



**RankenJordan**  
PEDIATRIC BRIDGE HOSPITAL

# Quick Reference: Astral Ventilator

## What is a Ventilator?

A ventilator is a machine that provides either full or partial breathing support to your child. The amount of support will vary with each condition.

The Respiratory Therapist may adjust the ventilator settings for the following reasons:

- Weaning (decreasing settings) as the lungs improve.
- Increasing settings like Pressure or Volume, if your child is becoming ill (pneumonia, tracheitis)
- Fine tuning to improve synchrony with the ventilator.

## Why is the ventilator that my child uses at home different than the one they used in the Intensive Care Unit (ICU)?

The home ventilator like the Astral is meant to be easily portable unlike most traditional ventilators that you may have seen in the ICU.

## Will my child always require a ventilator?

Unfortunately, every child's diagnosis and prognosis are different to accurately answer this question. Please consult with your Doctor for further information.



### Astral Links:

[ResMed \(seismic.com\)](http://seismic.com)

[astral-mob-slimfit-bag\\_user-guide\\_glo\\_mul.pdf \(resmed.com\)](#)

### Astral Manual:

[astral-100-150\\_user-guide\\_amer\\_eng.pdf \(resmed.com\)](#)

### Video: Overview, Setup, and Screen Display:

[5 Steps to Setup \(brightcove.net\)](#)

Things to take in consideration:

- Be patient. When on the ventilator the muscles become weaker, and weaning can take a very long time because of this. Think of it as training for a marathon, you would not just get off the couch and run over 26 miles one day. If you did, you are not human. To train for such an event you would start small, this is the same for weaning the ventilator.
- Be a learner. The more knowledge you have of the ventilator the more comfortable you will be in taking care of your child in emergency situations. Ask questions, read this material, and most importantly keep learning.
- Be organized. Make checklists, schedules, organize your equipment at home. It will help!
- Be proud. Being a caregiver is not easy. You will have great days and you will have tougher days. Keep the good vibes going. We are very proud of you!

What do the numbers mean?

- **Inspiratory Pressure/PIP**- The amount of force it takes to deliver a breath to the lungs (typically we want to keep this < 35 cwp to avoid damaging the lungs)
- **RR** – Respiratory Rate, how fast your child is breathing (be sure to know your child's baseline RR before going home)
- **Vte** - Tidal Volume Exhaled, amount of volume exhaled each breath (this can be visually seen with chest rise)

**Target Vte is based on age and weight.**

- Low birth weight infants- 4-6 ml/kg
- Term infants- 4-8 ml/kg
- Children- 6-10 ml/kg

**Example:** You have a 1-year-old child, and they weigh 9kg or 20lbs (lb/2.2 = kg). Their target range would be 4-8 ml/kg (9kg x 4ml = 36ml, 9kg x 8ml = 72ml), so their ideal Vte range would be between 36ml – 72ml.

- **Pressure Support/PS**- Provides extra support when spontaneously breathing, typically used for weaning off the ventilator.
- **PEEP**- Positive End Expiratory Pressure, is used to prevent airway collapsing after exhaling (helps keep the lungs open)
- **Leak**- Amount of volume leaking from the circuit, because of the whisper swivel (allows for exhalation) there will always be a leak, generally this will be between <40ml.
- **I:E Ratio**- amount of time inhaling compared to the amount of time exhaling, typically between 1:2 -1:4.
- **Peak Flow/PIF**- The rate at which gas is delivered during inhalation.
- **MAP**- Mean Airway Pressure, the average pressure in the lungs, this number is typically between 9-12 cwp.
- **MinVent/Ve**- Minute Ventilation, this value considers how much volume you inhale every minute. This value will change depending on the patients target Tidal Volume (as seen above).

## Possible Causes



Temp probe dislodgment, (most common cause)



Reconnect temp probe and push reset on the ventilator to get rid of the alarms.



Trach dislodgment may cause the ventilator to alarm circuit disconnect (always check to see if the trach is in first when troubleshooting)



It is possible that your child may detach the trach pilot balloon by pulling or biting. If this happens, you must remove the trach and insert a new one.

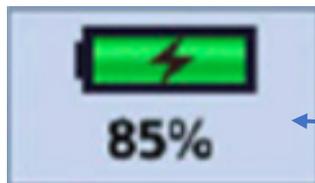
## Alarms



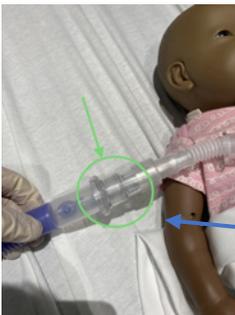
### Alarms:

**Low** inspiratory pressure (PIP), Tidal Volume (V<sub>t</sub>), Respiratory Rate (RR), Minute Ventilation (V<sub>e</sub>) usually means that there is a **leak** somewhere in the circuit. (see images on left for possible causes)

Low internal battery Alarm displayed.



Make sure the ventilator's power cord is attached appropriately to an outlet. You should see the charging symbol.

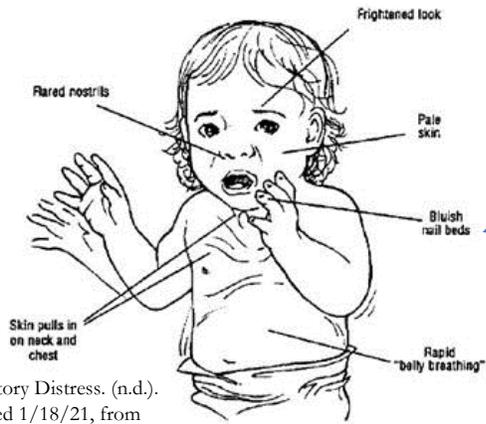


Whisper Swivel is clogged with secretions, do not throw away! Replace with a new or clean swivel and clean the dirty one.



Vent Circuit has too much "rainout" or condensation in the tubing causing an obstruction to flow. Drain the circuit back into the heater chamber.





Respiratory Distress. (n.d.). Retrieved 1/18/21, from <https://www.nationwidechildrens.org/conditions/respiratory-distress>.

High Tidal Volume (V<sub>t</sub>), High Minute Ventilation (V<sub>e</sub>) Alarm displayed.

Alarm priority		Alarm bar	Audible alert
High		Red flashing light	10 beeps every 5 seconds
Medium		Yellow flashing light	3 beeps every 15 seconds
Low		Yellow steady	2 beeps every 25 seconds

Your child is working harder to breathe. Make sure the trach is in, suction, or disconnect from ventilator and start bagging and investigate further.



High Pressure Alarm displayed.

Make sure the trach is in! If in, try suctioning.

If suctioning does not work:

- Could you pass the suction catheter? If not, remove the trach and place a new one in (could be plugged)!
- Look for kinks in the ventilator circuit/trach tube.
- Is your child coughing?
- Is there water in the circuit?
- Do they need a breathing treatment?

Alarm State:

- No light – No active alarms
- Steady Light - Active alarms
- Flashing Light – Alarm mute ON



If struggling to find the cause of the Ventilator Alarm and your child is in distress, use the resuscitator bag and call 911!





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# Preparing for Transport: Astral

Items needed for travel while on an Astral Vent:

1. Travel Case
2. Astral Vent with battery attached and charged.
3. Power Cord
4. Filter
5. Ventilator Circuit
6. Whisper Swivel
7. Step Up Adapter
8. Omni-flex (accordion)
9. HME
10. Suction (inline)
11. Oxygen Tubing

Other:

-See Essential Items to Have When Traveling handout.



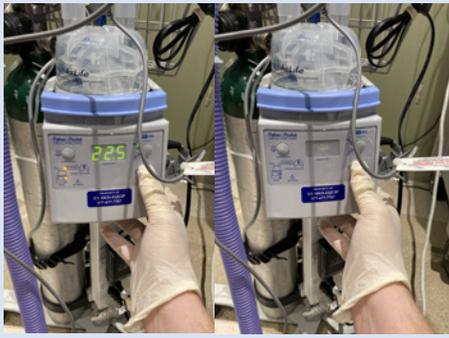
Mobility Bag

SlimFit Mobility Bag



Grab the ventilator HME. Next, disconnect between the omni-flex and step-up adaptor.

Connect the HME adaptor with the words facing towards the ventilator. If at first it does not connect, try flipping the HME over to the other side.



Turn off the heater by holding down on the power button (bottom right button) for around 1-2 sec.



Disconnect the "pigtail" connector on the back of the ventilator circuit on the humidifier.



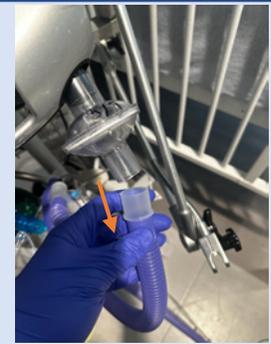
Disconnect the temp probe and place the purple cap in its original place.



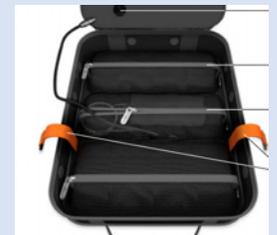
Next, disconnect the other temp probe connection by the heater/humidifier. After doing so, place the purple cap in its original place.



Unplug the temp probe that is attached to the heater, ravel it up, and keep close. Before connecting the temp probes again, be sure to clean it off with alcohol wipes.



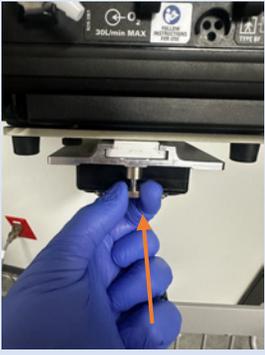
On the bottom of the ventilator, disconnect the "short" tubing between the bacterial filter and circuit.



Next, QUICKLY disconnect the "long" tubing from the humidifier and connect it directly to the bacterial filter on the bottom of ventilator.

To keep the circuit/humidifier clean while not in use connect the "short" ventilator tubing directly to the humidifier.

Grab your Astral travel case.



While pulling release, lift ventilator straight up to remove from bracket.



\*If on oxygen disconnect the tubing before placing the ventilator into the case.



Unclip the retention straps (Mobility Bag). Place ventilator into the carrying case and reconnect the oxygen tubing (if applicable).



Place the Astral power supply unit into the center pocket. Clip the retention straps and tighten. Zip up the carrying case.



Fasten the flaps under the handle of the Astral and secure in place using the VELCRO strip.



If on oxygen, connect the tubing into your portable oxygen tank. You are all ready to go!

When arriving back home, reverse the steps above from last to first.