

Torque specifications*	Nm (unless otherwise indicated)
Camshaft bearing cap bolts.....	10
Camshaft sprocket bolts.....	35
Crankshaft balancer bolt	
Step one (use NEW bolt).....	100
Step two (use NEW bolt) Turn an additional 150 degrees	
Cylinder head bolts (in sequence)	
M8 bolts	
Step one.....	15
Step two..... Turn an additional 60 degrees	
M11 bolts	
Step one.....	45
Step two..... Turn an additional 120 degrees	
Dipstick tube bolt.....	10
Engine mount bracket to engine block bolts.....	40 to 60
Engine mount nuts.....	70 to 90
Engine dress cover nuts.....	10
Exhaust manifold bolts.....	20
Exhaust manifold heat shield bolt.....	10
Exhaust pipe flange nuts.....	18 to 35
Flywheel/driveplate bolts	
Step one.....	30
Step two..... Turn an additional 45 degrees	
Fuel rail.....	10
Inlet manifold bolts.....	23
Sump baffle bolts.....	10
Sump drain plug.....	25
Sump to rear main oil seal housing bolts.....	10
Sump bolts.....	23
Oil pickup pipe bolts.....	10
Oil pump mounting bolts.....	23
Timing chain cover bolts	
To 2006 models.....	23
From 2006 models	
Step one.....	20
Step two..... Turn an additional 60 degrees	
Timing chain guide bolts.....	24
Timing chain idler sprocket bolts.....	65
Timing chain tensioner bolts.....	23
Valve cover bolts.....	10

*Note: Refer to Part E for additional specifications.

1 General information



Warning: The models covered by this manual are equipped with airbags. Always disable the airbag system before working in the vicinity of the impact sensors, steering column or instrument panel to avoid the possibility of accidental deployment of the airbag(s), which could cause personal injury (see Chapter 12).



Caution: On models equipped with a Anti-theft audio system, be sure the lockout feature is turned off before performing any procedure which requires disconnecting the battery.

This Part of Chapter 2 is devoted to in-vehicle repair procedures for the Alloytec 3.6L V6 engine. All information concerning engine removal and refitting and engine block and cylinder head overhaul on this engine can be found in Part E of this Chapter.

Since the repair procedures included in this Part are based on the assumption the engine is still in the vehicle, if they are being used

during a complete engine overhaul (with the engine already removed from the vehicle and on a stand) many of the Steps included here will not apply.

The Specifications included in this Part of Chapter 2 apply only to the procedures found here. The specifications necessary for rebuilding the block and cylinder heads are included in Part E.

The engine utilizes an aluminium block with cast-iron sleeves. The six cylinders are arranged in a "V" shape at a 60-degree angle between the two banks. The cylinder heads utilize a twin overhead camshaft arrangement with four valves per cylinder. On the 190 kW engine, variable cam timing is used via an adjustable camshaft drive sprocket controlled by the engine control system. The engine uses aluminium cylinder heads with powdered metal guides and valve seats. Hydraulic lifters negate the need for valve adjustments and roller rocker arms actuate the valves. The oil pump is mounted at the front of the engine behind the timing chain cover and is driven by the crankshaft.

2 Repair operations possible with the engine in the vehicle

Many major repair operations can be accomplished without removing the engine from the vehicle.

Clean the engine compartment and the exterior of the engine with some type of pressure washer before any work is done. A clean engine will make the job easier and will help keep dirt out of the internal areas of the engine.

Depending on the components involved, it may be a good idea to remove the bonnet to improve access to the engine as repairs are performed (refer to Chapter 11 if necessary).

If oil or coolant leaks develop, indicating a need for gasket or seal renewal, the repairs can generally be made with the engine in the vehicle. The sump gasket, the cylinder head gaskets, inlet and exhaust manifold gaskets, timing chain cover gaskets and the crankshaft oil seals are all accessible with the engine in place.

Exterior engine components, such as the water pump, the starter motor, the alternator, the power steering pump and the fuel injection components, as well as the inlet and exhaust manifolds, can be removed for repair with the engine in place.

Since the cylinder heads can be removed without removing the engine, valve component servicing can also be accomplished with the engine in the vehicle.

Renewal of, repairs to or inspection of the timing chain and sprockets and the oil pump are all possible with the engine in place.

In extreme cases caused by a lack of necessary equipment, repair or renewal of piston rings, pistons, connecting rods and rod bearings is possible with the engine in the vehicle. However, this practice is not recommended because of the cleaning and preparation work that must be done to the components involved.

3 Top Dead Centre (TDC) for number one piston - locating

- 1 Top Dead Centre (TDC) is the highest point in the cylinder that each piston reaches as it travels up the cylinder bore. Each piston reaches TDC on the compression stroke and again on the exhaust stroke, but TDC generally refers to piston position on the compression stroke.
- 2 Positioning the piston(s) at TDC is an essential part of many procedures such as timing chain/sprocket removal.