TwinStream™

Modern
jet ventilation

in a shared
airway

CARL REINER®
Breathing Engineering

TwinStream™ jet ventilator

Shared airway procedures:

The TwinStream™ provides an unparalleled solution for procedures in a shared airway, when both surgeon and anaesthetist require access to the same upper airway (Otolaryngology) or lower airway (Interventional pulmonology and Thoracic surgery).
With over a decade of clinical use, the TwinStream™ has proven itself an invaluable asset in numerous university hospitals across the European continent.

'Superimposed' HFJV:

Its unique combination of high-frequency (50-1500/min) and low-frequency ventilation (1-100/min) provides both optimal oxygenation and efficient CO_2 elimination at the same time. This is why Superimposed High-Frequency Jet Ventilation (S-HFJV) can be used without any time limit.

Jet Catheters

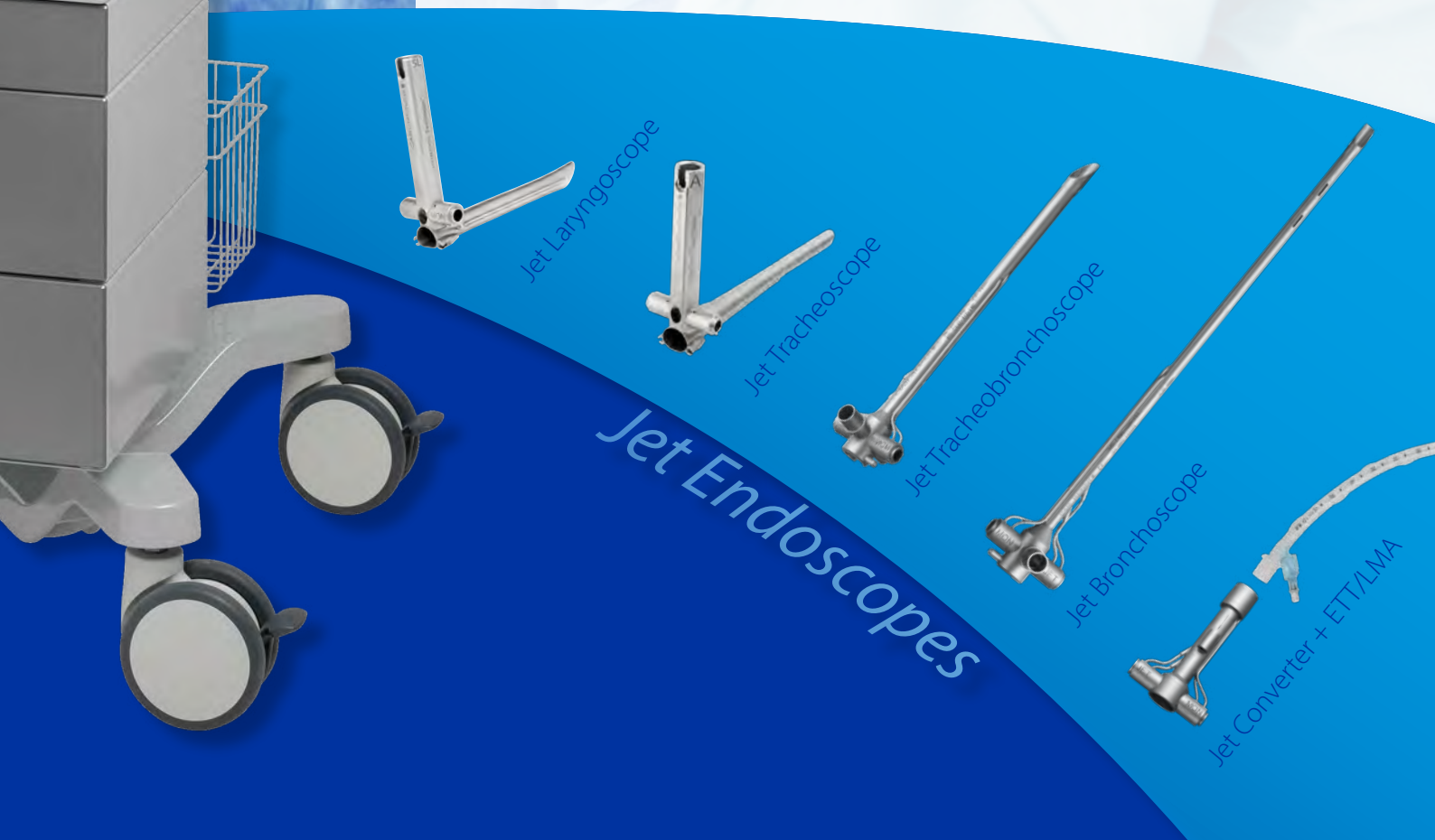
Single jet or double jet ?

Single jet (HFJV):

- High-frequency jet ventilation
- Fully accessible airway
- Superior oxygenation
- 1/2-lumen Jet Catheters
- PP monitoring
- Gas monitoring in airway
- Laser Safe Mode (LSM)
- Automatic pressure alarm

Double jet (S-HFJV):

- High-frequency jet ventilation
- Low-frequency jet ventilation
- Fully accessible airway
- Superior oxygenation
- CO_2 elimination
- Customised Jet Endoscopes
- 3/4-lumen Jet Catheters
- PIP, PEEP, MAP monitoring
- Gas monitoring in airway
- Laser Safe Mode (LSM)
- Automatic pressure alarm



Otolaryngology

Jet Catheter:

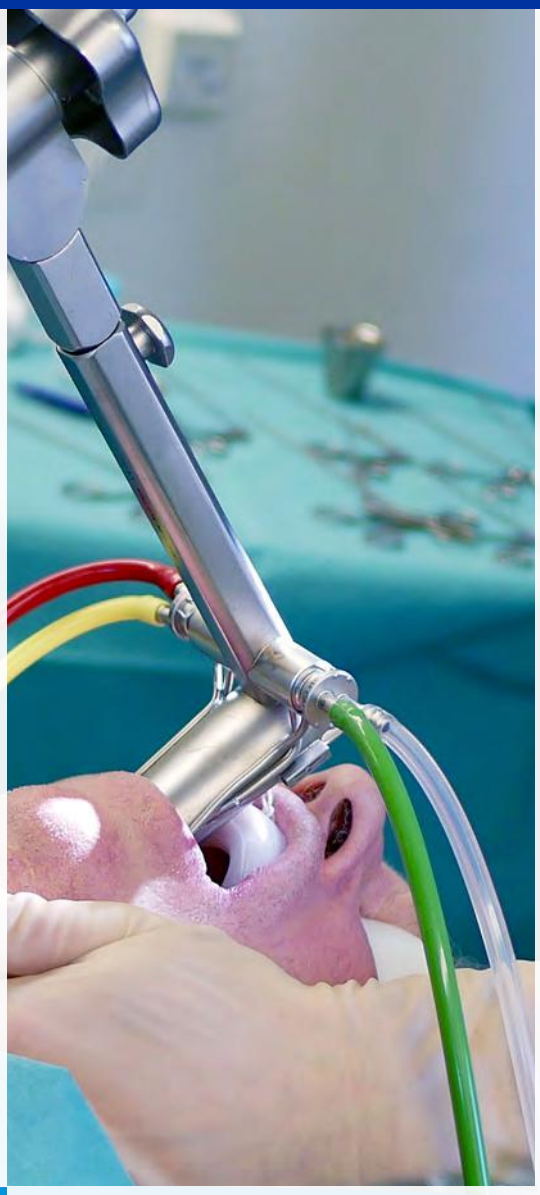
Infraglottic jet ventilation allows for laryngotracheal surgery (e.g. tumor resection, polyp removal, cyst removal, etc.) by means of a thin (laser-resistant) Jet Catheter, ranging from 1 to 4 lumens (OD 2.7 - 6.6 mm).

Jet Laryngoscope:

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

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 accessibility*

Double jet ventilation:

- *Optimal oxygenation*
- *CO_2 elimination (no time limit)*

Patient safety:

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

Interventional pulmonology

Rigid jet endoscope:

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

At the same time an 'open' jet endoscope provides optimal airway accessibility for a wide array of shared airway procedures such as e.g.:

- rigid bronchoscopy
- foreign bodies
- EBUS-TBNA
- APC
- cryotherapy
- stent placement
- laser surgery

Clinical advantages:

Rigid jet endoscope:

- *Open airway*
- *Integrated channels*

Double jet ventilation:

- *Optimal oxygenation*
- *CO_2 elimination (no time limit)*

Patient safety:

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

Thoracic surgery

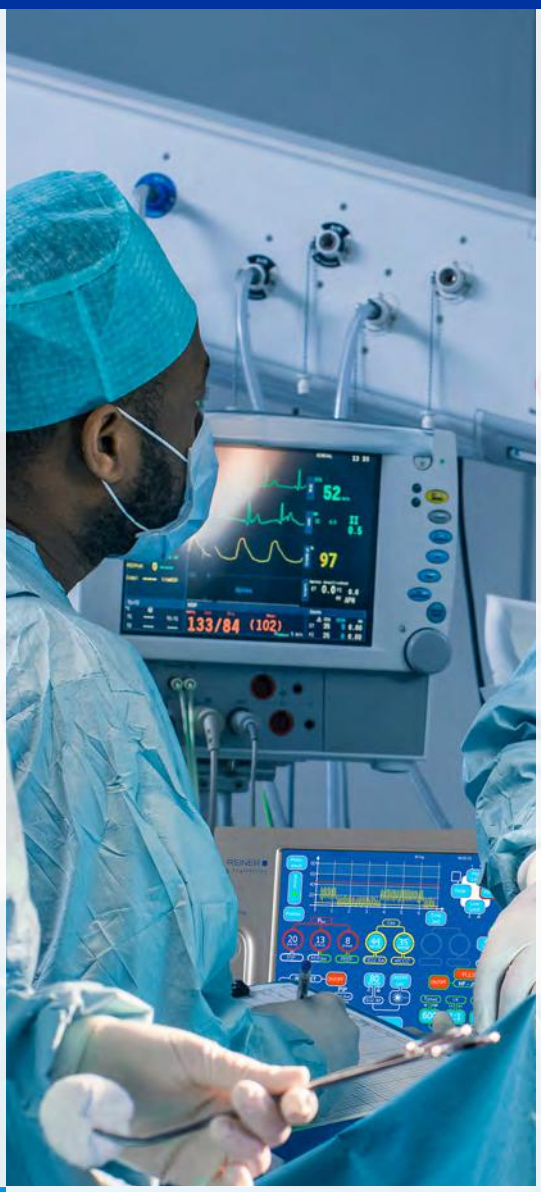
Jet Catheter:

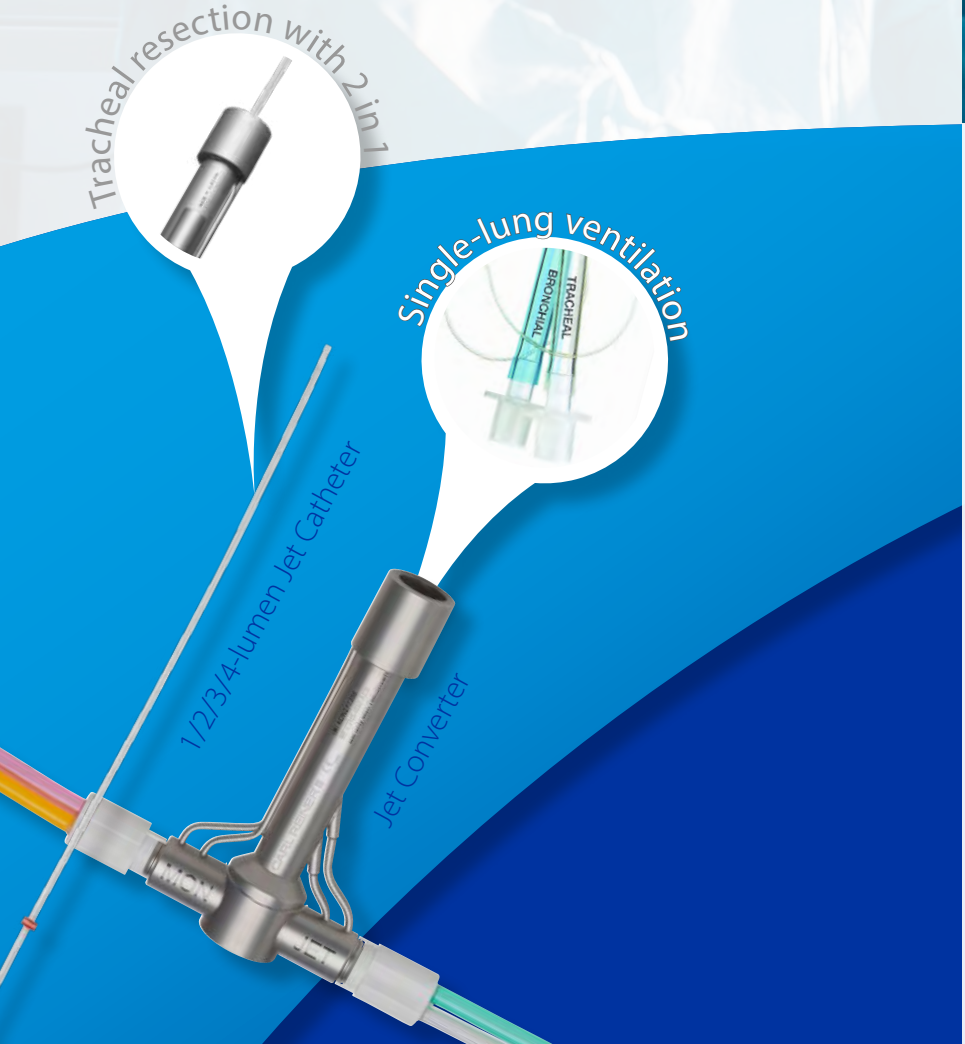
Several different types of Jet Catheters, ranging from 1 to 4 lumens, allow for shared airway procedures such as e.g. various resections (trachea, carina, pleura, lobe or lung).

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 1500/min) reduces any lung motion to an absolute minimum.





Clinical advantages:

Resection:

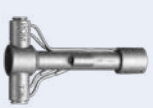
- *Optimal surgical accessibility*
- *2.7 - 6.6 mm jet catheter*
- *CO_2 elimination (no time limit)*

Single-lung ventilation:

- *Oxygenation of operated lung*
- *Virtually no lung motion*
- *No aggressive recruitment*

Patient safety:

- *Pressure & gas monitoring*

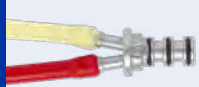


TwinStream™ configurations

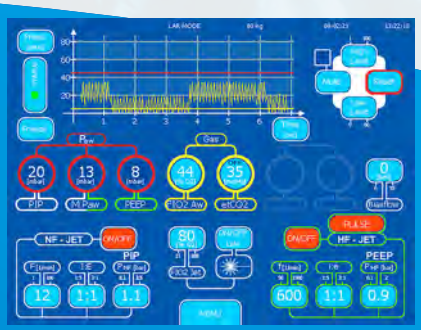
TwinStream™ ONE	TwinStream™
10.4" touchscreen	10.4" touchscreen
Single-jet ventilation (HFJV) • *HF: 50 - 200 /min*	Double-jet ventilation (S-HFJV) • *HF: 50 - 1500 /min* • *NF: 1 - 100 /min*
Ventilation mode: • *1-lumen mode*	Ventilation modes: • *Laryngoscopy mode* • *Bronchoscopy mode* • *1-lumen mode* • *2-lumen mode* • *3-lumen mode* • *4-lumen mode*
Monitoring: • *Pause pressure*	Monitoring: • *PIP, PEEP, MAP* • *$FiO_{2\,JET}$, $FiO_{2\,AW}$, $EtCO_2$*
Patient safety: • *Laser Safe Mode (LSM)* • *Automatic pressure limit*	Patient safety: • *Laser Safe Mode (LSM)* • *Automatic pressure limit*
Fully upgradable	*Configurable as required*

EasyConnect™:

Non-interchangeable jet & monitoring lines



TwinStream™ ONE



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CARL REINER®

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