Delivering uncompromising reliability in the toughest environments

Turbo Power eXtra, built to optimize performance and efficiency under harsh operating conditions

Operational benefits
- Dedicated for high-speed diesel engine applications
- Compressor pressure ratio capability up to 5.0
- Enables up to 20% higher power density
- Robust design based on field-proven features
- Can be optimized for full-load or part-load operation
- TBO increased to 20,000 hours for maximum uptime
- First frame size, TPX44-H, ready for engines rated 1 to 3.5 MW

Designed specifically for the large high-speed diesel sector
In use across areas as diverse as power generation, marine propulsion, mining and rail traction, large high-speed diesel engines have to meet a whole range of requirements in the toughest of environmental conditions. Demands on these engines can vary from extreme numbers of load cycles for mining machinery to constant load profiles in baseload power generation, right down to standby power generation involving just a few hours of operation per day.

Like the diesel engines used in these applications, the turbocharging system has to have a dedicated design, one that supports demanding acceleration and load acceptance requirements. And it must do so reliably and efficiently under harsh, cyclical operating conditions. Many of the applications in which high-speed diesel engines are used are also mission-critical, so unexpected downtime is a no-go. This is where the TPX (for Turbo Power eXtra) comes in.

High-speed diesel engines require turbocharging systems with high compressor pressure ratio capability over a very wide range of volume flows. And at the same time deliver the high efficiency that keeps fuel consumption low and reduces thermal loading of the critical components. The TPX was developed to fulfill this need.
TPX 44-H – adding extra versatility and ruggedness to proven performance characteristics

Designed to maximize reliability and ease of assembly/disassembly, for example by optimizing turbocharger-to-engine interfaces for accessibility and ease of servicing.

The TPX pushes the boundaries of single-stage turbocharging into areas in which two-stage turbocharging systems are in use today.

Its broad application range is made possible by, among other things, wide compressor maps, enabling standardization opportunities for different engine ratings.

Extra application flexibility is offered through a choice of vaned or unvaned diffusers, allowing TPX compressor efficiency and flow characteristics to be tuned for full-load or part-load operation.

With a compressor pressure ratio of up to 5.0 over a very wide range of volume flows plus high turbocharging efficiency, the TPX supports high-speed diesel engine users’ efforts to keep fuel costs low and reduce thermal loading of critical parts.

Field experience with the first frame size, the TPX 44-H, is successfully demonstrating the robustness and performance capabilities of this dedicated turbocharger series.

Proven strengths of the TPX turbocharger

Sturdiness
Gives greater performance reliability in even the toughest engine environments.

Versatility
Designed for a wide range of operating profiles and duty cycles in power-gen, marine propulsion, large mobile equipment and rail traction applications.

More power
Exceptional power density enabled by a high compressor pressure ratio of up to 5 over a wide flow range.

Advanced
Ready now for new diesel-like gas engines.

Service friendly
 Fewer components and easier access allow quick turbocharger exchange, increasing TBO by up to 20,000 hours.

Fast response
Quick acceleration and load pick-up ensured by optimization of transient performance.

Reduced emissions
Targets compliance with emissions and greenhouse gas (including CO₂) legislation across all applications.

Lower costs
Increased uptime, optional efficiency tunings and lower fuel consumption reduce overall cost of ownership.
Built to last and easy to access
ABB has designed the TPX as a heavy-duty turbocharger, and built it specifically for large high-speed diesel engines that are put through their paces in areas demanding exceptional robustness as well as quick, easy overhauls whenever the need arises.

To meet this demand for a truly robust turbocharger, one that ensures highest reliability without compromising on performance, the TPX has not only field-proven features but also a reduced number of components. With a modular design concept that focuses on ease of assembly and disassembly, accessibility and a quick turbocharger exchange are ensured. For example, its turbocharger-to-engine interfaces are optimized with this in mind. Four bolts are used for mounting, so tightening torques are lower than with two-bolt mounting. Safety and reliability solutions, including robust burst containment, have also been prioritized in the TPX design. And, importantly, the time between overhauls for the TPX is a lengthy 20,000 hours, for maximum up-time and lower operating costs.

Exceptional performance in extraordinary conditions
The first frame size of the new TPX turbocharger, the TPX 44-H, is already at work in the field, powering up high-speed diesel engines rated 1 to 3.5 MW. Building on the experience gained, ABB plans in the near future to add a second frame size with an approximately 20 percent higher flow capability.

Behind this successful start are a whole raft of technical advances: For example, the compressor pressure ratio of up to 5.0, with wide compressor maps for the breadth of application range that allows standardization for various engine ratings. More power is therefore available at altitude and at high ambient temperatures. Power density is up to 20 percent higher with the TPX for both constant- and variable-speed applications; alternatively, rated power can be maintained in severe ambient conditions. This extends the application range of single-stage turbocharging into areas in which two-stage turbocharging is used today.

A choice of vaned or unvaned diffusers gives extra flexibility by allowing TPX compressor efficiency and flow characteristics to be tuned for full-load or part-load operation. Transient performance is optimized for quick acceleration and load pick-up. Plus the high turbocharger efficiency and adapted characteristic of the TPX support low fuel consumption, reducing operating costs and overall total cost of ownership.

With all these features, the TPX meets market demand for a turbocharger covering a wide range of operating profiles and duty cycles, matching the engine industry’s wish to use a common engine platform for multiple applications.