

N.T. 3307A

JA1B

Features of the Scénic JA1B fitted with F4R 740 and F4R 741 (DP0) engines

This note cancels and replaces technical notes 3238B and 3293B

For sections not covered in this Technical Note, refer to MR 312 and Technical Note N $^{\circ}$ 3177A.

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EDITION ANGLAISE

"The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

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Table of contents

Pages

07

VALUES AND SETTINGS

Capacity - Grades	07-1
Accessories belt tensioning	07-3
Timing belt tensioning	07-4
Tightening the cylinder head	07-25

10

ENGINE AND PERIPHERALS

10-1
10-2
10-3
10-9

11 то

TOP AND FRONT OF ENGINE

Timing belt	11-1
Cylinder head gasket	11-9

12 FUEL MIXTURE

Specifications	12-1
Air filter unit.	12-4
Inlet manifold	12-5
Injector holder shim	12-6
Exhaust manifold	12-8

14 ANTIPOLLUTION

Fuel vapour rebreathing 14-1

16 STARTING - CHARGING

Alternator	16-1
Starter	16-3

Pages



Specifications 17-1 Immobiliser function 17-2 Injection / AC programming 17-3 Idle speed correction 17-4 **Richness regulation** 17-5 Adaptative richness correction 17-7 Camshaft dephaser 17-8 Coolant temperature management, 17-9 GCTE 17-10 Computer

19 CO

COOLING SYSTEM

Filling and bleeding	19-1
Diagram	19-2
Radiator	19-4
Water pump	19-5
Suspended engine mountings	19-6
Catalytic converter	19-8

20 CLUTCH

20-1

21 MANUAL GEARBOX

Identification	21-1
Ratios	21-1
Capacities - Lubricants	21-2
Special notes	21-4
Special notes	21-4

Table of contents

Pages

23 AUTOMATIC TRANSMISSION

General	23-1
Consumables	23-2
Parts to be systematically remplaced	23-2
Oil	23-2
Draining	23-3
Filling - Levels	23-4
Hydraulic distributor	23-6
Automatic transmission	
(Removing - Reffiting)	23-8
Differential output seal	23-12
Converter seal	23-13
Multifunction switch	23-14
Sensors	23-16
Computer	23-17
Solenoid valves	23-19
Wiring diagram	23-20
Modular connector	23-23
Line pressure take-off	23-24
Selector control	23-25
Fault finding - Introduction	23-26

36 STEERING ASSEMBLY

Manual steering assistance pump 36-1



62 AIR CONDITIONNING

General	62-1
Compressor	62-2
Dehydration canister	62-3
Condenser	62-4
Pressure relief valve	62-5
Connecting pipes	62-6
Wiring diagram	62-8

VALUES AND SETTINGS Capacities - Grades



Components	Capacity in litres (approx.)*	Grade	
Petrol engine	For oil changes	Countries in the European Union and Turkey	
(01)		PETROL	
		−15 °C	
		$-30 \degree C -20 \degree C -10 \degree C 0 \degree C +10 \degree C +20 \degree C +30 \degree C$	
		ACEA A2/A3 15W40-15W50	
		ACEA A1*/A2/A3 10W30-10W40-10W50	
		ACEA A1*/A2/A3 0W30-5W30	
		ACEA A1*/A2/A3 0W40-5W40-5W50	
		Standard ACEA A1-98	
		* Oil for fuel economy	
	5 15		
F4R	5.3 (1)	Other countries	
		When the lubricants specified for the countries of the European Union are not available, the following specifications should be used:	
		PETROL	
		API SH/SJ 15W40-15W50	
		API SH/SJ 10W40-10W50	
		API SH/SJ 5W30	
		API SH/SJ 5W30 API SH/SJ 5W40-5W50	
		API SH/SJ 100030 API SH/SJ 5W30 API SH/SJ 5W40-5W50 *Oil for fuel economy:	

* Check with dipstick (1) After replacing the oil filter

VALUES AND SETTINGS Capacities - Grades



Components	Capacity in litres	Grade	Special notes
Gearbox JC5	3.1	All countries: TRANSELF TRX 75 W 80 W (Standards API GL5 or MIL-L 2105 G or D)	
Gearbox DP0	7.9	ELF RENAULTMATIC D3 SYW (Standard DEXROW III)	
Cooling circuit F4R	7.9	Glacéol RX (type D)	Protection to $-20^{\circ}C \pm 2^{\circ}C$ for warm, moderate and cold climates. Protection to $-37^{\circ}C \pm 2^{\circ}C$ for very cold climates.

VALUES AND SETTINGS Accessories belt tension



To remove the belt, pivot the automatic belt tensioner in the direction shown below using a **13 mm angled ring spanner**. Hold the tensioning roller using a **6 mm Allen key (1)**.



The engine must be turned through two revolutions in order to position the belt correctly.

ALTERNATOR, POWER ASSISTED STEERING AND AIR CONDITIONING



- A Crankshaft
- B Air conditioning compressor
- C Alternator
- D Assisted steering pump
- E Water pump
- F Fixed roller
- T Automatic tensioning roller

When refitting the belt, it is essential to ensure that the tooth (X) inside the pulleys (timing side) remains "free".





SPECIAL TOOLING REQUIRED				
Mot. 799-01	Tool for immobilising pinions on the toothed timing belt			
Mot. 1054	Top Dead Centre pin			
Mot. 1496	Tool for setting the camshafts			
Mot. 1509	Tool for locking the camshaft pulleys			
Mot. 1509-01	Addition to Mot. 1509			
Mot. 1517	Tool for fitting inlet camshaft seals			
EQUIPMENT REQUIRED				
Angular tightening spanner				

There are two distinct procedures for setting the timing.

WARNING: the lower timing cover must be fitted before the crankshaft accessories pulley.

1st PROCEDURE

The first procedure is used for replacing all components which require the exhaust camshaft pulley and the inlet camshaft dephaser to be slackened.

During this operation, the following must be replaced:

- the nut of the exhaust camshaft pulley,
- the bolt of the inlet camshaft dephaser,
- the seal of the camshaft dephaser,
- the seal of the dephaser blanking plate.



Method for slackening the exhaust camshaft pulley and the inlet camshaft dephaser.

The operation is performed using tools Mot. 1509 and Mot. 1509-01.





Preparation of tool Mot. 1509

Remove the upper toothed pinion from the bracket.



Fit the toothed pinion of tool **Mot. 1509-01** instead and in place of it (reusing the two washers and the nut of tool **Mot. 1509**).





Fit:

- the spacer (1) of tool Mot. 1509-01 on the stud (2),



- tool Mot. 1509 as shown in the diagram below,



 the upper bolt (3) whilst positioning the spacer (4) of tool Mot. 1509-01 between the tool and the camshaft bearing cap housing (do not lock the bolt).



- the shouldered nut (5) of tool Mot. 1509-01.





Tighten the shouldered nut (6) and the bolt (7), then immobilise the pulleys with the toothed pinions of tool **Mot. 1509**.

Remove:

 the blanking plate of the inlet camshaft dephaser using a **14 mm** Allen key,



- the nut of the exhaust camshaft pulley,
- the bolt of the inlet camshaft dephaser.



Replacing the inlet camshaft dephaser seal

Fit the seal of the **inlet camshaft dephaser** using tool **Mot. 1517** and the old bolt (2).



NOTE: to use tool **Mot. 1517**, the hole must be modified to a diameter of **13 mm**.



Adjusting the timing

WARNING:

it is essential to degrease the end of the crankshaft (timing side), the bore and the bearing faces of the timing pinion, the bearing faces of the accessories pulley and the ends of the camshafts (timing side), the bores and the bearing faces of the exhaust camshaft pulley and the inlet camshaft dephaser; to prevent there being any slip between the timing, the crankshaft, the exhaust camshaft pulleys and the inlet dephaser, which may damage the engine.

NOTE:

to make it easier to position the grooves horizontally, position the pulley and dephaser, then tighten the old nut of the pulley and the old bolt of the dephaser to a torque of 1.5 daN.m MAXIMUM. Check that the pistons are positioned at mid-stroke (to prevent any contact between the valves and the pistons).

Position the grooves of the camshafts horizontally as **shown in the** diagram below (rotating the camshafts using tool Mot. 799-01 if necessary).





Check that the ring of the camshaft dephaser is correctly locked (no rotation of the ring to the left or to the right).



07

Position tool Mot. 1496, onto the end of the camshaft.



Remove the old nut from the pulley, the old bolt from the dephaser and replace them with a new nut and bolt (leave a clearance of 0.5 - 1 mm between the nut or the bolt and the camshaft pulleys).

Ensure that the crankshaft is correctly pinned at Top Dead Centre and not in the balancing hole (groove (5) of the crankshaft must be positioned in the middle of the two webs (1) of the crankshaft closure panel).



Incorrect position



Pinned crankshaft





When replacing the timing belt, the tensioning and fixed rollers must be replaced.

Ensure that the lug (1) of the tensioning roller is correctly positioned in the groove (2).



Refit:

- the timing belt,
- the fixed roller (3) tightening the mounting bolt to a torque of 4.5 daN.m,



- the lower timing cover without tightening the bolts,
- the crankshaft accessories pulley, pre-tightening the bolt (without locking the bolt, clearance of 2 3 mm between the bolt and the pulley).

NOTE:

- the crankshaft accessories pulley bolt can be reused if the length under its head does not exceed 49.1 mm (otherwise replace it),
- do not oil the new bolt. However, when reusing the bolt, it must be oiled on the threads and under the head.



Belt tension

Check that there is always a clearance of 0.5 - 1 mm between the nut, the bolt and the camshaft pulleys.

NOTE: do not rotate the tensioning roller in an anti-clockwise direction.

Align the references (6) and (7) of the tensioning roller using a **6 mm** Allen key at (B).



Pre-tighten the nut of the tensioning roller to a torque of **0.7 daN.m.**

NOTE: check that the nut and the bolt of the camshaft pulleys do not touch their respective pulleys. To do this, from time to time, push the camshaft pulleys against the camshafts.

Rotate the timing through **six revolutions** in a clockwise direction (timing side) using the **exhaust pulley** using tool du **Mot. 799-01**.

Alight the references (6) and (7) if necessary, slackening the nut of the tensioning roller by a maximum of one turn whilst holding it with a **6 mm** Allen key. Then tighten the nut finally to a torque of **2.8 daN.m**.

Tighten the bolt of the accessories crankshaft pulley to a torque of **2 daN.m (Top Dead Centre pin still positioned in the crankshaft).**



Mark a reference (C) using a pencil between the camshaft pulleys and the camshaft bearing cap housing.



REMOVE THE TOP DEAD CENTRE PIN.

07

Lock the flywheel using a large screwdriver, then turn the bolt of the accessories crankshaft pulley though an angle of $115^{\circ} \pm 15^{\circ}$.



Pin the crankshaft using the references made previously between the camshaft pulleys and the camshaft bearing cap housing. These references must be aligned, which will ensure that the pin is in the pinning hole and not in the crankshaft balancing hole.

Correct position



Incorrect position



Fit the tool for locking the camshaft pulleys **Mot. 1509 fitted with the additional tool Mot. 1509-01**.



07

Tighten the new bolt of the **inlet** camshaft dephaser to a torque of **10 daN.m**.

Tighten the new nut of the **exhaust** camshaft pulley to a torque of **3 daN.m**, **then turn through an angle of** $86^{\circ} \pm 6^{\circ}$.

Remove tool **Mot. 1496** for setting the camshaft, tool **Mot. 1509** for locking the camshaft pulleys and tool **Mot. 1054**, the Top Dead Centre pin.

Checking the timing and the tension

Checking the tension:

Rotate the crankshaft through two revolutions in a clockwise direction (timing side), and before the end of the two revolutions **(in other words, before the previously made references are aligned)**, insert the Top Dead Centre pin (so as to be between the balancing hole and the pinning hole) then put the timing in its setting point.

Before pinning



Pinned crankshaft



Remove the Top Dead Centre pin.

Check that the references of the tensioning roller are correctly aligned, otherwise repeat the tensioning procedure. To do this, slacken the nut of the tensioning roller by a maximum of one turn whilst holding it with a **6 mm** Allen key.

Align the references of the tensioning roller and tighten the nut finally to a torque of **2.8 daN.m**.

Checking the timing

Ensure that the references of the tensioning roller are in the correct position before checking the setting of the timing.

Fit the Top Dead Centre pin (check that the references made previously on the camshaft pulleys are aligned).

Fit (without forcing) tool **Mot. 1496** for setting the camshaft (the camshaft grooves must be horizontal and offset towards the bottom). If the tool cannot be inserted, the timing setting and tensioning procedure must be repeated.





Refit the blanking plate (1) (fitted with a new seal) of the dephaser tightening it to a torque of **2.5 daN.m**



07

2nd PROCEDURE

The second procedure is used for replacing all components located on the front of the timing which do not require the exhaust camshaft pulley and the inlet camshaft dephaser to be slackened.

Adjusting the timing

WARNING: it is essential to degrease the end of the crankshaft, the bore of the crankshaft pinion and the bearing faces of the crankshaft pulley to prevent any slip between the timing and the crankshaft which may damage the engine.

Position the grooves of the camshafts using tool **Mot. 799 01** as shown in the diagram opposite.



Position tool Mot. 1496, onto the end of the camshaft.



07

Ensure that the crankshaft is correctly pinned at Top Dead Centre and not in the balancing hole (groove (5) of the crankshaft must be positioned in the middle of the two webs (1) of the crankshaft closure panel).



Pinned crankshaft



Incorrect position





Check that the ring of the camshaft dephaser is correctly locked (no rotation of the ring to the left or to the right).





When replacing the timing belt, the timing tensioning and fixed rollers must be replaced.

Ensure that the lug (1) of the tensioning roller is correctly positioned in the groove (2).



Refit:

- the timing belt,
- the fixed roller (3) tightening the mounting bolt to a torque of 4.5 daN.m,



- the lower timing cover without tightening the bolts,
- the crankshaft accessories pulley, pre-tightening the bolt (without locking the bolt, clearance of 2 3 mm between the bolt and the pulley).

NOTE:

- the crankshaft accessories pulley bolt can be reused if the length under its head does not exceed 49.1 mm (otherwise replace it),
- do not oil the new bolt. However, when reusing the bolt, it must be oiled on the threads and under the head.



NOTE: do not rotate the tensioning roller in an anti-clockwise direction.

Align the references (6) and (7) of the tensioning roller using a 6 mm Allen key at (B).



Pre-tighten the nut of the tensioning roller to a torque of **0.7 daN.m.**

Tighten the bolt of the accessories crankshaft pulley to a torque of 2 daN.m (Top Dead Centre pin Mot. 1054 still positioned in the crankshaft).

Mark a reference (C) on the ring of the inlet camshaft dephaser and the exhaust pulley in relation to the camshaft bearing cap housing.



Remove tool **Mot. 1496** for setting the camshaft as well as the Top Dead Centre pin, tool **Mot. 1054**.

Tighten the crankshaft pulley bolt to an angle of $115^{\circ} \pm 15^{\circ}$, locking the flywheel using a large screwdriver.



07

Checking the timing and the tension

Checking the tension:

Rotate the crankshaft through two revolutions in a clockwise direction (timing side). Before the end of the two revolution (in other words, half a tooth before the previously made references are aligned), insert the crankshaft Top Dead Centre pin (so as to be between the balancing hole and the pinning hole) then put the timing in its setting point.



Correct position



Incorrect position



Remove the Top Dead Centre pin, tool Mot. 1054.

Check that the references of the tensioning roller are correctly aligned, otherwise repeat the tensioning procedure. To do this, slacken the nut of the tensioning roller by a maximum of one turn whilst holding it with a **6 mm** Allen key.

Align the references of the tensioning roller and tighten the nut finally to a torque of **2.8 daN.m**.

Checking the timing

Ensure that the references of the tensioning roller are in the correct position before checking the setting of the timing.

Fit the Top Dead Centre pin (check that the references made previously on the camshaft pulleys are aligned).

Fit (without forcing) tool **Mot. 1496** for setting the camshafts (the camshaft grooves must be horizontal and offset towards the bottom). If the tool cannot be inserted, the timing setting and tensioning procedure must be repeated.







METHOD FOR TIGHTENING THE CYLINDER HEAD

The bolts can be reused if the length under the head does not exceed 118.5 mm (otherwise, replace all the bolts).

Method for tightening the cylinder head

REMINDER: in order to tighten the bolts correctly, use a syringe to remove any oil which may have entered the cylinder head mounting bolt holes.

Do not oil the new bolts. However, when reusing the bolts, they must be oiled.

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



Check that all the bolts are correctly tightened to **2 daN.m** then, bolt by bolt, tighten to an angle of $165^{\circ} \pm 6^{\circ}$.

Do not tighten the cylinder head bolts after applying this procedure.

ENGINE AND PERIPHERALS Identification



Vehicle type	Engine	Gearbox	Capacity (cm ³)	Bore (mm)	Stroke (mm)	Ratio
JA1B	F4R 740 F4R 741	JC5 DP0	1998	82.7	93	9.8/1

Section to be consulted: Mot. F4R and N.T. 3200A.

SPECIAL TOOLING REQUIRED

Mot. 836-05 Kit for checking oil pressure

EQUIPMENT REQUIRED

22 mm long socket or pipe spanner

CHECKING

The oil pressure should be checked when the engine is warm (approximately **80°C**).

Contents of kit Mot. 836-05.



USE

B + F

Connect the pressure gauge in place of the oil pressure switch.

Oil pressure

Idling	1 bar
3,000 rpm	3 bar

SPECIAL TOOLING REQUIRED				
Mot. 1294-01	Tool for removing windscreen wiper arms			
Mot. 1040-01	Dummy sub-frame for removing and refitting engine and transmission assembly			
Mot. 1159	Tool for maintaining engine on subframe			
Mot. 1202-01	Diars for base clins			
Mot. 1202-02				
Mot. 1233-01	Threaded rods for lowering the sub-frame			
Mot. 1448	Long nose pliers for hose clips			
Mot. 1453	Engine support tool			

TIGHTENING TORQUES (in daN.m)	\heartsuit
Sub-frame front mounting bolts	6.2
Sub-frame rear mounting bolts	10.5
Bolts for mounting front right hand suspended engine mounting cover on the engine	6.2
Movement limiter mounting bolt	6.2
Mounting nut for rubber engine mounting pad on front left-hand side member support	6.2
Shock absorber base bolts	18
Brake caliper mounting bolt	4
Steering shaft yoke bolt	3
Sub-frame - side member tie rod bolts	3
Wheel bolts	9

REMOVAL

Put the vehicle on a 2 post lift.

Remove:

- the battery,
- the engine undertray.

Drain:

- the cooling circuit through the bottom hose of the radiator,
- the gearbox and the engine (if necessary),
- the coolant circuit (if fitted) using filling equipment.

ENGINE AND PERIPHERALS Engine and transmission assembly



Remove:

- the front wheels along with the mudguard,
- the sub-frame and body tie rods,
- the track rod ends,
- the brake calipers (as well as the ABS sensors, if fitted) and secure them to the suspension springs,
- the shock absorber base bolts,
- the heat shield (A) as well as the gearbox control (if fitted with manual gearbox),
- the protection plate (1), release the fuel supply pipe and disconnect it,
- the mountings (2) and the tie-rods,
- the clip (3) of the catalytic converter and secure this to the body.



- the horns,
- the two mountings of the **power assisted steering** hoses on the right hand side of the sub-frame,
- the nut and the eccentric bolt of the steering shaft yoke, after pushing back the guard.

SPECIAL NOTES FOR VEHICLES FITTED WITH A DRIVER'S AIRBAG

WARNING

In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:

- Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised for the duration of the operation with the wheels straight using a "steering wheel locking tool".
- If there is any doubt regarding the correct alignment of the rotary switch the steering wheel must be removed so that the alignment procedure described in the "AIRBAG" section can be applied.

REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

Remove:

- the front bumper,
- the air resonator,
- the windscreen wiper arms using tool Elé. 1294-01,
- the front grilles,





- the closure panel of the plenum chamber,



- the shock absorber cap protectors,
- the accelerator and clutch cables (if fitted with manual gearbox),
- the brake servo vacuum pipe (manifold side),
- the air filter unit and remove it as shown below.



NOTE: be careful of the vacuum outlet going from the inlet manifold to the brake servo. The manifold has to be replaced if this outlet is broken.

Disconnect the pipe as well as the connector on the canister.

SPECIAL NOTES ABOUT VEHICLES FITTED WITH AUTOMATIC TRANSMISSION

Disconnect:

- the ball joint (1) from the MFS (Multifunction Switch),
- the cable (2) of the MFS by releasing the sleeve stop.

NOTE: do not move the orange ring during this operation. It may be broken when removing or refitting. Where necessary, do not replace the control cable as the absence of this part does not affect the operation of the system.



ENGINE AND PERIPHERALS Engine and transmission assembly



Remove:

- the hoses on the heater radiator,
- the battery mounting,
- the mountings of the expansion bottle and release it,
- the mountings of the catalytic converter on the manifold and release it,
- the relay plate at (5) and disconnect the connectors (6), (7), (8) and (9) (if fitted with Automatic Transmission) as well as the fuse holder (10),



- the earth strap on the bulkhead,
- the mountings of the **air conditioning** hoses (if fitted) on the compressor and the dehydration canister.

NOTE: plugs must be fitted onto the hoses and pressure relief valve to prevent moisture from entering the circuit.

Fit the engine retaining tool **Mot. 1453** ensuring that the strap is correctly positioned.



Remove the suspended engine mounting cover.





Insert a wooden block between the gearbox and the sub-frame.

Remove the nut (1), then tap it with a copper hammer to release the suspended engine mounting stud.

Manual gearbox



Automatic transmission



Fit the two tools Mot. 1159 as shown below.





Fit tool **Mot. 1040-01** under the engine sub-frame.



Lower the lift until the tool touches the ground.

Remove the sub-frame mounting bolts and take out the engine and transmission assembly by lifting the body.

When starting to lift the body, ensure that the catalytic converter is removed and extract the radiator from its upper mountings (then place it on the sub-frame).

NOTE: for any operation requiring the engine, gearbox and sub-frame assembly to be separated, take care to mark the position of tool **Mot. 1159** on the sub-frame.

REFITTING

The alignment of the sub-frame with the body will be made easier by positioning two threaded rods **Mot. 1233-01** in the two front mountings of the subframe on the body.

When lowering the body onto the engine - gearbox assembly, ensure that the catalytic converter is refitted.

Tighten the sub-frame mounting bolts to a torque of: - **6.2 daN.m** at the front,

– 10.5 daN.m at the rear.

Refitting is the reverse of removal.

Correctly refit the heat shields.

Apply **Loctite FRENBLOC** to the caliper mounting bolts and tighten them to the recommended torque.

Press the brake pedal several times to bring the pistons into contact with the brake pads.

Fill:

- the engine and gearbox with oil (if necessary),
- the cooling circuit and bleed it (see section 19 "Filling - bleeding").

Fill the coolant circuit using the filling equipment (if fitted).
ENGINE AND PERIPHERALS Sump



SPECIAL TOOLING REQUIRED

Mot. 1233-01 Threaded rods for lowering the sub-frame

TIGHTENING TORQUES (in daN.m)	\heartsuit
Sub-frame front mounting bolts	6.2
Sub-frame rear mounting bolts	10.5
Sump bolts	1.4
Steering shaft yoke bolt	3
Lower ball joint mounting bolt	6
Engine tie bar bolt	6.2
Sub-frame - side member tie rod bolts	3
Wheel bolts 9	9

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the engine.

Remove:

- the front wheels as well as the right hand mudguard and the lower clip of the left hand mudguard,
- the nut and the eccentric bolt of the steering shaft yoke, after pushing back the guard.

WARNING

In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:

- Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised for the duration of the operation with the wheels straight using a "steering wheel locking tool".
- If there is any doubt regarding the correct alignment of the rotary switch the steering wheel must be removed so that the alignment procedure described in the "AIRBAG" section can be applied.

REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

Remove:

- the lower ball joint mountings as well as the track rod ends,
- the sub-frame and body tie rods,
- the gear control on the gearbox side (if fitted with manual gearbox),

Manual gearbox

- the horns,
- bolt (1), and slacken engine tie-bar bolt (2), without removing it,



Automatic transmission



- the bottom mountings of the bumper,



- the sub-frame mounting bolts, inserting the threaded rods Mot. 1233-01 as you go.

Lower the sub-frame progressively using the threaded rods **Mot. 1233-01** until a dimension of **X1 = 9 cm** is obtained.



Release the electrical harness from the sub-frame (left hand side).

Remove the sump.



REFITTING

Put a drop of **RHODORSEAL 5661** at (A) (on either side of bearing N° 1), and at (B) (at the intersection of the crankshaft closure panel and the cylinder block).



Refit the sump with a new seal, pre-tightening it to a torque of **0.8 daN.m**, then tighten it finally to a torque of **1.4 daN.m** in the order recommended below.



SPE	SPECIAL TOOLING REQUIRED					
Mot. 799-01	Tool for immobilising pinions on the toothed timing belt					
Mot. 1054	Top Dead Centre pin					
Mot. 1453	Engine support tool					
Mot. 1487	Tool for fitting inlet camshaft sealing plug					
Mot. 1488	Tool for fitting exhaust camshaft sealing plug					
Mot. 1489	Top Dead Centre pin					
Mot. 1496	Tool for setting the camshaft					
Mot. 1509	Tool for locking the camshaft pulleys					
Mot. 1509-01	Addition to Mot. 1509					
EQUIPMENT REQUIRED						
Angular tightening spanner						

TIGHTENING TORQUES (In daN.m and/ or $^{\circ}$)	\bigcirc
Fixed roller bolts	4.5
Crankshaft pulley bolts 2 + 135° ± 15°	
Tensioning roller nut	2.8
Mounting bolt for front right hand suspended engine mounting cover on engine	6.2
Mounting bolt for the movement limiter of the front right hand suspended engine mounting	6.2
Wheel bolts	9
Mounting bolt for the front left hand suspended gearbox mounting	
- on the manual gearbox	4.4
- on the automatic transmission	6.2
Mounting bolt for the suspended gearbox mounting on the side member	2.1
Engine tie bar bolts	6.2
Mounting bolt of the automatic transmission rear support	6.2

REMOVAL

Remove:

- the battery as well as its support,
- the front right wheel as well as the mudguard,
- the front right hand grille as well as the mounting bolts of the left hand grille,



- the closure panel of the plenum chamber,

- the protector of the right hand shock absorber cap,
- the bumper.
- the left hand lens unit.

REMOVAL

Put the vehicle on a 2 post lift.

Position the engine support, tool **Mot. 1453** with the retaining straps.



Remove:

the suspended engine mounting cover and the movement limiter,



 the engine tie bar and the rear transmission support at (1) for vehicles with automatic transmission,



- the suspended transmission mounting assembly.

Manual gearbox



Automatic transmission



the accessories belt (see Section 07 "Accessories belt tension"),

TOP AND FRONT OF ENGINE Timing belt



- the plate (3) on the side member,



- the upper radiator mountings,

Disconnect the connectors (4)

Unclip:

- the electrical harness on the upper timing cover and separate the assembly,
- the petrol pipe on the intermediate timing housing.



Remove:

- the camshaft sealing plugs,



- the Top Dead Centre pin plug.





Adjusting the timing

Rotate the engine in a clockwise direction (timing side) so as to position the camshaft grooves towards the bottom in an almost horizontal position as shown on the diagram below. Then insert the Top Dead Centre pin **Mot. 1054** so as to be between the balancing hole and the crankshaft setting groove.







Rotate the engine slightly in the same direction, inserting the pin **Mot. 1054** to the setting point.

The grooves of the camshafts must, at the setting point, be horizontal and offset towards the bottom as shown on the diagram below.



Correct position



Incorrect position (the pin is in the balancing hole).





Remove:

the crankshaft pulley, locking the flywheel using a screwdriver,



- the intermediate timing housing (1) having moved the engine to the right, on the gearbox side,
- the upper housing (2).





Slacken the timing belt by undoing the nut (1) of the tensioning roller.

To remove the timing belt, remove the fixed roller (2) and **take care not to drop the crankshaft pinion (as this does not have a key)**.

Remove the crankshaft timing pinion.

ł



TOP AND FRONT OF ENGINE Timing belt

WARNING: it is essential to degrease the end of the crankshaft, the bore of the crankshaft pinion and the bearing faces of the crankshaft pulley to prevent the timing slipping which may damage the engine.

REFITTING

When replacing the timing belt, the timing tensioning and fixed rollers must be replaced.

Refit:

- the timing belt (it is essential to follow the method described in Section 07 "Tensioning the timing belt"),
- the accessories belt (see Section 07 "Procedure for tensioning the accessories belt"),
- the plug of the Top Dead Centre pin, applying a drop of RHODORSEAL 5661 onto the thread,
- the new sealing plugs:
 - of the inlet camshaft (Mot. 1487),
 - the exhaust camshaft (Mot. 1488).



 the right hand suspended engine mounting as well as the engine tie bar - transmission rear support assembly (automatic transmission) version and the left hand suspended engine mounting, tightening them to the correct torque (see Section 19 "Suspended engine mounting").

SPECIAL TOOLING REQUIRED					
Mot. 799-01	Tool for immobilising pinions on the toothed timing belt				
Mot. 1054	Top Dead Centre pin				
Mot. 1159	Tool for securing engine				
Mot. 1202-01					
Mot. 1202-02	f Pliers for nose clips				
Mot. 1448	Long nose pliers for hose clips				
Mot. 1453	Engine support				
Mot. 1487	Tool for fitting inlet camshaft sealing plug				
Mot. 1488	Tool for fitting exhaust camshaft sealing plug				
Mot. 1496	Tool for setting the camshaft				
Mot. 1509	Tool for locking the camshaft				
Mot. 1509-01	∫pulleys				
Mot. 1512	Tool for fitting exhaust camshaft seal				
Mot. 1513	Tool for fitting the camshaft dephaser solenoid valve seal				
Mot. 1517	Tool for fitting inlet camshaft seals				
EQUIPMENT REQUIRED					
Tool f	for testing cylinder head				
Ang	ular tightening spanner				

TOP AND FRONT OF ENGINE Cylinder head gasket

TIGHTENING TORQUES (in daN.m and/or \degree)	\heartsuit
Fixed roller bolts	4.5
Crankshaft pulley bolts 2 + 135° ±	15°
Tensioning roller nut	2.8
Exhaust camshaft pulley nuts	
3 +	86°
Camshaft dephaser bolts	10
Cylinder head bolts	1.2
Oil decanter bolts	1.3
Wheel bolts	9
Mounting bolt for front right hand suspended engine mounting cover on engine	6.2
Mounting bolt for the movement limiter of the front right hand suspended engine mounting	6.2
Mounting bolt for the front left hand suspended gearbox mounting	
- on the gearbox	4.4
- on the automatic transmission	6.2
Mounting bolt for the suspended gearbox mounting on the side member	2.1
Engine tie bar bolts	6.2
Mounting bolt of the automatic transmission rear support	6.2

REMOVAL

Put the vehicle on a 2 post lift.

Remove:

- the timing belt (see method described in section 11, "Timing belt").
- the engine undertray,

Drain the cooling circuit (through the lower radiator hose).

Remove the two **power assisted steering** hoses on the right hand side of the sub-frame.

Position the two tools Mot. 1159 as shown below:





Insert a wooden block between the gearbox and the sub-frame.

Remove the engine support tool Mot. 1453.

Method for slackening the exhaust camshaft pulley and the inlet camshaft dephaser.

The operation is performed using tools Mot. 1509 and Mot. 1509-01.







Preparation of tool Mot. 1509

Remove the upper toothed pinion from the bracket.



Fit the toothed pinion of tool **Mot. 1509-01** instead and in place of it (reusing the two washers and the nut of tool **Mot. 1509**).



Fit:

- the spacer (1) of tool Mot. 1509-01 on the stud (2),



- Tool Mot. 1509 as shown in the diagram below,





 the upper bolt (3) whilst positioning the spacer (4) of tool Mot. 1509-01 between the tool and the camshaft bearing cap housing (do not lock the bolt).



- the shouldered nut (5) of tool Mot. 1509-01.



Tighten the shouldered nut (6) and the bolt (7), then immobilise the pulleys with the toothed pulleys of tool **Mot. 1509**.

Remove:

 the blanking plate of the inlet camshaft dephaser using a **14 mm** Allen key,



- the nut of the exhaust camshaft pulley,
- the bolt of the inlet camshaft dephaser.



TOP AND FRONT OF ENGINE Cylinder head gasket



Remove:

- the accelerator cable,
- the power steering reservoir from its support and release it,
- the injection rail protector,
- the fuel supply pipe on the injection rail and release it.

Disconnect:

- the connector (3) as well as those of the coils,
- the vacuum pipe from the brake servo on the inlet manifold,
- the air housing at (4).



NOTE: be careful of the vacuum outlet going from the inlet manifold to the brake servo. The manifold has to be replaced if this outlet is broken.

Move the air filter unit to the right in order to remove it. The air filter unit can pass between the windscreen aperture, the engine and the brake servo.



TOP AND FRONT OF ENGINE Cylinder head gasket



- the mountings of the catalytic converter, release it from the exhaust manifold and secure it to the exhaust pipe,
- the throttle body at (5),
- the oxygen sensor connector of the catalytic converter,
- the lifting bracket (6),
- the air distributor,



- the coils,

- the oil decanter,



TOP AND FRONT OF ENGINE Cylinder head gasket



- the lifting bracket on the flywheel side,
- the bolts of the cylinder head cover then release it vertically by tapping on the "lugs" at (1) using a copper hammer and lever it using a screwdriver at (2) (protect the screwdriver to avoid damaging the aluminium surfaces).





- the camshafts as well as the valve rockers,
- the hoses on the cylinder head water outlet housing as well as the coolant temperature sensor connector,
- the mountings of the electrical harness bracket at (10),



- the cylinder head.



CLEANING

It is very important not to scratch the gasket faces of all aluminium components.

Use the **Décapjoint** product to dissolve any part of the gasket which remains attached.

Apply the product to the parts to be cleaned; wait about ten minutes, then remove it using a wooden spatula.

Wear gloves whilst carrying out this operation.

We must draw your attention to the care which must be taken during this operation, to prevent any foreign bodies from being introduced into the oil channels (channels located in the cylinder block and in the cylinder head).

CHECKING THE GASKET FACE

Check that there is no gasket face bow. Maximum deformation: **0.05 mm**.

No regrinding of the cylinder head is permitted. Check the cylinder head for cracks.

REFITTING

When dismantling and refitting the cylinder head, please comply with the following points:

 It is important to re-prime the hydraulic tappets as these may become drained after a long time. To check whether they need repriming, press the top of the tappet at (A) with your thumb and if the tappet piston can be pressed down, submerge the tappet in a container filled with diesel then refit them.





– Check:

- that the exhaust heat shield is correctly positioned between the oxygen sensor and the manifold (so as to prevent a chimney effect which might destroy the wiring of the upstream sensor),
- the alignment (A) between the lower inlet manifold and the cylinder head (timing side), ensuring that the tabs (B) are correctly touching those of the cylinder head cover.



The lower inlet manifold must be tightened to a torque of **2.1 daN.m**.

Position the pistons at mid-stroke to prevent any contact with the valves when refitting the camshafts.

Position the cylinder head gasket then the cylinder head.

Check the bolts then tighten the cylinder head (see Section 07 "Tightening the cylinder head").





Refit:

- the valve rockers,
- the camshafts by oiling the bearings.

WARNING: do not put oil on the gasket face of the cylinder head cover.

The camshafts can be identified by the pulley mountings.

Detail of the pulley mountings:

- F exhaust camshaft,
- G inlet camshaft.





Position the grooves of the camshafts as shown in the diagram below.



NOTE: the gasket faces must be clean, dry and free from grease (avoid finger marks).

Apply Loctite 518 using a stipple roller to the gasket face of the cylinder head cover until it turns reddish in colour.





Fit the cylinder head cover tightening it to the correct torque.

Tightening procedure

Assembly	Bolt tightening order	Bolt slackening order	Tightening torques (in daN.m)
Operation n° 1	22 - 23 - 20 - 13	-	0.8
Operation n° 2	1 to12 14 to 19 21 and 24	-	1.2
Operation n° 3	-	22 - 23 - 20 - 13	-
Operation n° 4	22 - 23 - 20 - 13	-	1.2





NOTE: the gasket faces must be clean, dry and free from grease (avoid finger marks).

Apply **Loctite 518** using a stipple roller to the gasket face of the oil decanter until it turns **reddish in colour**.



Fit the oil decanter and tighten it to a torque of **1.3 daN.m** in the recommended order.



The seal of the control solenoid valve is replaced using tool **Mot. 1513**.





Refit:

- the coils, tightening them to a torque of 1.3 daN.m,
- the inlet manifold (fitted with new seals), tightening it to a torque of 0.9 daN.m in the recommended order,



- the throttle body, tightening the bolts (A) to a torque of 1.3 daN.m,
- the air filter unit, tightening the bolts to a torque of **0.9 daN.m**.



Replacing the camshaft seals

Fit the seal of the **exhaust camshaft dephaser** using tool **Mot. 1512**, using the old nut (1).



Fit the seal of the **inlet camshaft dephaser** using tool **Mot. 1517** and the old bolt (2).



NOTE: to use tool **Mot. 1517**, the hole must be modified to a diameter of **13 mm**.

Adjusting the timing

WARNING: it is essential to degrease the tip of the crankshaft, the bore of the timing pinion, the bearing faces of the pulley as well as the ends of the camshafts (timing side) and the bores of the camshaft pinions to prevent the timing from slipping which may damage the engine.

Refit:

- the timing belt (the method described in Section 07 "Timing belt tensioning procedure" must be complied with),
- the accessories belt (see Section 07 "Accessories belt"),
- the new sealing plugs:
 - of the inlet camshaft (Mot. 1487),
 - of the exhaust camshaft (Mot. 1488).



 the right hand suspended engine mounting as well as the engine tie bar - transmission rear support assembly (automatic transmission version) and the left hand angular engine mounting, tightening them to the correct torque (see Section 19 "Suspended engine mounting").

Refitting is the reverse of removal.

Fill and bleed the cooling circuit, (see section **19** "Filling and Bleeding").

FUEL MIXTURE Specifications



			Engine						
Туре	Gearbox	Туре	Suffix	Bore (mm)	Stroke (mm)	Capacity (cm ³)	Ratio	Catalytic converter	standard
JA1B	JC DPO	F4R F4R	740 741	82.7	93	1998	9.8/1	♦ C79 ♦ C119	EU 96

Enc	lino							
Engine		Engine	Pollutant emission **				Fuel*** (minimum octane rating)	
Туре	Туре	speed (rpm)	CO (%) (1)	CO2 (%)	HC (ppm)	Lambda (λ)	ootane rating)	
F4R	740 741	750	0.5 max	14.5 min	100 max	0.97<λ<1.03	Unleaded (IO 95)	

(1) at 2500 rpm, CO must be a maximum of 0.3

- * For a coolant temperature above **80°C** and after a stable speed of **2500 rpm**, for about **30 seconds**. Test to be carried out after return to idle speed.
- ** For legal values refer to your country specification.
- *** IO 91 unleaded compatible.

Temperature in °C (± 1°)	-10	25	50	80	110
Air temperature sensor CTN type Resistance in Ohms	10,450 to 8,525	2,120 to 1,880	860 to 760	-	-
Coolant temperature sensor CTN type Resistance in Ohms	-	2,360 to 2,140	770 to 850	275 to 290	112 to 117

FUEL MIXTURE Specifications



DESCRIPTION	MAKE/TYPE	SPECIAL NOTES					
Computer	SIEMENS "SIRIUS"	90 tracks					
Injection	-	Sequentia	Sequential Multipoint				
Stepper motor	PHILIPS	Resistanc	æ: 53 ± 5 Ω a	t ambient ten	nperature		
		Integrated into the throttle body Track resistance: 1,200 \pm 240 Ω Cursor resistance < 1,050 Ω					
Throttle potentiameter	CTS		Track	No load	Full load		
	013		A - B	1,250 Ω	1,250 Ω		
			A - C	1,245 Ω	2,230 Ω		
			B - C	2,230 Ω	1,245 Ω		
Magnetic sensor (TDC and engine speed)	ELECTRIFIL or SIEMENS	Integrated connector Resistance = 200 - 270 Ω					
Canister solenoid valve	SAGEM	Integrated into the canister Resistance: 26 \pm 4 Ω at 23 ° C					
Injector	MAGNETI-MARELLI PICO	Resistance: 14.5 Ω Start of leak: 0.7 cm³ /min maxi					
Air sensor	JAEGER	CTN (see table) Resistance: 2,500 Ω at 20 $^{\circ}$ C					
Coolant sensor	JAEGER	CTN (see table) Resistance: 3,500 Ω at 20 °C					
Pressure sensor	DELCO ELECTRONICS	Piezoelectric type Replace the seal every time it is removed					
Pinking sensor	SAGEM	Piezoelectric type Tightening torque: 2 daN.m					
Oxygen sensor	BOSCH	Track 80 (earth) and 45 (computer signal) Heating resistance $R = 9 \Omega$ at ambient temperature Rich mixture = 840 mV ± 70 Lean mixture = 20 mV ± 50					

FUEL MIXTURE Specifications

12

DESCRIPTION	MAKE/TYPE	SPECIAL NOTES				
Ignition coils	NIPPONDENSO	Pencil coil. One per cylinder Primary resistance: 0.5 \pm 0.02 Ω Secondary resistance: 6,800 \pm 1,000 Ω				
Plugs	BOSCH FR7 LDC	6 ± 1.5 kΩ Tightening torque: 2.5 to 3 daN.m				
Inlet manifold pressure	-	At idling speed: 300	0 ± 40 mb			
			upstream of the pre-catalytic converter	downstream of the pre-catalytic converter		
Exhaust back pressure	-	1,500 rpm.	30	23		
		3,000 rpm	108	84		
		4,500 rpm.	211	153		
		5,500 rpm.	321	266		
Submerged supply pump	BOSCH or WALBRO	Flow read: 130 litre	es/hour min.			
Pressure regulator	-	Regulated pressure Circuit without return: 3.5 ± 0.2 bars				
Camshaft dephaser solenoid valve	AISIN	"All or nothing" solenoid valve Resistance: 7.1 \pm 0.5 Ω				

FUEL MIXTURE Air filter unit.



SPECIAL TOOLING REQUIRED

Elé. 1294 -01 Tool for removing windscreen wiper arms

TIGHTENING TORQUES (in daN.m)

Air filter unit bolt



REMOVAL

Disconnect the battery.

Remove:

- the windscreen wiper arms using tool Elé. 1294-01,
- the plenum chamber panel,



- the bulkhead plate,



- the air resonator,
- the brake servo vacuum pipe (manifold side),
- the mounting bolts of the air filter unit (3).



Disconnect:

- the actuator (1),
- the fuel vapour rebreathing pipe (2).

Move the air filter unit to the right in order to remove it. The air filter unit can pass between the windscreen aperture, the engine and the brake servo.

REFITTING

Refitting is the reverse of removal.

NOTE: be careful of the vacuum outlet going from the exhaust manifold to the brake servo. The inlet manifold has to be replaced if this outlet is broken.

FUEL MIXTURE Inlet manifold



TIGHTENING TORQUES (in daN.m)	\heartsuit
Manifold bolts	1
Air filter unit bolt	0.9
Throttle body bolts	1.5

REMOVAL

Disconnect the battery.

Remove the air filter unit (see Section **12** Fuel mixture **"Air filter unit"**).

Disconnect:

- the throttle potentiometer,
- the pressure sensor,
- the pencil coils,
- the air temperature sensor,
- the accelerator cable.

Remove:

- the two mounting bolts of the throttle body (A),
- the bolts of the inlet manifold.

REFITTING

Refitting is the reverse of removal.

NOTE: use the recommended tightening order and the tightening torque of the inlet manifold and throttle body bolts.

If necessary, replace the seals of the manifold and the throttle body.


TIGHTENING TORQUES (in daN.m)	\bigcirc
Injector holder shim	2.1
Rail bolts	0.9
Inlet manifold bolts	1

Method for removing the injector holder shim

REMOVAL

Disconnect the battery.

Remove:

- the inlet manifold (see Section 12 Fuel mixture "Inlet manifold"),
- the injection rail protection,
- the flange of the injection harness.

Disconnect:

- the fuel inlet and return pipes (1) and (2) or the fuel inlet pipe (depending on version),
- the regulator vacuum pipe (depending on version),
- the injectors.



Remove the front right hand mudguard.

Secure the automatic tensioner of the accessories belt.

Remove the belt.

WARNING: all removed belts must be replaced. To do this, refer to the method in Section **07 "Accessories belt tension"**.

Remove:

- the assisted steering pump pulley,
- the three mounting bolts of the assisted steering pump.

Move aside the assisted steering pump, without removing the pipes.

Remove the mounting bolts and the injector holder shim.



REFITTING

Replace the seal.

Check the alignment (at A) between the lower inlet manifold and the cylinder head, ensuring that the distributor is touching (at B) the cylinder head cover.



Refitting is the reverse of removal.

Use the correct tightening torque for the mountings nuts and bolts of the shim.

Replace the accessories belt if it has been removed. To do this, refer to Section 07 "Accessories belt tension".

FUEL MIXTURE Exhaust manifold

12

SPECIAL TOOLING REQUIRED

Mot. 1495

Tool for removing and refitting the upstream oxygen sensor.

TIGHTENING TORQUES (in daN.m)	\bigcirc
Upstream oxygen sensor	4.5
Manifold bolts	1.8
Three point flange nut	2
Heat shield bolts,	1

REMOVAL

Put the vehicle on a 2 post lift. Disconnect the battery. Remove the air filter unit (see Section **12** Fuel mixture **"Air filter unit**").

Disconnect and remove the oxygen sensor (1) using tool **Mot. 1495**.

Remove the upper heat shield of the exhaust manifold.

Disconnect the exhaust downpipe.



Move the exhaust pipe backwards without removing it.

Position a block on the sub-frame to support the exhaust downpipe and avoid damaging the hose which would require the catalytic converter to be replaced.

Remove the flange (A) between the exhaust manifold and the cylinder block.



Release the manifold by pivoting it through 45° , then remove it from the right hand side.

REFITTING

Refitting is the reverse of removal.

NOTE: check that the heat shield is correctly positioned between the oxygen sensor and the manifold (so as to prevent a chimney effect which might destroy the wiring of the oxygen sensor).

Replace the gaskets of the manifold and of the three point mounting.

Use the correct order and tightening torque for the mountings nuts of the manifold.

WARNING: all damaged heat shields must be replaced to prevent the risk of fire.





- 1 Inlet manifold
- 2 Recycling solenoid valve
- 3 Fuel vapour absorber with solenoid valve
- 4 Fuel tank
- M Breather

CANISTER BLEED CONDITION

The canister bleed solenoid valve is controlled by **track 4** of the computer when:

- the coolant temperature is greater than 55 °C,
- the air temperature is greater than 10 °C,
- the engine is not idling,
- a given load threshold is reached,
- the throttle potentiometer is not in the **no load** position.

The opening cyclic ratio of the canister bleed solenoid valve can be viewed using the NXR diagnostic tool, by consulting the "Canister bleed solenoid valve OCR" parameter.

The solenoid valve is closed for a value less than **1.5%**.

STARTING - CHARGING Alternator



IDENTIFICATION

Vehicle	Engine	Alternator	Current
JA1B	F4R 740-741	BOSCH 0124 415 007 (AC)	98 A

CHECKING

After **15 minutes** warming up with a voltage of **13.5 volts**.

Rpm.	98 Amps
2,000	63 A
3,000	86 A
4,000	95 A



REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove:

- the front right wheel as well as the mudguard,
- the accessories belt (see Section 07 "Accessories belt tension"),
- the power steering reservoir on the fan unit and release it,
- the mounting of the **power assisted steering** pipe on the multifunction support,
- the assisted steering pump pulley,
- the assisted steering pump on its support and release it,
- the assisted steering pump support,



 the alternator by disconnecting the electrical connections.

REFITTING

Refitting is performed in the reverse order to removal.

Refer to Section **07** "**Accessories belt tension**" for the tensioning process.



IDENTIFICATION

Vehicle	Engine	Starter motor
JA1B	F4R 740-741	BOSCH 0001 106 012

STARTING - CHARGING Starter

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove:

- the front right wheel as well as the engine undertray,
- the air resonator.

Right-hand side of the vehicle

Remove:

- the track rod end using tool T.Av. 476,
- the upper mounting bolt of the shock absorber base and slacken the lower bolt.

Tilt the stub-axle carrier and disconnect the driveshaft.

Remove:

 the heat shield (B) and slacken the lower mounting of the flange (C),



 the mounting bolts of the starter motor and remove it from underneath.

REFITTING

Proceed in the reverse order from removal.

Check for the presence of the centring dowel which should be located at (A).

Correctly refit the heat shield.

FEATURES OF THE MULTIPOINT INJECTION FITTED ON F4R 740 - 741 ENGINES

- SIEMENS "SIRIUS 32" 90 track computer controlling the injection and the ignition.
- Multipoint injection operating in sequential mode without cylinder reference and camshaft position sensor. Consequently, phasing is performed by the computer using the Top Dead Centre sensor.
- Injection warning light on the instrument panel not operational.
- Specific precautions linked to the engine immobiliser: Installation of a 2nd generation type engine immobiliser involving a specific method for replacing the computer.
- Fuel circuit without return to tank (the regulator is located on the pump and sender unit assembly).
- Idling speed:

 nominal idling speed

 Idling speed corrected as a function of:

 the air conditioning
 the information from the power assisted steering pressostat,
 the electrical balance,
 the headed windscreen.

 Maximum engine speeds:

 when the coolant temperature is less than 75°C or depending on a timer
 when the coolant temperature is greater than 75°C
 - Canister bleed solenoid valve controlled by Opening Cyclic Ratio (OCR) depending on engine operation.
 - Fan and coolant temperature warning light controlled by the injection computer.
 - Automatic configuration when the air conditioning is operating by exchanging signals between the computers.
 - Inlet camshaft dephaser controlled by a solenoid valve operated by the computer depending on engine operation (engine speed / load).
 - Specific computers depending on whether the engine operates with a manual gearbox or automatic transmission.

INJECTION Immobiliser function

This vehicle is fitted with an engine immobiliser controlled by a random rolling code key recognition system.

REPLACING AN INJECTION COMPUTER

Injection computers are supplied uncoded, but must be programmed with a code.

When replacing the computer, the vehicle code must be programmed in and then a check must be made to ensure that the immobiliser system is operational.

To do this, simply switch on the ignition for a few seconds without starting the engine then switch off the ignition. When the ignition is off, the engine immobiliser function will be activated after approximately 10 seconds (red engine immobiliser warning light flashes).

IMPORTANT:

With this engine immobiliser, the computer keeps its immobiliser code for life.

In addition, this system does not have a security code.

Consequently, it is forbidden to perform tests with computers borrowed from the stores or from another vehicle which must then be returned.

It will no longer be possible to decode them.

THIS VEHICLE IS FITTED WITH A VARIABLE DISPLACEMENT COMPRESSOR

INJECTION COMPUTER / AC COMPUTER CONNECTION

The injection computer is connected to the **AC** computer by two wires:

- one wire from the injection computer to the AC computer on track 10. The instruction to authorise or prohibit compressor operation is conveyed on this wire.
- one wire from the CA computer to the injection computer on track 23. This consists of the absorbed power information signal.

When the **AC** button is pressed, the **AC** computer requests that the compressor is switched on. The injection computer either authorises or disallows the compressor clutch and imposes a modified idling speed. In this case, the engine speed may reach **900 rpm** depending on the power absorbed by the compressor.

COMPRESSOR OPERATION PROGRAMMING

During certain stages of operation, the injection computer stops the compressor from functioning.

Engine start programming

After the engine has started running, the compressor is prevented from functioning for **10 seconds**.

Heat protection programming

The compressor does not engage in cases where the coolant temperature is greater than + 115 °C .

Overspeed protection programming

The compressor is prevented from operating if the engine speed is greater than **6,000 rpm**.

CONNECTION BETWEEN THE POWER ASSISTED STEERING PRESSOSTAT AND THE INJECTION COMPUTER

The injection computer receives information from the power assisted steering pressostat and modifies the engine's idling speed to **780 rpm**.

ELECTRICAL CORRECTION DEPENDING ON BATTERY VOLTAGE AND ELECTRICAL BALANCE

The lower the battery voltage, the greater the correction. Correction of the engine speed is therefore variable. It begins when the voltage drops to below **12.7 Volts**. The idling speed may reach **900 rpm maximum**.

CORRECTION OF THE IDLING SPEED DEPENDING ON HEATED WINDSCREEN OPERATION

If the coolant temperature is less than **60° C**, the idling speed is set to **1,000 rpm**.

NOTE: after starting from cold and operating for a long time at idling speed, there may be a sudden fall in engine speed by around **80 rpm.** This fall in engine speed is due to the presence of an automatic starting device.

ADAPTIVE CORRECTION OF THE IDLING SPEED

This correction is only effective if the coolant temperature is greater than **80** °C, **20 seconds** after the engine is started and if an idle regulation phase is in progress.

VALUES OF IDLING OCR AND ITS ADAPTIVE CORRECTION

PARAMETERS	F4R 740 - 741 engines
Nominal idle speed	X = 750 rpm
Idling OCR	5% ≤ X ≤ 26%
Idling OCR adaptive	Limit value: – min: –8% – max: +8%

Every time the engine is switched off, the computer resets the stepper motor by adjusting it to its lower limit.

IMPORTANT: after erasing the computer memory, it is essential to start the engine then stop it to allow the stepper motor to be reset. Start the engine again and allow it to idle so that the adaptive correction can be readjusted.

OXYGEN SENSOR HEATING

The oxygen sensor is heated by the injection computer as soon as the engine is started.

Oxygen sensor heating is switched off:

- if the vehicle speed is greater than 140 km/h (value given for information purposes),
- depending on the engine load and speed.

UPSTREAM SENSOR VOLTAGE

The value read on the diagnostic tools (except the XR25) under the **"upstream sensor voltage"** parameter represents the voltage supplied to the computer by the oxygen sensor located upstream of the catalytic converter. It is expressed in millivolts. During richness regulation, the voltage must oscillate rapidly between two values:

- 150 \pm 100 mV for a lean mixture,
- **750** \pm **100 mV** for a rich mixture.

The smaller the gap between the upper and lower values, the poorer the information from the sensor (the gap is usually at least **500 mV**).

NOTE: in the event of a small gap, check the sensor heating.

DOWNSTREAM SENSOR VOLTAGE

If the vehicle only has an upstream oxygen sensor, the value read on the diagnostic tools under the **"downstream sensor voltage**" parameter must be approximately **410 mV** (ignore).

RICHNESS CORRECTION

The value read on the diagnostic tools under the "**richness correction**" parameter represents the average of the richness corrections applied by the computer depending on the richness of the fuel mixture as seen by the oxygen sensor located upstream of the catalytic converter.

The midpoint of the correction value is 128, with limit values of 0 and 255:

- value less than 128: request to make mixture leaner,
- value greater than **128**: request to make mixture richer.

17

ENTRY INTO RICHNESS REGULATION MODE

Richness regulation will start after a timed starting period if the coolant temperature is greater than **10° C** at no load and if the oxygen sensor is ready (sufficiently warm).

The timed starting period, depending on coolant temperature, is between **20 and 192 seconds**.

When richness regulation has not started, the value of the parameter is 128.

Non-loop mode

When richness regulation is occurring, the operating phases when the computer ignores the voltage information from the oxygen sensor are:

- at full load,
- whilst accelerating heavily,
- whilst decelerating with the no load information,
- in the event of a fault on the oxygen sensor.

DEFECT MODE IN THE EVENT OF AN OXYGEN SENSOR FAULT

When the voltage supplied by the oxygen sensor is incorrect (varies only slightly or not at all) during richness regulation, the computer will only enter defect mode if the fault has been present for approximately **3 minutes**. In this case, only the fault will be memorised; the "**richness correction**" parameter is **128**.

If an oxygen sensor fault is present and recognised and if the fault has already been stored, the system enters the open loop mode directly.

PRINCIPLE

During the loop mode, richness regulation corrects the injection time so as to obtain metering which is as close as possible to the richness **1**. The correction value is close to **128**, with limit values of **0** and **255**.

The adaptive correction is used to offset the injection cartographic map so as to recentre richness regulation around **128**.

After reinitialising the computer (return to **128** of the adaptive corrections) a special road test must therefore be carried out.

PARAMETERS	F4R 740 - 741 engines
Operating richness adaptive	82% ≤ X ≤ 224%
Idling richness adaptive	32% ≤ X ≤ 224%

ROAD TEST

Conditions:

- engine warm (coolant temperature > 80° C),
- do not exceed an engine speed of **4,800 rpm**

Pressure zones to cover during the test

	Zone n° 1 (mbars)	Zone n° 2 (mbars)	Zone n° 3 (mbars)	Zone n° 4 (mbars)	Zone n° 5 (mbars)
F4R	25039	951	7 63	35 7	53873
740 - 741	Average 325	Average 458	Average 576	Average 694	Average 813

Following this test the corrections will be operational.

The test must then be continued by driving normally, in a varied manner for 3 to 6 miles (5 to 10 km).

After the test, read the values of the richness adaptives. Initially **128**, they must have changed. If not, repeat the test ensuring that the conditions are observed.

INTERPRETATION OF INFORMATION GATHERED DURING A ROAD TEST

If there is a lack of fuel (injectors dirty, fuel pressure and flow too low, etc), richness regulation increases to obtain the richness as close as possible to **1** and adaptive correction increases until the richness correction returns to oscillate around **128**.

If there is an excess of fuel, the situation is reversed: richness regulation reduces and adaptive correction also reduces to recentre the richness correction around **128**.

INJECTION Camshaft dephaser

The camshaft dephaser (1) is located on the inlet camshaft. Its role is to modify the valve timing. It is controlled in an all or nothing manner by the injection computer via a solenoid valve (2) located on the cylinder head cover.

The solenoid valve is in the closed position at rest. It allows oil to flow through to control the dephaser depending on engine operation:

- if the engine speed is between 1,450 and 4,300 rpm,
- if the throttle potentiometer is in the **full load** position.

WARNING: a solenoid valve which is blocked open leads to an unstable idle speed and too high a pressure in the manifold at idling speed.

17

The fan unit is controlled by the injection computer.

FUNCTION

The coolant temperature information used is that from the injection system.

After the ignition is switched off, the system enters monitoring mode. If the coolant temperature exceeds the limit of **112°C** during the **2 minutes** after the engine is switched off, the fan unit is controlled at slow speed.

If the coolant temperature falls below **100°C**, the fan unit relay is cut off (the fan unit cannot be controlled for more than **10 minutes**).

OPERATION OF THE FAN UNITS

- The fan unit is controlled at slow speed if the coolant temperature exceeds **99**°C and is switched off when the temperature falls below **96**°C.
- The fan unit is controlled at high speed if the coolant temperature exceeds **102°C** and is switched off when the temperature falls below **100°C**.
- The fan unit is controlled when the AC function is selected on the instrument panel.

OPERATION OF THE TEMPERATURE LIGHT

The temperature light is illuminated if the coolant temperature exceeds **121°C** and is extinguished when the temperature falls below **118°C**.

ALLOCATION OF INJECTION COMPUTER INPUTS AND OUTPUTS

	61 62 63 64 65 66 67 68 69 70 71 72 73 74	31 32 33 34 35 35 36 37 38 39 40 41 41 42 43 44	1 2 3 4 5 6 7 8 9 10 11 12 13 14
		<u>45</u>	<u> 15 </u>
<u></u>	<u> </u>		<u></u>
	76 77 78	46 47 48	16 17 18
	79 80 81	49 50 51	<u>19</u> 20 21
	82 83 84	52 53 54	22 23 24
	85	55	25

 87
 57
 27

 88
 58
 28

 89
 59
 29

 90
 60
 30

1	\rightarrow	IGNITION COIL 2-3 CONTROL
3		POWER EARTH
4	\rightarrow	CANISTER BLEED CONTROL
8	\rightarrow	FAN UNIT 1 RELAY CONTROL
9	\rightarrow	COOLANT TEMPERATURE LIGHT
10	\rightarrow	AC COMPRESSOR CONTROL
12	\rightarrow	IDLE REGULATOR CONTROL (TRACK B)
13	←	COOLANT TEMPERATURE SENSOR INPUT
15		PRESSURE SENSOR EARTH
16	←	MANIFOLD PRESSURE SENSOR SIGNAL INPUT
19		PINKING SENSOR SHIELDING
20	←	PINKING SENSOR SIGNAL INPUT
23	←	COMPRESSOR POWER ABSORBED INFORMATION
24	←	ENGINE SPEED SENSOR SIGNAL INPUT
26		FAULT FINDING
28		POWER EARTH
29		+ AFTER IGNITION FEED
30		+ BEFORE IGNITION FEED
32	\rightarrow	IGNITION COIL 1-4 CONTROL
33		POWER EARTH
38	\rightarrow	FAN UNIT 2 RELAY CONTROL
39	\rightarrow	ACTUATOR RELAY CONTROL
41	\rightarrow	IDLE REGULATOR CONTROL (TRACK A)
42	\rightarrow	IDLE REGULATOR CONTROL (TRACK C)
43	⇐	THROTTLE POTENTIOMETER SIGNAL
45	←	OXYGEN SENSOR SIGNAL INPUT
49	←	AIR TEMPERATURE SENSOR INPUT
52	€	REVERSE GEAR INFORMATION (DEPENDING ON VERSION)
53	<u> </u>	VEHICLE SPEED INPUT
54	←	ENGINE SPEED SENSOR SIGNAL INPUT
56		FAULT FINDING
58	⇐	ENGINE IMMOBILISER SYSTEM
59	→	INJECTOR 1 CONTROL
60	\rightarrow	INJECTOR 3 CONTROL
63	\rightarrow	OXYGEN SENSOR HEATING CONTROL
64	\rightarrow	CAMSHAFT DEPHASER CONTROL
66		+ AFTER IGNITION FEED
68	\rightarrow	FUEL PUMP RELAY CONTROL
70	—	TDC ENGINE SPEED INFORMATION
72	\rightarrow	IDLE REGULATOR CONTROL (TRACK D)
73		COOLANT TEMPERATURE SENSOR EARTH
74		THROTTI E POTENTIOMETER SUPPLY
75		THROTTLE POTENTIOMETER EARTH
77		AIR TEMPERATURE SENSOR EARTH
78		PRESSURE SENSOR SUPPLY
79		PINKING SENSOR FARTH
80		OXYGEN SENSOR EARTH
85	←	PAS PRESSOSTAT INFORMATION (DEPENDING ON
88	←	HEATED WINDSCREEN INFORMATION
89	\rightarrow	INJECTOR 4 CONTROL
90	\rightarrow	INJECTOR 2 CONTROL

COOLING SYSTEM Filling and bleeding

Water flow is continuous in the heater matrix, which contributes to the cooling of the engine.

FILLING

The bleed screw must be opened.

Fill the circuit through the opening in the expansion bottle.

Close the bleed screw as soon as the fluid runs out in a continuous jet.

Start the engine (2,500 rpm).

Adjust the level by overflow for a period of about **4 minutes**.

Close the bottle.

BLEEDING

Let the engine run for **20 minutes** at **2,500 rpm**, until the engine cooling fan operates (time required for automatic degassing).

Check the liquid level is at the "Maximum" marker.

DO NOT OPEN THE BLEED SCREWS WHILST THE ENGINE IS RUNNING.

TIGHTEN THE PLUG OF THE EXPANSION BOTTLE WITH THE ENGINE WARM

Location of the bleed screw on the coolant housing.

COOLING SYSTEM Diagram

- 1 Engine
- 2 Radiator
- 3 "Hot" reservoir with degassing after thermostat
- 4 Heater matrix
- 5 Thermostat bracket
- 6 Restriction Ø 3 mm
- 7 Restriction \varnothing 8 mm

Water pump

D Thermostat

Bleed screw

The expansion bottle valve rating is **1.2 bar** (colour: brown).

COOLING SYSTEM Diagram

- 1 Engine
- 2 Radiator
- 3 "Hot" reservoir with degassing after thermostat
- 4 Heater matrix
- 5 Thermostat bracket
- 6 Restriction Ø 3 mm
- 7 Restriction Ø 8 mm
- 8 Automatic transmission oil temperature exchanger

Thermostat

The expansion bottle valve rating is **1.2 bar** (colour: brown).

COOLING SYSTEM Radiator

SPECIAL TOOLING REQUIRED	
Mot. 1202-01	Long nose pliers for hose
Mot. 1202-02 ∫	clips
Mot. 1448	Pliers for hose clips

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the cooling circuit through the lower radiator hose.

Disconnect the wiring of the fan unit.

Remove:

- the air resonator on the upper cross member,
- the upper cross member,
- the upper radiator mountings,
- the power steering reservoir on the fan unit and release it.

Remove:

- the fan unit mountings on the radiator and remove it,
- the radiator mountings on the condenser and remove
- it.

REFITTING

Refitting is the reverse of removal.

Fill and bleed the cooling circuit (see section **19** "Filling and bleeding").

NOTE: ensure that the fins of the radiator or of the condenser (if fitted) are not damaged when removing-refitting, and protect them if necessary.

COOLING SYSTEM Water pump

SPECIAL TOOLING REQUIRED		
Mot. 1202-01	Long nose pliers for hose	
Mot. 1202-02	clips	
Mot. 1448	Pliers for hose clips	

TIGHTENING TORQUES (in daN.m)

1.7

. . .

Water pump bolts

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove the engine undertray.

Drain the cooling circuit through the lower radiator hose.

Remove:

- the front right wheel along with the mudguard,
- the accessories belt (see Section 07 "Accessories belt tension"),
- the mounting bolts of the lower timing cover and separate it,
- the water pump pulley.
- the water pump.

Cleaning

It is very important not to scratch the gasket faces.

Use the **Décapjoint** product to dissolve any part of the gasket which remains attached.

Apply the product to the parts to be cleaned; wait about ten minutes, then remove it using a wooden spatula.

Wear gloves whilst carrying out this operation.

Do not allow this agent to drip on to the paintwork.

REFITTING

Refit:

- the water pump (fitted with a new seal), tightening the bolts to a torque of **1.7 daN.m**,
- the accessories belt and tension it (see section 07 "Accessories belt tension").

Fill and bleed the cooling circuit, (see section **19** "Filling and Bleeding").

TIGHTENING TORQUES (in daN.m)

Α	6.2
В	6.2
С	4.4
D	6.2

\frown	
(∇A)	
Y	

E	4.4
F	2.1
G	2.1
Н	6.2

TIGHTENING TORQUES (in daN.m)

Α	6.2
В	6.2
С	4.4
D	6.2

E	6.2
F	6.2
G	2.1
Н	2.1
I	6.2

EXHAUST Catalytic converter

TIGHTENING TORQUES (in daN.m)	\heartsuit
Engine tie bar bolt	6.2
Steering shaft yoke bolts	3
Engine sub-frame bolts	
– front \varnothing 10	6.2
− rear Ø 12	10.5
Three point flange nuts	2
Sub-frame - side member tie rod bolts	3

Disconnect the battery and put the vehicle on a two post lift.

Fit a flywheel immobiliser.

Remove the air filter unit (see Section **12 Fuel mixture** "Air filter unit").

Slacken the catalytic converter / exhaust manifold mountings.

Fit tool **Tav. 1233-01** replacing the bolts of the subframe one by one.

Remove:

- the bolts of the sub-frame tie-rods,
- the nut and eccentric bolt of the steering shaft yoke (1),
- the torque reaction arm.

If the vehicle has one, disconnect the oxygen sensor located downstream of the catalytic converter.

Lower the sub-frame to a height of **20 mm** at the front and **40 mm** at the rear.

Remove the exhaust mounting clip.

Remove the mounting nuts of the catalytic converter and remove it, taking care not to damage the heat shields.

REFITTING

Proceed in the reverse order from removal.

WARNING: all damaged heat shields must be replaced to prevent the risk of fire.

CLUTCH Mechanism - Disc

VEHICLE TYPE	ENGINE MODEL	MECHANISM	DISC	
JA1B	F4R		26 splines D = 215 mm E = 6.8 mm	VM: Foam green V: Green BC: Capri Blue B: Light blue
		215 CP ON 4400		

Cable-controlled dry-operating single disc clutch.

Constant pressure clutch thrust bearing.

20

REPLACEMENT (after removal of the gearbox)

SPECIAL TOOLING REQUIRED

Mot. 582-01 Locking sector

TIGHTENING TORQUES (in daN.m)

Mechanism mounting bolt

REMOVAL

Fit locking sector Mot. 582-01.

Remove the mounting bolts from the mechanism and remove the friction plate.

Check and replace any faulty parts.

REFITTING

Clean the splines of the clutch shaft and refit the assembly **without lubricant**.

Fit the disc (with the offset on the hub on the gearbox side).

Centre it.

Tighten progressively in a star pattern, then tighten the mounting bolts to the correct torque.

Remove the locking sector Mot. 582-01.

Coat with MOLYKOTE BR2 grease:

- the guide tube,
- the fork pads.

CLUTCH Mechanism - Disc

After refitting the gearbox, place the cable onto the clutch fork and check that the play compensation is in working order.

Check the travel of the clutch.

The travel of the fork must be:

NOTE: in the case of any intervention not requiring the gearbox to be removed or after fitting the gearbox, **DO NOT LIFT** the fork, as it may be released from the slot (A) of the clutch thrust bearing.

MANUAL GEARBOX Identification

"SCENIC" vehicles with F4R engines are fitted with JC5 type manual gearboxes.

The Workshop Repair Manual "B.V. JB. JC" deals with the complete repair of this component.

A marking (1), located on the gearbox housing, specifies:

- A Gearbox type
- **B** Gearbox suffix
- **C** Fabrication number
- **D** Factory of manufacture

A → JCX 000 ← C

Ratios

JC5								
Suffix	Туре	Differential ratio	1 st	2 nd	3 rd	4 th	5 th	Reverse gear
090	IA1B	15	11	22	28	34	39	11
090	3710	58	37	41	37	35	32	39

CAPACITY (in litres)

CHECKING THE LEVEL

Fill up to the hole

TIGHTENING TORQUES (in daN.m)	\heartsuit
Drain plug	2.2
Brake caliper bolt.	3.5
Shock absorber base bolt	17
Gearbox edge and starter motor bolt	3
Suspended transmission mounting bolt	4.4
Wheel bolts	9
Steering shaft yoke bolt	3
Sub-frame rear mounting bolts	11
Sub-frame front mounting bolts	6
Sub-frame - side member tie rod bolts	3
Lower ball joint nut	6
Steering ball joint nut	3.5
Engine tie-bar bolt	6.2

The gearbox is removed and refitted in the same way and does not present any specific problems in relation to **SCENIC** type vehicles fitted with a "**JC**" gearbox.

NOTE: when refitting the gearbox, the clutch control fork should preferably be held using a piece of string (1), to prevent it from coming out of its ball joint (located on the clutch housing).

The driveshafts are not fitted with retaining pins on the sunwheel.

MANUAL GEARBOX Special notes

Special notes for vehicles fitted with a driver's airbag

WARNING

In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:

- Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised for the duration of the operation with the wheels straight using a "steering wheel locking tool".
- If there is any doubt regarding the correct alignment of the rotary switch the steering wheel must be removed so that the alignment procedure described in section 88 "AIR BAG" can be applied.

REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

Position of the engine support tool Mot. 1453.

REFITTING

refit the gearbox following the method already described in **M.R. 312 Section 21 for the F3R engine**.

F engine

AUTOMATIC TRANSMISSION General

VEHICLE	ΑΤ ΤΥΡΕ	ENGINE	STEP-DOWN	FINAL DRIVE
JA1B	DP0 032	F4R 741	52/67	23/70

Automatic transmission identification engraving.

SPECIFICATIONS

MEGANE vehicles fitted with **DP0** automatic transmission have systems called: "**Shift Lock**" and "**Lock Up**".

The aim of the "Shift Lock" is to prevent the gear selector lever from being moved without simultaneously pressing the brake pedal. For breakdown operations when the battery is faulty, refer to the vehicle's handbook.

The aim of the **"Lock Up**" is to connect the automatic transmission directly to the engine. This function is performed by a **"mini clutch"** located on the converter. The **"Lock Up**" is controlled by the computer of the **DP0**.

Gear ratio (epicyclic gear train output):

1 st	2 nd	3 rd	4 th	Reverse gear
2.724	1.499	1	0.71	2.455

TOWING

The vehicle should preferably be towed on a tow truck or with the front wheels raised. However, if this is not possible, the vehicle may be towed under exceptional circumstances at a speed less than **50 km/h** and over a distance limited to **50 km** maximum (lever in **N**).

TOWED WEIGHT

The towed weight must be less than **1,300 kg** with a braked trailer (driver only).

AUTOMATIC TRANSMISSION Consumables

DESCRIPTION	COMPONENT CONCERNED
MOLYKOTE BR2 grease	Converter centrer
Loctite FRENBLOC	Brake caliper mounting bolt

Parts to be systematically replaced

Parts to be replaced when they have been removed:

- the self-locking nuts,
- the gaskets,
- the rubber seals.

Oil

The **DP0 automatic transmission is greased for life** and does not require any maintenance.

Only the level has to be topped up in the event of a slight leak.

Specific oil:

ELF RENAULTMATIC D3 SYN (to be ordered from ELF) Standard DEXRON III.

Capacity in litres

	Mechanism
Total volume	6
AUTOMATIC TRANSMISSION Draining



TIGHTENING TORQUES (in daN.m)	Ø
Drain plug	2.5
Filler spout	3.5

DRAINING

The automatic transmission should preferably be drained with the oil warm (60° C maximum), to remove as many impurities as possible.

Draining is performed by removing the plug (A).



Special notes:

- The plug has two functions:
- draining through the plug (A),
- filling through the spout (B).





FILLING - LEVELS

Filling is performed through the hole (D).



Use a funnel fitted with a **15/100** filter to prevent the ingress of impurities.

FILLING PROCEDURE

- 1 Place the vehicle on level ground.
- 2 Fill the automatic transmission with **3.5 litres** of new oil.
- 3 Run the engine at idling speed.
- 4 Connect the diagnostic tool and set up a dialogue with the automatic transmission computer (enter D14 on the **XR25**).
- 5 Monitor the transmission oil temperature parameter (enter **#04** on the **XR25**).
- 6 When the temperature reaches 60 $^{\circ}C \pm 1^{\circ}C$, open the filler cap.
- 7 Position a container to retrieve at least **0.1 litre** of excess oil and wait until the oil flows out **drop by drop**.



8 Close the filler cap.

PROCEDURE FOR CHECKING THE LEVEL WHEN NOT FILLING

The level MUST be checked using the method described below:

- 1 Place the vehicle on level ground.
- 2 Fill the automatic transmission with **0.5 litres** of new oil.
- 3 Run the engine at idling speed. Perform operations **4**, **5** and **6** described previously.

If oil does not flow out or if the quantity retrieved is less than **0.1 litre**; switch off the engine, add **0.5 litre**, allow the transmission to cool down to **50° C** then repeat operations **3 - 4 - 5 - 6**.

IMPORTANT: When replacing oil, the electronic oil age counter must be reset (inside the computer). Enter the date of the oil change using the "Write date of last after-sales operation" (G74* on the XR25).



Put the vehicle on a 2 post lift.

Lift the vehicle until the wheels are raised off the ground by a few centimetres. Connect the diagnostic tool:

NXR Enter dialogue with the automatic transmission computer	XR25 Put the ISO selector on S8 Enter the transmission code DP0 D14 then #04
---	---

Monitor the transmission oil temperature parameter.

The check must be performed with the oil temperature between 60 °C and 80 °C.

Start the engine and put the lever in D.

Monitor the engine speed parameter:

NXR	XR25
Enter dialogue with the computer.	Enter #06

Accelerate fully keeping the brakes on. The front wheels should not rotate.

WARNING: the full load position must not be held for more than **5 seconds**. Beyond this, there is a **high risk of destroying** the converter or the automatic transmission.

IMPORTANT: once the measurement has been taken, release the accelerator and **keep the brakes on until the engine speed stabilises to idle speed** (risk of damaging the automatic transmission if this is not complied with).

The engine speed must stabilise to:

2,570 ± 150 rpm.

A setting point outside the tolerance requires the converter to be replaced.

NOTE: A setting point which is too low may be linked to a lack of engine power.

AUTOMATIC TRANSMISSION Hydraulic distributor



SPECIAL TOOLING REQUIRED

B. Vi. 1462 Locking ball adjusting screw

TIGHTENING TORQUES (in daN.m)	\bigcirc
Cover mounting bolts	1
Distributor mounting bolts	0.75

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Drain the automatic transmission (see the relevant Section).

Remove:

- the mounting bolts (A) of the power steering pipes.
- the four retaining bolts of the hydraulic distributor cover (warning, oil may flow out).



Remove the seven mounting bolts of the hydraulic distributor.



Disconnect the solenoid valve connectors and remove the hydraulic distributor.

AUTOMATIC TRANSMISSION Hydraulic distributor

REFITTING

Position the hydraulic distributor and reconnect the solenoid valve connectors.

Refit the mounting bolts of the hydraulic distributor as shown below:

- Fit the distributor, precentring it using bolts (4) and (5).
- Fit the other bolts.
- Tighten the bolts to a torque of 0.75 daN.m in the order 1 2 3 4 5 6 7.



ADJUSTING THE LOCKING BALL

Hold the lever of the **MFS** (Multifunction switch) in the extreme position (1st imposed) using a plastic clip and a bolt in the mechanism housing.

Remove the bolt (C).



Position the locking ball by placing the roller (A) in the hollow part of the sector (B) corresponding to 1st imposed.



Fit tool **B.Vi. 1462** instead and in place of bolt (C). Screw the tool in fully whilst holding the locking ball.

Tighten bolt (D) to the correct torque.

Remove the tool and refit bolt (C) and tighten it to the correct torque.

When replacing the oil distributor, the auto-adaptives must be reset using the "Erase auto-adaptives" command (G80** on the XR25) and to reset the oil age counter of the automatic transmission computer, use the "Write date of last after-sales operation" command (G74* on the XR25).

AUTOMATIC TRANSMISSION Automatic transmission (Removing - Refitting)

SPECIAL TOOLING REQUIRED			
Mot. 1040-01	Sub-frame support dummy		
T. Av. 476	Ball joint extractor		
B. Vi. 1531 Tool for centring flywheel			
Not. 1453 Engine support			
EQUIPMENT REQUIRED			
Component actuator			

TIGHTENING TORQUES (in daN.m)	\bigcirc
Brake caliper guide bolt	3
Lower ball joint nut	6
Shock absorber base bolt	17
Engine tie-bar bolt	6.2
Transmission edge and starter motor bolt	4
Suspended mounting nut on AT	4.4
Wheel bolts	9
Steering ball joint nut	4
Converter mounting nut on the starter plate	2.1
Inertia wheel mounting nut on the converter	2.1
Modular connector support bolt	2

SPECIAL NOTES FOR VEHICLES FITTED WITH A **DRIVER'S AIRBAG**

WARNING

In order to eliminate any risk of damaging the rotary switch under the steering wheel, observe the recommendations below:

- Before the steering column and the steering rack are uncoupled, the steering wheel MUST be immobilised for the duration of the operation with the wheels straight using a "steering wheel locking tool".
- If there is any doubt regarding the correct alignment of the rotary switch the steering wheel must be removed so that the alignment procedure described in section 88 "AIR BAG" can be applied.

REMINDER: in this case, only qualified personnel who have received training may carry out the operation.

REFITTING

Put the vehicle on a 2 post lift.

Disconnect the battery.

Remove:

- the front wheels,
- the battery,
- the battery mounting,
- unclip the electrical harness of the battery support and the automatic transmission.

Disconnect:

- the ball joint (1) of the **MFS** (**Multifunction Switch**) cable.
- the cable (2) of the **MFS** by releasing the sleeve stop.

NOTE: do not move the orange ring during this operation. It may be broken when removing or refitting. Where necessary, do not replace the control cable as the absence of this part does not affect the operation of the system.



Disconnect the connector (1) by releasing the slide mechanism of the connector.

Remove the mounting bolt (2) of the modular connector support plate.



IMPORTANT: protect the connector by sliding it into a waterproof plastic bag.



Fit the hose clamps and disconnect the exchanger.

Remove:

- the wiring mounting bolts,
- the TDC sensor,
- the upper gearbox edge bolts,
- the right and left mudguards,
- the engine undertray,
- the right and left driveshafts,
- the power assisted steering pipe mountings on the **automatic transmission**.

Disconnect the speed sensor connector.

Remove:

- the engine / upper transmission studs,
- the starter motor,
- the exhaust / transmission stay,
- the torque reaction arm,
- the steering shaft yoke,
- the mounting bolts of the steering rack,
- the horn,
- the bumper.

Fit the engine support tool (Mot. 1410-01).



Secure the steering rack.

Remove:

- the engine sub-frame,
- the AT computer and its support,
- the cowl vent grille,
- the left hand headlight.

Fit the engine support tool (Mot. 1453).



Remove the **AT** support.

Rotate the crankshaft in a clockwise direction to access the three starter plate / converter connecting bolts and remove them.

Move the power assisted steering pipe towards the rear and secure it.



Tilt the engine / automatic transmission assembly as low down as possible.

Position the component actuator.

Remove the gearbox edge bolts and the lower stud (starter motor side).

Disconnect the automatic transmission from the engine, taking care not to release the converter.

Secure the converter with rope to prevent it from being released.



Remove the inertia wheel in order to replace the converter.

REFITTING

DO NOT REUSE THE CONVERTER MOUNTING NUTS NOR THOSE F THE INERTIA WHEEL. IF THESE HAVE BEEN REMOVED, ALWAYS USE NEW NUTS.

Refit the inertia wheel on the converter using tool **B. Vi. 1531**.



Refitting does not present any specific problems and should be performed in the reverse order to removal.

CHECK FOR THE PRESENCE OF CENTRING DOWELS

Replace the exhaust downpipe seal.

Fill with oil (see relevant Section).

When replacing the oil, the auto-adaptives must be reset using the "Erase auto-adaptives" command (G80** on the XR25) and to reset the oil age counter of the automatic transmission computer, use the "Write date of last after-sales operation" command (G74* on the XR25).

AUTOMATIC TRANSMISSION Differential output seal



SPECIAL TOOLING REQUIRED				
B. Vi. 1459	Tool for fitting the right hand driveshaft seal			
B. Vi. 1460	Tool for fitting the left hand driveshaft seal			

TIGHTENING TORQUES (in daN.m)	Ø
Brake caliper guide bolt	3
Lower ball joint nut	6
Shock absorber base bolt	17
Wheel bolts	9
Steering ball joint nut	4
Drain plug	2.5

To replace a differential output seal, the corresponding driveshaft must be removed.

REMOVAL

Put the vehicle on a 2 post lift.

Disconnect the battery.

Drain the automatic transmission through the plug (A).



Remove the faulty differential output seal using a screwdriver or a hook, taking care not to scratch the contact surfaces.

Warning: do not drop the spring of the seal into the automatic transmission.

REFITTING

The seal is fitted using tool B. Vi. 1459 or B. Vi. 1460.

Guide the assembly until the tool is touching the automatic transmission housing.

Refitting is the reverse of removal.

TIGHTEN THE NUTS, BOLTS AND STUDS TO THE RECOMMENDED TORQUES.

Fill the automatic transmission with oil and check the level (see relevant Section).



SPECIAL TOOLING REQUIRED		
B. Vi. 1457	Tool for fitting the converter seal	
Mot. 587	Seal extractor	

The converter seal can only be removed after having removed the automatic transmission and the convertor (see relevant Section).

REMOVAL

Remove the convertor, keeping it as straight as possible.

Warning: the converter contains a large amount of oil which may flow out when removing.

Using tool **Mot. 587**, remove the seal, taking care not to scratch the contact surfaces.

REFITTING

Great care must be taken during the operation. Oil all the contact surfaces.

Fit the new seal (**oiled**) until it is touching using tool **B. Vi. 1457**.

Check that the converter is correctly positioned.

AUTOMATIC TRANSMISSION Multifunction switch

 \bigcirc

1

1



TIGHTENING TORQUES (in daN.m)

MFS mounting bolts

Lever mounting nut

REMOVAL

Place the lever in position N.

Disconnect:

- the ball joint (1) of the MFS (Multifunction Switch) cable,
- the cable (2) of the **MFS** by releasing the sleeve stop.

Remove:

 the lever and the two mounting bolts (3) of the multifunction switch.



Disconnect:

 the modular connector (1) by releasing the slide mechanism of the connector. Remove:

the three mounting bolts (2) of the modular connector support plate.



Remove the two mounting bolts of the modular connector plate then extract the **Green** connector of the **MFS** (12 tracks).



REFITTING

Place the multifunction switch in position $\ensuremath{\textbf{N}}.$

Reconnect the connector of the MFS.



ADJUSTMENT

Control shaft in the **NEUTRAL** position.

Place the two electrical terminals on the position control tabs.



Switch the multimeter to the ohmmeter position.

Manually rotate the multifunction switch until the electrical adjustment contact closes (**resistance at contact terminals = 0** Ω).

Tighten the bolts to a torque of **1 daNm**.

AFTER TIGHTENING, THE ELECTRICAL CONTACT MUST BE CLOSED.

TIGHTEN THE NUTS, BOLTS AND STUDS TO THE RECOMMENDED TORQUES.

Check that it works and that the gears can be changed correctly.

AUTOMATIC TRANSMISSION Sensors



TIGHTENING TORQUES (in daN.m)	\heartsuit
Input speed sensor mounting bolt	1
Output speed sensor mounting bolt	1
Exchanger flow control solenoid valve bolt	1
Line pressure sensor bolt	0.8

The following:

- speed sensors,
- line pressure sensor,
- and the exchanger flow control solenoid valve,

are removed without draining and without removing the automatic transmission.



- 1 Input speed sensor
- 2 Output speed sensor
- 3 Exchanger flow control solenoid valve
- 4 Line pressure sensor

Special note on REMOVING:

When replacing a sensor, systematically remove the modular connector (see Section "**Removing / refitting the automatic transmission**").

IMPORTANT: Protect the connector by sliding it into a waterproof plastic bag.



LOCATION OF THE COMPUTER

The AT computer is located under the battery tray.





REPLACING THE COMPUTER

Procedure for programming the full load and no load positions of the accelerator pedal

When replacing the automatic transmission computer, the Full Load and No Load positions of the accelerator pedal must be programmed by applying the following procedure:

- Put the selector lever in position **P** or **N** and keep the engine switched off.

NXR

- Enter dialogue with the automatic transmission computer.
- Perform the Full Load position command.
- Perform the No Load position command.

XR25

- Enter the code G20*.
- "FL" flashes on the display.
- Press the accelerator pedal.
- The display reads "OK" then "FL" flashes.
- Release the accelerator pedal.
- The display reads "OK", "End" then "1.n63".
- Switch off the ignition.
- Ensure that bargraph **2 RH** is extinguished.

Procedure for resetting the age level of the AT oil

When replacing the automatic transmission computer, the **AT** oil age level in the computer to be replaced must be loaded into the new computer. Use the following procedure:

NXR

- From the memory of the computer to be replaced, read the oil age value using the command "Read oil counter".
- Replace the computer.
- Enter the oil age value into the memory of the new computer using the command "Write oil counter".
- Check that it has been entered using the command "Read oil counter".

XR25

- From the memory of the computer to be replaced, read the oil age value using the command "G83*".
 Note the 10 figure value displayed twice by the XR25 (e.g. 02 1245 3213).
- Replace the computer. Enter the oil age value into the memory of the new computer using the command "G82*". The value is entered character by character starting with the 10th (0 in the above example) and validating them with the star. The XR25 then requests the 9th, 8th, etc.

After validating the 1st figure, the XR25 will display the **10 figure** value entered twice.

AUTOMATIC TRANSMISSION Solenoid valves



The solenoid valves are removed after removing the hydraulic distributor (see relevant Section).



- 1 EVM Modulating solenoid valve
- 2 EVLU LOCK UP solenoid valve (convertor lock-up)
- 3 EVS4 Sequence solenoid valve
- 4 EVS3 Sequence solenoid valve
- 5 EVS1 Sequence solenoid valve
- 6 EVS2 Sequence solenoid valve
- 7 EVS6 Sequence solenoid valve
- 8 EVS5 Sequence solenoid valve



AUTOMATIC TRANSMISSION Wiring diagram



23

PARTS LIST

- 104 Ignition switch
- 107 Battery
- 119 Automatic transmission computer
- 120 Injection computer
- 160 Brake switch
- 225 Diagnostic socket
- 247 Instrument panel
- 250 Vehicle speed sensor
- 419 AC control unit
- 597 Engine fuse and relay box
- 755 Low adherence control
- 777 Power fuse board
- 780 Vehicle speed or turbine (AT) sensor
- 969 Gear selector lever locking motor
- 971 DP0 AT module
- 1016 Passenger compartment fuse box

AUTOMATIC TRANSMISSION Modular connector





- 1 GREEN connector (MFS)
- 2 YELLOW connector (IEH)
- 3 GREEN connector (line pressure)
- 4 YELLOW connector (turbine speed)
- 5 BLUE connector (vehicle speed)









The oil pressure take-off is located next to the pressure sensor.

Remove the bolt (V) and fit tool **Bvi. 466.06**.

AUTOMATIC TRANSMISSION Selector control





REMOVAL

Rotate the ring (B) in the direction shown on the diagram below to remove the cable from the sleeve stop.

DO NOT MOVE THE ORANGE RING (P) DURING THIS OPERATION



REFITTING

Refit in the reverse order to removal.

The gear selector cable has a precise setting.

Press on the Slide valve (T), then lock it in position using the clip.



Reconnect the cable on the ball joint of the multifunction switch in position **N** to the gear selector and to the MFS.

Move the clip to lock it in position. The adjustment has been done.

NOTE: The orange ring (P) may be broken when removing or fitting. Where necessary, DO NOT REPLACE THE CONTROL CABLE, as the absence of this part does not affect the operation of the system.

AUTOMATIC TRANSMISSION Fault finding - Introduction



To use the fault finding function of the DP0 automatic transmission, refer to the "Transmission" Fault Finding Document, Volume 2 of 1999.

SPECIAL NOTES

Engine speed, engine torque, load and coolant temperature, supplied by the engine management computer on wire connections are now emitted on a multiplexed connection (CAN bus on **tracks 38** and **39** of the Automatic Transmission computer).

Two new faults are therefore managed by the Automatic Transmission computer:

- 11 injection connections → Automatic transmission (CAN information)
- **12** engine speeds (emitted by injection)

These faults cannot be accessed with the XR25 although a general fault finding procedure is available.

DEALING WITH THESE NEW FAULTS

- **11 RH** injection → Automatic transmission connections (CAN information)
 - Check the continuity and insulation of the following lines:
 - between track 38 of the AT computer connector and track 27 of the injection computer connector,
 - between track 39 of the AT computer connector and track 57 of the injection computer connector.
 - Check the insulation between these two connections.

Check the wiring on the injection and AT computer connectors.

- 12 RH engine speed (emitted by injection).

This fault corresponds to the AT computer receiving a specific code emitted by the engine management computer, stating that the engine speed sensor is faulty. Apply the process proposed in the injection fault finding base.

CHANGE IN HOW TO DEAL WITH KNOWN FAULTS

- 4 RH Coolant temperature sensor circuit
- 6 RH Engine torque information invalid
- 7 LH Load potentiometer circuit (seen by injection)
- 19 RH Engine speed sensor circuit

These four faults correspond to incorrect values received from the injection computer along the CAN connections.

In this case, apply the process proposed in the injection fault finding base.

The setting point is 2,570±150 rpm.

STEERING ASSEMBLY Manual steering assistance pump



SPECIAL TOOLING REQUIRED

Mot. 453-01 Hose clamp pliers

Put the vehicle on a 2 post lift.

REMOVAL

Disconnect the battery.

Unclip the power steering reservoir and place it on the side.

Remove the accessories belt (refer to section 11).

Fit a clamp Mot. 453-01 to the supply pipe.

Disconnect the high pressure and supply pipes, and retrieve any power steering fluid which flows out.

Remove the pulley (three bolts).





Remove the power assisted steering pump (four bolts 1 and 2).





REFITTING

Proceed in the reverse order from removal.

Fill and bleed the circuit, moving the steering from lock to lock.

36

SPECIAL TOOLING REQUIRED			
T. Ar. 1094	Differential bearing extractor		
Dir. 1083 -01	Tool for fitting the pulley.		

REPLACING THE HUB

Place the pump on the bench, in a vice.

Fit tool T. Ar. 1094 and extract the hub.



NOTE: insert a bolt (1) between the centre line of the pump and the pushrod of tool **T. Ar. 1094**.

Fit the hub (new) and press it in using tool **Dir. 1083-01**. Coat it beforehand with multifunction grease to aid refitting.

NOTE: insert a block (2) of approximately **25 mm** between tool **Dir. 1083-01** and the hub.



Ensure the insertion dimension of **38 mm** between the mounting face of the pump and the bearing face of the pulley on the hub.





CONSUMABLES

- Oil for DELPHI HARRISON compressor: PLANETELF PAG 488: 220 cm³ \pm 15 (to be ordered from ELF).
- Refrigerant:
 R134a: 680 g ± 35
- Compressor:
 DELPHI HARRISON V5

AIR CONDITIONING Compressor



REPLACEMENT

Drain the R134a coolant circuit (refer to the procedure described in the "Air conditioning" manual).

Disconnect the battery.

Remove:

- the belt (see Section 7, page 7-3),
- the assisted steering pump, by means of the three mounting bolts (A).



Unclip the power assisted steering fluid reservoir.

Remove:

- the power assisted steering mounting on the subframe,
- the transverse bar,
- the fan unit,
- the three mounting bolts (B) of the compressor.



REFITTING

If it is changed, the compressor is supplied filled with oil.

Fit the compressor in the correct direction (filler plug and connector upwards).

Tighten:

- the three bolts (B),
- the R134a refrigerant pipe retaining bolts on the compressor to **3 daN.m**.

Create a vacuum then fill the R134a refrigerant circuit using the filling equipment (refer to the procedure described in the **"Air conditioning"** manual).

IMPORTANT:

When replacing the existing compressor with a new compressor, it is essential to drain some of the oil from the new compressor, so that the amount of oil in the new compressor corresponds to the amount of oil drained from the oil compressor.

Oil drained		Oil		Oil remaining
new	=	in the new	-	in the old
compressor		compressor		compressor



REMOVAL

Drain the R134a coolant circuit using the filling equipment (refer to the procedure described in the "Air Conditioning" manual).

Remove:

- the mounting bolts which secure the pipes to the dehydration canister (A),
- the two mounting bolts of the dehydration canister (B).



Fit plugs on each hole to prevent any moisture entering the components.

REFITTING

Refitting is the reverse of removal.

Oil the threads with **P.A.G. SP 10** oil and check that the seals are in good condition.

Create a vacuum then fill the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the **"Air conditioning**" manual).

When changing the dehydration canister, add **15 ml** of **P.A.G. SP 10** oil to the compressor.



REMOVAL

Place the vehicle on a lift.

Drain the **R134a** coolant circuit (refer to the procedure described in the "**Air conditioning**" manual).

Remove:

- the six mounting bolts of the upper cross member,



 the two lower mounting bolts of the condenser on the fan unit, then the two upper bolts,

- the mounting bolts of the pipes on the condenser.

Fit plugs to prevent any moisture entering.

Remove the condenser.

TIGHTENING TORQUES (in daN.m)	\heartsuit
Pressure relief valve retaining bolt	0.6
Pipe retaining bolt	0.8

REPLACEMENT

Drain the **R134a** coolant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

Remove the right hand cowl vent grille.

Slacken the left hand cowl vent grille.

Remove:

- the plenum chamber,
- the retaining bolt of the connection pipe, using a 5 mm Allen key
- the two retaining bolts of the pressure relief valve on the evaporator using a 4 mm Allen key.



When refitting, ensure that the pipe seals are in good condition.

Create a vacuum then fill the **R134a** refrigerant circuit using the filling equipment (refer to the procedure described in the "**Air conditioning**" manual).

Disconnect the battery.

Drain the **R134a** coolant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

LOW PRESSURE PIPE

REMOVAL

Remove the right hand cowl vent grille.

Slacken the left hand cowl vent grille.

Remove:

- the plenum chamber,
- the mounting bolt on the pressure relief valve,
- the mounting bolt on the compressor.

Fit plugs to prevent any moisture entering.

Remove the low pressure hose.

The low pressure circuit can be partially dismantled by unclipping the click-fit connector (1).



REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.

HIGH PRESSURE PIPE BETWEEN THE COMPRESSOR AND THE CONDENSER

REMOVAL

Remove:

- the mounting bolt on the compressor,
- the mounting bolt on the condenser.

Disconnect the tri-function pressure switch.

Remove the high pressure hose.

Fit plugs to prevent any moisture entering.



REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2** g).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.



Disconnect the battery.

Drain the **R134a** coolant circuit using the filling equipment (refer to the procedure described in the "**Air Conditioning**" manual).

HIGH PRESSURE PIPE BETWEEN THE DEHYDRATION CANISTER AND THE PRESSURE REDUCING VALVE

REMOVAL

Remove the right hand cowl vent grille.

Slacken the left hand cowl vent grille.

Remove the plenum chamber.

Detach the pipe from its mountings.

Remove the high pressure hose.

Fit plugs to prevent any moisture entering.



REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add **10 ml of PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.

HIGH PRESSURE PIPE BETWEEN THE DEHYDRATION CANISTER AND THE CONDENSER

REMOVAL

Remove:

- the mounting bolt on the dehydration canister.
- the mounting bolt on the condenser.

Fit plugs to prevent any moisture entering.

Remove the high pressure hose.



REFITTING

Refitting is the reverse of removal.

Check the condition of the seals and lubricate with **PLANETELF PAG 488** (approximately **2 g**).

When changing a pipe, add 10 ml of **PLANETELF PAG 488** oil or when a pipe bursts (rapid leak), add **100 ml**.








PARTS LIST

- 104 Ignition switch
- 120 Injection computer
- 171 Air conditioning clutch
- 225 Diagnostic socket
- 241 Lighting rheostat
- 247 Instrument panel
- 319 Air conditioning control panel
- 320 Base fan assembly/Air conditioning
- 411 Air conditioning pressostat
- 419 AC control unit
- 777 Power feed fuse board
- 1016 Passenger compartment fuse box
- R34 Engine/dashboard
- R254 Dashboard / Plenum chamber