



## **Technical Note 3676A**

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### **CB1N**

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**Basic manual: Workshop Repair Manual 345 and Technical Note 3286A**

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## **Features of Renault Clio Sport SPL lighter version (see manufacturer's plate)**

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***For parts not dealt with in this Technical Note, refer to Workshop Repair Manual 345 or to Technical Note 3286A.***

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**77 11 316 842**

**SEPTEMBER 2002**

**EDITION ANGLAISE**

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"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."

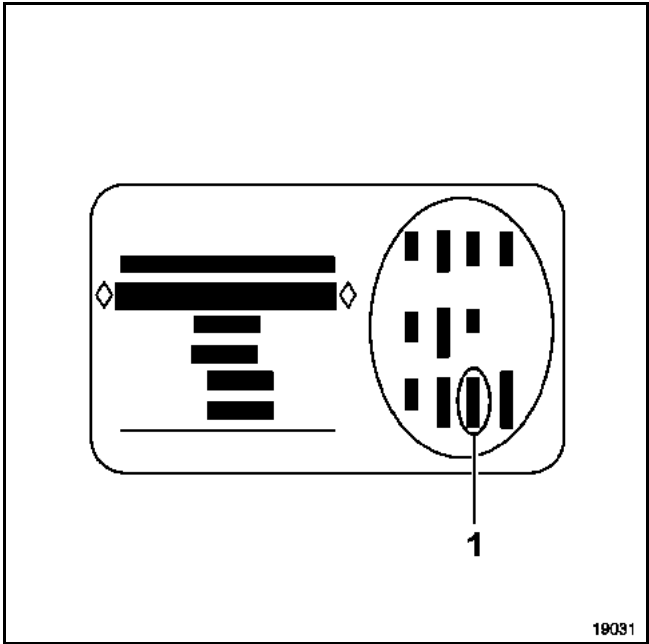
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Vehicle type	Engine		Gearbox	
	Type	Suffix	Type	Suffix
CB1N	F4R	736	JC5	129



1 Special designation "SPL" for SPORT LIGHT

The name SPORT LIGHT refers to the lightweight version of RENAULT CLIO SPORT.

This weight saving is achieved by removing certain systems, such as the ABS system or air conditioning, and making certain parts lighter.

Capacity - quantity

Components	Average capacity* in litres	
	After an oil change, calibrate with the dipstick	After replacing the oil filter
Engine (oil)		
F4R	5	5.2
Manual gearbox		
JC5	3.1	

\* Check with dipstick

Note:  
Never go past the MAX mark on the oil gauge.

Components	Capacity in litres	Grade
Cooling circuit	7	GLACEOL RX (type D). Add coolant only

## Accessories belt tension

## Tightening torques



Alternator mounting bolt M10	$4.4 \pm 0.6 \text{ daNm}$
Alternator mounting M8 bolt	$2.5 \pm 0.5 \text{ daNm}$

## REMOVAL

## Access to accessories belt

Put the vehicle on a two-post lift.

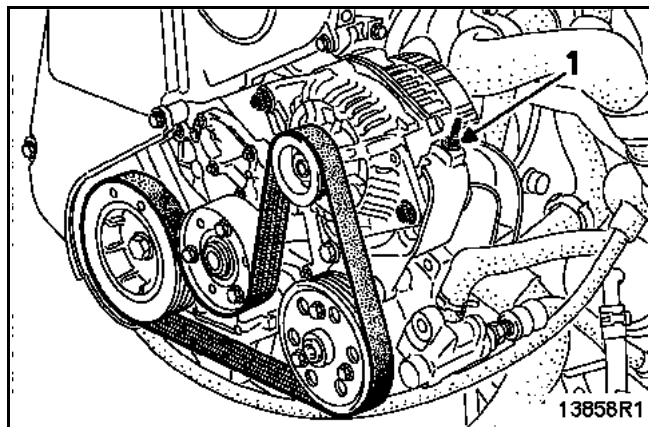
Disconnect the battery.

To access the accessories belt, remove:

- the engine undertray,
- the front right-hand wheel,
- the right-hand mudguard.

## Removing the accessories belt

Slacken the accessories belt by moving on the alternator: loosen the alternator mounting bolt, then turn nut (1) until the accessories belt comes out.



## REFITTING

Position the accessories belt along its drive route.

## Note:

Never refit a belt once removed, always replace it.

Tighten the accessories belt using nut (2) on the alternator bracket.

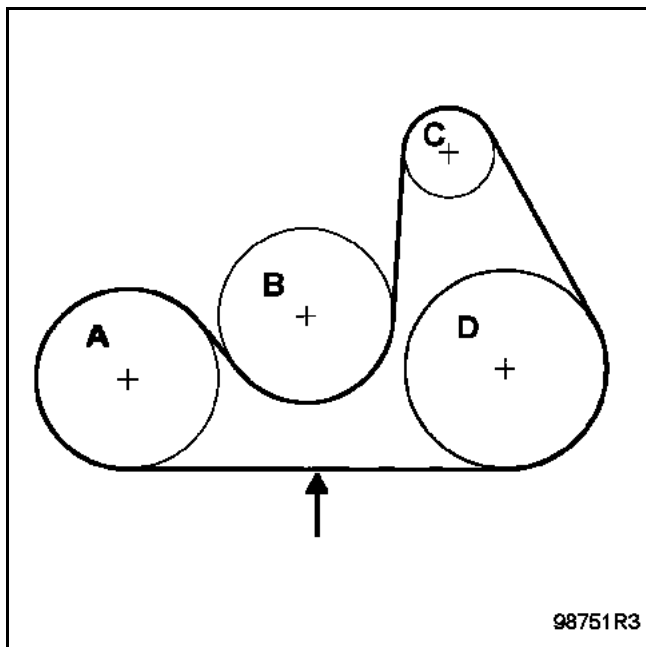
Check the accessories belt tension using belt tension tester **Mot. 1505**.

Belt tension (in Hertz):  $183 \text{ Hz} \pm 9$ .

Tighten the alternator mounting bolts to torque.

Rotate the crankshaft three times and check that the measurement is in the fitting tension tolerance.

Proceed in the reverse order to removal.



- A Crankshaft
- B Coolant pump
- C Alternator
- D Manual power steering pump
- Belt tension checking point

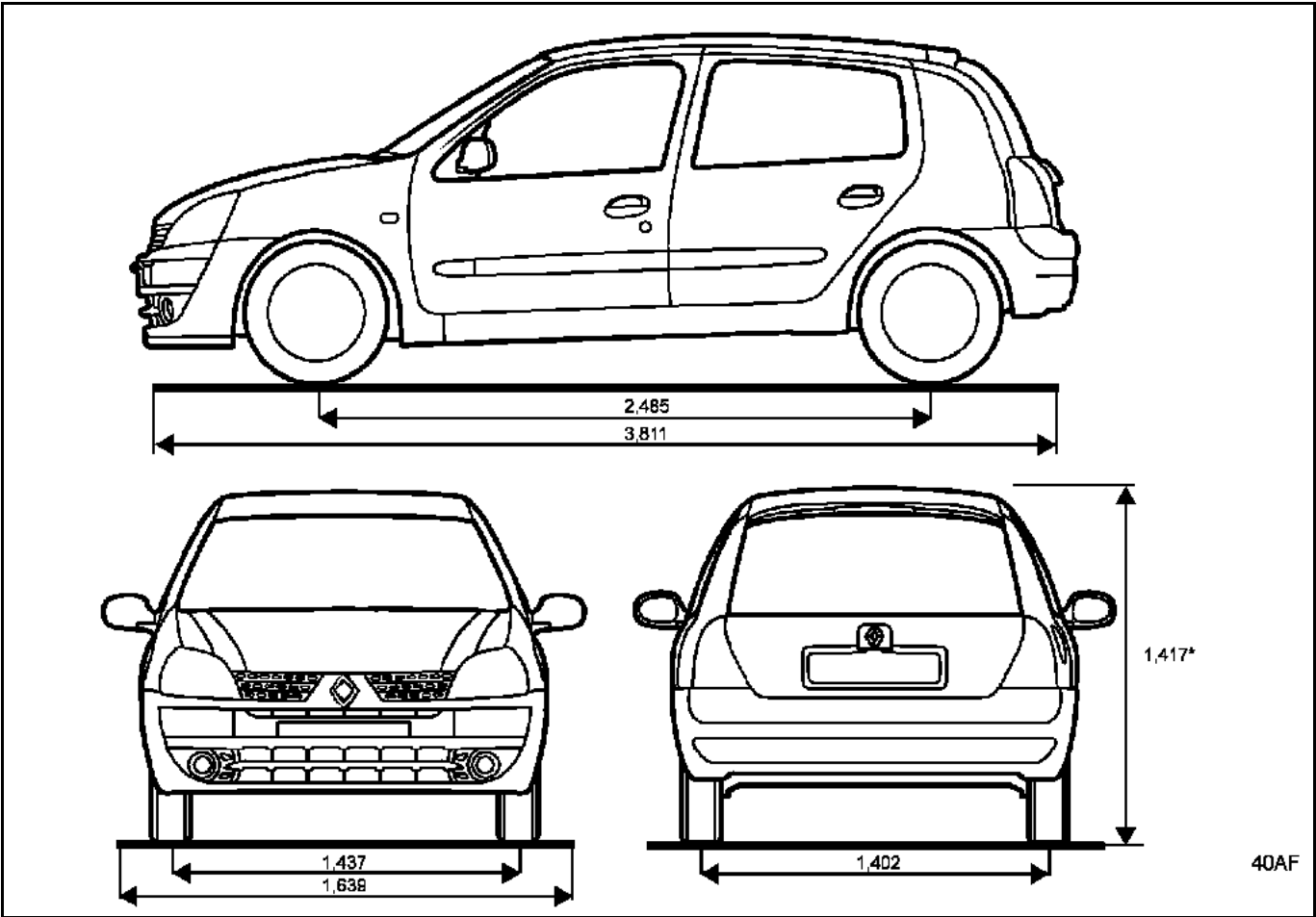
## CHECKING THE BELT TENSION

Cold engine

Position tester **Mot. 1505** on the belt tension checking point (see illustration below).

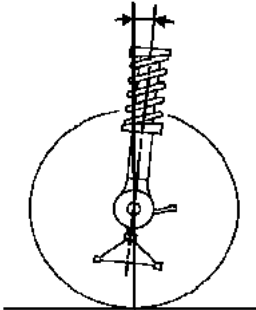
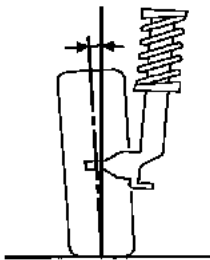
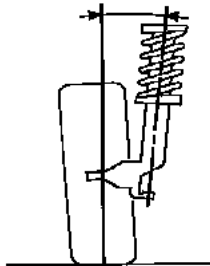
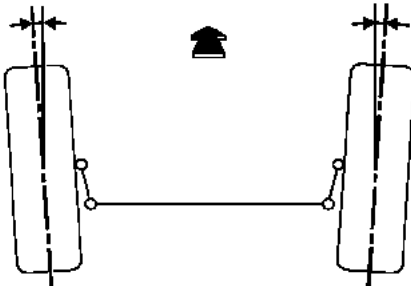
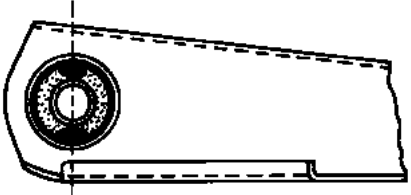
Check that the tension value is within the fitting tension tolerance, otherwise readjust it.

Dimensions in metres



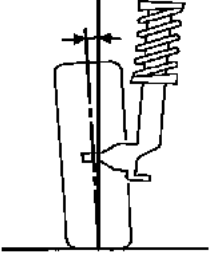
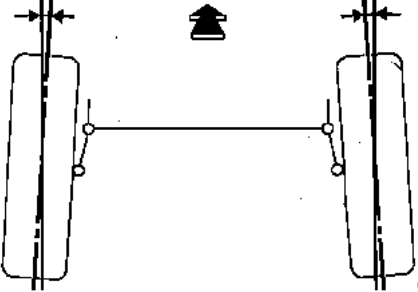
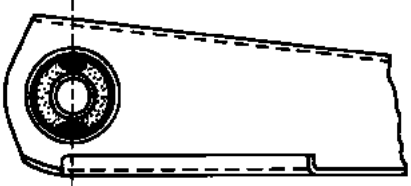
\* Unladen

Tyres: 195/45 R 16 (F4R ENGINE)

ANGLES	VALUES	POSITION OF FRONT AXLE (mm)	ADJUSTMENT
<b>CASTOR</b>  93012-1S	$\left. \begin{array}{l} 2^{\circ}44' \\ 3^{\circ}09' \\ 3^{\circ}33' \\ 3^{\circ}58' \\ 4^{\circ}20' \end{array} \right\} \pm 30'$  Max. right/left difference = $1^{\circ}$	H5 - H2 = 135 H5 - H2 = 120 H5 - H2 = 105 H5 - H2 = 90 H5 - H2 = 76	Not adjustable
<b>CAMBER</b>  93013-1S	$\left. \begin{array}{l} -0^{\circ}32' \\ -0^{\circ}33' \\ -0^{\circ}33' \\ -0^{\circ}33' \\ -0^{\circ}32' \end{array} \right\} \pm 30'$  Max. right/left difference = $1^{\circ}$	H1 - H2 = 124 H1 - H2 = 128 H1 - H2 = 132 H1 - H2 = 137 H1 - H2 = 141	Not adjustable
<b>PIVOT</b>  93014-1S	$\left. \begin{array}{l} 12^{\circ}51' \\ 12^{\circ}55' \\ 12^{\circ}59' \\ 13^{\circ}04' \\ 13^{\circ}07' \end{array} \right\} \pm 30'$  Max. right/left difference = $1^{\circ}$	H1 - H2 = 124 H1 - H2 = 128 H1 - H2 = 132 H1 - H2 = 137 H1 - H2 = 141	Not adjustable
<b>WHEEL ALIGNMENT</b>  93011-1S	(For two wheels)  Opening $0^{\circ} \pm 10'$ $0 \text{ mm} \pm 1.2 \text{ mm}$	Unladen	Adjusted by rotating the track rod sleeves
<b>POSITION FOR TIGHTENING RUBBER BUSHES</b>  81603S1	-	Unladen	-

**AXLE ASSEMBLIES VALUES AND ADJUSTMENT**  
**Rear axle geometry checking values**

**07B**

ANGLES	VALUES	POSITION OF REAR AXLE	ADJUSTMENT
<b>CAMBER</b>  93013-1S	-1°30' ± 20'	Unladen	Not adjustable
<b>WHEEL ALIGNMENT</b>  93011-2S	(For two wheels)  Opening -0°32' ± 10'  16 inch rim -3.8 mm ± 3.6 mm	Unladen	Not adjustable
<b>POSITION FOR TIGHTENING RUBBER BUSHES</b>  81603S1	-	Unladen	-

AXLE ASSEMBLIES VALUES AND ADJUSTMENT

Underbody height

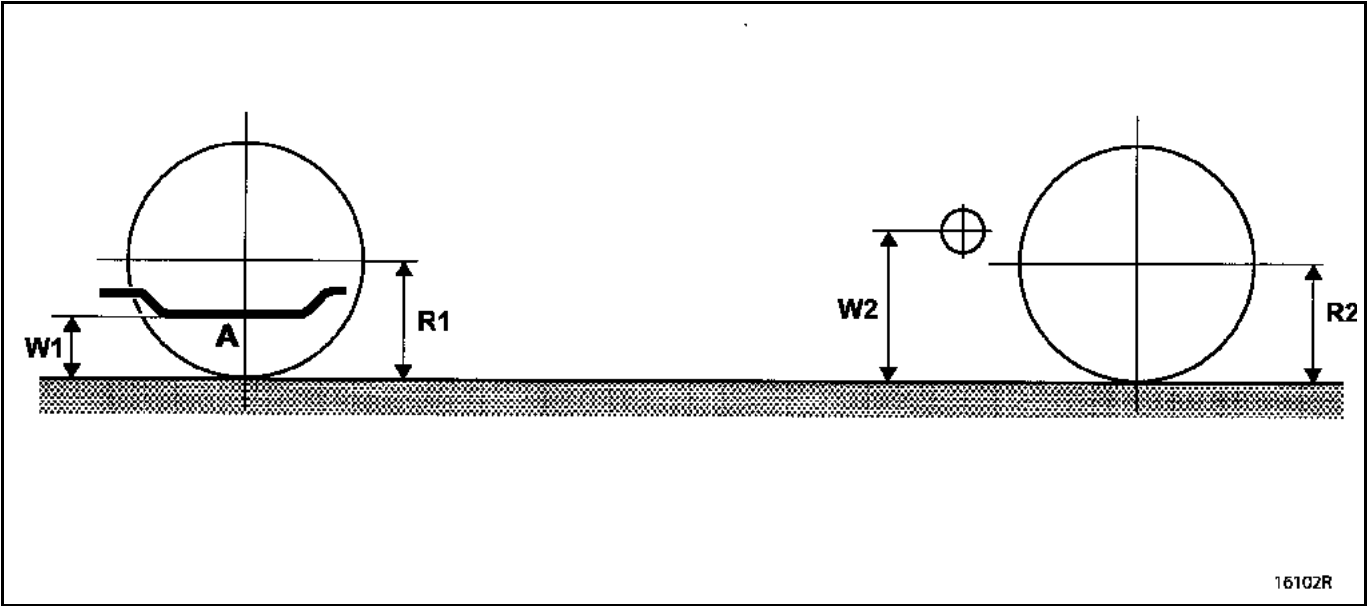
07B

Vehicle	At the front R1 - W1 (in mm)	At the rear R2 - W2 (in mm)	Dimension X (in mm) Right and Left
CB1N	125	5	-

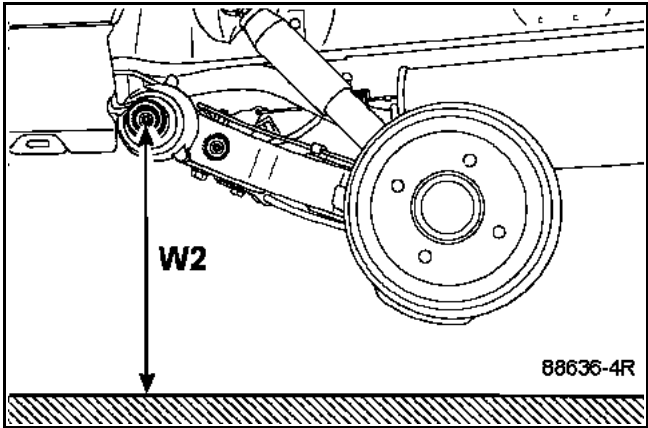
Tolerance:  $\pm 10\text{ mm}$

The difference between the right-hand side and the left-hand side of the same axle of a vehicle must not exceed **5 mm**, the driver's side always being higher.

Any operation on the underbody height does not require the brake limiter to be adjusted, as it is not controlled by the load, but it does require the brake limiter and headlights to be adjusted.



- R1** Tyre radius under load
- W1** Height measured between the lower side of the sub-frame (A) and the ground along the wheel shaft
- R2** Tyre radius under load
- W2** Height measured between the rear axle hinge pin and the ground



AXLE ASSEMBLIES VALUES AND ADJUSTMENT

Tyres and wheels

07B

Vehicle	Rim	Tyres	Tyre pressure when cold (1) (in bar) Tolerance ± 0.05	
			Front	Rear
CB1N	7J16 ET 38	195/45 R16 80V	2.7	2.2

(1) With full load and on motorways.

Wheel nut tightening torque: **9 daNm**

Rim run-out: **0.4 mm**

Vehicle	Brake disc thicknesses (in mm)				Maximum brake disc run-out (in mm)
	Front		Rear		
	Max.	Min.	Max.	Min.	
CB1N	24	21.8	8	7	0.07


Vehicle	Lining thicknesses (in mm)				Brake fluid
	Front		Rear		
	Max.	Min.	Max.	Min.	
CB1N	18	6	11	4.6	SAE J 1703 DOT 4

# STARTING - CHARGING

## Alternator

16A

Vehicle	Engine type	Alternator	Current
CB1N	F4R 736	VALEO A11 VI 88	75A

TIGHTENING TORQUES (in daNm)		
Alternator mounting M10 bolt	4.4 ± 0.6	
Alternator mounting M8 bolt	2.5 ± 0.5	

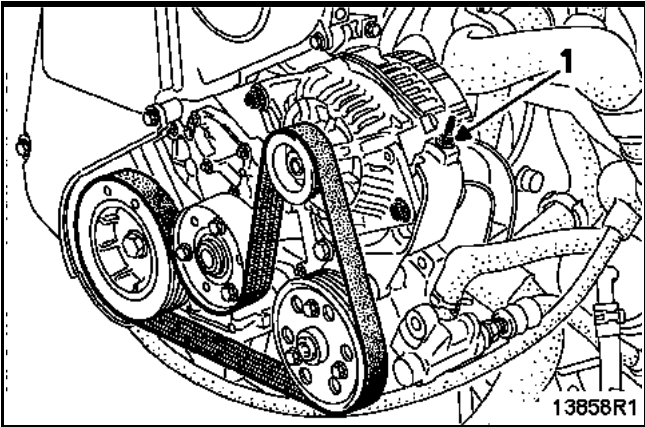
### REMOVAL

#### Accessing the alternator

To access the alternator, remove the accessories belt (see **Accessories belt tension** section).

#### Removing the alternator

- Remove:
- the alternator mounting bolts (1),
  - the alternator.



### REFITTING

Proceed in the reverse order to removal.

Tighten the accessories belt (see **Accessories belt tension** section).

### CHECKING THE TENSION

Connect a voltmeter to the battery terminals and read the battery voltage.

Start the engine and increase the engine speed until the voltmeter needle registers a stable regulated voltage.

This voltage must be above **13.5 V**.

Switch on as many power consumers as possible; the regulated voltage should be between **13.5 V** and **14.8 V**.

### CHECK

After **15 minutes** heating at **13.5 V**.

Engine speed (in rpm)	75 Amps
1000	46
2000	68
3000	71
4000	72

### SPECIAL FEATURES OF THE MULTIPOINT DIRECT INJECTION FITTED IN THE F4R 736 ENGINE

- **SIEMENS SIRIUS 34** 90-track computer controlling injection and ignition.
- Use of diagnostic tools.
- Multipoint injection operating in sequential mode without a cylinder marking or camshaft position sensor. This means that phasing is carried out by software using the TDC sensor.
- To carry out phasing, drive at half-load in 2nd gear for approximately **1 minute**.
- Injection warning light on instrument panel not operational.
- Special precautions relating to the engine immobiliser:  
Installation of a 3<sup>rd</sup> generation engine immobiliser, integrated into the UCH, requiring a special procedure to replace the computer.
- Idle speed
  - nominal idle speed (coolant temperature > **80°C**): **800 ± 50 rpm**
- Fuel vapour absorber bleed solenoid valve controlled by the opening cyclic ratio (OCR) depending on the engine operation.
- Control of the fan assembly and of the coolant temperature warning light on the instrument panel by the injection computer.
- Controlling an inlet camshaft (hydraulic) dephaser solenoid valve.
- Maximum engine speeds:
  - for a coolant temperature < **75°C**: **6700 rpm**.
  - for a coolant temperature > **75°C** in 1<sup>st</sup> or 3<sup>rd</sup> gear: **7250 rpm**.
  - for a coolant temperature > **75°C** in 4<sup>th</sup> or 5<sup>th</sup> gear: **7000 rpm**.
- Gear change indicator light comes on approximately **400 rpm** before the maximum speed.

### POWER ASSISTED STEERING PRESSURE SWITCH / INJECTION COMPUTER LINK

The injection computer receives a signal from the power steering pressure switch (which can be displayed on the diagnostic tools).

The injection computer does not adjust the engine idle speed.

### ELECTRIC CORRECTION ACCORDING TO BATTERY VOLTAGE AND ELECTRIC POWER BALANCE

The aim of this correction is to compensate for the drop in voltage due to operation of a power consuming component when the battery is at low charge.

To achieve this, the idle speed is increased, which increases the speed of rotation of the alternator, and this increases the battery voltage.

The lower the voltage, the more significant the correction. Correction of the engine speed is therefore variable. It begins when the voltage drops below **12.8 V**. The idling speed may reach **900 rpm** maximum.

**Note:**

After a cold start and lengthy idling, a sudden drop in engine speed to approximately **150 rpm** may be noticed.

## PRINCIPLE

Under normal hot engine operating conditions, the idle speed **Opening Cyclic Ratio** signal value varies between a high value and a low value, so that the nominal idle speed is obtained.

It is possible that during variations in the operation of the vehicle (running in, engine clogging, etc.), that the **Opening Cyclic Ratio (OCR)** could become close to the highest or lowest values.

The adaptative correction on the idle **Opening Cyclic Ratio** allows the slow variations of the engine's air requirements to be saved.

This correction only takes effect if the coolant temperature is greater than **75°C**, **20 seconds** after the engine is started and if the nominal idle speed regulation phase is active.

## VALUES OF THE IDLING OPENING CYCLIC RATIO AND ITS ADAPTIVE CORRECTION

PARAMETERS	F4R 736 ENGINE
Nominal idle speed	X = 800 ± 50 rpm.
Idling Opening Cyclic Ratio	2 % to 31 %
Idling Opening Cyclic Ratio adaptive	Thrust bearing MIN: - 7 % MAX: + 7 %

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

## INTERPRETATION OF THESE PARAMETERS

If there is an excess of air (air intake or throttle stop incorrectly adjusted, etc), the engine idling speed increases and the idle speed **Opening Cyclic Ratio** value decreases in order to return to nominal idle speed; the adaptive adjustment value of the idle speed **OCR** signal reduces in order to reset the idle speed regulation.

If there is insufficient air (due to clogging, etc.), the logic is reversed: the idle speed **OCR** signal increases and the adaptive adjustment also increases in order to reset the idle speed regulation operation.

### IMPORTANT

After clearing the computer memory, it is essential to start the engine and then switch it off to allow the potentiometer to be retimed. Start it again and let it run at idle speed so that the adaptive correction can take place.

### Note:

In the event of rough idling, check whether the engine phasing is correct. To do this, drive in 2nd gear at half-load for approximately **1 minute**. Then check state **ET018 Cylinder 1 recognition** using the After Sales diagnostic tool.

### HEATING THE SENSOR

The oxygen sensor is reheated by the injection computer when the engine is started.

Heating the oxygen sensor is stopped:

- when the vehicle speed is greater than **108 mph (180 km/h)** (value given for information purposes),
- according to the load and engine speed.

### UPSTREAM SENSOR VOLTAGE

The value read on the diagnostic equipment (except XR25) under the Upstream sensor voltage parameter represents the voltage supplied to the computer by the oxygen sensor located upstream from the catalytic converter. It is expressed in millivolts.

The voltage should fluctuate between two values during richness regulation:

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

The smaller the difference between the minimum and maximum values, the poorer the signal from the sensor (the difference is usually at least **500 mV**).

Note:

If the difference is small, check the sensor heater.

### MIXTURE CORRECTION

The value read on the diagnostic equipment under the Mixture correction parameter represents the average of the richness corrections made by the computer in line with the richness of the fuel mixture seen by the oxygen sensor located upstream of the catalytic converter.

The correction value has a mid-point of **128** and limits of **0** and **255**:

- value less than **128** = request for mixture to be made leaner.
- value greater than **128** = request for mixture to be made richer.

### ENTRY INTO RICHNESS REGULATION MODE

Richness regulation will start after a timed starting period according to the coolant temperature if the oxygen sensor is ready (sufficiently warm).

In all cases, richness regulation should be active after **2 minutes** if the coolant temperature is above **70 °C**.

When the mixture regulation is complete the parameter value is **128**. Refer to the **richness regulation** state on the diagnostic equipment.

### Unlooping phase

In the mixture regulation phase, the stages of operation during which the computer does not take into account the value of the voltage supplied by the upstream sensor are:

- at full load,
- under heavy acceleration,
- under deceleration with a no load signal,
- when the oxygen sensor is faulty.

In this case the value **128** is displayed.

### DEFECT MODE IN THE EVENT OF AN OXYGEN SENSOR FAULT

When the voltage from the oxygen sensor is incorrect (varying only slightly or not at all) during mixture regulation, the computer will only enter defect mode if the fault has been recognised as present for **10 seconds**. In this case only the fault will be memorised, the parameter: "Mixture correction" is **128**.

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

This vehicle is fitted with a 3rd generation engine immobiliser system, controlled by a card recognition system with random rolling code which requires a specific procedure for replacing the computer.

### REPLACING THE INJECTION COMPUTER

See Section **82A Engine immobiliser in Workshop Repair Manual 345** for engine immobiliser functions.

Injection computers are supplied without a code, but they can all be programmed with one.

If a computer is replaced, it must be programmed with the code of the vehicle and the correct operation of the engine immobiliser function must be ensured.

To do this, simply switch on the ignition for a few seconds without starting the engine and then switch it off. With the ignition off, the engine immobiliser function comes into operation after approximately **10 seconds** (the red engine immobiliser warning light flashes).

#### **WARNING**

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

Furthermore, this system does not have a fault finding code.

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

It will no longer be possible to decode them.

### PRINCIPLE

In loop mode, richness regulation adjusts the injection timing so as to obtain a mixture as close as possible to richness 1. The adjustment value is close to **128**, with limits of **0** and **255**.

The adaptive correction makes it possible to offset the injection map to realign the mixture regulation around **128**.

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

PARAMETERS	F4R 736 ENGINE
Operating adaptive richness	$64 \leq X \leq 160$
Idle adaptive richness	$64 \leq X \leq 160$
Mixture correction	$64 \leq X \leq 200$

### ROAD TEST

#### Conditions:

- engine warm (coolant temperature **> 75 °C**).
- do not exceed an engine speed of **4800 rpm**.

#### Pressure zones which must be passed through during the test

	Range No. 1 (mbar)	Range No. 2 (mbar)	Range No. 3 (mbar)	Range No. 4 (mbar)	Range No. 5 (mbar)
	251	399	517	635	753
					873
<b>F4R 736</b>	Average 325	Average 458	Average 576	Average 694	Average 813

Following this test the adjustments will be operational.

The test must be followed by normal smooth and varied driving for a distance of **3 to 6 miles (5-10 kilometres)**.

After the test, read the adaptive richness values. Initially **128**, they may have changed.

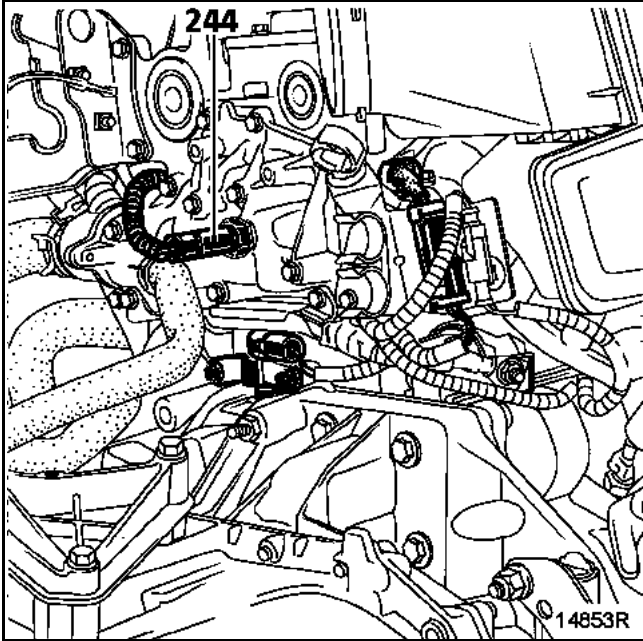
If not, repeat the test ensuring that the test conditions are observed.

### INTERPRETATION OF INFORMATION GATHERED DURING A ROAD TEST

In the case of a lack of fuel (injectors clogged, pressure and flow of fuel too low, etc), the richness regulation increases to obtain a richness as close as possible to **1** and the adaptive richness correction increases until the richness correction again fluctuates at around **128**.

In the event of an excessive amount of fuel, the logic is reversed: the richness regulation decreases and the adaptive richness correction also decreases to realign the richness correction at around **128**.

### CENTRALISED COOLANT TEMPERATURE MANAGEMENT



**244** Coolant temperature sensor (injection and coolant temperature indicator on the instrument panel).

**Three-track sensor:**

- two for the coolant temperature signal,
- one for the instrument panel indicator.

This system is fitted with a single coolant temperature sensor which is used for the injection, the fan assembly and the temperature warning light on the instrument panel.

#### Operating principle

Sensor **244** enables:

- the coolant temperature to be indicated on the instrument panel,
- the injection computer to be informed of the engine coolant temperature.

The injection computer uses the coolant temperature to control:

- the injection system,
- the fan assembly relay,
  - the fan assembly is controlled if the coolant temperature exceeds **98 °C**,
  - the fan assembly only has one speed,
  - the fan assembly can be controlled by the antipercolation device,
- temperature warning light.

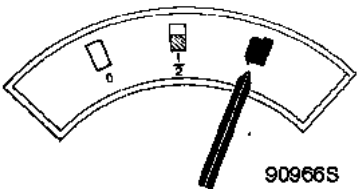
#### COOLANT TEMPERATURE WARNING LIGHT'

The coolant temperature warning light is controlled by the injection computer if the coolant temperature exceeds **118 °C** and goes out if the temperature falls below **115 °C**.

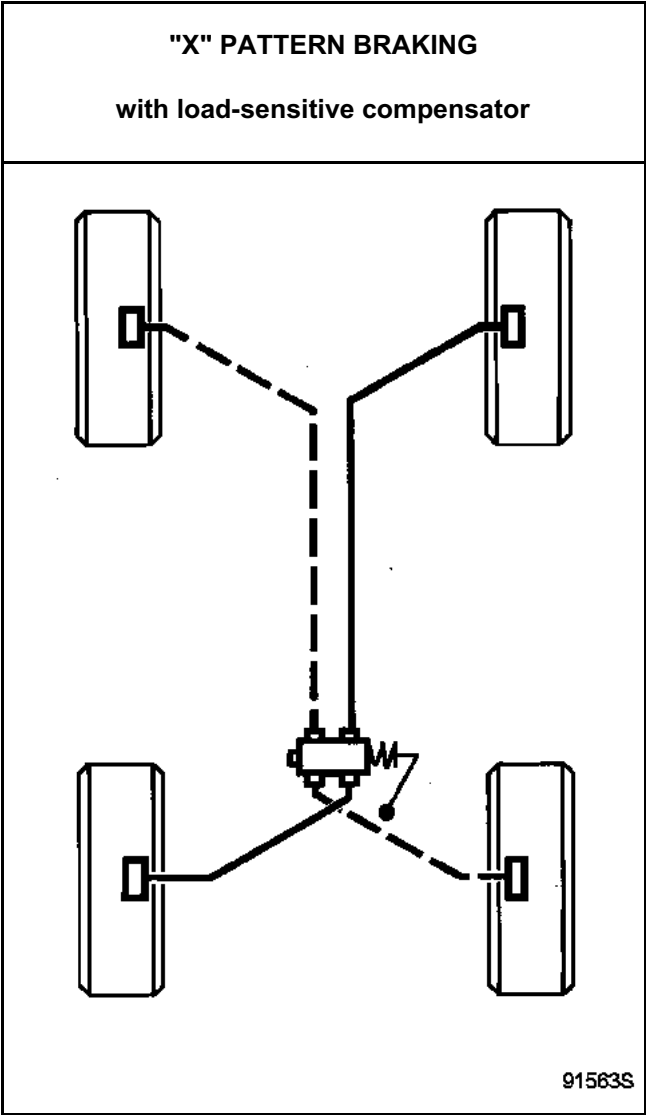
# GENERAL INFORMATION

## Brake compensator

30A

Vehicle	Amount of fuel in tank (driver on board)	Check pressure (1) (in bars)	
		Front	Rear
CB1N	 90966S	100	24 <sup>1</sup> / <sub>3</sub>

(1) The test is performed using two pressure gauges in an **X** arrangement.

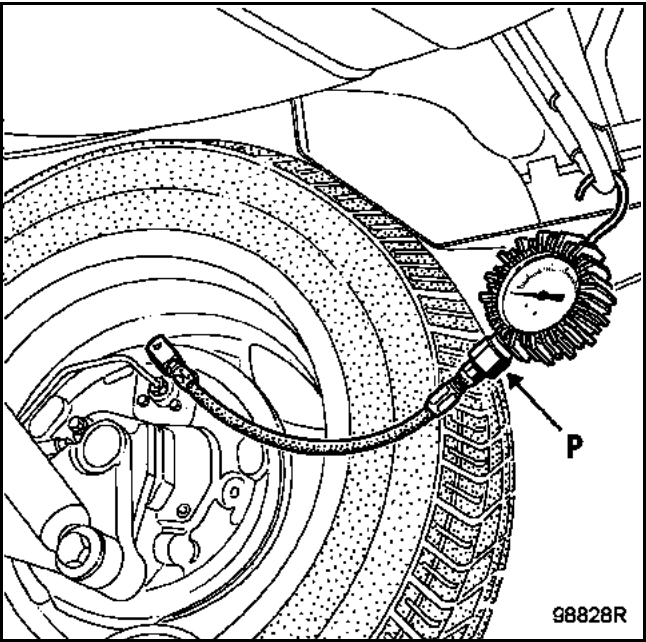


### CHECK

Connect two pressure gauges **Fre. 244-03** or **Fre. 1085-01**:


- one at the front right-hand side,
- one on the rear left-hand side.

Bleed the pressure gauges via screw (P).



### IMPORTANT

Gradually depress the brake pedal until the pressure at the front wheels is at the setting pressure (see table of values). Then read the corresponding pressure on the rear wheels: if it is incorrect, replace the compensator (sold adjusted at the Spare Parts Store).

TIGHTENING TORQUES (in daNm)		
Alternator M10 mounting bolt	4.4 ± 0.6	
Alternator M8 mounting bolt	2.5 ± 0.5	
Assistance pump mounting bolt	2.5 ± 0.5	
Mounting bolt for suspended engine mounting	6.2 ± 0.3	

REMOVAL

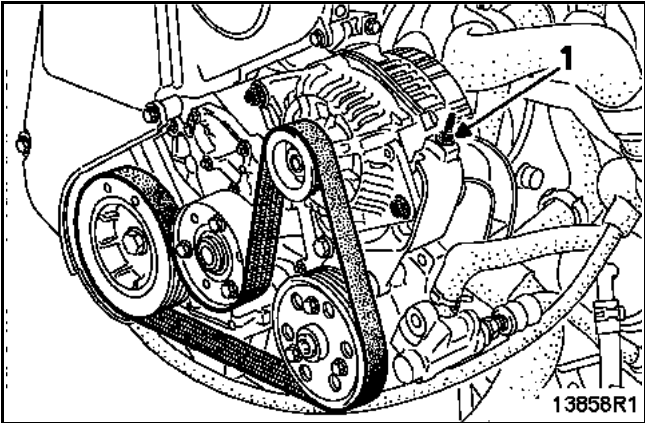
Access to manual power steering assistance pump

Put the vehicle on a two-post lift.

Disconnect the battery.

- Remove:
- the engine undertray,
  - the front right-hand wheel,
  - the right-hand mudguard.

Slacken the accessories belt by pressing on the alternator: loosen the alternator mounting bolt, then turn nut (1) until the accessories belt comes out.



Removing manual power steering assistance pump

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

- Disconnect the following pipes:
- supply pipe,
  - high-pressure pipe.

Note:  
Expect fluid to drain from the power-assisted steering.

Remove the manual power steering assistance pump

REFITTING

Proceed in the reverse order to removal.

Torque tighten.

Tighten the accessories belt according to the procedure described in the **Belt tension** section.

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