### **GRADIAN CCV: HEATED HUMIDIFIER**

#### **User Interface**

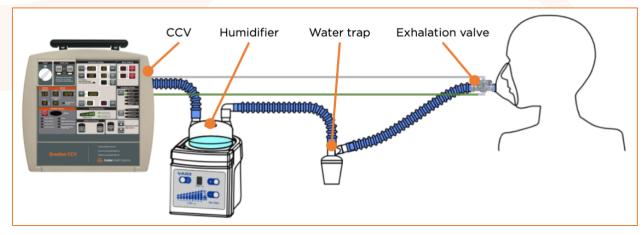


## **Assembly and Use**

- 1. Ensure that the humidifier is securely mounted to the Workstation and connected to power, and that all accessories are cleaned and sterilized.
- 2. Fill the water chamber with distilled water, up to the maximum level mark.
- 3. Assemble the circuit limbs so that the water trap is between the humidifier and the exhalation valve, as shown below.
- 4. Turn the humidifier heater on, and allow it to warm up.
- 5. Check the breathing circuit and exhalation valve to verify that there is an appropriate amount of humidification, and adjust the power level as needed:
  - → If no humidity is visible, increase the power level.
  - → If excessive condensate forms in the circuit, reduce the power level.

**Note:** The temperatures indicated for each power level signify the heater plate temperature; the **airway temperature** is generally about **half as much**.

- 6. Monitor the breathing circuit and water chamber during ventilation; ensure that there is water in the water chamber, and drain the water trap as needed to ensure that it does not overflow.
- 7. Disinfect or autoclave the water chamber, circuit, and water trap after each use.



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## **Principle of Operation**

The Heated Humidifier utilizes a temperature-regulated water chamber to add water vapor and heat to inspiratory gas. Heated Humidifiers provide more humidification than passive Heat/Moisture Exchangers (HMEs), and generally deliver an absolute humidity level of 33-44 mg  $H_2O/L$  (at 34-41°C) at the patient exhalation valve.

#### Indications for Heated Humidification

Heated humidification is recommended for every patient receiving invasive ventilation and is also suggested for non-invasive ventilation (NIV). The longer the anticipated duration of ventilation, the more important heated humidification becomes.

# **Precautions and Warnings**

- Position the humidifier below the bed, so that any condensate drains away from the patient.
- Position the water trap so that it is at the lowest point of the breathing circuit, and check it frequently to avoid overflowing.
- Monitor the patient circuit to assess whether adequate humidity is being delivered, particularly when ventilating at higher flow rates (>40 LPM).
- To reduce the chance of infection, always appropriately dispose of condensate collected in the water trap and ensure that the water chamber is cleaned regularly.
- Temperatures on the PWR Lv. chart correspond to the temperature of the heater plate; the airway temperature is usually 40-60% cooler.
- Never touch the heater plate of the humidifier when it is hot.
- Always fill the water chamber with distilled water.
- Do not fill the water chamber above the maximum level mark (300 cc).
- Always use appropriate mains power (200-240 VAC).

# **Alarms and Safety Features**

- o Over-Heat Protection: If the heater plate temperature exceeds 95°C, the High Temperature Alarm will activate, the display will read "H", and the heater will automatically shut off to protect the patient.
- Low Temperature Alarm: When the temperature set is less than 5°C, the alarm. will activate, and power may be discontinued at any time.