Veterinary Warming
User and Technical Manual

HotDog Temperature Management System

WC7xV Model Controllers

V10x Model Warming Blankets

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Introduction & Indications for Use

The Veterinary HotDog Temperature Management System (hereafter referred to as “the System”) is an advanced, conductive warming solution indicated for the monitoring and controlling patient temperatures in veterinary patients. It provides controlled, uniform heat to help maintain normothermia during surgical, post-operative, and other medical procedures where temperature management is critical. The System is intended for use in a variety of veterinary care environments; including surgical facilities, veterinary clinics, research institutions, and other settings where patients may be at risk of thermal instability. It is suitable for animals of various sizes and species and may be used for pre-operative warming, during anesthesia (which impairs thermoregulation), in post-operative recovery, trauma care, or any situation where maintaining body temperature is clinically indicated by the veterinarian.

Purpose

The purpose of the System is to provide effective temperature management to reduce the risk of hypothermia, especially in scenarios where patients are unable to regulate their body temperature. Unintended hypothermia can occur for various reasons, including the administration of anesthetic drugs during surgery. The System is designed to provide active warming through specialized Blankets and a temperature management Controller.

System Components

The Veterinary HotDog Temperature Management System consists of the following components:

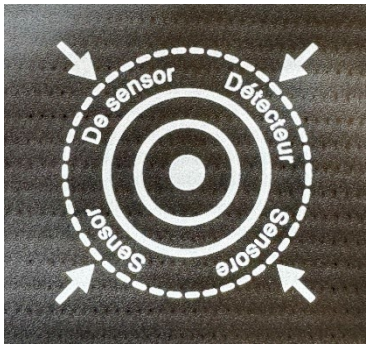
Component	Description	Model / Size	Dimensions	Notes
Controller (WC7xV Series)	Regulates and monitors the temperature of connected Warming Blankets.	WC71V – Single Port		Single Port. Can connect a single Warming Blanket.
		WC77V – Multiport		Four Ports. Can connect to (4) Warming Blankets, and (1) Underbody Mattress simultaneously.
Warming Blankets (V10x Series)	Flexible, semi-conductive polymer fabric Warming Blankets, designed for safe and uniform warming.	V101: X-Small	10" x 12" / 25.4 x 30.5 cm	Expected lifespan: 18–24 months. Expiration date marked on yellow cable.
		V102: Small	10" x 23" / 25.4 x 58.4 cm	
		V103: Medium	16" x 22" / 40.6 x 55.9 cm	
		V104: Large	22" x 31" / 55.9 x 78.7 cm	
		V106: Extra Large	27" x 47" / 68.6 x 119.4 cm	
A101 (Vet) Yellow Blanket Cables	Connects the Warming Blanket to the Controller.	A101 (Vet)	13 ft / 4.0 m	One end connects to the Warming Blanket's yellow cable: the other end plugs into Controller.
		A101-6000 (Vet)	20 ft / 6.1 m	
HotDog Pressure Reduction Pad	Intended to reduce the risk of pressure related injuries.	V600 - A	20" x 31" / 50.8 x 78.74 cm	Recommended for use under the Warming Blanket to reduce pressure-related risks on hard surfaces.
		V600 - B	20" x 40" / 50.8 x 101.6 cm	
NOTE: All components are sold separately				

Intended Use

The System is intended for use in veterinary clinics, surgical facilities, and research institutions. It is the responsibility of the clinician to determine whether warming is appropriate for each patient based on clinical considerations.

How the System Works

The HotDog Veterinary Temperature Management System uses conductive warming technology to deliver safe, uniform heat through semi-conductive Warming Blankets. Each Blanket contains an integrated sensor that communicates with the Controller to monitor Blanket temperature. The Controller energizes the Blanket only as needed to maintain the selected set-point. Both the Controller and Blanket are equipped with advanced safety features that continuously monitor system performance. Continuous patient contact with the labeled sensor area is essential for the system to function effectively.



Contraindications

The System should not be used on veterinary patients when clinical assessment indicates that warming may pose a risk or be inappropriate. The decision to use the System is at the discretion of the veterinarian or clinical professional.

Do Not Use the System in the Following Situations:

- Ischemic or Non-Perfused Tissue**:** Warming may increase the risk of thermal injury in areas with compromised blood flow, such as:
    - Distal to aortic cross-clamping.
    - In patients receiving vasoconstrictive drugs that cause prolonged vasoconstriction.
- Patients with Transdermal Medication: Warming may enhance the rate of drug delivery, potentially leading to overdose or adverse effects.
- Unsupervised Use: The System should only be operated by trained veterinary staff familiar with the device and its safety protocols.

Warnings

- Inspect the Warming Blanket before each use for signs of damage or excessive wear, such as cuts, holes, loose electrical connections, or cold areas. Do not use the System if any component is damaged, as thermal injury may result.
- If the over-temperature indicator or any other alarm continues to sound after resetting once, stop using the System immediately and contact Customer Service at 952-465-3500.
- To avoid the risk of electric shock, the Controller must only be connected to a supply mains with protective earth grounding.
- Avoid contact between sharp objects and the Warming Blanket to prevent damage.

- Do not use the System in the presence of flammable anesthetics or in environments where oxygen concentration is intentionally elevated above room air (e.g., hyperbaric chambers, oxygen tents).
    - ***Note:*** *Modern inhaled anesthetics used in veterinary medicine (e.g., isoflurane, sevoflurane, desflurane) are non-flammable. Normal oxygen use in operating and treatment rooms does not restrict use of the System. This precaution applies only to outdated flammable agents or extreme oxygen-enriched environments.*
- California Proposition 65 Warning: The medical devices and products mentioned in this IFU may contain chemicals including urethane or PVC, which is known to the State of California to cause cancer, birth defects, or other reproductive harm. For more information, visit www.p65warnings.ca.gov.

Precautions

- Do not use the Warming Blanket beyond the expiration date marked on the yellow cable extending from the Blanket. Product malfunction may occur.
- Always use a thin barrier (e.g., thin bed sheet or < 0.8mm) between the patient and the Warming Blanket to help prevent direct contact with potential residual cleaning agents or surface contaminants.
- Use the System only under the direct supervision of a clinician. All users must thoroughly review and understand the contents of this manual before use. New personnel should receive training to ensure safe and effective application during patient care.
- Monitor the patient's vital signs and temperature regularly during warming, in accordance with institutional protocols. If vital sign instability occurs, notify a veterinarian immediately.
- Ensure continuous patient contact with the labeled sensor on the black (patient-facing) side of the Warming Blanket. Loss of sensor contact may result in ineffective warming or trigger a system alarm.
- Maintain the patient's position over the marked sensor area throughout use. Sedated individuals may shift unexpectedly, increasing the risk of injury if positioning is not monitored.
- Do not expose the Warming Blanket sensor to a continuous flow of cold irrigation fluids.
- Do not set the temperature above 40°C (104°F) when the Warming Blanket is underneath or wrapped around the patient.
- When using a vacuum-activated positioning system (e.g., Hug-U-Vac Positioner*), use over-body warming rather than under-body or wrapped-around warming. Thermally accelerated pressure injuries could occur.
- Do not allow other warming devices to come into direct contact with the Warming Blanket. This may result in nuisance alarms.
- The Warming Blanket is not a pressure-reduction device. Steps must be taken to mitigate heat-on-pressure situations. Refer to the "Pressure Reduction Guidance" section for more information.
- Do not fold the Warming Blanket with the black (patient-side) surfaces touching during use, as this can cause localized heat build-up. The purple sides may be folded together to aid with positioning.
- Do not place rigid/hard return electrode plates between the Warming Blanket and patient. Use overbody warming or the HotDog 2-in-1 Warming + Grounding Mattress.
- Avoid the use of high-level disinfectants such as phenol on surfaces that may contact the patient. The CDC (USA) advises against such chemicals, as they are toxic and may cause burns to skin and mucous membranes.

- Turn off the System when not actively warming a patient.
- Do not open the Controller. Only authorized personnel may perform maintenance. The limited warranty will be voided if:
    - The Controller is disassembled or serviced by unauthorized individuals.
    - The System is used in a manner not specified in this manual.
    - The Controller is installed in an environment that does not meet grounding requirements.

Initial Setup and Assembly

The following instructions outline the proper setup, operation, and maintenance of the System. Always follow institutional protocols for patient care while using the System.

Preparation:

Components Needed for System Setup

To set up and operate the System, you will need the following components:

- Controller (WC7xV) and included components:
    - Power Cable
    - IV Pole Adapter
- A101 Yellow Blanket Cable
- A112 Blue Mattress Cable (if using Underbody Mattress)
- Pressure Reduction Device: Recommended to use the HotDog Pressure Reduction Pad
- Warming Blanket: Select the appropriate size to suit the patient type.

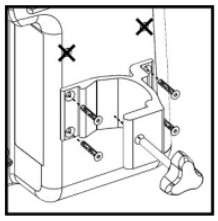
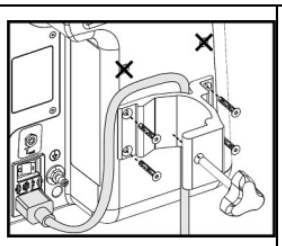
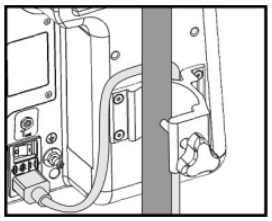
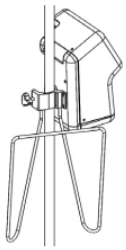
Mounting the Controller to an IV Pole (optional) (Figure 1)

1. Remove the four pre-installed screws on the lower back of the Controller. You may dispose of the white plastic washers (used for shipping).
2. Secure the IV pole adapter to the bottom four holes of the Controller using the provided pre-installed screws.
3. Place the Controller IV pole adapter around the IV pole and turn the clamp handle clockwise until securely tightened.

    Caution:
    - To prevent tipping, mount the Controller no higher than 44 in (112 cm) from the floor.
    - Use an IV pole with a minimum wheelbase radius of 14 in (35.6 cm).
    - Improper mounting may cause the IV pole to tip, potentially resulting in injury.

4. The back of the Controller includes a standard 75 mm x 75 mm VESA interface for additional mounting options (top and bottom holes).
5. The Controller has a clear cable-retention loop on the side for cable management. Rotate it downward for use.

Figure 1: Controller Mounted on an IV Pole.

 Line up the mounting clamp with the bottom two sets of screw holes. IMPORTANT: The clamp will not fit on the top two sets of screw holes.	 Ensure the power cable is in the clamp slot to strain relief cable. Tighten screws using supplied Allen wrench.	 Mount the Controller to the IV pole and tighten the clamp	 Optional storage rack sold separately. Attach if available.

Inspect the System:

1. Examine the Warming Blanket and Controller for signs of damage, including cuts, abrasions, punctures, or loose connections.
2. Ensure the expiration date on the yellow cable of the Warming Blanket has not passed.

Check the Environment:

1. Make sure the surgical surface is stable and clean.
2. Ensure that the work area is free of potential hazards, including liquids and sharp objects.
3. Confirm that the chosen power outlet is properly grounded.

Instructions for Use

Procedure Surface:

1. Start with a stable surgical surface.
2. Place a pressure reduction device, such as the HotDog™ Pressure Reduction Pad, on the surface to minimize the risk of pressure-related injuries.
3. Position the Warming Blanket on top of the pressure reduction device with the black (patient-facing) side facing up.

Note: *As a best practice, the unique serial numbers of the devices used during procedures should be documented.*

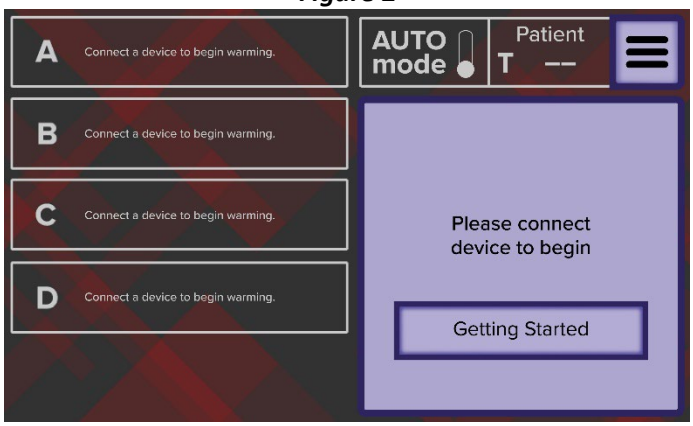
4. Place a thin barrier (e.g., thin bed sheet) in between the Warming Blanket and the patient to help prevent direct contact with potential residual cleaning agents or surface contaminants.

Power On the Controller:

1. Plug the Controller into a properly grounded power outlet.
2. Turn on the Controller using the power switch located on the back of the device.
3. Allow the Controller a moment to perform its Power-On Self-Test (POST).

4. Wait for the screen to display the message: "Please connect device to begin” (Figure 2)

Figure 2



Connecting the Warming Blanket (Table 1, Figure 3):

1. Connect the short yellow cable extending from the Warming Blanket to the stand-alone yellow A101 Cable by aligning the red dots and pushing straight in. ***Do not twist.***
2. Plug the opposite end of the A101 Cable into an available yellow port on the Controller, again with the red dot facing up.

Note: *An audible sound will confirm successful connection, indicating that the Warming Blanket sensor and corresponding safety systems are active and functional.*

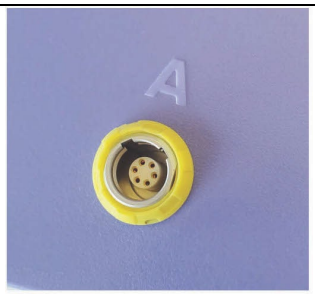
3. The corresponding port becomes available on the touchscreen.
4. The Controller will display "Ready to Warm" (Figure 4).

Table 1

WC71V Single Port Controller	WC77V Multiport Controller	Port Color	Device
A	A, B, C, D	Yellow	Warming Blanket
	M	Blue	U501V Warming + Grounding Mattress*

**Note: Visit www.vetwarming.com/manuals/ for the U501V Underbody 2-in-1 Warming Mattress + Return Electrode instructions for use and cable connection guidance.*

Figure 3: Available Controller Ports

 Port A on front of the Controller ***Note:*** *This is the only port available on the WC71V Single Port Controller.*	 Ports B, C, D, and M on back upper left of the Controller. (WC77V only). *Blue M port available on select WC77V Controllers only. Upgrade available if needed. Please contact Customer Service at 952-465-3500/cs@augsurg.com.*

Temperature Selection

1. Once the "Ready to Warm" message appears, select the newly populated ‘Warming Device’ port on the touchscreen to begin temperature selection. (Figure 4).

Figure 4: Ready to Warm

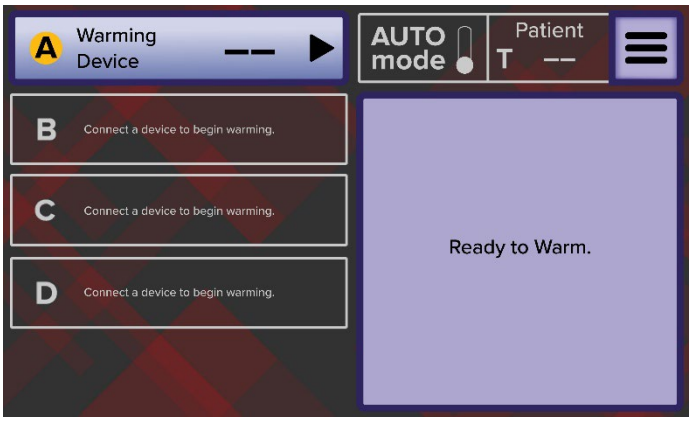
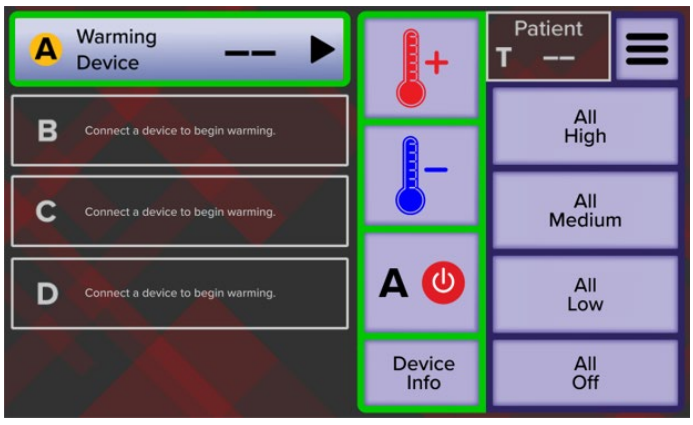


Figure 5: Selecting Port



2. The Warming Device highlighted in green is the currently selected device. To select its temperature, use the red + thermometer to increase the temperature, or the blue – thermometer to decrease the temperature (Figure 5, above).

3. Follow the guidelines for temperature selection shown below (Figure 6):

Figure 6: Temperature Selection Guidelines

Start by using the 40°C/104°F temperature setting. If the patient is becoming normothermic, there is no need to increase the temperature. If you are not getting the desired results, you may increase the temperature and use overbody warming only. Follow all precautions.

	Celsius Display	Fahrenheit Display
LOW	37	99
	38	101
MED	39	102
	40	104
	41	106
HIGH	42	108
	43	110

Use overbody warming instead of underbody warming or wrapped-around warming on patients with any risk factors such as dehydration, poor circulation, lack of perfusion, or any illness that may impact circulation.

*****Caution:** Do not exceed 40°C (104°F) when the Warming Blanket is placed underneath or wrapped around the patient.*

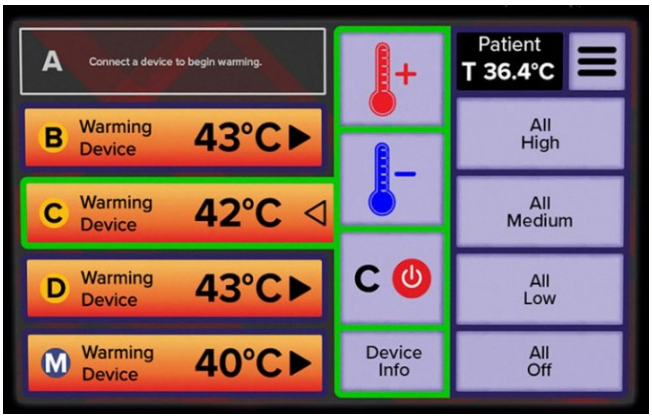
***Note:** There is no need to preheat the Warming Blanket, as the selected temperature will be reached within 5 minutes. Preheating your Blanket could result in sensor alarms.*

Connecting Additional Warming Blankets

(only available on the WC77V Controller) (Figure 7)

The WC77V Multiport Controller allows the connection of up to 4 Warming Blankets and 1 Underbody Mattress for simultaneous use.

Figure 7



- **Additional Components Needed (per additional Warming Blanket):**
    - A101 (vet) Yellow Blanket Cable
    - Pressure Reduction Device: Recommended to use the HotDog Pressure Reduction Pad
    - Warming Blanket: Select the appropriate size to suit the patient type.

- **Connecting the Additional Warming Blanket (Shown on Page 11, Table 1, Figure 3):**
    1. Connect the short yellow cable extending from the Warming Blanket to the stand-alone yellow A101 Cable by aligning the red dots and pushing straight in. ***Do not twist.***
    2. Plug the opposite end of the A101 Cable into an available yellow port on the Controller, again with the red dot facing up.

    Note: *An audible sound will again confirm successful connection, indicating that the Warming Blanket sensor and corresponding safety systems are active and functional.*

    3. The additional port becomes available on the touchscreen.
    4. The Controller will display "Ready to Warm" (Shown on Page 11, Figure 4).
    5. You are now ready to select the temperature as seen in the instructions and selection guidelines shown on page 11 and 12.
    6. Each connected Warming Device can be adjusted separately by selecting the specific port, or depending on need, they can all be adjusted simultaneously using the All High, All Medium, and All Low options shown on the right side of the screen. The corresponding temperatures for these options are shown on Page 12, Figure 6.

    Note: *All patients are unique and require individual attention. All High/Med/Low selections should be used cautiously.*

- **Connecting Underbody Mattress:**
    - *Visit www.vetwarming.com/manuals/ for the U501V Underbody 2-in-1 Warming Mattress + Return Electrode instructions for use and cable connection guidance.*

Controller Screen Overview

(Figure 8)

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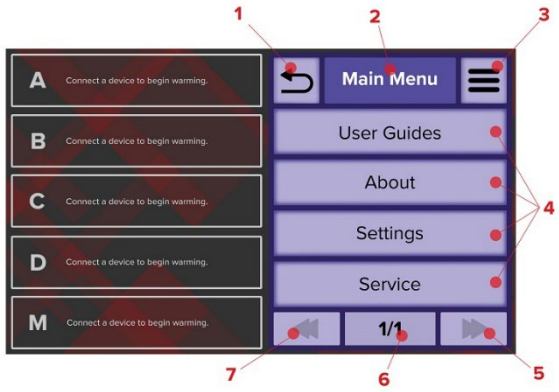
<td> 
</td>
<td>1. Back
2. Menu Title
3. Main Menu
4. Submenu
5. Next Page
6. Pages
7. Previous Page</td>
</tr>
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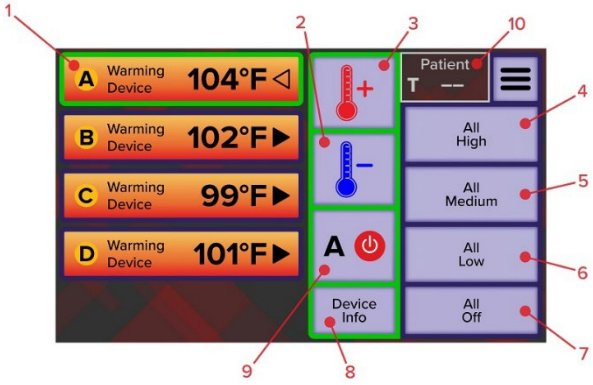
<td> 
</td>
<td>1. Currently Selected Warming Device (green border)
2. Decrease Selected Device Temperature
3. Increase Selected Device Temperature
4. Set All Devices to High Temperature
5. Set All Devices to Medium Temperature
6. Set All Devices to Low Temperature
7. Turn Off All Devices
8. View Selected Device Info
9. Turn off Selected Device
10. (feature not available on Veterinary Devices)</td>
</tr>
<tr>
<td colspan="2">Display Tips:

A. Do not press down hard. This is not needed.

B. An overly thick glove may prevent detection of finger.

C. Moisture on screen can confuse the system; ensure screen is dry before use</td>
</tr>
</table>

Patient Positioning Guidance

Proper patient positioning is essential for achieving optimal warming and minimizing the risk of injury. The System is designed to work effectively when the patient is correctly positioned on the Warming Blanket.

General Guidelines:

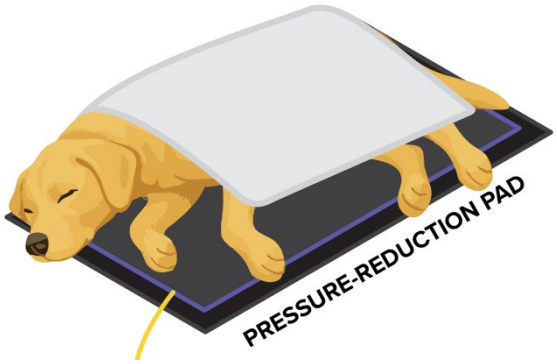
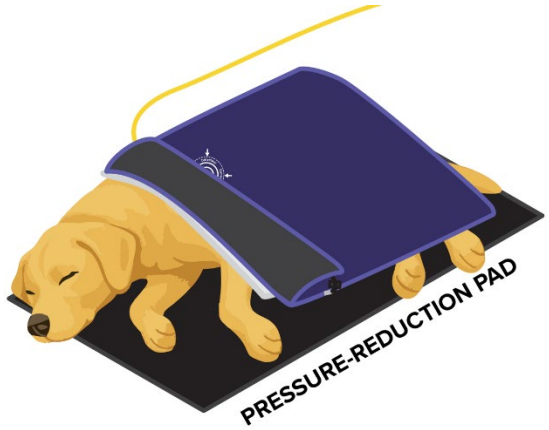
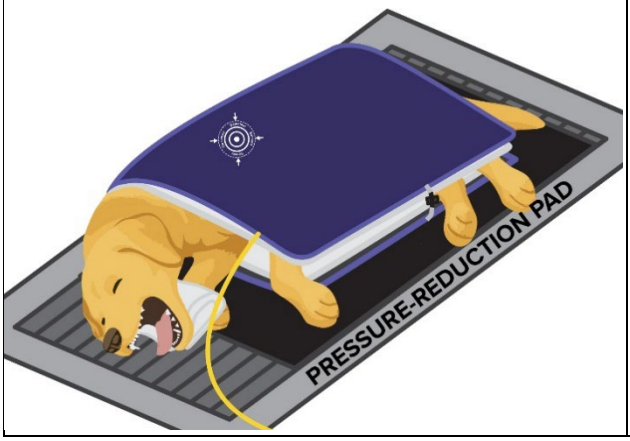
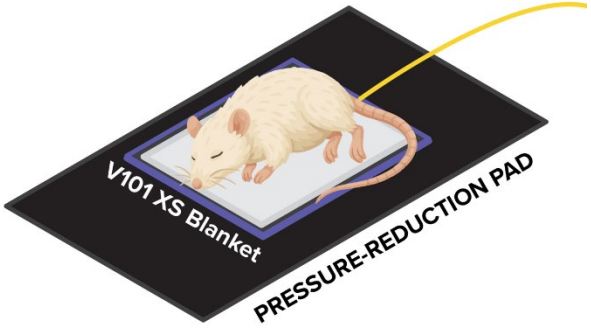
1. **Sensor Contact:**
    - Maintain contact between the patient and the labeled sensor on the black (patient-facing) side of the Warming Blanket at all times. This is especially important if the patient is repositioned during the procedure. This is crucial for the System to function as designed.
    - When using overbody warming (Warming Blanket placed on top of the patient), utilize the visual indicator on the opposite (purple non-patient side) to correctly align the sensor with the patient.
    - If users are struggling to maintain or reach normothermia, ensure that as much surface area of the patient as possible is in contact with the Warming Blanket.

2. **Positioning Options:**
    - Patients can be positioned on top of the Warming Blanket, provided the temperature does not exceed 40°C/104°F.
    - Wrapping patients in a “Hot Dog style” wrap (where the Warming Blanket wraps around the patient) is the most effective method for maintaining and achieving normothermia.
    - For post-operative recovery, overbody warming (with the Warming Blanket placed on top of the patient) is recommended
    - Use the included Blanket Straps (shown below) to help fold, conform, or secure the Warming Blanket to the patient as needed during procedures.

    Caution: *Non-anesthetized or conscious patients should not be left unsupervised with a Warming Blanket to prevent potential product damage.*

Blanket Strap

Visual Positioning Examples

Wrapped/Underbody Warming (using included Blanket Strap) 	**Warming Blanket Folding (Purple-to-purple side only)** 
Underbody with blanket/towel over patient (Assists in locking in warmth) 	**Overbody Warming with Blanket Folding (using included Blanket Straps)** 
Lateral Dental Positioning (on a wet table, using towel to prevent pooling on Blanket) 	**Small Exotics:** 

Pressure Reduction Guidance

The Warming Blanket is not a pressure-reduction device. To mitigate heat-on-pressure situations when the Blanket is placed under or wrapped around a patient on hard surfaces (e.g., surgical tables, dental grates), use a pressure-reduction device (such as the HotDog Pressure-Reduction Pad) between the Blanket and any hard surface.

Key Considerations:

- **Pressure Injuries:** External pressure can reduce blood flow (ischemia), potentially leading to tissue necrosis.
- **Risk Factors:**
    - Prolonged procedures or any instance in which a patient remains in a fixed position can significantly increase the risk of pressure injuries, particularly over bony prominences or pressure points. Frequent assessment and repositioning, when feasible, are critical to reducing this risk.
    - Pay particular attention to pressure points and bony prominences (e.g., scapula, ribs, greater trochanter).
- **Heat and Pressure Interaction:**
    - Partial Blood Flow (Hypoxia): Warming may improve circulation and reduce injury risk.
    - Full Occlusion (Anoxia): Heat will increase metabolic demand without oxygen supply, hastening tissue damage. Injuries caused by pressure-induced anoxia may be mistakenly identified as burns.
- **Best Practices:**
    - Use overbody warming instead of underbody warming for patients at risk (e.g., dehydration, poor circulation, impaired perfusion).
    - Alleviate pressure points by using positioning aids or high-density foam pads, like the HotDog™ Pressure Reduction Pad
    - Do not place hard objects (e.g., surgical instruments, cautery plates) between the patient and the Warming Blanket.

    Note:
    The HotDog Pressure Reduction Pad (sold separately) is specifically designed for compatibility with the System and provides effective pressure redistribution on surgical tables and dental grates. If an equivalent device is used, it must provide sufficient support and pressure relief. Refer to the HotDog Pressure Reduction Pad Instructions for Use (IFU) for proper setup, cleaning, and usage guidelines.

Wet Procedure Guidance

The System is highly effective in wet procedures, such as dental surgeries, orthopedic lavage, and other fluid-intensive cases. The Warming Blanket is waterproof and can safely come into contact with fluids, making it suitable for maintaining normothermia during these procedures. To ensure safe and effective warming, follow these guidelines:

General Considerations:

- **Use of Barriers:**
    - Avoid thick or highly absorbent materials that may become waterlogged during wet procedures, as they may interfere with heat transfer.
- **Fluid Flow:**
    - Do not allow continuous irrigation fluid to flow directly over the Warming Blanket sensor, as this may affect temperature regulation.
    - Use a slight grade on the surgical surface to facilitate fluid drainage and avoid pooling. (See figure 9 below)
- **Patient Fur/Hair:**
    - Ensure the patient's fur or hair does not become excessively soaked, as wet fur can reduce warming efficiency and potentially impact heat transfer.
    - Use a thin barrier, like a bed sheet, with sensitive patients, such as those with little to no fur and/or hair.
- **Positioning for Fluid Control:**
    - Use a rolled towel under the patient's mouth or head to redirect runoff.
    - Position the patient to prevent fluid accumulation on the Warming Blanket**.**

Caution: Do not exceed 40°C/104°F when using underbody or wrapped warming.

Caution: Use overbody warming for patients with increased risk factors, such as dehydration or impaired circulation.

Note: *Do not allow liquid ingress into the blanket connections. Product malfunction could occur.*

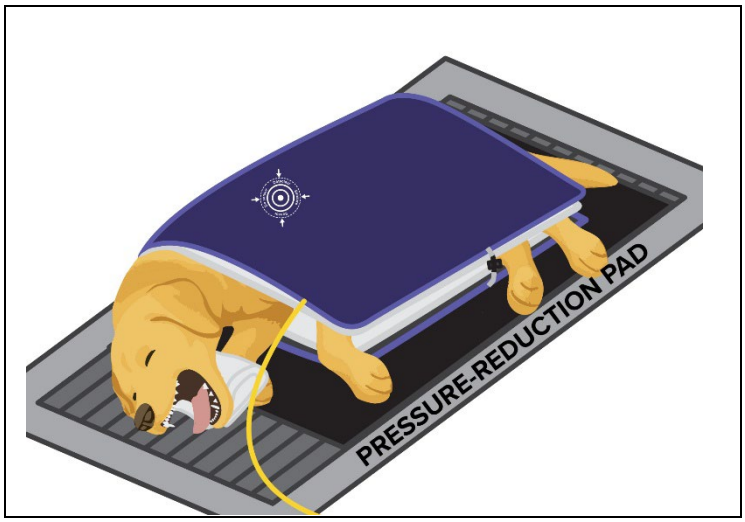
Maximizing Warming Efficiency

- The more patient surface area in contact with the Warming Blanket, the better the effectiveness.
- Wrapping the patient in a “hot dog” style wrap provides the most effective core warming.
- Use the supplied Blanket Straps to fold and conform the blanket as needed.

Caution: Do not fold the black (patient-side) of the blanket in a way that contacts itself. Folding the purple (non-patient side) to purple-side is acceptable.

Caution: If a higher temperature setting (above 40°C/104°F) is necessary, use overbody warming rather than underbody warming.

Suggested Fluid Control Set Up (Figure 9):



Caution:

- Do not place any objects, including fluid lines or monitoring devices, between the patient and the warming surface, as this can impede heat transfer and cause ineffective warming or increased risk of pressure related injuries.
- If repositioning the patient, always check that sensor contact is maintained.
- Non-anesthetized or conscious patients should not be left unsupervised with a Warming Blanket to prevent potential product damage.
- During wet procedures, always ensure that fluid does not continuously pool on the warming surface or flow directly over the warming sensor.

After-Use Instructions

1. **Power Down:**
   - Turn off the Controller using the power switch.
   - Unplug the power cord from the outlet.

2. **Disconnect the Warming Blanket:**
   - Detach the Blanket from the Controller, ensuring gentle handling of connectors.

3. **Inspection After Use:**
   - Check the Blanket and Controller for signs of wear or damage.

Cleaning and Maintenance Guidelines

Proper cleaning of the System is essential for safety and performance. Follow institutional protocols and the guidance below.

General Precautions

- Turn off and unplug the Controller before cleaning.
- Never immerse/submerge the Warming Blankets or Controller in liquids.
- Do not place components in autoclaves, sterilizers, or high-temperature cleaning systems.
- Avoid spraying solutions into electrical connectors, cable ports, or openings.
- Use only lightly moistened cloths on the Controller; avoid excessive moisture.

Approved Cleaning Solutions

Only use approved, non-abrasive disinfectants that are compatible with medical equipment.

Approved Examples

- Alcohol-based solutions (diluted per chemical manufacturer instructions)
- Bleach-based solutions (diluted per chemical manufacturer instructions)
- Ammonia-based solutions (diluted per chemical manufacturer instructions)
- Chlorhexidine solutions (diluted per chemical manufacturer instructions)
- Similar hospital-grade low- or intermediate-level disinfectants

Examples to Avoid

- Hydrogen peroxide or peroxide-based products
- Abrasive, oxidizing, or highly acidic cleaning agents
- Harsh solvents such as MEK, acetone, or phenol-based solutions

Note: *Use of unapproved cleaning agents may cause product damage and void the warranty.*

Cleaning Procedure

1. Inspect for visible contamination.
2. Remove debris using a soft brush or sponge with a mild detergent.
3. Disinfect with an approved cleaning agent using a soft cloth or disinfectant wipe.
4. Rinse with a clean cloth dampened with cool water to remove any residual cleaning chemicals.
5. Dry thoroughly before reusing. Wipe with a dry cloth and allow the blanket to air dry completely.
6. Inspect again for damage, residue, or signs of wear. Discontinue use if damage is found.

Storage

- Warming Blankets: Store flat or rolled. Avoid long-term folded storage.
- Controller: Store in a dry, ventilated area away from direct sunlight.
- Cables: Coil loosely. Use the Controller's cable-retention loop for secure storage.

Caution:

- Never machine wash, autoclave, or immerse components.
- Always rinse off residual cleaning agents before reuse.
- Ensure all components are completely dry before reconnecting power or using with a patient

Error Codes and Troubleshooting

The System is designed to provide clear alerts and error messages to help users identify and resolve issues efficiently. Follow the guidance below to troubleshoot common problems and respond to error codes.

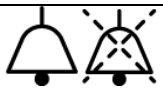
Error Codes	Error Description	Problem Solving Steps
E1	Over-Temperature	If the temperature exceeds one degree above the set point, the alarm will sound, and power to the Blanket will be automatically disconnected. To reset the alarm, unplug the Blanket and wait for 5 minutes before reconnecting it. Before turning the Controller back on, inspect the setup to ensure the Warming Blanket is not in contact with any other warming modality or device. Turn the Controller back on and select the desired temperature**. If the alarm sounds again, discontinue use and contact customer service.**
E2	Failure To Reach Temp	If the Blanket does not reach the set temperature within 10 minutes, the alarm will sound, and power to the Blanket will be automatically disconnected. To resolve this, check that the Blanket is in proper contact with the patient and that the sensor area is touching the patient. Unplug the Blanket, then reconnect it to reset the alarm**. If the alarm sounds again, discontinue use and contact customer service.**
E3	Port Current Reached	If the electrical current in the Blanket exceeds the allowable limit, the alarm will sound, and power to the Blanket will be automatically disconnected. This may indicate an electrical issue with the Blanket. Unplug the Blanket from the Controller, then reconnect it to reset the alarm. **If the alarm occurs again, discontinue use and contact customer service.** **Note:** If using four Extra Large (V106) Blankets simultaneously, stagger the start of warming for each Blanket by 2 minutes to prevent excessive electrical load.
E4	Sensor or Cable Failure	If the Controller loses communication with the sensor in the Warming Blanket, the alarm will sound, and power to the Blanket will be automatically disconnected. This may indicate an electrical issue with either the Blanket or the Controller. To isolate the problem, swap the cables and Blanket with known good components. **If the issue persists, discontinue use of the affected Blanket or cable and contact customer service.**
E5	Blanket Fold Detection	Not applicable to veterinary devices.
E7	Auto Mode Disengaged	Not applicable to veterinary devices. **Contact customer service if this error is not resolved after resetting the Controller.**
E8	Over-Temperature Sensor (Secondary)	The temperature sensor has exceeded 46° C. **Disconnect the Blanket and contact customer service.**

General Troubleshooting Steps

If an alarm occurs, it can be related to the Warming Blanket, Cable, or Controller. Follow these steps to identify and resolve the issue:

1. **Power Down the System:**
    - Turn off the Controller using the switch on the back.
    - Unplug the Controller from the wall outlet.
2. **Disconnect All Components:**
    - Unplug the Yellow Cable from the Controller.
    - Disconnect the Blanket from the Cable.
    - You should now have three separate pieces: Controller, Cable, and Blanket.
3. **Restart the Controller:**
    - Plug in the Controller and power it on, allowing it to complete the start-up process.
    - ***Next Steps:***
        - If the Controller does start up normally without alarms, proceed to the next step.
        - If the Controller does not start correctly or shows an error, contact Customer Service at 952-465-3500
4. **Test the Cable Connection:**
    - Connect just the yellow cable to the Controller without attaching the Blanket.
    - ***Next Steps:***
        - If the Controller acknowledges the cable without alarms, move to the next step.
        - If an alarm sounds, the cable is likely faulty and may need to be replaced.
5. **Test the Blanket:**
    - Connect the Blanket to the yellow cable.
    - Listen for a quick beep from the Controller indicating the blanket connection.
    - ***Next Steps:***
        - If the Controller acknowledges the Blanket without alarms, it is functioning correctly.
        - If no beep occurs or an alarms sound, try swapping the cable with a known good one. If the problem is resolved with a different cable, replace the original yellow cable.
        - If the issue persists even with a new cable, the Blanket is likely the issue. Move to the next step.
6. **Test with a Different Blanket:**
    - Use a different Blanket and repeat the above steps shown in Step 5
    - ***Next Steps:***
        - If the new blanket works without issue, the original blanket is faulty.
        - If the problem persists, the issue may be with the Controller itself. Please contact Customer Service at 952-465-3500.

Definition Of Product Symbols

	See IFU for Warnings and Precautions		See information for use at the provided website.		Measured temperature (invalid patient temperature)
	Natural Rubber Latex Free		Not Sterile	T 37.0°C	Valid Patient Temperature (example)
	Attention; consult accompanying documents		Reference Number		Lot Number
	BF Patient Applied Part according to IEC60601-1.		Serial Number		Manufacture Date
	Do not use after YYYY-MM-DD		Transport and storage temperature range		Manufacturer
	Keep Dry		Transport and storage humidity range		Fuse
	Equipotential		CE-Mark		Indicates separate treatment from general waste at end of life. See Precautions for details.
	Temperature Sensor		Device Temperature Increase Button +1°C (When gray, device is at maximum temperature.)		Device Temperature Decrease Button -1°C (When gray, device is at minimum temperature.)
	Main Menu Button		Back Button		Next/Previous Page Graph Scroll Left/Right
	Confirm/Yes Button		Cancel/No Button		Increase Setting Button (Volume, Brightness, Etc.)
	Decrease Setting Button (Volume, Brightness, Etc.)		Graph Zoom in Button		Graph Zoom out Button
	Slideshow Play/Pause Button (Outline indicates pause)		Slideshow Volume Button		Alarm Mute Button (X indicates alarm is muted.)
IPX2	Protected against dripping water when tilted up to 15°; vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.				
	Equipment Classified by Intertek Testing Services NA Inc. with respect to electric shock, fire, and mechanical hazards only, in accordance with UL 60601-1.				

Technical Manual

Repair, preventive maintenance, safety testing, and servicing of the System require the expertise of qualified medical-equipment service technicians familiar with best practices for medical device repair. Do not open the Controller. There are no user-serviceable parts inside. If service is required, contact Technical Support. Perform all maintenance activities according to the instructions in this Technical Manual.

Maintenance & Testing

Electrical Safety Checks and Functional Testing

Frequency:

- Perform these tests once every 24 months (or more frequently, as required by clinic guidelines).

Tools/Equipment:

- Warming Blanket Cable (A101)
- Ground continuity tester
- Leakage current tester
- Calibrated, fast-reacting thermocouple and meter
- HotDog Warming Blanket

Method:

1. **Power Connection:**
    - Insert the Controller power plug into a properly grounded hospital-grade electrical outlet.
    - Ensure that no cables or devices are connected to any of the ports.

    Warning: *To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth grounding.*
    Note: *The Controller is grounded and should not be attached to ungrounded tables intended for use with a hyfrecator or similar devices.*

2. **Safety Tests:**
    - Ground Continuity Test: Perform the test according to standard institutional protocol.

	Note: The equipotential stud on the back of the Controller may be used as a grounding point for these tests. Equipotential stud is for ease of attaining ground connection during electrical safety testing. Clip to stud during test. Reference 60601-1 8.6.7

- **Leakage Current Test:**
    - Connect a Warming Blanket to the Controller.
    - Measure the leakage current to ensure it does not exceed the maximum allowable limits as specified in Table 3.

Table 3: Maximum Allowable Leakage Current		
Polarity	**Condition**	**Current (mA)**
Normal / Reversed	Normal	0.1
	Open Ground	0.5
	Open Neutral	0.5
	Open Ground & Open Neutral	0.5

3. **Functional Testing of the Controller:**
    - **Access Diagnostic Test mode:**
        - Navigate to the Service Menu (Main Menu > Service > Diagnostic Test).
        - Click the green checkmark button to initiate the test.
        - The test will not start until all Warming Devices have been disconnected from the Controller.
    - **Alarm Verification:**
        - The alarm should sound near the end of the test to verify functionality.
        - **IEC 2-35 Compliance:**
            - This test verifies that the independent thermal cut-out (secondary over-temperature sensor) is operational.
    - **Test Results:**
        - If successful, the screen will display "Passed".
        - If unsuccessful, the screen will display "Failed".
        - If a failure is observed, contact Customer Service.

Functional Testing for Blanket and Controller:

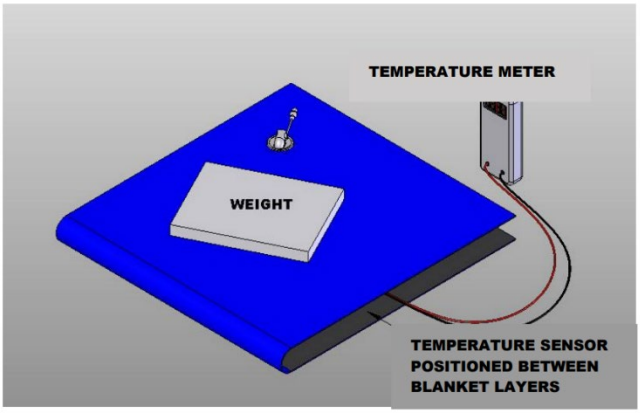
- Use a Warming Blanket to perform the following steps.
- If a failure occurs during any step, repeat the test with a different Warming Blanket.
- If the second Blanket also fails, contact Customer Service.

Steps:

1. **Temperature Sensor Placement:**
    - Tape a calibrated, fast-reacting temperature sensor to the patient-facing surface of the Warming Blanket directly over the sensor marking.

2. **Folding the Blanket (Figure 9):**
    - Fold the Warming Blanket back on itself (black side to black side) so the temperature sensor is inside the folded area.
    - Place a weight of 750 to 1000 grams (such as a small book or notebook) over the sensor location to ensure good contact between the sensor and the folded Warming Blanket.

Figure 3: Warming Blanket Test Configuration



3. **Power On and Connection:**
    - Turn the Mains Power Switch on the Controller to the ON position.
    - Connect the Warming Blanket cable to the Controller.
    - An audible tone will indicate that the Warming Blanket is connected.
4. **Temperature Setting:**
    - Set the Controller to the temperature to be verified.
    - If checking all set-points, start with the lowest temperature.
5. **Temperature Stabilization:**
    - Allow the device to reach the set point (indicated when the set point readout is no longer flashing).
    - After reaching the set point, let the temperature stabilize for an additional 10 minutes. **Note:** A temperature overshoot may occur during this process, which is normal.
6. **Temperature Verification:**
    - After 10 minutes, check the temperature reading on the sensor.
    - The temperature should be within ±1°C of the set-point temperature.
    - Measurement Accuracy:
        - Account for the accuracy and tolerance of the temperature sensor, which may range from ±0.2°C to ±2.0°C.
        - Example: If the Controller is set to 41°C and the sensor accuracy is ±1.0°C, the acceptable temperature range would be 39 to 43°C (41 ± 2°C).
    - If the measured temperature falls outside the acceptable range, repeat the test.

7. **Repeat Testing:**
    - Repeat steps 4-6 for each temperature setting to be verified.
    - If the temperature consistently falls outside the acceptable range with multiple blankets, contact Customer Service.

Important Notes:

- **Diagnostic Mode Requirements:**
    - The Controller must be in Diagnostic Test Mode for alarm verification.
- **Alarm Functionality:**
    - An alarm should sound at the end of the test, indicating that the thermal cut-out is operational.
- **Test Accuracy:**
    - The accuracy of the temperature measurement depends on the sensor type.
    - Always include the sensor tolerance when determining the pass/fail criteria.

Error Codes: Alerts & Alarms

When an Alarm or Alert condition occurs, the associated error code will remain displayed until the condition is resolved.

Sequential Display of Alarms and Alerts:

- If multiple Alarm or Alert conditions occur in succession, the system will display the code corresponding to the highest priority condition first.
- Once the highest priority condition is shown, subsequent codes will be displayed in order of priority.
- After all active conditions have been displayed, the screen will return to the main operating view, where the error codes will remain visible, replacing the temperature set point.

New Alarm or Alert Conditions:

- If a new Alarm or Alert condition arises while previous alerts are still active, the system will repeat the display of all active codes, sorted again by priority.

Alarm Resolution:

- To resolve an Alarm, follow the on-screen instructions.
- ***Important:*** Devices will not function when an Alarm is active.

Alarm Audio Pause:

- The alarm audio can be paused for 10 minutes. After this period, the audio will automatically resume if the condition has not been resolved.

Alert Error Condition	Code		Alarm Error Condition	Code

Calibration failure	EA		Port Current Limit Reached	E3
Hardware failure (secondary circuitry)	EC		Sensor or Cable Failure	E4
System Failure (Power Switch Failure)	EF		Blanket Fold Detection	E5
Hardware I2C failure	EH		Auto mode Disengaged	E7
Hardware power supply failure	EP		Over Temperature (Secondary)	E8
Primary Over-temperature	E1		Automatic Shutoff Timer	-- (returns to Standby mode)
Failure to Reach Temp	E2			

Alarm Error Condition	Code	Condition Delay	Signal Generation Delay (Software Alarm)	Signal Generation Delay (Hardware Alarm)
Overcurrent (System) [hardware]	E3	< 1 millisecond	< 200 milliseconds	< 50 seconds
Primary Over-temperature [software]	E1	15 Sec	< 200 milliseconds	(software only; won't alarm)
Port Current Limit Reached [hardware]	E3	< 1 millisecond	< 200 milliseconds	< 50 seconds
Sensor or Cable Failure [software]	E4	15 Sec	< 200 milliseconds	(software only; won't alarm)
Blanket Fold Detection [software]	E5	15 Sec	< 200 milliseconds	(software only; won't alarm)
Over Temperature TruCore (NA) [hardware]	E6	< 1 millisecond	Not implemented	< 50 seconds
Over Temperature (Secondary) [hardware]	E8	< 1 millisecond	< 200 milliseconds	< 50 seconds

Specifications

Physical Characteristics		
Dimensions		33 cm high x 14.0 cm deep x 19.7 cm wide13" high x 5.5" deep x 7.75" wide
Weight		5 kg (11 lbs)
Mounting		Can be placed on a horizontal flat surface (i.e. tabletop) or clamped to an IV pole.
Temperature Characteristics		
Temperature Control		Micro-processor
Operating Temperatures		Blanket Ports A and B adjustable in 1°C increments 37° to 43° ± 1.0°C 98.6° to 109.4° ± 1.8°F

Safety System

All alarm conditions are classified as Medium Priority Technical Alarms

Auditory Alarms	Minimum SPL of 65 dB(A) at 3m (from front of controller) with a background SPL not to exceed 55dB(A)
Primary Over-temp Alarm	Ports A, B, C, D (Warming Blanket) Medium Priority Alarm sounds when temperature sensor is at set point + 1°C
Secondary Over-temp Alarm	Ports A, B, C, D (Warming Blanket) An independent electronic circuit shuts the heater off if the Warming Blanket temperature sensor reaches set point + 3°C. (46°C) Medium Priority Alarm sounds.
Over-current limits	Port A: 10 amps max Port B: 10 amps max Port C: 10 amps max Port D: 10 amps max System: 14.6 amps Medium Priority Alarm sounds in over current condition. System utilizes power rationing when multiple ports are drawing current over system levels.
System Over-current Protection	Dual input fused lines. Medium Priority Alarm sounds

Electrical Characteristics

Leakage Current	Meets UL 60601-1 and IEC 60601-1 requirements for Class I, Type BF equipment.
Power Consumption	850W maximum
Power Cord	4.6 m (15 ft) - May vary by country and region per local requirements and regulations.
Device Ratings	Input: 100-240 VAC, 50/60 Hz, 850VA Output A, B, C, D: 48 VDC, 480 VA Max each
Fuses	T10AL250V (2 x 5x20mm)

Environmental Conditions

Environmental Conditions for Transport and Storage	Temperature: -20°C to 60°C Humidity: 20% to 80% Keep Dry
Environmental Conditions for Use	Temperature: 15°C to 25°C Humidity: 20% to 80%

Technical Description of PCLCS (physiologic closed-loop control system) – AUTO mode -- per IEC 60601-1-10 ed. 1.1

Accompanying Information from Table C.3	Details necessary for the safe use of a DISTRIBUTED PCLCS 6.4	NA - Not a distributed PCLCS
	Summary of the PCLC modes of operation and specification of PCLCS responses 8.2.2.6	See Table 1 in IFU
	Means to check responses of the PCLCS 8.2.2.6	If patient temperature is outside a normal range, AUTO mode is disengaged and E7 alert is initiated.

Classification and Standards

Certifications		IEC 60601-1; EN 60601-1-2; UL 60601-1; CAN/CSA-C22.2, No. 601.1, EN 55011
Classification		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 presence of flammable anesthetic mixtures with air or with oxygen or nitrous oxide. Classified by Intertek Testing Services NA Inc. with respect to electric shock, fire, and mechanical hazards only, in accordance with UL 60601-1. Classified under the Canadian Medical Device Regulation as Class II.
Diagnostics		A qualified technician can perform general system testing. The Controller has no user serviceable parts.
Important Information		This device complies with the EMC requirements according to IEC 60601-1-2. Radio transmitting equipment, cellular phones, etc. shall not be used in the close proximity of the device since this could influence the performance of the device. Particular precautions must be considered during use of strong emission sources such as High Frequency surgical equipment and similar so that, e.g., the HF-cables are not routed on or near the device. If in doubt, contact a qualified technician or your local representative.
Essential Performance		1. If the applied part cannot reach set point within 10 minutes, the warming device shall turn off and a medium priority technical alert shall be generated 2. Minimum watt density of the heater shall be sufficient to achieve clinically effective warming (0.10 watts per square inch (155 watts per square meter)) 3. Maximum watt density of the heater shall be less than 0.45 watts per square inch (620 watts per square meter) 4. Patient contact surfaces of the HotDog System shall operate at a set point +/- 5°C at steady state when device is under even thermal load 5. The thermal storage capacity of the applied part shall *be less* than 100% of the power output of the heater 6. In normal or single fault conditions, the warming device shall not raise skin temperature above 43°C. If skin temperatures exceed 43°C, they will stay within the following time/temperature limits:

Time (s)	Temperature (C)
10000	43.5
6000	44
3300	44.5
1990	45
1000	45.5
600	46
350	46.5
225	47
110	47.5
80	48
60	48.5
38	49
28	49.5
22	50
17	50.5

Electromagnetic Compatibility (EMC)

The System requires special precautions regarding Electromagnetic Compatibility (EMC) and must be installed and operated according to the EMC guidelines provided in this User Manual.

Warning (per IEC 1-2 Standard):

- **Adjacent or Stacked Equipment:**
    - Avoid using this equipment adjacent to or stacked with other equipment, as this may result in improper operation.
    - If adjacent or stacked use is unavoidable, carefully monitor both this equipment and the other devices to ensure normal operation.
- **Accessories and Cables:**
    - Only use accessories, transducers, and cables specified or provided by the manufacturer.
    - Using unauthorized components may increase electromagnetic emissions or reduce electromagnetic immunity, leading to improper operation.
- **Portable RF Communications Equipment:**
    - Keep portable RF communications equipment (including peripherals such as antenna cables and external antennas) at least 30 cm (12 inches) away from any part of the WC7X, including manufacturer-specified cables.
    - Failure to maintain this distance may degrade the performance of the equipment.

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
The HotDog Patient Warming System is intended for use in the electromagnetic environment specified below. The customer or user of the HotDog Patient Warming System should ensure that it is used in such an environment.		
Emissions test	**Compliance**	**Electromagnetic Environment – Guidance**
RF emissions, CISPR 11	Group 1	The HotDog Patient Warming System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions, CISPR 11	Class A	The HotDog Patient Warming System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
The HotDog Patient Warming System is intended for use in the electromagnetic environment specified below. The customer or the user of the HotDog Patient Warming System should ensure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment – Guidance**

Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines. ±1 kV for input/output lines	±2 kV for power supply lines. ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) ±2 kV line(s) to earth	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5 % *U*T (>95 % dip in *U*T) for 0,5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	<5 % *U*T (>95 % dip in *U*T) for 0,5 cycle 40 % *U*T (60 % dip in *U*T) for 5 cycles 70 % *U*T (30 % dip in *U*T) for 25 cycles <5 % *U*T (>95 % dip in *U*T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the HotDog Patient Warming System requires continued operation during power mains interruptions, it is recommended that the HotDog Patient Warming System be powered from an uninterruptible power supply or a battery.
Power frequency 50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE *U*T is the a.c. mains voltage prior to application of the test level.			

Guidance and Manufacturer's Declaration – Electromagnetic Immunity (cont'd)
The HotDog Patient Warming System is intended for use in the electromagnetic environment specified below. The customer or the user of the HotDog Patient Warming System should ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment – Guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 10 V/m 80 MHz to 2,5 GHz	3 V 10 V/m	Portable and mobile RF communications equipment should be used no closer to any part of the HotDog Patient Warming System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. **Recommended separation distance** $d = 1{,}2\sqrt{P}$ $d = 0{,}35\sqrt{P}$ 80 MHz to 800 MHz $d = 0{,}7\sqrt{P}$ 800 MHz to 2,5 GHz where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and *d* is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: 

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HotDog Patient Warming System is used exceeds the applicable RF compliance level above, the HotDog Patient Warming System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the HotDog Patient Warming System.

[b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the HotDog Patient Warming System

The HotDog Patient Warming System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the System as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter	Separation distance according to frequency of transmitter m

W	**150 kHz to 80 MHz** $d = 1{,}2\sqrt{P}$	**80 MHz to 800 MHz** $d = 0{,}35\sqrt{P}$	**800 MHz to 2,5 GHz** $d = 0{,}7\sqrt{P}$
0,01	0,12	0,04	0,07
0,1	0,37	0,11	0,22
1	1,2	0,35	0,70
10	3,7	1,1	2,2
100	12	3,5	7,0

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Customer Service Contact:

- **Phone:** +1 (952) 465-3500
- **Email:** cs@augsurg.com

Trademark and Patent Information:

HotDog® is a registered trademark of **Augustine Temperature Management**, registered in the **U.S. Patent & Trademark Office**. The devices are protected by one or more of the following patents:

- **US Patents:** 7,543,344; 7,714,255; 7,851,729; 7,786,408; 8,062,343; 8,283,602; 8,604,391; 8,624,164; 8,772,676; 8,986,359; 9,962,122; 9,668,303; 10,154,543; 10,201,935; 10,206,248; 10,506,668
- **PCT Patent:** EP 2,062,460
- Other patents are pending.

*Hug-U-Vac Positioner is a trademarked product.