Exhaust turbocharger

Downsizing has a long legacy at Audi – the first turbocharged gasoline engine, a five-cylinder unit, was produced as early as the late 1970s. Today the brand uses a turbocharger on all its four- and five-cylinder engines, both TDI and TFSI units, to increase performance and torque. Certain large V-engines employ two chargers according to the bi-turbo principle.

A turbocharger comprises a turbine driven by the exhaust gas flow and a compressor for the intake air. The two components are housed opposite each other on a common shaft. A maximum turbine speed of 200,000 rpm can be achieved, depending on the engine.

Audi is continually improving its turbocharger technology; examples of such improvements include optimization of the turbine rotors and bearings, temperature monitoring via sensors and the use of pulsation dampers that reduce vibrations. The charger on the compact 1.2 TFSI has an electric control element for particularly fast, precise actuation of the wastegate, a bypass valve that regulates boost pre ssure. Boost pressure builds up instantly, and fuel consumption decreases in the part-load range.

In the dynamic Audi TT RS, by contrast, the charger is particularly large. It generates relative boost pressures of up to 1.2 bar (17 psi) and can theoretically compress up to 335 liters (11.83 cubic ft) of air per second at full load. Its housing has a separate oil supply and a cooling system with its own water pump.

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