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## Maximizing Respiratory Humidifier Safety and Performance: The System Solution

Only when a total system approach to humidification is used can optimal product performance and patient safety be achieved. Fisher & Paykel Healthcare ensure that its individual system components, when used together, provide the most advanced humidification system available. This system has undergone extensive performance testing, meets international standards and complies with the regulatory requirements of numerous countries.

Substituting any part of this system with non Fisher & Paykel Healthcare components may not only compromise performance, but may impair essential safety features. For these reasons we advise that only Fisher & Paykel Healthcare components should be used in conjunction with Fisher & Paykel Healthcare humidifier controllers.

Over the past 30 years Fisher & Paykel Healthcare has used clinical research to continuously improve respiratory humidification technology in the medical environment. This research has led to the understanding that respiratory gases close to 37°C 100% relative humidity or 44mg H<sub>2</sub>O /L of water vapor is the optimal level of humidity for patients with a bypassed airway. This level of humidity promotes mucociliary clearance and maintains mucus quality for ease of suctioning.

In clinical practice, the delivery of optimally humidified medical gas to the patient poses a significant challenge. This challenge can only be met when a humidification system with reproducible, predictable performance and known outcomes is used.

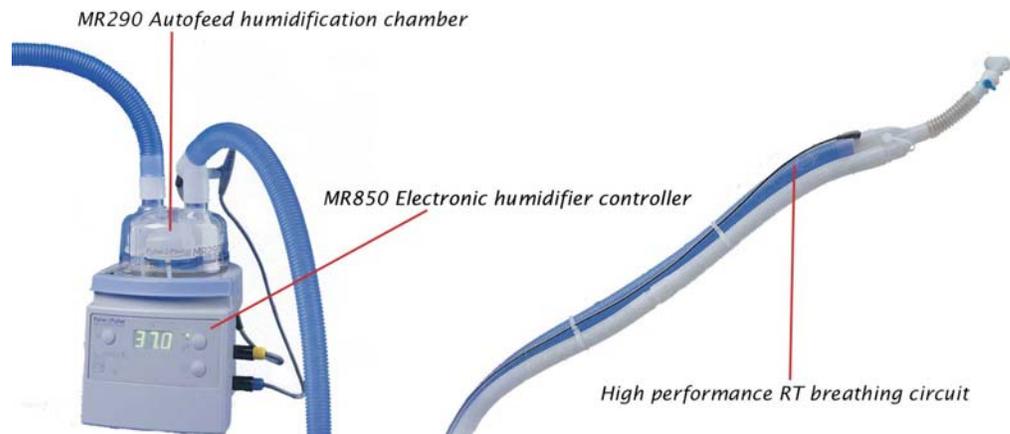


Figure. 1. MR850 Respiratory Humidification System

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## Optimal Humidity System: the MR850 humidifier controller

- Controls the creation and delivery of humidity to the patient with minimal condensate.
- Simple user controls and operation.
- Patient relevant alarms.
- Intuitive equipment setup.
- Intuitive setup indicators and alarms.
- Operates in a wide range of environmental conditions.
- Operates over a wide range of gas flow conditions.
- Advanced electronics and software with numerous backup systems.
- Continuously monitored temperature and flow sensors ensures accurate and consistent performance.
- Dual feedback control calibrated for Fisher & Paykel Healthcare chambers and circuits.



Figure. 2. Humidifier system controller

## Optimal Humidity System: the humidifier chamber

- Designed to create optimal humidity for flows within the range specified by of the humidifier controller.
- The MR290 automatic water-feed chamber employs a backup mechanism, which satisfies the intention of the ISO8185 requirement for safety under single fault conditions. (If water is fed to the chamber by a gravity fill system then there should be two methods to prevent flooding of the breathing system in the event of mechanical failure of one of these parts.)
- For manual water-feed chambers a water feed-set is used along with a feed-set clamp to control the flow of water. The Fisher & Paykel Healthcare clamp is self closing so that in the event of an emergency where the user releases the clamp to attend another situation, water flow ceases to the chamber preventing flooding of the breathing system.
- Maintains a closed breathing system by reducing the need to open the breathing system to refill the chamber with water.
- Constant compliance and compressible volume to ensure that all of the breath set on the ventilator is delivered to the patient.

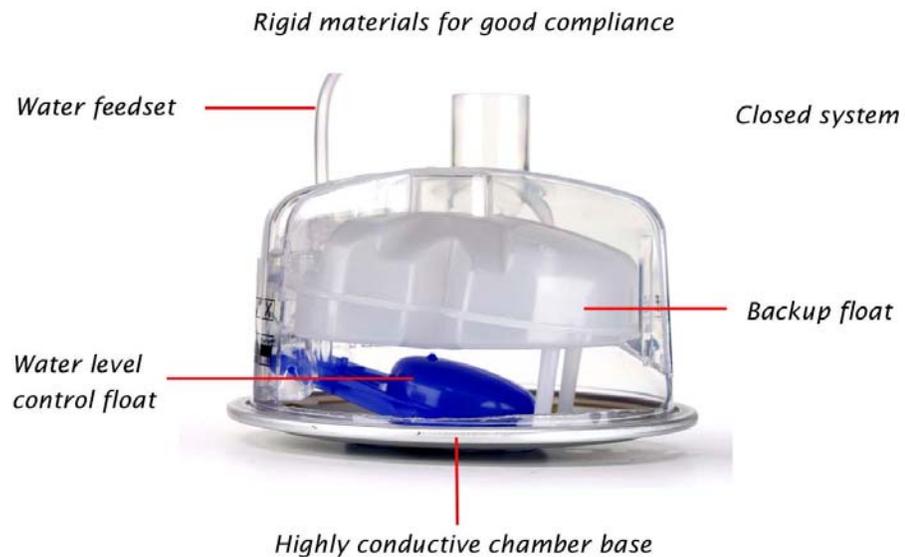


Figure 3. Section of the MR290 auto-feed humidification chamber, showing the dual float mechanism that maintains the chamber water level.

## Optimal Humidity System: the breathing circuit

- Transports optimal humidity from the chamber to the patient with minimal condensate.
- Electrical specifications optimized for the MR850 controller.
- Heater wire capable of maintaining the gas temperature across the breathing circuit avoiding cold spots which can cause excessive condensate.
- For dual heated breathing circuits the expiratory limb is capable of heating the gas to avoid condensate in both the circuit and the ventilator.
- Heater wire insulation is suitable for a wide range of flows (including periods of no flow) and an extended duration of use.
- For correct temperature and flow measurement the temperature probe is located in the center of the gas stream and in the correct orientation.
- Minimal compliance and compressible volume while maintaining flexibility.
- Maintains a closed breathing system through less intervention or manipulation to control condensate.
- Provision for convenient bronchodilator drug delivery.
- Complies with international standards requirements including biocompatibility

*Suitable for invasive and noninvasive use*

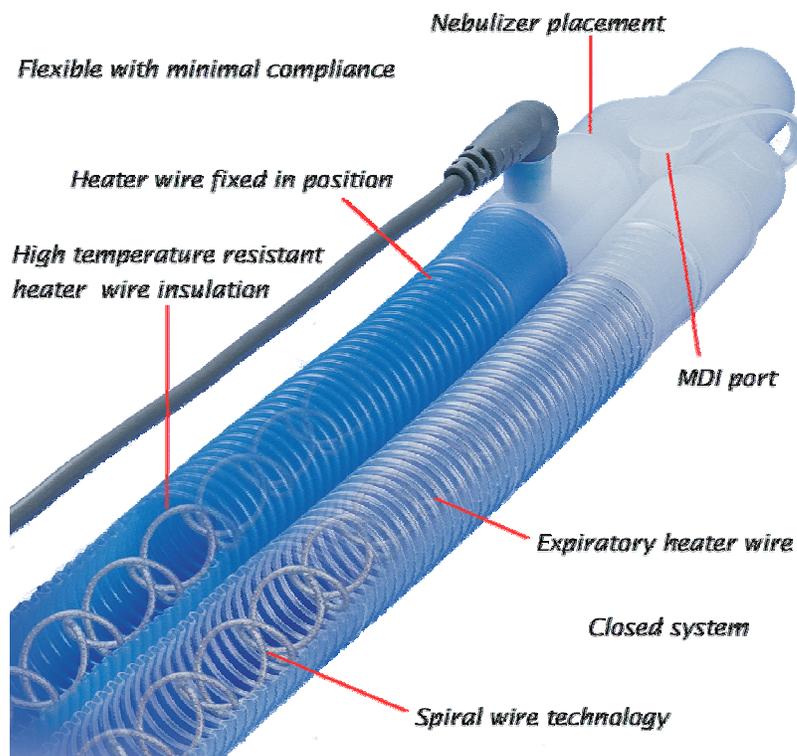


Figure 4. High performance RT breathing circuit.