

Oil-free Compressor



APPLICATIONS

High-Speed Trains | Light Rail Vehicles | Locomotives | Metros |
Regional and Commuter Trains

KNORR-BREMSE



INNOVATIVE, EFFICIENT AND ENVIRONMENTALLY FRIENDLY TECHNOLOGY

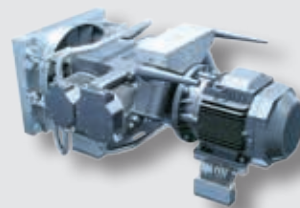


KNORR-BREMSE'S OIL-FREE COMPRESSOR IS NOW AVAILABLE FOR ALL RAIL APPLICATIONS. The Knorr-Bremse oil-free compressor offers an outstanding combination of high performance, low vibration and noise levels together with low life-cycle costs.

SUCCESSFUL INNOVATION

The Knorr-Bremse oil-free compressor has created a paradigm shift in the rail industry. This innovative and exciting product, now proven in years of service throughout the world, uses specially coated pistons and cylinders to eliminate the need for lubrication. With no oil in the system, the compressed air output is clean and free of oil. The result is no need to monitor oil health, add oil, change oil filters or disposal of oil-contaminated dryer desiccant and oil-contaminated condensate.

Ultimately the benefit to the train operator is significantly reduced operating costs along with much higher reliability and reduced down-time, all while at the same time bringing a major environmental advance to the rail industry.



Oil free compressor type VV180-T



VV1000-T OIL-FREE COMPRESSORS FOR HEAVY DUTY LOCOMOTIVES

The new VV1000-T rounds off the top end of the Knorr-Bremse Group's range of oil-free compressors. The essential advantage of this development is the fact that the compressed air is completely oil-free. This makes the unit safer and more eco-friendly, as oil is no longer discharged in the locomotive or onto the track bed, and ensures that no oil-based aerosols penetrate the braking system to reduce its operating life. The VV1000-T compressor was designed specifically for operation at low temperatures and extended service intervals to eight years – an industry first. It is significantly

quieter and is also much lighter than competing products. Volume production of this oil free compressor was launched at New York Air Brake (NYAB) in May 2014.



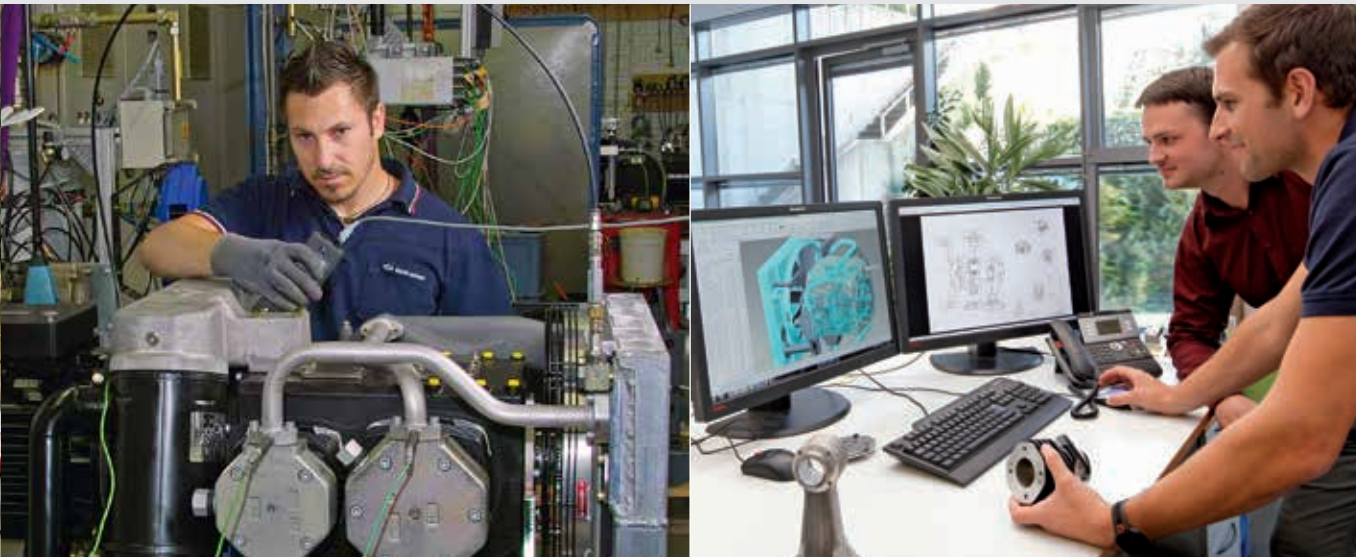
Oil free compressor type VV1000-T

KNORR-BREMSE'S OIL-FREE SETS NEW STANDARDS OF ECO-FRIENDLINESS, COMFORT AND ECONOMY



ADVANTAGES

- New development specifically designed for railway applications
- Oil-free air (environmental friendly, no downstream contamination)
- Modular design (standardized components)
- Lightweight and compact design
- Cold start at $-50\text{ }^{\circ}\text{C}$ possible without preheat
- Less complex system/fewer interfaces
- Various drive options (DC, AC, hydro, direct-coupled or V-belt)
- Low noise levels
- Low vibration



INNOVATIVE DEVELOPMENT BASED ON EXPERIENCE

By deciding to base its oil-free compressor on proven piston technology Knorr-Bremse was building on a solid foundation.

Over many decades, Knorr-Bremse piston compressors, used in rail vehicle air-treatment applications, have proven their reliability: but to develop the world's first rail oil-free compressor, new technology would be needed. During the course of the development work on this exciting project, Knorr-Bremse engineers worked closely with specialists from the engineering faculties of German universities. This powerful team of engineers developed a software program to calculate and synchronize the inertia and the gaseous forces involved, and delivered a design solution for this innovative new compressor with its oil-free technology.



COMMERCIAL ADVANTAGES

The commercial advantages of the oil-free compressor are reflected in its operating costs. Thousands of liters of lubricant are saved every year, and the filters and separators required by conventional compressors to remove oil from the compressed air are no longer necessary.

Also, there is no oil-contaminated dryer desiccant or oil-contaminated condensate to be disposed of.

All in all, this means significant savings – especially if the manpower requirements for previously needed servicing are also considered.



PROVEN IN-SERVICE AROUND THE WORLD

Following completion of the research and development work, various sizes of oil-free compressor have been proving their effectiveness for many years all over the world and in a wide range of conditions.

Ever since the first oil-free compressor was installed in a standard Deutsche Bahn train, thousands have gone into operation world-wide. The original technology has been continuously developed.

New models have increased global sales of the product, further confirming its reputation and versatility, especially in markets which have severe environmental conditions.

The oil-free compressor is an example of how innovative thinking can result in development of new, technologically advanced products. It has now become an accepted technology on modern trains worldwide.

FULL PRODUCT RANGE*



● = 50 Hz application at 1450 rpm ▲ = 60 Hz application at 1750 rpm

*The extended product range of oil-free compressors covers all applications.

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