



# Medical Compressed Air Systems

# In medical compressed air systems, what counts most is **experience.**

## OUR SAFETY STANDARDS SURPASS STATUTORY REQUIREMENTS

Since medical compressed air is classed as a pharmaceutical product and so is subject to the European Pharmacopoeia, medical compressed air systems have to comply with a range of statutory requirements and standards. We very much welcome this since the stringent prescriptions governing a safe and reliable supply are consistent with our own quality



and reliability standards. For over 50 years, BOGE, together with reputable hospital equippers and medical device manufacturers, has developed customised yet compliant system solutions for highly sensitive applications in medical compressed air supply - experience that hospital users benefit from every day.



### OUR PRODUCTS LIVE AND BREATHE THESE DIRECTIVES

BOGE medical compressed air systems, installed and certified by reputable hospital equippers and medical device manufacturers, comply with all the relevant standards and requirements, including:

- Medical devices directive 93/42/EC
- DIN EN ISO 7396-1
- DIN EN ISO 14971
- DIN EN ISO 9001 / 13485

## MORE THAN JUST AIR TO BREATHE – MEDICAL COMPRESSED AIR FROM BOGE



### Artificial respiration

Only a highly reliable source of absolutely pure breathing air is suitable for supplying to patients. In BOGE treatment units, the compressed air generated is dried, purified and treated in seven stages to obtain medical compressed air that complies with DIN EN ISO 7396-1.



### Medical systems

Medical compressed air is subject to the German Medicinal Products Act, which means that no concessions can be made to the defined purity of the air. Sterile filters provide an eighth treatment stage for the ultimate breathing air quality - whether for giving patients artificial respiration or for supplying air to anaesthetic systems.



### Medical staff

Whether for patient beds or operating theatres – medical compressed air is used in all areas of hospitals and must be readily available at all times. Thanks to designing compressed air generation with at least triple redundancy, the risk of failure is virtually ruled out.



### Surgical instruments

Numerous surgical instruments and tools – such as those for puncturing, drilling or dissecting – operate with compressed air. In addition, medical devices need to be inspected or dried at repeated intervals. Medical compressed air lets everyone involved breathe out.

**Reliability is the be-all and end-all where medical compressed air is concerned.**

The statutory requirements are correspondingly high in this highly sensitive area - after all, the safety of patients and medical staff is at stake here. From our many decades of working with reputable manufacturers of medical devices and hospital equippers, we are thoroughly conversant with the requirements. The fact that more and more German hospitals are relying on medical compressed air systems from BOGE is also, of course, due to the fact that we combine a safe and reliable supply with exemplary efficiency.

## HOW TO MAKE A MARK IN GERMAN HOSPITALS – WITH BOGE PLUS

**BOGE Plus** means efficiency tools that make all the difference. The benefits range from the planning stage to a safeguarded supply. We show you right at the outset what your system could look like and certainly ensure that all system components work together in the best possible way. Every step brings more efficiency into play.

### Simulations-Software for comparing systems



### Frequency-controlled medical compressor systems



### Ultra-modern control; monitoring and visualisation concepts



### Heat recovery concepts



### Load-dependent control of medical breathing air dryer



# Redundancy as a matter of principle.

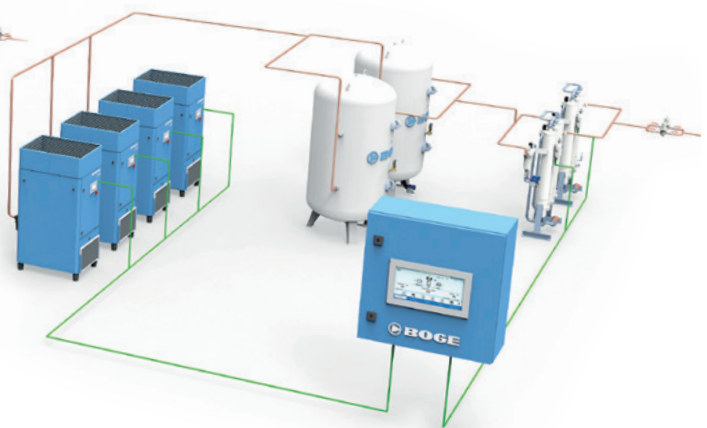
## Patient safety comes first.

### STANDARD-COMPLIANT: RELIABLE AND OUTSTANDINGLY EFFICIENT

#### TRIPLE SYSTEMS



#### QUADRUPLE SYSTEMS



#### MODULAR MEANS FLEXIBLE

The modular system design is the key to configuring tailor-made solutions for achieving maximum efficiency in operation.

#### AIRINTELLIGENCE PROVIS 2.0

One of the most innovative control units on the market which coordinates both fixed speed and frequency-controlled compressors.

#### FEATURES AT A GLANCE

- Visualisation
- Alarm Management
- Archiving
- Data Management

### MULTIPLE REDUNDANCY – SIMPLY MORE RELIABLE

BOGE's redundancy concepts are based on long-standing experience of applications in the medical sector. The top priority is absolute reliability. Even in a power cut, the supply of medical compressed air must be assured. We decide together with you whether a triple or quadruple system would be best.

### AUTOMATIC CONTROL FOR SMOOTH OPERATION

Master control systems for efficient but safe system operation. The compressor controls take over if these happen to fail or react too late. They ensure the availability of the medical compressed air supply and actively report any faults in the master system.

**When we design a compressed air system for medical use, we gear it to the worst case scenario every time – after all, patient safety is always the top priority for BOGE. Every compressed air generating system has at least triple redundancy. Compressed air buffers and medical compressed air treatment systems are designed with at least dual redundancy to guarantee a reliable supply no matter what the circumstances. A master system control coordinates the safe and efficient working of the system – the system restarts automatically after a power cut.**

## PREMIUM COMPONENTS AS A PROVEN BASIS



**BOGE has an extensive portfolio of compressors that provides the right technology for every use – whether oil-lubricated or oil-free. All principal components comply with the relevant standards.**

The spectrum ranges from screw and piston compressors right up to scroll compressors. There is also a choice of models, too, that particularly show their mettle in sensitive applications - through outstanding efficiency, super silencing or whisper-quiet low-vibration operation. These are all features that predestine BOGE compressors for use in hospitals. In view of

this diversity of models, nothing stands in the way of configuring a tailor-made medical compressed air system. BOGE's C, SC, S and K series have proved themselves time and again in everyday hospital use. New on the starting line are the PO, EO and HST series which are destined to set standards in large hospitals especially with their noise-optimised and efficient operation.

## SENSORS MEASURE IF THE AIR IS CLEAN

**In the interests of 100% medically pure breathing air, the treatment units in the DASZ-P series operate as a seven-stage system with two chambers which are used to dry the compressed air in a pressure swing process and remove harmful substances. Integrated filter and purification/catalytic stages treat the compressed air efficiently and reliably according to the stringent specifications for medical compressed air.**

**system for system delivery volumes of 13 - 1371 m<sup>3</sup>/h**

BOGE's breathing air treatment units actively dry and purify the resulting compressed air in seven stages, and ensure that the air remains well below the required thresholds at all times. Configured for 100% of a hospital's requirements, the treatment units are installed with dual redundancy and operated in parallel. The optionally available dew point control provides continuous monitoring of the dew point and so underpins the load-dependent operation



of the breathing air dryer. This means that the energy required for regenerating the desiccant beds can be reduced by up to 50%.

**DASZ-P 1-2 to DASZ-P 143-2 breathing air**



# Efficiency is a matter of control.

## We take a systematic approach.



### CONTROLLING WITH SURGICAL PRECISION



#### FOCUS CONTROL 2.0

Even the basic model of our modular control is one of the most modern in the industry: Up to four fixed speed and/or frequency-controlled compressors can be effortlessly operated with this control. In addition to an efficiency indicator, it also has an RFID interface.



#### AIRTELLIGENCE PLUS

For demand-based control of up to six fixed speed and/or frequency-controlled compressors which can be changed over at regular intervals. Alternatively, the weekly timer offers you 50 channels that you can use to freely programme compressor usage.



#### AIRTELLIGENCE PROVIS 2.0

Up to 16 compressors and 24 additional accessory components are under the command of this control. Browser-based visualisation can be linked to an existing server structure thanks to the Ethernet interface – your PC shows trend displays for pressure history, free air delivery, etc.



#### LOAD-DEPENDENT CONTROL

Intelligent load-dependent controlling of the medical dryers means that up to 50% of the regeneration energy can be saved! This works by continuously adapting the ratio of drying and regeneration to the current moisture „loading“ status.



#### LOAD/IDLE TIMES

In standard-compliant triple systems – configured for 100% demand – the compressors are substantially oversized for normal operation, which results in unnecessary idling times for screw compressors with a fixed speed. Speed-controlled systems avoid this, however, and lower the system pressure continuously to the switch-on pressure level.



#### HEAT RECOVERY

If the heat generated in the compression process is used elsewhere, this does not make the compressed air itself any cheaper, but considerable savings can be made in other areas – where heating costs, for example, or process water heating are concerned.

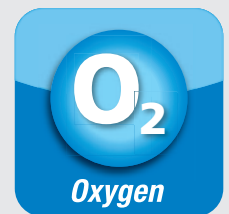
**When human lives are at stake, safety comes first.** But even in the medical sector, a compressed air system has to be cost-effective, which is why we have done our utmost to maximise efficiency and to further reduce the TCO - such as through low installation and running costs or through heat recovery. The use of highly-efficient energy-saving technologies in conjunction with ultra-modern controlling, monitoring and visualisation concepts guarantees the perfect interplay of all components!

## OXYGEN OR NITROGEN – ALL FROM A SINGLE SOURCE



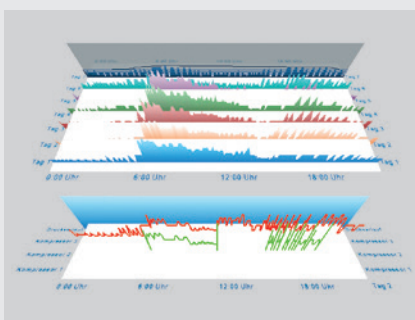
### OXYGEN IN UNLIMITED QUANTITY

BOGE generators O 3 P to O 15 P and BOGE O 3 PE to O 15 PE produce oxygen using the high-efficiency pressure swing absorption (PSA) process with a purity of 90 to 95 percent. It is now possible to generate just the quantity you need whenever you want, making you independent of expensive suppliers.



### NITROGEN JUST WHEN YOU NEED IT

BOGE nitrogen generators also use the principle of the pressure swing absorption (PSA) process. In this process, the nitrogen is effectively separated from the other components of the air. This results in nitrogen with a consistent purity of up to 5.0 (99.999%).



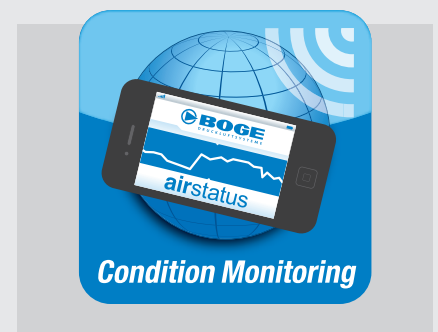
### SYSTEM SIMULATION

To configure a compressed air system to suit individual requirements, it is first of all necessary to carry out a needs analysis. The best decision-making help is the system simulation software that BOGE offers: By making a realistic comparison of systems, you are guided to the solution offering the best energy efficiency.



### ALSO RETROFITTABLE: DUOTHERM

The BOGE DuoTherm external heat recovery system also pays for itself in existing older-type screw compressors or other-brand screw compressors. It can easily be fitted to existing systems, needs very little space and brings a lasting improvement in the energy efficiency of the compressor.



### AIRSTATUS

BOGE airstatus controls and analyses your compressed air system with up to 32 components - even remotely from wherever you are. Your compressed air production can be evaluated at any time and optimised straight away if necessary. All you need for the airstatus app is a smartphone.

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**BOGE PLUS – CHECK OUT THE ADVANTAGES:**

- Medical compressed air systems designed with highly efficient premium BOGE components
- Optimal interplay of all system components
- User-friendly master control systems, monitoring and visualisation solutions, surveillance and alarm functions
- Proven redundancy concepts and the very highest safety standards – installed hundredfold in German hospitals
- Automatic restart of overall system following a power cut
- Compliant with all statutory directives and standards
- Decades of experience in working with renowned medical device manufacturers and hospital equippers
- Individual support with planning and implementation through needs analyses and system simulations
- A distinct majority of all German hospitals rely on medical compressed air systems from BOGE


**PREMIUM QUALITY**

For over 100 years, BOGE has been giving new impetus to the compressed air industry. We focus particularly on achieving the smallest possible production tolerances and the use of high-quality materials – for optimal cost-effectiveness and reliability.


**MAXIMUM EFFICIENCY**

BOGE enjoys an excellent reputation throughout the world for its extremely efficient solutions. We can demonstrate through simulation how to find the ideal combination of compressors to achieve the most cost-effective operation.


**ROHS-COMPLIANT**

All BOGE components and accessory parts meet the latest version of the RoHS EU directive 2011/65/EC (RoHS 2), which regulates the restriction of hazardous substances in electrical and electronic devices.


**HEAT RECOVERY**

94% of compressor-generated heat normally escapes unused as a stream of hot air! Using it to heat rooms or process water enables substantial savings to be made.