Chapter 4: Troubleshooting and Maintenance

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Note 5/13/2010: Information also current for firmware version 1.16.
Recovering From Sewing Interruptions

Your machine remembers the last-sewn stitch and position after most sewing interruptions, including thread breaks, hoop strikes, or shut-down. As long as the garment remains hooped, there is a good chance you can resume sewing once you’ve fixed the problem. Note: Sudden power loss or emergency shut-down may result in slight mis-alignment.

General Steps for Recovering from Sewing Interruptions
1. Fix the problem. Repair thread break/ replace needle, clear any blockage of thread or broken needle. Check that the bobbin and needle are re-threaded properly.

2. Verify sewing position. If the current needle does not appear to be over the correct position to resume sewing, press FUNC, then arrow down to POSITION, and press SET. If the sewing arm has been moved off the current sewing position, the carriage should return to this position now; otherwise it will not move. The stitch counter should also now reflect the current sewing position.

3. Back up if necessary. To overlap slightly to prevent gaps, press the STOP key until satisfied.

4. Press START to resume sewing.

If the Garment Has Become Mis-Aligned
If you find the machine is slightly off-alignment when resuming sewing, follow this procedure:

1. Make note of the current sewing position (stitch#). At this point, also make a mental note (best-guess) of how far off the sewing position is, and in what direction.

2. Return to the design Origin position. Do this by pressing the FUNC key, selecting ORIGIN, and pressing SET.

3. Adjust the position of the hoop using the arrow keys based on your guess in step 1.

4. Return to the stitch # of the last-sewn position by pressing MENU, choosing POSITION, and pressing SET. Arrow down to the third option (stitch #), enter the stitch # from step 1 using the arrow keys and press SET. The sewing arm will now move to the last-sewn position. Press ESC to return to the main (drive) screen.

5. Test-sew or trace to verify before resuming sewing. If you’re still slightly off, repeat steps 1–4 above.
Basic Troubleshooting: Thread Breaks

We’ve listed the most common causes for thread breaks are listed in a flowchart below, in order of frequency. Learn this checklist to keep your machine sewing trouble-free.

Thread Break

Is the thread actually broken?

Check if:
- bobbin out & reload or sensor is working/ properly threaded

Check if:
- thread path: is it correct at all points?
- feed: is it smooth? Is it catching on anything?
- Correct Needle orientation? Scarf should be at back

Check condition/quality of thread:
Old or mis-handled thread will break more frequently, especially when running in significant volume/speed.
Use quality 40-wt polyester or rayon embroidery thread.

Maybe a design problem if breaks in the same place(s).
1. Turn on the Stitch Sweeper, and reload the design, or
2. Have the digitizer fix the bad section or run a design cleanup to remove short stitches.

Check for damage/scarred surfaces from hoop strike or needle break. Broken bits of needle/other metal may scar/bur surfaces that contact thread i.e. needle, presser foot, needle plate, point area of rotary hook. Replace needle, use fine abrasive cord/cloth to "polish" these surfaces smooth again.

Re-thread and sew again.

Thread Breaks: Other Causes

Sometimes less-obvious causes may contribute. These regular maintenance steps will further reduce causes for thread break:

Keep Hook Area Clean
Over time, lint, bits of thread and other debris + oil combine in the rotary hook area to coat important sewing surfaces and interfere with sewing. Clean this area from time to time (more if you run your machine hard) with compressed air and/or a spray cleaner such as Hook Wash.

Improper Thread Tension
Over-tight AND over-loose tension either at the bobbin or the upper thread contribute indirectly to thread breaks.

Rotary Hook Timing
If you’ve eliminated the most common causes, check to see if the rotary hook may have slipped slightly out of time. Read more on rotary hook timing, its significance, how to check and adjust later on in this chapter.
General Maintenance and Upkeep

- **Oiling:** Use only white sewing machine oil
  
  There are 2 oiling schedules based on how frequently the machine is used:
  
  - **Every 8 hours** (or more if used heavily) – 1 drop of oil on the "race" of the hook as shown.
  
  - **Every 40 hours** (as shown in diagram below, right)
    
    (a) **needle bars:** 1 drop on each
    
    (for b, c, and d, move head to Needle 1)
    
    (b) **“cup”** cut-out marked in yellow on machine
    
    (c) **reciprocator and presser foot shafts,**
        upper portion
    
    (d) **reciprocator and presser foot shafts,**
        lower portion

- **Cleaning**

  **Clean the rotary hook area** on a regular basis (especially with regular use) using solvent and compressed air. Helps prevent buildup of debris/oily film from lint/dust and oil spray. Reduces thread breaks & other sewing problems. Remove the needle plate first to get better access for cleaning.

  Removing the needle plate exposes more of the rotary hook area for more-thorough cleaning.
Advanced Maintenance/Repair: Hook Timing

Rotary Hook Timing

The rotary hook is responsible for catching the top thread and creating a loop around the bobbin thread in order to form a stitch. To catch the top thread, the point of the rotary hook must arrive at a precise moment and distance to the needle (timing and clearance). When the timing and clearance are out of adjustment, the machine will generally experience missed stitches, looping, thread breaks and needle breaks.

Checking Rotary Hook Timing and Clearance

If you suspect that your rotary hook timing is off, you or your customer can check this easily yourself following these steps:

1. **Power the machine on** and allow it to continue to the main drive screen.

2. **Select needle six (6).** Do this using the keys on the control panel.

3. **Remove the needle plate and bobbin case.** Do this by loosening each of the two (2) flathead screws with an offset screwdriver (provided in the machine’s toolkit).

4. **Engage the needle.** Do this by pressing the P.FOOT key, which lowers the presser foot. Then, grab the needle bar over the presser foot, and pull it down until it locks into place.

5. **Turn shaft to 25 degrees.** Do this with a 3mm Allen wrench. Turn the main shaft from the rear of the machine clockwise to L+25 (25 degrees). The needle should be down and in the basket area of the rotary hook at this point.
Advanced Maintenance/Repair: Hook Timing
Checking Rotary Hook Timing and Clearance (continued)

TIMING (left-right) at 25 degrees:
Viewing the hook assembly from the front of the machine, the point of the rotary hook should be hidden behind the needle.

HOOK-NEEDLE CLEARANCE (front-back) at 25 degrees:
From the side of the machine, the point of the rotary hook should be approximately 0.1-0.15mm from the back of the needle (about the thickness of a business card). If the point is either touching or too far from the needle, the machine is not set correctly and will require adjustment.

Note that the hook point passes behind the needle across the lower portion of the scarf.

This clearance should be about the width of a business card.
Advanced Maintenance/Repair: Hook Timing

Adjusting Rotary Hook Timing

1. **Loosen the Rotary Hook.** Do this by loosening each of the three (3) set screws that attach the rotary hook to the rotary hook shaft. Start with the larger screw on the milled flat spot of the hook’s neck (lower right). *Loosen screws just enough to break the hook loose on the shaft.* Turn the wheel as necessary to access each screw from either side.

3. **Reset the dial to 25 degrees.** Check that the needle is lowered into the rotary hook basket once more and that the main shaft dial is set 25 degrees. Adjust the main shaft as necessary by hand at rear of the machine.

4. **Move hook and tighten screws.** Adjust the timing and clearance simultaneously according to the diagrams on the previous page. Tighten screws carefully. *If necessary, have an assistant hold the main shaft exactly at 25 degrees while positioning and tightening.*

**Helpful Hints**
- Have a helper hold the timing wheel at 25 degrees with the T-handle wrench as you make your adjustments and tighten the screws.

- Tighten each screw just enough to snug the hook back on the shaft, then re-check the timing, then tighten each screw further. Tighten all screws as firmly as you can manage. When practicing, re-check constantly as each screw is tightened.

- Use a quality flat-tip screwdriver with a wide grip to help you apply enough torque to secure the rotary hook tightly on the shaft.
Mechanical Procedures: Hook Retainer Adjustment

About the Hook Retainer (also called retaining finger)
The hook retainer is located at the front of the rotary hook, near the top of the bobbin case. It is responsible for keeping the inner basket and bobbin case from spinning freely, while still allowing thread to pass across the front of the rotary hook.

Adjusting the Hook Retainer
Follow this short procedure to adjust the hook retainer:

1. **Remove the needle plate.** Do this by loosening each of the two (2) flathead screws with an offset screwdriver.

2. **Loosen the black screw.** But do not remove. This will be the small button head hex screw toward the right corner, facing downward.

3. **Move the retainer.** Looking downward, set the stub located at the center of the retainer to approximately 0.8mm from the back edge of the rotary hook basket; or about halfway into the basket. The photo on the lower right shows a retaining finger close-up with proper clearance.

4. **Tighten Screw.** And check that the inner basket of the rotary hook does not rotate freely.
Advanced Maintenance/Repair: Presser Foot

Inspecting Presser Foot Height
Follow this procedure to check proper presser foot height:

1. **Engage the needle.** Do this by pressing the \textit{P.FOOT} key, which lowers the presser foot. Then, grab the needle bar over the presser foot, and pull it down until it locks into place.

![Image of presser foot engagement](image)

2. **Turn the shaft to 0 degrees.** Do this with using a 3mm hex wrench to turn the timing wheel at the rear of the machine.

3. **Check the clearance.** The distance between the plate and pressure foot should be approximately 1.2mm; or slightly less than the width of a dime.

![Image of presser foot clearance](image)
Advanced Maintenance/Repair: Presser Foot

Adjusting Presser Foot Height

1. **Take note of the adjustment needed** by completing steps 1-3 on previous page.

2. **Return the needle to the home position** by pressing the T.CUT button or manually turning the shaft to 270 deg. as indicated by the timing wheel at the back. This MUST be done before performing step 4 below.

3. **Remove retaining clip shown** with a 1.5 mm hex wrench, from the end of the metal guide rail on the control panel side of the moving head.

4. **Index the head past the needle 1 position** to needle “0”. Do this by turning the manual needle select knob clockwise.

5. **Loosen the set screw and adjust the presser foot height.** This is a phillips-type screw that fastens the pressure foot to the needle bar. Do not remove the screw. Adjust until the clearance measures approx. 1.2 mm or slightly less than the width of a dime.

6. **Tighten the set screw.**
Advanced Maintenance: Needle Depth
Inspecting Needle Depth

1. **Power the machine on** and allow it to continue to the main drive screen.

2. **Select needle six (6).** Do this using the controls on the control panel.

3. **Remove the needle plate and bobbin case.** Do this by loosening each of the two (2) flathead screws with an offset screwdriver (provided in the machine’s toolkit).

4. **Remove the bobbin case.**

5. **Engage the needle.** Do this by pressing the P. FOOT key, which lowers the presser foot. Then, grab the needle bar over the presser foot, and pull it down until it locks into place.

6. **Turn shaft to 25 degrees.** Do this with a 3mm hex wrench. Turn the main shaft from the rear of the machine clockwise to 25 degrees. The needle should be down and in the basket area of the rotary hook at this point.

7. **Check needle height relative to the hook point.** If needle depth is correct, the hook point will be passing behind the lower portion of the scarf.

The optional Needle Depth Gauge makes needle depth easier to check:

1. **Follow steps 1-4 above,** but do not remove the needle plate – not necessary.
2. **Turn shaft to 5 degrees.** This is bottom dead center for needle bar position in the sewing cycle.
3. **Insert the needle depth gauge as shown.** If depth is correct, needle point should scrape the top of the gauge. If too low, gauge insertion will not be possible. If too high, the gauge will not be able to contact the needle at all.
## Error Code List and Measures

<table>
<thead>
<tr>
<th>Code</th>
<th>Error</th>
<th>Description</th>
<th>Resolution/Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Circuit Board</td>
<td>Abnormality detected in control circuit board</td>
<td>Power down machine and, after 10 seconds, power on again.</td>
</tr>
<tr>
<td>002</td>
<td>Power Source</td>
<td>Power failure or abnormal voltage.</td>
<td>Power down machine and, after 10 seconds, power on again.</td>
</tr>
<tr>
<td>004</td>
<td>System Memory</td>
<td>System memory fault</td>
<td>Power down machine and, after 10 seconds, power on again.</td>
</tr>
<tr>
<td>015</td>
<td>Inverter Trip</td>
<td>Caused most frequently by uneven or inadequate AC power to the machine. Also may be main shaft motor overload, short, trouble with main shaft drive unit or other main shaft motor related abnormality.</td>
<td>Cut power and turn main shaft by hand. If turns normally, power on again. Check inverter for Error. Should be set at 0.0. Also check power coming into machine. In our experience, this is triggered by inadequate or irregular voltage (i.e. fewer than 110v) coming from the AC outlet.</td>
</tr>
<tr>
<td>016</td>
<td>X-assembly alarm</td>
<td>X-motor-related trouble, i.e. x-motor overload, short circuit, problem with motor drive unit</td>
<td>Power off machine, test pantograph movement manually. Check for any abnormality throughout full range of motion. If none found, power on and test. May need to check PMD (pulse motor driver).</td>
</tr>
<tr>
<td>017</td>
<td>Y-assembly alarm</td>
<td>Y-motor-related trouble, i.e. Y-motor overload, short circuit, problem with motor drive unit</td>
<td>Power off machine, test pantograph movement manually. Check for any abnormality throughout full range of motion. If none found, power on and test. May need to check PMD (pulse motor driver).</td>
</tr>
<tr>
<td>018</td>
<td>Main shaft error</td>
<td>Main shaft will not turn.</td>
<td>Currently, check for “birdnesting” at the rotary hook or any other blockage preventing main shaft from turning through its full rotation. Also check for needle bar boss jam as described on page 26 of this guide – another possible cause.</td>
</tr>
<tr>
<td>020</td>
<td>Needle detect</td>
<td>Machine not detecting current needle # correctly, or needle bar selection unit is off its stop position. Trouble with position-detecting circuit board.</td>
<td>Turn needle bar selector knob to until head is properly positioned at current needle position (check red alignment mark on knob with that on machine body).</td>
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<td>021</td>
<td>Needle move</td>
<td>Motor for needle bar selection unit has stopped partway through its path.</td>
<td>Follow same procedure listed for error 020</td>
</tr>
<tr>
<td>022</td>
<td>Needle move</td>
<td>Head unable to move due to malfunction of thread take-up lever or trouble of position-detecting circuit board</td>
<td>Follow same procedure listed for error 020</td>
</tr>
<tr>
<td>024</td>
<td>Needle Center</td>
<td>Needle bar stop position is off-center; needle bar stop position is out of place.</td>
<td>Follow same procedure listed for error 020</td>
</tr>
<tr>
<td>025</td>
<td>Needle over</td>
<td>Needle # out of range of actual needles on given machine.</td>
<td>Follow same procedure listed for error 020</td>
</tr>
<tr>
<td>026</td>
<td>Needle differ</td>
<td>Mismatch between actual selected needle position and needle number showing in the control panel.</td>
<td>Boot machine into maintenance mode and follow the procedure in this guide for re-setting “Needle Memory”.</td>
</tr>
<tr>
<td>030</td>
<td>Slow-speed mismatch</td>
<td>Improper speed adjustment at low speed. Speed does not decrease below 100rpm at low speed.</td>
<td>Perform automatic speed re-set: (1) Choose “OTHER” from the main menu, then select “SPEED”. After warning, machine will turn main shaft slowly from stop to max speed (needle does not engage).</td>
</tr>
<tr>
<td>050</td>
<td>C point sensor</td>
<td>Main shaft is stopped in a position other than “C” point (270 degrees)</td>
<td>Press SET and choose the AUTO option to allow machine to attempt to clear this error on its own. Barring that, choose “MANUAL” and turn the shaft back to 270 degrees.</td>
</tr>
<tr>
<td>051</td>
<td>L Sensor</td>
<td>Timing detection board fault, or marred photo-sensor. Malfunction of &quot;Lowest needle position&quot; sensor on detection circuit board.</td>
<td>Check to see if photo sensor is clean or if the slit plate contacts sensor. Also check rotary hook area for bird-nesting and clear thread/blockage as necessary.</td>
</tr>
<tr>
<td>052</td>
<td>C Sensor</td>
<td>Timing board detection fault, or marred photo-sensor. Malfunction of &quot;Color change position&quot; sensor on timing detection circuit board.</td>
<td>Check to see if photo sensor is clean or if the slit plate contacts sensor. Also check rotary hook area for bird-nesting and clear thread/blockage as necessary.</td>
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<td>055</td>
<td>Safety Cover</td>
<td>Switch not closed on left side of head due to safety cover being open</td>
<td>Close safety cover or close switch.</td>
</tr>
<tr>
<td>060</td>
<td>X Limit</td>
<td>Current design exceeds allowed width and/or or design position is positioned too far to left or right of center.</td>
<td>Check to make sure current pattern is digitized center-center. Re-check design position and size against currently-selected hoop and re-adjust as necessary.</td>
</tr>
<tr>
<td>061</td>
<td>Y Limit</td>
<td>Current design exceeds allowed height and/or or design position is positioned too far to above or below center.</td>
<td>Check to make sure current pattern is digitized center-center. Re-check design position and size against currently-selected hoop and re-adjust as necessary.</td>
</tr>
<tr>
<td>090</td>
<td>Miss reception</td>
<td>Not implemented</td>
<td>Not implemented</td>
</tr>
<tr>
<td>091</td>
<td>Failure to send</td>
<td>Not implemented</td>
<td>Not implemented</td>
</tr>
<tr>
<td>093</td>
<td>Data format</td>
<td>Not implemented</td>
<td>Not implemented</td>
</tr>
<tr>
<td>104</td>
<td>Miss function</td>
<td>Corruption/mis-read of design data</td>
<td>Re-transfer design again into machine and try again.</td>
</tr>
<tr>
<td>105</td>
<td>Dual function</td>
<td>Corruption/mis-read of design data</td>
<td>Re-load design again into memory</td>
</tr>
<tr>
<td>108</td>
<td>Improper read</td>
<td>Not implemented</td>
<td>Not implemented</td>
</tr>
<tr>
<td>110</td>
<td>Memory full</td>
<td>During design transfer, memory has filled to capacity</td>
<td>Delete unnecessary patterns from machine memory and try again.</td>
</tr>
<tr>
<td>111</td>
<td>Change Over</td>
<td>Color change mis-match</td>
<td>Design exceeds maximum # of 99 color changes or color change data is corrupt. Simplify or re-load design.</td>
</tr>
<tr>
<td>112</td>
<td>Data error</td>
<td>Data error in design</td>
<td>Re-load design</td>
</tr>
<tr>
<td>114</td>
<td>Id over</td>
<td># of patterns in control panel memory has exceeded the maximum of 99</td>
<td>Delete unnecessary patterns from machine memory and try again.</td>
</tr>
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<tr>
<td>118</td>
<td>Trace data over</td>
<td>Error in design trace data creation</td>
<td>Re-load design and try again.</td>
</tr>
<tr>
<td>120</td>
<td>Memory error</td>
<td>Fault in retaining contents of pattern memory</td>
<td>If this occurs frequently, it is likely that CPU is faulty. Enter maintenance mode and run memory clear function to test memory and clear all data. Re-set machine system and speed, then try re-loading design again. Update to firmware 1.11 or greater (for color LCD version of Voyager) which is more resilient against this sort of error.</td>
</tr>
<tr>
<td>130</td>
<td>Card error</td>
<td>Incapable of disposing of memory card continuously</td>
<td>Re-seat memory card and try again. Ensure that you are using a compatible memory card (Compact Flash up to 1 Gb in size) Failing the above, power off machine, power on again and re-try. Using same card, then different memory card.</td>
</tr>
<tr>
<td>131</td>
<td>Card not ready</td>
<td>Card not set</td>
<td>Same procedure as error code 130</td>
</tr>
<tr>
<td>133</td>
<td>Bad card</td>
<td>Not implemented</td>
<td>Same procedure as error code 130</td>
</tr>
<tr>
<td>141</td>
<td>Not found name</td>
<td>Designated pattern not found</td>
<td>Re-connect memory card into PC and re-save design again.</td>
</tr>
<tr>
<td>190</td>
<td>Cut blade</td>
<td>Thread cut knife is not at stop position</td>
<td>Look for bird’s nest or other obstruction to moving knife. Clean out throat /needle plate and rotary hook area. Perform thread cut to attempt to clear. Failing that, press manual engagement lever and manually turn main shaft to check that knife opens and closes properly, continuing until knife re-seats properly. In doing so, check moving knife timing, verifying that knife opens at approx. 116 degrees. If needed, reset knife according to page 22 of this guide.</td>
</tr>
<tr>
<td>193</td>
<td>Catcher</td>
<td>Thread catch hook is off its properly-retracted position. Limit switch to detect position is not &quot;OFF&quot;.</td>
<td>Check if not trimming properly. If thread is cut, ensure that catcher has returned to position, selecting either auto or manual. If so, cut and return thread catch hook to retracted position. If problem recurs, troubleshoot position of thread holder, which may mis-guide catcher and cause it to miss the thread.</td>
</tr>
</tbody>
</table>