Espace

AVANTIME

Technical Note 3625A

JE0X - DE0X

Basic manual: Workshop Repair Manuals 315 and 350

INDEPENDENT HEATER FAULT FINDING

PROGRAM No.: 0001
VDIAG No.: 08

77 11 311 502 **APRIL 2002** **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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INDEPENDENT HEATER UNIT
Fault finding - Introduction

This document presents the general fault finding procedure applicable to the additional heating function on Espace and Avantime vehicles with a G9T diesel engine.
A **Fault finding Special notes** Technical Note is available for each vehicle fitted with this computer and this function. It covers all the fault finding special notes in this document for the vehicle concerned. This Special notes Note complements or replaces the information provided in the Generic fault finding document.

The following are required for carrying out fault finding on this system:

- the Workshop Repair Manual for the vehicle concerned,
- the wiring diagram of the function for the vehicle concerned,
- the tools listed in Special tooling required.

GENERAL APPROACH TO FAULT FINDING:

- Use one of the diagnostic tools to identify the system fitted to the vehicle (to read the computer group, the program number, the Vdiag, etc.).

- Locate the Fault finding documents corresponding to the system identified.

- Include information contained in the **Introduction** sections.

- Read the faults stored in the computer memory and use the Fault interpretation section of the documents.
  Reminder: each fault is interpreted for a particular type of storage (fault present, fault stored in memory, fault present or stored). The specified checks for dealing with each fault are therefore only to be performed if the fault declared by the diagnostic tool can be identified in the document by its type. The way in which the fault is stored should be considered when using the diagnostic tool after switching the ignition off and on again.
  If a fault is interpreted when it is declared as stored, the conditions for applying fault finding appear in the NOTES box. When these conditions are not satisfied, use the fault finding procedure to check the circuit of the faulty part, since the fault is no longer present on the vehicle. Perform the same operation when a fault is declared as stored by the diagnostic tool but is only interpreted in the documentation as a present fault.

- Carry out the conformity check (appearance of possible faults not yet identified by the system's self-diagnosis procedure) and apply the relevant fault finding strategies according to the results.

- Confirm the repair (customer complaint disappears).

- Use the fault finding procedure for each Customer complaint if the fault persists.

DF001 PRESENT OR STORED	PRE-HEATER PLUG CC.0 : Short circuit to earth CO : Open circuit

NOTES	**Application condition for a fault finding strategy for a stored fault only one fault can be recalled at a time:** The fault is declared present after: – ignition of the spark plug and with no other fault declared present

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 9** ⟶ + Heater plug
Connector B2 **track 12** ⟶ **Earth** spark plug
Repair if necessary.

If the fault persists, replace the spark plug.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF002 PRESENT OR STORED	FUEL METERING PUMP CC.0 : Short circuit to earth CO : Open circuit

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the metering pump has been switched on and no other fault is declared present.

Check the condition of the **8-track connector** and replace it if necessary.

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

8-track connector**: track 4** → **Track 2** connector **ST2** metering pump
8-track connector**: track 2** → **Earth**
ST2 metering pump **connector track 1** → **Earth**

Repair if necessary.

Measure the resistance at the meter pump terminals.
If it is not approximately **10 Ω**, replace the metering pump.

If the fault persists, replace the metering pump.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF003 PRESENT OR STORED	COOLANT TEMPERATURE SENSOR CIRCUIT CC.0 : Short circuit to earth CO : Open circuit

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the boiler has been ignited and with no other fault declared present.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 3** ⟶ Temperature sensor
Connector B2 **track 4** ⟶ Temperature sensor
Repair if necessary.

Measure the resistance at the sensor terminals.
If it is not **12 kΩ ± 600 Ω at 20 °C**, replace the heater internal wiring.

If the fault persists, replace the heater.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF004 PRESENT OR STORED	COMBUSTION AIR FAN CC.0 : Short circuit to earth CO : Open circuit DEF : Blocked

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 14** ⟶ **Earth** combustion air fan
Connector B2 **track 13** ⟶ **+** Combustion air ventilation fan
Repair if necessary.

Using a multimeter, check that the winding of the ventilation fan is not cut.
Replace the fan if necessary.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF005 PRESENT OR STORED	OVERHEATING SWITCH CC.0 : Short circuit to earth CO : Open circuit

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 6** ⟶ Overheating switch
Connector B2 **track 5** ⟶ Overheating switch
Repair if necessary.

Measure the resistance at the switch terminals.
If it is not **12 kΩ ± 600 Ω at 20 °C**, replace the heater internal wiring (the overheating switch is not separate from the internal wiring).

If the fault persists, replace the heater.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF006 PRESENT OR STORED	FLAME DETECTOR CC.0 : Short circuit to earth CO : Open circuit

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 1** ⟶ Flame detector
Connector B2 **track 2** ⟶ Flame detector
Repair if necessary.

Measure the resistance at the flame detector terminals.
If it is not **1200 Ω ± 60 Ω at 50 °C**, replace the internal wiring (the flame detector is connected to the internal wiring).

Replace the heater if the fault persists.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF008 PRESENT OR STORED	HEATER MALFUNCTION 1.DEF : Overvoltage 2.DEF : Undervoltage

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Check the voltage between **tracks 1** and **2** of the **8-track connector.**
This should be between: 10.2 V < X < 16 V.

Check the **insulation, continuity and absence of interference resistance on the following connections**:
8-track connector: **track 1** ⟶ **+ Battery**
8-track connector: **track 2** ⟶ **Battery earth**
Repair if necessary.

Check the battery and charge circuit if the fault persists.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF010 PRESENT OR STORED	EXCEEDING START UP TIME 1.DEF

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time** The fault is declared present after: – two failed attempts to ignite the heater in **180 seconds**.

Check the **air inlet and exhaust ducts.** Repair if necessary.
Check the diesel supply pipes to the heater and ensure that they contain no air bubbles. Repair if necessary.
Measure the resistance at the meter pump terminals. If it is not approximately **10 Ω,** replace the metering pump.
Check the condition of the **spark plug**. Replace if necessary.
Replace the **heater** if the fault persists.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF011 PRESENT OR STORED	COLD BLOWER TIME EXCEEDED 1.DEF : if flame detector > 70°C the engine cooling fan is activated for 4 minutes

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Check the exhaust gas and combustion air pipes.
Repair if necessary.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 1** ⟶ Flame detector
Connector B2 **track 2** ⟶ Flame detector
Repair if necessary.

Measure the resistance at the flame detector terminals.
If it is not **1200 Ω ± 60 Ω at 50 °C**, replace the internal wiring (the flame detector is connected to the internal wiring).

Replace the **heater** if the fault persists.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF012 PRESENT OR STORED	CONTROL UNIT 1.DEF : Unidentified electrical fault

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Replace the **control unit**.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF013 **DF014** **DF015** **PRESENT** **OR** **STORED**	MINIMUM OUTPUT FLAME EXTINGUISHED MEDIUM OUTPUT FLAME EXTINGUISHED MAXIMUM OUTPUT FLAME EXTINGUISHED DEF : Unidentified electrical fault

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the heater has been ignited and with no other fault declared present.

Check the exhaust gas and combustion air pipes.
Repair if necessary.

Check the diesel supply pipes to the heater and ensure that they contain no air bubbles.
Repair if necessary.

Check the condition of connector B2 in the control unit and replace it if necessary.

Check the **insulation, continuity and absence of interference resistance on the following connections:**
Connector B2 **track 9** ⟶ **+** Heater plug
Connector B2 **track 12** ⟶ **Earth** spark plug
Repair if necessary.

If the fault persists, replace the **spark plug.**

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF016 **DF017** **DF018** **PRESENT** **OR** **STORED**	DETECTION OF OVERHEATING: LOW PROBABILITY DETECTION OF OVERHEATING: PROBABLE DETECTION OF OVERHEATING: CONFIRMED DEF: Unidentified electrical fault

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – the heater has been ignited and with no other fault declared present.
	Special notes: **Probable:** temperature difference of **15 °C** between the sensor and the overheating switch. **Confirmed:** temperature at the sensor or switch > **125 °C** **Low probability:** temperature threshold exceeded, sensor or switch > **130 °C**.

Check the circulation of water through the system.
Ensure that it is thoroughly degassed.

Remove the blower cover and disconnect connector B2 from the control unit.
Check the condition of the connector and replace it if necessary.

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

- Connector B2 **track 3** → Temperature sensor
- Connector B2 **track 4** → Temperature sensor
- Connector B2 **track 5** → Overheating switch
- Connector B2 **track 6** → Overheating switch

Repair if necessary.

Measure the resistance at the sensor terminals.
If it is not **12 kΩ ± 600 Ω at 20 °C,** replace the heater internal wiring.
Measure the resistance at the switch terminals.
If it is not **12 kΩ ± 600 Ω at 20 °C,** replace the heater internal wiring.

If the fault persists, replace the heater.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF019 PRESENT OR STORED	BLOCK: TOO MANY SUCCESSIVE START UPS DEF: Unidentified electrical fault

NOTES	**Priority when dealing with a number of faults:** If more than one of the faults **DF019** and **DF001, DF002** are stored, treat as a priority faults **DF001 Pre-heater plug and DF002 Metering pump.**
	Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time. The fault is declared present after: – 10 failed attempts to ignite the heater and with no other faults declared present.

Clear **incorrect start up counter** using the delete command **RZ002**.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

DF020 PRESENT OR STORED	BLOCK: TOO MUCH SUCCESSIVE OVERHEATING DEF: Unidentified electrical fault

NOTES	**Application condition for a fault finding strategy for a stored fault: only one fault can be recalled at a time.** The fault is declared present after: – 10 failed attempts to ignite the heater and with no other faults declared present.

Delete **overheating meter** using the clear control **RZ001**.

AFTER REPAIR	Apply the reference value to confirm that the repair is successful. Deal with any other possible faults. Clear the stored faults and check that no other fault appears.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values indicated in this conformity check are given as examples. **Conditions for performance:** Engine temperature below **81 °C** and external temperature below **5 °C**.

Order	Function	Parameter or state Check or action		Display and notes	Fault finding
1	+ After ignition feed present	**ET001**	+ After ignition present	**YES**	**In the event of a fault**, refer to the fault finding procedure for state **ET001**.
2	Engine running	**ET007**	Engine running	**YES** **NO** if check **AC002** is activated, light heater	**In the event of a fault**, refer to the fault finding procedure for state **ET007**.
3	Heater ventilation	**ET002**	Combustion air fan	**LIT**	**In the event of a problem,** perform the **fault finding procedure** for the Combustion air fan **DF004**
		PR014	Voltage of heater cooling fan	**0 at 7 V**	
4	Flame detected	**ET003**	Flame detected	**YES**	**In the event of a problem,** perform the **fault finding procedure** for the flame detector **DF006**
5	System blocked	**ET004**	System blocked	**NO**	**In the event of a problem,** perform the **fault finding procedure** for Block due to too many consecutive starts **DF019 and** Block due to successive overheating **DF020**
6	Heater output	**ET005**	Heater output	**MINIMUM OR MEDIUM**	**In the event of a fault**, refer to the fault finding procedure for state **ET005**.

NOTES	Only check the conformity after a **complete check** with the diagnostic tool. The values indicated in this conformity check are given as examples. **Conditions for performance:** Engine temperature below **81 °C** and external temperature below **5 °C**.

Order	Function	Parameter or state Check or action		Display and notes	Fault finding
9	Overheating switch	**PR008**	Overheating switch value measured	**Overheats if the temperature is above 125 °C**	**If there is a problem,** perform the **fault finding procedure** on the Overheating switch **DF005**.
10	Coolant temperature sensor	**PR010**	Coolant temperature sensor value measured	**X = Engine temperature ± 5 °C**	**If there is a problem,** perform the **fault finding procedure** on the Coolant temperature sensor circuit. **DF003**.
11	Flame detector	**PR013**	Flame detector value measured	**X = Heater temperature ± 20 °C**	**In the event of a problem,** perform the **fault finding procedure** for the Flame detector **DF006**.
12	Computer supply voltage	**PR108**	Computer supply voltage	**10.2 V < X < 16 V**	**In the event of a problem**, refer to the fault finding procedure for parameter **PR108**.
13	Spark plug feed instruction	**PR016**	Spark plug feed instruction	**None**	**If there is a problem,** perform the **fault finding procedure DF001** on the Faulty pre-heater plug.
14	Fuel pump command frequency	**PR017**	Fuel pump command frequency	**X = frequency in Hz ± 5%**	**If there is a problem,** perform the **fault finding procedure** on the Fuel metering pump **DF002**.

AC002 **AC003**	HEATER CONTROL AC002 : Ignite the heater AC003 : Extinguish the heater

NOTES	**IMPORTANT:** during heater control, it is essential that the engine is running to avoid any overheating due to non-circulation of water.

The heater may be started or stopped using the command menu on the diagnostic tool.
If it fails to start, check:
- there is fuel in the tank,
- that the fuses are intact
- that the combustion air and exhaust pipes are not plugged.

Repair if necessary.

Check **the connection and the condition of the intermediary 5-track connector** between the vehicle wiring and the heater and replace if necessary.

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

+ Battery → **Track A 5-track** connector
Earth → **Track D 5-track** connector
+ 12 V after ignition → **Track E 5-track** connector
Diagnostic socket → **Track B 5-track** connector

Repair if necessary.

If the fault persists, replace the heater.

ET001	+ AFTER IGNITION PRESENT

NOTES	None.

If the state is **INACTIVE**, check that the battery charge is **above 10.2 V**.
Otherwise repair the vehicle's charge circuit.

Check **the connection and the condition of the intermediate 5-track connector** between the vehicle wiring and the heater and replace if necessary.
Check **the connection and condition of the intermediate 8-track connector located on the heater mounting**.

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

- **+ Battery** → **Track 1 8-track** connector
- **Earth** → **Track 2 8-track** connector
- **+ 12 V after ignition** → **Track 7 8-track** connector

Repair if necessary.

Replace the heater **control unit** if the fault persists.

ET005	HEATER OUTPUT

NOTES	None.

OFF	State normal **if engine** off. The heater state is **OFF** if the external air temperature is **above 5 °C**. The heater is also **OFF** when the engine temperature is above **82 °C**.

MIN	The state of the heater is **MINIMUM OUTPUT** when the engine temperature is between **77 °C and 82 °C and is increasing, and** the external air temperature is below **5 °C.** The state of the heater is **MINIMUM OUTPUT** when the engine temperature is between **82 °C and 73 °C and is decreasing, and** the external air temperature is below **5 °C.**

AVERAGE	The state of the heater is **AVERAGE OUTPUT** when the outside air temperature is below **5 °C** and the coolant temperature is below **73 °C**. It will function at this level of output until the coolant temperature reaches **77 °C**.

ET007	ENGINE RUNNING

NOTES	None.

Manual switch control	Check that the manual switch is operating correctly. Replace the manual switch with a shunt and test the continuity of the connection between **track A4** of the heater relay and **track 6** of the **8-track** heater connector. Repair if necessary and replace the bimetal strip if necessary.
	Check that the heater relay feeds are operating correctly. Repair if necessary.
	Replace the heater **control unit** if the fault persists.

Injection control	Check the continuity between **track H3** of the grey injection unit connector and **track A2** of the heater relay. Check the continuity of the connection on **track A5** of the heater relay and **track 6** of the **8-track** heater connector. Repair if necessary.
	Check that the heater relay feeds are operating correctly. Repair if necessary.
	Replace the heater **control unit** if the fault persists.

PR108	COMPUTER SUPPLY VOLTAGE

NOTES	None.

Check **the connection and the condition of the intermediate 5-track connector** between the vehicle wiring and the heater and replace if necessary.

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

- **+ Battery** → **Track A 5-track** connector
- **Earth** → **Track D 5-track** connector
- **+ 12 V after ignition** → **Track E 5-track** connector

Repair if necessary.

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

- **Track A 5-track** connector → **Track 1 8-track** connector
- **Track D 5-track** connector → **Track 2 8-track** connector
- **Track E 5-track** connector → **Track 7 8-track** connector

Repair if necessary.
Replace the heater **control unit** if the fault persists.

NO DIALOGUE WITH THE COMPUTER	→ CHART 1
NO HEATING OR INADEQUATE HEATING	→ CHART 2

CHART 1	No dialogue with the computer

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.

Try the diagnostic tool on another vehicle.

Check:
– the connection between the diagnostic tool and the diagnostic socket (wiring in good condition),
– the engine fuses.

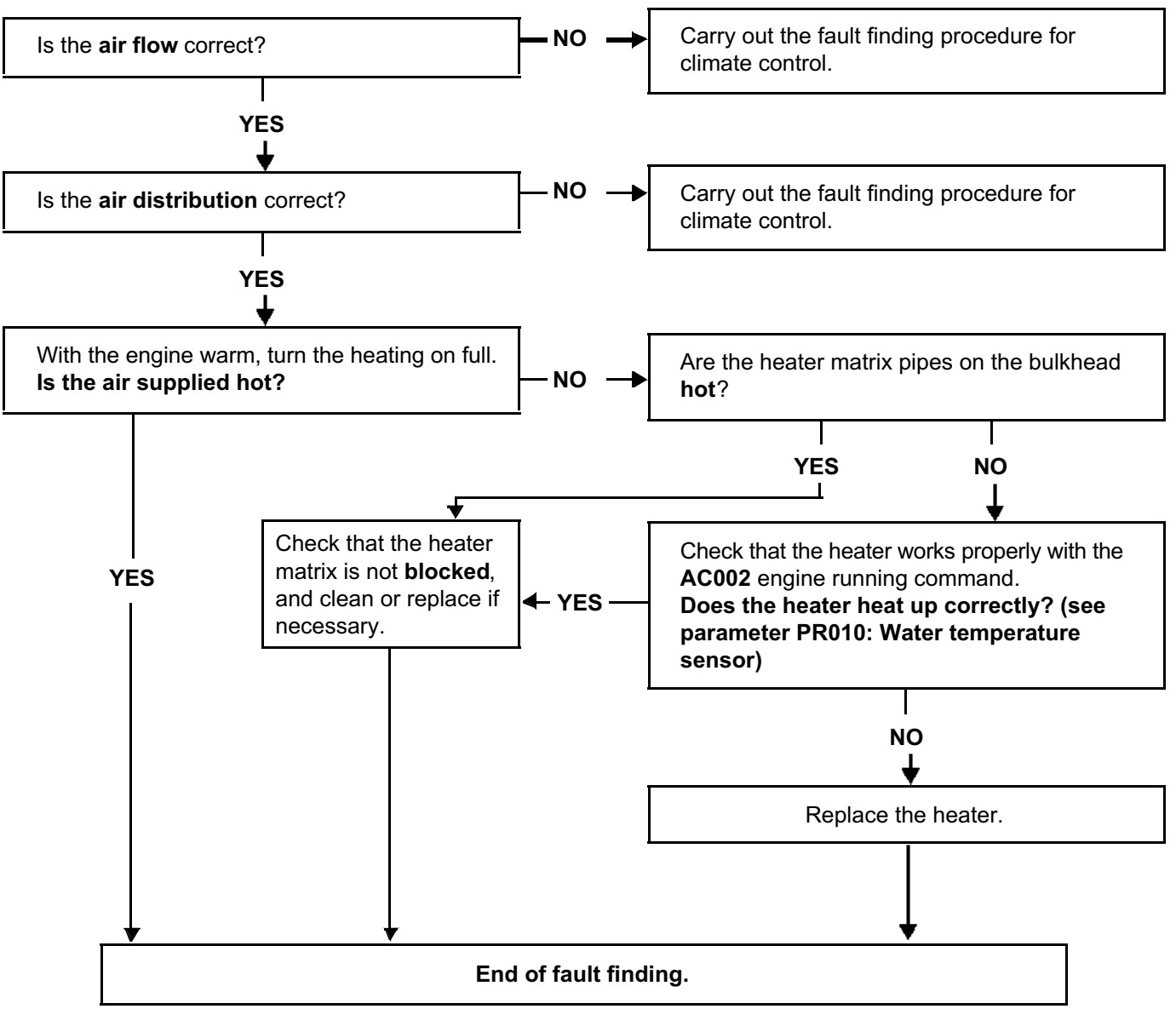
Check for the presence of **+ 12 volts before ignition** on **track 16**, for **+ 12 volts after ignition** on **track 1** and for an **earth** on **tracks 4 and 5** of the diagnostic socket.
Repair if necessary.

Check the **insulation, continuity and absence of interference resistance** on the connections between**:**
Connector **ST1 track A** → **V Battery** (fuse box)
Connector **ST1 track E** → **+ After ignition feed** (fuse box)
Connector **ST1 track D** → **Earth**
Connector **ST1 track B** → **Track 7** of the diagnostic socket (line K)
Repair if necessary.

AFTER REPAIR	Check that the system is operating correctly.

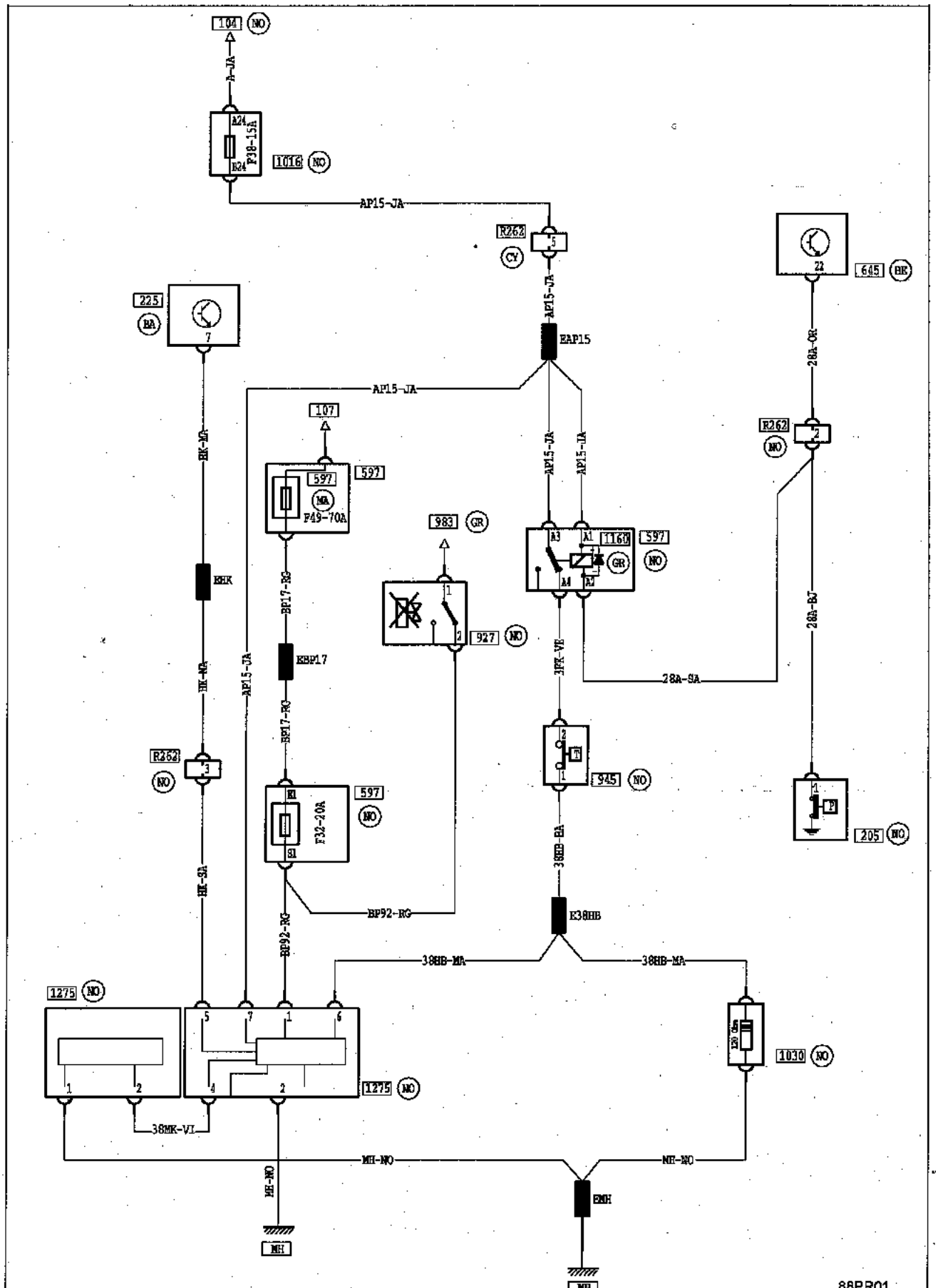
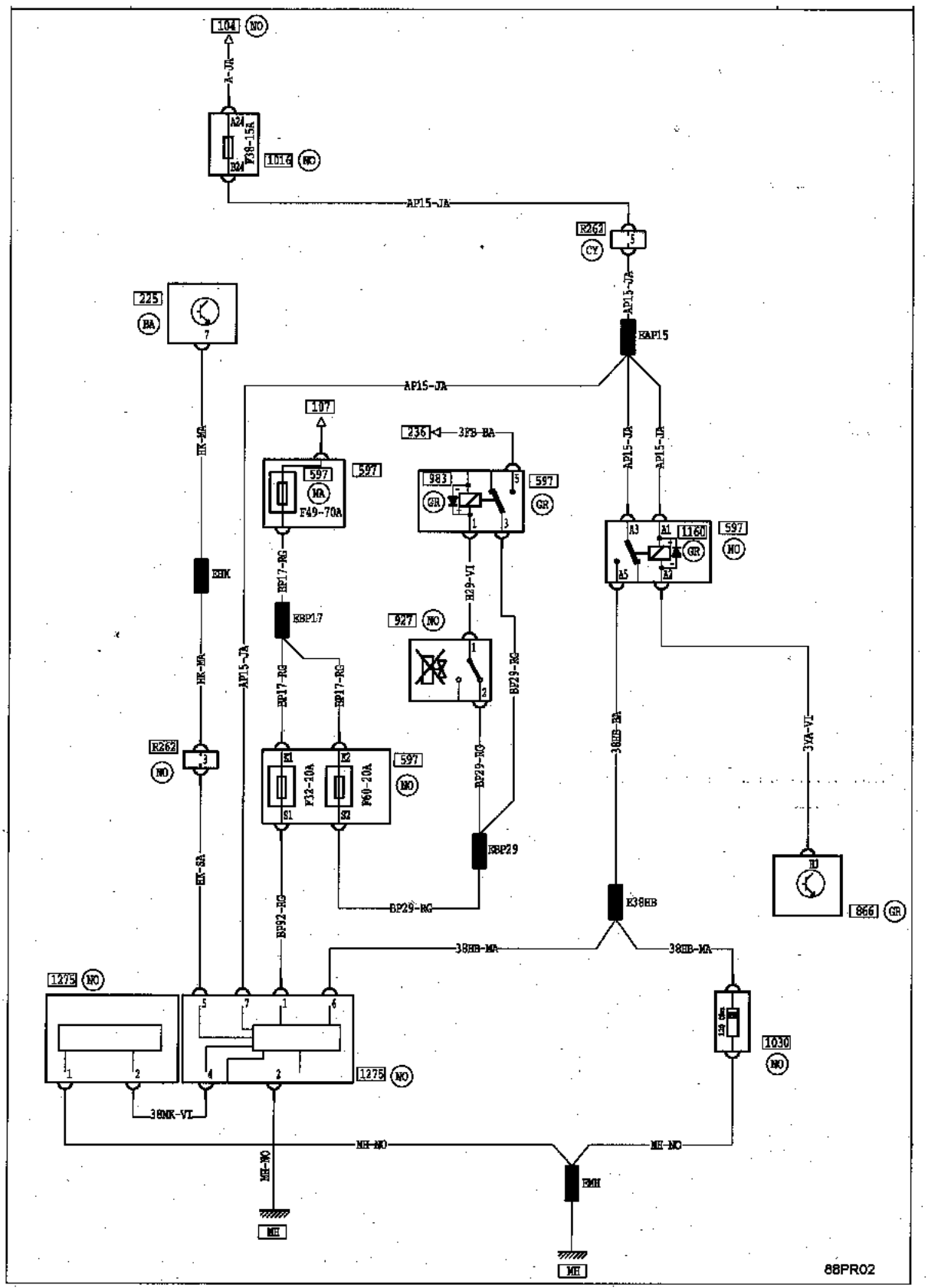
FAULT FINDING CHART 2	No heating or inadequate heating

NOTES	Only consult this customer complaint after a complete check using the diagnostic tool.



AFTER REPAIR	Check that the system is operating correctly.

MANUAL SWITCH HEATER CONTROL



INJECTION COMPUTER HEATER CONTROL