



# TwinStream™ ICU

*Pulsatile bilevel  
ventilation*

*for respiratory  
disease*

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Breathing Engineering

# Pulsatile bilevel ventilation

## Respiratory disease:

Pulsatile bilevel ventilation (p-BLV™) has been in clinical use for more than 10 years now. It provides high-frequency ventilation (50-1500/min) at two different pressure levels and is an established ventilation approach for respiratory disease in neonates, infants and adults in many European hospitals.

## Improved gas exchange:

p-BLV™ is known to treat respiratory distress syndrome more successfully and more gently than ventilation at conventional breathing frequencies. Its pulsatile flow pattern enhances gas mixing in smaller airways and thus improves gas exchange<sup>3,6</sup>.

## Lower peak pressures:

At the same time p-BLV™ generates lower peak pressures compared to conventional ventilation, thereby also reducing the risk of barotrauma and volutrauma<sup>1,2,5</sup>.



## Clinical advantages:

- Improved oxygenation<sup>3,6</sup>
- Improved CO<sub>2</sub> elimination<sup>3,6</sup>
- Increased FRC<sup>6</sup>
- Reduced atelectasis<sup>3</sup>
- Lower peak pressures<sup>1,2</sup>
- Reduced risk of barotrauma<sup>5</sup>
- Reduced risk of volutrauma<sup>5</sup>
- Haemodynamic stability
- Reinforced secretion clearance<sup>4</sup>

## Technical specifications

10.4" touchscreen

Ventilation modes:

- CPAP
- Pulsatile CPAP (p-CPAP)
- Bilevel ventilation (BLV)
- Pulsatile bilevel ventilation (p-BLV™)

Frequency:

- High frequency: 50 - 1500 /min
- Normal frequency: 1 - 100 /min

Emission pressure:

- High frequency: 0.1 - 2.0 bar
- Normal frequency: 0.1 - 3.5 bar

Monitoring:

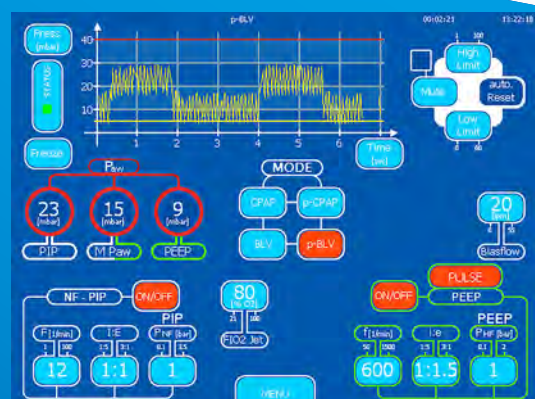
- PIP, PEEP, MAP
- FiO<sub>2</sub>

Patient safety:

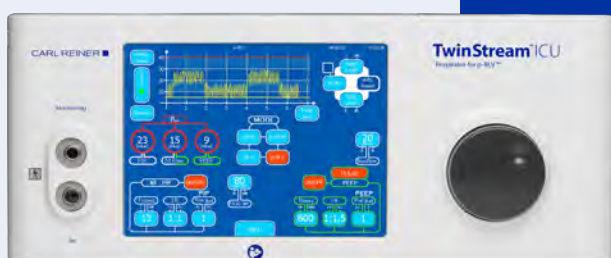
- Automatic pressure limit
- Active humidification

## Clinical indications:

- ARDS, ALI, VILI
- SARS, MERS, COVID-19
- Thoracic trauma, multi-trauma
- Severe burns
- Alternative to ECMO



TwinStream™ ICU



<sup>1</sup> Keszler, M., Donn, S. M., Bucciarelli, R. L., Alverson, D. C., Hart, M., and Lunyong, V. (1991). Multicenter controlled trial comparing high-frequency jet ventilation and conventional mechanical ventilation in newborn infants with pulmonary interstitial emphysema. *J. Pediatr.* 119, 85–93.

<sup>2</sup> Keszler, M., H.D. Modanlou, D.S. Brudno, F.I. Clark, R.S. Cohen, R.M. Ryan, et al. (1997), Multicenter controlled clinical trial of high-frequency jet ventilation in preterm infants with uncomplicated respiratory distress syndrome. *Pediatrics* 100, 593–599.

<sup>3</sup> Kraincuk, P., Körmöczi, G., Prokop, M., Ihra, G., Aloy, A. (2003): Alveolar recruitment of atelectasis under combined high-frequency jet ventilation: A computed tomography study. *Intensive Care Med* 2003; 29:1265–72

<sup>4</sup> Miller, A. G., Bartle, R. M., and Rehder, K. J. (2021a). High-Frequency Jet Ventilation in Neonatal and Pediatric Subjects: a Narrative Review. *Respir. Care* 66, 845–856.

<sup>5</sup> Swenson, A.W. & Becker, M.A. & Donn, S.M. & Attar, Mohammad. (2011). The use of high frequency jet ventilation to treat suspected pulmonary hypoplasia. *Journal of Neonatal-Perinatal Medicine.* 4. 33-37.

<sup>6</sup> Sütterlin, R., LoMauro, A., Gandolfi, S., Priori, R., Aliverti, A., Frykholm, P., Larsson, A. (2015); Influence of Tracheal Obstruction on the Efficacy of Superimposed High-frequency Jet Ventilation and Single-frequency Jet Ventilation. *Anesthesiology* 2015; 123:799–809