

## **Bio-Med Devices Crossvent 2i+ Competency**

- 1) How long will the vent run on battery power? How long will it take to fully charge?
- 2) Why is it important to turn the “MAX PRESSURE” and “PEEP” knobs to their minimum settings?
- 3) What is the proper method of using the touch screen controls?
- 4) How can you control the backlight when operating the vent on the battery?
- 5) When setting up the vent to deliver volume ventilation, it is important to set what correctly to insure the set tidal volume is being delivered?
- 6) How should the pneumotach be installed in order to measure exhaled tidal volume?
- 7) When I get an alarm condition, why can't I go to another screen?
- 8) I noticed that the tidal volume setting changes as flow is changed. Is it possible to fix tidal volume so it doesn't vary when flow is changed?
- 9) How can I use the vent in the same way I used the MVP-10?

## CV2i Answers and Explanations

- 1) A fully charged and properly conditioned battery can last up to 2 hours and 45 minutes. If the backlight is turned off this time can be increased up to 5 ½ hours...If an alarm condition is met while the backlight is off, the backlight turns on immediately and the alarm screen is displayed. The battery is NiMH and does not develop a memory, so it is **not** necessary to deep cycle the battery. It takes about 2½ hours to fully charge a fully depleted battery. Charging time will be less if it is not fully depleted.
- 2) Even when the power is off, if the vent is connected to a gas source, gas can bleed off if the “MAX PRESS” and “PEEP” knobs are not set to the minimum setting. Since the vent is usually connected to the blender in a built-in incubator application, in a case where you turned on the gas source but only used the flow meter attached to the blender, you could actually use more gas with the ventilator. If the vent is only connected to a gas source when it is being used, this is not an issue. When the vent is first turned on, two of the first knobs that would normally be adjusted are the MAX PRESS and the PEEP knobs. It doesn't matter what position the FLOW knob is in, since when the power is off, the flow knob positioning has no bearing on any gas bleed.
- 3) Since the screen works by detecting point pressure, it's best **not** to use a flat surface (like the pad of your finger). The back of the fingernail works best. You could even use a Palm Pilot stylus. Keep in mind that every part of the screen is not controlled by the touch screen: some areas only display information, rather than a parameter that can be changed. Example: Touching “FLOW” on the screen will not produce “reverse video” and allow one to change the flow. The flow level will change as the flow knob is turned. Since the color screen is more sensitive, using your fingernail is less important than in previous monochrome screen versions.
- 4) By default, the backlight will remain on all the time (whether the vent is running on external power or the internal battery). The backlight can be manually turned off by pressing and holding along the pressure bar graph on the left side of the screen and holding for 3 seconds until the second beep sounds. Turning off the backlight can double the battery life. When an alarm condition is met, the backlight will turn back on immediately. The backlight can also be turned on by pressing once anywhere on the screen.
- 5) If the MAX PRESSURE knob is set too low, it is possible for the vent to pressure limit before the set tidal volume is delivered. The peak pressure high limit alarm can be set to provide a safety pop off at a desired safety level.
- 6) When the pneumotach is attached to the vent, the tubing with the white line should always be connected to the blue port (patient prox) on the vent. This places the white line in the correct proximal position to the patient. When the vent is switched to the Flow Trigger mode, tidal volume measurement is automatically turned on. In February of 2010 a software update was developed to allow for very accurate measurements of tidal volume down to 2.0 ml tidal volumes. It is even

fairly accurate below this. As a safeguard to ensure that users are using the vent correctly, the exhaled tidal volume measurement can no longer be “turned OFF”. If a pneumotach is not placed in line with the circuit in the Flow Trigger mode the low tidal volume alarm will sound. Therefore when using the Flow Trigger mode, you must also use the pneumotach. In addition to measuring volumes, the pneumotach also acts as the flow sensor for patient triggering.

- 7) The alarm condition brings you to the alarm screen so that you will know immediately what alarm condition has been met. Once the alarm condition is no longer present, you are free to proceed to another menu. Go to another menu without correcting the alarm condition, simply press the ALARM QUIET key and proceed to whatever screen you desire.
- 8) Although you can switch the parameters so that tidal volume is controlled by the arrow keys and Inspiratory Time varies with flow, it is NOT necessary to do this to provide volume ventilation. In fact most people would prefer to fix the Inspiratory Time. In the event that you are providing pressure limited ventilation, the TV value has no real bearing since you are choosing to pressure limit each breath. To provide volume ventilation, simply turn up the MAX PRESS knob so the vent is volume limiting instead of pressure limiting. The exhaled tidal volume can then be controlled by adjusting the FLOW knob up or down accordingly while observing the exhaled tidal volume reading on the ALARM 1 screen. If tidal volume is selected to be controlled by the arrow keys, any change of the tidal volume setting will also change the Inspiratory time. The flow will then need to be readjusted to provide the correct Inspiratory Time. The exhaled tidal volume will need to be checked, and then adjustment may need to be made all over again. It is much easier to fix the Inspiratory Time, and use one knob (FLOW) to adjust the tidal volume setting. Note: Generally the set tidal volume on the MAIN screen will be higher than the actual exhaled tidal volume as measured by the pneumotach due to the loss of volume due to the tubing compliance of the circuit and the compliance of the lung.
- 9) By turning CONSTANT FLOW ON on the MAIN menu, the vent can be used just like the MVP-10 with the added convenience of built-in alarms. Be aware however, when constant flow is ON, the patient can no longer “trigger” the vent and modes like Assist Control and SIMV are no longer available. You will not be able to measure exhaled tidal volume in the CONSTANT FLOW mode. Even though patient triggered ventilation (Assist Control or SIMV) is the mode of choice for most level 3 NICU’s, it may be preferable to match settings at the referral hospital if the patient is doing well, rather than to make a change on transport that may require a longer stay at the referral facility.