



N.T. 3520E

XBXX

Basic manual: Technical Note 3490A

**LPG
INJECTION FAULT FINDING**

**COMPUTER TYPE: SAGEM GPL 2000 4 C
PROGRAM N°: A8
VDIAG N°: 04**

***This special features note cancels and replaces the corresponding pages of generic
Technical Note 3490E***

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EDITION ANGLAISE

*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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Ignition on, engine stopped.

NOTES

The values indicated in this conformity check are given as examples.
If necessary, consult the specific function specifications in the Workshop Repair Manual.

Order	Function	Parameter or status Check or action	Display and notes	Fault finding
1	LPG pressure	PR0104: LPG pressure	1 bar > X > 2.3 bars	In the event of a problem, consult the fault finding strategy PR0104
2	Petrol injection signal	PR001: Manifold pressure PR103: Air temperature PR002: Coolant temperature.	Atmospheric pressure Temperature under bonnet ± 5 °C Engine temperature ± 5 °C	In the event of a problem, consult the Petrol injection fault finding strategy
3	LPG mode selection	Set the switch to "LPG Mode" ET004: LPG mode switch Set the switch to "Petrol mode" ET004: LPG mode switch	ACTIVE INACTIVE	In the event of a problem, consult the fault finding strategy ET004

NOTES	Engine warm at idle speed, no electrical consumers.
	The values indicated in this conformity check are given as examples. If necessary, consult the specific function specifications in the Workshop Repair Manual.

Order	Function	Parameter or status Check or action	Display and notes	Fault finding
STATUS AND PARAMETER WINDOW				
1	LPG pressure	PR0104: LPG pressure	1 bar > X > 2,3 bars	In the event of a problem, consult the fault finding strategy PR0104
2	Entering LPG mode	Set the switch to "LPG Mode" <u>Wait 3 minutes.</u>		
		ET069: Forced petrol mode	INACTIVE	In the event of a problem, consult the fault finding strategy ET069
		ET084: Forced petrol mode empty tank	INACTIVE	In the event of a problem, consult the fault finding strategy ET084
		ET020: Petrol mode operation when LPG faulty	INACTIVE	In the event of a problem, consult the fault finding strategy ET020
		ET016: Operation in LPG mode	ACTIVE	In the event of a problem, consult the fault finding strategy ET012
		ET007: LPG main solenoid valve	ACTIVE	In the event of a problem, consult the fault finding strategy ET007
		ET051: Petrol pump cut-off	ACTIVE (You should not be able to hear the petrol pump running)	In the event of a problem, consult the fault finding strategy ET051

NOTES	Engine warm at idle speed, no electrical consumers.
	The values indicated in this conformity check are given as examples. If necessary, consult the specific function specifications in the Workshop Repair Manual.

Order	Function	Parameter or status Check or action	Display and notes	Fault finding
3	Entering petrol mode	Set the switch to Petrol mode. <u>Wait 1 minute.</u>		
		ET019: Operation in petrol mode	ACTIVE	In the event of a problem, consult fault finding strategy ET012
		ET051: Petrol pump cut-off	INACTIVE (You should be able to hear the petrol pump running)	In the event of a problem, consult the fault finding strategy ET051
		ET007: LPG main solenoid valve	INACTIVE	In the event of a problem, consult the fault finding strategy ET007

NOTES	Road test.
	The values indicated in this conformity check are given as examples. If necessary, consult the specific function specifications in the Workshop Repair Manual.

Order	Function	Parameter or status Check or action	Display and notes	Fault finding
PARAMETER AND STATUS WINDOW				
1	LPG pressure	PR0104: LPG pressure	1 bar > X > 2,3 bars	In the event of a problem, consult the fault finding strategy PR0104

ET004

LPG MODE SWITCH

NOTES

There must be no faults present or stored.

Check the **connection and condition of the** LPG/Petrol switch connector.
Change the connector if necessary.

Disconnect the switch and check the **insulation, continuity and absence of interference resistance of the connector** on the following connection:

Switch connector track A2 —————▶ **Vehicle earth**

Repair if necessary.

Check the **insulation, the continuity and absence of interference resistance** on the connection between:

LPG computer track C1 —————▶ **Switch connector track B1**

Repair if necessary.

If status **ET004** does not toggle between **ACTIVE** and **INACTIVE** each time the switch is pressed, replace the switch.

AFTER REPAIR

Restart the conformity check from the beginning.

ET016

OPERATION IN LPG MODE

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

There must be no faults present or stored.

There may be a problem with the **Petrol injection** system.
Carry out the fault finding strategy for the **Petrol injection system**.
Repair anything that is faulty.

Repeat the fault finding strategy on the **LPG injection system**.
Repair if necessary.

Restart the **conformity check** from the beginning.

AFTER REPAIR

Restart the conformity check from the beginning.

ET019

OPERATION IN PETROL MODE

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

There must be no faults present or stored.

There may be a problem with the **Petrol injection** system.
Carry out the fault finding strategy for the **Petrol injection system**.
Repair anything that is faulty.

Repeat the fault finding strategy on the **LPG injection system**.
Repair if necessary.

Restart the **conformity check** from the beginning.

AFTER REPAIR

Restart the conformity check from the beginning.

NOTES

Do not consult these customer complaints until you have performed a complete check using the fault finding tool

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation

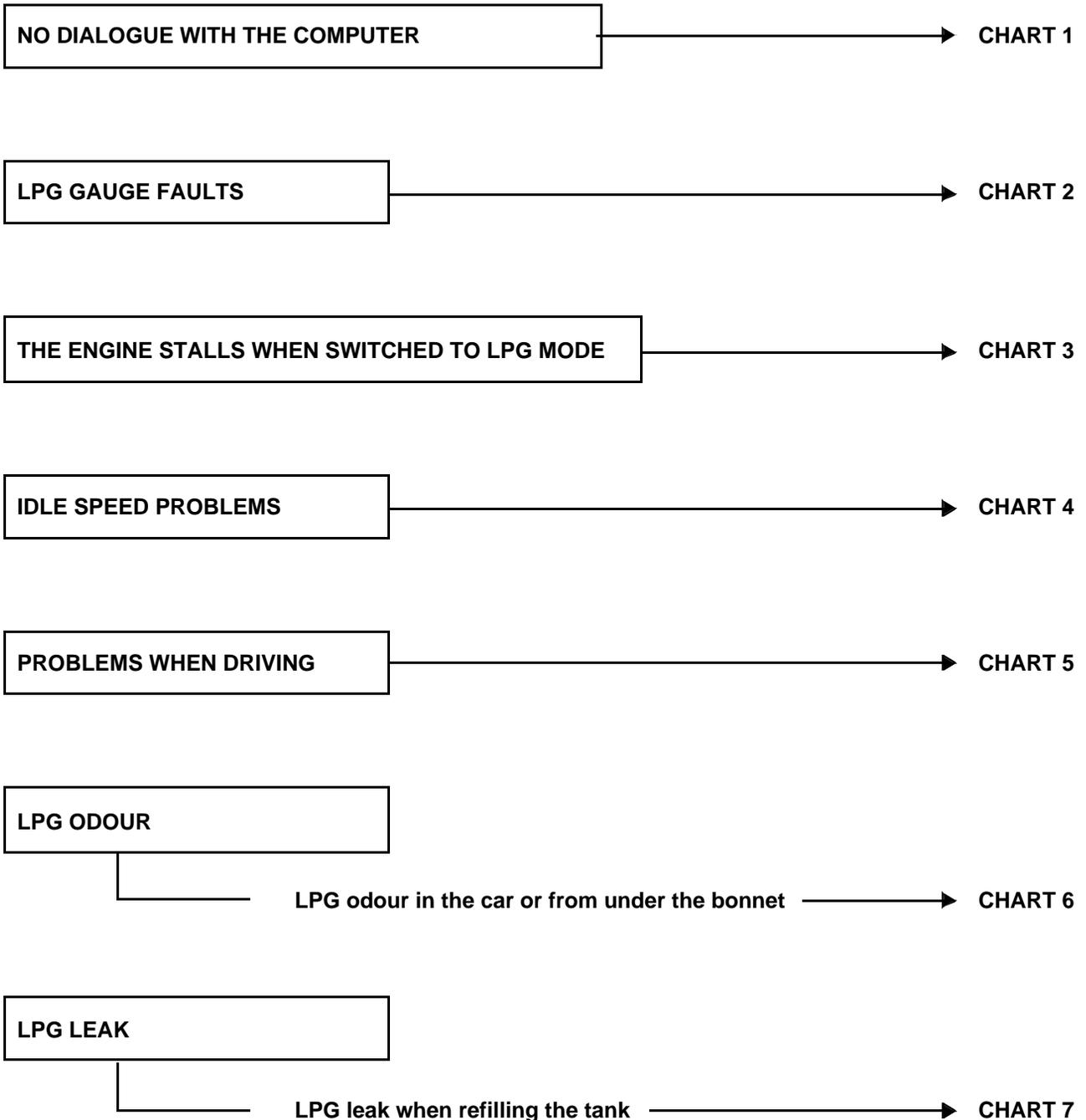


CHART 1

NO DIALOGUE WITH THE COMPUTER

NOTES

None.

Check **the condition of the battery and the vehicle earths**.
Repair if necessary.

Try the diagnostic tool on another vehicle.

- Check the connection between the diagnostic tool and the diagnostic socket (lead in good condition).
- Check the fuses.

Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connections between:

LPG injection computer track H1 → Earth
LPG injection computer track G1 → Earth
LPG injection computer track B4 → Diagnostic socket track 7

Repair if necessary.

Check for the presence of **+ 12 volts from the battery** on track H4 and **+12 volts after ignition** on track C2.
Repair if necessary.

Check the following tracks on the diagnostic socket:

Track 1 → +After ignition supply
Track 16 → +Battery
Tracks 4 and 5 → Earth

Repair if necessary.

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 2

LPG GAUGE FAULTS

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

Check that there is LPG in the tank.

Check the **connection and condition of the** LPG tank connector.
Change the connector if necessary.

Unplug the LPG tank connector and check the **resistance of the LPG tank sender, tracks B and D. (See the value in the HELP section).**
Replace the gauge rheostat.

Check for the presence of **earth on track D** of the LPG tank connector.
Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connections between:

LPG computer track D2	→	LPG tank sender
LPG computer track D3	→	LPG tank sender

Repair if necessary.

To check the fuel gauge on the instrument panel, you must:

- **Test the multiplex network.**
Refer to the section on the **multiplex network in the Workshop Repair Manual.**
- Carry out the fault finding strategy for the Instrument panel system if necessary.

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 3

THE ENGINE STALLS WHEN SWITCHED TO LPG MODE

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

Check that there is LPG in the tank.

- Check the condition of the reference pressure pipe and the pipe leaving the expansion valve.
- Check that the pipes are not blocked.
- Check that the pipes are not disconnected.
- Check that the expansion valve solenoid valve and the pressure sensor are connected.
- Check that the solenoid valve functions properly (you should hear it when switching mode).

No

Repair the faulty component.

Yes

Check the condition of the air filter.

Is the air filter in good condition?

No

Change the air filter

Yes

Check that the LPG supply pipes are not pinched or flattened.

Are the pipes in good condition?

No

Change the worn or damaged pipes.

Yes

Check the expansion valve coolant circuit.

Is the coolant circulating?

No

Repair the circuit

Yes



AFTER REPAIR

Perform a check using the diagnostic tool.

<p>CHART 3</p> <p>(Continuation 1)</p>	
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A



Check that the LPG filters on the expansion valve are clean.	
Are the filters clean?	No →

Change the filters.

Yes



<p>Check the resistance of the injectors. (See the value in the HELP section).</p> <p>Disconnect the main relay, the petrol pump cut-off relay, the four injectors, the main solenoid valve and the LPG tank connector. Check the insulation, continuity and absence of interference resistance on the connections between:</p> <p>Main relay track 4 → Injector 1 track 1 Main relay track 4 → Injector 2 track 1 Main relay track 4 → Injector 3 track 1 Main relay track 4 → Injector 4 track 1</p> <p>Check the insulation, continuity and absence of interference resistance on the connections between:</p> <p>LPG computer track G3 → Injector 1 track 2 LPG computer track G4 → Injector 2 track 2 LPG computer track H2 → Injector 3 track 2 LPG computer track H3 → Injector 4 track 2</p>	
Are the connections correct?	No →

Repair the connections.

Yes



B

AFTER REPAIR	Perform a check using the diagnostic tool.
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CHART 3

(Continuation 2)



Test the injectors.

Disconnect the battery.

Disconnect **the main relay** and connect **track 5**, connector side, to **+ battery**.

Disconnect the LPG computer.

Connect **track G3**, connector side, to **earth**.

You should hear **injector 1** working.

Change the injector if necessary.

Connect **track G4**, connector side, to **earth**.

You should hear **injector 2** working.

Change the injector if necessary.

Connect **track H2**, connector side, to **earth**.

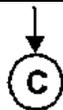
You should hear **injector 3** working.

Change the injector if necessary.

Connect **track H3**, connector side, to **earth**.

You should hear **injector 4** working.

Change the injector if necessary.



AFTER REPAIR

Check using the diagnostic tool.

CHART 3

(Continuation 3)



Check the **connection and condition of the tank connector**.
Change the connector if necessary.

Run the engine in **petrol mode**.
Disconnect the **LPG tank** and switch to **LPG mode**.
Check for the presence of **+12 volts** on **track C** of the LPG connector.
Repair if necessary.

Check for the presence of earth on track A of the LPG tank connector.
Repair if necessary.

Measure the **resistance of the LPG safety solenoid valve on tracks A and C**.
(See the value in the HELP section).
Change the solenoid valve if necessary.

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 4

IDLE SPEED PROBLEMS

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

The engine should function perfectly in petrol mode.

- Check the condition of the reference pressure pipe and the pipe leaving the expansion valve.
- Check that the pipes are not blocked.
- Check that the pipes are not disconnected.
- Check that the expansion valve solenoid valve and the pressure sensor are connected.
- Check that the solenoid valve functions properly (you should hear it when switching mode).

No

Repair the faulty component.

Yes

Check the condition of the air filter.

Is the air filter in good condition?

No

Change the air filter

Yes

Check the expansion valve coolant circuit.

Is the coolant circulating?

No

Repair the circuit.

Yes

- Check the valve clearances (D7F engine).
- Check the conformity of the spark plugs.
- Bleed the expansion valve.
- Completely clean the expansion valve if necessary.

Check that the LPG filters on the expansion valve are clean
Change the filters if necessary.

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 5

PROBLEMS WHEN DRIVING

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

- Check the condition of the reference pressure pipe and the pipe leaving the expansion valve.
- Check that the pipes are not blocked.
- Check that the pipes are not disconnected.
- Check that the expansion valve solenoid valve and the pressure sensor are connected.
- Check that the solenoid valve functions properly (you should hear it when switching mode).

No

Repair the faulty component.

Yes

Check the condition of the air filter.

Is the air filter in good condition?

No

Change the air filter.

Yes

Check the expansion valve coolant circuit.

Is the coolant circulating?

No

Repair the circuit.

Yes

- Check the conformity of the spark plugs.
- Bleed the expansion valve.
- Completely clean the expansion valve if necessary.

Check that the LPG filters on the expansion valve are clean.
Change the filters if necessary.

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 6

LPG ODOUR

(LPG odour in the car or from under the bonnet)

NOTES

IMPORTANT: you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations.
Consult the safety advice section before attempting any operation.

Check that the customer has filled up the car with LPG.

Check for LPG leaks as follows:

- Check that all the connections are leak-tight (from the filling nozzle to the LPG tank, from the tank to the expansion valve entry and from the expansion valve to the injectors).
- Tighten the unions if necessary or replace them. Refit the ventilation ducts and tighten the mounting bolts if necessary.
- Check that the screws in the pressure sensor and the expansion valve are tight and check that there are no leaks.
- Tighten the screws on the LPG outlet of the expansion valve.
- Check the condition of the tank (welding, etc).
- Check if there is an odour of LPG or degassing when the coolant tank is opened.
If yes, change the expansion valve (LPG leaking into cooling system).

AFTER REPAIR

Perform a check using the diagnostic tool.

CHART 7	LPG LEAK (LPG leak when refilling the tank)
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NOTES	<u>IMPORTANT:</u> you must consult the appropriate section of the Workshop Repair Manual for information on all gas supply circuit operations. <u>Consult the safety advice section before attempting any operation.</u>
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<ul style="list-style-type: none">- Open the plastic cover on the filler neck.- Check that the filler neck is in good condition.- Change the filler nozzle if necessary.- Look for leaks along the pipe that runs from the filler neck to the LPG tank. (fill up the car with LPG to perform this operation).- Repair the pipe if necessary.
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AFTER REPAIR	Perform a check using the diagnostic tool.
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