HOME CARE GUIDE
Newport™ HT70 Plus Ventilator
What’s inside
This guide provides information on how to care for your Newport™ HT70 Plus ventilator. You will find tips on how to set up, use, care for, and transport your ventilator. Also included are basic safety tips, a problem-solving guide, and an easy-to-understand glossary of the technical terms you may hear.

Review safety tips and notes
Throughout this guide are a number of safety tips designed to warn about conditions that could adversely affect you or your ventilator. Take a moment to review these tips before you begin your ventilation homecare.

Important phone numbers

Doctor: ___________________________ ___________________________
Homecare provider: ___________________________ ___________________________
Homecare supplier: ___________________________ ___________________________
Emergency: ___________________________ ___________________________
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YOUR GUIDE TO VENTILATION IN A HOME CARE SETTING

The information contained in this guide should be read and considered along with all other information made available by Medtronic and the clinical team supervising the patient’s ventilation care and other medical needs.

This guide is not intended to supersede or replace the product manual. For a complete set of instructions, please refer to the operating manual for the Newport™ HT70 Plus ventilator.

For additional resources to help you live better with your ventilator, visit medtronic.com/covidien/

THE ICONS

Critical
Used when information is critical to patient safety.

Tip
Highlights user tips and shortcuts.
WE’RE HERE TO HELP YOU TROUBLESHOOT

We’re committed to providing you the highest-quality equipment and support. That’s why we work closely with physicians, hospital staff, and outreach team members — and that’s why we’re confident your family will benefit greatly from the Newport™ HT70 Plus ventilator.

This guide provides valuable information that may help you feel more comfortable operating and maintaining your ventilator at home. It can help you understand key product features and functions and identify and troubleshoot some of the more common issues that you may encounter. You’ll also find important instruction sheets and forms at the end of the guide.

Please remember that this quick guide is not intended to supersede or replace the product manual. For complete information, always refer to the operating manual for the Newport™ HT70 Plus ventilator. The manual can be found at medtronic.com/covidien/support/product-manuals.html under the Portable Ventilation category.

So let’s get started and learn how to use the Newport™ HT70 Plus ventilator in a home setting.
THE BASICS OF HOME VENTILATION

Mechanical ventilation can help people who can’t breathe on their own because of an acute illness. It can also help people who have longer-term (chronic) conditions that require a ventilator to support breathing. These people may move to a place that offers specialized nursing or rehabilitation services or they may move back home. Many people who use long-term ventilation lead active, rewarding lives. They socialize and go to school and work — all while having their breathing supported by a ventilator.

What mechanical ventilation does

- Helps get oxygen, which is a necessary fuel, into the lungs and body
- Helps get rid of carbon dioxide, which is a byproduct of the body’s metabolism
- Helps ease the work of breathing for people who feel short of breath and uncomfortable without breathing assistance
- Assists with breathing for people who can’t breathe on their own

How a ventilator works

The ventilator is like a pump. It can assist someone’s breathing or do all of the breathing for them. Similar to the way you breathe, a ventilator blows gas (air plus supplemental oxygen as prescribed) into a person’s lungs (inspiration) and then lets the gas come out (exhalation). It can also hold some pressure in the person’s lungs between breaths when necessary to keep the air sacs open. This is known as positive end expiratory pressure, or PEEP.

How a ventilator connects to a person

Invasive methods
Often the ventilator is connected to a person through an endotracheal tube, or ETT, that is placed through the mouth or nose and down the windpipe. When the doctor places the ETT into the person’s windpipe, it is called intubation. Later, if the person needs to be ventilated for a longer period of time, the doctor may surgically create a special hole in the neck and insert a tracheostomy tube, or trach, into the windpipe. People who are intubated are not able to talk because the tube goes through their vocal cords. Also, they are not able to eat. People with a tracheostomy tube may be able to speak and they may be able to eat as well.

Noninvasive methods
Another option is to ventilate a person with a noninvasive mask, mouthpieces, or nasal prongs.
How people on ventilators are monitored

In the hospital
People who are ventilated in a hospital setting may be connected to monitors that measure heart rate, respiratory rate, blood pressure, and oxygen saturation. The ventilator itself can also act as a monitor for certain measurements. Patients may also be given chest X-rays or have their blood drawn to measure oxygen and carbon dioxide. Members of the healthcare team (doctors, nurses, respiratory therapists) use all of this information to assess the patient’s status and make adjustments to ventilation settings if necessary.

Outside the hospital
People who are ventilated outside of the hospital are monitored differently. Caregivers often rely on measurements provided by the ventilator and clinical assessments to keep track of the daily well-being of people using ventilators.

With the support of your physicians, respiratory therapists, and outreach team members, the Newport™ HT70 Plus ventilator can help make life more comfortable and allow greater mobility.
Keep your ventilator plugged into AC power whenever available.

SIMPLE TO USE

Get to know the Newport™ HT70 Plus ventilator

The Newport™ HT70 Plus ventilator is simple to use, fits easily into small spaces, and can be carried on a wheelchair or in a cruiser convertible bag when the patient moves around.

Your doctor will write a prescription for the ventilator settings. You should not change these settings unless your doctor or outreach team member tells you to do so. Sometimes the ventilator is used all day and all night. Sometimes it is used just part of the time. All of this information will be part of the doctor’s prescription.

Your Newport™ HT70 Plus ventilator system will consist of some or all of the following:

- **Humidifier**: You will use either a heated water reservoir humidifier or a heat and moisture exchanger (HME), sometimes called an artificial nose, in line with the breathing circuit tubing to humidify the air the patient breathes.

- **Breathing circuit**: The air that the ventilator pumps out will go through the breathing circuit tubing into the airway and then come back out through the exhalation valve. The breathing circuit tubing might be reusable (cleanable), disposable (not reusable), or a combination of both.

- **Tracheostomy tube (for invasive use) or mask, mouthpiece, and nasal prongs (for noninvasive use)**: Your outreach team member will help you with this.

- **AC power adapter, and internal dual and external DC battery system**: The ventilator plugs into AC (electrical) or DC (battery) power.
  - **AC power adapter**: You can plug the ventilator into any grounded AC wall outlet that supplies electricity.
  - **Internal dual battery system**: The internal dual battery system consists of the Power Pac and the internal backup battery. Together they can power the ventilator for up to 10 hours when the battery is new and fully charged and the ventilator is set at standard settings.

- **Power Pac battery**: (Figure 1) When external power is lost, the ventilator will run on the Power Pac as long as it is appropriately charged. The Power Pac can be recharged independently from the ventilator using AC or external battery power. The Power Pac charge level is displayed on the ventilator screen. You can also check it using the button on the bottom of the Power Pac.
  - **Green** = approximately 90% or higher charge level
  - **Amber** = charge not completed
  - **Red** = battery depleted (Figure 2)

2. Medtronic can provide convertible bags as necessary
3. Refer to chapter 7 of the operator’s manual for more information on battery operation
• **Emergency backup battery**: The backup battery portion of the system maintains operation without interruption whenever the Power Pac is swapped out and also if the Power Pac is depleted. The backup battery provides a maximum of 30 minutes of emergency backup power. (Figure 3)

- **External DC power**: You can run the ventilator from an external battery (including the one in your car) with a voltage of 12–30 volts DC. Use the auto lighter power adapter to connect the ventilator to a cigarette lighter-style DC connector.

- **Supplemental oxygen**: If the doctor prescribes supplemental oxygen, it should be added to the ventilator with a Low Flow Oxygen Reservoir. The doctor will prescribe the amount of oxygen and your oxygen provider will work with you to select the most appropriate delivery method.

**Additional supplies**
You will need other equipment and supplies. Please review all sections of this guide and talk to your outreach team member to determine the additional equipment and supplies you’ll need.
STARTING UP (STANDBY CONDITION ONLY)

When the Newport™ HT70 Plus ventilator is turned on, it goes through a short self-test before entering standby condition. Make sure you hear an alarm sound and see the LEDs light up during the self-test. Once the self-test is complete, the ventilator will be in standby condition and the startup screen will display.

**Note:** Ventilator settings can be adjusted from the startup screen if your outreach team member has made this function available.

The startup screen includes three buttons in the top message area: **Start Ventilation**, **Circuit Check**, and **Activate Preset**. (Figure 4)

**Circuit Check button**

Perform a circuit check every time the breathing circuit or exhalation valve is replaced. While the ventilator is in standby condition, touch the Circuit Check button and follow the instructions on the screen. It is a simple, automated two-step process.

**Note:** The circuit check function is not available during ventilation.
How to perform a circuit check

1. Touch the Circuit Check button at the top of the touchscreen and follow the on-screen instructions.
   a. Occlude (block) the patient connection end of the circuit (do not use a test lung).
      - Press the Accept button to confirm and start the circuit check.

   b. Open the patient connection end of the patient circuit.
      - Press the Accept button to continue the circuit check.
2. If the test passes, the message “Circuit Check PASSED Press ACCEPT to continue.” will be displayed.

3. When the circuit check is complete, adjust patient settings as prescribed and touch the Start Ventilation button when you are ready to begin ventilation.

4. To cancel the circuit check and return to the startup screen, press the Cancel button.

**If the circuit check fails**

1. The message “Circuit Check FAILED Press Accept to Continue” will be displayed.
   - Press the Accept button to return to the startup screen.

2. Check that all breathing circuit connections are properly connected and leak-free.

3. Make sure that oxygen is **not** connected to the breathing circuit and also that the 50 psi air oxygen mixer is not attached to the fresh gas intake port.

4. Touch the Circuit Check button to redo the test.

**Note:** If the circuit check fails repeatedly, try a different circuit.

**WARNING:** Do not use the ventilator if the circuit check fails. Inadequate ventilation may result. Use an alternate method of ventilation. For technical help, call your medical equipment provider or contact Medtronic medical technical support at 800-255-6774.
INTRODUCTION TO THE HEATED HUMIDIFIER AND HME

Your doctor may have prescribed a heated humidifier or a heat and moisture exchanger (HME) with your Newport™ HT70 Plus ventilator. When people have a tracheostomy tube, their nose and mouth cannot heat and humidify the air they breathe. Heated humidifiers and HMEs take the place of this function. Make sure to use your humidifier or HME as prescribed.

Heated humidifiers

Why a doctor prescribes a heated humidifier

- A heated humidifier adds heat and moisture to the gas (air) a patient breathes — even when there is a big airway leak or when using a speaking valve.
- The added heat and moisture can help keep secretions thinner and reduce mucous plugging and other secretion-related problems.¹

A heated humidifier includes a heater and a water chamber and requires AC power. The water chamber may be reusable or it may be disposable. You will route the breathing circuit tubing to the water chamber on its way to the patient. Usually the humidifier is placed near the ventilator for convenience. Humidifiers are most often used with the ventilator at the bedside. (Figure 5)

Some important things to remember about humidifiers

- A humidifier requires AC power, so it’s not practical for wheelchair use.
- If the water chamber is reusable, clean and sterilize it regularly.
- Don’t change the temperature control on the humidifier. This should be adjusted only by your outreach team member.
- Empty the water from your breathing circuit tubing regularly. Don’t let it build up.
- Keep the water chamber filled to the appropriate level with bottled sterile water or boiled distilled water. Don’t overfill it and don’t let it run dry. You will get used to the filling routine and will learn to predict when it will need to be filled.
- Make sure that you never run out of water. Keep plenty of bottled sterile or boiled distilled water on hand.

Heat and moisture exchangers (HMEs)

Why a doctor prescribes an HME

- It doesn’t need any kind of power or water, so it is very portable.
- It can simplify breathing circuit tubing configuration.
- It can help keep the airways moist.

An HME is a disposable device that provides humidification. It has a plastic housing with a material inside that absorbs heat and humidity from exhaled gas (air). The humidity is returned to the patient when he or she inhales. It may also be a bacterial-viral filter (it will say this on the label if it is). HMEs are most often used while the patient is moving around and is away from AC power. (Figure 6)

Some important things to remember about HMEs

- The patient cannot use a speaking valve while using an HME (the HME won’t work correctly).
- You will route the breathing circuit to the HME on its way to the patient. The HME is most effective when it is placed very near the patient connection of the breathing circuit.
- Manage airway leak. Make sure the patient exhales through the HME or it will not be effective.
- Be aware of any increased resistance to breathing. Change the HME if it is visibly soiled or shows signs of restricting flow to or from the patient.
- Change the HME regularly. Your durable medical equipment (DME) provider or physician will define the appropriate schedule.
- Make sure you keep plenty of HMEs on hand so you can change them as needed.

Figure 6
Example of Ventilation Circuit with HME

Keep several HMEs on hand.
UNDERSTANDING AND TROUBLESHOOTING ISSUES

This table lists some of the issues you may encounter when using your ventilator — and their possible causes and resolutions.

<table>
<thead>
<tr>
<th>Problem/area of concern</th>
<th>Possible cause</th>
<th>Possible resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Pac battery doesn’t last long enough</td>
<td>1. Not fully charged before use 2. Ventilator settings and patient condition demand more gas delivery than standard settings (e.g. a large leak during pressure ventilation, a high level of bias flow setting, or an aggressively breathing patient)</td>
<td>1. Connect Power Pac battery to external AC or DC power for at least 3 hours between uses 2. Power Pac battery is functioning normally under these conditions. Carry at least one extra fully charged Power Pac battery for ventilator-dependent patients and for patients whose ventilation patterns require higher battery power consumption 3. Contact Medtronic technical support at 800-255-6774</td>
</tr>
</tbody>
</table>
## UNDERSTANDING AND TROUBLESHOOTING ISSUES

<table>
<thead>
<tr>
<th>Problem/area of concern</th>
<th>Possible cause</th>
<th>Possible resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit check fails</td>
<td>1. Leak in breathing circuit or a test lung is attached to circuit</td>
<td>1. Tighten all circuit and water trap connections. Remove test lung and perform two-step circuit check according to on-screen instructions. Trim ends of proximal and exhalation valve tubing; reconnect, ensuring a tight fit.</td>
</tr>
<tr>
<td></td>
<td>2. Incorrect assembly of circuit/exhalation valve</td>
<td>2. Refer to operator’s manual.</td>
</tr>
<tr>
<td></td>
<td>4. Oxygen connected directly to the circuit</td>
<td>4. Do not connect oxygen directly to circuit. Use low flow oxygen reservoir or 50 psi air oxygen mixer. Connect oxygen device to fresh gas intake port after, not before, circuit check is complete.</td>
</tr>
<tr>
<td>Unable to view all monitored values</td>
<td>Monitored values screen is not open</td>
<td>Touch any monitored value at lower edge of the screen.</td>
</tr>
<tr>
<td>Water accumulating in breathing circuit</td>
<td>Gas is cooling as it travels through circuit tubing</td>
<td>Keep tubing as short and warm as possible between humidifier and patient and empty water trap frequently.</td>
</tr>
<tr>
<td>Green external power indicator on panel does not light when ventilator is plugged into external AC (wall) or DC (external battery or auto lighter outlet) power</td>
<td>1. External power not reaching ventilator</td>
<td>1. Ensure power cord is plugged into AC (wall) outlet. Ensure wall outlet is functioning.</td>
</tr>
<tr>
<td></td>
<td>2. Ventilator is running on internal battery system</td>
<td>2. External battery is depleted. Plug into another external battery, auto lighter, or external AC (wall) outlet. Fuse is burned out. Check/replace fuse in external battery system or auto lighter power adapter.</td>
</tr>
</tbody>
</table>

For additional assistance, Contact Medtronic technical support at 800-255-6774.
UNDERSTANDING AND TROUBLESHOOTING ALARM SIGNALS

Alarms are important! They alert you to possible changes in breathing, airway pressure, or ventilator function. The following table lists alarms you may encounter when using your ventilator and their possible causes and resolutions. For a complete list of alarms, please refer to the operator’s manual.

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible cause of alarm signal</th>
<th>Possible resolution</th>
</tr>
</thead>
</table>
| Occlusion alarm or sustained occlusion alarm | The patient’s expiratory gas pathway is occluded (blocked)                                     | • Evaluate exhalation limb of breathing circuit to determine what is causing resistance and resolve the issue  
                                              |                                                                                           | • Change exhalation valve                                                           |
| Important: The patient is not being ventilated — manually ventilate patient until resolved |                                                                                           | • Check exhalation valve line for kinks and remove as necessary                     |
|                                            |                                                                                           | • Replace on-airway flow sensor                                                     |
| High pressure alarm (high peak pressure alarm) | 1. Coughing, need for airway care or bronchodilator treatment                                | 1. Perform suctioning/airway care, or if due and prescribed, give bronchodilator treatment |
|                                            | 2. Secretions too dry/inadequate humidity                                                  | 2. Use heated humidifier with appropriate temperature setting and keep tubing warm |
|                                            | 3. Pneumatic nebulizer connected to the ventilator circuit (in-line) to provide medication delivery with each breath | 3. Contact Medtronic for assistance at 800-255-6774                                |
|                                            | 4. Supplemental oxygen flowing directly into breathing circuit                             | 4. Use low flow oxygen reservoir or 50 psi air oxygen mixer                         |
|                                            | 5. Kinked (bent) tubing                                                                  | 5. Check tubing for kinks (bends) and solve                                          |
|                                            | 6. Sticky exhalation valve and/or on-airway flow sensor (from medication or secretions)   | 6. Install clean exhalation valve and/or on-airway flow sensor                       |
|                                            | 7. Alarm setting too low                                                                  | 7. Contact your care provider for alarm setting adjustments                          |
# UNDERSTANDING AND TROUBLESHOOTING ALARM SIGNALS

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible cause of alarm signal</th>
<th>Possible resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm indicator(s) lit but not blinking, or alarm message in message window</td>
<td>Alarm condition is resolved or alarm message is “latched”</td>
<td>Push Alarm Silence/Reset button to clear indicators/messages one at a time or hold button 3 seconds to clear all messages</td>
</tr>
<tr>
<td>Auditory (sound) alarm too quiet</td>
<td>Alarm loudness set too low</td>
<td>Touch Alarms, touch Alarm Loudness, adjust setting to higher number, press Accept to save changes</td>
</tr>
<tr>
<td>Check circuit alarm or prox line alarm</td>
<td>1. Moisture in proximal line</td>
<td>1. Connect proximal line to the humidifier inlet (dry side)</td>
</tr>
<tr>
<td></td>
<td>2. No proximal filter in place</td>
<td>2. Install proximal filter (part number HT6004701)</td>
</tr>
<tr>
<td></td>
<td>3. Circuit disconnect</td>
<td>3. Reconnect the circuit</td>
</tr>
<tr>
<td>Low pressure alarm (low peak pressure alarm)</td>
<td>1. Circuit leak(s) (especially in volume control)</td>
<td>1. Check for and resolve leaks (see possible resolution for circuit check fails)</td>
</tr>
<tr>
<td></td>
<td>2. Flow setting too low while in volume control</td>
<td>2. Evaluate patient for signs of distress and contact your care provider</td>
</tr>
<tr>
<td></td>
<td>3. Airway leak while in volume control</td>
<td>3. Evaluate trach tube cuff pressure to ensure it is inflated correctly and the inner cannula is in place</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Low Pressure Diagram" /></td>
<td>Reposition mask and ensure mask is not vented</td>
</tr>
<tr>
<td>High expiratory minute volume alarm</td>
<td>1. Patient is breathing faster than usual</td>
<td>1. Check patient for anxiety, pain, discomfort, or change in illness and contact your care provider</td>
</tr>
<tr>
<td></td>
<td>2. Change in set PEEP, pressure control, pressure support, or patient condition has caused higher delivery of patient tidal volume</td>
<td>2. Check patient for anxiety, pain, discomfort, or change in illness and contact your care provider</td>
</tr>
<tr>
<td></td>
<td>3. Supplemental oxygen flowing directly into breathing circuit</td>
<td>3. Use low flow oxygen reservoir or 50 psi air oxygen mixer</td>
</tr>
<tr>
<td></td>
<td>4. On-airway flow sensor is not clean</td>
<td>4. Replace on-airway flow sensor</td>
</tr>
<tr>
<td>Alarm</td>
<td>Possible cause of alarm signal</td>
<td>Possible resolution</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Low expiratory minute volume alarm</td>
<td>1. Circuit leak(s)</td>
<td>1. Check for and resolve circuit leaks (see possible resolution for circuit check fails); contact provider for instructions</td>
</tr>
<tr>
<td><strong>Note:</strong> This alarm is only active when the on-airway flow sensor is in place</td>
<td>2. Airway leak (accidental)</td>
<td>2. Evaluate cuff inflation; increase as needed</td>
</tr>
<tr>
<td><strong>Note:</strong> The low minute volume alarm may be linked with backup ventilation</td>
<td></td>
<td>If only at night, ensure alarm settings are appropriate for both day and night conditions</td>
</tr>
<tr>
<td></td>
<td>3. Airway leak for speech (intentional)</td>
<td>3. These expiratory alarms cannot be used and should be disabled when a speaking valve is in use. Ensure patient is appropriately monitored for safety</td>
</tr>
<tr>
<td></td>
<td>4. Patient is breathing slower than usual</td>
<td>4. Check patient and contact medical provider as necessary</td>
</tr>
</tbody>
</table>
### UNDERSTANDING AND TROUBLESHOOTING ALARM SIGNALS

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible cause of alarm signal</th>
<th>Possible resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>High inspiratory minute volume alarm</td>
<td>1. Circuit leak (pressure control or pressure support breaths)</td>
<td>1. Check for and resolve circuit leaks (see possible resolution for circuit check fails)</td>
</tr>
<tr>
<td>On-airway flow sensor is not in place</td>
<td>2. Significant airway leak (pressure control or pressure support breaths)</td>
<td>2. Contact provider for instructions</td>
</tr>
<tr>
<td><strong>Note:</strong> Situations that violate the high minute volume alarm in pressure control may violate the low pressure alarm in volume control. You should seek similar remedies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Patient is breathing faster than usual</td>
<td>3. Check patient for anxiety, pain, discomfort, or change in illness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Circuit recently reconnected after disconnect</td>
<td>4. Press Alarm Silence/Reset button. Alarm will resolve by itself</td>
</tr>
<tr>
<td></td>
<td>5. High minute volume alarm has not been set properly for use without on-airway flow sensor</td>
<td>5. Set alarm for use without on-airway flow sensor or reconnect on-airway flow sensor</td>
</tr>
</tbody>
</table>

### Low inspiratory minute volume alarm

**Note:** The low minute volume alarm may be linked with backup ventilation

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible cause of alarm signal</th>
<th>Possible resolution</th>
</tr>
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<tbody>
<tr>
<td>1. Need suctioning/airway care when using pressure control or pressure support</td>
<td>1. Suction/perform airway care</td>
<td></td>
</tr>
<tr>
<td>2. Upper airway occlusion (blockage) during mask ventilation</td>
<td>2. Reposition head/neck</td>
<td></td>
</tr>
<tr>
<td>3. Supplemental oxygen flowing directly into breathing circuit</td>
<td>3. Use the low flow reservoir or 50 psi air oxygen mixer instead of adding oxygen directly into the circuit</td>
<td></td>
</tr>
<tr>
<td>4. Patient is breathing slower than usual</td>
<td>4. Assess the patient and ventilator settings</td>
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</table>
## UNDERSTANDING AND TROUBLESHOOTING ALARM SIGNALS

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<tr>
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<th>Possible cause of alarm signal</th>
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</tr>
</thead>
<tbody>
<tr>
<td>High VTE alarm/high expiratory tidal volume alarm</td>
<td>1. A change in PEEP, pressure control or pressure support, or patient condition has caused the pressure control or pressure support breath to result in a higher delivery of patient tidal volume</td>
<td>1. Check the patient for signs of distress and contact your provider</td>
</tr>
<tr>
<td>This alarm is only active when the on-airway flow sensor is in place</td>
<td>2. On-airway flow sensor is not clean</td>
<td>2. Replace sensor</td>
</tr>
<tr>
<td>Backup ventilation (BUV) alarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup ventilation is delivered in response to low minute volume alarm or apnea alarm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong>: Backup ventilation is suspended for one minute when the ventilator is powered on and after a ventilation setting is adjusted. Backup ventilation settings can be changed on the utilities screen</td>
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</tr>
<tr>
<td><strong>Note</strong>: The backup ventilation alarm is resolved when inspiratory minute volume rises to 10% above the low minute volume alarm setting or when the apnea alarm is resolved</td>
<td></td>
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**Backup ventilation (BUV) alarm**

Backup ventilation is delivered in response to low minute volume alarm or apnea alarm.

**Note**: Backup ventilation is suspended for one minute when the ventilator is powered on and after a ventilation setting is adjusted. Backup ventilation settings can be changed on the utilities screen.

**Note**: The backup ventilation alarm is resolved when inspiratory minute volume rises to 10% above the low minute volume alarm setting or when the apnea alarm is resolved.

**Possible cause of alarm signal**

1. A change in PEEP, pressure control or pressure support, or patient condition has caused the pressure control or pressure support breath to result in a higher delivery of patient tidal volume.

2. On-airway flow sensor is not clean.

**Possible resolution**

1. Check the patient for signs of distress and contact your provider.

2. Replace sensor.
# UNDERSTANDING AND TROUBLESHOOTING ALARM SIGNALS

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<tr>
<td>High baseline pressure alarm</td>
<td>1. Circuit check was not performed after circuit installation</td>
<td>1. Perform circuit check</td>
</tr>
<tr>
<td></td>
<td>2. Increased resistance to exhalation</td>
<td>2. Evaluate patient’s pathway of exhalation to determine cause of resistance and resolve the issue</td>
</tr>
<tr>
<td></td>
<td>3. Exhalation drive tubing is kinked (bent)</td>
<td>3. Check tubing for kinks (bends) and solve</td>
</tr>
<tr>
<td></td>
<td>4. Auto-triggering caused by leaks (if PEEP is set &gt; 0)</td>
<td>4. Check for and resolve leaks</td>
</tr>
<tr>
<td>Apnea alarm</td>
<td>1. No mandatory breaths or spontaneous efforts detected within the set time period (5–70 seconds)</td>
<td>1. Assess the patient’s breathing and intervene with a manual resuscitator if needed. Apnea alarm indicates an absence of breaths for a set time interval. If backup ventilation has been linked with the apnea alarm, it will begin when this alarm is violated. Patient level of consciousness may have changed. Ensure that the care provider is alerted to this issue.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Use A/CMV or SIMV modes (not SPONT) and ensure respiratory rate setting is adequate</td>
</tr>
<tr>
<td>Pressure control setting not reached alarm</td>
<td>1. Large airway leak</td>
<td>1. Check for and resolve leaks</td>
</tr>
<tr>
<td></td>
<td>2. Patient/circuit disconnection</td>
<td>2. Check for and resolve any disconnects</td>
</tr>
<tr>
<td>Alarm</td>
<td>Possible cause of alarm signal</td>
<td>Possible resolution</td>
</tr>
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<td>-------</td>
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| Power switchover alarm | No external power source — ventilator is switching to internal battery system | **1.** Ventilator is not detecting external power  
If it’s intentionally unplugged, press Alarm Silence/Reset to clear the message  
If it’s unintentionally unplugged, plug the ventilator into an external power source |
| **Important:** If external power was not disconnected intentionally, find the resolution that causes the green external power LED to light up |
| Running on backup battery alarm | Minimum of 30 minutes internal battery system use time left | Connect to external AC or DC power. Ensure the green external power LED lights up. Don’t leave the ventilator until you see the green light! |
| Power Pac battery is nearing depletion — ventilator is now running on emergency backup battery | | |
| Backup battery shutdown imminent alarm | Minimum of 15 minutes internal battery system use time remaining | Connect to external AC or DC power immediately. Ensure the green external power LED lights up. Don’t leave the ventilator until you see the green light.  
Prepare an alternate method of mechanical ventilation, if necessary |
<p>| <strong>Important:</strong> Internal battery system is depleted — connect to external power immediately | |</p>
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| High respiratory rate alarm  
Delivered breath rate is higher than set limit | 1. Patient is breathing rapidly  
2. Auto-triggering of ventilator caused by leak | 1. Check patient and contact medical provider as necessary  
2. Check and tighten device/tubing connections |
| High O₂ alarm  
Delivered oxygen concentration is higher than set limit | 1. Oxygen was increased prior to an intervention (e.g. suctioning) and not returned to prescribed value afterward  
2. Low flow reservoir is in use and patient’s minute volume has decreased  
3. Incorrect high oxygen alarm settings  
4. Incomplete or incorrect oxygen sensor calibration | 1. Set oxygen to prescribed value  
2. Evaluate patient and adjust settings or alarm as appropriate  
3. Correct the high oxygen alarm settings  
4. Calibrate oxygen sensor appropriately |
| Low O₂ alarm  
Delivered oxygen concentration is lower than set limit | 1. Oxygen supply loss or disconnect or empty cylinder  
2. Low flow reservoir is in use and patient’s minute volume has increased or airway or circuit leak has increased during pressure control (delivered minute volume is higher)  
3. Incorrect low oxygen alarm settings  
4. Incomplete or incorrect oxygen sensor calibration | 1. Restore oxygen supply  
2. Evaluate patient and adjust settings or alarm as appropriate  
3. Correct the low oxygen alarm settings  
4. Calibrate oxygen sensor |
| Oxygen sensor failure | Oxygen sensor depleted or past recommended replacement time | Calibrate or replace sensor as needed |
MANAGING MINUTE VOLUME ALARMS DURING PRESSURE VENTILATION

This section will help you understand the cause of minute volume alarms during pressure control/pressure support ventilation — with and without the on-airway flow sensor in use.

**Note:** Your outreach team member will set all of your ventilator’s adjustable alarms to safe levels and according to your doctor’s prescription. You should not change the alarm settings unless you are told to do so by either your doctor or your outreach team member.

**Without the on-airway flow sensor**

Without the on-airway flow sensor, the ventilator measures inspiratory volume (the volume of air leaving the ventilator). Inspiratory tidal volume (VTI) is the amount of volume delivered in one breath. Inspiratory minute volume (MVI) is the amount of volume delivered (all breaths) in one minute. There are alarm settings for low and high inspiratory minute volume.

**Low inspiratory minute volume alarm**

If the delivered minute volume is lower than the set low inspiratory minute volume alarm limit, the alarm will display and sound. If the backup ventilation setting is linked with the low minute volume alarm, the ventilator will add extra breaths (this is called backup ventilation, or BUV) to make up the missing minute volume until you can perform airway care or take other prescribed steps. When minute volume is slightly above the low alarm limit setting, the ventilator will return to normal ventilation.

Conditions that may result in a decrease in inspiratory minute volume:

- Occlusion
- Mucous plug
- MVI ↓
- Need for suctioning
- Slower/shallower breathing
MANAGING MINUTE VOLUME ALARMS DURING PRESSURE VENTILATION

High inspiratory minute volume alarm
The high minute volume alarm limit is violated if the delivered minute volume is higher than the set high inspiratory minute volume alarm limit.

Conditions that may result in an increase in inspiratory minute volume:
- Airway or circuit leak
- MVi
- Circuit disconnected
- Faster/deeper breathing

Note: This alarm is used in conjunction with the low pressure alarm, which should be set just below the peak pressure for mandatory pressure control or volume control breaths so it may provide an alert to a large leak or disconnect that prevents pressure from rising to that level.

Leaks: understanding the differences between day and night
During the day, the leak around a patient’s tracheostomy tube may be smaller, which means that the ventilator doesn’t need to deliver as much flow to keep airway pressure at the set level. If the on-airway flow sensor is not in use, inspiratory volume will likely go down.

This may change when a patient goes to sleep. The angle of the breathing circuit tubing connection may pull on the tracheostomy tube, which may increase the leak around the tube. Also, when a person relaxes in sleep, the airway relaxes, so the leak may be larger. A larger leak at night may mean that the ventilator needs to deliver more flow to keep airway pressure at the target pressure for pressure control and pressure support breaths.

These conditions may make the delivered (inspiratory) minute volume higher at night, so you may experience more high minute volume alarm violations at night than during the day. Talk with your outreach team member about resolving this issue.

With the on-airway flow sensor
With the on-airway flow sensor in use, the ventilator measures expiratory volume (the volume of air leaving the patient’s airway). Expiratory tidal volume (VTE) is the amount of volume coming from the patient in one breath. Expiratory minute volume (MVE) is the amount of volume that came from the patient (all breaths) in one minute.

There are alarm settings for low and high expiratory minute volume. There is an additional alarm setting called high exhaled tidal volume (VTE).

Low expiratory minute volume alarm
If the expiratory minute volume is lower than the set low expiratory minute volume alarm limit, the alarm will display and sound. If the backup ventilation setting is linked with the low minute volume alarm, the ventilator will add extra breaths (BUV) to make up the missing minute volume until you can take the prescribed steps to resolve the problem. When minute volume is slightly above the low alarm limit setting, the ventilator will return to normal ventilation.

Conditions that may result in a decrease in expiratory minute volume:
- Occlusion
- Mucous plug
- MVE ↓
- Need for suctioning
- Slower/shallower breathing
- Airway or circuit leak ↑
- Disconnect

High expiratory minute volume alarm
If the expiratory minute volume is higher than the set high expiratory minute volume alarm limit, the alarm will display and sound.

Conditions that may result in an increase in expiratory minute volume:
- Suction/airway care
- Bronchodilator treatment
- MVE ↑
- Faster/deeper breathing
- Airway or circuit leak ↓
Always keep a manual resuscitator near the patient — at the bedside, near the wheelchair, near the shower/bath, and in the car.

**MANAGING THE ACTIVITIES OF DAILY LIFE**

**Moving from bed to wheelchair**
For patients whose condition allows them to get out and about, the Newport™ HT70 Plus ventilator provides very easy mobility. Moving from a bed to a wheelchair may, however, require changes to the breathing circuit and humidification setup and will require special considerations for powering the ventilator.
Things you may change when going from the bedside setup to the wheelchair setup
- Use a modified breathing circuit configuration (described below).
- Use the HME instead of an AC-powered heated humidifier.

Breathing circuit for bedside setup (with humidifier) versus breathing circuit for wheelchair setup (with HME)
The ventilator’s breathing circuit assembly may be set up differently at the bedside than on a wheelchair. The bedside setup will likely have a heated humidifier in line with the breathing circuit; the one on the wheelchair will not. You will use an HME in line with the circuit in place of the heated humidifier when you are mobile. Please see the “Introduction to the heated humidifier and HME” section for more information about the importance of humidification.

Note: Your outreach team member will determine the setup.

Note: The wheelchair setup is shown with the proximal tubing connected on the patient side of the HME. Some users will not need to add this extra connector. They may connect the proximal tubing to the port provided on the wye connector (disposable circuit) or the exhalation valve (reusable circuit). Your outreach team member will decide this.

Setting up the HME on the circuit

1. Set aside the heated water humidifier, humidifier chamber, and humidifier tubing (and the temperature probe or thermometer, if normally used).
2. Attach the HME.
3. Connect the proximal pressure tubing to an adapter at the airway.
4. Plug the proximal tubing port on the wye connector or exhalation valve (the location you disconnected the proximal tubing from).
Showering and bathing
Before taking a shower or bath with the ventilator connected, make sure your battery is fully charged and ready to go.

While showering

- Keep the ventilator as far away from the water as you can.
- Position the ventilator with the electrical connections away from the water. If you need the breathing circuit length extended for showering, ask your outreach team member to help you with this.
- You may lightly drape a small towel over the ventilator (do not block any of the gas inlet ports) to keep shower spray off.
- Support the breathing circuit near the patient connection so that it does not put extra weight on the tracheostomy tube.
- Keep the circuit lower than the patient’s tracheostomy tube at all times to lessen the chance of shower water entering the lungs.

When bathing in a bathtub
Follow the basic instructions outlined for showering.
Take extra care to keep bath water from entering the breathing circuit and patient’s lungs through the exhalation valve. Using the disposable J-circuit may make it easier to keep water out of tubing and the airway.
LEAVING THE HOUSE

Freedom and mobility are one of the best features of the Newport™ HT70 Plus ventilator. With a plan in place and a little practice, it’s easy to manage these activities of daily living.

Going on outings: advance planning
- Make sure you have all the supplies you need before you leave the house.
- Use your mobile breathing circuit and humidification configuration (HME).
- Make sure batteries are fully charged (check the LCD on the Power Pac to make sure it is green).
- Save battery power by connecting to the DC auto lighter power adapter while in the car.

Important items to take on all outings
- Manual resuscitation bag
- Adequate portable oxygen (if needed)
- DC auto lighter power adapter (part number ADP3203P) for your Newport™ HT70 Plus ventilator
- AC power cord (to use when an AC outlet is available at your destination)
- Fully charged external battery and connector or an extra fully charged Power Pac

With mobile patients, be careful not to inadvertently pull out the tracheostomy tube.
LEAVING THE HOUSE

Moving a patient remaining in a wheelchair into a vehicle
If the patient will remain in a wheelchair during transport, the transition will be very easy. Just “drive” the chair into the vehicle. Make sure that the patient, wheelchair, and ventilator are fully secured. Once the patient is transferred, use the DC auto lighter power adapter to power the ventilator from the vehicle’s auto power port.

Moving a patient out of a wheelchair into a vehicle
Follow the steps outlined below when transferring a patient from a wheelchair into a vehicle.

1. Disconnect the ventilator from the patient and ventilate with the manual resuscitator (and oxygen if needed) during the transition.

2. Push the Alarm Silence / Reset button to silence alarms for one minute.

3. Move the ventilator and oxygen into the vehicle.

Plan ahead — The patient will need to be ventilated at all times. Two caregivers may be required to do this throughout the transfer process.
4. Position and secure the ventilator, oxygen, and breathing circuit inside the vehicle.
5. Check that the ventilator settings have not been disturbed.
6. Move the patient into the vehicle.
7. Reconnect the ventilator’s breathing circuit to the patient.
LEAVING THE HOUSE

8. Ensure the patient is comfortable and resolve alarms as needed.

9. Use the DC auto lighter power adapter connected to the vehicle’s auto port to power the ventilator.
Powering in an emergency
If a power outage occurs and there is no electricity (AC power) available, follow the steps outlined below.

1. Use battery power. The Power Pac has a 10-hour use time (when new and fully charged and the ventilator is operating on standard settings), and the internal battery has a 30-minute life. Your ventilator will automatically switch to the internal battery when the Power Pac is depleted.

2. If the Power Pac is depleted and AC power hasn’t been restored, switch to another long-life battery source. The ventilator can use a car battery or a marine battery (see below for additional items required) for power.

Using external battery power
When using external battery power, you will need these items:

1. Newport™ DC auto lighter power adapter (P/N ADP3203P)
   - 12 VDC vehicle adapter socket with battery clips
   - Auto or marine battery

   or

2. Newport™ DC auto lighter power adapter (P/N ADP3203P)
   - BAT3300A battery and protective case

Make sure to have your standard AC power cord system with you at all times so that you can plug in the ventilator and recharge it whenever AC power is available.

Remember — with either internal or external batteries, you should always have a backup plan for loss of power, and always have a manual resuscitator handy for emergencies.
### HOW TO USE A PASSY-MUIR™ SPEAKING VALVE IN-LINE WITH A BREATHING CIRCUIT

#### Required components
Consult with your outreach team member to ensure you have all the correct components.
- Tracheostomy tube
- Speaking valve or one-way valve (Figure 12)
- The Passy-Muir™ Ventilator swallowing and speaking valve PMV™ 007 is one example of a speaking valve that can be used in-line with your ventilator.
- Connector tubing to connect the PMV™ to the breathing circuit (Figure 13)
- Ventilator
- Breathing circuit for the ventilator

#### How to set up an in-line speaking valve
1. Use a Yankauer suction instrument (if available) to suction the oral cavity as instructed by your outreach team member.
2. Use a suction catheter to suction the tracheostomy tube.
3. **Important:** Slowly and completely deflate the tracheostomy cuff — this step is critical for patient safety.
4. Suction the tracheostomy tube a second time.
5. Place the one-way speaking valve into the connector tubing as shown in Figure 13.
6. Temporarily disconnect the breathing circuit from the patient’s airway while you attach the one-way valve to the tracheostomy tube.
7. Connect the other end of the connector tubing to the patient connection of the breathing circuit.
8. Resume ventilation (some ventilator settings may need to be adjusted). In some instances, an outreach member may suggest a different mode or breath type and the elimination of PEEP during speaking valve use.
9. Assess vocal cord function and patency of upper airway. To do this, have the patient say “aaaah” to determine vocal cord function.
10. Monitor the patient closely during the initial placement of the speaking valve. After extensive 1 to 1 monitoring (including monitoring of vitals) the decision can be made whether or not the patient is an appropriate candidate for more extended wearing.
11. Monitor the patient with a pulse oximeter during extended wearing of the PMV™.

These instructions are not intended to supersede or replace the speaking valve manufacturer instructions. Please refer to the instructions for use for the Passy-Muir™ ventilator swallowing and speaking valve.
CHANGING AND PERFORMING A QUICK CHECK ON THE BREATHING CIRCUIT

When you have only one ventilator
If you have only one ventilator, you’ll need two care team members — one to attend to the patient, and one to change and perform a circuit check on the breathing circuit.

Care team member #1
Manually ventilate the patient and make sure the patient remains comfortable while the second care team member changes and performs a circuit check on the breathing circuit.

Care team member #2
1. Ensure that the patient is comfortable with manual ventilation.
2. Turn the ventilator off by pressing the Power button and completing the shutdown sequence.
3. Remove the humidifier water chamber and the used tubing.
4. Set the used components aside for disinfection or discard them if you are using disposable components.
5. Install clean tubing and a clean humidifier chamber or HME. If you are installing a humidifier chamber, make sure the water is filled to the maximum fill line.
6. Turn the ventilator on by pressing the Power button and waiting for the startup screen.
7. Perform a circuit check as outlined in the section “How to perform a circuit check.” If the ventilator passes the check, continue with the steps to reconnect the ventilator to the patient. If the ventilator fails, do not use the ventilator. Follow the instructions outlined in the section “If the circuit check fails.”
8. Once the “Circuit Check PASSED Press ACCEPT to continue.” message is displayed, connect the breathing circuit tubing to the patient’s tracheostomy tube.
9. Confirm that patient settings are at the prescribed values and then touch the Start Ventilation button when you are ready to begin ventilation.
10. Ensure the patient is breathing comfortably.
11. Resolve any alarms, if necessary. Refer to the section “Understanding and troubleshooting alarm signals.”

Once the patient is ventilated and comfortable, remove the used components for cleaning and disinfection or disposal. Follow the instructions your outreach team member has given you, and be sure to keep used components away from food preparation and cooking areas.
CHANGING AND PERFORMING A QUICK CHECK ON THE BREATHING CIRCUIT

When you have two ventilators

- Change the breathing circuit on the alternate ventilator while it is idle (not in use).
- Perform a circuit check immediately after the circuit change.
- Promptly resolve any issues so the ventilator will be ready to use when you need it.
BREATHING CIRCUIT SETUP GUIDE

Newport™ HT70 Plus ventilator with disposable J-circuit and Fisher & Paykel™ heated humidifier

Fisher & Paykel™ reusable humidifier chamber

Fisher & Paykel™ heated humidifier for heated wire circuit such as an HC500

Proximal filter (P/N HT6004701)

Proximal line teed into dry side of humidifier (no adapter needed)

Proximal port is plugged

Disposable J circuit (P/N BCD43811P)
Newport™ HT70 Plus ventilator with HME and reusable single-limb circuit

- Newport™ HT70 Plus proximal in-line filter (P/N HT6004701)
- Reusable exhalation valve (P/N EXH3203P)
- Pressure port for use with HME (P/N NP130-22)
- Reusable single limb circuit without water trap (P/N HT600045)
Newport™ HT70 Plus ventilator with HME and disposable J-circuit

- Newport™ HT70 Plus proximal in-line filter (P/N HT6004701)
- Pressure port for use with HME (P/N NP130-22)
- Proximal pressure adapter tee (P/N NP130-22)
- Disposable J-circuit (P/N BCD43801P)
- Heat moisture exchanger (HME)
Please refer to the operating manual for the Newport™ HT70 Plus ventilator for complete cleaning and maintenance procedures.

Reminder — Never let the humidifier run out of water.

KEEPING IT CLEAN: INSTRUCTIONS FOR AT-HOME CLEANING AND MAINTENANCE

Wash your hands and keep it clean
One of the best ways to keep the patient and care team healthy is to wash your hands a lot:

- Before and after working with the ventilator
- Before and after working with the tubing and humidifier
- Before and after suctioning and performing other airway care

To-do list (several times each day)

- Make sure there is water in the humidifier chamber. Never allow it to dry out. Fill the humidifier to the maximum water level line (use bottled sterile or boiled distilled water).
- Empty liquid from the tubing into the water traps, then discard the contents of the water traps into a sink or toilet.
- Never drain the water from the circuit tubing back into the humidifier water chamber.
- Always clean up spills right away.
- Don’t let clutter accumulate near the ventilator.

To-do list (once each day)

Dampen a soft cloth with plain water, wring it out really well, and wipe off the outside of the ventilator, power cord, humidifier, breathing circuit tubing, low flow oxygen reservoir (if used), and the area near the ventilator.

To-do list (once each week or more often as needed)

Change the intake filter

1. Loosen the screws on the filter cover and remove the cover.
2. Remove the used intake filter and replace it with a new one.
3. Replace and secure the filter cover.

Never reuse the intake filter — throw it away and use a fresh one.
4. Discard the used filter — do not reuse it.
   - If you have two ventilators, change the filter on the ventilator that is not in use. As soon as you switch ventilators, change the filter on the other ventilator — that way it will be ready when you need it. Use a color code or other scheme so you know which filter has been changed and when you last changed it.
   - If you have only one ventilator and the user is not on oxygen, you can change the filter while the ventilator is in use.
   - If you have only one ventilator and the user is on oxygen, manually ventilate the patient while another care team member changes the filter or do so quickly to minimize time off oxygen.

Enlist the help of another care team member when you change the breathing circuit.

**Clean and disinfect the used breathing circuit and humidifier setup**

Only reusable components (e.g. the humidifier chamber or reusable exhalation valve) should be cleaned and disinfected. Disposable components (e.g. disposable circuits) should be discarded and replaced. To clean the reusable components, follow these steps:

1. Clear the cleaning area of unnecessary items.
2. Wash the sink and your hands thoroughly.
3. Remove the humidifier temperature probe from the breathing circuit.
4. Remove the heated wire connector from the breathing circuit. **Important:** Make sure the connector stays dry at all times.
5. Wipe down the temperature probe cable with a soft cloth dampened with a mild detergent. Place on a clean towel to air-dry.
6. Wash the probe tips using a soft brush. Rinse thoroughly with sterile, distilled water. Shake off excess water and place on a clean towel to air-dry.
7. Remove the exhalation valve from the circuit tubing.

**Disassembling and cleaning the breathing circuit, exhalation valve, and humidifier chamber**

1. Disassemble the breathing circuit tubing, exhalation valve, water traps, and humidifier chamber.
2. Put the components in a clean equipment bucket or clean sink.
3. Wash the components with hot water and a mild soap.
4. Use a soft brush to scrub as necessary.
5. Rinse the components thoroughly with water from the faucet.
6. Place the components on a clean dry towel to air-dry.
7. Wash the bucket or sink with hot soapy water and rinse well.
Disinfect the breathing circuit using a disinfectant solution or boiling water

Disinfectant:
1. Mix one part vinegar and two parts bottled sterile or boiled distilled water.
2. Completely submerge all circuit components in the vinegar solution. Make sure the components are completely covered by the solution.
3. Let the components soak for two hours.
4. Wash your hands with antimicrobial soap.
5. Drain and discard the vinegar solution.
6. Add sterile or boiled distilled water to the bucket and swish to rinse.
7. Place the parts on a clean towel to air-dry. Prop up tubing so that the interior surfaces can drain properly.
8. Let the components dry completely — this is very important — but don’t leave them out for more than three or four hours.
9. Wash your hands with antimicrobial soap before handling the clean, dry components.
10. Reassemble the breathing circuit.
11. Place the clean breathing circuit setup in a clean paper bag until it is needed.
12. Label the setup with the date it was cleaned and use it within two months of cleaning.

Boiling water:
1. Fill one (or more) large pots three-fourths full of water and bring the water to a boil on the stove.
2. Carefully submerge the components in the boiling water. Make sure the components are completely covered by the water.
3. Bring the water to a boil again, then lower the heat so the water simmers.
4. Simmer the components for five minutes.
5. Turn off the heat and let the water fully cool, but never leave the components submerged for more than two hours.
6. Wash your hands with antimicrobial soap.
7. Remove the components from the water and place them on a clean, dry towel. Prop up tubing so that the interior surfaces can drain properly.
8. Let all of the components dry completely — this is very important — but don’t leave them out for more than three or four hours.
9. Wash your hands again with antimicrobial soap.
10. Reassemble the breathing circuit.
11. Place the clean breathing circuit in a clean paper bag until it is needed.
12. Label the setup with the date it was cleaned and use it within two months of cleaning.

**Check the proximal in-line filter**
If the proximal in-line filter appears to have gotten wet or come in contact with a contaminant, discard it and replace it. Remember: In-line filters are not reusable. If the filter is clean and dry, continue to use it for a maximum of six months. Mark your calendar so you know when to change it. Check with your outreach team member for an exact filter-change schedule.

**Important:** Cleaning instructions cited here are guides for use with Newport™ accessories only. For specific cleaning instructions on third-party accessories, please reference the respective device labeling or consult your home care provider.
# RESOURCES: WHERE TO GO FOR MORE INFORMATION

If you have more questions about living with a ventilator, these resources can help.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>medtronic.com/covidien</strong></td>
<td>The Medtronic website can provide additional resources to help you and your family with your ventilator at home. It can provide information on how to care for your ventilator, tips for use, and forms to help you care for your ventilator at home.</td>
</tr>
<tr>
<td><strong>International Ventilator Users Network</strong>&lt;br&gt;<strong>ventusers.org</strong></td>
<td>The International Ventilator Users Network strives to enhance the lives and independence of users of home mechanical ventilation (HMV) through education, advocacy, research, and networking.</td>
</tr>
<tr>
<td><strong>Shiley™ tracheostomy tube pediatric homecare guide</strong>&lt;br&gt;<strong>Shiley™ tracheostomy tube adult homecare guide</strong></td>
<td>These guides, available on the Medtronic ventilation resource site, provide information on how to care for your tracheostomy tube. You will find tips on how to suction, change ties, change tubes, and care for the skin around the opening in the neck. Also included are basic safety tips, a problem-solving guide and an easy-to-understand glossary of the technical terms you may hear.</td>
</tr>
<tr>
<td><strong>Traceostomy.com</strong>&lt;br&gt;<strong>tracheostomy.com</strong></td>
<td>This site is an independent nonprofit project that is family-run, family-centered, and impartial. The site strives to provide information that follows accepted standards of care for pediatric tracheostomy care in a home setting.</td>
</tr>
<tr>
<td><strong>Ventilation Resource Site</strong>&lt;br&gt;<strong>livingwithavent.com</strong></td>
<td>This site, sponsored by Medtronic, provides a wide range of information about ventilators, home ventilation, and living with a ventilator. The site includes a link that allows you to request information about the Newport™ HT70 Plus ventilator.</td>
</tr>
</tbody>
</table>
These definitions will help you understand technical terms and abbreviations related to mechanical ventilation.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>A/CMV</td>
<td>Assist/control mandatory ventilation</td>
</tr>
<tr>
<td>b/min</td>
<td>Breaths per minute</td>
</tr>
<tr>
<td>cmH₂O</td>
<td>Centimeters of water: unit measure of pressure</td>
</tr>
<tr>
<td>CPAP</td>
<td>Continuous positive airway pressure</td>
</tr>
<tr>
<td>ETT</td>
<td>Endotracheal or tracheostomy tube</td>
</tr>
<tr>
<td>Expiratory</td>
<td>The portion of a breath that is not inspiratory; the time when the patient airway flow is away from the patient, and any time following when the patient flow is zero</td>
</tr>
<tr>
<td>f</td>
<td>Respiratory rate/frequency</td>
</tr>
<tr>
<td>FIO₂</td>
<td>Fraction of oxygen in the delivered mixed gas</td>
</tr>
<tr>
<td>I:E</td>
<td>Inspiratory to expiratory time ratio</td>
</tr>
<tr>
<td>Inspiratory</td>
<td>The portion of a breath when the patient airway flow is toward the patient, and any time following when the patient flow is zero, before expiratory flow begins</td>
</tr>
<tr>
<td>L</td>
<td>Liter</td>
</tr>
<tr>
<td>L/min</td>
<td>Liters per minute</td>
</tr>
<tr>
<td>Latched</td>
<td>The state where an alarm has been violated, and then is recovered; the alarm indicator and message remain visible until reset (cleared)</td>
</tr>
<tr>
<td>LED</td>
<td>Light emitting diode</td>
</tr>
<tr>
<td>mL</td>
<td>Milliliter (0.001 L)</td>
</tr>
<tr>
<td>Paw</td>
<td>Airway pressure</td>
</tr>
<tr>
<td>Pbase</td>
<td>Baseline airway pressure</td>
</tr>
<tr>
<td>PEEP/CPAP</td>
<td>The setting for (PEEP) pressure in the circuit between breaths</td>
</tr>
<tr>
<td>PEEP</td>
<td>Positive end expiratory pressure (Pbase)</td>
</tr>
<tr>
<td>Pmean</td>
<td>Mean airway pressure</td>
</tr>
<tr>
<td>Pressure Control</td>
<td>Pressure limit setting</td>
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</tbody>
</table>
## APPENDIX A: GLOSSARY OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>Ppeak</td>
<td>Peak airway pressure</td>
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<tr>
<td>Psupport</td>
<td>Pressure support</td>
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<tr>
<td>Ptrig</td>
<td>Trigger sensitivity</td>
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<tr>
<td>SPONT</td>
<td>Spontaneous ventilation</td>
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<tr>
<td>ti</td>
<td>Inspiratory time</td>
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<tr>
<td>Volume control (VT)</td>
<td>Tidal volume setting</td>
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<tr>
<td>V or V-dot</td>
<td>Flow / mandatory flow</td>
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<tr>
<td>VI</td>
<td>Inspiratory minute volume</td>
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APPENDIX B: MAINTENANCE GUIDELINES

Routine maintenance

- Perform the circuit check each time a fresh circuit/exhalation valve is installed.
- Check the air intake filter (located behind the filter cover) at setup and at least weekly while in use. In some environments, it may need to be checked more often. Replace when the majority of the filter surface area is no longer white. Air intake filters are not reusable.
  Warning: Never reverse the air intake filter when dirty.
- Check the proximal in-line filter weekly. Replace with a new filter if it appears to have gotten wet or come in contact with a contaminant. In-line filters are not reusable.
- If using the 50 psi air oxygen mixer, check the mixer intake filter (located behind the mixer cover) at setup and while in use. In some environments, it may need to be checked more often. Replace when the majority of the filter surface area is no longer white. Mixer intake filters are not reusable.
- Wipe down the surface of the ventilator housing regularly to remove any dust that might accumulate.
- If service is required, contact Medtronic technical service or your local equipment provider.

Do not attempt to open or perform any service procedures on the Newport™ HT70 Plus ventilator. Only Medtronic trained technicians are authorized to service the ventilator.

Medtronic Technical Support Service
Telephone: 800.255.6774
Fax: 760.603.5055
Email: venttechsupport@ovidien.com
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<th>Date</th>
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