164

# FAN - - RADIATOR COOLING AND A/C CONDENSER

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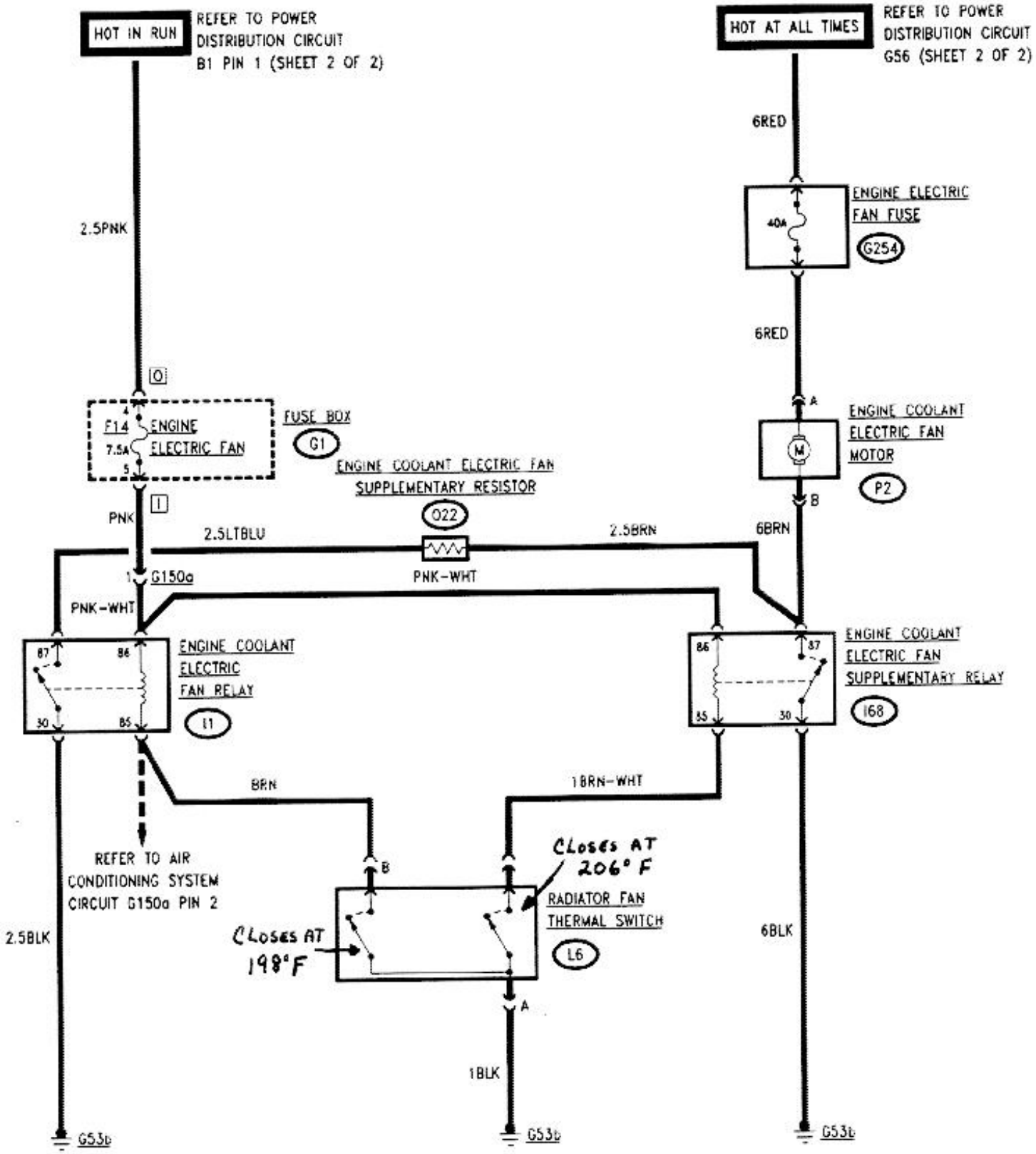


## GENERAL

The engine cooling is obtained by means of a suitable coolant.
The coolant temperature is controlled by an electric fan energized by closing of a thermal switch when the coolant temperature reaches a pre-set value ~ 92 ± 10°C (198° ± 18°F).
The electric fan is located behind the radiator and in front the air conditioning condenser, this provides cooling for both engine coolant and air conditioning freon.
The system is protected by two fuses as follows:

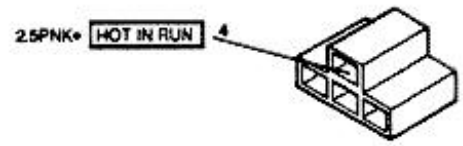
- **F14** fuse (7.5A) ENGINE ELECTRIC FAN, located in the fuse box **G1**.

- Free fuse **G254** (40A) ENGINE ELECTRIC FAN.

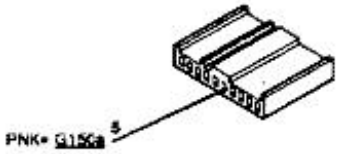
## OPERATIONAL DESCRIPTION

12V from the battery are applied to the engine coolant electric fan motor **P2** through the engine electric fan, 40A, free fuse **G254**.
With the start key set to "run", the voltage reaches the coil of the electric fan relays **I1** and **I68** through the electric fan fuse **F14** located in the fuse box **G1**.
When the engine coolant reaches a pre-set temperature 92 °±10°C (198° ± 18°F), the radiator fan thermal switch **L6** closes, and allows energizing of the relevant relay **I1**.
With the electric fan relay **I1** energized, the electric fan motor **P2** is grounded through the engine coolant fan supplementary resistor **O22** and becomes operative.
In the event the coolant temperature continues to increase, the supplementary thermal switch **L6** closes, and grounds the supplementary relay **I68**.
Energizing of the relay causes the closure of a contact which cuts-off the supplementary resistor **O22**, and allows the operation of the electric fan at a higher speed.
The electric fan motor **P2** can also be energized throught the air conditioning system when necessary to cool the freon in the condenser (refer to the Automatic air conditioning circuit).

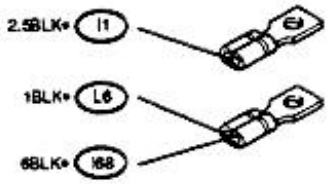
Fuse box G1 O



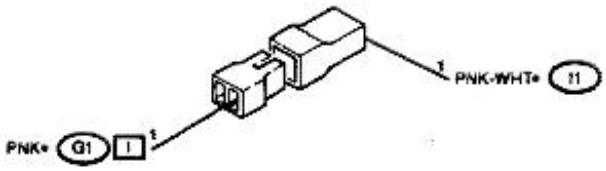

Fuse box G1 I



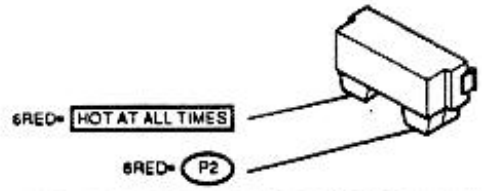

Engine compartment left side ground connection G53b



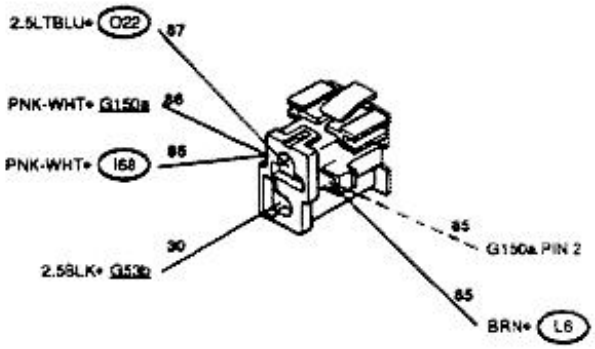

Connector, circuit board to engine compartment left side wiring G150a



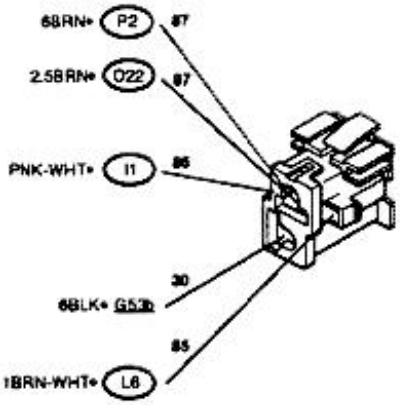

Engine electric fan fuse G254



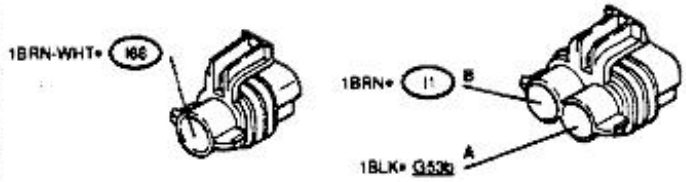

Engine coolant electric fan relay I1



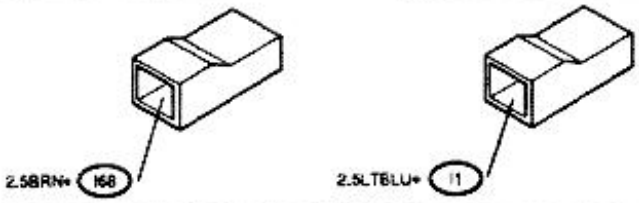

Engine coolant fan supplementary relay I68



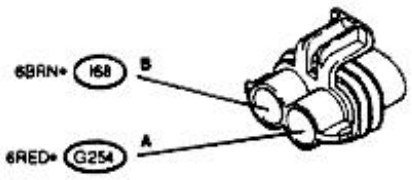

Radiator fan thermal switch L6

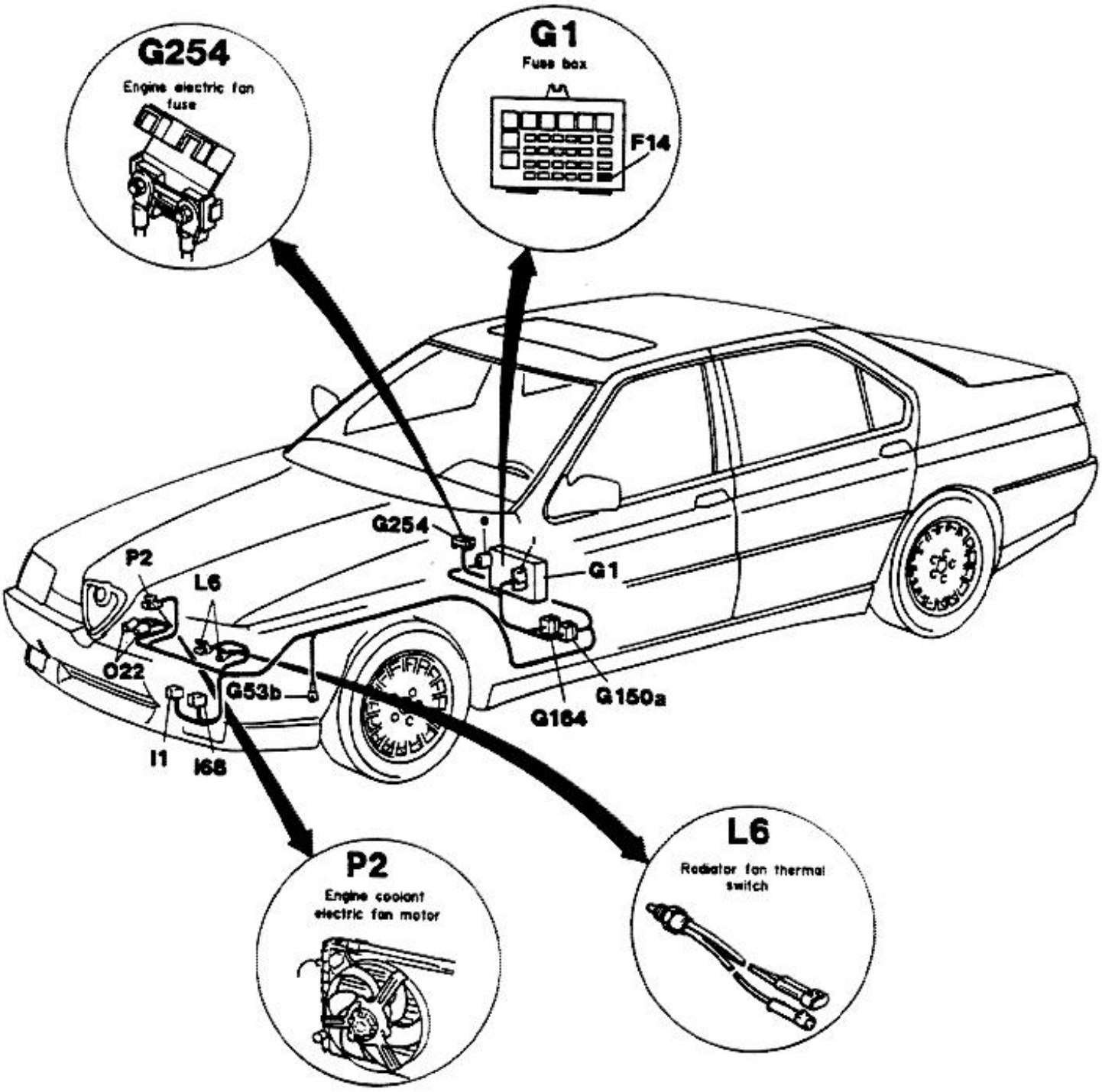



Engine coolant fan supplementary resistor O22




Engine coolant electric fan motor P2





| ENGINE COOLANT ELECTRIC FAN INOPERATIVE | TEST A |
|---|---|

| TEST STEPS | RESULTS | REMEDY |
|---|---|---|
| **A1** FUSE CHECK<br>- Check the engine electric fan fuse **F14** in the fuse box **G1** for integrity | OK ▶<br>~~OK~~ ▶ | Carry-out **step A2**<br>Replace **fuse F14** |
| **A2** FUSE CHECK<br>- Check the engine electric fan fuse **G254** for integrity | OK ▶<br>~~OK~~ ▶ | Carry-out **step A3**<br>Replace **fuse G254** |
| **A3** VOLTAGE CHECK<br>- With the ignition key set to "run" check for presence of 12V between pins 86 of relays **I1** and **I68** and ground | OK ▶<br>~~OK~~ ▶ | Carry-out **step A6**<br>Carry-out **step A4** |
| **A4** VOLTAGE CHECK<br>- With the ignition key set to "run" check for presence of 12V between pin 1 of connector **G150a** and ground | OK ▶<br>~~OK~~ ▶ | Repair wiring between **pin 1 of G150a and pins 86 of relays I1 and I68**<br>Carry-out **step A5** |

(Cont.d)

| ENGINE COOLANT ELECTRIC FAN INOPERATIVE | TEST A |
|---|---|

| TEST STEPS | RESULTS | REMEDY |
|---|---|---|
| **A5** VOLTAGE CHECK<br>- With the ignition key set to "run", check for presence of 12V between pin 40 of fusebox **G1** and ground. | OK ▶<br>~~OK~~ ▶ | Repair wiring between **pin 1 of G150a and pin 5l of fusebox G1**<br>Failure **of the power distribution circuit, refer to the relevant circuit of sheet 2 of 2** |
| **A6** GROUNDING CHECK<br>- With thermal switch pressed, check for presence of 0V at pins 85 of relays **I1** and **I68**. | OK ▶<br>~~OK~~ ▶ | Carry-out **step A7**<br>Carry-out **step A9** |
| **A7** GROUNDING CHECK<br>- Check for presence of ~~0V~~ 12V at pin 87 of relay **I1**. | OK ▶<br>~~OK~~ ▶ | Carry-out **step A11**<br>Carry-out **step A8** |
| **A8** GROUNDING CHECK<br>- Check for presence of 0V at pin 30 of relay **I1** | OK ▶<br>~~OK~~ ▶ | Replace **relay I1**<br>Repair wiring between **pin 30 of relay I1 and ground point G53b** |

(Cont.d)

| ENGINE COOLANT ELECTRIC FAN INOPERATIVE | TEST A |
|---|---|

| TEST STEPS | RESULTS | REMEDY |
|---|---|---|
| **A9** CONTINUITY CHECK<br>- Check continuity between pins of thermal switch and pins 85 of relays **I1** and **I68**. | OK ▶<br>~~OK~~ ▶ | Carry-out **step A10**<br>Repair or replace **wiring, as necessary** |
| **A10** GROUNDING CHECK<br>- Check for presence of 0V at pin A of thermal switch **L6** | OK ▶<br>~~OK~~ ▶ | Replace **thermal switch L6**<br>Repair wiring between **pin A of thermal switch and ground point G53b** |
| **A11** CONTINUITY CHECK<br>- Check that circuit between pins 87 of relays **I1** and **I68** is not open (R = 0,23 ohm) | OK ▶<br>~~OK~~ ▶ | Carry-out **step A13**<br>Carry-out **step A12** |
| **A12** CONTINUITY CHECK<br>- Check continuity between pins of supplementary resistor and pins 87 of relays **I1** and **I68** | OK ▶<br>~~OK~~ ▶ | Replace **supplementary resistor O22**<br>Repair or replace **wiring, as necessary** |

(Cont.d)

| ENGINE COOLANT ELECTRIC FAN INOPERATIVE | TEST A |
|---|---|

| TEST STEPS | RESULTS | REMEDY |
|---|---|---|
| **A13** VOLTAGE CHECK<br>- Check for presence of 12V between pins A and B of electric fan motor **P2** | OK ▶<br>~~OK~~ ▶ | Replace **electric fan motor P2.**<br>Carry-out **step A14** |
| **A14** VOLTAGE CHECK<br>- Check for presence of 12V between pin A of electric fan motor **P2** and ground | OK ▶<br>~~OK~~ ▶ | Carry-out **step A16**<br>Carry-out **step A15** |
| **A15** VOLTAGE CHECK<br>- Check for presence of 12V between pin of fuse **G254** (RED wire) and ground | OK ▶<br>~~OK~~ ▶ | Repair wiring between **pin A of motor and pin of fuse G254 (RED wire)**<br>**Failure of the power distribution circuit, refer to the relevant circuit of sheet 2 of 2** |
| **A16** GROUNDING CHECK<br>- With the ignition key set to "run" and the thermal switch pressed, check for presence of 0V at pin 87 of relay **I68** | OK ▶<br>~~OK~~ ▶ | Repair wiring between **pin 87 of relay I68 and pin B of motor P2**<br>Carry-out **step A17** |

(Cont.d)

| ENGINE COOLANT ELECTRIC FAN INOPERATIVE | TEST A |
|---|---|

| TEST STEPS | | RESULTS | REMEDY |
|---|---|---|---|
| A17 | GROUNDING CHECK | | |
| - Check for presence of 0V at pin 30 of relay I68 | | OK ▶ | Replace **relay I68** |
| | | ~~OK~~ ▶ | Repair wiring between **pin 30 of I68 and ground point G53b** |

**End of test A**