

11.1 Overview

Before proceeding, review the safety information in Chapter 1.

This chapter provides information about ventilator maintenance procedures and schedule, as well as cleaning and disinfection instructions.

All of the procedures in this chapter are to be performed by the operator.

For additional maintenance requirements, contact your Hamilton Medical service representative. Any documents referenced in this chapter are available on the MyHamilton website: <https://www.hamilton-medical.com/MyHamilton>

11.2 Cleaning, disinfection, and sterilization

The following sections provide general recommendations for cleaning, disinfecting, and sterilizing parts. For parts not supplied by Hamilton Medical, comply with the manufacturers' recommendations.

Do *not* attempt decontamination procedures unless specified by Hamilton Medical or the original manufacturer.

If you have any questions about the use of a particular cleaning or disinfection agent, contact the manufacturer of the agent.

After cleaning and decontaminating parts, perform any required tests and calibrations described in Chapter 5.

11.2.1 General guidelines for cleaning

Additional information for cleaning each part is included in Table 11-1.

To clean the device parts

1. Disassemble parts.
Note that breathing circuits must be disassembled completely and reprocessed as described in the associated *Reprocessing Guide*.
2. Wash parts in warm water and soap or an appropriate mild detergent solution.
3. Rinse parts thoroughly with clean, warm water.
4. Air dry.
5. Inspect all parts, and replace if damaged.
6. Sterilize or disinfect the parts, following the appropriate sterilization/disinfection procedure as described in the product documentation.
7. Reassemble and reinstall (if needed), and perform any required tests.

11.2.2 General guidelines for disinfection

Additional information for disinfecting each part is included in Table 11-1.

To disinfect the device parts

1. Clean, but do *not* re-assemble.
2. Disinfect with an appropriate mild bactericidal chemical solution.

Carefully follow the manufacturer's recommendations, including exposure time.

3. Reassemble and reinstall parts, and perform any required tests before reuse.

The following table summarizes the cleaning and disinfection guidelines for each major system component.

Table 11-1. Cleaning and disinfection methods parts

Part	Remarks	Cleaning method
Ventilator exterior including: <ul style="list-style-type: none"> • Housing • Tray • Gas supply hose • Power cables • Trolley • Mounting systems • Basket • O2 cylinder holding system 	<p><i>Do not</i> clean the ventilator interior. This can damage internal parts.</p> <p>! NOTICE! Pay very close attention to the exposure times listed by the cleaning agent manufacturer. Failure to follow manufacturers' recommendations can lead to incomplete cleaning and disinfection.</p> <p>Be particularly careful with infectious patients, and follow your hospital infection control procedures.</p>	<p>After each patient use, wipe with a damp cloth using a registered and approved surface cleaning/disinfection solution, as approved by your institution's protocol. Follow the cleaning agent manufacturer's recommendations.</p>
Touch screen	<ul style="list-style-type: none"> • Lock the screen before cleaning. See Section 10.2. • Handle the touch screen with care. • <i>Do not</i> use any vinegar-based solutions and avoid using a gritty cloth. 	<p>Wipe the screen with a damp, soft cloth using an appropriate and approved surface cleaning/disinfection solution or a nonabrasive glass cleaner.</p> <p>For approved cleaning agents, see Table 11-2.</p>

Part	Remarks	Cleaning method
Reusable accessories including: <ul style="list-style-type: none"> • Breathing circuits • Expiratory valves • Flow sensors • SpO2, CO2 sensors • Nebulizers • Masks • Filters and adapters • Water traps 	For CO2 sensors, refer to Hamilton Medical's <i>Approved cleaning agents for CO2 components statement</i> for supported cleaning and disinfectant agents.	Follow the instructions provided in the manufacturer's <i>Instructions for Use</i> and corresponding <i>Reprocessing Guide</i> .

Table 11-2. Cleaning agents for the touch screen

Cleaning agent	Concentration
Mikrobac Tissues wipes	n/a
mikrozid sensitive wipes	n/a
mikrozid AF liquid	Ready for use
Sani-Cloth Active wipes	n/a
Bacillol 30 Foam	Ready for use
Ethanol	--
Incidin Foam	Ready for use
Incidin Pro	0.25% to 4%
Incidin Rapid	0.25% to 2%
Isopropyl alcohol	--
Mikrobac forte	0.25% to 4%
perform	3%
terralin protect	2%

14.2 Environmental requirements

Table 14-2. Environmental requirements

Environment		Specifications
Temperature	Operation:	5°C to 40°C (41°F to 104°F)
	Storage:	-20°C to 60°C (-4°F to 140°F), in original packaging
Altitude		-650 to 4000 m (-2,132 to 13,123 ft) Note that at higher altitudes the ventilator performance may be limited. The Performance limited by high altitude alarm is generated and a message is shown on the display. See Table 9-2.
Atmospheric pressure	Operation and storage:	620 to 1100 hPa
Relative humidity	Operation and storage:	10% to 95%, noncondensing
Water protection		IP21