



*Touch-screen Neonatal Ventilator
with High Frequency Oscillation*

SLE5000



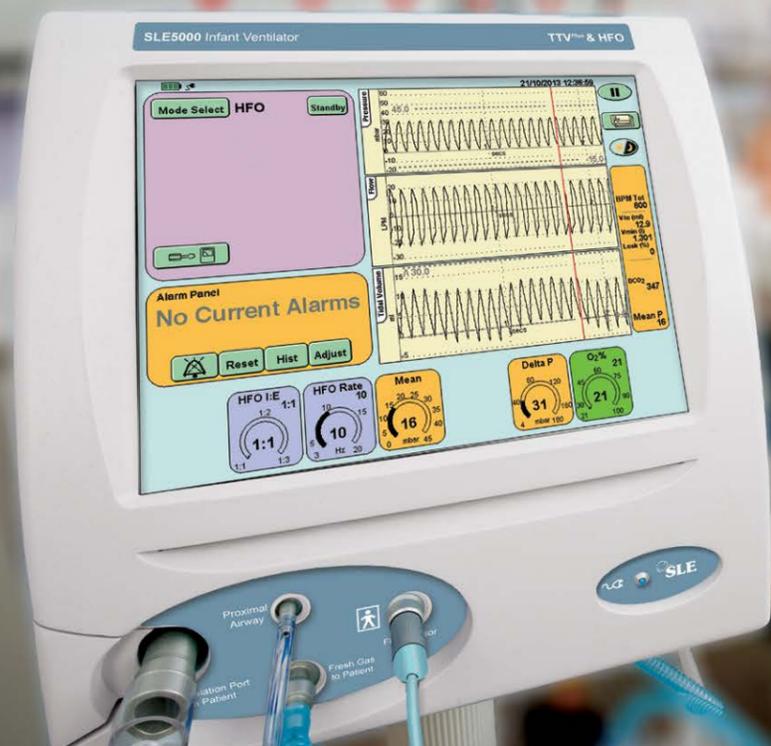
When the smallest thing matters

SLE5000: Designed for Infants

To keep up with the latest in ventilation the SLE5000 has continually reinvented itself. During the last few years this has meant updated electronics, updated pneumatics, new components and enhanced software to ensure that the SLE5000 can still ventilate the most difficult babies whilst remaining reliable and easy to maintain.

In addition to these regular technology updates, the latest version of the SLE5000 meets all of the latest regulatory requirements and has added a number of new features to keep it up to date.

To highlight these, and all previous updates the SLE5000 now comes in a smart white case to emphasise these changes.



Sophisticated and Powerful

High Frequency Oscillation (HFO)

In the SLE5000, HFO is powerful enough to cater for a wide range of patients from 300 g to 20 kg⁽¹⁾, depending on lung mechanics. In HFO mode, the SLE5000 provides oscillation with *active expiration* ensuring adequate gas exchange.

Since the same circuit is used between HFO and conventional modes of ventilation no patient disconnection is required.

Targeted Tidal Volume plus (TTV^{plus})

In TTV^{plus}, the SLE5000 measures the *expired* tidal volume (Vte) and adjusts the PIP in accordance with the changing lung mechanics, to deliver a stable user-set Vte at the user-set Ti.

The latest software adds ET tube leak compensation of up to 50% and automatic adjustment of PIP according to an individual patient's lung mechanics⁽²⁾.

Pressure Support Ventilation (PSV)

The SLE5000 boasts an automatic leak compensation algorithm that will ensure flow termination even in the presence of a leak. PSV is also available in SIMV. By pressure-supporting spontaneous breathing, the SLE5000 helps reducing the Work of Breathing of the baby⁽³⁾.

CPAP

The SLE5000 can be used with SLE's Miniflow nasal prongs, giving the user even more options for weaning babies and supporting them immediately after extubation.

New Features

The latest version of the SLE5000 has a number of new features:

- Service hour counter on rear panel
- New fresh gas port connector
- White case
- Blue power LED on front of case
- Lip on rear chassis to deflect dripping liquids
- New (internal) anti-occlusion valve
- Updated labelling on front and rear



Version 5 Software



High Frequency Oscillation



Targeted Tidal Volumes



Valveless System

References

1. Pressure and flow waveform characteristics of seven high frequency ventilators.

Harcourt ER, John J, Dargaville PA, Zannin E, Davis PG, Tingay DG:

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2. Volume-targeted versus pressure-limited ventilation in the neonate.

Wheeler K, Klingenberg C, McCallion N, Morley CJ, Davis PG:

Cochrane Library 2010, Issue 11

3. Work of breathing during SIMV with and without pressure support.

Deena Shefali Patel, Gerrard F Rafferty, Silke Lee, Simon Hannam and Anne Greenough:

Arch. Dis. Child. Published online 17 Feb 2009; doi:10.1136/adc.2008.152926



Audible and Visual Alarms
The alarm panel provides an immediate audible and pictorial view of the alarm condition, thus allowing easy monitoring, plus an alarm history of the last 100 conditions.

Integrated Battery
The SLE5000 has an internal battery that ensures uninterrupted operation in the event of a mains supply failure. The battery lasts for up to an hour under normal operation. This makes the ventilator even safer and practical for use in internal hospital transport.

Variable I:E Ratio
1:1, 1:2 and 1:3 ratios are available in HFO mode.

Patient Circuit Connections
Front panel mounted patient circuit connections with autoclavable exhalation block.

Integral Screen
Colour-coded user touch screen. Easy-to-use, logical sequence allowing quick, smooth adjustments. The SLE5000's 12.1 inch screen means that all the data you need can be easily seen.

Real-time Data Display
Real-time lung mechanics measurements and ventilatory data. This allows for continuous feedback for making crucial clinical decisions.

Pre-Setting Facility
Parameters can be preselected for the next mode whilst continuing to ventilate the patient in the current mode of ventilation.

Compact Unit
The SLE5000 ventilator is housed in a single compact box, making it easier to clean and use. The integrated touch-screen is angled for perfect visibility and easy to read from a distance.

Designed for Users

At SLE, we believe that the user should be able to concentrate on the most important part of their job: looking after the patient. That's why the SLE5000 has been designed to be so intuitive and easy-to-use.

New users find operating the SLE5000 simple and logical. Most only require the minimum amount of training to use the SLE5000 effectively. Considering the potential of the SLE5000, this is a huge achievement.

The SLE5000 case is manufactured in a unique solid cast polyurethane moulding. This tough material is ideal for use in a busy neonatal unit and easily withstands the knocks and bumps of everyday life.

Unique Interface

SLE has worked hard to deliver the best user interface in the market, with in-depth thought given to all user scenarios. Features include:

- ✓ Full touch operation
- ✓ Logical layout of the different sections
- ✓ Minimal number of sub-menus
- ✓ Easy-to-read characters
- ✓ Colour-coding of controls

The SLE5000 uses the same patient circuit for both conventional ventilation and HFO ventilation, which means that there are no hidden costs when you switch between modes.

Reliable and Cost-Effective

Continued Evolution

During the last few years SLE has completely rebuilt the SLE5000 from the inside out.

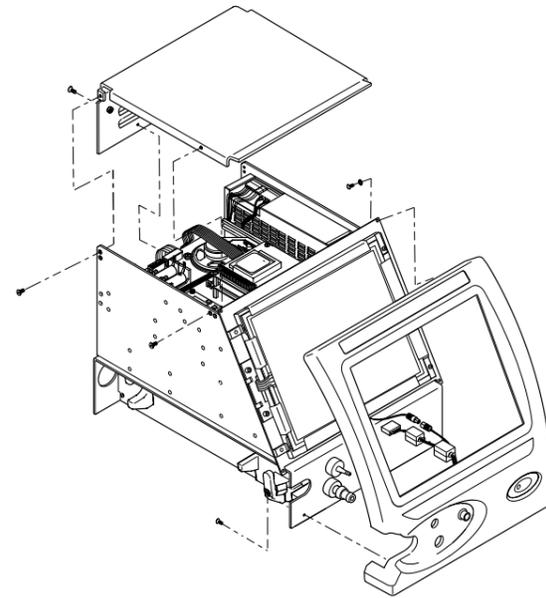
We have developed quieter valves, made our ventilators run cooler, added processing power, reduced maintenance costs, made servicing easier and introduced a brand new flow sensor.

Components updated since the release of the original SLE5000:

- Power Supply
- Hardware
- Operating System
- Electronics
- Software (v.5)
- Pneumatics
- Case
- Trolley

Conventional Ventilation

For those users that don't require High Frequency Oscillation Ventilation we have also introduced a new version of the SLE4000. The SLE4000 includes all of the same updates as the SLE5000, but as before, does not include HFOV modes.



Valveless System

All of SLE's ventilators use 'valveless technology'. This means that the management of the airflow is controlled not by a mechanical valve, but by a jet of air, acting as a pneumatic piston. This system is based on 20 years of development of a patented technology, and offers many significant advantages.

The first of these is that there is no additional resistance in the circuit. This ensures that even with the smallest of babies there is minimal resistance to flow and the Work of Breathing is kept to a minimum.

The high-speed air jets also mean that the system is very reactive allowing very precise control of the airflow with none of the problems of inertia and sticking associated with conventional valves.

The simplicity of the design - a single exhalation block and exhaust manifold - also mean that cleaning and assembly are simplified and reduce the chances of infection or mis-assembly.



Specifications

Ventilation Modes: Conventional

CPAP

Inspiratory Time — 0.1 to 3.0 s
 CPAP Pressure — 0 to 20 mbar
 PIP Pressure — 0 to 65 mbar
 Volume Targeting — 2 to 200 ml
 O₂% — 21% to 100%

CMV / SIMV

BPM — 1 to 150 BPM
 Inspiratory Time — 0.1 to 3.0 s
 PEEP Pressure — 0 to 20 mbar
 PIP Pressure — 0 to 65 mbar
 Volume Targeting — 2 to 200 ml
 O₂% — 21% to 100%

PTV / PSV

Backup — 1 to 150 BPM
 Inspiratory Time — 0.1 to 3.0 s
 PEEP Pressure — 0 to 20 mbar
 PIP Pressure — 0 to 65 mbar
 Volume Targeting — 2 to 200 ml
 O₂% — 21% to 100%

Ventilation Modes: HFO

HFO Only

HFO rate — 3 to 20 Hz
 I:E Ratio — 1:1, 1:2, 1:3
 Delta Pressure Range — 4 to 160 mbar
 (for 3.3 to 6 bar inlet gas pressures)
 Mean Airway Range — 0 to 45 mbar
 O₂% — 21% to 100%

HFO+CMV

BPM — 1 to 150 BPM
 Inspiratory Time — 0.1 to 3.0 s
 HFO rate — 3 to 20 Hz
 PEEP Pressure — 0 to 20 mbar
 PIP Pressure — 0 to 65 mbar
 Delta Pressure Range — 4 to 160 mbar
 (for 3.3 to 6 bar inlet gas pressures)
 O₂% — 21% to 100%

Monitoring Parameters

Flow Sensor

Flow Sensor Type...
 10 mm dual hot-wire anemometer
 (Optional autoclavable or single use).
 Electrically isolated (Type BF)
 Flow Rate — 0.2 to 30 l/min
 Accuracy — ±8% maximum
 Deadspace — 1 ml
 Weight — 10g

Monitoring Parameters (cont.)

Measurement of Flow & Volume

Flow rate — 0 to 99 l/min
 Expiratory Tidal Vol. — 0 to 999 ml
 Expiratory Minute Vol. — 0 to 18 litres
 Tube Leakage — 0 to 50%
 (Resolution: 1% averaged over 10 breaths)
 Respiratory Rate (BPM) — 0 to 999 BPM
 Compliance — 0 to 99.9 ml/mbar
 C20/C Range — 9999
 Sampling Time — 2 ms
 Resistance — 0 to 999 mbar/l/s

All the above values are measured under ATPD (ambient temperature and pressure, dry) conditions. See User Manual for full specifications.

Oxygen Concentration

Range — 21 to 100%

Pressure

Real-time Pressure Measurement — Resolution 1 mbar
 Sampling Time — 2 ms

(In HFO combined mode, Delta P is measured during expiration only.)

User Settable Alarms:

High Pressure

Autoset when patient pressure controls are adjusted or manually adjustable.
 Range — 10 to 110 mbar

Cycle Fail

Autoset when patient pressure controls are adjusted or manually adjustable.
 Range:
 0 or 5 mbar above low pressure threshold (whichever is lower) to 5 mbar below high-pressure threshold.

Low Pressure

Autoset when patient pressure controls are adjusted or manually adjustable.
 Range:
 10 mbar (conventional) / -70 mbar (HFO modes) to 10 mbar below high-pressure threshold.

High Tidal Volume

Range — 3 to 200 ml

Low Tidal Volume

Range — 0 to 200 ml

User Settable Alarms (cont.)

High Minute Volume

Range — 0.02 to 18 litres

Low Minute Volume

Range — 0 to 0.02 litres below high minute volume threshold

Apnoea time

Range — 5 to 60 s

Technical Specifications

Power Requirements

Voltage — 100-240 V
 50-60 Hz
 Power — 80-100 VA
 Battery Back-up — 45-60 min (dependant on mode of operation)
 Battery Charging:
 Full charge 24 hours, 80% charge after 8 hours

Outputs

Serial port, IBM-AT-compatible serial port, 9-pin DSub, RS-232C

Fresh Gas Flow

8 l/min

Air & O₂ Input

Pressures — 2.8 - 6 bar
 Maximum Gas Flow — 60 l/min

Operating Environment

Temperature — 10 - 40°C
 Humidity — 30 - 75% (non-condensing)

Dimensions

Size, Ventilator Only — 330 mm W x 330 mm H x 470 mm D
 Height on Trolley — 1310 mm
 Weight, Ventilator Only — 22.4 kg (with HFO)

Environmental Storage Conditions

When packed for transport or storage:
 Ambient Temp. — -40°C to +70°C
 Relative Humidity — 10% to 90% (non-condensing)
 Atmospheric Pressure — 500 to 1060 mbar

The SLE5000 conforms to all relevant regulations and certifications in the countries in which it is sold. Full details available on request.



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