HELP THEM BREATHE **MORE NATURALLY**

Technical Specifications

Puritan Bennett™ 980 Ventilator System

Compared to conventional mechanical ventilation (VC, VC+, PC, PS)

Medtronic
Further, Together

Puritan Bennett™ 980 Ventilator

Technical Specifications

The new Puritan Bennett™ 980 ventilator helps patients to breathe more naturally† through some of the most innovative breath delivery technology. Our simple, safe, and smart design helps provide more natural ventilation that may help improve patient comfort.[1]

PHYSICAL CHARACTERISTICS

Weight	113 lb (51.26 kg) including BDU, standard base, GUI and primary battery BDU only: 69 lb (31.3 kg)
Ventilator dimensions	12.5″ width x 11.5″ depth x 58″ height (32 cm width x 30 cm depth x 148 cm height) (including GUI screen)
Graphical user interface dimensions	15″ (38.1 cm) screen, rotates 170° and tilts up to 45° from vertical
A-weighted sound pressure level, ventilator	At a distance of one (1) meter, does not exceed 48 dBA at 5 L/min

Displayed units

Displayed weight units	Kilograms (kg) or pounds (lb) — user selectable
Displayed length units	Centimeters (cm) or inches (in) — user selectable
Pressure units	Hectopascal (hPa) or centimeters of water (cmH_2O) — user selectable

† Compared to conventional mechanical ventilation (VC, VC+, PC, PS)

Puritan Bennett™ 980 Pendant Ventilator

PENDANT CHARACTERISTICS

Pendant base dimensions	12.5" width x 11.5" depth x 43.5" height (32 cm width x 30 cm depth x 111 cm height)
Pendant base weight	76 lb (34.5 kg) including BDU, GUI and primary battery; BDU only: 60 lb (27.2 kg)
Graphical user interface dimensions	15" (38.1 cm) screen
Pendant graphical user interface weight	12.6 lb (5.7 kg)

COMPRESSOR CHARACTERISTICS

DC compressor

DC compressor base weight	89 lb (40.4 kg)
Battery	Ships with one lithium-ion one-hour battery

PNEUMATIC SPECIFICATIONS

Oxygen and air inlet supplies	Pressure: 241 to 600 kPa (35 psi to 87 psi) Flow: Maximum of 200 L/min
Gas mixing system	Up to 80 L/min for pediatric circuit type Up to 150 L/min for adult patients. Additional flow is available (peak flow to 200 L/min) for compliance compensation.
Maximum limited pressure ($P_{LIM\,max}$)	Limits circuit pressure to < 125 cmH_2O (123 hPa) at the patient wye
Maximum working pressure ($P_{W\,max}$)	$P_{W\,max}$ is ensured by the high pressure limit when P_I is 90 cmH_2O (88.26 hPa).

Measuring Devices

Pressure measurements	Type: Solid-state differential pressure transducer Sensing position: Inspiratory module, expiratory module
Flow and volume measurements	Type: Hot film anemometer Sensing position: Inspiratory module, expiratory module Type: Proximal flow sensor option utilizes differential pressure Sensing position: Patient wye
Oxygen measurement	Type: Galvanic cell Sensing position: Inspiratory module
Oxygen sensor life	Up to one year; operating life varies depending on oxygen usage and ambient temperature

Filtration Capabilities

Internal inspiratory filter bacterial/viral filtration efficiency	> 99.999%
Internal inspiratory filter particle filtration efficiency	>99.97% retention of particles 0.3 µm nominal at 100 L/min flow
Exhalation filter resistance (adult/pediatric, disposable)	<0.7 cmH_2O at 30 L/min (new) <0.35 cmH_2O at 15 L/min
Expiratory filter bacterial/viral filtration efficiency	> 99.999%
Exhalation filter particle filtration efficiency, pediatric/adult, disposable	Maximum of 0.03% penetration of particles 0.3 µm nominal at 30 L/min flow

Circuit Compliance and Resistance

Circuit compliance	Pediatric: 1.05 mL/cmH_2O to 9 mL/cmH_2O Adult: 1.05 mL/cmH_2O to 12 mL/cmH_2O
Inspiratory limb circuit resistance	Pediatric: 0.2 cmH_2O/L/s to 7.5 cmH_2O/L/s at 30 L/min Adult: 0.2 cmH_2O/L/s to 12.5 cmH_2O/L/s at 60 L/min
Expiratory limb circuit resistance	Pediatric: 0.2 cmH_2O to 7.5 cmH_2O at 30 L/min Adult: 0.2 cmH_2O to 12.5 cmH_2O at 60 L/min

ELECTRICAL SPECIFICATIONS

Electrical ratings without compressor	100 V ~, 50–60 Hz, 2.25 A 120 V ~, 50–60 Hz 1.5 A 220–240 V ~, 50–60 Hz, 0.75 A
Mains overcurrent release	CB1: 4 A CB2: 6 A
Earth leakage current	300 mA
Touch current	100 mA
Patient leakage current	100 mA maximum
Electrical ratings with DC compressor	100 V~, 50–60 Hz, 8.25 A 120 V~, 50–60 Hz, 6.0 A 220–240 V~, 50–60 Hz, 3.0 A

ENVIRONMENTAL SPECIFICATIONS

Temperature	Operation: 10°C to 40°C (50°F to 104°F) Storage: -20°C to 70°C (-68°F to 158°F)
Atmospheric pressure	Operation: 70 kPa to 106 kPa (10.15 psi to 15.37 psi) Storage: 50 kPa to 106 kPa (7.25 psi to 15.37 psi)
Altitude	Operation: -411.5 m to 3048 m (-1,350 ft to 10,000 ft) Storage: 6,096 m max (20,000 ft max)
Relative humidity	Operation: 10% to 95% non-condensing Storage: 10% to 95% non-condensing

SPECIFICATIONS

Parameter	Range	Overview
Predicted body weight (PBW)	3.5 kg (7.7 lb) to 150 kg (330 lb)	
Modes	Assist Control (A/C), Synchronized Intermittent Mandatory Ventilation (SIMV), Spontaneous (SPONT), BiLevel, Continuous Positive Airway Pressure (CPAP)	
Mandatory breath types	Volume Control (VC), Pressure Control (PC), and Volume Control Plus (VC+)	
Spontaneous breath types	Pressure Support (PS), Volume Support (VS), Tube Compensation (TC), and Proportional Assist™* Ventilation PAV™*+ software	
Ventilation type	Invasive and Noninvasive (NIV)	
Pressure support (P_{SUPP})	0 cmH_2O to 70 cmH_2O	
Rise time %	1% to 100%	
Expiratory sensitivity (E_{SENS})	1% to 80%; 1 L/min to 10 L/min with PAV™*+	
Tidal volume (V_T)	25 mL to 2,500 mL Resolution: 0.1 mL for values <5 mL; 1 mL for values 5 mL to 100 mL; 5 mL for values 100 mL to 395 mL; 10 mL for values ≥400 mL	
Respiratory rate (f)	1.0 1/min to 100 1/min 1.0 1/min to 150 1/min with Puritan Bennett™ 980 Universal ventilator	
Peak inspiratory flow ($\dot{V}_{MAX}$)	3 L/min to 150 L/min	Maximum rate of tidal volume delivery during mandatory volume-based breaths
Plateau time (T_{PL})	0.0 to 2.0 seconds	Amount of time inspiration is held in the patient's lungs after inspiratory flow ceases
Inspiratory pressure (P_I)	5 to 90 cmH_2O	Pressure above PEEP at which gas is delivered to the patient during mandatory PC breaths
Inspiratory time (T_I)	0.2 to 8.0 seconds	Time during which an inspiration is delivered to the patient
I:E ratio	1:299 to 149:1	Specifies the ratio of inspiratory time to expiratory time
Expiratory time (T_E)	≥ 0.20 seconds Resolution: 0.01 s	Time interval between the end of inspiration and beginning of the next inspiration
Trigger type	Pressure-triggering (P-TRIG) or flow-triggering ($\dot{V}$-TRIG)	Determines whether flow changes or pressure changes trigger patient breaths
Pressure sensitivity (P_{SENS})	0.1 cmH_2O to 20 cmH_2O	Determines the amount of pressure below PEEP required to begin a mandatory or spontaneous patient-initiated breath during pressure-triggered breaths
Flow sensitivity (V_{SENS})	0.2 L/min to 20 L/min	Determines volume of flow required to begin a mandatory or spontaneous patient-initiated breath
O_2%	21% to 100%	Percentage of delivered oxygen in the gas mixture

Parameter	Range	Overview
Positive end expiratory pressure (PEEP)	0 cmH_2O to 45 cmH_2O	The measured circuit pressure (referenced to the patient wye) at the end of the expiratory phase of a breath.
Apnea ventilation mandatory type	PC, VC	A safety mode of ventilation that starts if the patient does not receive a breath for an elapsed time exceeding the apnea interval.
Apnea peak inspiratory flow ($\dot{V}_{MAX}$)	3.0 L/min to 150 L/min	The maximum rate of tidal volume delivery during mandatory volume-based apnea breaths.
Apnea tidal volume (V_T)	25 mL to 2,500 mL	Sets the volume of gas delivered to the patient's lungs during a mandatory, volume-controlled apnea breath.
Apnea inspiratory pressure (P_I)	5 cmH_20 to 90-PEEP cmH_20	The pressure above PEEP at which gas is delivered to the patient during mandatory PC apnea breaths.
Apnea interval (T_A)	Apnea interval (TA) 10 to 60 seconds or Off in CPAP	The time after which the ventilator transitions to apnea ventilation.
Apnea respiratory rate (f_A)	2.0 1/min to 40 1/min and ≥60/T_A	Sets the number of volumeor pressure-based breaths per minute for ventilator initiated mandatory (VIM) apnea breaths.
Apnea O_2%	21% to 100% O_2	Determines the oxygen concentration in a standard mixture of air and oxygen.
Apnea I:E ratio	≤ 1.00:1	In PC breath types, specifies the ratio of apnea inspiratory time to apenea expiratory time.
Apnea inspiratory time (T_I)	0.20 to 8 seconds	Same as inspiratory time for non-apnea ventilation.
Apnea expiratory time (T_E)	0.20 to 59.8 seconds	For mandatory PC apnea breaths, the time interval between the end of inspiration and the beginning of the next inspiration.
Disconnect sensitivity (D_{SENS})	20% to 95% or Off (when Puritan Bennett™ ventilator with Leak Sync software is disabled); 1 L/min to 65 L/min (when Puritan Bennett™ ventilator with Leak Sync software is enabled)	The percentage of returned volume lost, above which the ventilator declares a circuit disconnect alarm when Leak Sync is not enabled or installed.
Humidification type	Heat-moisture exchanged (HME), non-heated expiratory tube, heated expiratory tube	The type of humidification system used on the ventilator.
Humidifier volume	100 mL to 1,000 mL	Empty fluid volume of the currently installed humidifier
Patient circuit type	Pediatric and adult	Specifies circuit for which compliance and resistance values during SST are calculated

ALARMS

Parameter	Range	Overview
Exhaled tidal volume	Low/high	
Exhaled minute volume	Low/high	
Inspired tidal volume	High	
Respiratory rate	High	
Circuit pressure	Low/high	
Apnea interval	10 to 60 seconds or Off in CPAP	

RESPIRATORY MANEUVERS

Parameter	Range	Overview
Negative inspiratory force (NIF)	≤ 0 cmH_2O to ≥ -50 cmH_2O	Negative pressure generated during a forced inspiratory effort against an obstructed airway
$P_{0.1}$	≥ -20 cmH_2O to 0 cmH_2O	Inspiratory depression of airway pressure after 100 ms of occlusion; $P_{0.1}$ is an indicator of respiratory drive
Vital capacity (VC)	0 mL to 6,000 mL	Maximum amount of air that can be exhaled after a maximum inhalation

ADVANCED DISPLAYED PATIENT DATA

Parameter	Range	Overview
% Leak	0% to 100%	Percentage of total delivered volume during inspiration attributed to the leak. Calculated as (leak volume during inspiration/total delivered inspiratory volume) x 100
Inspiratory leak volume (V_{Leak})	0 mL to 9,000 mL	The total volume delivered during inspiration to compensate for the leak
Leak	0 L/min to 200 L/min	Leak rate during exhalation at PEEP
Spontaneous rapid shallow breathing index (f/V_T)	0.1 1/min-L to 600 1/min-L	Calculated value using exhaled spontaneous tidal volume. High values generally indicate the patient is breathing rapidly but with low tidal volumes.
Dynamic resistance (R_{DYN})	0 $cmH_2O/L/s$ to 100 $cmH_2O/L/s$	Change in pressure per unit change in flow
Dynamic compliance (C_{DYN})	0 mL/cmH_2O to 200 mL/cmH_2O	Result of dividing the delivered tidal volume by the peak airway pressure
Inspiratory compliance (C_{20}/C)	0 to 1.00	Ratio of compliance of the last 20% of inspiration to the compliance of the entire inspiration

STANDARD PACKING LIST

The typical ventilator system ships with the items included below but can vary depending on the ventilator system purchased.

Quantity	Item
1	Graphical user interface
1	Breath delivery unit
1	Inspiratory filter, disposable
1	Expiratory filter, disposable (includes disposable condensate vial)
2	Gas hoses (air and oxygen)
1	Standard caster base
1	Power cord
1	Operator's manual CD
1	Puritan Bennett™ 980 series ventilator installation instructions
1	Flex arm
1	Drain bag
1	Gold standard circuit (for running EST)
1	EVQ, disposable (exhalation valve flow sensor)

PENDANT MOUNT PACKING LIST

Quantity	Item	Part Number
1	Graphical user interface (GUI)	
1	Breath delivery unit (BDU)	10092475
1	Universal base	10003861
1	Cable, 136 in (3.5m)	10123843

ORDERING INFORMATION

Standard Base Configuration	Part Number
Puritan Bennett™ 980 series ventilator kit ped/adult configuration, standard	980S1ENDIUUS
Puritan Bennett™ 980 series ventilator kit universal configuration, standard	980U1ENDIUUS

Pendant Base Configuration	Part Number
Puritan Bennett™ 980 series ventilator kit ped/adult configuration, pendant	980S2ENDIUUS
Puritan Bennett™ 980 series ventilator kit universal configuration, pendant	980U2ENDIUUS

DC Compressor Configuration	Part Number
Puritan Bennett™ 980 series ventilator kit ped/adult configuration, DC compressor	980S3ENDIUUS
Puritan Bennett™ 980 series ventilator kit universal configuration, DC compressor	980U3ENDIUUS

ACCESSORY PART NUMBERS

Standard Accessories	Part Number
Gold standard test circuit (tube assembly silic. 21L)	4-018506-00
Flex arm	4-032006-00
Oxygen hose assembly (United States, Latin America)	4-001474-00
Air hose assembly (United States, Latin America)	4-006541-00
Condensate vial	10063031
Power cord (North America)	10081056
Inspiratory bacterial filter	
Puritan Bennett™ inspiratory bacterial filter, disposable (D/Flex Filter, 22 mm ISO, box of 12)	4-074601-00
DAR™ mechanical filter, large (Sterivent™* filter, box of 12)	351U5856
Expiratory bacterial filter and collector vial	
Puritan Bennett™ pediatric-adult expiratory filtration system, disposable (carton of 12)	10043551
Puritan Bennett™ exhalation valve flow sensor, reprocessing kit (carton of 6)	10086048
Oxygen sensor	
Oxygen sensor	10097559
Operator's and technical manuals	
Puritan Bennett™ 980 Series Ventilator Operator's Manual (English)	10077893
Puritan Bennett™ 980 Series Ventilator Operator's Manual (CE Launch English)	10104514
Puritan Bennett™ 980 Series Ventilator Operator's Manual (Spanish)	10078065
Puritan Bennett™ 980 Series Ventilator Operator's Manual CD (International)	10087493
Puritan Bennett™ 980 Series Ventilator Operator's Manual CD (US English)	10126515
Service manual, English	10078090

Optional Accessories	Part Number
Rechargeable lithium-ion battery	10086042
Test lung	10005490
Humidifier bracket	10086049
Cylinder mount	10086050
Puritan Bennett™ wall air water trap	10086051
Adapter Plate (Trumpf)	10092430

Humidifiers and Breathing Circuits	Part Number
Reusable, adult, without heated wire	G-061208-SP
Reusable, pediatric, without heated wire	G-061223-00
Humidifier base	4-MR850-00

Drain Bag and Drain Bag Accessories	Part Number
Drain bag, disposable (package of 25)	4-048491-00
Drain bag tubing, disposable (package of 10)	4-048493-00
Clamp, reusable (package of 5)	4-048492-00
Drain cap	4-074613-00

Proximal Flow Options	Part Number
Host board (required for proximal flow option)	10084334
Proximal flow module hardware install kit	10084331
Proximal flow monitoring sensor, neonatal, with IFU and clips	10047078

Nebulizers	Part Number
Aeroneb™* Pro nebulizer	4-AP6000-US
Aeroneb™* Solo nebulizers (package of 10)	AG-AS3200
Aeroneb™* Solo convenience pack	AG-AS3350

1. Grasso S, Puntillo F, Mascia L, et al. Compensation for increase in respiratory workload during mechanical ventilation. Pressure-support versus proportional-assist ventilation. *Am J Respir Crit Care Med.* 2000;161(3 part 1):819-826.

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