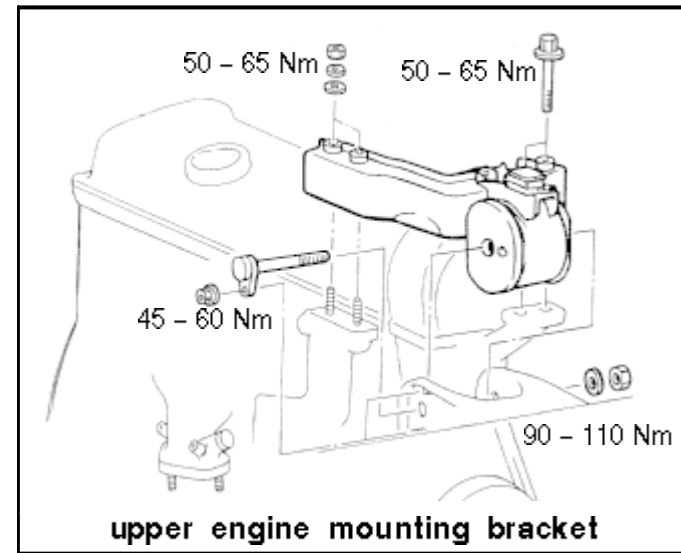
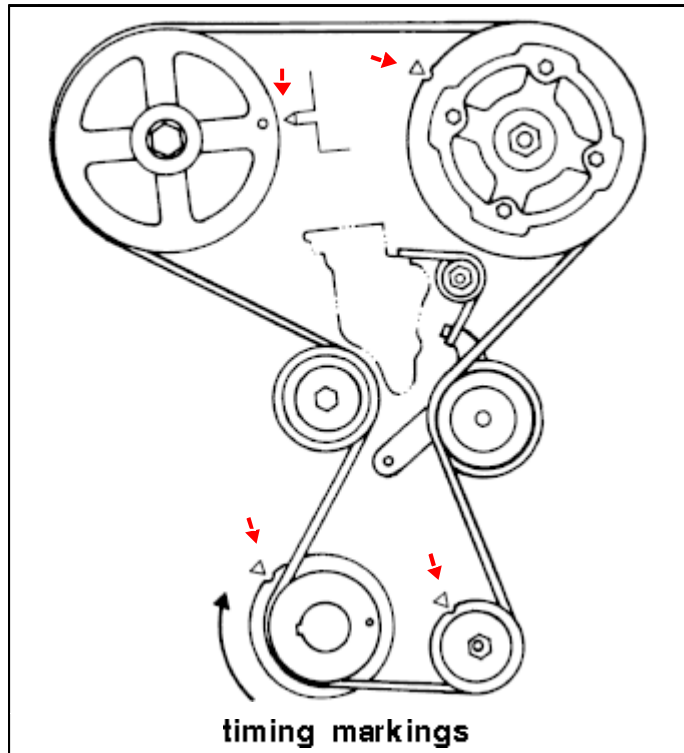


Timing

The 4D65 engine has two toothed belts. The timing belt drives the camshaft, injection pump and oil pump via a spring loaded tensioner pulley. The RH balance shaft is driven from the oil pump. The LH balance shaft is driven from the crankshaft by a short belt. When working on the timing belt, also check the condition of the LH balance shaft belt.

Timing belt



Removal and installation

Support the engine. Remove the upper engine mounting bracket and V-belts. Remove the upper air inlet section so that the valve cover can be removed. Remove the timing covers. Rotate the crankshaft clockwise until the camshaft gear and injection pump gear are properly located. Check the oil pump/balance shaft gear marking. Undo the timing belt tensioner from the rear. Re-tighten the tensioner in the lowest position in order to remove the timing belt. Mark the timing belt direction of rotation if it is not to be renewed. Check all components for wear and contamination.

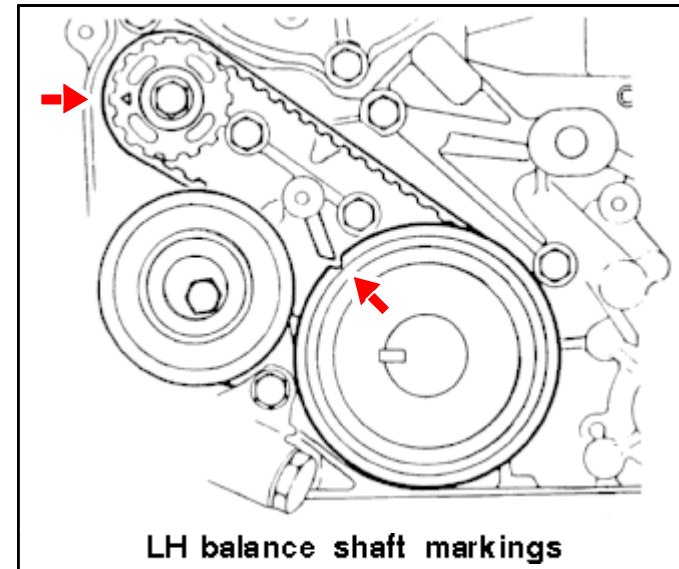
Fit the timing belt over the various gears. Rotate the crankshaft $1/2$ camshaft timing gear teeth anti-clockwise. Tension the belt by undoing the tensioner. Rotate the crankshaft $2 1/2$

camshaft timing gear teeth anti-clockwise. Tighten the belt tensioner. Rotate the crankshaft clockwise. Check that the markings are still properly located. Check the belt tension by depressing the belt between camshaft and injection pump.

belt tension	4 - 5 mm
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Repeat the tensioning procedure if the tension is incorrect. After fitting the various components: check the V-belts tension.

LH balance shaft drive belt



The LH balance shaft is driven by the crankshaft via a toothed belt. The belt tension is adjusted by a tensioner pulley.

Removal and installation

Before removing the belt; take off the timing belt. Ensure that the crankshaft is not turned. Check the crankshaft gear and balance shaft gear markings. Mark the toothed belt direction of rotation if it is not to be renewed. Check all the components for damage and wear.

Fit the toothed belt. Fit the tensioner pulley so that the centre of the tensioner pulley is to the left above the centre of the mounting bolt. Turn the tensioner pulley clockwise to tension the toothed belt. Ensure that when tightening the

tensioner pulley it is not turned further clockwise. The toothed belt would then be too taut. Check the belt tension by pushing the belt in at the top.

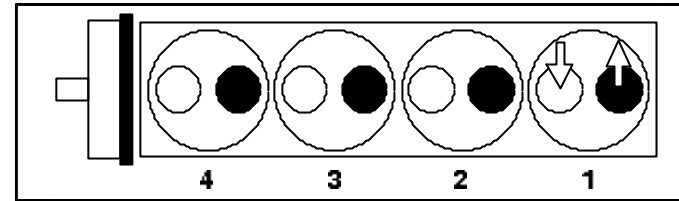
LH balance shaft toothed belt tension	5 - 7 mm
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Repeat the tensioning procedure if the belt tension is too little or too large.

torque settings	
camshaft timing gear	90 Nm
injection pump gear	85 Nm
oil pump gear	55 Nm
crankshaft gear	120 Nm
crankshaft pulley	25 Nm
idler pulley	49 Nm
balance shaft gear; left	37 Nm
tensioner pulley of LH balance shaft toothed belt	19 Nm
valve cover	6 Nm

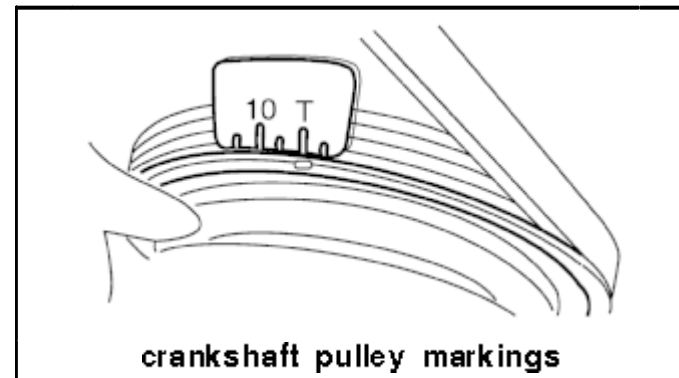
Valves, rocker arms and tappets

Valve clearance



The overhead camshaft operates the valves via rocker arms. The valve clearance is measured between rocker arm and valve; it is adjusted with a bolt on the rocker arm. Check the valve clearance with engine warm.

Check and adjust



valve clearance	
inlet	0,25 mm
exhaust	0,25 mm

Remove the glow plugs. Rotate the crankshaft to the T marking. Check that cylinder No. 1 or cylinder No. 4 is at the end of the compression stroke. Measure the valve clearance with reference to the table. Rotate the crankshaft one turn. Check the other valve groups.

adjustment procedure	
<i>condition</i>	<i>adjust</i>
piston cylinder No. 1 in TDC, end of compression stroke	inlet and exhaust valve(s) of cylinder No. 1
	inlet valve(s) of cylinder No. 2
	exhaust valve of cylinder No. 3
piston cylinder No. 4 in TDC, end of compression stroke	inlet and exhaust valve(s) of cylinder No. 4
	inlet valve(s) of cylinder No. 3
	exhaust valve of cylinder No. 2

torque settings	
valve adjusting locking nut	15 Nm
glow plugs	18 Nm
valve cover	6 Nm