

MEGANE

1 Engine and peripherals

16A

STARTING - CHARGING

Mégane II ph2

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V1

Edition Anglaise

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

The procedures 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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STARTING - CHARGING

Fault finding – Role of components

16A

● Battery

The principal purpose of the battery is to provide the powerful current briefly required by the starter motor to start the engine. For optimum starting, the current supplied by the battery must be sent to the starter motor with minimum loss. To achieve this, the electrical connections (wires, terminals, connectors, etc.) must be in good condition. When the engine is not running, the battery must feed the accessories that operate constantly, even with the ignition switched off, such as the alarm, radio codes, computers, etc.

● Starter

This turns the engine over to make it start, and requires a very powerful electric current, which the battery must be able to supply.

● Alternator

The alternator only operates when the engine is running. Its function is to recharge the battery, and at the same time to supply the electrical power required to operate all the electrical accessories on the vehicle.

The alternator on **Mégane II phase 2** is a controlled alternator. The UPC* controls the regulation via a serial connection.

● Engine Compartment Connection Unit or Protection and Switching Unit

The UPC* is connected to the alternator by a serial connection. The UPC* intelligently manages the alternator regulation voltage according to the engine phase, the battery charge, and the temperature.

● The UCH

The UCH* interprets the starting request and analyses if the starting conditions are satisfied, in order to transmit the request to the UPC*.

*UPC: **Engine Compartment Connection Unit or Protection and Switching Unit**

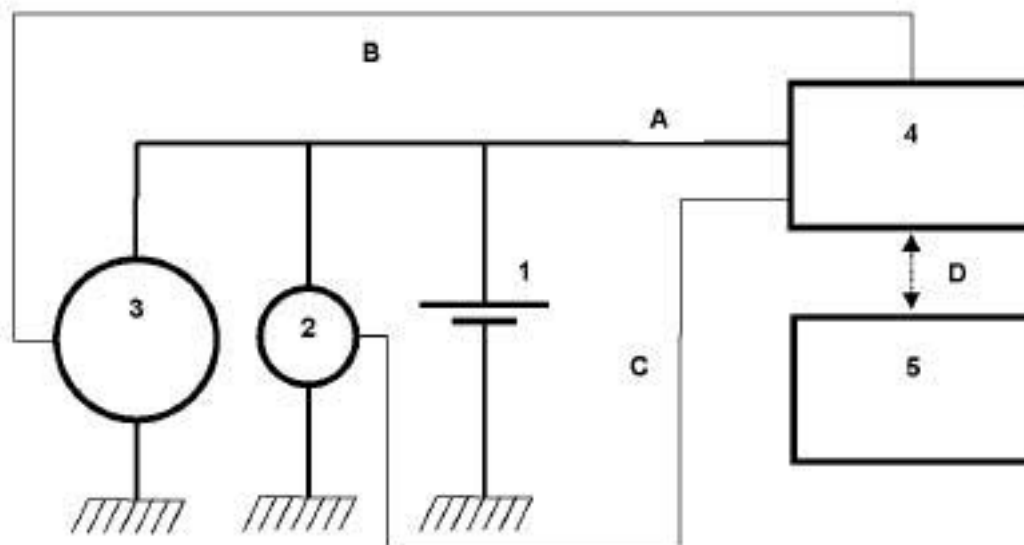
*UCH: **Passenger Compartment Central Unit**

STARTING - CHARGING

Fault finding – Operating diagram

16A

STARTING - CHARGING FLOWCHART:



1. Battery, component code **107**,
 2. Starter, component code **163**,
 3. Alternator, component code **103**,
 4. **Protection and Switching Unit**, component code **1337**
 5. **UCH**, component code **645**.
- A. "High current" wiring
 B. Serial connection for communication between the alternator and the UCH
 C. Starter control line
 D. Multiplex network

The function of the charging circuit is to:

- Ensure electrical energy is supplied to the vehicle whilst respecting the dynamic performance constraints of the engine and transmission assembly: the alternator resisting torques and the torque gradients measured must be managed.
- To control alternator loading and load shedding during engine management authorisation or variation of the electrical load.
- To ensure the quality of the on board network voltage in terms of the voltage level and variation (voltage gradient management).
- To optimise the battery charge by applying a voltage to its terminals correlating to its initial charge status (in sleep mode) and to its internal temperature.
- To inform the engine management about the mechanical power taken from the accessories pulley, the alternator charge rate and the rotor excitation current value.
- To run fault finding on the charging circuit: "Battery" warning light display.

The function of the starting circuit is to:

- start the vehicle when there is a starting request from the "start" button.

STARTING - CHARGING
Fault finding – Customer complaints

16A

STARTING

THE STARTER DOES NOT WORK

ALP 1

THE STARTER TURNS BUT DOES NOT ENGAGE

ALP 2

THE STARTER IS NOISY WHEN STARTING

ALP 3

LOW STARTER SPEED

ALP 4

STARTING - CHARGING

Fault finding – Fault finding charts

16A

ALP 1

The starter does not work

NOTES

Test the condition of the battery (see **80A, Battery, Test 1 Battery check**).
 Test the condition of the power fuse (see **TEST 2 Test of power fuse condition and source of fault**).
 Check **ET010 Starting conditions met** (see **87B, Passenger compartment connection unit, Fault finding - Interpretation of statuses**).
 Check that the engine is not jammed.

Check that the following terminals are correctly tightened:

- the battery,
- the starter,
- the engine earth,
- the bodywork earth.

Are the terminals correctly tightened?

NO →

Retighten the terminals (see **MR 364, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

YES
↓

Check that the following wires are in good condition:

- the wire connecting the battery +, component code **107**, to terminal **B+** of the starter, component code **163**,
- the wire connecting the battery - to the bodywork earth,
- the wire connecting the engine to the bodywork earth.

Are the wires in good condition?

NO →

Repair the damaged wires and terminals. If the connection is faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it.

YES
↓

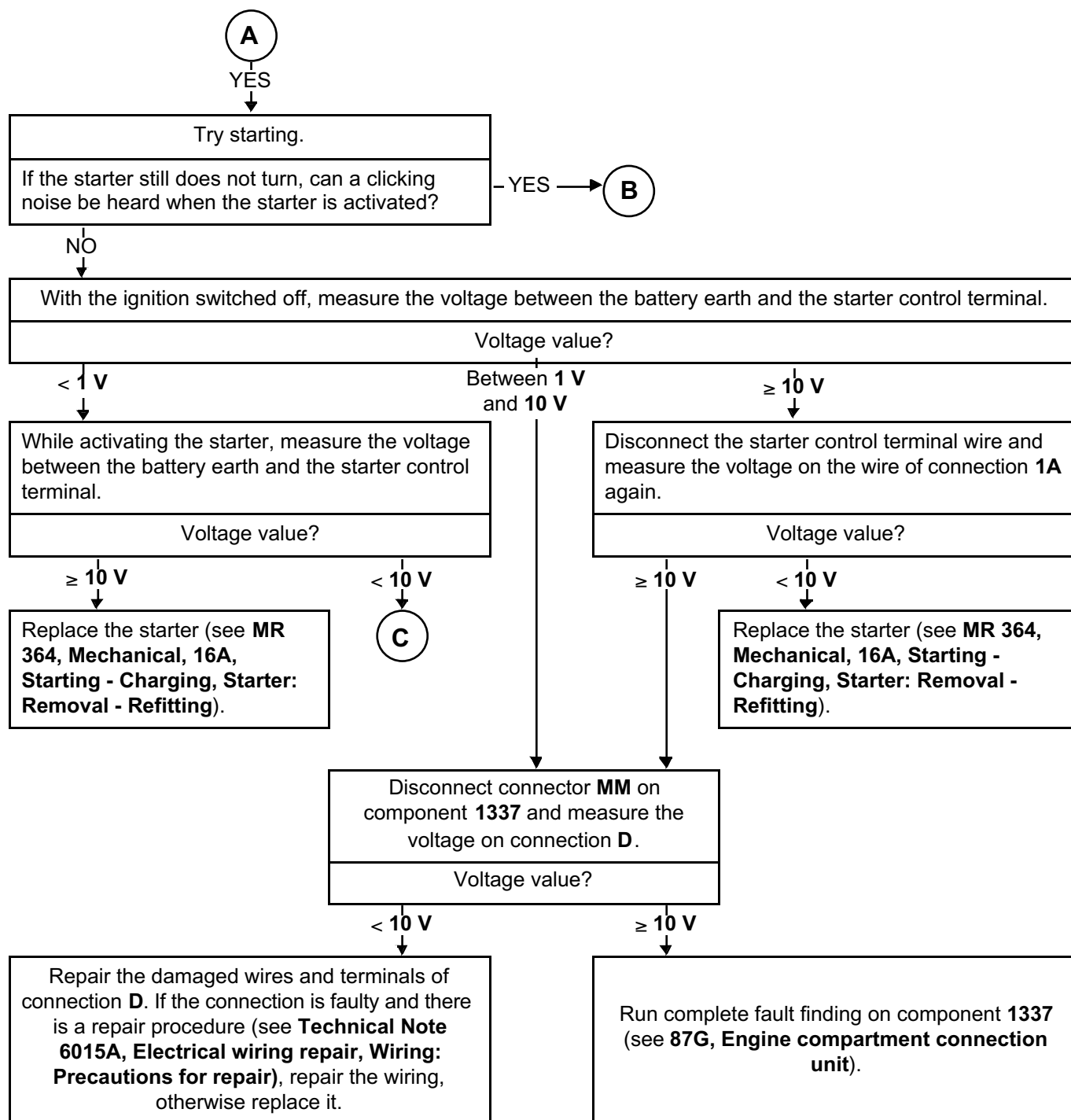
A

STARTING - CHARGING

Fault finding – Fault finding charts

16A

ALP 1 CONTINUED 1



**ALP 1
CONTINUED 2****B**

Measure the voltage on connection **BPDA** between the earth taken on one of the starter mounting points and its **B+** terminal while activating the starter.

Voltage value?

> 10 V

Between 0 V
and 10 V

Measure the drop in voltage on connection **BPDA** between the battery + terminal and the starter **B+** terminal while activating the starter.

Voltage value?

 $\geq 2 \text{ V}$

Replace the cable connecting the battery + terminal to the starter.

< 2 V

Measure the drop in voltage between the battery - terminal and the earth on one of the starter mounting points while activating the starter.

Voltage value?

 $\geq 2 \text{ V}$

Replace the earth cable(s) connecting the engine to the battery.

< 2 V

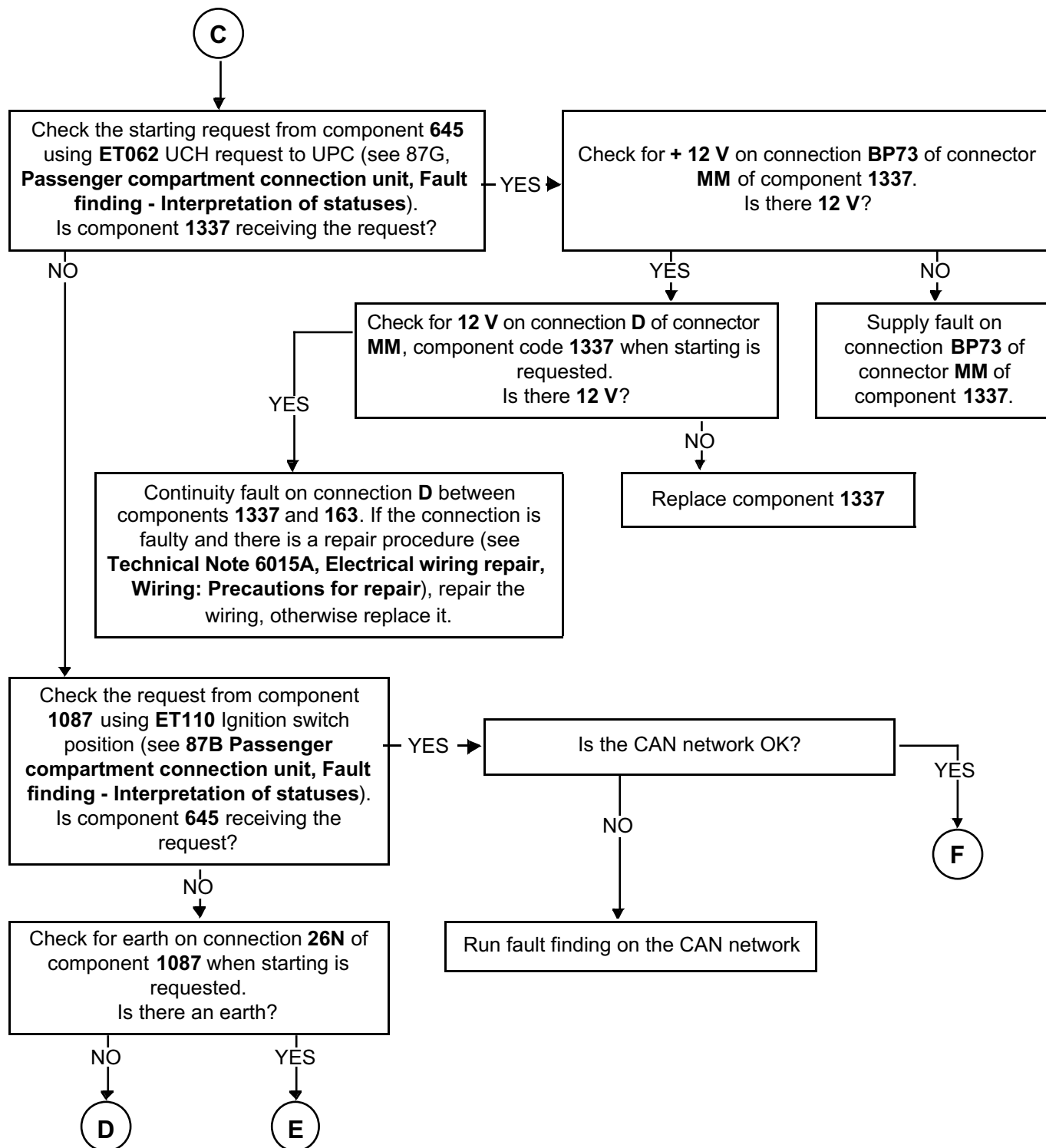
Replace the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).

STARTING - CHARGING

Fault finding – Fault finding charts

16A

ALP 1 CONTINUED 3

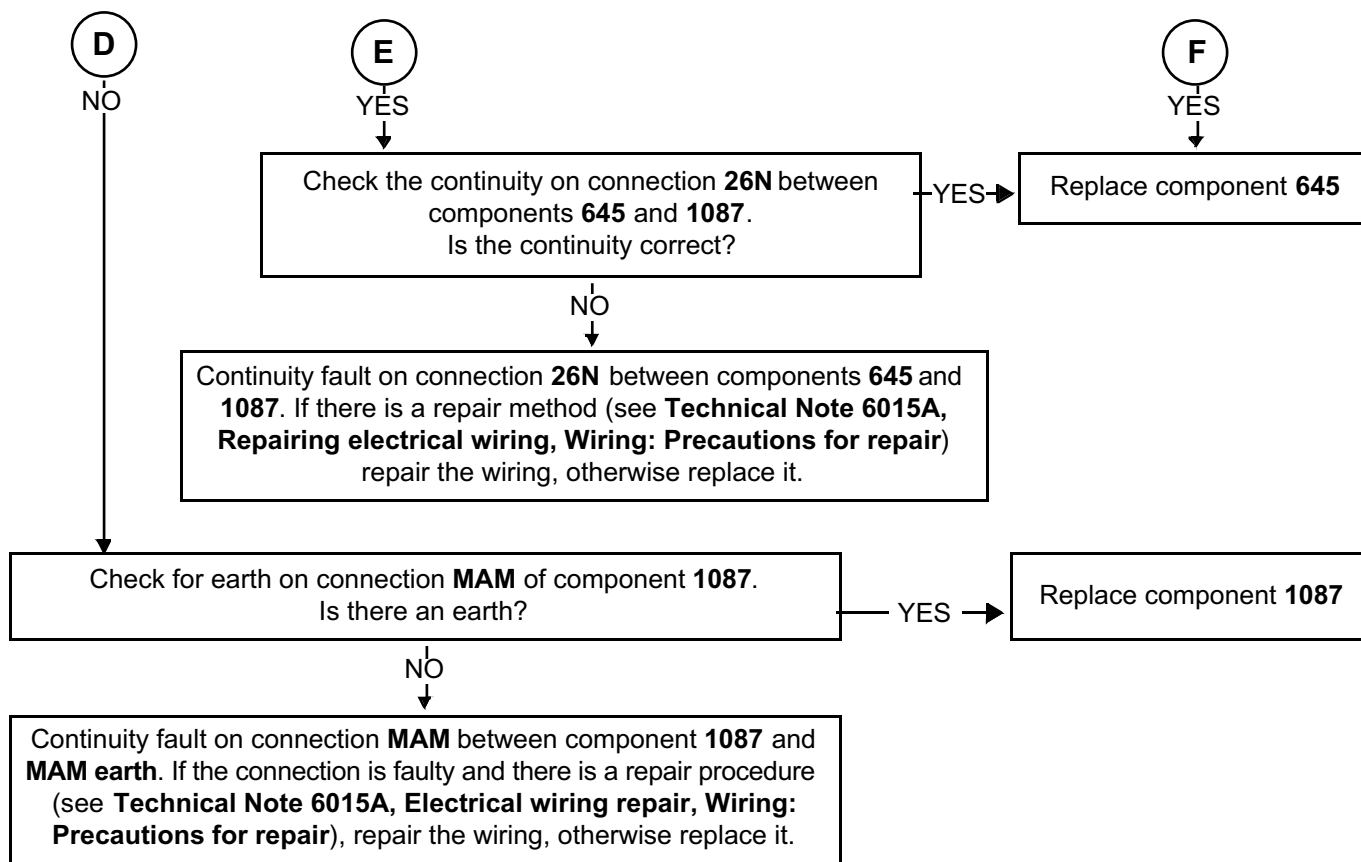


STARTING - CHARGING

Fault finding – Fault finding charts

16A

ALP 1 CONTINUED 4



STARTING - CHARGING

Fault finding – Fault finding charts

16A**ALP 2****The starter turns but does not engage****NOTES****Special notes:**

Disconnect the battery earth before handling.

Remove the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).

Check that the ring gear of the flywheel is in good condition.

Are the ring gear teeth damaged?

YES

Replace the flywheel (see **MR 364, Mechanical, Engine and peripherals, Engine and cylinder block assembly**).

Check the condition of the starter (broken teeth or worn gears).

Is the starter in good condition?

YES

Refit the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).

NO

NO

Replace the starter (see **MR 364, Mechanical, 16A, Starting - charging, Starter: Removal - Refitting**).

STARTING - CHARGING

Fault finding – Fault finding charts

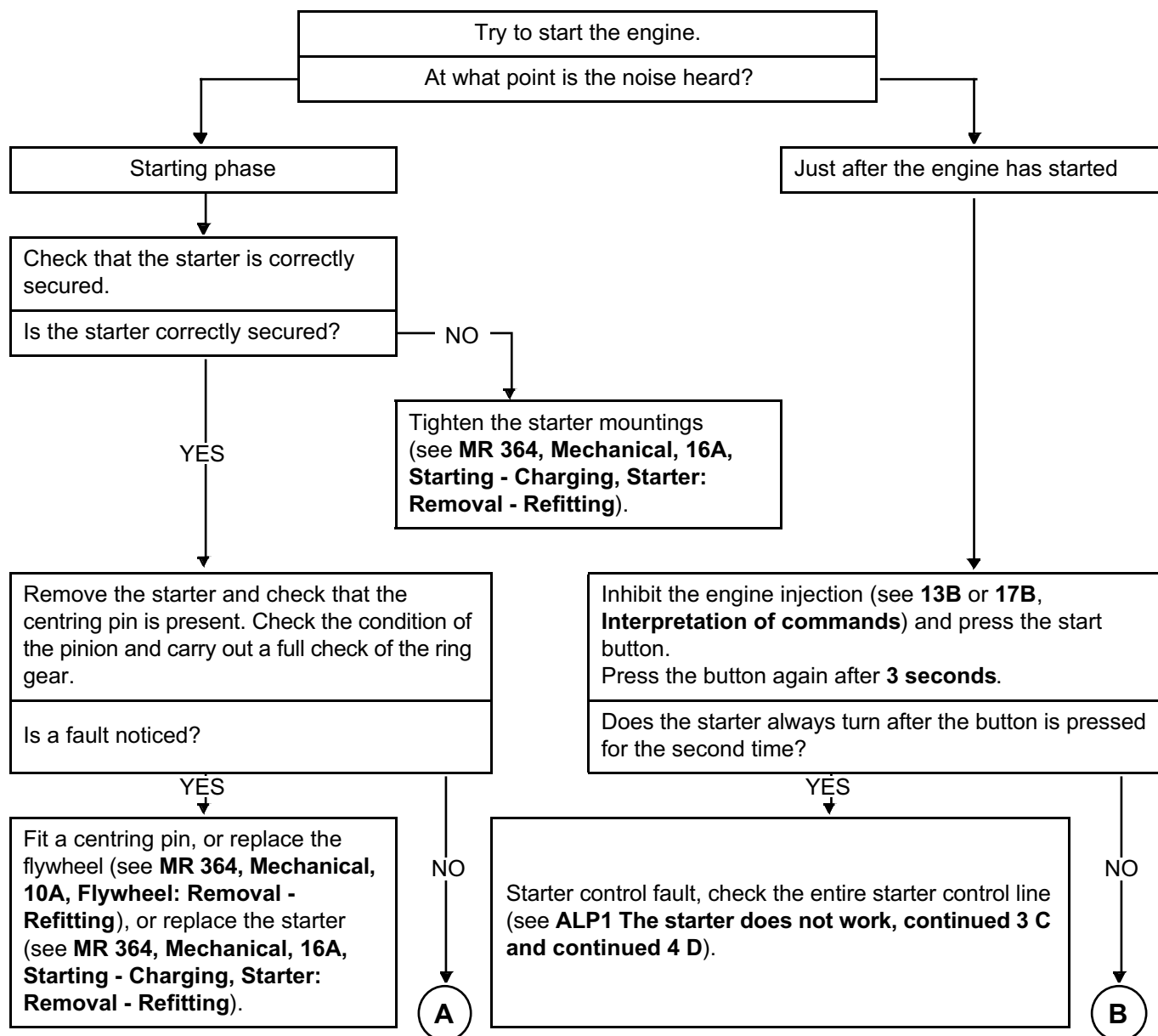
16A

ALP 3

The starter is noisy when starting

NOTES

Test the condition of the battery (see **80A, Battery, Test 1 Battery check**).
Check that the noise is actually coming from the starter.



STARTING - CHARGING

Fault finding – Fault finding charts

16A**ALP 3
CONTINUED**

Replace the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).



Make several attempts, waiting for **10 minutes** after 3 attempts (to let the starter cool). If the result is still the same after several attempts, replace the starter (see **MR 364, Mechanical, 16A, Starting - charging, Starter: Removal – Refitting**).

STARTING - CHARGING

Fault finding – Fault finding charts

16A**ALP 4**

The starter rotates slowly from the outset
The speed of rotation of the starter drops rapidly
The starter causes the warning lights on the instrument panel to become very dim

NOTES

Test the wiring (**TEST3 Wiring check**).
Test the condition of the battery (see **80A, Battery, Test 1 Battery check**).

If the fault is still present, replace the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).

NOTES

Perform this test only after running complete fault finding on the Engine compartment connection unit using the **diagnostic tool** (see **87G, Engine compartment connection unit**).
Because the Engine compartment connection unit houses the CHARGING CIRCUIT function (sub-function: alternator) and checks the alternator via a serial connection.

CHARGING**ALTERNATOR FLOW TEST****TEST 1****POWER FUSE AND WIRING****TEST THE CONDITION OF THE POWER FUSE AND THE CAUSE OF ITS FAULT****TEST 2****WIRING HARNESS CHECK****TEST 3**

TEST 1

Test the alternator supply

NOTES

Test the condition of the battery (see **80A, Battery, Test 1 Battery check**).

Engine warm and running at idle speed for **2 minutes**, all consumers switched off, measure the voltage at the battery terminals.

Voltage value?

$\geq 16 \text{ V}$

Replace the alternator (see **MR 364, Mechanical, 16A, Starting - Charging, Alternator: Removal - Refitting**).
Visually inspect the consequences (battery, corrosion, etc.).

$< 16 \text{ V}$

With the engine idling, connect a current clamp to the alternator **B+** wire, connection code **BPDA**, with all consumers switched off.

Current $< 5 \text{ A}$

Replace the alternator
(see **MR 364, Mechanical, 16A, Starting - Charging, Alternator: Removal - Refitting**).

Current between **5 A** and **35 A**

Keep the engine speed at **3000 rpm**
and still with no consumers switched on.

Value of measured current?
(i 1)

Current $> 35 \text{ A}$

Check that there are no
electrical components
consuming an abnormal
amount of current.
Disconnect the fuses one
by one.

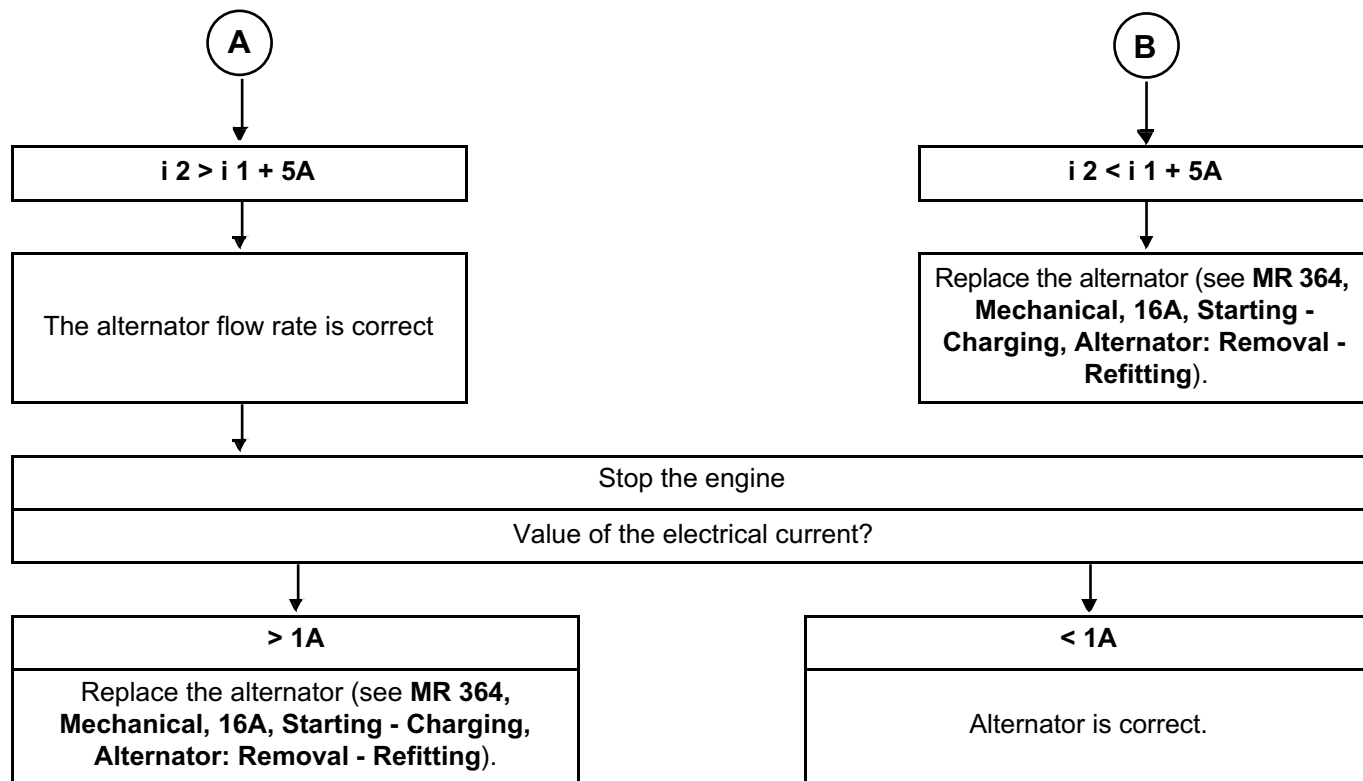
Keep the engine speed at **3000 rpm** with all consumers switched on.
Main beam headlights, de-icing, passenger compartment ventilation.

Value of measured current? (i 2)

Compare i 1 and i 2

A

B

TEST 1
CONTINUED

TEST 2

Test the condition of the power fuse and the cause of its fault

NOTES

Check that the engine is not blocked.

With the ignition off, measure the voltage between the negative battery terminal and the power fuse output

Is the voltage greater than or equal to **10V**?

YES

The power fuse is correct

NO

The power fuse is faulty

With the battery disconnected, measure the resistance between the negative battery terminal and the power fuse output

Is the resistance $\geq 10 \Omega$?

NO

Disconnect the alternator + terminal, then measure the resistance between the negative battery terminal and the power fuse output

Is the resistance $\geq 10 \Omega$?

YES

Replace the alternator (see **MR 364, Mechanical, 16A, Starting - Charging, Alternator: Removal - Refitting**).

NO

Check the wiring connecting the alternator and the starter to the battery + terminal (see **TEST 3 Wiring check**).

Is it in good condition?

NO

A

YES

Replace the starter (see **MR 364, Mechanical, 16A, Starting - Charging, Starter: Removal - Refitting**).

Possible external causes:
use of a "starter charger",
excessively long use of starter (e.g.: activating the starter with the gear engaged to move the vehicle) etc.

B

B

TEST 2
CONTINUED

A
NO
↓

Repair the damaged wires and terminals. If the connection is faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it.

B
↓

B
↓

Replace the power fuse (see **MR 364, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

TEST 3

Wiring check

NOTES

None.

Check the condition of the battery terminals.
Confirm that there is no corrosion on the battery terminals.
Check the tightness of the terminals (see **MR 364, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

Are the terminals and posts in good condition and not corroded?

NO →

Clean the terminals and posts or replace them, if necessary

YES
↓

Check that there are no electrolyte leaks from the battery (cracks or breakage).
Check that the mechanical mounting of the battery is sound (see **MR 364, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

Is the battery in good condition?

NO →

Change the battery and clean the surrounding area on the vehicle if necessary.
(see **MR 364, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

YES
↓

Inhibit the engine injection (see **13B** or **17B, Interpretation of commands**).
With the starter activated, measure the voltage on connection **BPDA** between the + terminal of the battery, component code **107**, and the **B +** of the starter, component code **163**.

Is the voltage > 2 V?

YES →

Repair the damaged wires and terminals. If the connection is faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it

NO
↓



TEST 3
CONTINUED

A

With the engine running and the main beam headlights and heated rear screen on, measure the voltage between the battery **B+**, component code **107**, and the alternator **B+**, component code **103**.

Is the voltage > 0.7 V?

YES →

Check that all the wires connecting the battery, the alternator and the starter are secure and in good condition, and that all their terminals are correctly tightened and secure.
Repair the damaged wires and terminals. If the connection is faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it

NO

With the engine running and the main beam headlights and heated rear screen on, measure the voltage between the negative terminal of the battery, component code **107**, and the alternator frame, component code **103**.

Is the voltage > 0.7 V?

YES →

Check the earths of the engine, alternator, chassis, gearbox, battery or starter (tightness, condition of terminals, condition of wires).
Repair the damaged wires and terminals. If the connection is faulty and there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace it

NO

The electrical circuit is in good order.