Clinical Practice Procedures:
Respiratory/Ventilation – MEDUVENT® Standard

Policy code	CPP_RE_MED_0525
Date	May, 2025
Purpose	To ensure a consistent procedural approach for the MEDUVENT® Standard ventilator.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
Source of funding	Internal – 100%
Author	Clinical Quality & Patient Safety Unit, QAS
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Ventilation – MEDUVENT® Standard

The MEDUVENT® Standard is a robust transport ventilator suitable for invasive and non-invasive mechanical ventilation in any patient over 10 kilograms in weight (~ 1 year of age). Using turbine controlled technology, it is capable of ventilating with or without a dedicated oxygen supply. The ventilator can operate for up to 8 hours on a single charge. The total ventilator weight is 2.1 kilograms, making it ideal for pre-hospital use.

Indications

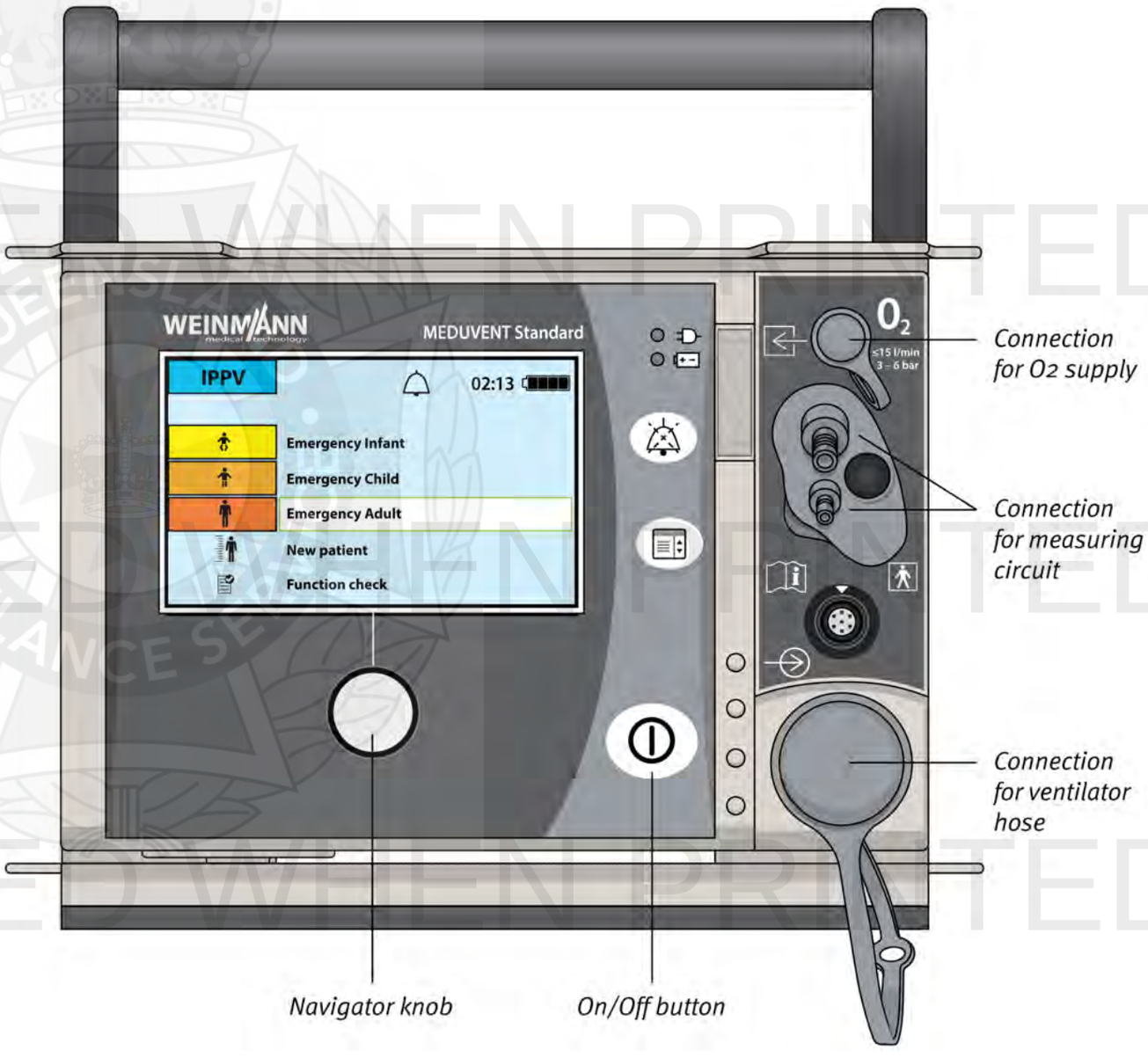
- Invasive mechanical ventilation

Contraindications

- Patients less than 10 kg (~ 1 year of age)

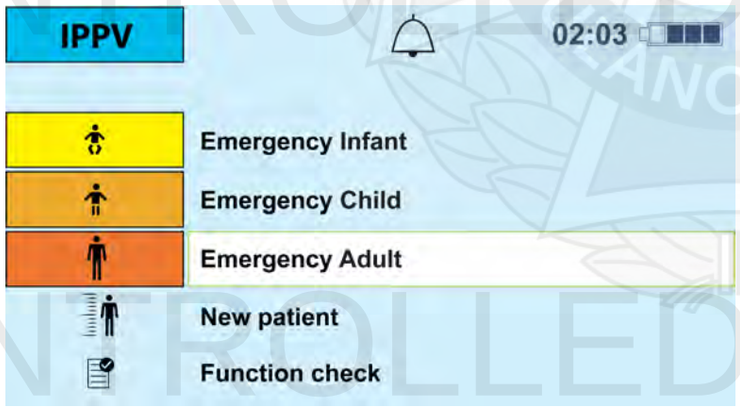
Complications

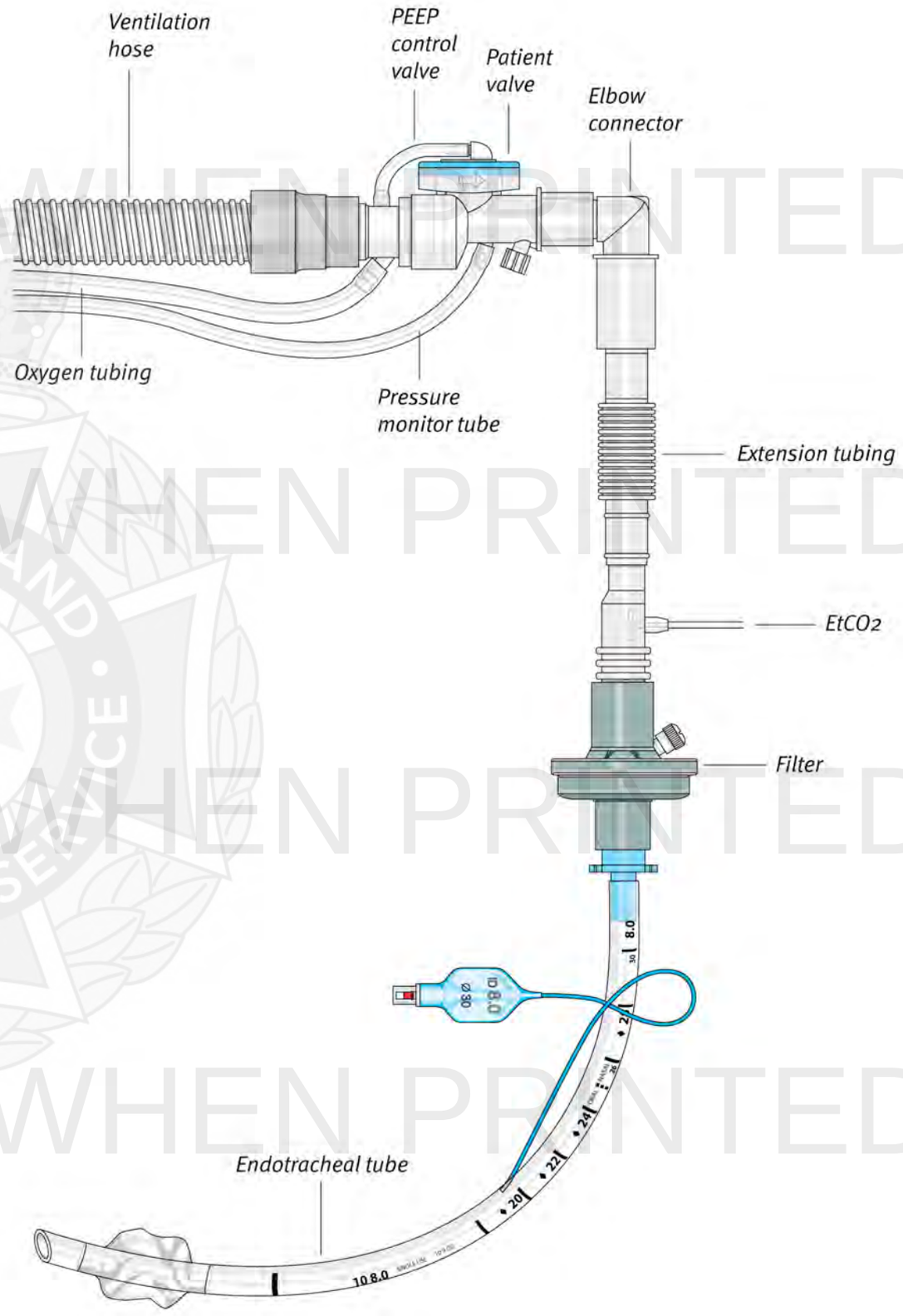
- Atelectrauma
- Barotrauma
- Volutrauma
- Pneumothorax
- Hypotension
- Hypoxia
- Ventilator associated pneumonia



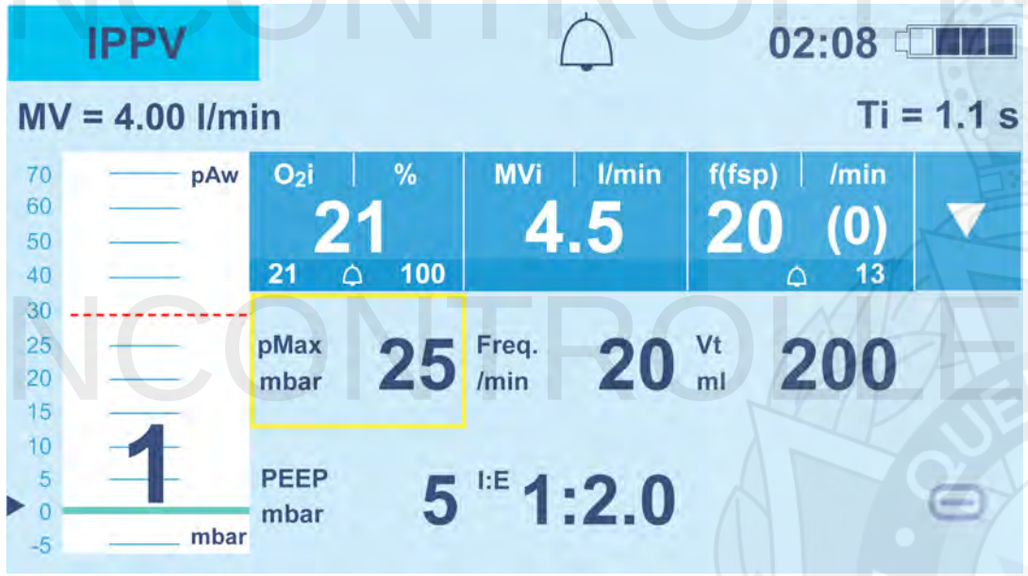
PROCEDURE – Connecting to a patient

1. Remove the functional (tested) disposable ventilator circuit from the packaging and confirm all components are present and tightly connected.
2. Securely connect the main ventilator hose, pressure monitoring hose and oxygen output hose to the ventilator front face.
3. Connect a length of oxygen tubing between a 15 L/minute adjustable oxygen flow metre and the ventilator's oxygen intake – if necessary, this step may be omitted if the patient is considered suitable for room air (FiO2 21%) ventilation.
4. Adjust the oxygen flow rate to 5 L/minute to generate an FiO2 of 100% – if necessary, slowly adjust the flow rate to meet the patient's specific oxygenation requirement.
5. Prepare the ventilator's patient valve by connecting the extension tubing, EtCO2 sensor and bacterial filter.
6. Turn the ventilator on by pressing the 'On/Off button'.
7. Using the Navigator Knob, select the appropriate emergency ventilation setting for the patient, options include:
   i. Emergency Adult;
   ii. Emergency Child; or
   iii. Emergency Infant.





8. Using the navigator knob, systematically rotate through the ventilator's default settings *(see Additional Information)* and adjust as required by pressing and rotating the navigator knob. A yellow solid perimeter box will identify the selected parameter.



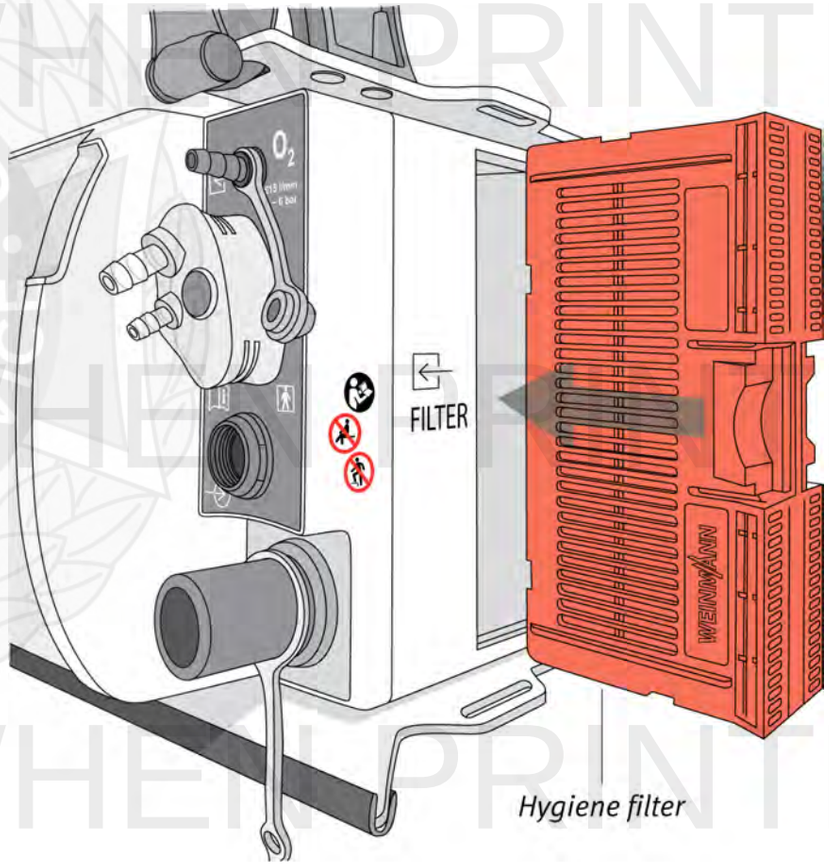
9. Confirm the unobstructed movement of air from the ventilator hose.
10. Connect the complete airway circuit to the patient's secured endotracheal tube (ETT).
11. Confirm adequate ventilation and oxygenation, check for appropriate:
    i. Chest rise and fall;
    ii. Air entry, with chest auscultation;
    iii. $EtCO_2$;
    iv. SpO_2;
    v. pMax; and
    vi. Haemodynamics.

Disconnecting the ventilator from the patient

Confirm with the receiving facility that they are happy for the ventilator to be disconnected from the patient, prior to doing so. Advise the airway clinician of all the ventilator settings.

PROCEDURE

1. Disconnect the breathing circuit from the ventilator and the patient.
2. Dispose of the ventilator circuit into an appropriate waste bin.
3. If necessary, change the hygiene filter.



Hygiene filter

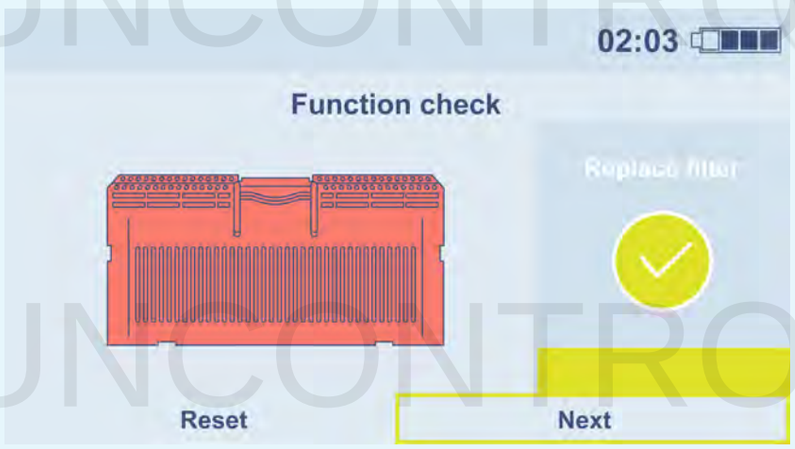
4. Wipe all surfaces with anti-bacterial wipes, including the inside of the filter compartment if performing a filter change.

Additional information

The MEDUVENT® standard ventilator and the next operational disposable circuit must be checked daily to ensure both are fully functional and ready for immediate use. The 'Function Test' will identify any required actions. Any device that identifies 'DEVICE NOT READY FOR USE' must be immediately removed from operational use and arrangements made for immediate repair by an approved MEDUVENT® service agent.

Display	Meaning	Action
Device ready for use	• Function check passed	• Use device without restrictions
Device not ready for	• Function check failed or	• Select details. Check the parts listed in the display and replace them if necessary. Repeat function check.
	• Function check cancelled.	• If function check is still not passed, contact authorised dealer or manufacturer.
Device ready for use. After function check, the service symbol in the start screen starts flashing	• Function check passed, but service required	• Contact authorised dealer

- The daily function test will provide operators with an assessment of the filter's serviceability. The result (colour) will determine the action required.



Colour	Action
Green	Continue to use hygiene filter
Yellow	Keep replacement hygiene filter ready
Red	Replace hygiene filter
Grey	Indicates the filter life used

The hygiene filter must be replaced:

- When prompted by the function check.
- At least every six months.
- After ventilating a patient who presents with a suspected infective respiratory illness.

If filter replacement is required:

a) Remove the old filter while wearing appropriate PPE (gloves and eye protection).

b) Squeeze the filter's outside tabs together.

c) Pull the hygiene filter out of the filter compartment.

d) Disinfect the filter compartment by wiping with a disinfectant wipe.

e) Dispose of the filter into contaminated waste.

f) Insert a new filter into the compartment until the hygiene filter 'clicks' into place.

g) Ensure the filter is flush with the side of the device.

h) Complete the function test.

i) Reset the filter counter during the function check. If the device complies, a green screen will show 'Device ready for use'.

Additional information *(cont.)*

- The MEDUVENT® has the following default EMERGENCY VENTILATOR settings.

SETTING	Adult	Child	Infant
Tidal Volume (Vt ml)	500 mL	200 mL	60 mL
Frequency (Freq/min)	10/min	20/min	30/min
Positive End Expiratory Pressure (PEEP mbar)	5 cmH_2O	5 cmH_2O	5 cmH_2O
Maximum peak inspiratory pressure (pMax mbar)	30 cmH_2O	30 cmH_2O	20 cmH_2O
Inspiration : Expiration ratio (I:E)	1:2	1:2	1:3

- The MEDUVENT® has three alarm sequences.

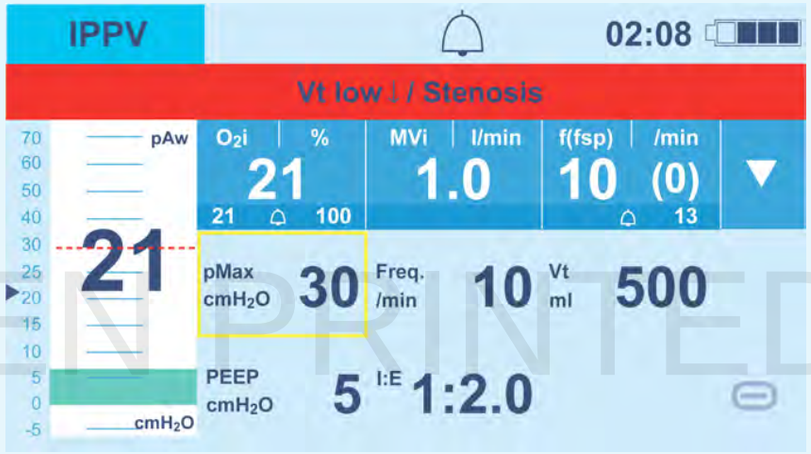
Alarm colour	Priority	Meaning
Red	High Priority	High priority alarms warn of imminent, fatal, or irreversible patient injuries or of device faults.
Yellow	Medium Priority	Medium priority alarms warn of immediate reversible patient injuries or minor device faults
Turquoise	Low Priority	Low priority alarms warn of delayed minor injuries or inconvenience to the patient or minor restrictions on the device.

When multiple alarms are active:

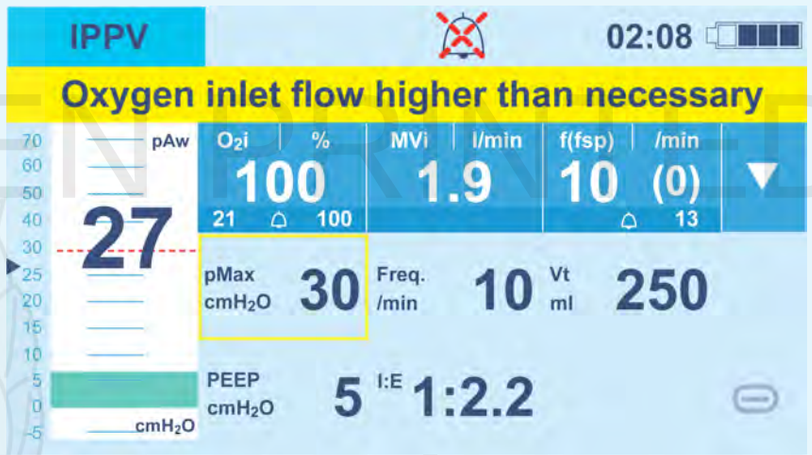
a. The device displays the alarm with the highest priority. Lower priority alarms will display once the higher priority alarm is no longer active.

b. If multiple alarms of identical priority: alarms will be displayed in rotation.

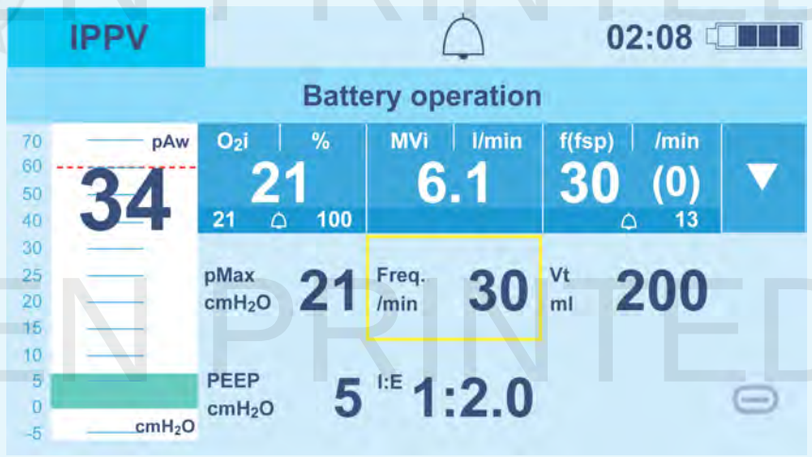
c. Technical alarms predominate, cannot be muted, and will be generated if no ventilation is possible.



High priority alarm



Medium priority alarm



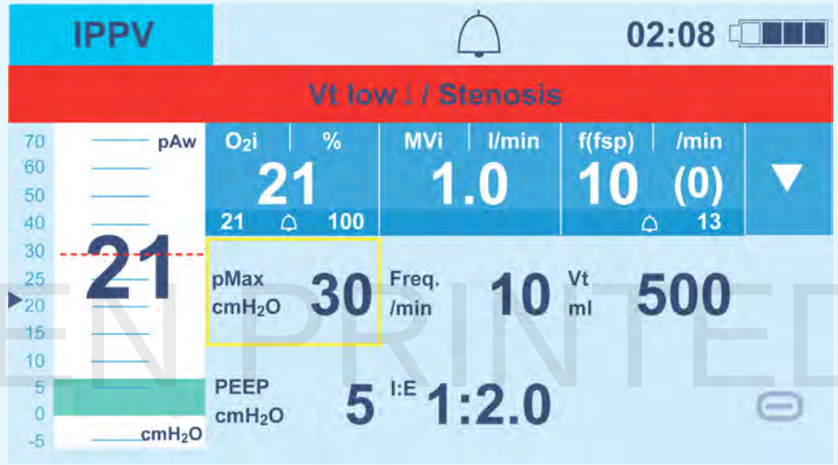
Low priority alarm

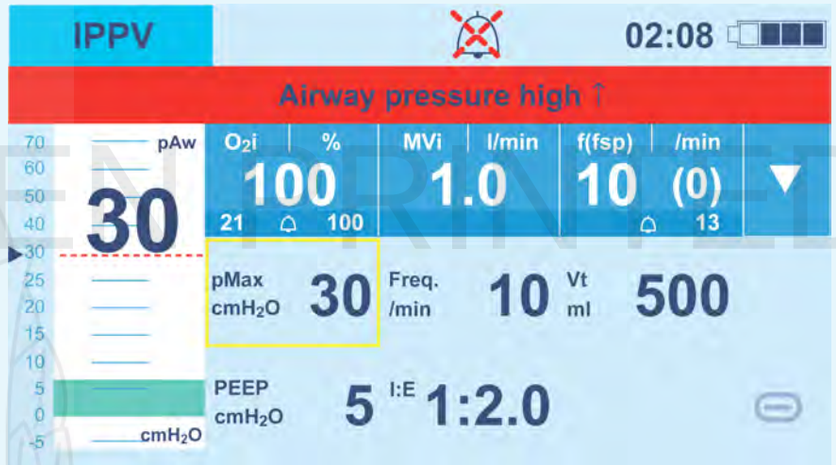
Additional information *(cont.)*

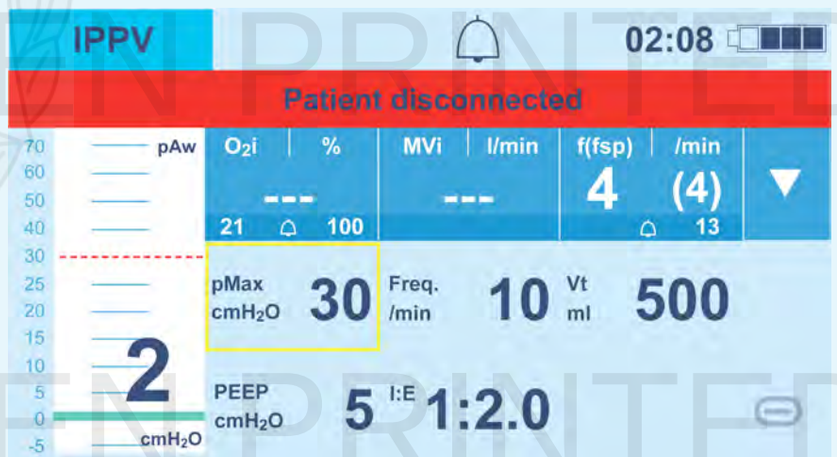
High Priority Alarms (Red):

If any alarms cannot be rapidly resolved, the patient must be removed from the ventilator and ventilated via a BVM.

Alarm	Cause	Remedy
Airway pressure high	• Obstruction of patient's airway • ETT incorrectly positioned • pMax set too low • Kinked tubes	• Clear the airway • Check position and remove if needed • Adjust pMax • Check and fix any tubing
Airway pressure low	• Breathing circuit leaking • ETT incorrectly positioned • Incorrect ventilation settings	• Replace breathing circuit • Check position and remove if required • Change settings appropriate for patient
Empty battery	• Rechargeable battery low	• Connect device to a power source
Check breathing circuit	• Tubes incorrectly connected, kinked or defective • Hygiene filter blocked	• Check breathing circuit • Check and replace hygiene filter
Device temperature high or low	• Device can operate between -20 to 70ºC	
Oxygen inlet flow high	• Flow setting higher than permitted	• Reduce flow to less than 15 L/minute
Patient disconnect	• Tubing disconnect from patient	• Connect patient to tubing
PEEP high	• Airway obstruction • ETT incorrectly positioned • Kinked tubing • Patient valve defective • Incorrect settings	• Troubleshoot obstruction • Position ETT correctly • Troubleshoot tubing • Replace disposable circuit • Adjust settings
Vt low/stenosis	• Airway obstruction • ETT incorrectly positioned • Kinked tubing • Hygiene filter blocked	• Troubleshoot potential obstruction • Position ETT correctly • Troubleshoot tubing • Replace hygiene filter

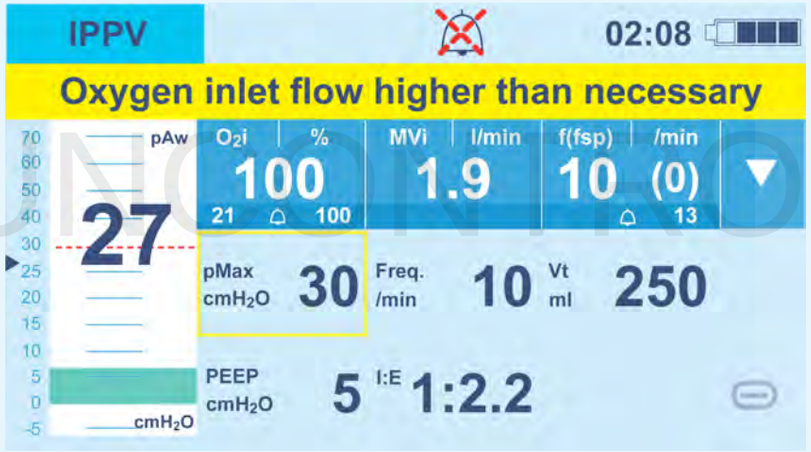






Additional information *(cont.)*

Medium Priority Alarms (Yellow):



Alarm	Cause	Remedy
Battery defective	• Battery defective • Rechargeable battery not inserted correctly	• Run device on rechargeable battery without line power until it switches off. Fully recharge battery. If the device continues to display the alarm: replace rechargeable battery • Check connection/do not open battery compartment/needs service
Battery weak	• Low charge	• Connect to line power and recharge battery
Check battery	• Low charge	• Use approved battery
Frequency high	• Patient's respiratory rate too high • Inspiratory trigger activated by artifact (spontaneous breathing patient only)	• Check patient • Reduce sensitivity on inspiratory trigger
Oxygen inlet flow high than necessary	• Flow setting higher than necessary	• Seal oxygen inlet with protective cap
Service required	• Device defective	• Have device repaired
Oxygen inlet flow high	• Flow setting higher than permitted	• Reduce flow to less than 15 L/minute
Vt not achievable	• Implausible ventilation parameters • pMax set too low	• Adjust ventilation parameters • Modify alarm settings

Battery maintenance:

Specification	• Rechargeable battery
Service life	• At least 300 charging cycles or 5 years
Operating hours	• 8 hours constant ventilating use

Providing additional oxygen to the patient (more than 21% room air)

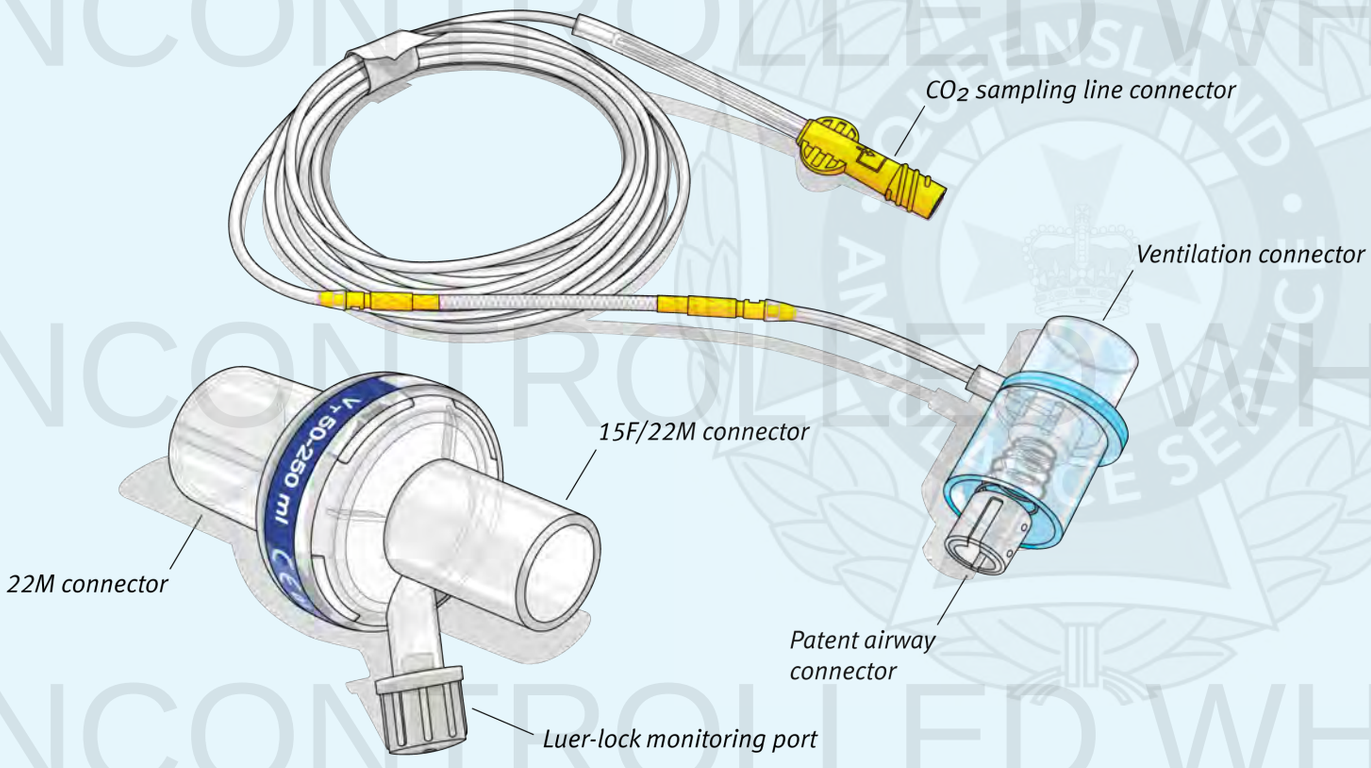
- Set the flow at the oxygen supply. The ventilator display will indicate the measured oxygen concentration.
- The oxygen concentration will be displayed on the device screen. After starting up, the device calculates oxygen concentration for the first 30 seconds based on the ventilation parameters.
- To lower the oxygen concentration, reduce oxygen flow and be guided by the calculation on the display.
- If flow exceeds maximum permissible value of 15 L/minute, the pressure relief valve might open during inspiration, placing ventilation therapy at risk. This may cause injury to the patient. Do not exceed maximum flow rate of 15 L/minute.

Additional information *(cont.)*

Wall flow rate	5			10			15		
Set MV	5	10	15	5	10	15	5	10	15
Approx. FiO_2	100	65	45	100	100	80	100	100	100

- Clinicians must always have an appropriate bag vale mask (BVM) available, in the event of a fault or other complication arising that cannot be immediately rectified.
- For all ventilated paediatric patients (ETT < 4.5 mm) consider using the Microstream™ Advance Neonatal-Infant Intubated CO_2 Filter Line and Gibeck Humid-Vent® Filter Pedi.

Microstream™ Advance Neonatal-Infant Intubated CO_2 Filter Line



Gibeck Humid-Vent® Filter Pedi