Acce//eron

TPS-F

Compact turbochargers for high pressure ratios

Performance plus

High flow rates, high efficiency and high pressure ratios – three turbocharger characteristics essential for powering up engine performance and reducing emissions.

The TPS-F is proven a family of Accelleron turbochargers offering high power density in a compact, sturdy design. It was developed to meet the performance and support the emissions requirements of small medium-speed diesel engines, large high-speed diesel engines and gas engines in the 400 kW to 3,300 kW power range.

Three versions are available for full-load pressure ratios of up to 5.2. diesel engines and gas engines in the 400 kW to 3,300 kW power range. Three versions are available for full-load pressure ratios of up to 5.2.

The modular, robust construction of the TPS-F ensures easy installation and maintenance, plus long times between overhauls and low lifecycle costs. The outline dimensions have been kept the same as those of the proven TPS-D/E1, offering important advantages for planned engine upgrades.

Tried and tested
Accelleron performs a comprehensive series of qualification tests to ensure the total reliability of its turbochargers. Safety features of the TPS-F include a proven turbine and compressor containment concept.

Market-oriented design
TPS-F turbochargers are designed to meet today's and future market requirements.

The TPS-F unites proven benefits of the TPS-D/E platform with features that cater to engine builder and end user demand for a rugged, high-performance turbocharger designed to meet immediate as well as longer-term goals. Highest efficiencies and full-load compressor pressure ratios of up to 5.2 contribute to an increase in bmep, reduced fuel consumption and lower emissions.

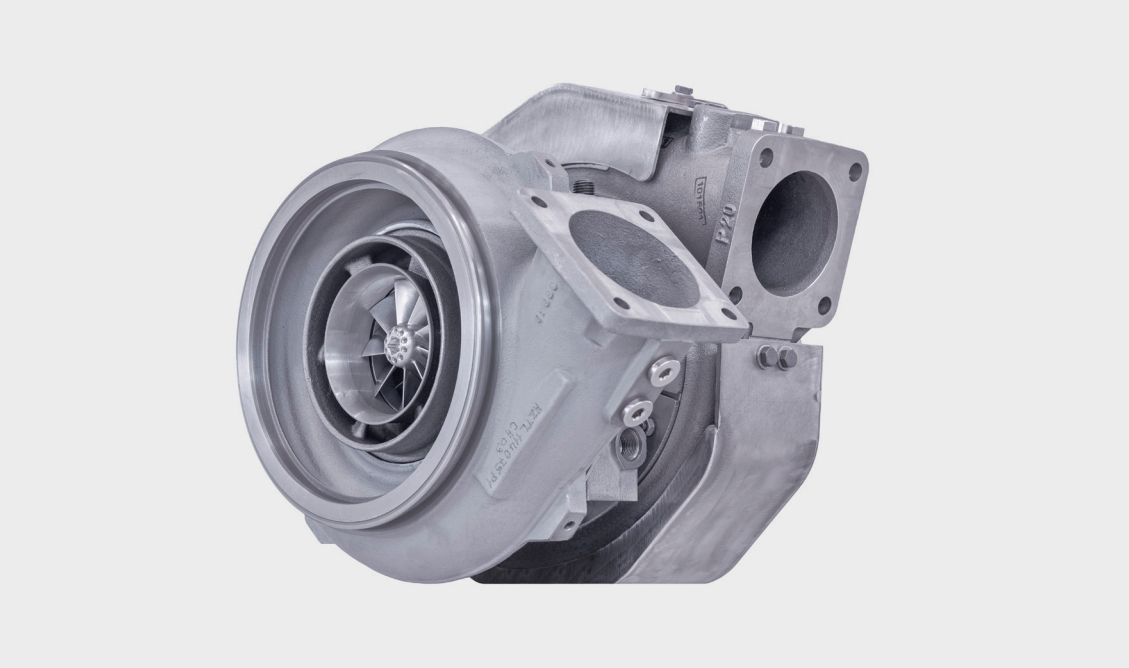
TPS-F turbochargers are available in five frame sizes.

Available options
Options include an HFO package, jet assist[2], variable turbine geometry[3] and turbine and compressor washing. A high-temperature package is also available for applications with extremely high gas inlet temperatures.

[1]Applies to frame sizes TPS48 to TPS61
[2]Depending on frame size and/or compressor type
[3]For frame sizes TPS57 and TPS61

Benefits that add up

The TPS-F brings together features that improve performance and cut engine emissions while keeping running costs low.



Features	Benefits
Three radial high-pressure compressor stages; increased volume flow; different trims	Full-load pressure ratios of up to 5.2 with aluminum compressor wheel; optimal matching
Stabilizer technology	Enlarged map widths, improved compressor stability
High-efficiency mixed-flow turbine, fully capable of pulse charging	Highest turbine performance, very high part-load efficiency
Highly compact design; same outline dimensions as TPS-D/E[4]	Interchangeability with TPS-D/E, combined with increased power density
Single-piece, oil- or water-cooled bearing casing	Optimized turbocharger cooling in all applications
Internal plain bearings with squeeze oil film, lubricated by engine lube oil	Outstanding operational reliability; engine-internal oil supply
HFO compatible turbine stage, wet cleaning of turbine and compressor	Improved operation in harsh conditions
Air intake and gas outlet variants available; variable positioning of casings and flanges	Optimized installation on engine
Variable turbine geometry versions available[5]	Increased operational flexibility
Optional high-temperature package	Improved rotor stability, longer casing lifetime
Comprehensive qualification test program, including containment tests	Highest operational safety

[4] Applies to frame sizes TPS 48 to TPS 61
[5] For frame sizes TPS 57 and TPS 61

Design features Turbine and compressor

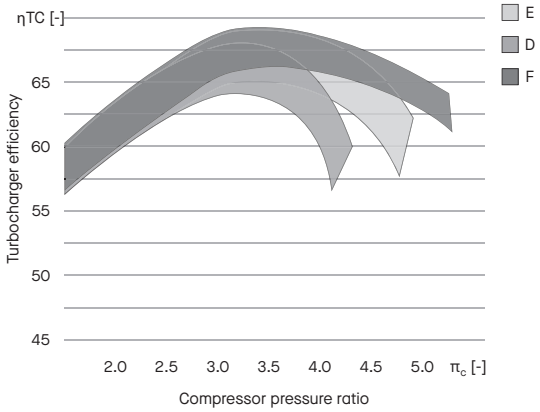
Turbine
The mixed flow turbine with nozzle ring ensures very high efficiencies and large volume flows in both pulse and constant pressure applications. Optional coated nozzle rings are available when operating TPS-F turbochargers under heavy fuel conditions. Variable turbine geometry is another option1 for specific applications with changing operating or ambient conditions. Gas inlet casings with one, two, three or four gas inlets accommodate all common pulse systems.

[1]For frame sizes TPS 57 and TPS 61

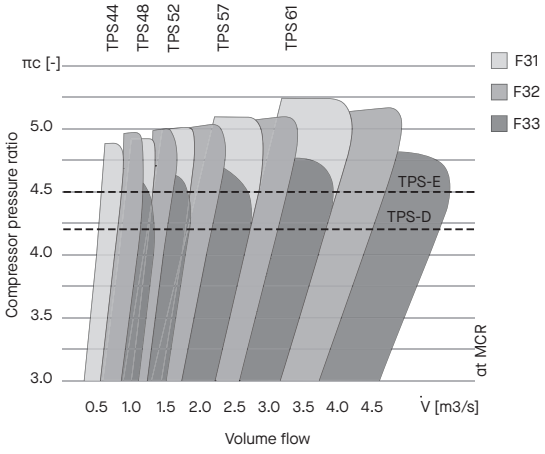
Compressor
Three radial compressor stages cover the complete range of pressure ratio and volume flow requirements. Full-load pressure ratios of up to 4.7 (TPS-F33), 5.0 (TPS-F32) and 5.2 (TPS-F31) can be achieved with aluminum alloy compressor wheels. Single-piece splitter bladed wheels with backswept blades allow peak efficiencies of more than 84 percent.

The TPS-F compressor featuresAccelleron stabilization technology as standard. By recirculating some of the air, this design innovation shifts the surge margin for an increase in compressor stability.

01 Volume flow range of TPL-F turbochargers



Compressor efficiency

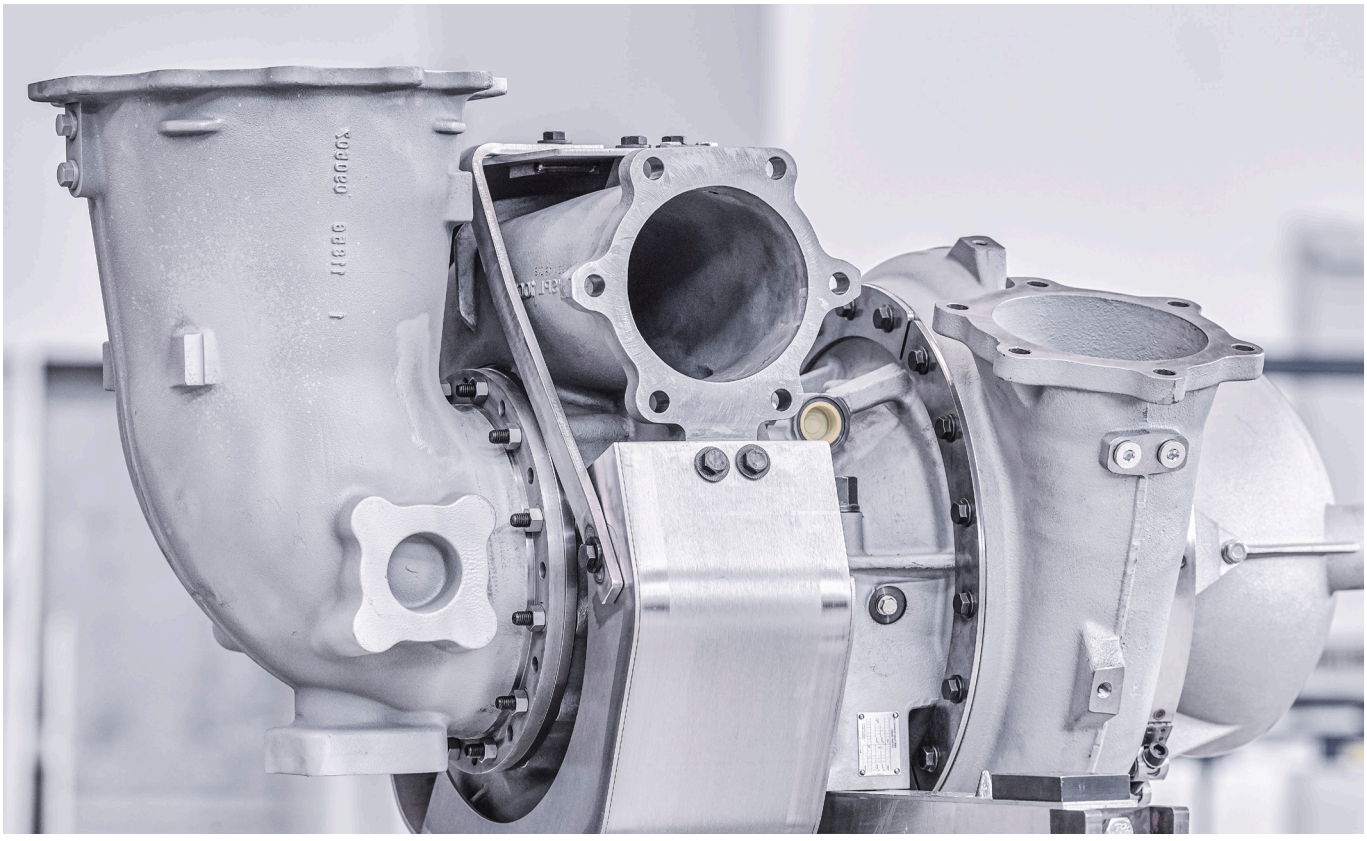


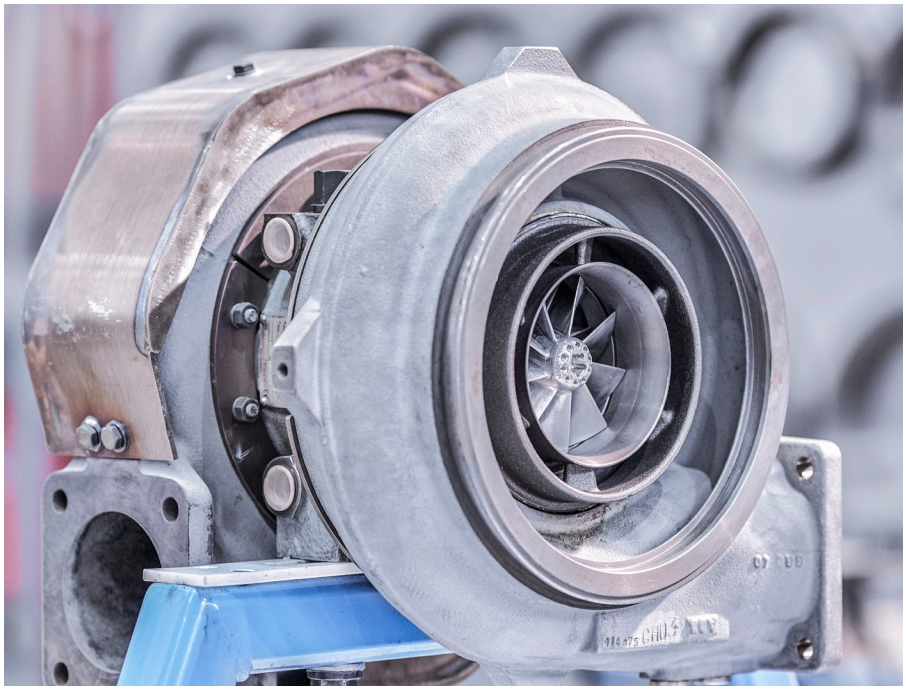
Design features Bearings and casings

Stable, compact and reliable
TPS-F plain bearings benefit from experience gained with over 80,000 Accelleron with plain bearings in service worldwide.

Accelleron developed the TPS bearing assembly for direct lubrication by the engine lube oil system. Shaft stability at all speeds is ensured by the centering of the radial bearing bushes in a squeeze oil film damper, while the position of the axial thrust bearing between the radial bearings contributes to the compact rotor design. This solution ensures a long bearing lifetime as well as safe, reliable operation of the TPS-F under all working conditions.

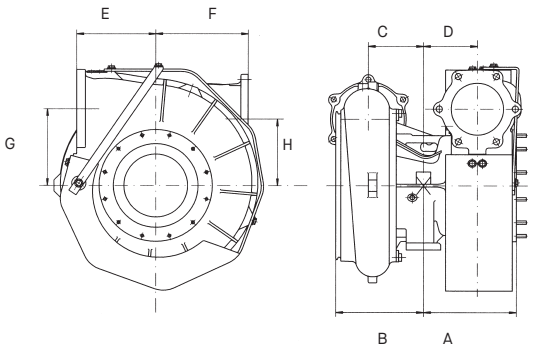
The compact, single-piece bearing casing is oil- or





water-cooled to keep component temperatures at critical locations low during steady-state operation and when shutting down the engine.

Optimized casing design
TPS-F casings are optimized for applications on four-stroke diesel and gas engines in the 400 kW to 3,300 kW power range. Excellent flow dynamics and minimized thermal stress are ensured.
Total containment is provided by an integrated inner and an outer burst protection ring.



Turbine and compressor washing are catered for. All casings, including suction branches and the gas outlet elbow, are also prepared for the connection of temperature and pressure measurement sensors.

For high gas engine exhaust temperatures Accelleron also offers a high-temperature package that includes heat-resistant casing materials.

Accelleron qualification tests
Tests include:
- Resonance endurance
- Low cycle fatigue
- Temperature cycle
- Hot shutdown
- Oil tightness
- Compressor containment
- Turbine containment
- Blade vibration
- Thrust bearing
- Noise

Type	A	B	C	D	E	F	G	H	Weight kg*
TPS44	164	166	96	100	145	175	130	113	120
TPS48	184	184	112	106	163	195	155	134	180
TPS52	221	214	132	128	188	225	185	160	250
TPS57	271	258	161	157	230	270	226	196	410
TPS61	323	305	192	187	274	321	269	233	680

*includes filter silencer

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