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Specifications of neonatal ventilator with high frequency oscillator ventilator with standard accessories

Microprocessor Controlled Time Cycled Pressure Limited Ventilator

1. Mode of Operation: Electrical

2. Application: Neonatal

3. Driving Gas:

- Air source as in built or external compressor with facility for connecting to central compressed air pipeline. Should have automatic switch over between ventilator's inbuilt or external air source and compressed air source with priority to central compressed air source.
- High pressure tubing for both central oxygen and compressed air. Adaptors to fit hospital connection of compressed air and oxygen to be provided.

4. Humidifier:

- a. Thermostatically servo controlled with probe to monitor proximal airway temperature with
- b. alarm facility.
- c. Having reusable heated wire adaptor suitable for disposable and disposable circuit.
- d. Includes neonatal humidifier jar: 2 Nos with each unit
- e. Facility for selecting active/ passive humidification.

5. Ventilatory Modes and Functions:

- Assist control.
- SIMV
- SIMV +Pressure support.
- Nasal CPAP mode
- PSV (with adjustable cycle %, rise and insp. Time).
- Inspiratory volume limit & volume guarantee / PRVC or equivalent
- HFOV and HFOV +CMV mode
- Adjustable flow cycled ventilation for all modes
- User adjustable, automatic and interactive apnea back-up ventilation
- PEEP.
- Flow sensor placement – at proximal (patient) end
- Adjustable I:E ratio
- Apnea back-up ventilation
- Manual breath

- Adjustable bias (expiratory) flow preferable
- Trigger sensitivity: both flow and pressure adjustable.
- FIO₂: adjustable (21 – 100%) and monitored.
- User adjustable FiO₂ increment during oxygen flush for neonatal patients.
- Synchronized nebulizer for providing in line nebulization

6. Alarms/ Indicators: Audio &/Or Visual with Adjustable Alarm Volume:

- Power failure
- Mode of operation: mains/battery
- Battery: fully charged/low.
- Unusual / incorrect settings message
- Gas supply failure for: oxygen and air.
- Insp. Time limit & i:e ratio limit
- Pressure/flow transducer [sensor] failure.
- Triggered breath indicator.
- Apnea.
- High peak pressure
- Tidal volume: high/ low
- Fio₂: high/low
- Minute volume: high/ low.
- Airway pressure: high/ low peak pressure
- PEEP/CPAP: high/ low
- Breath rate: high
- Auto PEEP indicator

7. Displays for Monitoring:

- Driving gas supply pressure (air & oxygen)
- PIFR & PEFR
- FIO₂.
- EtCO₂
- Resp. Rate: ventilator & patient.
- Time: inspiratory, expiratory, I:E ratio
- Inspired tidal volume
- Expired tidal volume
- Minute volume: ventilator
- Airway pressures: P_{max}. P_{mean} & P_{plateau}, PEEP
- % leak
- Auto PEEP
- Minimum 10” color graphics display with adjustable scales, sweep speed & movable cursor facility and touch screen
- Waveforms: flow, volume & pressure – airway(paw), colored & freeze facility
- Loops: flow/volume, paw/volume with memory, colored & freeze facility
- Trend of all monitored parameters for last 24 hrs.
- Compliance: dynamic
- Resistance
- Work of breathing (WOB)

8. Range or Pattern for Settings:

- FiO₂: 21 to 100%.

- Inspiratory Flow rate: 1 to 50 l/min
- Inspiratory Flow waveform: user selectable square, decelerating
- Resp. Rate: 1 to 130 /min.
- Insp. time: 0.15 – 3 sec.
- Inspiratory pause time :0.1-3 sec
- Expiratory time: min 250 msec onwards.
- I: E ratio: 1:1 to 1:4
- Insp. Tidal volume limit: 2 ml to 300 ml
- PEEP: 0 – 35 Cms of H2O.
- Pressure support: 0 – 40 Cms of H2O.
- Flow cycle: 0 to 45% of peak flow
- SIMV rate: 1 to 120 B. P. M.
- Apnea time adjustable: 10 to 40 sec.
- Apnea backup rate: 12 B. P. M. Onwards
- Pressure trigger: 0.1 to 10 cm H2O
- Flow trigger: 0.1 – 10 L.P.M.
- Bias flow/base flow: 0.4 to 5 L.P.M.
- Volume Limit: 2ml to 500 ml

For HFOV

frequency 3-20 Hz

Amplitude 4-180 mbar

MAP 0-45 mbar

I.E ratio 1 :1 to 1:3

9. Standard Accessories;

- 1) Reusable, autoclavable, dual limb (preferable) neonatal heated breathing circuit with water trap- 2 with each ventilator.
- 2) Stand with support arm for breathing circuit- 1 no each
- 3) Test lung – 1 nos each for neonatal ventilator
- 4) Patient Circuit Arm -1
- 5) Oxygen & Air Hose Set - 1
- 6) Disposable circuit and chamber for neonatal application, including its adaptors: 75 pieces per ventilator.
- 7) Nasal CPAP prongs: 2 different sizes (5 nos each size) supply with each unit
- 8) Compressor -1 (230V/50 Hz)

10. Flow sensor: If reusable – 4 / machine or if disposable 60/ machine

11. Ventilator Trolley- should be sturdy, robust having anticorrosive coating.
- with support arm

12. Consumables Should Include Following for neonatal ventilator

- Reusable breathing circuits: two no each per ventilator per year
- Disposable breathing circuits with chambers: 60 per ventilator per year
- Flow sensors if reusable – two each per ventilator per year
- Humidifier jar reusable: - 2 each per ventilator per year
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13. Ventilator & Compressor- should be from same manufacturer /OEM.

14. **All Software Upgrades** shall be provided free of cost.

15. **All Standard Accessories** should be provided with the machine.

16. **Power Supply:**

- a. 230 v +/- 15%; 50 Hz +/- 3%.
- b. Built in facility to work over a wide range of voltage fluctuations. Each unit to be supplied with true online UPS with rechargeable battery backup up to minimum one hour (internal or external) for complete system.

17. **Consumables:**

- a. Reusable autoclavable dual limb neonatal breathing circuit with water trap.
- b. Test Lung
- c. Disposable circuits
- d. Flow sensor
- e. Humidifier jar reusable
- f. Sample tubing with adaptors
- g. Nasal prongs

18. **Training** of hospital engineers & staff

19. **Warranty** for 2 years.

20. **After sales service** and **technical support** will be expected at least minimum of 5 years.