

# **NIPPY Junior + Ventilator**

## **Information and User Guide for Qualified Healthcare Professionals**



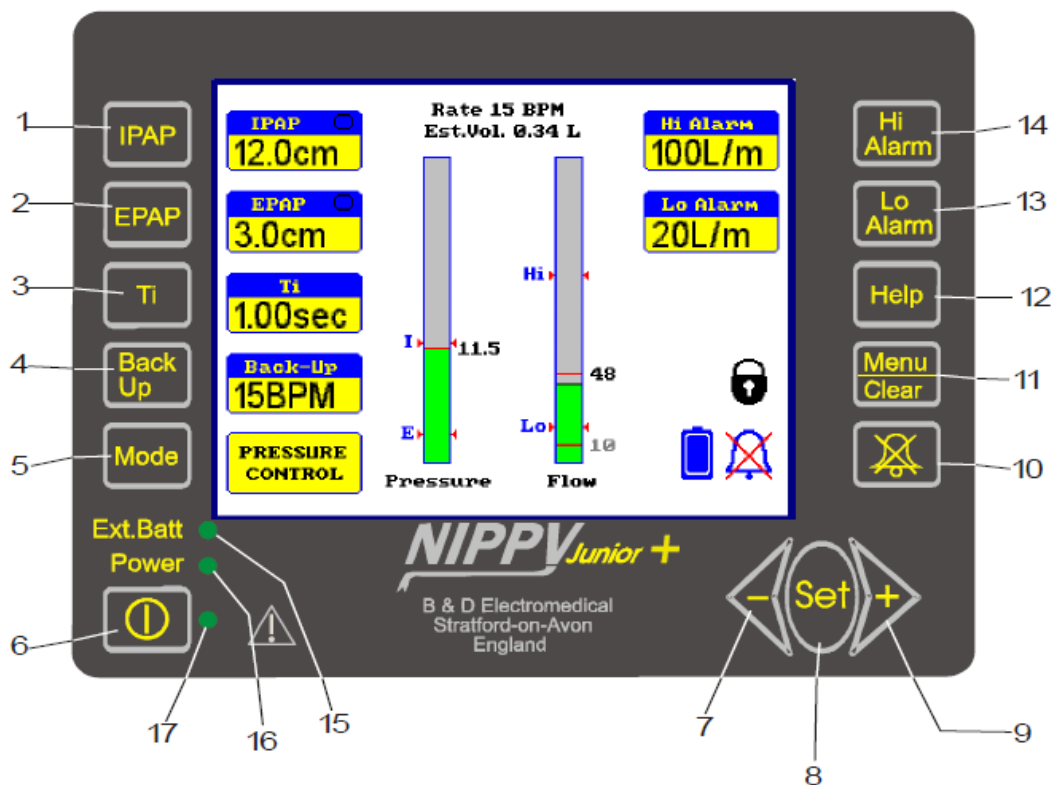


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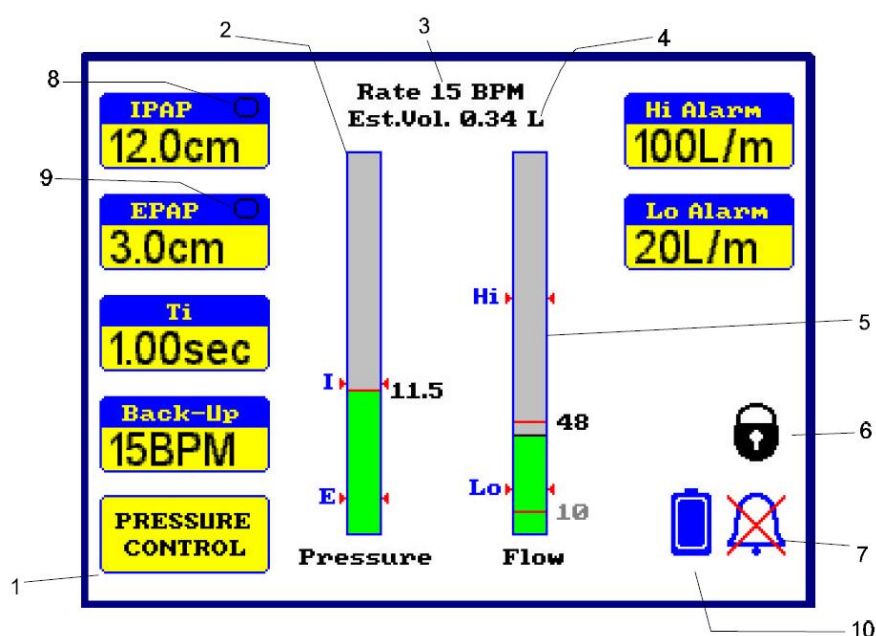
**Please Note:** This user guide includes detailed guidance on setting and altering ventilation parameters. This guide should therefore be used only by qualified medical professionals. For non-qualified members of staff please use the alternative user guide titled '*NIPPY Junior + Ventilator: Information and User Guide for Home Care Worker*'. The document will be reviewed on an annual basis and the reader should take note of the version and review dates on the document. The information contained was true at the time of review.

## Explanation of Display Screen



1. **IPAP** (Inspiratory Positive Airways Pressure): Indicates inspiratory airway pressure (scaled in cm H<sub>2</sub>O). To alter, select the button and use the – and + button to choose the appropriate value.
2. **EPAP** (Expiratory Positive Airways Pressure): Indicates expiratory airway pressure (scaled in cm H<sub>2</sub>O). To alter, select the button and use the – and + button to choose the appropriate value.
3. **Ti**: (Inspiratory time): Set only in pressure control mode. A ‘back up’ Ti is set in pressure support mode i.e. any back up breaths given are supported by the Ti set; spontaneous breaths are not.
4. **Back Up**: Back up respiratory rate measured in breaths per minute.
5. **Mode**: Displays current mode of ventilation.
6. **Power Button**: Press once to turn the ventilator on. When the ventilator is running, press and hold Start/Stop button to turn off. “Switch Ventilator Off” message will appear; Press again after 2 seconds.
7. **Minus (-) Button**: Used to reduce a value. Highlight the setting you want to alter then use this button to reduce the value set.
8. **Set Button**: Allows selection of a function when the main menu is open.
9. **Plus (+) Button**: Used to increase a value. Highlight the setting you want to alter, then use this button to increase the value set.
10. **Alarm Mute**: Press this button to mute the alarm when it is sounding. Once the cause of the alarm has been dealt with, press and hold this button to stop the mute.

11. **Menu:** Displays the menu screen. Provides options for; changing triggers, alarm volumes and display settings.
12. **Help:** Displays help messages.
13. **Lo Alarm:** To alter, select the button and use the – and + button to choose the appropriate value.
14. **Hi Alarm:** To alter select the button and use the – and + button to choose the appropriate value.
15. **Ext. Batt:** Indicates that ventilator is running on battery power. This may be internal or external.
16. **Power:** Indicates that external power is connected.
17. **Start:** Indicates that the ventilator is running.

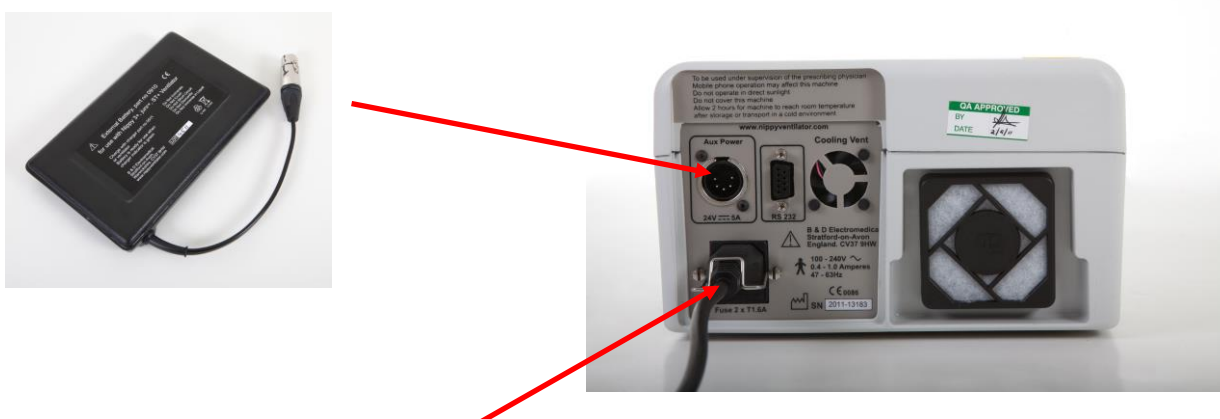


1. **Mode Selected:** Displays the mode the ventilator is currently functioning in.
2. **Pressure Display:** Indicates airway pressure (scaled in cm H<sub>2</sub>O).
3. **Rate Display:** Indicates patient breath rate (scaled in Breaths per minute).
4. **Volume Display:** Indicates estimated inspiratory tidal volume (scaled in millilitres).
5. **Flow Display:** Indicates airway flow (scaled in litres/minutes). Changes colour to red in flow alarm condition.
6. **Settings Locked Symbol:** This symbol shows that the settings are locked.
7. **Alarm Muted Symbol:** This symbol shows that the audible alarm has been temporarily silenced.
8. **I Trigger Indicator:** Indicates the trigger level set (see 'Triggers' page for information on setting the trigger level). "Flashes" each time the inspiratory cycle is initiated by the patient.

9. **E Trigger Indicator:** Indicates the trigger level set (see 'Triggers, page for information on setting the trigger level). "Flashes" each time the expiratory cycle is initiated by the patient.
10. **Auxiliary Battery:** Indicates when external battery is connected. Changes to when battery is low.

## Power:

- The NIPPY Junior+ runs on mains power supply, external battery and internal battery. Its power source runs accordingly in the sequence mentioned.
- External batteries may be connected to the NIPPY Junior+. It is charged when connected to the mains power starting with the internal battery, then will maintain battery capacity when it reached full battery charge.
- External battery with charger may occasionally be seen. This is charge with separate charger.
- To check the battery charge, press the 'Set' button twice. A window will appear on the screen showing the percentage (%) battery power and running time left.



Mains Lead

### To Charge a Battery

- Connect the charger to the battery socket **before switching on the mains power**.
- Connect the mains plug to the AC supply and switch on.
- Leave on charge until the charged / ready indicator lights.

On/Off:



**ON:** Press the Start/Stop button

**OFF:** Press and hold Start/Stop button. "Switch Ventilator Off" message will appear; Press Start/Stop button again after 2 seconds.

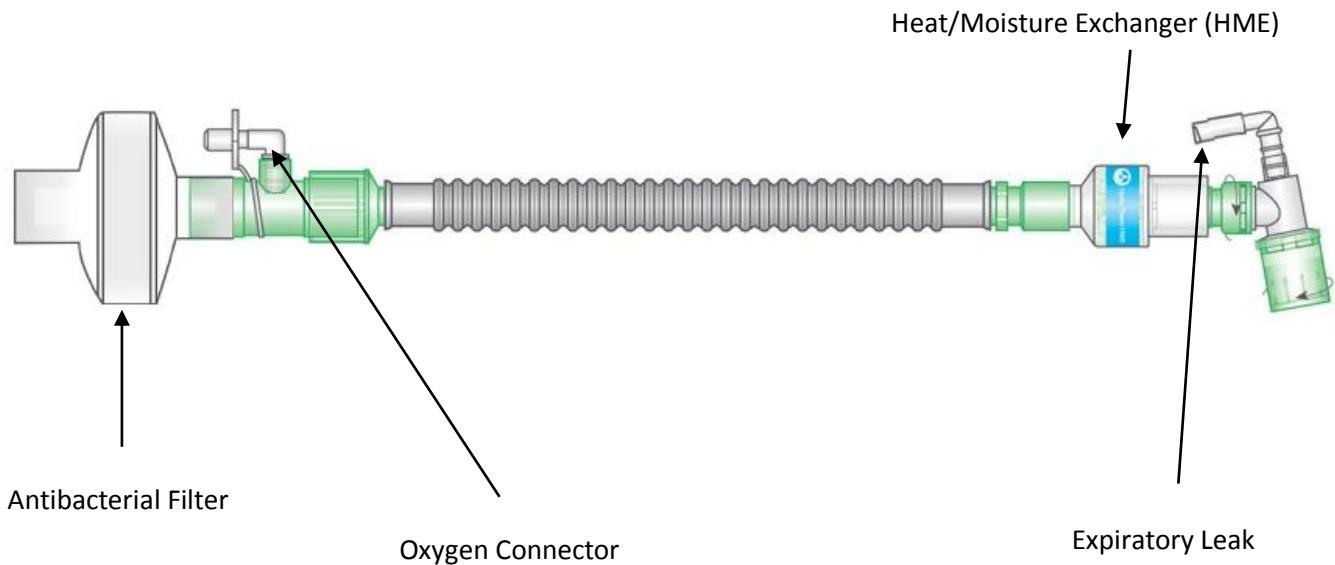
## Circuit:

### 'Dry' Circuit

Requires changing **weekly**. The HME must be changed **daily**. Please follow local policy for antibacterial filter for hospital settings.

**Order Code: 0806/SP6 from Breas Medical for 15mm circuit (image below), and 1850 from Intersurgical for HME**

*See equipment list for other order code.*

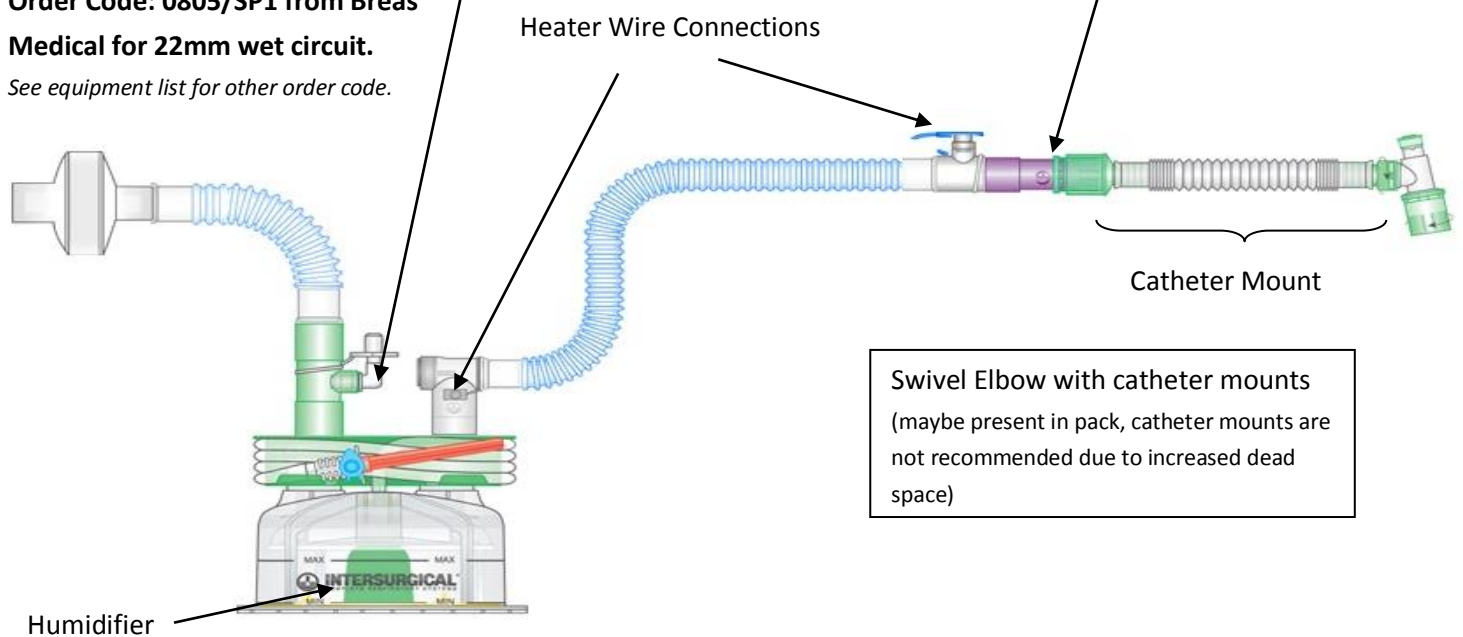


### 'Wet' Circuit

Requires changing **weekly**.

**Order Code: 0805/SP1 from Breas Medical for 22mm wet circuit.**

*See equipment list for other order code.*



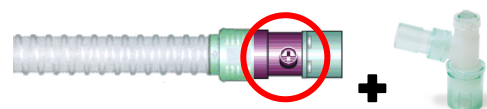
**NB:** Ensure that the circuit used has an **expiratory leak** to prevent CO2 re-breathing

**NB:** Ensure that the circuit used has an expiratory leak to prevent CO<sub>2</sub> re-breathing

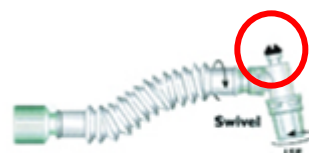
Swivel elbows come with different leaks:

- A. Purple cap for 22ml circuit + swivel elbow
- B. Black valve for higher leak
- C. Rubber tube for >100ml (Lurr fitting)

**A**



**B**



**C**



### Choosing the right circuit types:

- ✓ Always use a 22mm bore breathing circuit when the High Flow alarm is set above 80 lpm.
- ✓ Always use a 15mm bore breathing circuit when the High Flow alarm is set below 80 lpm.

### Oxygen Delivery.

This machine delivers air. In order to entrain oxygen, use the small green connector. Entrain oxygen via the wall flow-meter with small bore green tubing. NB 15LO<sub>2</sub> will provide approx. 40% due to dilution by air flow – 100% cannot be given



**It can also be attached via the humidifier as shown above in diagrams.**

## Lock/Unlock:



Hold ◀- or +▶ buttons together until padlock picture on screen unlocks/ locks.



If the lock on the screen is this colour it means a **total lock** and to unlock requires holding + and – buttons together whilst pressing on the set button.

## Machine Set Up:

Ventilator settings will not normally need to be changed once the child is set up on the ventilator. Settings should only be changed if you feel comfortable to do this and should only be changed by a professional or under their guidance.

- Select the desired parameter with the relevant button.
- The reading adjacent to the button will be highlighted by a purple flashing box.
- Alter it with the - or + buttons.
- When you have finished, move on to the next adjustment or wait a couple of seconds for the flashing box to disappear.

## Triggers:

The trigger determines how easy or difficult it is for the child to start and stop the breath in.

To set/change the triggers press the 'Menu' button and select 'Adjust Trigger Levels'. The trigger sensitivity is scaled 1–10, with 10 being the most difficult. Use the - & + buttons to select the appropriate trigger level.



The level chosen will then appear in the small square next to the IPAP/EPAP pressure.

### Inspiratory Trigger

- Ease for the child to start the breath in

The NIPPY junior uses flow triggering, detecting the start of the patient's inspiratory effort when the flow rate exceeds the level set by the Inspiratory Trigger sensitivity.

### Expiratory Trigger

- Ease for the child to stop the breath in

The expiratory trigger is used in Pressure Support mode only. Towards the end of inspiration when the inspiratory flow rate drops to the baseline, the ventilator will cycle into the expiratory phase.



## Alarms:

The NIPPY Junior+ sets alarm parameters automatically. To do this, press and hold the Hi alarm then the Low alarm.

Alarms can also be set manually. To set the alarms select the 'Hi Flow' or 'Lo Flow' button as appropriate. Use the ◀- or +▶ to increase or decrease the flow value. See below for further guidance:

### High Flow Alarm

- An adjustable alarm is provided to warn of excess inspiratory flow.
- This is activated when the inspiratory flow exceeds the set high flow alarm level for 5 seconds.
- An audible and visual alarm will operate.

#### To Set the Alarm:

- Set the Hi alarm to a value higher than the peak inspiratory flow. Allow for an increase in flow if the patient takes a deep breath.

**IMPORTANT:** Activation of the high flow alarm suggests disconnection of the breathing circuit, excessive leak in the circuit or decannulation.

### Low Flow Alarm

- An adjustable alarm is provided to warn of insufficient inspiratory flow.
- This is activated when the inspiratory flow fails to achieve the set low flow alarm level for 10 seconds.
- An audible and visual alarm will operate.

#### To Set the Alarm:

- Observe the flow reading. Set the Lo alarm to a value a little lower than the peak inspiratory flow. Allow for a reduction in flow as the patient falls asleep.

**IMPORTANT:** Activation of the low flow alarm suggests blockage of the breathing circuit or leak valve; this may be due to a mucus plug.

### Power Fail

- If the electrical power to the ventilator is interrupted, an audible alarm will sound. This alarm will run for 5 minutes unless cancelled with the mute button. Once cancelled the power fail alarm will not re-activate.

### Low Internal Battery

- An intermittent alarm (short beep) with no onscreen message indicates depleted mains fail alarm battery.

### Low External Battery

- When running on an external battery, the alarm will operate when there is approximately 10 minutes running time left.

### Low Pressure

- A pre-set low pressure alarm is provided.
- If the pressure falls to below 50% of the set IPAP level for 10 seconds, an audible and visual alarm will operate.

## High Pressure

- A pre-set high-pressure alarm is provided.
- If the pressure rises above 120% of the working pressure, an audible and visual alarm will operate after a 2 second delay.

## Breathing Circuit Disconnect

- A disconnect alarm is provided. An audible and visual alarm will operate.
- This alarm may be set to a more sensitive level.
- Press and hold the Hi and Low Alarm buttons simultaneously for 3 seconds.
- Select either normal or sensitive disconnect and press 'Set' button.



Low disconnection alarm setting appears on the screen as



High disconnection alarm settings appears on the screen as

Standard disconnection alarm setting does not show an icon on the screen.

## Fault

- The alarm may also be operated by an internal fault.
- In this case the fault will be displayed on screen.
- These alarms may be muted for approximately 2 minutes to allow for setting up of the ventilator.

## Alarm Mute:



Alarms may be muted by pressing the alarm mute button. To cancel the mute, press and hold the mute switch until a beep is heard (2 seconds).

**IMPORTANT:** It is important that the mute is cancelled once the problem is dealt with so the ventilator will alarm again if necessary.

## Alarm Checks:

**Hi Flow Alarm:** Disconnect the breathing circuit at the tracheotomy end. The alarm should operate after 5 seconds. Reconnect the circuit when you are satisfied that the alarm will operate if the patient disconnects.

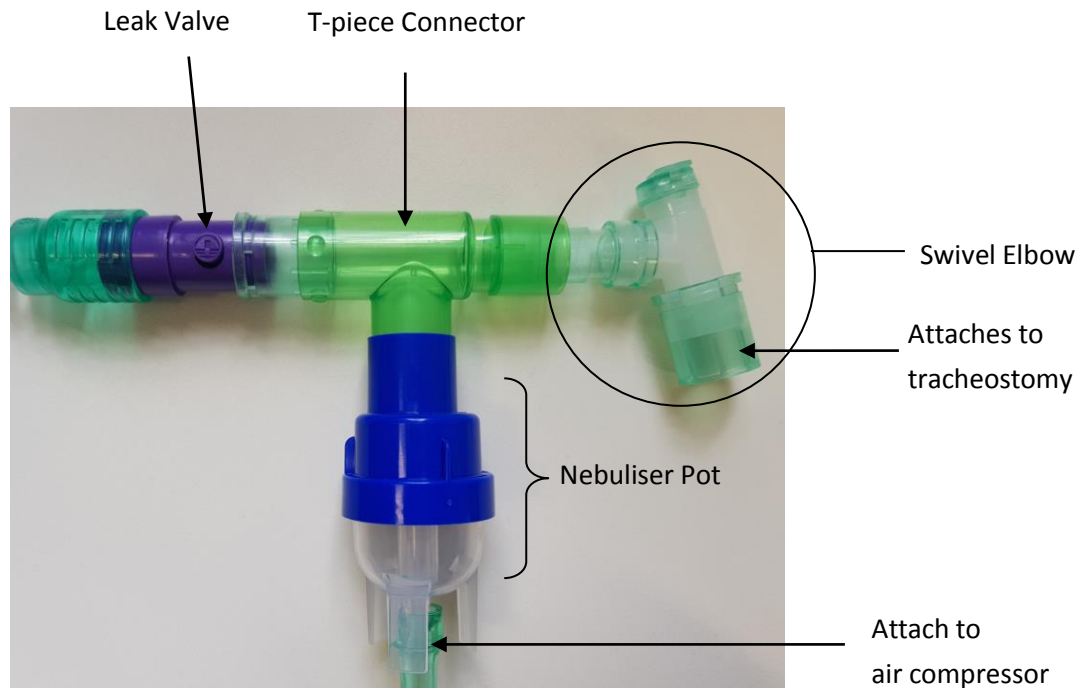
**Low Flow Alarm:** Disconnect the breathing circuit at the tracheotomy and occlude the end. The alarm should operate after 10 seconds. Refit the circuit when you are satisfied that the alarm will be activated if the airway obstructs.

## Troubleshooting Alarms

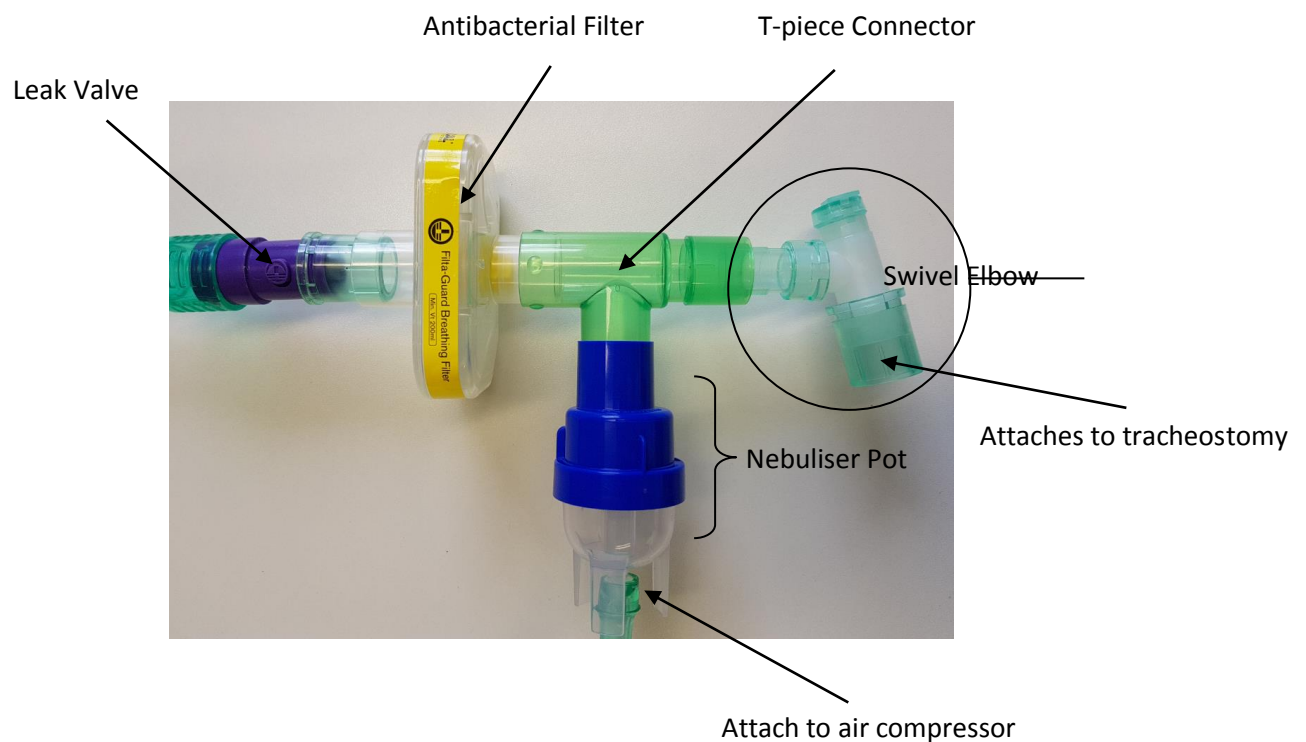
### NIPPY: Possible Alarm Causes and Actions

High flow/Breathing circuit disconnected may indicate a leak/ disconnection		Low flow may indicate blockage or obstruction	
1 Assess child <b>Accidental decannulation</b> (i.e. tracheostomy has come out)	Action Immediately insert tracheostomy  If difficulty follow emergency algorithm	1 Assess child Possible causes include: <b>Blocked tracheostomy</b>	Action Emergency algorithm: 1. Suction 2. Emergency tracheostomy change
2 Assess child Possible causes include: <b>Leak around tracheostomy</b> (particularly when asleep)	Cause - some leak may be tolerated and may be due to position of child – discuss with community ± medical teams, who can consider need for cuffed trache or upsize	2 Assess child <b>Retained secretions/ increased pulmonary resistance etc</b>	Action • suction, consider need for nebulisers, physiotherapy • refer to advanced treatment plan • discuss with community or medical team
3 Assess equipment <b>Disconnection within circuit</b> (Follow circuit from child through to ventilator and ensure everything is connected – NB humidifier connectors etc may be slightly loose)	Action • Reconnect any loose connections • Re-assess	3 Assess equipment <b>Circuit blockage</b> (Follow circuit from child through to ventilator and ensure it is not kinked or obstructed)	1 Assess child • Correct fault • Re-assess
<b>Is the alarm set appropriately</b> (i.e. as previously recorded and checked at start of shift)	• Check alarm settings are as prescribed and re-set if any discrepancies	<b>Is the alarm set appropriately</b> (i.e. as previously recorded and checked at start of shift)	• Check alarm settings are as prescribed and re-set if any discrepancies
<b>If the child is compromised and you can't resolve the issue rapidly – hand ventilate and call for help</b>			

## Giving Nebulisers



**For Nebulised Antibiotics (Please check your local policy on whether antibiotic nebulisers require filtering)**



## Troubleshooting Ventilator Problems

### Machine Failure

- Hand-ventilate immediately and change ventilator. Organise a new ventilator. Children ventilated >12 hours should have a backup machine.

### Humidification Problems

- Humidifier will alarm if temperature is too high or too low. Check alarms humidifier to see where in the circuit the problem is occurring.
  - a. Heater wire: life span approx. 8 months
  - b. Temperature gauges: one at humidifier and one at patient
  - c. Water in humidifier chamber: if low, temperature will go up and if too much H<sub>2</sub>O temperature will go down
  - d. Frequent disconnections: increase in cold air entry will increase heater activity so beware of increased heat on reconnection

### Ventilator Alarming High Flow

- Could be caused by disconnection/leak in the circuit. Check circuit for splits and check for disconnection at the tracheostomy, of the humidifier wires and at the machine.

### Ventilator Alarming Low Flow

- May be due to
  - a. Tracheostomy partially or completely blocked
  - b. Kink in the ventilator circuit
  - c. Rain out of water from the humidifier in the circuit
  - d. Covering/blocked exhalation port/valve

## **Consumables:**

- Antibacterial filters should be changed weekly at home with a weekly circuit change. See local hospital policy for guidance.
- Breathing circuit should be changed weekly
- Dust filters should be checked weekly at home
- Dust filters should be changed monthly

**NOTE:** Please see equipment list for ordering information

## **Ventilator Tips:**

- Check the alarms prior to connecting the child to the ventilator.
- If 24 hour ventilation is required, 2 ventilators should be used for 12 hours each and be clearly labeled 'day' and 'night'.
- Lock the machine after the appropriate settings are entered to avoid accidental tampering.

## **Useful Contact Information:**

For advice on the NIPPY Junior + machine on the phone during week working hours:

### **Breas Medical**

Unit A2, The Bridge Business Centre, Timothy's Bridge Road, Stratford-upon-Avon  
Warwickshire, CV37 9HW

Contact Information: +44 (0) 1789 293 460

Check your service agreement for your options.