TV-100 Study Guide

Batteries: 2 Lithium Ion hot swappable batteries

- Will last at least 7-8 hours with both batteries fully charged.
- If fully depleted will take approximately 8 hours to charge fully.
- Batteries will charge whenever unit is plugged in to an external power source.
- Charge time will take longer if unit is running.
- To change battery while running, only remove one battery at a time (unless the unit is plugged into an external power source)
- Batteries have a gauge to denote their charge level. This is represented by 5 bars on the end of the battery, where each bar represents approximately 20% of charge

Startup: Push power button on front of unit

- Choose either New Patient or Previous Patient.
    - Previous patient will bring up the mode and settings the vent was using when the vent was previously shut down.
    - New Patient will bring up default settings for every mode and patient size.
- Unless you choose Previous Patient, you must select the patient size that you intend to use the vent with (Neonatal, Pediatric or Adult).
- Upon selecting the Patient size, the corresponding disposable circuit type will be preselected. If you intend to use a non-disposable circuit or another brand circuit, you must choose it, or choose "Other" after opening the circuit drop down menu.
    - Neonatal circuit is 10mm in diameter (or 3/8")
    - Pediatric circuit is 15 mm in diameter
    - Adult circuit is 22 mm in diameter
- If "Other" is selected, the user should proceed to the Tools Menu and perform a Leak Test followed by a Compliance Test.
- The Compliance factor of the Bio-Med Devices circuits will automatically be entered when the circuit is selected.
- The correct pneumotach (Flow Sensor) must be used for the patient size selected. There are two choices:
    - Neonatal (2-100 ml)
    - Pediatric/Adult (50-2000 ml)
        - If the incorrect pnuemotach is installed, an error message will be displayed and the vent will not proceed to the Parameters screen until this is corrected.

Note: The vent CAN be used without a pneumotach, but the following information will not be displayed:

- Patient's measured exhaled tidal volume or minute volume
- Volume or Flow wave forms
- Neither of the loops: Volume/Pressure or Flow/Volume

Parameters/Modes

- On the Parameters screen, Once the desired mode is selected, all of the parameters associated with that particular mode will be presented.
- Select each parameter and either change the number displayed by using the up or down arrow keys, or enter the number directly. Select OK when the correct value has been displayed.
    - In many cases, the high and low alarm limits can be adjusted while the settings are being entered by touching the high or low number. The green box around the number indicates which value will be changed.
- Verify proper alarm settings values on the Alarm Screen prior to starting ventilation.
    - The Start Ventilation key can be found on either the Parameters screen or the Main screen.

Setup Assistant: If Setup Assistant is chosen on the Main screen the user will be given two options in the Adult mode:

- Basic Setup (not available in Neonatal or Pediatric modes): The user will be prompted to enter the sex of the patient, and the height of the patient.
    - This will automatically calculate a SET tidal volume of 7 ml/kg using the ideal body weight formula.
    - When Continue is selected, the vent will continue to the Volume-AC Mode with preselected values. At this point ventilation can be started, or any of the parameters can be modified prior to starting ventilation.
- Advanced Setup: Rather than having all the parameters and settings displayed on the screen for the user to set. The Advanced Setup will present each parameter (starting with Mode) for the user to set. The user can accept the displayed value by choosing NEXT, or change each value by selecting the parameter.
    - Once each parameter has been visited, the user will be presented with the CONTINUE key.
    - At this point the user can start ventilation. (Alarm parameters should be set prior to starting ventilation).

PRVC Mode (Pressure Regulated Volume Control…also known as Volume Guarantee)

- In this mode, the vent will regulate pressure up or down to achieve a SET tidal volume.
- Pressure will be increased by up to 3 cm at a time in the peds or adult mode and 1 cm in the neonatal mode.
  Note: It is important that the High Peak pressure alarm is set such that the Set volume is delivered.
- PRVC Alarm will be activated if the pressure reaches 5 cm or less below the High Pressure Alarm setting. This allows the user to make a decision whether to increase the pressure limit or decrease the Set volume to reduce pressures. (The purpose for this is to alert the caregiver when pressures are approaching the high limit so they can better make a decision on what to do. Many other ventilators will simply limit the breath at 5 or even 10 cm below the Set high pressure limit.)
- If the High Peak pressure limit is reached breath/volume will be limited at that point.

  Note: It is important to have a minimal to no leak around the ET tube in order for PRVC to function appropriately.

- When PRVC is initiated, a volume test breath will be delivered. Subsequent breaths will be delivered using pressure regulated breaths.

NIV Mode – The settings in this mode are very versatile and can be used in many ways

- A mandatory rate and inspiratory time can be set or can be turned off for a totally spontaneous mode.
- IPAP setting is set as a traditional BiPap setting where the pressure setting is relative to 0.
- CPAP can be achieved by setting the IPAP and EPAP levels to the same value.
- If the pneumotach is used, exhaled tidal volumes can be measured and flow cycling can be enabled.
    - Flow cycling (with settings from 5-70%) allows the patient the ability to cycle the vent into exhalation when the peak flow falls to a certain percentage.
- Apnea backup can be disabled by turning the backup rate to OFF.
- If vent goes into apnea ventilation it will alarm and remain in apnea ventilation until the user exits apnea ventilation from the parameters screen.

Note: In order for the vent to update the measured EPAP level it must see a patient effort or the vent must cycle.

- Infant nasal CPAP or BiPap with a mask or prongs can be used as long as the vent is able to detect the patient's inspiratory effort.

HFNC Mode (High Flow Nasal Cannula)-Peds/Adult

- This mode allows a flow to be delivered for a high flow nasal cannula system, low flow cannula or a resuscitation bag.
- For this mode, tubing will only be connected to the 22 mm vent output port. Nothing should be connected to the pressure line port or the exhalation valve line port.
- The max flow for pediatric and adult is 60 lpm.

nCPAP/HFNC Mode – Neonatal Mode

- For Infant HFNC, use as above and adjust flow as desired between 1-20 lpm.
- For nCPAP Mode, connect an infant circuit normally and switch the control variable to pressure.
- Adjust Set pressure to desired CPAP level.

Alarm Silence

- The alarm silence button is located next to the power button.
- If the alarm silence button is depressed prior to any active alarm sounding, all alarms will be silenced for 2 minutes, or until alarm button is pressed again (thus cancelling the alarm silence).
- If the alarm silence button is pressed in response to an alarm, the alarm will be silenced for 2 minutes unless an additional alarm is triggered. If so, alarm will sound for the new violation.

Standby & Powering OFF Ventilator

- The ventilator is in the Standby Mode after Startup, or whenever ventilation is stopped (using key on the Main Menu or the Parameters Menu.

Note: A popup menu will always ask the user to confirm whether they want to start or stop ventilation

- Powering OFF ventilator:
    - Hold Power button for at least 2 seconds.
    - Confirm that you want to Power off ventilator.
    - You do not have to stop ventilation prior to powering off ventilator.

Pre-Ox Key

- In neonatal mode, if the Pre-Ox button is pressed, the oxygen level will be increased 10 points over its current setting for 60 seconds (ie: If the oxygen level is set to 31%, pressing the Pre-Ox key will increase the oxygen level to 41% for 60 seconds).
- The Pre-Ox text will appear green when Pre-Ox is active.
- If the Pre-Ox Key is pressed again, before the end of 60 seconds, the increase will be cancelled and the oxygen level will revert to the Set level.
- In Peds and Adult Modes, Pre-Ox will increase the oxygen level to 100% for 60 seconds, or until the key is pressed again.

Main Screen and Graphics Screen Modifications

- The user can manipulate the screen as follows: By pressing the Page Layout key, the user can decide which of the wave forms are displayed on the main screen: Flow/Pressure, Volume/Pressure, or Flow/Volume.
- The user can also decide whether the pressure bar graph is scaled from 0-60 cm or 0-120 cm.
- The amplitude of the wave forms can be adjusted by pressing the +/- key and then adjusting the + or – on the respective wave forms (easiest way to think of it: + will make the wave form larger by making the scale smaller, and – will make the wave form smaller by making the scale larger.
- The speed of the wave form can be adjusted by pressing the +/- key then as follows: The key with the single wave form will make the wave form faster (less cycles can fit). And the key with the multiple wave forms will make the wave form slower (more cycles can fit).
- On the Graphics screen all three wave forms are displayed and can be scaled as previously mentioned.
- Loops: Pressure/Volume or Flow/Volume can alternatively be displayed instead of wave forms by pressing the appropriate key.

General

- Any time a parameter or alarm parameter is changed over 30%, a warning screen appears. You must acknowledge this screen to proceed. This is to help assure the correct settings are being applied and encourages the user to think about larger changes.

Inspiratory Hold & Expiratory Hold

- When the Exp Hold key is pressed an expiratory pause will be added to the end of the next mandatory breath and a resulting Auto Peep value will be displayed on the Lung Mechanics screen for 10 seconds.
- The Insp Hold key can function in two different manners:
    - A quick press and release of the Insp Hold key will result in an Insp Pause to be added to the next mandatory breath. A static compliance value will be calculated and displayed for 10 seconds on the Lung Mechanics screen. If the breath is a volume breath, the plateau pressure value will also be displayed
    - The Insp Hold key can also be used to provide an extended inspiratory hold maneuver at the end of the next breath. The hold can be up to a maximum of 15 seconds. If the user continues to hold the key past 15 seconds the vent will automatically cycle into exhalation after 15 seconds.
        - The Insp Hold button will be unavailable for 20 seconds after an Insp Hold of any length is initiated.

Loss of Oxygen

- If the vent is connected to oxygen and an oxygen percentage above 21% is Set, and the oxygen supply either runs out or is disconnected, an alarm will sound with a message saying “Invalid Oxygen Pressure”. This alarm can be cleared, but will continue to alarm every 30 seconds, until either the oxygen source is restored, or the oxygen setting is set to 21%.