

NeoMode Option

Introduction

This addendum tells you how to use the NeoMode software option on the Puritan Bennett™ 840 Ventilator System. See the *Puritan Bennett 800 Series Ventilator System Operator's and Technical Reference Manual* for general parameter and operational information. Any references to the software options BiLevel, Volume Ventilation Plus (VV+) which includes VC+ and VS breath types, Proportional Assist Ventilation (PAV*), Tube Compensation (TC), Respiratory Mechanics (RM), and Trending made in this addendum assume that the option has been installed on the ventilator. If these options aren't installed, then references to their functions do not apply.

Intended Use

The Puritan Bennett 840 Ventilator System with NeoMode option is intended to provide respiratory support to neonatal patients with ideal body weights as low as 0.3 kg. It is intended to cover a wide variety of clinical patient conditions in hospitals and hospital-type facilities, and may be used during intra-hospital and intra-hospital-type facility transport.

Description

The ventilator determines values for operational variables and allowable settings based on breathing circuit type and ideal body weight (IBW). The IBW range for neonates is 0.3 to 7.0 kg (0.66 to 15 lb.). Software controls prevent inadvertent mismatching of patient size and breathing circuit type. A neonatal breathing circuit connects to a neonatal filter and mounting plate installed on the expiratory port.

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NOTE:

To enable the NeoMode option, you must select the neonatal breathing circuit type in Short Self Test (SST). Breathing circuit type can only be changed during SST.

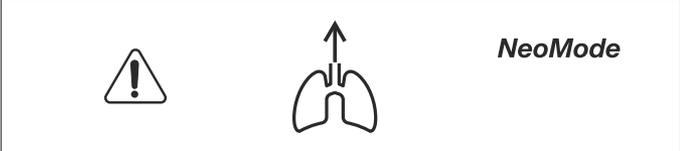
The following table contains the features included with the NeoMode software option.

NOTE: Older NeoMode software options may not have all the features included with the NeoMode 2.0 option.

Table 1: Features included with the NeoMode software option

Option	Neonatal, Pediatric, or Adult circuit types can be selected during SST	Includes Increase O ₂ 2 min and Neo nCPAP capability	Includes 2-mL tidal volume, 0.3 kg IBW	Allows Neonatal patient circuit use only
NeoMode	x			
NeoMode Update	x	x		
NeoMode 2.0	x	x	x	
Neonatal		x	x	x

Labels/Symbols

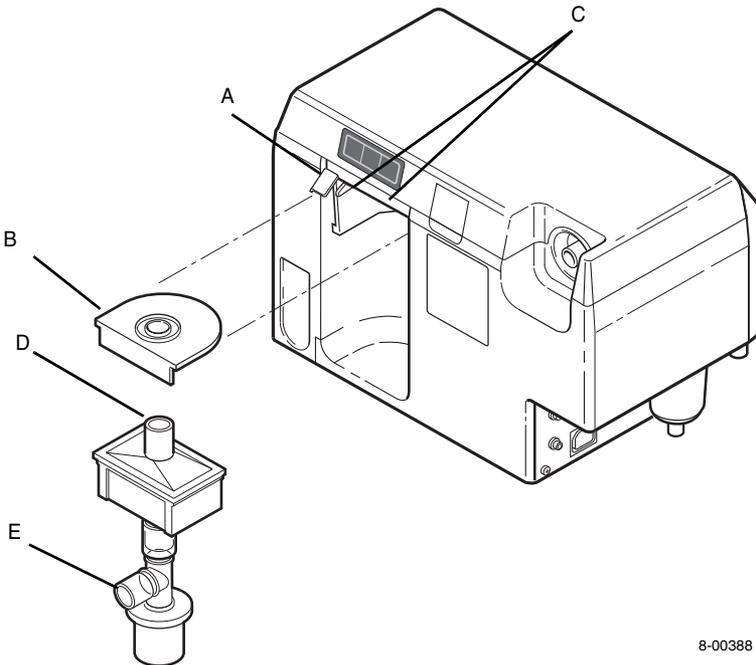
Symbol	Label definition or abbreviation
<p>This label appears on the front of the mounting plate.</p> <div data-bbox="389 456 1069 607" style="border: 1px solid black; padding: 10px; text-align: center;">  </div>	
	<p>From patient</p>
<div data-bbox="413 915 645 1057" style="border: 1px solid black; border-radius: 10px; padding: 5px; display: inline-block;">  </div> <p>This label is applied on the Puritan Bennett 840 keyboard, over the 100% O₂/CAL 2 min key.</p>	<ul style="list-style-type: none"> • If the circuit type is neonatal, the INCREASE O₂ 2 min key adjusts the underlying oxygen setting, adding 20% O₂ to the existing oxygen setting to a maximum of 100% O₂ for two minutes. • Oxygen sensor calibration is performed if 100% O₂ is delivered for at least two minutes. For more information, see “INCREASE O₂ 2 min key” section below.

How to install mounting plate and filter assembly

Follow these steps to install the mounting plate and expiratory filter (Figure 1):

1. With the exhalation filter latch in the up position (A), slide the mounting plate (B) with label facing out completely onto the two tracks (C) in the filter housing.
2. Push latch down to secure the mounting plate.
3. Install the filter's ventilator connector (D) into the mounting plate so that the breathing circuit connector (E) faces out.

Attach the expiratory limb of the breathing circuit to the breathing circuit connector (E).



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Figure 1. Installing the mounting plate and expiratory filter

Warning

To ensure that all breathing circuit connections are leak-tight, perform a circuit leak test by running SST every time you install the filter on a ventilator.

Caution

Adding accessories to the ventilator can increase system resistance and compliance. Do not add or remove accessories to the breathing circuit after running SST (which measures circuit resistance and compliance).

NOTE:

- If the ventilator has not reached operating temperature from recent usage, allow it to warm up for at least 10 minutes before running SST to ensure accurate testing.
 - Check the inspiratory and expiratory limbs of the breathing circuit and in-line water traps regularly for water buildup. Under certain conditions, they can fill quickly. Empty and clean the in-line water traps as necessary. Reference manufacturer's instructions for additional information.
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Connecting the breathing circuit

Warning

Use one of the ventilator breathing circuits listed in Table 7, or their equivalent. This ensures that maximum pressure/flow values specified by EN794-1 are not exceeded. Using a circuit with a higher resistance does not prevent ventilation, but can cause SST fault or compromise the patient's ability to breathe through the circuit.

Figure 2 shows how to connect the breathing circuit.

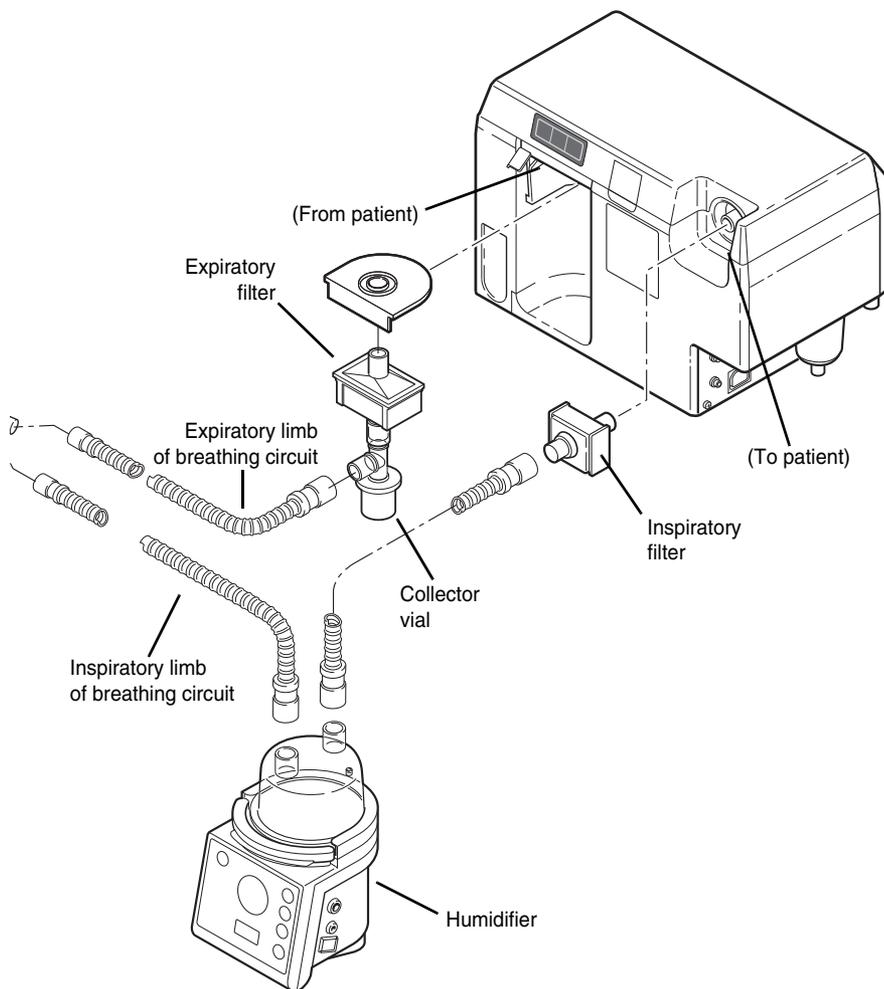


Figure 2. Connecting the breathing circuit

Ventilation Features

When ventilating neonatal patients, it is likely that you may change oxygen concentration more frequently than when ventilating adult patients. Since the oxygen concentration ventilator settings button is located near the PEEP settings button, a soft bound is included in ventilator software to guard against

inadvertently large changes in PEEP ($> \pm 2$ cmH₂O). The soft bound requires an acknowledgement in order to make a large change in the PEEP setting (Figure 3).

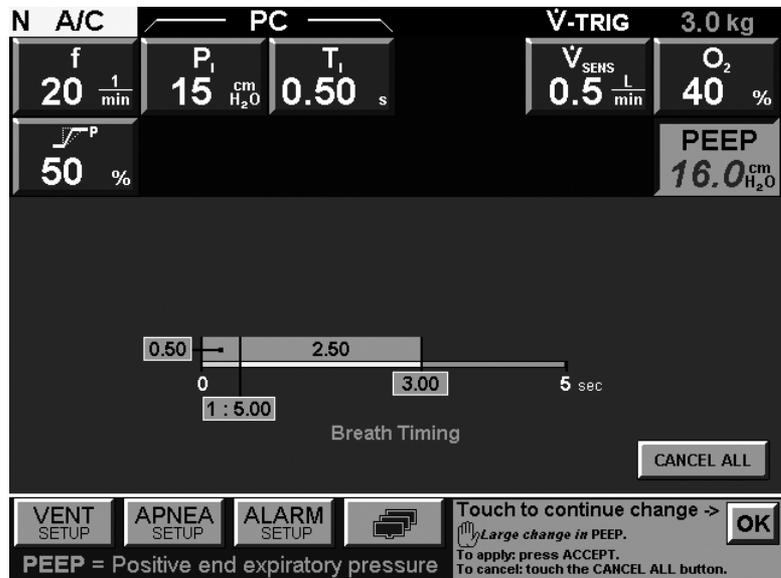


Figure 3. A soft bound appears, accompanied by an audible tone, during accidentally large PEEP changes

INCREASE O₂ 2 min key (O₂ suction)

With the NeoMode option installed and the circuit type is neonatal, pressing the INCREASE O₂ 2 min key causes the ventilator to deliver an additional 20% O₂ to the current oxygen setting for two minutes. If the circuit type is not neonatal, pressing this key delivers 100% O₂ for two minutes. The following rules apply to the INCREASE O₂ 2 min key:

- If the current O₂ setting is 80% or above, the ventilator will deliver 100% O₂ for two minutes, after which the oxygen sensor will be calibrated as long as the full two-minute interval elapses without a change in O₂ delivery.
- If the O₂ suction time-out (2 minutes) elapses, is cancelled, or if the O₂ suction function becomes unavailable (for example, due to a loss of the O₂ supply), the LED for the INCREASE O₂ 2 min key is turned off.

- If apnea ventilation occurs during the two-minute interval, the apnea % O₂ delivery also increases by 20% O₂.
- During LOSS OF AIR SUPPLY or LOSS OF O₂ SUPPLY alarms, the O₂ suction function is cancelled if in progress, and is temporarily disabled until the alarm condition no longer exists.
- During Safety PCV, circuit disconnect conditions, and standby mode (when the ventilator is turned on but not ventilating) the delivered oxygen concentration increases from 40% to 60% when the INCREASE O₂ 2 min key is pressed.

Table 2 lists the displayed messages when the INCREASE O₂ 2 min key is pressed at different oxygen concentrations.

Table 2: Oxygen delivery at various ventilator oxygen concentrations

Ventilator O ₂ concentration		Message displayed:
< 80% O ₂	When the INCREASE O ₂ 2 min key is pressed, an additional 20% oxygen concentration is added to the existing value.	+ 20%-Delivering x% O ₂ where x is the delivered oxygen percentage.
≥ 80% O ₂	When the INCREASE O ₂ 2 min key is pressed, an additional 20% oxygen concentration is added if allowed to deliver for <i>less than</i> two minutes.	+ 20%-Delivering 100% O ₂ .

Table 2: Oxygen delivery at various ventilator oxygen concentrations (continued)

Ventilator O ₂ concentration		Message displayed:
≥ 80% O ₂	When the INCREASE O ₂ 2 min key is pressed, the ventilator delivers 100% O ₂ . Oxygen sensor calibration is performed if allowed to deliver for two minutes.	+ 20% - 100%/ O ₂ CAL In Progress. If you want to calibrate the oxygen sensor, Puritan Bennett recommends performing the calibration from the MORE SETTINGS screen.
Calibration is initiated from the MORE SETTINGS screen	Oxygen sensor calibration is performed when initiated from the MORE SETTINGS screen (see Oxygen sensor calibration section for more information).	100%/ O ₂ CAL In Progress

Oxygen sensor calibration

The 100% O₂ calibration function can be initiated from the INCREASE O₂ 2 min key if the O₂ setting is 80% or above, or from the **More Settings** screen, at any oxygen concentration.

To perform an oxygen sensor calibration from the **More Settings** screen:



1. Touch the OTHER SCREENS button on the lower GUI, then touch the MORE SETTINGS button.
2. Touch the O₂ sensor button and turn the knob to select Calibration, and press ACCEPT. The progress indicator appears on the screen. The O₂ sensor setting will remain at the setting that existed before calibration (DISABLED or ENABLED).

During Oxygen Sensor calibration, the INCREASE O₂ 2 min LED is turned OFF.

Neo nCPAP

When using the NeoMode software option, and ventilating with a non-invasive ventilation (NIV) circuit, a separate CPAP mode, Neo nCPAP, (also known as nasal CPAP) allows spontaneous breathing with a desired PEEP level. In order to limit inadvertent

alarms associated with the absence of returned volumes in nasal CPAP breathing, Neo nCPAP does not make available exhaled minute volume and exhaled tidal volume alarm settings. Since some neonates don't trigger breaths, the default apnea interval, T_A , is set to OFF and requires acknowledgement (pressing the ACCEPT key) before proceeding. Also, some settings changes will initiate a PEEP restoration breath before phasing in those changes.

Because the minute volumes and tidal volumes are not reliably measured in CPAP, \dot{V}_{ETOT} and V_{TE} are replaced by the monitored PEEP value in the vital patient data area.

NOTE: In Neo nCPAP, Apnea Time, T_A can be adjusted, if desired. It merely defaults to OFF to avoid inadvertent alarms.

If the Apnea interval is set to OFF, any active apnea alarm will be automatically reset, and the message "APNEA DETECTION DISABLED" is displayed blinking at the bottom of the lower GUI screen.

To set the ventilator for Neo nCPAP:

1. Select NEW PATIENT from the ventilator's startup screen or touch the CURRENT VENT SETUP button.
2. If necessary, touch the IBW button and turn the knob to select the IBW. More ventilator settings appear.
3. Touch the VENT TYPE button and turn the knob to select NIV.

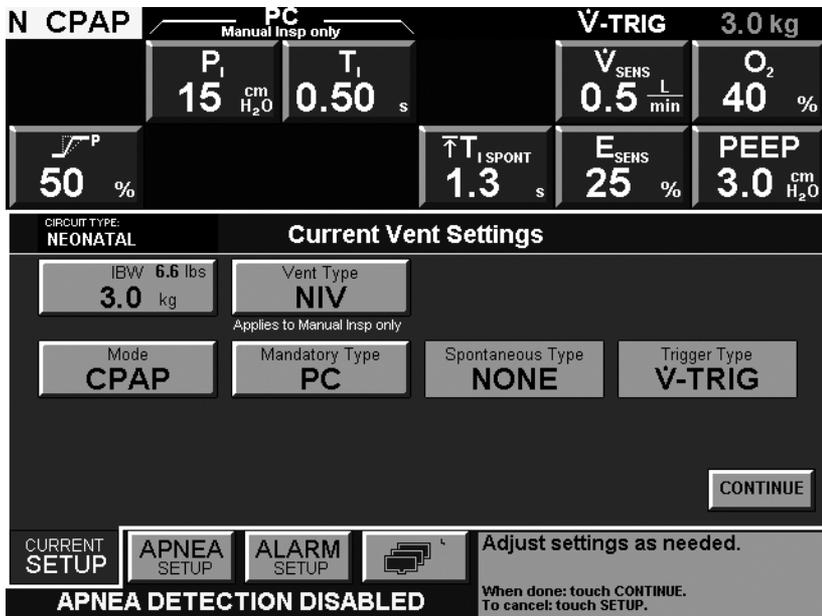


Figure 4. Neo nCPAP setup screen

4. Touch the MODE button and turn the knob to select CPAP (Figure 4). When CPAP is selected, the Spontaneous Type button becomes inactive. You must exit CPAP mode in order to change the Spontaneous Type setting.
5. Press CONTINUE to apply appropriate ventilator settings, including the apnea interval. When you are done, press ACCEPT.

Exiting CPAP mode

When you change the mode from CPAP to any other mode, several transition rules take effect:

- The apnea interval becomes the new patient value
- The $\dot{V}_{E\text{ TOT}}$, $V_{TE\text{ MAND}}$, $V_{TE\text{ SPONT}}$, and $V_{T\text{ I}}$ alarm sliders appear in the alarm settings screen according to their applicability to the selected mode

- The $\dot{V}_{E\text{ TOT}}$, $V_{TE\text{ MAND}}$, $V_{TE\text{ SPONT}}$, and V_{TI} alarms are set to their respective new patient values
- The Vital Patient Data area displays values for $\dot{V}_{E\text{ TOT}}$ and V_{TE}
- PEEP is displayed in the More Patient Data Screen
- When transitioning from apnea interval set to OFF to an apnea interval of time (T_A), the new setting is phased in immediately

Descriptions and ranges: settings, alarms, and monitored data

This section summarizes ventilator settings (Table 3), alarm settings (Table 4), and monitored data (Table 5) associated with the NeoMode option. Accuracies are listed only if they differ from those in the *Puritan Bennett 840 Ventilator System Operator's and Technical Reference Manual*. Table 2 lists the minimum and maximum range values for each ventilator setting. Most settings, however, are also limited by other settings or conditions (for example, a low alarm limit is always limited by the corresponding high alarm limit). Review the prompt area when making settings changes.

Table 6 correlates ideal body weight (IBW) to patient length.

Warning

Monitor the patient closely if alarms are disabled: there are no audible or visual annunciations for out-of-range conditions when volume, pressure, or apnea alarms are disabled.

Table 3: Ventilator settings

Setting	Function/Details
Apnea interval (T_A)	<p>Function: Defines the interval without breathing after which the ventilator declares apnea.</p> <p>Range: OFF (in NIV CPAP only) or 10 to 60 s.</p> <p>Resolution: 1 s</p> <p>New Patient Value: max (10 s, 60/ Apnea f s)- or OFF in NIV CPAP only</p>
Apnea respiratory rate (f)	<p>Function: Same as for non-apnea.</p> <p>Range: 2.0 to 40/min.</p> <p>Resolution: 0.1/min for < 10/min. 1/min for \geq 10/min.</p> <p>New Patient Value: 20/min.</p>
Apnea tidal volume (V_T)	<p>Function: Same as for non-apnea.</p> <p>Range: 2 to 315 mL.</p> <p>Resolution: 0.1 mL for 2 to 5 mL. 1 mL for 5 to 100 mL. 5 mL for 100 to 400 mL.</p> <p>New Patient Value: the greater of 5 mL or $(7.25 \times \text{IBW})$.</p>
Apnea peak flow (\dot{V}_{MAX})	<p>Function: Same as for non-apnea.</p> <p>Range: 1.0 to 30 L/min.</p> <p>Resolution: 0.1 L/min for flows of 1 to 20 L/min. 1 L/min for flows 20 L/min and above.</p> <p>New Patient Value: based on IBW.</p>
Flow pattern	<p>Function: The gas flow pattern of mandatory volume-controlled breaths.</p> <p>Range: Square or descending ramp.</p> <p>New Patient Value: Descending ramp.</p>

Table 3: Ventilator settings (continued)

Setting	Function/Details
Flow sensitivity (\dot{V}_{SENS})	<p>Function: The flow inspired by the patient that triggers the ventilator to deliver a mandatory or spontaneous breath.</p> <p>Range: 0.1 to 10 L/min.</p> <p>Resolution: 0.1 L/min.</p> <p>New Patient Value: 0.5 L/min.</p>
Ideal body weight (IBW)	<p>Function: Indicates an approximate value for patient's body weight assuming normal fat and fluid levels. Determines absolute limits on tidal volume and peak flow. Determines new patient settings for tidal volume, peak flow, and volume related alarms.</p> <p>Range: ≥ 0.30 kg (0.66 lb.) ≤ 7.0 kg (15 lb.).</p> <p>Resolution:</p> <ul style="list-style-type: none"> 0.1 kg for 0.3 to 3.5 kg. 0.5 kg for 3.5 to 7 kg. <p>New Patient Value: 3.0 kg.</p>
Inspiratory time (T_I)	<p>Function: Sets the duration of inspiration during pressure control (PC) mandatory breaths.</p> <p>Range: 0.20 to 8.00 s.</p> <p>Resolution:</p> <ul style="list-style-type: none"> 0.01 s/breath when <i>mandatory type</i> = PC or VC+. 0.02 s/breath when <i>mandatory type</i> = VC. When mandatory type is VC, T_I appears on the breath timing bar, not as a ventilator setting. <p>New Patient Value: Based on V_T, \dot{V}_{MAX}, and Flow Pattern</p>
Mandatory type	<p>Function: Sets the type of mandatory breath: volume control (VC), (VC+), or pressure control (PC).</p> <p>Range: VC, PC, or VC+.</p> <p>New Patient Value: PC.</p>

Table 3: Ventilator settings (continued)

Setting	Function/Details
Mode	<p>Function: Defines ventilatory mode, which defines breath timing and allowable breath types:</p> <p><i>A/C</i> allows VC, VC+, or PC mandatory breaths.</p> <p><i>SIMV</i> allows mandatory breaths (VC, VC+, or PC) and spontaneous breaths (with or without PS).</p> <p><i>SPONT</i> allows only spontaneous breaths (with or without pressure support, PS), except for manual inspirations. In <i>SPONT</i>, VS is allowed for spontaneous inspirations.</p> <p><i>CPAP</i> allows spontaneous (CPAP) breaths when Vent Type is NIV only</p> <p><i>BILEVEL</i> (optional) allows PC mandatory breaths and spontaneous breaths (with or without pressure support). BILEVEL establishes two levels of positive airway pressure. BILEVEL is not available if NIV is the vent type.</p> <p>Range: A/C, SIMV, SPONT, CPAP, or BILEVEL.</p> <p>New Patient Value: SIMV.</p>
O ₂ %	<p>Function: Sets the percentage of oxygen in the delivered gas.</p> <p>Range: 21 to 100%.</p> <p>Resolution: 1%.</p> <p>New Patient Value: 40%.</p> <hr/> <p>NOTE:</p> <p>A significant change to the O₂% setting can cause the V_{TE} (exhaled tidal volume) to be transiently displayed as lower or higher than the actual exhaled volume. This is a result of initial spirometry calculations and does not reflect actual volume exhaled by the patient.</p> <hr/>

Table 3: Ventilator settings (continued)

Setting	Function/Details
Peak flow (\dot{V}_{MAX})	<p>Function: Sets the peak (maximum) inspiratory flow during VC mandatory breaths.</p> <p>Range: 1.0 to 30 L/min.</p> <p>Resolution: 0.1 L/min for flows of 1 to 20 L/min. 1 L/min for flows 20 L/min and above.</p> <p>New Patient Value: based on IBW.</p>
PEEP	<p>Function: The positive pressure applied to the patient circuit during exhalation.</p> <p>Range: 0 to 45 cm H₂O.</p> <p>Resolution: 0.5 cm H₂O if PEEP < 20 cm H₂O or 1 cm H₂O if PEEP ≥ 20 cm H₂O</p> <p>New Patient Value: 3.0 cm H₂O</p>
Respiratory rate (f)	<p>Function: Sets the minimum number of mandatory breaths the patient receives per minute. Active in A/C, SIMV, and BiLevel.</p> <p>Range: 1.0 to 150/min.</p> <p>Resolution: 0.1/min for 1.0 to 10/min. 1/min for 10 to 150/min.</p> <p>New Patient Value: 20/min.</p>
Spontaneous Type	<p>Function: Sets the type of spontaneous breath: pressure supported (PS), not pressure supported (NONE). (The Tube Compensation (TC) and PAV+ options are not available in <i>NeoMode</i>.)</p> <p>Range: PS, VS, or NONE.</p> <p>New Patient Value: PS or NONE (in CPAP mode only).</p>

Table 3: Ventilator settings (continued)

Setting	Function/Details
Tidal Volume (V_T)	<p>Function: Sets the volume of gas delivered to the patient’s lungs during a mandatory VC or VC+ inspiration. For VC breaths, actual delivered volume is corrected for body temperature and pressure, saturated (BTPS) and to include breathing circuit compliance.</p> <p>Range: 2 to 315 mL.</p> <p>Resolution:</p> <p>0.1 mL for 2 to 5 mL. 1 mL for 5 to 100 mL. 5 mL for 100 to 400 mL.</p> <p>New Patient Value: the greater of 5 mL or $(7.25 \times \text{IBW})$.</p> <p>Accuracy:</p> <p>$\pm (4 \text{ mL} + 10\% \text{ of setting})$ for neonatal circuits $\geq 5 \text{ mL}$ $\pm (2 \text{ mL of setting})$ for tidal volumes of 3mL or 4 mL $\pm (1 \text{ mL of setting})$ for tidal volume of 2 mL</p>
<p>NOTE:</p> <p>Delivered (V_{TE}) accuracy is least at low tidal volumes. During ventilation of a test lung under various simulated conditions, the average volume delivered was 3.1 mL at a volume setting of 5 mL, with the following distribution:</p> <ul style="list-style-type: none"> • 68.2% of the delivered volumes were between 2.7 and 3.5 mL. • 95.5% of all volumes were between 2.3 and 3.9 mL. • 99.7% of all volumes were between 1.9 and 4.3 mL. • Only 0.3% were outside of the latter range. <p>Additional testing under simulated use conditions with a set V_{TE} of 2 mL gave the following results:</p> <ul style="list-style-type: none"> • The average volume delivered was 1.7 mL. • 72.9% of the delivered volumes were between 1.0 and 2.0 • 33.1% of the delivered volumes were between 1.5 and 2 mL • 99.91% of the delivered volumes were between 1.0 and 2.5 mL • Only 0.09% of the delivered volumes were outside of the latter range. 	

Table 3: Ventilator settings (continued)

Setting	Function/Details
Trigger type	Function: Determines whether breaths are triggered based on flow or pressure. See flow sensitivity. Range: Flow (\dot{V} -TRIG) only. New Patient Value: \dot{V} -TRIG
Vent type	Function: Allows user to select ventilation type Range: INVASIVE or NIV (non-invasive) New Patient Value: INVASIVE

Table 4: Alarm Settings

Setting	Function/Detail
<p>NOTE:</p> <ul style="list-style-type: none"> • Violation of a set alarm limit activates the applicable alarm condition. • If CPAP mode is chosen, any alarm limit that is indicated with “Not available if Mode is CPAP” means that the alarm sliders in the Alarm Setup screen are not available, and corresponding alarms are not detected or annunciated. • Alarm indicators may remain present even after a settings change that inactivates the alarm. 	
High circuit pressure limit (\bar{P}_{PEAK})	Function: Sets the maximum circuit pressure (relative to ambient) allowed during inspiration. Stops inspiration and begins exhalation. Range: 7 to 100 cmH ₂ O. Resolution: 1 cmH ₂ O. New Patient Value: 30 cmH ₂ O.

Table 4: Alarm Settings (continued)

Setting	Function/Detail
<p>High exhaled minute volume limit ($\uparrow\dot{V}_{E\text{TOT}}$)</p>	<p>Function: Sets the maximum exhaled minute volume limit (including mandatory and spontaneous breaths).</p> <p>Range: OFF <i>or</i> ≥ 0.10 L/min <i>and</i> $>$ low exhaled minute volume limit <i>and</i> ≤ 10 L/min.</p> <p>Not available if Mode is CPAP.</p> <p>Resolution: 0.005 L/min for 0.010 to 0.50 L/min. 0.05 L/min for 0.50 to 5.0 L/min. 0.5 L/min for 5.0 to 10.0 L/min</p> <p>New Patient Value: Based on IBW.</p>
<p>High exhaled tidal volume limit ($\uparrow V_{TE}$)</p>	<p>Function: Sets the maximum exhaled tidal volume limit for spontaneous or mandatory breaths.</p> <p>Range: OFF <i>or</i> $>$ low exhaled spontaneous tidal volume limit $>$ low exhaled mandatory tidal volume limit <i>and</i> 5 mL to 500 mL.</p> <p>Not available if Mode is CPAP.</p> <p>Resolution: 1 mL for 5 mL to 100 mL. 5 mL for 100 mL to 400 mL. 10 mL for 400 mL to 500 mL.</p> <p>New Patient Value: Based on IBW.</p>
<p>High respiratory rate limit ($\uparrow f_{TOT}$)</p>	<p>Function: Sets the maximum breath rate limit.</p> <p>Range: OFF <i>or</i> 10/min to 170 /min.</p> <p>Resolution: 1 /min.</p> <p>New Patient Value: OFF.</p>

Table 4: Alarm Settings (continued)

Setting	Function/Detail
High inspiratory time limit (\uparrow TI SPONT)	<p>Function: This setting determines maximum spontaneous inspiration time to be allowed during NIV, and it replaces the INSPIRATION TOO LONG alarm. Available in NIV only, when spontaneous breathing is possible. When the spontaneous inspiratory time equals or exceeds the (\uparrow TI SPONT) limit, the ventilator transitions to exhalation and displays a status message on the Upper GUI.</p> <p>Range: ≥ 0.2 s to New Patient Value s</p> <p>Resolution: 0.1 s</p> <p>New Patient Value: $1 + (0.1 \times \text{IBW})$ s rounded to nearest 0.1 s</p>
Low exhaled mandatory tidal volume limit (\downarrow V _{TE MAND})	<p>Function: Sets the minimum exhaled mandatory tidal volume limit.</p> <p>Range: OFF or ≥ 1 mL and $<$ high exhaled tidal volume limit and ≤ 300 mL</p> <p>Not available if Mode is CPAP.</p> <p>Resolution: 1 mL for 1 to 100 mL. 5 mL for 100 to 300 mL.</p> <p>New Patient Value: Based on IBW.</p>
Low exhaled minute volume limit (\downarrow V _{E TOT})	<p>Function: Sets the minimum exhaled minute volume limit for all breaths.</p> <p>Range: $<$ high exhaled minute volume limit and OFF or 0.01 L/min to 10 L/min.</p> <p>Not available if Mode is CPAP.</p> <p>Resolution: 0.005 L/min for 0.01 to 0.50 L/min. 0.05 L/min for 0.50 to 5.0 L/min. 0.5 L/min for 5.0 to 10.0 L/min.</p> <p>New Patient Value: Based on IBW.</p>

Table 4: Alarm Settings (continued)

Setting	Function/Detail	
Low exhaled spontaneous tidal volume limit ($\downarrow V_{TE\ SPONT}$)	Function: Sets the minimum exhaled spontaneous tidal volume limit. Range: OFF <i>or</i> ≥ 1 mL <i>and</i> $<$ high exhaled tidal volume limit <i>and</i> ≤ 300 mL. Not available if Mode is CPAP. Resolution: 1 mL for 1 to 100 mL. 5 mL for 100 to 300 mL New Patient Value: Based on IBW.	
Low circuit pressure ($\downarrow P_{PEAK}$)	Function: Sets the minimum circuit pressure limit. Active in NIV and VC+ If $\downarrow P_{PEAK}$ is not turned off, then changes to PEEP will cause the $\downarrow P_{PEAK}$ alarm limit to be recalculated. Range: for NIV: OFF <i>or</i> ≥ 0.5 cmH ₂ O to $< \bar{T}P_{PEAK}$ Resolution: 0.5 cmH ₂ O for PEEP < 20 cmH ₂ O 1.0 cmH ₂ O for PEEP ≥ 20 cmH ₂ O	
	For PEEP < 15 cmH₂O	For PEEP ≥ 15 cmH₂O
	Range for VC+: OFF or \geq PEEP + 5.5 cm H ₂ O New Patient Value (also applies to NIV): PEEP + 5.5 cm H ₂ O	Range for VC+: OFF or \geq PEEP + 6 cm H ₂ O New Patient Value (also applies to NIV): PEEP + 6 cm H ₂ O

Table 5: Monitored Data

Data	Function/Details
Exhaled tidal Volume (V_{TE})	<p>Function: The volume exhaled by the patient for the previous mandatory or spontaneous breath. The displayed value is corrected for body temperature and pressure, saturated (BTPS) and to include breathing circuit compliance. Updated at the beginning of the next inspiration.</p> <p>Range: 0 to 6000 mL.</p> <p>Not available if Mode is CPAP.</p> <p>Resolution:</p> <p>0.1 mL for 0.0 to 9.9 mL 1 mL for 10 to 6000 mL</p> <p>Accuracy:</p> <p>\pm (4 mL +10% of actual) for neonatal circuits.</p> <hr/> <p>NOTE:</p> <p>Exhaled tidal volume accuracy (V_{TE}) accuracy is least at low tidal volumes. During ventilation of a test lung under various simulated conditions, the average volume delivered was 1.25 mL at a volume setting of 2 mL, with the following distribution:</p> <ul style="list-style-type: none"> • 64% of the exhaled volumes were between 1.0 and 3.0 mL • 85.8% of the exhaled volumes were between 0.5 and 3.0 mL • 14.2% of the exhaled volumes were outside the latter range <hr/>

Table 5: Monitored Data

Data	Function/Details
Exhaled minute volume ($\dot{V}_{E\text{ TOT}}$)	<p>Function: A calculated total of the volumes exhaled by the patient for mandatory and spontaneous breaths for the previous 1-minute interval.</p> <p>Range: ≥ 0 L/min to < 99.9 L/min</p> <p>Not available if Mode is CPAP.</p> <p>Resolution: 0.01 L for minute volumes < 10.00 L/min 0.1 L for minute volumes ≥ 10.0 L/min</p>
Respiratory Mechanics C_{STAT} R_{STAT}	<p>Following an Inspiratory Pause Maneuver, if the C_{STAT} and R_{STAT} calculations are not shown in parentheses or there is no comment (see Section 14.12, Table 14-1 of the <i>Puritan Bennett 840 System Operator's and Technical Reference Manual</i>), the accuracy of displayed static compliance and resistance is as follows:</p> <p>Static compliance (C_{STAT}): $\pm (1 \text{ mL/cmH}_2\text{O} + 20\% \text{ of actual value})$</p> <p>Static resistance (R_{STAT}): $\pm (3 \text{ cmH}_2\text{O/L/s} + 20\% \text{ of actual value})$</p>

Table 6: IBW and patient length

IBW (rounded)	Length (rounded)
0.3 kg / 0.7 lb	26 cm / 10.25 in
0.4 kg / 0.9 lb	27 cm / 10.75 in
0.5 kg / 1.1 lb	28 cm / 11.00 in
0.6 kg / 1.3 lb	29 cm / 11.50 in
0.7 kg / 1.5 lb	30 cm / 11.75 in
0.8 kg / 1.8 lb	31 cm / 12.25 in
0.9 kg / 2.0 lb	32 cm / 12.50 in
1.0 kg / 2.2 lb	33 cm / 13.00 in
1.1 kg / 2.4 lb	34 cm / 13.50 in
1.2 kg / 2.6 lb	35 cm / 13.75 in
1.3 kg / 2.9 lb	36 cm / 14.25 in
1.4 kg / 3.1 lb	37 cm / 14.50 in
1.5 kg / 3.3 lb	38 cm / 15.00 in
1.6 kg / 3.5 lb	39 cm / 15.25 in
1.7 kg / 3.7 lb	40 cm / 15.75 in
1.8 kg / 4.0 lb	41 cm / 16.25 in
1.9 kg / 4.2 lb	42 cm / 16.50 in
2.0 kg / 4.4 lb	43 cm / 17.00 in

IBW (rounded)	Length (rounded)
2.2 kg / 4.9 lb	45 cm / 17.75 in
2.3 kg / 5.1 lb	46 cm / 18.00 in
2.4 kg / 5.3 lb	47 cm / 18.50 in
2.5 kg / 5.5 lb	48 cm / 19.00 in
2.6 kg / 5.7 lb	49 cm / 19.25 in
2.7 kg / 6.0 lb	50 cm / 19.75 in
2.8 kg / 6.2 lb	51 cm / 20.00 in
2.9 kg / 6.4 lb	52 cm / 20.50 in
3.0 kg / 6.6 lb	53 cm / 20.75 in
3.1 kg / 6.8 lb	54 cm / 21.25 in
3.2 kg / 7.1 lb	55 cm / 21.75 in
3.3 kg / 7.3 lb	56 cm / 22.00 in
3.4 kg / 7.5 lb	57 cm / 22.50 in
3.5 kg / 7.7 lb	58 cm / 22.75 in
3.6 kg / 7.9 lb	59 cm / 23.25 in
3.7 kg / 8.2 lb	60 cm / 23.50 in
3.8 kg / 8.4 lb	61 cm / 24.00 in
3.9 kg / 8.6 lb	62 cm / 24.50 in

Table 6: IBW and patient length (continued)

IBW (rounded)	Length (rounded)
2.1 kg / 4.6 lb	44 cm / 17.25 in
4.1 kg / 9.0 lb	64 cm / 25.25 in
4.2 kg / 9.3 lb	65 cm / 25.5 in
4.3 kg / 9.5 lb	
4.4 kg / 9.7 lb	
4.5 kg / 9.9 lb	
4.6 kg / 10.1 lb	
4.7 kg / 10.4 lb	
4.8 kg / 10.6 lb	
4.9 kg / 10.8 lb	
5.0 kg / 11.0 lb	
5.1 kg / 11.2 lb	
5.2 kg / 11.5 lb	
5.3 kg / 11.7 lb	
5.4 kg / 11.9 lb	
5.5 kg / 12.1 lb	
5.6 kg / 12.3 lb	
5.7 kg / 12.6 lb	

IBW (rounded)	Length (rounded)
4.0 kg / 8.8 lb	63 cm / 24.75 in
6.0 kg / 13.2 lb	
6.1 kg / 13.4 lb	
6.2 kg / 13.7 lb	
6.3 kg / 13.9 lb	
6.4 kg / 14.1 lb	
6.5 kg / 14.3 lb	
6.6 kg / 14.6 lb	
6.7 kg / 14.8 lb	
6.8 kg / 15.0 lb	
6.9 kg / 15.2 lb	
7.0 kg / 15.4 lb	

Table 6: IBW and patient length (continued)

IBW (rounded)	Length (rounded)
5.8 kg / 12.8 lb	
5.9 kg / 13.0 lb	

IBW (rounded)	Length (rounded)

Part numbers

Table 7 lists the parts and accessories for the NeoMode option shown in Figure 5.

Table 7: Ventilator parts and accessories

Item Number	Description	Part Number
1	Ventilator breathing circuit, neonatal, disposable (DAR)	307/6922
	Ventilator breathing circuit, neonatal, disposable, 4 feet (Allegiance Healthcare Corporation)	7441-4S2
2	Expiratory bacteria filter (DAR), disposable	DAR part number 351P19005 order part number 4-076408-00 (Box of 12)
3	Inspiratory bacteria filter, 22 mm ISO connectors, disposable (<i>D/Flex</i> , carton of 12)	4-074601-00
4	Mounting plate*	4-076405-00
5	Label, INCREASE O ₂ 2 min	10035957

*For information on cleaning and disinfection, follow the same instructions that are recommended for the ventilator exterior in the *Puritan Bennett 840 Ventilator System Operator's and Technical Reference Manual*. Autoclaving is not recommended.

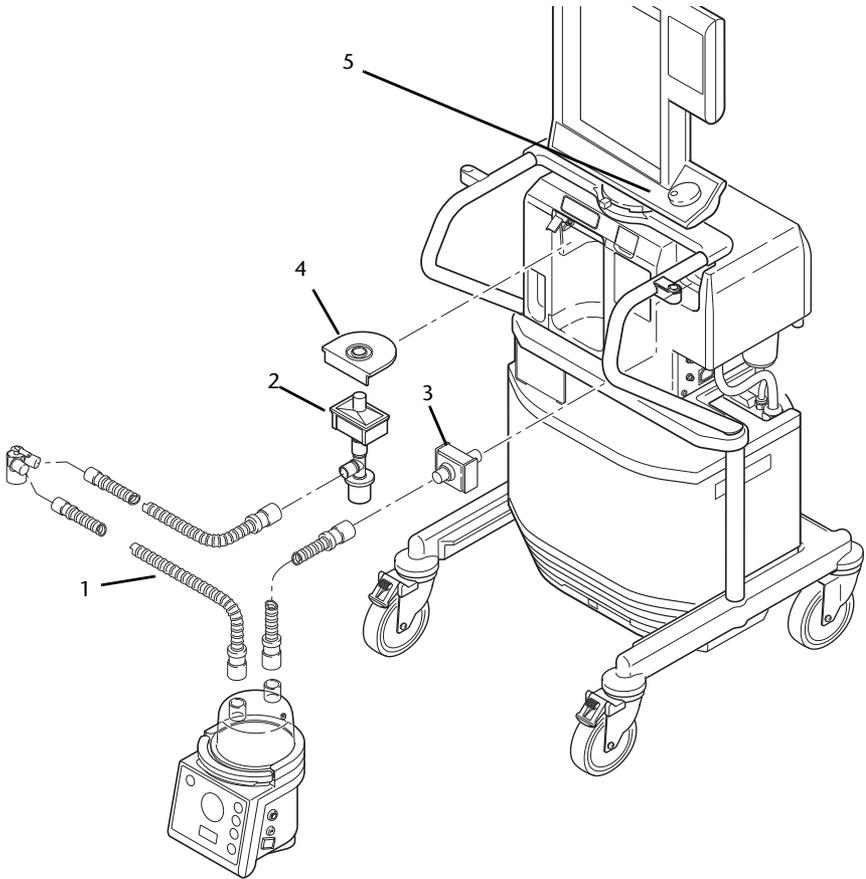


Figure 5. Ventilator accessories

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