

FI@UCSD Ventilator

Ventilator Cleaning and Maintenance Instructions

Cleaning and maintenance

The cleaning and maintenance described in this section should be carried out regularly.

WARNING

- Patients treated by mechanical ventilation are highly vulnerable to the risks of infection from dirty or contaminated equipment. Clean the device and its accessories regularly.
 - Always turn off and unplug the device before cleaning and be sure it is dry before plugging back in.
 - Do not immerse the device or power cord in water.
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CAUTION

- Clean only exterior surfaces of the ventilator device.
 - When required, wipe the exterior of the device with a damp cloth using an approved mild cleaning solution shown in Table 3.
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Filter Replacement

In order to ensure no cross-contamination between patients, a conservative limit of the HEPA filters being replaced after each patient use is set; in addition, the single time length use for the filter is limited to a month. As for the HME, it must be replaced every day.

Safety Checks

Qualified service personnel should perform extended self-test (EST) on the ventilator after servicing it at the intervals specified in Table 4.

Inspection and Calibration

Ventilator inspection and calibration should be performed by qualified service personnel at the intervals specified in Table 4.

Component Details

The tables below outline specific safety/maintenance details for different areas of the ventilator.

Table 1: Components in contact with the patient's breathing circuit

<i>Part</i>	<i>Maintenance</i>	<i>Frequency</i>
HEPA filters	Replacement of filter; proper disposal based on hospital protocol	After each patient use <i>OR</i> every month, whichever comes first
HME filters	Replacement of filter; proper disposal based on hospital protocol	Every day
Tubing and non-electrical connectors/valves	Wash in warm water and mild soap solution, then thoroughly rinse and wipe dry before reassemble and use	Several times a day, or the mandated cleaning frequency per hospital protocol
Ventilator mask	Disposal	After each patient use
Bellow	Wash in warm water and mild soap solution, then thoroughly rinse and wipe dry before reassemble and use	Several times a day, or the mandated cleaning frequency per hospital protocol
Electronic valves	Disassemble electrical component, and follow cleaning instructions for bellow and tubing	Disassembly takes time, so can be done every other day (valves are not close to the expiratory circuit)

Table 2: External Surfaces and Components

<u>Part</u>	<u>Maintenance</u>	<u>Frequency</u>
LCD Surface, Control Knobs and Control Module	A damp cloth and a non-abrasive cleaner, followed by a dry clean cloth. No sterilizers or immersion in liquid.	Periodically
Battery/Power Supply	Disinfect by wiping with a damp cloth using approved cleaning agents (see Table 3).	When transferring battery to or from another ventilator or every 3 years.
Bellow Cover	A damp cloth and a non-abrasive cleaner, followed by a dry clean cloth. No sterilizers or immersion in liquid.	Periodically, along with the control module

Table 3: Surface Cleaning Agents

<u>Part</u>	<u>Procedure</u>	<u>Comments/Cautions</u>
Ventilator exterior (including display screen)	<p>Wipe clean with a cloth dampened with one of the cleaning agents listed below or equivalent.</p> <p>Use a damp cloth and water to rinse off chemical residue as necessary.</p> <ul style="list-style-type: none"> • Mild dishwashing detergent solution • Isopropyl alcohol (70% solution) • Bleach (10% solution) • Window cleaning solution (isopropyl alcohol and ammonia) • Ammonia (15% solution) • Hydrogen peroxide (3% solution) • Formula 409™* cleaner (Clorox Company) • CaviCide™* surface disinfectant (Metrex Research Corporation) • Control III™* germicide (Maril Products, Inc.) • Mr. Muscle Window & Glass (SC Johnson) • Sani Cloths (PDI, Inc.) • [Propan-2-ol, Isopropanol, Isopropyl Alcohol] 	<ul style="list-style-type: none"> • Do not allow liquid or sprays to penetrate the ventilator openings or cable connections. • Do not attempt to sterilize the ventilator by exposure to ethylene oxide (ETO) gas. • Do not use pressurized air to clean or dry the ventilator. • Do not submerge the ventilator or pour cleaning solutions over or into the ventilator.

Table 4: Service Preventive Maintenance Frequency

<u>Frequency</u>	<u>Part</u>	<u>Maintenance</u>
Every 6 months	Entire ventilator	Run extended self-test (EST). Test alarm system.
Every 6 months	Battery	Perform battery test (as part of EST)
Every year	Entire ventilator	Perform electrical safety test and inspect ventilator for mechanical damage and for label illegibility.
Every 3 years OR when the battery test fails.	Battery	Replace battery. Actual battery life depends on the history of use and ambient conditions.