

USER'S MANUAL

Single Head Automatic Embroidery Machine (Compact Type)

SWF/B- Series



MME-110103

1. THIS IS AN INSTRUCTION FOR SAFE USE OF SMF. AUTOMATIC EMBROIDERY MACHINES. READ THOROUGHLY BEFORE USE.

- 2. CONTENTS IN THIS INSTRUCTION MAY CHANGE, WITHOUT PRIOR NOTICE, FOR IMPROVEMENT OF MACHINE QUALITY AND THUS MAY NOT CORRESPOND TO THE MACHINE YOU PURCHASED. CONTACT YOUR SALES AGENT FOR INQUIRIES.
- 3. THIS IS DESIGNED AND MANUFACTURED AS AN INDUSTRIAL MACHINE. IT SHOULD NOT BE USED FOR OTHER THAN INDUSTRIAL PURPOSE.

CONGRATULATIONS

on the purchase of your machine **SWF/B-T601C** or **SWF/B-T1201C**

and

WELCOME to the SWF FAMILY !!

OUR SUCCESS IS IMPORTANT TO US. We want to be your partner in business where you machine is concerned. Your machine is manufactured to the highest standards by the SunStar (SunStar Precision Company, Ltd.Korea). Both the manufacturer and their United States distributors are dedicated to product quality and customer care.

Taking the time to understand your machine, its maintenance needs, and its operation will make you more comfortable with your purchase. Knowledge of your equipment and confidence in its operation can only benefit your business from both a safety standpoint and in more efficient production.

We urge you to read your manual and mark any sections that you wish to discuss with your installation technician, customer support or during any training session. Your manual pages are printed on one side only, so be sure to make use of the space provided for making notes. While we have taken great care to make this manual as complete and easy to understand as possible, we still welcome your comments and suggestions.

CONTACT INFORMATION:



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CHAPTER 1

SAFETY RULES

When operating a machine of any type, it is important to take precautions in order to safeguard the user and the equipment. Whether the machine is owner operated or run by an employee, procedures should be followed in order to ensure that the operator is not injured and the machine is not damaged.



When moving, handling, installing or performing maintenance on your machine, it is important to observe all *DANGER* signals.



When operating the machine, observe all *WARNING* signs in order to protect against personal injury.



Follow all *CAUTION* signs to safeguard your machine during installation in your work environment.



When operating the machine, observe *NOTICE* signs in order to protect the machine from physical damage or breakdown.



Tips to help you learn about embroidery and produce quality embroidery.



DELIVERY OF YOUR MACHINE



Safeguarding your machine begins with delivery. Only trained and experienced persons, familiar with any special transporting instructions, should be employed to move your new machine.





- When removing the crated machine from the delivery truck, be sure to keep the crate in a horizontal position to prevent damage to the machine or injury to the workmen.
- All workers should wear safety shoes and, when moving the machine, be sure to hold the machine by the handles on the right and left sides.
- 3) When using a forklift, make sure all helpers are out of the way of the moving equipment. Make sure that all obstacles in the path of the forklift are removed. Ensure that the size and the power of the forklift is sufficient to support the machine. Place the machine in the center of the forklift arm and lift it carefully to maintain the weight balance.





INSTALLATION



The foundation under the machine and the environment is very important.

- 1) Ensure that the floor has a structure that is strong enough to support the weight of the machine.
- 2) Air conditioning and air filtering eliminates humidity that can cause corrosion and also dust that can block filters and screens. Make sure your machine's environment is as clean as possible.
- 3) Direct sunlight can cause the paint of the machine to fade.
- 4) Allow at least 50cm(20 inches) of space on each side of the machine for safety and convenience. Keeping the machine away from the wall allows room to move around the machine for maintenance and threading. It is also a safeguard against things falling on or against the machine.
- 5) Explosion: DO NOT operate the machine when there are inflammable substances in the air.
- 6) Lighting: Secure sufficient lighting for the operator. Lighting is not part of the SWF machine.
- 7) Machine Overturn: DO NOT place the machine on unstable stands or tables. Machine fall may cause serious injuries or machine damages. Abrupt stop during the machine delivery or external shocks may also overturn the machine.

MACHINE OPERATION



The SWF machines are designed for applying embroidery to fabric and other similar materials. Pay careful attention to the CAUTION and WARNING stickers placed on the machine. They are intended to call attention to safety rules. While operating the machine, please observe the following :

- Dress for safety. Long, unbound hair, jewelry such as necklaces, bracelets, dangling earrings and wide sleeves can get caught in the machine. Avoid wearing these items while operating the machine. Do not lean near or against any moving parts.
- 2) Wear shoes with non-slip soles.
- 3) Clear all personnel away from the machine before turning on the power. Customers and those unfamiliar with the machine, especially small children, should not be allowed near the machine at any time.
- 4) Keep your hands away from the moving parts of the machine such as the needle, hook, take-up lever, pulley and bobbin case when the machine is in operation.



- 5) **DO NOT** remove the safety cover on the hand wheel and the shaft. Covers are meant to protect the parts of the machine from dust and foreign objects as well as protect the operator.
- 6) Be sure the main power is turned off and the main switch is set to **OFF** before opening the cover of any electrical component or control box.
- 7) Be sure main switch is **OFF** before turning the main shaft manually.
- 8) Although the machine has a STOP phase between thread trims, color changes, and frame movements, you should not attempt to change or thread needles at that time. When changing or threading needles, turn the machine off using the main switch or be sure you are at the end of any designs and the machine is permanently paused until the operator activates the motor again.
- 9) DO NOT lean against the cradle or place your fingers near the guide grooves of the frame during operation.



Observe the following to avoid damage to the machine or functional failures. Take precautions during operation to help avoid accidents that result in downtime which affects production and profit.

- 10) **DO NOT** put any objects on the table of the embroidery machine. The table is meant to hold the goods being embroidered. **NOT** your tools and supplies. Objects that impede the movement of the pantograph can not only damage the machine but also cause severe registration problems during stitching.
- DO NOT use a bent or damaged needle. If you are unsure of the state of the needle, DO NOT use it.
 WHEN IN DOUBT, THROW IT OUT.
- 12) Change your needle plate when switching from caps to flats and vice versa.
- 13) Lower the tabletop when stitching tubular goods, but remember to raise it when stitching flat goods. The tabletop helps support the product. especially heavy jackets.



TROUBLESHOOTING



If you should have any problems with your new machine, contact the A/S Engineers at your SWF dealership. They are trained at SWF training centers and are ready and able to assist you.

- 1) Before cleaning or repairing the machine, turn off the main power and wait for four minutes so that the machine electricity is completely discharged. **NOTE** : When doing any routine troubleshooting, be aware that it takes about10 minutes after turning off the main switch before the electricity is fully discharged from the X/Y main shafts and drive box.
- 2) **DO NOT** change the settings or any parts on the machine without confirmation from SWF or its distributors.
- 3) Use ONLY SWF parts on your machine.
- 4) Be sure to replace all covers when you are finished with your cleaning or repairs.

CONTENTS OF WARNING STICKERS

Covers in the warning stickers refer to all covers near operating parts of the machine.







This sticker warns against high voltage, electric shock and burn.

- 1) Only professional technicians should open any covers marked with this sticker.
- 2) Wait four minutes after turning the main switch to **OFF** before opening the cover.



PLACEMENT OF WARNING STICKERS

WARNING STICKERS are placed on the machine as reminders to operate your equipment safely. When operating your machine, be sure to observe the directions on ANY warning stickers.





CHAPTER **2**

INSTALLATION AND MACHINE ASSEMBLY

Install you machine in an appropriate environment and with adequate and proper electrical supply. Failure to follow directions may result in injury to the operator or damage to the machine.

ENVIRONMENT

- Temperature : During machine operation the temperature should range between 0 and 40 degrees Celsius(32-104 degrees Fahrenheit). When the machine is not in operation the temperature should fall between-25 and 55 degrees Celsius(-13 and 131 degrees Fahrenheit).
- 2) Humidity : The relative humidity should fall between 45 and 90%



Do not let moisture drops on the machine. Provide air conditioning to control humidity and to prevent dust and corrosion.

- 3) Height: 1,000m above sea (max)
- 4) Grounding: Ensure the electricity is properly grounded.



Properly ground the machine to avoid electric shock. Use a three-wire grounding (grounding resistance below 100 ohms).

- 5) Light : Close any doors and windows near the machine to protect from direct light as well as dust and humidity.
- 6) Placement : Place the machine on a flat concrete floor that is strong enough to sustain the weight.



ELECTRICITY

1) Grounding : Make sure that the electricity is properly grounded.



Electric shock can result if the machine is not properly grounded. Use a threewire grounding (grounding resistance : below 100 ohms)

- 2) Input Voltage (regulate when installing) : 100V, 110V, 120V, 200V, 220V, 240V
- 3) Available Range of Voltage : On the transformers in the machine are wire taps that can be varied to match the voltage of the facility. These must be set within 10% of the facility's voltage.
- 4) Electric Capacity and Electric Power : Minimum input voltage(640 voltage amps is equivalent to 400 watts.) Each machine should have its own 20amp circuit breaker.
- 5) Insulation Resistance : The cover of the wires should have a resistance of more than 10 M ohms. (Measure with 500V insulation tester)



- 1) Check the voltage supply where the machine is being installed.
- 2) Install the cable away from the operator's work space to prevent accident or injury.
- 3) Have the electrical supply and its installation checked by a certified electrician for safety's sake.

6) Noise (LpAd) should measure 82.6dB (A) working 1200 SPM on SIO 10821-CA M1.



LEVELING THE MACHINE

The machine must be leveled when it is installed. Balancing the machine horizontally protects the needle from moving out of position.



 When there is no stand attached. adjust the front, rear, left and right of the machine using the level adjusting bolt. When the machine is level, tighten the fixing nut.



 When there is a stand attached, insert the four horizontally adjusting bolts into the holes on the stand. Then place the four rubber mats (for vibration prevention) under each of the bolts. Adjust the bolts until the caster is raised above the level of the floor. Use a level to adjust the machine using the horizontally adjusting bolts so that the machine is level on all four sides. When the machine is level, tighten down the fixing nuts.



- 1) The machine must be balanced horizontally in all four directions : front, back, left and right.
- 2) If the height of the four adjusting bolts varies over 10mm, use spacers beneath the lower bolts to make the heights even.





Horizontal balance front and back



Horizontal balance left to right

ASSEMBLY OF PERIPHERAL DEVICES

STAND ASSEMBLY

Detailed item connected with stand assembly desires to endure and offers 'stand manual'.





TABLE ASSEMBLY



 When using the border frame, attach the table b to the main body of the machine.



2) Attach the table (b) to the machine by inserting the table supporting plate into the table pressing plate as shown. When assembly is complete, fasten it with the table fixing screw.



DISASSEMBLING THE TABLE



1) Unscrew the fixing bolt and pull the table (b) forward to disassemble it.



2) Attach the optional magnetic holder base to the frame attachment plate as shown.



TUBULAR TO BORDER FRAME CONVERSION



1) Disassemble the tubular attachment Plate from the frame connection plate by unfastening the fixing screws as shown.



After removing the fixing screws, place them in a safe place to use when attaching the tubular attachment.



 Fasten the optional border frame to the connection plate with the fixing screws. Tighten the screws snugly.





Installing Lamp (Optional)

1) Disassemble the cover on the left and install the lamp as shown in the picture.



2) Disassemble the table and install the stabilizer as shown in the picture.





Installing Bobbin Winder

 Unwrap the packing. Unpack the arm and install bobbin winder (in the accessory kit) on the arm (bolts and washer are in the same kit).



Take care not to mix the parts of the bobbin winder with other disassembled parts.



BORDER TO TUBULAR FRAME CONVERSION



 Separate the border connection Plate from the frame connection plate by removing the fixing screws.



After removing the fixing screws, place them in a safe place to use when attaching the tubular attachment.



2) Attach the tubular attachment plate to the frame attachment with the fixing screws. Tighten the screws snugly.





PARTS OF THE MACHINE



- ① Base
- ② Main power switch
- ③ Upper thread stand
- 4 Main shaft drive motor
- (5) Color change box
- 6 Arm
- O Upper thread catcher
- (8) Head
- (9) Thread tension adjusting plate
- 1 Lamp switch
- ① Cylinder bed
- 12 Table

- ③ X-axis driving system
- (1) X-axis pulse motor
- (5) Y-axis driving system
- ⁽⁶⁾ Y-axis pulse motor
- D X/Y drive box
- 18 Encoder
- 19 Joint circuit border
- 20 Control box
- 2 Main power/drive unit
- ② Operation box
- ② Horizontal adjusting bolt



CHAPTER 4

FUNCTIONS AND FEATURES

1) EXPANDED MEMORY SIZE.

A maximum of 100 designs can be stored in your machine. The basic memory size is approximately 500,000 stitches. This can be expanded to two million stitches.

2) MIRROR IMAGE CONVERSION AND DESIGN DIRECTION

You can turn the design from one degree to 359 degrees. Your machine is also capable of mirror conversion, reversing the design in the X and Y direction.

3) ENLARGING AND REDUCING THE DESIGN

The embroidery design can be reduced or enlarged in size from 50% to 200% along the X and Y axis in increments of 1%.

4) AUTOMATIC SELECTION OF NEEDLE BAR

You can select the order of the needle bars up to the 99th bar.

5) **REPETITION OF DESIGNS**

The same design can be repeated up to 99 times along the X and Y axis.

6) AUTOMATIC OFFSET

When the embroidery design is finished stitching, the frame automatically returns to the offset point to make it easier to switch the frames.

7) MANUAL OFFSET

Appliques and switching frames during embroidery work is easier because the frame can be moved manually to a point selected beforehand. After that, the frame can be moved back to its place by pressing the proper keys.

8) RETURN TO START

The frame can be moved back to the beginning point of the design.

9) NON-STITCHING FUNCTION

The frame can be moved backward and forward in units of 1,100,1,000 and 10,000 stitches. The needle bar can also be moved backward and forward by color without stitching.

10) FRAME REVERSAL

When the thread breaks or the needle becomes unthreaded, the frame can be moved in units of one to ten stitches back to the beginning point of the design.



11) AUTOMATIC TRIMMING DEVICE

The trimming function is automatic, determined by the design and the setup of the machine.

12) AUTOMATIC DETECTION OF UPPER AND LOWER THREAD BREAKS

This device automatically stops the machine when the upper thread breaks, the thread pulls out of the needle, or the bobbin thread runs out.

13) POWER FAILURE SAFEGUARDS

When the power fails unexpectedly, the frame moves to the exact point where the stitching stopped. This can help reduce the number of product rejects.

14) 3.5 INCH FLOPPY DRIVE

A 3.5 inch floppy drive is included in the operation panel. Designs can be input by disks and can also be saved to a disk in Tajima or SWF format. Both 2DD (Double-sided double density) and 2HD (Double-sided high density) disks can be used.

15) EDITING

You can edit from the control panel. Stitch data and function code (jump, finish, trimming) can be changed, inserted or deleted.

16) MACHINE STOPPAGE

The screen will indicate why the machine has stopped operating.

17) RPM

The revolutions per minute is indicated on the screen.

18) FRAME SPEED

The speed can be adjusted to high, medium and low.

19) MEMORY

The screen indicates how much memory remains.

20) TAPE CODE COMPATIBILITY

ZSK, and Barudan two binary tape code and Tajima three binary tape code can be edited.

21) CODES FROM OTHER MACHINE BRANDS

Various formats can be automatically edited from the floppy disks. These include SWF, Barudan, Melco(EXP), Tajima, Happy, Toyota and ZSK.



CHAPTER 5

BASIC MACHINE OPERATION





CHAPTER 6

BUTTON AND SWITCH OPERATION

CONTROL PANEL



1) LCD MENU INDICATION SCREEN

The LCD Monitor on the control panel can show up to four lines of twenty letters each. It displays the menu chosen by the MENU CHOICE BUTTON (4).

2) THE CURSOR BUTTON

This button moves the cursor that appears on the LCD Menu Indication Screen



3) INDICATOR LIGHTS

This display has lights to indicate FIX POS (Fixed Position) which indicates the main shaft is not moving. RUN MODE indicates that the machine is ready to accept and run the design.

4) MENU CHOICE BUTTON

This button selects the desired menu.

FUNCTION OF SET BUTTON

- 1) Selection of menu
- 2) Number input setting
- 3) Work Completion: When the machine stops during operation, press and hold the set button until you hear a beeping sound. Then press the SET button again until the RUN MODE indicator light appears.

5) NUMBER BUTTONS

These buttons are used to select a different needle bar(color). To select a needle bar above the number 10, use the "+10"key and any other number needed.



To change the needle bar during use, press the CL key after selecting the number of the needle bar using the corresponding number button.

6) THE STOP BUTTON

For reverse sewing or stopping the machine, use THE STOP BUTTON OR SWITCH.

7) THE START BUTTON

Use this button to start the machine.

8) FRAME MOVEMENT BUTTON and MOVEMENT SPEED ADJUSTING BUTTON

Use the buttons on this small control unit to move the frame up, down, left and right. The buttons that activate the INDICATOR LIGHTS are used for frame movement speed adjustment (low, medium and high)

9) MAIN SHAFT SPEED CHANGE BUTTON

When you want to change the speed of the main shaft during operation, press UP to increase the speed and DOWN to decrease the speed.

10) EMERGENCY BUTTON

This button stops the machine IMMEDIATELY and should be used in emergency situations only.



START/STOP BUTTONS



Use the START and STOP buttons to:

- 1) Start embroidery work or stop the machine during operation.
- 2) Back up to correct stitching errors.
- 3) Move forward in the design while the machine is stopped (Use float function).
- 4) Move backward in the design while the machine is stopped (Use float function).

1) START/STOP DURING OPERATION

BUTTON OPERATION	MACHINE OPERATION
Press START button	Machine begins to embroider
Hold START button in	Machine begins at slow rpm (100 rpm) until you release START buttons. It then sews at set speed.
Press STOP button	Machine stops



Non-stitching operations cannot be performed in the initial moments of embroidery. If you want to perform non-stitching operations you must press the STOP button, release it right away, and when the machine goes to STOP MODE, press the FLOAT button. In the float mode you can select the number of stitches to move forward or backward.



2) START/STOP WHEN MACHINE IS STOPPED

BUTTON OPERATION	MACHINE OPERATION
Press STOP button once	Frame goes backwards in selected movement units (a setting between 1 stitch and 10)
Hold down START button	Frame starts to go backwards. If you press START before the machine travels the selected unit of stitches, the machine stops immediately. If the selected unit of stitches is reached. and the STOP button is released, the machine will continue to move backward continuously.
Press STOP button	Press STOP one more time and the machine will stop.

3) START/STOP DURING FORWARD NON-STITCHING OPERATIONS

BUTTON OPERATION	MACHINE OPERATION
Press START button in FLOAT mode	Frame moves forward in the selected units
Hold down START button	Frame moves forward. If you press start before the machine travels the selected unit of stitches, the machine stops immediately. If the selected unit of stitches is reached, and the START button is released, the machine will continue to move forward continuously.
Press START button	Press START one more time, and the machine will stop.

***SEE Page 96 for information about non-stitching operation while the machine is stopped.

4) START/STOP DURING BACKWARD FLOATING

Use the same directions found under START/STOP WHEN MACHINE IS STOPPED.

5) PERFORMING WORK OTHER THAN EMBROIDERY

When you want to perform manual cutting as in applique work, solenoid or sender tests, select the function and then press the START button.

[Note]

- 1) "Inching" refers to low-speed embroidery at a 100 rpm range, performed for stable stitching when the machine is re-started after stop.
- 2) "Frame movement unit" refers to the "BK STITCH UNIT" in "EMB FUNCTION." You can select from 1 to 10 stitches (by 1 stitch).



EMERGENCY STOP BUTTON





If you need to stop the machine due to something as simple as a thread break or as serious as hitting a frame, press the **EMERGENCY STOP** button. The machine will stop immediately.

To restart the machine, rotate the main shaft to the 100 degree mark and then turn the **EMERGENCY STOP** button to the right (see arrow in diagram).



ON/OFF BUTTON ON THREAD TENSION ADJUSTMENT BOARD



For normal operation, press the ON/OFF button or throw the toggle switch to turn the machine on The light will indicate that the machine is on. If you have a button, the light is in the button; if you have a toggle switch, it is below the toggle switch

When the machine stops after a thread break is detected, you can move the frame backward to the location of the thread break using the STOP button, and start the machine again to pick up the stitching. This is essentially an edit of the design.

If you want to back the machine up for any reason when a thread break has NOT occurred, you must press the ON/OFF switch twice. When the light is blinking, you can back up the machine to the desired location.

When an upper or lower thread break is detected the light on the head blinks. After fixing the thread and backing up to the point of the break, press the START button to start stitching again.

On multi-head machines, you can turn one or more heads off by throwing the toggle switch to the off position or pressing the ON/OFF button until the light goes off.



The take-up lever continues to operate even when the head is turned off. This movement can cause the needles to become unthreaded. A rubber magnet bar can be used to prevent the thread from pulling out of the needle.





THREADING AND TENSION

THE UPPER THREAD PATH





THREADING THE MACHINE



Thread Sensing Roller

One turn

Wrap the thread around thread guide disk clockwise. Make sure the thread falls between the tension discs.

Wrap the thread around thread sensing roller one time.



Wrap the thread 1.5 times around the main tensioner in the Vgroove between the rotary tension disks. Pass the thread through the spiral thread guide, the upper and lower thread guide, up through the eye of the thread take-up lever, down though the lower thread guide and then down through the lower thread guide.



Place the upper thread between the upper thread holder ball of the thread guide (lower).



TENSION CONTROL ON UPPER THREAD

Proper tension is an important factor in producing quality embroidery. If the upper tension is too loose, looping and thread breaks may occur. If the tension is too tight, thread and needle breaks may occur as well as puckering. A balance of 2/3 upper thread and 1/3 lower thread generally indicates good tension.

- The upper thread tension is controlled by turning the adjusting nut on the sub-tensions (pretensioners) and the main tension adjusting device. Turn clockwise to increase the tension and counterclockwise to decrease the tension.
- 2) The sub-tension adjusters or pre-tensioners should control about 2/3 of the tension while the main tension adjusting units should handle the other third. The pre-tensioners should be adjusted so that the upper thread flows smoothly through the disks and into the rollers of the main tension adjusting units. The main tensioners are used to fine tune the tension.





You should have to use some force to pull the thread through the tension units if adjusted correctly. The tension should be around 100-120g.

3) After the tension is adjusted on both the pre-tensioners and the main tension adjusting units, adjust the tension settings on the pre-tensioners again if the tension is too light to allow for the upper thread flow.



Adjust the thread tension according to the type of thread used and target fabric.



TAKE-UP SPRING



The play between the pull of the upper thread by the take-up lever and the pull of the thread by the hook creates tension on the upper thread. If the tension of the take-up spring is too tight, looping and loose stitches may result.

If the tension of the take-up spring is too weak, and the machine does not detect thread breaks, you can increase the tension by turning the thread tension adjusting stud clockwise.

If you want to change the relation between the tension of the thread and the operating capacity of the take-up lever, move the location of the take-up spring detector to the right or left.



The take-up spring should touch the detector for proper thread break detection



Dirt, dust or other foreign material can accumulate in the space shown, preventing the thread detector from sensing the thread. Remove any accumulation with crocus cloth, an emery board or other slightly abrasive material.

Our compact and newer systems use Wheel Sensor for thread break detection. The older systems use Spring Break Detection.


BOBBIN THREADING AND TENSION ADJUSTMENT



Use cotton yarn (#80-#120) to wind your own bobbins. You can also buy pre-wound bobbins in cotton or polyester for use in your SWF machine.

Insert the bobbin into the bobbin case. Holding the bobbin case in your left hand, place the bobbin in the case with the thread coming out in a toward the right. Pull the thread across to the left under the thread guide and pull it into the slot. Make sure the thread pulls smoothly from the bobbin.

Trim the thread to 3-4 cm before inserting the bobbin and case into the hook assembly. Long tails can cause the bobbin thread to tangle when the machine begins to stitch.



When holding the bobbin case in your left hand, the bobbin will turn clockwise when you pull the thread.



Remove the bobbin thread from the pigtail and jiggle the bobbin case lightly in an up and down motion. The bobbin should come out of the bobbin case and the case should drop about two inches and then stop If you have a thread tension gauge, set it to 25-35g.





BOBBIN WINDER



Insert the bobbin onto the shaft and wind the thread manually five or six times around the bobbin in the desired direction. Press the lever to wind the thread.



Fill the bobbin 80% and make sure that the thread is parallel to the bobbin.



Be careful not to overfill the bobbin as this will interfere with the smooth flow of the bobbin thread. Filling the bobbin to the recommended 80% capacity will render approximately 80 cm of thread



You can adjust the amount of thread on the bobbin by unfastening the screw of the adjusting plate and moving it in a clockwise direction for more thread and a counterclockwise direction for less thread. After adjustment is completed, be sure to retighten the adjusting plate screw.





For proper winding, the spool or cone of thread and the bobbin being filled by that thread should be parallel with each other. If this is not the case, unfasten the nuts on the bobbin winder and adjust the body of the bobbin winder until they are parallel.



If the bobbin thread is wound off-center or uneven, as seen in these examples, you may experience thread breaks, skipped stitches or birdnesting.





If the bobbin thread is wound too tight and the thread does not release smoothly, you may experience thread breaks or short tails on the bobbin after trimming.



Rotation of the bobbin winder may become slower with use. The joint screw of the winding wheel is set so that it can be adjusted from 100 to 190 degrees. Unscrew the joint screw of the winding wheel with a wrench, move the winding wheel forward the desired degree(s) and then refasten the joint screw securely.



THE NEEDLE, THE HOOK AND THE STITCHES

STITCH FORMATION

Understanding how a stitch is formed will help you understand hook timing and teach you to recognize quality embroidery. It will also help you better understand the importance of tension and the roles the different parts of the machine play in creating that tension and stitch. Stitch formation is the foundation of all sewing; it is the same on all machines that sew.

The needle moves down, and when it reaches the lowest point, the thread slips into the groove of the needle, protecting it from any friction generated between the needle and the fabric. (This is a very good reason to make sure your thread passes through ALL guides and clips on the way to the eye of the needle!)

When the thread is pressed between the body of the needle and the fabric, a loop is formed with the thread. (Different loops are formed, depending on the thread characteristics, needle shape and the type of fabric. Unstable loops, a result of wrong needle/thread, needle/fabric or thread/fabric combinations can result in skipped stitches.)

The point of the hook then approaches and penetrates the loop, enlarging it. The hook point should be positioned as close to the needle as possible so the hook point can be located inside the formed loop, allowing a stable locking of the thread.

The top thread then encircles the bobbin thread and a knot is formed, locking the top thread to the bobbin thread. This knot or stitch is drawn into the fabric by the take up lever, which rising to its highest point, tightens the thread with the help of the upper and lower thread tensions.

When the needle returns to the highest point, it begins the downward journey and the process begins again.



THE NEEDLE AND HOOK



THE NEEDLE

The needle is a slender piece of steel with an opening for thread called the eye and a point for piercing fabric so the thread can pass thought the fabric on the way to the bobbin housing. The needle and thread not only need to pierce the substrate, but also form the loop that helps create the stitch in the correct place which is in the hook assembly.

The proper needle will get the thread where it needs to be when that loop is formed. If the eye of your needle is too big, your embroidery may look untidy. If the loop is too small, the thread may break or fray or, worse, make it look scuffed and worn.

Heavier fabrics need heavier needles to avoid deflection which causes breaks which can knock the timing off. A delicate fabric needs a thinner blade to avoid destroying the fabric.



Take a two foot section of thread. Thread your needle on it and raise and lower the ends. The thread should move easily through the eye.

Needle size should conform to the thread weight. 40 weight thread, the most commonly used, calls for approximately a 75/11 size needle. For normal embroidery use a $DB \times K5$ needle. $DB \times K5$ is a needle with a reinforced blade and a larger eye that is used for most fabrics. It also has a longer groove to cradle the thread on the way down which guards against fraying. The longer scarf allows for a more forgiving registration process.



Mark your needle and case with a marker so you can tell at a glance which they are.

Sharp points tend to damage fibers at high speeds. Less lint is produced when there is less fabric damage. On heavy fabric and cap seams, a sharp needle works best. Sharps are best with small lettering. They create a crisper letter. A longer needle with a larger eye is available for metallics, reducing thread breaks and frays due to drag on the thread through the small oval eyes.



Machine embroidery needles come in sharp points for piercing heavy, tightly woven fabric and ball points, which glide between the fibers of the knits.

The size of yarn being pushed aside with the ball point determines the size of the needle. Light ball points (SES) are good for polo shirts, medium points (SUK) are good for fleece. The SKF or heavy ball point is seldom used except for elastic goods.

You should always select the proper needle for the job. The target material and the thread help determine the needle to be used for the job. If the proper needle is not used problems, including but not limited to looping, and thread breaks, can occur. Most materials call for ball point needles.

Needles are classified by system type, blade size, and type of point. Blade sizes range from 60/8 to 110/18 depending on the system.



Place your commonly used threads on the thread posts that are hardest to accessin the center of the rack. Place the colors you change most often on the posts that are easiest to reach. Consider keeping different size needles in a multi-needle machine. Put ballpoints in half and sharps in half to be ready for all jobs. You can place threads used in a job on neighboring needles to minimize machine movement between colors.

Keep a large eye needle for metallic thread on the machine at all times. You can designate needles for different thread weights as well. For faster production work, thread jobs on neighboring needles to minimize machine movements between colors.

Combine cotton bobbin thread and a small sharp needle with 60 weight thread for sharp, crisp lettering.



CHANGING THE NEEDLE

Make sure that the needle is clear of the needle plate before attempting to change it. If the needle is not clear of the needle plate, use the hand wheel to raise the needle.





STOP THE MACHINE BEFORE TURNING THE HAND WHEEL MANUALLY.



When inserting the needle, be sure that the groove is in the front and the scarf in the back. Improper insertion of the needle will prevent the machine from stitching correctly. A toothpick or other nonmetal item can be used to hold it straight while tightening the set screw. The shaft of the needle should be inserted completely into the needle bar.



If the needle is not inserted all the way to the top of the needle bar hole, the timing of the machine will be off. Broken needles and thread breaks can result.



Turning the needle slightly to the right at a very slight angle can help the point of the hook catch the thread with greater ease during the formation of the stitch. This is particularly helpful when using specialty threads.



RELATIONSHIP BETWEEN NEEDLE AND HOOK

The relationship between the needle and the hook is called timing. Timing between the needle and the hook is correct when the main shaft is 200 degrees.



It is a good idea to use a Size 11 needle when adjusting the timing. Although needle size increases toward the front – the scarf and the back dimension remaining the same – it is just good insurance to use this popular size, and use it each for each timing procedure.

THE ROTATING HOOK ASSEMBLY

The hook assembly, located beneath the throat plate, is the home of the bobbin case and bobbin. The inside of the hook assembly is called the basket, and is surrounded by the assembly raceway. The basket cradles the bobbin in the case after it has been placed on the shaft of the hook assembly.

The hook assembly has a hook point that is used by the sewing head to lock the top thread to the bobbin thread to form the stitch. As the machine is sewing, the bobbin in the case and the needle moves with the point of the hook. The timing of the passage of the hook point and the point of the needle is extremely important. If the hook approaches the loop too early, the hook point will not intercept the loop. The loop will be formed after the hook point has passed the needle, which will result in skipped stitches, and broken thread. If the hook approaches the loop too late, the loop will not be available when the hook point reaches the needle. Again, skipped stitches and broken thread will be the result.



The hook can move from the right to the left according to the allowance of the lower shaft gear. When the timing is correct, there is no movement when turning the hook clockwise.







The eye of the needle should be just below the point of the hook(b,c). The eye should look like a teardrop hanging from the point of the hook. If the eye is above or below, the needle bar may need adjusting. If the needle bar is too high, the loop will be formed above the hook point : too low, and the loop will form below the hook point. In both cases, skipped stitches will result. Needle bar height (a) rarely changes unless you crash a hoop. If one needle on a head is skipping stitches, needle bar height is most likely the culprit. If all are skipping, check the hook timing. Before you do anything change the needle, check the thread path and clean the bobbin case.



The point of the hook should be directly behind the needle. The gap between the point and the scarf of the needle (indentation on the back of the shaft) should be between 0.1 and 0.3 mm. A good test is to run a piece of paper between the needle and point of the hook. One piece of paper should fit with no deflection. Two pieces of paper, however, should deflect the needle. This measurement is important because if the hook passes too close to the needle, broken needles can result as well as broken thread and damaged hooks. If the hook passes too far from the needle, skipped stitches may result, as the hook point may not penetrate each loop that is formed. If it is far enough away, there will be no stitches formed at all.







The size of the eye of the needle-and the size of the needle groove varies-between different sizes of needles.

The front groove of the needle cradles the thread and protects it from the heat of sewing friction (which can result in thread breaks.).

The back groove of the needle (scarf) helps regulate the hook timing and prevent looping. Prevention of looping is important for quality stitching, so the hook point should be adjusted as close to the needle as possible to achieve perfect thread position while sewing.

If thread breaks or thread movement occurs, turn the needle slightly to the right. This helps to form a good loop as the very slight angle can help the point of the hook catch the thread with greater ease during the formation of the stitch.



As we have learned, when a stitch is formed, it makes a loop. The loop size may vary depending on the thread selection. Cotton forms a much tighter loop then synthetic thread. Loop formation can compromise the quality of your embroidery. The synthetic threads are polyester and rayon. Polyester has a greater elongation factor than rayon or cotton, meaning that it can be stretched more before returning to its original position and so creates a larger loop. Tightening the top tension when using polyester thread can eliminate the looping.



RELATIONSHIP BETWEEN TAKE-UP LEVER AND HOOK

The following pictures show the location of hook when the take-up lever starts to move up from the lower dead stop (main shaft rotation angle: 295°).



When the hook timing falls in the A range (see illustration below) the loop will be too small. Stitch formation will take place faster than the upward movement of the take-up lever. The thread will be too loose and looping and skipped stitches will occur.



If the hook timing falls in the B range (see below), the hook point will catch the thread when the loop is too big. This will cause thread breaks since the upward movement of the take-up lever is faster then the rate at which the thread comes off the hook.



When the hook timing is correct, the hook should move within the C range.





THREAD – BREAK DETECTING UNIT

The thread-break detecting unit contains rollers which sense the smooth rotation of the thread which determines if there has been a break in the upper or lower thread. Any dust, thread remnants, etc. will interfere with the roller's rotation and prevent detection of broken thread. Therefore, It is important to always keep the rollers and bush bearings clean and free of dust and dirt.

To clean the thread-break detecting unit, remove the cover of the thread tension adjusting plate, separate the cables and unscrew the roller base joint screw.

Use a soft brush of canned air to clean the rollers and bush bearings and then reassemble the unit.





Be sure to place the thread detecting board in the correct position or the unit will not operate.



CHAPTER 9

FLOPPY DISKS



Pre-formatted disks can be used. However be sure to use disks of recognized quality in your SWF machine.



GUIDELINES

- Keep disks away from objects with magnetic fields such as televisions.
- 2) Protect the disks from excess heat, humidity and direct sunlight.
- 3) Do not place heavy objects on the disks.
- 4) Do not remove the disk from the disk drive while formatting, reading or writing are in progress.
- 5) Do not open the cover of the disk drive.
- 6) Data cannot be written on to disks that are writeprotected.
- 7) Erasing data and reusing disks repeatedly can result in disk errors.
- Save you data on two separate disks in order to have a back-up of your information.



INSERTING THE DISK



INPUT AND OUTPUT OF EMBROIDERY DESIGNS

Embroidery designs can be input to an SWF machine using a floppy disk. Designs can be output to floppy disk.



Press and release the area of the acrylic door on the disk drive in order to open the cover. Insert the floppy disk into the drive as shown in the illustration above.

REMOVING THE DISK



Always press the release button on the drive itself to remove a disk. DO NOT remove a disk from the disk drive while it is formatting or reading and writing data.



If your electric power fails while the machine is operating, turn off the main switch and determine the cause of the service interruption before proceeding. The SWF embroidery machine can search for and return to its previous position when the electric current is restored. (See Non-Stitching Movement Page 96)



CHAPTER 10

NAVIGATING THE CONTROL PANEL

Consumable parts shall not be guaranteed even in warranty period.

INSTALLING THE OPERATING SYSTEM

The operating system is installed in the control panel at the factory. In the event of a malfunction of the controller box or an upgrade to a more recent version of the OS, you will have to install the operating system.

===== SWF-EMB	Vx.xx	=====
[T1201C]	XXXX/	xx/xx
================	======	======
SYSTEM LOADI	NG	•

[[]Menu screen]

When the menu function keys $\left(\begin{array}{c} \bullet \\ \blacksquare \end{array} \right) + \left(\begin{array}{c} \bullet \\ \blacksquare \end{array} \right)$ are pressed at the same time and the operating system does not appear, the system installment screen will appear. You will install the operating system from this screen.

1.	VERSION	INSTALL
2.	VERSION	BACKUP
3.	ENCODER	SETTING
4.	C/C SETI	ING

[[]Menu screen]



The system installment program includes the following auxiliary menus. They are displayed four at a time on the screen. Use the UP and DOWN cursor to move through the menus.

- 1. VERSION INSTALL: Installs the machine operating program.
- 2. VERSION BACKUP: Copies the machine operating program stored in the memory on to a disk.
- 3. ENCODER SETTING: Installs the main shaft encoder setting.
- 4. C/C SETTING: Installs the setting for the needle bar position signal.
- 5. X ORIGIN SETTING: Used to confirm the X-shaft origin when checking the machine.
- 6. Y ORIGIN SETTING: Used to confirm the Y-shaft origin when checking the machine.
- 7. EMERGENCY CHECK: Checks the function of the emergency switch.
- 8. SETTING DEFAULT: Changes the machine and embroidery settings back to the default settings.
- 9. CURRENT SETTING : Displays the current setting of the X and Y drives when checking the machine.
- 10. MACHINE SETTING: Displays information on the machine type.
- 11. EXIT: Select this to go back to the machine operation program.



[Machine data screen]



When you have a new version of the machine operating program to install, you should make a copy of the old program before installing the new one. Back-ups are always a good idea. Once the new version is successfully installed you can back that up as well.

Follow these directions to back up the current system and install the new operating program into the machine memory.

LESSON: Copy the version of the operation program stored in memory to disk 1 (back-up) and load the new version into memory from disk2.













If the needle bar selection is incorrect, the machine will not operate correctly.



MAIN INDICATION SCREEN

The menu indication screen shows the setting content and sub-menus for selected main menu. There is a list of 14 settings in the setting contents. Four will be listed at a time. Press CURSOR UP or DOWN key on the LCD to move to another screen.

SPEED	: 0[RPM]
0/	1991[00%]
TOTAL	:258051[ST]
NEEDLE	: 1[6] 1

SPEED: Indicates the present speed of the machine.

0/1991/[00%]: The percentage of the selected design that has been completed.

TOTAL: The total number of stitches in memory at present.

NEEDLE: Needle bar in use at the present time.

NO.	:	8
STITCH	:	16850
COLOR	:	6
JUMP	:	118

NO: Indicates the location of the selected design in memory. STITCH: The total number of stitches in the selected design. COLOR: Number of color changes (needle bars) in the design. JUMP: Number of JUMP stitches in the design.



X [mm]	:	83.4
Y [mm]	:	101.6
ANGLE	:	45
MIRROR	:	OFF

X[mm]: The X dimension (left to right) of the selected design.Y[mm]: The Y dimension (top to bottom) of the selected design.ANGLE: The selected orientation of the design by degrees.MIRROR: Indicates if the reverse function is activated.

X_SCALE	:	100
Y_SCALE	:	100

X SCALE: Indicates if the design has been scaled up or down in the X direction.

Y SCALE: Indicates if the design has been scaled up or down in the Y direction.



THE FUNCTION MENU





OUTLINE OF FUNCTION MENU





Items marked with a * cannot be set up in a sequence. Items marked with a + cannot be selected before the embroidery work begins.



EXPLANATION OF FUNCTION MENU

INPUT AND OUTPUT OF DESIGN

When the machine is turned on and the operating system loads, press The following screen will appear:

1.	EMB CALL	
2.	FDD CALL	
3.	EXTERNAL	INPUT
4.	EXTERNAL	OUTPUT

The sub-menu functions for design input and output are:

- 1. EMB CALL: Calls the design from memory.
- 2. FDD CALL: Reads design from the disk in the floppy drive.
- 3. EXTERNAL INPUT: Reads designs from an outside source.
- 4. EXTERNAL OUTPUT: Outputs designs from memory.
- 5. DESIGN DELETE: Deletes design stored in memory.
- 6. DESIGN COPY: Copies designs stored in memory.
- 7. MEMORY INITIAL: Deletes all designs stored in the memory.



• EMB CALL

CALLING THE DESIGN FROM MEMORY







1)	12372
2]	5954
3]	7281
4]	17325

5]	18294
6]	13826
7]	21064
8]	16850

1.	EMB CALL	
2.	FDD CALL	
3.	EXTERNAL	INPUT
4.	EXTERNAL	OUTPUT

SPEED	:	0 [RPM]
0/	168	350 [00%]
TOTAL	: 258	8051[ST]
NEEDLE	:	1[6] 1



FDD CALL

READS THE DESIGN FROM THE FLOPPY DISK.

LESSON: Move "GOLF" from the floppy disk to Location#30. Number of stitches:7667.









SELECT EMPTY ROOM ===> # 30 EMB READ : 55[%] [>>>>]

The screen shows the copying progress.

ZSK NEEDLE SEQ

MANUAL(0), AUTO(1)

MANUAL SELECT \rightarrow To save previous needle bar information.

 $\begin{array}{l} \mbox{AUTO SELECT} \rightarrow \mbox{To save present needle bar} \\ \mbox{information of design.} \end{array}$

1. BASIC SETTING		
2. NEEDLE	SETI	'ING
••••••	•••••	
SPEED	:	0 [RPM]
~ /		
0/		7667[00%]
0/ TOTAL	:	7667[00%] 258051[ST]

DESIGN from room no. 30 has been called.

= USER	SELE	CT FOI	RMAT	=
1. DOS	2.ZS	ĸ		
2. BAR	FMC	4.BAR	FDR	
3. EXI	C OR	PREVIC	ວບຣ	



EXTERNAL INPUT

READS DESIGNS FROM OUTSIDE SOURCE.

1.	GNT2910
2.	GNT4604
3.	SERIAL
4.	PARALLEL



- 1. GNT2910: Function that reads data from the Tape Reader.
- 2. GNT4604: Function that reads data from the Tape Reader.
- 3. SERIAL: Function that enables data correspondence between the PC and Machine.
- 4. PARALLEL: Data reading function from the SWF-NET1.

LESSON: Read data from GNT 2910 and store in Location #25.

After moving the cursor to GNT2910, Press SET	
◆	SELECT EMPTY ROOM ==> 15
Place the cursor at 25 to save it in Location#25. press SET	
	PRESS SET TO START ! ==> EXIT TO PREVIOUS
When ready, Press SET	
•	NOW DATA READING !



When all the data has been read from the tape, the following screen appears. To store the data, move the cursor to "YES" And then Press SET	DO YOU WANT	TO SAVE ?
	[YES]	[NO]
•	 As shown above, the tape format is automatically detected. The communication method of GNT4604 and SERIAL is the same as above. 	

EXTERNAL OUTPUT

OUTPUTS THE DESIGN



LESSON: Use the SERIAL communication to send data to another SWF machine.









DESIGN DELETE

DELETES A DESIGN STORED IN MEMORY

LESSON: Delete design in Location #30. Number of stitches:7667.



2.	FDD CALL
3.	EXTERNAL INPUT
4.	EXTERNAL OUTPUT
5.	DESIGN DELETE

1)	992
2]	5954
3]	7281
4]	17325

14]	10898
15]	55961
16]	5718
30]	7669

1)	992
2]	5954
3]	7281
4]	17325

SPEED	: 0[RPM]	
0/	: 1991[00%]	
TOTAL	: 258051[ST]	
NEEDLE	: 1[6] 1	



If you attempt to open a design that has been deleted you will see the following screen:

NOT	LOAD	DESIGN!	
 	•••••		
	•••••		

■ DESIGN COPY

COPY DESIGNS IN MEMORY TO ANOTHER LOCATION

LESSON: Copy design in Location#5 to Location #35. Number of stitches: 18294.

Place the cursor at "6. DESIGN COPY".		
	3. EXTERNAL INPUT	
★	4. EXTERNAL OUTPUT	
•	5. DESIGN DELETE	
	6. DESIGN COPY	
Press SET		
	1] 992	
•	2] 5954	
•	3] 7281	
	4] 17325	
Select Location #5 using the cursor UP or DOWN, or numerical keys.		
	2] 5954	
	3] 7281	
♥	4] 17325	
	5] 18294	







MEMORY INITIAL

DELETES ALL THE DESIGNS STORED IN THE MEMORY.

LESSON: Delete all the designs stored in the memory.




BASIC SET-UP FUNCTIONS

When the machine is turned on and the operating system loads, press This allows the set-up of basic design changes.

■ X SCALE

This reduces or enlarges the design along the X axis (left to right). The default is 100% and the range allowed is 50%-200%. **Remember that changing the size does not alter the stitch count**.



• Y SCALE

This reduces or enlarges the design along the Y axis (top to bottom). The default is 100% and the range allowed is 50%-200%.



Design can be enlarged in both the X and the Y direction.





■ ANGLE

Designs can be rotated from 0 to 359 degrees. The default is 0 degrees.





Changing the stitching angle of a design to 90 degrees can be a real benefit when embroidering on left front (chest) jackets, especially those satin jackets with flannel linings. By hooping the design sideways, you take advantage of the natural stability of the shoulder seam. When you place it on the machine, the jackets lining, sleeves, etc. fall out of the way. Rotate the design 90 degrees and stitch with ease.

■ MIRROR

Designs can be reversed on the X axis, the Y axis or both



Mirror of the design on the X-axis





Mirror of the design on the Y-axis

	•	

Mirror of the design on the X-and Y-axis

■ START ST

This function allows you to choose the start stitch of a design when you want it to be other than the first stitch of the design.





■ X SATIN

This function edits the width of a satin stitch in the X (left to right) direction. This can be increased in increments of 0.1 mm on each side. The default is set for 0 and the range is from 0 to 5.



Changing the satin width 2mm on each side.

• Y SATIN

This function changes the satin span in the Y direction.



When a new design is read into the memory of the machine, all settings revert to the default settings.

LESSON: Edit the # 5 design as follows:

X SCALE : 150% START ST :100 Y SCALE : 120% X SATIN : 3 MIRROR : Y Y SATIN : 2 ANGLE OF ROTATION: 45 degrees

Select the design in Location #5	
L	SPEED : 0[RPM]
	0/ 1991[00%]
	TOTAL : 258051[ST]
Press	NEEDLE : 1[6] 1
ل ه	1] X_SCALE : 100[%]
	2] Y_SCALE : 100[%]
	3] ANGLE : 0°
	4] MIRROR : NO MIRROR





==>				
X_SCALE	:	100		
[RANGE	: 50-	-200[%]	1	•••••

100

	1]	X_SCALE	:	150[%]
	2]	Y_SCALE	:	100[%]
•	3]	ANGLE	:	0°

:

:

NO MIRROR

The X scale has been setup as "150"

Y_SCALE	:	100	
[RANGE :	50	-200[%]]	
==>			

1]	X_SCALE	:	150[%]
2]	Y_SCALE	:	120[%]
3]	ANGLE	:	0°
4]	MIRROR	:	NO MIRROR

The Y scale has been setup as "120"







ANGLE	: 0°	
[RANGE	: 0 - 3	59°]
==>		

1] X_SCALE	:	150[%]
2] Y_SCALE	:	120[%]
3] ANGLE	:	45°
4] MIRROR	:	NO MIRROR

1]	X_SCALE	:	150[%]
2]	Y_SCALE	:	120 [%]
3]	ANGLE	:	45°
4]	MIRROR	:	Y MIRROR

4]	MIRROR	:	Y MIRROR
5]	START ST	:	100 st
6]	X SATIN	:	3
7]	Y SATIN	:	2

SPEED	: 0 [RPM]
0/	1991[00%]
TOTAL	: 258051[ST]
NEEDLE	: 1[6] 1

	The length of X and	I Y have cha	anged, and the
	MTDDOD	•	
	ANGLE	:	45
	Y [mm]	:	135.0
riess the DOWN key once.	X [mm]	:	96.5

SUB WORK

These functions can be used before the embroidery work begins.

Press $\left[\begin{array}{c} \hline \\ \hline \\ \hline \\ \hline \\ \end{array} \right]$ when the machine is on and the operating system has loaded.

The following screen appears:

1.	BOBBIN	WINDING
2.	DESIGN	TRACE
3.	LENGTH	MEASURE
4.	OPTIMIZ	ZE TRACE

BOBBIN WINDING: Winds the bobbin thread. (If the optional Bobbin Winder is installed).

DESIGN TRACE: Checks the outline area of the design (perimeter trace).

LENGTH MEASURE: Measure the length between two selected points.

OPTIMIZE TRACE: Traces the actual shape of the design.



BOBBIN WINDING



DESIGN TRACE

Trace the X and Y limits of the selected design (perimeter trace). This trace tells you if the design will fit in the selected hoop.

To use the **DESIGN TRACE** function, scroll down to Design Trace and then press the Set button.

The arrows in the illustration below show the path of the design trace. The design will be traced at its furthest points. This will appear as a square or a rectangle. If it is too large for the hoop, the frame stops and the message **FRAME LIMIT ERROR** appears on the screen,





DO NOT lock your needle in a down position to trace. If the design is larger that the hoop you will damage the presser foot.



LESSON: Select the design stored in Location #5 and perform a DESIGN TRACE.





LENGTH MEASURE

MEASURES THE DISTANCE BETWEEN TWO POINTS.





• OPTIMIZE TRACE

OUTLINE OF DESIGN (ACTUAL TRACE)

This function follows the actual outline of the design when the design selected is to be stitched in the selected hoop. This will take longer than a Design Trace. It will follow precisely the outline of current design, verifying if it will fit in the hoop selected.





REPETITION WORK

This function sets up a design to stitch more than once.

Press end when the operating system has loaded on the machine. In order to use this feature the following parameters must be set up.

- 1. X REPEAT : How many times X will be repeated.
- 2. Y REPEAT : How many times Y will be repeated.
- 3. X DESIGN INTERVAL : The interval in the direction of the X-axis. (mm)
- 4. Y DESIGN INTERVAL : The interval in the direction of the Y-axis. (mm)
- 5. X/Y PRIORITY : Determination of X or Y direction as priority.
- 6. DESIGN INTERVAL : Set-up of how to move from one design to another.

PARAMETER EXPLANATIONS

- Number of X repetitions : Enter the number of times the design is to be repeated in the direction of the X-axis using the numerical keys. Select from one to 99 times.
- Number of Y repetitions : Enter the number of times the design is to be repeated in the direction of the Y-axis using the numerical keys. Select from one to 99 times.
- **X Design interval** : Set up the distance between the beginning points of the design in the direction of the X-axis. The marks (+/–) show which way the design should be repeated. (+) Repeat design to the right and (–) repeat design to the left.





Y Design interval: Set up the distance between the beginning points of the design in the direction of the Y-axis. The marks (+/-) show which way the design should be repeated.(+) Repeat design above the Y-axis (-) Repeat design below the Y-axis.



X/Y PRIORITY : Determination of X or Y direction as priority.





DESIGN INTERVAL : There are two methods for moving the design, the jump and the stop code. The **STOP** code starts when the work has moved to the next design point. The **JUMP** code starts stitching automatically after moving to the next design.

Setting the needle bar (color change) differs according to the design movement chosen.

When the **STOP** code is used a color change is added automatically to the starting point of the design.

Example using four colors:

$$1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \qquad \qquad \Box \rangle \qquad 1 \rightarrow 1 \rightarrow 2 \rightarrow 3 \rightarrow 4$$

When a JUMP code is used, no color change is added to the start of the design. Select the four needle bars (color changes) in order of stitching.



The number of needle bars (color changes) is always indicated in the initial menu screen.

NO	:	8
STITCH	:	16850
COLOR	:	6
JUMP	:	118



LESSON: Select the design in Location #8 and repeat the design as indicated below:

Repeat X: 5 timesY DesignRepeat Y: 5 timesX/Y PriorX Design Interval: 40mmDesign Interval: 40mm

Y Design Interval: –40mm X/Y Priority: X Priority Design Interval: **JUMP** code



SPEED	:	0 [RPM]
0/		1991[00%]
TOTAL	:	258051 [ST]
NEEDLE	:	1[6] 1

====	=	REP	EAT	SETTING	====
1]	х	REP	EAT		
	1	->	99		
=>				(0)

====	-	REI	PEAT	SETTING	====
2]	Y	REI	PEAT		
	1	->	99		
=>				(0)

====	REPEAT	SETTING	====
3] X	Design	Interval	
-	300 -> ·	+300 [mm]	
=>		(0)











EMBROIDERY DATA SET-UP

Press when the operating system loads. There are three auxiliary menus in the data setup EMB FUNCTION : Sets up the parameters for the embroidery work. MACHINE FUNCTION : Sets up the parameters for the machine operation. DEFAULT : Sets all your embroidery functions and machine functions to the factory settings. If you are not sure where your settings should be scroll down to DEFAULT and press SET.

To set up the parameters, move the cursor to the chosen parameter. Use the numerical keys to enter the data. The set-up data will be stored automatically when you press

EMB FUNCTION

1]	TOTAL STITCH CLEAR
2]	TOTAL WORK CLEAR
3]	JUMP CONVERT:3st
4]	AUTO ORIGIN:YES

TOTAL STITCH CLEAR: (Total number of stitches)

Along with TOTAL ST from the main function menu, this function indicates the number of stitches (1 number for each stitch) performed from the beginning and is also used to go back to the beginning set-up data. (Only the numerical key **0** works here.)

TOTAL WORK CLEAR: (Total number of table set) Along with TOTAL WK from the main function menu, this function indicates the number of table sets (the selected design finished once) by 1 for each. (Only the numerical key **0** works here.)

JUMP CONVERT: (Trimming after jumps) This function trims and moves the frame if the jump function is repeated more than the number of times in the set-up. Example: If the number of repetition in the set-up is 5, during embroidery work that includes a jump code, the jump stitch is performed on the fourth stitch without trimming. After more than 4 stitches the work resumes after trimming and moving 5 stitches. The default is 3. Set-ups are possible from 0~10 stitches in increments of 1 stitch.

AUTO ORIGIN: (Return to the starting position) This function returns the frame to the starting position after the selected design has been finished. The default is YES. If **AUTO ORIGIN** is not desired, input '0' to select *NO*.





[JUMP CONVERT]

STOP INCHING: (Number of inching at the beginning) This indicates the number of stitches to be done at low speed. (When the machine starts to run, it proceeds gradually in *inching* speed.) The default is 2 stitches. Set-ups are possible from 0 to 5 stitches in increments of 1 stitch.

TRIM INCHING: (Number of inching after trimming) This indicates the number of stitches to be done in low speed when changing colors or finishing up a design. The default is 3 stitches. Set-ups are possible between 2~5 stitches in increments of 1 stitch.

AUTO JUMP: (Automatic jump stitch interval) The length of the stitch interval that causes the general code to change to a jump code. If the distance from one stitch from another stitch is longer than the frame was set up the move, a jump stitch will be performed. The default is 10.0mm and the auto jump can be setup from 5.0 to 12.7mm in increments of 0.1mm.

BK_ ST UNIT: (Back stitch transfer unit) This sets the number of stitches to be performed when operating the stop switch for the purpose of moving the frame forward and backward. The default is 1 stitch. This can be set up from 1 to 10 stitches in increments of 1 stitch

TRIM START: (Determines if the machine will automatically start after thread trimming) This is a value set that determines whether or not to automatically start the next section of the embroidery design after a thread trim by jump code, thread trimmer, and stop code. The default is *YES*. If automatic start is not desired, set NO by inputting $\mathbf{0}$.

ST BACKTACK: (Automatic Back-tack Function) This is a value set for a back-tack, a stitch that prevents thread unraveling. The default setting is *NO*.

AUTO BACK: (Automatic back stitch after detection of thread cut) This is a value set to automatically move the embroidery frame back in case of thread breaks. The default is 2 stitches it can be set in increments of 1 stitch from 0 to 5.



FRAME LIMIT: (Frame Limit Setting) This is setting that determines whether or not to use visual frame set limit. Refer to machine setting for visual frame limit setting on page. The default setting is NO.

JUMP LENGTH: (whether thread trimming should be determined by jump length). If a jump length is over the set value, this function performs automatic thread trimming.

APPLIQUE: If the identical number needle bar is set consecutively when the appliqué setting is YES, the machine stops automatically so the fabric can be trimmed without trimming the thread.

MACHINE FUNCTION

1]	FLAT, CAP:FLAT
2]	CORDING:NO
3]	BORING NEEDLE:0
4]	SEQUIN:NO

FLAT, CAP: Tells the machine if it is going to be stitching caps or flat goods. The default is FLAT (0). To set up for CAP, enter(1).

CORDING: Enables the cording function. The default is NO (0). Input (1) to for YES.

BORING NEEDLE: Enables the boring needle. Select the number of the needle bar that will be doing the boring work. The default is (0), and the default needle bar is the first needle bar. The trimming device and the thread detecting function of the first needle is turned OFF when boring is enabled.

SEQUIN: Enables the sequin function. The default is NO. To setup for YES, enter (1).

UP_THD SENSE: (Upper thread detection) Determines whether or not the upper thread break detecting sensor is enabled and, if so, the number of stitches to be detected. The upper thread will not be detected when (0) is input. The default is(1), and up to 10 stitches can be selected for detection.



TRIM LENGTH: (Length control of the thread tail after trimming) Determines the length of the upper thread left on the needle after automatic trimming. The default is medium length. To setup for *SHORT* enter (0), and for *LONG* enter (2).

AUTO TRIM: (Automatic trimming) Determines whether or not to have the automatic trimming function operated. The default is *YES*. To turn *OFF* the automatic trimming function, select *NO*.

AUTO C/C: (Automatic color changing) Determines whether or not to operate the automatic color changing function. The default is *YES*. To turn *OFF* the automatic color changing function, select *NO*.

MAX SPEED: (Limit of the maximum speed) Determines the maximum machine speed. The default varies according to the machine type and the goods being embroidered. The range is shown below, and the increment is 10rpm.

Type Sewing Materials	TUBULAR	САР
SWF/T1201C	1200	1200
SWF/T901C	1200	1200
SWF/T601C	1200	1200

MIN SPEED: (Minimum speed limit) Determines the minimum embroidery speed. The default speed is 300 rpm, and the speed can be varied from 300 rpm to the maximum speed with an increment of 10 rpm.

JUMP SPEED: (Speed of jump stitches) The setup of jump stitch (the frame moves without sewing) speed limit. The standard speeds 750 rpm. The limit can be setup from the minimum speed to the maximum speed in increments of 10 rpm.



If the jump stitch exceeds 750 rpm, broken needles and mechanical problems with the needle bar can occur.



INC SPEED: (Inching speed) Determines the sewing machine speed when the embroidery work begins. This is called Inching. The default for the single-head machine is 180 rpm, and 100 rpm for the four-head machine. The speed can be varied from 50 rpm to 200 rpm in increments of 10 rpm.

Type Sewing Materials	Basic default of Inching speed
SWF/T1201C	180
SWF/T901C	180
SWF/T601C	180

SLOW SPEED: The operator can work at a low speed on a particular part of a design by selecting:

The low embroidery speed can be set up for the same minimum to the maximum speed as mentioned above. The speed is set increments of 10 rpm.

POWER ORG: Determines if the machine will search for the origin automatically when to power is ON. The default is *NO* (0). To set up for *YES* input (1).

FRAME SPEED: Sets the speed at which the embroidery frame returns during automatic origin return or offset movement. The default setting is LOW(0). and you can change to high speed mode *HIGH* by pressing (1).

SPEED DATA: Allows the sewing speed to be slowed when heavy weight materials are being stitched. The default setting is HIGH (1). When LOW (0) is selected, the speed is decreased by 30~50 rpm.

COVER SWITCH: When the thread take-up cover is opened during operation, the machine automatically stops. Enter *DISABLE* to not use this safety function for Cover Switch.



₽₽[®]

EMBROIDERY DESIGN EDITING

This function is used to edit selected designs. When the operating system loads, press The sub-menu contains:

- P

STITCH EDIT: This allows editing of the stitch data of the selected design.DESIGN DIVIDE: This function is used to divide the selected design into two parts.DESIGN FILTERING: This function edits the stitch length and removes short stitches.

■ STITCH EDIT

LESSON: Edit the design in Location #5 as follows:

Check the *STITCH 500* data and set the X and Y data at (0). Set the *STITCH 700* data with the correct color changing code. Delete the *STITCH 800* data and insert X-0,Y-0. Enter *JUMP* in the *STITCH 900*.







SWE	90

500]	3	-33	N
501]	3	-32	N
DEL	INS	E	DIT

The cursor is placed at "DEL". To go back to the stitch data, press the previous stage. The cursor key is used to select DEL, INS, and EDIT.

500]	3	-33	N
501]	3	-33	N
		======	======
DEL	INS	E	DIT

=	==	STITCH	EDIT	===
ΧI	DAT	· ·		3
ΥI	DAT	· ·		-33
FUN	ICT]	ION :	NORM	AL(0)

===	STITCH	EDIT	===
X DAI	'A :		0
Y DAI	'A :		-33
FUNCI	ION :	NORM	AL(0)

	===	STIT	СН	EDIT	===
х	DAT	A	:		0
Y	DAT	A	:		0
FU	JNCT	ION	:	NORM	AL(0)



500]	3	-33	N
501]	3	-32	N
DEL	INS	E	DIT

The stitch 500 data has been corrected as indicated in the example.

=== STI	TCH EDIT	===
X DATA	:	3
Y DATA	:	-33
FUNCTION	: NORM	AL(0)

===	STITCH	EDIT	===
X DAT	A :		3
Y DAT	A :		-33
FUNCT	ION :	NORM	AL(0)

=== :	STITCH	EDIT	===
X DATA	:		3
Y DATA	:		-33
FUNCTI	on :	C	/C(1)

The following data are needed to correct the function code.

 $0 \rightarrow \text{General code}(\text{NORMAL})$

 $1 \rightarrow \text{Color change code}(C/C)$

- $2 \rightarrow \text{Jump code}(\text{JUMP})$
- $3 \rightarrow \text{Finish code(END)}$











DESIGN DIVIDE

LESSON: Divide the design in Location #5 as follows: DESIGN 1:0-1000 DESIGN 2: 1001-18294

Call design from Location #5 and then press	
	1. STITCH EDIT
	2. DESIGN DIVIDE
♥	3. DESIGN FILTERING







DESIGN FILTERING

LESSON: Select the design in Location #5 and edit the minimum stitch interval to 0.3mm or longer. Then store in Location #17. Number of stitches in design: 18294





■ SPEED CODE

LESSON: Select design in Location #5 and set the stitches between 1000 and 2000 to a low speed code. THE SPEED CODE function only works after you have started sewing. It slows the machine down at certain selected points in the design and then resumes speed.





FRAME MOVEMENT

Press when the operating system loads. The following screen will appear:

1.	DATA ORIGIN
2.	ORIGIN
3.	POWER RESUME

■ DATA ORIGIN

The SWF embroidery machine memorizes the position of the frame when it stops (by the stop switch, detection of thread breaks, etc.) during operation. The user can use the **DATA ORIGIN** to select a previous stopping point by using the frame transfer key, allowing work to be done at another location.



- A. Starting point of embroidery
- B. Stopping point of embroidery
- C. Point to which frame has been moved
- D. Frame returns to original course

ORIGIN : This function moves the frame to the starting point of the design. If you stop the machine and accidently move the frame, press FRAME, scroll to DATA ORIGIN and press SET.



- A. Starting point of embroidery
- B. Stopping point of embroidery
- C. Frame transfer course



■ POWER RESUME

If the frame moves during a power failure, use this function to move it back to where it was when the power failure occurred.



- A. Starting point of embroidery
- B. Stopping point of embroidery
- C. Frame transfer course

The automatic frame transfer functions are carried out by the three menus above: **DATA ORIGIN**; **ORIGIN**; **POWER RESUME**. The frame stops when the STOP Switch is pressed during frame transfer. After this you can move the frame using the frame transfer key or, if you press the START switch, the frame will move to its destination.



- A. Starting point of automatic frame transfer
- B. Emergency stopping point activated by moving the bar switch to the left.
- C. Point of frame reached by using the frame transfer key.
- D. The original doing reached by moving the bar switch to the right.
- E. The transfer course of the automatic frame transfer with no emergency stop performed



<u>FLOAT</u>

■ NON-STITCHING MOVEMENT

You must be sewing a design to use this function.

Press

when the operating system loads. The following screen appears: \blacksquare

1.	100 STITCH
2.	1000 STITCH
3.	10000 STITCH
4.	COLOR

100 STITCH : Forward/reverse in units of 100 stitches.
1000 STITCH : Forward/reverse in units of 1,000 stitches.
10,000 STITCH : Forward/reverse in units of 10,000 stitches.
COLOR : Forward / reverse by color

Select the number of stitches for the non-stitching operation with the cursor key.		
Then press SET		
To move forward press the START SWITCH. and to move in reverse press the STOP SWITCH. Then select the correct the number of	FLOAT 100 STITCH	
stitches or to end. press	EXIT -> PREVIOUS	



MACHINE DATA SET-UP

Press when the operating program loads. The following sub-menu appears:

1.	MACHINE TEST
2.	MACHINE SET
3.	ERROR LIST

MACHINE TEST: Checks the solenoid or thread detecting function. MACHINE SET: Sets up the frame limit.

ERROR LIST: Lists the 10 most recent errors that have occurred.

MACHINE TEST

LESSON: Test the jump solenoid function.





MACHINE SET

Press **SET** after selecting MACHINE SET and the following screen appears:

1.	MACHINE SET
2.	FRAME ORIGIN
3.	FRAME LIMIT SET

CUT NEEDLE is used when sewing materials are to be cut with a boring needle. REMEMBER that thread breaks are not detected and trim functions are not performed on the needle bar designated as the *CUT NEEDLE*.

LESSON: Designate the #6 needle bar as CUT NEEDLE



101



FRAME ORIGIN: This function locates the original starting point of the frame. This allows the embroidery to resume from its exact position in case of power failure.

FRAME LIMIT: Since there is no mechanical LIMIT SWITCH, the LIMIT must be set in the software. When two points are input the LIMIT is set (see illustration below).



If you want to set the machine so that an error code to warn when the LIMIT is exceeded, go to DATA SETUP, EMB FUNCTION, FRAME LIMIT and select YES.

LESSON: Set as P 1 X= 100, P 1 Y= 500, P 2 X-1500 and P 2 Y+-500






ERROR LIST

LESSON: Determine the 10 most recent or most frequent errors.





THE FLOPPY DRIVE AND DISK

Press

when the operating system has loaded and the following sub menu will appear:

1.	FDD	SAVE
2.	FDD	DELETE
3.	FDD	FORMAT
	••••••	

FDD SAVE: Saves the memory data onto the floppy disk FDD DELETE: Deletes designs on the floppy disk FDD FORMAT: Formats the floppy disk

FDD SAVE/ FDD DELETE

LESSON: Format a 2HD floppy disk and copy designs from Location #5 onto the disk in SWF format. Then delete the copied designs from the disk.













MANUAL CUTTING

When the operating system loads, press and the following screen will appear:

······	TRIMMING OPERATION							
====	=====	=====	=====	=====	====	=====	=====	======
	RUN	=>	ST	ART	SW	ITC	н	
	CAN	CEL	=>	PRI	IVI	OUS		

This function is used to trim during the embroidery operation. If the START SWITCH is pressed when the above screen appears, trimming is performed automatically.

Press (PREVIOUS) to cancel.

OFFSET SET-UP

OFFSET IS USED WHEN SEWING APPLIQUES

Press

when the operating system loads and the following screen will appear: $\overline{\mathbb{Z}}$

	_ q	ͲϪϿͲ		
	- 5		FOINI	
=>	FRAME	MOVE		

This function returns the frame to the point assigned by the user at the start and end of the embroidery operation. This function can come in handy when changing the frame or arranging the cloth. The following 4 set-up items must be entered:

- 1) **START POINT:** (Embroidery starting point) Assign the point to start the embroidery work.
- 2) **MIDDLE OFFSET:** (Middle point of the offset) To prevent accidents from occurring as the frame moves onto the offset point, assign a midway point.
- 3) **OFFSET POINT:** Assign the point the frame should automatically move to when the frame has reached the offset point assigned in the needle bar setup. (See Needle Bar Set-up Page 109).
- 4) At | 000 (needle bar set-up) enter CL at the desired offset point.





- 1. Starting point
- 2. Assigned number of stitches for offset
- 3. Number of the stitch where embroidery ends
- 4. Offset middle point
- 5. Offset point

The path at the beginning of the embroidery is 4. The path of the offset point from the assigned number of stitches for the offset point: 1-3-1. The path after the embroidery is finished 2-3.



The offset middle point and the offset point can be the same.
 The offset setup is deleted when a different design is called up.

LESSON: Set the offset point as follows:

- 1. Start Point X:-300 Y:500
- 2. Middle Offset X:600 Y:1500
- 3. Offset Point X:800 Y:2000

Press at the beginning menu.	
◆	=== START POINT ===
Use the frame transfer key to setup X:-300, Y:500. Then Press	=> FRAME MOVE
◆	==== MIDDLE OFFSET ===
	=> FRAME MOVE



Use the frame transfer key to setup X:600, Y:1500. Then Press SET	
♦	==== MIDDLE OFFSET ===
Use the frame transfer key	=> FRAME MOVE
(SET)	
•	=== OFFSET POINT === =================================

NEEDLE BAR SELECTION

Press **W** when the operating system loads and is on the screen. The following screen appears:

====	NEEDLE	SELEC'	Г	==	==
[1] :	: 1	- /	1
 [END] [INS	 SERT]	 []	DEL]



The set-up of the needle bar determines the automatic color changing functions and the needle bar changing order. The needle bar changing order (color changes) can be set from 1-99. When setting the needle bars, if you press (0) the setting of that needle will be deleted.



LESSON: Set the needle bar order as 1-2-10-11-12, adding an offset between #10 and #11.





Press $\left(+10 \right)$ and 1 to input 11.	
	==== NEEDLE SELECT ====
•	[12AoB]: 5 / 5
	[END] [INSERT] [DEL]
Press $+10$ and 2 to input 12.	
	==== NEEDLE SELECT ====
•	[12AoBC]: 6 / 6
\bullet	
	[END] [INSERT] [DEL]
Press (SET) to end the setup	
	==== NEEDLE SELECT ====
L	[12AoBC]: 6 / 6
	[END] [INSERT] [DEL]
Move the cursor to "END" and press \overline{SET} to end the setup.	 The cursor has been moved to [END], [INSERT], and [DEL].



Press CL to change the needle bar after it is selected.

SWF embroidery machines have short cuts that allow easy changes.

LESSON: If the order of the needle bars is set as 1-2-3-4 and you want to set the 3 to # 5needle bar, follow these directions:





LESSON: By using the functions INSERT and DEL(ETE) you can change the order of the needle bars from 1-2-10-OFFSET-11-12 to 1-2-3-10-11-12.









ERROR MESSAGES AND CORRECTIONS

MAIN SHAFT MOTOR

NO.	ERROR MESSAGE	MEANING	CORRECTION
100	Position Error	Main shaft does not stop at 100 degrees when machine stops.	Use degree wheel to move shaft angle to 100 degrees
101	Main Motor Driver	Error of the main shaft motor driver.	Turn main switch off and then turn it on again.
102	Overload	Thread is tangled, needle bar reciprocator is defective, thread is entangled when it trims.	Check the hook and then turn the main switch off and back on again.
103	Trimming System	Thread trimming sensor does not return home after trim.	Check operation of thread trimmer.
104	Right Bar Switch	Start button is pushed down when machine is turned on.	Check to see if contact is being made by start button.
105	Left Bar Switch	Start button is pushed down when machine is turned on.	Check to see if contact is being made by stop button.
106	Head Cover Open	Safety Cover of tension adjusting plate open.	Make sure to black plastic safety cover is closed.



Pulse Motor –X and Y axis

NO.	ERROR MESSAGE	MEANING	CORRECTION
200	(+X) Frame Limit Detection	The frame has reached its +X limit.	Move the frame in the -X direction
201	(–X) Frame Limit Detection	The frame has reached its –X limit.	Move the frame in the +X direction
202	(+Y) Frame Limit Detection	The frame has reached its +Y limit.	Move the frame in the -Y direction
203	(-Y) Frame Limit Detection	The frame has reached its –Y limit.	Move the frame in the +Y direction
204	X Axis Driver Error	An error has occurred in the X axis driver.	Check for green light on front of X axis board.
205	Y Axis Driver Error	An error has occurred in the Y axis driver.	Check for green light on front of Y axis board.
206	Wiper Return Error	Wiper Solenoid did not return.	Repair Wiper Mechanism

If you lose X or Y movement, check for green lights on the X and Y boards.



Color Change

NO.	ERROR MESSAGE	MEANING	CORRECTION
300	Needle Position	The needle bar did not reach the right location during the color change.	Turn the needle bar manually until correct one is in stitching position.

Encoder

NO.	ERROR MESSAGE	MEANING	CORRECTION
400	Encoder A signal is static.	There is an error on the A encoder.	Be certain the encoder cable is connected; turn machine off and on again.
401	Encoder Z signal is static.	There is an error on the Z encoder.	Be certain the encoder cable is connected; turn machine off and on again.

Repetition

NO.	ERROR MESSAGE	MEANING	CORRECTION
501	Repeat setting error (X and Y less than 99)	Repetition exceeds limit.	Reset so that X and Y are greater than 99.



Floppy Drive and Communication

NO.	ERROR MESSAGE	MEANING	CORRECTION
600	Floppy drive is not ready.	There is no disk in the drive.	Insert a disk in the drive.
601	There are no sectors found on the disk.	Floppy disk is not formatted or is incorrectly for the drive.	Format disk or select a different one.
602	No file found on disk in floppy drive.	There is no embroidery design on the disk.	Select a different disk.
603	Write protect error.	Disk was write protected when written.	Remove the write protect tab.
604	Error on disk.	Floppy disk is damaged.	Format or select a different disk.
605	Not enough space on disk.	Disk does not have enough space for data.	Select a different disk.
606	Drive open error.	Error when removing the disk during operation.	Insert the disk again.
607	Floppy reading error.	Floppy disk has bad sectors.	Format the disk or select a different one.
608	Floppy writing error disk.	Floppy disk has bad sectors.	Format the disk or select a different one.
609	Floppy error.	Unknown error has occured during operation of disk.	Format disk or select a different one.
610	Floppy driver error.	Unknown error has occured during operation of disk.	Retry with a new disk.
611 612	ZSK, Barudan disk not available.	The disk is damaged.	Retry with a new disk.
613	Too many bad sectors.	The disk is damaged.	Retry with a new disk.



Tape Reader and Communication

NO.	ERROR MESSAGE	MEANING	CORRECTION
630	Data read error	Error on the data read through the tape reader.	Enter data through tape reader again.
640	Network system not found.	Network device is not connected.	Check the connection of the network device.

Memory

NO.	ERROR MESSAGE	MEANING	CORRECTION
700	Memory file not found.	Embroidery data is not in memory.	Save the embroidery data on a floppy or tape.
701	Insufficient system memory.	Not enough memory for data.	Delete unnecessary data.
702	Insufficient memory.	Memory is full to capacity.	Delete unnecessary data.
703	Memory system error.	Error while copying or deleting data.	Reset or turn the main switch off and then on again.
704	Memory backup system error.	Battery is worn out.	Contact the nearest A/S center and replace the battery.

System Installation

NO.	ERROR MESSAGE	MEANING	CORRECTION
800	System file not found.	System is not installed.	Install the system with the installation disk.



CHAPTER **12**

THE CONTROL BOX



Fuse Capacity Kinds	F1 (Main Power)	F2 (Trimming, Picker Solenoid)	F3 (Jump Solenoid, Color Change Motor)	F4 (Wiper Motor)
SWF/A-T1201C				
SWF/A-T901C	250V/10A (31.8mm)	250V/4A (20mm)	250V/6.3A (20mm)	250V/1A (20mm)
SWF/A-T601C		()	()	(_ • ,)

FUSE LOCATION ON 110V POWER BOARD





Fuse Capacity Kinds	F1 (Main Power)	F2 (Trimming, Picker Solenoid)	F3 (Jump Solenoid, Color Change Motor)	F4 (Wiper Motor)
SWF/A-T1201C				
SWF/A-T901C	250V/6.3A (20mm)	250V/4A (20mm)	250V/6.3A (20mm)	250V/1A (20mm)
SWF/A-T601C		(2011111)	(,	(201111)

FUSE LOCATION ON 220V POWER BOARD



CHAPTER 13

MAINTENANCE AND INSPECTION

CHECK POINTS FOR REGULAR INSPECTIONS



Observe the machine safety and electrical rules during inspections. Before inspecting or cleaning, turn the machine power off. Use a compressor to clean each part.

- 1) Clean, oil and grease the recommended points and parts on a regular basis.
- 2) Inspect the tension of each drive belt.
- 3) The following problems can occur if the machine is not inspected regularly.
 - * Corrosion of P/C circuit board
 - * Damage on semi-conductor of the P/C circuit board
 - * Abnormal operation of the floppy disk drive.
 - * Defective connecter contacts.
 - * Insufficient oil and grease can cause abnormal wear on machine parts.

CLEANING

Use a compressor to clean the machine.



Clean around the hook every day.





Sun Star is not responsible for machine damages or malfunctions caused by insufficient or irregular cleaning or oiling.



Turn OFF the main power before inspecting or cleaning of the following parts. Adjust your cleaning cycle to the environment and conditions of your machine.



Guide rail for thread take-up lever. Clean once a week.



Movable and fixed blades. Clean once or twice a week. To clean, remove the needle plate and then pull the movable blade forward as shown. Clean, and then reassemble. Take note of the order the parts are removed so you can replace correctly.



OIL SUPPLY



Turn OFF the machine when oiling.



Sun Star is not responsible for machine damages or wear-outs caused by insufficient oiling.



The main power should be off while oiling the machine. Excessive oil can stain thread and fabrics. After oiling, run the machine without stitching for 2 or 3 minutes. Avoid excess oil in the hook as this will cause trimming problems.

WHERE TO OIL

Use sewing machine oil(Spindle Oil) or VG18 of ISO.



Oil Tank

Once every two weeks or when the oil falls below the red line of the oil tank window. ①

Needle Bar and Needle Bar Drive Shaft.

Oil once a week. ②





Three Oil Holes in Bed Cover

Oil once every three days. (3)



RACEWAY

Place a small amount of oil on the raceway of the hook assemble after removing the bobbin case. ④

Oiling cycle: once after 3-4 hours of operation



Blades

Oil the juncture of the movable blade and the fixed blade in the trimming area. (5)

Oiling cycle: once every 2-3 weeks



2) Oiling the Arm

Use the oiling device to oil each part of the arm. Do not overfill the tank.

- upper shaft bushing
- needle bar crank rod
- needle bar and controller
- take-up lever drive lever shaft
- presser foot drive lever shaft
- needle bar lever
- presser foot shaft





GREASE SUPPLY



The main power should be off while greasing the machine. Use lithium grease made of high quality mineral oil. Greasing the machine decreases noise and prevents wear.

Inside of the arm, the take-up lever drive cam, the main part of the take-up lever, the needle bar reciprocator, the presser foot drive shaft, the color change cam, and the blade cam (①, ②, ③, ④, ⑤, ⑥) should be cleaned and greased once every three months.

Places for supplying synthetic TM grease

NO	Where to Grease	Greasing cycle	Reference Fig.
1	Color change cam, color change head roller	Once in 3 months	7







The main power should be off while greasing the machine. Be sure to apply the grease only to the parts indicated. Use lithium-type grease (JIS No.2) Albania No.2.



X-axis LM Guide. Grease once a month.



Y-axis Rail Guide (2 on left and 2 on right). Grease once a month.



Head Drive-LM Guide. Grease once a month.



CHAPTER **14**

MACHINE ADJUSTMENTS



Turn the power to the machine off before adjusting the machine. After an automatic or manual thread cutting signal, the movable blade, started by the thread cutting cam, approaches at a set angle.





ADJUSTING THE TRIMMERS

To check the position of the thread cutting lever stopper, insert the roller into the blade cam with the thread cutting solenoid manual handle at the 100 degree position. Make sure the thread cutting lever is close to the blade cutting stopper. Unfasten the screw and change the position.

ADJUSTING THE MOVABLE BLADE

To adjust the approach angle of the movable blade, first check its position. The cutting point should be about 1mm inside the tip of the fixed blade. If the movable blade is not adjusted correctly, upper thread breaks or incorrect cuts can occur. If the position of the movable blade is incorrect, loosen the upper screw on the thread cutting drive lever and adjust the blade manually. When the blade is adjusted correctly, tighen the upper screw firmly on the thread cutting drive lever. Check that the upper and lower thread cutting drive lever can move easily with no movement of the thread cutting lever shaft bracket.





ADJUSTING THE ANGLE OF THE MOV-ABLE BLADE

To adjust the entrance angle of the movable blade, unfasten the two blade screws to set the upper shaft rotary angle at 295 degrees using the hand pulley. Insert a roller into the blade cam by turning the trimming solenoid manual. Then turn the mes cam. When the roller aligns with the curving line of the cam, tighten the blade cam bolts. Make sure the movable blade enters at operates at an angle of 295 degrees.

ADJUSTING THE TENSION OF THE FIXED AND MOVABLE BLADE

After changing or repairing the movable and fixed blade, check the tension of the blades as they cross by moving the blade manually. Cut the upper thread and check the thread. To adjust, use the tension adjusting bolt of the fixed blade. Move the movable blade manually until it is parallel with the cutting line of the fixed blade from the entering point to the returning position.





Make sure that the tension of the movable blade is correct. If it is too tight, the trimmers will not operate correctly and this incorrect tension will wear the blade. Be sure to clean this area of the machine often since thread trimmings accumulate.









ADJUSTING THE TRIMMER RETURN SPRING

The Trimming Return Spring helps the movable blade to return to its original position after trimming. If the machine is operated with the movable blade in an incorrect position the movable blade or the needle may be damaged.

To adjust the trimming return spring, unfasten the spring shaft screw so that the gap between where the bolt is attached to the surface and the center of the spring is 12mm. Turn the spring holder to adjust the tension of the spring and then refasten the screw. Turn the spring holder clockwise to increase the tension and counter-clockwise to decrease the tension.

PICKER ADJUSTMENT

If the picker position or starting height is not set correctly, the machine will cut both the upper and the lower thread to the same length, causing the upper thread to be too short which can cause it to come out of the needle.

To adjust the pecker, move it by hand so that it just touches the bobbin. Then adjust the tip by unfastening the picker screws. See illustration at left for correct position.

To adjust the waiting position of the picker, unfasten the screws of the picker solenoid cover. The gap between the tip of the picker and the bobbin should be approximately 20mm. Refasten the screws after adjusting.

To adjust the starting height of the picker, unfasten the stopper bolts so they just reach the bobbin when the picker is pressed by hand, adjust the height and re-tighten the bolts.





UPPER THREAD TENSION ADJUSTING PLATE

Press the Motor shaft link lever by hand, unscrew the holding screw of the upper thread pick up base and then adjust the upper thread base where the hook passes the center of the needle. Unfasten the bracket joint screw and refasten it so that the upper thread is picked up smoothly. Use the color change function to check each needle bar, assuring that the thread pick up action is smooth on each one.





When adjusting the small driving lever, be sure there is no movement at the axis where the driving lever and the arm attach.

ADJUSTING THE PRESSER FOOT FOR MINIMAL NOISE

1) Unscrew all the jointed screws of the presser foot driving cam and the small driving lever. Turn the hand wheel until the needle bar is at the lowest point(180 degrees/white bolt). Turn the cam and when the roller is located at the outer part of the arm, refasten the joint screw of the small driving lever snugly.





 Turn the hand wheel to 100 degrees(black bolt). Turn the cam until the presser foot holder is on the rubber of the presser foot stopper, and then fasten the joint screw of the cam tightly.





ADJUSTING THE HEIGHT OF THE PRESSER FOOT

Use the hand wheel to check what the relation between the presser foot and the needle will be when embroidering. Set the needle bar to 180 degrees. Remove the plate on the sides and loosen the joint screw of the presser foot. Adjust the space between the bottom of the presser foot and the upper part of the needle plate to accomodate the material being embroidered (K). Refasten the joint screw snugly. Repeat for each presser foot.

Standard Setting Value Needle plate for cap = 1.5mm Needle plate for flats(tubular) = 1mm





The presser foot should be touching the material being embroidered before the needle enters it. This gives a stable target for the needle and the upper thread. It also ensures that if the needle comes out the fabric for any reason the pressure foot and the needle location are aligned with the needle insertion point.



If the presser foot is too high, the needle will penetrate what is essentially an unstable target, causing flagging (movement of the fabric against the throat plate)which can result in broken thread and birdnesting(the term used to describe the collection of unwanted thread beneath the throat plate.)



If the presser foot does not touch the fabric, it can be lifted by the exit motion of the needle, creating a space between the fabric and the needle plate. This can cause thread breaks, skipped stitches and other problems.



RELATIONSHIP BETWEEN PRESSER FOOT AND NEEDLE



Color changes must be done when the upper shaft angle is at 100 degrees. If the needle is not in the center of the needle hole after adjustment, contact your machine distributor for repair.

Color Change Adjustment

When the machine changes needles (color change) the needle should be in the center of the needle hole. If it is not, manually adjust the cam so that the roller is located on the right center of the straight line of the cam. Open the cover of the half turn sensor and adjust so that the center is lined up with the center of the half-turn film.





ENCODER ADJUSTMENT

If the needle bar gets stuck, adjust the encoder position. For a fine adjustment, unfasten the two screws of the encoder coupling. Turn the hand wheel manually to 98 degrees. If the stop position light is red after this adjustment, refasten the two screws snugly.

If the encoder coupling can't be moved, loosen the two encoder screws and turn the hand wheel to 98 degrees. Adjust the encoder according to the illustration below. When the stop position light on the operation box is red, refasten the encoder screws snugly.





JUMP SOLENOID ADJUSTMENT



If the jump solenoid is not functioning correctly or needs to be replaced, release the solenoid nut with wrench included in the accessories kit. The measurement between the bracket projection to the solenoid should be 3.5mm.

If the solenoid projects too far, the needle bar will not move or it will catch. If it does not project far enough the needle bar reciprocator will not move correctly.



When assembling the bracket, solenoid and base plate, adjust the distance of the arm to the bracket section to 1mm. Fasten with the bracket joint screw.

If the installation position is incorrect and the needle bar reciprocator touches the needle bar when jumping, bend the needle bar slightly to adjust.



ADJUSTMENT OF DRIVE BELT TENSION



The main power should be off when adjusting drive belt tensions. When drive belt tension adjustments are needed, contact your service technician as the loss of tension will adversely affect the quality of embroidery as well as the operation of the machine.

> Tension Adjustment Specifications Model Name : U-305 Series – Standard Phonometry Belt Tester Manufacturer : UNITTA

TIMING BELT OF Y-AXIS

Check the belt with a sound wave tension meter. Pluck the end of the X drive at the center of the belt with a finger or tool and then adjust the Y-axis belt to 30~32 kgf. The input data should be :

Weight : 003.8gf/m Width : 015.0mm/#R Span : 0540mm

Release the tension base fixing bolts and turn the tension adjusting bolt to achieve the proper tension. Turning the bolt clockwise increases the belt tension. Turning it counter-clockwise decreases the tension.




TIMING BELT OF X-AXIS

Move the frame fixing plate on the right side to the end, then use the phonometry belt tension tester. Pluck the center of the X drive belt with a finger or tool and then adjust the X-axis belt to 10~11kgf. The input data should be :

Weight : 003.8gf/m Width : 015.0mm/#R Span : 0577mm

Release the tension base fixing bolts and turn the tension adjusting bolt to achieve the proper tension. Turning the bolt clockwise increases the belt tension. Turning it countercolckwise decreases the tension.





TIMING BELT OF MAIN MOTOR

Pluck the center of the belt span with a finger or tool and then adjust the timing belt tension of the main motor to 11~13kgf using the phonometry tension tester. The input data should be :

> Weight : 003.8gf/m Width : 015.0mm/#R Span : 0231mm

Release the 4 fixing bolts when adjusting the timing belt. If you raise the main motor, the tension decreases. If you lower it, the tension increases.



TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Machine fails to operate correctly.	Decrease of tension on belt.	Adjust the tension or replace the belt.	
	Main power shortage.	Check the F1 fuse on the controller box and replace if necessary.	Confirm correct fuse size and voltage.
	Machine fails to sense needle position.	Change needle bar manually check the color change by turning on the signal light on the normal needle position, then adjust the half-turn film.	
	The frame moved out of X or Y limits (limit set).	Correct start point of embroidery (manually move the frame so the design comes into the limit).	
	Bad connection of power supply box.	Check and firmly plug the connector.	
Machine stops with needle in incorrect	Decrease in tension on main drive belt.	Adjust belt tension.	
position.	Incorrect encoder position or bad encoder.	Adjust position of encoder or replace it.	
Incorrect color change.	Machine stops with needle in incorrect position.	Manually change the needle bar position.	After moving the shaft manually to clean, check and repair, turn the main shaft angle back to the normal position (100 degrees).



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Incorrect color change.	Machine does not sense one-time turning signal of needle position.	Perform the color change manually then readjust the half-turn film.	
	Incorrect needle for position.	Adjust the needle bar.	
	Incorrect take-up lever position.	Adjust the take-up lever so it is even with the other levers at the stopping position(main rotary shaft angle is 100 degrees).	Loosen the screw of the take-up lever drive and adjust its position so it is even with the other levers on the take-up lever guide rail, then refasten the screw.
	Loose connection or the color change motor fuse has blown.	Replace the F3 fuse in the power board. Check for loose connections.	Confirm correct fuse size and voltage.
Upper thread not detected.	Defective rotation of thread detecting roller.	Disassemble thread detecting roller, clean the gauge and bush bearing.	
	Poor connection on the thread tension adjusting plate.	Verify that the connection on the tension plate is working. If not, replace the circuit board.	



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Bad jump	Short circuit in fuse of jumping circuit.	Replace F3 fuse on the power board.	Confirm correct fuse size and voltage.
	Failure of or short circuit in the solenoid wiring.	Correct short circuit on wiring or replace the solenoid.	
	Loose connection.	Check connection.	
	Switch failure on thread tension adjusting plate and circuit board.	Replace switch and circuit board.	
Poor stitching quality.	Poorly digitized design.	Digitize design correctly.	
	Incorrect X or Y belt tension.	Adjust tension.	
	Foreign substance on X or Y rail.	Clean the rail.	
	Failure of X/Y circuit board.	Replace circuit board.	
	Embroidery frame/materials are unusually heavy.	Lower the machine speed.	
Frequent thread breaks.	Stitches are too short.	Edit design to eliminate short stitches.	
	Thread breaks at the same place in the design.	Digitize the design again and correct the problem area.	
	Needle too small or large for the thread selected.	Use proper needle for the thread.	
	Needle is damaged, bent, worn or the eye has a nick or burr.	Replace the needle.	
	Needle is installed incorrectly(height or orientation).	Reinstall needle.	
	Needle is dirty from adhesive or sticky backing.	Clean the needle and hook assembly or replace the needle.	Use minimum adhesive.



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Frequent thread breaks.	Poor quality or old thread (uneven poorly twisted, or poorly wound.)	Use good quality thread.	Choose quality thread and store it away from sunlight and dust.
	Using S-twisted thread.	Use Z-twisted thread. The rotary hook rotates counterclockwise so Z- twisted thread prevents the upper thread from unraveling.	Z-twisted thread(twisted to the left) S-twisted thread(twisted to the right)
			Z-twist prevents unraveling of thread in the counterclockwise rotation of the hook
	Upper thread tension is too tight.	Adjust tension.	
	Upper and lower thread not adjusted correctly in relationship to each other.	Adjust tension.	
	Spring tension is too tight or take-up lever is not adjusted correctly.	Adjust spring tension and take-up lever.	
	Damaged hook or bobbin case.	Use crocus cloth to remove any nicks and scratches or replace the damaged part(s).	Check rotary hook.
	Distance between the hook and the groove of the needles is too narrow.	Adjust the distance.	* Correct distance for smooth passing of upper thread is 0.5~0.7mm.



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Frequent thread breaks.	Not enough oil in the hook.	Oil the raceway of the hook assembly.	
	Timing between the needle and the hook is incorrect.	Adjust the timing.	
	Incorrect lower dead stop on the needle bar.	Readjust lower dead stop on the needle bar.	
	Thread is damaged on its way through the thread path.	Check the presser foot where the thread passes, the needle hole on the throat plate, the thread guides on the sewing head and the tension discs for nicks and burrs.	
	Too much movement in the material in the embroidery hoop.	Correct hooped material so it is held taut for stitching.	
	Incorrect presser foot height.	Adjust the height of the presser foot.	
Skipped stitches.	The needle is bent.	Change the needle.	
	Incorrect needle size for thread.	Change the needle or use a different thread.	
	The needle is installed incorrectly.	Install needle correctly.	
	Timing between the needle and the hook is incorrect.	Readjust the timing between the needle and hook.	
	Too much distance between the groove of the needle and the point of the hook.	Adjust the distance between the needle and the hook point.	
	Incorrect lower dead stop on needle.	Readjust the lower dead stop on the needle.	
	Damage to the point of the hook.	Use crocus cloth to smooth out the point of the hook or replace the hook.	



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Skipped stitches.	Frequent stops in the supply of the upper and lower thread.	Readjust the upper and lower thread tension.	
		If the problem is only on the lower thread. Replace the bobbin or the bobbin case.	
	The thread is too thick or has too much stretch.	Select the proper thread for the job.	
	Take-up spring is adjusted incorrectly resulting in tension that is too tight.	Adjust the take-up spring stroke and tension.	
	Fabric moves in the hoop when the needle enters or exits because the tension of the presser foot is too weak or the tension spring on the presser foot is damaged.	Replace the tension spring on the presser foot.	
Stitches pull out of material.	Upper thread tension is too loose.	Adjust upper thread tension.	
	Upper thread is dirty which is affecting the tension.	Clean discs of the pre- and main tensioners.	
	Lower thread tension is too loose.	Adjust bobbin thread tension.	
	Uneven bobbin tension.	Clean the bobbin case, being careful to clean any lint from under the adjustment spring.	
	Thread is too thick.	Use good quality thread.	
	Incorrect timing between the needle and the hook.	Adjust the timing.	
	Not enough oil in the raceway of the hook.	Oil the raceway of the hook assembly.	
Needle Breaks.	Needle is bent.	Replace the needle.	
	Needle is poor quality.	Buy good needle.	



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Needle Breaks.	Tip of the needle is dull, worn or damaged.	Replace the needle.	
	Needle is wrong size for the thread.	Use proper needle size.	
	Needle and hook point are touching.	Adjust the distance between the hook point and the needle.	
	Needle is installed incorrectly.	Install the needle correctly.	
	Needle is striking the throat plate.	Make sure the screws on the needle plate are snug. Check the position of the needle bar to be sure that the needle is centered in the hole of the plate.	
Puckering.	Upper and lower thread tension is too tight.	Adjust the tensions.	The size of the needle hole in the throat plate is 2.0mm
	Presser foot is not adjusted correctly.	Loosen tension of presser foot spring.	thread is : Cotton thread : #50-70
	Needle is damaged, dull or the wrong size.	Change the needle.	Needle DB × K5#9-14 Rayon thread : #30-60 Polyester thread : #40
	Hole in the throat plate is too small for the size of the needle.	Use the proper size needle.	i orgester thread . 1170



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Short upper thread after trimming due to separation failure.	Short circuit of fuse on the cutting circuit.	Replace the F2 fuse on the power board first. Then the F3.	Confirm correct fuse size and voltage.
	Failed connection on terminal or solenoid.	Replace the connection on the cutting solenoid.	
	Solenoid failure.	Replace the solenoid.	
	Broken TR cutting driver.	Replace the power board.	
Thread pulls out before it is cut.	When the upper thread is too short, check the tension.	Adjust the upper thread tension.	
	Check for damage on the movable blade.	Remove the damage on the movable blade using fine sandpaper or crocus cloth.	
	If the lower (bobbin) thread is too short, check that the thread is coming off the bobbin easily. Use quality bobbins to ensure the thread is not too weak or does not stretch too much.	Adjust or replace the tension spring of the bobbin case. Remove any dirt or foreign materials in the thread guide of the bobbin case. Change the bobbin.	Area to check for damage.
			If the lower thread is too short when the trim is made, the first stitch after the trim will not form.



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Upper thread comes out of the eye of the	Upper thread has been trimmed too short.	Check upper thread tension.	The default tail length is Medium.
needle after the triffi.	Upper thread tail is above the throat plate after cutting.	Set the length of the thread tails to Long or Medium on the control panel.	
		Remove any foreign substance in the Velcro strip that may be causing the thread to break.	
Tread is not cutting on one of the heads.	The movable and fixed blades are not working.	Check the fastening screw of the movable blade, the crank of the movable blade, the driving clamp and the connection of fastening screw.	
	The cross tension of the movable blade and the fixed blade is too loose.	Adjust the tension of the fixed screw.	
	The movable blade is broken.	Replace the movable blade.	
	The movable blade does not return to its correct position.	Adjust the position of the movable blade.	
No solenoid operation of the upper thread catcher.	Short circuit of the fuse. (when all heads operate incorrectly)	Replace F4 fuse in the power board if required.	Confirm correct fuse size and voltage.
	Malfunction of the solenoid wiring or the solenoid itself.	Check solenoid terminal connection and/or replace the solenoid.	
	Malfunction of circuit disc.	Replace thread sensor disc on pre-tensioner (thread sub-controller).	
	Bad connection	Check connection	



PROBLEM	PROBABLE CAUSE	REMEDY	TIP or PAGE
Upper thread catcher malfunction.	Upper thread catcher stroke is too short.	Adjust reach of upper thread catcher.	
	Upper thread catcher is overloaded.	Remove the reason for the overload.	



CHAPTER 16

NEEDLE CHART

FABRIC	NEEDLE SIZE	POINT
Fine Knitwear	75/11	BALL
Woven Fabrics	70/10	SHARP
Denim-light/medium	75/11	SHARP
Terry	75/11	SHARP
Densely Woven	80/12	SHARP
Silk	65/9	SHARP
Coated Fabrics/Cordura	80/12	SHARP
Vinyl	75/11	SHARP
Leather	75/11	SHARP
Caps-Woven, Corduroy	75/11 or 80/12	SHARP
Fleece	75/11 or 80/12	BALL
Knitwear/ Jersey	75/11	BALL



CHAPTER 17

BACKING

Backings fall into three categories: tearaway, cutaway and specialty.

Tearaway is a logical choice for many jobs and does not require scissors for removal-a safety feature for beginning embroiderers. Tearaways range in weight from one to three ounces per yard. A good tearaway is stable enough to stand up to multiple needle penetrations as well as tear well both directions. Tearaways that can be torn in only one direction can result in distortion of the embroidered design and unsightly remnants of the backing, which then must be cut away. Having to cut a tearaway negates one of the benefits of using the product. Delicate fabrics and designs demand a quality tearaway as longer stitches and fragile textiles should not be pulled roughly. Tear the backing away from the stitches as closely as possible; if you use two layers of tearaway, tear them away one at a time to avoid distortion. On delicate and stretch knit fabrics, use tearaway with caution-but on swimsuits and socks, tearaway should be used. The two layer trick works well on these stretchy items but pull it away a layer at a time.

Cutaways are required to provide a stable base for knits and other stretchy fabrics. Cutaway weights range from 1.5 to 3.5 ounces per yard. While the article is stitching, the backing can prevent the fabric from disappearing into the hole of the throat plate and, after the stitching is completed, the cutaway helps keep the fabric in shape through launderings. When trimming cutaways be sure to keep the shirt in view at all times. Place the shirt closest to you and hold the backing up in the air. With the shirt hanging down and the backing in hand, trim the backing with sharp scissors, preferably with blunt ends. Use a gliding motion instead of sawing with the blades, as this will help you avoid cuts in the fabric. Quality stable cutaways tolerate multiple needle penetrations; wash well maintaining the shape of the design, and trim easily. Although soft backings are desirable, it is often necessary to choose a more stable and therefore stiffer backing to achieve a crisp embroidered design.

Fusible backings can be bonded permanently to garments and fabrics. They lend stability to stretchy fabrics, which can also be difficult fabrics to hoop. Fusible backings can also be used as a final application on the reverse surface of completed embroidery projects to cover scratchy metallic for wearing comfort, or permanently fuse designs to enhance durability. Ensure that the fabric can be ironed before using fusible backings. You can use spray adhesive to affix regular cutaways and tearaways to garments and other embroiderable product.



CHAPTER 18

HOOPING AND TENSIONS

The tension of the fabric in your hoop is just as important as the tension on the threads of your machine. Many a stitching problem can be traced to poor hooping. Proper hooping is one of the most important factors in producing quality stitching.

Make sure that your fabric is straight in the hoop. Use a hooping device or mark with disappearing ink or tailor's chalk. Hoop the chosen backing with the garment and press the inner hoop down. The idea is to get the fabric taut in the hoop so the material doesn't shift, and close enough to the throat plate so the hooped fabric doesn't bounce against the throat plate. This is called flagging and can cause poor quality, skipped stitches and can compromise your design registration. Sliding an extra piece of backing under the hooped garment can often help if you experience skipped stitches as this fills any gap between the garment and the throat plate. The needle and hook have the best change of forming a good stitch when the material is stable and tight against the machine.

You should not stretch the fabric after hooping it. You should avoid tightening the thumbscrews of the hoop after the hooping is completed. You could unintentionally tighten too much which can cause bruising or breaking of the fibers. The exception would be with very heavy fabrics.

Hooping caps should be approached the same way. You want the material to be as close to the throat plate as possible. Caps are a challenge because they are curved. You should research and find the caps that fit your machine the best.

When hooping, pull the cap down tight against the cap hooping device, using the closure in the back. Then fasten the hoop against the front of the cap, snug down on the seam of the crown and the bill of the cap. Be aware that your cap frames are adjustable, so you can make them tighter or looser when required.

Closing the gap between the cap and the throat plate is most important when stitching caps. Hoop a piece of backing with the cap even if it already has fused buckram or other backing. You will find that your design registration and stitch quality is best when the cap is as snug and immovable as possible. Sliding another piece of backing under the cap before you begin to stitch can help.

The tension of your machine is important to stitch quality, too. The upper and lower thread should pull out smoothly. Be careful, especially if you wind your own bobbins, that there is not too much thread on the bobbin. Overwound bobbins can cause stitching troubles as the thread does not come off the bobbin smoothly and evenly.



Before you being, check for damage to the bobbin, its case and the cone or spool of thread you are using for stitching.

Make sure that your machine is threaded correctly before you begin to check the tensions. Your upper thread should run through the pretensioners (sub-controllers) and the main tensioner as well as the take-up lever and all the eyes and guides on the way to the needle.

The bobbin should be threaded correctly and the thread should be under the adjustment plate and through the pigtail,

When checking the bobbin tension, perform a "drop test" Put a new bobbin in the case but do not pass thread through the pigtail. Hold the bobbin by the thread and let it drop into the palm of your hand, which You should hold about 8-12 inches under the bobbin. If it drops a few inches and stops, the bobbin tension is correct. If it doesn't move, it is too tight. If it drops into your hand, it is too loose. Turn the screw on the bobbin to the right to tighten and to the left to loosen the tension. Once the bobbin tension is set correctly, leave it alone. Adjust the top thread to fine tune the thread on each needle.

The top tension begins with the pre-tensioners, the discs that first meet the thread as it comes off the cones and through the thread rack guides. Loosen the main tension knob so there is no tension on the thread at the tension spring and remove the thread from the needle eye. Hold the main tension disc to prevent turning and pull the trand. If it stops when it is around the main tension disc, the pre-tensioner is doing its job. If is does not, tighten the pre-tensioner until the thread stops. Your pre-tensioner has too much tension on it if the main tension discs fail to turn when they are not being held. If the thread does not stay on the main tension disc, you have too little tension at the pre-tensioner.

Once the pre-tensioners are adjusted, back off the main tension knob until there is no tension at all and then tighten it down about 7or 8 turns. Sew a block, about 2 or 3 inches square. The reverse of the embroidery should show 1/3 bobbin and 2/3 upper thread. If there is more bobbin thread, you need to loosen the main tension. If there is more upper thread, you need to tighten the main tension.

