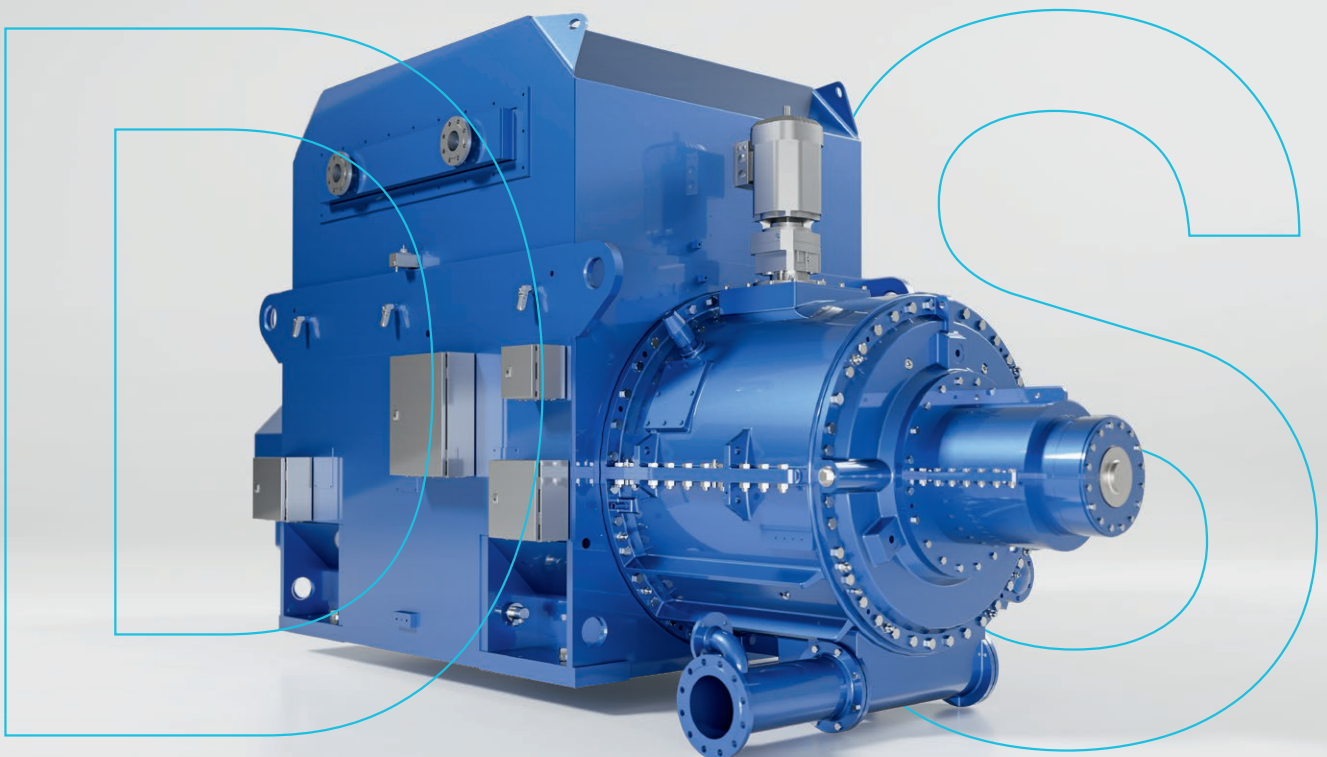


Compact. Economical. Robust. E-Pack DS – Drive System



Combined solution for electromechanical integration

Transition to electrification

The E-Pack DS is your ideal drive system upgrade for numerous industries, from chemicals and petrochemicals to power, oil and gas. Suitable for motor-driven compressors and pumps as well as generators driven by gas or steam turbines, it does more with less space. From generators in mobile containers to offshore applications and beyond, our drive system combines a small footprint, low weight and high efficiency. So you can transition to electric with confidence.

Synchronization of electrics and mechanics

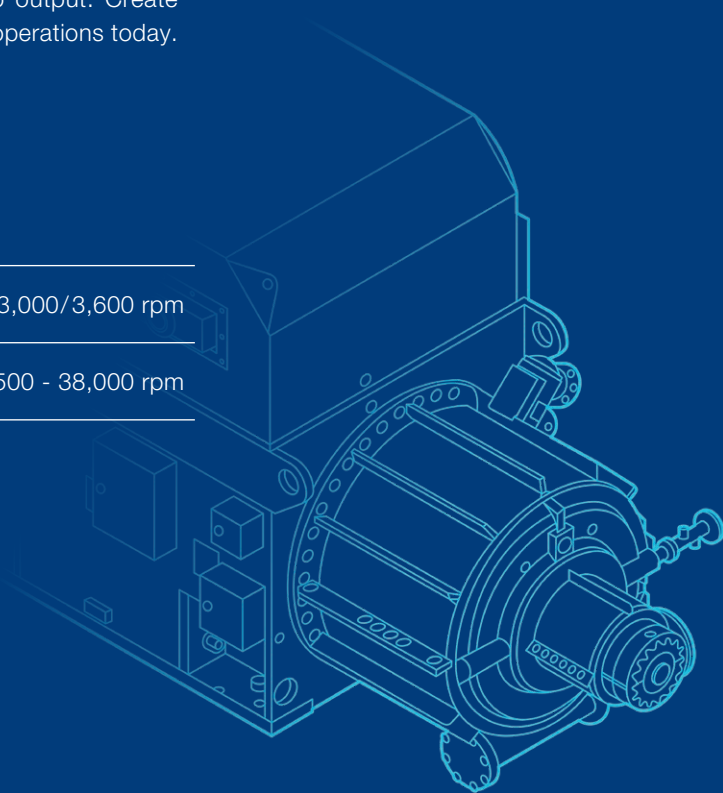
As a unique synchronized package featuring an electrical machine with an integrated gearbox, the E-Pack DS sets the benchmark for compact and effective electric drivetrains. It can be deployed in purely electric new developments or retrofitted in existing structures to replace gas and steam turbines. The compact and flexible design of this modular high-speed electrical drive package features fewer technical interfaces and cuts costs. And with a 1-40 MW range, it is a truly powerful performer.

Standardization of all process parameters

The high degree of standardization enables reduced complexity and a focus on essential components such as couplings and bearings. Robust design features promote durability, lower wear and streamlined maintenance. The E-Pack DS delivers a low total cost of ownership (TCO), with increased energy generation boosting efficiency and lowering overall consumption relative to output. Create your perfect package from our flexible portfolio and optimize your operations today.

Typical power and speed range

4-pole and 2-pole electrical machines	1,500/1,800 rpm	3,000/3,600 rpm
Gear ratios	2.5 - 11	4,500 - 38,000 rpm
Power range	1 - 40 MW	



Typical use case: electric motor
to centrifugal compressor

10.7 ^{MW}
rated power

**1,500/
13,440**
rpm

8.96 gear
ratio

99 %
gearbox
efficiency

50 %
reduced power loss
vs. traditional parallel
shaft gear unit

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VOITH



Integrated partners

Voith and ELIN Motoren combine the benefits of the gearbox and motor in a single drivetrain. In this way, they craft perfectly optimized electromechanical drive packages that deliver up to 40 MW. Enjoy quick and simple on-site installation – plus a unique aligned package supplied by a single source.



Compact Streamlined design for extra efficiency

The E-Pack DS is perfect for applications involving space and weight constraints. Comprising a highly compact integrated module that promotes a shorter and lighter drivetrain (see Fig. 1), it delivers powerful performance in a smaller package.

This reduced footprint (see Fig. 2) brings with it a number of related benefits, enabling operators to use a smaller base frame, a smaller plant and smaller industrial buildings.

The installation process is also easier and can be performed using simple coaxial base frames. By contrast, a 10 MW parallel shaft gear (PSG) requires a 500 to 800 mm offset at a gear ratio from 2 to 10.

Up to

30%

smaller footprint

Footprint comparison of standalone drivetrain and E-Pack DS

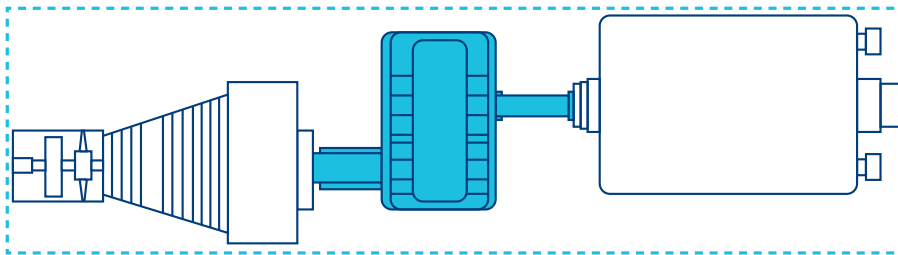


Fig. 1: Standard standalone drivetrain

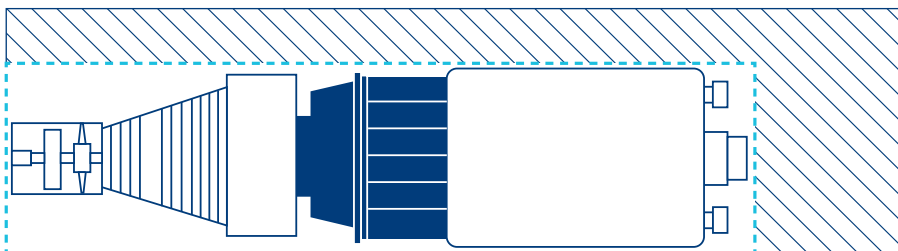
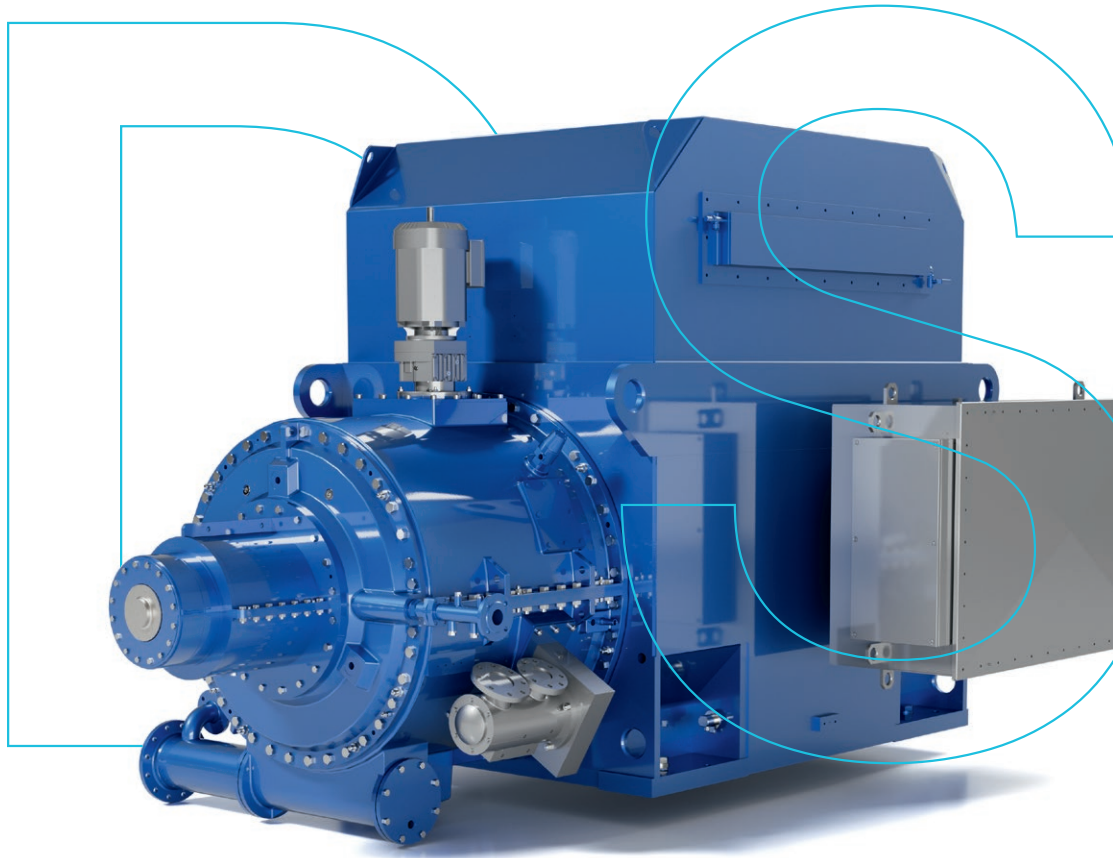


Fig. 2: 30% reduced footprint with E-Pack DS
from Voith and ELIN Motoren

Compact. Economical. Robust.



Smaller size, bigger benefits

At up to 30% shorter and as much as 10% lighter, the E-Pack DS enables greater flexibility throughout your operations. The smaller footprint perfectly reflects the streamlined character of this solution and its focus on deployment in real-world settings.

Extra efficiency allows you to make greater use of less space, while added simplicity promotes swifter execution of work-flows and orders. All this boosts the bottom line for OEMs and operators. It's the best opportunity to go electric.

Up to

10%

weight reduction

Added value

The compact design concept features joint oil piping, instrumentation, junction boxes and controls. This helps boost performance and flexibility in plant engineering scenarios.

- ✓ One package, fewer interfaces, less overall engineering
- ✓ Torsionally and laterally optimized drive system
- ✓ Easier on-site deployment at OEM and end user
- ✓ Uses fewer resources and has lower CO₂ footprint

Economical Cut TCO and boost sustainability



Go green in a way that benefits your budget. By lowering your engineering and project management costs, this integrated concept delivers immediate results. More sustainable operations coupled with improved performance is a real win-win.

From easier monitoring and shorter lead times to better overall system efficiency, the financial positives are plain to see. Easier integration, faster commissioning and a smaller footprint also help lower your total cost of ownership (TCO).

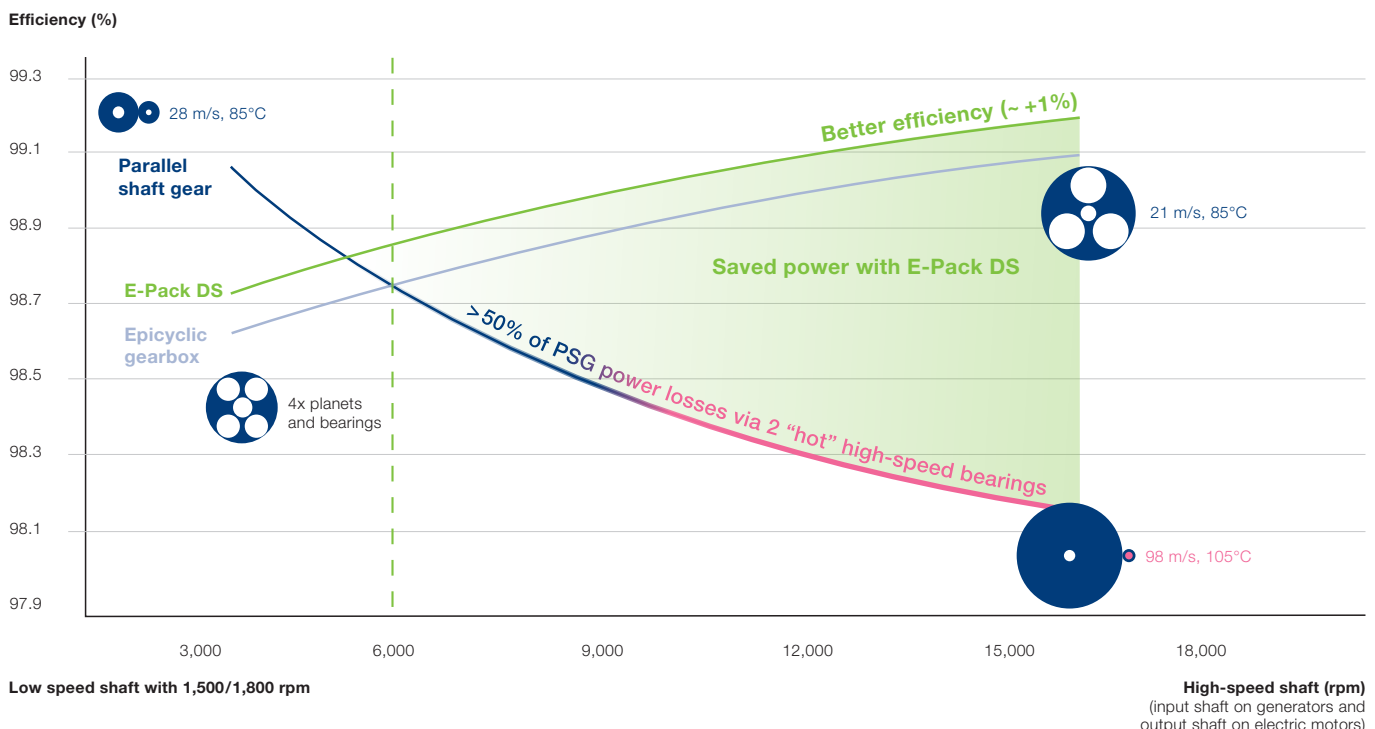
A sleek solution with a proven track record, the E-Pack DS needs only three planetary bearings. Its improved planetary gear efficiency at higher gear ratios has been physically verified. An optional integrated oil system has the potential to further shrink its footprint.

Approximately

10%



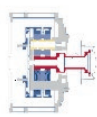
overall savings

Superior gear efficiency with planetary gears at high gear ratios: E-Pack DS leads the way



*) Typical PSG use case 10 MW $i=2$ → High speed bearings: load 3.2 MPa, speed 28 m/s, 85°C
 Typical PSG use case 10 MW $i=10$ → High speed bearings: load 3.4 MPa, speed 98 m/s, 105°C

Typical 10 MW use case with major savings on operating costs

		PSG API	PSG AGMA	EG E-Pack DS
				
Efficiency	(%)	97.8	98.0	99.0
Power losses	(kW)	241.9	213.4	107.5
Power losses	(%)	2.2	2.0	1.0
Savings with EG E-Pack DS vs. PSG at EUR 0.10/kWh		EUR 107,520/year*	EUR 84,720/year*	
at EUR 60 per ton of CO ₂		EUR 30,578/year*	EUR 24,094/year*	

*Assumption of 8,000 operating hours per year

Reduce power losses, save money

Featuring minimum gear components and bearings, the E-Pack DS outperforms the overall efficiency of a parallel shaft gear-box by up to 1%. It typically delivers a return on investment (ROI) within 2-3 years – and boosts profits for 20-30 years.

Voith and ELIN Motoren have generated a truly harmonized electromechanical drive package. Bundling their expert

electromechanical knowledge, they conduct detailed internal multibody simulations that take performance to the next level.

The advantages over a parallel shaft gear unit (PSG) can already be felt at a gear ratio of 4. And the comprehensive scope of supply extends through to a plug and drive concept, ensuring the ideal solution whatever your needs.

Up to

1%

better gear efficiency

Added value

Simplicity, effectiveness and elimination of low-speed bearings result in profitable green performance. Streamlined processes promote added cost benefits.

- ✓ Lower power losses and oil temperatures
- ✓ Lower operational costs
- ✓ Longer-lasting oil and components
- ✓ Environmentally friendly package

Compact. Economical. Robust.

Robust Optimized for safety and durability



The E-Pack DS is typically coupled to the turbine or compressor without any sensitive high-speed bearings. This helps avoid wear and associated power losses. In a unique aligned package, the motor, generator and turbo gear are assembled and tested in-house at Voith.

You receive a tested and configured complete machine for connection to your drive unit. Aligned “one system, one source” maintenance and the enhanced safety margin of this coordinated equipment ensure greater durability and reliability. The elimination of high-speed and low-speed bearings also reduces system complexity (see graphic on page 9).

Cooler bearings feature improved and stable damping behavior, as well as a longer service life with less wear-out and a lower risk of issues such as coking. This delivers clear benefits in terms of operations and cost savings.

Flexible extension options

Robust gear technology

+

Robust 4-pole and
optional 2-pole
electrical machines

=

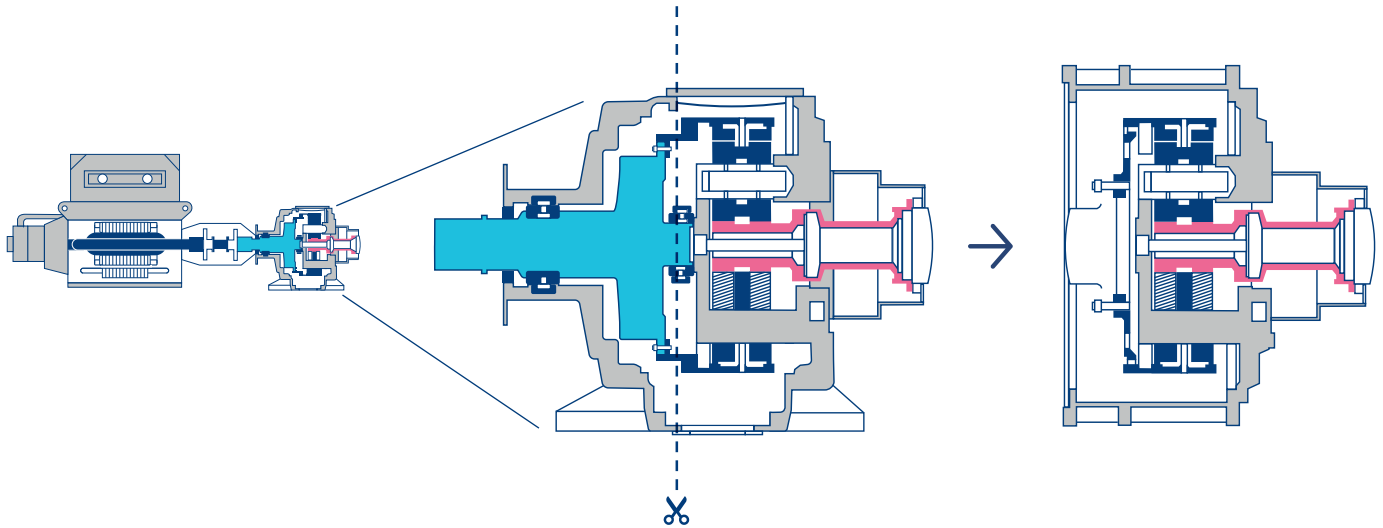
Long service life

0

interface risks



Technical concept – free-standing solution compared to E-Pack DS with focus on essential components



One package, fewer interfaces

Keep things simple: Fewer components mean more reliability and efficiency, while fewer bearings enable improved dynamics. And since the drivetrain has a coaxial arrangement with no offset, this promotes greater modularization.

In a further boost to standardization, the gearbox does not require a foundation. A pair of casing sizes cater to a broad

range of gear ratios from 3 to 11. You can also avoid bearing and shaft currents thanks to the optimized earthing concept.

The gear unit and electrical machine use standard oil supply and drain lines for quick and easy on-site alignment. No extra test run is needed before installation. Voith and ELIN Motoren are your single source for torsional analysis, optimization and more.

Added value

Alignment powers more robust performance underpinned by smoother maintenance. By reducing wear and associated aspects, it supports a longer and more productive service life.

- ✓ Harmonized operation and maintenance
- ✓ Less lubrication oil, longer service life
- ✓ Better spare parts management
- ✓ Optimized earthing concept

source for entire system

Industry benefits

Electrifying performance

The E-Pack DS is suitable for all sectors that require turbo-gearred electrical machines. It can be deployed in retrofits and new developments across a range of settings including the chemical and petrochemical industry, oil and gas production, and power generation.

What sets this solution apart is the fact that compressors, pumps and more are traditionally driven by turbines. If these components were to be replaced with an electric motor, a gearbox would also be required. The E-Pack DS combines the benefits of the gearbox and motor in a single drive system, making it much simpler to install and maintain. Going electric has never been so easy.

Flexible extension options

- ✓ Mechanical oil pumps
 - ✓ Rotor turning gears
 - ✓ Base frame
 - ✓ Lube oil system
 - ✓ Jacking oil system
-

Plug-and-drive solution: E-Pack DS with gearbox and electrical machine tested by Voith and ELIN Motoren in Weiz, Austria



Source: TGM Kanis Turbinen GmbH

Compact. Economical. Robust.

Voith Service

Maximum availability

The E-Pack DS is the unique compact drive system from Voith and ELIN Motoren. This aligned, synchronized and standardized solution is provided within a flexible framework from which you can select the perfect package to meet your needs.

It only takes the partnership of operator, turbomachinery OEM, Voith and ELIN Motoren to ensure streamlined and synchronous maintenance and overhaul of the entire drivetrain. With our full range of services and team of experts, we are there for you every step of the way.



Go electric with
confidence
**Contact our
experts**

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