

RENAULT

Technical Note 6014A

**TWINGO I - KANGOO I - CLIO II - LOGAN -
SANDERO - MEGANE I - SCENIC I -
MEGANE II Ph 1 - SCENIC II Ph 1 -
VELSATIS - ESPACE IV - TRAFIC II - MASTER
PROPULSION - MASTER II - KOLEOS - THALIA/
SYMBOL**

For vehicles not concerned by this Technical Note the fault finding is performed by the diagnostic tool.

CHECKING THE CHARGING CIRCUIT AND STARTER

**Help when looking for faults or malfunctions on one or more components of the starting or charging circuits.
Comments and special notes on battery maintenance and protection.**

77 11 332 282

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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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16A **STARTING - CHARGING**

Checking the charging circuit and starter

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Purpose and components:

The main function of the charging circuit is to produce and distribute the electrical energy required to operate the various electrical consumers on the vehicle (computers, lights, etc.). It is also used to start the engine.

The main components are a battery, an alternator and a starter motor.

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.

Note:

- A battery must always be fully charged, even when stored.
- Recharge the battery, if necessary (see **Technical Note 6512A**)

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.

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.

Wiring and connections:

In view of the currents involved, the electrical connections must be of very high quality. The slightest fault (connection or terminal loose or dirty, old wire, etc.) creates electrical resistance that is not only detrimental to the correct operation of the charging circuit, but may also cause overheating and a fire hazard.

Power-fuse:

Some vehicles are fitted with a power-fuse. This high-power fuse is fitted directly after the battery to protect all of the vehicle electrical components, even the most powerful consumers (such as the alternator or the starter). The power-fuse is positioned either on the positive terminal of the battery, or in the wiring to which it is connected.

Voltage measurement:

Do not use needle voltmeters as they are not accurate enough.

Preferably use instruments with a digital display which are more accurate and better protected against connection errors.

Use tools approved by RENAULT.

Current measurement:

Preferably use a current clamp.

If it is difficult to hold several cables, use the tool **Elé 1806** which fits onto the battery negative terminal in series.

Test equipment:

To check the condition of the battery, use the instrument **Midtronics R330 (Elé: 1593)**. Respect the conditions of use for this tool.

Only use the Midtronics instrument if there is a fault affecting the charging circuit and not as a preventive measure.

CHECKING THE AREA AROUND THE BATTERY

- Insufficient tightening of the bracket mounting bolt: the bracket must be fitted using the correct tightening torque (see **Repair Manual for the corresponding vehicle, 80A, Battery: Removal - Refitting**). Excessive tightening is not beneficial and can be dangerous, as it can damage, or even break, the battery. Conversely, insufficient tightening allows too much play, and there may be wear caused by battery movement and breakage caused by impact.
- Insufficient tightening of the battery terminal mounting: check that the battery terminals are correctly fitted and tightened. The terminals must be fitted using the correct tightening torque (see **Repair Manual for the corresponding vehicle, 80A, battery: removal - refitting**).
- Insufficient tightening of the battery terminal stud nuts: check that the battery terminal stud nuts are correctly fitted securely tightened. The nuts must be tightened to the correct tightening torque (see the **MR for the corresponding vehicle, 80A, Battery, Battery: Removal - Refitting**).

WARNING

- All vehicles are equipped with low water consumption batteries. Opening the battery and topping up the electrolyte are FORBIDDEN.
- Batteries contain sulphuric acid, which is a hazardous chemical.
- Battery charging produces hydrogen and oxygen, which are very flammable gases and thus there is a risk of explosion.
- Any batteries with filling plugs must not be opened under any circumstances but replaced immediately with Renault approved batteries.

Battery recharging:

When parked, vehicles consume power through their permanent consumers and through any accessories fitted as After-Sales options. To keep battery discharging to a minimum, limit the number of times the vehicle is started, periods with the ignition on, doors open, etc., as much as possible.

A discharged battery must be recharged using a Renault-approved battery charger (**see Technical Note 6512A**)

WARNING

- Simultaneous recharging of several batteries in series or in parallel is forbidden.
- A battery charger used on a battery connected to a vehicle can irreparably damage the vehicle computers due to the high voltages created when charging.
- The location of the charger must take this into account (ventilation).
- A battery charger or a booster not approved by Renault can damage the electrical components.

Battery storage:

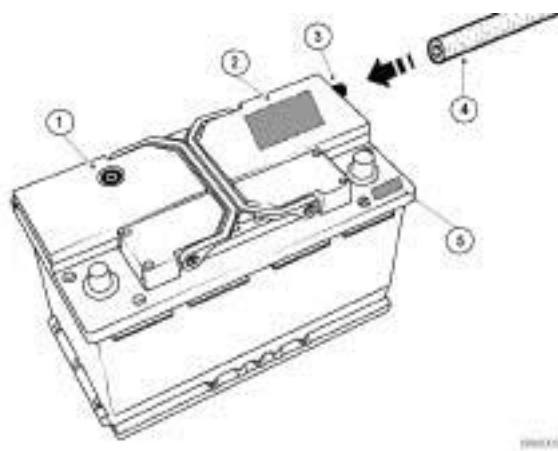
Even when stored off the vehicle, a battery gradually discharges, and more rapidly if the ambient temperature is high.

For a battery to remain operational for a long time, it must be stored at a temperature of around **15°C** and protected from moisture. To retain a good level of charge, it is recommended that a complete battery recharge is carried out after the battery has been stored for 3 months.

A new battery that has been stored for more than one year must not be fitted to a vehicle.

Replacing a battery:

Always replace a battery with one that has the same electrical and dimensional specifications.



1	Hydrometer (magic eye)
2	Battery label example
	L5 12V 95AH Test 850A EN 82 00 000 000
	L5: dimensions Letter L = height 190 mm Letters LB = height 175 mm Figure 5 = length 352 mm (if 4 = 314 mm, etc.) The width is always 175 mm 12V: nominal voltage 95Ah: nominal capacity 850A: starting current EN: complies with European standards
3	Degassing vent
4	Degassing pipe
5	Date of manufacture format: DD/MM/YYYY

Visual inspection of the battery

Make sure there are no cracks or breakages, traces of acid, or creepage (sulphation) on the terminals. If any of the above are present, replace the battery and clean the surrounding area.

Check that the degassing pipe is properly connected to the battery vent

Check that the degassing pipe (4) is correctly positioned

Types of alternator:

- Non-electronically-managed alternators: these are conventional alternators which only have battery feed and fault warning light outputs.
- Alternators that are not electronically controlled and with a DF output (standard function on Vel Satis, Laguna, Espace 4 and Mégane, and fitted to some older applications): these alternators have an additional output compared to other conventional alternators that are not electronically-controlled. This output informs the computers about the alternator's present charging rate.
- Electronically-managed alternators (function available from the Modus onwards): they have no fault warning light output, or DF output, but they have a multiplex network (BSS network) that carries the signals relating to the operation of the alternator: faults, charging rate, temperature, settings (output voltage), type of alternator, etc. The output voltage of these alternators is computer-managed via the BSS network.

Output voltage:

On alternators that are not electronically-controlled, the alternator output voltage is **14.4V ± 0.3V at 20°C** (this decreases with the alternator increase in temperature by approximately **10 mV/°C**).

Some alternators have charging rate variation management. When current is drawn suddenly (main beam headlights, de-icing, etc. switched on), the current supplied by the alternator does not change immediately, but increases gradually. Thus, the charging rate of these alternators changes from **0 to 100%** in a few seconds (depending on the alternator make and speed of rotation). During this transition period, the alternator's output voltage is not stable.

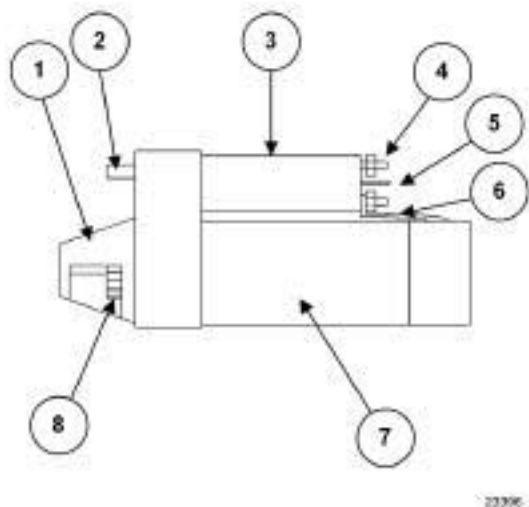
Note:

Wait **20 seconds** after switching any of the vehicle electrical consumers on or off before taking a measurement.

Information about starter motors:

WARNING

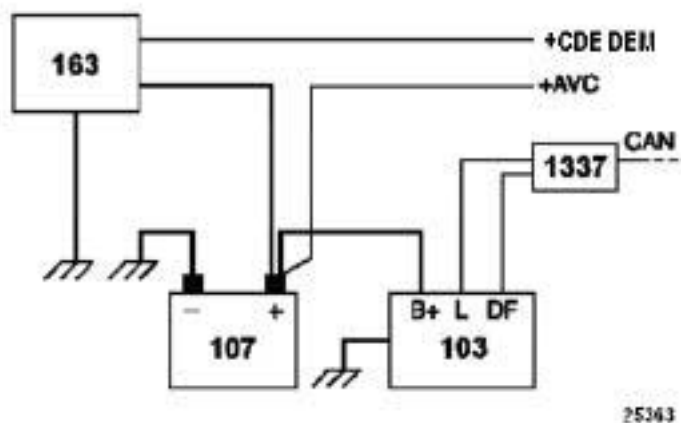
- Always disconnect the battery earth before removing the starter motor.
- Do not operate the starter for a period of more than 20 seconds in succession.
- After three attempts at starting, wait **10 minutes** to allow the starter to cool.



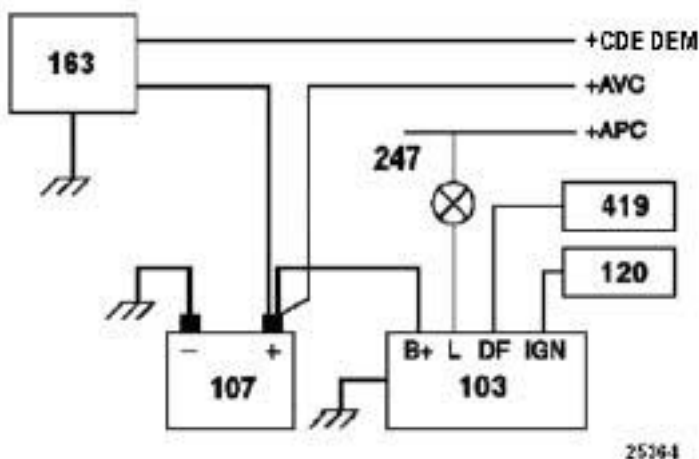
Key:

- 1 – Starter head
- 2 – Centring pin
- 3 – Electromagnetic switch (solenoid)
- 4 – Battery + 12 V terminal (power supply)
- 5 – Control circuit terminal
- 6 – Induction plate
- 7 – Electric motor
- 8 – Drive gear

Alternator with DF output (Mégane II)



Alternator with DF output (Espace IV P9X):

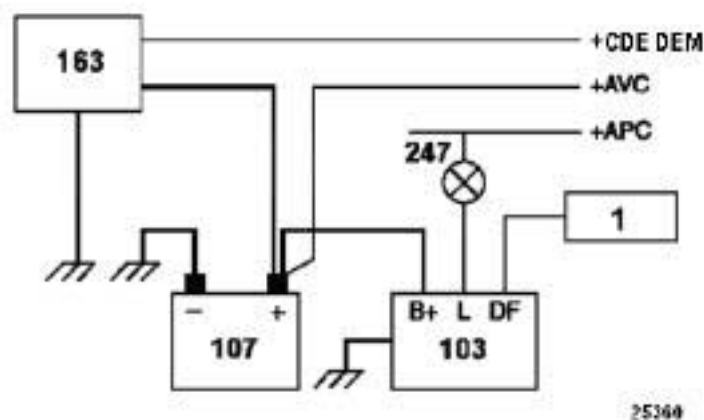


- 163: starter
- 107: BATTERY
- 103: alternator
- 1337: USM = UPC
- 419: air conditioning computer
- 120: Injection computer
- 247: charging circuit fault warning light on instrument panel

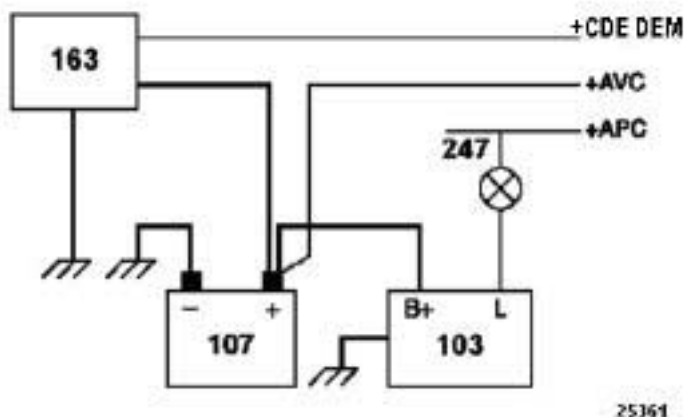
Alternator terminals:

- B+: alternator power output
- L: bulb output
- DF: output giving the alternator charge rate
- IGN: excitation control

Alternator with DF output (Espace IV except P9X, Vel Satis F4R and P9X, Laguna II ph2 F4R, K4M, G9T605, G9T703, F9Q758):



Non-electronically-managed alternator (all other vehicles):



163:	starter
107:	BATTERY
103:	alternator
1	for Espace IV except P9X: air conditioning computer. For Vel Satis and Laguna II ph2: injection computer
247:	charging circuit fault warning light on instrument panel

Alternator terminals:

- B+: alternator power output
- L: bulb output
- DF: output giving the alternator charge rate

STARTING/CHARGING

Charging circuit check: Fault finding charts (ALPs)

16A

FAULT WARNING LIGHT FAULT

THE FAULT WARNING LIGHT DOES NOT COME ON WHEN THE IGNITION IS SWITCHED ON WITH THE ENGINE OFF

ALP 1

THE FAULT WARNING LIGHT COMES ON OR THE MESSAGE 'CHARGING CIRCUIT FAULT' APPEARS WHEN THE ENGINE IS RUNNING

ALP 2

FAULT WHEN THE STARTER MOTOR IS OPERATING:

THE SPEED OF ROTATION OF THE STARTER MOTOR DROPS RAPIDLY

THE STARTER MOTOR ROTATES SLOWLY FROM THE OUTSET

ALP 3

THE STARTER MOTOR CAUSES THE WARNING LIGHTS ON THE INSTRUMENT PANEL TO BECOME VERY DIM

THE STARTER DOES NOT TURN WHEN ACTUATED

ALP 4

THE STARTER TURNS BUT DOES NOT ENGAGE

ALP 5

THE STARTER IS NOISY WHEN STARTING

ALP 6

DIFFICULT STARTING

AFTER THE VEHICLE HAS BEEN IMMOBILE FOR SEVERAL DAYS

AFTER FREQUENT SHORT JOURNEYS

Alp7

WHEN COLD

TEST 1: power-fuse and the source of its fault

TEST 2: wiring check

TEST 3: battery condition (MIDTRONICS test)

TEST 4: alternator flow

TEST 5: high consumption of electrical current check

ALP 1

The fault warning light does not come on when the ignition is switched on with the engine off

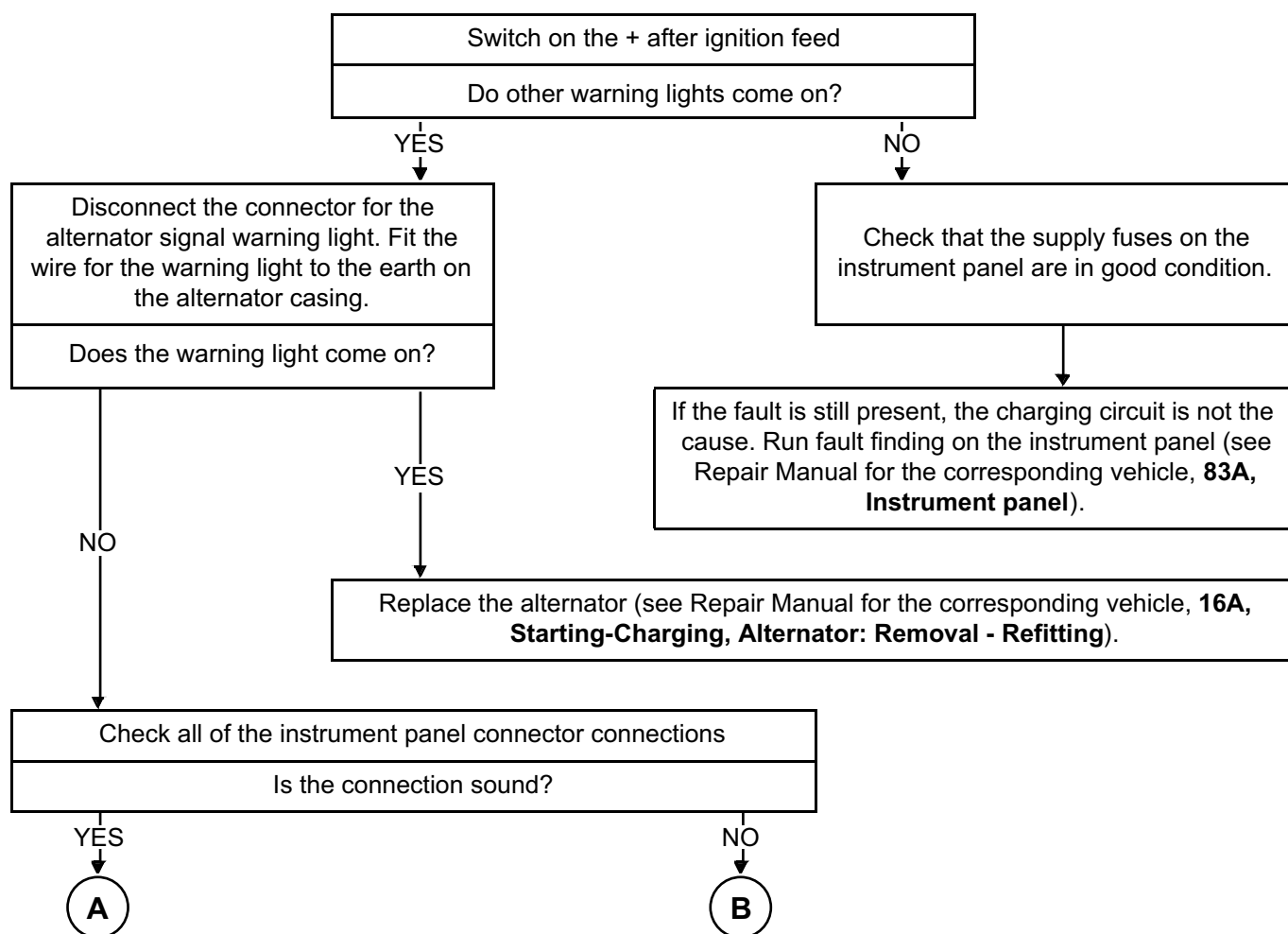
Application: all vehicles except Laguna II and Vel Satis

NOTES

Use the tools from the kit ELE 1681 to avoid damaging the connections.

Note:

On the Laguna II and Vel Satis there is no fault warning light and therefore it is normal for the light not to illuminate.



AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

ALP 1 CONTINUED

A
YES
↓

B
NO
↓

Reconnect the connector for the signal warning light.
With the engine at idle, measure the voltage between
the battery earth and the alternator earth.

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

Voltage value?

< 0.7 V

Check the operation of the
warning light by performing a
fault finding procedure on the
instrument panel (see Repair
Manual for the corresponding
vehicle, **83A Instrument
panel**).

> 0.7 V

Retighten the alternator and
check that the engine earth and
the alternator earth are in good
condition.

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

ALP 2

The fault warning light comes on or the message "Charging circuit fault" appears when the engine is running

Applicability: All types

NOTES

Check the conformity of the alternator connections.
Check that the battery terminals are correctly tightened and in good condition (see the MR for the corresponding vehicle, **80A, Battery, Battery: Removal - Refitting**).
Perform a fault reading for any potential faults, using the diagnostic tool.
Test the battery (T3).

Visually inspect the alternator belt and pulley.

Is the belt tension and the belt and the pulley correct to specification?

YES

NO

If the belt is defective or slack, replace the alternator belt (see Repair Manual for corresponding vehicle, **11A Accessories belt**). If the pulley is faulty, replace the alternator (see Repair Manual for corresponding vehicle, **16A, Starting-Charging, Alternator: Removal-refitting**).

With the engine running, does the warning light illuminate?

YES

NO

Check that the following wiring and terminals are in good condition:

- the wire connecting the battery + to the alternator B+ terminal,
- the wire connecting the battery - to the bodywork earth,
- the wire connecting the engine to the bodywork earth.

Alternator is correct

A

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

ALP 2 CONTINUED 1

A

With the engine running at 3000 rpm and with all consumers switched off, measure the voltage to the battery terminals.

Voltage value?

< 13.5V

Measure the voltage between the alternator + terminal and the alternator earth

Voltage value?

< 13.5V

≥ 13.5V

Replace the alternator (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Alternator: Removal - Refitting**).

Between 13.5V and 14.8V

> 14.8V

Replace the alternator (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Alternator: Removal - Refitting**). Visually inspect the consequences (battery condition, corrosion, etc.).

Stop the engine

Disconnect the connector for the alternator signal warning light and allow the engine to run at idle speed.

Does the warning light or message extinguish on the instrument panel?

YES

B

NO

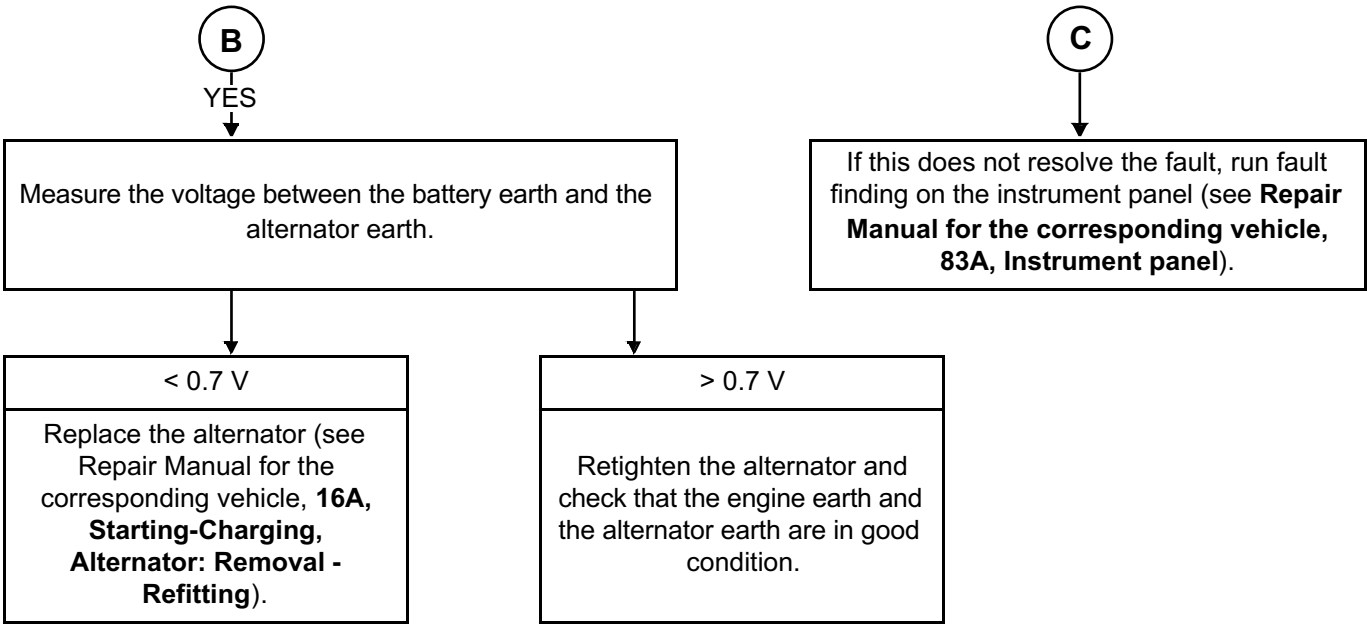
Check the insulation to earth of the alternator warning light signal wire.

C

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

ALP 2
CONTINUED 2



AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

STARTING/CHARGING

Charging circuit check: Fault finding charts (ALPs)

16A

ALP 3

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

Applicability: All types

NOTES

Test the wiring (T2).
Check the condition of the battery (T3).

If the fault is still present, replace the starter (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Starter: Removal - Refitting**).

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

ALP 4

The starter does not operate when it is actuated.

Applicability: All types

NOTES

Test the condition of the battery (T3).
Test the condition of the power-fuse (T1), if fitted to the vehicle.
Check the condition of the fuse controlling the starter.
Check the engine immobiliser (see **Repair Manual for the corresponding vehicle, section 82 or 87**).
Check that the engine is not jammed.

Check that the following terminals are correctly tightened:

- the battery
- starter
- engine earth
- bodywork earth

Are the terminals correctly tightened?

NO →

Retighten the terminals (see Repair Manual for the corresponding vehicle, **80A, Battery, Battery: Removal - Refitting**).

YES
↓

Check that the following wires are in good condition:

- the wire connecting the battery + to the starter B+ terminal
- 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 any damaged wires and terminals. If the connection is faulty and if there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace the wiring.

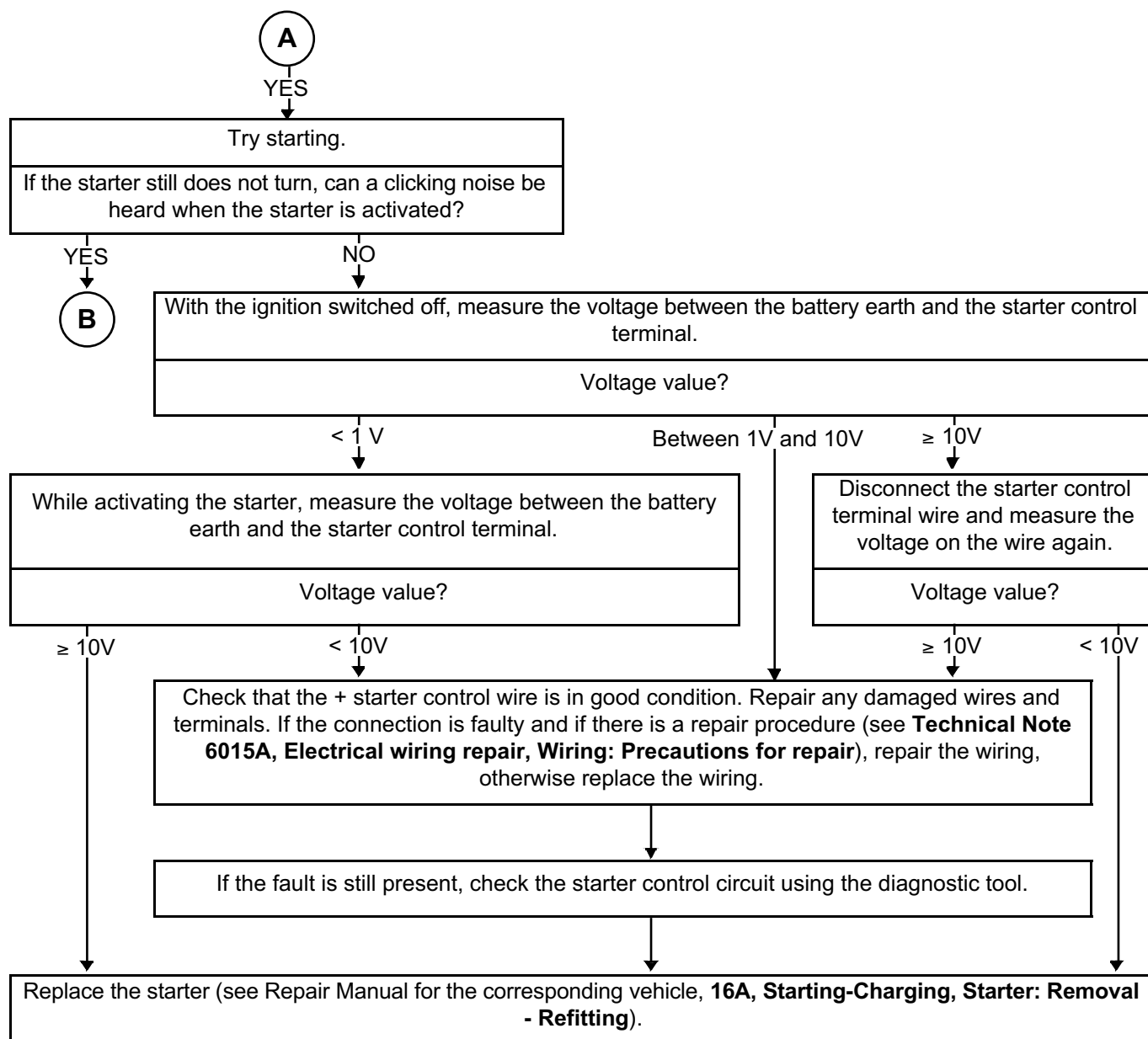
YES
↓



AFTER REPAIR

Using the diagnostic tool, check that no faults have appeared on the computers. Clear the faults if necessary.
Check that the fault is no longer present.
Test the battery (T3).

ALP 4 CONTINUED 1



AFTER REPAIR

Using the diagnostic tool, check that no faults have appeared on the computers. Clear the faults if necessary.
Check that the fault is no longer present.
Test the battery (T3).

ALP 4 CONTINUED 2

B

YES

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

Voltage value?

≥ than 10V

Between 0V and 10V

Measure the drop in voltage between the battery + terminal and the starter B+ terminal, while activating the starter.

Voltage value?

≥ 1V

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

< 1 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?

≥ 1V

Replace the earth wire(s) connecting the engine to the battery

< 1 V

Replace the starter (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Starter: Removal - Refitting**).

AFTER REPAIR

Using the diagnostic tool, check that no faults have appeared on the computers. Clear the faults if necessary.
Check that the fault is no longer present.
Test the battery (T3).

ALP 5

The starter turns but does not engage

Applicability: All types

NOTES

Disconnect the battery earth before handling.

Remove the starter (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Starter: Removal - Refitting**)

Check the condition of the engine flywheel ring gear (for damaged teeth).

Is the engine flywheel ring gear in good condition?

NO

Replace the flywheel

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

Is the starter in good condition?

YES

Refit the starter (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Starter: Removal - Refitting**).

NO

Replace the starter (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Starter: Removal - Refitting**).

YES

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

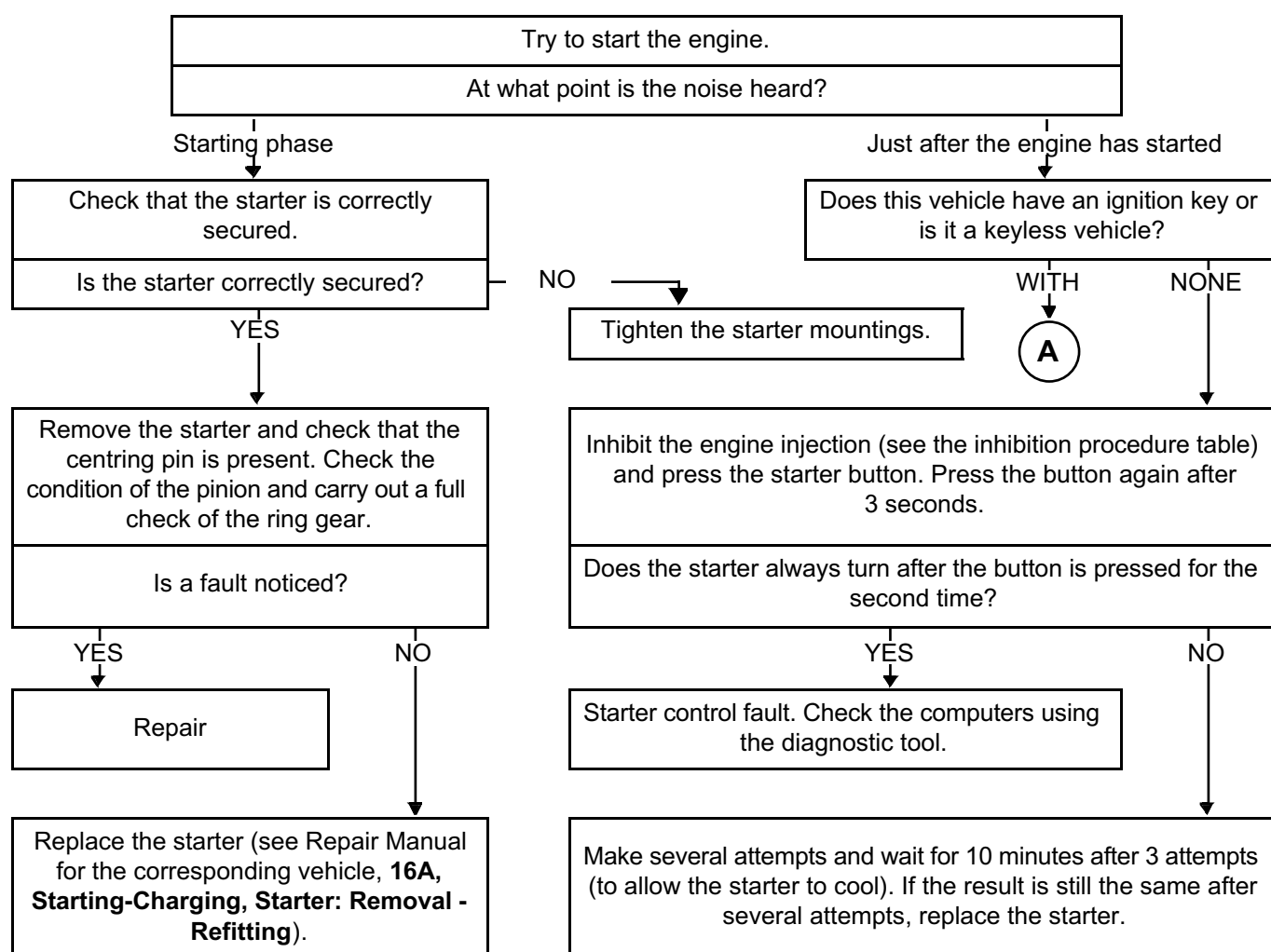
ALP 6

The starter is noisy when starting

Applicability: All types

NOTES

Test the condition of the battery (T3).
Check to make sure that the noise is actually coming from the starter.



AFTER REPAIR

Using the diagnostic tool, check that no faults have appeared on the computers. Clear the faults if necessary.
Check that the fault is no longer present.
Test the battery (T3).

**ALP 6
CONTINUED 1**

A

WITH
↓

Inhibit the engine injection (see the inhibition procedure table), run the starter motor for 2 seconds and release the key.

Does the starter continue to run after the key is released?

YES
↓

Starter control fault. Check and repair the control circuit.

NO
↓

Make several attempts, and wait for 5 minutes after 5 attempts (to allow the starter to cool). If the result is still the same after several attempts, replace the starter.

AFTER REPAIR

Using the diagnostic tool, check that no faults have appeared on the computers. Clear the faults if necessary.
Check that the fault is no longer present.
Test the battery (T3).

ALP 6 CONTINUED 2	
------------------------------	--

Injection inhibition procedure summary table, according to vehicle and engine type.

Vehicle	D4	D7	E7	F4	F5	F8	F9	G9	M9	P9	ZD	K4	K7	K9	L7	V4	TR25
Twingo	F	E															
Clio2	F	E	E	F		E						F	E	A	F		
Kangoo	F	E				E						F	E	A			
Mégane 1				E			E					E					
Mégane 2 ph1				C			E					C		B			
Espace 3				F				E							F		
Avantime				F				E							F		
Laguna 2 ph1				C	D		E	E				C			D		
Laguna 2 ph2				C			E	E	H			C			D		
Vel Satis ph1				C				E		G						E	
Vel Satis ph2				C				E	H	G						E	
Espace 4 ph1				C			E	E		G						E	
Espace 4 ph2				C			E	E	H	G						E	
Logan Sandero	E											E	E	A			
Master 2 ph2							E	E			E						
Master 2 ph3								H									
Trafic 2 ph1				C			E	E									
Trafic 2 ph2								H	H								
Koleos									H								E

AFTER REPAIR	Check that the fault is no longer present. Test the battery (T3).
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ALP 6 CONTINUED 3	
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A	VP005: disable injection
B	VP013: locking the injector command
C	VP013: locking the injector command VP008: unlocking the injector command.
D	AC088: locking the injector command AC089: unlocking the injector command.
E	Command not available (disconnect the TDC sensor or the injectors and erase any stored faults using the diagnostic tool after repair).
F	AC591 locking the injector command VP592: unlocking the injector command.
G	VP036: fuel supply inhibition VP037: lift fuel supply inhibition
H	SC037: compression test

AFTER REPAIR	Check that the fault is no longer present. Test the battery (T3).
---------------------	--

ALP 7

Difficult starting:

- After the vehicle has been immobile for several days
- After frequent short journeys
- When cold

Application: All types

NOTES

Test the condition of the battery (T3).
Carry out a high electrical consumer test (T5).

Test the alternator supply (T4).

If the fault is still there, check the wiring (T2).

If the fault is still present, the charging circuit is not the cause. Check the ignition, preheating (diesel), etc.

AFTER REPAIR

Check that the fault is no longer present.
Test the battery (T3).

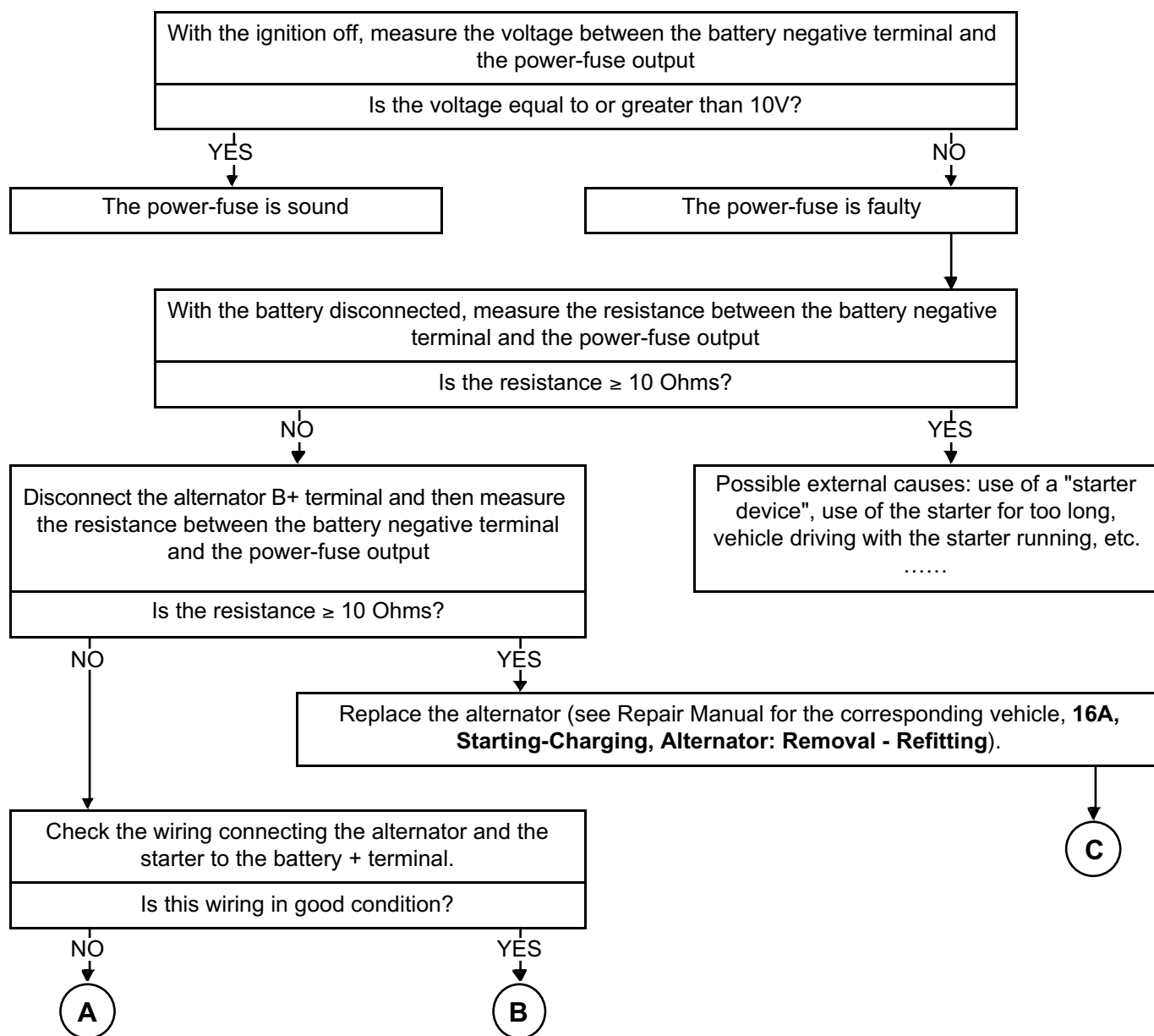
TEST 1

Tests the condition of the power-fuse and the source of its fault

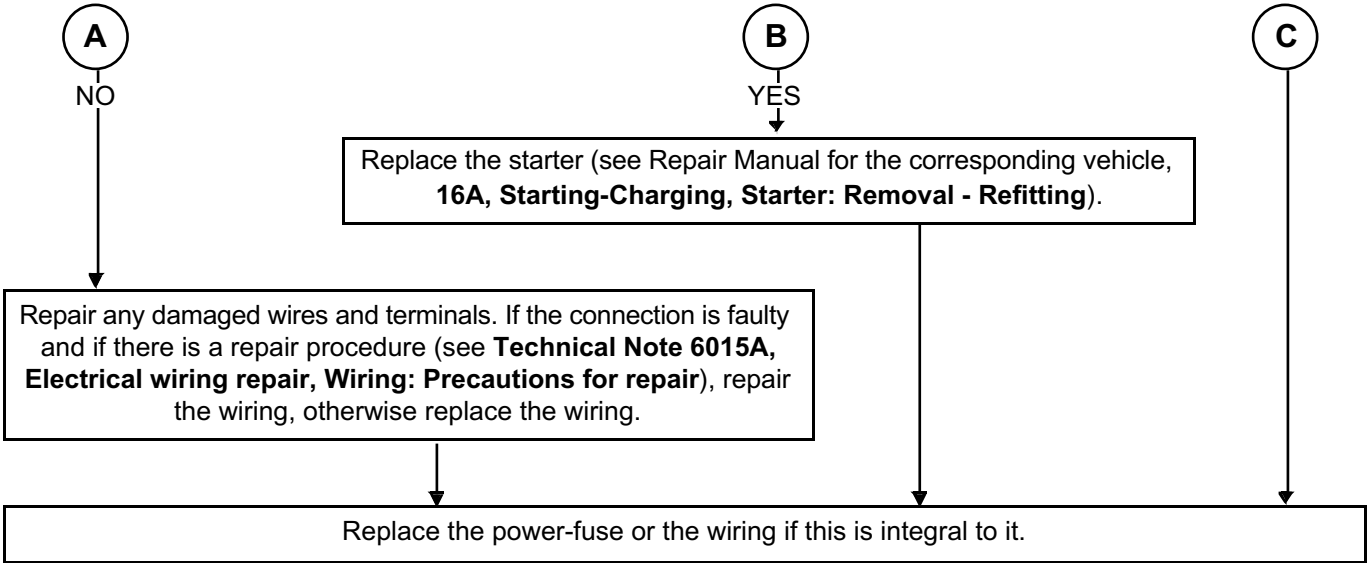
Applicability: Vehicles fitted with a power-fuse

NOTES

Check that the engine is not locked



TEST 1
CONTINUED



TEST 2

Wiring test

Applicability: All types

NOTES

None

Check the condition of the battery terminals. Check there is no oxidation on the battery terminals. Check that the terminals are in good condition and correctly tightened: (See **MR 392, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

Are the terminals in good condition and not corroded?

NO →

Clean the terminals 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 **MR392, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

Is the battery in good condition?

NO →

Replace the battery if necessary and clean its surroundings in the vehicle: (see **MR 392, Mechanical, 80A, Battery, Battery: Removal - Refitting**).

YES
↓

Disable 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 107, and the B + of the starter, component 163.

Is the voltage > 1 V?

YES →

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

NO
↓

A

TEST 2
CONTINUED



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

Is the voltage > 0.7 V?

YES →

Check the condition and tightness of all the wires connecting the battery, the alternator and the starter, and check that all of their terminals are correctly tightened and secure.

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

NO

With the engine running and main beam headlights and heated rear screen on, measure the voltage between the battery negative terminal, component 107, and the alternator frame, component 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 any damaged wires and terminals. If the connection is faulty and if there is a repair procedure (see **Technical Note 6015A, Electrical wiring repair, Wiring: Precautions for repair**), repair the wiring, otherwise replace the wiring

NO

The electrical circuit is in order.

TEST 3

Battery condition test

Applicability: All types

NOTES

Switch off the ignition before carrying out this test

Check whether or not the engine has been running during the previous hour.

Has the engine been running in the last hour?

NO

YES

Stop the engine and remove the key to interrupt the + after ignition supply and switch on the main beam headlights for 2 minutes. Then switch the headlights off and wait for 2 minutes.

Carry out a battery test using the MIDTRONICS instrument (the information requested by the MIDTRONICS instrument is provided on the battery plate: see page 16A-4)

What message does the MIDTRONICS instrument display?

The instrument does not switch on.

"Battery OK + recharge", or "charge + retest"

"Battery good"

"Incorrect component" or "Replace battery"

"Test impossible"

Test the instrument on another battery

Recharge the battery (see **Technical Note 6512A, Battery charging**).

The battery is sound.

A

Is the message appearing for the first time?

Is the instrument working?

YES

C

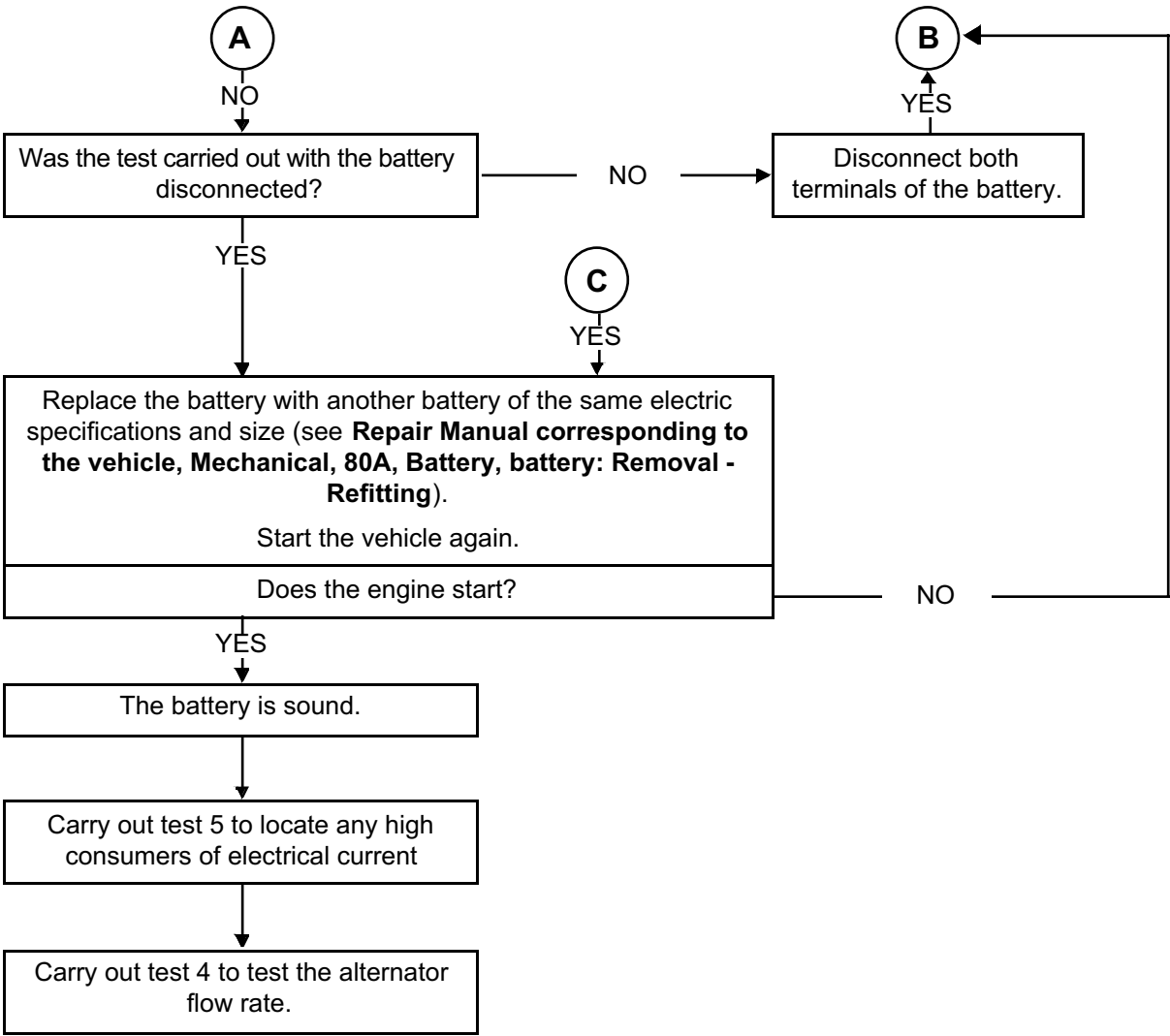
NO

Replace the instrument

Carry out test 5 to locate any high consumers of electrical current

Carry out test 4 to test the alternator flow rate.

TEST 3
CONTINUED



TEST 4

Test the alternator supply

Application: All types

NOTES

Test the condition of the battery (T3).

Measure the voltage at the battery terminals with the engine warm and running at idle speed and with all consumers switched off.

Voltage value?

< 14.8V

> 14.8V

Replace the alternator (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Alternator: Removal - Refitting**). Visually inspect the consequences (battery condition, corrosion, etc.).

With the engine at idle speed, connect a current clamp to the alternator B+ wire with all consumers switched off.

Current < 5 A

Current between 5A and 35A

Current > 35A

Replace the alternator (see Repair Manual for the corresponding vehicle, **16A, Starting-Charging, Alternator: Removal - Refitting**).

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

Value of measured current? (i 1)

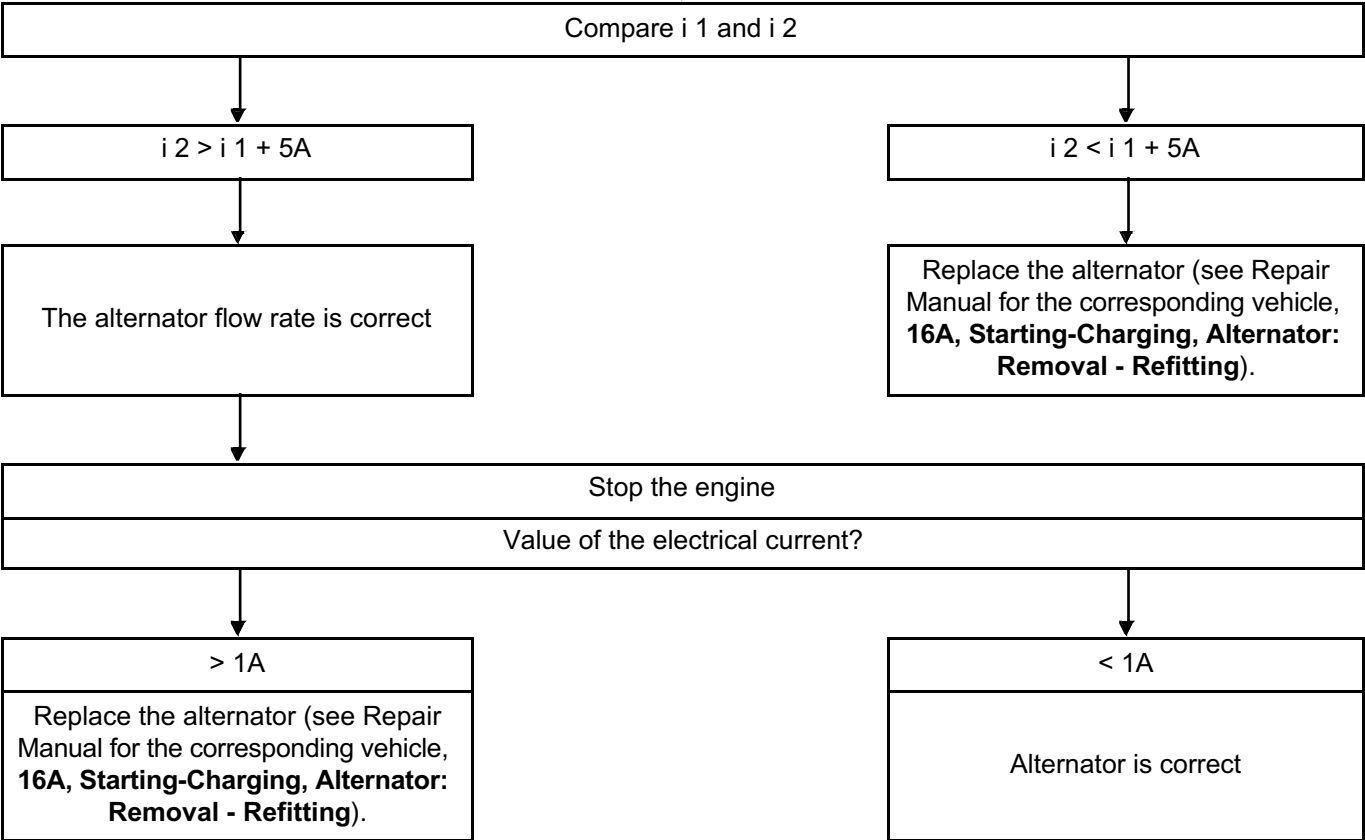
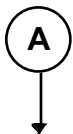
Check that there are no electrical components consuming an abnormal amount of current.
Disconnect the fuses one by one to identify the consumer.

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)

A

TEST 4
CONTINUED



TEST 5

High consumption of electrical current check

Application: All types

NOTES

Use a current clamp.
If it is difficult to hold several cables, use the tool ELE 1806 which fits onto the battery negative terminal in series.

Preparation of the vehicle before carrying out the test to check for high electrical current consumers

Open the bonnet.

If necessary, fit the tool ELE 1806 to the battery negative terminal.

Fit the current clamp around the tool.

Start the vehicle and allow the engine to run at idle speed for approximately 1 minute, then stop.

Wait 40 minutes for the vehicle to shut down.

Current consumed < 30 mA

NO

YES

Vehicle is correct

Leave the vehicle deactivated

Remove the fuses 1 to 1 and check the amount of current consumed