For information on operating the Model 750 temperature management unit, please refer to the Model 750 Operator's Manual.

Please forward to Biomedical Engineering Department

Informationen zum Betrieb des Temperaturmanagementgeräts Modell 750 finden Sie im Betriebshandbuch für das Modell 750.

Bitte an die Abteilung für biomedizinische Technik weiterleiten
Check the 3M® Bair Hugger™ therapy website to ensure you have the most recent version of this document.

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Introduction

Description of the Total Temperature Management™ System

The 3M™ Bair Hugger™ brand Total Temperature Management system consists of a Model 750 forced-air temperature management unit (with optional rolling stand, and other accessories) and disposable components, including Bair Hugger forced-air blankets, the 3M™ 241™ blood/fluid warming set, and may be used with the 3M™ Bair Paws™ patient warming gowns.

The Bair Hugger warming unit is attached to the blanket or gown by means of a flexible hose. Warm air is generated in the unit and flows through the hose and into the blanket or gown. Depending on the model, the blanket or gown is placed either around, over, or underneath the patient. Small perforations on the blanket or gown allow the warm air to be dispersed over the patient. For fluid warming applications, the Model 241 blood/fluid warming set is inserted in the warming unit hose. When the unit is turned ON and a temperature setting is selected, warm air flows over the Model 241 tubing and warmed fluid exits from the distal end of the tubing. For additional information on Bair Hugger blankets, Bair Paws gowns, the 241 blood/fluid warming set, or other accessories visit us online at bairhugger.com or bairpaws.com.

This manual includes operating and service instructions and unit specifications for the Model 750 temperature management unit. You can use the Model 750 temperature management unit in all clinical settings where the patient may become too warm or too cold including the operating room to provide patient temperature management. For information about using Bair Hugger blankets, Bair Paws gowns or the 241 blood/fluid warming set with the Model 750 temperature management unit, refer to the “Instructions for Use” included with each of these disposable components. The Bair Hugger system should only be used by trained medical professionals.

Indications

The Bair Hugger temperature management system is intended to prevent and treat hypothermia. In addition, the temperature management system can be used to provide patient thermal comfort when conditions exist that may cause patients to become too warm or too cold. The temperature management system can be used with adult and pediatric patients.
Definition of Symbols

The following symbols may appear on the product’s labeling or exterior packaging.

An equipotentiality plug (grounded) conductor other than a protective earth conductor or a neutral conductor, providing a direct connection between electrical equipment and the potential equalization busbar of the electrical installation. Please consult IEC 60601-1; 2005 for requirements.

Fuse

Nonexplosion proof

Type BF equipment (patient applied)

Voltage, alternating current (AC)

This system is subject to European WEEE Directive 2002/96/EC. This product contains electrical and electronic components and must not be disposed of using standard refuse collection. Please consult local directives for disposal of electrical and electronic equipment.

Protective earth ground

No free hosing

Consult operator's manual

Consult instructions for use

Recycle to avoid environmental contamination. This product contains recyclable parts. For information on recycling - please contact your nearest 3M Service Center for advice.

Manufacturer

Attention; see instructions for use

Keep dry

Temperature limits
**Explanation of Signal Word Consequences**

⚠️ **WARNING:**
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ **CAUTION:**
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠️ **NOTICE:**
Indicates a situation which, if not avoided, could result in property damage only.

**Contraindications**

Do not apply heat to lower extremities during aortic cross-clamping. Thermal injury may occur if heat is applied to ischemic limbs.

⚠️ **WARNING**

1. Do not leave patients with poor perfusion unmonitored during prolonged warming therapy sessions. Thermal injury may result.

2. The Bair Hugger temperature management unit has been designed to operate safely ONLY with 3M Patient Warming disposable components. Use with other products may cause thermal injury. (To the full extent permitted by law, the manufacturer and/or importer declines all responsibility for thermal injury resulting from the unit being used in conjunction with product other than 3M Patient Warming products.)

3. Do not warm patients with the temperature management unit hose alone. Thermal injury may result. Always connect the hose to a Bair Hugger blanket or Bair Paws gown before providing therapy.

4. Do not place the non-perforated side of the blanket on the patient. Thermal injury may result. Always place the perforated side (the side with small holes) towards the patient.

5. Do not continue temperature management therapy if the Over-temp indicator light illuminates and the alarm sounds. Thermal injury may result. Unplug the unit, and contact a qualified service technician.

6. Do not continue 241 blood/fluid warming therapy if the Over-temp indicator light illuminates and the alarm sounds. Immediately stop fluid flow, and discard the blood/fluid warming set. Unplug the temperature management unit, and contact a qualified service technician.

7. Do not use a forced-air warming device over transdermal medication. Increased drug delivery and patient injury or death may occur.

8. Do not allow the patient to lie on the warming unit hose or allow the hose to directly contact the patient’s skin during patient warming; thermal injury may result.

9. Reusable blankets made from woven fabric, or blankets without discrete, visible holes, can cause the safety system of this unit to fail, which may result in serious thermal injury. This warming unit has been designed to operate safely ONLY with Bair Hugger blankets and Bair Paws gowns.

10. Do not connect a Bair Hugger blanket, 241 blood/fluid warmer, or Bair Paws gown to the warming unit if it has been cut or damaged; thermal injury may result.
11. Do not use a Bair Hugger blanket to transfer or move the patient; injury may result.

12. To reduce the risks associated with hazardous voltage and fire:
   - keep power cord visible and accessible at all times. The plug on the power cord serves as the disconnect device. The wall socket outlet shall be as close as practical and shall be easily accessible.
   - use only the power cord specified for this product and certified for the country of use.
   - do not allow the power cord to get wet.
   - do not use the warming unit when it appears the warming unit, power cord or any component is damaged. Contact 3M Patient Warming technical support at 1-800-733-7775.
   - this equipment must only be connected to a supply mains with protective earth.

13. To reduce the risks associated with exposure to biohazards always perform the decontamination procedure prior to returning the warmer for service and prior to disposal.

14. Do not retain the patient using a warming blanket alone, as injury may result. Use a draw sheet, safety strap, or other means to retain the patient.

15. Do not modify this equipment without authorization of the manufacturer.

16. To ground this Bair Hugger warming unit, only connect to receptacles marked "Hospital Only” "Hospital Grade,” or a reliable grounded outlet.

⚠️ CAUTIONS

1. Except for specific blanket models, Bair Hugger blankets are not sterile and are all intended for single patient use ONLY. Placing a sheet between the Bair Hugger blanket and the patient does not prevent contamination of this product.

2. Monitor the temperature and cutaneous response of patients who are incapable of reacting, communicating and/or who are without a sense of feeling every 10-20 minutes or according to institutional protocol. Monitor the patient’s vital signs regularly. Adjust air temperature or discontinue therapy when the therapeutic goal is reached or if vital sign instability occurs. Notify physician of vital sign instability immediately.

3. Do not leave pediatric patients unattended during therapy.

4. Do not initiate temperature management therapy unless the temperature management unit is free from mechanical damage and is safely placed on a hard surface or securely mounted. Otherwise, injury may result.

5. To prevent tipping, clamp the Model 750 temperature management unit to an IV pole at a height that provides stability. We recommend clamping the unit no higher than 44” (112 cm) on an IV pole with a minimum 28” (71 cm) diameter wheelbase. Failure to do so may result in IV pole tipping, catheter site trauma, and patient injury.

6. Electrical shock hazard. Do not disassemble the temperature management unit unless you are a qualified service technician. There are electrically live parts with in the unit when it is connected to a power source, even when the unit is in Standby mode.

7. To reduce the risks associated with environmental contamination follow applicable regulations when disposing of this device or any of its electronic components.
NOTICES

1. The Bair Hugger temperature management unit meets medical electronic interference requirements. If radio frequency interference with other equipment should occur, connect the unit to a different power source.

2. Federal law (USA) restricts this device to sale by or on the order of a licensed healthcare professional.

3. To avoid Bair Hugger warming unit damage:
   - do not immerse the Bair Hugger warming unit or warming unit parts or accessories in any liquid or subject them to any sterilization process.
   - do not use solvents such as acetone or thinner to clean the warming unit; avoid abrasive cleaners.
   - clean warming unit exterior with soft cloth using plain water or a mild, all-purpose or nonabrasive cleaner.

Proper Use and Maintenance

3M Patient Warming assumes no responsibility for the reliability, performance, or safety of the temperature management unit if the following events occur:

- Modifications or repairs are performed by unqualified personnel.
- The unit is used in a manner other than that described in the Operator's or Service Manuals.
- The unit is installed in an environment that does not meet the appropriate electrical and grounding requirements.

Read Before Servicing Equipment

All repair, calibration, and servicing of the Bair Hugger model 750 temperature management unit requires the skill of a qualified, medical equipment service technician who is familiar with good practice for medical device repair. If service does not require the manufacturer's attention, the Model 750 Service Manual provides the technical information needed to service the unit, or 3M Patient Warming will provide that information on request. Perform all repairs and maintenance in accordance with the instructions in the Service Manual.

Safety Inspection

Perform a safety inspection after making repairs to the Bair Hugger temperature management unit and before returning the unit to service. A safety inspection should include calibrating the operating temperature settings and testing the over-temperature detection function as described in this service manual as well as testing for leakage current and continuity check on safety ground.
Overview

When you connect the Model 750 temperature management unit to a grounded power source, the unit automatically performs the power-on-reset operation described below. Following the power-on-reset operation, the unit will enter the Standby mode. You can select any operating mode by pressing the appropriate button on the unit’s control panel. See Figure 1.

Unit Power-On-Reset

The Model 750 temperature management unit performs the following power-on-reset sequence after you connect the unit to a grounded power source:

- Performs all self-test functions.
- Illuminates all indicator lights and all pixels in the alphanumeric display momentarily.
- Displays the text “MD 700’s” and the software revision level in the alphanumeric display.
- Produces 3 chirping sounds.
- Enters the Standby mode.

If the temperature management unit loses power for less than 1 second, the unit’s software will remain in the operating mode you selected prior to the power loss. If the unit loses power for longer than 1 second, the unit’s software will reset when you restore power. The unit will then enter the Standby mode.
Operating Modes

The Model 750 temperature management unit has 4 operating modes: Ambient, 32°C, 38°C, 43°C.

To select the 32°C, 38°C, 43°C, or Ambient mode, press the corresponding button. The temperature management unit will operate within the specified temperature range, shown in the table below.

<table>
<thead>
<tr>
<th>Temperature Mode</th>
<th>Temperature of Delivered Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>32°C</td>
<td>32°C ± 1.5°C</td>
</tr>
<tr>
<td>38°C</td>
<td>38°C ± 1.5°C</td>
</tr>
<tr>
<td>43°C</td>
<td>43°C ± 1.5°C</td>
</tr>
<tr>
<td>Ambient</td>
<td>Unit will supply air that is slightly warmer than room temperature</td>
</tr>
</tbody>
</table>

After you select a temperature mode, the following events occur:

- Corresponding indicator light illuminates.
- Blower operates.
- Heater activates except in Ambient mode.
- Temperature mode timer and hour meter activate.
- Temperature at the blanket-end of the hose appears in the alphanumeric display.
- Temp in Range indicator light illuminates when the temperature at the blanket end of the hose is within ±1.5°C* of the selected setting; this indicator light does not illuminate in the Ambient mode.

Standby Mode

To place the unit in Standby mode, press the Standby button. When in Standby mode, the following events occur:

- Standby indicator light illuminates.
- Blower and heater turn off.
- Alphanumeric display deactivates.
- Temperature mode timer pauses.
- Alarm and fault detection functions remain active.

* Within ±3°C in units with < Rev. L software. The Rev version appears in the display window upon connection to a power source.
Fault Conditions

The Model 750 temperature management unit’s software recognizes several nonhazardous fault conditions including:

- Sensor failures
- Heater failures
- Computer failure
- Software failure
- Keypad failure
- Power supply failure
- Blower motor failure
- Forced over-temperature test failure

When a fault condition exists, the following events occur:

- Fault indicator light flashes.
- Audible alarm sounds.
- Blower heater turns off.
- Fault code appears in the alphanumeric display.
- Up to 5 fault codes are stored in memory.

When the audible alarm sounds, press any button on the keypad to temporarily silence it. The temperature management unit must be unplugged before it can be restarted. See Viewing the Fault Code Log and the Fault Code Table for more information about specific fault codes.

Over-Temperature Condition

When an overtemperature condition exists, the following events occur:

- Over-temp indicator light flashes.
- Audible alarm sounds.
- Blower and heater turn off.
- Fault code appears in the alphanumeric display (see Fault Code Table).

When the audible alarm sounds, press any button on the keypad to temporarily silence it. The temperature management unit must be unplugged before it can be restarted.

* Up to 3 fault codes in units with < Rev L software. The Rev version appears in the display window upon connection to a power source.
Alternative Modes

The Model 750 temperature management unit has 5 Alternative modes that allow access to the service and calibration utilities of the unit.

<table>
<thead>
<tr>
<th>Alternative Modes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AltMode0</td>
<td>Hour meter</td>
</tr>
<tr>
<td>AltMode1</td>
<td>Calibration</td>
</tr>
<tr>
<td>AltMode2</td>
<td>Fault code log</td>
</tr>
<tr>
<td>AltMode3</td>
<td>System information</td>
</tr>
<tr>
<td>AltMode4</td>
<td>Over-temperature detection test</td>
</tr>
</tbody>
</table>

The Hour Meter mode displays the cumulative amount of operating time (in Ambient, Low, Medium, and High modes) the temperature management unit has accrued since the initialization of EEPROM. The time is displayed in whole hours only.

The Calibration mode allows a technician to check and adjust the hose end sensor calibration. This should be done as part of routine maintenance and always after servicing the temperature management unit or replacing the hose. The hose end sensor temperature can be altered a maximum of ±3.0°C by adjusting the calibration offset value. In the Calibration mode, the temperature management unit operates in the Ambient temperature mode, and the alphanumeric display shows the current hose end sensor temperature and calibration offset with 0.1°C precision.

The Fault Code Log mode sequentially displays the last 5* fault codes stored in system memory. Please refer to the Fault Code Table on page 17 for more information about a particular fault code.

The System Information mode allows the technician to view important system information including the firmware, system identification, serial port baud rate, 5V power supply status, and the control board serial number.

The Over-temperature Detection Test mode allows the user to test the operation of the independent over-temperature shutdown system.

* The last 3 fault codes in units with < Rev L software. The Rev version appears in the display window upon connection to a power source.
Accessing the Alternative Modes

To access the Alternative modes, you must press the Alternative Mode button that is located on the front panel of the temperature management unit but is unlabeled. Press the text on the Bair Hugger logo when the instructions direct you to press the Alternative Mode button.

To enter one of the Alternative modes, press the Alternative Mode button in combination with one of the operating mode buttons, also located on the front panel. Figure 2 indicates which keys must be pressed to enter each of the 5 Alternative modes. When the correct combination of keys is pressed, the display reads “Hold for AltModeX,” where “X” represents the selected Alternative mode from the list above.

Exiting an Alternative Mode

Exit the Alternative modes by pressing the Alternative Mode button or by waiting for 60 seconds. You will need to access the Alternative modes for several of the service procedures described in this manual.
Service Procedures

**CAUTION**
Auto tester must not interrupt the voltage during unit on power reset or an error 053/054 may result.

**Calibrating the Operating Temperatures**

**CAUTION**
Perform all temperature testing of the temperature management unit with a 3M Patient Warming Model 22110 Temperature Test Unit.

3M Patient Warming assumes no responsibility for the reliability, safety, or performance of the Bair Hugger system if temperature tests or adjustments are made in any manner other than those described here. Improper measurement or adjustment of the temperature management unit’s normal operating temperature could result in patient exposure to temperatures outside of the indicated range and may lead to patient injury.

**Service frequency**
Every 6 months or 500 hours of use, or whenever service is performed.

**Tools/equipment**
Model 22110 Temperature Test Unit

**NOTES:**

- The Model 22110 Temperature Test Unit simulates the operating characteristics of Bair Hugger blankets when used with Bair Hugger temperature management units.

- When using the Model 22110 Temperature Test Unit, take temperature readings using a calibrated thermometer that can accept a male, subminiature connector and read a “K” style thermocouple (e.g., a Fluke Model 52 K/J Thermometer). If the test unit’s connector does not fit your thermometer, remove the connector from the test unit and attach a connector that fits your meter. Be certain to observe polarity.
Method

Note: If the temperature management unit has been stored at a temperature lower than 20°C, allow it to reach ambient temperature before beginning the calibration procedure.

1. Attach the Model 22110 temperature test device to the end of the temperature management unit hose.

2. Connect the temperature management unit to a grounded power source. The unit performs a self-test and automatically proceeds to Standby mode.

3. Press the Ambient button to place the unit in Ambient mode. Allow the unit to run in Ambient mode for at least ten minutes to equalize the temperature of the unit's internal components.

4. Press the Alternative Mode button (see Figure 2) and the Ambient button simultaneously for 3 seconds. The temperature management unit is now in Calibration mode. In this mode, the temperature management unit performs the following tasks:
   - 37 °C and 38 °C indicator lights flash.
   - Blower activates.
   - Heater elements deactivate.
   - The text “TMP” and the temperature in °C (0.1°C resolution) at the end of the hose appear in the alphanumeric display.
   - The text “OS” and the current calibration offset value (0.1°C resolution) appear in the alphanumeric display.

5. Compare the temperature shown on the alphanumeric display and the temperature on the independent, temperature calibration device.
   - If the temperatures match, press the Alternative Mode button to return the temperature management unit to Standby mode.
   - If the temperatures do not match, adjust the temperature management unit’s displayed temperature:
     a. Press the 32°C button to decrease the temperature or the 38°C button to increase the temperature by 0.1°C. You can adjust the temperature of the temperature management unit a maximum of ±3°C.
     b. Continue to press the 32°C or 38°C button(s) until the temperature in the alphanumeric display matches the temperature on the calibration device.
     c. Press the Alternative Mode button to store the calibration offset value and return the temperature management unit to Standby mode.

Note: If it is necessary to enter an offset value greater than ±3°C, there may be a defect in the hose end sensor. Remove unit from service until a new hose assembly can be substituted.
Testing the Over-Temperature Detection System

**WARNING**
Do not perform the over-temperature detection system test while the temperature management unit is being used for temperature management therapy. Thermal injury may result.

**CAUTION**
Connect each warming unit being tested to a separate power source.

**Service frequency**
Every 6 months or 500 hours of use, or whenever service is performed.

**Tools/equipment**
Model 22110 Temperature Test Unit

**Method**

**NOTE:** If continuing from previous section (Calibrating the Operating Temperature) skip to step 4.

**NOTE:** If the temperature management unit has been stored at a temperature lower than 20°C, allow it to reach ambient temperature before beginning the test.

1. Connect the temperature management unit to a grounded power source. The unit performs a self-test and automatically proceeds to Standby mode.
2. Connect the temperature test kit to the hose of the temperature management unit.
3. Press the Ambient button and allow the temperature management unit to run for five minutes.
4. Press the Alternative Mode button (See Figure 2) and the 43 °C button simultaneously for three seconds. The temperature management unit is now in a Forced Over-temperature mode. In this mode, the temperature management unit performs the following tasks:
   - Blower activates.
   - Heater elements continuously operate at full power.
   - 43°C indicator light flashes.
   - Over-temperature timer activates.
   - “OT Test” flashes in the alphanumeric display.
5. Wait for the temperature management unit to perform the over-temperature test. When the test is complete, the temperature management unit performs the following tasks:
   - Heater elements deactivate.
   - Blower continues to operate. (NOTE: The blower turns off if an over-temperature condition occurs during normal use.)

6. View the alphanumeric display to determine test outcome:
   a. PASS—The unit detected an over-temperature condition within 150* seconds. An alarm sounds for 2 short beeps. The text “PASS” flashes in the alphanumeric display, followed by these messages:
      1. OT Test OT Test
      2. TestTime XX Secs
      3. Unplug To Reset
   b. FAIL—Unit did not detect an over-temperature condition within 150* seconds (time-out failure). An alarm sounds and the Fault indicator light flashes. The text “FAIL” flashes in the alphanumeric display, followed by these messages:
      1. OT Test FAIL
      2. TestTime 150* Secs
      3. Unplug To Reset

   NOTE: Do not place a temperature management unit back into service if it fails the Over-temperature Detection System test. Send the unit back to 3M Patient Warming for repair. See Returning Units for Service on page 27.

4. Record the maximum temperature displayed by the test kit. (Use maintenance log on page 32.) If the temperature is >56°C (53°C ± 3°C typical) contact 3M Patient Warming technical service for further instructions.

5. Unplug the temperature management unit to reset it.

*Within 90 seconds in units with < Rev L software. The Rev version appears in the display window upon connection to a power source.
Viewing the Fault Code Log

Service frequency
As often as necessary.

Tools/equipment
None required.

Method
1. If your temperature management unit is already ON, you can access the fault code log from any operating mode. Otherwise, connect the temperature management unit to a grounded power source. The unit performs a self-test and automatically proceeds to Standby mode. Then select any operating mode.

2. Press the Alternative Mode button (see Figure 2: Alternative Mode button on page 11) and the 32°C button simultaneously for three seconds. The temperature management unit is now in Fault Code Log mode. In this mode, the temperature management unit performs the following tasks:
   a. Continues to operate in current operating mode.
   b. 32°C and 38°C indicator light flashes.
   c. Text “FC(n) XXX” appears in the alphanumeric display. “FC” is an abbreviation for the phrase “fault code,” “n” represents the numerical order of the fault code in the log, and “XXX” represents the code for the fault condition. See Fault Code Table on page 16 for a list of fault codes and their meanings.
   d. The time (HH:MM:SS) of each fault appears below “FC(n) XXX” in the alphanumeric display. If the unit reaches 100 or more hours the time only reads hours and minutes.

3. Press either the 32°C or 38°C button to view the next fault code in the log. The temperature management unit stores a maximum of 5 fault codes in non-volatile memory.

4. Press the Alternative Mode button to return the temperature management unit to its previous operating mode.

Clearing the Fault Code Log
Put the unit in Fault Code mode by pressing the Alternative Mode button and the 32°C button simultaneously for three seconds; then, press the 43°C button.

Note
The fault code log should not be cleared unless instructed to do so by a 3M Patient Warming representative.
## Fault Code Table

The software will detect and report the following conditions by displaying the corresponding fault code:

<table>
<thead>
<tr>
<th>Fault Condition</th>
<th>Fault Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal sensor 1 over-temperature condition</td>
<td>001</td>
</tr>
<tr>
<td>Hose end sensor 2 over-temperature condition</td>
<td>002</td>
</tr>
<tr>
<td>Hose end sensor 3 over-temperature condition</td>
<td>003</td>
</tr>
<tr>
<td>Internal sensor 1 shorted</td>
<td>004</td>
</tr>
<tr>
<td>Hose end sensor 2 shorted</td>
<td>005</td>
</tr>
<tr>
<td>Hose end sensor 3 shorted</td>
<td>006</td>
</tr>
<tr>
<td>Hose end sensor 2 open</td>
<td>007</td>
</tr>
<tr>
<td>Low wattage heater failure</td>
<td>008</td>
</tr>
<tr>
<td>Medium wattage heater failure</td>
<td>009</td>
</tr>
<tr>
<td>High wattage heater failure</td>
<td>010</td>
</tr>
<tr>
<td>A/D converter timeout</td>
<td>011</td>
</tr>
<tr>
<td>A/D startup check failed</td>
<td>012</td>
</tr>
<tr>
<td>(Reserved Fault Code)</td>
<td>013</td>
</tr>
<tr>
<td>Error in execution loop</td>
<td>014</td>
</tr>
<tr>
<td>Timeout on alphanumeric display busy flag clearing</td>
<td>015</td>
</tr>
<tr>
<td>RAM corruption in duplicate RAM locations</td>
<td>016</td>
</tr>
<tr>
<td>Error in executing a depressed key</td>
<td>017</td>
</tr>
<tr>
<td>Stuck key during startup</td>
<td>050</td>
</tr>
<tr>
<td>EEPROM is at max # write cycles</td>
<td>051</td>
</tr>
<tr>
<td>Non-0 EEPROM byte detected after zeroing</td>
<td>052</td>
</tr>
<tr>
<td>EEPROM checksum failure on copy # 1</td>
<td>053</td>
</tr>
<tr>
<td>EEPROM compare failure copy #1 to copy #2</td>
<td>054</td>
</tr>
<tr>
<td>EEPROM compare failure copy #1 to RAM</td>
<td>055</td>
</tr>
<tr>
<td>EEPROM write cycle time out</td>
<td>056</td>
</tr>
<tr>
<td>SPI byte transfer time out</td>
<td>057</td>
</tr>
<tr>
<td>EEPROM write error when entering standby</td>
<td>059</td>
</tr>
<tr>
<td>Real time clock failure</td>
<td>060</td>
</tr>
<tr>
<td>Temperature out of range high</td>
<td>070</td>
</tr>
<tr>
<td>Temperature out of range low</td>
<td>071</td>
</tr>
<tr>
<td>5 V power supply in excess of 5.333 V</td>
<td>100</td>
</tr>
<tr>
<td>5 V power supply under 4.667 V</td>
<td>101</td>
</tr>
<tr>
<td>Startup test EEPROM error</td>
<td>102</td>
</tr>
<tr>
<td>Startup test RAM error</td>
<td>103</td>
</tr>
</tbody>
</table>
Viewing the Hour Meter

Service frequency
As often as necessary.

Tools/equipment
None required.

Method
1. If your unit is already ON, you can begin the test from any operating mode. Otherwise, connect the temperature management unit to a grounded power source. The unit performs a self-test and automatically proceeds to Standby mode. Then select any operating mode.

2. Press the Alternative Mode button for three seconds (see Figure 2). The temperature management unit is now in Hour Meter Display mode. In this mode, the temperature management unit performs the following tasks:
   a. Continues to operate in current operating mode.
   b. "Hours" appears in the alphanumeric display.
   c. Cumulative hours of temperature management unit operation appear in the alphanumeric display.

3. Wait 60 seconds or press the Alternative Mode button to return the temperature management unit to its previous operating mode.

Viewing the Operating Timer
To view the amount of time the temperature management unit has been operating in the current temperature mode, press and hold the Current Temperature mode button for at least three seconds. The time is displayed in HH:MM:SS format.
Replacing the Air Filter

Service frequency
Every 12 months or 500 hours of use.

Tools/equipment
- Replacement air filter
- #2 Phillips screwdriver

WARNING
Do not attempt to clean the air filter as it may contain hazardous microorganisms. Discard the filter in a manner consistent with institutional protocol for biohazardous material.

Method
1. Disconnect the temperature management unit from the grounded power source.
2. Turn the temperature management unit upside down.
3. Remove the 2 screws located in the louvered filter cover.
4. Lift the filter cover off the temperature management unit.
5. Remove the air filter and discard it.
6. Place the new filter in the filter compartment with the gasket toward the filter ledge.
7. Replace the filter cover with the louvers facing the back of the temperature management unit.
8. Replace the 2 screws in the filter cover.
Replacing the Hose

Service frequency
As needed.

Tools/equipment
- Replacement hose
- Phillips screwdriver
- Needle-nose pliers
- Strap wrench (optional)

Method

Detaching Hose
1. Disconnect the temperature management unit from the power source before replacing hose.
2. Unscrew the hose collar.
3. If present, use the Phillips screwdriver to remove the 2 screws that attach the hose to the unit.
4. Slide the hose out of the temperature management unit. The hose will still be attached to the unit by a cable.
5. Using the needle-nose pliers, carefully detach the cable connector from the header plug located inside the hose connector (see Figure 3. Hose replacement).

Figure 3. Hose replacement
Reattaching Hose

1. Attach the cable connector of the new hose to the header plug, making sure that the protrusions on the connector align with the corresponding slots on the header.

2. Align the flat section of the hose end with the corresponding flat part of the unit’s hose connector and slide the replacement hose into the temperature management unit.

3. Screw the hose collar back into place.

4. Reconnect the temperature management unit to a grounded power source.

5. Calibrate operating temperature settings (see page 21 for instructions).

6. Perform over-temperature detection system test (see page 14 for instructions).
Replacing the Fuses

Service frequency
As needed.

Caution
Use proper Electrostatic Discharge (ESD) procedures when performing this maintenance. Failure to use proper ESD preventative measures could cause damage to the control board.

Tools/equipment
- Small Phillips screwdriver
- Medium Phillips screwdriver
- Needle-nose pliers
- ESD strap
- Model 750 Control Board
- Flat screwdriver (optional)

Method
1. Detach the hose (see Detaching Hose on page 20 for instructions).

Disassembling the Temperature Management Unit
1. Using a medium Phillips screwdriver, remove the two screws that attach the IV pole clamp or plug.
2. Turn the unit so the bottom of the unit faces up. Remove the four bottom screws with a medium Phillips screwdriver.
3. Unplug the 2-pin black connector used for the main voltage.
4. Using the medium Phillips screwdriver, remove the two screws that connect the 2 ground wires. Remove the bottom enclosure.
5. Using the medium Phillips screwdriver, remove the four screws that hold the chassis assembly to the top enclosure (Figure 2).

6. Unplug the user interface and LCD connector to remove the top enclosure. If needed, use a flat screwdriver to lift and release the snap-fit LCD connector.

7. Replace fuses.

**Reassembling the Temperature Management Unit**

1. Plug in the user interface and LCD connectors.

2. Attach the chassis assembly to the top enclosure with the 4 screws.

3. Screw in the two ground wires (with the 2 screws).

4. Plug in the 2-pin black connector.

5. Attach the bottom to the top enclosure with the 4 screws.

6. Attach the IV pole clamp or plug (with the 2 pole clamp screws).

7. Reattach the hose (see reattaching the hose on page 21 for instructions).
General Maintenance and Storage

Cleaning the Cabinet and Hose

Service frequency
As needed.

Tools/Equipment
- Soft cloth lightly dampened with water
- Mild detergent or antimicrobial spray
- Dry soft cloth

⚠️ WARNING
Do not immerse the cabinet or hose while cleaning. Moisture will damage the components, and thermal injury may result.

⚠️ CAUTIONS
- Do not use a dripping wet cloth to clean the cabinet. Moisture may seep into the electrical contacts and damage the components.
- Do not use alcohol or other solvents to clean the cabinet. Solvents may damage the labels and other plastic parts.

Method
1. Disconnect the temperature management unit from the power source before cleaning.
2. Wipe the cabinet and the outside of the hose with a damp, soft cloth and a mild detergent or antimicrobial spray.
3. Dry with a separate soft cloth.

Storage
Store all components in a cool, dry place when not in use.
# Troubleshooting

The model 750 software routinely checks unusual operating conditions. If such a condition occurs, the system may trigger a fault condition and alarm. The warming unit can be reset by disconnecting the warming unit from the main power source, allowing 30-60 seconds for the system to reset. If the fault condition reoccurs upon connection to the main power source, the unit may have a hard-fault or permanent error.

Call Technical Support for Replacement Parts at 1-800-733-7775.

<table>
<thead>
<tr>
<th>Fault Code</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-001</td>
<td>Faulty hose end sensor at patient end.</td>
<td>Replace hose. Refer to service manual or IFU included with replacement part for instructions.</td>
</tr>
<tr>
<td>FC-002</td>
<td>Faulty elbow sensor.</td>
<td>Replace elbow sensor. Refer to IFU included with replacement part for instructions.</td>
</tr>
<tr>
<td>FC-003</td>
<td>Hose disconnected from unit.</td>
<td>Reattach hose.</td>
</tr>
<tr>
<td>FC-004</td>
<td></td>
<td>Calibrate and return to service.</td>
</tr>
<tr>
<td>FC-005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC-006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC-007</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| FC-008     | Faulty heater element or faulty control board. | • Verify fan runs in ambient.  
• Check continuity of J4 connector on control board.  
  White to black  
  White to blue  
  White to yellow  
  If “open”, replace heater. Otherwise, replace control board.  
• Calibrate and return to service. |
| FC-009     |               | |
| FC-010     |               | |
| FC-050     | Defective user interface. | Replace user interface.  
• Calibrate and return to service. |
| FC-053, 054 | EEPROM error. | Reset microprocessor.  
(Press the Bair Hugger logo and **Standby** button at same time while connected to power source.  
Release buttons when Standby light remains on).  
Calibrate and return to service. |
| FC-070     | Various | Contact 3M Patient Warming technical service. |
| FC-071     |               | |
| FC-100     | Defective control board. | Replace control board.  
Calibrate and return to service. |
<p>| FC-101     |               | |</p>
<table>
<thead>
<tr>
<th>Fault Code</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-001</td>
<td>Hose end at blanket end occluded.</td>
<td>Disconnect from power source. Remove hose occlusion. Position hose end correctly into hose card (refer to the operator’s manual). Wait 30-60 seconds before reconnecting to the main power source. Reconnect to power source. If no fault occurs, unit is ready for use.</td>
</tr>
<tr>
<td>FC-002</td>
<td>Hose end sensor failure at blanket end. Faulty elbow sensor.</td>
<td>Disconnect from power source. Allow unit to cool. Wait 30-60 seconds before reconnecting to the main power source. Reconnect to power source. If no fault occurs, unit is ready to use.</td>
</tr>
<tr>
<td>FC-003</td>
<td>Moisture.</td>
<td></td>
</tr>
<tr>
<td>FC-004</td>
<td>Intermittent sensor failure.</td>
<td></td>
</tr>
<tr>
<td>FC-005</td>
<td>High heat.</td>
<td></td>
</tr>
<tr>
<td>FC-006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC-007</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Technical Support and Customer Service

USA, Worldwide

TEL: 800-733-7775  952-947-1200
FAX: 800-775-0002  952-947-1400

When You Call for Technical Support
We will need to know the serial number of your Bair Hugger temperature management unit when you call us. The serial number label is located on the back or side of the unit.

In-Warranty Repair and Exchange

USA
Call 3M Patient Warming customer service if your Model 750 temperature management unit requires factory service. A customer service representative will give you a Return Authorization (RA) number. Please use this RA number on all correspondence concerning your temperature management unit. Your customer service representative will also send a shipping carton to you at no charge, if needed. Call your local supplier or sales representative to inquire about borrowing a temperature management unit while we service your unit.

OUTSIDE THE USA
Contact your local distributor concerning in-warranty repair and exchange.
Returning Units for Service

Tools/equipment
- 3M Patient Warming service carton
- Tape dispenser
- Shipping label
- Marking pen

Method
1. Call Technical Support to get a Return Authorization (RA) number and a service carton.
2. Remove the top foam piece. If the plastic liner is available, use it to enclose the temperature management unit.
3. Lower the temperature management unit carefully into the carton.
4. Place the unit hose on the temperature management unit see (Figure 4).
5. Replace the top foam piece. Observe proper orientation.
6. Lay the unit hose on top of the foam piece around the edge.
7. Seal the carton with tape.
8. Apply the shipping label addressed to 3M Patient Warming.
9. Write the RA number on the outside of the carton.
10. Ship to 3M Patient Warming.

Figure 4. Packing configuration (View: Looking down into box.)
## Specifications

### Physical Characteristics

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>12.5’ high x 13.5’ deep x 10” wide</td>
</tr>
<tr>
<td>Weight</td>
<td>16.3 lb (7.4 kg)</td>
</tr>
<tr>
<td>Relative Noise Level</td>
<td>55 dBA</td>
</tr>
<tr>
<td>Hose</td>
<td>Flexible, compatible with the Bair Hugger brand 241 blood/fluid warming system</td>
</tr>
<tr>
<td>Filtration System</td>
<td>High efficiency 0.2 µm filter</td>
</tr>
<tr>
<td>Recommended Filter Change</td>
<td>Every 12 months or 500 hours of use</td>
</tr>
<tr>
<td>Mounting</td>
<td>Can be clamped to an IV pole, placed on a hard surface, or mounted to the rolling stand accessory</td>
</tr>
</tbody>
</table>

### Temperature Characteristics

<table>
<thead>
<tr>
<th>Recommended Operating Environment</th>
<th>Temperature: 15°C-25°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity: Max relative humidity 80% (up to 31°C) decreasing linearly to 50% relative humidity at 40°C</td>
<td></td>
</tr>
<tr>
<td>Altitude: Max 2,000m</td>
<td></td>
</tr>
<tr>
<td>Temperature Control</td>
<td>Electronically controlled</td>
</tr>
<tr>
<td>Heat Generated</td>
<td>1644 BTU/hr (average), 482 W (average)</td>
</tr>
<tr>
<td>Operating Temparatures</td>
<td>Average temperatures at the end of the hose:</td>
</tr>
<tr>
<td>HIGH:</td>
<td>43° ± 1.5°C</td>
</tr>
<tr>
<td>MED:</td>
<td>38° ± 1.5°C</td>
</tr>
<tr>
<td>LOW:</td>
<td>32° ± 1.5°C</td>
</tr>
<tr>
<td>Time to Reach Operating Temperature</td>
<td>2 - 5 minutes (dependent on blanket model)</td>
</tr>
<tr>
<td>Storage/Transport Temperature</td>
<td>-20°C to 45°C (-4°F to 113°F) Store all components in a cool, dry place when not in use</td>
</tr>
</tbody>
</table>

### Safety System

<table>
<thead>
<tr>
<th>Thermostat</th>
<th>Independent electronic circuit; thermal cutoff shuts the heater OFF to ensure hose end air remains below 56°C (53°C ± 3°C typical); back-up over-temperature detection at hose inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm System</td>
<td>Over-temperature (≤56°C, 53°C ± 3°C typical): red Over-Temp indicator light flashes, alarm sounds, heater and blower shut down, operating indicator lights turn OFF, control panel becomes unresponsive.</td>
</tr>
<tr>
<td>Fault</td>
<td>Fault: amber Fault indicator light flashes, alarm sounds</td>
</tr>
<tr>
<td>Overcurrent Protection</td>
<td>Dual input fused lines</td>
</tr>
</tbody>
</table>
### Electrical Characteristics

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Element</td>
<td>1400 W Resistive</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>Meets UL 60601-1 and IEC 60601-1 requirements.</td>
</tr>
<tr>
<td>Blower Motor</td>
<td>Operating speed: approximately 4,000 rpm. Airflow: up to 48 cfm or 23 L/s</td>
</tr>
</tbody>
</table>

#### Power Consumption
- **Peak**: 1550 W
- **Average**: 800 W

#### Power Cord
- 15 ft, SJT, 3 cond., 13 A
- 15 ft, SJT, 3 cond., 15 A
- 4.6 m, HAR, 3 cond., 10 A

#### Device Ratings
- 110-120 VAC, 50/60 Hz, 11.7 A, or 220-240 VAC, 50/60 Hz, 7.2 A, or 100 VAC, 50/60 Hz, 15 A

#### Fuses
- **Type**: Fast acting ceramic fuses, 250 VAC
- **Amp Rating**:
  - 12 A (110 - 120 VAC)
  - 8 A (220 - 240 VAC)
  - 15 A (100 VAC)
- **Operating speed**: F (Fast Acting)
- **Breaking capacity**:
  - 15 A, 12 A: 750 A @ 250 Vac
  - 15 A, 12 A: 10,000 A @ 125 Vac
  - 8 A: 200 A @ 250 Vac
  - 8 A: 10,000 A @ 125 Vac

#### Certifications
- IEC 60601-1; EN 60601-1-2; UL 60601-1;
- CAN/CSA-C22.2, No. 601.1, EN 55011;
- EN 80601-2-35

#### Classification
- **MEDICAL — GENERAL MEDICAL EQUIPMENT AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY IN ACCORDANCE WITH UL 60601-1; CAN/CSA-C22.2, No.601.1; ANSI/AAMI ES60601-1:2005 CSA-C22.2 No. 60601-1:08; EN 80601-2-35; Control No.4HZ8.**
- Classified under IEC 60601-1 Guidelines (and other national versions of the Guidelines) as Class I, Type BF, Ordinary equipment, Continuous operation. Not suitable for use in the presence of flammable anesthetic mixtures with air or with oxygen or nitrous oxide. Classified by Underwriters Laboratories Inc. with respect to electric shock, fire and mechanical hazards only, in accordance with UL 60601-1, EN 80601-2-35 and in accordance with Canadian/CSA C22.2, No. 601.1. Classified under the Medical Device Directive as a Class IIb device.

#### Diagnostics
- A qualified service technician can perform over-temperature detection system testing, temperature output testing, operating temperature calibration, and fault code troubleshooting.
Maintenance Checklist

☐ Filter inspection
1. Remove and inspect the filter.
2. Return filter or replace as necessary.
   *Note: Replace every 12 months or every 500 hours (PN 90047).*

☐ Calibrate the hose end sensor
1. Attach the Bair Hugger temperature test unit (PN 22110).
   a. Connect temperature sensor to your meter.
2. Run in Ambient mode for 10 minutes.
3. Enter the Calibration mode.
   a. Press the Alt (Bair Hugger logo) and Ambient button, together for approximately 3-seconds.
   b. Temperature measured at end of hose will display on LCD.
4. Adjust Bair Hugger unit’s displayed temperature so it matches test unit sensor (± .1° increments).
   a. 32°C button lowers displayed temperature.
   b. 43°C button raises displayed temperature.
   *Note: Unit can only adjust ± 3.0°C. Try a different hose if more adjustment is required and call 3M Patient Warming technical support with results.*
5. Save Settings – Press the Alt (Bair Hugger logo) button to save your settings.

☐ Test over temperature detection system
1. Initiate over-temperature test
   a. Press the Alt (Bair Hugger logo) and 43°C button together for approximately 3-seconds.
   b. Wait as unit executes self test.
   c. Two beeps indicate test has completed.
2. Review Results
   a. Observe max temperature <56°C.
   b. Pass or fail indicated on display.
## Maintenance Log

<table>
<thead>
<tr>
<th>DATE</th>
<th>MAINTENANCE ACTION PERFORMED</th>
<th>HOUR METER</th>
</tr>
</thead>
<tbody>
<tr>
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