

**STARTING AND RECHARGING - DESCRIPTION**

**STARTING AND RECHARGING - FUNCTIONAL DESCRIPTION**

**STARTING AND RECHARGING - WIRING DIAGRAM**

**STARTING AND RECHARGING - COMPONENT LOCATION**

Packet print

The ignition and recharging circuit comprises the battery, starter motor and alternator. The battery (12V) is low maintenance type. The starter motor consists of a d.c. motor supplied by the battery and an excitation electromagnet. When the ignition key is turned as far as it will go (AVV), the motor windings are supplied to generate the electromagnetic forces that are used to turn the starter motor pinion. This simultaneously activates the electromagnet that operates the mechanism that causes the pinion to mesh with the flywheel ring gear and thus turn the crankshaft. The alternator recharges the battery during normal engine rotation. The alternator shaft (rotor) is turned by the crankshaft via a belt. When supplied by an excitation current, the rotor generates a magnetic field that sets up an alternating current in the fixed winding (stator). A diode rectifier bridge at the back of the alternator allows the alternating current to be transformed into a direct current that is sent to recharge the battery. A voltage regulator built into the alternator maintains the power supply at a constant voltage (around 14 V) throughout all load variation and engine speed ranges. Recharging system efficiency is controlled by the Body Computer, which measures the D+ signal from the alternator with the engine running. If the voltage measured is insufficient, the warning light in the instrument panel is switched on as well as the display of a message. As an option, an upgraded potentiometer (160A) that is designed for connection to oversized cable cross-sections may be fitted.

**STARTING AND RECHARGING - DESCRIPTION**

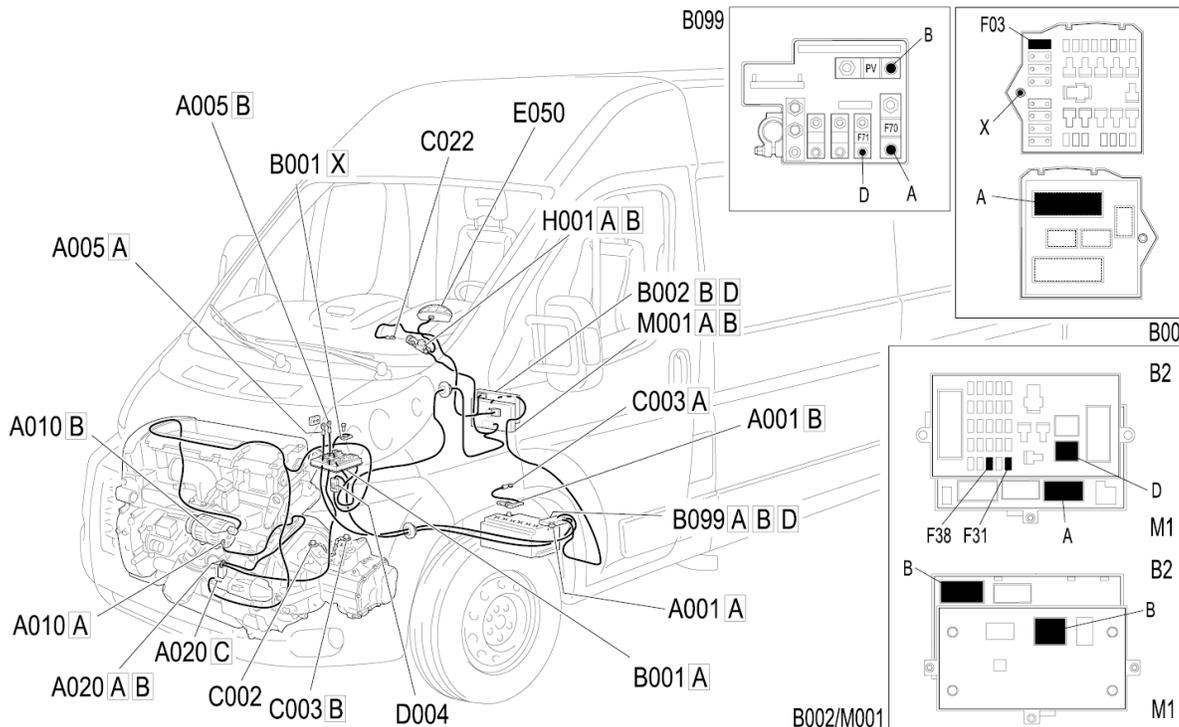
**STARTING AND RECHARGING - FUNCTIONAL DESCRIPTION**

**STARTING AND RECHARGING - WIRING DIAGRAM**

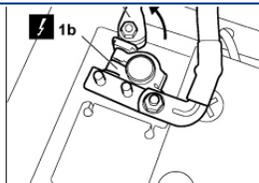
**STARTING AND RECHARGING - COMPONENT LOCATION**

Packet print

The Body Computer M001 receives a direct battery power supply at pin 1 (protected by fuse F38 of B002) and 18 of the coupling with the junction unit under the dashboard B002; it also receives an ignition-controlled power supply (INT) at pin 9 of the same coupling. The M001 Body Computer is also connected to the C022 central dashboard earth via pins 10 and 19 of connector B and via pin 20 of the junction with the B002 junction unit under the dashboard (output from pin 10 of connector B of the B002 junction unit). On turning the key in the H001 ignition switch to the end position (AVV), the starter motor A020 (connector C) electromagnets winding receive a power supply from pin 3 of connector A. This direct battery power supply reaches the H001 ignition switch (pin 2 of connector A) via a line protected by fuses F70 of the B099 fuse control unit and F03 of the B001 engine compartment junction unit. Connector A for the starter motor A020 receives a power supply directly from the battery via the line protected by the dedicated "powerful" fuse (CAL4) of the fuse box on the battery B099 and the shunt fuse for terminal board A005. The direct current generated by the A010 alternator is sent from connector A (B+) to connector B of the A020 starter motor, which is internally connected to the line connected to the A001 battery. The connection between connector B (D+) of the A010 alternator and pin 25 of connector A of the M001 Body Computer allows the performance of the alternator itself to be diagnosed (in the event of an insufficient recharging level). Once a fault has been discovered, the M001 Body Computer, through the CAN, will light up the "battery recharging" warning light on the E050 instrument panel.

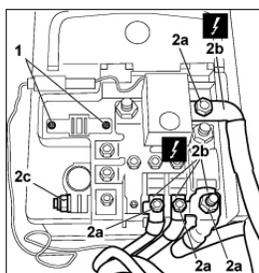


<a href="#">A001</a>	BATTERY	<a href="#">_Op. 5530B BATTERY AND LEADS</a>
<a href="#">A005</a>	Contact board	<a href="#">_Op. 5530B BATTERY AND LEADS</a>
<a href="#">A010</a>	ALTERNATOR	<a href="#">_Op. 5530A ALTERNATOR AND COMPONENTS</a>
<a href="#">A020</a>	STARTER MOTOR	<a href="#">_Op. 5520B STARTER MOTOR AND COMPONENTS</a>
<a href="#">B001</a>	JUNCTION UNIT	<a href="#">_Op. 5505A MULTI-FUNCTION COMPONENTS</a>
<a href="#">B002</a>	JUNCTION UNIT UNDER DASHBOARD	<a href="#">_Op. 5505A MULTI-FUNCTION COMPONENTS</a>
<a href="#">B099</a>	MAXI FUSE BOX ON BATTERY	<a href="#">_Op. 5530B BATTERY AND LEADS</a>
<a href="#">C002</a>	BATTERY EARTH ON ENGINE	-
<a href="#">C003</a>	BATTERY EARTH ON BODY SHELL	-
<a href="#">C022</a>	Centre dashboard earth	-
<a href="#">D004</a>	FRONT/ENGINE COUPLING	-
<a href="#">E050</a>	INSTRUMENT PANEL	<a href="#">_Op. 5560B ANALOGUE CONTROL PANEL</a>
<a href="#">H001</a>	IGNITION SWITCH	<a href="#">_Op. 5520A IGNITION SWITCH</a>
<a href="#">M001</a>	BODY COMPUTER	<a href="#">_Op. 5505A MULTI-FUNCTION COMPONENTS</a>



1. Rotate lever (1a) as illustrated and disconnect negative terminal (1b) from the battery.

	Description	Connector
1b	BATTERY	<a href="#">See A001 BATTERY</a>



- Remove the protective cover for the supply casing.

1. Unscrew the power supply casing anchorage bolts.

2. Undo fixing nuts (2a), detach electrical connections (2b), undo nut (2c) securing the positive terminal and remove the power supply casing from the vehicle.

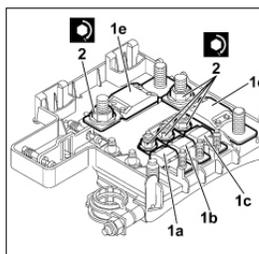
	Description	Connector
2c	BATTERY	<a href="#">See A001 BATTERY</a>

Refitting ( )

- Check that the power supply box is not damaged and that there is no oxidation.

- If necessary, carry out continuity tests.

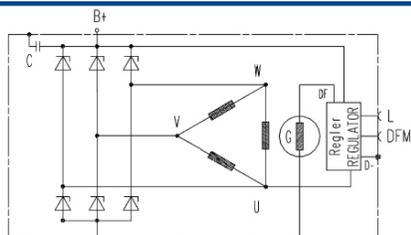
- Check that the fuses on the power supply casing are intact; change any fuses that are damaged as indicated below:



1. Undo the retaining nut and remove the fuse concerned:

- (1a) - F73, 50A
- (1b) - F72, 70A
- (1c) - F71, 80A
- (1d) - F70, 150A
- (1e) - PowerVAL fuse, CAL4

*It is very important to make sure that the nuts securing the fuses are correctly tightened to torque in order to avoid damage to the*



#### TECHNICAL DATA

The types of alternator adopted on this vehicle are summarized in the table.

Alternator	2.2 JTD	2.3 JTD / 3.0 JTD	2.3 JTD / 3.0 JTD Increased power
Type	-	-	-
Voltage (V)	14	14	14
Rated current (A)	150	110	140
Supplier	BOSCH	BOSCH	BOSCH

The installation of power electrical equipment (e.g. electric motors used frequently or electric motors used less frequently but for long periods and whilst the engine is switched off, such as chargers for town use), or a large number of additional electrical appliances may require power that the normal vehicle system is not capable of supplying. In these cases suitable capacity additional batteries and a more powerful alternator should be adopted.

For further details,

[See descriptions 5530B BATTERY AND LEADS](#)

#### OPERATION

With the alternator still with the ignition key in the ON position, the Body Computer lights up the warning light in the instrument panel and sends a power supply to the voltage regulator built into the alternator via terminal D+.

In these conditions the energizing circuit (rotor) is enabled to earth by the regulator electronics. With the alternator rotating through the effect of the variation of the rpm and the magnetic field, a three-phase alternating voltage is produced in the electrical circuit (stator) which rectified by the diode bridge can exit terminal B+.

When the upper fixed calibration level is reached it charges the battery and supplies the system. The Body Computer checks the efficiency of the alternator recharging system by detecting two parameters: the voltage signal coming from terminal D+ of the actual alternator and the engine rpm signal received on the CAN from the engine management control unit.

At the key-on as long as the voltage is below around 5.5 V, the Body Computer signals the insufficient recharging state; when the voltage exceeds 5.5 V, the warning light goes out; if, on the other hand, with the engine moving (speed above 700 rpm), the voltage decreases below the level of 4.5 V, then the warning light comes on constantly accompanied by the display of a message.

