighted.
 - If assigned to a needle with a thread assigned to it, that thread information will appear below the thread tree.
2. Tap to select the desired needle.
 - a. The selected color block will change to the newly assigned needle and the color associated with it.

-  b. Colors from Design Off - If this view option is OFF, the selected color block in the view window will update to the newly assigned color.
3. Continue by selecting the next color block to change and repeating the first two steps.
4. Optional - Add any color sequence commands and/or effects desired. See below.
5.  Confirm to apply the sequence and exit the screen.


Automatic Color Match

To automatically set the color sequence of the design:





1.  Tap the Color Match button below the color sequence.
 - This will compare the color information from the design and the colors assigned to needles and make matches based on those color values. Each color block will be overlaid with a match evaluation.
 -  Distant Match
 -  Close Match
2. Review the colors in the color sequence and make changes as desired.
3. Optional - Add any color sequence commands and/or effects desired. See below.
4.  Confirm to apply the sequence and exit the screen.

Color Sequence Commands & Effects

On each side of the thread tree are different commands and effects that can be applied in a color sequence.

- **Interrupt Commands**
 -  Appliqué - Placing this command between color blocks will cause the machine to move the hoop out as far as possible with the needle still within the hoop limits.
 - This command is often placed after the placement stitch in an appliqué design. This allows the embroiderer to have easier access to the material without taking the hoop off of the machine. It also stops the machine automatically instead of the embroiderer watching the sew-out to stop the machine and place the appliqué material.

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- After an Appliqué command has stopped the machine, starting the machine will move the hoop back into place and continue sewing the design.
-  Pause - Placing this command between color blocks will cause the machine to stop and wait to be restarted, but it will not move the hoop forward.
 - This command is often placed in designs larger than a single bobbin can sew as a reminder to replace the bobbin.
- **Effects**
 -  Thinner 3D - Placing this effect on a color block will adapt the Acti-Feed of the affected block for use with thinner 3D embroidery foam (typically 2mm foam).
 - This effect is often preceded by a pause or applique command to place the foam.
 -  Thinner 3D - Placing this effect on a color block will adapt the Acti-Feed of the affected block for use with thicker 3D embroidery foam (typically 3mm foam).
 - This effect is often preceded by a pause or applique command to place the foam.
 -  Looping - Thinner 3D - Placing this effect on a color block will adapt the Acti-Feed of the affected block for use with thicker thread and intentionally overfeeds, creating loops in the stitches.
 - This command is often placed in designs that were created for use with this technique and for use with a thicker, fuzzier thread.
 -


Adding/Removing Commands & Effects to the Color Sequence

To add a command or effect to the color sequence,


1. Tap to select the color block in the color sequence.
2. Tap on the command or effect to be added.
 - Commands are added after the selected color block and appear with the sequence.
 - Effects are added to the selected color block and appear as an overlay to the color block.

To remove a command or effect to be removed from the color sequence,

1. Tap on the command or effect to be removed.
 - Commands are displayed and selectable as a block within the sequence.



- Effects are displayed as an overlay to a color block. Select the color block to which the effect is applied.
- 2.  Tap to select the trash button below the color sequence.
 - Commands will be removed from the sequence entirely.
 - Effects will be removed from the color block, but the color block will remain.

To remove all commands and effects from the color sequence,

1.  Tap on the Reset Color Sequence button below the color sequence. This removes all effects and commands while leaving needle assignments.

Additional Functions

On the bottom of the screen is the grabber function. It exists on this screen for easier access if changing cones of thread on the machine.



-  Grabber In /  Grabber Out
 - Closes and opens the grabber.
 - This is helpful when changing needles or capturing threads in the trap behind the needles.

10.1. Colorize Thread Tree

This screen shows the same thread tree display as on the previous screen. What needles are changed on this screen are reflected on the Color Sequence screen.


Thread Charts List

On the left side of the screen, the thread charts are listed. This list can be limited using the following tools.

-  Search - Try adding the Manufacturer, Product Line, or even partial words in the search field to limit the charts listed.
-  Show/Hide - Individual charts can be hidden or shown to limit the list to only your preferred charts.

Threads List


On the screen's right side, the selected chart's contents will be displayed in the threads list. This list can be limited using the search field.

-  Search - Try adding the color ID number, color name, or even partial words in the search field to limit the colors listed.

Assigning Thread to a Needle



To assign a thread to a needle

1. Tap the desired needle/cone on the thread tree to select it.
 - Once selected, the circle representing the needle/cone will be ringed to highlight it.
 - If the needle is already populated and the thread exists in the selected chart, the list will automatically scroll to the selected swatch.
2. Tap the desired thread chart to select it from the list.
3. Tap to select the desired color from the contents of the selected chart.
 - The search functionality can hasten the search.
 - The swatch will highlight when selected.
 - The cone/needle will change to match the color selected.


4.  Select another cone/needle to change or tap the confirm button to exit to the Color Sequence screen.

Additional Functions

On the bottom of the screen is the grabber function. It exists on this screen for easier access if changing cones of thread on the machine.

-  Grabber In /  Grabber Out
 - Closes and opens the grabber.
 - This is helpful when changing needles or capturing threads in the trap behind the needles.


Also available is the ability to clear the assignments on the thread tree.

-  Clear or Reset Thread Tree - Removes all assigned thread colors from the needles on the thread tree.




10.2. Thread Chart Preferences

This screen allows you to customize the number of charts visible on the screen for colonizing the thread tree.




The field at the top of the screen allows you to search for a specific chart.

-  Search - Try adding the Manufacturer, Product Line, or even partial words in the search field to limit the charts listed.

Each chart is listed with two options on the right.

-  Default Chart
 - This chart is the chart selected for unassigned needles.
 - There is can be only one default chart.
 - Tapping on the button will make that chart the default, make it visible, and disable the show/hide button as the default chart MUST be shown
- Show/Hide Chart
 -  Chart is visible on the colorize thread tree screen.
 -  Chart is hidden on the colorize thread tree screen.

Along the bottom are a few more tools.

-  Shows all charts.
-  Scrolls to the default chart.
-  Confirms the changes and exits to the previous screen.

11. Hoop Selection



Selecting the same hoop in the software that is installed on the machine is critical for accurate placement and safety.




Warning!!

Selecting a different hoop than what is currently installed on the machine can potentially cause damage to the machine or yourself.



Hoop Categories

Selecting a hoop category can narrow the search for your desired hoop. The categories include the following.

-  Round
-  Rectangular
-  Square
-  Magnetic
-  Wide-Angle Driver
-  Slim Line Clamps
-  Melco Fast Clamp
-  Miscellaneous
-  Show All / Clear Filters

Measurement Units

This setting changes the display of the hoop measurement units on this screen and the main screen.

-  Set to Centimeters
-  Set to Inches

Hoop List


The hoop list displays the currently visible hoops and gives the hoop rough dimensions.



Information

Hoop dimensions listed may vary between manufacturers. In this list, dimensions are listed WIDTH x HEIGHT.



To select a hoop,

1. Tap on the desired hoop.
2.  Tap on the confirm button.
 - OR
1. Double-tap on the desired hoop. This will not work for hoops/clamps with additional messages.



Customize Hoop List

The hoop list can be customized to show only the hoops you want.

1. Tap on the Customize Hoop List button.
2. Scroll through the hoops on the subsequent screen and
 -  Show the hoops you wish to include in the main hoop list.
 -  Hide the hoops you wish to exclude from the main hoop list.

Choosing the Appropriate Hoop for the Job

Hooping a garment properly and selecting the right hoop for the job is essential to quality embroidery production.



The hoop provides the means to move the product at high speeds and accurately place the stitch. If the hoop is too loose, the wrong size, or if the product is hooped poorly, it can adversely affect the embroidery quality.

Choosing a Hoop Shape

Each hoop shape has benefits and drawbacks.

Traditional Round	Even tension across the fabric. Great hoop for most left-chest designs.	Limited number of sizes. Larger hoops must be used for square-shaped designs.
Traditional Square	Larger sew fields.	Tension is often tighter in the corners and looser on the edges.
Specialty (Clamp & Frames)	Tend to be easier to hoop quickly. Better for difficult-to-hoop materials and/or placements.	Does not hold the material as securely as a traditional style hoop.

Choosing the Appropriate Hoop Size

The ideal hoop for an embroidery design is one that just fits. The design should fall just within the hoop limits. This removes the influence of excess material from around the design and can help with registration (lining up), puckering, and overall stitch quality.

Occasionally there will be obstacles to using the smallest hoop possible for a design. It could be that a button is in the way, or a seam would fall right into the hoop. Adjusting your hoop size to better accommodate the material may be necessary.

Hoop Construction

Some of the larger hoops come in either wood or plastic. The wooden hoops are double-walled and have more grip than the plastic. However, the inner and outer wooden hoop must remain aligned. The outer hoop cannot be rotated for easier hooping or tightening. Each set of hoops will have a registration number printed on both hoops to help keep them aligned.

Specialty Hoops

Specialty hoops such as clamps and frames that use adhesives are useful when dealing with difficult placements on garments or materials that are hard to hoop.

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As they rarely provide the same hold on the materials as a traditional hoop, these hoops tend to be reserved for more specialized applications.

12. Machine Speed



This reflects the maximum speed the machine will run. The machine may automatically slow for longer stitch movements in X, Y, and also Z. Longer stitches, as well as higher thread feed values, may affect speed.

Changing Machine Speed

The machine speed may be altered by clicking or tapping the plus or minus button on either side of the speed setting.

Actual Speed

The actual speed is displayed below the set maximum speed.

Machine Speed Suggestions

While the embroidery machines have extremely fast sew speeds, these speeds may need to be changed depending on the products or designs you are planning to embroider.

When the machines start to sew, they will begin slowly and then rapidly speed up after the thread has had a couple of stitches to catch.

The machine will sew at the set sew speed if it is possible. However, design factors may cause the machine to slow down. Longer machine movements and stitches will cause this. If you hear the machine changing speeds constantly, you may want to lower the set sew speed to even out sew quality.

Machine Speed Suggestions

850-1000 s.p.m.	Sewing using the Wide Angle Driver for caps and micro (pocket) clamps. Designs using metallic or specialty threads.
1000-1200 s.p.m.	Finer detailed designs, smaller lettering.
1200-1400 s.p.m.	Faster production.

These sew speeds are meant as guidelines and should be adjusted as needed.

Symptoms From Sewing Too Fast

Sewing at too high of a speed can result in a few undesirable outcomes. These would include:

- Thread breaks
- Bobbin pulling to the top
- Poor registration of designs (design details or outlines don't line up)

These symptoms can also be caused by other settings or applications. However, if you experience one or more of these symptoms, adjusting your sew speed could be a possible solution.

13. Acti-Feed



Acti-Feed affects the amount of thread fed to the material being embroidered. While much of Acti-Feed is automated based on sensor feedback, giving Acti-Feed guidelines such as a minimum can help create higher-quality sewouts.

Feed Chart

This chart helps monitor the feed of thread to the product. It displays the following:

- Feed - This is the amount of thread being fed to account for the detected material thickness.
- Minimum - Displayed as the lower user-adjustable line. This represents the lowest the Acti-Feed is allowed to go.
- Maximum - Displayed as the upper user-adjustable line. This represents the highest amount the Acti-Feed is allowed to go without modifiers/effects in the color sequence.

As the machine embroiders, this will show a history of the Acti-Feed. This can be used to help diagnose thread breaks, false breaks, and sew quality issues. When the minimum is set appropriately on an even material, the feed activity will only be making minor adjustments. Large adjustments in feed tend to indicate shifts in material, embroidery, or potential problems.



Information

Bobbin case cleanliness and differences in bobbin tension can affect the Acti-Feed.

Minimum

The Acti-Feed Minimum sets a lower limit for the Acti-Feed. It allows the machine to adjust the amount of thread fed as needed, but it will not allow feeding less than the specified amount.

The ideal setting for the minimum is two points less than the actual thickness of the material (and stabilizer) being sewn.

The Acti-Feed Minimum is displayed as the lower set line in the Feed Chart.

Maximum

The Acti-Feed Maximum sets an upper limit for the Acti-Feed. It allows the machine to adjust the amount of thread fed as needed, but it will not allow feeding more than the specified amount. It is uncommon to need to limit the maximum for the Acti-Feed.



Acti-Feed Suggestions

The Acti-Feed Suggestions can provide a guideline for where the minimum should be set.

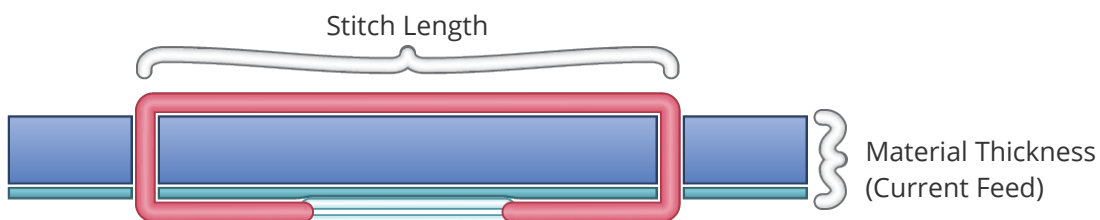


Tapping any fabric/garment suggestion populates the slider and Acti-Feed Minimum to a mid-point suggestion for that material. As even the same type of garment can vary in thickness, you may wish to adjust the Acti-Feed Minimum a bit more.

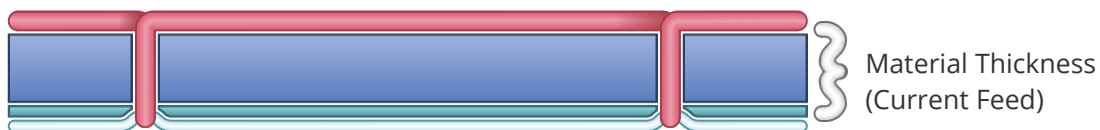
Material Thickness

Material thickness is a determining factor in the amount of thread fed for each stitch. The perceived material thickness is displayed as the current feed value in the Feed Chart.

Material thickness is measured in points. In this and many embroidery software applications, a point is used as a fine unit of measure representing a tenth of a millimeter.



Satin Stich



Walk or Fill Stitch

Appropriate Acti-Feed Settings

Finding the perfect settings or limits for your acti-feed is not always necessary, but it can improve sew quality and machine performance.

Sew quality and thread breaks are indicators of appropriate or inappropriate thread feed. Those symptoms are listed in the sections below.

Acti-Feed Minimum Value is Adequate When...

The minimum does not need to be adjusted when:

- Satin and fill stitches - There is no looping or pulling on the top of a sew-out when sewing satin and fill stitches.
- Satin stitches - On the back side of the sew-out, you can see approximately $\frac{1}{3}$ of the bobbin showing in the middle of columns and the top color for the remainder around the sides.
- Fill Stitches - On the back of the sew-out, the top thread is even along the outer edge of the shape.

Increase Acti-Feed Minimum Value When...

When too little thread is being fed into the design, you need to increase the material thickness value. If you experience any of the following problems, you may need to perform this adjustment.

- Satin stitches - You are encountering thread breaks and can see bobbin thread on the top of the design.
- Satin stitches - Too much bobbin is showing on the back of the design.
- Fill stitches - You can see bobbin thread on the top of the design.
- Fill stitches - There is insufficient top thread showing on the back of the design.
- Registration Loss - If designs are not lining up when sewn and the cause is the thread being pulled way too tight, increasing the Material Thickness may help. Using a stable backing will also help.

Decrease Minimum Acti-Feed Value When...

When too much thread is fed into the design, you must decrease the material thickness value. If you experience any of the following problems, you may need to perform this adjustment.

- Satin stitches - The stitches in the design are looping.

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- Satin stitches - Not enough bobbin is showing on the back of the design.
- Fill stitches - You are encountering thread breaks, and the stitches in the design are looping.
- False Bobbin Breaks - When the software falsely detects bobbin breaks that are not truly broken thread, it could be that your material thickness is too high.



Advanced Acti-Feed Calibration

Acti-Feed behavior is based on the play of the thread through the system and against the sensor. One of the key factors is the bobbin tension. If your desired tension is different than that called out in the **Bobbin Threading & Tensioning** section, the **Advanced Acti-Feed Calibration** section shows how Acti-feed can be adjusted to suit your needs or the needs of your embroidery application.

14. Transform





The transform screen allows for the movement or placement and rotation of designs.

View Window in the Transform Screen

Move X/Y & Rotate

When in the transform screen, the view window takes on different functions. These functions can be changed back using the switch on the right side of the screen.

-  Move / Rotate
-  Pan / Zoom

Move

The main portion of the view window allows for tapping and dragging a design to a new location in the hoop. Once let go, the hoop arms will move to accommodate the new design location.



Warning!!

Dragging or moving designs outside the hoop limits can cause damage to you or the machine.

Rotate Bar








What was the zoom bar becomes the rotate bar when in the transform screen.

- Dragging up or down on this bar rotates the design.

Specific Movements

Quick Orientation







Rather than rotating by dragging on the rotate bar, the left side of the screen allows for access to the most commonly used transforms.

-  45° Counterclockwise or  45° Clockwise
-  90° Counterclockwise or  90° Clockwise
-  180° - often used with cap designs
-  Flip the design vertically
-  Flip the design horizontally

Move/Rotate By



The right side of the screen provides an area for more precision in movement and rotation.

Tap into a field to specify an amount and then use the following corresponding buttons to execute the movement or rotation.

- Rotate  counterclockwise or  clockwise by the specified amount
- Move  left or  right by the specified amount
- Move  down or  up by the specified amount






Actual Rotation, Reset, and Center Hoop

In the middle of the lower section of the screen, you'll find functions for resetting rotation, the current rotation of the design, and centering the hoop.

-  Reset Rotation to 0°
 - If the design elements were rotated in design software, resetting to 0° will not change them from what is stored in the file.
-  Center the Hoop
 - This moves the hoop on the machine to the center of the sewfield. This may differ from the actual center of the hoop.

Machine Operations

To make positioning in the hoop a bit easier, some machine functions were copied to this screen to help with visibility. They include the following.

-  Change to Needle (Move Needle case)
 - Tapping this brings up a window displaying the thread tree / needle assignments.
 - Selecting the desired needle number and confirming will move the needle case to that needle.
-  Laser On /  Laser Off
 - Activates or deactivates the laser for positioning.
-  Grabber In /  Grabber Out
 - Closes and opens the grabber.
 - This can help get the grabber into a better position for seeing the fabric or the laser light.




Laser Alignment

Tapping the laser alignment button will enter the laser alignment screen.












Laser Alignment is a technique for rotating and positioning a design based on a couple of points and the (usually invisible) line that connects them. This can be a helpful technique to use when trying to line up to lines on a garment such as stripes, seams, or the tops of pockets.

Laser Alignment essentially aligns the horizontal axis of the design origin to the line created by specifying the following two points on the garment.

To use laser alignment,

1. Using the arrow keys, move to the first point on the hooped product to which you would like to align.
2.  Confirm the position of the first point by tapping the confirm first point button. The second confirm button becomes visible.
3. Using the arrow keys, move to the second point on the hooped product to which you would like to align.


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4.  Confirm the position of the second point by tapping the confirm second point button.
5.  Once both points are confirmed, the design is rotated to match the line created by the two points and the positioning buttons become available. Tapping any one of the following buttons will differently position the design in relation to the line created by the two confirmed points.
 -  Position the bottom of the design on the line and the design origin horizontally aligned to the first confirmed point.
 -  Position the bottom of the design on the line and the design origin horizontally centered between the first and second confirmed points.
 -  Position the bottom of the design on the line and the design origin horizontally aligned to the second confirmed point.
 -  Position the design origin horizontal axis on the line and the design origin horizontally aligned to the first confirmed point.
 -  Position the design origin horizontal axis on the line and the design origin horizontally centered between the first and second confirmed points.
 -  Position the design origin horizontal axis on the line and the design origin horizontally aligned to the second confirmed point.
 -  Position the top of the design on the line and the design origin horizontally aligned to the first confirmed point.
 -  Position the top of the design on the line and the design origin horizontally centered between the first and second confirmed points.
 -  Position the top of the design on the line and the design origin horizontally aligned to the second confirmed point.

15. Presser Foot Adjustment

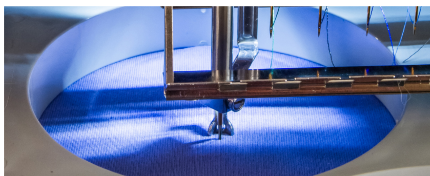


The machine has an adjustable presser foot that can be set from 0.5mm to 3.5mm above the needle plate. The presser foot height should be changed when the thickness of the material you are sewing changes dramatically. To adjust the presser foot height, the software must be open, and your machine must be on and communicating with it. A hoop with the fabric you will be using should be installed.

1. Adjusting the presser foot is easiest with the needle case moved to needle 16. It is not necessary, but it makes the adjustment gear easier to see. If the machine is not on needle #16, the gear can still be accessed. Do not attempt to move the needle case during the following steps.
2.  Tap to lower the needle and the presser foot.
3. Locate the presser foot eccentric (gear) behind the needle case.



4. Turn the gear with your fingers to adjust the presser foot height up or down as needed.
5. Set the presser foot height over an unsewn section of the fabric. Set the presser foot so that it is just touching the material.



6. Once adjusted, confirm through the dialogs onscreen to return the needle to head up.

Setting the Presser Foot for Different Materials

The presser foot will need to be adjusted whenever you drastically change the thickness of the material that you are sewing on. For example, if you sew a sweatshirt and then sew a T-shirt, the presser foot would need to be adjusted.

The presser foot is meant to stabilize the material as the needle moves down through it and then help keep the material off of the needle as the needle moves back up. Ideally, the presser foot would sit just on the surface of the material, but that setting may not work for all material types.

For squishy materials like fleece or terry cloth, it is often better to lower the foot a bit more and press into the material.

Symptoms of Poor Presser Foot Height

Having the presser foot set poorly can result in a few sewing issues.

Too High

- Thread breaks
- Poor registration










Too Low

- Louder sewing
- Faint lighter halo around designs on dark fabric
(Usually removed with steam, water, or a light ironing aid)

16. Trace Design

Tracing a design is an easy way to check placement on the hooped product.









Trace

1. Tap on the Trace button in the view window.
2. Optional - Select the trace shape
 -  Traces a polygon created from the outermost points of the design
 -  Traces a rectangle of the farthest edges of the design.
3. Optional - Adjust the trace speed
4.  Tap to begin the trace
 - If the trace shape exceeds the hoop limit, the trace will not be allowed.
 -  Rectangle traces can exceed hoop limits where the design falls well within
 -  Polygon traces fall much closer to the edges of the design and cannot exceed hoop limits if the design itself does not also exceed them.
 - When tracing, the laser will be shining onto the hooped product.
 - The hoop will move, and the laser will trace the rectangular design bounds or the design's outermost points. The selected shape determines this.
 -  Tap to pause mid-trace.
 -  Once paused, tap to resume the trace.
 -  Once paused, tap to abort the trace and return to the origin.
 -  If the window is closed mid-trace, the machine will return to the origin.

Move Laser To:

The hoop can be moved to shine the laser on specific points along the outer bounds of the design.

-  **Top Left Corner**

-  **Top Center**
-  **Top Right Corner**
-  **Middle Left**
-  **Middle Center (Usually Design Origin)**
-  **Middle Right**
-  **Bottom Left Corner**
-  **Bottom Center**
-  **Bottom Right Corner**

Additional Functions



Grabber In /




Grabber Out

- Closes and opens the grabber.
- This is helpful when changing needles or capturing threads in the trap behind the needles.


17. Settings

The Settings page is full of settings for the touchscreen and software with access to additional settings for the machine below.

- **Machine Name**

-  Edit the machine name by tapping on the edit button or within the field.
- This provides a customizable machine name to make it easier to tell multiple machines apart.
- This has no effect on machine performance.



- **Network**

- Shows the current network setup.
- Internet connection is not required to run the machine, but it is required for software updates and video content within the help system.
-  Tap the Network Connection button to select network settings.



- **Time Zone**

- Select your current time zone from the drop-down. This helps convert time stamps to the local time of the machine.

- **Units of Measure (Designs)**

- This changes the display of design size as well as units of movement in the transform screen.
-  Set to Centimeters
-  Set to Inches

- **Units of Measure (Hoops)**





- This changes the display of the hoop size on the main screen and in the hoop selection screen.
-  Set to Centimeters
-  Set to Inches

- **Touchscreen Volume**

- This slider adjusts the volume of the touchscreen's speaker.
- It does not adjust sounds from the machine.

- **Touchscreen Brightness**
 - This slider adjusts the brightness of the screen.
- **Screen Saver Delay**
 - This adjusts the delay for the screen saver.
 - Setting this to zero disables the screen saver.

Additional Settings

-  **Design Filter**
 - Adjust settings related to the stitches and trims within the design.
-  **Advanced Acti-Feed**
 - Adjust the machine's Acti-Feed behavior
-  **Machine Preferences**
 - Alter some of the machine's behaviors around loading, trimming, and thread breaks.
-  **Software Update (Internet Connection Required)**
 - Access software and firmware updates as well as notification settings.


17.1. Network Connection



Connection Setup

Tapping on Connection Setup takes you to the Network Selection screen.

On this screen, you can select the connection type.

- Wireless - choose from the list of available networks discovered below.
 -  Rescan - If needed, a scan can be requested and a new list generated.
 - If a password is required, a password request and keyboard will appear.
- Wired - select this option if choosing to connect via an Ethernet cable.

Current Network Status

Listed here is information about the established connection.

17.2. Design Filter

Stitch Filters

These filters add or remove needle penetrations along existing lines based on the settings below.

- **Maximum Stitch Length**
 - If a stitch exceeds this amount, a needle penetration will be added to evenly divide the stitch into lengths that fall below this threshold.
- **Short Stitch Length**
 - This defines a "Short Stitch" for the next filter setting.
- **Delete Short Stitches**
 - If a stitch falls below the defined "Short Stitch Length", needle penetrations will be filtered out until a stitch remains that exceeds this defined length.

Ties and Trims

Tie and Trims settings are only applied upon design (re)load.

- **Optimize Ties**
 - When enabled, this adds a small stitch on either side of a trim command. This may help hold the thread if the ties in the design are insufficient.
- **Convert Jumps to Trim**
 - When enabled, this filter counts consecutive jumps. If the number of consecutive jumps in a design meets or exceeds the specified Count to Convert, those jumps will be converted to trim commands.



Information

Some embroidery design files will not or cannot contain explicit jump commands. These designs may rely on this setting to create machine trim commands within a color block.



Information

Some embroidery designs with longer stitches may contain a jump between the needle penetrations creating the stitch. If the Count to Convert number is less than or equal to the number of jumps between these penetrations, the stitches themselves will become trims. This creates an odd machine behavior where there is only a single needle penetration, followed by a trim. This repeats until the jumps between the needle penetrations fall below the count.

If you encounter one of these designs, change the count, disable the conversion, or contact the design supplier for explicit trims or edits.



Satin Width Adjustment

This setting allows you to adjust the width of all satin stitches when they are being sewn. This can help compensate for some pull of stitches.

The width of the satin stitches are adjusted by percentages and by points (0.1mm).

- Percentage - the width of the satin stitches are multiplied by this value.
- Points - the satin stitch width has this value added to each end of the stitch.
- The values of 100% and 0 points will load the design unaltered.

These stitches can be altered along the X-axis (horizontal stitch direction) and along the Y-axis (vertical stitch direction).

-  If locked together, X and Y will both be changed according to the value entered for X.
-  If unlocked, X and Y can be altered independently.
-

Minimum Width

A minimum width can be specified in points for satin stitches that fall below this value are expanded to meet this width.

Minimum Width is used with the pull compensation above and the custom table below. Only a value of zero leaves the design unaltered from this setting.



Information

The diameter of most needles used for embroidery ranges between six and eight points.

Setting this value to something close to that may prevent thread breaks from continually trying to sew satin stitches smaller than the needle being used.


Use Custom Table



The compensation settings above are only used if Custom Table is disabled.



If Custom Table is enabled, a custom table is used. These tables allow for compensation to vary depending on the width of the satin stitches.

-  Tap to enter the Compensation Tables screen.
 - From there the custom table can be selected and/or altered.

17.2.1. Satin Width Adjustment

Selecting a Compensation Table

1. Tap the expand-down button to open the drop-down.
 - Tapping within the field will allow the name of any custom table to be edited.
 - Wide-Angle Driver offsets will be added to the global compensation values when using any frame that utilized the wide-angle driver.
2. From the list, tap to select the desired table.

Editing a Variable Compensation Table

With a compensation table selected, the values will populate below.



Tap in any field other than the 0 or ∞ width fields to begin editing.

- Width Range - This is the range that the different compensations will affect.
 - This range is displayed in points (0.1mm)

The width of the satin stitches are adjusted by percentages and by points (0.1mm).

- Percentage - the width of the satin stitches are multiplied by this value.
- Points - the satin stitch width has this value added to each end of the stitch.
- The values of 100% and 0 points will load the design unaltered.


These stitches can be altered along the X-axis (horizontal stitch direction) and along the Y-axis (vertical stitch direction).

-  If locked together, X and Y will both be changed according to the value entered for X.
-  If unlocked, X and Y can be altered independently.

Saving Changes

Changes to the value fields will be saved by any of the following.

- Shifting focus to another field
- Selecting another table

-  Confirming out of the screen





Caution!

Altering these values can produce a subtle shift or a huge difference in the look of the satin stitches produced by your machine.



Keeping notes of changes made and used in this screen is advised.

17.3. Machine Preferences



- **All Thread Detection**

-  When disabled, no upper or lower thread breaks are detected. Disabling automatically disables Bobbin Thread Detection.
-  When enabled, upper thread breaks are detected. Enabling DOES NOT automatically reenables Bobbin Thread Detection.
- Thread break detection can be affected by poor hooping technique, unsuitable Acti-Feed settings, and inappropriate presser foot adjustment.

- **Bobbin Thread Detection**

-  When disabled, no lower thread breaks are detected.
-  When enabled, lower thread breaks are detected.

- **Move Hoop Forward at End of Design**

-  When disabled, the hoop will remain where the design ended. This is usually at design origin.
-  When enabled, the hoop will move forward as far as possible with the needle still remaining within the hoop limits.

- **Inching Stitch Count**

- When beginning to sew at the start of a design or after a trim, the machine will sew slowly. This is the number of stitches the machine sews before starting to speed up to the set speed.



- **Upper Break Backup Count**

- When an upper thread break is detected, the machine will automatically back up this specified number of stitches.
- It will not back up past a trim, color change, or start of a design.

- **Bobbin Break Backup Count**

- When a bobbin thread break is detected, the machine will automatically back up this specified number of stitches.
- It will not back up past a trim, color change, or start of a design.

- **Force Design Return to Origin**

-  When disabled, the hoop position may remain at the last stitch of the design. Many designs already end with a return to origin command.
-  When enabled, the hoop position will return to design origin whether or not the design file ends with that command.

- **Tail Length**



- This adjusts the length of the upper thread left behind to start the next stitch after a trim.

- **Trim Type**

- This slightly alters the trim behavior of the machine.
 - Normal - used for most threads
 - Metallic - altered to improve trimming on some of the stretchier metallic threads

Color Sequence Settings

- **Closest Color Match on Load**

-  When disabled, the color sequence is not automatically color-matched.
-  When enabled, the color sequence is automatically matched as closely as possible to the thread colors currently assigned to the thread tree.



Information

Because color information from software providers, software versions, and thread manufacturer color card versions vary, it is recommended that the color sequence be reviewed before sewing.

Saving Preferences



Confirming out of this screen will save your preferences.

17.4. Advanced Acti-Feed Calibration

This section of Machine Preferences will alter the behavior of Acti-Feed. This will cause thread breaks to be detected more or less frequently and make tighter or looser embroidered stitches.



Caution!

Changing these settings will alter the way the thread is fed to the cloth and the accuracy of thread break detection.



Information

If using a different bobbin tension than that explained in the Bobbin Threading & Tensioning section, these sliders will most likely need adjusting to maintain appropriate Acti-Feed and thread break detection.

Standard Embroidery

The Standard Embroidery slider will affect the loft of the stitches on standard embroidery. This includes any embroidery without the additional color sequence effects of 3D Foam or Looping stitches applied to it.

Feed Adjust:

- Sliding this slider to the right will create looser stitching.
 - This could also increase false bobbin breaks or create looped stitches.
- Sliding this slider to the left will create tighter stitches.
 - This could also increase fabric ripples and design distortion from push/pull.



Thin or



Thick 3D Foam

Feed Adjust:

- Sliding this slider to the right will create looser stitching.
 - This could also increase false bobbin breaks or create looped stitches.
- Sliding this slider to the left will create tighter stitches.
 - This could also increase fabric ripples and design distortion from push/pull.

Minimum Offset:

This offset is applied to the minimum Acti-Feed setting. This is meant to account for the thickness of the foam used when creating 3D embroidery. This number should be about or just under the thickness of the foam in tenths of a millimeter. As most foams used are either 2mm or 3mm thick, the defaults for these values reflect that thickness.



Looping Stitch

Looping stitch intentionally overfeeds thread. This creates relatively consistent loops and a unique look that can mimic other thread-through-cloth techniques like a chenille or moss stitch.

This style of embroidery is usually done with a thicker 12wt wool-like thread.

Feed Adjust:

The feed adjust for looping stitches is already adjusted, but the slider can adjust that further.

- Sliding this slider to the right will create looser stitching.
- Sliding this slider to the left will create tighter stitches.

Minimum Offset:

This offset is applied to the minimum Acti-Feed setting. Adding to this will feed more thread creating larger loops.

Calibration History

This drop-down provides a history of the changes made to the Act-Feed Calibration settings. This allows for backtracking if the newest changes don't have the desired effect.

Thread Break Sensitivity

The sensitivity of the thread break sensor can be adjusted to be more or less sensitive.

- If you are experiencing too many false thread or bobbin breaks but your other adjustments are where you like them, you can decrease the sensitivity.
- If your machine is not detecting actual thread or bobbin breaks, the sensitivity can be increased to detect more thread breaks.



Information





Upon closing this screen, you will be cautioned about making changes to these settings as changes here can greatly impact the performance of the machine and the quality of the embroidery.

17.5. Software Updates

The Software Updates screen will walk you through updating the software when needed. The developers are always working to improve the products, so updates with enhancements to performance and features may be made available at any time.

- **Notifications (Internet Connection Required)**

-  When disabled, the Settings button on the main screen won't flash red when there is an update available.
-  When enabled, the Settings button will flash red when an update is available.

Currently Installed

This shows the current version numbers of the installed following

- UI Operating Software - This is the operating software that keeps the touchscreen running.
- UI Application - This is the software that is visible and allows access to the embroidery machine controls.
- Firmware - This is the firmware that runs on the machine board and controls machine behavior.

Install from USB Drive

Should the machine not be connected to the internet, updates can be downloaded from the internet and installed onto a USB drive via a separate computer.

1. Download the SWU file.
2. Place only this file on a USB drive.
3. Insert the USB drive into the touchscreen unit.
4. Tap on "Search for Update"
5. Follow the prompts

Installing Firmware from USB Drive

Firmware can also be updated from a USB drive.

1. Download the desired firmware (three .bin files)
2. Place only these three .bin files on a USB drive.

3. Insert the USB drive into the touchscreen unit.
4. Tap on "Search for Update"
5. Follow the prompts

Updates

When updates are available for specific components, those components will be displayed below with a highlighted install or reboot button.

1. Tap the install or reboot button to restart in the new application version, OS, or install the firmware.
 - It may take a few moments to install or reboot in a new environment.

Available Firmware

The current firmware will also be displayed as available, but not highlighted. If a technician instructs you to, "Install Firmware" can be used to reinstall the current firmware on the board.



Connection Setup

Tapping on Connection Setup takes you to the Network Selection screen.



18. Maintenance

Maintenance Timers

The top portion of the screen is devoted to the maintenance timers. These count down at specific intervals and prompt you to perform the required maintenance on time or after a specified number of stitches.

Each timer counts down both a specific amount of time and a set number of stitches. When either interval is reached, the maintenance will be due and the step-through button will pulse yellow.

The timer bars will fill up as time or stitches elapse. This indicates how soon a maintenance timer will be due. Both the time and stitches can be viewed.

-  The Maintenance Timer Bar displays the time elapsed and remaining.
-  The Maintenance Timer Bar displays the time elapsed and remaining.


Timer With No Progress



Timer Full - Maintenance Due









Maintenance Step-Throughs

 Tapping the Maintenance Step-Through Start button will begin stepping the machine through the corresponding maintenance procedure.

Each procedure will walk the user through where and how much to lubricate, move the machine to the proper positions for lubrication, and reset the timer upon completion.

Each screen of the step-throughs will have instructions, images, and buttons on the bottom to proceed through. Not all buttons will be available on every screen. There are times when the next steps must be completed before exiting the step-through.

-  Go to the Previous Step

-  Go to the Next Step
-  Cancel - Exit without completing the step-through.
-  Completed - Exit and reset the timer.
-  In Spec - the X-cable tension is within the spec - continue to the next step
-  Out of Spec - the X-cable tension is out of spec - continue to the next step for adjustment





Machine Information

The machine information displays information about the software, environment, firmware, and the machine itself.

Much of this information will be useful if speaking with technical support.

Technical Screens

The buttons at the bottom of the screen will open technical screens that deal with different facets of the machine's functionality.

-  **Head Timing**
 - Deals with the rotation of the hook and Z position
-  **Needlecase Calibration**
 - Stores and manipulates the left-right needle centering
-  **Sensors**
 - Shows the current state of the sensors
-  **Steppers**
 - Deals with the functions of several motors

Status Log

The status log shows the latest captured action of the machine.

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Tapping this will open the status log and display a history of actions along with timestamps.

18.1. Head Timing

The Head Timing screen deals with the Z-rotation of the machine.




Warning!!

Tapping almost any button in this screen will make the machine move the needle. Be careful and stay clear of the needle.





Exiting this screen will also cause the machine to return to the Head Up position.



Move To a Specified Degree



1. Enter a number into this field.
2.  Press the move to button to move to this rotation.
3. The Current Z Position will display near the bottom of the screen.

Or use the buttons to the right to go to specific Head Timing positions

-  **Top Center**
-  **Head Up**
-  **Bottom Center**
-  **Hook Timing**












Move By a Specified Degree

1. Enter a number into this field.
2.  Press the rotate back to rotate back by the specified amount, or
3.  Press the rotate forward to rotate forward by the specified amount.
4. The Current Z Position will display near the bottom of the screen.

Or use the buttons below to rotate by their specified amounts.

-  **Rotate plus 20°**



-  **Rotate plus 10°**
-  **Rotate plus 5°**
-  **Rotate plus 1°**
-  **Rotate plus 0.1°**
- **or**
-  **Rotate minus 20°**
-  **Rotate minus 10°**
-  **Rotate minus 5°**
-  **Rotate minus 1°**
-  **Rotate minus 0.1°**

Current Z Position

This displays the current Z position of the machine. It will update whenever the rotation changes.

Release / Engage Z

The motors controlling the Z shaft can be disengaged allowing the Z position to be subject to gravity and manual manipulation. Tap the button to release or engage Z.

-  **Z Engaged** - The Z motor is engaged and the Z position is being held by the machine.
-  **Z Released** - The Z motor is disengaged and the Z position can be changed manually.

Status Log

The status log shows the latest captured action of the machine.

Tapping this will open the status log and display a history of actions along with timestamps.

18.2. Sensors

The sensors screen shows the status of the sensors.

The onscreen representation of the LEDs corresponds to the state of the LEDs on the board. The sensors show as

-  Active
-  Inactive

The groups indicate which sensor is being shown.

- **X-Axis**
 - Count - shows the position in relation to machine origin or "Home"
 - Home Sensor - as this sensor is looking for the change point between blocked and open, it could be lit or unlit when at home. However, the slightest movement will cause it to shift to the other state.
 - Active - The carriage is toward the left of the machine. (X coordinate/count is positive)
 - Inactive - The carriage is toward the right of the machine. (X coordinate/count is negative)
- **Y-Axis**
 - Count - shows the position in relation to machine origin or "Home"
 - Home Sensor - as this sensor is looking for the change point between blocked and open, it could be lit or unlit when at home. However, the slightest movement will cause it to shift to the other state.
 - Active - The carriage is toward the front of the machine. (Y coordinate/count is positive)
 - Inactive - The carriage is toward the back of the machine. (Y coordinate/count is negative)
- **Z-Axis**
 - Count - Shows the rotational position
 - Index - Detects which side of the rotation the Z is on.
 - Active - Z Position is between 180° and 360°

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- Inactive - Z Position is between 0° and 180°
 - Safe - Provides information to the machine related to color change operations.
 - Active - Z Position is at Head Up (27°)
 - Inactive - Z Position is not at Head Up
- **Trimmer**
 - Shows the state of the trimmer sensor.
- **Grabber**
 - Shows the state of the grabber sensor.
- **Thread Feed**
 - Shows the state of the thread feed sensor.

Status Log

The status log shows the latest captured action of the machine.

Tapping this will open the status log and display a history of actions along with timestamps.

18.3. Needle Case Calibration

The calibration tab is used for calibrating the color change table. Essentially this is the information that keeps all of the machine needles in the center of the hole in the needle plate. If this calibration is off, it can cause thread breaks and needle breaks.



Caution!


Making changes in this screen can severely impact the performance of your machine. Please adjust these settings only under the guidance of a technician.

Table Commands

- **Get Table**
 - Pulls the table from the machine's board and stores a copy on the touchscreen unit.
- **Default Table**
 - Sends a generic table to the machine's board.
 - This is a general table and is not meant to be sewn with. It is merely a starting point for the calibration process from scratch.
- **Set Table**
 - Send the values saved on the touchscreen module to the machine's board.
 -

Quick Z Position



The needle can quickly be positioned using the buttons in the middle of the screen.

-  **Head Up**
-  **Bottom Center**

Move to Needle



The needle case can be quickly moved using the following buttons on the lower portion of the screen.

-  **Move One Needle Up**


-  **Select the Needle to Move to**
-  **Move One Needle Down**

Needle Case Adjustments

The needle case calibration table can be adjusted and tested using the following buttons on the lower portion of the screen.

-  **Shift Needle Case Left - also adjusts the table on the machine's board**
-  **Shift Needle Case Right - also adjusts the table on the machine's board**

Test any adjustments easily by cycling from one needle to the next.

-  **Cycle Needles**
 1. **This moves the needle to head up**
 2. **moves one needle up**
 3. **then moves the needle to bottom center.**

Status Log

The status log shows the latest captured action of the machine.

Tapping this will open the status log and display a history of actions along with timestamps.



Information

Upon closing this window, you will be prompted about changes made.



18.4. Steppers



Used mainly by technicians, the Steppers Screen allows access to certain motor functions.

Color Change



- **Home**
 - Returns the Needle Case to the home position.
 - This will move to a mechanical limit and then back to needle 1
- **Needle +**
 - Moves the Needle Case right one needle
- **Needle -**
 - Moves the Needle Case left one needle
- **Start Test / End Test**
 - Cycles through all the needles

Trimmer


- **Home**
 - Moves the Trimmer to the Home position.
- **Select**
 - Moves the Trimmer to the Select position.
- **Cut**
 - Moves the Trimmer to the Cut position.
- **Map Sensor**
 - Maps the sensor and returns the values in the Status Log.
- **Start Test / End Test**
 - Repeatedly performs the trim procedure without moving the needle.
- **Home**
 -  The trimmer is in the home position.
 -  The trimmer is not in the home position.
- **NPT Sensor**




-  NPT Sensor is enabled
-  NPT Sensor is disabled

Grabber

- **Home**
 - Moves the grabber out (Home)
- **In**
 - Moves the grabber in.
- **Start Test / End Test**
 - Cycles the grabber in and out.
- **Home**
 -  The grabber is in the home position.
 -  The grabber is not in the home position.

Thread Feed

- **Forward 200**
 - Moves the thread feed drive motor forward 200 steps.
 - This should result in feeding roughly 89mm of thread.
- **Backward 200**
 - Moves the thread feed drive motor backward 200 steps.
- **Step Forward**
 - Steps the thread feed motor one step forward.
- **Step Backward**
 - Steps the thread feed motor one step backward.
- **Start Test / End Test**
 - Cycles through forward and backward movements.
- **Home**
 -  The thread feed gear is in the home position.

-  The thread feed gear is not in the home position.
- **Feeder Profile**
 - Use the Feeder Profile button to rotate the thread feed motor one full revolution to analyze the tooth profile of the drive gear and populate the fields below the button.
- **Feeder Home Adjust**
 - When enabled, this allows for a slight adjustment to the rotation of the gear when in the home position.
 -  Feeder Home Adjust is enabled
 -  Feeder Home Adjust is disabled
 - The value entered when enabled is the amount of the adjustment.

Status Log

The status log shows the latest captured action of the machine.

Tapping this will open the status log and display a history of actions along with timestamps.

19. Hooping



Hooping the fabric or garment securely is important to the quality of the embroidery. This section will walk you through the adjustment of the hoop tension as well as the hooping process.

Adjusting the Hoop Tension

You will need to adjust the tension of the hoop any time you change to a drastically different material. For example, changing from a T-shirt to a sweatshirt would require a change in hoop tension.

1. Start with a clean flat working surface. Remove clutter from the area. Do not hoop on an uneven surface or stack of shirts.
2. Use an appropriate hoop for your design. For more information, read the section on choosing an appropriate hoop.
3. Loosen the tension on the outer hoop ring by turning the adjustment screw counter-clockwise.



4. Place the outer hoop ring inside the garment.
5. Slide the appropriate backing between the outer ring and the hoop.
6. Smooth the fabric over the hoop.
7. Gently align the inner hoop with the outer hoop, sandwiching the backing and a single layer of the garment. The mounting brackets should be facing up.
8. Press the hoop down and into place. It should go fairly easily. Take care to press on the ring rather than on the arms.



Warning!!

Pressing on the arms can bend the hoop out of shape or break it.

9. Reach inside the garment and tighten the outer hoop by turning the adjustment screw clockwise. Tighten the hoop to finger-tight.



10. Now, without loosening the screw, remove the hoop from the garment.
11. Tighten the adjustment screw a turn or two more.
12. The outer hoop is now adjusted.



Note:

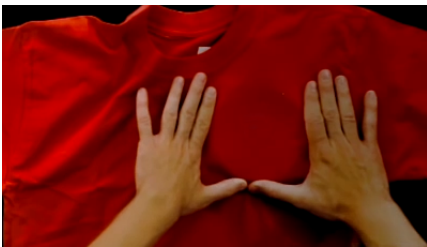
The appropriate tightness of a hoop can be tested by tapping rapidly with moderate pressure on the fabric inside the hoop. By doing this, you can mimic the presser foot of the machine. If material walks into the hoop, the hoop is too loose and needs further adjustment.

Hooping the Garment or Fabric



With the hoop properly adjusted, the garment can be hooped.

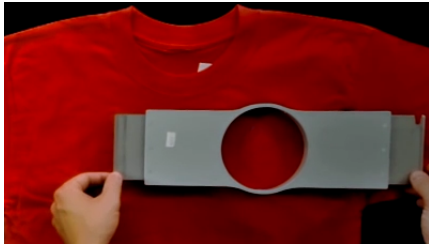
1. Start with a clean flat working surface. Remove clutter from the area. Do not hoop on an uneven surface or stack of shirts.
2. Use an appropriate hoop for your design. For more information, read the section on choosing an appropriate hoop.
3. Place the properly tensioned outer hoop ring inside the garment.
4. Slide the appropriate backing between the outer ring and the hoop.
5. Smooth the fabric over the hoop.



6. Gently align the inner hoop with the outer hoop, sandwiching the backing and a single layer of the garment. The mounting brackets should be facing up. The notch in the mounting bracket will face the machine when the hoop is loaded onto the machine.

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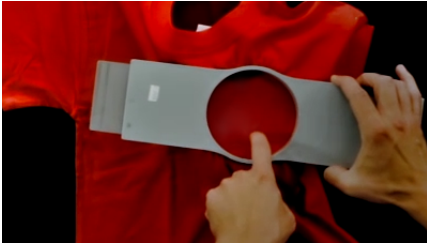
7. Using the hoop arms as a guide, make sure that the hoop is level with the garment. This will help prevent sewing a design crookedly on a product.



8. Press the hoop down and into place. Take care to press on the ring rather than on the arms. Pressing on the arms can bend the hoop out of shape or break it.
 - It may be helpful to start by placing one hand just below and off of the outer hoop to stabilize and smooth the fabric.
 - Try to hoop in a smooth motion. If the hoop rocks back and forth, extra material will move into the hoop and diminish the quality of the embroidery.
 - Do not overstretch the material. Stretching the material will stretch and distort the sew-out. It can also lead to puckering.



9. Once the material has been hooped, make sure that the garment is smooth, flat, and taut. If the garment is loose, you may need to remove the hoop and adjust the hoop tension or hooping method.



10. Check the back of the hooped piece. Make sure that there are no wrinkles or other parts of the garment lodged in the hoop.
11. As a final step, check the hoop for placement accuracy and straightness.

Hooping Tips

Round hoops give the most even tension of all the hoop shapes.

Wooden hoops will have registration marks on them. These help maintain the shape and hold of the hoop.

Many wooden hoops are double-high, meaning their sides are twice as tall as normal hoops. They help grip slick or bulky goods because of the larger surface area and slight tooth the wood provides.

Choose the smallest hoop that the design will fit in without going over the hoop limitations.

Adjust the hoop tension before hooping the final garment. If you adjust the tension of the hoop while the garment is in it, you will increase your chances of “hoop burn” and create ripples in the garment.

Sew a Swatch!

It is often a good idea to sew a practice piece on material as similar to the final product as possible. Although not essential, producing a sample is an excellent way to prevent or solve potential problems before embroidering the final product.

Working With Different Fabrics

Different fabrics and fabric weights may require you to loosen or tighten the hoop. It might take a few attempts to get the exact setting for the fabric you are working with. Most fabrics do not require the hoop to be tightened down once in the hoop.

20. Loading a Hoop onto the Machine



1. Install a hoop by sliding the side brackets of the hoop underneath the spring clips on the support arms. Make sure that the slotted bracket is to the right as you are facing the machine.
2. Slide the hoop towards the rear of the machine until it snaps into place and the brackets are fully seated beneath the spring clips.
3. Pull back gently on the hoop arms to ensure the spring clips are engaged.
4. Run your fingers around the edges of the hoop to ensure that sleeves, collars, zippers, or other garment parts are not inadvertently under the hoop. Balloon the garment out around the cylindrical lower arm. This will prevent other garment parts from becoming sewn into the underneath side of the embroidery.

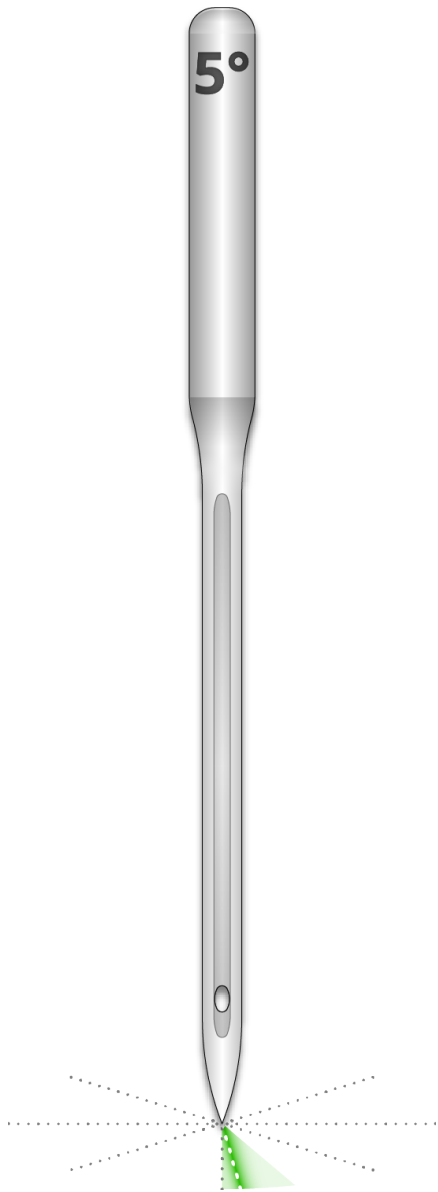
21. Needles

21.1. Replacing A Needle



Sew conditions and material properties will affect the life of a needle, but eventually, needles will need to be changed.

1. Make sure the safety grabber blade is in the back position before changing a needle. If it is not, press the Adjustment and Center keys on the machine keypad to move the grabber back.
2. Above each needle is a needle clamp set screw that holds it in place. Using a small flat-blade screwdriver, turn the needle clamp set screw counterclockwise about a half of a turn, until the needle can slide down and out of the needle bar. Do not loosen too much or remove the set screw. Loosen the screw just enough for the needle to be removed.
3. Remove the needle by pulling down on the needle.
4. Embroidery needles have a front and a back side. The needle must be installed correctly or the sew quality may suffer. If you install the needle incorrectly, you may also get thread breaks. The front of the needle has a long groove (thread guide), while the back has an indented notch (scarf) just above the eye of the needle.



5.

With the thread guide facing forward and the scarf facing back, slide the needle up and into the needle clamp as far as it will go. The eye of the needle should then be turned 5° to the right. The acceptable range is 0° - 20° to the right.

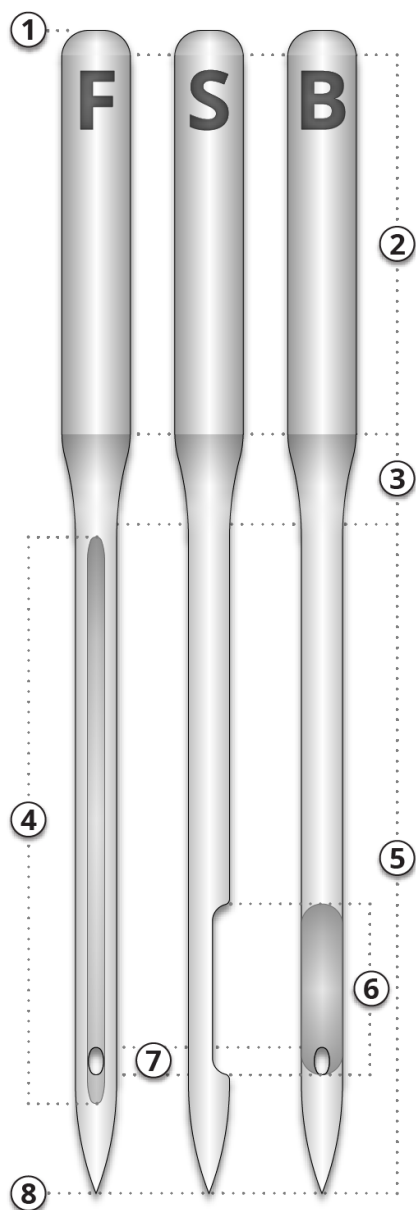
6. A needle orientation magnet may be used to help determine the angle of the needle eye. This cylindrical magnet can be temporarily attached to the front of the needle just above the eye. The end of the magnet will rest on each side of the thread guide and stick straight out from the needle. This will better indicate the angle of the eye. For reference, one minute is 6° on a clock face.
7. While holding the needle in place, re-tighten the needle clamp set screw to hold the needle in place.

Common Reasons to Change the Needle

- The needle breaks or is bent.

- The thread will consistently fray - this usually means there is a bur on the needle causing it to fray a part of the thread.
- The needle is dull.
- Sewing conditions change, such as a change in fabric.

Anatomy of a Needle



1. Butt
2. Shank
3. Taper or Shoulder
4. Thread Guide or Front Groove

5. Blade
6. Scarf
7. Eye
8. Tip or Point

21.2. Needle Types

Embroidery quality can be greatly affected by your choice of needles. You will need to find what works best with your applications. The following information should help.

Choosing a Needle

Your machine utilizes DBxK5 needles. Among other things, this means that they are industrial needles with larger eyes.



Needle Sizes

Needles come in a variety of sizes, and most are marked with two numbers. For example, you will find 75/11 needles. The first number is metric and is the diameter of the needle blade. It is measured in hundredths of a millimeter. A 75/11 needle has a blade that is 0.75mm in diameter.

Standard sewing conditions will utilize needle sizes ranging from 65/9 to 80/12 needles.

Smaller needles work well for finer materials, thinner threads, and delicate detail work.

Larger needles work well for tougher and more abrasive materials. As the holes made by the needle are larger, sewing creates less friction on the threads and helps prevent thread breaks.

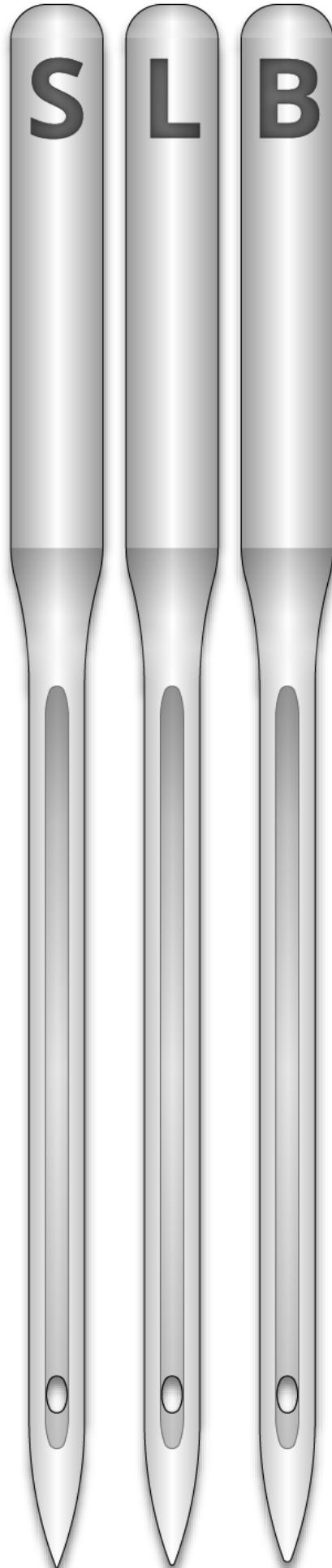
60/8	Used for the thinnest threads and finest detail work.	A thinner needle blade is more prone to needle deflection and breakage. Uncommon needle size and can be difficult to source and purchase.
65/9	Smallest of the more common needles. Used for fine fabrics, 60-weight thread, delicate design details, and tiny lettering.	A thinner needle blade is more prone to needle deflection and breakage.
70/10	Used for fine fabrics, design details, and small lettering. Good needle size for a larger majority of embroidery work.	A thinner needle blade is more prone to needle deflection and breakage.
75/11	Standard needle size and good for the majority of embroidery applications.	May be too large for finer detail work.

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80/12	Largest of the more common needles. Often used caps with buckram backing or cotton duct jackets to help alleviate thread breaks.	Larger holes can damage finer materials and smaller design details.
90/14	Used with some specialty and metallic threads.	Larger holes can damage finer materials and smaller design details. Uncommon needle size and can be difficult to source and purchase.
100/16	Used with the thicker 12-weight threads like the wool-acrylic blends.	Larger holes can damage finer materials and smaller design details. Uncommon needle size and can be difficult to source and purchase.

Needle Points

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S - Sharp

L - Light Ball or Universal

B - Ballpoint

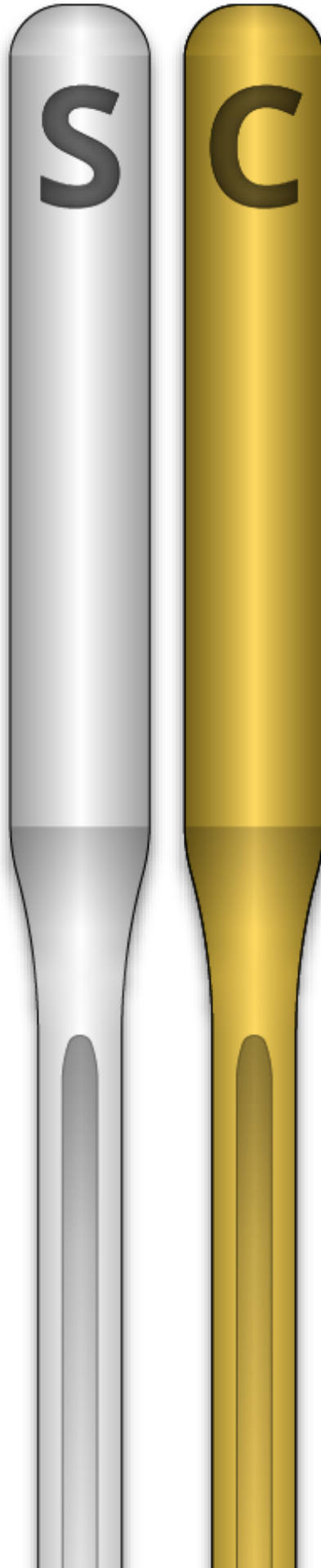
Needle points also come in a variety of options. The main two are sharp and ballpoint.

Sharp point needles are generally better at cutting through materials and are usually used on tightly woven or non-woven.

Ball point needles are most often used on knit materials. They tend to move the threads of the material to the side of the needle as they sew. Ball point needles are usually marked with a “BP” on the package.

Needle Coatings

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Needle Coatings

Needles are offered with a few different coatings.

Standard needles are silver in color and offer a sewing life of approximately 4 to 6 solid sewing hours.

Titanium needles are gold in color and offer an extended sewing life of 2 to 3 times the life of a standard needle. While they are stronger needles, they have little flex. If deflected, they will often break instead of bend.

Other needle coatings exist that reduce the heat built up when traveling through synthetic materials.

22. Thread Types

Thread comes in many styles, weights, and compositions. Understanding the differences can help determine the appropriate thread for the job.



Information

Manufacturers and suppliers often have fact sheets with sewing tips, design settings, and needle recommendations on their websites. This is very useful in learning to use a variety of thread types.

Thread Content



Thread comes in a few compositions. These have different properties that can drastically affect sewing and quality.

Polyester

Polyester thread has become the standard thread for Melco embroidery machine users.

- Stronger than other threads
- Fewer thread breaks when sewing
- Colorfast and resistant to chlorine making it ideal for garments that are washed frequently. It is perfect for uniforms and corporate apparel.
- Comes in a wide variety of colors



Information

Polyester thread is recommended for use with your machine to achieve full sew speed and prevent thread breaks.

Metallic

Metallic threads are often used to add a bit of sparkle to a design.

- High sheen or sometimes a matte finish
- Can be more problematic to sew with

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- Requires lighter densities and longer stitch lengths
- Usually requires slower sew speeds and larger needles

Wool/Acrylic Blend and Wool/Cotton

Usually a heavier thread, these threads can be used for a more natural or hand look.

- Unique look
- Can be more problematic to sew with
- Requires much lighter densities and longer stitch lengths
- Usually requires slower sew speeds and larger needles

Rayon

Rayon threads are made of natural fibers and can have slightly higher sheens than polyester.

- Wide variety of colors
- Beautiful Sheen
- Less strength than polyester
- Not chlorine resistant
- Usually requires slower sew speeds

Thread Weight (Thickness)

Thread is commonly referred to by its weight. In many cases, this is a number beside the type. For example, you might find a “Poly 40”. This number usually means that it would require 40 kilometers of thread to weigh 1 kilogram. With this method, the higher the number, the thinner the thread.

- 40-weight thread is the industry standard for embroidery. Most stock designs are digitized for use with 40-weight.
- 60-weight thread is excellent for fine details and small lettering.
- 12-weight thread is very thick and can work well for a hand embroidery look.

Each thread weight will require different needles and design specifications.

23. Stabilizers



Appropriate stabilizer is essential for embroidering most fabrics. Without stabilizer, fabrics can slip even when they are hooped tightly. Using the proper stabilizer is directly linked to the production of consistently high-quality embroidery. It is important to understand that many different embroiderers with identical criteria may choose completely different stabilizer and topping formulas and still achieve successful embroidery results. Experimentation and experience are essential in creating consistently high-quality embroidery. New products are constantly being developed and introduced. Find the combinations that work best for you.

Stabilizer is placed on the underneath side of a fabric before it is embroidered. It is also sometimes referred to as interfacing or stabilizer. Depending on the material, stabilizer can:

- Stabilize the material as it is being sewn
- Provide support for the stitches after sewing is complete
- Different stabilizer types provide varying levels of support.

Cut-away

Cut Away stabilizer is a woven or non-woven material that must be cut from the fabric after the embroidery is complete. This type of stabilizer is used to support the embroidery on the fabric during and after the embroidery process. It also prevents the fabric from stretching during embroidery.

Cut-away stabilizer is a great choice for knits or loosely woven materials. These materials tend to move and stretch. The cut-away stabilizer helps to stabilize the material and support the stitches.

Cut-away stabilizer also has a softer feel to it. If the embroidery is going to eventually be against the skin directly, consider using cut-away for a more pleasant experience for the wearer.

As the name implies, cut-away stabilizer must be removed by cutting it away with scissors after the embroidery is complete. It is best to remove leaving $\frac{1}{8}$ to $\frac{1}{4}$ of an inch edge.

Tear-away

Tear-away stabilizer is a non-woven material that tears easily in any direction and can be easily removed after embroidery. Tear-away is extremely simple and fast to use, but the uses are limited because it offers little support to unstable fabrics. Some examples of fabrics suitable for tear away are cotton sheeting, heavy woven dress shirts, denim, terry cloth, and hats.

Tear-away stabilizer is a favorite among embroiderers because of its ease of removal. It is simply torn away from the garment after the embroidery is finished.

It often has a feel that is similar to paper, and leftovers can be rough against the skin.

It is best used with stable materials, as the stabilizer offers little support for the material.

Specialty Stabilizers

Specialty stabilizers such as poly mesh and nylon mesh are also options. While they may not be as stable as traditional cut-aways, they are much less visible through lighter-weight garments. They also tend to be softer than other stabilizers.

Water soluble stabilizer is also available for jobs that require that no stabilizer be left after the completion of the embroidery. Be aware that this would require a fairly stable garment as the stabilizer will be dissolved completely and offer no support once the garment has been laundered.

Stabilizer Choice Example

The choice of stabilizer impacts the quality of the embroidery greatly. The following examples were sewn on the same machine with all the same settings. The only difference was the choice of stabilizer.

Embroidery on T-Shirt



Cut-away stabilizer provides needed stability to the thin knit of a T-shirt. The embroidery holds the shape of the design.



Tear-away stabilizer does not hold up to the embroidery. The stitching is allowed to pull in and the borders do not line up.

Embroidery on T-Shirt



Cut-away stabilizer provides needed stability to the thin knit of a T-shirt. The embroidery holds the shape of the design.



Tear-away stabilizer allows the T-shirt to pull and pucker as the design is sewn.

Stabilizer Weights

Stabilizer comes in different thicknesses. Many times, you can ask for sample packets from suppliers to find what will work best with your application.

Heavier stabilizers tend to offer more support. Lighter stabilizers are often less visible. Because finding the right stabilizer for the application requires some experience or experimentation, having a medium-weight stabilizer is a good starting place for new embroiderers.

Toppings

Toppings are used to keep your stitches from falling into the nap of a lofty material like terry cloth or polar fleece. It can also be used to clean up small lettering and the overall appearance of your embroidery. Most toppings are water-soluble and can be easily removed after the embroidery is complete.

24. Attaching & Adjusting Hoop Arms

Depending on the hoop you plan on using, the hoop support arms on the machine will need to be in the inner position, outer position, or removed completely if using a clamp or the wide-angle driver.

This section will walk you through attaching and removing the support arms properly as well as adjusting the spring clips.

Attaching the Hoop Support Arms



Determine which support arm position the chosen hoop requires. Most of the smaller hoops require the inner position. Most of the larger hoops require the outer position.

1. Align the hoop arms to either the inner holes or the outer holes on the x-carriage. There will be two holes for each support arm.
2. Make sure the clips on the ends where the tubular frame will attach are facing up. The sides of the hoop arms should face outward. This will ensure the brackets are attached to the correct side of the carriage. Also, make sure both clips are attached securely to the arms.
3. Insert two thumbscrews for each arm. Install them to nearly finger-tight.
4. Install a hoop by sliding the side brackets of the hoop underneath the spring clips on the support arms. Slide the hoop towards the rear of the machine until it snaps into place and the brackets are fully seated beneath the spring clips. Make sure that the slotted bracket is to the right as you are facing the machine. The support arms will still move a little.
5. Using the installed hoop as a guide, square up the support arms.
6. Tighten the thumb screws to finger-tight.
7. Using a 6mm hex wrench, tighten the screws a quarter to half turn more. Do not overtighten as the screws are designed to snap before damage to the x-carriage can occur.



Information

If the hoop brackets shift forward and back, the spring clip may need to be adjusted. See the information below.

Removing the Hoop Support Arms

1. Use a 6mm hex wrench to loosen each of the two thumb screws attaching each arm to the x-carriage.
2. Using your fingers, fully loosen the thumb screws.
3. Remove the support arms from the x-carriage.

Adjusting the Spring Clips

When you have a hoop installed, you should make sure both spring clips are attached securely to the arms. If either side of the hoop can move front to back underneath the clip, the clip needs to be adjusted. It may be necessary to move the hoop forward for easier access to the nuts holding the clips. To adjust the clip:

1. Use a 5mm Hex nut driver to loosen the two nuts holding the clip in place.
2. Push the block underneath the clip as far forward as it will go.
3. Hold the block in place while tightening the nuts.

25. Installing the Wide-Angle Driver






Cap frames and micro clamps utilize the Wide-Angle Driver. The Wide-Angle Driver consists of two pieces.

- The cap frame driver ring
- The lower arm bracket




You must ALWAYS select the proper frame/hoop in the software when sewing with the Wide-Angle Driver. Failure to do so may result in damage to your equipment!

Wide-Angle Driver Installation



1. Select the Wide-Angle Cap Frame for the hoop in the software.

- a.  Tap to select a hoop
- b.  Tap to select the Wide-Angle Driver Category
- c. Locate and select the Wide-Angle Cap Frame
- d.  Confirm to return the main screen

2. Center the sewfield.

- a.  Tap to go to the Transform screen
- b.  Tap to center the sewfield of the Wide-Angle Cap Frame
- c.  Confirm to return to the main screen.

3. Moving the machine to either needle 8 or needle 9 is also beneficial.

- a.  Tap to access the move-to-needle option.
- b. Tap to select either needle 8 or 9.
- c.  Confirm to move the needle case and return to the main screen.

4. If attached, remove the hoop arms from the machine. To do this, use a 6mm Allen wrench to loosen the two thumb screws securing each arm. Unscrew them and remove the arms.



Warning!!

Failure to remove the hoop arms will result in the wide-angle driver colliding with the arms during sewing.

5. Remove the hook guard.
 - a. Loosen the thumb screw securing the hook guard and slide it away from the machine.
 - b. Set aside.



6. Loosen the knobs of the lower shaft support until the top of the screws are flush with the t-nut.
7. Slide the shaft support mount into the lower arm extrusion and toward the back of the machine until it contacts the hard stop. It should slide smoothly into the t-channel. The t-nut must go all the way back to the hard stop or the shaft will be set too far forward on the machine.



8. Tighten the two knobs.

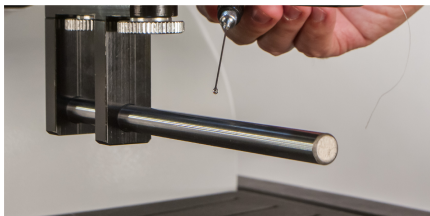


9. Reattach the hook guard by sliding it back into place and tightening the thumb screw.


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10. A few drops of sewing machine oil should be applied to the lower support shaft prior to the initial installation of the driver ring assembly. This oil should be applied every three months on later installations.



11. Slide the red driver assembly onto the lower arm and support shaft. This may be easier if the grabber bar of the machine is closed.

-  Tap to close the grabber.

Then, slide the red driver assembly onto the lower arm and support shaft. Notice the orientation of the ring in the picture.



12. Using two of the thumb screws from the hoop arms, attach the red driver to the x-carriage of the machine. The driver will attach to the two innermost holes. Tighten them to finger-tight, and then use a 6mm Allen wrench to tighten an eighth to quarter turn more. Do not over-tighten the screws as they are designed to break before damage to the machine can occur.





Information

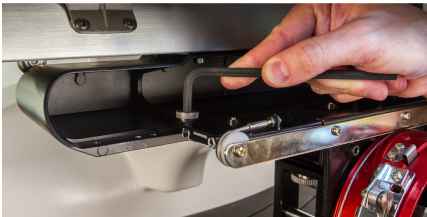
The red driver ring should slide easily over the lower arm of the machine and should allow for a business card or two to fit between the ring and the lower arm. The space should be enough for the card(s), but no more.

If the gap between the ring and the lower arm is incorrect, or if you are unable to install the driver, it will need to be adjusted. See the adjustment section for instructions on how to test and adjust.


13. The Red Wide Angle Driver is now installed and ready to use.

Red Wide Angle Driver Removal

1. Starting with a 6mm Allen wrench, remove the thumbscrews attaching the red driver assembly to the x-carriage.



2. Slide the red driver assembly toward you and off of the lower arm and support shaft. This may be easier if the grabber bar of the machine is closed.

- o  Tap to close the grabber.



3. Remove the hook guard.
 - a. Loosen the thumb screw securing the hook guard and slide it away from the machine.
 - b. Set aside.

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4. Loosen the knobs of the lower shaft support. Then, slide the lower support shaft out of the t-channel and off the machine.



5. Reattach the hook guard by sliding it back into place and tightening the thumb screw.



6. The wide-angle driver is now removed. Hoop arms can be reattached to sew with flat hoops.

25.1. Adjusting the Wide-Angle Driver



This procedure may need to be performed if the Wide-Angle Driver was purchased separately from your machine, the driver has been dropped or mishandled, if the initial installation of the driver shows the adjustment to be off, or if prompted by technical support.

The Wide-Angle Driver may need to be adjusted to custom-fit each machine. A driver that is not properly adjusted to the machine it is used on will result in a negative impact on sew-out quality, machine productivity, and reliability.

The following tools will be used:

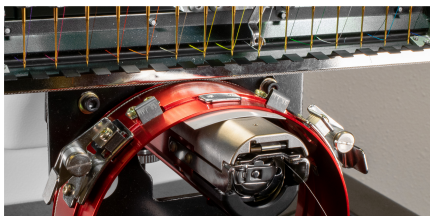
- Screwdriver, Hex Drive, Ball End, 4mm
- Hex Set, 7 Pieces, Metric Long – 6mm and 2mm

Testing for Appropriate Adjustment

1. Install the driver using the instructions for Installing the Wide-Angle Driver.
2. Position the driver so that the bearing block is aligned to the front of the support shaft and the driver ring is centered with the hole in the needle plate. Reference the ring's frame location tab.



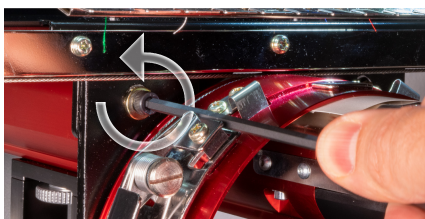
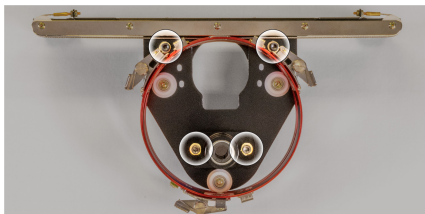
3. Place a business card of medium to heavy stock (or equivalent) between the needle plate and the driver ring. A single business card should be able to slide between them with little resistance. A gap of two business cards is acceptable.



4. If the gap is too small or too large, the driver will need to be adjusted using the steps below.

Adjustment Procedure

1. Begin by loosening the two bearing block hex screws and the two interface bracket screws using the 4mm hex screwdriver.

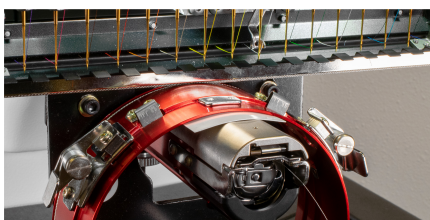


2. Install the Wide-Angle Driver on your machine.
3. Position the driver so that the bearing block is aligned to the front of the support shaft and the driver ring is centered with the hole in the needle plate. Reference the ring's frame location tab.

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4. Place a business card of medium to heavy stock (or equivalent) between the needle plate and the driver ring. This will act as a spacer. The ring should just rest on the card.



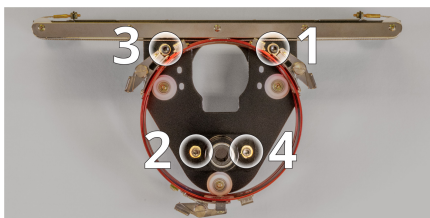
5. While making sure the edges of the two black brackets are aligned, tighten one of the upper screws.



6. Tighten the opposite screw securing the bearing mounting block.



7. Tighten the second upper screw securing the bracket and then the second lower screw securing the bearing mounting bracket. Tightening these four screws in a star-like pattern achieves the best results. Then remove the business card.

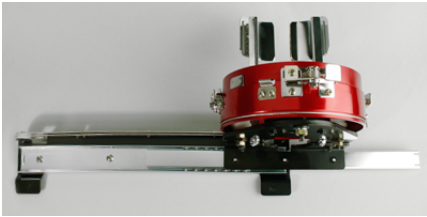


8. Move the y-beam and x-carriage by hand to ensure there is no binding. This can only be accomplished with the machine off or the e-stop engaged.

25.2. Maintaining the Wide-Angle Driver

Approximately once per year, the red wide-angle driver will need to be cleaned and greased. The following steps will walk you through the procedure.

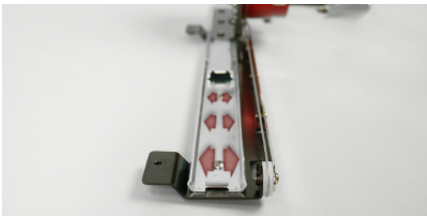
1. Remove the driver cylinder from the machine and lay it upside down on a flat surface.
2. Slide the driver ring fully to one side.



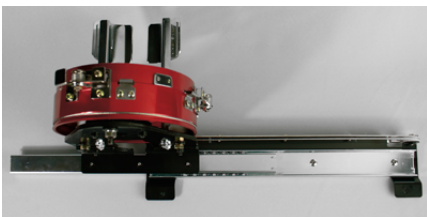
3. Clean the exposed portion of the exposed slider bearing groove with a clean towel.



4. Apply a thin film of hp grease to the grooves of the slider bearing.



5. Move the driver all the way to the opposite side and repeat the previous two steps.



6. Move the driver back and forth a few times to spread the grease.
7. The driver may now be reinstalled on the machine or stored for future use.

26. Sewing Caps



Sewing caps will require a little more setup than sewing a flat product. For sewing caps, you will need to do the following.

1. Select the appropriate hoop in the application.
2. Install the Wide-Angle Driver.
 - This may need adjusting the first time.
3. Hoop a cap.
4. Load the hooped cap onto the driver.
5. Set up the design for caps
6. Load the design and set the proper settings for sewing caps.
7. Adjust the presser foot for the cap.
8. Center the design on the cap.

The next few sections of this document will assist in sewing a cap.

26.1. Hooping A Cap



The process for hooping a cap on the Wide Angle Cap Frame (WACF) is the same for almost any type of cap or visor you are hooping.

You will want to have the cap gauge installed on a sturdy surface to start.

Preparing the Cap

Preparing the cap before it is hooped will help the sew quality and ease the hooping process.

To prepare the cap,

1. Remove any cardboard from the inside of the cap.



2. Straighten the bill as best you can. It can be reshaped after the embroidery is complete.



3. Pull the sweatband to the outside of the cap. Near the back of the cap, the sweatband may be sewn into the cap. At this point, it may need to be folded a bit to fit in the frame.



4. If the cap has a braid, move it around the cap to the inside and under the brim.

Hooing the Cap

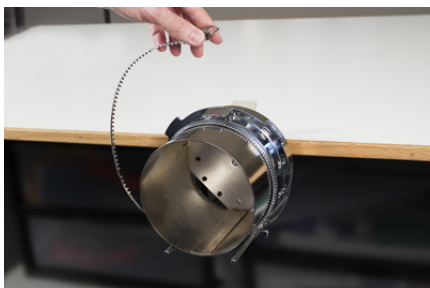


To hoop the cap,

1. Slide the cap frame onto the cap gauge. Make sure the locating tab on the cap gauge fits into the cap frame notch and the cap frame slips firmly under the two roller clips. Watch your fingers! Don't pinch them between the back of the frame and the gauge.



2. Swing the metal strap open.



3. Place an appropriate stabilizer over the gauge and the teeth of the cap frame. Make sure that the stabilizer is long enough to support the full embroidery area. It may be easiest to use stabilizer long enough to reach the posts on the bottom of the cap frame.



Note:

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Some people find it easier to use the binder clips to hold the stabilizer while they are hooping the cap. The downside to this technique is that you have to remove the clips from inside the cap when you are done hooping. That isn't always easy. Clipping the stabilizer before hooping the cap is completely optional.



4. Slide the prepared cap onto the cap frame with the visor pointing up and the frame going inside the cap. The bill should be pushed against the bill-stop on the frame. The bill should also be relatively centered on the frame. The centering mark on the bill-stop can be used for reference.



Note:

The sweatband may not touch the vertical ridge of the frame. That's okay. Different caps have varying sweatband widths and not all will appear the same when hooped.

5. The cap should ride over the two clip posts toward the bottom of each side of the frame.
6. Press down on the bill to ensure that it is falling in the bill trough of the cap frame. This will help keep the cap from slipping around or off the frame when the cap is being sewn.



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7. Pull the side of the sweatband toward the cap frame and down. Smooth any bunching of the cap sides or sweatband. You may eventually need to fold the sweatband a bit to avoid the latching hook. But this will help with the placement of the cap on the frame. As you do this, watch the stabilizer to ensure it is still in



8. When the left side of the cap is within the strap hinge post, swing the strap up and over the cap brim. On the side of the cap, the teeth of the strap should fall just above the seam attaching the sweatband of to the cap.



9. Continue bringing the strap around the front of the cap. On the front of the cap, the teeth of the strap must fall into the seam for the bill.



10. Bring the strap down the other side of the cap. Make sure the teeth of the strap fall just above the stitching attaching the sweat band. This will help ensure a level sewout.

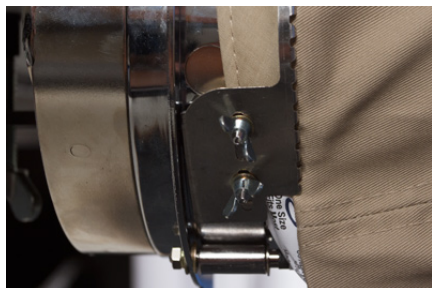
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11. Hook the latch on the strap into the hook on the latch post. You may need to fold or adjust the sweatband of the cap slightly to accommodate the hook and latch. At this point, you want to hook the latch, but not close the latch.



12. The cap frame strap may need to be tightened if it does not fit the cap snugly or loosened should it be too tight to fasten appropriately. This is only necessary when hooping a different style of cap for the first time using the cap frame. Subsequent hoopings of that style should fit well after the adjustment.
 - To adjust the cap frame strap, loosen the two wing nuts on the left side of the frame.



- Then, push the strap down against the cap brim moving from the latch toward the wing nuts so that it is very snug to the cap.



- Slide the strap toward the wing nut to remove the excess.

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- Tighten the wing nuts while holding the strap tight against the cap.

13. Smooth the lower part of the cap while snapping the buckle closed. The buckle should be tight.



14. If clips were used to secure the stabilizer while hooping, remove them now.



15. If sewing on the sides of the cap, smooth the cap material backward and over the clip posts on the both sides. Indent the cap material along the clip posts.

16. While pressing the cap material around the post, use a clip to secure the material to the post. Orient the clip handles toward the back of the cap.



These are only necessary when sewing the sides of the cap or if the cap is unstructured.



Information

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17. You may now remove the cap frame from the gauge.

- To do this, place the palms of your hands on the gauge and place your fingers on the frame.



- Pull your fingers toward your palms until the cap frame released from the gauge.
- Inspect the hooping. Look at the inside of the cap to ensure that the stabilizer is not bunched and that it is caught in the teeth of the frame.



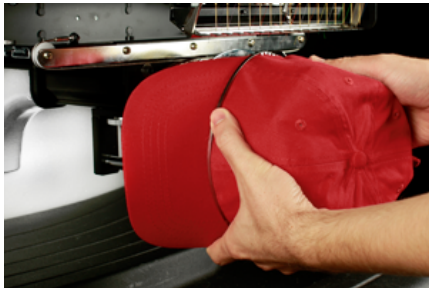
18. The cap is now ready to be placed on the wide-angle driver on the machine.

26.2. Loading a Hooped Cap



To load a hooped cap onto the installed wide-angle driver, use the following steps.

1. Rotate the hooped cap 90° to allow the bill to pass under the needle case.



2. Rotate the bill back up so that it is behind the needle case and the location tab on the driver aligns with the notch in the frame.



3. This also aligns the rectangular holes along the edge of the frame with the spring-loaded locking clamps on the driver.



4. With the frame aligned, press the frame toward the driver until the three (3) spring-loaded locking clamps snap into place. It may be helpful to grasp the back of the driver and close your grip to push the cap into place as pictured.



Removing a Hooped Cap

To remove a hooped cap from the installed Wide-Angle Driver, use the following steps.

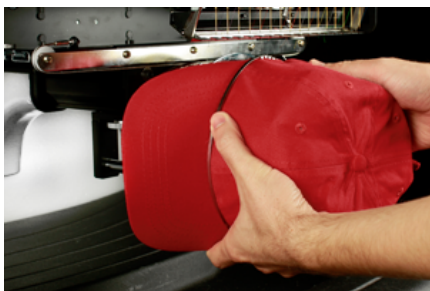
1. Press the three locking clamps on the driver while gently pulling back on the frame.



2. This will allow the frame to release and be pulled free from the driver.



3. Rotate the hooped cap 90° so the bill can pass under the needle case. The hoop can now be removed from the machine.



26.3. Sew Settings For Caps



The settings in the application will need to be adjusted for better quality on a cap. Be sure to address the following.

Design Orientation

To be oriented appropriately for a cap, the design usually needs to be rotated 180° in the software. For assistance on this, review the Transform section of this document.

Sew Speed

Sew speed for caps will need to be adjusted. Because the material is going around instead of back and forth, the machine speed will need to be set between 850 - 1200 stitches per minute. For newer embroiderers, starting at 1000 s.p.m. and adjusting from there may be a good idea.

For more information, see the Machine Speed section.

Acti-Feed Settings

Don't forget to change the Acti-Feed settings for caps. There is an Acti-Feed suggestion for caps that can be fine-tuned as you are sewing. For more information, see the Acti-Feed section.

Adjusting the Presser Foot for Caps

The presser foot will need to be adjusted any time you significantly change the thickness of the material you're sewing on.

With caps, adjusting the presser foot is a little different than with flat goods. Because the cap flags (bounces) and has a seam, it is often best to set the presser foot to a standard setting and adjust from there.

Make sure the machine is stopped.

Adjust the presser foot by rotating the adjustment gear counterclockwise until it can no longer rotate. This will take the presser foot to the lowest position possible. This can be accomplished with the needle at head up (default position) or at bottom center (as described in the adjusting the presser foot section).

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If the needle is not at the presser foot adjustment point, the presser foot will not appear to move. Even if the needle is at the adjustment point, it may be difficult to see a change in the presser foot. The material of the cap is pressing up against it and you may not see it lift off the material. This is normal and will not affect the actual adjustment.

With the presser foot adjusted all the way down, rotate the gear clockwise and bring the presser foot back up. Count the clicks of the gear. Raise the presser foot two to five clicks back up. Again, you most likely will not see the presser foot move. You may need to adjust further based on the sew-out experience.

Centering a Design on a Cap

Unless you hooped absolutely perfectly, and that is exceedingly difficult to do, you will most likely need to adjust the hoop position on the machine to better center the design on your cap.

The best way to accomplish this is to have the hoop loaded on the machine first.

Screen Versus Cap

Pressing the Center Hoop button on the Transform screen is convenient, but it doesn't work well for caps. It functions by centering the hoop or frame to the machine's origin.

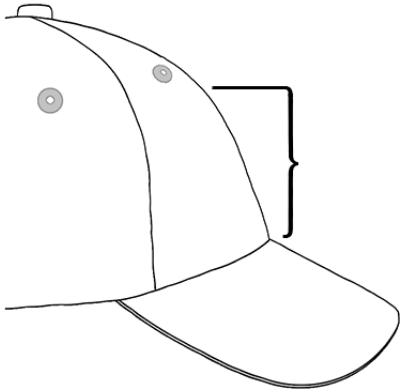
The View Window will display the hoop limits. Centering the design within these limits will not necessarily center the design on the cap. Because caps have different profiles and embroiderers hoop inconsistently, small adjustments may need to be made to the hoop placement.

When the design is centered on the cap, the placement may appear to be off in the software and on screen.

Centering Vertically

Centering the design vertically will take a bit of measuring, but it only needs to be done once for a particular style of cap. Additional caps will not require vertical adjustments.

To find an appropriate vertical placement on the cap, measure from the bill of the cap to where the curve really starts to come over the head. This is similar to measuring the design height that the cap can accommodate. Once measured, divide the measurement in half. Measure up from the bill that half distance to find a good vertically centered placement for the design.



Marking this measurement on the cap with masking tape or tailor's chalk works well. Use the physical up or down arrow to move the hoop into position. As you use these buttons, the machine's laser will illuminate the placement.

Centering Horizontally

With the cap frame loaded on the machine, use the physical left or right arrow buttons to center the cap horizontally. If the cap has six panels, you will have a seam running down the middle of the front. This acts as a marker for center. If the cap has five panels, it will not have a seam, and you may need to use a tape measure and tailor's chalk to find the center.

Using the laser to line up to the center may not work as well in this case. As the cap comes off of the needle plate, the laser is displayed farther to the right. This is from the laser being set just behind the right upper arm front cover of the machine.

For more accurate placement, line up the active needle (the needle with the presser foot behind it).

Trace the Design

Tracing the design using the hoop and trace keys simultaneously on the keypad of the machine will also give you a good idea of where the design will be sewn.

Watch the Hoop Limits

Depending on the structure of the cap, you will be able to sew within varying distances from the hoop limits. Softer, thinner, and more pliable materials will allow you to sew closer to the limit. Tougher and less flexible materials may cause the fabric to ramp up at the teeth causing flagging, needle deflection, and thread or needle breaks.

27. Thread Break Troubleshooting

Thread breaks are an irritating part of embroidery, but they do not have to be merely tolerated. By following a few steps when rethreading the needle, you can begin to diagnose the nature of the thread break and hopefully avoid a subsequent one.

Diagnosing a Thread Break

Following a diagnostic method when rethreading a needle is a good way to eliminate the simplest and most common causes of thread breaks. Start with the following steps. Each step is explained in more detail in the following sections..

After the first thread break,

1. Check the upper thread path.
2. Check the bobbin tension.

Rethread the machine and sew. If a second thread break occurs in a relatively short time,

3. Check the needle.
4. Check the presser foot height.
5. Check the acti-feed settings.

Rethread the machine and sew. If a third thread break occurs relatively quickly, you may need to contact Technical Support or utilize the next sections to help determine the cause.

6. Use the Thread Break Diagnostic Table below to begin a more thorough analysis.

Thread Break Diagnostic Table

Sections containing information about each of the possible solutions follow the table.

Real Top
Thread Break
(this design
only)

Thread breaks on this material/garment only.

- Check for application-specific issues like specialty thread or needle type.

	Thread breaks at the start or end of elements.	<ul style="list-style-type: none"> • If the application information does not help, contact Technical Support. • Check the tie stitches of the design. • Check the bobbin tension and tail length. • If the items above do not help, contact Technical Support.
	Thread breaks mostly on lettering.	<ul style="list-style-type: none"> • Avoid doubling tie stitches. • Make sure the stitches are long enough to sew well. • Check the density settings. Lettering that is too dense will not sew smoothly. • If the items above do not help, contact Technical Support.
Thread breaks on all materials/garments.	Thread breaks mostly in the corners.	<ul style="list-style-type: none"> • Try capping or mitering the troublesome corners. • If that does not help, contact Technical Support.
	Thread breaks all over the design.	<ul style="list-style-type: none"> • Check for stitches that are too small to sew well. • Check the density settings. Designs that are too dense will not sew smoothly. • Has the design been scaled too far? • Check for too many needle penetrations in a concentrated area. • Check for application-specific issues like specialty thread or needle type. • If the items above do not help, contact Technical Support.
False Top Thread Break		<ul style="list-style-type: none"> • Check your Acti-feed settings. • Check your presser foot adjustment. • Check your bobbin tension.

False Bobbin Break

- Check for thread buildup under the needle plate.
- If the above items do not work, contact Technical Support.

- Check your Acti-feed settings.
- Check your presser foot adjustment.
- If the above items do not work, contact Technical Support.

Real Bobbin Break

- Check the bobbin tension.
- Clean the bobbin case.
- Check the bobbin case for damage.
- Use continuous filament polyester bobbin thread.
- Check for an overwound bobbin.
- If the above items do not work, contact Technical Support.

Thread breaks on one needle only.

- Change the needle.
- Check the needle orientation.
- Change the cone of thread. Some cones can become damaged and prevent smooth sewing.
- Check for application-specific issues like specialty thread or needle type.
- If the items above do not help, contact Technical Support.

Real Top Thread Break (all designs)

Thread breaks on all needles.

- Check the presser foot adjustment.
- Check the actifeed settings.
- Check the bobbin tension.
- Check for application-specific issues like specialty thread or needle type.
- Clean under and center the needle plate.
- Check the rotary hook support.

Missed Trim

- Reset the machine (described in a later section).
- If the items above do not help, contact Technical Support.

- Check the tie stitches of the design.
- Check your Acti-feed settings.
- Clean underneath the needle plate and ensure that it is centered.
- If the above items do not work, contact Technical Support.

Missed Start

- Check the needle orientation.
- Check the tie stitches of the design.
- Check the acti-feed settings.
- Check the bobbin tension and tail length.
- If the above items do not work, contact Technical Support.

Bird Nest (mass of thread under the needle plate)

- Make sure the thread is lined up under the pinch roller.
- Clean and grease the pinch rollers.
- Check the rotary hook support.
- Clean underneath the needle plate and ensure that it is centered.
- If the above items do not work, contact Technical Support.

27.1. Thread Break From Thread Path Issues

Troubleshooting the Upper Thread Path

The upper thread path should run smoothly the entire way from the cone of thread through the eye of the needle. If there is a rough spot or the thread does not follow the proper path, thread breaks are more likely. Look for the following issues when troubleshooting a thread break.

- Thread Does Not Follow Proper Path
- Damaged Cones of Thread (Bruised Cones)
- Rough Spot in the Thread Path
- Thread Wrapped Around Thread Tube
- Thread Pulling Across Top of Cone
- Thread Pooling Below Cone

Thread Does Not Follow Proper Path

If it is wrapped around the thread tube or missing from one of the thread guides, it will not sew as reliably.

As you are rethreading the machine from a thread break, make sure that the thread follows the proper path. See how in the upper threading section.

Damaged Cones of Thread (Bruised Cones)

While not the most common cause of thread breaks, damaged cones can create issues for embroiderers. If a cone has been dropped, the threads may have shifted. This can cause the thread to cast off the cone less freely and create thread breaks.

As you rethread the machine, pull on the thread with the pinch roller up and see how it pulls. If the cone is damaged, it may pull easily for a bit and then feel as though it is being pulled across sandpaper. This can cause thread breaks.

The age of the thread and exposure to the elements can also weaken thread. Storing your thread where it is shielded from the elements and light can help prolong the life of your thread.

Change to a different cone of thread. Some cones can be saved by casting off thread until you are past the damaged part of the cone.

Rough Spot in the Thread Path

Check along the thread path for any rough areas. You may find that the cone of thread has a rough spot on the plastic core. This can catch thread as it is being cast off and fed through the machine.

Remove any rough spots from the plastic core with a fine sandpaper or emery board.

Thread Wrapped Around Thread Tube

If the thread wraps around the thread tube at the top of the cone, the thread will most likely break. This is usually caused from the thread tube being extended too far above the cone.

Adjust the thread tube to extend just above the cone. Extend it about ½".

Thread Pulling Across Top of Cone

As thread casts off and runs through the system of the machine, it pulls through the thread tube quickly. If the thread tube is not extended far enough above the cone, the thread can pull across the top of the cone and create thread breaks.

Adjust the thread tube to extend just above the cone. Extend it about ½".

Thread Pooling Below Cone

If the thread cones are not properly seated on the thread tree of the machine, vibration from the machine can cause the cones to spin and/or the thread to cast off and puddle at the bottom of the cones. As thread collects below the cone, it can catch before being fed into the machine. This can cause extreme tension on the thread and cause the thread to snap.

If using larger cones, be sure to sit the cone snugly on the thread tubes. If the cones wobble, install a thread clover on the thread tube before loading the cone of thread. The clover will expand inside the cone and prevent it from wobbling.

If using smaller spools of thread, you may need to use a thread cone/spool holder to prevent the thread casting off from falling under the spool base.

Troubleshooting the Bobbin Thread

Thread breaks can occur from issues with the bobbin. To ensure that the bobbin is not the problem, look for the following issues when troubleshooting thread breaks.

- Wrong Type of Bobbin
- Bobbin Thread is Low or Out
- Bobbin is Overwound
- Bobbin Case Not Properly Inserted into the Machine
- Bobbin Tail Too Short
- Improper Bobbin Tension or Dirty Bobbin Case
- Damaged Bobbin Case

Wrong Type of Bobbin

The machine uses a style L bobbin. Attempting to use a different style would be difficult and could produce many problems.

Using spun polyester bobbins can also cause some thread break issues. Spun polyester bobbins are created by spinning multiple polyester fibers together. This creates a fuzzier thread that pulls less smoothly through the system and generates a good deal more lint.

Use Style L continuous polyester filament bobbins.

Bobbin Thread is Low or Out

As bobbins unwind, the tension can become inconsistent. This can cause bobbin tension that is too loose or too tight. That can result in bobbin pulling through to the top of the design or thread breaks. It can also result in bobbin breaks.

Change to a new continuous filament polyester bobbin.

Bobbin is Overwound

Some pre-wound bobbins are over-wound and become big enough to apply pressure to the bobbin case. This creates resistance as the bobbin attempts to spin. This resistance can mimic a bobbin tension that is too tight and produce thread breaks and misstarts.

Cast off the bobbin thread before loading the bobbin into the bobbin case or try a new bobbin.

Bobbin Case Not Properly Inserted into the Machine

If the bobbin case is not inserted properly in the machine, the machine cannot form a complete stitch. A loose bobbin case will rattle and can cause thread breaks and needle breaks.

If the bobbin case is not inserted at all, the machine cannot create a stitch. The thread will usually get caught on the central shaft of the rotary hook. You will also commonly hear a popping sound before the thread break.

Remove the bobbin case and ensure that the rotary hook is clean. Clean the area with a brush or canned air. Then, with the pigtail in the twelve o'clock position and the bobbin facing the machine, insert the bobbin case into the rotary hook. If the lever on the case is not used, you can hear the bobbin case click into place. See how in the bobbin threading and tensioning section.

Bobbin Tail Too Short

If the thread breaks occur mostly as the machine is starting, the problem could be misstarts from the bobbin tail being too short when the bobbin case is inserted into the machine. Ideally, the bobbin tail should be two to three inches long. Longer tails can wrap up in the machine. Shorter tails may not allow for a stitch to catch when starting the machine.

When inserting the bobbin case into the machine, trim the tail to two to three inches in length.

Improper Bobbin Tension or Dirty Bobbin Case

Bobbin tension that is too tight can cause thread breaks, misstarts, puckering, and design registration issues.

Bobbin tension that is too loose can cause bobbin pull to the top of the design.

A dirty bobbin tension spring can mimic any of the problems above. If lint is caught under the tension spring and the spring is over-tightened to compensate, the tension spring may become damaged and the case may need to be replaced.

Clean and properly tension the bobbin case. See how in the bobbin threading and tensioning section.

Damaged Bobbin Case

The bobbin case that holds the bobbin must maintain its original shape. If dropped, the bobbin case may have bent and is no longer round. This will apply uneven pressure on the bobbin and create uneven tension.

Replace the bobbin case with a new one.

Troubleshooting the Needle

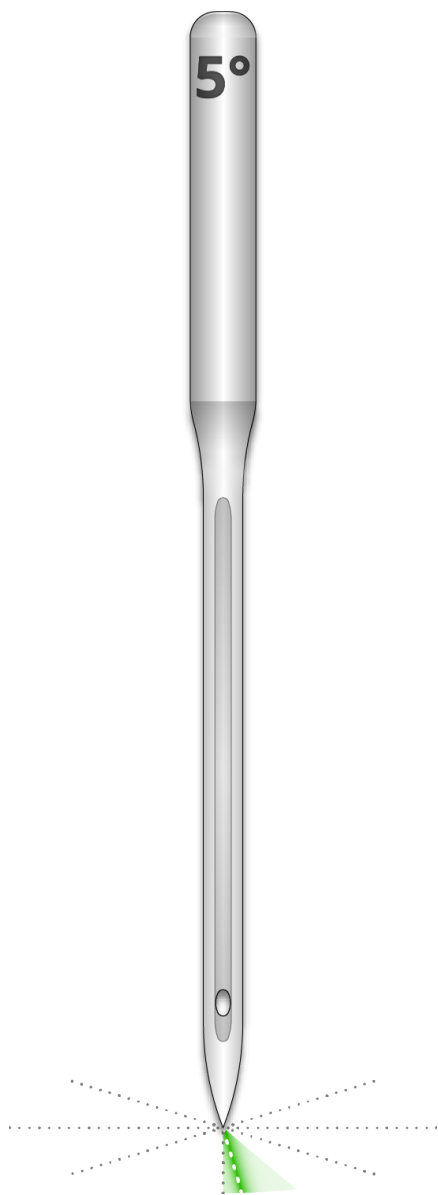
Proper needle orientation is essential to producing a proper stitch. If the needle orientation is incorrect, the loop of thread that is created while making a stitch may not be in the appropriate location to be caught by the rotary hook to complete the stitch.

A damaged needle can also cause thread breaks.

Look for the following items when diagnosing a thread break.

- Needle Angle Out of Range
- Needle in Backward
- Damaged Needle

Needle Angle Out of Range



Ideally, the eye of the needle should be 5° to the right of center when sewing. There is an acceptable range of 0°-20° to the right, but 5° is the absolute ideal. The chance of thread breaks increases if the needle orientation is outside of the acceptable range.

As a visual reference, think of a minute on a clock face as being 6°.

Adjust the needle orientation to have the eye of the needle 5° to the right. For more help, see the needle replacement section.

Needle in Backwards

Embroidery needles have a front and a back side. If you install the needle in backward, you will most likely encounter thread breaks within the first few stitches after starting a design.

The front of the needle has a long groove (thread guide), while the back has an indented notch (scarf) just above the eye of the needle.

Reorient the needle to have the thread guide to the front, the scarf to the back, and the eye of the needle to be 5° to the right. For more help, see the needle replacement section.

Damaged Needle

Standard needles last approximately 4 to 6 solid sewing hours. After this time they begin to wear out. Burs may form on the needle or they become dull and cause thread breaks.

Replace the needle. For more help, see the needle replacement section.

Troubleshooting the Presser Foot

Proper presser foot height can contribute greatly to the sew quality of the machine. Look for the following issues when troubleshooting a thread break.

Presser Foot Set Too High

If the presser foot is set too high, you may see more material movement and a loss of design registration. This is often accompanied by thread breaks.

Stop the machine and adjust the presser foot. See how in the presser foot section.

Presser Foot Set Too Low

While rarely does this create a thread break, having the presser foot too low can increase the sound of the machine as it sews. It can also create a faint light halo around the design on a dark garment. This halo can usually be removed with steam, water, or a light ironing aid.

Stop the machine and adjust the presser foot. See how in the presser foot section.

27.2. Troubleshooting Designs

How a design has been digitized can greatly affect how it sews. Testing against a standard test design is a good way to tell if the design you've been trying to sew is the cause of your thread breaks.

Sew the test design on a swatch of broadcloth and a couple of pieces of cut-away backing. If the test design sews well, but the problem design does not, there is a good chance that the design is the issue.

When diagnosing design issues, pay attention to where the thread breaks are occurring.

- Thread Breaks Occur at the Beginning or End of Elements
- Thread Breaks in the Corners of Elements
- Thread Breaks on the Lettering
- Thread Breaks All Over the Design



Information

While many of the methods discussed use DesignShop as the embroidery digitizing/editing software for the examples, the general principle can be applied to most embroidery software. A few tools used may be DesignShop-specific features and tools.

Thread Breaks Occur at the Beginning or End of Elements

How the design ties in and ties off the elements will affect how the stitches start and trim. If these ties are not appropriate, thread breaks and mistrims can occur.

Check your tie-ins and tie-offs.

Thread Breaks in the Corners of Elements

As stitches navigate around corners, it can be common for them to bunch up and cause puckering, thread breaks, and even holes in the garment. Changing how the stitches handle corners can smooth these problems out.

Cap or miter the corners of elements.

Thread Breaks on the Lettering

Lettering that is added to a design can have different settings that will change how the lettering sews. Stitches may be smaller than your needle, densities may be too tight, and with some keyboard alphabets, tie stitches may have been doubled up. All of these problems can cause thread breaks.

To address these issues, you'll need to check:

- Tie-ins and tie-offs (Avoid double ties)
- Density settings
- Smaller stitches - Use "Pull Offset"

Thread Breaks All Over the Design

If thread is breaking everywhere in the design, and the test design sews well, it could be that the design is too dense, there are too many needle penetrations in concentrated areas, or perhaps the design was scaled down too far.

To address these issues, you'll need to check:

- Density settings
- Scaling a Design
- Stitch Proximity

Troubleshooting Tie Stitches

Tie stitches are small groupings of stitches at the beginning and end of embroidery elements. Their purpose is to lock the thread in place and prevent it from pulling out when the machine starts sewing or trims. Setting tie stitches appropriately for the design will help keep the design running smoothly as well as stay in the garment after laundering.

Watch for the following issues when working with tie stitches:

- Misstarts Caused by a Lack of Tie Stitches
- Manually Digitized Tie Stitches
- Tie In/Tie Off Property
- Mistrims Caused by Doubled Tie Stitches

- Removing Digitized Ties From Alphabets
- Use Optimize Ties. This will optimize the ties stitches in the design.

Misstarts Caused by a Lack of Tie Stitches

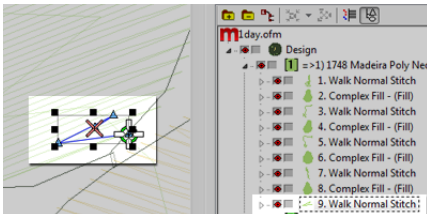
Thread breaks, or at least what look like thread breaks, can be caused from a lack of tie stitches. A lack of tie stitches will often cause the thread not to catch as the machine starts to sew. The needle may even come unthreaded. The machine will detect this as a thread break when it is really a missed start.

In DesignShop, ensure the design contains tie stitches.

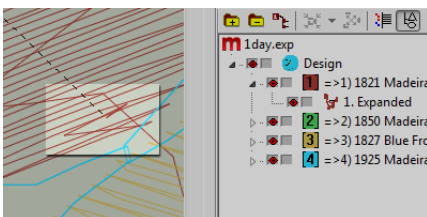
Manually Digitized Tie Stitches

In wireframe files, you may find tie stitches in the form of manually digitized small walk normal or manual stitch elements at the beginning and end of an element. This is typical of older designs or designs from digitizers who may have started digitizing in older versions of software.

If you zoom in on the last element of a color, you may see these few stitches going back and forth across each other. If you don't see these, check the properties of the project for tie stitches.



In expanded stitch files, these tie stitches are a bit harder to see because you cannot just select the last element before a trim.



Tie-In/Tie-Off Property

The properties window of DesignShop allows you to automatically add tie stitches to a wireframe design. To ensure that a wireframe design has tie stitches:

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Select the design in the project view and open the Object Properties window.

With “All Elements” selected in the properties drop-down menu, select the Tie In And Tie Off.

Placing check marks in the “Tie In” and “Tie Off” boxes will add tie stitches to the beginning and/or end of a digitized element.

Choosing “Only When Necessary” from the “When To Tie” drop-down menu will add the tie stitches only when at a trim command or at the beginning or end of the design. Choosing “Always” will add tie stitches to the entry and exit of every element.

Clicking Apply and OK will apply the changes to the object properties.

Tie stitches applied through the object properties window can also be seen in the stitches tab as “TI” or “TO” (Tie In or Tie Off).

The ideal tie stitch for the machine is most often style 1 with a width of 6 points and the number of stitches set to “Default”. This creates a nice small stitch pattern that adjusts how aggressive the tie stitch is based on the length of the stitch line. Since longer stitch lines usually require more aggressive tie stitches, this works well for most applications.

Mistrims Caused by Doubled Tie Stitches

Using object properties to add tie stitches to designs or embroidery alphabets that already contain manually digitized tie stitches will double them up. Doubling tie stitches will often cause thread breaks and/or mistrims.

Do not use object properties to designs or embroidery alphabets that already contain manually digitized tie stitches.

Before adding tie stitches, look for manually digitized tie stitches in older files like those described above. If using older alphabets in DesignShop, check the alphabet information to prevent doubling tie stitches. As only some of the alphabets contain tie stitches, this is an important step in creating smooth-sewing lettering.

Removing Digitized Ties From Alphabets

The manually digitized tie stitches on the older embroidery alphabets may be removed so that object properties may be used on all the alphabets in DesignShop. To do that, go to the Tools menu and select Convert Alphabets....

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From the Convert Alphabets window, click on Remove Ties to remove the manually digitized tie stitches from all of the installed alphabets.

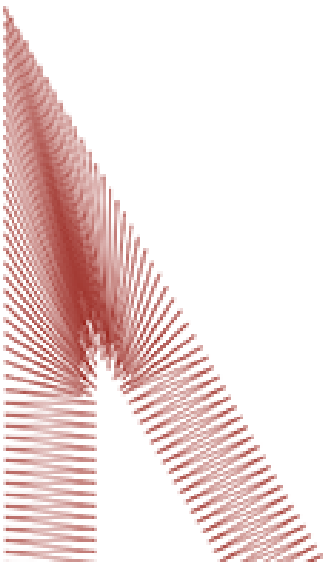
Use The Software Features to Address Tie Stitches

Both DesignShop and Melco OS contain features that will allow you to easily optimize the locks (tie stitches) of a design. It will scan through a design, remove tie stitches, if there are any, and replace them with optimal ties for the design. The design filter works well for both wireframe and stitch files.

To use this filter in Design Shop, go to Tools, then Filters, and select Design Filter... In the design filter window, check "Optimize Locks". Next, click Filter and Adjust Now. Click OK to close the window.

For the machine, go to Settings, then Design Filter. Enable "Optimize Ties". Once enabled, the feature will stay on until disabled. This means that every design to be loaded in the software will be filtered and have the ties altered or added. This may be a good option if you are uncertain how to handle tie stitches.

Troubleshooting Corners



The problem of thread breaks in corners arises as stitches navigate around corners. It can be common for them to bunch up and cause puckering, thread breaks, and even holes in the garment. Notice the dark area of stitches in the example. Such tight stitching is problematic.

Changing how the stitches handle the tighter angled corners can smooth these problems out.

Look at the following examples to prevent sewing issues in the corners.



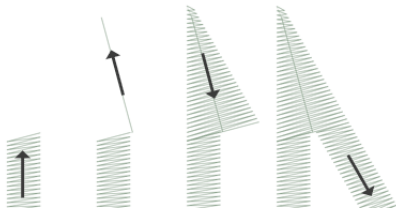
- Capping the Corners
- Mitering Corners
- Variations On Miters
- Corners On Singleline Elements

Capping the Corners

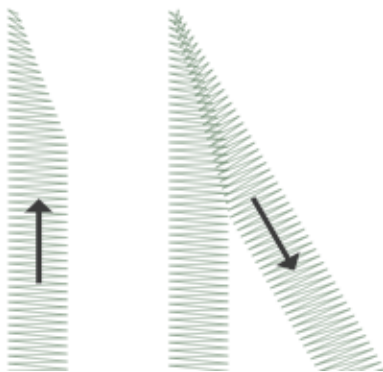
Capping the corners is a way to keep the stitches in a consistent direction and maintain an even stitch spacing. The drawback of capping comes from the limited range of use. Larger corners should not be capped as longer satin stitches are prone to snagging and becoming loose. Try to avoid creating satin stitches longer than 6 - 7 millimeters in length.

To cap a corner,

1. Use a satin stitch element to sew to the inside edge of the corner.
2. Use a walk stitch to travel to the tip of the corner.
3. Use a second satin stitch element to sew back to the inside edge of the corner.
4. Use a third satin stitch element to sew the last leg of the corner.



Mitering Corners

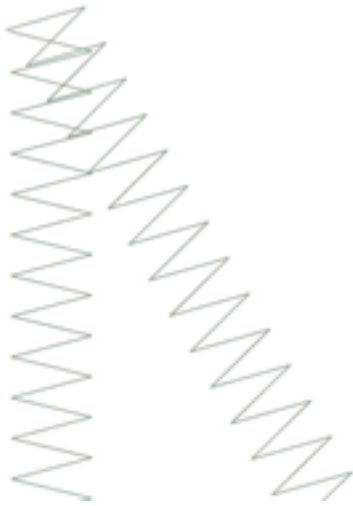


Mitering corners is another way to keep the stitches in a consistent direction and maintain an even stitch spacing. Mitering works well for less extreme angles and wider satin stitches.

To miter a corner,

1. Use a satin stitch element to sew to the inside edge of a corner. Continue the element but taper the end from the inside of the corner to the point. Be sure to leave enough of the edge under the corner to create an overlap with the second element.
2. Use a second satin stitch element to sew from the point to continue to the second leg of the corner. The inside edge of the element should create a seam from the tip of the point to inside of the corner.

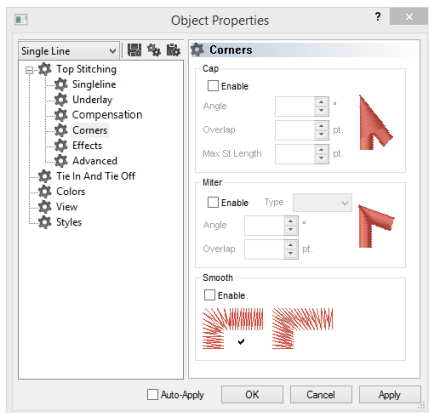
Variations On Miters



Miters can and should be altered to adapt the size of the design and the application. A complete overlap may work well for smaller elements that do not have the room to taper before becoming smaller than a needle. This is also typical of traditional tackle twill tack-down stitches.

This type of corner is also common on small lettering.

Corners On Singleline Elements



Singleline column elements have a “Corners” property. This object properties submenu will allow you to choose how that element handles corners.

You can choose to have the corners cap or miter. With miter, you have the option of type 1 or type 2. Type 1 is the miter that comes to a point. It is the first example of a miter shown above. The example shown under “variations” is a type 2 miter.

With the cap and the miter, you can choose at what angle the special corner should occur. You can also choose an overlap amount.

The “Corners” property is available in the higher levels of DesignShop.

Stitches Too Small

Some designs may contain elements with stitches that are too small to sew reliably well.

DesignShop will begin filtering out every other stitch that falls below five points in length. This will help alleviate the issue, but it may not solve it completely.

Look for the following if your design has thread breaks on thin outlines or small elements or lettering.

- Stitch Size vs. Needle Size
- Thread Breaks On Small Satin Stitches
 - Edit the Smaller Areas Manually
 - Use Pull Offset to Lengthen Stitch Lines
 - Use Minimum Column Width to Prevent Thread Breaks

- “Short Stitches”
- Thread Breaks on Walk Stitches
 - Use Fewer Input Points



Measurement Units - What's a Point?

Measurement Units - What's a Point?

Points are a very fine unit of measure found in the embroidery industry and represent a tenth of a millimeter.

For a reference:

- 10 points = 1 millimeter
- 100 points = 1 centimeter
- 254 points = 1 inch

Stitch Size vs. Needle Size

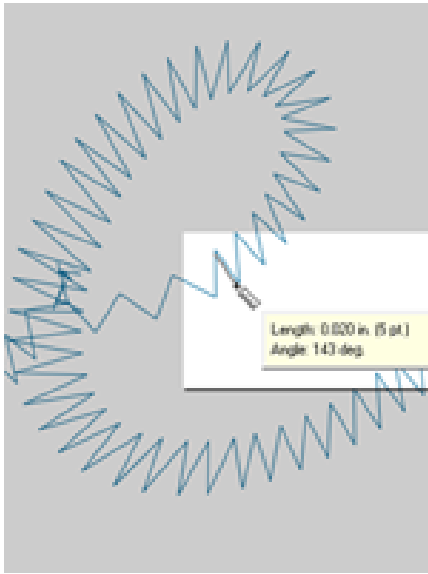
As a general rule, it is best to keep stitch lengths longer than the diameter of the needle you are using to sew them. Because most needles are between 7 and 8 points in diameter, for most applications and designs, try to keep stitches 10 points long or longer.

Ideal minimum stitch lengths would be:

- Walk Stitches ≥ 15 points
- Satin Stitches ≥ 10 points
- Fill Stitches ≥ 20 points

These values may be altered if the application or design dictates, but they are good general minimums.

Thread Breaks On Small Satin Stitches



If thread breaks are occurring on small satin stitches or on small lettering, it could be that your stitches are smaller than the needle that you're using. This can cause some thread breaks. To find this problem areas, use the ruler tool in DesignShop to measure the stitches in the thinnest satin stitch areas. If you find that the stitches are less than ten points or one millimeter wide, you will most likely need to address that area.

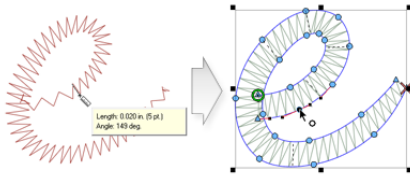
Widen the smaller stitch areas to better accommodate the needle and sew with few thread breaks. This can be done a few ways.

- Edit the small areas to widen the stitches.
- Use Pull Offset to widen the stitches.
- Use minimum column width to prevent any satin stitch from falling below the specified amount.

Edit the Smaller Areas Manually

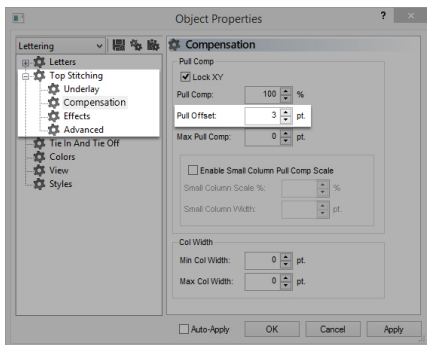
The smaller area of stitches may be edited manually. If the file is an OFM or in wireframe format, you can edit the edges of the wireframe elements to allow for longer stitches.

Use the ruler tool to find the smaller areas of the design. Then, using wireframe edit mode, move the input points to widen the column and lengthen the stitch lines.



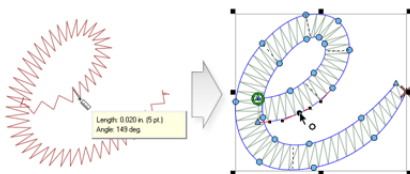
Use Pull Offset to Lengthen Stitch Lines

To modify larger areas of designs, it might be more helpful to use pull offset. Pull offset is found in object properties under the “Pull Comp” sub-menu.



Pull offset extends the stitch lines of an element by adding the specified amount to each side. If the element was 5 points wide at the thinnest point, a “3” could be entered into the pull offset field to extend the stitch lines by three points on each end. This would create an element that at the thinnest point is now 11 points wide and thick enough to sew without breaking a thread.

Because pull offset extends each end of the stitch line, adding 3 to each side of a 5-point satin stitch will give you an 11-point satin.

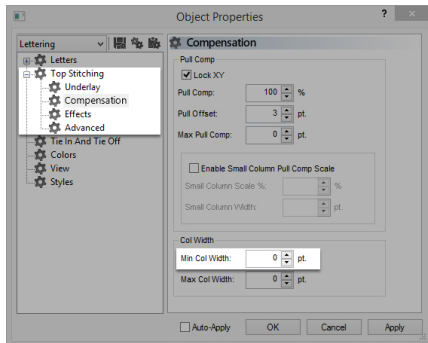


Use Minimum Column Width to Prevent Thread Breaks

Another way to prevent tiny satin stitches from giving you thread breaks is to use the “Minimum Column Width”. This feature will prevent any multi-stitch line element (columns or fills) from creating a stitch less than the specified amount.

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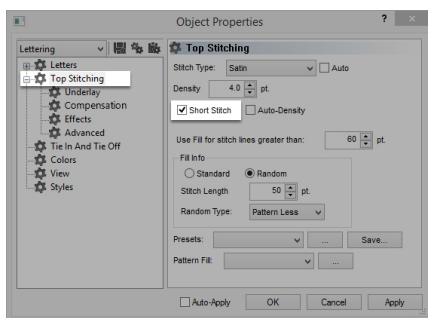
Found in object properties under “Compensation”, placing a “10” in the “Min. Col. Width” field can help prevent thread breaks on more questionable designs.



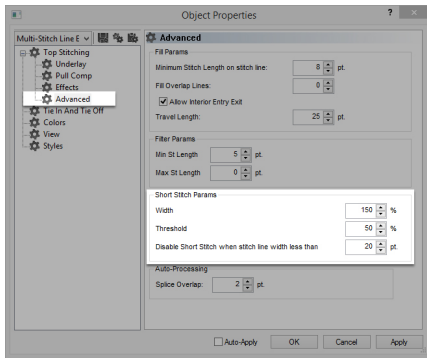
“Short Stitches”

“Short Stitches” is a feature that alternates the length of stitches on the inside of curves and sharper angles. It is meant to prevent thread breaks, thread build up, and damage to garments in those tighter areas.

Newer versions of DesignShop have this feature on by default.



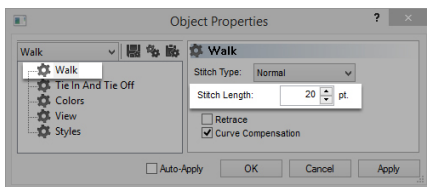
While this feature is beneficial most of the time, it can cause stitches that are too small in smaller lettering or narrow satin stitches. For that reason, since DesignShop V9, a new parameter has been added to the short stitch properties. It will automatically disable for stitch lines shorter than a specified amount. This is set to 20 points by default and should work well for most designs. These parameters can be found under the “Advanced” sub-menu.



With designs saved in older versions of software, these parameters may need to be checked.

Thread Breaks on Walk Stitches

If walk stitches are the problem area of a design, it could be that the stitch length is just set too short. Try to avoid a stitch length of less than 15 points.



Use Fewer Input Points

Probably the most common cause of thread breaks on walk stitch elements from digitizing is using too many input points in a small area. Every input point that is created also creates a needle penetration.

Many new digitizers try to use more input points to help a walk input element follow a line in the artwork. Try to use fewer points to create the same shape. It will decrease the stitch count, allow the design to be more easily edited, and help prevent stitches that are shorter than the diameter of the needle.

Also, try to keep at least 10 points (1 mm) between the input points.

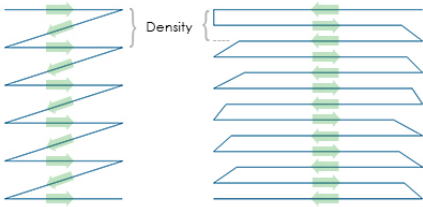
Troubleshooting Density

The density of the stitches in a design can also lead to thread breaks. This usually occurs from one of the following.

- Density Setting is Too Tight
 - What is an Ideal Density Setting?

- Too Many Layers of Stitches
- Needle Penetrations are too Concentrated
 - Stitch Proximity Plot
 - Stitch Proximity Filter

Density Setting is Too Tight



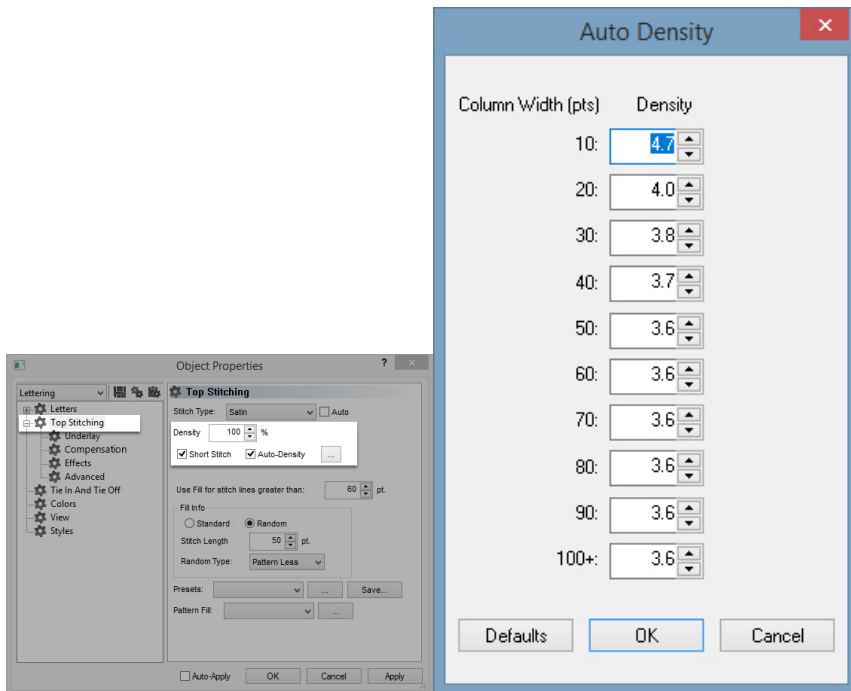
The density setting in DesignShop represents the distance between stitch lines going the same direction. In some ways, it may be helpful to think of it as stitch spacing. The larger the number is, the farther apart the stitch lines will be.

If the stitches are too close together, it can cause friction and thread breaks as well as causing rippling and poor sew quality.

What is an Ideal Density Setting?

Density settings will need to be changed to accommodate different stitch types and applications. Finding an appropriate setting may take some experimentation. Good starting points are found in the software.

For satin stitches:



Consider using “Auto Density”. Auto density is a setting that will vary the density based on the length of the stitch lines. The longer a stitch is, the more it stays up out of the material. For that reason, longer stitches or wider columns often require tighter densities with the stitches closer together. This keeps the stitches even and looking nice.

For fill stitches:

One density setting should work well throughout a fill. Fill stitches are usually comprised of a series of identical stitch lengths. A standard density setting of 3.8 points should work fairly well as a starting point for most fills. This setting may need to be adjusted for different stitch lengths, fill patterns, and applications.



Information

Specialty threads and applications often require altering density settings. The manufacturers' websites are good places to find recommended design and sew settings.

Too Many Layers of Stitches

Building up multiple layers of stitching can also lead to density issues. Too many stitches packed into one place can create a tough or stiff patch of stitches. This will often lead to friction and thread breaks as another layer of stitching is applied on top.

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In designs that require layers of stitches, each layer will need to have a lighter density setting so that when all the layers are built up, they reach an overall stitch density close to that of a single normal fill.

Needle Penetrations Are Too Concentrated

If multiple design elements line up in one area, it can create a concentration of needle penetrations. This concentration can create holes in a garment as well as thread breaks.

Avoid overlapping design elements with needle penetrations that are concentrated in a small area.

Stitch Proximity Plot

DesignShop can plot out the needle penetrations and color code the concentrations. To use this tool, go to Tools > Filter > Stitch Proximity Plot.... Then, hide the stitches in your design. Behind the design you will see the proximity plot. It resembles a weather map. The dark areas are your possible trouble areas, and the lighter areas should give you little trouble.

Stitch Proximity Filter

The Stitch Proximity Filter will slightly adjust the needle penetrations in the most concentrated areas to help alleviate the troublesome areas in a design. To use the filter, go to Tools > Filter > Proximity Filter....



Caution!

Using this filter will convert all wireframe data to expanded data, making future editing or scaling difficult.

27.3. Troubleshooting Application Thread Breaks

Different sewing applications may cause thread breaks and other sew quality issues. Look for the following when diagnosing an application problem.

- Embroidering Abrasive or Coated Materials
- Is the Needle Size Appropriate for the Design?
- Is the Backing Appropriate for the Material?
- Is the Design Appropriate for the Material?
- Are You Using Adhesives?
- Is the Garment Hooped Properly?
- Are You Using Specialty Threads?

Embroidering Abrasive or Coated Materials

Course or rough materials can cause friction on the thread and create thread breaks. Using a larger needle will create a bigger hole and reduce the friction on the thread. This can be helpful on materials like heavy canvas or cotton duct.

On abrasive materials, use a larger needle like an 80/12 to alleviate thread breaks.

Coated and water-resistant materials like some computer bags can heat up a needle and begin to melt as the needle moves through the material. This melted material can gum up a needle making it more prone to thread breaks and more difficult to rethread.

Using a titanium-coated or non-stick needle can help prevent thread breaks on these coated materials.

Is the Needle Size Appropriate for the Design?

If your design contains a significant amount of finer detail work, the smaller stitches can result in thread breaks if they are smaller than your needle.

Using a smaller needle like a 70/10 or 65/9 can help with small lettering and fine details.

Is the Backing Appropriate for the Material?

Sewing without proper support can reduce sew quality and increase thread breaks.

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Choose a backing that is appropriate to the material and design you are embroidering.

Lighter, stretchy, and flimsy materials may require a more substantial cut-away type of backing. More stable materials can utilize tear-away type backings.

Design size and density may also need to be considered when choosing a backing. Heavier stitch counts in smaller areas will require a more stable backing.

Is the Design Appropriate for the Material?

While the majority of standard garment material will support the majority of embroidery designs, the design / material relationship is one that must be considered.

Consider the difference in embroidering a 10-inch, 50,000 stitch design on a jacket back and then on a t-shirt. The jacket back would have a far better sew quality with that number of stitches in that space. The t-shirt would likely pucker and curl under the embroidery.

Make sure that the material and backing can support the design OR make sure the design settings are appropriate for the material.

If you are embroidering on a lighter material, try using lighter densities and placing fewer stitches on the garment.

Are You Using Adhesives?

Adhesives can certainly gum up the works when it comes to embroidery. These sticky helpers keep appliqué and backing in place, but they can build up on the needles and cause thread breaks.

Avoid using adhesives if possible. If the job requires the use of adhesives, use the minimum amount you can. Using a titanium or non-stick needle can prevent the adhesive buildup and consequent thread breaks.

Is the Garment Hooped Properly?

How a garment is hooped will affect how the material runs in the machine. If hooped poorly, the material may bounce or “flag”. This can create odd thread dynamics and produce thread breaks as well as registration loss and overall poor sew quality.

Sewing with loose hoop arms can create similar results.

Use a hoop that fits as closely to the design as possible. Properly adjust the hoop tension, and ensure that the hoop arms are securely attached.

Are You Using Specialty Threads?

Specialty threads often require specific needles and digitizing to sew smoothly.

Consult the manufacturer's website for specifics on sewing specialty threads.

27.4. Troubleshooting Machine Caused Thread Breaks

Cleaning Under the Needle Plate

Thread trimmings and lint buildup can cause thread breaks and misstrims. Cleaning beneath and ensuring that the needle plate is centered can prevent these frustrations.

- Cleaning Under the Needle Plate
- Center the Needle Plate

Cleaning Under the Needle Plate

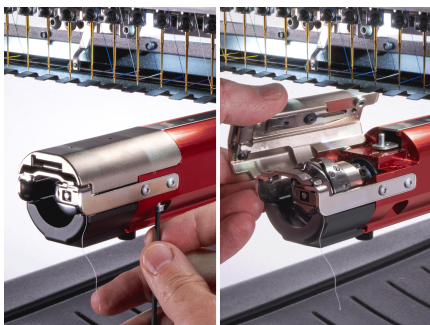
1. Remove the bobbin case.



2. Remove the rotary hook guard by loosening the thumb screw securing the hook guard and sliding it away from the machine.



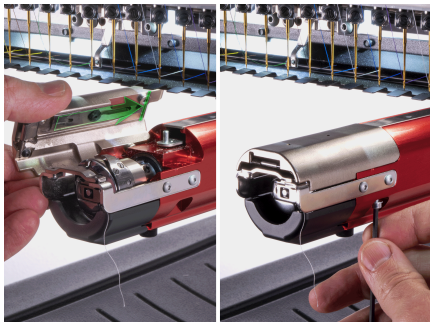
3. Remove the needle plate by removing the two allen screws that secure it.



4. Using compressed air or a brush, remove any thread or lint buildup from the area.

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5. Reinstall the rotary hook guard.
6. Reinstall the needle plate. Ensure that the blade is in the far back position before installing.



Warning!!

The needle plate must be installed with the trimmer in the far back position. If it is installed with the trimmer in any other position, damage to your machine can occur. The hole in the back of the knife must fit over the pin in the lower arm.

Center the Needle Plate

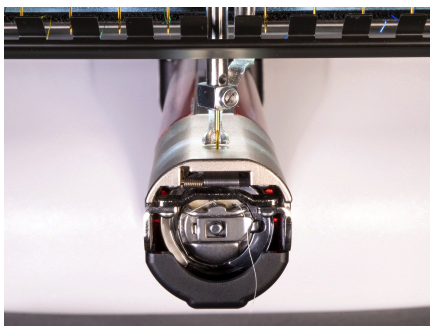
1. Center the needle plate as best you can by feel and by eye.
2. Lower the needle to its bottommost rotation.
 - This can be done manually by pressing the e-stop and rotating the z-shaft to control the descent of the needle,
 - OR by tapping the  Presser Foot button
 - OR by going to  Maintenance and then the  Head Timing screen. Then tap on  Bottom Center.





Warning!!

Either software option will bring the needle down very quickly. If the needle plate is installed with the trimmer in the wrong position or if the needle plate isn't roughly centered, damage to your machine can occur.

3. With the needle lowered, loosen the screws securing the needle plate, and center the hole in the needle plate around the needle.



4. Tighten the screws securing the now-centered needle plate.
5. Depending on the method used to lower the needle, raise it back up by releasing the E-stop or by tapping on  Head Up and  Confirm to exit.

Pinch Rollers Need Maintenance

The most common sign that pinch rollers need maintenance is that the thread will walk to the side of the roller and create a “bird’s nest”. This is typically flagged by the software as a thread break, but when you look at the top thread, it doesn’t appear to be broken. However, when you look under the cloth, you find a mass of thread under the needle plate.

Maintaining these rollers is part of the normal maintenance timers, but if you are experiencing trouble with bird-nesting, clean and grease the rollers.

Cleaning & Greasing the Pinch Rollers

To clean and grease the pinch rollers,

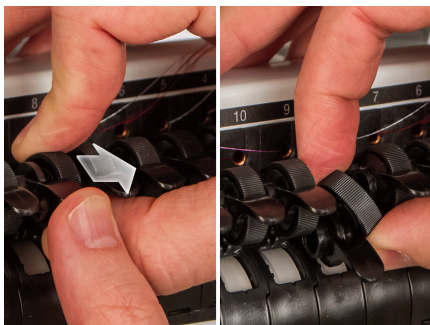
1. Lift the thread feed arm.



2. With one hand, steady the lever. With the other hand, pull the pinch roller to the right and off of the hub.

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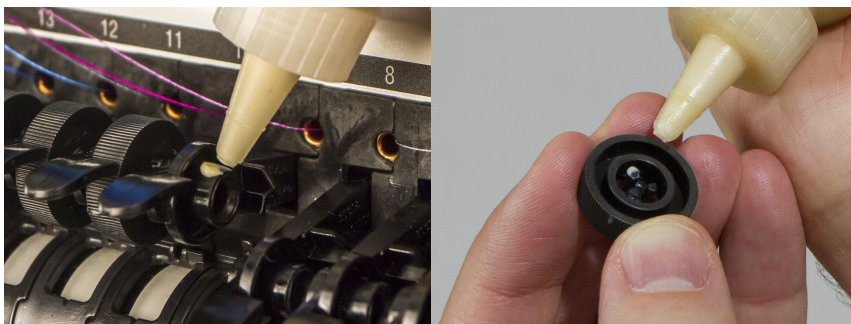
3. Next, with the roller tilted, pull the arm slightly to the left and pull the roller straight out from the machine. The arm has a small amount of flex to it, but if pulled too far to the left, it can be damaged.



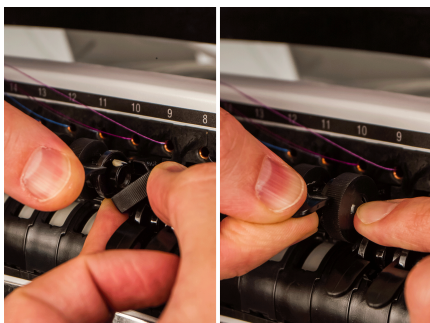
4. With a soft cloth, clean both the hub and the pinch roller. Take care to avoid getting grease on the pinching surface of the roller.



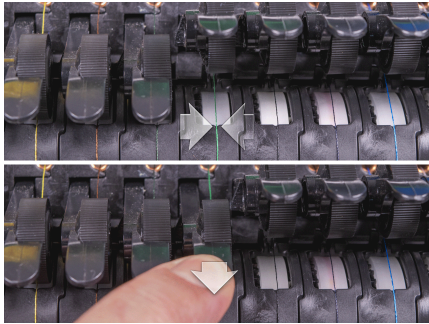
5. Apply EMB Polymer grease to the top surface of the hub and on the outer surface of each of the three tabs inside the pinch roller.



6. Reinstall the pinch roller.



- With the roller tilted, pull the arm slightly to the left and reinsert the roller straight into place.
 - Tilt the roller back up. Gently rotate the roller to help spread the grease before snapping it into place.
 - Press the roller to the left to snap it into place.
7. Line the thread up with the v-notch on the thread feed gear cover and press the pinch roller arm back down.



Rotary Hook Support Adjustment

The rotary hook support may need to be adjusted if a garment gets caught in the rotary hook or if it is struck too forcefully with a hoop as the hoop is being loaded onto the machine. It may also need to be adjusted if the screws securing it are accidentally loosened.

If the rotary hook support gap is too large or too small, it will cause sewing issues.

To inspect and adjust the rotary hook support gap, you will need the Hook Retaining Finger Gauge (PN:009027-01).

Inspect the Rotary Hook Support Gap

1. Remove the bobbin case.

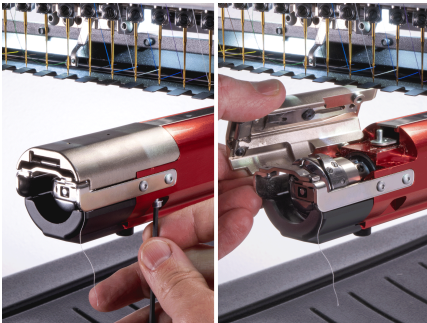





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2. Remove the rotary hook guard by loosening the thumb screw securing the hook guard and sliding it away from the machine.



3. Remove the needle plate by removing the two allen screws that secure it.



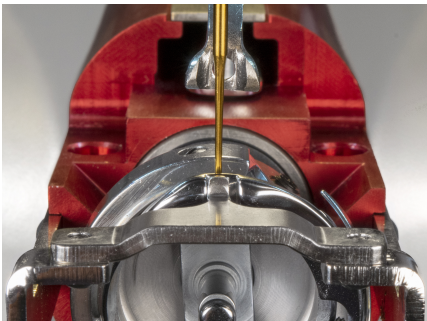
4. In the software, go to  Maintenance and then the  Head Timing screen. Then tap on  Bottom Center.





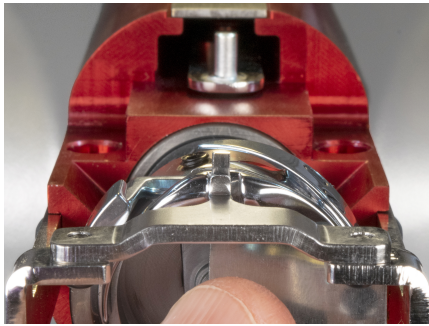
Warning!!

This will bring the needle down very quickly.

5. Inspect the left-to-right position of the hook support as it aligns to the needle. It should be center left to right. If not, it may be necessary to form the hook support to the correct alignment. If this is not possible, you may need to replace the hook support.



6. Once the left-to-right position of the hook support is correct, tap on  Head Up and  Confirm to exit.
7. Insert the retaining finger gauge between the hook support and the hook basket.



Warning!!

If the gauge does not slide in easily, do not force it. You may scratch the highly polished surface of the hook support or hook basket, resulting in thread breaks.

9. The retaining finger gauge should slide between the hook support and the hook basket with no resistance. The gap between the hook support and the hook basket should be no more than 1.1 times the thickness of the gauge. (The gauge is 0.020', and the tolerance is +/- 0.002')
10. The tip of the hook support should be flush with the top of the hook basket.
11. If the adjustment is not correct, adjust the rotary hook support with the procedure below.

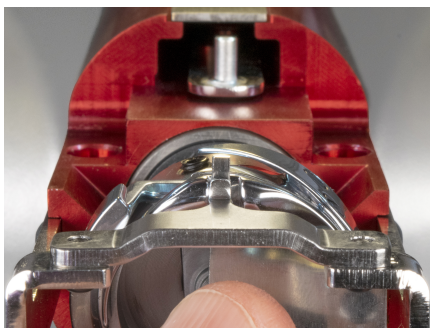
Adjusting the Rotary Hook Support

1. Use a hex wrench to loosen the two screws toward the front of the machine holding the hook support. (1.5mm hex)
2. Insert the gauge between the hook support and the hook basket.



3. Adjust the position of the hook support to the requirements from the inspection procedure above.
4. Remove the gauge while holding the position of the hook support. Make sure that the tip of the hook support is no higher than the hook basket.

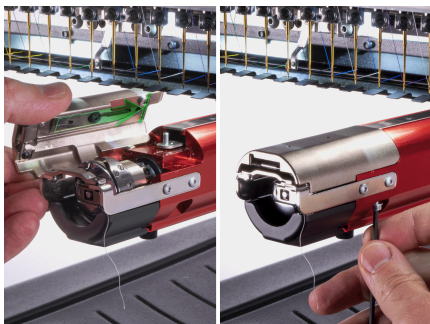
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5. Tighten the screws holding the hook support.
6. Verify that the gauge still slides freely between the basket and the hook support.
7. Reinstall the rotary hook guard.



8. Reinstall the needle plate. Ensure that the blade is in the far back position before installing.







Warning!!

The needle plate must be installed with the trimmer in the far back position. If it is installed with the trimmer in any other position, damage to your machine can occur. The hole in the back of the knife must fit over the pin in the lower arm.

9. Center the needle plate as above.

27.4.1. Center the Needle Plate

1. Center the needle plate as best you can by feel and by eye.
2. Lower the needle to its bottommost rotation.
 - This can be done manually by pressing the e-stop and rotating the z-shaft to control the descent of the needle,
 - OR by tapping the  Presser Foot button
 - OR by going to  Maintenance and then the  Head Timing screen. Then tap on  Bottom Center.





Warning!!

Either software option will bring the needle down very quickly. If the needle plate is installed with the trimmer in the wrong position or if the needle plate isn't roughly centered, damage to your machine can occur.

3. With the needle lowered, loosen the screws securing the needle plate, and center the hole in the needle plate around the needle.



4. Tighten the screws securing the now-centered needle plate.
5. Depending on the method used to lower the needle, raise it back up by releasing the E-stop or by tapping on  Head Up and  Confirm to exit.