

Energy-efficient systems for medical compressed air

Safety matters. That is why hospitals rely on a double-redundant supply of medical compressed air. Fourfold compressed air systems operate efficiently and provide flexibility during planning – and they ensure a maximum safety.



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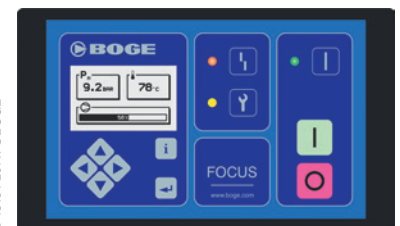
Hospitals depend on medical compressed air as much as humans depend on their respiratory systems. Operating rooms and other units can only function with a reliable supply of it. That is why the EN ISO 7396-1 standard stipulates double-redundant compressor technology in hospitals. If one compressor fails while another is being serviced, a third compressor must be able to cope with maximum demand. Most hospitals therefore employ systems comprising large, high performance compressors. Their overall output can be up to 300 percent of maximum demand, even though a maximum output of 100 percent is rarely needed. In fact, during off-peak hours and much of the night less than half of that is required.

There is no need for this disparity between demand and safety reserves. Medical compressed air can be produced more efficiently today using equipment such as a flexible fourfold compressed air system.

In this solution, each air compressor covers just 50 percent of the calculated maximum demand. In the unlikely event of a malfunction during maintenance, there are still two compressors capable of supplying the volume of air required. This configuration reduces the overall installed output of the compressors from 300 to 200 percent of maximum demand.

EFFICIENT, FLEXIBLE AND SAFE

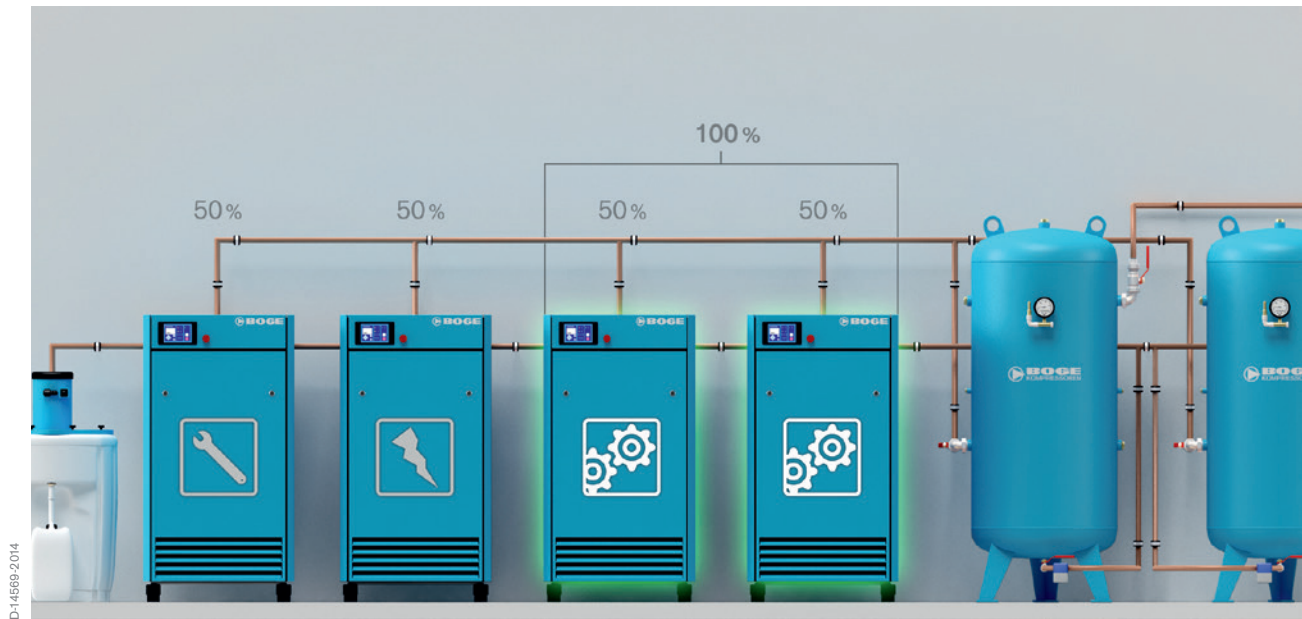
Fourfold compressed air systems are not necessarily more expensive to buy than systems with three compressors, rather they are more efficient to operate. Total energy consumption can be reduced by up to 12 percent without loss of performance. This is because, during low air demand periods, larger compressors either need to run at idle, or at intermittent operation. The former consumes a lot of energy, the latter causes mechanical strain and often increased wear due to the many switching cycles.



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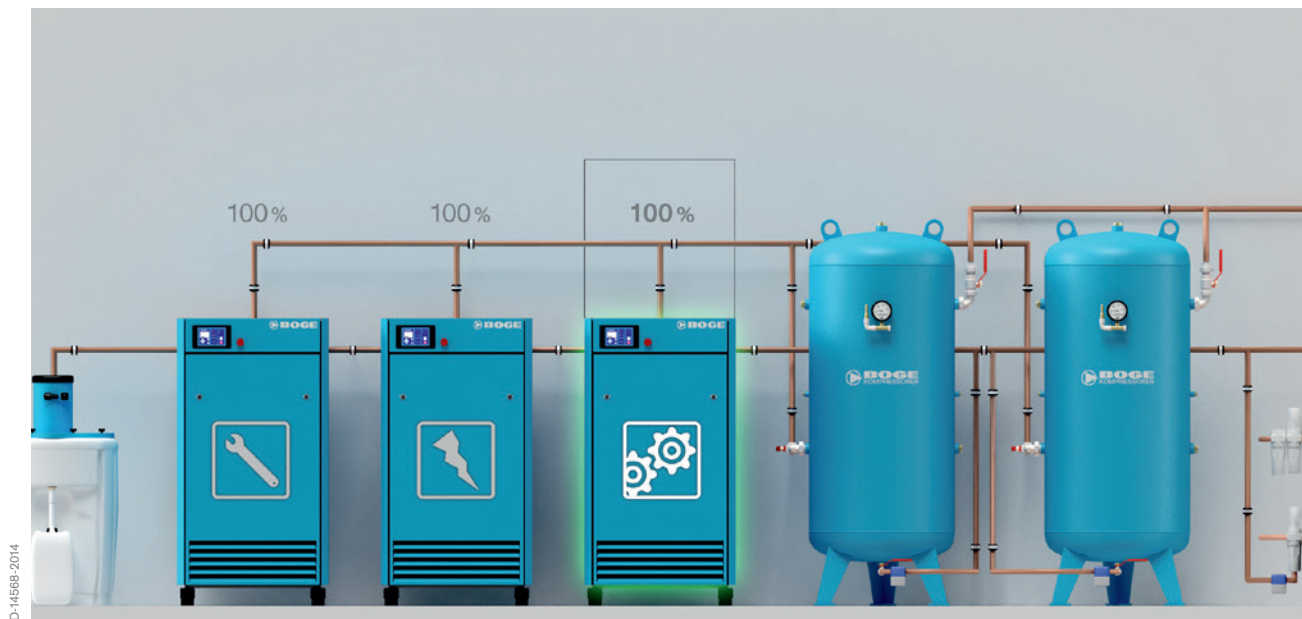
BOGE FOCUS display with efficiency display

CONFIGURATION OF A FOURFOLD COMPRESSED AIR SYSTEM

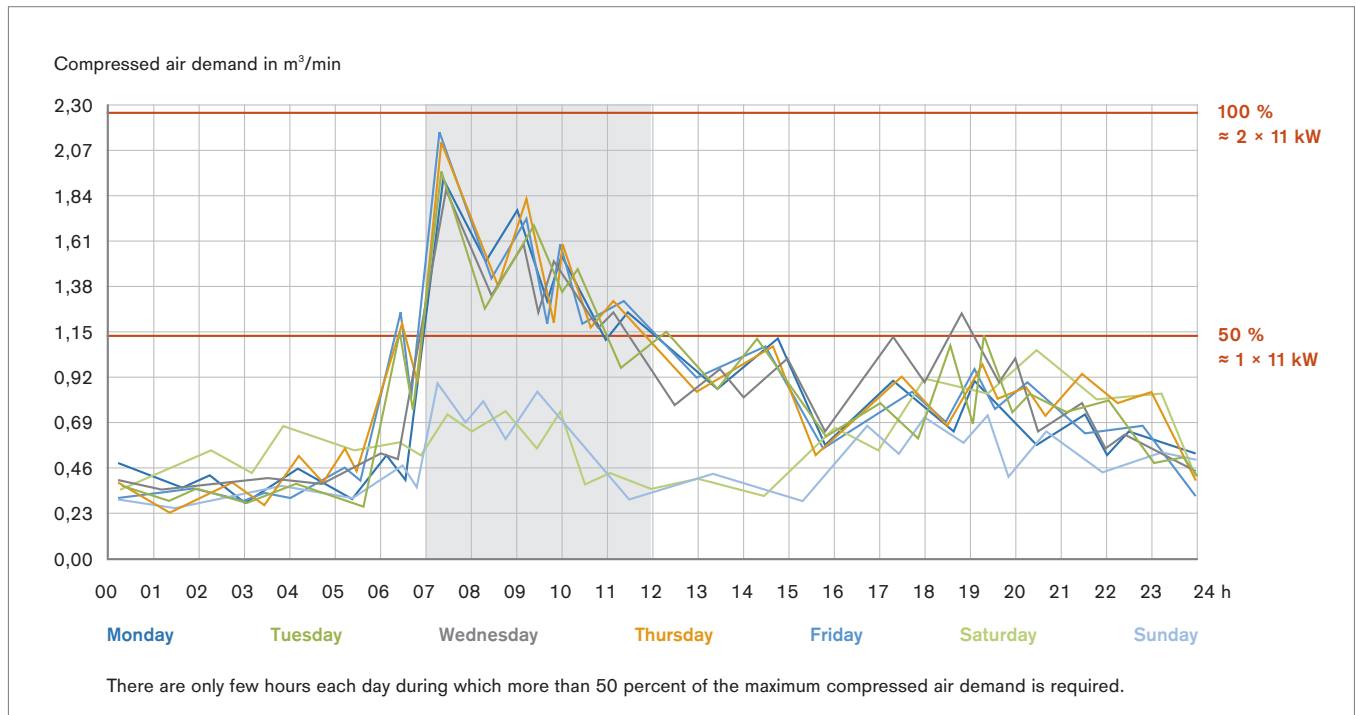


If during the maintenance of a compressor another unit fails, the remaining compressors must be able to cover the hospital's maximum demand. The percentages indicate the output capacity of the compressors in terms of the maximum compressed air required by the hospital.

CONFIGURATION OF A THREEFOLD COMPRESSED AIR SYSTEM



EXEMPLARY DIAGRAM ILLUSTRATING THE COMPRESSED AIR CONSUMPTION IN A HOSPITAL WITH APPROX. 1,200 BEDS



A fourfold compressed air system, however, allows a single compressor to operate continuously at optimum capacity and supply the entire hospital during partial load periods. A second compressor only activates if there is more demand. This solution therefore potentially saves a lot, even though the maintenance costs for four units may at first be a little higher than those of a threefold compressed air system. Aside from the conceptual advantages of a fourfold system, its operation can be optimised further still. By adjusting the pressure band, the hourly number of switching cycles can be reduced significantly, which means less idling and an efficient utilisation of compressor output.

SAFE AND INTELLIGENT CONTROL

Intelligent compressor control not only ensures that all the compressors share an equal workload, it also allows system efficiency to be determined and displayed graphically at any time. System design, the control concept and the associated software meet all the requirements for use in medical applications. To demonstrate this they are validated by Dräger in compliance with the applicable standards, such as IEC 62304 – Medical Device Software. Additional features such as external system pressure monitoring provide a maximum of operational safety.

TECHNOLOGY FOR THE FUTURE

A fourfold compressed air system can be an exceptionally good investment when building a new hospital or replacing an existing system, and also when extending a compressed air plant. The output of a system consisting of three compressors can be increased by installing a fourth unit, ensuring new requirements are safely met. At the same time this technical alteration improves efficiency and flexibility, making the compressed air plant ready for the future.

Fourfold compressed air systems can be installed using piston and screw compressors from the DWSC, DWLC and DWLS series.

Piston or screw compressors in a redundant configuration to ensure continuous production of compressed air

Compressed air vessels in duplicate, compliant with EN ISO 7396-1

Pressure reducing station for reducing compressor pressure to line pressure (4/5 or 7/8 bar)



D-13187-2014

Oil/water separation system for condensate treatment in accordance with §7a of the German Water Resources Act (WHG)

Conditioning unit for ensuring air quality compliant with the European Pharmacopoeia

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As of August 2015:

Dräger Medical GmbH changes to Drägerwerk AG & Co. KGaA.

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