Patient Temperature Management Systems

Blanketrol® III

Users Guide for Experienced Users

Technology to the next degree™

GENTHERM

Blanketrol® III
Hyper-Hypothermia Systems

The Blanketrol® III is used to lower or to raise a patient's temperature and/or maintain a desired temperature through conductive heat transfer. The unit uses sterile water or water that has been passed through a filter of less than or equal to 0.22 microns to pump heated or cooled water to a blanket.

The unit can be set to operate based on the temperature of the water, Manual Control Mode; or it can be set to operate based on the patient's temperature Automatic Modes.

Blanketrol III Operation Modes:

1. Auto Control Mode
2. Gradient 10C SMART Mode
3. Gradient Variable SMART Mode

Supplies Needed:

1. Maxi-Therm Lite/Maxi-Therm/PlastiPad/Kool-Kit
2. 286 Connecting hose (unless using PlastiPad with hoses attached)
3. 400 Series Probe/connecting cable (if using an Automatic mode)
4. 2 gallons of sterile water or water that has been passed through a filter of less than or equal to 0.22 microns.

Blanketrol® III Set Up:

1. Lift the lid of the water fill opening and gradually pour approximately 2 gallons (7.6 liters) of sterile water or water that has been passed through a filter of less than or equal to 0.22 microns into the reservoir. Stop pouring when the water reaches the strainer visible at the bottom of the water fill opening.

2. Connect the blanket to the unit by attaching the quick-disconnect female coupling of the connecting hose to the male outlet coupling (on the bottom row) of the unit.

**Note: if using the Kool-Kit Head Wrap be sure to fill the wrap before placing it on patient's head.*

3. Make sure that unit is OFF, plug cord into hospital grade receptacle.
4. Lay the hyper-hypothermia blanket flat with the hose route, without kinks, towards the unit.
5. Place the 400 series temperature probe into esophagus or rectum per policy; check placement with an x-ray for esophageal probe only per hospitals policy.

Tips for User:

1. Patient core temperature,the condition of skin in contact with the blanket and blanket's water temperature should be checked every 20 minutes or as directed by a physician. Surgical patients, temperature sensitive and pediatric patients should be checked more frequently.
2. The clinician is responsible for determining the appropriateness of the temperature limits in dependency to time. Exceeding 40°C for extended periods can cause tissue damage and burns; clinical judgement based on patient age, clinical condition and current medications, should be used to determine the safe maximum contact periods.
3. Notify the physician if the core temperature does not reach the prescribed temperature in the time prescribed or deviates from prescribed temperature. The placement and position of the 400 Series probe should also be inspected regularly.
4. The patient should be turned and properly repositioned according to hospital/institution policy/ protocol. Changes in skin color, edema, inflammation, or indications of pressure sores (especially over bony prominences) should be noted and treated promptly as ordered.
5. If using 2 blankets, be sure to tuck blanket around patient and in between arms/legs.
6. When disconnecting the cooling blankets from the hoses on the Blanketrol®, make sure that the unit has been off for a few minutes to allow water to drain back in to the machine.

MANUAL MODE & AUTO CONTROL MODE

In order to switch from one operating mode to another, press the "Temp Set" button, and then select the operating mode of choice.

Manual Mode is recommended for:

- Pre-conditioning water to achieve desired water temperature before start of therapy
- Fever control in patients unable to have continuous core temperature monitoring
- Peri-operative normothermia or warming of patients that don't require continuous core temperature monitoring
- Based on current recommendations MANUAL CONTROL should be avoided for Targeted Temperature Management (TTM); servo control should be used for TTM.

1. Press Temp Set button.
2. Press the up or down arrow to adjust the water set point to the desired temperature per physician's order.
3. Press Manual Control mode (green light will appear in the oval).
4. Patient temperature should always be monitored.
5. Exceeding 40°C for extended periods can cause tissue damage and burns; clinical judgement based on patient age, clinical condition and current medications, should be used to determine the safe maximum contact periods.

Auto Control Mode is recommended for:

- Patients that can be treated for shivering
- Larger patients with denser body mass
- Patients going through withdrawal or have increased metabolism
- Maintaining perioperative normothermia
- Current guidelines recommend servo control for all TTM procedures.

Consult the physician's order to determine the desired patient Set Point temperature. As a safety precaution, the Set Point display can only be set between 30°C - 40°C (86°F - 104°F) to operate in Automatic Control Mode.

1. Press the Temp Set button.
2. Press the up or down arrow to adjust the set point to the desired temperature per physician's order.
3. Press Auto Control (green light will appear in the oval).
4. A 400 series temperature probe must be used to operate in Auto Control mode.
5. Patient temperature should always be monitored.
6. Water temperature may go all the way down to 4°C or up to 42°C.
7. Exceeding 40°C for extended periods can cause tissue damage and burns; clinical judgement based on patient age, clinical condition and current medications, should be used to determine the safe maximum contact periods.

GRADIENT 10C MODE SMART

Gradient 10°C Mode is recommended for:

- Neonates and small patients
- Patient's overshooting their Set Temperature
- Patients with low metabolism or very sedated.

The unit monitors the patient's temperature and maintains the temperature of the water in the Blanketrol® at the maximum of 10°C (18°F) from patient's temperature reading.

Gradient is the maximum allowable temperature difference between the patient and the water. So if the patient's temperature is 35°C and the set point is 33°C and the unit is in the Gradient 10C mode, the water will not cool further than 25°C or warm further than 42°C (automatic stop point for safety). After initial set up is complete place the desired temperature sensing device (esophageal, rectal, Foley catheter probe) according to hospital protocol.

1. Press the Temp Set button
2. Use the up or down arrows to adjust the set point to the desired temperature per physician's order.
3. Press Gradient 10°C button (green light will appear in the oval).
4. Press SMART button
5. A 400 series temperature probe must be used to operate in Gradient 10°C mode.
6. Patient temperature should always be monitored.
7. Exceeding 40°C for extended periods can cause tissue damage and burns; clinical judgement based on patient age, clinical condition and current medications, should be used to determine the safe maximum contact periods.

** The water will be a maximum of 10 degrees warmer/ cooler than the patient (the water temperature will not go above 42°C or below 4°C)*

** The blanket may not feel cold to the touch at this point but through conductive cooling the patient will slowly cool down.*

If the patient should start to run a fever or temperature starts rising the water temperature will rise with patient temperature to maintain the 10°C temperature difference. Should this occur the operator may want to change back to Auto Control Mode.

GRADIENT VARIABLE MODE WITH SMART

Gradient Variable Mode with Smart is recommended for:

- Neonates and small patients
- Patient's overshooting their Set Temperature
- Patients with low metabolism or very sedated

Gradient Variable allows the care giver the opportunity to have greater control over the water temperature (minimizing overshoot) without having to manage the Blanketrol®. The Blanketrol® operates on the same principle as in Gradient 10C mode, but allows the caregiver to customize the temperature offset, rather than defaulting to 10°C. Keep in mind the larger the number the more aggressively the unit allows the water temperature to adjust. A smaller gradient number maintains a tighter temperature to the temperature of the patient.

For example, if the Gradient Variable is set to 20°C and the patient's temperature is 34°C and their target set point is 33°C, the water will cool as low as 14°C.

1. Press the Temp Set button
2. Use the up or down arrows to adjust the set point to the desired temperature per physician's order.
3. Press Gradient Variable button
4. Press SMART button, green light will appear in oval.
5. In the Temp Set window "xxx" will appear, use the up and down arrows to adjust the Variable per physician's order.
6. Press Gradient Variable button again to start treatment (green light will appear in oval).
7. Exceeding 40°C for extended periods can cause tissue damage and burns; clinical judgement based on patient age, clinical condition and current medications, should be used to determine the safe maximum contact periods.
8. Gradient Variable mode can be set 0-33 (patient temperature dependent). However, it is not recommended to ever use a setting of "0". This setting will only allow the water to track and equal the actual patient temperature with no therapy being delivered to the patient.

** For rapid cooling in a short period of time e.g. sedated patients for therapeutic hypothermia*

** The water will not go above 42°C or below 4°C*

** If you go below 5°C for your Gradient Variable Set Point, the water may not fluctuate enough to cool the patient as skin temperature is cooler than core temperature.*

SMART MODE & MONITOR ONLY MODE

The SMART mode should always be used when in the Gradient modes. It will help manage larger gradients in patients who have fever or develop fever during Therapeutic Hypothermia.

Once you activate the SMART mode the unit will evaluate whether or not the patient's current temperature is the same as their target temperature every 30 minutes. If they are not the same then the unit will respond by adjusting the water temperature by 5 degrees (warmer or colder) until the patient reaches their target temperature.

Once the patient reaches the target temperature the SMART mode will turn off and the Blanketrol® III will default back to the original Gradient setting. If the patient's temperature drifts 0.2°C (+ or -) the SMART mode timer will start again.

1. Press the SMART button when the unit is running in either Gradient mode (green light will appear in the oval)

** This can be helpful in minimizing shivering with fever. This may also be helpful when managing the temperature of large or muscular people. Smart mode can be turned off at any time.*

Monitor Only Mode

The Monitor Only mode displays the temperature reading on the patient temperature probe. This is good to use post therapy to monitor for rebound hyperthermia. While in Monitor Only mode, the unit does not circulate water and will not cool or warm the water.

TROUBLE SHOOTING

Low Water:

1. Press the Temp Set button (this will return water to the unit).
2. Add sterile water or water that has been passed through a filter of less than or equal to 0.22 microns to the bottom of the screen.
3. If the water is too low, the Blanketrol® III will stop circulating water. The water will drain back to the unit and if there is not enough water to run, the unit will read “Low Water”. This indicates that there is not enough circulating water and more sterile water should be added.

Power Surge or Accidental Unplug:

1. Plug Blanketrol® III back in.
2. The unit will default to Set Point of 37°C.
3. Return to original Set Point per physician order.

Check Probe:

1. Check the connection between the black cable and the probe making sure they are tight.
2. Confirm placement of temperature probe in/on the patient.
3. The Blanketrol® III will automatically shut off if the patient’s temp drops below 30°C or over 43.5°C as a safety mechanism while in the Auto or Gradient modes.
4. Press Temp Set button and place in Manual mode if patient’s temp is reading below 30°C or over 43.5°C.

X-Ray:

1. All Gentherm blankets are radiolucent, but the circulating water during an x-ray can create shadowing. To prevent this, press the Temp Set button and this will allow the Blanketrol® III to drain the water from the blankets attached. Allow approximately 30 seconds before taking the film.
2. For stable neonates, they may be gently lifted and film placed directly under patient at the discretion of the team.
3. To resume therapy, press the mode that the unit was in previously.

Low Flow:

1. Something may be occluding the hoses.
2. You may tape your hoses down to the bed but not to the point of occlusion.
3. Check for kinked blanket or hoses.
4. Check to make sure the fly wheel is rapidly spinning.
5. Filter should be replaced every 2-3 months.

Leaking hoses:

1. Make sure that the hoses are connected.
2. Must hear a “click” when connecting blankets.

Excessive condensation:

1. During the warm and humid months, condensation may occur if the water gets too cold for a prolonged time. Use the Gradient Mode instead of Automatic Mode to ensure water temperature does not go too low.
2. If in the Manual mode, do not stay in the very low range for a prolonged period of time. If condensation is occurring have the biomed or maintenance team come to the room to get the ambient temperature and dew point and set as directed.

Need to Defibrillate:

1. Most cardiac arrest patients will have their pads still on under the Kool-Kit or blanket. Per ACLS protocol a caregiver can then charge, clear and defibrillate as usual.
2. If pads are not in place, wipe down the patient’s chest free of moisture and place new pads to defibrillate.

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