



## Vyntus® PNEUMO | Vyntus® IOS | Vyntus® APS

Modular high-end PC-Spirometer for spirometry, impulse oscillometry and bronchial challenge testing

# One device, your flexibility

The **modular JAEGER®** Vyntus PNEUMO spirometer and the Vyntus IOS impulse oscillometry system go hand in hand with the Vyntus APS for bronchial challenge testing, in one compact device. The Vyntus Family offers many **further measurement capabilities** to extend your diagnostic testing.

And all this **powered by the SentrySuite®** software platform for intelligent respiratory diagnostics.



Vyntus PNEUMO

Vyntus IOS

Vyntus APS/PNEUMO

Vyntus APS/IOS

STANDARD TESTING CAPABILITITES

Slow Spirometry Forced Spirometry Maximum Voluntary Ventilation	✓	✓	✓	✓
Pre and Post handling Trending	✓	✓	✓	✓
Impulse Oscillometry for central and peripheral airway resistance		✓		✓
Bronchial Challenge Testing with software controlled nebulizer			✓	✓

OPTIONAL TESTING CAPABILITITES

Rocc airway resistance PO.1, MIP/MEP SNIP – Sniff nasal insp. pressure Rhinomanometry Compliance  Vyntus® ECG for rest and stress			✓	
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# Vyntus PNEUMO/IOS – The heart of the system, the JAEGER flow and volume transducer

**Thousands** of PFT labs depend every day on Vyair's proven, accurate, reliable **heated JAEGER pneumotach**.

For **hundreds** of publications the JAEGER pneumotach was the device of choice. Its excellent dynamic range effectively tests a broad population from small children to adults.

The pneumotach has been designed to work with the validated MicroGard® II bacterial/viral filter and is easy to disassemble.



**User's demand hygiene that is simple and cost-effective. When using MicroGard filter, our pneumotach and all downstreamed parts only needs to be cleaned and disinfected once every 3 months\*.**



# Spirometry Guidance & Quality

Coaching for operator and patient for best results



**SentrySuite records all breathing maneuvers** independently of the patient's cooperation and shows you the best curve

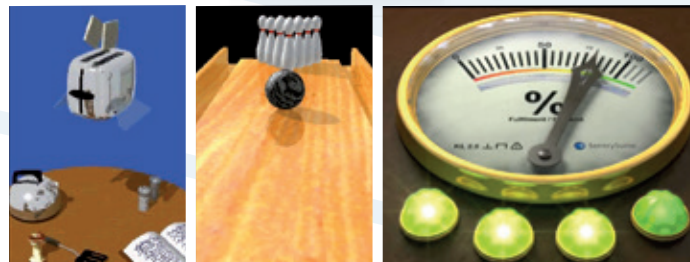
**Online breathing curves** for controlled real-time patient guidance



**Color-coded guidance bar** for in test exhalation time and plateau recognition

**A green check mark** indicates successful end of test according ATS/ERS

**Online textual guidance** helps coach clinician through each maneuver



## Animation incentives

Choose from 10 user-definable animation programs to assist the operator and coach patients of all ages.

# Precise data management

SentrySuite software acts as your powerful assistant that will help guide and coach you from calibration to test completion and report generation.

**Clear graphs** enlargeable to full screen view with just one mouse click

**Interpretation Templates**  
Create your own templates with macros or select from a choice of several automatic interpretation algorithms



**All test results in one adjustable table** including predicted, LLN, author, Z-score, best values, values of all trials, pre-post comparison and more

**Color-coded classification bar**



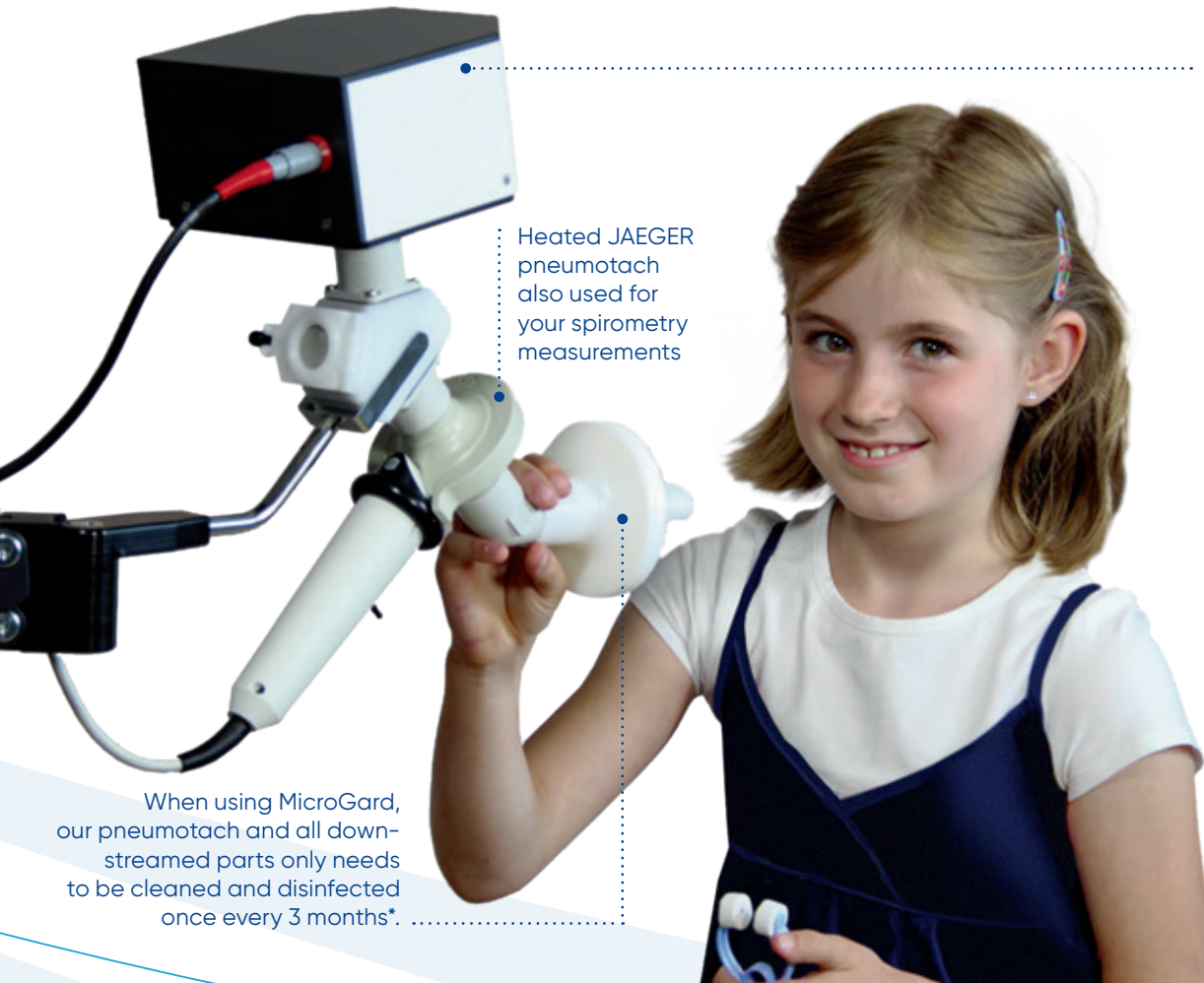
**Color-coded repeatability graph**

enables direct visual feedback on test quality

# Vyntus IOS – the result of 25 years experience in Impulse Oscillometry

Tidal breathing analysis with Impulse Oscillometry (IOS) has proven to be an informative and meaningful tool used in the early detection and follow up of pulmonary diseases like asthma, COPD and idiopathic pulmonary fibrosis.

**IOS is almost independent of patient cooperation** and can test a larger patient range than spirometry alone, from children, adult and geriatric patients.



Heated JAEGER pneumotach also used for your spirometry measurements

Extremely quiet impulse generator with an impressive resolution of 10 complete impedance spectra per second over the whole range from 3 – 50Hz **allows informative Intra Breath Analysis.**

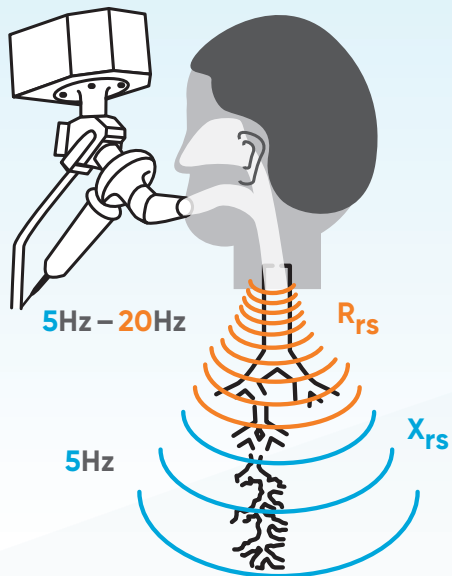
When using MicroGard, our pneumotach and all downstream parts only needs to be cleaned and disinfected once every 3 months\*.

## IOS enhances your diagnostic testing

- Spirometric and airway resistance diagnostics in one device.
- Assessment and differentiation of airway function **under quiet breathing conditions.**
- Allows testing children < 5 years of age.
- **Automated Quality Management System** for best results with multi trial concept
- Sensitive and early detection of pulmonary obstruction.
- **Allows differentiation of central and peripheral airways** by measuring airway resistance and reactance at multiple frequencies.
- **More sensitive in detecting response to drug therapy** than FEV1 alone.
- **Excellent for bronchial provocation monitoring.**
- Classification of small airway severity and interpretation of test results.

## How does it work?

The oscillations of the multi-frequency measurement signal penetrate the respiration tract at varying depths. Whereas 20 Hz signals are absorbed (shunted) in the large airways, 5 Hz oscillations penetrate the entire lung. Thus, the respiratory resistance  $R_{rs}$  of the large airways can be differentiated from the lung reactance  $X_{rs}$  of the small airways.



## More than 4600 IOS users – countless studies published

### The experts found that...

- Impulse oscillometry and plethysmography should be considered the preferred techniques for measuring bronchodilation in COPD Clinical Trials<sup>1</sup>
- Several forced oscillation measures are more accurate and sensitive for detecting bronchodilator response than FEV(1) in patients with asthma<sup>2</sup>
- Airway resistance measured by IOS during methacholine challenge correlates better with asthma symptoms than traditional spirometric measures implying a higher sensitivity index<sup>3</sup>
- Impulse oscillometry provides an effective measure of lung dysfunction in 4-year old children at risk for persistent asthma<sup>4</sup>
- Spirometry underestimated the prevalence of lung function abnormalities in comparison to forced oscillation<sup>5</sup>



# Vyntus APS – for accurate and safe bronchial challenge testing

Vyntus APS is an Aerosol Provocation System. Up-to-date and sophisticated electronics and mechanics allow for optimal use of its nebulization technology with precise dosing. For the observation measurements Vyntus APS combines with the Vyntus PNEUMO and/ or the Vyntus IOS in one system.

Low noise compressor and interface for Vyntus APS/ PNEUMO/IOS

Expiratory filter effectively protects for aerosol contamination

Combine your Vyntus APS with Vyntus PNEUMO or Vyntus IOS

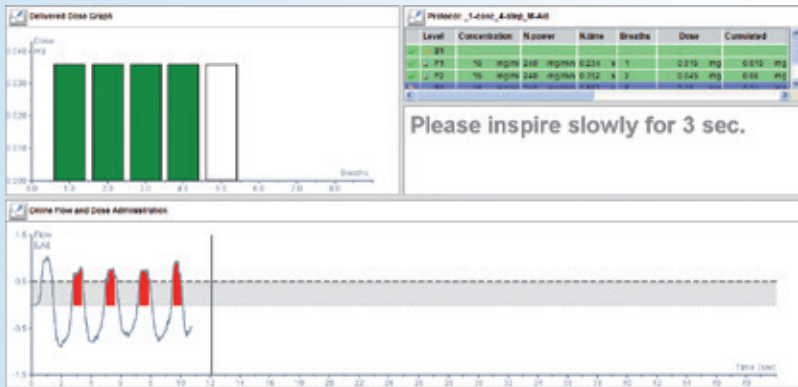
APS head with easily removable connection block for cleaning

Sidestream® nebulizer for efficient drug delivery

## Everything you demand from a provocation system

- **Single** and multiple **concentration** bronchial provocation testing
- **Pulse or continuous nebulization** allow for a broad age range to be tested
- **Software guidance** throughout the procedure
- **Time and volume-controlled** process guarantees highest drug efficiency
- **Computer-controlled nebulization** guarantees the amount of drug inhaled is reproducible
- **Timer functionality** monitors exposure times
- **Automated calculation of PD and PC** based on FEV1, R5Hz, Fres, etc.
- **Standard protocols delivered** with each system, with the ability to customize and make your own





### Stay in control during nebulization

with real-time visualization of dose administration and breathing patterns during nebulization. During nebulization, the software automatically calculates the actual dose that has been administered. As soon the pre-set dose has been achieved the compressor automatically switches off.

### The experts found that...

The single concentration dosimeter method provides values comparable to the Gold Standard.<sup>6</sup>

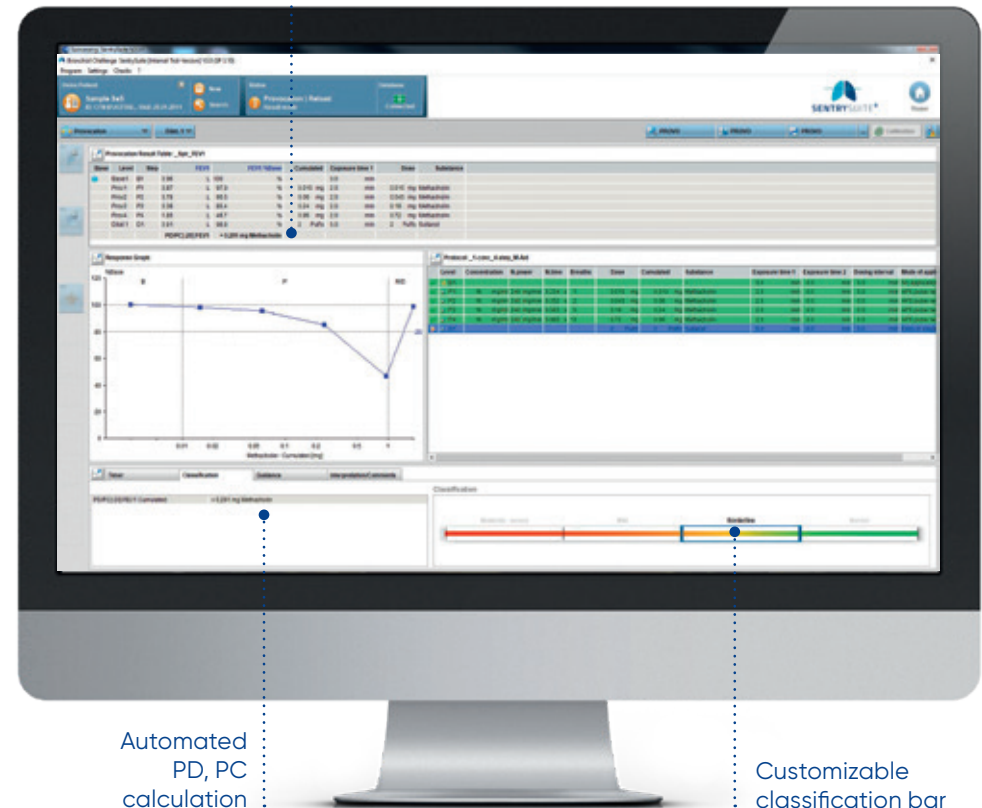
A published 1-concentration-4-step dosimeter protocol for methacholine testing together with the Vyaire APS system is available.<sup>7</sup>



## Highest level of patient safety with SentrySuite software

The built-in intelligence of the observation module ensures patient safety while achieving accurate provocation thresholds. After the initial baseline measurement to exclude a contra-indication, the software monitors the patient's response to each provocation step. It either automatically progresses to the next provocation step or flags that the pre-set provocation level has been achieved.

On-the-fly clear overview after each observation measurement



Automated PD, PC calculation

Customizable classification bar

# Technical Specifications



**Vyntus PNEUMO**



**Vyntus IOS**



**Vyntus APS/IOS**

Flow-Volume/pressure measurements		
Flow	Type	Pneumotach
	Range	0 to $\pm 20$ L/s
	Accuracy	0 to 18 L/s: $\pm 2\%$
		18 to 20 L/s: $\pm 5\%$
	Resolution	1 $\mu$ L/s
	Resistance	< 0.05 kPa/(L/s) (0.5 cmH <sub>2</sub> O/(L/s)) at 10 L/s
Volume	CMRR	> 60 dB at 50 Hz
	Type	Software Integration
	Range	$\pm 20$ L
	Accuracy	0 to 20 L: $\pm 3\%$ or $\pm 0.05$ L (whichever is greater)
Mouth pressure Vyntus PNEUMO	Resolution	1 $\mu$ L
	Type	Piezo Resistive
	Range	$\pm 20$ kPa ( $\pm 150$ mmHg)
	Accuracy	0 to 2 kPa (0 to 15 mmHg): $\pm 2\%$
		2 to 20 kPa (15 to 150 mmHg): $\pm 5\%$
	Resolution	0.001 Pa (0.0000075 mmHg)
CMRR	> 60 dB at 50 Hz	
Mouth pressure Vyntus IOS	Type	Piezo Resistive
	Range	$\pm 2$ kPa ( $\pm 15$ mmHg)
	Accuracy	$\pm 2\%$
	Resolution	0.001 Pa (0.0000075 mmHg)
	CMRR	> 60 dB at 50 Hz
Vyntus APS		
Compressor	Flow	8 L/min $\pm 1.5$ L/min
	Pressure	1.4 bar $\pm 0.3$ bar
Nebulizer	Name	Philips Respironics Sidestream®
	Type	Compressed air nebulizer
	Mean mass diameter	3.2 $\mu$ m
	Output power	240 mg/min
Vyntus IOS		
Test signal	Type	Impulses of alternating direction
	Pulse interval	0.1 – 10 s
	Impulse length	40 ms
	Frequency range of single impulse	0 – 100 Hz
	Maximal impulse pressure	0.3 kPa (3 cmH <sub>2</sub> O)
	Power spectrum	Maximum at 5 Hz to –25 dB at 50 Hz
	System verification	Reference impedance
	Accuracy	< $\pm 2\%$
Calibration syringe		
	Volume:	1 L/3 L
	Accuracy:	+/- 12 mL



**Vyntus APS nebulizer**



**Option rhinomanometry**



**Option SNIP**

Power supply		
PC or notebook	Main voltage	100 to 240 V AC; 50 to 60 Hz, max 1.5 A
	Power input	max. 1.5 A (depending on PC/notebook)
Vyntus PNEUMO/IOS/APS	Type	Magic Power MPM-X125
	Mains input voltage	100 – 240 V, AC 47 – 63 Hz
	Power consumption	1.5 – 1 A
	Output voltage	24 V DC
	Output	120 VA/5 A
	Electrical safety	Protection class I
Moisture protection	Complete system	IP 20
Classification of applied parts		
Vyntus PNEUMO	Applied part	Type B
Vyntus IOS	Applied part	Type B
Vyntus APS	Applied part	Type B
Category according to MDD 93/42/EEC (2007)		
	Complete system	Active class IIa medical product
Operating mode		
	Complete system	Continuous operation
Ambient conditions		
Complete System	Altitude	≤ 3000 m
	Temperature	+10 °C to +34 °C (+50 °F to 93.2 °F)
	Rel. humidity	20 to 80 % RH, non-condensing
	Ambient pressure	700 to 1060 hPa (525 to 795 mmHg)
Transport and storage conditions		
Complete System	Temperature	– 20 °C to +50 °C (– 4 °F to 122 °F)
	Rel. humidity	15 to 95 % RH, non-condensing
	Ambient pressure	600 to 1200 hPa (375 to 900 mmHg)
Dimensions		
Vyntus Basic Module for Vyntus PNEUMO/IOS	Size	29.2 x 19.8 x 6.4 cm (11.5" x 7.8" x 2.5") (W x D x H)
Vyntus Extended Basic Module for Vyntus APS	Size	29.2 x 29.2 x 12.3 cm (11.5" x 11.5" x 4.8") (W x D x H)
Medical power supply	Size	18 x 9 x 6 cm (7.1" x 3.5" x 2.4") (W x D x H)
Standards, directives and market clearances		
Standards	EN 60601-1, EN 60601-1-2, EN 62304, EN 62366, EN ISO 14971, EN ISO 10993-1	
Directives	93/42/EEC amended by 2007/47/EC, RoHS 2011/65/EU compliant	
Market clearances	CE	




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## GLOBAL HEADQUARTERS

Vyairé Medical, Inc.  
26125 North Riverwoods Blvd  
Mettawa, IL 60045  
USA

 Vyairé Medical GmbH  
Leibnizstrasse 7  
97204 Hoechberg  
Germany



[vyaire.com](http://vyaire.com)

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