F&P 850

F&P 850 System - Managing Condensation

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Contents

Condensation Management

Introduction

Condensation can occur in the breathing circuits attached to the MR850 Humidifier for many reasons. The majority of these reasons are related to:

- Environmental conditions (i.e. exposure of the humidifier and breathing circuits to external heating or cooling)
- Incorrect setup of the MR850 Humidification System.

The flow diagram below shows a method of troubleshooting excessive circuit condensate that addresses the three most significant reasons for condensate formation. A more in-depth description of the troubleshooting steps is provided on pages 4 – 8.

Excessive Condensation?

Check Circuit/Probe Setup

- Circuit correctly set up
- Temperature probe correctly set up
- Heater-wire adapter working correctly
- See specific neonatal tips

1

Check Environmental Conditions

- Ambient room temperature
- Incoming gas temperature
- Drafts
- Air-conditioning

2

Circuit Type

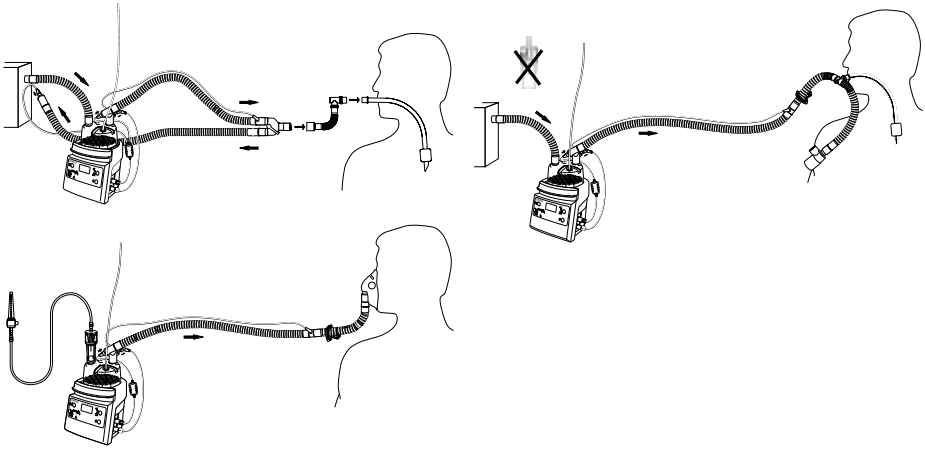
Evaqua™ 2 circuits minimize condensate compared with conventional circuits

3

Check Circuit and Probe Setups

1. Check the breathing circuit is correctly set up

a Check that the breathing circuit is set up correctly according to the specific circuit User Instructions. Ensure the connections of the inspiratory limb, expiratory limb, and dryline to the humidifier and ventilator are correct.



b Check how many, and what, accessories are connected to the circuit after the Y-piece (i.e. catheter mount, nebulizer, $ETCO_2$ adapter). Accessories such as these are all unheated and allow heated, humidified gas to cool down and condensate to form. If accessories are present, consider whether they are necessary for patient care. If possible, remove any unneeded accessories.

c. Ensure that the humidifier is positioned below the head of the patient to allow condensation in the circuit to drain back into the water chamber.

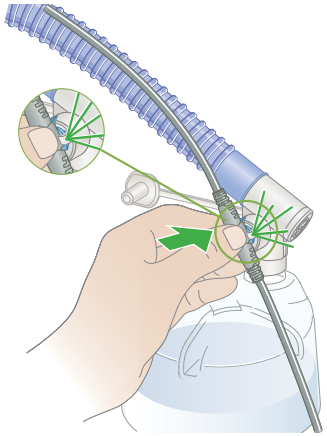
d. Ensure that the breathing circuit is positioned so that condensation drains away from the patient into the water chamber.

2. Check the temperature probe is correctly set up

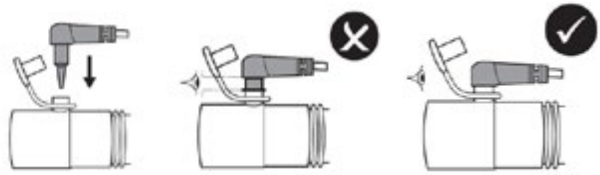
a. Check that the chamber temperature probe has been properly connected to the chamber probe port. Ensure that the temperature and flow probes are latched or clicked into place – this may require some force, but there should be an audible click when positioned correctly. Make sure that the temperature and flow probes are clean and dry.

The probe will "latch" or "click" into place.

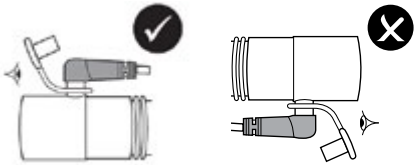
The temperature and flow probe is now accurately positioned.



b. Check that the airway temperature probe (also known as patient end probe) is connected correctly, and ensure this has been fully inserted into the airway probe port. Incomplete insertion of this into the probe port is common. Make sure that the temperature probe is clean and dry. It may be useful to remove the temperature probes from the circuit to check whether it is wet, and if necessary dry and re-insert.



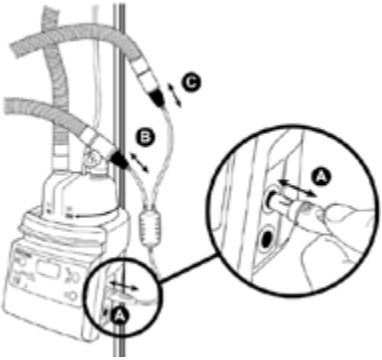
c. Check that the breathing circuit is positioned so that the airway temperature probe is on top. If it is hanging from the bottom side, temperature readings may be affected, which will result in poor control of the humidifier.



Note: *Ensure that the temperature probes are operating within the target specification range. Temperature probes should be checked and calibrated every six months by a trained biomedical engineer or technician to make sure they are operating within specifications. Temperature probes should be routinely replaced every three years, and may need to be replaced earlier if they are physically damaged or not operating within target specifications.*

3. Check for the correct setup and function of the heater-wire adapter

a. Check that the heater-wires have been properly connected to the appropriate limbs of the breathing circuit. Ensure that heater-wire alarms are not active.



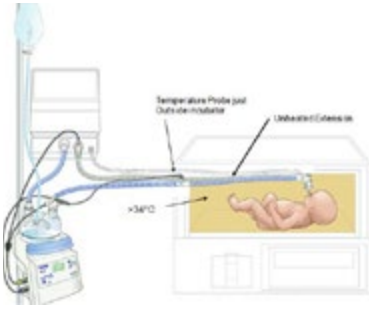
b. The presence of excessive condensate in the expiratory limb may indicate a faulty expiratory limb heater-wire adapter. To check whether the adapter is working as expected, feel the expiratory limb and if it is not warm to touch then replace the breathing circuit. If the new breathing circuit expiratory limb is also not warm to touch, then the heater-wire adapter may be faulty and need to be serviced or replaced.

4. Troubleshooting condensate in neonatal circuits

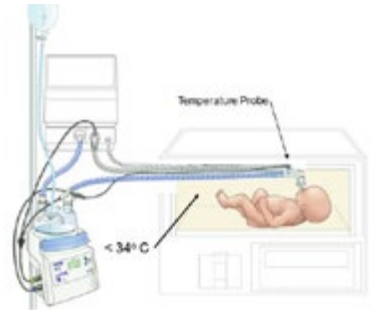
1. Ensure that the correct breathing circuit is being used based on the total flow rate.
   - If the flow rate is ≥ 4 L/min, then use RT265.
   - If the flow rate is < 4 L/min, then use RT266.

2. Ensure that the unheated extension is used properly and that the airway temperature probe is in the correct position when the patient is in an incubator.

   Note: *RT330 and RT331 do not require the use of an unheated extension. Therefore, when using these two circuits the probe should always be positioned inside the incubator (refer to picture below).*



For incubators with temperature ≥ 34 °C, use unheated extension and place temperature probe just outside.



For incubators with temperature < 34 °C and infant radiant warmers, remove unheated extensions and place temperature probe at patient Y-piece.

3. If condensate occurs during High-Frequency Oscillation or High-Frequency Ventilation:

   Excessive condensation can occur with High-Frequency Oscillation or Ventilation modes. If this happens, then contact a Fisher & Paykel Healthcare Product Manager for advanced device options. If condensate continues to form, then remove the unheated extension.

4. If condensate occurs during the use of nasal CPAP:

   Condensation can form in the long, unheated extensions which are part of some nasal CPAP interfaces. If condensation occurs check for and remove unheated extensions. Consider changing to the F&P Flexitunk nasal CPAP interface which incorporates a material which allows moisture to 'wick' out of the interface. F&P Healthcare does not recommend turning down the MR850 to Noninvasive/Mask mode to reduce condensation. Neonatal patients require the humidity levels delivered using Invasive mode and condensate should be managed by optimising the interface setup.

Check Environmental Conditions

1. Ambient room temperature

a. Check whether the ambient room temperature setting is within the specifications of the circuit. The MR850 will function in ambient room temperatures of 18 to 26 °C. However, the ambient room temperature specifications of the circuit override this as this is where condensation will form. If the ambient room temperature is outside of the circuit specifications, adjust the room temperature if possible.

b. If the room is at a consistent temperature above 26 °C, and cannot be adjusted, then consider contacting a Fisher & Paykel Healthcare Product Manager for more advanced troubleshooting options.

2. Incoming gas temperature

a. Check which ventilator is in use with the MR850. If the ventilator is a turbine (room-entraining) type, the gas mix coming out of the ventilator can be much warmer than from a traditional (pneumatic) ventilator. Follow the troubleshooting steps below for turbine/room-entraining ventilators:

1. Check that the dryline is not resting on or touching the warm housing of the ventilator.
2. Add an RT024 Dryline Extension to extend the length of the dryline. This extension may allow the warm gases exiting the ventilator to cool before entering the humidifier.
3. Talk to a Fisher & Paykel Healthcare Product Manager for advanced troubleshooting.

3. Drafts

Breathing circuits and humidifier chambers exposed to drafts can result in excessive condensate. This occurs when the draft cools the heated gas in the system below the dew point (the temperature where the water vapor in a gas turns to water droplets). Check the location of the humidifier and circuit to ensure there are no drafts from windows, corridors, fans, or air conditioning units. If drafts are present, move the humidifier away from this area.

4. Air-conditioning

Air-conditioning units may blow cold air directly onto the humidifier, circuit, or both. Air-conditioning vents located in the ceiling may also blow cold air across the ceiling and then down walls. Check that the humidifier and circuit are not directly placed against a wall and move these if they are.

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