



PHILIPS

Hospital
respiratory care

Pocket guide

Philips Respironics V60
and V60 Plus* ventilators

A comprehensive noninvasive solution

* Not available in USA and may not be available in all markets.

Introduction

Philips is passionate about providing solutions that lead to healthier patients and healthier practices. This pocket guide is designed to help familiarize clinicians with the set-up and application of the Philips Respironics V60 and V60 Plus* ventilators.

The V60 and V60 Plus ventilators are microprocessor-controlled, bi-level, positive airway pressure ventilatory assist systems that provide noninvasive and invasive ventilatory support for spontaneously breathing adult and pediatric patients (> 20 kg). The V60 also offers the option of adding a high flow nasal therapy (HFT)* functionality.

Use this guide for a step-by-step explanation of how to use the V60 and V60 Plus ventilators, from initial setup to mask and port settings to changing modes. This guide also includes suggestions for increasing tank life during transport.

The value of the noninvasive approach

NIV has been shown to significantly reduce many of the complications associated with conventional mechanical ventilation, including the incidence of ventilator-acquired pneumonia,¹ while at the same time reducing the overall cost of care by shortening lengths of stay.^{2,3}

The V60 Plus ventilators enable high flow therapy (HFT), so you can rotate between NIV and HFT,* wean, or escalate therapy – all while using the same circuit.

* HFT, V60 Plus and 3.00 SW are not available in the USA and may not be available in all markets.

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Features, modes, therapies and options

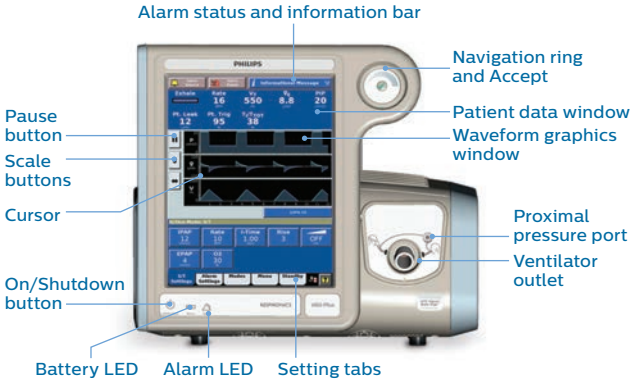
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* May not be available in all markets.

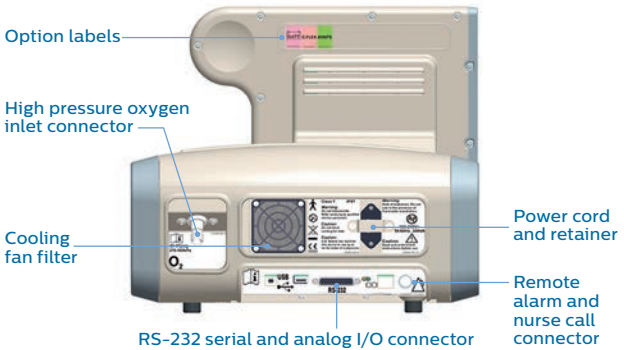
** Not available in the USA and may not be available in all markets.

Device overview

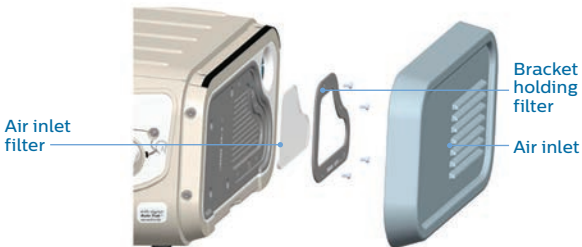
Front



Back



Side



Air inlet filter

The air inlet filter should be inspected every month and replaced if needed.

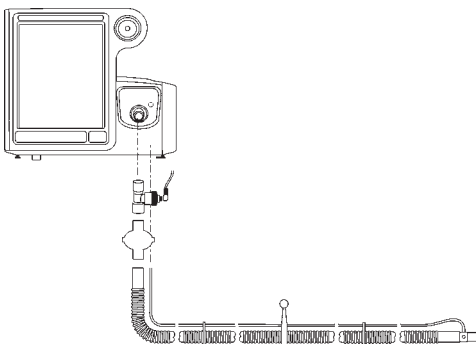
To change the air inlet filter

1. Power down the V60 or V60 Plus* and disconnect it from AC power.
2. Turn the D-ring fastener (bottom of side panel) counter-clockwise one-quarter turn and release.
3. Remove the side panel.
4. Remove the air inlet filter by pinching it out of the recess in the bracket.
5. Install the new air filter by tucking it into the recessed area.
6. Replace the side panel, push in the D-ring fastener, then turn one-quarter rotation or until it locks.

Patient circuit configurations

Assemble the patient circuit, including main flow bacterial filter, proximal line, and humidifier (if desired).

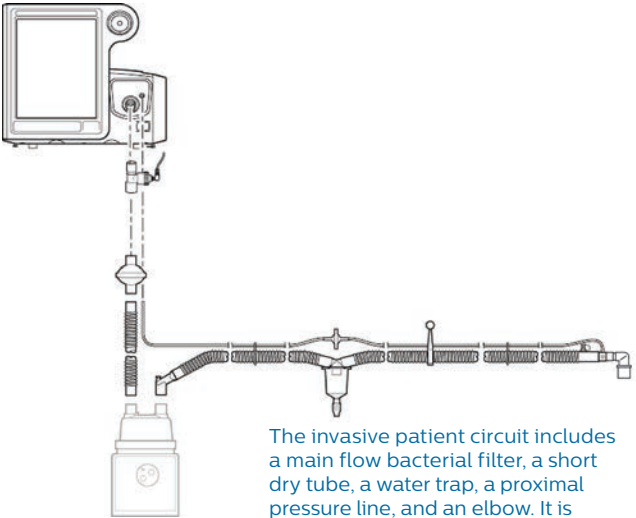
1. Standard patient circuit



The standard patient circuit includes a main flow bacterial filter, an exhalation port, and a proximal pressure line. Not for use with a humidifier.

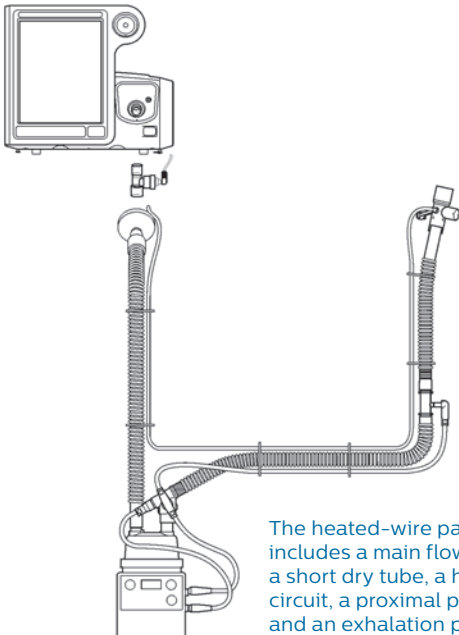
* Not available in the USA and may not be available in all markets.

2. Invasive patient circuit



The invasive patient circuit includes a main flow bacterial filter, a short dry tube, a water trap, a proximal pressure line, and an elbow. It is meant to be used with a humidifier.

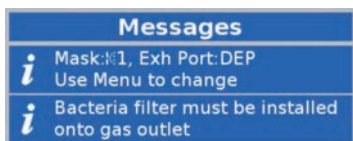
3. Heated-wire patient circuit



The heated-wire patient circuit includes a main flow bacterial filter, a short dry tube, a heated-wire circuit, a proximal pressure line, and an exhalation port.

General operation

Once the circuit and filter are attached, press the **On/Shutdown** button. Informational messages are displayed on the screen; one that informs the clinician to ensure a bacterial filter has been added to the machine outlet,* the second message, appearing in NIV modes, indicates which mask and leak port have been inputted. Continue to **Mode** settings. Otherwise, follow the instructional steps to change the mask and port settings.



Mask and port settings

1. Press the **Menu** setting tab.
2. Press the **Mask** and **Port** button.
3. Press desired patient interface type (see *Mask leak symbols* for more information) and press **Accept** to apply.
4. Press the desired exhalation port (see *Exhalation port settings* for more information) and press **Accept** to apply.
5. Run the exhalation port test only if required.

Setting changes

1. In the **Settings** window, touch the setting to be changed.
2. Adjust the setting by using either the arrow keys or the navigation ring.
3. Once the correct value has been chosen, press **Accept**.

Setting rate

Because the V60 and V60 Plus** are intended to augment ventilation in patients who are spontaneously breathing, the rate should be set as a back-up rate in the case of apnea. If the patient fails to trigger a breath through Auto-Trak within the interval determined by the rate setting, the ventilator triggers a mandatory breath.

* Available with 2.30 or above software only – not available in all markets.

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General operation

Rise time

Rise time is the speed at which inspiratory pressure rises to the set (target) pressure. Set to the fastest rise time tolerated (1 for the fastest rise; 5 for the slowest rise).

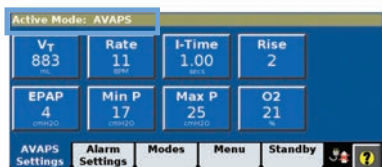
- Too slow of a rise may exacerbate dyspnea in the ARF patient, possibly depriving the patient of needed flow.
- If rise time is insufficient to reach the desired inspiratory pressure or time, decrease the rise time setting (e.g., change from 5 to 3, therefore resulting in a faster rise time).

I-Time

Setting I-Time adjusts the inspiratory time for a machine-triggered breath, therefore influencing the I:E ratio in V60 or V60 Plus* machine-triggered breaths. Inspiratory time is controlled by the patient in a patient-triggered breath.

Mode changes

The active ventilation mode is displayed in the upper left corner of the screen. To set or change a mode:



1. Select the **Modes** setting tab.
2. Select the desired mode (active mode will be displayed).
3. Adjust settings as desired. Newly adjusted setting values will be displayed in yellow.
4. Select **Activate Mode** to apply.



Therapy changes from NIV to HFT*

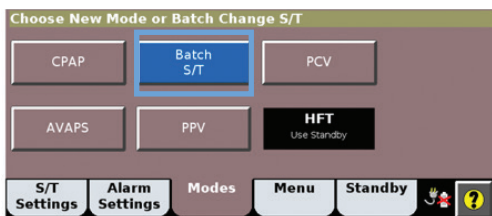
1. Select **Standby**.
2. Remove interface from patient.
3. Change interface to a recommended Philips high flow nasal cannula.
4. Select **HFT**.
5. Adjust parameters.
6. Select **Start HFT**.

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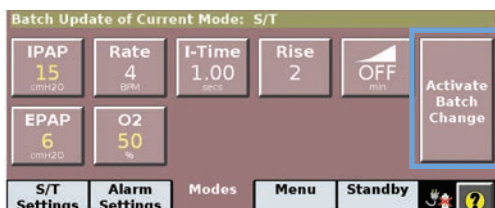
Batch changes

Batch changes are available in only the active mode or therapy. Batch changes allow simultaneous activation of multiple ventilation setting changes. To make batch changes follow these steps.

1. Press the **Modes** setting tab.
2. Press the active mode (it will state “Batch” and be displayed in blue).

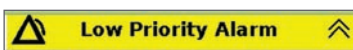


3. Adjust settings as desired so that newly adjusted values are displayed in yellow.
4. Press **Activate Batch Change** to apply all changes at once.



Alarm message navigation

To hide alarms or informational messages in the Alarms or Messages list, press the **Alarm** button (flashing if high priority) or the **Informational Messages** button when up arrows are present. To display messages, touch the **Informational Messages** button when down arrows are present. For a list of alarms, see the *Philips Respironics V60 and V60 Plus* Ventilators User Manual*.

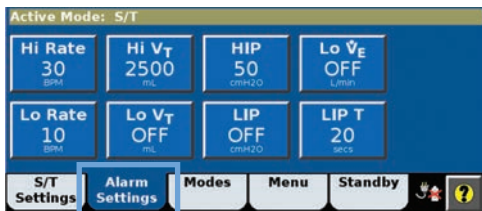


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General operation

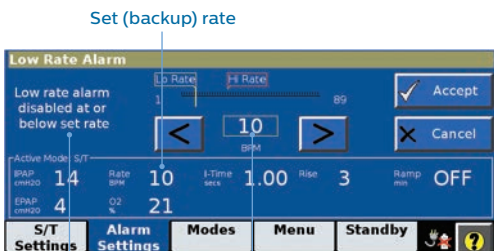
Alarm settings*

1. Press the **Alarm Settings** tab.
2. Press and change the appropriate alarm value.
3. Press **Accept**.



Low rate

On the V60 and V60 Plus**, the low rate alarm may also serve as an apnea alarm. It is recommended to set the low rate alarm higher than the backup rate but lower than the patient's spontaneous rate. If the low rate alarm value is set at or below the set rate, the low rate alarm cannot be triggered, and the alarm is essentially disabled. A text warning will appear on the left side of the **Settings** screen if the user sets the low rate at or below the set (backup) rate.



Warning that alarm will not work with current backup rate

Low rate alarm setting

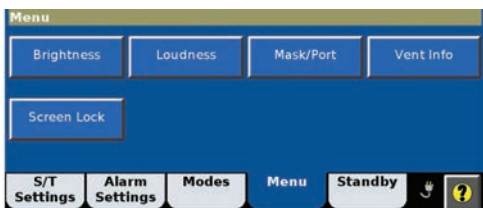
* There is no Alarm Settings tab in HFT.

** Not available in the USA and may not be available in all markets.

Menu tab

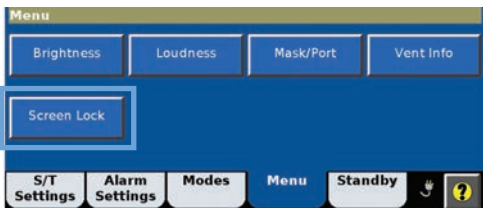
User preferences can be adjusted using the Menu window. There is a **Brightness** setting button for day or night view. The **Loudness** setting button adjusts the volume of alarms and the audible feedback click. The **Alarm Volume Escalation** feature,* if enabled, will escalate alarm volume when a high priority alarm is not responded to within 40 seconds. Ventilator alarm volume increases to maximum volume over a 20-second period. When the function is active and a touchscreen or a button press is detected, the ventilator automatically returns the alarm volume to the user setting.

There is a **Mask/Port** menu button to choose various mask leak values and to choose the correct port (see *Mask Leak symbols*). The **Vent Info** menu button displays the software version and other information specific to the ventilator. There is also a **Screen Lock** button.



Screen Lock

Screen Lock deactivates all buttons and tabs on the touchscreen except the **100% O₂** key, **Alarm Silence**, **Alarm Reset**, and **Alarm Message** buttons, and **Help** icon. The tabs will be grayed out.



To unlock the screen, press the **Accept** button (✓) in the center of the navigation ring.

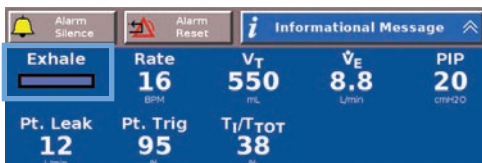


*Available with 2.30 software and above only – not available in all markets.

General operation

Patient data and waveforms

The data screen displays alarms and patient data, which include rate, estimated tidal volume, estimated minute ventilation, peak inspiratory pressure, patient trigger %, T_I/T_{TOT} %, and leak. The breath-type indicator color corresponds to waveform color: **turquoise** for spontaneously triggered, **orange** for timed triggered, and **blue** for exhale.



- **Pt. Trig:** Patient-triggered breaths as a percentage of total breaths over the last 15 minutes.
- **Rate:** Total breath rate (Spont and Timed), a moving average over the last 6 breaths or 15 seconds.
- **T_I/T_{TOT} %:** Inspiratory time divided by the total cycle time over the last 8 breaths.
- **Pt. or Tot. Leak:** Estimated unintentional leak (Pt. Leak) or total of intentional plus unintentional leak (Tot. Leak).
- **Breath indicator bar:** Changes color depending on breath type and inspiratory phase. Spontaneous breath is **turquoise** (Spont), machine-triggered breath is **orange** (Timed), and exhalation is **blue** (Exhale).

Standby

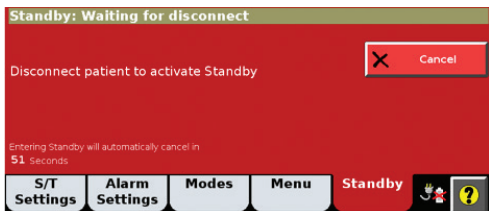
Standby suspends ventilation and retains current settings when the clinician wants to temporarily disconnect the patient from the ventilator. Ventilator settings and most menu functions can be changed during the standby mode.

To activate Standby

1. Press the **Standby** tab.
2. Remove the mask.
3. Disconnect the circuit from the mask.

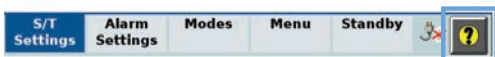
In ventilation modes, the ventilator will not enter standby until the patient is disconnected. It continues ventilation while waiting for the patient to be disconnected. In HFT,* detection of disconnection from the patient is not available, therefore the clinician must select the **Standby** tab and then engage standby by selecting **Enter Standby**.

The standby mode gives the clinician up to 60 seconds to disconnect the patient from the ventilator. If after 60 seconds no disconnection is detected, the standby mode cancels.



Help button

Press the **Help** icon (?) to display additional information. Touch the screen anywhere to return to normal operation.



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General operation

Mask leak symbols*

Leak symbol

(printed on mask)

Patient interface

Leak 1

(no exhalation port on mask)

PerformaTrak oro-nasal mask
Contour Deluxe nasal mask
AF811 (CapStrap gel mask)
AF531 (EE Leak 1)
AF421 (EE Leak 1)
AF541 (EE Leak 1)

Leak 2

(exhalation port within mask)

PerforMax with entrainment elbow
AF531 (EE Leak 2)
AF421 (EE Leak 2)
AF541 (EE Leak 2)

Leak 3

AP111 (OptiLife Interface)

Leak 4 (exhalation port within mask)

Reserved for future use

The Leak symbol represents the intentional leak characteristics of the mask, and the proper V60 or V60 Plus** mask/port settings will ensure the greatest accuracy and optimum performance. If the Leak symbol does not appear on a Respirationics patient interface, use the chart above to determine the proper setting. When using an interface other than a Respirationics mask, choose the Leak setting **Other**. This selection results in Total Leak, not Patient Leak, being displayed on the patient data screen.






Leak 1 symbol on mask

* In HFT, no mask leak symbol or exhalation port selections need to be made.

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Exhalation port settings

After pressing the appropriate mask setting, press the correct exhalation port setting. The chart below references the various exhalation port settings and when an exhalation port test is recommended. An exhalation port test is only recommended when using a PEV (plateau exhalation valve) or non-Respironics exhalation ports with unknown leak characteristics.

	Port selections	Exhalation port test recommended
	Respironics Disposable Exhalation Port (DEP)	No
	Respironics Whisper Swivel	No
	Respironics Plateau Exhalation Valve (PEV)	Yes
	Other exhalation port	Yes

Exhalation port test

If a port test is required, follow the instructions provided on the screen.

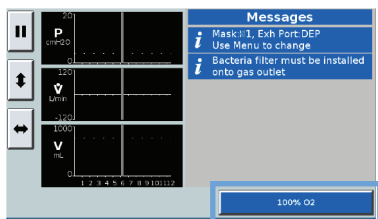
Features, modes, therapies and options

Auto-Trak/Auto-Trak+*

Auto-Trak automatically maintains appropriate trigger and cycle thresholds to maintain patient-ventilator synchrony even with changing leak. An optional upgrade, Auto-Trak+ allows the clinician to customize Auto-Trak's trigger and E-cycle sensitivity.

100% O₂ key*

Upon pressing the **100% O₂** key, the V60 or V60 Plus** delivers 100% O₂ for two minutes. The clinician is also given the option to cancel the action or add an additional two minutes of 100% O₂.



Ramp

The ramp time allows the patient to adapt to ventilation gradually by increasing inspiratory and expiratory pressures (IPAP and EPAP/CPAP) from sub-therapeutic to user-set pressures over a user-set interval (5-45 minutes).

How to set a ramp time

1. Press the **Ramp Time** button in the Mode settings window.
2. As the ramp progresses, the Ramp Time button graphic fills in.
3. To change the ramp interval or end the ramp, press the **Ramp Time** button again, and the Ramp in Progress window opens.
4. To end the ramp and apply the full IPAP and EPAP/CPAP pressures immediately, press **End Ramp**.
5. To end the ramp and start a new one, press **Start New Ramp**, and the Ramp Time setting window opens again to allow a new ramp time to be set.

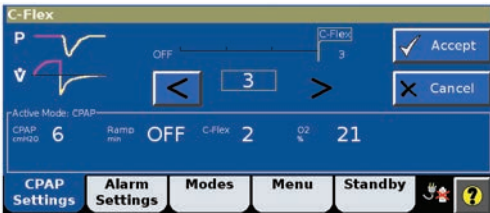
* Available with 2.30 or above software only – not available in all markets.

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C-Flex

C-Flex improves the comfort of traditional CPAP by reducing the pressure at the beginning of exhalation and returning it to the set level before the end of exhalation. C-Flex may not be appropriate for patients where even a transient drop in CPAP is deemed undesirable.

The amount of pressure relief is determined by the C-Flex setting and the expiratory flow of the patient. Pressure relief is increased with a higher setting number (1, 2, or 3) and greater patient expiratory flow. This applies only during the active part of exhalation.



The illustration correlates with the C-Flex setting

Pressure-controlled ventilation (PCV)

In PCV, breaths with a user-set IPAP and I-Time are delivered to the patient. The patient can trigger an inspiration and, therefore, control the rate. However, the patient does not control the inspiratory time. Also be aware that any changes in EPAP without an equal change in IPAP will change the pressure support.

Features, modes, therapies and options

Average volume-assured pressure support (AVAPS)

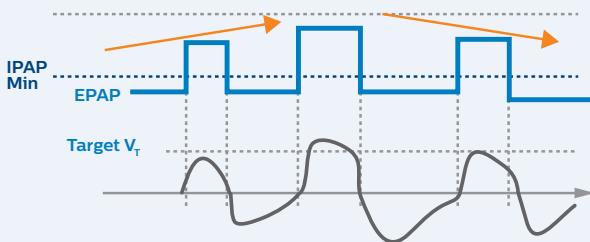
AVAPS is a volume-targeted mode and is intended for use with stable chronic patients who do not require rapid pressure support changes to maintain a target V_T .

At start-up, AVAPS applies an inspiratory pressure equal to one of the following, whichever is greater

- EPAP + (target volume/60 ml/cmH₂O)
- EPAP + 8 cmH₂O
- P_{\min}

The V60 and V60 Plus* will automatically adjust IPAP (up to 2.5 cmH₂O per minute), to maintain a tidal volume target.

Note: when adjusting AVAPS minimum and maximum pressures, remember that IPAP is adjusted to meet the target value. If calculated target pressure is outside of the set pressure range, the target volume will not be achieved.



AVAPS automatically adapts pressure support (< 2.5 cmH₂O per minute) to guarantee an average tidal volume.

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Starting AVAPS

1. When switching from S/T mode to AVAPS, set the Min P at the current IPAP pressure.
2. During AVAPS startup, there may be a period of time before the target tidal volume is achieved. If the target V_T is not achieved at the current Min P setting, increase the Min P until the target V_T is reached. Remember, the V_T displayed on the V60 and V60 Plus* is a six-breath average, so the effect of a settings change may not be fully reflected for several breaths.
3. Once the target V_T is reached, reduce Min P slightly to allow the AVAPS algorithm to adjust.
4. If target V_T is not achieved due to a low Min P setting, an informational message will appear. Adjust Min P accordingly unless the maximum pressure for the patient has been reached.
5. If target V_T is exceeded because Min P is set too high, an informational message will appear. Adjust Min P accordingly unless the minimum pressure for the patient has been reached.
6. Set the high and low V_T alarms appropriately.
7. In AVAPS, the EPAP setting must be at least 1 cmH₂O below the Min P setting. In some cases, an increase in the Min P setting is required before increasing the EPAP setting.



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Features, modes, therapies and options

High flow therapy (HFT)*

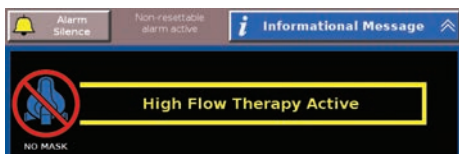
HFT is for spontaneously breathing patients only, ones who require oxygen therapy at a flow rate higher than traditional oxygen delivery options such as a low flow nasal cannula. It should only be used with a heated humidification circuit. Dry gas delivery at a high flow rate may cause patient discomfort and may impair the mucociliary function.

Flow rate capability and oxygen concentration range

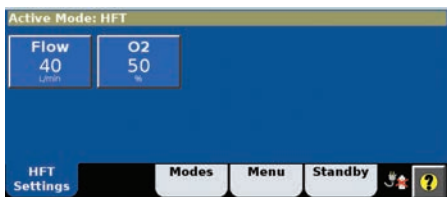
- Flow = 10 l/min – 80 l/min**
- O₂ = 21% – 100%

Upon initiation of therapy, three notifications are displayed.

1. **No Mask** icon, indicating NIV masks are inappropriate interfaces for HFT.
2. **High Flow Therapy Active** notification, indicating therapy has been activated.



3. **Patient alarms are disabled during HFT** notification, indicating that there are no patient alarms (such as high and low RR, pressure, or minute ventilation). There are two system alarms, one that target flow has not been reached and the other that the patient circuit is occluded. The Alarms tab is disabled in HFT. Provide external monitoring, including oximetry, to inform the clinician of a change in the patient's condition.



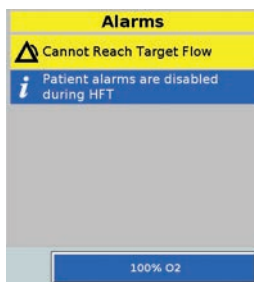
* Not available in the USA and may not be available in all markets.

** The maximum deliverable flow rate varies based on nasal cannula orifice size and on patient nasal passage resistance.

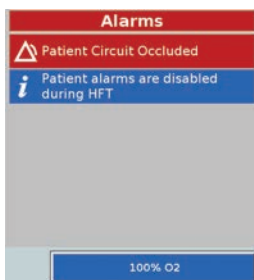
Philips recommended nasal high flow cannula or high flow trach adaptors may be used. NIV masks or direct connection to ET tubes or tracheostomies are not appropriate. When connecting a high flow interface, the NIV circuit exhalation port must be blocked via the Philips Respironics AC611 with FEP connect or removed to adapt a Philips recommended cannula with a 22 mm connection during HFT.* Failure to block or remove the exhalation port will result in a reduction in the delivered flow due to the leak through the exhalation port.



When administering HFT with a nasal cannula, it is important to ensure that the set target flow is appropriate for the size of the nasal prongs. An excessively high flow rate relative to the size of the nasal prongs may cause the target flow to not be reached, resulting in a **Cannot Reach Target Flow** alarm notification. If the delivery circuit or cannula becomes occluded, the V60 or V60 Plus* will reduce the set flow to maintain a lower system pressure until the occlusion is relieved.



During HFT, verify that an occlusive patient interface is not being used. Occlusive patient interfaces include a cannula fully sealed within the nares, an NIV mask, or a direct connection to a tracheostomy tube or endotracheal tube. Remove any occlusive interface immediately as this may expose the patient to unintended high pressures.



* HFT, V60 Plus and 3.00 SW are not available in the USA and may not be available in all markets.

Features, modes, therapies and options

Patient transport

Tips to maximize E-cylinder oxygen tank duration

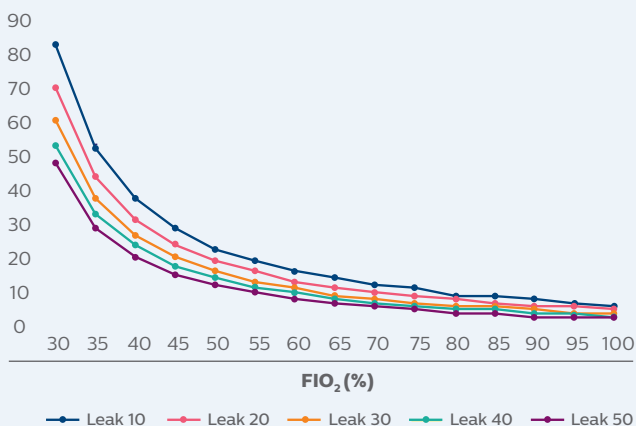
- Make sure all cylinders are full (2000 psig or more).
- We recommend that you do not use any oxygen delivery devices that will limit flow such as Grab 'N Go cylinder/regulators (flow is limited to 100 l/min). The pressure will be maintained, but the oxygen concentration will be reduced and the low oxygen pressure alarm will activate.
- Make sure the cylinder regulators are turned off while the V60 or V60 Plus* is connected to wall oxygen.
- Never turn the cylinder regulator on until ready to transport the patient.
- Turn on only one cylinder regulator at a time. If both cylinders are turned on, they may become simultaneously depleted, leaving no backup oxygen.
- Whenever possible, reduce FIO₂ prior to transport. The higher the FIO₂ setting, the greater the oxygen consumption. This is particularly important during transport in high-leak situations such as NIV.
- Minimize all patient leaks. Adjust mask prior to transport, and loosen appropriately when patient is back on wall oxygen.
- Avoid using masks that have an exhalation port built into the mask when there is already an exhalation port in the circuit.

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Below are graphs representing oxygen tank duration at various leak values. These are estimates only, based on 2000 psig. Time may vary depending on the V60 or V60 Plus* settings used and the patient's changing ventilatory demand.

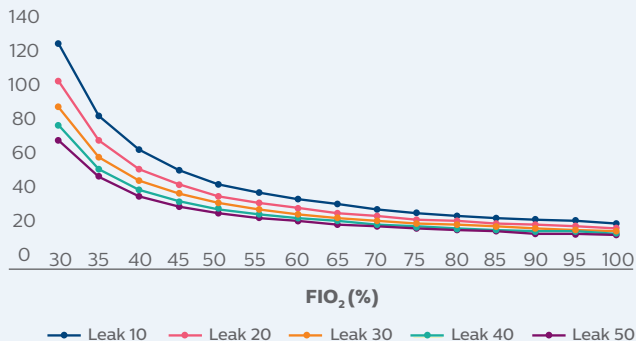
VT 500; RR 40; IPAP 18; EPAP 6

Duration in (minutes)



VT 500; RR 20; IPAP 18; EPAP 6

Duration in (minutes)



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References

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Australia
1800 251 400

New Zealand
0800 251 400

Philips Home Healthcare Solutions
1300 766 488 or +61 2 9947 0440

Philips Healthcare Head Office
65 Epping Road North Ryde NSW 2113
Locked Bag 30 North Ryde NSW 1670

philips.com
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