



The Planned Maintenance Programme whose operations are described later on is the one in force at the time of printing and replaces and cancels the one in volume 1 of the Manual

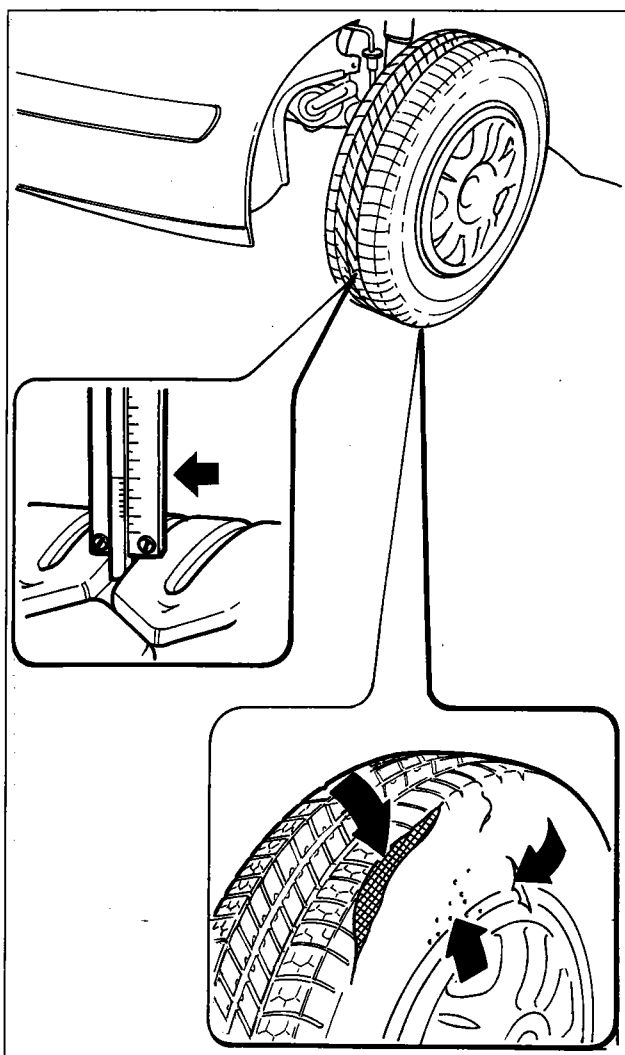
PLANNED MAINTENANCE PROGRAMME

N°	OPERATION	THOUSANDS OF KM									PAGE
		20	40	60	80	100	120	140	160	180	
1	Check tyre condition and wear	•	•	•	•	•	•	•	•	•	1
2	Check operation of front disc brake pad wear sensor	•	•	•	•	•	•	•	•	•	2
3	Check condition of rear disc brake pads (Bravo 1998 20v)		•		•		•		•		2
4	Check rear drum brake linings condition and wear			•			•			•	2
5	Visually inspect condition of: underbody exterior and protection, pipes (exhaust, fuel system, braking system), rubber elements (boots, hoses, bushes, etc.)	•	•	•	•	•	•	•	•	•	3
6	Check tension and, if necessary, adjust various drive belts (excluding engines equipped with automatic tensioners)	•									3
7	Visually inspect condition of trapezoid belts and/or various Poly-V drive belts		•		•		•		•		6
8	Check/adjust clutch pedal travel or height (excluding hydraulically operated version)		•		•		•		•		7
9	Check/adjust handbrake lever travel		•		•		•		•		8
10	Check/adjust tappet clearance (1910 TD diesel version)	•	•		•		•		•		8
11	Check/adjust tappet clearance (1929 D diesel version)	•		•		•		•		•	9
12	Checking exhaust gas emissions/diesel fumes		•		•		•		•		10
13	Check operation of anti-evaporation system				•				•		13
14	Replace fuel filter (petrol engines)		•		•		•		•		13
15	Replace fuel filter (diesel engines)	•	•	•	•	•	•	•	•	•	14
16	Replace air filter cartridge (petrol engines)		•		•		•		•		15
17	Replace air filter cartridge (diesel engines)	•	•	•	•	•	•	•	•	•	15
18	Check/top up fluid levels (engine cooling, braking system, power steering, windscreen washer, battery, etc.)	•	•	•	•	•	•	•	•	•	16
19	Replace timing belt						•				20
20	Replace spark plugs, check leads		•		•		•		•		43
21	Check operation of engine control systems (using diagnostic socket)		•		•		•		•		45
22	Check gearbox and differential oil level (only for version with manual gearbox)				•				•		46
23	Checking automatic gearbox oil level	•	•	•	•	•	•	•	•	•	46
24	Changing engine oil (or every 18 months) (every 10,000 Km for diesel engines)	•	•	•	•	•	•	•	•	•	47
25	Replace engine oil filter (every 10,000 km for diesel engines)	•	•	•	•	•	•	•	•	•	47
26	Change brake fluid (or every 24 months)			•			•			•	48
27	Replace pollen filter (or every 12 months)	•	•	•	•	•	•	•	•	•	50

Foreword

The maintenance operations consist of checking and restoring the efficiency of certain vehicle components subject to wear which may deteriorate during normal usage conditions.

This section describes the operations which should be carried out on the vehicle at the intervals set out in the Planned Maintenance Programme (on the previous page). Each operation is described independently on account of which there is no pre-defined ideal operating cycle to be repeated at each interval. It is therefore necessary to ensure that those operations which require the same components to be dismantled are carried out at the same intervals in order to maximize the efficiency of the repair times. If, when carrying out each operation, the need arises to carry out additional replacements or further repairs not envisaged in the Planned Maintenance Programme, prior approval must be obtained first from the Customer.

PLANNED MAINTENANCE OPERATIONS

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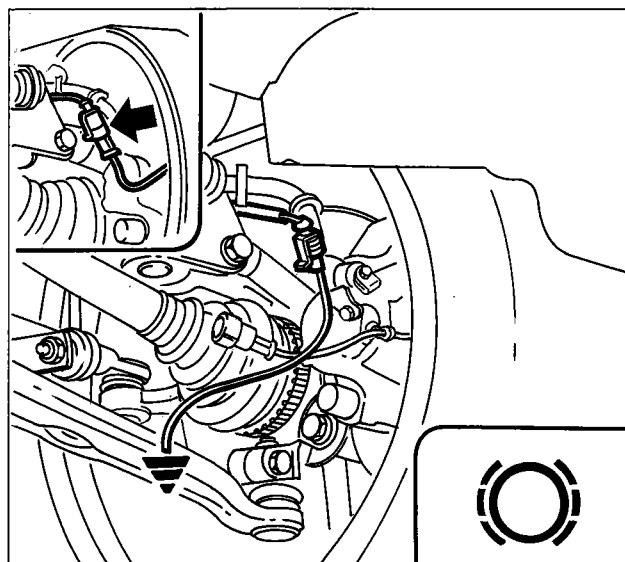
1 CHECK CONDITION OF TYRES AND WEAR

Check the condition of the tyres making sure, in particular, that there are no signs of ageing on the tread and the tyre walls, that the tyres are not excessively/unevenly worn and that there are no abrasions/burrs, porousness or cuts.

Check the depth of the tread using a special gauge, taking the measurement at the intersection between the transverse and longitudinal splining (at several points on the circumference). The minimum permissible depth is 1.6mm. The difference between the depths of tread on the same tyre should not exceed 2 mm. The difference between the depths of tread on different tyres on the same axle should not exceed 5 mm.

If the tread wear is uneven, check the tyre inflation pressure and inform the Customer of the possible need to balance the wheels.

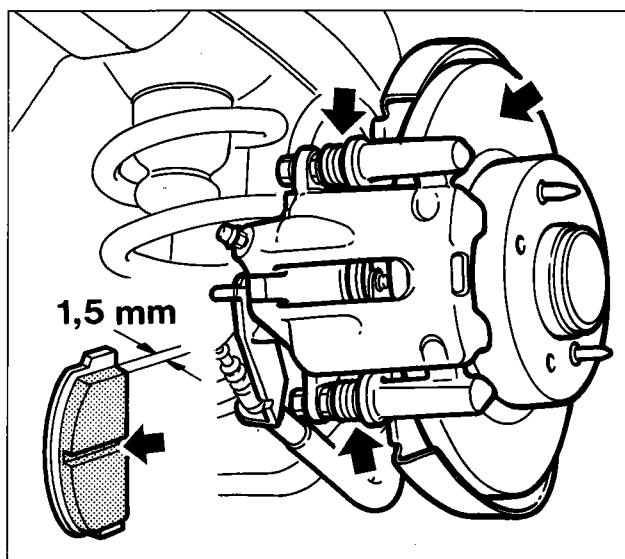
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2 CHECK OPERATION OF FRONT DISC BRAKE PAD WEAR SENSOR

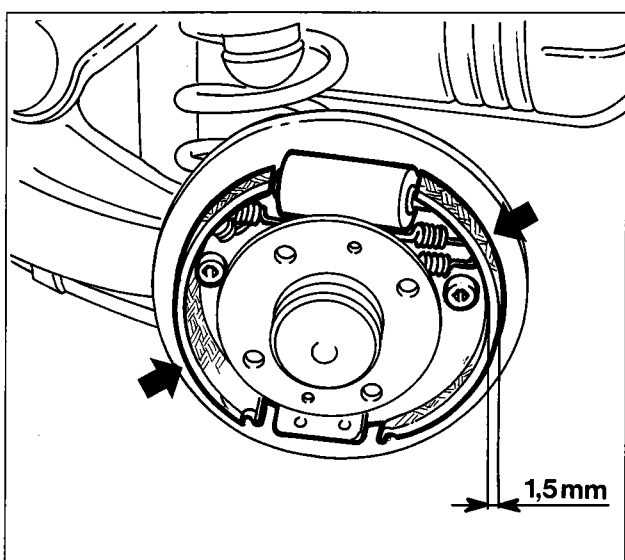
Disconnect the connector for the front disc brake pad wear sensor, place the terminal for the wiring side coupling to earth and check that the relevant warning light in the instrument panel comes on.



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3 CHECK CONDITION OF REAR DISC BRAKE PADS (Bravo 1998 20v)

Remove one of the rear wheels and check the thickness of the friction material through the slit in the brake caliper; the minimum permissible thickness is 1.5 mm. Check that the wear of the pads is even. Visually inspect the condition of the brake caliper dust boots. Check the condition of the brake disc work surfaces (for wear or deep grooves). Notify the Customer of the need to replace or re-grind (in the case of a brake pad) one of the components which has been checked.

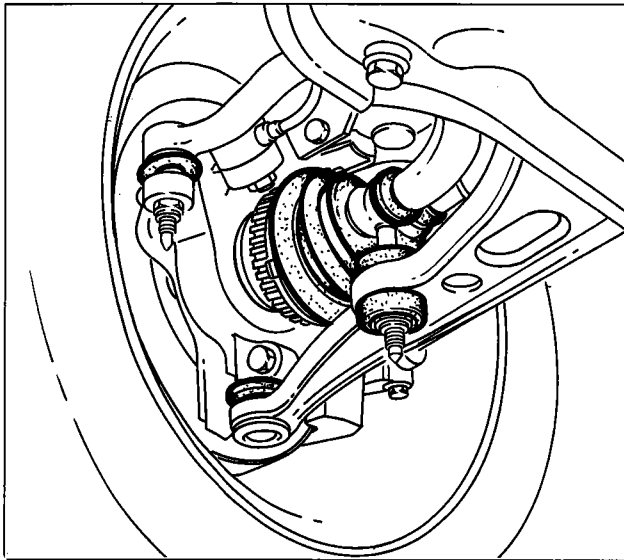


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4 CHECK CONDITION AND WEAR OF REAR DRUM BRAKES

With one of the rear wheels removed, remove the brake drum. Check the thickness of the brake linings: the minimum permissible thickness is 1.5 mm. Also check that there is no fouling from oil or grease. Check the efficiency of the shoe return device and the automatic recovery of the clearance between the drum and the shoes. Check the efficiency of the wheel cylinders (sliding of pistons, condition of dust boots). Check the condition of the drum work surfaces (for wear or grooves). Notify the Customer of the need to replace or skim (in the case of brake drums) one of the components which has been checked.

If there is an inspection window in the brake drum it is possible to check the thickness of the brake linings without having to remove the actual drum.



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5 VISUALLY INSPECT CONDITION OF: PIPES, RUBBER ELEMENTS, FLEXIBLE PIPES FOR BRAKING SYSTEM AND FUEL SYSTEM

Position the vehicle on a lift. Visually inspect:

- for the presence of any fluid leaks from the following systems: lubrication, fuel, engine cooling, braking and power assisted steering;
- the condition of the rubber elements: bushes, flexible (support) mountings and (protective) boots; check that the collars retaining the pipes and bushes have not loosened.

Check that the wires and cables for the retaining brackets in the engine compartment are correctly positioned.

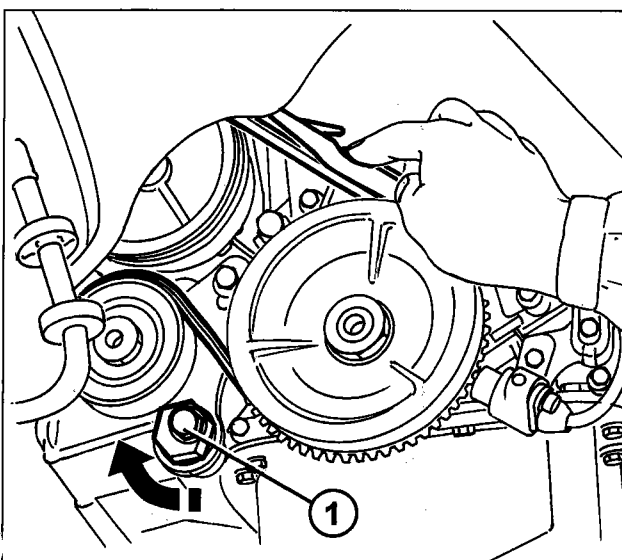
Also check for possible interference of the flexible brake pipes in maximum steering conditions.

6 CHECK CONDITION AND TENSION OF VARIOUS DRIVE BELTS AND ADJUST, IF NECESSARY

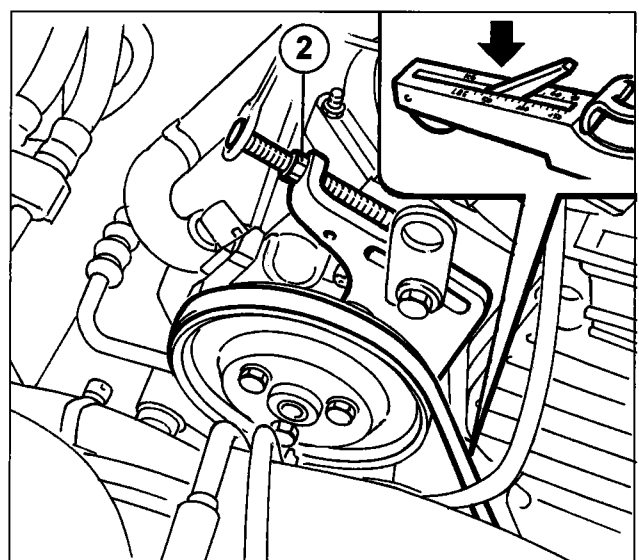
The tension of the various drive belts is checked using tool 1895762000. Engines equipped with automatic tensioners are exempt from this check.

Bravo-Brava 1581 16v

Check that alternator drive belt and power assisted steering drive belt tension, measured using the special equipment, are within the recommended values given in the table at the bottom of this paragraph. If the tension values are not correct, loosen the bolt (1), and rotate the tensioner further working on the hexagonal opening, then tighten the bolt once again and check the tension of the alternator belt. To adjust the power assisted steering pump belt, act on the adjustment screw and the lock nut (2).

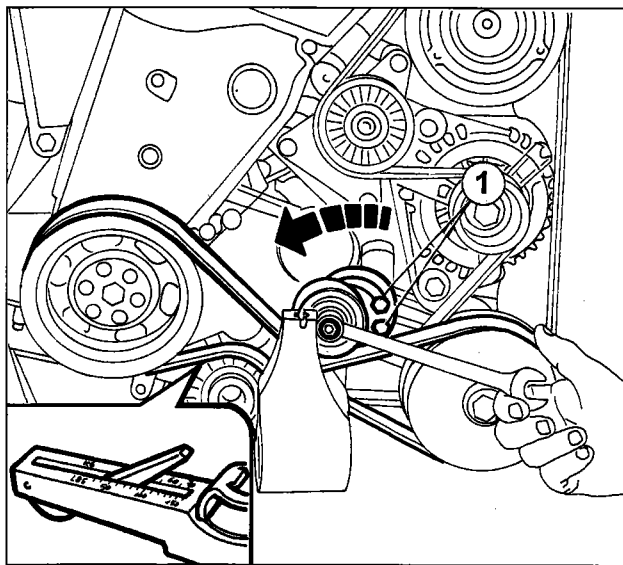


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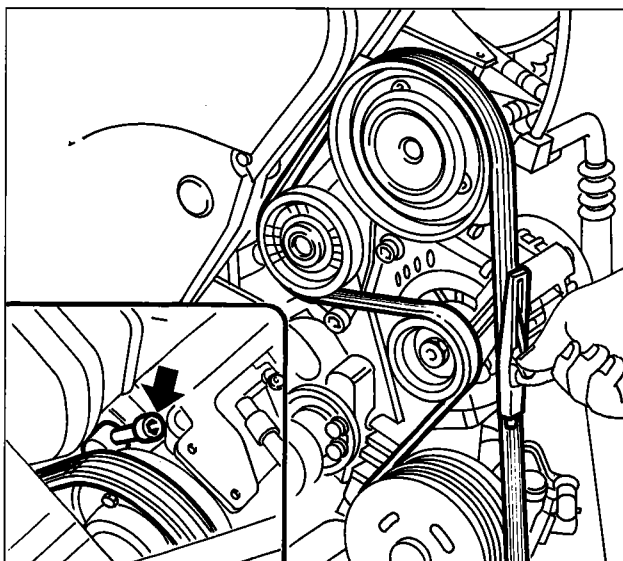
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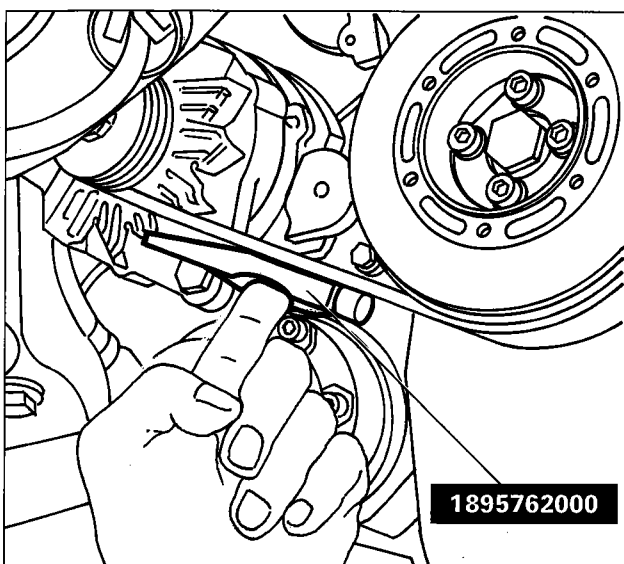


Bravo 1998 20v

Check that the tension values for the alternator/air conditioning compressor drive belt and the power assisted steering drive belt, measured using the special equipment, correspond to the recommended figures, given in the table overleaf. If the tension values are not correct, act on the centre tensioner screw to adjust the power assisted steering belt tension, with the fixing bolts (1) slack, tension and lock the bolts (1).



To adjust the tension of the alternator/air conditioning compressor belt tension, act on the special adjustment screw removing the compressor cover, if necessary.



Bravo-Brava 1929 D

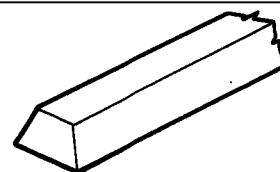
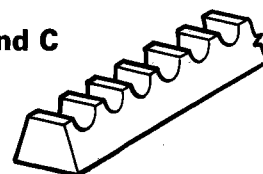
Check that the tension values measured using the special tool, correspond to the recommended figures, given in the table overleaf. If the tension values are not correct, act on the bolts fixing the alternator and the screw for adjusting the drive belt tension and the special micrometric screw and bolts fixing the pump to correct the tension of the power assisted steering pump drive belt tension.

Tension values for used belts

BELT SECTION			TENSION daN
AV 10	TYPE A	Not pre-run in	20 ÷ 29
	TYPES B and C	Not pre-run in	25 ÷ 35
AV 11	TYPES B and C	Not pre-run in	25 ÷ 35
AV 13	TYPE A	Not pre-run in	30 ÷ 40
	TYPES B and C	Not pre-run in	32 ÷ 43
POLY-V	3 ribs		23 ÷ 30
	4 ribs		30 ÷ 41
	5 ribs		38 ÷ 53
	6 ribs		45 ÷ 62
	7 ribs		54 ÷ 74

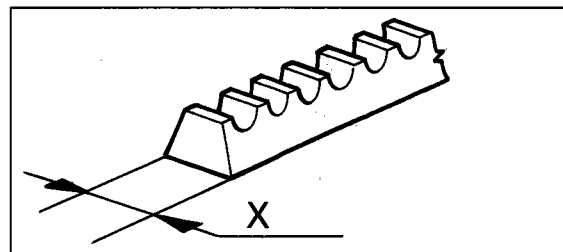
Tension figures for new belts

BELT SECTION		TENSION daN
AV 10	TYPE A	30 ÷ 40
	TYPE B and C	40 ÷ 55
AV 11	TYPE B and C	40 ÷ 55
AV 13	TYPE A	45 ÷ 55
	TYPE B and C	50 ÷ 65
POLY-V	3 ribs	36 ÷ 45
	4 ribs	48 ÷ 60
	5 ribs	60 ÷ 75
	6 ribs	72 ÷ 90
	7 ribs	84 ÷ 105

Trapezoid type belts
Type A

Type B and C


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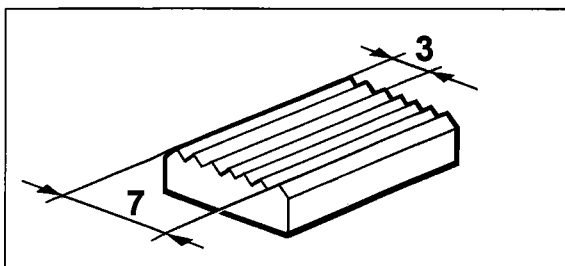
In order to determine whether the trapezoid belt in question is type AV 10 - AV 11 - etc., it is necessary to measure the distance "X" on the back of the belt; if the figure is 10 mm then the belt is a type AV10, if it is 11 mm then it is type AV 11 and so on.



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Poly-V type belts

In order to determine the number of ribs on the poly-v belt in question it is necessary to count the number of teeth (or points) from 3 - 7 on the actual belt, as illustrated in the diagram below.



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7 VISUALLY INSPECT CONDITION OF VARIOUS TRAPEZOID AND/OR POLY-V DRIVE BELTS

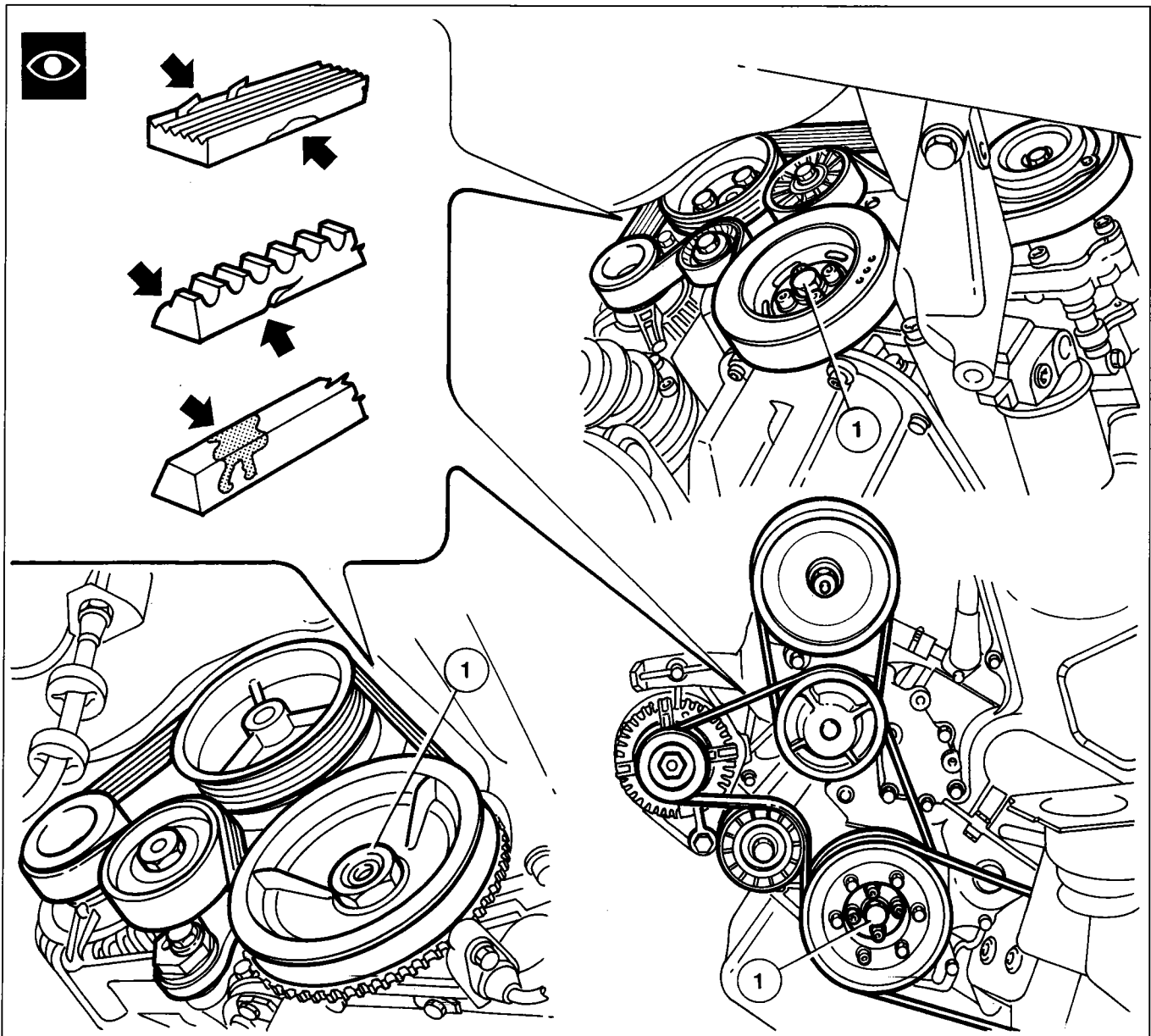
- Disconnect the negative battery lead, remove the right front wheel, then remove the wheel arch lining to gain access to the auxiliary shaft drive belts.
- Insert a spanner in the nut (or bolt) fixing the damper flywheel (1), rotate the crankshaft and check the condition of the auxiliary shaft drive belts along the entire perimeter.



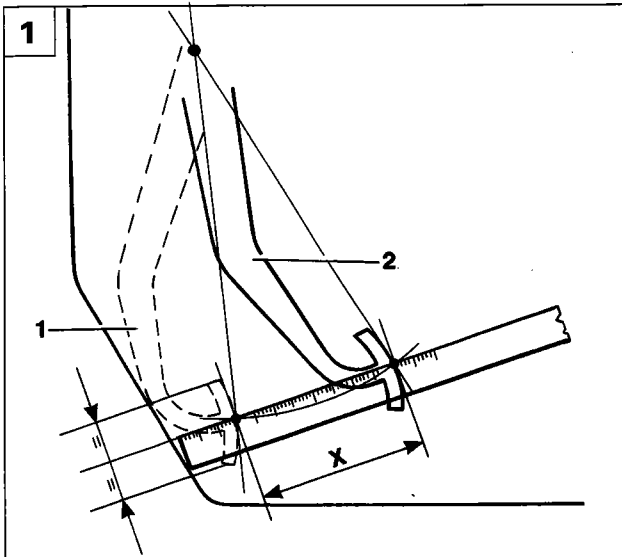
Check the condition of the belts, check in particular that there are no: cracks, cuts, surface wear of the material (which would appear smooth and shiny), dry or hard sections with a consequent loss of grip.

Also check that the belts have not come into contact with oil or solvents which could adversely affect the elasticity of the rubber or the adhesion properties.

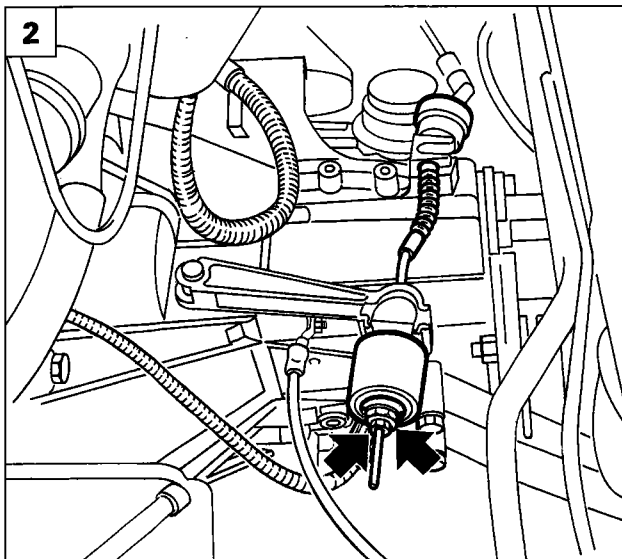
If one of the above faults is found, inform the Customer of the need to replace the belts.



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8 CHECK, ADJUST CLUTCH PEDAL TRAVEL OR HEIGHT



The check should only be carried out on vehicles with mechanical release devices (1370 12v - 1581 16v - 1747 16v - 1910 TD - 1929 D). The 1998 20v engine type has a hydraulic release device.

1. Measure the clutch pedal travel:

1. Pedal in end of travel position
2. Pedal in rest position

X. Pedal travel:

155 ± 10 mm (1370 12v)

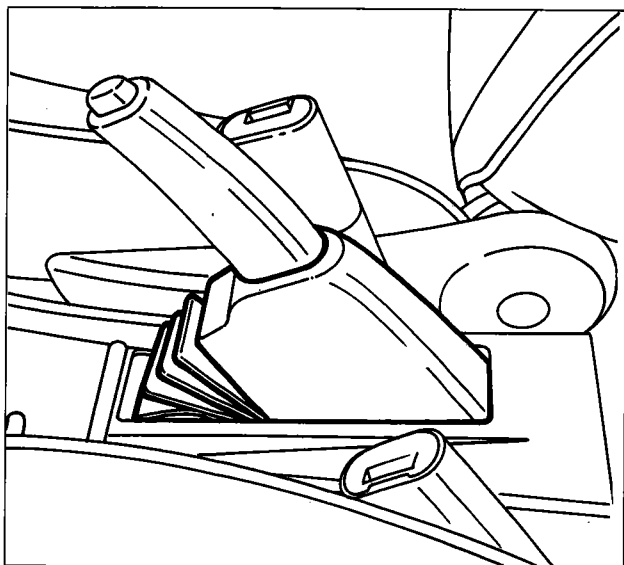
170 ± 10 mm (1581 16v - 1747 16v - 1910 TD - 1929 D)

2. In order to adjust the clutch pedal in the rest position it is necessary:

- to let the clutch operating mechanism bed in by fully depressing the pedal 2 or 3 times;
- to check that the travel "X" corresponds to the recommended figure. The travel is measured using a rule corresponding to the pedal centre line and is equivalent to the distance between the pedal in the end of travel position (pedal in contact with the bodyshell) and the pedal in the rest position.
- any adjustments to the travel are carried out via the nut and lock nut for the clutch cable, gearbox side.

NOTE *There should be no obstructions in the area under the pedals preventing the total travel of the pedals: take care, in particular, that any mats are lying flat and not interfering with the pedals.*

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9 CHECK/ADJUST HANDBRAKE LEVER TRAVEL

Operate the handbrake lever several times and check that the travel of the toothed sector is 5 notches.

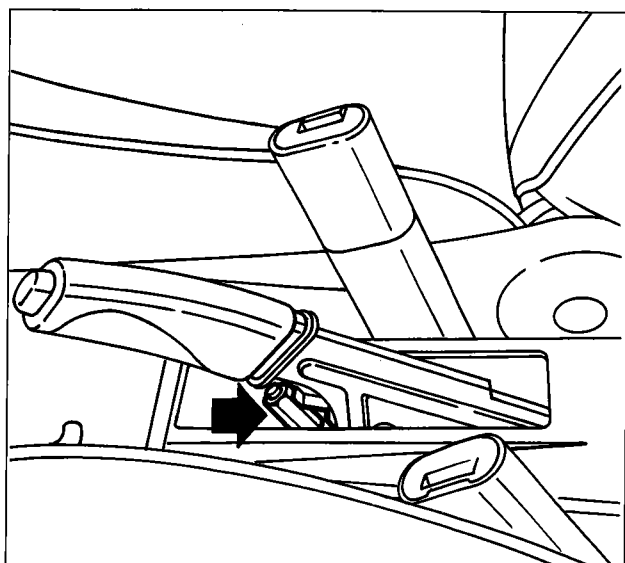
If this is not the case, proceed with the adjustment as follows:

- remove the protective boot for the control lever;
- act on the adjustment nut shown, tightening or loosening it in order to increase or decrease the handbrake lever cable travel;
- check that the lever travel is equal to 5 notches on the toothed sector.

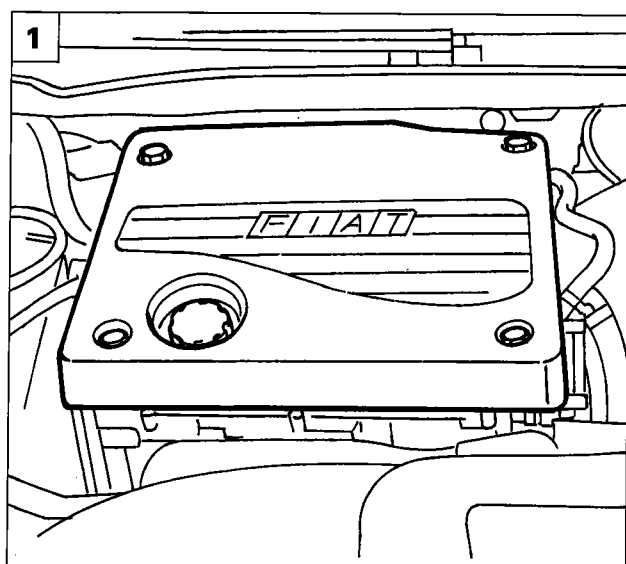


When the adjustment has been carried out, the control lever travel should not exceed 5 notches on the toothed sector.

With the handbrake lever in the rest position the rear wheels should rotate freely; if this is not the case, repeat the adjustment.



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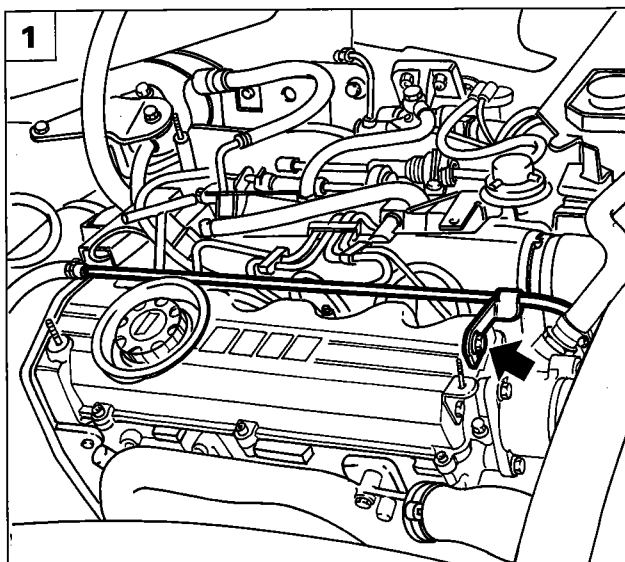
10 11 CHECK/ADJUST TAPPET CLEARANCE

The following components must be removed in order to check and, if necessary, adjust the tappet clearance.

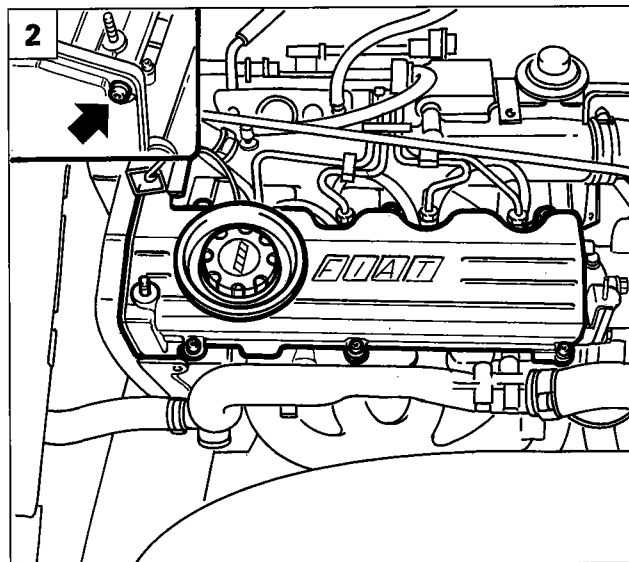


Bravo-Brava 1910 TD

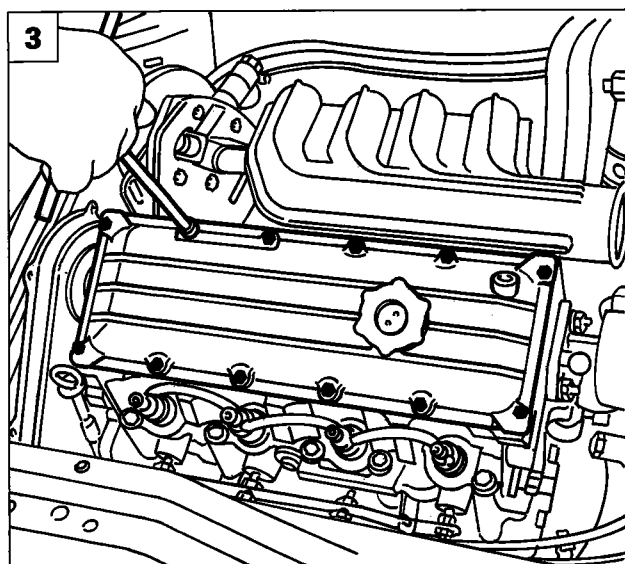
1. Remove the upper engine protection.



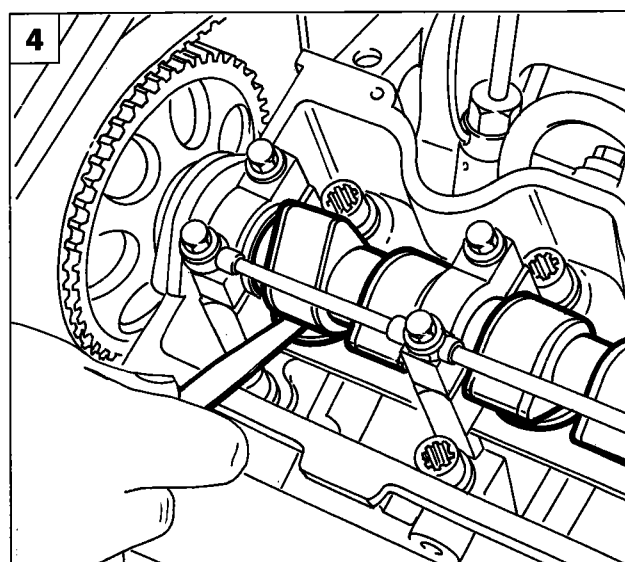
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P4A17EX04



P4A09CA03

1. Disconnect the rigid engine coolant pipe using tool 1860967000 to undo the connector on the cylinder head; also undo the bolt shown and position the pipe at the side.
2. Undo the bolts fixing the tappet cover and remove it taking care to disconnect the oil vapour recovery pipe and the bolt shown-in the inset fixing the timing belt cover to the tappet cover. Then proceed with checking the tappet clearance.

Bravo-Brava 1929 D

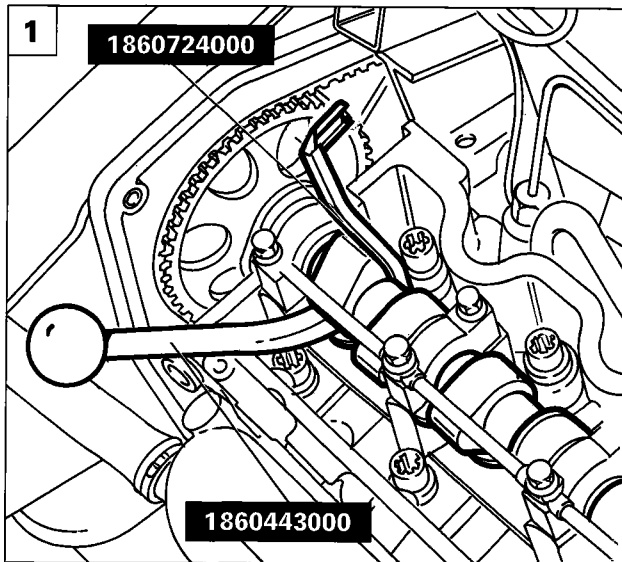
3. Undo the bolts fixing the tappet cover, disconnect the brackets connected to it and remove it. Then proceed with checking the tappet clearance.

Checking tappet clearance and, if necessary, adjusting

4. Rotate the camshaft so that the inlet and exhaust valves are in the closed position. With the engine cold, check the clearance between the cam recess radius and the tappet is within the recommended values using a feeler gauge.

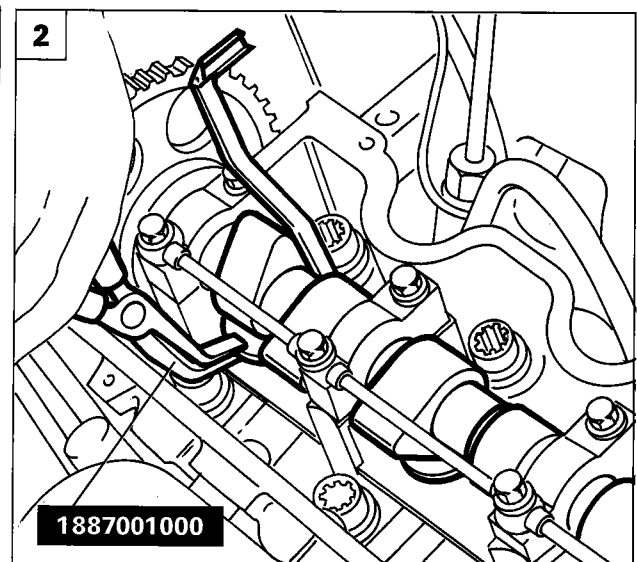
Engine type	1910 TD	1929 D
Inlet	0.35 mm	0.30 mm
Exhaust	0.35 mm	0.35 mm

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If the tappet clearance does not correspond to the recommended figures, proceed as follows:

1. Using pressure lever 1860443000, lower the cup for the tappet concerned and insert tool 1860724000 for retaining tappets positioning the notches in the edge of the tappet in such a way as to facilitate the subsequent extraction of the shim to be replaced.



2. Lift up the shim to be replaced, working as appropriate, then remove it using pliers 1887001000.

NOTE Replace the shim removed with another one of the appropriate size to restore the correct valve clearance. Carry out the same operation for the other shim for the pair of valves being adjusted.

12 CHECK EXHAUST GAS EMISSIONS (petrol engines)

The electronic injection/ignition systems used are capable of automatically controlling the advance, the carbon monoxide (CO) content and the idle air flow rate, therefore no manual adjustment operations are required. However, a check on the content of the exhaust gases downstream of the catalyzer can provide useful indications on the injection/ignition system operating conditions and the engine and catalyzer parameters.

The concentration of carbon monoxide (CO), unburnt hydrocarbons (HC) and the value λ , is measured with the catalyzer at operating temperature (300 - 350 °C) (we recommend driving hard along a section of road for around 5 to 10 minutes to ensure that the catalyzer reaches operating temperature), the insert a suitably calibrated tester sensor at least 30 cm into the end of the exhaust pipe as shown in the diagram overleaf.

If the shape of the end section of the exhaust pipe is such that the sensor cannot be fully introduced, add a special extension pipe ensuring the seal in the join area.

1. Check that the concentration of CO and the value λ during idling and accelerated idle, correspond to the values recommended in the government circular:

Engine measurement during idling: CO limit $\leq 0.5\%$ vol.

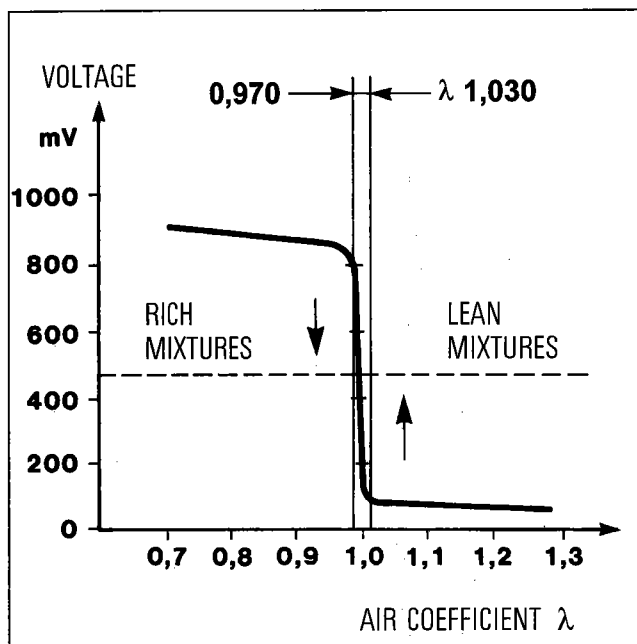
Measurement for accelerated idle (2000 - 2500 rpm): CO limit $\leq 0.3\%$ vol.

Lambda = 1 ± 0.03

If the values are not within the limits set out in the government circular, the Customer must be notified of the need to check:

- that the Lambda sensor is working properly using the Fiat/Lancia tester;
- for the presence of air penetration in the area surrounding the Lambda sensor housing;
- the injection system, particularly the wear of the spark plugs.

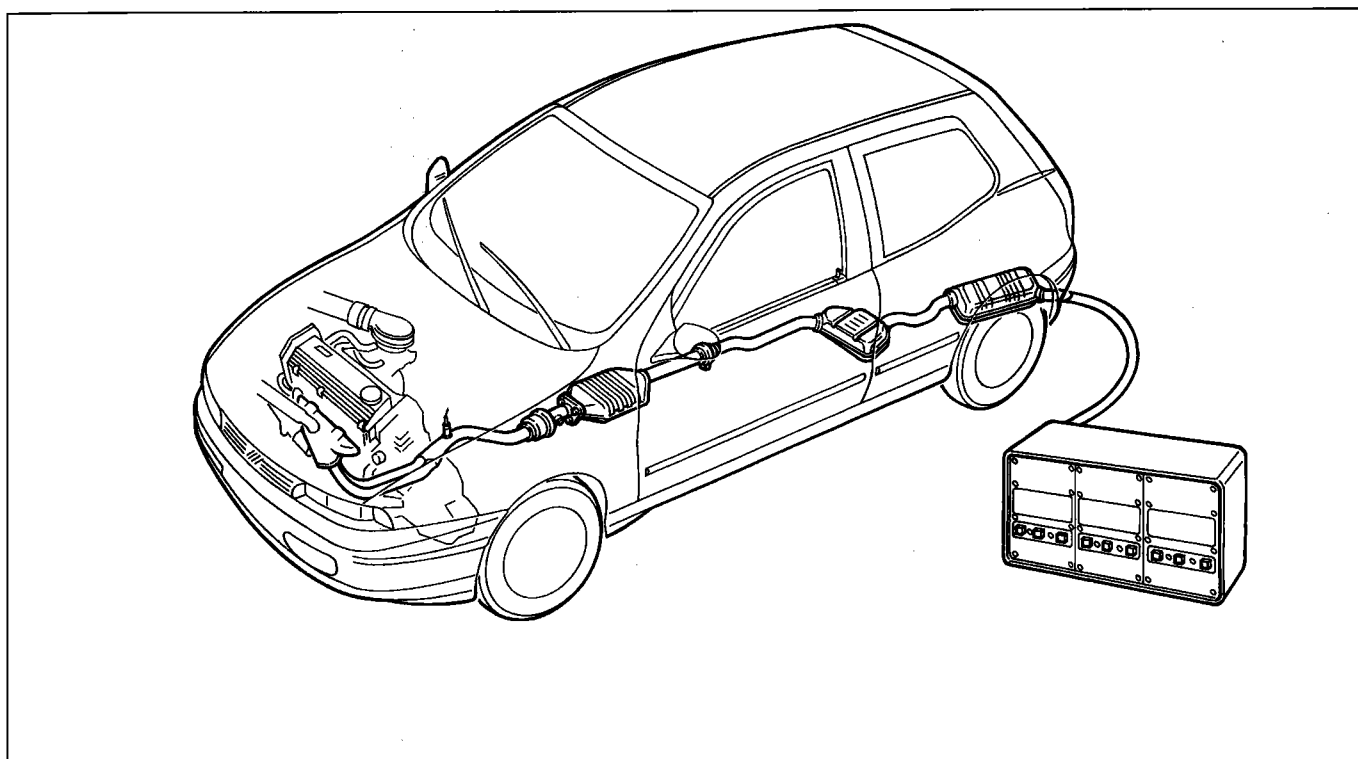
2. If the HC figure is more than 90 p.p.m., the cause of the problem should be sought in the engine timing or the decreased efficiency of the catalyzer.



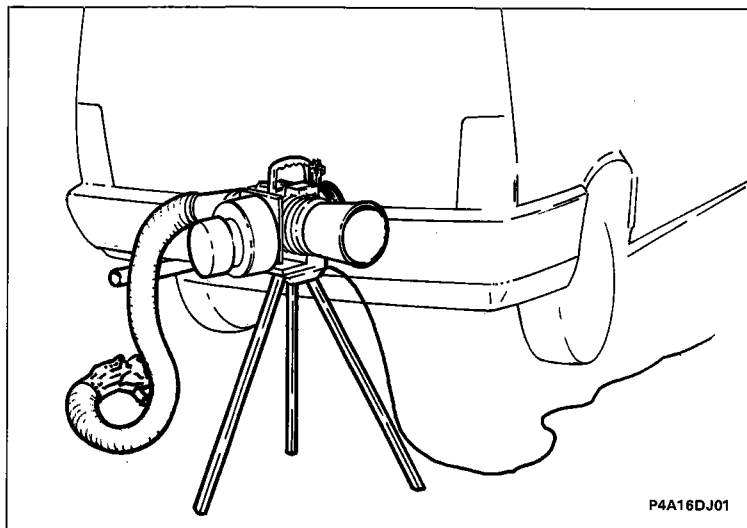
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Factor λ is obtained from the ratio between the quantity of intake air and the theoretical quantity of air required to burn all the fuel injected.

To achieve an optimum mixture the quantity of fuel injected must be as close as possible to the theoretical quantity required to be completely burnt in relation to the quantity of air drawn in by the engine. In this case the Lambda factor is equal to 1 (ideal mixture) and the CO content is within the legal limits. With $\lambda \geq 1$ (lean mixture), excess air, the CO tends to assume low values: with $\lambda \leq 1$ (rich mixture), lack of air, the CO values tend to be high.



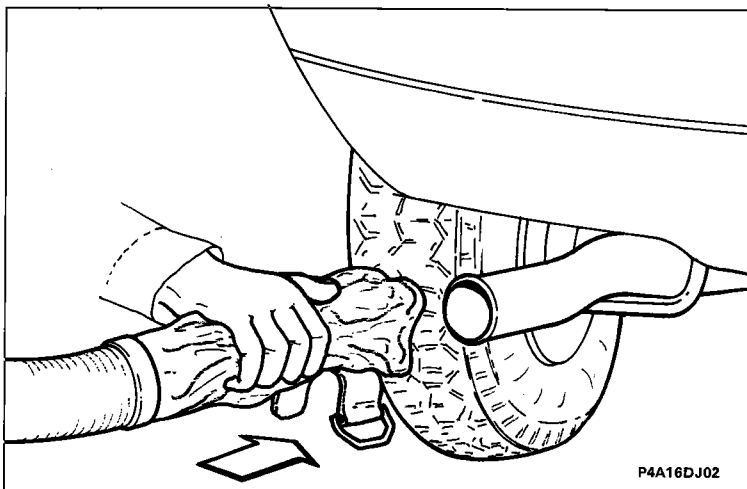
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12 CHECK EXHAUST GAS EMISSIONS (diesel engines using opacity meter)

Start up the engine and let it reach operating temperature (radiator cooling fan comes on twice).

Place the opacity metering measuring unit in a stable position near the vehicle exhaust pipe (the opacity meter exhaust must be positioned against the wind).



Connect the measuring unit flexible pipe with the vehicle exhaust pipe. Carry out the equipment connections and adjustments in accordance with the Manufacturers' instructions.

Fully depress the accelerator pedal three times in quick succession so that the engine revs limiter speed is reached.

Carry out measurements for five subsequent full accelerations.

Make a note of the maximum values reached. To obtain the figure for the test, calculate the arithmetical average of the three closest values.

If there is more than one suitable trio, select the one which gives the highest average value.

Compare the values with the limit given on the plate on the vehicle conforming with the EEC directive.

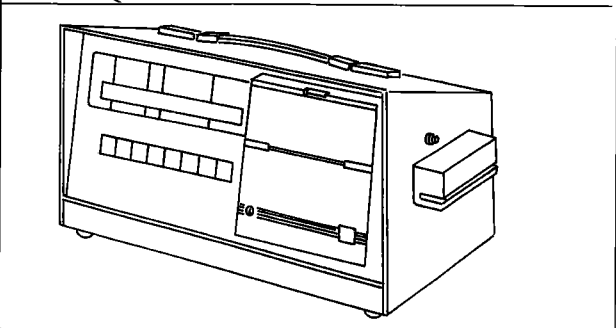
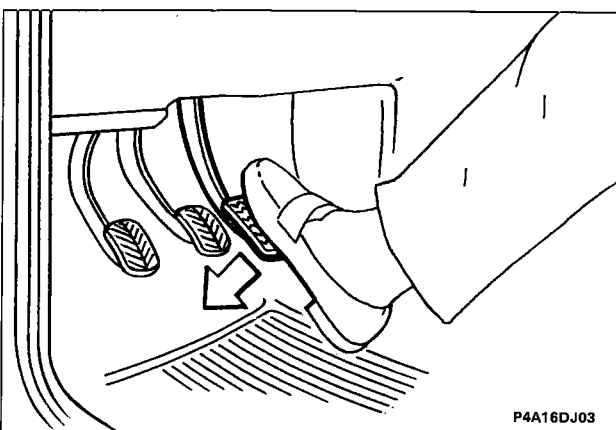
Where figures are not available, apply the following limits from directive 92/55/EEC:

Naturally aspirated diesel engine:

$$K = 2,5 \text{ m}^{-1}$$

Diesel engine with turbocharger:

$$K = 3 \text{ m}^{-1}$$

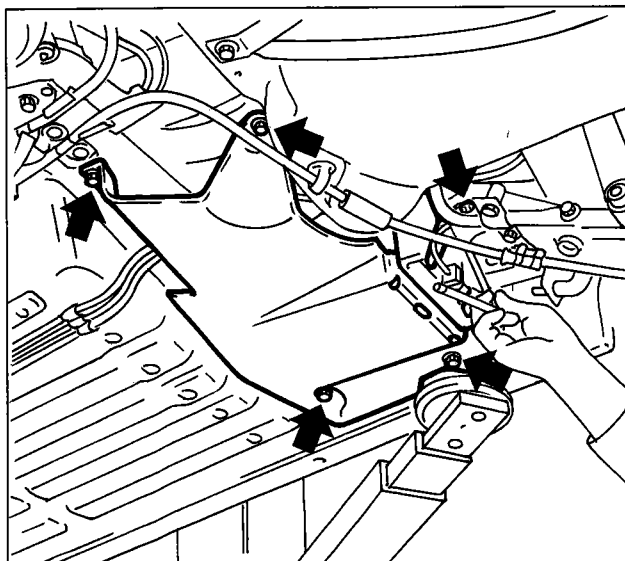


If the figure for the exhaust fumes is more than 70%, notify the Customer of the need to carry out a series of tests on: the condition of the air filter, injection pump timing and flow rate, valve clearance and timing, injector calibration and cleanliness, compression ratio.

13 CHECK ANTI-EVAPORATION SYSTEM

The anti-evaporation system prevents the petrol vapours, which form in the tank and the fuel system, from being discharged into the atmosphere and consequently releasing the light hydrocarbons (HC) which they contain, producing a pollutant effect.

It is therefore necessary to check that the anti-evaporatin system pipes are correctly positioned in the engine compartment; also check their condition, making sure that there are no signs of cracks, cuts or leaks and that they are correctly fixed and not interfering with other components. Check the condition of the active charcoal filter. Position the vehicle on a lift and check the condition of the pipes under the floo of the vehicle.

14 REPLACE FUEL FILTER (petrol engines)

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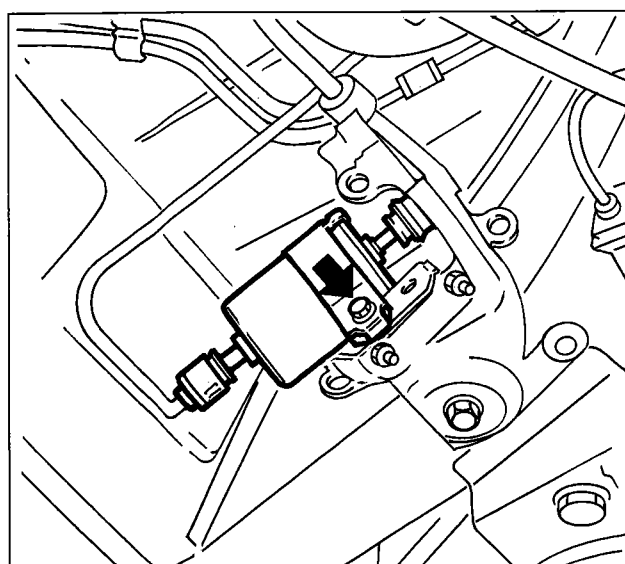


Proceed with removing the fuel filter by carrying out the following operations:



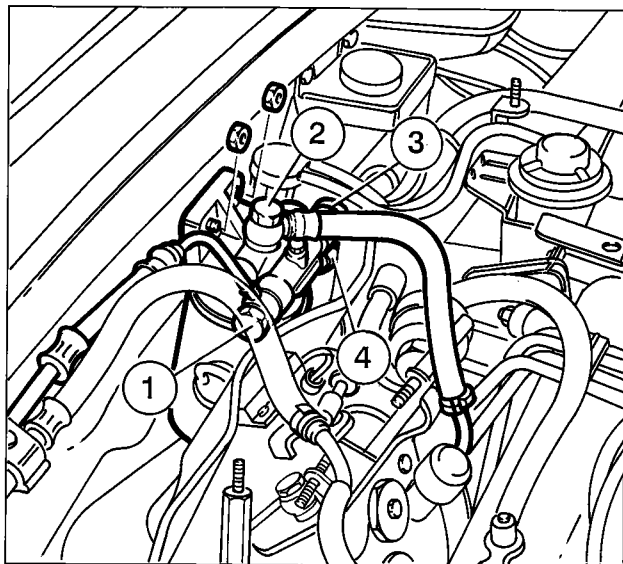
- Raise the vehicle;
- undo the bolts shown in the diagram and remove the protective shield.
- disconnect the rapid fue inlet and outlet connectors from the filter, collecting the fuel which comes out during the operation in a suitable container.
- undo the fixing bolt and remove the filter.

NOTE *The filter should NEVER BE FITTED THE WRONG WAY ROUND, or else it has to be replaced (even after working in the wrong position for a short period). The arrow on the outer casing indicates the direction in which the fuel should flow. After replacing the filter, start up the engine and check that there are no leaks of fuel from the seals.*

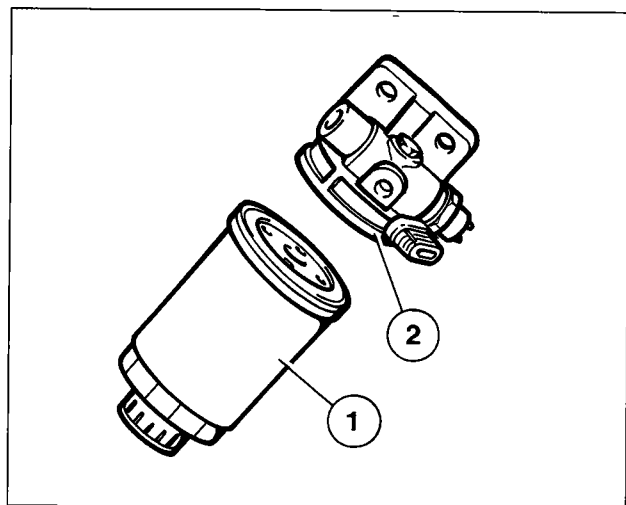


P4A41CJ03

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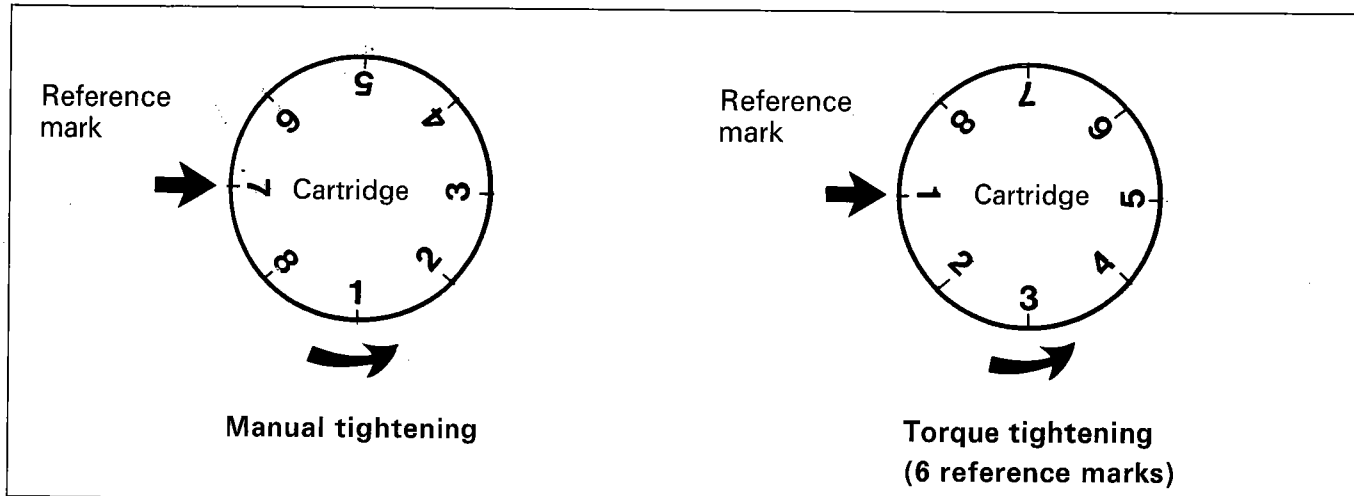


P4A14CA01



P4A14CA02

For the 1929 D version, which is equipped with a Lucas pump, this is achieved by means of the numbered references on the cartridge. For example, when the cartridge is in contact with the support a mark must be made on the support corresponding to one of the references on the filter, then the filter must be tightened counting 6 reference marks after that reference.



P4A10DJ01

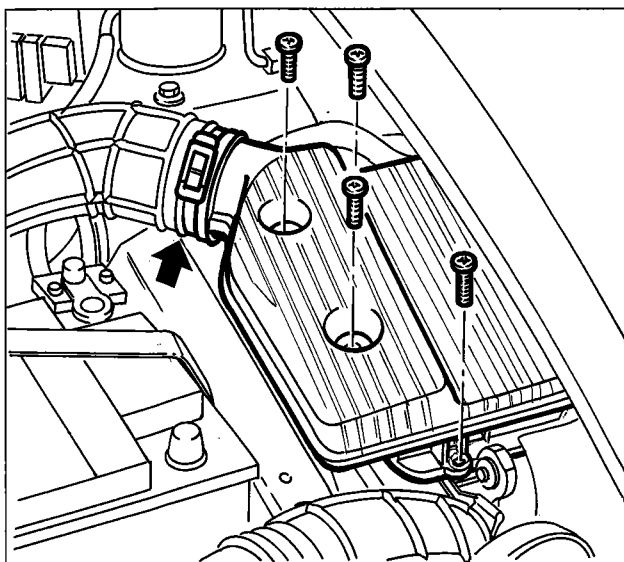
15 REPLACE FUEL FILTER (diesel engines)

To replace the fuel filter, after having disconnected the negative battery lead, proceed as follows:

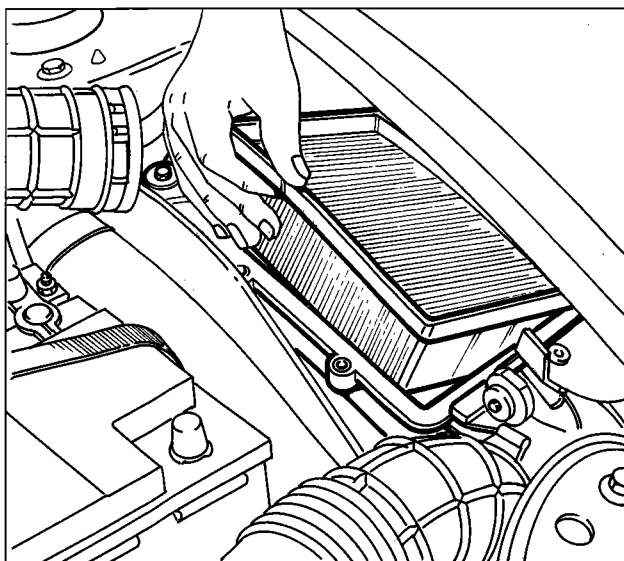
- Disconnect the connector (1) for the fuel supply pipe from the tank from the filter;
- Disconnect the connector (2) for the fuel supply pipe to the injection pump from the filter;
- Disconnect the electrical connection (3) from the fuel pre-heating device sensor;
- Disconnect the electrical connection (4) supplying the fuel pre-heating device;
- Undo the two nuts fixing the partition between the passenger and engine compartments and remove the complete fuel filter.
- At the bench, undo the fuel filter (1) with the seal from the support (2).

When refitting the fuel filter, proceed as follows:

- lubricate the rubber seal for the cartridge;
- fill the filter cartridge with diesel fuel (in order to shorten the self-bleeding time);
- tighten the cartridge in contact with the support;
- close the cartridge by 3/4 of a turn (to achieve a tightening torque of 1.3 - 1.6 daNm).



P4A15CA01



P4A15CA02



16 17 REPLACE AIR FILTER CARTRIDGE

Undo the bolts fixing the air filter cover. Lift up the cover and extract the filter element; to facilitate this last operation, release the retaining band for the connecting hose to the butterfly casing.



Any cleaning operation could damage the filter and risk adversely affecting the operation of the engine fuel system.

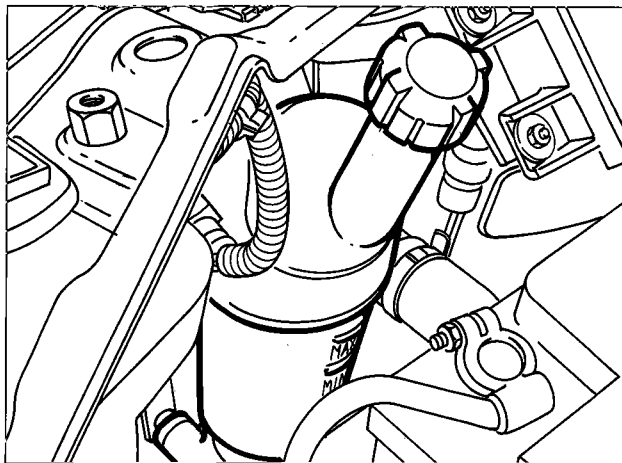
Clean the air filter cartridge container carefully, replace the filter, then refit the cover and fix it using the appropriate bolts.



If there are traces of oil on the filter, check for possible penetration throughout the entire air circuit.

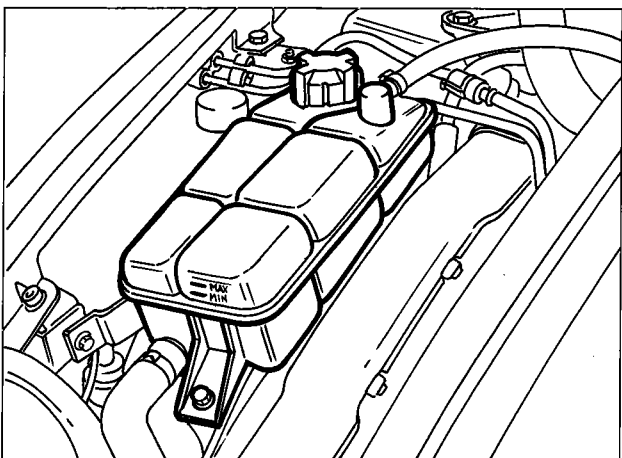
NOTE *If the vehicle is used on dusty roads replace the air filter more often. If they ask, the Customer should be provided with suitable information on the optimum maintenance frequencies depending on the specific usage of the vehicle.*

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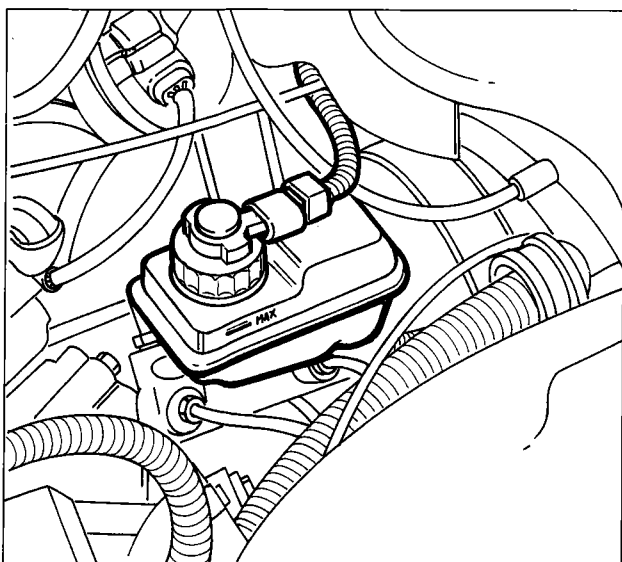
1370 12v - 1581 16v

P4A16CA01



1747 16v - 1998 20v - 1910 TD - 1929 D

P4A16CA02



P4A16CA03

18 TOP UP FLUID LEVELS

Engine coolant



Do not remove the radiator cap when the engine is very hot as there is a danger of being scalded.

The fluid level should be checked with the engine cold and it should not be below the MIN level on the tank.

If the level is too low, slowly pour a mixture of 50% distilled water and Fiat Lubrificanti Paraflu 11 through the filler.

NOTE *The addition of "Paraflu Formula Europa" to Paraflu 11 used originally means that it is not possible to check the efficiency of the anti-freeze using the regular test equipment. "Paraflu Formula Europa" is already mixed which means that water does not have to be added.*

Brake fluid level

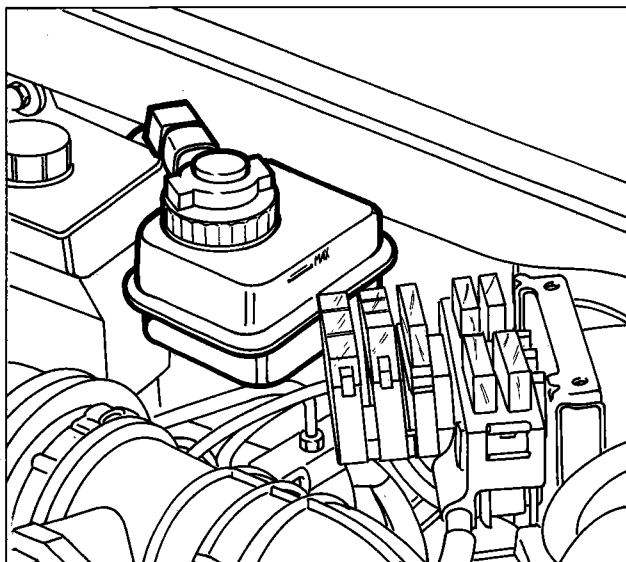
The brake fluid level is checked with the vehicle on a flat surface.

Check that the level of the fluid in the tank corresponds to the MAX reference on the tank.

It is normal for the brake fluid level to decrease over a period of time because this indicates that the brake pads are working properly.

The level of the brake fluid should not exceed the MAX level in the tank.

Check the operation of the warning light in the instrument panel: when the cover of the tank is pressed (with the ignition in the ON position) the warning light (ⓘ) should come on.




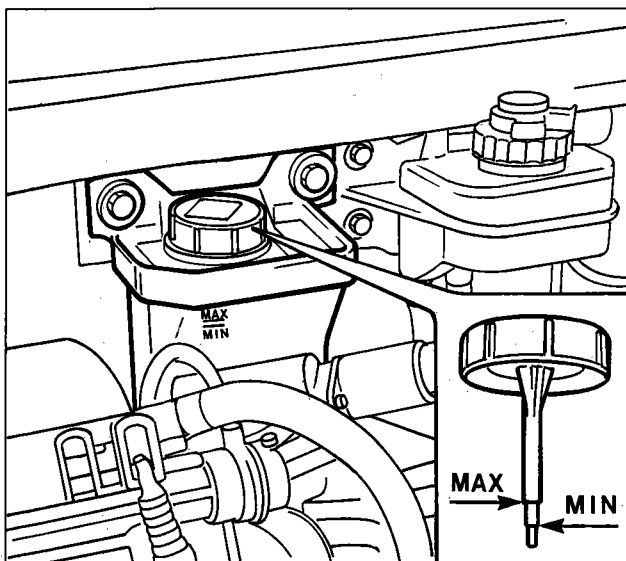
P4A17CA01

If fluid has to be added, only use DOT4 classification. Tutela TOP 4 270°C, which is used initially, is particularly recommended.



Avoid the brake fluid, which is particularly corrosive, from coming into contact with the paintwork. If it does, wash immediately with cold water.

The symbol , on the container, identifies synthetic type brake fluids, distinguishing them from mineral types. The use of mineral type fluids irreparably damages the rubber seals in the braking system.



P4A17CA02

Power steering fluid level

Check that, with the vehicle on a flat surface and the engine cold, the fluid level is between the MIN and MAX references on the dip stick in the tank cap or on the actual tank.

In order to carry out the check, clean the dip stick, fully tighten the cap, undo it and check the level.

When the fluid is hot it may exceed the MAX level.

If necessary, add fluid, making sure that it has the same characteristics as the fluid already present in the system.

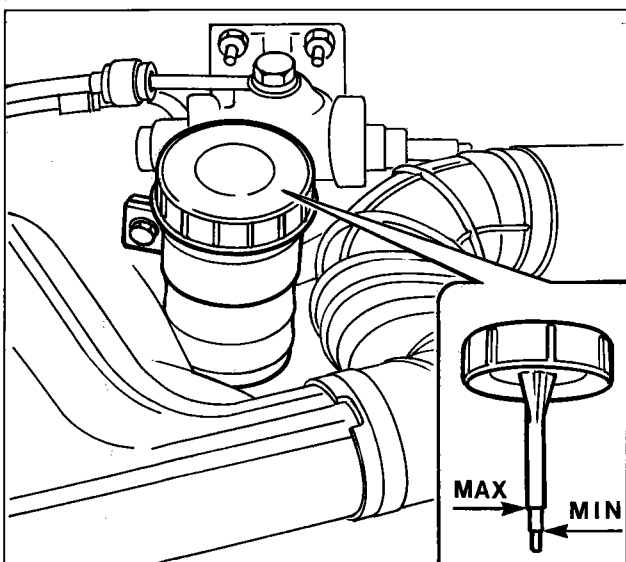
Start up the engine and wait until the level of the fluid in the tank stabilizes.

With the engine running and the vehicle stationary, turn the steering wheel completely to the right and to the left several times.

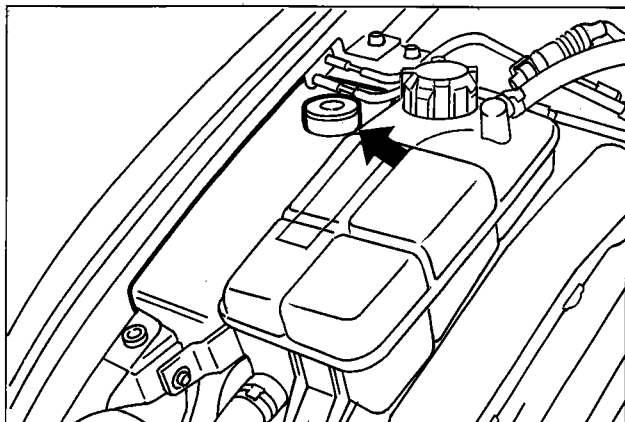
Top up until the level corresponds to the MAX reference, then retighten the cap.



Avoid power steering fluid coming in to contact with the hot parts of the engine as it is inflammable.



P4A17CA03



Windscreen/rearscreen and headlamp washer fluid level

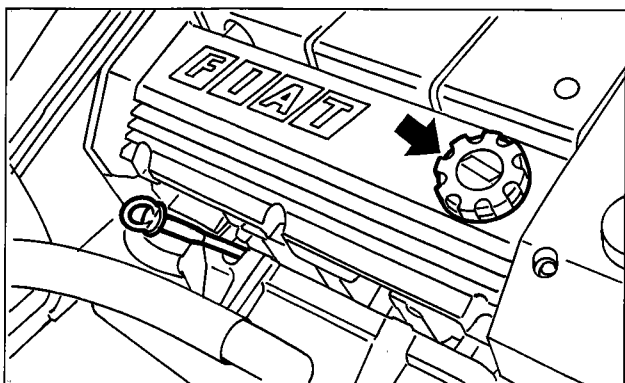
In order to add fluid, lift up the cap, lift up the filter and pour a mixture of water and Arexons DP1 fluid in the following percentages:

- 30% Arexons DP1 and 70% water in summer;
- 50% Arexons DP1 and 50% water in winter.

In the case of temperatures below -20 °C, use undiluted Arexons DP1.

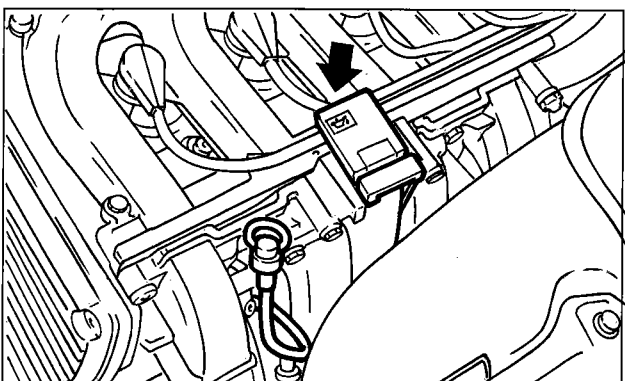
Versions with headlamp washers are fitted with a dip stick indicating the amount of fluid in the windscreen washer reservoir.

Bravo-Brava 1370 12v



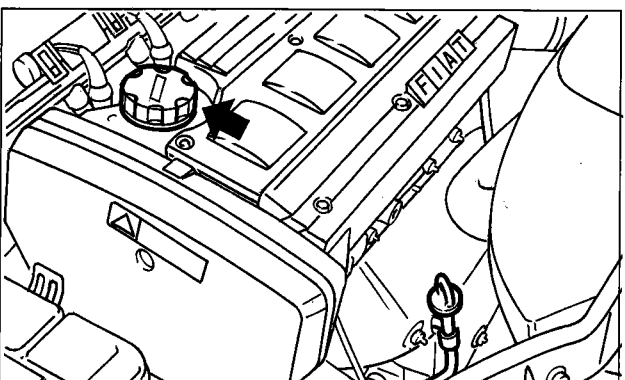
P4A18CA02

Bravo-Brava 1581 16v



P4A18CA03

Bravo-Brava 1747 16v



P4A18CA04

Engine oil level

The engine oil level is checked with the vehicle on a flat surface and the engine cold, or around 10 minutes after the engine has been switched off.

The oil level should be between the MIN and MAX marks on the dip stick. The gap between the MIN and MAX levels corresponds to around 1 litre of oil.

If the level of the oil is close to or actually below the MIN reference, add oil through the filler until the MAX reference is reached.

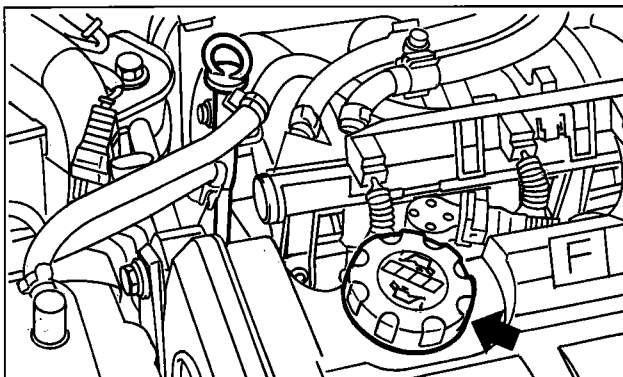


The level of the oil should never exceed the MAX reference.

When topping up with oil take great care to avoid accidentally spilling engine oil in the alternator ventilation slits which could cause serious damage to the alternator and also represents a fire hazard.

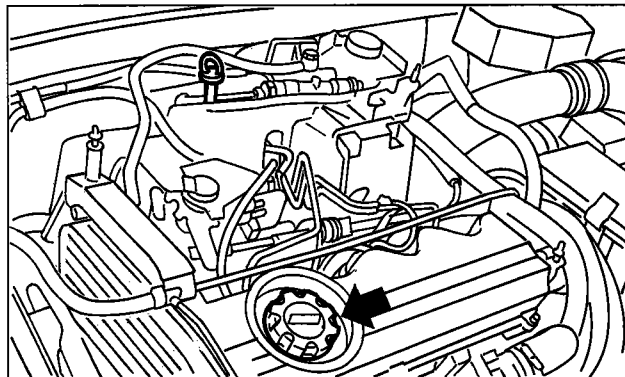
Do not add oil with different characteristics from those of the oil used in the engine. Only the use of semi-synthetic oil guarantees the planned maintenance intervals.

After having added oil, before checking the level, let the engine run for a few seconds and wait for several minutes after it has been switched off.



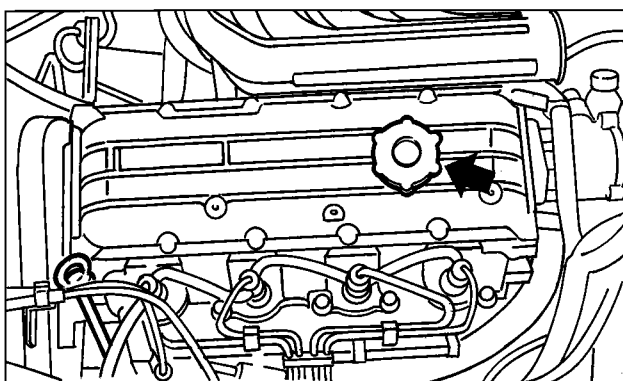
P4A19CA01

Bravo 1998 20v



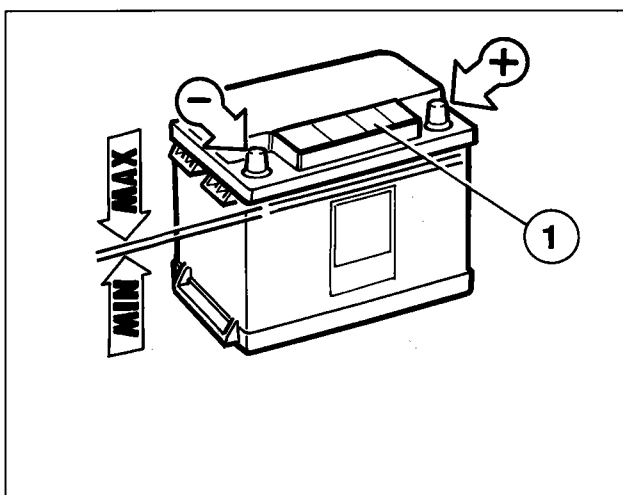
P4A19CA02

Bravo-Brava 1910 TD



P4A19CA03

Bravo-Brava 1929 D



P4A19CA04

Battery fluid level

The battery is the "reduced maintenance" type: in normal usage conditions it does not need topping up with distilled water.

The level of the battery fluid (electrolyte), with the vehicle on a flat surface, should be between the references on the battery. If the level is below the MIN mark, lift up the protective cover (1) and top up using distilled water.



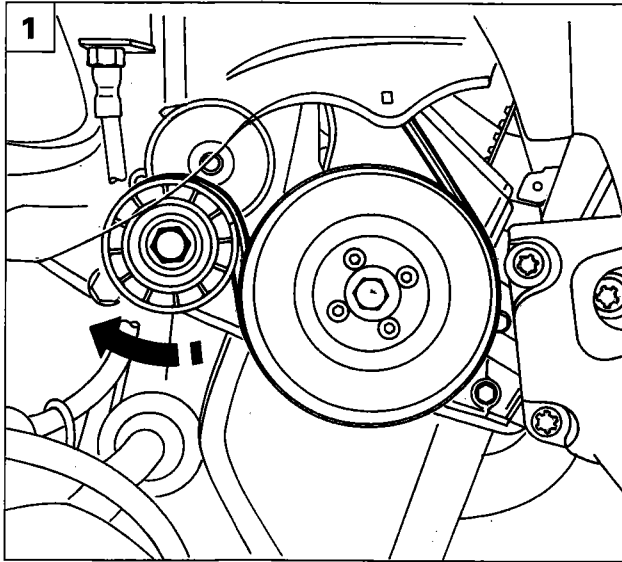
The fluid contained in the battery is poisonous and corrosive. Avoid contact with the skin and eyes. Keep naked flames and possible sources of sparks away from the battery as there is a danger of explosion and fire.



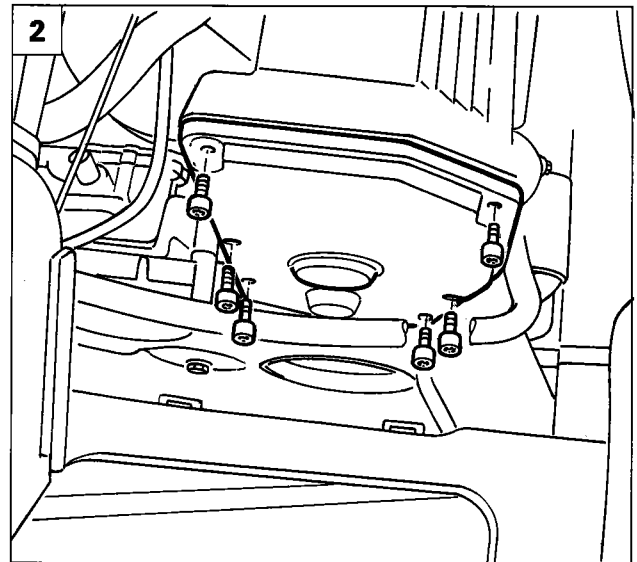
The state of charge of the battery should be checked, preferably at the beginning of the cold season, to avoid the possibility of the electrolyte freezing.

This check should be carried out more often if the vehicle is mainly used for short journeys or if it is equipped with consumers which absorb power permanently with the ignition switched off, particularly if they have been fitted in the after market.

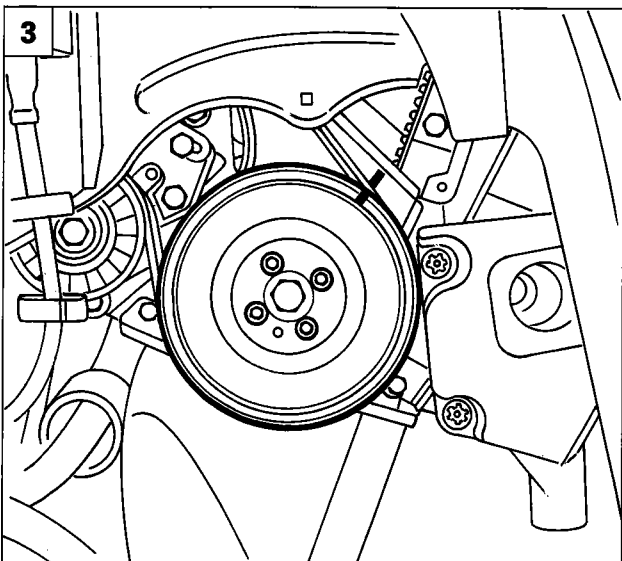
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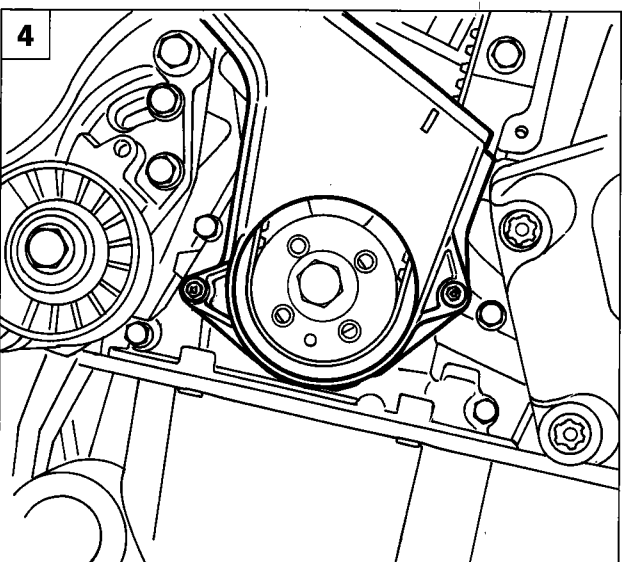
P4A11AX01



P4A12AX02



P4A12AX03



P4A12AX04



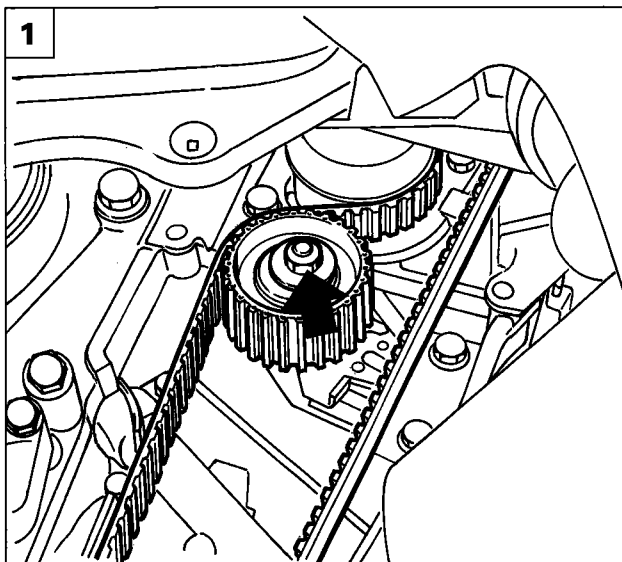
19 REPLACE TIMING BELT

Bravo-Brava 1370 12v

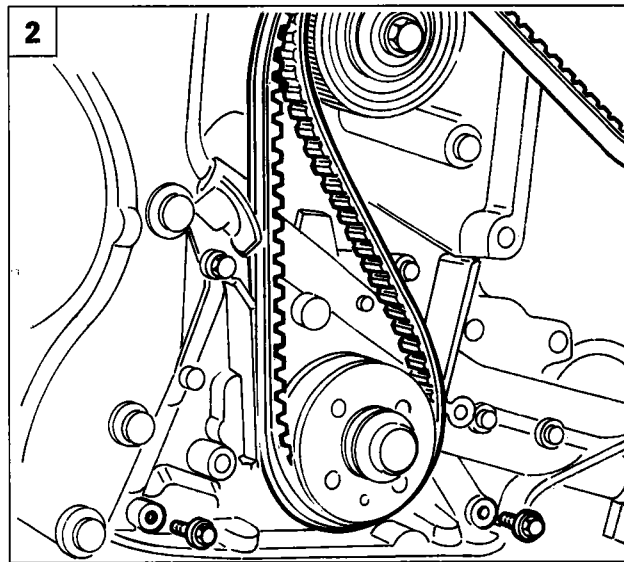
Position the vehicle on a lift, then:

- disconnect the negative battery lead;
- remove the right front wheel;
- remove the right wheel arch liner to gain access to the auxiliary shaft drive belt.

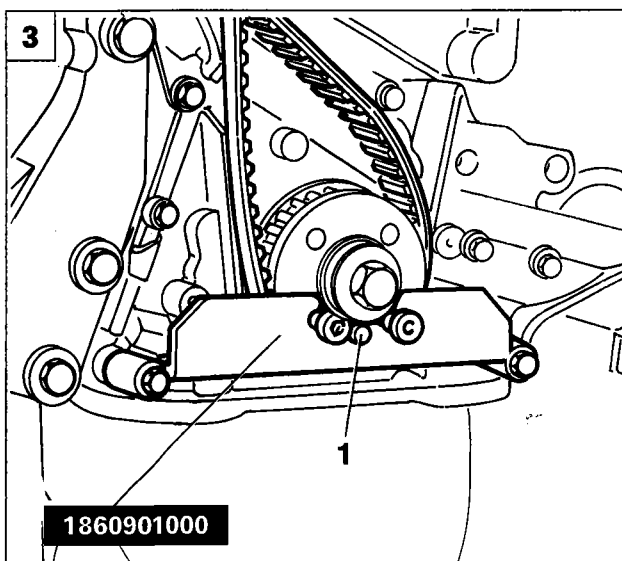
1. Loosen the auxiliary shaft drive belt tension acting on the centre nut for the automatic tensioning device to release the spring inside the actual device. Then remove the actual belt from the damper flywheel leaving it fitted on the power steering pump pulley; it is not necessary to remove the upper shield for the power assisted steering pump.
2. Remove the upper shield for the timing drive belt after having removed the support for the coolant pipe.
3. Loosen the bolts fixing the damper flywheel, then rotate the latter until the reference on it coincides with the reference on the shield underneath. Then, remove the damper flywheel.
4. Remove the lower timing belt lower shield.



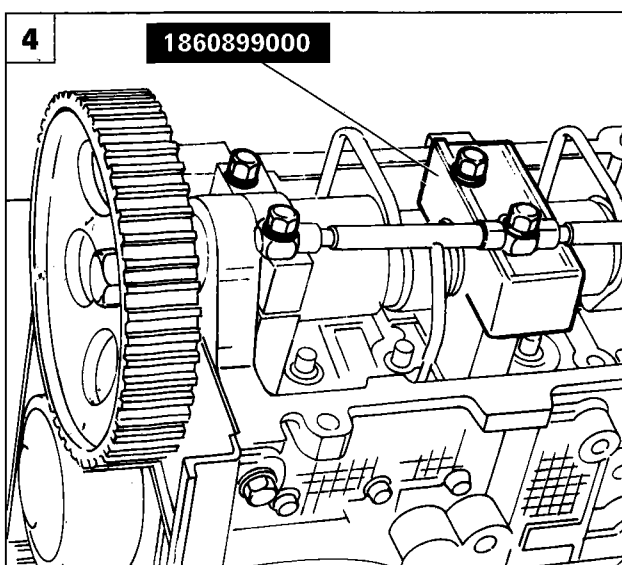
P4A14AX01



P4A30AX01



P4A30AX02



P4A31AX01



1. Loosen the automatic tensioner bolt, releasing the belt tension, then remove it.



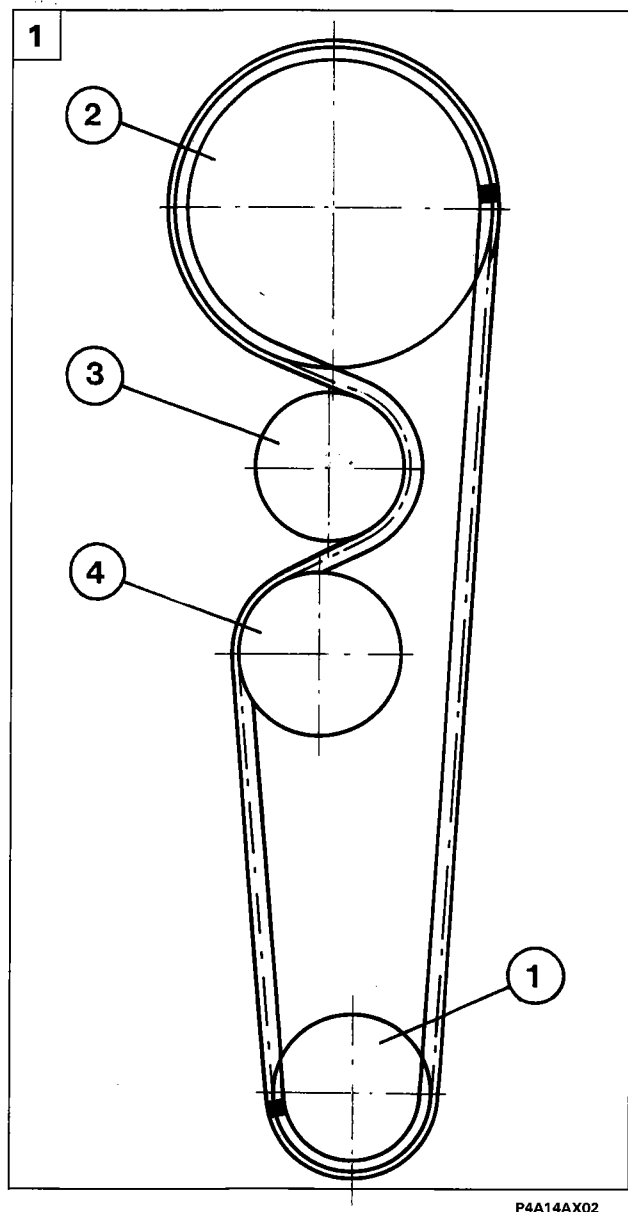
Fitting timing drive belt

2. After having removed the tappet cover, loosen the bolt fixing the camshaft drive pulley using spanner 1860831000; fit the toothed belt on the crankshaft gear and remove the two bolts illustrated fixing the oil pump to the crankcase.
3. Place tool 1860901000 in position, ensuring that the opening (1) in the tool coincides with the dowel on the crankshaft gear; in this position cylinder no. 1° is at T.D.C.
4. Remove the bolts fixing the 1st - 2nd - 3rd and 4th timing caps, exhaust side, loosen the inlet side ones, raise the lubrication duct, remove the 2nd cap and place tool 1860899000 for timing the camshaft in the housing, then tighten all the caps to a pre-torque of 1 daNm.

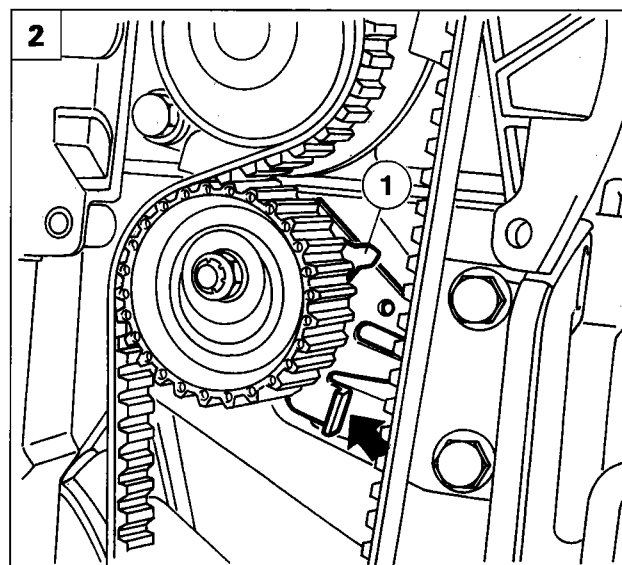


Work with due care when raising the lubrication duct to avoid the duct being distorted or broken.

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P4A14AX02



P4A14AX03



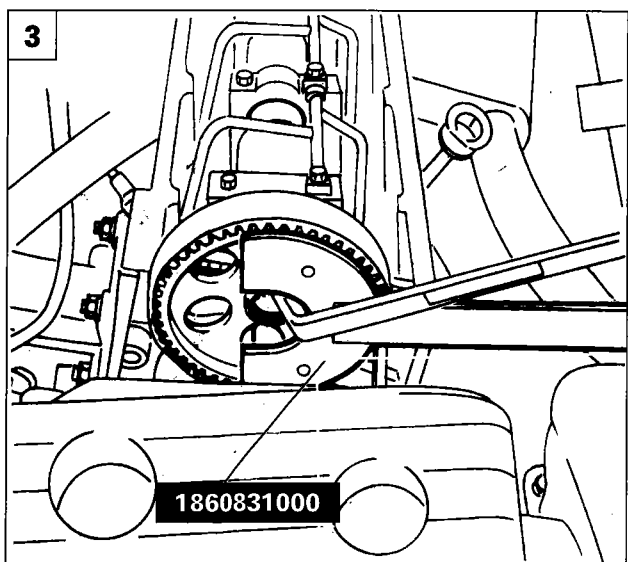
1. Complete the refitting of the belt observing the following order:



- crankshaft drive pinion (1);
- camshaft drive pulley (2);
- water pump pulley (3);
- automatic tensioner (4).

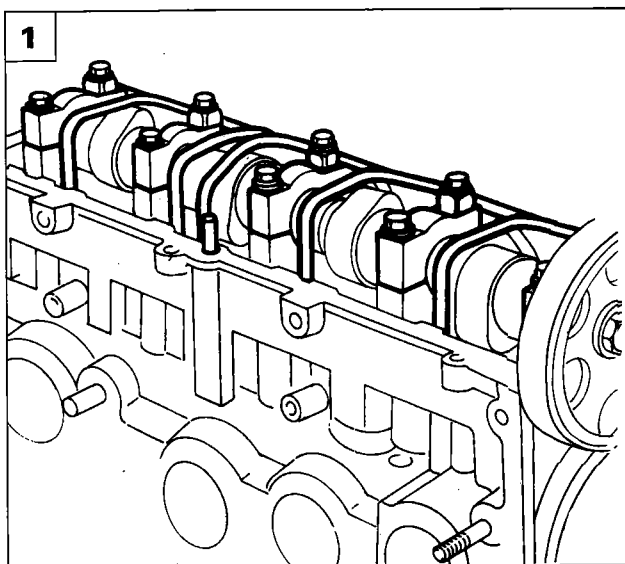
NOTE The belt should be fitted avoiding bending it at acute angles in order not to adversely affect the structure of the actual belt.
The belt should also be fitted with the arrows on it facing in the direction of rotation of the engine.

Tensioning timing drive belt



P4A32AX01

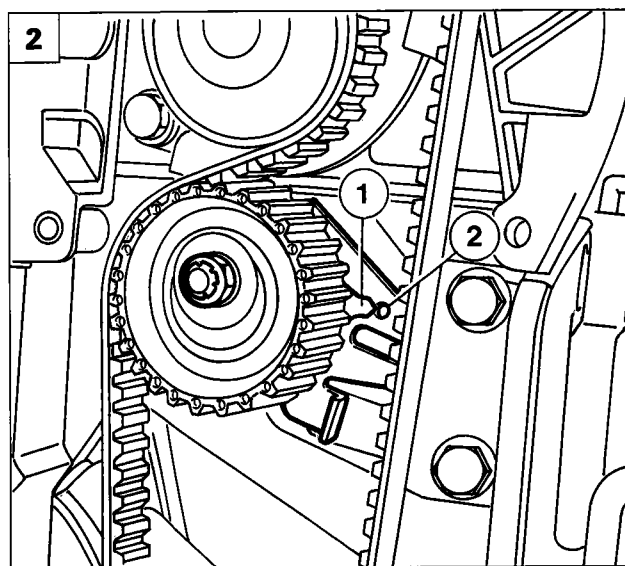
2. Using tool 1860443000, act at the point shown by the arrow and place the moving index (1) on the tensioner in the maximum tension position, then lock the nut fixing the tensioner.
3. Tighten the fixing bolt for the camshaft drive pulley to a torque of 11.3 daNm using spanner 1860831000.



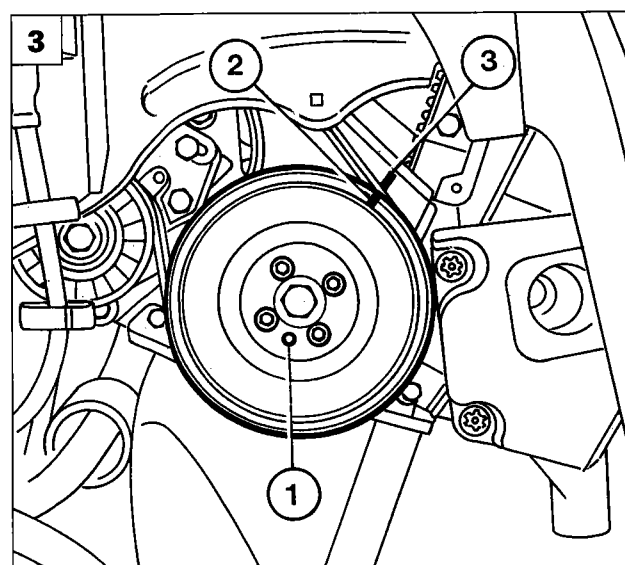
1. Remove tool 1860899000 and refit the 2nd cap.
 In order to carry out this operation it is necessary to remove the bolts fixing the 1st - 2nd - 3rd and 4th caps, exhaust side, loosen the inlet ones, slightly raise the lubrication duct, remove the tool and position the cap, tightening the cap fixing bolts to the recommended torque.



Work with due care when raising the lubrication duct to avoid the duct from being distorted or broken.

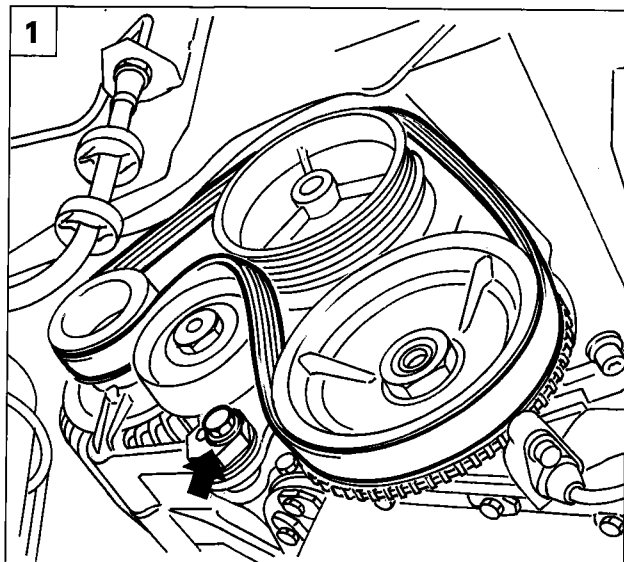


2. Remove tool 1860901000 placed previously on the timing gear and rotate the crankshaft through two revolutions in its direction of rotation. Loosen the tensioner fixing nut, make sure that the moving index (1) coincides with the fixed reference (2), then lock the nut fixing the tensioner and tighten it to the recommended torque.



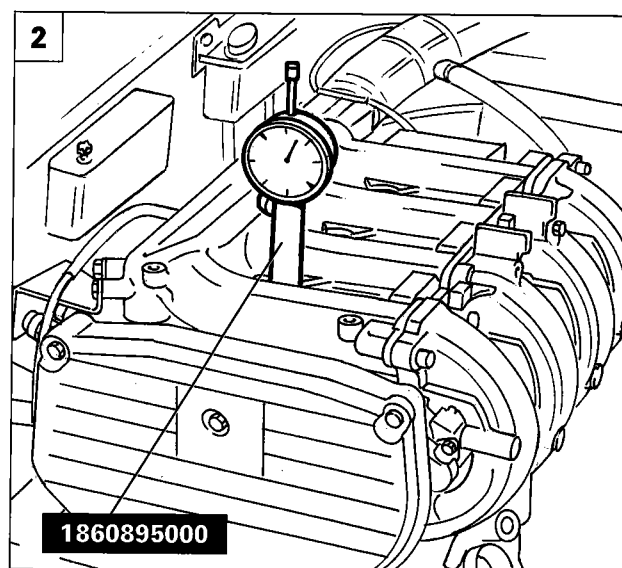
3. Refit the previously removed components, taking care to refit the auxiliary shaft drive pulley with the opening in the actual pulley engaged with the dowel (1) on the crankshaft pinion and also checking the engine timing ensuring that the reference (2) on the pulley corresponds with the reference (3) on the timing belt shield.

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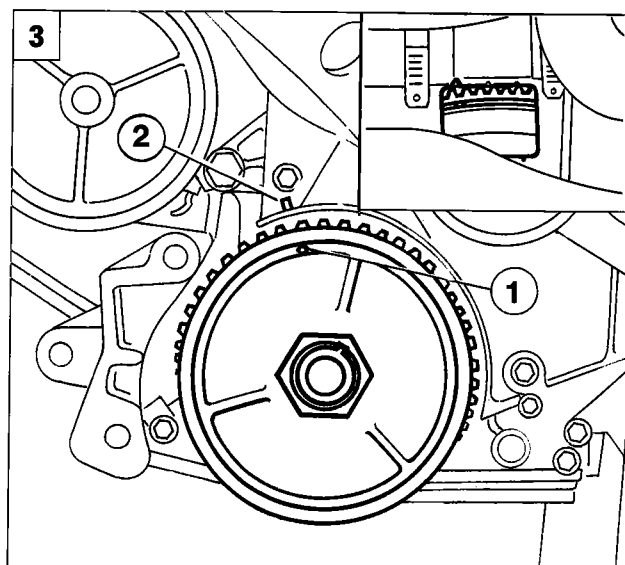


P4A09CX03

P4A11CX05



P4A11CX03



P4A11CX04

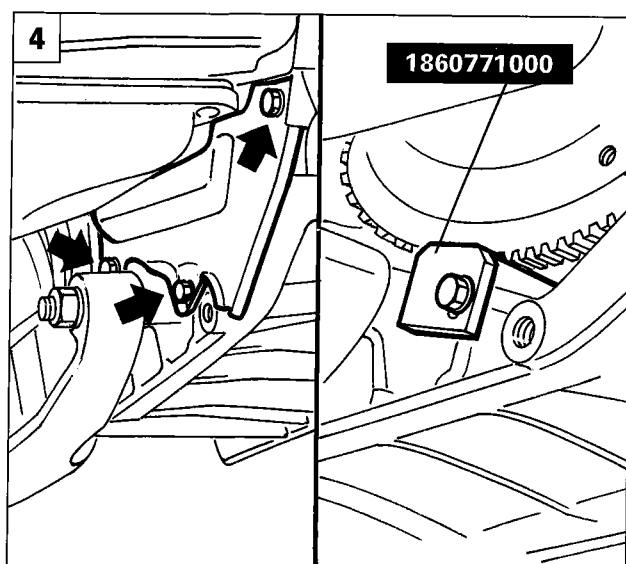


Bravo-Brava 1581 16v

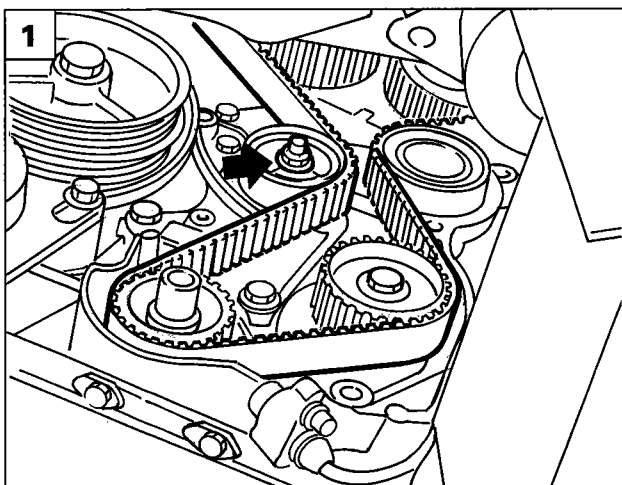
Position the vehicle on a lift, then:

- disconnect the negative battery lead;
- remove the right front wheel;
- remove the right wheel arch liner.

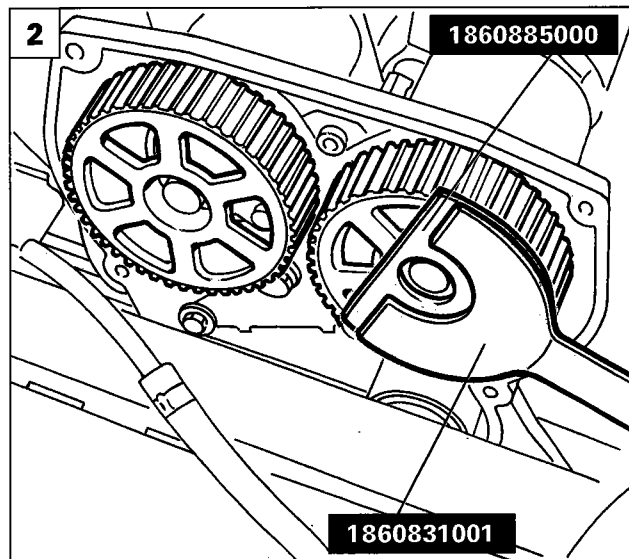
1. To gain access to the timing belt it is necessary to remove the alternator drive belt from the damper flywheel. In order to do so, act on the tensioner fixing bolt shown in the diagram.
2. After having removed the air intake pipe near the upper part of the timing belt shield, remove the spark plugs and position the dial gauge by cylinder no. 1 using support 1860895000; rotate the crankshaft until T.D.C. is found.
3. Check that the reference (1) on the damper flywheel is aligned with the reference (2) on the timing belt lower shield. Also check that the reference on the flywheel coincides with the reference on the bell housing, as shown in the inset.
4. Remove the lower protective casing for the flywheel from the bell housing, then place flywheel lock 1860771000 in position and remove the damper flywheel. Then undo the upper and lower bolts fixing the timing belt shield and remove it.



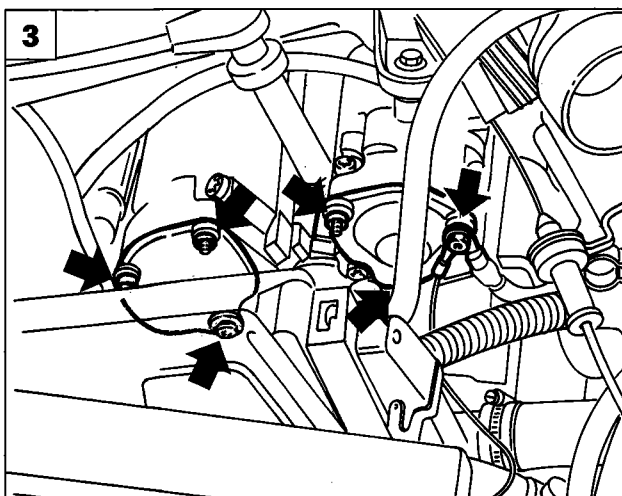
P4A12CX01



P4A12CX04



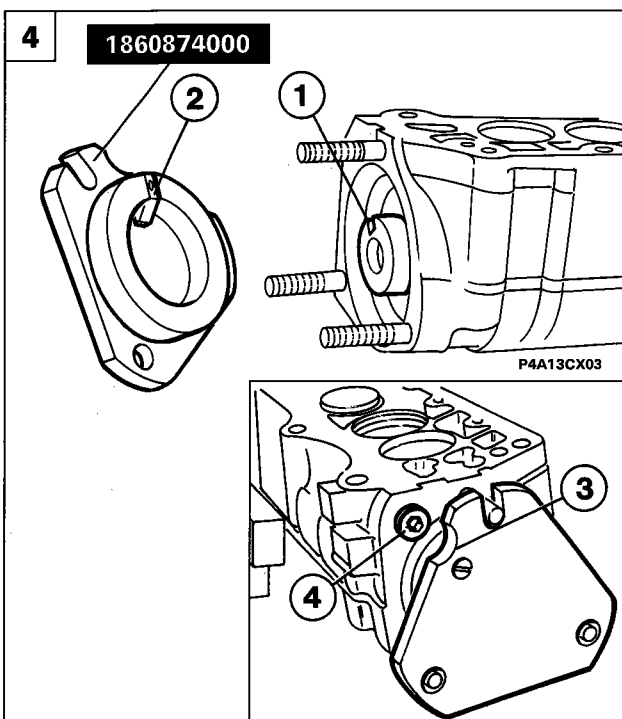
P4A12CX05



1. Loosen the nut fixing the automatic belt tensioner in order to discharge the belt tension, then remove the actual belt.

Timing at "0"

2. Loosen the bolts fixing the camshaft pulleys using tool 1860885000 fitted on support 1860831001.
3. Remove the ignition coils acting on the mounting bracket fixing nuts, after having disconnected the appropriate supply connections. Then remove the camshaft rear covers, as shown in the diagram.
4. Position tools 1860874000 for timing the camshafts, making sure that the housing (1) for the shaft coincides with the element (2) on the tools; engage the element in the housing and fix the tool to the camshaft housing by the covers which were removed previously. Repeat this operation both the camshaft inlet shaft and the exhaust one.



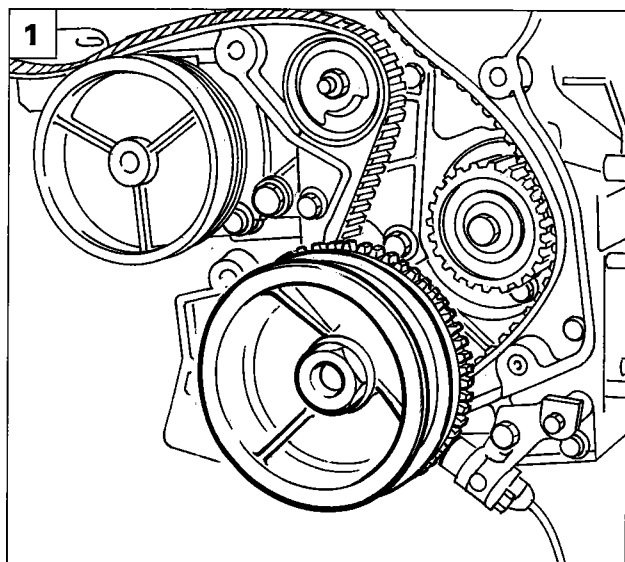
P4A13CX04



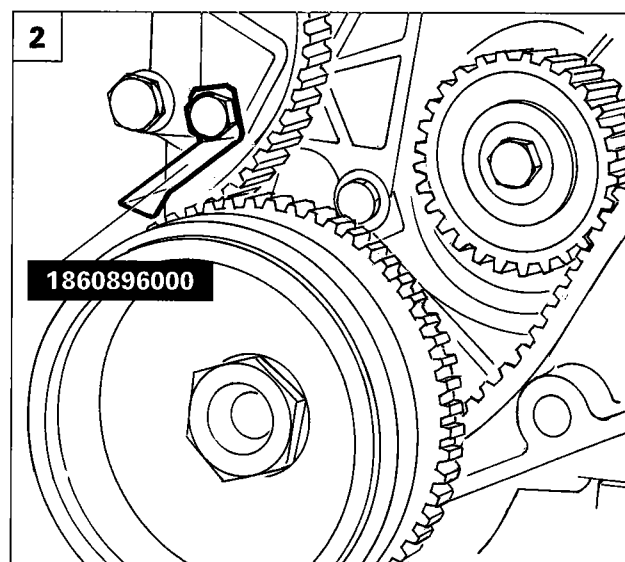
If the tools do not fit perfectly and it is necessary to rotate the camshafts, align the pistons so that none of them are at T.D.C. thereby avoiding the valves from being incorrectly positioned.



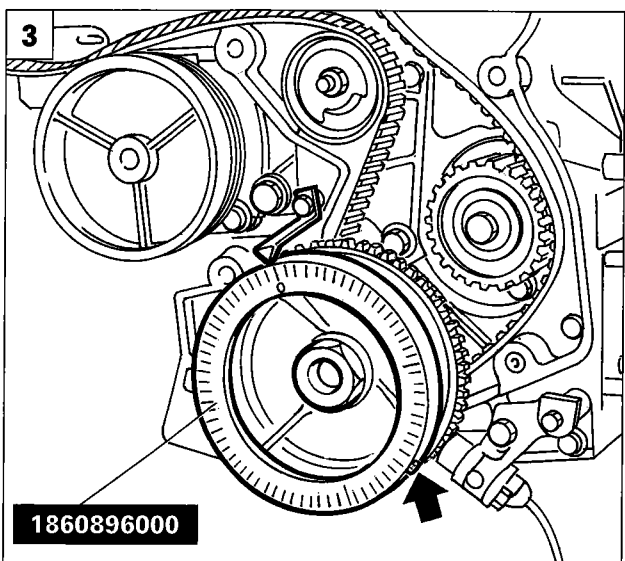
Tools 1860874000 for timing the shafts differ only in terms of the reference housing (3) in the angle at the bottom which should correspond to the plug (4) in the camshaft housing.



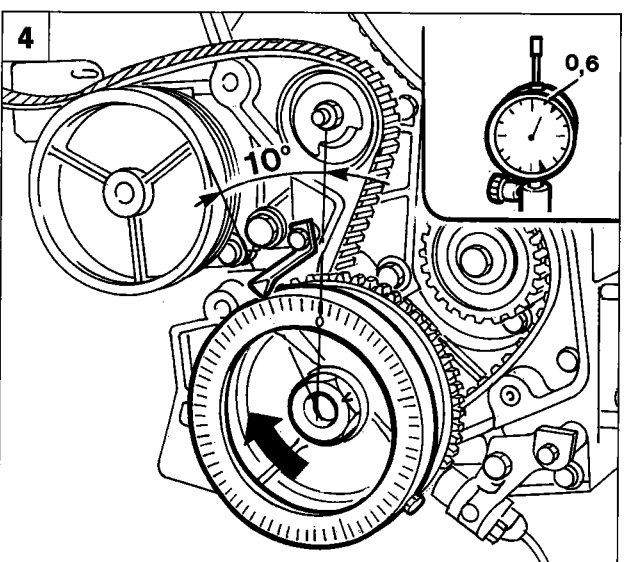
P4A14CX02



P4A14CX04



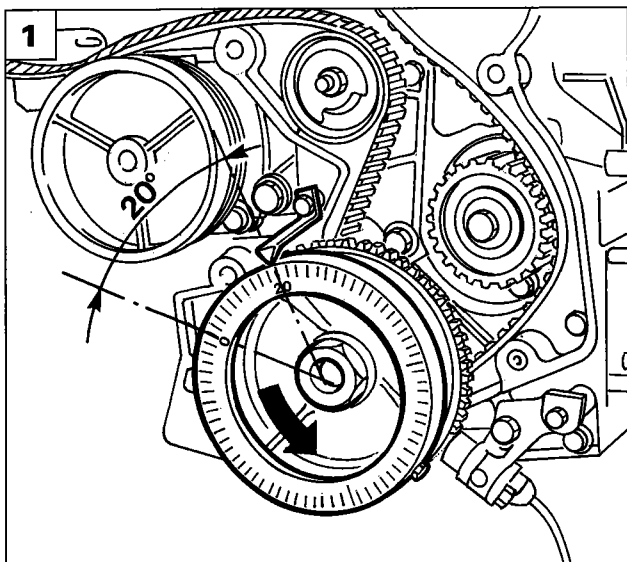
P4A15CX01



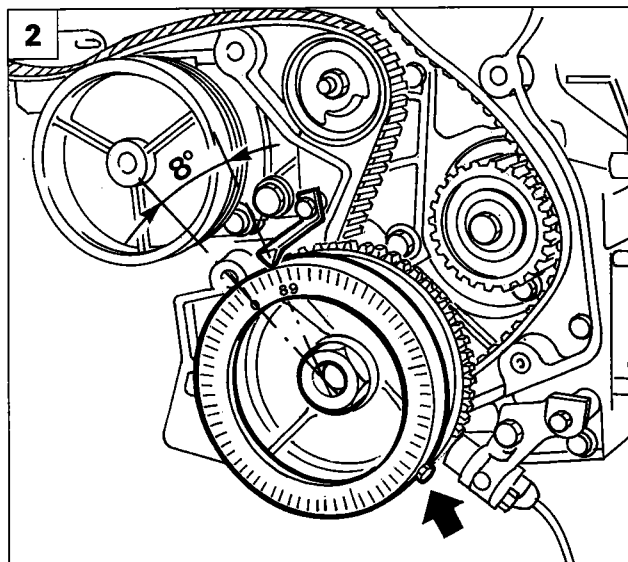
P4A15CX02



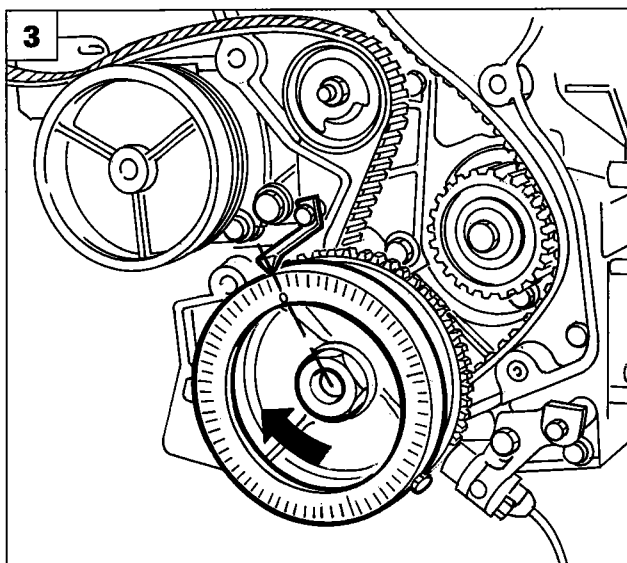
1. Only fit the timing drive belt on the crankshaft pinion. With flywheel lock 1860771000 fitted, fit the damper flywheel and tighten the fixing nut to a torque of 22 daNm, then remove the flywheel lock.
2. Remove the auxiliary shaft belt tensioning device acting on the fixings in order to allow the tool to be positioned for timing at "0". Use a dial gauge to recheck that cylinder no. 1 is at T.D.C. then, using the fixing bolt for the timing belt shield, fix the fixed reference shown in the diagram in the housing of the bolt used.
3. Fit the support base for the graduated disc 1860896000 on the auxiliary shaft drive pulley and fix it to the pulley using a bolt. Then fit the graduated disc on the support base ensuring that the "0" on the disc coincides with the fixed reference positioned previously.
4. Rotate the crankshaft through around 10° in its normal direction of rotation using a special spanner on the damper flywheel fixing nut; take a reading of the axial movement of the piston from the dial gauge (for example 0.6 mm).



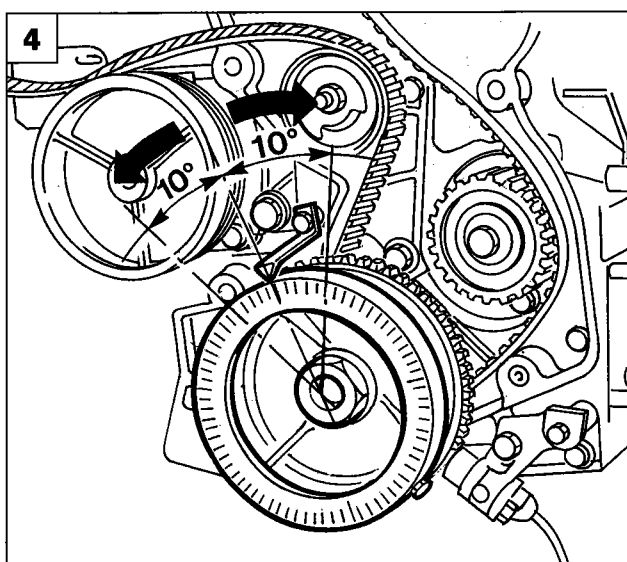
P4A15CX03



P4A15CX04



P4A16CX01

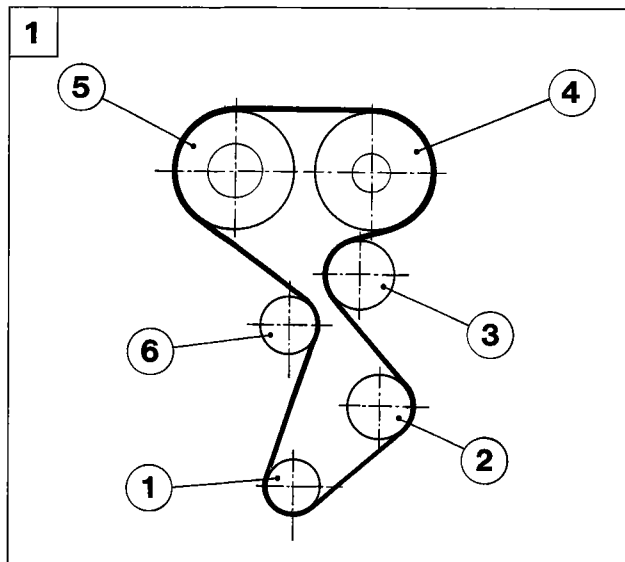


P4A18CX02

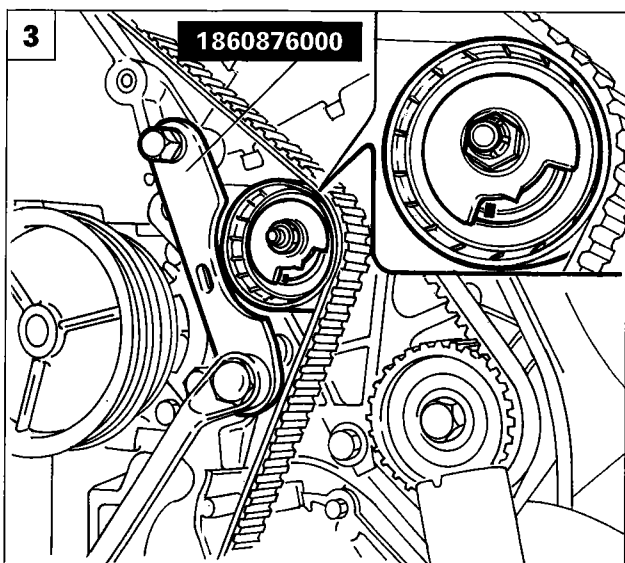
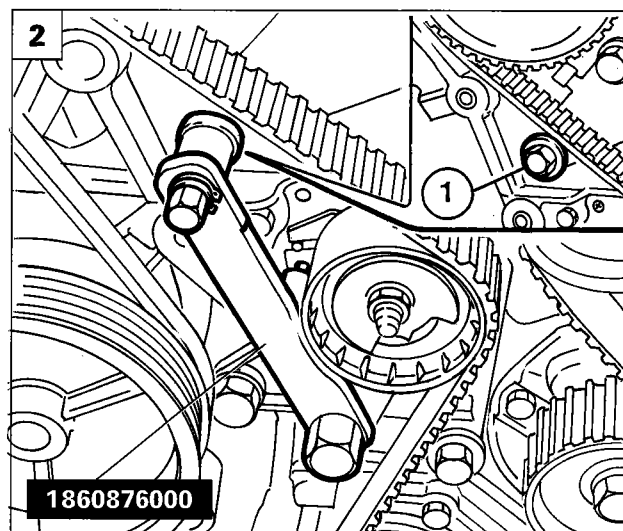
1. Rotate the crankshaft in the opposite direction to the normal direction of rotation through 20° in relation to the fixed reference. Rotate the crankshaft once again in its normal direction of rotation until the same axial movement value which appeared previously on the dial gauge (0.6 mm) appears.
2. Read the angular value on the graduated disc corresponding to the previous axial movement (for example 8°). Take the arithmetical average of the angular value of the crankshaft set at the beginning of the procedure (10°) and the current value (8°), then release the graduated disc from the base, position it in relation to the fixed reference, without rotating the crankshaft, at the value which is the arithmetical average (for example $9^\circ = \text{the average of } 10^\circ \text{ and } 8^\circ$), then lock the graduated disc once again.
3. Rotate the crankshaft pulley in a clockwise direction until the "0" on the graduated disc coincides with the fixed reference.
4. Rotate the crankshaft through 10° in a clockwise direction and an anti-clockwise direction checking that the reading on the dial gauge during the clockwise rotation of the crankshaft is the same as that for the anti-clockwise rotation.



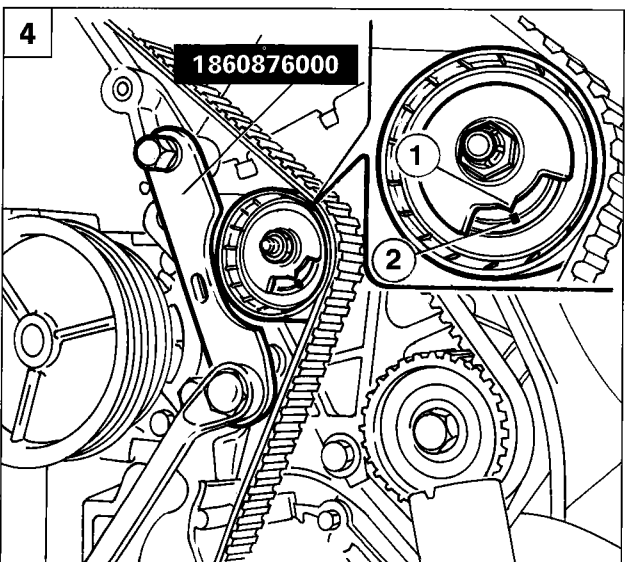
If the readings on the dial gauge after the check carried out for point 4 are not the same, repeat the procedure described on the previous pages.



P4A16CX03



P4A17CX01



P4A17CX03

Tensionamento cinghia distribuzione

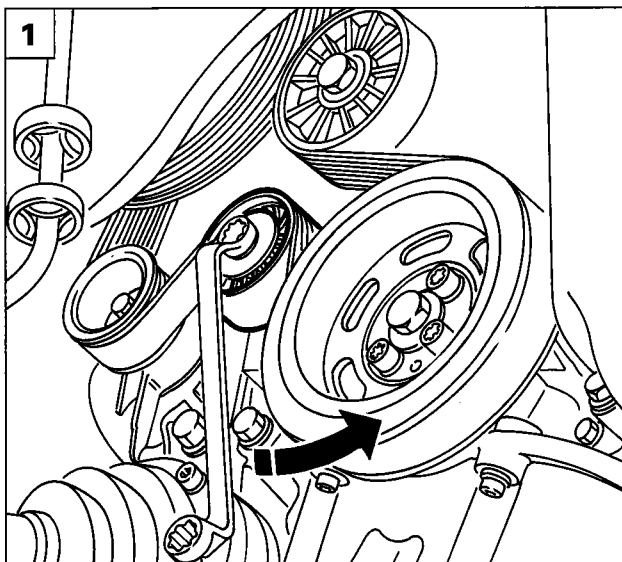
1. Complete the fitting of the belt in the following order: 1. Crankshaft gear (already fitted) - 2. Oil pump gear - 3. Fixed pulley - 4. Timing pulley, inlet side - 5. Timing pulley, exhaust side - 6. Automatic tensioner.



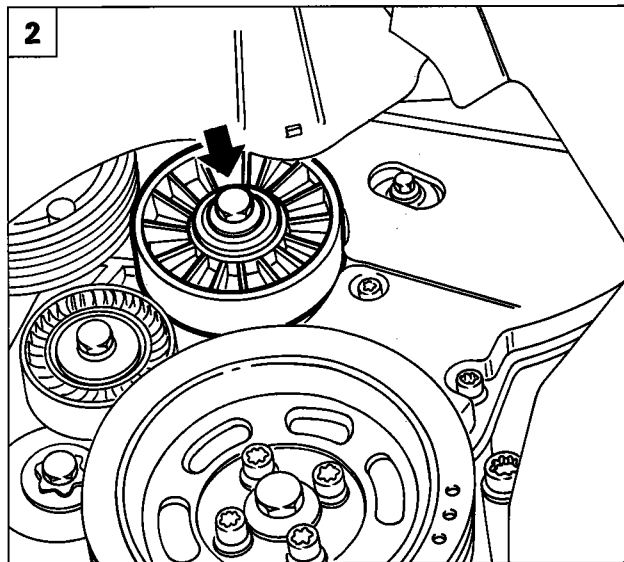
Fit the belt with the camshaft pullies facing towards the right in order to recover any necessary clearance for fitting the belt perfectly on the actual pulleys, ensuring the correct tension in the section of the belt already fitted.

2. Remove the bolt (1) to allow tool 1860876000 for tensioning the timing belt to be positioned.
3. Acting on tool 1860876000, place the belt tensioner in the maximum tension position, then lock the tensioner nut. Remove the dial gauge and tighten the camshaft pullies to a torque of 11.5 daNm using tool 1860885000 on support 1860831001.
4. Remove tools 1860874000; rotate the crankshaft through two revolutions in the direction of rotation, loosen the nut locking the tensioner and, using a special spanner on the belt tensioner, position reference (1) in line with reference (2), then tighten the belt tensioner lock nut to a torque of 2.3 daNm.

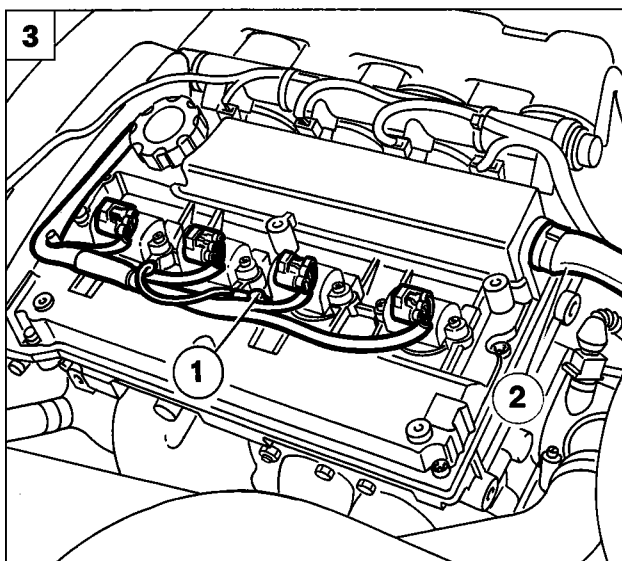
As a further check, refit the dial gauge, detect T.D.C. and check that tools 1860874000 fit on the camshafts, then refit the components removed previously.



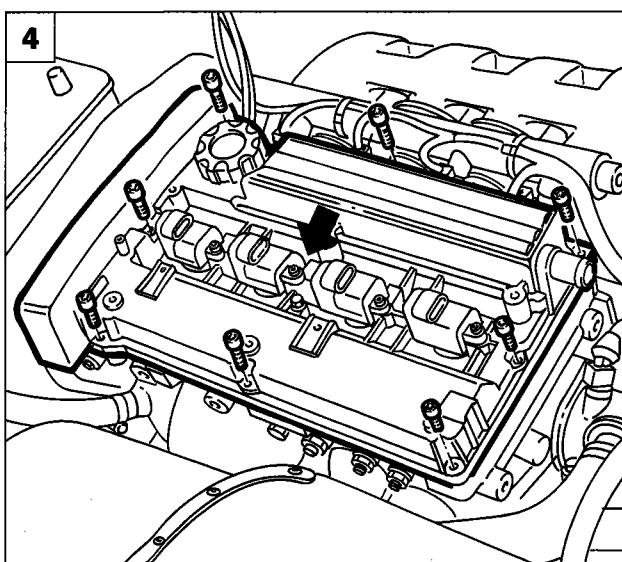
P4A11BX01



P4A11BX03



P4A12BX03



P4A12BX05



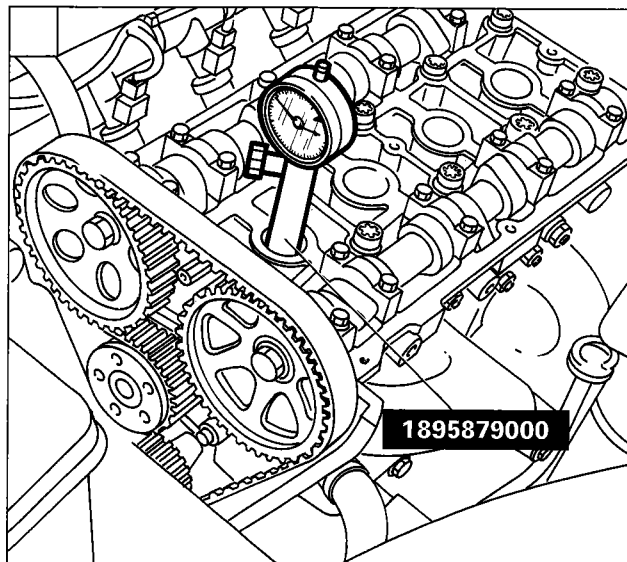
Bravo-Brava 1747 16v

Position the vehicle on a lift, then:

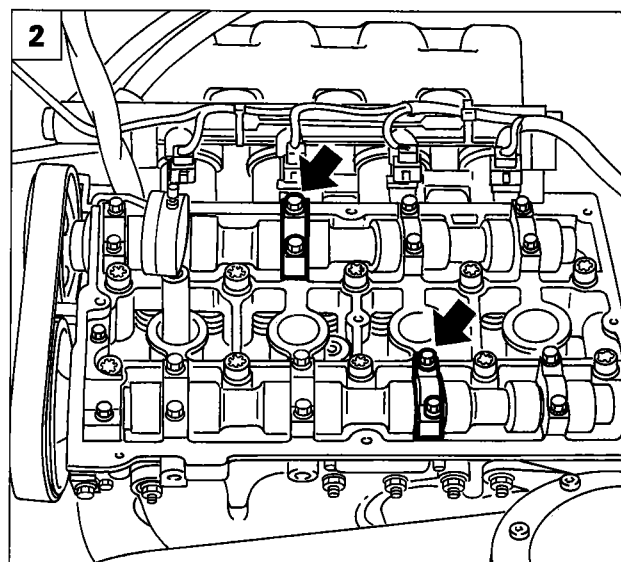


- disconnect the negative battery lead;
- remove the right front wheel;
- remove the right wheel arch liner.

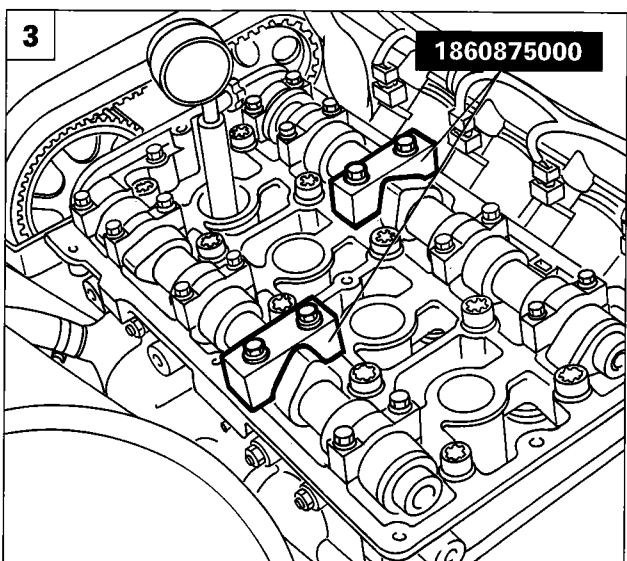
1. Loosen the tension for the auxiliary shaft drive belt acting in an anti-clockwise direction on the centre nut for the automatic tensioning device to release the spring inside the actual device; then fit the belt.
2. Remove the fixed pulley for the auxiliary shaft drive belt, then undo the upper and lower bolts fixing the timing belt shield and remove it.
3. Remove the cover for the ignition coils, disconnect the connections from the coils, the earth cable (1) and the oil vapour recovery pipe from the cylinder head cover.
4. Disconnect the connector from the air conditioning compressor, release the cable and remove the cylinder head cover acting on the fixing bolts shown in the diagram.



P4A13BX02



P4A13BX03



P4A13BX04



1. Remove the spark plugs using a special spanner. Position the dial gauge by cylinder no. 1 using support 1895879000, rotate the crankshaft until T.D.C. is detected.

2. Remove the 2nd cap fixing the inlet side camshaft and the 3rd cap fixing the exhaust side camshaft, as shown in the diagram.



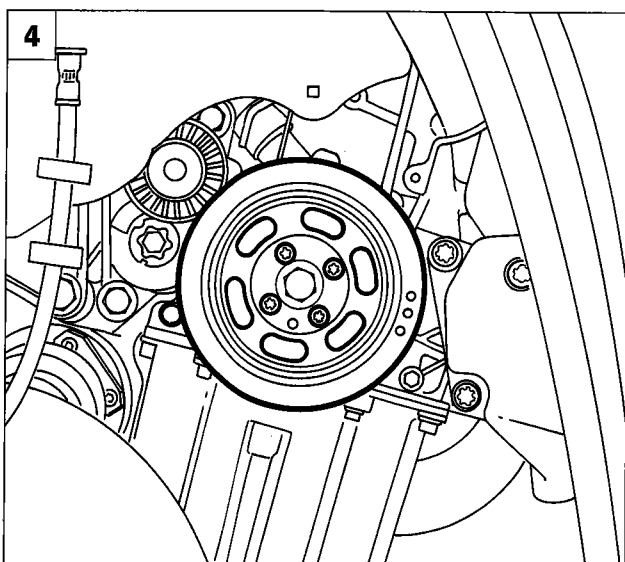
When the camshaft caps are removed, they must be marked so that they can be refitted in the correct position. If this is not the case, there could be problems with the reliability of the camshafts.

3. Position and fix the pair of tools 1860875000 by the previously removed caps.

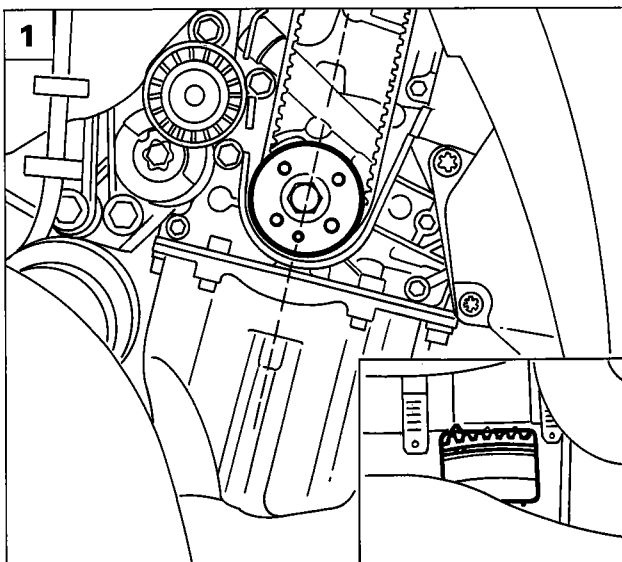


The pair of tools 1860875000 should exact follow the profile of the camshaft cams.

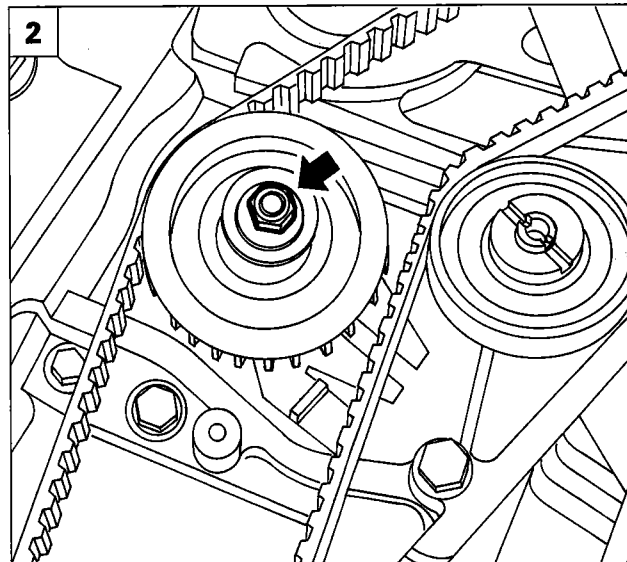
4. Remove the lower gearbox protective cover and place flywheel lock 1860898000 in position. Then remove the damper flywheel (auxiliary shaft drive pulley).



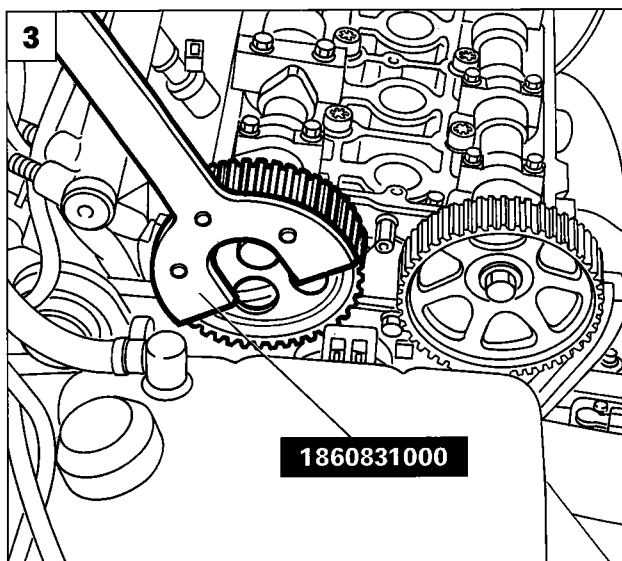
P4A14BX02



P4A14BX03



P4A14BX04



P4A15BX01



1. Check that the centering dowel on the timing drive gear is in line with the engine. Also remove the inspection cover on the bell housing and check that the reference on the fly-wheel coincides with the reference on the actual bell housing.
2. Loosen the timing belt tension acting on the nut shown in the diagram, then remove the actual belt.

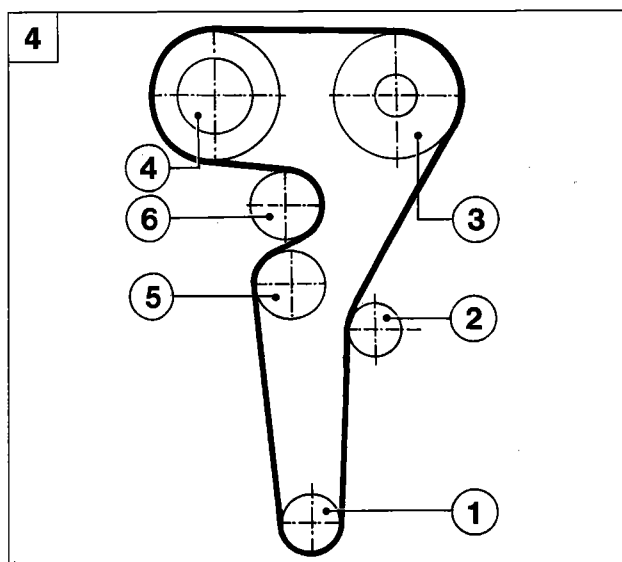
Fitting the timing belt

3. To facilitate the positioning of the timing belt, loosen the bolt fixing the inlet side camshaft pulley and the exhaust side pulley, using tool 1860831000. These pulleys have slots, allowing the correct matching of the belt-pulley.
4. Fit the belt observing the following order:
1. Crankshaft drive pinion - 2. Fixed pulley - 3. Camshaft pulley, exhaust side - 4. Camshaft pulley, inlet side - 5. Automatic tensioner pulley - 6. Water pump pulley.

NOTE The belt should be fitted avoiding any bends at acute angles in not to adversely affect the structure of the actual belt.

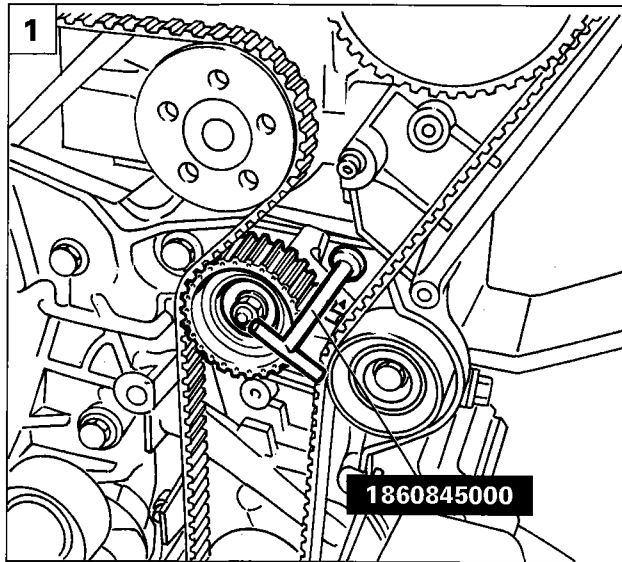


Fit the belt so that the arrow is pointing in the direction of rotation of the engine. There are three reference marks on the belt for fitting during production.

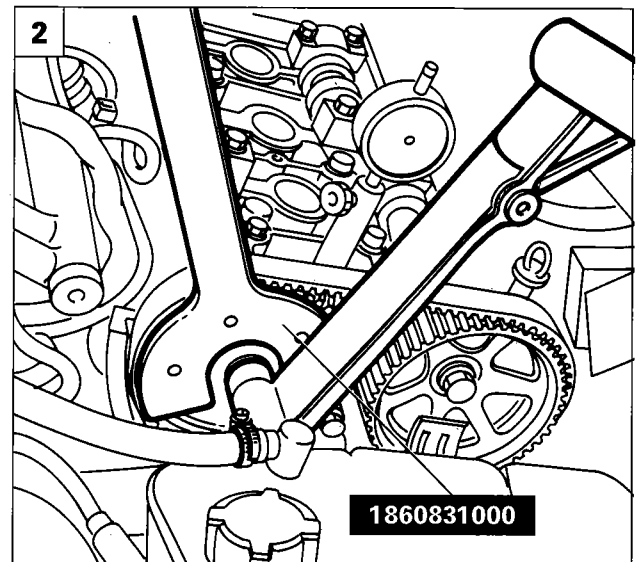


P4A31CA01

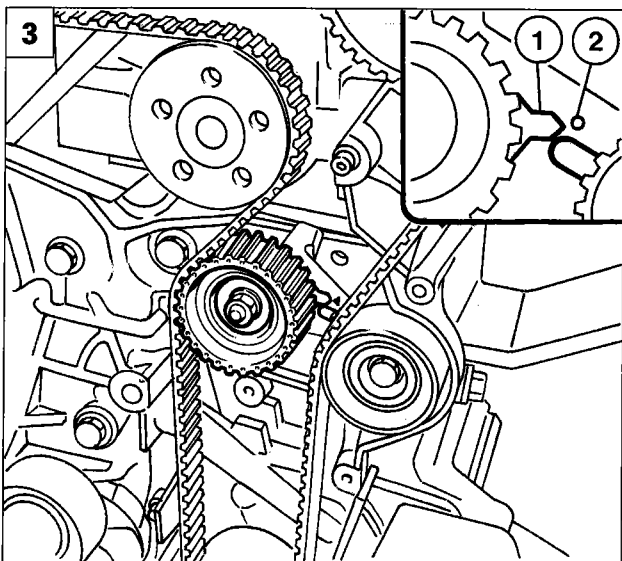
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P4A16BX01



P4A16BX02



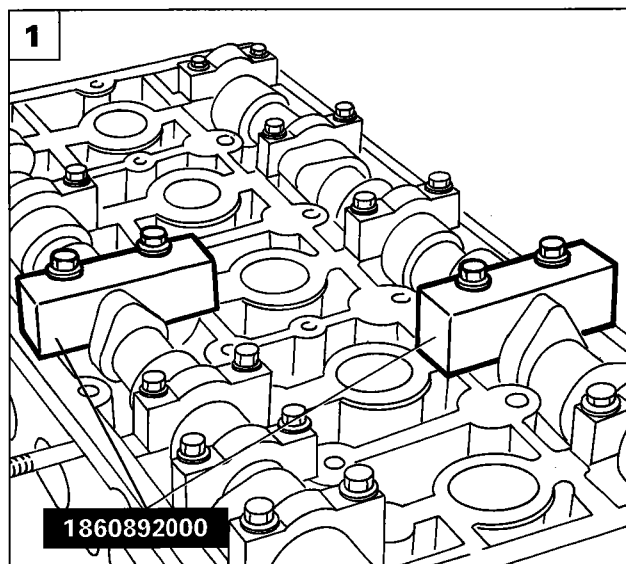
P4A16BX03



Tensioning the timing belt

1. Introduce tool 1860845000 in the opening in the automatic tensioner support; rotate the tool to exert force on the automatic tensioner until it is in the maximum tension position, then tighten the nut fixing the tensioner to the support.
2. Tighten the bolts fixing the inlet side and exhaust side camshaft pulley to a torque of 11.8 daNm using tool 1860831000.
3. Remove the pair of tools 1860875000 and return the camshaft caps (marked during the dismantling) to their correct position and tighten them to a torque of 1.5 daNm. Remove the flywheel lock 1860898000, then rotate the crankshaft through two revolutions in its direction of rotation.

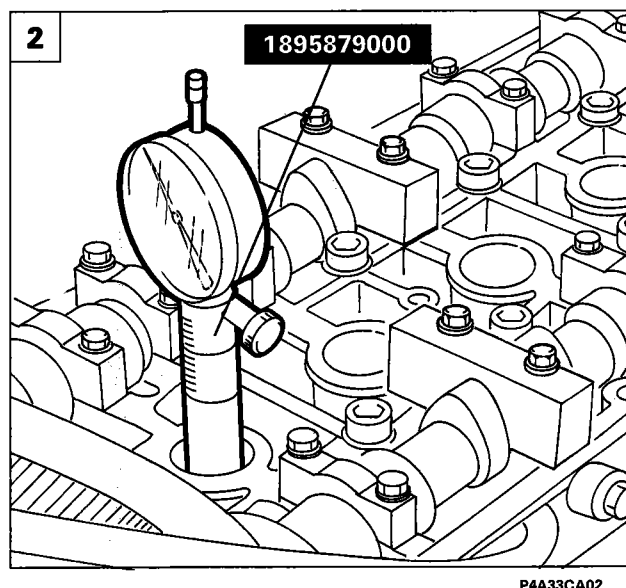
Loosen the belt tensioner fixing nut and, using tool 1860845000, make sure that the moving reference (1) for the belt tensioner coincides with the fixed reference (2) on the crankcase. Tighten the nut fixing the belt tensioner to a torque of 2.5 daNm and proceed with refitting the components removed previously.



Bravo 1998 20v

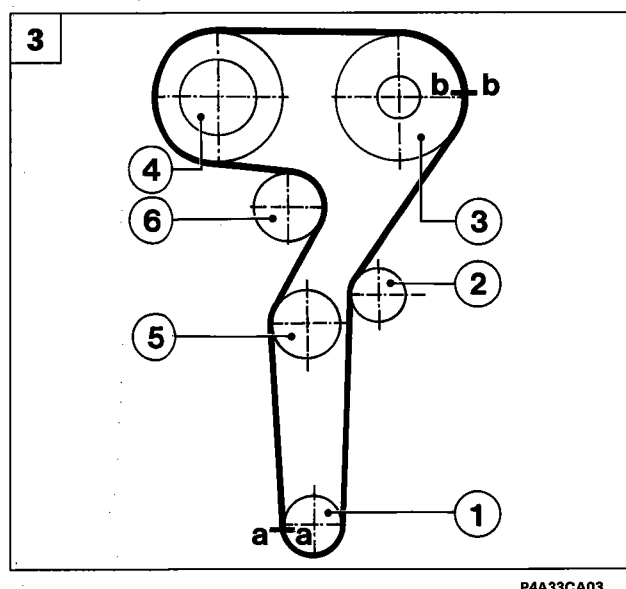
The removing-refitting of the timing drive belt cannot be carried out on the vehicle as there is insufficient space between the timing belt cover and the bodyshell to do so. It must be replaced with the engine at the bench; for more details on the procedure, refer to the instructions in the manual for overhauling this engine type.

1. The camshafts are timed by positioning tools 1860892000 in place of the cap for the 2nd cylinder, exhaust side and the cap for the 3rd cylinder, inlet side.



NOTE The letters "A" and "S" on tools 1860892000 indicate "Aspirazione" and "Scarico" (inlet and exhaust). Make sure when refitting, that the profile on the tools is perfectly in line with the profile of the camshaft caps.

2. To determine T.D.C. for cylinder n° 1, position a dial gauge with tool 1895879000 for support, tightened in place of the spark plug for the first cylinder. Rotate the crankshaft until T.D.C. is reached shown by the dial gauge. Under these circumstances the reference on the crankshaft gear should coincide with the reference on the oil pump cover.

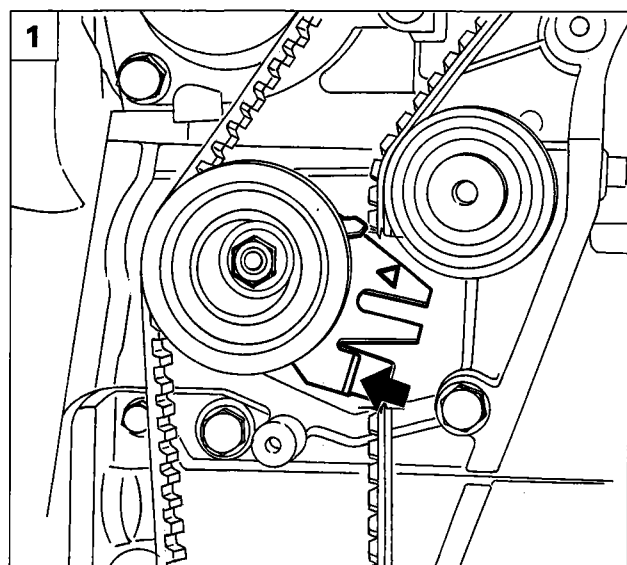


3. With the camshaft pullies slack, fit the belt observing the following order:
 1. Crankshaft gear - 2. Fixed pulley - 3. - Camshaft pulley, exhaust side - 4. - Camshaft pulley, inlet side - 5. Automatic tensioner - 6. Water pump.



There is an arrow on the belt which indicates the direction of rotation of the engine. There are also references used in production for fitting.

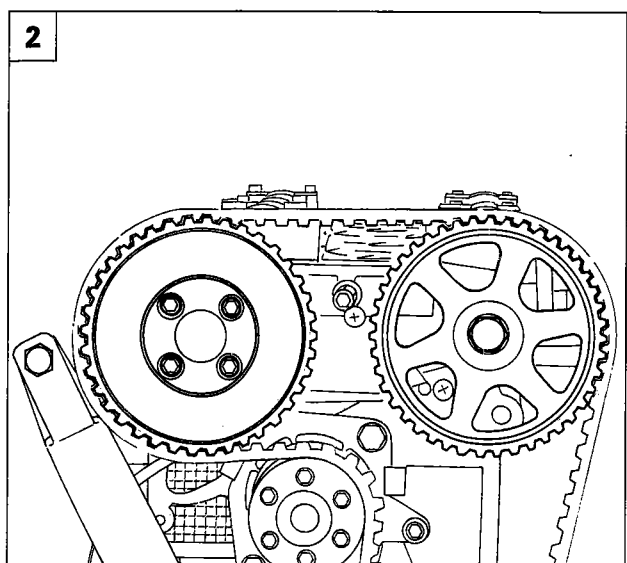
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P4A34CA01

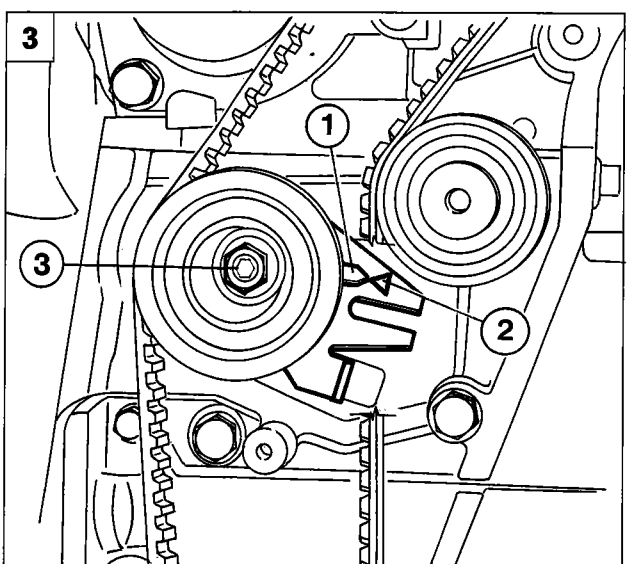


1. Using a screwdriver, apply force to the automatic tensioner tab so that the tensioner is in the maximum tension position, then tighten the nut fixing the tensioner to the support.



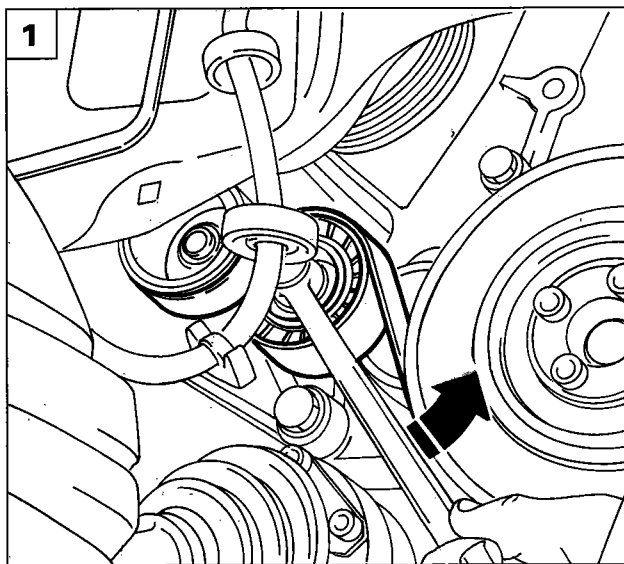
P4A34CA02

2. Using spanner 1860831000, torque tighten the inlet and exhaust side pullies to the recommended figures. Remove the tools positioned for timing and locking the camshafts and rotate the crankshaft through two revolutions in its direction of rotation.

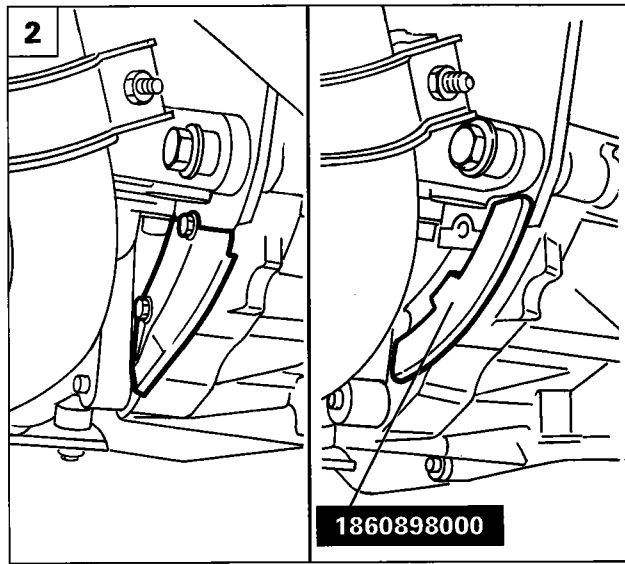


P4A34CA03

3. Loosen the nut fixing the tensioner and ensure that the moving reference on the tensioner (1) coincides with the fixed reference (2), then tighten the nut fixing the tensioner to torque and proceed with the refitting of the components removed previously.

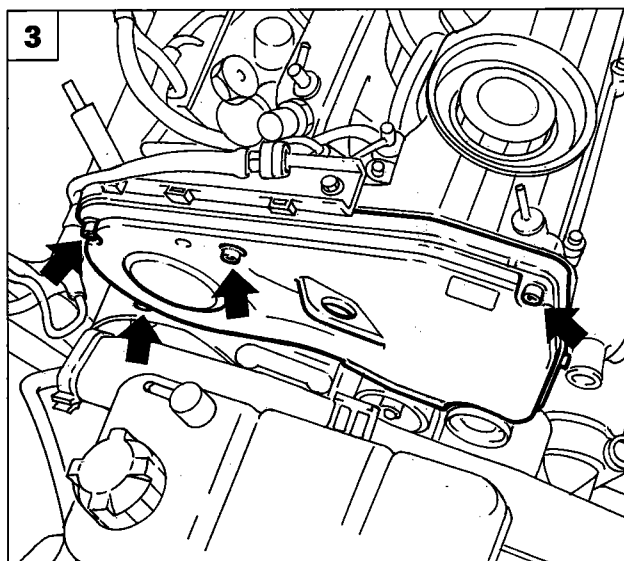


P4A35CA01

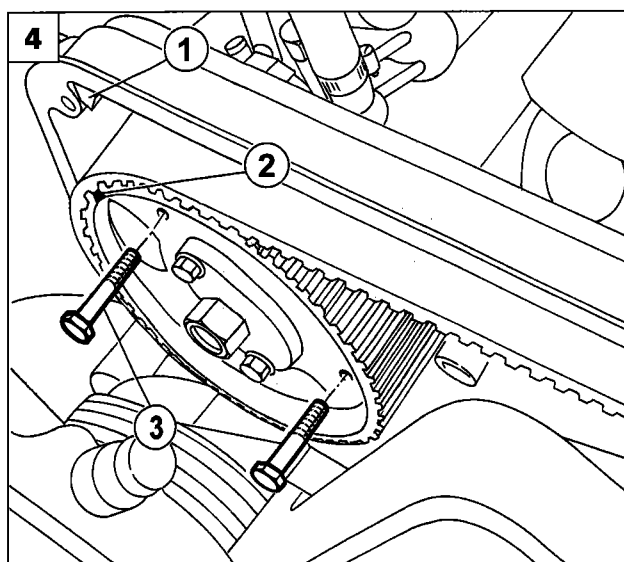


P4A35CA02

P4A35CA03



P4A35CA04



P4A35CA05



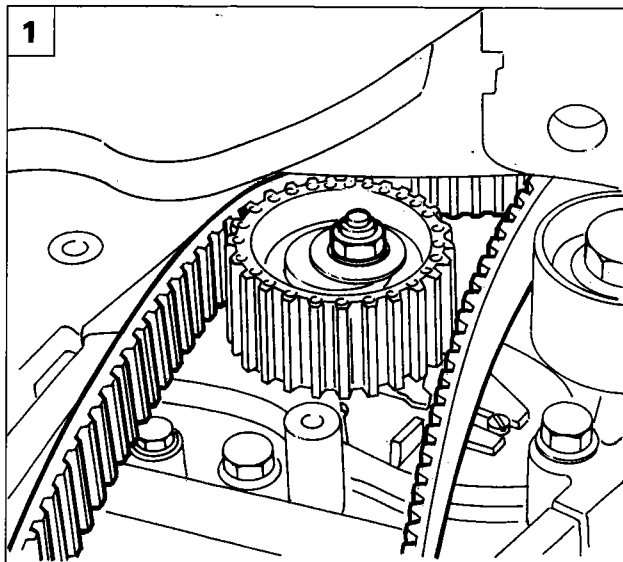
Bravo-Brava 1910 TD 75 e 100

Position the vehicle on a lift, then:

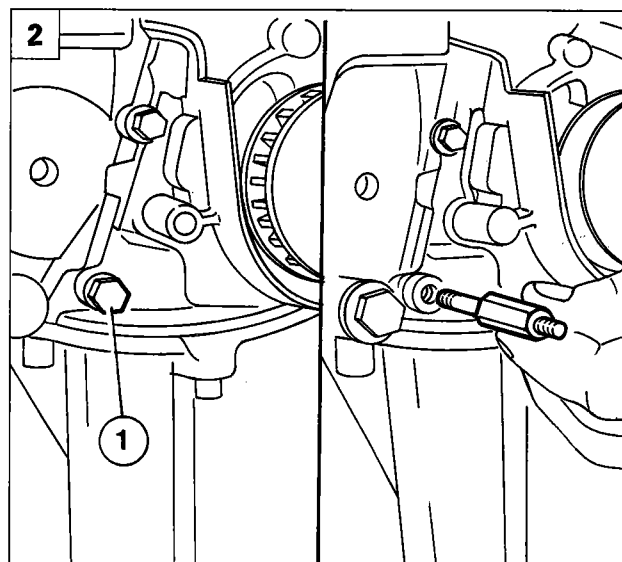
- disconnect the negative battery lead;
- remove the right front wheel;
- remove the right wheel arch liner.

1. Rotate the device tensioning the auxiliary shaft drive belt in the direction shown by the arrow, slacken the belt tension and remove it.
2. Remove the lower shield for the engine compartment, undo the bolts for the gear-box shield and position the flywheel lock 1860898000. Then remove the damper flywheel (auxiliary shaft drive pulley).
3. Remove the lower shield for the timing belt; remove the reaction connecting rod complete with mounting bracket near the upper timing belt shield, then remove the latter as well.
4. For the 1910 TD 75 version, check that the injection pump timing is correct by making sure that references (1) and (2) illustrated are in line, then lock the pulley in position using the service bolts (3) inserted in the special housings in the actual pulley.

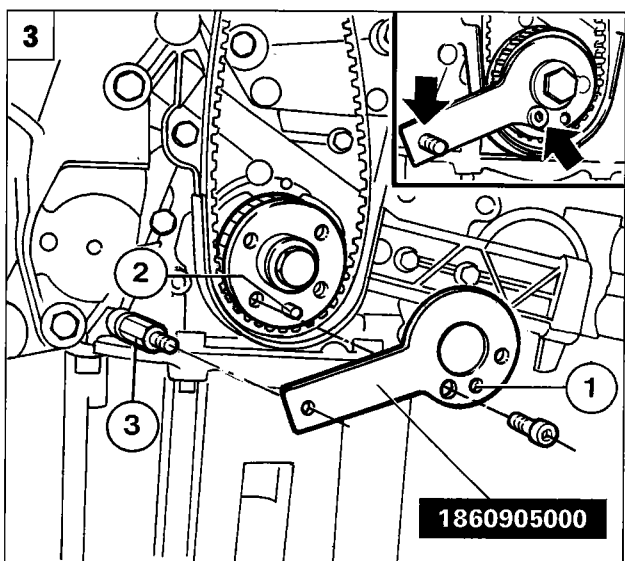
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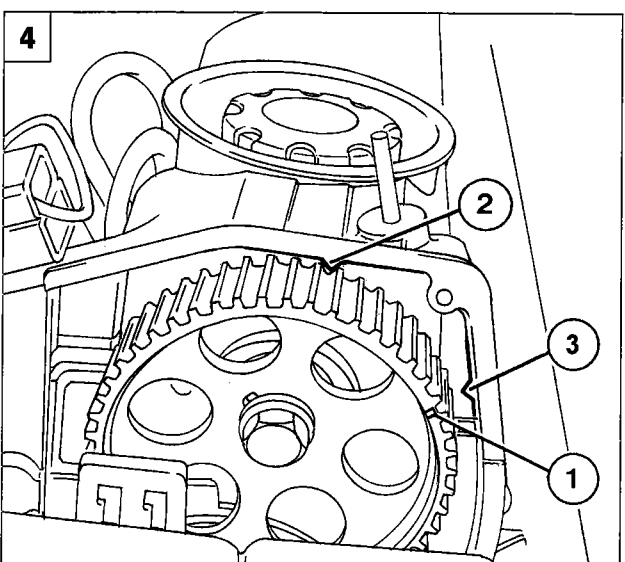
P4A36CA01



P4A36CA02



P4A36CA03



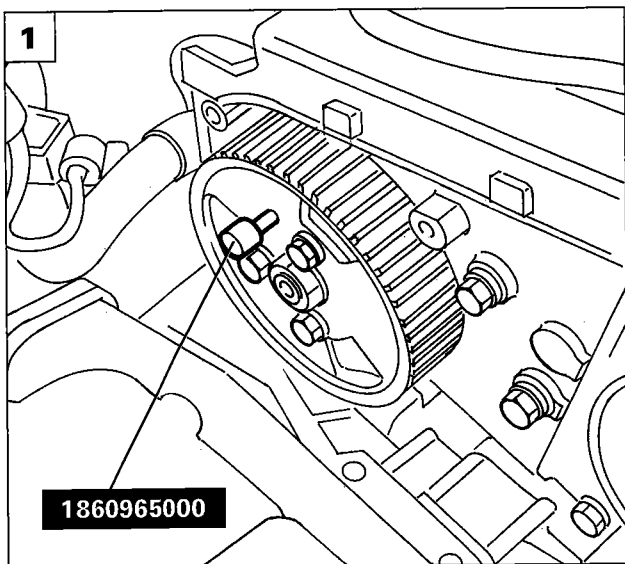
P4A13GX04

1. Loosen the nut illustrated for the tensioning device, release the belt tension, then remove it.

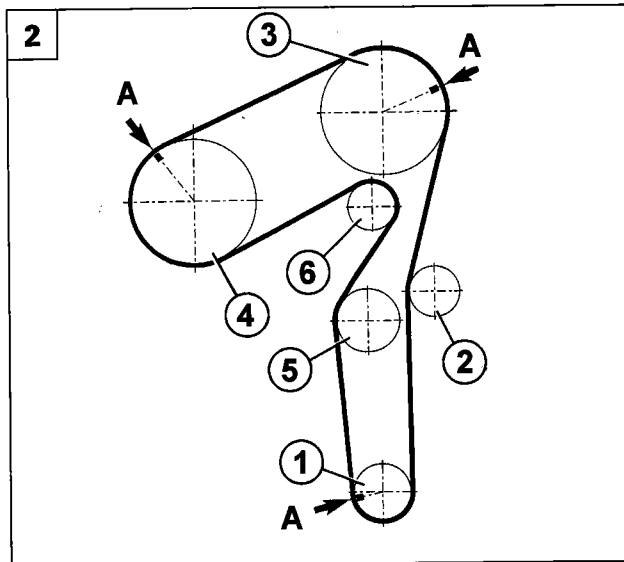
Refitting and tensioning the timing belt

2. Remove the bolt (1) illustrated fixing the oil pump; place the pin for tool 1860905000 in place of the bolt. Then fit the timing belt on the crankshaft gear only.
3. Position tool 1860905000 on the crankshaft gear and on the pin (3); rotate the crankshaft using small movements until the dowel (2) is matched up with the opening (1). In this position cylinder no. 1 is at T.D.C.
4. Using tool 1860831000, rotate the camshaft pulley until the following alignments are achieved:
 - up to engine n° 416499
the reference (1) on the pulley should have moved 7 teeth (in a clockwise direction) in relation to the reference (2) on the tappet cover.
 - from engine n° 416450
the reference (1) on the pulley should be aligned with the reference (3) on the tappet cover.

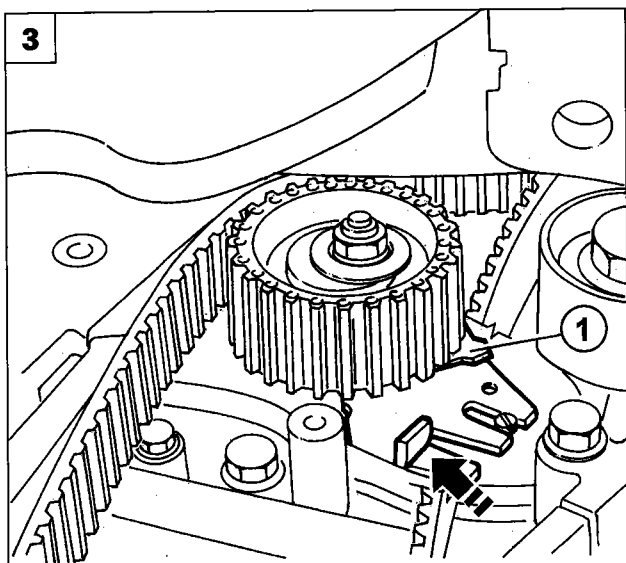
NOTE The timing is correct when, with piston n° 1 at T.D.C., the reference (1) is in the position shown in the diagram (for engines up to n° 416449 the exact position of the reference can vary $\pm 3^\circ$ engine or $\frac{1}{2}$ point).



P4A37CA01



P4A37CA02



P4A14GX02



1. For the 1910 TD 100 version, loosen the bolts fixing the injection pump pulley and rotate it until pin 1860965000 can be inserted at the point shown.

2. Complete the fitting of the timing belt observing the following order:

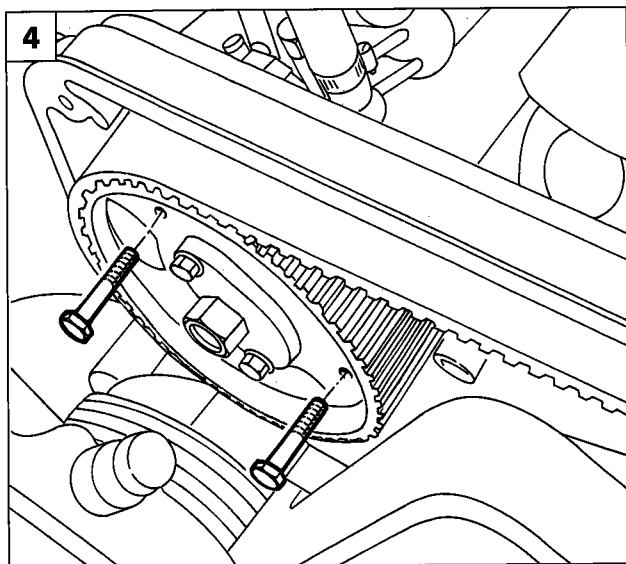
1. Crankshaft gear
2. Fixed pulley
3. Timing pulley
4. Injection pump pulley
5. Automatic tensioner
6. Water pump

For all the pre and post modification engines the new belt can be fitted and timed by following the alignment of the transverse references (A) on the back of the timing belt and the references on the pulleys.

NOTE *Fit the belt so that the arrow is pointing in the direction of rotation of the engine.*

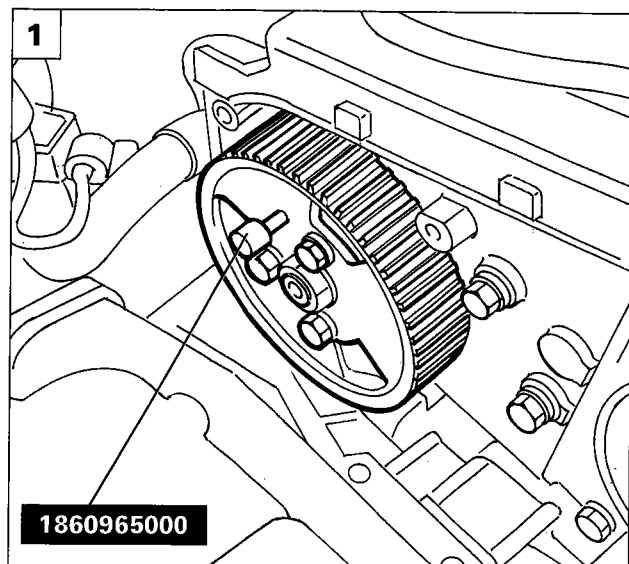
3. Exert force at the point shown on the automatic tensioner placing the tensioner moving reference (1) in the maximum tension position, then lock the belt tensioner fixing nut.

4. For the 1910 TD 75 version, release the injection pump drive pulley by undoing the three bolts positioned previously.



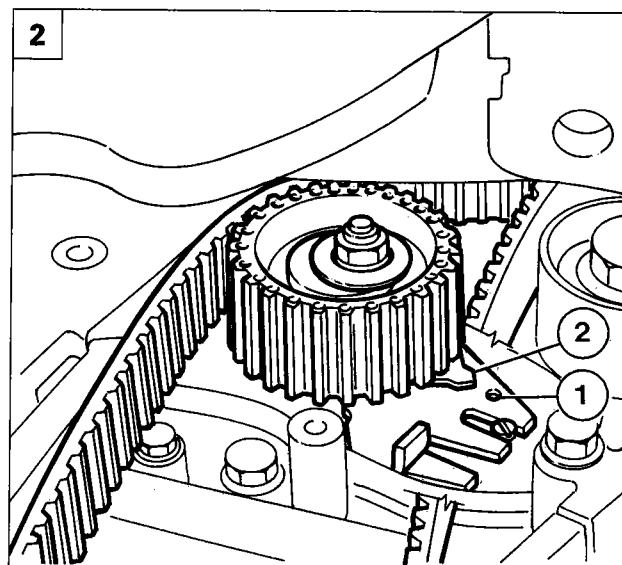
P4A14GX03

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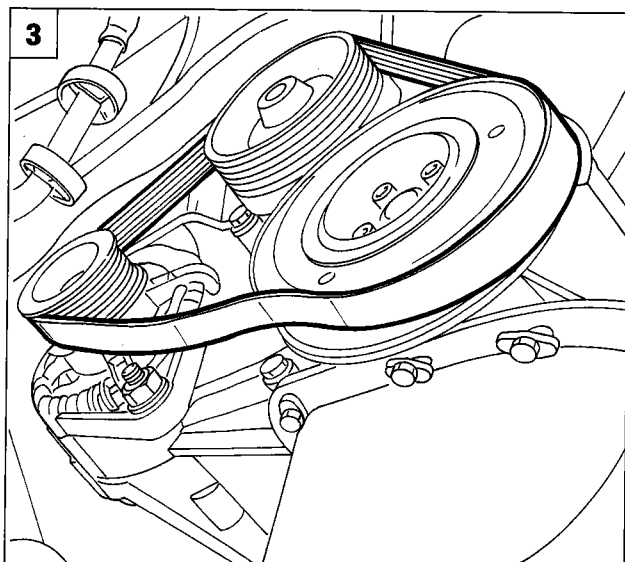
P4A38CA01

1. For the 1910 TD 100 version, fix the injection pump pulley tightening the fixing bolts to the recommended torque and removing pin 1860965000 from the housing.



P4A38CA02

2. Rotate the crankshaft through two revolutions in its normal direction of rotation, release the nut fixing the tensioner and make sure that the fixed reference (1) on the tensioner support coincides with the moving reference (2) for the belt tensioner. Lock the tensioner fixing nut and then tighten it to the recommended torque. Proceed with refitting the components previously removed reversing the order of the operations described previously.



P4A10EX02

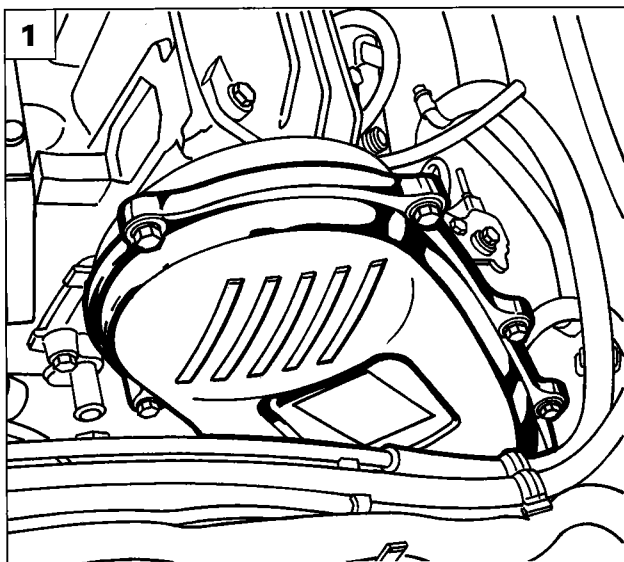


Bravo-Brava 1929 D

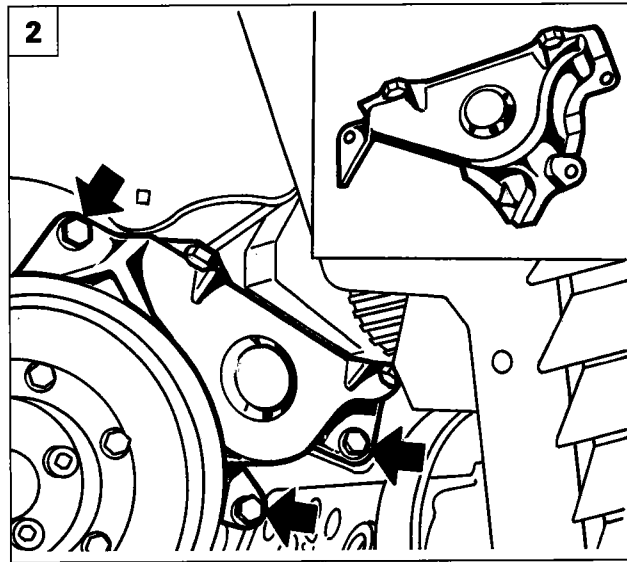
Position the vehicle on a lift, then:

- disconnect the negative battery lead;
- remove the right front wheel;
- remove the right wheel arch liner.

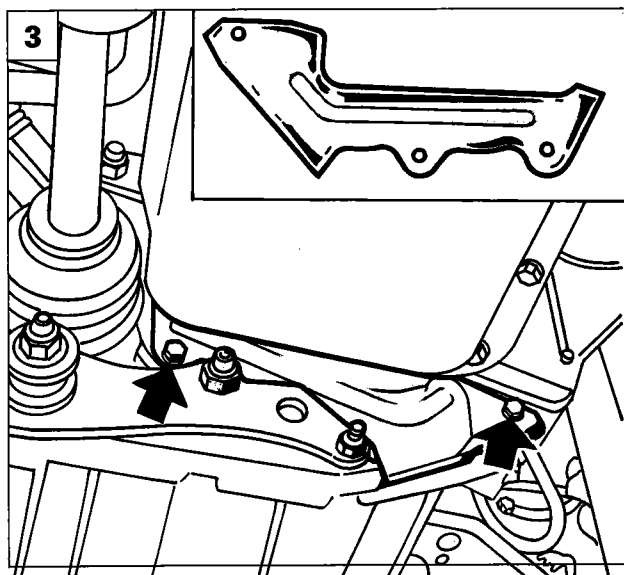
3. Remove alternator drive belt acting on the fixing bolts and the adjustment screw. If the vehicle is equipped with air conditioning, remove the air conditioning compressor drive belt from the damper flywheel.



P4A11EX01



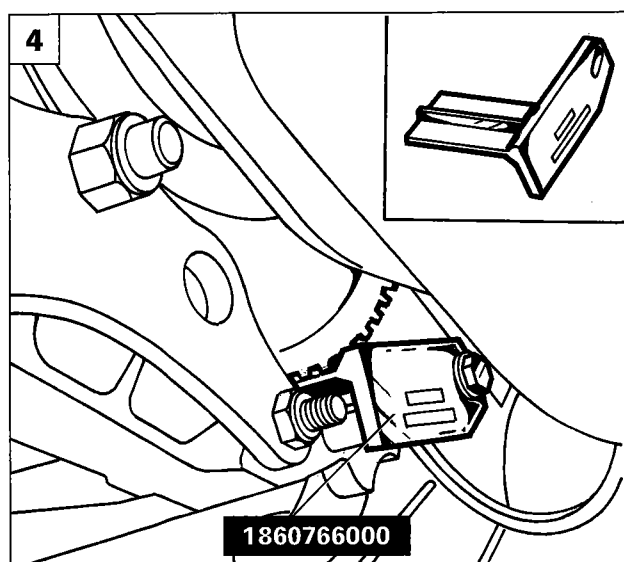
P4A11EX03



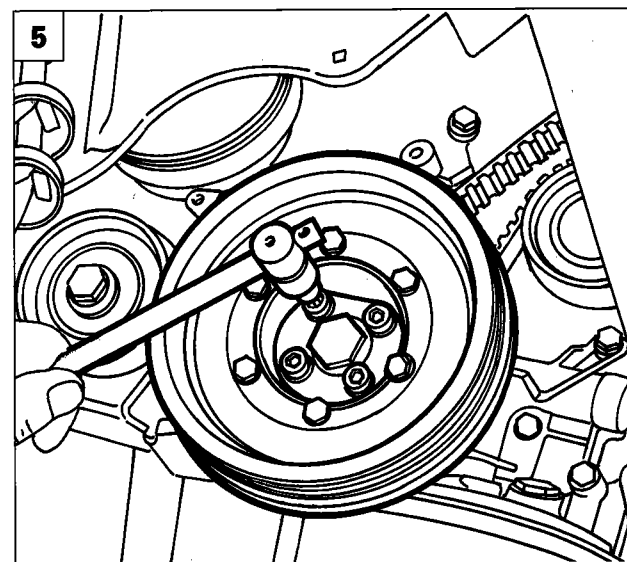
P4A11EX04



1. Remove the upper protective cover for the timing drive belt; if necessary, release the mounting brackets for the engine cooling system pipes.
2. Remove the lower timing belt cover.
3. Remove the lower flywheel shield from the bell housing.
4. Place flywheel lock 1860766000 in position to prevent the rotation of the crankshaft.
5. Remove the damper flywheel, then remove the flywheel lock 1860766000.

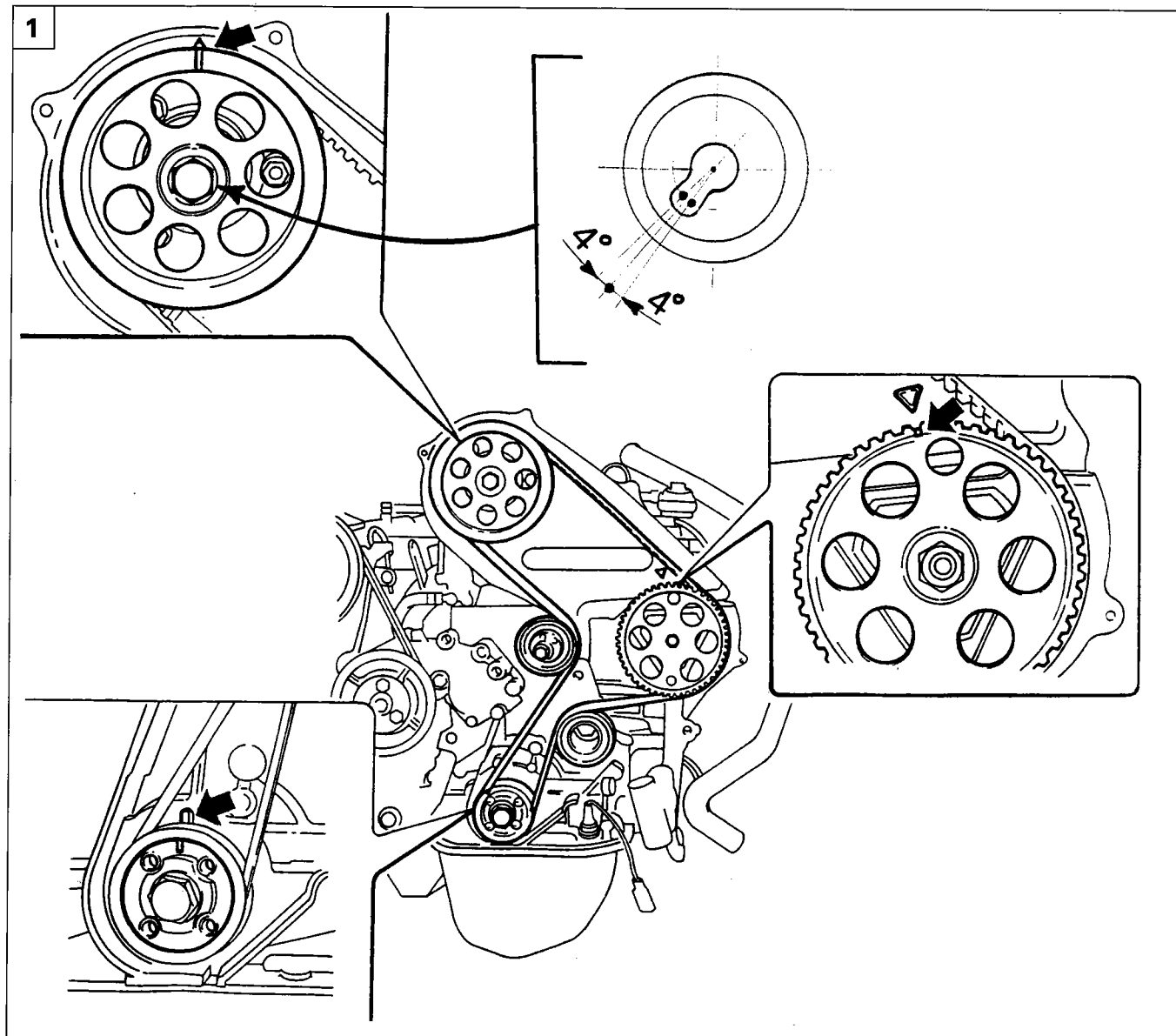


P4A12EX03

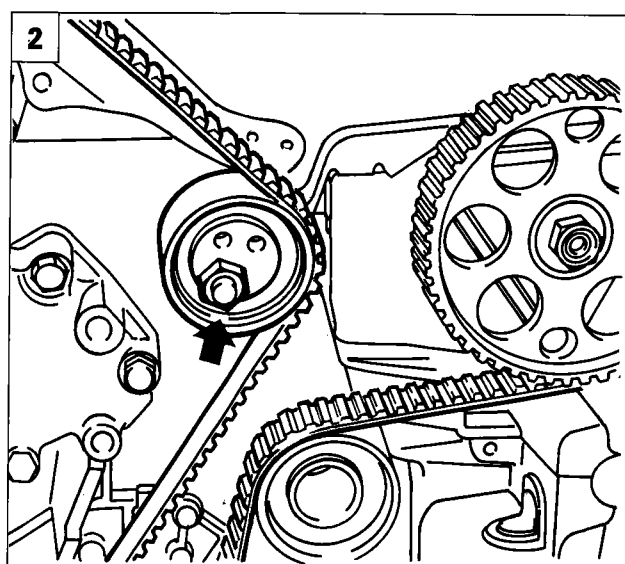


P4A12EX04

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P4A40CA01



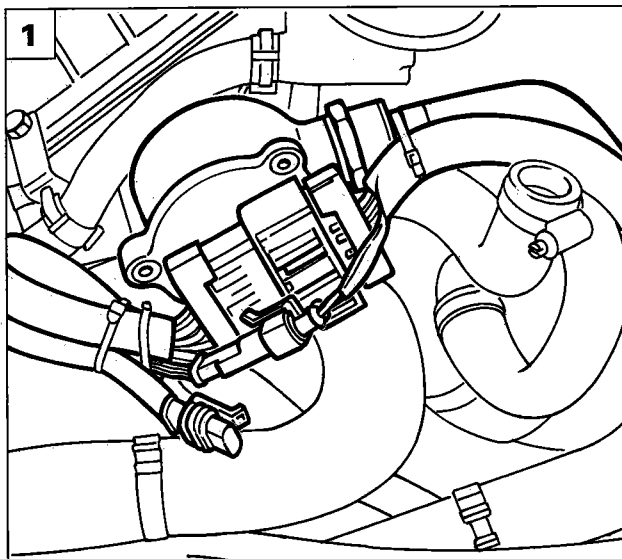
P4A40CA02



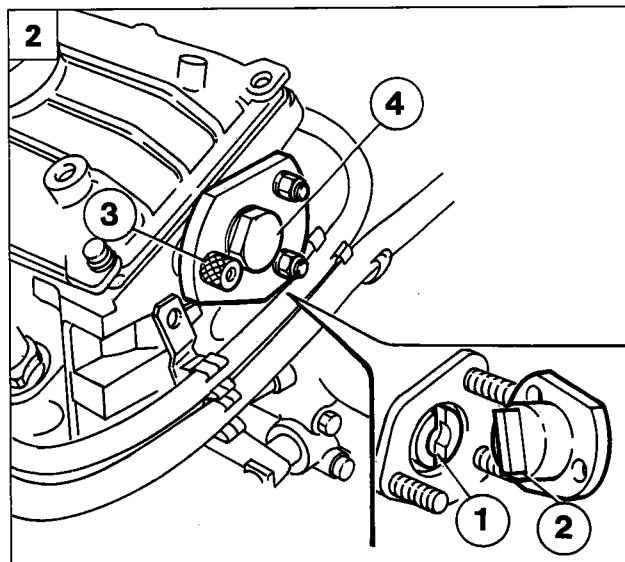
1. Rotate the crankshaft in its normal direction of rotation until the references on the crankshaft pulley and the injection pump drive pulley are in line with the fixed references on the engine. Cylinder no. 1 will be at T.D.C., under these circumstances and the camshaft will be timed for the explosion stroke in cylinder no. 1.

NOTE The fixing opening for the camshaft drive pulley has a slot on account of which under these circumstances the reference on it should not coincide exactly with the fixed reference on the cover.

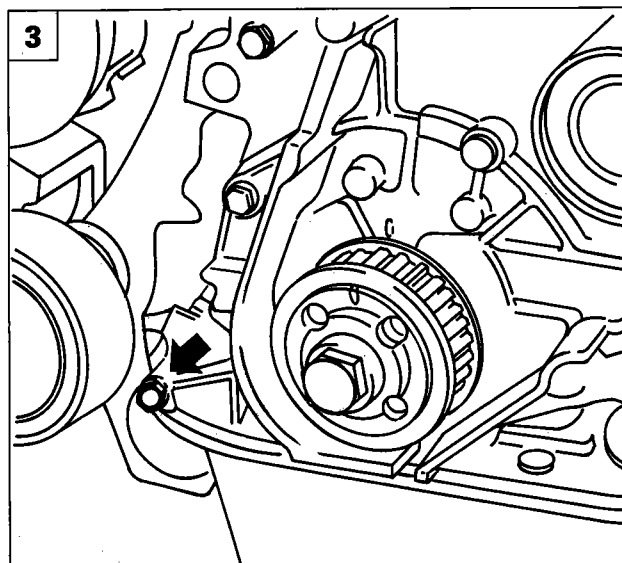
2. Loosen the belt tensioner nut, then remove the timing drive belt.



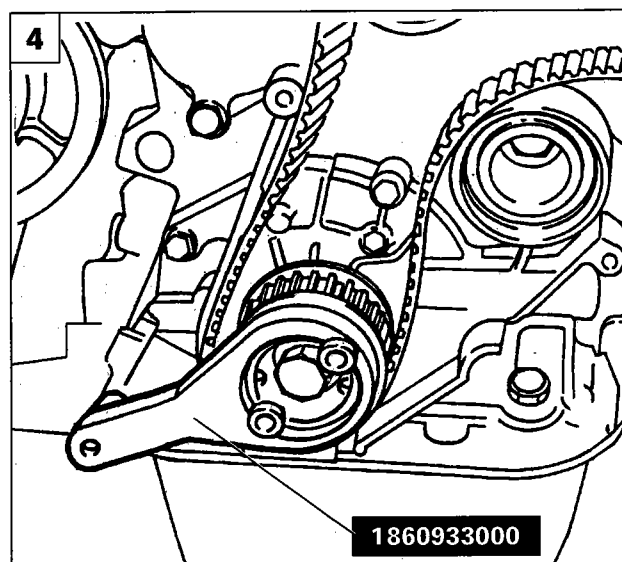
P4A41CA01



P4A41CA02



P4A41CA03

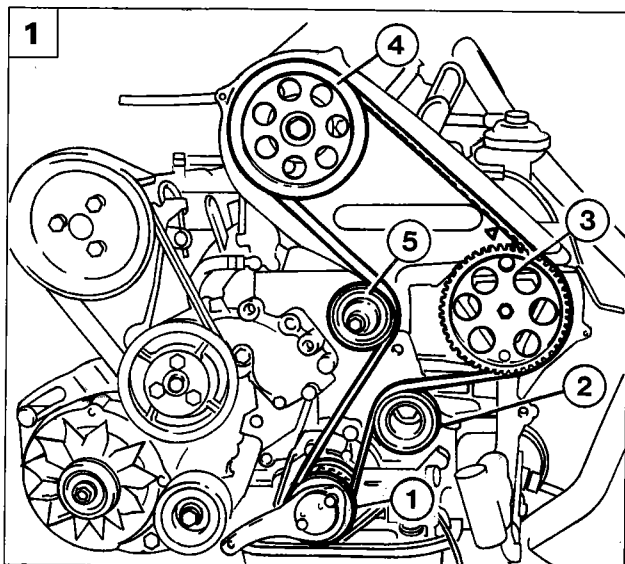


P4A41CA04



1. Move the connections and the cables shown in the diagram aside, then undo the nuts fixing the brake servo vacuum pump to the cylinder head and remove it.
2. Position tool 1860934000 for timing the camshaft, matching the splining (1) for the camshaft with the projection (2) on the tool.
Fix the tool to the cylinder head placing the centering dowel (3) as illustrated in the diagram. The dowel should be perfectly centered on the tool; if it is not, use a spanner (4) to centre the dowel on the tool using extremely small movements.
3. Remove the bolt shown in the diagram which fixes the front cover to the crankcase. Then fit the timing drive belt on the crankshaft drive gear only.
4. Position tool 1860933000 for accurately determining T.D.C. for cylinder no. 1. The tool should be perfectly fixed to the crankshaft drive gear using two bolts and using another bolt to the crankshaft front cover (for the bolt removed previously). Then loosen the bolt fixing the camshaft drive pulley using tools 1860831000 and 1860848000.

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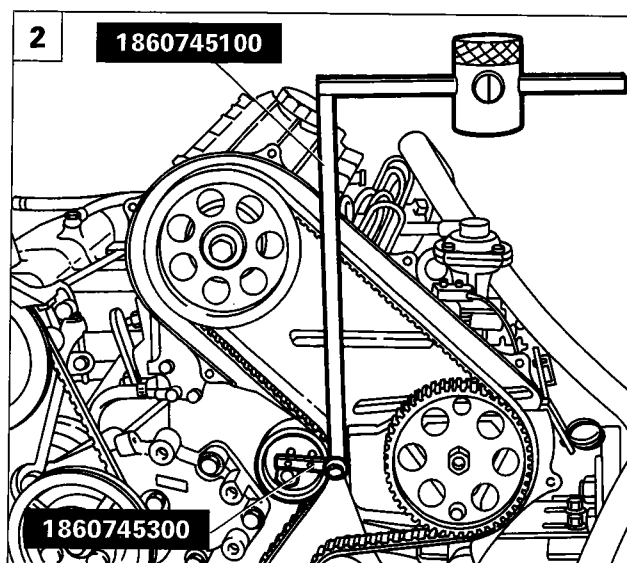
Fitting and tensioning the timing drive belt

1. Complete the fitting of the timing belt observing the following order:

- Crankshaft gear;
- fixed pulley;
- injection pump pulley;
- timing pulley;
- belt tensioner.



Check that the reference on the injection pump corresponds with the fixed reference on the rear cover.



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2. Fit part 1860745300 on tool 1860745100, the position the weight with the knurled part 120 mm away on the millimetric rod and lock it in place.

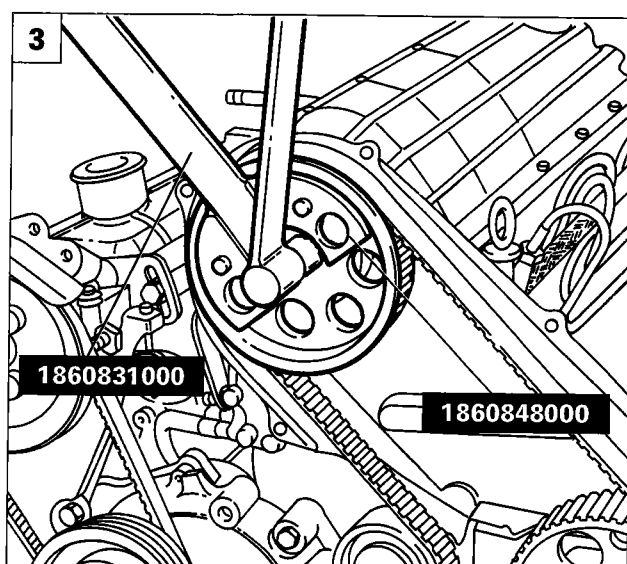
Fit the tool produced in this way on the belt tensioner as illustrated in the diagram and, acting on the joint, position the millimetric rod on the horizontal plane and lock the joint fixing bolt.

3. Tighten the bolt fixing the camshaft drive pulley to the recommended torque. Remove the tools positioned previously for determining the timing and T.D.C. and the flywheel lock.

Let the belt bed in by rotating the crankshaft through two revolutions in its direction of rotation and tighten the nut fixing the belt tensioner to torque, then remove the tools used for the tensioning.

NOTE *During this last phase the millimetric rod may move away from the horizontal plane; if this is the case, the joint must be adjusted again and the operation repeated.*

Refit the previously removed components reversing the procedure described for the removal.



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20 REPLACE SPARK PLUGS AND CHECK LEADS

The cleanliness and condition of the spark plugs are critical for the efficiency of the engine and containing pollutant emissions. The following types of spark plug are fitted:

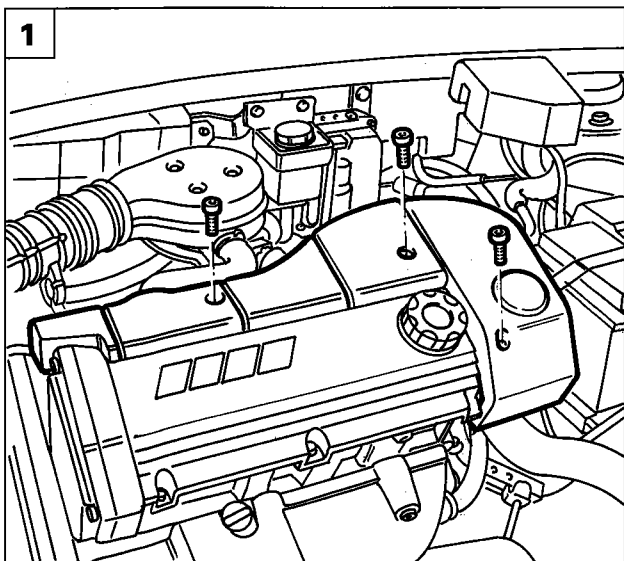
	Spark plug type
1370 12v 1581 16v	Champion RC8BYC Golden Lodge 2HLDR NGK BKR6EKC
1747 16v	Fiat 7GBMSR Champion RC7BMC Champion RC8BYC Golden Lodge 2HLDR NGK BKR6EKC
1998 20v	Fiat 7GBMSR Champion RC7BMC



Only use recommended type spark plugs: if the heat rating is insufficient or not guaranteed for the correct period, problems can arise.

Also check the condition of the supply cables making sure that there are no cuts, cracks or restrictions along the entire length.

NOTE Carry out the following operations with the engine cold.

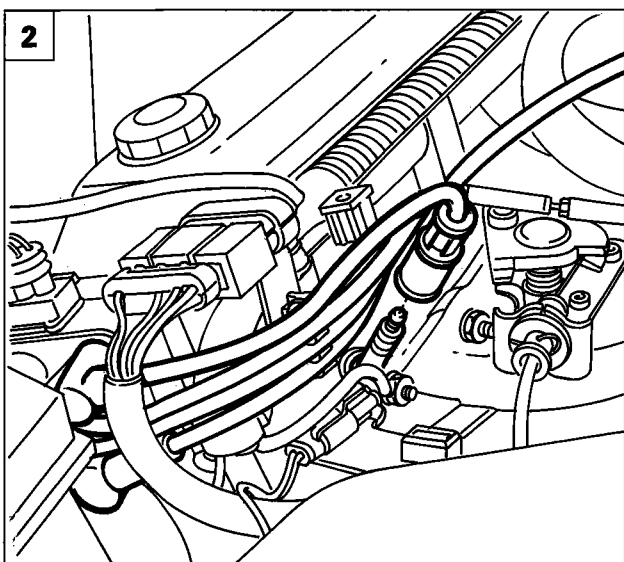


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Bravo-Brava 1370 12v

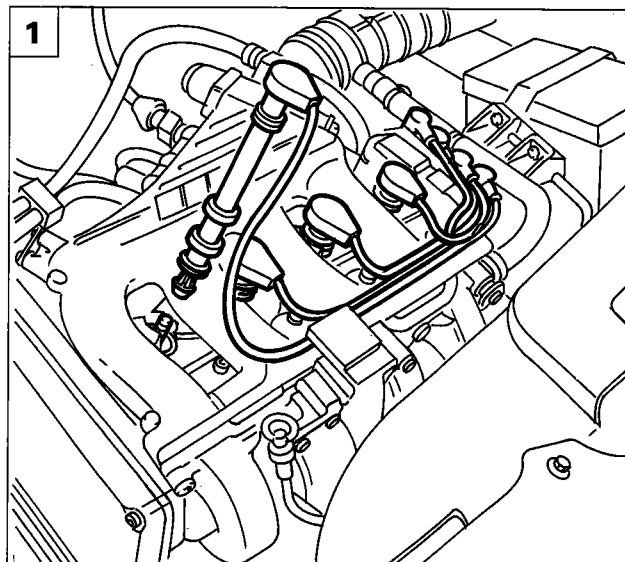
1. Remove the cylinder head shield shown in the diagram.



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2. Disconnect the H.T. leads from the spark plugs taking great care when extracting the boots and remove and replace the spark plugs using an appropriate spanner.

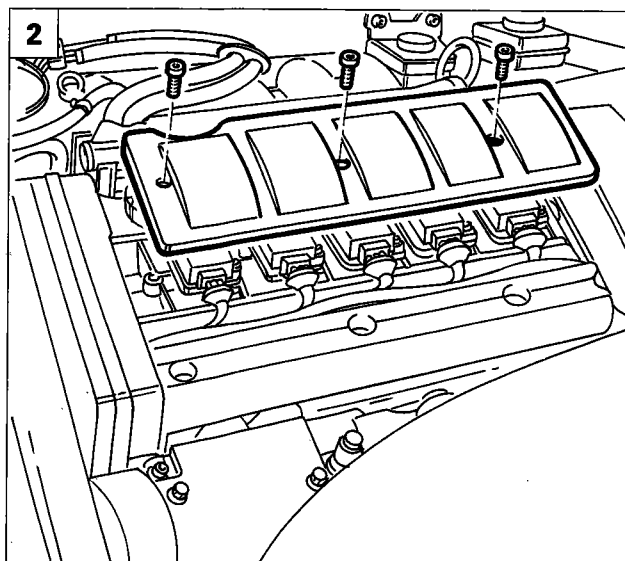
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Bravo-Brava 1581 16v

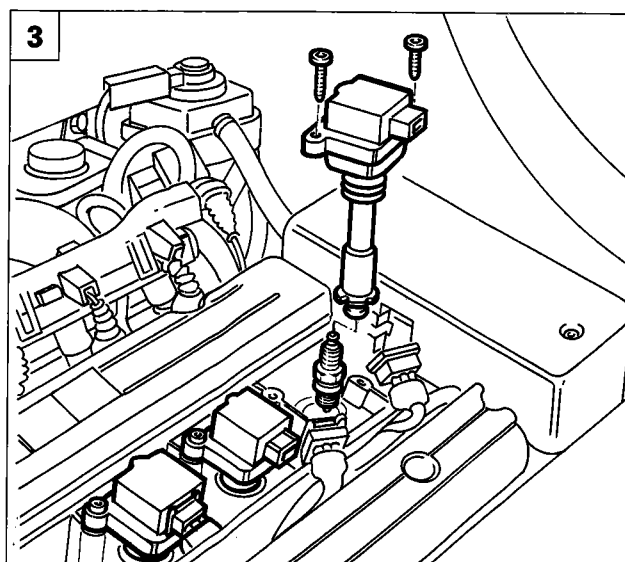
1. Disconnect the H.T. leads from the spark plugs taking great care when extracting the boots and remove and replace the spark plugs using an appropriate spanner.



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Bravo-Brava 1747 16v - 1998 20v

2. Remove the cover for the ignition coils, then disconnect the supply connectors.



P4A44CA03

3. Remove the ignition coils acting on the fixing bolts; undo the spark plugs using a special spanner and proceed with replacing them.

21 CHECK OPERATION OF ENGINE CONTROL SYSTEMS (using the autodiagnostic socket)

A complete electronic fault diagnosis of the injection/ignition system can be carried out by connecting the Fiat/Lancia Tester or the SDC or Examiner stations to the diagnostic socket.

The system is also equipped with an autodiagnostic function which recognizes, memorizes and signals any failures.

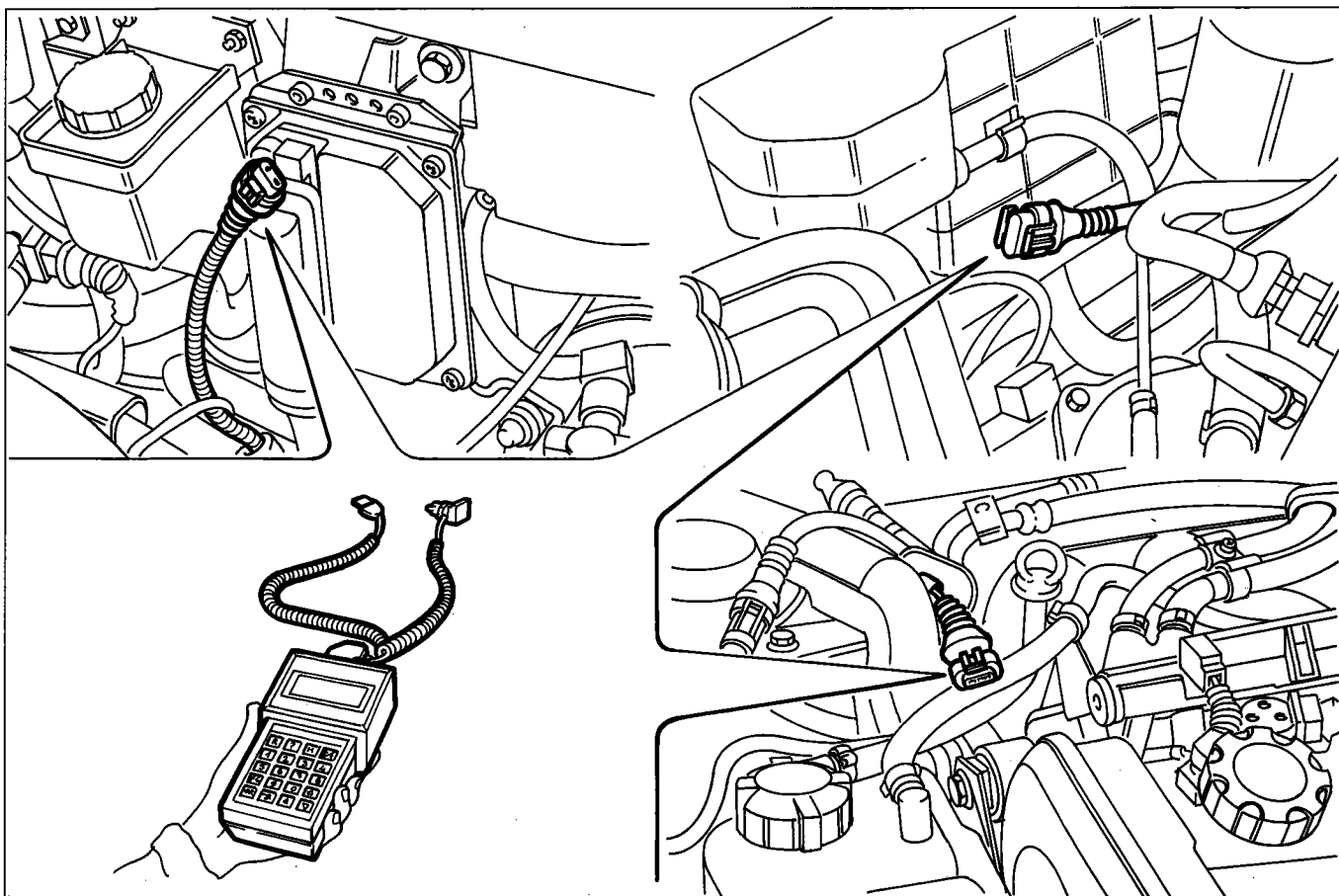
If a fault is detected and confirmed it is permanently memorized and the relevant sensor is excluded from the system until it is repaired.

When a fault is detected and confirmed the warning light in the dashboard usually comes on: when the fault is repaired the light goes out.

Working with the Fiat/Lancia Tester or the SDC or the Examiner it is possible to carry out a complete system fault diagnosis which consists of three stages:

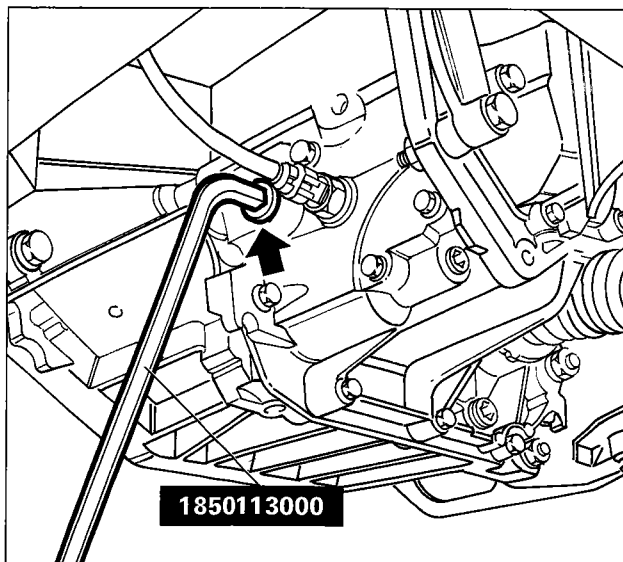
1. display of a series of functional parameters;
2. display of the errors or their cancelling;
3. activation of certain actuators (active diagnosis).

Unlike the Fiat/Lancia Tester, the SDC and Examiner equipment use a "touch screen" type display which is easy to use and can display several parameters simultaneously; a single CD ROM, which can be periodically updated, makes it possible to carry out fault diagnosis for electronic systems on all Group vehicle models. Also, if connected to a printer, the results of the fault diagnosis can be certified. In addition to the diagnostic functions these pieces of equipment have powerful integrated measuring instruments.



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22 CHECK GEARBOX/DIFFERENTIAL OIL LEVEL

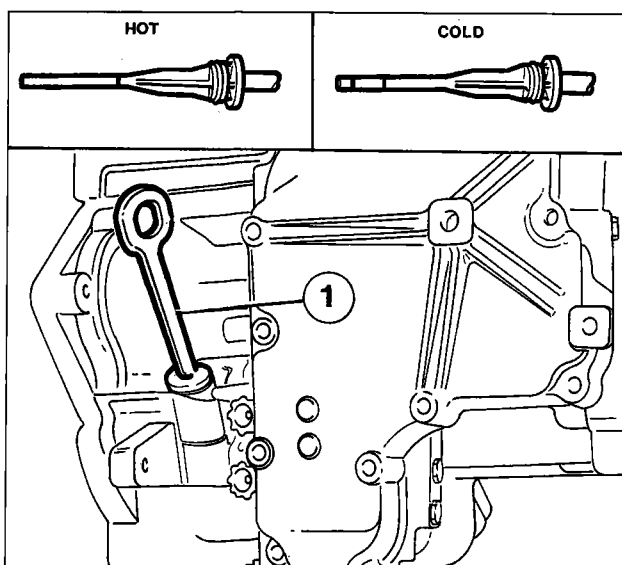


Position the vehicle on a lift. Undo the filler plug and check that the level of the oil is below the lower edge of the opening.

If necessary, top up until the correct level is restored.

Retighten the filler plug tightening it to a torque of 4.6 daNm.

23 CHECK AUTOMATIC GEARBOX OIL LEVEL (Bravo-Brava 1581 16v)



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NOTE The gearbox oil level should be checked with the engine and the gearbox at normal operating temperature (gearbox oil temperature: 70 - 80°C), on account of which the vehicle must be driven for a suitable length of time before the check.

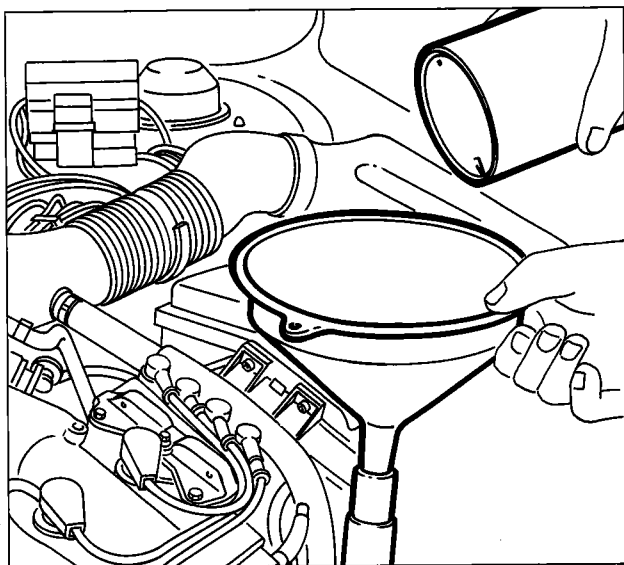
Proceed with checking the gearbox oil level by carrying out the following operations:

- park the vehicle on a flat surface and apply the handbrake;
- with the engine idling, gently move the selector lever from position P to position 1, then return it to P;
- extract the oil dip stick (1) and clean it again;

- completely insert the dip stick in its housing;
- extract the dip stick once again and check the the level of the oil is between the two reference on the side of the rod marked HOT.



If the check takes place with the temperature of the gearbox oil low, check that the level of the oil is between the reference on the side of the dip stick marked COLD. If possible, check the level again with the oil at the correct temperature (70 - 80 °C).

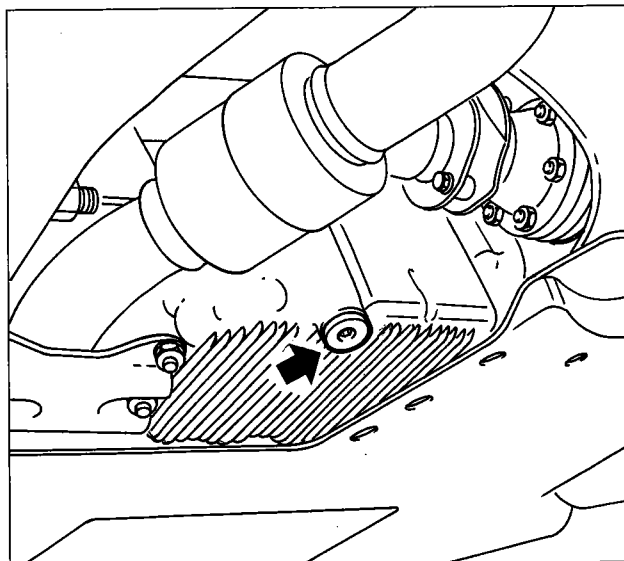


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If the oil level is low, notify the Customer of any leaks or seepage and the need to solve the problem. If refilling is necessary, extract the dip stick and, using a clean container in order not to contaminate the oil, pour in the necessary quantity of gearbox oil. Then recheck the level using the dip stick and check that there are no leaks from the drain plug.

Recommended gearbox oil: TUTELA GI/2

Periodic replacement: 3 litres (2.7 kg)



P4A47CA02

24 25 CHANGE ENGINE OIL AND FILTER

- With the engine hot remove oil filler plug;
- remove the engine oil dip stick.



With the engine warm, work very carefully inside the engine compartment because there is a danger of being scalded. Remember that, with the engine hot, the fan may start working with the danger of injury.

- Raise the vehicle, remove the engine compartment lower shield and undo the drain plug and completely drain the oil into a suitable container.

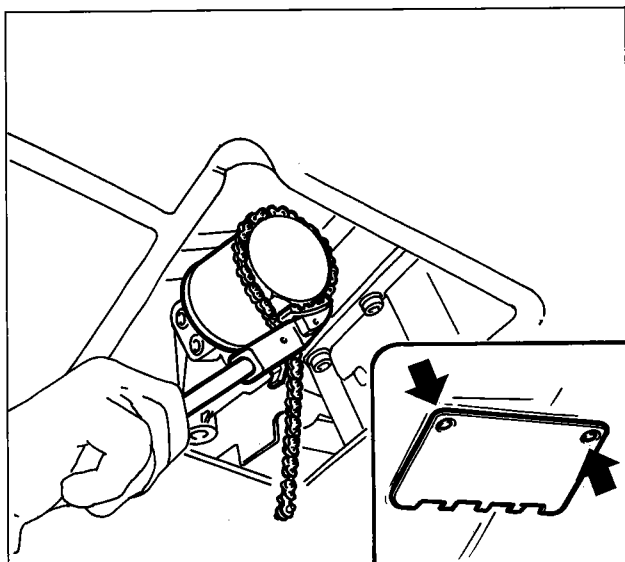


Work very carefully whilst removing the drain plug because the oil could be very hot.

- Working from underneath the vehicle using the appropriate equipment, release the oil filter and remove it;

NOTE *For the 1747 16v and 1998 20v versions, the engine compartment lower shield does not have to be removed because the drain plug is accessible from the rear of the engine and the oil filter can be reached by removing the special flap on the actual shield.*

- clean the drain plug and tighten it, with the appropriate seal, to the recommended torque;
- lubricate the seal for the new filter with oil and tighten fully by hand.



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- lower the vehicle, introduce the correct quantity of recommended oil;
- check that the oil level is correct using the dip stick;
- reposition the oil filler plug, let the engine idle for around 2 minutes, switch off the engine and wait for several minutes, then check the level of the oil and make sure there are no leaks.

NOTE

If the vehicle is mainly used in one of the following particularly harsh conditions:

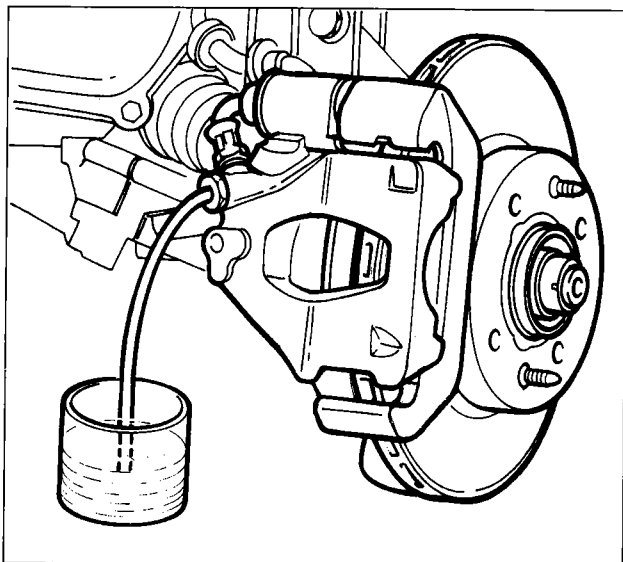
- towing a trailer or caravan
- dusty roads
- short, repeated journeys (less than 7-8 km) at sub-zero temperatures
- engine often idling or driving long distances at low speeds

notify the Customer of the need to change the oil more often than indicated in the Planned Maintenance Programme.



The engine oil used and the oil filter replaced contain substances which are dangerous to the environment. The used oil and the filters should be deposited in special containers and then disposed of in accordance with the laws in force.

26 CHANGE BRAKE FLUID




P4A48CA01

The brake fluid is hygroscopic, i.e. it absorbs humidity. To avoid problems with braking, the brake fluid should be changed every two years, irrespective of the mileage.

- Raise the vehicle and, if necessary, remove the wheels;
- connect a flexible pipe to the bleed screws on the brake calipers (for rear drum brakes to the bleed screws on the wheel cylinders), loosen them and, acting on the control pedal, drain the fluid into a suitable container.
- remove the plug from the brake fluid reservoir and (simultaneously to the operation of draining the old fluid) introduce the recommended fluid into the system. Continue to introduce the new fluid until it starts to come out of the bleed screws, then tighten them.



Avoid the brake fluid, which is extremely corrosive, coming into contact with the paintwork. If it does, wash immediately with water.

The symbol , present on the container, identifies a synthetic type of brake fluid, distinguishing it from mineral kinds. The use of mineral type fluids irreparably damages the special rubber seals in the braking system.

- Bleed the system keeping the flexible pipe connected to the bleed screw and the opposite end immersed in a transparent container filled with the same fluid as the circuit;
- loosen the bleed screw and, at the same time, press the brake pedal letting it return slowly; repeat this operation until any air bubbles finish coming out;
- with the pedal fully depressed, tighten the bleed screw and remove the pipe. Carry out this operation separately for each wheel starting at the rear (the furthest from the brake fluid reservoir).

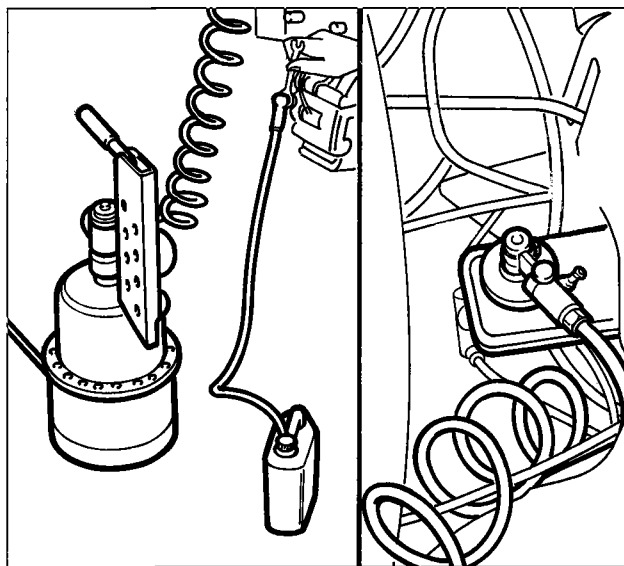


During the bleeding operation keep the level of the fluid in the reservoir above the MIN reference.

Do not reuse the hydraulic fluid drained during the bleeding procedure.

- Restore the level of the fluid in the reservoir and refit the cap;
- check the efficiency of the braking system.

NOTE *For versions with hydraulic clutches (Bravo 1998 20v) the fluid in the circuit must be drained by connecting a flexible pipe to the clutch operating cylinder bleed screw, loosening it and acting on the pedal to drain the fluid into a suitable container. Proceed with bleeding the hydraulic clutch circuit in the same way as described for the braking circuit, using the clutch pedal this time.*

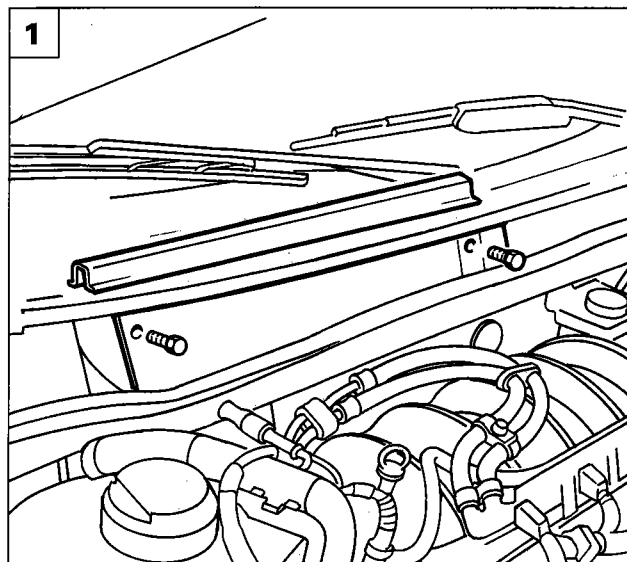


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The bleeding operation can also be carried out using the "Jollyfren" equipment. This equipment allows the hydraulic system to be bled quickly. The bleeding action is carried out simultaneously for both wheels by a single operator representing a considerable time saving.

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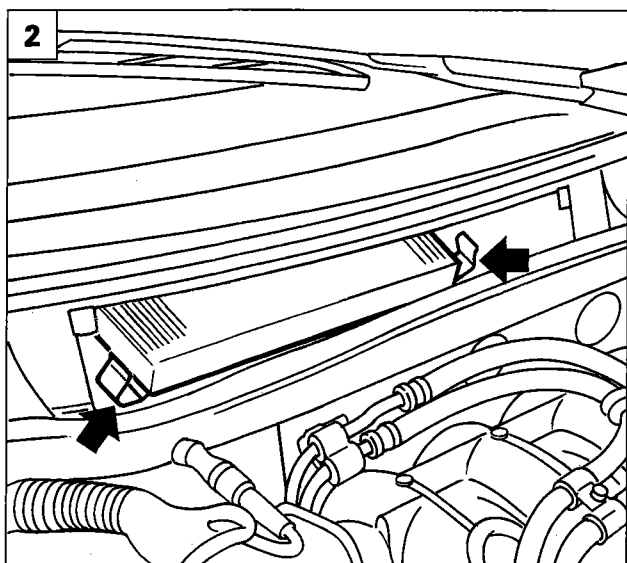
27 REPLACE POLLEN FILTER



P4A50CA01



1. To gain access to the pollen filter it is necessary to raise the seal shown in the diagram and then undo the bolts shown and remove the access flap for the pollen filter.



P4A50CA02

2. Release the side retaining springs in the pollen filter housing, extract it and proceed with replacing it.

NOTE Failure to replace the filter can considerably reduce the efficiency of the climate control system.
If the vehicle is often used in dusty or strongly polluted areas, advise the Customer of the need to replace the filter element more often; it should especially be replaced if a decrease in the flow rate of the air introduced into the passenger compartment is noticed.