Critical Care Ventilators
Critical Care Ventilators

• The ventilators in this category will be capable of handling all ICU patients safely and effectively.
Puritan Bennett PB840

- **Modes**
  - A/C, SIMV, PS, Bilevel
- **Mandatory Breath Type**
  - Volume (VC), Pressure (PC), PRVC (VC+)
  - NIV mode
- **Touchscreen and dial knob navigation**
- **Adult/Pediatric/Infant**
- **Inspiratory/Expiratory hold functions for Pplat and Intrinsic PEEP monitoring**
- **Pressure/Flow/Volume waveforms and Flow/Volume + Pressure/Volume loops**
- **External alarm and streaming capabilities**
Puritan Bennett PB980

- **Modes**
  - A/C, SIMV, PS, Bilevel

- **Mandatory Breath Type**
  - Volume (VC), Pressure (PC), PRVC (VC+)
  - NIV mode

- **Adult/Pediatric/Infant (>7 kg)**

- **Same as PB840 with additional monitor and patient safety features**
  - Multiple graph views (up to 5 can be displayed)
  - Adjustable patient data parameters (Default will look the same as the PB840)
  - Vt/IBW monitoring

- **External alarm and streaming capabilities**
Dräger Dura

- Modes
  - Volume control
  - Pressure control
  - CPAP/BIPAP
  - Support Ventilation
  - Combination Of Modes
  - Intermittent mandatory Ventilation
  - NIV is optional
- Delivers up to +35 of PEEP
- Delivers 21%-100% FiO2
- Inspiratory and Expiratory hold function to measure plateau pressure
- Visual waveform monitoring
- Simplified settings, knob dial
Dräger Evita/Evita XL

• Modes
  – IPPV
  – IPPVAssist/CMV
  – CMVAssist – SIMV
  – SIMV supp – MMV
  – MMV supp – BIPAP
  – BIPAP ASB
  – BIPAP1 Assist / PCV+
  – PCV + P supp
  – PCV+Assist – APRV – CPAP
  – CPAPASB / CPAP/P supp
  – CPAP/P supp – ILV

• Pressure/Flow/Volume waveforms and Flow/Volume + Pressure/Volume loops

• Plateau pressure monitoring
GE Carescape R860

- **Modes**
  - A/C, SIMV, PS, Bilevel, APRV
- **Mandatory Breath Type**
  - Volume (VC), Pressure (PC), PRVC (VC+)
  - NIV mode
- **Easy navigation interface via touchscreen and dial knob**
- **Optimal PEEP (software)**
- **FRC clinical support tool (software)**
- **Spirodynamics and transpulmonal pressure**
- **PEEP Titration and Vd/Vtt**
- **Up to 4 waveforms and loops may be displayed at the same time**
Nihon Koden NKV-550

• Indicated for continuous ventilation
• Specs available: [https://www.accessdata.fda.gov/cdrh_docs/pdf18/K181695.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf18/K181695.pdf)
• Adult/Pediatric/Neonatal
  - Assisted/Control Mandatory Ventilation (A/CMV), Synchronized Intermittent Mandatory Ventilation (SIMV) or Spontaneous Ventilation (SPONT)
• Lung Protection software
• PEEP recruitment software
Servo-I/Servo-S/Servo-U

- **Modes**
  - A/C, SIMV, PS, Bilevel
- **Mandatory Breath Type**
  - Volume (VC), Pressure (PC), PRVC (Similar to VC+)
  - NIV mode
- **Inspiratory/Expiratory hold functions for Pplat and Intrinsic PEEP monitoring**
- **Pressure/Flow/Volume waveforms and Flow/Volume + Pressure/Volume loops**
- **Adult/Pediatric/Infant**
- **Servo S is similar to Servo I with updated display but is not touchscreen (utilizes dial)**
- **Servo U is a touchscreen device**
Vyair Avea

- Modes
  - A/C, SIMV, PS
- Breath Types
  - VC, PC, PRVC, APRV (Bilevel)
- Pressure/Volume waveforms as well as Flow/Volume loops available
Vyaire Vela

- **Modes**
  - A/C, SIMV, PS

- **Breath Types**
  - VC, PC, PRVC, APRV (Bilevel)

- **Pressure/Volume waveforms as well as Flow/Volume loops available**
Anesthesia Machines

*Critical Care Capable*
Anesthesia Machines

• These machines, typically utilized by anesthesia in the operating room, are capable of ICU-level critical care ventilation.
• Monitoring capabilities vary based upon model.
GE Aisys CS

- Highest acuity model
- Similar to Aestiva, Aisys, and Avance
- B850 Patient Monitor
  - Critical care level
- Mode of ventilation will be SIMV PCV-VG
  - Synchronized Intermittent Mechanical Ventilation Pressure Controlled Ventilation Volume Guarantee
GE Avance/Avance CS²

- CS² is newest model
- Similar footprint to Aestiva, Aisys, and Aisys CS2
- B650 Patient Monitor
  - Critical care level
- Mode of ventilation will be SIMV PCV-VG
  - Synchronized Intermittent Mechanical Ventilation Pressure Controlled Ventilation Volume Guarantee
GE Aisys Carestation

- Similar footprint to Aestiva, Aisys CS2, and Avance
- Two possible monitors
  - B650: critical care level
  - B450: can be used for critical care monitoring, but there are limitations (3 leads instead of 5)
- Mode of ventilation will be SIMV PCV-VG
  - Synchronized Intermittent Mechanical Ventilation Pressure Controlled Ventilation Volume Guarantee
GE Carestation 650

- Smallest footprint
- Only at MSQ
- **B450 Patient Monitor**
  - Can be used for critical care monitoring, but there are limitations *(3 leads instead of 5)*
- Mode of ventilation will be **SIMV PCV-VG**
  - Synchronized Intermittent Mechanical Ventilation Pressure Controlled Ventilation Volume Guarantee
GE Aestiva 3000 Carestation

- Similar footprint to Aisys, Aisys CS2, and Avance
- Two possible monitors
  - **B650**: critical care level
  - **B450**: can be used for critical care monitoring, but there are limitations (3 leads instead of 5)
- Modes
  - PC, VC, SIMV, PSV Pro
Dräger Fabius GS/GS Premium

- Similar footprints
- Highest acuity model
- Requires external monitor
  - Philips MP-50s, MP-70s or MP-90s
  - All are critical care level
- Mode of ventilation
  - SIMV + PCIMV
Dräger Tiro

• Smaller footprint than Fabius
• Requires external monitor
  – Philips MP-50s, MP-70s or MP-90s
  – All are critical care level
• Mode of ventilation
  – SIMV + PCIMV
Narkomed GS

• Requires external monitor
  – Philips, GE or others
  – All are critical care level

• Mode of ventilation
  – VC only
Penlon SP2

- Requires external monitor
  - Philips, GE or others
  - All are critical care level

- Modes of ventilation
  - PCV, PSV, SIMV, SMMV
Critical Care Capable
Critical Care Capable

• These ventilator devices can be used to support critical care ventilation if necessary.
• These have the capability of handling critical care patients but would not be considered ideal.
LTV 1000/LTV 1200

- Ideal for chronic ventilator patients but can be used in the critical care setting on patients with minimal ventilator requirements
- Modes – A/C, Spontaneous
- Mandatory breath type – PC, VC
- Lacks graphics and waveforms, only displays numerical data
- **LTV 1000**: PEEP valve must be added
Versamed iVent

- Typically used in LTACH or home setting but can be utilized as a critical care vent with limited settings options
- Modes – A/C, SIMV, Spontaneous
- Breath Type – VC, PC, PS
- Adaptive flow and I-time
- Waveform and loops available
- Audible and visual alarms
- MRI Conditional
Transport Ventilators
Transport Ventilators

• These ventilators are currently being used as transport ventilators or being utilized for mobility purposes.

• These have the capability of handling critical care patients but would not be considered ideal.

• They all lack graphical data and have limited alarm and monitoring functions.
Carefusion Revel

- Battery powered or DC power outlet
- Mode – A/C, SIMV, Spontaneous
- Breath type – VC, PC, PRVC, PS
- Airway pressure manometer (Numerical and LED indicator)
- LED patient data display (Vt, VE, PIP, PEEP)
- Docking station or maybe taken off docking for transport
- FiO2 21%-100%
- Audible alarms – PIP, Ve, RR
Pneupac Parapac and Parapac Plus 310

- Pneumatically powered via high pressure O2 source (tank or wall)
- Single limb circuit, utilizes and exhalation valve
- CMV VC mode (Parapac Plus has CPAP mode)
- PEEP
  - Parapac - utilizes a PEEP valve
  - Parapac Plus – has built in PEEP via pressure line which can be dialed in (Max 20 CmH2o)
- PIP manometer gauge
- Audible high PIP alarms (can be difficult to hear from outside the room)
Sub-Acute Ventilators
• Ideally, these ventilators are meant for patients who are chronic ventilator patients or patients with lower ventilator requirements.
  – PEEP < 8 CmH2O, FiO2 < 50%, Stable PIP

• These ventilators may be used in the acute care settings however have **limited monitoring capabilities.**
  – No graphics, non streaming, does not have external alarm capabilities
Trilogy EVO/100/200

• Typically used as a home ventilator
• Modes
  – A/C
  – SIMV
  – AVAPS-AE
  – NIV
• Mandatory Breath
  – PC/VC
  – SIMV-PS
• Normally does not have a 50 PSI connection
• Must have O2 bleed in from a flow meter
Phillips V60 (Invasive Mode)

- Intended for spontaneously breathing patients who require assisted ventilation
- Requires different adapters to connect to either trach or ETT
- Mode of ventilation: PCV
- Single limb circuit with bi-directional flow
Dräger Carina

- Similar capabilities as the Phillips V60
- Primarily designed for non-invasive usage
- May be capable of being is as invasive ventilator via PC
Disposable Ventilator
Vortran Go2

- Single patient use
- Flow powered
- PC or PS breaths
- PIP and PEEP monitoring
- 50 cmH2o pop off valve (safety valve)
- 100% and 50% FiO2
- One way valve allows additional flow for spontaneously breathing patients
- Comes in three pieces
  - Tee piece (patient connection)
  - Pressure manometer
  - Modulator (2 dials, pressure and respiratory rate)
- MRI Conditional
CPAP/BIPAP
Possible Invasive Capabilities
• Depending on software, these may be capable of being used as an invasive ventilator.
Resmed S9

- Primarily designed for home use
- Preferred system for OSA
- Has IVAPS and ST with backup rate which may be able to utilized in invasive mode (testing in progress)
- Vt / RR readings
- Capable of streaming with additional hardware
- Lacks audible alarms