

VKMA 03902

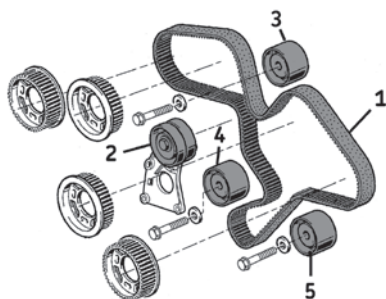
VKMC 03902-2



A



- (7): Crankshaft timing pin (ref. 0187-A).
- (12): Camshaft sprocket locking tool (PEU ref. 0187-C, CIT ref. 0187-N).
- (13): Exhaust sprocket locking tool (ref. 0187-F).
- (14): Camshaft hub locking tool (ref. 0187-B).
- (18): Belt fitting tool (PEU ref. 0187-J).



- (8): 10 Nm
- (9): 10 Nm
- (10): 10 Nm
- (11): 10 Nm
- (15): 25 Nm
- (17): 25 Nm
- (27): 80 Nm
- (28): 20 Nm

#### Removal

- 1) Disconnect the battery according to the vehicle manufacturing guidelines.
- 2) Prepare the vehicle for the timing replacement according to the vehicle manufacturing guidelines.
- 3) Turn the engine until the crankshaft sprocket timing pin (7) can be inserted (Fig. C).
- 4) Loosen the camshaft sprocket fastening bolts (9) and (10) using tool (12) (Fig. D).
- 5) Loosen the camshaft sprocket fastening bolts (8) and (11) using tool (13) (Fig. D).

**Note:** Lightly lubricate the crankshaft timing pins (14) before use (Fig. C).

- 6) Insert the timing pins (14) in camshafts (8), (9), (10) and (11) (Fig. C).
- 7) Remove the bolt (15) from the plate (16) then loosen the tensioner roller fastening nut (28) (Fig. D).
- 8) Loosen the bolts (17) of the plate (16) (Fig. D).
- 9) Remove the idler roller (3) (Fig. D).
- 10) Remove the timing belt.
- 11) Remove the plate (16) and tensioner roller (2) assembly (Fig. D).
- 12) Remove the idler rollers (4) and (5) (Fig. D).
- 13) **Removing the water pump (VKMC 03902-2):** firstly bleed the cooling circuit, check it is clean, and clean if required; secondly fully loosen the water pump fastening bolts and remove the pump.

#### Refitting

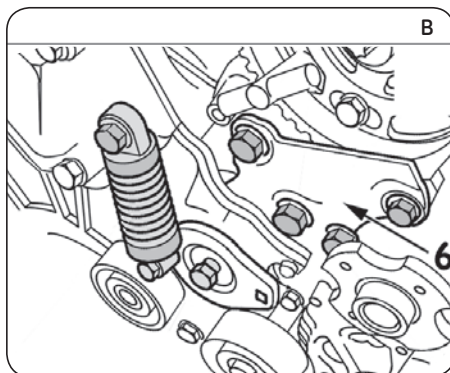
**Caution:** Clean the bearing surfaces of the rollers.

- 14) **Refitting the water pump:** Firstly fit the new water pump and tighten waterpump bolts with torque to manufacturer recommendations; then check that the water pump pulley runs properly, and has no hard or locking spots.
- 15) Check that the timing pins (7) and (14) are correctly inserted (Fig. C).
- 16) Check that the camshaft sprockets (8), (9), (10) and (11) turn freely on their shafts (Fig. C). Move the camshaft sprockets to the end of the oblong holes by turning them in the engine rotation direction.
- 17) Fit the new idler rollers (4) and (5) (Fig. D).
- 18) Refit the plate (16) and tensioner roller (2) assembly by fitting and lightly tightening the fastening bolts (17) (Fig. D).

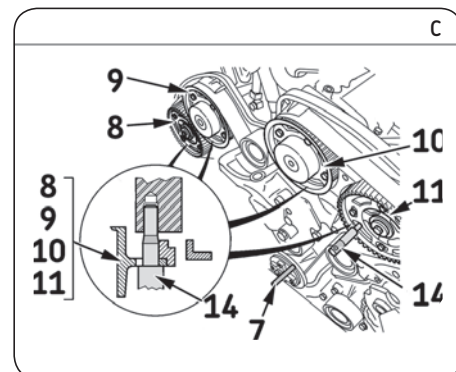
**Note:** Fastening bolt (15) will be fitted later (Fig. D).

- 19) Place the new timing belt (1) on the crankshaft sprocket and immobilise with tool (18) (Fig. E).
- 20) Fit the timing belt (1) in the following order: idler roller (5) camshaft sprockets (11) and (10). Refit the idler roller (3) and tighten its fastening bolt (27) to a torque of 80 Nm. Continue fitting the belt on the camshaft sprockets (9) and (8), the tensioner roller sprocket (2), the water pump pulley and the idler roller (4) (Fig. D).

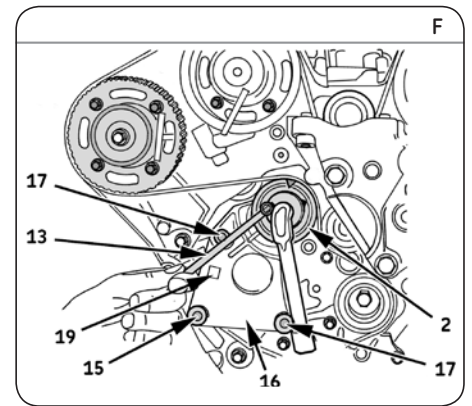
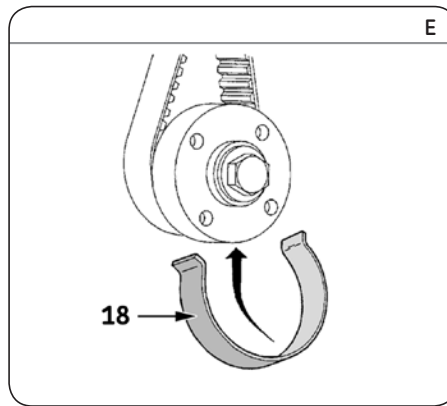
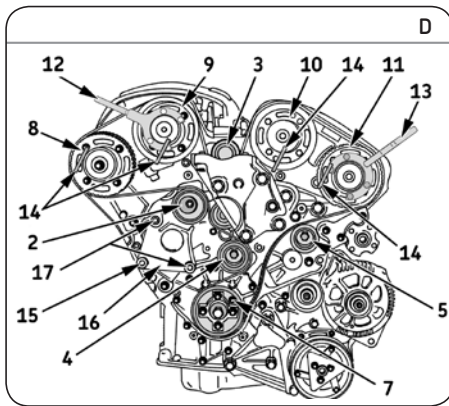
B



C



Install Confidence



**Note:** To help place the belt on the camshaft sprockets, turn the sprockets slightly in an **anti-clockwise** direction. The angular displacement of the camshaft sprockets must not exceed one tooth.

- 21) Turn the plate (16) using a suitable key inserted in the square hole (19) and insert the fastening bolt (15) (Fig. F).
- 22) Tighten the fastening bolts (15) and (17) to 25 Nm (Fig. F).
- 23) Loosen slightly the tensioner roller fastening nut (28).
- 24) Tighten the timing belt (1): turn the adjustment dial (20) on the tensioner roller using a suitable key until the moving pointer (21) is in position (22) (Fig. G). The moving index (21) is aligned with the fixed marker (23) (Fig. G).
- 25) Tighten the tensioner roller fastening nut (28) to 20 Nm.
- 26) Check that the camshaft sprocket fastening bolts are not bearing against the ends of the oblong holes. Tighten the fastening bolts to 10 Nm.

**Caution:** If the fastening bolts of the camshaft sprockets are bearing against one end of the oblong holes, remove the timing belt and restart the installation process from step 22).

- 27) Remove the pins (7) and (14) together with the tool (18) (Fig. D and Fig. E).
- 28) Turn the crankshaft **clockwise** through two rotations until pins (7) and (14) can be inserted (Fig. D).
- 29) Loosen the tensioner roller fastening nut (28) and turn the adjustment dial (20) using a suitable key until the moving pointer (21) is in position (24) (Fig. H).

**Note:** The moving pointer (21) must be aligned with the notch (25) on the tensioner roller (Fig. H).

- 30) Tighten the tensioner roller fastening nut (28) to 20 Nm while holding the setting plate (20) in position with an Allen key (Fig. H).
- 31) Remove the pins (7) and (14) (Fig. C).

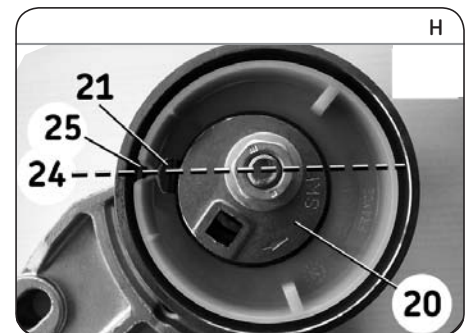
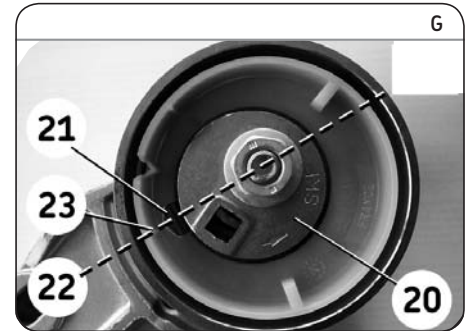
- 32) Turn the crankshaft **clockwise** through two rotations until the pin (7) can be inserted (Fig. C).
- 33) Check the tensioner roller setting (2): the moving pointer (21) must be in position (24) (Fig. H).

**Note:** The timing belt tension is set when the moving pointer (21) on the tension roller is aligned with the notch (25) (Fig. H).

- 34) If the marks are not aligned, loosen the tensioner roller fastening nut (28) and turn the adjustment dial (20) using a suitable key until the moving pointer (21) is in position (24) (Fig. H). Rotate the crankshaft two turns in the **clockwise** direction and check the roller setting again (see previous step).
- 35) Insert the pins (14) in the shaft sprockets (Fig. C).
- 36) If the pins (14) cannot be inserted, slightly loosen the camshaft sprocket fastening bolts and turn the camshaft hubs until the pins can be inserted.

**Caution:** If the camshaft sprockets are bearing against one end of the oblong holes, remove the timing belt and restart the installation process from step 19).

- 37) If necessary, retighten the camshaft sprocket fastening bolts to a torque of 10 Nm.
- 38) Remove the pins (7) and (14) (Fig. C).
- 39) Refit the remainder of the removed components in the reverse order to removal.
- 40) Fill the cooling circuit with the permanent fluid recommended.
- 41) Check the circuit's leak-tightness when the engine reaches its running temperature and secure the level of coolant when the engine is at ambient temperature (20 °C).



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