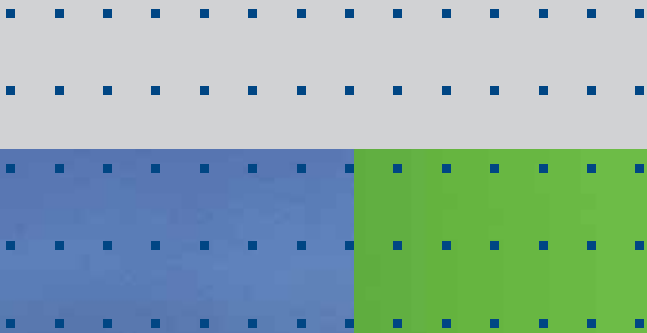


Oil-free compressor



A s p e c t s

Environmental aspects

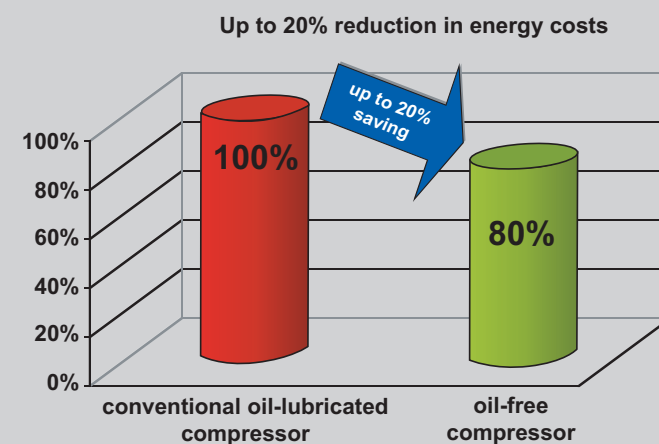
Compressor technology for the 21st century

The oil-free compressor avoids the need to dispose of oil and oil-contaminated waste following oil changes and air filter replacement. The reduced impact on the environment can be illustrated by the example of a fleet with some 6,000 compressors in operation.

Some 50,000 liters of oil are required every year for oil changes – and a further 5,000 liters for topping up. This does not include additional oil loss due to leaks and improper maintenance. So by using oil-free compressors, the company can avoid disposing of well over 55,000 liters of used oil. Added to this are oil-contaminated filter elements (3,000 to 6,000 per year), air dryer granulate (some 7 tons per year), and contaminated condensate from the air-dryer, which in modern vehicles is gathered in special collectors. This means the company can avoid generating a total of some 600,000 liters of hazardous waste each year.

Thanks to their low friction design and balanced rotation, oil-free compressors also require up to 20% less energy than conventional ones. A company with 500 compressors could save approximately 2.25 million kW/h per year by using the new technology.

The oil-free compressor not only saves oil – it uses significantly less energy as well.



New aspects of compressor technology

Knorr-Bremse's oil-free compressor sets new standards of eco-friendliness, comfort and economy.

In 2003 Knorr-Bremse Systeme für Schienenfahrzeuge GmbH was awarded the Environment Prize of the City of Munich for its oil-free compressor. The expert jury described this innovative product as a pioneering breakthrough in compressor technology. With its combination of eco-friendliness, comfort and economy, the new compressor offers huge advantages to rail vehicle manufacturers and operators.

Advantages of oil-free compressor I

- Low life cycle costs
- Reduced maintenance costs
- Eco-friendly, thanks to completely oil-free air (no lubricant)
- Longer service life for air dryer
- No restriction of duty cycle
- Reduced start-up energy requirements
- No disposal of condensate
- No oil filter required
- No condensate collector required
- Smaller motor
- Reduced dimensions
- Reduced weight

Advantages of oil-free compressor II

- Modular design (standardized components)
- Reduced spare part complexity
- Various drive options (DC, AC, hydro, direct-coupled or V-belt)
- Low vibration
- Radically reduced vibration transfer in the car body
- Low noise level

Environmental aspects

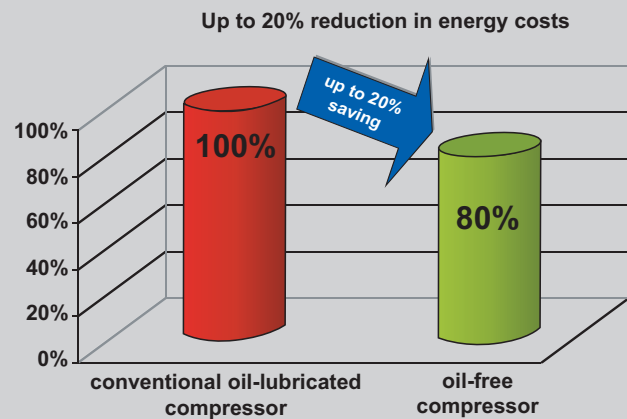
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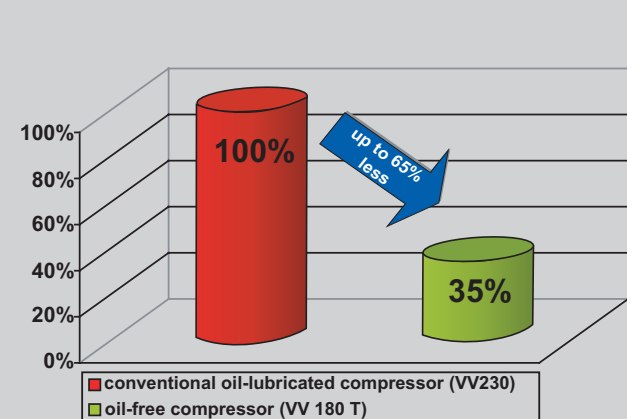


Aspects of comfort

Whisper-quiet oil-free compressor for railway rolling stock

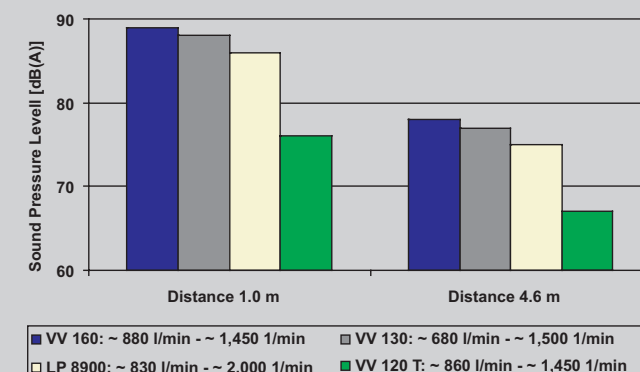
Minimal transfer of vibration from the compressor to the car body means maximum comfort for passengers. The special spring mountings and low-vibration design results in vibration levels that are approaching those of a screw compressor. A combination of compact design and the option of frameless suspension means the compressor is suitable for underfloor mounting.

The oil-free compressor sets new standards, thanks to especially low levels of vibration transfer.



The extremely low noise level of piston compressors is due to their compact design, generous airflow around the valves, optimized air intake ducts and minimal bearing play.

Various noise reduction measures, combined with extremely low-vibration operation, make the oil-free version significantly quieter than conventional compressors.

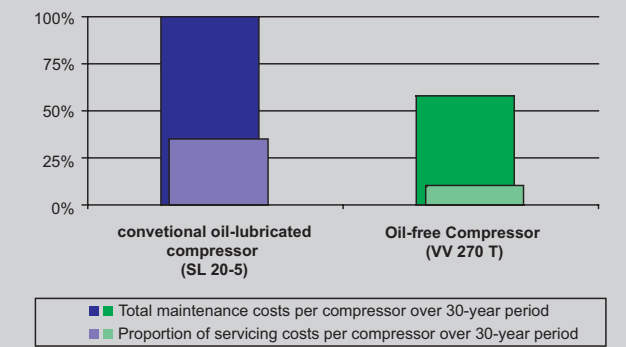


Aspects of cost saving

Extremely low life cycle costs

Servicing becomes a rare event with the new, oil-free compressor. Much of the routine maintenance work required by conventional units is no longer necessary. So in addition to saving oil (100%) and energy (up to 20%), their low life cycle costs make the new Knorr-Bremse compressors amongst the most economical of their kind.

The modular design, using standardized pistons, cylinders, connecting rods and bearings means further savings in terms of purchasing and storage of spare parts.



Total maintenance costs per compressor over 30-year period
 Proportion of servicing costs per compressor over 30-year period
 The oil-free compressor offers considerable reductions in servicing and maintenance costs. In the example above, based on average costs for 1,500 operating hours per year, overall maintenance costs are cut by almost 40% and servicing costs by almost 70%.

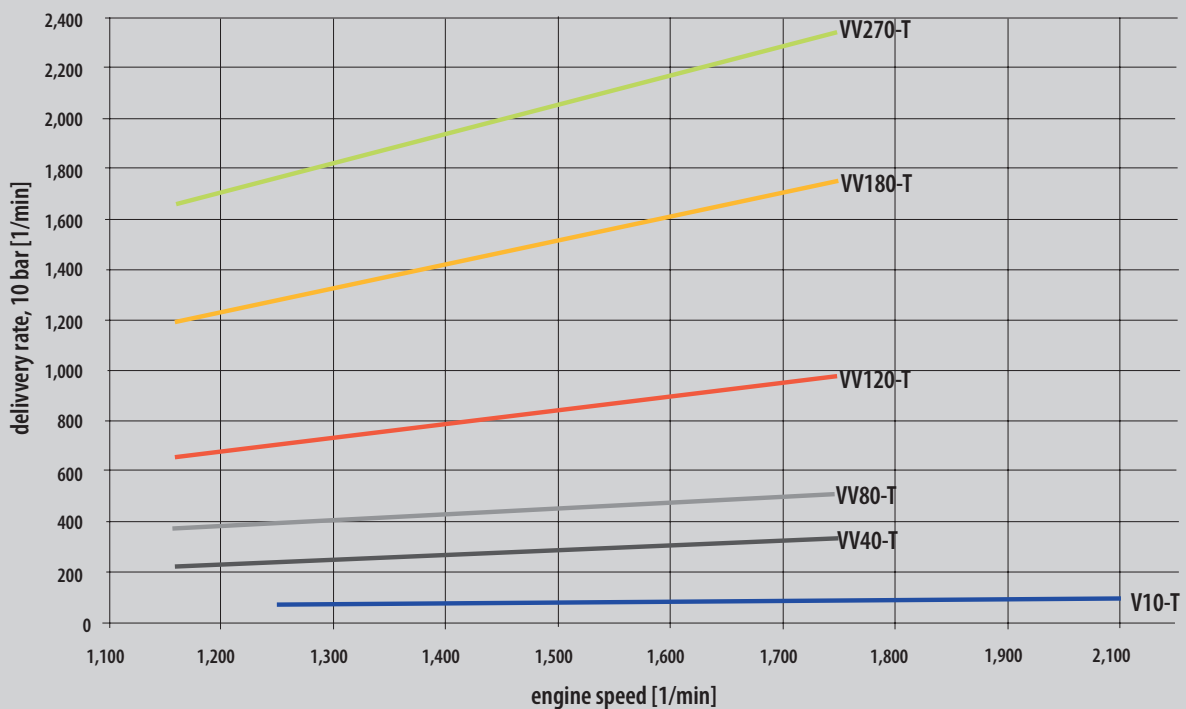
Servicing and maintenance of the oil-free compressor involve considerably less work than with conventional compressors – resulting in significant savings.

Maintenance activity	Interval	VV130	VV120	VV120-T oil-free
Check oil level	Monthly	■	■	
Service oil bath air filter	Monthly	■		
Change oil	Yearly	■ (6-monthly)	■	
Replace air filter unit	Yearly		■	■
Clean cooler unit	Yearly	■	■	■
Replace valves	3-yearly	■		
Overhaul	8-yearly	■ (6-yearly)	■	■
Overhaul motor	8-yearly	■ (6-yearly)	■	■

Full product range aspects

Oil-free compressors for all railway applications

The extended product range of oil-free compressor covers all applications from auxiliary compressors up to locomotive compressors.



Depending on the engine speed the oil-free compressors deliver up to 2,350 l/min at 10 bar.

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