

Timing

Timing belt

E engines

Checking and renewing

The camshaft is driven by a toothed belt with an eccentric, spring loaded tensioner pulley.

Renew timing belt: every 90.000 km / 3 years.

The ancillary gear, to the right above the crankshaft gear, drives a shaft with helical gears to provide a right angled oil pump drive; this is fitted to the engine block. To renew the timing belt proceed as follows:

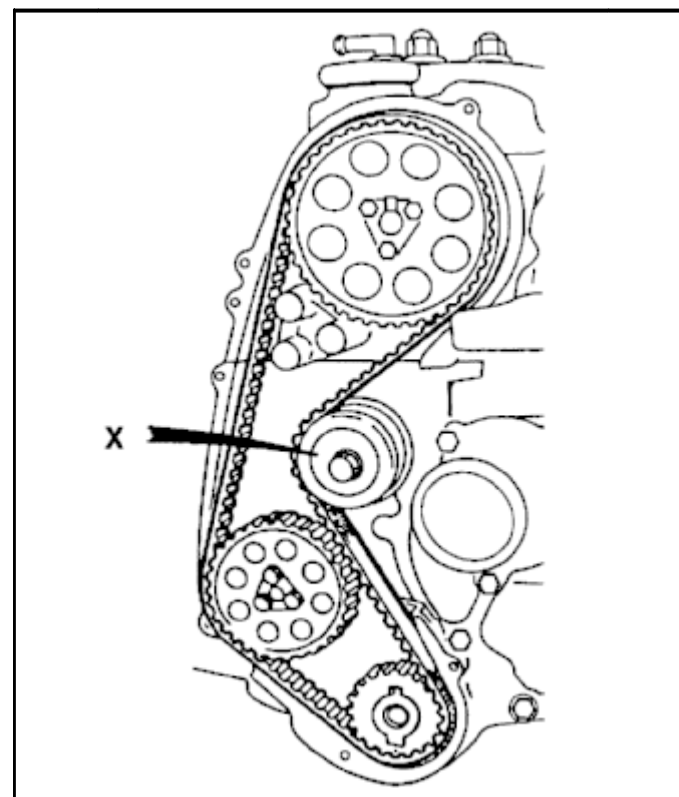
Remove both side plates; the spark plugs and the V belt(s). Place the crankshaft in TDC with piston No. 1 at the end of the compression stroke. Remove the water pump and crankshaft pulleys. Support the engine. Disconnect the RH engine mounting bracket. Both timing cover sections may now be removed. Use a Torx wrench.

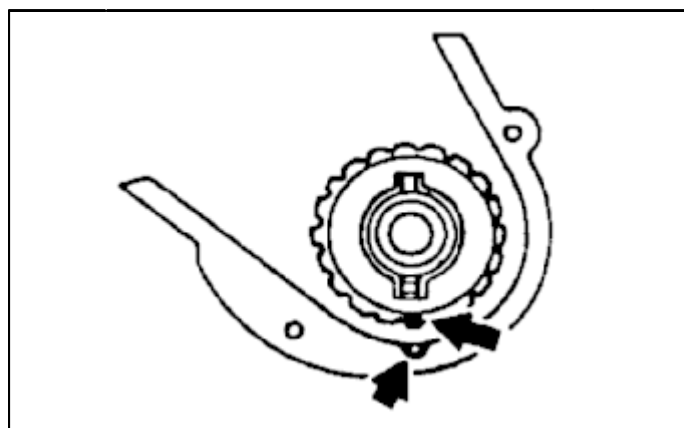
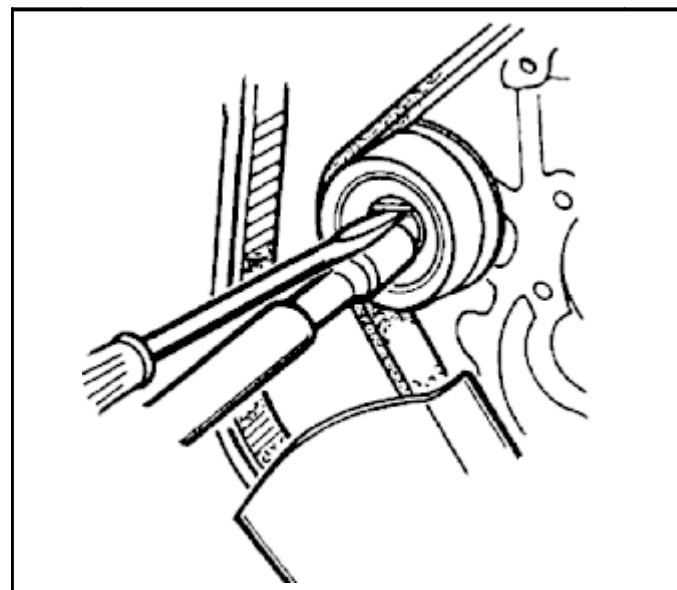
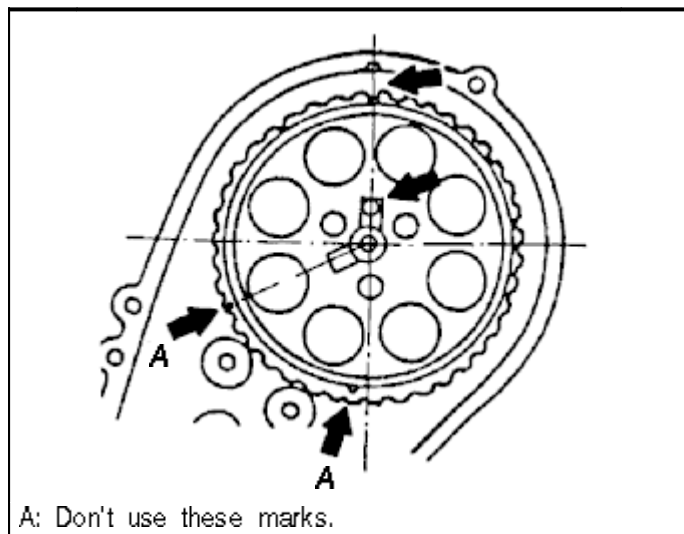
Note: Refer to the illustration for the correct camshaft location marks; there are also markings which should not be used.

Insert a screwdriver into the tensioner pulley slot and slacken the tensioner pulley nut. Turn the screwdriver against the spring pressure to release the belt. Hand tighten the nut.

Apply a marking to show the direction of rotation. Remove the toothed belt. Check all components for further use. Renew any worn or damaged parts. Refit the timing belt as follows:

Place the camshaft and crankshaft in the position shown in the illustration. Turn the tensioner pulley 70 - 80° clockwise. Tighten the nut provisionally. Fit the belt, paying heed to the direction of rotation mark. Slacken the tensioner pulley nut until the tensioner pulley exerts pressure on the belt. Turn the camshaft approx. 20° (two teeth) clockwise. Tighten the tensioner pulley nut to 16 - 21 Nm whilst preventing the tensioner pulley from moving. Complete the engine assembly.





Torque settings: in Nm

Valve cover	4 - 6
Timing cover	5,1 - 6,5
Water pump pulley	8,4 - 0,8
Crankshaft pulley	108 -127
Water pump	5,1 - 6,5
Tensioner pulley nut	16 - 21
Spark plugs	20 - 29
Engine mounting bracket	21 - 26

GA engines

Checking and renewing

A chain drives the camshaft via two chain guides, and is kept taut through a chain tensioner on the LH guide. Remove and refit the timing chain as follows:

Drain the Cooling system. Remove the engine sump. Remove in sequence: the poly-V-belt(s); the power steering pump mounting, if fitted; the air filter; the RH engine mounting bracket; the water pump; the chain tensioner from the side of the timing cover; the valve cover and spark plugs. Rotate the crankshaft until cylinder No. 1 is in TDC at the end of the compression stroke; check this using the distributor rotor position. Remove: the crankshaft pulley; the timing cover and the camshaft chain gear bolt.

Remove the chain guides and the chain with chain gears. Check the chain for wear and damage. Check that cylinder No. 1 is in TDC at the end of the compression stroke. Lay the chain over the chain gears. Ensure that the markings on

chain gears and chain are aligned, see the illustration. The chain markings consist of two silver coloured links separated by an equal distance 'A'.

Fit the chain with the chain gears. Tighten the camshaft gear to 98 - 127 Nm. Note that the washer must be fitted with the chamfered side outwards. Fit the chain guides. Complete engine assembly. Apply liquid gasket to the timing cover mating faces.

Torque settings: in Nm	
Valve cover	2 - 4
Water pump pulley	6,3 - 8,3
Crankshaft pulley	132 - 152
Water pump	6,3 - 8,3
Chain tensioner	13 - 19
Timing cover	16 - 21
Camshaft gear	98 - 127
Chain guides	13 - 19

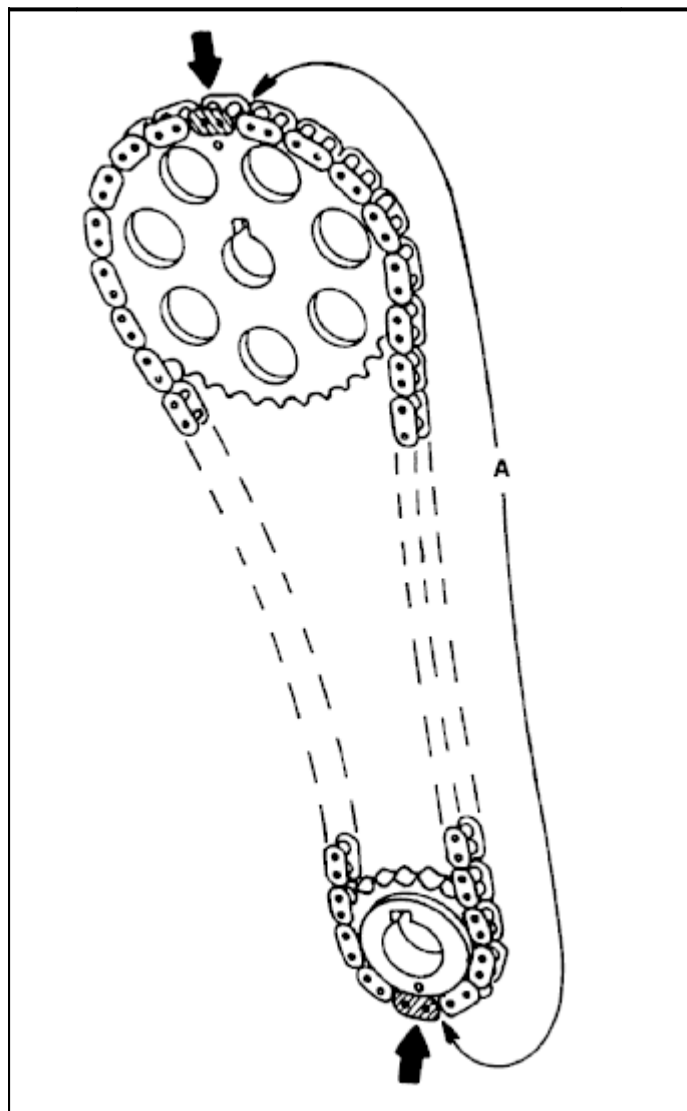
CA engines

Checking and renewing

The 16 valve engine with two overhead camshafts (DOHC) has a toothed timing belt with a spring loaded tensioner pulley and an idler pulley. The crankshaft position sensor is mounted with three bolts to the upper timing cover. The oil pump is mounted on the crankshaft, in a housing behind the distribution.

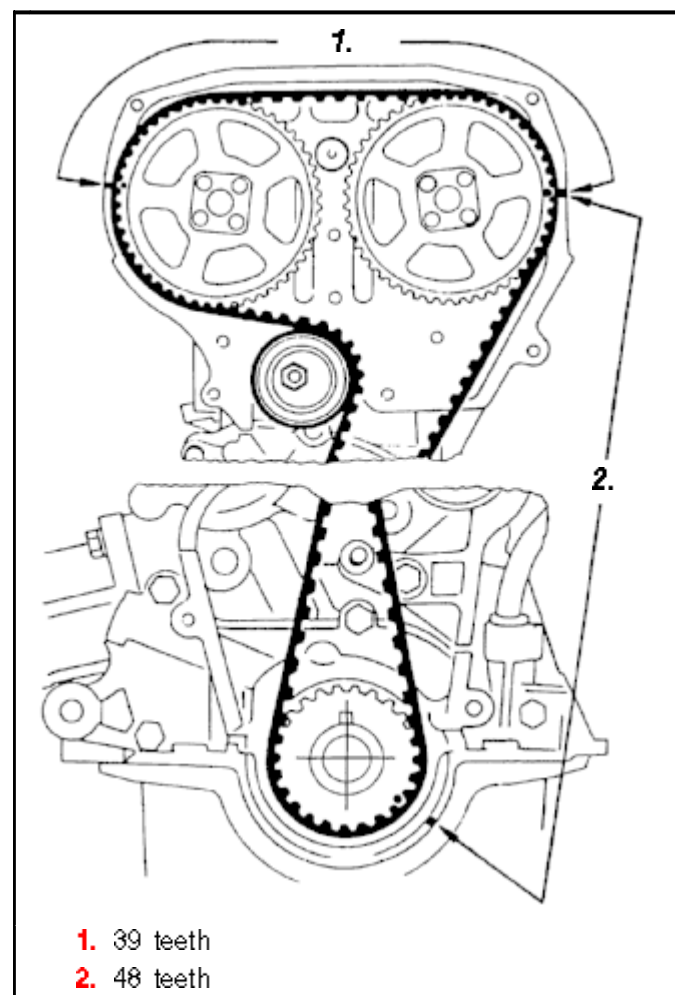
Renew timing belt: Every 90.000 km / 3 years.

Drain the cooling system. Remove the top water hose; the lower RH oil baffle plate; the V belt(s) and the water pump pulley. Remove the crankshaft position sensor from the timing cover. Carefully mark its position. Support the engine. Remove the engine mounting bracket on the side. Remove the upper cover section so that the camshaft gear markings are visible. Align the markings (see illustration). Remove the crankshaft pulley; this is accessible via the inspection cover in the RH inner wing panel. Remove the lower cover section. Apply markings to the belt and note the direction of rotation, if the belt is suitable for further use. Unscrew the tensioner pulley nut. Move the tensioner pulley clockwise with an Allen key against the spring pressure to release the belt. Remove the timing belt. Check all components for further use. Renew any parts which are worn or damaged. Refit the timing belt as follows:



Check the camshafts and crankshaft positions. See illustration. Fit the belt ensuring that the belt markings are aligned, or check the number of teeth between the crankshaft gear and camshaft gear and between the two camshaft gears; see illustration.

Slacken the tensioner pulley nut to tension the belt. Secure the lower cover section. Fit the crankshaft pulley and tighten the pulley bolt to 142 - 152 Nm. Rotate the crankshaft two full turns clockwise. Tighten the tensioner pulley bolt without moving the tensioner pulley to 22 - 29 Nm. Secure the upper cover section noting that the bolt lengths vary. Both outer bolts at the top of the cover are the shortest; the extra long bolt is in the centre, second from the top. Place the crankshaft position sensor in the marked position. Tighten to 7 - 8 Nm. Tighten the engine mounting bracket to 39 - 54 Nm. Complete engine assembly.



Torque settings: in Nm	
Lower timing cover	3 - 5
Upper timing cover	7 - 8
Crankshaft pulley	142 - 152
Idler pulley nut	31 - 42
Tensioner pulley nut	22 - 29
Crankshaft position sensor	7 - 8
Spark plugs	20 - 29
Engine mounting bracket	39 - 54

Valves, rocker arms and tappets

Valve clearance

Checks and adjustments

The valve clearance is checked and adjusted with the engine warm. The tappets have the usual adjustment bolts. Adjust the valves in the following sequence:

Piston No. 1 in TDC at the end of the compression stroke.

Cylinder No. 1:	inlet and exhaust
Cylinder No. 2:	inlet
Cylinder No. 3:	exhaust

Piston No. 4 in TDC ditto:

Cylinder No. 2:	exhaust
Cylinder No. 3:	inlet
Cylinder No. 4:	inlet and exhaust

The adjustment values are as follows:

E engines:	
All valves	0,28 mm
GA 14S:	
Inlet	0,20 - 0,30 mm
Exhaust	0,25 - 0,35 mm

torque settings

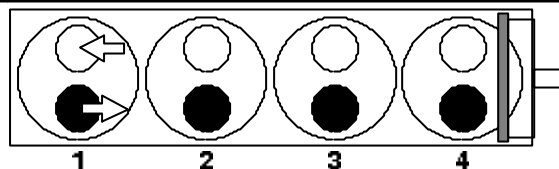
lock nut

E engines:

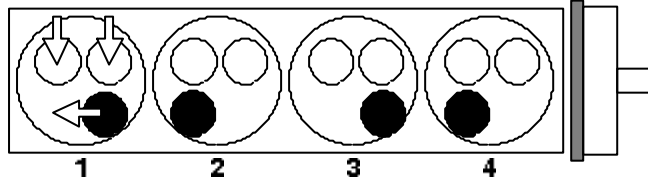
16 - 21 Nm

GA 14S:

7,4 - 11,3 Nm



Firing order: 1-3-4-2

E engines

Firing order: 1-3-4-2

GA 14S engines