Introduction to SLE

SLE has been a recognised world leader in the designing and manufacturing of healthcare products for over 40 years.

Our years of experience in infant ventilation, has given us an understanding of the challenges facing clinicians when caring for the tiniest or most critical babies.

From being the pioneers of neonatal Patient Triggered Ventilation (PTV) in the 1980’s, to the introduction of combined HFO in the 1990’s, SLE have maintained a position of strength in neonatal ventilation.

Our guiding principle is to support clinical and nursing staff in their task. The knowledge and experience gained during years of development in neonatal ventilation is evident in the SLE 5000. The SLE 5000 is the result of our ongoing commitments to innovation, competency and cost efficiency.

Along with our well-known and well used High Frequency Oscillation, we have also added Pressure Support Ventilation (PSV), and Targeted Tidal Volume Ventilation (TTV) to our conventional modes of ventilation.

SLE is continually developing technology to produce ventilators that meet the highest standard. Like the healthcare professionals we serve, we are dedicated to finding innovative solutions to clinical challenges.

We have fostered close relationships with several leading universities, hospitals, and industry specialists, which has enabled us to create ventilation products that take advantage of the very latest technology.

SLE invests in on ongoing education, research and development. By continuing to work with the world’s leading scientists, we will ensure that our products will always meet and exceed the needs of the medical community.

SLE Timeline

Newborn 150
1981

Newborn 250
1985

SLE2000
1990

SLE2000 HFO
1995

SLE2000 HFO+
1999

SLE5000
2002

SLE5000 INFANT VENTILATOR
Modes of **CPAP, CMV, TTV, PTV, PSV, SIMV, TTV + PSV, HFO, HFO+CMV**

- Ability to pre set parameters in all modes of operation
- Powerful HFO with active expiration to cover a wide range of patients
- Full colour, total touch screen operation
- Integral flow monitoring measuring lung mechanics and displaying of loops and waveforms
- Trending of measured parameters
- **Standard patient circuit for all modes** *(Except with NO therapy)*
- Unique, patented valveless technology
- Integral battery with 60 minutes operating capability
- Software based allowing for upgrading to versions with new or improved functions

*The SLE5000 is capable of mechanical ventilation of a range of patients from 300g - 20Kg body weight. This is however dependent on the condition of the patient and appropriate use of the ventilator.*
Features and Functions

User Interface
Brightly coloured user touch screen. Easy to use, logical sequence allowing quick, smooth adjustments.

Mode Panel
The mode panel is the user's interface to all mode-related functions.

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.

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

Patient Circuit Connections
Front panel mounted patient circuit connections with (autoclavable) exhalation block.
**Integral Flow Monitoring**
Allows real time wave forms of flow, pressure and volume to be displayed. Loops depicting flow/volume, flow/pressure and volume/flow may also be displayed.

**Realtime Data Display**
Realtime lung mechanic measurements and ventilatory data. This allows for continuous feedback for making crucial clinical decisions.

**Night Mode and Screen Lock**
A low level light mode for night time environments with automatic screen locking. Auto activation on an alarm condition.

**Screen Pause**
Wave form freeze for review.
Advanced Ventilator Features

TTV
There is increasing clinical evidence to suggest that it is volutrauma that causes lung injury, which is worsened by barotrauma. It is also evident that efficient gaseous exchange is dependant on the delivery of appropriate tidal volumes.

Targeted Tidal Volume (TTV) enables the user to select a target volume that they wish to achieve, allowing the ventilator to adjust PIP and Ti to achieve and maintain the selected tidal volume.

Main benefits of TTV:
- Reduction in volutrauma
- A stable tidal volume accommodating changes in resistance and compliance
- A more stable PaCO₂ resulting in reduced episodes of hypocapnia and hypercapnia
- Reduction in barotrauma
- Ability to self wean

PSV
In this mode of ventilation the infant has the ability to trigger and terminate every breath. The main aim of PSV is to reduce the ‘work of breathing’ (WOB) in the spontaneously breathing infant.

Main benefits of PSV:
- Reduced WOB
- Improved infant/ventilator synchrony
- Reduced need for sedation
- Retraining of respiratory musculature
- Reduced time to wean

PSV is designed and used in the weaning process and can be used with or without Synchronous Intermittent Mandatory Ventilation (SIMV).

HFO
In the SLE 5000, HFO is powerful enough to cater for a wide range of patients e.g. 300g to 20kg, dependant on lung mechanics. The SLE5000 provides sinusoidal ventilation with active expiration.

Main benefits of HFO:
- Improves ventilation at lower pressures
- Higher levels of PEEP can be used without having to use high peak airway pressures to maintain appropriate levels of CO₂
- Produces more uniform lung recruitment
- Reduces airleaks
- Improved oxygenation in infants with severe RDS
**Technical Specification**

**Ventilation Modes**

**Conventional**
- **CPAP / PTV / PSV**
  - Inspiratory Time: 0.1 to 3.0 sec
  - CPAP Pressure: 0 to 20 mbar
  - Inspiratory Pressure: 0 to 65 mbar
  - Volume Targeting: 3 to 200 ml
  - \( \text{FI}_2 \): 21% to 100%

**CMV / SIMV**
- **BPM**: 1 to 150
- **I:E Ratio**: (11.2:1 to 1:600)
- Inspiratory Time: 0.1 to 3.0 sec
- **PEEP Pressure**: 0 to 20 mbar
- **Inspiratory Pressure**: 0 to 65 mbar
- **Volume Targeting**: 3 to 200 ml
- **\( \text{FI}_2 \)**: 21% to 100%

**HFO Ventilation**

**HFO Only**
- **Frequency Range**: 3-20 Hz
- **I:E Ratio**: 1:1
- **Delta Pressure Range**: 4 to 180 mbar
- **Mean airway range**: 0 to 35 mbar
- **\( \text{FI}_2 \)**: 21% to 100%

**HFO+CMV**
- **BPM**: 1 to 150
- **Inspiratory Time**: 0.1 to 3.0 sec
- **Frequency Range**: 3-20 Hz
- **I:E**: (11.2:1 to 1:600)
- **Inspiratory Pressure**: 0 to 65 mbar
- **Delta Pressure Range**: 4 to 180 mbar
- **Mean airway range**: 0 to 35 mbar
- **\( \text{FI}_2 \)**: 21% to 100%

**Monitoring Parameters**

**Measurement of Flow & Volume**
- **Flow Sensor Type**: 10 mm dual-hot-wire-anemometer (autoclavable)
- **Flow Rate**: 0.2 to 32 lpm (Accuracy 8%)
- **Expiratory Tidal Volume**: 0 to 999 ml
- **Expiratory Minute Volume**: 0 to 18 litres
- **Deadspace**: 1 ml
- **Weight**: 10 g

**Conventional Ventilation & combined modes only**:
- **Tube Leakage**: 0 to 50% (Resolution: 5%, averaged over 5 breaths)
- **Breath Rate (total)**: 0 to 150 BPM
- **Dynamic Compliance**: 0 to 100 ml/mbar (Resolution: 1 ml/mbar)
- **C20/C**: Resolution 0.1
- **Sampling Time**: 2 ms
- **Resistance**: 0 to 1000 mbar .second/l
- **Triggering**: Inspiratory flow (0.2 to 10 lpm)

Above values are measured under ATPD (ambient temperature and pressure, dry) conditions

**Oxygen Concentration**
- **Range**: 21 to 100% (Resolution 1%)

**Pressure**
- **Real Time Pressure measurement**: Resolution: 1 mbar
- **Sampling Time**: 2 ms
- **Peak Pressure**: 0 to 175 mbar (resolution 1 mbar)
- **PEEP Pressure**: 0 to 175 mbar (resolution 1 mbar)
- **Mean Pressure**: -175 to 175 mbar (resolution 1 mbar)

In HFO combined mode Delta P is measured during expiration only

**User Settable alarms**

**High Pressure**
- Autoset when patient pressure controls are adjusted or can be manually adjustable
- **Range**: 10 to 110 mbar
- **Resolution**: 0.5 mbar

**Cycle Fail**
- Autoset when patient pressure controls are adjusted or may be manually adjusted

**Low Pressure**
- Autoset when patient pressure controls are adjusted or can be manually adjustable
- **Range**: -10 mbar (Conventional)
- **Resolution**: 0.5 mbar
- **Low Tidal Volume**
  - **Range**: 0 to 35 ml
  - **Resolution**: 0.2 ml
- **Low Minute Volume**
  - **Range**: 0 to 0.1 litres below high minute volume threshold
  - **Resolution**: 0.1 litre
- **High Minute Volume**
  - **Range**: 0 to 18 litres
  - **Resolution**: 0.1 litre

**Apnoea time**
- Settable only in CPAP or when Backup rate less than 20 BPM
- **Range**: 3 to 60 sec
- **Resolution**: 1 second

**Power, Dimensions, Standards etc.**

**Power Requirements**
- **Voltage**: 100-250V/ 50-60Hz
- **Power**: 115 VA
- **Battery life**: 10 years

**Battery back up, 45-60 minutes dependant on mode of operation**

**Battery Charging**: Full charge 24 hours, 80% charge after 8 hours

**Outputs**
- **RS-232C**
- **Air and \( \text{O}_2 \) input**
  - **Pressures**: 3-5 bar
  - **Fresh Gas Flow**: 8 litres/min
  - **Maximum gas flow**: 60 litres/min

**Patient Circuits**
- **10mm single use**
- **10mm Re-usable**
- **15mm single use**
- **15mm Re-usable**

**Operating Environment**
- **Temp**: 10-40°C
- **Humidity**: 0-90% (Non condensing)

**Dimensions**
- **Size, Ventilator only**: 330mm W x 330mm H x 470mm D
- **Height on short stand**: 1140 cms
- **Height on tall stand**: 1270 cms
- **Weight (ventilator only)**: 23.6 Kgs

**Conducted to conform to**
- **BS EN 475:1995**
- **BS EN 794-1:1997**
- **BS EN 60601-1:1990**
- **BS EN 60101-1-2:1993**
- **BS EN 60601-1-4: 1996**
- **Medical Devices Directive (93/42/EEC)**
- **European conformity mark: CE 0120**

**Environmental storage conditions**
- **When packed for transport or storage**
  - **Ambient Temperature**: -40°C to +70°C
  - **Relative Humidity**: 10% to 90% non condensing

**Atmospheric Pressure**
- **500hPa to 1060hPa**