

SWIFT

Quick Start Guide

Miami Headquarters

Ricoma International Corporation
11555 NW 124 Street, Miami, FL 33178

☎ (305) 418-4421 | Toll Free: 1 (888) 292-6282

☎ Fax: (305) 418-5036

🌐 www.ricoma.com

✉ info@ricoma.com



Contents

- Getting Started: Machine Overview..... 01**
 - Machine Inventory 01
 - Package Contents.....01
 - Toolbox Contents.....01
 - Core Components 02
 - Machine Installation02
 - Frame Assembly..... 02
 - Adjust Control Panel Position 03
 - Raise Thread Stand..... 04
 - Power on & Start Up 04
- Threading Operation 05**
 - Replace Spool05
 - How to Change the Thread Spool 05
 - Thread Needle05
 - Needle Threading Method 05
 - Full Machine Threading.....05
 - Raise the Thread Stand 05

Install the Thread Tube.....	06
Place the Thread Spool	06
Start Threading	06
Needle Installation	08
Needle Selection	08
Needle Installation.....	08
Needle Installation Procedure.....	08
Bobbin Installation	09
Bobbin Case Structure	09
Threading and Inserting the Bobbin	09
Embroidery Hoop & Bracket	10
Cap Embroidery Accessories	10
Disassembly and Assembly of the Cap Frame Driver.....	11
Installation of the Cap Frame Mounting Base	11
Flat Embroidery Hoops and Brackets.....	12
Installation of the Hoop Arm	12
Removing the Hoop Bracket	13

Attaching the Hoop.....	13
Detaching the Hoop.....	13
Table Board Installation & Application	14
Installation of the Table Plate.....	14
Using the Flat Embroidery Hoop.....	14
How to Install the Flat Embroidery Hoop.....	14
Flat Embroidery Hoop Installation Method	15
Fabric Hooping.....	16
Centering the Left Chest Logo.....	16
Left Chest Logo Positioning.....	16
Hooping Recommendations / Tips for Hooping	16
Hooping Flat Garments.....	17
Hooping Caps.....	17
Hooping with Round Embroidery Hoop	18
Maintenance	18
Every 8 Hours	18
Weekly Maintenance	19
Biweekly Maintenance	19

Annual Maintenance.....20

Common Troubleshooting.....20

Thread Breakage Troubleshooting20

Needle Replacement.....21

Bobbin Thread Depletion21

 Emergency Stop Alarm 21

 Color Change Malfunction 22

 Main Shaft Not at 100° 22

 Manual 100° Shaft Calibration 22

 Rotary Hook Timing 22

Thread Tension23

Tension Testing.....23

Top Thread Tension Adjustment: Tension Spring Lever24

Top Thread Tension Adjustment: Tension Knobs.....25

 Factors Affecting Upper Thread Tension 25

Bobbin Thread Tension25

 Factors Affecting Bobbin Tension 26

Thread Breakage Issues26

Causes of Thread Breakage26

Thread Breakage Prevention.....27

Thread Breakage Troubleshooting27

Needles28

Needle Structure28

Needle Life28

Causes of Needle Breakage.....28

Needle Specifications29

Needle Coating.....29

Needle Point Types30

 Difference Between Sharp and Ball Point Needles..... 30

Needle and Thread Compatibility 31

Embroidery Thread 31

Thread Consumption..... 31

Bobbin..... 31

 Bobbin Side Types 32

Bobbin Thread Material Selection.....32

 Cotton Thread 32

 Nylon Thread 32

 Filament Polyester 32

 Spun Polyester 32

Top Thread Material Selection33

 Rayon Thread 33

 Polyester Thread..... 33

 Cotton Thread 34

 Metallic Thread..... 34

Backing35

 Backing Color35

 Backing Weight35

 Common Backing Weights 35

Types of Backing35

 Cut - Away Backing..... 36

 Tear - Away Backing 36

 Water - Soluble Backing 36

 Topping 36

 3D Foam..... 36

Polyester Mesh Backing 36

Heat - Bonded Backing 37

Embroidery Craft Techniques37

Special Embroidery Frames.....37

 Magnetic Embroidery Frame..... 37

 8-in-1 Device 37

 Hoop Positioning Plate 38

Cap Embroidery38

 Key Points in Cap Selection 38

 Key Points in Cap Embroidery Operation..... 38

 Digitizing and Punching Tips for Cap Embroidery 39

Operating Speed: Cap Embroidery vs. Flat Embroidery.....39

Hoop Positioning Reference Standards39

 Recommended Operating Speeds 39

 Beach Towel 39

 Bath Towel 40

 Hand Towel 40

 Fingertip Towel..... 40

 Washcloth 40

 Napkin 40

 Pillowcase 40

Bed Sheet	40
Men's Bathrobe	40
Women's Bathrobe.....	40
Backing and Needle Recommendations by Fabric.....	40
Canvas	40
Polyester Velour	41
Coated Fabric / Waterproof Fabric.....	41
Corduroy	41
Cotton Plain Weave.....	41
Denim	41
Dress Shirt (Woven)	41
Golf Shirt	41
Hat Fabric	41
Leather & Synthetic Leather	41
Underwear & Intimate Apparel / Silk	41
Lycra / Spandex Stretch Fabric	42
Nylon Windbreaker Jacket	42
Knitted Sweater.....	42
Athletic Hoodie.....	42
T-Shirt	42
Terry Cloth / Looped Fabric	42

Getting Started: Machine Overview

Machine Inventory

■ Package Contents

	
Embroidery Hoops × 11	
	
Flat Embroidery Hoop x 1 (optional)	Cap Ring x 1
	
Cap Base x 1	Cap Drive Unit x 1
	
Hoop Armrest x 1	Power Cable
	
Ethernet Cable	Toolbox & Starter Accessory Kit

■ Toolbox Contents

		
Embroidery needle x 1	Thread Cutter x 1	Double-ended Wrench x 3
		
Phillips screwdriver x 1	Flat screwdriver x 1	9-Piece Hex Key Set
		
Needle nose pliers	Mini oil can	Sewing machine oil
		
USB Flash Drive	Bobbin Case	Cleaning brush
		
Spare parts include but are not limited to: screws, springs, connecting rods, needle bar guide sleeves, threaders, bobbins and other accessories.		

■ Core Components

	Lower Frame This embroidery machine is equipped with a load-bearing frame to support the unit during embroidery. Assemble the frame before use if needed. If the frame is not assembled, place the machine on a sturdy horizontal surface with ample operating clearance for embroidery work.
	Touch Screen Control Panel The machine is equipped with a touch screen for full operation. Adjust the touch panel to your preferred viewing angle prior to machine operation. For more details on panel functions, please refer to the Control Panel Overview chapter.
	Thread Stand The thread stand holds embroidery spools and guides thread routing. Always lift up the thread stand before threading.
	Emergency Stop Button Press the emergency stop button at the lower-left of the control panel in case of emergency. To restart, rotate the knob clockwise until it pops up, then resume operation.
	Head Indicator Light The head indicator light is located at the upper right of the machine head. It lights green during normal operation. The light flashes red if the thread breaks while embroidering.

Machine Installation

■ Frame Assembly

Step 1 Install Connecting Plate

- Unpack and remove left and right frame legs, connecting plate, and tools. Remove all protective wrapping and plastic film.
- Place the frame assembly upside down.
- Using hex-head screws with spring and flat washers, install the connecting plate upside down onto the frame leg posts, and tighten with an Allen key.



Step 2: Install Casters

- Remove protective caps from caster screws. Secure each caster to its corresponding mounting hole (located on the horizontal crossbar plane of the left and right frame legs).
- After turning the caster clockwise, use the included open-end wrench to tighten the hex screw.
- Repeat these steps for the remaining three casters.



Step 3: Install Leveling Feet

- Screw down four leveling feet to touch the floor, level the frame and lock firmly. Once leveled, casters will lift off the ground to prevent sliding.



- After all four leveling feet are fully locked, the casters will be lifted off the ground, and the machine frame will no longer move.

Tips

- After frame assembly, ensure the frame is installed vertically and parallel before tightening all screws.

Step 4: Mount Complete Machine

- After all leveling feet and casters are installed, flip the frame upright.



- Finally, place the machine onto the frame, align the machine feet with the mounting holes, and lock with screws. This step is recommended to be completed by 2–3 people.



■ Adjust Control Panel Position

Your touch control panel can be adjusted up, down, left and right. Tear off the protective plastic film before adjusting the position.

How to adjust the horizontal position of the panel

- To move the panel left and right, loosen the torx screw on top of the panel arm.



- Then adjust the panel to the desired angle and tighten the torx screw.

How to adjust the vertical position of the panel

- To move the panel up and down, loosen the torx screw on the side of the panel arm.



- Adjust the panel to the required angle, then tighten the torx screw.

■ Raise Thread Stand

- Turn the knobs on the side of the thread stand support counter clock wise to loosen.



- Lift the thread stand to the highest position and keep both sides level.
- Tighten each knob clockwise to lock the thread stand in place.

📖 Tips

- Lift both sides of the thread stand at the same time to ensure horizontal alignment.

■ Power on & Start Up

- The power socket is located at the rear left of the machine. Connect the power cord to the machine first, then plug into the mains outlet.



Threading Operation

Replace Spool

The following steps explain spool replacement. If the machine is pre-threaded from factory, go directly to Step 3 and Step 4.

■ How to Change the Thread Spool

1. Align the new spool in position; do not remove the existing threaded line.
2. Connect the thread end of the new spool with the thread of the corresponding needle position.



3. Pinch the thread above the presser foot and pull gently until the old thread is fully pulled out. Keep pulling until the knot passes the last guide hole before the needle.



4. Cut the thread directly above the knot. Then thread the end through the needle eye and out under the presser foot.

Thread Needle

Needles are pre-installed at the factory. Refer to the needle installation section for replacement instructions.

■ Needle Threading Method

1. Thread the needle eye from front to back, then pass under the presser foot.
2. Pull the thread upward and clip it into the tension spring. Leave a 1–2 inch thread tail and trim excess.



Full Machine Threading

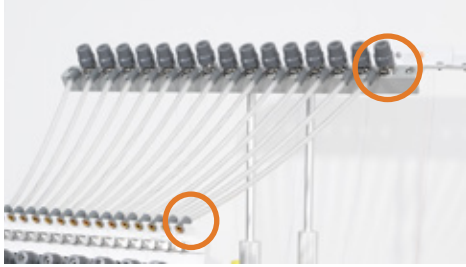
Before threading, raise the thread stand and install spools and guide tubes correctly.

■ Raise the Thread Stand

Refer to the Raise Thread Stand section in machine installation.

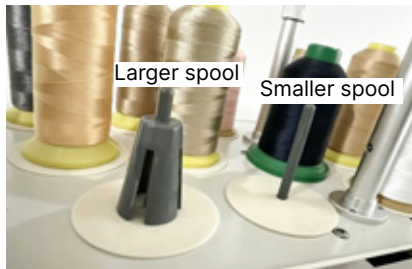
■ Install the Thread Tube

Connect one end of the guide tube to the slot directly below the top tension knob, and the other end to the slot on the machine head. Match upper slots to lower slots in order: 1st upper slot to 1st lower slot, and so on.



■ Place the Thread Spool

1. Remove the packaging from the thread cone.
2. Release the catch at the bottom of the thread cone, free the thread end, and pull the thread out completely from the bottom.
3. Place each thread cone onto its designated spindle in order.



📖 Tips

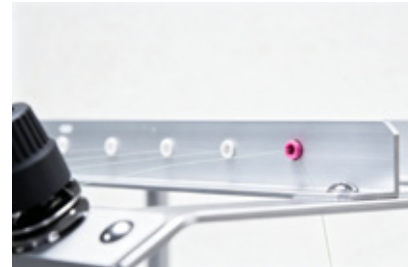
- Do not place spools with similar colors such as black and navy next to each other to avoid color mismatch.

■ Start Threading

Familiarize the threading path: Rear guide hole → Middle rear guide hole → Middle front guide hole → Front stand guide hole.



1. Pass each thread through the upper stand guide holes in sequence up to the top tension knob.



2. Pass the thread through the small guide hole behind the first tension knob. Place the thread between the clips on the right side and lock it into the 3 o'clock position. Correct installation: the metal plate shall clamp the thread tightly.



3. Remove guide tubes on both sides. Use the threader to hook the thread and pass it through the plastic tube, then remove the threader.



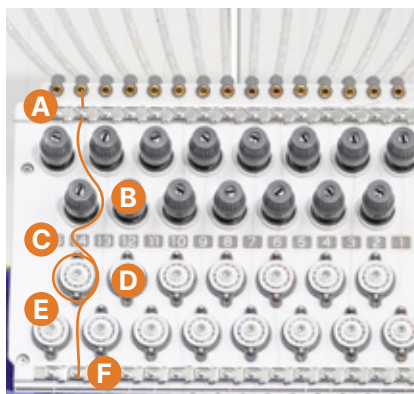
4. Reinstall and align both ends of the guide tubes.

5. Pass the thread through the clip above the tension knob. Gently lift the clip and place the thread inside; do not press hard to avoid damage or wrong threading. **See Point A.**

6. Pull the front cover of the knob toward you and slide the thread to the right. Thread according to needle number. The figure shows No.14 needle path with aligned knob and needle mark. **See Point B.**

7. Locate the post above the thread breakage wheel. Thread in from the left, wrap clockwise one full circle around the wheel, and exit from the left side. **See Path C-E.**

8. Lift the bottom clip, insert the thread from below and clamp tightly. **See Point F.**



9. Lift the middle spring to threading position. Route the thread around the roller from the right and pass through the middle opening. **See Point G.**

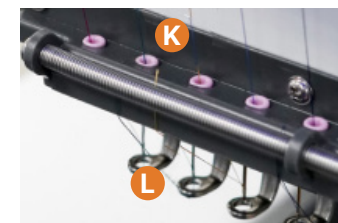
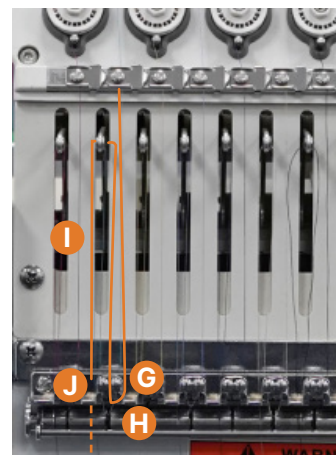
10. Pass the thread through the spring from right to left. **See Point H.**

11. Lead the thread out of the roller, wrap to the left outer side, and pull up to the swing arm. **See Point I.**

12. Pass the thread through the take-up lever hole from right to left. **See Point I.**

13. Thread downward through the ceramic guide hole, then continue to the next one. **See Point J and K.**

14. Thread the needle eye front to back and pass through the presser foot. **See Point L.**



15. Check all needles for neat and consistent threading. Trial embroidery can start after confirmation.

Tips

- If a needle runs out of thread, re-thread following the same path as the adjacent correctly threaded needle.

Needle Installation

Needle Selection

Selecting a suitable needle is the key to ensuring embroidery quality. If the needle size does not match the thread and fabric (too thick or too thin), problems such as thread breakage and skipped stitches are likely to occur.

DBxK5 is the universal standard needle system for embroidery machines. The DBxK5 75/11 sharp needle is suitable for most embroidery scenarios. It features a medium point and a large eye for smooth thread passage and effectively reduces thread breakage.

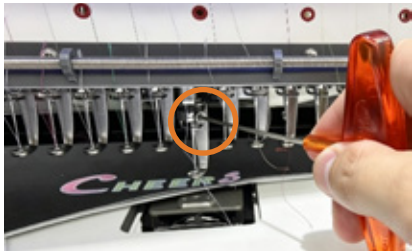
For special embroidery works, you may select other needle specifications according to actual needs. Refer to the Needle chapter to choose the proper needle model matching your embroidery.

Needle Installation

When replacing the needle, keep the long groove facing the machine and away from the operator. Insert the needle fully vertically to the top of the needle bar without tilting. Improper needle installation will cause machine malfunction, or even needle breakage and thread breakage. Refer to the needle schematic diagram.

■ Needle Installation Procedure

1. Use a screwdriver to loosen the needle fixing screw enough to remove the needle; no need to unscrew it completely.



2. Dispose of old needles properly in a puncture-proof container.
3. The needle has a long groove on the front and a short crescent scarf on the back. Install with the long groove facing forward, pass the Tips through the presser foot, and push the shank fully into the needle bar.



4. Confirm the long groove faces forward. Hold the needle steady and tighten the fixing screw.



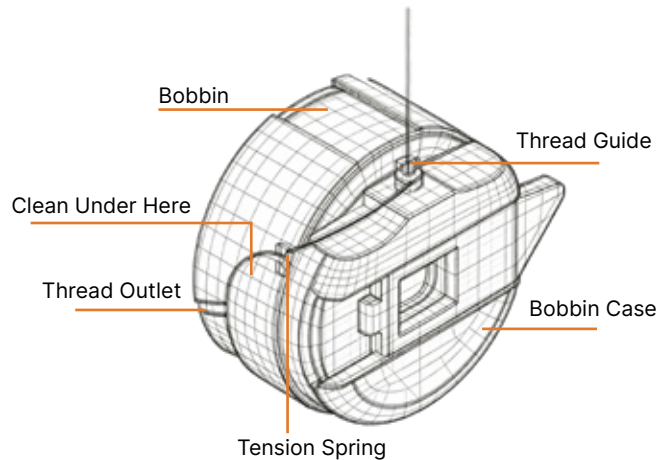
📖 Tips

- Use a wooden toothpick to assist needle positioning during installation. Never use metal objects to avoid scratching the needle eye and causing thread breakage.

Bobbin Installation

Bobbin Case Structure

Before threading and loading the bobbin, refer to the figure to familiarize yourself with all bobbin case parts mentioned in this manual.



Threading and Inserting the Bobbin

1. Lift the latch and pull the bobbin case forward to remove it.



2. Take out the old bobbin if inside the case.

3. Place a new bobbin into the case and ensure thread unwinds clockwise.



Tips

- Flip the bobbin case and pull the thread gently to check installation. The thread and letters on the bobbin should rotate clockwise.

4. Pass the bobbin thread through the slit of the bobbin case.



5. Pull the thread under the tension arm and out of the groove.



6. Wind the thread around the small thread guide on the bobbin case.



7. Lift the latch and reinstall the bobbin case. Keep the thread tail within 3 inches to avoid tangling.

Embroidery Hoop & Bracket

This machine supports flat embroidery, garment embroidery and cap embroidery.

Flat embroidery: dedicated hoops for large-area fabrics.

Garment embroidery: flat-laid clothes such as shirts and coats embroidered with hoop armrests.

Cap embroidery: uses curved accessories matching cap radian.

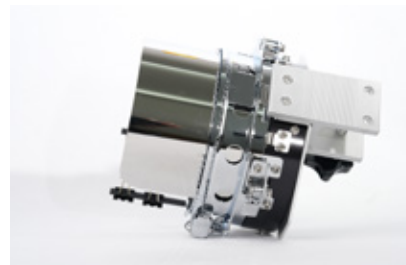
Cap Embroidery Accessories

Cap embroidery requires the matching cap drive bracket, mounting base and cap ring.

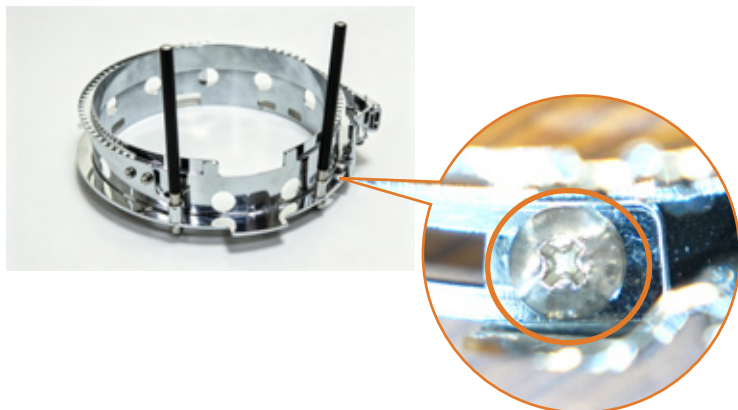
Cap drive bracket: fixed on the machine to secure caps and rings.



Cap mounting base: supports the cap hoop during hooping and can be installed on the frame or table.



Cap hoop: dedicated for caps; adjustable via the side screw according to cap thickness.



Disassembly and Assembly of the Cap Frame Driver

1. Loosen the screws connecting the cap drive bracket to the frame with a Phillips screwdriver.



2. Pull the drive bracket forward with both hands.

Tips

- No need to remove screws completely; it can be detached once loosened on both sides.

Installation of the Cap Frame Mounting Base

1. Select the cap hoop from the preset list on the control panel; the frame will move automatically.

Tips

- Do not install the cap drive bracket before selecting the cap hoop.

2. Remove other hoops first if installed.

3. Install the drive bracket and let the shuttle box pass through the rear opening.

4. Align the four pulleys with the guide rail under the shuttle box.



5. Push the bracket into place and lock into the No.6 slots on both sides.



6. Tighten the Phillips screws to secure the bracket.



Flat Embroidery Hoops and Brackets

The Ricoma SWIFT series is equipped with 11 hoops in six sizes from A to F (A smallest, F largest).

Choose the smallest possible hoop that fits the design without collision. Use the preset hoop function to confirm layout.

Tips

- The smallest suitable hoop provides optimal fabric tension and reduces thread breakage and wrinkling.

■ Installation of the Hoop Arm

Install hoop brackets on the guide rail first for garment embroidery such as shirts.

1. Mount A-E hoops in No.5 and No.6 slots on both sides.

2. Mount F hoop in No.1 and No.2 slots.



3. Clip the armrest bracket into the corresponding slots.

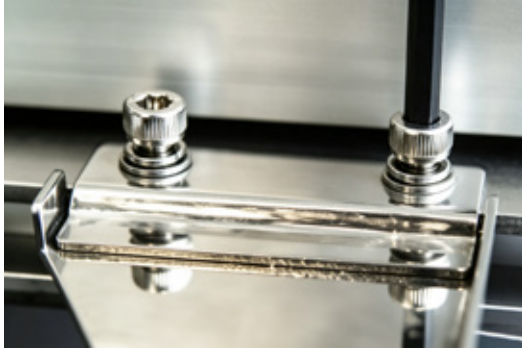


4. Clamp the guide rail between the two metal plates and align screws with slots.



■ Removing the Hoop Bracket

To remove the flat embroidery frame holder: Use a 4 mm Allen key to loosen the screws counterclockwise, release the holder arm, then pull it straight out towards the front of the machine.

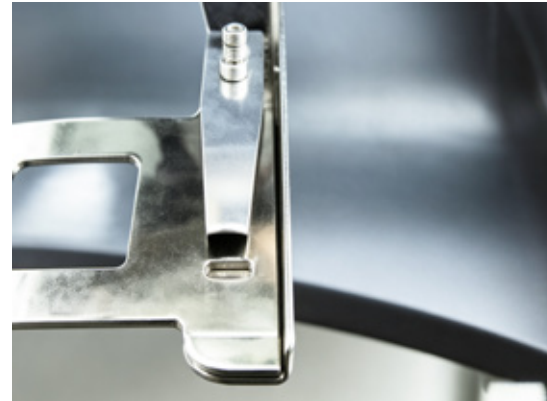


■ Attaching the Hoop

The metal bracket of the embroidery frame can snap under the latch of the frame holder. When correctly loading the frame into the holder, ensure the U-shaped open slot faces the machine side.



Load the embroidery frame into the handle holder, ensuring the frame edge snaps into the groove at the end of the latch. The slot on the frame should securely engage under the latch's protrusion.



■ Detaching the Hoop

Lift the bracket to release pressure and pull out the hoop. New brackets may feel tight at first.

Table Board Installation & Application

Installation of the Table Plate

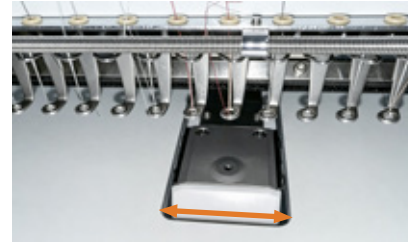
The machine is equipped with a table board for large and thick garments.



1. Slide the table board into the machine and place it steadily on the limit bracket.



2. Align the shuttle box with the opening of the table board.



3. Fix both ends of the table board with Phillips screws after positioning.



Using the Flat Embroidery Hoop

■ How to Install the Flat Embroidery Hoop

1. Lay stabilizer to fully cover the hoop area.



2. Place fabric over the stabilizer to cover the entire hoop.



3. Smooth the fabric and fasten clips on the short sides first.



4. Smooth again and fasten clips on the long sides.



5. Install clips with lugs facing outward.



■ Flat Embroidery Hoop Installation Method

1. Place the hooped hoop on the table board and fix excess fabric backward.



2. Mount the hoop to the last two slots and tighten screws.



Fabric Hooping

Centering the Left Chest Logo

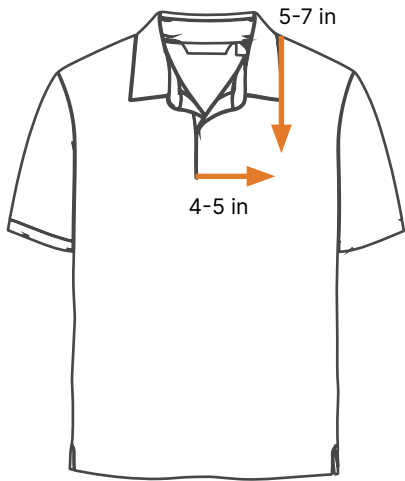
Before hooping a garment, you must first determine the appropriate position for the design. To determine the placement, first find the center point of the design.

Tips

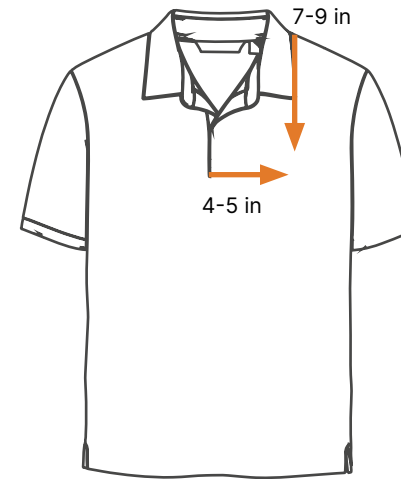
- The center position varies with garment and logo size.

■ Left Chest Logo Positioning

Ladies: Mark 5–7 inches below shoulder-neck joint and 4–5 inches from center line; set center at intersection.



Men's Style: Mark 7 – 9 inches below shoulder-neck joint and 4 – 5 inches from center line; set center at intersection.



Tips

- Position the logo closer to the front placket rather than the armhole.
- Mark the center with tailor chalk, water-soluble pen or masking tape.

■ Hooping Recommendations / Tips for Hooping

Correct hooping is the most fundamental and important step in embroidery. When hooping, refer to the following key points:

- Use the smallest hoop that fully covers the pattern.
- Use proper stabilizer to stabilize fabric and prevent stretching.
- Keep fabric smooth, wrinkle-free and properly tensioned; re-hoop if loose.
- Keep fabric tight; square hoops grip only at corners while round hoops have even pressure.
- Do not stretch fabric forcibly to avoid wrinkling and position deviation.

■ Hooping Flat Garments

1. Place lower hoop inside the garment with adjusting screws toward the hem.
2. Cover the entire lower hoop with backing stabilizer.
3. Align and press the upper hoop into the lower one.
4. Keep fabric smooth and taut without overstretching; qualified if hard to lift.



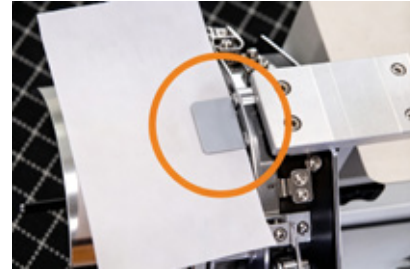
5. Flip the garment to confirm full stabilizer coverage; re-hoop if needed.

■ Hooping Caps

1. Align and lock the cap hoop onto the base into three spring latches.
2. Release the metal strap and place it on the left side.
3. Flatten the cap brim and untie the back strap.
4. Fold the sweatband fully backward.



5. Place stabilizer under the cap guard.



6. Fit the cap onto the hoop with sweatband under the guard.

7. Place the flexible metal strap over the brim with serrated edge close to the edge.



8. Fasten the buckle and tighten the cap side without wrinkles.



9. Secure excess fabric with clips facing toward the cap center.



■ Hooping with Round Embroidery Hoop

1. Use Type A or Type B embroidery hoop.
2. Find a flat surface with the same width as the selected hoop. A table corner can be used as a reference. Place the lower hoop on the flat surface.
3. Place the stabilizer on top of the lower hoop. It is recommended to spray adhesive on the stabilizer or use self-adhesive stabilizer.
4. Place the cap on the lower hoop and stabilizer.
5. Smooth the fabric and remove all wrinkles.
6. Place the upper hoop over the fabric and align it with the lower hoop.
7. Fasten and lock the upper and lower hoops following the flat garment hooping method.

Maintenance

Many embroidery machine faults are caused by improper daily maintenance. Proper upkeep is essential to extend the service life of the machine. Use dedicated sewing machine oil (available at most sewing and embroidery supply stores) and white lithium grease (available at hardware stores) for maintenance. Before using any alternative products, consult technical staff to confirm compatibility with the equipment.

Every 8 Hours

Remove the bobbin case. Clean the rotary hook with a soft brush, filtered air pump, or standard compressed air duster (such as Dust Off).



Add 2–3 drops of sewing machine oil to the joint edge of the rotary hook and bobbin case.



Remove the bobbin case again and clean the entire rotary hook area using a soft brush, dehumidified air compressor, or compressed air duster.



Weekly Maintenance

Remove the needle plate above the shuttle box, and clean the area around the thread trimmer with a soft brush, filtered air compressor, or compressed air duster.

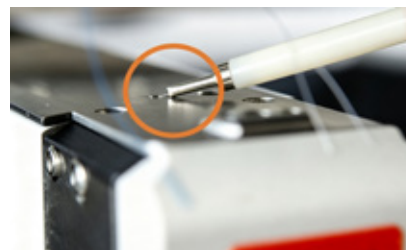


Use the edge of a business card or spare bobbin thread to clean lint from the gaps of the bobbin case. Do not blow with your mouth to avoid saliva contamination.



Biweekly Maintenance

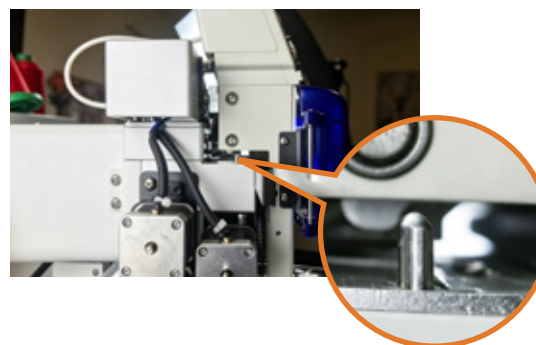
Add 2–3 drops of sewing machine oil to the front and rear oil holes of the shuttle box needle plate.



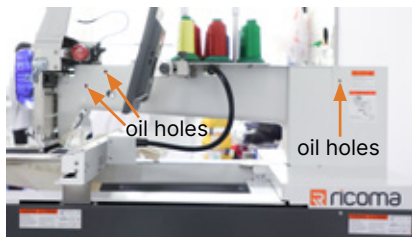
Add 2–3 drops of sewing machine oil to the guide plate.

Tips

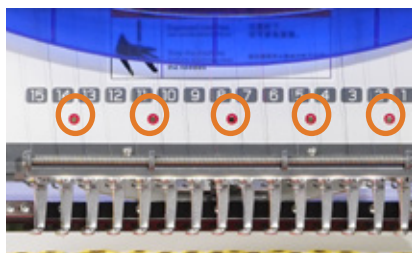
- Move the machine to the last stitch position before oiling. The oil holes are located on the front of the T-rail, directly behind the screws.



Add 2–3 drops of sewing machine oil to each of the three red oil holes on the right side of the machine.



Add 1–2 drops of oil through the hole on the metal cover. Note: The sponge pad inside the needle bar cover will automatically absorb the oil.



Annual Maintenance

Apply white lithium grease to the bearings and metal rollers at the rear of the machine head. Move the head from Needle 1 to the last needle to lubricate all rollers evenly.



Common Troubleshooting

Thread Breakage Troubleshooting

When the thread breaks, the machine stops automatically and triggers an alarm. Breakages usually occur under the machine head.

1. Re-thread the needle eye and presser foot from the break point.
2. Clip the thread onto the tension spring and leave about 1 inch of thread tail.



3. Backtrack the pattern by about 5–10 stitches.
4. Press the start button to resume embroidery.

Tips

- Always backtrack after thread breakage. The machine usually makes extra stitches when the thread snaps; backtracking prevents blank gaps in the pattern.

Needle Replacement

Step 1: Remove and Discard Broken Needle

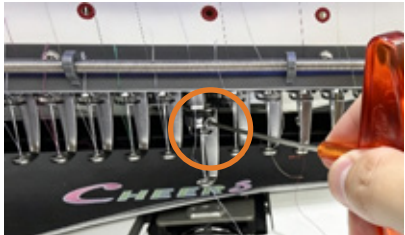
1. Retrieve the broken needle from the garment; if not found, check the shuttle box area.
2. Loosen the needle set screw with a hex key — only loosen enough to remove the needle.
3. Dispose of broken needles in a puncture-proof container.

Step 2: Install New Needle

1. The needle has a long groove on the front and a crescent scarf on the back. Install the needle with the long groove facing forward, pass the Tips through the presser foot, and insert the shank fully into the needle bar.



2. Keep the long groove facing forward, hold the needle steady, and tighten the set screw.



Tips

- A wooden toothpick may be used to assist positioning. Never use metal objects inside the needle eye, as they may scratch and cause thread breakage.

Bobbin Thread Depletion

The machine will stop and alarm automatically when the bobbin thread runs out.

How to distinguish top thread breakage from empty bobbin: If the top thread is still connected to the fabric, the bobbin thread is exhausted.

If so, replace the empty bobbin with a new one and reinstall the bobbin case.

■ Emergency Stop Alarm

The emergency stop alarm is triggered when the button is pressed during transportation or emergencies. To reset, rotate the emergency stop knob clockwise following the arrow mark until it pops up.

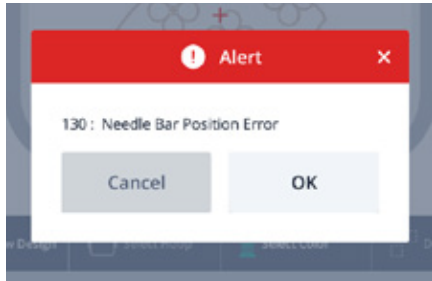


■ Color Change Malfunction

A color change error occurs when the machine cannot detect the correct needle. This usually happens if the head stops between needles or the red knob is accidentally turned.

The control panel will show "0" instead of the actual needle number.

Press Confirm to clear the error, adjust the knob until the correct needle number appears, then resume operation.



Once the needle number displays normally, operation can be resumed.

■ Main Shaft Not at 100°

The main shaft must be calibrated to 100° for normal start and stop. A shaft error appears when not aligned.

Common causes include needle collision with the hoop or tangled bobbin thread (bird nesting).

1. Press the reset key for automatic 100° alignment.



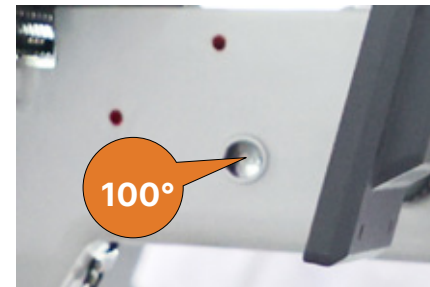
2. Confirm a valid needle number is displayed.

3. Press reset again. If auto calibration fails, use the black knob on the right for manual adjustment. Restart the machine and reset to resume.

■ Manual 100° Shaft Calibration

1. Turn off the machine power.

2. Locate the shaft angle viewing window on the right side.



3. Press and hold the black knob, turn counterclockwise until the pointer aligns with 100°.

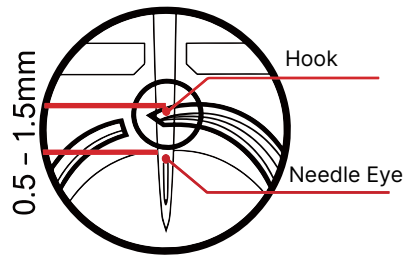
4. Restart the equipment.

5. After the main interface loads completely, press the Reset key on the control panel. The machine will resume embroidery.

■ Rotary Hook Timing

Rotary hook timing refers to the coordination between the hook and needle. Correct synchronization is critical for quality and fault prevention. Excessive gap causes skipped stitches and breakage; too small a gap leads to needle collision and breakage.

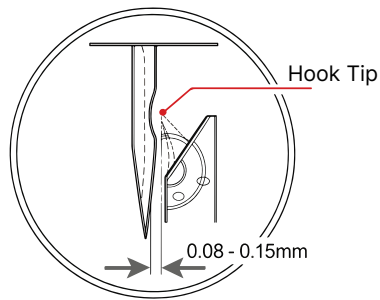
The method for adjusting hook timing: Rotate the main



The method to adjust hook timing is: rotate the machine spindle to a specific angle, and adjust the hook position at this angle. This angle is called the timing angle.

SWIFT model timing angle: 196°

When timed correctly, the hook point aligns perfectly with the needle scarf with a standard gap of 0.08 mm~0.15 mm.



If machine timing needs to be readjusted, please contact Ricoma Technical Support.

Thread Tension

Proper thread tension is a prerequisite for high-quality embroidery. Incorrect thread tension will lead to various embroidery issues. Loose tension causes thread looping on the fabric, while overly tight tension frequently results in thread breakage.

Tension is determined by the complexity of the design, fabric type, embroidery thread, stabilizer material and even thread winding methods. Always check that the machine is correctly threaded before making any tension adjustments.

most cases, abnormal tension is simply caused by improper threading. You can adjust the tension via the following parts:

- Tension spring lever
- Top thread tension knob
- Bobbin case

Tips

- Before adjusting tension with the bobbin case, tension knobs or other components, we recommend adjusting the tension spring lever first. It is the quickest solution, and minor tweaks to the lever can effectively optimize thread tension for embroidery. The lever regulates the overall tension for all needles, while each tension knob only controls the tension of the individual working needle.

Tension Testing

The tension of the bobbin case affects the stitch quality of all needles. The most common and recognized test method is the I-test. Test procedure: Stitch a solid vertical column that is 1 inch (approx. 2.54 cm) high, then inspect the reverse side. For ideal bobbin tension, one-third of the bobbin thread runs straight down the center of the column, with the top thread accounting for the remaining two-thirds on both sides.



- If too much bobbin thread is visible on the back of the stitch across all needles: This indicates the bobbin tension is too loose. Solution: Turn the large screw on the bobbin case clockwise to tighten the bobbin tension.
- If too little bobbin thread is visible on the back of the stitch across all needles: This indicates the bobbin tension is too tight. Solution: Turn the large screw on the bobbin case counterclockwise to loosen the bobbin tension.
- If too little top thread is visible in the stitch across all needles: This indicates the top thread tension is too tight. Solution: Use the tension spring lever to loosen the top thread tension for all needles.
- If too much top thread is visible in the stitch across all needles: This indicates the top thread tension is too loose. Solution: Use the tension spring lever to tighten the top thread tension for all needles.
- If too much top thread is visible in the stitch of a single needle: This indicates the tension for that specific needle is too loose. Solution: Turn the corresponding tension knob clockwise to tighten the tension.
- If too little top thread is visible in the stitch of a single needle: This indicates the tension for that specific needle is too tight. Solution: Turn the corresponding tension knob counterclockwise to loosen the tension.

Top Thread Tension Adjustment: Tension Spring Lever

The spring adjustment lever controls the overall tension for all needles, while the tension knob only controls the tension for the currently working needle.

Depending on the embroidery fabric and design requirements, it may be necessary to adjust the spring lever up or down. It is recommended to keep the spring lever at a 90-degree angle to the embroidery direction.

When adjusting tension, simply move it 1-2 notches up or down from the center position.

When embroidering heavy fabrics, lower the spring adjustment lever. When embroidering lightweight fabrics, raise the spring adjustment lever.

To tighten tension for all needles: Lower the spring lever 1-2 notches.

To loosen tension for all needles: Raise the spring lever 1-2 notches.



Tips

Never set the tension spring lever to its extreme top or bottom position, as this may cause thread breakage. The top position will make the thread too loose for normal operation, while the bottom position will make it overly tight and lead to malfunctions as well.

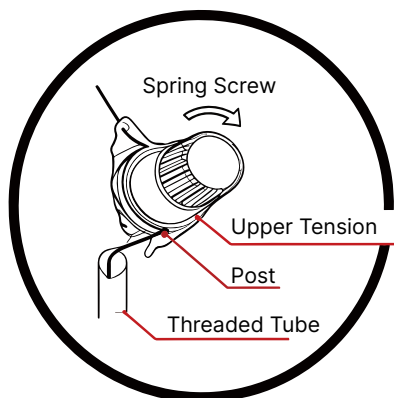


Top Thread Tension Adjustment: Tension Knobs

The optimal tension setting varies by embroidery thread type. Thread material has a noticeable effect on tension, even among products from most mainstream brands. For instance, polyester thread requires nearly twice the tension of rayon thread.

Adjust the tension knobs until you achieve the proper tension for the thread in use.

Top thread tension knobs allow quick tension adjustment for individual needles. See the figure below for reference.



If the upper thread is showing excessively on the back of the embroidery:

Turn the dial clockwise to tighten the upper thread tension.

If the upper thread is showing too little on the back of the embroidery:

Turn the dial counter-clockwise to loosen the upper thread tension.

Tips

- It is recommended to make fine adjustments of only a quarter turn at a time, whether tightening or loosening. This allows you to clearly observe the actual effect of each tension change on the embroidery.

Factors Affecting Upper Thread Tension

- **Thread Color:** The dyeing process can alter the surface texture of the thread, thereby affecting its smoothness through the machine and needle, resulting in tension variations.
- **Thread Thickness:** When changing to thread of a different thickness, the tension must be adjusted accordingly.
- **Machine Speed:** Generally, the lower the speed, the better the stitch quality.

Dust and Lint in the Threading Path: Excessive debris will directly affect thread tension.

Bobbin Thread Tension

Proper bobbin tension is key to ensuring high-quality embroidery. If the tension is set incorrectly, frequent thread breaks may occur.

Tips

- The tension of a new bobbin case is preset at the factory and usually does not require further adjustment.

You can fine-tune the bobbin thread tension by adjusting the screw on the bobbin case.

Turn the screw counter-clockwise to loosen the tension, and clockwise to tighten it.



If the bobbin thread is showing excessively on the back of the embroidery, the bobbin tension is too loose.

Solution: Turn the large screw on the bobbin case clockwise to tighten the bobbin thread.

If the bobbin thread is showing too little on the back of the embroidery, the bobbin tension is too tight.

Solution: Turn the large screw on the bobbin case counter-clockwise to loosen the bobbin thread.

When the bobbin tension is too tight, the column stitches will appear too narrow, or only a thin bobbin thread will be visible in the center of the solid column stitches in an "I-Test". In this case, if the bobbin thread gets snagged, the embroidery can easily unravel.

■ Factors Affecting Bobbin Tension

- Unstable bobbin tension is usually caused by the bobbin sticking inside the bobbin case. Try pulling out several feet of bobbin thread to check if the bobbin rotates smoothly without sticking. Causes of sticking may include: mismatched bobbin specifications, overfilled bobbins, or manufacturing defects in the bobbin itself.

If you suspect the bobbin is not rotating smoothly inside the machine, you can perform the following test: Place the bobbin case face down on a workbench or flat surface, then pull out a few inches of bobbin thread. If the bobbin cannot rotate freely on the flat surface, it is highly likely that it will not rotate smoothly inside the machine either. It is recommended to replace it with another bobbin and retest.

- If tension abnormalities persist after adjusting the bobbin thread, please check if the bobbin case or needle is damaged, as damaged parts can lead to poor results.

Thread Breakage Issues

Causes of Thread Breakage

1. Fabric is too thick: When the fabric is too thick, the needle can easily bend slightly, causing the embroidery thread to rub against the needle plate, fray, and break. Solution: Replace with a larger size needle.
2. Hidden obstacles inside the garment: Obstacles such as heavy seams, inside pockets, and hidden buttons can cause thread breakage.
3. Improper hooping: Ensure the fabric is hooped firmly. Hooping too loosely can cause thread breakage and other embroidery faults.
4. Excessive stabilizer: Stabilizer that is too thick will increase friction between the embroidery thread and the needle, leading to thread or needle breakage.
5. High-density designs: Excessive stitch density can cause the needle to deflect, resulting in frayed or broken threads. Small-area high-density designs have overly concentrated stitches, making them prone to breakage.
6. Stitches are too short: Stitches that are too short can cause thread buildup in the same spot (also known as "bird's nests"), leading to fraying and breakage. You can delete the overly short stitches or enlarge the design by 5%-10%.
7. Needle issues: A needle installed backwards or crookedly can cause breakage; a damaged or dull needle will also cause thread breakage.

Thread Breakage Prevention

1. Store embroidery thread properly: It is recommended to store it in a cool, dark place. Old thread stored improperly can become brittle and break easily. Thread exposed to air, light, and high temperatures for long periods will degrade and needs to be replaced with new thread and stored correctly.
2. Do not use tape to secure thread tails: Tape can leave sticky residue, increasing friction and causing breakage.
3. Check the thread path, needle eye, needle plate, and hook for burrs.
4. Regularly oiling the machine is key to ensuring smooth operation. At the same time, using a hook cleaning tool to keep the hook area clean is also very important, especially when using adhesive-backed stabilizers or sprays, as residual adhesive can cause the thread to fray and break. Please refer to the maintenance section for correct machine maintenance methods.

Thread Breakage Troubleshooting

If thread breakage occurs frequently, follow these steps to rule out technical machine issues:

1. Check the threading path. Confirm that the threading is correct, strictly following the path in the threading section of the manual.
2. Check the needle and the actual breakage status. Sometimes the machine signals a break, but the thread is actually still connected to the fabric. When this happens, check the entire threading path, manually cut the thread, and check the bobbin thread tail. If it is indeed broken, re-thread according to the correct path.
3. Confirm that thread tension is normal. Tension that is too tight can cause skipped stitches, breakage, fabric puckering, and excessive stress on the thread; tension that is too loose can cause thread bunching and looping.

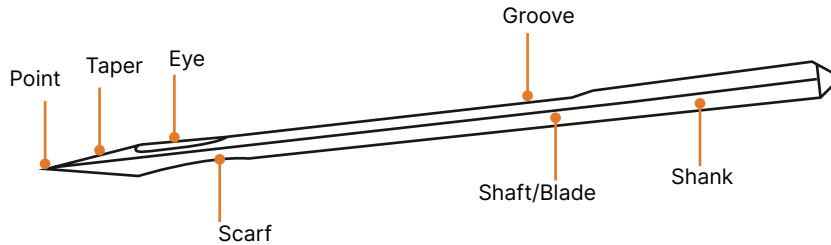
4. Check if the embroidery thread has defects. If defects are present, pull out several meters of thread to eliminate the damaged section. If this doesn't work, replace the entire spool with new thread.
5. Check if the needle is damaged or improperly installed. If only a single or a few needles are breaking, it is usually a needle issue. Replace damaged or bent needles.
6. Confirm the bobbin is installed correctly. Clean out accumulated lint and dust in the bobbin case, and ensure the thread cutter has fully returned to position.
7. If all needles are breaking. The hook timing needs to be adjusted; see the Needle and Hook Timing Adjustment section for details.

Tips

- It is recommended to do a test embroidery first using two layers of stabilizer, or fabric identical to the garment. This allows you to confirm if the stabilizer, topping, and hooping method are appropriate, while also verifying if the upper and bobbin thread tensions are normal. Isacord embroidery thread made of 100% polyester is recommended.

Needles

Needle Structure



Shank: The top part of the needle head, used to insert into the needle bar and connect to the machine.

Shaft/Blade: The main body part extending from the lower end of the shank to the upper end of the tip.

Point: The area below the needle eye that tapers to a point.

Taper: The very bottom of the needle, used to pierce the fabric.

Eye: The hole in the needle through which the thread passes.

Groove: The longitudinal groove on the front of the needle.

Scarf: The crescent-shaped indentation on the back of the needle, above the eye.

Needle Life

The lifespan of a needle is affected by various factors.

Including but not limited to:

- Needle material
- Needle model and specifications
- Fabric material used for embroidery
- Frequency of needle use

Many professional embroiderers follow a basic rule for determining when to replace a needle called the "Three-Break Rule". When three consecutive thread breaks occur on the same needle, the needle should be replaced promptly. If multiple performance abnormalities occur during machine operation, the needle should also be replaced promptly. Specific manifestations include but are not limited to:

- Frequent thread breakage
- Deteriorating stitch quality
- Fabric snagging or pulling
- Machine making unusual noises
- Reduced machine operating speed

Causes of Needle Breakage

Needle breakage is caused by various factors.

Including but not limited to:

- Needle wear and aging
- Excessive stitches in the design, or localized high density
- Fabric is too loose within the embroidery frame (hooping not tight enough)
- Needle hitting the embroidery frame
- Severe fabric shifting during embroidery

Needle Specifications

When selecting a needle, the primary consideration is the needle shank diameter specification, such as 75/11, 90/14, etc. If you've ever wondered why this designation contains two numbers, it's because this numbering system combines European and Asian size identification codes.

The first number (e.g., 75 or 90) is the European standard number. It represents the actual diameter of the needle shank. For example, an 80-size needle has a blade width of 0.80 mm.

The second number (e.g., 11 or 14) uses the Asian standard numbering system, which was also used by Singer. In this system, the smaller the number, the finer the needle shank diameter.

75/11 Needle

General-purpose embroidery machine needle, suitable for most standard projects, such as golf shirts, sweatshirts, dress shirts, lightweight jackets, light canvas, aprons, holiday stockings, etc.

70/10 Needle

Primarily used for quick-drying fabrics, such as 100% polyester T-shirts, golf shirts, etc.

65/9 or 60/8 Needle

Best suited for embroidery on extremely lightweight, delicate fabrics. Used for silk, high-quality linen, and small, intricate designs such as complex appliqué and very small lettering.

80/12 Needle

Suitable for thicker, stiffer fabrics, capable of penetrating the material smoothly. Commonly used for heavy canvas, vinyl, thin leather, baseball caps, brims, etc.

90/14 Needle

Often used for thick thread embroidery, such as metallic thread embroidery. The needle eye is larger, allowing the thread to pass through smoothly; the needle body is rigid, also commonly used for items like canvas and belts.

Tips

- The point must be capable of easily penetrating the fabric to avoid needle deflection when contacting the material. Otherwise, the needle may strike surrounding metal parts or the needle plate, causing damage to the needle or the machine. For tightly woven or knitted fabrics, a finer needle should be used; for tough, thick fabrics that easily cause needle deflection, a thicker needle is required.

Needle Coating

Most sewing and embroidery needles are chrome-plated to enhance durability and appearance. Titanium-coated needles, although more expensive than chrome-plated ones, can last 5 to 7 times longer. These needles also reduce thread friction, thereby reducing the frequency of breakage and saving time and labor costs. Titanium-coated needles have a golden finish and are available in various common sizes.



Needle Point Types

To ensure the needle pierces the fabric cleanly and sharply, it is essential to select the appropriate needle point type. The needle point types used in commercial embroidery include:

- 1. Precision Point / Sharp Point, Marking: SPI
 - The point is slender, fine, and sharp.
 - Suitable for high-count, high-density fabrics, microfibers, and certain synthetic fabrics.
- 2. Regular Point, Marking: R
 - The point has standard sharpness.
 - Suitable for woven fabrics, including finished caps.
- 3. Light Ball Point, Marking: SES
 - Designed to push apart the yarns in knit fabrics rather than piercing them directly, maintaining the integrity of the knit structure.
 - The most commonly used point type, considered a universal point.
 - Suitable for most knit and woven fabrics.
- 4. Medium Ball Point, Marking: SUK
 - Used to push apart coarser yarns, such as those found in heavy knit fabrics.

SPI	Acute Round	
R	Normal Round (Sharp)	
SES	Light Ball Point	
SUK	Med Ball point	

■ Difference Between Sharp and Ball Point Needles

The two most common needle point types used in sewing and embroidery are sharp points and ball points.

Sharp point needles are used for woven fabrics. These needles will slightly pierce the fabric when necessary, but can also enter the gaps between the yarns like a ball point needle. Woven fabrics are made of interlaced warp and weft threads, so even if one thread is pierced and broken, the overall structure remains intact. The sharp point needle is the one included in your initial accessory kit.

📖 Tips

- We recommend using Groz-Beckert brand needles. The model designation for Groz-Beckert sharp points is RG.

Ball point needles are suitable for knit fabrics. These needle points do not cut the fabric, but instead slide through the fabric's own pores. If a hole is pierced in knit fabric, the material can easily unravel, because knit fabric is made from a single continuous yarn.

📖 Tips

- We recommend using Groz-Beckert brand needles. The model designation for Groz-Beckert ball points is FFG.

Needle and Thread Compatibility

The size of the needle eye changes with the needle size, so in some cases, it is necessary to simultaneously change to a corresponding thread thickness. For example: 65/9 or 60/8 size needles require a finer thread (such as size 60 thread), as a finer thread is needed to pass smoothly through the needle eye. The table below shows the correspondence between common needle sizes and thread specifications:

Needle Size			Thread Weight			
USA	Japan	Germany	Cotton	Silk	Nylon	Rayon
0.26	9	65	70-80	100-120	130-150	70-100
0.27	10	70				
0.29	11	75	50-60	60-70	100-130	100-130
0.32	12	80				
0.34	13	85	50-0	60-70	60-100	130-160
0.36	14	90				

Embroidery Thread

Thread Consumption

Thread consumption varies with stitch type. Longer stitches (such as long satin stitches, jump stitches) consume more top thread than short stitches (such as fill stitches). The actual number of stitches a bobbin can embroider varies with thread type and pattern stitch length.

Bobbin

When the machine runs well, we often overlook the role of the bobbin. But once bobbin thread issues arise, they can severely impact production efficiency. This is because the bobbin affects all needle bars; simply changing the needle cannot improve sewing results. Such a crucial component must be inspected carefully.

You can choose to wind your own bobbins or purchase commercial pre-wound bobbins (disposable bobbins). Self-wound bobbins often have poor thread payout stability. For high-speed commercial embroidery machines to operate normally, thread payout must be smooth, even, and stable. Commercial pre-wound bobbins are a cost-effective choice that ensures stable bobbin thread operation.

Your Ricoma machine requires L-type bobbins. Polyester bobbin thread is preferred over cotton because polyester produces less lint.



Polyester bobbin thread is mainly divided into two types: spun polyester and filament polyester.

Spun Polyester: In this process, the thread is made by twisting short fibers together. Not recommended, as this type of thread is prone to breakage and can accumulate under the bobbin case tension spring, leading to tension abnormalities over time.

Filament Polyester: In this process, the thread is made from a single continuous filament. This bobbin thread runs more smoothly in the bobbin case and has higher strength.

■ Bobbin Side Types

Some bobbins have side structures to support the thread during rotation.

Paper-Sided Bobbin: This is the most common type.

Side-Less Bobbin: Consists only of the thread body, without any side support structure.

Plastic-Sided Bobbin: Some embroiderers believe plastic-sided bobbins rotate more smoothly and run more steadily in the bobbin case.

Magnetic Bobbin: Magnetic bobbins have no sides and rely on magnets for support. Magna Glide brand bobbins have a magnet built into the center, which helps maintain stable bobbin tension, allows the bobbin to run more smoothly, and prevents bobbin nesting. When using magnetic bobbins, the gunmetal-colored brake (tension spring) on the bobbin case usually needs to be removed.

Bobbin Thread Material Selection

■ Cotton Thread

Although cotton thread is not as strong as synthetic fibers, its skin-friendly texture is favored, allowing for more flexible bobbin tension adjustment. However, cotton thread has a significant drawback: it produces a large amount of lint, which easily accumulates under the

bobbin tension spring. Lint buildup can cause the tension spring to "bounce," ultimately preventing effective maintenance of bobbin tension.

■ Nylon Thread

The characteristics of nylon thread are almost the opposite of cotton thread. The advantage of using nylon thread lies in its high strength, allowing a single bobbin to hold many yards of nylon thread. Disadvantages of using nylon thread include: its small diameter and smooth texture make it difficult to maintain constant tension within the bobbin case, and its extremely slippery nature makes tension control even more challenging.

■ Filament Polyester

This thread is the most commonly used bobbin thread material in the American embroidery industry, offering advantages such as high strength, moderate fineness, durability, reliability, and low lint production. It is known for its uniform texture and excellent quality. A standard "L" size bobbin can hold 127 yards of this thread. For this reason, American embroiderers widely choose this bobbin thread material. Reducing bobbin changes or thread breakage can effectively decrease downtime and improve efficiency.

■ Spun Polyester

Spun polyester has many advantages, making it the preferred bobbin thread material for many manufacturers. Its texture is similar to cotton thread but without the lint issue, and it offers the best economy. Spun polyester bobbins require lower tension spring pressure. However, it still produces some lint buildup, requiring regular cleaning and maintenance.

The reason this issue has been overlooked for a long time is that many people mistakenly believe L-size bobbins can only hold 94 yards of this thread. While this is true for 100-weight spun polyester, several

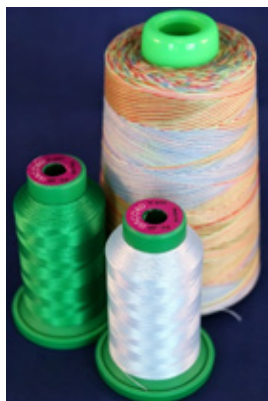
suppliers actually offer 120-weight spun polyester. This specification yields 120 yards per bobbin, only 7 yards less than filament polyester.

Top Thread Material Selection

60, 70, and 80-weight threads are fine threads. These threads are suitable for delicate fabrics, tiny intricate designs, and small font sizes. When using these threads, the pattern density needs to be increased by 5%–10%.

30 and 40-weight threads are medium threads. This specialized thread can be used to fill large areas with fewer stitches. When using this type of thread, the stitch count can be reduced by 15%, saving production time. 35-weight thread is typically used for multi-color threads. The factory-supplied thread set is 40-weight.

12-weight thread is a thick thread. This specialized thread can achieve a hand-embroidered effect. When using this type of thread, long float stitches need to be employed. This thread requires additional setup and debugging; it is recommended to adjust the tension simultaneously.



■ Rayon Thread

Rayon thread is widely used in the American embroidery industry,

available in 30, 40, and 60 weights. This thread is made from cellulose, with a soft, flexible texture, beautiful sheen, and smooth feel. This thread has better running performance than other commonly used embroidery threads and presents a very rich visual effect when embroidered on fabric. Unfortunately, it is not the strongest. When using rayon, even minor equipment malfunctions can lead to a significant increase in thread breakage. Compared to other embroidery threads, rayon is not only more expensive but also susceptible to environmental factors such as temperature and light.

Black and white rayon threads are more prone to breakage due to the bleaching and dyeing process: white yarn requires deep bleaching to achieve bright whiteness, while black yarn needs to absorb a large amount of pigment to achieve a rich black, resulting in reduced thread toughness.

■ Polyester Thread

Early polyester embroidery thread was difficult to use because the fiber itself is very elastic, prone to loose loops, leading operators to set the tension too tight. This repeated stretching exacerbated the problem, causing the polyester thread to stretch and deform further. When the thread relied on its own elasticity to return to its original length, the embroidery would pucker and the fabric would shrink. Today's polyester thread performance has greatly improved. Many products offer excellent embroidery performance and a richer color range, making them a high-quality choice for embroidery practitioners. For some lightweight, delicate fabrics, its strength might be a bit high, but its resistance to breakage can effectively improve production efficiency. We recommend using 100% polyester thread for all embroidery projects.

Polyester is one of the two embroidery fibers that can use fluorescent dyes. The fluorescent-colored embroidery thread used in your shop is most likely polyester. Polyester thread has excellent abrasion resistance and bleach resistance, making it particularly suitable for items that will be exposed to sunlight for long periods, come into contact with chlorine water, or require harsh washing.



Tip

- Polyester thread is stiffer than rayon and may require appropriate tension or thread take-up spring adjustment. Try different tensions using the spring adjustment lever to find the most suitable parameters.

■ Cotton Thread

If you desire a rustic, handmade feel or are doing small personalized lettering on dress shirts, cotton thread is an ideal choice. Cotton thread is easy to adjust for tension, has a matte finish, and some people prefer it over other shiny embroidery threads. This thread material comes in a wide range of weights, from extremely thick to very fine. In the past, it was the preferred thread for making fine golf logos. Today, this thread material is mostly used for creating appliqué with a handcrafted style.

■ Metallic Thread

Many embroiderers try to avoid metallic thread because it is often difficult to handle. The good news is: this beautiful embroidery thread can actually be tamed for use.

This metallic thread is stiffer than other varieties and has a special structure. Metallic thread is essentially made by bonding a metallic foil layer to a nylon or polyester core. Product quality varies among different manufacturers, so it's recommended to communicate with peers and choose a brand with stable performance.



If problems occur when using metallic thread, you can try the following methods:

- Use a finer gauge metallic thread.
- Choose a needle with a larger eye.
- Check the digitizing file.
- Ensure the embroidery density is suitable for metallic thread.
- Check if there are too many short stitches or small corner stitches.

Backing



Backing (also called stabilizer) is the foundation of quality embroidery. It is designed to support or even replace the fabric, keeping the fabric flat to prevent embroidery pattern distortion. Various types of backing/stabilizer are used in embroidery, and which one to choose depends on the fabric you are using.

Three factors should be considered when selecting backing material:

Fabric Stability: Fabrics with high elasticity or loose texture require heavy backing; structurally stable, tightly woven fabrics can use light or medium-weight backing.

Stitch Density: The higher the pattern density, the heavier the backing should be.

Washability: If the fabric requires frequent washing, heavy backing should be used. After multiple washes, the backing will gradually soften.

Backing Color

Backing mainly comes in two colors: black and white. White is the most common and suitable for most embroidery projects. Some embroiderers use black backing on dark-colored garments, especially when the backing might be visible or show through, such as with pique mesh knitwear.

Backing comes in two forms: large rolls and pre-cut pieces.

Embroiderers typically choose large rolls for embroidering large areas. Pre-cut backing pieces are more suitable for smaller logos, such as the common left-chest logo.

Backing Weight

Backing is available in various weight specifications, and its weight needs to match the type of garment being embroidered. When selecting backing, the primary consideration is the fabric's stability requirement. The core goal is to eliminate the fabric's stretch—the greater the fabric's elasticity, the heavier the backing weight should be. Follow this general principle when choosing backing: for lightweight fabrics, thicker backing is recommended; for heavy fabrics, thinner backing is needed.

■ Common Backing Weights

Lightweight: 1 to 1.5 ounces

Medium-weight: 2 to 2.75 ounces

Heavyweight: 3 to 3.5 ounces

Tip

- Embroidery results often require multiple adjustments. If necessary, multiple layers of backing can be stacked, or backings of different weights can be used in combination.
-

Types of Backing

The backing used in embroidery can be divided into several categories, each with its specific purpose, suitable for different types of fabrics.

■ Cut - Away Backing

Cut-away backing is used for permanent support and offers the best stability. This backing comes in various weights from light to heavy, some being heat-bondable. It provides clearer and crisper embroidery on fine designs, including small lettering.

This backing remains permanently on the fabric after use, and the excess needs to be trimmed away with scissors, hence the name "cut-away." Its weight range covers 1 ounce (lightweight) to 3.75 ounces (heavyweight). Cut-away backing is most suitable for stretchy fabrics (like knits) and garments that require frequent wearing and washing, effectively preventing pattern distortion. It is also suitable for loosely woven fabrics and unstructured cap styles. It is recommended to use lightweight cut-away backing for designs with lower stitch density, while heavyweight cut-away backing is needed for designs with higher stitch density.

■ Tear - Away Backing

Tear-away backing has lower stability than cut-away backing and primarily provides light support. This backing comes in various weights from light to heavy and is available in self-adhesive versions. Similar to cut-away backing, tear-away backing lives up to its name—after embroidery is complete, the embroiderer can tear it away from the garment, hence the name. This backing is typically used for non-stretch, tightly woven natural fiber fabrics (such as towels, hats, bags, etc.). Besides being suitable for highly stable fabrics, tear-away backing is also commonly used in design scenarios where backing visibility needs to be avoided. If the fabric requires stronger support, multiple layers of light to medium-weight tear-away backing can be stacked.

■ Water - Soluble Backing

Water-soluble backing / non-show backing is a lightweight woven cut-away backing, soft, thin, and strong. This backing is specifically designed to provide extra stability for knitwear and gets its name

because it doesn't show through on light-colored garments. It is commonly used for low-stitch-count designs on polo shirts and T-shirts. For best results, it is recommended to use water-soluble backing in combination with tear-away backing. Water-soluble backing can be removed by spraying with water or applying heat.

■ Topping

Water-soluble topping is a water-soluble film placed on the surface of the embroidery design to prevent stitches from sinking into textured fabrics. This topping is suitable for delicate, mesh, and hard-to-stabilize fabrics, such as pique mesh, fleece, terry cloth, corduroy, etc. It is highly recommended for embroidering towels, as it makes the stitches more three-dimensional and prominent. When using this topping, backing is still needed on the back of the fabric for added stability. This topping can be removed by tearing, spraying with water, or a combination of both.

■ 3D Foam

3D foam is used for lettering or designs on caps to create a 3D effect. This backing comes in various colors and can be up to 3 mm thick. To use it, first place the 3D foam on the embroidery area, then use short column fill stitches to embroider while cutting the foam. After embroidery is complete, remove the excess foam. If any foam residue remains, it can be removed by heating with a heat gun/hairdryer.

■ Polyester Mesh Backing

Polyester mesh backing is extremely lightweight, yet its strength performance is particularly outstanding. It is used to achieve maximum stability when heavy cut-away backing is not desired. Polyester mesh backing is very suitable for lightweight, highly elastic technical sportswear fabrics, providing good support without affecting the

garment's original hand feel. When embroidering elastic technical golf shirts, this backing material can be used, and it is recommended to use it double-layered.

■ Heat - Bonded Backing

Heat-bonded backing is suitable for highly elastic fabrics. After being ironed and bonded onto the garment at high temperature, the fabric and backing become one, resulting in a more stable structure. It can also be used to cover the back of finished embroidery, for example, on baby onesies, to prevent the bobbin thread from rubbing against the backing and irritating the infant's skin.

Embroidery Craft Techniques

Special Embroidery Frames

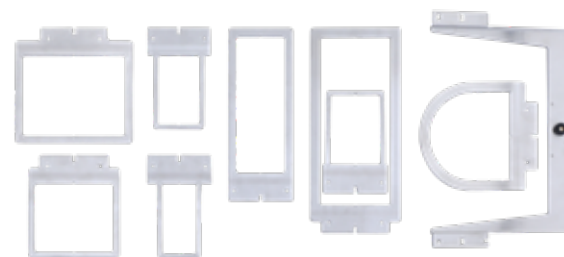
■ Magnetic Embroidery Frame

Magnetic embroidery frames are an ideal solution for sewing ultra-thick fabrics like bags. This type of frame provides stronger support for the fabric, ensuring it is firmly secured within the frame. It is also suitable for thin fabrics prone to hoop marks, such as satin, effectively preventing hoop marks from damaging the fabric.



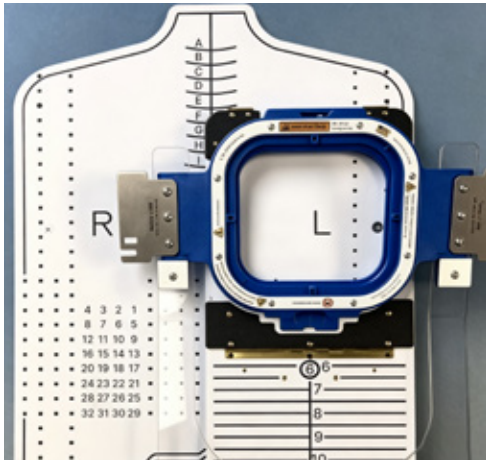
■ 8-in-1 Device

This 8-in-1 device is specifically designed for items difficult to hoop. It consists of eight different sized frames paired with one universal main holder. It needs to be used with adhesive backing, allowing fabric to be directly fixed on top of the narrow frame for embroidery. The narrow frame structure facilitates sewing in tight, hard-to-reach areas like pockets and sleeves.



■ Hoop Positioning Plate

Embroidery operators use this device during batch embroidery to standardize the placement of the embroidery frame and garment, ensuring consistent positioning for each finished piece. The positioning plate can secure the outer frame; simply lay the garment and fasten the outer frame to complete hooping. It is compatible with dedicated frames, offering simple, fast, and efficient operation, greatly improving the uniformity of pattern positioning.



Cap Embroidery

■ Key Points in Cap Selection

Select caps that are compatible with the cap frame. The curvature of the inner visor stiffener of the cap should closely match the bending curvature of the cap frame. If the gap in the middle or on the sides is too large, pattern misalignment is highly likely to occur at those positions.

■ Key Points in Cap Embroidery Operation

For best results, pair with appropriate backing. Most embroidery operators recommend: Use 3 oz (approx. 80g) tear-away backing on unstructured caps (no top stiffener), combined with spray adhesive to enhance the clarity of small text and fine details; For structured hard-top caps, use light to medium-weight tear-away backing depending on the complexity of the design; the more complex the design, the heavier the backing required.



When embroidering caps made of textured fabrics like twill or corduroy, it is recommended to use water-soluble topping to enhance the clarity of small patterns and text.

When embroidering caps, it is recommended to slightly tighten the bobbin case tension. If the fabric in the embroidery area of the cap is not flat enough, it can easily cause the bobbin thread to be pulled to the front of the embroidery. It is recommended to use spun polyester bobbin thread because its texture provides moderate friction, making it easier to maintain tension balance, which is very suitable for cap embroidery. It is recommended to set up and calibrate a dedicated set of bobbin cases specifically for cap embroidery.



Needles need to be changed frequently when embroidering caps. The dense fabric on caps can easily cause needle tip wear. It is recommended to change the needle after approximately eight hours of continuous use or after three consecutive thread breaks. Titanium alloy needles are more wear-resistant and better suited for long-term cap embroidery work.



■ Digitizing and Punching Tips for Cap Embroidery

- Simplify or eliminate unnecessary details and outline stitches as much as possible.
- Appropriately widen the column stitch width. When embroidering on the curved surface of a cap, column stitches in the X-axis direction will be narrower than when embroidering on flat fabric.
- Increase the fill stitch length to reduce the number of penetrations, lessen the load on the fabric, and shorten embroidery time.
- Try to enlarge text height to more than 3/8 inch.
- Use a segmented digitizing approach. Although this increases the number of color changes, it can significantly improve the registration accuracy for most patterns.

Operating Speed: Cap Embroidery vs. Flat Embroidery

Machine operating speed depends on the quality of the digitized pattern and the type of fabric. To ensure finished product quality, adjust the machine speed promptly according to different fabrics.

Tip

- Continuously check the stitches during embroidery to ensure there are no issues like floating threads, skipped stitches, or looping. If stitches are loose or the embroidery effect is poor, reduce the machine operating speed until the stitches are flat and clean.

If thread breakage is frequent and the following conditions have been confirmed correct, it can be improved by reducing speed:

- The pattern digitizing is standard, and the stitch count ratio is reasonable.
- The fabric hooping is proper and secure.
- The thread tension is adjusted correctly.
- The threading path is correct.

■ Recommended Operating Speeds

- When embroidering caps, we recommend controlling the machine operating speed between 450 and 650 stitches per minute.
- When embroidering flat fabrics, it is recommended to control the machine operating speed between 650 and 850 stitches per minute.

Hoop Positioning Reference Standards

■ Beach Towel

- Center the design, with the center point 5 inches from the bottom edge.
- Lettering design size: 4 ~5 inches.

■ Bath Towel

- Position the design 2 inches above the hem, or 4 inches from the bottom edge.
- Lettering design size: 3 ~4 inches.

■ Hand Towel

- Position the design 1 ~1.5 inches above the hem, or 2 inches from the bottom edge.
- Lettering design size: 2.5 ~3 inches.

■ Fingertip Towel

- Center the design, 2.5 inches from the bottom edge.
- Lettering design size: 2.5 inches.

■ Washcloth

- Position the design 2 inches from the bottom edge, or 1.5 inches above the hem.
- Lettering design size: 1 ~2 inches.

■ Napkin

- Center the design and embroider it in the corner diagonal to the napkin label.
- Lettering design size: 1 ~2 inches.

■ Pillowcase

- Position the design 3 inches from the bottom edge.
- Lettering design size: 1.25 ~2.25 inches.

■ Bed Sheet

- Center the design 2 inches above the sewn-on fabric band on the bed sheet, embroidered on the reverse side; the design should be visible after the sheet is turned down (most customers prefer full names embroidered, especially common on children's bed sheets).
- Design size at the bottom edge: 3 inches; area above the bottom edge: 3 ~5 inches.

■ Men's Bathrobe

- Design position: 7 ~10 inches from the shoulder seam, and 3 ~5 inches left/right from the garment center line.

■ Women's Bathrobe

- Design position: 4 ~6 inches from the shoulder seam, and 3 ~5 inches left/right from the garment center line.

Backing and Needle Recommendations by Fabric

■ Canvas

- Backing: Light to medium-weight tear-away backing.
- Needle: 75/11 Sharp point / Regular ball point needle.
- Suggestion: For long, continuous embroidery sessions, prioritize sharp point needles for better durability.

■ Polyester Velour

- Backing: Lightweight polyester tear-away backing; suitable for long-term sun exposure, chlorine washing, salt water, industrial washing, and bleaching environments, effectively locking in color and protecting the fabric.
- Needle: 75/11 Fine ball point needle.

■ Coated Fabric / Waterproof Fabric

- Needle: 75/11 or 80/12 Sharp point / Fine ball point needle.

■ Corduroy

- Backing: Use medium-weight water-soluble topping combined with light to medium-weight tear-away backing.
- Needle: 75/11 Fine ball point needle.

■ Cotton Plain Weave

- Backing: Heavy cut-away backing, or a combination of tear-away / water-soluble backing.
- Needle: 75/11 Fine ball point needle.
- Suggestion: Cotton thread has good compatibility and is suitable for children's wear embroidery.

■ Denim

- Backing: Heavy cut-away backing, or a combination of tear-away / water-soluble backing.
- Needle: 75/11 Fine ball point needle.

■ Dress Shirt (Woven)

- Backing: Use extra-heavy cut-away backing, or a combination of tear-away / water-soluble backing.
- Needle: 75/11 or 70/10 Fine ball point needle.
- Suggestion: When embroidering fine details, it is recommended to switch to an 80/12 needle.

■ Golf Shirt

- Backing: Light to extra-heavy cut-away backing; for heavy knit fabrics, use medium to heavy cut-away backing; for medium-weight knit fabrics, use light cut-away backing.
- Needle: 75/11 Fine ball point needle.

■ Hat Fabric

- Backing: Medium to heavy-weight tear-away backing.
- Needle: 75/11 or 80/12 Sharp point needle.

■ Leather & Synthetic Leather

- Backing: Lightweight tear-away backing.
- Needle: For stiff / foamed leather (upholstery, bags) use 75/11 or 80/12 Fine ball point needle; for soft garment leather use 70/10 or 80/12 Sharp point needle.

■ Underwear & Intimate Apparel / Silk

- Backing: Water-soluble tear-away backing.
- Needle: Select 70/10 or 80/12 Fine ball point needle based on the embroidery thread specification.

■ Lycra / Spandex Stretch Fabric

- Backing: Medium-weight cut-away backing or water-soluble tear-away backing.
- Needle: 70/10 Medium ball point needle.

■ Nylon Windbreaker Jacket

- Backing: Light to extra-heavy cut-away backing.
- Needle: 75/11 Fine ball point needle.

■ Knitted Sweater

- Backing: Medium to heavy-weight cut-away backing.
- Needle: 75/11 Fine ball point needle.

■ Athletic Hoodie

- Backing: Heavy-weight tear-away backing or cut-away backing.
- Needle: 75/11 Fine ball point needle.

■ T-Shirt

- Backing: Thin water-soluble tear-away backing or medium-weight cut-away backing.
- Needle: 75/11 Fine ball point needle.

■ Terry Cloth / Looped Fabric

- Backing: Use medium-weight water-soluble tear-away backing, combined with water-soluble topping (topping).
- Needle: 75/11 or 80/12 Fine ball point needle.



Miami Headquarters

11555 NW 124 Street, Miami, FL 33178, USA

☎ (305) 418-4421 | Toll Free: 1 (888) 292-6282

☎ Fax: (305) 418-5036

🌐 www.ricoma.com

✉ info@ricoma.com

Ricoma Manufacturing Base in China

Ricoma (Huizhou) Co., Ltd.
Ricoma Science & Technology Industrial Park, No.1
Hongtong Road, Dayawan West District 516083,
Huizhou, Guangdong, China

☎ +86 752 5366 999

🌐 www.ricoma.cn

✉ info@ricoma.cn

Sales & Marketing Center

Ricoma (Shenzhen) Co., Ltd.
Longgang District, Shenzhen, Guangdong China

☎ +86 755 2585 7576

🌐 www.ricoma.com

✉ info@ricoma.cn