

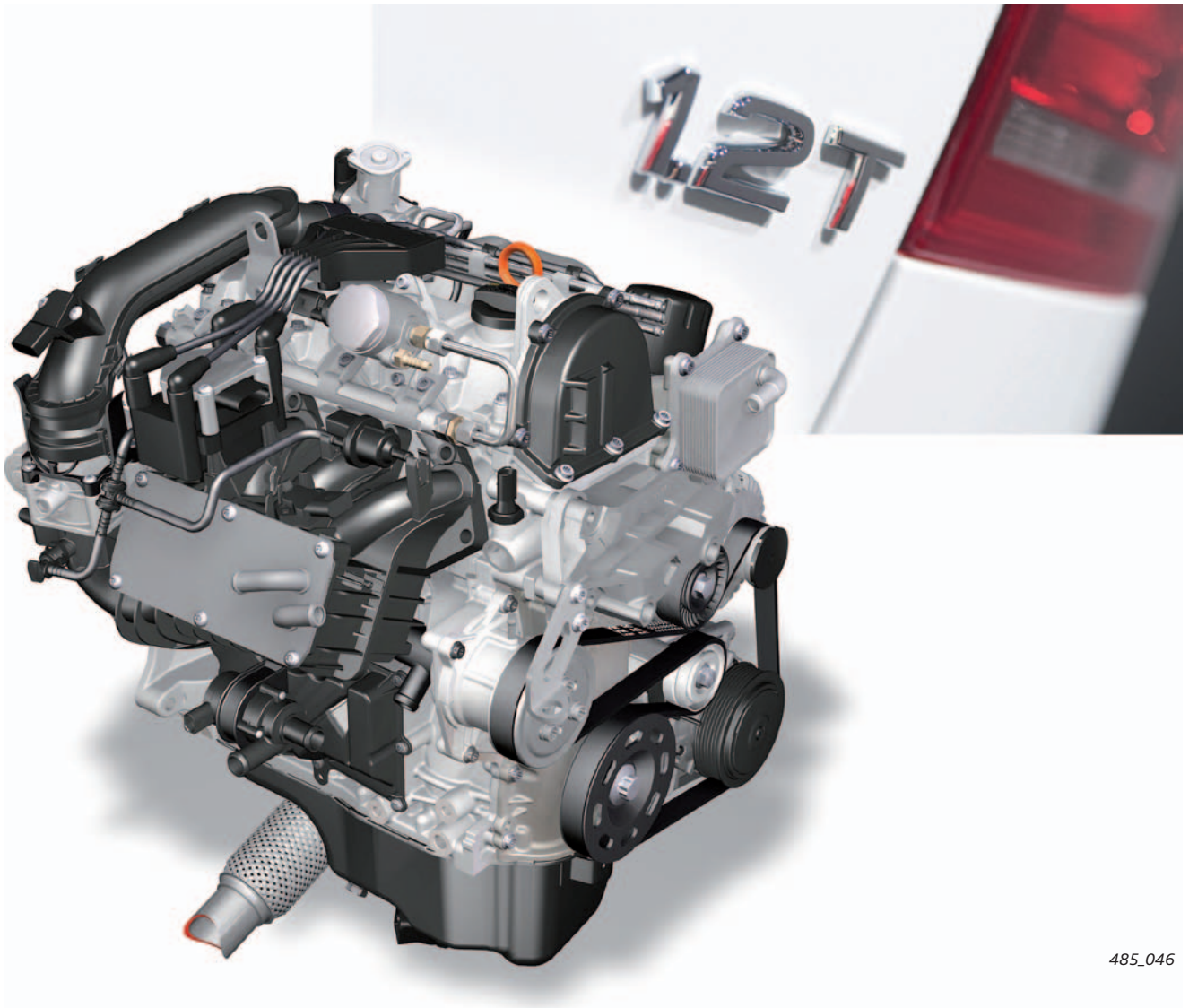
Audi 1.2L TFSI engine

Following on from the A3 with its 92 kW 1.4l TFSI engine which paved the way for small petrol engines with superior torque and high fuel economy by combining turbocharging with direct fuel injection, Audi presents the 1.2l TFSI - yet another engine with TFSI technology for the entry-level segment. Economy and pulling power are still the key success factors, especially in the light of the on-going heated debate on CO₂ emissions.

For this reason, Audi has systematically extended its *TFSI** strategy, and with the new 63 and 77 kW 1.2l TFSI engines it continues its successful efforts in *downsizing** the volume engines for the A1 and A3. Audi has further improved the engine technology of the small but powerful EA 111 engine series by maintaining a sharp focus on optimising friction and lightweight design. Featuring a new weight-optimised aluminium cylinder block and an entirely new combustion process, this engine offers an ideal combination of performance, fuel economy and cost for entry-level Audi models.

The radically redesigned 1.2l TFSI engine, which in the A3 delivers a specific power output of 87.7 HP from a displacement of 1197 cm³, utilises the same technology as its renowned siblings with displacements of 1.8 and 2.0 litres. Turbocharging and direct petrol injection make a perfect combination in the A3 too, and together they provide a high compression ratio of 10.0 : 1 which not only benefits thermodynamic efficiency but also enhances performance and economy.

Typically of a turbo, the small four cylinder operates at low speeds. In the A3 the engine delivers an impressive 175 Nm of torque between 1550 and 4100 rpm and a maximum power output of 77 kW (105 hp) at 5000 rpm. This allows the engine to run smoothly and efficiently. The three-door Audi A3 with 1.2l TFSI engine accelerates in 11.1 seconds from zero to 100 kph (A3 Sportback 11.3 seconds). The A3 and the A3 Sportback consume on average only 5.5 litres of fuel per 100 km. At the same time, the engine produces CO₂ emissions of only 127 g/km. Fuel consumption is reduced by 1 litre per 100 km compared to the 75 kW (102 HP) predecessor engine (1.6l MPI).



485_046

Learning objectives of this Self Study Programme are:

In this Self Study Programme you will learn the technology of the 1.2l TFSI engine.

When you have worked your way through this Self Study Programme you will be able to answer the following questions:

- ▶ How is the basic engine designed?
- ▶ What are the differences between the 1.2l TFSI engine and the TFSI engines previously used by Audi?
- ▶ Which modifications have been made to the fuel system?
- ▶ What are the special features of the engine management system?
- ▶ What must be observed when servicing the vehicle?

Introduction

Specifications	5
----------------	---

Engine mechanicals

Weight reduction measures	6
Cylinder block	6
Cranktrain	7
Chain drive	8
Cylinder head	9
Positive crankcase ventilation	13
Vacuum supply	15

Oil supply

Oil circuit	16
Oil filter	17

Air supply

Overview	18
Charge air circuit	18
Charge pressure actuator V465 with charge pressure actuator position sensor G581	19
Charge pressure control function	20

Cooling system

Overview	22
Charge air cooling system	22
Engine cooling system	23
Thermal management	27
Active coolant pump	27

Fuel system

System overview	29
Injectors N30 – N33	29

Engine management

Overview of the Simos 10 system on the Audi A3	30
Engine control unit J623	32
Operating modes	32
Ignition system	33

Service

Special tools	35
Scope of maintenance	36

Annex

Glossary	37
Test your knowledge	38
Summary	39
Self Study Programmes	39

► The Self Study Programme explains the basics of the design and function of new models, new automotive components or new technologies.

It is not a Repair Manual! Figures given are for explanatory purposes only and refer to the software version valid at the time of preparation of the SSP.

For maintenance and repair work, always refer to the current technical literature.

Terms shown in italics and marked by an asterisk (*) are explained in the glossary at the back of this Self Study Programme.



Note

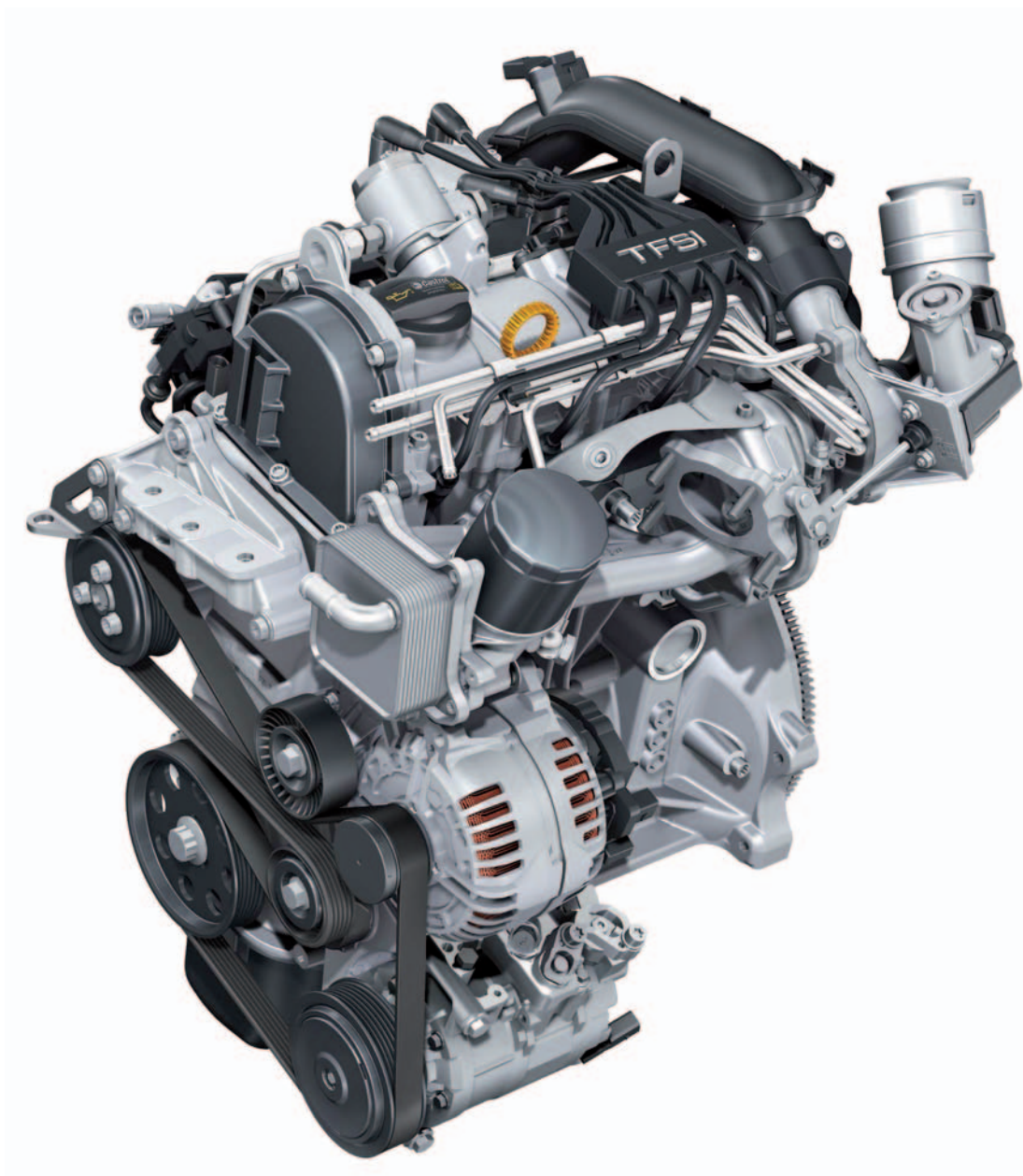


Reference

Introduction

Brief technical description

- ▶ Newly developed aluminium cylinder block with innovative cast iron cylinder liners
- ▶ Two-valve cylinder head with inclined overhead valves
- ▶ Steel crankshaft with reduced conrod and main bearing diameters of 42 mm
- ▶ Low-friction lightweight crank drive
- ▶ Positive crankcase ventilation system with oil separator integrated in the cylinder block and cylinder head
- ▶ Active coolant pump
- ▶ Easy-to-service split lightweight timing case with plastic and magnesium alloy covers
- ▶ Exhaust turbocharger module with electrical charge pressure actuator
- ▶ Ignition transformer
- ▶ Single-chamber exhaust system with close-coupled pre-catalyst
- ▶ Combustion process: Homogeneous direct injection



485_014



Reference

You can find basic information about the TFSI technology in Self Study Programmes 432 "Audi 1.4l TFSI engine" and 384 "Audi chain-driven 1.8l 4V TFSI engine".