

E-PACK[®], The High Speed Electrical Machine

Greater success through:

- Working with the Epicyclic Gear Unit experts from BHS and electrical machine professionals.
- Fewer technical interfaces.
- Buying an assembled and tested module, instead of components.
- Reduced engineering and hardware expenses.
- Increased overall system efficiency.
- Shorter delivery time.
- Only one module supplier, instead of several component suppliers.
- One responsible partner for service and repair.

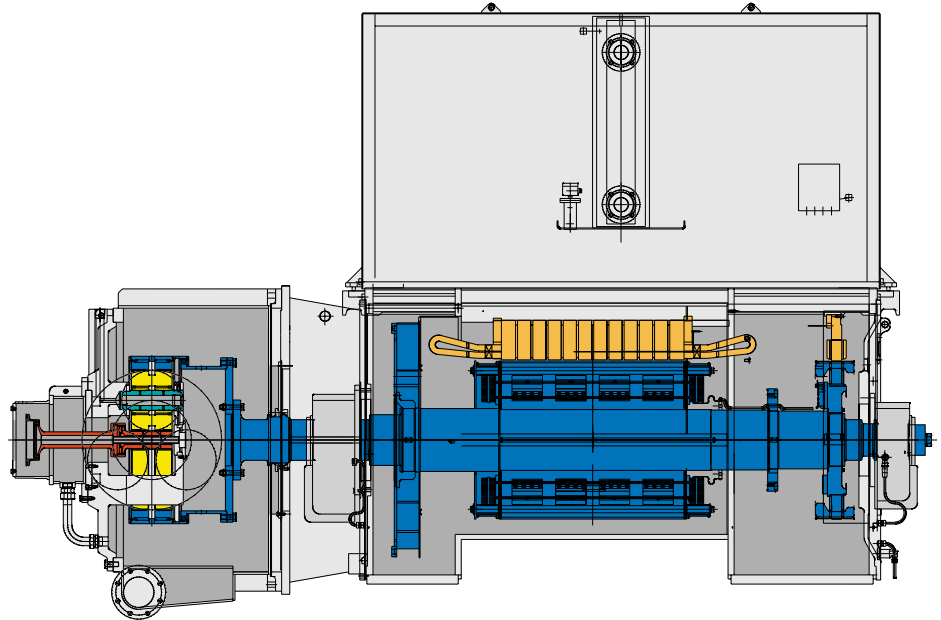


Figure 1: Proven BHS Stoeckicht Epicyclic Gear Unit integrated with LDW Generator.

Technical advantages over conventional arrangements:

- Lower shaft train length, width and weight.
- BHS RTP* or RTG* Epicyclic Gear Units, can operate at up to 1% higher efficiency than a parallel shaft gear unit.
- Lower lube oil requirements.
- System includes low and high-speed couplings and guards.
- Epicyclic gears are inherently quieter than parallel shaft gear units.
- No gear pedestal required.
- Gear unit and electrical machine use common oil supply and drain lines, simplifying installation.
- Simple and efficient monitoring of spindle temperatures.
- Quick and easy assembly and disassembly. No alignment on low speed side.



Figure 2: E-PACK[®] for B+VI Steam Turbine in Assens, Denmark

- Journal bearings on the electrical machines, accessible without system disassembly.
- Packaged with 4-pole electrical machines.

* Star Type Epicyclic Gear Unit; RTP double-helical, RTG spur-gearing - also refer to our Epicyclic Gear Unit brochure.

Technical Data

Power range: 1 - 37 MW
 High speed shaft: 3000 - 19000 rpm
 Low speed shaft: 1500 or 1800 rpm
 Voltage range: 3 - 15 kV

E-PACK® Epicyclic Gear Units are delivered with 4-pole electrical machines for 50 Hz and 60 Hz applications.

BHS E-PACK® Gear Units applications include:

- Motor driven compressors
- Motor driven pumps
- Steam turbine driven generators
- Gas turbine driven generators.

The E-PACK® is a complete drive package, facilitating the design and construction of shaft trains.

Since E-PACK® can be installed on site, with no shop assembly, lead times are reduced.

Through a minimized number of supplier interfaces, E-PACK® installations incur lower engineering expenses than traditional arrangements.

To offer the E-PACK® system, BHS has teamed up with the following electrical machine manufacturers:

- LDW Lloyd Dynamo Werke, Bremen	Synchronous Motor and Generator 3 - 37 MW
- Alstom, Rugby	Synchronous Generator 15 - 37 MW
- AvK, Ingolstadt	Synchronous Generator 1 - 9 MW
- Elin EBG, Wien - LDW Lloyd Dynamo Werke, Bremen	Asynchronous Motor 1 - 20 MW

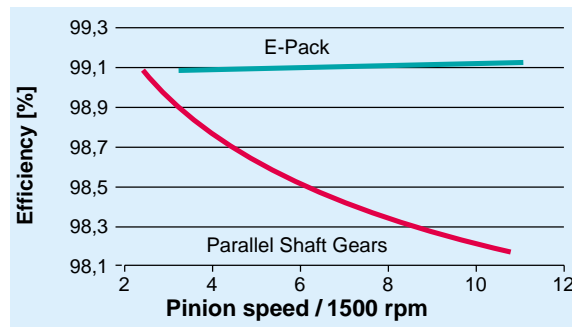


Figure 3:
Efficiency comparison;
Conventional gear versus
E-PACK® Gear Unit.

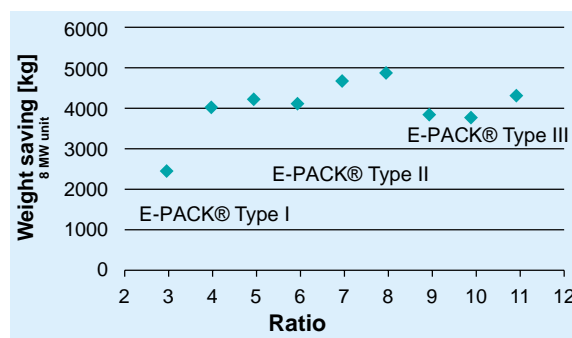


Figure 4:
Weight saving of an
E-PACK® system versus
a conventional solution
(incl. couplings and
mounting flange on electric
machine; excl. base
frames, oil system etc.)

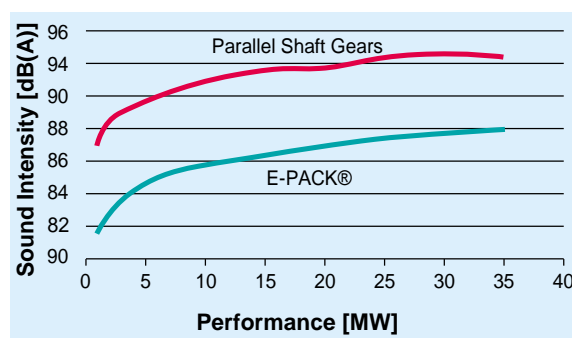
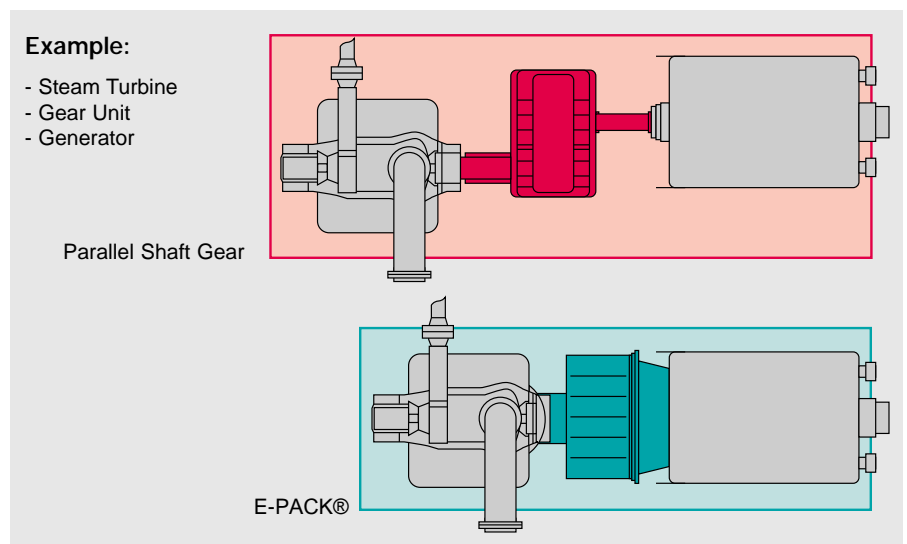


Figure 5:
Gear noise comparison,
conventional gear versus
E-PACK® Gear Unit.

Figure 6 (below):
Comparison of conventional
arrangement and E-PACK®
space requirements in the
shaft train.





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