

Vehicle type	Engine	Manual gear box	Automatic Transmission	Capacity (cm ³)	Bore (mm)	Stroke (mm)	Compression Ratio
B540	J7R 732	PK1	–	1995	88	82	9,2
B543	J7T 760	PK1	–	2165	88	89	9,2
B544	Z7X 722	PK1	–	2975	93	73	9,6
B544	Z7X 722	PK7	–	2975	93	73	9,6
B544	Z7X 723	–	AD8	2975	93	73	9,6
B546	J8S 760	PK1	–	2068	86	89	21,5

Refer to the appropriate engine workshop manual for the various engine types.

Engine Repair manual	J7R - J7T	J8S	Z7X
Mot. J (E)	X		
Mot. J (D)		X	
Mot. Z (E)			X

PRECAUTIONS WHEN STOPPING THE ENGINE (vehicles with turbo charger)

let the engine idle for 30 seconds before turning the ignition off.

If the engine is not idled for about 30 seconds, or if the engine is revved before the ignition is turned off, the turbo charger will continue to turn under inertia (engine stopped) which may damage the turbo charger shaft.

ATTENTION :

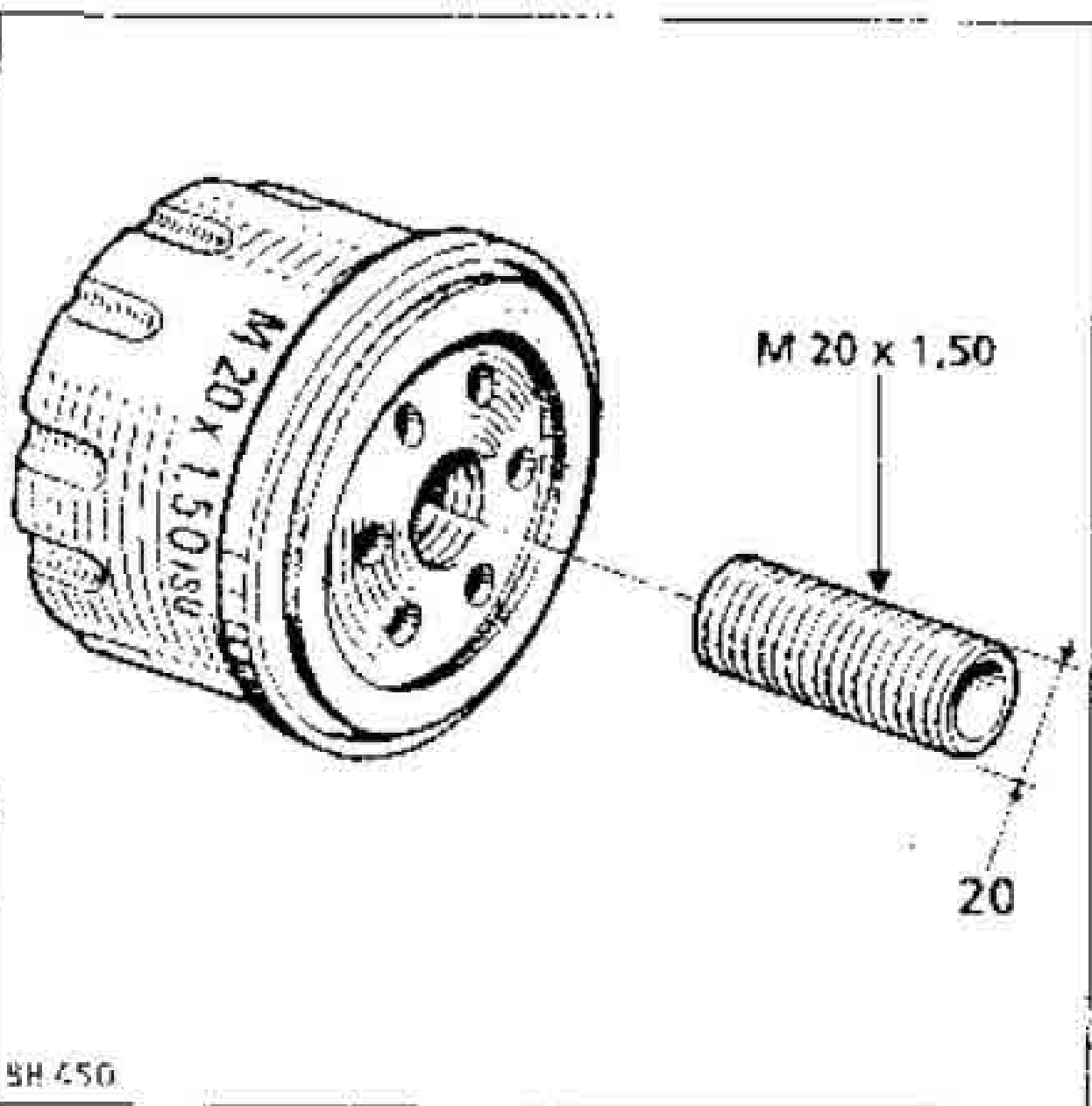
- Take care when working under the bonnet as certain assemblies may be extremely hot.

FITTING AN OIL FILTER TWO POSSIBLE TYPES WHICH CAN BE DISTINGUISHED VISUALLY.

ALL ENGINE TYPES (except SBU)

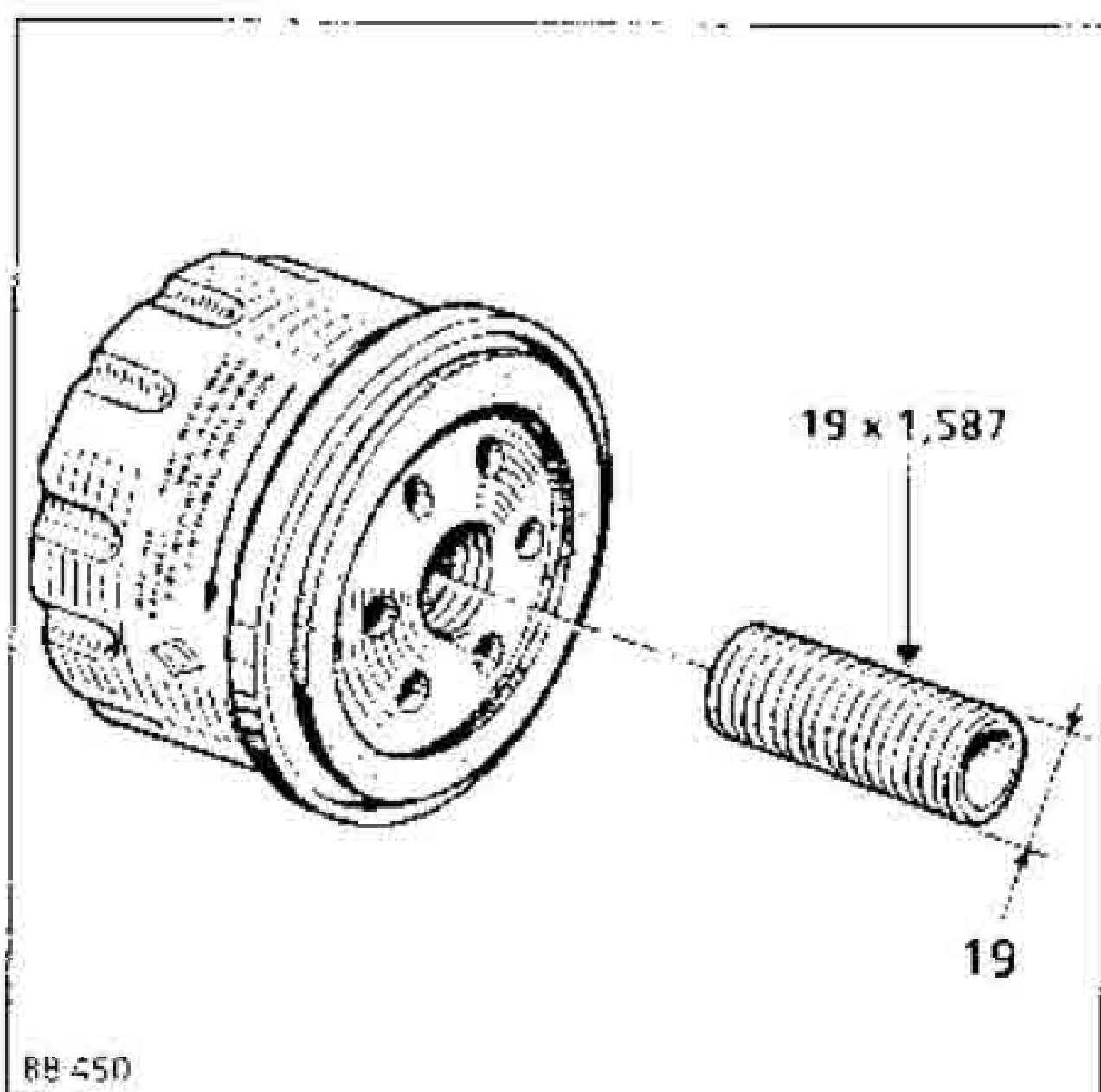
The filter marked "20 x 1,50" is fitted on a metric thread 20 x 1,50 boss.

The filter is identified visually



SBU ENGINE

Oil filter without this marking is fitted on a 19 x 1,587 boss (3/4 inch, 16 threads to the inch).



ATTENTION : A 20 x 1,50 oil filter can be wrongly mounted on a 19 x 1,587 boss, but will loosen under vibration. The assembly will have obvious play before mounting on the engine block

REMINDER : Never fit a petrol filter on a diesel version or vice versa.

CHECKING METHOD

An oil consumption of 1 litre per 1000 km (621 miles) is acceptable

Check there is no external engine oil leak.

To drain the engine oil and check the level, certain conditions must be observed :

- the engine must be warm,
- the dipstick and oil filler plug must be removed.

Let the oil drain out for 15 minutes minimum.

Refit the drain plug and "seal" it (spot of paint on the plug and sump) to check that it has not been removed at a later date.

Use a measure to obtain the required quantity of oil for refilling

Engine types :

Z7X	6,2 litres
J7R	6,5 litres
J7T 12 valve	5,7 litres
J8S Turbo	6,7 litres

Refit and seal the filling plug.

Ask the driver to return after 1 000 km (621 miles) having regularly checked the level on the dipstick.

When the vehicle is returned, ensure the filling and drain plugs have not been disturbed.

Drain the oil again under the same conditions :

- engine warm,
- dipstick and filling plug removed.

Drain the engine oil and measure the exact amount drained.

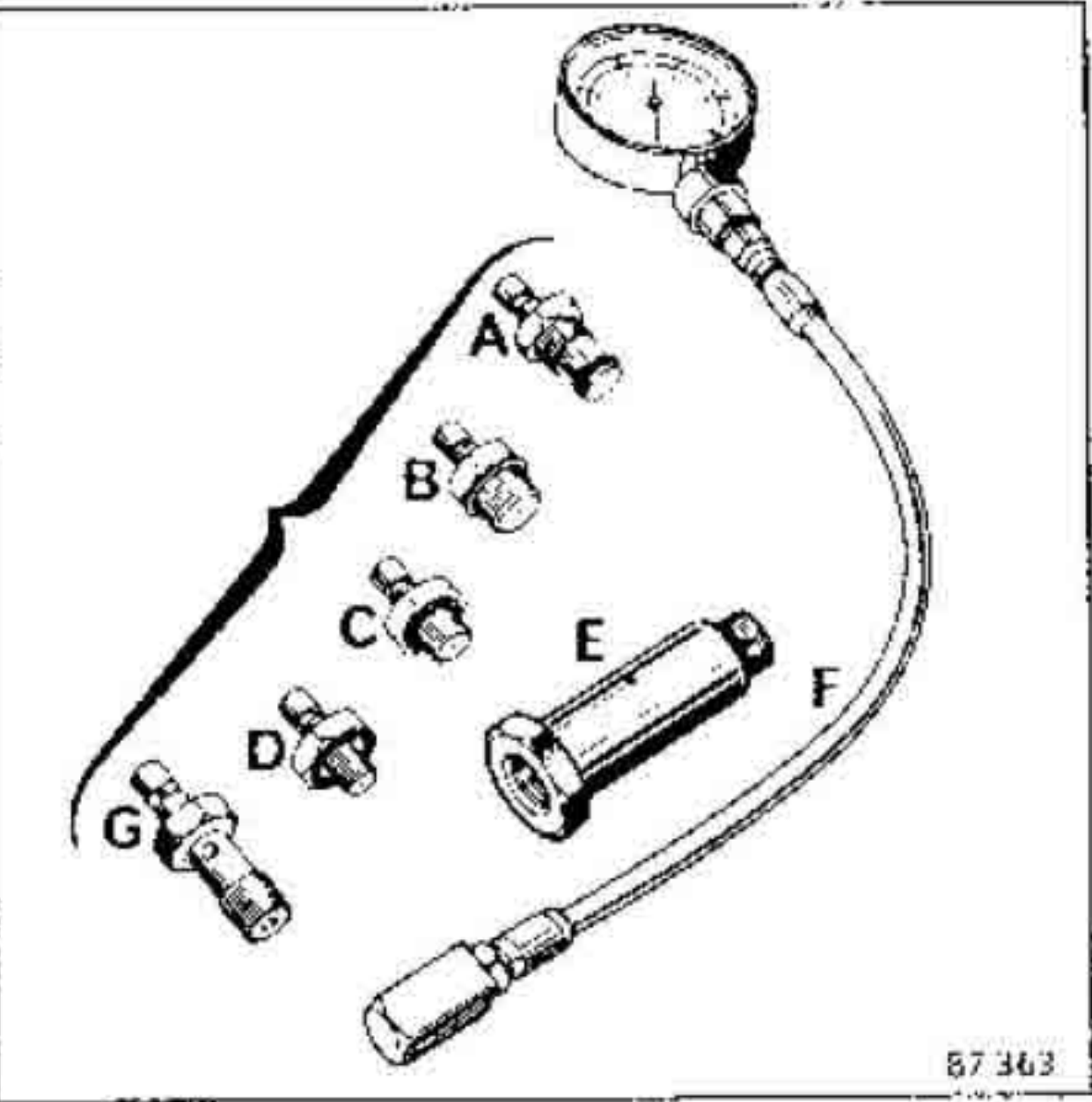
Calculate the oil consumption for 1 000 km (621 miles) if the distance travelled is different.

CHECKING

SPECIAL TOOLING REQUIRED		
Mot.	B36 -05	Oil pressure test kit
FACOM S 22 L	Socket for removing pressure switch	

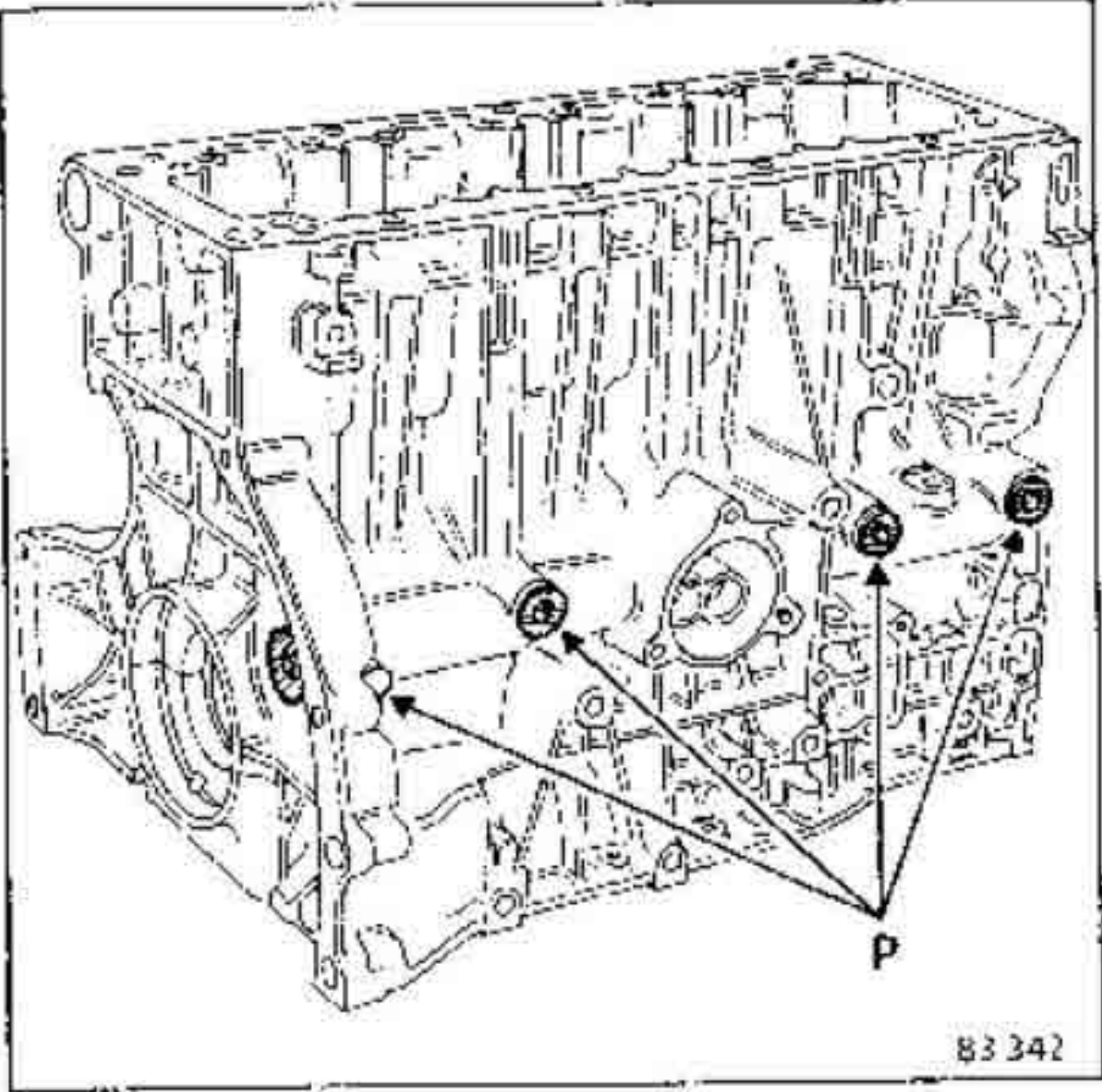
The engine must be warm to check the oil pressure (about 80°C)

Oil pressure test kit components Mot. 836-05.



USE:
- J petrol engines B or C + F

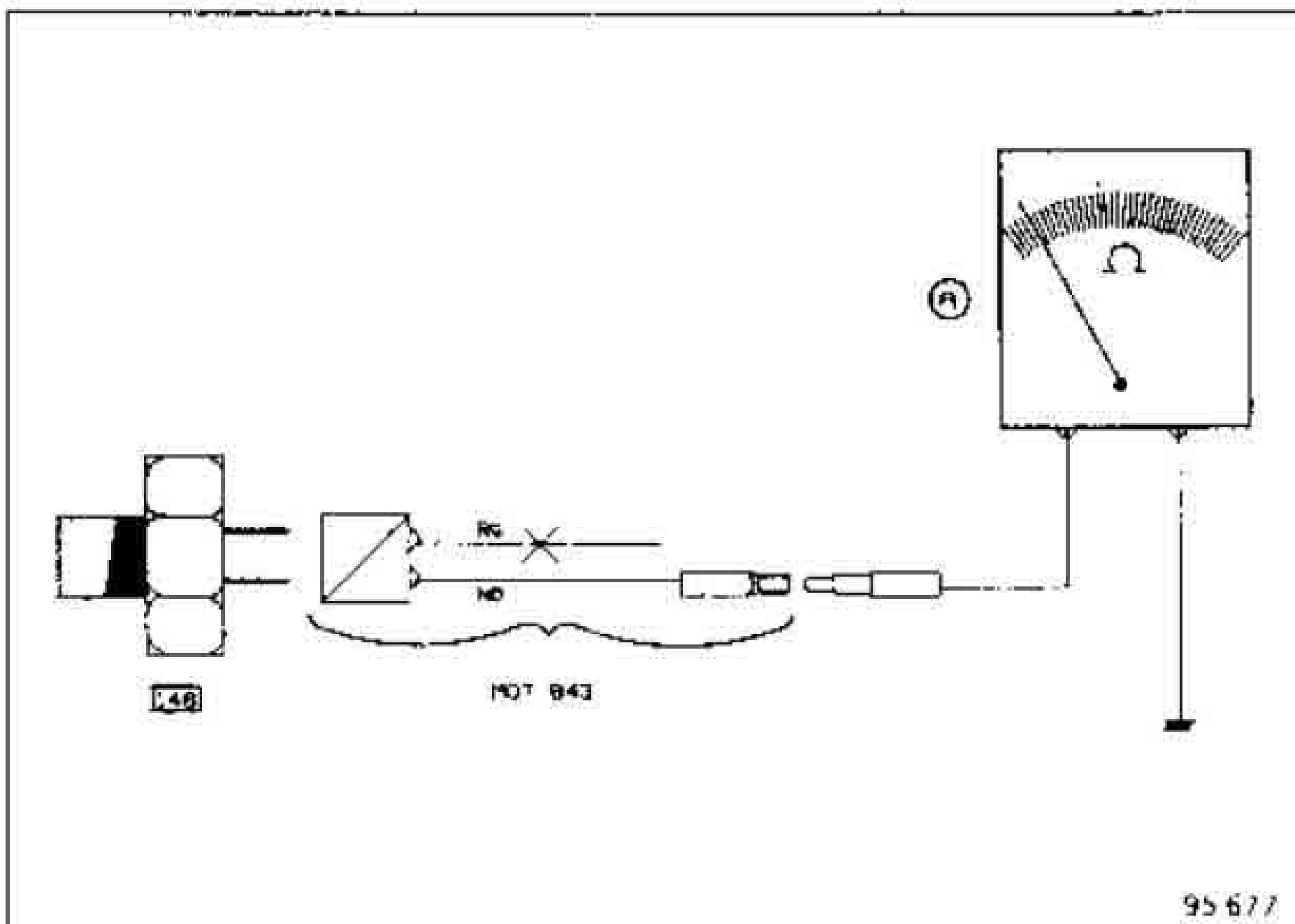
The oil pressure may be measured on the engine at (P).



J petrol engine

Minimum oil pressure at 80°C :	
- idle speed	0,8 bar min
- idle speed (12 valve engine)	1,25 bar min
- at 3 000 rpm.	3 bars min

The oil pressure is measured using a multimeter



148 Oil pressure transmitter
 Mot. 843 Extension
 A Multimeter

Disconnect the oil pressure transmitter connector.

Fit the extension of tool Mot. 843 to the oil pressure transmitter.

Use a multimeter between the extension and earth (A).

The ohm variation is inversely proportional to the oil pressure.

Sensor resistance depending on pressure, for increasing values at ambient temperature. $\pm$

<u>PRESSURE IN BAR</u>	<u>RESISTANCE IN OHMS</u>
0	270 ± 15
4	108 ± 8
8	0 to 30

SPECIAL TOOLING REQUIRED	
Mot. 1202	Hose clip pliers
Rou. 604 -01	Hub locking tool
T.Av. 1050	Driveshaft removal tool
T.Av. 602	Driveshaft fitting tool
SEFAC 689	Load positioning tool

TIGHTENING TORQUES (in daN.m) 	
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Brake caliper bolt	3,5
Driveshaft nut	25
Shock absorber base bolt	25,5
Upper cross member bolt	2,5
Engine cooling fan and radiator mounting bolt	1,5
Left hand driveshaft bellows bolt	2,5
Power assisted steering pipe nut	3
ABS sensor bolt	0,7
Engine tie bar flange nuts	5,5
Engine tie bar nuts and bolts	15,5
Right suspended engine mounting cover nut, on chassis	10,5
Right suspended engine mounting cover nut, on engine	5,5
Left hand engine rubber mounting bolt	4
Lower cross member mounting bolt	2,5

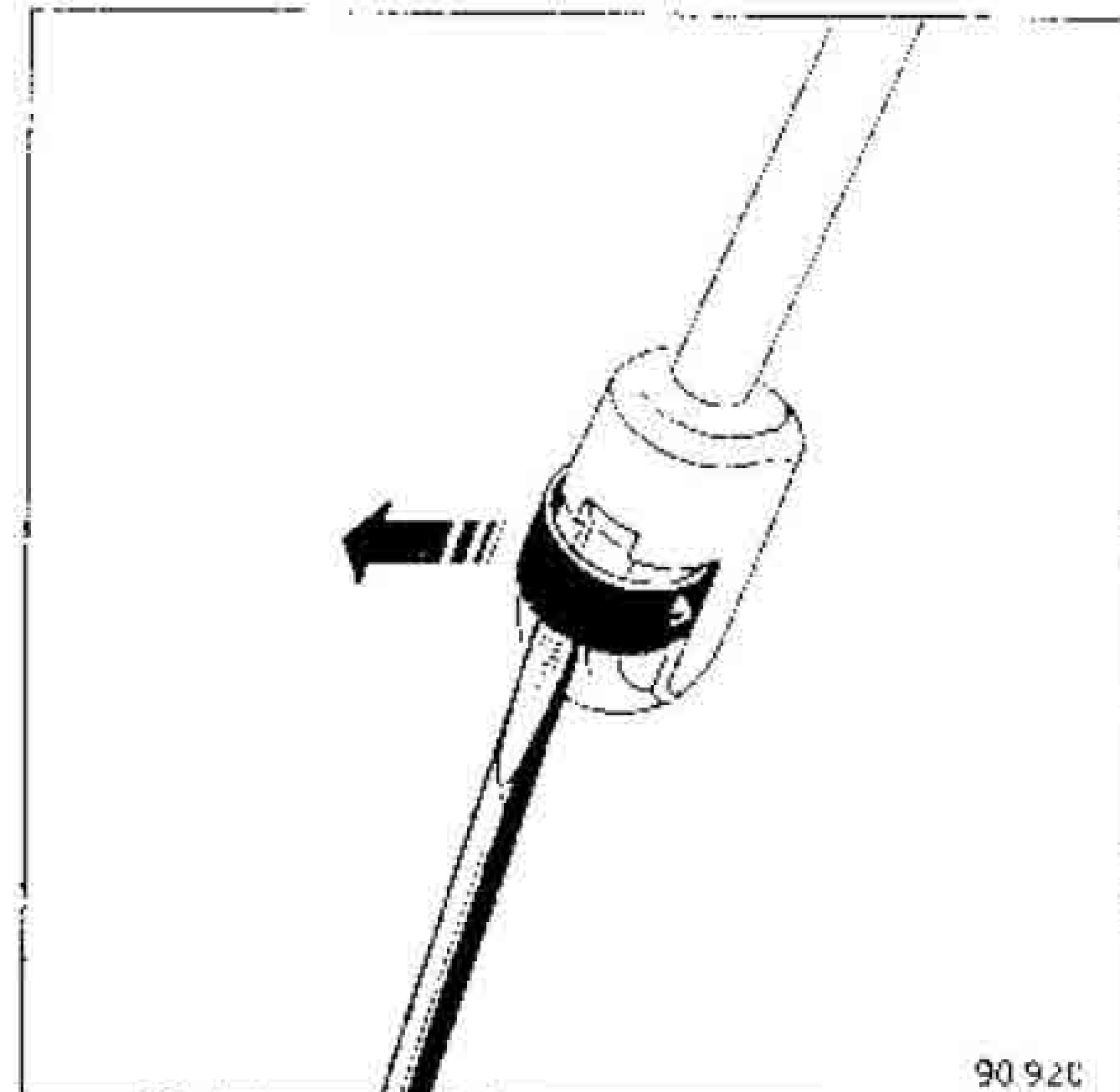
REMOVAL

Put the vehicle on a 2 post lift.

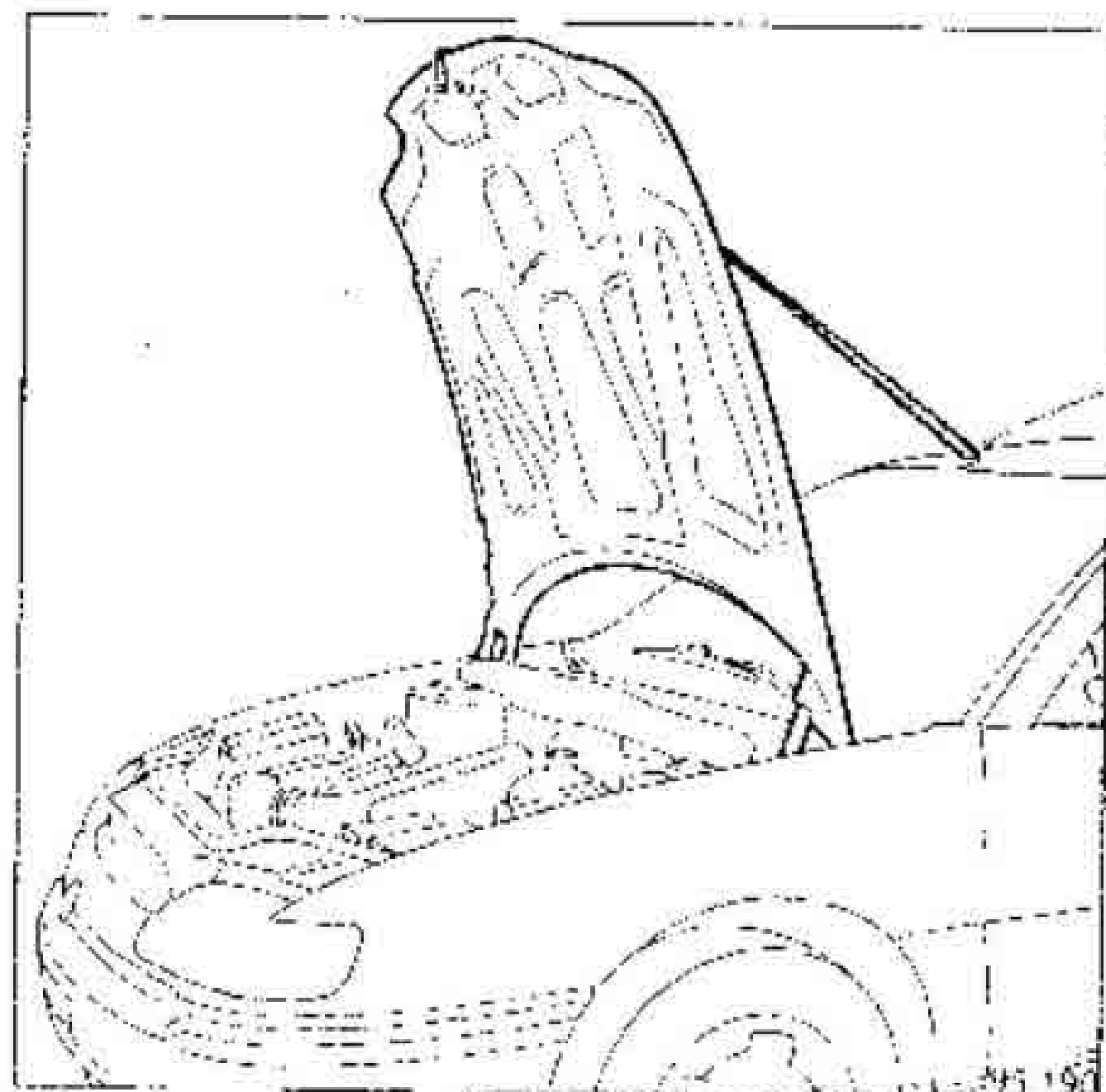
Disconnect the battery

Remove the front wheels

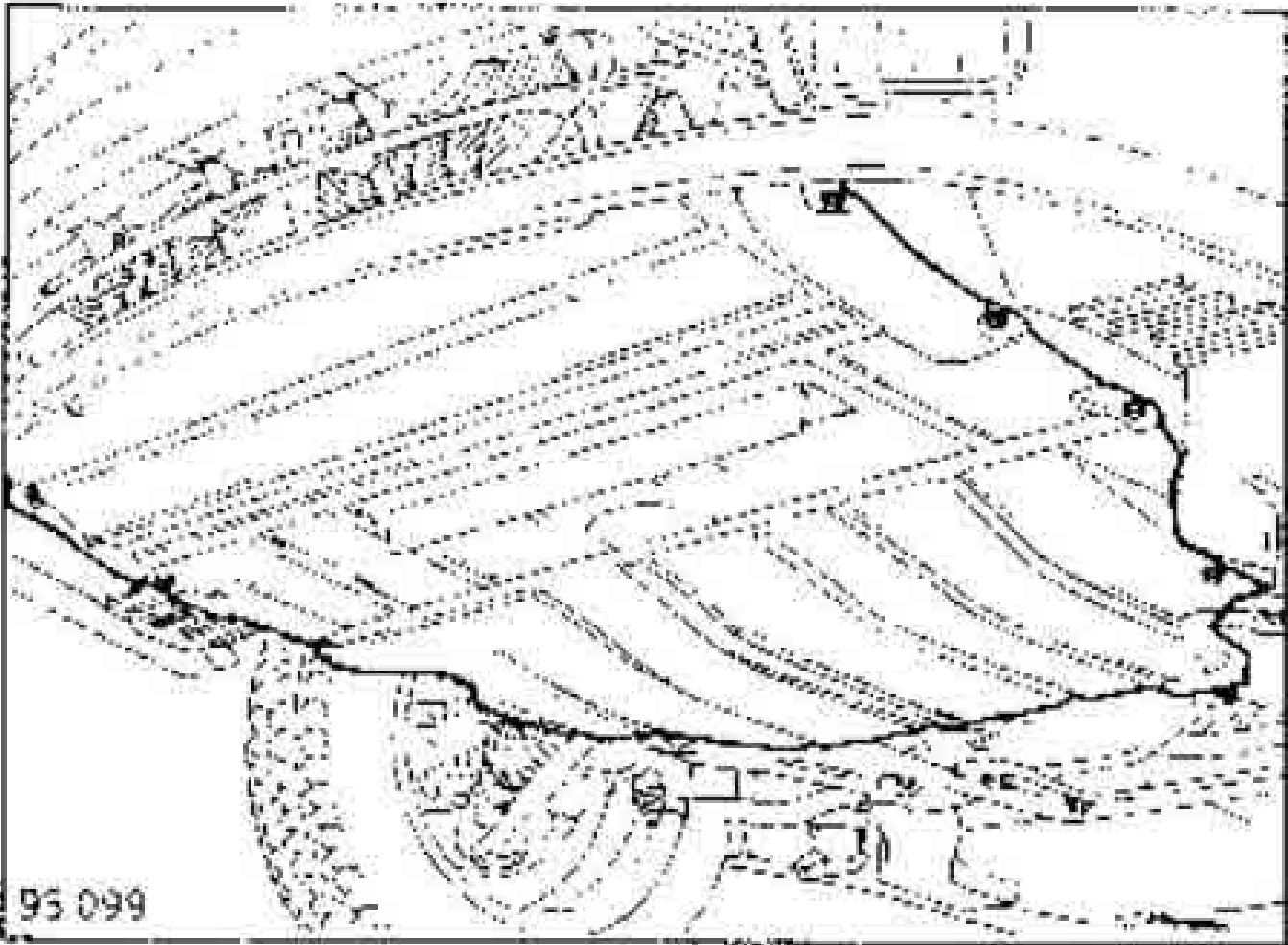
Unhook the bonnet struts, by separating the retaining clip hooks but do not remove from their position



Secure the bonnet in the fully open position.

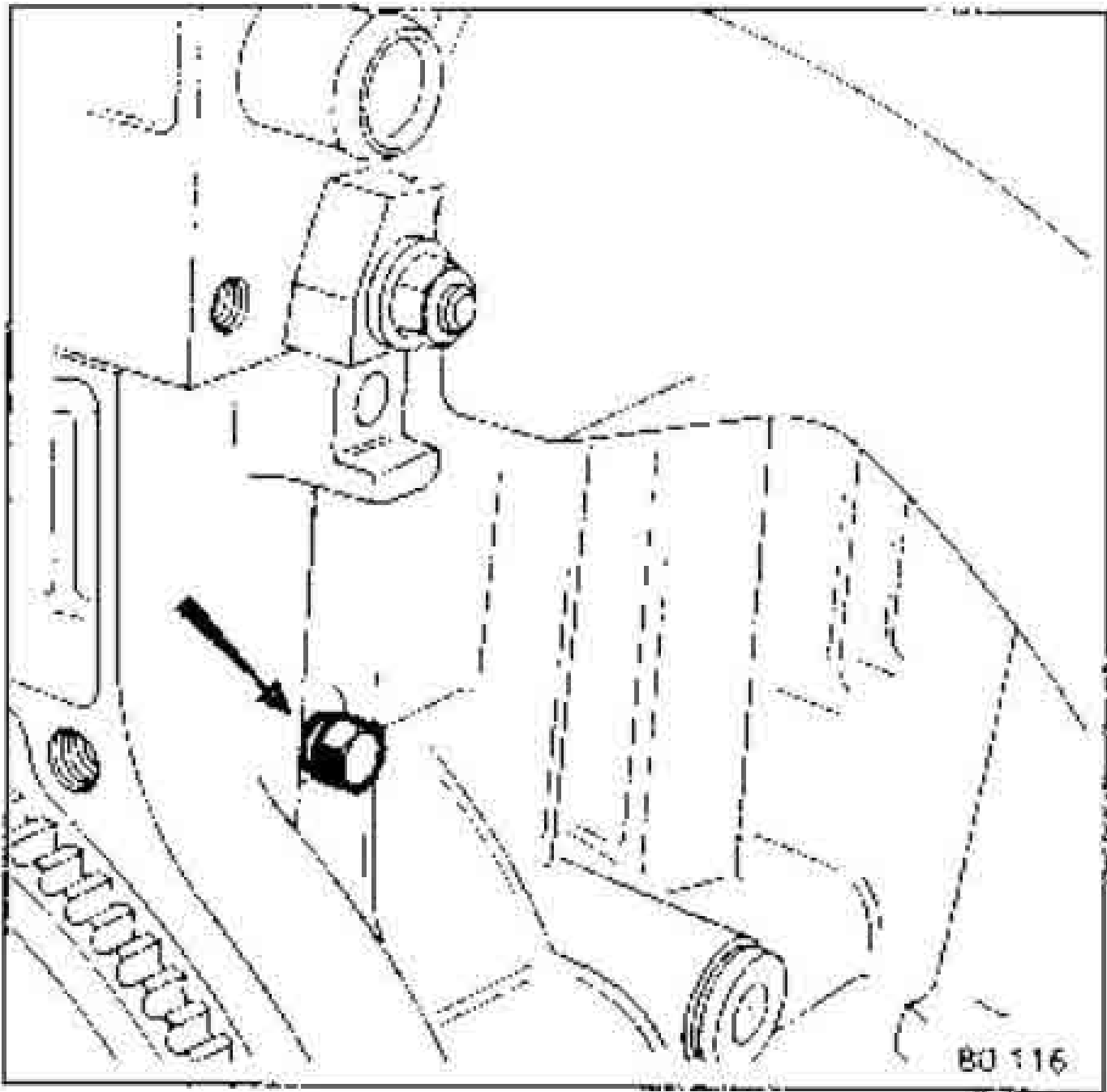
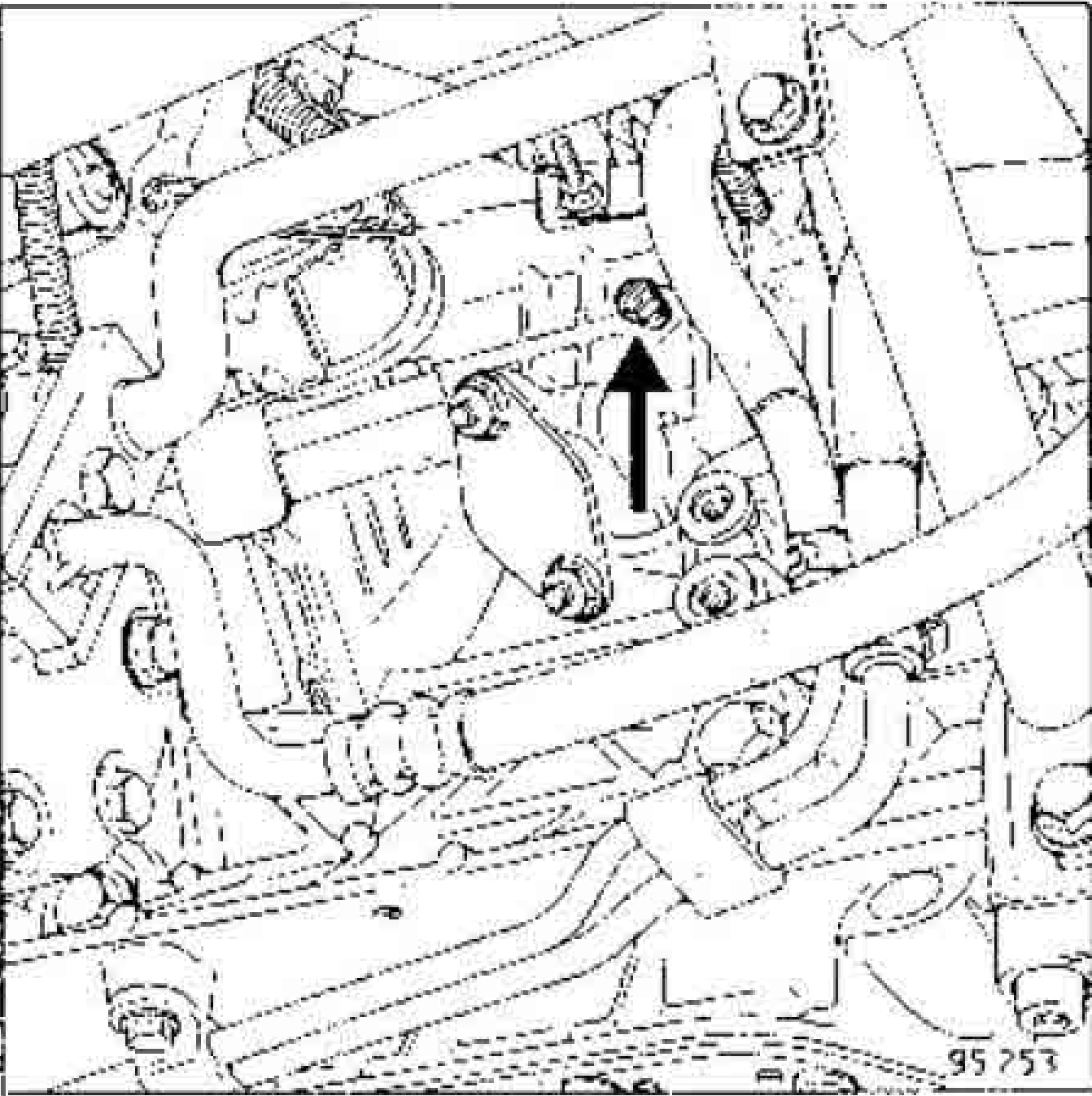


Remove the engine undertray.



Drain:

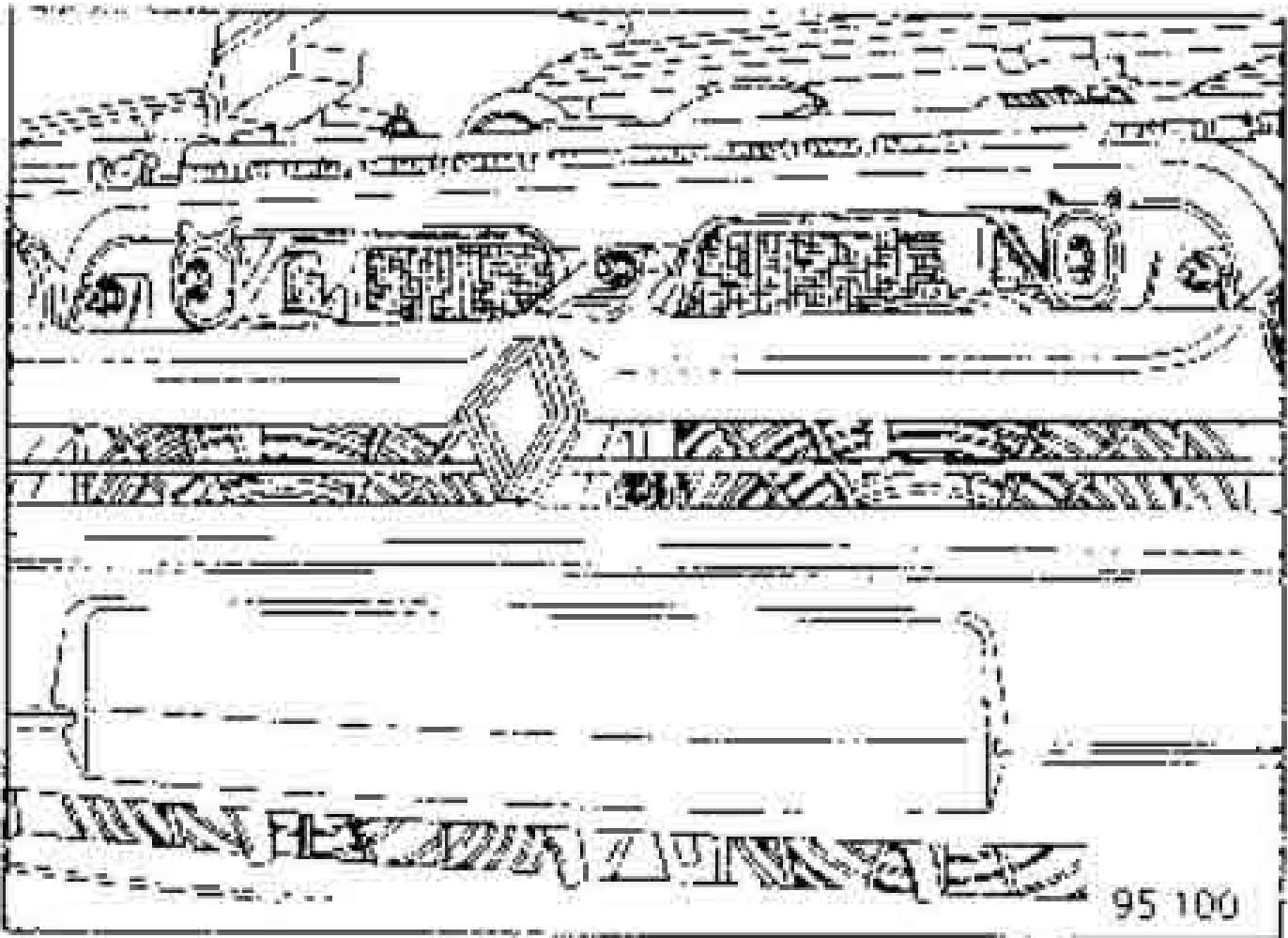
- the gear box,
- the cooling circuit,
 - from the lower radiator hose,
 - from the cylinder block



- the freon circuit (if fitted) see chapter 6,
- the power assisted steering circuit (if fitted)

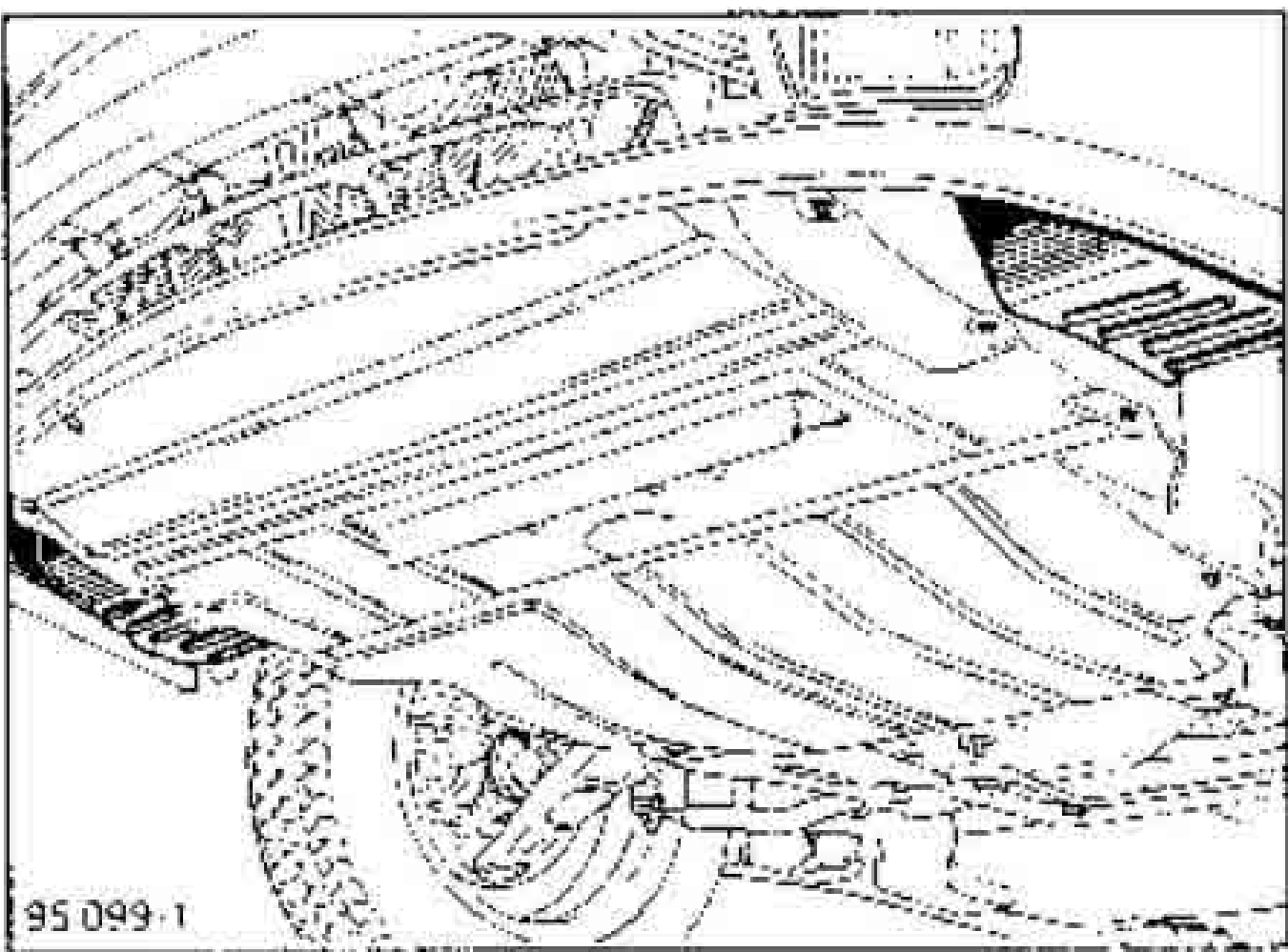
Remove:

- the radiator grille,
- the indicator lights,

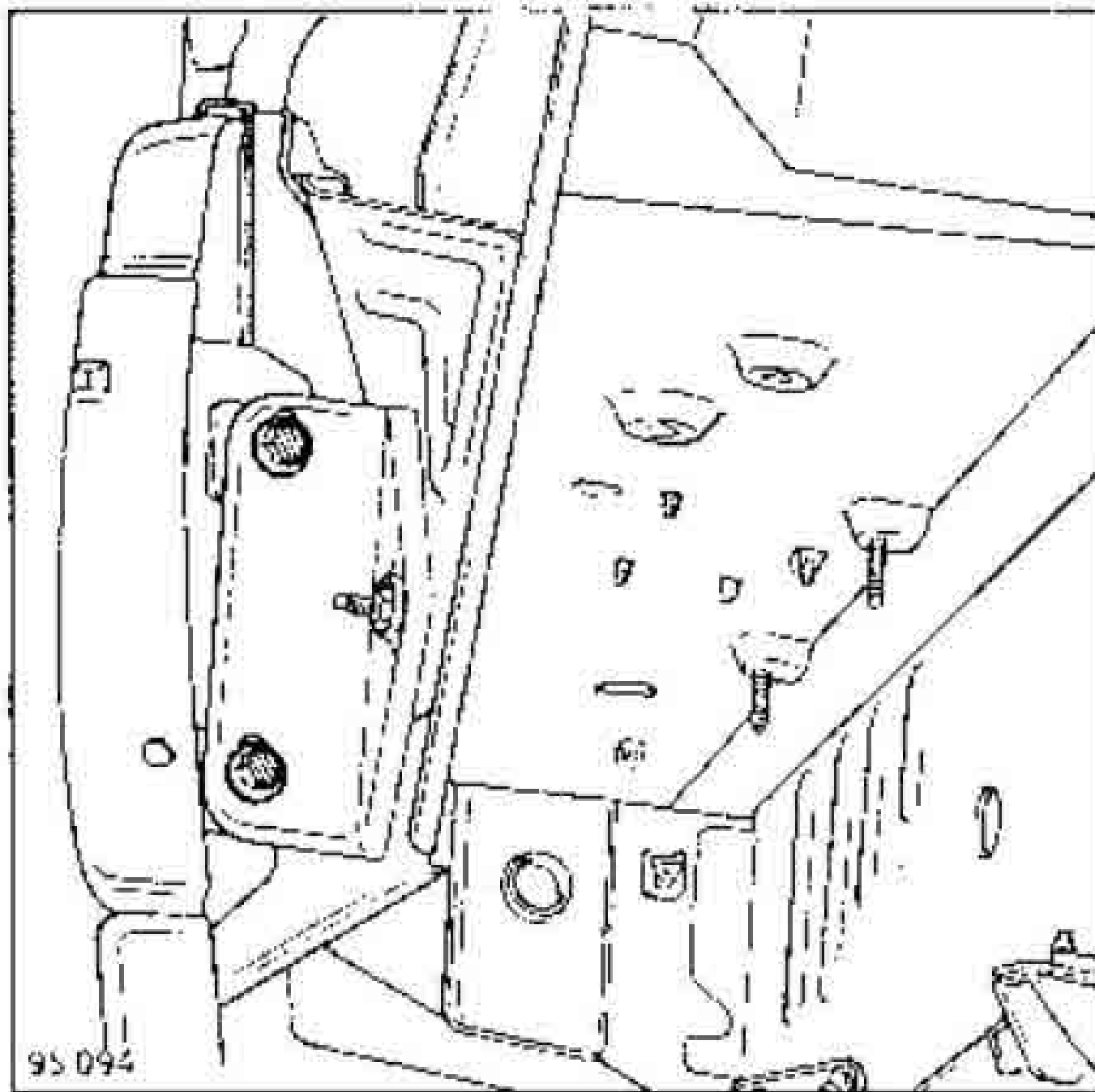


Remove:

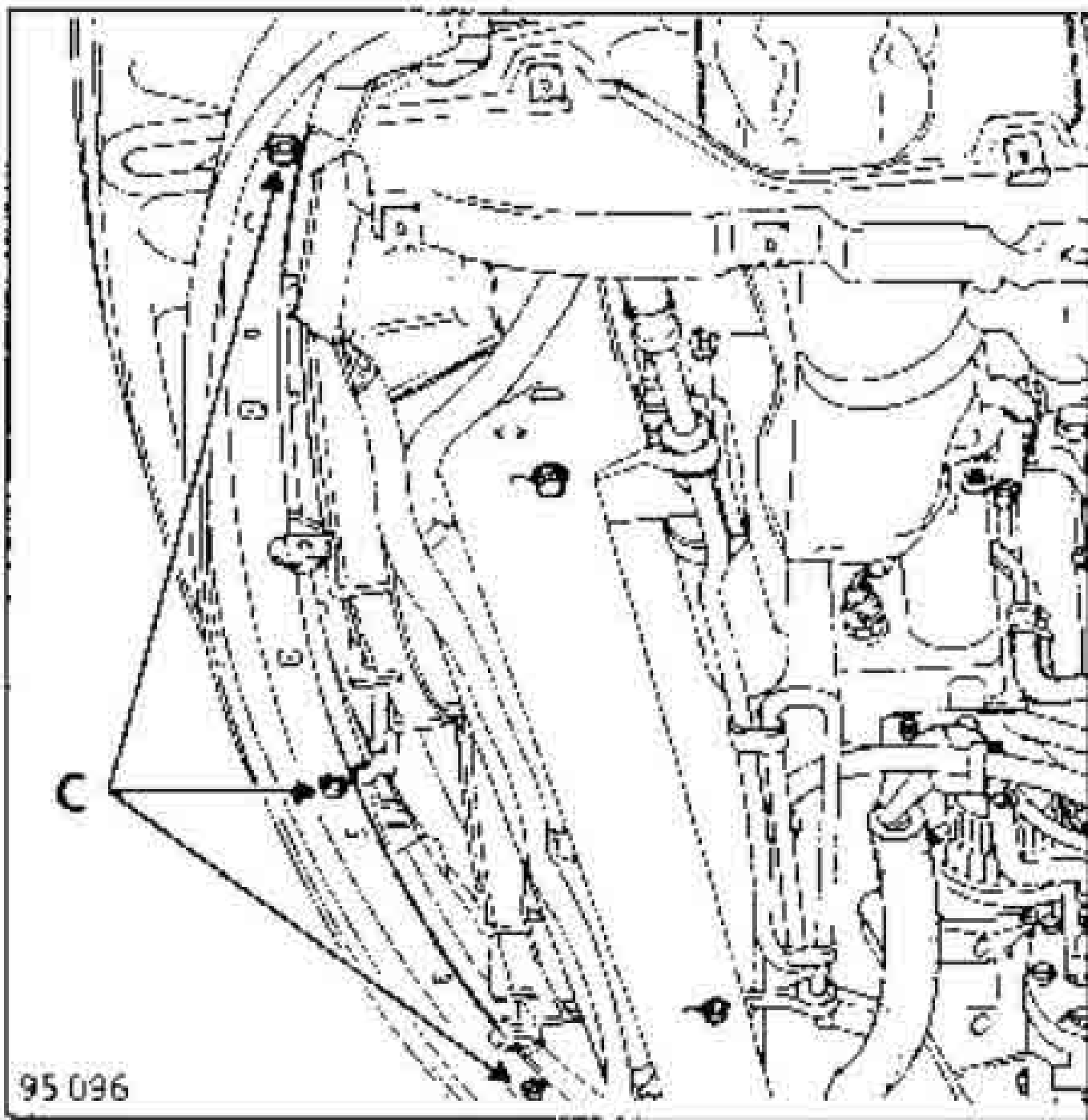
- the front wheels,
- the wheel arch protectors.



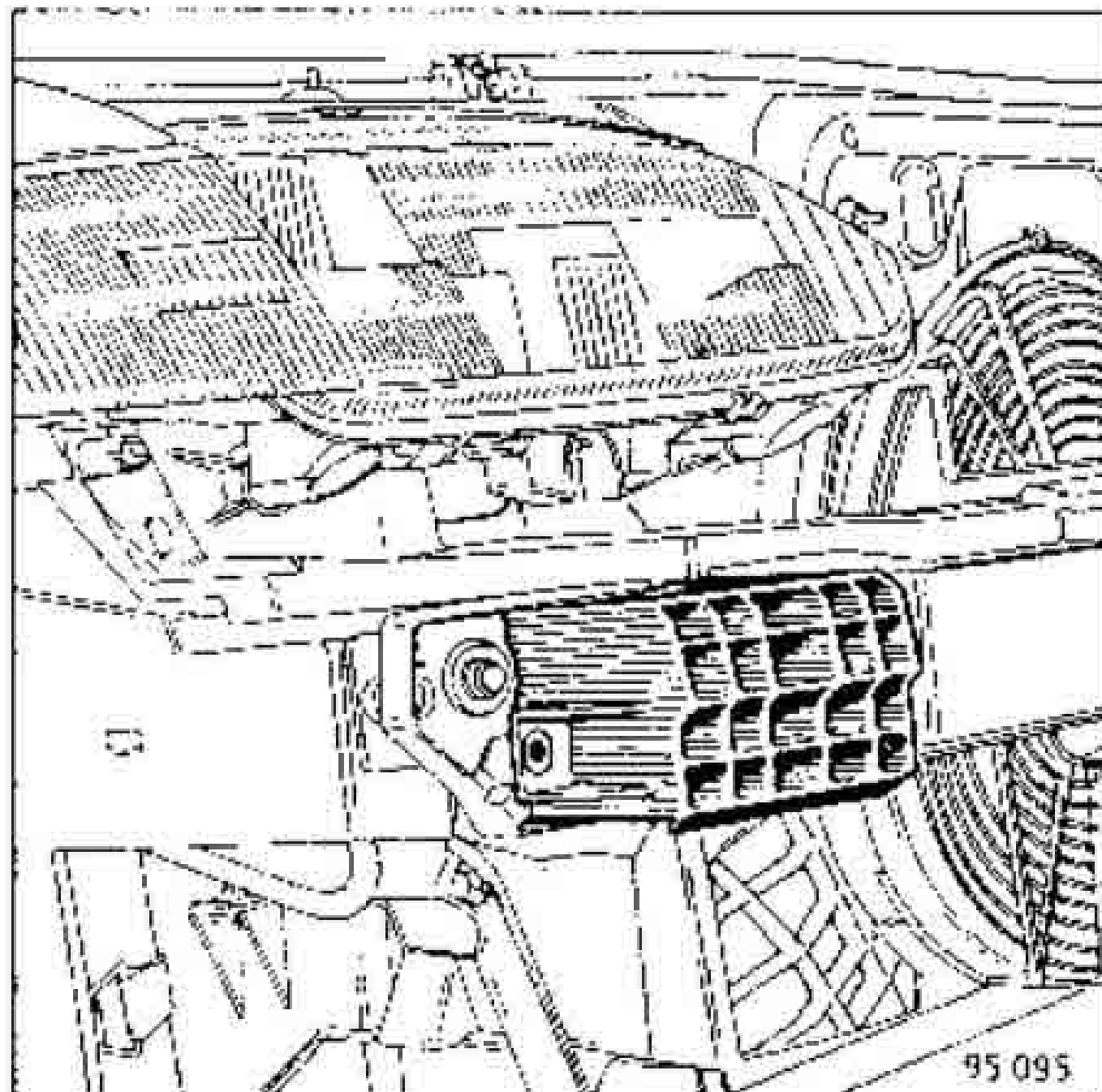
- the bumper left and right hand side mountings



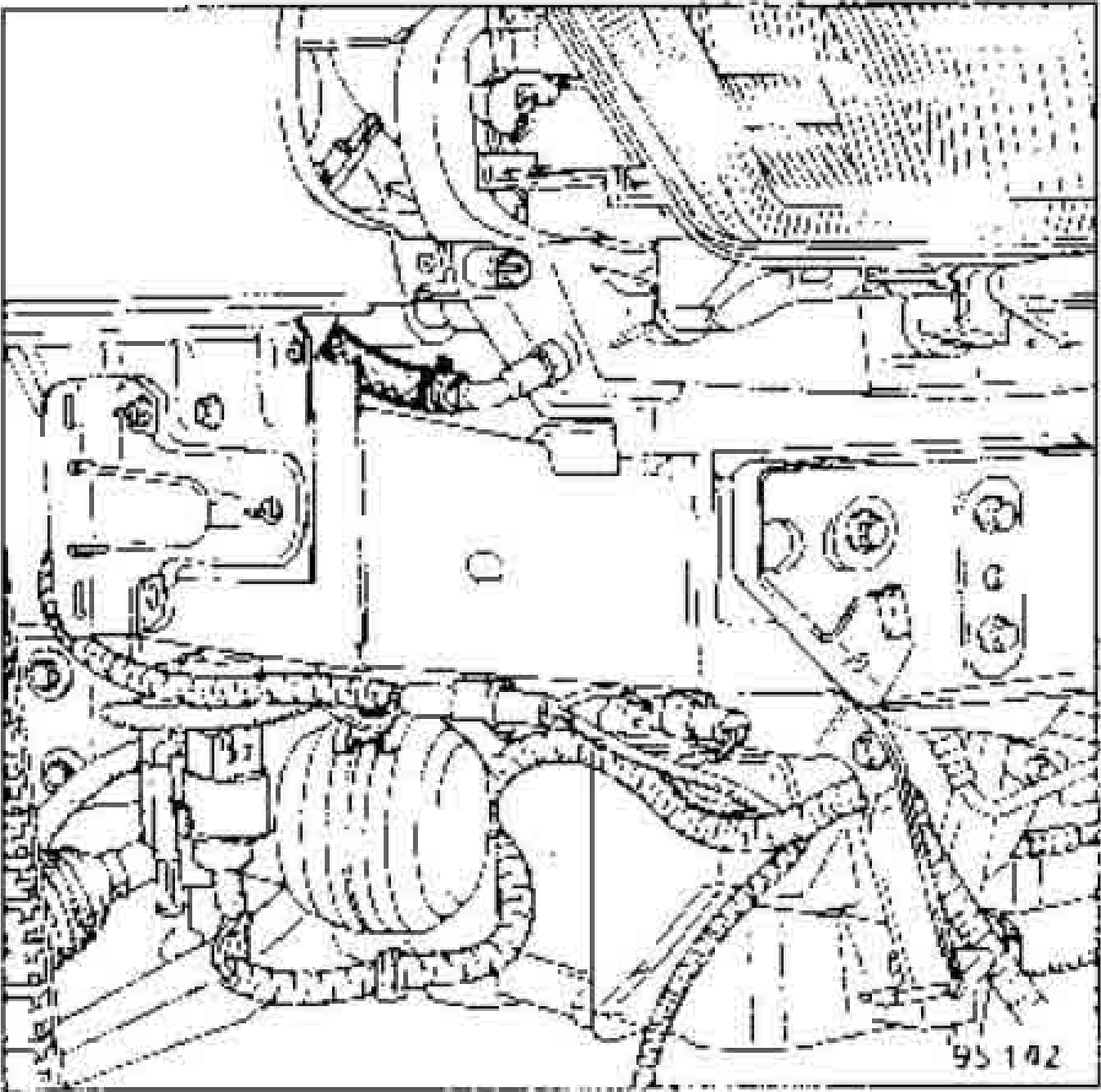
- the 3 lower bolts (C), and disconnect the additional headlight wiring harness,



- the upper cross member impact absorbers.

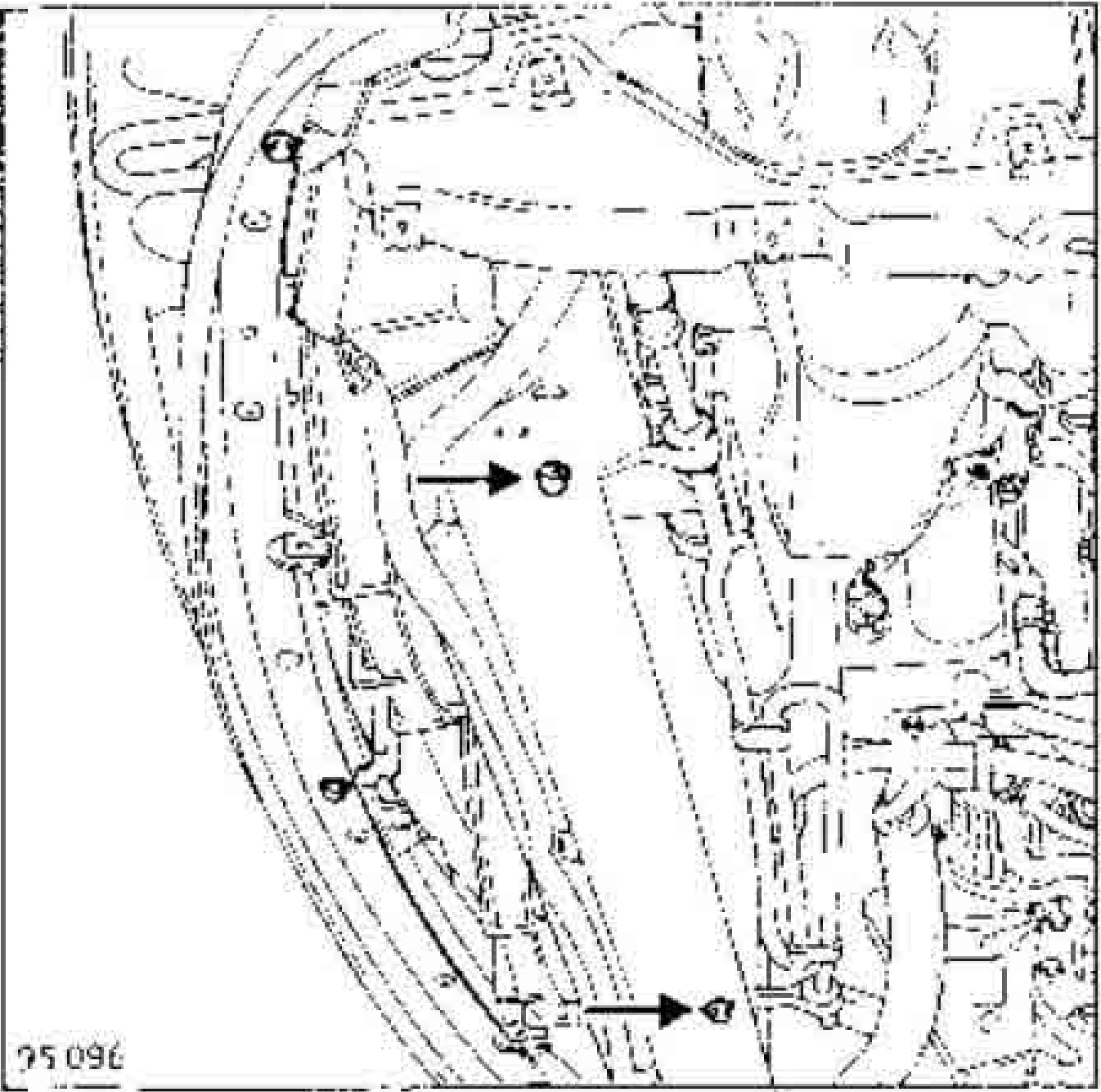


Disconnect the light connectors and the headlight washer hoses (if fitted).

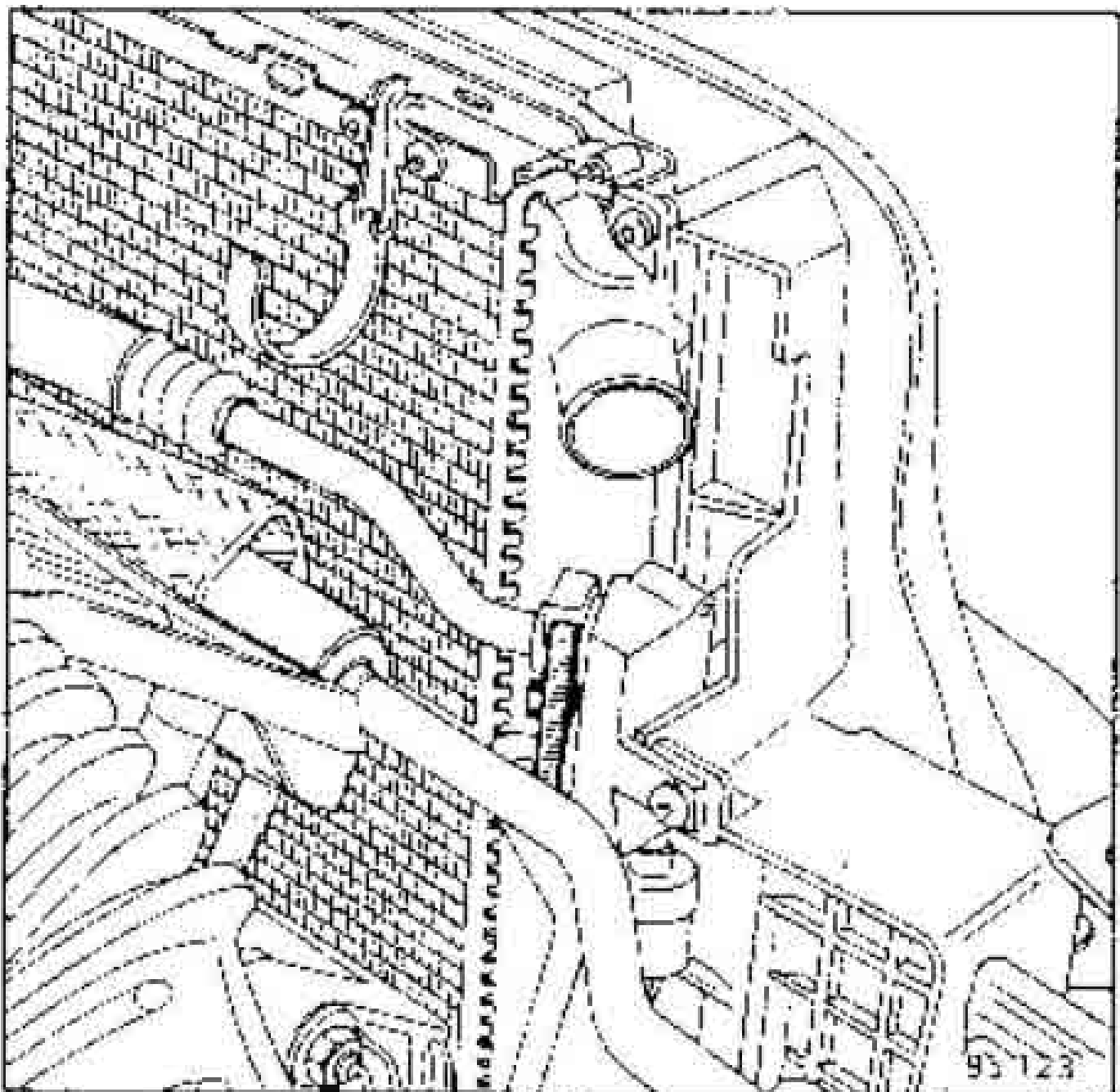


Remove:

- The power assisted steering cooling hose mountings (if fitted),



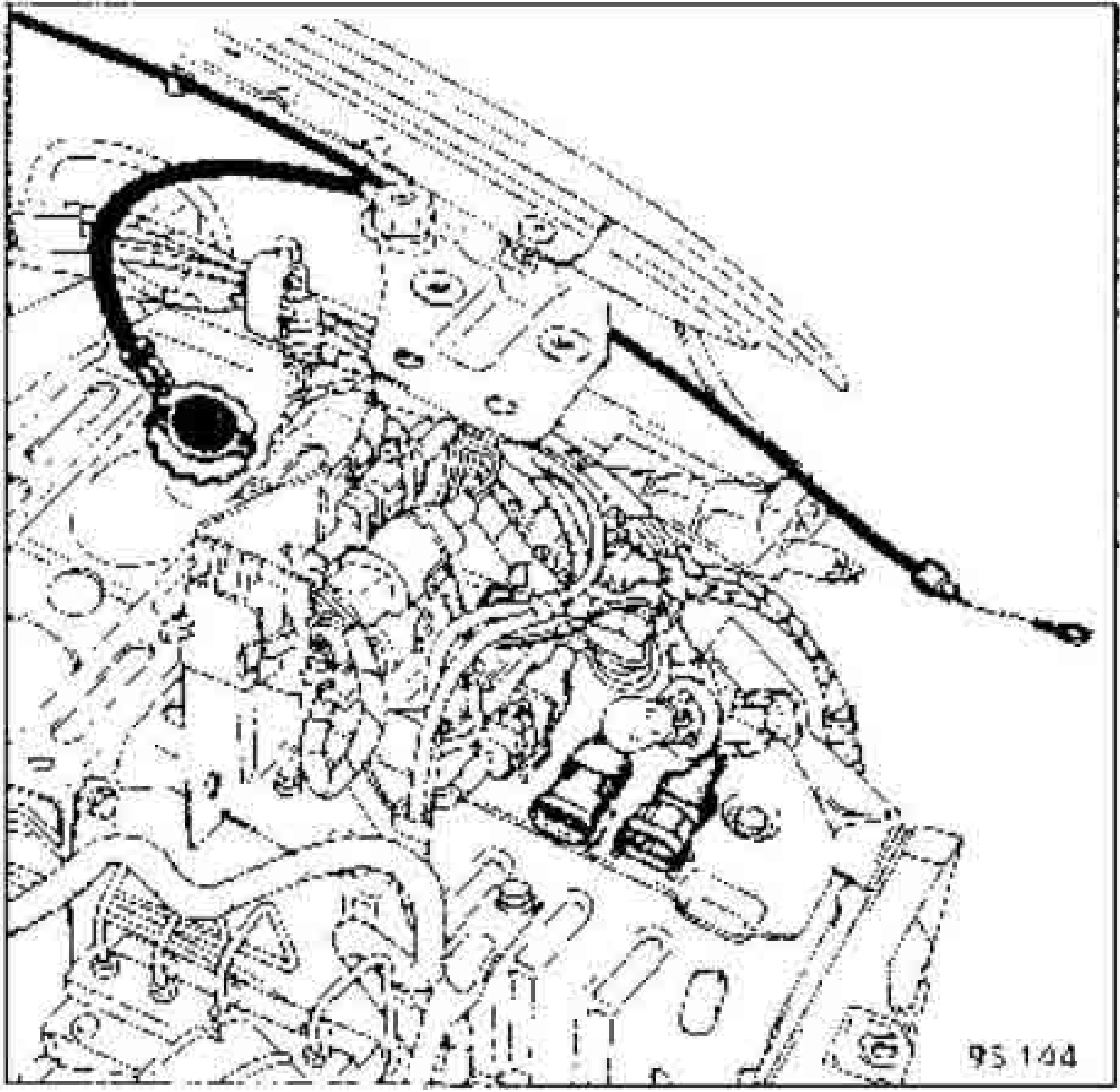
- the air conditioning condenser hose mounting bolts (if fitted),



- the battery,
- the bonnet release cable.

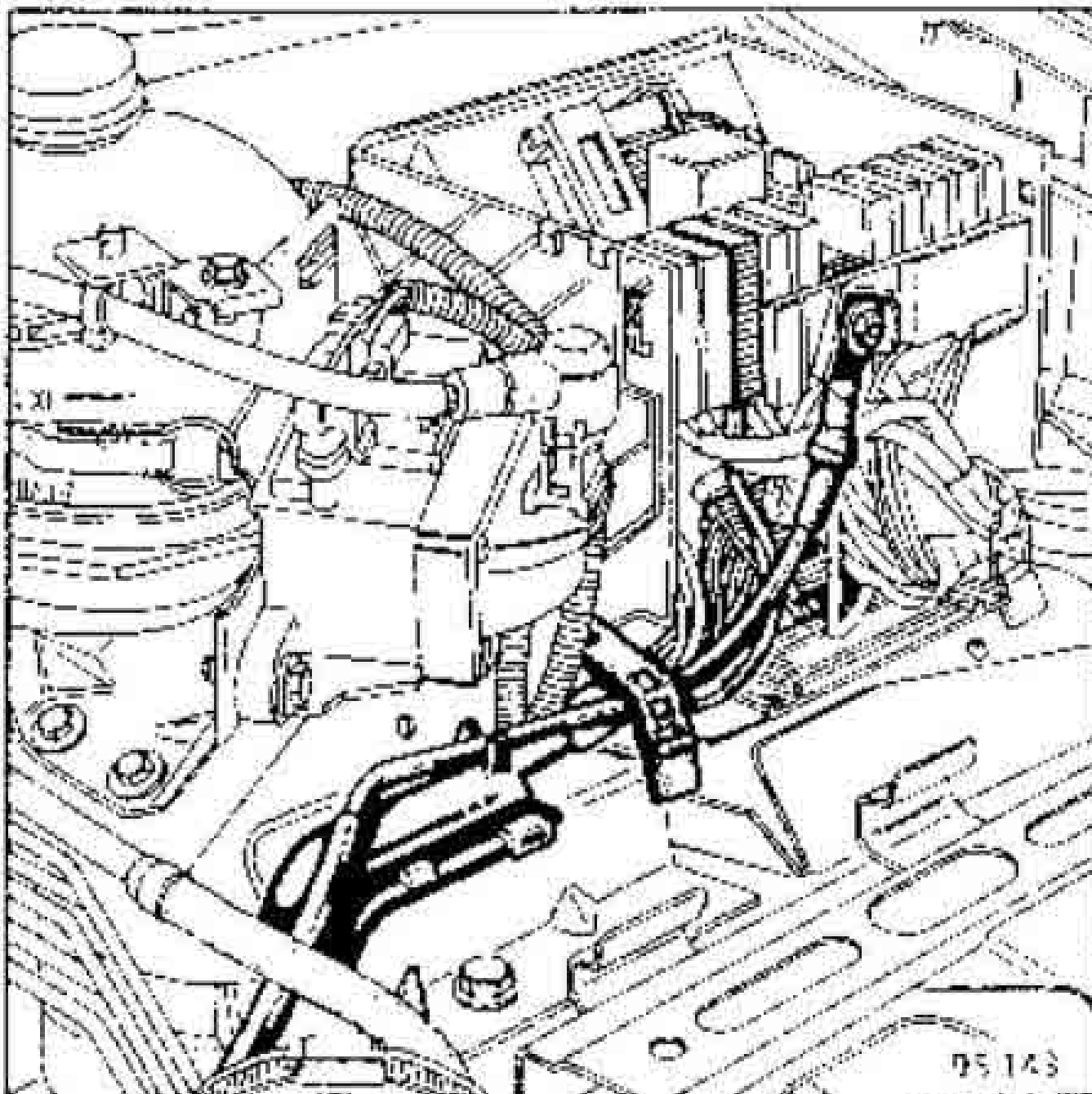
Disconnect:

- the earth connection and the wiring connectors for the engine cooling fan in the front left hand wing.



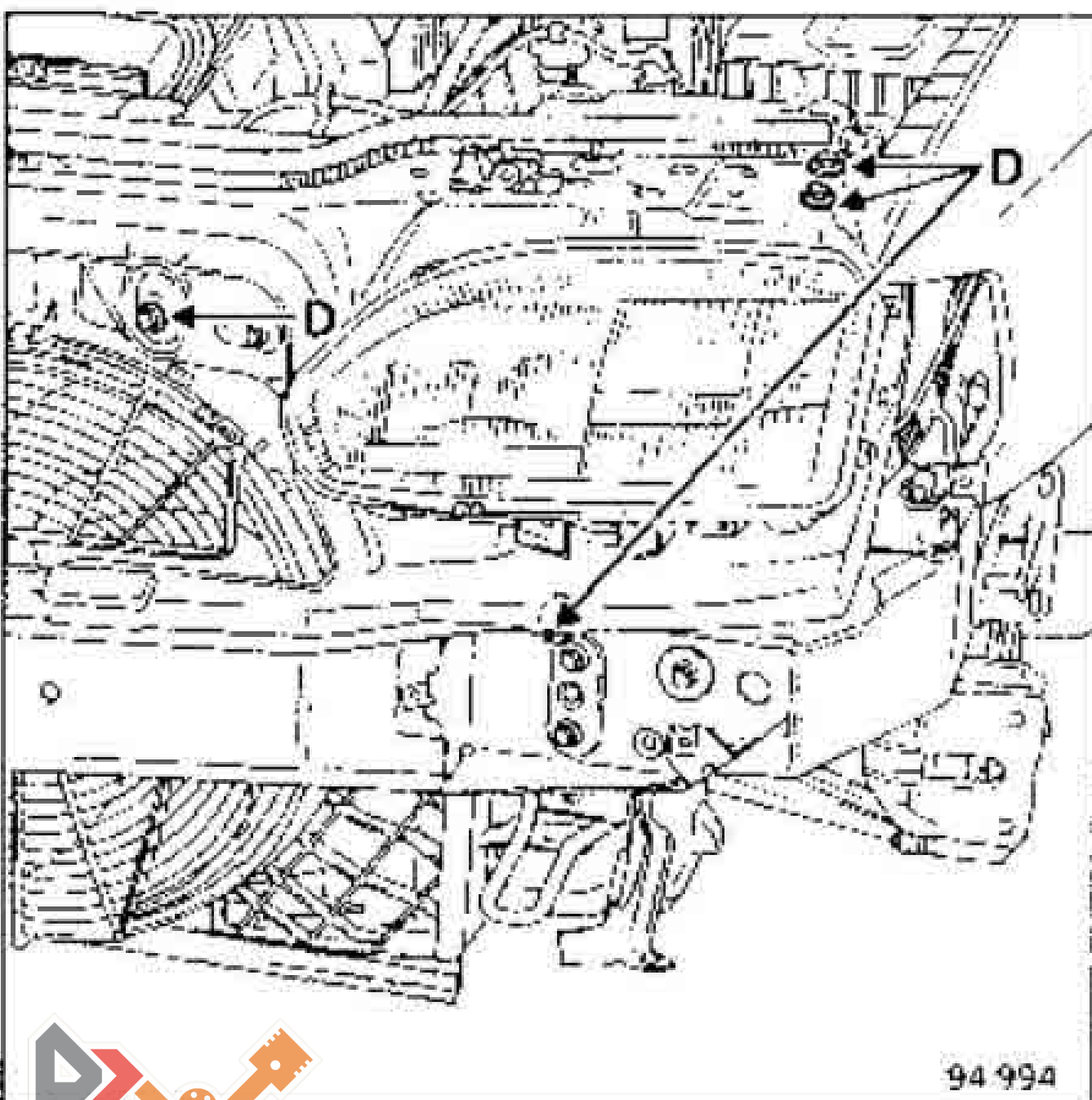
Disconnect:

- main engine feed wire,
- fuse board supply wire,
- engine wiring connector.



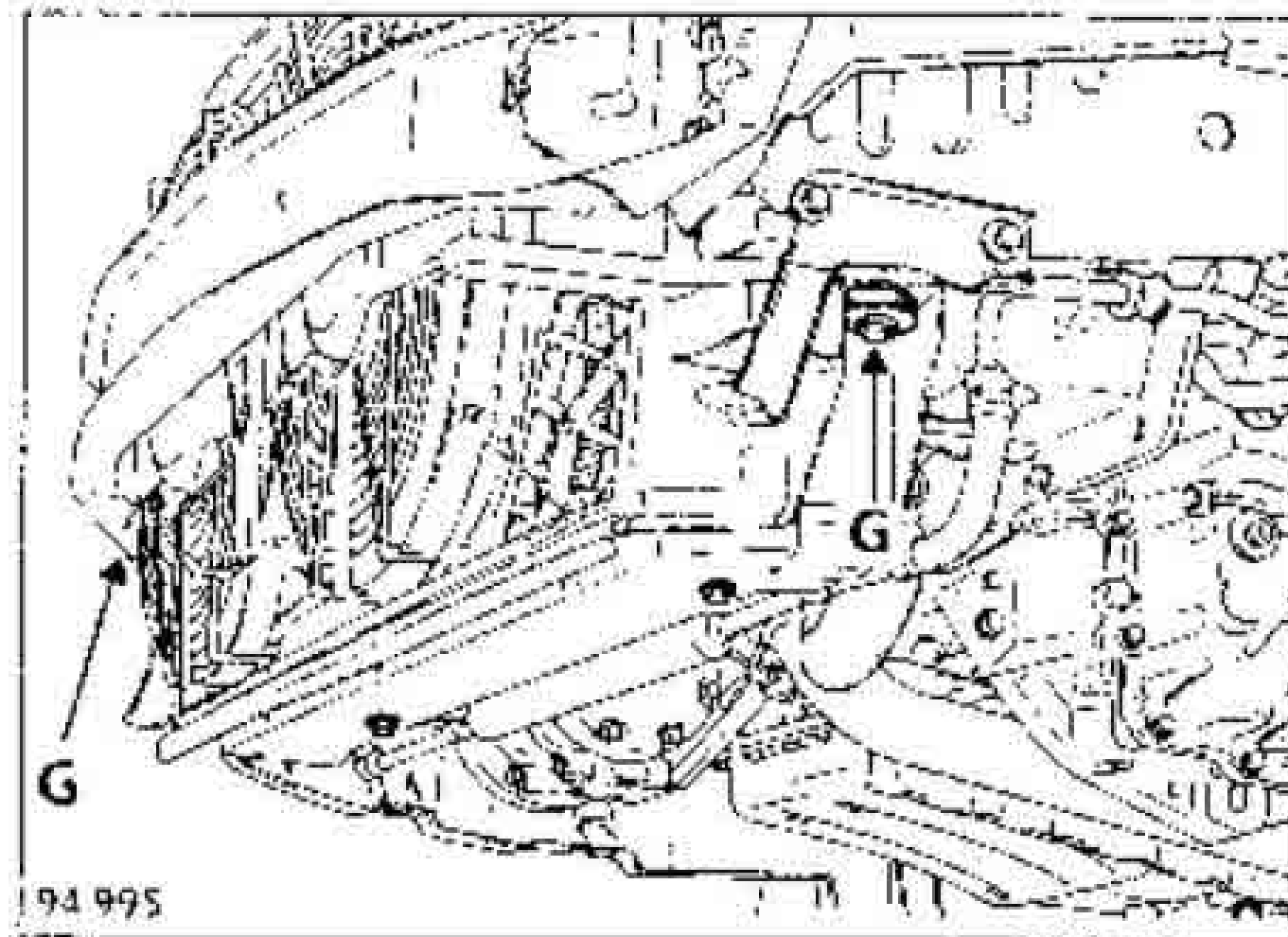
Remove:

- engine wiring sleeve,
- upper cross member mountings (D)

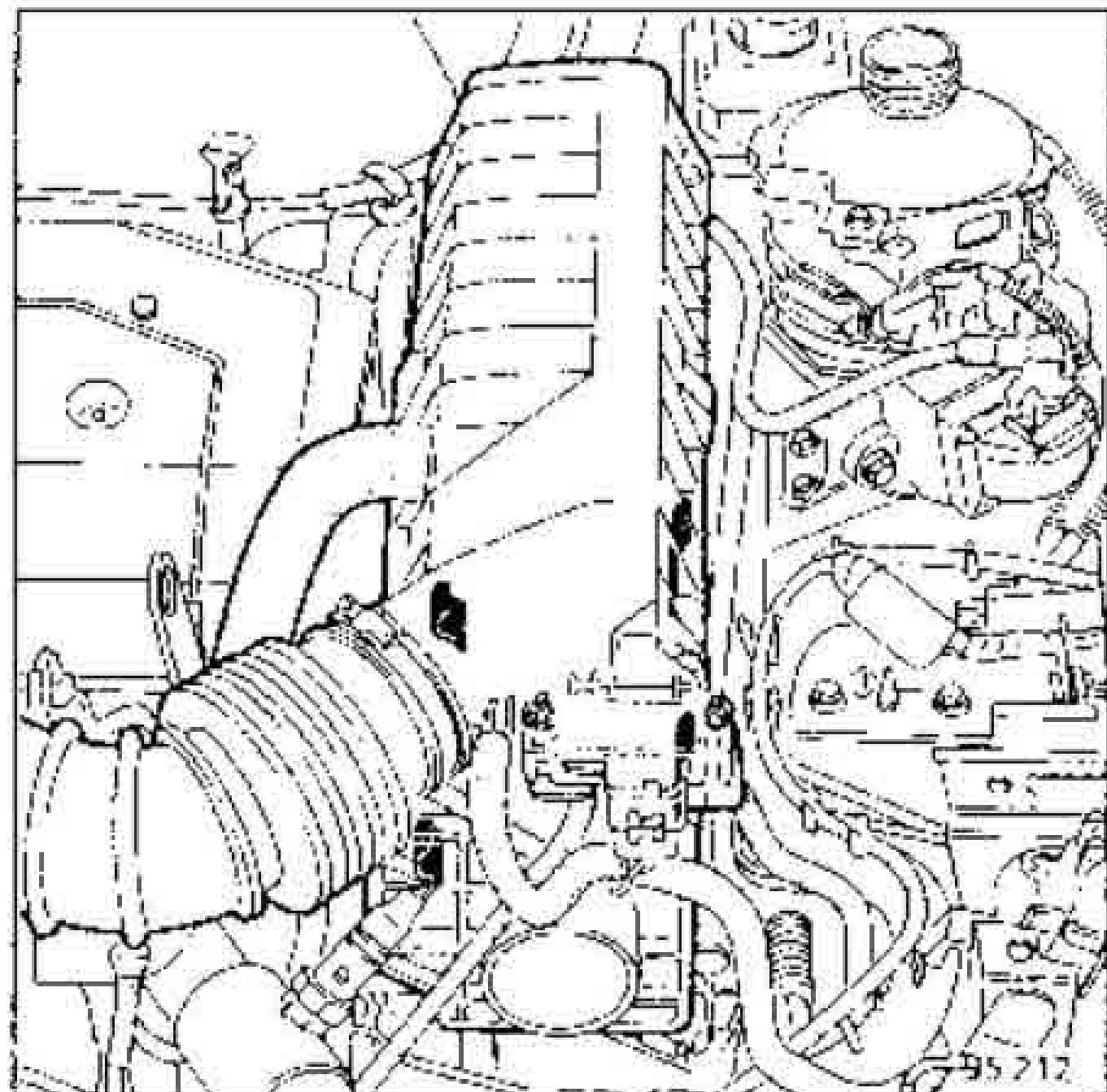


Remove:

- the upper cross member with the headlights,
- the radiator and engine cooling fan assembly mountings (G),
- the mounting,

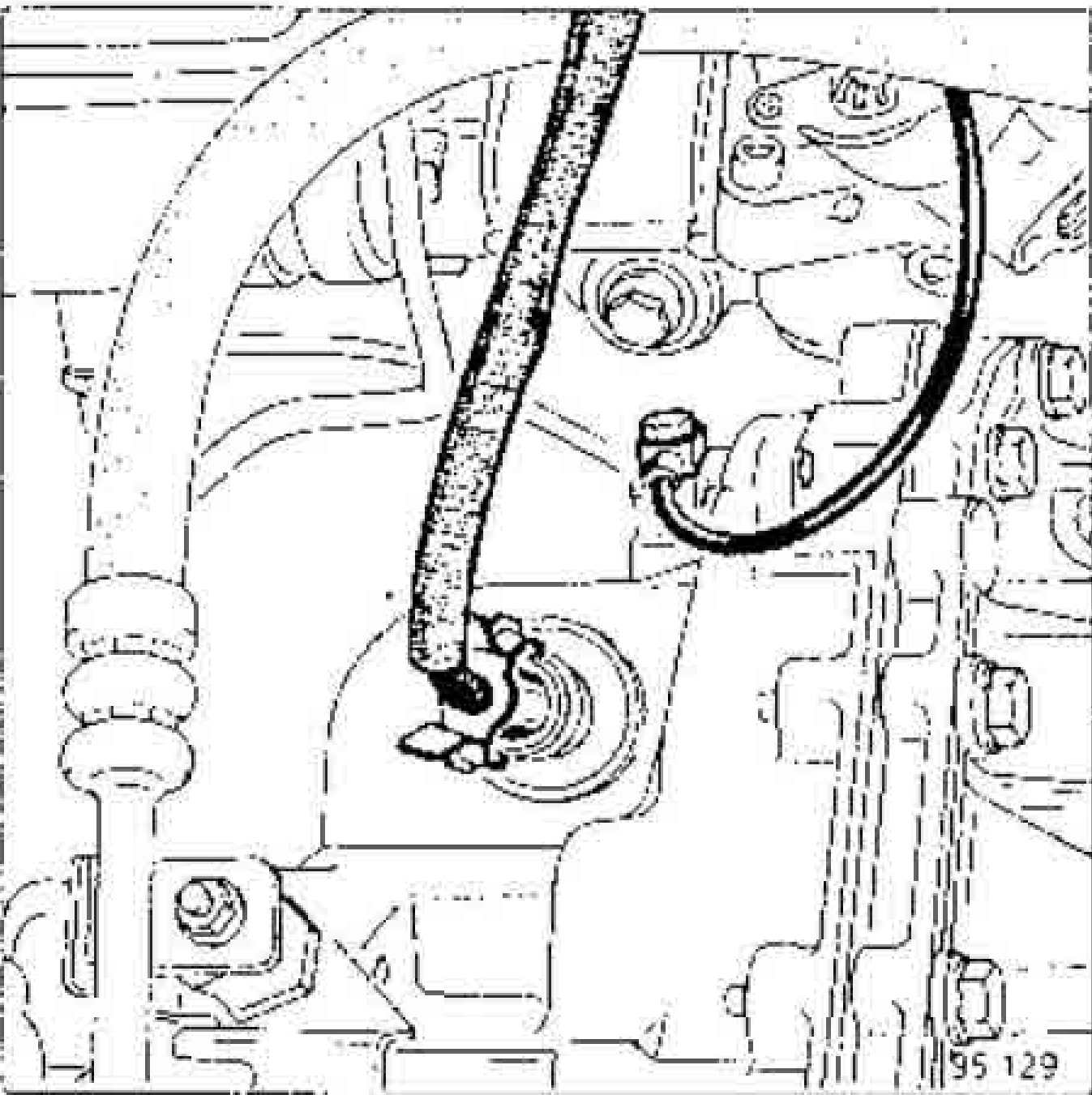


- the accelerator cable cowl,
- the accelerator cable,
- the air filter and its mounting.

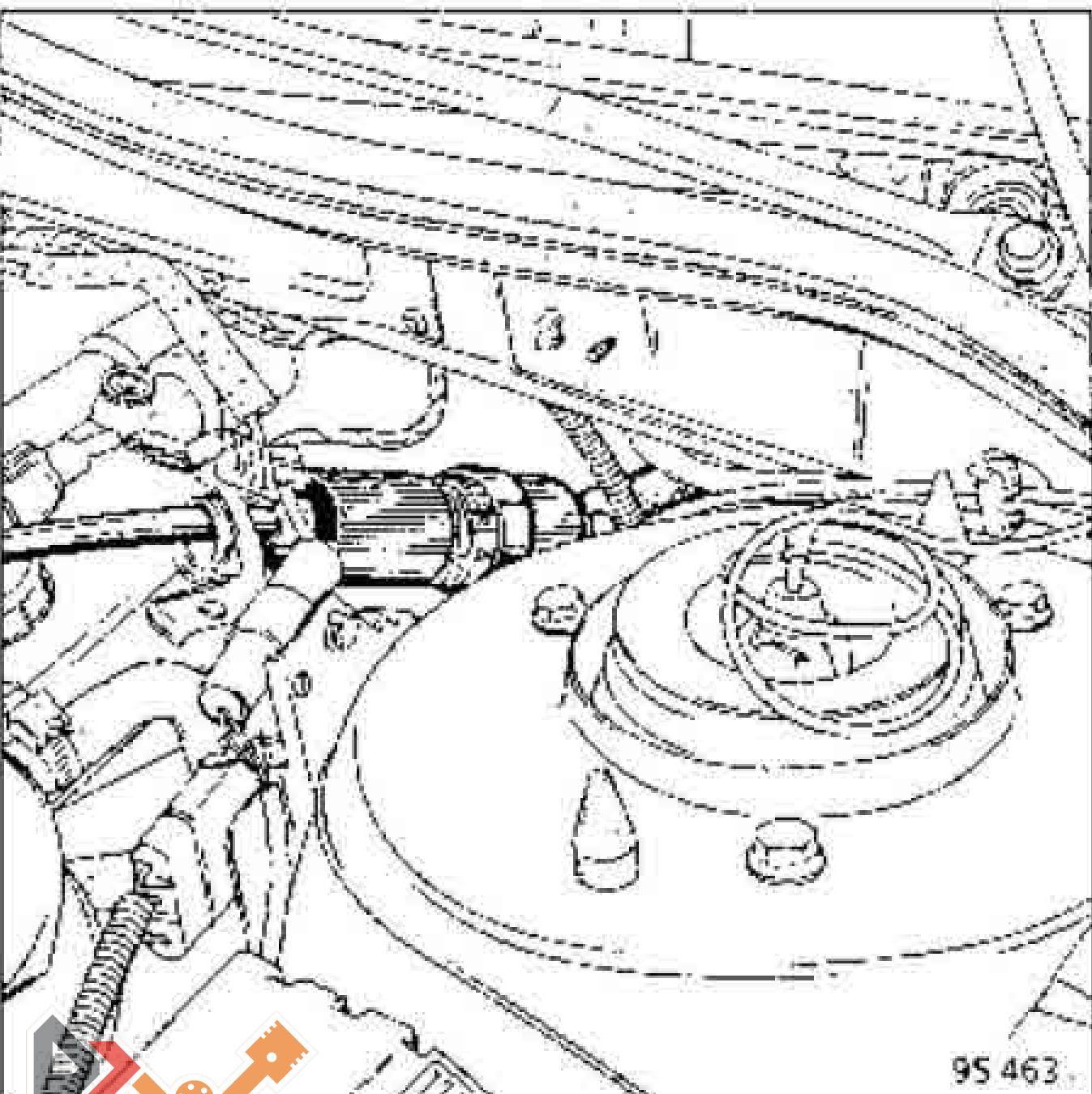


Remove:

- the speedometer cable and sensor,

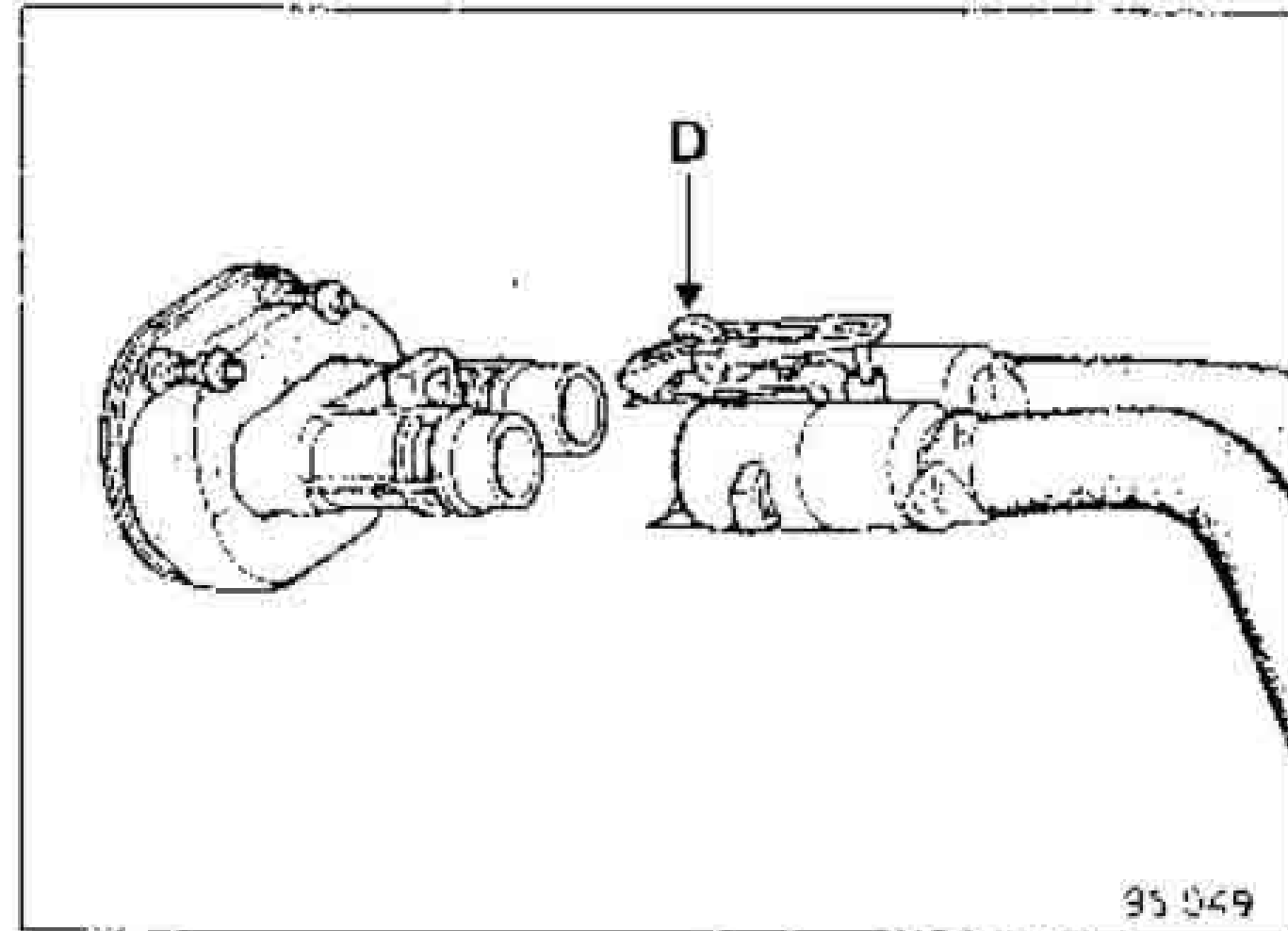


- the clutch cable after releasing the semi-automatic adjustment (see chapter 37),



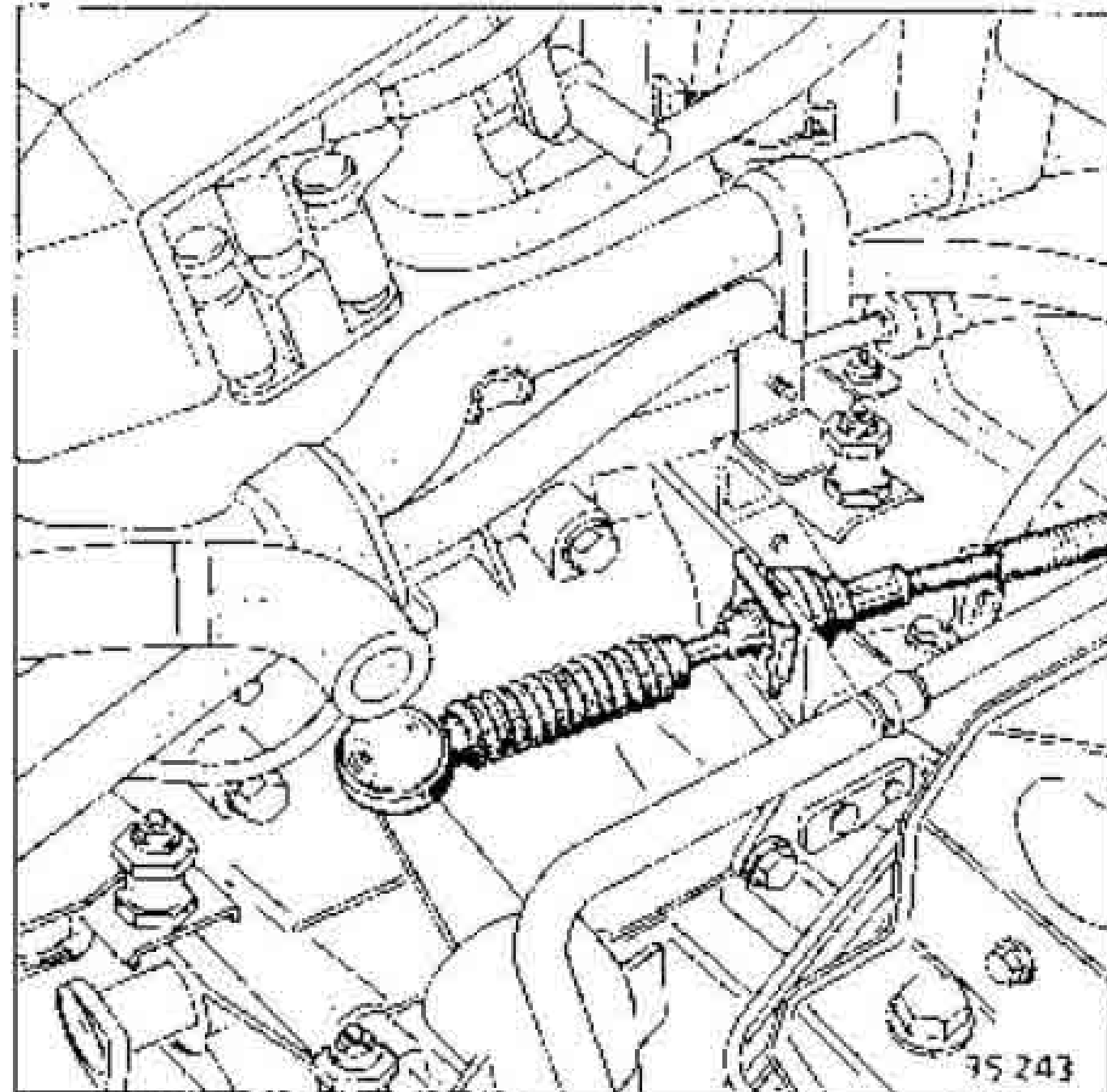
- the heater matrix hoses using a screwdriver to press at (D) and pull the two hoses back sharply to release them from the radiator.

Take care not to damage the two seals.



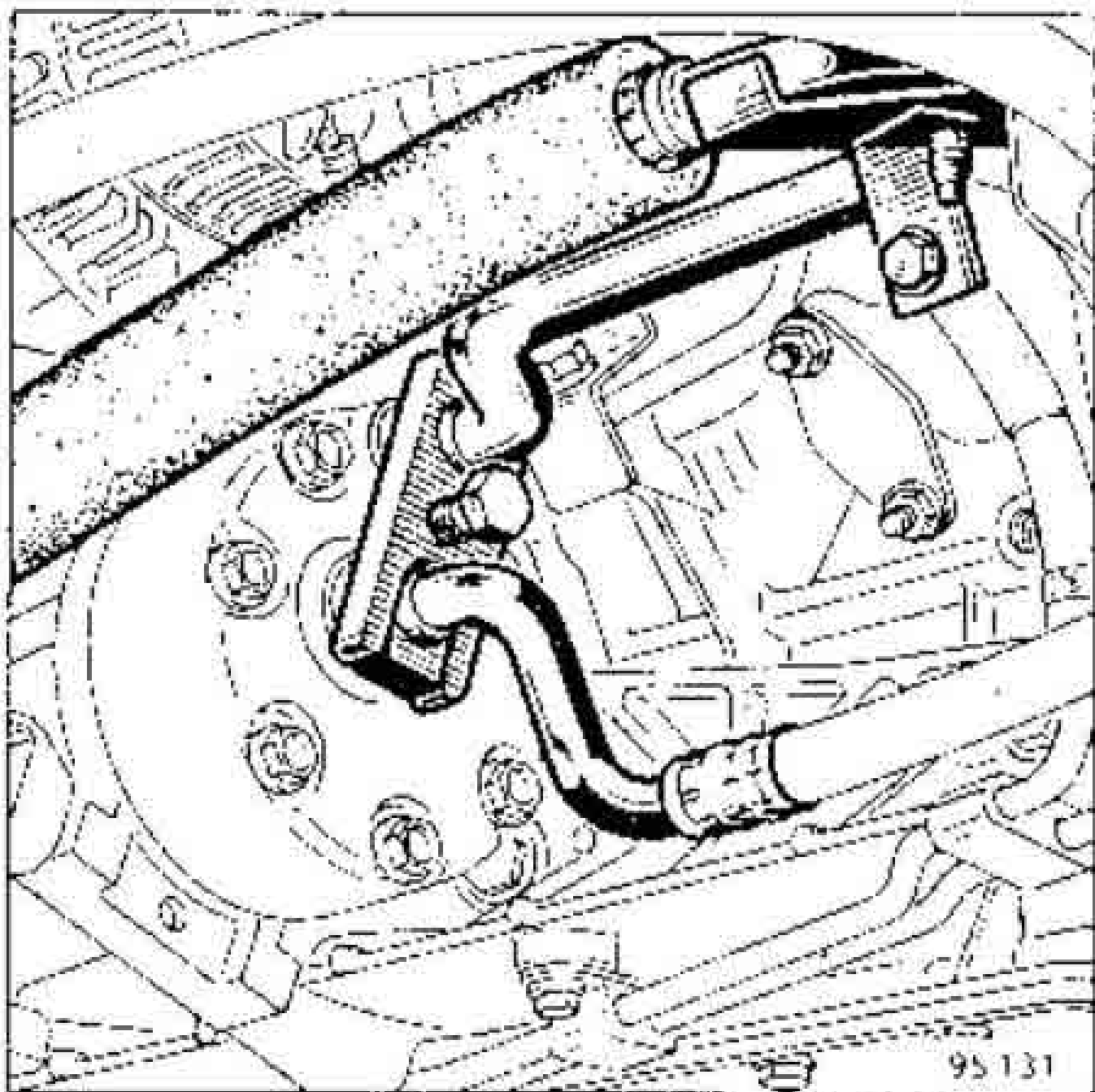
Remove:

- the brake vacuum hose,
- the expansion bottle, which should be attached to the engine,
- the upper gear control cable.

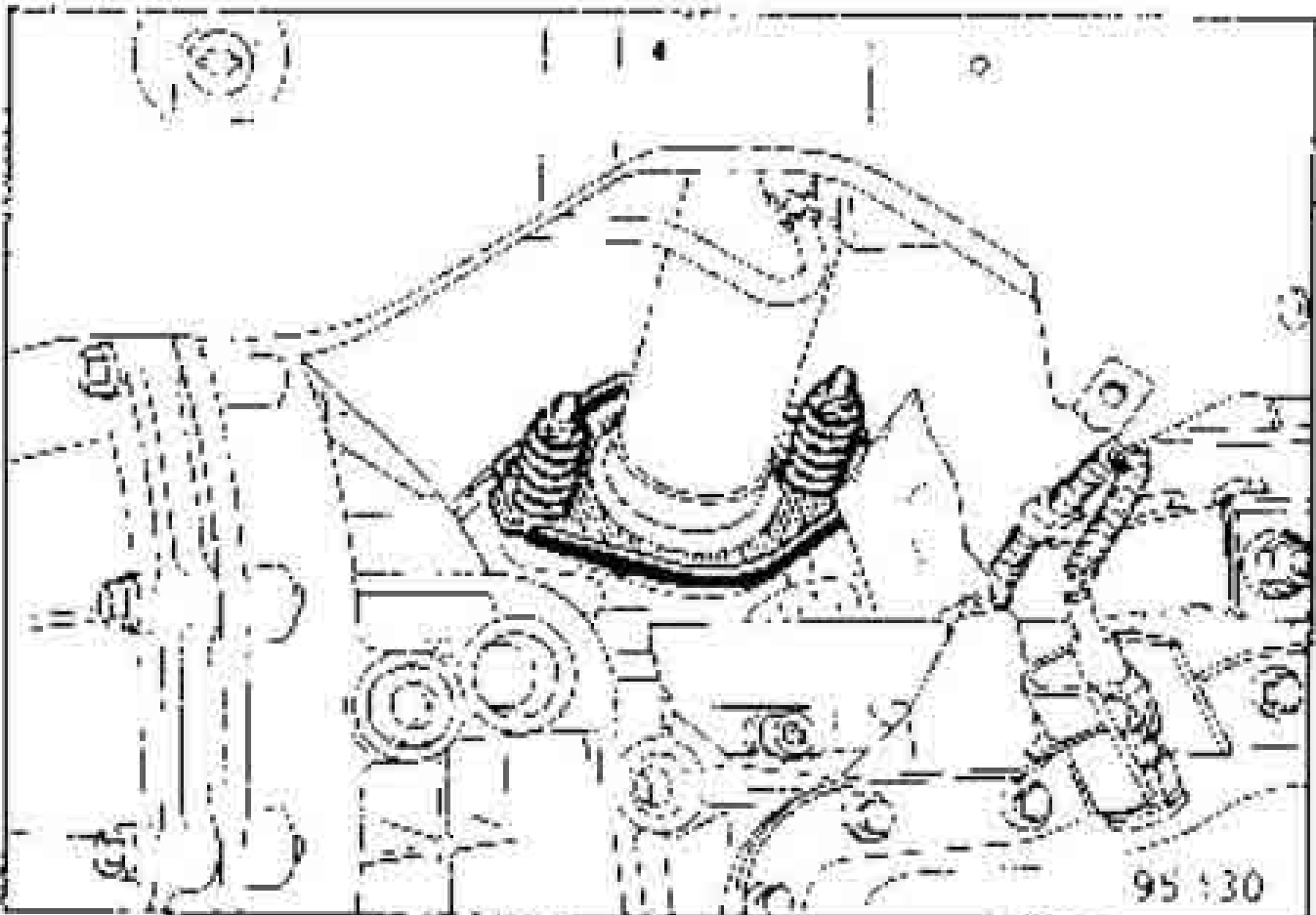


Remove:

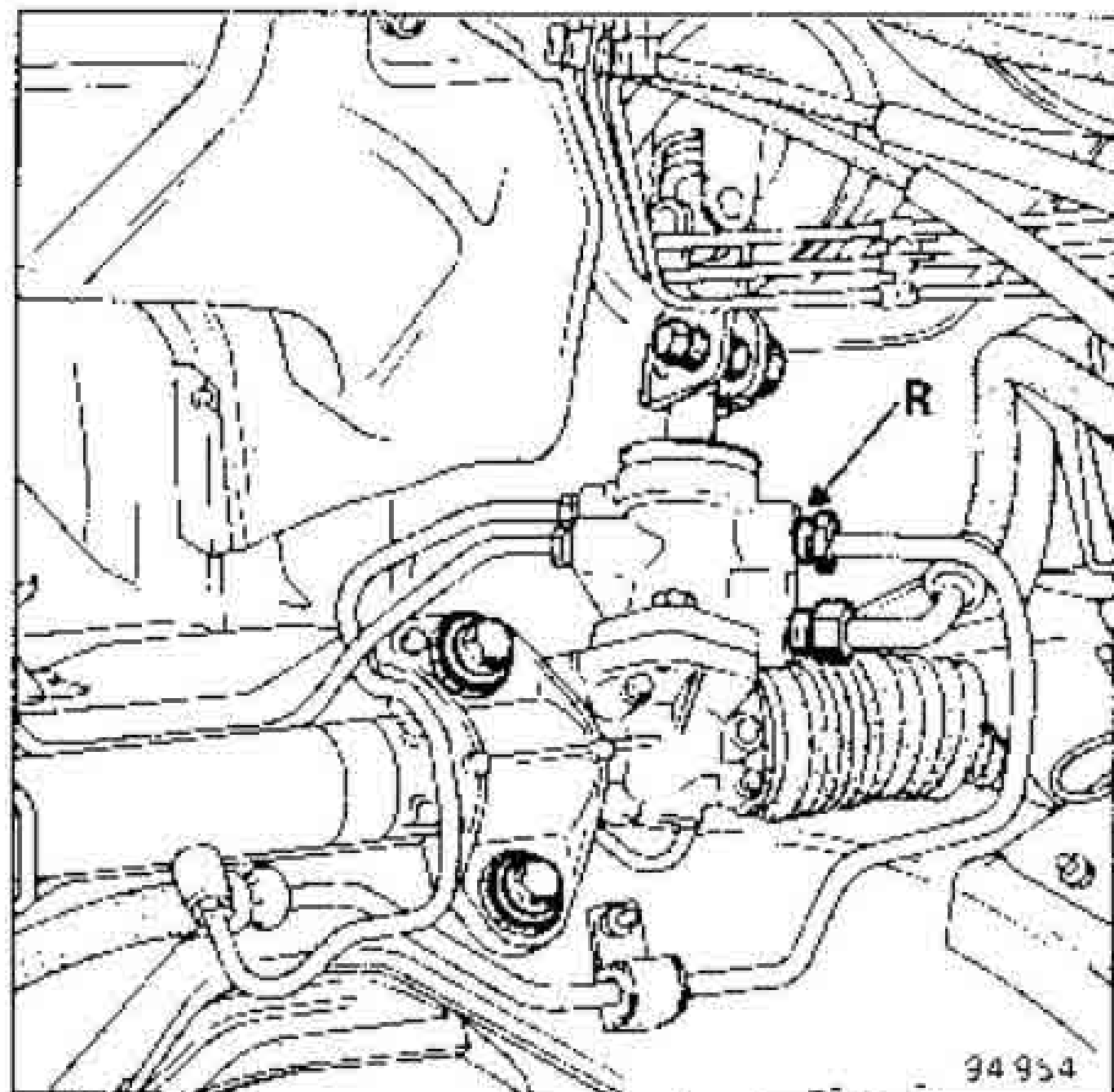
- the air conditioning compressor outlet hoses (if fitted),



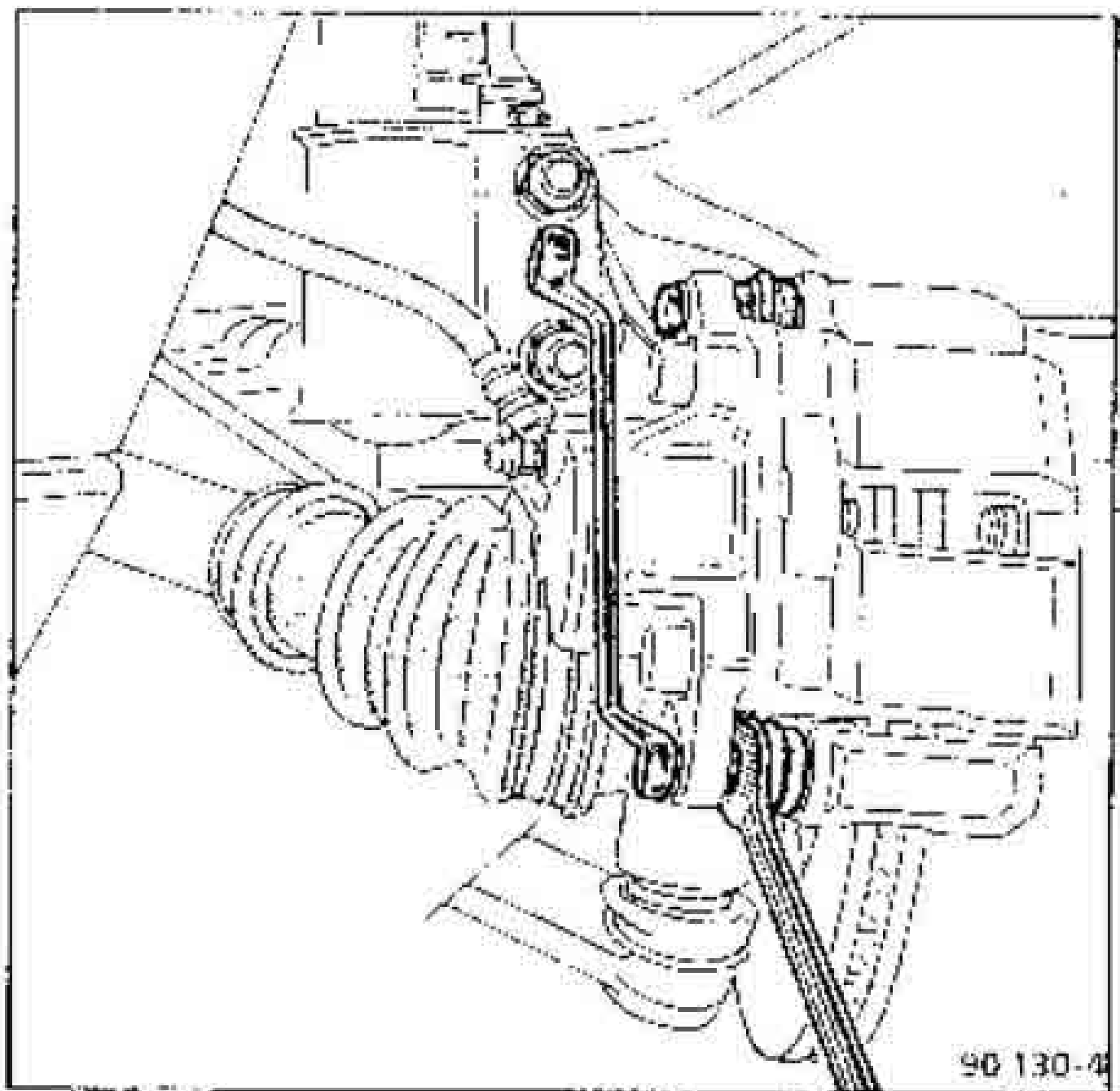
- the injection computer and wiring which should be secured to the engine,
- the petrol lines at the bottom of the right hand bulkhead,
- the manifold outlet exhaust flange,



- the power assisted steering union (R) on the ball valve

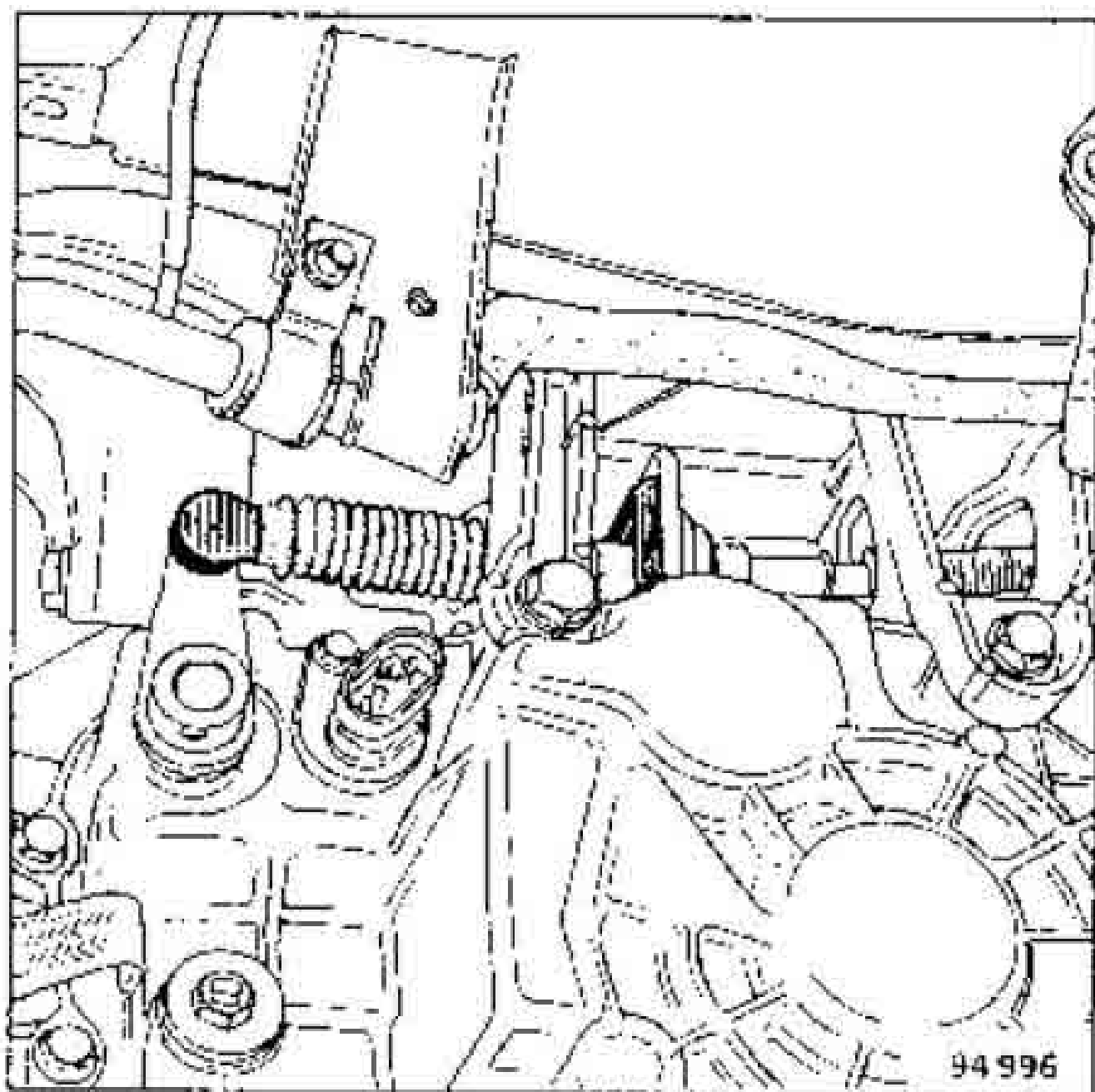


- the left and right hand brake calipers which should be secured to the shock absorber springs.

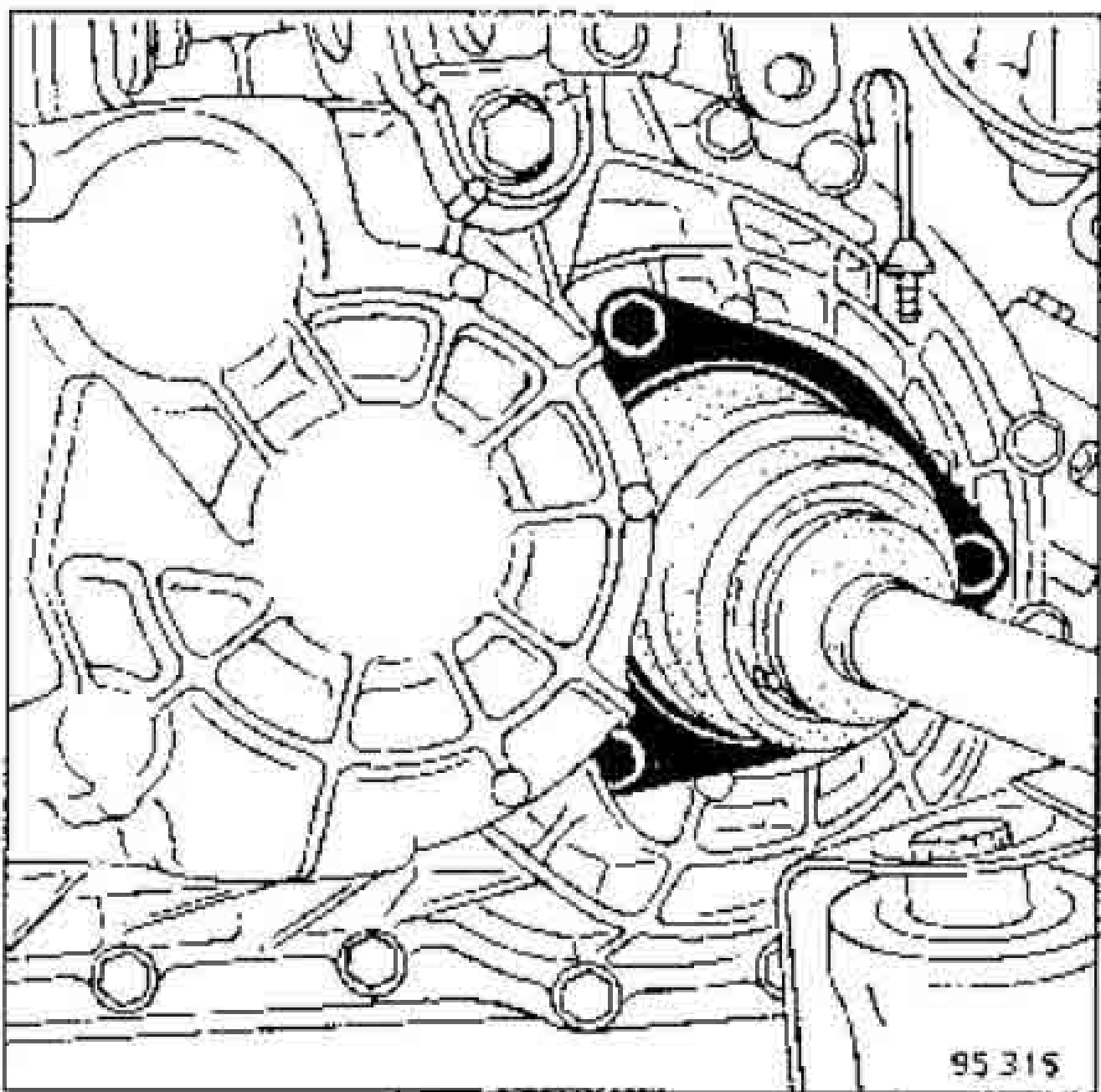


On left hand side, remove :

- the earth strap on gear box,
- the rear section of the wheel arch protector,
- the lower gear control cable,



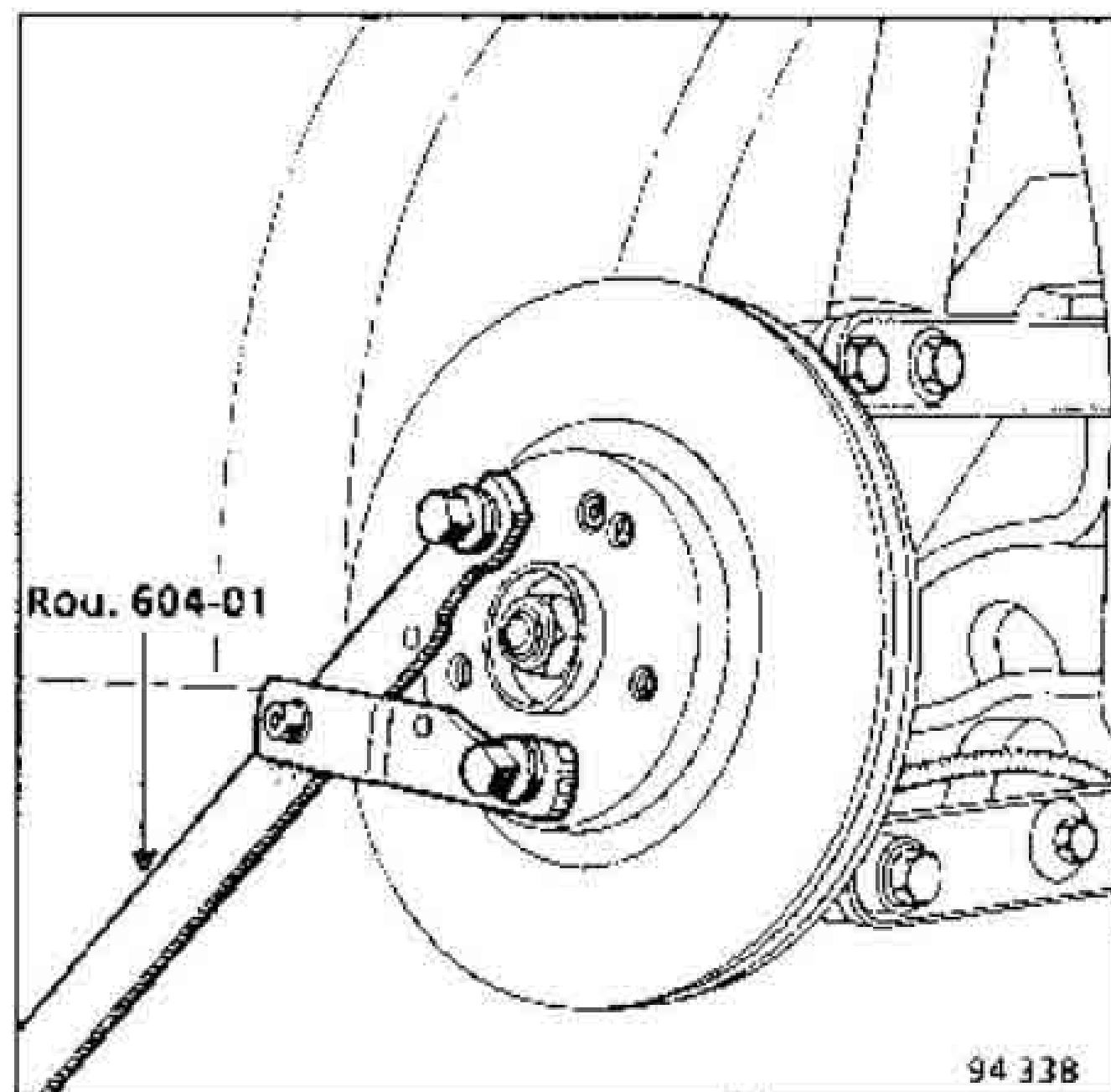
- the 3 driveshaft spider joint bolts



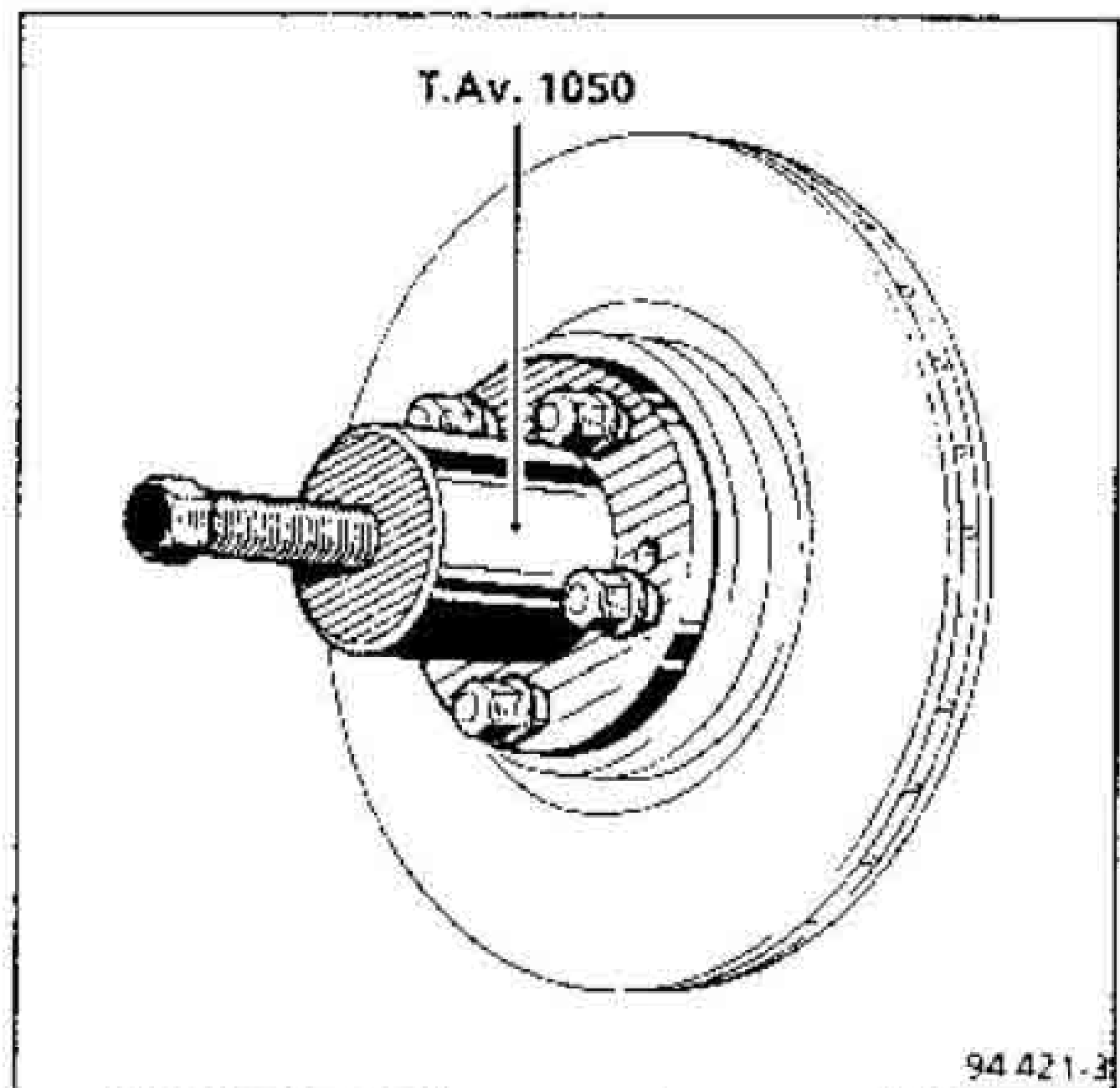
- the 2 shock absorber base bolts.

On the right hand side, remove:

- the ABS wiring support,
- the ABS sensor on the hub and secure it to the shock absorber spring,
- the rear section of the wheel arch protector,
- the driveshaft nut using tool Rou. 604-01



- Fit tool T. Av. 1050 on the brake disc.

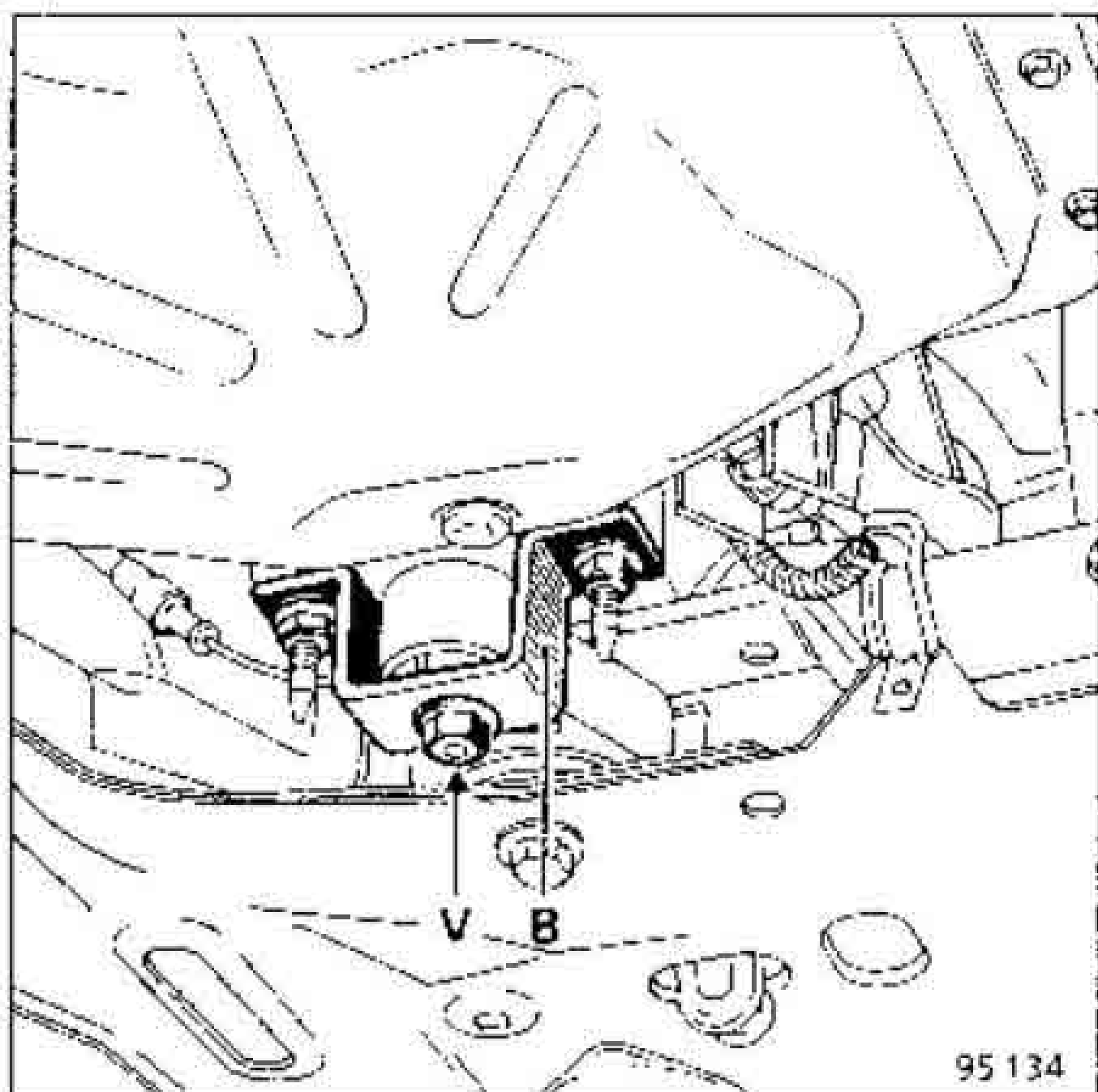


Remove the shock absorber base bolts

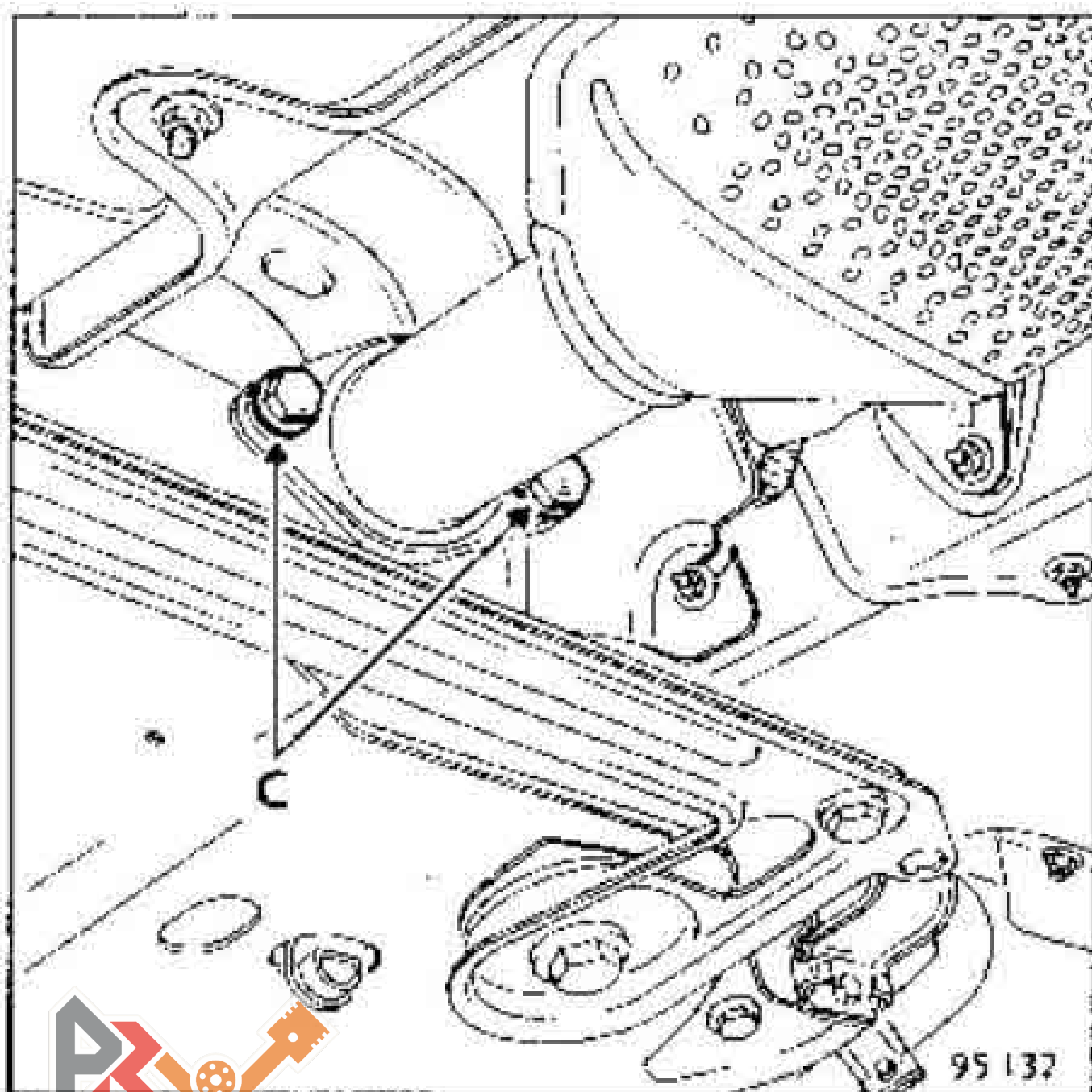
Extract the driveshaft from the brake disc using tool T. Av. 1050

Remove:

- flange (B) of engine tie bar,
- bolt (V) for mounting the tie bar on the engine,



- the primary exhaust pipe

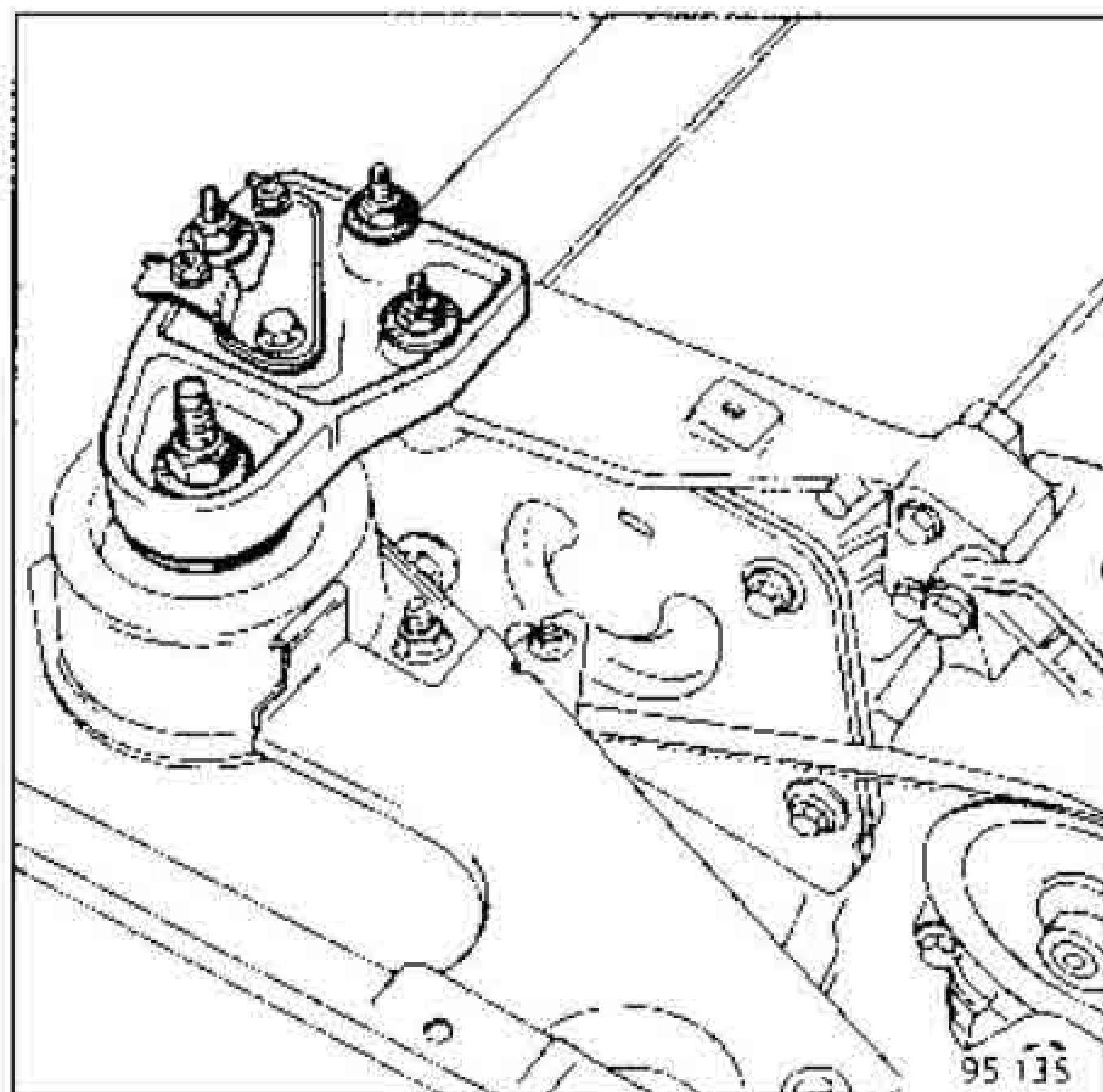


Remove the 2 bolts (C).

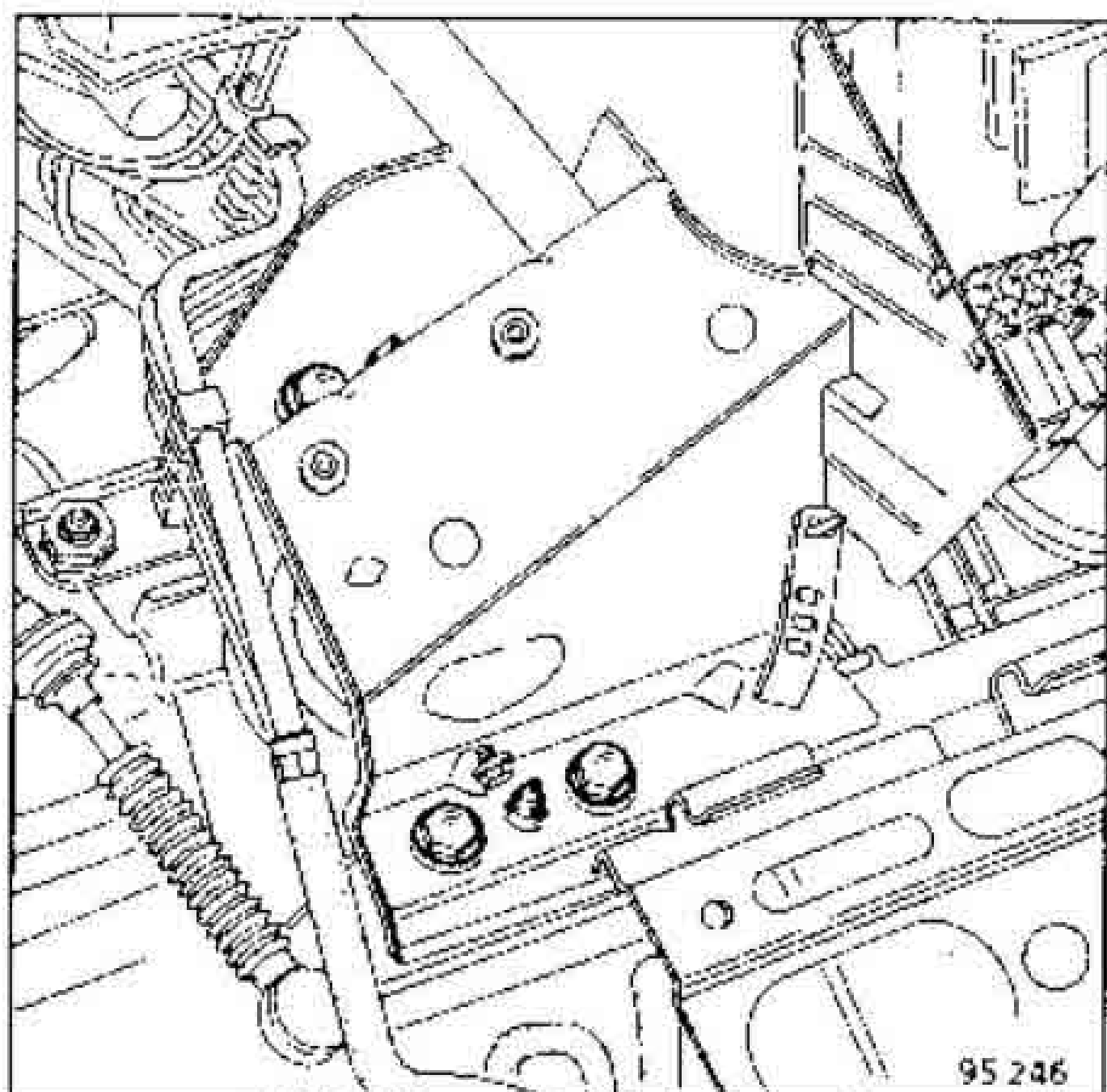
Fit the workshop hoist, fit tool SEFAC 689 on the lifting rings, and support the engine's weight.

Remove:

- the ignition power module and mounting
- the right hand side suspended engine mounting cover,

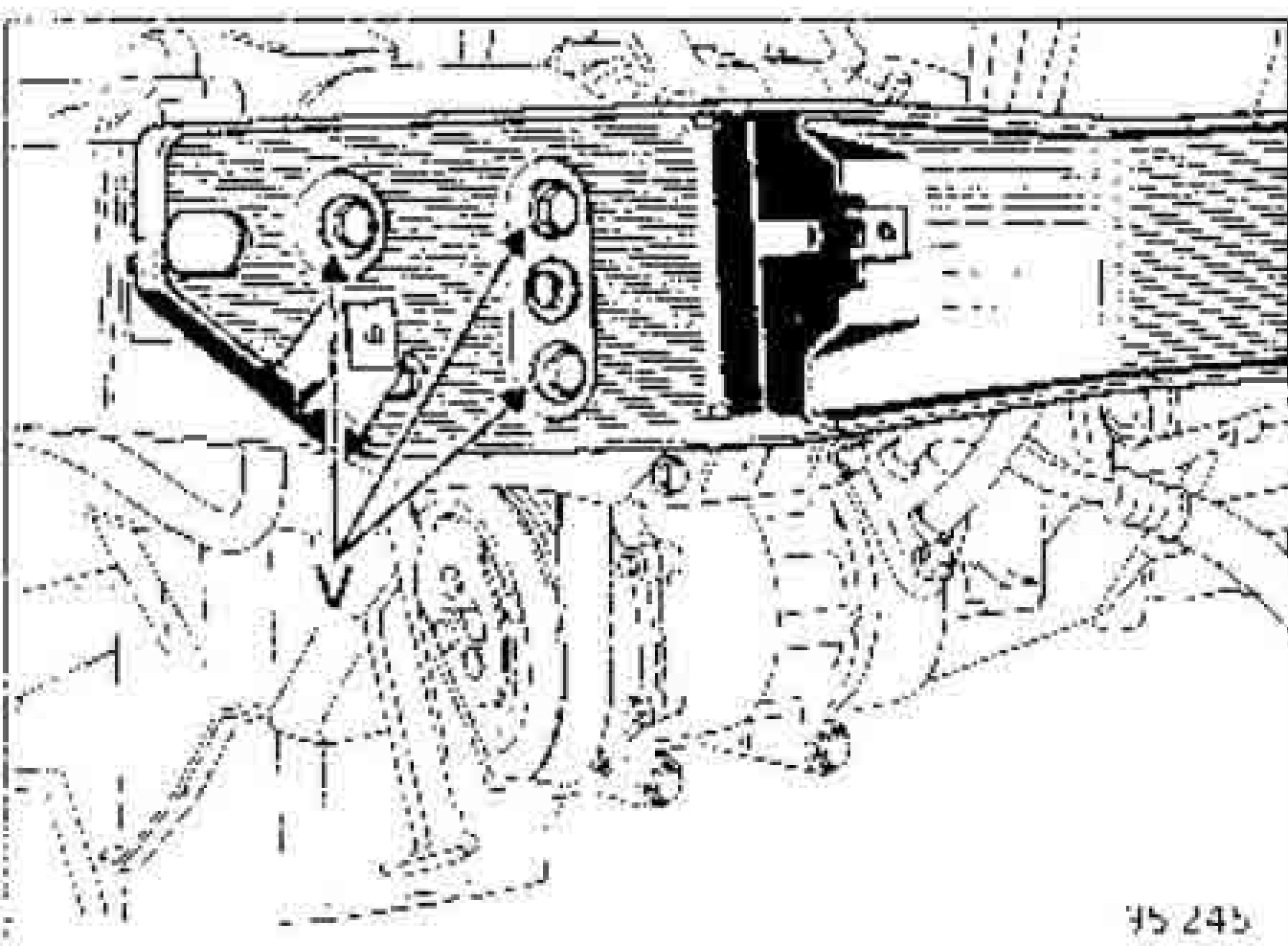


- the 3 left hand side rubber suspended engine mounting mounting bolts.



Using a rope, secure the right hand driveshaft to the engine.

Remove the lower cross member mounting bolts (V)



Note : this cross member helps to strengthen the engine bay. This is why the engine must be supported by the hoist when working on the cross member, (if the cross member is removed without supporting the engine weight, the side members will move closer together).

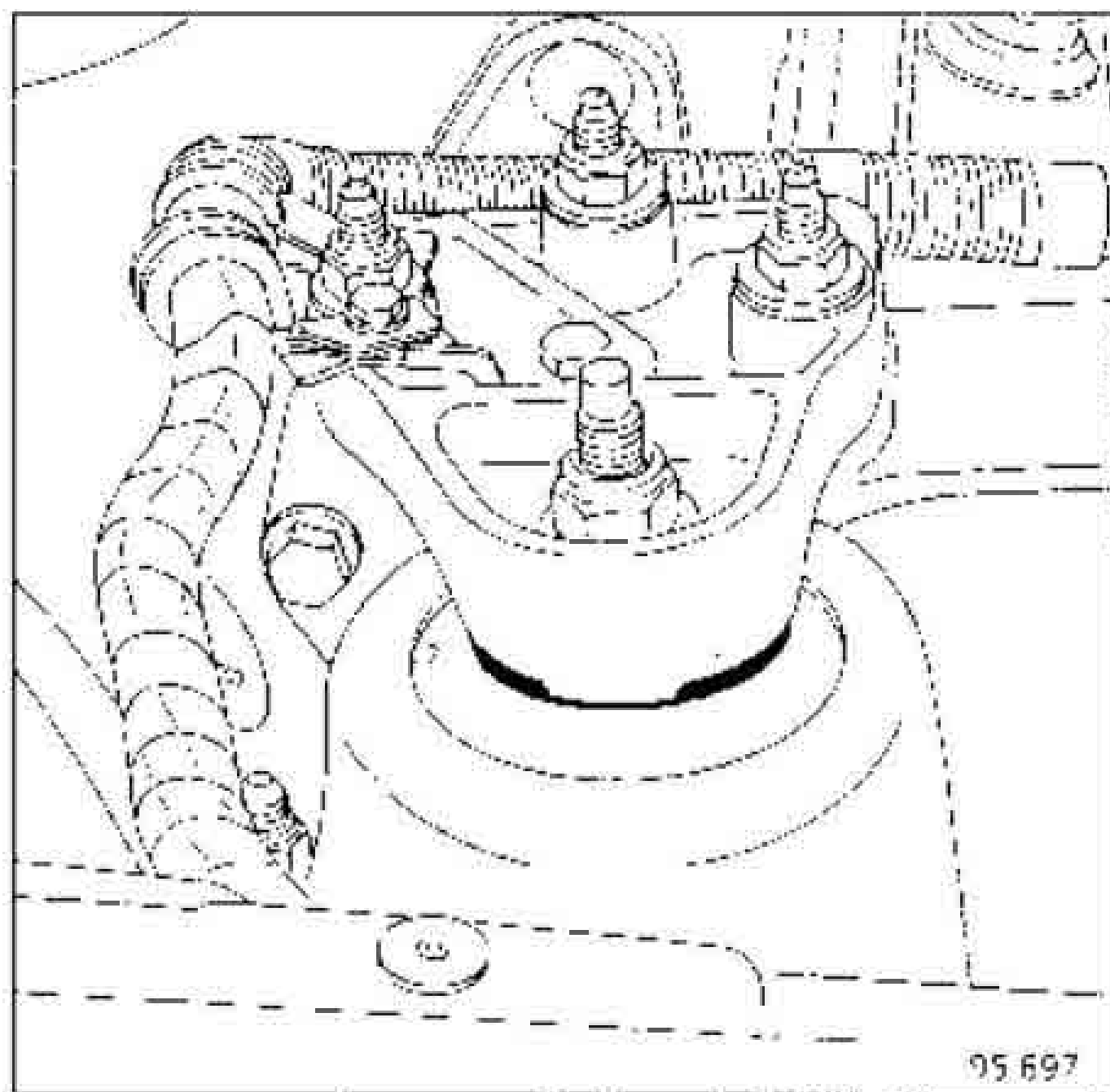
Remove the engine from the engine compartment first by releasing the right hand side driveshaft. Turn the engine by a quarter turn to do this.

REFITTING- Special notes

Replace the engine in the compartment but without fitting it.

Refit:

- the lower cross member,
- the left hand engine mounting,
- the right hand suspended engine mounting cover. Ensure the cover is correctly positioned with the rubber suspended engine mounting



- the engine tie bar.

Refitting is then the reverse of removal

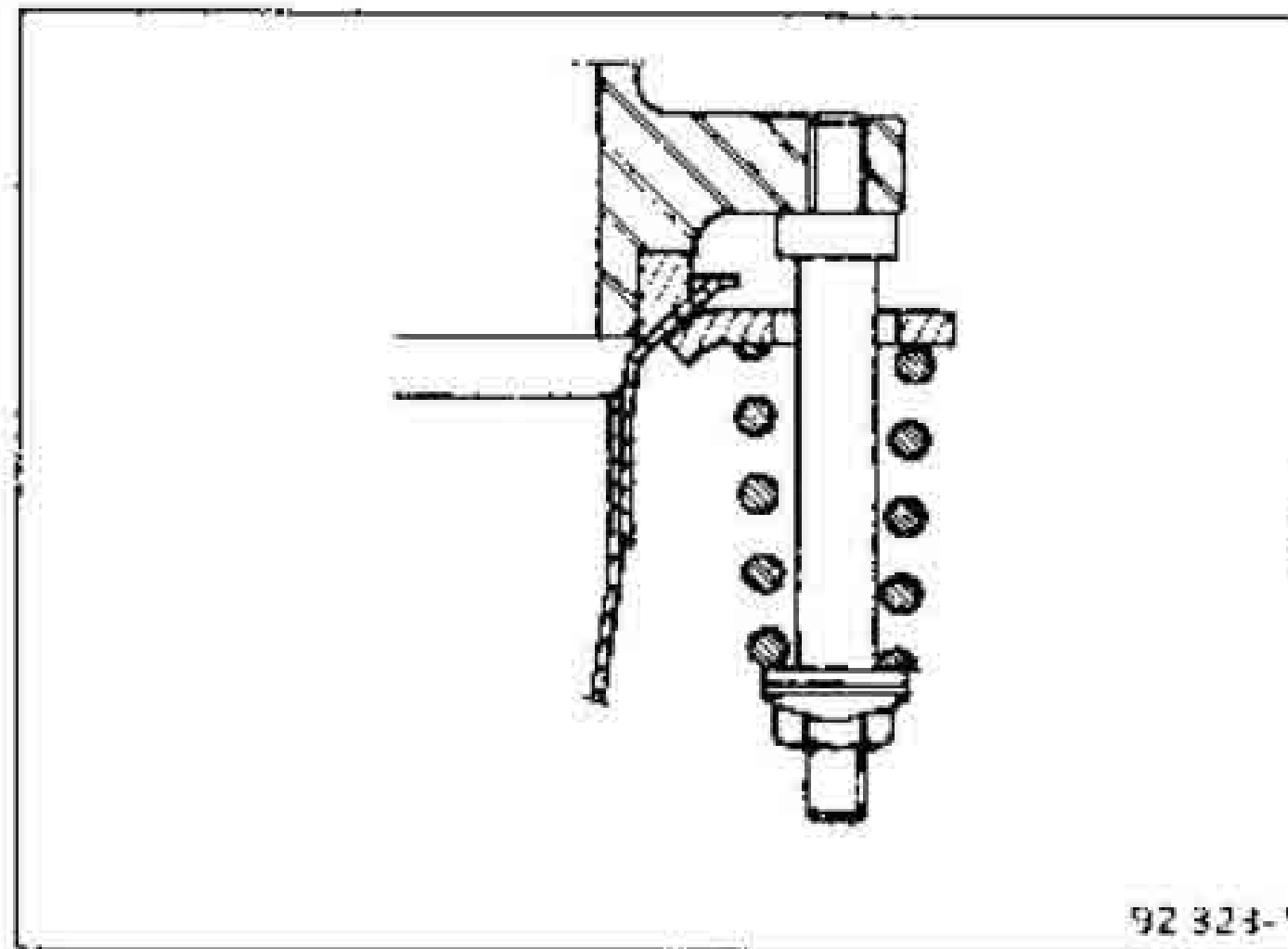
Top up:

- the gear box oil,
- the engine oil if necessary,
- the power assisted steering circuit,
- the cooling circuit and bleed
- the freon circuit (air conditioning version).

Adjust:

- the accelerator cable,
- the semi-automatic clutch adjustment system (see chapter 37).

Tightening the exhaust flange with spring fittings.



IMPERATIVE : tighten to the stop .

- Fit brake caliper mounting bolts using Loctite **FRENBLOC** and torque tighten.

Press the brake pedal several times to move the brake piston into contact with the brake pads

- Tighten all nuts and bolts to the recommended torque.

SPECIAL TOOLING REQUIRED		
Rou.	604 -01	Hub locking tool
T.Av.	476	Ball joint extractor
T.Av.	1050	Driveshaft removal tool
SEFAC 689		Load positioning tool

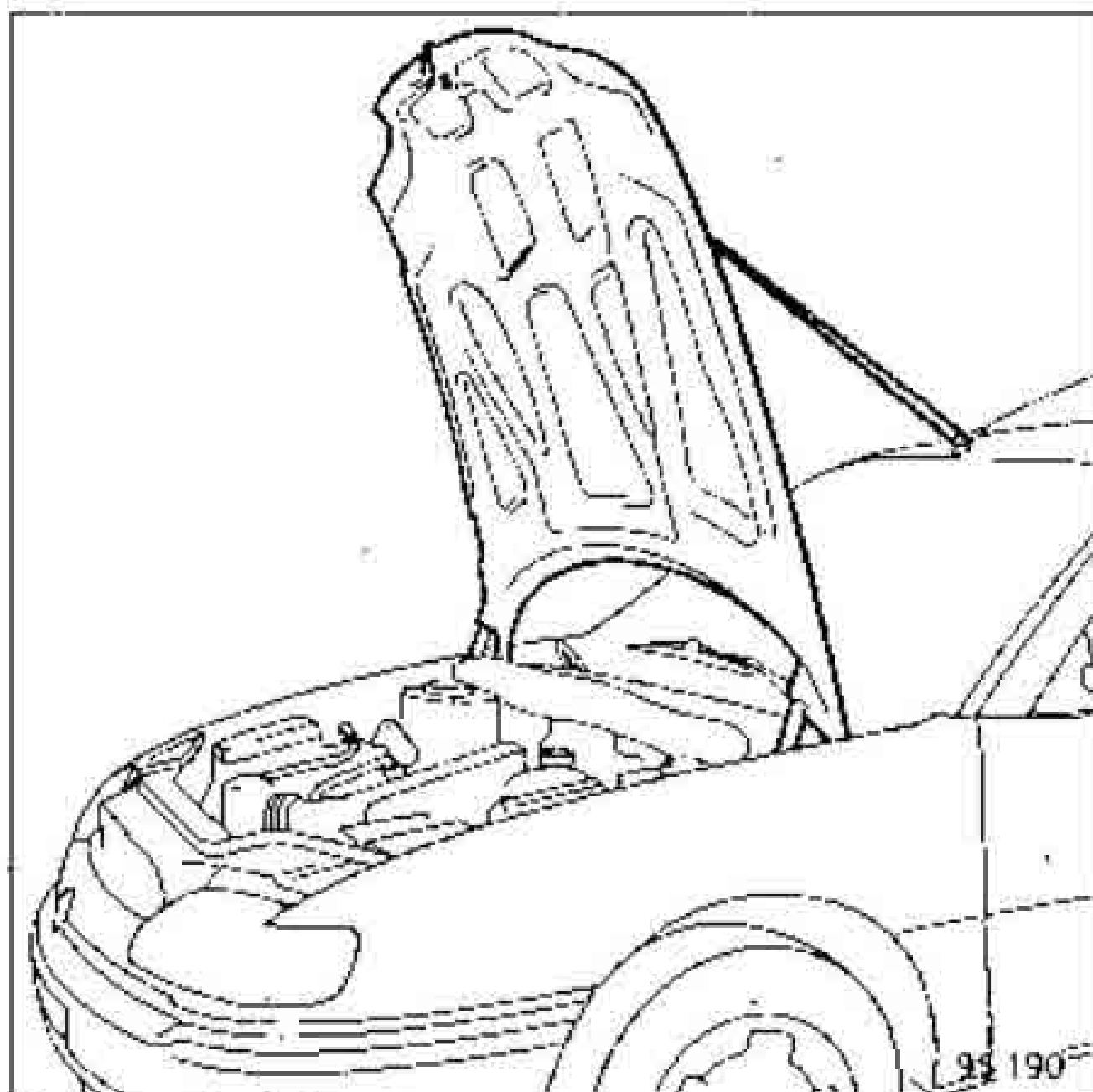
TIGHTENING TORQUES (in daN.m)		
Wheel bolts	10	
Hydro-elastic engine mounting pad bolts	10,5	
Gear box mounting bolt	4	
Right hand driveshaft nut	25	
Shock absorber base bolts	25,5	

REMOVAL

Place the vehicle on a 2 post lift (see chapter 0 - methods of lifting).

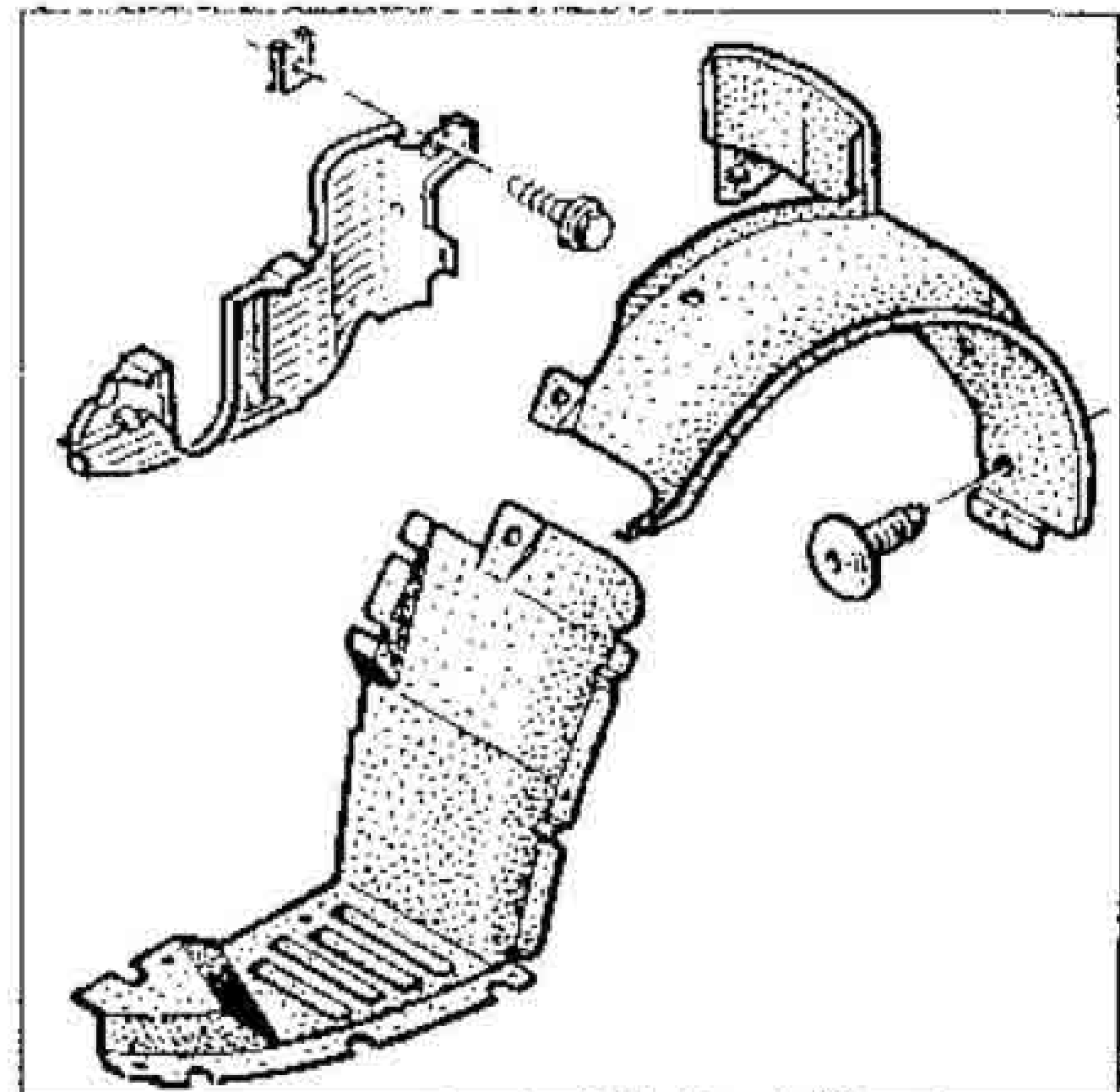
Disconnect the battery.

Secure the bonnet to the roof aerial using a cord.



Remove:

the engine undertray, the front wheels, the front bumper and impact absorbers the wheel arch protectors.

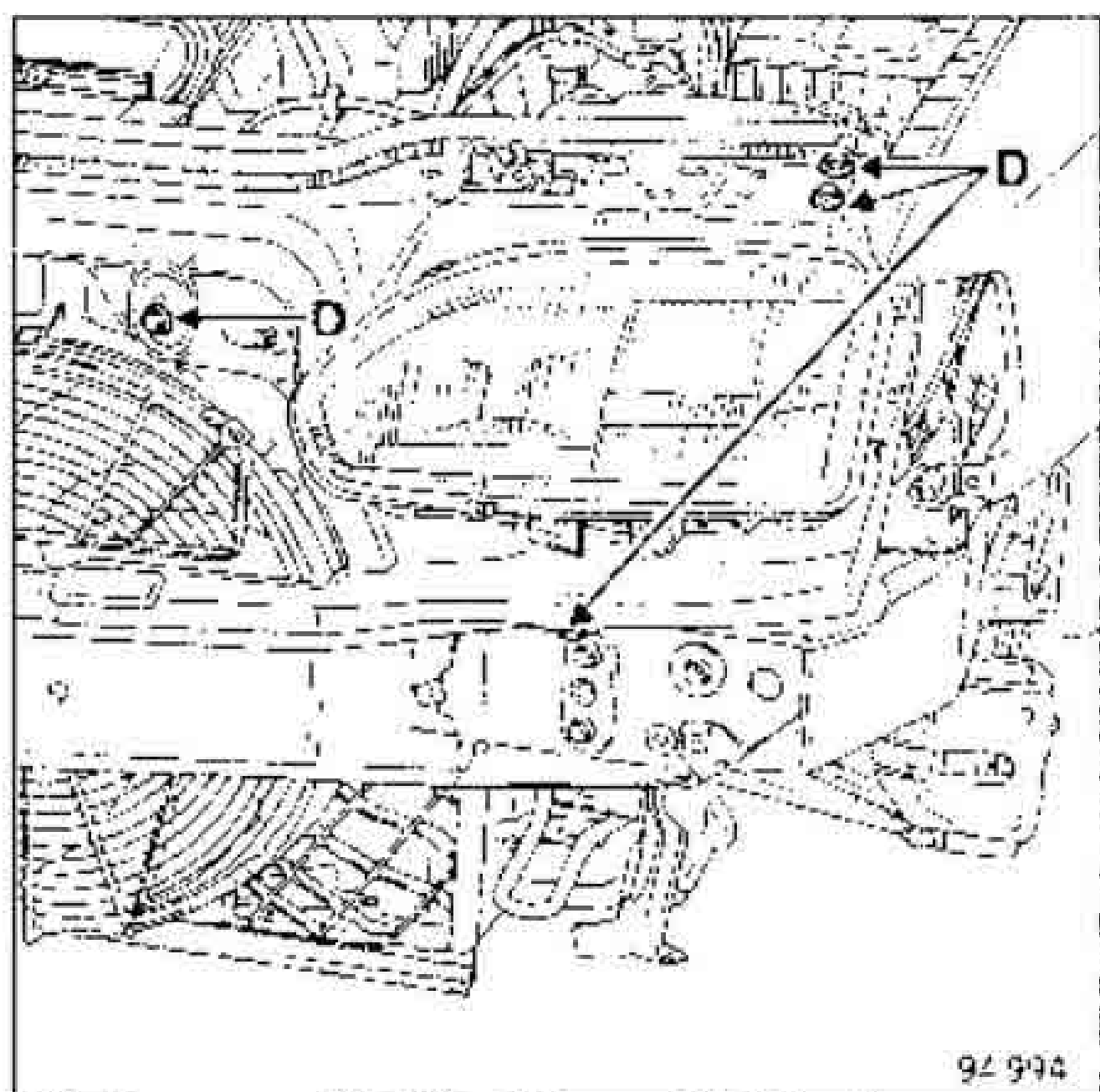


- the radiator grille,
- the indicators.

Disconnect the lights connectors.

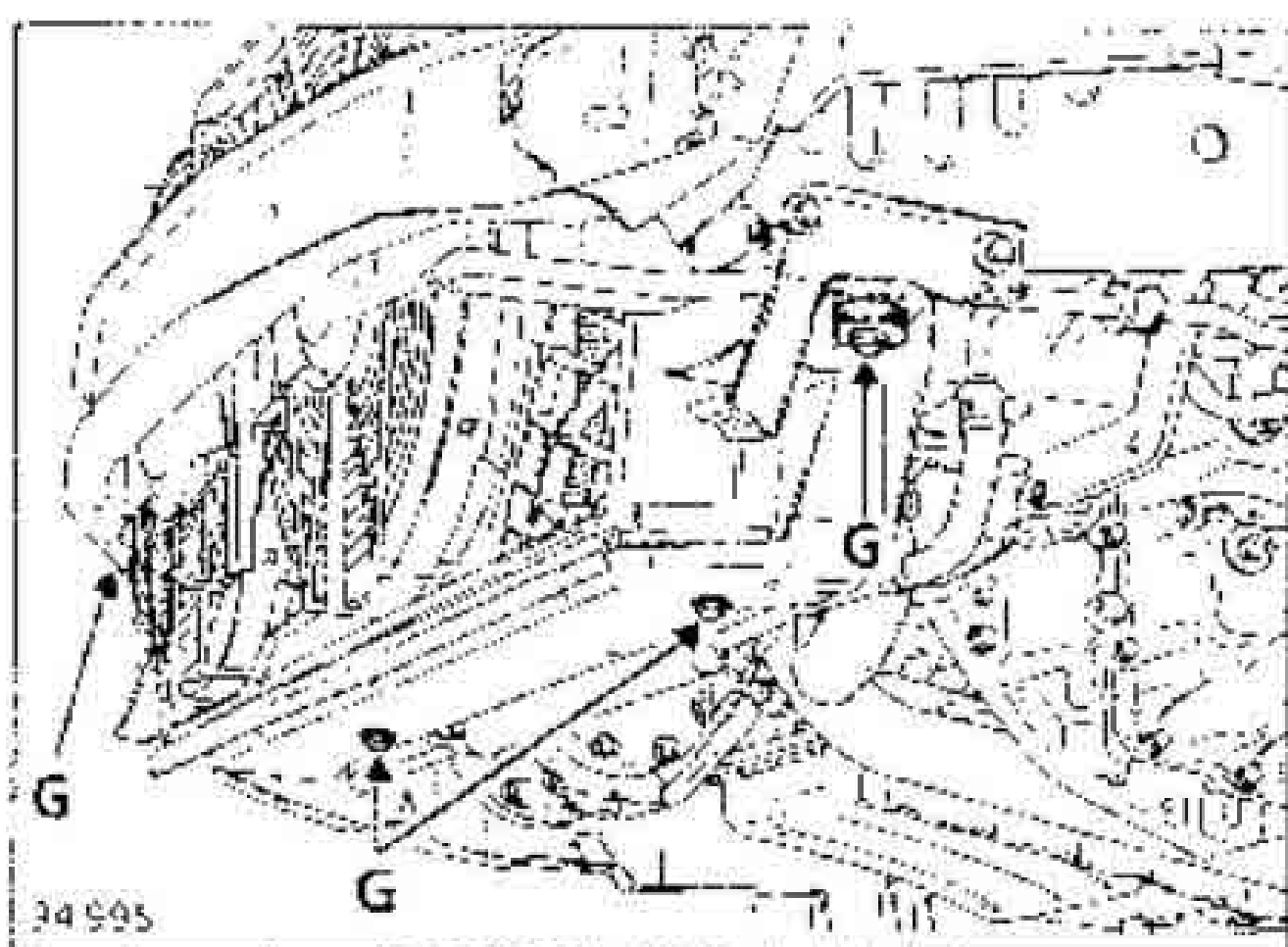
Drain the cooling circuit by the lower radiator hose, the air conditioning freon circuit (depending on version), and the gear box.

Remove the upper cross member mountings at (D).



Remove the upper cross member and the lights.

Remove the condenser air conditioning ducts, the radiator mounting bolts and the steering oil cooler at (G).



Remove the radiator assembly

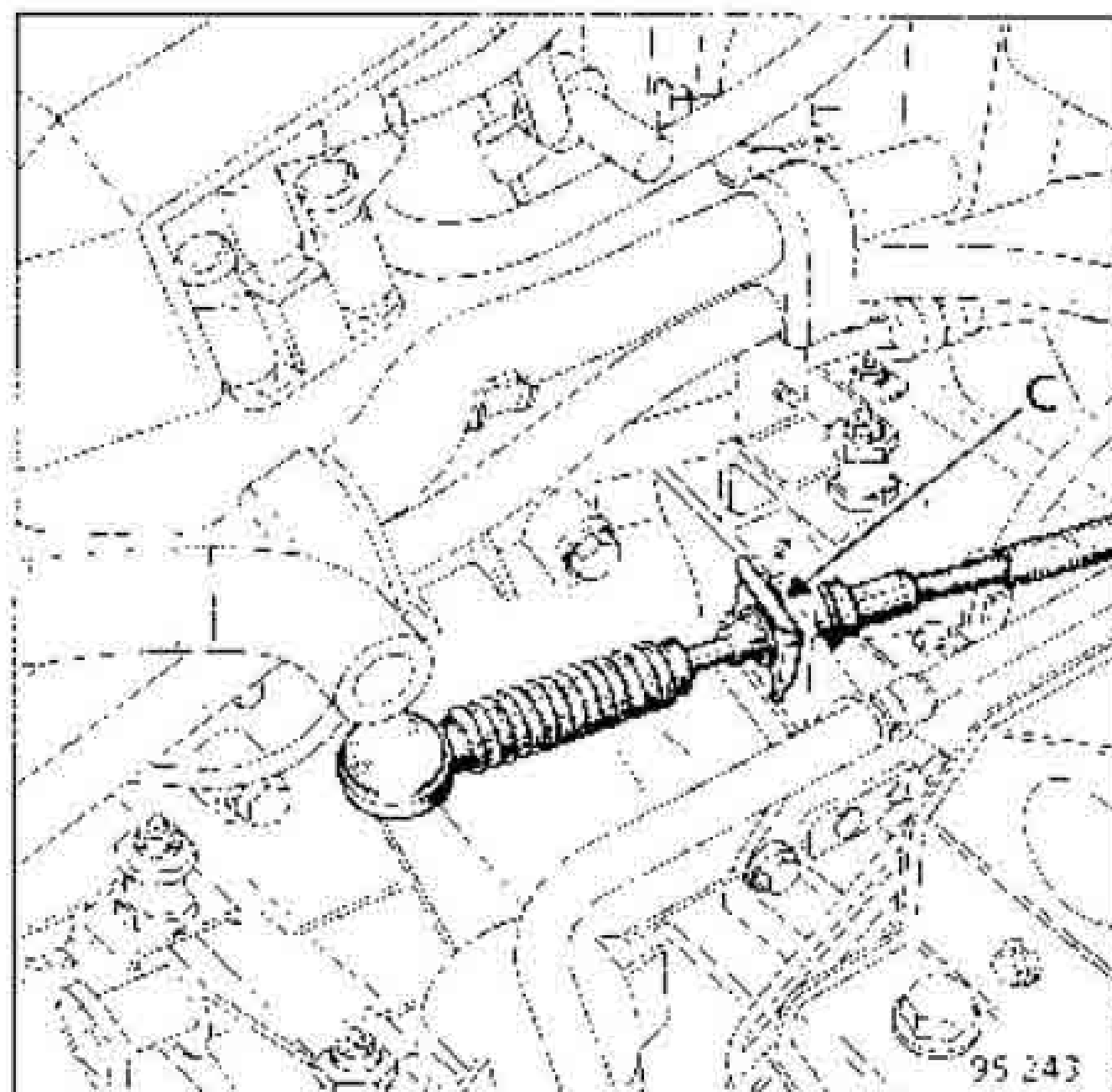
Disconnect the engine wiring connectors

Remove the sleeve between the air filter and the inlet manifold, the battery and its tray.

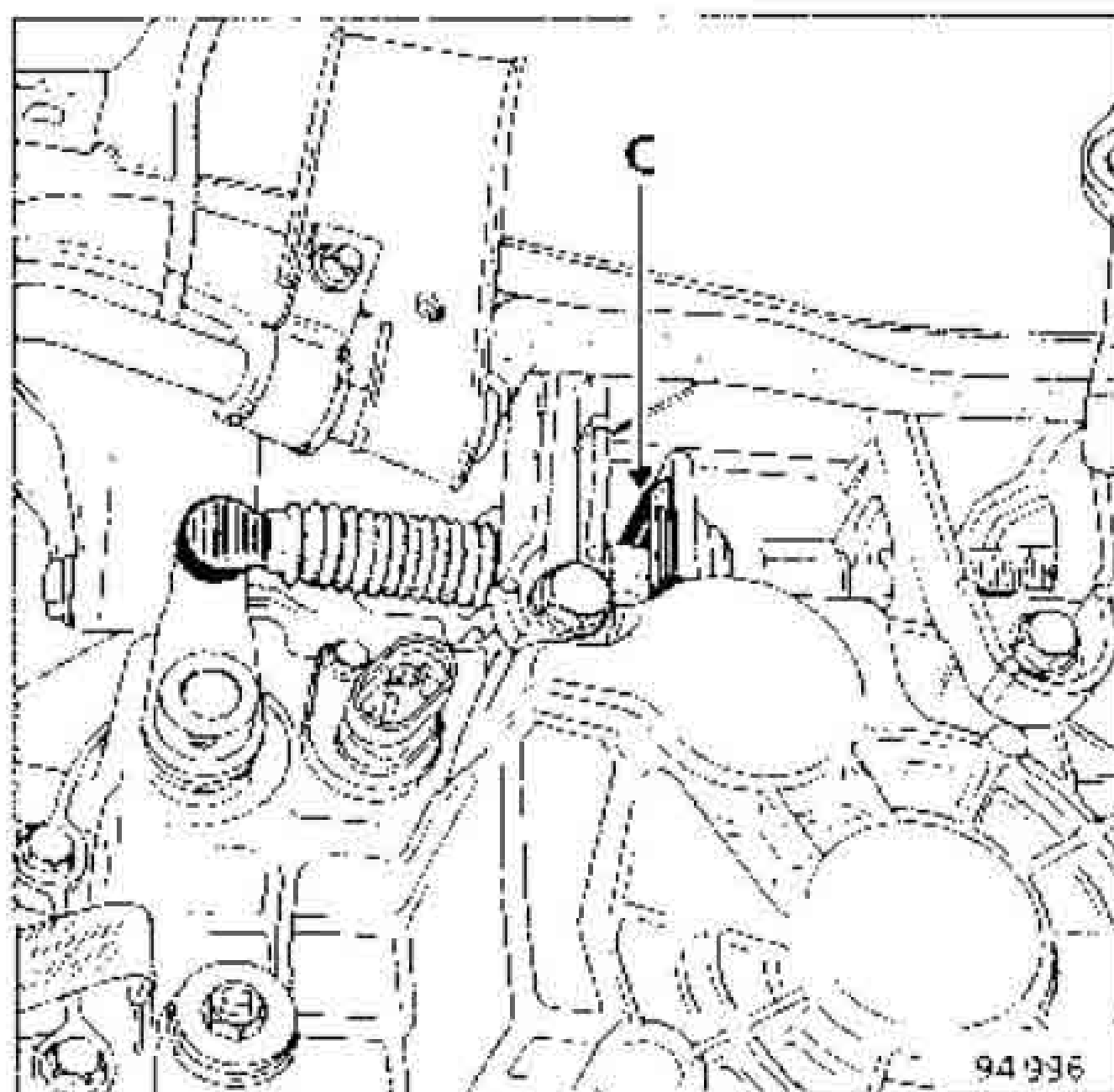
Disconnect:

- the accelerator cable,
- the speedometer cable,
- the gear selection cable.

ABOVE



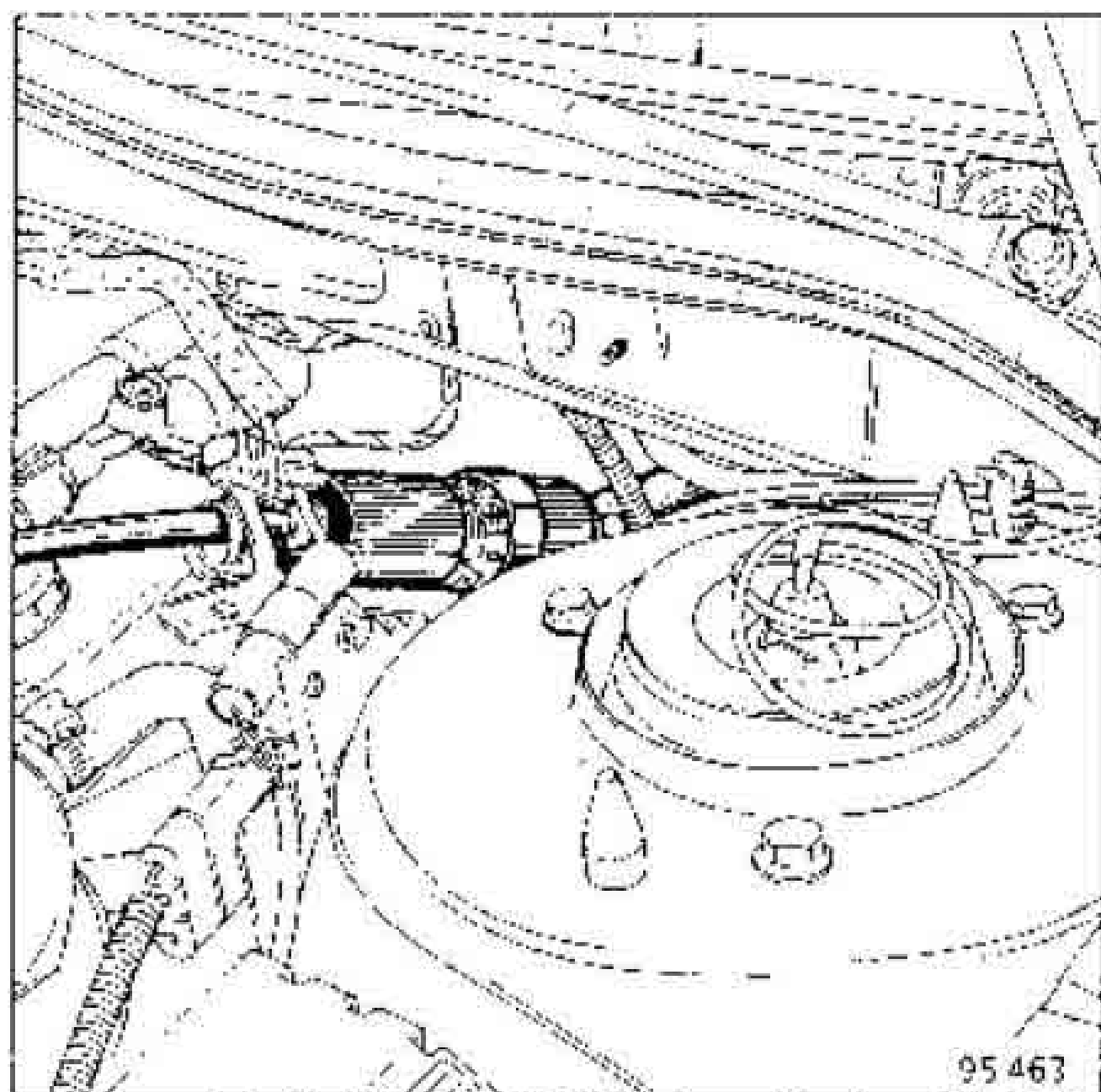
ON THE SIDE



For this, remove pins (C).

Disconnect the clutch cable.

Release the automatic adjustment system.

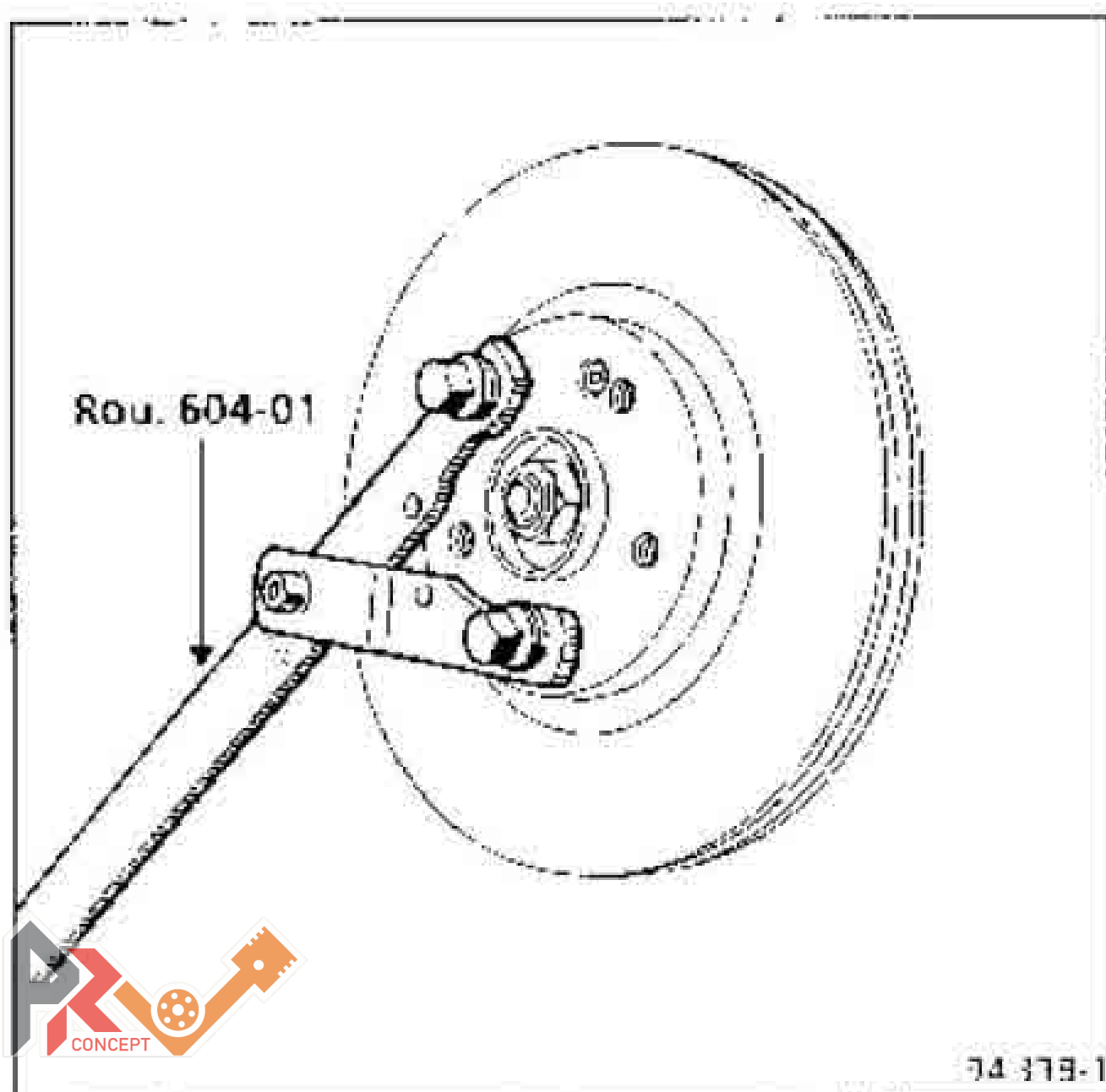


Disconnect the flexible heater matrix hoses.

Remove:

- the left hand drive shaft mountings, gear box side,
- the brake calipers, secure them to the springs

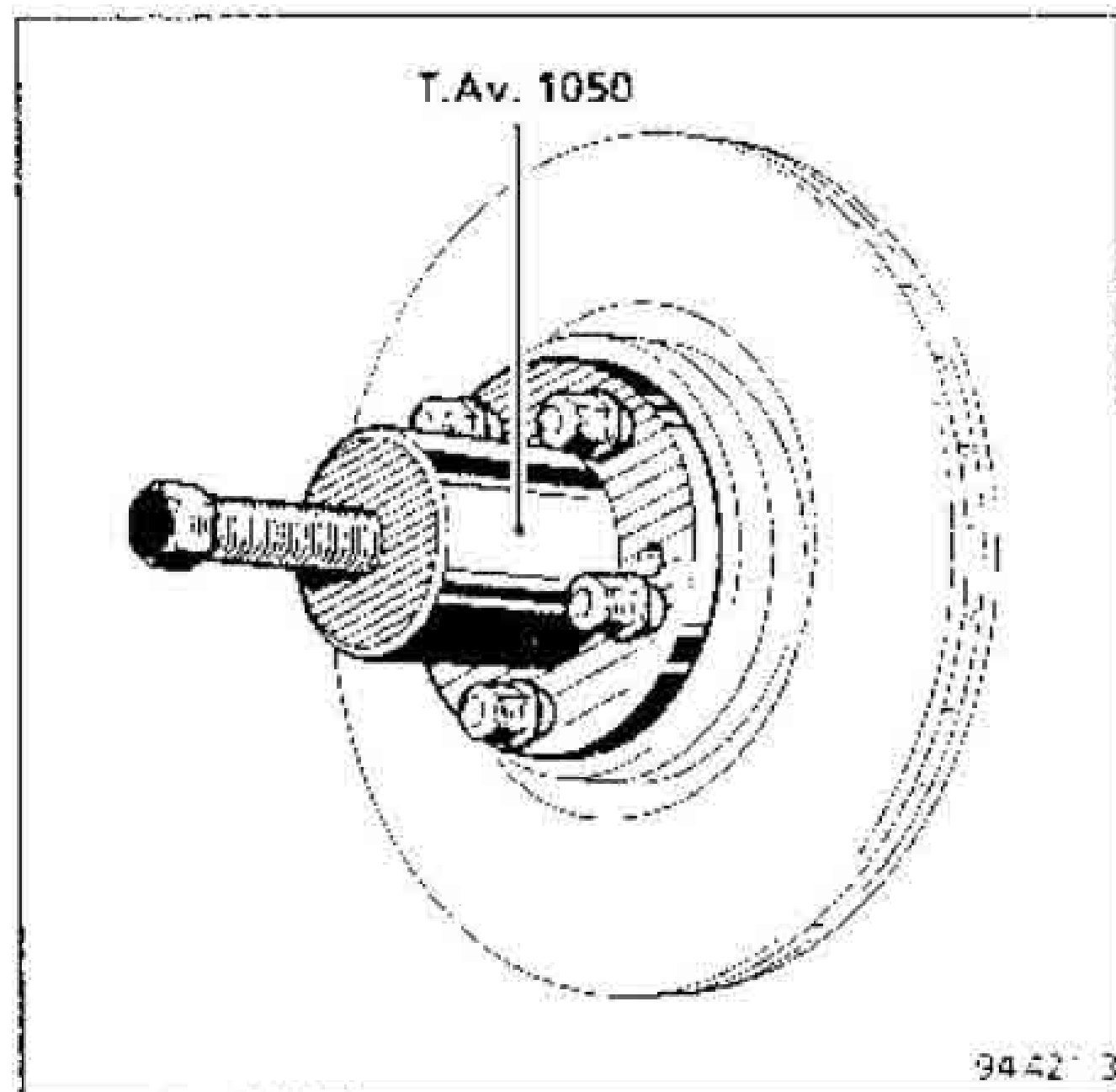
Using tool Rou. 604-01 remove the driveshaft nut.



Fit tool T. Av. 1050 on the brake disc.

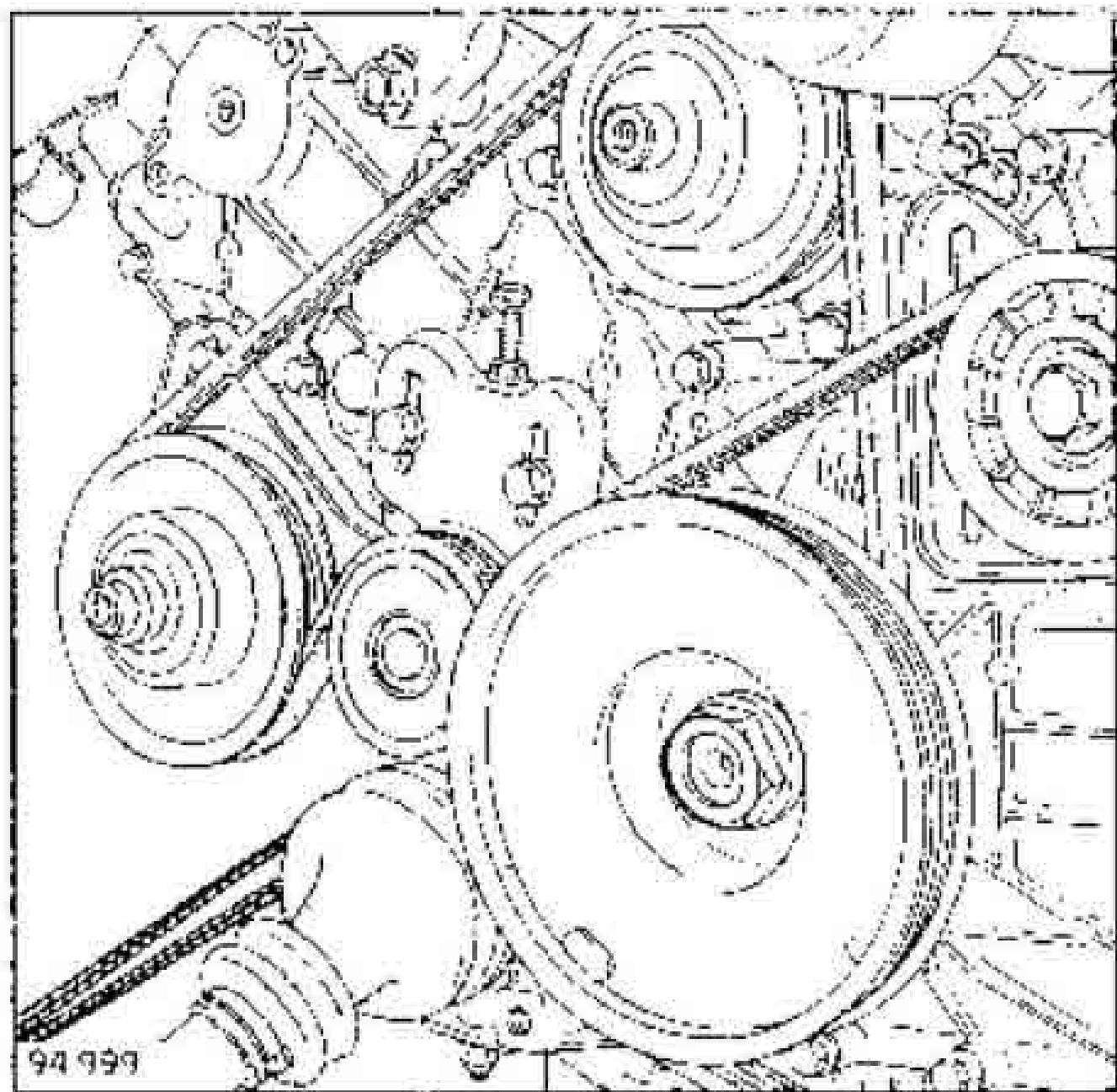
Remove the shock absorber base mountings on the right hand side using tool T. Av. 1050.

Remove the driveshaft from the disc hub.



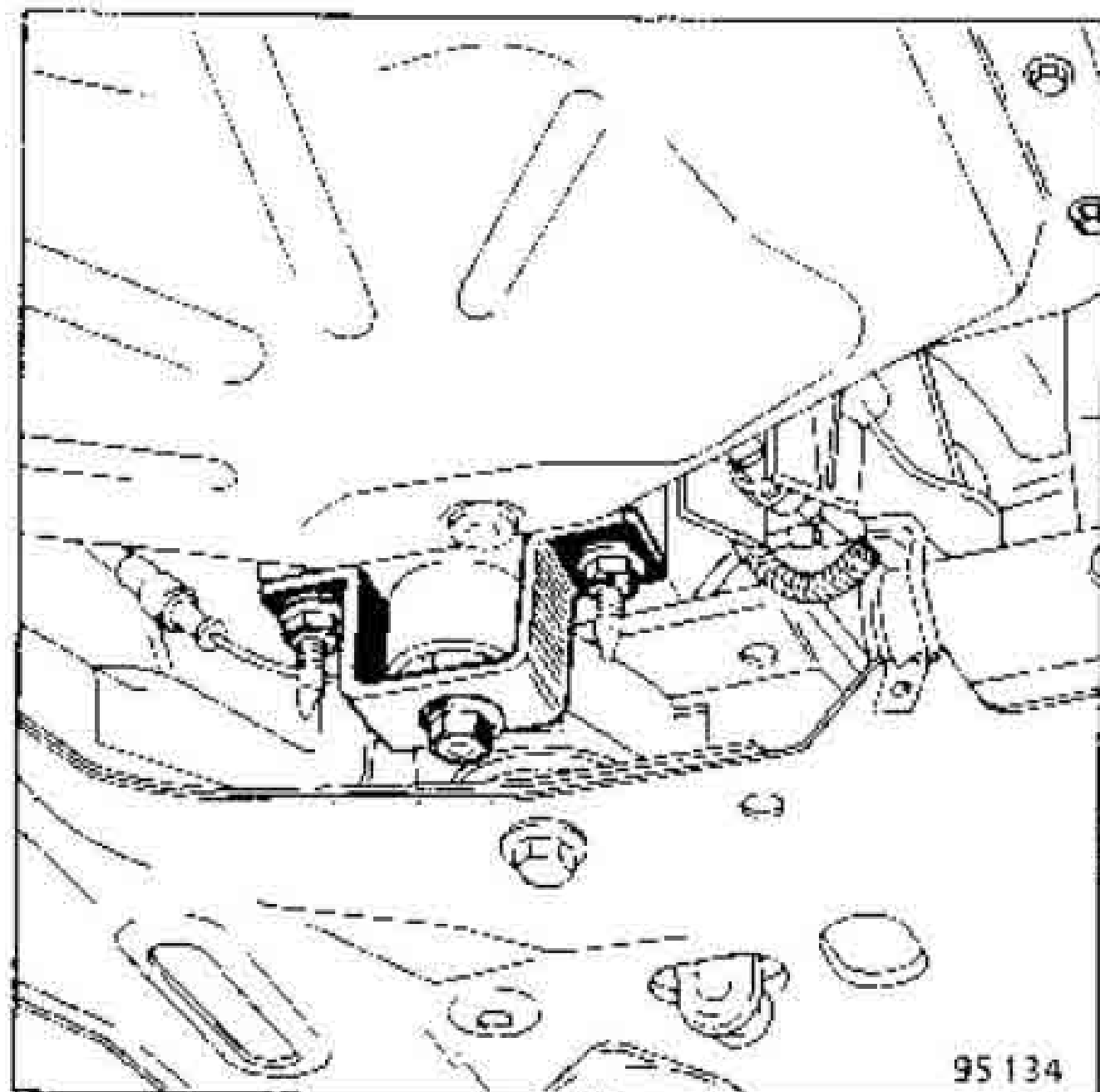
The right hand driveshaft is removed with the engine-gear box assembly.

Secure the driveshaft to the intermediate bearing using a cord

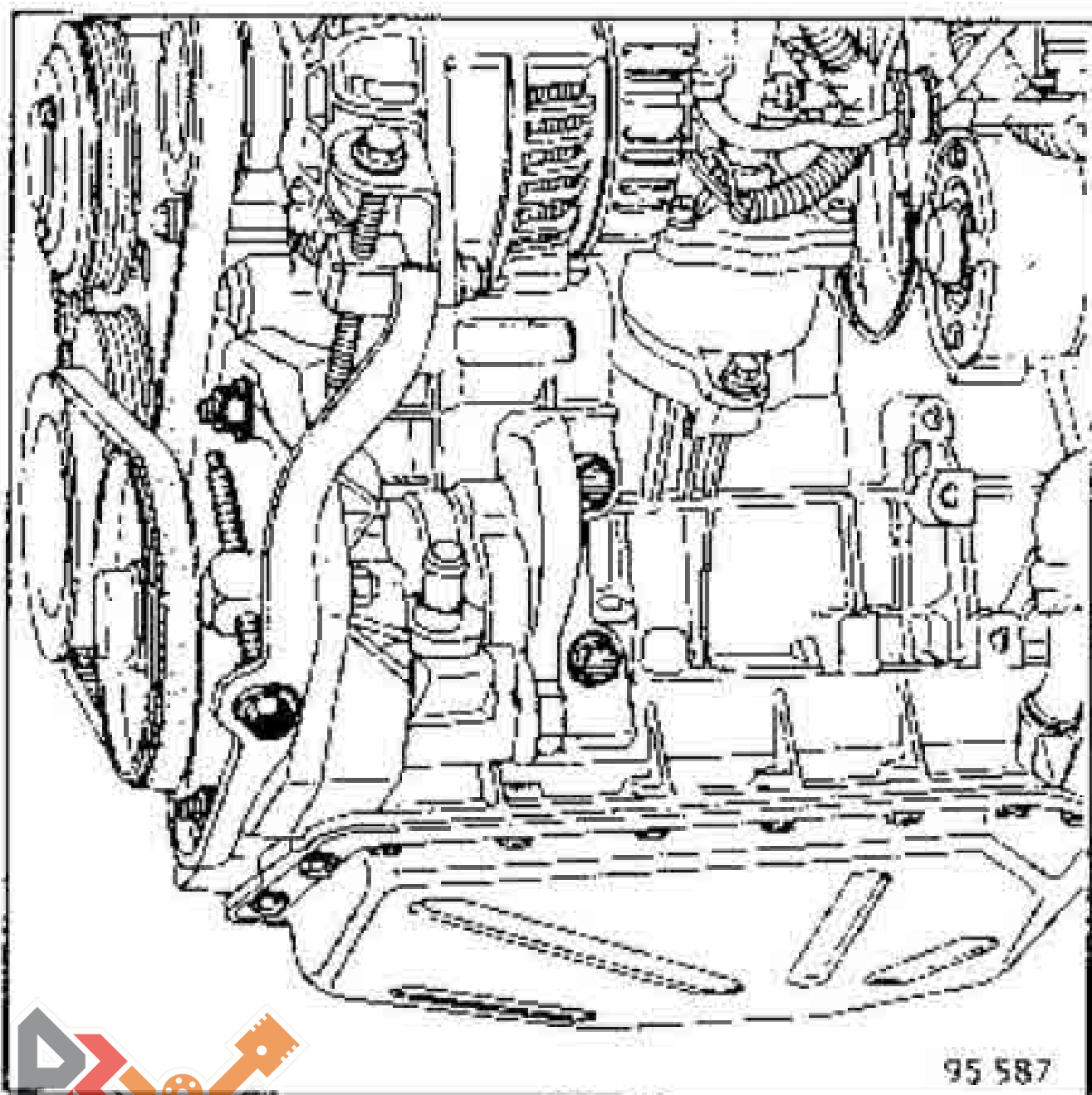


Remove:

- the shock absorber base mountings, remove the spider from the gear box,
- the left hand driveshaft,
- the engine tie bar mountings,



- the power assisted steering pump pipes at the pump

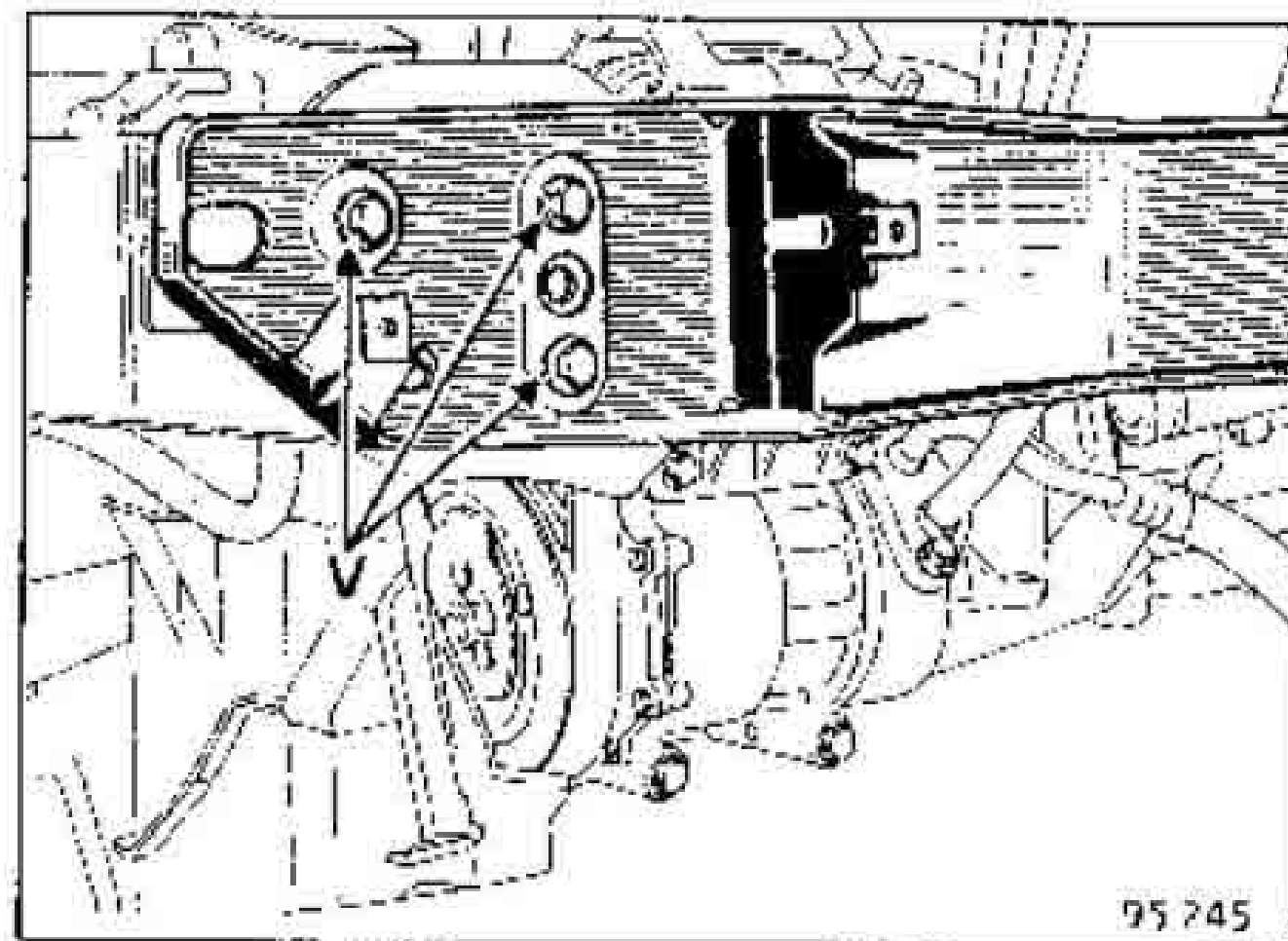


- the exhaust flange and remove the exhaust downpipe.

Fit the load positioning tool SEF 689 on the engine lifting rings, and take the engine's weight.

Loosen the suspended engine mounting nut.

Remove the front cross member mountings at (V).



IMPORTANT

This cross member may only be removed when the engine is no longer in the engine bay or when the engine weight is supported.

If the cross member is loosened or removed when the engine is in place and is not supported, the ends of the side members will be moved.

If however the cross member is removed when the engine is not supported, the engine and transmission units must be supported for refitting the cross member.

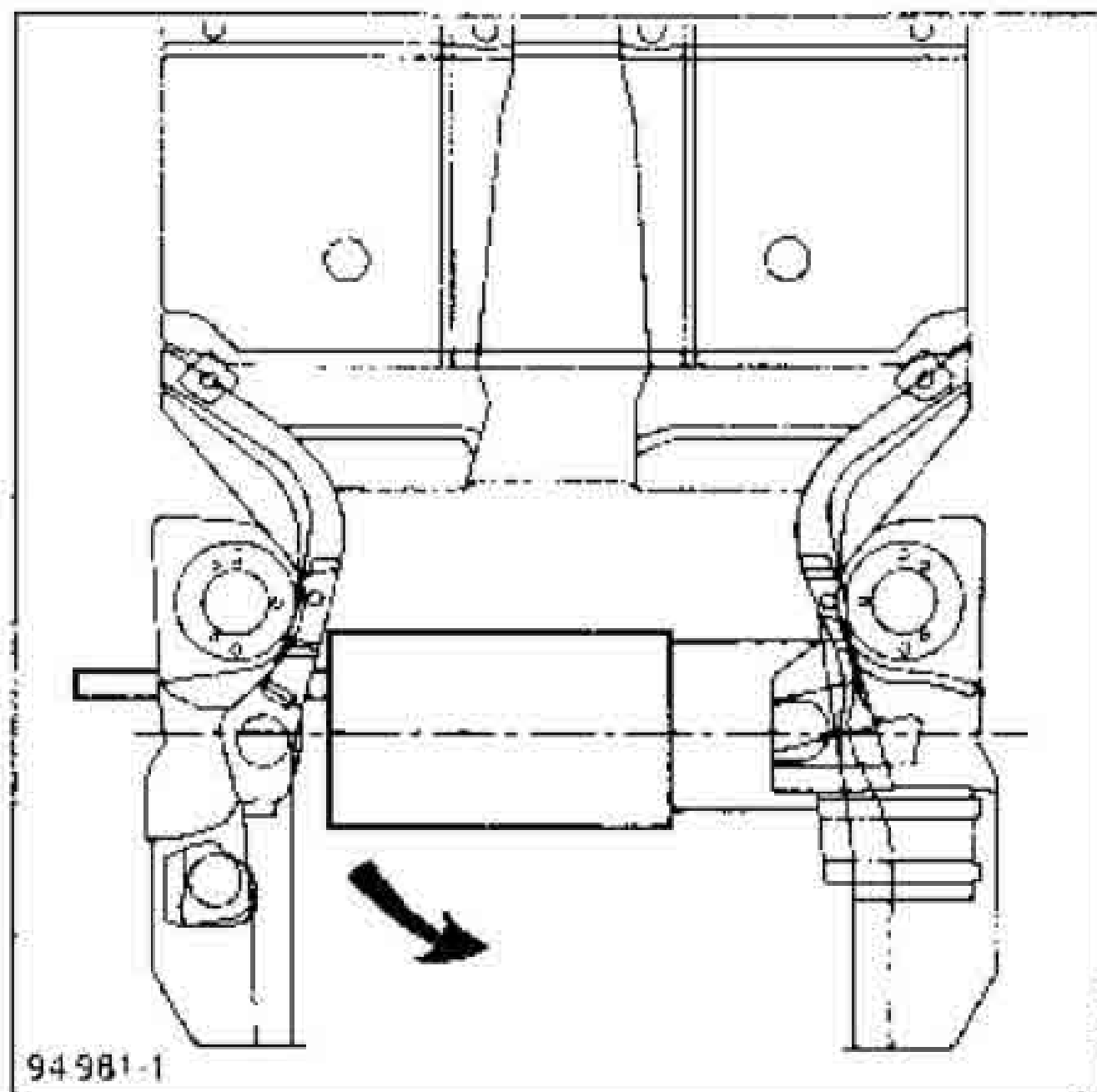
- the earth strap on the gear box,

Remove:

- the complete suspended engine mountings,
- the gear box mountings.

Using tool SEF 689, tilt the engine assembly upwards, engine side.

Use the hoist to lower the assembly, in order to turn it by 1/4 turn.



Remove the engine assembly

REFITTING

Replace the engine assembly and gear box in the engine bay without resting the engine assembly on its mountings.

Fit the front cross member.

Refitting is the reverse of removal.

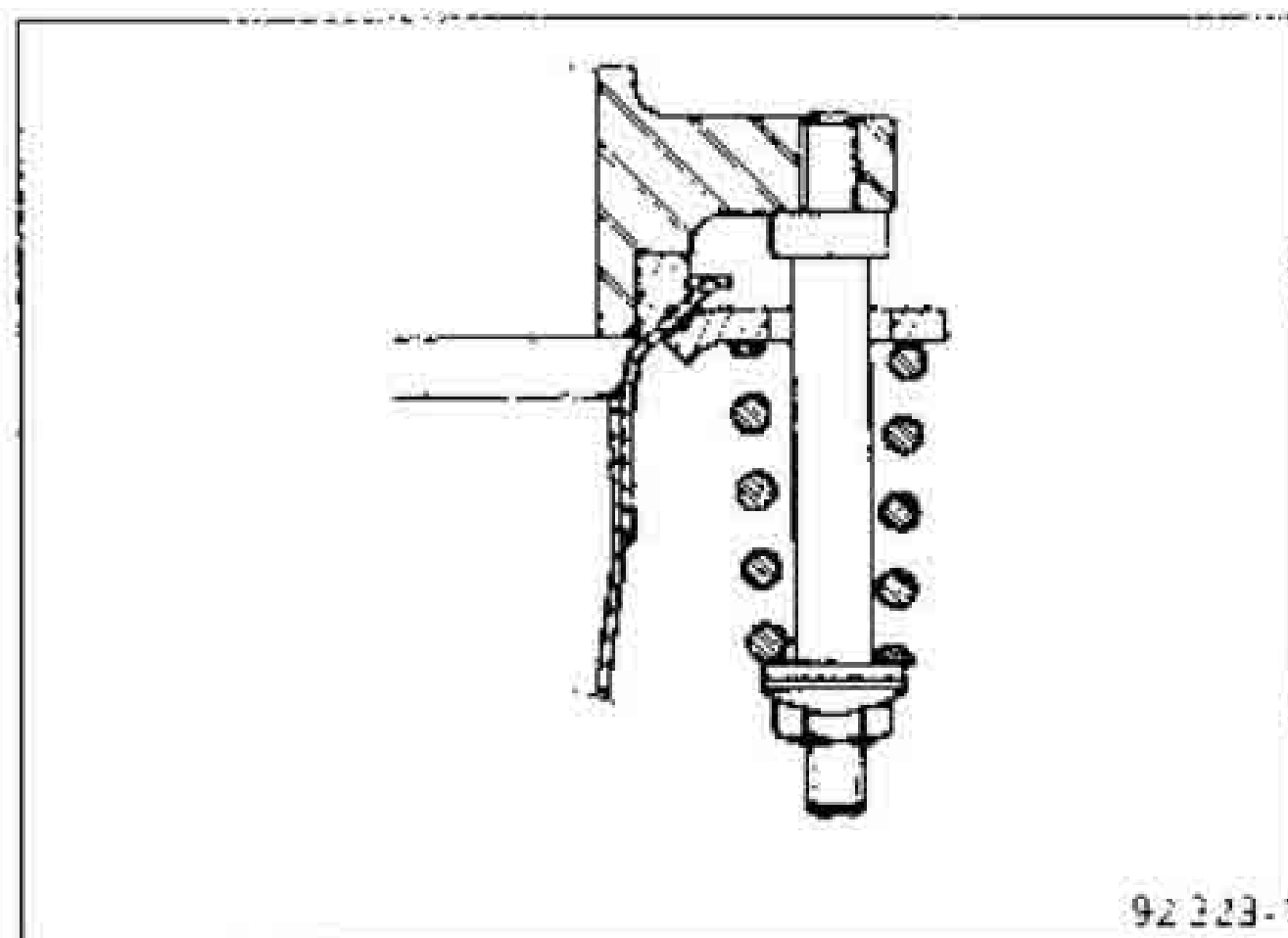
Top up:

- the gear box oil,
- the engine oil if necessary,
- the power assisted steering circuit,
- the cooling circuit and bleed,
- the freon circuit (air conditioned version).

Adjust the accelerator cable.

Adjust the clutch automatic adjustment system.

Tightening the exhaust flange with spring mountings.



IMPERATIVE : tighten to the stop .



Fit the brake caliper mounting bolts using Loctite FRENBOC and torque tighten.

Press the brake pedal several times to move the brake piston in contact with the brake discs.

SPECIAL TOOLING REQUIRED		
Rou.	604 -01	Hub locking tool
T.Av.	476	Ball joint extractor
T.Av.	1050	Driveshaft removal tool
B. Vi.	31 -01	Spring pin punch
SEFAC 689		Load positioning tool

TIGHTENING TORQUES (in daN.m)		
Wheel bolts	10	
Hydroelastic engine mounting pad nuts	10,5	
Gear box mounting bolt	4	
Right hand driveshaft nut	25	
Shock absorber base bolt	25,5	

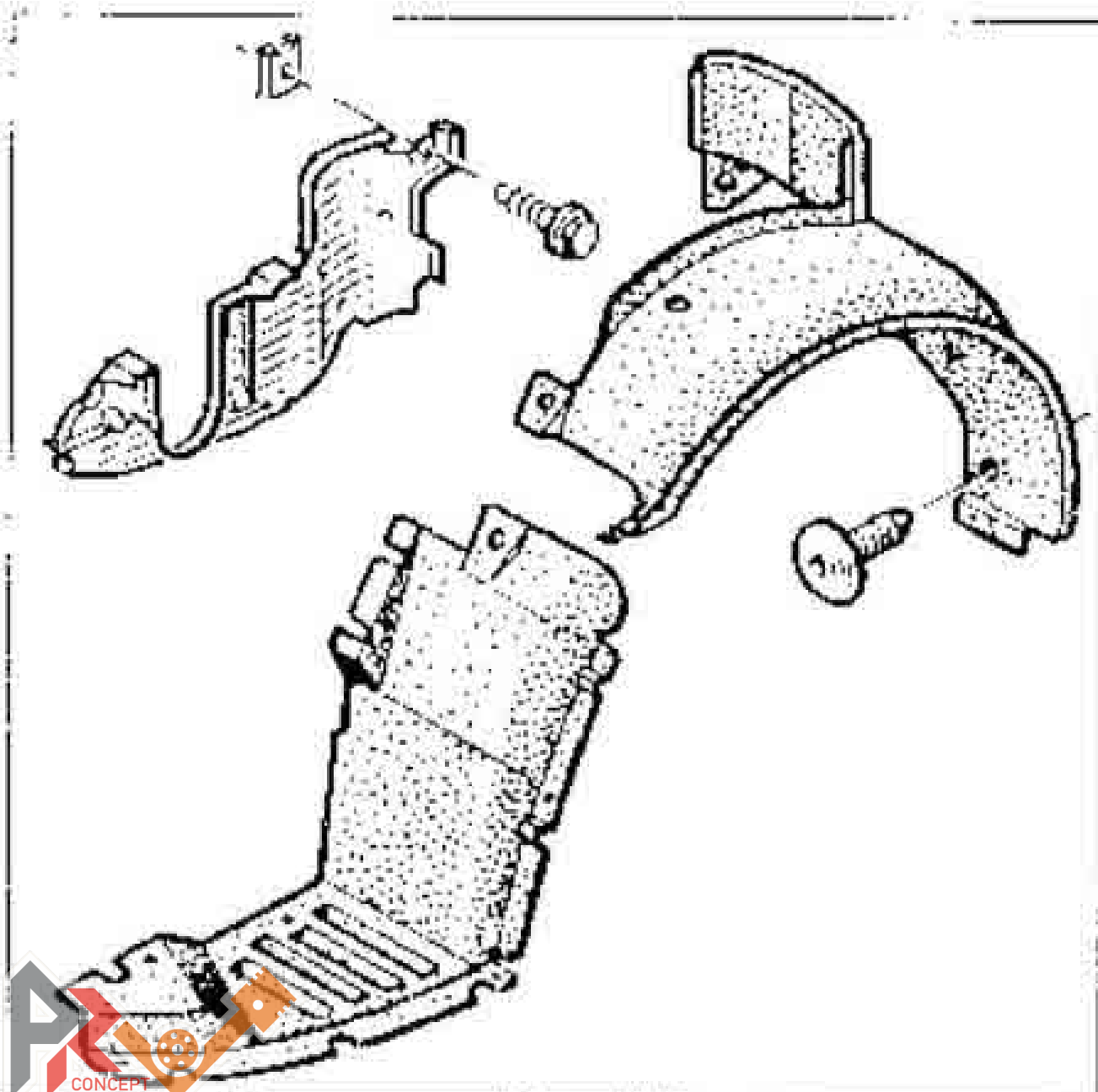
REMOVAL

Put the vehicle on a 2 post lift (see chapter 0 - methods of lifting).

Disconnect the battery.

Remove:

- the bonnet,
- the engine undertray,
- the front wheels
- the front bumper and impact absorbers,
- the wheel arch protectors.



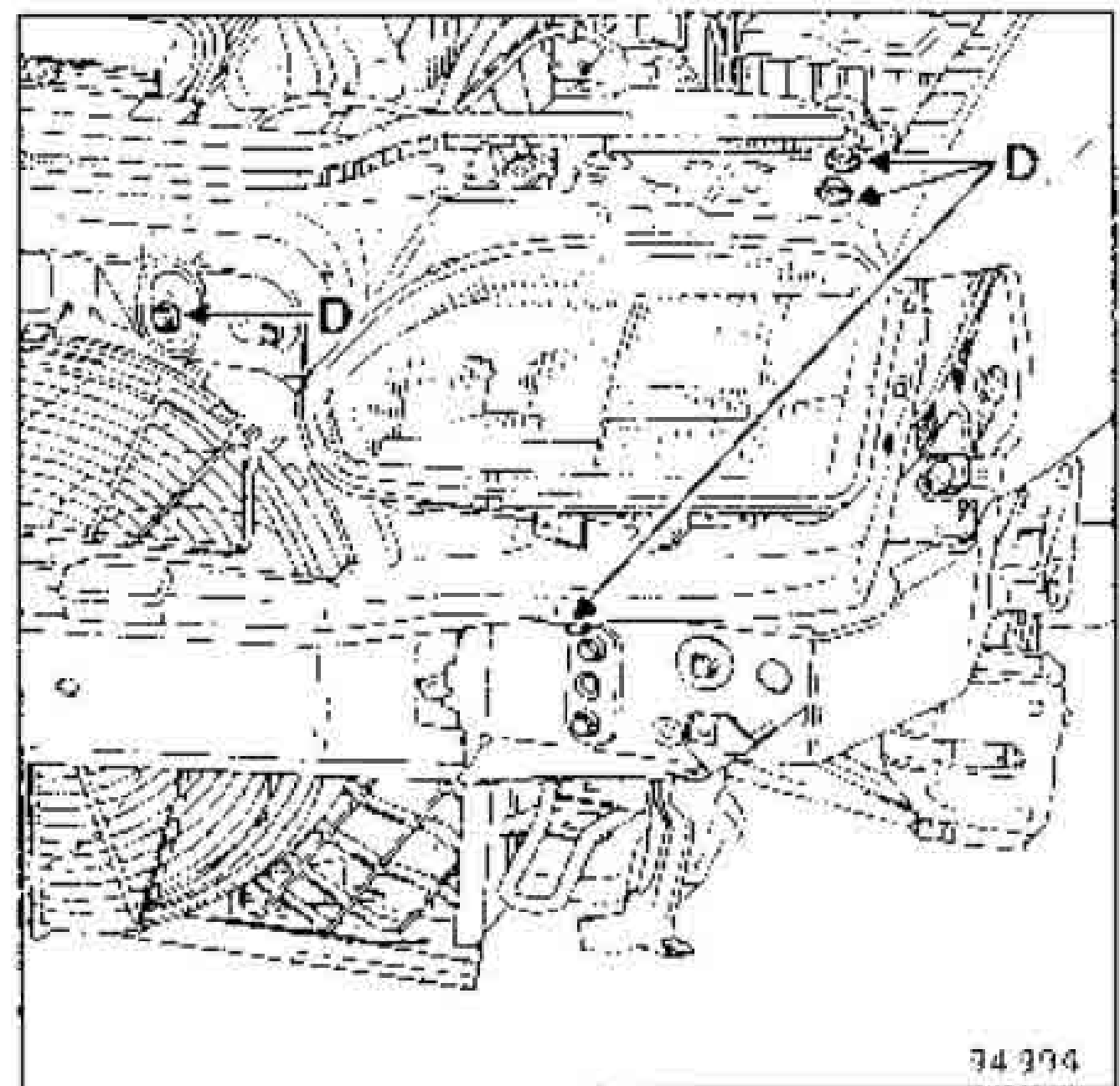
Remove the radiator grille and indicators

Disconnect the lights connectors.

Drain:

- the cooling circuit by the lower radiator hose,
- the air conditioning freon circuit (depending on version),
- the gear box.

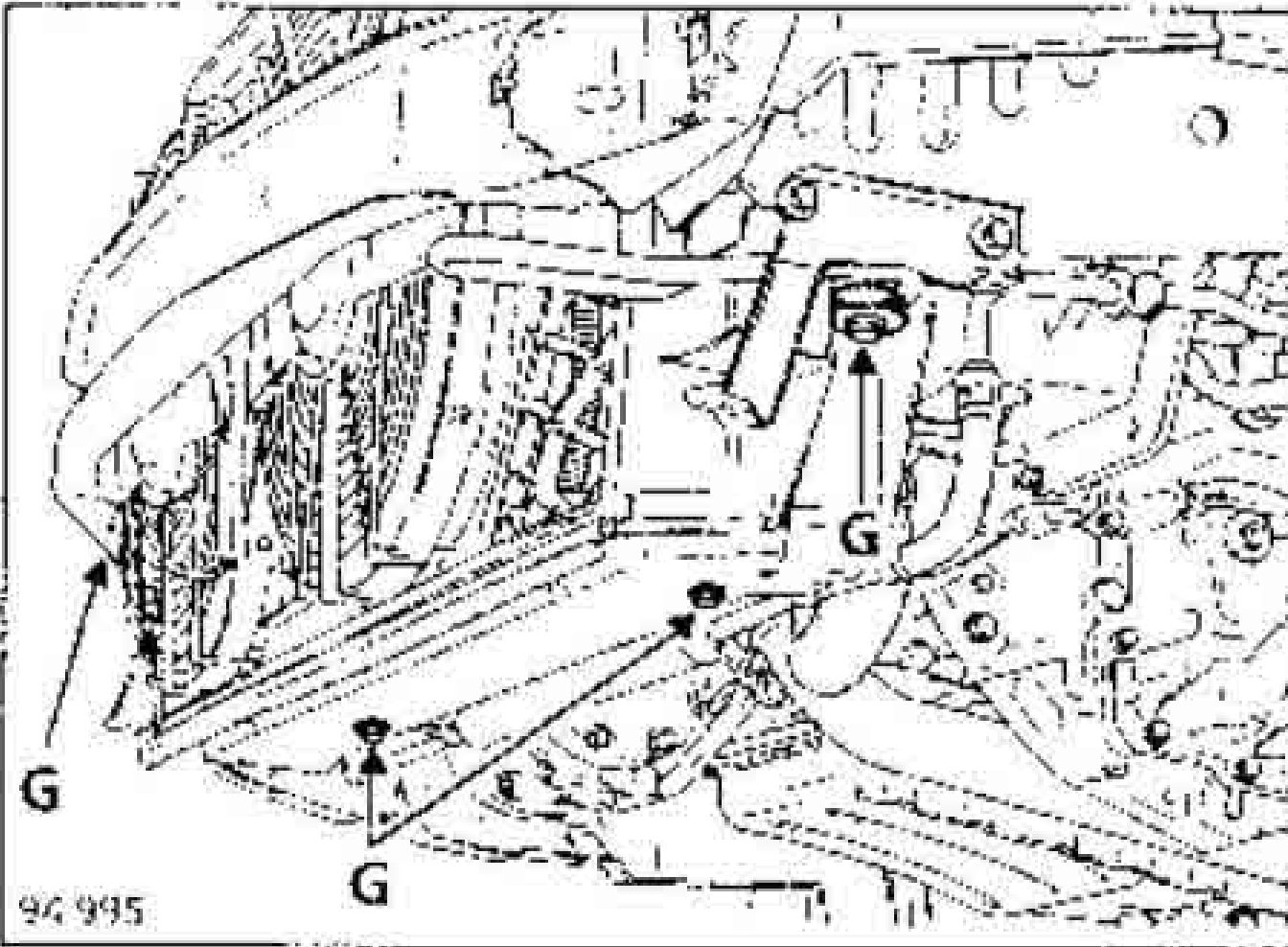
Remove the upper cross member mountings at (D).



Remove the upper cross member and lights.

Remove:

- the air conditioning condenser pipes,
- the radiator and power assisted steering oil cooler mounting bolts (G).



Remove the radiator assembly

Disconnect:

- the engine wiring connectors,
- the injection computer and place on the engine.

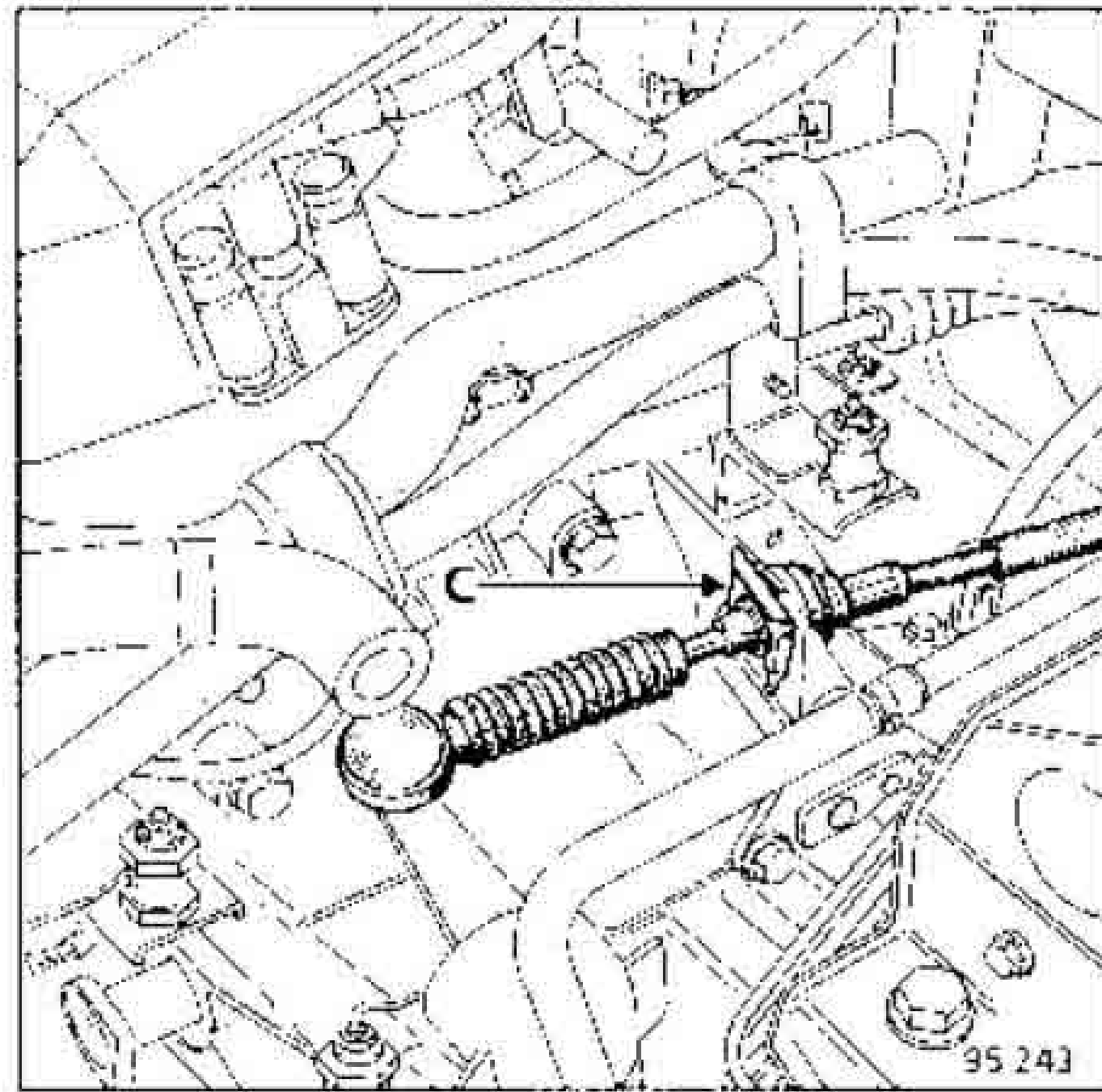
Remove:

- the sleeve between the air filter and the inlet manifold,
- the battery and tray.

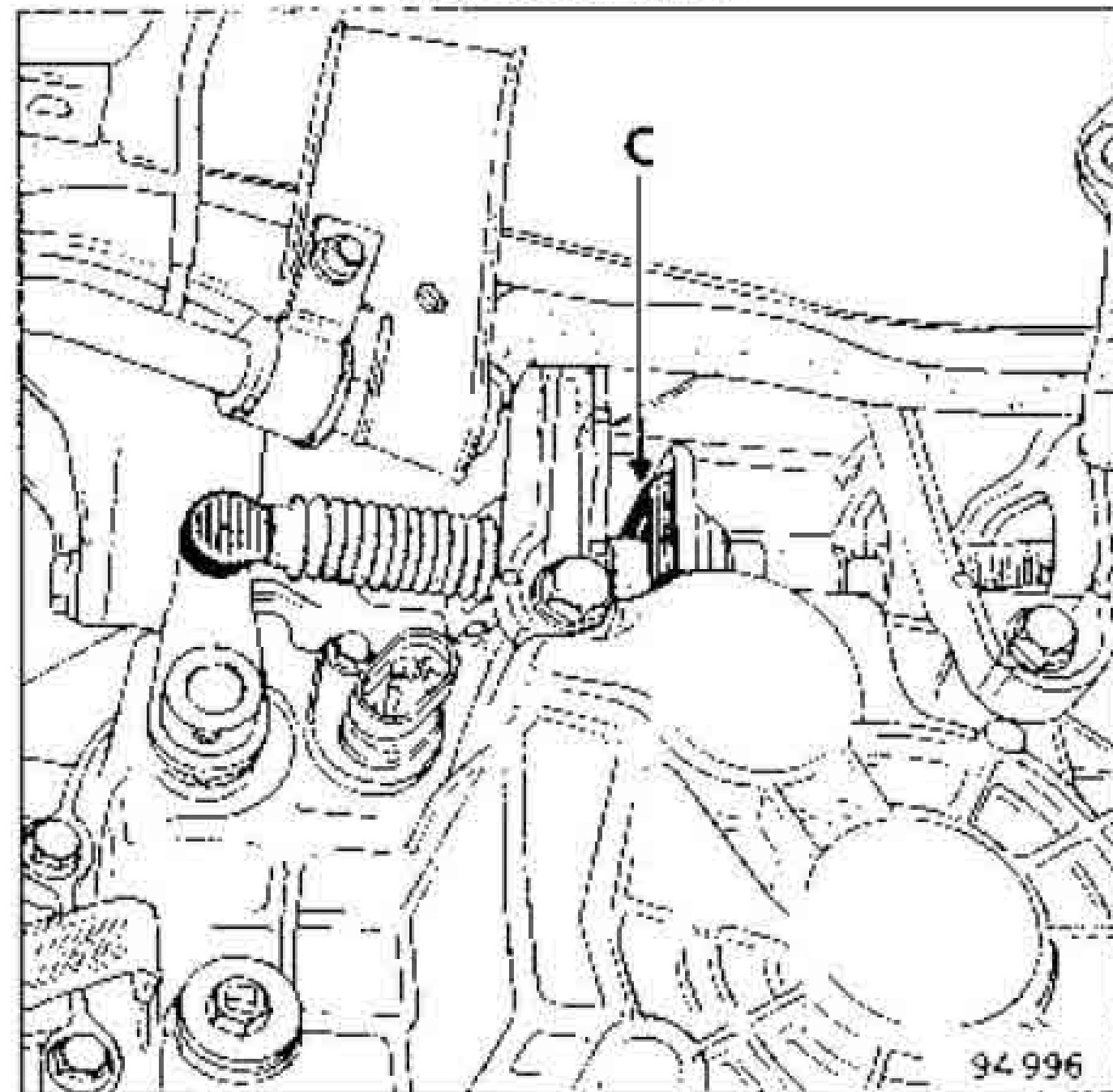
Disconnect:

- the accelerator cable,
- the speedometer cable,
- the gear selection cables.

ABOVE



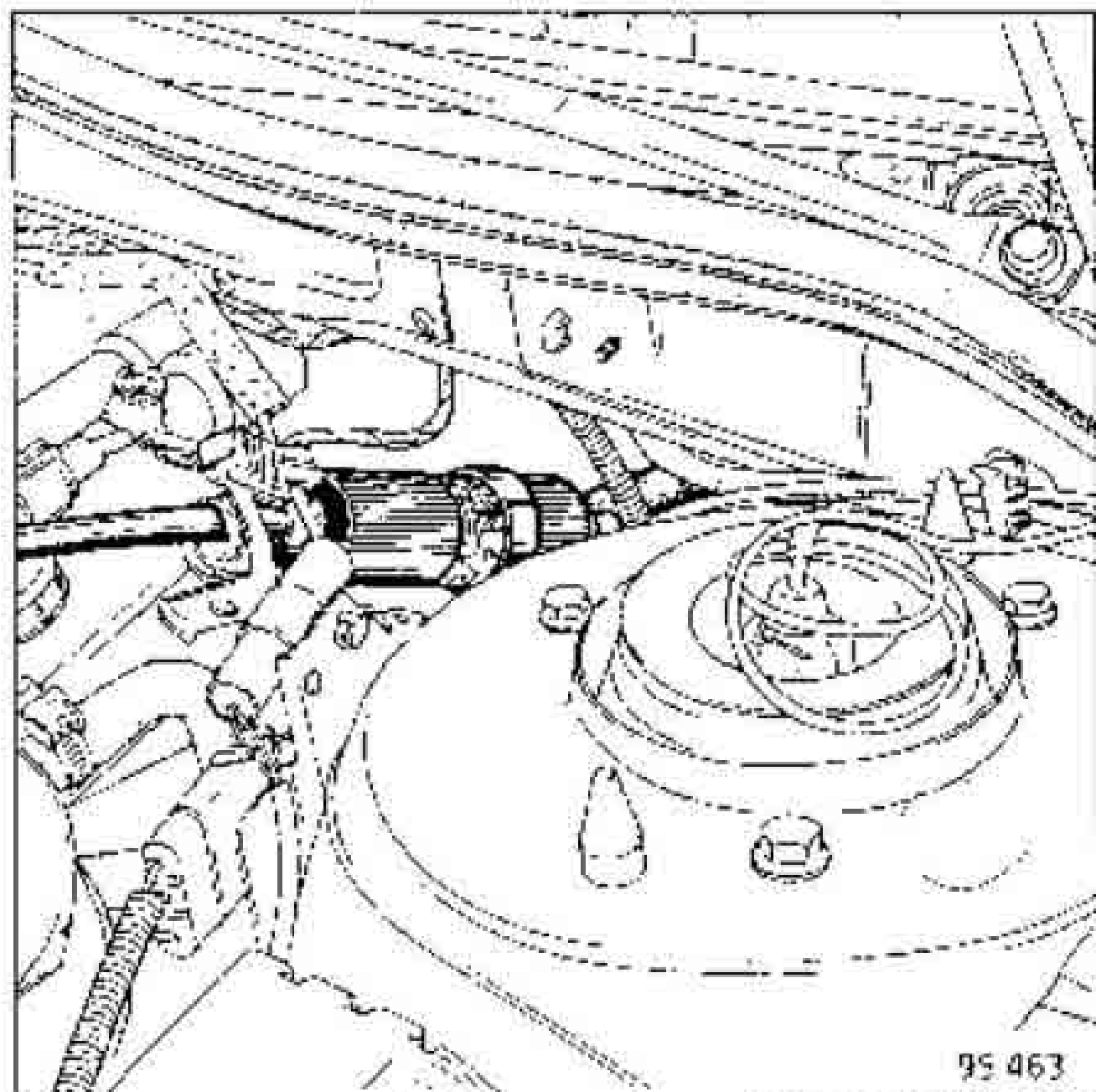
FROM THE SIDE



For this, remove pins (C).

Disconnect the clutch cable.

Release the automatic adjustment system.

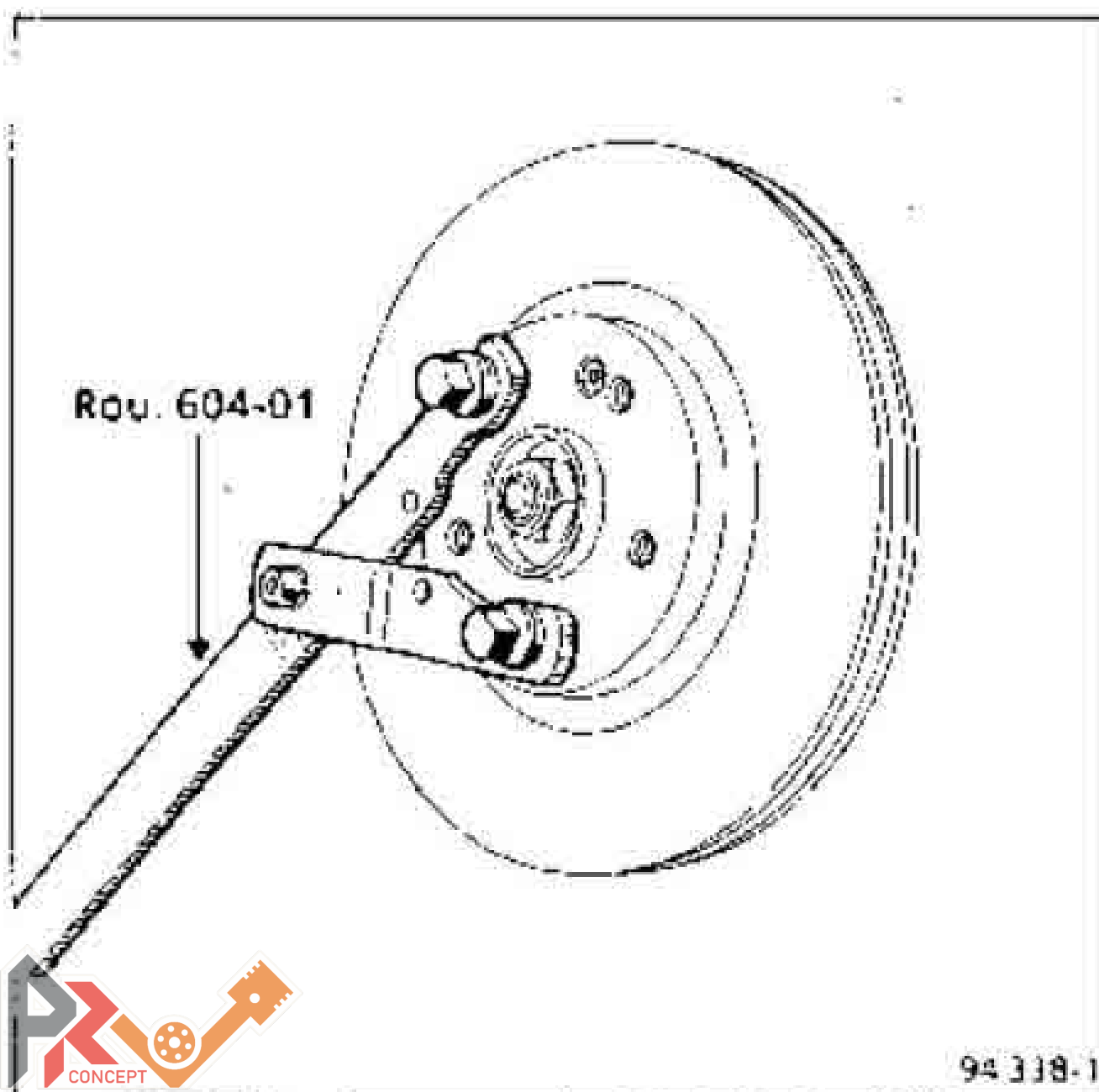


Disconnect the flexible heater matrix hoses.

Remove:

- the left hand driveshaft mountings, gear box side,
- the brake calipers, secure the calipers to the springs.

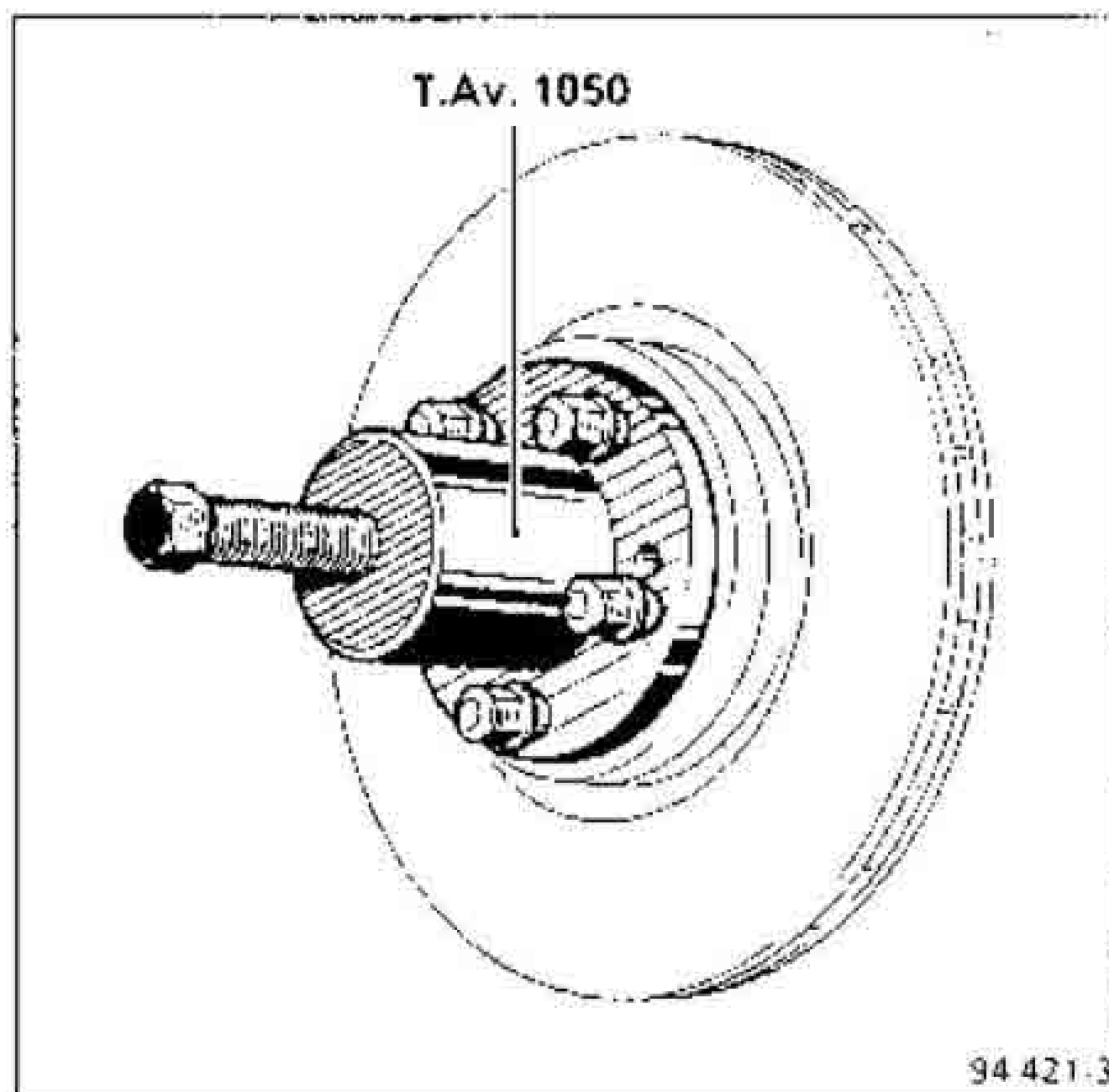
Using tool Rou. 604-01, remove the driveshaft nut.



Fit tool T. Av. 1050 on the brake disc.

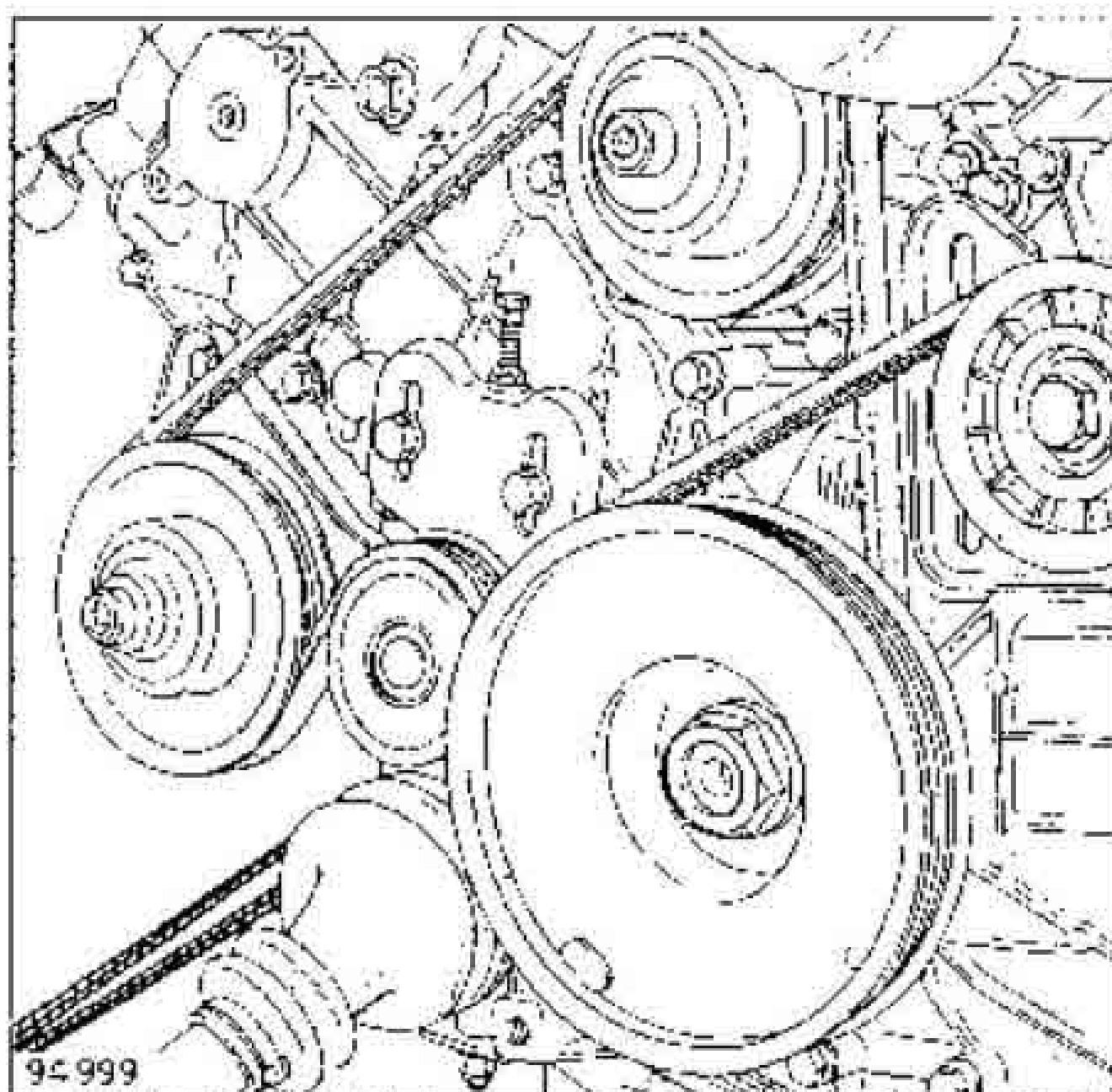
Remove the right hand side shock absorber base mountings.

Using tool T. Av. 1050, remove the driveshaft from the disc hub.



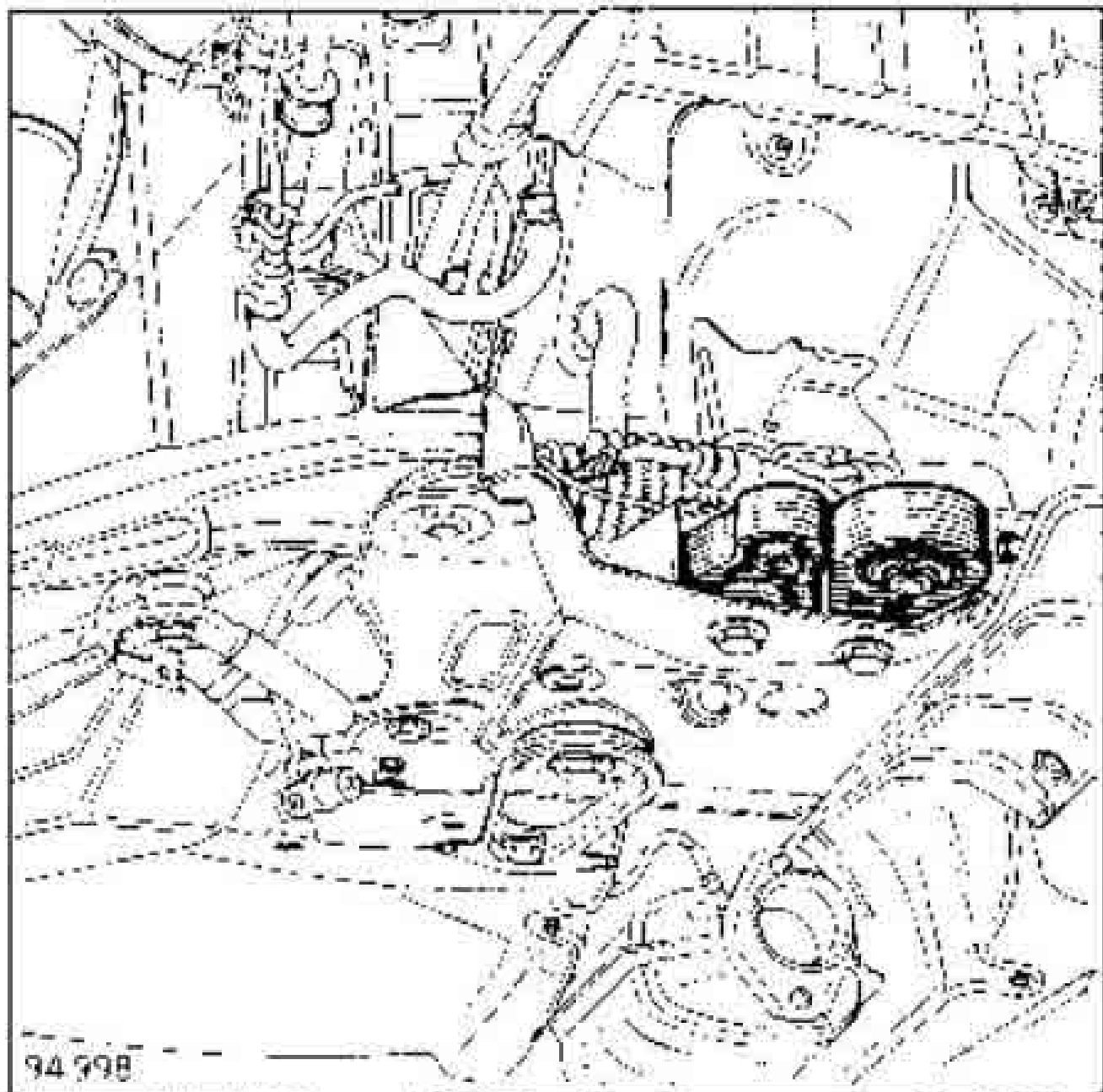
The right hand driveshaft is removed with the engine - gear box assembly.

Secure the driveshaft to the intermediate bearing using a cord.

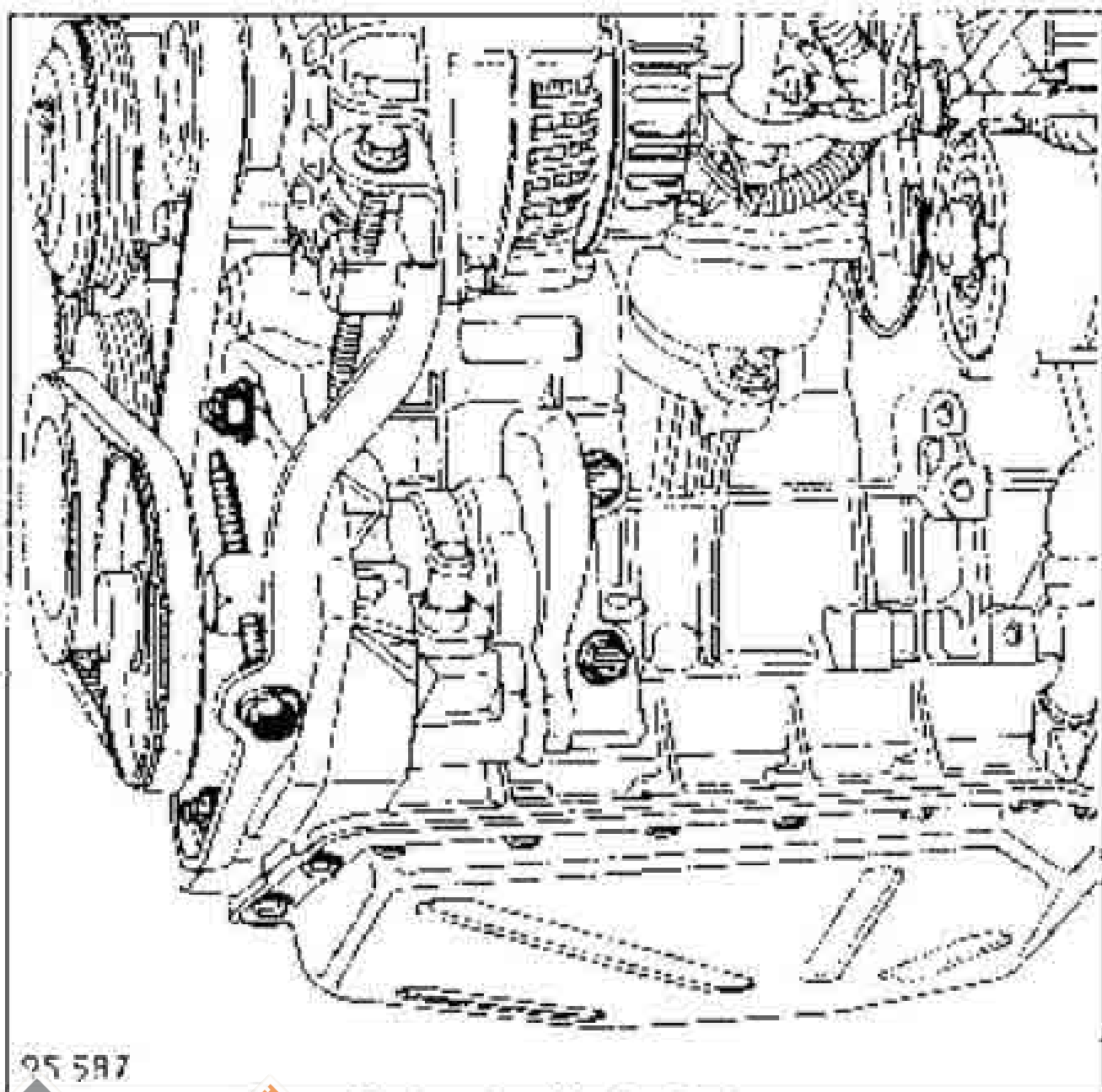


Remove:

- the shock absorber base mountings, extract the spider from the gear box,
- the left hand drive shaft,
- the engine tie bar mountings,



- the power assisted steering pump pipes from the pump,



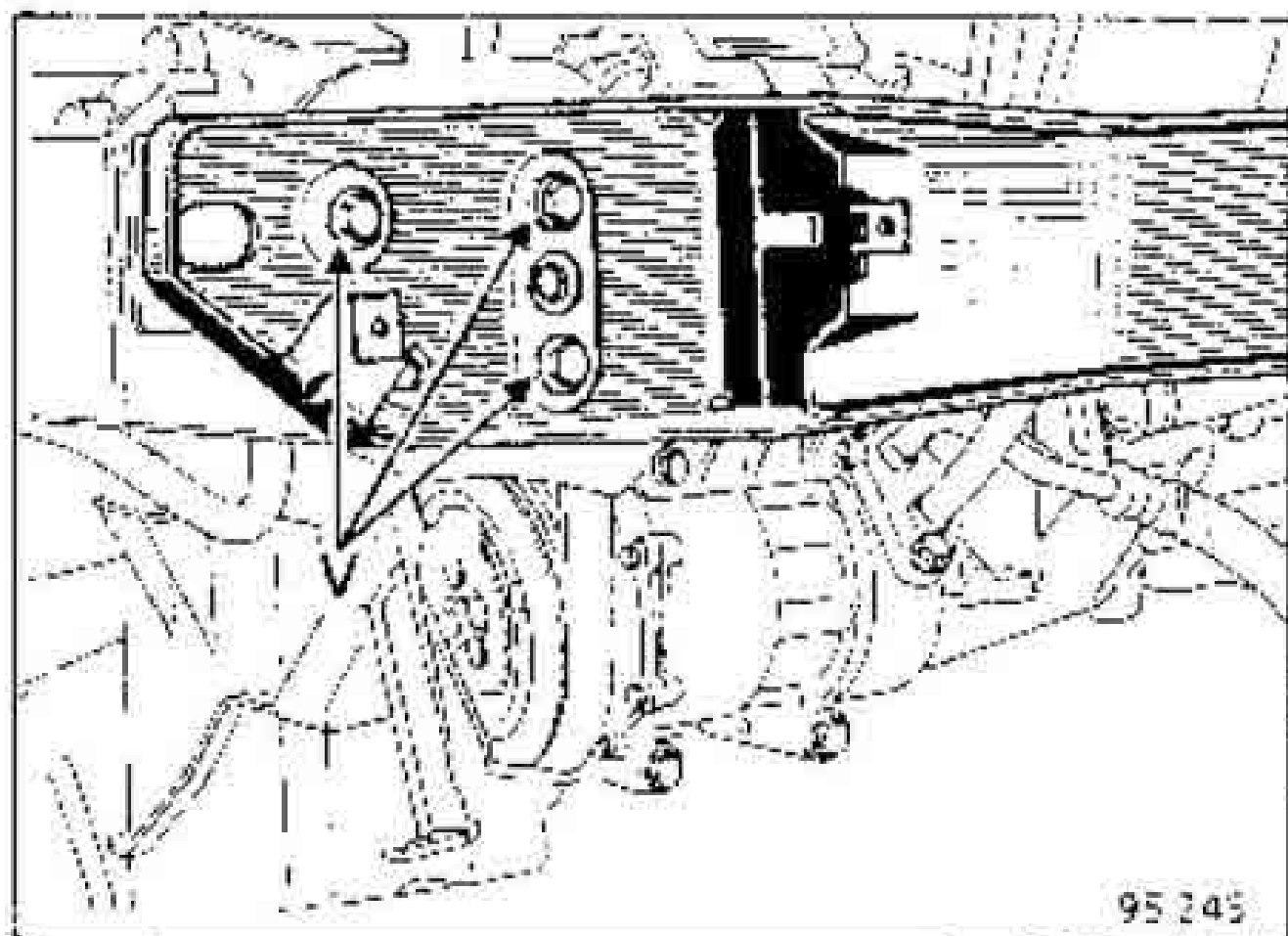
- the exhaust flanges and remove the downpipe.

Fit the load positioning tool SEFAC 689 on the engine lifting rings.

Support the engine's weight.

Loosen the suspended engine mounting nut.

Remove the front cross member mountings at (V).



IMPORTANT

This cross member may only be removed when the engine is no longer in the engine bay or when the engine weight is supported.

If the cross member is loosened or removed when the engine is in place and is not supported, the ends of the side members will be moved.

If however the cross member is removed when the engine is not supported, the engine and transmission units must be supported for refitting the cross member.

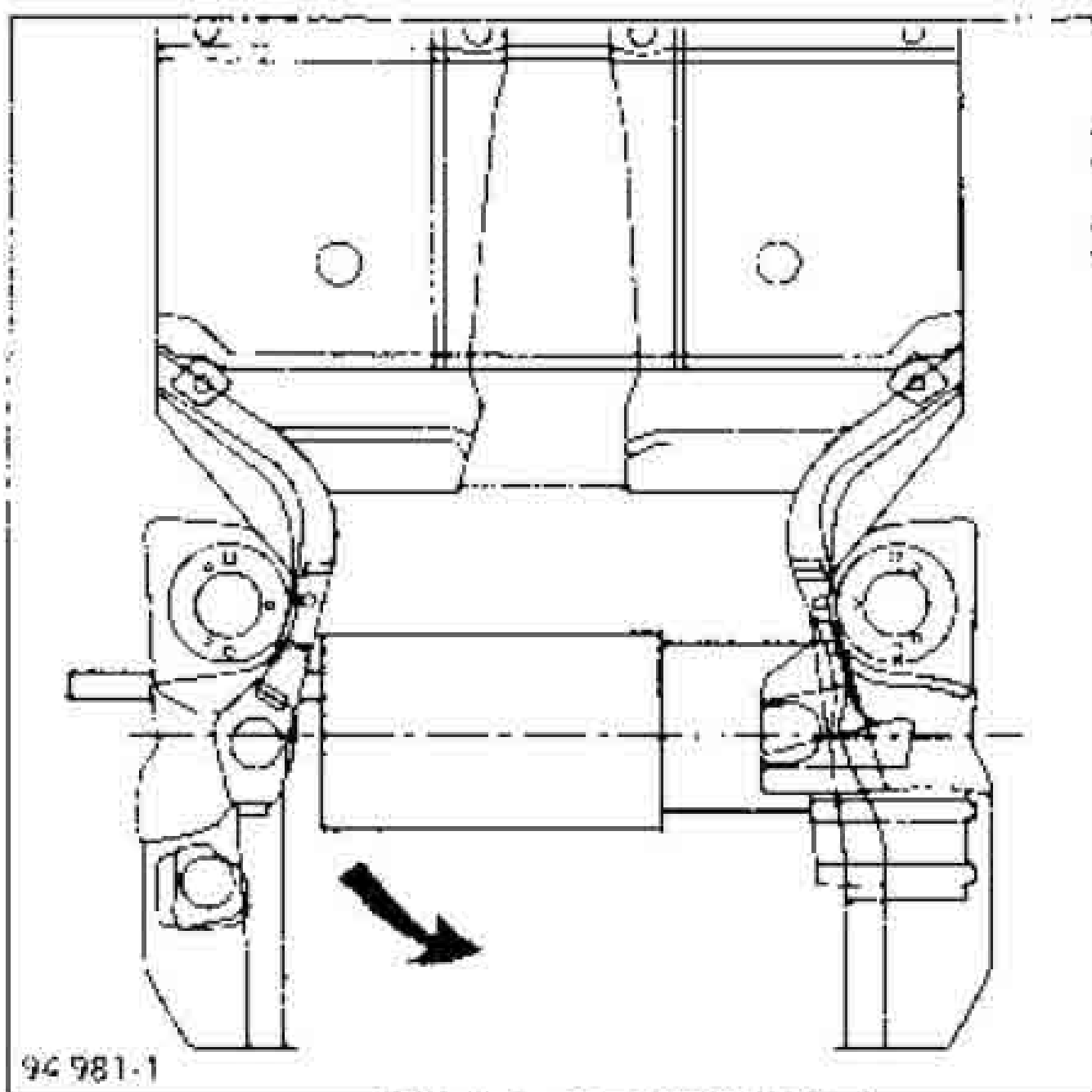
- the gearbox earthing wires,

Remove:

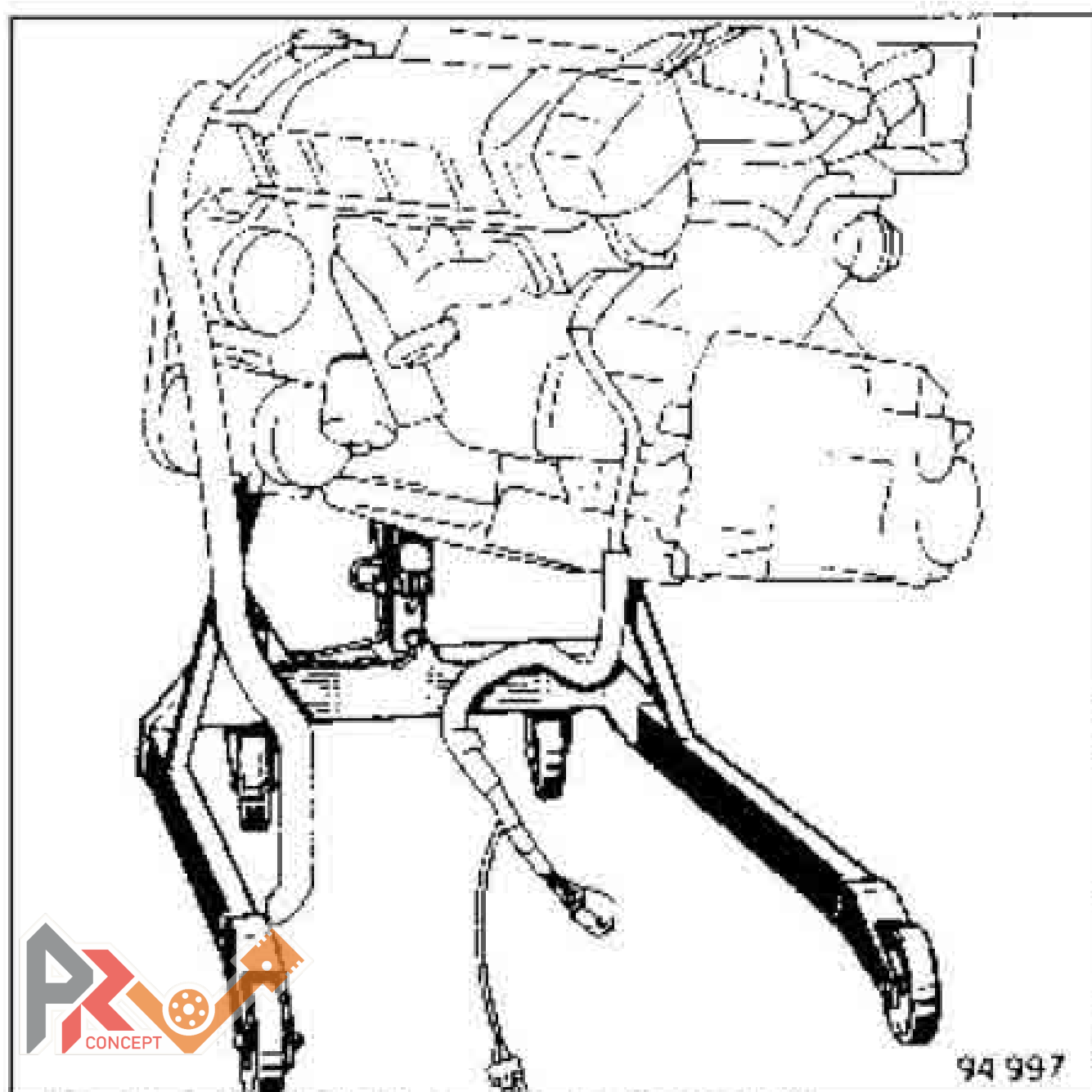
- the complete suspended engine mountings,
- the gear box mountings.

Using tool SEF 689, tilt the engine assembly upwards, engine side.

Use the hoist to lower the assembly, in order to turn it by 1/4 turn



Remove the engine assembly.



REFITTING

Replace the engine assembly and gear box in the engine bay without resting the engine assembly on its mountings.

Fit the front cross member.

Refitting is the reverse of removal.

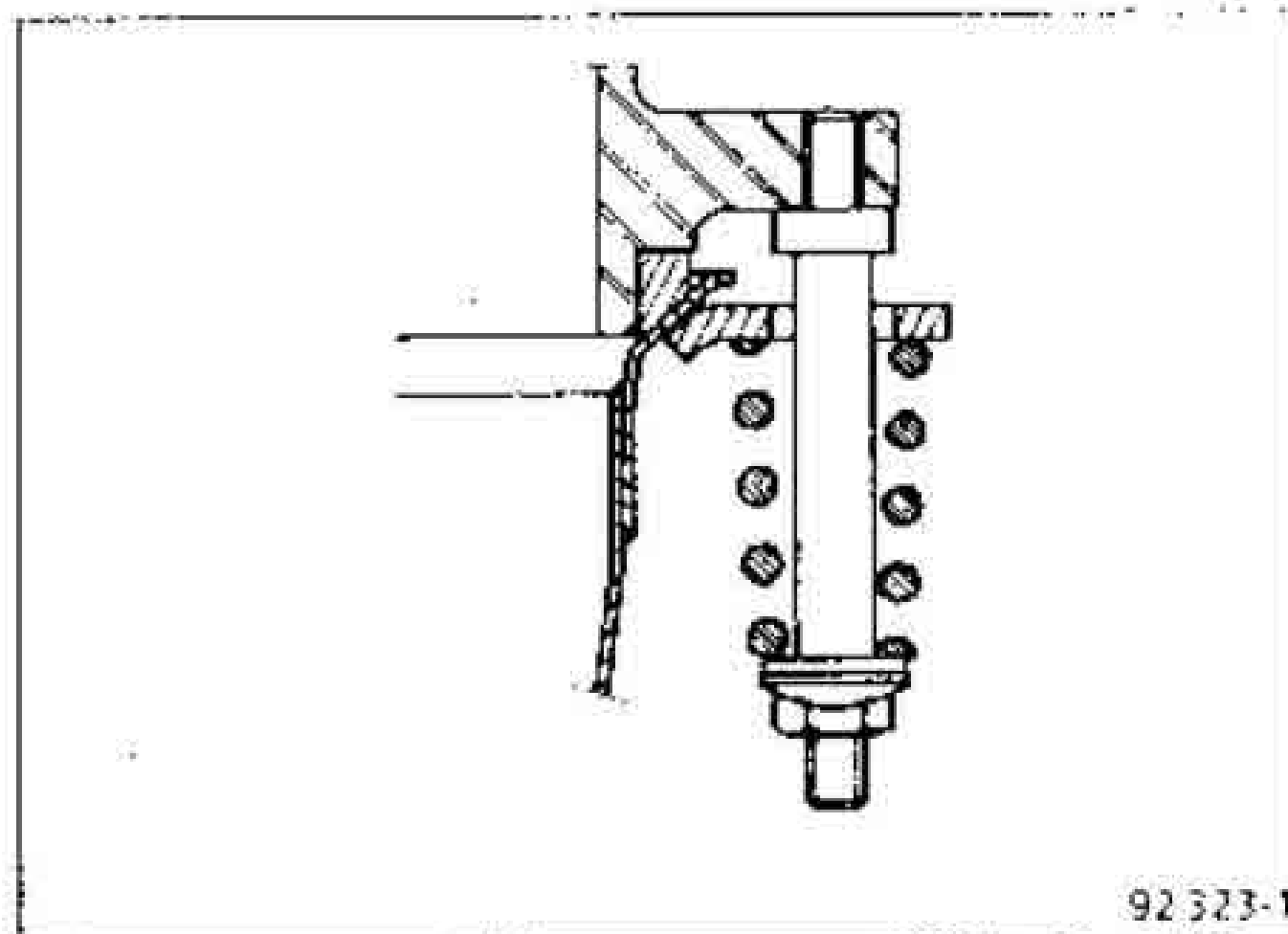
Top up:

- the gear box oil,
- the engine oil if necessary,
- the power assisted steering circuit,
- the cooling circuit and bleed,
- the freon circuit (air conditioned version).

Adjust the accelerator cable.

Adjust the clutch automatic adjustment system.

Tightening the exhaust flange with spring mountings



IMPERATIVE : tighten to the stop.



Fit the brake caliper mounting bolts using Loctite FRENBLOC and torque tighten.

Press the brake pedal several times to move the brake piston in contact with the brake discs.

SPECIAL TOOLING REQUIRED		
Mot.	1018	Drain spanner
Mot.	1063	Elbow spanner for sump (Torx 40)
T.Av.	476	Ball joint extractor

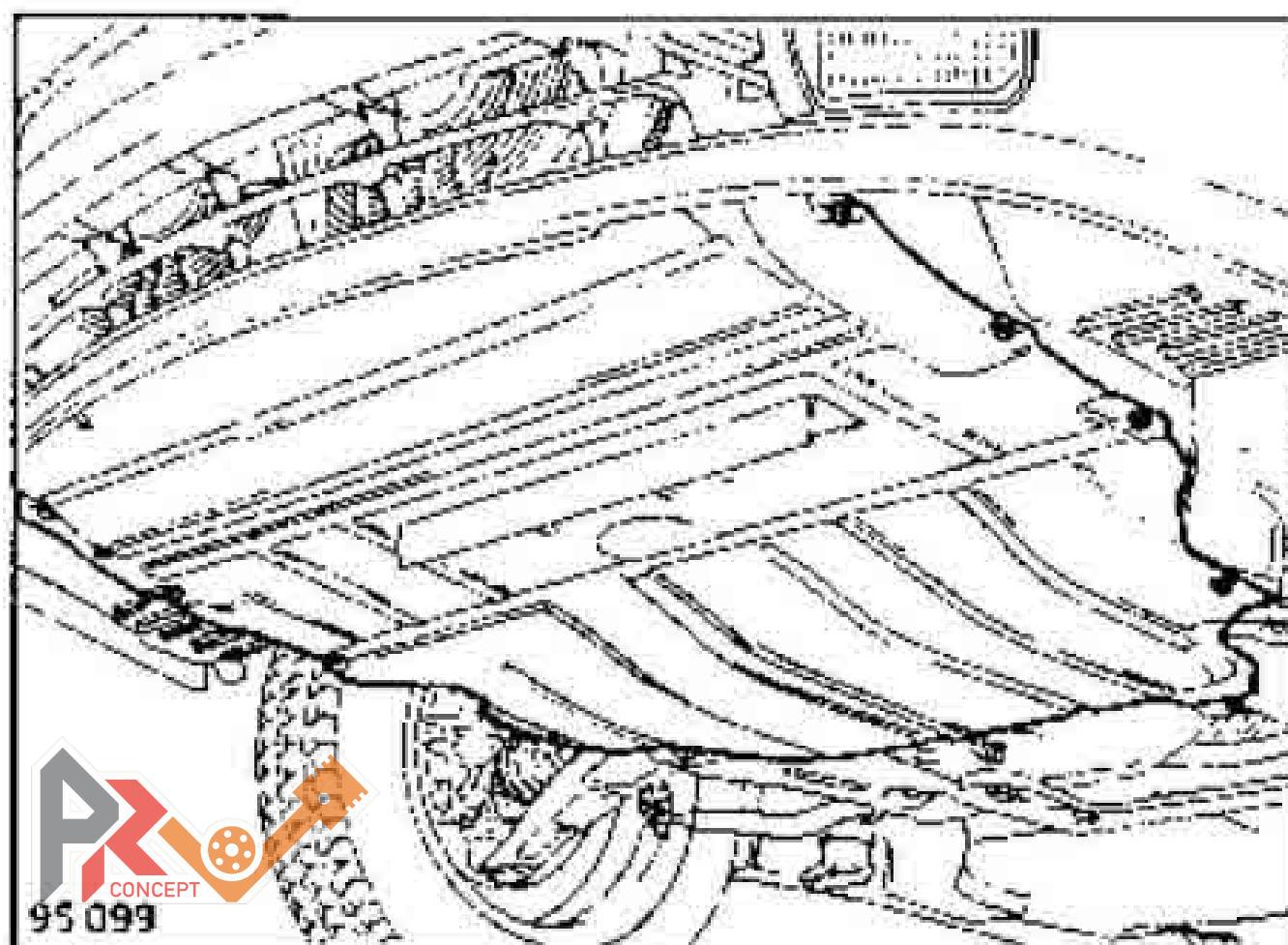
TIGHTENING TORQUES (in daN.m)		
Sump bolt	1,5	
Engine tie bar mounting flange	5,5	
Engine tie bar mounting bolt	15,5	
Shock absorber base bolt	25,5	
Brake caliper bolt	3,5	
Wheel bolt (4 bolts)	9	
Wheel bolt (5 bolts)	10	
Driveshaft bearing bolt	4	
Sump mounting bolt on gear box	4	
Bearing retaining flange bolt on driveshaft bearing	0,7 to 0,9	

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

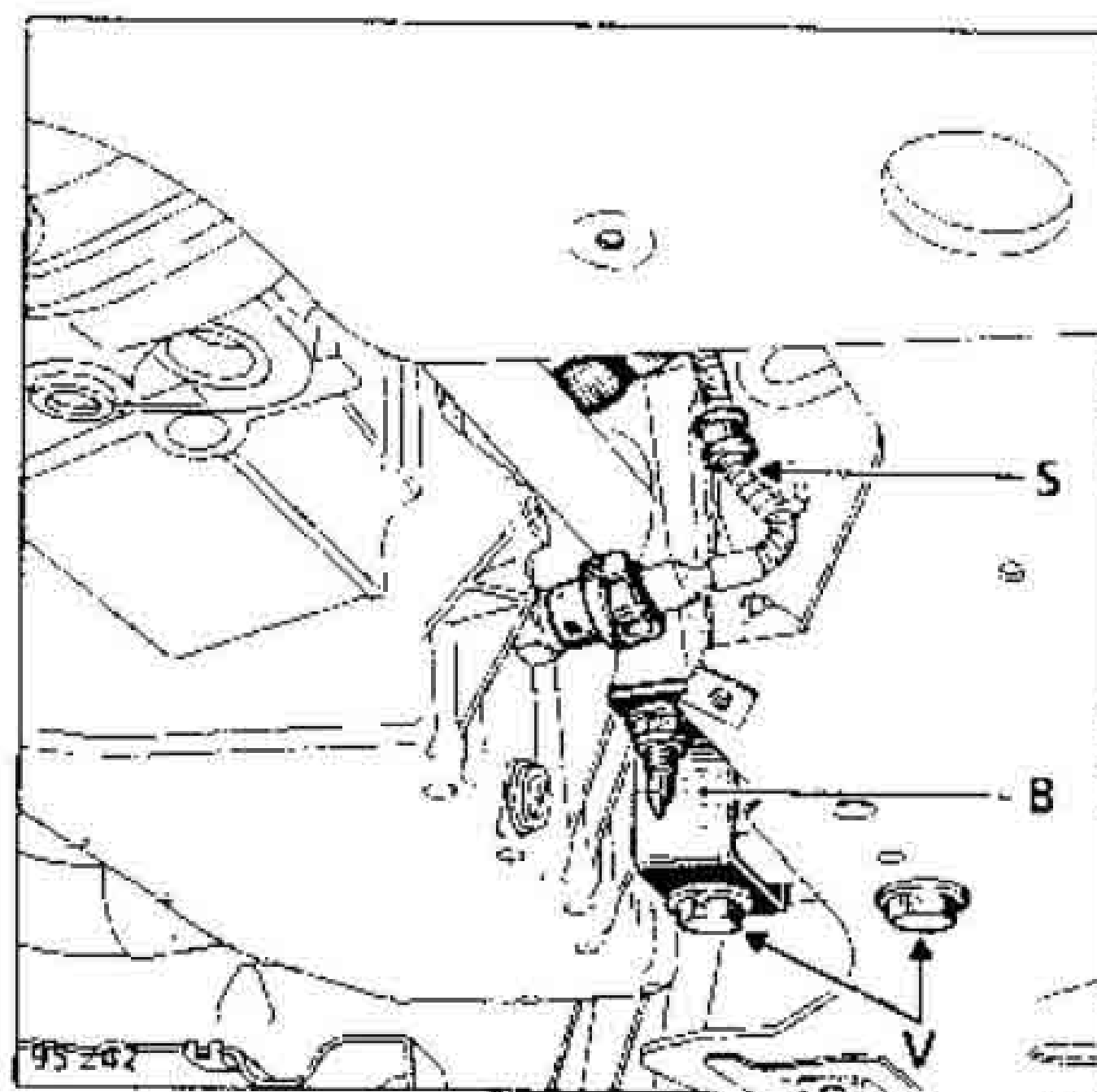
Remove the engine undertray.



Drain the engine.

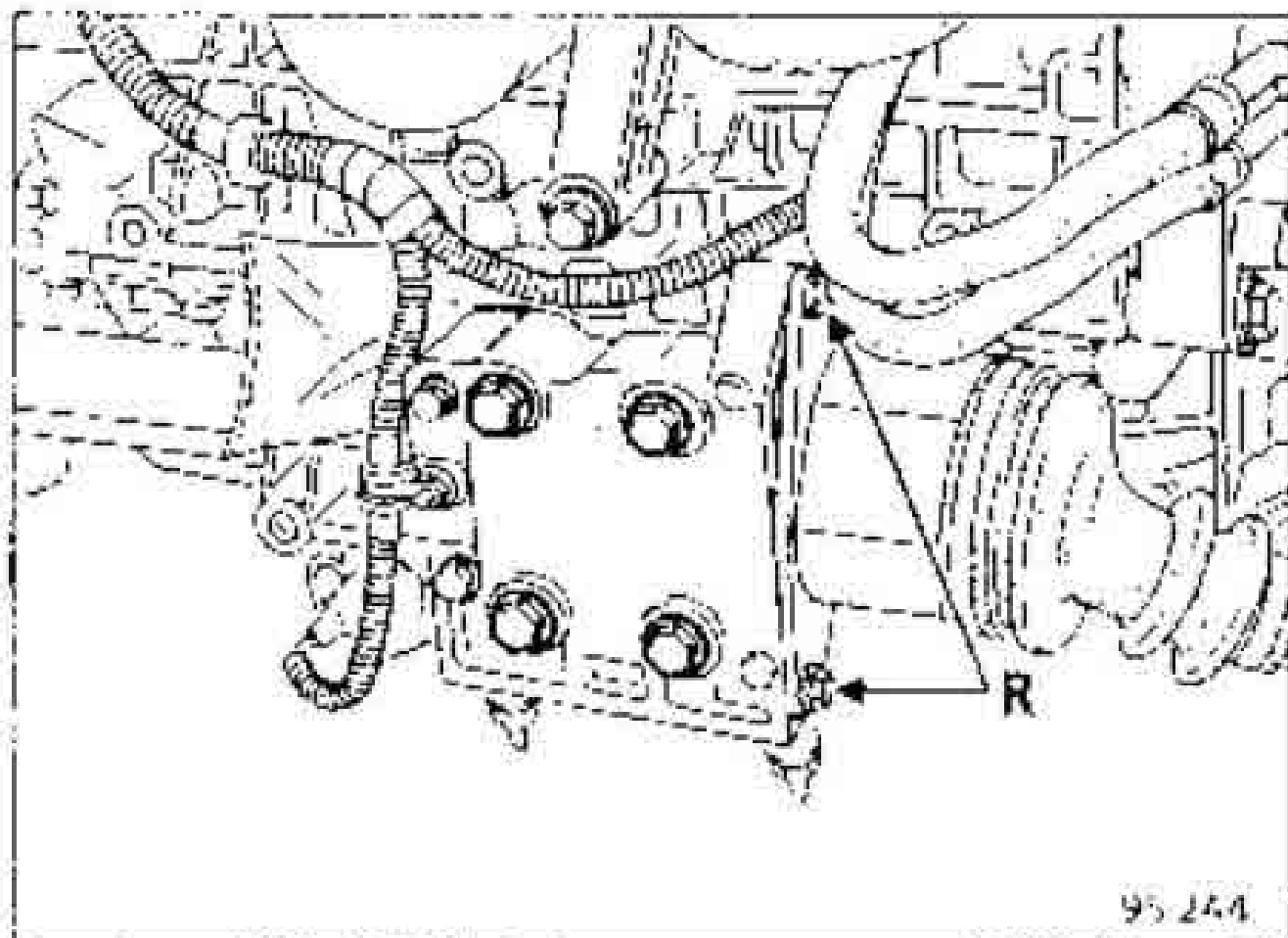
Remove:

- the engine tie bar mounting flange (B),
- the engine tie bar mounting bolts (V), remove the tie bar,
- the oil pressure and level sensor wiring (S),
- the oil level sensor

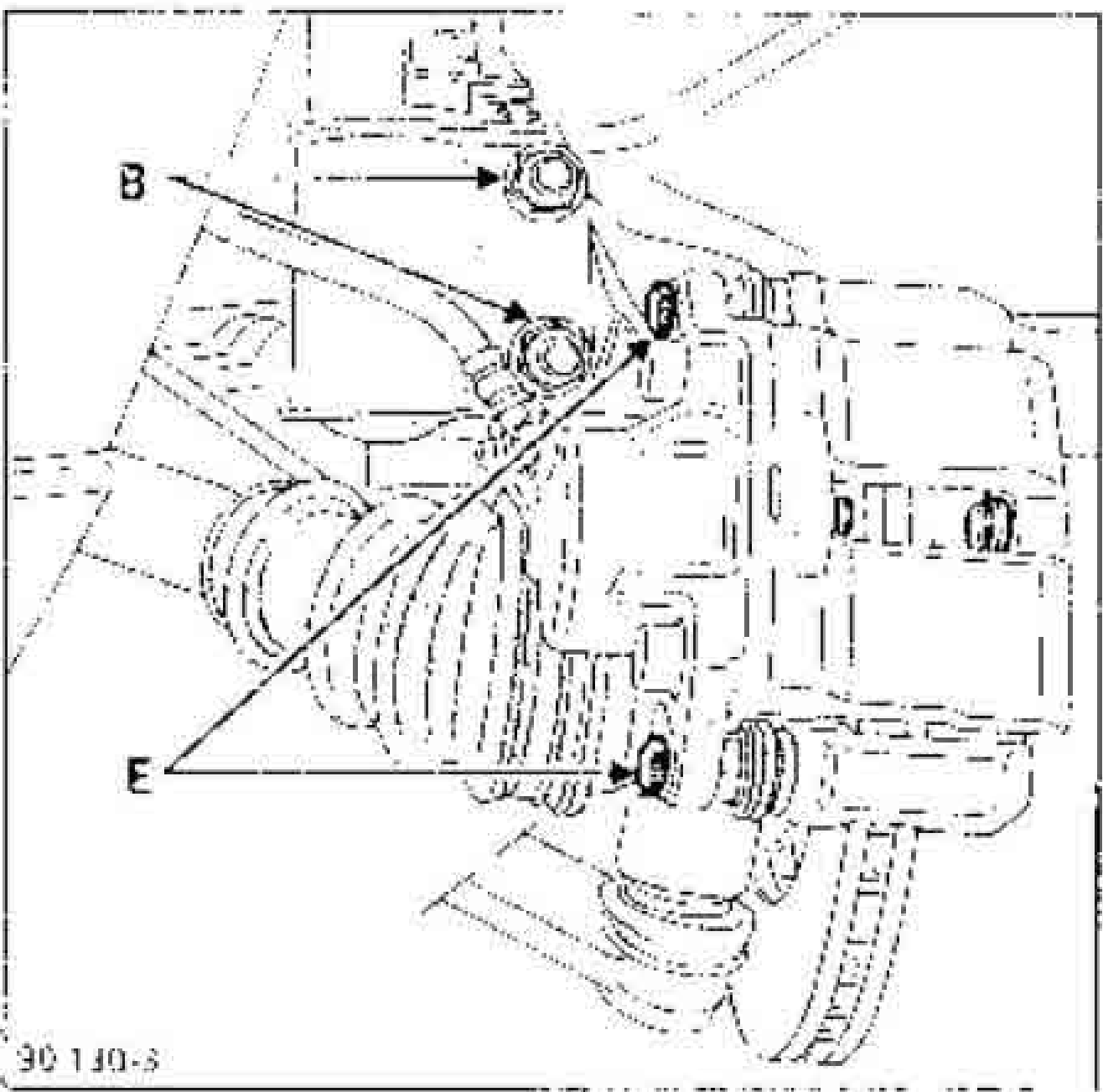


Remove:

- the 4 driveshaft bearing mounting bolts and the bearing retaining flange bolts (R)



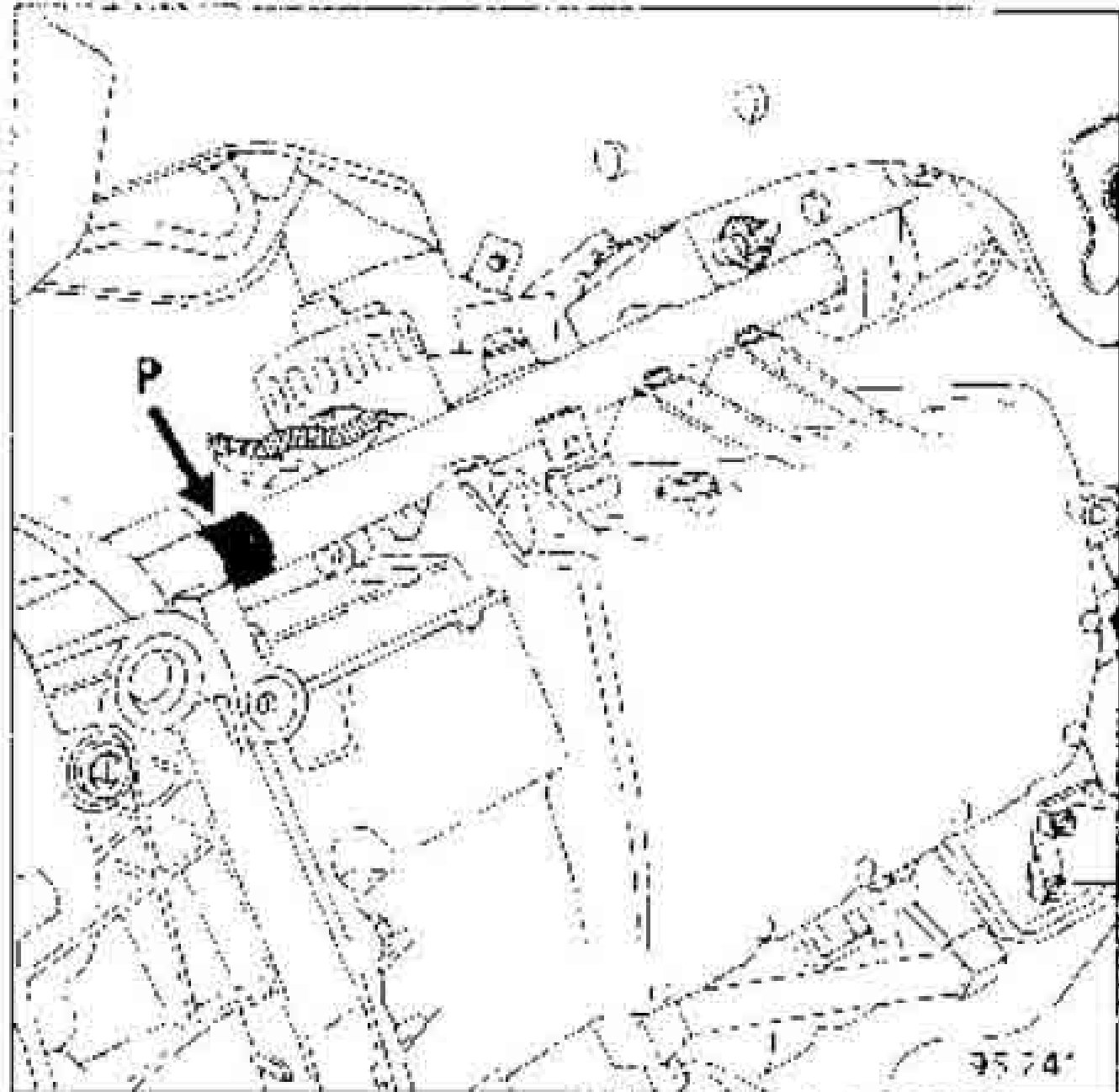
- the front right hand wheel,
- the front right hand brake caliper (E),
- the front right hand shock absorber base bolts (B).



- the front right hand steering ball joint (T. Av. 476)

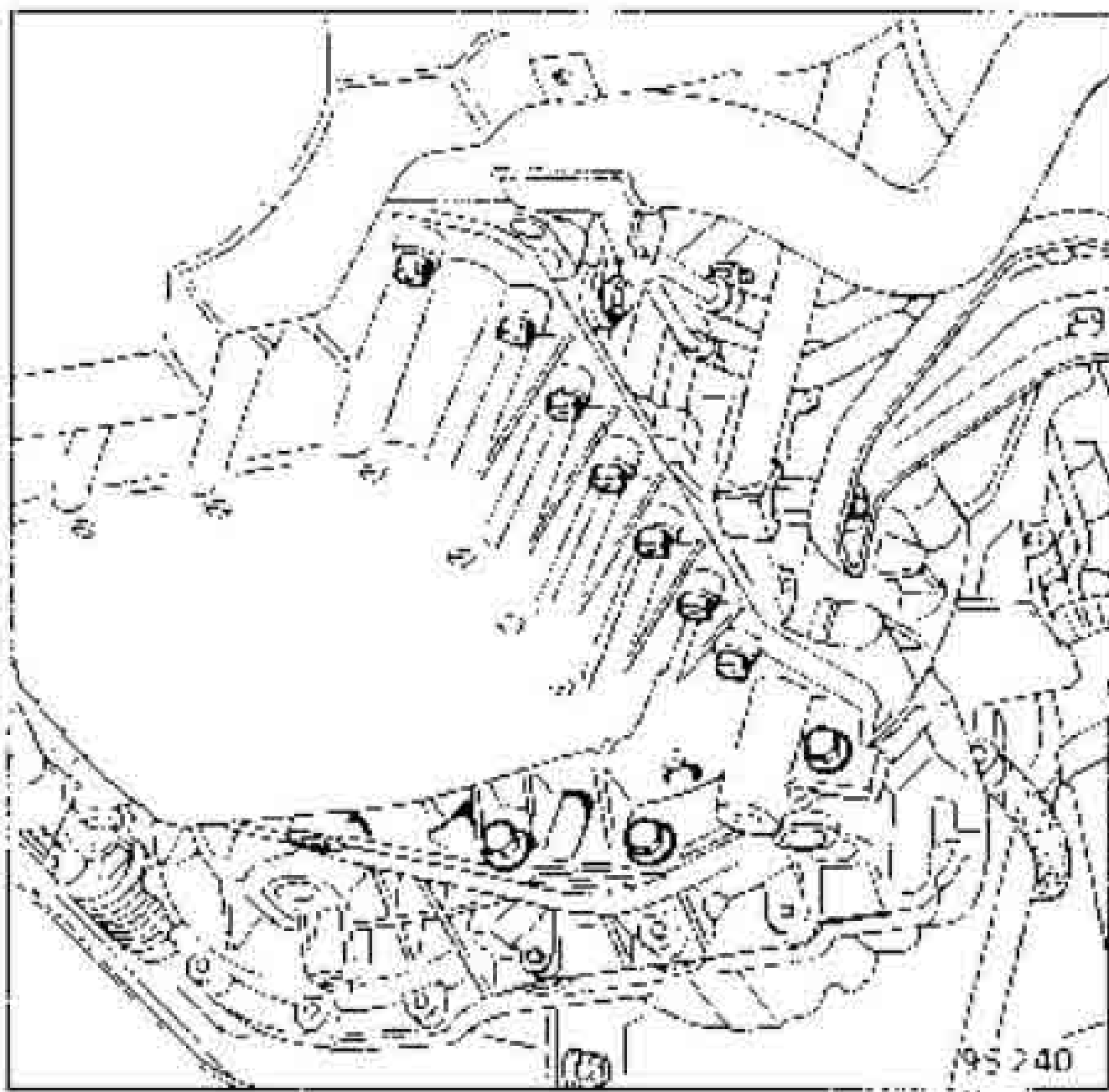
Tip the stub axle carrier and release the right hand driveshaft from the final drive output.

Protect the face of the seal (P) on the driveshaft.



Remove:

- the mounting bolts mounting the sump to the gear box,
- the mounting bolts mounting the sump to the cylinder block.



Remove the sump

REFITTING- Special notes

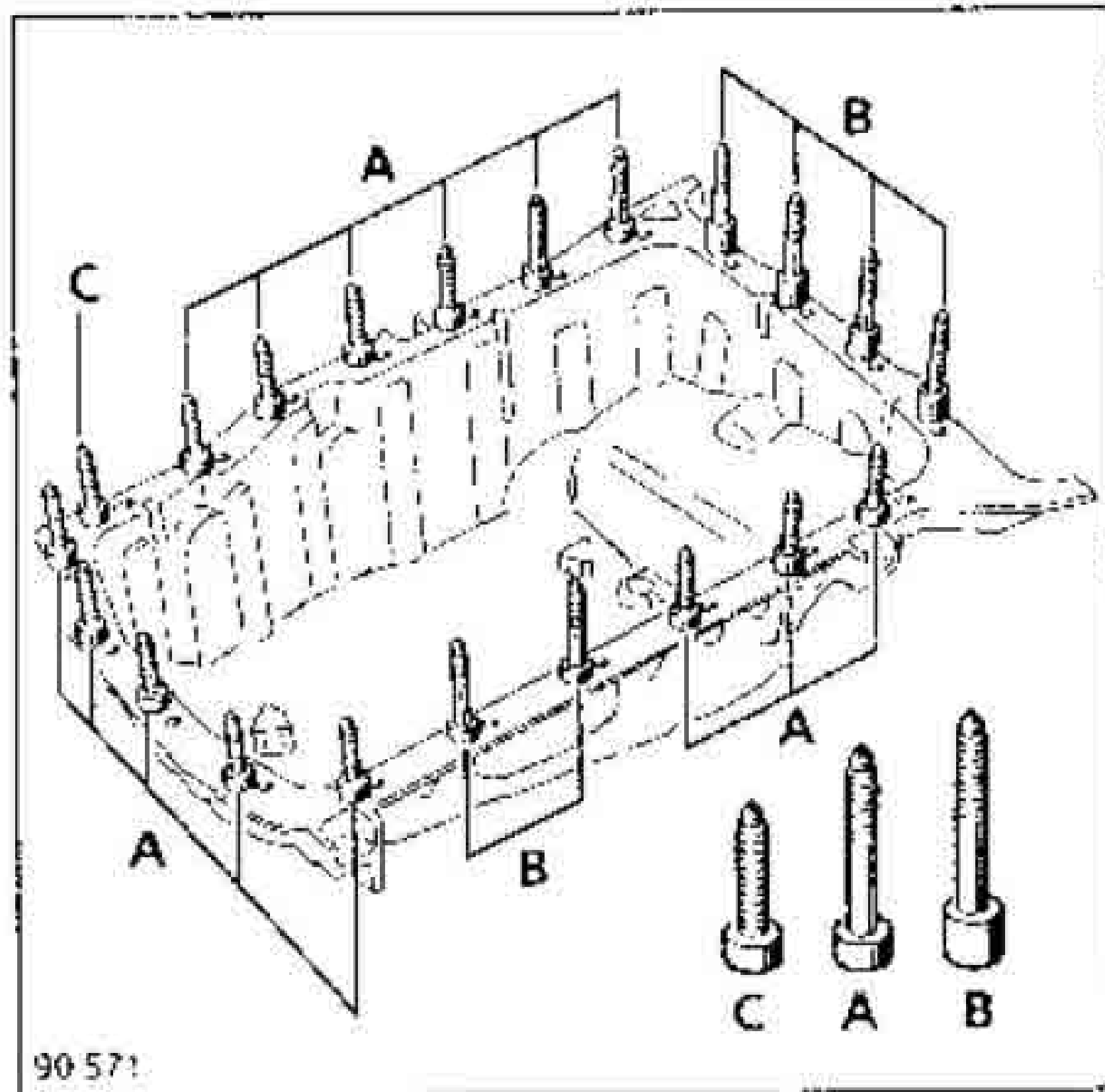
Replace the seal, fitted dry.

Replace the sump

Sump bolt marking

3 types of bolts (A), (B), (C)

- 14 bolts (A) 39 mm
- 6 bolts (B) 55 mm
- 1 bolt (C) 28 mm.



Tighten the three clutch-sump mounting bolts first.

Refit the driveshaft and the brake calipers.

Tighten the nuts and bolts to the recommended torques

Top up the engine oil level.

SPECIAL TOOLING REQUIRED		
T.Av.	476	Ball joint extractor
		Torx 40 socket
		Engine sump plug spanner

TIGHTENING TORQUES (in daN.m)



Manifold mounting bolts	4
Sump plate bolts	1
Strengthening plate mounting bolts on gear box	4
Engine tie bar mounting flange	4,5
Engine tie bar mounting bolt	16,5
Shock absorber base bolt	25,5
Brake caliper bolt	3,5
Wheel bolt (4 bolts)	9
Wheel bolt (5 bolts)	10
Driveshaft bearing bolt	4
Bearing retaining flange bolt on driveshaft bearing	0,7 to 0,9
Steering ball joint nut	4
Oil pump mounting bolt	5,5

REMOVAL

Put the vehicle on a 2 post lift.

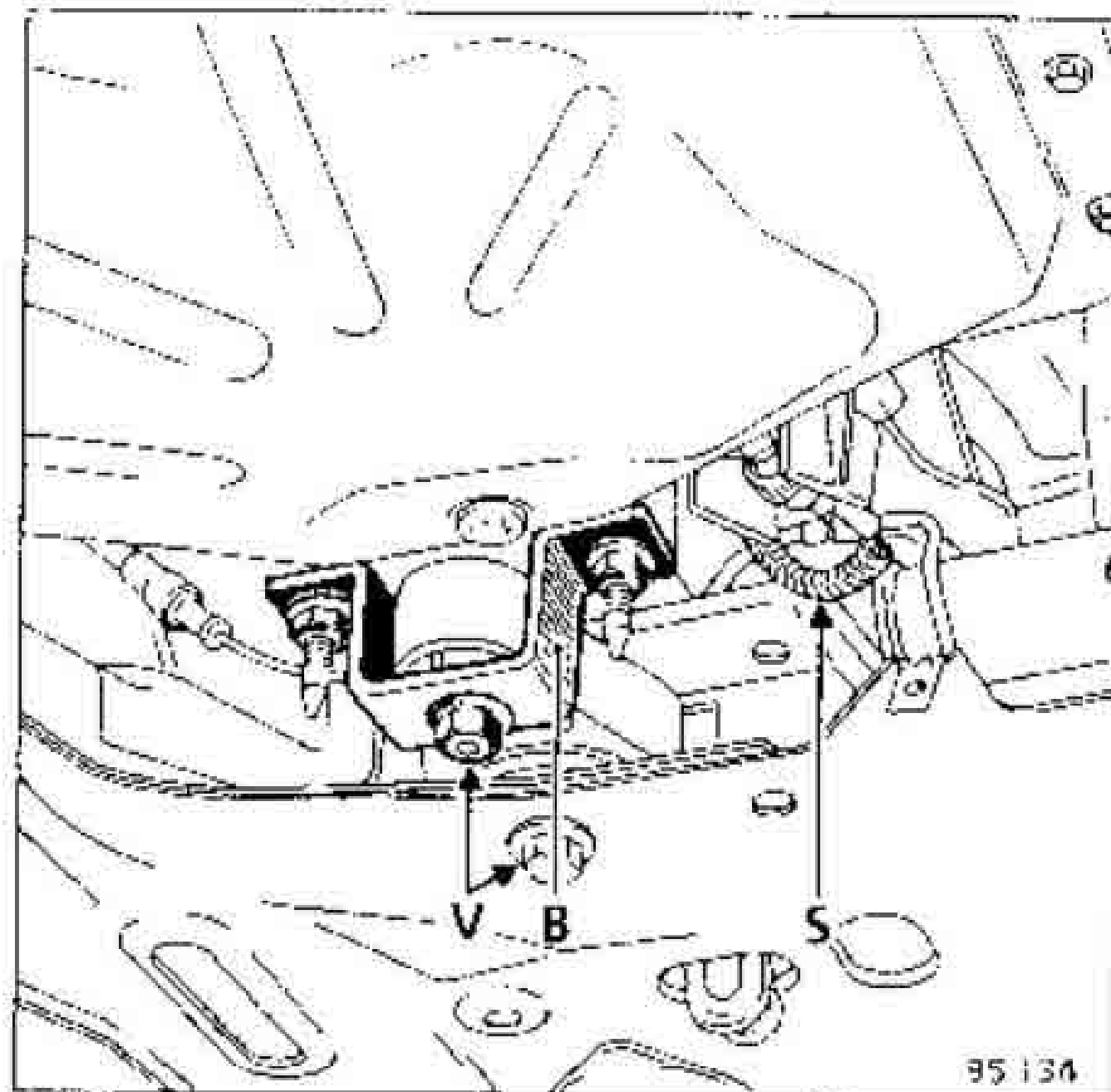
Disconnect the battery

Remove the engine undertray.

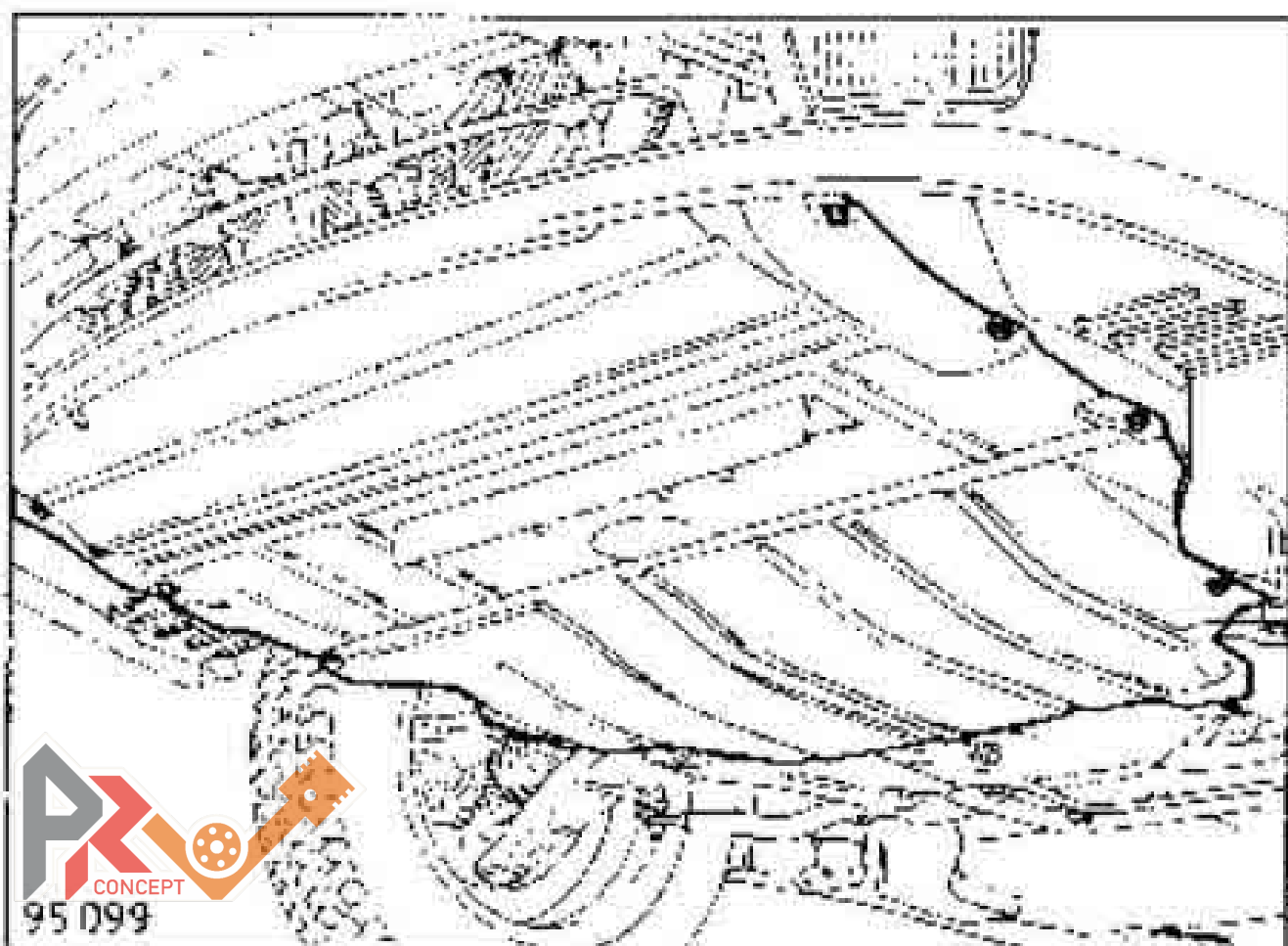
Drain the engine.

Remove:

- the engine tie bar mounting flange (B),
- the engine tie bar mounting bolts (V), remove the tie bar,
- the oil pressure and level sensor wiring (S),

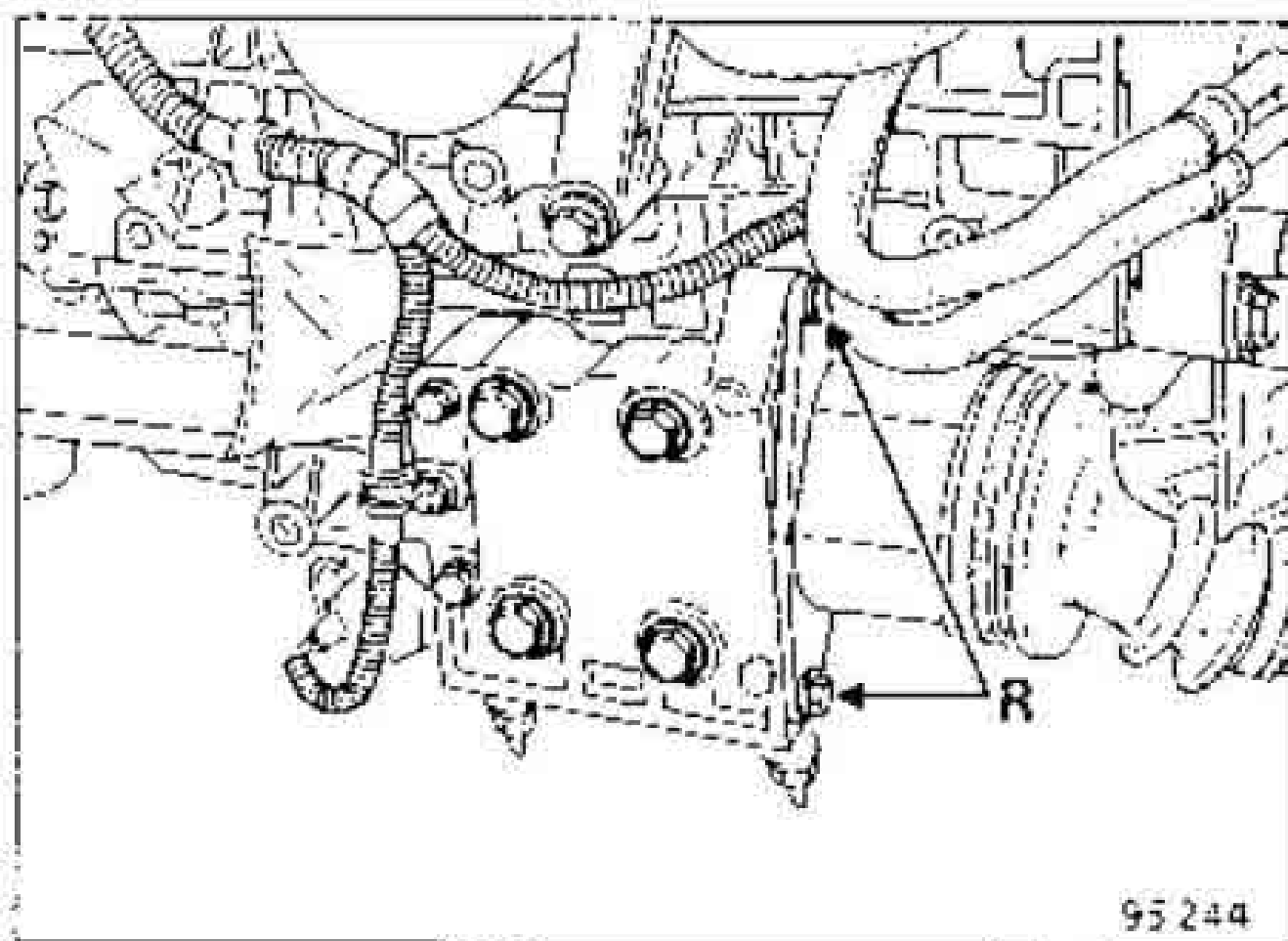


95 134

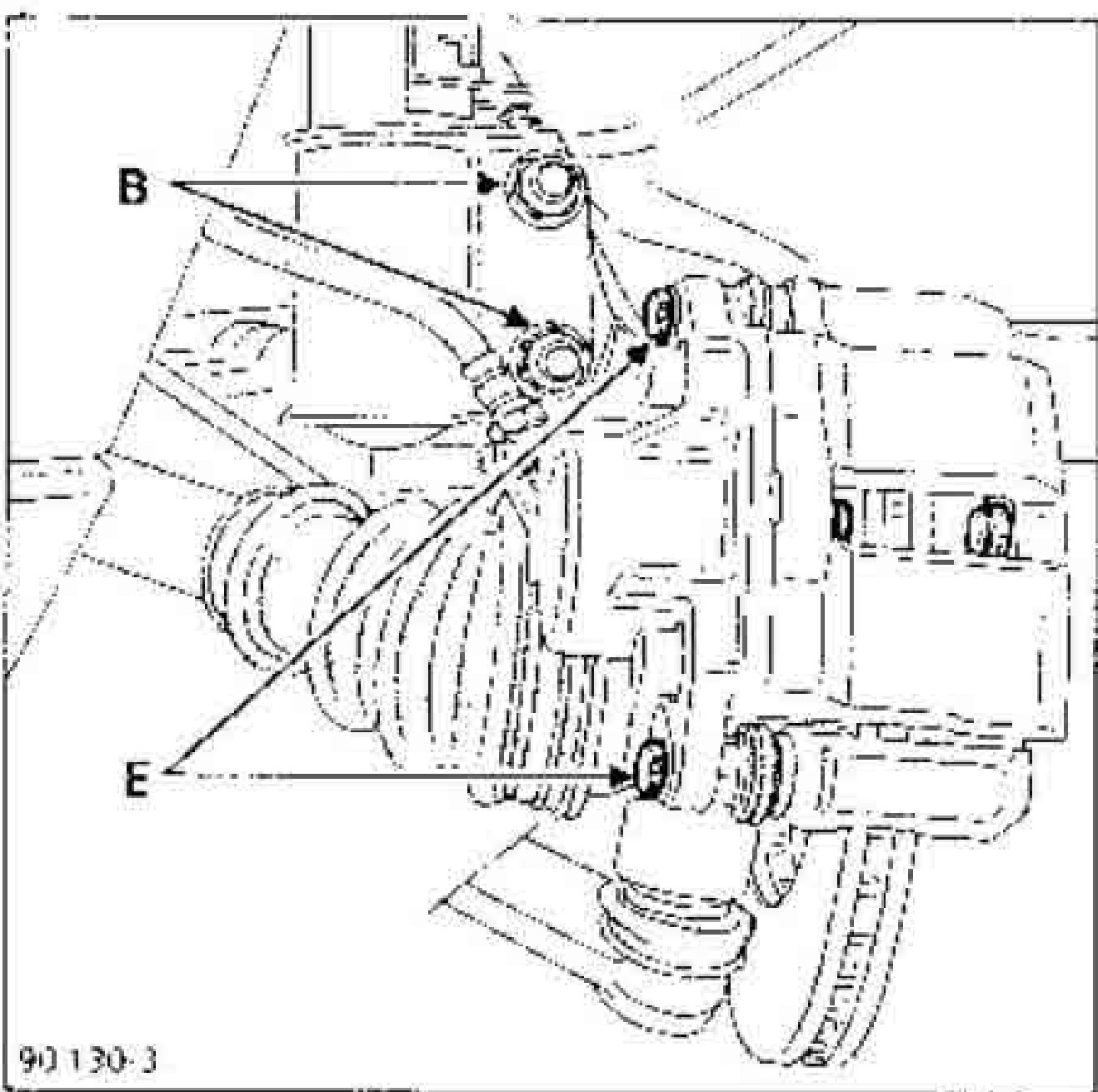


Remove:

- the 4 driveshaft bearing mounting bolts and the bearing retaining flange bolts (R) on the bearing.



- the front right hand wheel,
- the front right hand brake caliper (E),
- the 2 shock absorber base bolts (B) on front right hand side
- the steering ball joint using tool T.Av. 476.

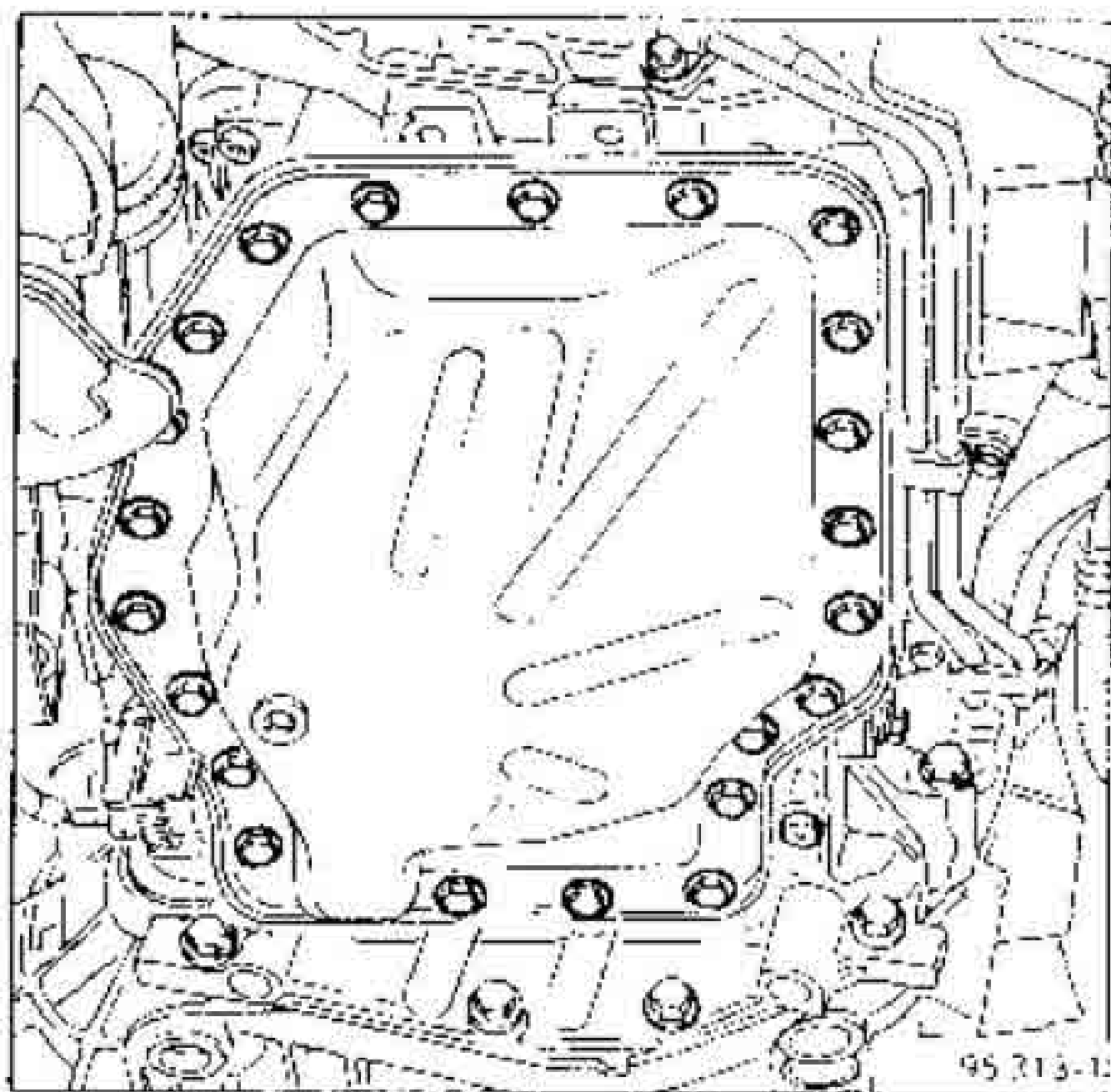


Tilt the stub axle carrier and remove the right hand driveshaft from the final drive output.

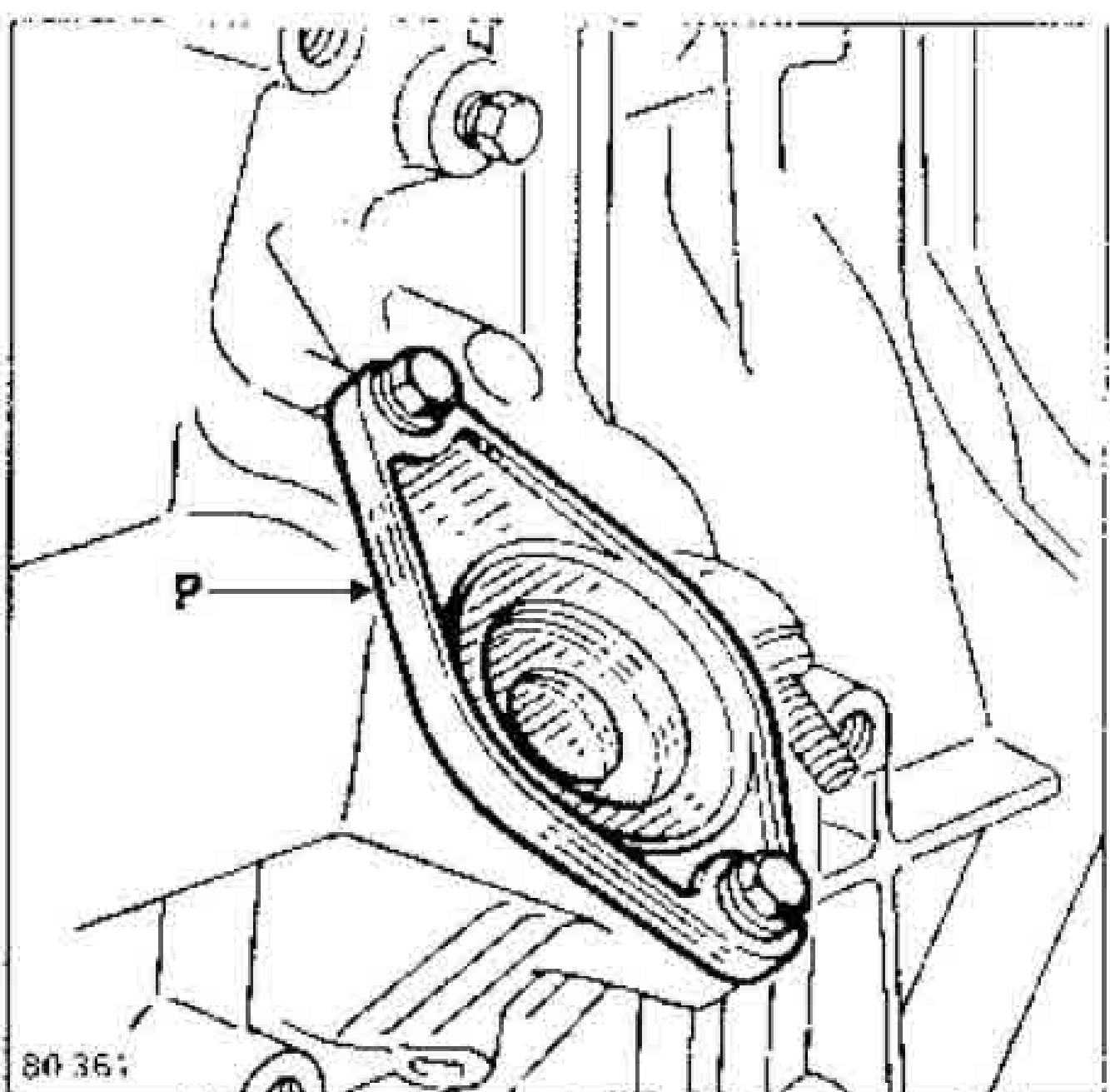
Protect the driveshaft sealing face.

Remove:

- the sump mounting bolts,

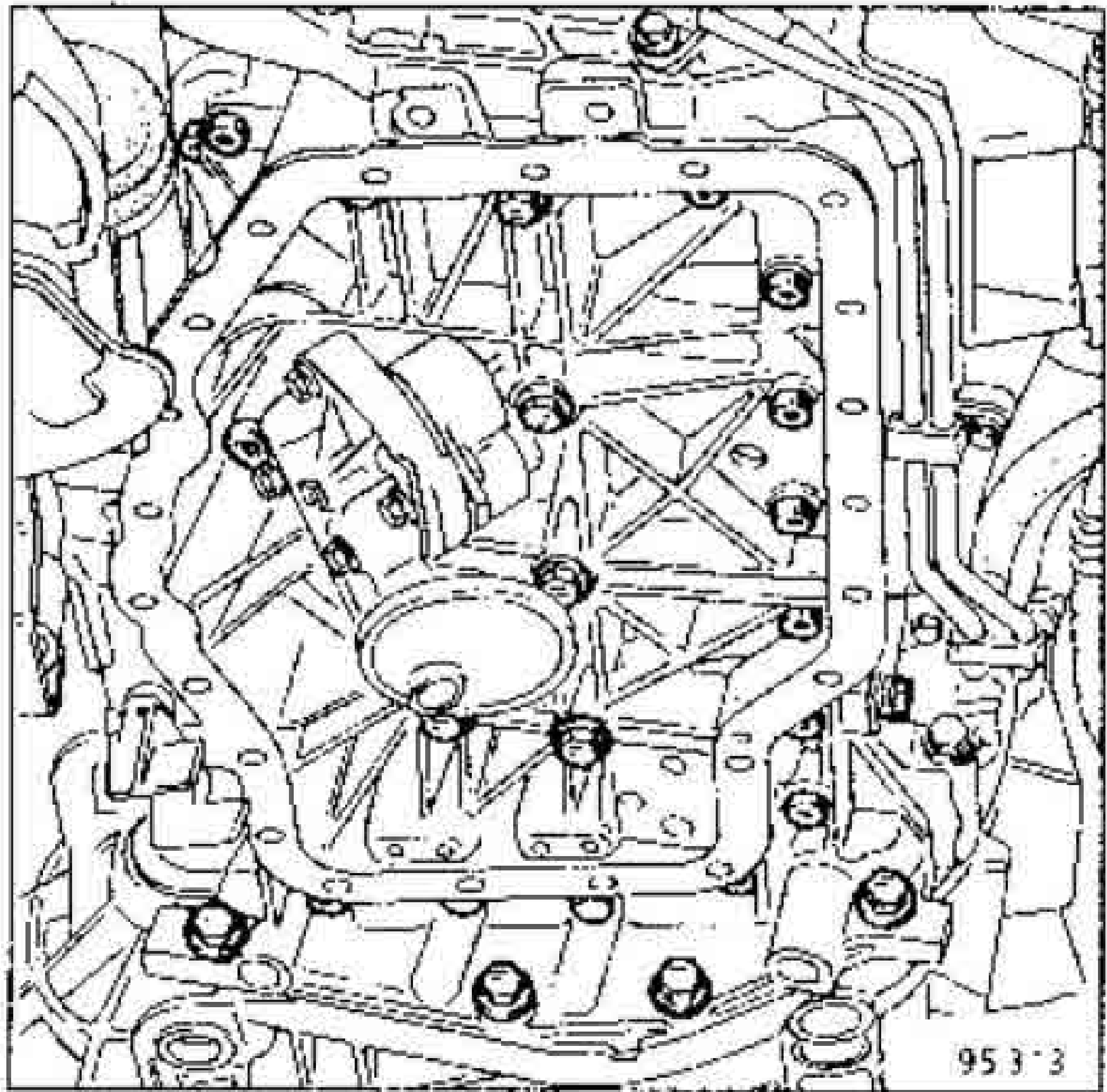


- the oil pump cover (P),
- the oil pump shaft drive gear,



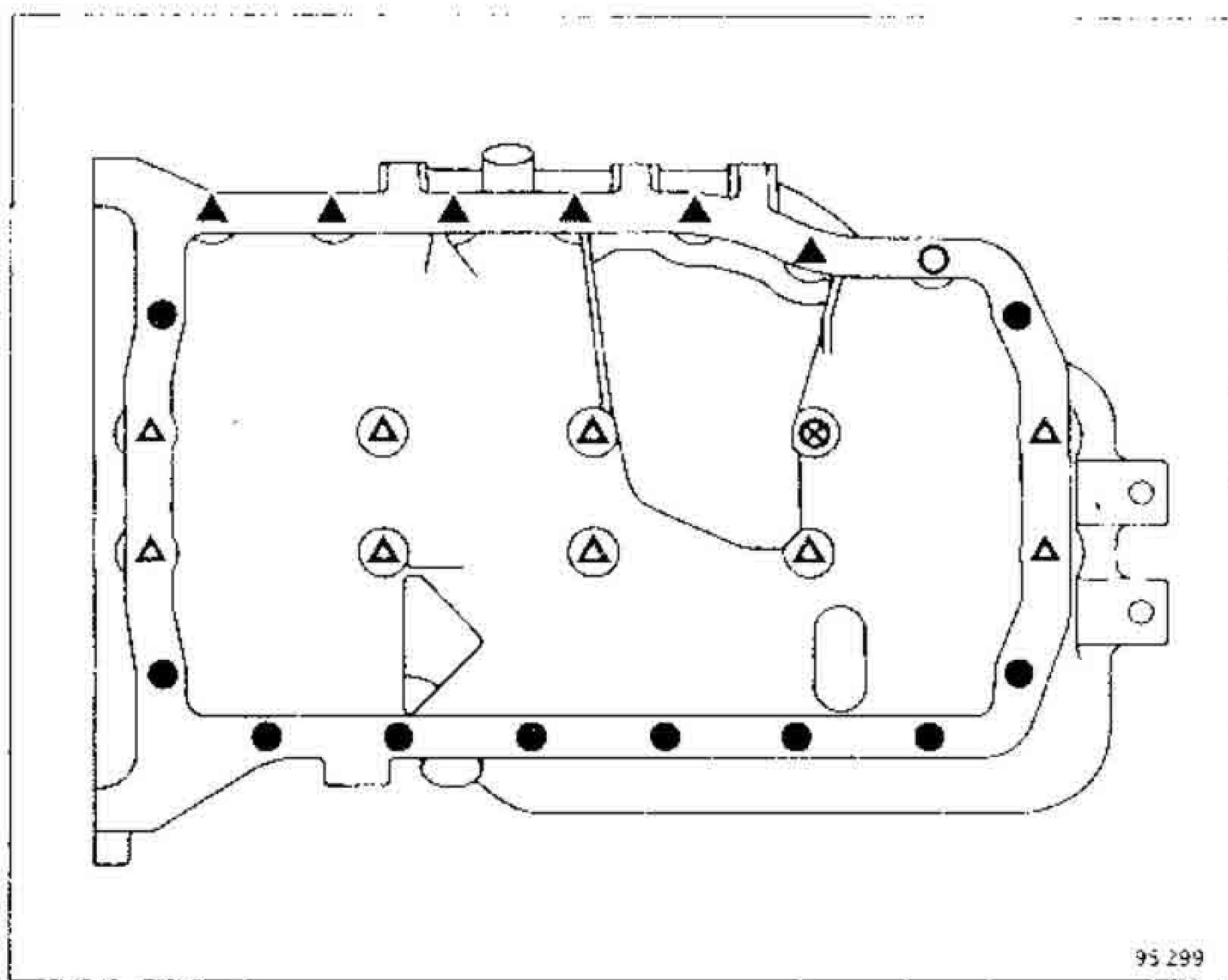
Remove:

- the oil pump mounting bolts,
- the oil pump and drive shaft,



- the inlet manifold mounting bolts,
- the strengthening plate mounting bolts.

Identification of the plate mounting bolts on the cylinder block and sump.



5 bolt types marked as follows:

10 bolts (M7 x 100-55), tightening torque : 1,2 to 1,5 daN.m

1 bolt (M7 x 100-28), tightening torque : 1,2 to 1,5 daN.m

6 bolts (M7 x 100-39), tightening torque : 1,2 to 1,5 daN.m

9 bolts (M10 x 150-75), tightening torque : 5,5 to 7 daN.m

1 bolt (M10 x 150-40), tightening torque : 5,5 to 7 daN.m

FITTING THE SUMP PANEL

Fit all the bolts in the sump then in the same order torque tighten to 0,9 daN.m

ATTENTION : if the tightening torque is exceeded, the seal centring dowels may be damaged and this may cause a leak.

Refitting is then the reverse of removal. Top up the engine oil.

SPECIAL TOOLING REQUIRED

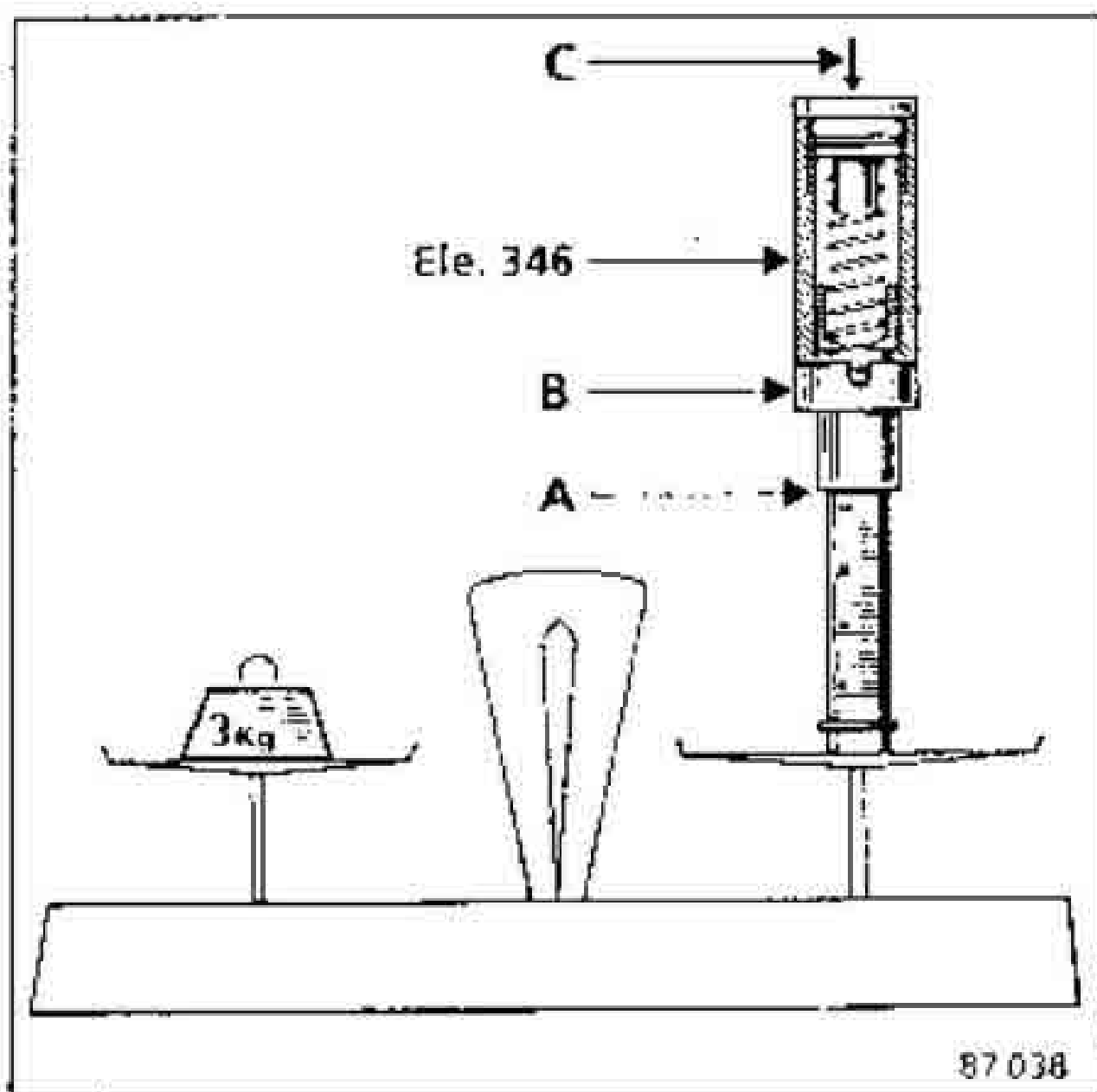
Elé.	346-04	Belt tension tester
Elé.	346-05	Belt tension test bar
B. Vi.	906	Pinion pre-load tool

CALIBRATION OF TOOL Elé. 346

Two methods:

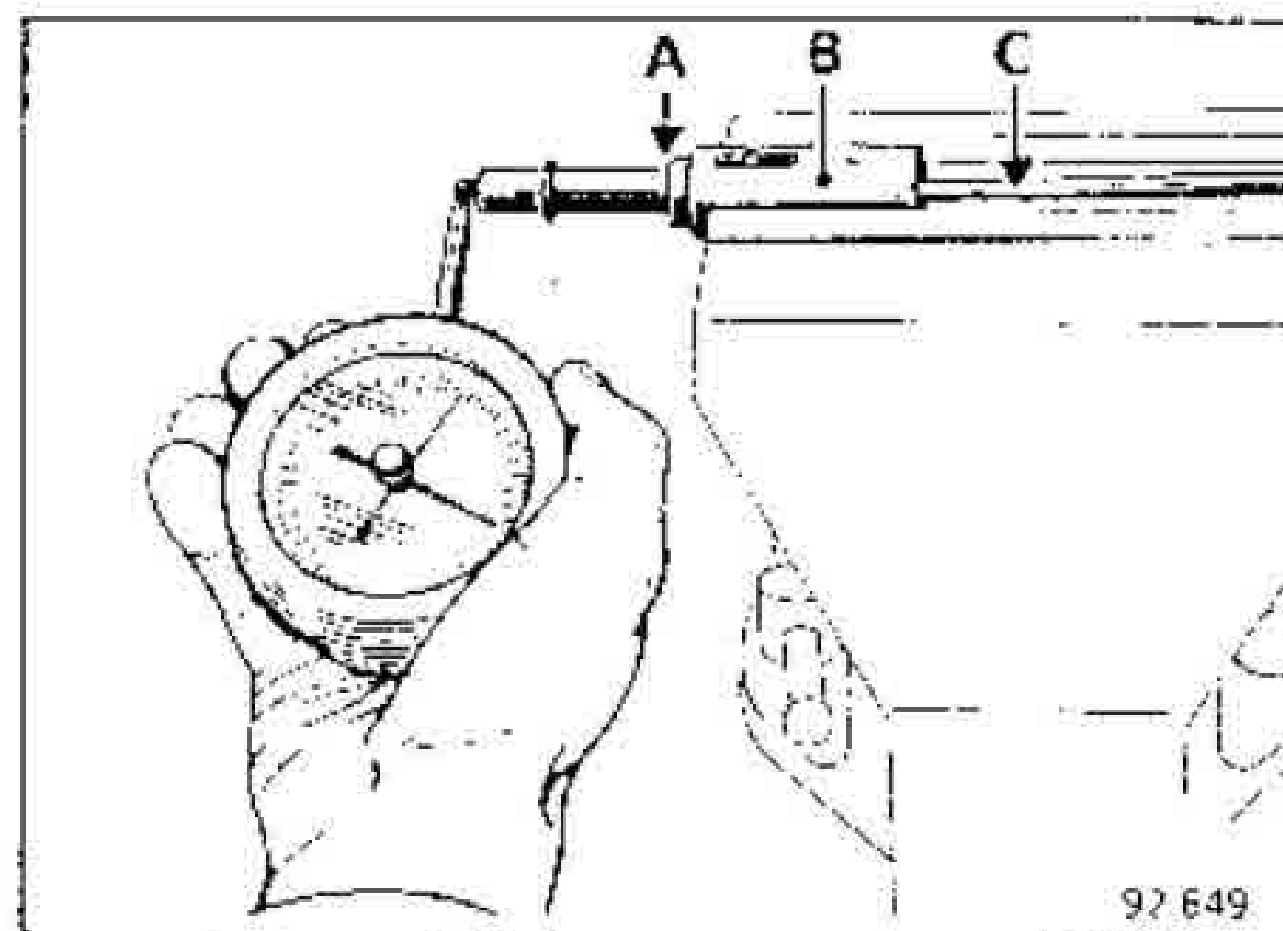
The calibration of tool Elé. 346 must be set correctly before it is used (new tool) and at regular intervals thereafter.

1st method :



Apply a force of **3 daN** to the tool (a weight of **3 kg**). its shoulder (A) should come flush with the plunger body (B). If it does not, turn the screw (C) to increase or decrease the spring pressure.

2nd method :



Grip tool **Elé. 346** in a vice after first removing the plug. push the cylindrical part of tool **B. Vi. 906** against the sliding section. The shoulder (A) should be flush with the body of the plunger (B) when the pointer indicates **3 daN**. If it does not, turn screw (C) to increase or decrease the spring pressure.

Belt tension (1) in mm

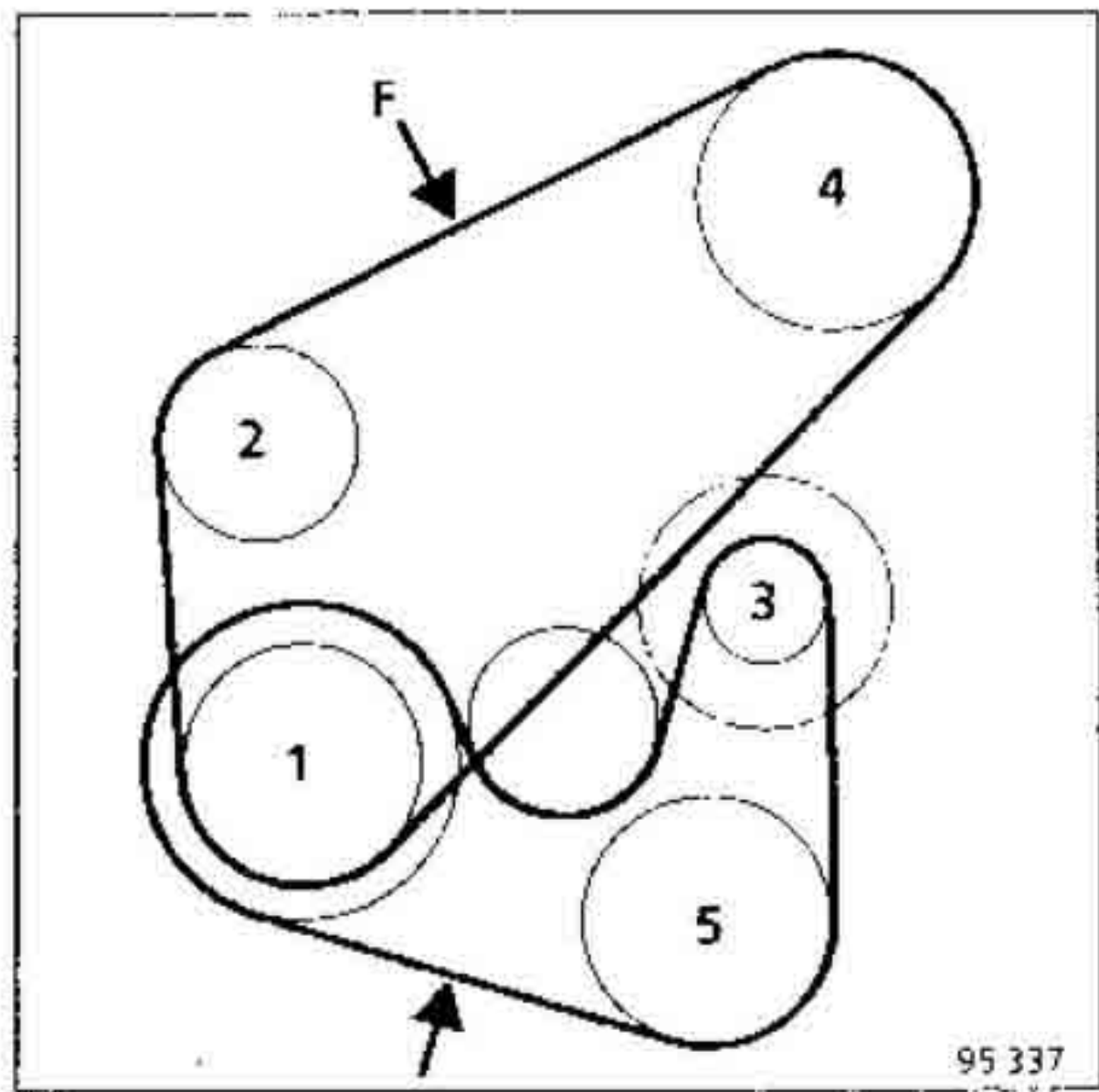
Type	Alternator drive belt	PAS drive belt	Air conditioning drive belt
	Multitooth	V-shaped	Multitooth
J7R - J7T	4	6	3,5

(1) Should be correct after 10 minutes operation.

Note: the belt tensions will be given in a new note for other engine types.

Belt tension checking points (F).

ENGINES J7R - J7T



- 1 Crankshaft
- 2 Water pump
- 3 Alternator
- 4 Steering pump
- 5 Air conditioning compressor

SPECIAL TOOLING REQUIRED

Mot.	799	Camshaft pinion locking tool
Mot.	1 135-01	Timing belt tensioning tool
Elé.	346-04	Timing belt tension tester
Elé.	346-05	Timing belt tension test bar

TIGHTENING TORQUES (in daN.m)



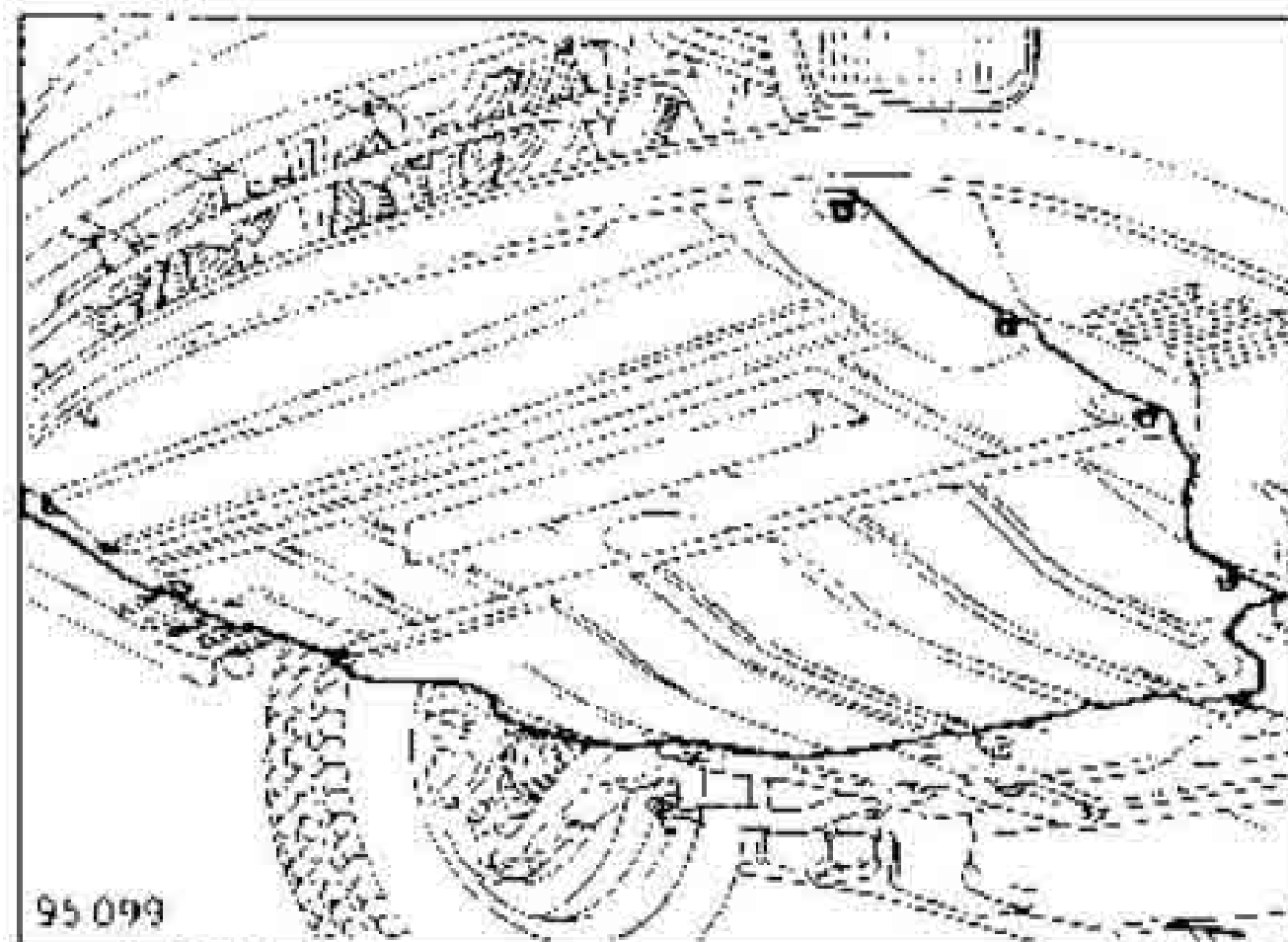
Wheel bolts (4 bolts)	9
Wheel bolts (5 bolts)	10
Tensioner mounting nut	3
Tensioner nut	5
Crankshaft pulley bolt	$8 \pm 0,5$
Power assisted steering pump belt tension nut	2
Pump mounting nut and bolt	4
Alternator mounting nut	6
Alternator drive belt tension nuts	2
Upper timing cover mounting bolt	2
Lower timing cover mounting bolt	1,5
Mounting bolt for mounting lower cover on upper cover	0,5

Put the vehicle on a 2 post lift.

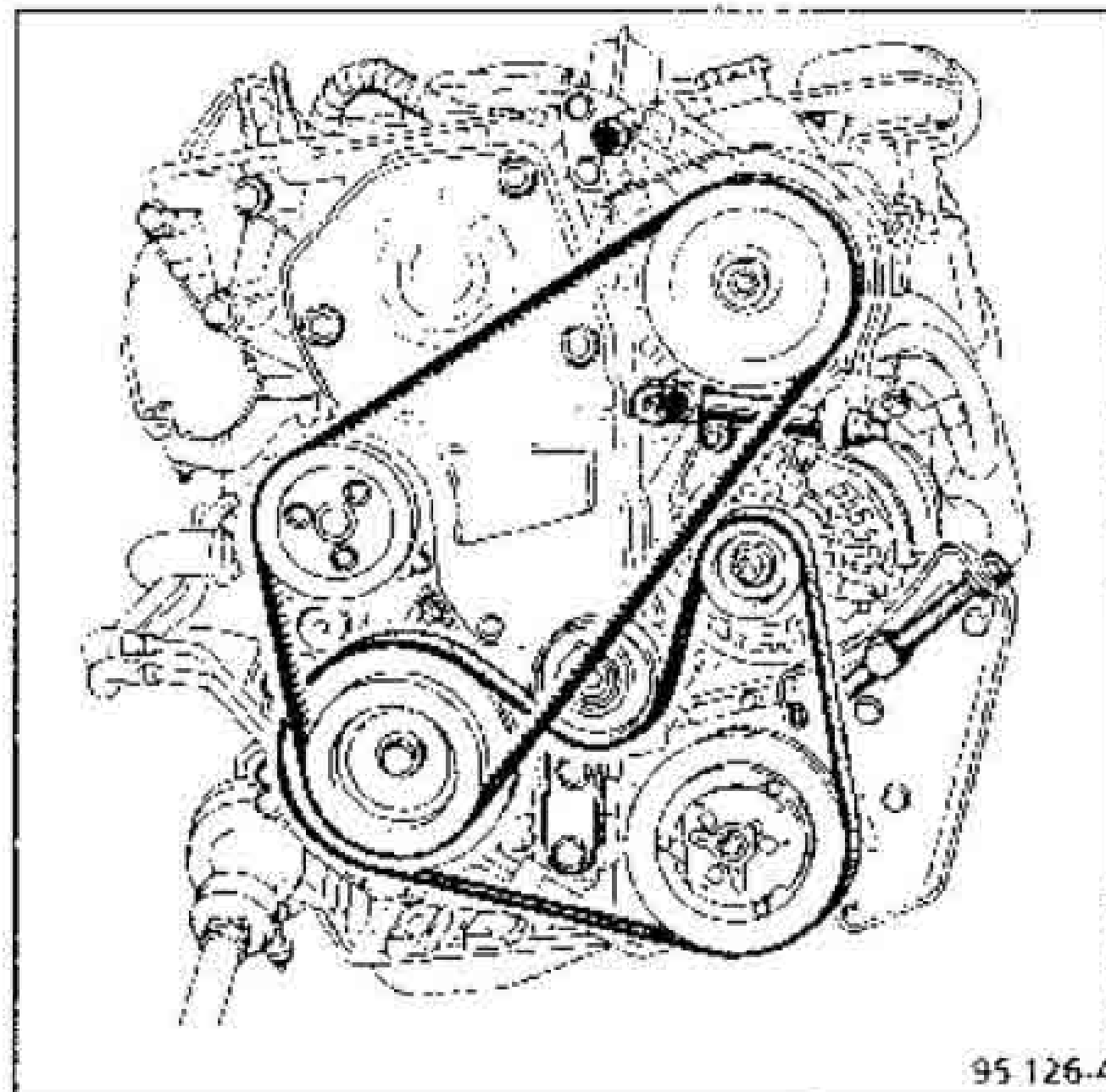
Disconnect the battery.

Remove:

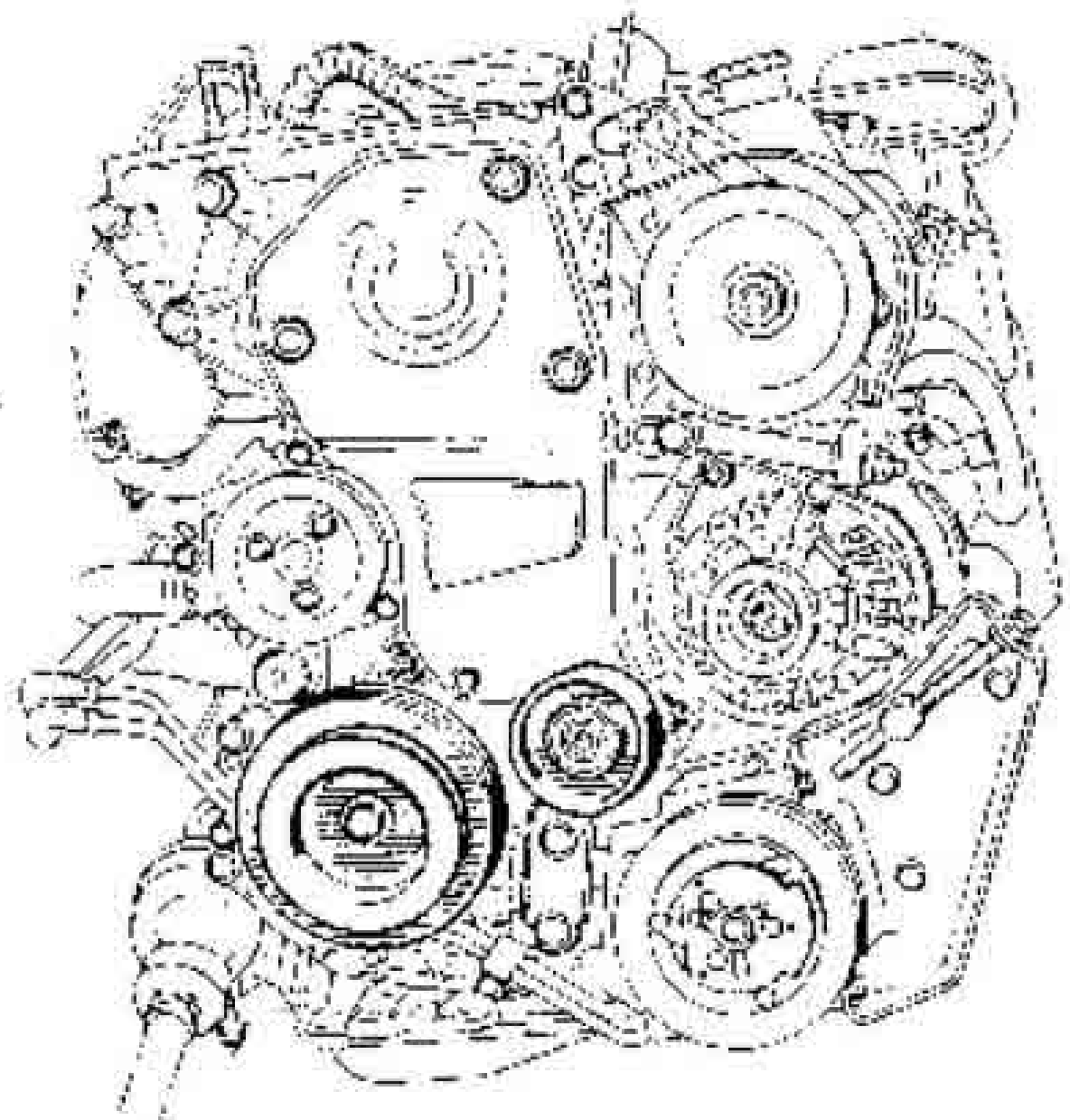
- the front right hand wheel,
- the engine undertray,
- the front and rear right hand side wheel arch protectors,



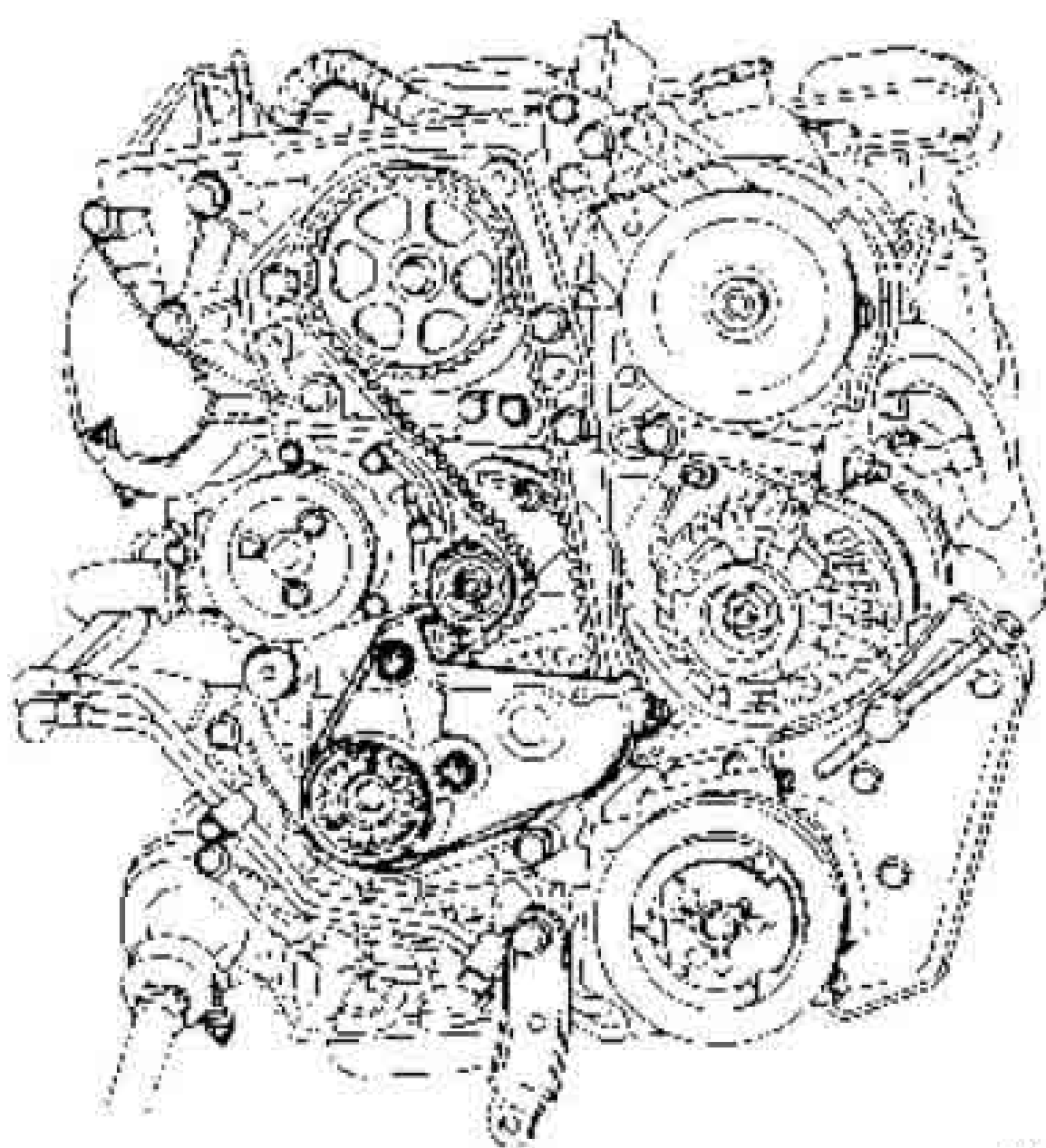
- the belt for the power assisted steering pump , the alternator and the compressor.



- the tensioning wheel for the alternator - compressor belt,
- the crankshaft pulley, to do this, engage a gear and press the brake pedal.



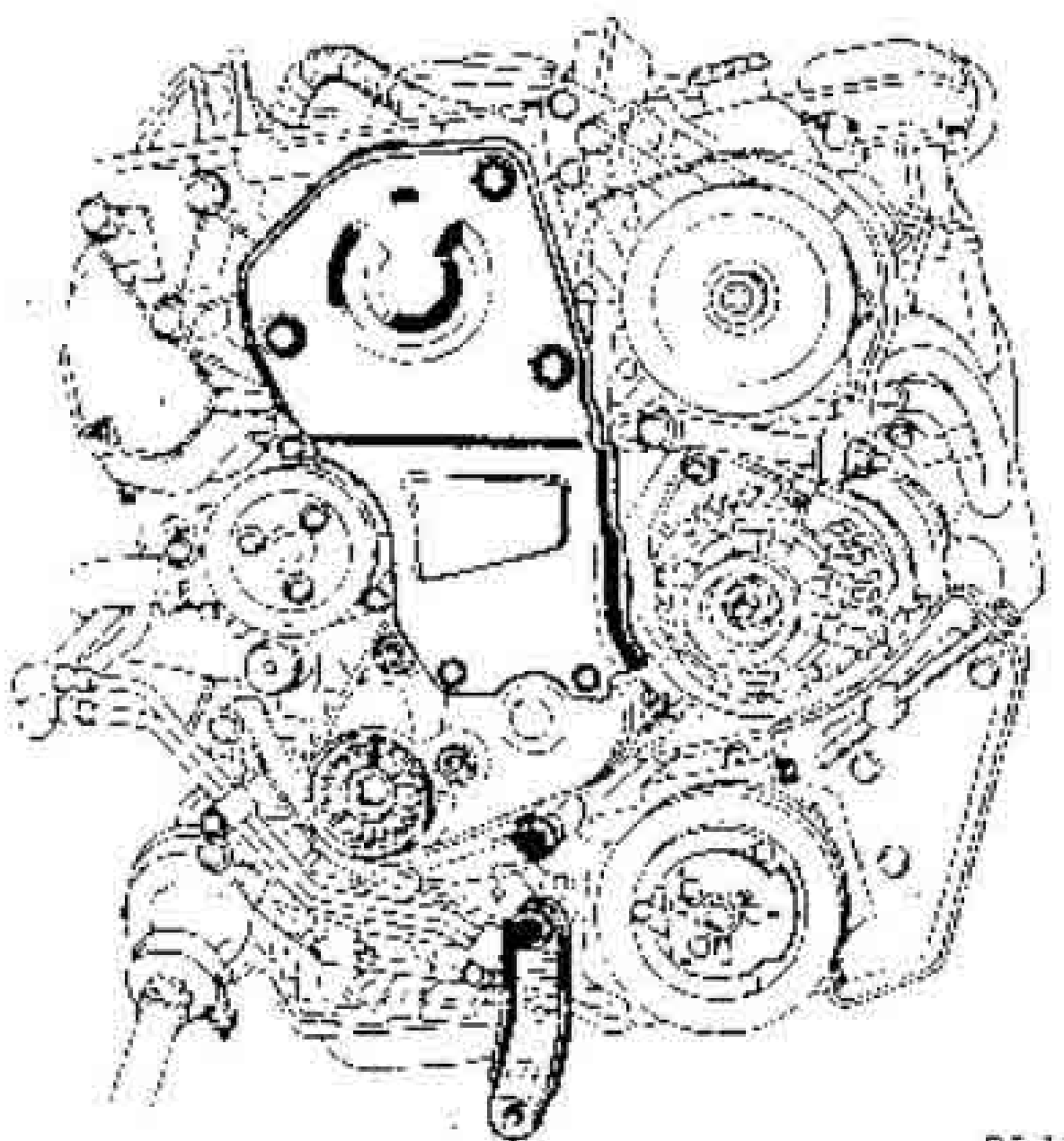
95 126-3



95 126-1

Remove:

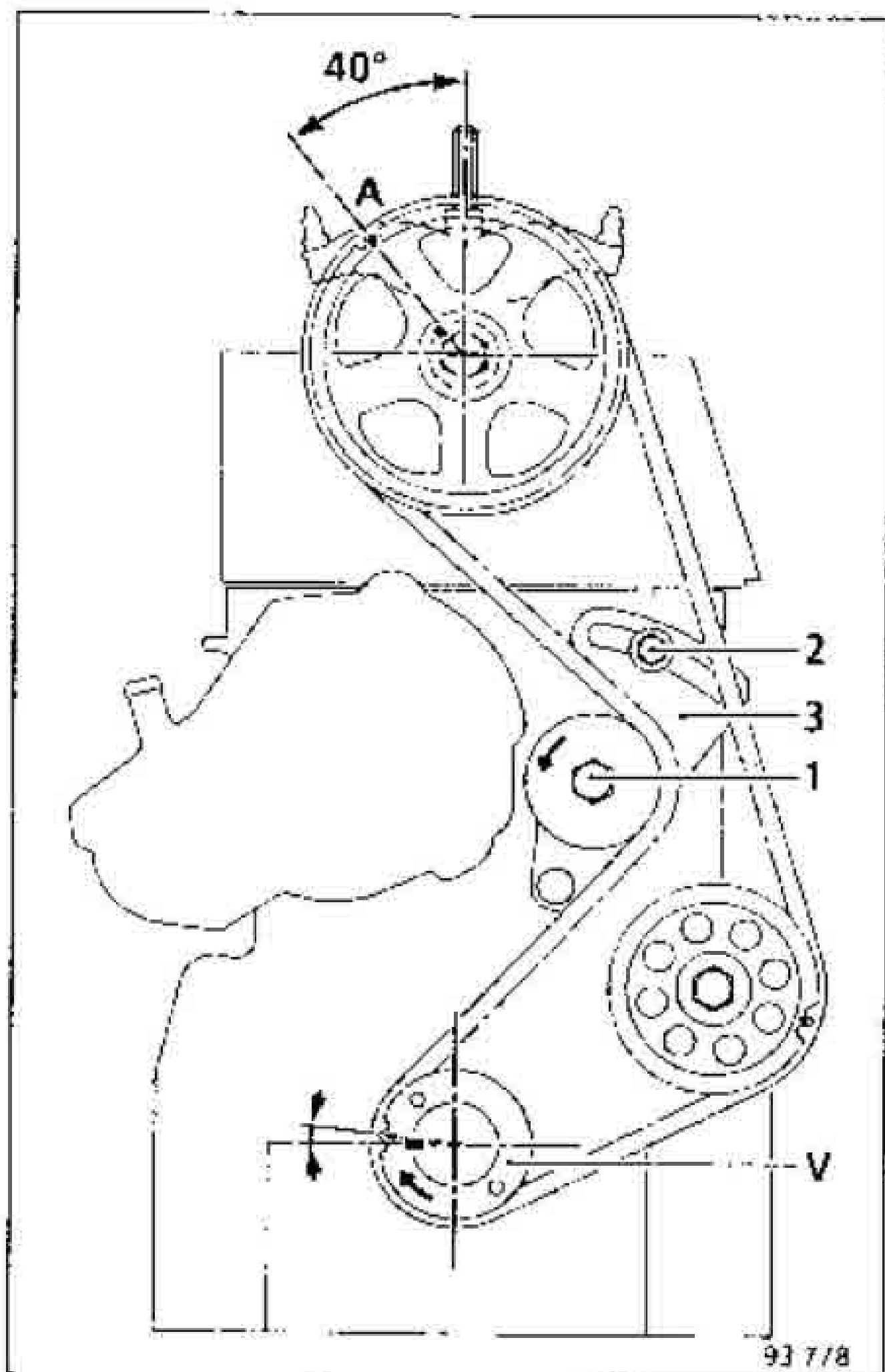
- the upper timing cover,



95 125-2

- the lower timing cover.

Using a crank fitted to the crankshaft pulley, turn the crankshaft to align the pistons. To do this, align the crankshaft pulley key (V) horizontally, pointing to the left.



If removing the belt but not replacing it, make reference marks on the side of the belt opposite the camshaft pulley and the crankshaft gear (if the original reference marks have been erased).

Loosen the nuts (1), then (2), and tilt the tensioning mounting (3).

Remove the timing belt.

REFITTING

SPECIAL NOTES

With the crankshaft key still horizontal and pointing to the left hand side ; position the camshaft (marked on notched pulley (A) at about 40° to the left of the vertical) using tool Mot. 799.

Fit the notched belt correctly (⇒)
(⇒)

(arrows pointing to the right) aligning the belt and crankshaft pulley reference marks, the intermediate shaft marks and the camshaft marks.

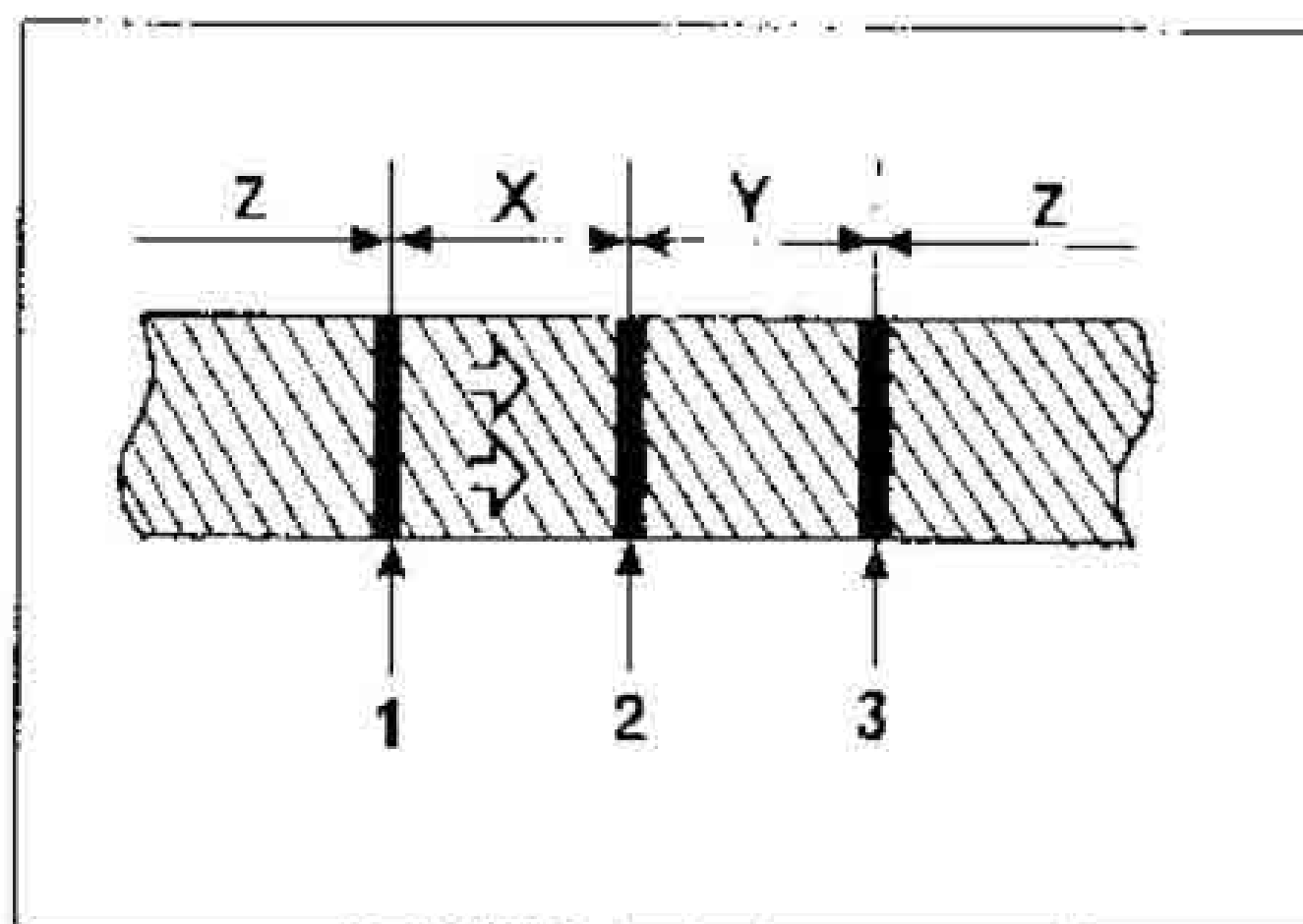
IDENTIFICATION, BELT MARKING

Number of teeth

J7R engine = 116

J7T engine = 118

View of back of belt



J7R engine

X = 44 teeth

Y = 23 teeth

Z = 49 teeth

J7T engine

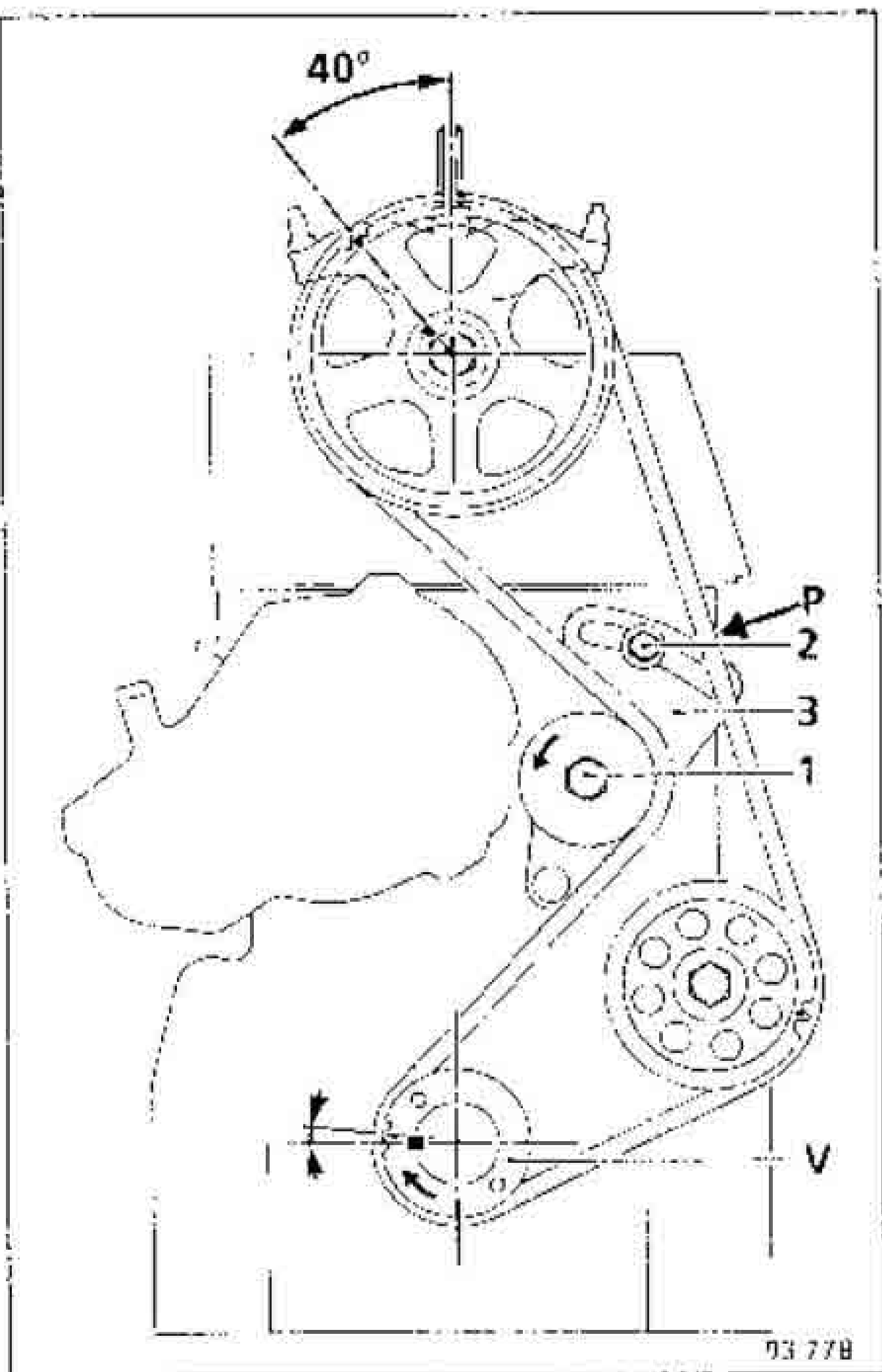
X = 45 teeth

Y = 23 teeth

Z = 50 teeth

- 1 One mark aligned with the tooth for the camshaft pulley
- 2 One mark aligned with the tooth for the intermediate shaft pulley
- 3 One mark aligned with the tooth for the crankshaft pulley

Ensure the tension tested is correctly calibrated (see page 11-01).



Lock nut (2) in the centre of the support mounting slot (3) (at 2,5 daN.m).

With the tension wheel in the released position press the belt hard with your thumb at (P) (to tension the flexible core).

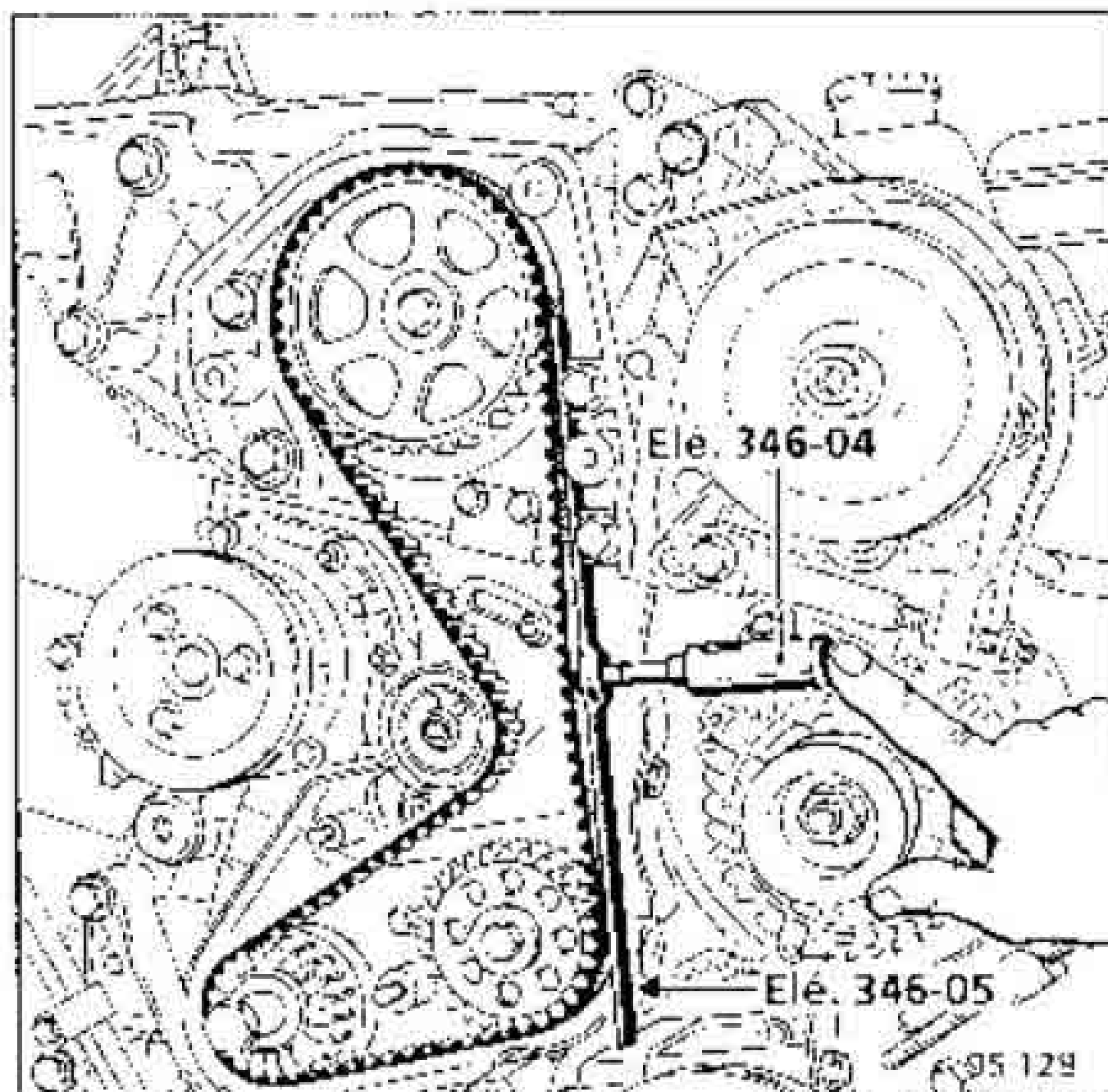
Using tool Mot. 1135-01 turn the tensioning wheel anti-clockwise to register 9 ± 1 mm on tool Elé. 346-04 and 346-05.

It is imperative that the nut (1) of the tension wheel is tightened to 5 daN.m, to avoid loosening which could damage the engine.

Turn the engine twice in the normal running direction, (clockwise, when facing the crankshaft pulley).

Reposition the camshaft pulley reference mark to about 40° from the vertical, and press the belt hard with your thumb at (P).

Check the belt tension with tools Elé. 346-04 and Elé. 346-05, which should register 9 ± 1 mm.



Refit the timing covers and the belts removed.

Refitting is then the reverse of removal.

ADJUSTMENT OF TAPPETS

SPECIAL TOOLING REQUIRED		
Mot.	647	} Tappet adjustment spanner
Mot.	567	
+ T 290		
Set of feeler gauges		

Play (mm), when cold :

8 valve engine :

- inlet 0,10 to 0,15
- exhaust 0,20 to 0,25

12 valve engine :

- inlet 0,15 to 0,20
- exhaust 0,20 to 0,25

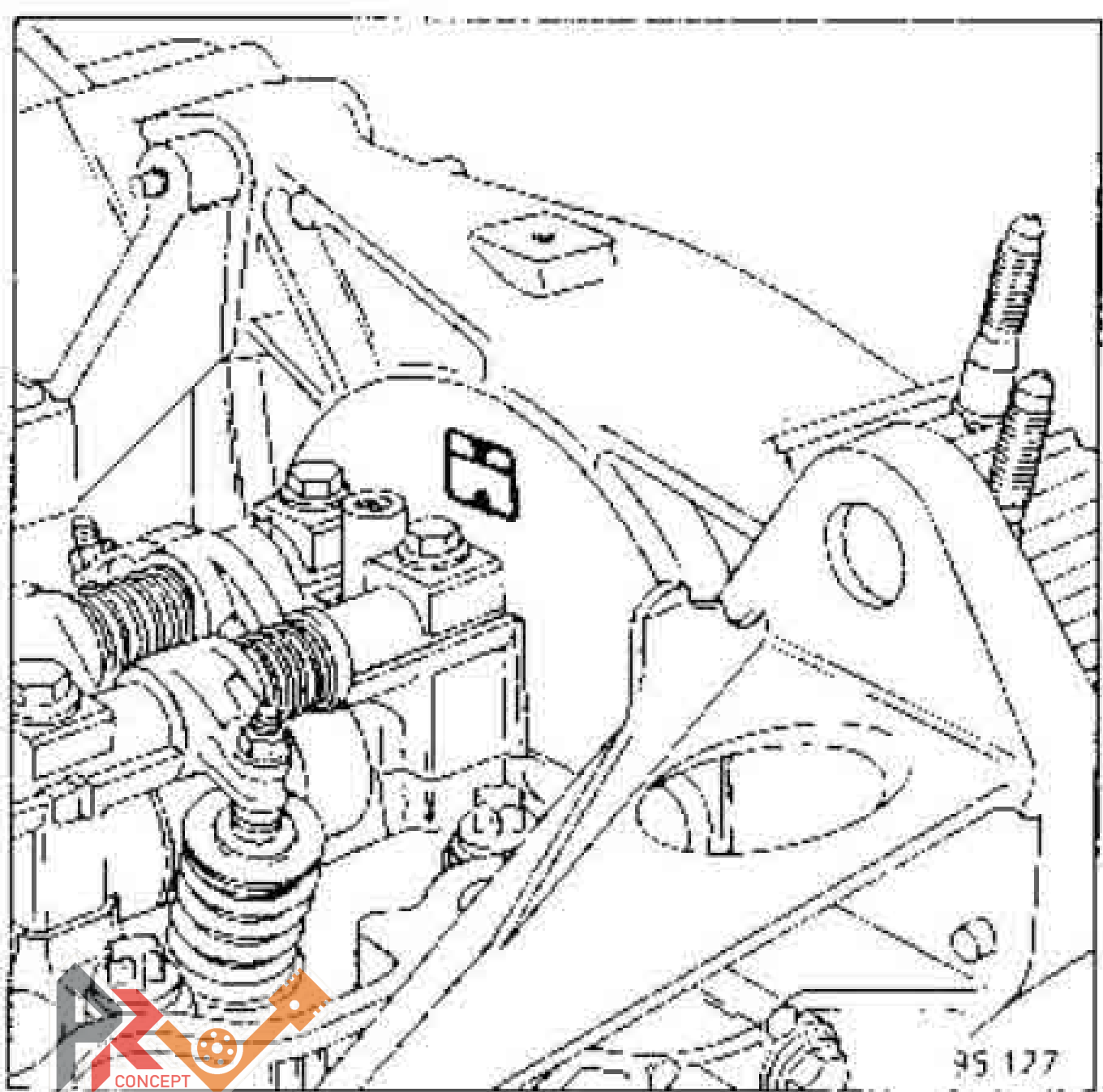
Position the crankshaft to obtain TDC on cylinder no. 1.

Turn the crankshaft (viewed from the timing side) clockwise to align the 1st mark on the camshaft sprocket (cylinder head side) with the mark on the end cover.

Adjust the corresponding tappets then turn the camshaft to the next mark (see table).

Mark	Adjust	
	Inlet	Exhaust
1st	2	4
2nd	1	2
3rd	3	1
4th	4	3

NOTE : when refitting the rocker box cover, tighten the 2 end bolts then the centre bolt to a torque of 1,4 to 1,8 daN.m.



REPLACEMENT

SPECIAL TOOLING REQUIRED		
Mot.	251-01	Dial indicator support
Mot.	252-01	Support plate
Mot.	588	Liner retaining flange
Mot.	720	Cylinder head centring tool
Mot.	1 202	Hose clip pliers
Mot.	1 135-01	Belt tensioner
Mot.	591-04	Angular wrench for tightening cylinder head and reference
Mot.	591-02	
Mot.	1 229	Engine support tool
Elé.	346-04	Belt tension tester
Elé.	346-05	Belt tension bar
Facom	S x 55	Torx 55 socket and end tool

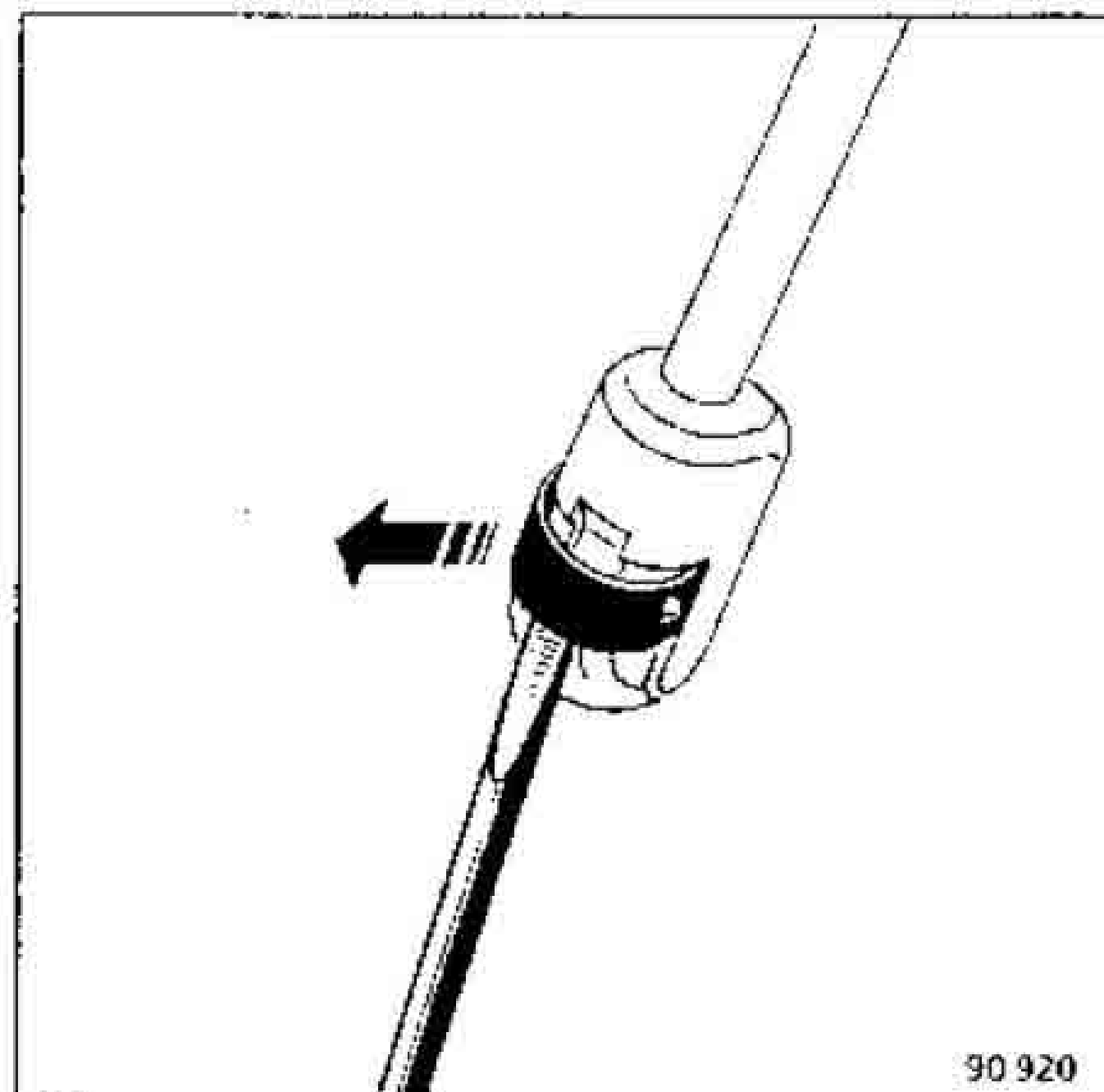
MATERIALS

DECAPJOINT : Gasket surface cleaner

TIGHTENING TORQUES (in daN.m)



Wheel bolts (4 bolt)	9
Wheel bolts (5 bolt)	10
Fixing nut for suspended engine mounting cover on chassis	10,5
Fixing nut for suspended engine mounting cover on engine	5,5
Rocker cover nut	1,4 to 1,8
Inlet manifold support mounting bolt	2
Inlet manifold support mounting nut	4
mounting nut and bolt for exhaust support	6



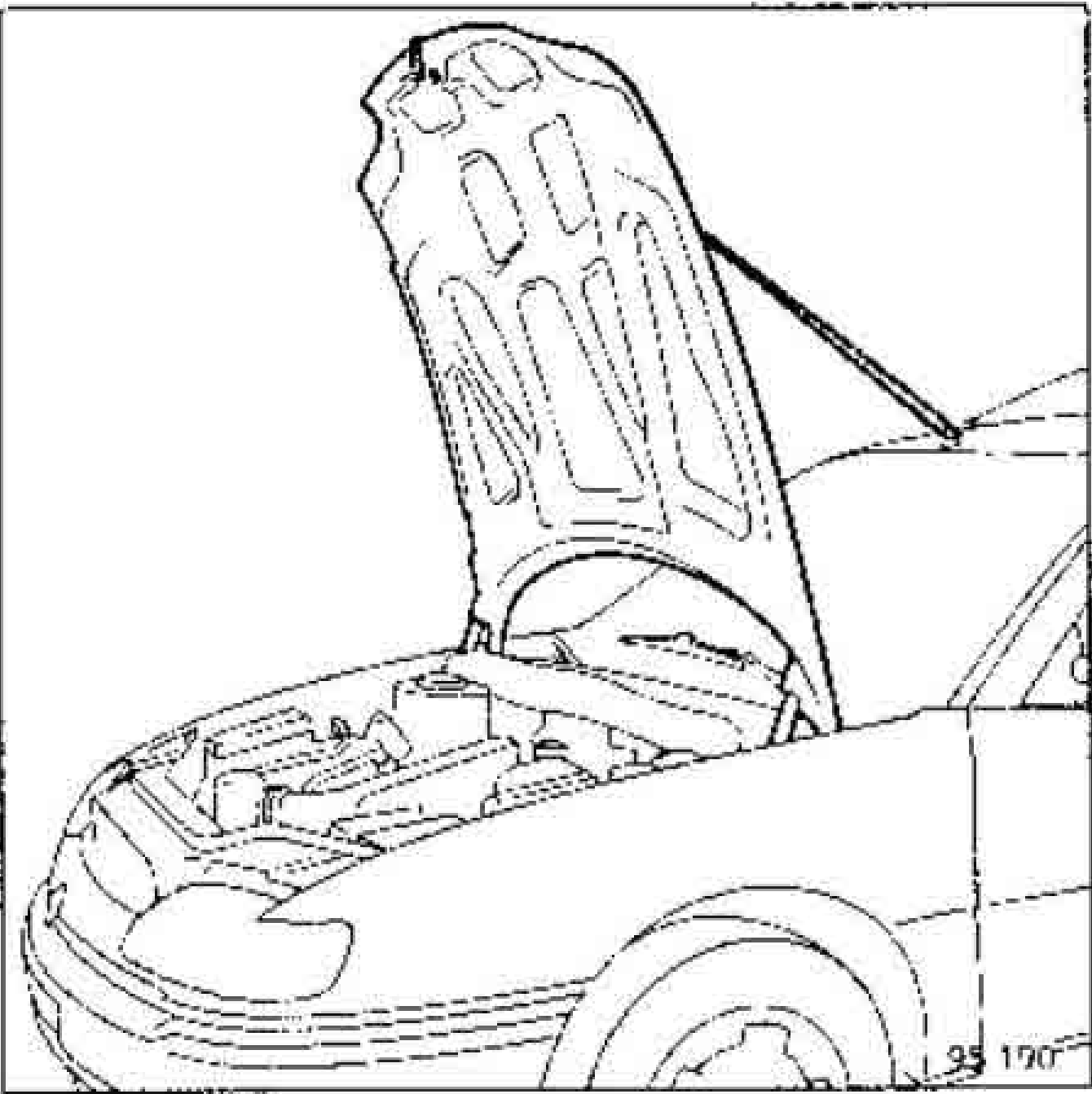
Put the vehicle on a 2 post lift

Disconnect the battery

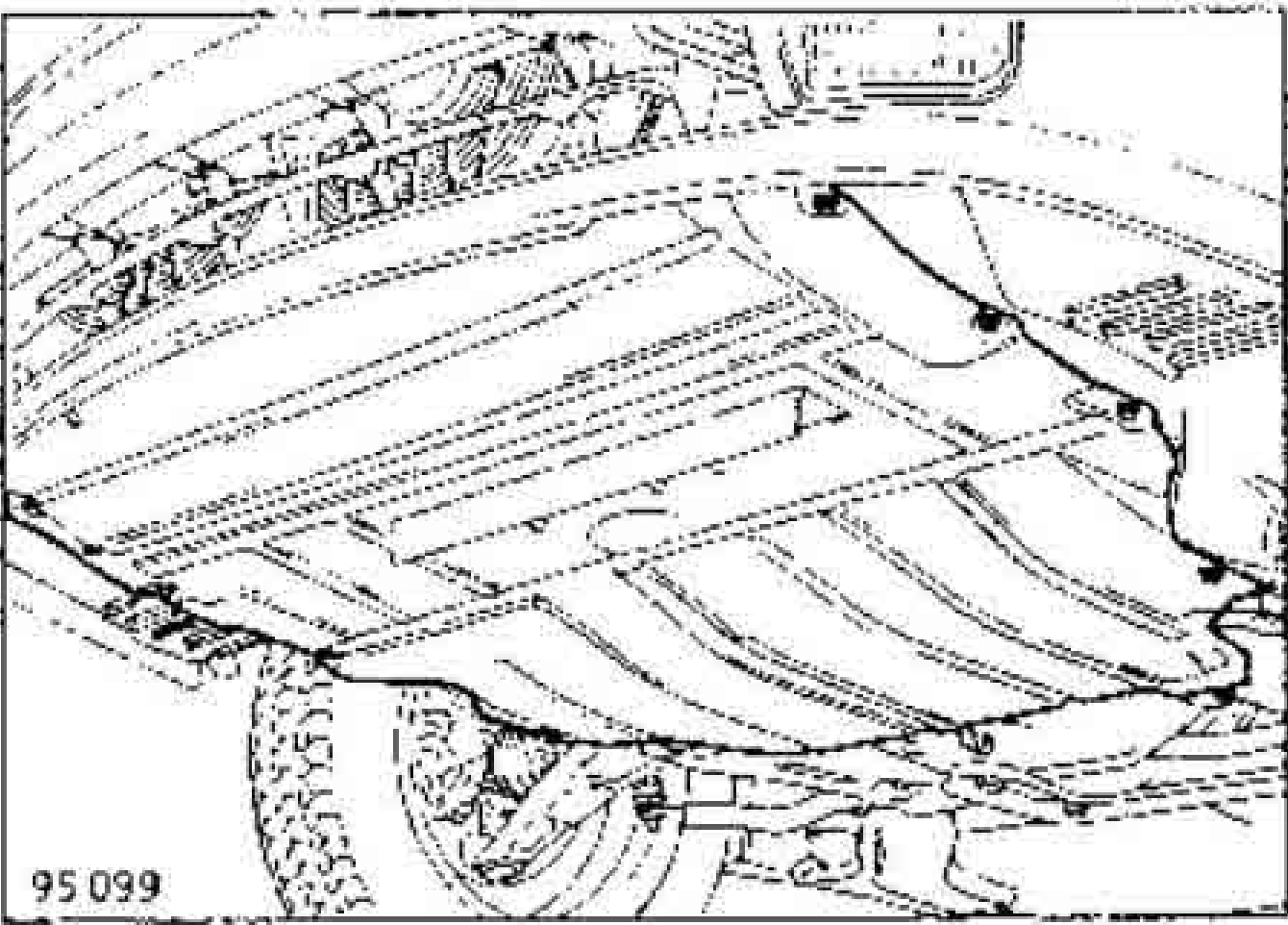
Remove the front right hand wheel

Unhook the bonnet struts by separating the retaining clip hooks but without removing them from their position.

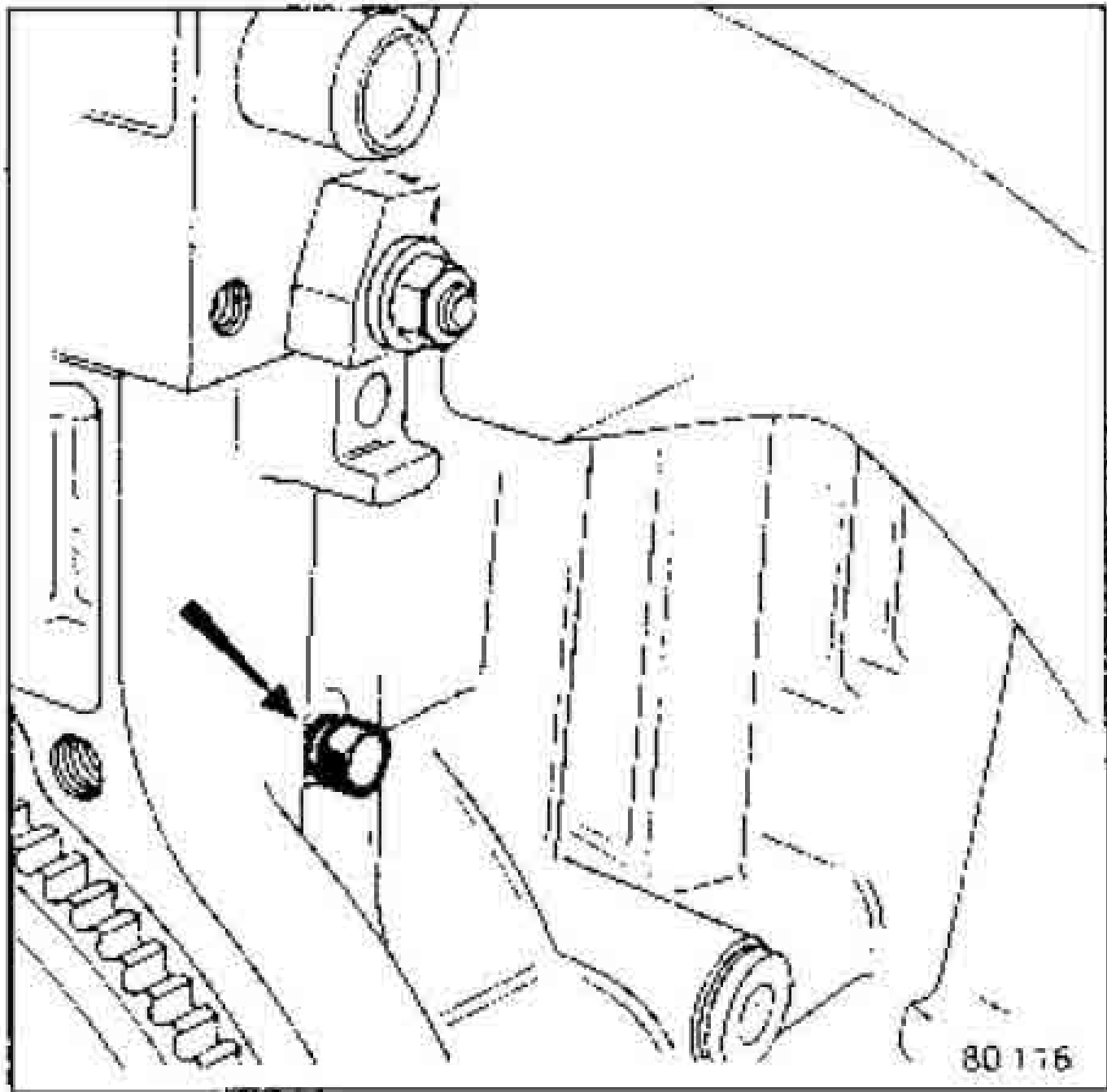
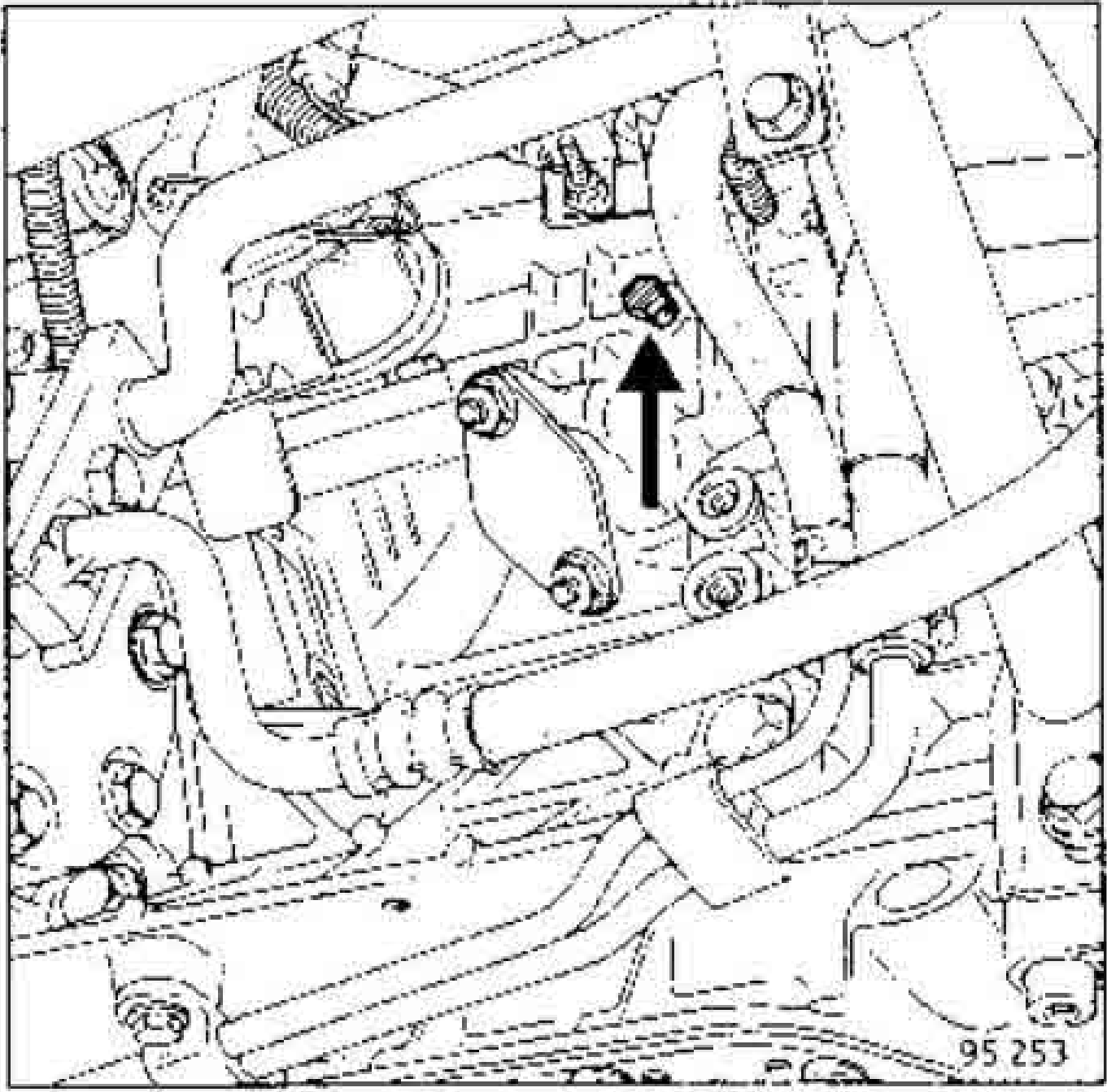
Secure the bonnet in the fully open position



Remove the engine undertray and the front right hand side wheel arch protector.

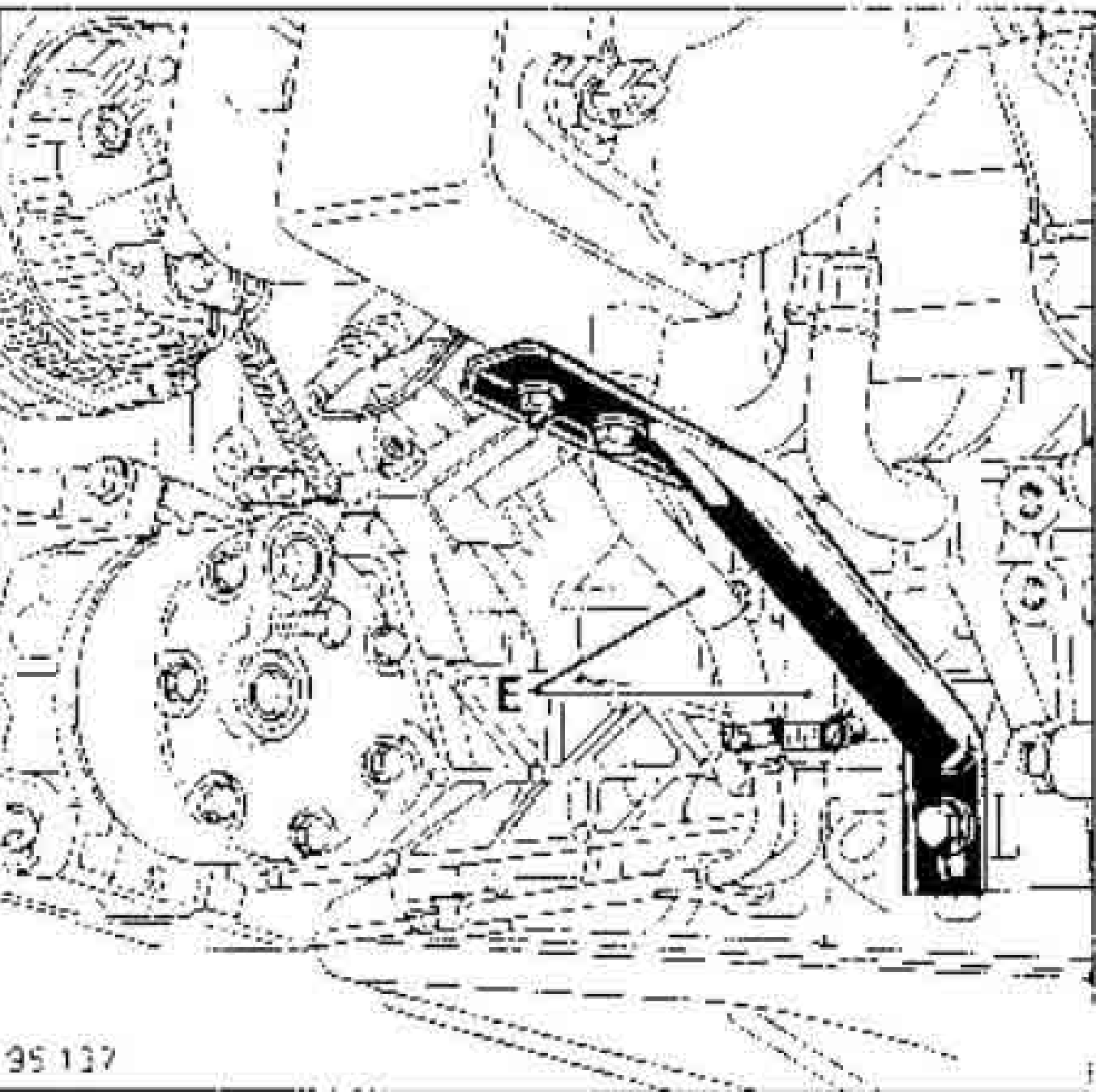


Drain the cooling circuit :
- from the lower radiator hose,
- from the cylinder block.

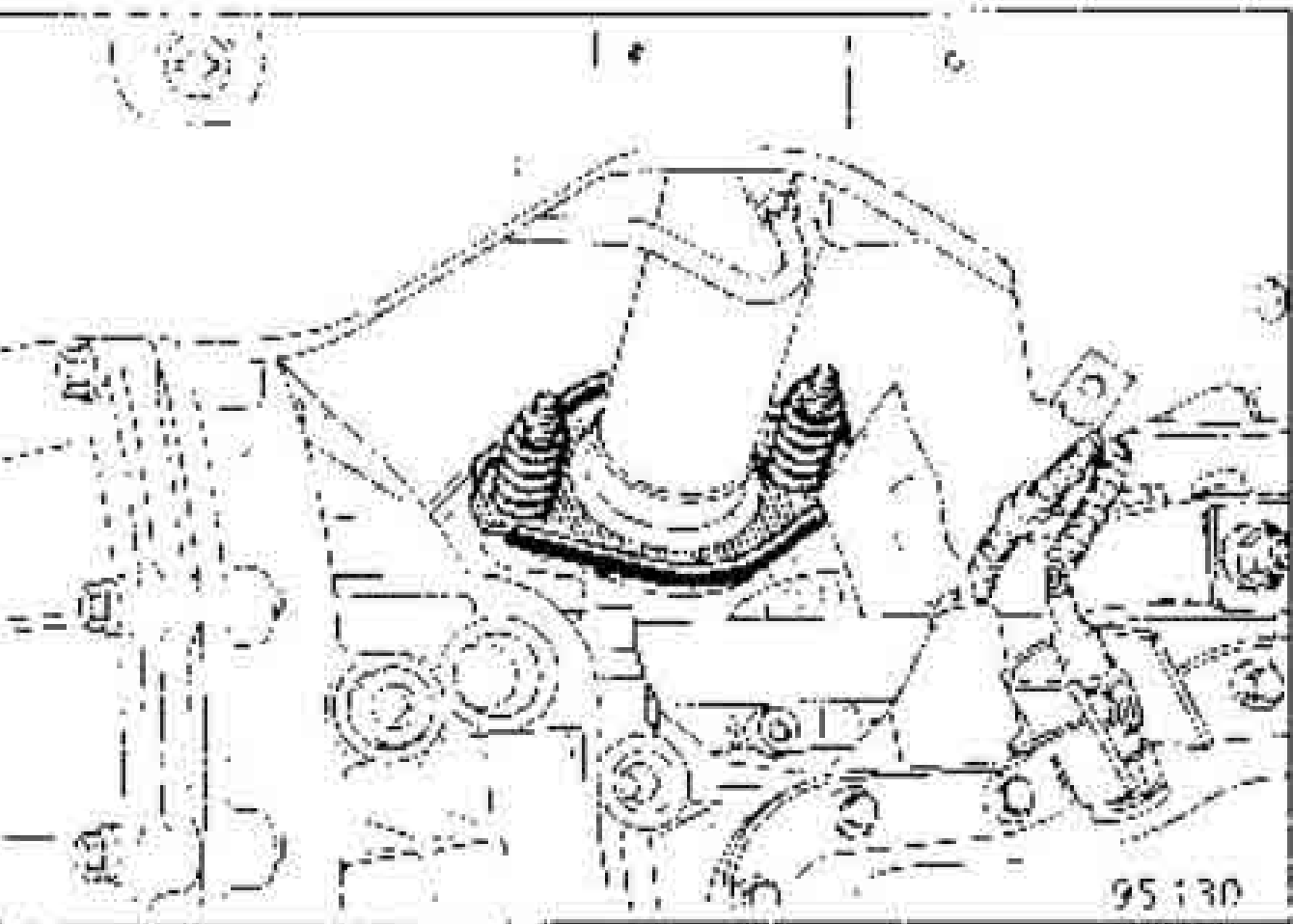


Remove:

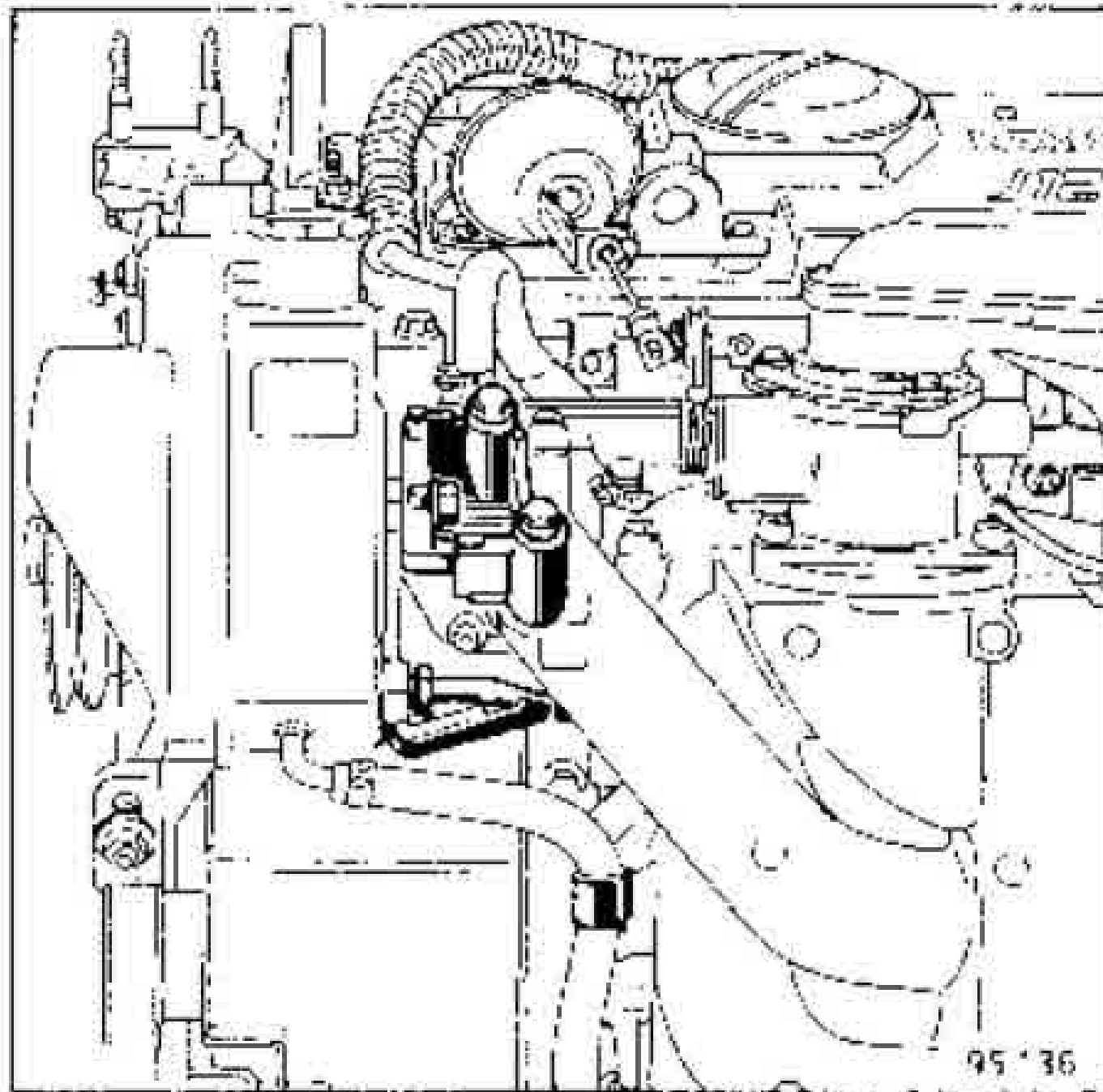
- the support under the exhaust manifold,
- the support under the inlet manifold,
- disconnect the fuel pipes (E),



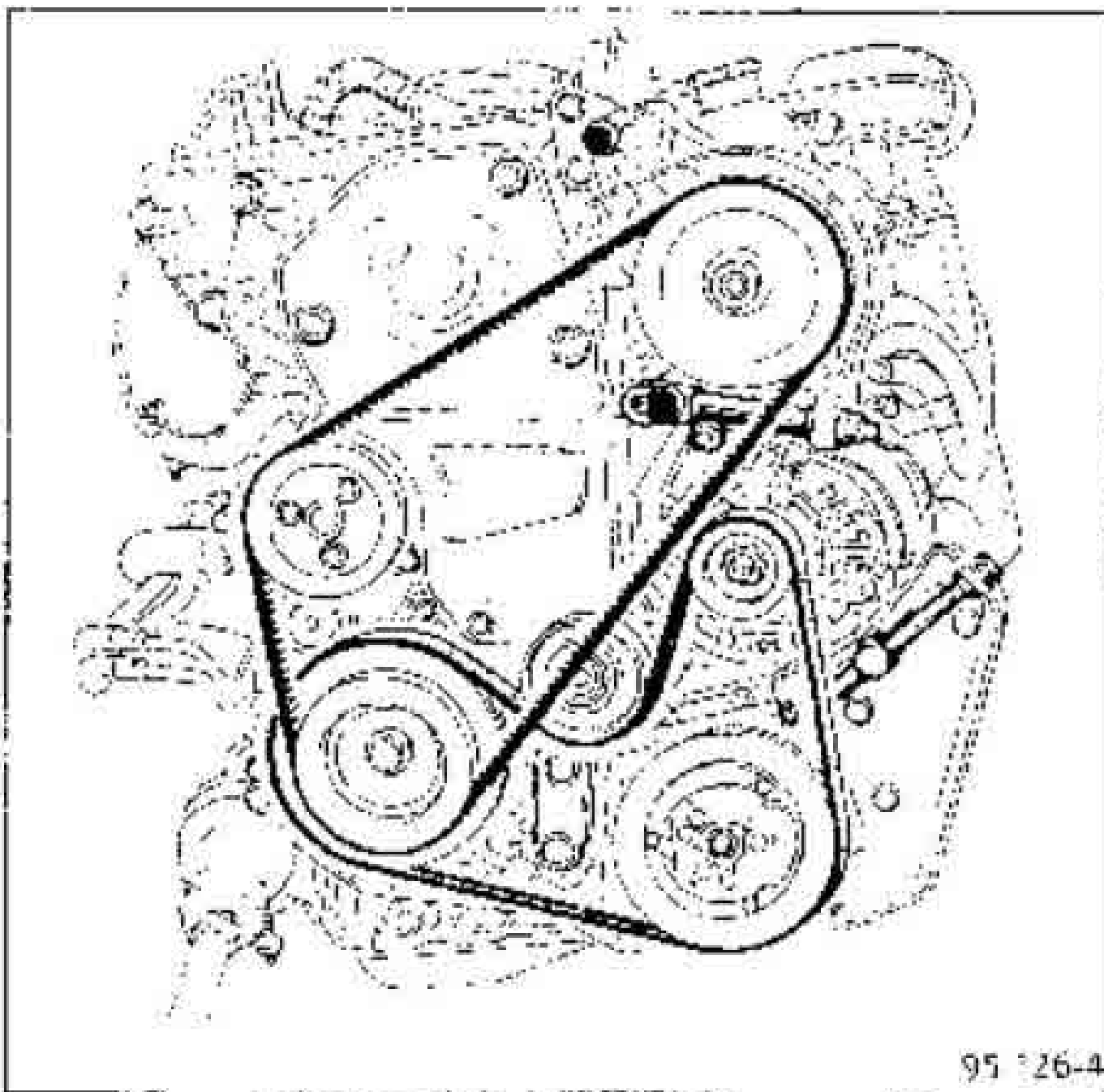
- the exhaust flange, manifold side,



- the power assisted steering pump on the manifold,



- the belts for the power assisted steering pump and the alternator - compressor,



Remove the power assisted steering pump mounting bolts, and release the pump from its mountings.

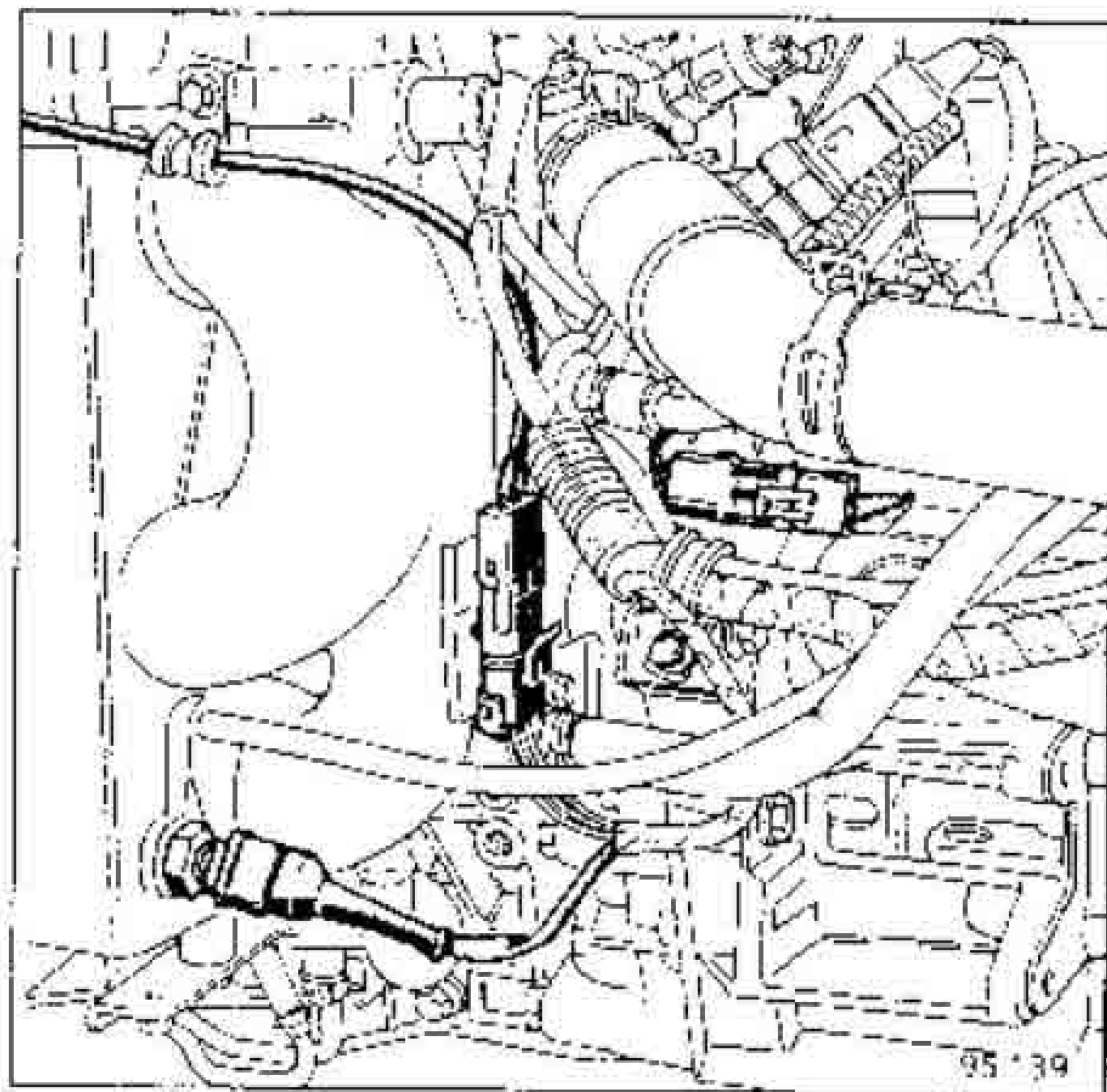
Remove the timing belt
(see chapter 11 "Timing belt").

Remove:

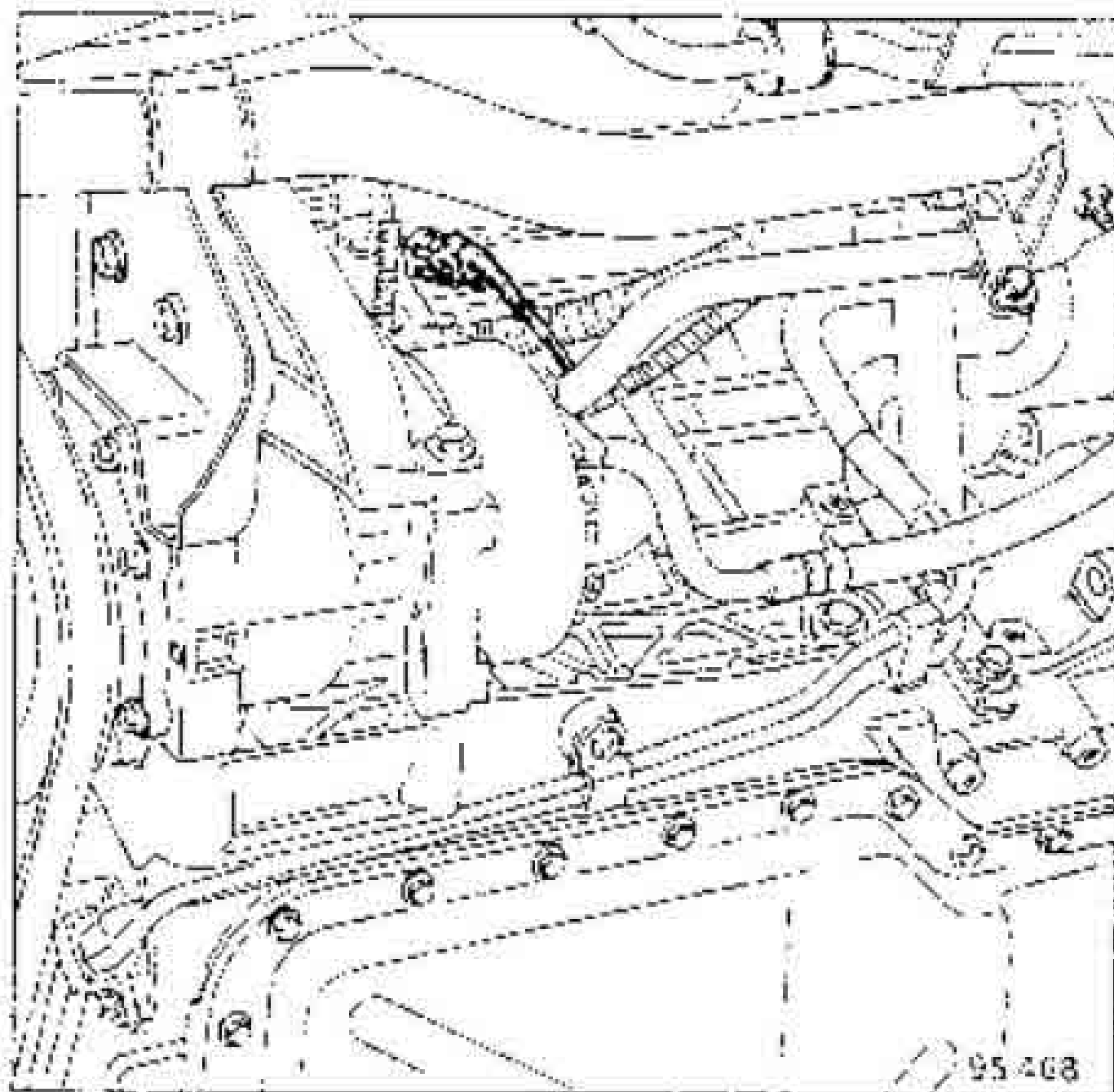
- the air filter sleeve,
- the accelerator cable,
- the hoses : for oil vapour rebreathing on the rocker box cover, for brake vacuum, and for the coolant circuit on the cylinder head (heater matrix and expansion bottle),
- the injector connectors,
- the injection bar wiring support and the plug HT leads support,
- the injection computer and its mounting,
- the injection computer wiring support clips, and remove the assembly (computer, wiring, injection bar support).

Disconnect:

- the connectors on the cylinder head coolant outlet pipe,

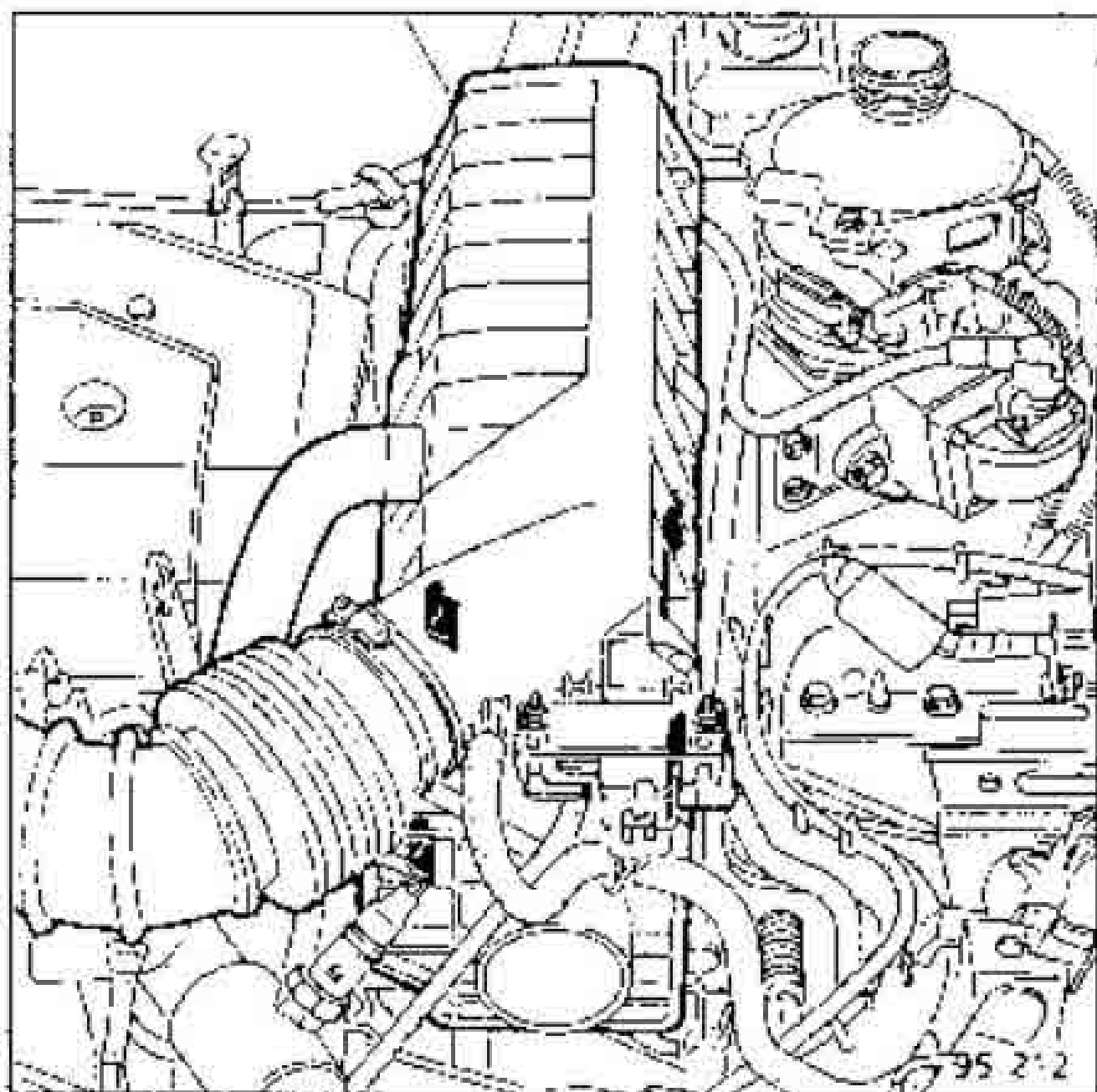


- the pinking sensor connector on the cylinder head.

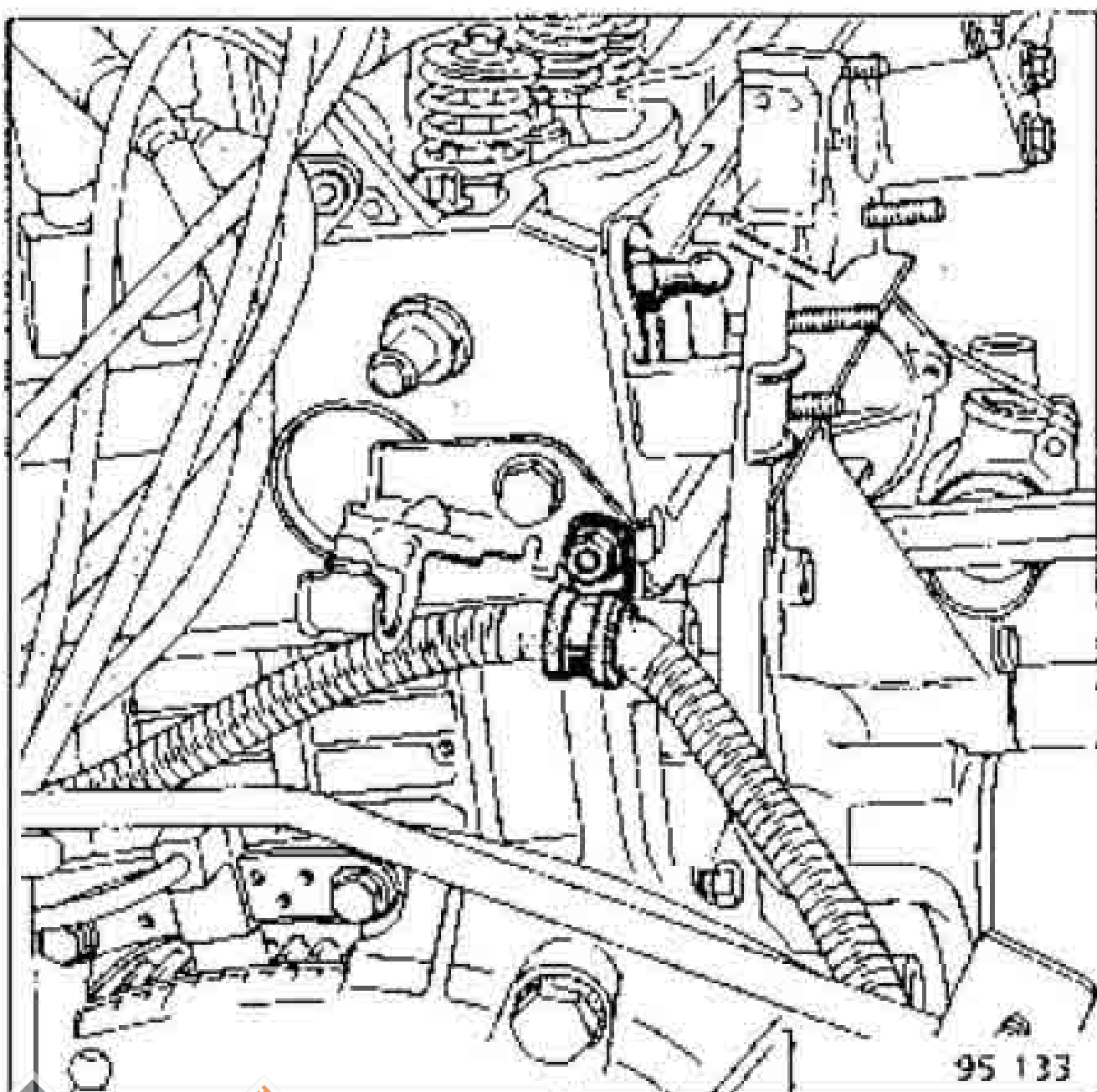


- the connectors on the inlet manifold,

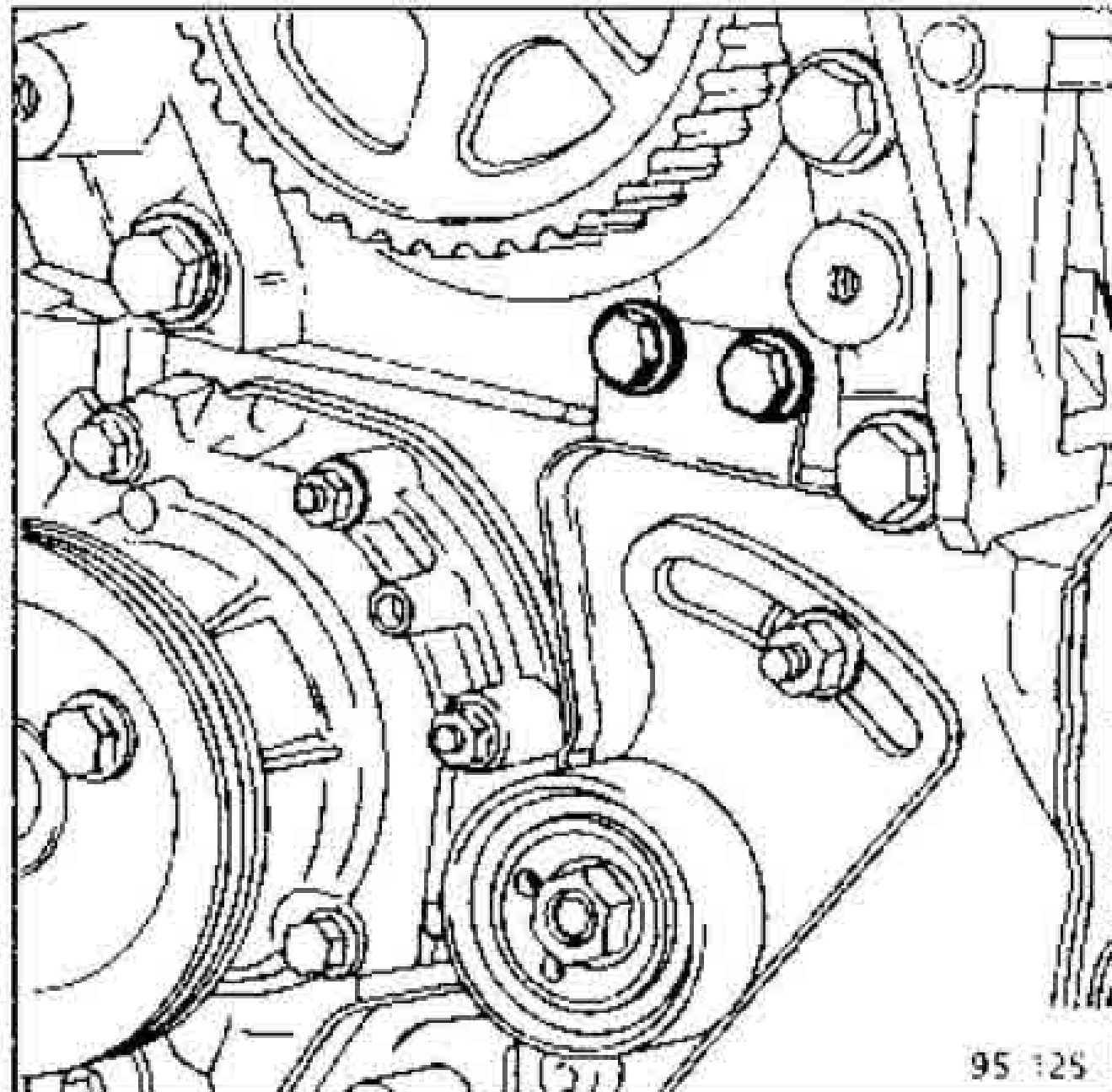
- Remove:
- the air filter,



- the mounting bolt for the oil sensor wiring channel and the support bracket on the cylinder head, remove the wiring from the cylinder head, see below,

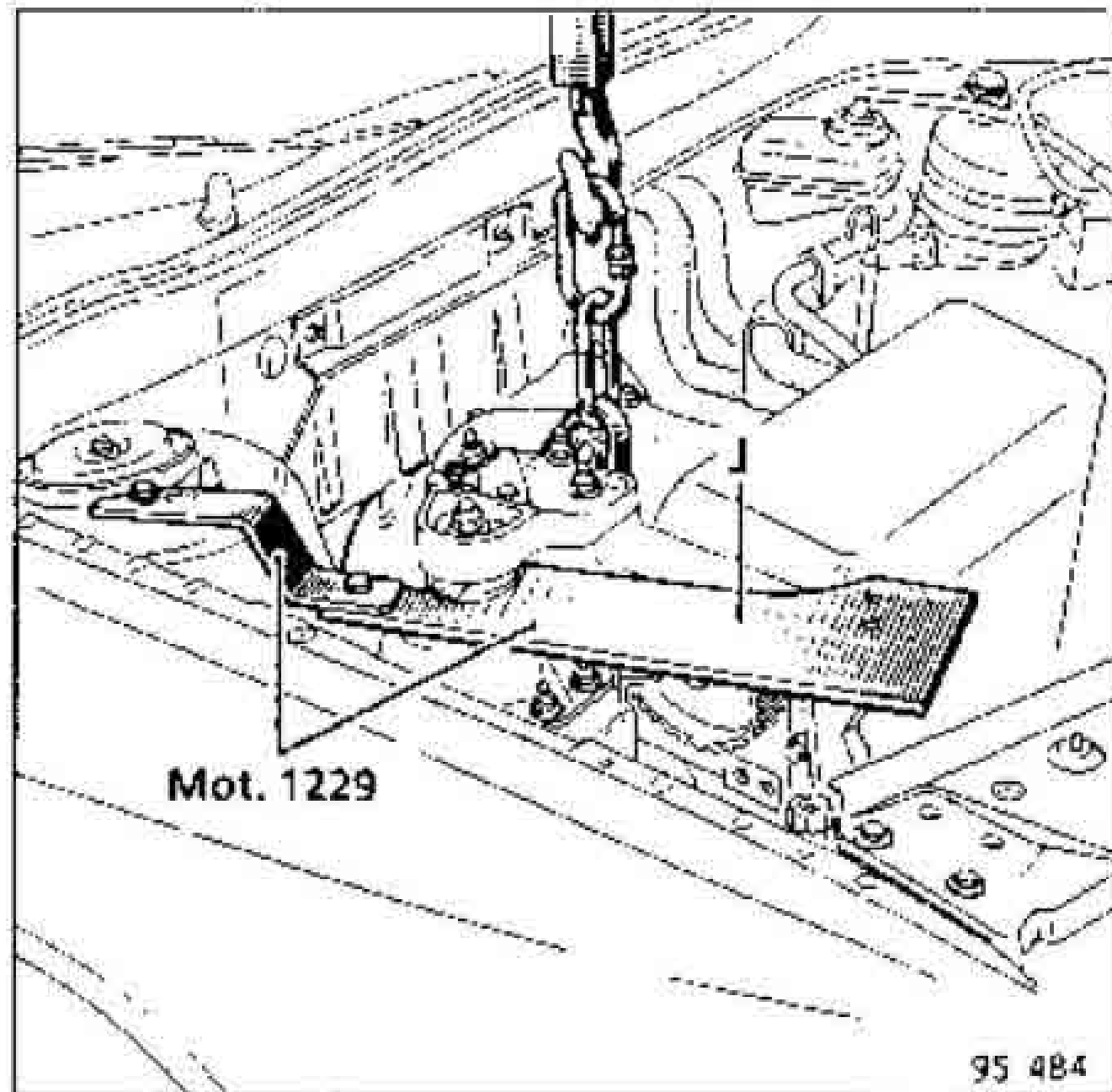


- the two lower timing cover mounting bolts on the cylinder head under the camshaft pulley,



- the injection computer support.

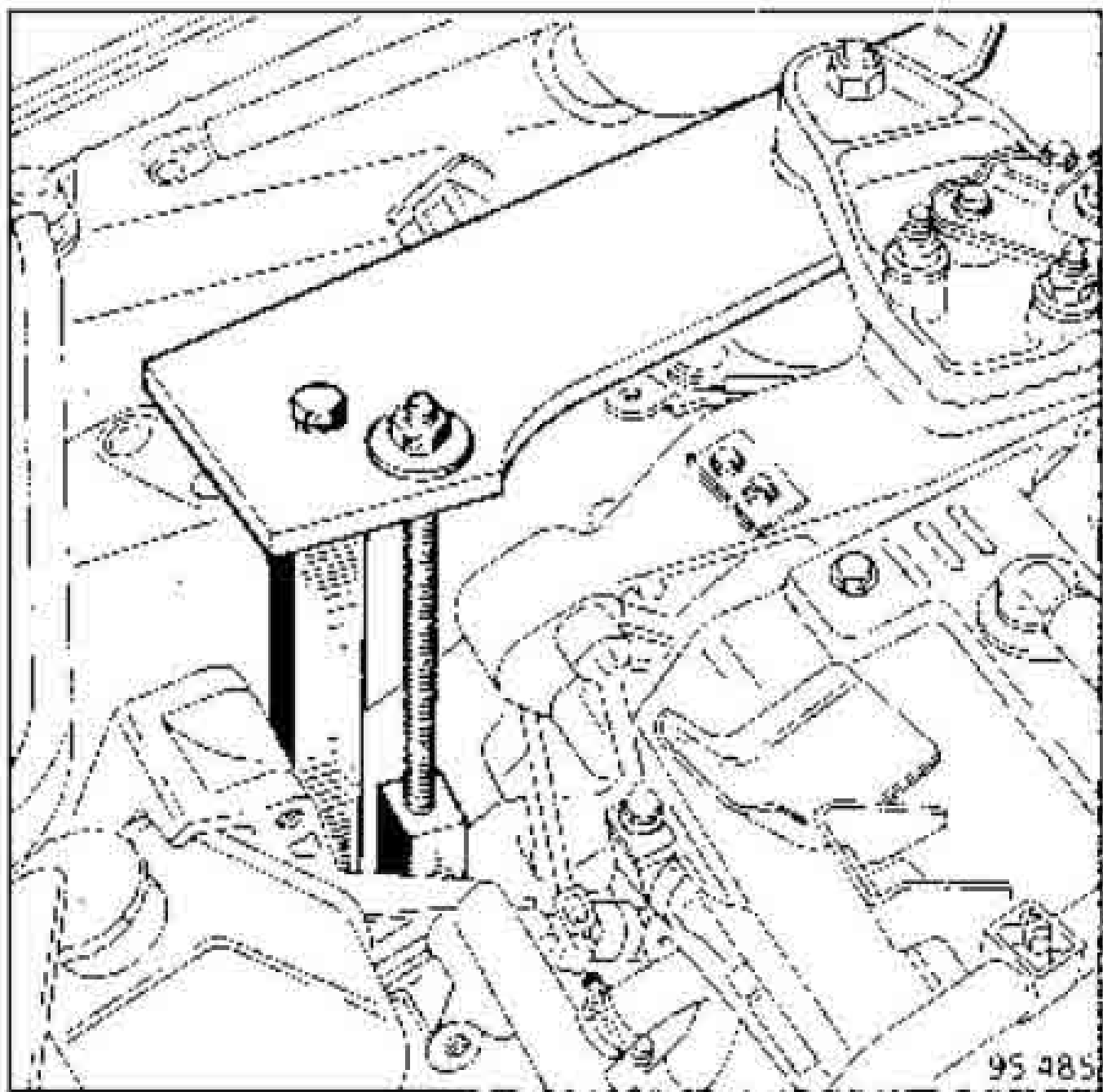
Using the workshop hoist, take the engine's weight on the right hand side, and slide the small plate marked J of tool Mot. 1229 under the right hand engine mounting.



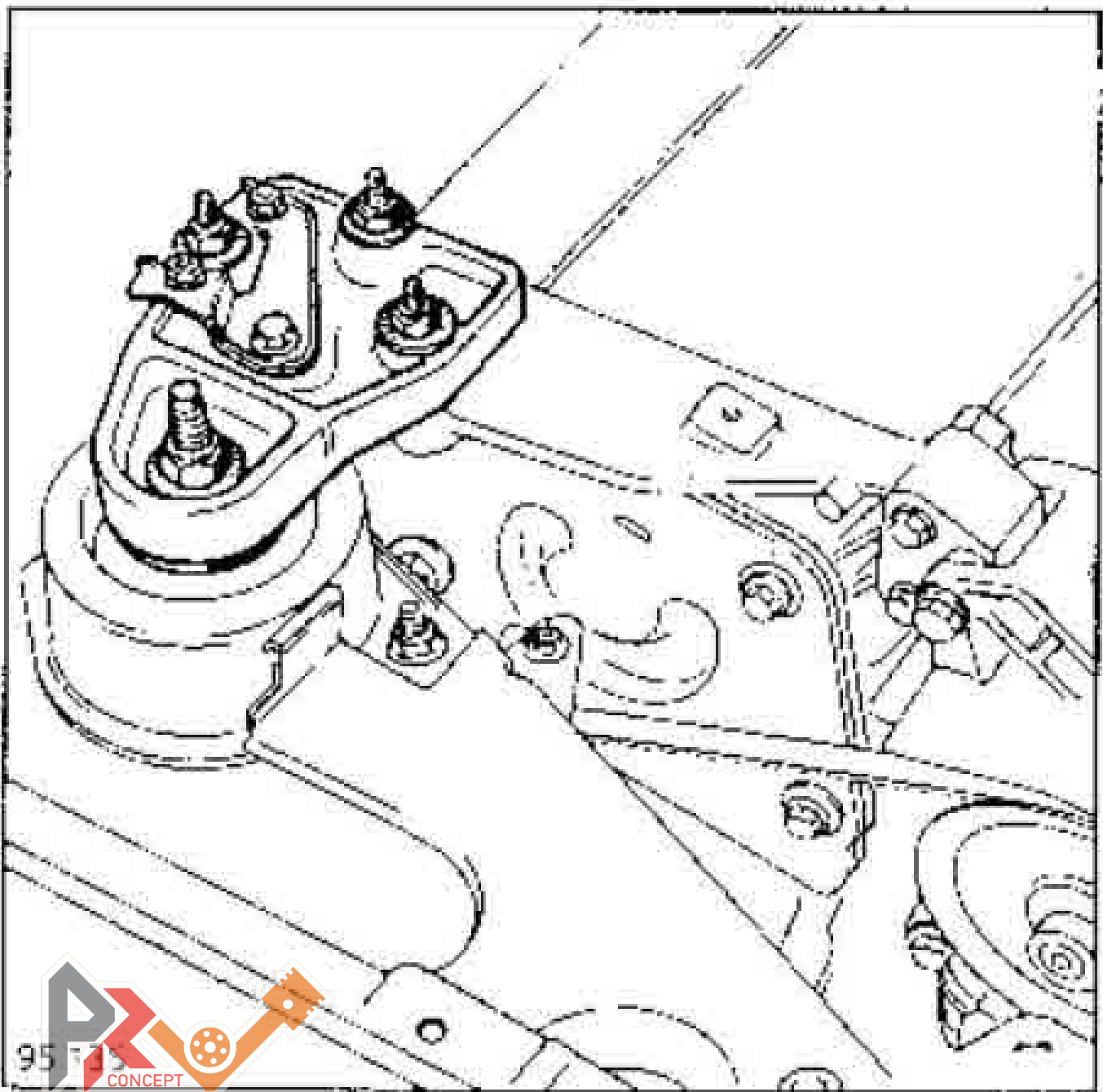
Remove the hoist, and fix the small plate (marked J) of tool Mot. 1229 on to the front right hand shock absorber turret.

Slide the support bracket of tool Mot. 1229 into the hole in the front right hand side member.

Fit the threaded rod of tool Mot. 1229 to the plate and fit the other end of the rod to the power assisted steering pump mounting.



Remove:
– the right hand suspended engine mounting cover,



– the rocker cover.

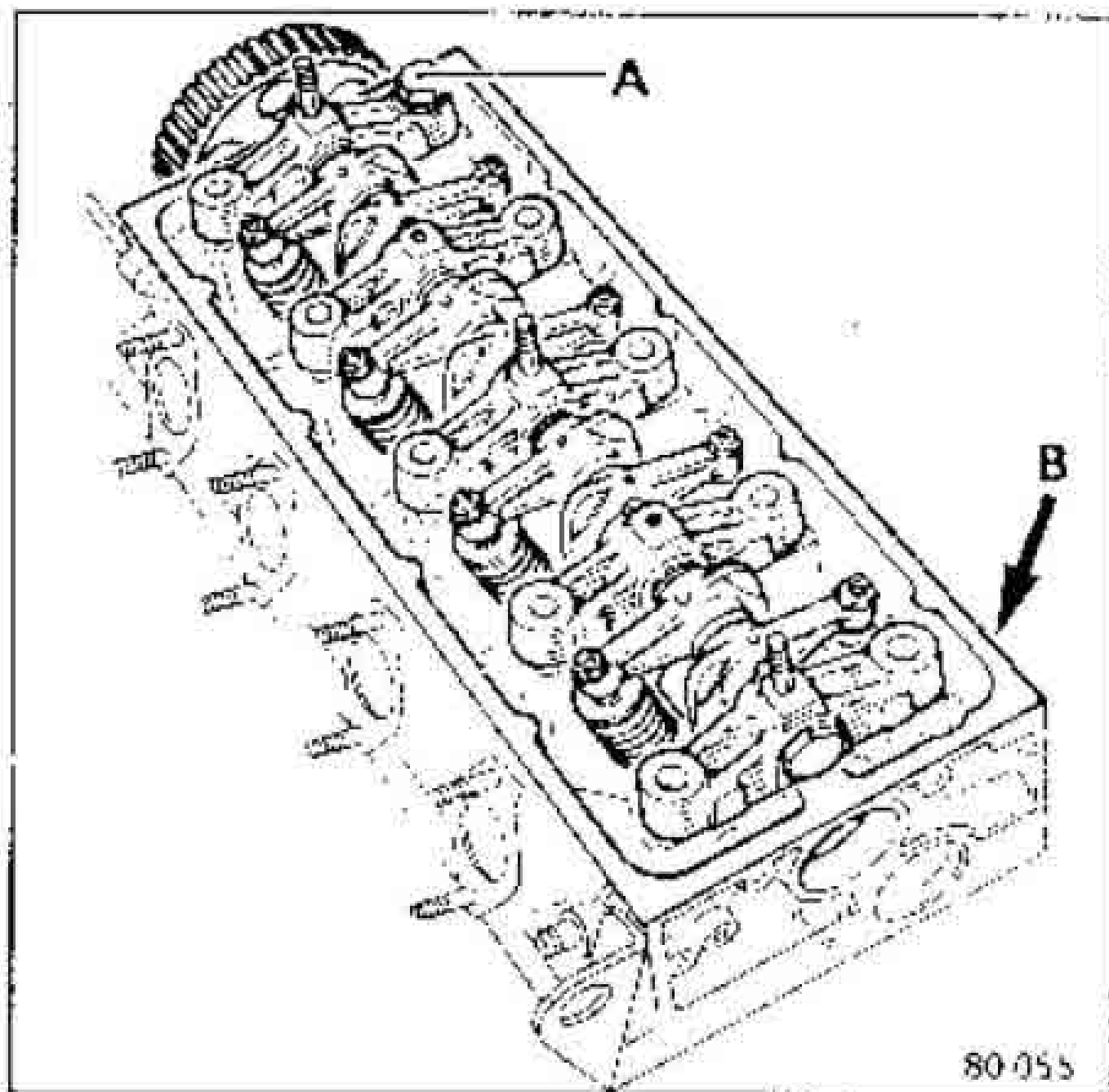
loosen the cylinder head bolts.

J engine 12 valve

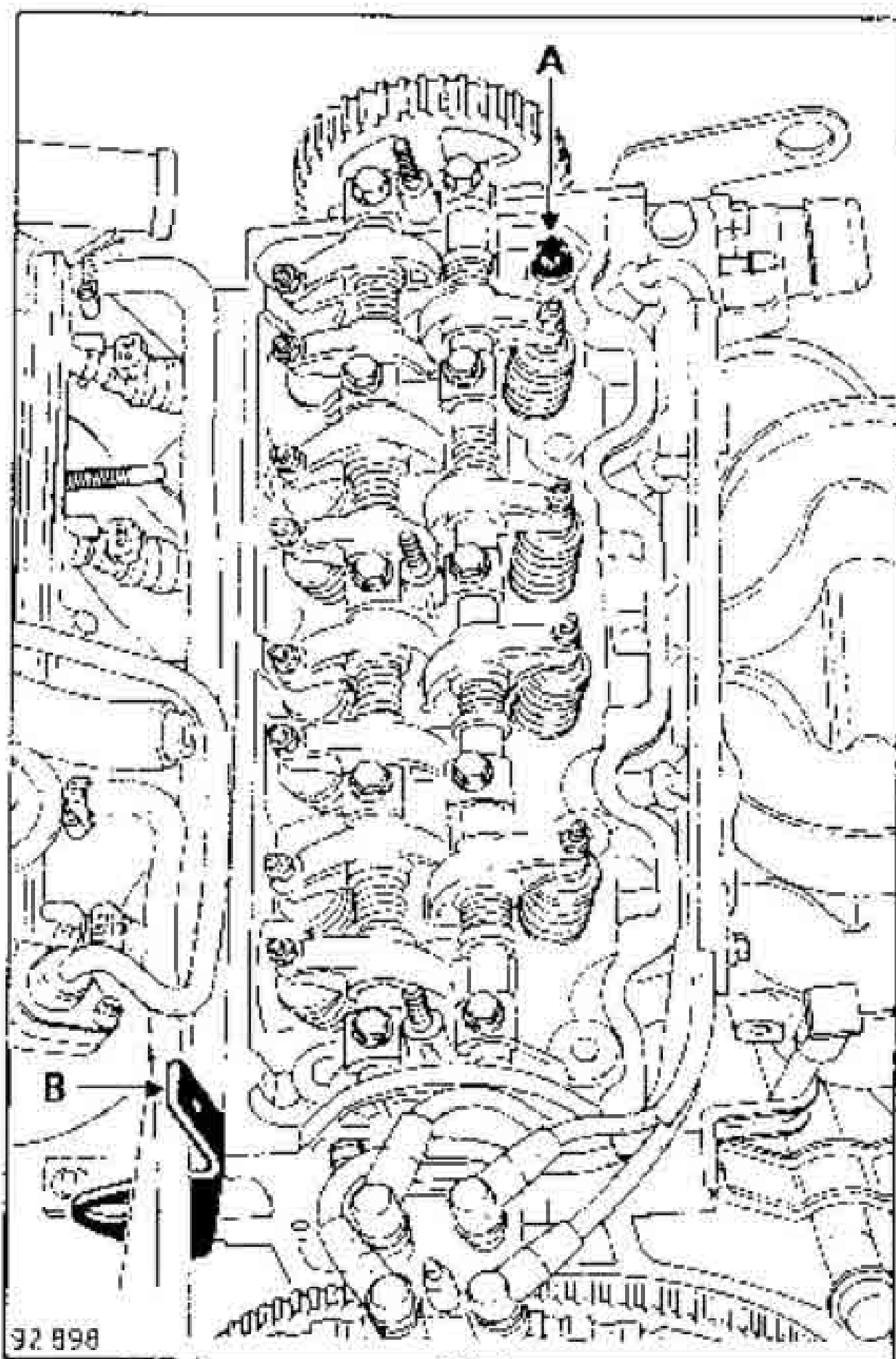
Marking the position of the 10 cylinder head bolts is vital to ensure the correct bolt is fitted back in its same hole.

The cylinder head is centred on the cylinder block by a dowel at (A).

Remove all the cylinder head bolts except bolt (A), then rotate the cylinder head around this bolt by lapping at (B), against a block of wood.



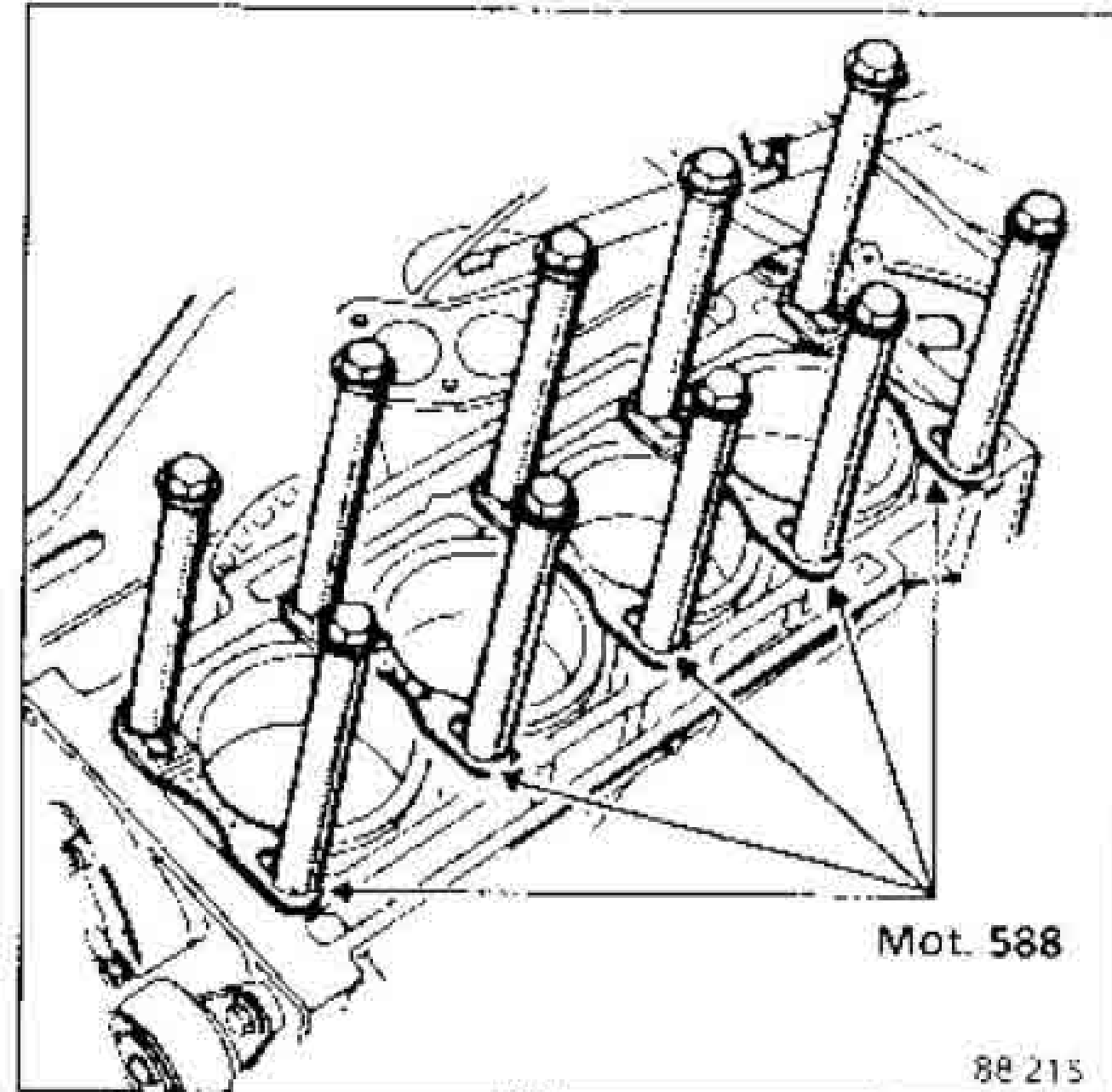
Remove the rocker shaft.



If just the head gasket is being replaced, the rocker shaft need not be removed.

Remove the manifolds and cylinder head assembly using the workshop hoist and a chain.

When fitting the cylinder liner retaining flange tool Mot. 588, remove the cylinder head centring dowel.



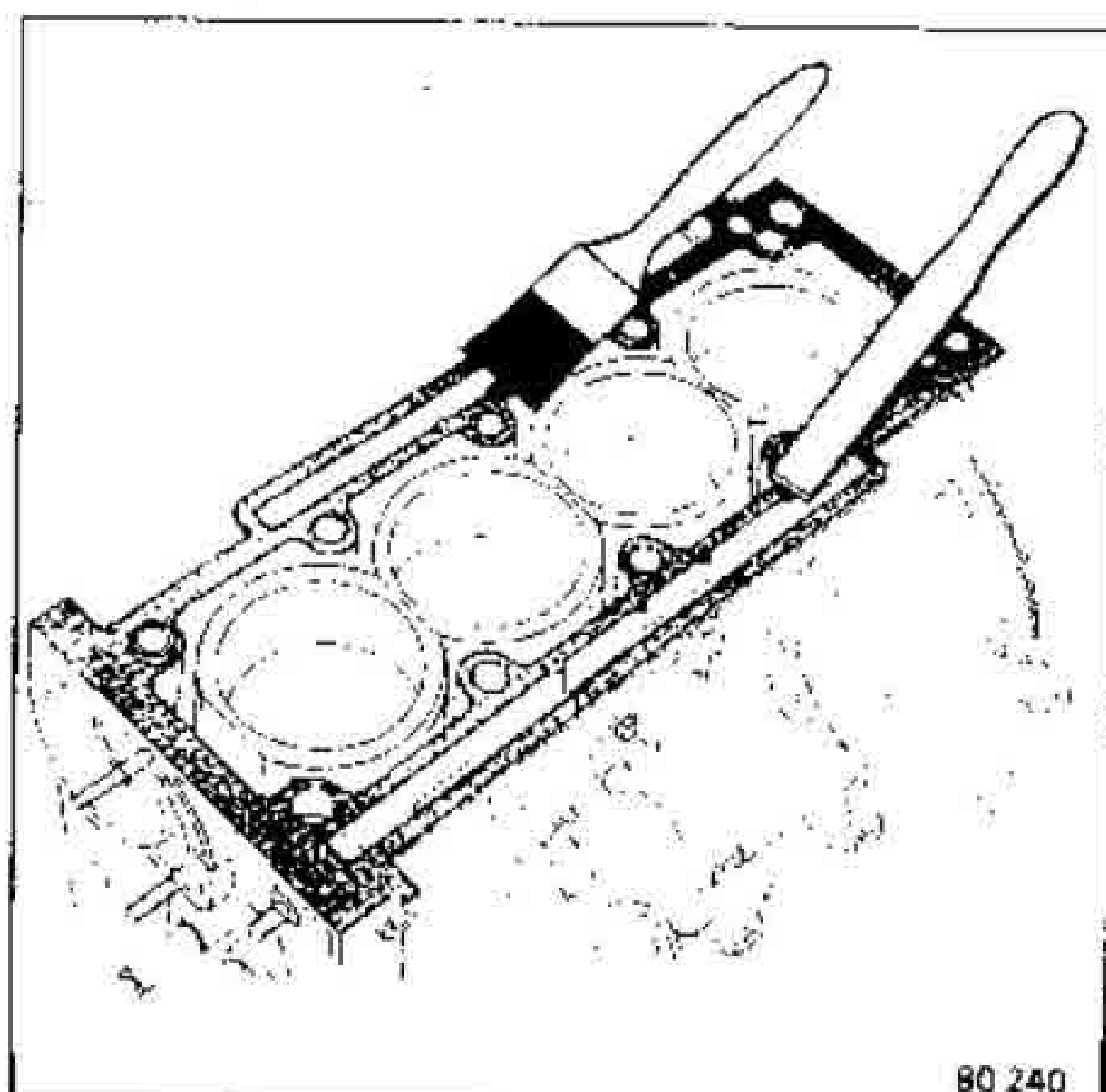
Cylinder liner protrusion is measured with the gasket compressed. Fit the flange tools Mot. 588 as shown in the diagram above.

CLEANING

It is very important to avoid scratching the surface of aluminium parts.

Use Décapjoint to dissolve any remaining gasket material.

Apply the product to the part to be cleaned ; wait for about 10 minutes, then remove using a wooden spatula.



CLEANING (continued)

Wear gloves during this operation.

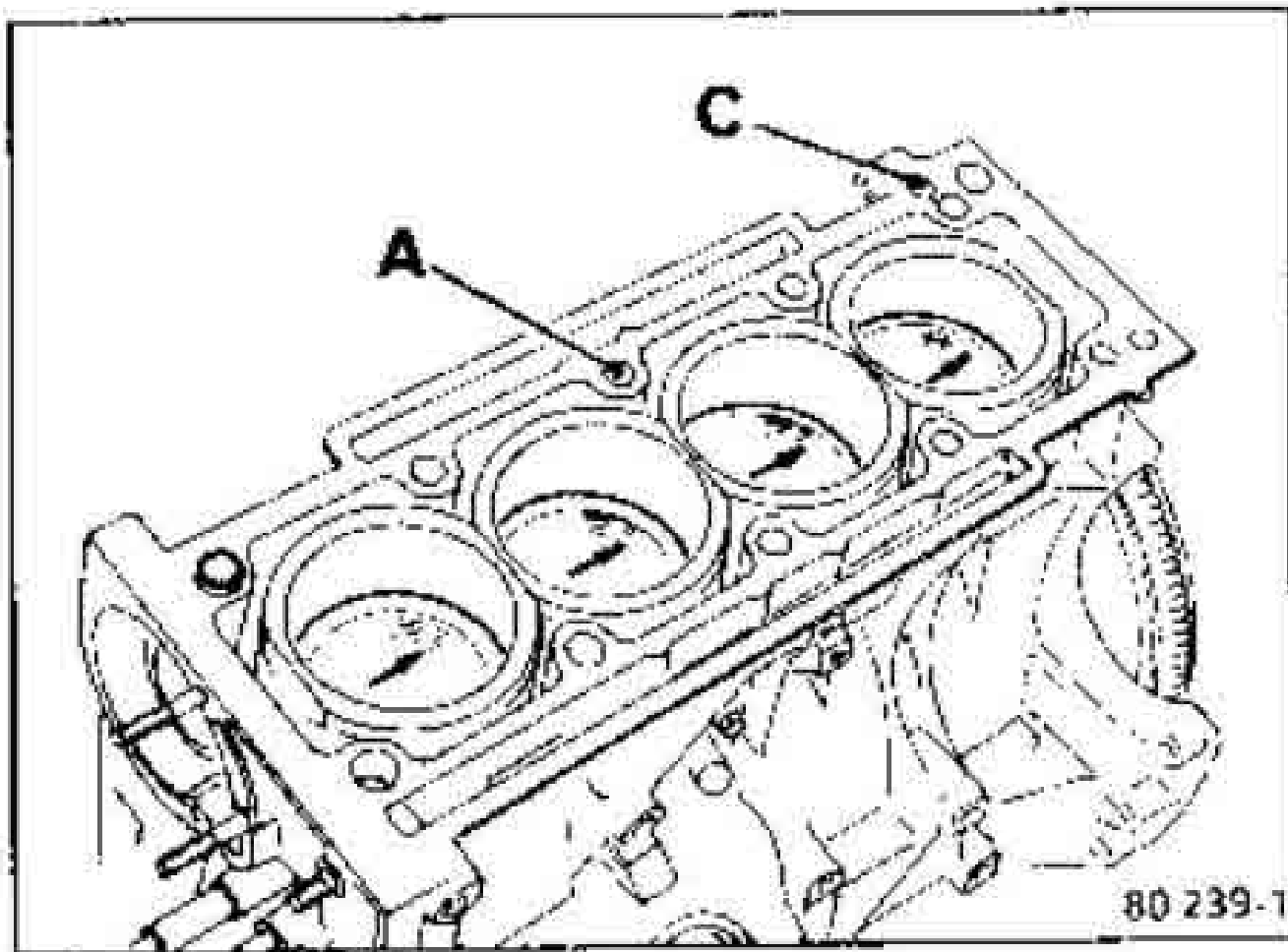
Do not spill any of the product onto paintwork.

This operation must be performed with care, in order to avoid the introduction of foreign bodies into the high pressure oilways which provide oil to the rockers (oilways in both the cylinder head and cylinder block).

The filter in the rocker shaft or the rocker nozzles may be blocked if foreign bodies do enter the oilways and the rocker cams and slides may be quickly damaged.

Use a syringe to remove any oil in the mounting holes in the cylinder head, especially in the oil inlet channel (C) (except J engine, 12 valve), (A) (for J engine, 12 valve).

This is necessary to ensure the bolts may be correctly tightened.

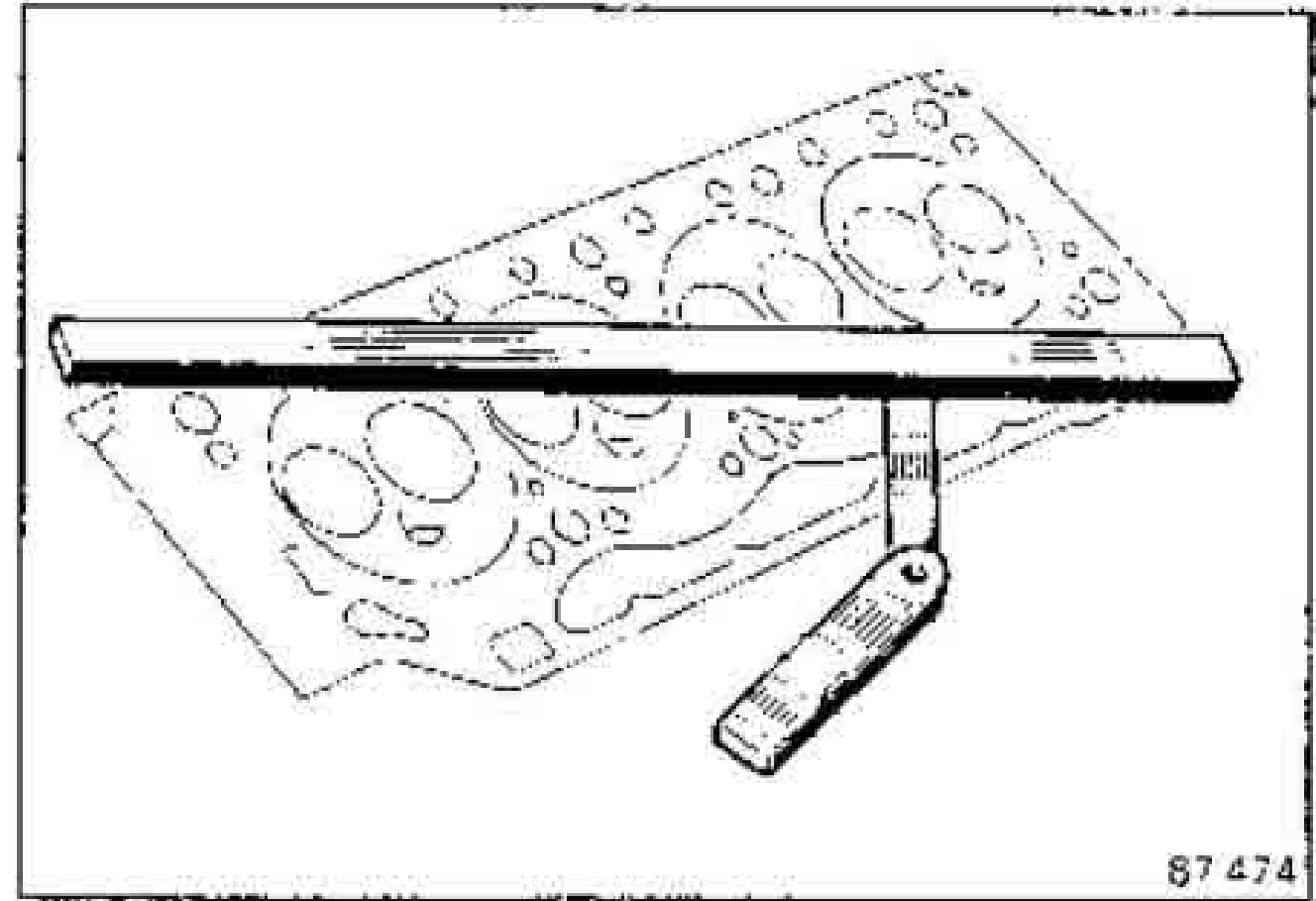


CHECKING THE SEALING FACE IS FLAT

Check the sealing face is flat using a straight bar and a set of feeler gauges.

Maximum deformation 0,05 mm

The cylinder head may not be machined flat.



CHECKING CYLINDER LINER PROTRUSION

The O rings (J) only ensure sealing.

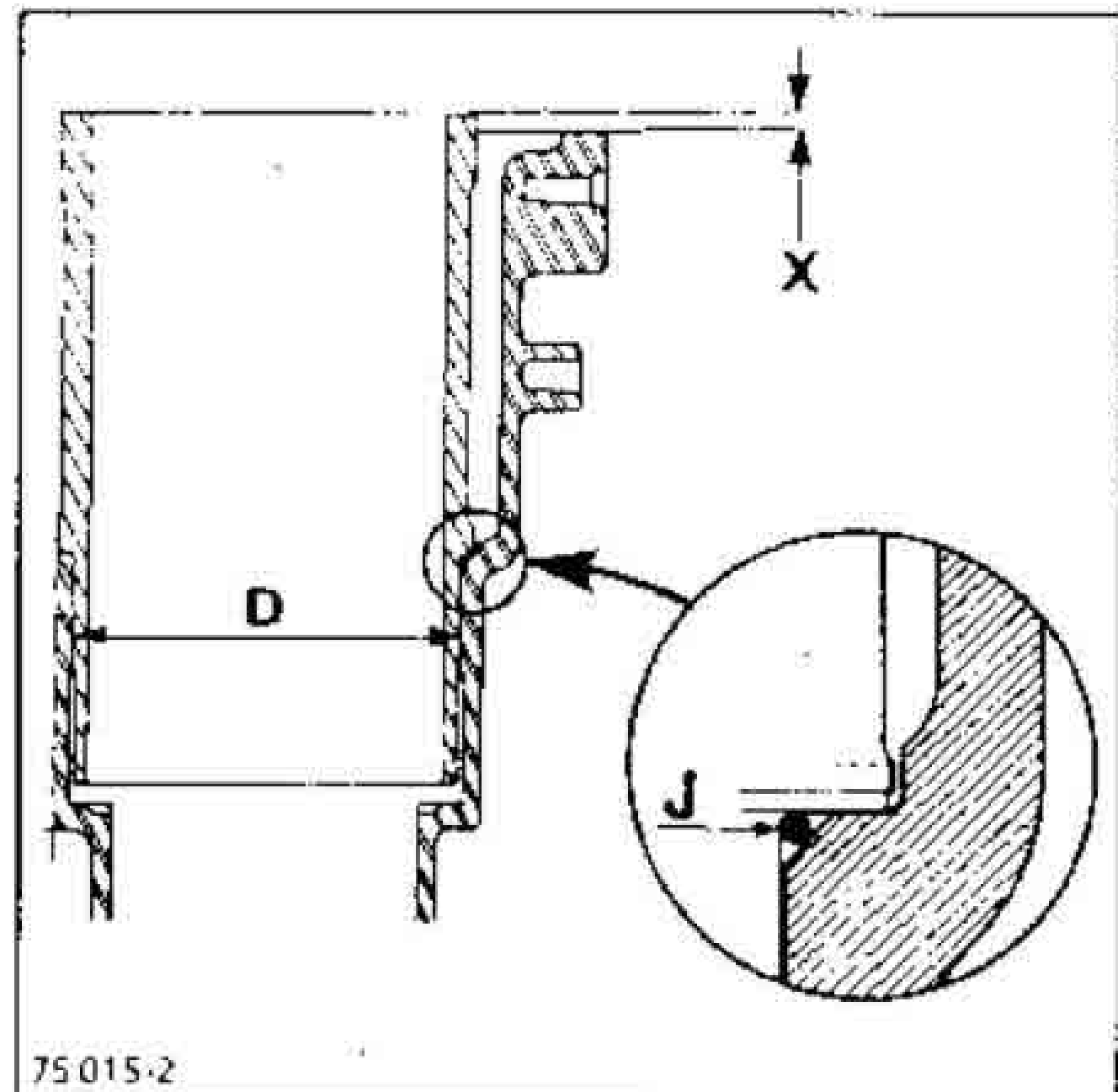
The cylinder liner rests directly on the cylinder block and liner protrusion is ensured only by manufacturing size.

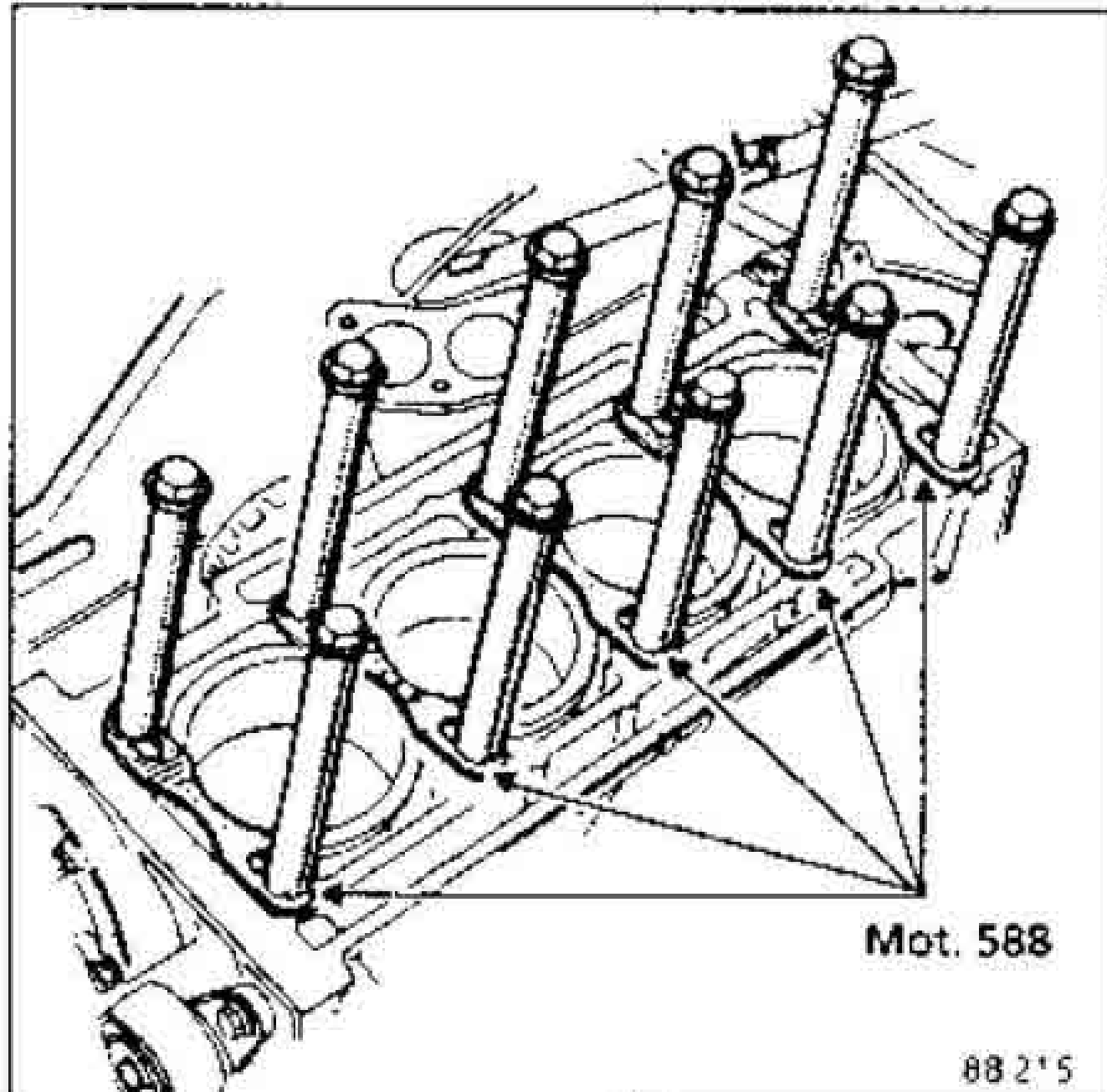
Protrusion (X) is measured with the gasket compressed.

Protrusion (X) (mm) 0,08 to 0,15

Check the protrusion using tools

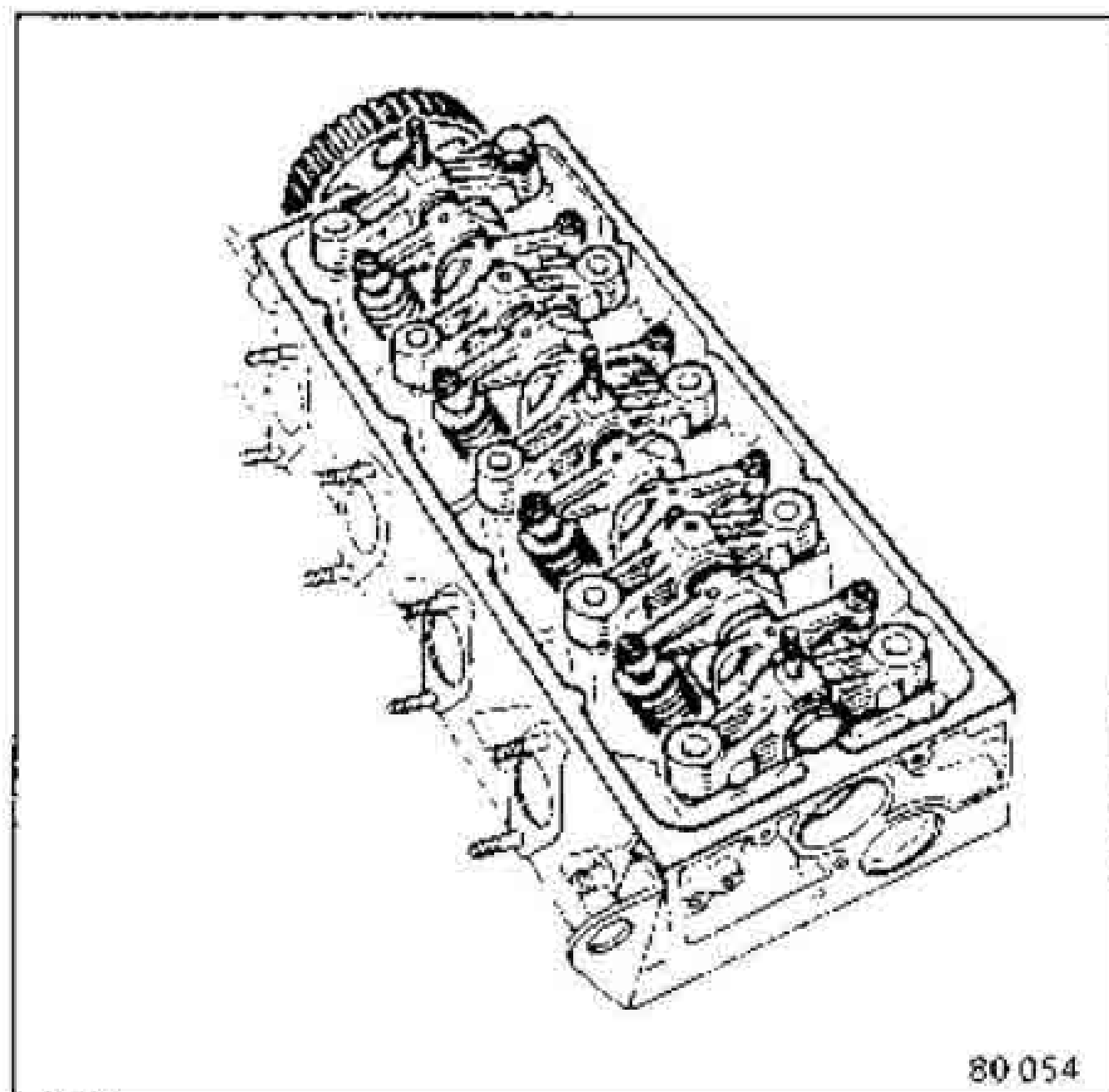
Mot. 251-01 and Mot. 252-01, flanges Mot. 588 fitted.





8 valve engines

Refit the rocker shaft and the cylinder head bolts.

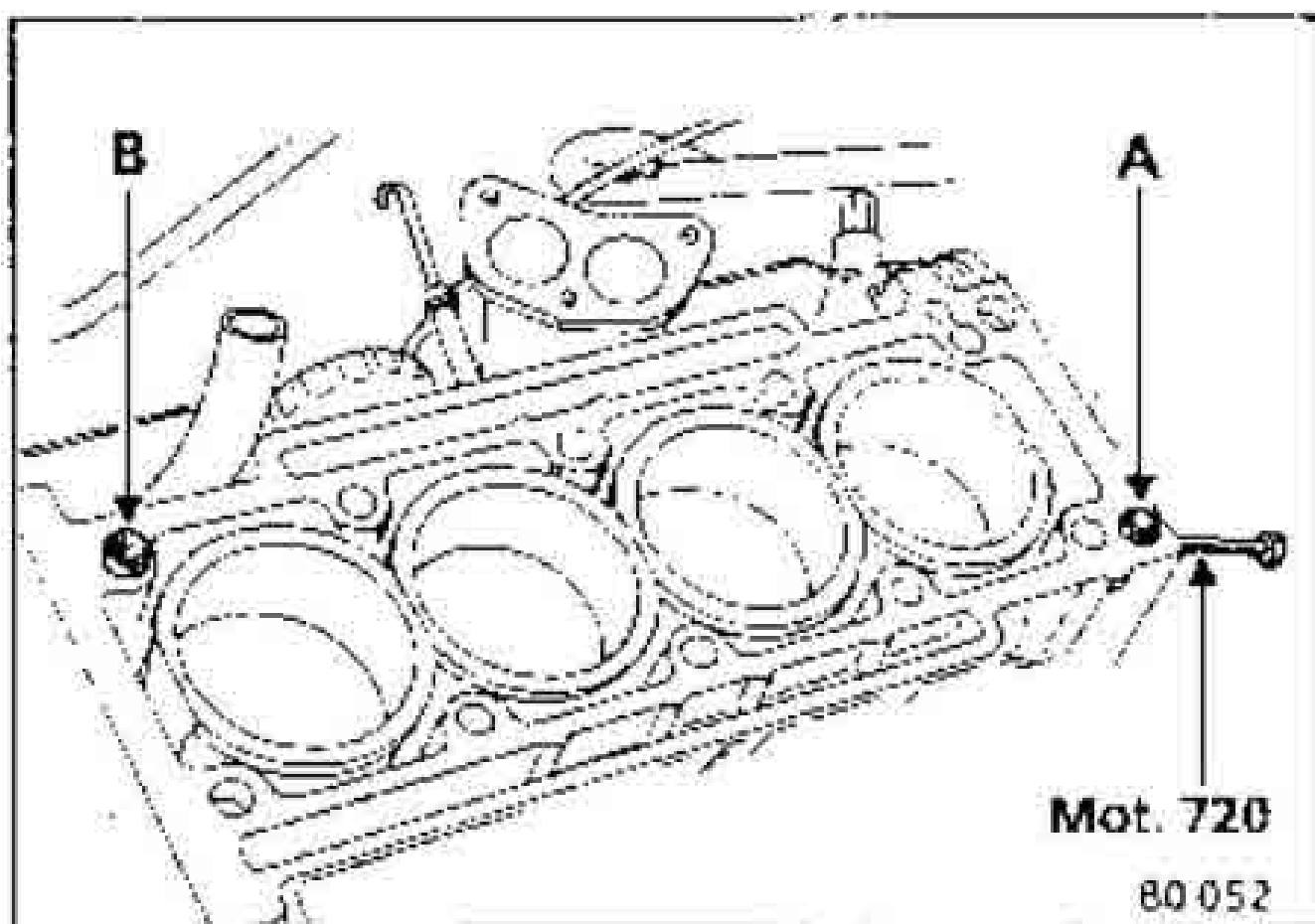


If the protrusion is incorrect, refer to repair manual **Mot. J (E)**.

REFITTING

SPECIAL NOTES

To centre the cylinder head and the gasket, use the centring dowel (**B**) on the cylinder block and fit tool **Mot. 720** at (**A**).

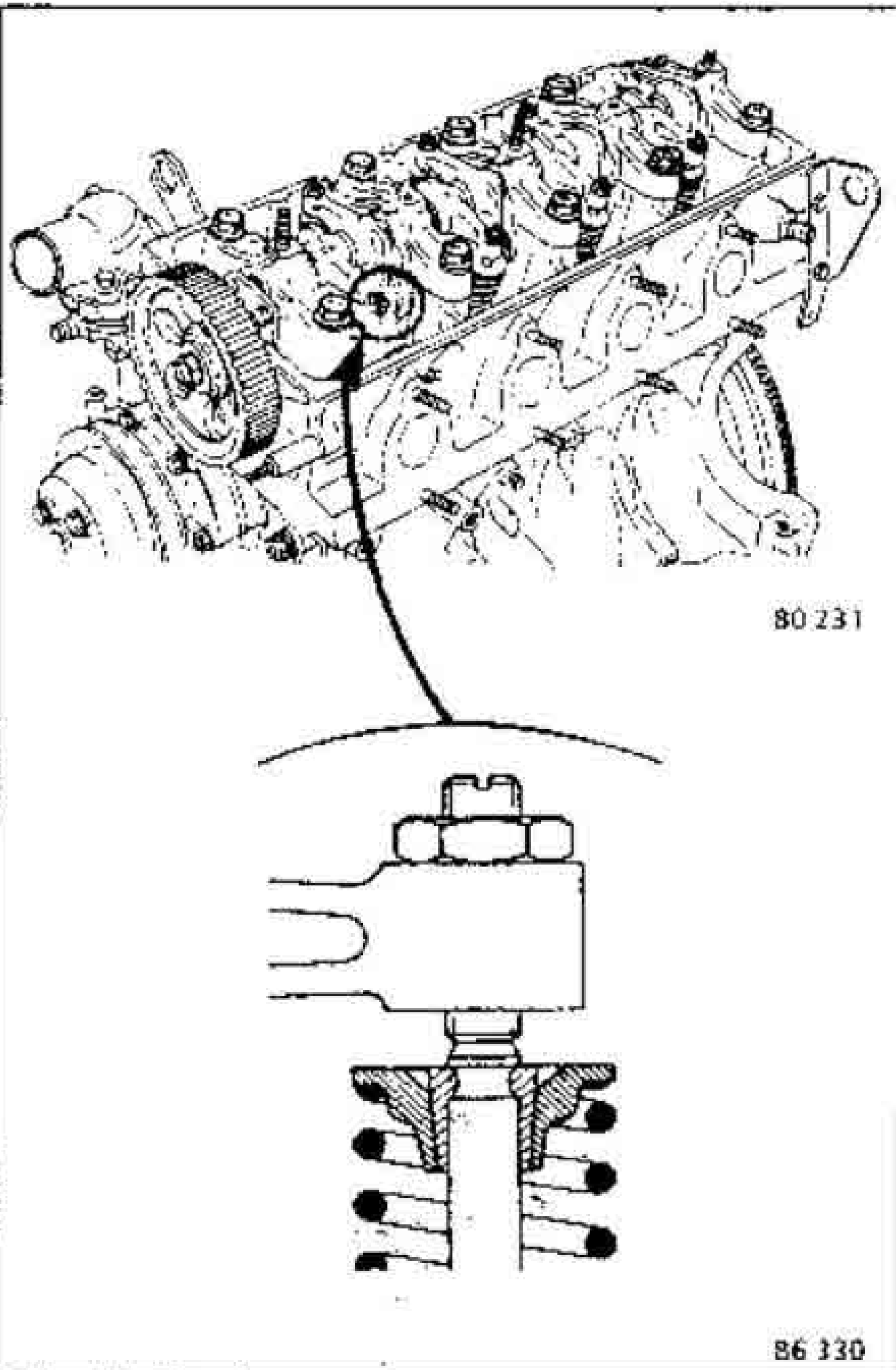


J engine, 12 valve

Position the cylinder head bolts according to the reference marks made when they were removed.



When tightening the cylinder head bolts, ensure the rocker hammers rest correctly on the valve stems (risk of twisting or forcing the valve stem).



TIGHTENING - RETIGHTENING (All types)

The cylinder head is not retightened and the tappets are not adjusted during the "Maintenance Check" at 10 000 km.

Wipe all bolts using a cloth.

Grease all the bolts (under the head and on the thread) using engine oil.

CYLINDER HEAD TIGHTENING METHOD

a) Gasket precompression

Tighten all bolts to 2 daN.m in the order specified below

b) Cylinder head tightening

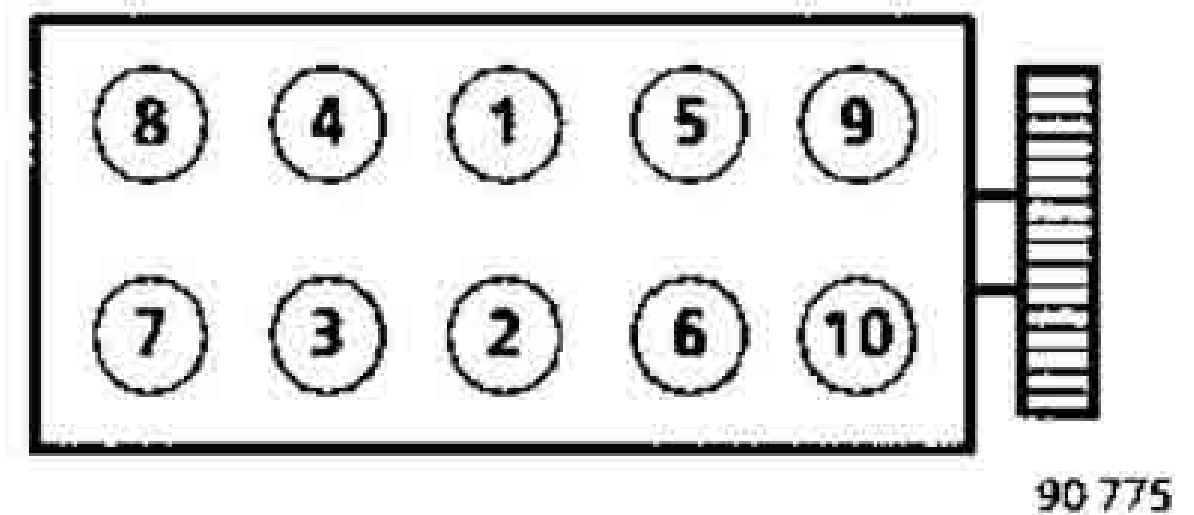
Tighten by an angle of :

8 valve engine	105°	}	*
12 valve engine	80°		

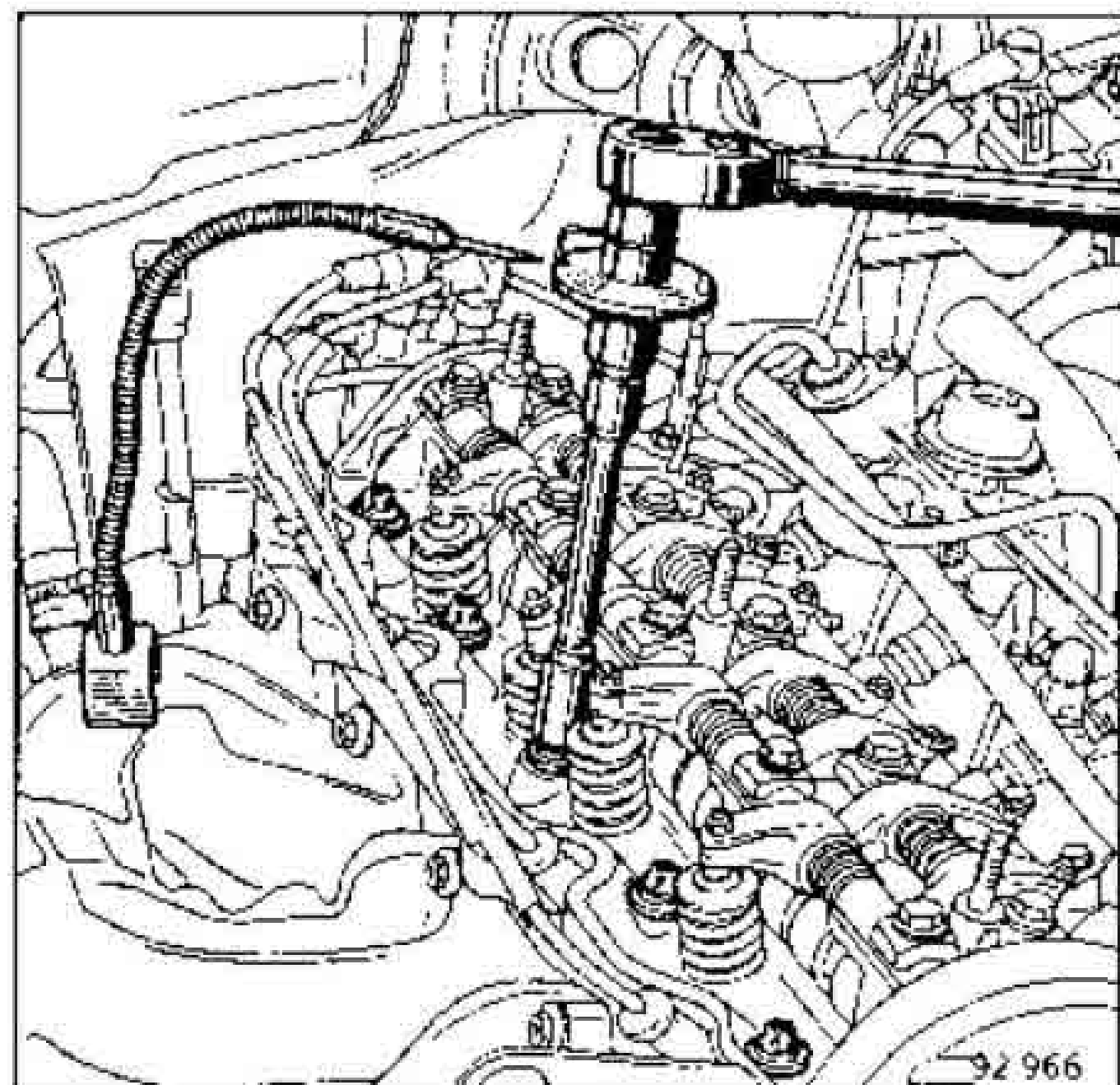
Then tighten by an angle of :

8 valve engine	105°	}	*
12 valve engine	80°		

* Tightening order

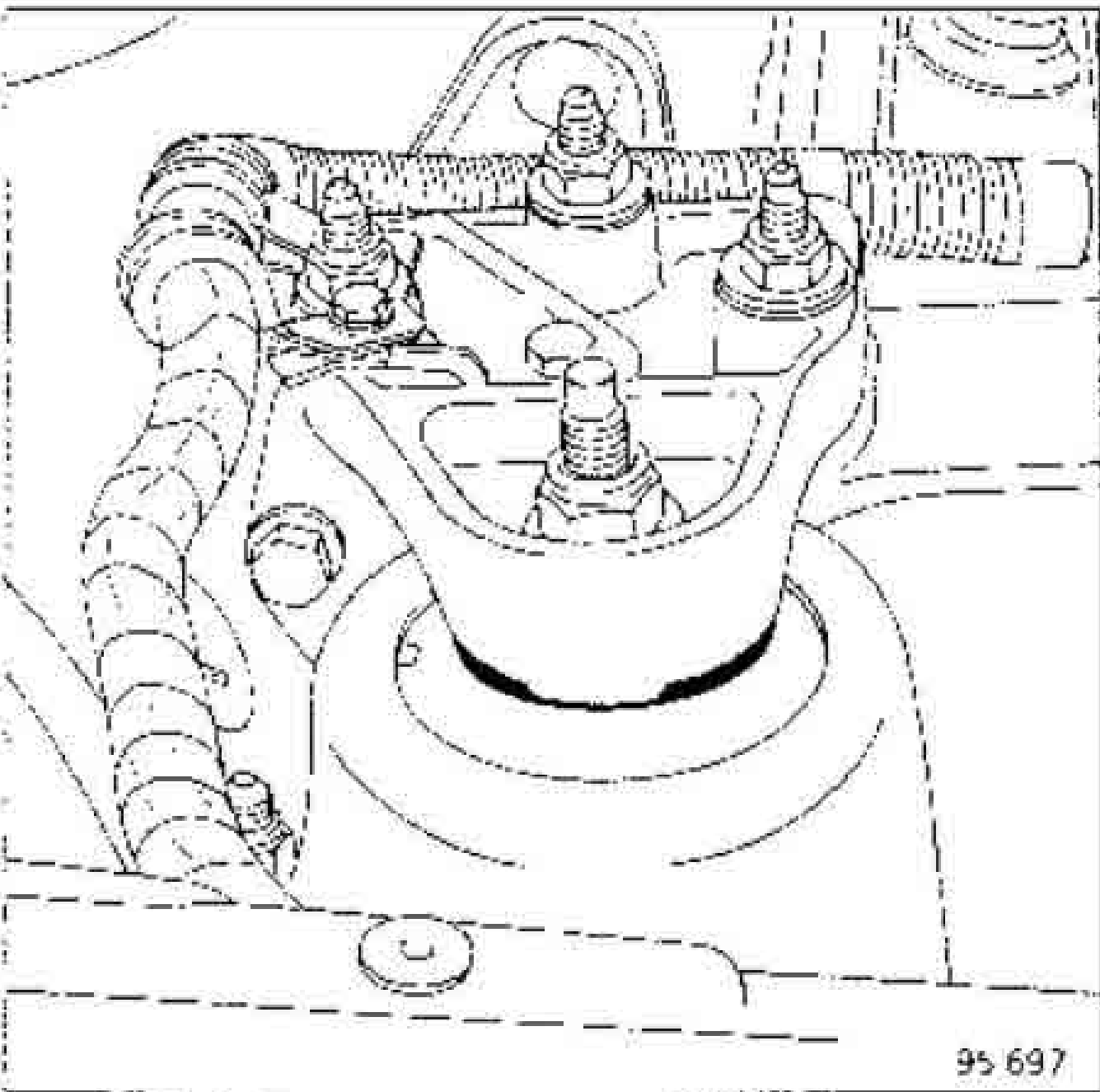


Angular wrench with reference



Refit the suspended engine mounting cover

Ensure the cover is correctly fitted in relation to the right hand suspended engine mounting flexible support.



Refit the rocker box cover and accessories.

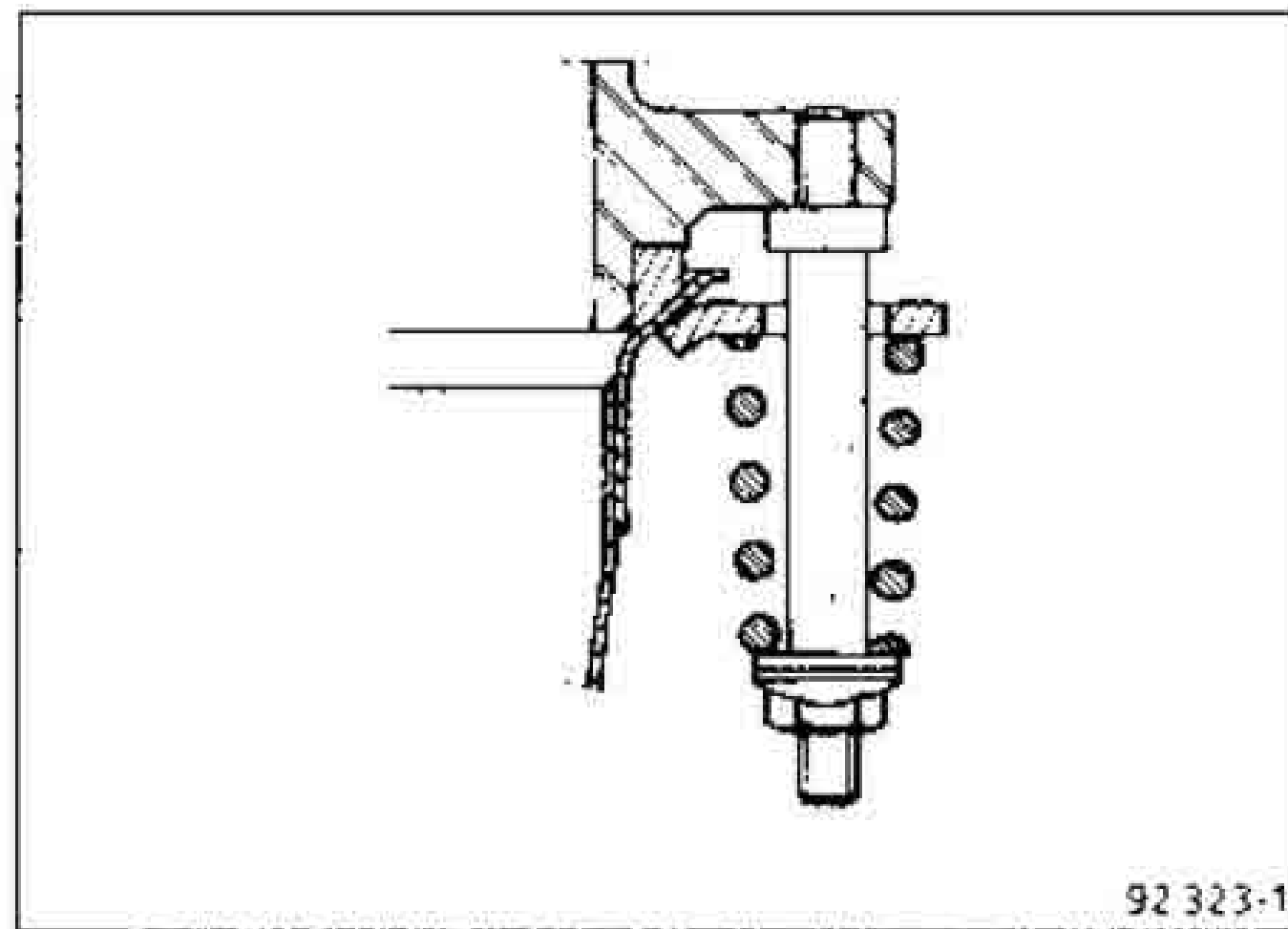
Refit the cylinder block drain plug

Do not forget to remove tool **Mot. 720**.

Adjust the timing (see chapter "Timing belt").

Top up and bleed the cooling circuit.

Adjust the accelerator cable.



Exhaust flange

IMPERATIVE :

Tighten to the stop.

Tighten all nuts and bolts to the specified torque



SPECIAL TOOLING REQUIRED

Mot.	1229	Engine support tool
Mot.	861	TDC pin
Mot.	1054	
Mot.	588	Liner retaining tool
Mot.	591	Angular wrench for tightening cylinder head
Mot.	1135-01	Belt tensioner

TIGHTENING TORQUES (in daN.m)



Front suspended engine mounting cover nut	4,5
Wheel bolt (4 bolts)	9
Wheel bolt (5 bolts)	10
Suspended engine mounting cover bolt	6,5

REMOVAL

Put the vehicle on a lift

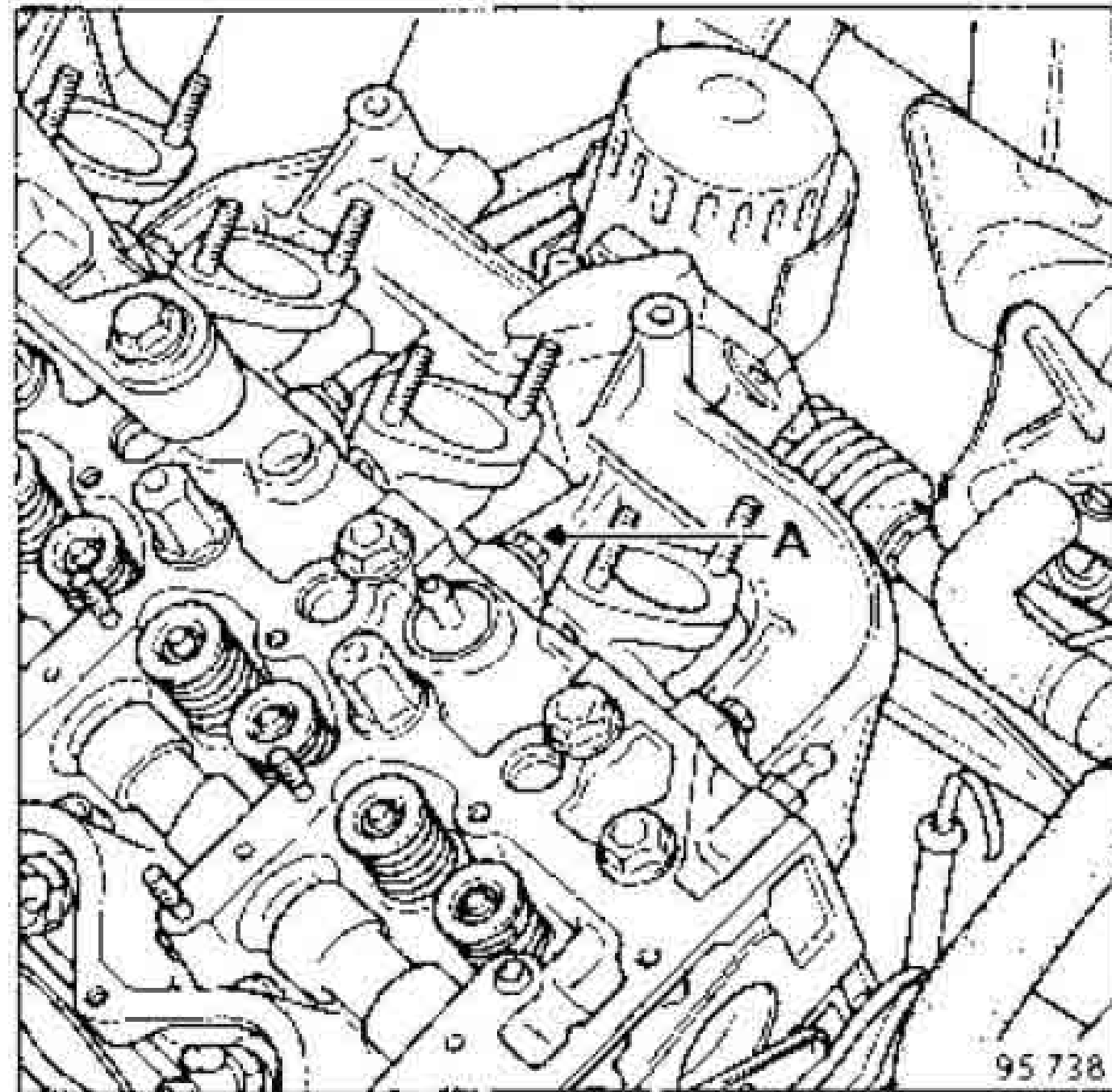
Remove:

- the engine and gear box undertray,
- the turbo charger air pipes,
- the air filter,
- the engine oil decanter,
- the turbo heat shield,
- the diesel pipes at the injection pump,
- the front right hand wheel,
- the belts (alternator, power assisted steering pump, air conditioning, depending on version),
- the water pump pulley,
- the timing cover,
- the crankshaft pulley.

Drain the cooling circuit.

Remove:

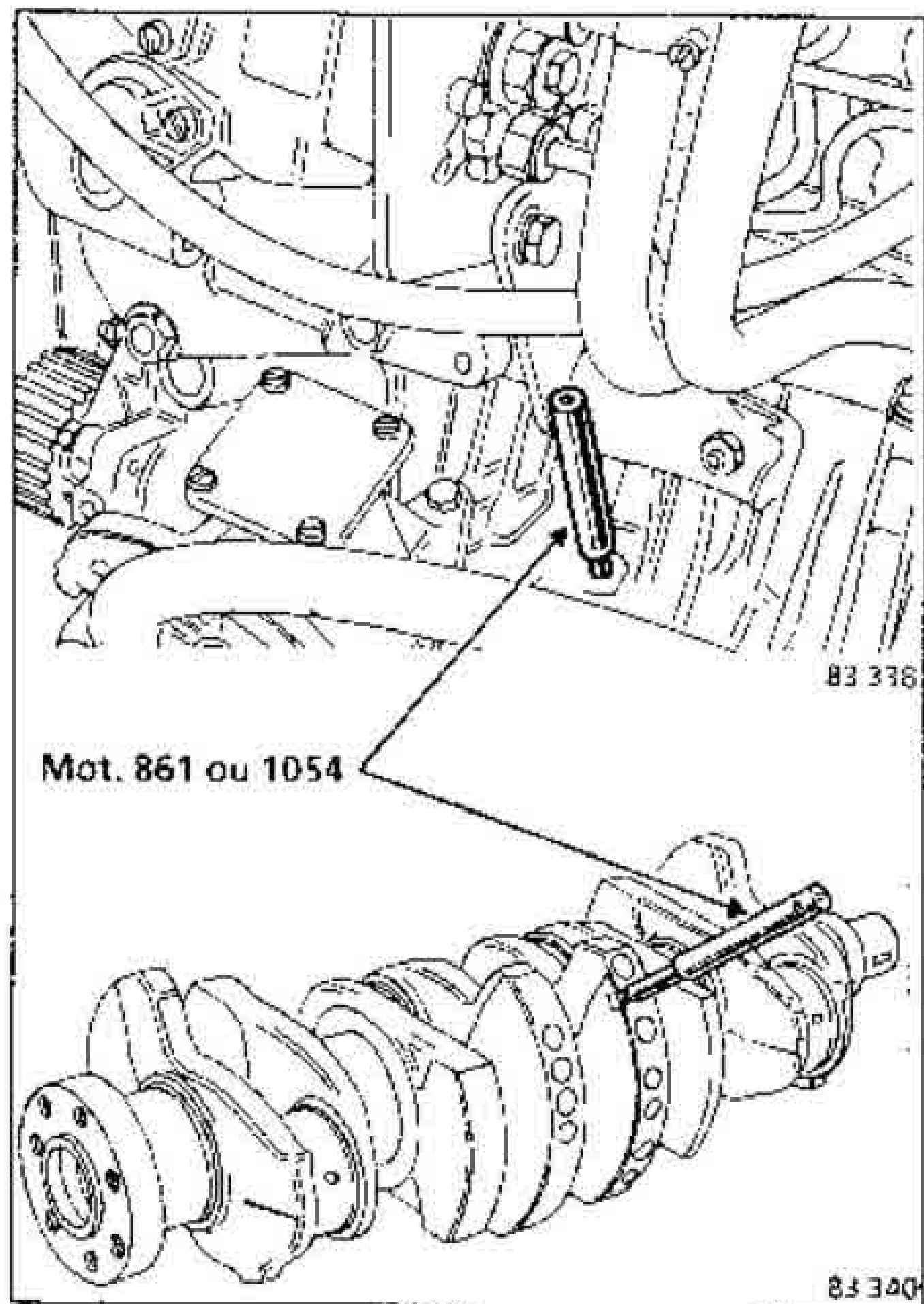
- the exhaust downpipe,
- the turbo charger,
- the remote oil filter body support
- the cooling circuit rigid channel mountings to be able to remove bolt (A) for the exhaust



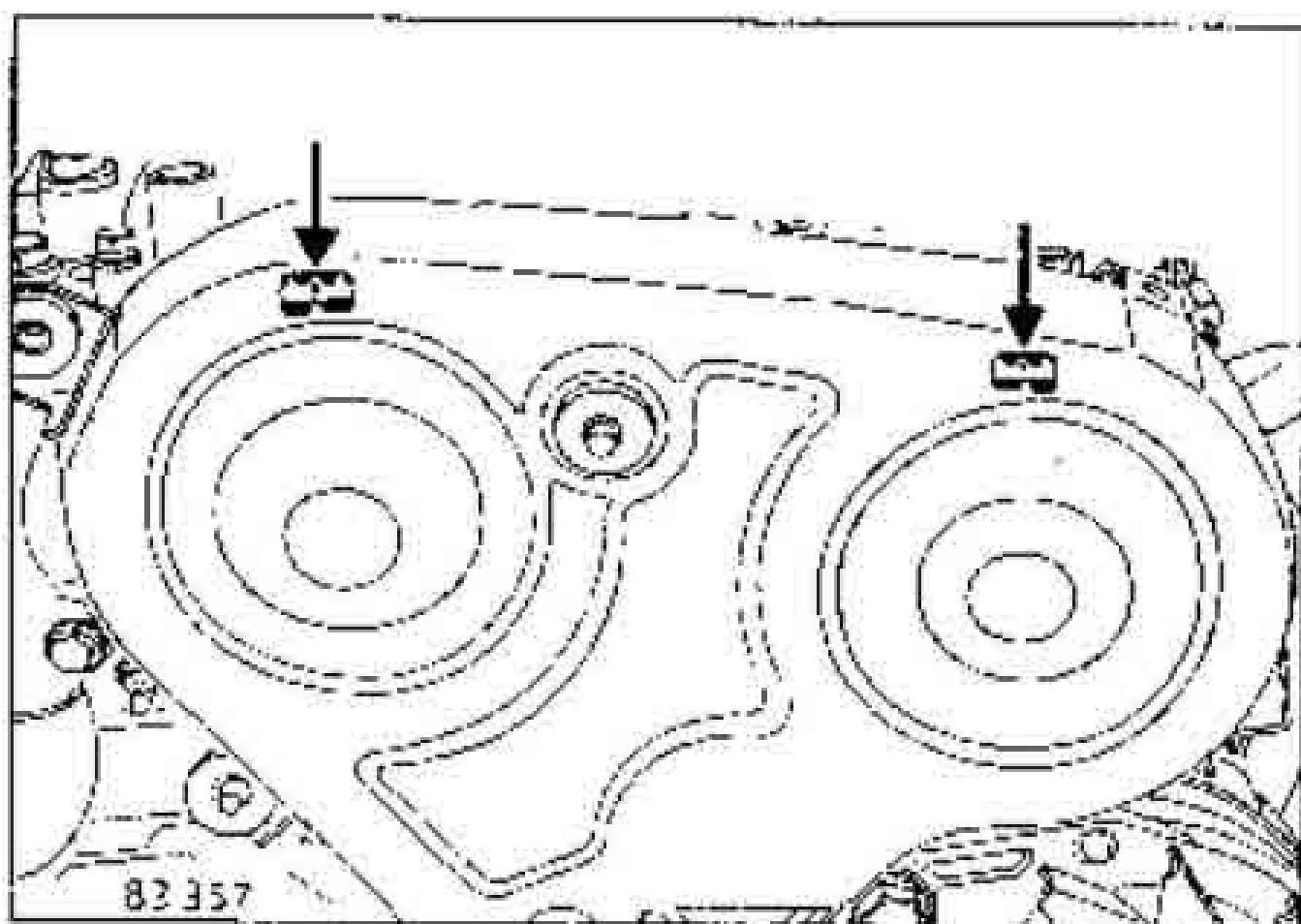
Remove the exhaust manifold.

Turn the crankshaft to fit the TDC pin **Mot. 861** or **1054** (take care not to fit the pin in a balancing hole).

Check the crankshaft cannot turn by moving it forwards and backwards.

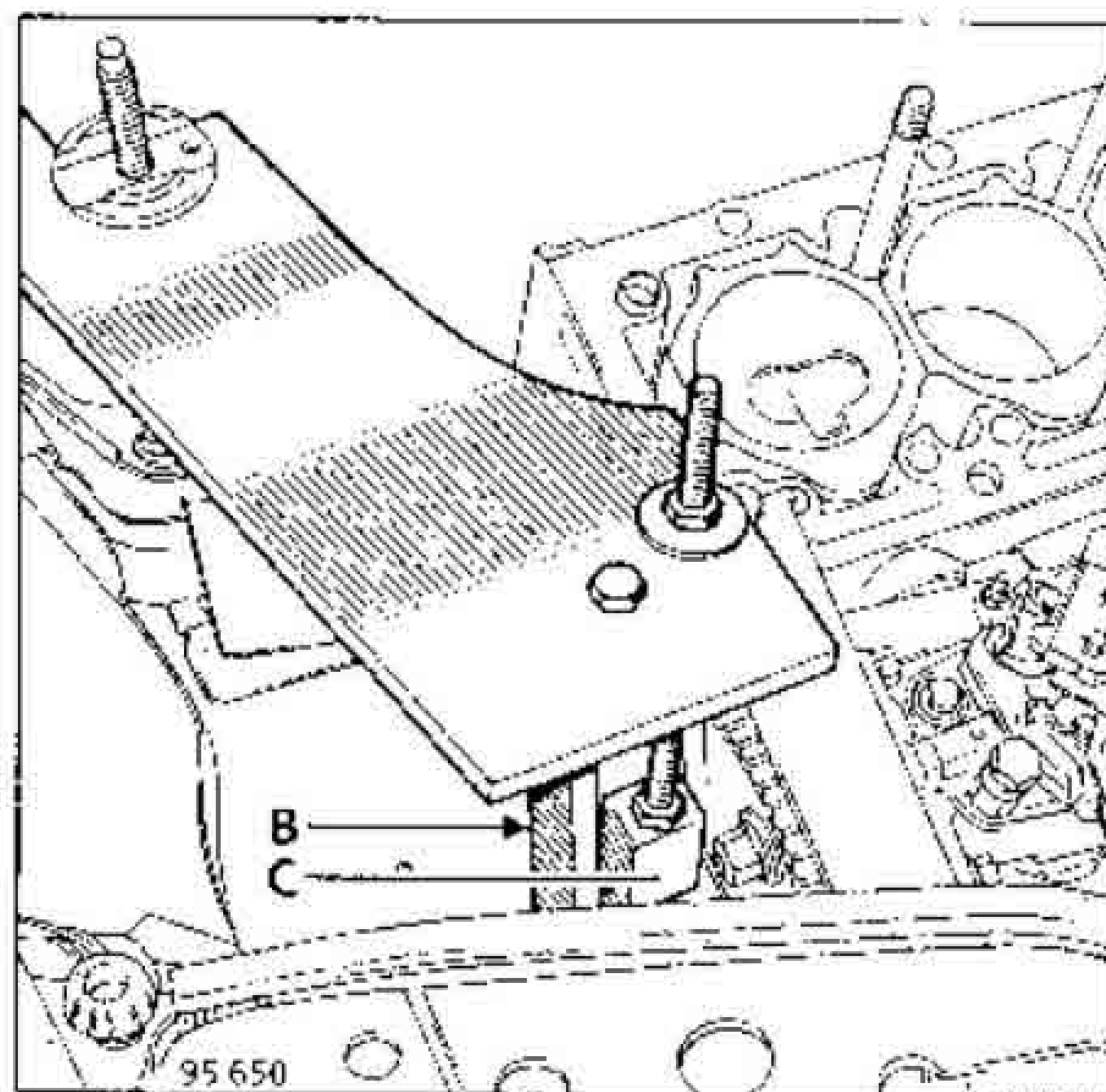


Check the adjustment of the camshaft sprocket and the injection pump sprocket.

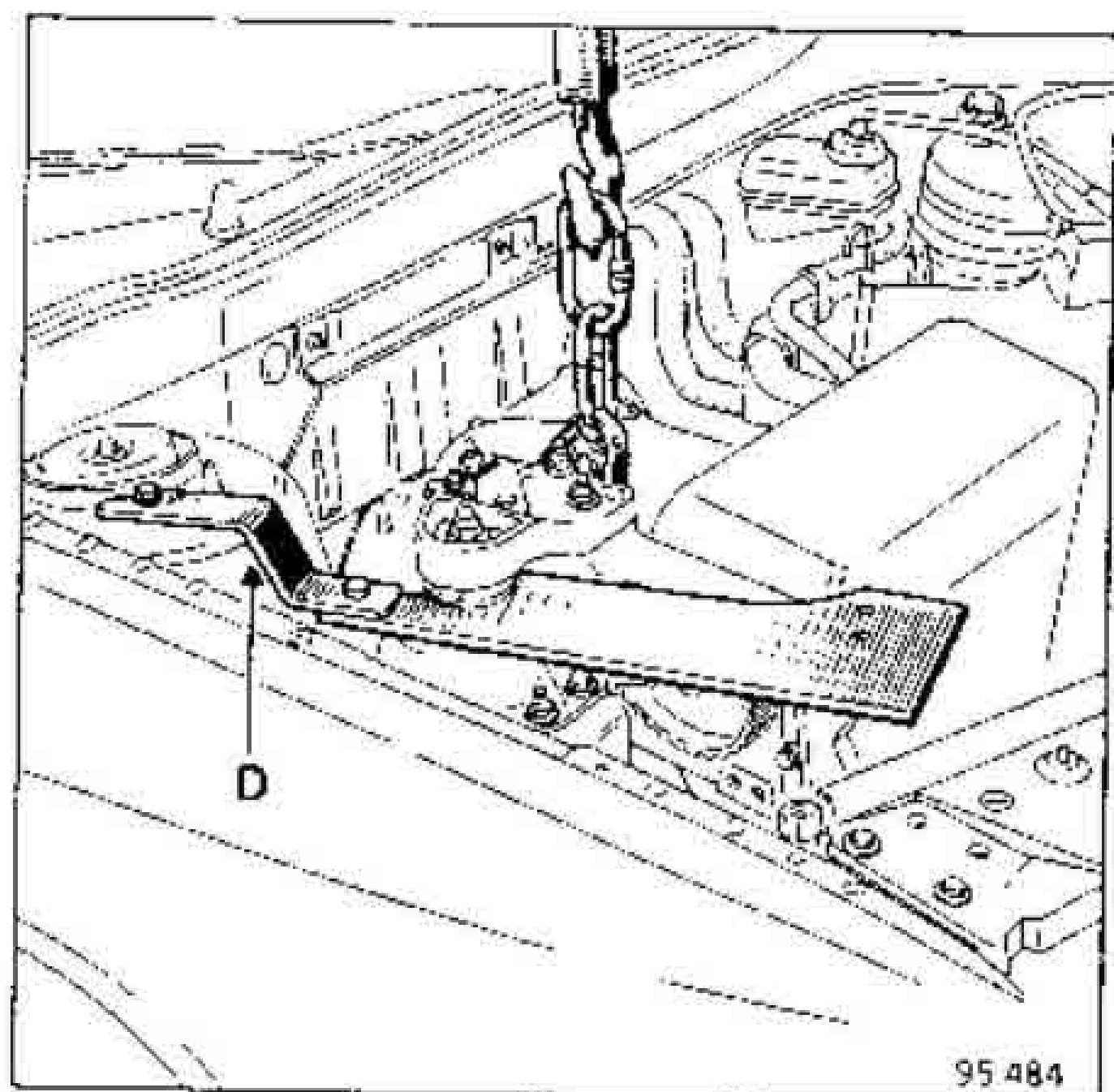


Using the workshop hoist lift the engine and gear box weight, to completely clear the suspended engine mountings.

Fit tool Mot. 1229 on the engine mounting block, support (B) in the side member oblong slot and fix the mounting (C) on the injection pump support.



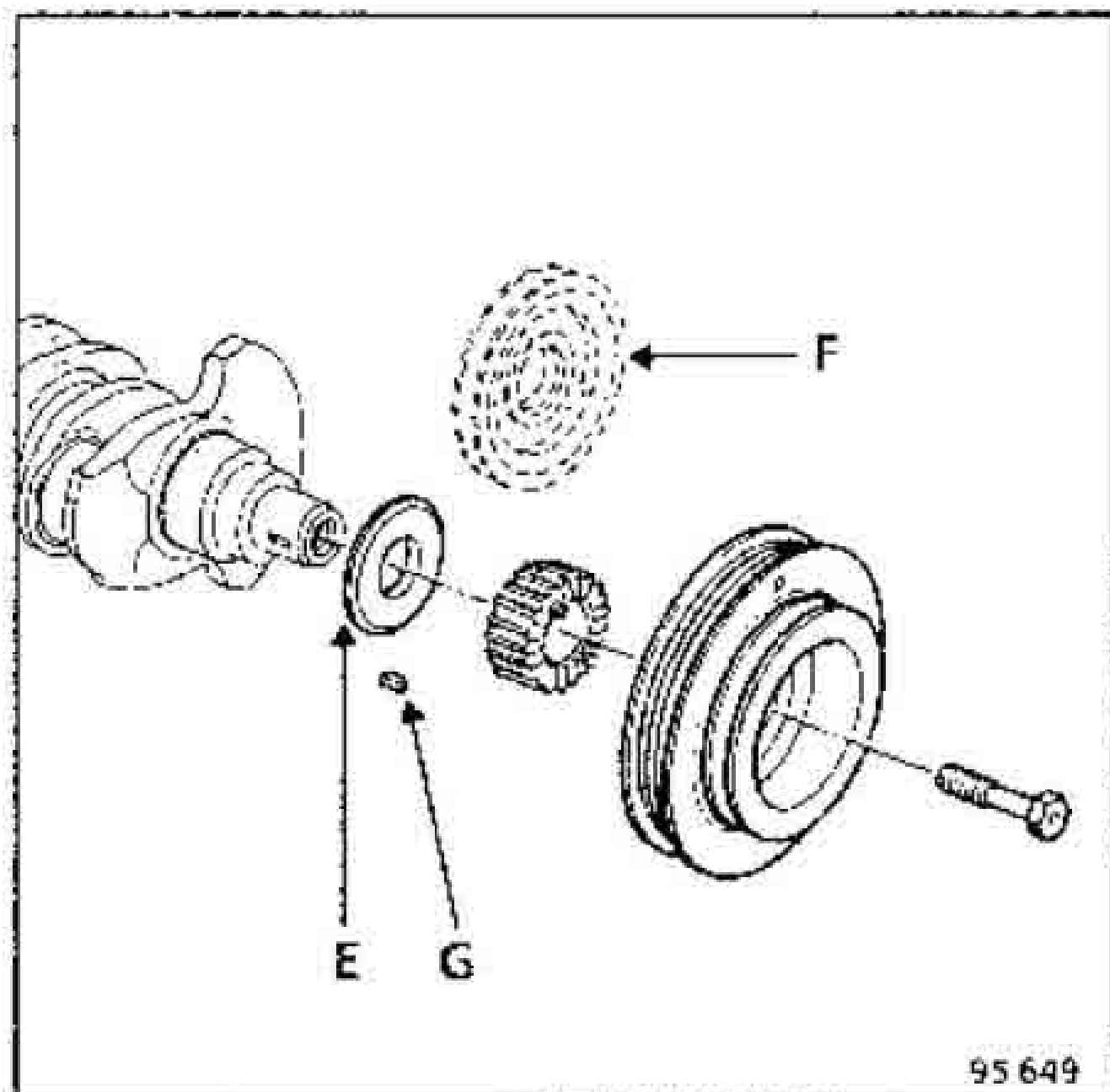
Fit the safety bracket (D) between the tool and the shock absorber turret bolt.



REMOVAL

Remove:

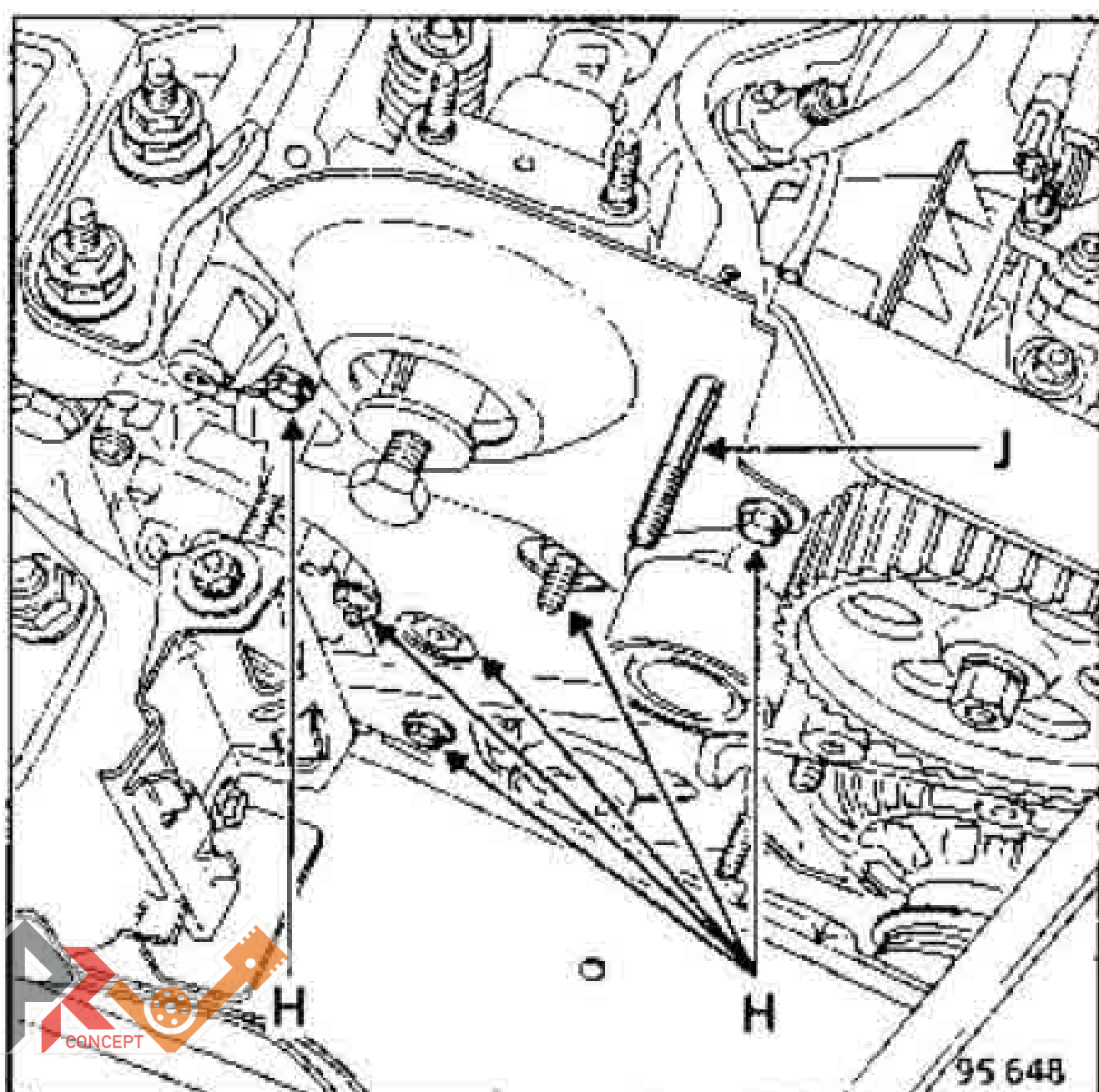
- the timing belt,
- all timing gears (camshaft, intermediate shaft, crankshaft).



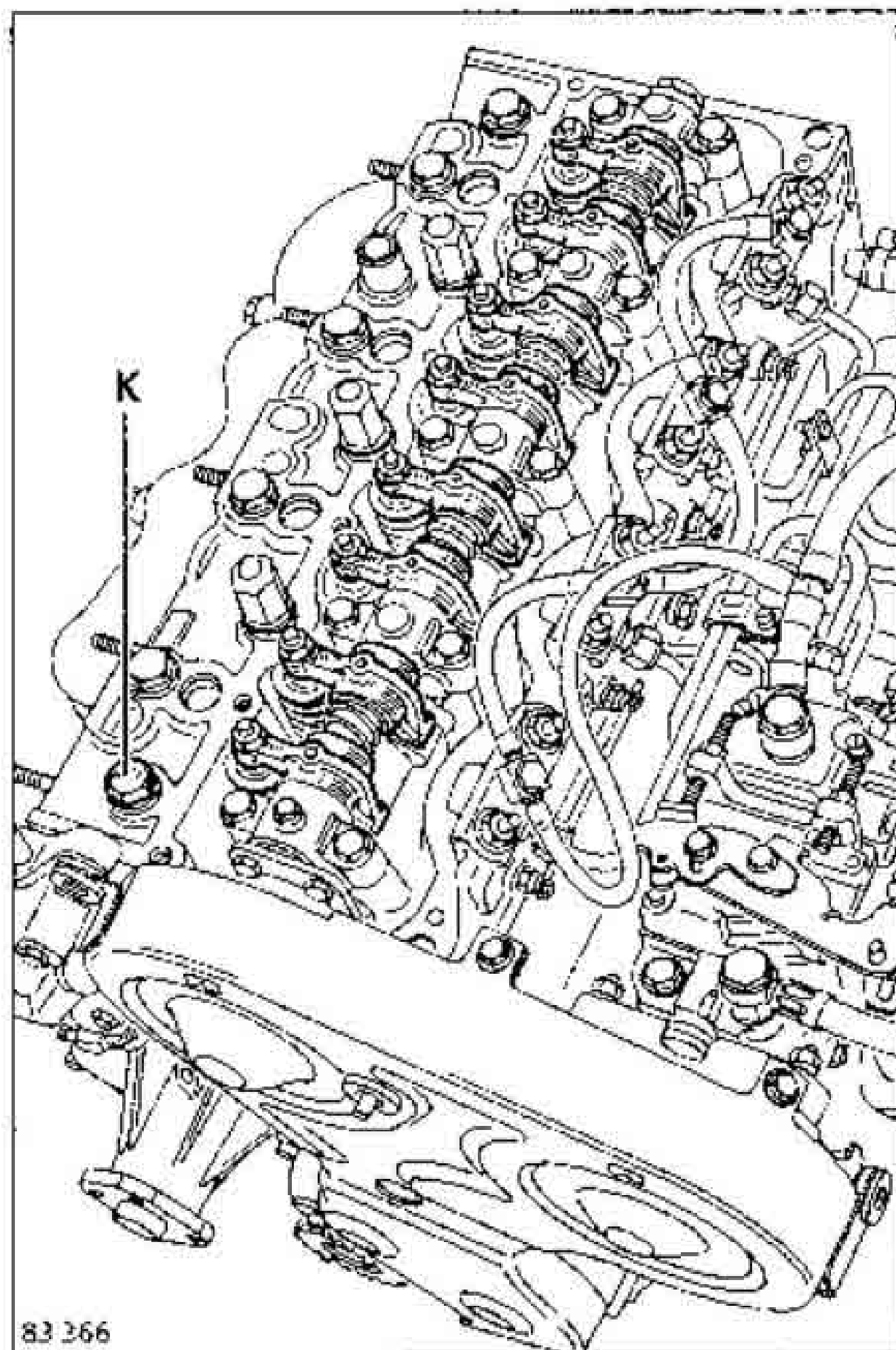
ATTENTION : washer (E) or gear (F) is located behind the crankshaft key (G) .

Remove:

- mountings (H) for the timing cover and the pin (J),



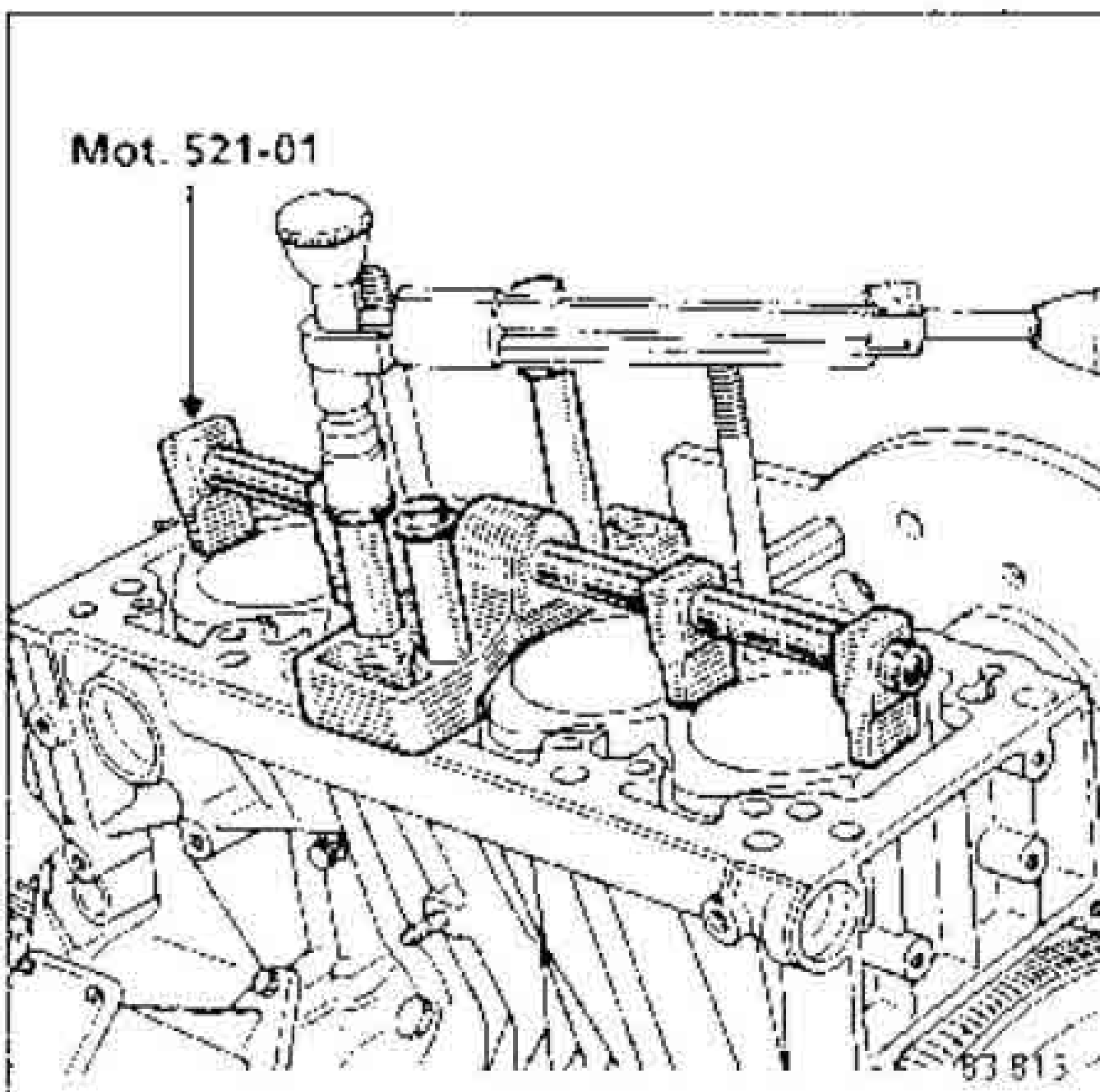
- the rocker box cover,
- the rocker shaft,
- the rear injection pump bolt,
- the injector galleries,
- the cylinder head bolts except bolt (K) on the centring dowel which should be loosened and left in place.



Use a wooden block for knocking the cylinder head to release it from the gasket sealing face between the cylinder head and the pins. As the gasket is bonded on the cylinder head, the cylinder block and the cylinder liners, the cylinder head must not be lifted, which would lift out the liners enough to allow foreign bodies to enter.

REMOVAL

Fit the liner retaining tool
Mot. 521-01.



CLEANING

It is very important to avoid scratching the surface of aluminium parts.

Use Décapjoint to dissolve any remaining gasket material.

Apply the product to the part to be cleaned ; wait for about 10 minutes, then remove using a wooden spatula.

Wear gloves during this operation.

Do not spill any of the product onto paintwork.

This operation must be performed with care, in order to avoid the introduction of foreign bodies into the high pressure oilways which provide oil to the rockers (oilways in both the cylinder head and cylinder block). and which return it from there.

The filter in the rocker shaft or the rocker nozzles may be blocked if foreign bodies do enter the oilways and the rocker cams and slides may be quickly damaged.

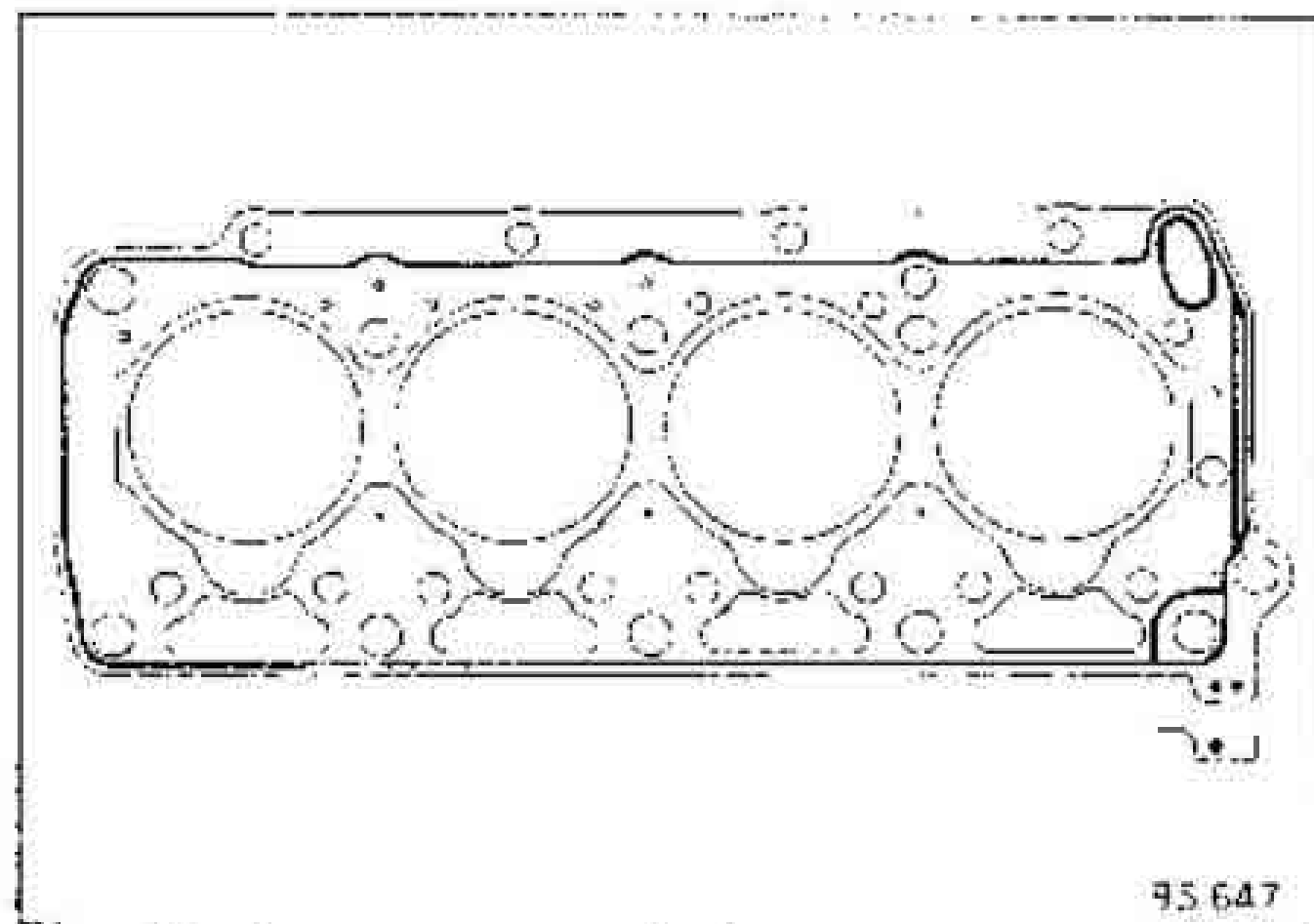
Use a syringe to remove any oil in the mounting holes in the cylinder head, especially in the oil inlet channel and the holes for the hexagonal socket bolts.

This is necessary to ensure the bolts may be correctly tightened.

HEAD GASKET

This gasket does not contain asbestos.

There are two thicknesses of gasket for replacement.



A Head gasket thickness 1,6

B Head gasket thickness 1,8

REFITTING

Locate the new head gasket.

The cylinder head is tightened by angle after the gasket has been precompressed.

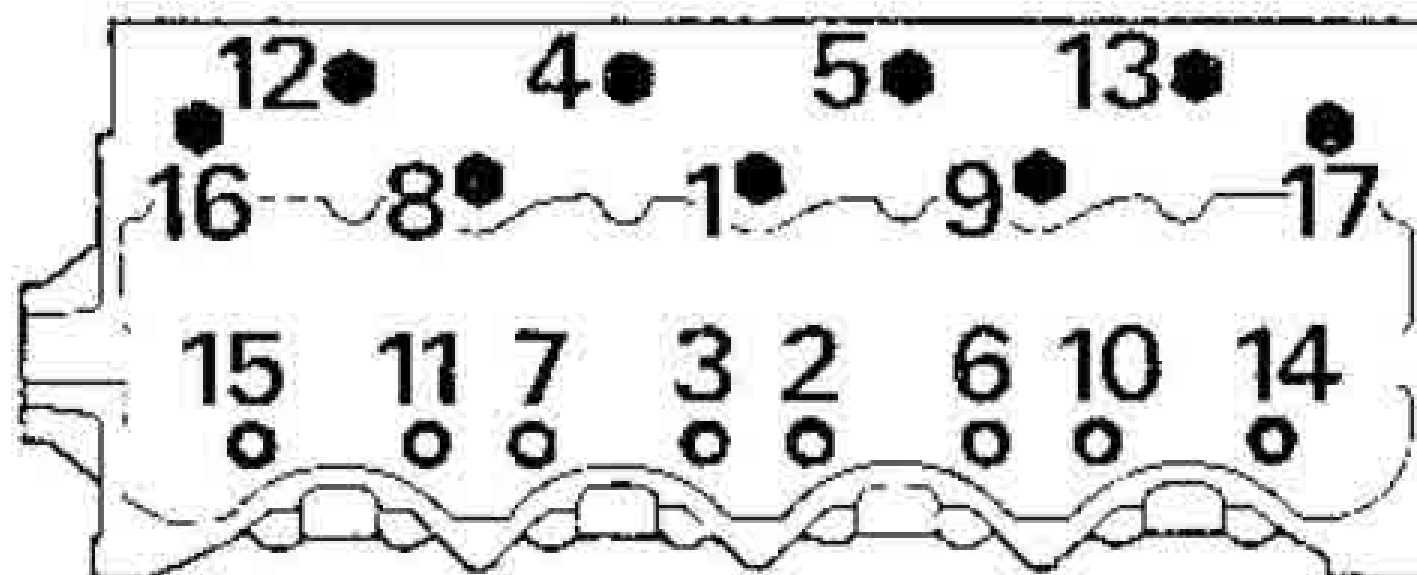
The cylinder head is not retightened after the engine has been run

Apply engine oil to the bolt threads and under the bolt heads.

GASKET PRECOMPRESSION

Tighten all the bolts to 2 daN.m.

Angle tighten according to the table below.



83 174

	Pins 1-8-9	Bolt H 16	Bolt H 17	Bolt H 4 - 12	Bolt H 5 - 13	Other
1 st angle	80°	80°	70°	60°	50°	60°
2 nd angle	80°	80°	70°	60°	50°	60°

ADJUSTING TIMING

Check the position of:

- the crankshaft, with TDC pin, Mot. 861 in the crankshaft slot (attention, crankshaft balancing holes may be located around this slot).

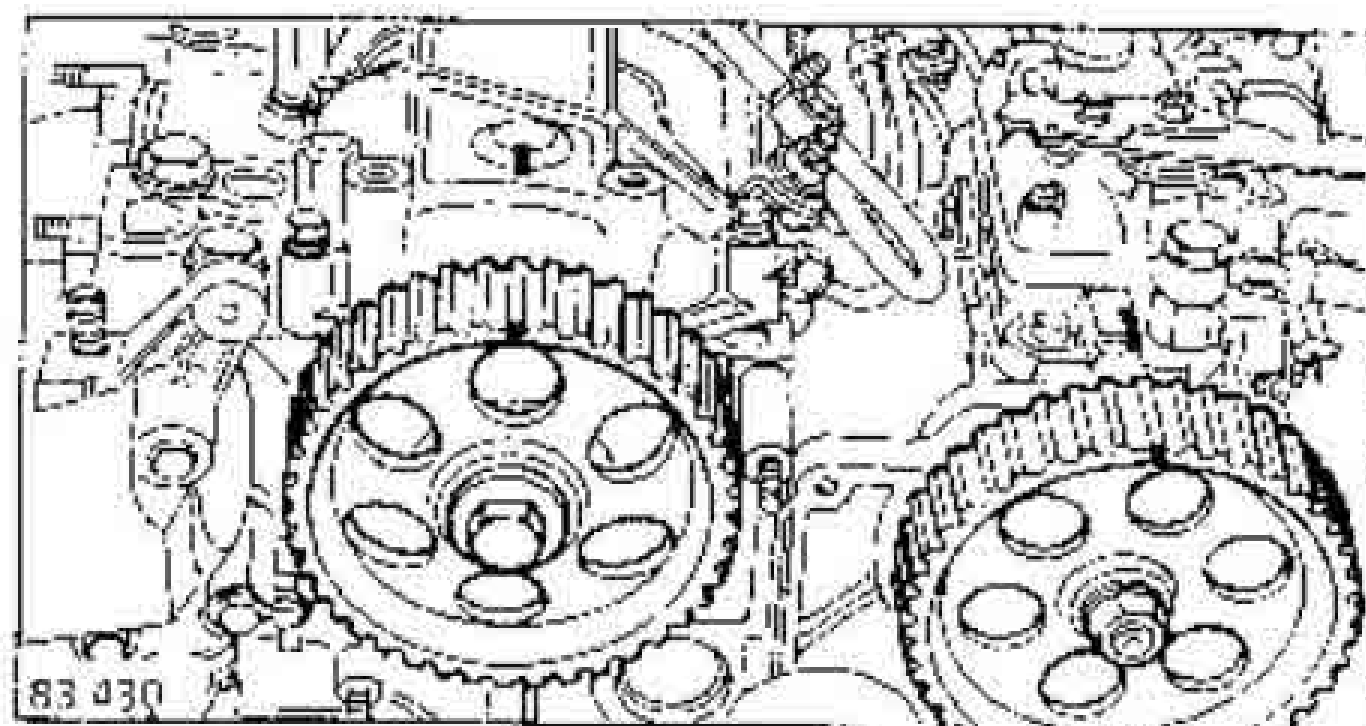
Check the pin is correctly positioned by rotating the crankshaft forwards and backwards (no rotation possible), if rotation is possible through a slight angle, a balancing hole has been used.

- the camshaft :

Mark on the timing sprocket in line with the boss on the cylinder head cover.

- the injection pump:

Mark on the injection pump sprocket opposite the line of the boss on the injection pump.

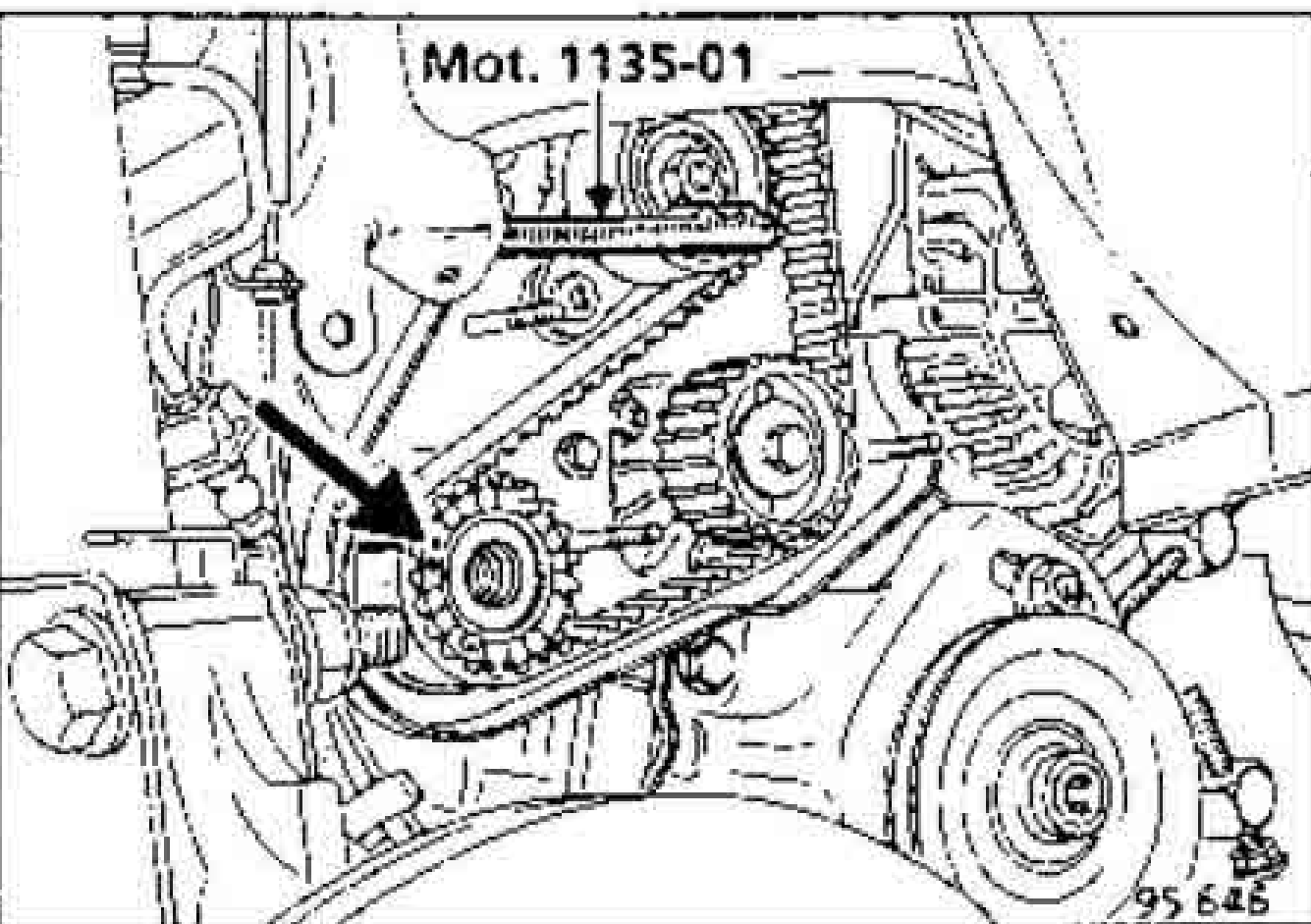


Align the belt marks with the sprocket marks.

ADJUSTING THE TIMING

For the crankshaft gear (see diagram below).

Using tool Mot. 1135-01 turn the tensioning wheel anti-clockwise.



Lock the tensioner.

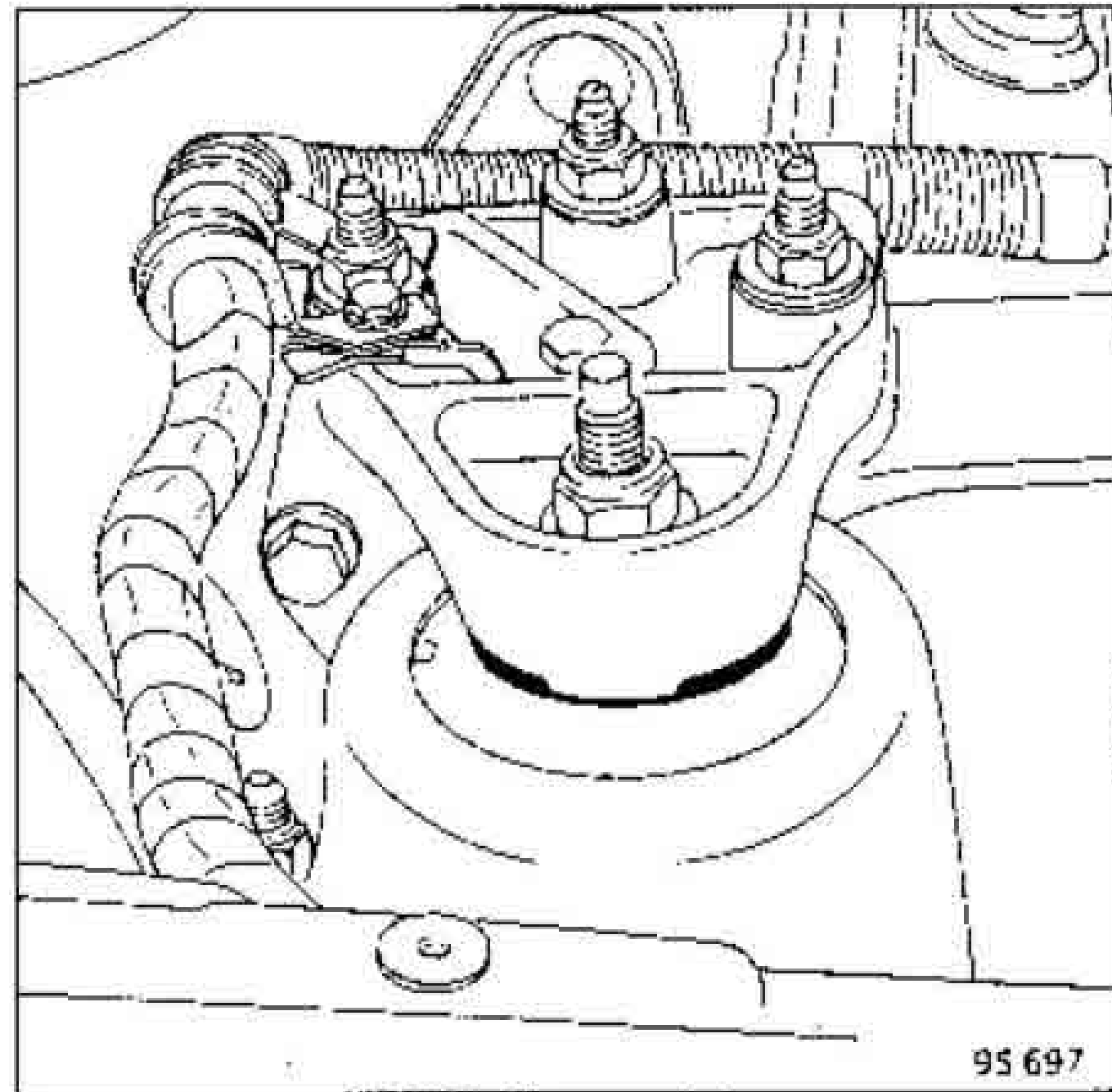
The belt tension is specified in a later technical note.

REFITTING

Refitting is the reverse of removal.

Top up and bleed the cooling circuit (if necessary).

Refit the suspended engine mounting cover, ensuring the cover fits correctly with the right hand suspended engine mounting flexible mounting.



SPECIAL TOOLING REQUIRED		
Mot. 1 229	Engine support tool	
Mot. 587	Cylinder head spring pin extractor	
Mot. 589	Camshaft gear supports	
Mot. 588	Cylinder liner retaining tool	
Mot. 591	Angular wrench for tightening cylinder head	
Mot. 1 209	Spring compressor tool	
Elé. 346-04	Belt tension tester	

TIGHTENING TORQUES (in daN.m)		
Front suspended engine mounting		
cover nut	4,5	
Wheel bolt	10	
Suspended engine mounting cover bolt	6,5	
Camshaft bolt	8	

REMOVAL

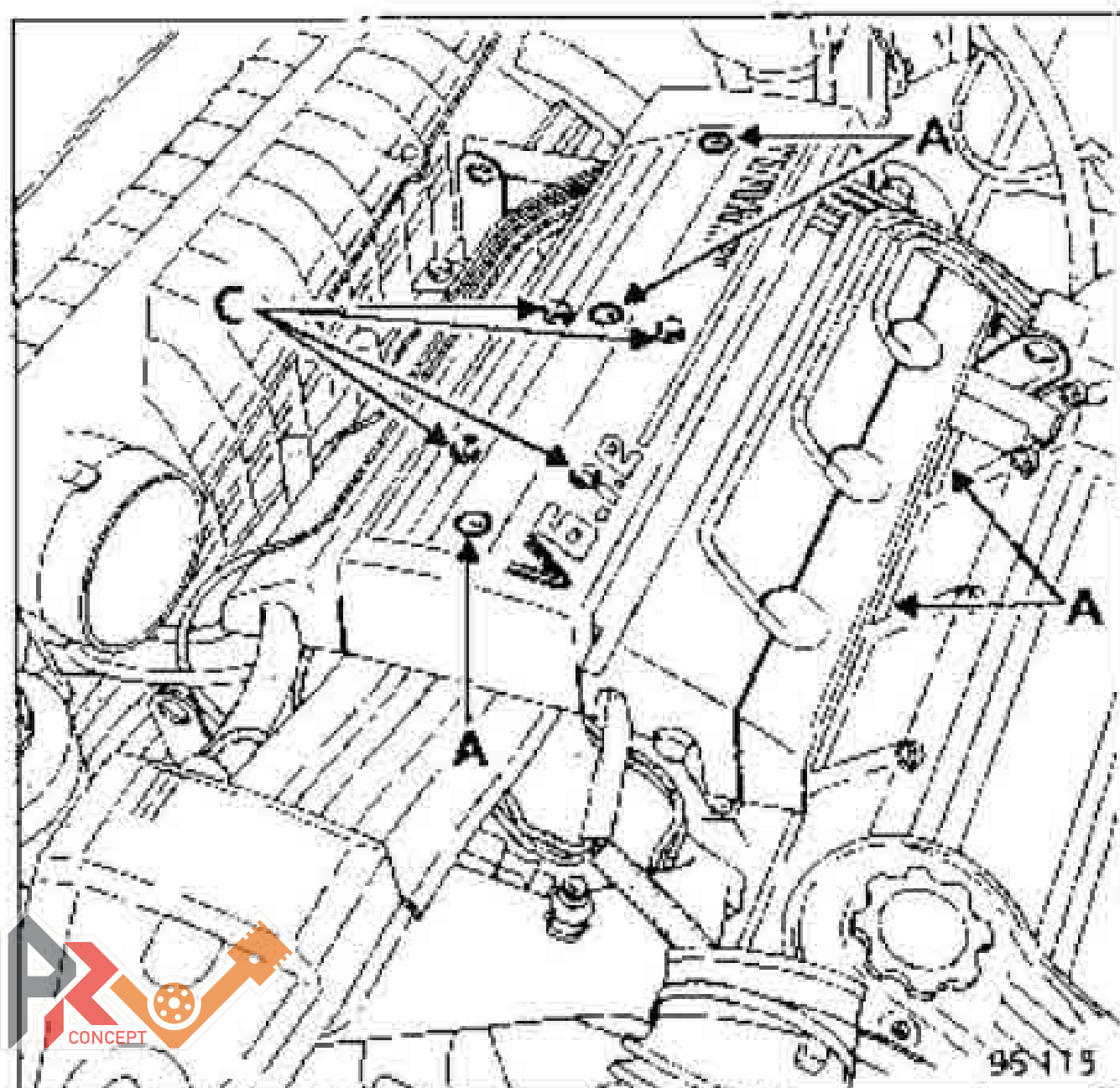
Put the vehicle on a lift.

Disconnect and remove the battery.

Move the injection computer.

Remove:

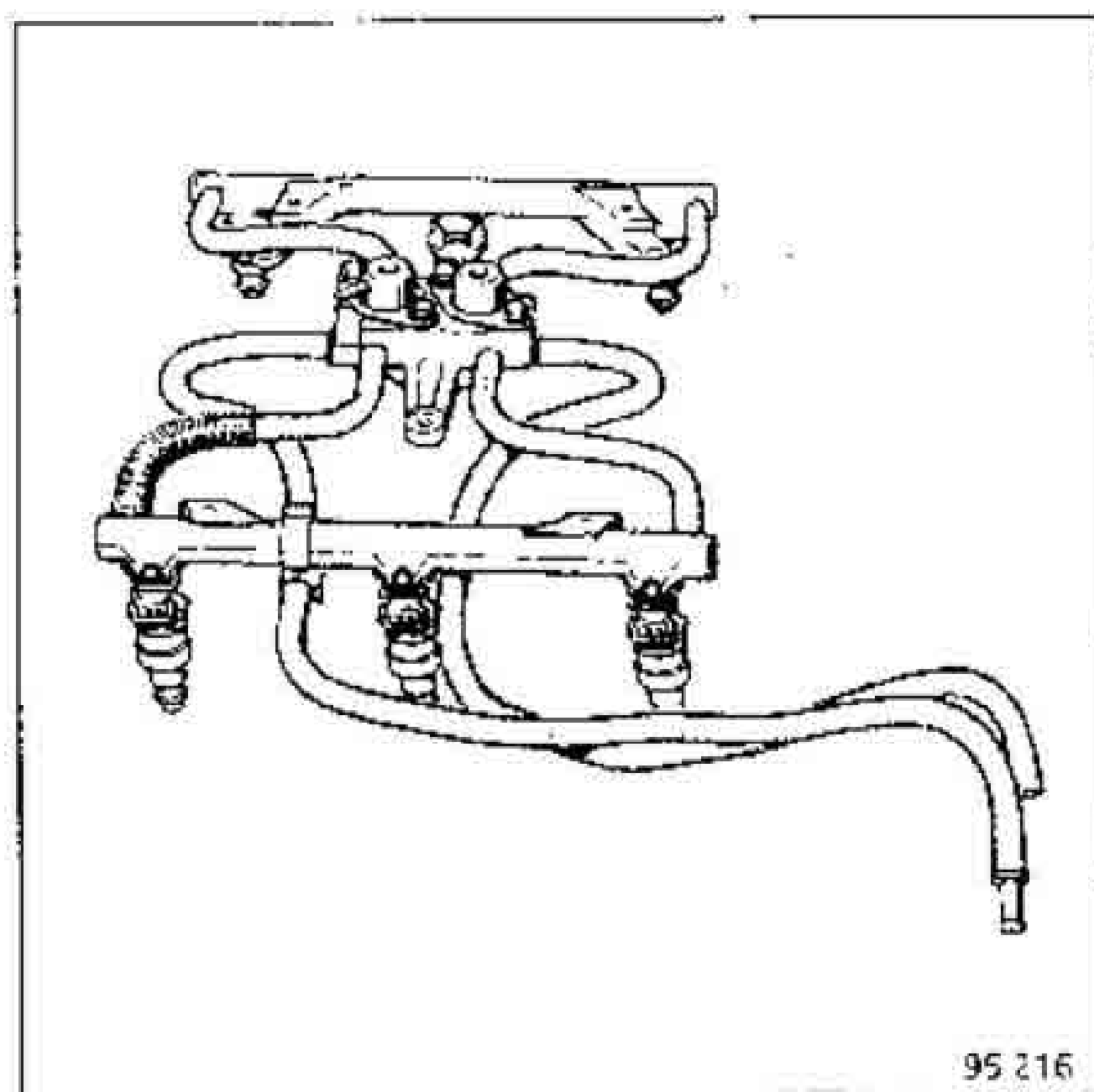
- the air filter inlet sleeve,
- the engine covers at (A).



- the throttle housing electrical connectors.
- the four mounting bolts from the wiring retaining plate on the injector bars, then the five hook bolts, the wiring under the plate, and place the wiring on the rear cylinder head.

Disconnect the fuel inlet and outlet pipes.

Remove the injector bar mounting bolts and the shock absorber adjustment assembly bolts. Remove the assembly.



ATTENTION : under each mounting point for the injector bar and the pressure regulator, there are thermal insulation blocks.

Take care to retain these when removing the assemblies.

REMOVAL

Remove the rear left hand side engine lifting bracket.

Disconnect the accelerator cable.

Remove:

- the four mounting bolts for the bracket which joins the right hand suspended engine mounting and the manifold,
- the rigid vacuum ducts for cruise control,
- the four manifold bolts and remove them.

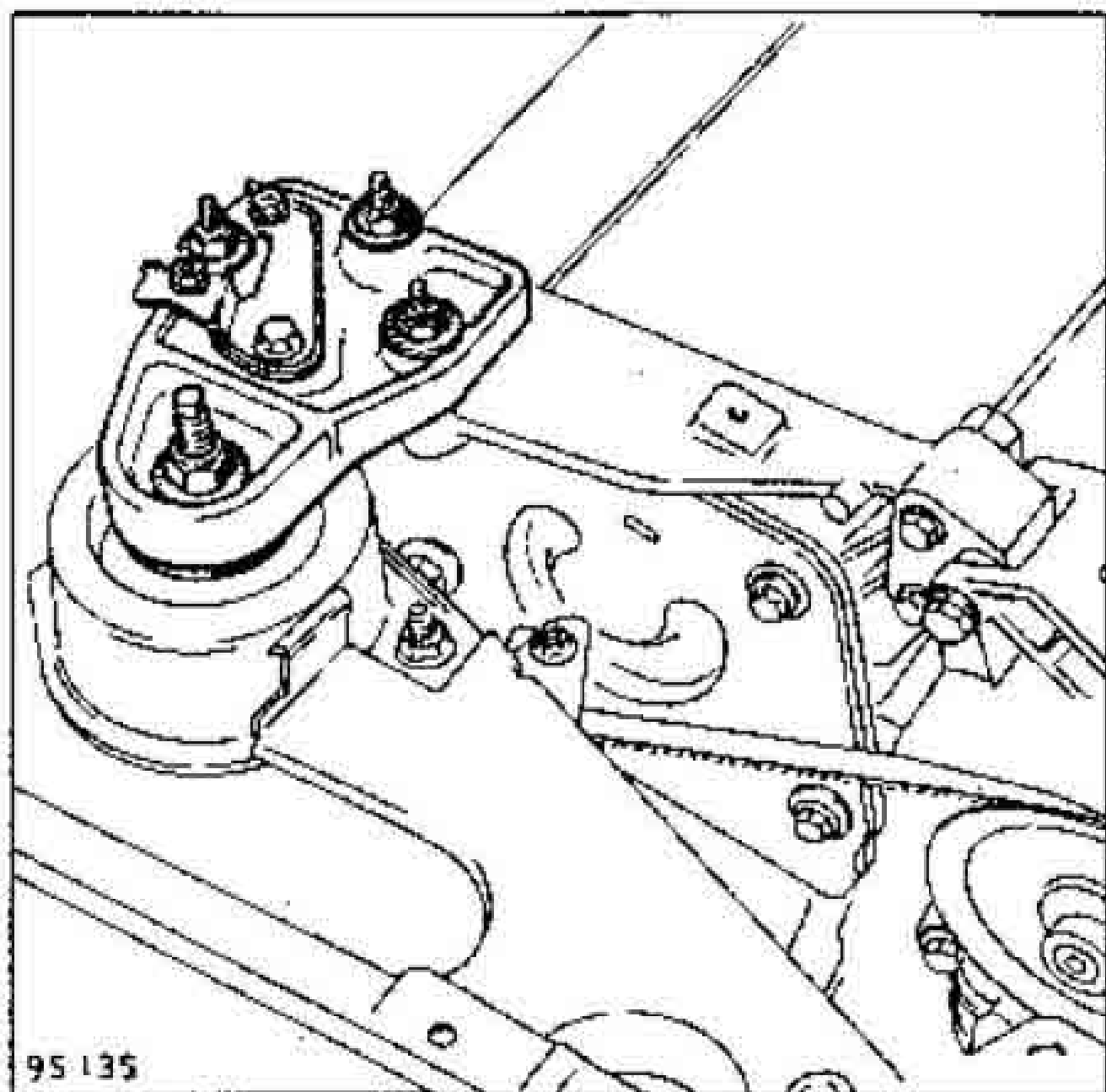
Drain the cooling circuit through the lower radiator hose.

Remove:

- the alternator,
- the exhaust,
- the computer mounting,
- the inlet manifold between the two cylinder heads,
- the front right hand wheel,
- the complete wheel arch protector.

Use a workshop hoist to lift the weight of the engine and gear box.

Remove the suspended engine mountings.

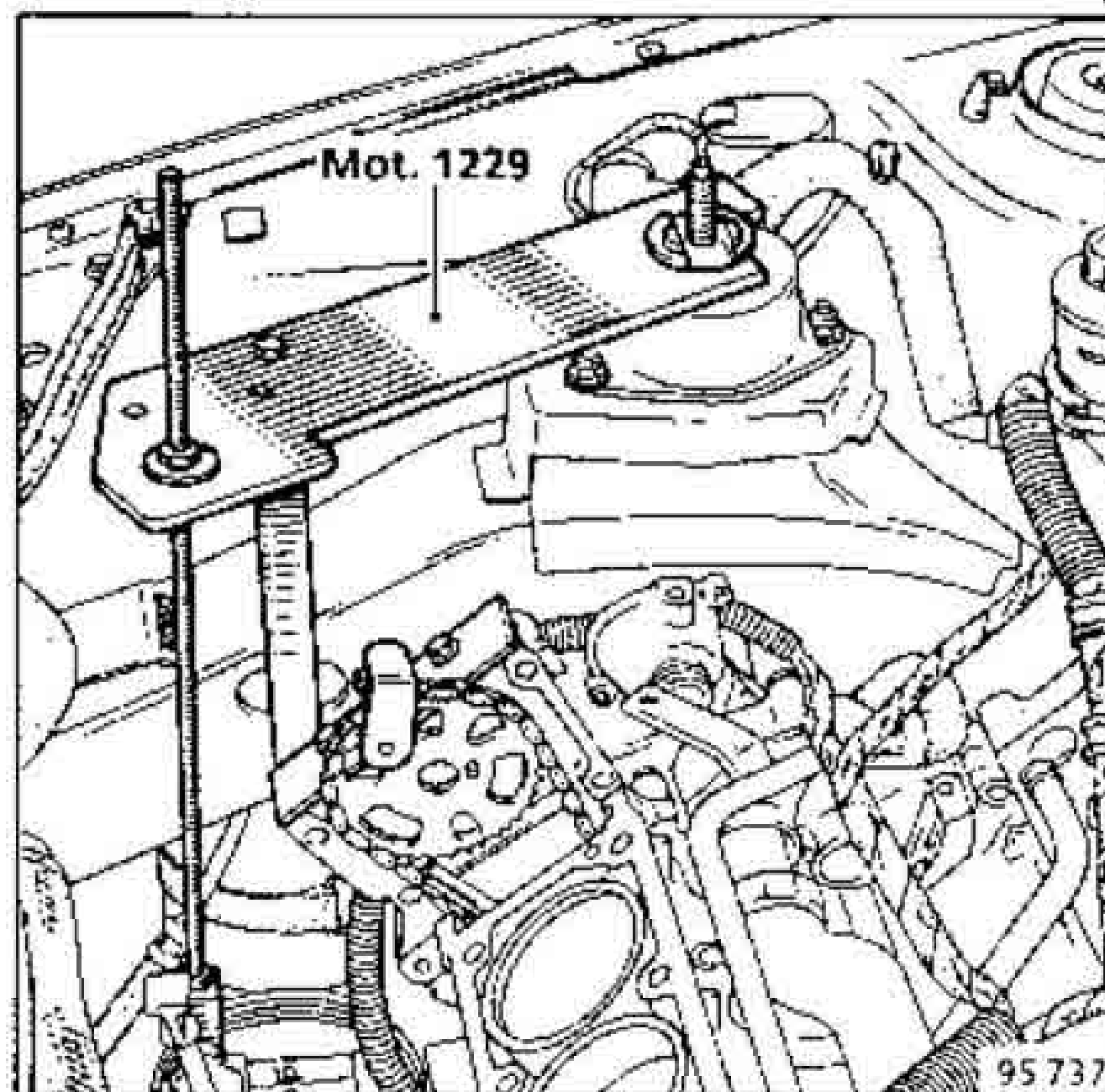


Fit tool Mot. 1229 under the suspended engine mounting washer.

Fit the support between the oblong slot in the front right hand side member and the tool.

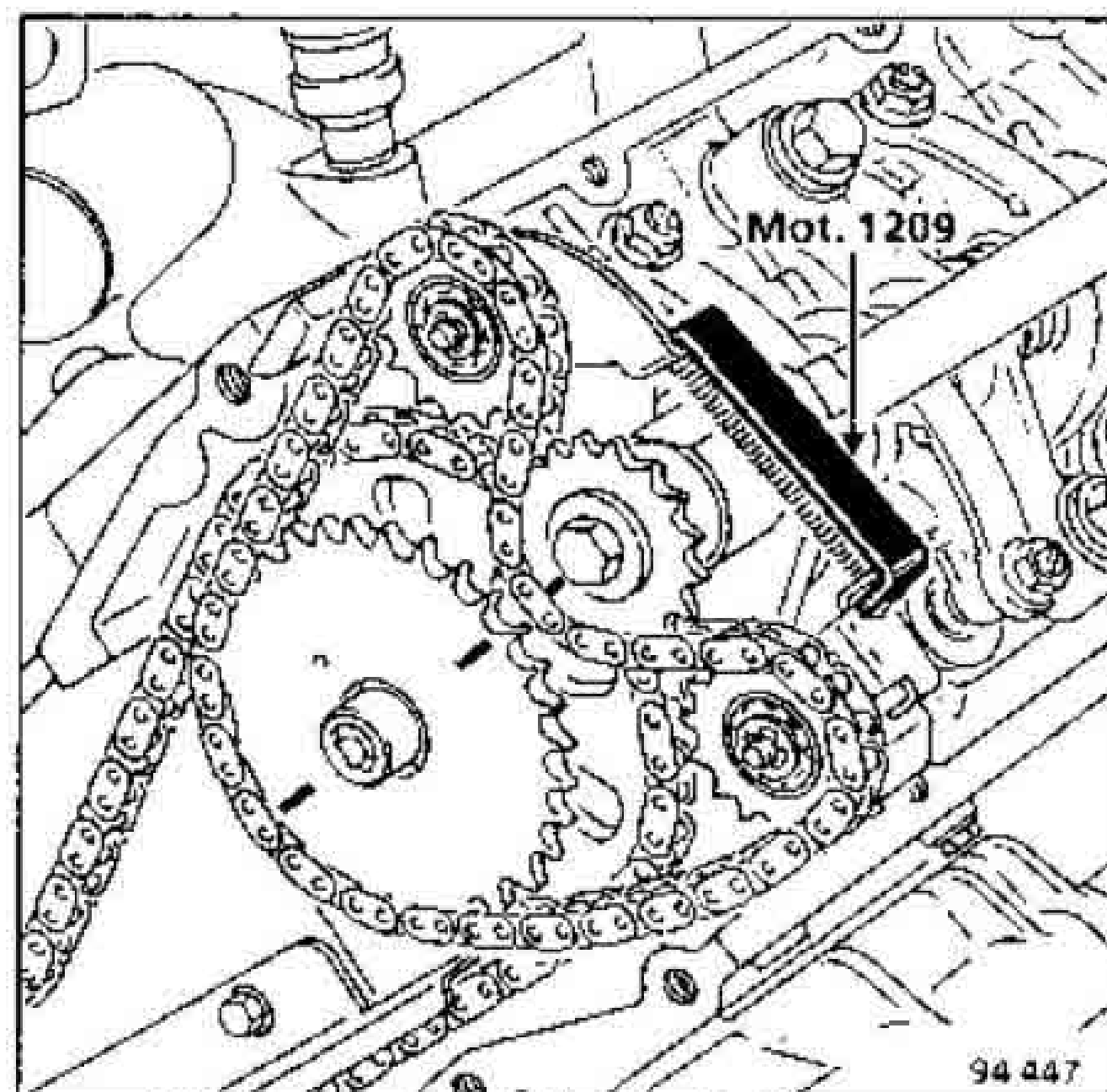
Fit the threaded rod on tool Mot. 1229 to the plate and the other end of the rod on the lower alternator mounting.

Remove the workshop hoist.



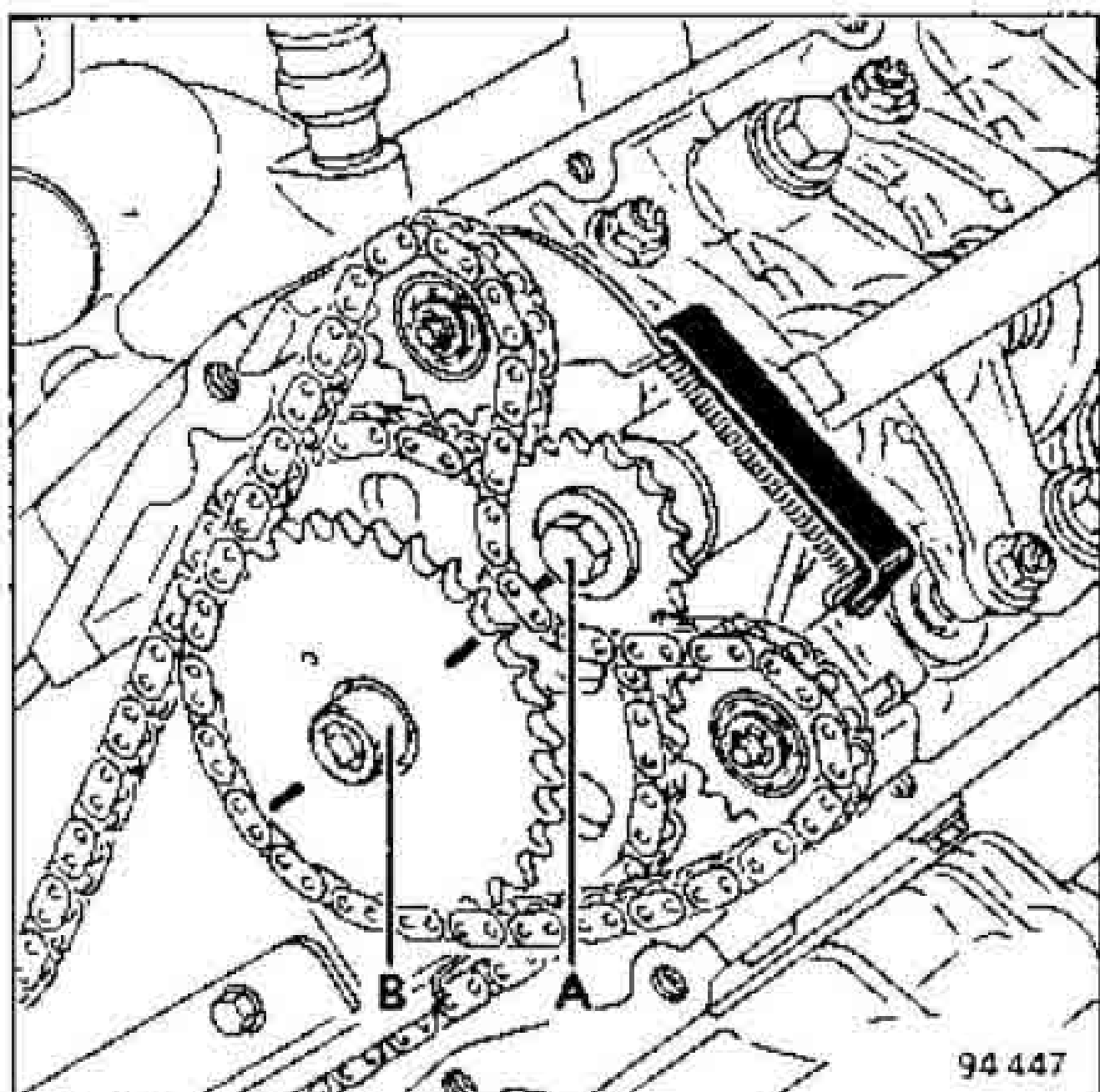
Align the sprocket marks.

Fit tool Mot. 1209 on the balancing shaft tension chain.



REMOVAL

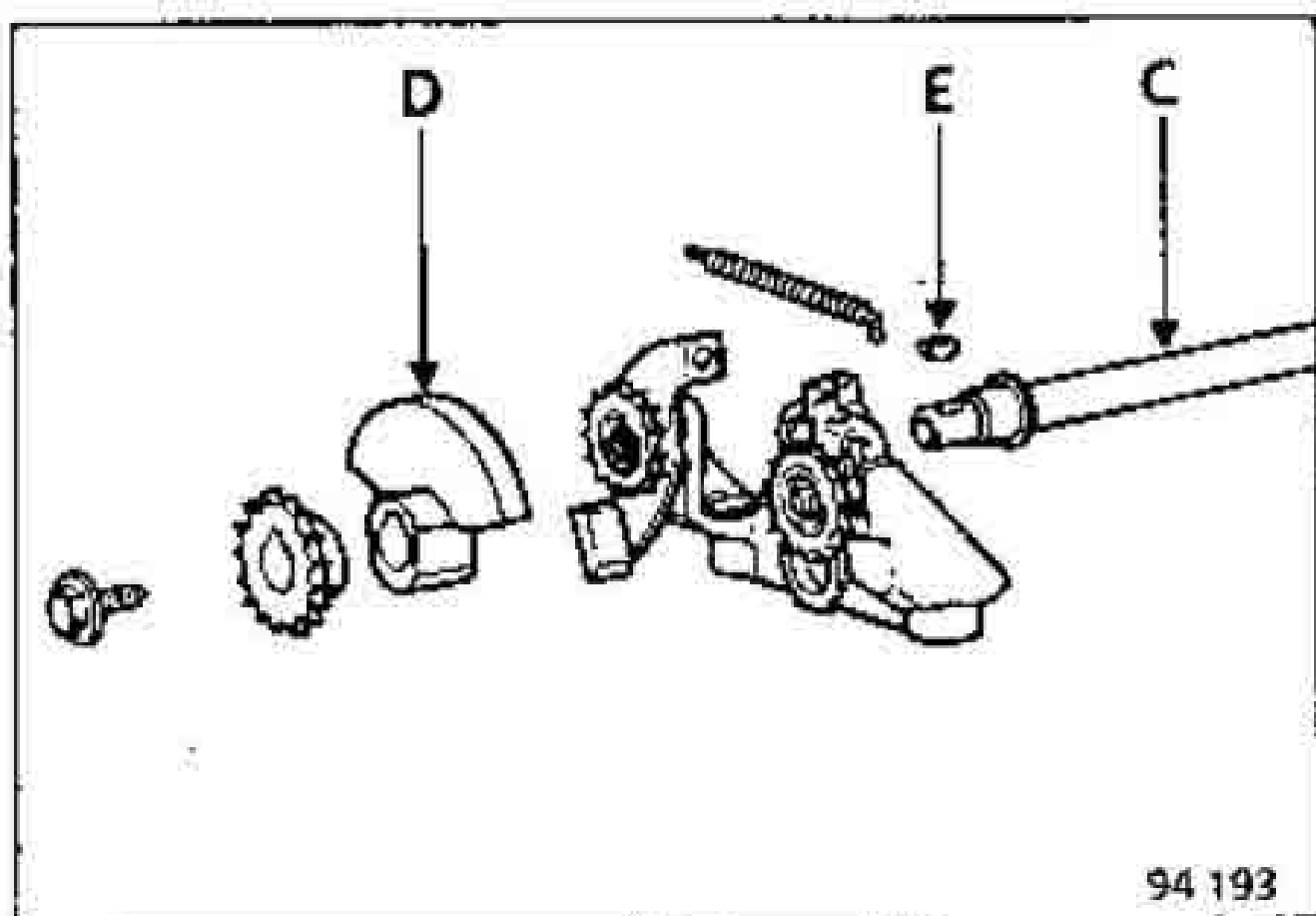
Remove the 4 mounting bolts from the timing cover, and bolts (A) and (B).



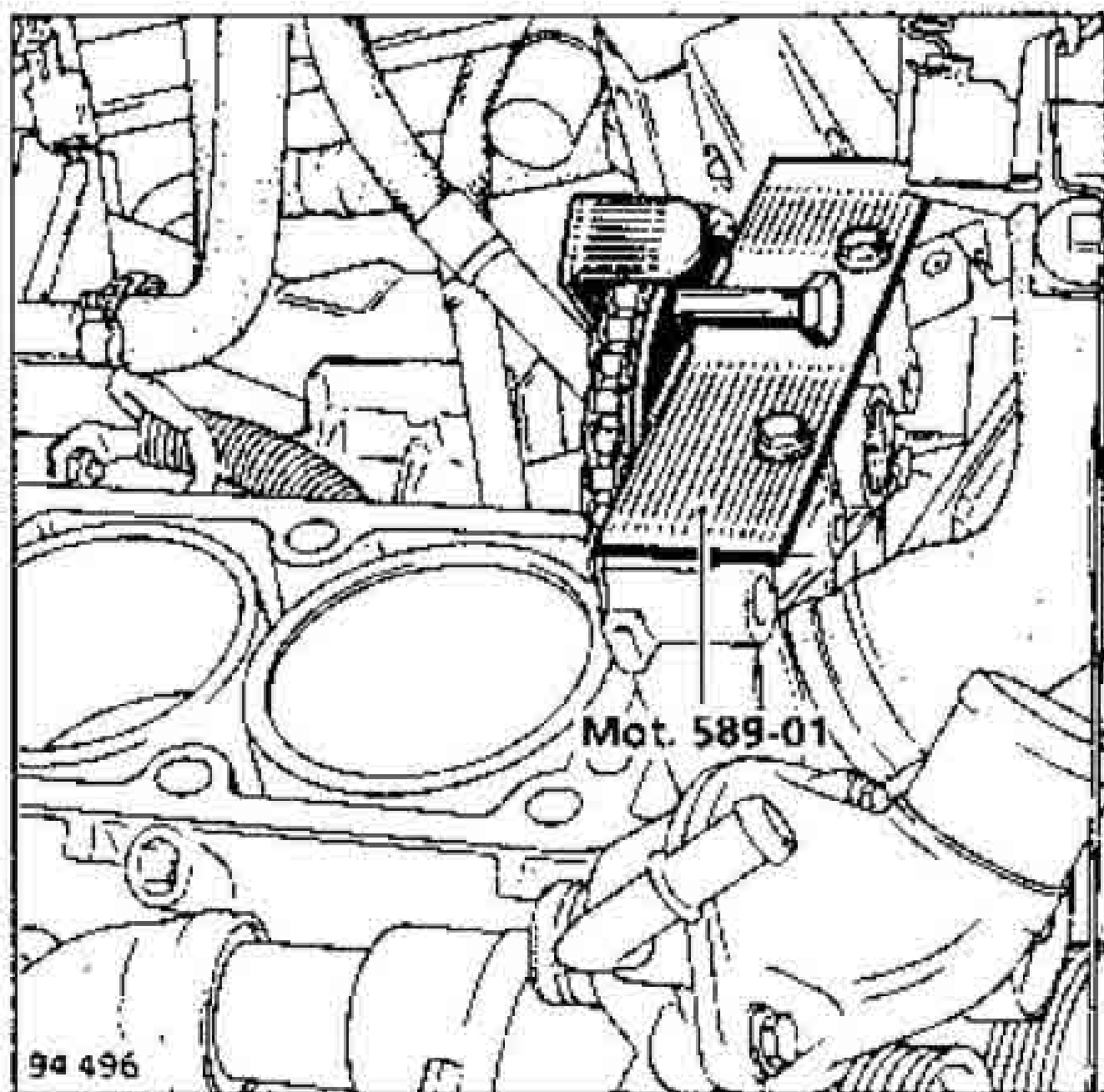
Remove:

- the balance shaft drive chain,
- the balance shaft sprockets.

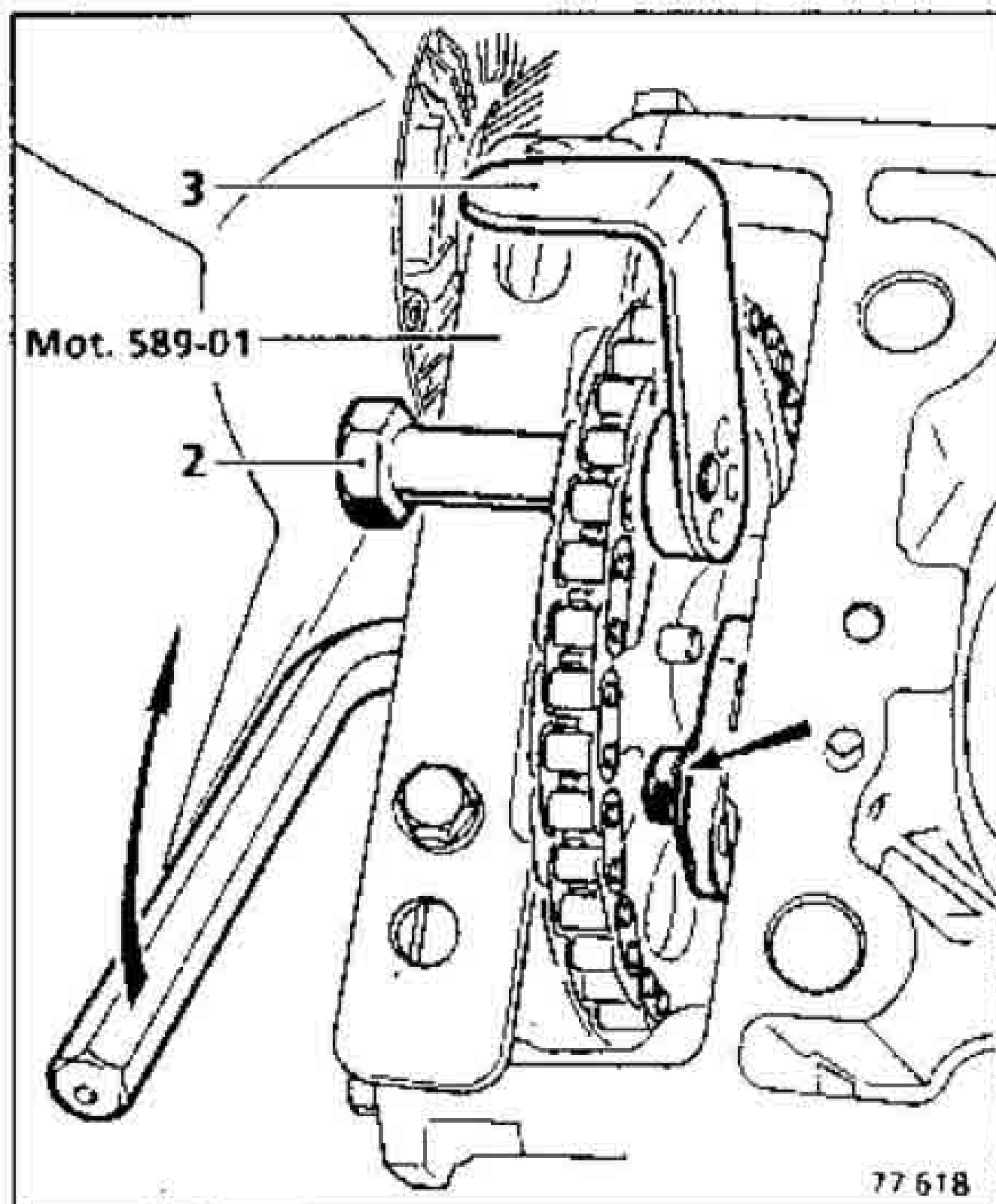
Turn the shaft back (C) to remove the balance weight (D) and key (E).



Fit the support Mot. 589-01 for the camshaft sprocket on the timing cover.



Secure the camshaft gear with bolt (2) and nut (3) through a hole in the sprocket.

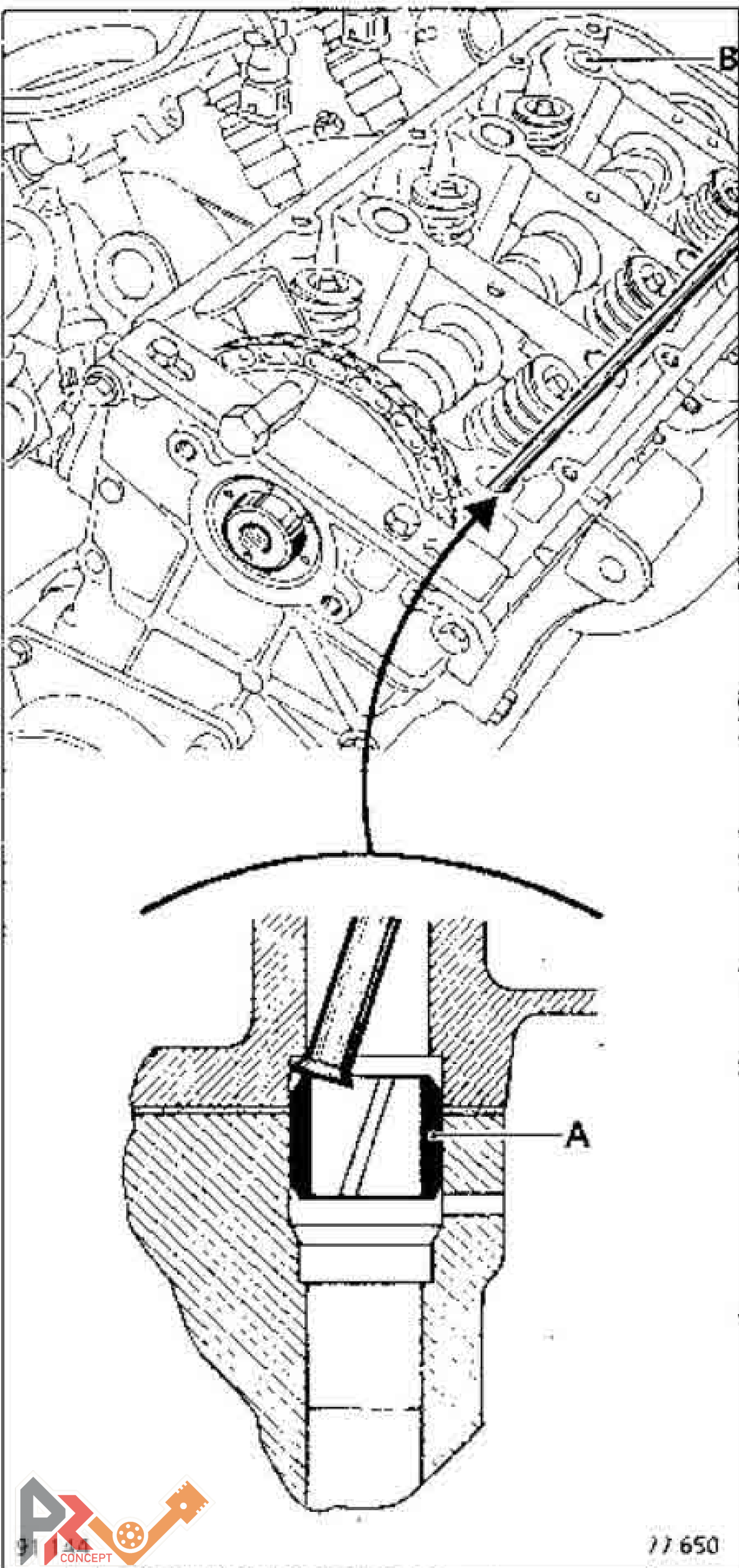


Remove:

- the cylinder head bolts,
- the valve gear.

Unscrew the mounting bolts from the camshaft stop and remove the stop from its fitting, turn the camshaft back.

Press in the centring dowels (A) and (B) using an old rocker stem for example.

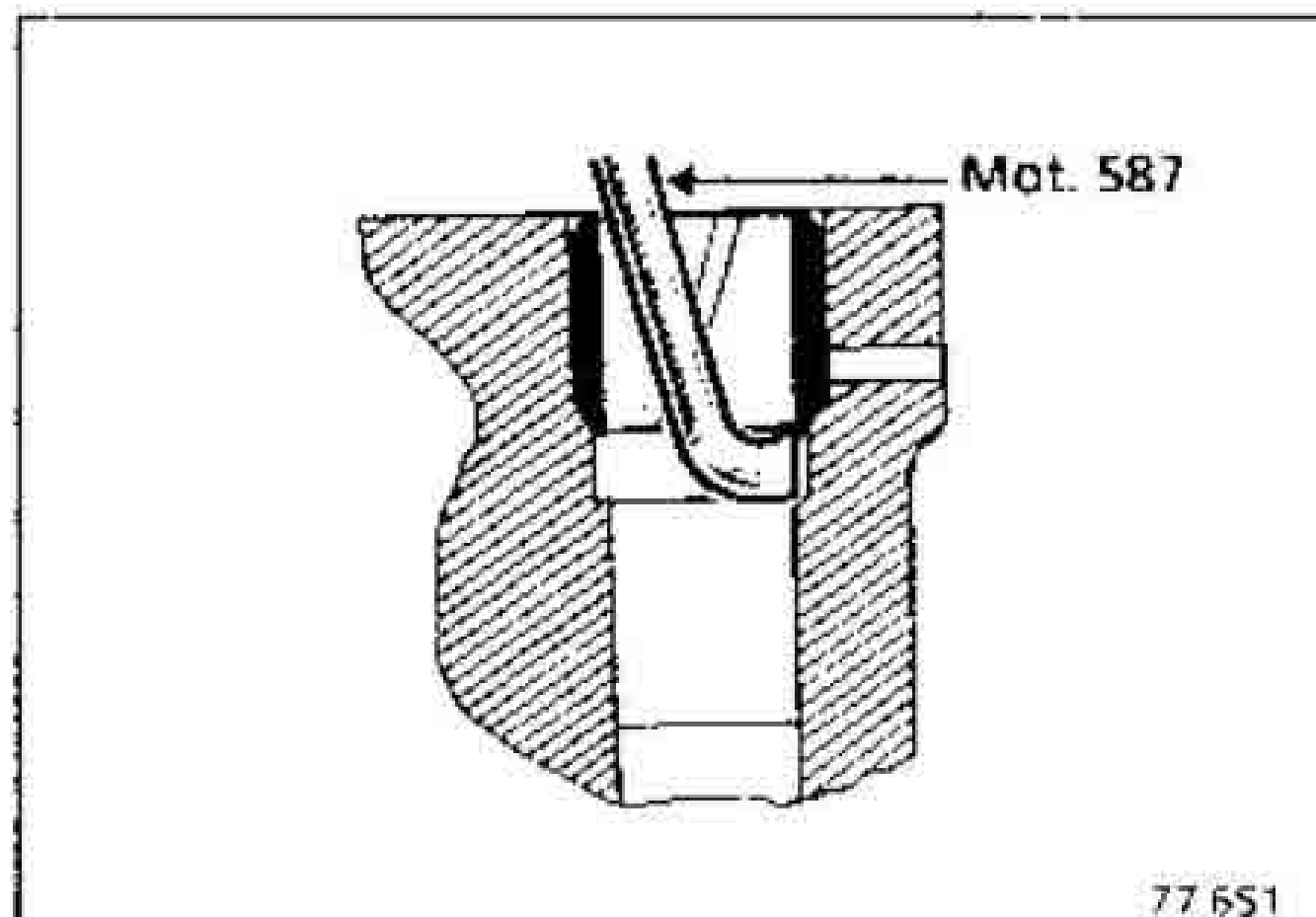


Release the cylinder head and remove it, taking care not to remove the cylinder liners.

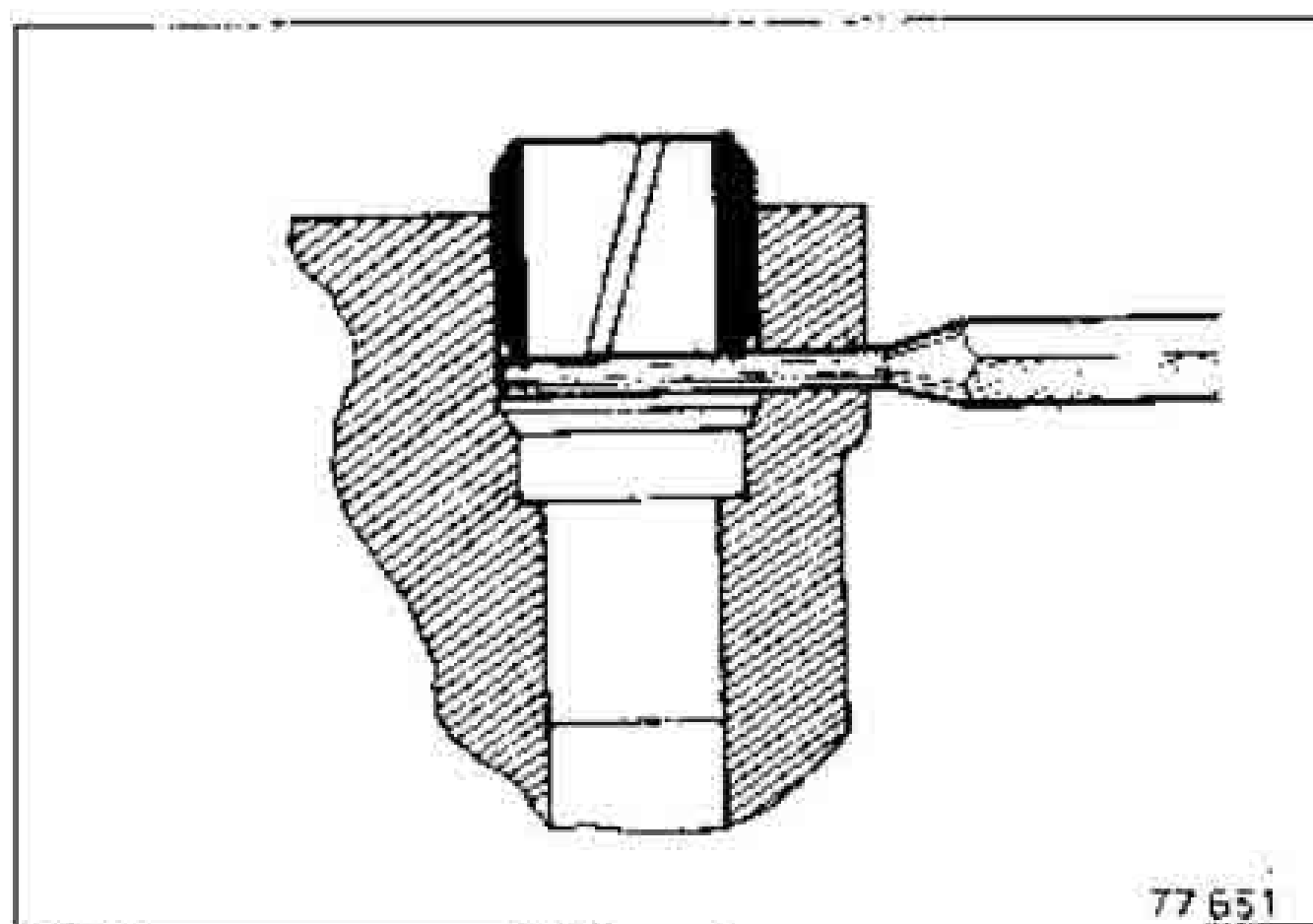
Remove any coolant remaining in the cylinder block using a syringe.

Remove the centring dowels (A) and (B) from the cylinder head using tool Mot. 587.

Remove the cylinder head gasket.



Set the centring dowels at the correct height using a spring pin punch $\varnothing 3$ mm.



Clean the cylinder head gasket surface and the cylinder block sealing surface : use Décapjoint.

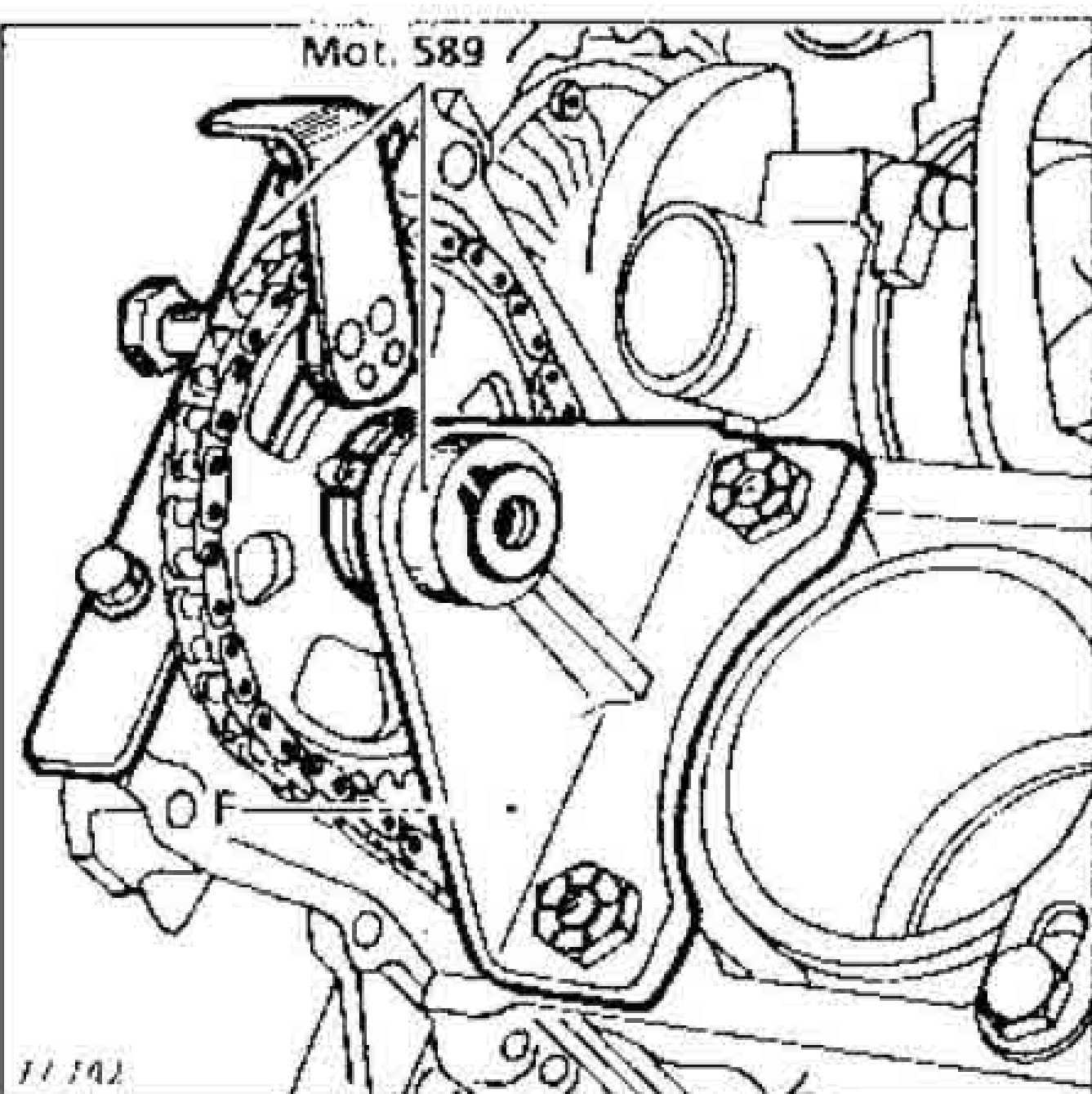
CHECKING THE SEALING FACE IS FLAT

Check that the sealing face is flat using a straight metal bar and a set of feeler gauges.

Maximum deformation 0,05 mm

The cylinder head may not be machined flat.

In order to avoid altering the timing, use a dummy bearing (F) only when the crankshaft must be turned, for example : replacing the "liner - piston" assembly.



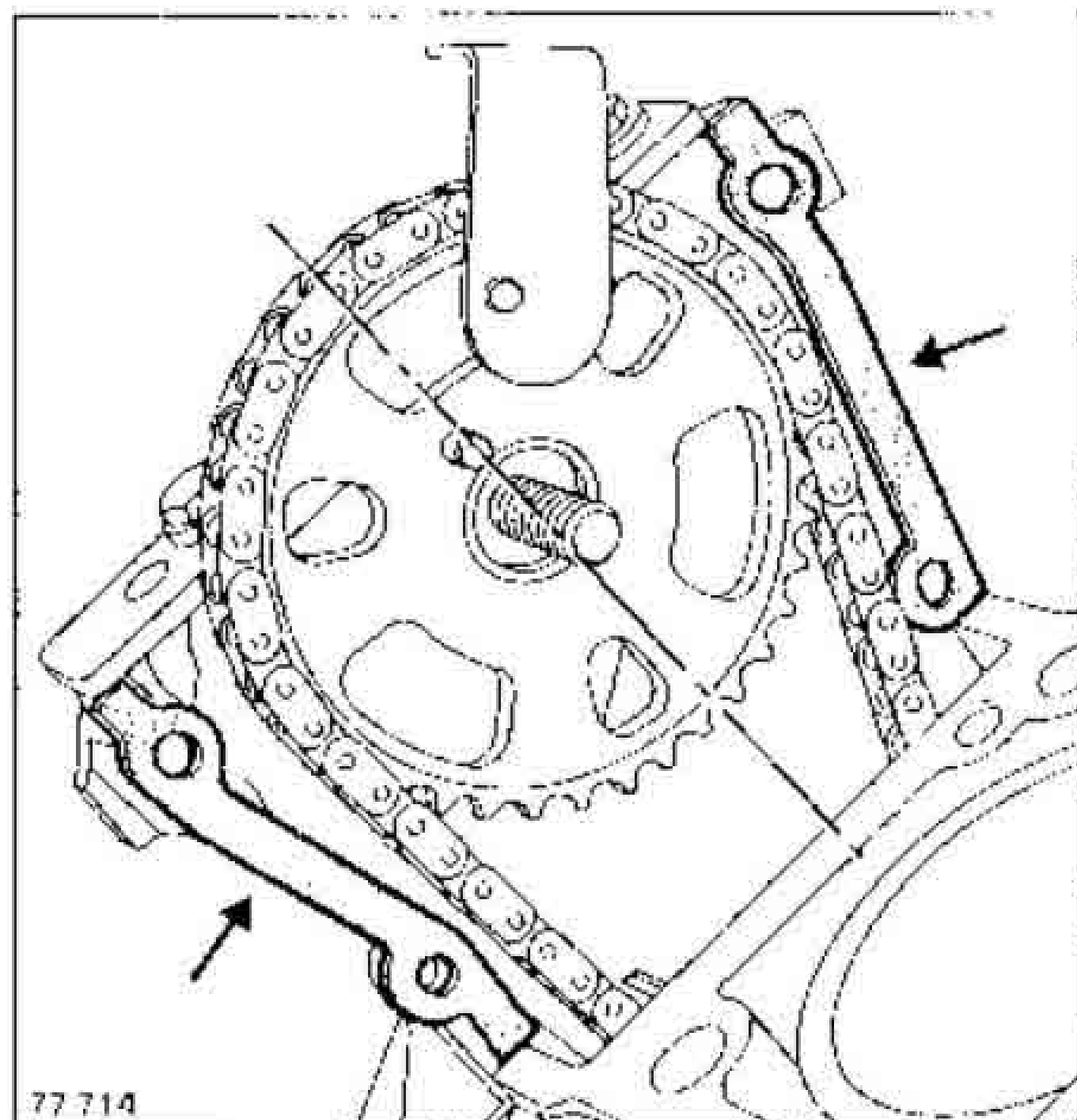
REFITTING

Refitting is the reverse of removal.

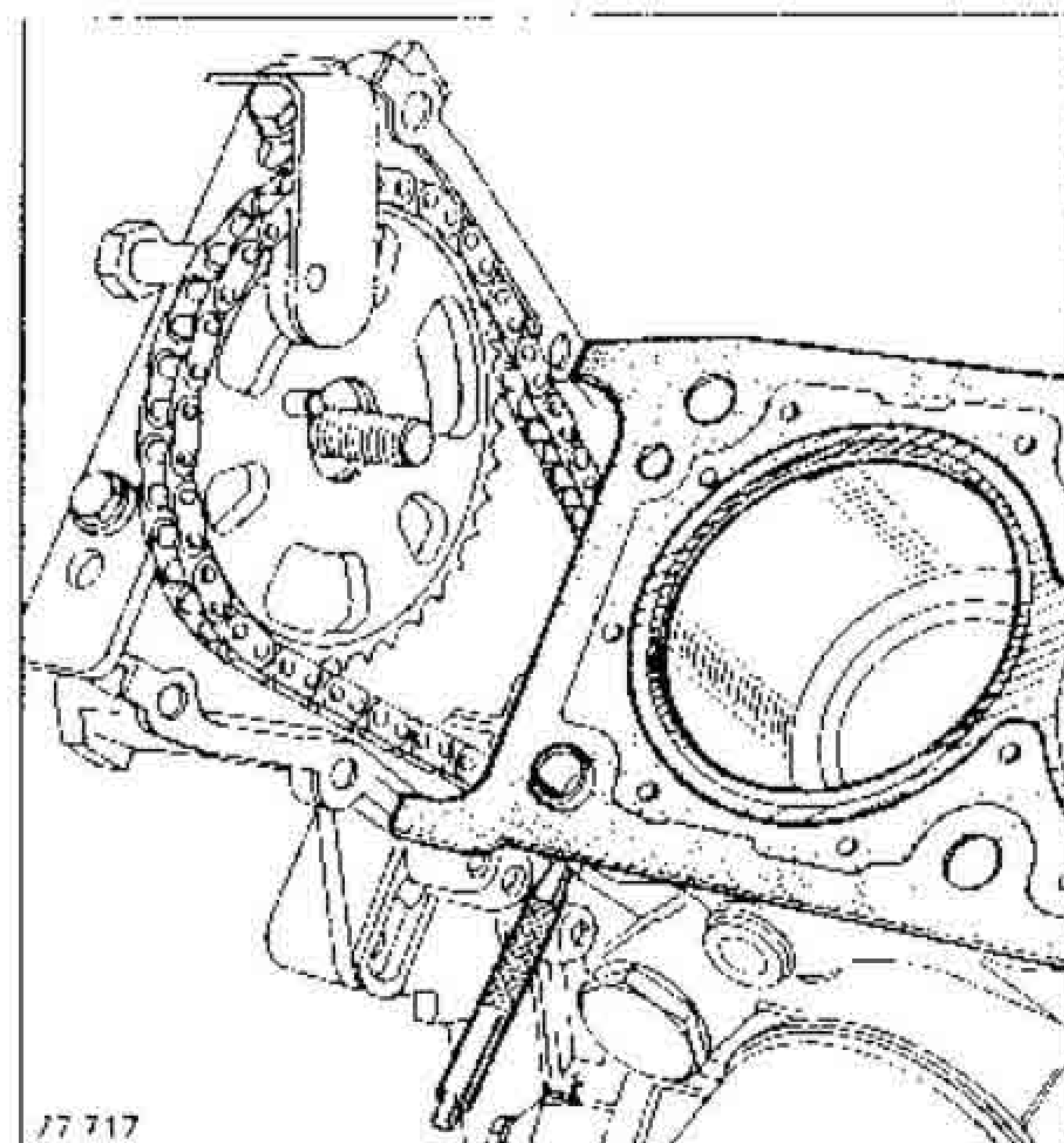
SPECIAL NOTES

SEALING BETWEEN THE CYLINDER HEAD AND THE TIMING COVER

Apply Autojoint AJ66 (77 01 422 751) around the timing cover and cylinder head where they meet.



Insert a rod $\varnothing$ 3 mm (spring pin punch) in each centring dowel hole and press in as far as possible to prevent the centring dowel being pushed down when replacing the cylinder head.



SEALING BETWEEN CYLINDER HEAD AND TIMING COVER

Fit:

- a new cylinder head gasket, dry,
- the cylinder head, taking care to position it correctly.

Insert the timing cover bolts and hand tighten them.

Carefully locate the camshaft in the sprocket, aligning the splines.

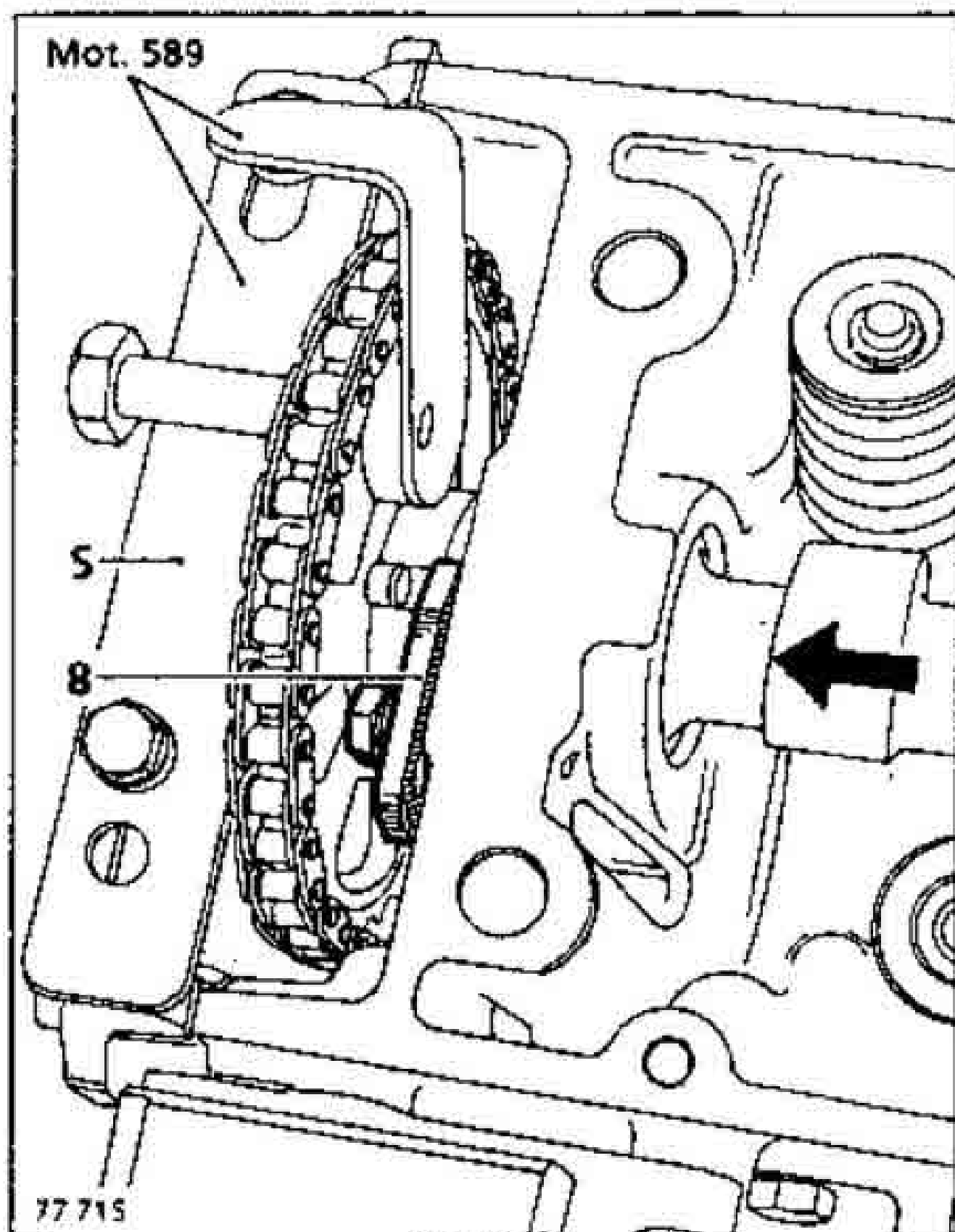
Ensure that the stop (8) is fully down, in order to allow the camshaft flange to pass.

Slightly tighten the sprocket mounting bolt.

Remove the support (5).

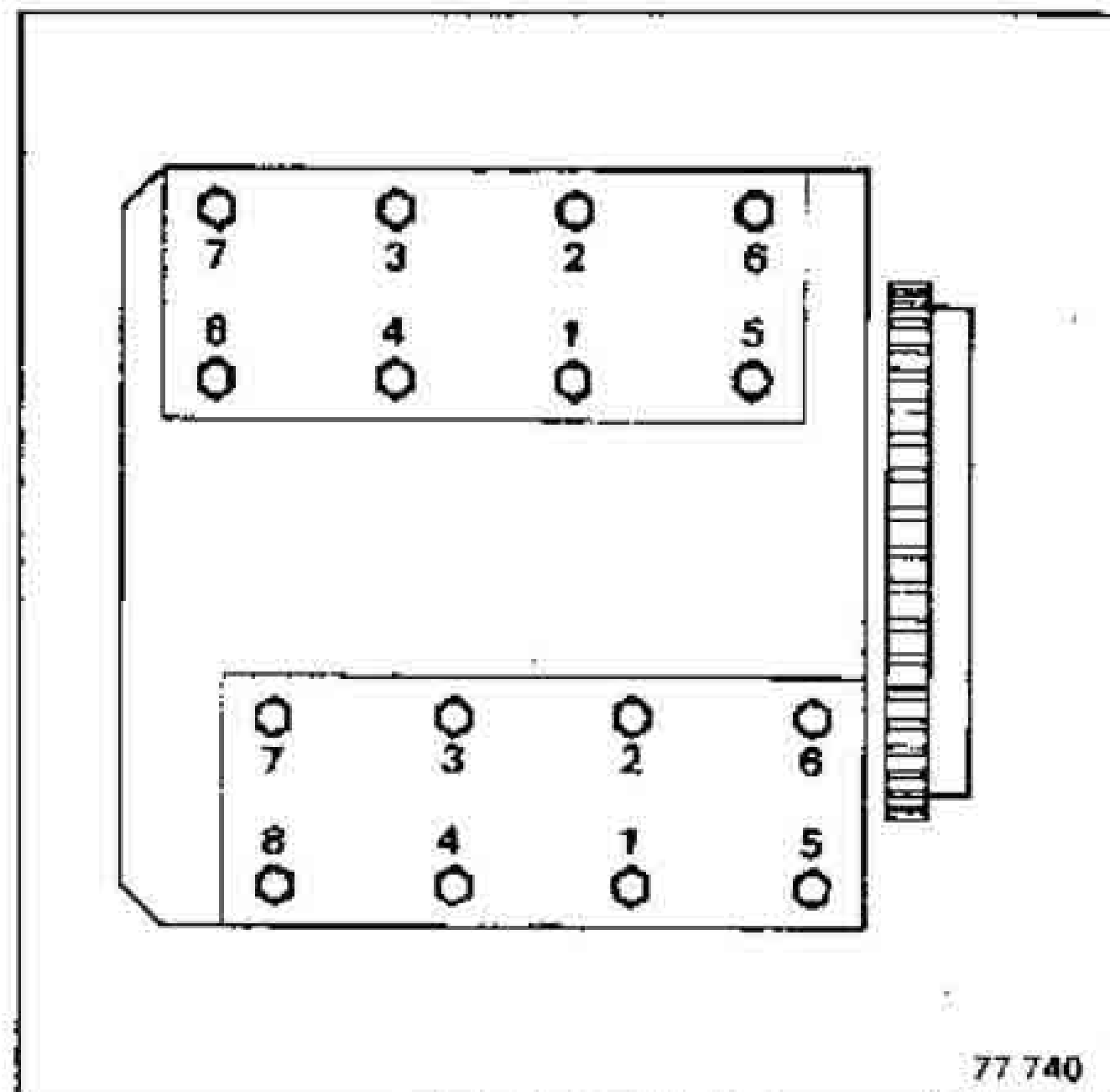
Insert the camshaft stop as far as possible in the location and torque tighten the bolt.

Remove the two rods $\varnothing 3$ mm.



TIGHTENING

Pretighten the bolts to 6 daN.m following the order given to precompress the gaskets.



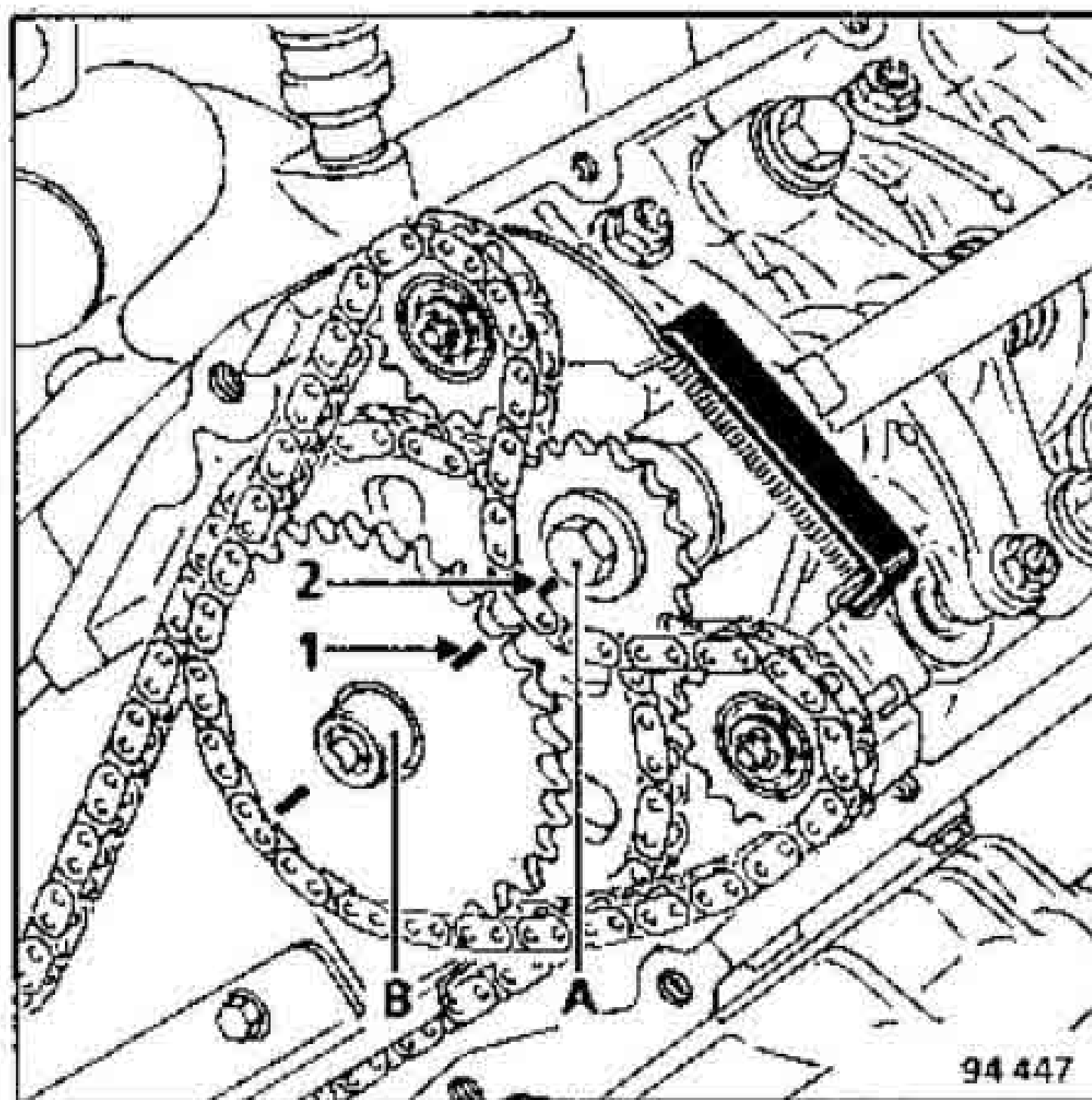
Unscrew all the bolts

Pretighten to 4 daN.m, then tighten all the bolts by and angle of 180°.

ATTENTION : the key may come out of the balancing shaft, so place a cloth in the timing cover.

TIGHTENING

Fit sprocket (A) with its chain then sprocket (B) and align marks (1) and (2) opposite each other.



Apply a drop of Loctite **FRENETANCH** to the two balancing shaft mounting bolts and torque tighten.

Remove tool **Mot. 1209** to fit the balancing shaft chain tensioner.

Refit all the engine accessories.

Run the engine at 2 000 rpm for 15 minutes.

The cylinder head is retightened when cold after the engine has been stopped for a minimum of 6 hours.

Unscrew:

- the 4 timing cover bolts,
- the 2 inlet manifold bolts.

RETIGHTENING

Angle tighten by another 50° for each bolt in the order given (without first unscrewing).

REMOVAL

The engine and gear box must be removed to remove this head gasket.

Refer to the section for Mat. Z.

ADJUSTMENT VALUES AND SPECIFICATIONS

Vehicle	Engine						Gear box	Injection type	Ignition type
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm ³)	Comp Ratio			
BS40	J7R	732	88	82	1995	9,2	PK1 (1)	Multipoint SIEMENS + richness regulation	M.P.A. with pinking sensor

(1) Manual gear box

Engine	Idle speed regulation		Fuel	
	Speed(rpm)	Richness (CO)	Specification	Octane rating
J7R 732	750 ± 50* (not adjustable)	0,5 % max (not adjustable)	Eurosuper lead free	95 (1)

* For a coolant temperature between 80 and 100°C.

(1) Minimum permitted octane rating : 91.

Pump fitted in fuel tank	Voltage: 12 volts Pressure: 3 bars Flow: 80 l/h
Pressure regulator	Pressure: – under zero vacuum : 3 ± 0,2 bars – under 500 mbar vacuum : 2,5 ± 0,2 bars
Bendix DEKA electromagnetic injectors	Voltage: 12 volts Resistance : 14,5 ± 0,5 Ω
Throttle housing	SOLEX : Ø 55 mm ref: 988 (manual gear box)
Throttle position potentiometer	A - Idle speed: XR25 value = 10 to 4/ B - Full load : XR25 value = 190 to 252
Idle speed regulating valve	HITACHI (single winding) Type AESP 207

ADJUSTMENT VALUES AND SPECIFICATIONS

Computer	Bendix no.	Homologation no.	RNUR no.
in the engine compartment	S101 724 102	77 00 853 733	77 00 853 740 (A)

(A) Manual gear box

Air temperature sensor	BENDIX : type CTN
Coolant temperature sensor	BENDIX : type CTN

Oxygen sensor	Type: NGK (heated) at 850°C – Rich mixture : 625 to 1 100 mV – Poor mixture : 0 to 80 mV
Catalytic converter (under floor)	3-way type Marked  C14
Paper cartridge air filter	Replacement : 12,000 miles (20 000 km)
Anti-evaporation system	With canister : Knecht - Tecafiltre - CAN06
Plugs	CHAMPION : S281 YC EYQUEM : C52LJS Gap: 0,9 mm

ADJUSTMENT VALUES AND SPECIFICATIONS

Vehicle	Engine						Gear box	Injection type	Ignition type
	Type	Suffix	Bore (mm)	Travel (mm)	Capacity (cm ³)	Comp. Ratio			
8543	J7T	760	88	89	2165	9,2	PK1 (1)	Multipoint SIEMENS + richness regulation	M.P.A. with pinking sensor

(1) Manual gear box

Engine	Idle speed regulation		Fuel	
	Speed (rpm.)	Richness (CO)	Specification	Octane rating
J7T 760	825 ± 50 * (not adjustable)	0,5 % max (not adjustable)	Eurosuper Lead free	95 (1)

* For a coolant temperature between 80 and 100°C.

(1) Minimum permitted octane rating : 91

Pump fitted in fuel tank	Voltage: 12 volts Pressure: 3 bars Flow: 80 l/h
Pressure regulator	Pressure: - under zero vacuum : 3 ± 0,2 bars - under 500 mbar vacuum : 2,5 ± 0,2 bars
BOSCH electromagnetic injectors	Voltage: 12 volts Resistance : 2,5 ± 0,5 Ω
Throttle housing	PIERBURG: Ø 24/55 mm ref: 7.13.992.00 (manual gear box)
Throttle position potentiometer	A - Idle speed: XR25 value = 64 to 89 B - Full load : XR25 value = 194 to 240
Idle speed regulating valve	HITACHI (single winding) Type AESP 207 (J7T 760)

ADJUSTMENT VALUES AND SPECIFICATIONS

Computer	Siemens no.	Homologation no.	RNUR no
in the engine compartment	S100 720 101	77 00 745 988	77 00 744 416 (A)

(A) Manual gear box

Air temperature sensor	BENDIX : type CTN
Coolant temperature sensor	BENDIX : type CTN

Oxygen sensor	Type: NGK (heated) at 850°C – Rich mixture : 625 to 1 100 mV – Poor mixture : 0 to 80 mV
Catalytic converter (under floor)	3-way type Marked  C19
Paper cartridge air filter	Replacement : 12,000 miles (20 000 km)
Anti-evaporation system	With canister : Knecht - Tecafiltre - CAN06
Plugs	NGK: BCP6ET EYQUEM : FC 62LS3 Gap: 1.2 mm not adjustable

ADJUSTMENT VALUES AND SPECIFICATIONS

Vehicle	Engine						Gear box	Injection type	Ignition type
	Type	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm ³)	Comp. Ratio			
B544	27X	722 723	93	73	2975	9,6	PK1 (1) PK7 (1) AD8 (2)	Multipoint SIEMENS + richness regulation	M.P.A. with pinking sensor

(1) Manual gear box

(2) Automatic transmission

Engine	Idle speed regulation		Fuel	
	Speed(rpm)	Richness (CO)	Specification	Octane rating
27X 722 27X 723	700 ± 50* (not adjustable)	0,5 % max (not adjustable)	Eurosuper lead free	95 (1)

* For a coolant temperature between 80 and 100°C.

(1) Minimum permitted octane rating : 91.

Pump fitted in fuel tank	Voltage: 12 volts Pressure: 3 bars Flow: 80 l/h
Pressure regulator	Pressure: – under zero vacuum : 3 ± 0,2 bars – under 500 mbar vacuum : 2,5 ± 0,2 bars
Bendix DEKA electromagnetic injectors	Voltage: 12 volts Resistance : 14,5 ± 0,5 Ω
Throttle housing	SOLEX : Ø 55 mm ref: 974 (manual gear box) ref: 975 (automatic transmission)
Throttle position potentiometer	A - Idle speed: XR25 value = 10 to 47 B - Full load : XR25 value = 190 to 252
Idle speed regulating valve	HITACHI (single winding) Type AESP 207

ADJUSTMENT VALUES AND SPECIFICATIONS

Computer	Bendix no.	Homologation no.	RNUR no.
in the engine compartment	S101 722 101 S101 722 102 S101 722 201	77 00 851 748 77 00 851 749 77 00 851 750	77 00 860 292 (A) 77 00 860 652 (B) 77 00 851 644 (C)

- (A) Manual gear box (4 x 2)
(B) Manual gear box (4 x 4)
(C) Automatic transmission (AD8)

Air temperature sensor	BENDIX : type CTN
Water temperature sensor	BENDIX : type CTN

Oxygen sensor	Type: NGK (heated) at 850°C – Rich mixture : 625 to 1 100 mV – Poor mixture : 0 to 80 mV
Catalytic converter (under floor)	3-way type Marked  C20
Paper cartridge air filter	Replacement : 12,000 miles (20 000 km)
Anti-evaporation system	With canister : ROCHESTER
Plugs	EYQUEM : RFC 58 LS 3 Gap: 1.2 mm

RICHNESS REGULATION AND THE OXYGEN SENSOR

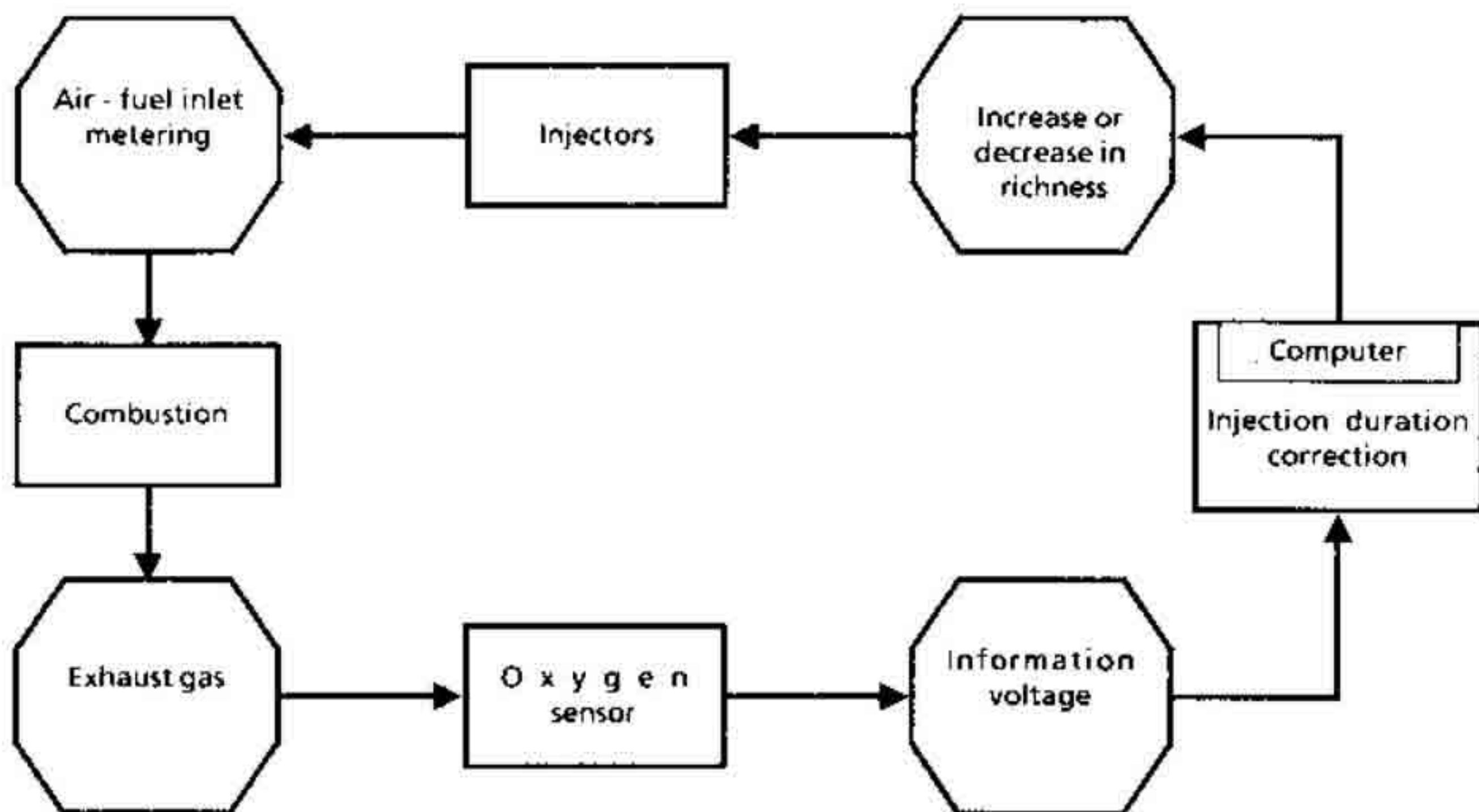
Richness regulation using the oxygen sensor, together with a 3-way catalytic converter, eliminates a high proportion of the three greatest pollutants in exhaust gasses (CO, HC, NOx).

For the catalytic converter to function properly, the richness of the fuel mixture must be correctly metered, to be as near as possible to the richness 1 (that is, close to the stocheometric ratio : 1 g petrol to 14,8 g of air).

The regulation principle is based on continuous measurement of the oxygen content of the exhaust gasses by the oxygen sensor and the richness correction which results from these measurements.

Located in the exhaust downpipe, the oxygen sensor alternately transmits the information that the mixture is rich or weak (depending on richness regulation).

SYNOPSIS OF RICHNESS REGULATION



NOTE:

Richness regulation does not operate under the following conditions :

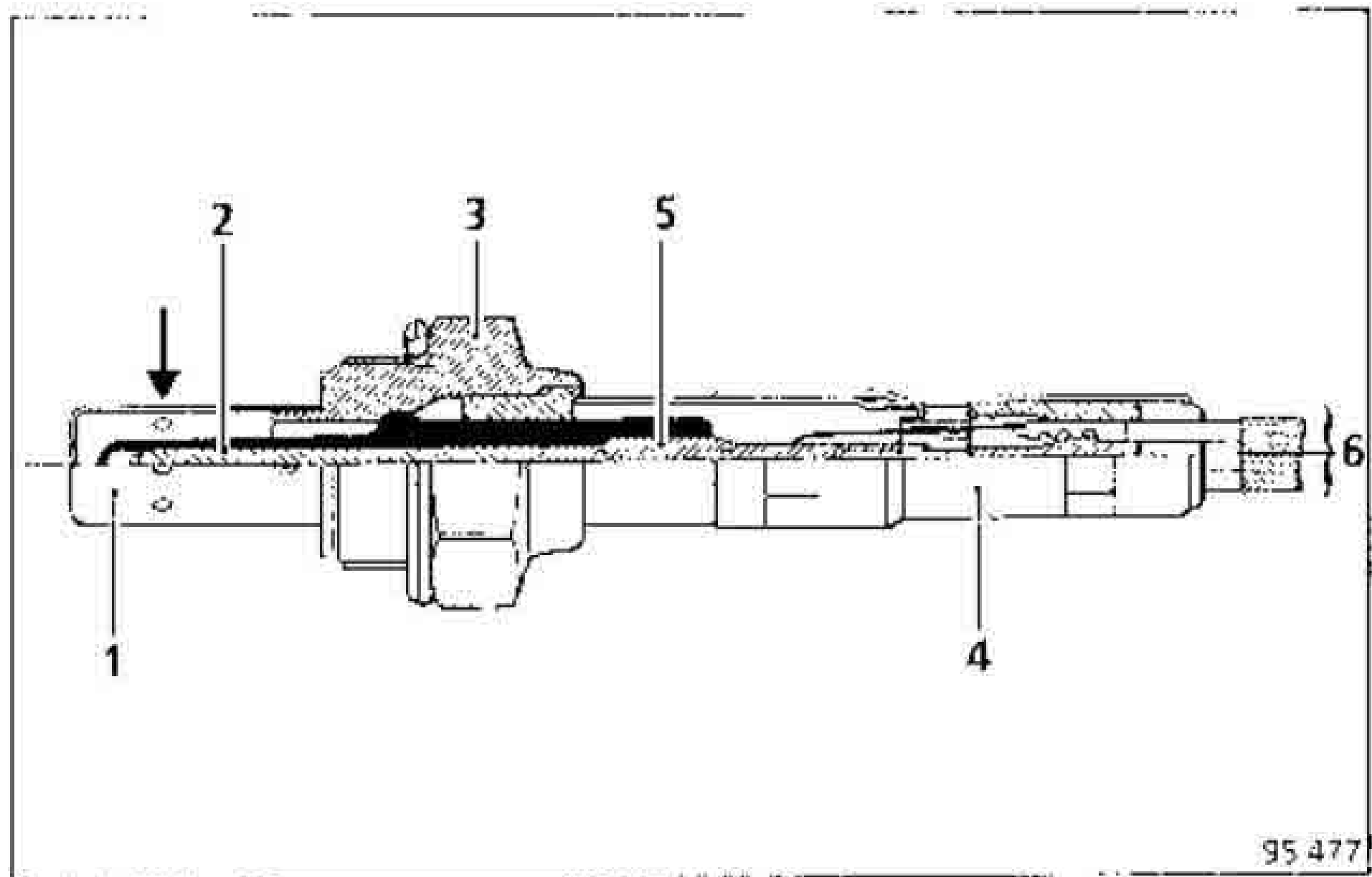
- under full load,
- when the engine is being started (starting delay to ensure the sensor reaches the correct operating temperature),
- if there is an oxygen sensor fault (defect mode).

OXYGEN SENSOR PRINCIPLE (LAMBDA SENSOR)

The operating principle of the oxygen sensor is based on the property of the ceramic of the sensor to conduct oxygen ions (from about 250°C).

If the oxygen content is not the same on both sides of the ceramic, an electrical voltage is established between the two sides.

This voltage, which is a reflection of the exhaust gas oxygen content, is transmitted to the injection computer.



95 477

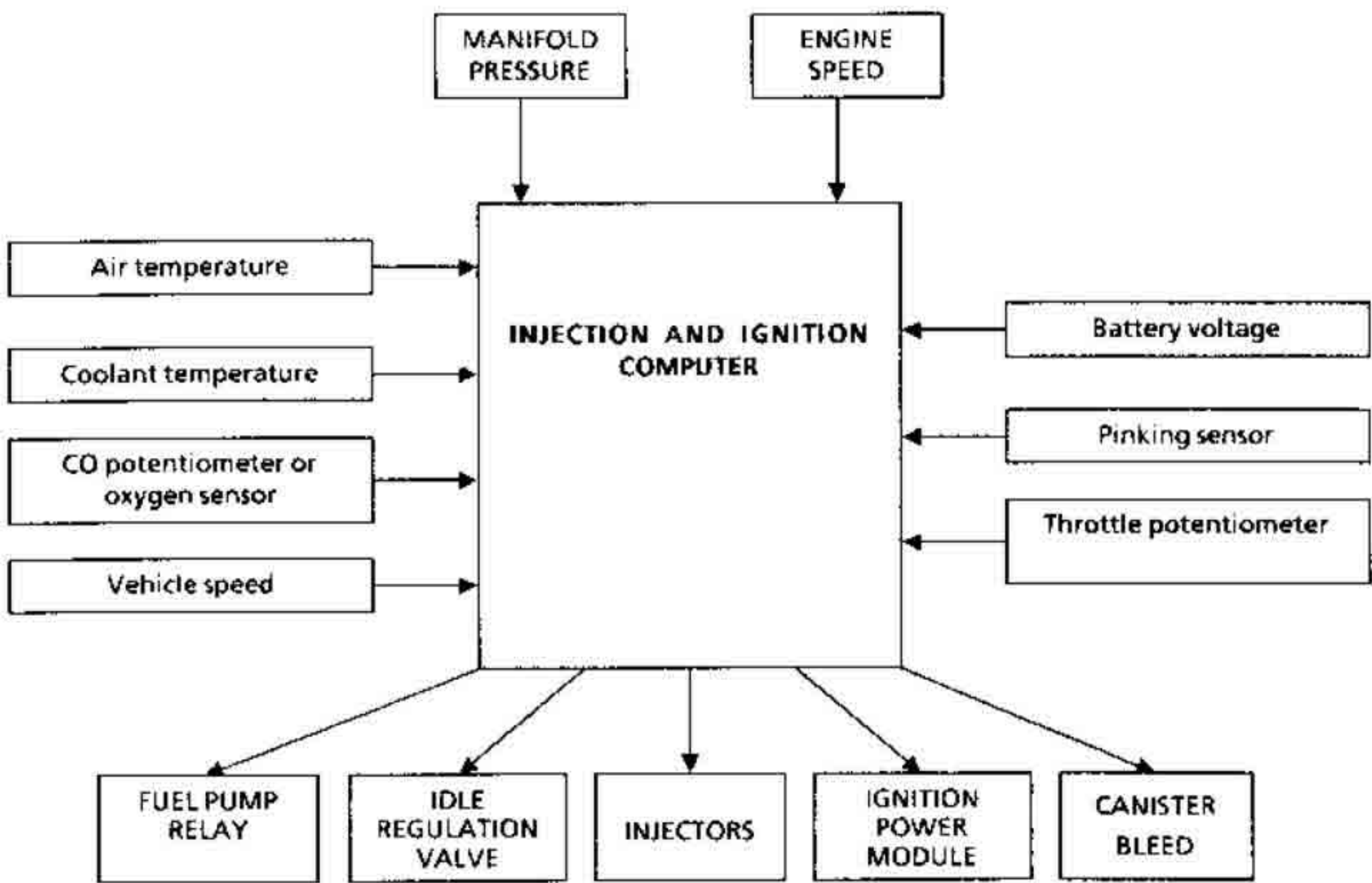
- 1 Protective sleeve
- 2 Ceramic sensor
- 3 Body
- 4 Protective socket
- 5 Heating element
- 6 Electrical connections

→ Exhaust gas flow



The NGK sensor is fitted with electrical heating fed + after ignition. This allows the sensor to operate more quickly after the vehicle has been started

INJECTION "R"



SPECIAL NOTES FOR 12 VALVE ENGINES

AIR INJECTION SYSTEM

The inlet manifold on 12 valve engines has a double air injection system circuit.

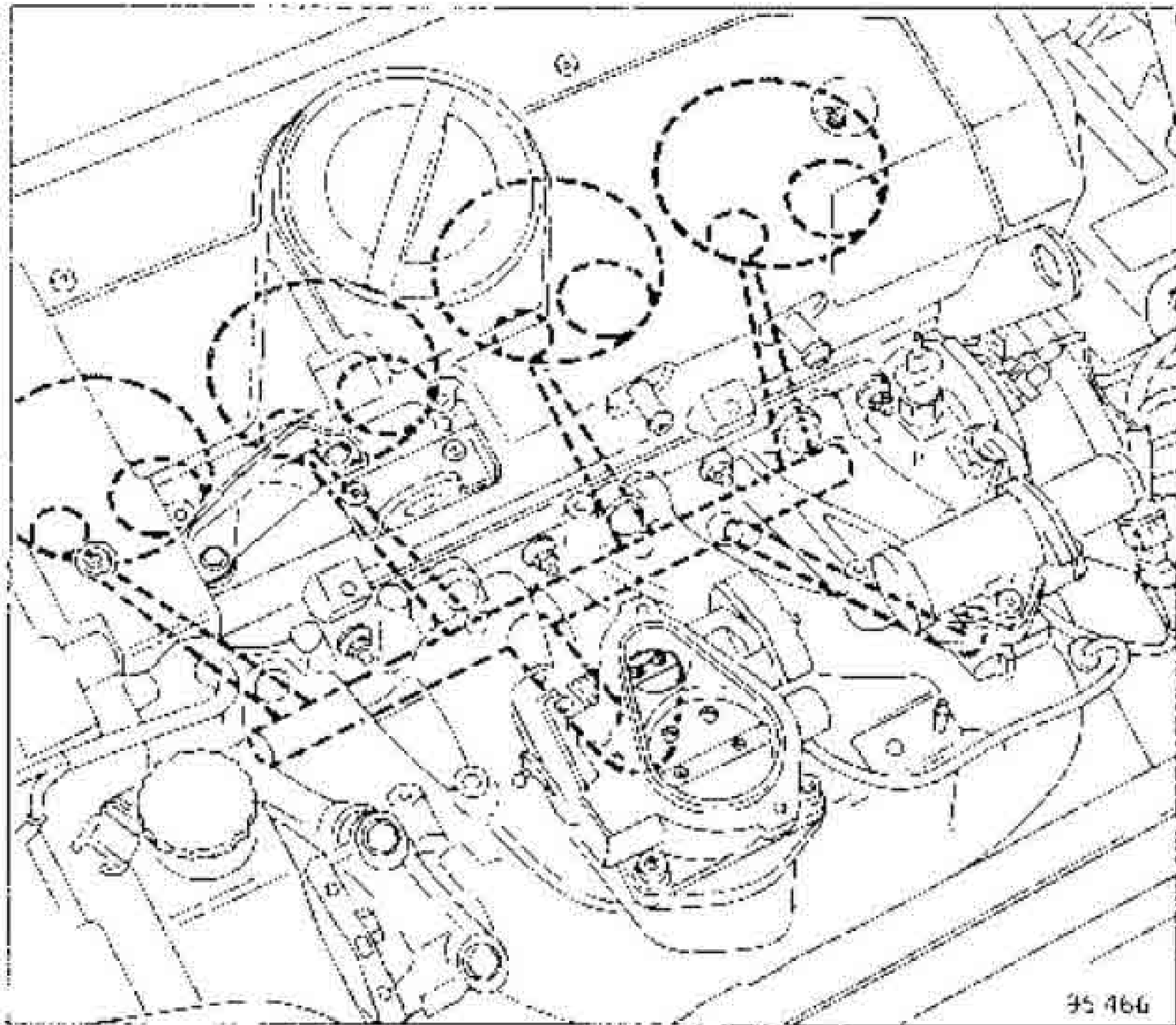
One circuit is used for idle speed and low load :

→ this is the air jet circuit,

The other is used for higher loads :

→ this is the main circuit

Layout of the circuits



The principle of the system uses the inlet vacuum to generate a jet of air at the inlet valve.

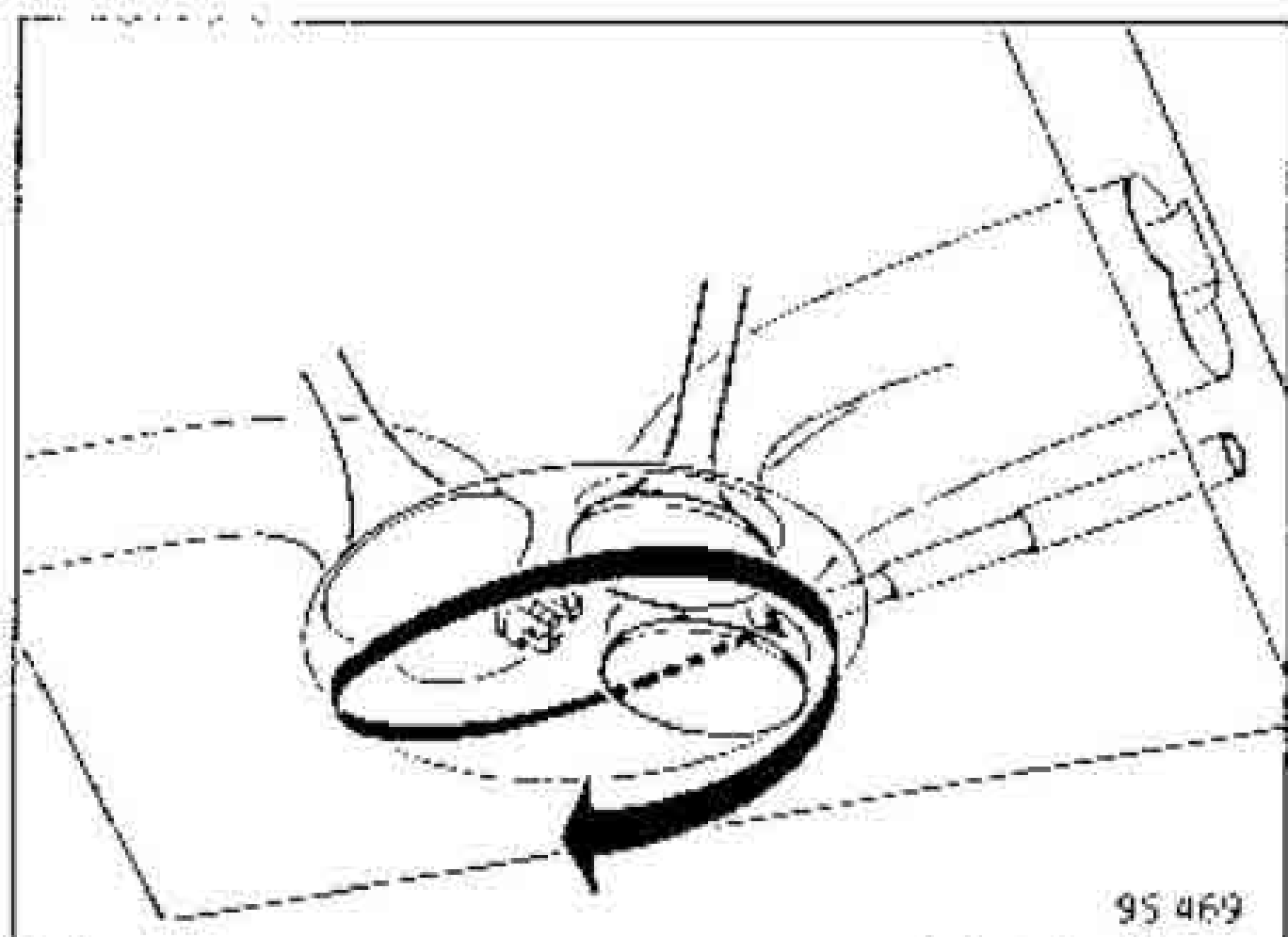
To do this, four secondary circuits, venting immediately upstream of the smallest diameter valve are fitted parallel to the main pipes.

These air jet circuits are fed by a distribution bar into which the throttle housing primary body inlet pipe feeds ($\varnothing$ 24 mm) as well as the idle speed regulation valve.

The effects of the air jet

The air jet creates turbulence in the mixture admitted into the cylinder during the inlet phase

This movement is conserved during the compression phase.



This turbulence improves the fuel mixture homogeneity and also allows combustion speed to be increased.

Air jet operation.

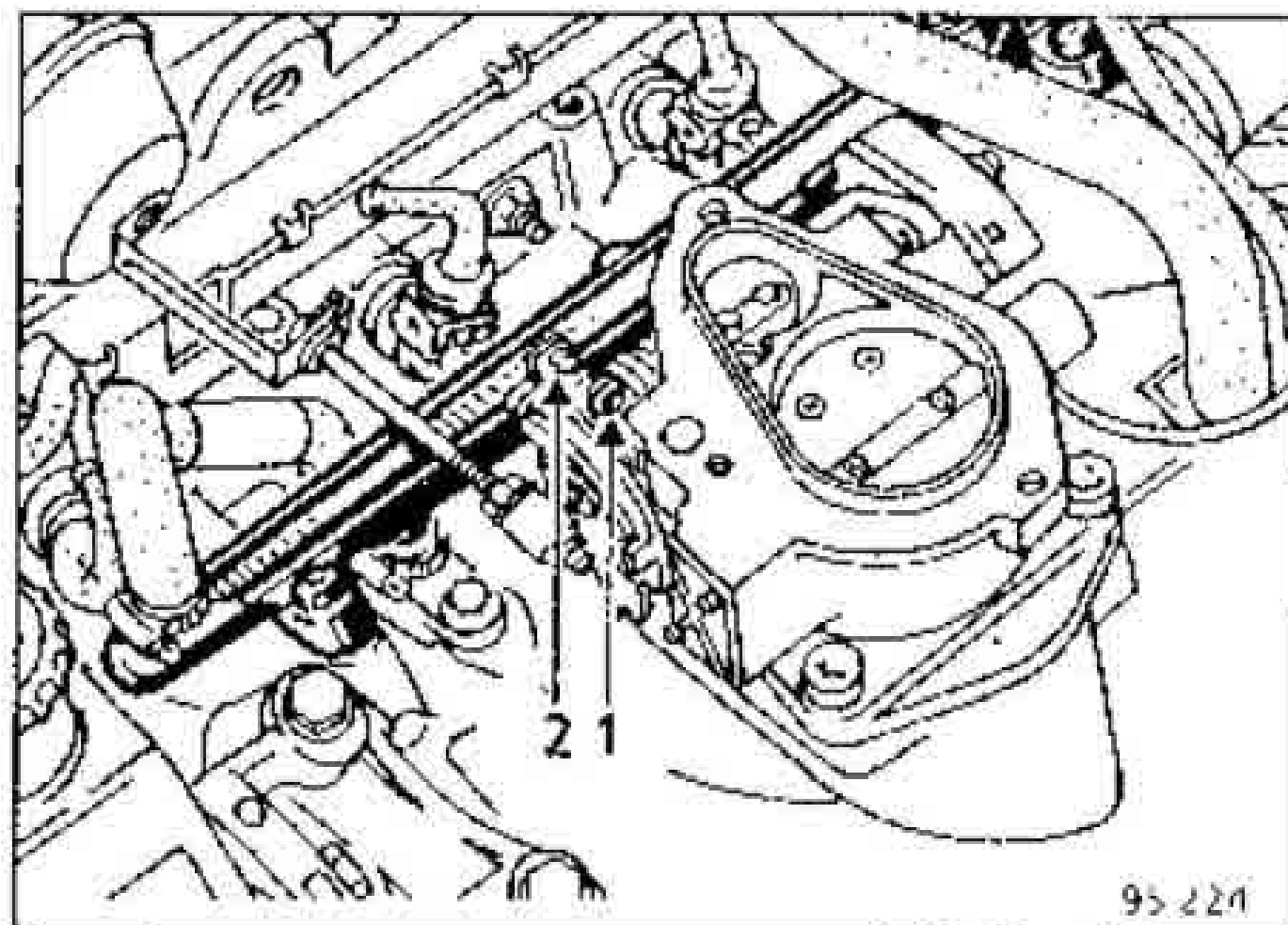
The air jet circuit is used at idle speed when air is injected via the idle speed regulation valve.

For low loads (until the main body opens) the air is injected via the throttle housing main body Ø 24 mm (and also through the idle speed regulation valve).

For higher loads, when the second throttle housing body is open, injection of air is made via the main manifold pipes (the air injection circuit has a maximum flow but is not as effective).

Checking operation of the air injection system.

Engine warm : throttle housing cover removed, no load on accelerator pedal.



Open the throttle until the resistance is met then return it

Re-accelerate until the resistance is met again. (the resistant point is when levers 1 and 2 meet. With the second body butterfly remaining completely closed, hold lever 2 in position by hand).

Under these conditions, the XR25 should show :

- Throttle position :
17 = 95 to 104
- Engine speed :
06 = 2 700 to 3 000 rpm.

If this engine speed is not obtained, the air jet circuit is fouled.

Under these same engine load conditions, a cleaning agent can be sprayed into the manifold through the first throttle housing body (Ø 24 mm)

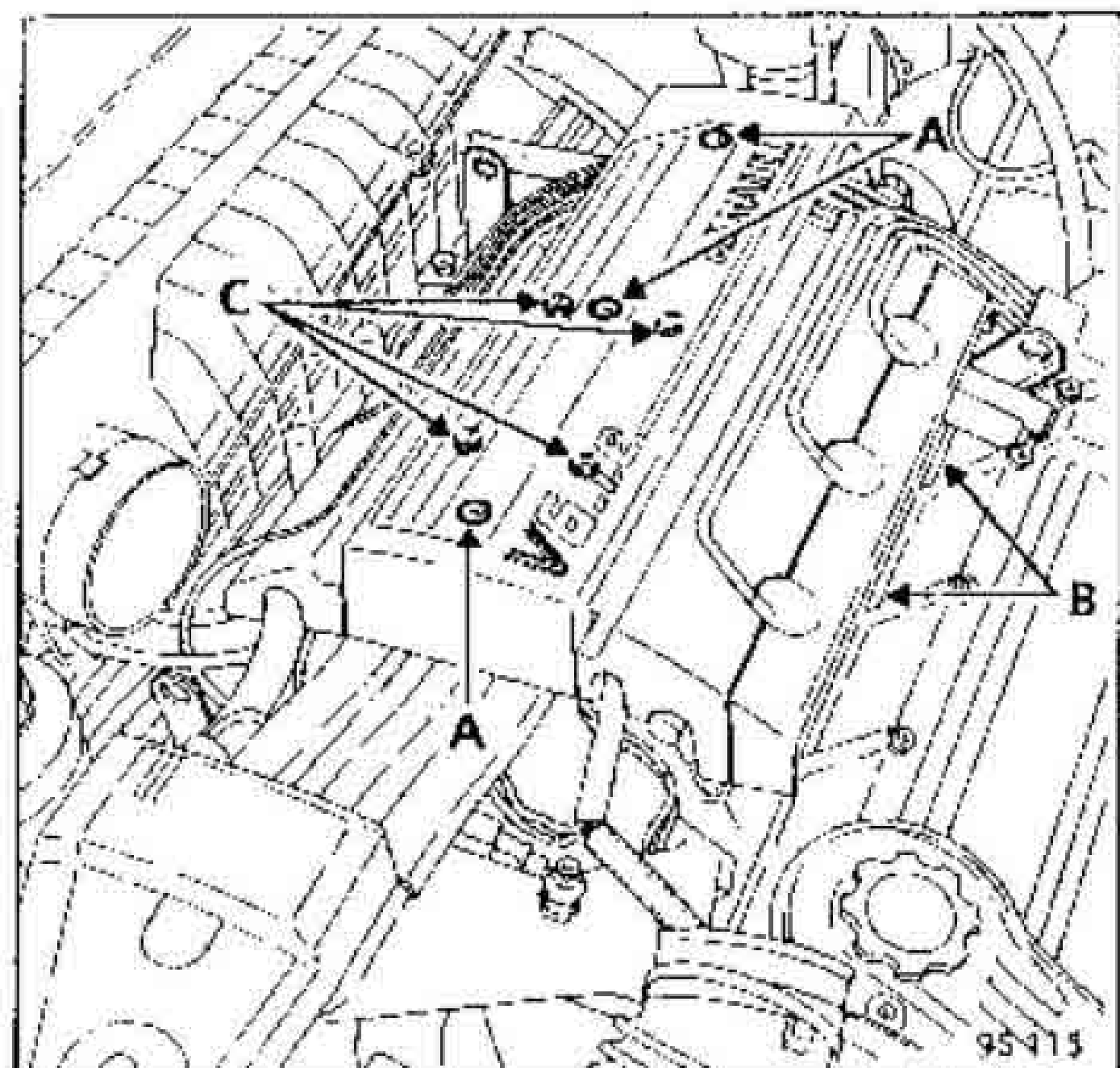
(If this cleaning process is not sufficient, the manifold should be removed and the air jets should be cleaned in the cylinder head.)

IMPORTANT NOTE : the air jets in the cylinder head are conical, venting upstream of the valve with a smaller diameter of 4,5 mm.

REMOVAL

All covers must be removed to work on the throttle housing.

To do this, the three mounting bolts (A) on the upper cover must be removed, then the two side cover bolts (B).

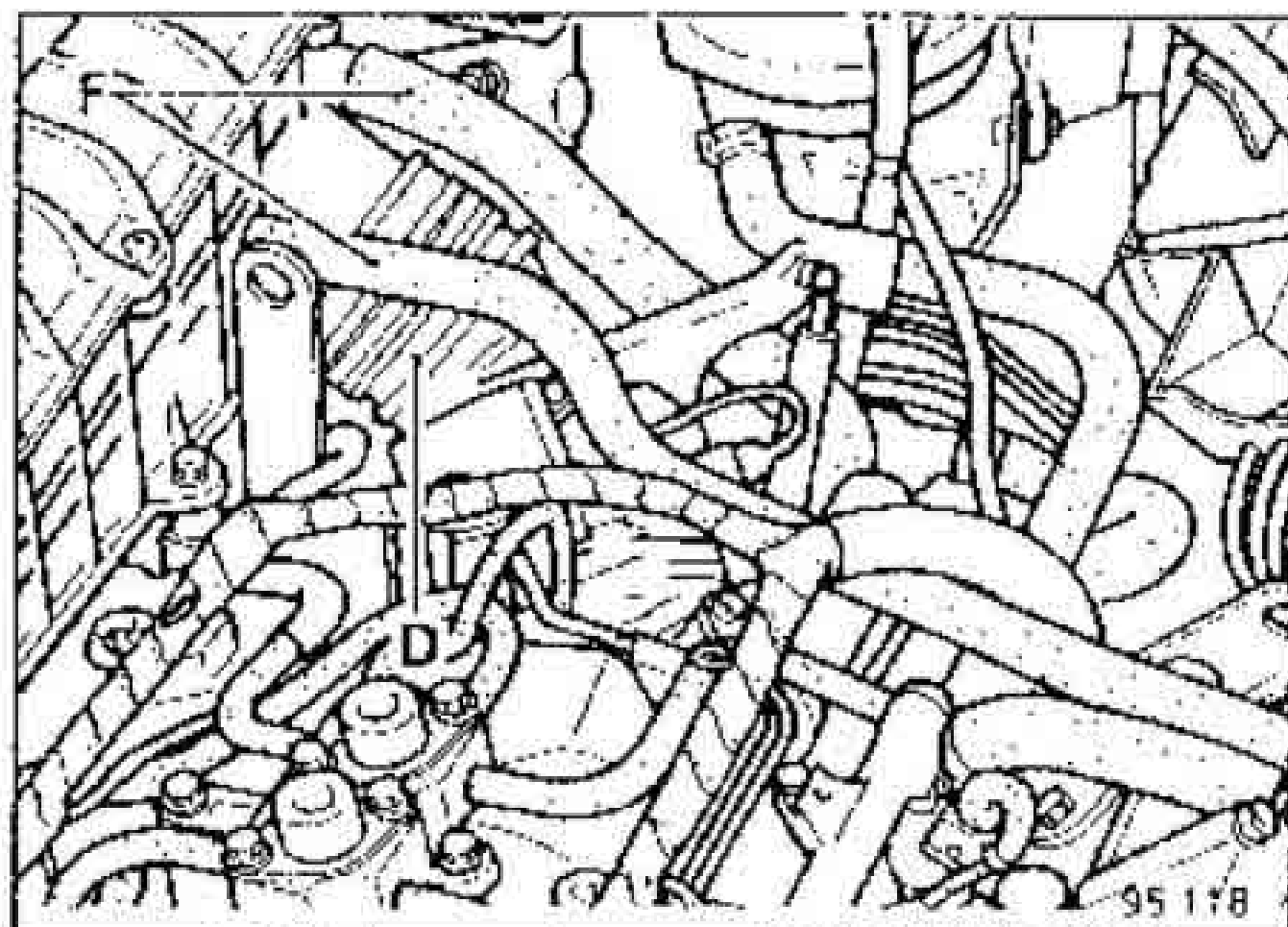


Then remove the four cover nuts (C) from the metal mounting (under the upper cover).

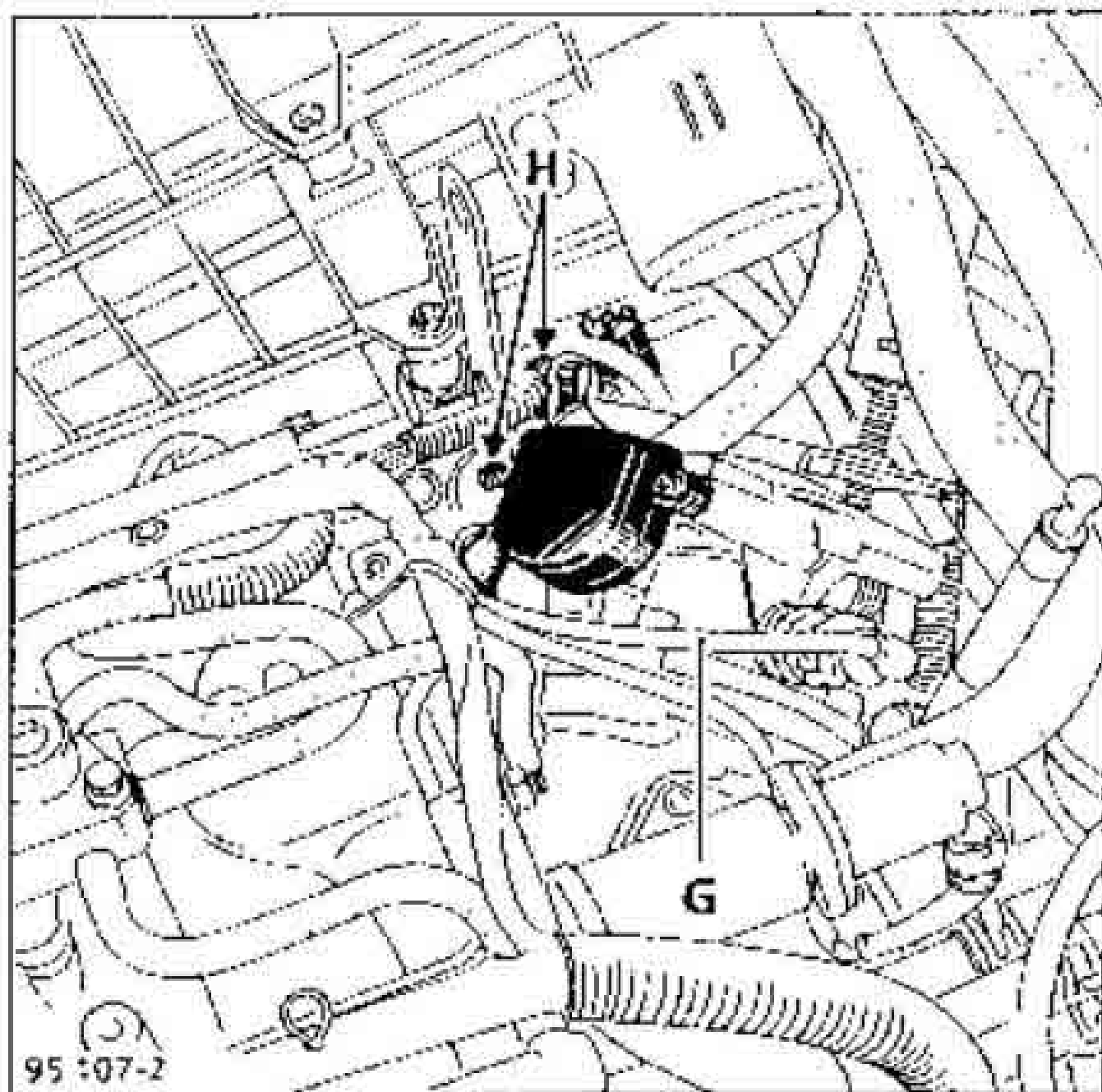
Disconnect the six plugs (the leads may remain in place on the cover).

Remove the assembly via the front left hand side.

Remove the flexible air intake hose to the throttle body (D). To do this, remove the collar on the air filter and the three bolts on the throttle housing (Torx).



Remove the oil vapour rebreathing pipes and the supply pipes to the idle speed regulation valve (F).



Disconnect the air temperature sensor (G).

Remove the wiring retaining bolt (H) and disconnect the throttle potentiometer connector.

Disconnect the accelerator cable, the spring, the speed regulator ball joint (if fitted).

Remove the three throttle housing mounting bolts on the intermediate manifold.

REFITTING

Check the sealing face of the throttle housing and ensure the seal is correct.

Ensure the connectors are correctly clipped in, and that the rebreathing pipes are in good condition.

Ensure the plug leads are correctly clipped onto the plugs.

J ENGINES, 8 and 12 valve

REMOVAL - REFITTING

Put the vehicle on a lift.

Disconnect the battery.

Remove:

- the air filter cover on the throttle housing,
- the speed regulator bellows (if fitted),
- the accelerator cable on the throttle housing

Disconnect:

- the 4 injectors,
- the throttle position potentiometer,
- the idle speed regulation valve.

Disconnect:

- the oil vapour rebreathing pipes,
- the air supply pipe to the idle speed regulation valve.

THEN:

8 valve engine

Disconnect:

- the vacuum pipe to the master vac,
- the pneumatic pipe to the fuel pressure regulator,
- the injection bar fuel inlet and return pipes

Remove the injection bar

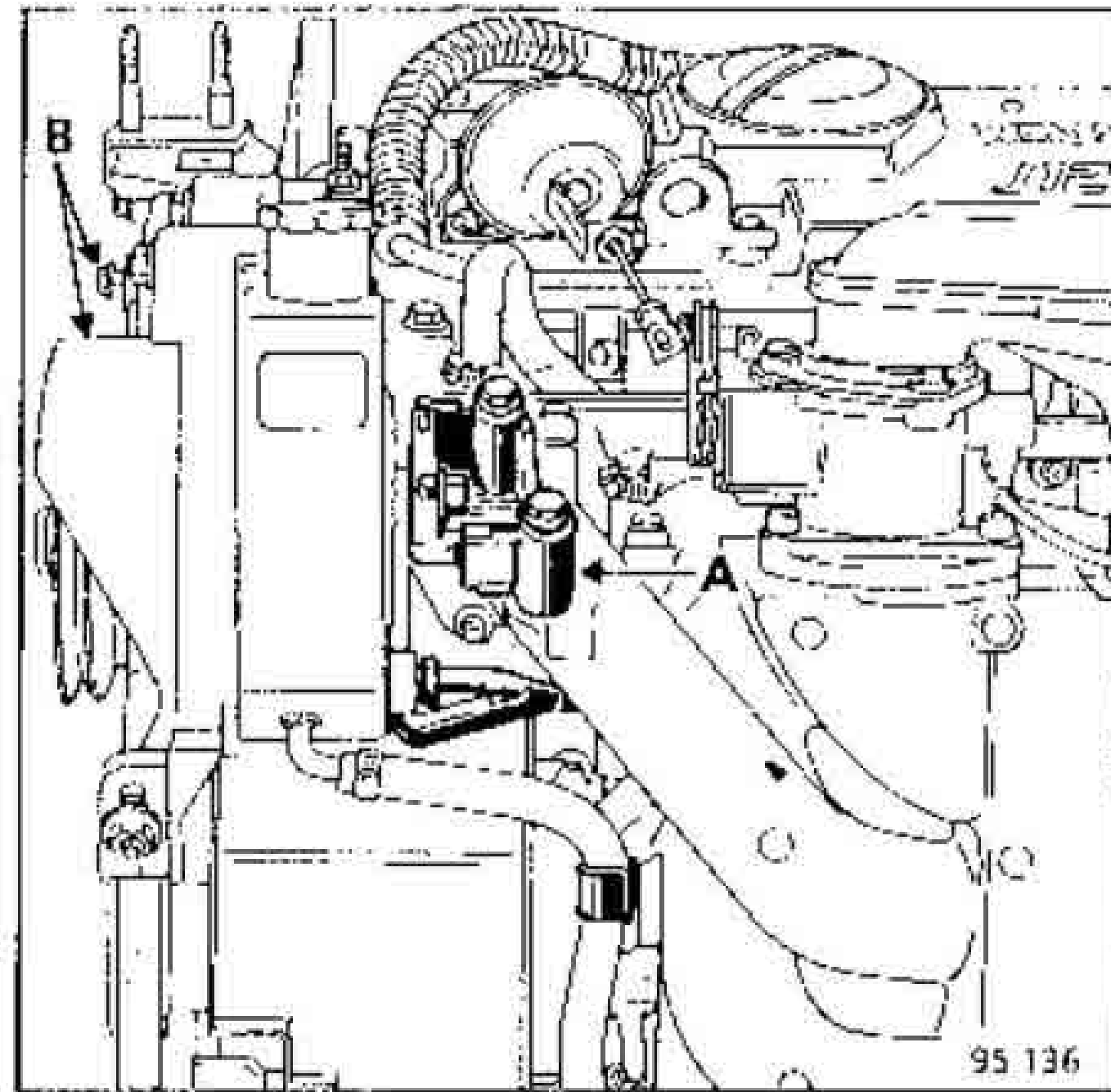
12 valve engine

Remove the plastic cover on the left hand side of the cylinder head in order to release the injector wiring.

REMOVING THE MANIFOLD

Remove:

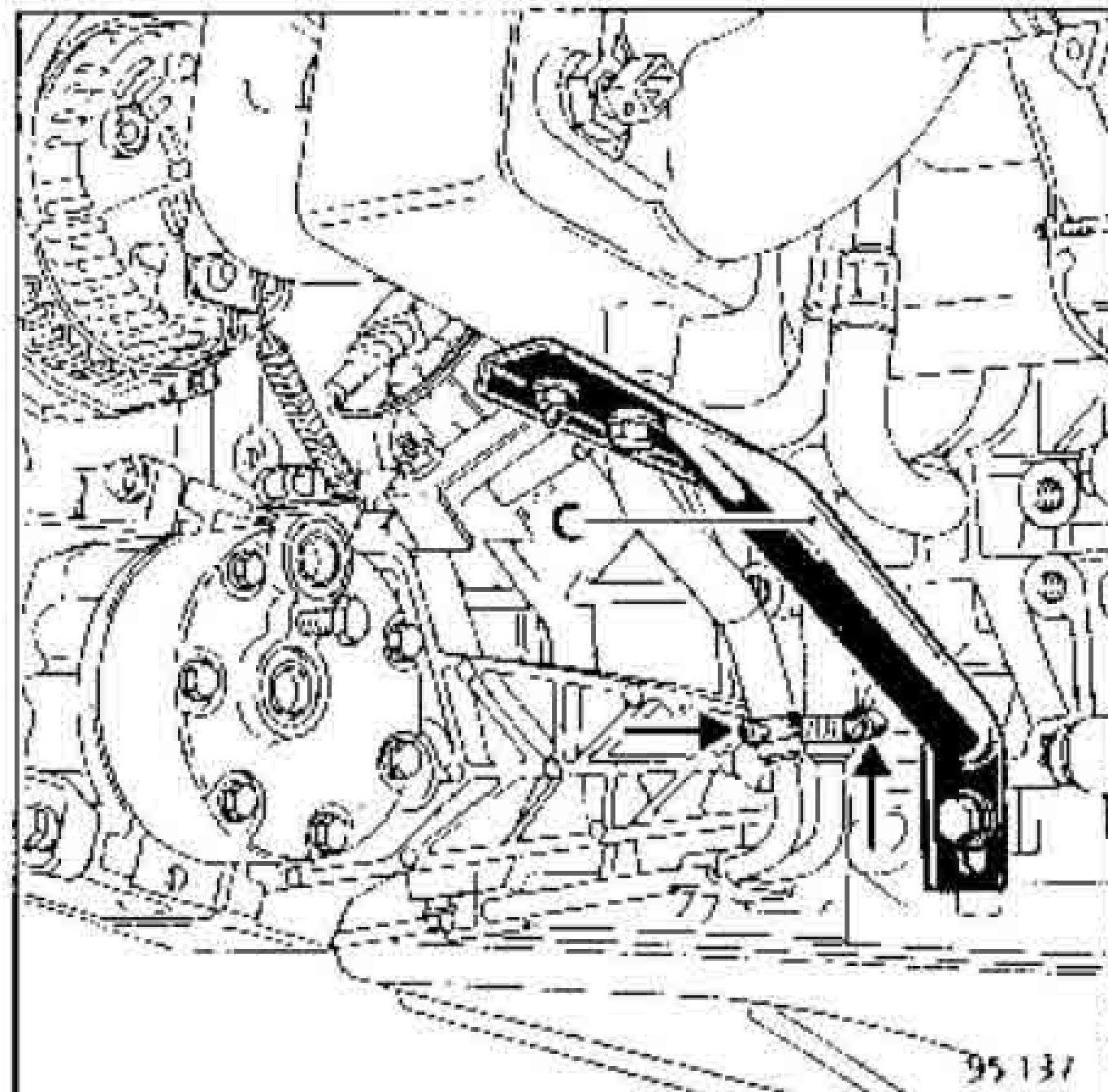
- the rear mounting for the power assisted steering pump (A),
- the inlet manifold - right hand engine mounting connection (B),



- the inlet manifold mounting nuts (from below)

Lift the vehicle and remove :

- the engine undertray,
- the inlet manifold support mounting (C)



8 valve engines

Remove the petrol pipe retaining bolts on the manifold.

12 valve engines

Fit clamps Mot. 453-01 on the petrol pipes (D) .

Disconnect:

- the pipes,
- the air temperature sensor.

Remove the inlet manifold retaining bolts (from below).

Lower the vehicle

12 valve engines

Unscrew the coolant temperature indicator sensor in order to remove the inlet manifold.

When the manifold is removed, the throttle housing and the idle speed regulation valve can be removed

REFITTING

Proceed as for the reverse of removal, ensuring that the collars and pneumatic pipes are in good condition and that all wiring connectors are correctly clipped in.

12 valve engines

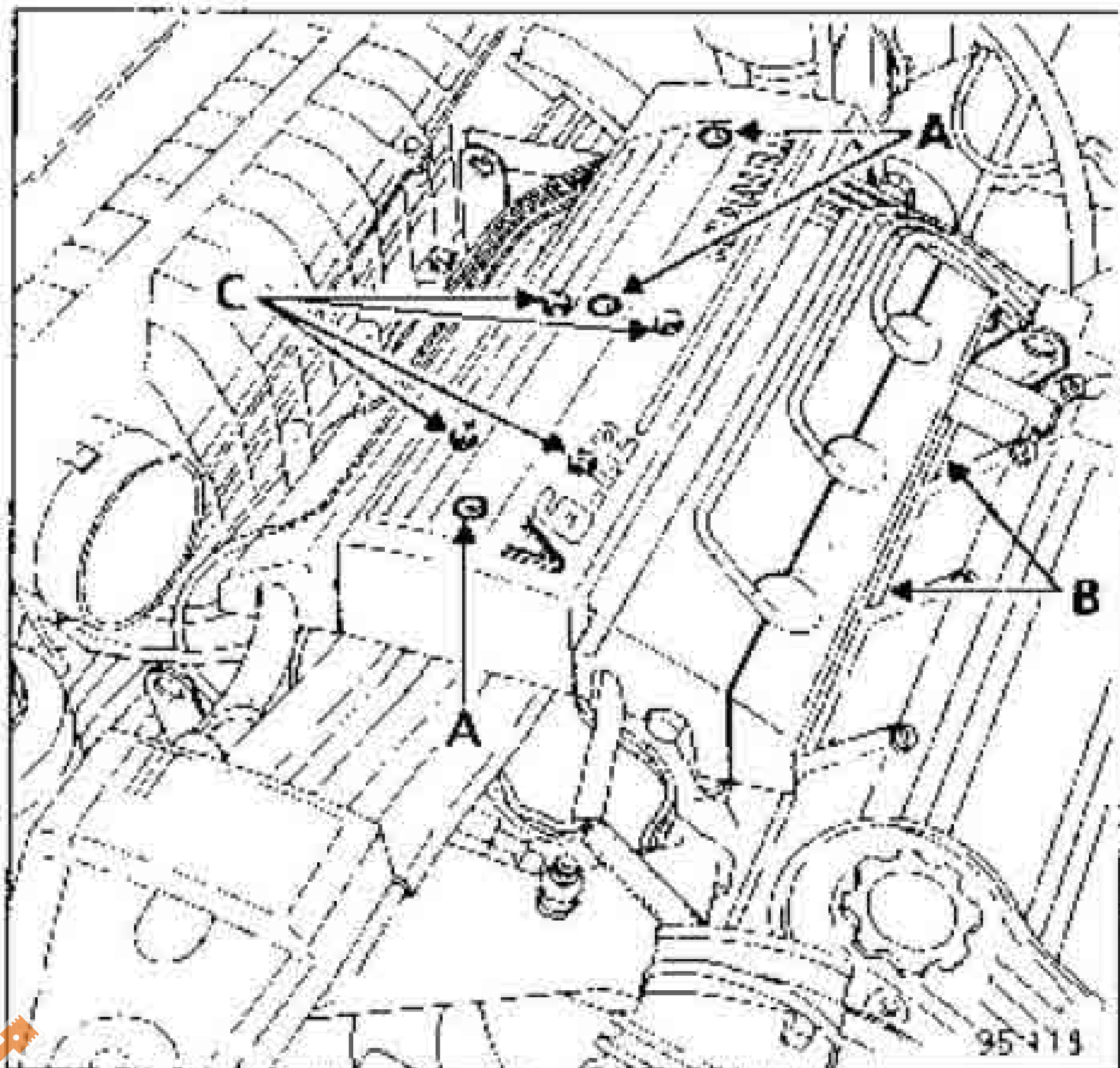
After refitting the temperature sensor, top up the coolant level.

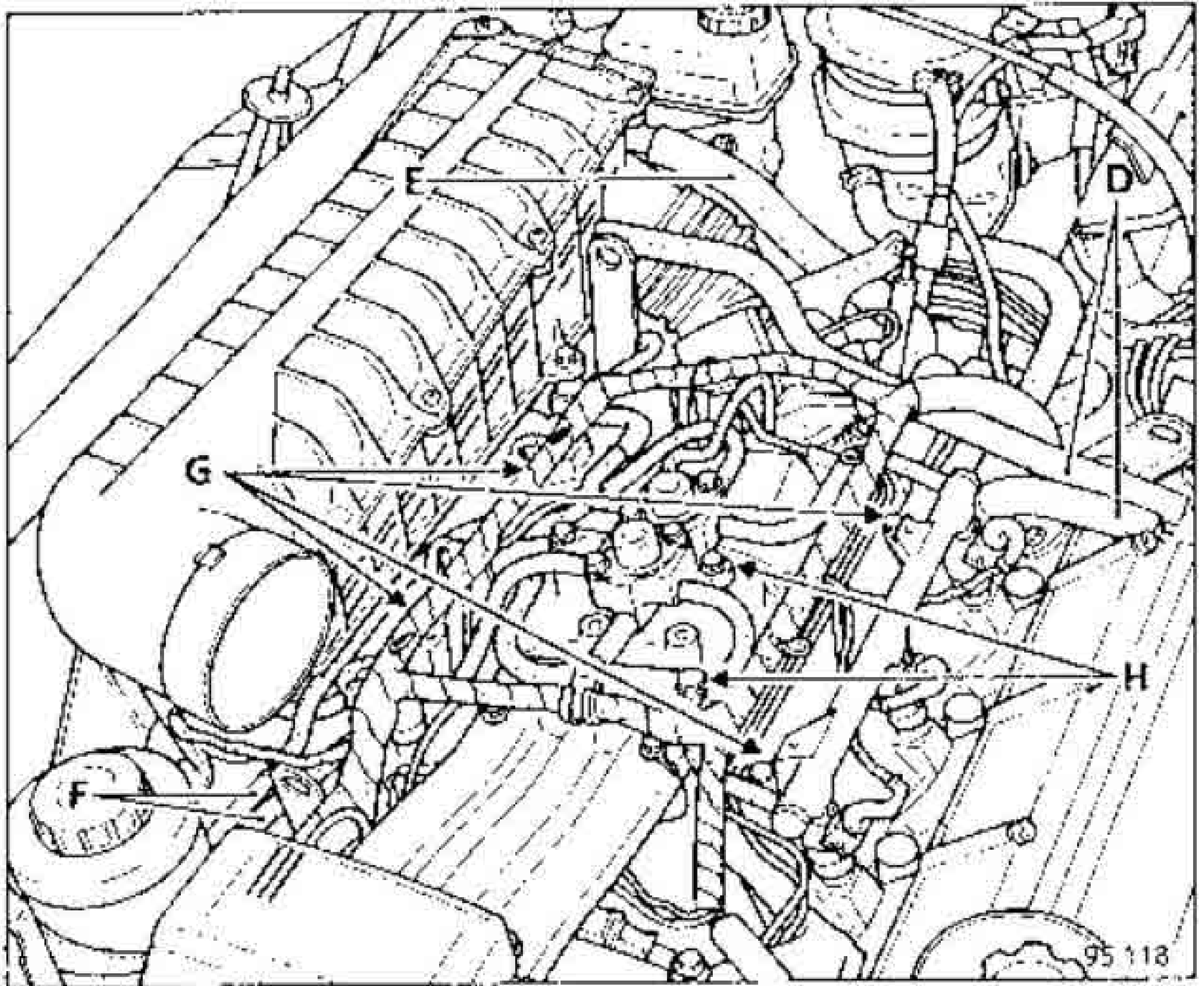
REMOVING THE INLET MANIFOLD

First remove all covers on the engine ; remove bolts (A), bolts and nuts (C), disconnect the plugs.

Remove the assembly via the left hand side.

Remove the four mounting bolts for the wiring retaining channel on the injection bars then the 5 hook bolts for the wiring under the plate.



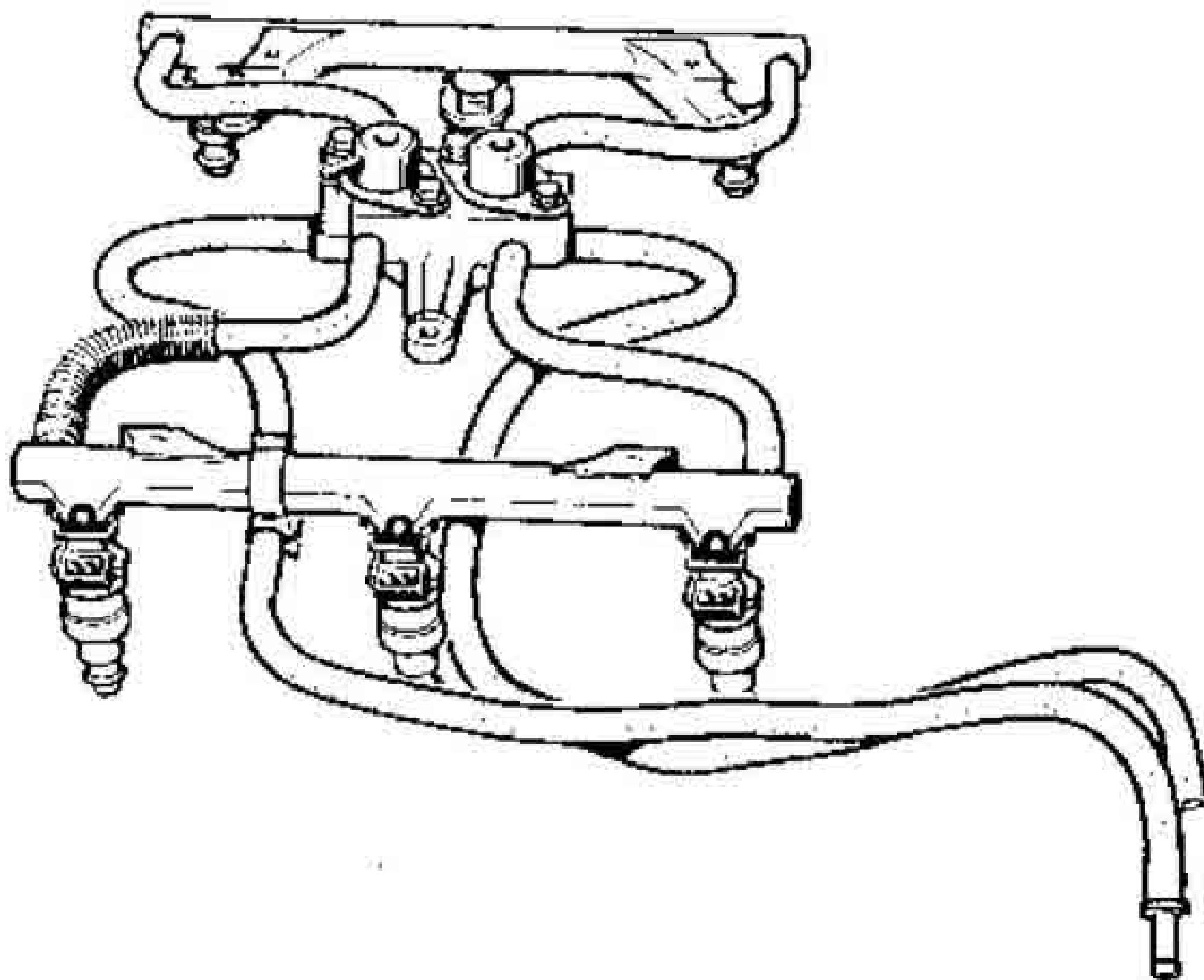


Remove the re-breathing pipe assembly (D) and the supply assembly to the idle speed regulation valve (E)

Disconnect the fuel inlet and return pipes on the rear right hand side of the cylinder head (F).

Remove the four mounting bolts for the injection bars on the manifold (G), and disconnect the injectors.

Remove the mounting bolts for the regulator - pulse damper on the manifold (H) and disconnect the vacuum pipe on the regulator.

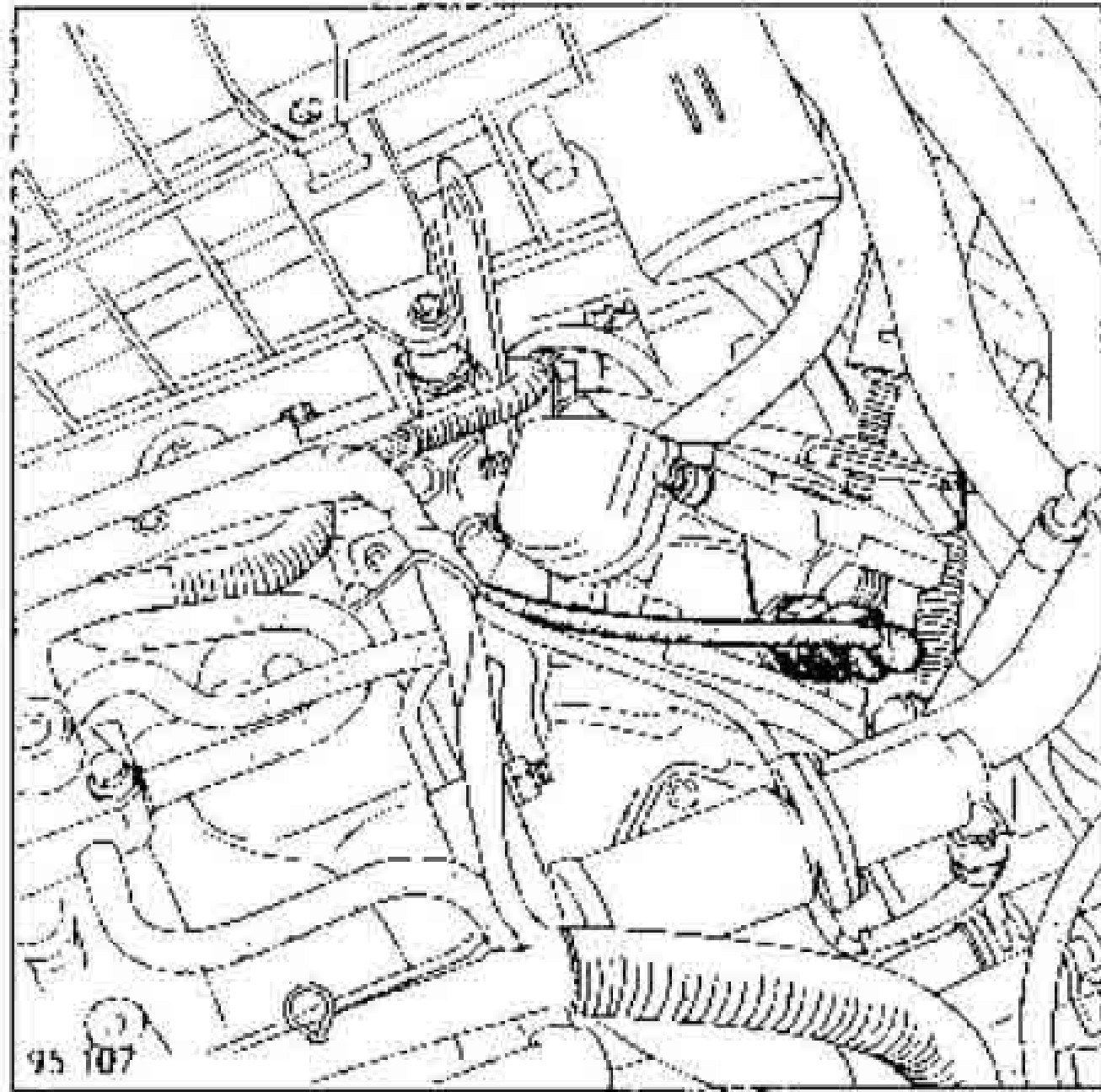


95 216

ATTENTION : Under each mounting point for the injection bar and the pressure regulator there are thermal insulation blocks.
Take care to retain these when removing the assembly.

IMPORTANT NOTE : The petrol pipe unions on the injection bar and the regulation assembly are rigid and cannot be removed.

Remove the air inlet pipe on the throttle housing (one collar on air filter side and three Torx bolts on the throttle housing).



REFITTING

Refitting is the reverse of removal

When refitting the manifold, any seals which have been removed must be renewed.

Tightening torque for bolts mounting manifold on cylinder head = $1,5 + 0,5 \text{ daN.m}$

- 0

,5

Check that :

- the thermal insulation blocks are replaced under each injection bar mounting
- the pneumatic pipes are reconnected correctly,
- the injectors and plugs are refitted.

Disconnect the air temperature sensor connector, and the idle speed regulation valve connector.

On the engine lifting bracket, remove the wiring retaining bolt and disconnect the throttle potentiometer.

Remove:

- the four mounting bolts from the bracket between the right hand suspended engine mounting and the manifold,
- the cruise control rigid vacuum pipes and the petrol vapour canister pipes passing over the manifold.

Disconnect the accelerator cable from the throttle housing and unhook the spring.

Remove the four bolts mounting the manifold on the cylinder head.

Move the leads to the front of the vehicle.

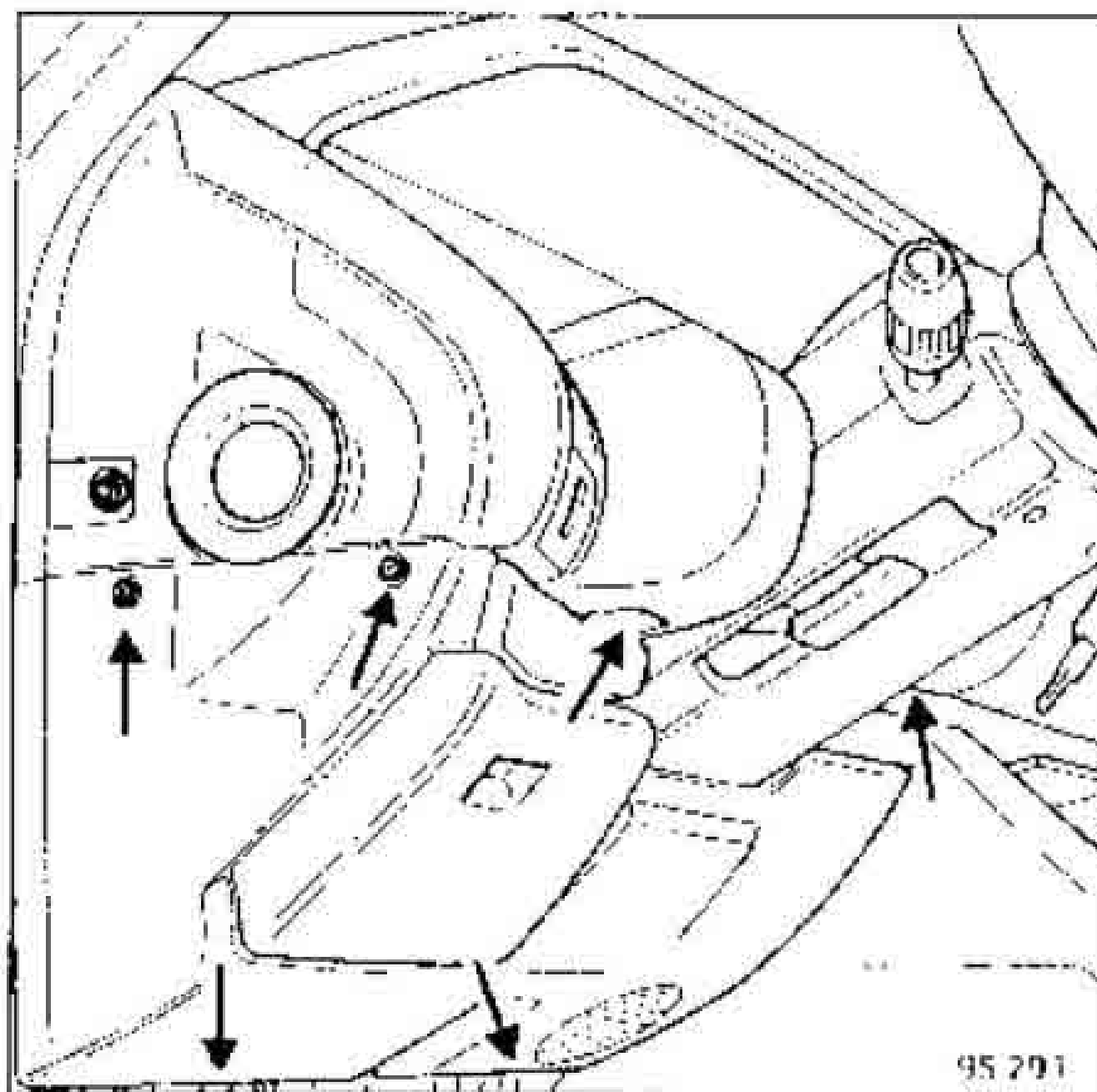
Remove the manifold - throttle housing assembly via the left.

Remove the manifold on the bench.

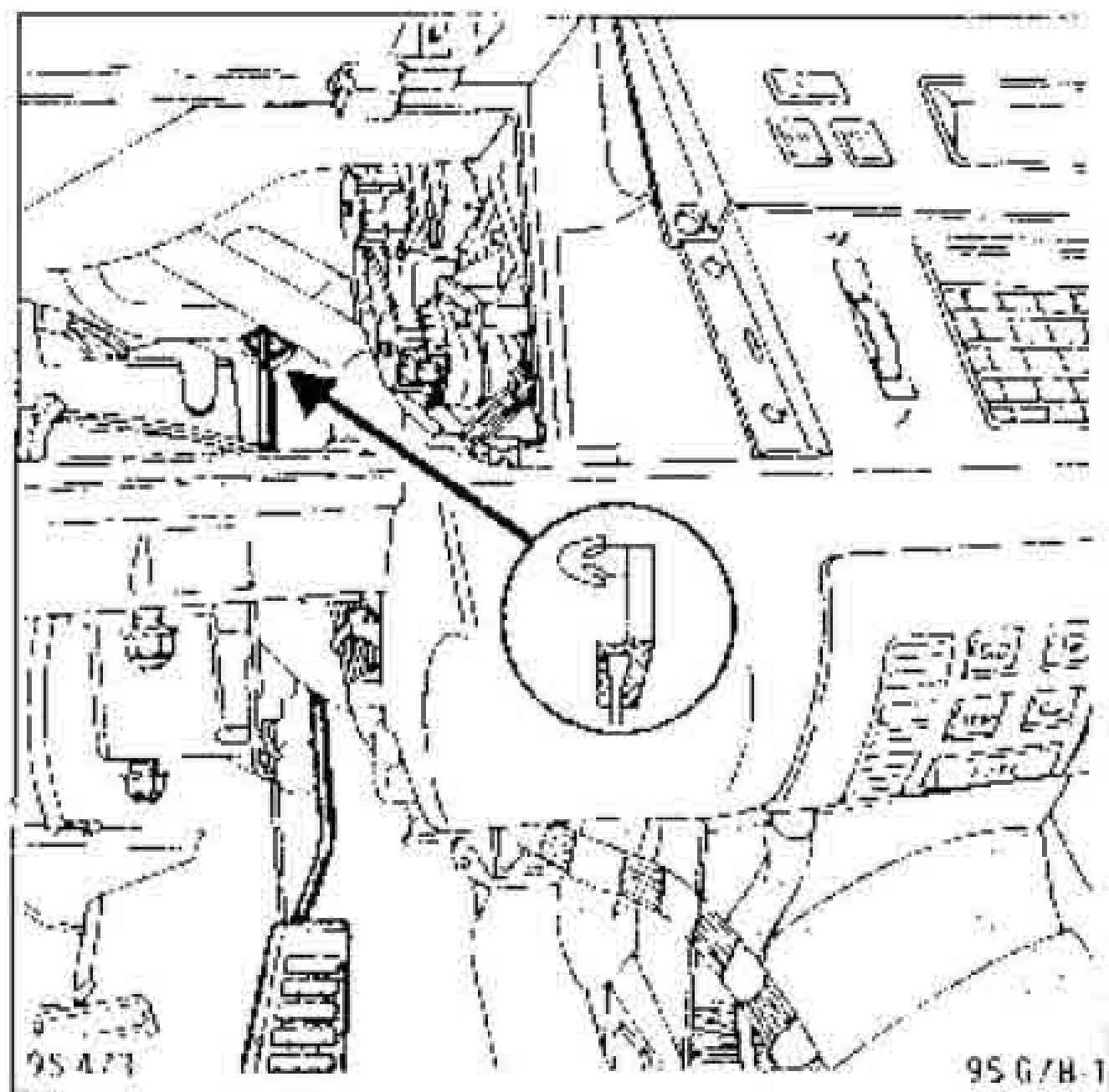
REMOVAL - REFITTING - Special notes

Remove the cable at the throttle housing or the injection pump.

In the passenger compartment, remove the plastic cover under the steering wheel.



Under the dashboard, remove the cable from the pedal.



Remove the cable.

MAKE: GARETT

TYPE: T2

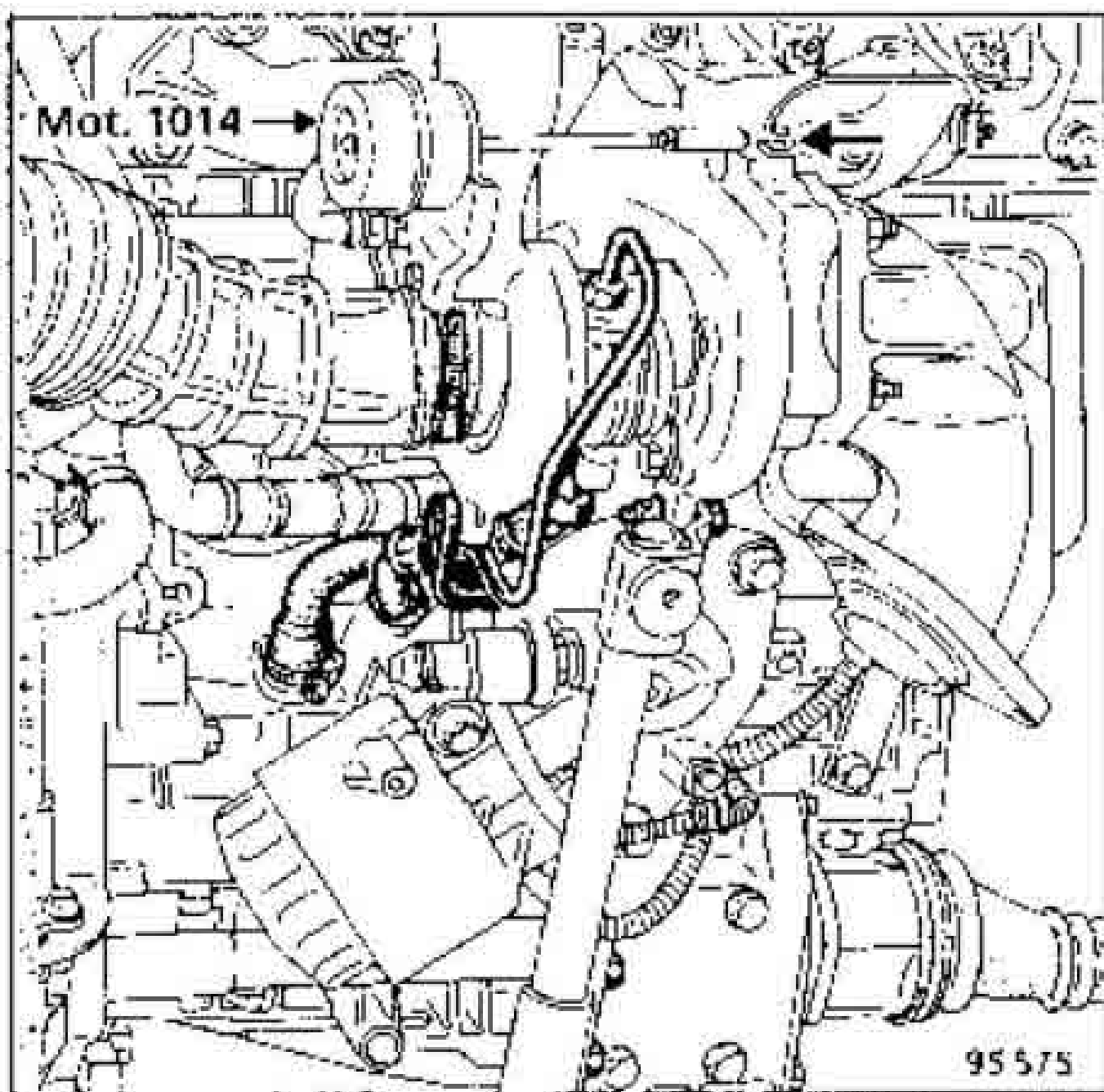
PRESSURE ADJUSTMENT VALUES

Control pressure values (mbar)	Adjustment pressure values (mbar)	Rod movement (mm)
820 to 880	840 to 860	0,38
1040 to 1120	1060 to 1100	4

CHECKING AND ADJUSTING THE BOOST PRESSURE ON THE VEHICLE

Use a magnetic base and dial gauge fitted at the end of the wastegate rod.

Apply an increasing pressure to the wastegate using pressure gauge Mot. 1 014.



ROAD TEST TESTING

With the vehicle on a hill, in third gear, depress the accelerator at just 3 000 rpm. The increase in engine speed and pressure is therefore progressive.

Value obtained :

Engine speed = 4 250 $\pm$ 50 rpm.

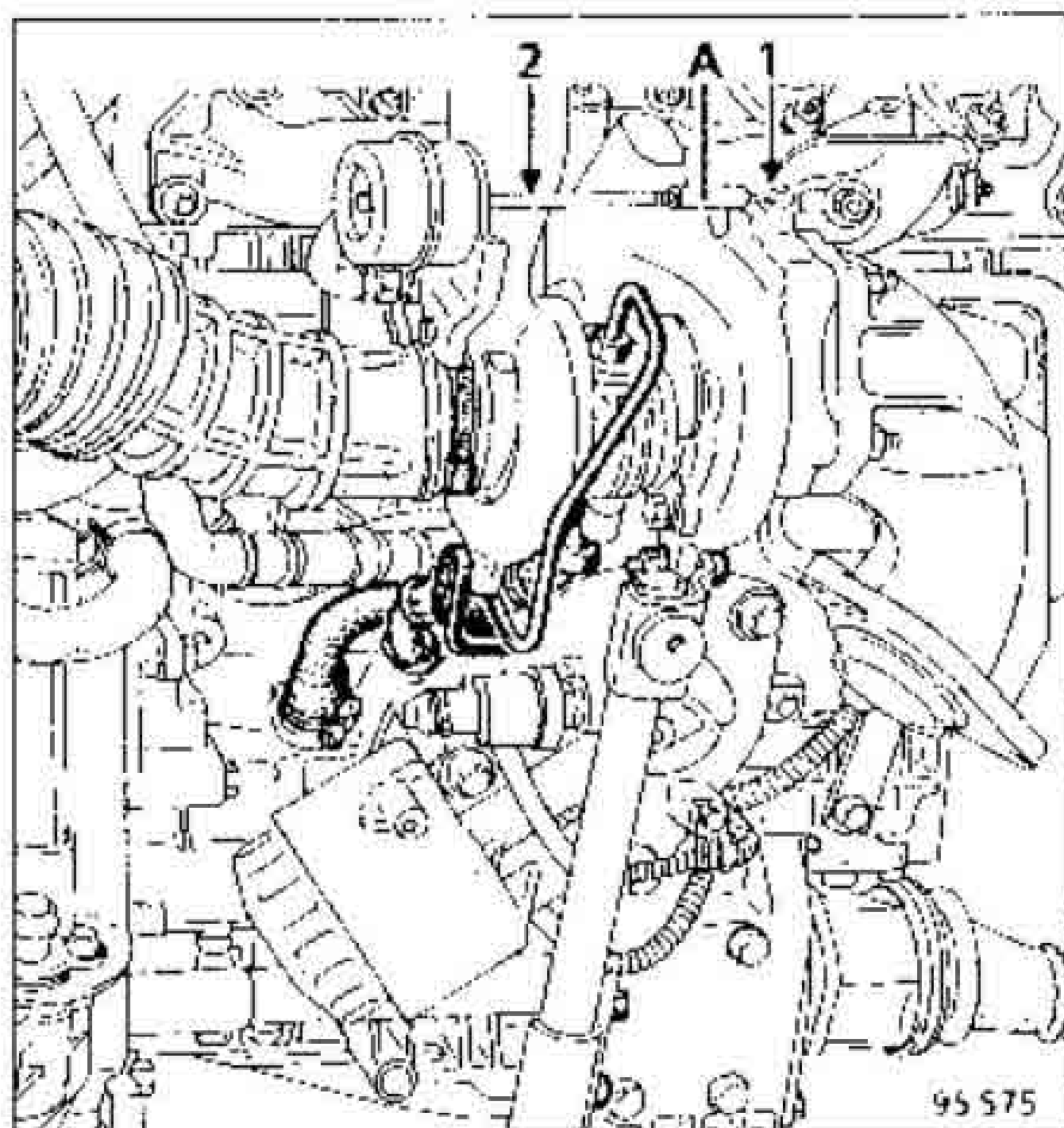
Pressure = 1 725 $\pm$ 25 mbar

ADJUSTING THE BOOST PRESSURE

when checking the boost pressure, the wastegate rod length may have to be altered if the pressure is incorrect.

This adjustment is made with the turbo charger in place on the vehicle.

To do this, undo clips (1) and the regulator arm rod (A).



Hold the rod on the wastegate side with a vice clip (2) (next to the thread).

Unscrew the counter nut then tighten or loosen the threaded end (A) ; tighten or loosen by half turns (tighten to increase boost pressure).

NOTE : to make the replacement of the threaded end on the regulator arm easier, use tool Mot. 1 014 and applying an increasing pressure to the wastegate.

REMOVAL - REFITTING OF THE TURBO CHARGER

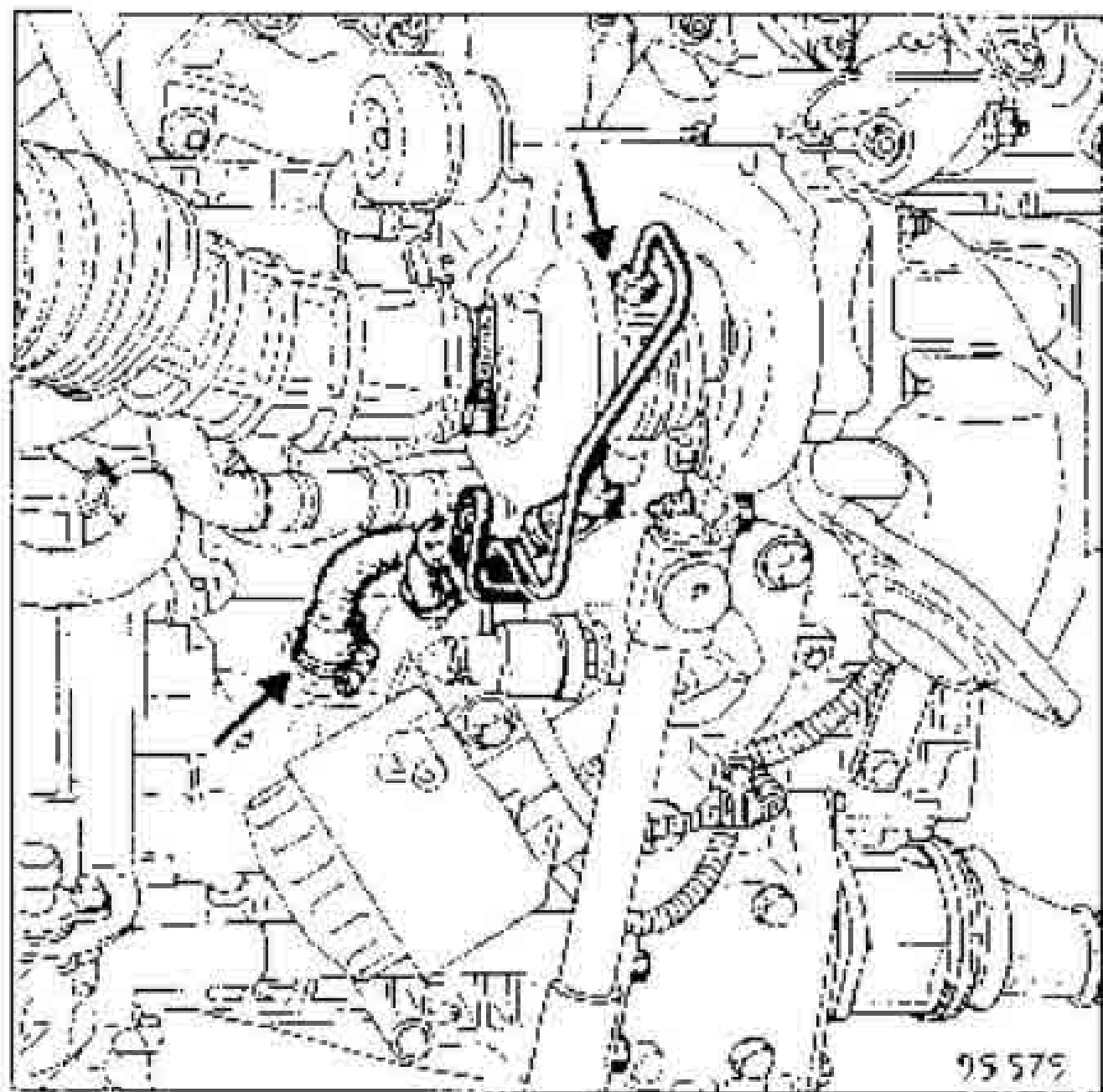
NOTE: in order to loosen the mounting bolts for the turbo charger on the exhaust manifold, spray a releasing agent on the nuts when they are warm, and then just before removal.

REMOVAL

Put the vehicle on a lift.

Remove:

- the heat shield on the turbo charger,
- the turbo charger air inlet and outlet pipes,
- the oil inlet union, turbo charger side,
- the oil return union, engine side, remove the two pipes,
- the fuel filter mounting bolts and remove the filter to the side.



- the exhaust downpipe flange (retain the metex ring),
- the turbo charger support (at the lower end, from underneath the vehicle, only the upper bolt is removed ; the top section can then be tipped backwards),
- the heat shields ; one on the exhaust manifold (the lower bolt only needs to be loosened) and the other on the turbine outlet,

- the four mounting bolts mounting the turbo charger on the exhaust manifold

Remove the turbo charger.

On the workbench remove the turbine outlet elbow, and the oil return pipe.

ATTENTION : the oil return union is positioned in relation to the turbo charger. Note its position before removal.

REFITTING THE TURBO CHARGER

Special precautions

- Ensure no foreign body enters the turbine or charger during refitting.
- After a turbo charger fault, check (oil consumption), that the inter-cooler is not filled with oil.

If it is, it must be removed, rinsed with a cleaning agent and left to drain completely.

- After a high mileage, ensure the oil inlet and return pipes for the turbo charger are not blocked by deposits.

Remove and clean as necessary (replace if leaking).

REFITTING

Refitting is the reverse of removal. Replace all damaged collars, the turbine outlet elbow self locking mounting nuts, and the mounting nuts for fixing the turbo charger on the exhaust manifold (replace the manifold seal).

NOTE: the turbo charger must be fitted on the exhaust manifold first of all and the nuts tightened to the specified torque.

Then fit the support

TIGHTENING TORQUES (in daN.m)



Turbo charger on exhaust manifold mounting nuts	4,5
Turbine outlet elbow on turbine nuts	2,5
Oil inlet pipe	
– on turbo charger	2
– on engine block	3,5
Oil return pipe (on turbo charger)	4
Wastegate rod counter nut	0,6
Mounting bolt on support for wastegate on turbocharger	1,5

Important precautions :

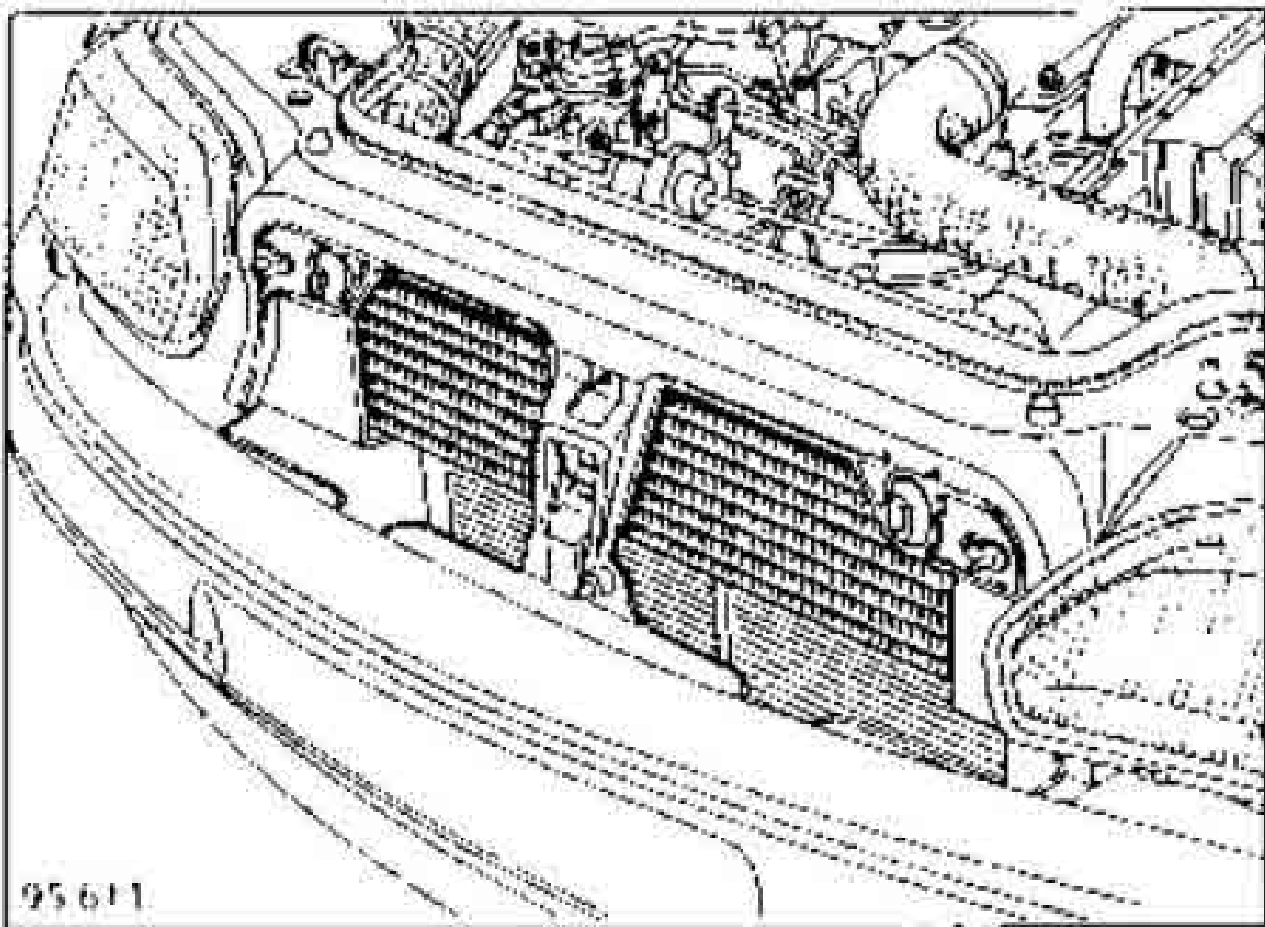
Before starting the engine, disconnect and isolate the feed wire to the injection pump electrical stop.

Activate the starter until the oil pressure warning light extinguishes (this may take a few seconds).

Reconnect the electrical stop, preheat and start the engine.

Let the engine idle and check the oil unions are not leaking.

The inter-cooler is located at the front of the vehicle in between the radiator and the front panel.



REMOVING THE INTER-COOLER

Put the vehicle on a lift and remove the engine undertray.

Disconnect the battery.

Remove:

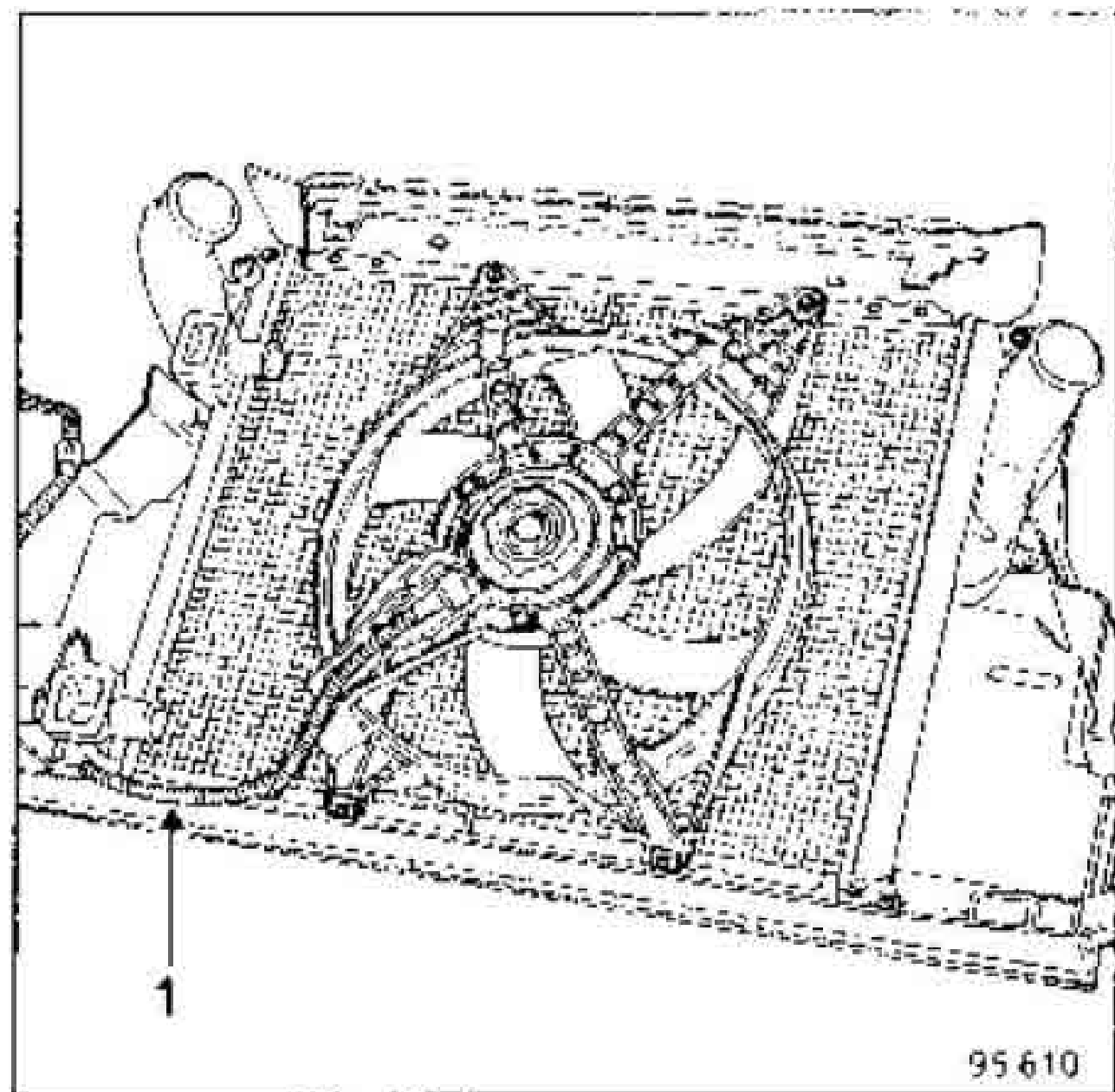
- the inter-cooler air inlet and outlet pipes
- the radiator coolant inlet pipes (use clamp Mot. 1202).

Disconnect the engine cooling fan assembly, and the thermostat at the bottom of the radiator ; remove the wiring (1).

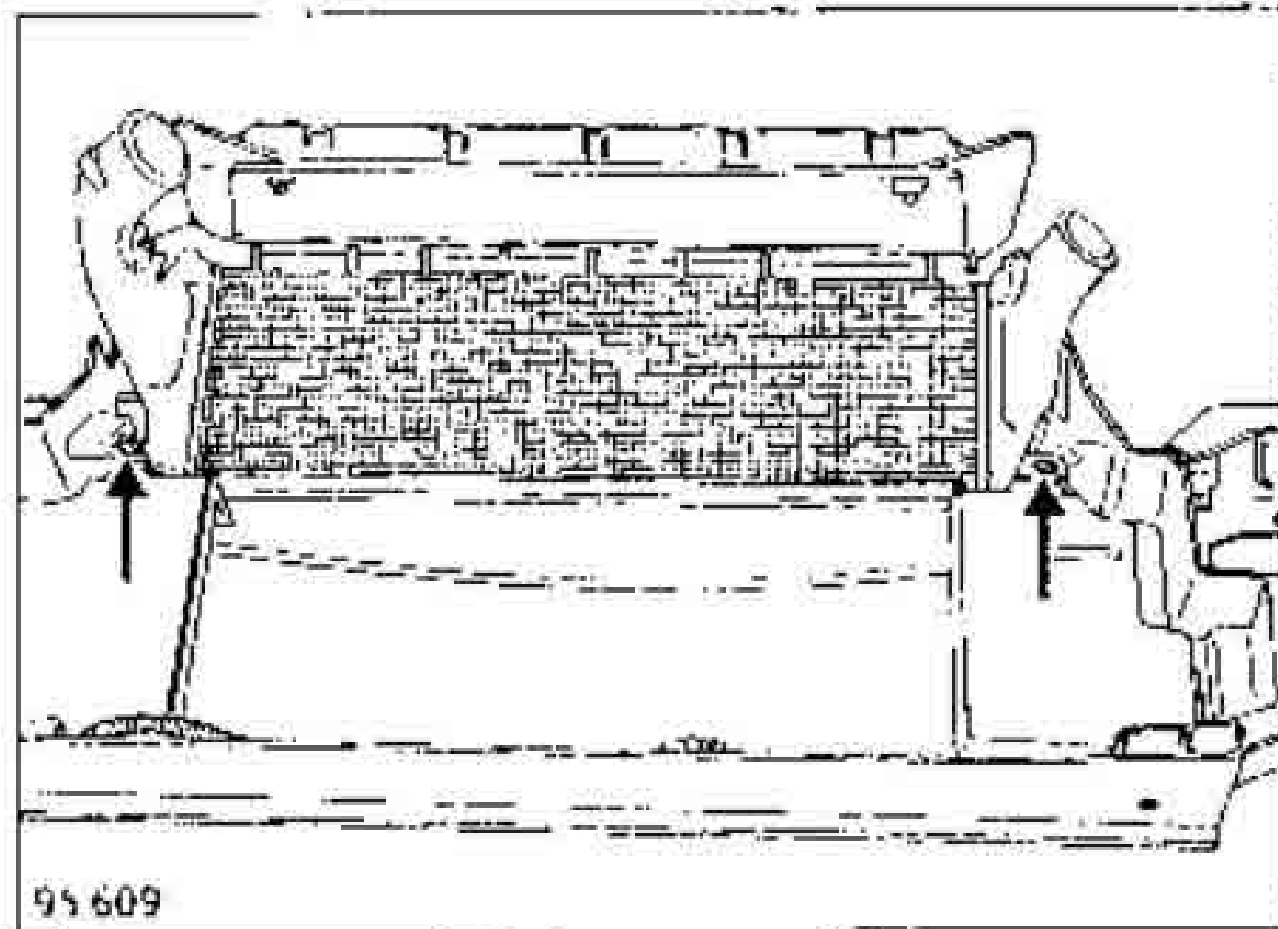
Remove:

- the two bolts mounting the engine cooling fan assembly on the radiator and disconnect the engine cooling fan assembly from underneath the vehicle,
- the four bolts mounting the radiator on the front panel.

Remove the radiator.



Remove the two bolts mounting the inter-cooler on the front panel ; remove the inter-cooler.



NOTE: if the vehicle is fitted with air conditioning, the fans located in front of the panel do not have to be removed to gain access to the inter-cooler

REFITTING THE INTER-COOLER

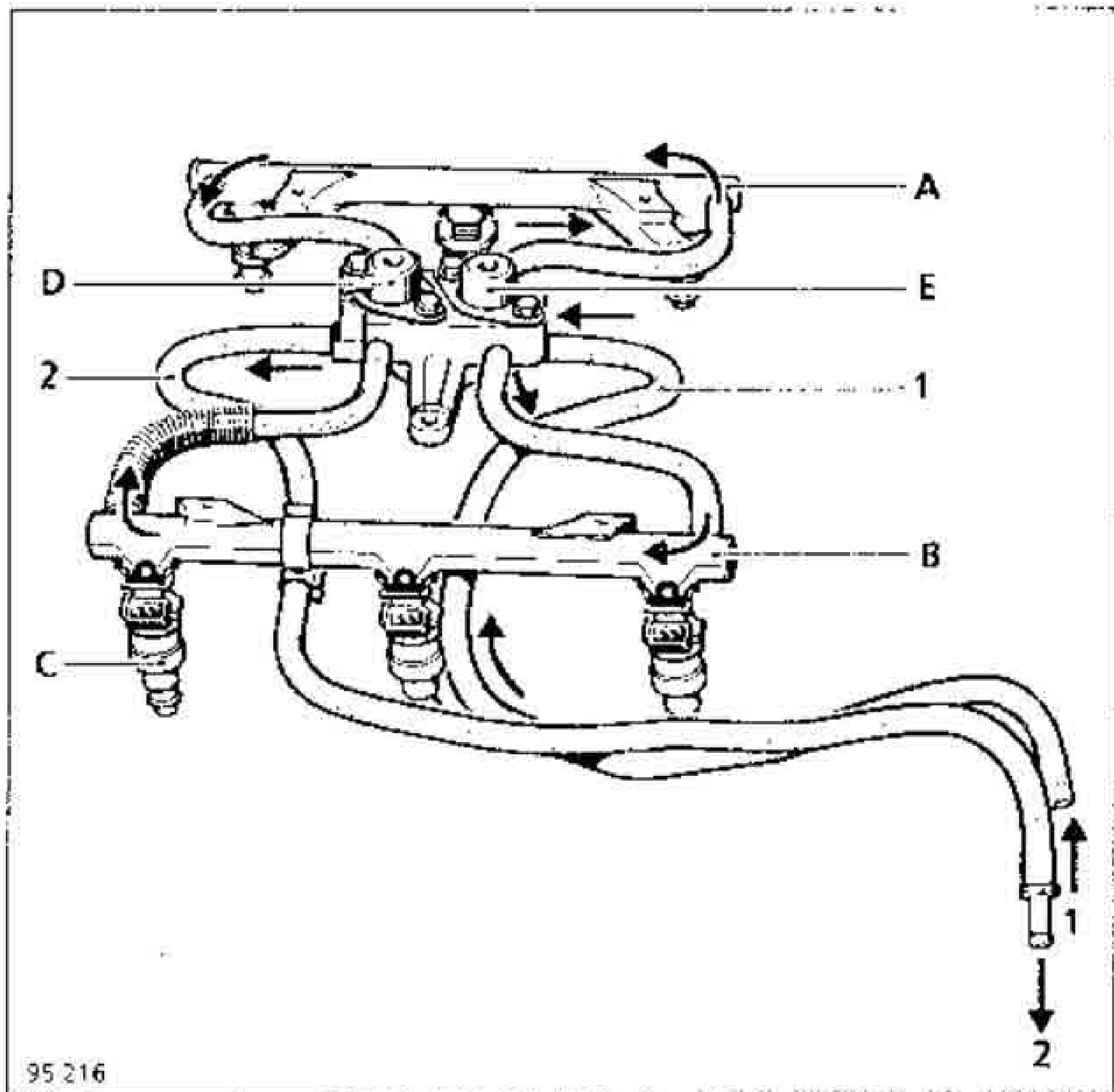
Refitting is the reverse of removal.

Ensure :

- the lower radiator mounting washers are fitted (between the radiator and the front panel),
- the clips are correctly fitted on the lower engine cooling fan assembly section,
- all electrical connectors are correctly clipped in,
- the inter-cooler air pipe collars are correctly tightened.

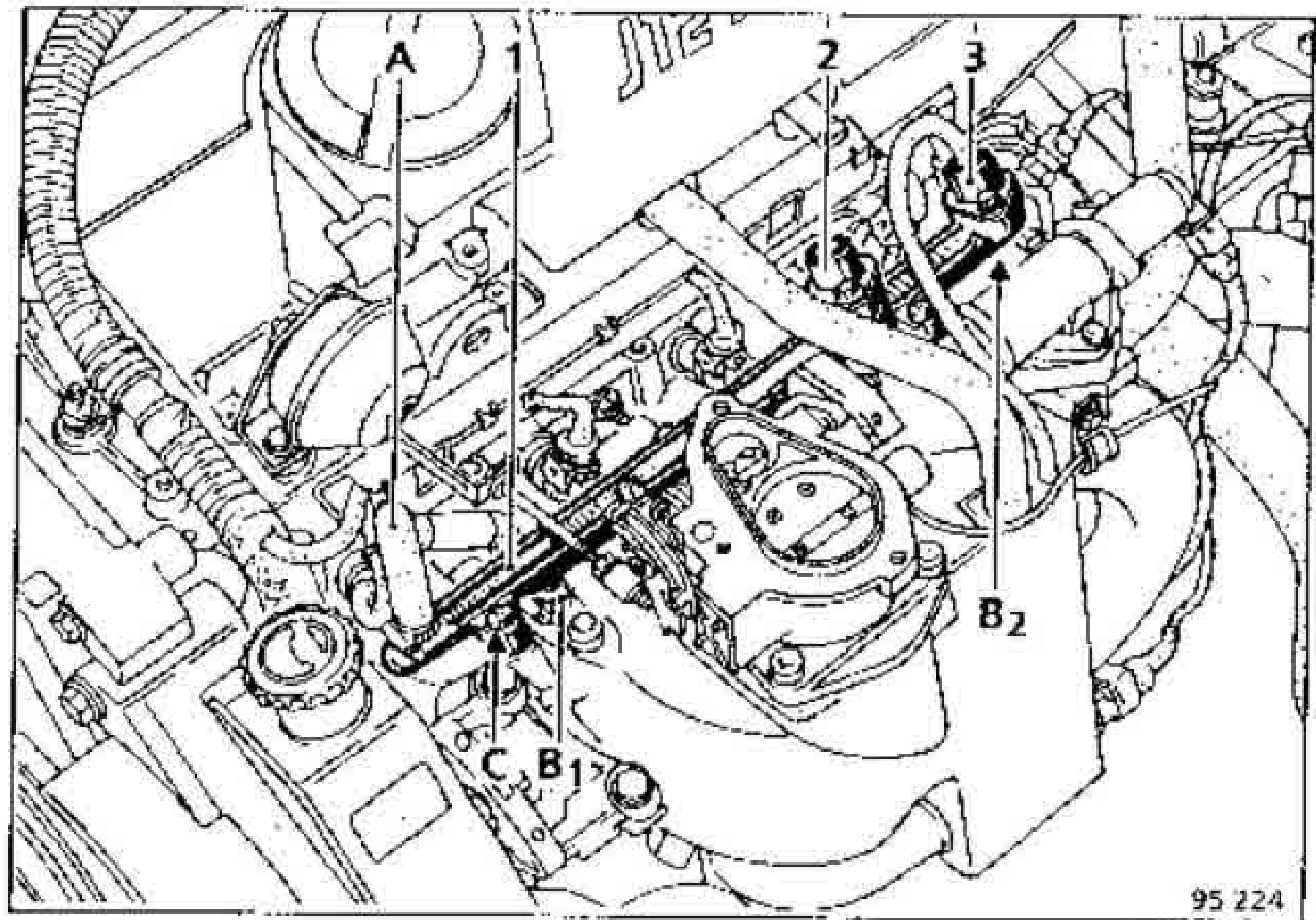
Then top up the engine cooling circuit and bleed when warm.

LAYOUT



- A Front injection bar (cylinders 1, 2, 3)
- B Rear injection bar (cylinders 4, 5, 6)
- C Injectors
- D Fuel pressure regulator (Manifold pressure information taken from intermediate manifold take-off)
- E Pulse damper
- 1 Fuel inlet from fuel pump
- 2 Fuel return to tank

NOTE: There is no link between the pulse damper and the pressure regulator.



- 1 Injection bar
- 2 Pulse damper
- 3 Fuel pressure regulator
- A Fuel inlet pipe
- B₁ Return pipe location, 12 valve engine
- B₂ Return pipe location, 8 valve engine

NOTE: At each mounting for the injection bar on the manifold, there are "anti-percolation" blocks (C) on either side of the mounting. Remember to refit these blocks if removing and refitting the injection bars.

FUEL INLET AND RETURN PIPES

The fuel inlet and return pipes are rigid from the reservoir to the inlet to the engine compartment.

Note that the diameters are different.

INLET UNION

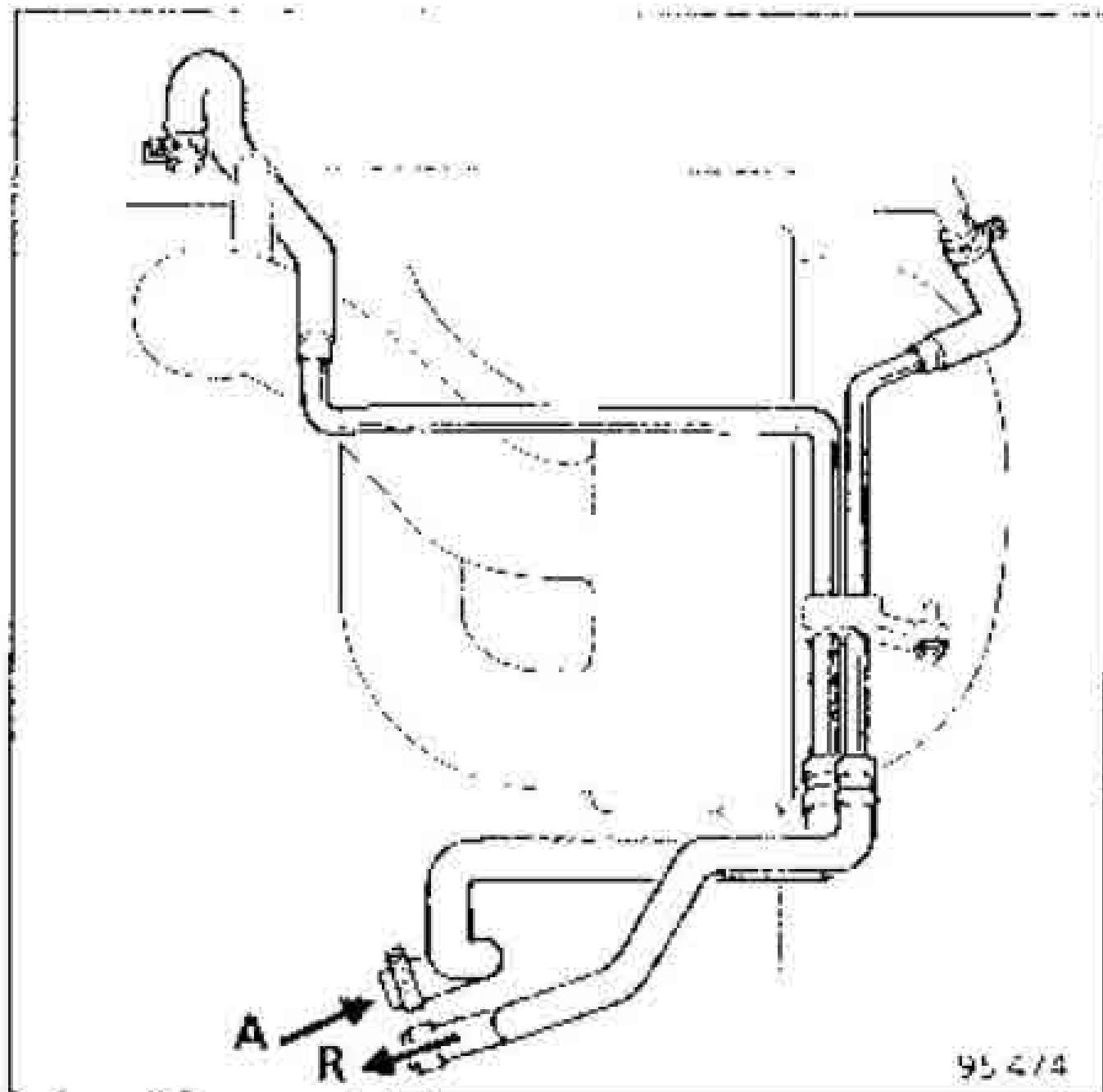
Ø 10 mm ring marked green.

RETURN UNION

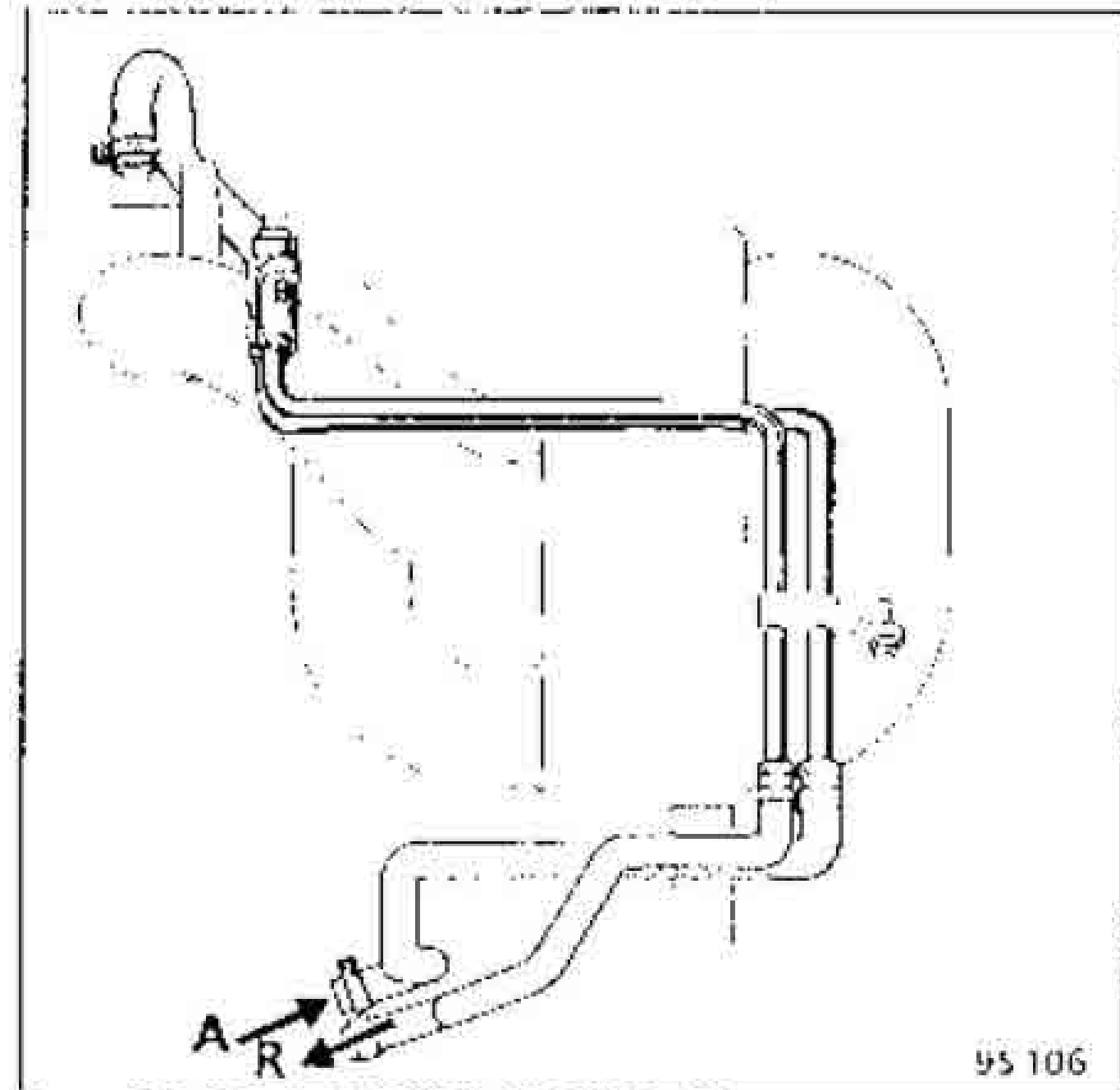
Ø 8 mm ring marked red.

In the engine compartment, the pipes pass on the right hand side of the sump then rise behind the inlet manifold.

8 VALVE ENGINES



12 VALVE ENGINES



A Fuel inlet pipe
R Fuel return pipe

These two pipes are located between the manifold and the engine block.

CHECKING THE SUPPLY PRESSURE

Disconnect the fuel inlet pipe where it joins the engine.

Fit the T piece of tool **Mot. 904** then the 0-6 bars pressure gauge of tool **Mot. 843**.

Start the engine.

Note the pressure and compare to the value given in the specification tables.

Disconnect the vacuum pipe from the regulator.

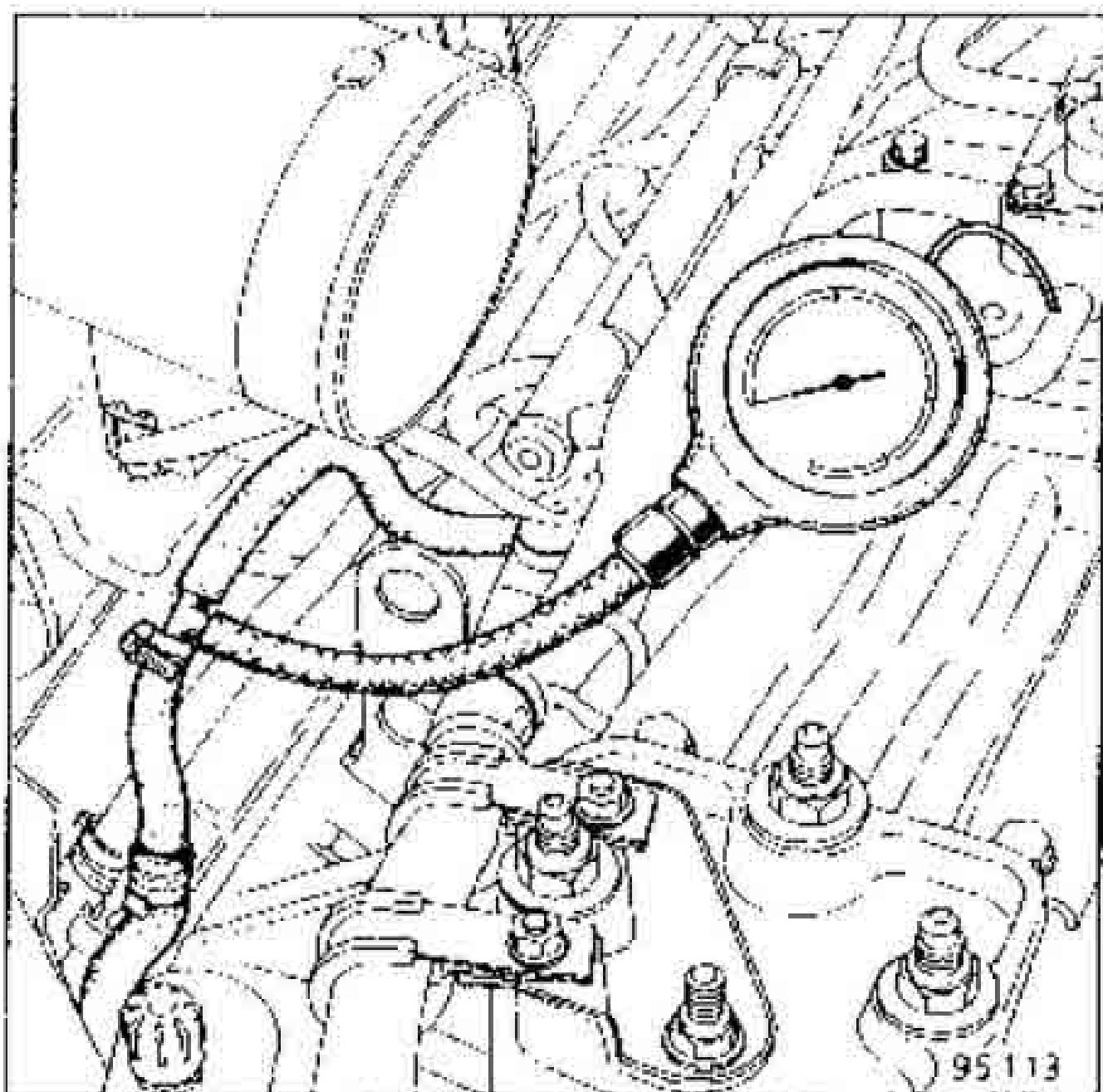
At idle speed, the supply pressure should increase by between **600 and 700 mbars**.

(Or by the difference between atmospheric pressure and the manifold pressure).

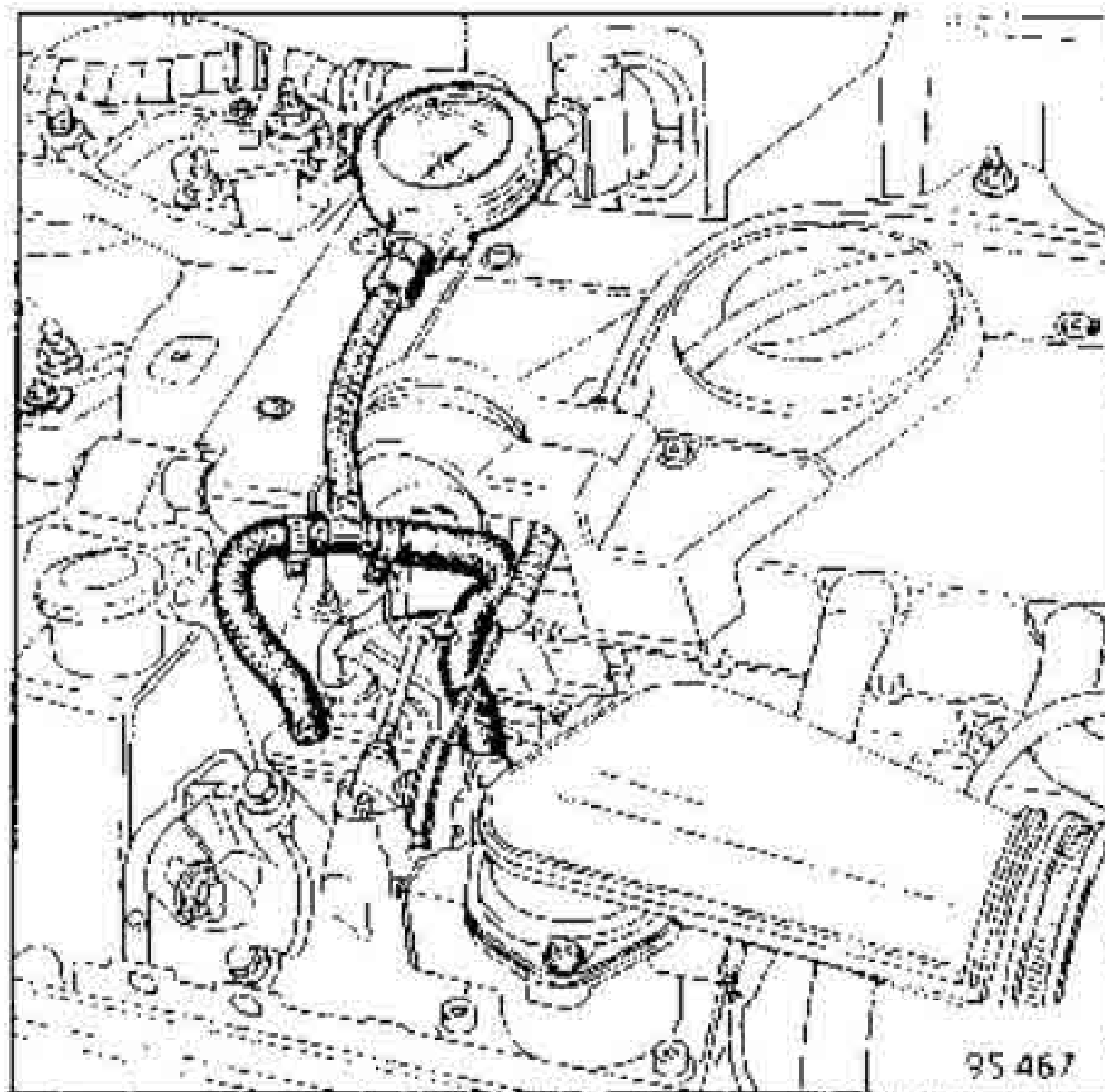
Quickly reconnect the vacuum pipe.

Fitting the tools.

Z7X ENGINE



J7R - J7T ENGINES



CHECKING THE PUMP PRESSURE

Clamp the return pipe to the reservoir for several seconds.

The pressure should be more than **5 bars**.

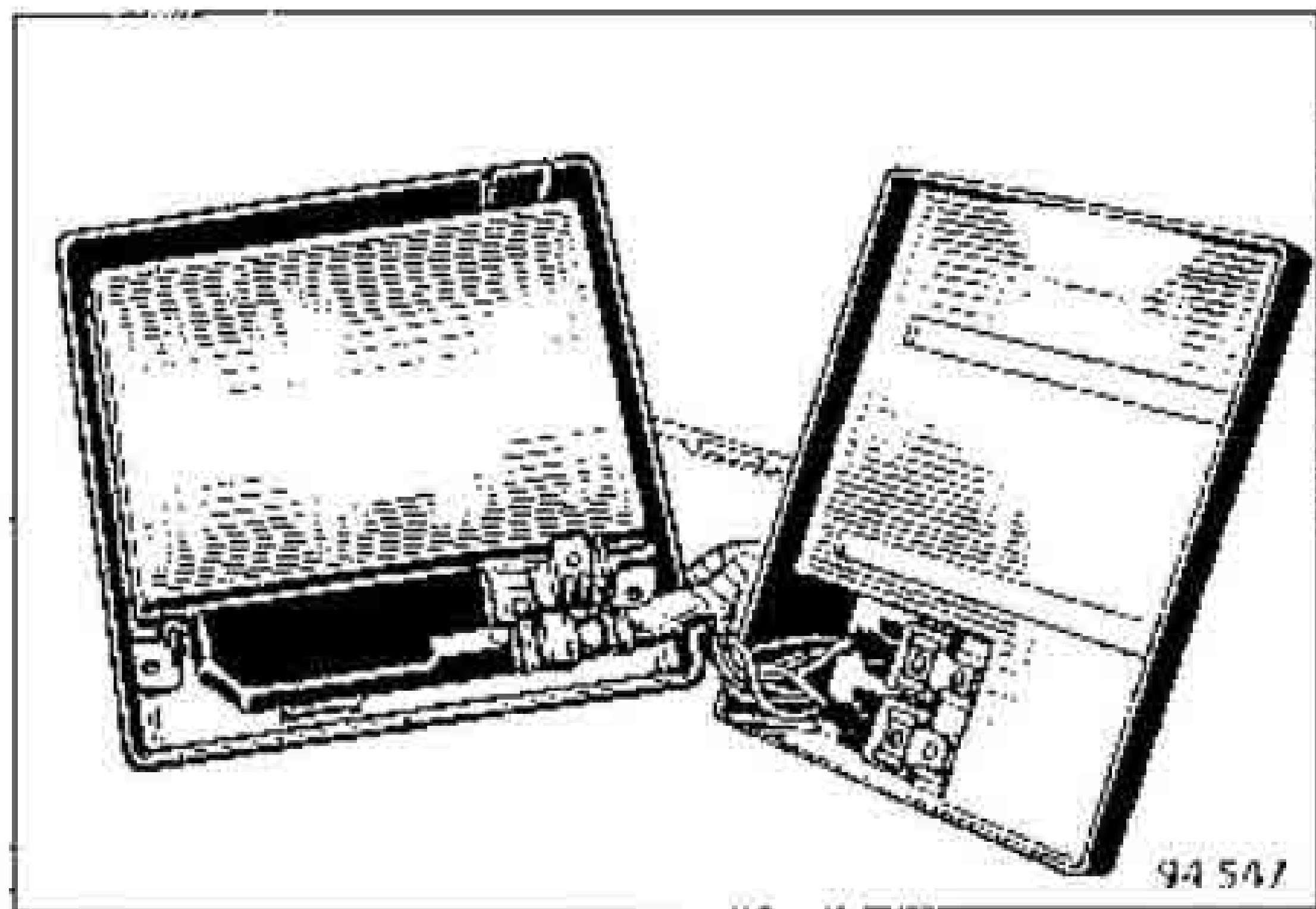
If not, check the electrical circuit, the fuel pump and the fuel filter.

CHECKING THE FUEL PUMP DELIVERY

On the fuel pressure regulator tank return pipe, fit a flexible hose leading into a measuring cylinder.

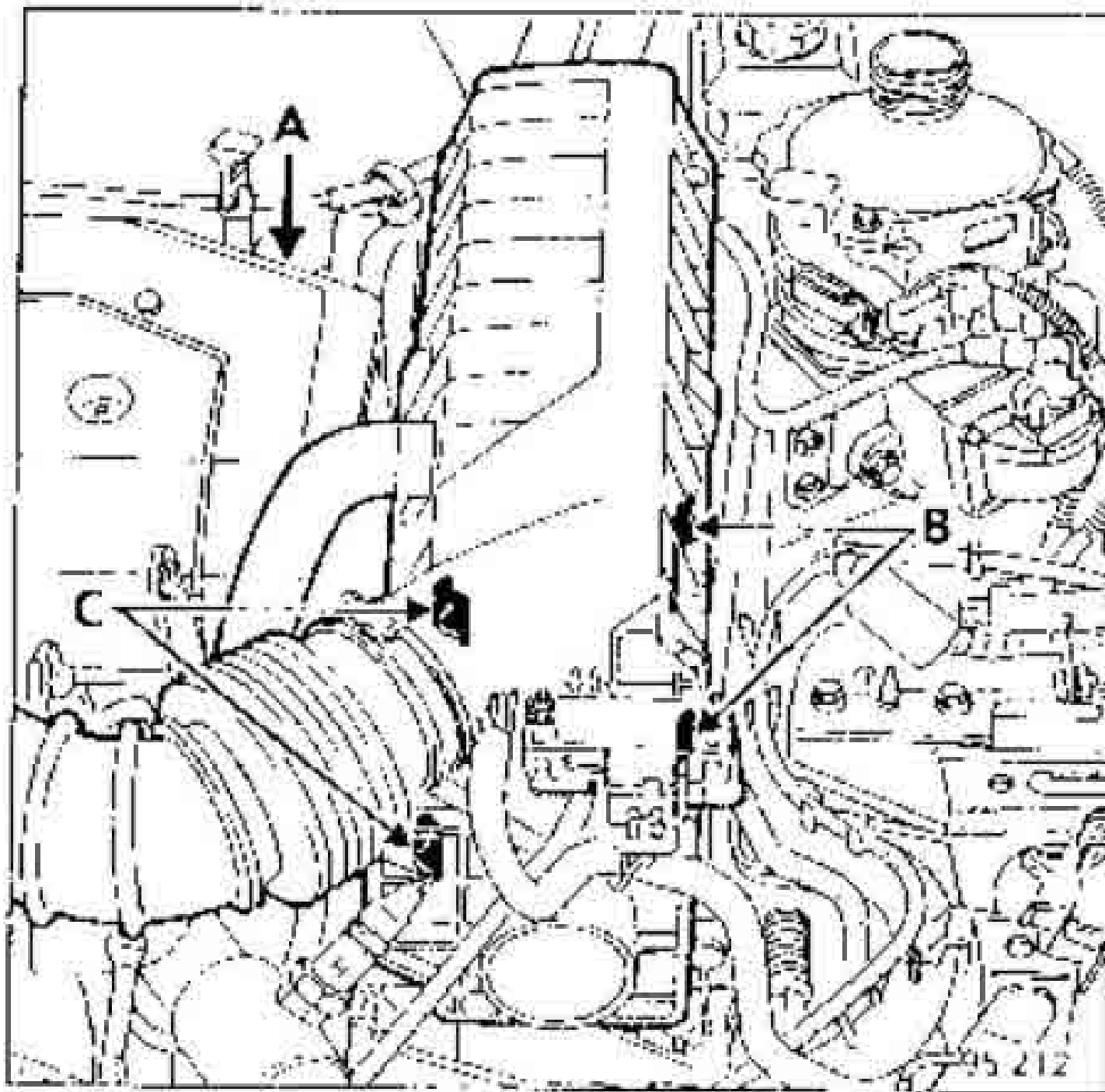
Activate the fuel pump by shunting tracks 3 and 5 on the fuel pump relay connector (large wires) (computer disconnected).

Min. delivery : 80 l/h or almost 1,5 litre in 60 seconds



If the delivery is low, check the supply voltage (delivery drops by 10 % for a voltage drop of 1 volt).

REMOVING THE AIR FILTER



- A Side support rods
- B Mounting retaining clips
- C Mounting positioning clips

Disconnect:

- the HT lead from the ignition power module and the distributor,
- the petrol vapour rebreathing pipe on the front of the filter,
- the idle speed regulation valve supply pipe,
- the absolute pressure sensor connector and the pneumatic pipe to this sensor,
- the upper air outlet sleeve from the filter, then the lower sleeve,
- rod (A) ,
- the accelerator cable retaining hook.

With a flat blade screwdriver, separate the clip (B) and tip the filter towards the engine to unhook it from clips (C).

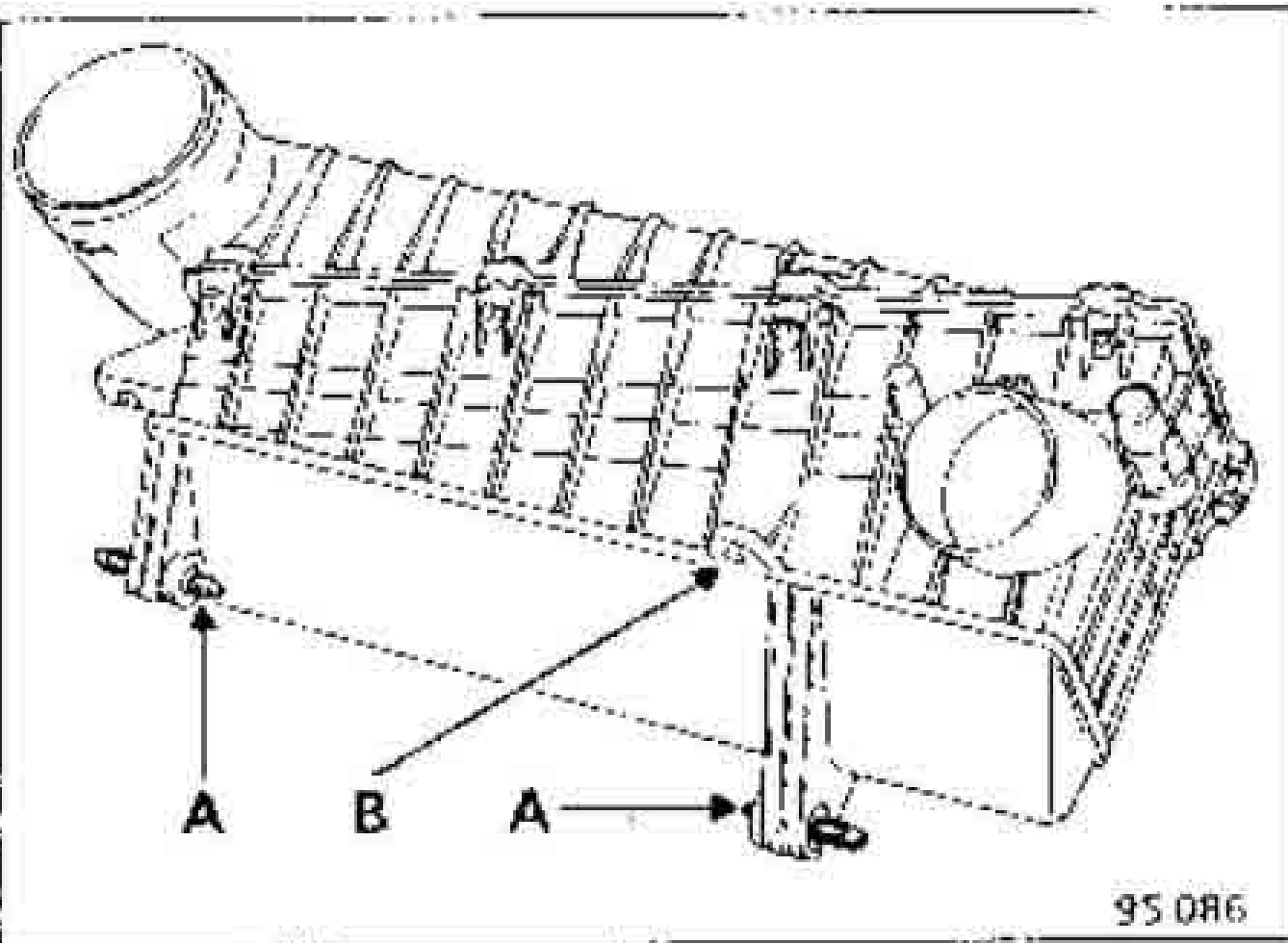
Remove the air filter assembly.

When refitting:

Check the pressure sensor and HT lead are correctly refitted and check the condition of the pneumatic pipes.

REMOVING THE AIR FILTER ASSEMBLY

Air filter mounting points.



A lower mounting with long Torx bolt
B side mounting in front of filter
Rubber mounting on cylinder head

REMOVAL

Remove:

- the rigid air inlet sleeve
- the collar on the filter outlet, and remove the outlet.

Remove the two rebreathing pipes on the filter.

Then remove the mounting nut (B).

Unscrew the two bolts (A) in the lower mounting (unscrew them until the filter is released from its mounting).

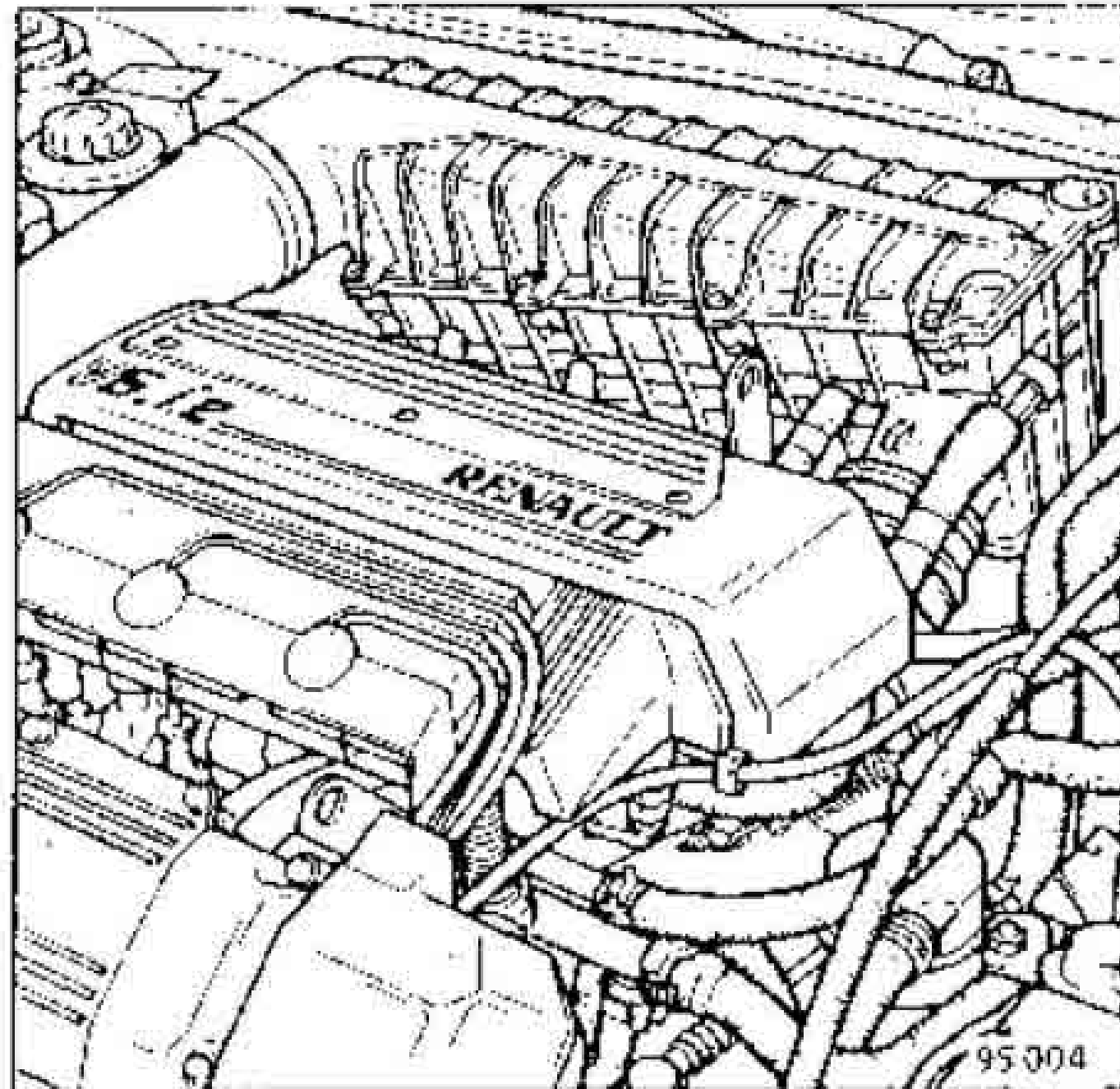
Remove the filter

REPLACING THE FILTER CARTRIDGE

Remove the rigid air inlet pipe from the filter.

Unscrew the 8 mounting bolts on the filter cover, but do not remove them.

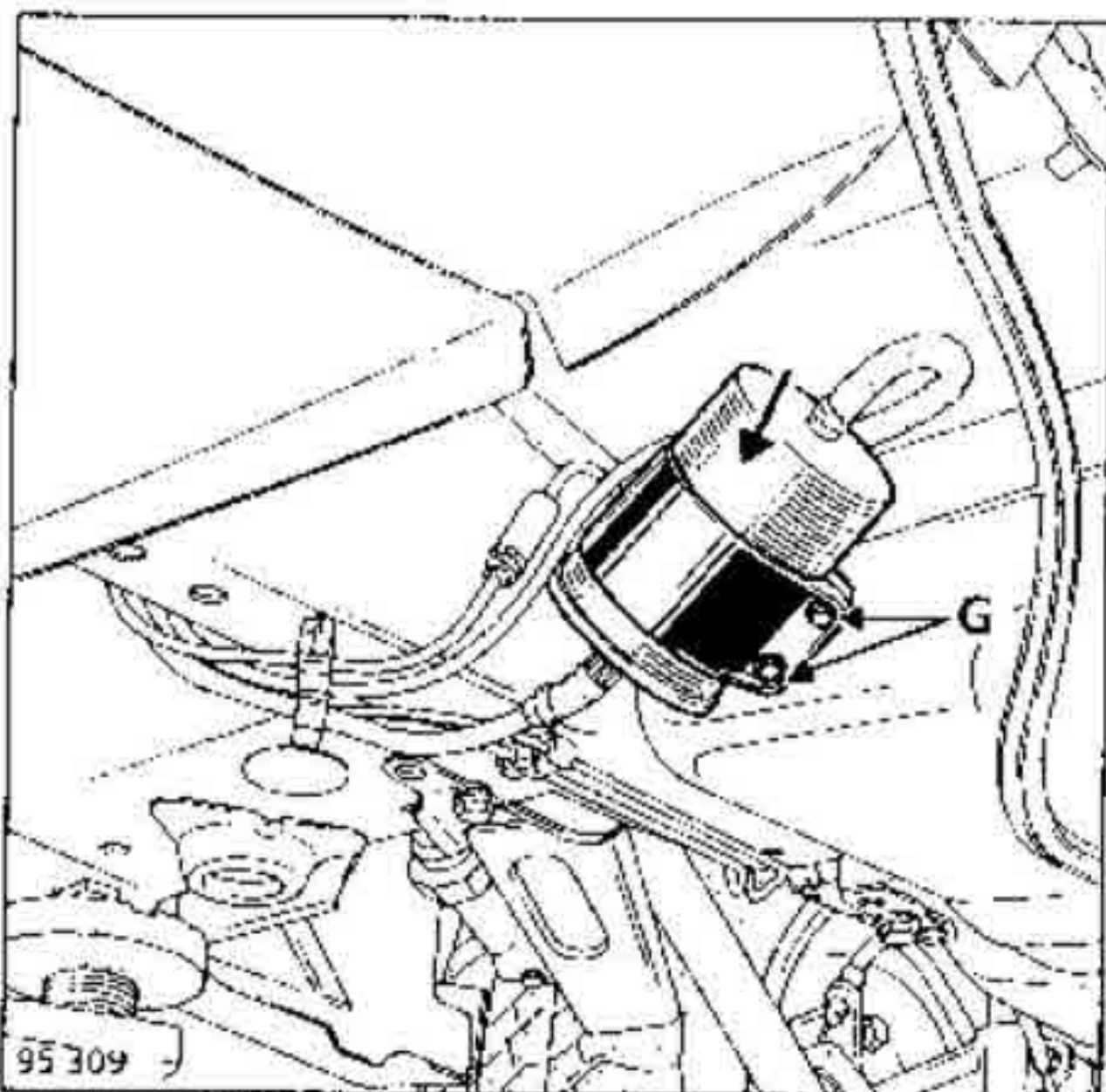
Remove the cover and the cartridge.



NOTE: when refitting the cover, do not push on the bolts to make them grip.
The nuts inside could be dislodged.

LOCATION (REMOVAL - REFITTING)

VERSION 4 x 2



Before removing the inlet and outlet pipes, fit clamps **Mot. 453-01** to the hoses.

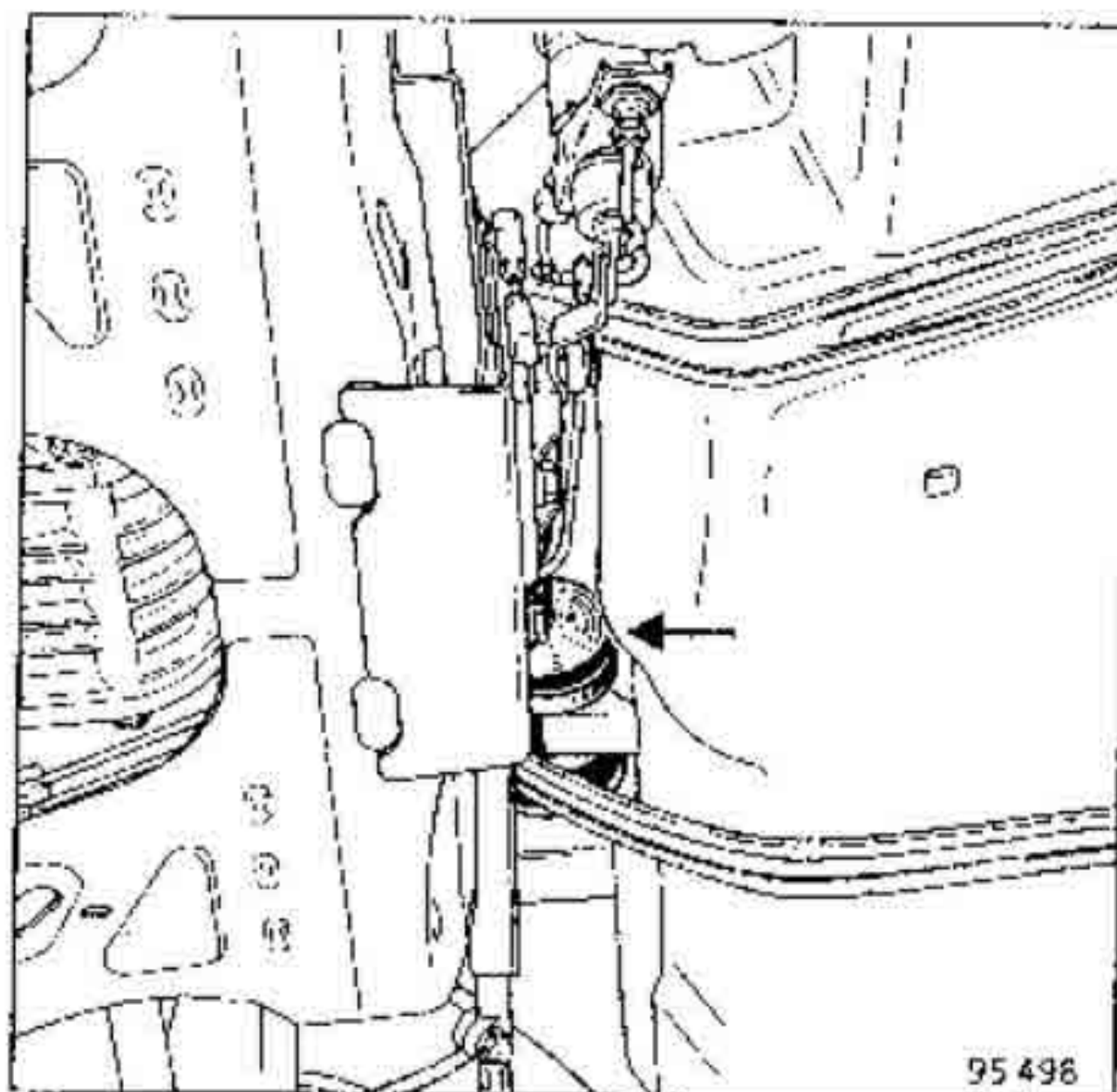
Remove the two bolts **G** to remove the filter.

Refitting:

Observe the fitting direction marked by the arrow on the filter body.

Tighten the two bolts **G** until the filter no longer turns in its position ; bolt tightening torque : **0,4 daN.m**.

VERSION 4 x 4



Before removing the inlet and outlet pipes, fit clamps **Mot. 453-01** to the hoses.

The filter is mounted by two collars.

Remove the collars then remove the filter.

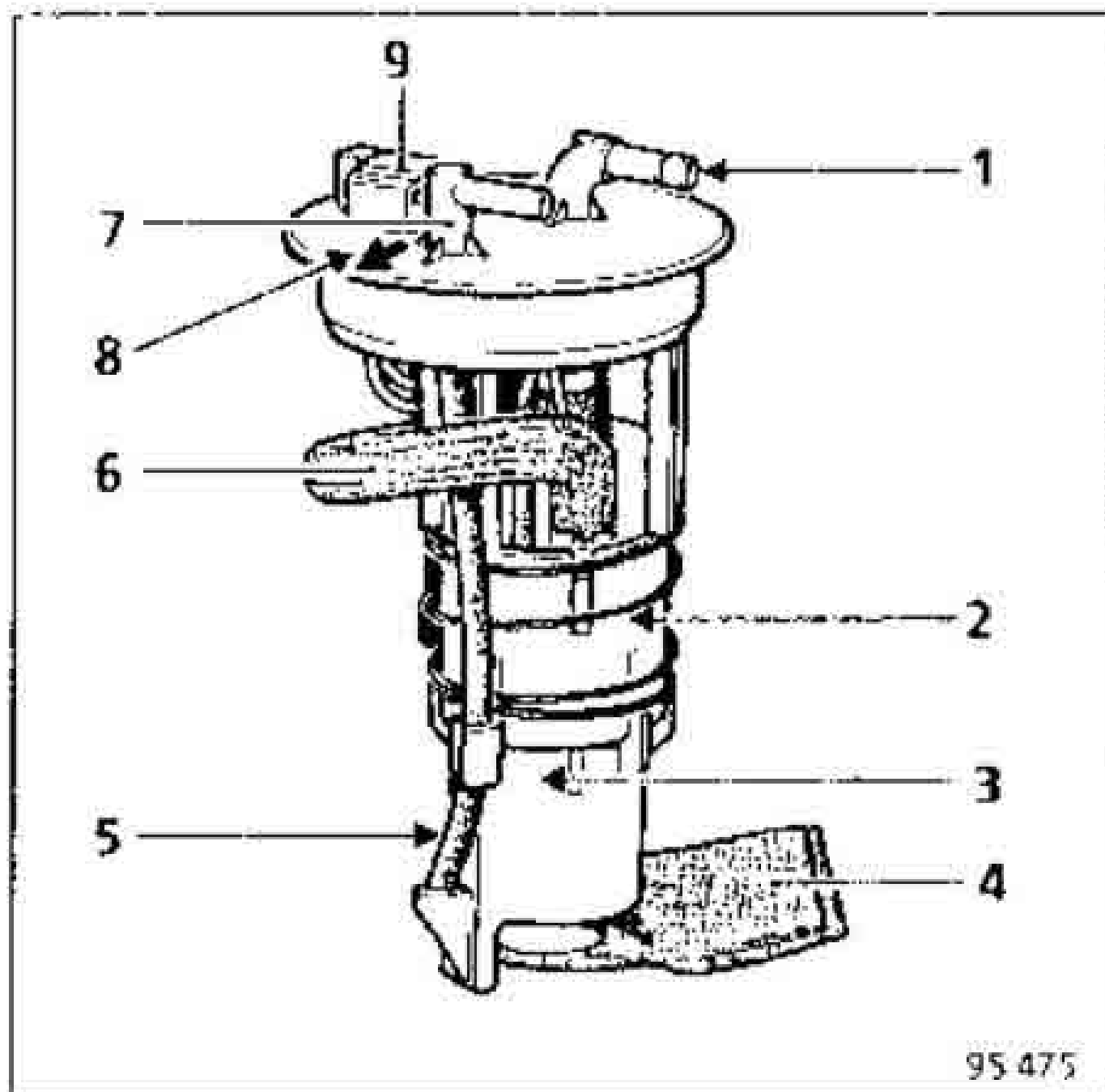
Refitting:

Observe the fitting direction marked by the arrow on the filter body.

Ensure the collars are correctly positioned in relation to the mounting and the filter.

The fuel pump is fitted in the fuel tank.

PUMP DETAILS



- 1 Pump outlet (to injection bar inlet)
- 2 Spring
- 3 Pump (located in lower part of mounting)
- 4 Pump breather filter
- 5 Fuel return pipe to bottom of tank
- 6 Intermediate return pipe
- 7 Injection bar return
- 8 Reference arrow
- 9 2 way connector for electrical supply to pump

PUMP SPECIFICATIONS

Make : Walbro

Min. delivery : 80 l/h at 12 volts and 3 bars

Note that a voltage drop of 1 volt reduces the delivery by about 10 per cent.

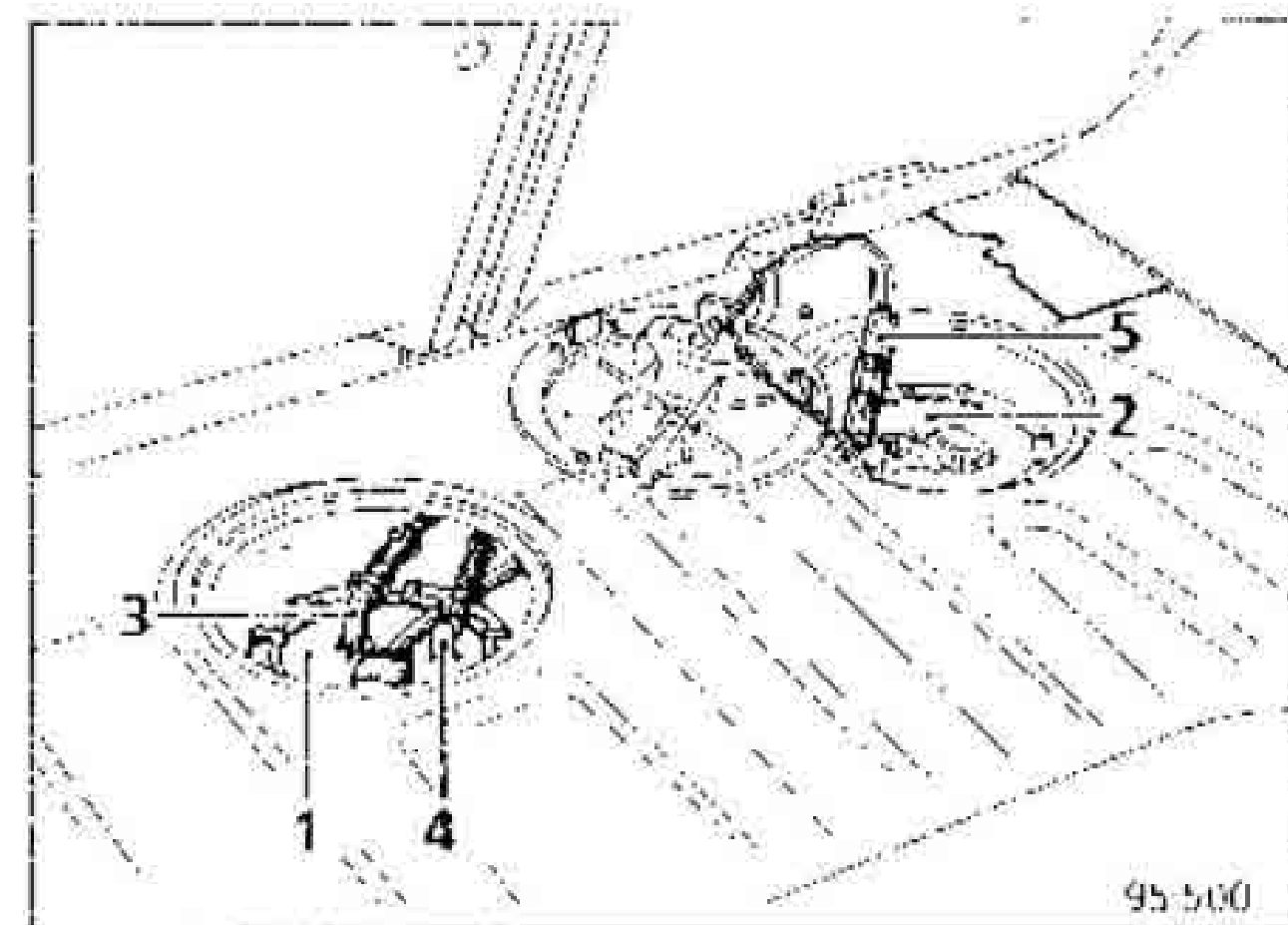
IMPORTANT

While removing and refitting the fuel tank, do not smoke or use heat sources near the working area.

ACCESS

Access to the pump is gained from the vehicle boot having removed the access hole cover.

VERSION 4 x 2



- 1 Pump
- 2 Sender unit
- 3 Pump return pipe
- 4 Tank return pipe
- 5 Intermediate connection

REMOVAL - REFITTING

The pump may be removed directly through the access hole in the boot.

To do this:

Disconnect:

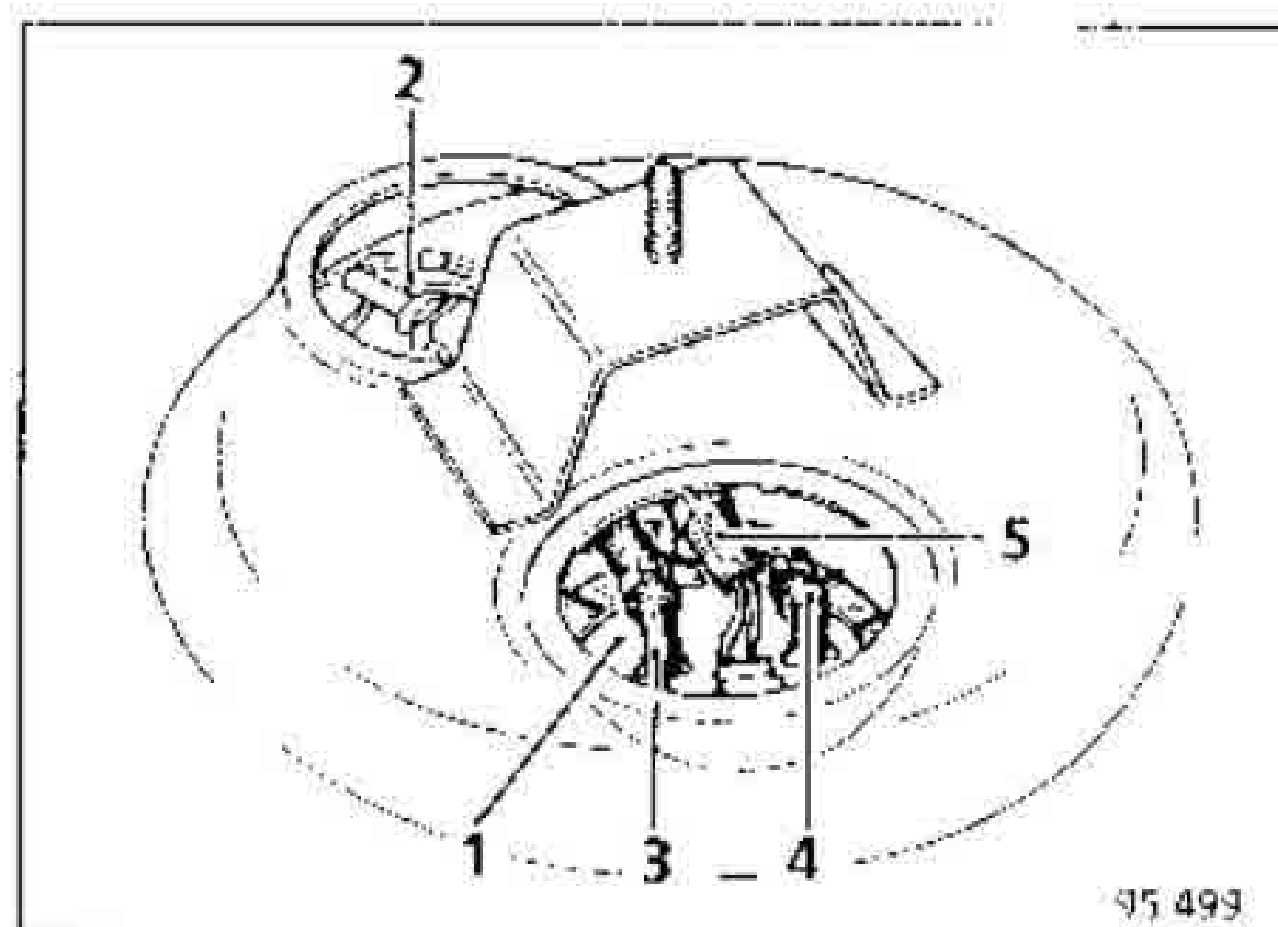
- the battery.
- the connector on the pump.

Remove the collars on the fuel inlet and return pipes

Use tool Mot. 1242 to loosen the pump mounting nut.

Remove the nut, remove the pump assembly.

VERSION 4 x 4



The emergency wheel must be removed to gain access to the fuel pump.

- 1 Pump
- 2 Sender unit
- 3 Pump return pipe
- 4 Tank return pipe
- 5 Intermediate connection

REMOVAL - REFITTING

The pump cannot be removed via the hole in the boot, the tank must be completely removed.

Having disconnected the battery, disconnect the electrical supply to the pump and the two fuel inlet and return pipes, through the boot access hole.

When the fuel tank has been removed, use tool Mot. 1242 to undo the pump mounting nut.

Remove the nut, remove the pump assembly.

REMOVAL - REFITTING

IMPORTANT : The nut must be replaced on the tank immediately after removing the pump as it cannot be replaced after a few minutes have elapsed.

(The hole expands because of the petrol around it if there is no pump mounting nut and the tank must be replaced).

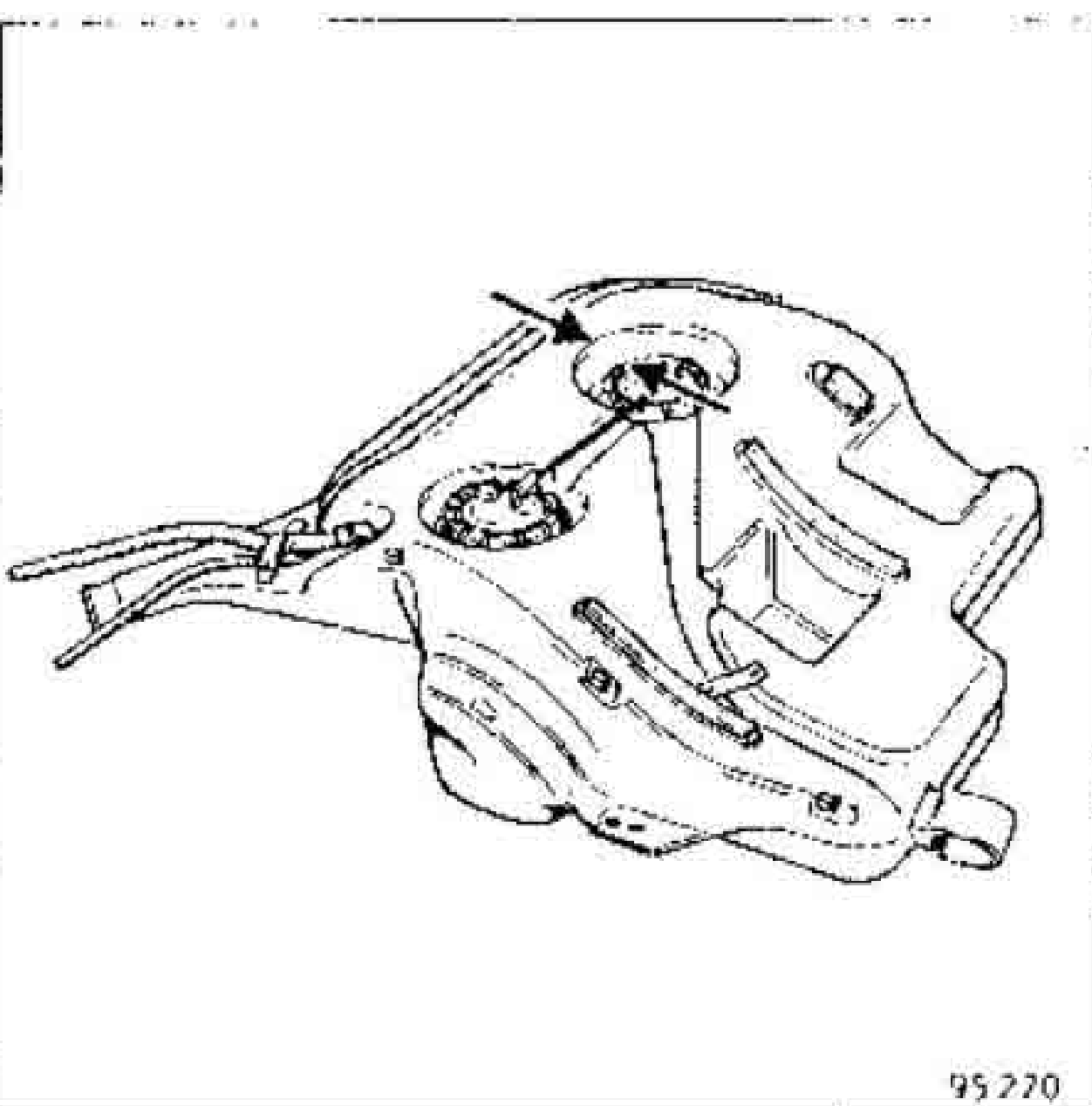
REFITTING

When refitting the pump, the pump seal must be fitted beforehand

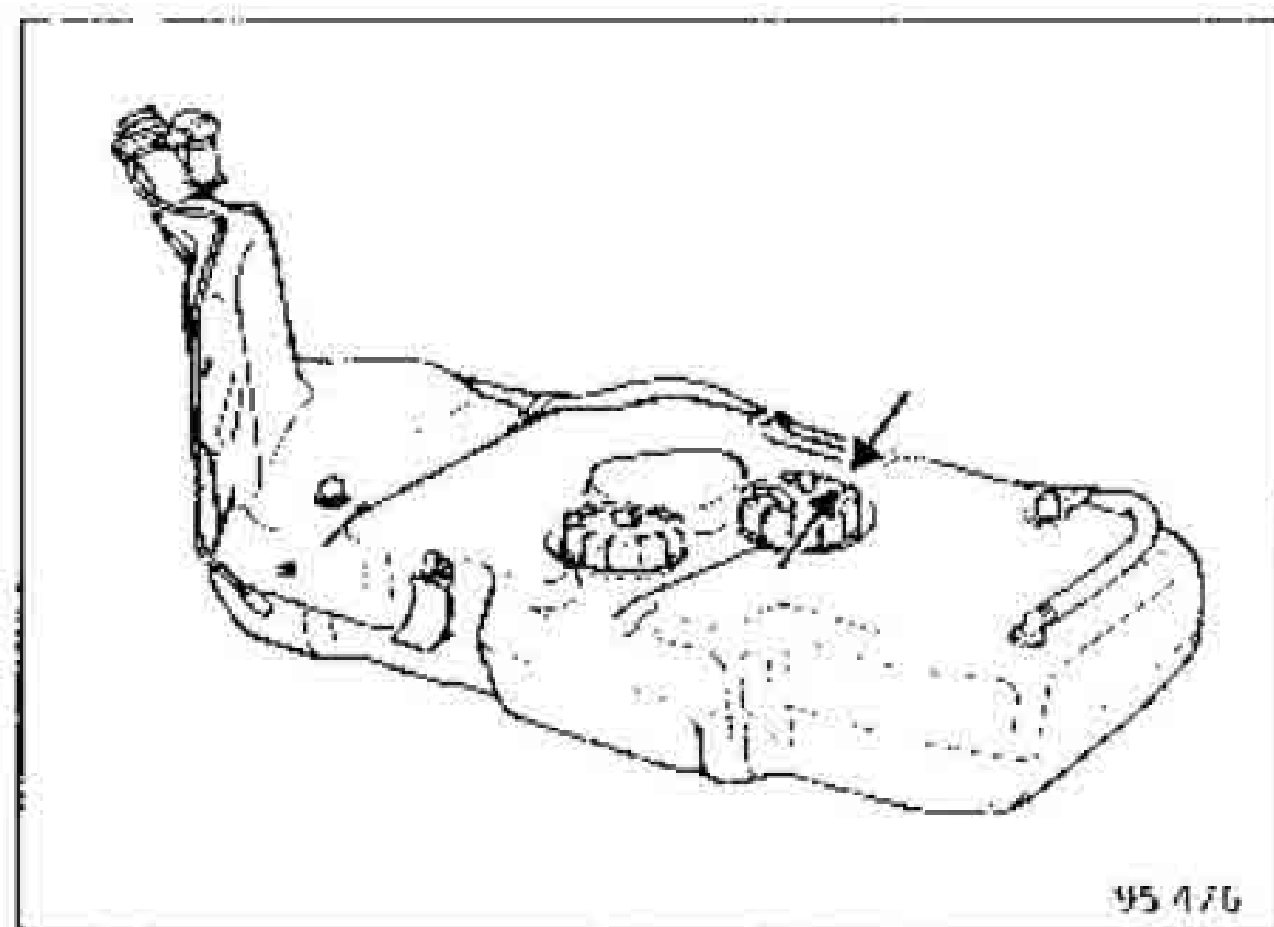
Ensure the seal has not been damaged; replace it if necessary.

Before refitting the pump, locate it correctly following the arrows marked on the pump and tank.

VERSION 4 x 2



VERSION 4 x 4



When the pump is correctly positioned, the nut may be fitted and tightened.

Tightening torque : 5 daN.m max.

To remove and/or tighten the pump nut tool Mot. 1242 must be used.

NOTE: When the pump is in place, the lower part touches the bottom of the fuel tank. To tighten the nut, the pump must therefore be held against the tank.

SPECIFICATIONS

Vehicle	Engine	Injection equipment
B546	J8S 760	Bosch

Description	Make and type	Special notes
Injection pump	VE4/9F2250R423 VE4/9F2250R423-1*	Single piston rotary pump, centrifugal regulator, automatic hydraulic advance, automatic cold start and accelerated idle device and electromagnetic stop, boost pressure flow correction (L.D.A.) (* Vehicle with air conditioning option)
Pump setting (engine at TDC, pump piston stroke)	0,76 ± 0,02 mm	
Injector holders	BOSCH KCA 15566	
Injectors	BOSCH DN OSD306	Setting 150 $\begin{matrix} + 8 \\ + 0 \end{matrix}$ bars, max dev'n 8 bars
Fuel filter	BOSCH or PURFLUX	With integral priming pump
Return pipes		$\varnothing$ external 6 mm $\varnothing$ internal 2 mm length 275 mm
Thermostat (accelerated idle)	VERNET (CALORSTAT)	Travel 7 to 9,5 mm between 15° and 45 °C
Preheating unit	CARTIER or NAGARES	With pre and post heating (3 min max)
Plugs	BERU	Current 15 A approx. after 8 min heating
Plug post heating temperature switch		Circuit opens : 65° ± 2 °C Circuit closes : 55° ± 2 °C
Turbo charger	GARRETT T2	Boost pressure : 1,725 ± 0,025 bar at 4 200 ± 50 rpm Static opening pressure : 850 ± 30 mbars for 0,38 ± 0,02 mm adjusting rod travel

SETTINGS

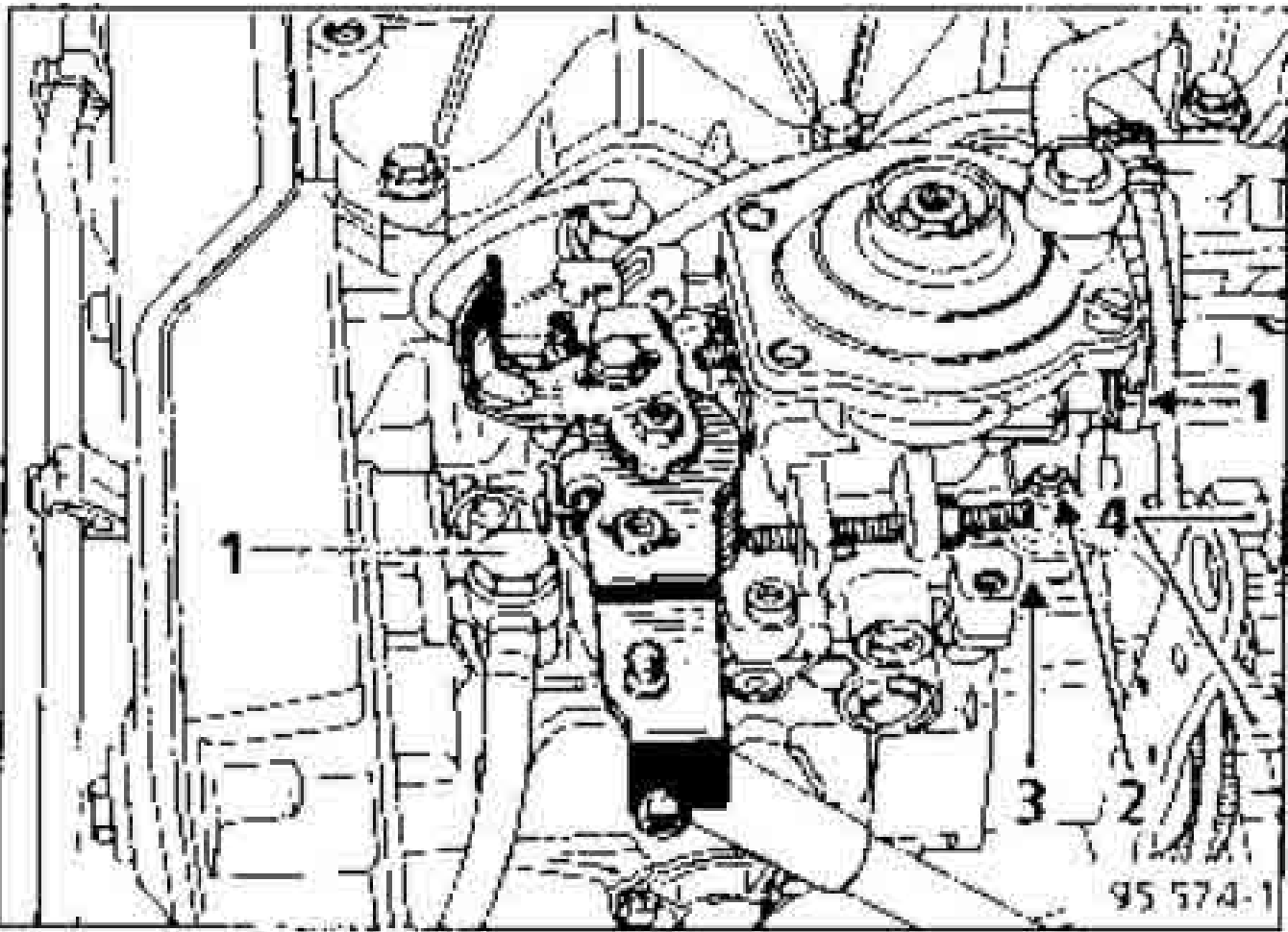
Idle speed	: 850 ± 25 rpm
Accelerated idle	: 950 ± 25 rpm
Max speed:	
– when empty	: 4 700 to 4 900 rpm
– when loaded	: 4 400 to 4 600 rpm

Exhaust fume opacity :

HO CONCEPT Regulation value 1,36 m⁻¹ : 42,5 %

Legal limit 2 m⁻¹ : 55 %

TIGHTENING TORQUES



TIGHTENING TORQUES (in daN.m)



1	Fuel inlet and outlet unions	2,5
2	Electrical stop bolt	2
3	Electrical stop on pump	2,5
4	Injection pipe unions	2,5
	Injector holders on cylinder head	7
	Bolt at end of hydraulic head	2,5
	Pump hub nut	5

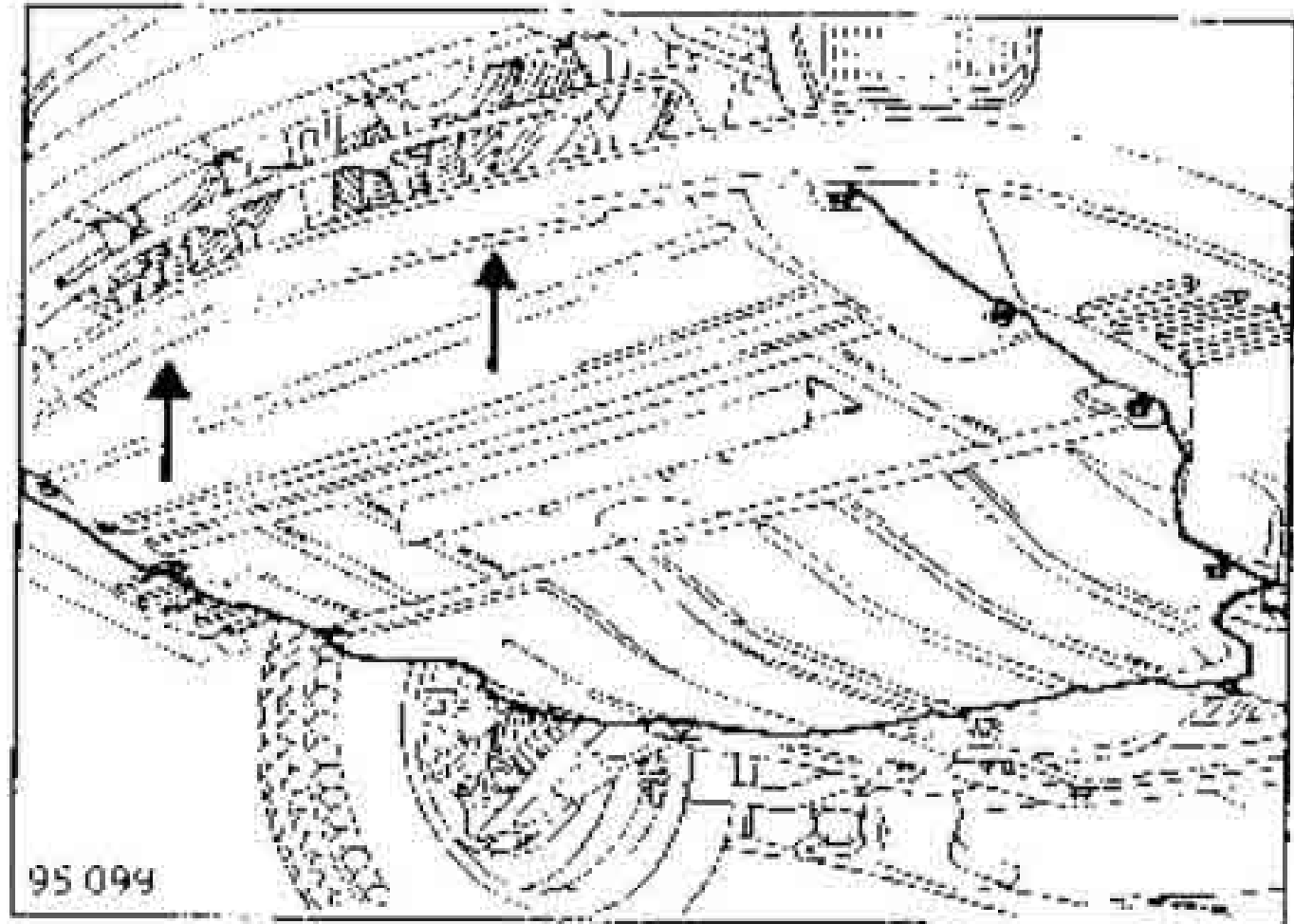
IMPORTANT : the fuel outlet pipe union is marked "OUT". If removing the pump, do not confuse it with the inlet pipe bolt.

REMOVING THE INJECTION PUMP

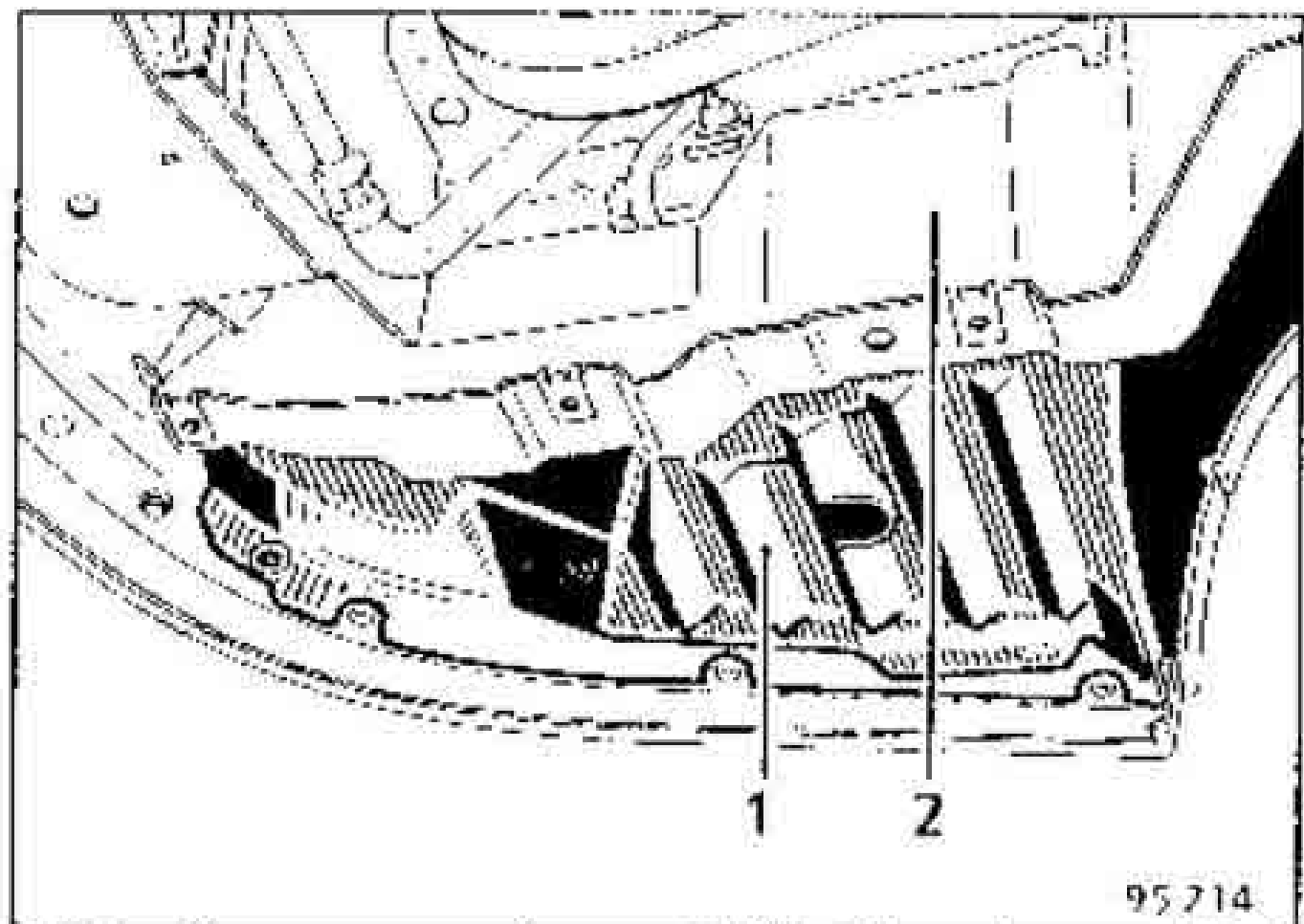
Put the vehicle on a lift and disconnect the battery.

Remove:

- the engine undertray,



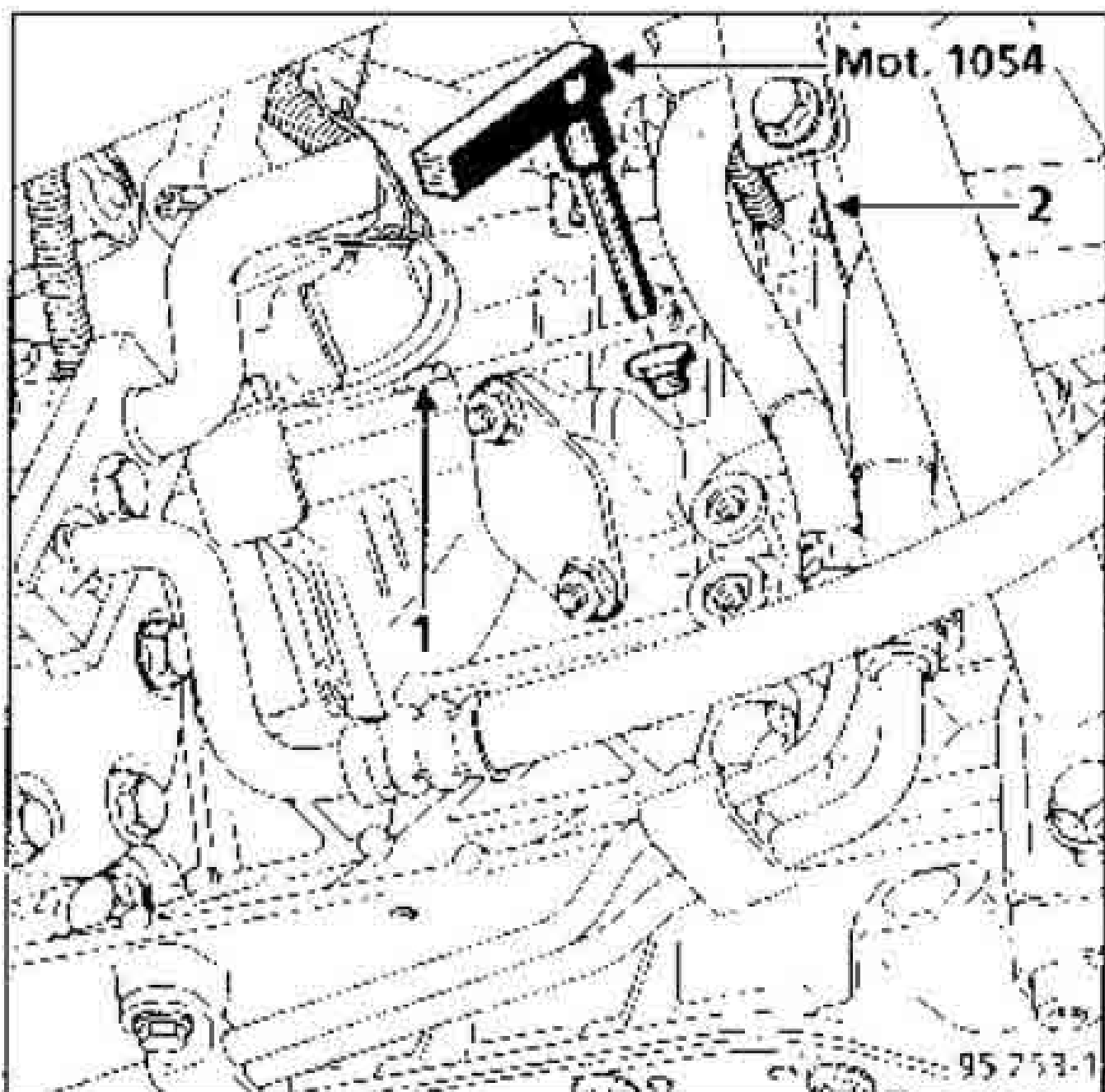
- the two plastic protectors (1) and (2) in the front right hand wheel arch (Remove the wheel to improve access).



Fitting gauge pin Mot. 1054
(Engine at TDC).

Turn the engine to fit gauge pin **Mot. 1054** when the engine is at TDC.

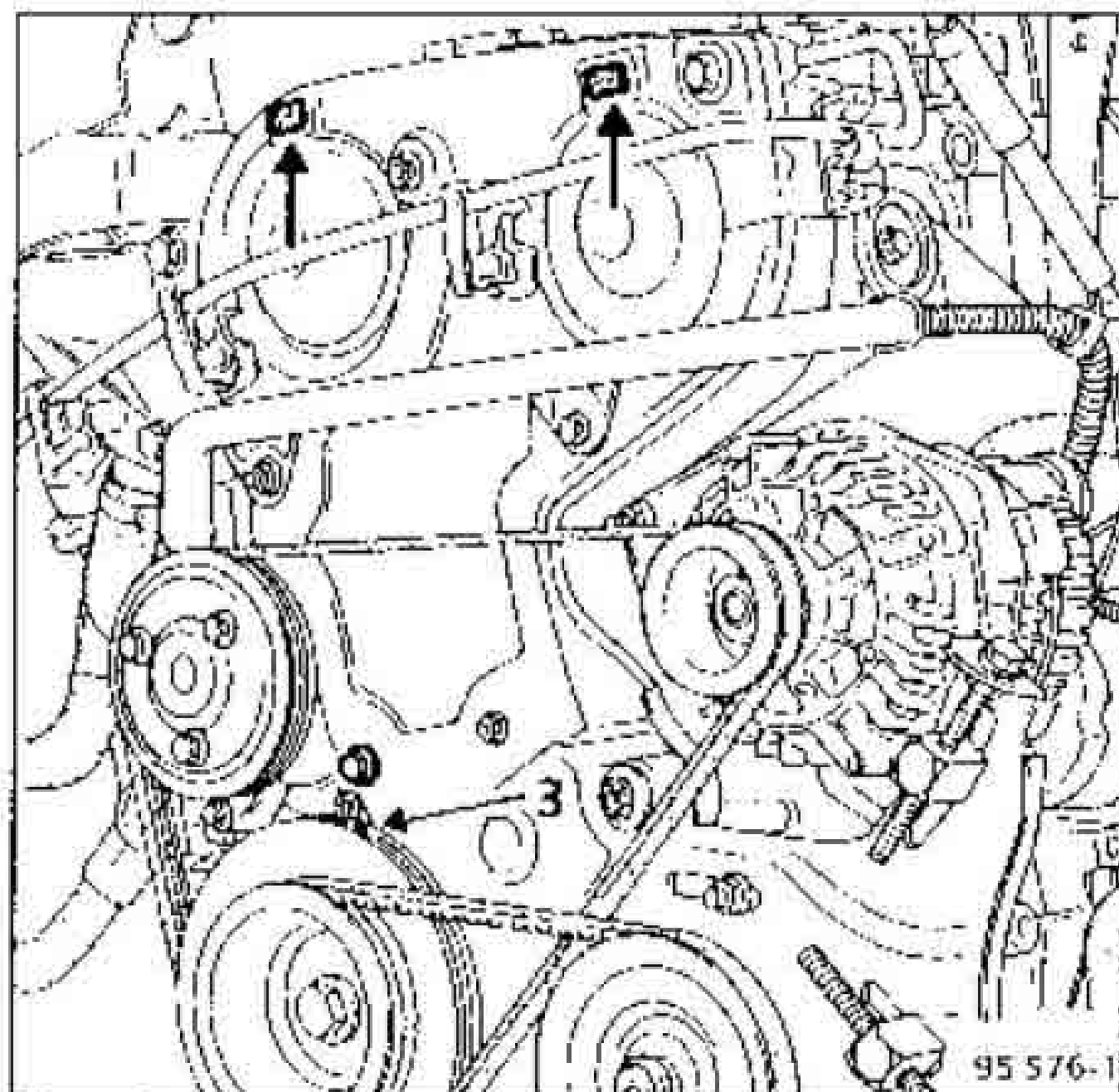
The access plug on the engine unit is located between the vacuum pump (1) and the rear of the starter (2)



NOTE: The TDC mark on the engine flywheel is not directly visible (air filter in the way).

To aid the mechanic, a mark has been located on the rear of the crankshaft pulley (3).

When the engine is at TDC, this mark is opposite a timing cover mounting bolt.



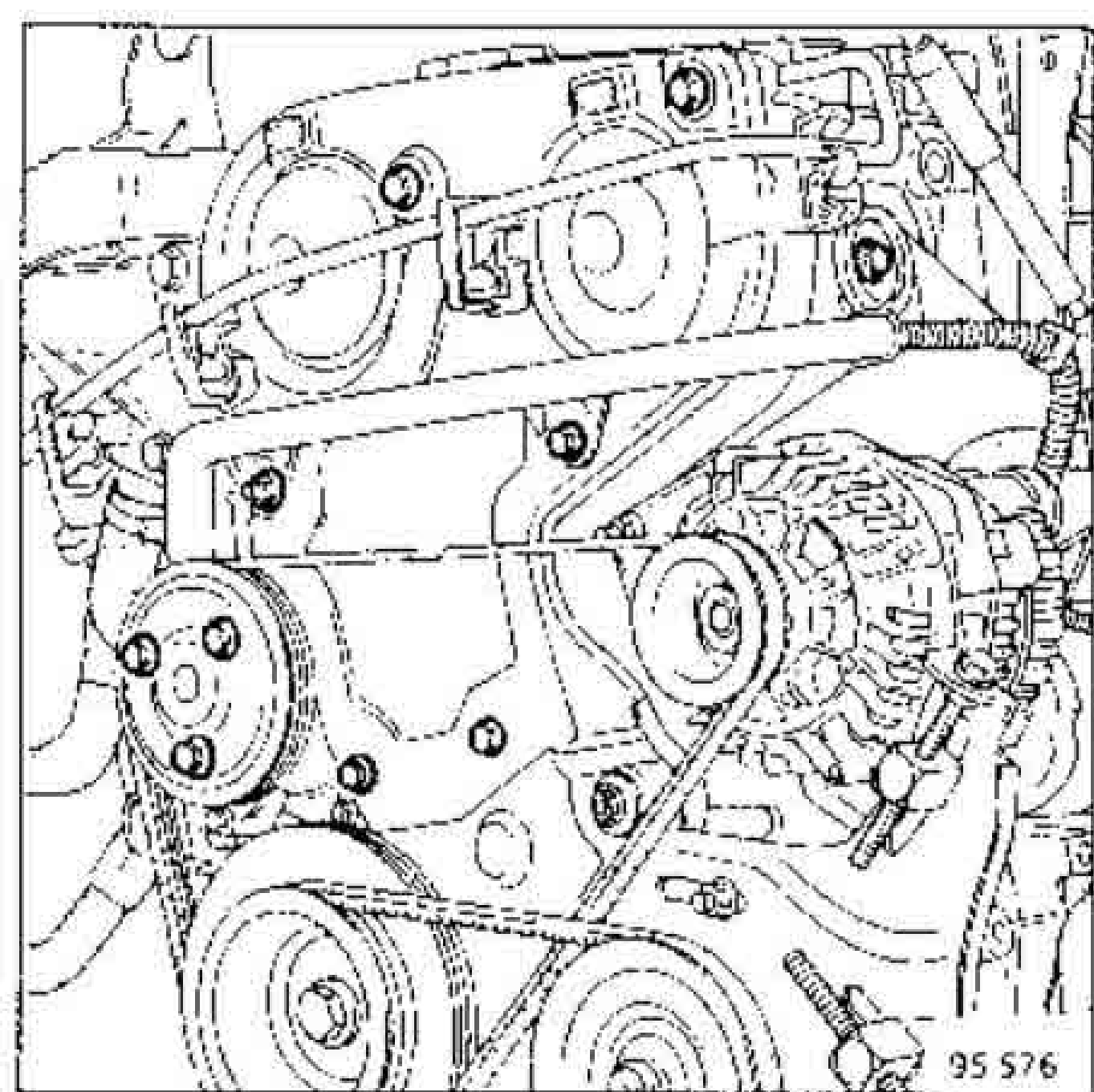
IMPORTANT : at TDC on cylinder N° 1, the marks on the pump sprockets and camshaft sprockets can be seen through the timing cover holes (see diagram).

REMOVING THE TIMING COVER

The water pump pulley must be removed to remove the timing cover.

To do this, tighten the belt more than normal and undo the three bolts.

Remove the belt and the pulley.



Remove the fuel inlet and outlet pipes from the cover.

Remove:

- the cover mounting bolts,
- the cover, bringing it upwards and tilting it forwards (To facilitate this operation, remove the inter-cooler outlet pipe).

REMOVING THE INJECTION PUMP

Remove:

- the fuel inlet and return unions as well as the boost pressure corrector pneumatic pipe bolt,
- the high pressure pipes.

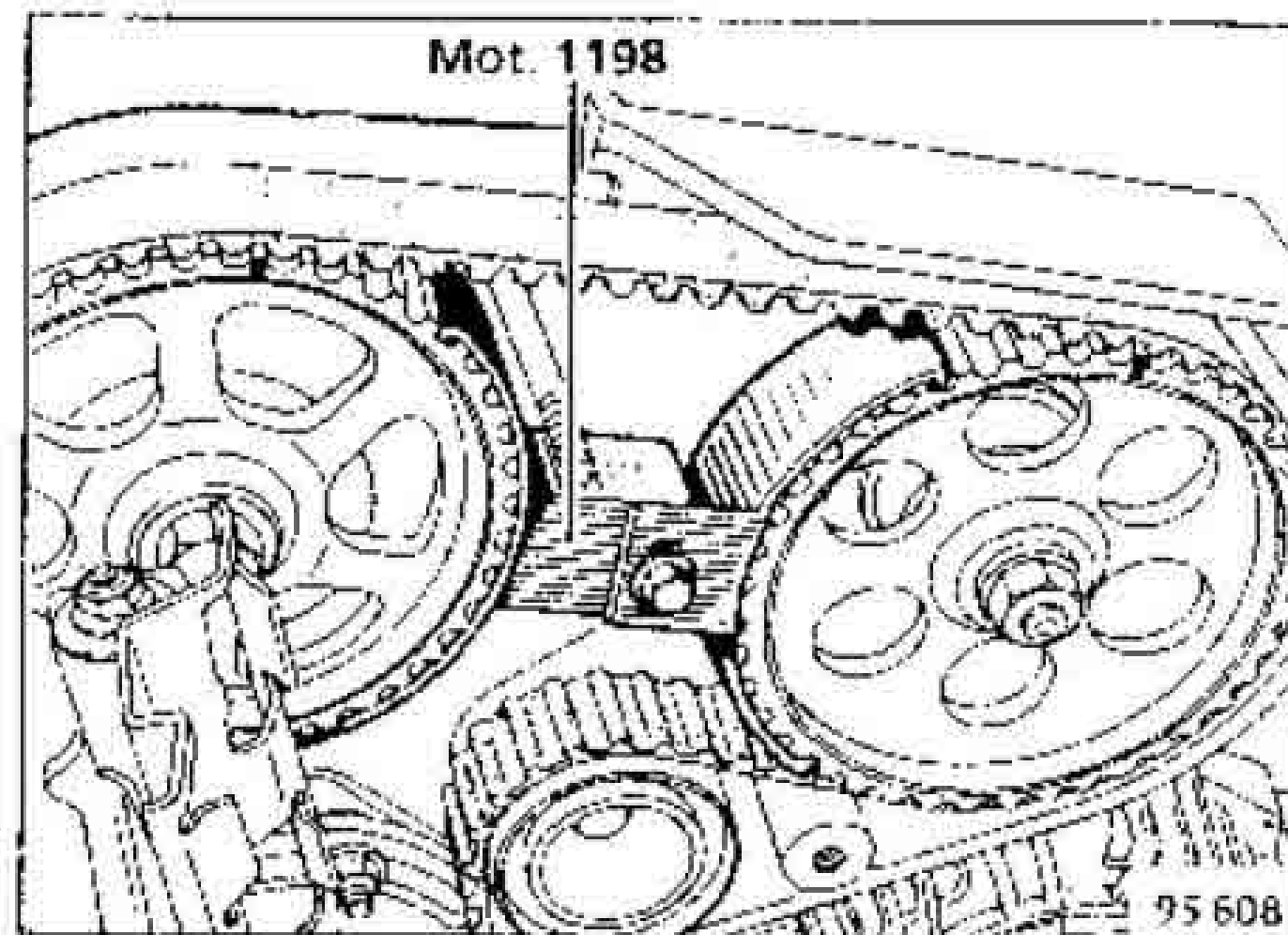
Disconnect the electrical stop and the 3 track connector at the rear of the pump.

Remove:

- the accelerator control cable and the accelerated idle speed cable grip,
- the rear pump support.

Remove the TDC pin Mot. 1054 and turn the gear back one tooth.

Fit tool Mot. 1198 for locking the pump gear and loosen the pump hub nut by about one turn.



Fit extractor Mot. 1053 ; loosen the gear and remove the hub nut.

Remove the three pump mounting bolts (use Mot. 909-01).

Remove the pump.

REFITTING AND SETTING THE PUMP

Before refitting the pump, turn the shaft so that the key is aligned with the outlet of cylinder N° 1.

Having turned the pump gear back one tooth allows the pump to be fitted correctly on the mountings.

Fit the pump on its mountings and insert the bolts but do not tighten them.

Refit the hub nut and torque tighten to **5 daN.m**.

Remove tool Mot. 1198.

Fit the dial gauge base Mot. 856 at the end of the injection pump and attach a dial gauge.

Turn twice in the engine rotation direction, and zero the dial gauge on a BDC pump piston point.

Fit pin : **Mot. 1054** when the engine is at TDC on cylinder N° 1.

In this position, turn the pump on its mountings to obtain a pump piston travel of **0,76 ± 0,02 mm**.

Tighten the pump mountings and turn the pump gear twice to check the pump setting.

NOTE : the plug at the end of the hydraulic head must be fitted with a new copper seal when refitting, Part No. : 50 00 242 149.

REFITTING THE PUMP

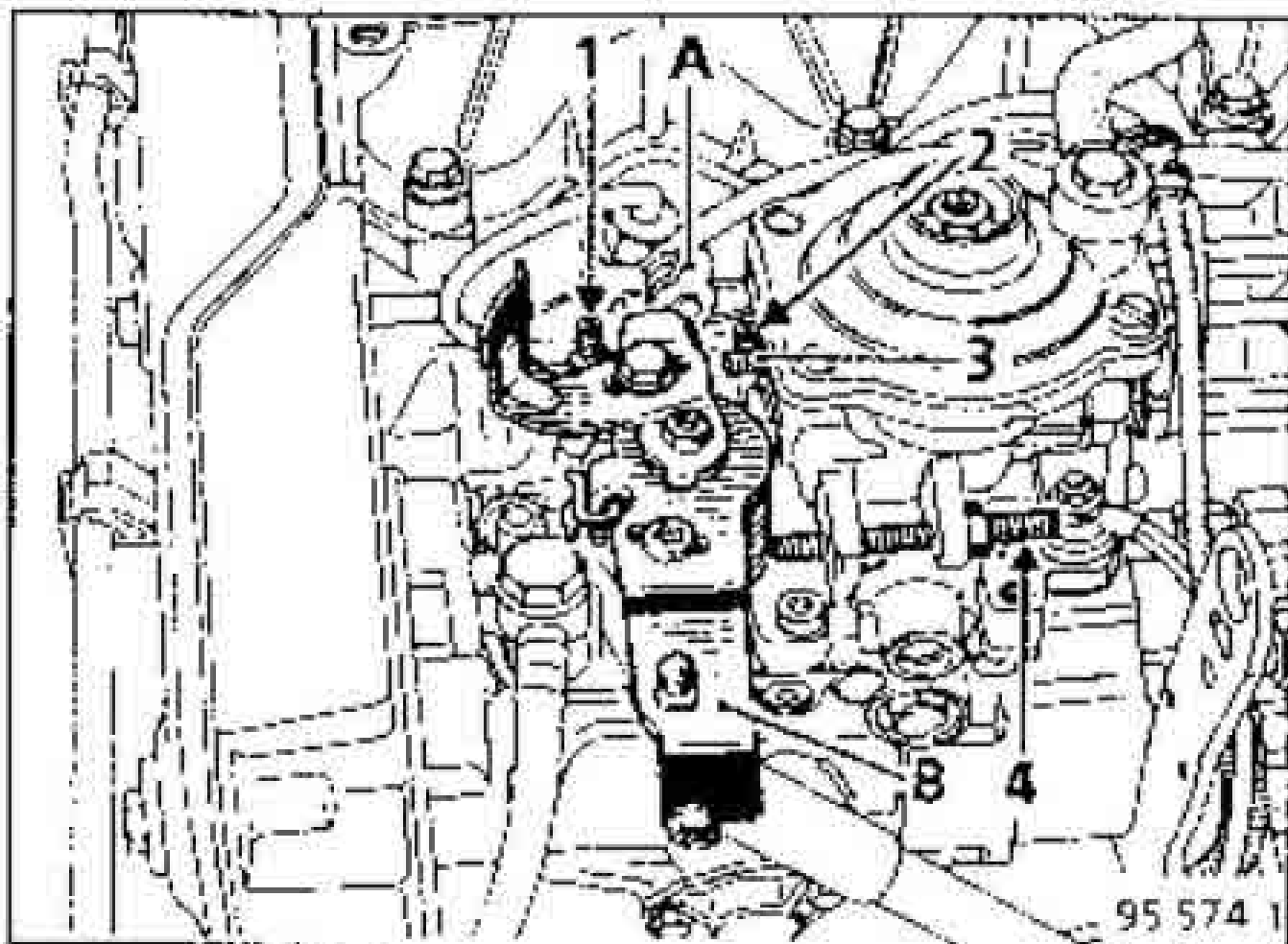
Refitting is the reverse of removal.

Special notes:

- the mounting bolts for the water pump pulley should be refitted using **LOCTITE FRENETANCH** (blue) and torque tightened to **4 daN.m**,
- the accelerated idle cable grip setting should be made when the engine is warm (see page 13-18).

ENGINE SPEED SETTINGS

IDLE SPEED SETTING - ACCELERATED IDLE - ANTI-STALL



- A** Idle and accelerated idle speed lever
B Accelerator lever
1 Accelerated idle speed adjustment stop bolt
2 Normal idle speed adjustment stop bolt
3 Residual flow stop bolt (anti stall)
4 Max. speed stop bolt (not adjustable except in injection centre)

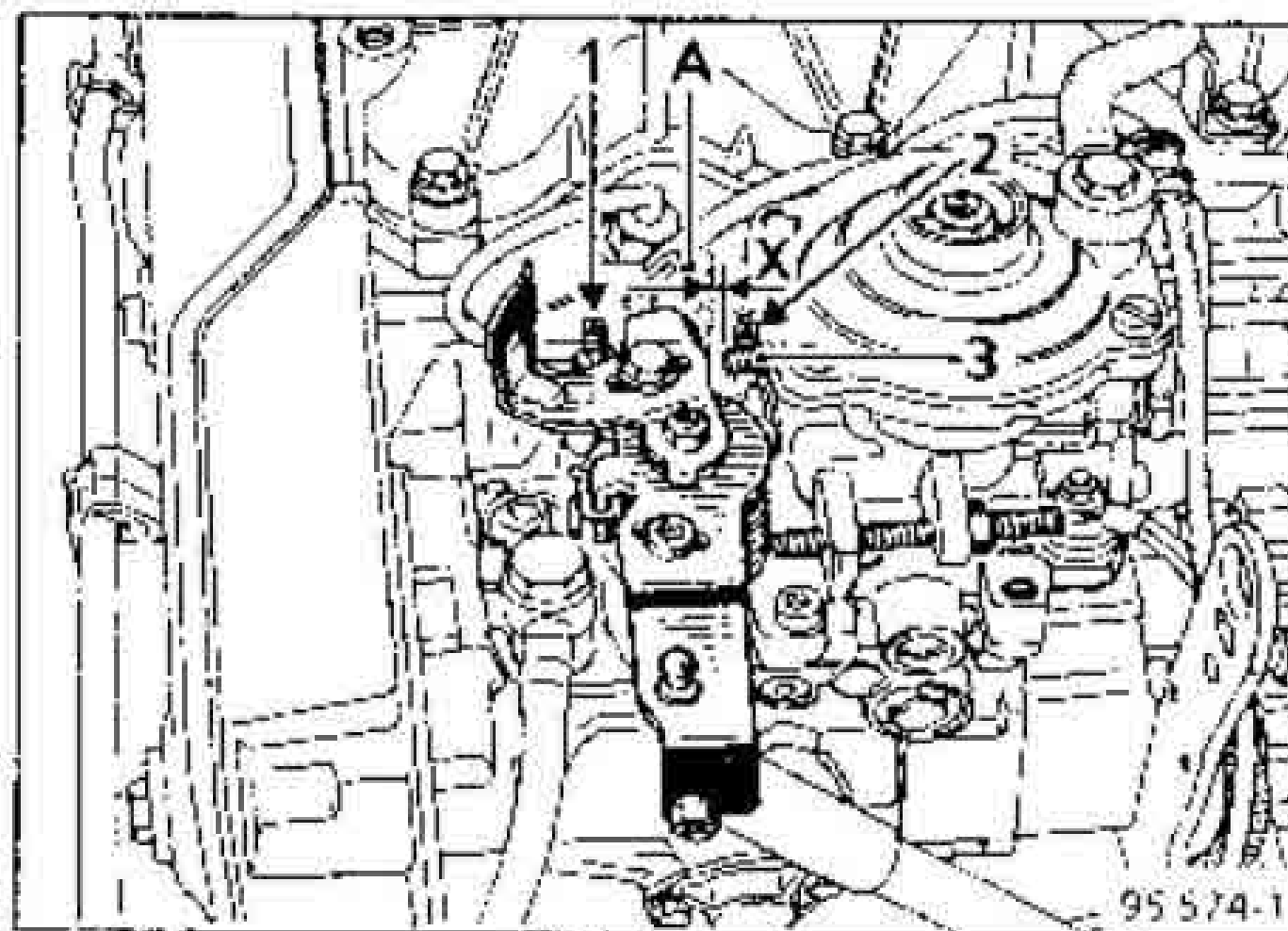
ADJUSTMENT OF IDLE SPEED AND ANTI-STALL (Residual)

These adjustments must be made when the engine is warm and after the engine cooling fan has operated at least twice.

Procedure :

- check that lever (A) is against the stop bolt (2). (see adjusting the accelerated idle cable grip),
- move this bolt to obtain an engine speed of 850 ± 25 rpm.
- fit a 4 mm shim between the load lever (B) and the stop bolt (3).
Move the bolt (3) to give an engine speed of 1400 ± 50 rpm.
- remove the shim.

- accelerate sharply several times then return the engine to idle speed
- check the idle speed and adjust when necessary to 850 ± 25 rpm using bolt (2),
- refit the 4 mm shim (X) and check the engine speed stabilises at 1400 ± 50 rpm



ADJUSTING THE ACCELERATED IDLE SPEED (Engine warm)

Set lever (A) against the stop bolt (1).

Check the accelerated idle speed and adjust where necessary to 950 ± 25 rpm using bolt (1).

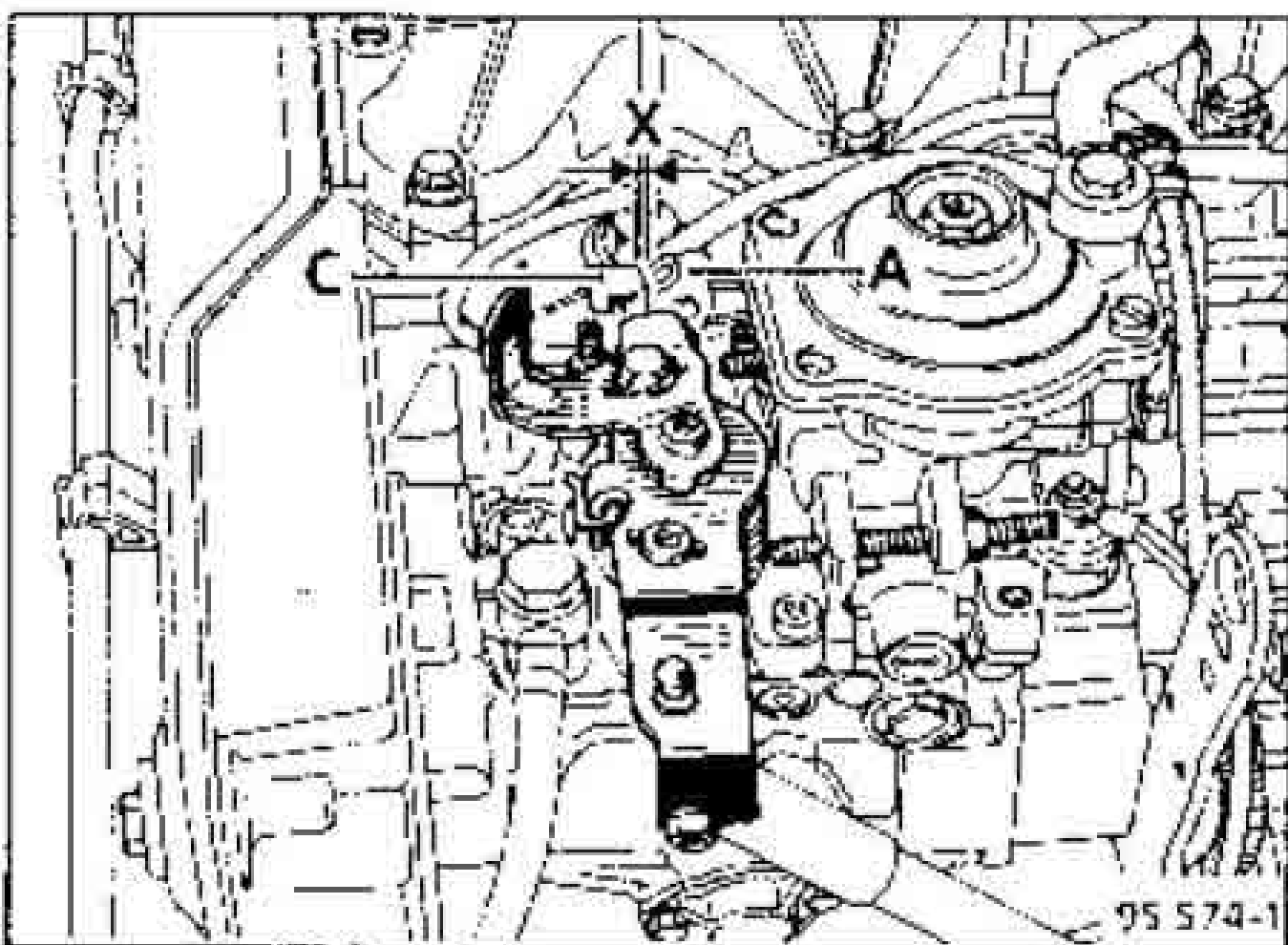
ADJUSTING THE ACCELERATED IDLE CABLE GRIP POSITION

(Operation carried out with engine warm after previous tests) :

Hold the cable taut and position the cable grip (C) at distance (X) from the lever (A).

Vehicles without air conditioning :
 $X \approx 6 \text{ mm}$

Vehicles with air conditioning (bellows) :
 $X \approx 2 \text{ mm}$



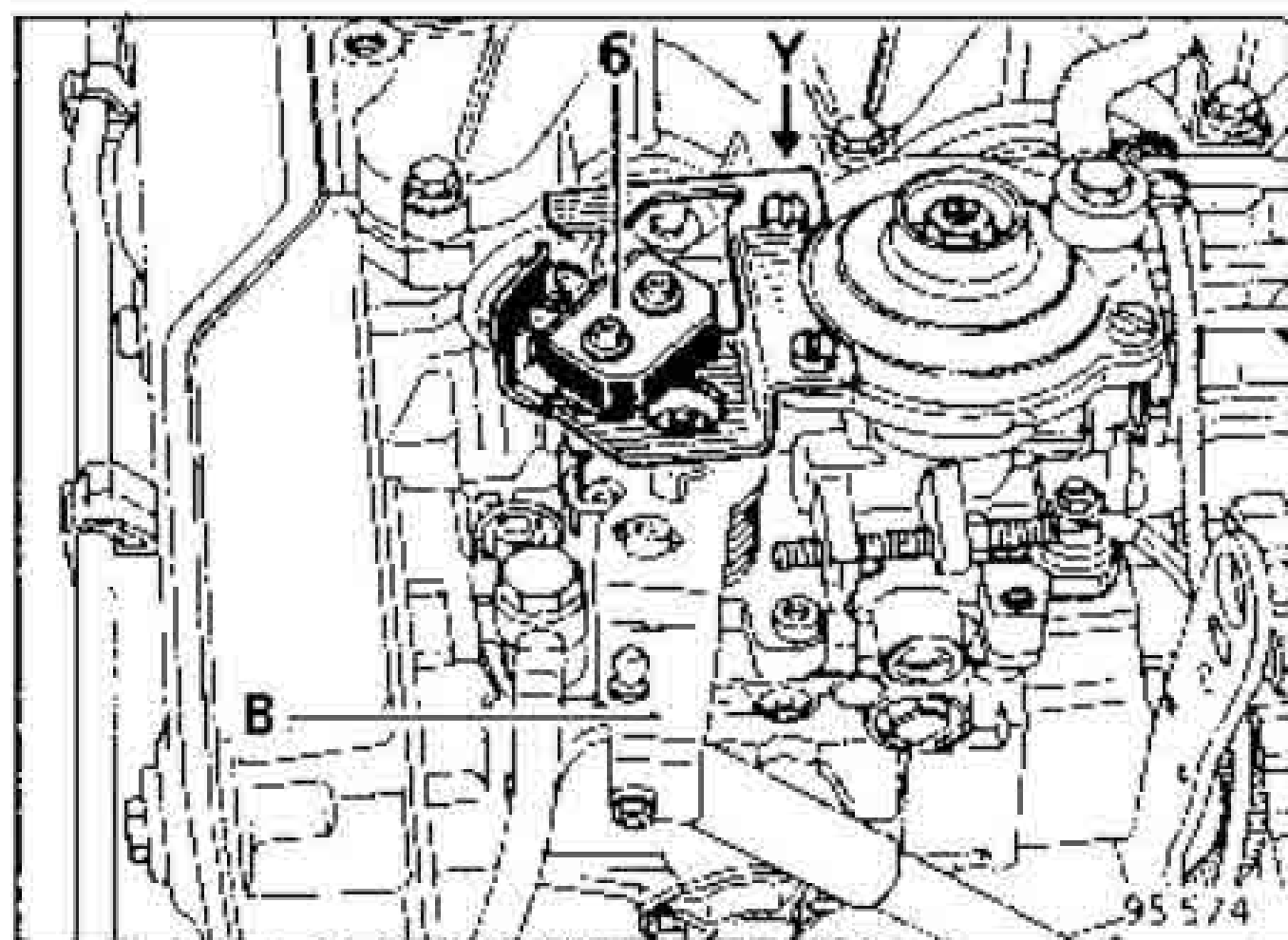
ADJUSTMENT OF PRE POST HEATING MICROSWITCH (6)

Adjusting or checking the microswitch must be carried out :

- when it is replaced,
- when replacing burnt out heater plugs,
- after working on the pump (by Renault Injection Centre).

Use an ohmmeter.

Fit a shim (Y) between the load lever (B) and the stop bolt (3).



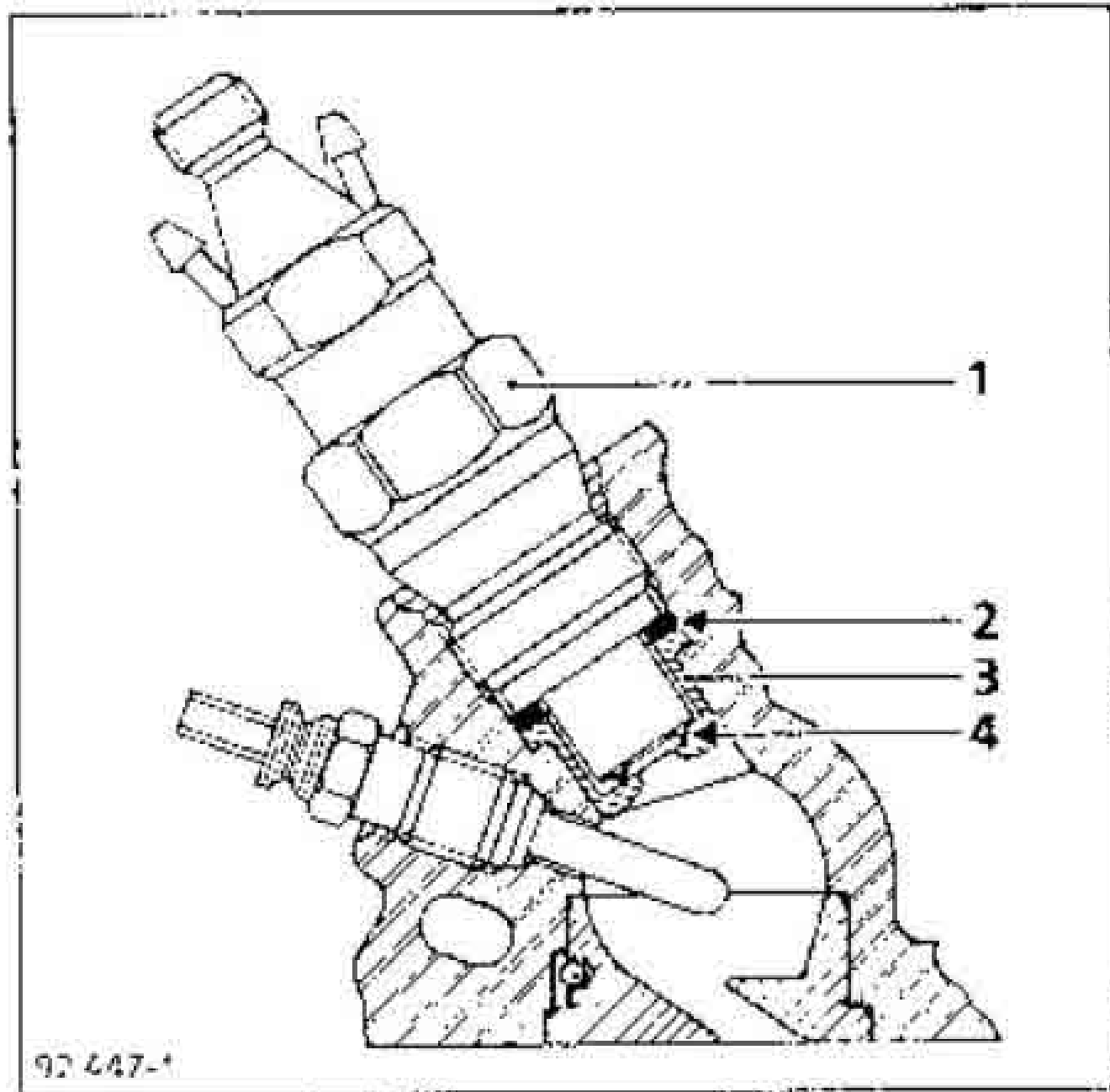
Shim Y in mm	Microswitch	Ohmmeter
7,5	Closed	0 Ω
8,5	Open	Infinity

Adjustment is made by moving the microswitch on its mounting.

Unscrew the bolt and move the microswitch until the correct values are obtained.

SPECIAL NOTES

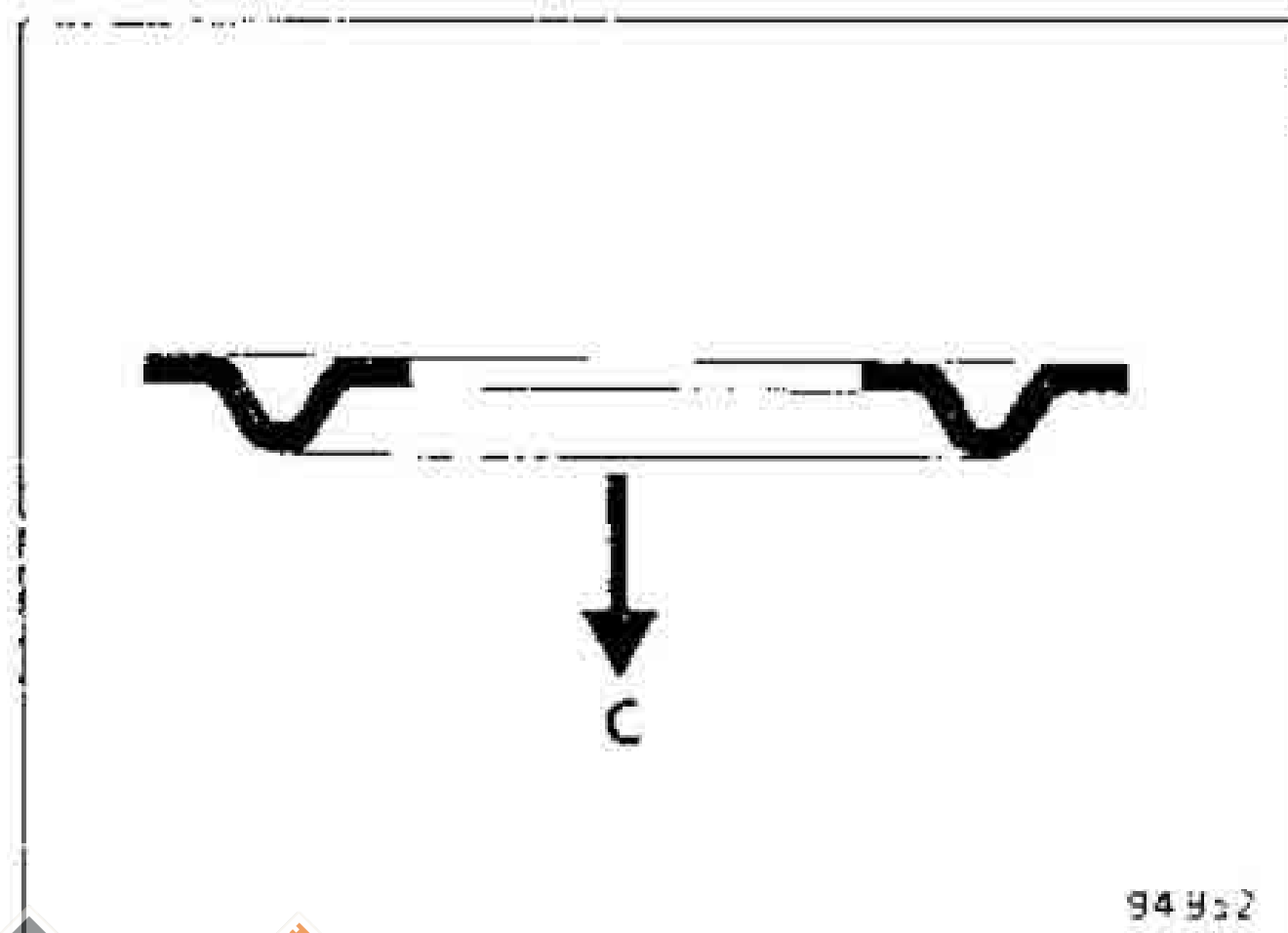
The J85 engine cylinder head is designed to receive threaded injector holders of type Bosch "KCA".



- 1 Threaded injector holder
- 2 Copper seal
- 3 Flame baffle sleeve
- 4 Flame baffle washer

The latest design of flame baffle washer must be fitted with this type of injector holder.

ENSURE CORRECT FITTING DIRECTION



NOTE: Each time the injector holder is removed and refitted, fit a new seal and flame baffle washer.

IMPORTANT : tighten the injector holder to a torque of 7 daN.m using tool Mot. 997.

TOPPING UP THE CIRCUIT

Oil type to be used :

- ELF RENAULT MATIC D2 or
- MOBIL ATF 220.

CAPACITY

- 1,1 l separate reservoir,
- 0,7 l integral reservoir.

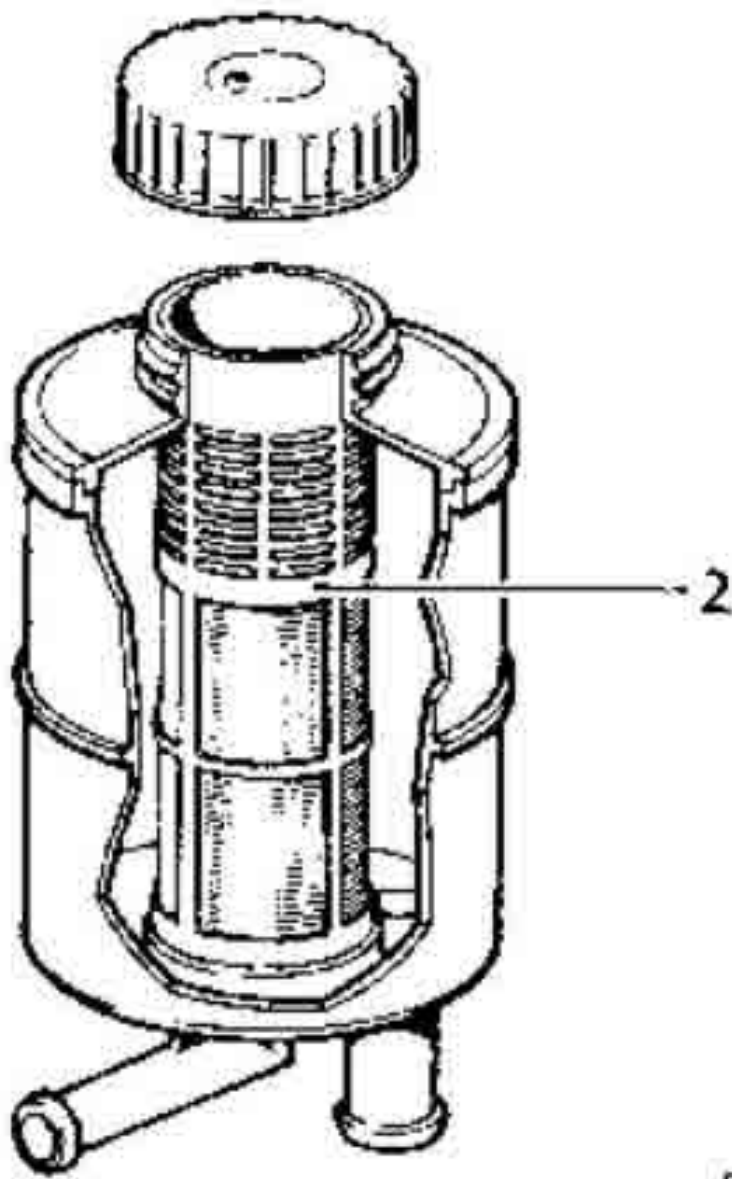
Topping up the circuit

Top up the oil reservoir (to 3/4), using a filter and mesh of 15/100 to avoid the introduction of impurities into the oil.

Start the engine and turn the steering wheel gently from lock to lock.

Top up the level and check the circuit for leaks.

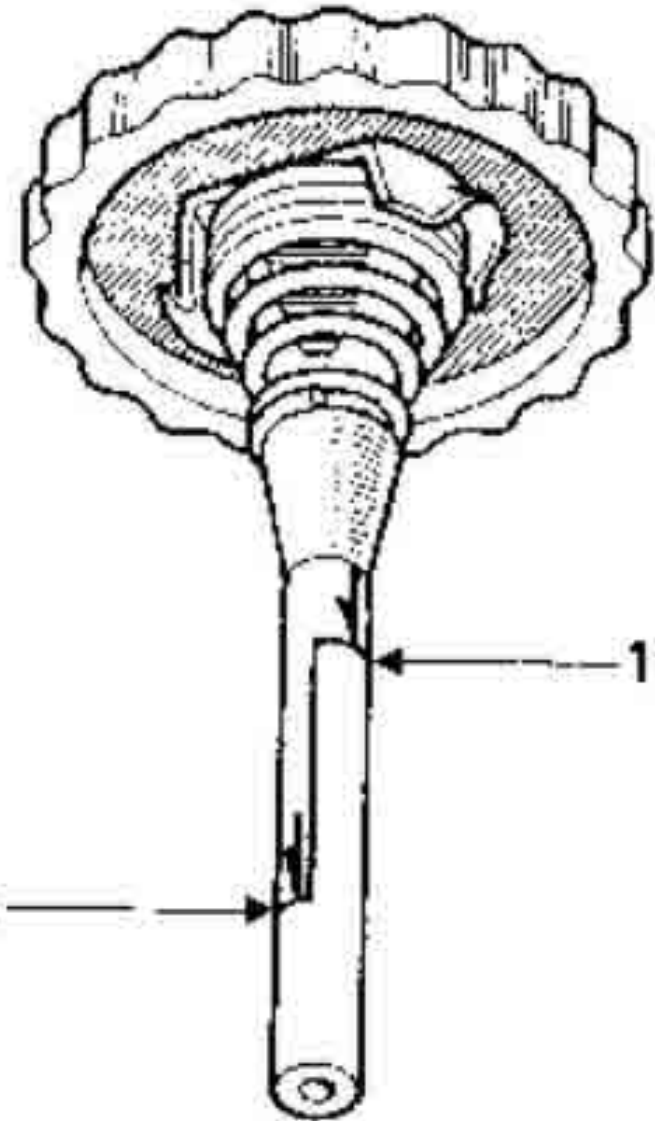
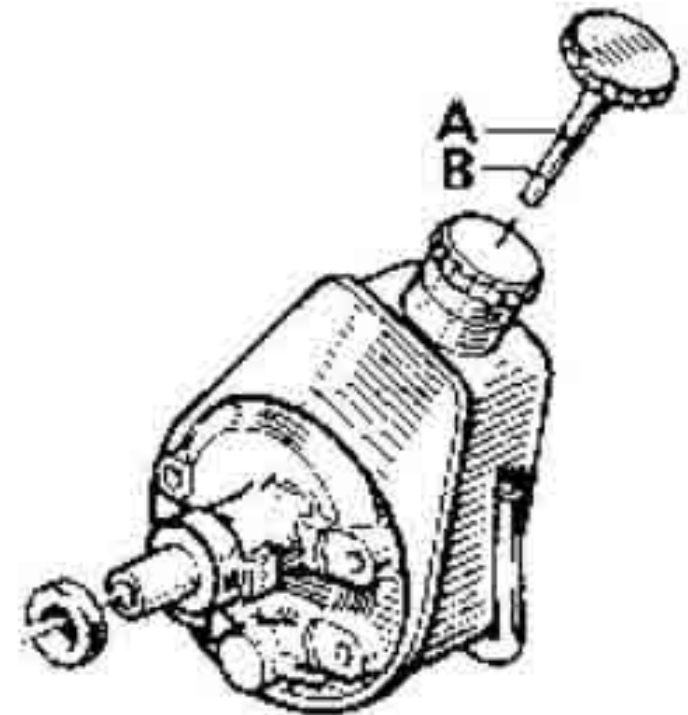
SEPARATE RESERVOIR



91 662

The oil should be visible at the level of the filter sleeve rim (2).

INTEGRAL RESERVOIR



77 404-1

- when cold : the level should be on the mark (2) "FULL COLD",
- when warm : the level should be on the mark (1) "FULL HOT".

CHECKING THE OIL PRESSURE

FAULT FINDING

The most common fault is lack of power.

The causes for lack of power can be checked by checking the oil pressure during the following operations :

- no action on the steering wheel
- full steering wheel lock.

1 - No action on the steering wheel

Whatever the engine speed, the pressure should not exceed 5 to 7 bars.

- at idle speed : pressure too high
➔ faulty valve,
- when accelerating : pressure too low
➔ faulty regulator.

2 - Full steering wheel lock

This operation should not be carried out over a long period to avoid overheating the oil.

When the steering wheel is turned in one direction only, the pressure should lie in a certain range (see page 13-23).

When turning to one side and then the other, the pressure difference should not exceed 5 bars.

- pressure too low and pressure gauge needle wavers :
➔ faulty regulator,
- pressure too low but pressure gauge needle does not waver :
➔ - drive belt slack,
- faulty valve,
- cylinder internal leak,
- pressure difference when turning to either side :
➔ faulty valve.

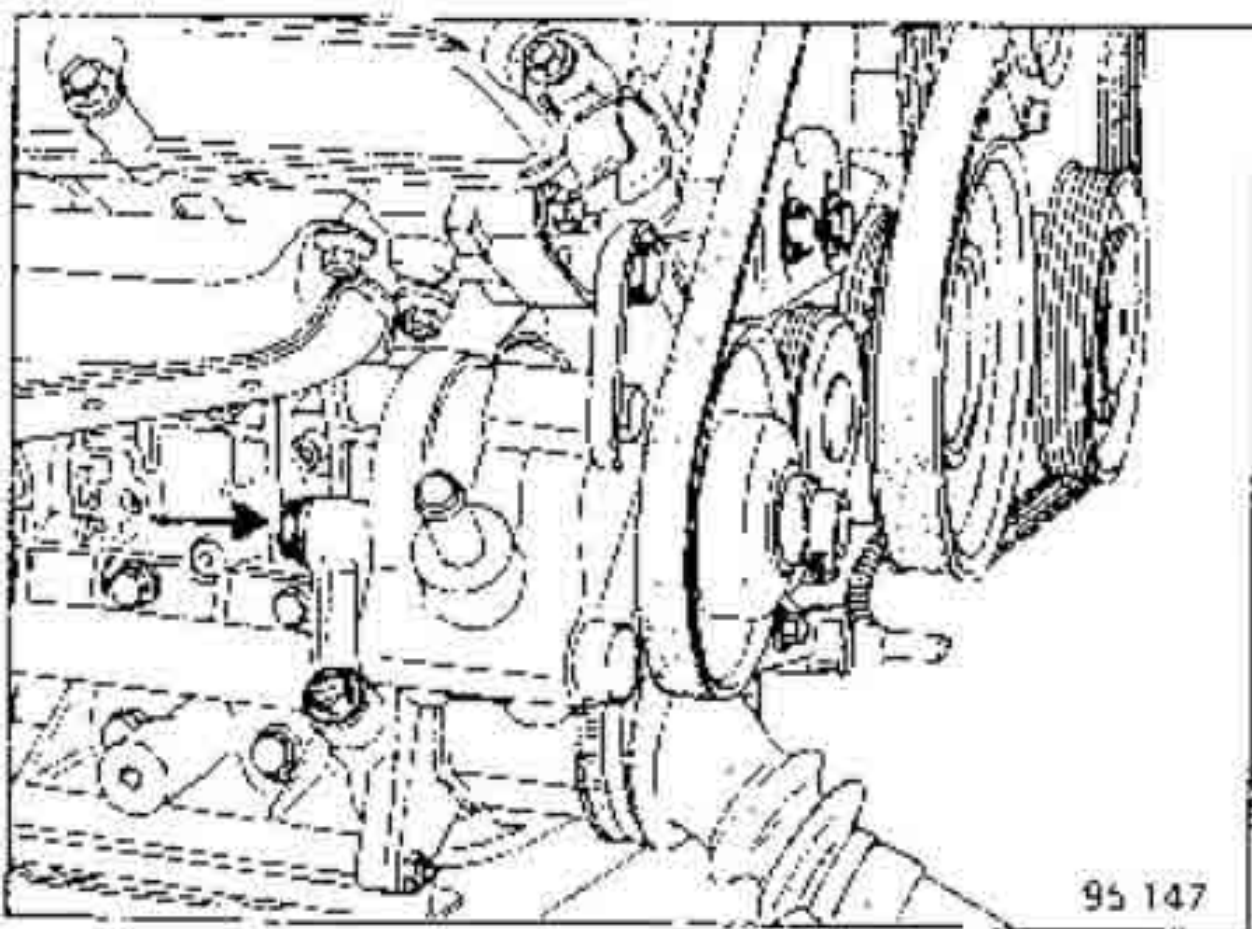
CHECKING THE OIL PRESSURE

SPECIAL TOOLING REQUIRED		
Dir.	803	Metric thread union
Dir.	1 204	Pressure measuring union
Mot.	453 - 01	Hose clamps
Fre.	1 085	Pressure gauge
	or	
Fre.	244 - 03	Connecting pipe
Fre.	284 - 06	

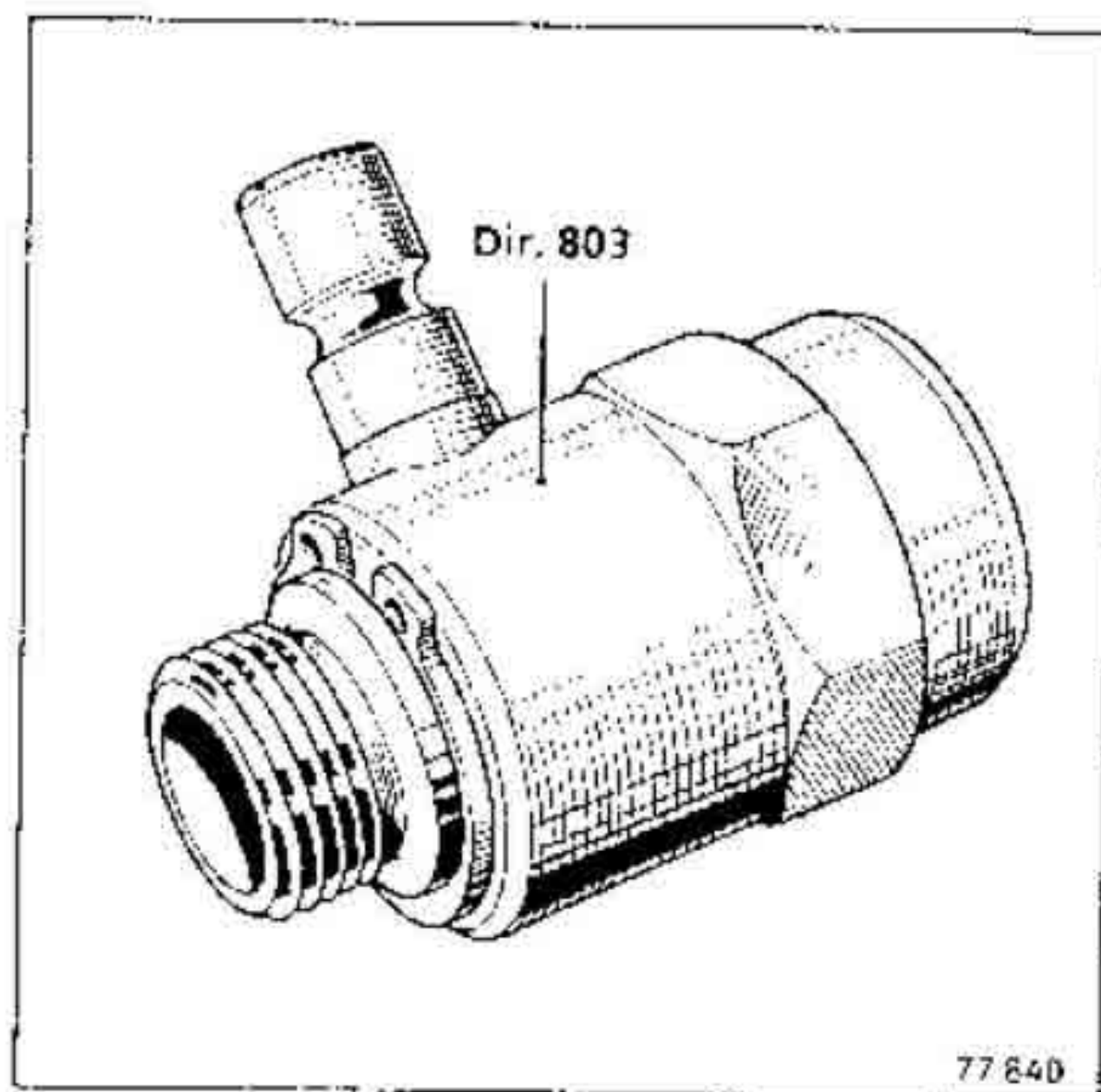
Fit clamp **Mot. 453-01** on the pump low pressure pipe.

A) V6 engine

Disconnect the high pressure pipe (oil will run out).



Fit the union **Dir. 803** (metric thread) between the pipe and the pump.

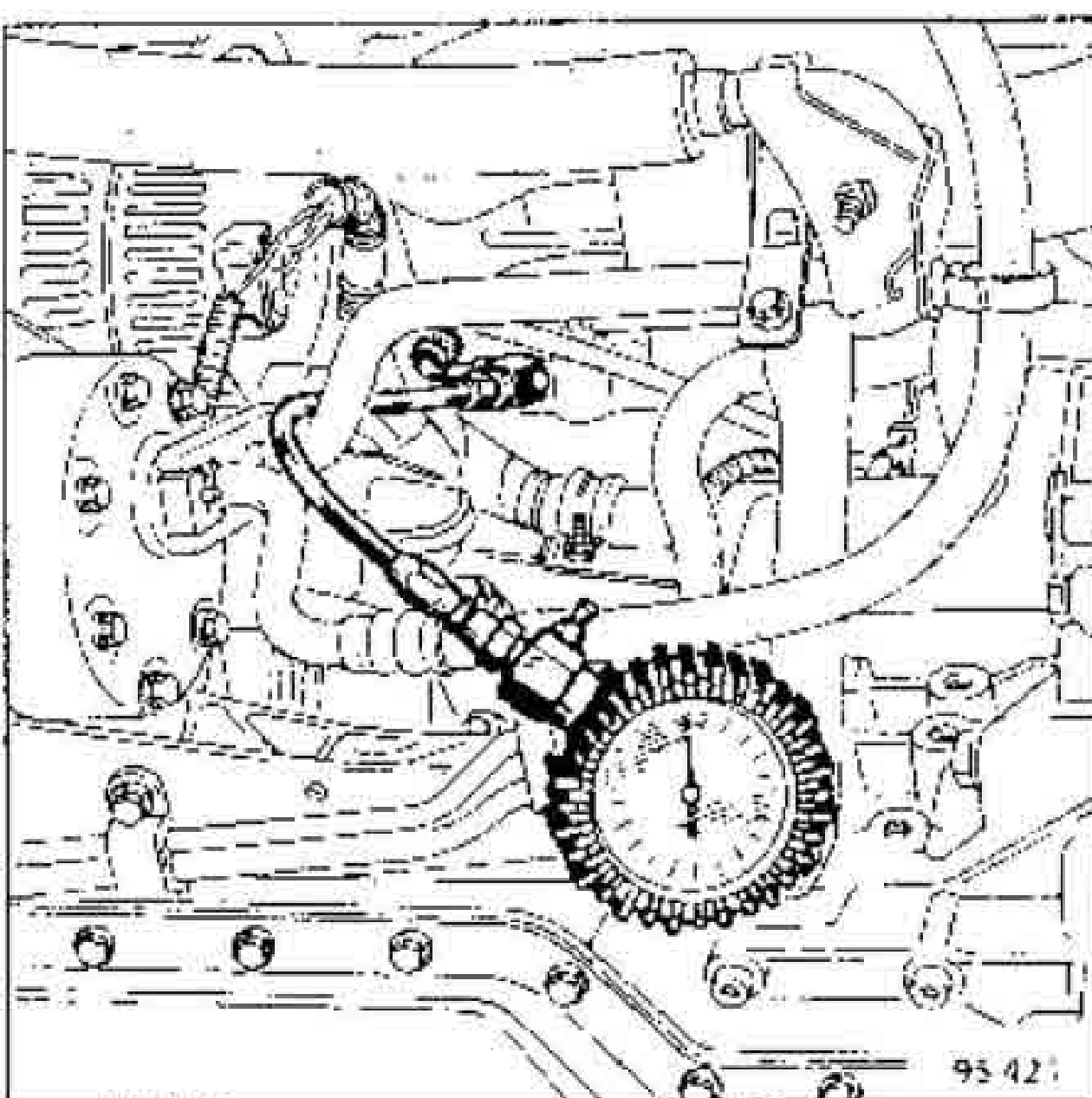


Connect the pressure gauge **Fre. 1 085** or **Fre. 244-04**.

CHECKING THE OIL PRESSURE (cont)

B) 4 cylinder engine (J engines)

On the rigid pipe (high pressure) from the pump remove the pressostat and connect the pressure measuring union Dir. 1204 and the oil pressure gauge Fre. 1 085 or Fre. 244-04.



Oil will run out.

ALL TYPES

Remove clamp Mot. 453-01 (V6 engine).

Top up the oil level and run the engine to check the oil pressure.

Wheels straight, whatever the engine speed, the pressure should not exceed : 5 to 7 bars

Wheels locked to one side, held in position, the maximum pressure should be : 86 to 93 bars.

This operation should not be carried out over a long period to avoid overheating the oil.

Remove union Dir. 803 or Dir. 1204 and the pressure gauge by cutting the supply to the pump using a clamp Mot. 453-01 (V6 engine).

Reconnect the high pressure pipe or the pressostat (depending on the case) and remove clamp Mot. 453-01.

Top up the reservoir oil level.

SPECIAL TOOLING REQUIRED

Mot. 453-01

Hose clamp

TIGHTENING TORQUES (in daN.m)



Pump mounting bolt	4,5
Rear support mounting bolt	2,5
Tensioner mounting bolt	2,5

REMOVAL

Remove:

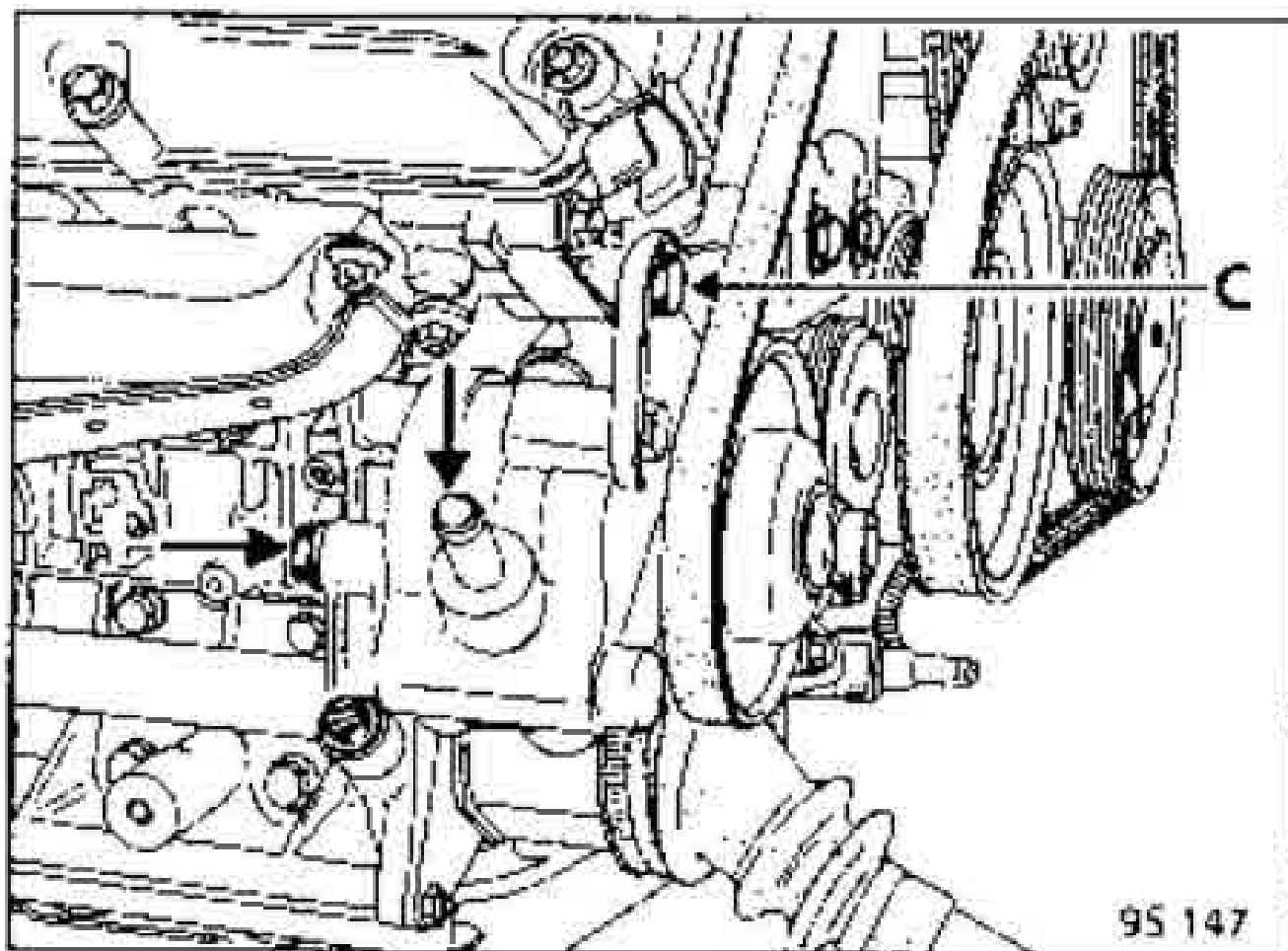
- the lower protective plate,
- the front right hand wheel,
- the side protective plate.

Fit clamp Mot. 453-01 on the inlet pipe.

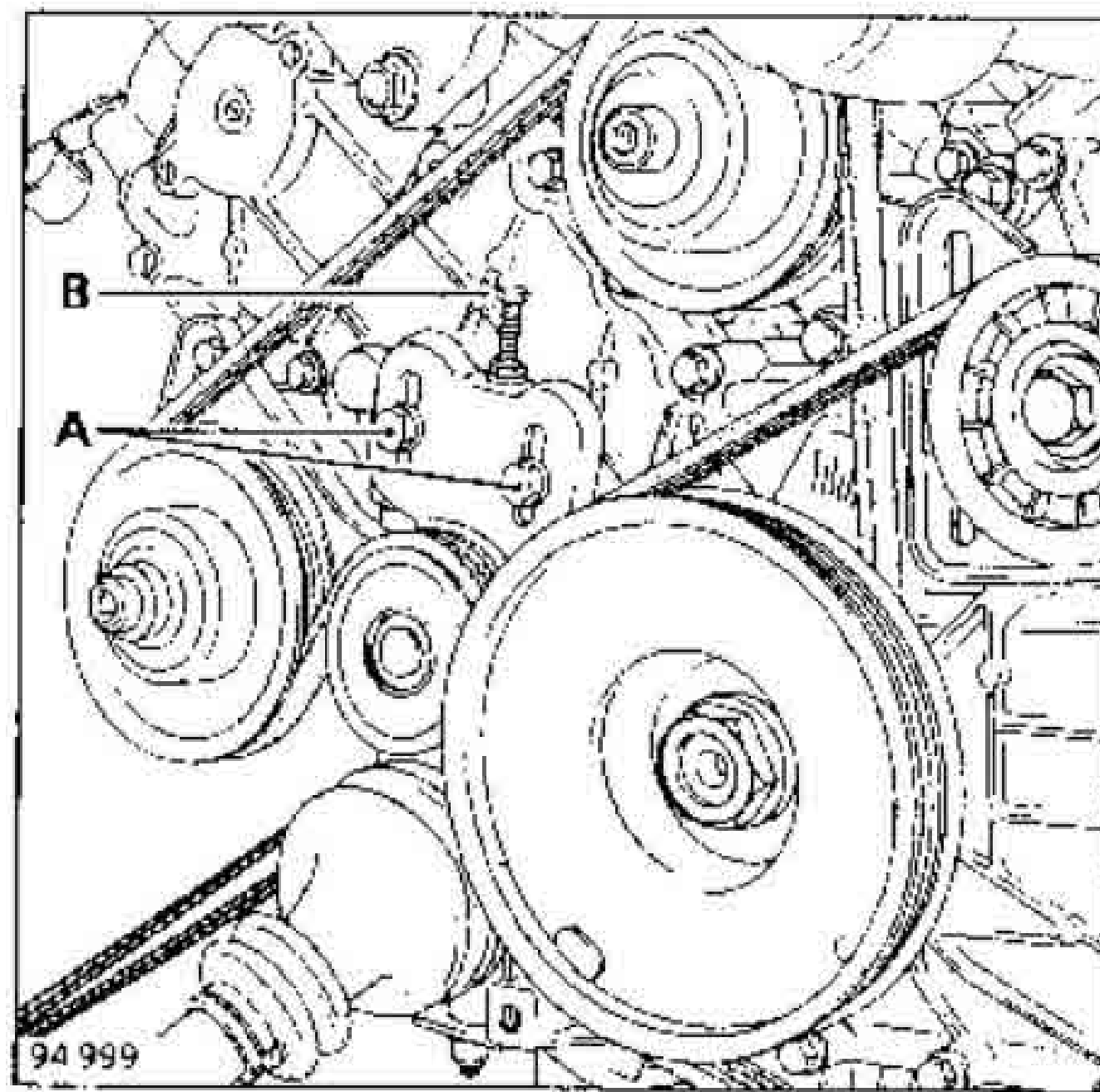
Oil will run out.

Reconnect :

- the inlet pipe,
- the high pressure pipe.



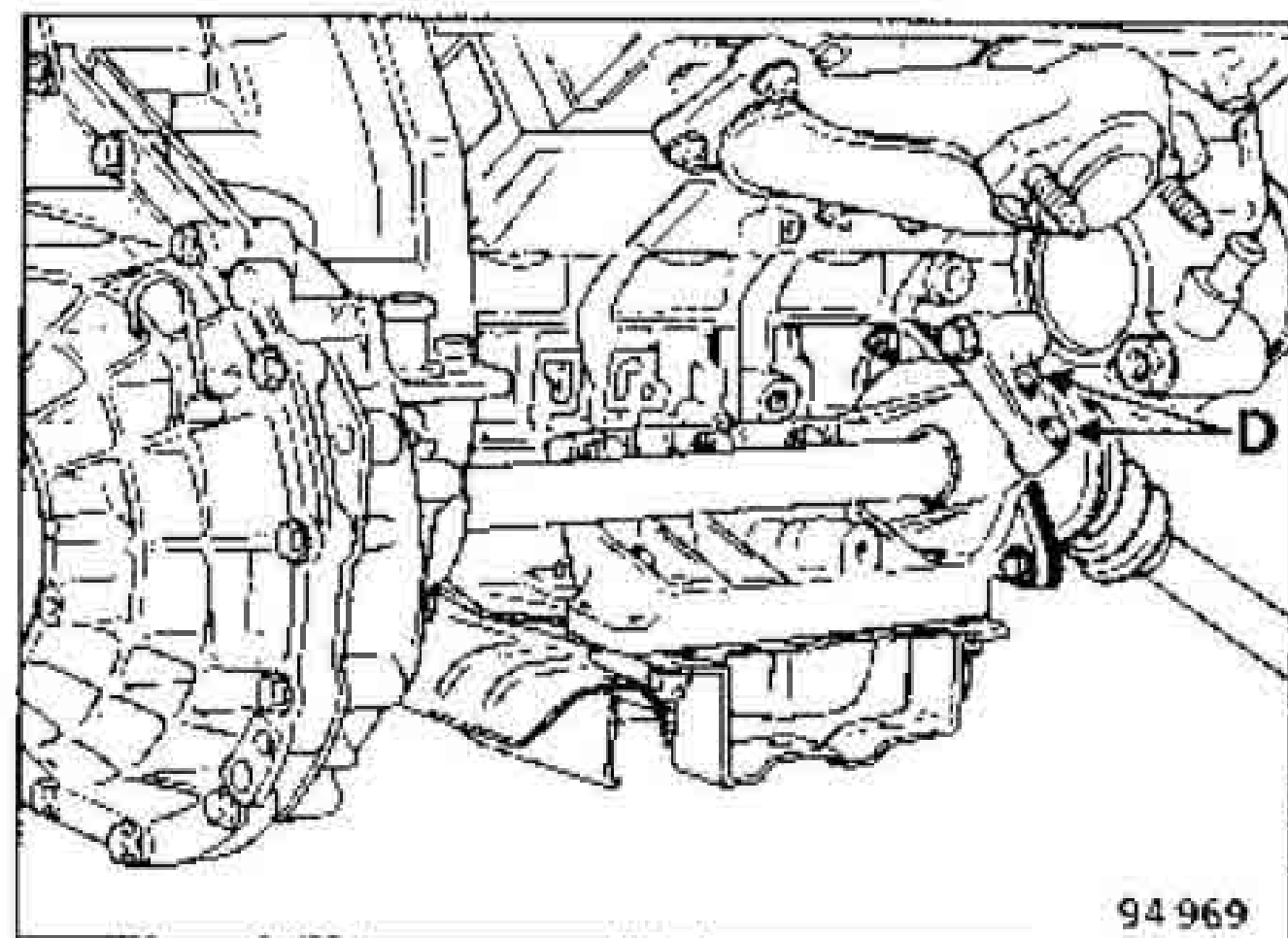
Unscrew the two bolts (A) for the tension wheel and bolt (B).



Remove the belt.

Remove:

- bolt (C),
- the two mounting bolts (D) for the rear support,
- the pump - support assembly
- the pulley (see page 13-28),
- the rear support.



REFITTING

Fit:

- the support,
- the pulley,
- the pump - support assembly.

Adjust the belt tension (see appropriate paragraph).

Top up and bleed the circuit.

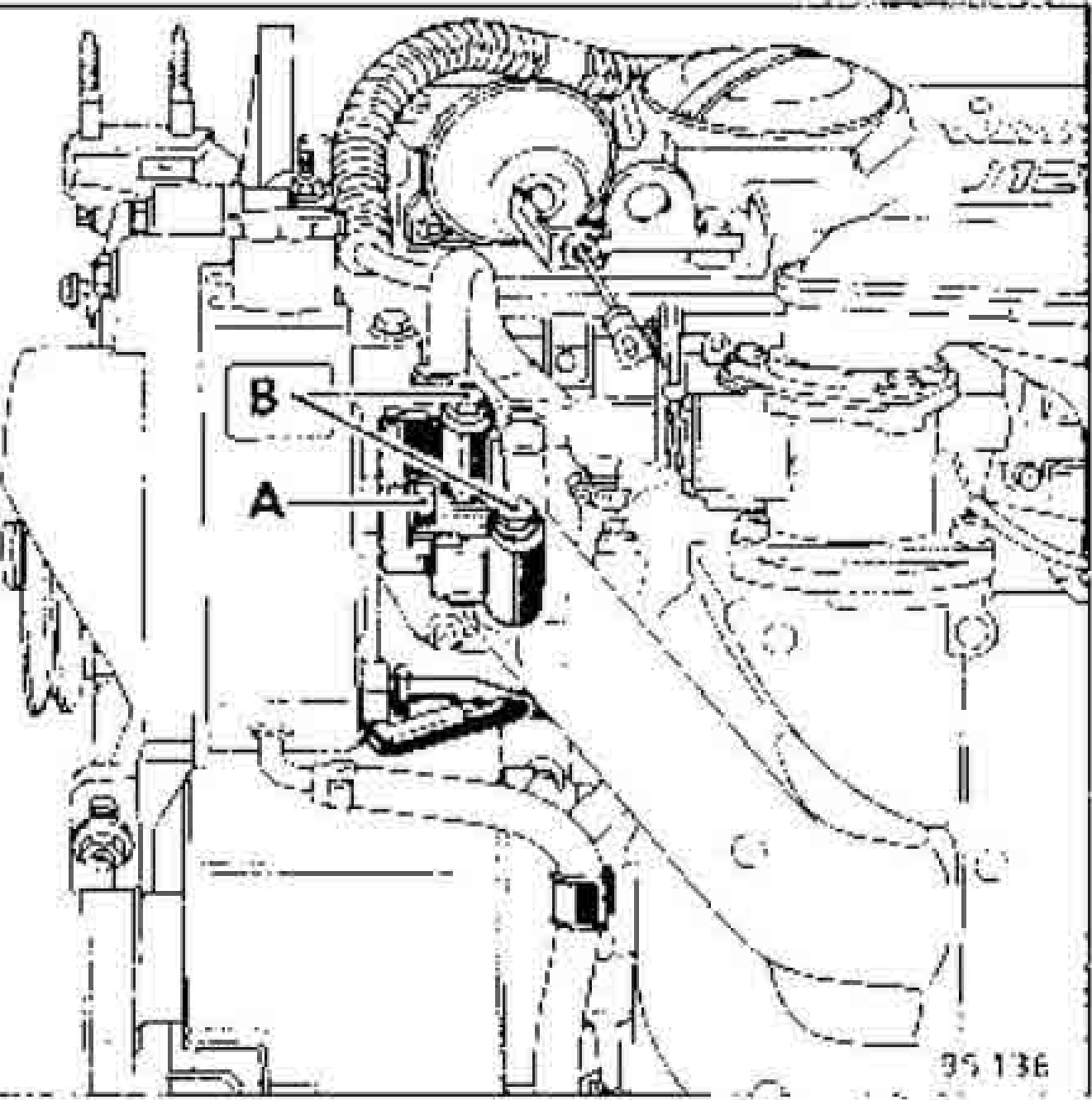
Pump with integral reservoir

TIGHTENING TORQUES (in daN.m)			
Mounting nuts and bolts for pump and support	Ø 8	2,5	
	Ø 10	4,5	

REMOVAL

Drain the pump reservoir using a syringe.

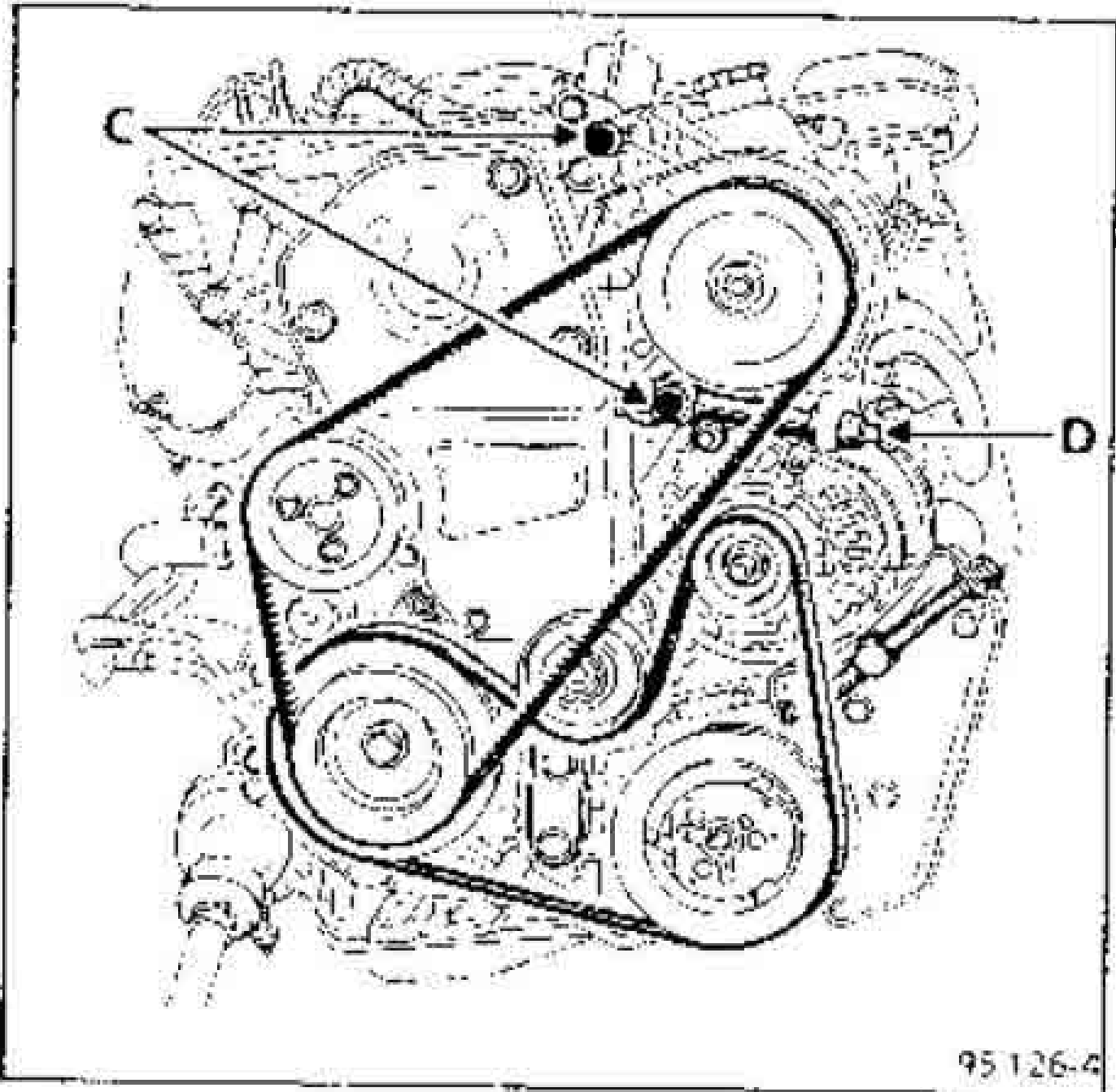
Disconnect the pipes : high and low pressure.



- Remove :
- nut (A),
 - the two bolts (B) for the support mounting,
 - the support.

Move the injection computer.

Unscrew the two bolts (C) and pull the tensioner backwards.



Remove the belt and remove the support - pump assembly.

REFITTING

- Fit :
- the pump - support assembly,
 - the tensioner,
 - the belt.

Adjust the belt tension.

- Torque tighten :
- the nut (D),
 - the bolts (C).

Fit the rear support and torque tighten the bolts (B) and nut (A).

Check the belt tension (see appropriate paragraph).

Top up and bleed the circuit (see appropriate paragraph).

SPECIAL TOOLING REQUIRED

Mot. 453-01

Hose clamp

TIGHTENING TORQUES (in daN.m)



Support mounting bolt	4,5
Tensioner mounting nut	2,5
Pump mounting bolt	4,5
HP pipe union	2,8

REMOVAL

remove:

- the lower protective plate,
- the front right hand wheel,
- the front right hand wheel arch protector.

Fit clamp **Mot. 453-01** on the inlet pipe.

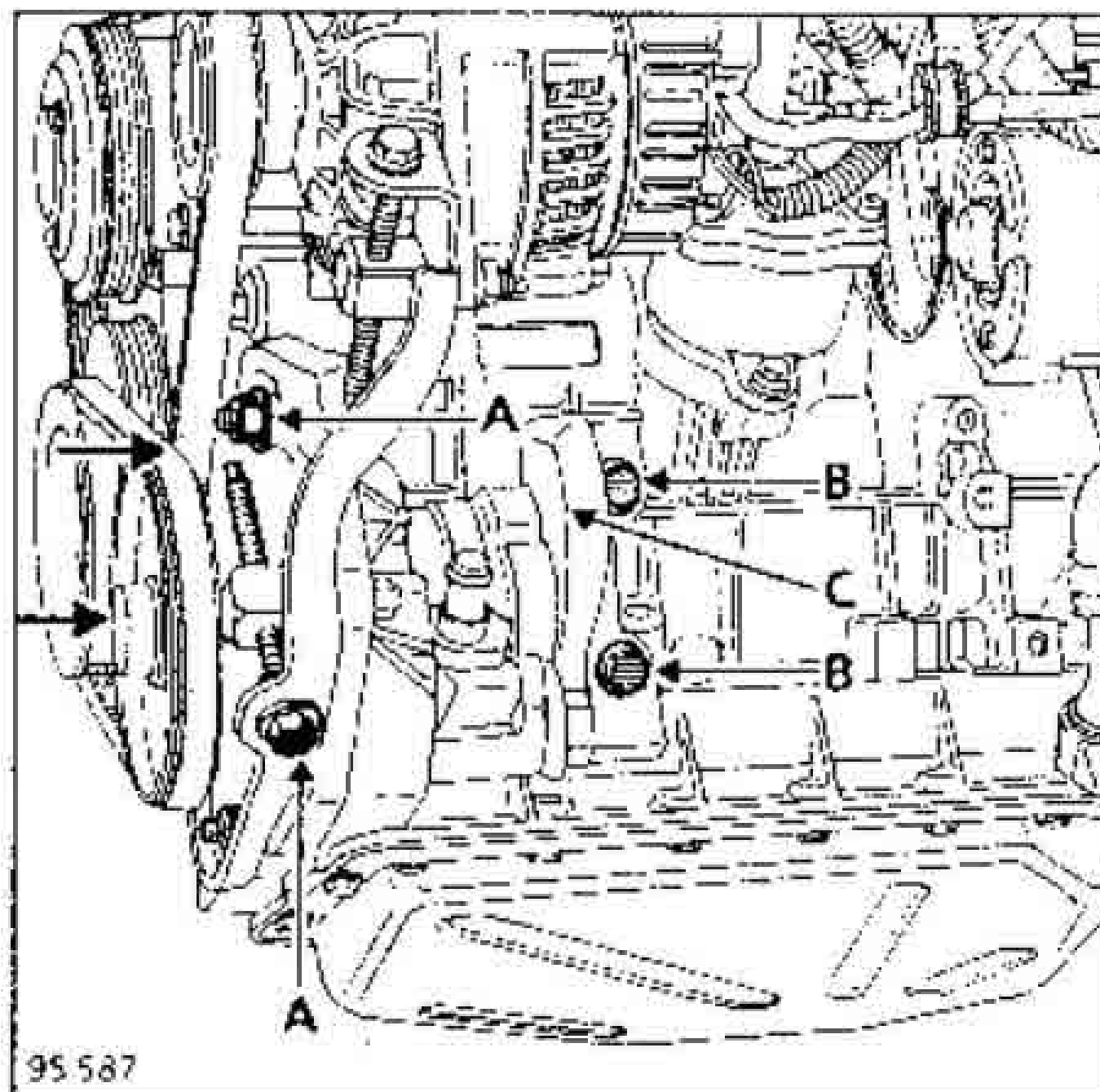
Oil will run out.

Disconnect :

- the inlet pipe,
- the high pressure pipe.

Remove:

- the alternator drive belt tensioner, slacken the steering pump belt and remove it. (Tensioner + 2 nuts (A) + bolt (C)) :
- the rear support (bolt B),



- the two side support bolts (arrowed),
- the pump - support assembly

REFITTING-Special notes

Adjust the tension of the two drive belts (see appropriate paragraph).

Top up and bleed the circuit.

REPLACING THE PULLEY

SPECIAL TOOLING REQUIRED

Dir. 1083

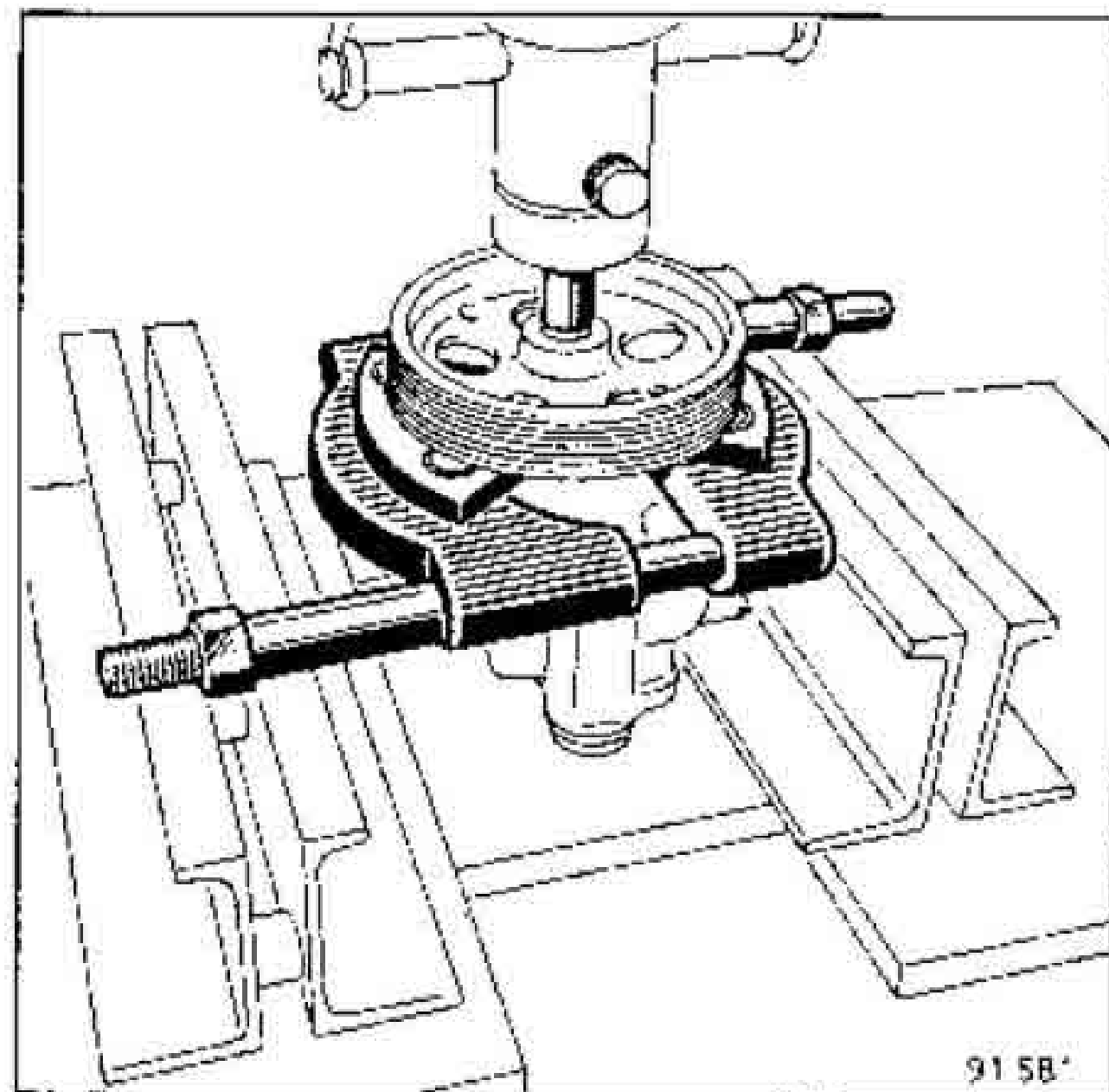
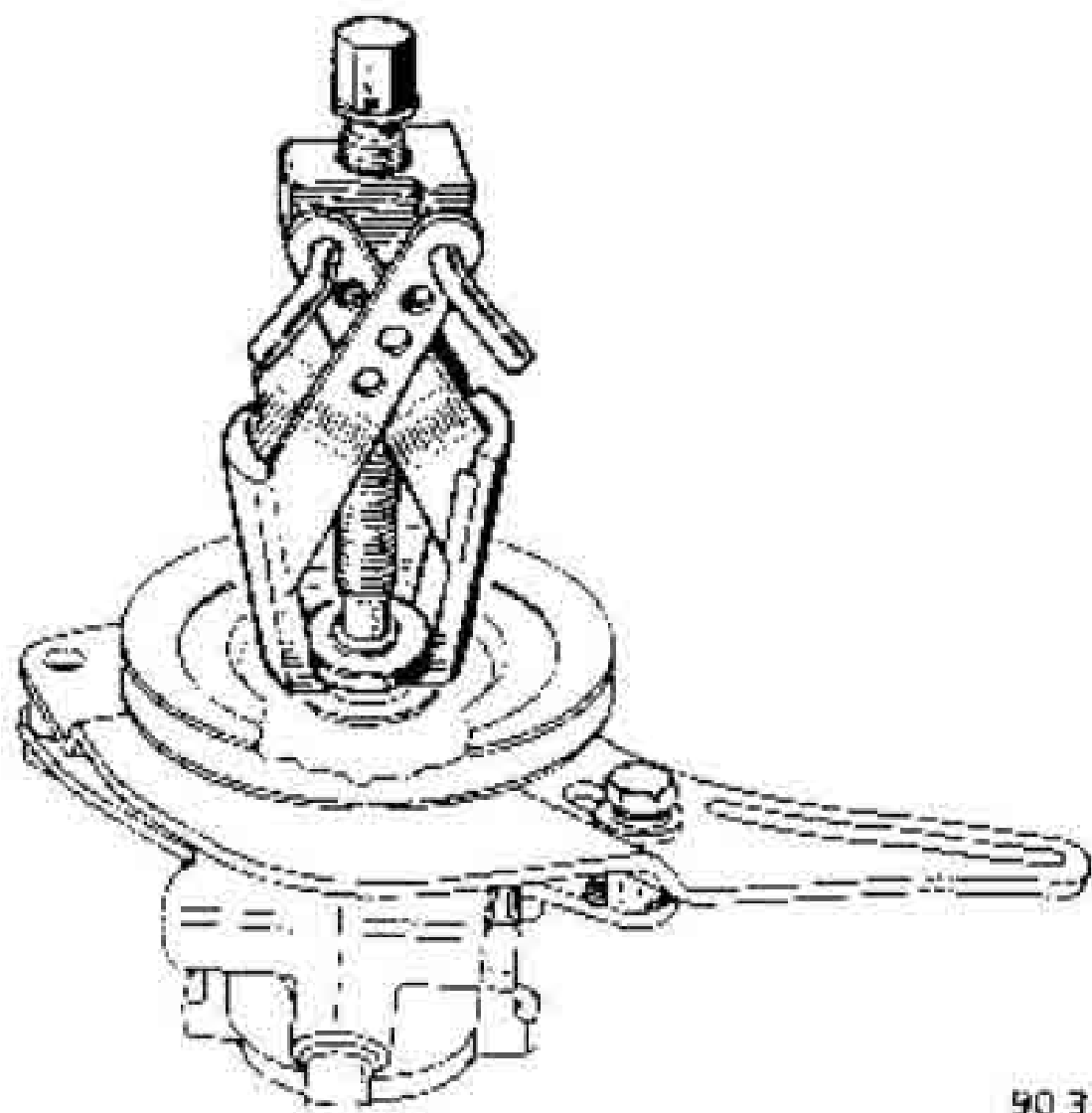
tooling for refitting the
steering pump pulley

REMOVAL

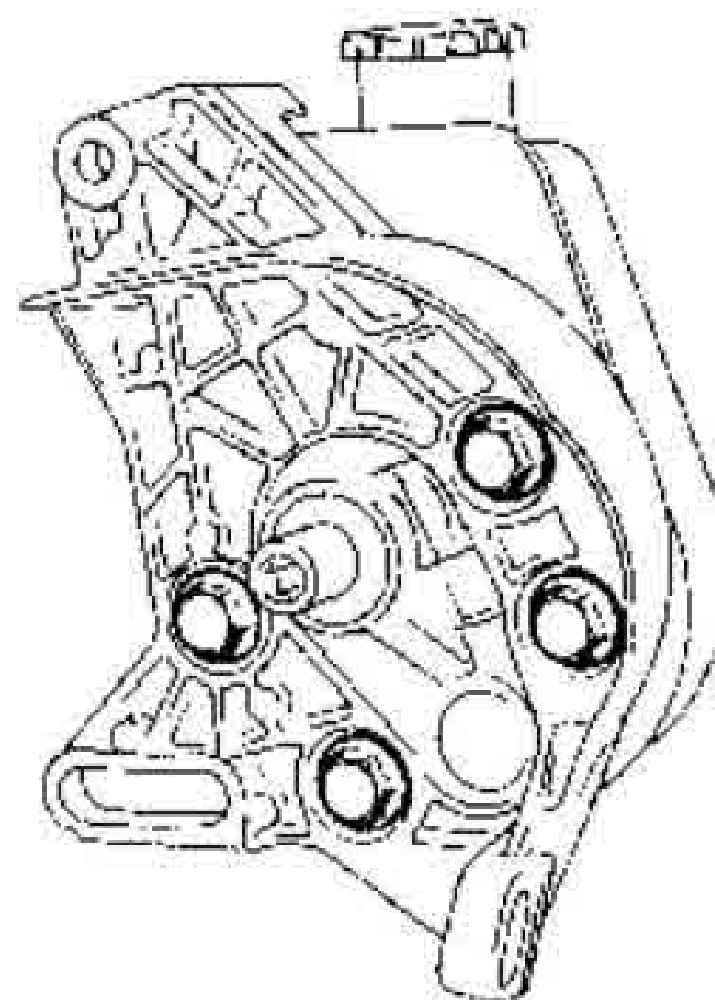
According to fitting, extract the pulley having measured the dimension in relation to the end of the shaft.

Pulley with a neck

Use an extractor.



Remove the support mounting bolts and retain the support.



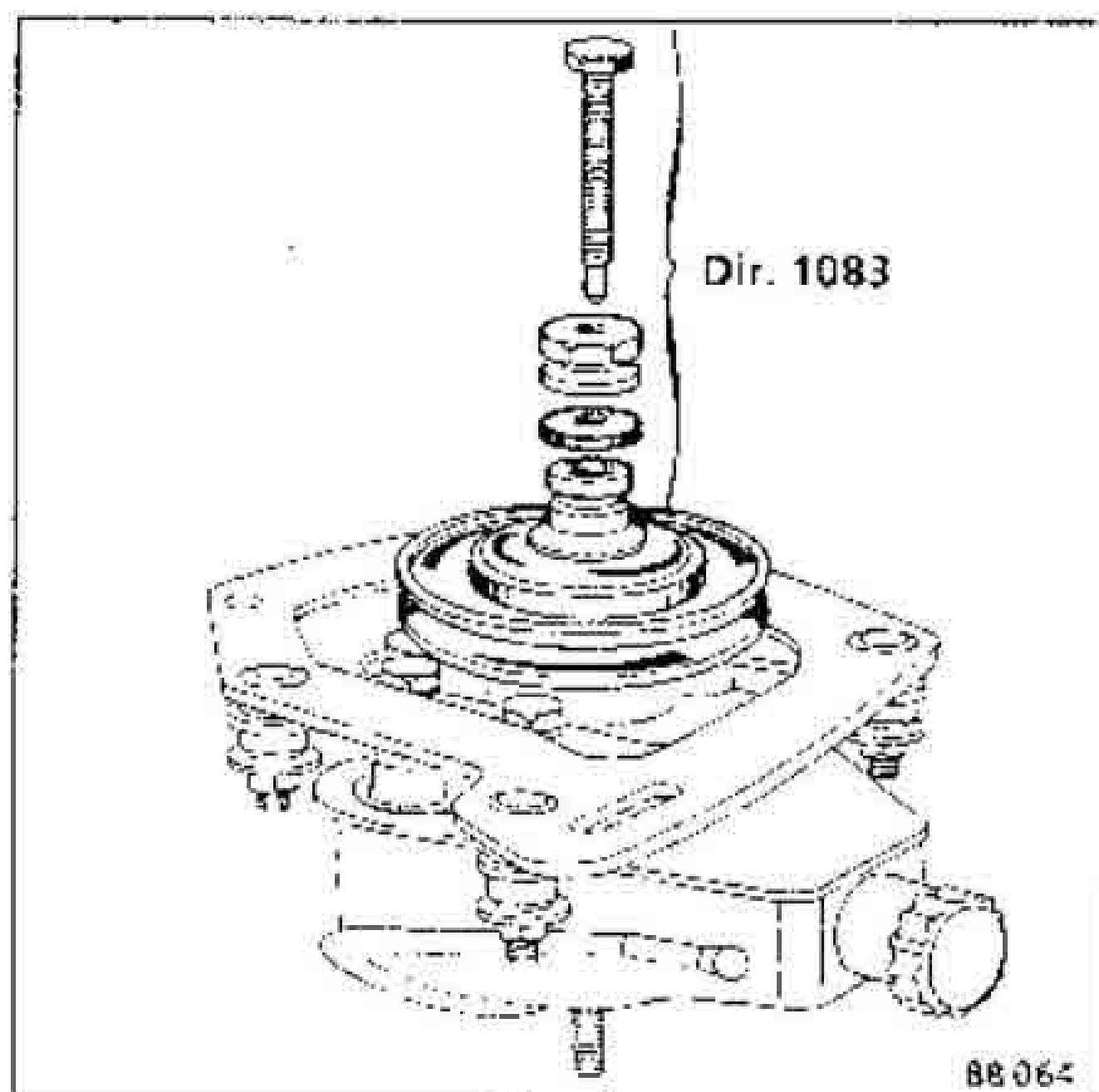
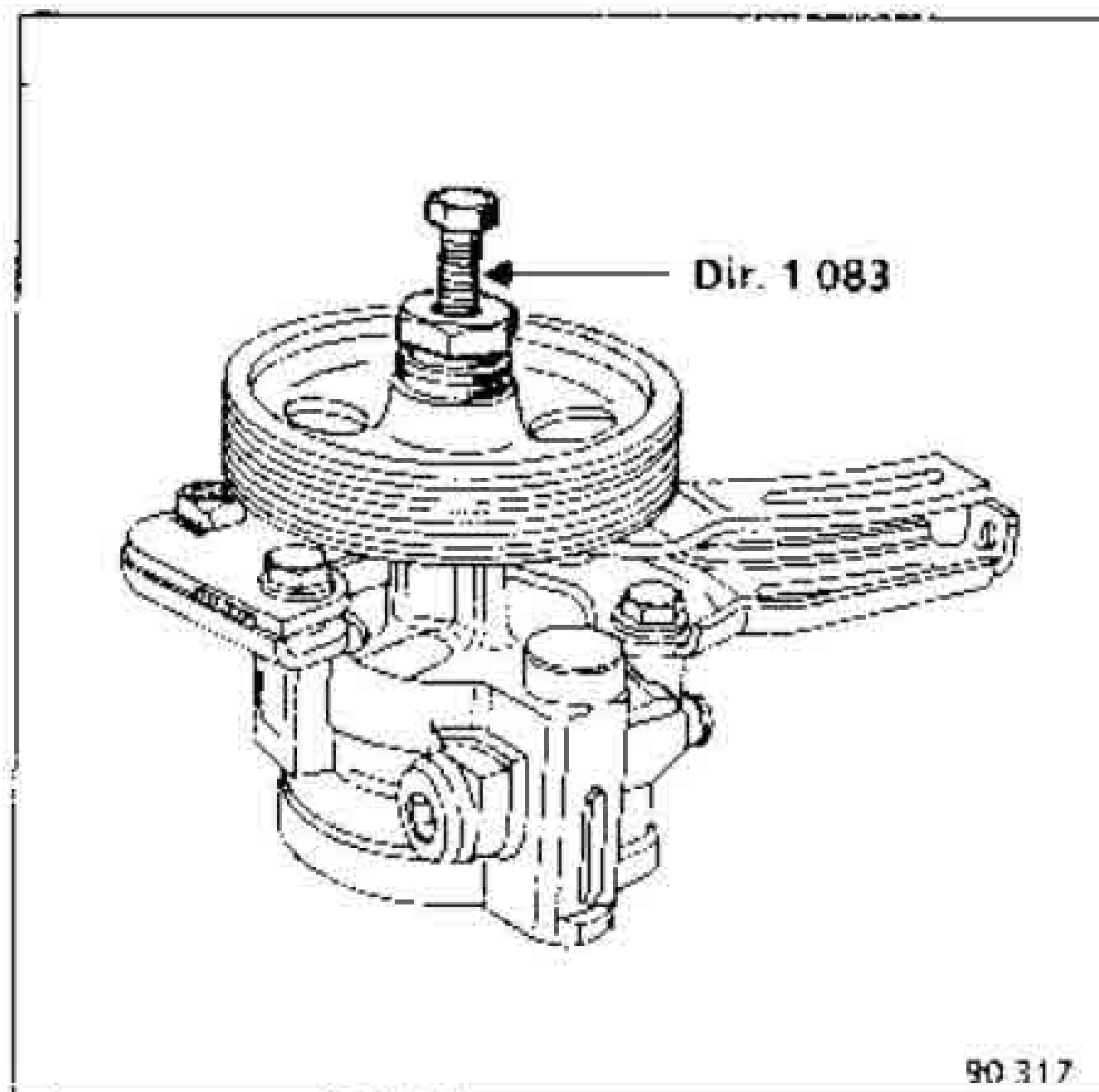
Pulley without a neck

Use a vice and a FACOM U 53 T type extractor.

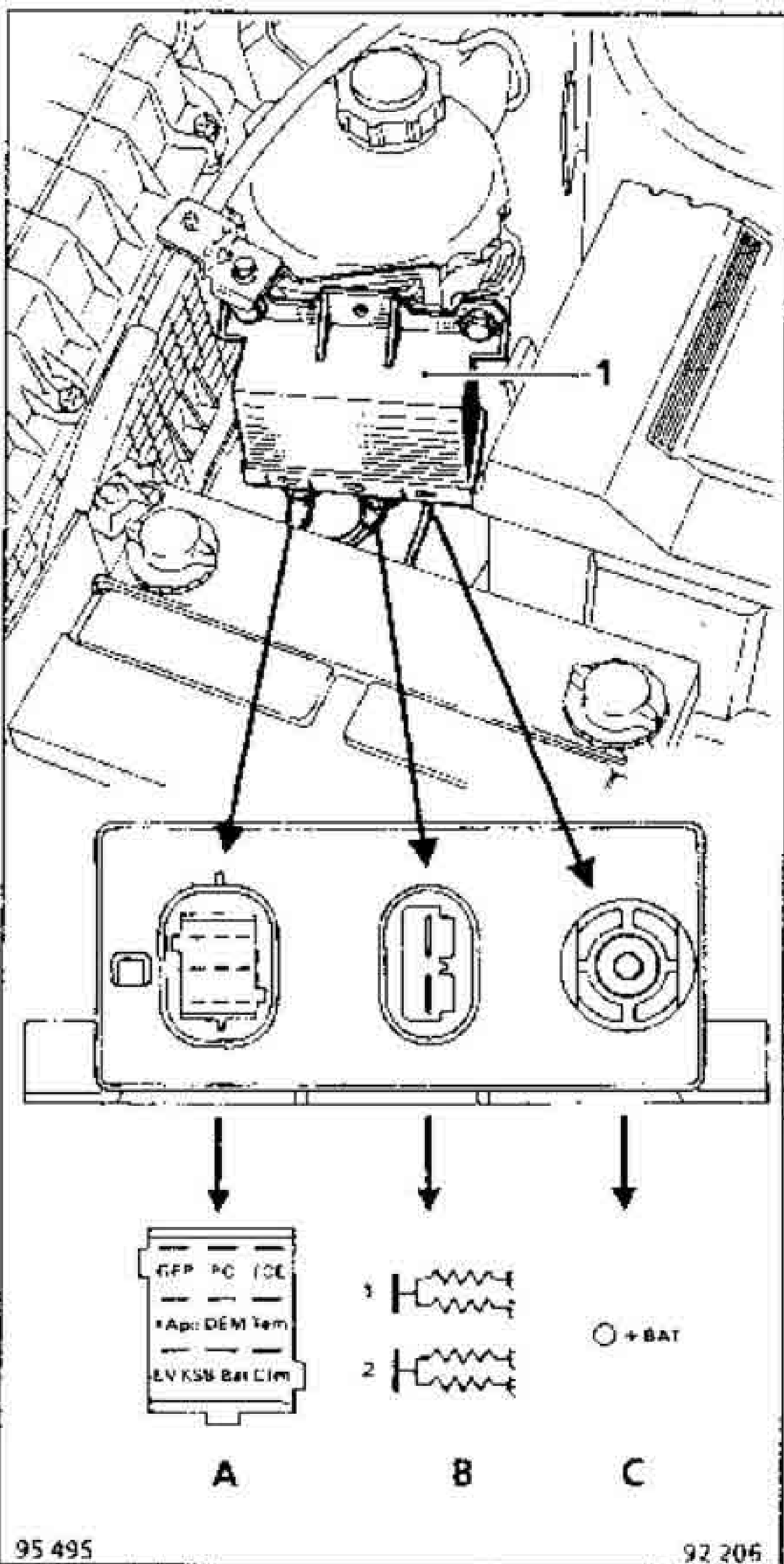
REFITTING

NOTE : before refitting the pulley, ensure that the pump support can be fitted afterwards otherwise position it before refitting the pulley.

Fit the pulley using tool Dir. 1083 to the dimension measured before the pulley was removed (grease the thread and pulley support well).



PRE AND POST HEATING UNIT COMPUTER LAYOUT (1)



TRACK ALLOCATION

Connector A

- GEP** : Power steering electric pump assembly output: not used
- P.C.** : Injection pump control lever load switch (circuit closed at idle speed)
- TCE** : Coolant temperature switch (circuit open above approx. 60 °C)
- + APC** : + after ignition
- DEM** : + starter information
- TEM** : Preheating warning light
- EV KSB** : Cold start advance solenoid
- BAT** : Battery earth
- cIm** : + Accelerated idle solenoid feed, for cold start accelerated idle

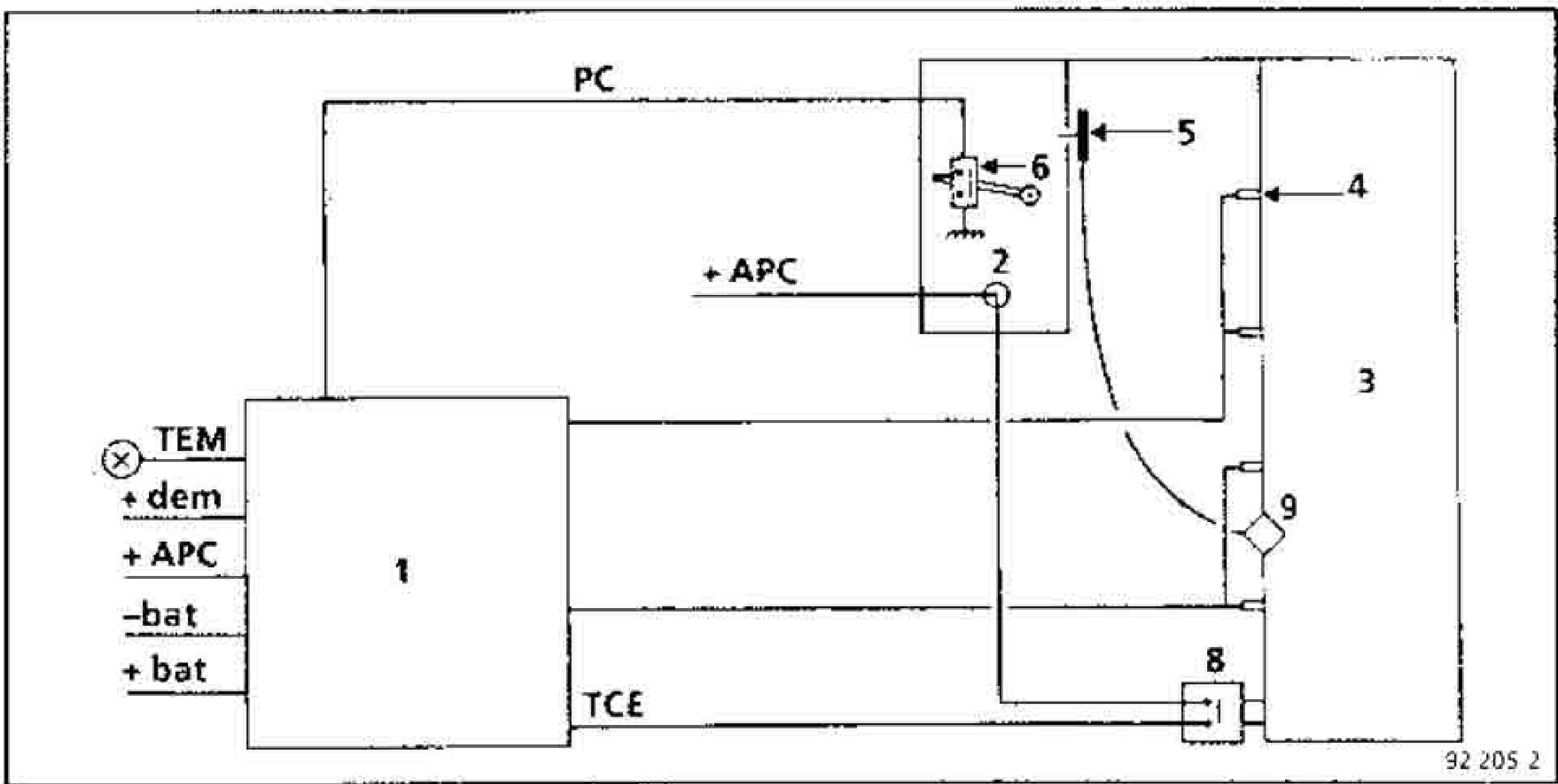
Connector B

- 1** : Feed for plugs 1 and 2
- 2** : Feed for plugs 3 and 4

Terminal C

Feed + 12 V before ignition

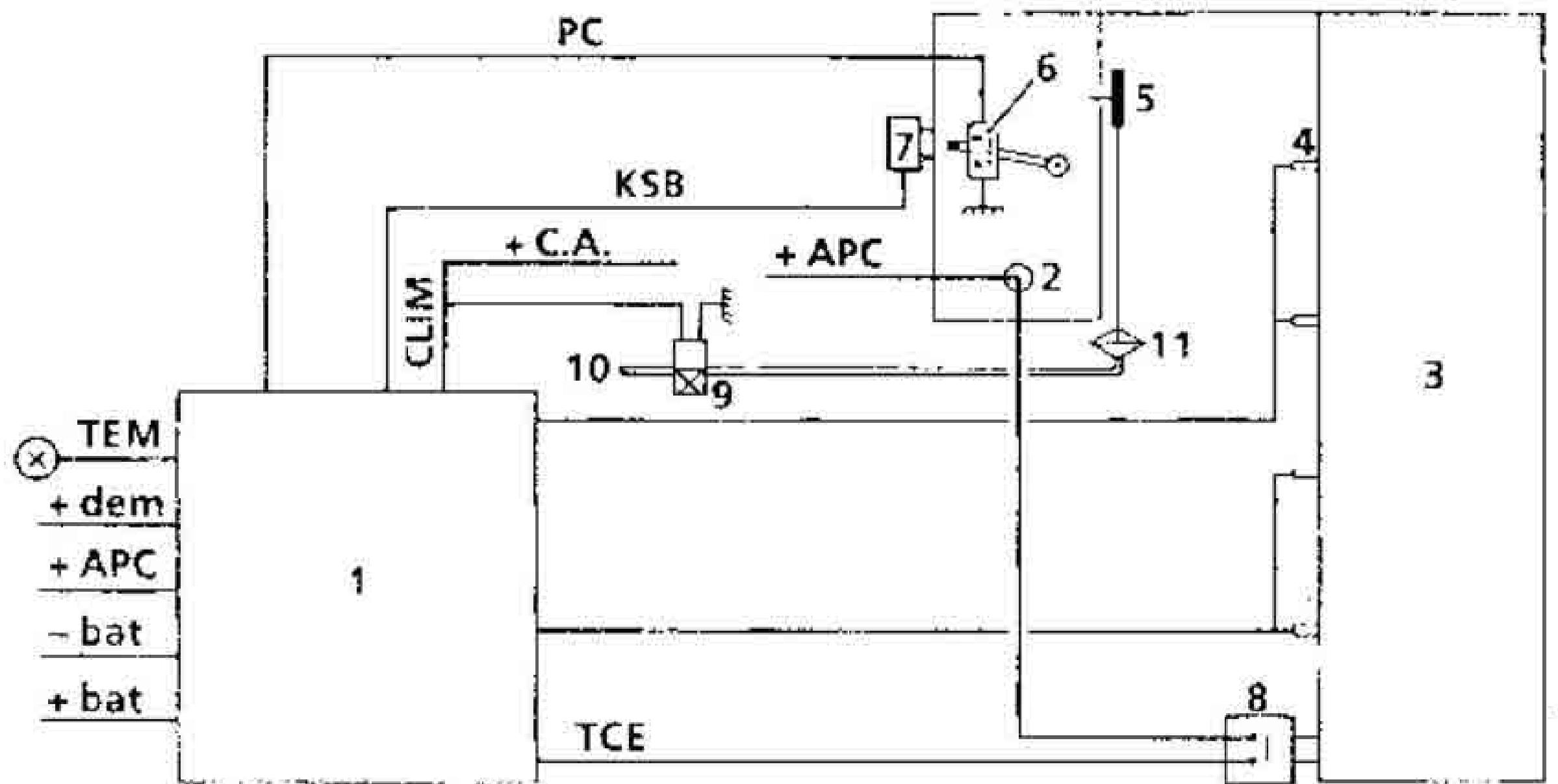
COLD STARTING SYSTEM OPERATING DIAGRAM



92 205 2

- 1 Preheating computer
- 2 Injection pump
- 3 Engine
- 4 Plugs
- 5 idle speed and accelerated idle lever
- 6 Solenoid (circuit closed at idle speed)
- 8 Temperature switch (circuit closed for temperature below 60 °C approx)
- 9 Thermo-element (allows accelerated idling when the engine is cold)

COLD STARTING SYSTEM OPERATING DIAGRAM (AIR CONDITIONED)



91 205-3

- 1 Preheating computer
- 2 Injection pump
- 3 Engine
- 4 Plugs
- 5 Idle speed and accelerated idle lever
- 6 Solenoid (circuit closed at idle speed)
- 7 Cold advance electro magnet (KSB)
- 8 Temperature switch (circuit closed for temperature below 60 °C (approx))
- 9 Accelerated idle control solenoid (cold starting and air conditioning)
- 10 Vacuum
- 11 Pneumatic capsule for accelerated idle control

PRE AND POST HEATING UNIT OPERATING PRINCIPLE

1 - Ignition - preheating function

The preheating time (plugs supplied) and therefore the time that the warning light is illuminated on the dashboard are dependent on temperature.

This time is about :

- 12 to 14 seconds between 0° and - 10 °C,
- 8 seconds at 20 °C,
- 2 seconds at 80 °C.

NOTES:

- The supply to the plugs is cut after approx. 8 seconds after the warning light has extinguished if the starter is not activated,
- the advance unit (KSB) is not activated,
- the solenoid for increasing idle speed is energised (air conditioned option).

2 - Starting

While the starter is activated the following are fed :

- the 4 heater plugs,
- the accelerated idle solenoid (air conditioned option),
- the advance unit (KSB).

3 - Engine started - post heating function

The heater plugs are fed 100 % for 10 seconds after the ignition key is released.

They are then fed in alternate pairs.

(They alternate every 2 seconds).

The plugs can be fed in this manner for a maximum of 3 minutes (depending on coolant temperature)

When accelerating, the post heating function is interrupted 3 seconds after the full load switch has opened.

The function returns when the engine load decreases or the engine returns to idle speed (switch closes).

4 - Cold accelerated idle function

When the vehicle is fitted with air conditioning, accelerated idle is controlled by a vacuum pneumatic capsule (on the injection pump).

This capsule is connected to the vacuum circuit by a solenoid valve.

For cold accelerated idle, the computer energises the solenoid valve at the same time as the plugs are fed.

FAULT FINDING

General

The pre and post heating unit is fitted with protective cut outs which de-activate one or more functions :

- power circuit or plug circuit short circuit,
- warning light on instrument panel short circuit,
- feed more than **16 ± 1 volts**.

NOTE : as soon as the fault above disappears, the operation of the unit reverts to normal.

Fault finding for the unit is based on the following observations :

- 1 The warning light is not illuminated and the engine will not start from cold.
- 2 The warning light illuminates and the engine will not start from cold.
- 3 The warning light will not illuminate and the engine starts from cold after about 10 seconds pre heating.
- 4 Normal pre heating operation and no post heating operation.
- 5 Normal pre and post heating operation and the cold start solenoid and injection pump advance solenoid do not operate (K5B).
- 6 Cold accelerated idle (air conditioned option) does not operate.

FAULT FINDING

1. The preheating warning light will not illuminate and the engine will not start from cold.

TEST	REMEDY
Disconnect connector (B) for plug supply and carry out a pre heating test : - the warning light illuminates normally, - the warning light does not illuminate and a voltage is read across the connector outputs (B), - the warning light does not illuminate and no voltage is read across the connector outputs (B).	Check the plug wiring. If correct, check and replace any faulty plugs. Check the plug circuit and the instrument panel warning light circuit. Repair if necessary. Check: - + battery to connector (A), - + after ignition to connector (C), - earth - battery to connector (C), - if the feed is correct, replace the preheater unit

2. The warning light illuminates and the engine will not start from cold.

TEST	REMEDY
Disconnect connector (B) and carry out a preheating test. The warning light illuminates and there is a voltage across the connector outputs (B). The warning light illuminates and there is no voltage across the connector outputs (B).	Check the plug circuit. If correct, check and replace any faulty plugs. Replace the preheater unit.

3 - The warning light does not illuminate and the engine starts normally after about 10 seconds preheating.

TEST	REMEDY
Earth the "tém" output (for warning light) on connector (C) using a 2 amp fuse, ignition on : - the fuse blows, - the warning light does not illuminate, - the warning light illuminates.	The instrument panel warning light wiring is faulty. Repair the wiring. The bulb has blown or the wiring is faulty. Replace the bulb or repair the wiring. Replace the preheater unit.

FAULT FINDING

4 - Normal preheating operation and no post heating operation

TEST	REMEDY
Disconnect connector (C) and check using a voltmeter/ohmmeter : - the resistance between output PC and -Bat ignition off : • accelerator at idle position : resistance = 0 ohm, • accelerator at cold position : resistance = infinity, - the voltage, ignition on, between output : TCE and -Bat : • engine cold, coolant temperature below 55 °C $\pm$ 2 °C = 12 volts, • engine warm, coolant temperature above 65 °C $\pm$ 2 °C = 0 volt, - If the tests carried out are correct and the post heating still does not operate after cold starting.	If the circuit is open, check the wiring, the microswitch and its connectors. Repair if necessary. If the circuit is closed, check the conformity and adjustment of the microswitch. If there is no voltage: check the electrical wiring, the temperature switch and its connector. if there is a voltage : check the wiring and the conformity of the temperature switch. Replace the preheater unit.

5 - Normal pre and post heating operation and the cold start solenoid and injection pump advance solenoid do not operate (KSB).

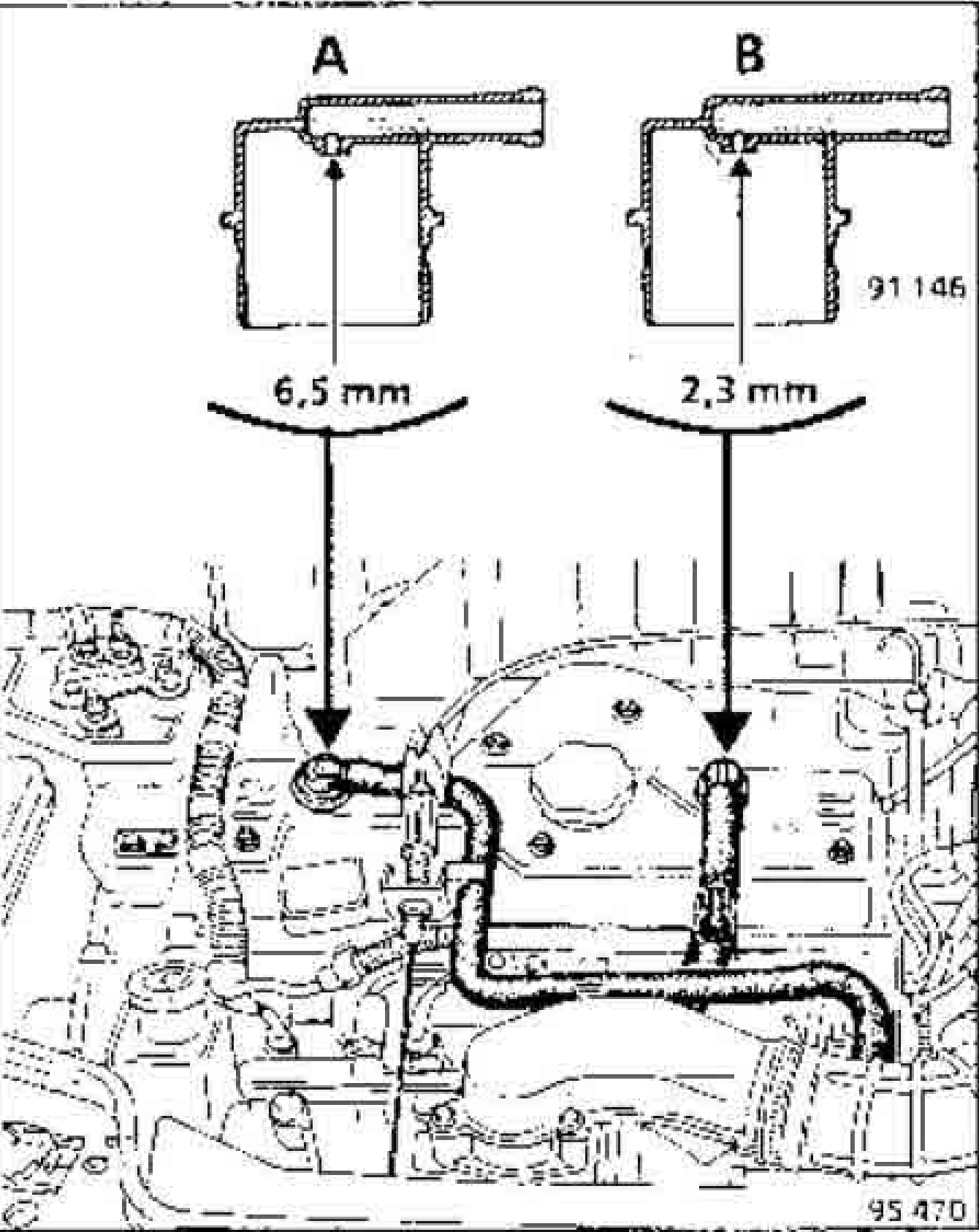
TEST	REMEDY
Disconnect connector (C) and measure the resistance between EV KSB and -Bat. The resistance should be about 5 ohms. Engine at idle speed, connector (C) disconnected, connect + APC and EV KSB and the engine noise should change slightly (sharper note).	If incorrect, check the wiring and the solenoid valve, repair. If the engine noise does not change check for the voltage (12 V) on the SB solenoid and its conformity. if there is a change in engine noise, the preheating unit is faulty. ATTENTION : the KSB only operates for a very short time (5 to 10 seconds after the engine is started).

FAULT FINDING

6 - Cold accelerated idle (air conditioned option) does not operate.

TEST	REMEDY
Operate the air conditioning : – accelerated idle does not operate, – accelerated idle does not operate and the solenoid valve is energised. Accelerated idle operates with the air conditioning but not for cold starting (while the preheating warning light is illuminated and until the temperature switch cuts out ; the solenoid valve is energised). Accelerated idle operates normally for preheating but cuts out and restarts alternately for post heating.	Check that the solenoid valve (9) is opening the pneumatic circuit, otherwise check electrical wiring and replace solenoid valve if faulty. Check the pneumatic circuit between the vacuum pump, the solenoid valve (9) and the bellows (11), repair if faulty or incorrectly connected. Check the wiring between the preheating unit and the solenoid valve If there is not voltage at the "CLIM" output when the preheating warning light is illuminated, replace the preheating unit. The preheating unit is faulty, replace it

8 VALVE ENGINES



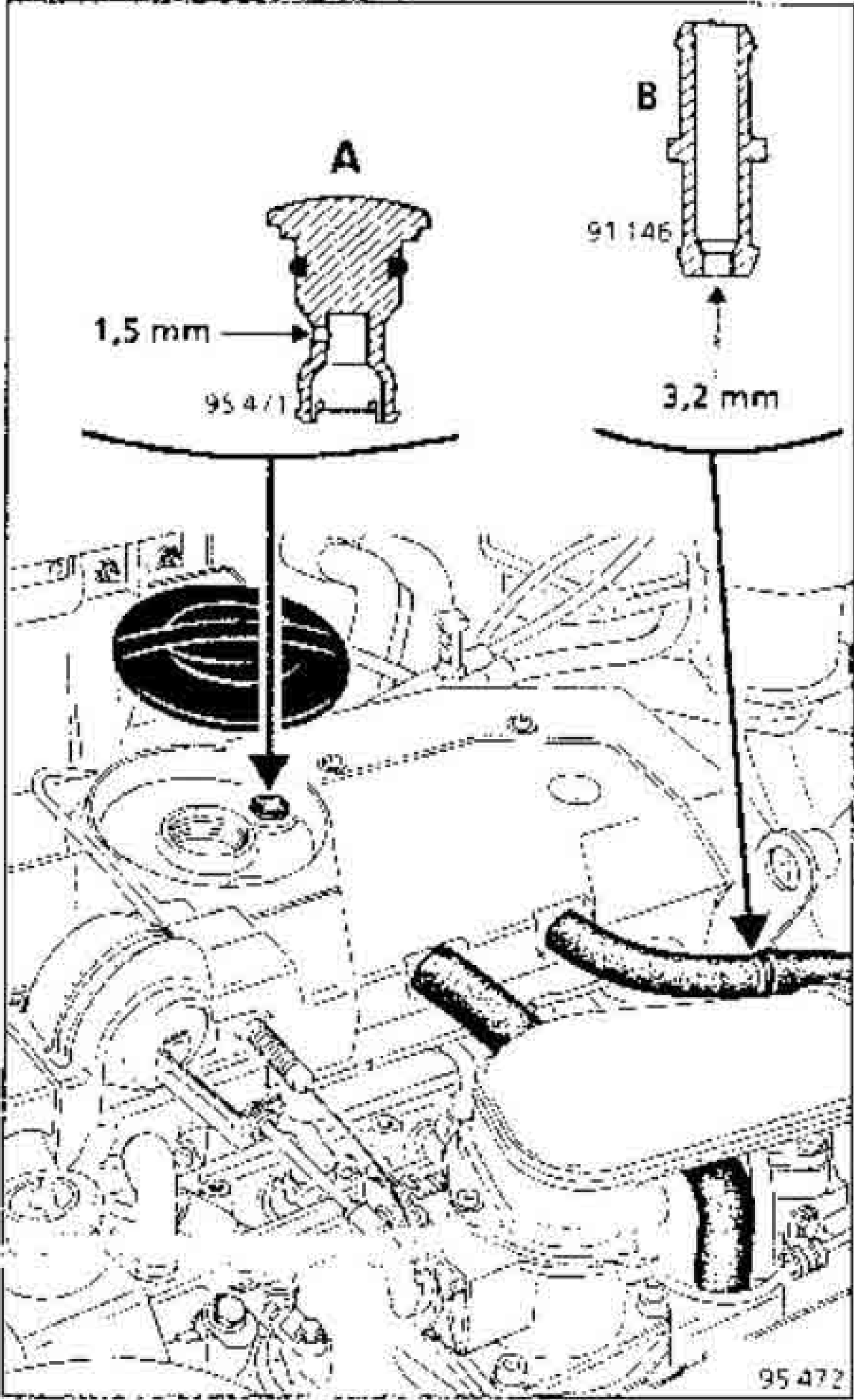
A Rebreathing upstream of throttle housing
jet Ø 6,5 mm

B Rebreathing downstream of throttle housing
jet Ø 2,3 mm

To ensure correct operation of the emission control system, the oil rebreathing circuit must be kept clean and in good condition.

Check the conformity and cleanness of jets, pipes and take-offs.

12 VALVE ENGINES



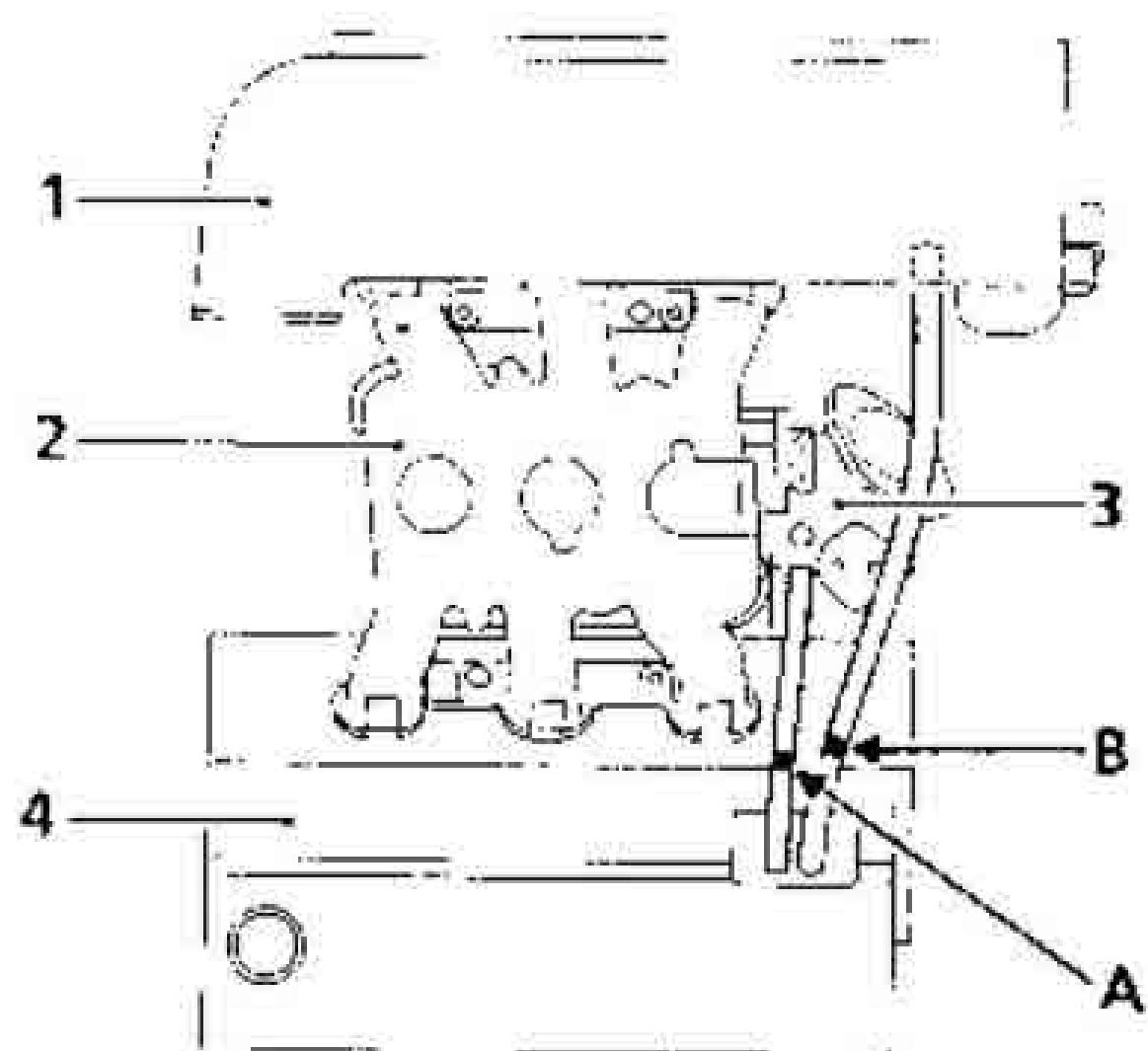
A Rebreathing upstream of throttle housing
jet Ø 1,5 mm

B Rebreathing downstream of throttle housing
jet Ø 3,2 mm

To ensure correct operation of the emission control system, the oil rebreathing circuit must be kept clean and in good condition.

Check the conformity and cleanness of jets, pipes and take-offs.

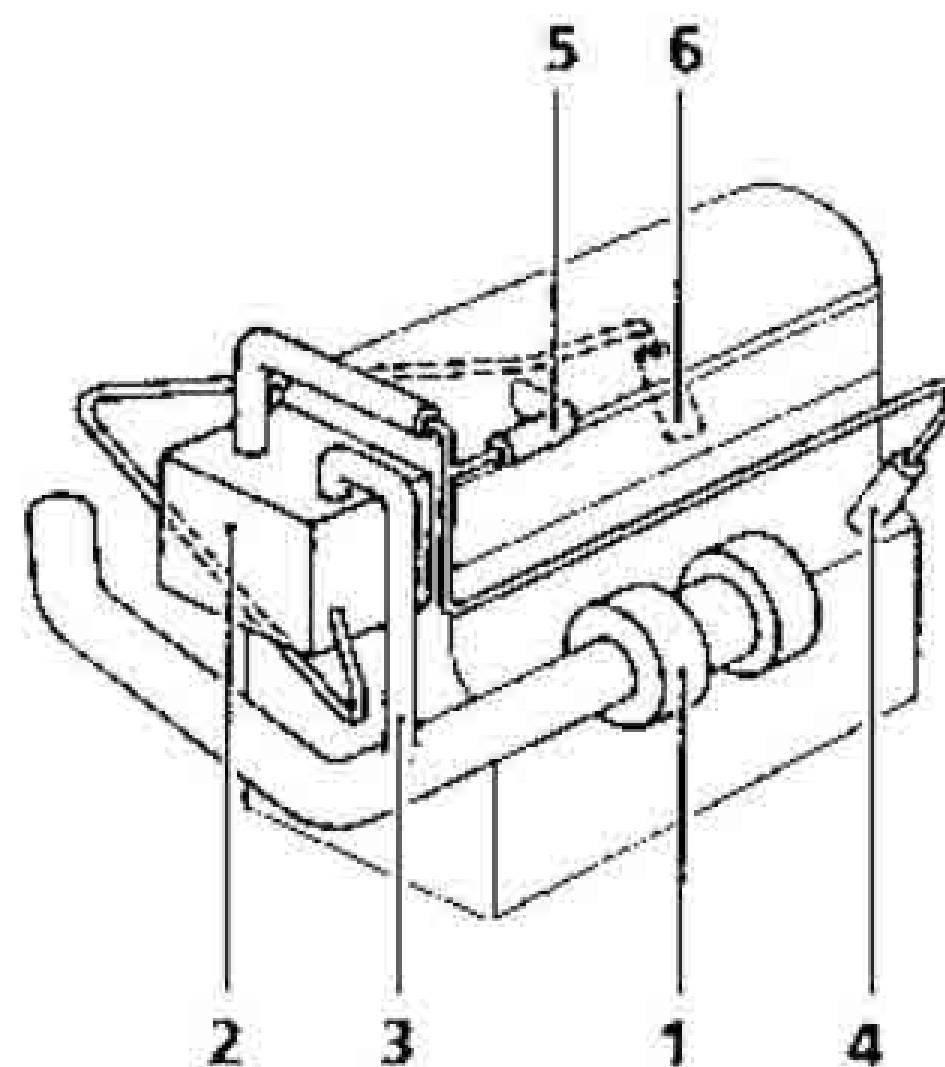
Z7X ENGINE



95 117

- 1 Air filter
- 2 Inlet manifold
- 3 Intermediate manifold
- 4 Front bank
- A Downstream rebreathing pipe with jet
Ø 1,7 mm
- B Upstream rebreathing pipe with jet
Ø 6,5 mm

J8S ENGINE



95 637

- 1 Turbo charger
- 2 Oil vapour decanter unit
- 3 Oil vapour rebreathing upstream of turbo charger
- 4 Cylinder block oil vapour rebreathing take off
- 5 Rocker box cover rebreathing take off
- 6 Take off on cylinder block for oil return

NOTE : the rebreathing circuits must be maintained in good condition. Check the cleanness of pipes and the conformity of jets.

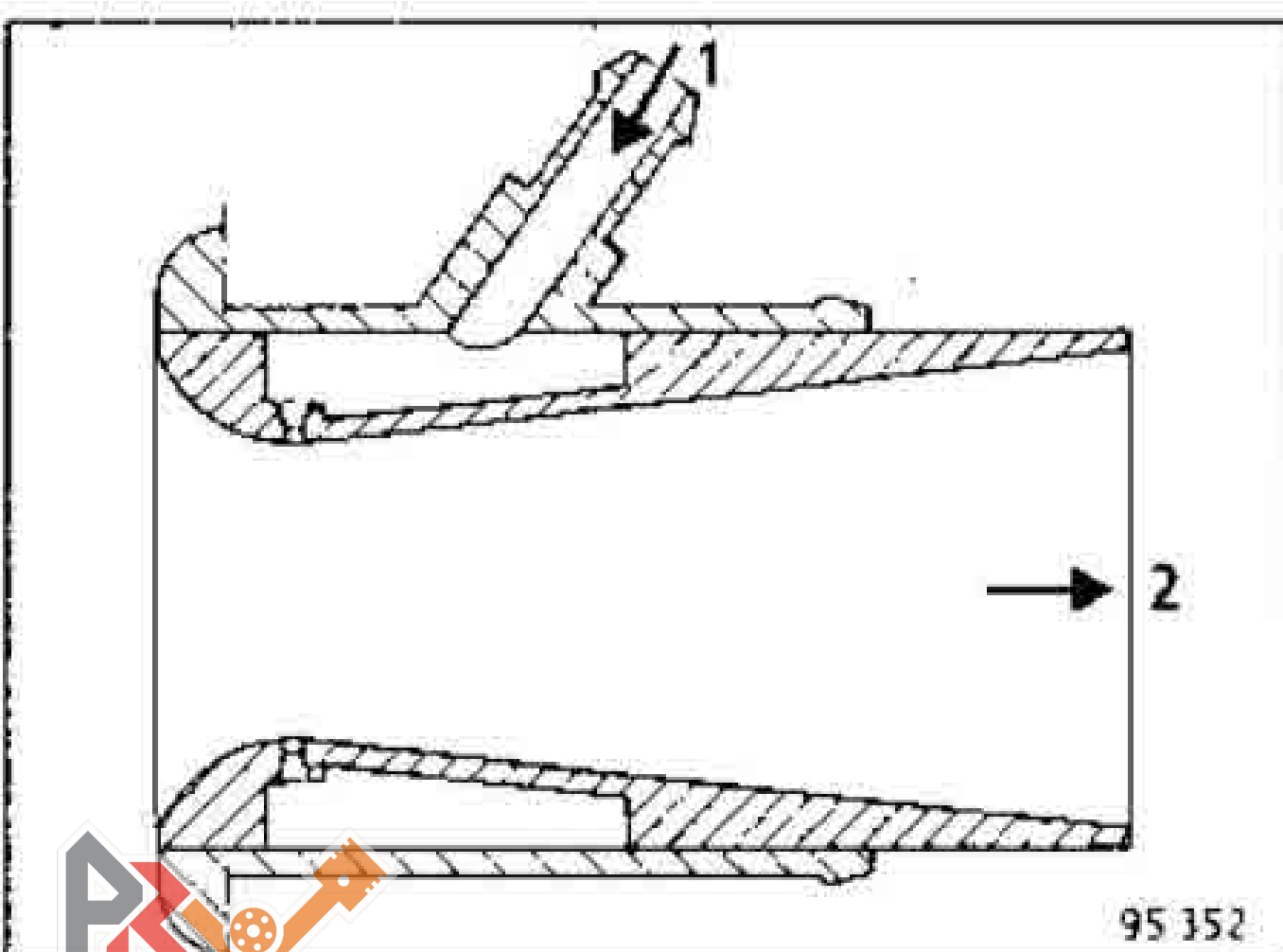
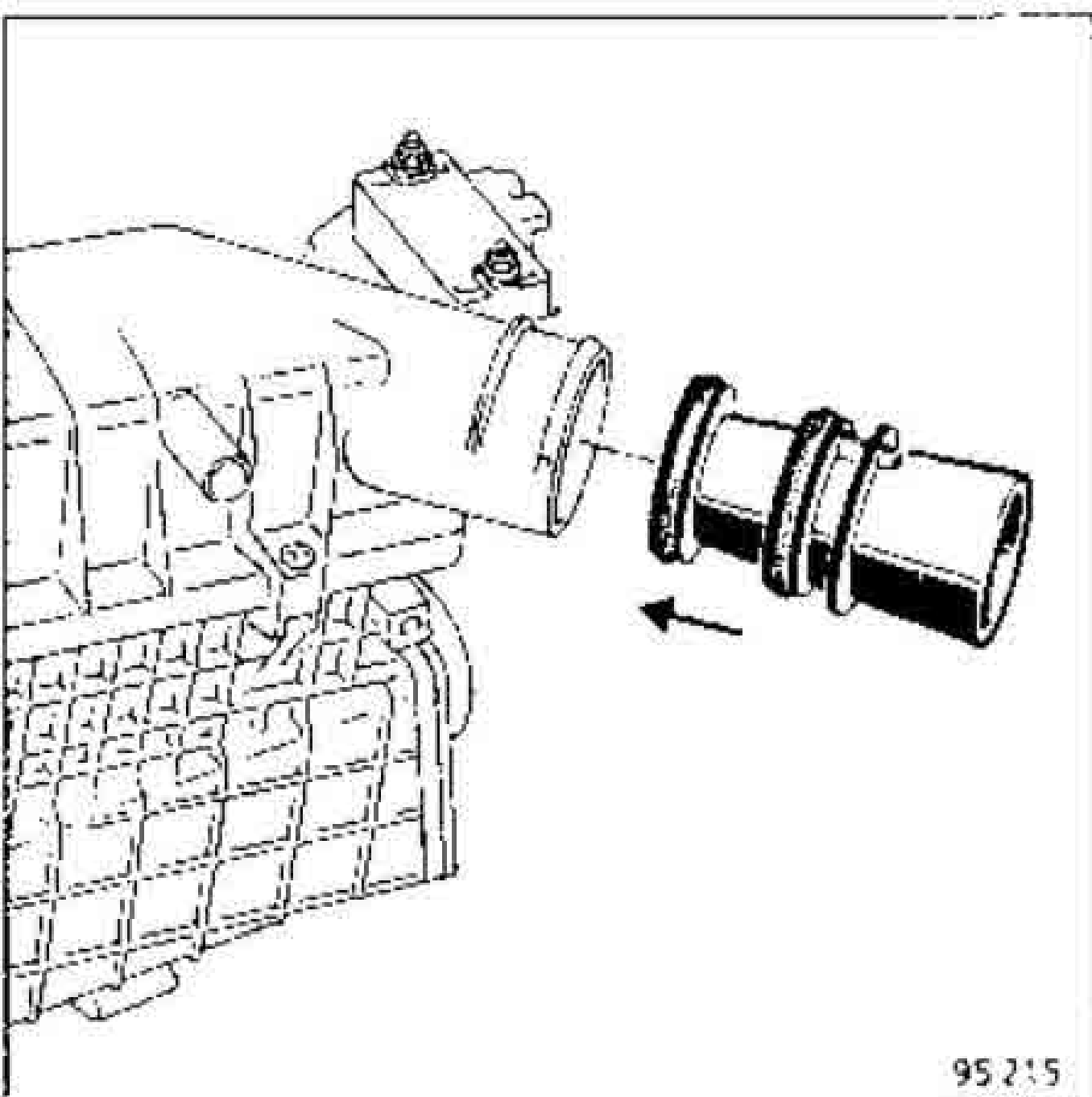
PRINCIPLE

The petrol vapours in the fuel tank are collected by the absorber (canister).

The canister is bled at the air filter outlet (1) on the pipe to the throttle housing inlet (2).

Bleeding is carried out using the venturi.

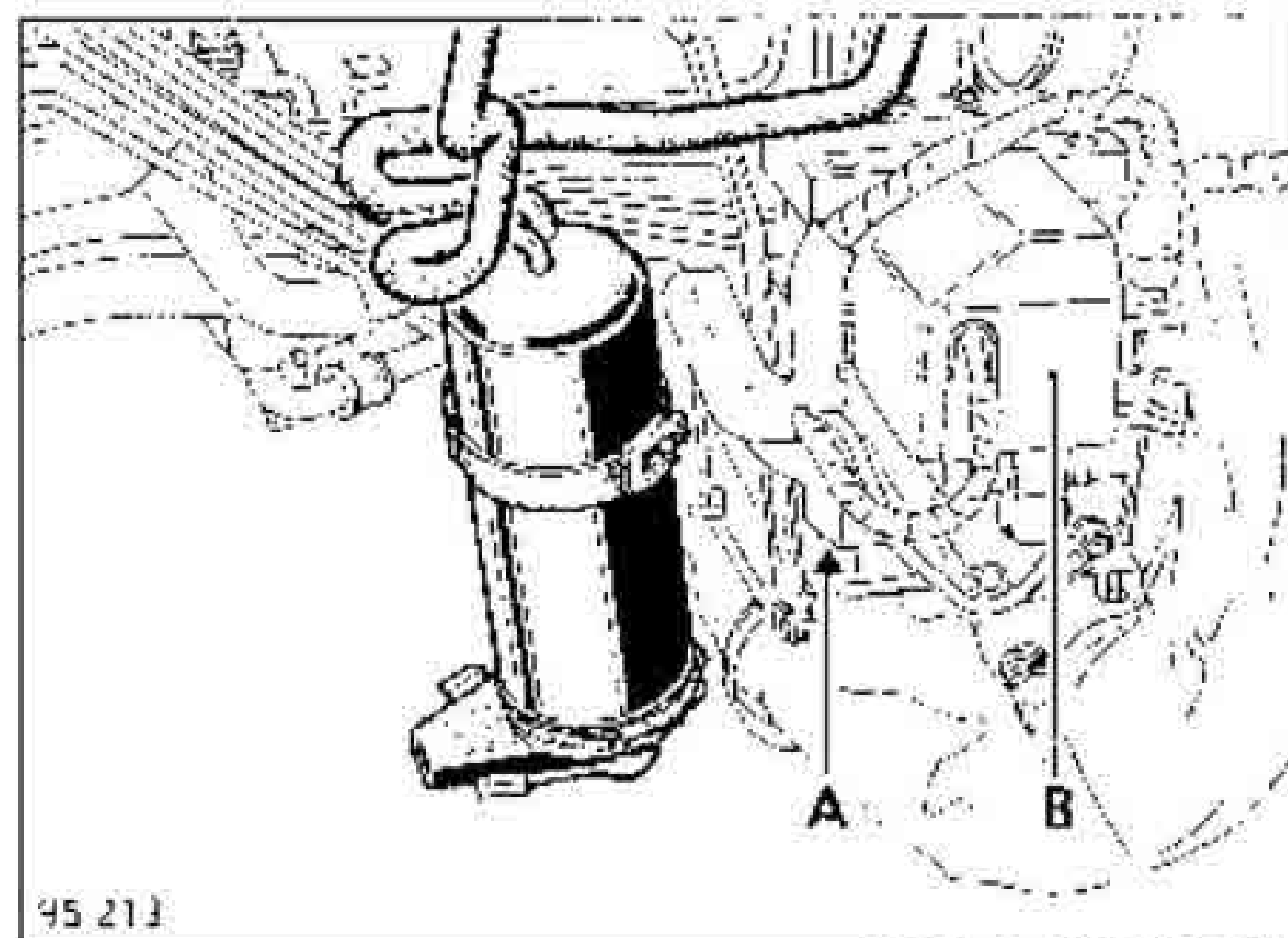
VENTURI DETAIL (located in the filter outlet)



Canister bleeding is generated by the vacuum created at the take off point to the canister.

This vacuum is due to the speed of the air passing through the venturi at the smallest diameter.

REMOVING THE PETROL VAPOUR ABSORBER (CANISTER)



The canister is mounted on the inside of the front left hand side member.

A Front left hand side member
B ABS hydraulic assembly

Put the vehicle on a lift

Remove the engine undertray.

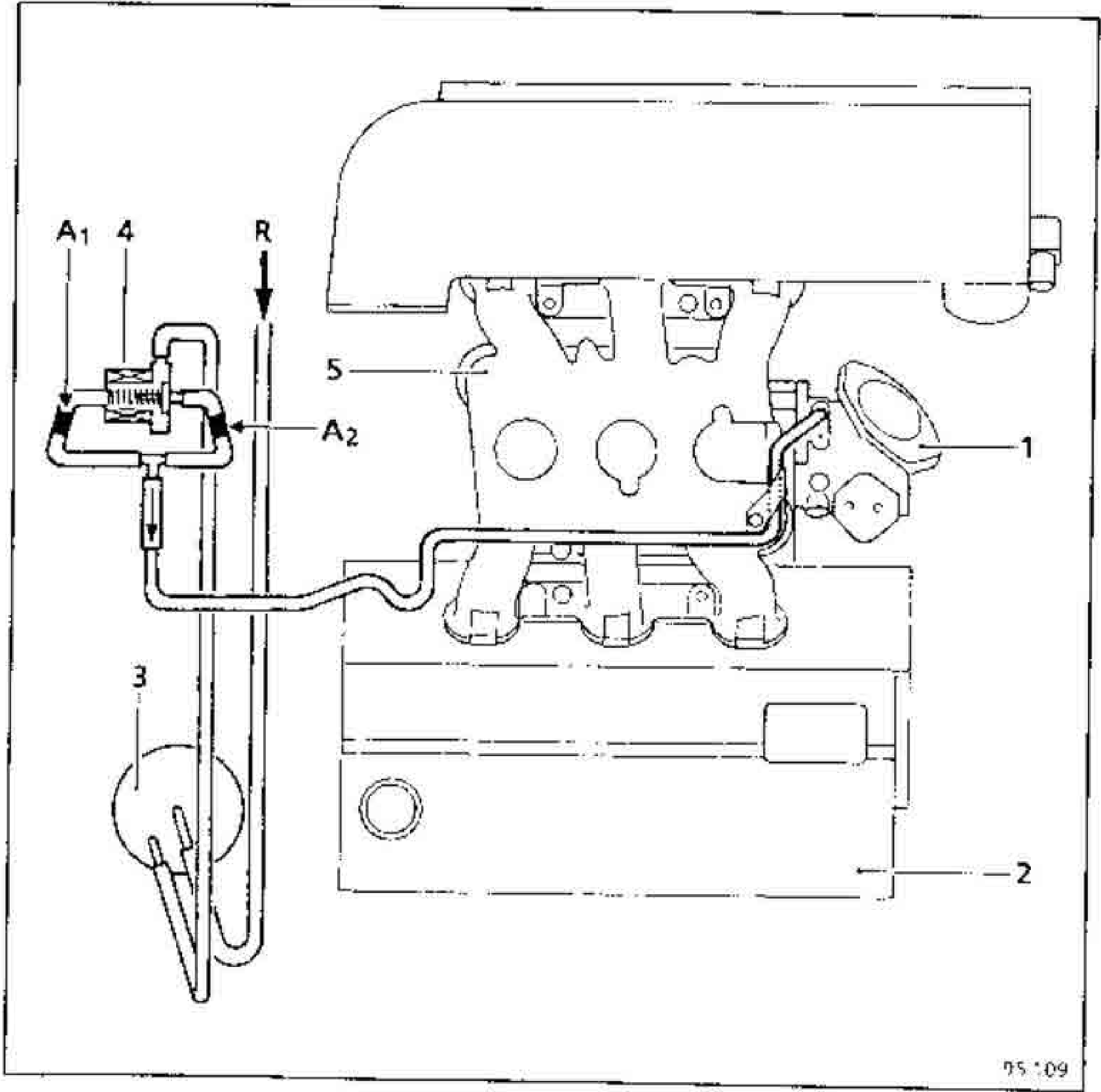
Remove the canister mounting strap.

Remove the canister and the pneumatic pipes.

NOTE:

- the canister bleed pipe is off centre and is of greater diameter than the vapour collecting pipe.
- The vent at the bottom of the canister must be on the right hand side.

OPERATING DIAGRAM



- 1 Intermediate manifold (upstream from the throttle housing)
- 2 Front cylinder bank
- 3 Petrol vapour absorber (or canister)
- 4 Canister bleed solenoid valve
- 5 Inlet manifold
- A₁ Jet Ø 0,3 mm
- A₂ Jet Ø 1,9 mm
- R Pipe for recuperating petrol vapours from the fuel tank.

OPERATING PRINCIPLE

Engine stopped:

The fuel tank is vented via the petrol vapour canister. The vapours are retained by the active carbon in the canister.

Engine at idle speed:

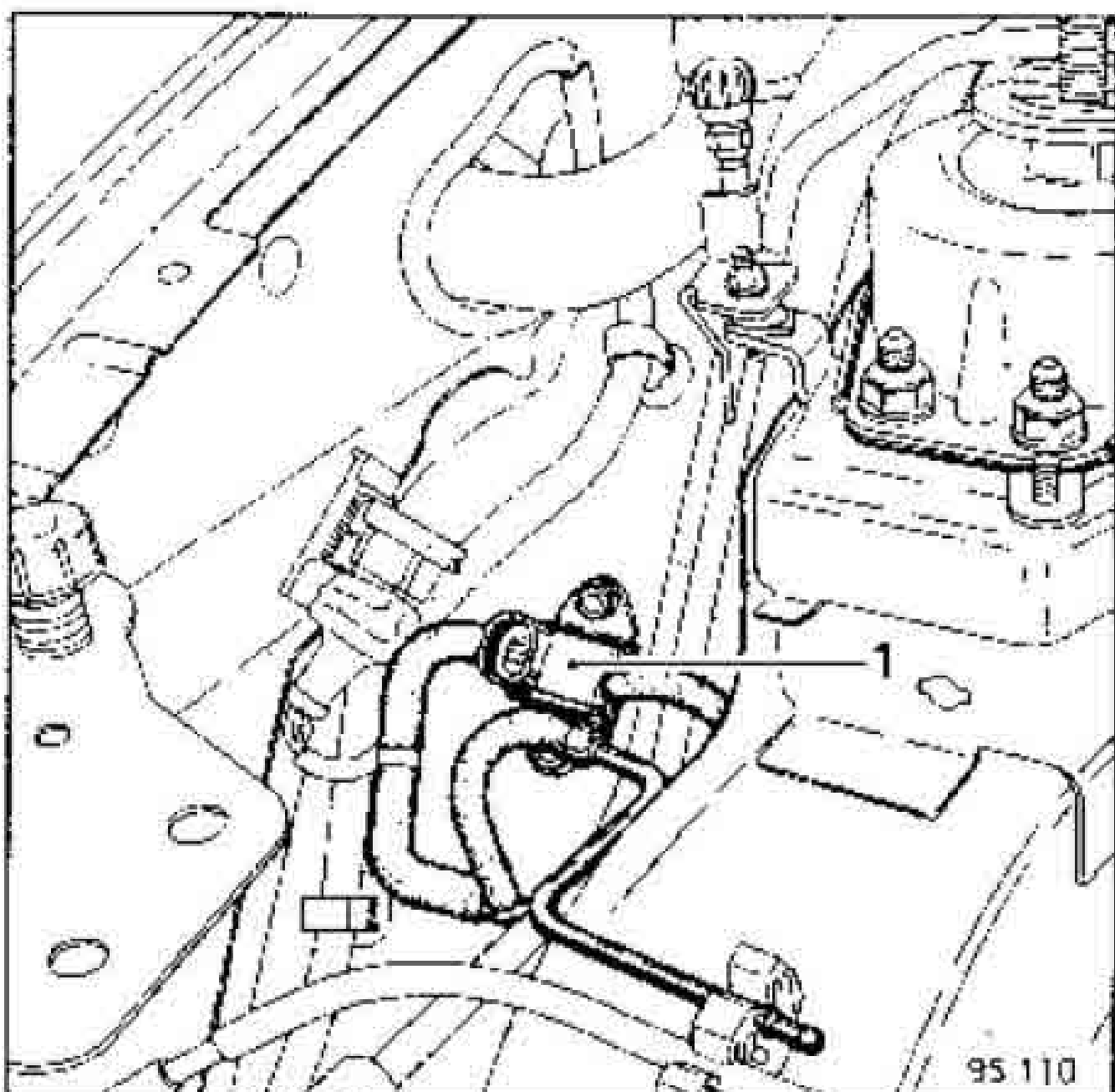
The solenoid valve is not energised. the canister is however partially bled through nozzle A₁ (Ø 0,3 mm).

Engine at speed other than idle :

Under certain engine speed conditions, for predetermined loads, the injection computer energises the solenoid valve and allows the canister to be bled via jet, A₂ (Ø 1,9 mm).

COMPONENT LAYOUT

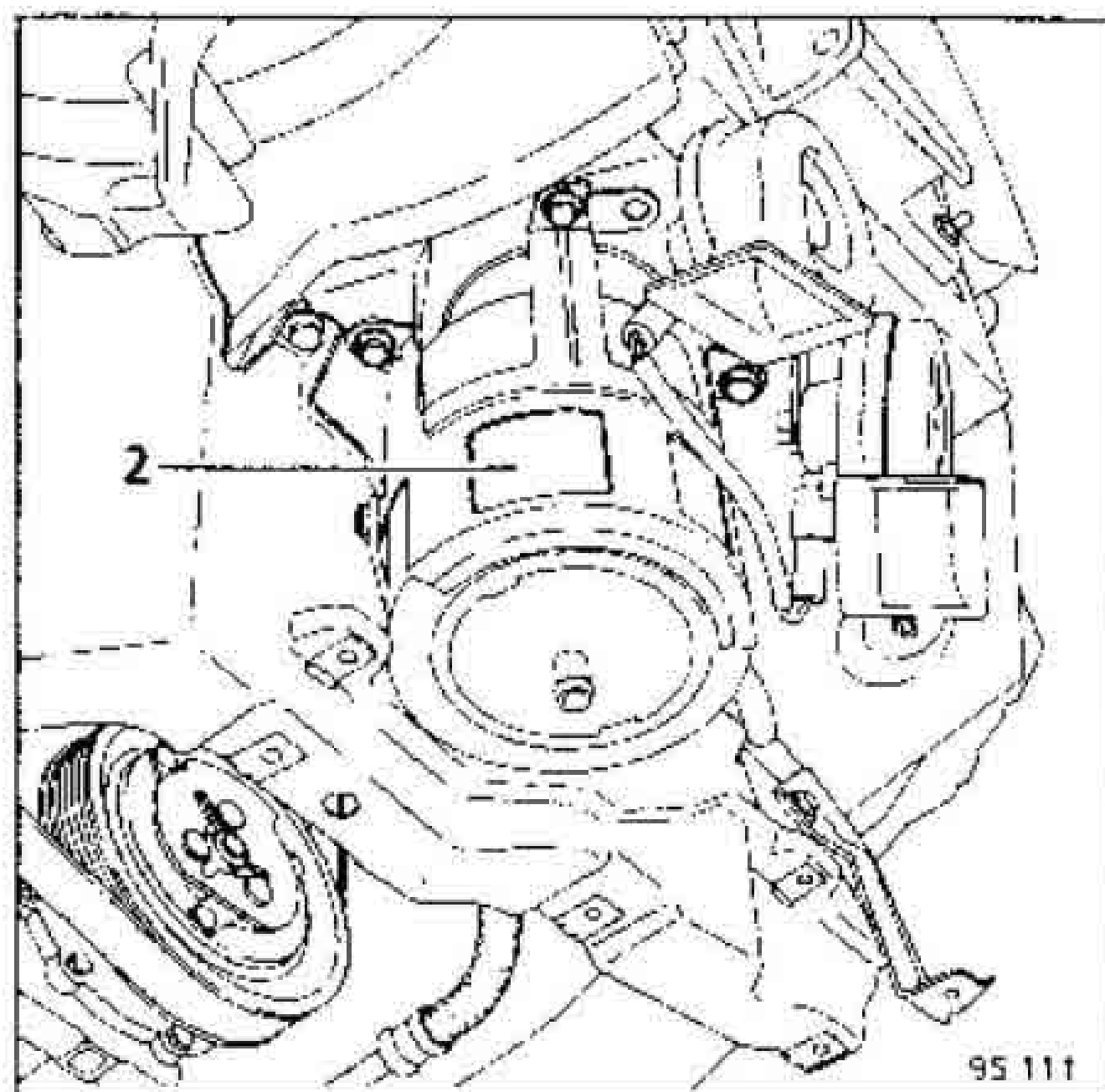
Canister bleed solenoid valve (1)



The canister is mounted on the front right hand wheel arch.

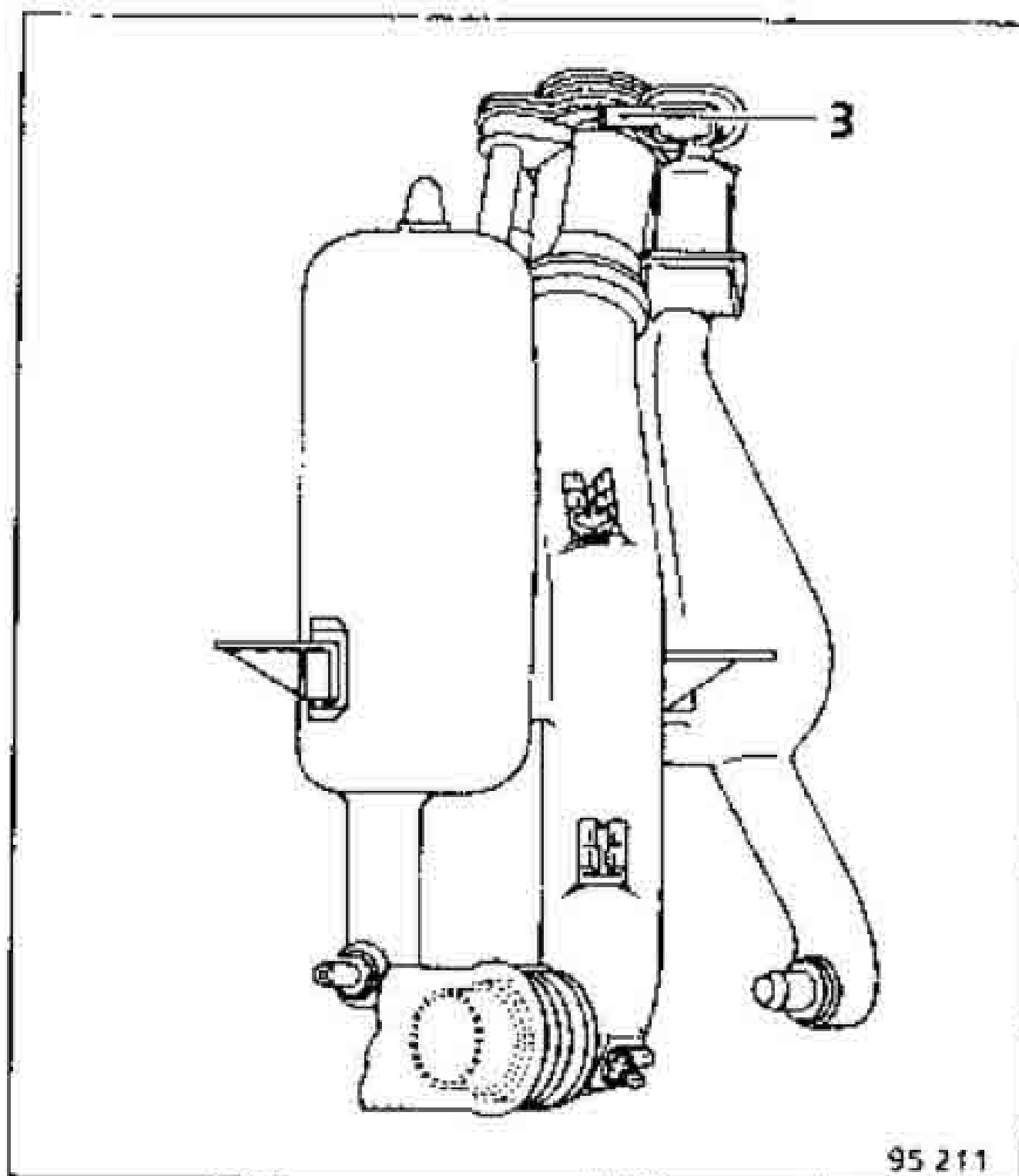
The injection computer must be removed to gain access to the canister.

Petrol vapour canister (2)



The canister is mounted at the front of the vehicle under the right hand side member side cover.

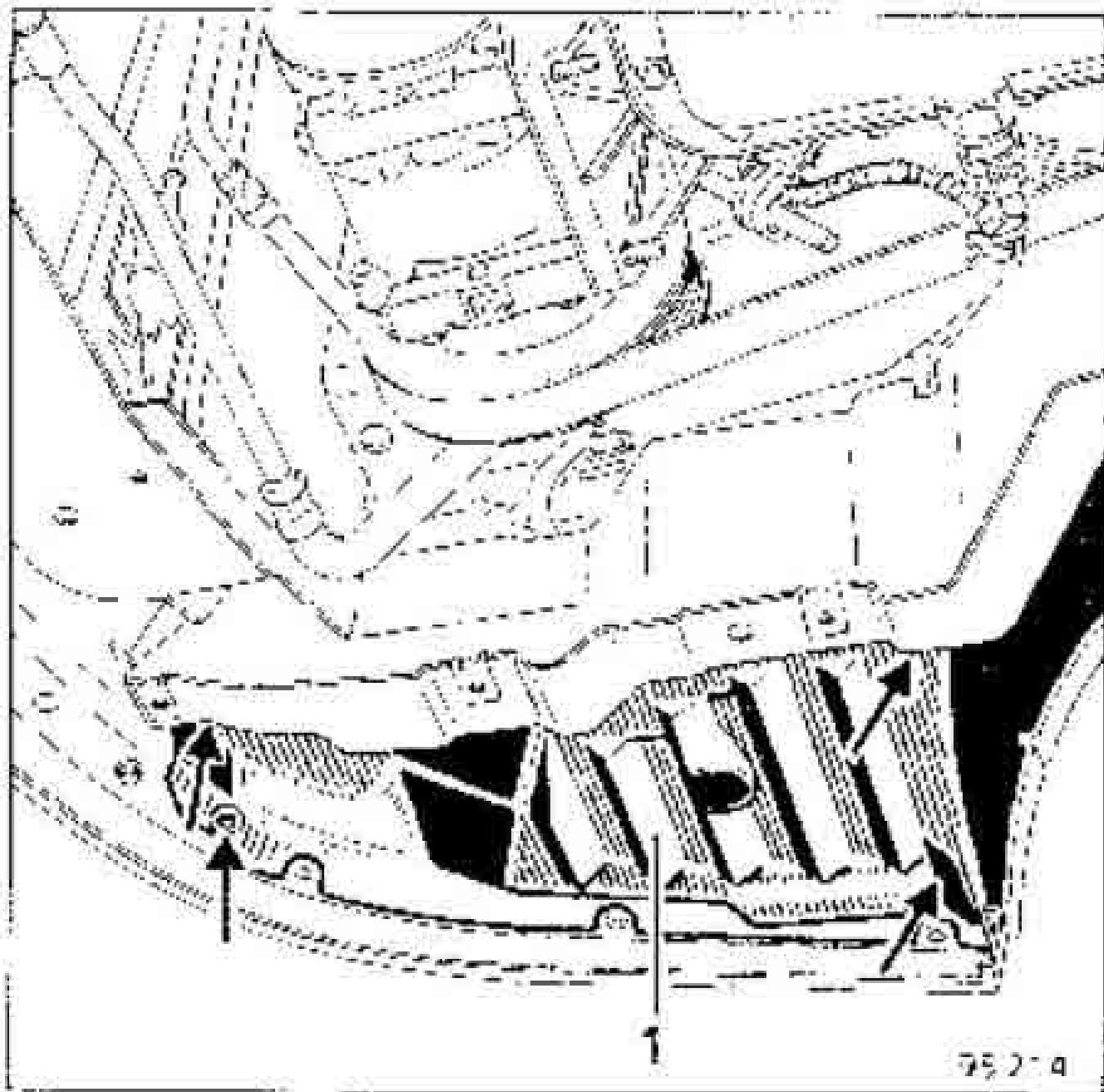
Petrol vapour recycling pipe (3)



The petrol vapour recuperation take off for the fuel tank is located on the upper section of the filler neck.

REMOVAL - REFITTING OF THE CANISTER

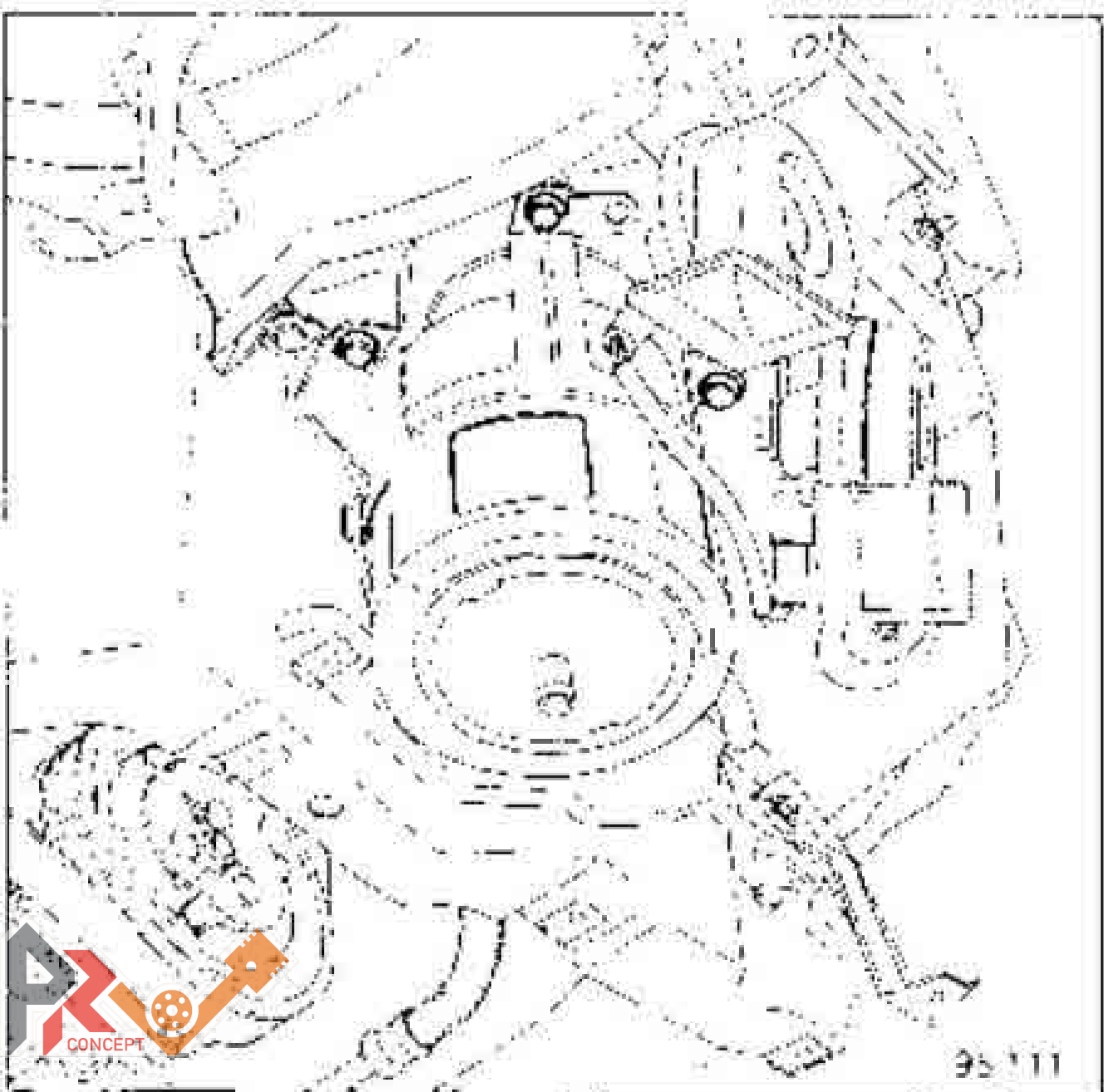
Put the vehicle on a lift.



From underneath the vehicle, remove the four mounting bolts for the plastic protective cover (1).

Tip the cover backwards.

The canister is mounted on a support fixed by three bolts underneath the side member side cover.



Remove the three canister mounting bolts.

Remove the assembly and disconnect the petrol vapour rebreathing pipes.

Remove:

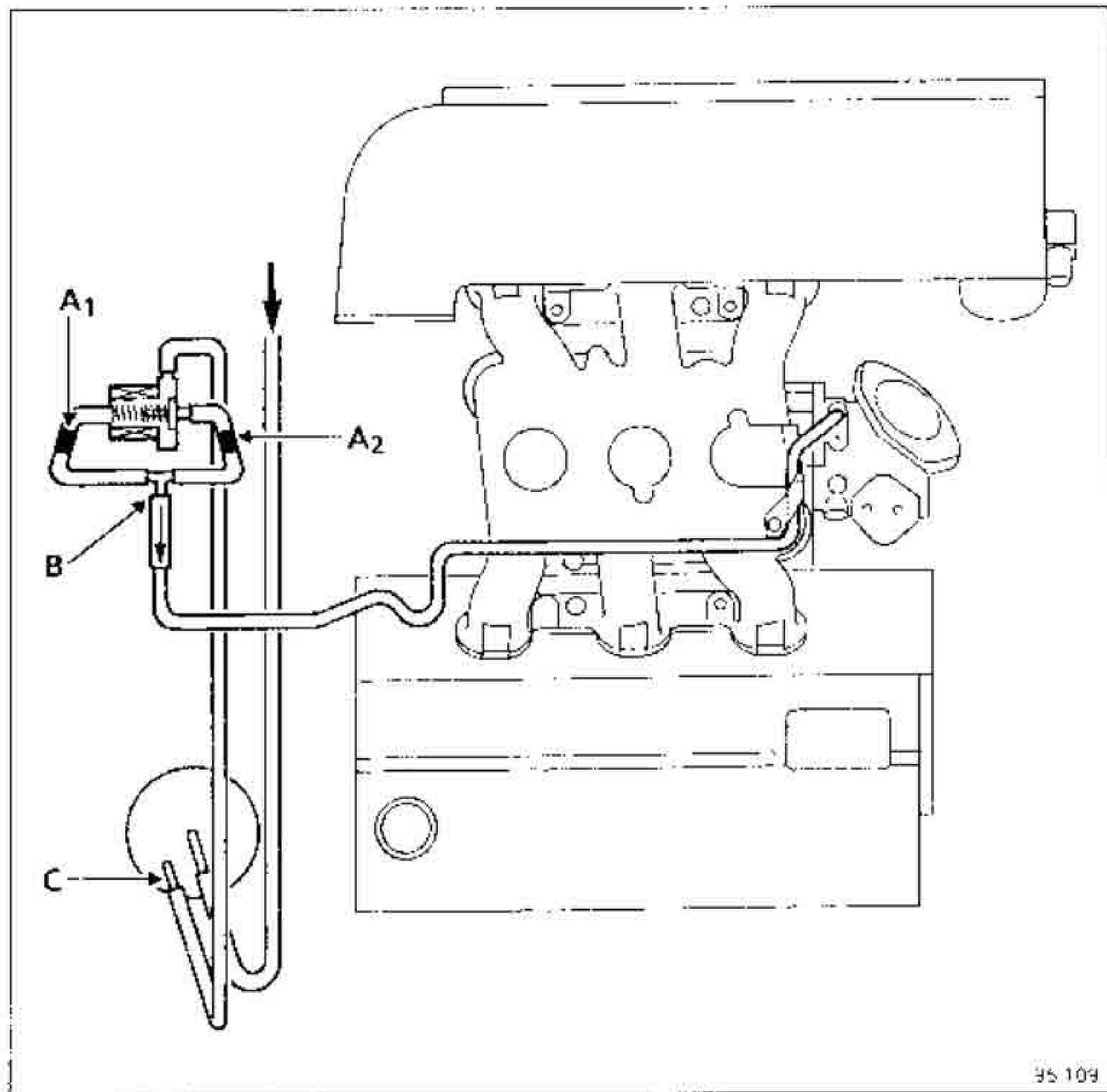
- the strap holding the canister to the support,
- the canister.

REFITTING

Refitting is the reverse of removal.

Ensure the rebreathing pipes are correctly fitted back on to the canister.

FAULT FINDING



95 109

A₁ Jet Ø 0,3 mm
A₂ Jet Ø 1,9 mm

CHECKING THE CIRCUIT

Engine at idle speed.

Disconnect the pipes and check there is a vacuum at (B) ($\approx$ the manifold vacuum).

→ If the vacuum is zero, check the piping to the intermediate manifold, and the cleanness of the take off on the manifold.

Then disconnect the piping at (C), and fit a pressure gauge (0 ; - 1 000 mbar). At idle speed a low vacuum value should be read.

→ if the vacuum is zero, check the conformity and cleanness of jet A₁, and then check the pipe to the canister.

Engine warm, at idle speed : accelerate slightly a few times ; the solenoid valve should click as it operates and the vacuum measured at (C) should increase.

→ If the vacuum remains low, check the cleanness and conformity of jet A₁, then check the pipe to the canister.

→ if the solenoid valve does not click as it operates, check :

- that the engine is warm,
- that the solenoid valve resistance is correct ($R = 30 \Omega$),
- the solenoid electrical feed (check continuity using bornier M.S. 1048).

To check the pipe between the fuel tank filler neck and the canister, remove the pipe at the filler neck and blow air down the pipe. Check to see that air emerges at the canister.