

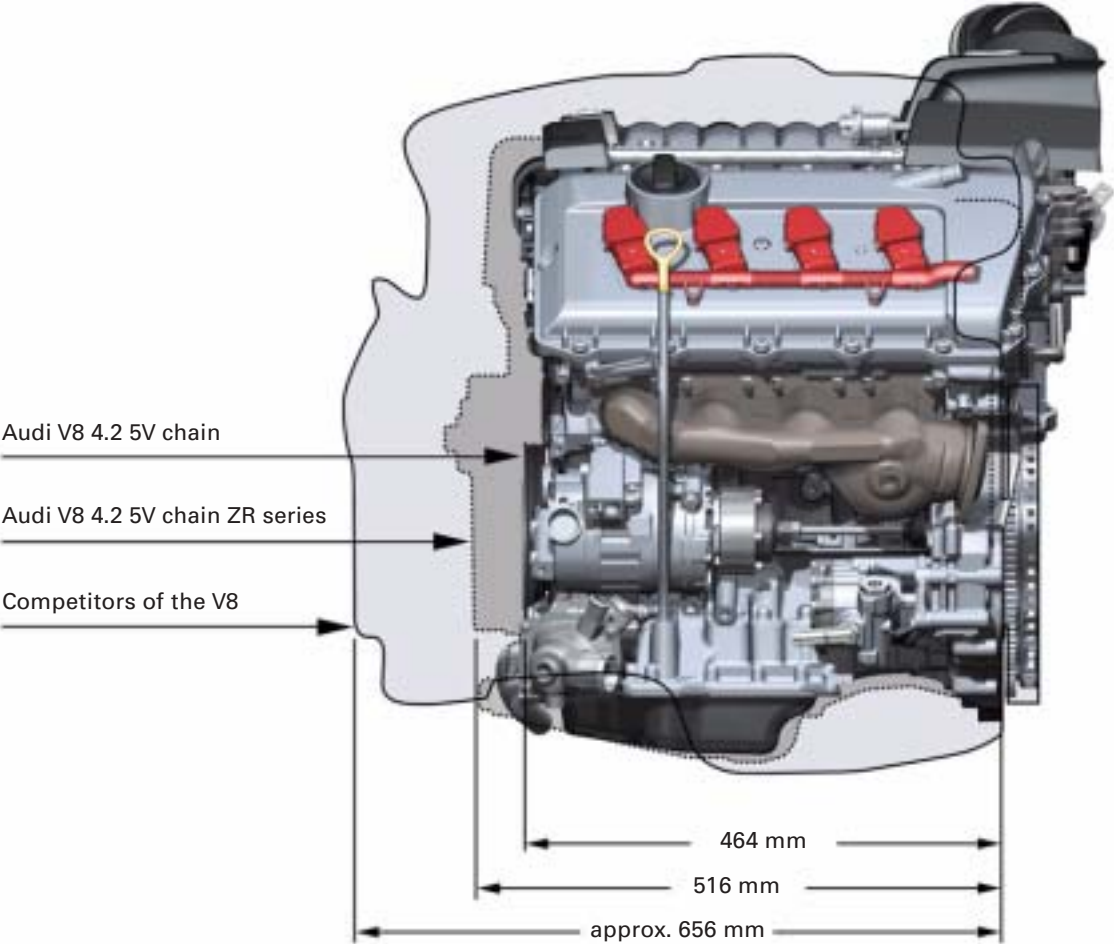


## AUDI engines – Chain drives

Self-Study Programme 327



A compact engine design has been achieved by positioning the chain drive on the gearbox side and by using a four-piece chain drive distributed on two planes. Thus, it is possible to install multi-cylinder engines in smaller model series without the need for extending the front end of the vehicle. The chain drive helps reduce operating costs, because it is maintenance free and designed for long life.



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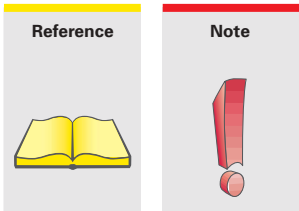
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The Self-Study Programme imparts a basic knowledge of the design and function of new models, new automotive components or new technologies.

**The Self-Study Programme is not a Repair Manual!**  
The values given are intended as a guideline only and refer to the software version valid at the time of publication of the SSP.

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



## Overview

### Audi engines with camshaft timing chain

In the Audi engines specified below, the camshaft is timed by a chain drive.

3.2-litre V6 FSI engine



327\_002

1.6-litre R4 FSI engine



327\_001\_1

6.0-litre W12 engine



327\_006



3.0-litre V6 TDI engine



327\_003

4.0-litre V8 TDI engine



327\_004

4.2-litre V8 engine



327\_005

# 1.6-litre R4 FSI engine

## Description

### Technical features

- Camshafts driven by timing chains
- Air filter integrated in the engine cover
- Oil circuit with closed-loop Duocentric oil pump
- Dual circuit cooling system
- Petrol direct injection with supply on demand fuel system
- Bosch Motronic MED 7.5.11 petrol direct injection system



327\_001

### Reference



For further information, please refer to SSP 296 - The 1.4-litre and 1.6-litre FSI engines with timing chain.



## Performance features

### Torque and power output

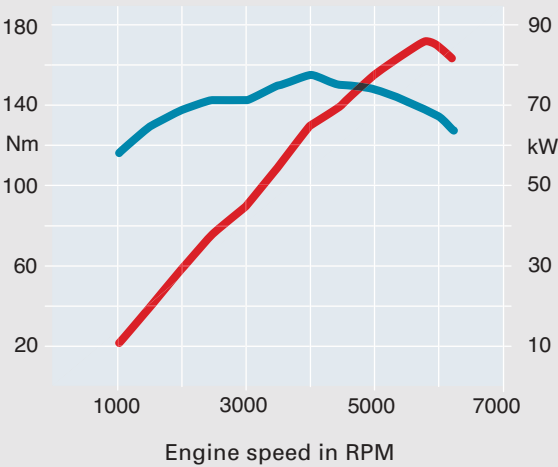
The engine code and engine number can be found on the left-hand side of the cylinder block under the battery mounting.



327\_022

Torque/power curve

- Max. torque in Nm
- Max. power output in kW



### Specifications

|                                 |   |
|---------------------------------|---|
| Engine code                     | BAG   |
| Type of engine                  | 4-cylinder inline engine  |
| Displacement in cm <sup>3</sup> | 1598  |
| Max. power output in kW (bhp)   | 85 (115) at 6000 RPM  |
| Max. torque in Nm               | 155 at 4000 RPM   |
| Number of valves per cylinder   | 4   |
| Bore in mm                      | 76.5  |
| Stroke in mm                    | 86.9  |
| Compression ratio               | 12 : 1  |
| Firing order                    | 1–3–4–2   |
| Fuel grade                      | Super Plus unleaded, at least 98 RON (unleaded Super, 95 RON, as an alternative with slight reduction in performance) |
| Exhaust emission control        | Close-coupled primary catalytic converter, NO <sub>x</sub> storage catalytic converter, Exhaust gas recirculation     |
| Engine management               | Fully electronic engine management with drive-by-wire throttle control  |
| Emission category               | EU IV   |

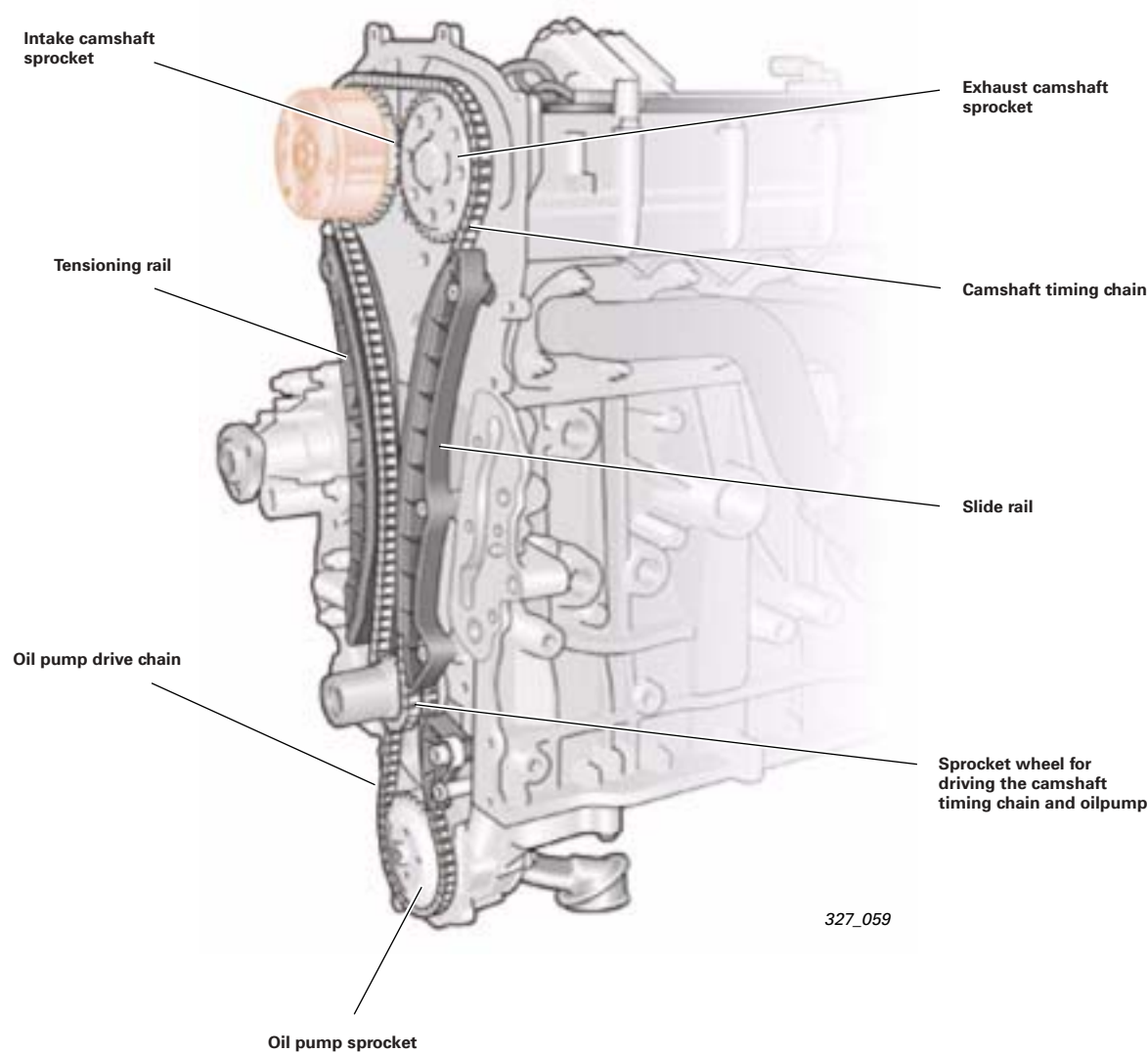
# 1.6-litre R4 FSI engine

## Chain drive

### Driven camshafts

The overhead camshafts are driven directly by the crankshaft via a timing chain.

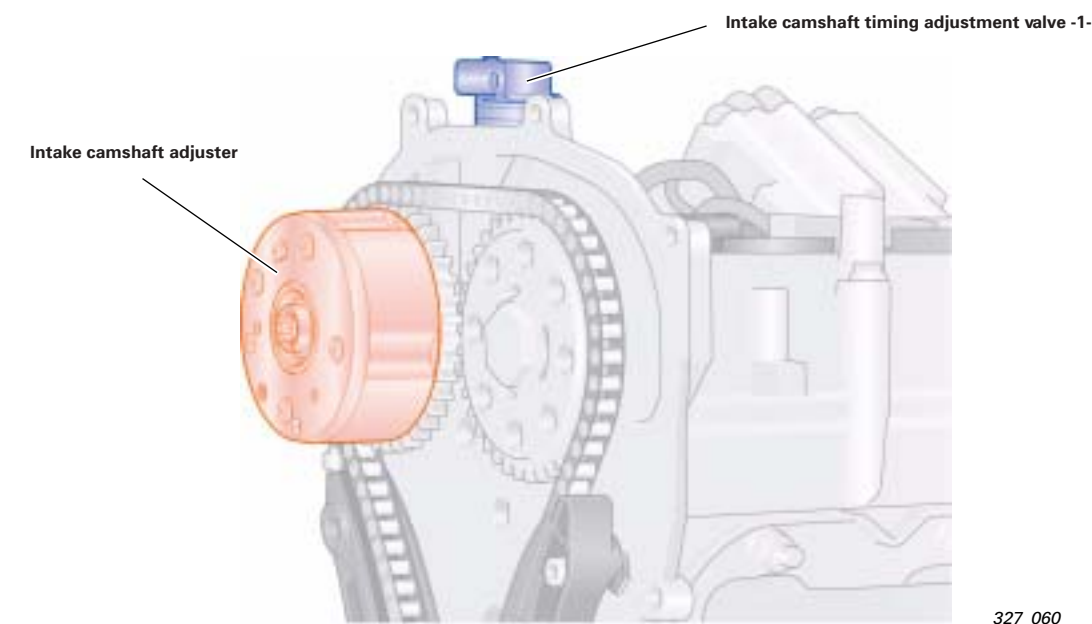
The camshaft timing chain is guided by a slide rail and tensioned by the tensioning rail.



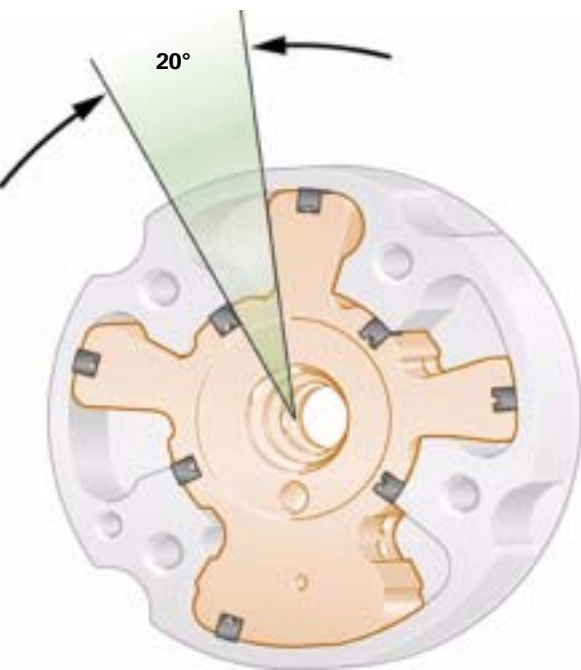
**Camshaft adjuster**

The intake camshaft can be adjusted in dependence on engine speed and load. The camshaft timing is adjusted continuously over a range of 20° camshaft angle in the "advance" direction relative to the basic setting.

A vane cell adjuster, which is actuated by the engine oil pressure, is used as the adjustment mechanism. Intake camshaft timing adjustment valve -1- is activated by the engine control unit. It regulates the oil pressure in the camshaft adjuster, and hence the camshaft timing.



327\_060



327\_061

**Camshaft adjuster**

The camshaft adjuster housing is rigidly connected to the intake camshaft sprocket, the internal rotor to the intake camshaft. The oil inlet pressure causes the internal rotor to counter-rotate relative to the housing, thus adjusting the camshaft.

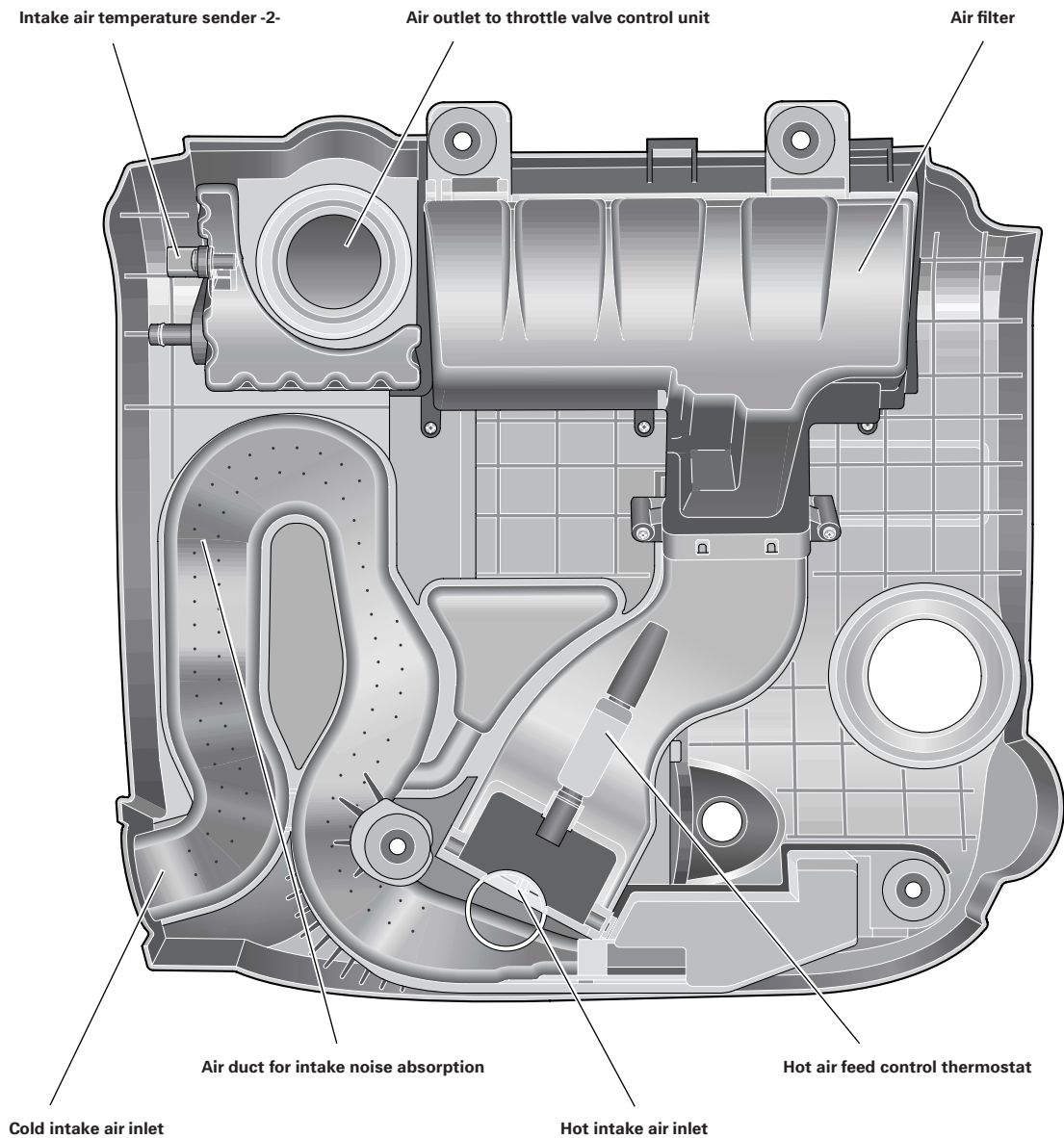
# 1.6-litre R4 FSI engine

## Intake system

### Engine cover

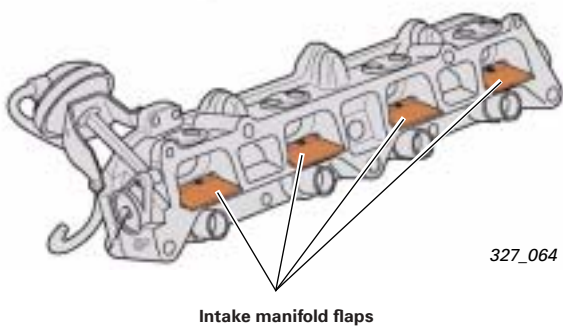
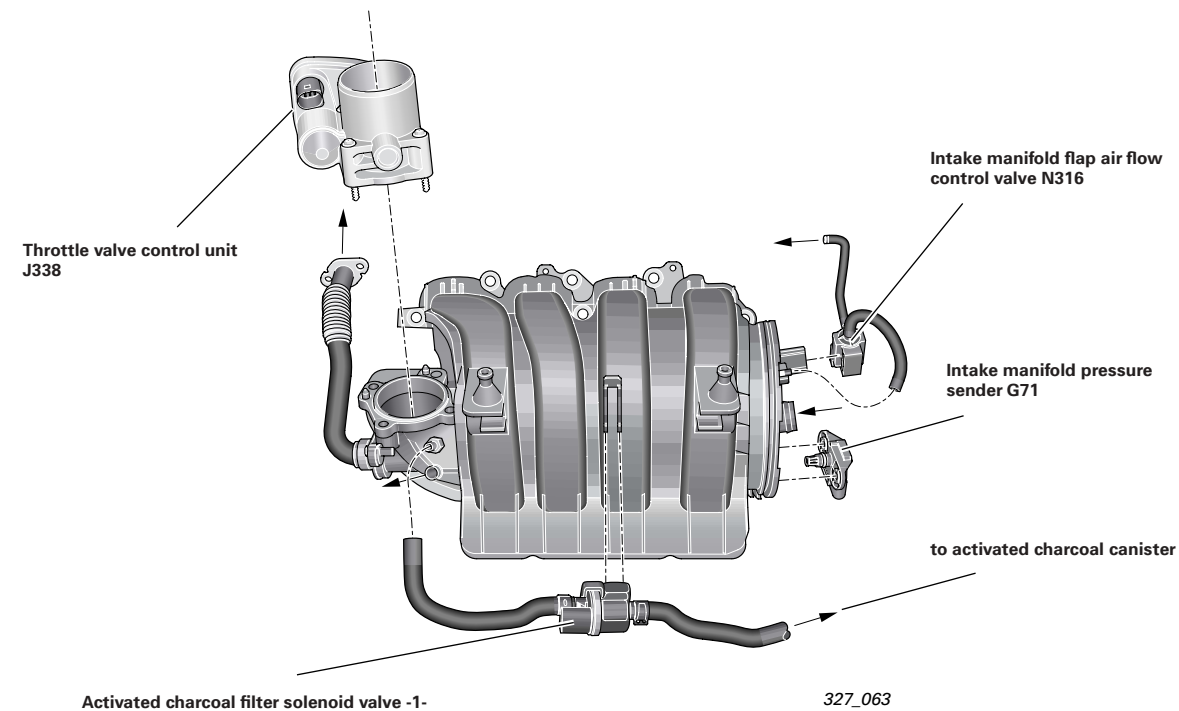
The following parts are integrated in the engine cover:

- the air filter,
- the air duct running from the air inlet to the throttle valve control unit,
- the air duct for intake noise absorption,
- the hot air feed control thermostat and
- intake air temperature sender -2- for engine load calculation



### Intake manifold upper section

The upper section of the intake manifold is made of plastic and accommodates the vacuum reservoir required to operate the intake manifold flaps.



### Fuel distributor (intake manifold lower section)

The fuel distributor represents the lower section of intake manifold and is bolted to the cylinder head. In addition to the ports for distributing fuel to the injectors, the fuel distributor accommodates the intake manifold flaps for intake air flow control.

#### Reference



For a functional description of the intake manifold flaps, please refer to SSP 279 - The 2.0-litre 110 kW engine with petrol direct injection (FSI).