TwinStream™ EVO

jet ventilator

CARL REINER®

TwinStream™ EVO
jet ventilator

Shared airway

TwinStream™ EVO provides an unparalleled solution for procedures in a shared airway, when both surgeon and anaesthetist require access to the same upper airway (laryngology) or lower airway (interventional pulmonology or thoracic surgery).

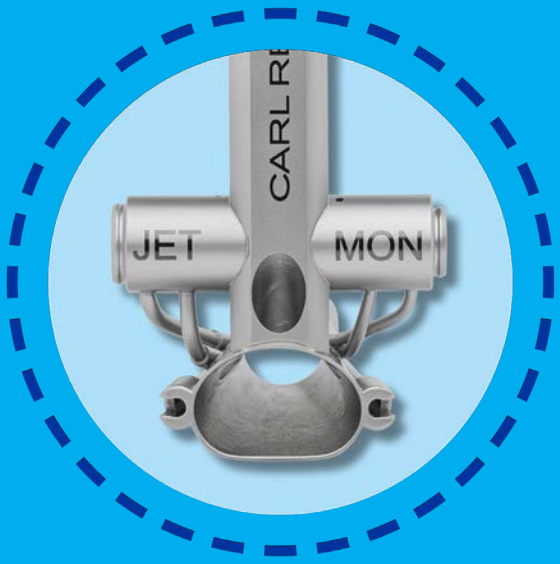
Motion management

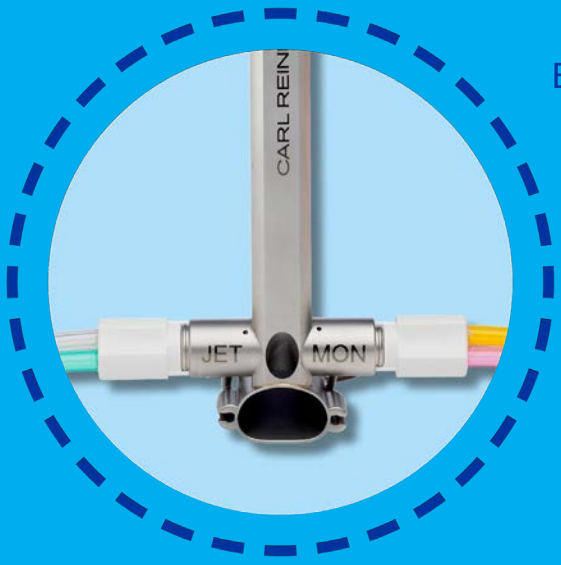
TwinStream™ EVO can immobilise the thorax and abdomen in conventionally intubated patients. S-HFJV™ can reduce respiratory motion to a minimum during procedures in e.g. interventional radiology or interventional cardiology[3,4].

TwinStream™ EVO
jet endoscopes

4 integrated channels

Carl Reiner jet endoscopes come with 2 integrated channels for ventilation (normal and high frequency) and 2 integrated channels for monitoring (airway pressures and gas concentrations). This unique design allows for tubeless supraglottic jet ventilation[5,6]. In addition, monitoring the oxygen concentration within the airway allows for optimal patient safety during laser surgery.





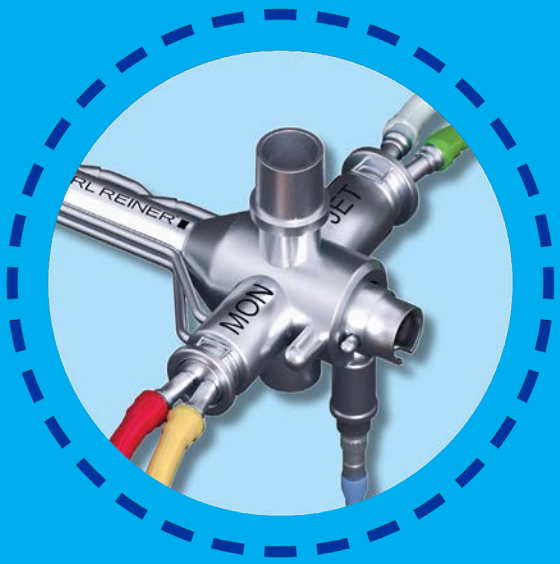
EasyConnect™ lines

The plug-and-play connectors for the patient tubing effortlessly click into place. Their ergonomic position to the left and right of the jet endoscopes provides a completely free main orifice for surgical access. To assure maximum patient safety both connectors have a different diameter, making sure the lines cannot be inadvertently interchanged.

Additional features

All Carl Reiner jet endoscopes benefit from a specially developed anti-reflection surface treatment to achieve optimal results during laser surgery.

Jet bronchoscopes come with additional inlets for a prismatic light deflector, an adapter to cover the main orifice with various caps and a standard 15 mm connection for emergency ventilation with a self-inflating bag.



Laryngology

Jet Laryngoscope:

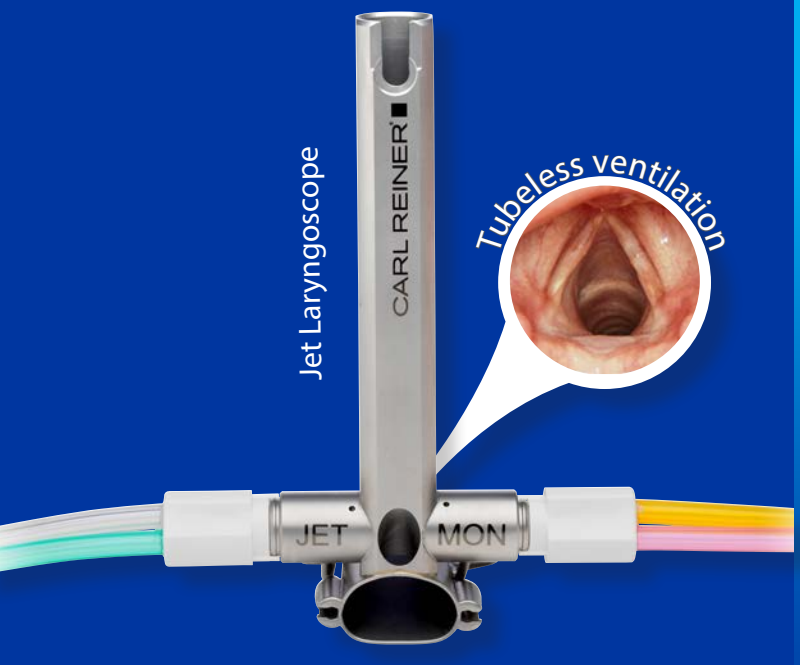
Tubeless supraglottic jet ventilation allows for optimal laryngotracheal surgery without endotracheal tube or jet catheter restricting the surgeon's view and access[6].
Even a challenging (sub)glottic stenosis can easily be treated supraglottically[5].

Jet Catheter:

Infraglottic jet ventilation allows for laryngo-tracheal surgery by means of a thin jet catheter, ranging from 1 to 4 lumens (OD 2.7 - 6.6 mm).

Laser surgery:

Laser Safe Mode (LSM) reduces the oxygen concentration in the airway down to the exact desired level to avoid any risk of airway fires.



Clinical advantages:

Tubeless ventilation:

- Complete surgical visibility
- Optimal surgical access

Double jet ventilation:

- Optimal oxygenation[1,2]
- CO_2 elimination (no time limit)[6]

Patient safety:

- Laser Safe Mode (LSM)
- Pressure & gas monitoring

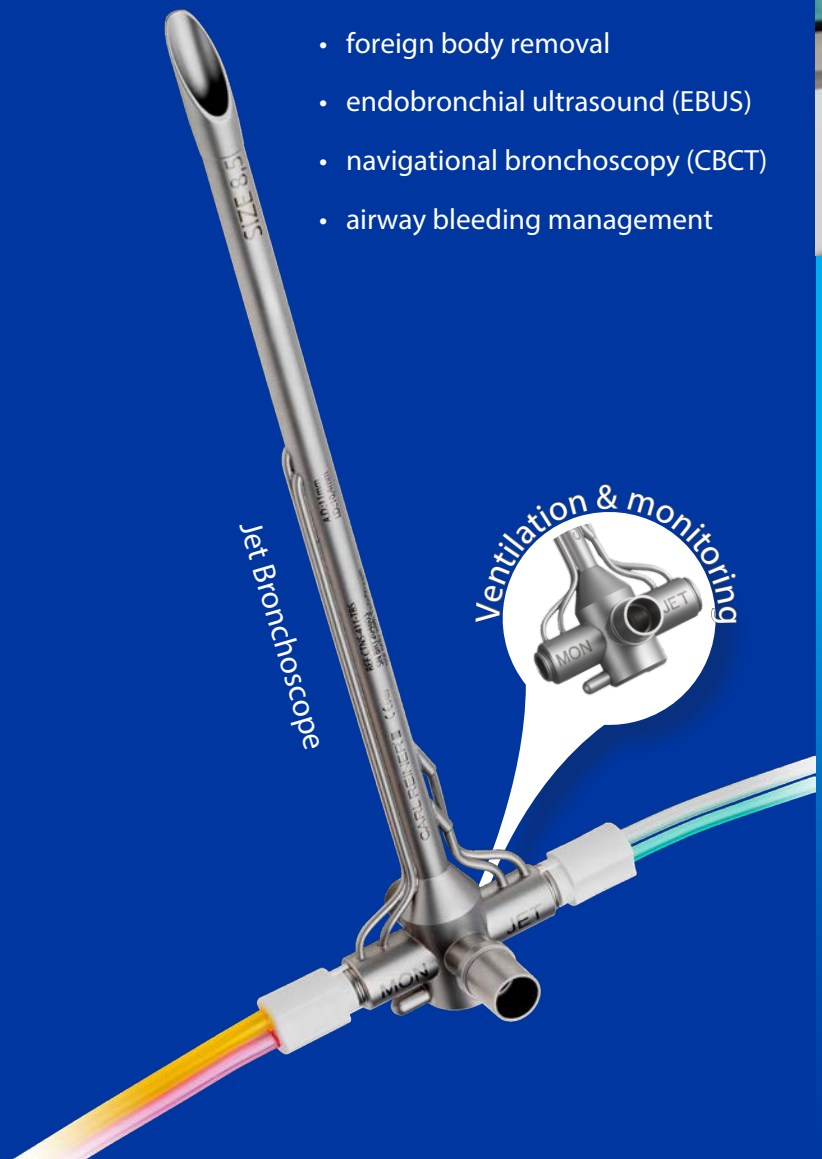
Interventional Pulmonology

Rigid jet endoscope:

A 'Jet Bronchoscope' or 'Jet Tracheobronchoscope' comes with integrated channels for double jet ventilation, airway pressure monitoring and gas monitoring.

A rigid jet endoscope provides unrestricted access to an 'open' airway for a wide array of interventional bronchoscopic procedures, such as e.g.:

- restoring airway patency:
  - laser surgery
  - electrocautery
  - cryotherapy
  - argon plasma coagulation
  - stent placement
- foreign body removal
- endobronchial ultrasound (EBUS)
- navigational bronchoscopy (CBCT)
- airway bleeding management



Clinical advantages:

Rigid jet endoscope:

- Complete surgical visibility
- Optimal surgical access

Double jet ventilation:

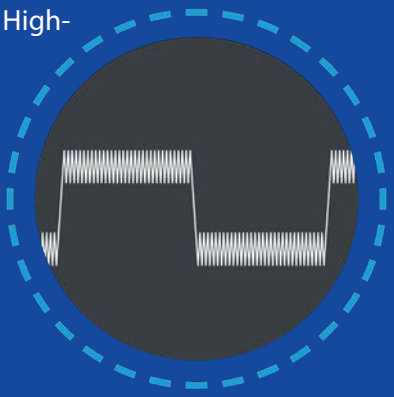
- Optimal oxygenation[1,2]
- CO_2 elimination (no time limit)[6]

Patient safety:

- Laser Safe Mode (LSM)
- Pressure & gas monitoring

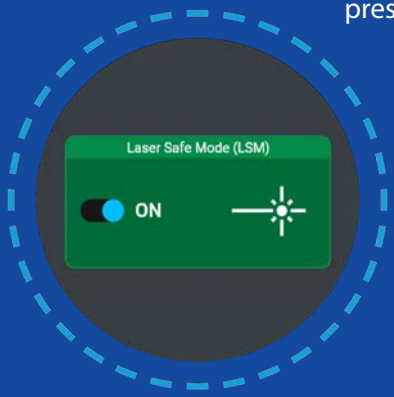
‘Double’ jet ventilation

Superimposed High-Frequency Jet Ventilation (S-HFJV™) combines a pressure-controlled ventilation at normal frequency, e.g. 12/min, with High-Frequency Jet Ventilation (HFJV) at e.g. 600/min. The high frequency is ‘superimposed’ over the normal frequency.



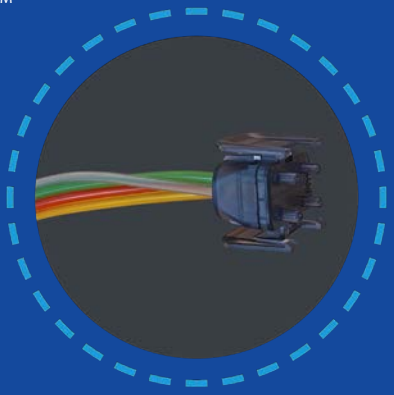
Laser Safe Mode

To avoid any risk of airway fire during laser surgery the Laser Safe Mode (LSM) reduces the set FiO_2 concentration to a preset value (between 21- 40%). In addition, it measures the real-time O_2 concentration in the airway and informs you when it is safe to use the laser.



EvoConnect™

TwinStream™ EVO comes with a single-use tubing set, which is equipped with an ergonomically designed connector. The EvoConnect™ system allows for effortless plug and play of the patient tubing. In addition it eliminates any risk of tubing misconnection.

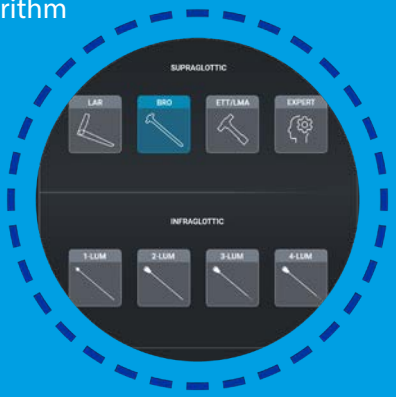


Ergonomic display

The external 15.6" touchscreen is tiltable and allows for optimal visualisation of all graphic and numeric values. An additional 5" touchscreen is integrated into the ventilator itself.

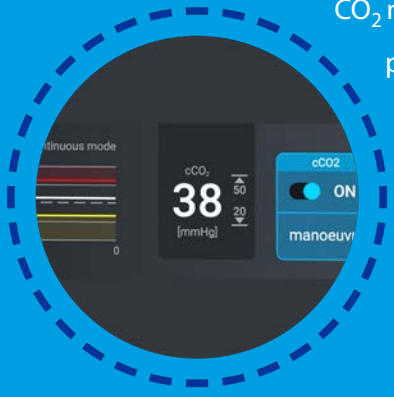
Ventilation modes

A ventilation mode is available for each type of patient interface. In LAR, BRO and ETT/LMA mode a weight-based algorithm provides the default ventilation parameters.



cCO_2 measurement

In addition to the intermittent CO_2 measurement, TwinStream™ EVO now also features continuous CO_2 monitoring. cCO_2 provides both a trend and a numerical value, even during high-frequency jet ventilation.



Thoracic surgery

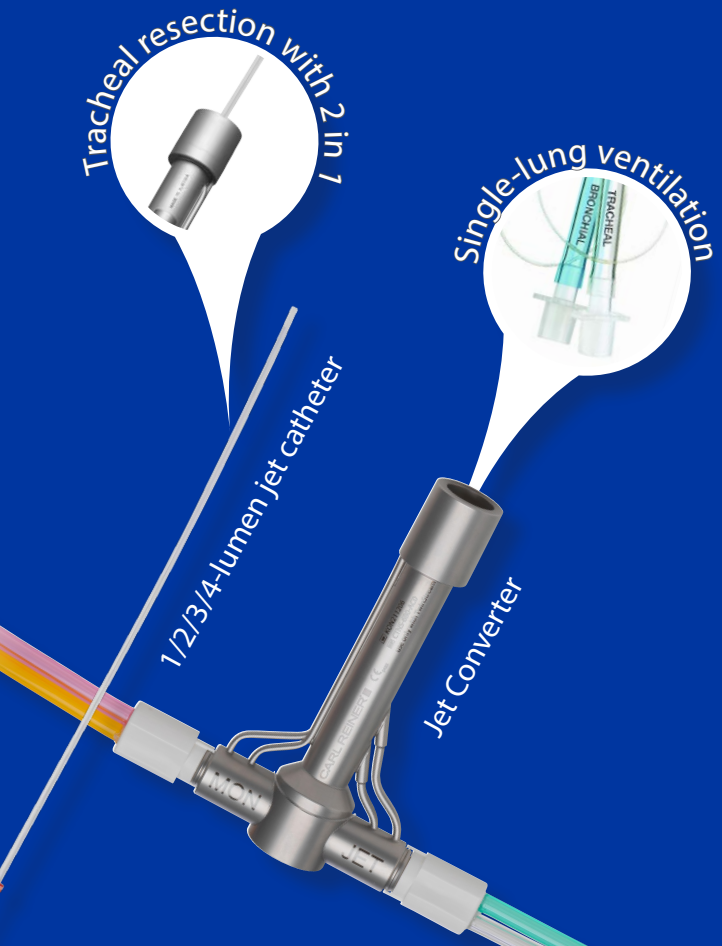
Jet catheter:

Several different types of jet catheters, ranging from 1 to 4 lumens, allow for shared airway procedures such as e.g. various resections (trachea, carina, pleura, lobe or lung).

Jet Converter:

A combination of Jet Converter and jet catheter allows switching from a wide endotracheal tube to a tiny jet catheter and back. During e.g. a tracheal resection this provides the surgeon with optimal working space when required.

During Single-Lung Ventilation the Jet Converter connects to a Double-Lumen Tube to gently ventilate the operated lung. HFJV provides optimal oxygenation, while its frequency range (up to 2000/min) reduces any lung motion to an absolute minimum[1,2,3,4].



Clinical advantages:

Resection:

- Optimal surgical access
- 2.7 - 6.6 mm jet catheter
- CO_2 elimination (no time limit)

Single-lung ventilation:

- Oxygenation of operated lung[1,2]
- Virtually no lung motion[3,4]
- No aggressive recruitment

Patient safety:

- Pressure & gas monitoring

Interventional Radiology

Jet Converter:

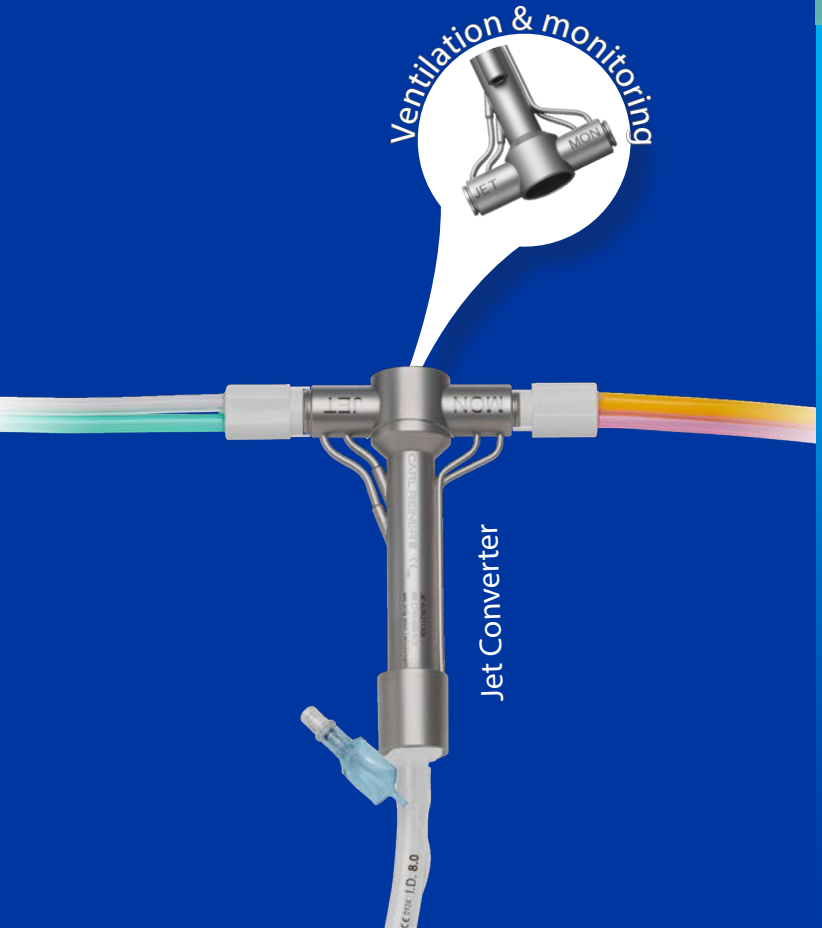
A Jet Converter can connect to any endotracheal tube or laryngeal mask airway, making it possible to use jet ventilation on conventionally intubated patients.

Interventional radiology:

During tumour ablation the exact targeting of the tumour is essential for the accuracy of the therapeutic effect, as well as to avoid collateral damage to healthy tissue.

High-Frequency Jet Ventilation (HFJV) can attain a frequency as high as 2000/min, effectively reducing the respiratory motion to virtually nothing[3,4].

Superimposed High-Frequency Jet Ventilation (S-HFJV™) allows for optimal reduction of respiratory motion in the thoracoabdominal environment, while still guaranteeing optimal CO_2 elimination, especially during longer procedures, which may take up to 4-5 hours.



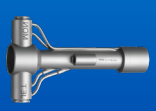
Clinical advantages:

Jet Converter:

- S-HFJV™ for intubated patients
- Pressure & gas monitoring

Double jet ventilation:

- Optimal oxygenation[1,2]
- Optimal CO_2 elimination[6]
- Reduced respiratory motion



Interventional Cardiology

Jet Converter:

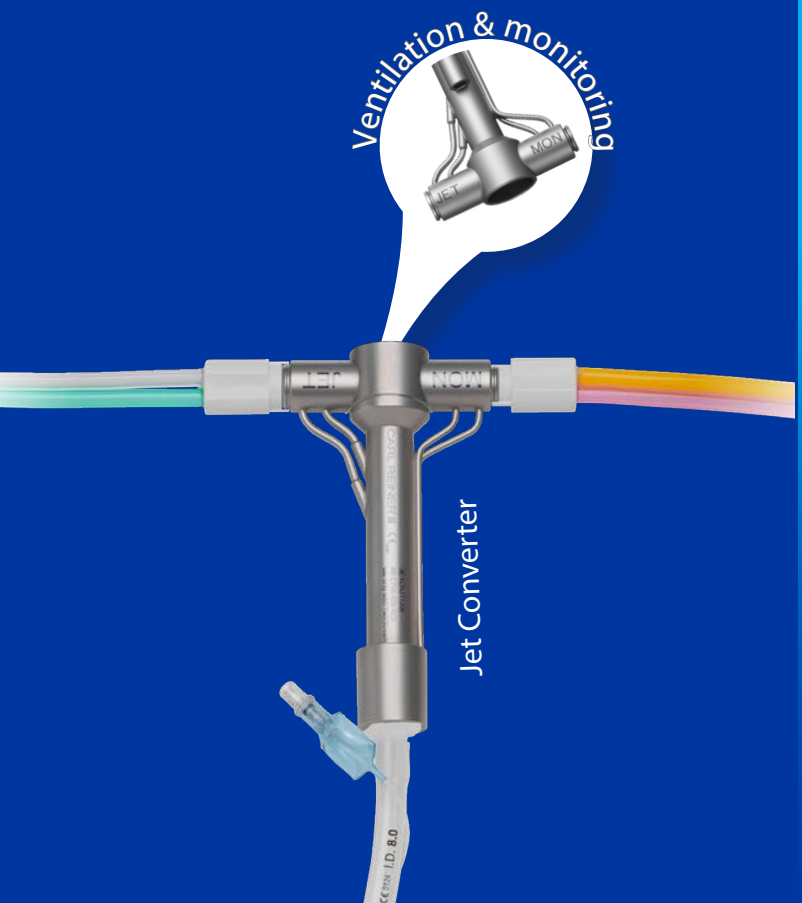
A Jet Converter can connect to any endotracheal tube or laryngeal mask airway, making it possible to use jet ventilation on conventionally intubated patients.

Interventional cardiology:

During treatment of cardiac arrhythmia by means of radiofrequency ablation (RFA) the stability of the contact between the ablation catheter tip and the cardiac tissue is of crucial importance.

Compared to conventional ventilation High-Frequency Jet Ventilation (HFJV) is known to improve the stability of this contact significantly.

Superimposed High-Frequency Jet Ventilation (S-HFJV™) allows for optimal reduction of respiratory motion, while still guaranteeing optimal CO_2 elimination, especially during longer procedures, which may take up to 4-5 hours.



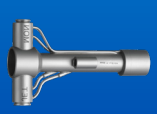
Clinical advantages:

Jet Converter:

- S-HFJV™ for intubated patients
- Pressure & gas monitoring

Double jet ventilation:

- Optimal oxygenation[1,2]
- Optimal CO_2 elimination[6]
- Reduced respiratory motion



Configurations

TwinStream™ EVO
single jet ventilator

5" touchscreen
Single-jet ventilation (HFJV) • HF: 50 - 200 /min
Ventilation mode: • 1-lumen mode
Monitoring: • Pause pressure • $FiO_{2\ JET}$
Patient safety: • Laser Safe Mode (LSM) • Automatic pressure limit

TwinStream™ EVO
double jet ventilator

15.6" + 5" touchscreen
Double-jet ventilation (S-HFJV™) • HF: 50 - 2000 /min • NF: 1 - 120 /min
Ventilation modes: • LAR mode • BRO mode • ETT/LMA mode • 1-lumen mode • 2-lumen mode • 3-lumen mode • 4-lumen mode
Monitoring: • PIP, PEEP, MP_{AW}, ΔpHF • $FiO_{2\ JET}$, $FiO_{2\ AW}$, cCO_2, $EtCO_2$
Patient safety: • Laser Safe Mode (LSM) • Automatic pressure limit

[1] 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

[2] 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

[3] Galmén K, Harbut P, Freedman J, Jakobsson JG (2017); The use of high-frequency ventilation during general anaesthesia: an update. F1000Res 6: 756.

[4] Galmén K, Freedman J, Toporek G et al. (2018): Clinical application of high frequency jet ventilation in stereotactic liver ablations – a methodological study [version 2; peer review: 2 approved]. F1000Research 2018, 7:773

[5] Wijermars LGM, Hoekstra CEL, Nguyen TTT, Stevens MF, Dikkers FG. (2022): New Treatment Strategy for Subglottic Stenosis Using the Trachealator, a Novel Non-occlusive Balloon. Laryngoscope. 2022 Nov;132(11):2202-2205.

[6] Windpassinger M., Prusak M., Gemeiner J., Edlinger-Stanger M., Imme Roesner, Denk-Linnert D-M., Plattner O., Khattab A., Kaniusas E., Wang L., Sessler D. (2025): Regional lung ventilation during supraglottic and subglottic jet ventilation: A randomized cross-over trial. Journal of Clinical Anesthesia 102 (2025) 111773.

CARL REINER®

Manufactured by Carl Reiner GmbH, Mariannengasse 17, 1090 Vienna, Austria, +43 1 402 62 51 0

www.carlreiner.eu