



**BEACONMEDÆS**<sup>®</sup>

Part of the Atlas Copco Group

# mAIR Medical Air Systems



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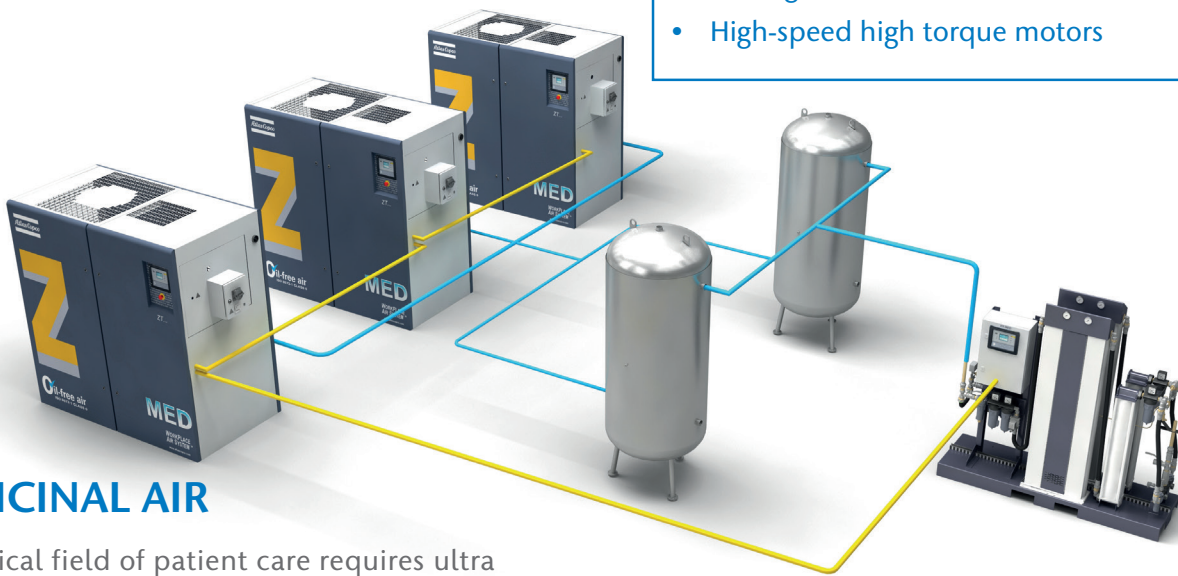
*Life*  
is in the  
details.<sup>®</sup>



## MEDICAL AIR SYSTEMS

The mAIR Medical Air Plant is designed in accordance with HTM 02-01, ISO 7396-1 and European Pharmacopoeia standards. The system design is modular providing maximum flexibility for easy on-site installation. All systems are factory tested and certified offering complete piece of mind.

mAIR systems are designed and manufactured according to ISO 13485 quality management system and are CE certified in accordance with MDD 93/42/EEC.



## MEDICINAL AIR

The critical field of patient care requires ultra clean, purified, medical air delivered to operating theatres and hospital beds with absolute reliability. A hospital's medical air supply is a vital life support service, maintaining respiration of the critically ill during mechanical ventilation.

As such, within Europe, 'medicinal air' is classified as a drug, and the concentration of impurities therein must be carefully controlled to ensure compliance with the European Pharmacopoeia monograph.

The dMED purification system has been independently certified by SGS Belgium NV (Société Générale de Surveillance) to provide medicinal air complying with the European Pharmacopoeia monograph.

The results of the challenge test were obtained using a carefully controlled, highly contaminated inlet air supply, validating the dMED's performance in the worst case scenario - extreme levels of environmental pollution.

## MEDICAL AIR APPLICATIONS:

- Mechanical ventilation
- Anaesthesia
- Drug delivery via a nebuliser
- Testing medical devices
- Drying of medical devices

### Surgical air applications:

- Pneumatic surgical tools (drilling, sawing, etc)
- Pneumatic ceiling pendant operation
- Testing of medical devices
- High-speed high torque motors

## MAIR CHALLENGE TEST

Test	European Pharmacopoeia	mAIR
CO <sub>2</sub>	< 500 ppm	< 220 ppm <sup>(1)</sup>
CO	< 5 ppm	< 1 ppm <sup>(2)</sup>
SO <sub>2</sub>	< 1 ppm	< 0.2 ppm <sup>(3)</sup>
NO <sub>x</sub>	< 2 ppm	< 0.1 ppm <sup>(4)</sup>
Water vapour	ADP -45°C (-49°F) / PDP -31°C (-23°F)	PDP -40°C (-40°F)
Oil vapour	< 0.1 mg/m <sup>3</sup>	< 0.003 ppm
Dust particles	Not specified	< 0.01 ppm
Taste and odour	Taste and odour free	Free

(1) With 700 ppm (at inlet)      (2) With 50 ppm (at inlet)  
 (3) With 5 ppm (at inlet)      (4) With 5 ppm (at inlet)

## TAILOR MADE

BeaconMedæ's mAIR systems are composed of modular blocks, enabling you to select up to 6 compressors and match the volumetric medical air flow with the purification package of your choice. Downstream pressures range from 4 to 11 bar as standard, with options including additional sensors for monitoring of contaminants in the medical air supply and the intelligent EWD 'zero loss' condensate drain for coalescing filters.

## PEACE OF MIND

By complying to the HTM02-01 standard, redundancy for both compressors and air purifiers is always guaranteed. The result is a completely dependable and energy efficient network, giving you peace of mind and keeping your costs to a minimum.

## LOWER ENVIRONMENTAL IMPACT



The air compression process has a number of by-products, one of which is a large volume of condensate. Generally, this condensate is an emulsified combination of oil and water which, if left untreated, is extremely harmful to the environment.

The Atlas Copco range of condensate separators is designed to separate the oil from the water, allowing for the water to be drained away and the oil to be disposed of in an environmentally friendly manner.

## OPTIMISING YOUR SYSTEM

Some applications may need or may benefit from additional options and more refined control And air treatment systems. To meet these needs, BeaconMedæ's has developed options and easily integrated compatible equipment.

## PURITY AND PRECISION

The BeaconMedæ's series of Medical Air Purifiers offers unique multi-stage filtration that converts regular compressed air from any type of compressor into internationally certified medical air. These innovative devices provide clean air for all your medical and surgical applications.

## UNPARALLELED EFFICIENCY

An mAIR system is packed with features to lower your cost of ownership (life cycle cost) and save energy. Microprocessor controlled off-load running of compressors reduces the number of starts that compressors must make, reducing wear, increasing reliability and lowering power consumption.

The 'zero loss' EWD condensate drains fitted to all air receivers, coupled with an extremely low pressure drop across the purification packages, further enhances the efficiency of the overall system.

## UNSURPASSED PURITY

Built to exacting standards, mAIR systems are engineered to provide certified breathing air, even in situations where the air intake may contain high concentrations of ambient pollution.

The dMED multi-stage filtration system ensures patient safety in 'worst case', but real life pollution scenarios. With the assurance of world-wide after sales and service, mAIR systems offer the complete solution for all critical breathing air applications.



## AIR PURIFICATION

The dMED (dual MED) is a duplexed purification package for converting a compressed air source into breathing quality air. The dMED has 7 stages of active purification:

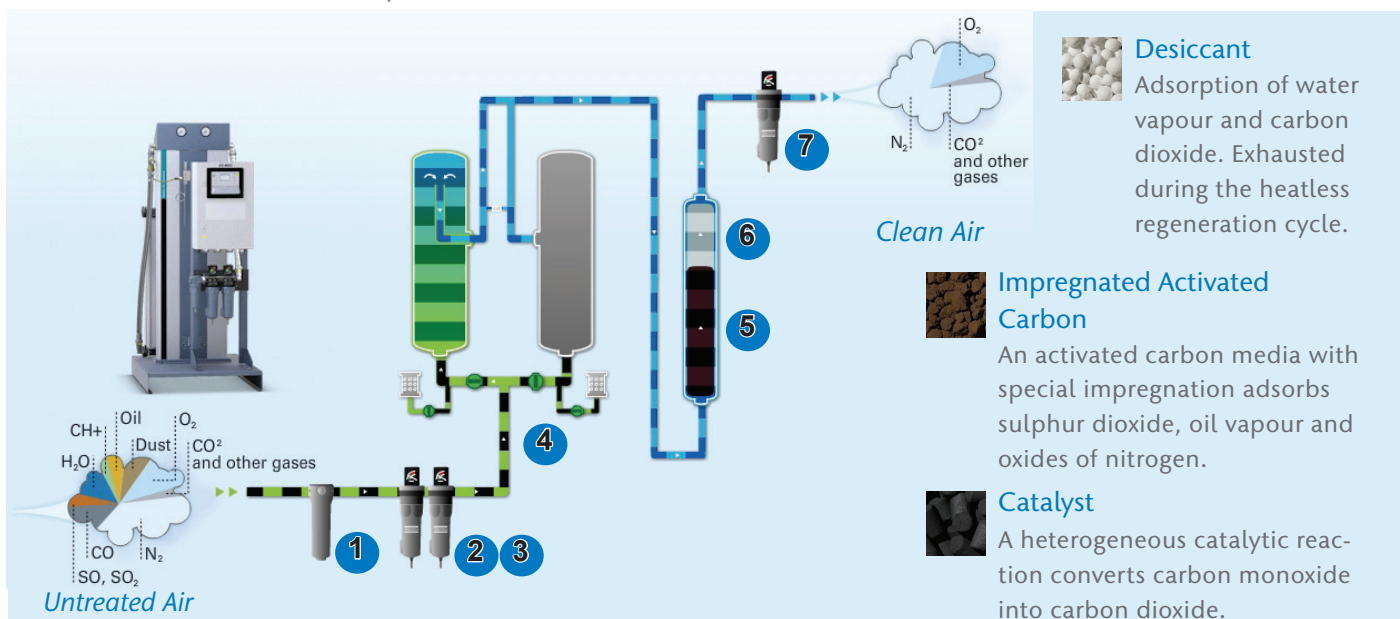
1. Water separator - liquid water
2. Bulk aerosol filter - oil and water
3. Fine coalescing filter - oil and water
4. Desiccant dryer - water and CO<sub>2</sub>
5. Activated carbon - gaseous impurities
6. Catalyst - CO oxidation
7. Bacteria filter - bacteria/fine particles

1, 2 & 3 - A water separator and pre and fine coalescing filters remove free water and particles down to 0.01 micron and eliminate oil droplets down to 0.01 ppm.

4 - A heatless desiccant dryer reduces moisture content to a pressure dew point of -40°C/-40°F, removing any risk of condensation, bacteria and mold growth.

5 & 6 - A dual cleaning stage includes activated carbon to eliminate hydrocarbons (oil vapour, smells). A catalyst then converts CO into CO<sub>2</sub>.

7 - A bacterial filter at the exit removes bacteria and particles that may have been introduced in the desiccant stages down to 0.01 micron.



## MINIMAL PRESSURE DROP

Generously sized desiccant towers are filled with a high efficiency adsorption media to ensure the required dew point is maintained at the highest periods of demand.

Changeover of the towers is carefully controlled with separate depressurisation and pressurisation cycles, maximising desiccant life and minimising dusting. The generously sized components minimise pressure drop, saving energy and maximising flow output.

## CARBON MONOXIDE REMOVAL

Carbon monoxide concentrations in urban areas are closely related to motor traffic density and weather, varying greatly with time and distance from the source(s).

The European Pharmacopoeia monograph for medicinal air specifies a maximum concentration of 5 ppm for carbon monoxide.

The QDT HOC filter, downstream of the desiccant

dryer contains a catalyst which oxidises carbon monoxide to give carbon dioxide. If you cannot be certain that background levels of carbon monoxide in the environment will never exceed 5 ppm, the dMED's QDT HOC component is the ultimate safety device, ensuring patient safety and consistent compliance with the European Pharmacopoeia.

## ENERGY EFFICIENT

Maintaining a consistently low dew point is critical to patient safety, and to the operation of air driven surgical tools. The dMED incorporates state-of-the-art energy management control with built-in purge control as a standard option. This purge control makes the purifiers more efficient, leading to energy savings on purge losses of up to 90%, depending on installation and usage.

The principle is simple. Although the time for a saturated tower to regenerate remains constant, the switching from one tower to the other is delayed if the PDP level in the active tower is adequate. This is controlled via the PDP sensor. As soon as the minimum level PDP in the active tower is reached, the dryer cycle that was on hold will resume by switching to the dry tower.

# INTELLIGENT CENTRAL CONTROLLER

A properly managed compressed air network will save energy, reduce maintenance, decrease downtime, increase reliability and improve product quality. The ES medical central controller is the most efficient way to monitor and control multiple compressors and air purifiers simultaneously.

- User-friendly 5.7" high-definition colour display with clear pictograms & LED indicators
- Internet-based visualisation using a simple Ethernet connection
- Increased reliability: new, multilingual user interface and durable keyboard
- Automatic restart after voltage failure
- Graphical indication Service Plan
- Remote monitoring and connectivity functions

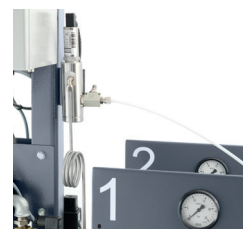
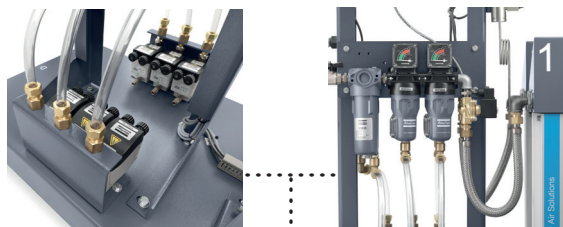


# COST EFFECTIVE

At BeaconMedæS we strive to provide the most energy-efficient solutions. Energy consumption is mainly linked to internal pressure drops and the regeneration process. As such our medical air purifiers are designed to keep the pressure drop as low as possible and provide the most efficient regeneration process.

## KEY BENEFITS AT A GLANCE

- Efficient central controller to monitor and control multiple compressors simultaneously as well as dryers and filters
- Minimised pressure drop and increased reliability
- Access to real time status from any computer connected to the Hospitals LAN
- Easy to install, easy to maintain
- High precision filters increase the lifetime of the dryer
- Robust design simplifies manoeuvrability
- High flow performance



## STANDARD OPTIONS

<ul style="list-style-type: none"> <li>• QDT HOC filter *</li> </ul>	<ul style="list-style-type: none"> <li>• Guarantees EurPh air quality even in the most polluted of environments</li> </ul>
<ul style="list-style-type: none"> <li>• Filter monitoring *</li> </ul>	<ul style="list-style-type: none"> <li>• Voltage free contacts provide 'plant fault' alarm if pressure drop limit is reached (ie blockage).</li> </ul>
<ul style="list-style-type: none"> <li>• EWD on filters</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces environmental impact</li> </ul>
<ul style="list-style-type: none"> <li>• Purge Saver</li> </ul>	<ul style="list-style-type: none"> <li>• Increase efficiency with dewpoint sensing switching - the dryer will only switch towers when the desiccant is saturated</li> </ul>
<ul style="list-style-type: none"> <li>• CO/CO2 sensors</li> </ul>	<ul style="list-style-type: none"> <li>• Additional monitoring and alarms for increased safety</li> </ul>
<ul style="list-style-type: none"> <li>• AIRconnect</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced monitoring system with SMS/email notification and agent+ visualisation software</li> </ul>
<ul style="list-style-type: none"> <li>• QDT saturation indicator</li> </ul>	<ul style="list-style-type: none"> <li>• Additional indicator to indicate any oil carry over to the HOC filter for increased safety</li> </ul>

\* Included as standard with every mAIR system, for complete peace of mind

## COMPRESSOR SOLUTIONS

BeaconMedæS along with Atlas Copco continue to innovate and provide increased product solutions for the Healthcare sector. By making use of the wide range of compressor technologies available from Atlas Copco we can provide a bespoke modular system to suit your specific needs.



## 1ST IN OIL-FREE AIR TECHNOLOGY

Over the past sixty years Atlas Copco has pioneered the development of oil-free air technology, resulting in a range of air compressors and blowers that provide 100% pure, clean air. Through continuous research and development, Atlas Copco achieved a new milestone, setting the standard for air purity as the first manufacturer to be awarded ISO 8573-1 CLASS 0 certification.



## ADVANCED CONTROL

As the industry leader committed to meeting the needs of the most demanding customers, Atlas Copco requested the renowned TÜV

institute to type-test its range of oil-free compressors. Using the most rigorous testing methodologies available, all possible oil forms were measured across a range of temperatures and pressures. The TÜV found no traces of oil at all in the output air stream. Thus Atlas Copco is not only the first compressor manufacturer to receive CLASS 0 certification, but also exceeds ISO 8573-1 CLASS 0 specifications.

CLASS	Concentration total oil (aerosol, liquid, vapor) mg/m <sup>3</sup>
0	As specified by the equipment user or supplier and more stringent than class 1
1	<0.01
2	<0.1
3	<1
4	<5

Current ISO 8573-1 (2010) classes (the main five classes and the associated maximum concentration in total oil content)

### CLASS 0 MEANS:

- ✓ Zero risk of contamination
- ✓ Zero risk of damaged or unsafe products
- ✓ Zero risk of losses from operational downtime

Atlas Copco's MK5 Elektronikon controller is fitted to every medical compressor in the mAIR system. The Elektronikon is an advanced microprocessor based, real-time operating system with an ergonomic alphanumeric user interface.

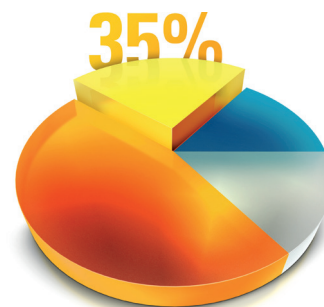


The Elektronikon controls, monitors and protects the compressor and provides service warnings. The array of sensors provide functional and operational information as well as a warning if a problem develops.

## VSD: DRIVING DOWN ENERGY COSTS

Energy typically represents over 80% of a compressor's life cycle cost. Looking continuously to innovate and reduce customer costs, Atlas Copco pioneered Variable Speed Drive (VSD) technology in 1994.

The Medical VSD range is the ideal solution for a fluctuating air demand. By monitoring the outlet pressure, the air flow is adjusted to the demand. Energy savings of up to 35% become a reality thanks to the high turndown ratio and the new fan saver cycle.



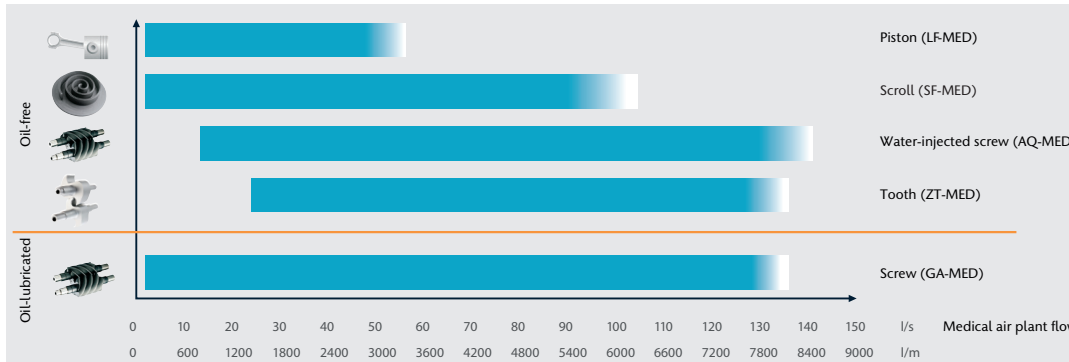
Minimised energy consumption for the most demanding applications, making major energy savings a reality.

- Advanced Variable Speed Drive technology
- Average energy savings of 35%
- Flexible pressure selection: 4-13 bar

# COMPRESSOR PERFORMANCE

Our medical range of compressors are provided with the MK5 Elektronikon controllers and CAN connections. All models are simple and easy to install and are pre-configured in our factory to communicate with the ES-MED central controller, which is included on our dMED dryer system. Meaning we can offer a medical air system at the pressure or flow you require with a technology of your choice.

COMPRESSOR SELECTION TABLE					
MODEL	LF-MED	SF-MED	ZT/ZR-MED	AQ-MED	GA-MED
TECHNOLOGY	PISTON	SCROLL	TOOTH	WATER LUBE	SCREW
OIL-FREE	✓	✓	✓	✓	
STANDARD	HTM/ISO	HTM/ISO	HTM/ISO	ISO	HTM/ISO
FLOW	✓	✓✓	✓✓✓	✓✓✓	✓✓
PRESSURE	✓✓	✓✓	✓✓	✓✓✓	✓✓✓
CAPITAL COST	✓✓	✓	✓	✓	✓✓
LIFETIME COST	✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓
VSD			✓	✓	✓



## Oil Flooded Screw

GA-MED  
Working pressure: 4-13 bar  
Capacity FAD:900-3600 lpm  
Installed power:5-22 kW



**Oil Free Scroll**  
SF-MED  
Working pressure: 4-10 bar  
Capacity FAD:180-xxxx lpm  
Installed power:1-22 kW

## Oil Free Tooth

ZT/ZR-MED  
Working pressure: 4-10 bar  
Capacity FAD:1800-2700 lpm  
Installed power:1-22 kW

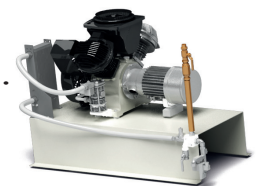


**Oil Free Water Lubricated**  
AQ-MED  
Working pressure: 4-13 bar  
Capacity FAD:1320-4980 lpm  
Installed power:15-30 kW

## KEY BENEFITS AT A GLANCE

- Advanced microprocessor based controller for optimised operation
- Wide range of models including oil free solutions and variable speed drive
- Access to real time status from any computer connected to the Hospitals LAN
- Easy to install, easy to maintain
- Modular design simplifies manoeuvrability on site
- High efficiency

**Oil Flooded Piston**  
LF-MED  
Working pressure: 4-10 bar  
Capacity FAD:480-900 lpm  
Installed power:4-7.5 kW



## STANDARD OPTIONS

• Synthetic oil	• Prolongs the compressor life
• Heavy duty inlet filter	• Added protection for regions with high dust content
• Tropical thermostat	• For regions with high humidity
• Phase sequence relay	• Prevents turning the compressor the wrong

\* Options are specific to each technology type

## A STEP AHEAD IN CONTROL AND MONITORING

Get the most out of your medical air system with our next-generation Elektronikon<sup>®</sup> Mk5 Graphic controller, ES medical central controller and AIR-Connect<sup>™</sup> Visualisation and Notification package. Elektronikon<sup>®</sup> regulates system pressure to push energy efficiency to new levels. The ES medical controller offers one central point of control for your whole compressed air network while AIRConnect<sup>™</sup> gives you access to valuable information.

Controlling and monitoring your system has never been easier.

### CENTRAL CONTROLLER

The dMED with ES medical controller featuring colour display offers the following benefits:

- Standard option purge control for up to 90% energy savings
- Control of dryer and sequencing of compressors
- Alarms and warnings on PDP, net pressure and service
- Service warning indications for desiccant, catalyst, filters and water drains.
- Pressure sensors at in/outlet allowing detailed monitoring
- Easy readout of the CO/CO2 sensors (if fitted)

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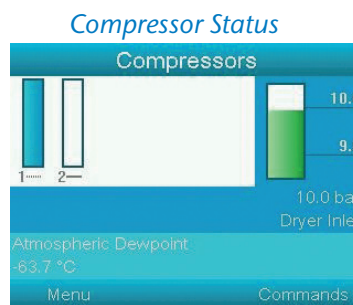
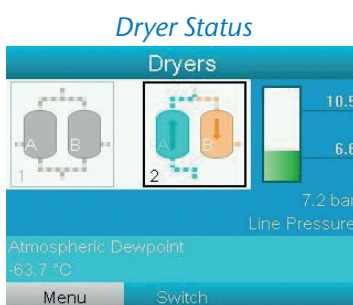
- User-friendly 5.7-inch high-definition colour display with clear pictograms & LED indicators
- Internet-based visualisation using a simple Ethernet connection
- Increased reliability: new, multilingual user interface and durable keyboard
- Automatic restart after voltage failure
- Graphical indication Service Plan
- Remote monitoring and connectivity functions

The advanced controller protects the system and offers the possibility to repeat the most important alarms (e.g. emergency clinical alarm, emergency operating alarm, dew point alarm) through voltage-free contacts. It can connect to a hospital's Building Management System (BMS).

### REAL-TIME MONITORING

Simple and easy to install, the AIRConnect<sup>™</sup> monitoring device collects data from your medical air system. Through a website integrated within the Elektronikon module, all data is visualised in real-time, offering you immediate clarification. As these real-time visualisation pages are accessed through the hospital's LAN, total data security is assured.

- Logging and trending for an accurate performance status of your system
- Desktop event notification to avoid constant status checking
- E-mail and SMS event notification for additional convenience



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