

Service.



Self-Study Programme 248

The W Engine Concept

Design and Function



Introduction

The constantly rising demands regarding performance, running comfort and fuel economy have led to the advancement of existing drive units and the development of new drive units.

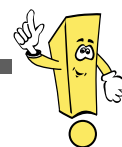
The new W8 as well as the W12 engine by VOLKSWAGEN are representatives of a new engine generation - the W engines.

The W engines set exacting demands on design. Large numbers of cylinders were adapted to the extremely compact dimensions of the engine. In the process, more attention was paid to lightweight design. This Self-Study Programme will familiarise you with the engine mechanicals of the W engine family.



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New



Important Note



This Self-Study Programme explains the design and function of new developments. The contents will not be updated!

Please always refer to the relevant Service Literature for current inspection, adjustment and repair instructions.

At a glance



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Introduction

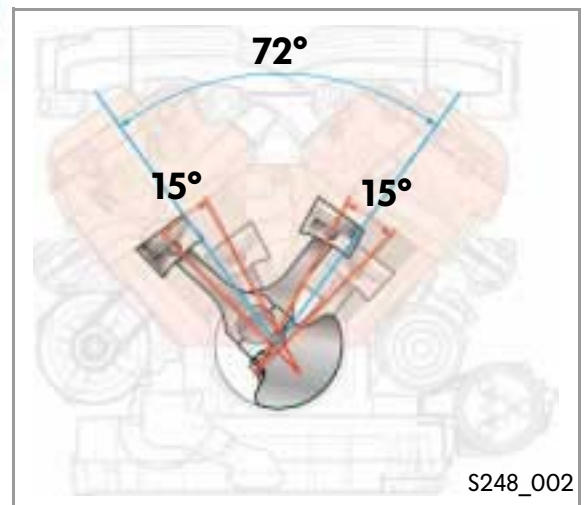
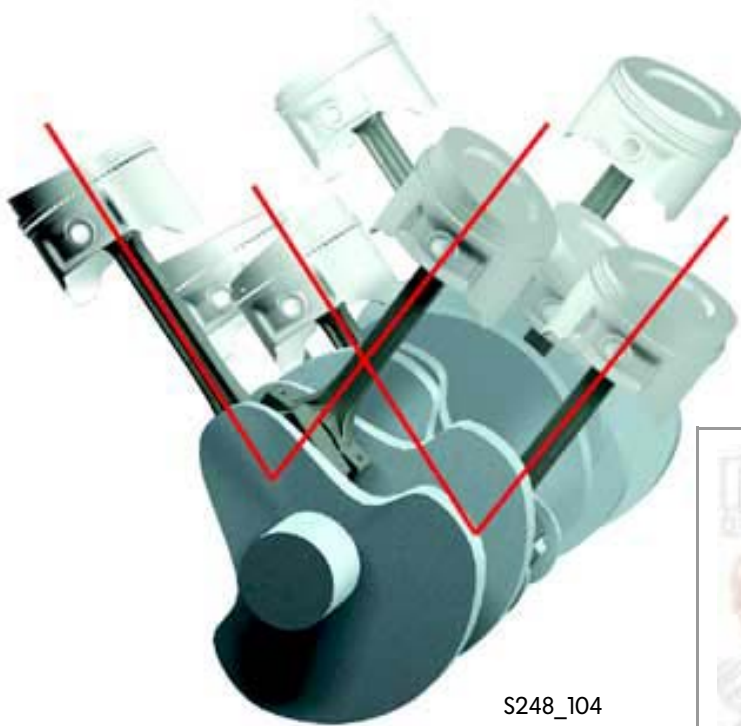


W engines - what does the W stand for?

With the aim of building even more compact units with a large number of cylinders, the design features of the V and VR engines were combined to produce the W engines.

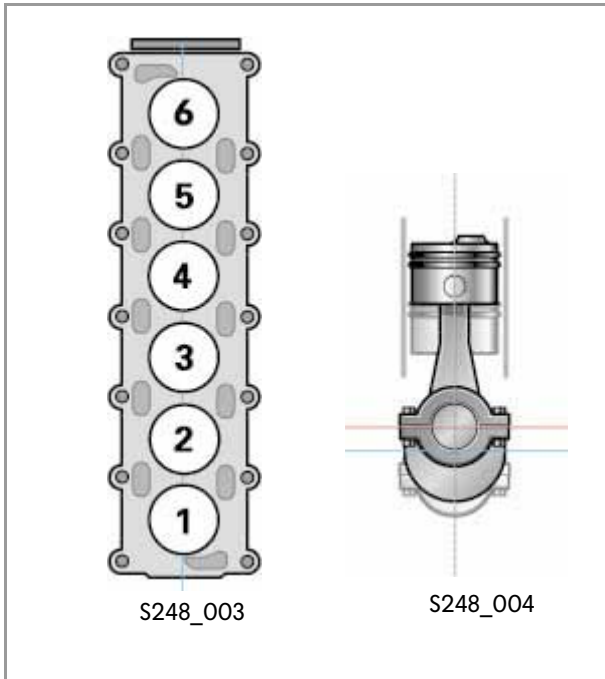
As with the V engines, the cylinders are distributed to two banks. In the W8 and W12 engines, these banks of cylinders are aligned at a V-angle of 72° in relation to one another. As in the VR engine, the cylinders within each bank maintain an angle of 15° .

When the W engine is viewed from the front, the cylinder arrangement looks like a double-V. Put the two Vs of the right and left cylinder banks together, and you get a W. This is how the name "W engine" came about.



The W principle

To illustrate the principle of the W engine cylinder arrangement, we will first show you conventional engine types.

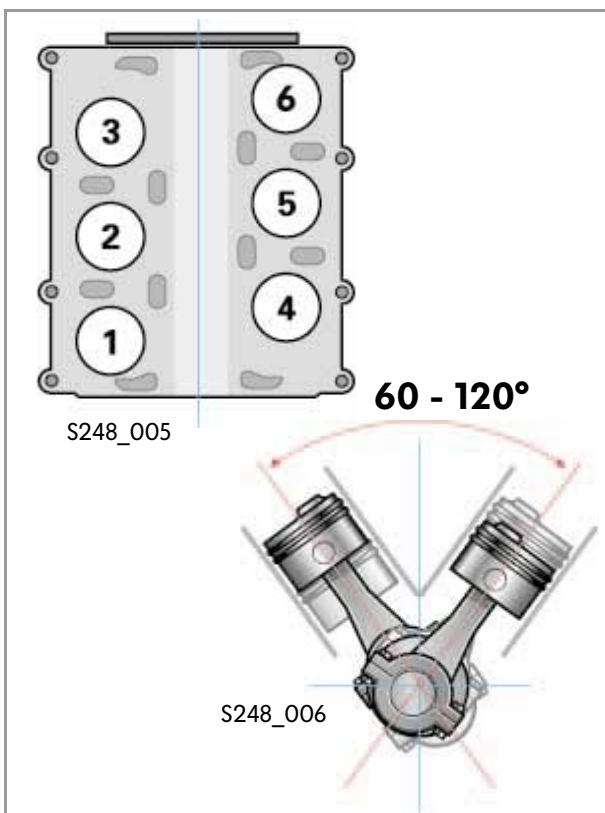


The inline engine

Represents the earliest development level in engine development. The cylinders are arranged in-line vertically above the crankshaft.

Advantage: Simple design

Drawback: Large numbers of cylinders result in very long units unsuitable for transverse mounting.



The V engine

To make engines shorter, the cylinders in the V engines are arranged at an angle of between 60° and 120° , with the centre lines of the cylinders intersecting with the centre line of the crankshaft.

Advantage: Relatively short engines

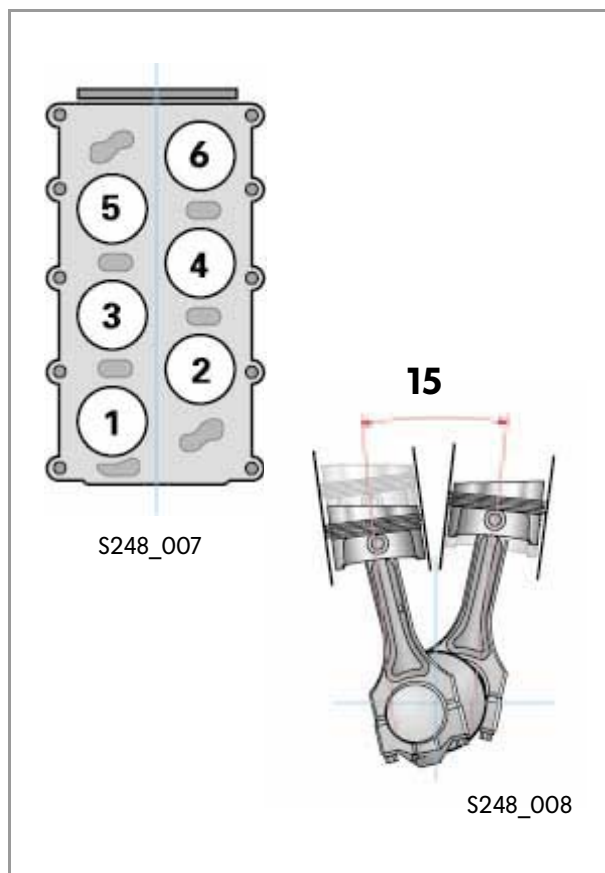
Drawback: The units are relatively wide, have two separate cylinder heads, and therefore require a more complex design and a larger engine compartment volume.

Introduction



VR engines

The need for a powerful alternative suitable for transverse mounting for use in lower mid-range vehicles saw the development of the VR engine. Six cylinders, offset at a V-angle of 15°, are accommodated in a fairly slender and very short engine block. Unlike previous designs, the engine only has one cylinder head. This made it possible to supply the Golf with a compact VR6 cylinder engine, for example.



W engines

The engines of the W family are a combination of two "VR banks" based on a modular design principle.

The cylinders of one bank have an angle of 15° relative to each other while the two VR banks are arranged at a V-angle of 72°.

