# RENAULT

# 1 Engine and peripherals

- 10A ENGINE AND CYLINDER BLOCK ASSEMBLY
- 11A TOP AND FRONT OF ENGINE
- 12A FUEL MIXTURE
- **TURBOCHARGING**
- 13A FUEL SUPPLY
- 13B DIESEL INJECTION
- 14A ANTIPOLLUTION
- 16A STARTING CHARGING
- 17A IGNITION
- 17B PETROL INJECTION
- 19A COOLING

X45

#### **FEBRUARY 2009**

**Edition Anglaise** 

<sup>&</sup>quot;The repair methods given by the manufacturer in this document are based on the technical specifications current when it was prepared.

The methods may be modified as a result of changes introduced by the manufacturer in the production of the various component units and accessories from which his vehicles are constructed."

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# **KOLEOS - Section 1**

## **Contents**

Page

10A	ENGINE AND CYLINDER BLOCK ASSEMBLY		11A	TOP AND FRONT OF ENGINE	
	Crankshaft seal at timing end Removal - Refitting	10A-1		Final compression pressure: Check	11A-1
	Crankshaft seal at gearbox end : Removal - Refitting	10A-6		Accessories belt: Removal - Refitting	11A-5
	Sump: Removal - Refitting	10A-12		Crankshaft accessories	
	Engine oil: Draining - Refilling	10A-17		pulley: Removal - Refitting Rocker cover: Removal -	11A-13
	Oil filter: Removal - Refitting	10A-21		Refitting	11A-17
	Oil filter unit: Removal - Refitting	10A-24		Camshaft dephaser: Removal - Refitting	11A-26
	Exchanger: Removal - Refitting	10A-27		Camshaft dephaser solenoid valve: Removal - Refitting	11A-27
	Oil pressure sensor: Removal - Refitting	10A-30		Oil decanter: Removal - Refitting	11A-29
	Oil level sensor: Removal - Refitting	10A-32		1	
	Oil pump: Removal -	404.24	12A	FUEL MIXTURE	
	Refitting	10A-34		Air intake: Description	12A-1
	Oil pressure: Check	10A-38		Air resonator: Removal -	404.0
	Multifunction support: Removal - Refitting	10A-41		Refitting  Air filter: Removal - Refitting	12A-3 12A-6
	Engine/gearbox assembly: Removal - Refitting	10A-44		Air filter unit: Removal - Refitting	12A-8
	Flywheel: Removal - Refitting	10A-86		Air flowmeter: Removal -	.2, ( 0
	Valves: Adjusting	10A-90		Refitting	12A-12
				Air inlet flap: Removal - Refitting	12A-14

## **Contents**

12A	FUEL MIXTURE		13B	DIESEL INJECTION	
	Throttle valve: Removal - Refitting	12A-17		Diesel injection computer: Removal - Refitting	13B-11
	Throttle valve: Cleaning	12A-20		Camshaft position sensor: Removal - Refitting	13B-13
	Air inlet duct: Removal - Refitting	12A-22		Crankshaft position sensor: Removal - Refitting	13B-13
	Inlet manifold: Removal - Refitting	12A-24		High pressure pump: Removal - Refitting	13B-20
	Exhaust manifold: Removal - Refitting	12A-36		Fuel pressure regulator: Removal - Refitting	13B-25
12B	TURBOCHARGING			Diesel return pipe: Removal - Refitting	13B-27
	Turbocharging: Precautions	105.4		Diesel injector fuel return rail: Removal - Refitting	13B-32
	for repair  Turbocharger. Removal -	12B-1		Injector rail protector: Removal - Refitting	13B-36
	Refitting Turbocharger oil pipe: Removal - Refitting	12B-4 12B-11		High-pressure pipe between the pump and rail: Removal - Refitting	13B-39
	Intercooler: Removal - Refitting	12B-13		High-pressure pipe between the rail and injector: Removal - Refitting	13B-46
13A	FUEL SUPPLY			Injector rail: Removal - Refitting	13B-50
	Manual priming pump: Removal - Refitting	13A-1		Rail pressure sensor: Removal - Refitting	13B-55
	Fuel filter: Removal -	10/4-1		Oxygen sensor: Removal - Refitting	13B-59
	Refitting	13A-3		Fuel temperature sensor: Removal - Refitting	13B-62
	Injector rail - Injectors: Removal - Refitting	13A-6		Diesel injector: Removal -	100 02
	Fuel pressure: check	13A-12		Refitting	13B-65
	Fuel flow: check	13A-15		,	
	ı		14A	ANTIPOLLUTION	
13B	DIESEL INJECTION			Oil vapour rebreathing system: Operating diagram	14A-1
	Diesel injection: Precautions for repair	13B-1		Exhaust gas recirculation: Operating diagram	14A-3
	Diesel injection: List and location of components	13B-6			

## **Contents**

14A	ANTIPOLLUTION		17B	PETROL INJECTION	
	Fuel vapour recirculation circuit: Operating diagram	14A-4		Fuel injection: List and location of components	17B-1
	Fuel vapour canister: Removal - Refitting	14A-5		Oxygen sensors: Removal - Refitting	17B-4
	Fuel vapour absorber bleed solenoid valve Removal -	14A-7		Petrol injection computer: Removal - Refitting	17B-6
	Refitting  Exhaust gas recirculation solenoid valve: Removal -	14/4-7		Camshaft position sensor: Removal - Refitting	17B-7
	Refitting	14A-8		Crankshaft position sensor: Removal - Refitting	17B-8
	Intercooler: Removal - Refitting	14A-14			
	Exhaust gas recirculation rigid pipe: Removal -	14A-19	19A	COOLING	
	Refitting	14A-19		Engine cooling: Parts and consumables for the repair work	19A-1
16A	STARTING - CHARGING			Engine cooling: Precautions for repair	19A-2
	Charging circuit: Identification	16A-1		Engine cooling circuit: Specifications	19A-3
	Starting system: Identification	16A-2		Engine cooling circuit: check	19A-4
	Alternator: Removal - Refitting	16A-3		Engine cooling circuit: Operating diagram	19A-6
	Starter: Removal - Refitting	16A-7		Cooling circuit: Draining - Refilling	19A-10
474	LONITION			Cooling radiator: Removal - Refitting	19A-15
17A	IGNITION Ignition: Specifications	17A-1		Water pump: Removal - Refitting	19A-22
	Coils Removal - Refitting	17A-2		Thermostat: Removal - Refitting	19A-25
	Spark plugs: Removal - Refitting	17A-4		Plenum chamber: Removal - Refitting	19A-27
				Engine cooling fan assembly: Removal - Refitting	19A-39
				Water pump inlet pipe: Removal - Refitting	19A-43
				Expansion bottle: Removal - Refitting	19A-53

## **Contents**

19A	COOLING		19D	ENGINE MOUNTING	
	Electric water pump:			Left-hand suspended engine	
	Removal - Refitting  Coolant temperature sensor:	19A-57		mounting: Removal - Refitting	19D-1
	Removal - Refitting	19A-59		Right-hand suspended engine mounting: Removal - Refitting	19D-19
19B	EXHAUST			Lower engine tie-bar: Removal - Refitting	19D-26
	Exhaust: Parts and consumables for the repair work	19B-1			
	Exhaust: Precautions for repair	19B-6			
	Catalytic pre-converter: Removal - Refitting	19B-7			
	Catalytic converter: Removal - Refitting	19B-8			
	Connector pipe: Removal - Refitting	19B-16			
	Silencer: Removal - Refitting	19B-18			
	Particle filter: Parts description	19B-20			
	Particle filter: Removal - Refitting	19B-21			
	Particle filter: Cleaning	19B-25			
	Particle filter pressure sensor: Removal - Refitting	19B-27			
	Particle filter temperature sensors: Removal - Refitting	19B-29			
19C	TANK				
	Fuel tank: Draining	19C-1			
	Fuel tank: Removal - Refitting	19C-4			
	Filler neck: Removal - Refitting	19C-15			
	Fuel level sensor module: Removal - Refitting	19C-18			

M9R

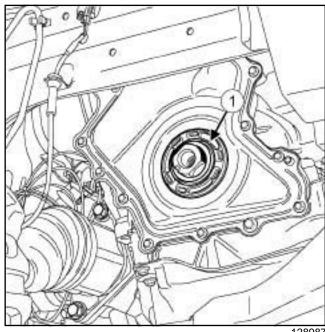
		Tightening torques ♡	
timing seal	end	crankshaft	47 N.m

#### REMOVAL

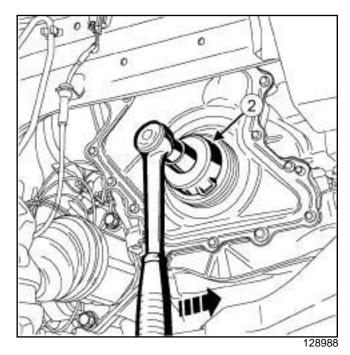
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
  - -the crankshaft accessories pulley (see 11A, Top and front of engine, Crankshaft accessories pulley: Removal - Refitting, page 11A-13).

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



128987



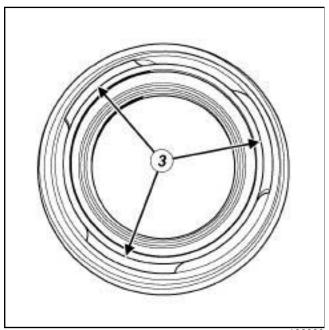
☐ Remove the crankshaft seal (1) using the tool (2) supplied in the spare parts kit for the new seal.



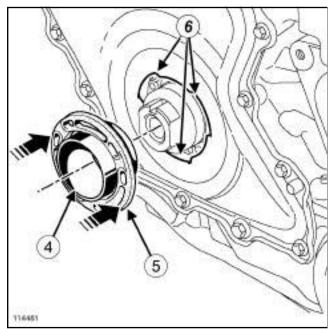
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#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED



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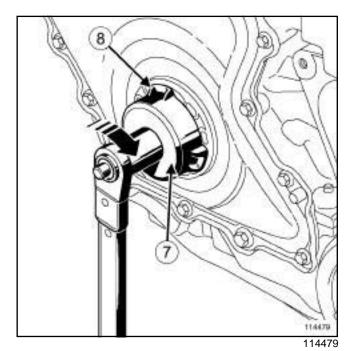
114481

WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

- ☐ Refit the new "seal (5) protector (4) " assembly on the crankshaft.
- ☐ Align the seal notches (3) with the notches on the ti-

ming cover (6).

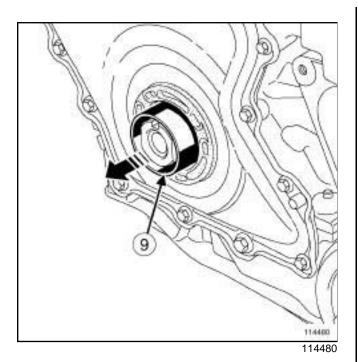


Note:

The (7) is supplied in the new seal parts kit.

- ☐ Position the lugs of the (7) into the notches of the seal (8).
- Move the "tool seal" assembly by hand until it comes into contact with the timing cover (check that the seal notches fit correctly into the timing cover notches).
- $\hfill \Box$  Finger tighten the seal (8) clockwise using the (7) .
- ☐ Torque tighten the timing end crankshaft seal (47 N.m) using the (7) supplied in the new spare parts kit.

M9R



☐ Remove the seal fitting protector (9) .

#### **II - FINAL OPERATION**

#### □ Refit:

- -the crankshaft accessories pulley (see 11A, Top and front of engine, Crankshaft accessories pulley: Removal - Refitting, page 11A-13),
- -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).



2TR

#### **Essential special tooling**

Mot. 1867 Crankshaft seal fitting tool (timing end)

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for repair**).

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).

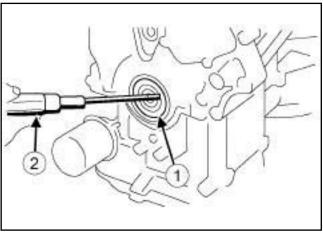
#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### ☐ Remove:

- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- -the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5).
- -the crankshaft accessories pulley (see 11A, Top and front of engine, Crankshaft accessories pulley: Removal Refitting, page 11A-13).

## II - OPERATION FOR REMOVAL OF PART CONCERNED



128984

☐ Remove the crankshaft seal (1) on the timing end using an appropriate tool (2).

#### REFITTING

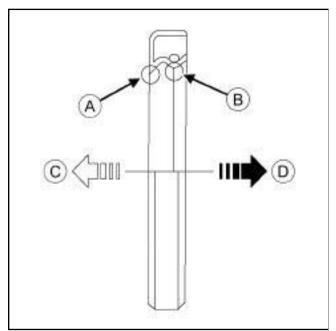
#### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the crankshaft seal on the timing end,
  - the crankshaft accessories pulley bolt.



2TR

## II - REFITTING OPERATION FOR PART CONCERNED



128985

- (A) Dust seal lip
- (B) Seal lip
- (C) Engine exterior
- (**D**) Engine interior
- □ Apply fresh engine oil to the joint face and to the seal lips (A) and (B).
- ☐ Refit the crankshaft seal on the timing end, observing the direction of fitting.



128986

□ Refit the new crankshaft seal on the timing end using the tool (Mot. 1867) (3) until the tool is resting on the surface of the cylinder block.

#### **III - FINAL OPERATION.**

#### ☐ Refit:

- the crankshaft accessories pulley (see 11A, Top and front of engine, Crankshaft accessories pulley: Removal - Refitting, page 11A-13),
- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

## Crankshaft seal at gearbox end: Removal - Refitting

M9R

Tightening torques ♡	
crankshaft cover bolts (initial torque)	5 N.m
crankshaft cover bolts	12 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair operation (see Vehicle: Precautions for repair) (01D, Mechanical introduction).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17).
- □ Remove:
  - -the battery (see Battery: Removal Refitting) (80A, Battery),
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

#### 6 SPEED MANUAL GBOX

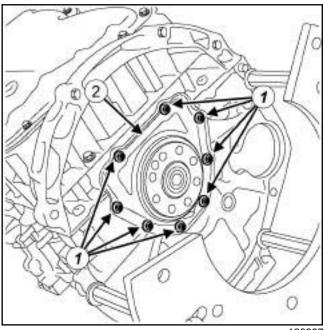
- □ Remove:
  - the manual gearbox (see Manual gearbox: Removal - Refitting) (21A, Manual gearbox).
  - the clutch (see Mechanism / Disk: Removal Refitting) (20A, Clutch),
  - the flywheel (see 10A, Engine and cylinder block assembly, Flywheel: Removal - Refitting, page 10A-86).

#### 6 SPEED AUTO GBOX

#### □ Remove:

- the automatic transmission (see Automatic gearbox: Removal - Refitting) (23A, Automatic transmission),
- the drive plate (see Drive plate: Removal Refitting) (23A, Automatic transmission).

#### II - OPERATION FOR REMOVAL OF PART **CONCERNED**



128997

#### Note:

The crankshaft seal on the gearbox side cannot be separated from the crankshaft sealing cover.

#### Remove:

- the crankshaft sealing cover bolts (1),
- the crankshaft seal crankshaft sealing cover assembly (2).

### Crankshaft seal at gearbox end: Removal - Refitting

M9R

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

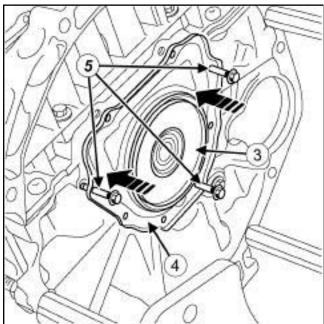
#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

#### Degrease:

- the joint face of the crankshaft sealing cover on the cylinder block,
- the crankshaft seal mating face.
- ☐ Always replace the crankshaft seal crankshaft sealing cover assembly.

#### **II - REFITTING OPERATION FOR PART CONCERNED**



128998

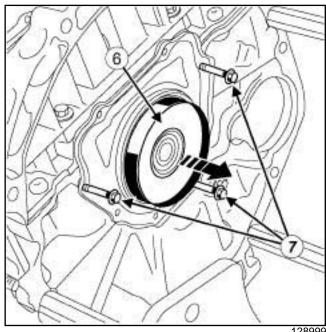
#### Note:

Touching the lip of the seal is strictly forbidden. Any contact with it will result in the lip being permanently damaged, which will cause an oil leak.

#### ☐ Fit:

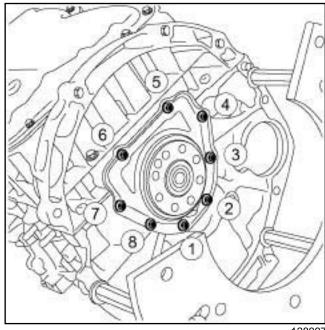
- the new seal protector (3) seal cover (4) assembly on the crankshaft,
- -the bolts (5) (M6 90 mm long) to guide the crankshaft "seal - cover" assembly.

☐ Move the "seal - cover" assembly evenly by hand until it makes contact with the cylinder block.



#### □ Remove:

- the crankshaft seal protector (6),
- the crankshaft sealing cover bolts (7) .



128997

- ☐ Refit the crankshaft sealing cover bolts.
- ☐ Pretighten in order and to torque the crankshaft cover bolts (initial torque) (5 N.m) (1) and (5).
- ☐ Torque tighten in order the crankshaft cover bolts (12 N.m).

Crankshaft seal at gearbox end: Removal - Refitting

10A

M9R

#### **III - FINAL OPERATION**

#### 6 SPEED MANUAL GBOX

#### ☐ Refit:

- the flywheel (see 10A, Engine and cylinder block assembly, Flywheel: Removal - Refitting, page 10A-86),
- -the clutch (see **Mechanism / Disk: Removal Refitting**) (20A, Clutch),
- the manual gearbox (see **Manual gearbox: Removal Refitting**) (21A, Manual gearbox).

#### 6 SPEED AUTO GBOX

#### ☐ Refit:

- the drive plate (see **Drive plate: Removal Refitting**) (23A, Automatic transmission).
- the automatic transmission (see Automatic gearbox: Removal - Refitting) (23A, Automatic transmission).

#### □ Refit:

- -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- -the battery (see **Battery: Removal Refitting**) (80A, Battery).
- ☐ Top up the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).

## Crankshaft seal at gearbox end: Removal - Refitting

2TR

#### **Essential special tooling**

Mot. 1868 Crankshaft seal fitting tool (flywheel end)

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair operation (see Engine: Precautions for repair) (02A, Lifting equipment).

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### **IMPORTANT**

Wear gloves during this operation.

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).

#### ND5 or ND8

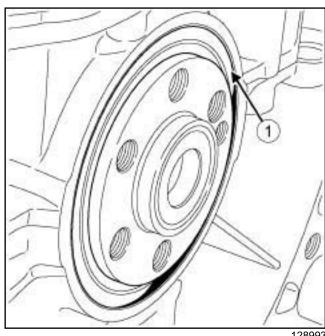
- □ Remove:
  - the manual gearbox (see Manual gearbox: Removal - Refitting) (21A, Manual gearbox).
  - -the clutch disc and pressure plate (see Mechanism / Disk: Removal - Refitting) (20A, Clutch),
  - the flywheel (see 10A, Engine and cylinder block assembly, Flywheel: Removal - Refitting, page 10A-86) (20A, Clutch).

#### FK0 or FK8

- □ Remove:
  - the automatic transmission (see Automatic gearbox: Removal - Refitting) (23A, Automatic transmission),

- the drive plate (see Drive plate: Removal - Refitting) (23A, Automatic transmission).

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



□ Remove the seal (1) from the crankshaft on the gearbox side.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

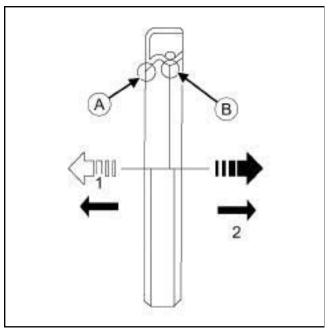
☐ Always replace the crankshaft seal on the gearbox side.

## Crankshaft seal at gearbox end: Removal - Refitting



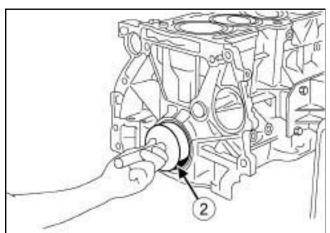
2TR

## II - REFITTING OPERATION FOR PART CONCERNED



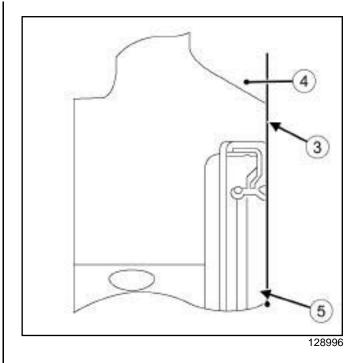
128994

- (A) Dust seal lip
- (B) Seal lip
- c) (2) Engine interior
- ☐ Apply fresh engine oil to the new crankshaft seal on the gearbox side on the mating face and on the seal lip (A), (B).
- ☐ Refit the crankshaft seal (1) on the gearbox side, checking the direction of fitting is observed.



12899

□ Push the crankshaft seal on the gearbox side using the tool (2) (Mot. 1868).



(4) Gap:  $0 \sim 0.5 \text{ mm}$ 

☐ Check the gap between the crankshaft seal (5) on the gearbox side and the cylinder surface (3).

#### **III - FINAL OPERATION**

#### ND5 or ND8

- ☐ Refit:
  - the flywheel (see 10A, Engine and cylinder block assembly, Flywheel: Removal - Refitting, page 10A-86) (20A, Clutch),
  - the clutch disc and pressure plate (see Mechanism / Disk: Removal Refitting) (20A, Clutch),
  - the manual gearbox (see **Manual gearbox: Removal Refitting**) (21A, Manual gearbox).

#### FK0 or FK8

- □ Refit:
  - the drive plate (see Drive plate: Removal Refitting) (23A, Automatic transmission),
  - the automatic transmission (see Automatic gearbox: Removal - Refitting) (23A, Automatic transmission).



2TR

☐ Connect the battery (see **Battery** : **Removal - Refitting**) (80A, Battery).

**Sump: Removal - Refitting** 



M9R

#### **Essential special tooling**

Mot. 1716 Removes housing with silicone seals.

	Tightening torques	
sump bolts		5 N.m
sump bolts		16 N.m

#### **IMPORTANT**

Wear goggles with side protectors for this operation.

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **WARNING**

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

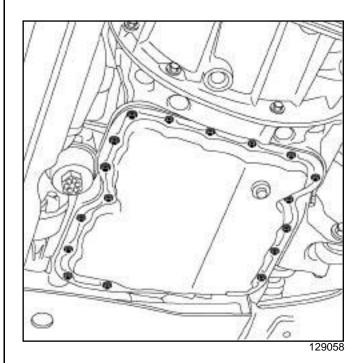
Correct the engine oil level if necessary before delivering the vehicle to the customer.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the oil filler cap equipped with the dipstick,
  - the engine undertray.
- □ Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17) (10A, Engine and peripherals),

## II - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Remove the sump bolts.
- □ Detach the sump using the (Mot. 1716).
- ☐ Remove the sump.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

WARNING

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

- ☐ Clean the sump.
- ☐ Check that the sump is not:
  - scratched,
  - deformed.

Note:

Always replace the sump if it is scratched or deformed.

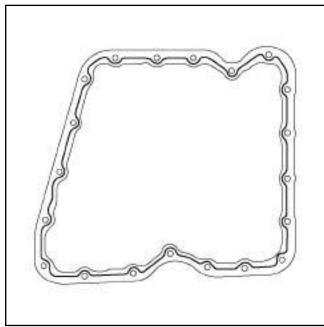
☐ Check that the base plate is not scratched.

**Sump: Removal - Refitting** 



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# II - REFITTING OPERATION FOR PART CONCERNED



129059

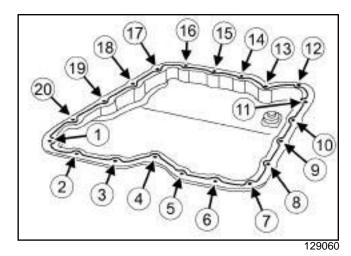
WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

#### **WARNING**

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

- □ Apply a bead of SILICONE ADHESIVE SEAL (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) with a diameter of 5 mm ± 2 mm to the sump in order to ensure a good seal.
- ☐ Fit the lower cover.
- ☐ Refit the sump bolts.



- □ Pretighten to torque in order the sump bolts (5 N.m).
- ☐ Torque tighten in order the **sump bolts (16 N.m)**.

#### **III - FINAL OPERATION.**

- ☐ Fill up with engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17) (10A, Engine and peripherals).
- ☐ Refit:
  - the engine undertray,
  - the oil filler cap equipped with the dipstick.
- ☐ Start the engine and wait until the engine oil warning light goes out.

## ENGINE AND CYLINDER BLOCK ASSEMBLY **Sump: Removal - Refitting**



2TR

#### **Essential special tooling**

Mot. 1716 Removes housing with silicone seals.

### Tightening torques 7 N.m sump bolts

#### **IMPORTANT**

Wear protective gloves during the operation.

#### Note:

Take care not to burn yourself; engine oil can be very hot.

Prolonged and repeated contact with used engine oil may cause skin cancer.

Avoid all direct skin contact with used engine oil. In the event of contact with the skin, carefully wash the affected area with soap or hand cleaner.

#### REMOVAL

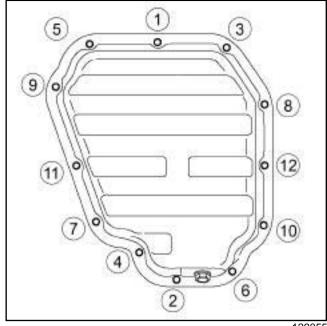
#### I - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

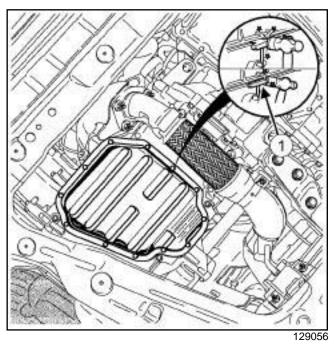
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove the engine undertray.
- ☐ Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17).

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



129055

☐ Remove the sump bolts in order.



☐ Remove the sump using tool (Mot. 1716) (1) and a hammer.

**Sump: Removal - Refitting** 

10A

2TR

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### **IMPORTANT**

Wear goggles with side protectors for this operation.

#### **WARNING**

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

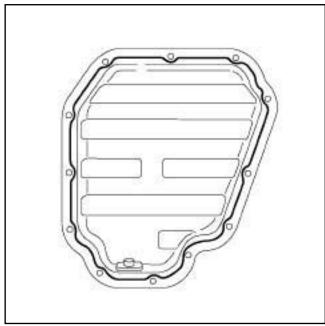
- ☐ Clean the sealing surface using the product SUPER CLEANING AGENT FOR JOINT FACES (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products).
- ☐ Check that the sump is not:
  - -scratched,
  - deformed.

If this is the case, replace the sump.

☐ Check that the base plate is not scratched.

#### **WARNING**

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).



129057

□ Apply a bead of SILICONE ADHESIVE SEALANT (see Vehicle: Parts and ingredients for the repairwork) with a diameter of approximately 5 mm, approximately 8 mm away from the inner edge of the sump to ensure a good seal.

#### Note:

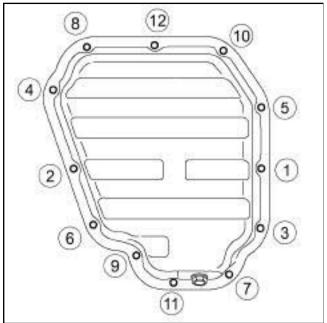
The fitting operation must be performed within 5 minutes following the application of the seal.

# ENGINE AND CYLINDER BLOCK ASSEMBLY Sump: Removal - Refitting

10A

2TR

# II - REFITTING OPERATION FOR PART CONCERNED



129055

- ☐ Refit the sump.
- ☐ Finger tighten in order the sump bolts until contact is made.
- ☐ Torque tighten in order the sump bolts (7 N.m).

#### **III - FINAL OPERATION**

#### Note:

Top up the engine oil at least **30 minutes** after the sump has been refitted.

- ☐ Refit the engine undertray.
- ☐ Fill up the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).

**Engine oil: Draining - Refilling** 



M9R

Essential special tooling				
Mot. 1018	Sump plug tool.			

Mot. 1018	Sump plug tool.
Es	ssential equipment
oil recovery conta	ainer
oil draining wrend	ch
torque wrench	
8 mm square dra	in plug socket

	Tightening torques ♡				
engine plug	oil	sump	drain	44 N.m	

	Average oil capacity (adjust using dipstick) (L)			
Engine	Oil change without filter replacement	Oil change with filter replace- ment		
M9R	7.0	7.4		

#### I - PRECAUTIONS FOR REPAIR

#### **WARNING**

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

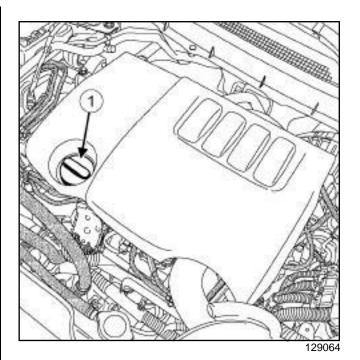
Correct the engine oil level if necessary before delivering the vehicle to the customer.

#### II - PARTS AND CONSUMABLES FOR REPAIR

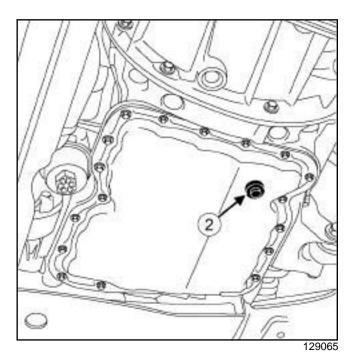
- □ parts always to be replaced: Engine oil sump drain plug seal (10,03,01,04)
- □ Consumables:
  - engine oil (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

#### **III - OIL SERVICE**

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).



- ☐ Remove:
  - the oil filler cap (1) fitted with the dipstick,
  - the engine undertray.



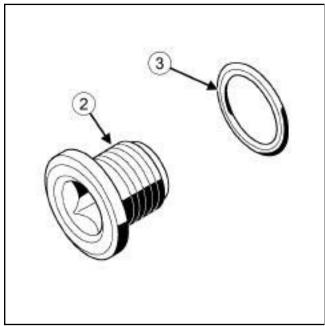
- ☐ Place the **oil recovery container** under the engine oil drain plug (2).
- □ Remove the drain plug (2) from the engine oil sump using tool (Mot. 1018) or an oil draining wrench.
- ☐ Let the engine oil run into the oil recovery container.
- ☐ Remove the drain plug seal.

Engine oil: Draining - Refilling

M9R

#### ☐ Clean:

- the drain plug,
- the engine oil sump.



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#### ☐ Refit:

- a new seal on the drain plug (2) (position the groove (3) towards the drain plug),
- the drain plug on the engine oil sump.
- ☐ Torque tighten the engine oil sump drain plug (44 N.m) using a torque wrench and a 8 mm square drain plug socket.
- ☐ Remove the **oil recovery container**.
- ☐ Refit the engine undertray.

#### **IV - FILLING**

☐ Fill up with engine oil, respecting the recommended quantity.

#### Note:

When filling up the engine oil, always leave at least **10 minutes** for the oil to drain down before checking the level on the dipstick.

- ☐ Check the oil level with the dipstick.
- ☐ Refit the oil filler cap equipped with the dipstick.

**Engine oil: Draining - Refilling** 



2TR

## **Essential equipment** oil recovery container

	Tightening torques ♡	
drain plug		34 N.m

Replacing the engine oil	Average oil capacity (check and adjust with dipstick) (I)
With oil filter replace- ment	5.1
Without oil filter replacement	4.8
Dry engine (return to good condition)	5.9

#### I - PRECAUTIONS FOR REPAIR

#### **IMPORTANT**

Wear heat protective gloves during the operation.

#### **WARNING**

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

#### Note:

Take care not to burn yourself; engine oil can be very hot.

Prolonged and repeated contact with used engine oil may cause skin cancer.

Avoid all direct skin contact with used engine oil. In the event of contact with the skin, carefully wash the affected area with soap or hand cleaner.

#### II - PARTS AND CONSUMABLES FOR THE REPAIR

☐ parts always to be replaced: Engine oil sump drain plug seal (10,03,01,04)

#### □ Consumables:

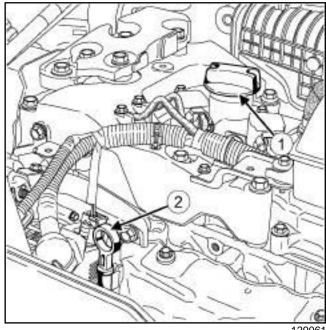
- engine oil (see Engine oil: Specifications) (Technical Note 6013A, 04A, Lubricants).

#### **III - OIL SERVICE**

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove the engine cover.



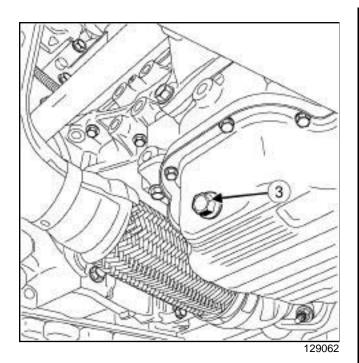
#### □ Remove:

- the oil filler cap (1),
- the dipstick (2) .

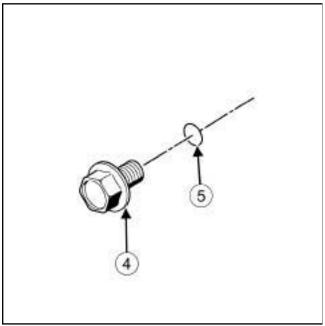
**Engine oil: Draining - Refilling** 

10A

2TR



- ☐ Remove the drain plug (3).
- ☐ Let the oil run into a **oil recovery container**.



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- ☐ Refit:
  - the new seal (5) on the drain plug, observing the direction indicated on the diagram,
  - the drain plug (4).
- ☐ Torque tighten the drain plug (34 N.m).
- ☐ Wipe the traces of oil around the drain plug in order to be able to detect possible leaks.

#### **IV - FILLING**

☐ Fill the engine with oil, respecting the recommended quantity.

#### Note:

When filling up the engine oil, always allow at least **10 minutes** for the oil to drain down before checking the level with the dipstick.

- ☐ Check the engine oil level with the dipstick.
- ☐ Refit:
  - the dipstick,
  - the oil filler cap,
  - the engine cover.

Oil filter: Removal - Refitting

M9R

#### **Essential equipment**

oil recovery container

#### 

oil filter unit cover

25 N.m

#### **WARNING**

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

#### Note:

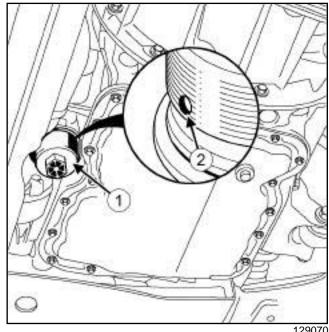
When filling up the engine oil, always allow at least 10 minutes for the oil to drain down before checking with a dipstick.

#### **REMOVAL**

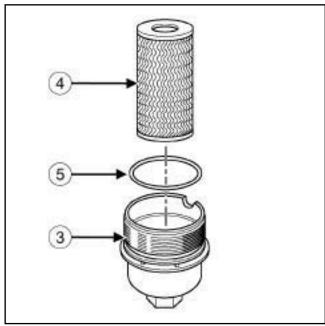
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove the engine undertray.
- ☐ Place the **oil recovery container** under the oil filter.

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



- ☐ Undo the oil filter unit cover (1) until oil flows through the opening (2).
- ☐ Allow the oil contained in the oil filter unit to flow.



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- □ Remove:
  - the cover (3) oil filter (4) assembly,
  - the cover seal (5).

# ENGINE AND CYLINDER BLOCK ASSEMBLY Oil filter: Removal - Refitting

10A

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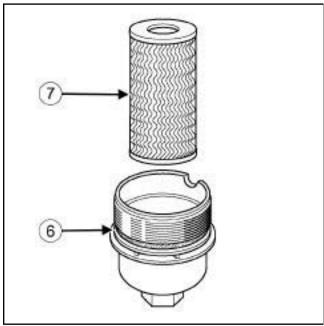
#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

□ parts always to be replaced: Oil filter cartridge (10,05,05,04) thick, to the alternator rotor.

parts always to be replaced: Oil filter cover seal (10,05,05,10) thick, to the alternator rotor.

☐ Clean the oil filter unit cover.



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- ☐ Fit:
  - a new cover seal (6),
  - a new filter element (7) in the cover.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Manually tighten the "cover oil filter" assembly.
- ☐ Torque tighten the oil filter unit cover (25 N.m).

#### **III - FINAL OPERATION.**

- ☐ Refit the engine undertray.
- ☐ Start the engine and let it run until the oil pressure warning light goes off.
- ☐ Adjust the engine oil level (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).
- ☐ Refit the "filler cap dipstick" assembly.

Oil filter: Removal - Refitting

2TR

Essential special tooling		
Mot. 1654	Oil filter removing tool, 64 mm diameter.	

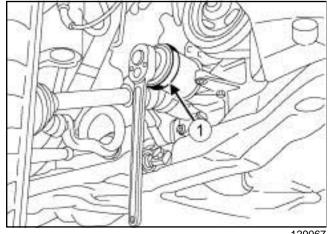
	Tightening torques ▽	
oil filter		18 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - the engine undertray.

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



- ☐ Fit the (Mot. 1654) (1) on the oil filter using a ratchet.
- ☐ Remove the oil filter.

#### REFITTING

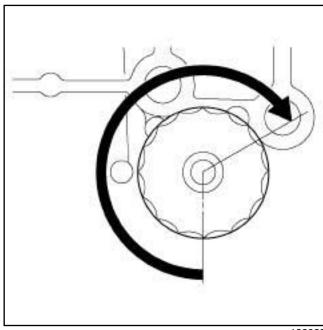
#### I - REFITTING PREPARATION OPERATION

□ parts always to be replaced: Oil filter (10,05,05, 03)

- ☐ Wipe the oil traces around the oil filter in order to be able to detect possible leaks.
- ☐ Lubricate the oil filter seal with new engine oil.

#### **II - REFITTING OPERATION FOR PART CONCERNED**

☐ Screw on the oil filter until it makes contact.



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☐ Torque tighten the oil filter (18 N.m).

#### **III - FINAL OPERATION**

#### □ Refit:

- the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the engine undertray.
- ☐ Top up the engine oil if necessary (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17).

## ENGINE AND CYLINDER BLOCK ASSEMBLY Oil filter unit: Removal - Refitting

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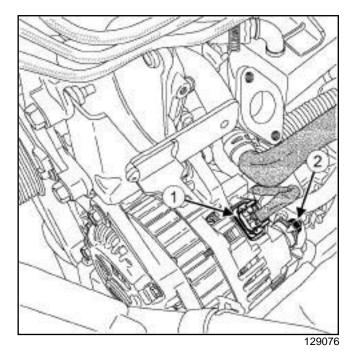
Essential special tooling					
Mot. 1448	Long clips.	nose	pliers	for	hose

Tightening torques ♡	
oil filter unit bolts (initial torque)	5 N.m
oil filter unit bolts	25 N.m
alternator positive termi- nal nut	10 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- □ Remove:
  - the engine cover,
  - the engine undertray.
- ☐ Drain the engine cooling circuit (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10)
- ☐ Remove the engine cooling fan assembly (see 19A, Cooling, Engine cooling fan assembly: Removal - Refitting, page 19A-39).
- ☐ Disconnect the oil pressure sensor connector.

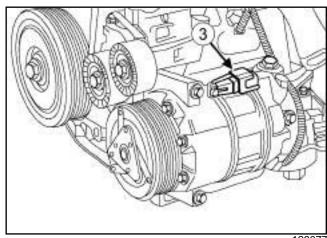


□ Disconnect the alternator connector (1).

#### □ Remove:

- the nut (2) from the alternator positive terminal.
- the alternator positive terminal wiring.

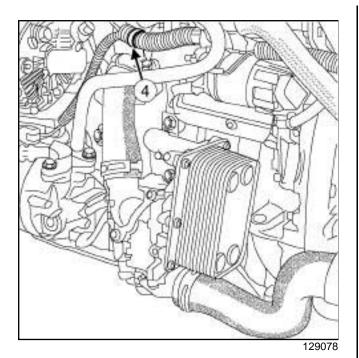
#### AIR CON 01 or AIR CON 02



□ Disconnect the connector (3) from the air conditioning compressor.

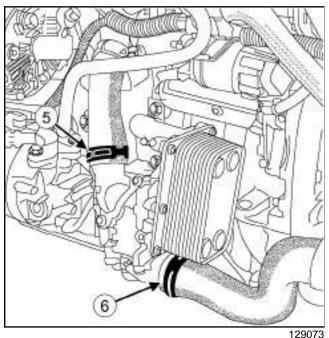
Oil filter unit: Removal - Refitting

M9R



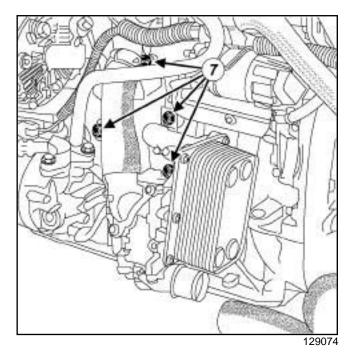
- ☐ Unclip the wiring at (4).
- Move aside the wiring.

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



□ Remove:

- -the clamp (5) from the oil filter unit coolant outlet union using the (Mot. 1448),
- -the clamp (6) from the oil filter unit coolant inlet union using the (Mot. 1448).
- ☐ Disconnect the oil filter unit coolant inlet union hose.



- ☐ Remove the bolts (7) from the oil filter unit.
- ☐ Disconnect the oil filter unit coolant outlet union ho-
- ☐ Remove the oil filter unit.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the oil filter unit seal.

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

#### Note:

The oil pressure sensor must be replaced if it is removed.

- ☐ Clean:
  - the cylinder block gasket face,
  - the oil filter unit seal housing if being reused.

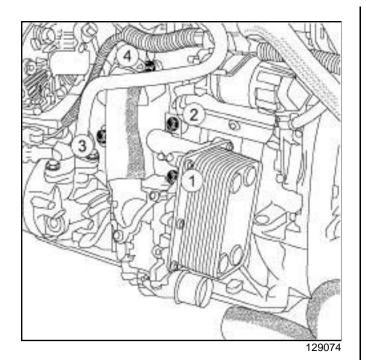
#### **II - REFITTING OPERATION FOR PART CONCERNED**

- ☐ Refit a new oil filter unit seal.
- Connect the coolant outlet union hose to the oil filter unit.

Oil filter unit: Removal - Refitting

10A

M9R



- □ Refit:
  - the oil filter unit,
  - the oil filter unit bolts.
- ☐ Torque tighten in order:
  - the oil filter unit bolts (initial torque) (5 N.m) (2) and (4),
  - the oil filter unit bolts (25 N.m).
- ☐ Connect the coolant inlet union hose to the oil filter unit.
- ☐ Refit:
  - the clamp from the oil filter unit coolant outlet union using the **(Mot. 1448)**,
  - the clamp from the oil filter unit coolant inlet union using the **(Mot. 1448)**.

#### **III - FINAL OPERATION**

☐ Clip on the wiring at (4).

#### AIR CON 01 or AIR CON 02

☐ Connect the air conditioning compressor connector.

- □ Refit:
  - the alternator positive terminal wiring,
  - the alternator positive terminal nut.

☐ Torque tighten the alternator positive terminal nut (10 N.m).

- □ Connect:
  - the alternator connector,
  - the oil pressure sensor connector.
- □ Refit the engine cooling fan assembly (see 19A, Cooling, Engine cooling fan assembly: Removal Refitting, page 19A-39).
- ☐ Connect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Fill the engine cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
- □ Bleed the engine cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10)
- □ Refit:
  - the engine undertray,
  - the engine cover.

**Exchanger: Removal - Refitting** 

10A

M9R

The oil-water heat exchanger is not sold separately by the Parts Department. To replace it, it is necessary to replace the oil filter unit (see 10A, Engine and cylinder block assembly, Oil filter unit: Removal - Refitting, page 10A-24).

## ENGINE AND CYLINDER BLOCK ASSEMBLY **Exchanger: Removal - Refitting**

2TR

Tightening torques ▽		
oil-water heat exchan- ger bolts	22 N.m	
oil pressure sensor	15 N.m	
engine drain plug	10 N.m	
radiator drain plug	2 N.m	

#### **IMPORTANT**

Wear heat protective gloves during the operation.

#### Note:

Be careful not to burn yourself; the engine oil and coolant can be very hot.

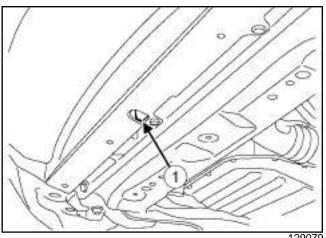
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - the engine undertray.

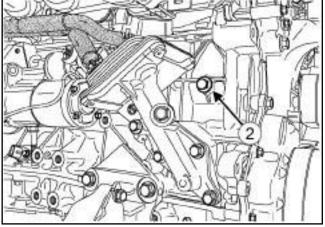


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- ☐ Drain the coolant:
  - Open the radiator drain plug (1) located at the bottom of the radiator, then remove the radiator cap.

#### Note:

Let the coolant run into a drain tray.



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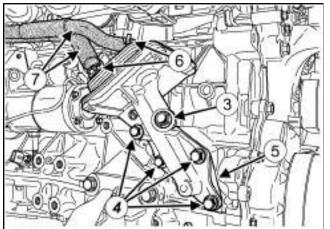
☐ Remove the engine coolant drain plug (2).

**Exchanger: Removal - Refitting** 

10A

2TR

## II - OPERATION FOR REMOVAL OF PART CONCERNED



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- ☐ Disconnect the oil pressure sensor connector.
- ☐ Remove:
  - the oil pressure sensor (3),
  - the bolts (4) of the oil-water heat exchanger,
  - the seal (5) of the oil-water heat exchanger,
  - the hose clips (6).
- □ Disconnect the hoses (7) of the oil-water heat exchanger.
- ☐ Remove the oil-water heat exchanger.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

- ☐ Always replace the seal of the oil-water heat exchanger.
- ☐ Use SUPER RELEASING AGENT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products) to clean:
  - the threading of the engine coolant drain plug,
  - the threading of the oil pressure sensor.
- ☐ Apply a SILICONE ADHESIVE SEALANT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products) to:
  - the threading of the engine coolant drain plug (2),
  - the threading of the oil pressure sensor (3).

## II - REFITTING OPERATION FOR PART CONCERNED

Connect the hoses to the oil-water heat exchanger.

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- the hose clips,
- the new oil-water heat exchanger seal,
- the oil-water heat exchanger,
- the bolts of the oil-water heat exchanger,
- the oil pressure sensor.
- ☐ Torque tighten:
  - the oil-water heat exchanger bolts (22 N.m),
  - the oil pressure sensor (15 N.m).
- ☐ Connect the oil pressure sensor connector.

#### **III - FINAL OPERATION**

- □ Refit:
  - the engine drain plug (2),
  - the radiator drain plug (1).
- ☐ Torque tighten:
  - the engine drain plug (10 N.m),
  - the radiator drain plug (2 N.m).
- ☐ Refit:
  - the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).
- ☐ Check the engine oil level.
- □ Top up the engine oil if necessary (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).
- ☐ Fill the cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- □ Bleed the cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- Refit the engine undertray.

Oil pressure sensor: Removal - Refitting

M9R

Tightening torques	
oil pressure sensor	40 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- □ Remove:
  - the engine cover,
  - -the alternator (see 16A, Starting Charging, Alternator: Removal - Refitting, page 16A-3).

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



- 129084
- ☐ Disconnect the oil pressure sensor connector.
- ☐ Remove the oil pressure sensor (1) using a long socket with a diameter of 22 mm.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the oil pressure sensor.

#### **II - REFITTING OPERATION FOR PART CONCERNED**

☐ Refit the oil pressure sensor.

- ☐ Torque tighten the oil pressure sensor (40 N.m) using a long socket with a diameter of 22 mm.
- ☐ Connect the oil pressure sensor connector.

#### **III - FINAL OPERATION**

- □ Refit:
  - the alternator (see 16A, Starting Charging, Alternator: Removal - Refitting, page 16A-3),
  - the engine cover.

# **ENGINE AND CYLINDER BLOCK ASSEMBLY Oil pressure sensor: Removal - Refitting**



2TR

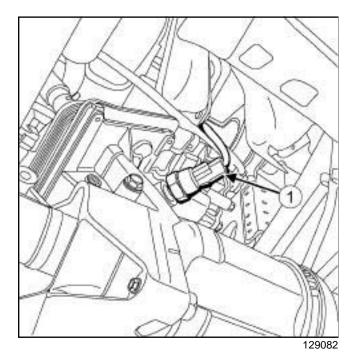
Tightening torques ♡	
oil pressure sensor	15 N.m

### **REMOVAL**

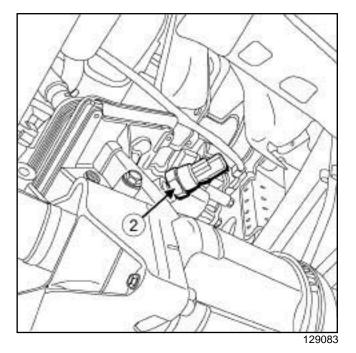
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



☐ Disconnect the oil pressure sensor connector (1).



☐ Remove the oil pressure sensor (2) .

## REFITTING

### I - REFITTING PREPARATION OPERATION

- ☐ Clean the threading of the oil pressure sensor using a SUPER RELEASING AGENT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products).
- ☐ Coat the threading of the oil pressure sensor with SI-LICONE ADHESIVE SEALANT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products).

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the oil pressure sensor.
- ☐ Tighten to torque the oil pressure sensor (15 N.m).
- ☐ Connect the oil pressure sensor connector.

### **III - FINAL OPERATION**

☐ Refit the front right-hand wheel (see **Wheel: Removal - Refitting**) (35A, Wheels and tyres).

Oil level sensor: Removal - Refitting

10A

M9R

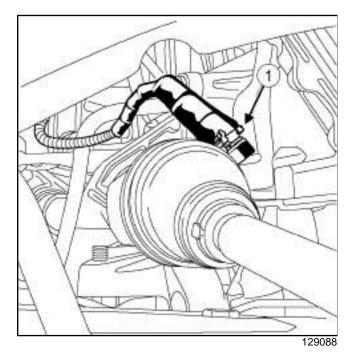
Tightening torques ♡	
oil level sensor	20 N.m

## **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Disconnect the oil level sensor connector (1).
- ☐ Remove the oil level sensor.

## REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the oil level sensor.
- ☐ Torque tighten the oil level sensor (20 N.m).

☐ Connect the oil level sensor connector.

## **II - FINAL OPERATION.**

### ☐ Refit:

- the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

# **ENGINE AND CYLINDER BLOCK ASSEMBLY**Oil level sensor: Removal - Refitting

10A

2TR

Tightening torques ♡	
oil level sensor bolt	6 N.m

## **IMPORTANT**

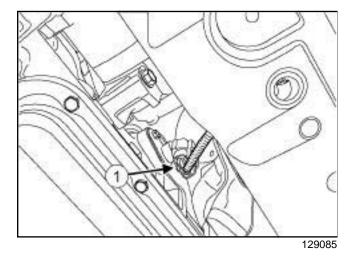
Wear protective gloves during the operation.

## REMOVAL

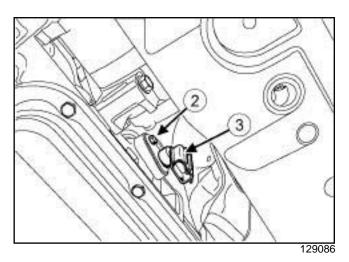
## I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the engine undertray.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Disconnect the oil level sensor connector (1).



□ Remove:

- the oil level sensor bolt (2),
- the oil level sensor (3) .

## REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the oil level sensor,
  - the oil level sensor bolt.
- ☐ Torque tighten the oil level sensor bolt (6 N.m).
- ☐ Connect the oil level sensor connector.

## **II - FINAL OPERATION**

☐ Refit the engine undertray.

10A

M9R

Tightening torques ♡	
oil pump bolts on the cylinder block	25 N.m
oil splash plate bolt on the oil pump	10 N.m
bolts of the oil strainer	10 N.m

## **IMPORTANT**

Wear goggles with side protectors for this operation.

## **IMPORTANT**

Wear latex gloves during the operation.

### WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

## **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

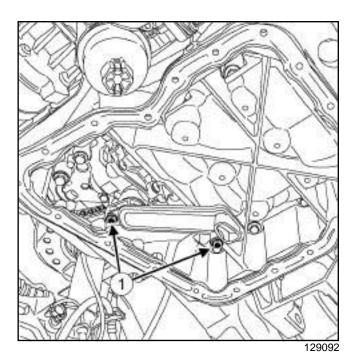
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

## ☐ Remove:

- the oil filler cap equipped with the dipstick,
- the engine undertray.
- ☐ Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).

## ☐ Remove:

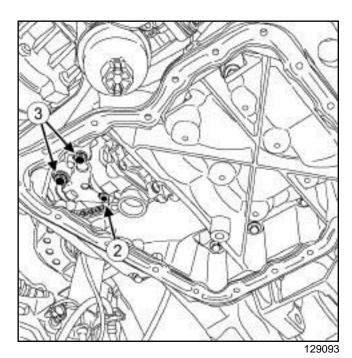
- -the sump (see 10A, Engine and cylinder block assembly, Sump: Removal Refitting, page 10A-12),
- -the oil level sensor (see 10A, Engine and cylinder block assembly, Oil level sensor: Removal - Refitting, page 10A-32).



#### □ Remove:

- the bolts (1) from the oil strainer,
- the oil strainer,
- the seal of the oil strainer.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



### □ Remove:

- the oil splash plate bolt (2) on the oil pump,
- the oil pump bolts (3) from the cylinder block,

10A-34

10A

M9R

-the oi	l pump.
---------	---------

### REFITTING

# I - REFITTING PREPARATION OPERATION

### **WARNING**

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

Clean the sump.

Note:

Always replace the sump if it is scratched or deformed.

- ☐ Check that the sump is not:
  - -scratched,
  - deformed.
- ☐ Check that the base plate is not scratched.

# II - REFITTING OPERATION FOR PART CONCERNED

☐ Refit the oil pump.

Note:

If necessary, use a locally produced hook to ft the oil pump chain to the oil pump pinion.

- ☐ Refit:
  - the oil pump bolts on the cylinder block,
  - the oil splash plate bolt on the oil pump.
- ☐ Torque tighten:
  - -the oil pump bolts on the cylinder block (25 N.m),
  - -the oil splash plate bolt on the oil pump (10 N.m).

## **III - FINAL OPERATION.**

- ☐ Refit:
  - the new oil strainer seal,
  - the oil strainer,
  - the bolts of the oil strainer.

☐ Torque tighten the	bolts	of	the	oil	strainer	(10
N.m).						

### ☐ Refit:

- the oil level sensor (see 10A, Engine and cylinder block assembly, Oil level sensor: Removal - Refitting, page 10A-32),
- the sump (see 10A, Engine and cylinder block assembly, Sump: Removal - Refitting, page 10A-12).
- ☐ Top up the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).
- ☐ Refit:
  - the engine undertray,
  - the oil filler cap equipped with the dipstick.
- ☐ Start the engine and wait until the engine oil warning light goes out.

10A

2TR

	Tig	htening torques 🗇	
coolant bolts	pump	cover	7 N.m

## **IMPORTANT**

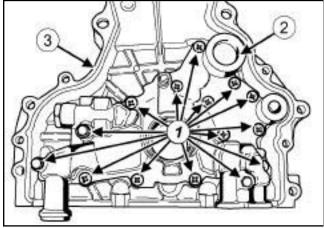
Wear protective gloves during the operation.

## REMOVAL

### I - REMOVAL PREPARATION OPERATION

- □ Place the engine on a support (see **Engine**: **Dismantling**) (Technical Note 6045A, 10A, Engine and peripherals).
- □ Remove the timing cover (see Timing chain: Removal) (Technical Note 6045A, 10A, Engine and peripherals).

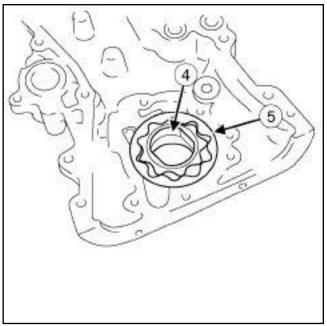
# II - OPERATION FOR REMOVAL OF PART CONCERNED



129089

## ☐ Remove:

- the oil pump cover bolts (1),
- the oil pump cover (2) from the timing cover (3) .



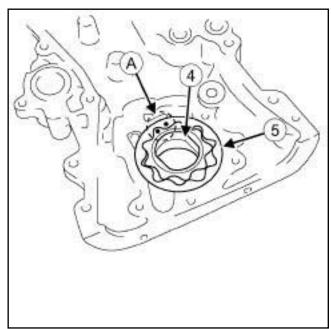
129090

## ☐ Remove:

- the internal rotor (4),
- the external rotor (5) .

### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED



129091

### □ Refit:

- the external rotor (5),

10A

## 2TR

- the internal rotor (4) with the punched marks (A) as illustrated,
- the oil pump cover (2) on the timing cover (3).
- ☐ Torque tighten the coolant pump cover bolts (7 N.m).

## **II - FINAL OPERATION.**

☐ Refit the timing cover (see **Timing chain: Refitting**) (Technical Note 6045A, 10A, Engine and peripherals).

# ENGINE AND CYLINDER BLOCK ASSEMBLY Oil pressure: Check

#### M9R

Essential special tooling		
Mot. 836-05	Oil pressure gauge kit.	
Mot. 1495-01	22 mm socket for removing/ refitting oxygen sensors.	

## WARNING

Always check the oil level using the dipstick.

Do not exceed the maximum level on the dipstick (could destroy the engine).

Correct the engine oil level if necessary before delivering the vehicle to the customer.

#### Note:

When topping up the engine oil, always leave at least 10 minutes before checking the level with a dipstick.

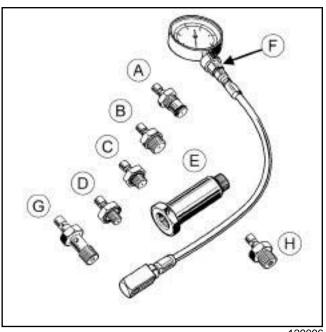
It is essential to monitor the engine oil pressure as the engine oil temperature rises (approximately 80°C or the first time the engine cooling fan is activated).

### I - PARTS AND CONSUMABLES FOR THE REPAIR

- Always replace:
  - the drain plug seal (in the event of an oil change),
  - oil filter (if removed).
- Consumables:
  - -the engine oil (see Engine oil: Specifications) (Technical Note 6013A, 04A, Lubricants).

## **II - CHECKING**

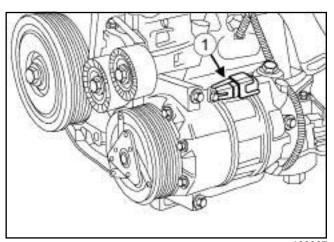
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the engine cover,
  - the engine undertray,
  - the alternator (see 16A, Starting Charging, Alternator: Removal - Refitting, page 16A-3),
  - the oil pressure sensor (see 10A, Engine and cylinder block assembly, Oil pressure sensor: Removal - Refitting, page 10A-30).



129096

- ☐ Place the oil pressure measurement tool (Mot. 836-05) with the correct end pieces in place of the oil pressure sensor using the tool (Mot. 1495-01) or a 22 mm long socket.
- $\square$  End pieces: (C) + (F).

## AIR CON 01 or AIR CON 02



129097

- ☐ Disconnect the connector from the air conditioning compressor (1).
- ☐ Refit the alternator (see 16A, Starting Charging, Alternator: Removal - Refitting, page 16A-3).
- Start the engine.

# ENGINE AND CYLINDER BLOCK ASSEMBLY Oil pressure: Check

10A

# M9R

	Monitor the engine oil pressure as the oil temperature rises (approximately $80^{\circ}C$ or the first time the engine cooling fan is activated); it should not be less than the pressure at idle speed.
	Measure the pressure which should be:
	- at idle speed: <b>1.4 bar</b> ,
	-at 3000 rpm: <b>4.7</b> to <b>6.4 bar</b> .
	Switch off the ignition.
	Remove the alternator (see 16A, Starting - Charging, Alternator: Removal - Refitting, page 16A-3) .
/	AIR CON 01 or AIR CON 02
•	Connect the air conditioning compressor connector.
	Remove the tool (Mot. 836-05) with the end parts.
	Refit the oil pressure sensor (see 10A, Engine and cylinder block assembly, Oil pressure sensor: Removal - Refitting, page 10A-30).
	Wipe any oil run-off with a cloth.
	Wait for at least 10 minutes.
	Check the engine oil level using the dipstick.
	Top up the engine oil if necessary (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17).
	Refit the alternator (see 16A, Starting - Charging, Alternator: Removal - Refitting, page 16A-3) .
	Start the engine and check that there are no oil leaks at the oil pressure sensor.
	Refit:
	- the engine undertray,
	- the engine cover.

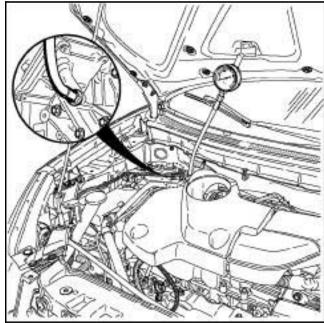
# ENGINE AND CYLINDER BLOCK ASSEMBLY Oil pressure: Check

10A

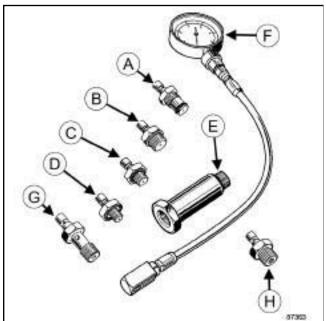
2TR

Essential special tooling		
Mot. 836-05	Oil pressure gauge kit.	

## **CHECKING**



12909



87363

- ☐ Use the tool (Mot. 836-05) and a 27 mm long soc-
- ☐ Check the oil pressure when the engine is warm (approximately **80°C**).

- □ Remove the oil pressure sensor (see 10A, Engine and cylinder block assembly, Oil pressure sensor: Removal Refitting, page 10A-30).
- ☐ Fit the end piece (D) of tool (Mot. 836-05) in place of the oil pressure sensor.
- ☐ End pieces: (D) + (F)
- ☐ 2TR engine:
  - Idle speed: more than 0.98 bar
  - 2000 rpm: more than **2.94 bar**.
- □ Remove the end piece (D) of tool (Mot. 836-05) from the position of the oil pressure sensor.
- □ Refit the oil pressure sensor (see 10A, Engine and cylinder block assembly, Oil pressure sensor: Removal Refitting, page 10A-30).

# **ENGINE AND CYLINDER BLOCK ASSEMBLY Multifunction support: Removal - Refitting**

10A

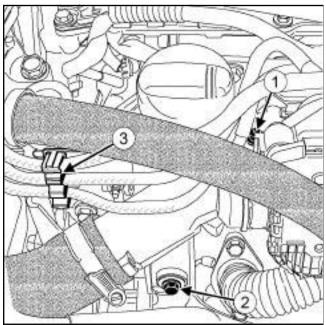
M9R

Tightening torques 🗇	
bolts of the multifunction support	44 N.m
air conditioning com- pressor bolts	25 N.m
bolts of the expansion bottle pipe support	25 N.m
clip of the intercooler air outlet pipe	6 N.m
bolt of the intercooler air outlet pipe	8 N.m

## REMOVAL

#### I - REMOVAL PREPARATION OPERATION

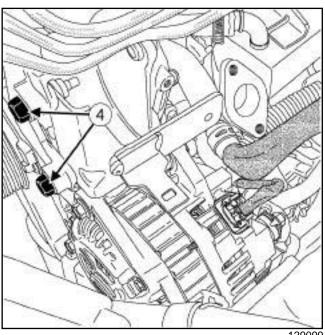
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine cover.



129098

- ☐ Loosen the clip (1) on the intercooler air outlet pipe.
- ☐ Remove the intercooler air outlet pipe bolt (2).
- ☐ Disconnect the intercooler air outlet pipe from the damper valve.
- ☐ Move the intercooler air outlet pipe to one side.

☐ Unclip the fuel pipe from the support (3).



129099

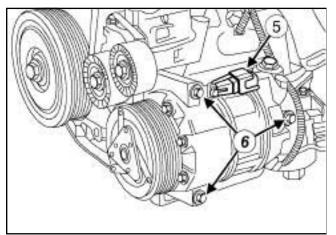
## □ Remove:

- the bolts (4) of the expansion bottle pipe support,
- the support of the expansion bottle pipe,
- the engine undertray,
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3).

Multifunction support: Removal - Refitting

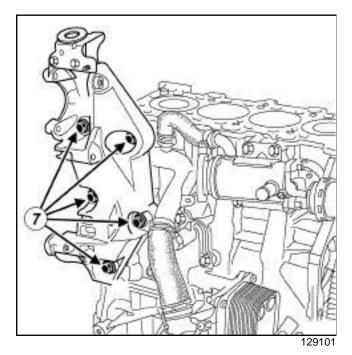
M9R

## AIR CON 01 or AIR CON 02



- □ Disconnect the connector (5) from the air conditioning compressor.
- ☐ Remove the bolts (6) from the air conditioning compressor.
- ☐ Move aside the air conditioning compressor.

## II - OPERATION FOR REMOVAL OF PART **CONCERNED**

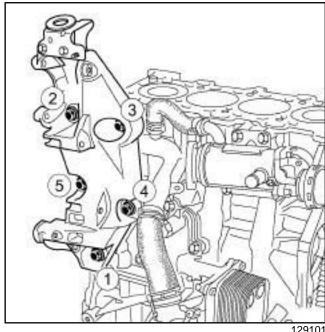


### □ Remove:

- the multifunction support bolts (7),
- the multifunction support.

## REFITTING

## I - REFITTING OPERATION FOR PART **CONCERNED**



129101

- Position the multifunction support.
- ☐ Without tightening, refit in order the bolts of the multifunction support.
- ☐ Torque tighten in order the **bolts of the multifunc**tion support (44 N.m).

## **II - FINAL OPERATION**

## AIR CON 01 or AIR CON 02

- ☐ Fit the air conditioning compressor.
- ☐ Refit the air conditioning compressor bolts.
- ☐ Torque tighten the air conditioning compressor bolts (25 N.m).
- ☐ Connect the air conditioning compressor connector.

#### □ Refit:

- the alternator (see 16A, Starting Charging, Alternator: Removal - Refitting, page 16A-3),
- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),

# ENGINE AND CYLINDER BLOCK ASSEMBLY Multifunction support: Removal - Refitting

## M9R

- -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection), - the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres), - the engine undertray, - the support of the expansion bottle pipe,
- ☐ Torque tighten the bolts of the expansion bottle
- pipe support (25 N.m). ☐ Clip the fuel pipe onto the support.

- the bolts of the expansion bottle pipe support.

☐ Torque tighten the clip of the intercooler air outlet

☐ Connect the intercooler air outlet pipe to the damper

pipe (6 N.m).

☐ Refit the intercooler air outlet pipe bolt.

- ☐ Torque tighten the **bolt of the intercooler air outlet** pipe (8 N.m).
- ☐ Refit the engine cover.
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).



M9R

Essential special tooling				
Mot. 1448	Long nose pliers for hose clips.			
Mot. 1390	Support for removing/refitting the engine - gearbox assembly.			
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.			

Essential equipment
refrigerant charging station

Tightening torques ♡	)
left-hand suspended engine mounting bolts	110 N.m
left-hand suspended engine mounting bolts	110 N.m
right-hand suspended engine mounting bolts	55 N.m
upper engine tie-bar bolt	120 N.m
upper engine tie-bar bolt	120 N.m
earth strap bolt	14 N.m
automatic gearbox coo- lant pipes	25 N.m
earth strap bolt	14 N.m
air filter unit support bolts	10 N.m
heater matrix coolant outlet pipe bolt	25 N.m
automatic gearbox con- trol cable nut	14 N.m
heater matrix inlet pipe bolt	25 N.m
heater matrix coolant outlet pipe bolt	25 N.m
automatic gearbox com- puter mounting bolts	27 N.m
wiring bracket bolts	10 N.m

Tightening torques	
air filter unit air outlet pipe clips	5 N.m
bolt on the turbochar- ging pressure regula- tion actuating solenoid valve support	10 N.m
support bolt of the manual priming pump	12 N.m
intercooler air outlet pipe bolt	8 N.m
clip of the intercooler air outlet pipe clip	6 N.m
fuel pipe support bolt	10 N.m
compressor pipe union bolts	4 N.m
intercooler air inlet pipe clip	6 N.m
intercooler air inlet pipe bolt	8 N.m

## **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Vehicle: Precautions for repair**).

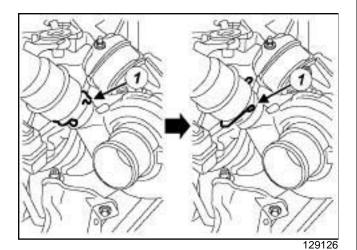
## **REMOVAL**

## I - REMOVAL PREPARATION OPERATION

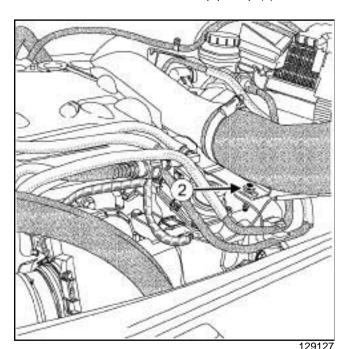
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - the engine cover,
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit.

10A

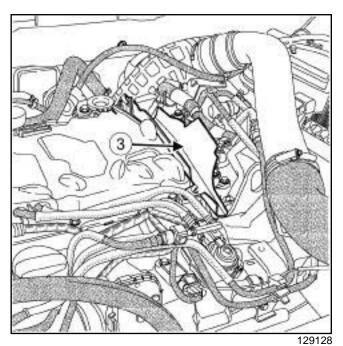
M9R



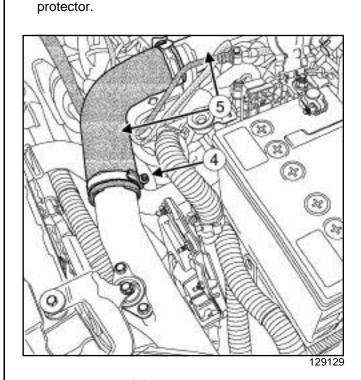
□ Rotate the intercooler air inlet pipe clip (1).



- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel supply pipe bracket.
- ☐ Move the intercooler air inlet pipe to one side.



☐ Remove the protective plate (3) from the injector rail



- ☐ Loosen the clip (4) on the intercooler air inlet pipe.
- ☐ Disconnect the « intercooler air inlet pipe duct » assembly (5).
- ☐ Remove:
  - the battery (see **Battery: Removal Refitting**) (80A, Battery).
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

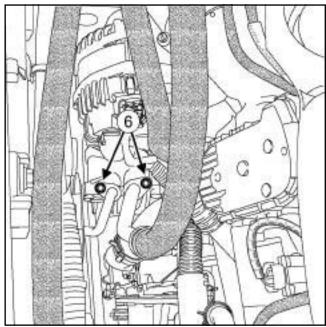
10A

M9R

transmission).

AIR CON 01 or AIR CON 02	AIR (
☐ Drain the refrigerant circuit (see Coolant circuit Draining - Refilling) (62A, Air conditioning).	
	TO F
□ Remove the engine undertray.	
☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).	
6 SPEED MANUAL GBOX	F
☐ Drain the manual gearbox (see <b>Manual gearbox</b> oil: Draining - Refilling) (21A, Manual gearbox).	
6 SPEED AUTO GBOX	200
☐ Drain the automatic transmission (see <b>Automatic gearbox oil: Draining - Refilling</b> ) (23A, Automatic	100

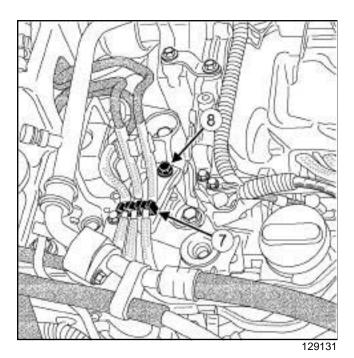
# AIR CON 01 or AIR CON 02



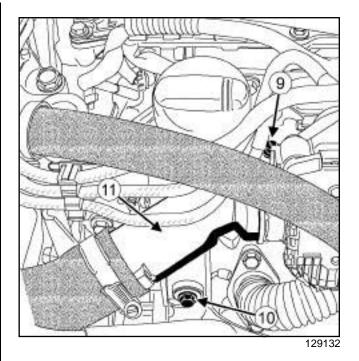
129130

- ☐ Remove the compressor pipe union bolts (6) .
- ☐ Disconnect the compressor pipe unions.
- ☐ Plug the openings.

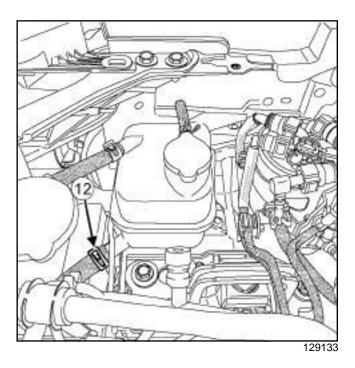
M9R



- ☐ Unclip the fuel pipes from their mounting support (7)
- ☐ Move the fuel pipes aside.
- ☐ Remove:
  - the fuel pipe bolt (8),
  - the fuel pipe support.



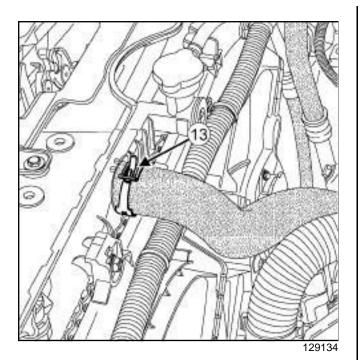
- □ Loosen the clip (9) on the intercooler air outlet pipe.
- ☐ Remove the intercooler air outlet pipe bolt (10).
- □ Disconnect the intercooler air outlet pipe (11) from the damper valve.
- ☐ Move the intercooler air outlet pipe to one side.



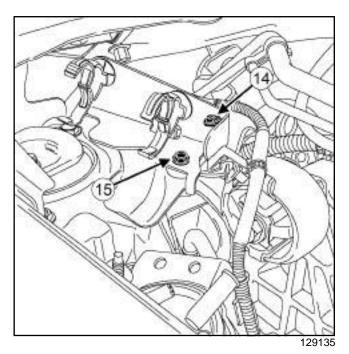
- ☐ Remove the clip (12) from the expansion bottle hose using the tool (Mot. 1448).
- ☐ Disconnect the hose from the expansion bottle.

10A

M9R



- ☐ Remove the cooling radiator top hose clip (13) using the (Mot. 1448).
- ☐ Disconnect the cooling radiator top hose.
- □ Remove:
  - -the fuel filter (see 13A, Fuel supply, Fuel filter: Removal Refitting, page 13A-3),
  - the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).
- ☐ Disconnect the fuel return quick-release union leading to the tank.

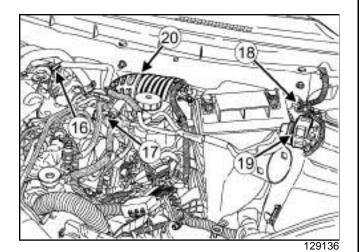


- ☐ Unclip the wiring (14) from the manual priming pump support.
- □ Remove:
  - the support bolt (15) of the manual priming pump,
  - the manual priming pump support.

# Engine/gearbox assembly: Removal - Refitting

10A

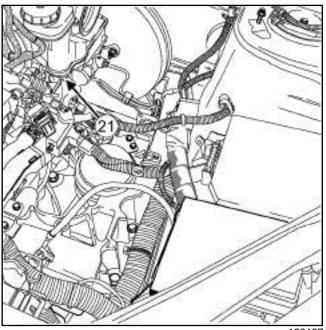
M9R



### □ Disconnect:

- the turbocharging pressure regulation valve actuating hose (16) ,
- the brake servo hose (17) from the non-return valve.
- ☐ Remove the bolt (18) from the turbocharging pressure regulation actuating solenoid valve support.
- ☐ Move aside the turbocharging pressure regulation actuating solenoid valve (19) and the turbocharging pressure regulation valve actuating hoses (16).
- □ Remove the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Loosen the air filter unit air outlet pipe clip located on the turbocharger side.
- ☐ Disconnect the air filter unit air outlet pipe (20) from the turbocharger.

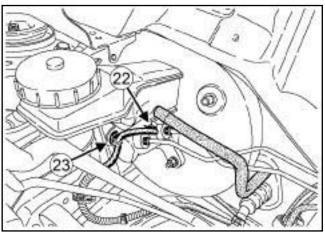
## LEFT-HAND DRIVE



129137

□ Disconnect the brake fluid level sensor connector (21).

## RIGHT-HAND DRIVE



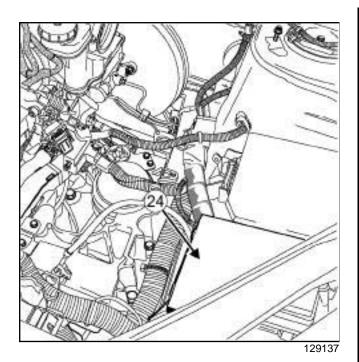
131248

- ☐ Disconnect the brake fluid level sensor connector (22).
- ☐ Unclip the brake fluid level sensor wiring harness at (23).

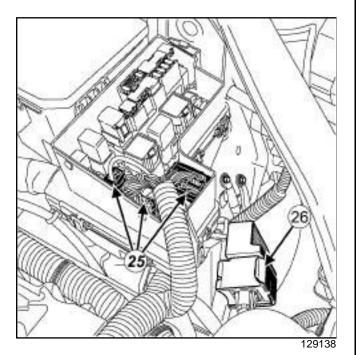
# Engine/gearbox assembly: Removal - Refitting

10A

M9R

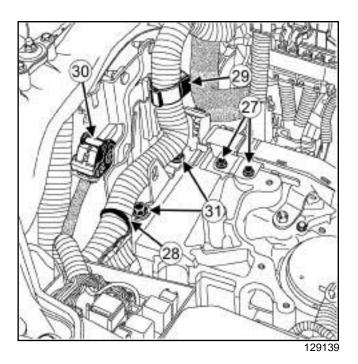


☐ Remove the fuse box cover (24).



### □ Disconnect:

- the fuse box wiring connectors (25),
- the pre-postheating unit connector (26) .



- ☐ Remove the bolts (27) from the wiring bracket.
- ☐ Unclip:
  - the wiring at (28),
  - the wiring at (29).

# 6 SPEED AUTO GBOX

- □ Disconnect the connector (30) from the automatic transmission computer.
- □ Remove:
  - the automatic transmission computer mounting bolts (31) ,
  - the earth cable,
  - the « automatic transmission computer mounting support » assembly.

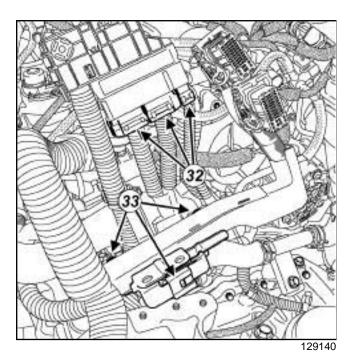
# 6 SPEED MANUAL GBOX

□ Remove the automatic transmission computer mounting.

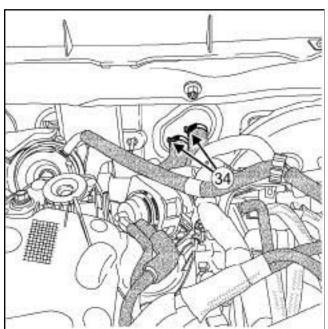
# Engine/gearbox assembly: Removal - Refitting

10A

M9R



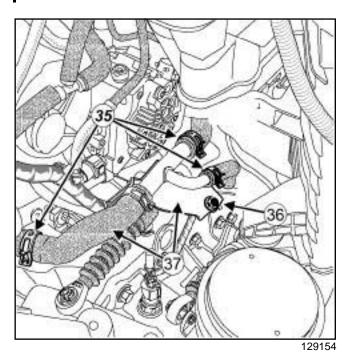
- ☐ Disconnect the battery protection fuse wiring connectors (32).
- ☐ Unclip the wiring harness from the brackets at (33).



129141

- □ Remove the heater matrix pipe clips (34) using the (Mot. 1448).
- ☐ Disconnect the heater matrix pipes.

# 6 SPEED MANUAL GBOX



#### □ Remove:

- the heater matrix coolant outlet pipe clips (35) using the tool (Mot. 1448),
- the heater matrix water outlet pipe bolt (36) .
- □ Disconnect the « heater matrix coolant outlet duct pipe » assembly (37) from the inlet distributor and the heater matrix coolant outlet pipe.

### ■ Unclip:

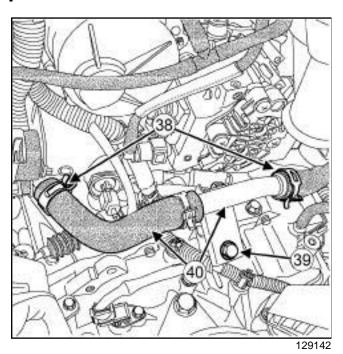
- the selector cable and the gear selector lever cable from the manual gearbox (see Manual gearbox selector cable: Removal - Refitting) (37A, Mechanical component controls).
- the gear shift cable and the gear shift lever cable from the manual gearbox (see **Manual gearbox selector cable: Removal Refitting**) (37A, Mechanical component controls).

# Engine/gearbox assembly: Removal - Refitting

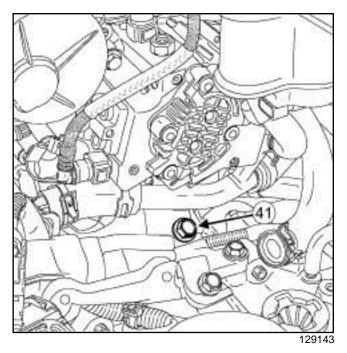
10A

M9R

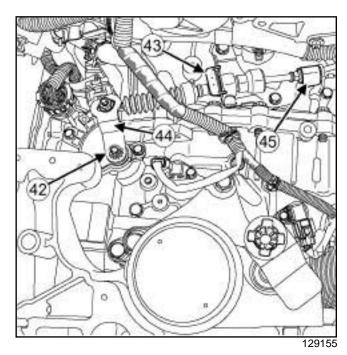
# 6 SPEED AUTO GBOX



- □ Remove:
  - -the heater matrix coolant outlet pipe clips (38) using the (Mot. 1448).
  - the heater matrix coolant outlet pipe bolt (39) .
- □ Disconnect the « heater matrix coolant outlet pipe duct » assembly (40) from the inlet distributor and the heater matrix coolant outlet pipe.



- ☐ Remove the heater matrix coolant inlet pipe bolt (41)
- ☐ Separate the coolant inlet hose from the heater matrix.



#### □ Remove:

- the nut (42) of the automatic gearbox control cable,
- the stop (43) from the control cable of the automatic gearbox.

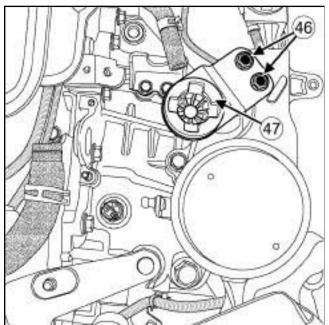
# ☐ Unclip:

- the automatic gearbox control cable from the multifunction switch lever (44) .

10A

M9R

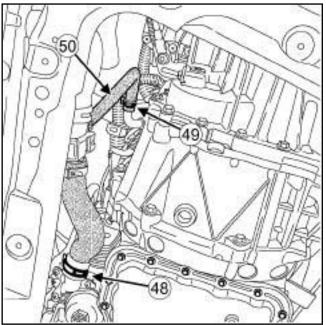
- the automatic gearbox control cable from the control cable upper bracket (45) .



12914

- ☐ Remove:
  - the bolts (46) from the air filter unit support,
  - the air filter unit support (47).

# 6 SPEED MANUAL GBOX



129156

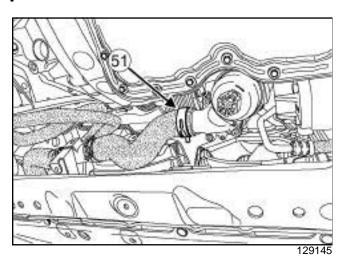
- ☐ Remove:
  - the oil filter unit coolant inlet pipe clip (48) using the (Mot. 1448),
  - the clip (49) from the coolant hose using the tool (Mot. 1448).
- ☐ Disconnect:
  - the oil filter unit coolant inlet pipe,
  - the coolant hose (50).

10A-53

# Engine/gearbox assembly: Removal - Refitting

M9R

## 6 SPEED AUTO GBOX

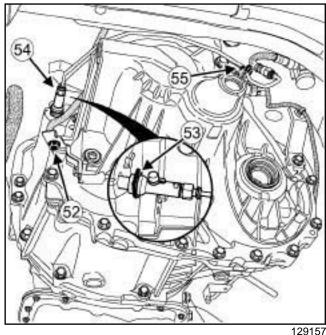


- ☐ Remove the oil filter unit coolant inlet pipe clip (51) using the tool (Mot. 1448).
- ☐ Disconnect the oil filter unit coolant inlet pipe.

#### □ Remove:

- the front wheels (see Wheel: Removal Refitting) (35A, Wheels and tyres).
- -the front splash guards (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection).
- the front left-hand wheel driveshaft (see Front lefthand wheel driveshaft: Removal - Refitting) (29A, Transmission).
- the front right-hand wheel driveshaft (see Front right-hand wheel driveshaft: Removal - Refitting) (29A, Transmission).
- the electric coolant pump (see 19A, Cooling, Electric water pump: Removal - Refitting, page 19A-**57**)
- -the front axle subframe (see Front axle sub-frame: Removal - Refitting) (31A, Front axle components).

## 6 SPEED MANUAL GBOX



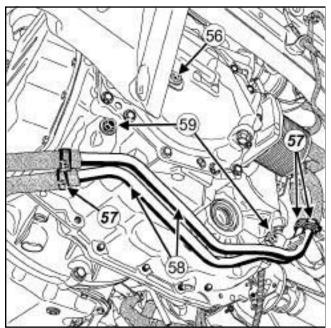
- □ Remove:
  - the earth strap bolt (52),
  - the earth strap,
  - the clutch control pipe clip (53).
- □ Disconnect the clutch control pipe (54) from the manual gearbox.
- ☐ Unclip the clutch control pipe from its clip (55).
- ☐ Drain the oil from the clutch control pipe.

Engine/gearbox assembly: Removal - Refitting

10A

M9R

# 6 SPEED AUTO GBOX



129146

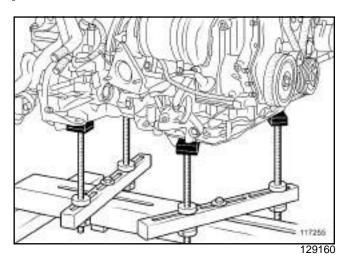
- □ Remove:
  - the earth strap bolt (56),
  - the earth strap.
- ☐ Remove the automatic gearbox coolant hose clips (57) using the tool.
- ☐ Disconnect the automatic gearbox coolant hoses from the automatic gearbox coolant pipe (58).
- □ Remove:
  - the automatic gearbox coolant pipe bolts (59),
  - the automatic gearbox coolant pipe.
- ☐ Remove the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21)

# 4X4 TRANSMISSION

☐ Remove the transfer box (see **Transfer box: Removal - Refitting**) (29A, Driveshafts).

# II - OPERATION FOR REMOVAL OF PART CONCERNED

## 6 SPEED MANUAL GBOX

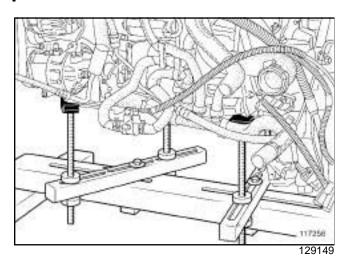


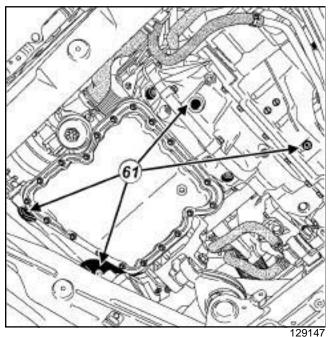
□ Place the engine and the gearbox on the rubber pads of the tool (Mot. 1390) at points (60).

10A

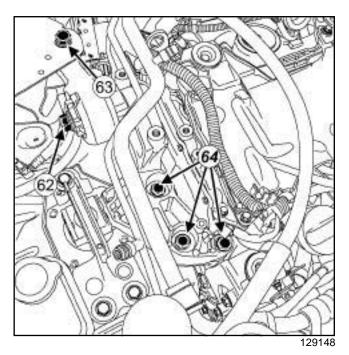
M9R

# 6 SPEED AUTO GBOX





□ Place the engine and the gearbox on the rubber pads of the tool (Mot. 1390) at points (61).



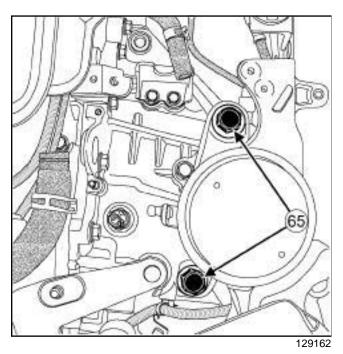
## ☐ Remove:

- the upper engine tie-bar bolt and washer (62),
- the upper engine tie-bar bolt (63) from the body,
- the upper engine tie-bar,
- the right-hand suspended engine mounting bolts (64) .

Engine/gearbox assembly: Removal - Refitting

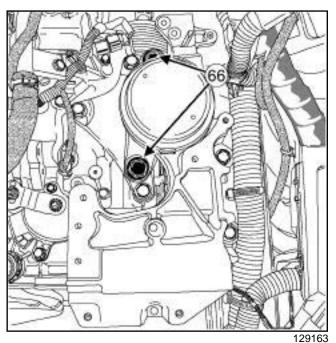
M9R

# 6 SPEED MANUAL GBOX



☐ Remove the left-hand suspended engine mounting bolts (65) from the manual gearbox.

# 6 SPEED AUTO GBOX



- ☐ Remove the left-hand suspended engine mounting bolts (66) from the automatic gearbox.
- ☐ Remove the « engine gearbox assembly » .
- ☐ Raise the vehicle.
- ☐ Move the « engine gearbox assembly » aside.

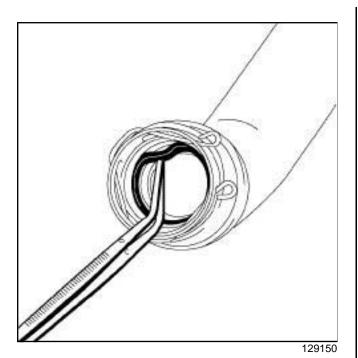
## **REFITTING**

### I - REFITTING PREPARATION OPERATION

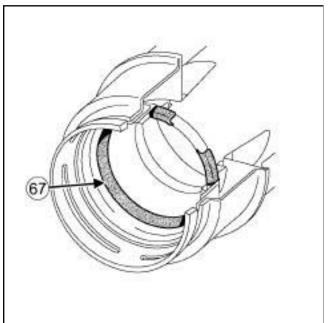
- □ Always replace:
  - the intercooler air inlet pipe seal,
  - the compressor pipe union seals,
  - the engine tie-bar washer,

# Engine/gearbox assembly: Removal - Refitting

M9R



☐ Remove the intercooler air inlet pipe seal using a.



☐ Refit the new intercooler air inlet pipe seal (67).

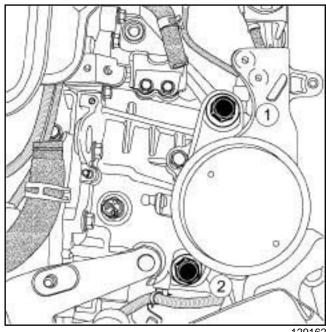
## Note:

Check that the seal on the intercooler air inlet pipe is fitted the correct way round.

## **II - REFITTING OPERATION FOR PART CONCERNED**

- ☐ Place the « engine-gearbox » assembly in the vehi-
- ☐ Lower the vehicle.

# 6 SPEED MANUAL GBOX



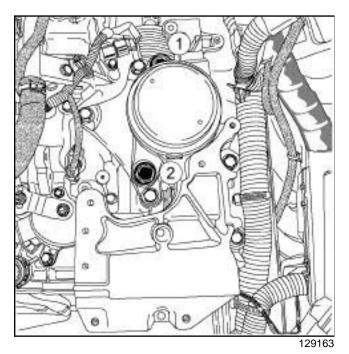
- ☐ Refit the left-hand suspended engine bolts located on the manual gearbox.
- ☐ Torque tighten in order the left-hand suspended engine mounting bolts (110 N.m).

# Engine/gearbox assembly: Removal - Refitting

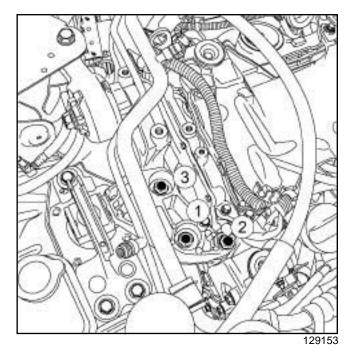


M9R

## 6 SPEED AUTO GBOX



- ☐ Refit the left-hand suspended engine bolts located on the automatic gearbox.
- ☐ Torque tighten in order the left-hand suspended engine mounting bolts (110 N.m) located on the automatic gearbox.



- ☐ Refit the right-hand suspended engine mounting bolts located on the engine.
- □ Torque tighten in order the right-hand suspended engine mounting bolts (55 N.m) located on the engine.
- Refit:
  - the upper engine tie-bar,
  - the upper engine tie-bar bolt on the body,
  - the new upper engine tie-bar washer,
  - the upper engine tie-bar bolt on the engine.
- ☐ Tighten to torque and in order:
  - the **upper engine tie-bar bolt (120 N.m)** on the engine,
  - the **upper engine tie-bar bolt (120 N.m)** on the body.
- ☐ Remove the tool (Mot. 1390).

### **III - FINAL OPERATION**

## 4X4 TRANSMISSION

☐ Refit the transfer box (see **Transfer box: Removal - Refitting**) (29A, Driveshafts).

□ Refit the particle filter (see 19B, Exhaust, Particle filter: Removal - Refitting, page 19B-21).

# Engine/gearbox assembly: Removal - Refitting

10A

M9R

	liner: Removal - Refitting) (55A, Exterior protec-
6 SPEED MANUAL GBOX	tion).
☐ Clip the clutch control pipe onto its clip (55).	- the front wheels (see Wheel: Removal - Refitting)
☐ Connect the clutch control pipe onto the manual gearbox.	(35A, Wheels and tyres).
□ Refit	6 SPEED MANUAL GBOX
- the clutch control pipe clip (53)	☐ Connect:
- the earth strap,	- the coolant hose <b>(50)</b> ,
-the earth strap bolt (52).	<ul> <li>the oil filter unit coolant inlet pipe onto the oil filter unit.</li> </ul>
☐ Torque tighten the earth strap bolt (14 N.m).	□ Refit:
	- the coolant hose clip <i>(49)</i> using the <b>(Mot. 1448)</b> ,
	<ul> <li>the clip (48) on the oil filter unit coolant inlet pipe using the (Mot. 1448).</li> </ul>
6 SPEED AUTO GBOX	
□ Refit:	
- the automatic gearbox coolant pipe,	C CREED ALITO CROY
-the automatic gearbox coolant pipe bolts (59).	6 SPEED AUTO GBOX
☐ Torque tighten the automatic gearbox coolant pipes (25 N.m).	☐ Connect the oil filter unit coolant inlet pipe onto the oil filter unit.
☐ Connect the automatic gearbox coolant hoses onto the automatic gearbox coolant pipes (58).	☐ Refit the clip (51) on the oil filter unit coolant inlet pipe using the (Mot. 1448).
☐ Refit the automatic gearbox coolant hose clips using the (Mot. 1448).	
□ Refit:	□ Refit:
- the earth strap,	- the air filter unit support (47),
- the earth strap bolt <i>(56)</i>	<ul> <li>the air filter unit mounting bolts (46).</li> <li>Torque tighten the air filter unit support bolts (10)</li> </ul>
☐ Torque tighten the earth strap bolt (14 N.m).	N.m).
1	
□ Refit:	
<ul> <li>- the front axle sub-frame: Removal - Refitting) (31A, Front axle components),</li> </ul>	
<ul> <li>- the electric coolant pump (see 19A, Cooling, Electric water pump: Removal - Refitting, page 19A-57)</li> </ul>	
- the front right-hand wheel driveshaft (see <b>Front right-hand wheel driveshaft: Removal - Refitting</b> ) (29A, Transmission).	

- the front left-hand wheel driveshaft (see Front lefthand wheel driveshaft: Removal - Refitting)

(29A, Transmission).

Engine/gearbox assembly: Removal - Refitting

10A

M9R

6 SPEED MANUAL GBOX	6 SPEED AUTO GBOX
<ul> <li>Clip on:         <ul> <li>the selector cable and the gear selector lever cable from the manual gearbox (see Manual gearbox selector cable: Removal - Refitting) (37A, Mechanical component controls),</li> <li>the selector cable and the gear selector lever cable from the manual gearbox (see Manual gearbox selector cable: Removal - Refitting) (37A, Mechanical component controls).</li> </ul> </li> </ul>	<ul> <li>□ Clip on:         <ul> <li>the automatic gearbox control cable onto the control cable upper bracket,</li> <li>the automatic gearbox control cable onto the multifunction switch lever.</li> </ul> </li> <li>□ Refit:</li> </ul>
□ Connect the «heater matrix coolant outlet pipe - duct assembly » (37) onto the inlet distributor and the heater matrix coolant outlet pipe.	<ul><li>the automatic gearbox control cable nut,</li><li>the automatic gearbox control cable stop.</li></ul>
<ul> <li>Refit the heater matrix coolant outlet pipe bolt (36).</li> <li>Torque tighten the heater matrix coolant outlet pipe bolt (25 N.m).</li> <li>Refit the heater matrix coolant outlet pipe clips (35)</li> </ul>	<ul> <li>□ Torque tighten the automatic gearbox control cable nut (14 N.m).</li> <li>□ Refit the heater matrix coolant inlet pipe bolt (41).</li> </ul>
using the (Mot. 1448).	<ul> <li>□ Torque tighten the heater matrix inlet pipe bolt (25 N.m).</li> <li>□ Connect the « heater matrix coolant outlet pipe duct » (40) assembly onto the inlet distributor and the heater matrix coolant outlet hose.</li> <li>□ Refit the heater matrix coolant outlet pipe bolt (39).</li> <li>□ Torque tighten the heater matrix coolant outlet pipe bolt (25 N.m).</li> <li>□ Refit the heater matrix water outlet hose clips (38) using the tool (Mot. 1448).</li> </ul>
	<ul> <li>□ Connect the heater matrix pipes.</li> <li>□ Refit the heater matrix pipe clips (34) using the (Mot. 1448).</li> <li>□ Clip the wiring onto the brackets (33).</li> <li>□ Connect the wiring connectors (32) to the battery protection fuse.</li> <li>6 SPEED MANUAL GBOX</li> </ul>

☐ Refit the automatic gearbox computer mounting.

# Engine/gearbox assembly: Removal - Refitting

10A

M9R Refit the bolt on the turbocharging pressure regulation actuating solenoid valve support. 6 SPEED AUTO GBOX ☐ Torque tighten the **bolt on the turbocharging pres-**□ Fit: sure regulation actuating solenoid valve support -the « automatic gearbox computer - mounting (10 N.m) support » assembly, □ Connect: - the earth cable. - the brake servo pipe to the non-return valve, ☐ Refit the automatic gearbox computer mounting - the turbocharging pressure regulation valve actuabolts (31). ting hose (16). ☐ Torque tighten the automatic gearbox computer mounting bolts (27 N.m). ☐ Refit: ☐ Connect the automatic gearbox computer connec-- the manual priming pump support, tor. - the support bolt of the manual priming pump. ☐ Torque tighten the support bolt of the manual priming pump (12 N.m). Clip on: ☐ Clip the wiring on the manual priming pump support - the wiring at (30), - the wiring at (29). □ Connect the fuel return quick-release union of the □ Refit the wiring bracket bolts (28). fuel pipe leading to the tank. ☐ Torque tighten the wiring bracket bolts (10 N.m). □ Refit: □ Connect: - the manual priming pump (see 13A, Fuel supply, - the pre-postheating unit connector (26), Manual priming pump: Removal - Refitting, page **13A-1**), - the wiring connectors (25) in the fuse box. - the fuel filter. □ Refit the fuse box cover. ☐ Connect the cooling radiator top hose. LEFT-HAND DRIVE ☐ Refit the cooling radiator top hose clip using the tool (Mot. 1448). ☐ Connect the brake fluid level sensor connector (21). Connect the expansion bottle hose. ☐ Refit the expansion bottle clip (12) using the (Mot. RIGHT-HAND DRIVE □ Connect the intercooler air outlet pipe (11) to the damper valve. ☐ Clip on the brake fluid level sensor wiring at (23). □ Connect the brake fluid level sensor connector (22). ☐ Refit the intercooler air outlet pipe bolt (10). □ Torque tighten: - the intercooler air outlet pipe bolt (8 N.m), ☐ Refit the air filter box (see 12A, Fuel mixture, Air fil-- the clip of the intercooler air outlet pipe clip (6 ter unit: Removal - Refitting, page 12A-8). N.m) using the tool (Mot. 1608).

☐ Place the turbocharging pressure regulation actuating solenoid valve support on the air filter unit.

☐ Connect the air filter unit air outlet pipe to the turbo-

☐ Torque tighten the air filter unit air outlet pipe

clips (5 N.m) using the tool (Mot. 1608).

charger and the air filter unit.

☐ Clip the fuel pipes onto the fuel pipe support (7).

☐ Torque tighten the **fuel pipe support bolt (10 N.m)**.

Refit the fuel pipe support.

☐ Refit the fuel pipe support bolt (8).

Engine/gearbox assembly: Removal - Refitting

10A

M9R ☐ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10). AIR CON 01 or AIR CON 02 Refit the engine undertray. □ Remove the blanking plugs from the compressor and the compressor pipe unions. AIR CON 01 or AIR CON 02 ☐ Refit the new compressor pipe union seals. ☐ Fill the refrigerant circuit using a refrigerant char-☐ Connect the compressor pipe unions onto the comging station (see Coolant circuit Draining - Refilpressor. ling) (62A, Air conditioning). ☐ Refit the compressor pipe union bolts. ☐ Torque tighten the compressor pipe union bolts (4 N.m). Refit: - the battery tray (see Battery tray: Removal - Refitting) (80A, Battery), ☐ Connect the «intercooler air inlet pipe-duct» as-- the battery (see Battery: Removal - Refitting) sembly (5). (80A, Battery), ☐ Torque tighten the intercooler air inlet pipe clip (6 - the air inlet sleeve to the air filter unit, N.m) using the tool (Mot. 1608). - the air inlet sleeve clips, ☐ Refit the protector plate on the injector rail protector. - the engine cover. ☐ Rotate the intercooler air inlet pipe to refit the clip in its housing. ☐ Clip the intercooler air inlet pipe onto the turbochar-☐ Refit the intercooler air inlet pipe bolt to the fuel supply pipe bracket. ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m). 6 SPEED MANUAL GBOX ☐ Fill with oil: -the manual gearbox (see Manual gearbox oil: **Draining - Refilling**) (21A, Manual gearbox). - the brake fluid reservoir. ☐ Bleed the hydraulic clutch control (see Clutch circuit: Bleeding) (37A, Mechanical component controls). 6 SPEED AUTO GBOX ☐ Fill the automatic gearbox oil (see Automatic gearbox oil: Draining - Refilling) (23A, Automatic transmission) ☐ Fill the cooling system (see 19A, Cooling, Cooling) circuit: Draining - Refilling, page 19A-10) .



M9R	
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2TR, and FK0 or FK8

Essential special tooling		
Mot. 1869	Pliers for disconnecting the fuel circuit	
Mot. 1448	Long nose pliers for hose clips.	
Mot. 1390	Support for removing/refitting the engine - gearbox assembly.	

Essential equipment
refrigerant charging station
diagnostic tool

Tightening torques ▽	
left-hand suspended engine mounting bolts	50 N.m
right-hand suspended engine mounting bolts	55 N.m
earth cable bolt on the automatic gearbox	21 N.m
air conditioning pipe bolt	4 N.m
air conditioning pipe nut	4 N.m
earth cable bolt on the alternator support	7 N.m
bracket bolts	21 N.m
engine wiring support bolts	21 N.m

## **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see Engine: Precautions for repair) .

### **IMPORTANT**

Wear protective gloves during the operation.

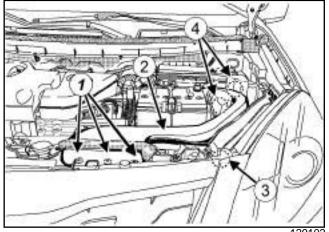
## **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

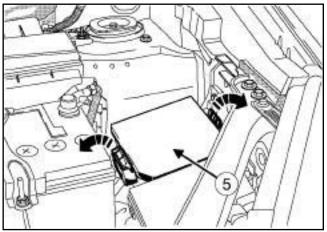
☐ Position the vehicle on a two-post lift (see Vehicle: Towing and lifting) (02A, Lifting equipment).

## **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.



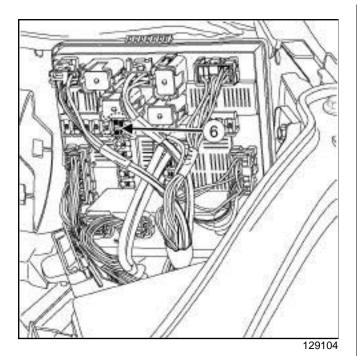
- ☐ To release the fuel pressure, remove:
  - the air inlet sleeve clips (1),
  - the air inlet sleeve (2) from the air resonator (3) and the air filter unit (4).



☐ Remove the cover (5) from the Protection and Switching Unit.

10A

2TR, and FK0 or FK8



- □ Remove the fuse (6) of the fuel pump(F13) (15A).
- ☐ Release the fuel pressure of the fuel supply pipe.

## Note:

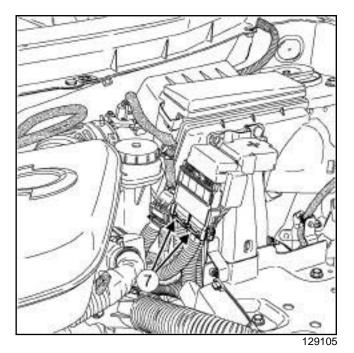
After switching the engine off, start it again two or three times to fully release the fuel pressure.

## ☐ Drain:

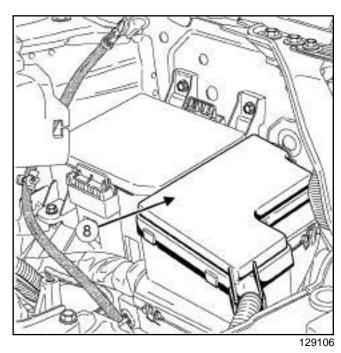
- -the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10)
- -the automatic gearbox oil (see **Automatic gearbox oil: Draining Refilling**) (23A, Automatic transmission),
- the refrigerant circuit using a refrigerant charging station (see Coolant circuit Draining Refilling) (62A, Air conditioning).

## □ Remove:

- the engine cover,
- -the battery (see **Battery: Removal Refitting**) (80A, Battery).



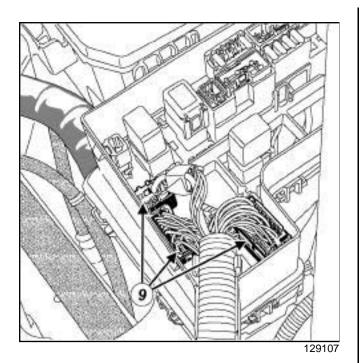
- ☐ Disconnect the battery positive terminal wiring connectors (7).
- □ Remove the battery tray (see **Battery**: **Removal Refitting**) (80A, Battery).



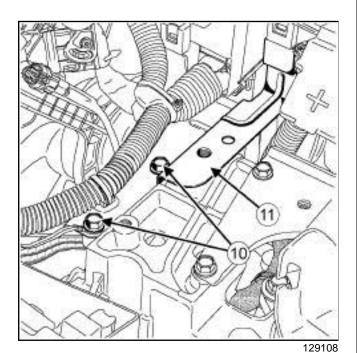
☐ Remove the engine fuse and relay box cover (8).

10A

2TR, and FK0 or FK8



☐ Disconnect the engine fuse and relay box wiring connectors (9).

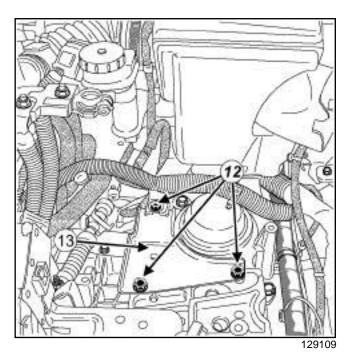


☐ Remove:

- the engine wiring support bolts (10),
- the engine wiring support (11) .

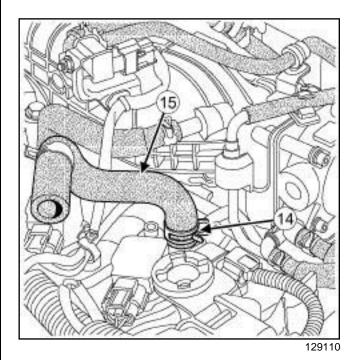
#### Note:

Attach the engine wiring temporarily on the engine side.



#### □ Remove:

- the bolts (12) from the bracket,
- the bracket (13),
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
- the rocker cover air resonator (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).



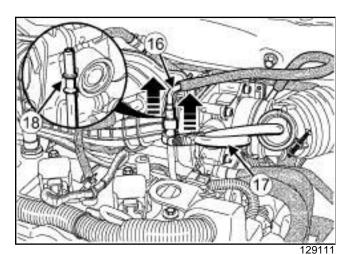
#### □ Remove:

- the breather hose clip (14),

10A

2TR, and FK0 or FK8

- the breather hose (15),
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22).



Remove the plug of the fuel supply union.

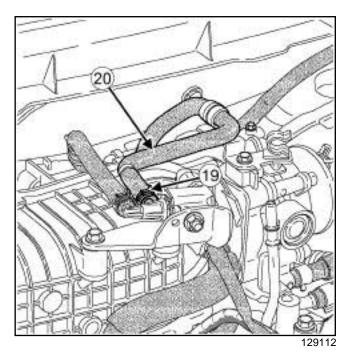


During this operation, be sure to:

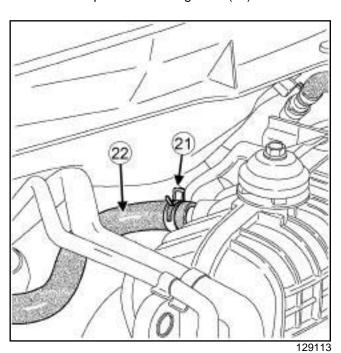
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.
- □ Disconnect the quick-release union (16) using the tool (Mot. 1869) (17).

Note:

Insert the tool (Mot. 1869) on the second retainer (18).



- □ Disconnect:
  - the fuel vapour rebreathing hose clip (19),
  - the fuel vapour rebreathing hose (20) .



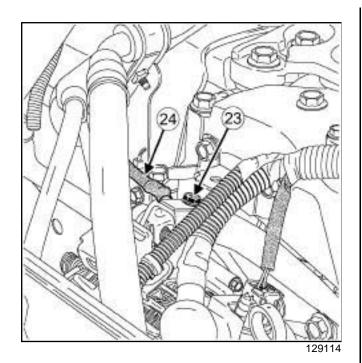
☐ Disconnect:

- the clip (21) from the brake servo vacuum pipe,
- the vacuum pipe (22) from the brake servo.

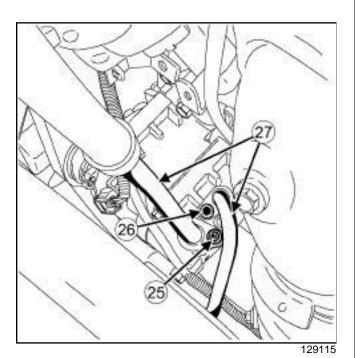
### Engine/gearbox assembly: Removal - Refitting

10A

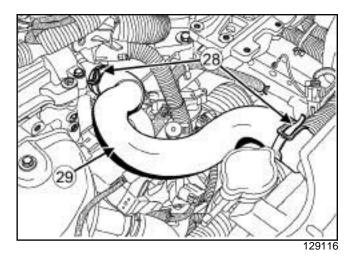
2TR, and FK0 or FK8



- ☐ Remove the alternator support earth cable bolt (23) .
- □ Disconnect the earth cable (24) from the alternator support.

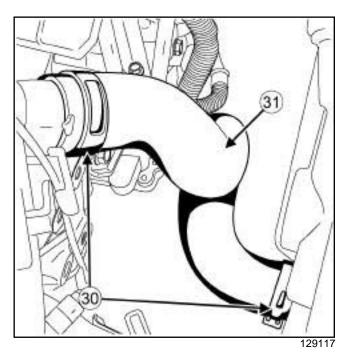


- □ Remove:
  - the air conditioning pipe nut (25),
  - the air conditioning pipe bolt (26).
- □ Disconnect the air conditioning pipes (27) from the air conditioning compressor.
- ☐ Fit plugs into the openings.



#### □ Remove:

- the radiator upper hose clips (28) using the tool (Mot. 1448)
- the radiator upper hose (29).



#### Note:

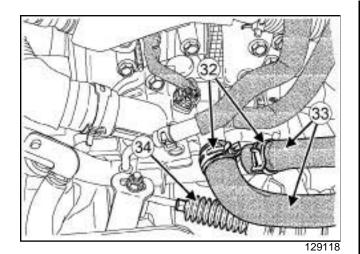
Take care with the remaining coolant.

#### ☐ Remove:

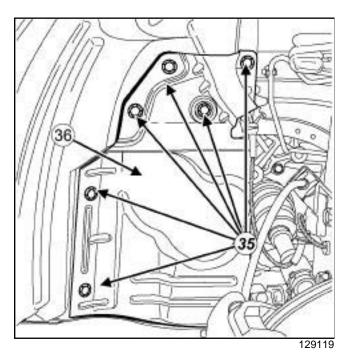
- the radiator lower hose clips (30) using the tool (Mot. 1448),
- the radiator lower hose (31).

10A

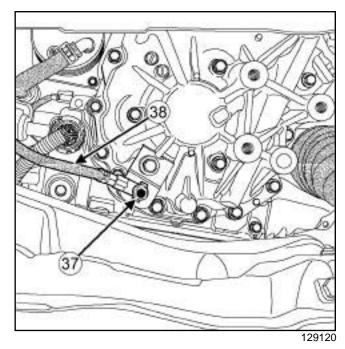
2TR, and FK0 or FK8



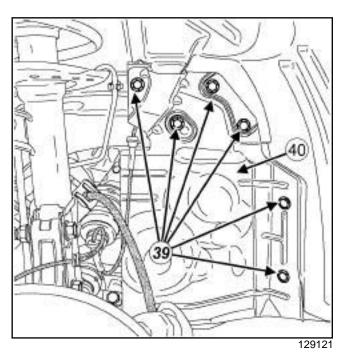
- ☐ Remove the clips (32) from the heater hoses.
- □ Disconnect:
  - -the heater hoses (33),
  - -the automatic gearbox control cable *(34)* (see Automatic gear control cable: Removal Refitting) (37A, Mechanical component controls).
- □ Remove the front wheels (see Wheel: Removal Refitting) (35A, Wheels and tyres).



- ☐ Unclip the left-hand splash guard clips (35).
- □ Remove the left-hand splash guard (36).



- ☐ Remove the automatic gearbox earth cable bolt (37)
- ☐ Disconnect the automatic gearbox earth wire (38).



- ☐ Unclip the right-hand splash guard clips (39).
- □ Remove:
  - the right-hand splash guard (40),
  - the connector pipe (see 19B, Exhaust, Connector pipe: Removal - Refitting, page 19B-16) ,
  - the front left-hand driveshaft (see Front left-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),

10A

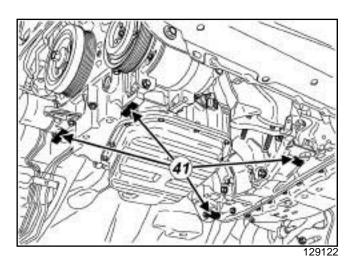
2TR, and FK0 or FK8

- -the front right-hand driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Driveshaft),
- -the rear suspended engine mounting (see 19D, Engine mounting, Lower engine tie-bar: Removal - Refitting, page 19D-26),
- -the front axle sub-frame: Removal Refitting) (31A, Front axle components).

#### FK8

- ☐ Uncouple the longitudinal driveshaft from the transfer box (see **Propshaft: Removal Refitting**) (29A, Driveshafts).
- ☐ Secure the longitudinal driveshaft to the control cable bracket using a cord.
- ☐ Remove the transfer box (see **Transfer box: Removal Refitting**) (29A, Driveshafts).

## II - OPERATION FOR REMOVAL OF PART CONCERNED

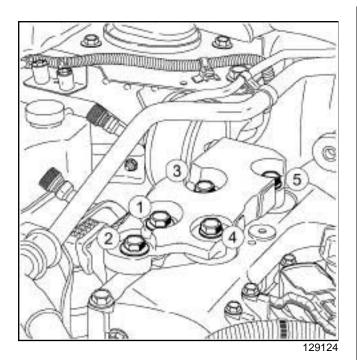


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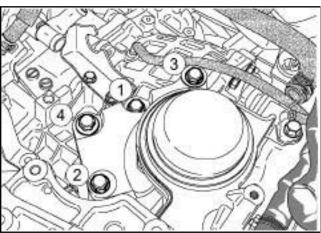
□ Support the « engine-gearbox » assembly on the tool (Mot. 1390) at (41).

**10A** 

2TR, and FK0 or FK8



☐ Remove in order the right-hand suspended engine mounting bolts.



129125

☐ Remove in order the left-hand suspended engine mounting bolts.

#### Note:

Check that no part is interfering with the vehicle side.

Before and during lifting, always check that the wiring remains connected.

During removal, always take care to prevent the vehicle from falling off the lift because of changes in its centre of gravity.

□ Raise the lift to remove the « engine-gearbox » assembly.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ For standard engine replacements (see Engine: Parts and consumables for the repair work) (Technical Note 6045A, 10A, Engine and peripherals).
- □ Always replace the O-rings on the air conditioning pipes.

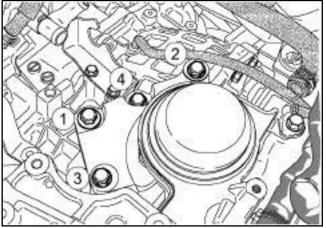
## II - REFITTING OPERATION FOR PART CONCERNED

#### Note:

Never allow engine oil to come into contact with the suspended engine mounting. Do not damage the suspended engine mountings.

Check that every suspended engine mounting is fitted correctly and tighten the nuts and bolts.

☐ Fit the « engine - gearbox » assembly into the engine compartment using the tool (Mot. 1390).



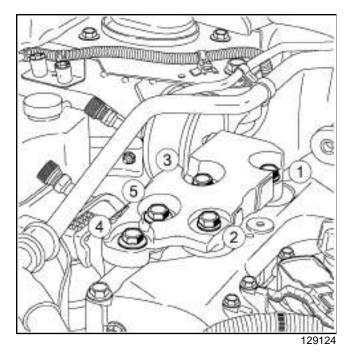
129125

- Refit in order the left-hand suspended engine mounting bolts.
- □ Torque tighten in order the left-hand suspended engine mounting bolts (50 N.m).

### Engine/gearbox assembly: Removal - Refitting

10A

2TR, and FK0 or FK8



- Refit in order the right-hand suspended engine mounting bolts.
- ☐ Torque tighten in order the right-hand suspended engine mounting bolts (55 N.m).

#### **III - FINAL OPERATION.**

#### FK8

- Refit:
  - -the transfer box (see Transfer box: Removal Refitting) (29A, Driveshafts),
  - -the longitudinal driveshaft on the transfer box (see **Propshaft: Removal Refitting**) (29A, Driveshafts).

#### □ Refit:

- -the front right-hand driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),
- the front left-hand driveshaft (see Front left-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),
- -the connector pipe (see 19B, Exhaust, Connector pipe: Removal - Refitting, page 19B-16) ,
- -the front axle sub-frame: Removal Refitting) (31A, Front axle components),

- the rear suspended engine mounting (see 19D, Engine mounting, Lower engine tie-bar: Removal - Refitting, page 19D-26),
- the right-hand splash guard.
- Clip on the right-hand splash guard clips.
- ☐ Connect the earth cable on the automatic gearbox.
- ☐ Refit the earth cable bolt on the automatic gearbox.
- ☐ Torque tighten the earth cable bolt on the automatic gearbox (21 N.m).
- ☐ Refit the left-hand splash guard.
- ☐ Clip on the left-hand splash guard clips.
- □ Refit the front wheels (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).
- □ Connect:
  - the automatic gearbox control cable (see Automatic gear control cable: Removal Refitting)
     (37A, Mechanical component controls)
  - the heater hoses.
- □ Refit:
  - the heater hose clips,
  - the radiator lower hose,
  - the radiator lower hose clips,
  - the radiator upper hose,
  - the radiator upper hose clips.
- ☐ Remove the caps from the apertures.
- ☐ Connect the air conditioning pipes on the air conditioning compressor.
- ☐ Refit:
  - the bolt from the air conditioning pipe,
  - the air conditioning pipe nut.
- ☐ Torque tighten:
  - the air conditioning pipe bolt (4 N.m).
  - the air conditioning pipe nut (4 N.m).
- ☐ Connect the earth cable on the alternator support.
- ☐ Refit the earth cable bolt on the alternator support.
- ☐ Torque tighten the earth cable bolt on the alternator support (7 N.m).
- □ Refit:
  - brake servo vacuum pipe,
  - the clip on the brake servo vacuum pipe,
  - the fuel vapour rebreathing pipe,

10A

#### 2TR, and FK0 or FK8

- the fuel vapour rebreathing hose clip.
- Connect the quick-release union on the fuel supply pipe.

#### Note:

Check the connection of the quick-release union by pulling on the part.

#### □ Refit:

- the plug of the fuel supply union,
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal Refitting, page 12A-22),
- the breather hose,
- the breather hose clip,
- -The air resonator on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
- the bracket (13),
- the bracket bolts.
- ☐ Torque tighten the bracket bolts (21 N.m).

#### ☐ Refit:

- the engine wiring support,
- the engine wiring support bolts.
- ☐ Torque tighten the **engine wiring support bolts (21 N.m)**.
- Connect the engine fuse and relay box wiring connectors.

#### Refit:

- the fuse and relay box cover,
- -the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery).
- Connect the battery positive terminal wiring connectors.

#### □ Refit:

- -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
- the engine cover,
- the fuel pump fuse,
- the Protection and Switching Unit cover,
- the air inlet sleeve on the air filter unit and on the air resonator,
- the air inlet sleeve clips.

#### □ Refill:

- the refrigerant circuit using a refrigerant charging station (see Coolant circuit Draining - Refilling) (62A, Air conditioning).
- the automatic gearbox oil (see Automatic gearbox oil: Draining - Refilling) (23A, Automatic transmission),
- the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).
- □ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

#### Note:

When replacing the engine, carry out the programming using the diagnostic tool (see Fault finding - Replacement of components) (17B, Petrol injection).

2TR, and ND5 or ND8

Essential special tooling			
Mot. 1869	Pliers for disconnecting the fuel circuit		
Mot. 1448	Long nose pliers for hose clips.		
Mot. 1390	Support for removing/refitting the engine - gearbox assembly.		

Essential equipment
refrigerant charging station
diagnostic tool

Tightening torques ♡	
rigittering torques w	
bolts and nuts of the left-hand suspended engine mounting	105 N.m
left-hand suspended engine mounting nut	65 N.m
right-hand suspended engine mounting bolts	55 N.m
earth cable bolt on the manual gearbox	14 N.m
air conditioning pipe bolt	4 N.m
air conditioning pipe nut	4 N.m
earth cable bolt on the alternator support	7 N.m
bracket bolts	21 N.m
engine wiring support bolts	21 N.m

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see Engine: Precautions for repair) .

#### **IMPORTANT**

Wear protective gloves during the operation.

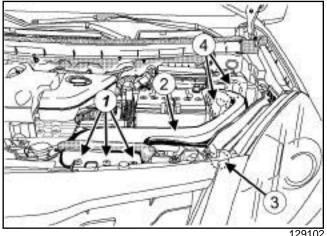
#### **REMOVAL**

#### I - OPERATION FOR REMOVAL OF PART **CONCERNED**

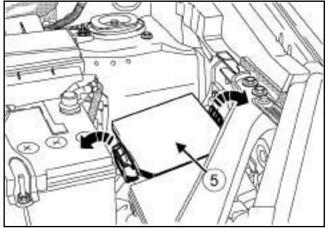
☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.



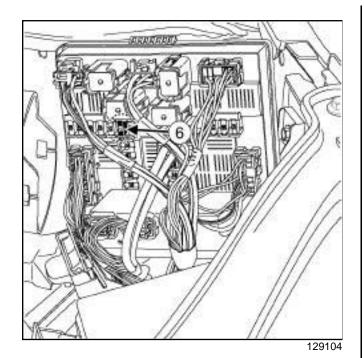
- ☐ To release the fuel pressure, remove:
  - the air inlet sleeve clips (1),
  - the air inlet sleeve (2) from the air resonator (3) and the air filter unit (4).



☐ Remove the cover (5) from the Protection and Switching Unit.

10A

2TR, and ND5 or ND8



- □ Remove the fuse (6) of the fuel pump(F13) (15A).
- ☐ Release the fuel pressure of the fuel supply pipe.

#### Note:

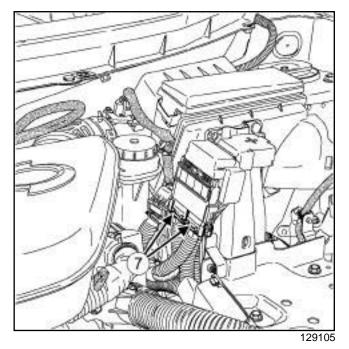
After switching the engine off, start it again two or three times to fully release the fuel pressure.

#### ☐ Drain:

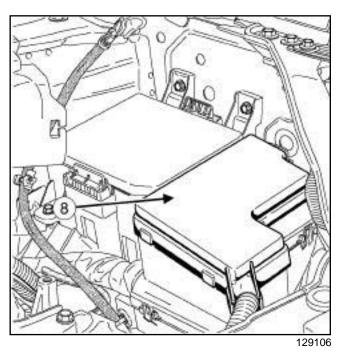
- -the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10)
- the manual gearbox oil (see **Manual gearbox oil: Draining Refilling**) (21A, Manual gearbox),
- the refrigerant circuit using a refrigerant charging station (see Coolant circuit Draining Refilling) (62A, Air conditioning).

#### □ Remove:

- the engine cover,
- -the battery (see **Battery: Removal Refitting**) (80A, Battery).



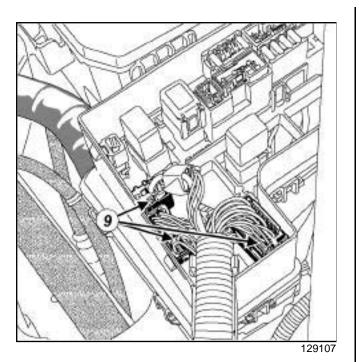
- ☐ Disconnect the battery positive terminal wiring connectors (7).
- □ Remove the battery tray (see Battery tray: Removal Refitting) (80A, Battery).



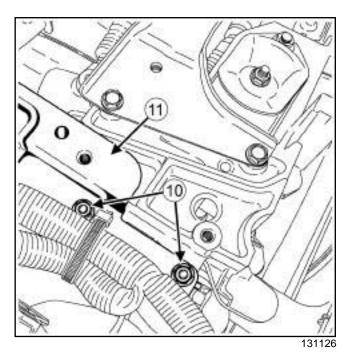
☐ Remove the engine fuse and relay box cover (8).

10A

2TR, and ND5 or ND8



☐ Disconnect the engine fuse and relay box wiring connectors (9).



#### □ Remove:

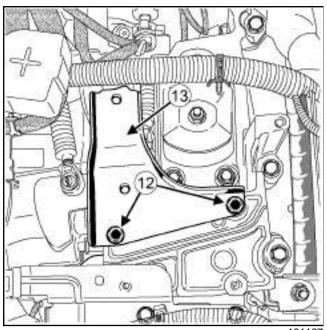
- the engine wiring support bolts (10),
- the engine wiring support (11) .
- the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).

#### Note:

Attach the engine wiring temporarily on the engine side.

10A

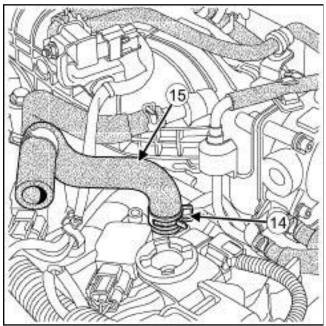
2TR, and ND5 or ND8



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#### □ Remove:

- the bolts (12) from the bracket,
- -the bracket (13),
- -the rocker cover air resonator (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3)

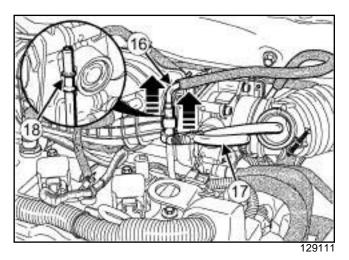


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#### □ Remove:

- the breather hose clip (14),
- the breather hose (15),

 the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22).



☐ Remove the plug of the fuel supply union.

#### **IMPORTANT**

During this operation, be sure to:

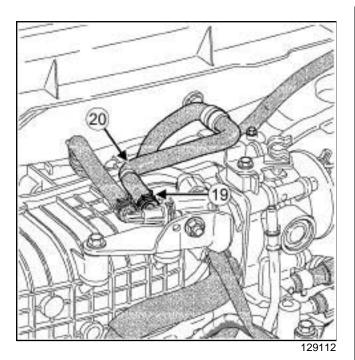
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.
- □ Disconnect the quick-release union (16) from the fuel supply pipe using the tool (Mot. 1869) (17).

#### Note:

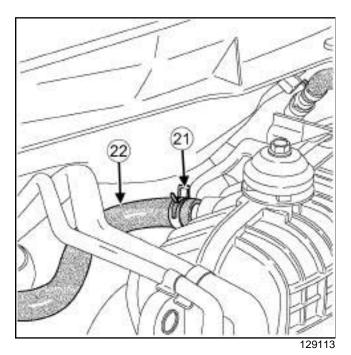
Insert the tool (Mot. 1869) on the second retainer (18).

10A

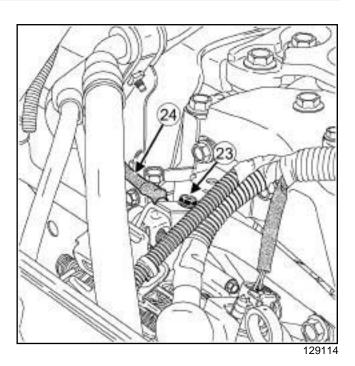
2TR, and ND5 or ND8



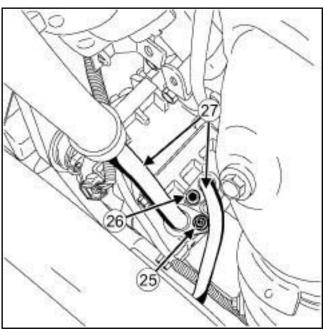
- □ Disconnect:
  - the fuel vapour rebreathing hose clip (19),
  - the fuel vapour rebreathing hose (20) .



- □ Disconnect:
  - the clip (21) from the brake servo vacuum pipe,
  - the vacuum pipe (22) from the brake servo.



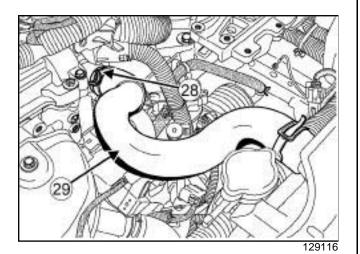
- ☐ Remove the alternator support earth cable bolt (23).
- □ Disconnect the alternator support cable (24).



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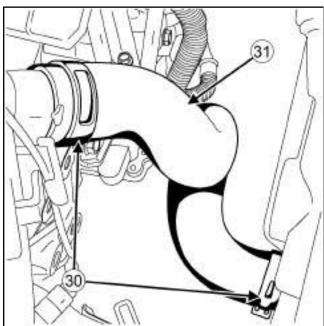
- □ Remove:
  - the air conditioning pipe nut (25),
  - the air conditioning pipe bolt (26) .
- □ Disconnect the air conditioning pipes (27) from the air conditioning compressor.
- ☐ Fit plugs into the openings.

2TR, and ND5 or ND8



□ Remove:

- -the radiator upper hose clips (28) using the tool (Mot. 1448)
- the radiator upper hose (29) .



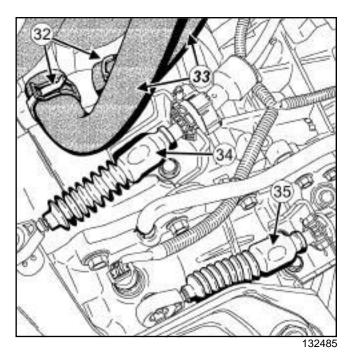
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Note:

Take care with the remaining coolant.

#### ☐ Remove:

- -the radiator lower hose clips (30) using the tool (Mot. 1448),
- the radiator lower hose (31).

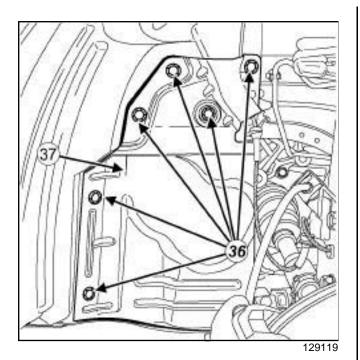


☐ Remove the clips (32) from the heater hoses.

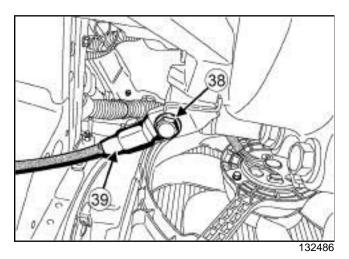
#### ☐ Disconnect:

- the heater hoses (33),
- the gear lever cable *(34)* (see Automatic gear control cable: Removal Refitting) (37A, Mechanical component controls).
- the selector lever cable (35) (see Automatic gear control cable: Removal - Refitting) (37A, Mechanical component controls).
- □ Remove the front wheels (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

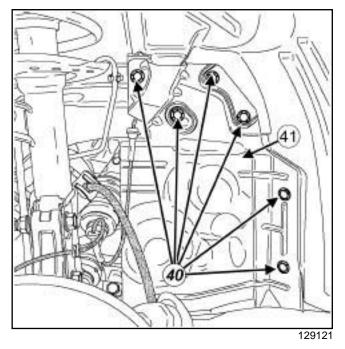
2TR, and ND5 or ND8



- ☐ Unclip the left-hand splash guard clips (36).
- ☐ Remove the left-hand splash guard (37).



- ☐ Remove the manual gearbox earth cable bolt (38).
- ☐ Disconnect the manual gearbox earth cable (39).



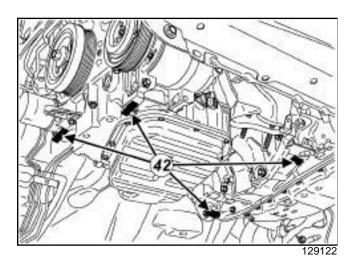
- ☐ Unclip the right-hand splash guard clips (40).
- □ Remove:
  - the right-hand splash guard (41),
  - the connector pipe (see 19B, Exhaust, Connector pipe: Removal - Refitting, page 19B-16)
  - the front left-hand driveshaft (see **Front left-hand wheel driveshaft: Removal Refitting**) (29A, Driveshafts),
  - the front right-hand driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),
  - the rear suspended engine mounting (see 19D, Engine mounting, Lower engine tie-bar: Removal - Refitting, page 19D-26),
  - the front axle subframe (see Front axle sub-frame: Removal Refitting) (31A, Front axle components).

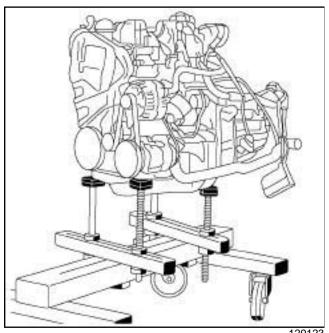
#### ND5

- □ Disconnect the longitudinal driveshaft from the transfer box (see **Propshaft: Removal Refitting**) (29A, Driveshafts).
- ☐ Secure the longitudinal driveshaft to the control cable bracket using a cord.
- ☐ Remove the transfer box (see **Transfer box: Removal Refitting**) (29A, Driveshafts).

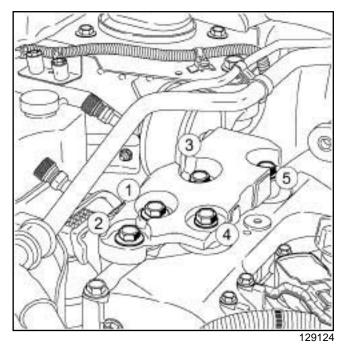
2TR, and ND5 or ND8

## II - OPERATION FOR REMOVAL OF PART CONCERNED

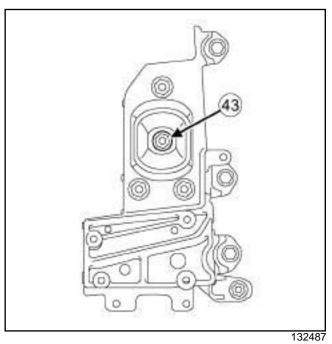




□ Support the «engine-gearbox» assembly on the (Mot. 1390) at (42).



☐ Remove in order the right-hand suspended engine mounting bolts.

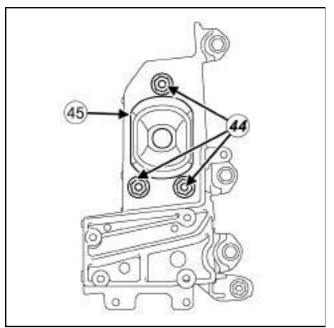


☐ Remove the left-hand suspended engine mounting nut (43) from the gearbox.

### Engine/gearbox assembly: Removal - Refitting

10A

2TR, and ND5 or ND8



131131

#### ☐ Remove:

- the nuts (44) and bolts from the left-hand suspended engine mounting,
- the rubber pad (45) from the left-hand suspended engine mounting.

#### Note:

Check that no part is interfering with the vehicle side.

Before and during lifting, always check that the wiring remains connected.

During removal, always take care to prevent the vehicle from falling off the lift because of changes in its centre of gravity.

□ Raise the lift to remove the « engine-gearbox » assembly.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ For standard engine replacement (see Engine: Parts and consumables for the repair work).
- ☐ Always replace the O-rings on the air conditioning pipes.

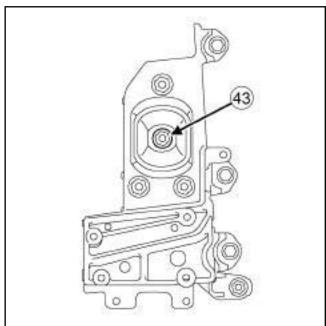
## II - REFITTING OPERATION FOR PART CONCERNED

#### Note:

Never allow engine oil to come into contact with the suspended engine mounting. Do not damage the suspended engine mountings.

Check that every suspended engine mounting is fitted correctly and tighten the nuts and bolts.

- ☐ Fit the « engine gearbox » assembly into the engine compartment using the tool (Mot. 1390).
- □ Refit the rubber pad on the left-hand suspended engine mounting.



132487

#### □ Refit:

- the left-hand suspended engine mounting nut (43) on the gearbox.
- the bolts and the nuts of the left-hand suspended engine mounting.
- ☐ Torque tighten:
  - the bolts and nuts of the left-hand suspended engine mounting (105 N.m),
  - the left-hand suspended engine mounting nut (65 N.m).

### Engine/gearbox assembly: Removal - Refitting

10A

2TR, and ND5 or ND8



- Refit in order the right-hand suspended engine mounting bolts.
- ☐ Torque tighten in order the right-hand suspended engine mounting bolts (55 N.m).

#### **III - FINAL OPERATION.**

#### ND5

- □ Refit:
  - the transfer box (see Transfer box: Removal Refitting) (29A, Driveshafts),
  - -the longitudinal driveshaft on the transfer box (see **Propshaft: Removal Refitting**) (29A, Driveshafts).

#### □ Refit:

- -the front right-hand driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),
- the front left-hand driveshaft (see Front left-hand wheel driveshaft: Removal Refitting) (29A, Driveshafts),
- -the connector pipe (see 19B, Exhaust, Connector pipe: Removal Refitting, page 19B-16),
- -the front axle sub-frame: Removal Refitting) (31A, Front axle components),

- the rear suspended engine mounting (see 19D, Engine mounting, Lower engine tie-bar: Removal - Refitting, page 19D-26)
- the right-hand splash guard.
- ☐ Clip on the right-hand splash guard clips.
- ☐ Connect the earth cable on the manual gearbox.
- ☐ Refit the earth cable bolt on the manual gearbox.
- ☐ Torque tighten the earth cable bolt on the manual gearbox (14 N.m).
- ☐ Refit the left-hand splash guard.
- ☐ Clip on the left-hand splash guard clips.
- □ Refit the front wheels (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).
- □ Connect:
  - the selector lever cable (see Automatic gear control cable: Removal Refitting) (37A, Mechanical component controls)
  - the gear lever cable (see Automatic gear control cable: Removal - Refitting) (37A, Mechanical component controls)
  - the heater hoses.
- □ Refit:
  - the heater hose clips,
  - the radiator lower hose,
  - the radiator lower hose clips,
  - the radiator upper hose,
- the radiator upper hose clips.
- ☐ Remove the caps from the apertures.
- ☐ Connect the air conditioning pipes on the air conditioning compressor.
- □ Refit:
  - the bolt from the air conditioning pipe,
  - the air conditioning pipe nut.
- ☐ Torque tighten:
  - the air conditioning pipe bolt (4 N.m).
  - the air conditioning pipe nut (4 N.m).
- ☐ Connect the earth cable on the alternator support.
- ☐ Refit the earth cable bolt on the alternator support.
- □ Torque tighten the earth cable bolt on the alternator support (7 N.m).
- Refit:
  - brake servo vacuum pipe ,

10A

#### 2TR, and ND5 or ND8

- the clip on the brake servo vacuum pipe,
- the fuel vapour rebreathing hose.
- the fuel vapour rebreathing hose clip.
- ☐ Connect the quick-release union on the fuel supply pipe.

#### Note:

Check the connection of the quick-release union by pulling on the part.

#### □ Refit:

- the plug of the fuel supply union,
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22) ,
- the breather hose,
- the breather hose clip,
- -The air resonator on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
- the bracket (13),
- the bracket bolts.
- ☐ Torque tighten the **bracket bolts (21 N.m)**.
- ☐ Refit:
  - the engine wiring support,
  - the engine wiring support bolts.
- ☐ Torque tighten the **engine wiring support bolts (21 N.m)**.
- Connect the engine fuse and relay box wiring connectors.
- Refit:
  - the engine fuse and relay box cover,
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery).
- □ Connect the battery positive terminal wiring connectors.
- ☐ Refit:
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - the engine cover,
  - the fuel pump fuse,
  - the Protection and Switching Unit cover,

- the air inlet sleeve on the air filter unit and on the air resonator.
- Clip on the air inlet sleeve clips.

#### □ Refill:

- the refrigerant circuit using a **refrigerant charging station** (see **Coolant circuit Draining Refilling**) (62A. Air conditioning).
- the manual gearbox oil (see **Manual gearbox oil: Draining Refilling**) (21A, Manual gearbox),
- the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).
- □ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

#### Note:

When replacing the engine, carry out the programming using the diagnostic tool (see Fault finding - Replacement of components) (17B, Petrol injection).

Flywheel: Removal - Refitting



#### 2TR, and 6 SPEED MANUAL GBOX

#### **Essential special tooling**

Mot. 1431

Flywheel locking tool.

#### Tightening torques

flywheel bolts

108 Nm

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see **Clutch: Precautions for repair**).

Note:

The engine flywheel is of the dual-mass type.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

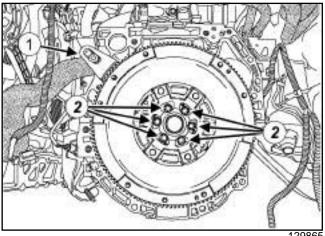
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Remove:
  - the gearbox (see **Manual gearbox: Removal Refitting**) (21A, Manual gearbox),
  - -the clutch disc and pressure plate (see **Mechanism / Disk: Removal Refitting**) (20A, Clutch).

## II - OPERATION FOR REMOVAL OF PART CONCERNED



- 12986
- □ Position the (Mot. 1431) (1) .
- □ Remove:
  - the flywheel bolt (2),
  - the flywheel,
  - the (Mot. 1431).

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

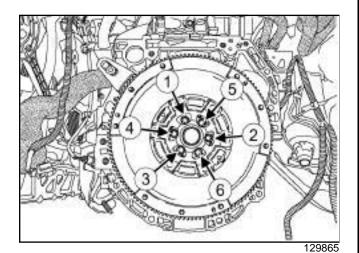
- □ Always replace the flywheel bolts.
- ☐ Clean the engine flywheel bolt thread holes on the crankshaft using SURFACE CLEANER (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products).
- Degrease the pressure face of the flywheel on the crankshaft.
- ☐ Check the condition of the flywheel.

Flywheel: Removal - Refitting

10A

2TR, and 6 SPEED MANUAL GBOX

## II - REFITTING OPERATION FOR PART CONCERNED



- ☐ Refit:
  - the flywheel,
  - the new flywheel bolts,
  - -the (Mot. 1431).
- ☐ Tighten to torque and in order the flywheel bolts (108 Nm).

#### **III - FINAL OPERATION.**

- ☐ Remove the (Mot. 1431).
- ☐ Refit:
  - -the clutch disc and pressure plate (see **Mechanism / Disk: Removal Refitting**) (20A, Clutch),
  - the gearbox (see **Manual gearbox: Removal Refitting**) (21A, Manual gearbox).

Flywheel: Removal - Refitting



M9R, and 6 SPEED MANUAL GBOX

#### **Essential special tooling**

Mot. 1431

Flywheel locking tool.

#### Tightening torques

flywheel bolts

25 N.m + 45° ±

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see Clutch: Precautions for repair) .

Note:

The engine flywheel is of the dual-mass type.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

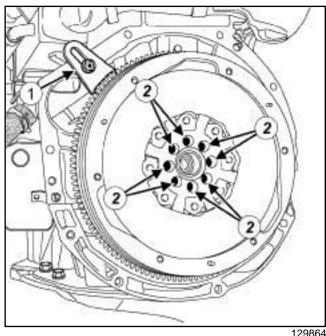
☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- □ Remove:
  - the gearbox (see Manual gearbox: Removal Refitting) (21A, Manual gearbox),
  - -the clutch disc and pressure plate (see Mechanism / Disk: Removal - Refitting) (20A, Clutch).

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



- □ Position the (Mot. 1431) (1).
- □ Remove:
  - the flywheel bolts (2),
  - the flywheel,
  - the (Mot. 1431).

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

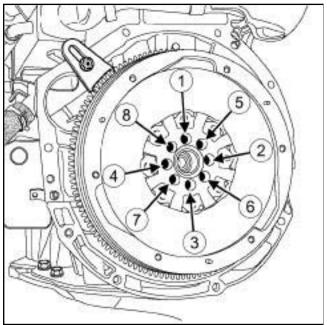
- ☐ Always replace the flywheel bolts.
- ☐ Clean the engine flywheel bolt thread holes on the crankshaft using SURFACE CLEANER (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products).
- ☐ Degrease the flywheel bearing face on the crankshaft with SURFACE CLEANER (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products).
- ☐ Check the condition of the flywheel.

Flywheel: Removal - Refitting

10A

M9R, and 6 SPEED MANUAL GBOX

## II - REFITTING OPERATION FOR PART CONCERNED



129864

- ☐ Refit:
  - the flywheel,
  - the new flywheel bolts,
  - -the (Mot. 1431).
- □ Torque tighten in order the flywheel bolts (25 N.m + 45° ± 6°).

#### **III - FINAL OPERATION.**

- ☐ Remove the (Mot. 1431).
- □ Refit:
  - -the clutch disc and pressure plate (see **Mechanism / Disk: Removal Refitting**) (20A, Clutch),
  - the gearbox (see **Manual gearbox: Removal Refitting**) (21A, Manual gearbox).

Valves: Adjusting

10A

2TR

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see **Engine: Precautions for repair**).

## I - PREPARATION OPERATION FOR ADJUSTING VALVE CLEARANCES

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### **IMPORTANT**

Wear protective gloves during the operation.

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the intake duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22),
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - -the battery tray (see Battery: Removal Refitting) (80A, Battery),
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8) ,
  - the engine cover,
  - -The air resonator on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).
  - the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
  - the scuttle panel half-grille (see **Scuttle half-grille: Removal Refitting**) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
  - -the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - the inlet manifold (see **Inlet manifold: Removal Refitting**) ,
  - the engine undertray.



129165

☐ Place the trolley jack (1) or an equivalent engine supporting tool under the cylinder block.

#### Note:

Place a wooden block or equivalent on the support surface to ensure stability.

#### **IMPORTANT**

To prevent any accidents, the trolley jack must only be used to lift and/or move the vehicle. The vehicle height must be maintained with axle stands which are strong enough to support the weight of the vehicle.

□ Remove the right-hand suspended engine mounting (see 19D, Engine mounting, Right-hand suspended engine mounting: Removal - Refitting, page 19D-19).

#### □ Disconnect:

- the wiring on the right-hand engine mounting bracket.
- the ignition coil connectors.

#### □ Remove:

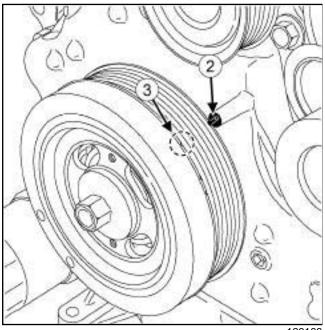
- the right-hand engine mounting bracket (see Timing cylinder head: Removal) (Technical Note 6045A, 10A, Engine and peripherals),
- the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2) (17A, Ignition),

### **ENGINE AND CYLINDER BLOCK ASSEMBLY** Valves: Adjusting

#### 2TR

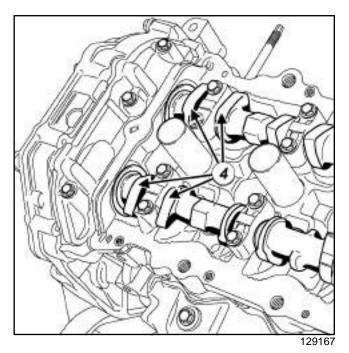
- -the rocker cover (see 11A, Top and front of engine, Rocker cover: Removal - Refitting, page **11A-17**) (11A, Top and front of engine),
- the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection).

#### **II - VALVE CLEARANCE MEASUREMENT OPERATION**



129166

☐ Turn the crankshaft accessories pulley clockwise and align the TDC mark (3) and the mark (2) located on the timing cover.

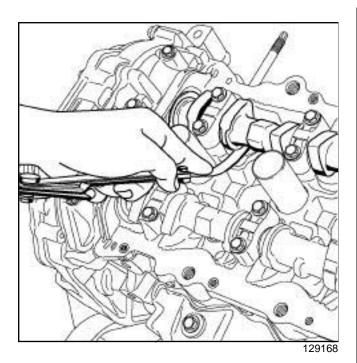


☐ Check if the nose of the inlet and exhaust cams (4) of cylinder no. 1 are pointing outwards as illustrated. If they are not pointing outwards, turn the crankshaft accessories pulley an additional turn (360 degrees).

# ENGINE AND CYLINDER BLOCK ASSEMBLY Valves: Adjusting

10A

2TR



☐ Use a feeler gauge to measure the clearance between the valve tappet and the camshaft.

Note:

Valve clearance:

- inlet:

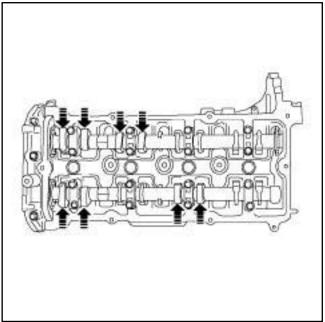
0.24~0.32 mm (cold),

0.304~0.416 mm (hot: 80°C).

- exhaust:

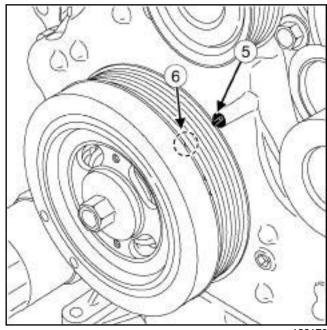
0.26~0.34 mm (cold),

0.308~0.432 mm (hot: 80°C).



129169

- ☐ Measurement positions (cylinder no. 1 at TDC):
  - Cylinder no. 1: inlet and exhaust,
  - Cylinder no. 2: inlet,
  - Cylinder no. 3: exhaust.
- Measure the valve clearance in the locations indicated by a black arrow on the diagram using a feeler gauge.



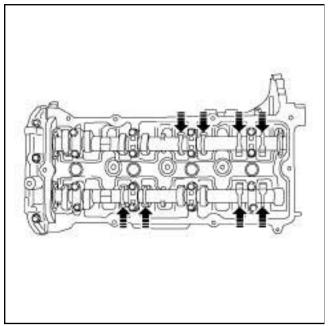
129170

☐ Turn the crankshaft accessories pulley one turn (360°) to align the TDC mark (6) and the mark (5) located on the timing cover.

Valves: Adjusting

10A

2TR



129171

- ☐ Referring to the diagram, measure the valve clearance in the locations indicated by a black arrow in the diagram using a feeler gauge
- ☐ Measurement positions (cylinder no. 4 at TDC):
  - Cylinder no. 2: exhaust,
  - Cylinder no. 3: inlet,
  - Cylinder no. 4: inlet and exhaust.

## III - VALVE CLEARANCE ADJUSTMENT OPERATION

- □ Remove the engine gearbox assembly (see 10A, Engine and cylinder block assembly, Engine/ gearbox assembly: Removal - Refitting, page 10A-44).
- ☐ Strip down the engine (see Engine: Dismantling).
- ☐ Remove the timing cylinder head (see **Timing cylinder head: Removal**).
- ☐ Adjust the valve clearance (see **Upper engine**: **Checking**).
- ☐ Refit the timing cylinder head (see **Timing cylinder head**: **Refitting**).
- ☐ Rebuild the engine (see Engine: Refitting).

#### **IV - FINAL OPERATION**

- □ Refit:
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),

- the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the rocker cover (see 11A, Top and front of engine, Rocker cover: Removal Refitting, page 11A-17),
- the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2),
- the right-hand engine mounting bracket (see **Timing cylinder head: Refitting**) (Technical Note 6045A, 10A, Engine and peripherals).
- □ Connect:
  - the ignition coil connectors,
  - the wiring on the right-hand engine mounting bracket.
- □ Refit the right-hand suspended engine mounting (see 19D, Engine mounting, Right-hand suspended engine mounting: Removal - Refitting, page 19D-19).
- □ Remove the trolley jack (1) or equivalent engine support tool from under the cylinder block.
- □ Refit:
  - the engine undertray.
  - the inlet manifold (see **Inlet manifold: Removal - Refitting**) ,
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scuttle panel half-grille (see **Scuttle half-grille: Removal Refitting**) (56A, Exterior equipment),
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
  - The air resonator on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).
  - the engine cover,
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
  - the battery tray (see Battery: Removal Refitting) (80A, Battery),
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22).

### TOP AND FRONT OF ENGINE Final compression pressure: Check

M9R

#### **Essential special tooling**

Mot. 1772 Compression end pressure test end piece-hose.

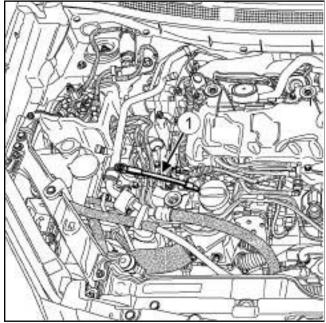
#### **Essential equipment**

diesel compression gauge

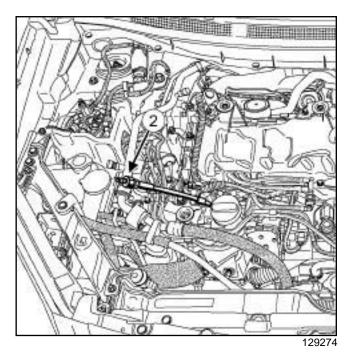
diagnostic tool

#### I - CHECK PREPARATION OPERATION

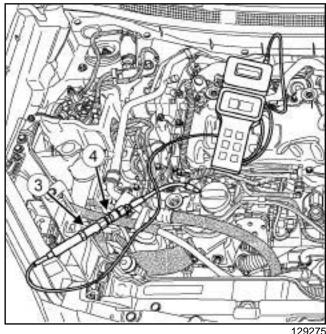
- □ Remove:
  - the engine cover,
  - the heater plugs (see Heater plugs Removal Refitting).



- ☐ Fit the hose (Mot. 1772) in place of one of the removed plugs.
- ☐ Moderately tighten the hose (Mot. 1772) (1) using an open-jawed spanner.



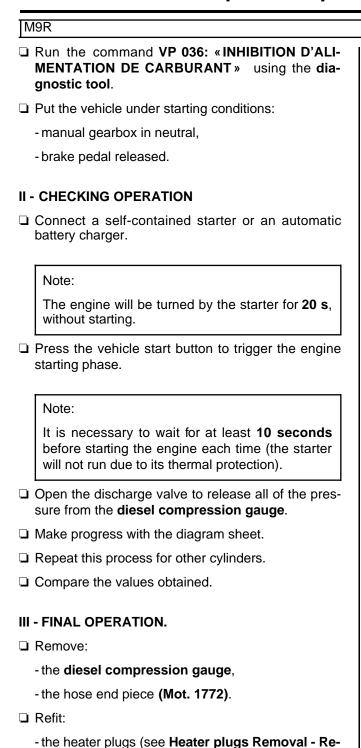
- ☐ Screw the conversion hose end piece (Mot. 1772) (2) of the diesel compression gauge onto the hose.
- ☐ Moderately tighten the end piece onto the hose (Mot. 1772).



- ☐ Connect the diesel compression gauge (3) on the (Mot. 1772).
- □ Open the discharge valve (4) of the diesel compression gauge to release the pressure.
- ☐ Close the discharge valve (4) of the diesel compression gauge.

Final compression pressure: Check

11A



fitting),

- the engine cover.

□ Run the command VP 037: « ARRÊTER L'INHIBITION D'ALIMENTATION EN CARBURANT» using the diagnostic tool.

#### Note:

If the engine does not start, run the command VP 037: « ARRÊTER L'INHIBITION D'ALIMENTATION EN CARBURANT » using the diagnostic tool or switch off the ignition and wait for 3 minutes and restart the engine.

### Final compression pressure: Check



2TR

#### **Essential equipment**

petrol compression gauge

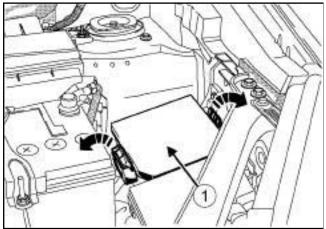
#### **CHECKING**

#### I - PREPARATION OPERATION FOR CHECK

#### **IMPORTANT**

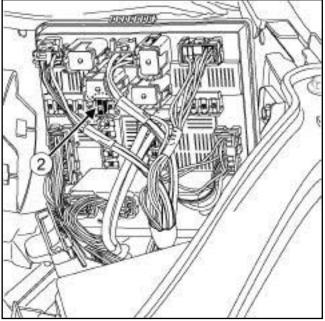
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).



13109

□ Remove the cover (1) from the Protection and Switching Unit.



131097

- □ Remove the fuse (2) of the fuel pump(F13) (15A).
- ☐ Release the fuel pressure in the fuel supply pipe after the engine has started.

#### Note:

After switching the engine off, start it again two or three times to fully relieve the fuel pressure.

#### □ Remove:

- the engine cover,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3).
- ☐ Disconnect the ignition coil connectors.

#### Note:

Remove all the engine spark plugs.

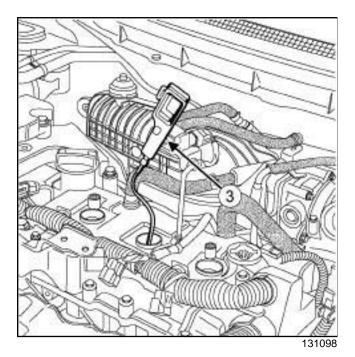
#### □ Remove:

- the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2) ,
- the spark plugs (see 17A, Ignition, Spark plugs: Removal Refitting, page 17A-4).

### Final compression pressure: Check



2TR



☐ Connect a petrol compression gauge (3) .

#### ND5 or ND8

- Put the vehicle under starting conditions:
  - gear lever in neutral for manual gearbox,
  - brake pedal depressed.

#### FK0 or FK8

- ☐ Put the vehicle under starting conditions:
  - gear lever in neutral for automatic gearbox,
  - brake pedal depressed.

#### **II - TEST OPERATION**

☐ Press the vehicle start button to trigger the engine starting phase.

#### Note:

The engine will be driven by the starter for **20 s**, without starting.

Measure the engine compressions, cylinder by cylinder, at an engine speed of 250 rpm.

- ☐ Check the compression pressure value:
  - standard compression pressure: 14.4 kg/cm²,
  - minimum compression pressure: 12.1 kg/cm<sup>2</sup>,
  - compression pressure differential limit between the cylinders: 1 kg/cm².

#### **III - FINAL OPERATION**

- ☐ Disconnect the **petrol compression gauge**.
- □ Refit:
  - the spark plugs (see 17A, Ignition, Spark plugs: Removal - Refitting, page 17A-4),
  - the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2).
- ☐ Connect the ignition coil connectors.
- □ Refit:
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
  - the engine cover,
  - the fuel pump fuse (F13) (15A),
  - the Protection and Switching Unit cover.
- ☐ Press the vehicle start button to start the engine.

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting



M9R

#### **Essential equipment**

brush with non abrasive bristles

Tightening torques	
fixed roller bolt	44 N.m
tensioning roller bolts	25 Nm

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **WARNING**

Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

#### **REMOVAL**

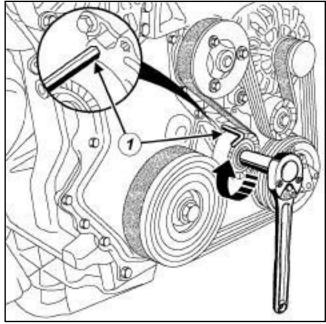
#### I - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).

## II - OPERATION FOR REMOVAL OF PART CONCERNED



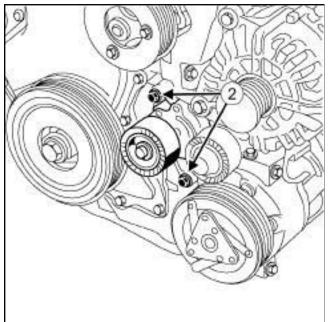
135145

- □ Place a 3 mm Allen key (1) in the tensioning roller hole.
- □ Rotate the tensioning roller clockwise and push on the key at the same time until the tensioning roller locks
- ☐ Remove the accessories belt.
- ☐ Turn the tensioning roller slightly in a clockwise direction.
- ☐ Remove the 3 mm Allen key.
- ☐ Turn the tensioning roller anti-clockwise until it locks.

### **Accessories belt: Removal - Refitting**

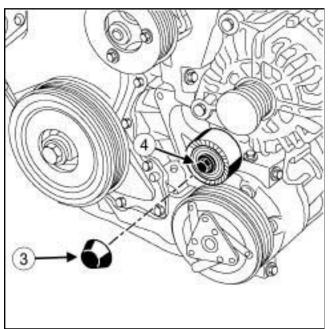


M9R



129285

- □ Remove:
  - the tensioning roller bolts (2),
  - the tensioning roller.



129286

#### Remove:

- the fixed roller bolt protector (3),
- the fixed roller bolt (4),
- the fixed roller.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

□ parts always to be replaced: Accessories belt (10,10,01,03)

parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)

parts always to be replaced: Accessories fixed roller (10,10,01,06)

#### **WARNING**

Only use brushes with plastic or non-corrosive metal (brass) bristles.

#### Note:

Clean the V-grooves on all accessories pulleys using a **brush with non abrasive bristles**.

#### Note:

The Parts Department supplies the tensioning roller with a pin in the locked position.

## II - REFITTING OPERATION FOR PART CONCERNED

- Refit:
  - the new fixed roller,
  - the fixed roller bolt.
- ☐ Torque tighten the fixed roller bolt (44 N.m).
- Refit:
  - the fixed roller bolt protector,
  - the new tensioning roller,
  - the tensioning roller bolts.
- ☐ Torque tighten the **tensioning roller bolts (25 Nm)**.
- ☐ Refit the new accessories belt.
- ☐ Turn the tensioning roller slightly in a clockwise direction
- ☐ Remove the tensioning roller locking pin.
- ☐ Turn the crankshaft twice.
- ☐ Check that the accessories belt V-grooves are correctly fitted in the accessories pulley V-grooves.

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting

11A

M9R

#### **III - FINAL OPERATION**

#### □ Refit:

- -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting



2TR, and AIR CON 01 or AIR CON 02

Tightening torques ♡	
new auto-tensioner bolts	25 N.m
fixed roller bolts	28 N.m
right-hand side suspen- ded mounting bolts on the engine	55 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **WARNING**

Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

#### **REMOVAL**

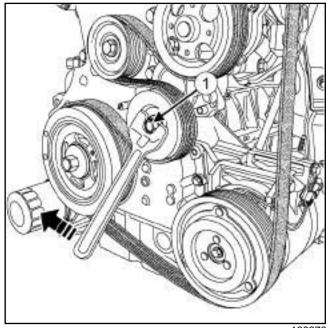
#### I - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - the front right-hand flap (see **Flap: Removal Refitting**) (55A, Exterior protection),
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).

## II - OPERATION FOR REMOVAL OF PART CONCERNED



129276

☐ Carefully rotate the tensioning roller bolt (1) clockwise, to release the accessories belt.

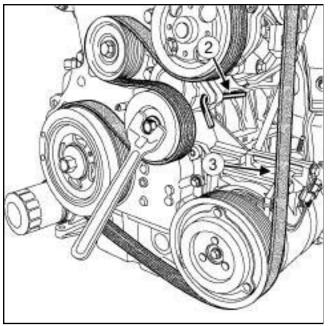
#### Note:

Do not rotate the tensioning roller bolt anticlockwise. If the tensioning roller bolt is turned anticlockwise, replace the auto tensioner and tensioning roller at the same time.

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting

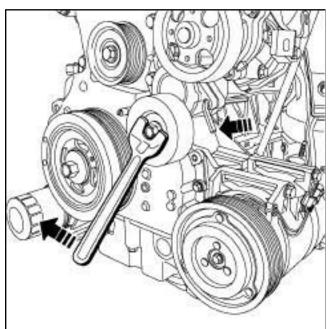


2TR, and AIR CON 01 or AIR CON 02



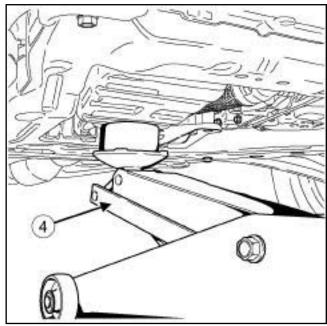
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- ☐ Insert an Allen key (2) in the auto tensioner to maintain the play in the accessories belt.
- ☐ Remove the accessories belt (3).



129278

☐ Remove the Allen key whilst carefully rotating the tensioning roller bolt clockwise.



129279

☐ Place the trolley jack (4) or an equivalent engine support tool under the lower section of the engine.

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting



2TR, and AIR CON 01 or AIR CON 02



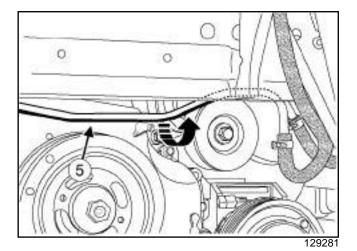
#### Note:

Do not remove bolt N  $\bf 1$  or  $\bf 2$  from the right-hand side suspended mounting on the engine.

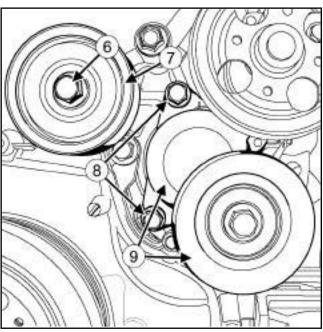
- □ Loosen in order the N 1 and 2 bolts of the right-hand side suspended mounting on the engine.
- ☐ Remove the remaining bolts from the right-hand side suspended mounting on the engine in order.

#### Note:

Carefully lower the jack to perform the following operation.



- ☐ Unclip the petrol vapour breathing pipe (5).
- Separate the petrol vapour breathing pipe on one side.



129282

- □ Remove:
  - the fixed roller bolt (6),
  - the fixed roller (7),
  - the auto tensioner bolts (8),
  - the auto tensioner and the tensioning roller (9) at the same time.





2TR, and AIR CON 01 or AIR CON 02

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

□ parts always to be replaced: Accessories belt (10,10,01,03)

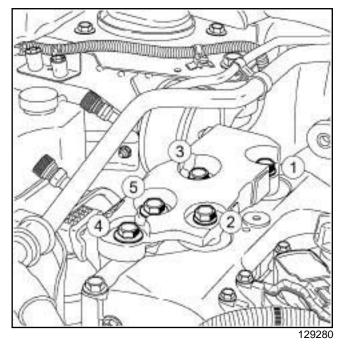
parts always to be replaced: Accessories belt tensioning roller (10,10,01,04)

parts always to be replaced: Accessories fixed roller (10,10,01,06)

parts always to be replaced: Accessories tensioning roller bolt (10,10,01,09)

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Use a brush to remove any deposits from the crankshaft accessories pulley V-grooves.
- ☐ Refit:
  - the new auto tensioner and the tensioning roller **(9)** at the same time,
  - the new auto tensioner bolts (8).
- ☐ Torque tighten the new auto-tensioner bolts (25 N.m) (8).
- ☐ Refit:
  - the fixed roller (7),
  - the fixed roller bolt (6)
- ☐ Torque tighten the fixed roller bolts (28 N.m) (6).
- ☐ Clip on the petrol vapour rebreathing pipe (5)



#### Note:

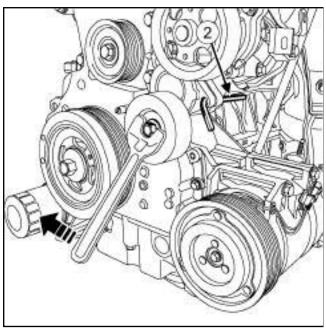
Carefully lower the jack to perform the following operation.

- ☐ Refit the right-hand side suspended mounting bolts on the engine.
- □ Torque tighten the right-hand side suspended mounting bolts on the engine (55 N.m).
- □ Place the trolley jack (4) or an equivalent engine support tool under the lower section of the engine.

# TOP AND FRONT OF ENGINE Accessories belt: Removal - Refitting



2TR, and AIR CON 01 or AIR CON 02



129283

☐ Carefully rotate the tensioning roller bolt clockwise, to insert an Allen key (2) in the auto tensioner.

#### Note:

Do not rotate the tensioning roller bolt anticlockwise. If the tensioning roller bolt is turned anticlockwise, replace the auto tensioner and tensioning roller at the same time.

- □ Refit the new accessories belt (3).
- □ Remove the Allen key (2), whilst carefully rotating the tensioning roller bolt (1) clockwise.
- ☐ Turn the camshaft around twice to fit the accessories belt correctly.

#### **III - FINAL OPERATION**

#### ☐ Refit:

- -the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
- the front right-hand flap (see Flap: Removal Refitting) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

# Crankshaft accessories pulley: Removal - Refitting



M9R

Essential special tooling		
Mot. 1770	Crankshaft pulley locking tool.	

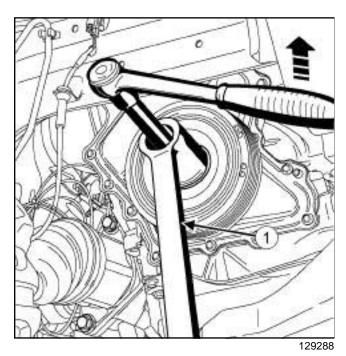
Tightening torques ▽		
crankshaft accessories pulley bolt	50 N.m + 85° ± 6°	

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
  - -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove:

-the crankshaft accessories pulley bolt using the (Mot. 1770) (1),

- the spacer,
- the crankshaft accessories pulley.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### **WARNING**

Only use brushes with plastic or non-corrosive metal (brass) bristles.

#### **WARNING**

Do not run the engine without the accessories belt to avoid damaging the crankshaft accessories pulley.

- □ In case of reuse, clean the crankshaft accessories pulley V-grooves using a brush to get rid of any deposits.
- ☐ The crankshaft accessories pulley bolt must always be replaced with a new one.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the crankshaft accessories pulley by inserting it into the two crankshaft flat surfaces,
  - the spacer,
  - the new crankshaft accessories pulley bolt fitted with a washer.
- □ Position the (Mot. 1770).
- □ Torque tighten the crankshaft accessories pulley bolt (50 N.m + 85° ± 6°).

#### **III - FINAL OPERATION.**

- ☐ Refit:
  - the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

# TOP AND FRONT OF ENGINE Crankshaft accessories pulley: Removal - Refitting



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# Crankshaft accessories pulley: Removal - Refitting



2TR

#### **Essential special tooling**

Mot. 1878 Crankshaft pulley locking tool

#### Tightening torques

crankshaft accessories pulley bolt

42 N.m + 60°

#### **IMPORTANT**

Wear protective gloves during the operation.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

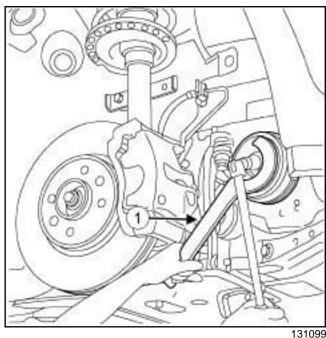
#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### □ Remove:

- the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection).
- -the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5).

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



#### Note:

This operation requires two people.

- ☐ Loosen the crankshaft accessories pulley bolt using the tool (Mot. 1878) (1)
- ☐ Remove the crankshaft accessories pulley using a two-claw extractor for inside grip.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ The crankshaft accessories pulley bolt must always be replaced with a new one.

#### **II - REFITTING OPERATION FOR PART CONCERNED**

- □ Refit:
  - the crankshaft accessories pulley,
  - the new crankshaft accessories pulley bolt.

#### Note:

This operation requires two people.

☐ Torque and angle tighten the crankshaft accessories pulley bolt (42 N.m + 60°) using the tool (Mot. 1878).

# Crankshaft accessories pulley: Removal - Refitting



2TR

#### **III - FINAL OPERATION.**

#### ☐ Refit:

- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- -the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
- the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).

Rocker cover: Removal - Refitting



2TR

	Essential equipment
trolley jack	

Tightening torques ♡	
rocker cover bolts (ini- tial torque)	2 N.m
rocker cover bolts	8 N.m
engine mounting bolts on the right-hand side	48 N.m
front resonator support bolts	10 N.m
earth cable bolts	7 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).

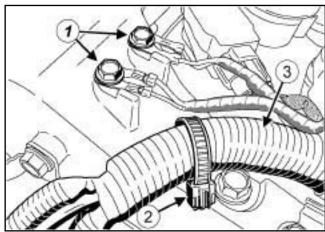
#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### □ Remove:

- -the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
- -the battery (see **Battery: Removal Refitting**) (80A, Battery)
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
- the engine cover,
- -the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22) ,

- the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
- the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
- the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
   (85A, Wiping Washing),
- the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
- the motorised throttle valve without disconnecting the cooling hoses (see 12A, Fuel mixture, Throttle valve: Removal - Refitting, page 12A-17)
- the intake distributor (see 12A, Fuel mixture, Inlet manifold: Removal - Refitting, page 12A-24).



135174

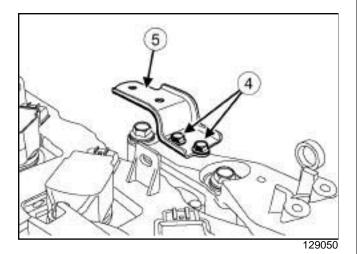
#### □ Remove:

- the earth cable bolts (1),
- the wiring clip (2).
- ☐ Disconnect the ignition coil connectors.
- ☐ Move aside the wiring (3).

## Rocker cover: Removal - Refitting

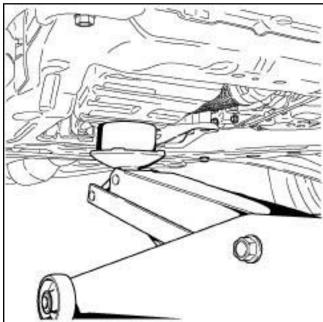


2TR



#### Remove:

- the front resonator support bolts (4),
- the front resonator support (5),
- the pipes on the rocker cover,
- the engine undertray.



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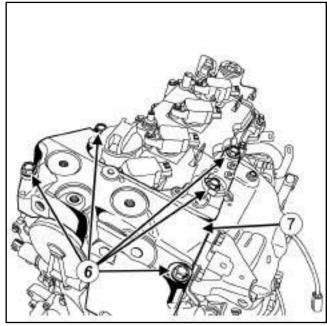
#### Note:

To ensure stability, place a wooden block or equivalent on the support surface.

#### Note:

To ensure stability, place an object behind the trolley jack or equivalent to provide support.

- ☐ Fit the **trolley jack** or an equivalent engine support tool under the cylinder block.
- □ Remove the right-hand suspended engine mounting (see 19D, Engine mounting, Right-hand suspended engine mounting: Removal - Refitting, page 19D-19).



129292

#### □ Remove:

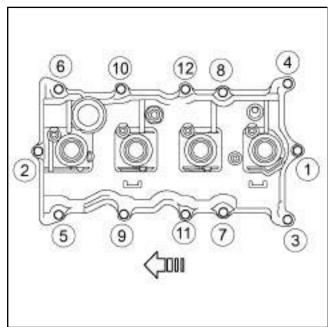
- the engine mounting bolts (6) on the right-hand side.
- the engine mounting on the right-hand side (7),
- the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2).

Rocker cover: Removal - Refitting



2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129293

- ☐ Remove:
  - the rocker cover bolts in order,
  - the rocker cover,
  - the rocker cover gasket.

#### **REFITTING**

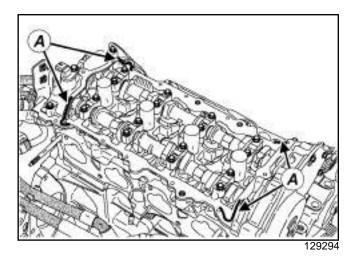
#### I - REFITTING PREPARATION OPERATION

☐ Always replace the rocker cover seal.

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

☐ Use SUPER CLEANER FOR JOINT FACES (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) to clean the sealing surfaces.



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#### **WARNING**

Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

☐ Apply a beading (A) of SILICONE ADHESIVE SEA-LANT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) approximately 3 mm in diameter.

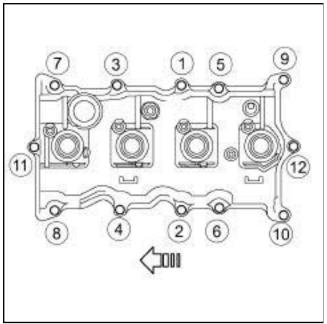
# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the new seal on the rocker cover,
  - the rocker cover.

Rocker cover: Removal - Refitting



2TR



129293

- ☐ Torque tighten in order:
  - -rocker cover bolts (initial torque) (2 N.m),
  - rocker cover bolts (8 N.m).

#### **III - FINAL OPERATION**

- ☐ Refit:
  - the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2).
  - the engine mounting on the right-hand side,
  - the engine mounting bolts on the right-hand side.
- ☐ Torque tighten the engine mounting bolts on the right-hand side (48 N.m).
- □ Refit the right-hand suspended engine mounting (see 19D, Engine mounting, Right-hand suspended engine mounting: Removal - Refitting, page 19D-19).
- ☐ Remove the trolley jack or equivalent engine supporting tool from the cylinder block.
- ☐ Refit:
  - the engine undertray,
  - the pipes on the rocker cover,
  - the front resonator support,
  - the front resonator support bolts.
- ☐ Torque tighten the front resonator support bolts (10 N.m).
- ☐ Connect the ignition coil connectors.

- □ Refit:
  - the wiring clip,
  - the earth cable bolts.
- ☐ Torque tighten the earth cable bolts (7 N.m).
- Refit:
  - the inlet manifold (see 12A, Fuel mixture, Inlet manifold: Removal Refitting, page 12A-24),
  - the motorised throttle valve (see 12A, Fuel mixture, Throttle valve: Removal Refitting, page 12A-17),
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
  - the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22),
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
  - the engine cover,
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

Rocker cover: Removal - Refitting



M9R

Essential special tooling		
Mot. 1431	Flywheel locking tool.	
Mot. 1766	TDC locating pin.	

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

#### **WARNING**

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump may also damage the engine by:

- -blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

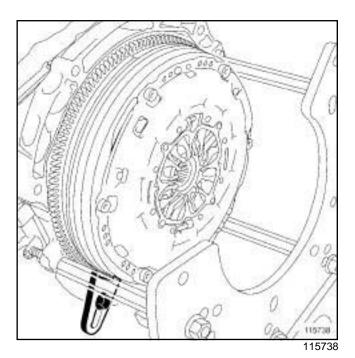
#### Note:

Consult the safety and cleanliness advice and operation recommendations before carrying out any operation (see **Engine: Precautions for repair**).

- □ Remove the engine gearbox assembly (see 10A, Engine and cylinder block assembly, Engine/ gearbox assembly: Removal - Refitting, page 10A-44).
- ☐ Place the engine on the component support (see Engine support equipment: Use).
- □ Drain the engine (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).

#### □ Remove:

- -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- -the coolant pump (see 19A, Cooling, Water pump: Removal Refitting, page 19A-22).



☐ Fit the flywheel locking tool (Mot. 1431) onto the cylinder block.

#### □ Remove:

- the crankshaft accessories pulley (see 11A, Top and front of engine, Crankshaft accessories pulley: Removal - Refitting, page 11A-13),
- the flywheel locking tool (Mot. 1431),
- the crankshaft seal on the timing side (see 10A, Engine and cylinder block assembly, Crankshaft seal at timing end Removal - Refitting, page 10A-1),
- the timing chain (see Timing chain: Removal -Refitting) ,
- ☐ Remove the exhaust gas pressure sensor (see Exhaust gas pressure sensor: Removal Refitting)

#### □ Remove:

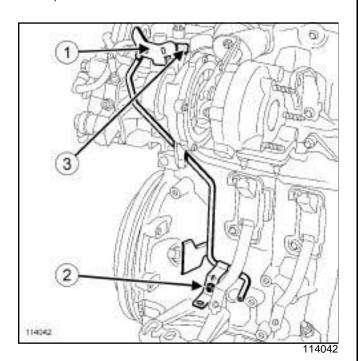
- the vacuum pump (see Vacuum pump: RemovalRefitting) ,
- the high pressure pipe between the pump and the rail (see 13B, Diesel injection, High-pressure pipe between the pump and rail: Removal - Refitting, page 13B-39),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
- the diesel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal - Refitting, page 13B-32),

Rocker cover: Removal - Refitting



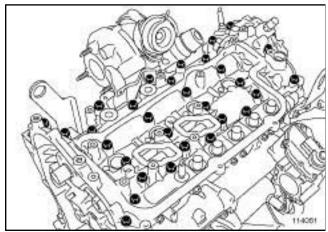
#### M9R

- the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal Refitting, page 13B-46),
- -the diesel injectors (see 13B, Diesel injection, Diesel injector: Removal - Refitting, page 13B-65).



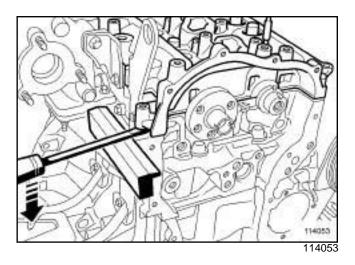
- ☐ Remove the bolts (1) and (2) of the fuel collector outlet pipe of the cylinder head.
- ☐ Disconnect the fuel collector outlet pipe from the cylinder head at (3).
- Move aside the fuel collector outlet pipe from the cylinder head.

#### II - REMOVAL OF THE ROCKER COVER



11405

☐ Remove the rocker cover bolts.



- Position a protective shim on the cylinder head.
- ☐ Detach the rocker cover using a flat-blade screwdriver, using the shim for leverage
- ☐ Remove the rocker cover camshafts assembly

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ Clean using SUPER CLEANING AGENT FOR JOINT FACES (see Vehicle: Parts and ingredients for the repairwork):
  - the joint face on the rocker cover,
  - the joint face on the cylinder head.

#### **WARNING**

Do not scrape the joint faces of the aluminium, any damage caused to the joint face will result in a risk of leaks.

#### **WARNING**

Clean the cylinder head carefully to avoid any foreign bodies entering the oil return and supply pipes.

Failure to follow this advice could lead to the blocking of the various oil inlet galleries, which would quickly result in engine damage.

- ☐ Remove the residue using a plastic spatula.
- ☐ Finish cleaning the joint faces using a GREY ABRA-SIVE PAD part number 77 01 405 943.

Rocker cover: Removal - Refitting



M9R

- ☐ Use SURFACE CLEANER (see Vehicle: Parts and ingredients for the repairwork) to clean:
  - the joint face on the rocker cover,
  - the joint face on the cylinder head.

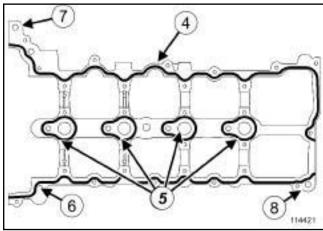
#### **WARNING**

To ensure proper sealing, the gasket surfaces must be clean, dry and not greasy (avoid any finger marks).

#### **WARNING**

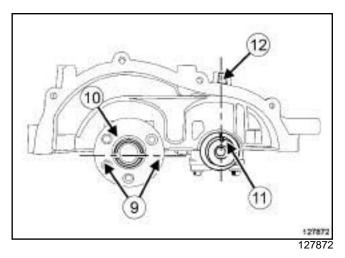
Applying excess sealant could cause it to be squeezed out when parts are tightened. A mixture of sealant and fluid could damage certain components (engine, radiator, etc.).

#### **II - REFITTING THE ROCKER COVER**



114421

- □ Apply a bead of SILICONE ADHESIVE SEALANT (see Vehicle: Parts and consumables for repair) with a diameter of 1.5 ± 1 mm to the cylinder head at (4), (5) and (6).
- ☐ Fit two studs (M6 length 60 mm) into the holes (7) and (8) on the cylinder head to guide the rocker cover.



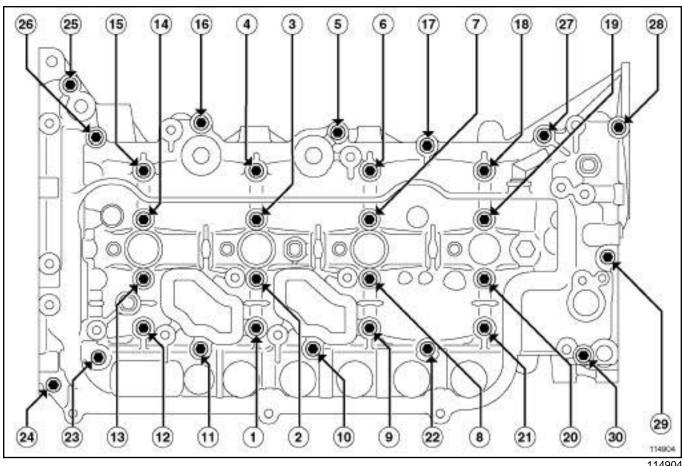
Position:

- the groove on the exhaust side of the camshaft (9) horizontally (large clearance (10) facing upwards),
- the groove on the inlet side of the camshaft (11) facing towards the rocker cover boss (12) .
- ☐ Check that cylinders 1 and 4 are at Top Dead Centre using the (Mot. 1766) (see Timing chain: Removal Refitting).
- ☐ Refit the rocker cover camshafts assembly.

**Rocker cover: Removal - Refitting** 



M9R



- ☐ Tighten in order and successively, the rocker cover bolts (12), (15),(18) and (21) to gradually fit the rocker cover on the cylinder head.
- ☐ Remove the two rocker cover guide studs.
- ☐ Fit without tightening the remaining rocker cover bolts.
- □ Loosen bolts (12), (15), (18) and (21).
- ☐ Fit without tightening bolts (12), (15), (18) and (21).
- ☐ Tighten the rocker cover bolts in order.
- ☐ Clean the excess silicone adhesive sealant on the timing and coupling faces using a plastic spatula.

#### **III - FINAL OPERATION**

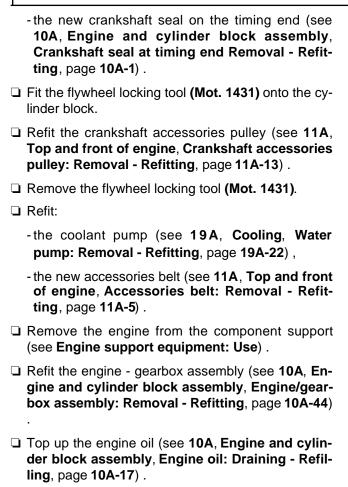
- ☐ Connect the fuel collector outlet pipe of the cylinder head.
- ☐ Tighten the bolts of the fuel collector outlet pipe of the cylinder head.
- □ Refit:
  - -the diesel injectors (see 13B, Diesel injection, Diesel injector: Removal - Refitting, page 13B-**65**),

- the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal -Refitting, page 13B-46),
- the diesel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal - Refitting, page 13B-32),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal - Refitting, page 11A-**29**),
- the high pressure pipe between the pump and the rail (see 13B, Diesel injection, High-pressure pipe between the pump and rail: Removal - Refitting, page 13B-39),
- the vacuum pump (see Vacuum pump: Removal - Refitting) .
- ☐ Refit the exhaust gas pressure sensor (see Exhaust gas pressure sensor: Removal - Refitting) .
- □ Refit:
  - the timing chain (see Timing chain: Removal -Refitting),

# TOP AND FRONT OF ENGINE Rocker cover: Removal - Refitting

**11A** 

M9R



Camshaft dephaser: Removal - Refitting

11A

2TR

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

□ Remove the engine and gearbox assembly (see 10A, Engine and cylinder block assembly, Engine/gearbox assembly: Removal - Refitting, page 10A-44) (10A, Engine and peripherals).

# II - OPERATION FOR REMOVAL OF PART CONCERNED

☐ Remove the camshaft dephaser (see Timing - cylinder head: Removal) (Technical Note 6045A, 10A, Engine and peripherals).

#### **REFITTING**

# I - REFITTING OPERATION FOR PART CONCERNED

□ Refit the camshaft dephaser (see Timing - cylinder head: Refitting) (Technical Note 6045A, 10A, Engine and peripherals).

#### **II - FINAL OPERATION.**

☐ Refit the engine and gearbox assembly (see 10A, Engine and cylinder block assembly, Engine/ gearbox assembly: Removal - Refitting, page 10A-44) (10A, Engine and peripherals).

## Camshaft dephaser solenoid valve: Removal - Refitting



2TR

	Tiç	ghtening torques 🗇	
camsha solenoid			6 N.m
upper o	engine	tie-bar	130 N.m

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

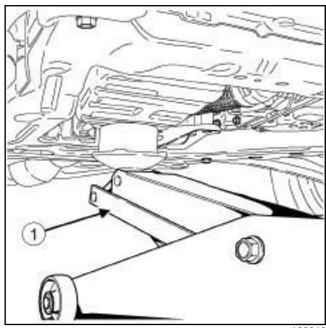
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### Note:

Place a piece of wood or equivalent on the bearing surface to ensure complete stability.

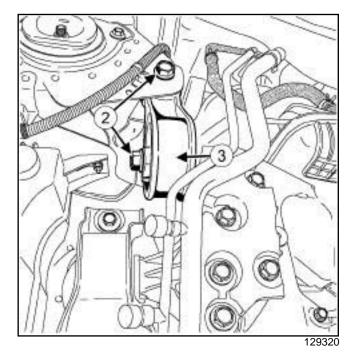
#### Note:

Place an object behind the trolley jack or equivalent equipment as a support to ensure complete stability.



129319

☐ Place the trolley jack (1) or an equivalent engine supporting tool under the cylinder block.



#### ☐ Remove:

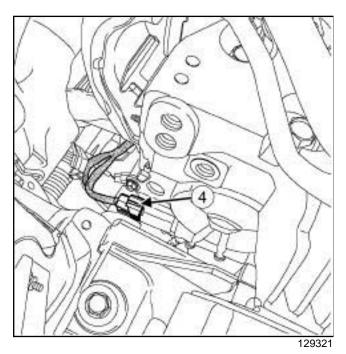
- the upper engine tie-bar bolts (2),
- the upper engine tie-bar (3).

#### Camshaft dephaser solenoid valve: Removal - Refitting

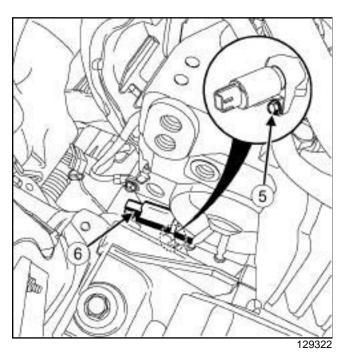


2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



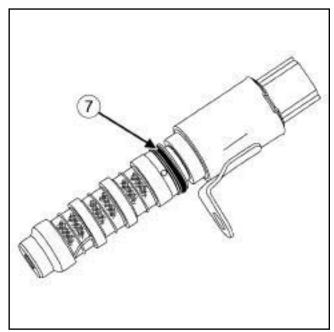
☐ Remove the solenoid valve connector (4) from the camshaft dephaser.



☐ Remove:

- the camshaft dephaser solenoid valve bolt (5),
- the camshaft dephaser solenoid valve (6) .

#### REFITTING



129323

- □ Always replace:
  - the new O-ring (7) on the camshaft dephaser solenoid valve (6),
  - the new washers on the upper engine tie-bar bolt (2).

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the camshaft dephaser solenoid valve (6),
  - the camshaft dephaser solenoid valve bolt (5) .
- ☐ Torque tighten the camshaft dephaser solenoid valve bolt (6 N.m).
- □ Refit the camshaft dephaser solenoid valve connector (4).

#### **II - FINAL OPERATION**

- ☐ Refit:
  - the upper engine tie-bar (3),
  - the upper engine tie-bar bolts (2) .
- ☐ Torque tighten the **upper engine tie-bar bolts (130 N.m) (2)**.
- ☐ Remove the trolley jack (1) or equivalent engine supporting tool from under the cylinder block.

# **TOP AND FRONT OF ENGINE**Oil decanter: Removal - Refitting



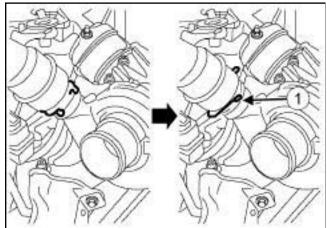
M9R

Tightening torques ♡	
heat shield bolts	7 Nm
oil decanter bolts (initial torque)	5 N.m
oil decanter bolts	10 Nm
intercooler air inlet pipe bolt	8 N.m

#### **REMOVAL**

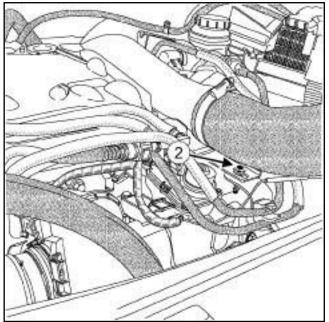
#### I - REMOVAL PREPARATION OPERATION

☐ Remove the engine cover.



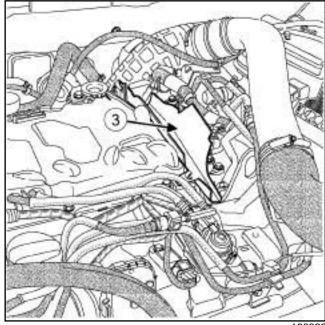
12932

☐ Turn the clip (1) on the intercooler air inlet pipe.



129325

- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.



129326

#### ☐ Remove:

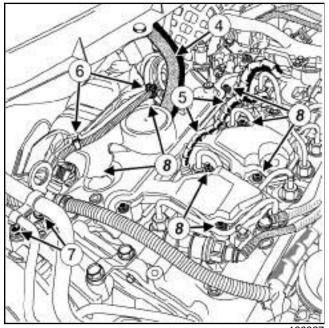
- the protector plate (3) from the injector rail protector,
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).

Oil decanter: Removal - Refitting



M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129327

#### ☐ Disconnect:

- the oil vapour rebreathing hose (4) from the oil decanter.
- -The **cylinder 1** injector connector on the timing end.

#### ■ Unclip:

- the injector wiring from the oil decanter at (5),
- the wiring from the heat shield at (6).

#### □ Remove:

- the wiring mounting bolts (7),
- the wiring harness support,
- the bolts (8) from the oil decanter,
- the oil decanter heat shield assembly,
- the oil decanter seals,
- the heat shield bolts,
- the heat shield,
- the oil separator.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

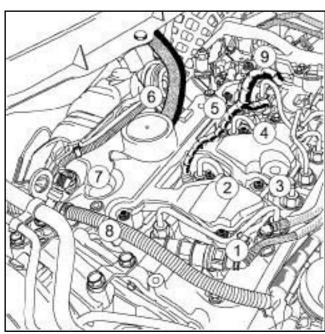
#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

- Degrease the joint faces of the cylinder head and the oil decanter.
- □ Always replace:
  - the oil decanter seals,
  - the intercooler air inlet pipe seal.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the heat shield on the oil decanter.
- ☐ Torque tighten the heat shield bolts (7 Nm).



12932

#### ☐ Refit:

- the oil decanter seals,
- the oil decanter heat shield assembly,
- the oil decanter bolts.
- ☐ Torque tighten in turn:
  - the oil decanter bolts (initial torque) (5 N.m),
  - the oil decanter bolts (10 Nm).

Oil decanter: Removal - Refitting

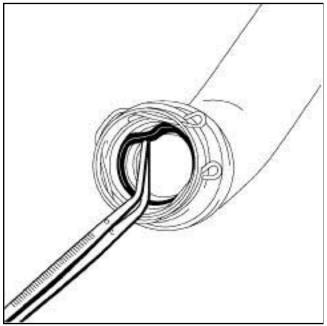
11A

#### M9R

- □ Refit:
  - the wiring harness support,
  - the wiring mounting bolts (7).
- ☐ Clip:
  - the wiring onto the heat shield at (6).
  - the injector wiring onto the oil decanter at (5).
- □ Connect:
  - the cylinder 1 injector connector,
  - the oil vapour rebreathing hose to the oil separator.

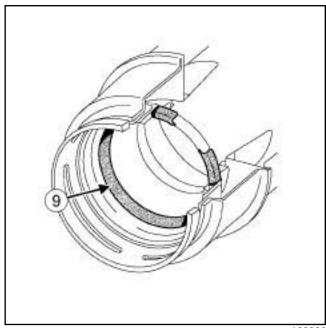
#### **III - FINAL OPERATION.**

□ Refit the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal - Refitting, page 13B-36).



129329

☐ Remove the intercooler air inlet pipe seal using a.



129330

#### Note:

Check whether the intercooler air inlet pipe seal (9) is correctly positioned.

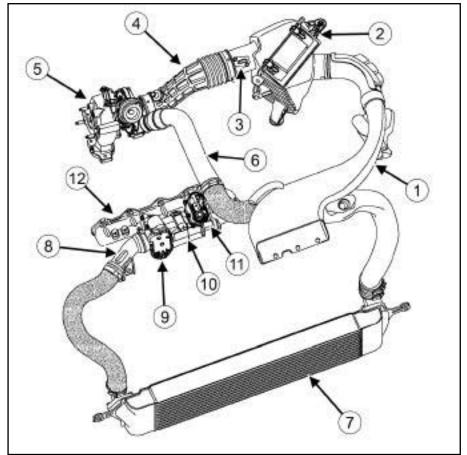
- ☐ Refit the new intercooler air inlet pipe seal.
- ☐ Refit the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to fit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt onto the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- Refit the engine cover.

# **FUEL MIXTURE Air intake: Description**

**12A** 

M9R

#### AIR INLET CIRCUIT DIAGRAM



129332

(1)	Air inlet sleeve
(2)	Air filter unit
(3)	Airflow meter
<b>(4</b> )	Air filter unit air outlet pipe
<b>(5)</b>	Turbocharger
(6)	Intercooler air inlet pipe
<b>(7</b> )	Exchanger
(8)	Intercooler air outlet pipe
<b>(9</b> )	Air inlet valve
(10)	Turbocharger pressure sensor unit
(11)	Exhaust gas recirculation sole- noid valve
<b>(12)</b>	Inlet manifold

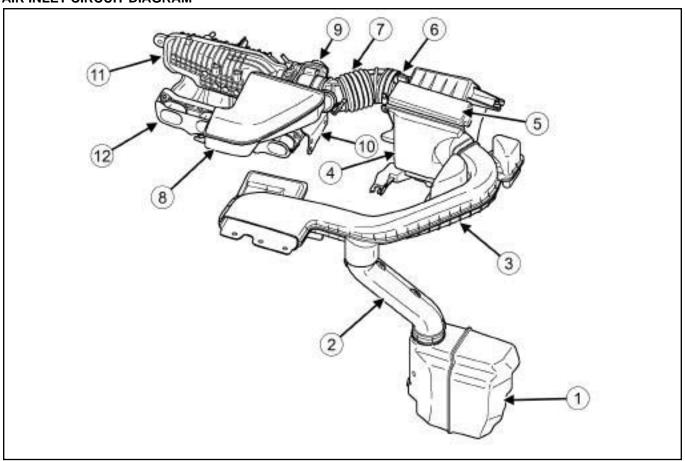
# **FUEL MIXTURE**

Air intake: Description

12A

2TR

#### **AIR INLET CIRCUIT DIAGRAM**



129331

- (1) Air resonator on front end panel
- (2) Air resonator sleeve
- (3) Air inlet sleeve
- (4) Air filter unit
- (5) Air filter cover
- (6) Air flowmeter
- (7) Air inlet duct
- (8) Air resonator on the rocker cover
- (9) Motorised throttle valve
- (10) Motorised throttle valve support
- (11) Inlet manifold
- (12) Inlet manifold adapter

# **FUEL MIXTURE**

## Air resonator: Removal - Refitting

2TR

Tightening torques ▽	
front end panel air reso- nator bolts	6 N.m
air resonator bolt on the rocker cover	6 N.m

Note:

This vehicle is fitted with two air resonators.

#### I - REMOVING THE AIR RESONATOR IN THE **FRONT END PANEL**

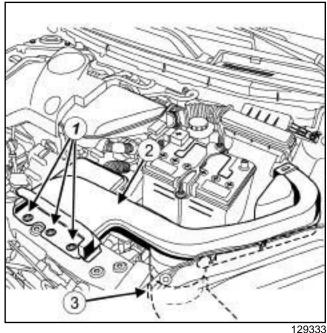
#### 1 - REMOVAL PREPARATION OPERATION

#### **IMPORTANT**

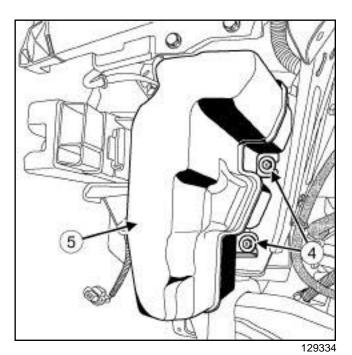
Wear protective gloves during the operation.

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment)
- □ Remove:
  - -the front left-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - -the front splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - -the front wheel arch liners (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection).

#### 2 - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Unclip the air inlet sleeve clips (1).
- □ Remove:
  - the air inlet sleeve (2),
  - the air resonator sleeve (3) .



- □ Remove:
  - the front end panel air resonator bolts (4),
  - the front end panel air resonator (5) .

# FUEL MIXTURE Air resonator: Removal - Refitting

12A

2TR

# II - REFITTING THE AIR RESONATOR IN THE FRONT END PANEL

# 1 - OPERATION FOR REFITTING PART CONCERNED

- □ Refit:
  - the front end panel air resonator (5),
  - the front end panel air resonator bolts (4).
- □ Torque tighten the front end panel air resonator bolts (6 N.m).
- □ Refit:
  - the air resonator sleeve (3),
  - the air inlet sleeve (2).
- ☐ Clip on the air inlet sleeve clips.

#### 2 - FINAL OPERATION

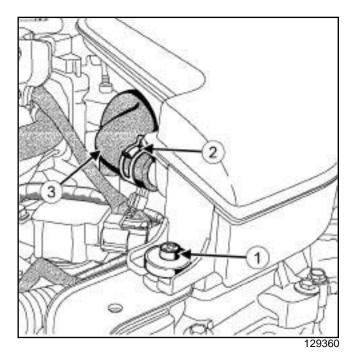
- □ Refit:
  - -the front left-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front splash guard (see Front wheel arch liner: Removal Refitting) (55A, Exterior protection),
  - the front wheel arch liners (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).

# III - REMOVING THE AIR RESONATOR ON THE ROCKER COVER

#### 1 - REMOVAL PREPARATION OPERATION

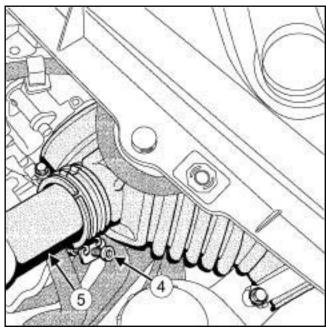
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment)
- ☐ Remove the engine cover.

# 2 - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove:

- the air resonator bolt on the rocker cover (1),
- the oil vapour rebreathing pipe clip (2).
- ☐ Disconnect the oil vapour rebreathing pipe (3) from the air resonator.



129336

- ☐ Loosen the air resonator clip (4).
- ☐ Remove the air resonator (5) from the air inlet sleeve.

# FUEL MIXTURE Air resonator: Removal - Refitting

12A

2TR

# IV - REFITTING THE AIR RESONATOR ON THE ROCKER COVER

# 1 - OPERATION FOR REFITTING PART CONCERNED Refit the air resonator (5) on the rocker cover. Tighten the air resonator clip (4). Connect the oil vapour rebreathing pipe (3). Refit: the oil vapour rebreathing pipe clip (2), the air resonator bolt on the rocker cover (1). Torque tighten the air resonator bolt on the rocker cover (6 N.m). 2 - FINAL OPERATION Refit the engine cover.

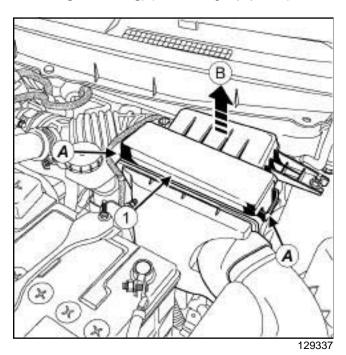
# **FUEL MIXTURE** Air filter: Removal - Refitting

2TR

#### **REMOVAL**

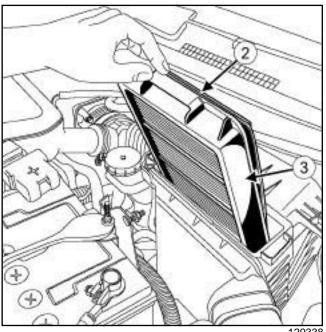
#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).



- ☐ Press the tabs (A) on both sides of the air filter co-
- ☐ Pull upwards on the air filter cover (1) and remove it

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



- □ Remove:
  - the filter element (2) and the support (3) from the air filter unit,
  - the filter element (2) from the support (3) .

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ Clean the air filter unit if necessary.
- ☐ Always replace the filter element (2).

#### **II - REFITTING OPERATION FOR PART CONCERNED**

- ☐ Refit:
  - the filter element (2) on the support (3),
  - the support (3) on the air filter unit.

#### **III - FINAL OPERATION**

□ Refit the air filter cover (1).

# **FUEL MIXTURE**

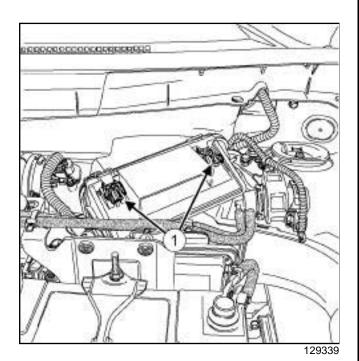
Air filter: Removal - Refitting

**12A** 

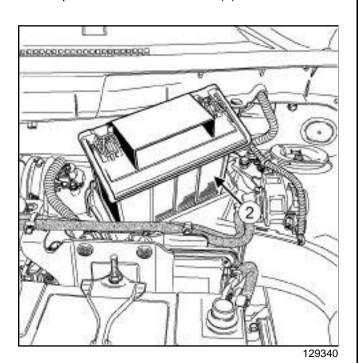
M9R

#### **REMOVAL**

# OPERATION FOR REMOVAL OF PART CONCERNED



☐ Unclip the air filter unit cover at (1).



#### ☐ Remove:

- the filter element cover assembly (2) from the air filter unit,
- the filter element from the air filter unit cover.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

☐ Clean the air filter unit.

#### **WARNING**

If the air filter is fitted incorrectly in the air filter unit, unfiltered air may enter the engine.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the filter element on the air filter unit cover,
  - the filter element cover assembly on the air filter
- Clip on the air filter unit cover.

# **FUEL MIXTURE**

# Air filter unit: Removal - Refitting



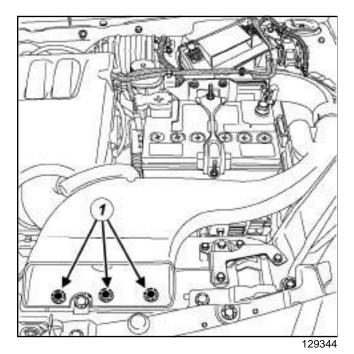
M9R

Essential special tooling			
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.		

Tightening torques	
air filter unit nut	10 N.m
wiring clip bolt	10 N.m
air filter unit air outlet duct clip	5 N.m

#### REMOVAL

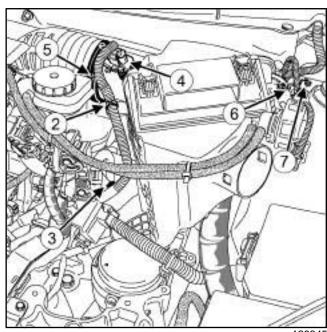
#### I - REMOVAL PREPARATION OPERATION



#### □ Remove:

- the air inlet sleeve clips (1),
- the air inlet sleeve from the air filter unit,
- -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129345

- Unclip:
  - the air filter unit wiring clip (2),
  - the gearbox breather hose clip (3) from the air filter unit
- □ Remove the air flowmeter (4) (see 12A, Fuel mixture, Air flowmeter: Removal Refitting, page 12A-12).
- □ Loosen the air filter unit air outlet duct clip (5) on the air filter unit side.
- ☐ Disconnect the air outlet duct from the air filter unit.
- □ Remove:
  - the wiring clip bolt (6),
  - the air filter unit nut (7),
  - the air filter unit.

#### REFITTING

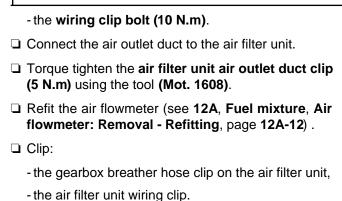
# I - OPERATION FOR REMOVAL OF PART CONCERNED

- ☐ Refit:
  - the air filter unit,
  - the air filter unit nut,
  - the wiring clip bolt.
- ☐ Tighten to torque:
  - the air filter unit nut (10 N.m),

# FUEL MIXTURE Air filter unit: Removal - Refitting

12A

#### M9R



#### **II - FINAL OPERATION**

- ☐ Refit:
  - -the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery).
  - -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
  - the air inlet sleeve on the air filter unit,
  - the air inlet sleeve clips.

# **FUEL MIXTURE** Air filter unit: Removal - Refitting

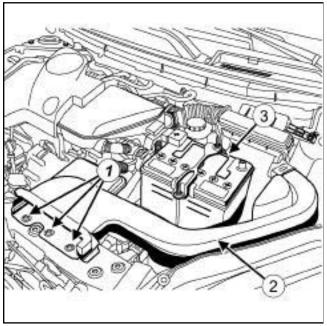
2TR

Tightening torques ♡	
air filter unit nut	10 N.m
air filter unit bolt	6 N.m
air inlet duct clip	6 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

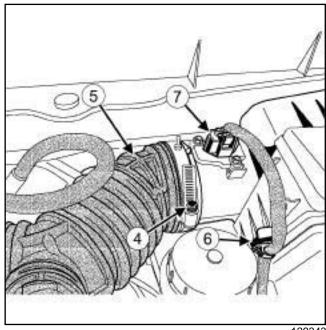
☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).



129341

- ☐ Unclip the air inlet sleeve clips (1).
- □ Remove:
  - the air inlet sleeve (2),
  - the battery (3) (see Battery : Removal Refitting) (80A, Battery)
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



129343

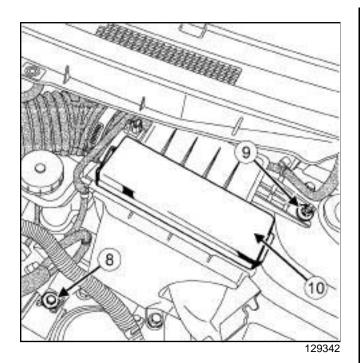
- □ Loosen the air inlet duct clip (4).
- ☐ Disconnect the air inlet duct (5) from the air filter unit.
- ☐ Unclip the wiring clip at (6).
- □ Disconnect the air flowmeter connector (7).

#### **FUEL MIXTURE**

## Air filter unit: Removal - Refitting

12A

2TR



□ Remove:

- the air filter unit bolt (8),
- the air filter unit nut (9),
- the air filter unit (10).

Note:

If necessary, remove the air flowmeter (see 12A, Fuel mixture, Air flowmeter: Removal - Refitting, page 12A-12).

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

Note:

If replacing the air filter unit, refit the air flowmeter (see 12A, Fuel mixture, Air flowmeter: Removal - Refitting, page 12A-12).

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the air filter unit,
  - the air filter unit nut,
  - the air filter unit bolt.

- ☐ Torque tighten:
  - the air filter unit nut (10 N.m),
  - the air filter unit bolt (6 N.m)
- ☐ Connect the air flowmeter connector.
- ☐ Clip on the wiring clip.
- ☐ Connect the air inlet duct to the air filter unit.
- ☐ Torque tighten the air inlet duct clip (6 N.m).

#### **III - FINAL OPERATION.**

- ☐ Refit:
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the air inlet sleeve.
- ☐ Clip on the air inlet sleeve clips.

# FUEL MIXTURE

# Air flowmeter: Removal - Refitting

**12A** 

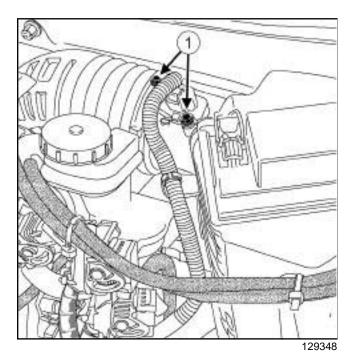
M9R

Essential special tooling				
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.			

Tightening torques	
air flowmeter bolts	2 N.m

#### **REMOVAL**

# OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Disconnect the connector from the air flowmeter.
- ☐ Remove:
  - the air filter unit air flowmeter bolts (1),
  - the air flowmeter,
  - the air flowmeter seal.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the air flowmeter seal.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the air flowmeter seal,
  - the air flowmeter,
  - the air filter unit air flowmeter bolts (1).
- ☐ Torque tighten the air flowmeter bolts (2 N.m) on the air filter unit using the tool (Mot. 1608).
- ☐ Connect the air flowmeter connector.

# FUEL MIXTURE Air flowmeter: Removal - Refitting

12A

2TR

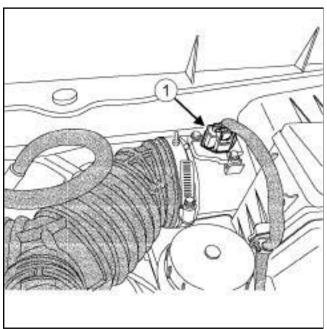
Tightening torques ♡	
air flowmeter bolts	2 N.m

#### **REMOVAL**

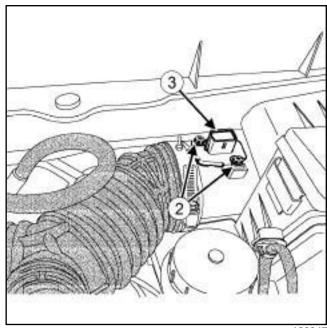
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- 129346
- ☐ Disconnect the air flowmeter connector (1).
- ☐ Move aside the air flowmeter connector (1).



129347

- □ Remove:
  - the bolts (2) from the air flowmeter,
  - the air flowmeter (3) .

#### **REFITTING**

#### REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the air flowmeter (3),
  - the air flowmeter bolts (2).
- ☐ Torque tighten the air flowmeter bolts (2 N.m) (2).
- ☐ Connect:
  - the air flow sensor connector (1),
  - the battery (see **Battery: Removal Refitting**) (80A, Battery).

# FUEL MIXTURE Air inlet flap: Removal - Refitting



M9R

Essential special tooling				
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.			

#### **Essential equipment**

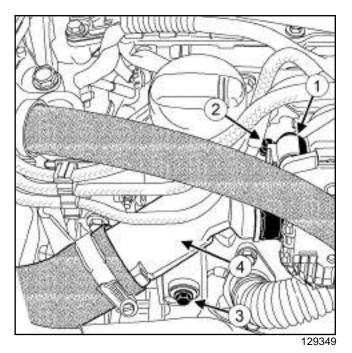
diagnostic tool

Tightening torques ♡	
strut bolts and nuts on the damper valve	10 N.m
strut bolts on the inlet manifold	10 N.m
dipstick guide tube bolts	10 N.m
intercooler air outlet pipe bolt	8 N.m
intercooler air outlet pipe clip	6 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Remove the engine cover.

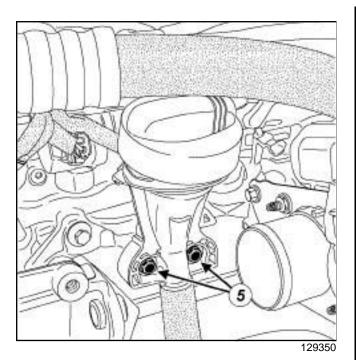


- ☐ Disconnect the connector from the damper valve wiring (1).
- □ Loosen the clip (2) on the intercooler air outlet pipe.
- ☐ Remove the intercooler air outlet pipe bolt (3).
- ☐ Disconnect the intercooler air outlet pipe (4) from the damper valve.
- $\hfill \square$  Move the intercooler air outlet pipe to one side.

### Air inlet flap: Removal - Refitting

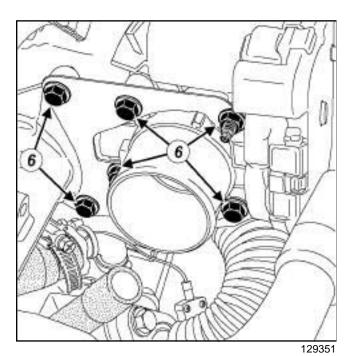
**12A** 

M9R



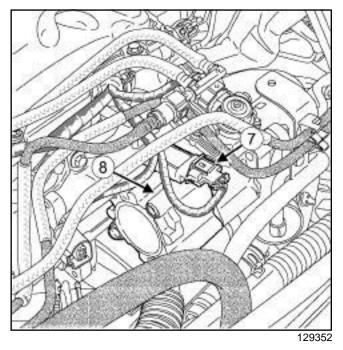
- □ Remove:
  - the dipstick guide tube bolts (5).
  - the dipstick guide tube.
- ☐ Plug the opening of the dipstick guide tube on the cylinder block.

## II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Remove:
  - the strut bolts and nuts (6),

- the damper valve strut,
- the damper valve,
- the seal between the damper valve and the turbocharger pressure sensor housing.



☐ Disconnect the connector (7) from the turbocharger pressure sensor.

#### ☐ Remove:

- the turbocharger pressure sensor housing (8),
- the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ Clean and degrease the bearing faces:
  - between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - between the damper valve and the turbocharger pressure sensor housing.
- □ Always replace:
  - the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve.
  - the seal between the damper valve and the turbocharger pressure sensor housing.

# FUEL MIXTURE Air inlet flap: Removal - Refitting

12A

M9R

	REFITTING OPERATION FOR PART DNCERNED
	Refit:
	<ul> <li>the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,</li> </ul>
	-the turbocharger pressure sensor housing.
	Connect the turbocharger pressure sensor connector.
	Refit:
	- the seal between the damper valve and the turbo- charger pressure sensor housing,
	- the damper valve,
	- the damper valve strut,
	- the strut bolts and nuts.
	Torque tighten in turn:
	- the strut bolts and nuts on the damper valve (10 N.m).
	-the strut bolts on the inlet manifold (10 N.m).
Ш	- FINAL OPERATION.
	Remove the plug from the opening of the dipstick guide tube on the cylinder block.
	Refit:
	- the dipstick guide tube,
	- the dipstick guide tube bolts.
	Torque tighten the dipstick guide tube bolts (10 N.m).
	Connect the intercooler air outlet pipe to the damper valve.
	Refit the intercooler air outlet pipe bolt.
	Torque tighten:
	-the intercooler air outlet pipe bolt (8 N.m),
	-the intercooler air outlet pipe clip (6 N.m) using the tool (Mot. 1608).
	Connect the damper valve wiring connector.
	Refit the engine cover.
	Connect the diagnostic tool.
	Reinitialise the programming in accordance with the procedure for command <b>SC036</b> when replacing the damper valve (see <b>Fault finding - Replacement of components</b> ) (13B, Diesel injection).

# FUEL MIXTURE Throttle valve: Removal - Refitting

2TR

Essential special tooling					
Mot. 1448	Long clips.	nose	pliers	for	hose

### **Essential equipment**

diagnostic tool

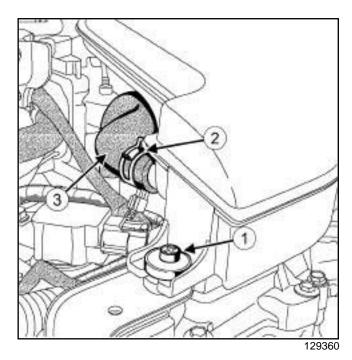
Tightening torques ♡	
motorised throttle valve bolts	8 N.m
air inlet pipe clips	6 N.m
the air resonator bolt	6 N.m.

#### **REMOVAL**

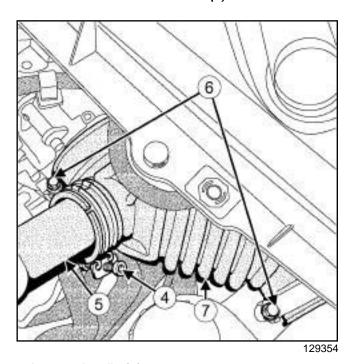
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine cover.

## II - OPERATION FOR REMOVAL OF PART CONCERNED

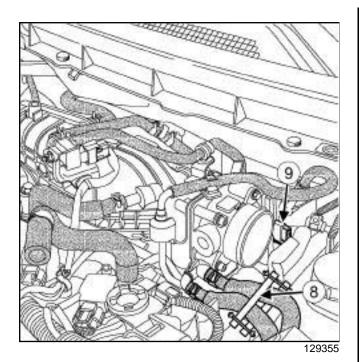


- ☐ Remove:
  - the bolt (1) from the air resonator,
  - the breather hose clip (2).
- □ Disconnect the breather hose (3).

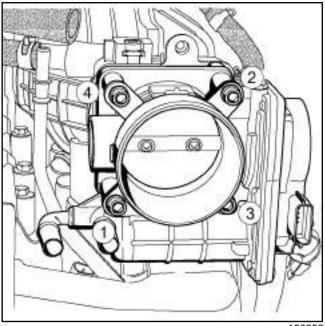


- □ Loosen the clip (4).
- ☐ Remove the air resonator (5) on the rocker cover.
- ☐ Loosen the air inlet pipe clips (6).
- ☐ Remove the air inlet pipe (7).

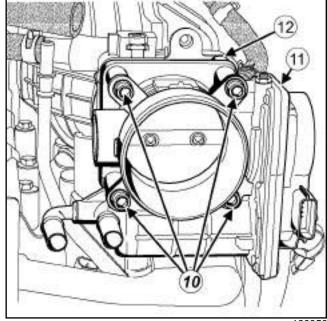
2TR



- ☐ Fit the hose clamp (8) on the motorised throttle valve coolant pipes.
- ☐ Remove the motorised throttle valve coolant pipe clips using the tool (Mot. 1448).
- □ Disconnect:
  - the motorised throttle valve coolant pipes,
  - the motorised throttle valve connector (9).



129356



129356

#### □ Remove:

- in order the motorised throttle valve bolts (10),
- the motorised throttle valve (11),
- the motorised throttle valve seal (12) .

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the motorised throttle valve seal.

Throttle valve: Removal - Refitting

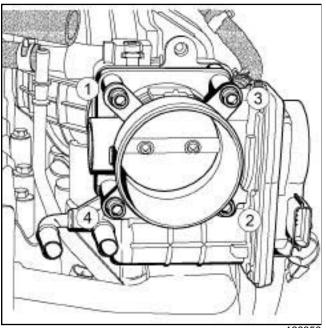
**12A** 

2TR

### II - REFITTING OPERATION FOR PART CONCERNED

#### □ Refit:

- the motorised throttle valve seal,
- the motorised throttle valve,
- the motorised throttle valve bolts.



129356

- ☐ Torque tighten in order the motorised throttle valve bolts (8 N.m).
- ☐ Connect:
  - the motorised throttle valve connector,
  - the motorised throttle valve coolant pipes.
- ☐ Refit the motorised throttle valve coolant pipe clips using the tool (Mot. 1448).
- ☐ Remove the hose clamp from the motorised throttle valve coolant pipes.
- ☐ Refit the air inlet pipe.
- ☐ Tighten the air inlet pipe clips (6 N.m).
- ☐ Refit the air resonator on the rocker cover.
- ☐ Tighten the clip (4).
- ☐ Connect the breather hose (3).
- ☐ Refit:
  - the breather hose clip,
  - the air resonator bolt on the rocker cover.
- ☐ Torque tighten the air resonator bolt (6 N.m.)

#### **III - FINAL OPERATION**

- ☐ Refit the engine cover.
- ☐ Connect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Carry out the programming of the motorised throttle valve using the diagnostic tool (see Fault finding -Replacement of components) (17B, Petrol injection).
- ☐ Carry out the following if necessary:
  - top up the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
  - bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

**Throttle valve: Cleaning** 

12A

2TR

#### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this opera-

#### **IMPORTANT**

Wear goggles with side protectors for this operation.

#### Note:

Be sure to work in a clean environment so as not to allow any contamination of the throttle valve.

## PARTS AND INGREDIENTS FOR THE REPAIRWORK

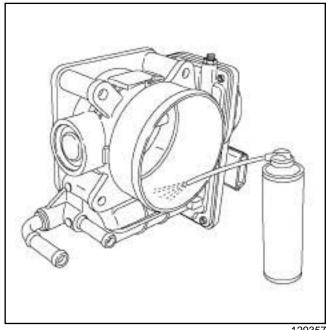
- Consumables (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products):
  - CARBURETTOR CLEANER,
  - Lint-free cleaning cloths.

#### **CLEANING**

#### I - CLEANING PREPARATION OPERATION

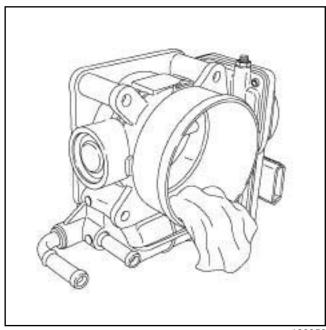
- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the throttle valve (see 12A, Fuel mixture, Throttle valve: Removal Refitting, page 12A-17)

**II - CLEANING THE PART CONCERNED** 



129357

- ☐ Hold the throttle valve flap open manually.
- □ Spray the CARBURETTOR CLEANER product in the air vent until all traces of clogging have disappeared.

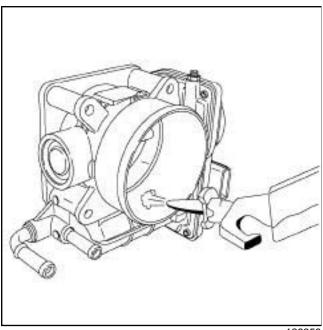


129358

☐ Remove the cleaning product residue and residue of the dirt using lint-free cleaning cloths.

**Throttle valve: Cleaning** 

2TR



129359

☐ Use a hot air gun along the edge of the throttle valve and then on the air vent.

#### Note:

If the throttle valve is dropped or is subject to any other impact, it must be replaced.

#### **III - FINAL OPERATION.**

- □ Refit the throttle valve, fitted with a new seal (see 12A, Fuel mixture, Throttle valve: Removal Refitting, page 12A-17).
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ When refitting the throttle valve, carry out the necessary programming (see Fault finding Replacement of components) (17B, Petrol injection).

### **FUEL MIXTURE** Air inlet duct: Removal - Refitting

2TR

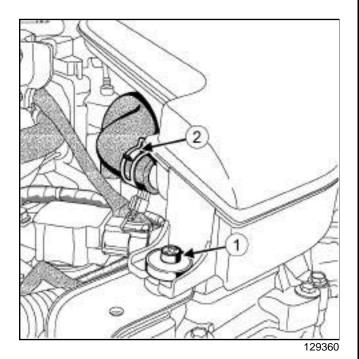
Tightening torques ♡	
air inlet duct clips	6 N.m
air resonator bolt	6 N.m

#### **REMOVAL**

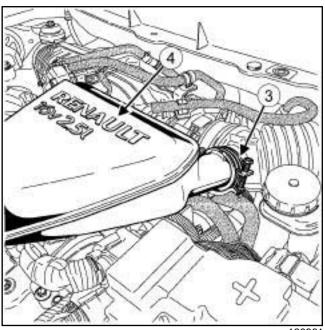
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove the engine cover.

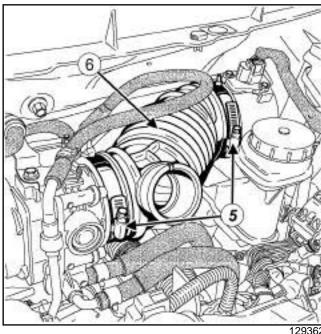
#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



- □ Remove:
  - the bolt (1) from the air resonator,
  - the oil vapour rebreathing pipe clip (2) .
- ☐ Disconnect the oil vapour rebreathing pipe.



- □ Loosen the air resonator clip (3) on the air inlet duct.
- ☐ Remove the air resonator (4) on the rocker cover.



- □ Loosen the clips (5) of the air inlet duct on the air filter unit and on the throttle valve.
- ☐ Remove the air inlet duct (6).

# FUEL MIXTURE Air inlet duct: Removal - Refitting

12A

2TR

### **REFITTING**

-	I - REFITTING OPERATION FOR PART	
	CONCERNED	
	Refit:	
	- the air inlet duct (6),	
	-the air inlet duct clips (5).	
	Torque tighten the <b>air inlet duct clips (6 N.m)</b> on the air filter unit and on the throttle valve.	
	Refit the air resonator on the rocker cover.	
	Tighten the air resonator clip (3) on the air inlet duct.	
	Connect the oil vapour rebreathing pipe.	
	Refit:	
	- the oil vapour rebreathing pipe clip (2),	
	- the air resonator bolt (1).	
	Torque tighten the air resonator bolt (6 N.m).	
Ш	FINAL OPERATION.	
	Refit the engine cover.	

M9R

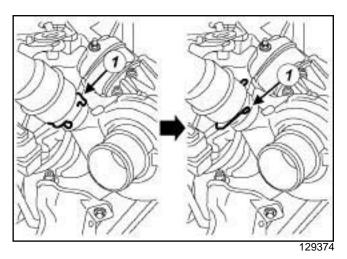
Essential special tooling		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.	

Tightening torques ▽	
inlet manifold nuts and bolts	15 N.m
inlet manifold nuts and bolts	25 N.m
dipstick guide tube bolts	10 N.m
intercooler air outlet duct bolt	8 N.m
intercooler air outlet duct clip	6 N.m
EGR bypass solenoid valve bolts	10 N.m
air filter unit air outlet duct clips	5 N.m
intercooler air inlet hose clip	6 N.m
intercooler air inlet duct bolt	8 N.m

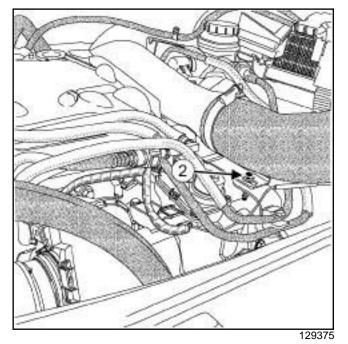
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - the engine cover,
  - the engine undertray.
- □ Drain the engine cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
- □ Remove:
  - the clips from the air inlet sleeve,
  - the air intake sleeve on the air filter unit,
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

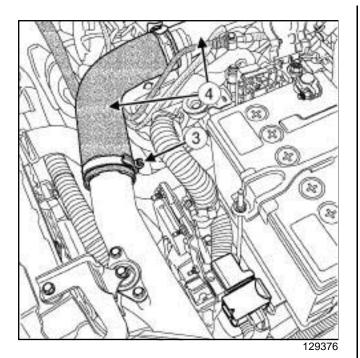


☐ Turn the clip (1) on the intercooler air inlet duct.



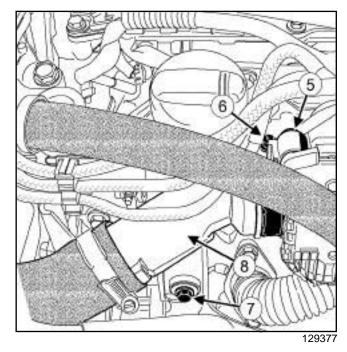
☐ Remove the intercooler air inlet duct bolt (2) from the fuel pipe support.

M9R



- ☐ Loosen the clip (3) on the intercooler air inlet duct.
- □ Remove:
  - the air inlet duct assembly (4) from the intercooler,
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).
- □ Loosen the air filter unit air outlet duct clip on the turbocharger.
- □ Disconnect:
  - the oil vapour rebreathing pipe from the oil separator,
  - the air filter unit air outlet duct from the turbocharger.
- ☐ Fit a blanking plug in the opening of the oil separator.
- □ Remove:
  - -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
  - the scuttle half-grille (see **Scuttle half-grille**: **Removal Refitting**) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - -the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - -the water chamber (see 19A, Cooling, Plenum chamber: Removal - Refitting, page 19A-27) ,

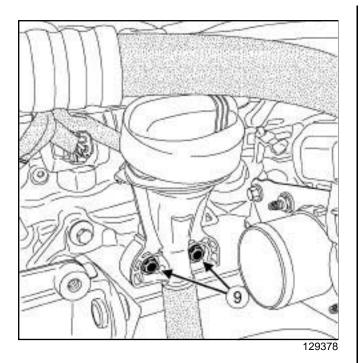
 the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19).



- □ Disconnect the connector from the damper valve wiring (5).
- ☐ Loosen the clip (6) on the intercooler air inlet duct.
- ☐ Remove the bolt (7) from the intercooler air outlet duct.
- ☐ Disconnect the intercooler air outlet duct (8) from the damper valve.
- ☐ Move the intercooler air outlet duct to one side.

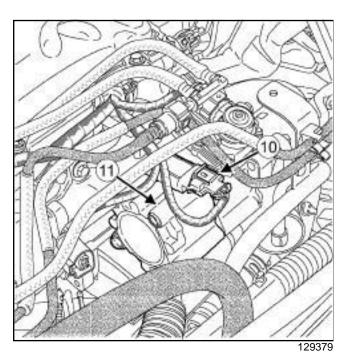
### Inlet manifold: Removal - Refitting

M9R



#### □ Remove:

- the dipstick guide tube bolts (9),
- the dipstick guide tube.
- ☐ Plug the opening of the dipstick guide tube on the cylinder block.
- ☐ Remove the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14).

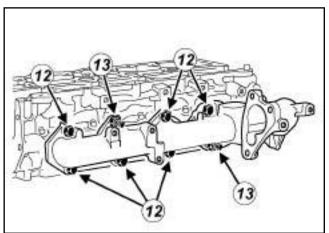


Disconnect the connector (10) from the turbocharger pressure sensor.

#### □ Remove:

- the turbocharger pressure sensor housing (11),
- the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal -Refitting, page 14A-19),
- the EGR solenoid valve (see 14A, Antipollution, Exhaust gas recirculation solenoid valve: Removal - Refitting, page 14A-8),
- the starter (see 16A, Starting Charging, Starter: Removal - Refitting, page 16A-7),
- the intercooler (see 14A, Antipollution, Intercooler: Removal Refitting, page 14A-14),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3),
- the multifunction support (see 10A, Engine and cylinder block assembly, Multifunction support: Removal Refitting, page 10A-41).

### II - OPERATION FOR REMOVAL OF PART CONCERNED



129380

#### ☐ Remove:

- the intake distributor bolts (12),
- the intake distributor nuts (13),
- the inlet manifold,

#### M9R

- the inlet manifold gasket.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

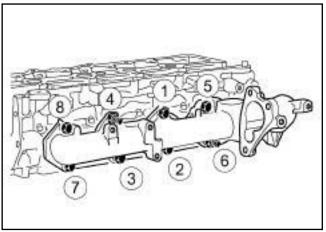
#### ☐ Clean:

- the cylinder head joint face,
- the intake distributor joint face,
- the exhaust gas recirculation rigid pipe joint faces,
- the turbocharger pressure sensor housing joint faces,
- the damper valve seal face.

#### □ Always replace:

- the inlet manifold gasket,
- the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler,
- the exhaust gas recirculation rigid pipe seal on the exhaust manifold,
- the exhaust gas recirculation rigid pipe seals,
- the exhaust gas recirculation rigid pipe clip,
- the rigid exhaust gas recirculation pipe bolts,
- the coolant outlet unit seal,
- the gasket between the intake distributor and the EGR solenoid valve.
- the seal between the turbocharger pressure sensor housing and the EGR solenoid valve,
- the seal between the damper valve and the turbocharger pressure sensor housing,
- the intercooler air inlet duct seal.

## II - REFITTING OPERATION FOR PART CONCERNED



129380

#### ☐ Refit:

- the new intake distributor seal,
- the inlet manifold,
- the inlet manifold nuts and bolts.
- □ Pretighten to torque and in order the **inlet manifold nuts and bolts (15 N.m)**.
- ☐ Torque tighten in order the inlet manifold nuts and bolts (25 N.m).

#### **III - FINAL OPERATION.**

#### □ Refit:

- the multifunction support (see 10A, Engine and cylinder block assembly, Multifunction support: Removal - Refitting, page 10A-41),
- the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3)
- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- the intercooler (see 14A, Antipollution, Intercooler: Removal Refitting, page 14A-14)
- the starter (see 16A, Starting Charging, Starter: Removal Refitting, page 16A-7),
- the new seal between the EGR solenoid valve and the intake distributor,

**12A** 

#### M9R

- -the EGR solenoid valve (see 14A, Antipollution, Exhaust gas recirculation solenoid valve: Removal - Refitting, page 14A-8),
- the new exhaust gas recirculation rigid pipe seals,
- -the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal -Refitting, page 14A-19),
- the new seal between the turbocharger pressure sensor housing and the EGR solenoid valve,
- the turbocharger pressure sensor housing.
- ☐ Connect the turbocharger pressure sensor connector

#### □ Refit:

- the seal between the damper valve and the turbocharger pressure sensor housing,
- the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14).
- ☐ Remove the plug from the opening of the dipstick guide tube on the cylinder block.
- ☐ Torque tighten the dipstick guide tube bolts (10 N.m).
- ☐ Connect the intercooler air outlet duct to the damper valve.
- ☐ Refit the intercooler air outlet duct bolt.
- □ Torque tighten:
  - -the intercooler air outlet duct bolt (8 N.m),
  - the intercooler air outlet duct clip (6 N.m) using the tool (Mot. 1608).
- ☐ Connect the damper valve wiring connector.

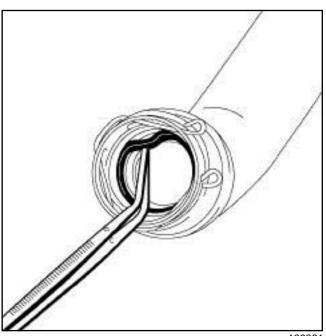
#### Refit:

- the exhaust gas recirculation rigid pipe seal on the exhaust manifold,
- -the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19).
- the coolant outlet unit seal,
- -the water chamber (see 19A, Cooling, Plenum chamber: Removal Refitting, page 19A-27),
- -the water chamber hoses and pipes (see 19A, Cooling, Plenum chamber: Removal Refitting, page 19A-27).
- ☐ Fit the EGR bypass solenoid valve.

- ☐ Refit the EGR bypass solenoid valve bolts.
- ☐ Torque tighten the EGR bypass solenoid valve bolts (10 N.m).

#### □ Connect:

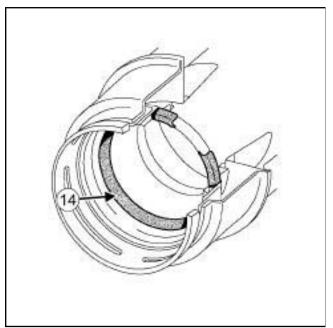
- the vacuum hoses on the EGR bypass solenoid valve and on the exhaust gas cooler,
- the EGR bypass solenoid valve connector.
- □ Refit the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- Connect the air filter unit air outlet duct to the turbocharger and to the air filter unit.
- ☐ Torque tighten the air filter unit air outlet duct clips (5 N.m) using the tool (Mot. 1608).
- ☐ Remove the blanking plug from the opening of the oil separator.
- ☐ Connect the oil vapour rebreathing hose to the oil separator.
- ☐ Fit the intercooler air inlet duct assembly onto the intercooler air inlet pipe.
- ☐ Torque tighten the intercooler air inlet hose clip (6 N.m) using the tool (Mot. 1608).



12938

☐ Remove the intercooler air inlet duct seal using a .

M9R



129382

#### Note:

Check whether the intercooler air inlet duct seal (14) is correctly positioned.

- ☐ Refit the new intercooler air inlet duct seal.
- ☐ Turn the intercooler air inlet duct to fit the clip in its housing.
- ☐ Clip the intercooler air inlet duct onto the turbocharger.
- ☐ Refit the intercooler air inlet duct bolt to the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet duct bolt (8 N.m).
- ☐ Refit:
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
  - the scoop under the scuttle panel grille (see **Scoop** under scuttle panel grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),

- the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
- the air intake sleeve on the air filter unit,
- the clips of the air inlet sleeve.
- □ Fill the engine cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
- □ Bleed the engine cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
- ☐ Refit:
  - the engine undertray,
  - the engine cover.

**12A** 

2TR

Essential special tooling		
Mot. 1869	Pliers for disconnecting the fuel circuit	

Tightening torques ♡	
intake distributor nuts and bolts	20 N.m
intake distributor sup- port bolts	20 N.m
motorised throttle valve bolts	8 <b>N</b> .m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

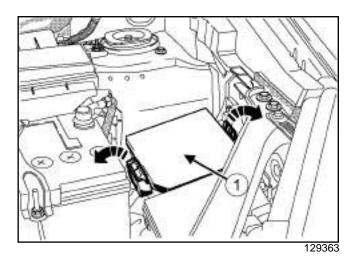
#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).

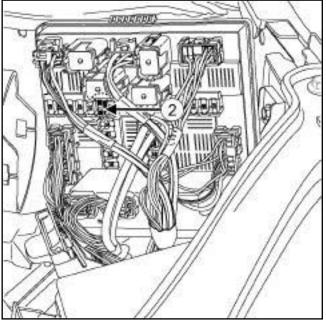
#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- ☐ Remove the engine cover.
- ☐ Remove the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).



☐ Disconnect the cover (1) from the Protection and Switching Unit.



129364

- □ Remove the fuse (2) of the fuel pump(F13) (15A).
- ☐ Release the fuel pressure in the fuel pipe after starting the engine.

#### Note:

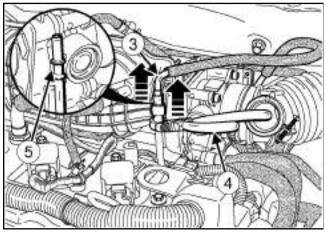
After switching the engine off, start it again two or three times to fully relieve the fuel pressure.

#### ☐ Remove:

- the battery (see Battery: Removal Refitting) (80A, Battery)
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),

#### 2TR

- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
- the engine cover,
- -the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22).



129365

☐ Remove the plug of the fuel supply union.

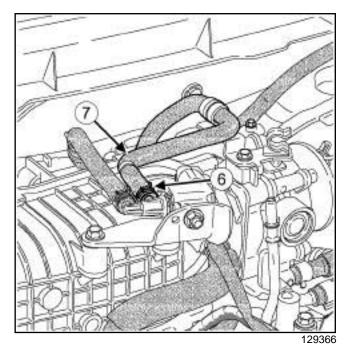
#### **IMPORTANT**

During this operation, be sure to:

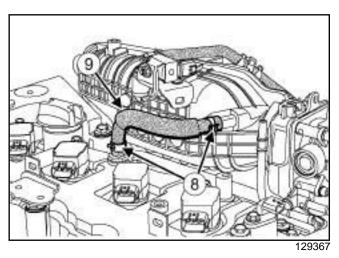
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.
- □ Disconnect the quick-release union (3) using the tool (Mot. 1869) (4) as illustrated.

#### Note:

Insert the tool (Mot. 1869) (4) into the second retaining part (5).



- □ Remove the petrol vapour rebreathing pipe clip (6) .
- □ Disconnect the petrol vapour rebreathing pipe (7).



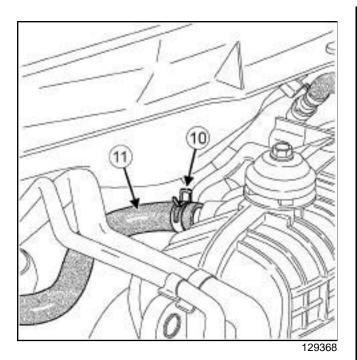
- ☐ Remove the clips (8) of the oil vapour rebreathing
- □ Disconnect the oil vapour rebreathing hose (9).

hose.

### Inlet manifold: Removal - Refitting

**12A** 

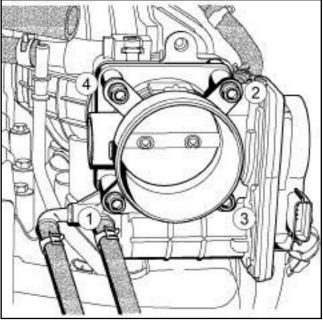
2TR



- ☐ Remove the clip (10) from the vacuum pipe of the brake servo.
- Disconnect the vacuum pipe (11) from the brake servo.

#### □ Remove:

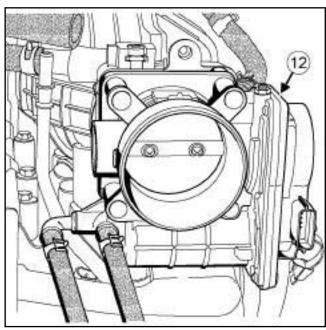
- -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
- the scuttle panel half-grille (see **Scuttle half-grille: Removal Refitting**) (56A, Exterior equipment),
- -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
- -the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).
- ☐ Disconnect the motorised throttle valve connector.



129369

#### □ Remove:

- in order the motorised throttle valve bolts,
- the motorised throttle valve without disconnecting the coolant pipes.



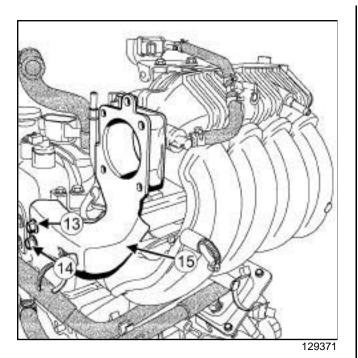
129370

☐ Move aside the throttle valve (12).

### Inlet manifold: Removal - Refitting

12A

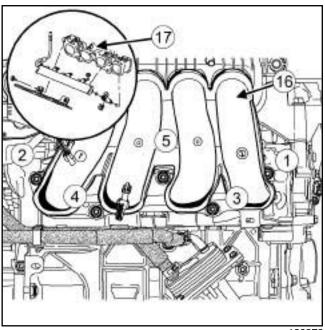
2TR



#### □ Remove:

- the intake distributor support bolts (13) and (14),
- the intake distributor support (15),
- the seal.

## II - OPERATION FOR REMOVAL OF PART CONCERNED



129372

#### □ Remove:

- in order, the intake distributor bolts and nuts,
- the inlet manifold (16),
- the intake distributor seal,
- the intake distributor adapter (17),
- the intake distributor adapter seal.

#### Note:

The engine must remain covered to prevent impurities from entering inside.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

#### □ Always replace:

- the intake distributor seal,
- the intake distributor adapter seal,
- the motorised throttle valve seal.

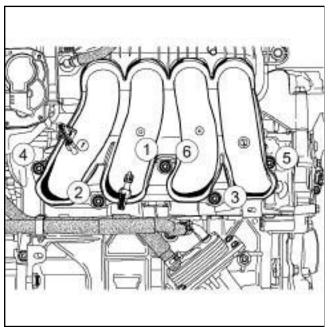
## II - REFITTING OPERATION FOR PART CONCERNED

#### □ Refit:

- the new intake distributor adapter seal,
- the intake distributor adapter,

#### 2TR

- the new intake distributor seal,
- the inlet manifold,
- the intake distributor nuts and bolts.



129373

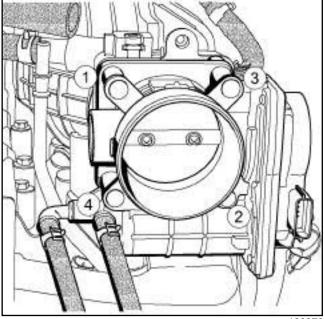
☐ Torque tighten in order the intake distributor nuts and bolts (20 N.m).

#### Note:

Mark (6) indicates retightening of the bolt to a torque of 20 N.m.

#### **III - FINAL OPERATION**

- Refit:
  - the new intake distributor support seal,
  - the intake distributor support,
  - the intake distributor support bolts.
- ☐ Torque tighten the intake distributor support bolts (20 N.m).
- ☐ Refit:
  - the new motorised throttle valve seal,
  - the motorised throttle valve bolts.



129370

- ☐ Torque tighten in order the motorised throttle valve bolts (8 N.m).
- ☐ Connect the motorised throttle valve connector.
- ☐ Refit:
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scuttle panel half-grille (see **Scuttle half-grille: Removal Refitting**) (56A, Exterior equipment),
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing).
- ☐ Connect the brake servo vacuum pipe.
- ☐ Refit the clip of the vacuum pipe of the brake servo.
- ☐ Connect the oil vapour rebreathing hoses.
- ☐ Refit the clips of the oil vapour rebreathing hose.
- ☐ Disconnect the petrol vapour rebreathing pipe.
- ☐ Refit the petrol vapour rebreathing pipe clip.
- ☐ Connect the quick-release union of the fuel supply.

#### Note:

Check the condition of the quick-release union connection again.

☐ Remove the fuel supply union plug.

12A

2TR

#### ☐ Refit:

- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22) ,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
- the engine cover,
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
- -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- -the battery (see **Battery: Removal Refitting**) (80A, Battery)
- the fuel pump fuse,
- the Protection and Switching Unit cover.
- ☐ Refit the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

M9R

Essential special tooling		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.	

### **Essential equipment**

roller-type stud removal tool

Т	
Tightening torques ♡	
exhaust manifold studs	9 N.m
exhaust manifold nuts	18 <b>N</b> .m
exhaust manifold nuts	30 N.m
exhaust gas cooler coo- lant inlet pipe support bolts	10 N.m
intercooler water inlet pipe bolts	10 N.m
exhaust gas recircula- tion rigid pipe heat shield bolts	10 N.m
EGR bypass solenoid valve bolts	10 N.m
air filter unit air outlet pipe clips	5 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the engine cover,
  - the engine undertray,
  - the clips from the air inlet sleeve,
  - the air intake sleeve on the air filter unit,
  - -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
  - the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery),
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).

- ☐ Loosen the air filter unit air outlet duct clip on the turbocharger.
- □ Disconnect:
  - the oil vapour rebreathing pipe from the oil separator,
  - the air filter unit air outlet duct from the turbocharger.
- ☐ Fit a blanking plug in the opening of the oil separator.
- □ Remove:
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).
- ☐ Drain the engine cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)

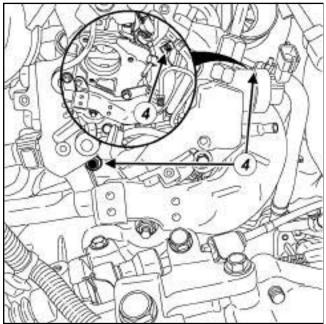
1293

- Disconnect:
  - the connector (1) from the EGR bypass solenoid valve.
  - the vacuum hoses (2) from the EGR bypass solenoid valve.

#### M9R

#### □ Remove:

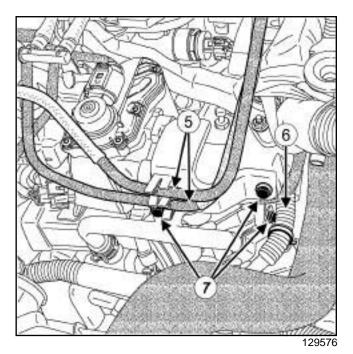
- the EGR bypass solenoid valve bolts (3),
- the EGR bypass solenoid valve,
- the coolant outlet unit (see 19A, Cooling, Plenum chamber: Removal Refitting, page 19A-27).



129390

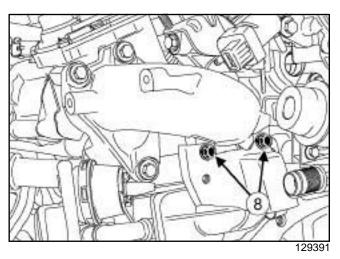
#### □ Remove:

- the bolts (4) from the exhaust gas recirculation rigid pipe heat shield on the exhaust manifold and on the cylinder head,
- the heat shield from the exhaust gas recirculation solenoid valve.



#### ☐ Unclip:

- the fuel pipes (5),
- the electrical wiring (6) .
- ☐ Remove the bolts (7) from the intercooler water inlet pipe.
- ☐ Move the intercooler water inlet pipe to one side.



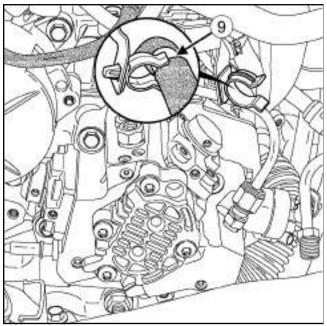
#### ☐ Remove:

- the bolts (8) of the exhaust gas cooler coolant inlet pipe support from the intake distributor,
- the exhaust gas cooler coolant inlet pipe support.

### **Exhaust manifold: Removal - Refitting**

**12A** 

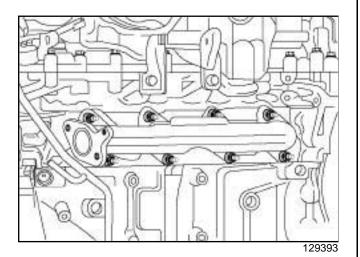
M9R



129392

- ☐ Unclip the cooling hose (9) from the turbocharger.
- □ Remove:
  - -the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19),
  - the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal Refitting, page 19B-8)
  - the turbocharger (see 12B, Turbocharging, Turbocharger: Removal Refitting, page 12B-4).

## II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove:

- the nuts and spacers from the exhaust manifold,

- the exhaust manifold,
- the exhaust manifold gasket.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

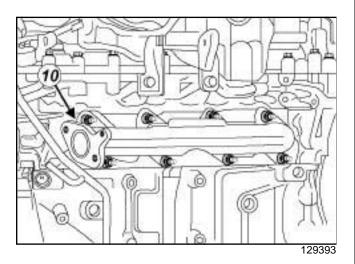
WARNING

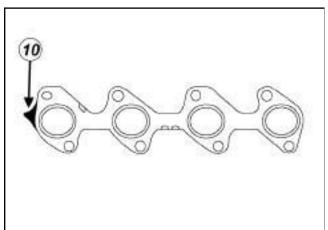
The joint faces must be clean, dry and free from grease (avoid finger marks).

- □ Always replace:
  - the exhaust manifold studs, if they have been loosened during the removal operation,
  - the exhaust manifold nuts,
  - the exhaust manifold gasket.
- ☐ Clean and degrease the bearing faces:
  - of the exhaust manifold, if it is to be reused,
  - of the cylinder head,
  - of the exhaust gas recirculation rigid pipe heat shield.
- □ Check if the exhaust manifold studs are torque tightened to 9 N.m. Otherwise replace the exhaust manifold studs which are loosened.
- ☐ Torque tighten the exhaust manifold studs (9 N.m) using a roller-type stud removal tool.

M9R

## II - REFITTING OPERATION FOR PART CONCERNED



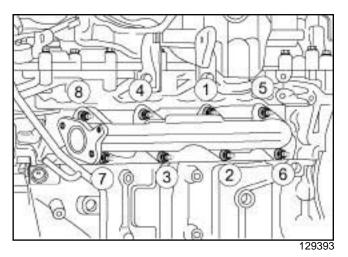


129394

Note:

Check if the manifold seal is correctly positioned. The tab must be positioned at (10) .

- ☐ Refit:
  - the new exhaust manifold gasket,
  - the exhaust manifold,
  - the spacers.
- ☐ Finger tighten the new exhaust manifold nuts until they are in contact.



- □ Pretighten to torque and in order the **exhaust manifold nuts (18 N.m)**.
- ☐ Torque tighten in order the exhaust manifold nuts (30 N.m).

#### **III - FINAL OPERATION**

- □ Refit:
  - the turbocharger (see 12B, Turbocharging, Turbocharger: Removal - Refitting, page 12B-4),
  - the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal Refitting, page 19B-8)
  - the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19).
- ☐ Clip the cooling hose (9) onto the turbocharger.
- ☐ Fit the exhaust gas cooler coolant inlet pipe support onto the intake distributor.
- ☐ Refit the exhaust gas cooler coolant inlet pipe support bolts.
- ☐ Torque tighten the exhaust gas cooler coolant inlet pipe support bolts (10 N.m).
- ☐ Position the intercooler water inlet pipe.
- ☐ Refit the intercooler water inlet pipe bolts.
- ☐ Torque tighten the intercooler water inlet pipe bolts (10 N.m).
- ☐ Clip:
  - the electrical wiring (6),
  - the fuel pipes (5).
- ☐ Position the heat shield for the exhaust gas recirculation rigid pipe.

**12A** 

M9R	
☐ Refit the EGR rigid pipe heat shield bolts	- the clips of the air inlet sleeve.
☐ Torque tighten the exhaust gas recirculation rigid pipe heat shield bolts (10 N.m).	☐ Fill the engine cooling system (see 19A, Cooling Cooling circuit: Draining - Refilling, page 19A-10
□ Refit:	
<ul> <li>- the coolant outlet unit (see 19A, Cooling, Plenum chamber: Removal - Refitting, page 19A-27) ,</li> </ul>	☐ Bleed the engine cooling system (see 19A, Cooling Cooling circuit: Draining - Refilling, page 19A-10
<ul> <li>-the water chamber hoses and pipes (see 19A, Cooling, Plenum chamber: Removal - Refitting, page 19A-27).</li> </ul>	☐ Refit: - the engine undertray,
☐ Fit the EGR bypass solenoid valve.	- the engine cover.
☐ Refit the EGR bypass solenoid valve bolts.	
☐ Torque tighten the EGR bypass solenoid valve bolts (10 N.m).	
□ Connect:	
<ul> <li>-the vacuum hoses on the EGR bypass solenoid valve and on the exhaust gas cooler,</li> </ul>	
-the EGR bypass solenoid valve connector.	
☐ Remove:	
<ul> <li>-the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),</li> </ul>	
-the windscreen wiper mechanism (see <b>Windscreen wiper mechanism: Removal - Refitting</b> ) (85A, Wiping - Washing),	
<ul> <li>- the scuttle half-grille (see Scuttle half-grille: Removal - Refitting) (56A, Exterior equipment),</li> </ul>	
<ul> <li>-the windscreen wiper arms (see Windscreen wiper arm: Removal - Refitting) (85A, Wiping - Washing),</li> </ul>	
<ul> <li>- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).</li> </ul>	
☐ Connect the air filter unit air outlet duct to the turbo- charger and to the air filter unit.	
☐ Torque tighten the air filter unit air outlet pipe clips (5 N.m) using the tool (Mot. 1608).	
☐ Remove the blanking plug from the opening of the oil separator.	
☐ Connect the oil vapour rebreathing pipe to the oil decanter.	
□ Refit:	
-the battery tray (see <b>Battery tray: Removal - Refitting</b> ) (80A, Battery),	
-the battery (see <b>Battery: Removal - Refitting</b> ) (80A, Battery)	

- the air intake sleeve on the air filter unit.

**12A** 

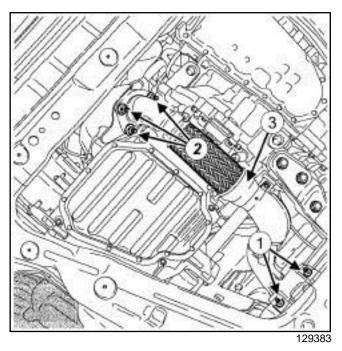
2TR

T	
Tightening torques ▽	
catalytic pre-converter heat shield bolts	6 N.m
exhaust manifold lower heat shield bolts	6 N.m
exhaust manifold nuts (initial torque)	15 N.m
exhaust manifold nuts	42 N.m
exhaust manifold upper heat shield bolts	6 N.m
dipstick guide tube bolt	22 N.m
exhaust connecting pipe nuts	65 N.m
exhaust connecting pipe rubber mounting bush support nuts	14 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

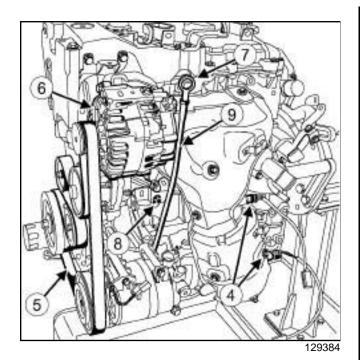
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.



#### □ Remove:

- the exhaust connecting pipe rubber mounting bush support nuts  $(\mathbf{1})$  ,
- the exhaust connecting pipe nuts (2),
- the connector pipe (3),
- the seal,
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres)
- the front wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),

2TR



 $lue{}$  Disconnect the oxygen sensor connectors .

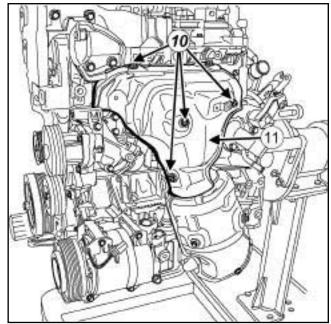


Do not damage the oxygen sensor.

If the oxygen sensor falls on hard ground, for example concrete, replace the sensor.

#### ☐ Remove:

- -the oxygen sensors (4) (see 17B, Petrol injection, Oxygen sensors: Removal Refitting, page 17B-4),
- -the accessories belt (5) (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- -the windscreen washer bottle neck (see **Windscreen washer bottle funnel: Removal Refitting**) (85A, Wiping washing),
- the alternator *(6)* (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3),
- the dipstick (7),
- the dipstick guide tube bolt (8),
- the dipstick guide tube (9),
- the O-ring.



129385

#### Note:

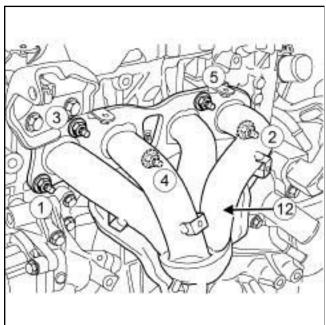
The engine must remain covered to prevent impurities from entering inside.

#### ☐ Remove:

- the bolts (10) from the exhaust manifold upper heat shield,
- the upper heat shield (11) from the exhaust manifold.

2TR

## II - OPERATION FOR REMOVAL OF PART CONCERNED



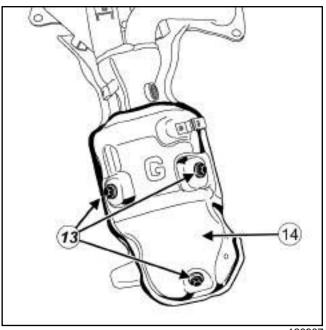
129386

#### Note:

The engine must remain covered to prevent impurities from entering inside.

#### □ Remove:

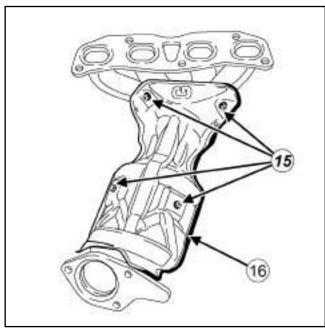
- the exhaust manifold nuts in order,
- the exhaust manifold (12).



129387

#### ☐ Remove:

- the bolts (13) from the exhaust manifold lower heat shield,
- the lower heat shield (14) from the exhaust manifold



129388

#### ☐ Remove:

- the bolts (15) from the catalytic pre-converter heat shield,
- the catalytic pre-converter heat shield (16) .

### **Exhaust manifold: Removal - Refitting**

**12A** 

2TR

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the seals,
  - the O-ring.

### II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the catalytic pre-converter heat shield,
  - the catalytic pre-converter heat shield bolts.
- ☐ Torque tighten the catalytic pre-converter heat shield bolts (6 N.m).
- □ Refit:
  - the exhaust manifold lower heat shield,
  - the exhaust manifold lower heat shield bolts.
- ☐ Torque tighten the exhaust manifold lower heat shield bolts (6 N.m).
- □ Refit:
  - the new exhaust manifold gasket,
  - the exhaust manifold,
  - the exhaust manifold nuts.



129386

- ☐ Torque tighten in order:
  - -the exhaust manifold nuts (initial torque) (15 N.m),

- the exhaust manifold nuts (42 N.m).

#### **III - FINAL OPERATION**

- □ Refit:
  - the exhaust manifold upper heat shield,
  - the exhaust manifold upper heat shield bolts.
- ☐ Torque tighten the exhaust manifold upper heat shield bolts (6 N.m).
- □ Refit:
  - the new O-ring,
  - the dipstick guide tube,
  - the dipstick guide tube bolt,
  - the dipstick.
- ☐ Torque tighten the dipstick guide tube bolt (22 N.m).
- ☐ Refit:
  - the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3)
  - the windscreen washer bottle neck (see Windscreen washer bottle funnel: Removal Refitting) (85A, Wiping washing),
  - the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
  - the oxygen sensors (see 17B, Petrol injection, Oxygen sensors: Removal - Refitting, page 17B-4).
- □ Connect the oxygen sensor connectors.
- ☐ Refit:
  - the front wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - the new seal,
  - the connector pipe,
  - the exhaust connecting pipe nuts,
  - the exhaust connecting pipe rubber mounting bush support nuts.
- ☐ Torque tighten:
  - the exhaust connecting pipe nuts (65 N.m),
  - the exhaust connecting pipe rubber mounting bush support nuts (14 N.m).
- Refit the engine undertray.

12A

2TR

☐ Connect the battery (see **Battery**: **Removal - Refitting**) (80A, Battery).

### **TURBOCHARGING**

### **Turbocharging: Precautions for repair**

M9R

#### **Essential equipment**

parts washer

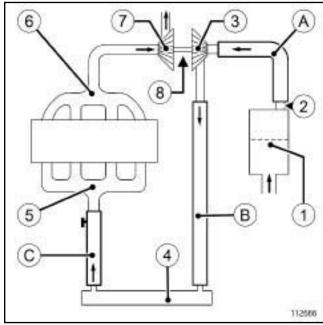
#### I - TURBOCHARGER: GENERAL INSTRUCTIONS

For the turbocharging pressure regulator check (see **Fault finding - Tests**) (Technical Note 3419A, 12B, Turbocharging).

#### WARNING

The turbocharger pressure regulator rod must not be adjusted.

#### II - TURBOCHARGER CIRCUIT DIAGRAM



112666

<b>(1)</b>	Air filter unit	
<b>(2</b> )	Air flowmeter	
(3)	Compressor wheel	
<b>(4</b> )	Intercooler	
(5)	Inlet manifold	
(6)	Exhaust manifold	
<b>(7</b> )	Turbine wheel	
(8)	Bearing system (bearing wheel shaft)	+
( <b>A</b> )	Air filter box air outlet pipe	
( <b>B</b> )	Turbocharger air outlet pipe	
(C)	Intercooler air outlet pipe	

## III - APPLICATION CONDITIONS OF INSTRUCTIONS

The instructions below must be followed when replacing a turbocharger due to mechanical damage:

- damage to the bearing system,
- broken shaft or turbine wheel,
- compressor wheel rubbing against the turbocharger casing,
- broken or damaged compressor wheel,
- extensive clogging of the turbine wheel casing (hard deposits).

#### FOR THE AIR CIRCUIT:

- Consequences:
  - swarf or metal objects in the turbocharger inlet and outlet pipes,
  - oil in the air circuit (collected in the intercooler).
- Risks (after replacing the turbocharger):
- metal objects sucked in by the compressor wheel (destruction of the turbocharger).

#### FOR THE LUBRICATION CIRCUIT:

- Consequences:
- swarf found in the engine oil circuit,
- circulation of swarf within the circuit.
- Risks (after replacing the turbocharger):
  - premature wear on the bearing system (destruction of turbocharger).

#### **WARNING**

Metal objects may enter the oil and air circuits as a result of a broken turbocharger.

Failure to follow the INSTRUCTIONS listed will lead to the turbocharger breaking again.

#### **INSTRUCTIONS:**

- Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17)
- Replace the oil filter (see 10A, Engine and cylinder block assembly, Oil filter: Removal - Refitting, page 10A-21).
- Replace the seals and fittings,
- Carry out the following only if the compressor wheel is broken or rubbing against the turbocharger casing:
  - Drain the intercooler,

### TURBOCHARGING **Turbocharging: Precautions for repair**

#### M9R

Clean the turbocharger air pipes.

#### Note:

When carrying out an operation on the air or lubrication circuit, it is necessary to plug the open holes to prevent any risk of foreign bodies entering the system.

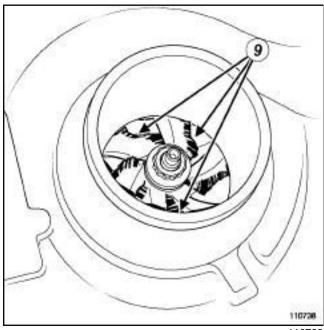
#### IV - AIR CIRCUIT\*: INSTRUCTIONS FOLLOWING MECHANICAL DAMAGE TO THE TURBOCHARGER

#### Note:

- (\*) These instructions for the air circuit are only to be followed in the case of:
- broken compressor wheel,
- compressor wheel rubbing against the turbocharger casing.

Remove the intercooler if fitted to the vehicle (see 12B, Turbocharging, Intercooler: Removal - Refitting, page 12B-13).

Turn the intercooler over and allow the oil inside to drain out.



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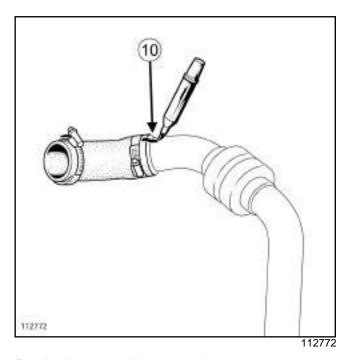
#### Note:

If the compressor wheel (9) is damaged, metal objects are ejected inside the air pipes.

Check that there are no metal objects inside the air flowmeter (2).

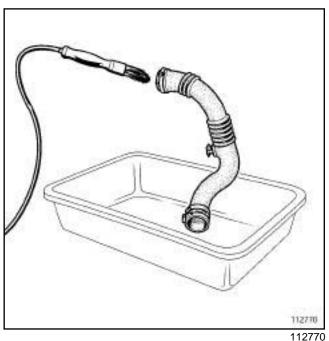
#### Remove:

- the air pipe(between the air filter unit and the turbocharger) (A),
- the air pipe (B) (between the turbocharger and the intercooler).



For air pipes comprising several components:

- mark (10) the fitting position of each component,
- separate all the components.



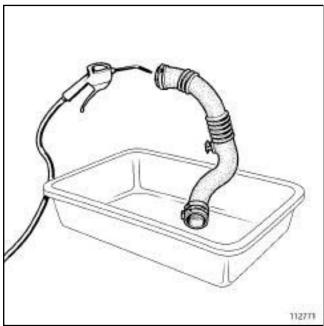
## TURBOCHARGING Turbocharging: Precautions for repair

12B

M9R

One by one, clean the pipes removed with the **parts** washer:

- brush as much of the inside of the pipe as possible (only use brushes with plastic bristles),
- wash plenty of cleaning product from the cleaning station through the pipe,
- allow the cleaned pipe to drain by standing it upright,
- ensure the cleaning product has drained out completely (check areas where liquid may be retained, e.g. gaiters, resonators etc.).



112771

Dry the pipes one by one using a compressed air spray gun.

For pipes comprising several components:

- assemble the components, taking note of their correct fitting position *(10)* .

#### Refit:

- the air pipe(between the air filter unit and the turbocharger) (A),
- the air pipe **(B)** (between the turbocharger and the intercooler).

Refit the intercooler, if fitted to the vehicle (see 12B, Turbocharging, Intercooler: Removal - Refitting, page 12B-13).

## V - LUBRICATION CIRCUIT\*\*: INSTRUCTIONS FOLLOWING MECHANICAL DAMAGE TO THE TURBOCHARGER

#### Note:

(\*\*) These instructions relating to the lubrication circuit must always be followed in all cases of mechanical damage as listed above.

Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining - Refilling, page 10A-17).

Replace the oil filter (see 10A, Engine and cylinder block assembly, Oil filter: Removal - Refitting, page 10A-21).

Only fill the engine with a suitable oil type (see **Engine oil: Specifications**) (Technical Note 6013A, 04A, Lubricants).

### VI - GENERAL INSTRUCTIONS TO BE FOLLOWED WHEN REMOVING A TURBOCHARGER

Always replace:

- the oil supply pipe:
- if the pipe is blocked, even partially (due to scale, carbonised oil etc.),
- if the pipe is fitted with self-retaining seals.
- the oil return pipe:
- •if the pipe is blocked, even partially (due to scale, carbonised oil etc.).
- if the pipe is fitted with self-retaining seals.
- all seals that have been removed,
- all fittings that have been removed.

#### WARNING

Failure to observe the following procedure may lead to destruction of the turbocharger.

When starting the engine:

- do not accelerate,
- allow the engine to run for **1 minute**, the time taken for the oil circuit pressure to increase (until the oil pressure warning light on the instrument panel goes out),
- accelerate several times at no load,
- check the air circuit and the oil circuit for leaks.

### TURBOCHARGING

**Turbocharger: Removal - Refitting** 

12B

M9R

Essential special tooling				
Mot. 1448	Long nose pliers for hose clips.			
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.			

# Essential equipment roller-type stud removal tool

Tightening torques	
turbocharger cooling pipe bolts	10 N.m
turbocharger cooling pipe retaining bracket bolt	10 N.m
turbocharger studs	15 N.m
turbocharger strut bolt on the flywheel end	25 N.m
turbocharger lower nuts	15 N.m
turbocharger upper nut	15 N.m
turbocharger lower nuts	28 N.m
turbocharger upper nut	28 N.m
turbocharger bolt	25 N.m
turbocharger strut bolt on the timing end	25 N.m
exhaust gas pressure sensor pipe assembly bolt	10 N.m
exhaust gas pressure sensor hollow bolt	16 N.m
exhaust gas tempera- ture sensor	44 N.m
turbocharger heat shield bolts	7 N.m
intercooler air inlet duct bolt	8 N.m
air filter unit air outlet duct clips	5 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 12B, Turbocharging, Turbocharging: Precautions for repair, page 12B-1).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see <b>Vehicle</b>	е:
Towing and lifting) (02A, Lifting equipment).	
☐ Remove:	

- the engine cover,
- the engine undertray.
- □ Drain the engine cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)

#### □ Remove:

- the clips from the air inlet sleeve,
- the air intake sleeve from the air filter unit,
- the battery (see Battery: Removal Refitting) (80A, Battery)
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).
- ☐ Undo the air filter unit air outlet duct clip on the turbocharger.

#### □ Disconnect:

- the oil vapour rebreathing hose on the oil separator.
- the air filter unit air outlet duct from the turbocharaer.
- ☐ Fit a blanking plug in the opening of the oil separator.

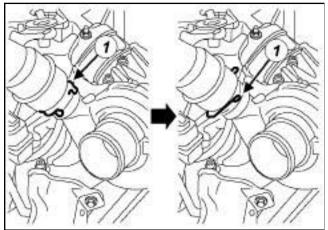
#### □ Remove:

- the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
- the scuttle panel half-grille (see **Scuttle half-grille**: **Removal Refitting**) (56A, Exterior equipment),
- the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
   (85A, Wiping Washing),

# TURBOCHARGING Turbocharger: Removal - Refitting

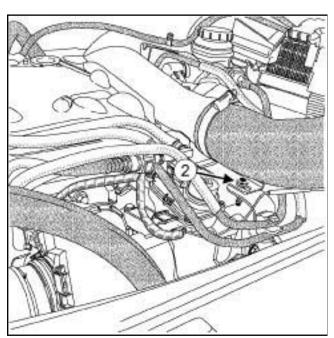
#### M9R

- the scoop under the scuttle panel grille (see **Scoop** under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).



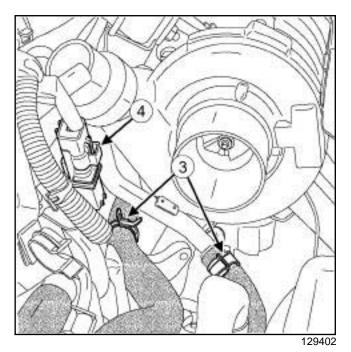
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☐ Turn the clip (1) on the intercooler air inlet duct.



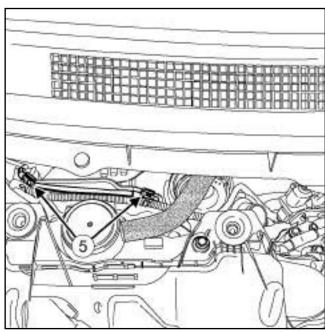
129401

- ☐ Remove the intercooler air inlet duct bolt (2) from the fuel pipe support.
- ☐ Move aside the intercooler air inlet duct.



□ Remove the turbocharger cooling pipe clips (3) using the tool (Mot. 1448).

- ☐ Disconnect:
  - the turbocharger cooling pipes,
  - the connector (4) from the exhaust gas temperature sensor.



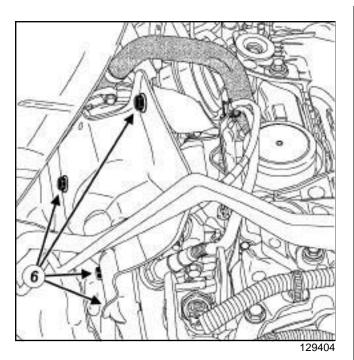
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☐ Unclip the exhaust gas temperature sensor wiring (5) from the heat shield.

### **Turbocharger: Removal - Refitting**

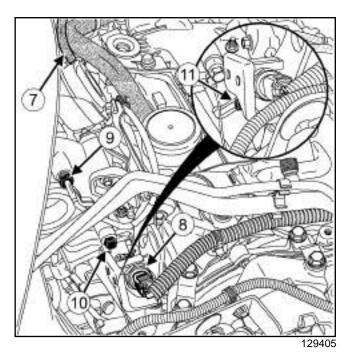
12B

M9R



#### □ Remove:

- the bolts (6) from the turbocharger heat shield,
- the turbocharger heat shield,
- -the oxygen sensors (see 13B, Diesel injection, Oxygen sensor: Removal - Refitting, page 13B-59),
- the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal Refitting, page 19B-8),
- -the turbocharger oil pipe (see 12B, Turbocharging, Turbocharger oil pipe: Removal Refitting, page 12B-11).



#### □ Disconnect:

- the turbocharging pressure regulator hose (7) from the turbocharger,
- the connector (8) from the exhaust gas pressure sensor.

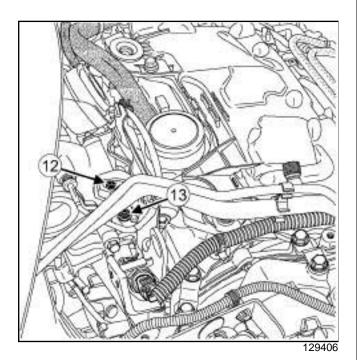
#### □ Remove:

- the exhaust gas temperature sensor (9) from the turbocharger,
- the exhaust gas pressure sensor bolt (10) .
- the bolt (11) from the exhaust gas pressure sensor pipe assembly,
- the exhaust gas pressure sensor pipe assembly from the lifting eye.

### **Turbocharger: Removal - Refitting**

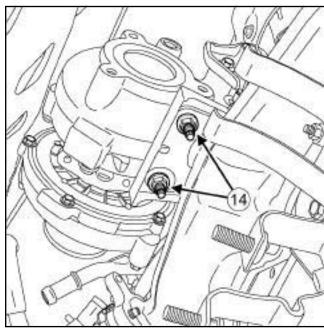
M9R

### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



☐ Remove:

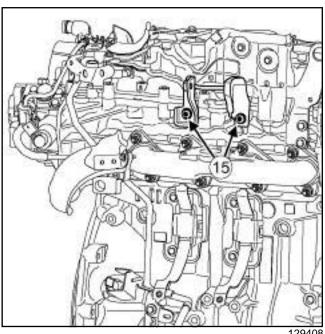
- the turbocharger bolt (12),
- -the upper turbocharger nut (13) from the exhaust manifold.



### □ Remove:

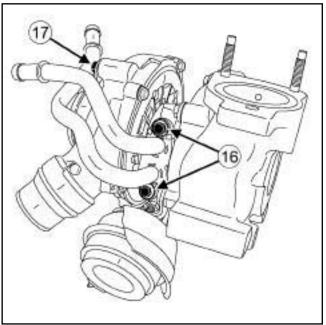
- -the lower turbocharger nuts (14) from the exhaust manifold,
- the turbocharger upwards,

- the gasket between the turbocharger and the exhaust manifold.



#### □ Remove:

- the bolts (15) from the turbocharger strut,
- the turbocharger strut.



129409

### ☐ Remove:

- the turbocharger cooling pipe bolts (16) from the turbocharger,
- the turbocharger cooling pipe retaining bracket bolt from the turbocharger,
- the turbocharger cooling pipe,

# TURBOCHARGING Turbocharger: Removal - Refitting

12B

### M9R

- the seal between the turbocharger and the turbocharger cooling pipe,
- the turbocharger studs from the turbocharger using a **roller-type stud removal tool**.

### REFITTING

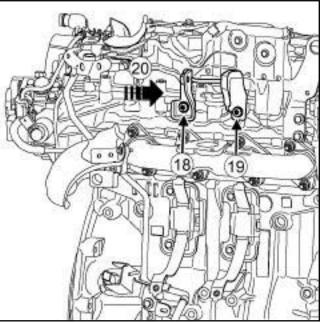
#### I - REFITTING PREPARATION OPERATION

- ☐ Clean and degrease the bearing faces:
  - the exhaust manifold,
  - of the turbocharger (if being reused),
  - of the cooling pipe (if being reused).
- □ Always replace:
  - the intercooler air inlet duct seal,
  - the seal between the turbocharger and the exhaust manifold.
  - the seal between the turbocharger and the catalytic converter,
  - the seal between the turbocharger and the turbocharger cooling pipe,
  - -the seal between the catalytic converter and the particle filter,
  - the nuts between the turbocharger and the catalytic converter,
  - the upper turbocharger nut,
  - the lower turbocharger nuts,
  - the turbocharger studs,
  - the exhaust gas temperature sensor.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the new turbocharger cooling pipe seal,
  - the turbocharger cooling pipe,
  - the turbocharger cooling pipe bolts,
  - the turbocharger cooling pipe retaining bracket bolt on the turbocharger.
- ☐ Torque tighten:
  - the turbocharger cooling pipe bolts (10 N.m),
  - the turbocharger cooling pipe retaining bracket bolt (10 N.m).
- ☐ Refit the new turbocharger studs.

□ Torque tighten the turbocharger studs (15 N.m) using the flat surfaces of the studs or a roller-type stud removal tool.



129410

Note:

The turbocharger strut must move freely.

- ☐ Fit the turbocharger strut.
- ☐ Finger-tighten the bolts (18) and (19) of the turbocharger strut.
- ☐ Fit the turbocharger without its seal and hold the turbocharger flat against the exhaust manifold.
- ☐ Push the turbocharger strut according to the arrow (20) so that it is resting against the turbocharger on the flywheel end.

#### Note:

Do not tighten the bolt too quickly to prevent the turbocharger strut from rotating.

- ☐ Tighten the turbocharger strut bolt (19) on the timing end slightly.
- ☐ Remove the turbocharger.
- ☐ Tighten to torque the turbocharger strut bolt on the flywheel end (25 N.m) (18).
- ☐ Position the seal between the turbocharger and the exhaust manifold.
- ☐ Refit the turbocharger.
- ☐ Tighten the turbocharger bolt (12) by a few turns.

# TURBOCHARGING **Turbocharger: Removal - Refitting**

### M9R

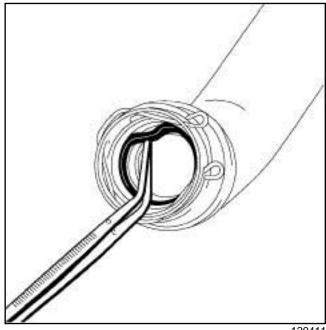
- Refit without tightening:
  - the upper turbocharger nut,
  - the lower turbocharger nuts.
- ☐ Pretighten to torque:
  - the turbocharger lower nuts (15 N.m),
  - the turbocharger upper nut (15 N.m).
- □ Torque tighten:
  - the turbocharger lower nuts (28 N.m),
  - the turbocharger upper nut (28 N.m).
- ☐ Tighten the turbocharger strut bolt (19) on the timing end slightly.
- ☐ Torque tighten:
  - -the turbocharger bolt (25 N.m) (12),
  - -the turbocharger strut bolt on the timing end (25 N.m).

#### **III - FINAL OPERATION.**

- ☐ Fit the exhaust gas pressure sensor pipe assembly.
- □ Refit:
  - -the exhaust gas pressure sensor pipe assembly bolt.
  - the exhaust gas pressure sensor bolt.
- □ Torque tighten:
  - the exhaust gas pressure sensor pipe assembly bolt (10 N.m),
  - -the exhaust gas pressure sensor hollow bolt (16 N.m).
- ☐ Refit the exhaust gas temperature sensor on the turbocharger.
- ☐ Torque tighten the exhaust gas temperature sensor (44 N.m).
- ☐ Clip the exhaust gas temperature sensor wiring onto the heat shield.
- □ Connect:
  - the exhaust gas pressure sensor connector,
  - the turbocharging pressure regulator hose on the turbocharger,
  - the exhaust gas temperature sensor connector,
  - the turbocharger cooling pipes.
- ☐ Refit the turbocharger cooling pipe clips using the tool (Mot. 1448).

#### □ Refit:

- the turbocharger oil pipe (see 12B, Turbocharging, Turbocharger oil pipe: Removal - Refitting, page 12B-11),
- the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal - Refitting, page 19B-8),
- the oxygen sensors (see 13B, Diesel injection, Oxygen sensor: Removal - Refitting, page 13B-**59**),
- the turbocharger heat shield,
- the turbocharger heat shield bolts.
- ☐ Torque tighten the turbocharger heat shield bolts (7 N.m).

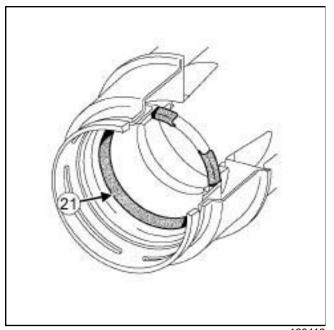


☐ Remove the intercooler air inlet duct seal using a .

### **Turbocharger: Removal - Refitting**

12B

M9R



129412

#### Note:

Check whether the intercooler air inlet duct seal (21) is correctly positioned.

- ☐ Refit the new intercooler air inlet duct seal.
- ☐ Turn the intercooler air inlet duct to fit the clip in its housing.
- ☐ Clip the intercooler air inlet duct onto the turbocharger.
- ☐ Refit the intercooler air inlet duct bolt to the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet duct bolt (8 N.m).

### ☐ Refit:

- the scoop under the scuttle panel grille (see **Scoop** under scuttle panel grille: Removal Refitting) (56A, Exterior equipment),
- -the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting) (85A, Wiping Washing),
- the scuttle panel half-grille (see **Scuttle half-grille**: **Removal Refitting**) (56A, Exterior equipment),
- the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
- the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).

- ☐ Connect the air filter unit air outlet duct to the turbocharger and to the air filter unit.
- ☐ Torque tighten the air filter unit air outlet duct clips (5 N.m) using the tool (Mot. 1608).
- □ Remove the blanking plug from the oil separator opening.
- ☐ Connect the oil vapour rebreathing hose to the oil separator.

#### Refit:

- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the battery (see Battery: Removal Refitting) (80A, Battery)
- the air intake sleeve of the air filter unit,
- the clips of the air inlet sleeve.
- □ Fill the engine cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10)
- □ Bleed the engine cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10)

#### ☐ Refit:

- the engine undertray,
- the engine cover.

### Turbocharger oil pipe: Removal - Refitting



M9R

Tightening torques ▽		
turbocharger oil pipe bolts on the turbochar- ger	10 N.m	
turbocharger oil pipe hollow bolt on the cylin- der block	16 N.m	
turbocharger oil pipe bolt on the cylinder block	25 N.m	

#### **IMPORTANT**

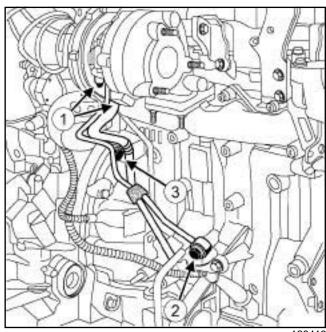
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 12B, Turbocharging, Turbocharging: Precautions for repair, page 12B-1).

### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the engine cover.
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove:
  - the engine undertray,
  - the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal Refitting, page 19B-8)

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129413

#### □ Remove:

- the turbocharger oil pipe bolts (1) on the turbocharger,
- the hollow bolt (2) mounting the turbocharger oil pipe on the cylinder block,
- the turbocharger oil pipe bolt (3) on the cylinder block.
- the turbocharger oil pipe.

### REFITTING

### I - REFITTING PREPARATION OPERATION

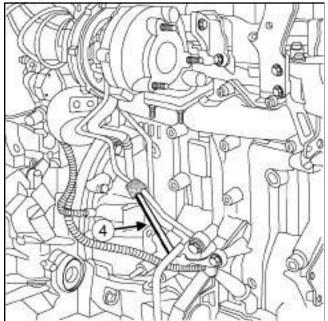
- Always replace:
  - the seal between the turbocharger and the turbocharger oil pipe,
  - the oil pipe O-ring on the cylinder block end,
  - the two copper seals on the oil supply union side on the cylinder block end.

### Turbocharger oil pipe: Removal - Refitting

12B

M9R

# II - REFITTING OPERATION FOR PART CONCERNED



129414

### Note:

Do not rotate the turbocharger oil pipe O-ring at the cylinder block end when fitting.

After fitting, check that the turbocharger oil pipe O-ring has not come out of its housing.

Check the two copper seals on the oil supply union on the cylinder block end.

☐ Lubricate the new oil pipe O-ring on the cylinder block end.

### ☐ Fit:

- -the seal between the turbocharger and the turbocharger oil pipe,
- the oil pipe O-ring on the cylinder block end,
- the two copper seals on the oil supply union side on the cylinder block end,
- the turbocharger oil pipe, first fitting it inside the cylinder block (4).
- ☐ Refit in order and without tightening:
  - the turbocharger oil pipe bolts (1) on the turbocharger,
  - the hollow bolt **(2)** mounting the turbocharger oil pipe on the cylinder block,
  - -the turbocharger oil pipe bolt (3) on the cylinder block.

- ☐ Torque tighten in order:
  - the turbocharger oil pipe bolts on the turbocharger (10 N.m),
  - the turbocharger oil pipe hollow bolt on the cylinder block (16 N.m).
  - the turbocharger oil pipe bolt on the cylinder block (25 N.m).

### **III - FINAL OPERATION**

- □ Refit:
  - the catalytic converter (see 19B, Exhaust, Catalytic converter: Removal Refitting, page 19B-8)
  - the engine undertray.
- □ Connect the battery (see Battery : Removal Refitting) (80A, Battery).
- ☐ Refit the engine cover.

Intercooler: Removal - Refitting

M9R

Tightening torques ▽		
intercooler air outlet duct nuts	25 N.m	
intercooler bolts	17 N.m	
intercooler air inlet duct nuts	25 N.m	
clip for the intercooler air outlet hose	5 N.m	

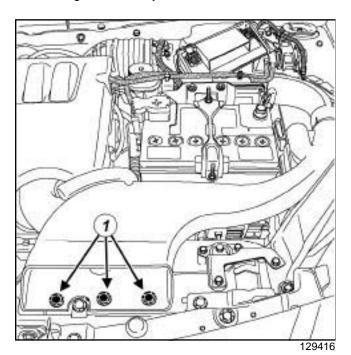
### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 12B, Turbocharging, Turbocharging: Precautions for repair, page 12B-1).

### REMOVAL

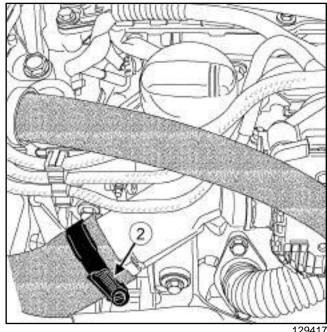
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the engine cover,
  - the engine undertray.



- □ Remove:
  - the air inlet sleeve clips,

- the air intake sleeve on the air filter unit,
- the front bumper (see Front bumper: Removal -Refitting) (55A, Exterior protection).



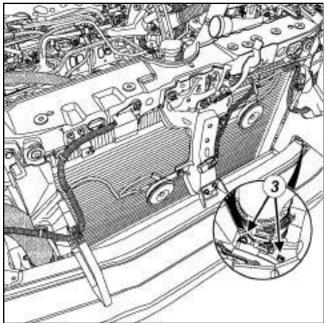
- 129417
- ☐ Loosen the clip (2) of the intercooler air outlet hose.
- ☐ Disconnect the intercooler air outlet hose from the intercooler air outlet duct.

Intercooler: Removal - Refitting

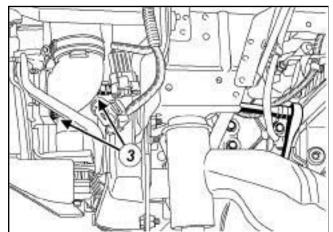
12B

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED

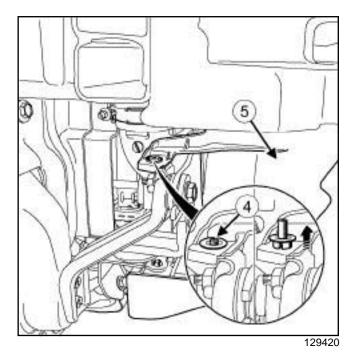


129418

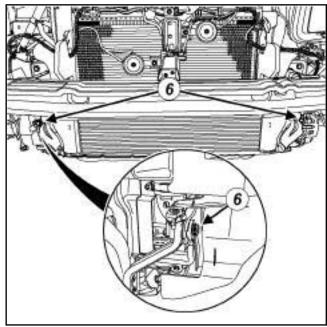


129419

- ☐ Remove:
  - the intercooler air inlet duct nuts (3) from the intercooler,
  - the seal from the intercooler air inlet duct.



- ☐ Unclip the clip (4) from the intercooler side protector plate on the right-hand side.
- ☐ Separate the intercooler side protection plate on the right-hand side (5).



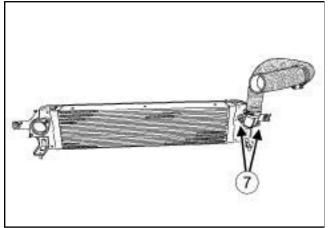
129421

- ☐ Remove the intercooler bolts (6).
- ☐ Detach the intercooler from the rubber mounting component by lifting it.
- ☐ Remove the intercooler/intercooler air outlet duct assembly from the cooling circuit.

### Intercooler: Removal - Refitting

**12B** 

M9R



129422

- □ Remove:
  - the intercooler air outlet duct nuts (7) from the intercooler.
  - the intercooler air outlet hose/duct assembly from the intercooler,
  - the intercooler air outlet duct seal.
- Plug the openings.

### REFITTING

### I - REFITTING PREPARATION OPERATION

□ Always replace the seals of the intercooler air inlet and outlet ducts.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Remove the blanking plugs from the openings.
- □ Refit:
  - the new intercooler air outlet duct seal on the intercooler,
  - the intercooler air outlet hose/duct assembly on the intercooler,
  - the intercooler air outlet duct nuts on the intercooler.
- ☐ Torque tighten the intercooler air outlet duct nuts (25 N.m).
- ☐ Fit the intercooler air outlet duct/intercooler assembly on the rubber mounting component.
- ☐ Refit the intercooler bolts.
- ☐ Torque tighten the intercooler bolts (17 N.m).
- ☐ Fit the intercooler side protection plate on the right-hand side.

- ☐ Clip the intercooler side protection plate clip on the right-hand side.
- □ Refit:
  - the new air inlet duct seal on the intercooler.
  - the intercooler air inlet duct on the intercooler,
  - the intercooler air inlet duct nuts on the intercooler.
- ☐ Torque tighten the intercooler air inlet duct nuts (25 N.m).

#### **III - FINAL OPERATION**

- ☐ Connect the intercooler air outlet hose to the intercooler air outlet duct.
- ☐ Torque tighten the clip for the intercooler air outlet hose (5 N.m).
- □ Refit:
  - the front bumper (see Front bumper: Removal -Refitting) (55A, Exterior protection),
  - the air intake sleeve on the air filter unit.
  - the air inlet sleeve clips,
  - the engine undertray,
  - the engine cover.

### Manual priming pump: Removal - Refitting

13A

M9R

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

During this operation, be sure to:

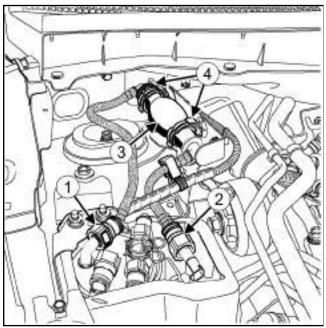
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### REMOVAL

# OPERATION FOR REMOVAL OF PART CONCERNED



129423

☐ Unclip the fuel supply pipe of the manual priming pump from the support.

- □ Disconnect:
  - the manual priming pump quick-release union (1) from the fuel filter,
  - the manual priming pump quick-release union (2) from the fuel supply pipe.
- □ Remove the manual priming pump (3) from the mounting clips (4).
- ☐ Insert the blanking plugs.

### REFITTING

### I - REFITTING PREPARATION OPERATION

### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

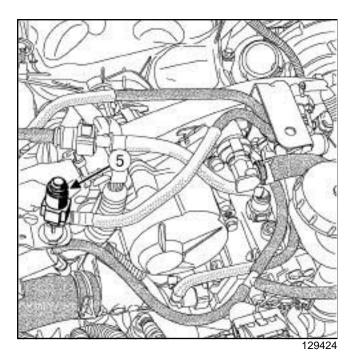
- ☐ Refit the manual priming pump on the mounting clips.
- ☐ Remove the blanking plugs.
- □ Connect:
  - the manual priming pump quick-release union to the fuel supply pipe,
  - the manual priming pump quick-release union to the fuel filter.
- ☐ Clip the fuel supply pipe of the manual priming pump onto the support.

#### **III - FINAL OPERATION.**

- ☐ Prime the fuel circuit using the manual priming pump.
- ☐ Turn the engine over several times until it starts.

# FUEL SUPPLY Manual priming pump: Removal - Refitting

M9R



Note:

Check for fuel leaks at the air bleed connection.

- ☐ If the engine does not start:
  - disconnect the quick-release union *(5)* from the fuel supply pipe,
  - Activate the manual priming pump until the fuel runs without air bubbles,
  - prime the fuel circuit once more using the manual priming pump.

### Fuel filter: Removal - Refitting

13A

M9R

Tightening torques ♡	
fuel filter mounting sup- port bolt	9 N.m
fuel filter protector bolt	10 N.m
fuel filter protector nuts	25 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **IMPORTANT**

During this operation, be sure to:

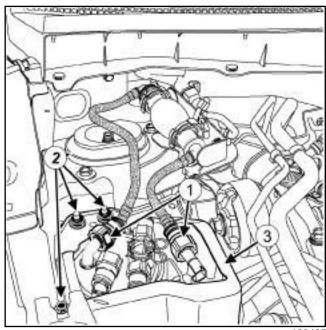
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

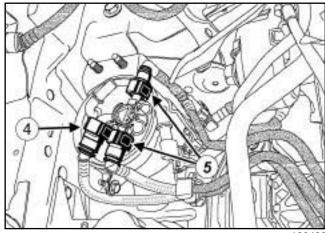
### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION



129425

- □ Disconnect the quick-release unions (1) of the manual priming pump.
- ☐ Insert the blanking plugs.
- ☐ Remove:
  - the mountings (2) of the fuel filter protector,
  - the fuel filter protector (3).



129426

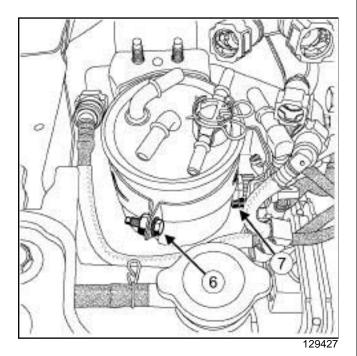
- □ Disconnect:
  - the fuel supply quick-release union (4) from the high pressure pump of the fuel filter,
  - the fuel return quick-release unions (5) from the fuel filter.
- ☐ Insert the blanking plugs.

### Fuel filter: Removal - Refitting

13A

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Remove the bolt (6) of the mounting support of the fuel filter.
- $\hfill \Box$  Disconnect the water detection sensor connector (7)
- ☐ Remove the fuel filter.

### REFITTING

### I - REFITTING PREPARATION OPERATION

### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Fit the fuel filter on the mounting support.
- ☐ Connect the coolant detection sensor connector.
- ☐ Refit the bolt in the mounting support of the fuel filter.
- ☐ Torque tighten the fuel filter mounting support bolt (9 N.m).

Remove the black	anking plugs	from the	inlet a	and c	outle
unions of the fu	ıel filter.				

- ☐ Connect the inlet and outlet unions of the fuel filter to the fuel filter.
- ☐ Open the bleed screw on top of the diesel filter.
- ☐ Prime the fuel circuit using the manual priming pump until the pipes are filled with fuel.
- ☐ Close the bleed screw on top of the fuel filter.
- ☐ Check that there are no fuel leaks.
- Start the engine.
- ☐ Check that there are no fuel leaks.

#### **III - FINAL OPERATION.**

#### Note:

Be careful not to pinch or damage the fuel pipes.

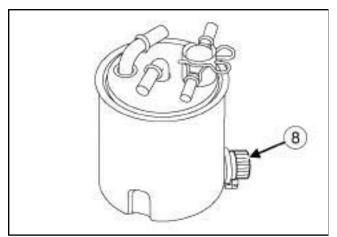
- ☐ Remove the blanking plugs.
- □ Connect:
  - the fuel return quick-release unions of the fuel filter.
  - the fuel supply quick-release union of the high pressure pump of the fuel filter,
- □ Refit:
  - the fuel filter guard.
  - the mountings of the fuel filter protector,
- ☐ Torque tighten:
  - the fuel filter protector bolt (10 N.m),
  - the fuel filter protector nuts (25 N.m).
- ☐ Connect the quick-release unions of the manual priming pump.
- □ Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).

13A-4

Fuel filter: Removal - Refitting

13A

M9R



129428

### Note:

Regularly bleed the water that has collected in the fuel filter through the bleed plug (8) .

Prime the fuel circuit using the manual priming pump after the water purge.

Check for fuel leaks after starting the engine.

### Injector rail - Injectors: Removal - Refitting

13A

2TR

### **Essential special tooling**

Mot. 1869 Pliers for disconnecting the fuel circuit

injector rail bolts

22 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

### **REMOVAL**

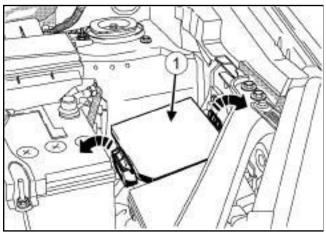
#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **IMPORTANT**

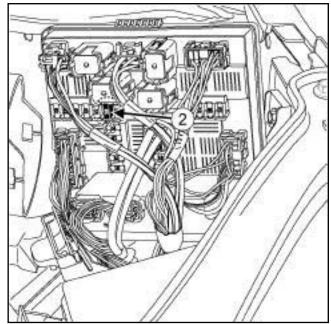
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

☐ Remove the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).



129429

Unclip the cover (1) of the engine interconnection unit.



129430

- ☐ Remove the fuse (2) of the fuel pump(F13) (15A).
- ☐ Start the engine to relieve the fuel pressure.

#### Note:

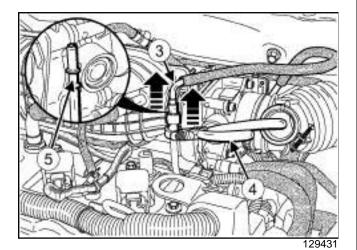
After switching the engine off, start it again two or three times to fully relieve the fuel pressure.

### ☐ Remove:

- the battery (see Battery: Removal Refitting) (80A, Battery)
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8) ,
- the engine cover,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal Refitting, page 12A-22).

# Injector rail - Injectors: Removal - Refitting

2TR



☐ Remove the plug of the fuel supply union.

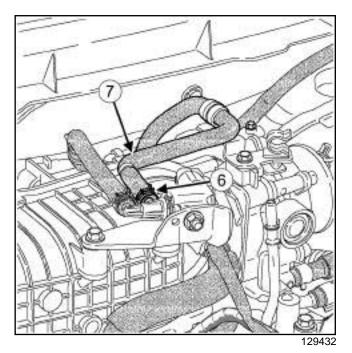
### **IMPORTANT**

During this operation, be sure to:

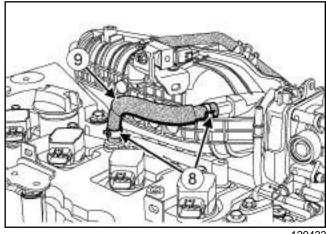
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.
- □ Disconnect the quick-release union of the fuel supply (3) using the tool (Mot. 1869) (4).

### Note:

Insert the tool (Mot. 1869) (4) on the second retainer (5).



- ☐ Remove the clips (6) of the petrol vapour rebreathing pipe.
- ☐ Disconnect the petrol vapour rebreathing pipe (7).

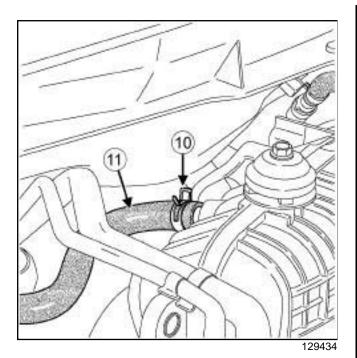


129433

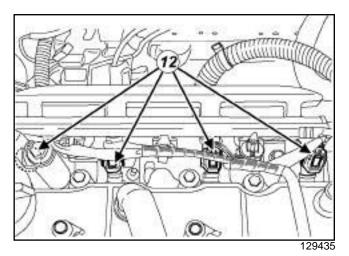
- ☐ Remove the clips (8) of the oil vapour rebreathing
- ☐ Disconnect the oil vapour rebreathing hose (9).

### Injector rail - Injectors: Removal - Refitting

2TR



- □ Remove the clip (10) from the vacuum pipe of the brake servo.
- □ Disconnect the vacuum pipe (11) from the brake servo.
- □ Remove:
  - -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
  - -the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting)
     (56A, Exterior equipment)
- ☐ Disconnect the motorised throttle valve connector.
- □ Remove the motorised throttle valve without disconnecting the coolant pipes (see 12A, Fuel mixture, Throttle valve: Removal Refitting, page 12A-17)



- □ Disconnect the injector connectors (12) .
- □ Remove the intake distributor (see 12A, Fuel mixture, Inlet manifold: Removal Refitting, page 12A-24).

# II - OPERATION FOR REMOVAL OF PART CONCERNED

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

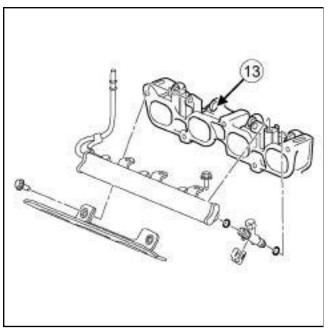
### **IMPORTANT**

Wear protective gloves during the operation.

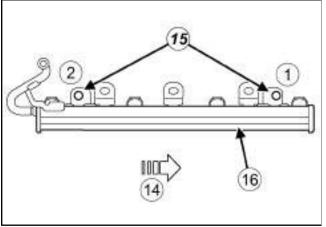
### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

2TR

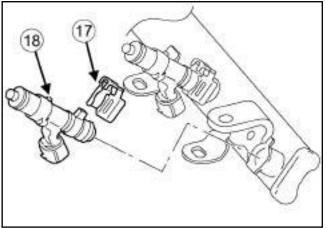


129436



129437

- (14) Front of engine
- ☐ From the adapter (13) of the intake distributor, remove:
  - in order, the injector rail injector bolts (15),
  - the injector rail (16) .



129438

- ☐ From the injector rail guard remove:
  - the clips (17) from the injectors,
  - the injectors (18).

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

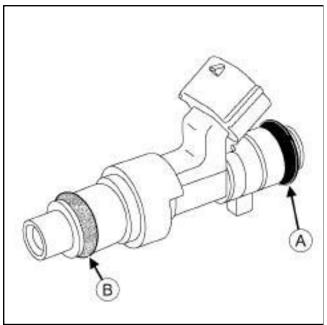
- □ Always replace:
  - the injectors' O-rings,
  - the injector clips,
- ☐ Clean the injectors using the INJECTOR CLEANER (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products).
- ☐ Lubricate the new O-rings with fresh engine oil.

### Injector rail - Injectors: Removal - Refitting

13A

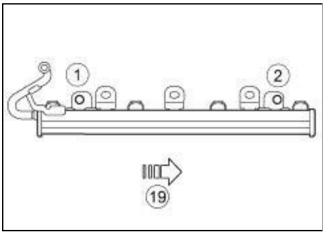
2TR

# II - REFITTING OPERATION FOR PART CONCERNED



129439

- ☐ On the injectors, refit:
  - the blue O-rings (A),
  - The brown O-rings (B) .
- ☐ On the injector rail, refit:
  - the injectors,
  - the new injector clips.



129437

(19)

Front of engine

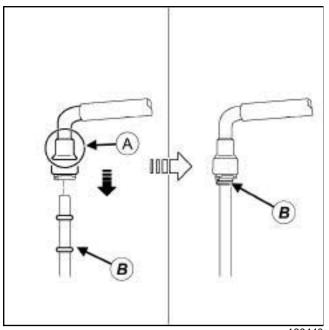
- ☐ On the inlet manifold adapter, refit:
  - the injector rail,
  - the injector rail bolts.
- ☐ Torque tighten in order the injector rail bolts (22 N.m).

### **III - FINAL OPERATION.**

- □ Refit the intake distributor (see 12A, Fuel mixture, Inlet manifold: Removal Refitting, page 12A-24)
- ☐ Connect the injector connectors.
- □ Refit the motorised throttle valve (see 12A, Fuel mixture, Throttle valve: Removal Refitting, page 12A-17).
- ☐ Connect the motorised throttle valve connector.
- ☐ Refit:
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing).
- ☐ Connect the brake servo vacuum pipe.
- ☐ Refit the clip of the vacuum pipe of the brake servo.
- ☐ Connect the oil vapour rebreathing hose.
- ☐ Refit the clips of the oil vapour rebreathing hose.
- ☐ Disconnect the petrol vapour rebreathing pipe.
- ☐ Refit the clips of the petrol vapour rebreathing pipe.

### Injector rail - Injectors: Removal - Refitting

2TR

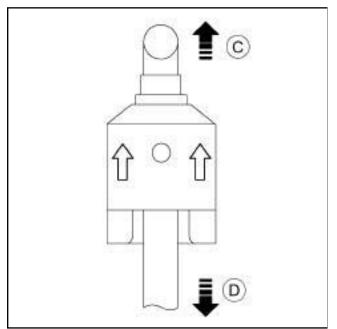


129440

☐ Connect the quick-release union of the fuel supply.

#### Note:

Connect the quick-release union (A) on part (B) . Then check the connection by pulling on part (A)  $\,$ 



129441

- (C) Direction of the fuel supply pipe
- (**D**) Direction of the injector rail

#### □ Refit:

- the plug of the fuel supply union,
- the air inlet duct (see 12A, Fuel mixture, Air inlet duct: Removal - Refitting, page 12A-22),
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3)
- the engine cover,
- the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
- the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the battery (see Battery: Removal Refitting) (80A, Battery)
- the fuel pump fuse.
- ☐ Clip the cover on the engine interconnection unit.
- ☐ Refit the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

## Fuel pressure: check

# 13A

2TR

Essential special tooling		
Mot. 1869	Pliers for disconnecting the fuel circuit	
Mot. 1863	Set of unions for measuring fuel pressure	
Mot. 1311-01	Fuel pressure test kit.	

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **IMPORTANT**

Wear goggles with side protectors for this operation.

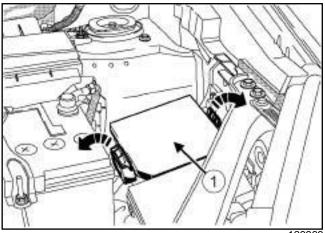
### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this operation.

### **CHECKING**

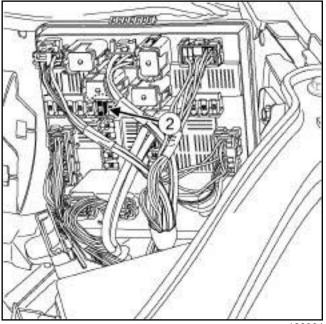
### I - CHECK PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).



129363

□ Remove the cover (1) from the Protection and Switching Unit.



129364

- □ Remove the fuse (2) of the fuel pump (F13) (15A).
- ☐ Relieve the pressure of the fuel on the fuel supply pipe after the engine has started.

### Note:

After switching the engine off, start it again two or three times to fully relieve the fuel pressure.

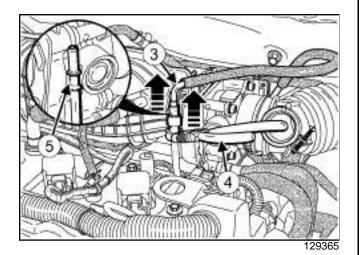
### ☐ Remove:

- the engine cover,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3).

### Fuel pressure: check

13A

2TR



- ☐ Remove the plug of the fuel supply union.
- ☐ Disconnect the quick-release union (3) using the tool (Mot. 1869) (4).

#### Note:

Insert the (Mot. 1869) (4) on the second retainer (5).

### **II - FUEL PRESSURE CHECKING STAGE**

- ☐ Connect:
  - -the fuel pressure checking kit (Adapter D) (Mot. 1863),
  - the fuel pressure checking kit (Mot. 1311-01).
- □ Refit the fuse (2) of the fuel pump (F13) (15A).

### Note:

It may take a few seconds to obtain a correct injector rail pressure reading.

☐ Note the fuel pressure after the engine has started. The fuel pressure must be constant (3.5 bar)

### Note:

If the result is unsatisfactory, check that the hoses and the fuel supply pipes are not obstructed.

If there is no fault in the hoses and the tubes, replace the fuel filter assembly.

### **III - FINAL OPERATION.**

□ Remove the fuse of the fuel pump (F13) (15A).

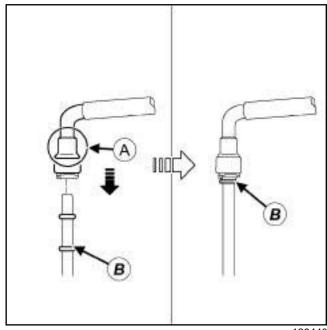
☐ Relieve the pressure of the fuel on the fuel supply pipe after the engine has started.

#### Note:

After switching the engine off, start it again two or three times to fully relieve the fuel pressure.

### □ Disconnect:

- the fuel pressure checking kit (Mot. 1311-01),
- the fuel pressure checking kit (Adapter D) (Mot. 1863).



129440

☐ Connect the quick-release union (A).

### Note:

Connect the quick-release union  $(\mathbf{A})$  on part  $(\mathbf{B})$  .

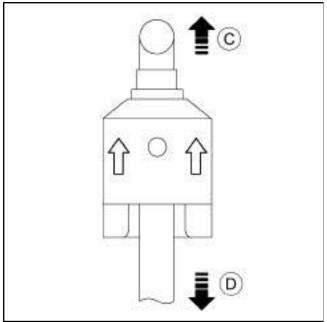
Then check the connection by pulling on part (A)

.

Fuel pressure: check

13A

2TR



129441

- (C) Direction of the fuel supply pipe
- (**D**) Direction of the injector rail

### ☐ Refit:

- the plug of the fuel supply union,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).
- the engine cover,
- the fuse (2) of the fuel pump (F13)(15A),
- the Protection and Switching Unit cover.
- □ Refit the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

Fuel flow: check

13A

### 2TR

Essential special tooling		
Mot. 1311-01	Fuel pressure test kit.	
Mot. 1863	Set of unions for measuring fuel pressure	

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **IMPORTANT**

Wear goggles with side protectors for this operation.

### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this operation.

#### Note:

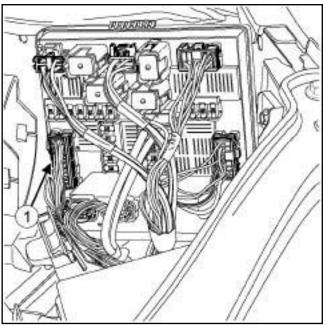
This procedure must be carried out with the ignition off.

#### I - PREPARATION OPERATION FOR CHECK

- □ Ensure you have a checking tool (Mot. 1311-01) and a "T" union for the tool (Mot. 1863).
- □ Disconnect the quick-release union of the supply pipe of the injector rail (see 13A, Fuel supply, Fuel pressure: check, page 13A-12).
- ☐ Put the " T " union between the fuel supply union and the injector rail.
- ☐ Take a pipe which is long enough to drain the pump into a container and fit it to the " **T**" outlet union.

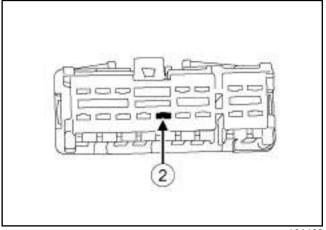
### **II - FUEL FLOW CHECKING OPERATION**

- ☐ Insert the pipe into a graduated measuring cylinder (2000 ml).
- ☐ Remove the Protection and Switching Unit cover.



131407

□ Disconnect the white 16-track connector (1).



131408

☐ Connect the terminal (2) of the white connector to the (+) battery supply to operate the fuel pump.

### Note:

The flow reading should be between **80 and 120 I/h**.

☐ Disconnect the (+) battery supply from the terminal (2) of the white connector.

### **III - FINAL OPERATION.**

- ☐ Connect thewhite (1) 16-track connector.
- Refit the Protection and Switching Unit cover.

Fuel flow: check

13A

### 2TR

- ☐ Disconnect:
  - -the union of the fuel supply pipe from the " T " union,
  - the " T " union from the injector rail,
  - the discharge pipe,
- ☐ Connect the quick-release union of the fuel supply pipe to the injector rail (see 13A, Fuel supply, Fuel pressure: check, page 13A-12).

### Diesel injection: Precautions for repair

13B

M9R

#### I - RISKS RELATING TO CONTAMINATION

The high-pressure direct injection system is highly sensitive to contamination. The risks caused by contamination are:

- damage to or destruction of the high pressure injection system,
- a component seizing,
- a component not being properly sealed.

All After-Sales operations must be performed under very clean conditions. Having carried out an operation in good conditions means that no impurities (particles a few microns in size) have penetrated the system during dismantling.

The cleanliness principle must be applied from the filter to the injectors.

What are the sources of contamination?

- metal or plastic swarf,
- paint,
- fibres:
- cardboard,
- brushes,
- · paper,
- · clothing,
- cloth,
- foreign bodies such as hair,
- ambient air,
- etc.

#### **WARNING**

Do not clean the engine with a high pressure cleaner to prevent damaging the connections.

### 1 - Cleaning cloths

Use lint-free cleaning cloths (see **Vehicle: Parts and ingredients for the repairwork**) (04B, Consumables - Products).

It is prohibited to use cloths or ordinary paper towels: these produce lint and lose fibres, which then contaminate the fuel circuit.

Each cloth must only be used once.

### 2 - Blanking plugs

The blanking plugs are used to cap the fuel circuit once it is opened and to therefore prevent contaminants from entering.

A set of blanking plugs should be used once only and used plugs must be discarded after use: once used, the plugs are soiled and cleaning them is not sufficient to make them reusable.

Unused plugs must also be discarded and must not be used when carrying out work on an injection system.

Part number for set of blanking plugs: (see **Vehicle: Parts and ingredients for the repairwork**) (04B, Consumables - Products).

#### Note:

There is no specific set of blanking plugs for S9U and S9W engines. In order to comply with the cleanliness recommendations, use plugs that are compatible with the blanking plug sets for F9Q, G9U, G9T or ZD3 engines.

### 3 - Protective bags

Use hermetically-resealable plastic bags, using adhesive tape, for example, to store components which will be refitted and reused. Stored parts will therefore be less subject to the risk of contamination.

These are single-use bags: after use they must be discarded.

### 4 - Cleaning products

Two cleaning products can be used:

- an injector cleaner (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products),
- an aerosol spray brake cleaner (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products).

To use the injector cleaner, be sure to have a clean brush in good condition (the brush must not lose any bristles) as well as a clean container which has no impurities in it.

### Note:

Use a new injector cleaner each time work is carried out (a used cleaning agent will contain impurities).

### Diesel injection: Precautions for repair

13B

M9R

# II - ADVICE TO BE FOLLOWED BEFORE ANY OPERATION

- 1) Carry out the work in a clean working area and take care to protect removed components from dust using plastic bags which are hermetically-resealable, for example.
- 2) Always order the following from the Parts Department before carrying out work:
- a new set of blanking plugs, specific to the engine,
- enough lint-free cleaning cloths.
- one of the two **cleaning products** for fuel pipe unions,
- the parts that are always to be replaced after each removal operation, mentioned in the operational procedures specific to the vehicle (see related Workshop Repair Manual).
- 3) Wear safety goggles fitted with side shields to prevent the cleaning product from splashing the eyes.
- 4) Wear leaktight protective gloves (Nitrile type) to avoid prolonged contact with the skin.

Note:

When using leather protective gloves, wear a pair of leaktight protective gloves (Nitrile type) over the top.

- 5) Before carrying out work on the injection system, use plastic bags or clean rags, for example, to protect:
- the accessories and timing belts,
- the electrical accessories (starter, alternator, powerassisted steering pump, sensors and electrical connectors),
- the flywheel face.

# III - INSTRUCTIONS TO BE FOLLOWED DURING THE OPERATION

Wash your hands before and while carrying out the work.

Replace leaktight protective gloves (Nitrile type) when they are soiled or damaged.

All components removed from the injection system must be stored in a hermetically sealed plastic bag once they have been capped.

Reseal the bag hermetically, for example using adhesive tape, even if the bag must be opened shortly afterwards: ambient air can be a source of impurities.

After opening the fuel circuit, the use of brushes, cleaning agents, air blow guns, rifle-type brushes or standard cloths is strictly prohibited: these items are likely to allow impurities to enter the system.

When replacing a component with a new one or when refitting it after storing it in a plastic bag, do not unpack it until it is time to fit it on the vehicle.

#### **IV - CLEANING**

There are currently two procedures for cleaning the fuel circuit before opening it in order to carry out work in the workshop.

These procedures enable the fuel circuit to be cleaned to prevent contamination from entering: they both have the same end result and neither is preferred over the other.

### 1 - Cleaning using injector cleaner

Clear the access to the unions that need opening, following the work procedures specific to the vehicle (see the relevant Workshop Repair Manual).

Protect sections which are sensitive to fuel leaks.

Pour the injector cleaning agent into a container which is free from impurities.

### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this operation.

Dip a clean brush, which is not shedding bristles, into the container of injector cleaning agent.

### **IMPORTANT**

Wear goggles with side protectors for this operation.

Clean the unions carefully using the brush and the injector cleaning agent.

Blast the components that have been cleaned with compressed air (tools, workbench, and also parts, unions and around the injection system). Check that no bristles from the brush have come away and that the area is clean.

Wipe the sections that were cleaned with fresh cleaning cloths.

Open the circuit at the unions and immediately fit the relevant blanking plugs.

### Diesel injection: Precautions for repair

13B

M9R

#### WARNING

To prevent impurities from entering, once the fuel circuit is opened, it must not be blasted with compressed air. Use cleaning cloths only, if necessary.

### 2 - Using the brake cleaner

Clear the access to the unions that need opening, following the work procedures specific to the vehicle (see the relevant Workshop Repair Manual).

Protect sections which are sensitive to fuel leaks.

### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this operation.

### **IMPORTANT**

Wear goggles with side protectors for this operation.

Spray the brake cleaner onto the unions to be opened.

Clean the unions carefully using fresh cleaning cloths.

Blast the components that have been cleaned with compressed air (tools, workbench, and also parts, unions and around the injection system). Check that no bristles from the brush have come away and that the area is clean.

Open the circuit at the unions and immediately fit the relevant blanking plugs.

### **WARNING**

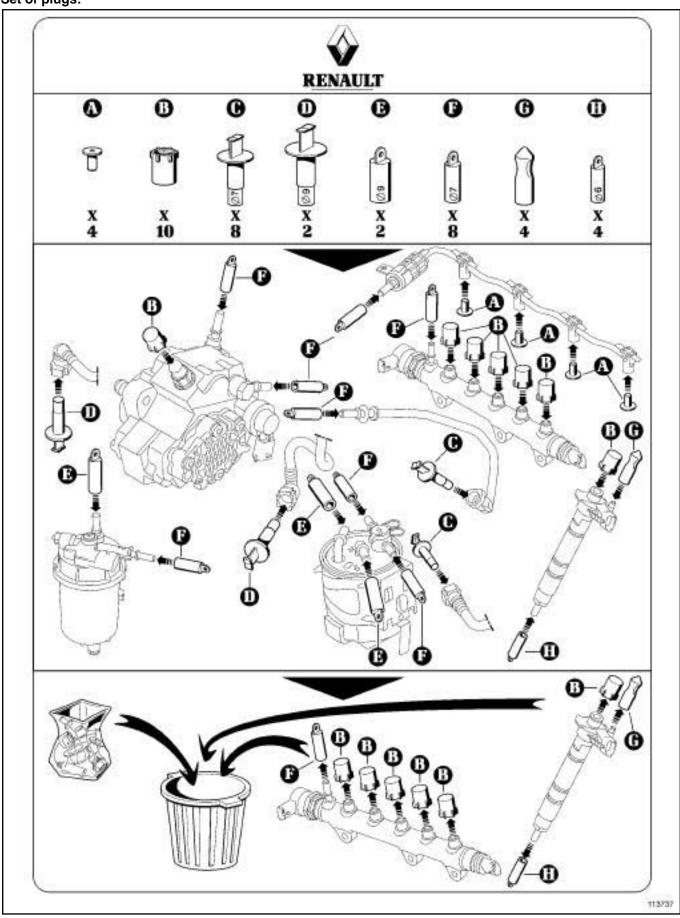
To prevent impurities from entering, once the fuel circuit is opened, it must not be blasted with compressed air. Use cleaning cloths only, if necessary.

Diesel injection: Precautions for repair

13B

M9R

Set of plugs:



# DIESEL INJECTION Diesel injection: Precautions for repair

13B

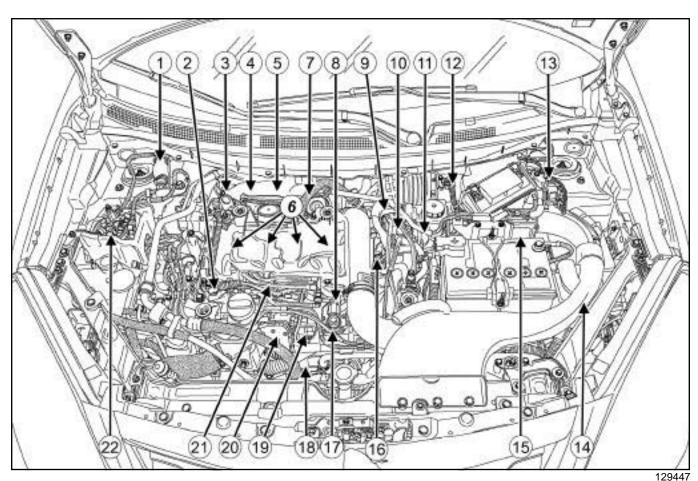
M9R

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## Diesel injection: List and location of components

13B

M9R

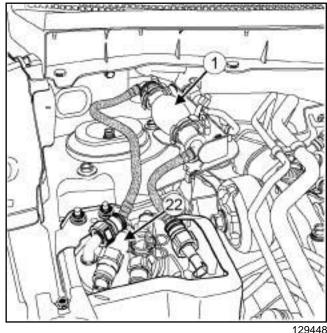


(1)	Manual priming pump
<b>(2</b> )	Injection rail pressure regulator
(3)	Exhaust gas pressure sensor
(4)	Oxygen sensor
(5)	Exhaust gas temperature sensor
(6)	Injectors
<b>(7</b> )	Turbocharger
(8)	Injector rail pressure sensor
(9)	Fuel temperature sensor
(10)	Fuel pressure regulator on the high pressure pump
(11)	High-pressure pump
<b>(12)</b>	Airflow meter
(13)	Turbocharging pressure regulator control solenoid valve
(14)	Pre/postheating unit
(15)	Diesel injection computer
(16)	Camshaft position sensor
(17)	Exhaust gas recirculation sole- noid valve control

Intercooler

(18)

(1	<b>19</b> )	Turbocharger pressure sensor
(2	20)	Air inlet valve
(2	21)	Injector rail
(2	<b>22</b> )	Fuel filter

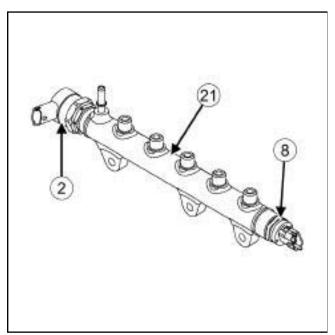


# Diesel injection: List and location of components

13B

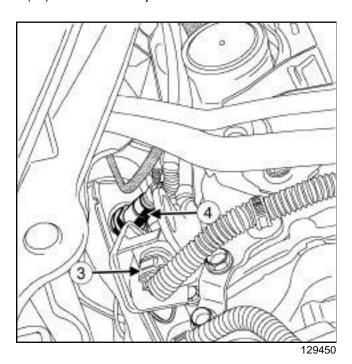
M9R

(1) Manual priming pump(22) Fuel filter

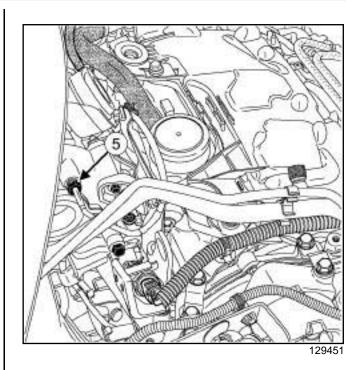


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- (2) Injection rail pressure regulator
- (8) Injector rail pressure sensor
- (21) Injector rail



- (3) Exhaust gas pressure sensor
- (4) Oxygen sensor



(5) Exhaust gas temperature sensor

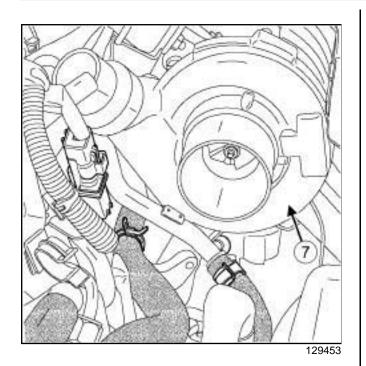


(6) Injectors

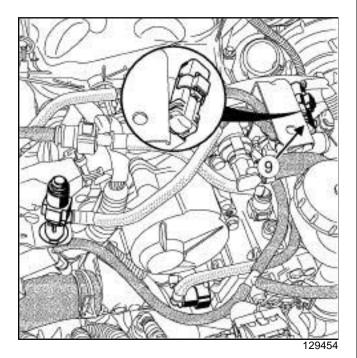
Diesel injection: List and location of components

13B

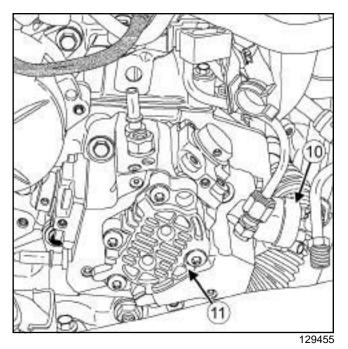
M9R



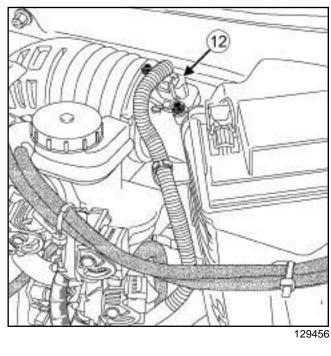
(7) Turbocharger



(9) Fuel temperature sensor



(10) Fuel pressure regulator on the high pressure pump(11) High-pressure pump

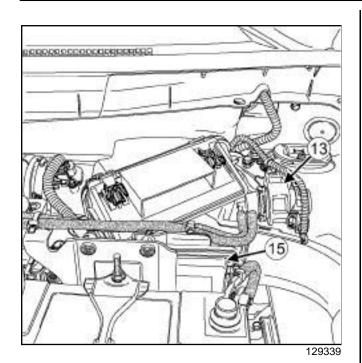


(12) Airflow meter

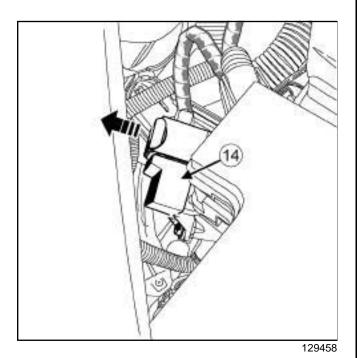
Diesel injection: List and location of components

13B

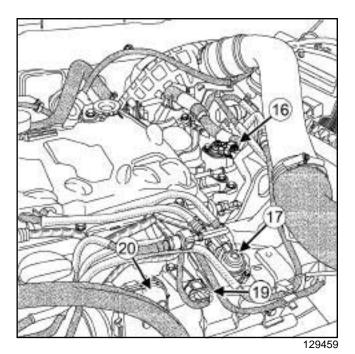
M9R



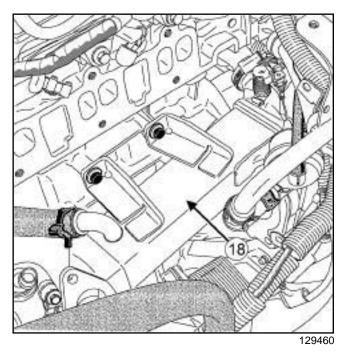
(13) Turbocharging pressure regulator control solenoid valve(15) Diesel injection computer



(14) Pre/postheating unit



(16) Camshaft position sensor
 (17) Exhaust gas recirculation solenoid valve control
 (19) Turbocharger pressure sensor
 (20) Air inlet valve



(18) Intercooler

13B Diesel injection: List and location of components

M9R	
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## Diesel injection computer: Removal - Refitting

13B

M9R

### **Essential equipment**

diagnostic tool

### Tightening torques

diesel injection computer nuts

12 N.m

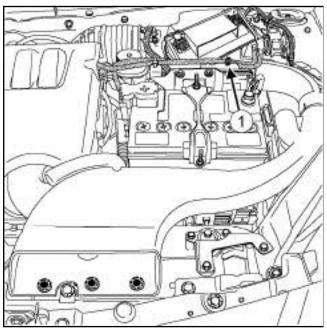
### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **REMOVAL**

### I - REFITTING PREPARATION OPERATION

□ Before replacing the diesel injection computer, save the injection computer data using the diagnostic tool according to command scenario SC003 (see Fault finding - Replacement of components) (13B, Diesel injection).

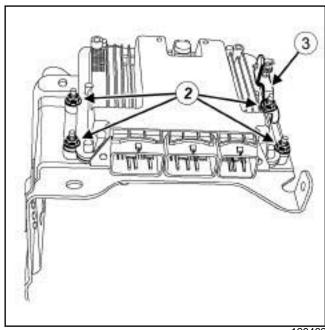


12946

- ☐ Unclip the control pipe (1) of the turbocharger pressure regulator valve on the diesel injection computer.
- □ Remove the battery (see Battery : Removal Refitting) (80A, Battery).

- ☐ Disconnect the injection computer connector.
- □ Remove the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129462

- ☐ Remove:
  - the diesel injection computer nuts (2),
  - the support (3) from the control pipe of the turbocharger pressure regulator valve on the diesel injection computer,
  - the diesel injection computer.

### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the diesel injection computer,
  - the support of the turbocharger pressure regulator valve control pipe on the diesel injection computer,
  - the diesel injection computer nuts.
- ☐ Torque tighten the diesel injection computer nuts (12 N.m).

### **II - FINAL OPERATION.**

□ Refit the battery tray (see **Battery tray: Removal - Refitting**) (80A, Battery).

# Diesel injection computer: Removal - Refitting

13B

_	
N	19R
	Connect the diesel injection computer connector.
	Refit the battery (see ${\bf Battery: Removal - Refitting})$ (80A, Battery).
	Clip the control pipe of the turbocharger pressure regulator valve on the support.
	Connect the diagnostic tool
	After replacing the diesel injection computer, save the injection computer data using the <b>diagnostic tool</b> according to command scenario <b>SC001</b> (see <b>Fault finding - Replacement of components</b> ) (13B, Diesel injection).

## Camshaft position sensor: Removal - Refitting

13B

M9R

Tightening torques ♡	
camshaft position sen- sor bolt	10 Nm
intercooler air inlet pipe bolt	8 N.m

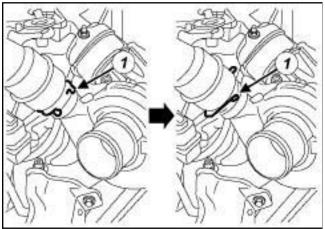
### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **REMOVAL**

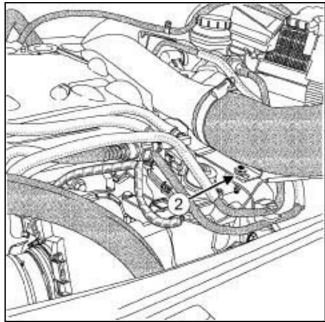
### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.



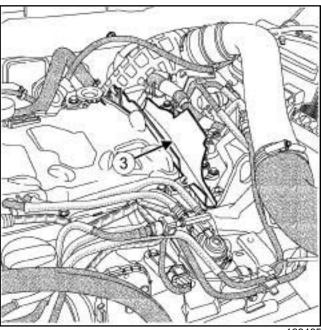
129463

☐ Turn the clip (1) on the intercooler air inlet pipe.



129464

- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.



129465

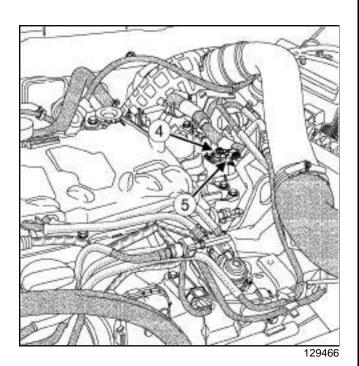
☐ Remove the protector plate (3) from the injector rail protector.

## Camshaft position sensor: Removal - Refitting

13B

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Disconnect the camshaft position sensor connector.
- ☐ Remove:
  - the bolt (4) from the camshaft position sensor,
  - the camshaft position sensor (5) .

### **REFITTING**

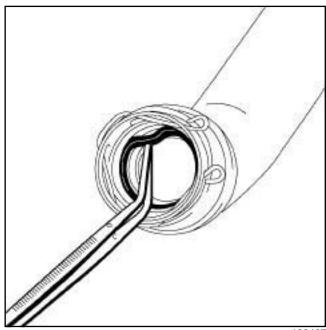
### I - REFITTING PREPARATION OPERATION

□ Always replace the seal of the intercooler air inlet pipe.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the new camshaft position sensor seal.
- ☐ Lubricate the camshaft position sensor seal with engine oil.
- ☐ Refit:
  - the camshaft position sensor,
  - the camshaft position sensor bolt.
- ☐ Tighten to torque the camshaft position sensor bolt (10 Nm).
- ☐ Connect the camshaft position sensor connector.

### **III - FINAL OPERATION**

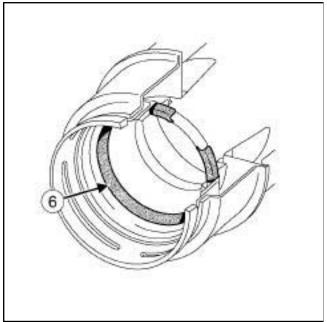


129467

☐ Remove the intercooler air inlet pipe seal using a .

# Camshaft position sensor: Removal - Refitting

M9R



129468

### Note:

Check that the seal (6) on the intercooler air inlet pipe is fitted the correct way round.

### ☐ Refit:

- the new intercooler air inlet pipe seal,
- the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Refit the engine cover.

## Crankshaft position sensor: Removal - Refitting

13B

M9R

1	
Tightening	torques 🗇
crankshaft position sensor bolt	10 N.m
bolts of the diesel fuel drain pipe	25 N.m
catalytic converter sup- port bracket bolts on the cylinder block	50 N.m
turbocharger cooling pipe bolts	10 N.m
transfer box mounting support bolts on the transfer	48 N.m
transfer box mounting support bolts on the cylinder block	50 N.m
turbocharger cooling pipe bolts	10 N.m
catalytic converter mounting support nut	51 N.m
catalytic converter	mounting sup- port bolts51 N.m
catalytic converter heat shield bolts	6 N.m

### **IMPORTANT**

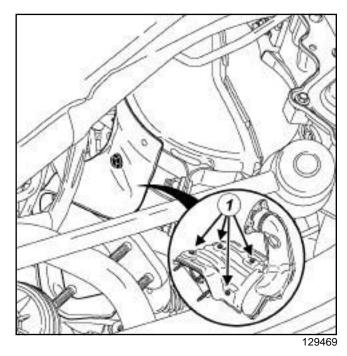
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the engine undertray,
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),

- the front right-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- the front right-hand wheel driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Transmission).
- the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21) (19B, Cooling).

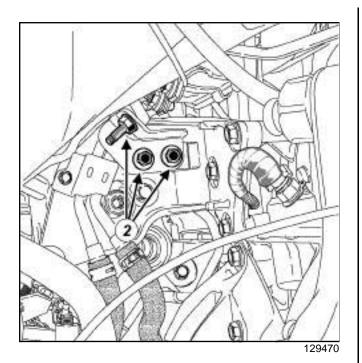


### ☐ Remove:

- the catalytic converter heat shield bolts (1),
- the catalytic converter heat shield.

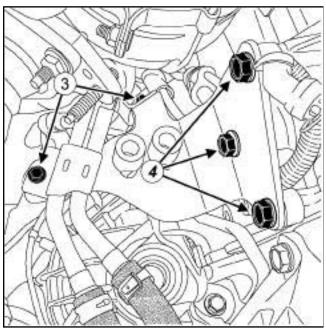
## Crankshaft position sensor: Removal - Refitting

M9R



- □ Remove:
  - -the nut and the bolts (2) of the catalytic converter mounting support,
  - the catalytic converter mounting support.

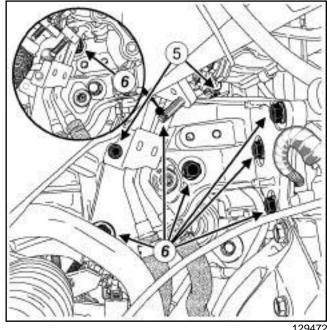
### 4X2 TRANSMISSION



☐ Remove the bolts (3) from the turbocharger cooling pipe.

- ☐ Move aside the turbocharger cooling pipe.
- □ Remove:
  - the bolts (4) from the mounting support of the catalytic converter,
  - the catalytic converter mounting support.

### **4X4 TRANSMISSION**

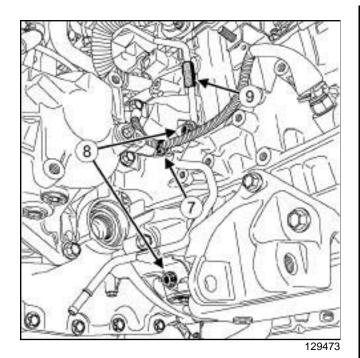


- ☐ Remove the bolts (5) from the turbocharger cooling
- ☐ Move aside the turbocharger cooling pipe.
- □ Remove:
  - the bolts (6) from the mounting support of the transfer box,
  - the mounting support from the transfer box.

## Crankshaft position sensor: Removal - Refitting

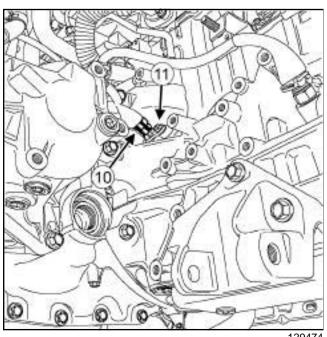
13B

M9R



- ☐ Unclip the wiring of the diesel fuel drain pipe at (7).
- ☐ Remove the bolts (8) from the turbocharger cooling pipe.
- ☐ Disconnect the diesel fuel drain pipe from the rubber connecting part (9) of the diesel fuel drain pipe.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129

Move the crankshaft position sensor heat insulation to one side.

- □ Disconnect the connector (10) from the crankshaft position sensor.
- □ Remove:
  - the bolt (11) from the crankshaft position sensor,
  - the crankshaft position sensor.

### REFITTING

### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the crankshaft sensor O-ring if the crankshaft position sensor is to be re-used,
  - the seal between the catalytic converter and the particle filter,
  - the seal between the particle filter and the silencer,
- the catalytic converter mounting support.
- ☐ Clean and degrease the bearing faces:
  - on the catalytic converter,
  - of the particle filter,
  - of the silencer.
- ☐ Lubricate the O-ring of the crankshaft position sensor with engine oil.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the crankshaft position sensor.
- ☐ Position the crankshaft position sensor so it is pressing against the cylinder block.
- ☐ Refit the crankshaft position sensor bolt.
- □ Torque tighten the crankshaft position sensor bolt (10 N.m).
- ☐ Connect the crankshaft position sensor connector.
- ☐ Fit the crankshaft position sensor heat insulation.

### **III - FINAL OPERATION.**

- ☐ Connect the diesel fuel drain pipe to the rubber connecting part of the diesel fuel drain pipe.
- ☐ Refit the diesel fuel drain pipe bolts.
- □ Torque tighten the **bolts of the diesel fuel drain** pipe (25 N.m).
- ☐ Clip on the wiring of the diesel fuel drain pipe.

Crankshaft position sensor: Removal - Refitting

13B

M9R 4X2 TRANSMISSION Refit: - the mounting support of the catalytic converter, - the catalytic converter support bracket bolts. ☐ Torque tighten the catalytic converter support bracket bolts on the cylinder block (50 N.m). ☐ Refit the turbocharger cooling pipe bolts. ☐ Torque tighten the turbocharger cooling pipe bolts (10 N.m). 4X4 TRANSMISSION Refit: - the mounting support of the transfer box, - the mounting support bolts of the transfer box. □ Torque tighten: -the transfer box mounting support bolts on the transfer (48 N.m), -the transfer box mounting support bolts on the cylinder block (50 N.m). ☐ Refit the turbocharger cooling pipe bolts. ☐ Torque tighten the turbocharger cooling pipe bolts (10 N.m). ☐ Refit: - the mounting support of the catalytic converter, - the catalytic converter mounting support nut, - the catalytic converter mounting support bolts. □ Torque tighten: -the catalytic converter mounting support nut (51 N.m),-the catalytic converter (mounting support bolts51 N.m). ☐ Refit: - the catalytic converter heat shield, - the catalytic converter heat shield bolts. ☐ Torque tighten the catalytic converter heat shield

bolts (6 N.m).

□ Refit:

- the seal between the catalytic converter and the particle filter,
- the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21) (19B, Cooling),
- the front right-hand wheel driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Transmission).
- the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the engine undertray.

# High pressure pump: Removal - Refitting

M9R

### **Essential special tooling**

Mot. 1906 High pressure pump pinion locking tool

Tightening torques ▽	
high pressure pump pinion nut	90 N.m
high pressure pump bolts (initial torque)	5 N.m
high pressure pump bolts	25 N.m
intercooler air inlet pipe bolt	8 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### WARNING

Dismantling the interior of the high pressure pump and the injectors is prohibited.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### **REMOVAL**

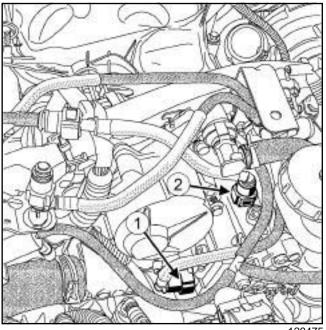
### I - REMOVAL PREPARATION OPERATION

#### □ Remove:

- the engine cover,
- the battery (see Battery: Removal Refitting) (80A, Battery),
- the battery tray (see Battery tray: Removal Refitting),
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal - Refitting, page 13B-36).

### II - OPERATION FOR REMOVAL OF PART **CONCERNED**

☐ Remove the high pressure pipe between the pump and the rail (see 13B, Diesel injection, High-pressure pipe between the pump and rail: Removal -Refitting, page 13B-39).



### □ Remove:

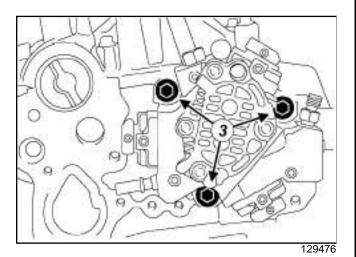
- the quick-release union (1) from the high pressure pump supply pipe,

# DIESEL INJECTION High pressure pump: Removal - Refitting

13B

### M9R

- the quick-release union (2) from the high pressure pump return pipe.
- ☐ Insert the blanking plugs.
- ☐ Disconnect the high pressure pump pressure regulator connector.



☐ Remove:

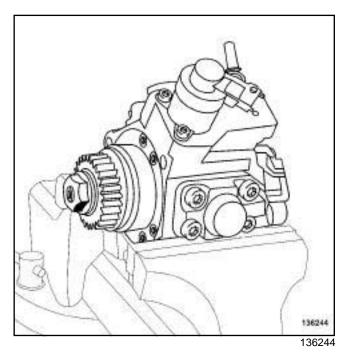
- the high pressure pump bolts (3),
- the high pressure pump.

### **REFITTING**

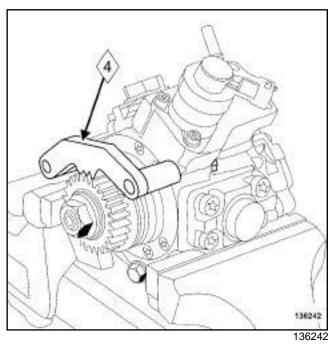
### I - REFITTING PREPARATION OPERATION

- Always replace:
  - the high pressure pump O-ring,
  - the high pressure pump bolts,
  - the high pressure pipe between the high pressure pump and the injector rail,
  - the intercooler air inlet pipe seal.
- ☐ Lubricate the new O-ring using engine oil.

### If replacing the high pressure pump



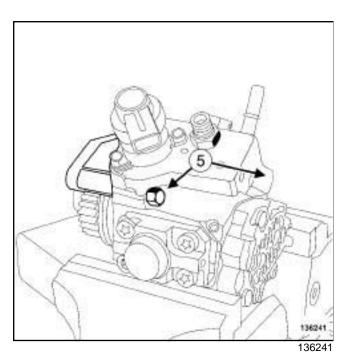
☐ Secure the high pressure pump pinion in a vice's protective jaws.



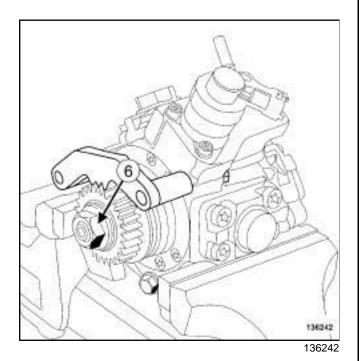
☐ Fit the (Mot. 1906) (4) on the high pressure pump pinion.

# High pressure pump: Removal - Refitting

M9R

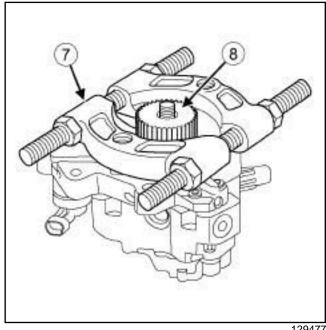


- ☐ Fit:
  - the washers of the (Mot. 1906) on the high pressure pump,
  - the nuts (5) of the (Mot. 1906) on the high pressure pump.
- ☐ Tighten the nuts (5) on the high pressure pump.



- □ Remove:
  - the high pressure pump pinion nut (6),
  - the nuts of the (Mot. 1906) from the high pressure pump,

- the washers of the (Mot. 1906) from the high pressure pump,
- the (Mot. 1906).

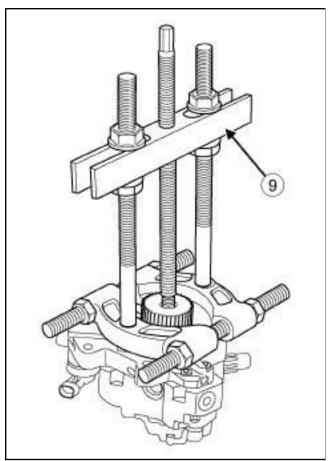


129477

☐ Fit a separator (7) under the high pressure pump pinion (8).

## High pressure pump: Removal - Refitting

M9R



129478

- ☐ Fit an arm (9) on the separator.
- □ Remove:
  - the high pressure pump pinion,
  - the separator and the arm.
- ☐ Refit:
  - the pinion to the new high pressure pump,
  - the high pressure pump nut,
- ☐ Put the high pressure pump in a vice with jaws.
- ☐ Fit:
  - -the (Mot. 1906),
  - the washers of the **(Mot. 1906)** on the high pressure pump,
  - -the nuts of the **(Mot. 1906)** on the high pressure pump.
- ☐ Tighten the nuts on the high pressure pump.
- ☐ Torque tighten the high pressure pump pinion nut (90 N.m).
- □ Remove:
  - the nuts of the **(Mot. 1906)** from the high pressure pump,

- the washers of the (Mot. 1906) from the high pressure pump,
- the (Mot. 1906).

# II - REFITTING OPERATION FOR PART CONCERNED

### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

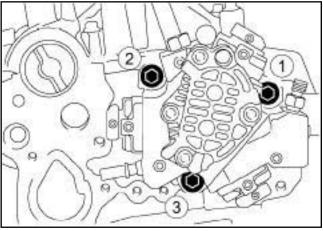
Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

### Note:

Do not apply pressure to the high pressure pump pinion teeth.

Check that the high pressure pump is in contact with the cylinder head before positioning the bolts.

Refit the high pressure pump.



129479

- ☐ Refit the high pressure pump bolts.
- □ Torque tighten the high pressure pump bolts (initial torque) (5 N.m).
- ☐ Torque tighten the **high pressure pump bolts (25 N.m)**.
- ☐ Remove the blanking plugs.
- □ Refit the high pressure pipe between the pump and the injector rail (see 13B, Diesel injection, Highpressure pipe between the pump and rail: Removal Refitting, page 13B-39).
- ☐ Connect the fuel pressure regulator connector.

## High pressure pump: Removal - Refitting

### M9R

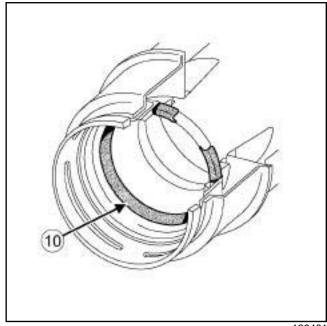
- □ Connect:
  - -the high pressure pump return pipe quick-release
  - the high pressure pump supply pipe quick-release union.

### **III - FINAL OPERATION**

- Fit the wiring.
- □ Refit:
  - the seal of the intercooler air inlet pipe temporarily,
  - -the battery tray (see Battery tray: Removal Refitting),
  - -the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).
- Check for leaks.
- ☐ Disconnect the intercooler air inlet pipe.
- ☐ Move the intercooler air inlet pipe to one side.
- ☐ Refit the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal - Refitting, page 13B-36).



Remove the intercooler air inlet pipe seal using a.



129481

Note:

Check that the intercooler air inlet pipe seal is fitted in the right direction.

- ☐ Refit:
  - the new seal (10) of the intercooler air inlet pipe,
  - the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbochar-
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Refit the engine cover.

## Fuel pressure regulator: Removal - Refitting

13B

M9R

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### REMOVAL

# I - FUEL PRESSURE REGULATOR ON THE INJECTOR RAIL

### **WARNING**

Once the warranty period for the injector rail has expired, only the pressure sensor can be replaced.

During the injector rail warranty period, the injector rail should be completely replaced if the pressure sensor fails.

### 1 - REMOVAL PREPARATION OPERATION

□ Remove the injector rail (see 13B, Diesel injection, Injector rail: Removal - Refitting, page 13B-50).

# 2 - OPERATION FOR REMOVAL OF PART CONCERNED

☐ Remove the pressure regulator from the injector rail.

# II - FUEL PRESSURE REGULATOR ON THE HIGH PRESSURE PUMP

### **WARNING**

Once the warranty period for the high pressure pump has expired, only the pressure regulator can be replaced separately.

Whilst the warranty period for the high pressure pump is still running, the high pressure pump should be replaced as a whole if the pressure regulator displays a fault.

### 1 - REMOVAL PREPARATION OPERATION

□ Remove the high pressure pump (see 13B, Diesel injection, High pressure pump: Removal - Refitting, page 13B-20).

# 2 - OPERATION FOR REMOVAL OF PART CONCERNED

☐ Remove the high pressure pump pressure regulator.

### **REFITTING**

# I - FUEL PRESSURE REGULATOR ON THE INJECTOR RAIL

# 1 - OPERATION FOR REFITTING PART CONCERNED

Refit the pressure regulator on the injector rail.

### 2 - FINAL OPERATION

□ Refit the injector rail (see 13B, Diesel injection, Injector rail: Removal - Refitting, page 13B-50).

# Fuel pressure regulator: Removal - Refitting

13B

M9R

# II - FUEL PRESSURE REGULATOR ON THE HIGH PRESSURE PUMP

# 1 - OPERATION FOR REFITTING PART CONCERNED

☐ Refit the pressure regulator on the high pressure pump.

### 2 - FINAL OPERATION

□ Refit the high pressure pump (see 13B, Diesel injection, High pressure pump: Removal - Refitting, page 13B-20).

# DIESEL INJECTION Diesel return pipe: Removal - Refitting

M9R

Tightening torques ♡	
fuel filter protector bolt	10 N.m
fuel filter protector nuts	25 N.m
intercooler air inlet pipe bolt	8 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

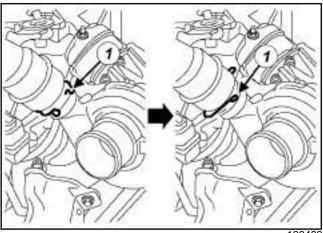
### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

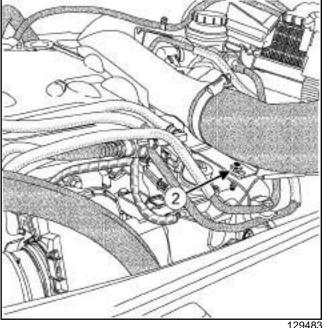
### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.



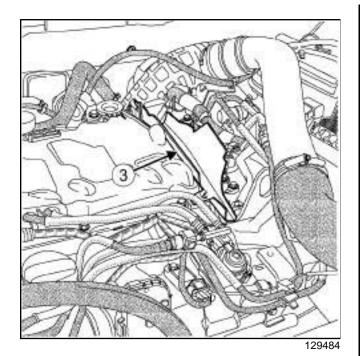
☐ Rotate the clip (1) of the intercooler air inlet pipe on the turbocharger.



- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move aside the intercooler air inlet pipe.

# DIESEL INJECTION Diesel return pipe: Removal - Refitting

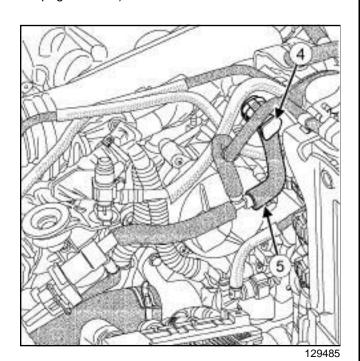
M9R



☐ Remove the protector plate (3) from the injector rail protector.

### □ Remove:

-the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal - Refitting, page 13B-36).



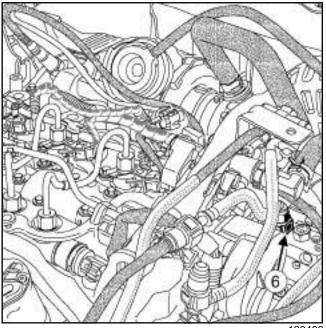
### Disconnect:

- the brake servo pipe (4) of the non-return valve,
- the vacuum pipe (5) of the non-return valve.

# II - OPERATION FOR REMOVAL OF PART CONCERNED

### Note:

During this operation, mark the routing of the diesel return pipe before removing it.



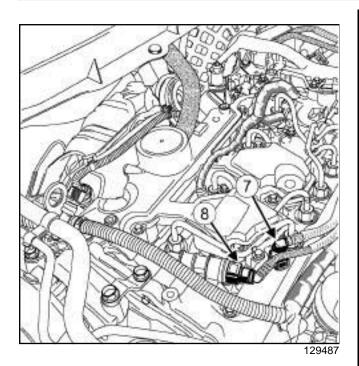
129486

- □ Disconnect the quick-release union (6) from the diesel return pipe on the high pressure pump.
- ☐ Insert the blanking plugs.

## Diesel return pipe: Removal - Refitting

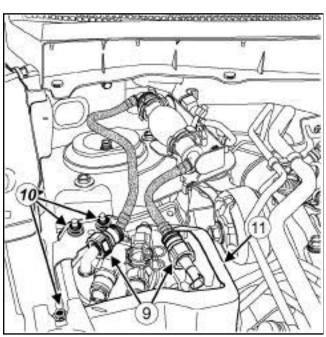
13B

M9R



### □ Disconnect:

- the diesel return pipe quick-release union (7) on the injector rail,
- the diesel return pipe quick-release union (8) from the diesel injector fuel rail.
- ☐ Insert the blanking plugs.

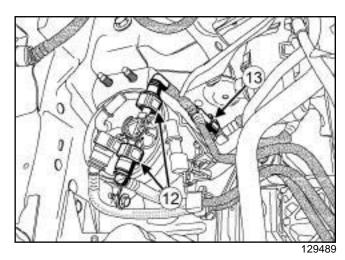


129488

- ☐ Disconnect the quick-release unions (9) from the manual priming pump.
- ☐ Insert the blanking plugs.

### □ Remove:

- the nuts and the bolt *(10)* from the fuel filter protector,
- the fuel filter protector (11).



### □ Remove:

- the fuel return quick-release unions (12) from the fuel filter,
- the fuel return quick-release union (13) from the fuel pipe to the tank.
- ☐ Insert the blanking plugs.
- ☐ Unclip the diesel return pipe from the mounting clips.
- ☐ Remove the diesel return pipe.

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

☐ Always replace the seal of the intercooler air inlet pipe.

### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

### Note:

During this operation it is essential to correctly position the diesel return pipe.

# DIESEL INJECTION Diesel return pipe: Removal - Refitting

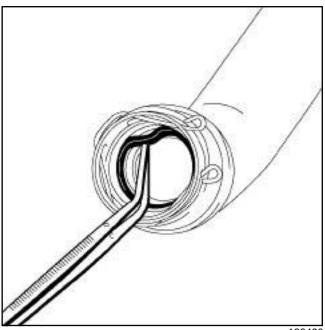
13B

### M9R

- ☐ Fit the fuel return pipe.
- ☐ Remove the blanking plugs.
- ☐ Connect the fuel return quick-release unions:
  - to the high pressure pump,
  - to the injector rail,
  - to the diesel injector fuel return rail,
  - to the fuel pipe going to the tank,
  - to the fuel filter.
- ☐ Unclip the diesel return pipe from the mounting clips.
- ☐ Refit:
  - the fuel filter protector.
  - the fuel filter protector nuts,
  - the fuel filter protector bolt,
- ☐ Torque tighten:
  - the fuel filter protector bolt (10 N.m),
  - -the fuel filter protector nuts (25 N.m).
- ☐ Connect the quick-release unions of the manual priming pump.

### **III - FINAL OPERATION.**

- ☐ Connect:
  - the vacuum pipe to the non-return valve,
  - the brake servo pipe to the non-return valve.
- ☐ Refit:
  - the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).

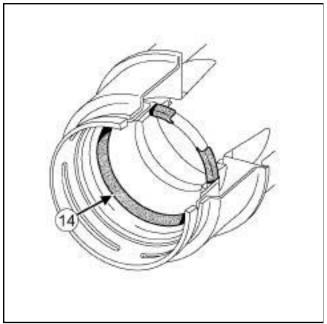


129490

☐ Remove the intercooler air inlet pipe seal using a .

Diesel return pipe: Removal - Refitting

M9R



129491

### Note:

Check that the intercooler air inlet pipe seal is fitted in the right direction.

### ☐ Refit:

- the new seal (14) of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe on the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- □ Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).
- ☐ Refit the engine cover.

# Diesel injector fuel return rail: Removal - Refitting

13B

M9R

Tightening torques ♡	
diesel injector fuel return rail bolt on the rocker cover	10 N.m
intercooler air inlet pipe bolt	8 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

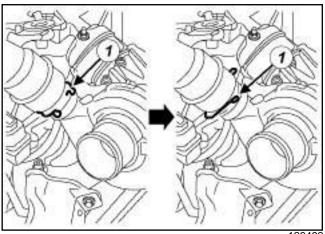
### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### **REMOVAL**

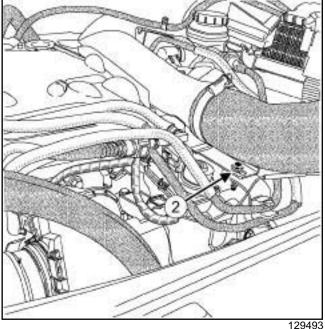
### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.



129492

□ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.

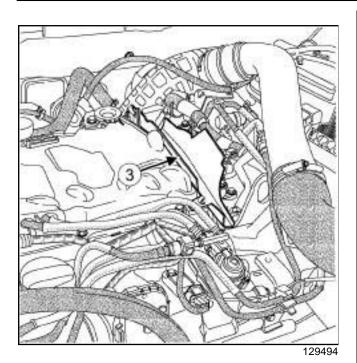


- 129493
- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.

## Diesel injector fuel return rail: Removal - Refitting

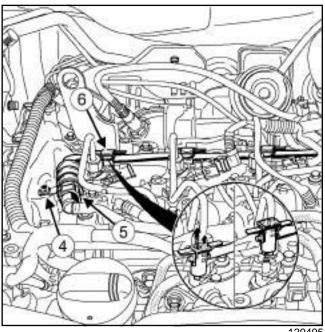
13B

M9R



- ☐ Remove the protector plate (3) from the injector rail protector.
- □ Remove:
  - the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36),
  - -the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129495

☐ Remove the diesel injector fuel return rail bolt (4) from the rocker cover.

### Note:

Do not allow any diesel fuel to enter the engine via the rocker cover opening during this operation.

- ☐ Disconnect the quick-release union (5), located on the diesel injector fuel return rail, from the diesel return pipe.
- □ Raise the mobile section (6) of the injector union on the diesel injector fuel return rail.
- □ Remove:
  - the diesel injector fuel return rail,
  - the seal between the diesel injector and the diesel injector fuel return rail, from each injector.
- ☐ Insert the blanking plugs.

## Diesel injector fuel return rail: Removal - Refitting

13B

M9R

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

- Always replace:
  - the seal between the diesel injector and the diesel injector fuel return rail,
  - the intercooler air inlet pipe seal.

### WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Remove the blanking plugs from the inlet and outlet unions of the fuel filter.
- ☐ Refit:
  - the seal between the diesel injector and the diesel injector fuel return rail, from each injector,
  - the diesel injector fuel return rail.
- ☐ Clip on the diesel injector fuel return rail unions.
- ☐ Connect the diesel injector fuel return rail unions.
- ☐ Refit the diesel injector fuel return rail bolt on the rocker cover.
- ☐ Torque tighten the diesel injector fuel return rail bolt on the rocker cover (10 N.m).

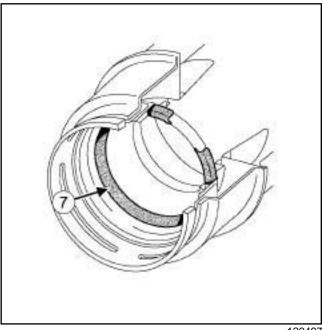
### **III - FINAL OPERATION**

- ☐ Refit:
  - the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
  - -the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).



129496

☐ Remove the intercooler air inlet pipe seal using a .



129497

### Note:

Check that the seal (7) on the intercooler air inlet pipe is fitted the correct way round.

- ☐ Refit:
  - the new seal of the intercooler air inlet pipe,
  - the protector plate on the injector rail protector.

# Diesel injector fuel return rail: Removal - Refitting

13B

Ш	19R
	Turn the intercooler air inlet pipe to refit the clip in its housing.
	Clip the intercooler air inlet pipe onto the turbocharger.
	Refit the intercooler air inlet pipe bolt on the fuel pipe support.
	Torque tighten the intercooler air inlet pipe bolt (8 N.m).
	Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).
	Refit the engine cover

# Injector rail protector: Removal - Refitting

13B

M9R

Tightening torques	
injector rail protector bolts	8 N.m
intercooler air inlet pipe bolt	8 N.m

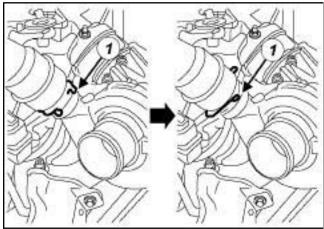
### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **REMOVAL**

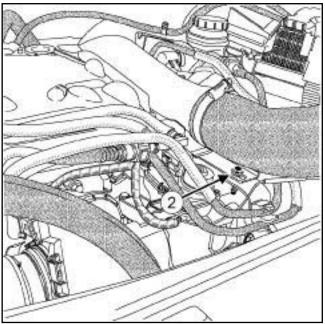
### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.



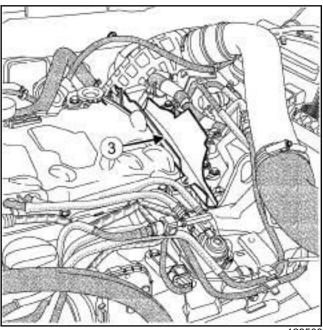
129498

□ Rotate the clip (1) of the intercooler air inlet pipe on the turbocharger.



129499

- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move aside the intercooler air inlet pipe.



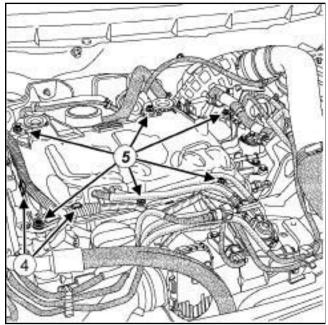
129500

☐ Remove the protector plate (3) from the injector rail protector.

## Injector rail protector: Removal - Refitting

M9R

### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



- ☐ Unclip the electrical wiring from the injector rail protector at (4).
- □ Remove:
  - the bolts (5) from the injector rail protector,
  - the injector rail protector.

### REFITTING

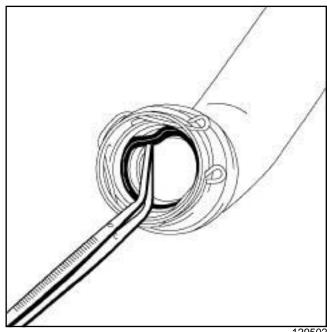
### I - REFITTING PREPARATION OPERATION

☐ Always replace the seal of the intercooler air inlet pipe.

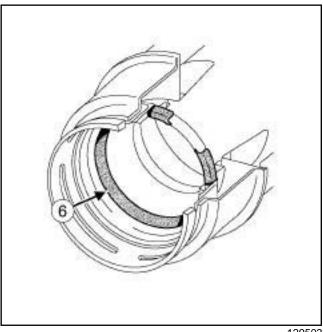
### **II - REFITTING OPERATION FOR PART CONCERNED**

- ☐ Refit:
  - the injector rail protector,
  - the injector rail protector bolts.
- ☐ Torque tighten the injector rail protector bolts (8 N.m).
- ☐ Clip the electrical wiring onto the injector rail protector.

### **III - FINAL OPERATION.**



☐ Remove the intercooler air inlet pipe seal using a .



129503

### Note:

Check that the seal (6) on the intercooler air inlet pipe is fitted the correct way round.

- ☐ Refit:
  - the new seal of the intercooler air inlet pipe,
  - the protector plate on the injector rail protector.

# DIESEL INJECTION Injector rail protector: Removal - Refitting

13B

N	19R
	Turn the intercooler air inlet pipe to refit the clip in its housing.
	Clip the intercooler air inlet pipe onto the turbocharger.
	Refit the intercooler air inlet pipe bolt on the fuel pipe support.
	Torque tighten the intercooler air inlet pipe bolt (8 N.m).
	Refit the engine cover.

High-pressure pipe between the pump and rail: Removal - Refitting

13B

M9R

	Essential special tooling
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.

Tightening torques ♡	
high pressure pipe nut on the high pressure pump	32 N.m
high pressure pipe nut on the injector rail	32 N.m
high pressure pipe bolts between the high pres- sure pump and the injector rail	10 N.m
air filter unit air outlet pipe clips	5 N.m
wiring channel bolt	8 N.m
intercooler air inlet pipe bolt	8 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### IMPORTANT

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

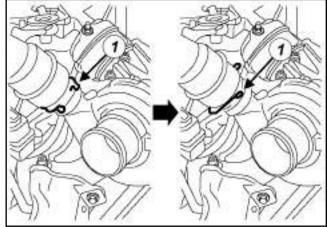
To awid any corrosion or damage, protect the areas on which fuel is likely to run.

### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

□ Remove:

- the engine cover,
- the clips from the air intake sleeve,
- the air intake sleeve from the air filter unit.
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).



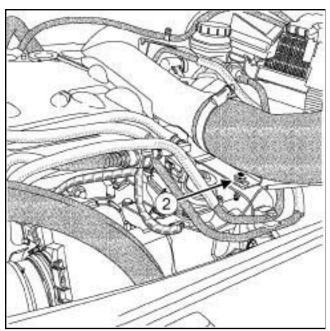
129504

□ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.

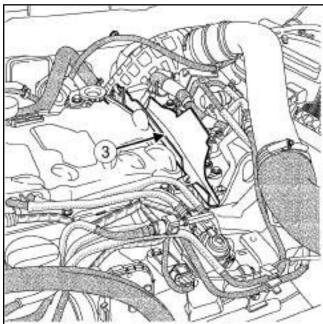
### High-pressure pipe between the pump and rail: Removal - Refitting

13B

M9R

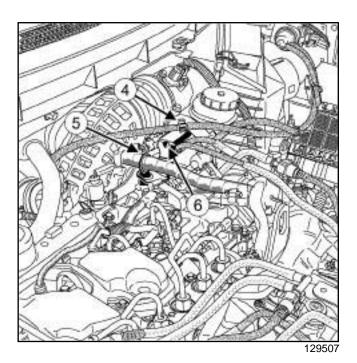


- 129505
- ☐ Remove the bolt (2) from the intercooler air inlet pipe from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.

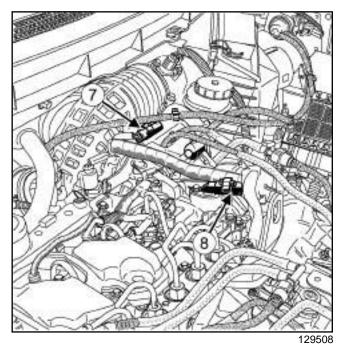


129506

- □ Remove:
  - the protector plate (3) from the injector rail protector,
  - -the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).



- ☐ Unclip:
  - the control pipe from the turbocharger pressure regulator valve at (4) ,
  - the wiring at (5).
- □ Remove the mounting (6).

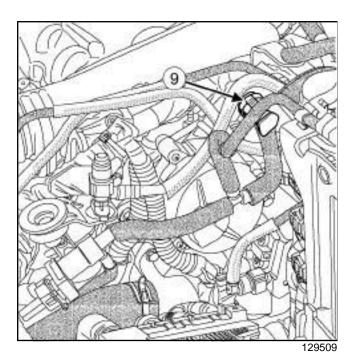


- □ Disconnect:
  - the fuel temperature sensor connector (7) ,
  - the connector (8) from the camshaft position sensor.

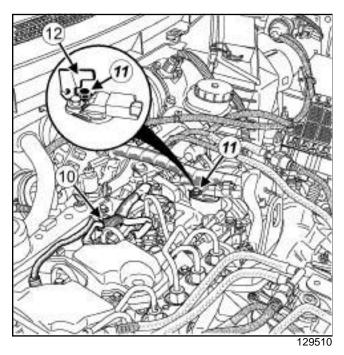
High-pressure pipe between the pump and rail: Removal - Refitting

13B

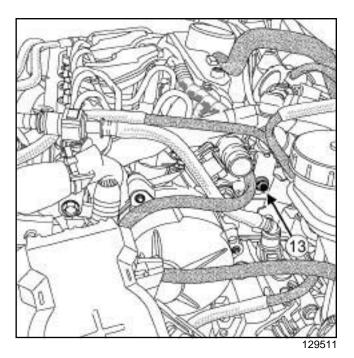
M9R



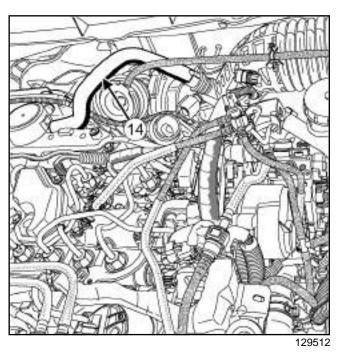
☐ Disconnect the brake servo pipe (9) from the non-return valve.



- ☐ Unclip the injector wiring from the oil separator at (10).
- □ Remove:
  - the wiring channel bolt (11),
  - the wiring (12).



- ☐ Remove the bolt (13) from the high pressure pipe between the high pressure pump and the injector rail.
- ☐ Move aside the wiring.

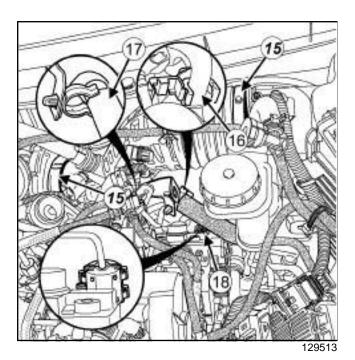


☐ Remove the oil vapour rebreathing pipe (14) from the oil separator.

High-pressure pipe between the pump and rail: Removal - Refitting

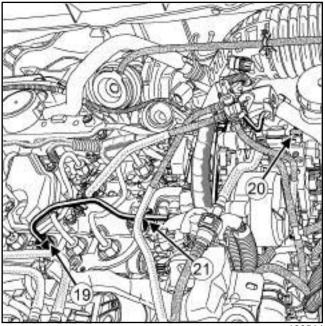
13B

M9R



- □ Loosen the air outlet pipe clips (15) of the air filter unit.
- ☐ Disconnect the air outlet pipe from the air filter unit.
- ☐ Unclip:
  - the brake servo pipe (16),
  - the turbocharger cooling pipe (17),
  - -the high pressure pipe nut protector (18) on the high pressure pump.
- ☐ Move aside the high pressure pipe nut protector.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



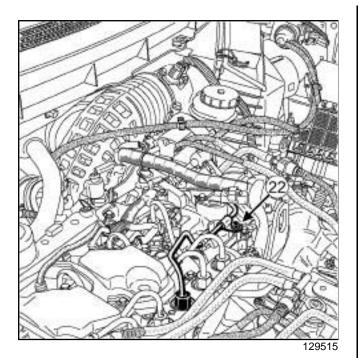
129514

- ☐ Undo:
  - the nut (19) from the high pressure pipe on the injector rail using a 19 mm long lever spanner, part number 77 11 223 721,
  - the nut (20) from the high pressure pipe on the high pressure pump using a 17 mm long lever spanner, part number 77 11 223 720.
- ☐ Mark the position of the pad (21) between the high pressure pipe and the lower cover.

High-pressure pipe between the pump and rail: Removal - Refitting

13B

M9R



### Note:

Do not allow any diesel fuel to enter the engine via the rocker cover opening during this operation.

### □ Remove:

- the high pressure pipe bolt (22) on the lower cover.
- the high pressure pipe between the high pressure pump and the injector rail.
- ☐ Insert the blanking plugs.

### REFITTING

### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the high pressure pipes between the high pressure pump and the injector rail,
  - the intercooler air inlet pipe seal.

### **WARNING**

Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Remove the blanking plugs.
- ☐ Position:
  - the high pressure pipe olive in the injector rail taper.
  - the high pressure pipe olive in the high pressure pump outlet taper.
- ☐ Correctly position the pad between the high pressure pipe and the rocker cover.
- ☐ Fit the high pressure pipe nuts without tightening them, starting with the nut at the injector rail end.
- ☐ Torque tighten:
  - the high pressure pipe nut on the high pressure pump (32 N.m) using a 17mm long lever spanner, part number 77 11 223 720,
  - the high pressure pipe nut on the injector rail (32 N.m) using a 19mm long lever spanner, part number 77 11 223 721.
- ☐ Refit the high pressure pipe bolts between the high pressure pump and the injector rail.

High-pressure pipe between the pump and rail: Removal - Refitting

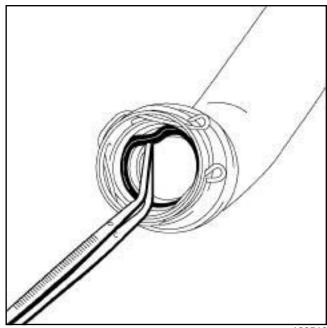
13B

M9R

□ Torque tighten the high pressure pipe bolts between the high pressure pump and the injector rail (10 N.m)

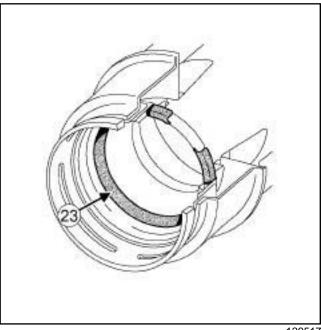
### **III - FINAL OPERATION**

- ☐ Clip:
  - -the high pressure pipe nut protector on the high pressure pump,
  - the turbocharger cooling pipe,
  - the brake servo pipe .
- ☐ Connect the air filter unit air outlet pipe to the air filter unit and to the turbocharger.
- ☐ Torque tighten the air filter unit air outlet pipe clips (5 N.m) using the tool (Mot. 1608).
- ☐ Connect the oil vapour rebreathing pipe to the oil separator.
- ☐ Fit the wiring channel.
- ☐ Refit the wiring channel bolt.
- ☐ Torque tighten the wiring channel bolt (8 N.m).
- ☐ Clip the injector wiring onto the oil separator.
- □ Connect:
  - the camshaft position sensor connector,
  - the fuel temperature sensor connector,
  - the brake servo pipe to the non-return valve.
- Refit the support.
- ☐ Clip:
  - the wiring,
  - the turbocharger pressure regulator valve control pipe.
- □ Refit the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).



129516

☐ Remove the intercooler air inlet pipe seal using a .



129517

### Note:

Check that the seal (23) on the intercooler air inlet pipe is fitted the correct way round.

### ☐ Refit:

- the new seal of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.

High-pressure pipe between the pump and rail: Removal - Refitting

13B

ΠV	19R
	Turn the intercooler air inlet pipe to refit the clip in its housing.
	Clip the intercooler air inlet pipe onto the turbocharger.
	Refit the intercooler air inlet pipe bolt on the fuel pipe support.
	Torque tighten the <b>intercooler air inlet pipe bolt (8 N.m)</b> .
	Connect the battery (see <b>Battery : Removal - Refitting</b> ) (80A, Battery).
	Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).
	Refit:
	- the air intake sleeve on the air filter unit,
	- the clips of the air intake sleeve,
	-the engine cover.

High-pressure pipe between the rail and injector: Removal - Refitting

13B

M9R

-	
Tightening torques ♡	
high pressure pipe nuts on the injectors	32 N.m
high pressure pipe nuts on the injector rail	32 N.m
intercooler air inlet pipe bolt	8 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

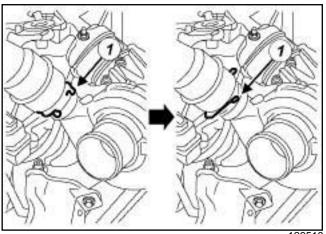
### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### **REMOVAL**

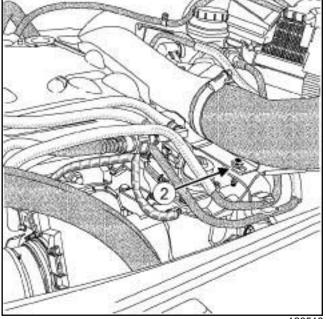
### I - REMOVAL PREPARATION OPERATION

- ☐ Remove the front engine cover.
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).



129518

□ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.



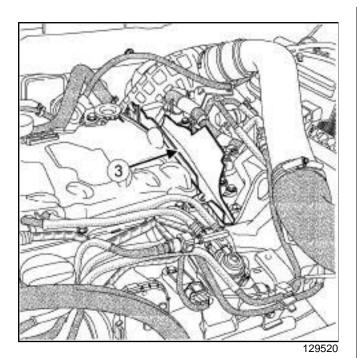
129519

- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.

High-pressure pipe between the rail and injector: Removal - Refitting

13B

M9R



#### □ Remove:

- the protector plate (3) from the injector rail protector,
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29),
- the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal Refitting, page 13B-32).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129521

#### Note:

Loosen the pipe nuts one by one.

#### Note:

Do not allow any diesel fuel to enter the engine via the rocker cover opening during this operation.

#### ☐ Undo:

- the high pressure pipe nuts on the injectors using a
   17 mm long lever spanner, part number 77 11
   223 720.
- the high pressure pipe nuts on the injector rail using a 19 mm long lever spanner, part number 77 11 223 721.
- ☐ Remove the high pressure pipes between the rail and the injectors one by one.
- ☐ Insert the blanking plugs.

High-pressure pipe between the rail and injector: Removal - Refitting

13B

M9R

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - -the high pressure pipes between the injector rail and the injectors,
  - the intercooler air inlet pipe seal.

#### WARNING

Before fitting a new high pressure pipe, lightly lubricate the nut threads with the oil from the applicator provided in the new parts kit.

Be careful not to allow oil into the high pressure pipe.

Do not lubricate high pressure pipes supplied without an applicator, as these high pressure pipes are self-lubricating.

#### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

□ Remove the blanking plugs.

#### Note:

Tighten the high pressure pipes between the rail and the injectors one by one.

#### ☐ Fit:

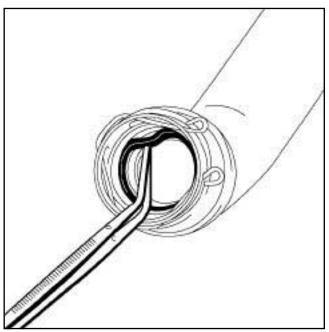
- the high pressure pipe olives between the rail and the injectors in the injector rail tapers,
- the high pressure pipe olives between the rail and the injectors in the injector tapers.
- ☐ Manually tighten the high pressure pipe nuts between the rail and the injectors, starting with the nuts on the injector rail side.
- ☐ Torque tighten:
  - -the high pressure pipe nuts on the injectors (32 N.m) using a 17 mm long lever spanner, part number 77 11 223 720,

- the high pressure pipe nuts on the injector rail (32 N.m) using a 19 mm long lever spanner, part number 77 11 223 721.

#### **III - FINAL OPERATION**

#### □ Refit:

- the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal Refitting, page 13B-32).
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36)



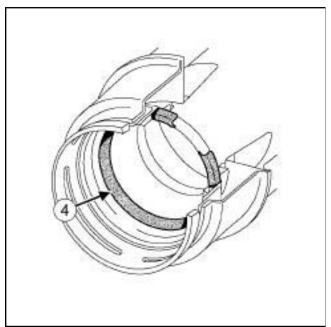
129522

☐ Remove the intercooler air inlet pipe seal using a .

13B

High-pressure pipe between the rail and injector: Removal - Refitting

M9R



129523

#### Note:

Check that the seal (4) on the intercooler air inlet pipe is fitted the correct way round.

#### ☐ Refit:

- the new seal of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).
- ☐ Refit the engine cover.

# DIESEL INJECTION Injector rail: Removal - Refitting

13B

M9R

Tightening torques ♡	
injector rail bolts	25 N.m
intercooler air inlet pipe bolt	8 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **WARNING**

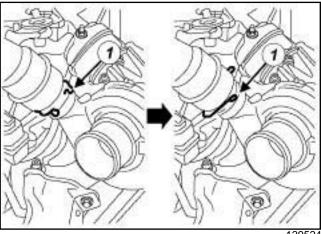
To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

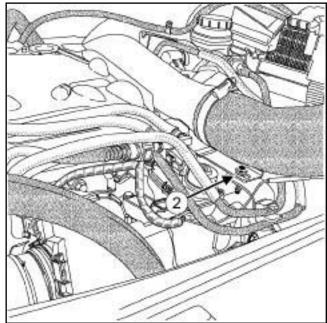
- □ Remove:
  - the engine cover,
  - the clips from the air intake sleeve,
  - the air intake sleeve from the air filter unit.

□ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).



129524

□ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.

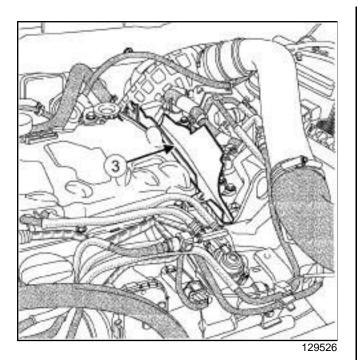


- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move the intercooler air inlet pipe to one side.

### Injector rail: Removal - Refitting

13B

M9R



#### □ Remove:

- the protector plate (3) from the injector rail protector.
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36),
- the air inlet flap (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14),
- -the turbocharger pressure sensor unit (see 12A, Fuel mixture, Air inlet flap: Removal - Refitting, page 12A-14)
- -the exhaust gas recirculation solenoid valve (see 14A, Antipollution, Exhaust gas recirculation solenoid valve: Removal - Refitting, page 14A-8),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
- the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal Refitting, page 13B-32),
- the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal Refitting, page 13B-46),
- the high pressure pipes between the high pressure pump and the injector rail (see 13B, Diesel injection, High-pressure pipe between the pump and rail: Removal Refitting, page 13B-39).



#### Note:

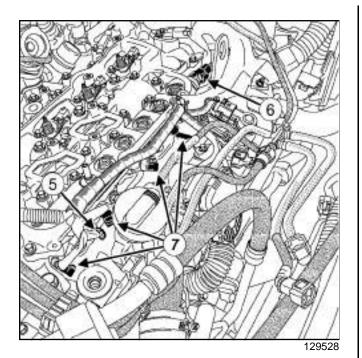
Do not allow any diesel fuel to enter the engine via the rocker cover opening during this operation.

- ☐ Disconnect the diesel return pipe quick-release union (4) from the injector rail.
- ☐ Insert the blanking plugs.

# Injector rail: Removal - Refitting

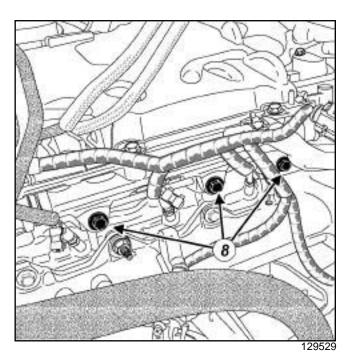
13B

M9R



- □ Disconnect:
  - the pressure regulator connector (5) on the injector rail,
  - -the connector (6) from the rail pressure sensor (see 13B, Diesel injection, Rail pressure sensor: Removal - Refitting, page 13B-55)
  - the heater plug connectors (7).
- ☐ Move the fuel pipes aside.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Remove:
  - the injector rail bolts (8),
  - the injector rail,
  - the injector rail seal.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the injector rail seal,
  - the intercooler air inlet pipe seal.

#### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Remove the blanking plugs.
- □ Refit:
  - the injector rail along with its seal,
  - the injector rail bolts.

### Injector rail: Removal - Refitting

13B

M9R

☐ Torque tighten the injector rail bolts (25 N.m).

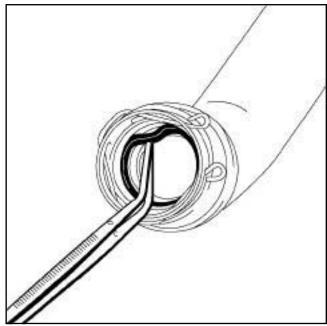
#### **III - FINAL OPERATION**

#### □ Connect:

- the heater plug connectors,
- the rail pressure sensor connector,
- -the pressure regulator connector on the injector rail,
- the diesel return pipe quick-release union on the injector rail.

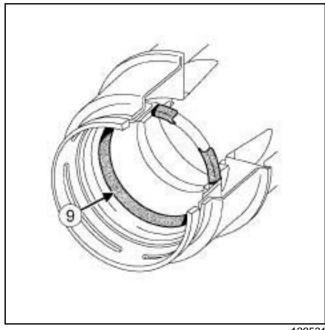
#### ☐ Refit:

- the high pressure pipes between the high pressure pump and the injector rail (see 13B, Diesel injection, High-pressure pipe between the pump and rail: Removal Refitting, page 13B-39),
- the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal Refitting, page 13B-46),
- the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal Refitting, page 13B-32),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
- -the exhaust gas recirculation solenoid valve (see 14A, Antipollution, Exhaust gas recirculation solenoid valve: Removal - Refitting, page 14A-8),
- -the turbocharger pressure sensor unit (see 12A, Fuel mixture, Air inlet flap: Removal - Refitting, page 12A-14)
- the air inlet flap (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14),
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).



129530

☐ Remove the intercooler air inlet pipe seal using a .



129531

#### Note:

Check that the seal (9) on the intercooler air inlet pipe is fitted the correct way round.

#### ☐ Refit:

- the new seal of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.

# DIESEL INJECTION Injector rail: Removal - Refitting

13B

N	19R
	Turn the intercooler air inlet pipe to refit the clip in its housing.
	Clip the intercooler air inlet pipe onto the turbocharger.
	Refit the intercooler air inlet pipe bolt on the fuel pipe support.
	Torque tighten the intercooler air inlet pipe bolt (8 N.m).
	Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).
	Connect the battery (see <b>Battery</b> : <b>Removal - Refitting</b> ) (80A, Battery).
	Refit:
	- the air intake sleeve on the air filter unit.

- the clips of the air intake sleeve,

- the engine cover.

# Rail pressure sensor: Removal - Refitting

13B

M9R

Tightening torques ♡	
rail pressure sensor	80 N.m
injector rail protector bolt	8 N.m
intercooler air inlet pipe bolt	8 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

#### **WARNING**

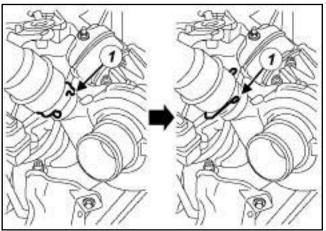
Once the warranty period for the high pressure pump has expired, only the pressure regulator can be replaced separately.

Whilst the warranty period for the high pressure pump is still running, the high pressure pump should be replaced as a whole if the pressure regulator displays a fault.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- □ Remove:
  - the engine cover,
  - the battery (see Battery: Removal Refitting) (80A, Battery).



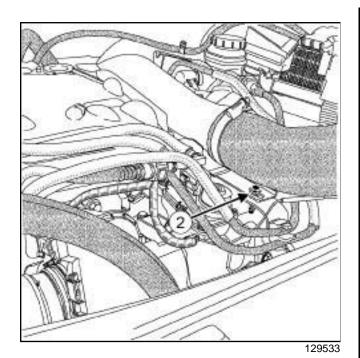
129532

□ Rotate the clip (1) of the intercooler air inlet pipe on the turbocharger.

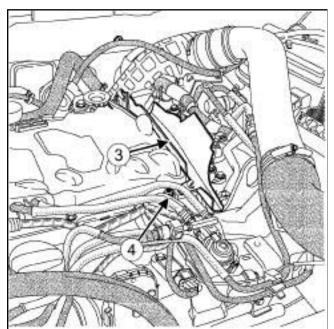
# Rail pressure sensor: Removal - Refitting

13B

M9R

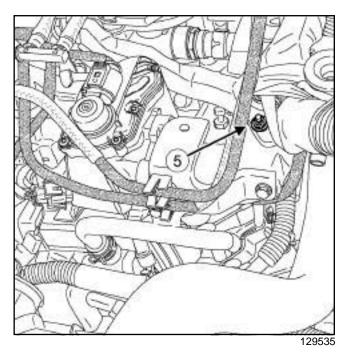


- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel pipe support.
- ☐ Move aside the intercooler air inlet pipe.

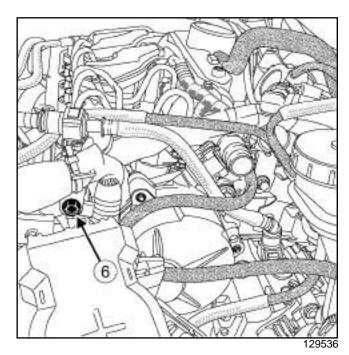


129534

- ☐ Remove:
  - -the protector plate (3) from the injector rail protector,
  - the injector rail protector bolt (4) .



☐ Remove the wiring nut (5).

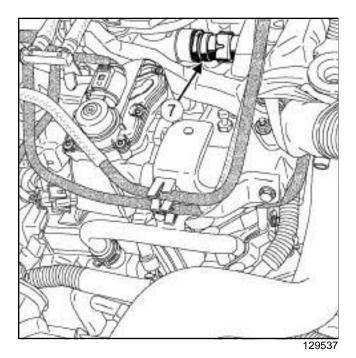


- ☐ Remove the wiring bolt (6).
- ☐ Move aside the wiring.

### Rail pressure sensor: Removal - Refitting

M9R

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



- ☐ Disconnect the rail pressure sensor connector.
- □ Remove the rail pressure sensor (7).
- ☐ Insert the blanking plugs.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the seal of the intercooler air inlet pipe.

#### WARNING

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

#### **II - REFITTING OPERATION FOR PART CONCERNED**

☐ Remove the blanking plugs.

Note:

The rail pressure sensor has no seal.

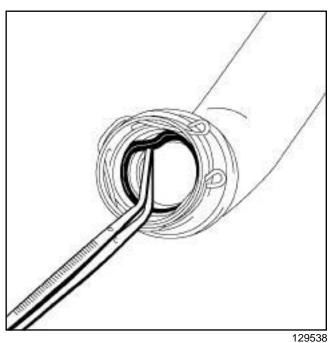
#### Note:

Use a torque wrench with an adapter for an open-ended spanner (27 mm) to tighten the rail pressure sensor.

- ☐ Refit the rail pressure sensor.
- ☐ Torque tighten the rail pressure sensor (80 N.m).
- ☐ Connect the rail pressure sensor connector.

#### **III - FINAL OPERATION.**

- ☐ Fit the wiring.
- ☐ Refit:
  - the wiring bolt,
  - the wiring nut,
  - the injector rail protector bolt.
- ☐ Torque tighten the injector rail protector bolt (8 N.m).

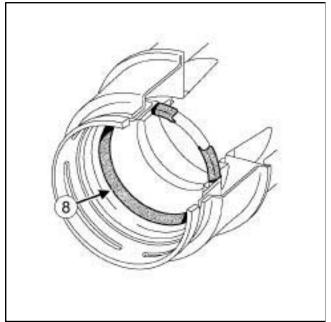


Remove the intercooler air inlet pipe seal using a .

# Rail pressure sensor: Removal - Refitting

13B

M9R



129539

#### Note:

Check that the seal (8) on the intercooler air inlet pipe is fitted the correct way round.

#### ☐ Refit:

- the new seal of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.
- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- □ Prime the fuel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).
- ☐ Refit the engine cover.

# Oxygen sensor: Removal - Refitting

13B

M9R

#### **Essential special tooling**

Mot. 1495-01 22 mm socket for removing/ refitting oxygen sensors.

Tightening torques ♡	
oxygen sensor	50 N.m
intercooler air inlet pipe bolt	8 N.m

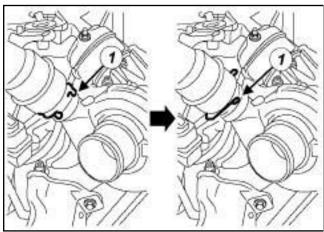
#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **REMOVAL**

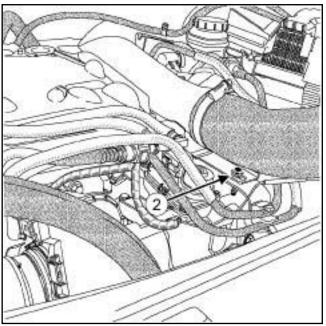
#### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.

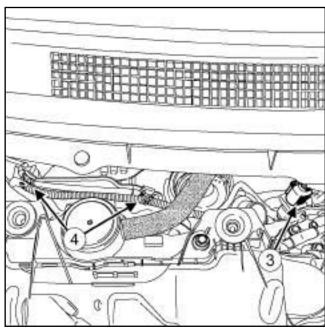


129540

□ Rotate the clip (1) of the intercooler air inlet pipe on the turbocharger.



- ☐ Remove the bolt (2) from the intercooler air inlet pipe from the fuel pipe support.
- ☐ Move aside the auxiliary air cooler air inlet pipe.



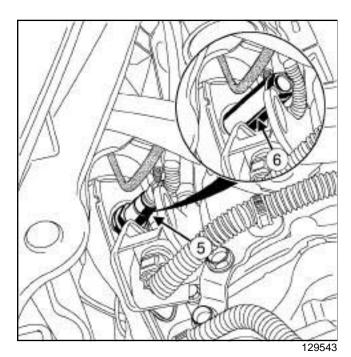
- 129542
- □ Disconnect the connector (3) from the oxygen sensor wiring.
- □ Remove the connector from the oxygen sensor wiring.
- ☐ Unclip the oxygen sensor wiring from the heat shield at (4).
- ☐ Move the oxygen sensor wiring aside.

Oxygen sensor: Removal - Refitting

13B

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove the oxygen sensor (5) using the (Mot. 1495-01) (6).

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

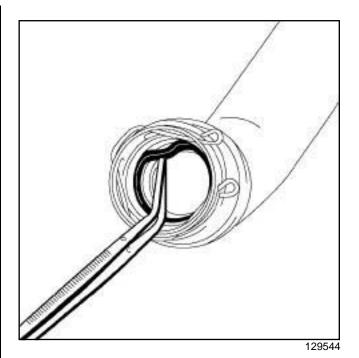
☐ Always replace the seal of the intercooler air inlet pipe.

# II - REFITTING OPERATION FOR PART CONCERNED

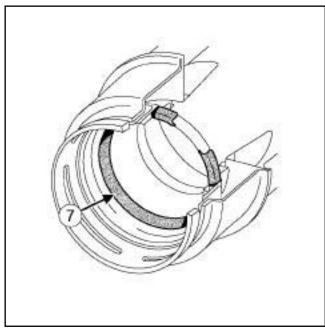
- ☐ Refit the oxygen sensor.
- ☐ Torque tighten the oxygen sensor (50 N.m) using the tool (Mot. 1495-01).

#### **III - FINAL OPERATION.**

- ☐ Clip the oxygen sensor wiring onto the heat shield.
- ☐ Refit the oxygen sensor wiring connector to the support.
- ☐ Connect the oxygen sensor wiring connector.



☐ Remove the intercooler air inlet pipe seal using a .



129545

#### Note:

Check that the seal (7) on the intercooler air inlet pipe is fitted the correct way round.

- ☐ Refit the new intercooler air inlet pipe seal.
- ☐ Rotate the intercooler air inlet clip pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.

# DIESEL INJECTION Oxygen sensor: Removal - Refitting

13B

M9R	
Refit the intercooler air inlet pipe bolt on the fuel pipe support.	
☐ Torque tighten the intercooler air inlet nine holt (8	

☐ Refit the engine cover.

N.m).

### Fuel temperature sensor: Removal - Refitting

13B

M9R

Tightening torques	
fuel filter protector nuts	10 N.m
fuel filter protector bolt	25 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

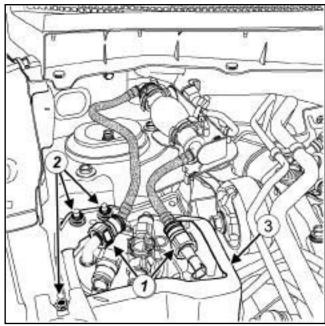
#### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

#### **REMOVAL**

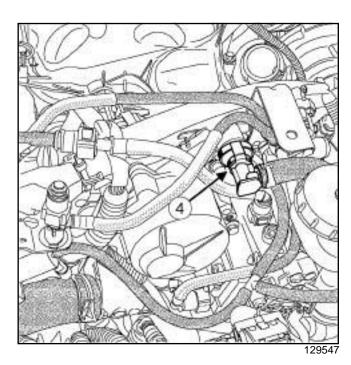
#### I - REMOVAL PREPARATION OPERATION

☐ Remove the front engine cover.



129546

- ☐ Disconnect the quick-release unions (1) from the manual priming pump.
- ☐ Insert the blanking plugs.
- ☐ Remove:
  - the nuts and the bolt (2) from the fuel filter protector.
  - the fuel filter protector (3).



□ Disconnect the brake servo pipe (4) from the non-return valve.

### Fuel temperature sensor: Removal - Refitting

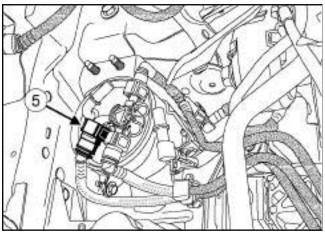
13B

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED

#### Note:

The fuel temperature sensor is integrated into the fuel return pipe and these two components cannot be removed separately.



129548

- ☐ Disconnect the fuel supply quick-release union (5) from the high pressure pump of the fuel filter.
- ☐ Insert the blanking plugs.



□ Disconnect:

- -the fuel supply quick-release union (6) from the high pressure pump,
- the fuel temperature sensor connector (7) .

- Unclip:
  - the fuel temperature sensor,
  - the air bleed quick-release union (8),
  - the high pressure pump fuel supply pipe.
- ☐ Remove fuel temperature sensor and fuel supply pipe assembly from the high pressure pump.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the fuel temperature sensor and fuel supply pipe assembly of the high pressure pump.
- Clip
  - the high pressure pump fuel supply pipe,
  - the air bleed quick-release union,
  - the fuel temperature sensor.
- ☐ Remove the blanking plugs from the openings.

#### Note:

Be careful not to pinch or damage the fuel pipes.

#### ☐ Connect:

- the fuel temperature sensor connector,
- the fuel supply quick-release union of the high pressure pump,
- the high pressure pump fuel supply quick-release union to the fuel filter.

#### **III - FINAL OPERATION.**

- ☐ Connect the brake servo pipe of the non-return valve
- ☐ Refit:
  - the fuel filter protector,
  - the nuts and the bolt of the fuel filter protector.

Fuel temperature sensor: Removal - Refitting

13B

INIAK	
☐ Torque tighten:	
- the fuel filter protector nuts (10 N.m),	
- the fuel filter protector bolt (25 N.m).	
☐ Remove the blanking plugs from the openings.	
Connect the quick-release unions of the manual priming pump.	
□ Prime the circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).	
☐ Refit the engine cover.	

Diesel injector: Removal - Refitting

M9R

#### **Essential equipment**

diagnostic tool

Tightening torques ♡	
injector clamp bolts	35 N.m
intercooler air inlet pipe bolt	8 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

#### **IMPORTANT**

Use the diagnostic tool before any operation is carried out on the injection circuit to check:

- that the rail is not under pressure,
- that the fuel temperature is not too high.

Working on the circuit with the engine running is strictly forbidden.

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

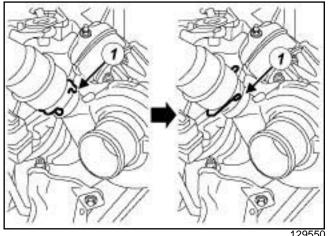
#### WARNING

Dismantling the interior of the high pressure pump and the injectors is prohibited.

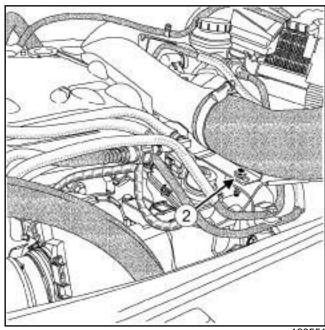
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Remove the front engine cover.
- □ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).



☐ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.

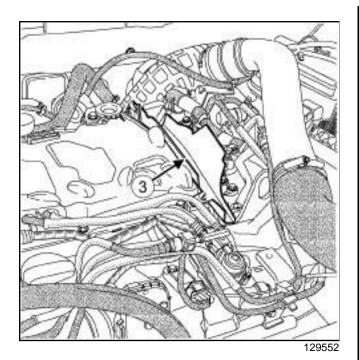


- ☐ Remove the bolt (2) from the intercooler air inlet pipe from the fuel pipe support.
- ☐ Move aside the intercooler air inlet pipe.

### Diesel injector: Removal - Refitting

13B

M9R



#### □ Remove:

- the protector plate (3) from the injector rail protector,
- the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36),
- the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29),
- the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal Refitting, page 13B-32),
- the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal Refitting, page 13B-46).
- ☐ Disconnect the injector connectors.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



#### Note:

Cylinder No. 1 is located on the timing end.

#### Remove:

- the injector clamp bolts (4),
- the injector clamps.
- the injectors one by one, noting the IMA codes for each injector,
- the injector copper sealing washer,
- the seal between the diesel injector and the diesel injector fuel return rail from each injector.

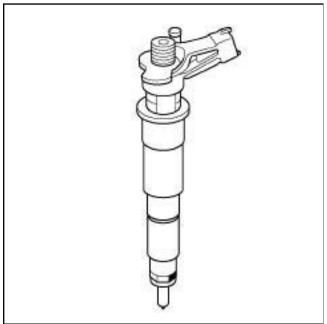
### Diesel injector: Removal - Refitting

13B

M9R

#### REFITTING

#### I - REFITTING PREPARATION OPERATION



129554

#### **WARNING**

It is strictly forbidden to clean the injectors with:

- a wire brush,
- an emery cloth,
- an ultrasonic cleaner.

#### Note:

Use new cloths, part no. **77 11 211 707** soaked in new degreaser to clean:

- the injector holes,
- the injector covers,
- the injector clamps.

#### Note:

Use a new cloth to dry components that have been cleaned.

- □ Always replace:
  - the copper sealing washer,
  - the seal between the diesel injector and the diesel injector fuel return rail,
  - the intercooler air inlet pipe seal.

#### **WARNING**

Do not remove the blanking plugs from each component until the last moment.

Also, do not remove the components from their packaging until they are to be fitted to the vehicle.

☐ Clean the diesel injector.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the seal between the diesel injector and the diesel injector fuel return rail on each injector,
  - the new copper sealing washer on the injectors,
  - the copper sealing washer injector assembly,
  - the injector clamps.
  - the injector clamp bolts.
- ☐ Torque tighten the **injector clamp bolts (35 N.m)**.

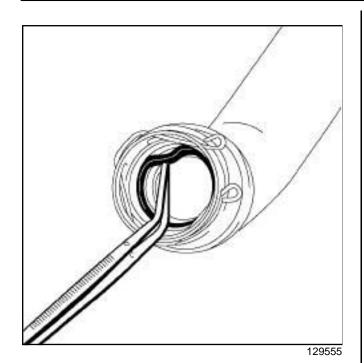
#### **III - FINAL OPERATION.**

- □ Connect the connectors for injector numbers 2, 3 and 4.
- □ Refit:
  - the high pressure pipes between the rail and the injectors (see 13B, Diesel injection, High-pressure pipe between the rail and injector: Removal Refitting, page 13B-46),
  - the diesel injector fuel return rail (see 13B, Diesel injection, Diesel injector fuel return rail: Removal - Refitting, page 13B-32),
  - the oil separator (see 11A, Top and front of engine, Oil decanter: Removal Refitting, page 11A-29)
  - the injector rail protector (see 13B, Diesel injection, Injector rail protector: Removal Refitting, page 13B-36).

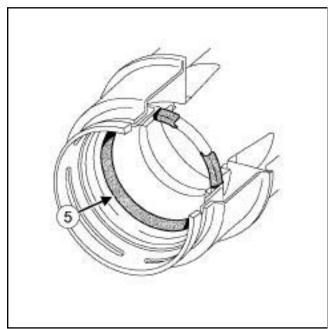
### Diesel injector: Removal - Refitting

13B

M9R



☐ Remove the intercooler air inlet pipe seal using a.



129556

#### Note:

Check whether the intercooler air inlet pipe seal (5) is correctly positioned.

#### ☐ Refit:

- the new seal of the intercooler air inlet pipe,
- the protector plate on the injector rail protector.

- ☐ Turn the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt on the fuel pipe support.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).

#### □ Connect

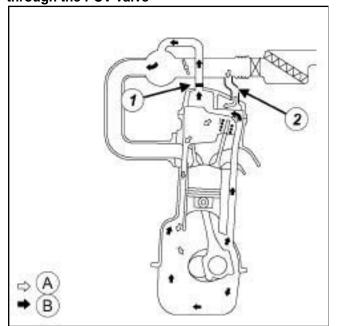
- the battery (see Battery: Removal Refitting) (80A, Battery)
- diagnostic tool thick, to the alternator rotor.
- □ Enter the injector codes in the diesel injection computer in accordance with command scenario SC002 and reinitialise the program using command scenario SC036 replacing the diesel injector (see Fault finding Replacement of components) (13B, Diesel injection).
- □ Prime the circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).
- ☐ Refit the engine cover.

# Oil vapour rebreathing system: Operating diagram



2TR

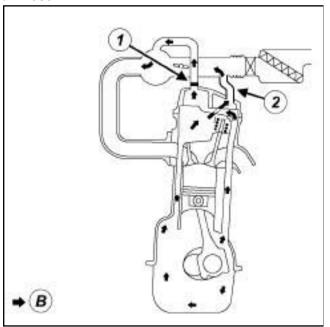
 ${f I}$  – Under low loads, the oil vapour is rebreathed through the PCV valve



129561

- (A) Fresh air
- (B) Oil vapour
- (1) PCV valve
- (2) Fresh air hose

II – Under medium and heavy loads, the oil vapour is rebreathed through the PCV valve and the fresh air hose



129562

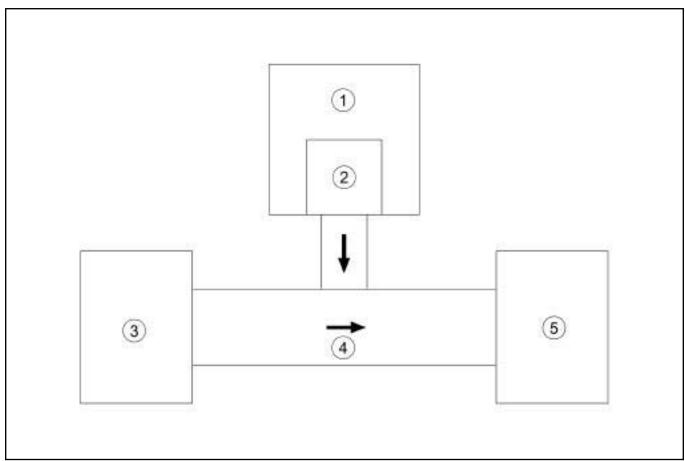
(A) Oil vapour

(1) PCV valve(2) Fresh air hose

# Oil vapour rebreathing system: Operating diagram



M9R

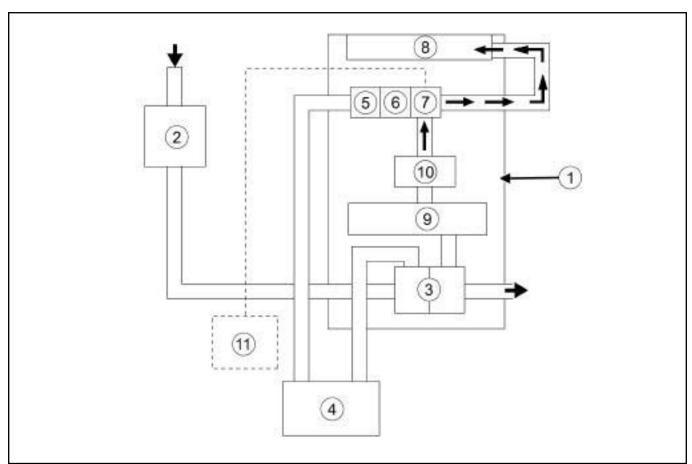


Engine

- (2) Oil separator
- (3) Air filter unit
- (4) Air filter unit air outlet duct
- (5) Turbocharger

# **Exhaust gas recirculation: Operating diagram**

M9R



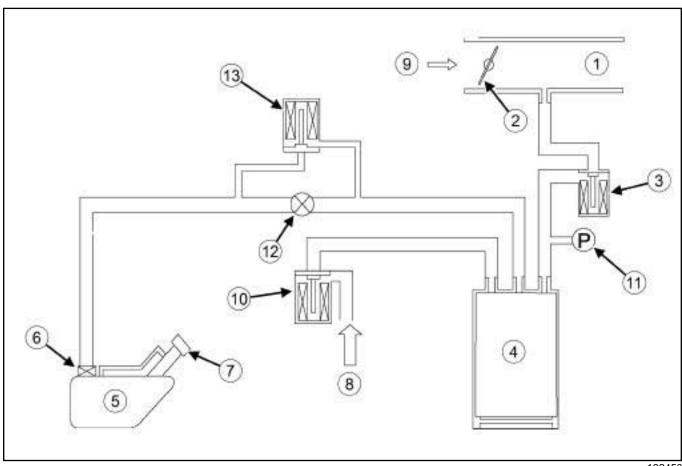
(1)	Engine
<b>(2</b> )	Air filter unit
(3)	Turbocharger
<b>(4)</b>	Intercooler
<b>(5)</b>	Air inlet valve
(6)	Turbocharging pressure sensor housing
(7)	Exhaust gas recirculation sole- noid valve control
(8)	Intake distributor
<b>(9</b> )	Exhaust manifold
<b>(10)</b>	Exhaust gas cooler
(11)	Diesel injection computer

# Fuel vapour recirculation circuit: Operating diagram



2TR

### **OPERATING DIAGRAM OF THE CIRCUIT**



(1)	Inlet manifold
(2)	Throttle valve
(3)	Fuel vapour absorber bleed solenoid valve
(4)	Fuel vapour absorber
(5)	Fuel tank
<b>(6</b> )	Fuel anti-return valve
<b>(7</b> )	Fuel filler cap
(8)	Fresh air vent
(9)	Fresh air
(10)	Fuel vapour absorber drain stop solenoid valve
(11)	Fuel vapour pressure sensor
(12)	Anti-return valve
(13)	Anti-return valve bypass sole- noid valve

### Fuel vapour canister: Removal - Refitting



2TR

#### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **IMPORTANT**

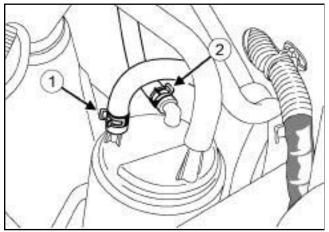
Wear leaktight gloves (Nitrile type) for this operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Remove the windscreen washer bottle neck (see Windscreen washer bottle funnel: Removal - Refitting) (85A, Washing - Wiping).

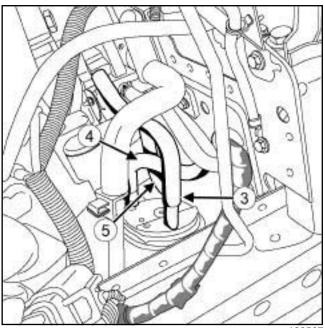
# II - OPERATION FOR REMOVAL OF PART CONCERNED



12956

#### □ Remove:

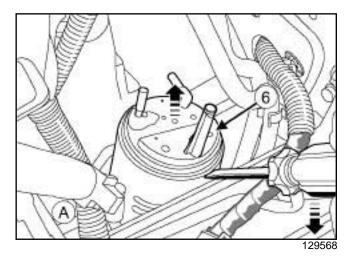
- the clip (1) from the fuel tank fuel vapour inlet hose,
- the clip (2) from the fuel vapour circulation hose leading to the solenoid valve.



129567

#### □ Disconnect:

- the breather hose (3),
- the fuel tank fuel vapour inlet hose (4),
- the fuel vapour circulation hose (5) leading to the solenoid valve.



□ Remove the fuel vapour absorber (6) from the fuel tank retaining notch by pushing it in the direction of the arrow.

(A): inside of the right-hand headlight.

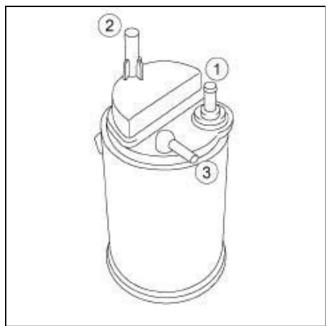
### Fuel vapour canister: Removal - Refitting



2TR

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION



129569

#### **WARNING**

The breather should not be blocked during normal engine operation.

- ☐ Refit the fuel vapour absorber (6):
  - if there are cracks and damage visible,
  - if a fault arises during the following checking procedure:
  - a) block the take-off pipe (2). Blow in the take-off pipe (1). Check that air circulates freely through the take-off pipe (3).
  - b) block the take-off pipe (1). Blow in the take-off pipe (2). Check that air circulates freely through the take-off pipe (3).

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the fuel vapour absorber in the retaining notch.
- □ Connect:
  - the fuel vapour circulation hose leading to the solenoid valve,
  - the fuel tank fuel vapour inlet hose,
  - the breather hose.

#### □ Refit:

- the clip of the fuel vapour circulation hose leading to the solenoid valve,
- the clip of the fuel tank fuel vapour inlet hose.

#### **III - FINAL OPERATION.**

- □ Refit the windscreen washer bottle neck (see Windscreen washer bottle funnel: Removal - Refitting) (85A, Washing - Wiping).
- □ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

# **14A**

Fuel vapour absorber bleed solenoid valve Removal - Refitting

2TR

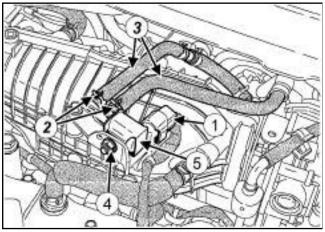
Tightening torques ♡	
fuel vapour absorber bleed solenoid valve nut	5 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Remove the engine cover.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129570

- ☐ Disconnect the fuel vapour absorber bleed solenoid valve connector (1).
- ☐ Remove the clips (2) from the fuel vapour absorber bleed pipes.
- ☐ Disconnect the fuel vapour absorber bleed pipes (3)

□ Remove:

- the fuel vapour absorber bleed solenoid valve nut (4),
- the bleed solenoid valve (5) from the fuel vapour absorber.

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the fuel vapour absorber bleed solenoid valve,
  - the fuel vapour absorber bleed solenoid valve nut.
- ☐ Torque tighten the fuel vapour absorber bleed solenoid valve nut (5 N.m).
- ☐ Connect the fuel vapour absorber bleed pipes.
- ☐ Refit the fuel vapour absorber bleed pipe clips.
- ☐ Connect the fuel vapour absorber bleed solenoid valve connector.

#### **II - FINAL OPERATION.**

- ☐ Refit the engine cover.
- □ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

### Exhaust gas recirculation solenoid valve: Removal - Refitting



M9R

Essential special tooling			
Mot. 1448	Long nose pliers for hose clips.		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.		

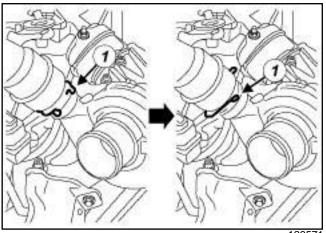
Essential equipment
diagnostic tool

Tightening torques ♡	
exhaust gas recircula- tion solenoid valve bolts	21 N.m
exhaust gas recircula- tion exchanger water inlet pipe bracket bolts	10 N.m
exhaust gas recircula- tion cooling bypass solenoid valve bolts	10 N.m
intercooler water inlet pipe bolts	10 N.m
exhaust gas recircula- tion rigid pipe bolts	25 N.m
intercooler air inlet hose clip	6 N.m.
intercooler air inlet pipe bolt	8 N.m

#### **REMOVAL**

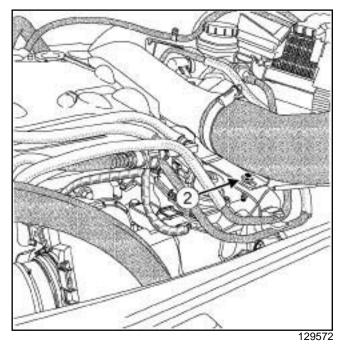
#### I - REMOVAL PREPARATION OPERATION

- ☐ Remove the front engine cover.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- □ Remove:
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit.



129571

□ Rotate the intercooler air inlet pipe clip (1).

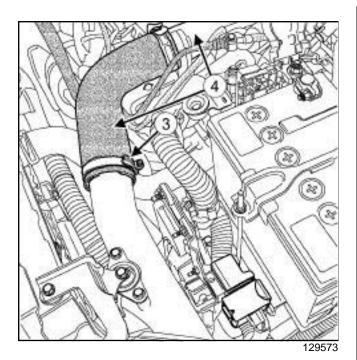


- ☐ Remove the intercooler air inlet pipe bolts (2) from the fuel supply pipe bracket.
- ☐ Move the intercooler air inlet pipe to one side.

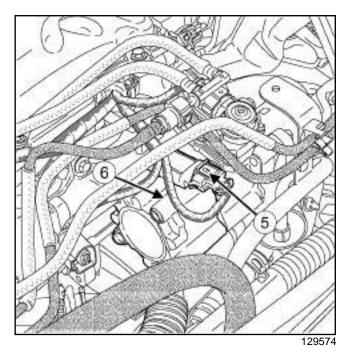
#### Exhaust gas recirculation solenoid valve: Removal - Refitting

14A

M9R



- ☐ Loosen the clip (3) from the air inlet hose on the intercooler.
- ☐ Disconnect the intercooler air inlet pipe hose assembly (4) from the intercooler air inlet pipe.
- ☐ Remove:
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - -the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14) (12A, Fuel mixture).



□ Disconnect the turbocharger pressure sensor connector (5).

#### □ Remove:

- the turbocharger pressure sensor housing (6),
- the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve.



#### □ Remove:

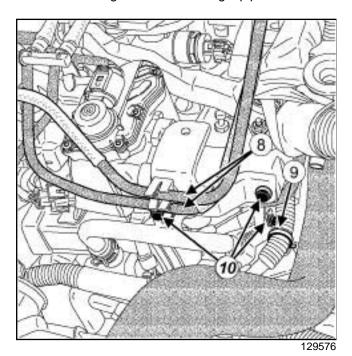
- the bolts (7) from the EGR rigid pipe,
- the exhaust gas recirculation rigid pipe,

#### Exhaust gas recirculation solenoid valve: Removal - Refitting

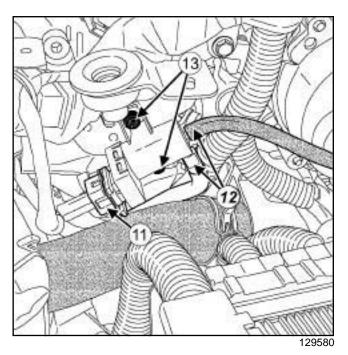


M9R

- the exhaust gas recirculation rigid pipe seal.



- ☐ Unclip:
  - -the fuel pipes (8),
  - the wiring (9).
- ☐ Remove the bolts (10) from the intercooler water inlet pipe.
- ☐ Move the intercooler water inlet pipe to one side.

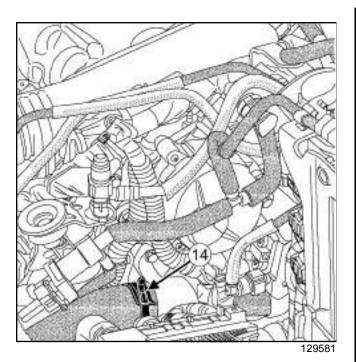


- ☐ Disconnect:
  - the exhaust gas recirculation cooling bypass solenoid valve connector (11),
  - the vacuum hoses (12) from the exhaust gas recirculation cooling bypass solenoid valve.
- □ Remove:
  - the exhaust gas recirculation cooling bypass solenoid valve bolts (13) ,
  - the exhaust gas recirculation cooling bypass solenoid valve.

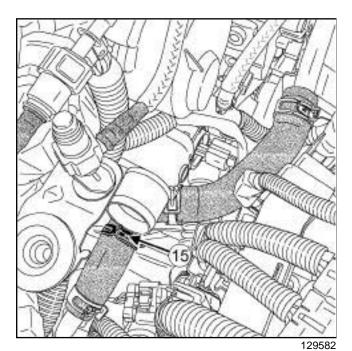
#### Exhaust gas recirculation solenoid valve: Removal - Refitting

14A

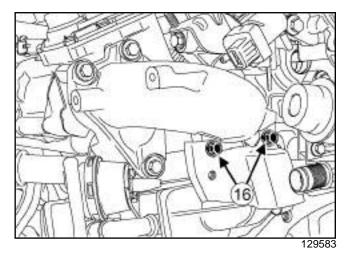
M9R



- □ Remove the clip (14) from the radiator water inlet hose using the tool (Mot. 1448).
- ☐ Disconnect the radiator water inlet hose from the inlet manifold.



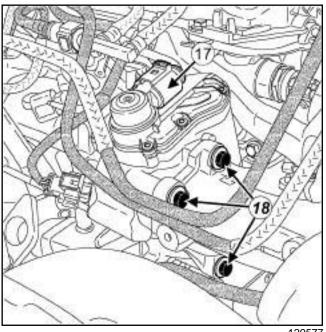
- ☐ Remove the exhaust gas recirculation exchanger water inlet pipe clip (15) using the tool (Mot. 1448).
- ☐ Disconnect the exhaust gas recirculation exchanger water inlet pipe from the inlet manifold.



#### □ Remove:

- the bolts (16) from the exhaust gas recirculation exchanger water inlet pipe bracket on the inlet manifold,
- the exhaust gas recirculation exchanger water inlet pipe bracket.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- ☐ Disconnect the connector (17) from the exhaust gas recirculation solenoid valve.
- □ Remove:
  - the exhaust gas recirculation solenoid valve bolts (18) from the inlet manifold,
  - the exhaust gas recirculation solenoid valve,

#### Exhaust gas recirculation solenoid valve: Removal - Refitting

14A

#### M9R

- the seal between the exhaust gas recirculation solenoid valve and the inlet manifold.

### REFITTING

### I - REFITTING PREPARATION OPERATION

- Clean the gasket faces.
- □ Always replace:
  - the seal between the exhaust gas recirculation solenoid valve and the inlet manifold,
  - the exhaust gas recirculation rigid pipe seal,
  - the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - the intercooler air inlet pipe seal.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the seal between the exhaust gas recirculation solenoid valve and the inlet manifold,
  - the exhaust gas recirculation solenoid valve,
  - the exhaust gas recirculation solenoid valve bolts on the inlet manifold.
- ☐ Torque tighten the exhaust gas recirculation solenoid valve bolts (21 N.m).
- ☐ Connect the exhaust gas recirculation solenoid valve connector.

#### **III - FINAL OPERATION.**

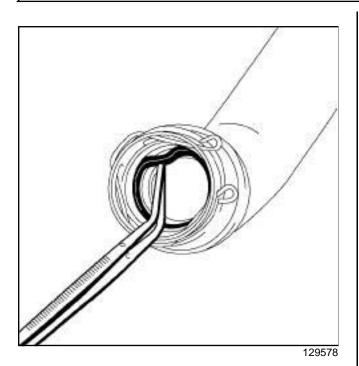
- ☐ Position the exhaust gas recirculation exchanger water inlet pipe bracket on the inlet manifold.
- □ Refit the exhaust gas recirculation exchanger water inlet pipe bracket bolts.
- ☐ Torque tighten the exhaust gas recirculation exchanger water inlet pipe bracket bolts (10 N.m).
- ☐ Connect the exhaust gas recirculation exchanger water inlet pipe to the inlet manifold.
- ☐ Refit the exhaust gas recirculation exchanger water inlet pipe clip using the tool (Mot. 1448).
- ☐ Connect the radiator water inlet hose to the inlet manifold.
- □ Remove the radiator water inlet hose clip using the tool (Mot. 1448).

Position the exhaust	gas	recirculation	cooling	by-
pass solenoid valve.				

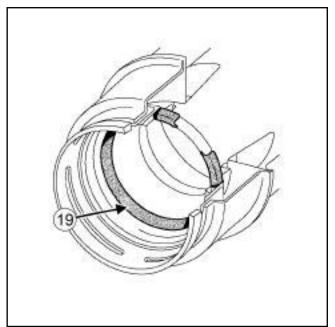
- ☐ Refit the exhaust gas recirculation cooling bypass solenoid valve bolts.
- ☐ Torque tighten the exhaust gas recirculation cooling bypass solenoid valve bolts (10 N.m).
- □ Connect:
  - the vacuum hoses to the exhaust gas recirculation cooling bypass solenoid valve,
  - the exhaust gas recirculation cooling bypass solenoid valve connector.
- ☐ Position the intercooler water inlet pipe.
- ☐ Refit the intercooler water inlet pipe bolts.
- ☐ Torque tighten the intercooler water inlet pipe bolts (10 N.m).
- ☐ Clip:
  - the wiring,
  - the fuel pipes.
- ☐ Refit:
  - the new exhaust gas recirculation rigid pipe seals,
  - the exhaust gas recirculation rigid pipe,
  - the EGR rigid pipe bolts.
- ☐ Torque tighten the exhaust gas recirculation rigid pipe bolts (25 N.m).
- □ Refit:
  - the new seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - the turbocharger pressure sensor housing.
- ☐ Connect the turbocharger pressure sensor connector.
- ☐ Refit:
  - the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal - Refitting, page 12A-14) (12A, Fuel mixture),
  - the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Connect the intercooler air inlet pipe hose assembly to the intercooler air inlet pipe.
- ☐ Torque tighten the intercooler air inlet hose clip (6 N.m.) using the tool (Mot. 1608).

### Exhaust gas recirculation solenoid valve: Removal - Refitting

M9R



☐ Remove the intercooler inlet pipe seal using .



129579

#### Note:

Check that the seal (19) on the intercooler air inlet pipe is fitted the right way round.

- $\hfill \square$  Refit the new intercooler inlet pipe seal.
- ☐ Rotate the intercooler inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt to the fuel supply pipe bracket.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Refit:
  - the air inlet sleeve to the air filter unit,
  - the air inlet sleeve clips.
- ☐ Fill the cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- ☐ Refit the engine cover.
- ☐ Connect thediagnostic tool.
- □ Reinitialise the programming following command scenario SC036 when replacing the exhaust gas recirculation solenoid valve diagnostic tool (see Fault finding - Replacement of components 13B, Diesel injection).

### Intercooler: Removal - Refitting



M9R

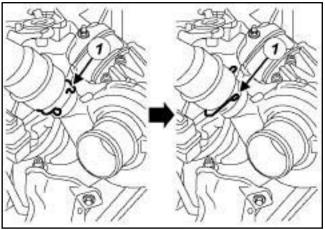
Essential special tooling				
Mot. 1448	Long nose pliers for hose clips.			
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.			

Tightening torques	
exhaust gas cooler bolts	25 N.m
dipstick guide tube bolts	10 N.m
intercooler air outlet pipe bolt	8 N.m
intercooler air outlet pipe clip	6 N.m
air filter unit air outlet pipe clips	5 N.m
intercooler air inlet pipe bolt	8 N.m

#### REMOVAL

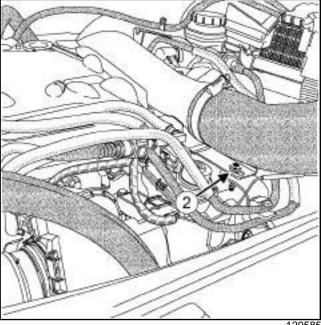
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Remove:
  - the engine cover,
  - -the windscreen wiper arms (see Windscreen wiper arm: Removal - Refitting) (85A, Wiping -Washing),
  - the scuttle panel half grille (see **Scuttle half-grille**: Removal - Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal - Refitting) (85A, Wiping - Washing),
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).



129584

☐ Rotate the intercooler air inlet pipe clip (1) on the turbocharger.



- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel supply pipe bracket.
- ☐ Move the intercooler air inlet pipe to one side.
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).
- □ Remove:
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit,
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery),

# ANTIPOLLUTION Intercooler: Removal - Refitting

#### M9R

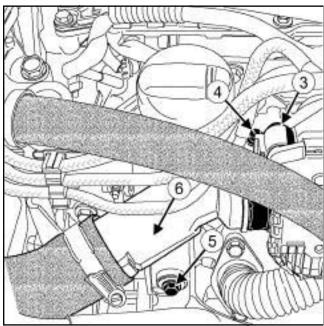
- the air filter box (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Loosen the air filter unit air outlet pipe clip on the turbocharger.

#### □ Disconnect:

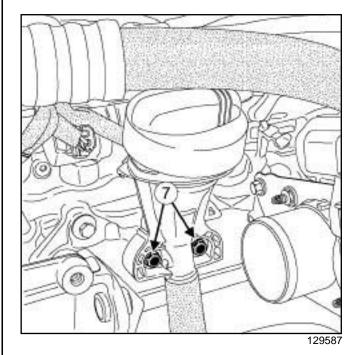
- the oil vapour rebreathing pipe from the oil separator.
- the air filter unit air outlet pipe from the turbocharger.
- ☐ Fit a blanking plug into the oil separator opening.

#### □ Remove:

- the intake distributor (see 12A, Fuel mixture, Inlet manifold: Removal Refitting, page 12A-24),
- -the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19).

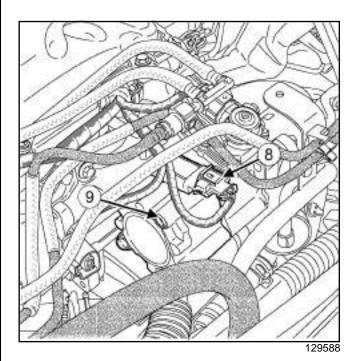


- 129586
- □ Disconnect the connector (3) from the damper valve wiring.
- ☐ Loosen the clip (4) on the intercooler air outlet pipe.
- ☐ Remove the intercooler air outlet pipe bolt (5).
- ☐ Disconnect the intercooler air outlet pipe (6) from the damper valve.
- ☐ Move the intercooler air outlet pipe to one side.



#### □ Remove:

- the bolts (7) from the dipstick tube,
- the dipstick tube.
- ☐ Fit a blanking plug on the opening of the dipstick guide tube on the cylinder block.
- □ Remove the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal - Refitting, page 12A-14).



☐ Disconnect the turbocharger pressure sensor connector (8).

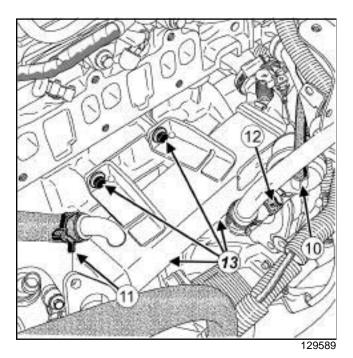
## Intercooler: Removal - Refitting

#### M9R

#### □ Remove:

- the turbocharger pressure sensor housing (9),
- the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19),
- -the starter motor (see 16A, Starting Charging, Starter: Removal Refitting, page 16A-7).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



#### □ Remove:

- the vacuum hose (10) from the exhaust gas cooler,
- the clip (11) from the exhaust gas cooler water outlet pipe using the tool (Mot. 1448),
- the clip (12) from the exhaust gas cooler water inlet hose using the tool (Mot. 1448).

#### □ Disconnect:

- the exhaust gas cooler water outlet pipe from the exhaust gas cooler,
- the exhaust gas cooler water inlet hose from the exhaust gas cooler.

#### □ Remove:

- the bolts (13) from the exhaust gas cooler,
- the exhaust gas intercooler.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

#### □ Clean:

- the exhaust gas recirculation rigid pipe joint faces,
- the exhaust gas recirculation solenoid valve seal face,
- the turbocharger pressure sensor housing seal faces.
- the damper valve seal face.

#### □ Always replace:

- the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler,
- the exhaust gas recirculation rigid pipe seals,
- the exhaust gas recirculation rigid pipe clip,
- the bolts securing the exhaust gas recirculation rigid pipe on the exhaust manifold,
- the inlet manifold gasket,
- the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
- the seal between the damper valve and the turbocharger pressure sensor housing.

# II - REFITTING OPERATION FOR PART CONCERNED

#### □ Refit:

- the exhaust gas cooler,
- the exhaust gas cooler bolts.
- □ Torque tighten the exhaust gas cooler bolts (25 N.m).

#### ☐ Connect:

- the exhaust gas cooler water inlet pipe to the exhaust gas cooler,
- the exhaust gas cooler water outlet pipe to the exhaust gas cooler.

#### □ Refit:

- the clip on the exhaust gas cooler water inlet pipe using the tool **(Mot. 1448)**,

Intercooler: Removal - Refitting

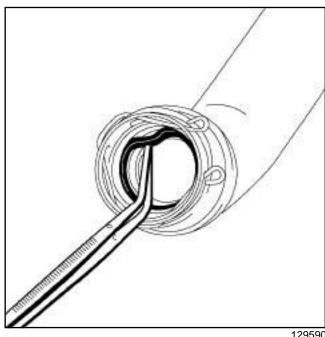
#### M9R

- the clip on the exhaust gas cooler water outlet pipe using the tool (Mot. 1448),
- the vacuum hose on the exhaust gas cooler.

#### **III - FINAL OPERATION.**

- □ Refit:
  - the starter (see 16A, Starting Charging, Starter: Removal - Refitting, page 16A-7),
  - the new seals on the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas cooler,
  - -the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal -Refitting, page 14A-19),
  - -the new seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - the turbocharger pressure sensor housing.
- ☐ Refit:
  - -the new seal between the damper valve and the turbocharger pressure sensor housing,
  - the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal - Refitting, page 12A-14).
- ☐ Remove the blanking plug from the opening of the dipstick guide tube on the cylinder block.
- Refit:
  - dipstick guide,
  - the dipstick guide tube bolts.
- ☐ Torque tighten the dipstick guide tube bolts (10 N.m).
- ☐ Connect the intercooler air outlet pipe to the damper valve.
- ☐ Torque tighten:
  - the intercooler air outlet pipe bolt (8 N.m),
  - -the intercooler air outlet pipe clip (6 N.m) using the tool (Mot. 1608).
- ☐ Connect the damper valve wiring connector.
- □ Refit:
  - the new exhaust gas recirculation rigid pipe seal on the exhaust manifold.

- the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas cooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-
- the new seal on the inlet manifold,
- the inlet manifold (see 12A, Fuel mixture, Inlet manifold: Removal - Refitting, page 12A-24),
- the inlet manifold hoses and pipes.
- ☐ Refit the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).
- ☐ Connect the air filter unit air outlet pipe to the turbocharger and to the air filter unit.
- ☐ Torque tighten the air filter unit air outlet pipe clips (5 N.m) using the tool (Mot. 1608).
- ☐ Remove the blanking plug from the opening of the oil separator.
- ☐ Connect the oil vapour rebreathing pipe to the oil decanter.

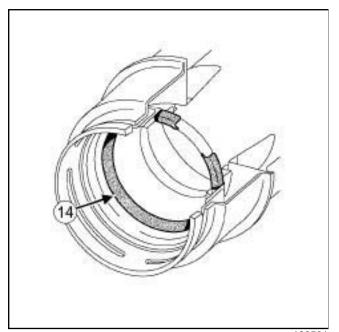


☐ Remove the intercooler air inlet pipe seal using a .

## Intercooler: Removal - Refitting



M9R



129591

#### Note:

Check that the new seal (14) on the intercooler air inlet pipe is fitted the right way round.

- ☐ Refit the new intercooler inlet pipe seal.
- □ Rotate the intercooler inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt to the fuel supply pipe bracket.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- □ Refit:
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - -the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
  - the scuttle panel grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),

- the air inlet sleeve to the air filter unit,
- the air inlet sleeve clips.
- ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- □ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Refit:
  - the engine cover,
  - the engine undertray.

## Exhaust gas recirculation rigid pipe: Removal - Refitting



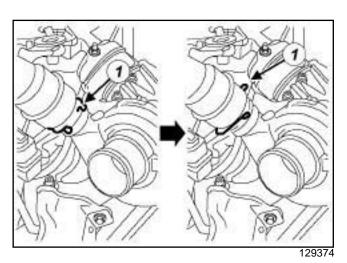
M9R

Essential special tooling		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.	

Tightening torqu	Ies 🖯
exhaust gas recircula- tion rigid pipe clip	5 N.m
exhaust gas recircula- tion rigid pipe bolts on the exhaust manifold	35 N.m
bolt securing the EGR rigid pipe on the cylinder head	10 N.m
EGR rigid pipe bolts	25 N.m
exhaust gas recircula- tion exchanger water inlet pipe bracket bolts	10 N.m
intercooler water inlet pipe bolts	10 N.m
exhaust gas recircula- tion rigid pipe heat shield bolts	10 N.m
exhaust gas recircula- tion cooling bypass solenoid valve bolts	10 N.m
air filter unit air outlet pipe clip	s5 N.m
intercooler air inlet pipe bolt	8 N.m

- **REMOVAL**
- I REMOVAL PREPARATION OPERATION
- 1 Exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - -the engine cover,
  - the engine undertray,

- the air inlet sleeve clips,
- the air inlet sleeve from the air filter unit.

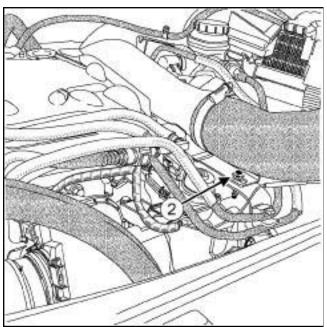


 $\Box$  Rotate the intercooler air inlet pipe clip (1).

### Exhaust gas recirculation rigid pipe: Removal - Refitting



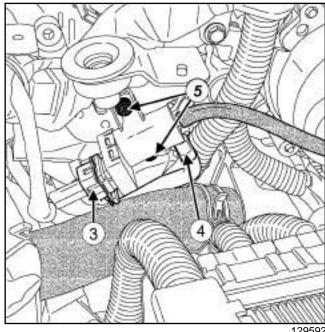
M9R



129375

- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel supply pipe bracket.
- ☐ Move the intercooler air inlet pipe to one side.
- □ Remove:
  - -the battery (see Battery: Removal Refitting) (80A, Battery)
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - -the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8) (12A, Fuel mixture).
- ☐ Loosen the air filter unit air outlet pipe clip on the turbocharger.
- □ Disconnect:
  - the oil vapour rebreathing pipe from the oil separator
  - the air filter unit air outlet pipe from the turbocharger.
- ☐ Fit a blanking plug into the oil separator opening.
- □ Remove:
  - -the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
  - the scuttle panel grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing).

- the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).
- □ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).



129592

#### □ Disconnect:

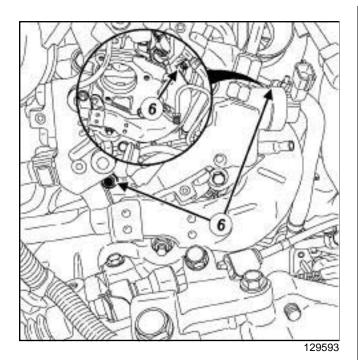
- the connector (3) from the EGR cooling bypass solenoid valve,
- the vacuum hoses (4) from the EGR cooling bypass solenoid valve.

#### □ Remove:

- the EGR cooling bypass solenoid valve bolts (5),
- the EGR cooling bypass solenoid valve,
- the water chamber (see 19A, Cooling, Plenum chamber: Removal - Refitting, page 19A-27) (19A, Fuel mixture).

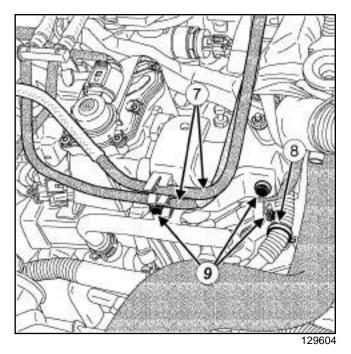
### Exhaust gas recirculation rigid pipe: Removal - Refitting

M9R



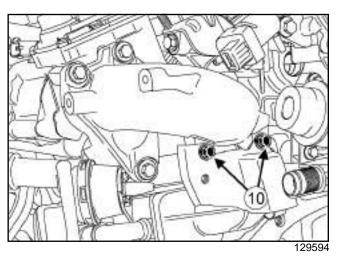
#### □ Remove:

- the bolts (6) from the exhaust gas recirculation rigid pipe heat shield on the exhaust manifold and the cylinder head,
- the heat shield from the rigid exhaust gas recirculation pipe.



#### ☐ Unclip:

- the fuel pipes (7),
- the wiring (8).
- ☐ Remove the bolt (9) from the intercooler water inlet pipe.
- ☐ Move the intercooler water inlet pipe to one side.

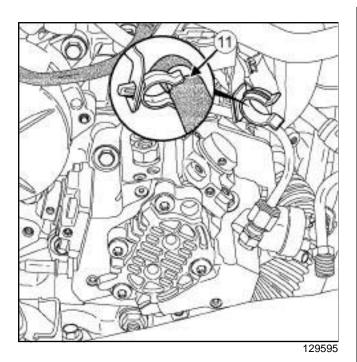


#### ☐ Remove:

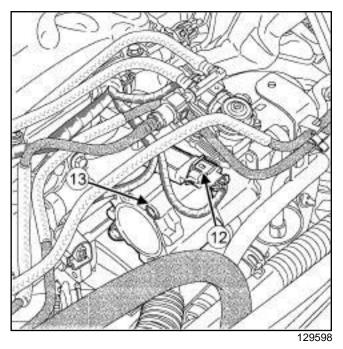
- the exhaust gas recirculation exchanger water inlet pipe bracket bolts (10) from the inlet manifold,
- the exhaust gas recirculation exchanger water inlet pipe bracket.

### Exhaust gas recirculation rigid pipe: Removal - Refitting

M9R



- ☐ Unclip the turbocharger cooling hose (11).
- 2 Exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.
- ☐ Remove the front engine cover.
- □ Remove the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Remove the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14) (12A, Fuel mixture).



- ☐ Disconnect the turbocharger pressure sensor connector (12).
- ☐ Remove:
  - the turbocharger pressure sensor housing (13),
  - the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve.

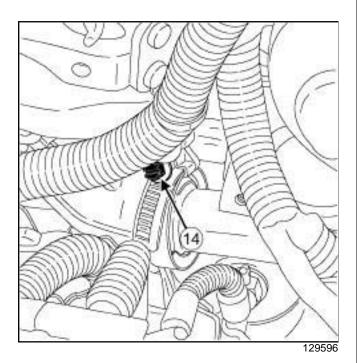
### Exhaust gas recirculation rigid pipe: Removal - Refitting



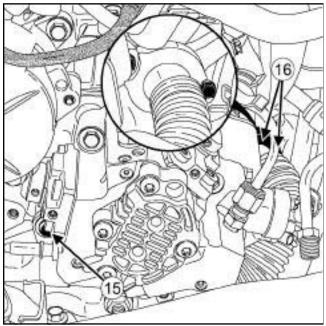
M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED

1 - Exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger



☐ Remove the clip (14) from the exhaust gas recirculation rigid pipe.

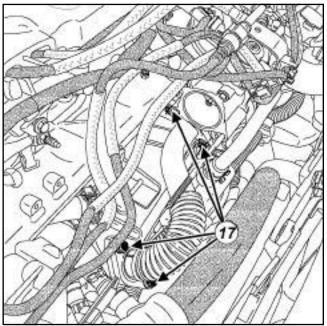


129605

#### □ Remove:

- the bolt (15) securing the exhaust gas recirculation rigid pipe on the cylinder head,

- the bolts (16) securing the exhaust gas recirculation rigid pipe on the exhaust manifold,
- the exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger,
- the exhaust gas recirculation exchanger rigid pipe seal.
- 2 Exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.



129599

#### □ Remove:

- the bolts (17) from the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.
- the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger,
- the exhaust gas recirculation exchanger rigid pipe seals.

### Exhaust gas recirculation rigid pipe: Removal - Refitting



M9R

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

1 - Exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

- Clean the gasket faces.
- ☐ Always replace:
  - the exhaust gas recirculation exchanger rigid pipe,
  - -the exhaust gas recirculation exchanger rigid pipe seal,
  - the exhaust gas recirculation exchanger rigid pipe clip.
  - the bolts securing the exhaust gas recirculation rigid pipe on the exhaust manifold,
  - the intercooler inlet pipe seal.
- 2 Exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.

#### WARNING

The joint faces must be clean, dry and free from grease (avoid finger marks).

- Clean the gasket faces.
- □ Always replace:
  - the exhaust gas recirculation exchanger rigid pipe seals,
  - the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - the seal between the damper valve and the turbocharger pressure sensor housing.

# II - REFITTING OPERATION FOR PART CONCERNED

1 - Exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger

□ Refit:

- the new exhaust gas recirculation rigid pipe with the new seal,
- the exhaust gas recirculation exchanger rigid pipe clip.
- the new bolts securing the exhaust gas recirculation rigid pipe on the exhaust manifold,
- the bolt securing the exhaust gas recirculation rigid pipe on the cylinder head.
- ☐ Tighten to torque:
  - the exhaust gas recirculation rigid pipe clip (5 N.m) using tool (Mot. 1608),
  - the exhaust gas recirculation rigid pipe bolts on the exhaust manifold (35 N.m),
  - the **bolt securing the EGR rigid pipe on the cy- linder head (10 N.m)**.
- 2 Exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.

Refit:

- the exhaust gas recirculation rigid pipe with the new seals.
- the EGR rigid pipe bolts.
- ☐ Torque tighten the EGR rigid pipe bolts (25 N.m).

#### **III - FINAL OPERATION.**

1 - Exhaust gas recirculation exchanger rigid pipe between the exhaust manifold and the exhaust gas recirculation exchanger

☐ Unclip the turbocharger cooling hose.

- ☐ Position the exhaust gas recirculation exchanger water inlet pipe bracket on the inlet manifold.
- ☐ Refit the exhaust gas recirculation exchanger water inlet pipe bracket bolts.
- ☐ Torque tighten the exhaust gas recirculation exchanger water inlet pipe bracket bolts (10 N.m).
- Position the intercooler water inlet pipe.
- ☐ Refit the intercooler water inlet pipe bolts.

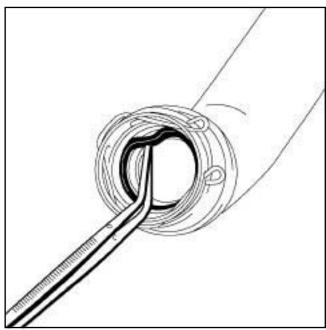
## Exhaust gas recirculation rigid pipe: Removal - Refitting

14A

#### M9R

- □ Torque tighten the intercooler water inlet pipe bolts (10 N.m).
- Refit:
  - the wiring harness,
  - the fuel pipes.
- ☐ Position the heat shield for the exhaust gas recirculation rigid pipe.
- ☐ Refit the rigid EGR pipe heat shield bolts.
- ☐ Torque tighten the exhaust gas recirculation rigid pipe heat shield bolts (10 N.m).
- ☐ Refit:
  - -the water chamber (see 19A, Cooling, Plenum chamber: Removal Refitting, page 19A-27) (19A, Fuel mixture),
  - -the water chamber hoses and pipes (see **19A**, **Cooling**, **Plenum chamber: Removal Refitting**, page **19A-27**) (19A, Fuel mixture).
- ☐ Position the exhaust gas recirculation cooling bypass solenoid valve.
- ☐ Refit the exhaust gas recirculation cooling bypass solenoid valve bolts.
- ☐ Torque tighten the exhaust gas recirculation cooling bypass solenoid valve bolts (10 N.m).
- □ Connect:
  - the vacuum hoses to the exhaust gas recirculation cooling bypass solenoid valve,
  - the exhaust gas recirculation cooling bypass solenoid valve connector.
- □ Refit:
  - -the scoop under the scuttle panel grille (see **Scoop** under scuttle panel grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing).
  - the scuttle panel grille (see **Scuttle half-grille: Removal Refitting**) (56A, Exterior equipment),
  - -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing).
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8) (12A, Fuel mixture).
- ☐ Connect the air filter unit air outlet pipe to the turbocharger and the air filter unit.

- ☐ Torque tighten the air filter unit air outlet pipe clip (s5 N.m) using the tool (Mot. 1608).
- ☐ Remove the blanking plug from the opening of the oil separator.
- Connect the oil vapour rebreathing pipe to the oil decanter.
- □ Refit:
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  - the battery (see Battery: Removal Refitting) (80A, Battery).

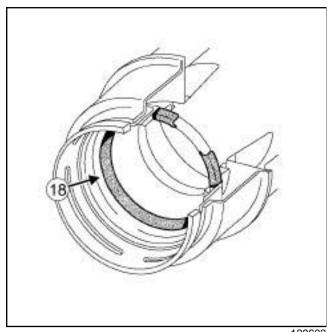


129601

☐ Remove the intercooler inlet pipe seal using .

### Exhaust gas recirculation rigid pipe: Removal - Refitting

M9R



129602

Note:

Check that the seal (18) on the intercooler inlet pipe is fitted the right way round.

- ☐ Refit the new intercooler inlet pipe seal.
- □ Rotate the intercooler inlet pipe to refit the clip in its housing.
- ☐ Refit:
  - the intercooler inlet pipe on the turbocharger,
  - the intercooler air inlet pipe bolt on the fuel supply pipe bracket.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- □ Refit:
  - the air inlet sleeve to the air filter unit,
  - the air inlet sleeve clips,
  - -the engine cover.
- ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- ☐ Bleed the cooling circuit (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10) (19A, Cooling).
- ☐ Refit the engine undertray.

2 - Exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation exchanger.

□ Refit:

- the new seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
- the turbocharger pressure sensor housing.
- ☐ Connect the turbocharger pressure sensor connector.
- ☐ Refit:
  - the new seal between the damper valve and the turbocharger pressure sensor housing,
  - the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14) (12A, Fuel mixture).
- ☐ Connect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Refit the engine cover.

# STARTING - CHARGING Charging circuit: Identification

#### I - OPERATION

These vehicles are fitted with an alternator with internal ventilation and an integrated regulator, and an indicator light on the dashboard which operates as follows:

- when the ignition is switched on, the warning light comes on,
- when the engine is started, the warning light goes out,
- if the warning light comes on while the engine is running, it indicates a « charging » fault.

#### **II - IDENTIFICATION**

Engine	Alternator	Current intensity
2TR	HITACHI: LR1110-713C	110 A
M9R	MITSUBISHI: A3TJ2481	150 A

# STARTING - CHARGING Starting system: Identification

### STARTER IDENTIFICATION

Engine	Gearbox type	Starter
M9R		VALEO 194262
2TR	Manual gearbox	MITSUBISHI M000T22271
	Continuously variable automatic transmission	MITSUBISHI M000TA0271

16A

M9R

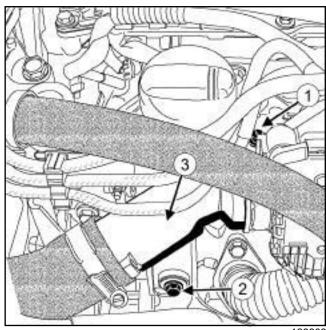
Essential special tooling			
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.		

Tightening torques ♡	
alternator lower bolt	25 N.m
alternator upper bolt	25 Nm
alternator positive termi- nal nut	10 N.m
bolts of the expansion bottle hose support	25 N.m
bolt of the intercooler air outlet pipe	8 N.m
clip of the intercooler air outlet pipe clip	6 N.m

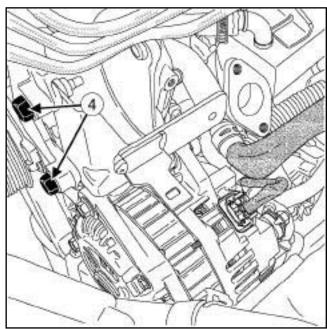
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Remove:
  - the engine cover,
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres).
  - -the front right-hand wheel arch liner (see Front wheel arch liner: Removal Refitting) (55A, Exterior protection)
  - -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5) (11A, Top and front of engine).



- 129608
- □ Loosen the clip (1) on the intercooler air outlet pipe.
- □ Remove the intercooler air outlet pipe bolt (2) .
- ☐ Disconnect the intercooler air outlet pipe (3) from the damper valve.
- ☐ Move the intercooler air outlet pipe to one side.



129609

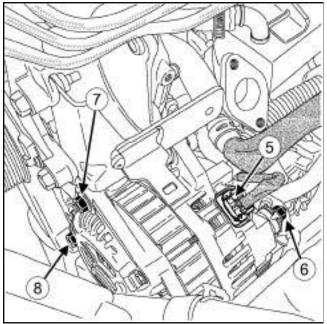
#### □ Remove:

- the bolts of the support (4) of the expansion bottle hose,
- the support of the expansion bottle hose.

16A

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129610

- □ Disconnect the alternator connector (5) .
- □ Remove:
  - the nut (6) from the alternator positive terminal.
  - the alternator positive terminal cable,
  - the alternator upper bolt (7).
- □ Loosen the alternator lower bolt (8).
- ☐ Slowly remove the lower bolt of the alternator until the bolt head comes into contact with the side member.
- ☐ Pull the alternator towards the front of the vehicle.
- ☐ Lift the alternator to remove it with its lower bolt.

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the alternator with its lower bolt on the support,
  - the alternator upper bolt,
  - the alternator positive terminal cable,
  - the alternator positive terminal nut.
- ☐ Torque tighten:
  - -the alternator lower bolt (25 N.m),
  - the alternator upper bolt (25 Nm),

- the alternator positive terminal nut (10 N.m).
- ☐ Connect the alternator connector of the intercooler to the damper valve

#### II - FINAL OPERATION.

- ☐ Fit the support of the expansion bottle hose.
- ☐ Refit the bolts of the expansion bottle hose support.
- ☐ Torque tighten the **bolts of the expansion bottle hose support (25 N.m)**.
- ☐ Connect the intercooler air outlet pipe to the damper valve.
- ☐ Refit the bolt of the intercooler air outlet pipe on the damper valve.
- ☐ Torque tighten:
  - the bolt of the intercooler air outlet pipe (8 N.m),
  - the clip of the intercooler air outlet pipe clip (6 N.m) using the tool (Mot. 1608).
- □ Refit:
  - the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5) (11A, Top and front of engine),
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - the engine cover,
- □ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).

2TR

Tightening torques ♡	
alternator bolts	65 N.m
nut of terminal B10	N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

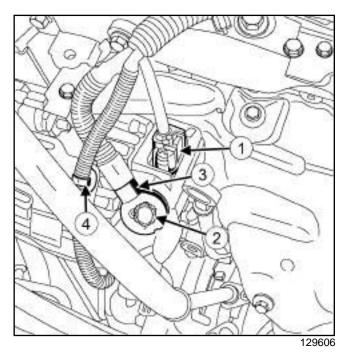
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **IMPORTANT**

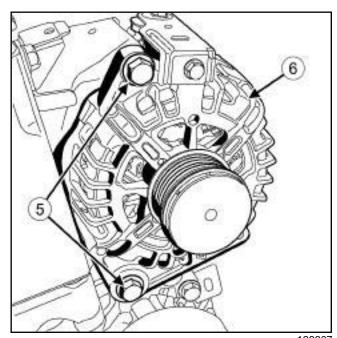
To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
  - -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
  - -the windscreen washer bottle neck (see **Windscreen washer bottle funnel: Removal Refitting**) (85A, Wiping washing).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Disconnect the alternator connector (1).
- ☐ Remove the nut (2) from terminal B.
- □ Disconnect the wiring (3).
- ☐ Remove the clip (4) from the wiring.



129607

- □ Remove:
  - the alternator bolts (5),
  - the alternator (6) .

2TR

### **REFITTING**

-	REFITTING OPERATION FOR PART ONCERNED
	Refit:
	- the alternator,
	- the alternator bolts.
	Torque tighten the alternator bolts (65 N.m).
	Refit the wiring clip (4).
	Connect the wiring (3).
	Torque tighten the <b>nut of terminal B10 (N.m)</b> .
	Connect the alternator connector.
<b>II</b> -	- FINAL OPERATION.
	Refit:
	-the windscreen washer bottle neck (see Windscreen washer bottle funnel: Removal - Refitting) (85A, Wiping - washing),
	-the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
	-the front right-hand wheel arch liner (see <b>Front wheel arch liner: Removal - Refitting</b> ) (55A, Exterior protection),
	- the front right-hand wheel (see <b>Wheel: Removal - Refitting</b> ) (35A, Wheels and tyres).
	Connect the battery (see <b>Battery : Removal - Refitting</b> ) (80A, Battery).

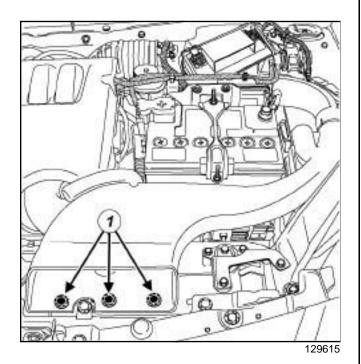
M9R

Essential special tooling		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.	

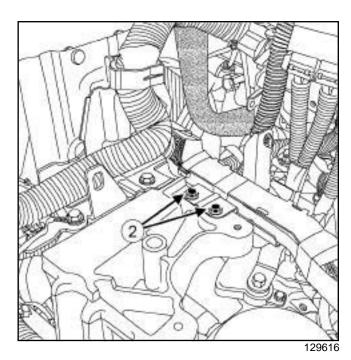
Tightening torques ♡	
starter bolts	48 N.m
nut of terminal B	8 N.m
nut of terminal S5	N.m
clip of the intercooler air inlet hose	6 N.m

#### **REMOVAL**

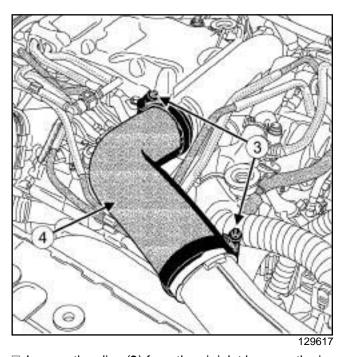
#### I - REMOVAL PREPARATION OPERATION



- ☐ Remove:
  - the engine cover,
  - the air inlet sleeve clips (1),
  - the air inlet sleeve from the air filter unit,
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery).
  - the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery).

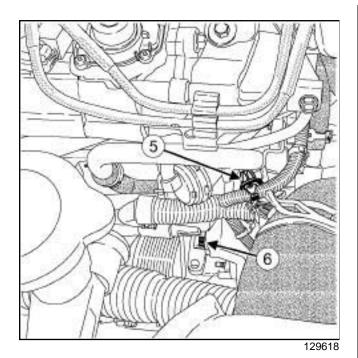


- ☐ Remove the bolts (2) from the engine wiring harness channel.
- Move aside the wiring.

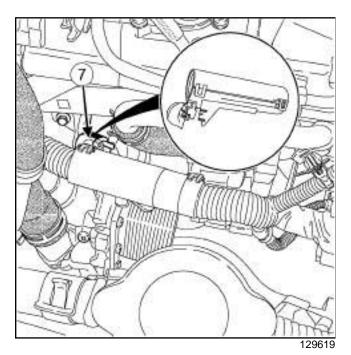


- □ Loosen the clips (3) from the air inlet hose on the intercooler.
- ☐ Disconnect the intercooler air inlet hose (4) from the air inlet pipes of the intercooler.

M9R

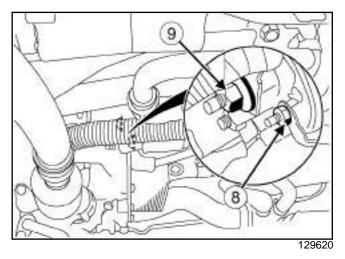


- ☐ Unclip the wiring at (5).
- ☐ Remove the bolt (6) from the wiring bracket.
- ☐ Separate the « wiring bracket wiring » assembly.



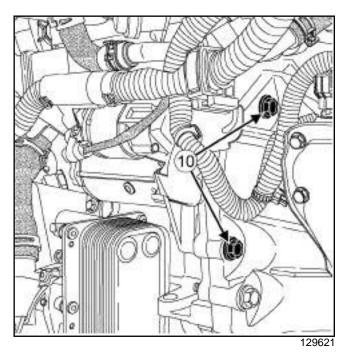
- ☐ Unclip the cap from terminal B (7).
- ☐ Remove the cap from terminal B.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



#### □ Remove:

- the nut of terminal S (8),
- the nut of terminal B (9),
- the cable of terminal S,
- the cable of terminal B.



#### □ Remove:

- the starter bolts (10),
- the starter by raising the vehicle.

16A

M9R

	REFITTING OPERATION FOR PART ONCERNED
	Refit:
	- the starter,
	- the starter bolts.
	Torque tighten the starter bolts (48 N.m).
	Refit:
	- the cable of terminal B,
	- the cable of terminal S,
	- the nut of terminal B,
	- the nut of terminal S.
	Torque tighten:
	- the nut of terminal B (8 N.m),
	- the <b>nut of terminal S5 (N.m)</b> ,
	- FINAL OPERATION.
	Clip on the cap of terminal B.
	Fit the « wiring bracket - wiring » assembly.
	Refit the bolt <i>(6)</i> of the wiring bracket.
	Clip the wiring onto its mounting (5).
	Connect the air inlet hose to the air inlet pipes of the
_	intercooler
	Torque tighten the clip of the intercooler air inlet hose (6 N.m) using the tool (Mot. 1608).
	Position the wiring.
	Refit the wiring bolts (2).
	Refit:
	-the battery tray (see <b>Battery tray: Removal - Refitting</b> ) (80A, Battery),
	-the battery (see <b>Battery: Removal - Refitting</b> ) (80A, Battery)
	- the air inlet sleeve from the air filter unit,
	- the air inlet sleeve clips,
	- the engine cover.

2TR, and 6 SPEED MANUAL GBOX

Tightening torques ♡	
starter bolts	113 N.m
nut of terminal B9	N.m
nut of terminal S4	N.m
wiring bracket bolts	28 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

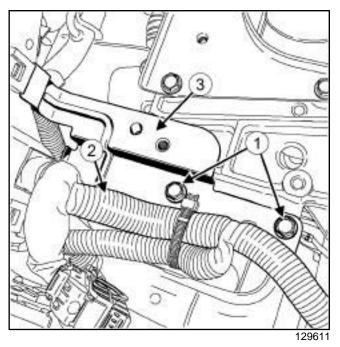
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

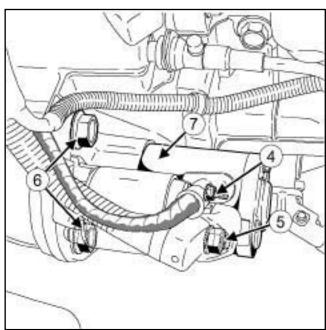
#### □ Remove:

- the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8) ,
- -the battery (see **Battery: Removal Refitting**) (80A, Battery),
- -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
- the engine undertray.



- ☐ Remove the bolts (1) from the wiring bracket.
- □ Separate the wiring (2) and its bracket (3).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129612

#### □ Remove:

- the nut (4) of terminal S,
- the nut (5) of terminal B,
- the starter bolts (6),
- the starter (7).

16A

2TR, and 6 SPEED MANUAL GBOX

### **REFITTING**

-	REFITTING OPERATION FOR PART ONCERNED
	Refit:
	- the starter,
	- the starter bolts.
	Torque tighten the starter bolts (113 N.m).
	Refit:
	-the nut of terminal <b>B</b> ,
	-the nut of terminal S.
	Torque tighten:
	-the nut of terminal B9 (N.m),
	-the nut of terminal S4 (N.m).
II ·	FINAL OPERATION
	Refit:
	-the wiring (2) and its bracket (3).
	- the wiring bracket bolts.
	Torque tighten the wiring bracket bolts (28 N.m).
	Refit:
	- the engine undertray,
	- the battery tray (see <b>Battery tray: Removal - Refitting</b> ) (80A, Battery),
	-the battery (see <b>Battery: Removal - Refitting</b> ) (80A, Battery),
	-the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).

2TR, and FK0 or FK8

Tightening torques ♡	
starter bolts	50 N.m
nut of terminal B9	N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

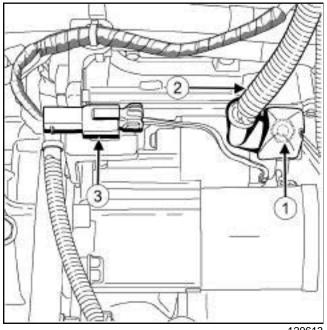
☐ Position the vehicle on a two-post lift (see Vehicle: Towing and lifting) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

□ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).

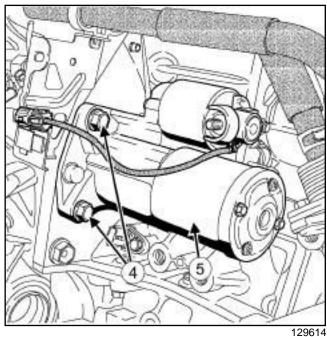
#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



129613

- ☐ Remove the nut of terminal B(1).
- Disconnect:
  - the wiring of terminal B (2),

- the connector S (3).



- □ Remove:
  - the starter bolts (4),
  - the starter (5).

#### REFITTING

#### I - REFITTING OPERATION FOR PART **CONCERNED**

- ☐ Refit:
  - the starter,
  - the starter bolts.
- ☐ Torque tighten the **starter bolts (50 N.m)**.
- ☐ Connect:
  - the connector S.
  - the wiring of terminal **B**.
- ☐ Torque tighten the **nut of terminal B9 (N.m)**.

#### **II - FINAL OPERATION.**

☐ Connect the battery (see Battery: Removal - Refitting) (80A, Battery).

# **IGNITION**

**Ignition: Specifications** 



2TR

Engine type	Brand	Spark plug type	
2TR	NGK	DILKAR6A-11	
Gap:1.1 mm			

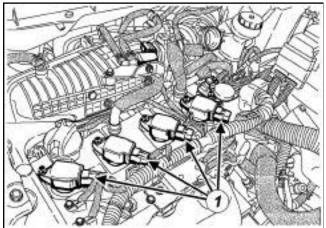
# IGNITION Coils Removal - Refitting

2TR

Tightening torques ♡	
ignition coil bolts	7 Nm

### **REMOVAL**

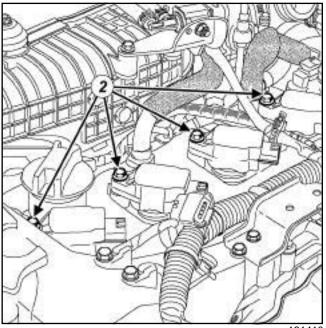
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Remove:
  - -the engine cover,
  - -The air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).



131409

☐ Disconnect the connectors (1) from the ignition coils.

# OPERATION FOR REMOVAL OF PART CONCERNED



131410

#### Note:

Never drop or bang an ignition coil.

Never remove an ignition coil.

#### ☐ Remove:

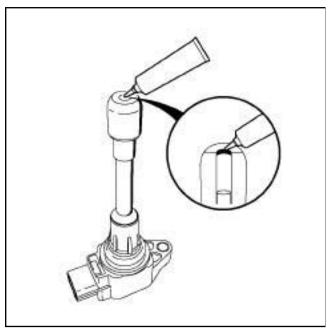
- the ignition coil bolts (2),
- the ignition coils.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

- ☐ If necessary, replace:
  - the ignition coils,
  - the ignition coil bolts.

2TR



131411

□ Put a bead of FLUORSTAR 2L (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) 2 mm in diameter on the internal perimeter of the high-tension caps of the ignition coils.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the ignition coils,
  - the ignition coil bolts.
- ☐ Torque tighten the ignition coil bolts (7 Nm).

#### **III - FINAL OPERATION.**

- ☐ Connect the ignition coil connectors.
- □ Refit:
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
  - the engine cover.
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).

### **IGNITION**

## **Spark plugs: Removal - Refitting**



2TR

Esse	ential special tooling
Ele. 1382	Set of plug wrenches 16 & 21 mm torque 17.5 & 28 N.m + square adapter 9-9.52 for wrench Ele. 1086
Ele. 1382-01	14 mm Plug spanner.

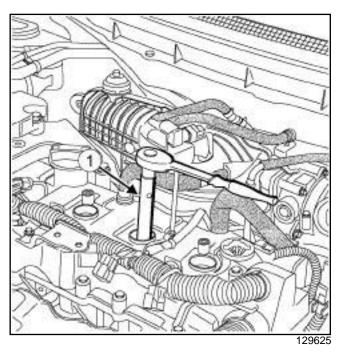
	Tightening torques ▽	
spark plugs		20 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- □ Remove:
  - the engine cover,
  - -the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
  - the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2) .

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove the spark plugs using the (Ele. 1382) (1) equipped with the (Ele. 1382-01).

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

☐ Replace the spark plugs (if necessary).

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the spark plugs.
- ☐ Torque tighten the spark plugs (20 N.m) using the tool (Ele. 1382) with the tool (Ele. 1382-01) attached.

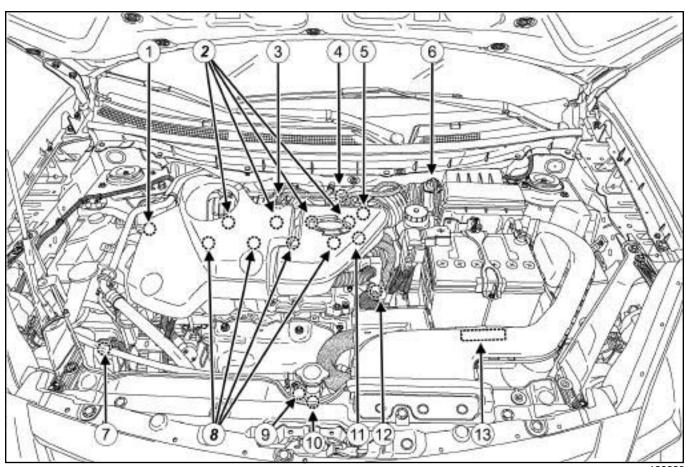
#### **III - FINAL OPERATION**

- ☐ Refit:
  - the ignition coils (see 17A, Ignition, Coils Removal Refitting, page 17A-2) ,
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
  - the engine cover.
- □ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

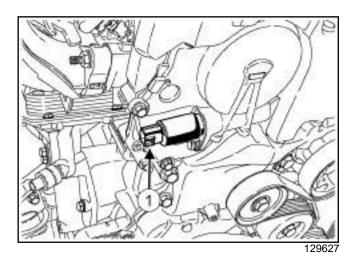
# Fuel injection: List and location of components

17B

2TR



(1)	Camshaft dephaser solenoid valve
<b>(2</b> )	Injectors
(3)	Fuel vapour absorber bleed solenoid valve
(4)	Motorised throttle body
<b>(5)</b>	Crankshaft position sensor
<b>(6)</b>	Airflow meter
<b>(7</b> )	Petrol vapour absorber
(8)	Ignition coils
(9)	Upstream oxygen sensor
<b>(10)</b>	Downstream oxygen sensor
(11)	Camshaft position sensor
(12)	Coolant temperature sensor
(13)	Injection computer

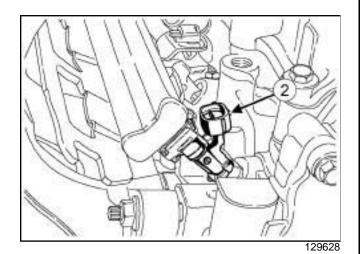


(1) Camshaft dephaser solenoid valve

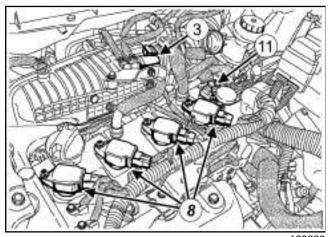
# Fuel injection: List and location of components



2TR



(2) Injector

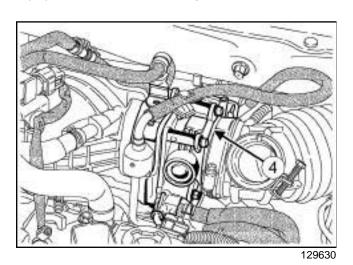


12

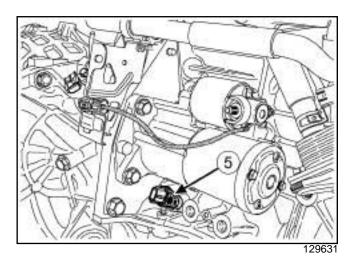
(3) Fuel vapour absorber bleed solenoid valve

(8) Ignition coils

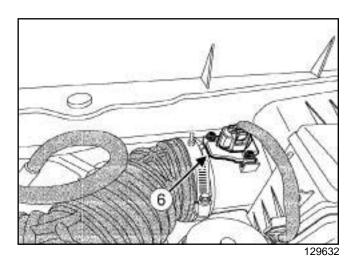
(11) Camshaft position sensor



(4) Motorised throttle body



(5) Crankshaft position sensor

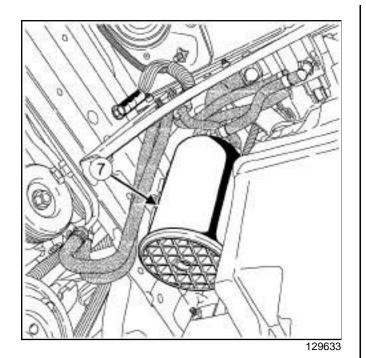


(6) Airflow meter

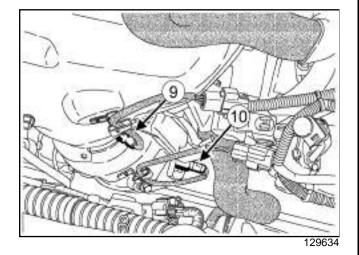
Fuel injection: List and location of components



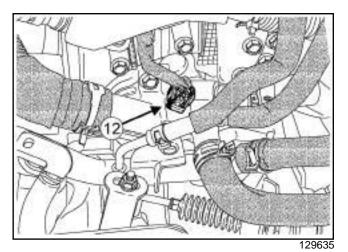
2TR



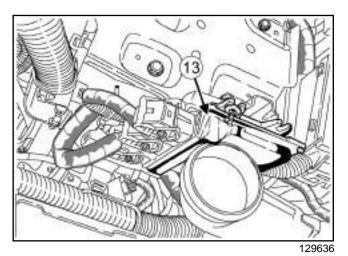
(7) Petrol vapour absorber



(9) Upstream oxygen sensor(10) Downstream oxygen sensor



(12) Coolant temperature sensor



(13) Injection computer

# PETROL INJECTION Oxygen sensors: Removal - Refitting



2TR

#### **Essential special tooling**

Mot. 1495-01 22 mm socket for removing/ refitting oxygen sensors.

Tightening torques 🤉	)
upstream oxygen sen- sor	50 Nm
downstream oxygen	50 Nm

#### Note:

sensor

Take care not to damage the heated oxygen sensor.

Scrap any heated oxygen sensors that may have fallen on a hard surface such as a concrete floor. Replace the oxygen sensor if necessary.

#### Note:

Before fitting a new heated oxygen sensor, clean the threading on the exhaust pipe using the cleaner for heated oxygen sensor threading and apply antiseize lubricant (standard maintenance product).

Never exceed the tightening torque of the heated oxygen sensors.

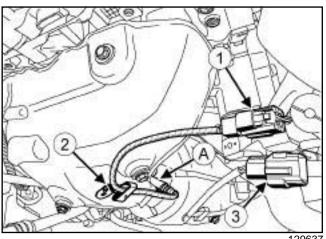
#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- ☐ Remove the engine undertray.

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED

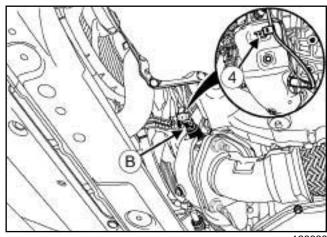
#### 1 - UPSTREAM OXYGEN SENSOR (A)



129637

- □ Disconnect the upstream oxygen sensor connector
- ☐ Unclip the wiring of the upstream oxygen sensor from the heat shield at (2).
- □ Remove the upstream oxygen sensor (A) using the (Mot. 1495-01).

### 2 - DOWNSTREAM OXYGEN SENSOR (B)



129638

- ☐ Disconnect the downstream oxygen sensor connector (3).
- ☐ Unclip the wiring of the oxygen sensor from the heat shield at (4).
- □ Remove the upstream oxygen sensor (B) using the (Mot. 1495-01).

# **PETROL INJECTION** Oxygen sensors: Removal - Refitting

2TR

### **REFITTING**

# I - REFITTING OPERATION FOR PART

CONCERNED
1 - Upstream oxygen sensor (A)
☐ Refit the upstream oxygen sensor.
☐ Torque tighten the upstream oxygen sensor (50 Nm) using the tool (Mot. 1495-01).
☐ Clip the wiring of the upstream oxygen sensor onto the heat shield at (2).
☐ Connect the upstream oxygen sensor connector.
2 - Downstream oxygen sensor (B)
☐ Refit the downstream oxygen sensor.
☐ Torque tighten the downstream oxygen sensor (50 Nm) using the tool (Mot. 1495-01).
☐ Clip the wiring of the downstream oxygen sensor onto the heat shield at (4).
☐ Connect the downstream oxygen sensor connector.
II - FINAL OPERATION.
☐ Refit the engine undertray.
☐ Connect the battery (see <b>Battery</b> : <b>Removal - Refitting</b> ) (80A. Battery).

## Petrol injection computer: Removal - Refitting

17B

2TR

Essential equipment
diagnostic tool

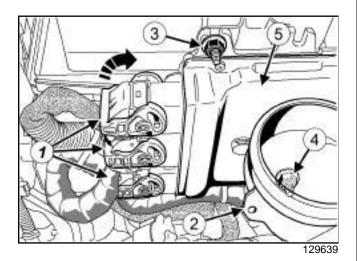
Tightening torques ▽	
bolt of the injection computer	7 N.m
nut of the injection com- puter	7 N.m

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Remove the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Disconnect the injection computer connectors (1).
- □ Remove:
  - the air resonator sleeve (2),
  - the nut (3) of the injection computer,
  - the bolt (4) of the injection computer,
  - the injection computer (5) .

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the injection computer,
  - the bolt of the injection computer,
  - the nut of the injection computer.
- ☐ Torque tighten:
  - the bolt of the injection computer (7 N.m),
  - the nut of the injection computer (7 N.m).
- ☐ Refit the air resonator sleeve.
- ☐ Connect the injection computer connectors.

#### **II - FINAL OPERATION.**

- ☐ Refit the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- □ Connect the battery (see Battery : Removal Refitting) (80A, Battery).
- □ Perform the programming of the injection computer using the diagnostic tool (see Fault finding - Replacement of components) (17B, Petrol injection).

## Camshaft position sensor: Removal - Refitting



2TR

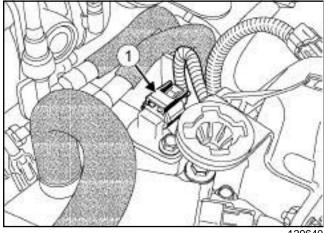
Tightening torques ▽	
camshaft position sen- sor bolt	7 Nm

#### REMOVAL

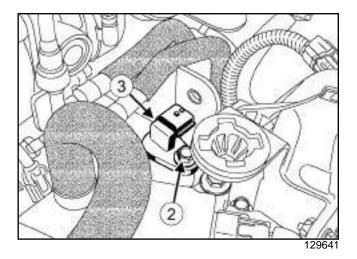
#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove:
  - the engine cover,
  - -the air resonator on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3).

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



☐ Disconnect the connector (1) from the camshaft position sensor.



#### Note:

Handle the sensor carefully to avoid dropping or hitting it.

- □ Remove:
  - the camshaft position sensor bolt (2),
  - the camshaft position sensor (3).

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the O-ring on the position sensor of the camshaft.

#### **II - REFITTING OPERATION FOR PART CONCERNED**

- ☐ Refit:
  - the camshaft position sensor,
  - the camshaft position sensor bolt.
- ☐ Torque tighten the camshaft position sensor bolt (7 Nm).
- ☐ Connect the connector of the camshaft position sensor.

#### **III - FINAL OPERATION**

- □ Refit:
  - The air resonator on the rocker cover (see 12A. Fuel mixture, Air resonator: Removal - Refitting, page 12A-3).
  - the engine cover.

# Crankshaft position sensor: Removal - Refitting



2TR

Tightening torques ♡	
crankshaft position sen- sor bolt	7 N.m

Note:

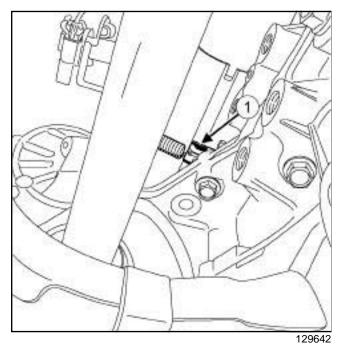
Take care not to burn yourself. The exhaust manifold may be hot.

#### **REMOVAL**

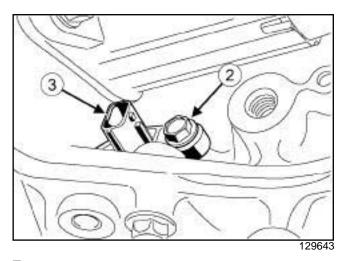
#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



☐ Disconnect the crankshaft position sensor connector (1).



u

#### Note:

Handle the sensor carefully to avoid dropping or hitting it.

- □ Remove:
  - the crankshaft position sensor bolt (2),
  - the crankshaft position sensor (3) .

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the O-ring on the position sensor of the crankshaft.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the crankshaft position sensor,
  - the crankshaft position sensor bolt.
- □ Torque tighten the crankshaft position sensor bolt (7 N.m).
- ☐ Connect the crankshaft position sensor connector.

#### **CONSUMABLES**

Use GLACEOL RX (TYPE D) coolant or L255 coolant.

Note:

Ready-to-use coolant or antifreeze must be diluted with distilled water in accordance with the guidelines marked on the container.

# **Engine cooling: Precautions for repair**

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

Only use GLACEOL RX (TYPE D) coolant.

#### WARNING

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

#### WARNING

Drain with the engine warm.

Flush and refill with the engine cold or warm.

Never flush a hot engine (risk of major thermal shock).

#### **WARNING**

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to -25°C ± 2 for cold and temperate countries,
- protection down to -40°C ± 2 for "extreme cold" countries.

#### WARNING

If the coolant is leaking from the expansion bottle cap, replace the valve.

#### Note:

Refer to the vehicle's Maintenance Booklet for information on cooling system service intervals.

For any further information, refer to the workshop repair manual of the vehicle concerned.

When a faulty vehicle arrives, check:

- the condition and tension of the water pump drive
- that the fan, the radiator and the radiator grille are not obstructed by an object which may impede the flow of air.

Vehicles in the current range have cooling systems with the following specifications:

- hermetically-sealed pressurised circuit (expansion bottle valve).

#### Note:

Ready-to-use coolant or antifreeze must be diluted with distilled water in accordance with the guidelines marked on the container.

# **Engine cooling circuit: Specifications**

19A

Vehicles in the current range have cooling systems with the following specifications:

- hermetically-sealed pressurised circuit (expansion chamber valve),
- circuit using type D coolant,
- passenger compartment heating system equipped with a "heater matrix" type radiator located under the dashboard, which helps to cool the engine.

#### Volume of coolant

Engine	Gearbox	Quantity	Grade
		(L)	
2TR	Manual gearbox	6.9	
	Continuously variable automatic transmission	7.2	GLACEOL RX type D
M9R	Manual gearbox	8.0	Only use coolant
Mak	Automatic gearbox	8.5	

#### Special notes:

- protection down to 25°C ± 2 for cold and temperate countries,
- protection down to  $40^{\circ}$ C ± 2 "extreme cold" countries.

#### Thermostat opening temperatures

Engine	Start of opening (°C)	End of ope- ning (°C)	
2TR	93.5 - 96.5	108	

### **Engine cooling circuit: check**

#### **IMPORTANT**

To avoid any risk of damaging the systems, follow the instructions regarding safety and cleanliness and operation recommendations before carrying out the repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

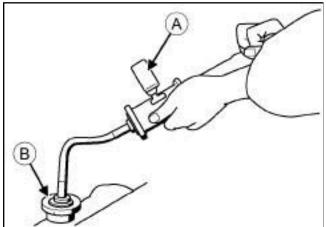
#### **IMPORTANT**

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

# I - CHECKING THE SEALING OF THE COOLING SYSTEM



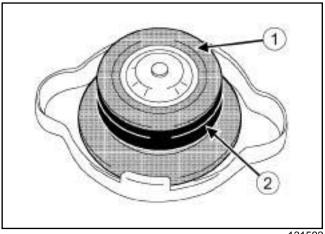
131591

- ☐ Pressurise the system using the radiator cap checking device (A) and an adapter (B).
- ☐ Test pressure:

- 2TR: **0.88 bar** - M9R: **1.37 bar** 

☐ Check that there are no leaks.

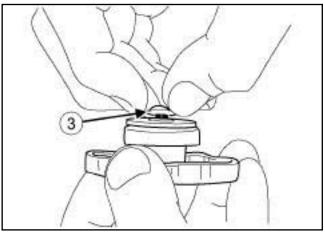
#### **II - CHECKING THE RADIATOR CAP VALVE SEAT**



131592

- ☐ Check:
  - that the valve seat (1) is inflated at the point that the edge of the metal tappet (2) is not visible when viewed from above.
  - that the valve seat is not dirty or damaged.

#### **III - CHECKING THE VACUUM VALVE**

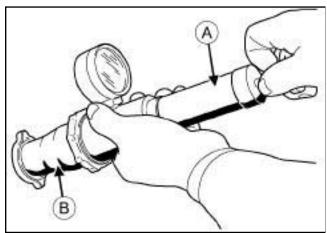


131593

- ☐ Pull on the vacuum valve (3) to open it.
- ☐ Check:
  - that the vacuum valve closes completely when it is released,
  - that the vacuum valve is not dirty or damaged,
  - that there are no abnormalities in the opened or closed statuses of the vacuum valve.

# **Engine cooling circuit: check**

# IV - CHECKING THE DISCHARGE PRESSURE OF THE RADIATOR CAP



131594

- ☐ Apply engine coolant to the surface of the cap seal.
- ☐ Refit:
  - -the radiator cap checking device (A) using an adapter (B),
  - the radiator cap on the adapter.

#### Note:

The pressure should not drop; if it does, look for the leak.

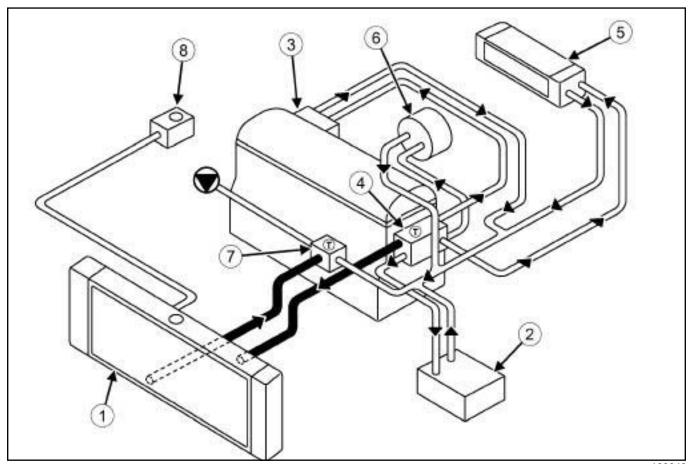
- ☐ Pump with the radiator cap checking device.
- □ Discharge pressure:
  - -2TR: 0.784 0.98 bar (limit 0.59 bar)
  - M9R: **1.27 1.47 bar** (limit **1.08 bar**)
- ☐ Replace the radiator cap if there are any irregularities relating to the three components above.

# **Engine cooling circuit: Operating diagram**

19A

2TR, and FK0 or FK8 – 2TR, and ND5 or ND8

2TR, and FK0 or FK8



129646

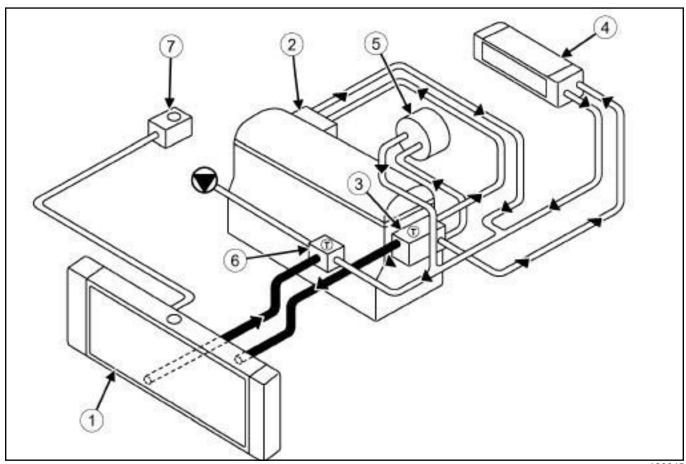
(1)	Cooling radiator
<b>(2</b> )	Gearbox oil cooler
(3)	Coolant - oil heat exchange
<b>(4</b> )	Cylinder head thermostat
<b>(5)</b>	Heater matrix
<b>(6</b> )	Throttle valve
<b>(7</b> )	Cylinder block thermostat
(8)	Expansion bottle

# **Engine cooling circuit: Operating diagram**

19A

2TR, and FK0 or FK8 – 2TR, and ND5 or ND8

2TR, and ND5 or ND8

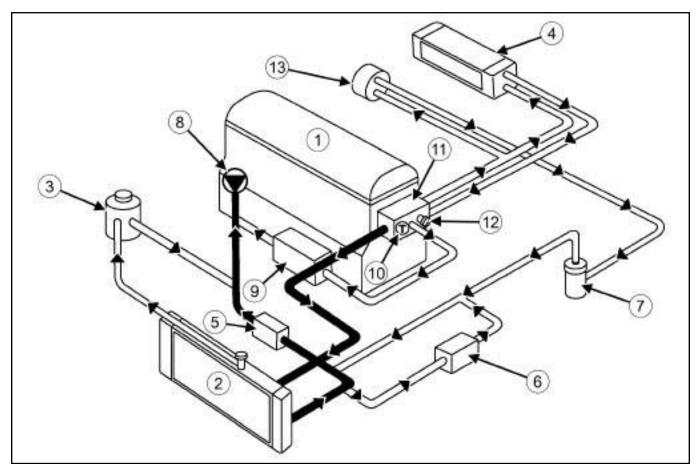


<b>(1</b> )	Cooling radiator
<b>(2</b> )	Coolant - oil heat exchanger
(3)	Cylinder head thermostat
<b>(4</b> )	Heater matrix
<b>(5)</b>	Throttle valve
<b>(6</b> )	Cylinder block thermostat
<b>(7</b> )	Expansion bottle

# **Engine cooling circuit: Operating diagram**

19A

M9R, and 6 SPEED AUTO GBOX



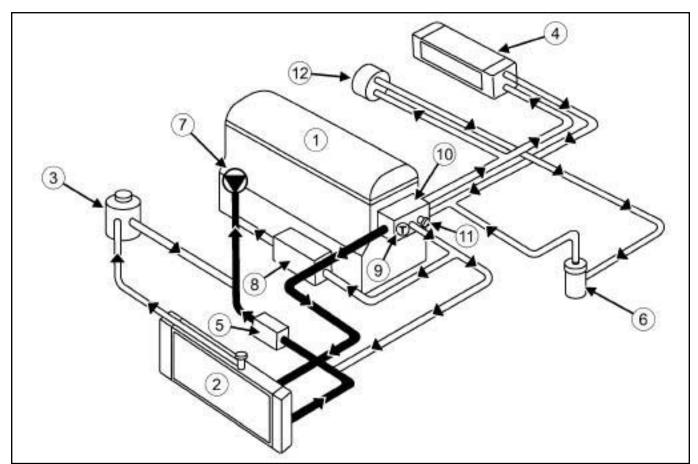
129648

(1)	Engine
(2)	Cooling radiator
(3)	Expansion bottle
(4)	Heater matrix
<b>(5</b> )	Coolant - oil heat exchanger
<b>(6</b> )	Automatic gearbox oil cooler
<b>(7</b> )	Electric coolant pump
(8)	Water pump
<b>(9</b> )	Exhaust gas cooler
<b>(10)</b>	Thermostat
(11)	Thermostat support
<b>(12)</b>	Bleed screw
(13)	Turbocharger

# **Engine cooling circuit: Operating diagram**

19A

M9R, and 6 SPEED MANUAL GBOX



131100

<b>(1)</b>	Engine
<b>(2</b> )	Cooling radiator
(3)	Expansion bottle
<b>(4)</b>	Heater matrix
<b>(5</b> )	Coolant - oil heat exchanger
<b>(6</b> )	Electric coolant pump
<b>(7</b> )	Water pump
(8)	Exhaust gas cooler
(9)	Thermostat
(10)	Thermostat support
(11)	Bleed screw
(12)	Turbocharger

# **Cooling circuit: Draining - Refilling**

#### **Essential equipment**

coolant draining tray

compressed air nozzle

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

#### **WARNING**

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

#### I - OIL SERVICE

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **WARNING**

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

#### **WARNING**

Drain with the engine warm.

Flush and refill with the engine cold or warm.

Never flush a hot engine (risk of major thermal shock).

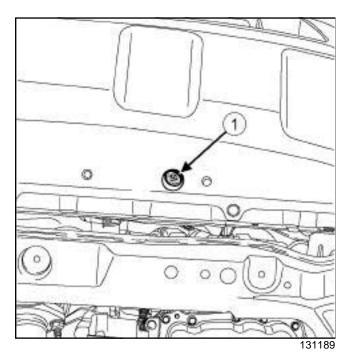
#### **WARNING**

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

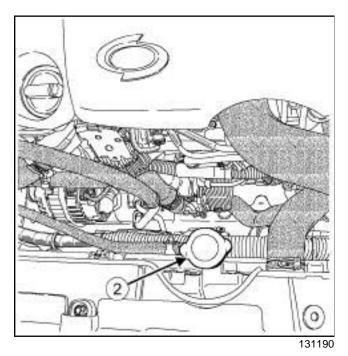
The criteria to be met are:

- protection down to -25°C ± 2 for cold and temperate countries,
- protection down to -40°C ± 2 for "extreme cold" countries.
- ☐ Remove the engine undertray.
- ☐ Position the **coolant draining tray** under the vehicle.

# **Cooling circuit: Draining - Refilling**

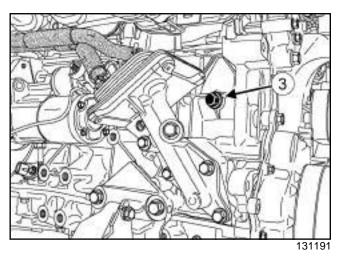


□ Remove the drain plug (1).



- ☐ Remove the radiator cap (2).
- ☐ Use a **compressed air nozzle** to blow air into the circuit through the radiator opening to remove as much coolant as possible.

#### 2TR



□ Remove the coolant drain plug (3) from the cylinder block and drain all of the engine coolant from the circuit.

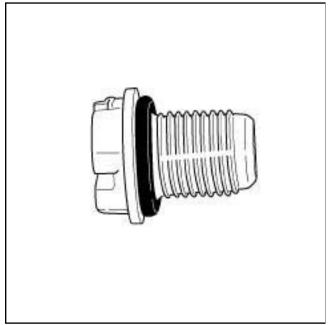
- □ Remove the expansion bottle (see 19A, Cooling, Expansion bottle: Removal - Refitting, page 19A-53).
- ☐ Drain the expansion bottle.

#### **II - CLEANING**

- ☐ Fill the cooling system with water through the radiator opening.
- ☐ Let the water run until the water collected by the cooling radiator bottom hose runs clear.
- ☐ Use a **compressed air nozzle** to blow air into the circuit through the radiator opening to remove as much coolant as possible.

# **Cooling circuit: Draining - Refilling**

#### **III - FILLING**



131192

Note:

Carefully clean the drain plug and refit a new Oring.

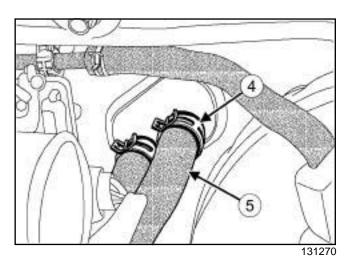
☐ Refit the expansion bottle (see 19A, Cooling, Expansion bottle: Removal - Refitting, page 19A-53)

2TR

☐ Refit the coolant drain plug (3) on the cylinder block.

☐ Refit the drain plug (1).

☐ Remove the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).



□ Remove:

- the clip (4),
- the heater hose (5).
- ☐ Lift the heater hose (5) as high as possible.

Note:

Capacity of the engine coolant:

- 2TR - BVV (CVT): 7.2 I,

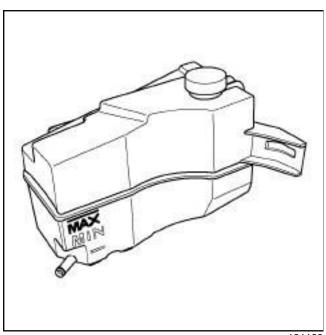
- M9R - BVM: 8.0 I,

- M9R - BVA: **8.5 I**.

- ☐ Pour the coolant slowly, at less than 2 l/min, so that the air escapes from the cooling system.
- ☐ When the coolant starts to go out of the heater matrix, connect the heater hose to the heater matrix and continue to pour coolant until the radiator is full.

# **Cooling circuit: Draining - Refilling**

2TR



1311

☐ Fill with coolant up to the « MAX » mark on the expansion bottle.

M9R



131194

Note:

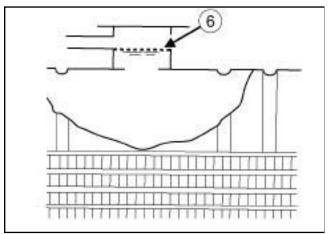
The coolant level rises approximately **15 mm** when the engine stops.

- ☐ Fill with coolant up to **15 mm** below the « MAX » mark on the expansion bottle.
- ☐ Refit the radiator cap.
- □ Refit the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Clean any surfaces soiled by the coolant.

#### **IV - BLEEDING**

- ☐ Start the engine.
- □ Maintain the engine speed at 3000 rpm, until the engine cooling fan assembly is triggered a third time (time required for automatic degassing).
- ☐ Check that the heating is operating correctly.
- ☐ Allow the engine to cool until the engine coolant temperature is less than **50°C**.

# **Cooling circuit: Draining - Refilling**



131195

- ☐ Remove the radiator cap.
- ☐ Top up the coolant level (6).
- ☐ Refit the radiator cap.

#### **V - FINAL OPERATION**

- ☐ Remove the **coolant draining tray**.
- ☐ Refit the engine undertray.

## Cooling radiator: Removal - Refitting

19A

M9R

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

#### **IMPORTANT**

To avoid any risk of damaging the systems, follow the instructions regarding safety and cleanliness and operation recommendations before carrying out the repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

#### **WARNING**

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

#### **WARNING**

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to -25°C ± 2 for cold and temperate countries,
- protection down to -40°C ± 2 for "extreme cold" countries.

#### **WARNING**

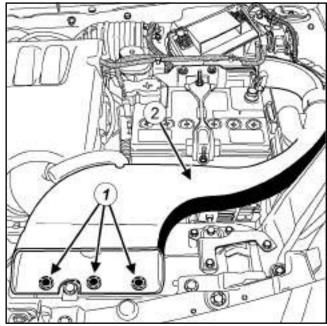
The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- □ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

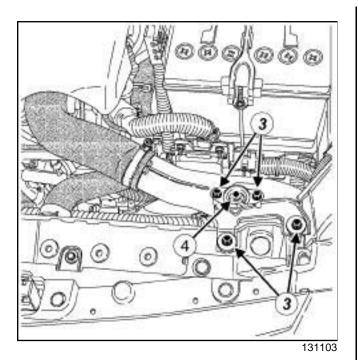


131102

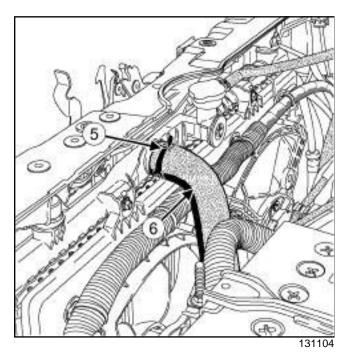
- ☐ Unclip the clips (1).
- □ Remove the air inlet sleeve (2).

# **Cooling radiator: Removal - Refitting**

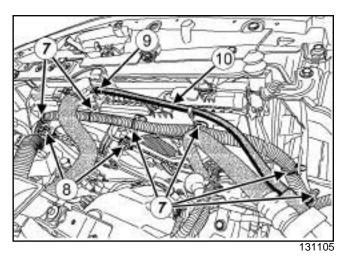
M9R



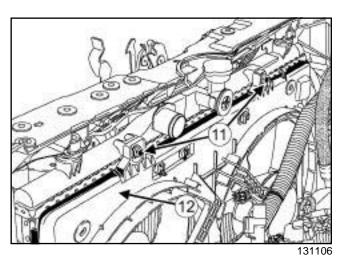
- □ Remove:
  - the bolts (3) of the air inlet pipe support,
  - the air inlet pipe support (4).



- □ Remove the cooling radiator top hose clip (5) using the (Mot. 1448).
- □ Disconnect the radiator top hose (6).



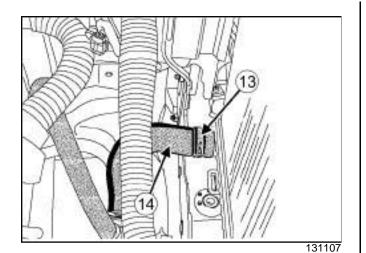
- ☐ Unclip the wiring clips (7).
- ☐ Disconnect the connectors (8) from the motor-driven fan assembly.
- ☐ Remove the clip (9).
- ☐ Disconnect the hose (10).



#### □ Remove:

- the bolt (11) from the motor-driven fan assembly,
- the engine cooling fan assembly (12) .

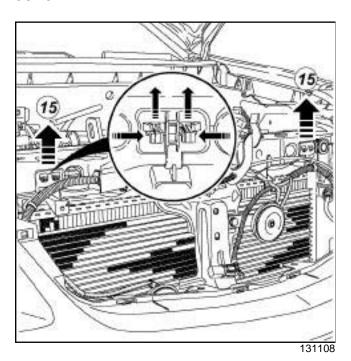
M9R



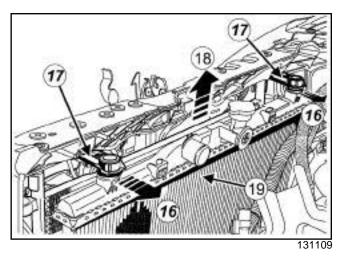
☐ Remove the cooling radiator bottom hose clip (13) using the (Mot. 1448).

□ Disconnect the radiator bottom hose (14).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



☐ Move the radiator supports in the direction (15)



□ Remove:

- the supports (17) in the direction of (16),
- the radiator (19) in the direction of (18).

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

□ Refit:

- the cooling radiator,
- the radiator supports.
- ☐ Place the supports in their original positions.

#### **II - FINAL OPERATION.**

- ☐ Connect the radiator bottom hose.
- □ Refit:
  - the clip of the radiator bottom hose using the tool (Mot. 1448).
  - the engine cooling fan assembly,
  - The bolt from the motor-driven fan assembly.
- ☐ Connect the hose (10).
- ☐ Refit the clip (9).
- ☐ Connect the motor-driven fan assembly connectors.
- ☐ Clip on the wiring clips (7).
- ☐ Connect the radiator top hose.
- □ Refit:
  - the clip of the radiator top hose using the tool (Mot. 1448),
  - the air inlet pipe support,
  - the bolts of the air inlet pipe support,

# COOLING Cooling radiator: Removal - Refitting

19A

### M9R

- the air intake sleeve.
- ☐ Refit the engine undertray.
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).
- ☐ Fill and bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Check that there are no leaks.

## Cooling radiator: Removal - Refitting

19A

2TR

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

#### **IMPORTANT**

To avoid any risk of damaging the systems, follow the instructions regarding safety and cleanliness and operation recommendations before carrying out the repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

When working in the engine compartment, take care as the radiator fan(s) may start up unexpectedly (risk of being cut).

To avoid any risk of serious burns when the engine is hot:

- do not open the expansion bottle cap,
- do not drain the cooling system,
- do not open the bleed screw(s).

#### WARNING

Take care not to damage the bearing faces to prevent any risk of coolant leaks.

#### WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to -25°C ± 2 for cold and temperate countries,
- protection down to -40°C ± 2 for "extreme cold" countries.

#### **WARNING**

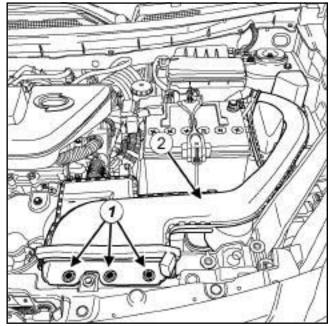
The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

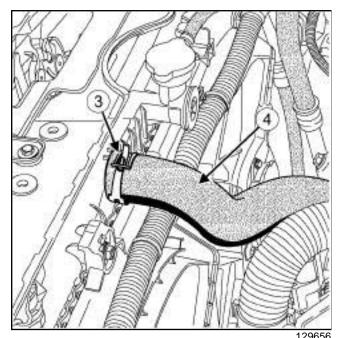
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- □ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).



129655

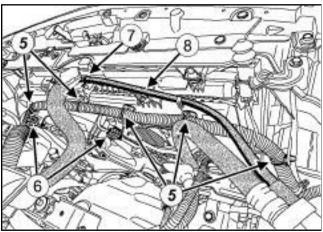
- ☐ Unclip the clips (1).
- ☐ Remove the air inlet sleeve (2).

2TR

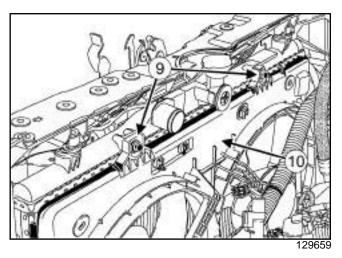


- ☐ Remove the clip (3) from the radiator top hose using
- ☐ Disconnect the radiator top hose (4).

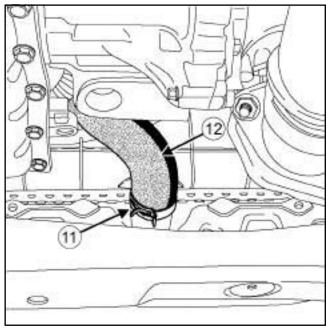
the tool (Mot. 1448).



- 129658
- ☐ Unclip the clips (5) from the wiring
- ☐ Disconnect the connectors (6) from the motor-driven fan assembly.
- ☐ Remove the clip (7) from the expansion bottle degassing hose using the tool (Mot. 1448)
- ☐ Disconnect the degassing hose (8) from the expansion bottle.



- □ Remove:
  - the bolts (9),
  - the engine cooling fan assembly (10) .



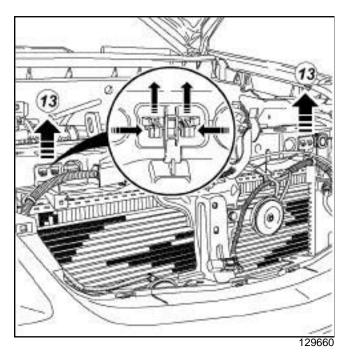
129657

- □ Remove the clip (11) from the radiator bottom hose using the tool (Mot. 1448).
- ☐ Disconnect the radiator bottom hose (12).

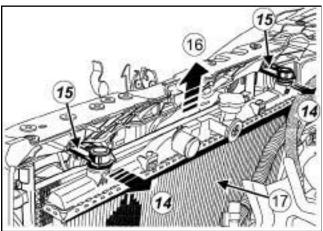
### **Cooling radiator: Removal - Refitting**

2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



☐ Move the radiator supports in the direction of (13).



129661

#### □ Remove:

- -the supports (15) in the direction of (14),
- the radiator (17) in the direction of (16) .

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the cooling radiator,
  - the radiator supports.
- ☐ Place the supports in their original positions.

#### **II - FINAL OPERATION.**

- Connect the radiator bottom hose.
- ☐ Refit:
  - the clip of the radiator bottom hose using the tool (Mot. 1448),
  - the engine cooling fan assembly,
  - the fan assembly bolt.
- ☐ Connect the degassing hose to the expansion bottle.
- ☐ Refit the clip of the expansion bottle degassing hose using the tool (Mot. 1448).
- ☐ Connect the motor-driven fan assembly connectors.
- ☐ Clip on the wiring clips (5).
- ☐ Connect the radiator top hose.
- □ Refit the radiator top hose clip using the tool (Mot. 1448).
- ☐ Refit the air intake sleeve.
- ☐ Clip on the air inlet sleeve clips.
- ☐ Refit the engine undertray.
- ☐ Connect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Fill and bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Check that there are no leaks.

### Water pump: Removal - Refitting

19A

M9R

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Parts and consumables for the repair work, page 19A-1).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

□ Remove the « engine - gearbox assembly » (see 10A, Engine and cylinder block assembly, Engine/gearbox assembly: Removal - Refitting, page 10A-44).

# II - OPERATION FOR REMOVAL OF PART CONCERNED

□ Remove the coolant pump (see Timing - cylinder head: Removal) (Technical Note 6017A, 10A, Engine and peripherals).

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

□ Refit the coolant pump (see **Timing - cylinder head: Refitting**) (Technical Note 6017A, 10A, Engine and peripherals).

#### **II - FINAL OPERATION.**

□ Refit the « engine and gearbox » assembly (see 10A, Engine and cylinder block assembly, Engine/gearbox assembly: Removal - Refitting, page 10A-44).

### Water pump: Removal - Refitting

19A

2TR

# Tightening torques 🗇

coolant pump bolts

25 N.m

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

Wear protective gloves during the operation.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).

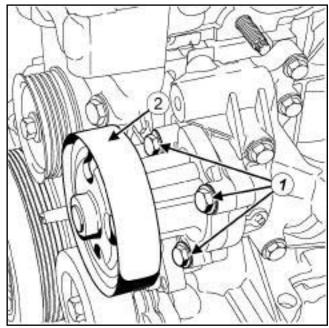
#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - the front right-hand splash guard (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).
  - -the front right-hand wheel arch liner (see **Front** wheel arch liner: Removal Refitting) (55A, Exterior protection),
  - -the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
  - the fixed roller (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),

- the auto tensioner (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- the screen washer bottle filler neck (see Windscreen washer bottle funnel: Removal Refitting) (85A, Washing Wiping),
- the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



131415

#### □ Remove:

- the coolant pump bolts (1),
- the coolant pump (2),
- the coolant pump seal.

#### REFITTING

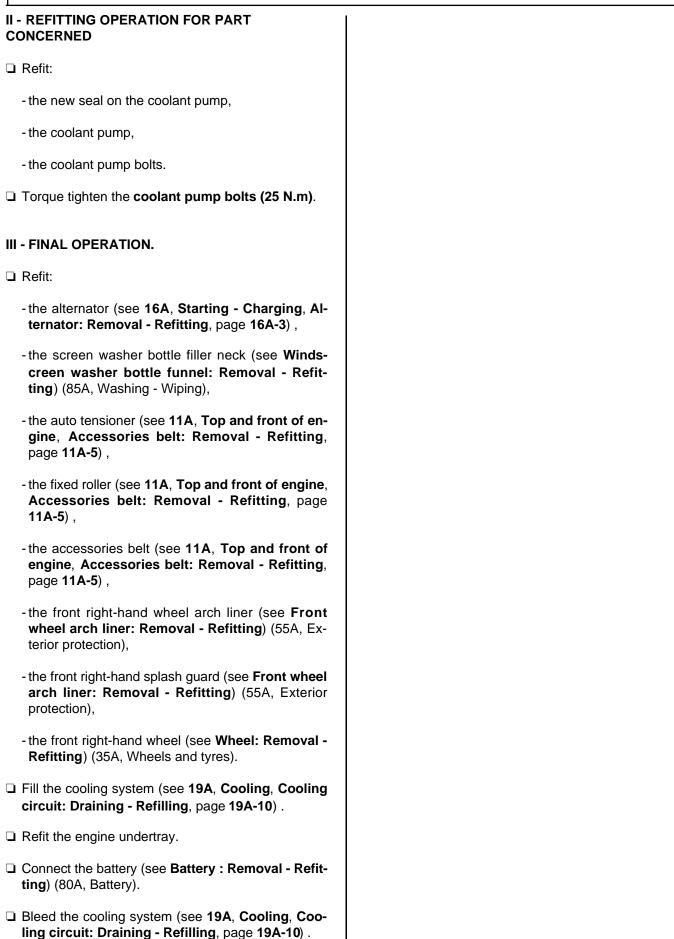
#### I - REFITTING PREPARATION OPERATION

- □ Always replace the seals.
- ☐ Clean the surface of the coolant pump seal using SURFACE CLEANER (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables Products).
- □ Apply RESIN ADHESIVE (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) to the surface of the coolant pump seal.

### Water pump: Removal - Refitting

19A

2TR



### **Thermostat: Removal - Refitting**

2TR

Essential special tooling						
Mot. 1448	Long clips.	nose	pliers	for	hose	

Tightening torques ▽	
thermostat unit bolts	22 N.m

#### **IMPORTANT**

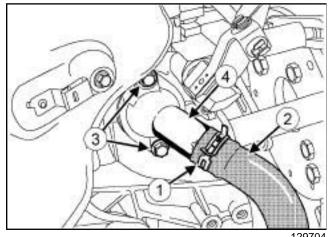
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **REMOVAL**

#### I - OPERATION FOR REMOVAL OF PART **CONCERNED**

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).

#### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



- ☐ Remove the clip (1) from the lower pipe of the cooling radiator using the tool (Mot. 1448).
- ☐ Disconnect the lower pipe (2) from the cooling radiator.

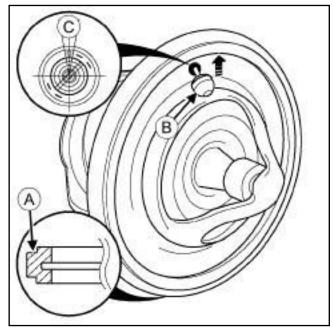
- □ Remove:
  - the thermostat unit bolts (3),
  - the thermostat unit (4),
  - the seal of the thermostat unit,
  - the thermostat,
  - the seal.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

□ Always replace the seal.

#### **II - REFITTING OPERATION FOR PART CONCERNED**



129673

Note:

The deviation position of the discharge valve may be within a range of 20 degrees as shown at (C)

#### Refit:

- the new seal (A) to the thermostat,
- the thermostat with the discharge valve (B) facing upwards.
- the seal of the thermostat unit,
- the thermostat unit,
- the thermostat unit bolts.

# **Thermostat: Removal - Refitting**

19A

	Λ
	Torque tighten the thermostat unit bolts (22 N.m).
	Connect the lower pipe of the cooling radiator.
	Refit the clip on the lower pipe of the cooling radiator using the tool <b>(Mot. 1448)</b> .
Ш.	FINAL OPERATION
	Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).
	Refit the engine undertray.
	Connect the battery (see <b>Battery : Removal - Refit- ting</b> ) (80A, Battery).
	Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).

### Plenum chamber: Removal - Refitting

19A

M9R

Essential special tooling					
Mot. 1448	Long clips.	nose	pliers	for	hose

Tightening torques ♡	
water chamber bolts	11 N.m
wiring bracket bolts	10 N.m
heater matrix water inlet pipe bolt	25 N.m
heater matrix water out- let pipe bolt	25 N.m
heater matrix inlet pipe bolt	25 N.m
heater matrix water out- let pipe bolt	25 N.m
EGR cooling bypass solenoid valve bolts	10 N.m

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

#### **WARNING**

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The criteria to be met are:

- protection down to -25°C ± 2 for cold and temperate countries,
- protection down to -40°C ± 2 for "extreme cold" countries.

#### **WARNING**

Before disconnecting the battery:

- wait for the motor-driven fan assembly to stop,
- wait for the computer to finish saving (1 minute).

#### **REMOVAL**

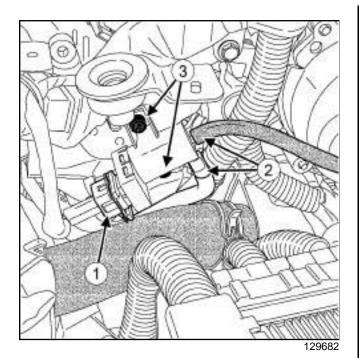
#### I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the engine cover,
  - the engine undertray.
- □ Remove:
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit,
  - the battery (see Battery: Removal Refitting)
     (80A, Battery)
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery tray),
  - the air filter box (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

### Plenum chamber: Removal - Refitting

# 19A

M9R

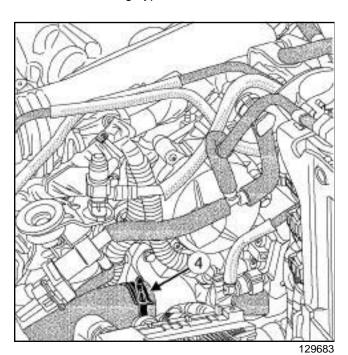


□ Disconnect:

- the connector (1) from the EGR cooling bypass solenoid valve
- the underpressure hoses (2) from the EGR cooling bypass solenoid valve.

#### ☐ Remove:

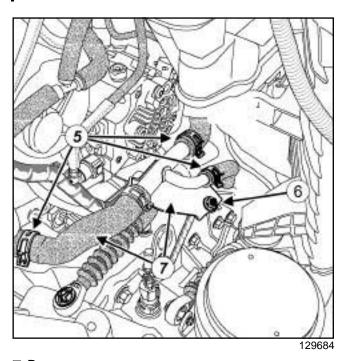
- the EGR cooling bypass solenoid valve bolts (3),
- the EGR cooling bypass solenoid valve.



☐ Remove the clip from the coolant radiator inlet hose (4) using the tool (Mot. 1448).

☐ Disconnect the coolant radiator inlet hose.

#### 6 SPEED MANUAL GBOX

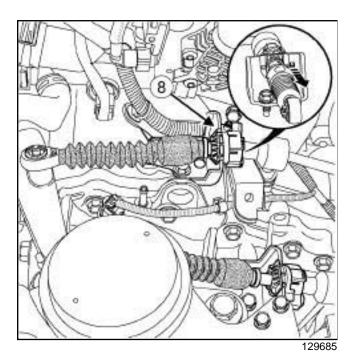


□ Remove:

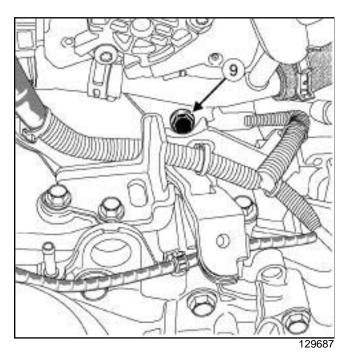
- the clips (5) from the heater matrix water outlet hose using the tool (Mot. 1448),
- the bolt (6) from the heater matrix water outlet hose.
- ☐ Disconnect the « heater matrix water outlet pipe hose assembly » (7) from the water chamber and heater matrix water outlet hose.

# Plenum chamber: Removal - Refitting

M9R



☐ Unclip the gear shift cable (8).



☐ Remove the bolt (9) from the heater matrix inlet pipe.

### 6 SPEED AUTO GBOX

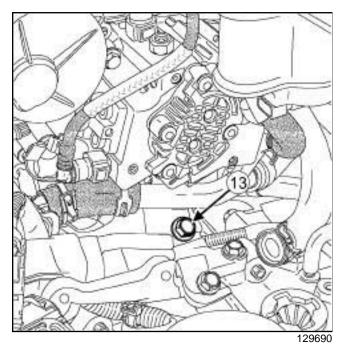


129142

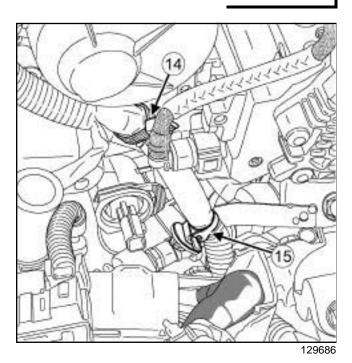
#### ☐ Remove:

- the heater matrix water outlet hose clips (10) using the tool (Mot. 1448)
- the bolt (11) from the heater matrix water outlet hose.
- ☐ Disconnect the « heater matrix water outlet pipe hose assembly » (12) from the water chamber and heater matrix water outlet hose.

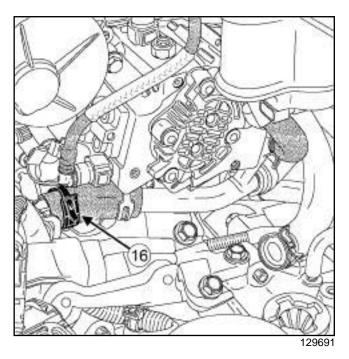
M9R



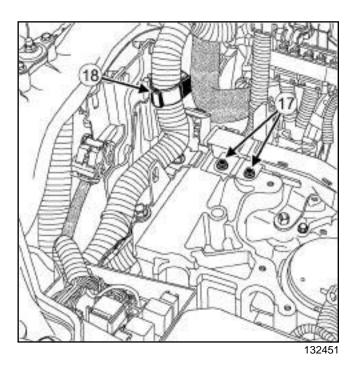
☐ Remove the bolt (13) from the heater matrix inlet pipe.



- Unclip:
  - the wiring at (14),
  - the wiring at (15) .



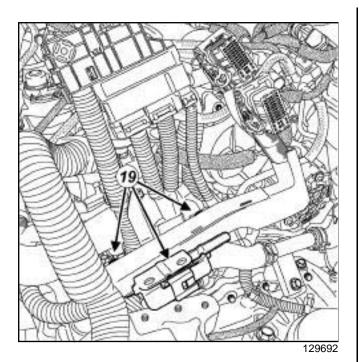
- □ Remove the clip from the heater matrix water inlet hose (16) using the tool (Mot. 1448).
- ☐ Disconnect the heater matrix water inlet hose from the water chamber.
- ☐ Move aside the water matrix water inlet hose.
- ☐ Disconnect the coolant temperature sensor connector.



- ☐ Remove the bolts (17) from the wiring bracket.
- ☐ Unclip the wiring at (18).

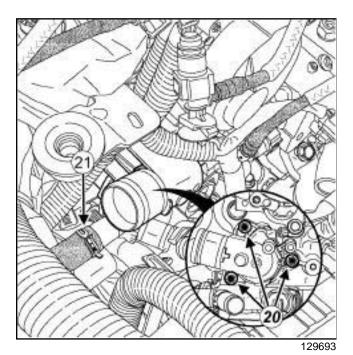
### Plenum chamber: Removal - Refitting

M9R



- ☐ Unclip the wiring brackets (19).
- Move aside the wiring.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove:

- the water chamber bolts (20),
- the exhaust gas recirculation intercooler water inlet hose clip (21) using the tool (Mot. 1448).
- ☐ Disconnect the water chamber from the exhaust gas recirculation intercooler water inlet hose.

□ Remove the water chamber seal.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the water chamber seal.

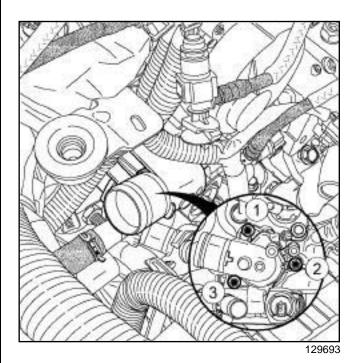
#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

□ Replace the coolant temperature sensor if necessary (see 19A, Cooling, Coolant temperature sensor: Removal - Refitting, page 19A-59).

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the new water chamber seal on the water chamber.
- ☐ Connect the water chamber to the exhaust gas recirculation intercooler water inlet hose.
- □ Refit the exhaust gas recirculation intercooler water inlet hose clip using the tool (Mot. 1448).



- $\hfill \square$  Refit the water chamber bolts.
- ☐ Torque tighten in order the water chamber bolts (11 N.m).

# Plenum chamber: Removal - Refitting

19A

M9R

III - FINAL OPERATION.		
□ Clip:	6 SPEED AUTO GBOX	
- the wiring on to the brackets (19),	□ Refit the heater matrix water outlet hose bolt (11)	
- the wiring at <b>(18)</b> .	☐ Torque tighten the heater matrix inlet pipe bolt (25 N.m).	
☐ Refit the wiring bracket bolts (17).		
<ul> <li>□ Torque tighten the wiring bracket bolts (10 N.m).</li> <li>□ Connect:         <ul> <li>the coolant temperature sensor connector,</li> <li>the heater matrix water inlet hose to the water chamber.</li> </ul> </li> </ul>	Connect the « heater matrix water outlet pipe - hose » assembly to the water chamber and the hea- ter matrix water outlet hose.	
	☐ Refit the heater matrix water outlet hose bolt.	
	☐ Torque tighten the heater matrix water outlet pipe bolt (25 N.m).	
□ Refit the heater matrix water inlet hose clip using the tool (Mot. 1448).	☐ Refit the heater matrix water outlet hose clips (10) using the tool (Mot. 1448).	
□ Clip:	doing the tool (meta 1440).	
- the wiring at <i>(15)</i> ,		
-the wiring at (14).	☐ Connect the coolant radiator hose.	
6 SPEED MANUAL GBOX	☐ Refit the coolant radiator inlet hose clip using the tool (Mot. 1448).	
☐ Refit the bolt to the heater matrix inlet pipe.	☐ Refit the EGR cooling bypass solenoid valve.	
☐ Torque tighten the heater matrix water inlet pipe bolt (25 N.m).	☐ Refit the EGR cooling bypass solenoid valve bolts.	
<ul> <li>□ Clip the gear shift cable.</li> <li>□ Connect the «heater matrix water outlet pipe - hose » assembly to the water chamber and the heater matrix water outlet hose.</li> <li>□ Refit the heater matrix water outlet pipe bolt (6).</li> </ul>	☐ Torque tighten the EGR cooling bypass solenoid valve bolts (10 N.m).	
	□ Connect:	
	<ul> <li>the vacuum hoses to the EGR cooling bypass sole- noid valve,</li> </ul>	
☐ Torque tighten the heater matrix water outlet pipe bolt (25 N.m).	<ul> <li>the exhaust gas recirculation cooling bypass sole- noid valve connector.</li> </ul>	
□ Refit the heater matrix water outlet hose clips (5) using the tool (Mot. 1448).	□ Refit:	
	- the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),	
	<ul> <li>the battery tray (see Battery tray: Removal - Refitting) (80A, Battery),</li> </ul>	
	- the battery (see <b>Battery</b> : <b>Removal - Refitting</b> ) (80A, Battery)	
	- the air inlet sleeve to the air filter unit,	
	- the air inlet sleeve clips,	
	- the engine cover.	
	☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).	
	☐ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).	
	☐ Refit the engine undertray.	

### Plenum chamber: Removal - Refitting

19A

2TR, and FK0 or FK8

Tightening torques ♡	
coolant outlet unit bolts	22 N.m
bolts on the coolant inlet housing	22 N.m
coolant temperature sensor	25 N.m

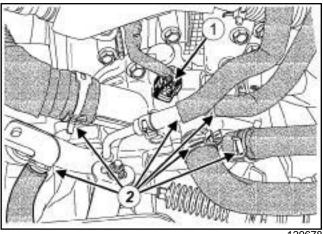
#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Remove:
  - the air inlet sleeve (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery),
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery).

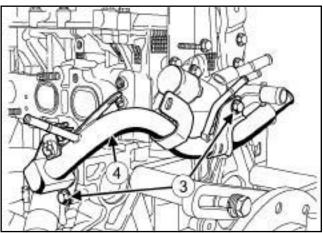


129678

- Disconnect the coolant temperature sensor connector (1).
- ☐ Remove the clips (2) from the cooling hoses.
- ☐ Disconnect all the cooling hoses from the coolant inlet housing and the coolant outlet unit.

#### □ Remove:

- the clips from the wiring of the coolant inlet housing,
- the coolant temperature sensor,
- the coolant temperature sensor seal,



129679

#### □ Remove:

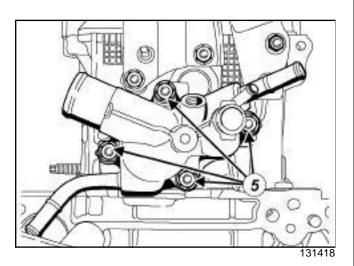
- the bolts (3) from the coolant inlet housing,
- the coolant inlet housing,
- the O-ring from the coolant inlet housing.

### Plenum chamber: Removal - Refitting



2TR, and FK0 or FK8

# II - OPERATION FOR REMOVAL OF PART CONCERNED



#### Remove:

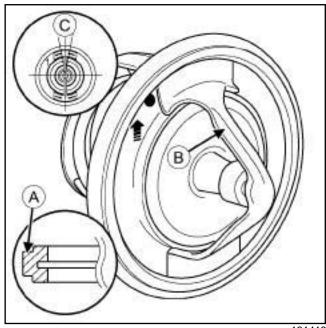
- the coolant outlet unit bolts,
- the coolant outlet unit.
- the coolant outlet unit seal,
- the thermostat,
- the thermostat seal.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

- Always replace:
  - the seals,
  - the O-ring.

# II - REFITTING OPERATION FOR PART CONCERNED



131419

#### Note:

The position deviation of (**C**) the mobile valve may be within the region of **20**° as illustrated.

#### Refit:

- the new seal (A) to the thermostat,
- the thermostat with the mobile valve (B) facing upwards,
- the new coolant outlet unit seal,
- the coolant outlet unit,
- the coolant outlet unit bolts.
- ☐ Torque tighten the coolant outlet unit bolts (22 N.m)

#### **III - FINAL OPERATION**

- ☐ Apply new engine oil to the new O-ring.
- ☐ Refit:
  - the new O-ring on the coolant inlet housing,
  - the coolant inlet housing,
  - the coolant inlet housing bolts.
- ☐ Torque tighten the **bolts on the coolant inlet hou- sing (22 N.m)**.
- □ Refit:
  - the clips on the wiring of the coolant inlet housing,

### Plenum chamber: Removal - Refitting

#### 2TR, and FK0 or FK8

- the new coolant temperature sensor seal, - the coolant temperature sensor. ☐ Torque tighten the coolant temperature sensor (25 N.m). ☐ Connect all the cooling hoses on the coolant inlet housing and the water chamber. ☐ Refit the clips on the hoses. ☐ Connect the coolant temperature sensor connector. □ Refit: - the battery tray (see Battery tray: Removal - Refitting) (80A, Battery), -the battery (see Battery: Removal - Refitting) (80A, Battery), -the air inlet sleeve (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3). ☐ Fill the cooling system (see 19A, Cooling, Cooling
- ting) (80A, Battery). ☐ Bleed the cooling system (see 19A, Cooling, Coo-

☐ Connect the battery (see Battery : Removal - Refit-

circuit: Draining - Refilling, page 19A-10).

☐ Refit the engine undertray.

ling circuit: Draining - Refilling, page 19A-10) .

### Plenum chamber: Removal - Refitting

19A

2TR, and 6 SPEED MANUAL GBOX

Tightening torques ♡	
water chamber bolts	22 N.m
bolts on the coolant inlet housing	22 N.m
coolant temperature sensor	25 N.m

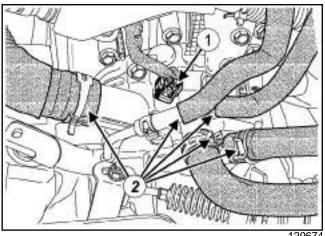
#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

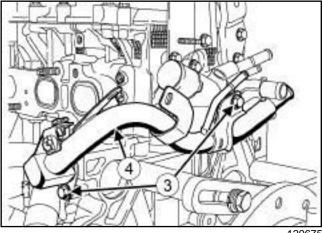
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Remove:
  - the air inlet sleeve (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3),
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery),
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery).



- 129674
- Disconnect the coolant temperature sensor connector (1).
- ☐ Remove the clips (2) from the cooling hoses.
- ☐ Disconnect all the cooling hoses from the coolant inlet housing and the water chamber.

#### □ Remove:

- the clips from the wiring of the coolant inlet housing,
- the coolant temperature sensor,
- the coolant temperature sensor seal,



#### 129675

#### □ Remove:

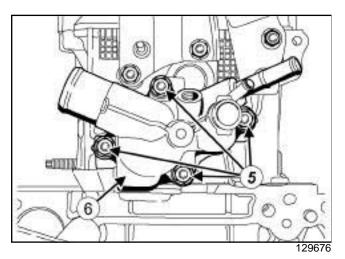
- the bolts (3) from the coolant inlet housing,
- the coolant inlet housing,
- the O-ring from the coolant inlet housing.

# Plenum chamber: Removal - Refitting



2TR, and 6 SPEED MANUAL GBOX

# II - OPERATION FOR REMOVAL OF PART CONCERNED



#### ■ Remove:

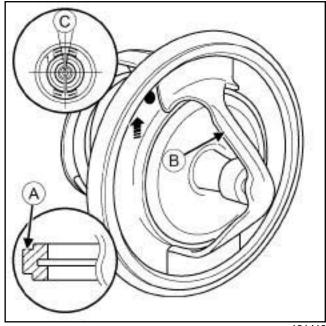
- the coolant outlet unit bolts,
- the coolant outlet unit,
- the coolant outlet unit seal,
- the thermostat,
- the thermostat seal.

#### **REFITTING**

#### I - REFITTING PREPARATION OPERATION

- Always replace:
  - the seals,
  - the O-ring.

# II - REFITTING OPERATION FOR PART CONCERNED



131419

# 

The position deviation of (**C**) the mobile valve may be within the region of **20**° as illustrated.

#### Refit:

Note:

- the new seal (A) to the thermostat,
- the thermostat with the mobile valve (B) facing upwards,
- the new water chamber seal,
- the coolant outlet unit,
- the water chamber bolts.
- ☐ Torque tighten the water chamber bolts (22 N.m).

#### **III - FINAL OPERATION**

☐ Apply new engine oil to the new O-ring.

#### ☐ Refit:

- the new O-ring on the coolant inlet housing,
- the coolant inlet housing,
- the coolant inlet housing bolts.
- ☐ Torque tighten the **bolts on the coolant inlet hou- sing (22 N.m)**.

#### ☐ Refit:

- the wiring clips on the coolant inlet housing,

# Plenum chamber: Removal - Refitting

19A

#### 2TR, and 6 SPEED MANUAL GBOX

- -the new coolant temperature sensor seal,
  -the coolant temperature sensor.
  Torque tighten the coolant temperature sensor (25 N.m).
  Connect all the cooling hoses on the coolant inlet housing and the water chamber.
  Refit the clips on the cooling hoses.
  Connect the coolant temperature sensor connector.
  Refit:
  -the battery tray (see Battery tray: Removal Refitting) (80A, Battery),
  -the battery (see Battery: Removal Refitting) (80A, Battery),
  -the air inlet sleeve (see 12A, Fuel mixture, Air re-
- ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

sonator: Removal - Refitting, page 12A-3) .

- ☐ Refit the engine undertray.
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- □ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

# Engine cooling fan assembly: Removal - Refitting



M9R

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

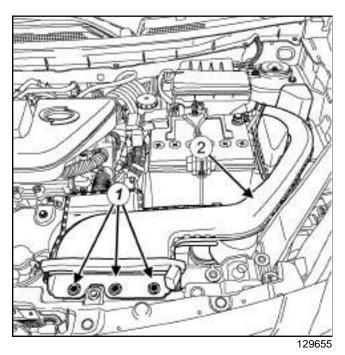
#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

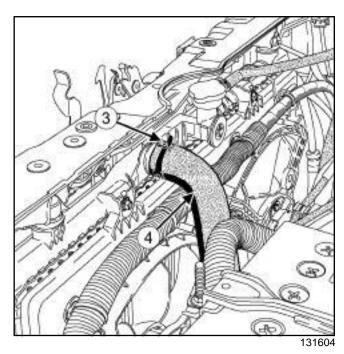
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

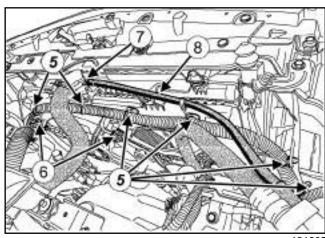
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).



- ☐ Unclip the clips (1).
- ☐ Remove the air inlet sleeve (2).



- □ Remove the radiator top hose clip (3) using the tool (Mot. 1448).
- □ Disconnect the cooling radiator top hose (4).



131605

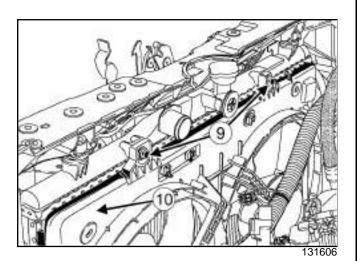
- ☐ Unclip the wiring clips (5).
- ☐ Disconnect the connectors (6) from the motor-driven fan assembly.
- □ Remove the clip (7).
- ☐ Disconnect the expansion bottle degassing hose (8)
- ☐ Move aside the expansion bottle degassing hose.

# Engine cooling fan assembly: Removal - Refitting

19A

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Remove:
  - the bolts (9),
  - the engine cooling fan assembly (10) .

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the engine cooling fan assembly,
  - the bolts (9) on the fan assembly.

#### **II - FINAL OPERATION.**

- ☐ Refit the expansion bottle degassing hose in its original position.
- ☐ Connect the degassing hose to the expansion bottle.
- ☐ Refit the degassing hose clip.
- ☐ Connect the motor-driven fan assembly connectors.
- ☐ Clip on the wiring clips.
- ☐ Connect the radiator top hose.
- ☐ Refit:
  - -the radiator top hose clip using the tool (Mot. 1448),
  - the air intake sleeve.
- ☐ Clip on the air inlet sleeve clips.
- ☐ Refit the engine undertray.
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

- ☐ Fill and bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Check that there are no leaks.

# Engine cooling fan assembly: Removal - Refitting

19A

2TR

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

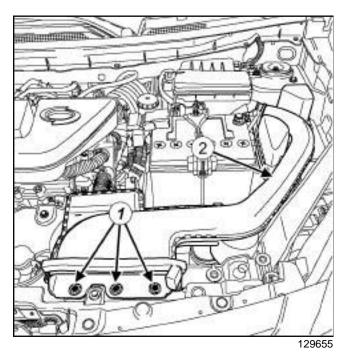
#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

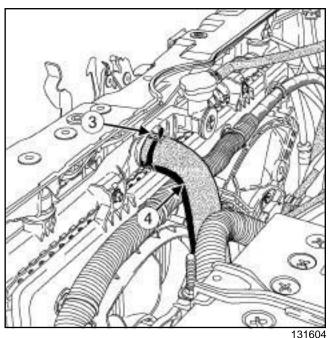
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

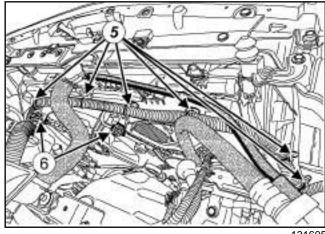
- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).



- ☐ Unclip the clips (1).
- ☐ Remove the air inlet sleeve (2).



- ing the tool
- □ Remove the radiator top hose clip (3) using the tool (Mot. 1448).
- ☐ Disconnect the radiator top hose (4).



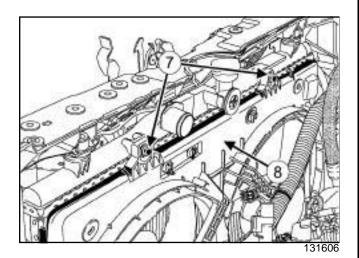
- 131605
- ☐ Unclip the wiring clips (5).
- ☐ Disconnect the connectors (6) from the motor-driven fan assembly.

# **Engine cooling fan assembly: Removal - Refitting**

19A

2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Remove:
  - the bolt (7) from the motor-driven fan assembly,
  - the engine cooling fan assembly (8) .

#### **REFITTING**

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the engine cooling fan assembly,
  - The bolt from the motor-driven fan assembly.

#### **II - FINAL OPERATION.**

- ☐ Connect the motor-driven fan assembly connectors.
- ☐ Clip on the wiring clips.
- ☐ Connect the radiator top hose.
- ☐ Refit:
  - -the radiator top hose clip using the tool (Mot. 1448),
  - the air intake sleeve.
- ☐ Clip on the air inlet sleeve clips.
- ☐ Refit the engine undertray.
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Fill and bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Check that there are no leaks.

# Water pump inlet pipe: Removal - Refitting

19A

M9R

Essential special tooling			
Mot. 1448	Long nose pliers for hose clips.		
Mot. 1608	Torque screwdriver 1 to 6.6 N.m.		

1			
Tightening torques ▽			
coolant pump inlet pipe bolt	10 N.m		
dipstick guide tube bolts	10 N.m		
intercooler air outlet pipe bolt	8 N.m		
intercooler air outlet pipe clip	8 N.m		
air filter unit air outlet pipe clips	5 N.m		
intercooler air inlet pipe bolt	8 N.m		

#### **IMPORTANT**

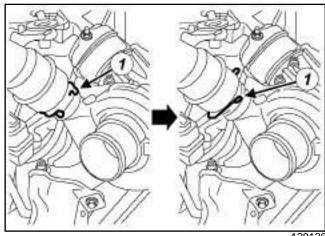
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Parts and consumables for the repair work, page 19A-1).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**)
- ☐ Remove:
  - the engine cover,
  - the windscreen wiper arms (see **Wiper arms: Removal Refitting**) (85A, Wiping Washing).
  - the scuttle panel half-grille (see **Scuttle half-grille**: **Removal Refitting**) (85A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),

 the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).

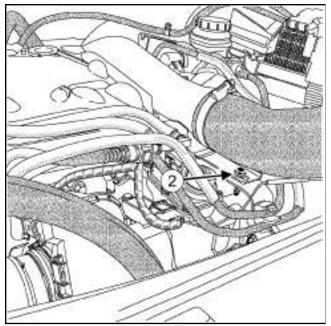


129126

☐ Pivot the intercooler air inlet pipe clip (1).

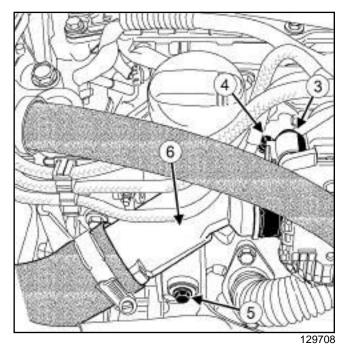
### Water pump inlet pipe: Removal - Refitting

M9R



- 129707
- ☐ Remove the intercooler air inlet pipe bolt (2) from the fuel supply pipe bracket.
- Move aside the intercooler air inlet pipe
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- □ Remove:
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit,
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery).
  - the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).
- ☐ Loosen the air filter unit air outlet pipe clip on the turbocharger.
- □ Disconnect:
  - the oil vapour rebreathing pipe from the oil separator,
  - the air filter unit air outlet pipe from the turbocharger.
- ☐ Fit a blanking plug into the oil separator opening.
- □ Remove:
  - -the inlet manifold (see 12A, Fuel mixture, Inlet manifold: Removal Refitting, page 12A-24),

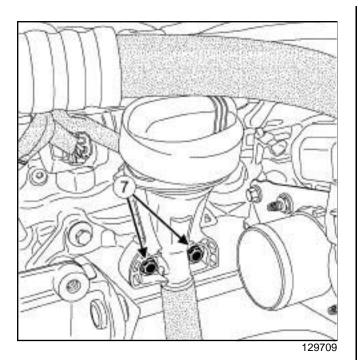
 the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas recirculation intercooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19).



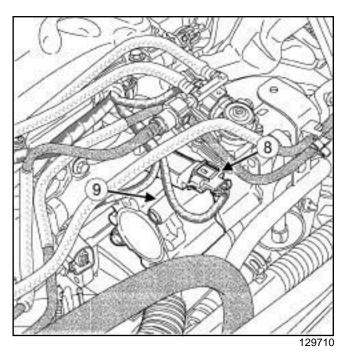
- □ Disconnect the connector (3) from the damper valve wiring.
- ☐ Loosen the clip (4) on the intercooler air outlet pipe.
- ☐ Remove the intercooler air outlet pipe bolt (5).
- ☐ Disconnect the intercooler air outlet pipe (6) from the air inlet flap.
- ☐ Move the intercooler air outlet pipe to one side.

# Water pump inlet pipe: Removal - Refitting

M9R



- □ Remove:
  - the dipstick guide tube bolt (7),
  - the dipstick tube.
- ☐ Fit a blanking plug on the opening of the dipstick guide tube on the cylinder block.
- □ Remove the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14).



☐ Disconnect the turbocharger pressure sensor connector (8).

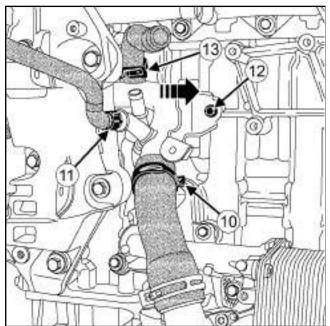
#### □ Remove:

- the housing from the turbocharging pressure sensor  $(\mathbf{9})$  ,
- the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation intercooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19),
- the starter (see 16A, Starting Charging, Starter: Removal Refitting, page 16A-7),
- the exhaust gas recirculation intercooler (see 12B, Turbocharging, Intercooler: Removal - Refitting, page 12B-13).
- ☐ Unclip the wiring harness from the coolant pump inlet pipe.

# Water pump inlet pipe: Removal - Refitting

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



12971

#### □ Remove:

- -the clip (10) from the coolant pump inlet pipe coming from the oil filter unit using the tool (Mot. 1448).
- -the clip (11) from the coolant pump inlet pipe coming from the expansion bottle using the tool (Mot. 1448).
- ☐ Remove the coolant pump inlet pipe bolt (12).
- □ Pull the coolant pump inlet pipe in the direction of the arrow.
- ☐ Move aside the coolant pump inlet pipe.
- □ Remove the clip (13) from the coolant pump inlet pipe coming from the exhaust gas recirculation intercooler using the tool (Mot. 1448).

#### □ Disconnect:

- the hose coming from the exhaust gas recirculation intercooler from the coolant pump inlet pipe,
- the hose coming from the oil filter unit from the coolant pump inlet pipe,
- the hose coming from the expansion bottle from the coolant pump inlet pipe.
- ☐ Remove the coolant pump inlet pipe.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

#### □ Clean:

- the exhaust gas recirculation intercooler joint face,
- the exhaust gas recirculation solenoid valve joint face.

#### **WARNING**

The joint faces must be clean, dry and free from grease (avoid finger marks).

#### □ Always replace:

- the coolant pump inlet pipe seal,
- the seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve
- the seal between the air inlet flap and the turbocharger pressure sensor housing.
- ☐ Refit the new coolant pump inlet pipe seal.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Connect the hose coming from the exhaust gas recirculation intercooler onto the coolant pump inlet pipe.
- ☐ Refit the clip (13) on the coolant pump inlet pipe coming from the exhaust gas recirculation intercooler using the tool (Mot. 1448).
- ☐ Connect the coolant pump inlet pipe to the hose coming from the oil filter unit.

#### Note:

Check that the coolant pump inlet pipe is correctly installed. The coolant may leak if it is incorrectly installed.

#### ☐ Refit:

- the coolant pump inlet pipe,
- the coolant pump inlet pipe bolt.
- ☐ Torque tighten the coolant pump inlet pipe bolt (10 N.m).
- ☐ Connect the hose coming from the expansion bottle to the coolant pump inlet pipe.

#### □ Refit

- the clip on the coolant pump inlet pipe coming from the oil filter unit using the tool **(Mot. 1448)**,

# Water pump inlet pipe: Removal - Refitting

19A

M9R

- the clip on the coolant pump inlet pipe coming from the expansion bottle using the tool **(Mot. 1448)**.

### Water pump inlet pipe: Removal - Refitting

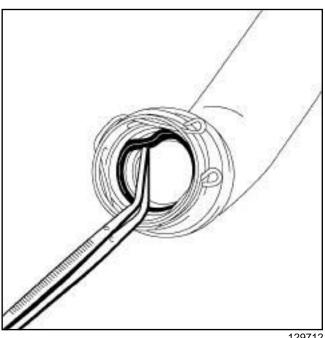
19A

M9R

#### **III - FINAL OPERATION.**

- ☐ Clip on the wiring of the coolant pump inlet pipe.
- □ Refit the exhaust gas recirculation intercooler (see 12B, Turbocharging, Intercooler: Removal - Refitting, page 12B-13).
- ☐ Refit:
  - the starter (see 16A, Starting Charging, Starter: Removal Refitting, page 16A-7)
  - the new exhaust gas recirculation rigid pipe seals between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation intercooler,
  - the exhaust gas recirculation rigid pipe between the exhaust gas recirculation solenoid valve and the exhaust gas recirculation intercooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19),
  - the new seal between the turbocharger pressure sensor housing and the exhaust gas recirculation solenoid valve,
  - the housing of the turbocharging pressure sensor.
- ☐ Connect the turbocharger pressure sensor connector.
- □ Refit:
  - the new seal between the air inlet flap and the turbocharger pressure sensor housing,
  - the damper valve (see 12A, Fuel mixture, Air inlet flap: Removal Refitting, page 12A-14).
- ☐ Remove the blanking plug from the dipstick guide tube on the cylinder block.
- ☐ Refit:
  - dipstick guide,
  - the dipstick guide tube bolts.
- ☐ Torque tighten the dipstick guide tube bolts (10 N.m).
- ☐ Connect the intercooler air outlet pipe to the damper valve.
- ☐ Refit the intercooler air outlet pipe bolt.
- ☐ Tighten:
  - -the intercooler air outlet pipe bolt (8 N.m),
  - -the intercooler air outlet pipe clip (8 N.m) using the tool (Mot. 1608).
- ☐ Connect the damper valve wiring connector.
- □ Refit:
  - the new exhaust gas recirculation rigid pipe seal on the exhaust manifold,

- the exhaust gas recirculation rigid pipe between the exhaust manifold and the exhaust gas recirculation intercooler (see 14A, Antipollution, Exhaust gas recirculation rigid pipe: Removal - Refitting, page 14A-19),
- the new inlet manifold seal,
- the inlet manifold (see 12A, Fuel mixture, Inlet manifold: Removal - Refitting, page 12A-24),
- the inlet manifold hoses and pipes (see 12A, Fuel mixture, Inlet manifold: Removal - Refitting, page 12A-24),
- □ Refit the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Connect the air filter unit air outlet pipe to the turbocharger and the air filter unit.
- ☐ Torque tighten the air filter unit air outlet pipe clips (5 N.m) using the tool (Mot. 1608).
- ☐ Remove the blanking plug from the opening of the oil separator.
- Connect the oil vapour rebreathing pipe to the oil decanter.



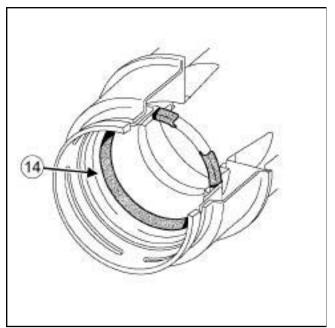
129712

□ Remove the intercooler air inlet pipe seal using the tool.

### Water pump inlet pipe: Removal - Refitting

19A

M9R



129713

#### Note:

Check that the seal (14) on the intercooler air inlet pipe is fitted the correct way round.

- ☐ Refit the new intercooler air inlet pipe seal.
- □ Rotate the intercooler air inlet pipe to refit the clip in its housing.
- ☐ Clip the intercooler air inlet pipe onto the turbocharger.
- ☐ Refit the intercooler air inlet pipe bolt to the fuel supply pipe bracket.
- ☐ Torque tighten the intercooler air inlet pipe bolt (8 N.m).
- ☐ Refit:
  - -the battery tray (see **Battery tray: Removal Refitting**) (80A, Battery),
  - -the battery (see **Battery**: **Removal Refitting**) (80A, Battery)
  - -the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - -the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (85A, Exterior equipment),
  - the windscreen wiper arms (see Wiper arms: Removal Refitting) (85A, Wiping Washing),

- the air inlet sleeve to the air filter unit,
- the air inlet sleeve clips.
- ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Refit:
  - the engine cover,
  - the engine undertray.

# Water pump inlet pipe: Removal - Refitting

19A

2TR

Tightening torques ▽		
coolant pump housing bolts	22 N.m	
coolant pump inlet pipe bolts	22 N.m	
dipstick guide tube bolt	22 Nm	
exhaust manifold upper heat shield bolts	6 N.m	

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

Wear protective gloves during the operation.

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

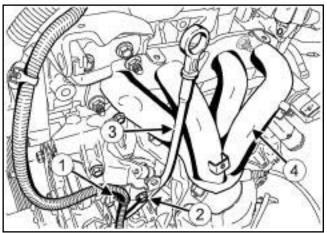
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

#### **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Remove the engine undertray.
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- □ Remove:
  - the front right-hand wheel (see **Wheel: Removal Refitting**),
  - the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),

- the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the fixed roller (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
- the auto tensioner (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
- the windscreen washer bottle filler neck (see Windscreen washer bottle funnel: Removal -Refitting) (85A, Washing - Wiping),
- the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3),
- the coolant pump (see 19A, Cooling, Water pump: Removal - Refitting, page 19A-22).



131422

#### □ Remove:

- the exhaust manifold upper heat shield bolts,
- the exhaust manifold upper heat shield,
- the clip (1),
- the dipstick guide tube bolt (2),
- the dipstick (3) and the dipstick guide tube,
- the exhaust manifold (4) (see 12A, Fuel mixture, Exhaust manifold: Removal - Refitting, page 12A-36).

#### Note:

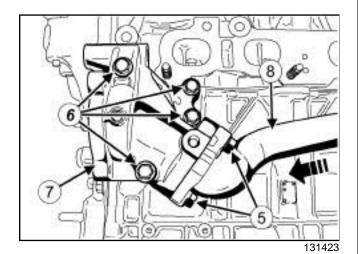
The engine must remain covered to prevent impurities from entering inside.

### Water pump inlet pipe: Removal - Refitting

19A

2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



□ Remove:

- the bolts (5) from the coolant pump inlet pipe,
- the coolant pump housing bolts (6),
- the coolant pump housing (7),
- the coolant pump housing seal,
- the coolant pump inlet pipe seal,
- the coolant pump inlet pipe (8) as shown on the diagram,
- the coolant pump inlet pipe O-ring at the thermos-

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the seals,
  - the O-ring.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the coolant pump inlet pipe,
  - the coolant pump inlet pipe seal,
  - the coolant pump housing seal,
  - the coolant pump housing,
  - the coolant pump housing bolts,
  - the coolant pump inlet pipe bolts.

- □ Torque tighten:
  - the coolant pump housing bolts (22 N.m),
  - the coolant pump inlet pipe bolts (22 N.m).

#### **III - FINAL OPERATION.**

- □ Refit:
  - the exhaust manifold (see 12A, Fuel mixture, Exhaust manifold: Removal Refitting, page 12A-36),
  - the dipstick and the dipstick guide tube,
  - the dipstick guide tube bolt.
- ☐ Torque tighten the dipstick guide tube bolt (22 Nm).
- □ Refit:
  - the clip (1),
  - the exhaust manifold upper heat shield,
  - the exhaust manifold upper heat shield bolts.
- ☐ Torque tighten the exhaust manifold upper heat shield bolts (6 N.m).
- Refit:
  - the coolant pump (see 19A, Cooling, Water pump: Removal - Refitting, page 19A-22) ,
  - the alternator (see 16A, Starting Charging, Alternator: Removal Refitting, page 16A-3)
  - the windscreen washer bottle filler neck (see Windscreen washer bottle funnel: Removal -Refitting) (85A, Washing - Wiping),
  - the auto tensioner (see 11A, Top and front of engine, Accessories belt: Removal Refitting, page 11A-5),
  - the fixed roller (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5).
  - the accessories belt (see 11A, Top and front of engine, Accessories belt: Removal - Refitting, page 11A-5),
  - the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
  - the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - the front right-hand wheel (see **Wheel: Removal Refitting**) .
- ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

# Water pump inlet pipe: Removal - Refitting

19A

2TR

- ☐ Refit the engine undertray.
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).
- □ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

# **Expansion bottle: Removal - Refitting**

2TR

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

#### Tightening torques

expansion bottle nut4

N.m

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

#### **WARNING**

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

#### WARNING

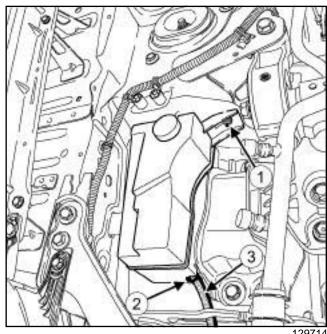
Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

Drain the expansion bottle.

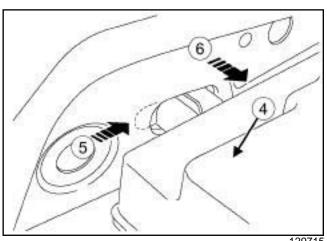
#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



#### Remove:

- the expansion bottle nut (1),
- the clip (2) from the expansion bottle hose using the tool (Mot. 1448).
- □ Disconnect the expansion bottle hose (3).

#### **III - OPERATION FOR REMOVAL OF PART CONCERNED**



☐ Remove the expansion bottle (4) in the direction of (6) pushing it in the direction of (5).

**Expansion bottle: Removal - Refitting** 

19A

2TR

### **REFITTING**

	REFITTING OPERATION FOR PART NCERNED
☐ Refit the expansion bottle.	
☐ Connect the hose onto the expansion bottle.	
□ F	Refit:
-	the clip on the expansion bottle hose using the tool (Mot. 1448),
-	the expansion bottle nut.
	Forque tighten the expansion bottle nut4 (N.m).
II -	FINAL OPERATION.
□ F	Fill the expansion bottle to the « MAXIMUM » level.
<b></b>	Check that there are no leaks.

# **Expansion bottle: Removal - Refitting**

19A

M9R

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

#### 

expansion bottle bolts

4 N.m

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

#### **WARNING**

The coolant helps to keep the engine running properly (heat exchange).

The system does not operate using pure water.

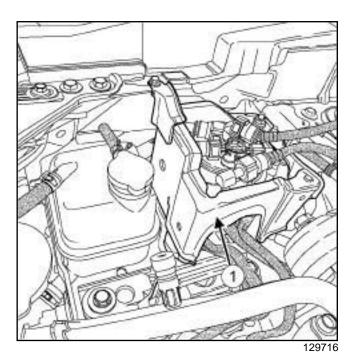
#### **WARNING**

Before the operation, protect the electrical accessories to prevent any risk of short circuiting and protect the belts to avoid damaging them.

#### REMOVAL

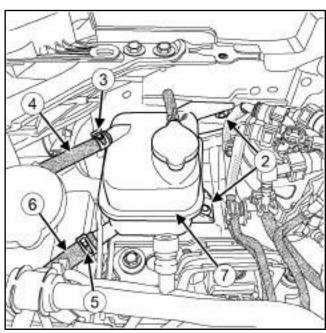
#### I - REMOVAL PREPARATION OPERATION

☐ Drain the expansion bottle.



☐ Remove the fuel filter (see 13A, Fuel supply, Fuel filter: Removal - Refitting, page 13A-3) guard (1).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129717

#### □ Remove:

- the expansion bottle bolts (2),
- the clip (3) from the expansion bottle hose using the tool (Mot. 1448).
- □ Disconnect the expansion bottle hose (4).

# **Expansion bottle: Removal - Refitting**

19A

M9R	
□ Remove the clip (5) from the expansion bottle ho using the tool (Mot. 1448).	se
☐ Disconnect the expansion bottle hose (6).	
☐ Remove the expansion bottle (7).	
REFITTING	
I - REFITTING OPERATION FOR PART CONCERNED	
☐ Refit the expansion bottle.	
☐ Connect the expansion bottle hoses.	
□ Refit:	
<ul> <li>the expansion bottle hose clips using the tool (Mo 1448),</li> </ul>	ot.
-the expansion bottle bolts.	
☐ Torque tighten the expansion bottle bolts (4 N.n	n).
II - FINAL OPERATION.	
□ Refit the fuel filter guard (see 13A, Fuel supp Fuel filter: Removal - Refitting, page 13A-3).	ly,
Note:	
The coolant level rises approximately <b>15 mn</b> when the engine stops.	n
Fill the expansion bottle approximately <b>15 mm</b> blow the « MAXIMUM » level of engine coolant.	)e-

☐ Check that there are no leaks.

# **Electric water pump: Removal - Refitting**



M9R

#### **Essential special tooling**

Mot. 1448 Long nose pliers for hose clips.

#### 

electric coolant pump

85 N.m

bracket bolt

#### **IMPORTANT**

To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot.

Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

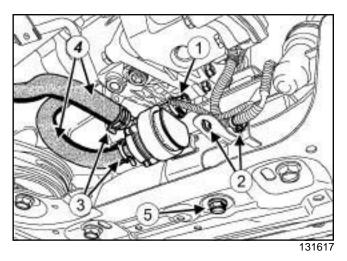
Do not open the bleed screw(s) with the engine running.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Remove the engine undertray.

# II - OPERATION FOR REMOVAL OF PART CONCERNED

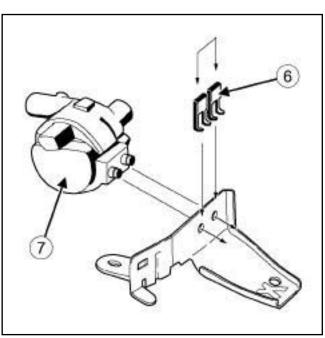


- □ Disconnect the electric coolant pump (1) connector.
- ☐ Unclip the wiring clips (2).
- ☐ Tighten the clips (3) using the tool (Mot. 1448).

#### Note:

Watch out for splashes of coolant from the electric coolant pump during this operation.

- ☐ Disconnect the electric coolant pump cooling hoses (4).
- □ Remove the bolt (5) from the bracket of the electric coolant pump.



131618

- □ Remove:
  - the clips (6),

# **Electric water pump: Removal - Refitting**

19A

M9R

- the electric coolant pump (7).

#### **REFITTING**

I - REFITTING OPERATION FOR PART CONCERNED
Refit:

the electric coolant pump,
the clips,
the bolt of the electric coolant pump bracket.

Torque tighten the electric coolant pump bracket bolt (85 N.m).
Connect the electric coolant pump cooling hoses.
Refit the clips on to the hoses using the tool (Mot. 1448).
Clip on the wiring clips.
Connect the electric coolant pump connector.

II - FINAL OPERATION.
Refit the engine undertray.

☐ Connect the battery (see Battery : Removal - Refit-

☐ Fill and bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page

ting) (80A, Battery).

19A-10).

### Coolant temperature sensor: Removal - Refitting

M9R

#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2) . thick, to the alternator rotor.

#### **IMPORTANT**

The circuits are designed to be pressurised, so be careful at high temperatures (risk of serious burns).

Do not remove the cap from the expansion bottle while the engine is hot. Take care when carrying out a repair under the bonnet, as the radiator fan(s) may start to operate without warning.

Do not open the bleed screw(s) with the engine running.

#### WARNING

When carrying out a repair that requires a complete change, it is essential to flush the circuit with clean water, blast compressed air through the circuit to drive out the water, fill and bleed the circuit and then measure the effective protection.

The parameters to be observed are:

- Protection down to -25°C ± 2 for cold and temperate climates,
- Protection down to -40°C ± 2 for very cold climates.

#### WARNING

Prepare for the flow of fluid, and protect the surrounding components.

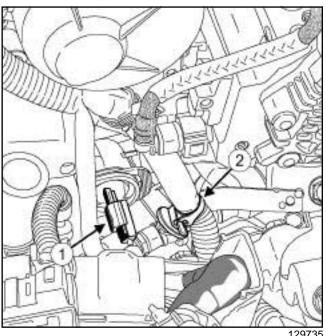
#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

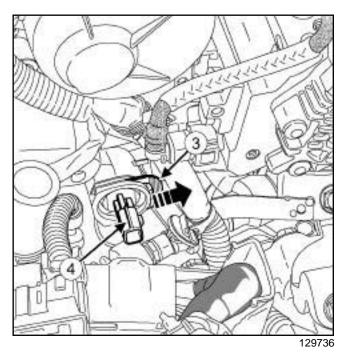
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment.
- □ Remove:
  - -the battery (see Battery: Removal Refitting) (80A, Battery)
  - the engine undertray.

☐ Drain the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10).

#### **II - OPERATION FOR REMOVAL OF PART** CONCERNED



- □ Disconnect the coolant temperature sensor (1).
- ☐ Unclip the wiring at (2).
- Move aside the wiring.



- ☐ Unclip the retaining clip (3) of the coolant temperature sensor in the direction of the arrow.
- ☐ Remove the coolant temperature sensor (4).

# Coolant temperature sensor: Removal - Refitting

19A

M9R

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# I - REFITTING PREPARATION OPERATION ☐ Always replace the coolant temperature sensor seal. **II - REFITTING OPERATION FOR PART CONCERNED** □ Refit: - the new coolant temperature sensor seal, - the coolant temperature sensor into its housing. ☐ Clip on the coolant temperature sensor mounting clip. ■ Attach the wiring. ☐ Connect the coolant temperature sensor connector. **III - FINAL OPERATION.** ☐ Refit the battery (see Battery: Removal - Refitting) (80A, Battery). ☐ Fill the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10) . ☐ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining - Refilling, page 19A-10) ☐ Refit the engine undertray.

# Coolant temperature sensor: Removal - Refitting

19A

2TR

	Tightening torques	
coolant sensor	temperature	25 N.m

#### **IMPORTANT**

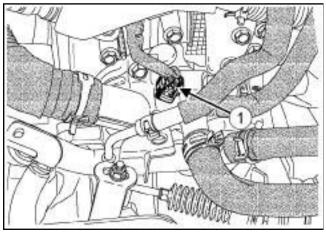
To avoid all risk of damage to the systems, apply the safety and cleanliness instructions and operation recommendations before carrying out any repair (see 19A, Cooling, Engine cooling: Precautions for repair, page 19A-2).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Remove:
  - the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - the engine cover,
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3).

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129734

- □ Disconnect the coolant temperature sensor connector (1).
- ☐ Remove the coolant temperature sensor.

#### **REMOVAL**

#### I - REFITTING PREPARATION OPERATION

☐ Always replace the coolant temperature sensor seal.

# II - REFITTING OPERATION FOR PART CONCERNED

- □ Refit:
  - the new coolant temperature sensor seal,
  - the coolant temperature sensor.
- □ Torque tighten the coolant temperature sensor (25 N.m).
- ☐ Connect the coolant temperature sensor connector.

#### **III - FINAL OPERATION.**

- □ Refit:
  - the air resonator located on the rocker cover (see
     12A, Fuel mixture, Air resonator: Removal Refitting, page 12A-3)
  - the engine cover,
  - the battery (see Battery: Removal Refitting)
     (80A, Battery)
  - the air intake sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).
- ☐ Top up the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).
- ☐ Bleed the cooling system (see 19A, Cooling, Cooling circuit: Draining Refilling, page 19A-10).

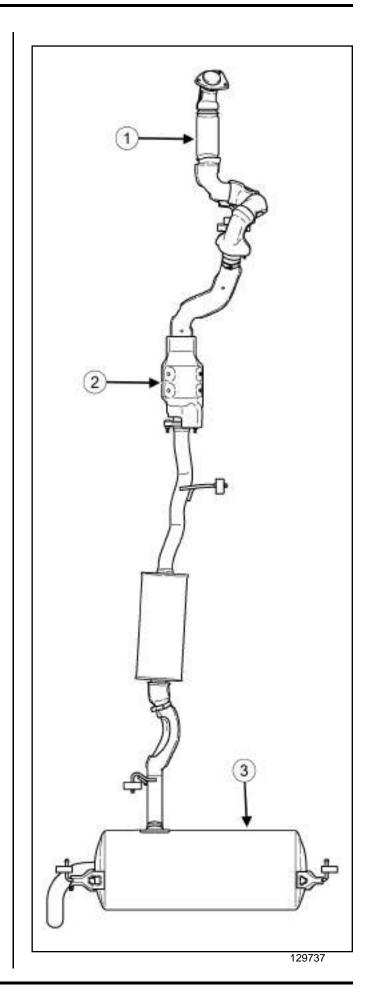
# **Exhaust: Parts and consumables for the repair work**



I

# **Exhaust: Parts and consumables for the repair work**

2TR



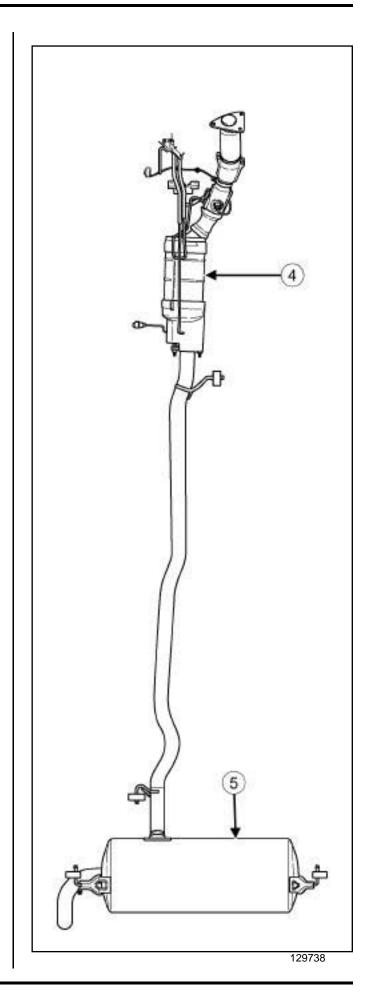
# **Exhaust: Parts and consumables for the repair work**

- (1) Connecting pipe(2) Catalytic converter
- (3) Silencer

Always replace the seals and the sealing rings after any removal.

# **Exhaust: Parts and consumables for the repair work**

M9R



# **Exhaust: Parts and consumables for the repair work**

19B

<b>(4</b> )	Particle filter
-------------	-----------------

(5) Silencer

Always replace the seals after any removal.

# **EXHAUST Exhaust: Precautions for repair**

#### I - PARTS AND CONSUMABLES FOR THE REPAIR

#### 1 - Parts always to be replaced:

- the seal or sealing ring on the connection between the catalytic converter or catalytic pre-converter and the rest of the exhaust system

#### 2 - Consumables:

(see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products)

- surface cleaner
- abrasive pads

#### **II - ADVICE TO OBSERVE**

#### **IMPORTANT**

Do not park and run the engine in a place where combustible substances and materials such as grass or leaves can come into contact with the hot exhaust system.

#### **IMPORTANT**

Catalytic converters contain ceramic fibres; these are contained within a closed unit, and cannot disperse. Cutting or drilling catalytic converters is prohibited.

- 1 During removal and refitting, the catalytic converter or catalytic pre-converter must not receive any knocks or impacts as this could damage it.
- 2 The whole exhaust pipe is made of stainless steel.
- 3 After working on the bracket between the catalytic converter or catalytic pre-converter and the rest of the exhaust system, ensure that the connection is perfectly sealed.

#### To do this:

- clean the pressure faces of the connection using the ABRASIVE PADS.
- degrease the pressure faces of the connection using **SURFACE CLEANER** and clean cloths.
- always replace the seal or sealing ring on the connection

Check the following and deal with if necessary:

- no underbody contact between the exhaust system and the heat shields,
- all of the heat shields are present and secure.

#### Note:

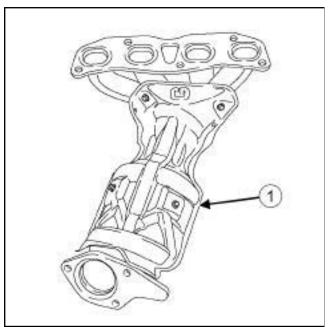
All damaged heat shields must be replaced.

Start the engine.

Check that there are no leaks: deal with any leaks.

# Catalytic pre-converter: Removal - Refitting

2TR



129739

#### Note:

The catalytic pre-converter (1) is integrated into the exhaust manifold.

☐ For removal or replacement of the catalytic pre-converter (see 12A, Fuel mixture, Exhaust manifold: Removal - Refitting, page 12A-36).

# Catalytic converter: Removal - Refitting

19B

M9R

# Essential equipment roller-type stud removal tool

Tightening torq	ues 🗇
studs of the catalytic converter on the turbo-charger	15 N.m
catalytic converter nuts on the turbocharger	21 N.m
catalytic converter brac- ket nuts	21 N.m
catalytic converter mounting bracket bolts on the cylinder block	50 N.m
turbocharger cooling pipe bolts	10 N.m
transfer box bracket bolts on the transfer box	48 N.m
transfer box bracket bolts on the cylinder block	50 N.m
turbocharger cooling pipe bolts	10 N.m
catalytic converter mounting nut	51 N.m
catalytic converter	mounting bolts51 N.m
catalytic converter heat shield bolts	6 N.m
front right-hand wheel driveshaft relay bearing bolts	44 N.m
turbocharger heat shield bolts7	N.m

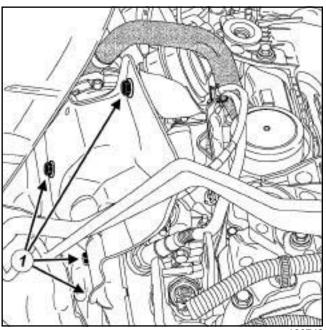
#### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

#### **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- □ Remove:
  - the engine cover,
  - the windscreen wiper arms (see Windscreen wiper arm: Removal Refitting) (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - the windscreen wiper mechanism (see Windscreen wiper mechanism: Removal Refitting)
     (85A, Wiping Washing),
  - the scoop under the scuttle panel grille (see Scoop under scuttle panel grille: Removal - Refitting) (56A, Exterior equipment).



129742

#### □ Remove:

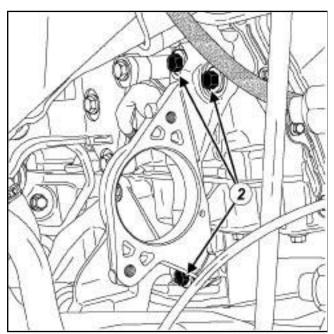
- the bolts (1) from the turbocharger heat shield,
- the turbocharger heat shield,
- the oxygen sensors (see 13B, Diesel injection, Oxygen sensor: Removal - Refitting, page 13B-59),
- the engine undertray,

# Catalytic converter: Removal - Refitting

# 19B

#### M9R

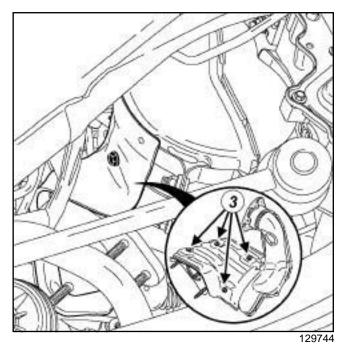
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel driveshaft (see Front right-hand wheel driveshaft: Removal Refitting) (29A, Transmission).



129743

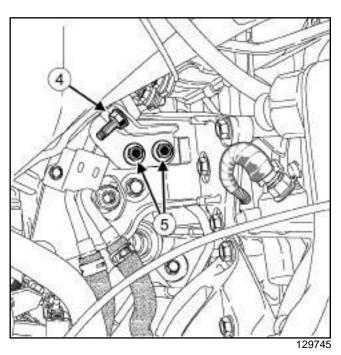
#### □ Remove:

- the bolts (2) from the front right-hand wheel driveshaft relay bearing,
- the front right-hand wheel driveshaft relay bearing,
- the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21).



#### □ Remove:

- the catalytic converter heat shield bolts (3),
- the catalytic converter heat shield.

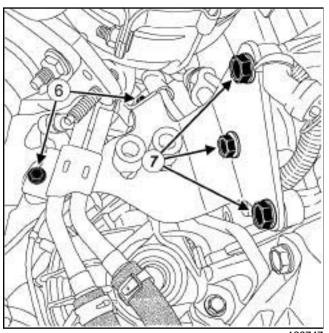


#### ☐ Remove:

- the nut (4) and the bolts (5) of the catalytic converter mounting,
- the catalytic converter mounting.

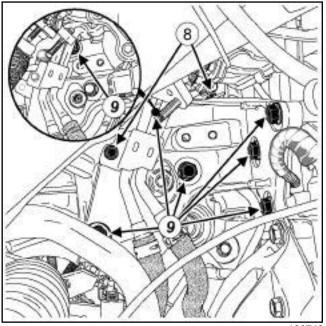
M9R

#### 4X2 TRANSMISSION



- 129747
- ☐ Remove the bolts (6) from the turbocharger cooling pipe.
- ☐ Move aside the turbocharger cooling pipe.
- □ Remove:
  - the catalytic converter mounting bracket bolts (7) from the cylinder block,
  - the catalytic converter mounting bracket bolts.

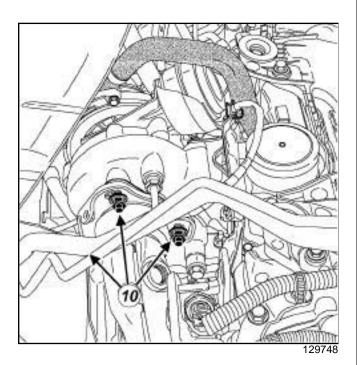
#### 4X4 TRANSMISSION



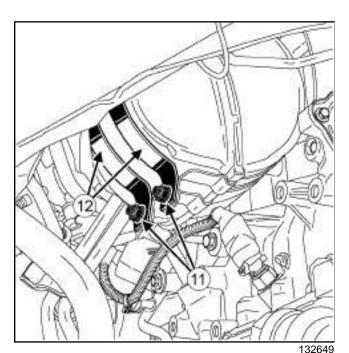
- 129746
- ☐ Remove the bolts (8) from the turbocharger cooling pipe.
- ☐ Move aside the turbocharger cooling pipe.
- ☐ Remove:
  - the bracket bolts (9) of the cylinder block transfer box and the transfer box,
  - the transfer box bracket.

M9R

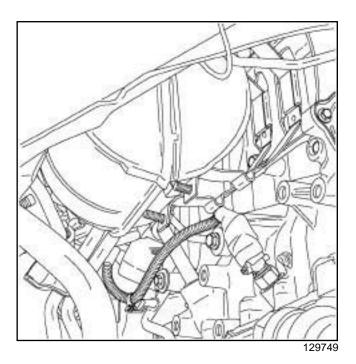
# II - OPERATION FOR REMOVAL OF PART CONCERNED



- □ Loosen the catalytic converter nuts (10).
- ☐ Remove the catalytic converter studs of the turbocharger using a **roller-type stud removal tool**.



- □ Remove:
  - the catalytic converter bracket nuts (11),
  - the catalytic converter half-clips (12) .
- ☐ Move the catalytic converter towards the rear of the vehicle.



#### □ Remove:

- the catalytic converter on the right-hand side of the vehicle,
- the seal between the catalytic converter and the turbocharger.

#### REFITTING

#### I - REFITTING PREPARATION OPERATION

- ☐ Clean and degrease the bearing faces of:
  - on the turbocharger,
  - on the catalytic converter in case of reuse,
  - of the particle filter,
  - of the silencer.
- □ Always replace:
  - the catalytic converter studs,
  - the catalytic converter nuts,
  - the seal between the catalytic converter and the turbocharger,
  - the seal between the catalytic converter and the particle filter,
  - the seal between the particle filter and the silencer,
  - the catalytic converter mounting nut.

# Catalytic converter: Removal - Refitting

19B

M9R

# II - REFITTING OPERATION FOR PART CONCERNED

CONCERNED	4X4 TRANSMISSION
□ Refit:	□ Refit:
- the catalytic converter on the brackets,	
<ul> <li>the new seal between the turbocharger and the ca- talytic converter,</li> </ul>	<ul> <li>- the transfer box bracket,</li> <li>- the transfer box bracket bolts on the cylinder block and the transfer box.</li> </ul>
<ul> <li>- the new catalytic converter studs onto the turbo- charger.</li> </ul>	☐ Torque tighten:
☐ Torque tighten the studs of the catalytic converter on the turbocharger (15 N.m) using a roller-type	<ul> <li>the transfer box bracket bolts on the transfer box (48 N.m).</li> </ul>
<ul><li>stud removal tool.</li><li>Refit the new catalytic converter nuts on the turbo-</li></ul>	<ul> <li>The transfer box bracket bolts on the cylinder block (50 N.m).</li> </ul>
charger.	Refit the turbocharger cooling pipe bolts.
□ Torque tighten the catalytic converter nuts on the turbocharger (21 N.m).	☐ Torque tighten the turbocharger cooling pipe bolts (10 N.m).
□ Refit:	,
<ul> <li>the catalytic converter half-clamps on the catalytic converter,</li> </ul>	
- the catalytic converter bracket nuts.	☐ Refit:
☐ Torque tighten the catalytic converter bracket	- the catalytic converter mounting,
nuts (21 N.m).	- the new catalytic converter mounting nut,
	<ul> <li>the bolts of the catalytic converter mounting.</li> </ul>
4X2 TRANSMISSION	☐ Torque tighten:
□ Refit:	- the catalytic converter mounting nut (51 N.m),
- the catalytic converter mounting bracket,	- the catalytic converter (mounting bolts51 N.m).
<ul> <li>the catalytic converter mounting bracket bolts on the cylinder blocks.</li> </ul>	☐ Refit:
☐ Torque tighten the catalytic converter mounting	- the catalytic converter heat shield,
bracket bolts on the cylinder block (50 N.m).	- the catalytic converter heat shield bolts.
☐ Refit the turbocharger cooling pipe bolts.	☐ Torque tighten the catalytic converter heat shield
☐ Torque tighten the turbocharger cooling pipe	bolts (6 N.m).
bolts (10 N.m).	☐ Refit:
	<ul> <li>the seal between the catalytic converter and the particle filter,</li> </ul>
	<ul> <li>the particle filter (see 19B, Exhaust, Particle filter: Removal - Refitting, page 19B-21)</li> </ul>
	- the front right-hand wheel driveshaft relay bearing,
	<ul> <li>the front right-hand wheel driveshaft relay bearing bolts.</li> </ul>
	☐ Torque tighten the front right-hand wheel drives-

☐ Refit:

haft relay bearing bolts (44 N.m).

(29A, Transmission).

the front right-hand wheel driveshaft (see Front right-hand wheel driveshaft: Removal - Refitting)

# Catalytic converter: Removal - Refitting

19B

### M9R

- -the front right-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
- the engine undertray,
- -the oxygen sensors (see 13B, Diesel injection, Oxygen sensor: Removal - Refitting, page 13B-59),
- the turbocharger heat shield,
- the turbocharger heat shield bolts.
- □ Torque tighten the turbocharger heat shield bolts7 (N.m).
- □ Refit:
  - the scoop under the scuttle panel grille (see **Scoop** under scuttle panel grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper mechanism (see **Windscreen wiper mechanism: Removal Refitting**) (85A, Wiping Washing),
  - the scuttle half-grille (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
  - -the windscreen wiper arms (see **Windscreen wiper arm: Removal Refitting**) (85A, Wiping Washing),
  - -the engine cover.
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

## Catalytic converter: Removal - Refitting

19B

2TR

-	
Tightening torques ♡	
catalytic converter brac- ket nuts on the connec- tor pipe	45 N.m
silencer bracket nuts on the catalytic converter	45 N.m

### **IMPORTANT**

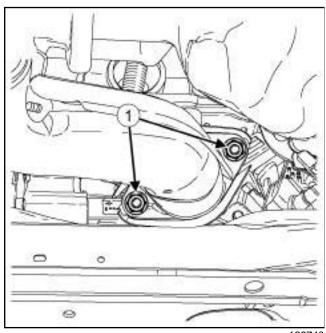
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

### REMOVAL

# I - OPERATION FOR REMOVAL OF PART CONCERNED

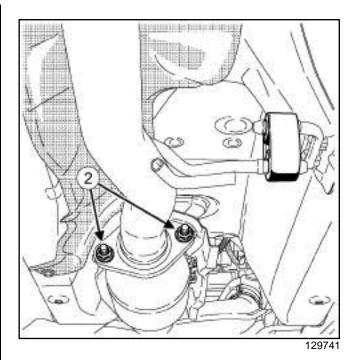
- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the engine undertray.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129740

☐ Remove the catalytic converter bracket nuts (1) on the connector pipe.



### □ Remove:

- the silencer bracket nuts (2) on the catalytic converter.
- the catalytic converter,
- the seal between the connector pipe and the catalytic converter,
- the seal between the catalytic converter and the silencer.

### REFITTING

### I - REFITTING PREPARATION OPERATION

□ Always replace the seals.

# II - REFITTING OPERATION FOR PART CONCERNED

### □ Refit:

- the catalytic converter on the connector pipe with a new seal,
- the catalytic converter bracket nuts on the connector pipe.
- the catalytic converter on the silencer with a new seal,
- the silencer bracket nuts on the catalytic converter.

### ☐ Torque tighten:

 the catalytic converter bracket nuts on the connector pipe (45 N.m),

# **EXHAUST**Catalytic converter: Removal - Refitting

19B

### 2TR

-the silencer bracket nuts on the catalytic converter (45 N.m).

### **III - FINAL OPERATION.**

☐ Refit the engine undertray.

# Connector pipe: Removal - Refitting

2TR

Tightening torques ♡	)
connector pipe bracket nuts on the catalytic pre-converter	65 N.m
catalytic converter brac- ket nuts on the connec- tor pipe	45 N.m
connector pipe rubber mounting bush support nuts	14 N.m

### **IMPORTANT**

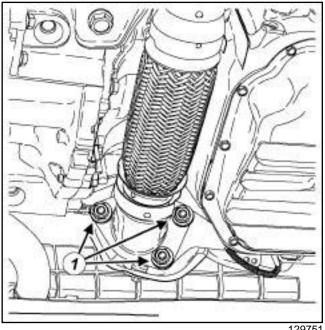
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

### **REMOVAL**

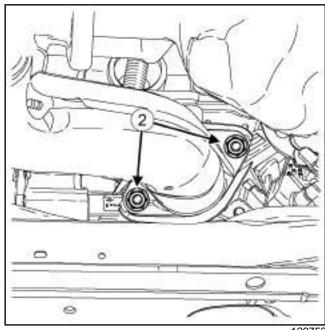
### I - OPERATION FOR REMOVAL OF PART **CONCERNED**

- ☐ Position the vehicle on a two-post lift (see Vehicle: Towing and lifting) (02A, Lifting equipment).
- ☐ Remove the engine undertray.

### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



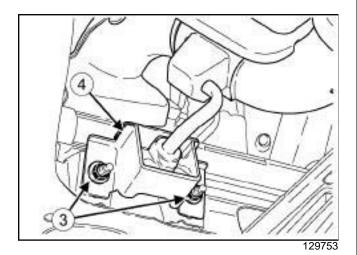
☐ Remove the connector pipe nuts (1) on the catalytic pre-converter.



☐ Remove the catalytic converter bracket nuts (2) on the connector pipe.

### **Connector pipe: Removal - Refitting**

2TR



Remove:

- -the connector pipe rubber mounting bush support nuts  $(\mathbf{3})$  ,
- the connector pipe,
- the connector pipe rubber mounting bush support (4),
- the seal between the catalytic converter and the connector pipe,
- the seal between the connector pipe and the catalytic converter.

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

- Always replace:
  - the seal between the catalytic converter and the connector pipe,
  - the seal between the connector pipe and the catalytic converter.

# II - REFITTING OPERATION FOR PART CONCERNED

### □ Refit:

- the connector pipe rubber mounting bush support on to the connector pipe,
- the connector pipe on to the catalytic pre-converter with a new seal,
- -the connector pipe bracket nuts on the catalytic pre-converter,
- the connector pipe on to the catalytic converter with a new seal,
- the catalytic converter bracket nuts on the connector pipe,

- the connector pipe rubber mounting bush support nuts.
- ☐ Torque tighten:
  - the connector pipe bracket nuts on the catalytic pre-converter (65 N.m),
  - the catalytic converter bracket nuts on the connector pipe (45 N.m),
  - The connector pipe rubber mounting bush support nuts (14 N.m).

### **III - FINAL OPERATION.**

☐ Refit the engine undertray.

# **EXHAUST** Silencer: Removal - Refitting

Essential special tooling		
Mot. 1857	Pliers for removing exhaust pipe rubber mounting bushes	

-		
	Tightening torques ♡	
	silencer bracket nuts on the catalytic converter	45 N.m
	silencer bracket nuts on the particle filter	45 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

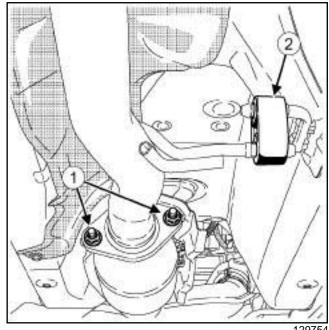
### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

### **II - OPERATION FOR REMOVAL OF PART** CONCERNED

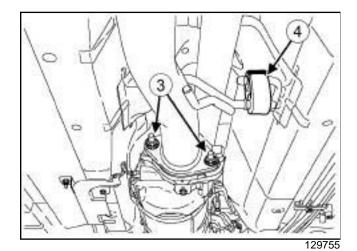
### 2TR



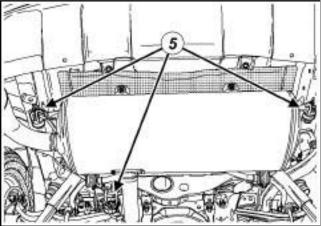
- ☐ Remove the silencer bracket nuts (1) on the catalytic converter.
- □ Separate the silencer rubber mounting bush (2) using the tool (Mot. 1857).

# Silencer: Removal - Refitting

### M9R



- ☐ Remove the silencer bracket nuts (3) on the particle filter.
- □ Separate the silencer from the rubber mounting bush (4) using the tool (Mot. 1857).



129756

Note:

This operation requires two people.

- □ Separate the silencer from the rear rubber mounting bush (5) using the tool (Mot. 1857).
- □ Remove:
  - the silencer,
  - the seal between the silencer and the catalytic converter,
  - the seal between the silencer and the particle filter.

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

☐ Always replace the seals.

# II - REFITTING OPERATION FOR PART CONCERNED

☐ Refit the silencer on the rubber mounting bushes.

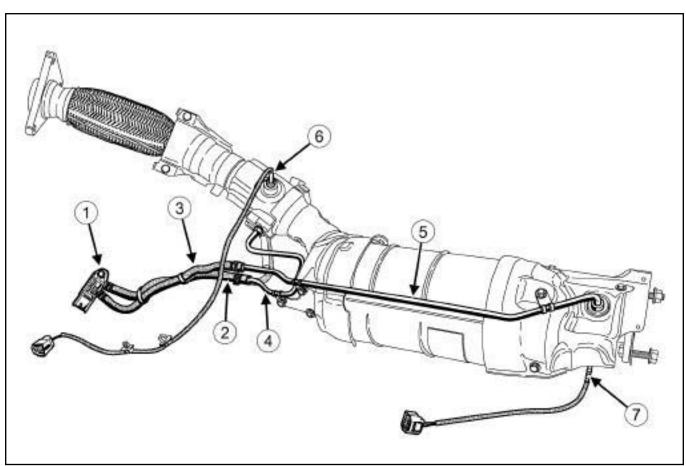
### 2TR

- ☐ Refit:
  - the silencer on the catalytic converter with a new seal,
  - the silencer bracket nuts on the catalytic converter.
- ☐ Torque tighten the silencer bracket nuts on the catalytic converter (45 N.m).

### M9R

- ☐ Refit:
  - the silencer to the particle filter with a new seal,
  - the silencer bracket nuts on the particle filter.
- ☐ Torque tighten the silencer bracket nuts on the particle filter (45 N.m).

M9R



	1	29	7	5	7
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(1)	Particle filter pressure sensor
(2)	Upstream pressure measurement hose
(3)	Downstream pressure measurement hose
(4)	Upstream pressure measurement connection
(5)	Downstream pressure measurement connection
(6)	Temperature sensor upstream of the particle filter
(7)	Temperature sensor downstream of the particle filter

## Particle filter: Removal - Refitting

M9R

# **Essential equipment** diagnostic tool

Tightening torques ▽	
upstream/downstream pressure measurement pipe unions	33 N.m
upstream/downstream pressure measurement pipe bolts	6 N.m
temperature sensor mounting bolt	4 N.m
particle filter bracket nuts on the catalytic converter	65 N.m
silencer bracket nuts on the particle filter	45 N.m
rubber mounting bush nuts on the particle filter	14 N.m

### **IMPORTANT**

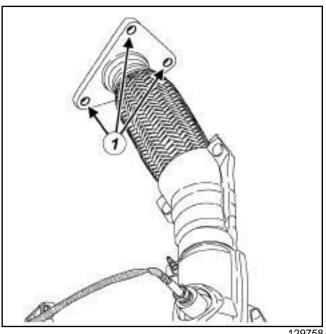
Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

### **REMOVAL**

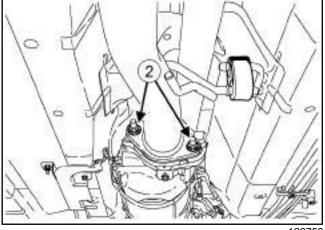
### I - OPERATION FOR REMOVAL OF PART **CONCERNED**

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).

### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



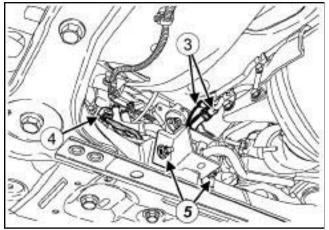
☐ Remove the nuts (1) from particle filter bracket on the catalytic converter.



□ Remove the nuts (2) from the silencer bracket on the particle filter assembly.

### Particle filter: Removal - Refitting

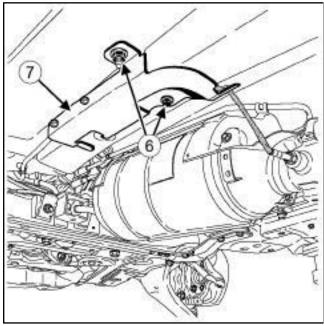
M9R



129760

### □ Disconnect:

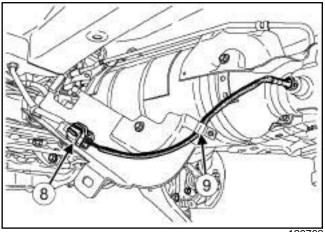
- the particle filter pressure measurement hoses (3),
- the particle filter upstream temperature sensor connector  $(\mathbf{4})$  .
- ☐ Unclip the wiring from the upstream temperature sensor.
- ☐ Remove the rubber mounting bush support nuts (5) from the particle filter.



129761

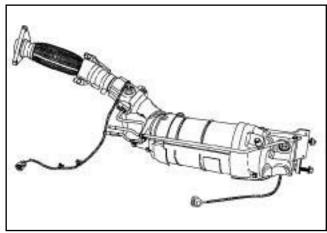
### ☐ Remove:

- the bolt and the nut (6) from the downstream temperature sensor support,
- the downstream temperature sensor support (7) .



129762

- □ Disconnect the particle filter downstream temperature sensor connector (8).
- ☐ Unclip the downstream temperature sensor wiring at (9).



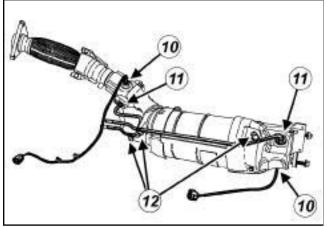
129763

### □ Remove:

- the « particle filter flexible connection pipe upstream/downstream pressure measurement pipes upstream/downstream temperature sensors » assembly,
- the seal between the catalytic converter and the particle filter,
- the seal between the particle filter and the silencer,
- the rubber mounting bush support from the particle filter support.

### Particle filter: Removal - Refitting

M9R



129764

### □ Remove:

- the upstream and downstream temperature sensors (10) from their adapters,
- the upstream and downstream pressure measurement pipes (11),
- the bolts of the upstream and downstream pressure measurement pipes (12).

### REFITTING

### I - REFITTING PREPARATION OPERATION

- ☐ Always replace the seals.
- ☐ Using abrasive pads (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables
  - Products), clean the mating faces:
  - of the catalytic converter and the particle filter,
  - of the particle filer and the silencer.
- □ Degrease the mating faces using surface cleaner (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products) and clean cloths.

### **WARNING**

To prevent the surrounding components from overheating, do not damage (tear, pierce bend etc.) a heat shield.

All damaged heat shields must be replaced.

# II - REFITTING OPERATION FOR PART CONCERNED

- With particle filter removed, refit:
  - the upstream/downstream temperature sensors of the particle filter assembly (see 19B, Exhaust, Particle filter temperature sensors: Removal -Refitting, page 19B-29),
  - the upstream/downstream pressure measurement pipes onto their adapters.
- ☐ Torque tighten:
  - the upstream/downstream pressure measurement pipe unions (33 N.m),
  - The upstream/downstream pressure measurement pipe bolts (6 N.m).

### □ Refit:

- the rubber mounting bush support of the particle filter support,
- the « particle filter flexible connection pipe upstream/downstream pressure measurement pipes upstream/downstream temperature sensors » assembly with new seals.
- ☐ Connect the downstream temperature sensor connector.
- ☐ Clip on the downstream temperature sensor wiring at (9).
- ☐ Refit the downstream temperature sensor mounting.
- ☐ Torque tighten the **temperature sensor mounting bolt (4 N.m)**.
- □ Clip on the wiring of the upstream temperature sensor.
- ☐ Connect the particle filter pressure measurement hoses.
- □ Refit:
  - the particle filter bracket nuts on the catalytic converter,
  - the silencer bracket nuts on the particle filter.
- ☐ Torque tighten:
  - the particle filter bracket nuts on the catalytic converter (65 N.m),
  - the silencer bracket nuts on the particle filter (45 N.m),
  - the rubber mounting bush nuts on the particle filter (14 N.m).
- Make sure that there is no contact with the underbody.

Particle filter: Removal - Refitting

19B

M9R

### **III - FINAL OPERATION.**

- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).
- □ Reinitialise the particle filter parameters using the diagnostic tool (see Fault finding Replacement of components) (13B, Diesel injection).

# Particle filter: Cleaning

19B

M9R

### **Essential equipment**

kit for particle filter

kit for twin exhaust

diagnostic tool

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).

### Note:

A forced regeneration is only possible after the « SERVICE » warning light comes on with the message « Regenerate particle filter » or the orange warning light « Check emission control » comes on (see **Driver's Handbook of the vehicle concerned**).

# I - INSTRUCTIONS FOR CARRYING OUT A FORCED REGENERATION OF THE PARTICLE FILTER

# Precautions to be taken for particle filter forced regeneration

☐ There are currently two additional kits for extracting exhaust gases in the workshop (see Garage equipment catalogue 2005), both of which are approved for the high temperatures produced during particle filter forced regeneration.

The two kits approved for particle filter regeneration are:

- the **kit for particle filter** for use with vehicles fitted with a single exit silencer,
- the **kit for twin exhaust** for use with vehicles equipped with a twin exhaust pipe on the silencer.

### **IMPORTANT**

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

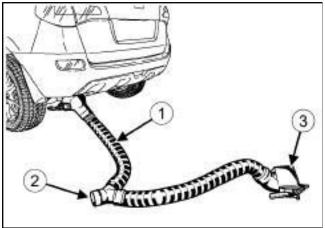
Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

## Particle filter: Cleaning

M9R

### Twin exhaust pipe kit special features



129765

### Note:

When using a kit for a twin exhaust pipe (1) on a single exhaust pipe, be sure to:

- place an exhaust gas extractor over the openings (2) and (3) if the forced regeneration is carried out in the workshop,
- that the openings (2) and (3), are positioned to direct the hot exhaust gases away from another vehicle or person, if the operation is carried out outside the workshop.

# II - PARTICLE FILTER FORCED REGENERATION PROCEDURE USING THE DIAGNOSTIC TOOL

Connect the diagnostic tool to the vehicle.

### **IMPORTANT**

During forced regeneration of the particle filter, the temperature of the exhaust pipe rises significantly.

Always use one of the two kits approved for the high temperatures reached during forced regeneration, whether the operation is carried out in the workshop using an exhaust gas extractor, or outside the workshop.

Ensure that when in use, the kit is not touching the rear bumper when carrying out forced regeneration of the particle filter.

### Note:

To prevent engine racing, check the engine oil level using the dipstick before running the forced regeneration command.

The engine oil level must be between the « MIN » and « MAX » marks on the dipstick.

### Note:

If required, the forced regeneration procedure may be stopped by pressing the engine Start button twice in succession.

### Note:

Strong odours and thick smoke are to be expected during forced regeneration of the particle filter.

- ☐ For the particle filter forced regeneration procedure (see Fault finding Interpretation of commands) (13B, Diesel injection).
- ☐ When forced regeneration of the particle filter has finished, and using the **diagnostic tool**:
  - deal with the present faults,
  - clear the stored faults.
- □ Drain the engine oil (see 10A, Engine and cylinder block assembly, Engine oil: Draining Refilling, page 10A-17).
- □ Replace the oil filter (see 10A, Engine and cylinder block assembly, Oil filter: Removal - Refitting, page 10A-21).

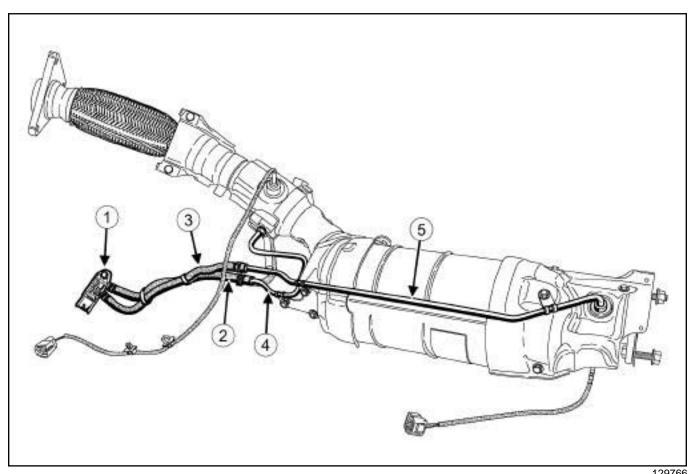
# Particle filter pressure sensor: Removal - Refitting

M9R

Tightening torques ♡	
particle filter pressure sensor bolt	10 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).



129766

(1)	Particle filter pressure sensor
(2)	Upstream pressure measurement hose
(3)	Downstream pressure measurement hose
(4)	Upstream pressure measurement connection
(5)	Downstream pressure measurement connection

- ☐ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- ☐ Remove the particle filter (see 19B, Exhaust, Particle filter: Removal - Refitting, page 19B-21) .

### **REMOVAL**

### I - REMOVAL PREPARATION OPERATION

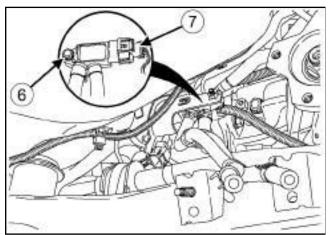
☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).

# Particle filter pressure sensor: Removal - Refitting

19B

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



- 129767
- ☐ Remove the particle filter pressure sensor bolt (6).
- □ Disconnect the particle filter pressure sensor connector (7).
- ☐ Remove the particle filter pressure sensor.

### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit the particle filter pressure sensor.
- ☐ Connect the particle filter pressure sensor connector.
- ☐ Torque tighten the particle filter pressure sensor bolt (10 N.m).

### **II - FINAL OPERATION.**

- □ Refit the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21).
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

## Particle filter temperature sensors: Removal - Refitting



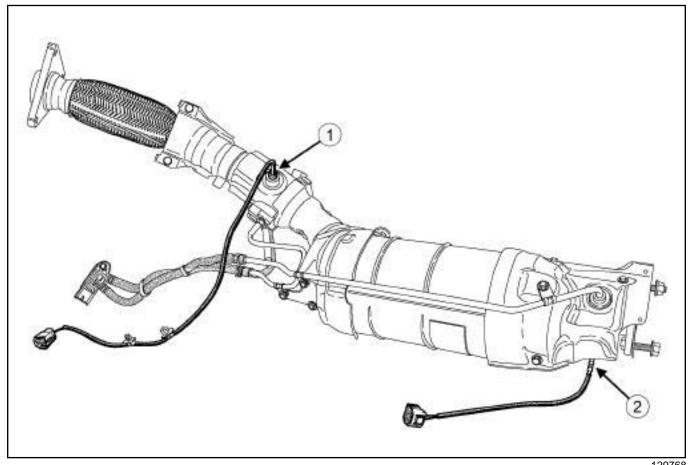
M9R

Essential equipment
diagnostic tool

Tightening torques	
particle filter upstream temperature sensor union	30 N.m
particle filter downs- tream temperature sen- sor union	30 N.m
downstream tempera- ture sensor mounting bolt	4 N.m
downstream tempera- ture sensor insulation bolts	6 N.m

### **IMPORTANT**

Consult the safety and cleanliness advice and operation recommendations before carrying out any repair (see 19B, Exhaust, Exhaust: Precautions for repair, page 19B-6).



129768

## Particle filter temperature sensors: Removal - Refitting

### M9R

(1)	Temperature s	Temperature sensor upstream of		
	the particle filter			
<b>(2</b> )	Temperature	sensor	downs-	

tream of the particle filter

## REFITTING

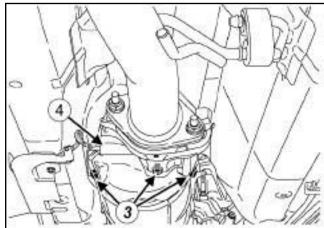
**REMOVAL** 

# I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).

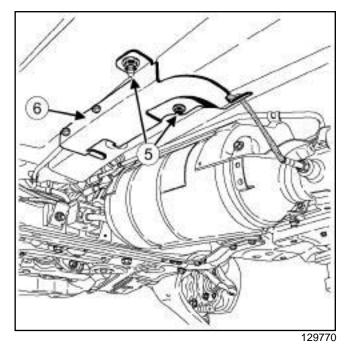
# II - OPERATION FOR REMOVAL OF PART CONCERNED

### 1 - Downstream temperature sensor

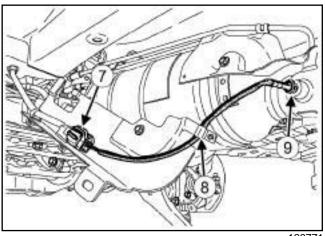


129769

- □ Remove:
  - -the downstream temperature sensor insulation bolts (3) ,
  - the downstream temperature sensor insulation (4).



- ☐ Remove the bolt and the nut (5) of the downstream temperature sensor mounting.
- ☐ Unclip the downstream temperature sensor mounting (6).



- 129771
- □ Disconnect the particle filter downstream temperature sensor connector (7).
- ☐ Unclip the wiring at (8).
- ☐ Remove the particle filter downstream temperature sensor union (9) from its adapter welded to the particle filter.

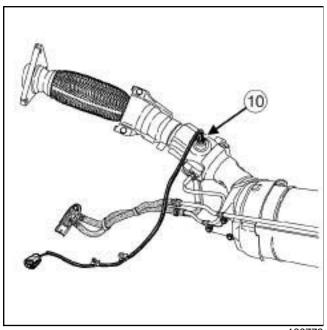
### 2 - Upstream temperature sensor.

□ Remove the particle filter (see 19B, Exhaust, Particle filter: Removal - Refitting, page 19B-21).

### Particle filter temperature sensors: Removal - Refitting

19B

M9R



129772

☐ Remove the particle filter upstream temperature sensor union (10) from its adapter welded to the particle filter.

### REFITTING

### I - REFITTING PREPARATION OPERATION

□ Check the condition of the temperature sensor wiring.

### Note:

If necessary, replace the particle filter temperature sensor wiring.

□ Coat the particle filter downstream temperature sensor bolt union with COPPER-ALUMINIUM LUBRI-CANT (see Vehicle: Parts and ingredients for the repairwork) (04B, Consumables - Products).

# II - REFITTING OPERATION FOR PART CONCERNED

### 1 - Upstream temperature sensor.

- ☐ Refit the upstream temperature sensor to its adapter.
- ☐ Torque tighten the particle filter upstream temperature sensor union (30 N.m).
- □ Refit the particle filter (see 19B, Exhaust, Particle filter: Removal Refitting, page 19B-21).

### 2 - Downstream temperature sensor

- ☐ Refit the downstream temperature sensor to its adapter.
- ☐ Torque tighten the particle filter downstream temperature sensor union (30 N.m).
- ☐ Connect the downstream temperature sensor connector.
- ☐ Clip on the downstream temperature sensor wiring at (8)
- ☐ Refit the downstream temperature sensor mounting.
- ☐ Torque tighten the downstream temperature sensor mounting bolt (4 N.m).
- ☐ Refit the downstream temperature sensor insulator.
- ☐ Torque tighten the downstream temperature sensor insulation bolts (6 N.m).

### **III - FINAL OPERATION.**

- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Check that there are no faults using the **diagnostic** tool.

### **Essential equipment**

### pneumatic transfer pump for fuels

### **IMPORTANT**

During this operation, be sure to:

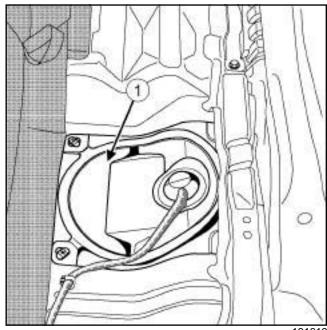
- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **IMPORTANT**

Wear leaktight gloves (Nitrile type) for this operation.

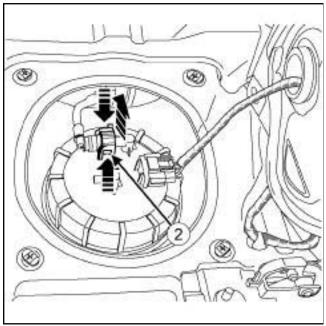
### I - OIL SERVICE

- □ Disconnect the battery (see Battery: Removal Refitting) (80A, Battery).
- ☐ Lift up:
  - -the rear bench seat base (see **Complete rear seat: Removal Refitting**) (76A, Rear seat frames and runners),
  - partially, the floor carpet under the rear bench seat base (see **Floor carpet: Removal - Refitting**) (71A, Body internal trim).



131619

☐ Partially remove the blanking cover (1) from the inspection flap.



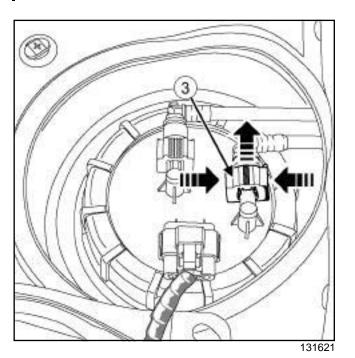
131620

Note:

Make preparations for fuel outflow from the supply and return pipes.

☐ Disconnect the quick-release union (2) from the fuel supply pipe.

M9R

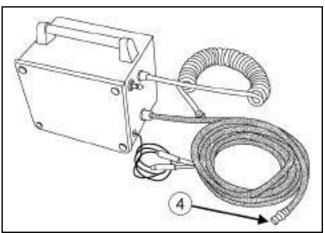


Note:

Make preparations for fuel outflow from the supply and return pipes.

☐ Disconnect the quick-release union (3) from the fuel supply pipe.

☐ Fit blanking plugs on the unions using the blanking plug kit (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).



131622

☐ Connect the **pneumatic transfer pump for fuels**(4) to the fuel supply pipe quick-release union.

# TANK Fuel tank: Draining

	Place the discharge pipe of the <b>pneumatic transfer pump for fuels</b> in a container.
	Activate the pneumatic pump.
	Let the fuel flow out until it the flow is intermittent.
II ·	- REFITTING
	Remove:
	- the pneumatic transfer pump for fuels,
	- the blanking plugs.
	Connect the fuel supply quick-release union to the fuel sender.
	Refit the blanking cover on the inspection flap.
	Fit:
	-the floor carpet under the rear bench seat base (see <b>Floor carpet: Removal - Refitting</b> ) (71A, Body internal trim),
	-the rear bench seat base (see <b>Complete rear seat: Removal - Refitting</b> ) (76A, Rear seat frames and runners).
	Connect the battery (see Battery : Removal - Refit-

ting) (80A, Battery).

# TANK Fuel tank: Removal - Refitting

19C

M9R

# Essential equipment component jack

Tightening torques ♡		
fuel tank retaining strap bolts	31 N.m	
rear axle bolts	63 N.m	
rear axle nut	78 N.m	
rear final drive sub- frame strut bolts	53 N.m	
breather pipe bolt	9 N.m	
fuel filler neck bolts	9 N.m	
silencer bracket bolts on the particle filter	45 N.m	

### **IMPORTANT**

Wear goggles with side protectors for this operation.

### **IMPORTANT**

Wear protective gloves during the operation.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

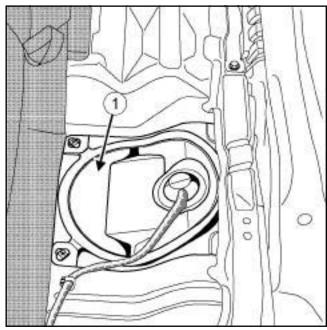
### **WARNING**

Keep the pipe unions away from contaminated areas.

### **REMOVAL**

# I - OPERATION FOR REMOVAL OF PART CONCERNED

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: **Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Lift up:
  - the rear bench seat base (see Complete rear seat: Removal - Refitting) (76A, Rear seat frames and runners),
  - partially, the floor carpet under the rear bench seat base (see Floor carpet: Removal) (71A, Body internal trim).
- □ Drain the fuel tank (see 19C, Tank, Fuel tank: Draining, page 19C-1).

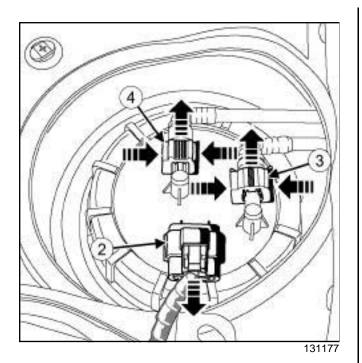


131176

☐ Remove the inspection flap blanking cover (1).

# Fuel tank: Removal - Refitting

M9R



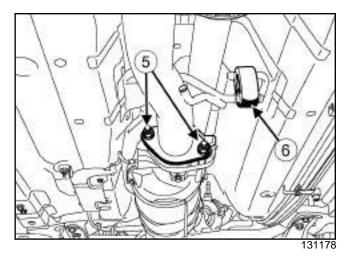
### □ Disconnect:

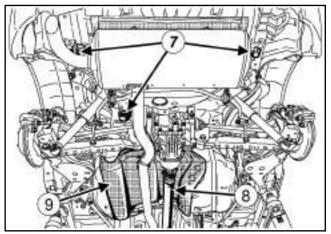
- the fuel sender connector (2),
- the quick-release union (3) from the fuel supply pipe,
- the quick-release union (4) from the fuel return pipe.

### Note:

Make preparations for fuel outflow from the supply and return pipes.

☐ Fit blanking plugs on the unions (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).





131179

### □ Remove:

- the silencer bracket bolts (5) on the particle filter,
- the silencer from the rubber mounting bushes (6) and (7).

### 4X4 TRANSMISSION

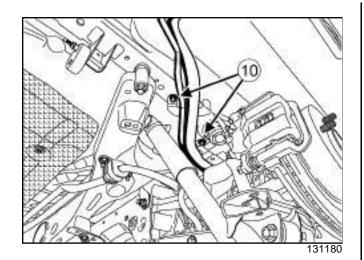
☐ Remove the longitudinal driveshaft (8) (see Propshaft: Removal - Refitting) (29A, Driveshafts).

### □ Remove:

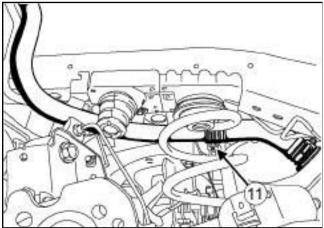
- the fuel tank heat shield (9),
- the rear right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal Refitting**) (55A, Exterior protection).

# **TANK** Fuel tank: Removal - Refitting

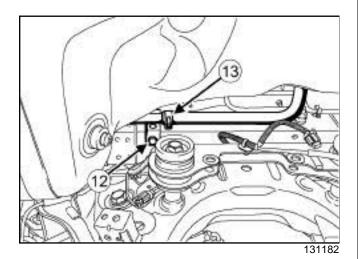
M9R



□ Remove the fuel filler neck bolts (10) .

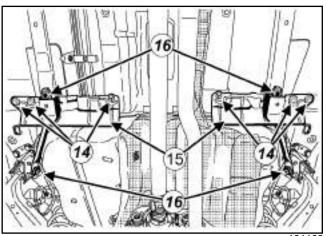


- ☐ Remove the fuel filler neck bracket (11) .
- ☐ Disconnect the filler neck from the fuel tank.



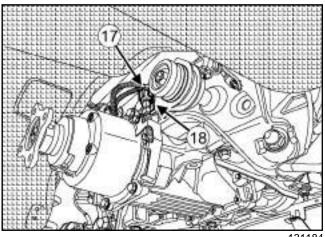
- □ Remove:
  - the breather pipe bolt (12),
  - the breather pipe bracket (13) .

☐ Disconnect the breather pipe.



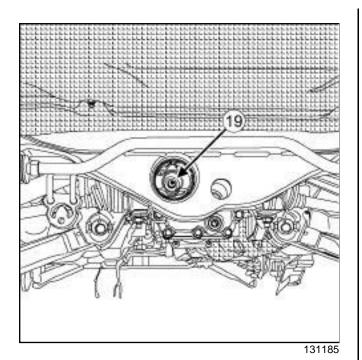
- □ Remove:
  - the clips (14),
  - the covers (15),
  - the rear final drive subframe strut bolts (16),
  - the rear final drive subframe struts,
  - the parking brake cable (see Parking brake cables: Removal - Refitting) (37A, Mechanical component controls).

### **4X4 TRANSMISSION**

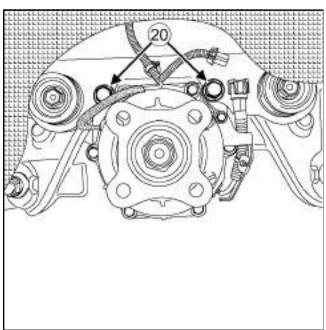


- □ Disconnect the connector (17) from the electric cou-
- ☐ Unclip the wiring clip (18).

M9R



☐ Loosen the rear final drive nut (19).



130046

☐ Remove the rear final drive bolts (20).

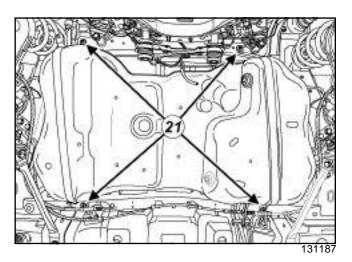
Note:

Do not remove the rear final drive from the vehicle.

☐ Tilt the rear final drive downwards.

# II - OPERATION FOR REMOVAL OF PART CONCERNED

☐ Place a **component jack** beneath the fuel tank.



- ☐ Remove:
  - the fuel tank retaining strap bolts (21),
  - the fuel tank retaining straps,
  - the fuel tank.

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the clips,
  - the fuel filler neck bracket,
  - the breather pipe bracket.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the fuel tank,
  - the fuel tank retaining straps,
  - the fuel tank retaining strap bolts.
- ☐ Torque tighten the fuel tank retaining strap bolts (31 N.m)
- ☐ Remove the **component jack**.

# TANK

# Fuel tank: Removal - Refitting

19C

M9R

### **III - FINAL OPERATION**

4X4 TRANSMISSION
☐ Refit the rear axle in its original position.
☐ Torque tighten:
-the rear axle bolts (63 N.m),
-the rear axle nut (78 N.m).
☐ Clip on the wiring clip.
☐ Connect the electric coupler connector.
☐ Refit:
<ul> <li>the parking brake cable (see Parking brake ca- bles: Removal - Refitting) (37A, Mechanical com- ponent controls).</li> </ul>
- the rear final drive subframe struts,
- the rear final drive subframe strut bolts,
-the covers <i>(15)</i> ,
-the new clips (14).
☐ Torque tighten the rear final drive subframe strut bolts (53 N.m).
☐ Connect the breather pipe.
☐ Refit:
- the new breather pipe bracket,
- the breather pipe bolt.
☐ Torque tighten the <b>breather pipe bolt (9 N.m)</b> .
☐ Connect the fuel filler neck onto the fuel tank.
□ Refit:
<ul><li>□ Refit:</li><li>- the new fuel filler neck bracket,</li></ul>
- the new fuel filler neck bracket,
- the new fuel filler neck bracket, - the fuel filler neck bolts.
<ul> <li>- the new fuel filler neck bracket,</li> <li>- the fuel filler neck bolts.</li> <li>□ Torque tighten the fuel filler neck bolts (9 N.m).</li> </ul>

- the fuel tank heat shield.

### 4X4 TRANSMISSION

□ Refit the longitudinal driveshaft (see **Propshaft: Removal - Refitting**) (29A, Driveshafts).

### ☐ Refit:

- the silencer on the rubber mounting bushes,
- the silencer bracket bolts on the particle filter.
- ☐ Torque tighten the silencer bracket bolts on the particle filter (45 N.m).
- ☐ Remove the blanking plugs.
- □ Connect:
  - the fuel return pipe quick-release union,
  - the fuel supply pipe quick-release union,
  - the fuel tank sender unit connector.
- ☐ Refit the blanking cover on the inspection flap.
- ☐ Refit:
  - the floor carpet under the rear bench seat base (see Floor carpet: Removal) (71A, Body internal trim),
  - the rear bench seat base (see **Complete rear seat: Removal Refitting**) (76A, Rear seat frames and runners).
- ☐ Connect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).

### **TANK**

# Fuel tank: Removal - Refitting

19C

2TR

# Essential equipment component jack

Tightening torques ▽		
fuel tank retaining strap bolts	31 N.m	
rear axle bolts	63 N.m	
rear axle nut	78 N.m	
rear axle subframe bolts	53 N.m	
fuel filler neck bolts	9 N.m	
silencer bracket bolts on the catalytic converter	45 N.m	

### **IMPORTANT**

Wear goggles with side protectors for this operation

### **IMPORTANT**

Wear protective gloves during the operation.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

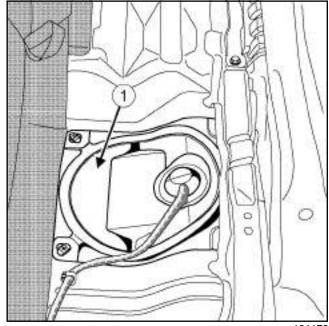
### **WARNING**

Keep the pipe unions away from contaminated areas.

### **REMOVAL**

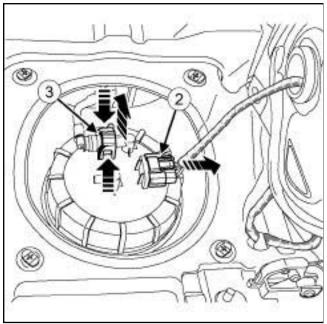
### I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- □ Disconnect the battery (see **Battery**: **Removal Refitting**) (80A, Battery).
- ☐ Lift up:
  - the rear bench seat base (see Complete rear seat: Removal - Refitting) (76A, Rear seat frames and runners),
  - partially, the floor carpet under the rear bench seat base (see **Floor carpet: Removal**) (71A, Body internal trim).
- □ Drain the fuel tank (see 19C, Tank, Fuel tank: Draining, page 19C-1) (19C, Tank).



131176

☐ Remove the inspection flap blanking cover (1).



131168

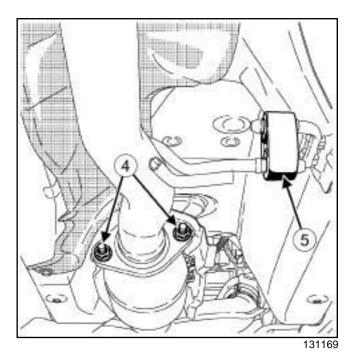
### □ Disconnect:

- the fuel sender connector (2),
- the quick-release union (3) from the fuel supply pipe.

### Note:

Make preparations for fuel outflow from the supply and return pipes.

☐ Fit blanking plugs on the unions (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

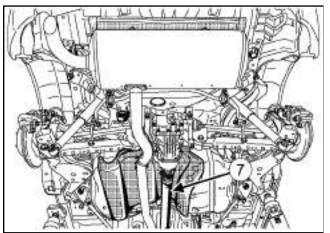


131170

### ☐ Remove:

- the silencer bracket bolts (4) on the catalytic converter,
- the silencer from the rubber mounting bushes (5) and (6) .

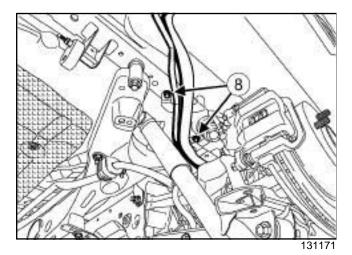
### 4X4 TRANSMISSION



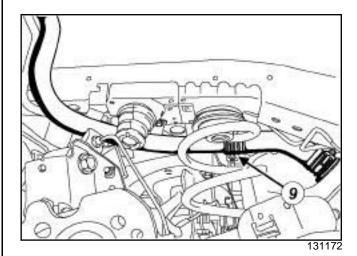
135035

☐ Remove the longitudinal driveshaft (7) (see Propshaft: Removal - Refitting) (29A, Driveshafts).

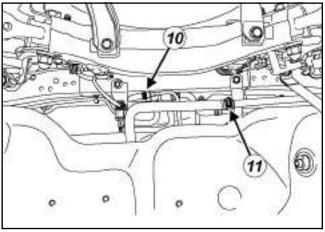
- ☐ Remove:
  - the fuel tank heat shield,
  - -the rear right-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the rear right-hand wheel arch liner (see **Rear wheel arch liner: Removal Refitting**) (55A, Exterior protection).



☐ Remove the fuel filler neck bolts (8).

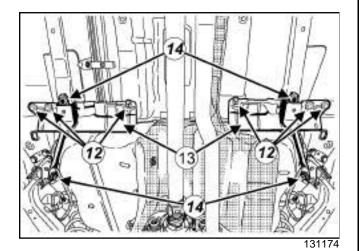


- ☐ Remove the fuel filler neck bracket (9).
- ☐ Disconnect the filler neck from the fuel tank.



131173

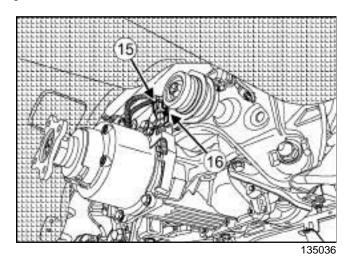
- ☐ Remove:
  - the breather pipe bracket (10),
  - the fuel vapour rebreather pipe bracket (11) .
- ☐ Disconnect:
  - the breather pipe,
  - the petrol vapour rebreather pipe.



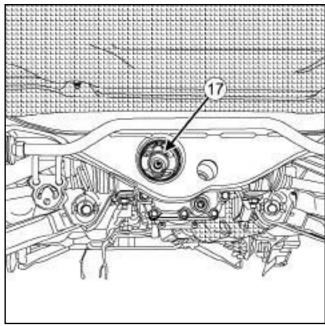
□ Remove:

- the clips (12),
- the covers (13),
- the rear axle subframe strut bolts (14),
- the rear axle subframe struts,
- -the parking brake cable (see **Parking brake cables: Removal Refitting**) (37A, Mechanical component controls).

### 4X4 TRANSMISSION

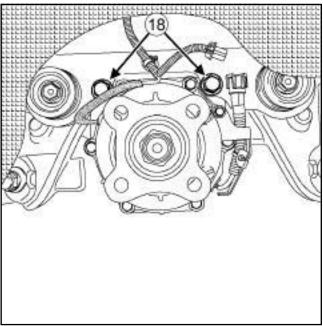


- ☐ Disconnect the connector (15) from the electric coupler.
- ☐ Unclip the wiring clip (16).



135037

☐ Loosen the nut (17) on the rear axle.



130046

☐ Remove the rear axle bolts (18).

Note:

Do not remove the final drive from the vehicle.

☐ Tilt the rear axle downwards.

### **TANK**

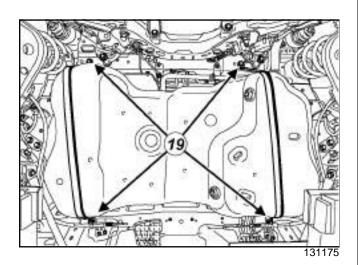
# Fuel tank: Removal - Refitting

19C

2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED

☐ Fit a **component jack** under the fuel tank.



□ Remove:

- the fuel tank retaining strap bolts (19),
- the fuel tank retaining straps,
- the fuel tank.

### **REFITTING**

### I - REFITTING PREPARATION OPERATION

- ☐ Always replace:
  - the fuel filler neck bracket,
  - the clips,
  - the breather pipe bracket,
  - the petrol vapour rebreathing pipe bracket.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the fuel tank,
  - the fuel tank retaining straps,
  - the fuel tank retaining strap bolts.
- ☐ Torque tighten the fuel tank retaining strap bolts (31 N.m)
- ☐ Remove the component jack.

### **III - FINAL OPERATION**

4X4 TRANSMISSION
☐ Refit the rear axle in its original position.
☐ Torque tighten:
- the rear axle bolts (63 N.m),
- the rear axle nut (78 N.m).
☐ Clip on the wiring clip.
☐ Connect the electric coupler connector.
☐ Refit:
<ul> <li>the parking brake cable (see Parking brake cables: Removal - Refitting) (37A, Mechanical component controls).</li> </ul>
- the rear axle subframe struts,
- the rear axle subframe bolts,
- the covers (13),
- the new clips <i>(12)</i> .
☐ Torque tighten the rear axle subframe bolts (53 N.m).
☐ Connect:
- the petrol vapour rebreathing pipe,
- the breather pipe.
☐ Refit:
- the new petrol vapour rebreathing pipe bracket,
- the new breather pipe bracket.
☐ Connect the fuel filler neck onto the fuel tank.
☐ Refit:
- the new fuel filler neck bracket,
- the fuel filler neck bolts.
☐ Torque tighten the fuel filler neck bolts (9 N.m).
□ Refit:
- the rear right-hand wheel arch liner (see Rear

wheel arch liner: Removal - Refitting) (55A, Ex-

- the rear right-hand wheel (see Wheel: Removal -

Refitting) (35A, Wheels and tyres),

terior protection),

- the fuel tank heat shield.

# TANK Fuel tank: Removal - Refitting

19C

2TR

4	X4 TRANSMISSION		
	Refit the longitudinal driveshaft (see <b>Propshaft: Removal - Refitting</b> ) (29A, Driveshafts).		
	Refit:		
	- the silencer on the rubber mounting bushes,		
	- the silencer bracket bolts on the catalytic converter.		
	Torque tighten the silencer bracket bolts on the catalytic converter (45 N.m).		
	Remove the blanking plugs.		
	Connect:		
	-the fuel supply pipe quick-release union,		
	- the fuel tank sender unit connector.		
	Refit the blanking cover on the inspection flap.		
	Refit:		
	-the floor carpet under the rear bench seat base (see <b>Floor carpet: Removal</b> ) (71A, Body internal trim),		
	-the rear bench seat base (see <b>Complete rear seat: Removal - Refitting</b> ) (76A, Rear seat frames and runners).		
	Connect the battery (see <b>Battery : Removal - Refitting</b> ) (80A, Battery).		

### TANK

# Filler neck: Removal - Refitting

Tightening torques ♡	
breather pipe bolt	9 N.m
retaining bracket bolt	81 N.m
fuel filler neck bolts	9 N.m

### **IMPORTANT**

Wear goggles with side protectors for this opera-

### **IMPORTANT**

Wear protective gloves during the operation.

### **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

### **WARNING**

Keep the pipe unions away from contaminated areas.

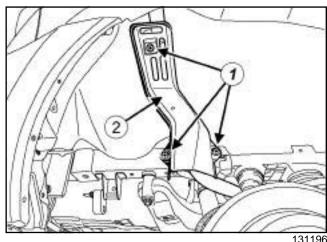
### **REMOVAL**

### I - OPERATION FOR REMOVAL OF PART **CONCERNED**

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- ☐ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- ☐ Drain the fuel tank (see 19C, Tank, Fuel tank: Draining, page 19C-1).

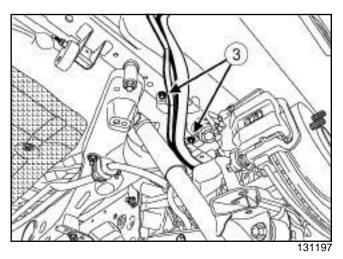
### □ Remove:

- the rear right-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
- the rear right-hand wheel arch liner (see Rear wheel arch liner: Removal - Refitting) (55A, Exterior protection).



- ☐ Remove:
  - the clips (1)
  - the fuel filler neck protector (2) .

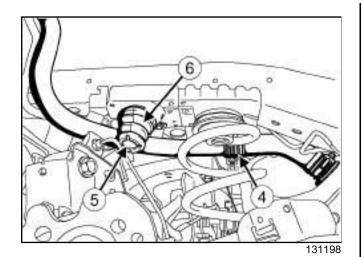
### **II - OPERATION FOR REMOVAL OF PART CONCERNED**



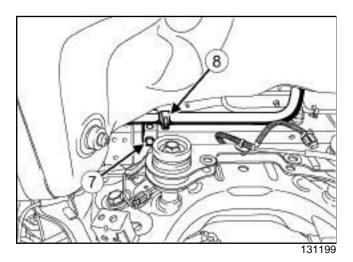
□ Remove the fuel filler neck bolts (3).

### **TANK**

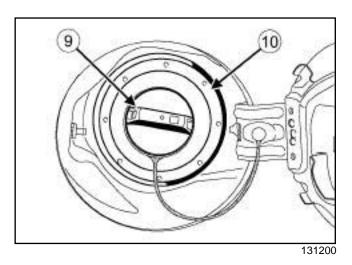
# Filler neck: Removal - Refitting



- □ Remove:
  - the fuel filler neck bracket (4),
  - the retaining bracket bolt (5),
  - the retaining bracket (6) .



- □ Remove:
  - the breather pipe bolt (7),
  - the breather pipe bracket (8) .
- ☐ Disconnect the breather pipe.



- □ Remove:
  - the cap (9),
  - the filler neck flange (10),
  - the filler neck.

### REFITTING

### I - REFITTING PREPARATION OPERATION

- □ Always replace:
  - the clips,
  - the fuel filler neck bracket,
  - the breather pipe bracket.

# II - REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the filler neck,
  - the filler neck flange,
  - the filler neck plug.
- ☐ Connect the breather pipe.
- □ Refit:
  - the new breather pipe bracket,
  - the breather pipe bolt.
- ☐ Torque tighten the **breather pipe bolt (9 N.m)**.
- ☐ Refit:
  - the retaining bracket (6),
  - the retaining bracket bolt.
- ☐ Torque tighten the **retaining bracket bolt (81 N.m)**.

# TANK Filler neck: Removal - Refitting

	Refit:
	- the new fuel filler neck bracket,
	- the fuel filler neck bolts.
	Torque tighten the fuel filler neck bolts (9 N.m).
Ш	- FINAL OPERATION.
	Refit:
	- the fuel filler neck protector,
	- the new clips,
	-the rear right-hand wheel arch liner (see <b>Rear wheel arch liner: Removal - Refitting</b> ) (55A, Exterior protection).
	-the rear right-hand wheel (see <b>Wheel: Removal - Refitting</b> ) (35A, Wheels and tyres).
	Connect the battery (see <b>Battery : Removal - Refitting</b> ) (80A, Battery).

## **TANK**

## Fuel level sensor module: Removal - Refitting

## **Essential special tooling**

Mot. 1397

Universal petrol tank gauge nut wrench.

## **IMPORTANT**

Wear goggles with side protectors for this opera-

#### **IMPORTANT**

Wear protective gloves during the operation.

## **IMPORTANT**

During this operation, be sure to:

- refrain from smoking or bringing red hot objects close to the working area,
- be careful of fuel splashes when disconnecting the union.

#### **WARNING**

To avoid any corrosion or damage, protect the areas on which fuel is likely to run.

## **WARNING**

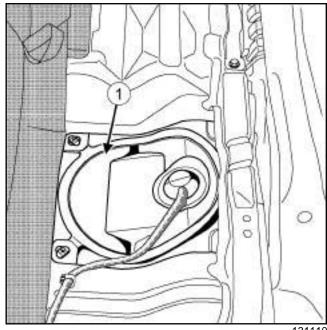
Keep the pipe unions away from contaminated areas.

#### REMOVAL

#### I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle**: Towing and lifting) (02A, Lifting equipment).
- □ Disconnect the battery (see Battery: Removal -Refitting) (80A, Battery).
- ☐ Lift up:
  - -the rear bench seat base (see Complete rear seat: Removal - Refitting) (76A, Rear seat frames and runners),
  - partially, the floor carpet under the rear bench seat base (see Floor carpet: Removal) (71A, Body internal trim).

## 1 - Pump-sender-filter assembly

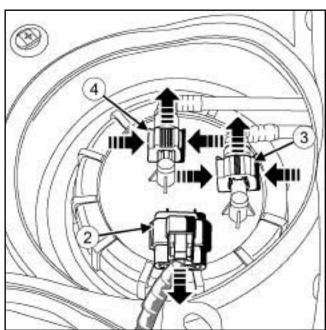


☐ Remove the inspection flap blanking cover (1).

#### Note:

Make preparations for fuel outflow from the supply and return pipes.

## M9R



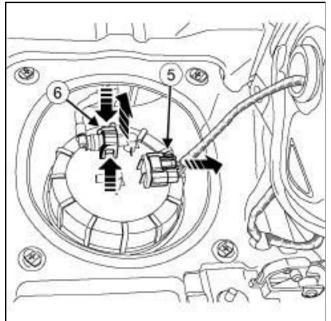
- □ Disconnect:
  - the fuel sender connector (2),

## **TANK**

## Fuel level sensor module: Removal - Refitting

- the quick-release union (3) from the fuel supply pipe.
- the quick-release union (4) from the fuel return pipe.

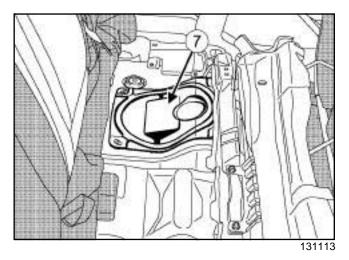
## 2TR



131112

- □ Disconnect:
  - the fuel sender connector (5),
  - -the quick-release union (6) from the fuel supply pipe.
- ☐ Fit blanking plugs on the unions (see 13B, Diesel injection, Diesel injection: Precautions for repair, page 13B-1).

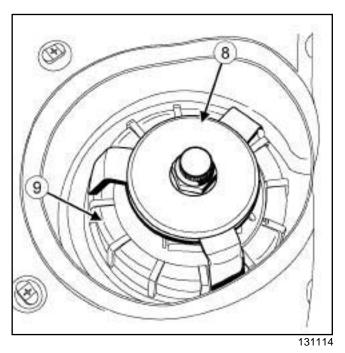
#### 2 - Sender



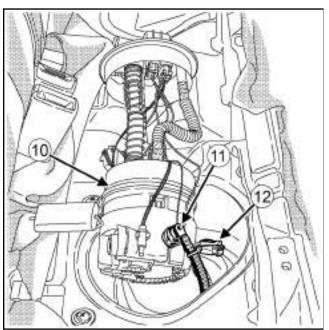
 $\ \square$  Remove the inspection flap blanking cover (7) .

# II - OPERATION FOR REMOVAL OF PART CONCERNED

## 1 - Pump-sender-filter assembly



□ Remove the nut (9) from the « pump-sender-filter » assembly using the tool (Mot. 1397) (8).



131115

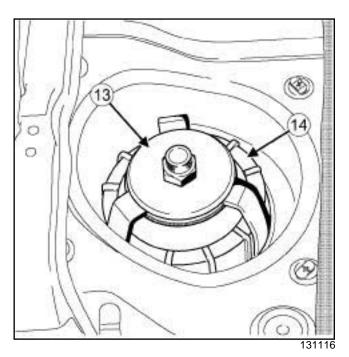
## Note:

Take care to ensure that the float is not damaged during the operation.

Make preparations for the fuel outflow, for example using cloths.

- □ Remove the « pump-sender-filter » assembly (10).
- ☐ Disconnect:
  - the fuel pipe (11),
  - the connector (12).

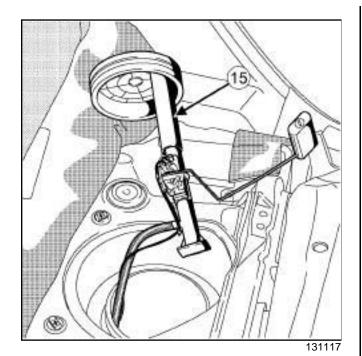
## 2 - Sender



☐ Remove the nut (14) from the sender using the tool (Mot. 1397) (13).

## **TANK**

## Fuel level sensor module: Removal - Refitting



#### WARNING

To prevent the tank from being deformed, refit the fuel sender unit nut to the tank well immediately.

#### Note:

Take care to ensure that the float is not damaged during the operation. Make preparations for the fuel outflow, for example using cloths.

☐ Remove the sender (15)

#### REFITTING

## I - REFITTING PREPARATION OPERATION

☐ Always replace the « pump-sender-filter » assembly O-ring and the sender O-ring.

# II - REFITTING OPERATION FOR PART CONCERNED

## 1 - Pump-sender-filter assembly

- ☐ Connect:
  - -the connector (12),
  - the fuel pipe (11).
- ☐ Refit:
  - the new O-ring,
  - the pump-sender-filter assembly,

- the « pump-sender-filter » assembly nut using the tool (Mot. 1397).

## 2 - Sender

- □ Refit:
  - the new O-ring,
  - the sender,
  - the nut on the sender using the tool (Mot. 1397).

#### **III - FINAL OPERATION**

#### 1 - Pump-sender-filter assembly

☐ Remove the blanking plugs.

#### M9R

- ☐ Connect:
  - the fuel return pipe quick-release union,
  - the fuel supply pipe quick-release union,
  - the fuel tank sender unit connector.

## 2TR

- □ Connect:
  - the fuel supply pipe quick-release union,
  - the fuel tank sender unit connector.
- ☐ Refit the blanking cover on the inspection flap.
- ☐ Refit:
  - the floor carpet under the rear bench seat base (see Floor carpet: Removal) (71A, Body internal trim),
  - the rear bench seat base (see **Complete rear seat: Removal Refitting**) (76A, Rear seat frames and runners).
- ☐ Connect the battery (see Battery: Removal Refitting) (80A, Battery).

## 2 - Sender

☐ Refit the blanking cover on the inspection flap.

## **TANK**

# Fuel level sensor module: Removal - Refitting

## □ Refit:

- -the floor carpet under the rear bench seat base (see **Floor carpet: Removal**) (71A, Body internal trim),
- -the rear bench seat base (see **Complete rear seat: Removal Refitting**) (76A, Rear seat frames and runners).
- ☐ Connect the battery (see Battery : Removal Refitting) (80A, Battery).

## Left-hand suspended engine mounting: Removal - Refitting

19D

M9R

Esse	ential special tooling
Mot. 1453	Multiple-adjusting engine mounting support with retaining straps.
Mot. 1453-01	Additional winder nut on engine lift support Mot. 1453.

Essential equipment
safety strap(s)

Tightening torque	s 🛇
left-hand suspended engine bolts on the upper body	80 N.m
left-hand suspended engine mounting bolts on the body side	80 N.m
left-hand suspended engine mounting bolts on the manual gearbox	110 N.m
left-hand suspended engine mounting bolts on the automatic gearbox110	N.m
air filter unit bracket bolts	10 N.m
automatic transmission computer mounting bolts	27 N.m
wiring bracket bolts	10 N.m

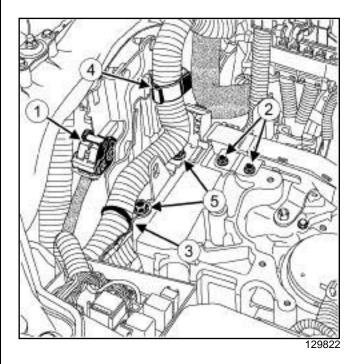
## **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

- □ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - the air inlet sleeve clips,
  - the air inlet sleeve from the air filter unit,
  - -the battery (see **Battery: Removal Refitting**) (80A, Battery)
  - -the battery tray (see Battery tray: Removal Refitting) (80A, Battery tray),

 the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8).

## 6 SPEED AUTO GBOX



□ Disconnect the automatic transmission computer connector (1).

- ☐ Remove the bolts (2) from the wiring bracket.
- ☐ Unclip:
  - the wiring at (3),
  - the wiring at (4).
- □ Remove:
  - the automatic transmission computer mounting bolts (5),
  - the earth cable.

## 6 SPEED MANUAL GBOX

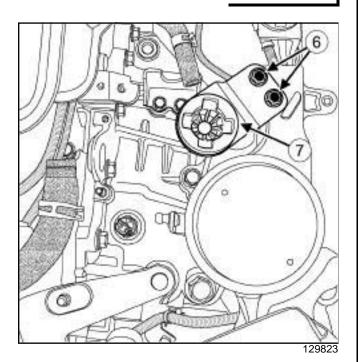
☐ Remove the automatic transmission computer mounting.

## Left-hand suspended engine mounting: Removal - Refitting

M9R

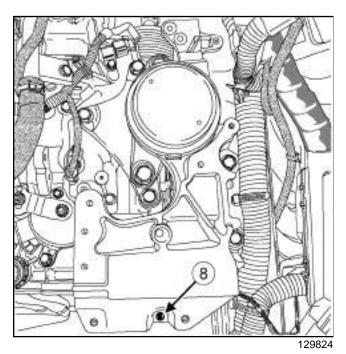
## 6 SPEED AUTO GBOX

☐ Remove the «automatic transmission computer mounting » assembly.



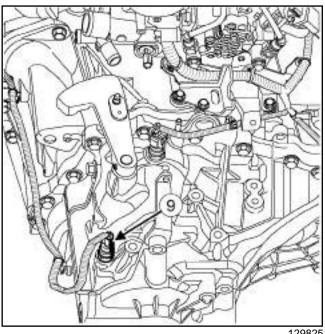
## □ Remove:

- the bolts (6) from the air filter unit support,
- the air filter unit support (7).

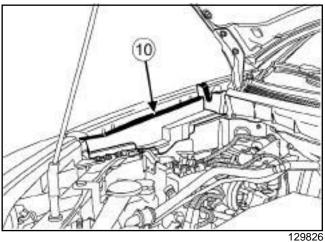


☐ Unclip the wiring at (8).

## 6 SPEED MANUAL GBOX



☐ Disconnect the reverse gear position switch connector (9).

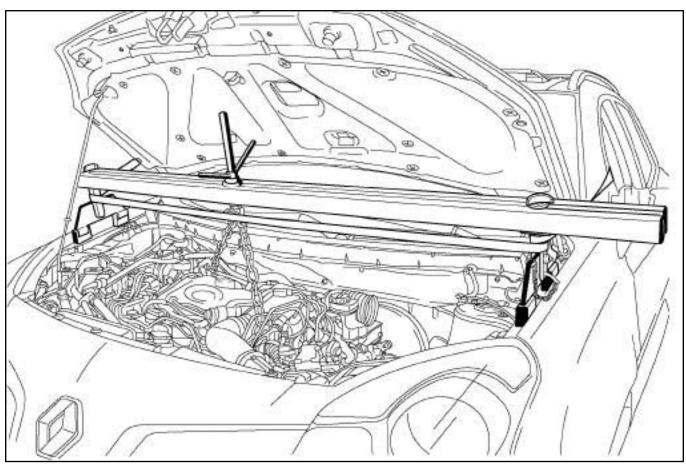


☐ Remove the left-hand and right-hand bonnet seals **(10)**.

Left-hand suspended engine mounting: Removal - Refitting

19D

M9R



- ☐ Fit the (Mot. 1453) and the (Mot. 1453-01) using safety strap(s).
- ☐ Remove:
  - the engine undertray,
  - -the front left-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - -the front left-hand splash guard (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection).

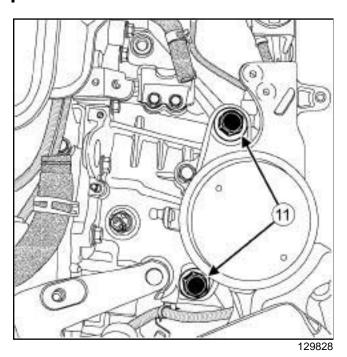
# Left-hand suspended engine mounting: Removal - Refitting

19D

M9R

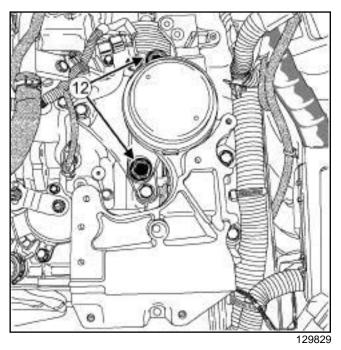
# II - OPERATION FOR REMOVAL OF PART CONCERNED

## 6 SPEED MANUAL GBOX

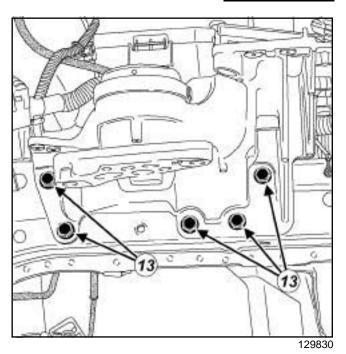


☐ Remove the left-hand suspended engine bolts (11) on the manual gearbox.

## 6 SPEED AUTO GBOX



☐ Remove the left-hand suspended engine bolts (12) on the automatic gearbox.

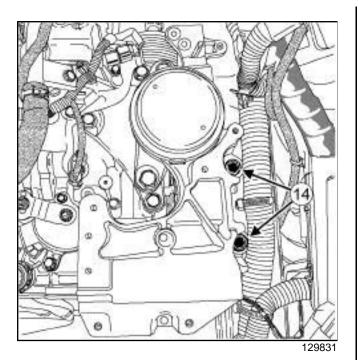


☐ Remove the left-hand suspended engine bolts (13) on the body side.

## Left-hand suspended engine mounting: Removal - Refitting

19D

M9R

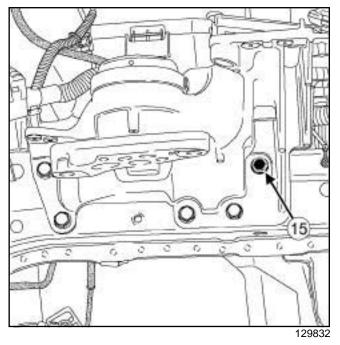


- □ Remove:
  - -the left-hand suspended engine bolts (14) on the upper body,
  - the left-hand suspended engine mounting.

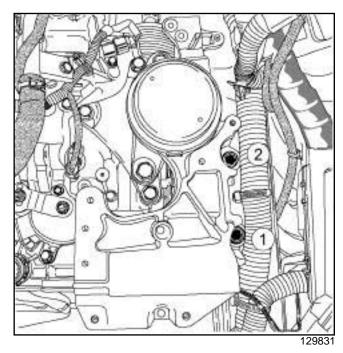
## **REFITTING**

# I - REFITTING OPERATION FOR PART CONCERNED

☐ Fit the left-hand suspended engine mounting.



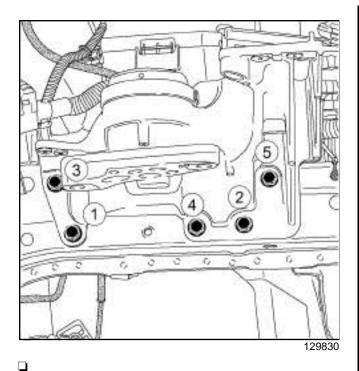
☐ Refit without tightening the left-hand suspended engine bolt (15) on the body side.



- ☐ Refit the left-hand suspended engine bolts on the upper body.
- ☐ Torque tighten in order the left-hand suspended engine bolts on the upper body (80 N.m).

## Left-hand suspended engine mounting: Removal - Refitting

M9R

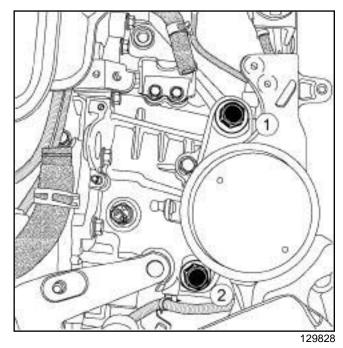


Note:

Use a torque wrench and an open-end wrench adapter to torque tighten bolts (1) and (4) .

- ☐ Refit the left-hand suspended engine mounting bolts on the body side.
- □ Torque tighten in order the left-hand suspended engine mounting bolts on the body side (80 N.m).

## 6 SPEED MANUAL GBOX



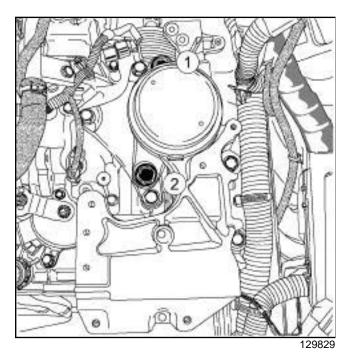
- ☐ Refit the left-hand suspended engine bolts on the manual gearbox.
- □ Torque tighten in order the left-hand suspended engine mounting bolts on the manual gearbox (110 N.m).

Left-hand suspended engine mounting: Removal - Refitting

19D

M9R

#### 6 SPEED AUTO GBOX



- ☐ Refit the left-hand suspended engine bolts on the
- ☐ Torque tighten in order the left-hand suspended engine mounting bolts on the automatic gearbox110 (N.m).

## **II - FINAL OPERATION**

automatic gearbox.

- ☐ Refit:
  - -the front left-hand splash guard (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
  - -the front left-hand wheel (see **Wheel: Removal Refitting**) (35A, Wheels and tyres),
  - the engine undertray.
- □ Remove (Mot. 1453) and the (Mot. 1453-01) and the safety strap(s).
- ☐ Refit the left-hand and the right-hand bonnet seals.

## 6 SPEED MANUAL GBOX

- ☐ Disconnect the reverse gear switch connector.
- ☐ Clip on the wiring at (8).

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- the air filter box mounting,
- the air filter box support bolts.
- □ Torque tighten the air filter unit bracket bolts (10 N.m).

#### 6 SPEED MANUAL GBOX

□ Position the automatic transmission computer mounting.

## 6 SPEED AUTO GBOX

- □ Position the « automatic transmission computermounting » assembly.
- □ Refit:
  - the earth cable,
  - the automatic transmission computer mounting bolts.
- □ Torque tighten the automatic transmission computer mounting bolts (27 N.m).
- ☐ Clip:
  - the wiring at (4),
  - the wiring at (3).
- ☐ Refit the wiring bracket bolts.
- ☐ Torque tighten the wiring bracket bolts (10 N.m).

## 6 SPEED AUTO GBOX

- □ Connect the automatic transmission computer connector.
- Refit:
  - the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
  - the battery tray (see Battery tray: Removal Refitting) (80A, Battery tray),
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the air inlet sleeve from the air filter unit,
  - the air inlet sleeve clips.

## Left-hand suspended engine mounting: Removal - Refitting

19D

2TR, and FK0 or FK8

	Essential special tooling
Mot. 1453	Multiple-adjusting engine mounting support with retaining straps.

1	
Tightening torque	es 🛇
lifting eye bolts	28 N.m
left-hand suspended mounting bolts (1-7) on the body80	N.m
left-hand suspended engine mounting nut (8)	14 N.m
left-hand suspended engine mounting bolt (9) on the gearbox	50 N.m
left-hand suspended engine mounting bolt (10) on the gearbox	50 N.m
left-hand suspended engine mounting bolt (11) on the gearbox	50 N.m
left-hand suspended engine mounting bolt (12) on the gearbox	50 N.m
engine wiring bracket bolt	10 N.m
engine wiring bracket	nuts10 N.m
bracket bolts	28 N.m
wiring harness bracket bolts	28 N.m

## **IMPORTANT**

Wear protective gloves during the operation.

## **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

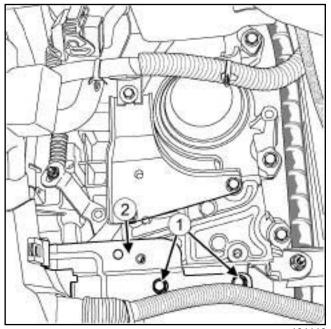
☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

## **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

#### □ Remove:

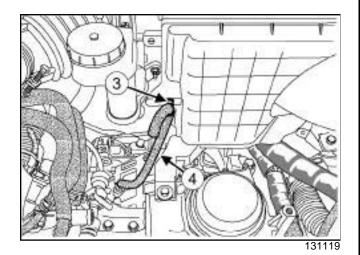
- the engine cover,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
- the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
- the battery (see Battery: Removal Refitting) (80A, Battery)
- the battery tray (see **Battery: Removal Refitting**) (80A, Battery).



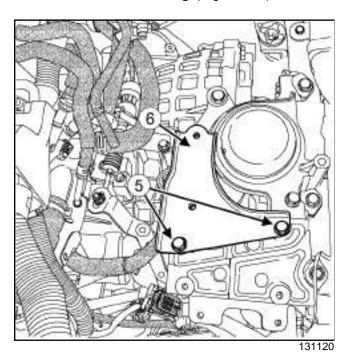
- $\hfill \square$  Remove the bolts (1) from the wiring bracket.
- ☐ Move aside the wiring and bracket (2).

## Left-hand suspended engine mounting: Removal - Refitting

2TR, and FK0 or FK8

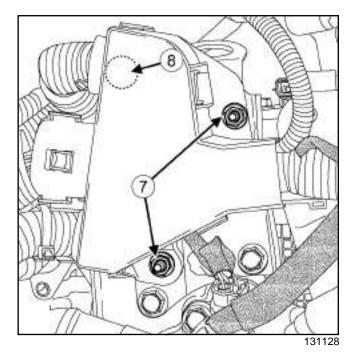


- $\ \ \Box$  Unclip the breather hose clip (3) .
- ☐ Remove:
  - the breather hose (4),
  - the air filter box (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).



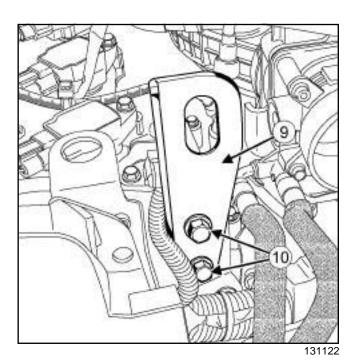
## ☐ Remove:

- the bolts (5) from the bracket,
- the bracket (6) .



## ☐ Remove:

- the engine wiring bracket nuts (7),
- the engine wiring bracket bolt (8) .
- ☐ Move the engine wiring to one side.



## Refit:

- the lifting eye (9),
- the lifting eye bolts (10) .
- ☐ Torque tighten the lifting eye bolts (28 N.m).

## Left-hand suspended engine mounting: Removal - Refitting

2TR, and FK0 or FK8

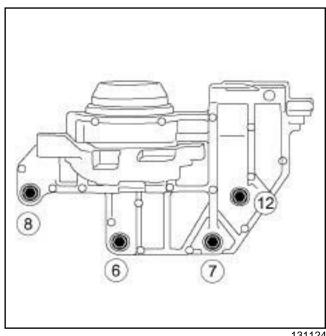
☐ Remove the scuttle half-grilles (see Scuttle halfgrille: Removal - Refitting) (56, Exterior equipment).

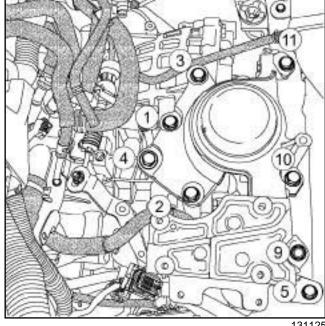


131123

- ☐ Position the (Mot. 1453) (11).
- □ Remove:
  - the front left-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres),
  - the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
  - -the front left-hand wheel arch liner (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection).

## **II - OPERATION FOR REMOVAL OF PART CONCERNED**





- ☐ Remove in the following order:
  - the left-hand suspended engine mounting bolt (1) from the gearbox,
  - the left-hand suspended engine mounting bolt (2) from the gearbox,
  - the left-hand suspended engine mounting bolt (3) from the gearbox,
  - the left-hand suspended engine mounting bolt (4) from the gearbox,

## Left-hand suspended engine mounting: Removal - Refitting

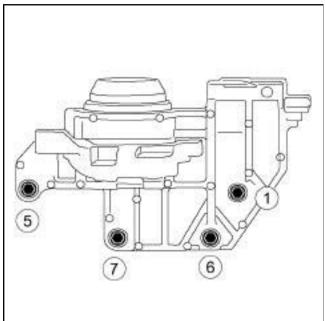
19D

## 2TR, and FK0 or FK8

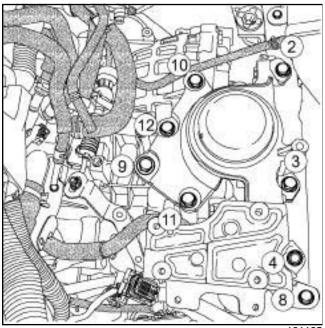
- the left-hand suspended engine mounting nut (5),
- -bolts **(6-12)** from the left-hand suspended engine mounting on the body.
- ☐ Remove the left-hand suspended engine mounting.

#### REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED



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131125

□ Refit the left-hand suspended engine mounting on the body.

- ☐ Refit the bolts of the left-hand suspended engine mounting on the body and on the gearbox.
- ☐ Torque tighten in turn:
  - the left-hand suspended mounting bolts (1-7) on the body80 (N.m),
  - the left-hand suspended engine mounting nut (8) (14 N.m),
  - the left-hand suspended engine mounting bolt (9) on the gearbox (50 N.m),
  - the left-hand suspended engine mounting bolt (10) on the gearbox (50 N.m),
  - the left-hand suspended engine mounting bolt (11) on the gearbox (50 N.m),
  - the left-hand suspended engine mounting bolt (12) on the gearbox (50 N.m).

#### II - FINAL OPERATION.

#### Refit

- the front left-hand wheel arch liner (see **Front wheel arch liner: Removal Refitting**) (55A, Exterior protection),
- the front right-hand splash guard (see Front wheel arch liner: Removal - Refitting) (55A, Exterior protection),
- the front left-hand wheel (see Wheel: Removal -Refitting) (35A, Wheels and tyres).

## ☐ Remove:

- tool (Mot. 1453)
- the lifting eye bolts,
- the lifting eye.

#### ☐ Refit:

- the engine wiring bracket bolt,
- the engine wiring bracket nuts,
- the scuttle half-grilles (see Scuttle half-grille: Removal Refitting) (56A, Exterior equipment),
- the bracket (6),
- the bracket bolts (6).

## ☐ Torque tighten:

- the engine wiring bracket bolt (10 N.m),
- The engine wiring bracket (nuts10 N.m),
- the bracket bolts (28 N.m).

#### ☐ Refit:

 the air filter box (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),

## Left-hand suspended engine mounting: Removal - Refitting

## 2TR, and FK0 or FK8 - the breather hose. ☐ Clip on the breather hose clip. □ Refit: - the wiring harness bracket, - the wiring harness bracket bolts. ☐ Torque tighten the wiring harness bracket bolts (28 N.m). □ Refit: - the battery tray (see **Battery: Removal - Refitting**) (80A, Battery), -the battery (see Battery: Removal - Refitting) (80A, Battery) - the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8), - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3), -the engine cover.

## Left-hand suspended engine mounting: Removal - Refitting

19D

2TR, and ND5 or ND8

	Essential special tooling
Mot. 1453	Multiple-adjusting engine mounting support with retaining straps.

# Essential equipment trolley jack

Tightening	 torques ♡
lifting eye bolts	28 N.m
left-hand suspended engine mounting support bolts on the gear-box	45 N.m
left-hand suspended engine mounting bolt (1) on the body	80 N.m
left-hand suspended engine mounting bolts (2), (3) and (4) on the body	80 N.m
left-hand suspended engine mounting bolts (5), (6) and (7) on the body	80 N.m
left-hand suspended engine mounting bolt (1) on the body	80 N.m
left-hand suspended engine mounting bolt (8) on the body	14 N.m
bolts and the nuts (12) of the left-hand suspended engine mounting	105 N.m
rubber pad nut on the gearbox	65 N.m
engine wiring bracket bolt	10 N.m
engine wiring bracket	nuts10 N.m
bracket bolts	28 N.m
wiring harness bracket bolts	28 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

## **REMOVAL**

#### I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

## **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

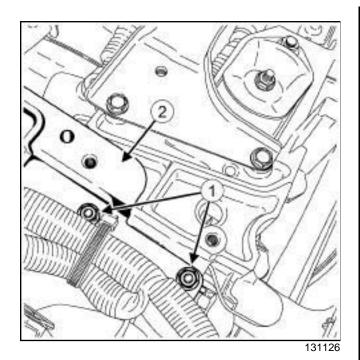
## ☐ Remove:

- the engine cover,
- the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
- the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8),
- the battery (see Battery: Removal Refitting) (80A, Battery)
- the battery tray (see **Battery: Removal Refitting**) (80A, Battery).

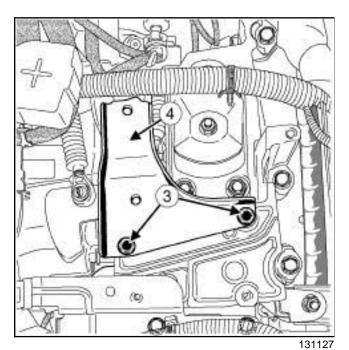
## Left-hand suspended engine mounting: Removal - Refitting

19D

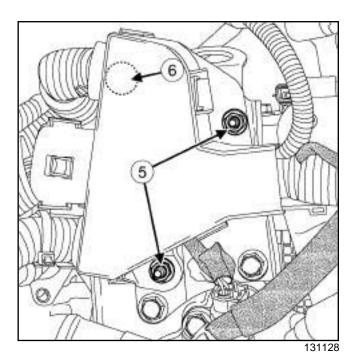
2TR, and ND5 or ND8



- ☐ Remove the bolts (1) from the wiring bracket.
- ☐ Move aside the wiring and bracket (2).
- □ Remove the air filter unit (see 12A, Fuel mixture, Air filter unit: Removal Refitting, page 12A-8).

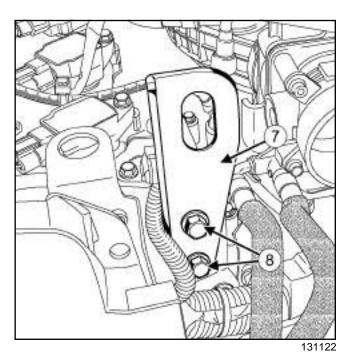


- ☐ Remove:
  - the bolts (3) from the bracket,
  - the bracket (4).



## ☐ Remove:

- the engine wiring bracket nuts (5),
- the engine wiring bracket bolt (6) .
- ☐ Move the engine wiring bracket to one side.



## ☐ Refit:

- the lifting eye (7),
- the lifting eye bolts (8) .
- ☐ Torque tighten the **lifting eye bolts (28 N.m)**.

## Left-hand suspended engine mounting: Removal - Refitting

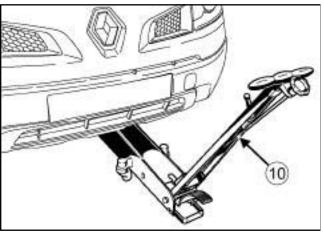
2TR, and ND5 or ND8

☐ Remove the scuttle half-grilles (see Scuttle halfgrille: Removal - Refitting) (56A, Exterior equipment).



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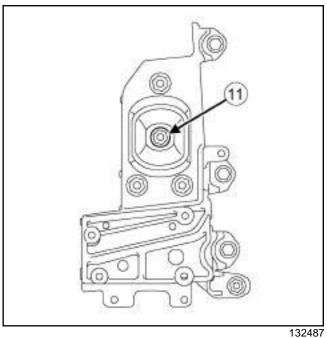
☐ Position the (Mot. 1453) (9).



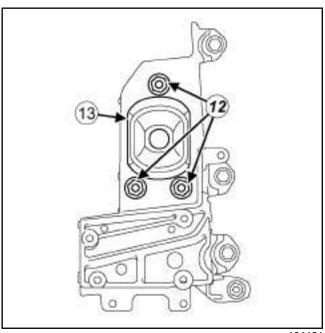
131129

☐ Position the **trolley jack** (10) under the gearbox

## **II - OPERATION FOR REMOVAL OF PART CONCERNED**



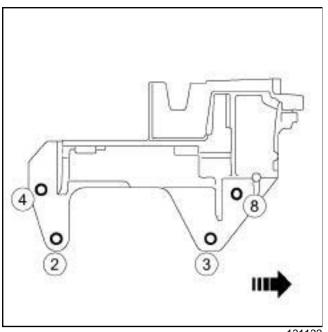
☐ Remove rubber pad nut (11) on the gearbox.



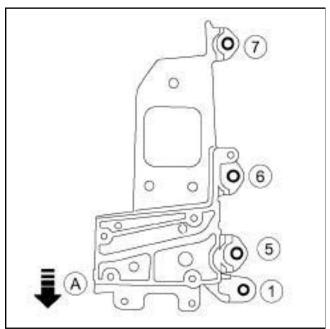
- ☐ Remove:
  - the nuts (12) and bolts from the left-hand suspended engine mounting,
  - the rubber pad (13) from the left-hand suspended engine mounting.
- ☐ Separate the gearbox from the left-hand suspended engine mounting.

## Left-hand suspended engine mounting: Removal - Refitting

2TR, and ND5 or ND8



131132

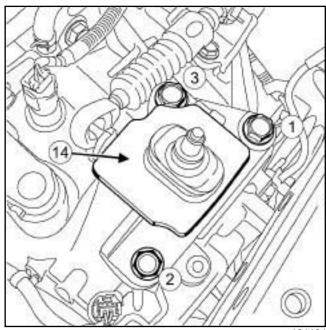


131133

#### (A) Front of the vehicle

- ☐ Remove in the following order:
  - the left-hand suspended engine mounting bolt (1) on the body,
  - the left-hand suspended engine mounting bolt (8) on the body,
  - the left-hand suspended engine mounting bolts (2) , (3) and (4) on the body,
  - the left-hand suspended engine mounting bolts (5) , (6) and (7) on the body.

☐ Remove the left-hand suspended engine mounting on the body.



## □ Remove:

- in order the left-hand suspended engine mounting support bolts (14) on the gearbox,
- the left-hand suspended engine mounting support (14) on the gearbox.

## REFITTING

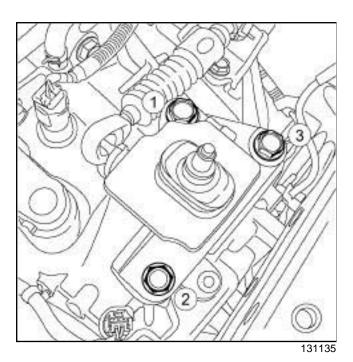
## I - REFITTING OPERATION FOR PART **CONCERNED**

- ☐ Refit the left-hand suspended engine mounting support on the gearbox.
- □ Refit the bolts to the left-hand suspended engine mounting bracket on the gearbox.

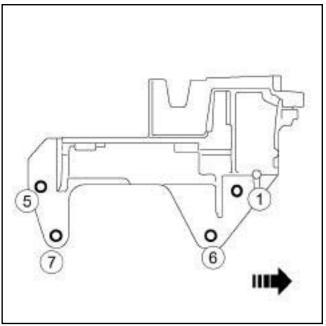
## Left-hand suspended engine mounting: Removal - Refitting

19D

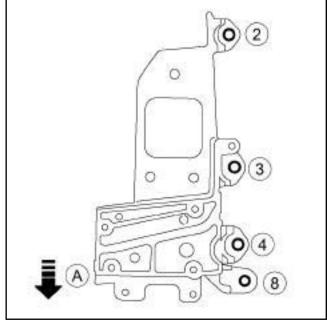
2TR, and ND5 or ND8



- □ Torque tighten in order the left-hand suspended engine mounting support bolts on the gearbox (45 N.m).
- ☐ Refit the left-hand suspended engine mounting on the body.



131132



- (A) Front of the vehicle
- ☐ Refit the left-hand suspended engine mounting bolts on the body.
- ☐ Torque tighten in turn:
  - the left-hand suspended engine mounting bolt (1) on the body (80 N.m),
  - the left-hand suspended engine mounting bolts (2), (3) and (4) on the body (80 N.m),
  - the left-hand suspended engine mounting bolts (5), (6) and (7) on the body (80 N.m),

Left-hand suspended engine mounting: Removal - Refitting

- the bracket (4) - the bracket bolts.

☐ Refit:

☐ Torque tighten the **bracket bolts (28 N.m)**.

unit: Removal - Refitting, page 12A-8)

- the wiring harness bracket

- the wiring harness bracket bolts

- the air filter unit (see 12A, Fuel mixture, Air filter

- 2TR, and ND5 or ND8 -the left-hand suspended engine mounting bolt (1) on the body (80 N.m), -the left-hand suspended engine mounting bolt (8) on the body (14 N.m). ☐ Place the gearbox on the left-hand suspended engine mounting using the tool (Mot. 1453) or using the trolley jack. □ Refit: - the rubber pad on the left-hand suspended engine mounting, - the rubber pad nut (11) on the gearbox, - the bolts and the nuts (12) of the left-hand suspended engine mounting. ☐ Torque tighten: -the bolts and the nuts (12) of the left-hand suspended engine mounting (105 N.m), -the rubber pad nut on the gearbox (65 N.m). II - FINAL OPERATION. ☐ Remove the trolley jack. □ Remove: - tool (Mot. 1453) - the lifting eye bolts, - the lifting eye. □ Refit: - the scuttle half-grilles (see Scuttle half-grille: Removal - Refitting) (56A, Exterior equipment), - the engine wiring bracket bolt, - the engine wiring bracket nuts. □ Torque tighten: - the engine wiring bracket bolt (10 N.m), - The engine wiring bracket (nuts10 N.m). □ Refit:
- □ Torque tighten the wiring harness bracket bolts (28 N.m).
- □ Refit:
  - the battery tray (see Battery: Removal Refitting) (80A, Battery),
  - the battery (see Battery: Removal Refitting) (80A, Battery)
  - the air inlet sleeve (see 12A, Fuel mixture, Air filter unit: Removal - Refitting, page 12A-8),
  - the air resonator located on the rocker cover (see 12A, Fuel mixture, Air resonator: Removal - Refitting, page 12A-3),
  - the engine cover.

## Right-hand suspended engine mounting: Removal - Refitting

19D

M9R

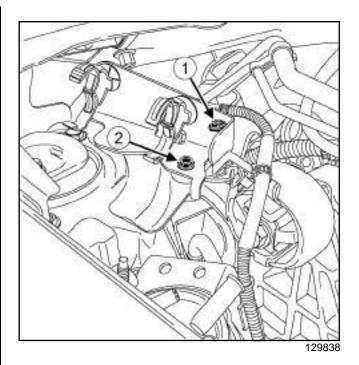
	Essential special tooling
Mot. 1390	Support for removing/refitting the engine - gearbox assembly.

Tightening torques ♡	
right-hand suspended engine mounting bolts on the engine	55 N.m
right-hand suspended engine mounting bolts on the body	55 N.m
upper engine tie-bar bolt on the engine	120 N.m
upper engine tie-bar bolt on the body	120 N.m
fuel pipe support bolt	12 N.m
support bolt of the manual priming pump	12 N.m

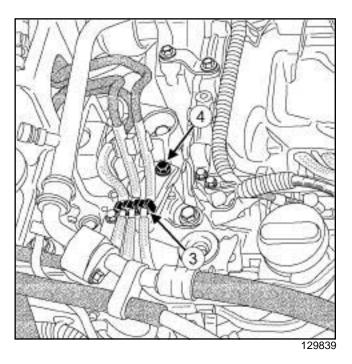
## REMOVAL

## I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove:
  - the engine cover,
  - -the fuel filter (see 13A, Fuel supply, Fuel filter: Removal Refitting, page 13A-3),
  - the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal Refitting, page 13A-1).



- ☐ Unclip the wiring of the manual priming pump support at (1).
- □ Remove:
  - the support bolt (2) of the manual priming pump,
  - the manual priming pump support.



- $\hfill \Box$  Unclip the fuel pipes from the fuel pipe support at (3)
- Move aside the fuel pipes.

19D-19

## Right-hand suspended engine mounting: Removal - Refitting

19D

## M9R

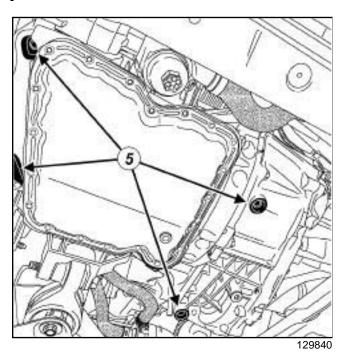
- □ Remove:
  - the fuel pipe support bolt (4),
  - the fuel pipe support,
  - the engine undertray,
  - -the front axle sub-frame: Removal Refitting) (31A, Front axle components).

## **WARNING**

It is strictly forbidden to apply any pressure to the engine oil sump. Damage to the sump will irreparably damage the engine by:

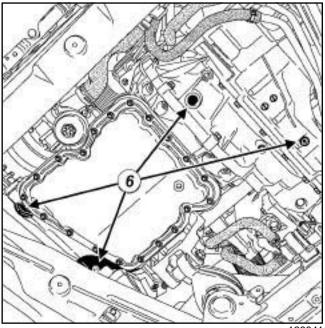
- blocking the strainer,
- raising the oil level above maximum, with a risk of engine racing.

## 6 SPEED MANUAL GBOX



□ Support the engine on the tool (Mot. 1390) at (5).

## 6 SPEED AUTO GBOX



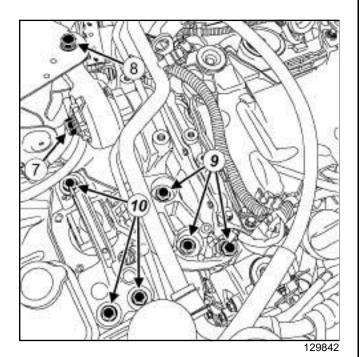
- □ Support the engine on the tool (Mot. 1390) at (6).
- □ Lower the vehicle slightly to relieve the pressure on the right-hand suspended engine mounting rubber pad.

## Right-hand suspended engine mounting: Removal - Refitting

19D

M9R

# II - OPERATION FOR REMOVAL OF PART CONCERNED



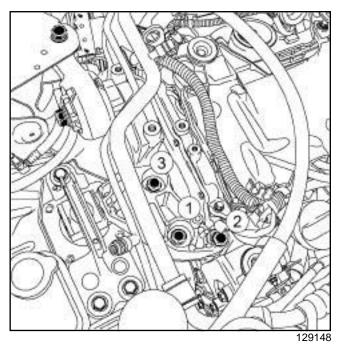
□ Remove:

- the bolt (7) from the upper engine tie-bar and the rubber mounting bush,
- the bolt (8) from the upper engine tie-bar on the body,
- the bolts (9) from the right-hand suspended engine mounting on the engine,
- the right-hand suspended engine mounting bolts (10) on the body,
- the right-hand suspended engine mounting.

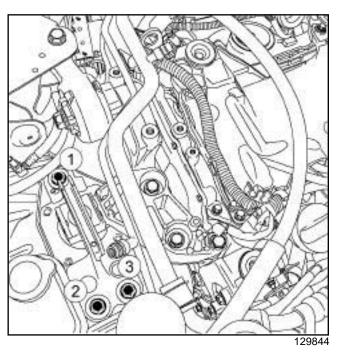
## REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

- ☐ Fit the right-hand suspended engine mounting.
- ☐ Refit the right-hand suspended engine mounting bolts on the body.



- ☐ Refit and manually tighten the right-hand suspended engine mounting bolts on the engine (3).
- ☐ Torque tighten in order the right-hand suspended engine mounting bolts on the engine (55 N.m).



- ☐ Torque tighten in order the right-hand suspended engine mounting bolts on the body (55 N.m).
- ☐ Refit:
  - the upper engine tie-bar,
  - the upper engine tie-bar bolt on the body.
- Manually tighten the upper engine tie-bar bolt on the body.

Right-hand suspended engine mounting: Removal - Refitting

19D

V	19R
	Remove the tool (Mot. 1390).
	Refit:
	<ul> <li>-the front axle sub-frame: Removal - Refitting) (31A, Front axle components).</li> </ul>
	- the upper engine tie-bar with the rubber mounting bush,
	- the upper engine tie-bar bolt on the engine.
	Manually tighten the upper engine tie-bar bolt on the engine.
	Torque tighten in order:
	-the upper engine tie-bar bolt on the engine (120 N.m),
	-the upper engine tie-bar bolt on the body (120 N.m).
II ·	FINAL OPERATION
	Refit the engine undertray.
	Refit the fuel pipe support.
	Refit the fuel pipe support bolt.
	Torque tighten the fuel pipe support bolt (12 N.m).
	Clip on the fuel pipes on the fuel pipe support.
	Refit:
	- the manual priming pump support,
	- the support bolt of the manual priming pump.
	Torque tighten the support bolt of the manual priming pump (12 N.m).
	Clip the wiring on the manual priming pump support.
	Refit:
	-the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1),
	-the fuel filter (see 13A, Fuel supply, Fuel filter: Removal - Refitting, page 13A-3),
	- the engine cover.
	Prime the diesel circuit using the manual priming pump (see 13A, Fuel supply, Manual priming pump: Removal - Refitting, page 13A-1).

# Right-hand suspended engine mounting: Removal - Refitting

19D

2TR

-	
Tightening torques ▽	
expansion bottle nut4	N.m
right-hand suspended engine mounting bolts	55 N.m
upper engine tie-bar bolts	120 N.m

## **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

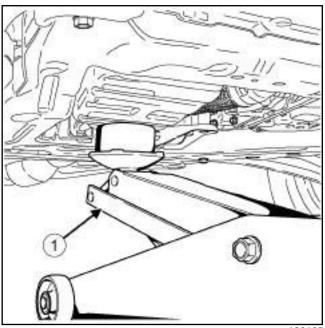
## **IMPORTANT**

Wear protective gloves during the operation.

## **REMOVAL**

# I - OPERATION FOR REMOVAL OF PART CONCERNED

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the engine cover.



129165

## Note:

To ensure complete stability, place a piece of wood or equivalent on the bearing surface.

## Note:

To ensure complete stability, place an object behind the trolley jack or an equivalent piece of equipment to provide support.

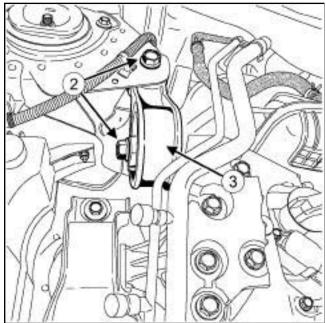
□ Place the **trolley jack** (1) or an equivalent engine supporting tool under the cylinder block.

## Right-hand suspended engine mounting: Removal - Refitting

19D

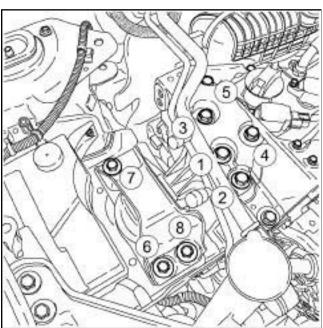
2TR

# II - OPERATION FOR REMOVAL OF PART CONCERNED



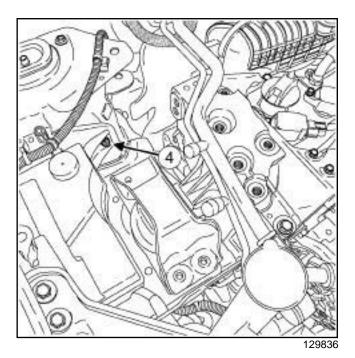
129834

- □ Remove:
  - the upper engine tie-bar bolts (2),
  - the upper engine tie-bar (3).



12002

☐ Remove in order the right-hand suspended engine mounting bolts.



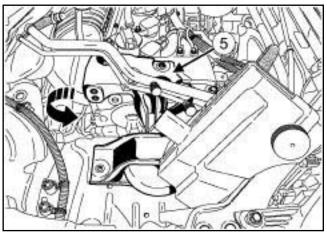
☐ Remove the nut (4) from the expansion bottle.

## Note:

Do not disconnect the lower coolant pipe from the expansion bottle.

#### Note:

Temporarily secure the expansion bottle to the side of the engine.



129837

- □ Rotate a quarter-turn anticlockwise the right-hand suspended engine mounting (5) as shown on the diagram.
- ☐ Remove the right-hand suspended engine mounting.

Right-hand suspended engine mounting: Removal - Refitting

2TR

## **REFITTING**

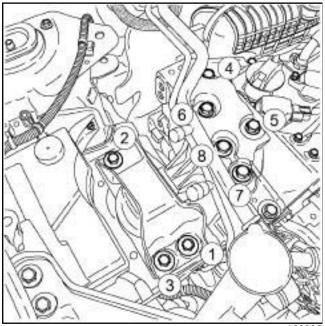
## I - REFITTING PREPARATION OPERATION

☐ Always replace the upper engine tie-bar bolt washer.

# II - REFITTING OPERATION FOR PART CONCERNED

#### □ Refit:

- the right-hand suspended engine mounting,
- the expansion bottle nut,
- the right-hand suspended engine mounting bolts.
- ☐ Torque tighten the **expansion bottle nut4 (N.m)**.



12983

- ☐ Torque tighten in order the **right-hand suspended** engine mounting bolts (55 N.m).
- □ Refit:
  - the upper engine tie-bar,
  - the upper engine tie-bar bolts.
- ☐ Torque tighten the upper engine tie-bar bolts (120 N.m).

## **III - FINAL OPERATION**

- ☐ Remove the **trolley jack** or equivalent engine supporting tool from underneath the cylinder block.
- ☐ Refit the engine cover.

## Lower engine tie-bar: Removal - Refitting

19D

M9R

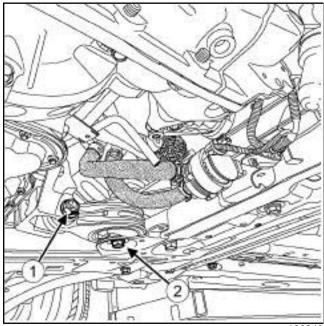
Tightening torques ♡	
lower engine tie-bar bolt on the front axle sub-frame	110 N.m
lower engine tie-bar bolt on the lower engine tie-bar support	155 N.m

## **REMOVAL**

## I - REMOVAL PREPARATION OPERATION

- ☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).
- ☐ Remove the engine undertray.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



129848

## ☐ Remove:

- the lower engine tie-bar bolt (1) from the lower engine tie-bar support,
- the bolt (2) of the lower engine tie-bar from the front axle subframe,
- the lower engine tie-bar.

## REFITTING

# I - REFITTING OPERATION FOR PART CONCERNED

#### ☐ Refit:

- the lower engine tie-bar,
- the lower engine tie-bar bolt on the front axle subframe.
- the lower engine tie-bar bolt on the lower engine tie-bar support.
- ☐ Torque tighten in order:
  - the lower engine tie-bar bolt on the front axle sub-frame (110 N.m),
  - the lower engine tie-bar bolt on the lower engine tie-bar support (155 N.m).

#### **II - FINAL OPERATION**

☐ Refit the engine undertray.

## Lower engine tie-bar: Removal - Refitting

19D

2TR

Tightening torques ♡	
engine tie-bar bolt on the subframe	110 N.m
engine tie-bar bolts on the gearbox	110 N.m
engine tie-bar bolt on its support	110 N.m

#### **IMPORTANT**

Wear protective gloves during the operation.

## REMOVAL

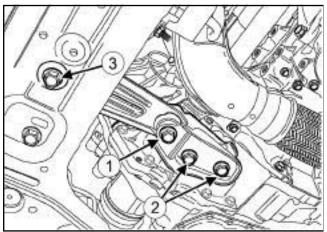
## I - REMOVAL PREPARATION OPERATION

☐ Position the vehicle on a two-post lift (see **Vehicle: Towing and lifting**) (02A, Lifting equipment).

## **IMPORTANT**

To prevent the vehicle from falling, lash it to the vehicle lift using a strap.

# II - OPERATION FOR REMOVAL OF PART CONCERNED



13142

## □ Remove:

- the engine tie-bar bolt (1) on its support.
- the bolts (2) from the engine tie-bar on the gearbox,
- the rear support of the engine,
- the engine tie-bar bolt (3) from the subframe,
- the engine tie-bar .

## REFITTING

#### REFITTING OPERATION FOR PART CONCERNED

- ☐ Refit:
  - the engine tie-bar,
  - the engine tie-bar bolt from the subframe,
  - the rear support of the engine,
  - the engine tie-bar bolts on the gearbox,
  - the engine tie-bar bolt from its mounting,
- ☐ Torque tighten:
  - the engine tie-bar bolt on the subframe (110 N.m),
  - the engine tie-bar bolts on the gearbox (110 N.m),
  - the engine tie-bar bolt on its support (110 N.m).