

ENGINE COOLING

(versions without air conditioner) (*)

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(*) in cars with air conditioner see the section "Air Conditioner"

GENERAL DESCRIPTION

A fan helps the radiator to disperse the heat of the engine coolant, due to a thermometric switch that detects when the coolant temperature is too high and turns on the fan.

NOTE: The Boxer and T.SPARK versions (M.Y. '97) are fitted with a solenoid valve with only one speed, while the 2.0 T.SPARK version (M.Y. 96) and

the TD and TD-CAT versions are fitted with a solenoid valve with two different speeds: the first is operated when the conditioner compressor is engaged with the car stationary at a first temperature level of the coolant fluid; the second speed cuts in at a higher temperature.

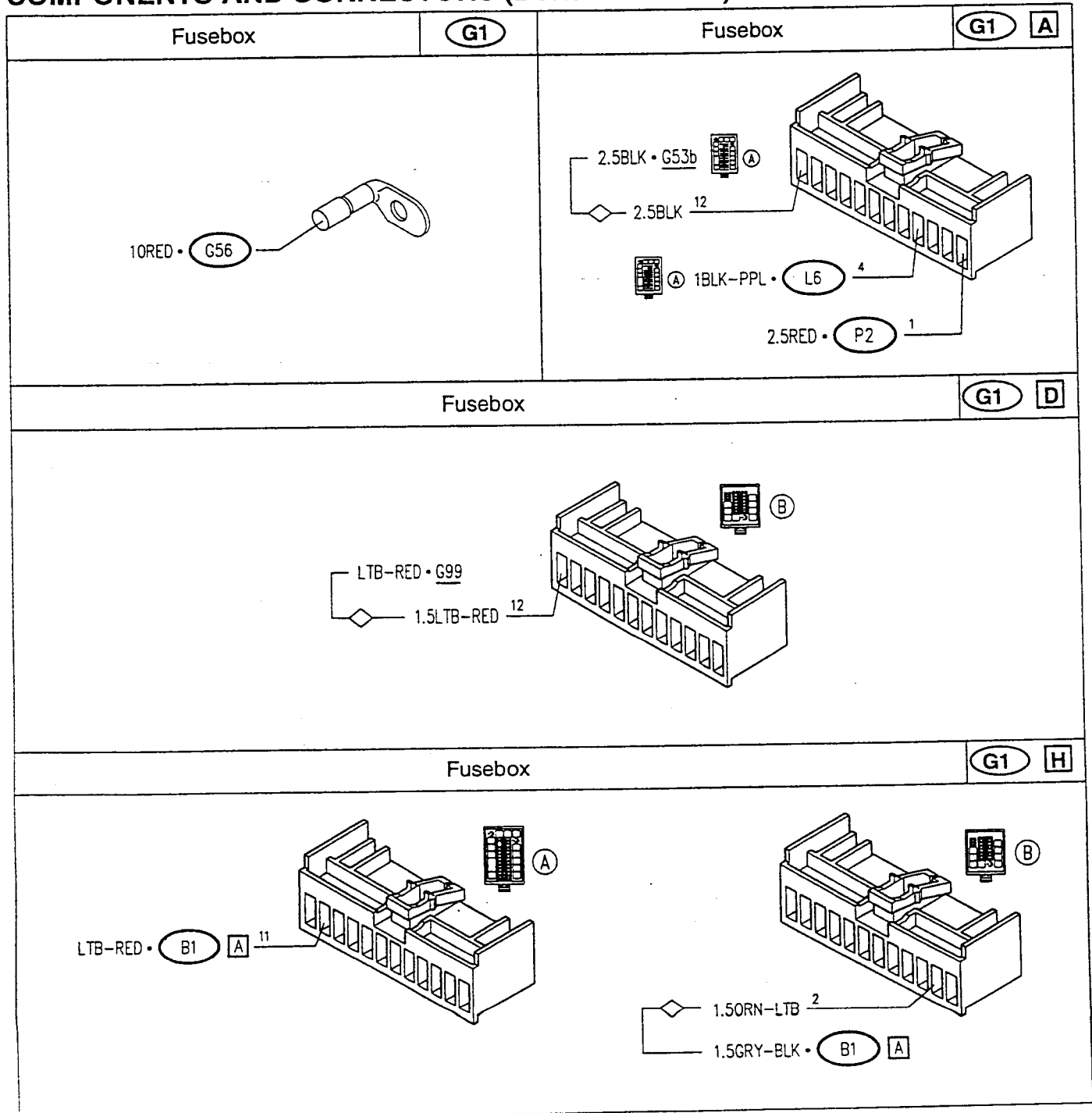
N.B. For versions with air conditioner, the electric circuit is shown in the section "Climate control".

FUNCTIONAL DESCRIPTION (Boxer Versions)

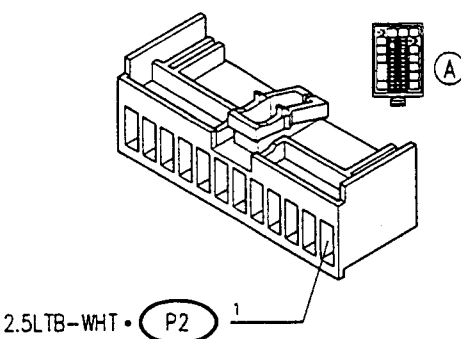
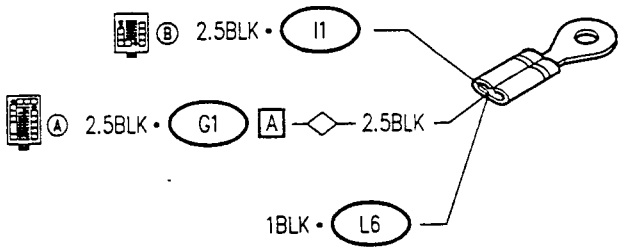
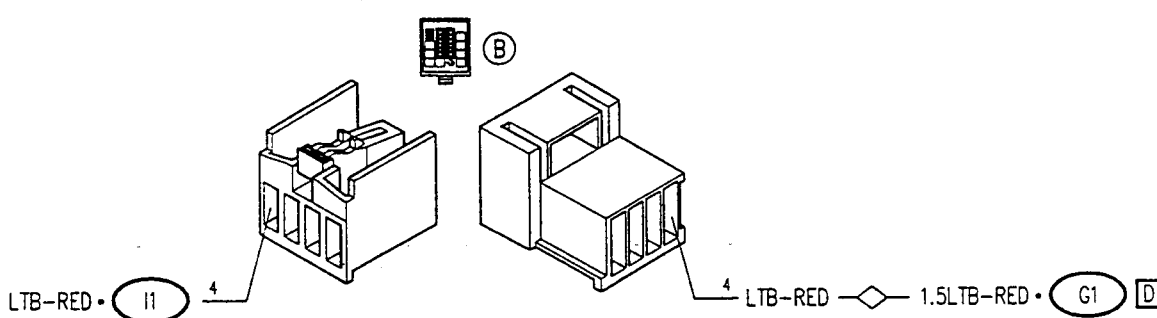
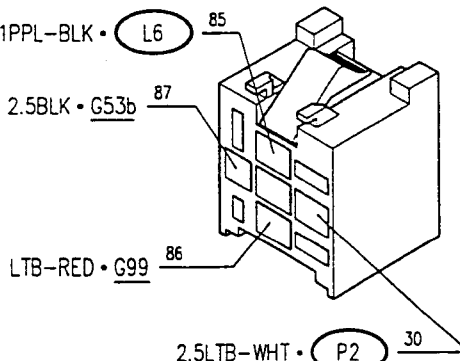
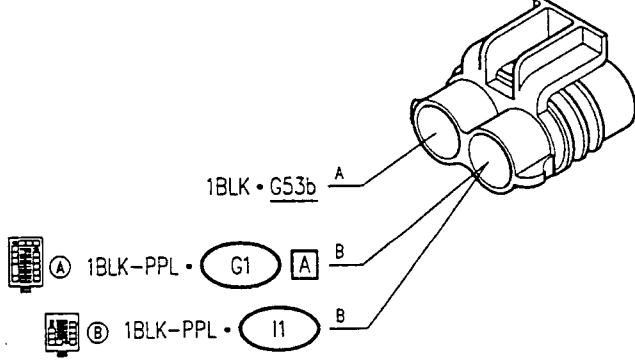
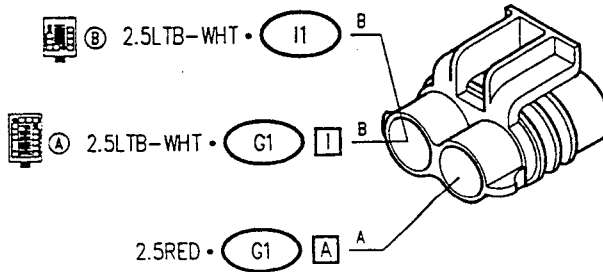
The fan **P2** is supplied directly with battery voltage via fuse **F14** of fusebox **G1**.
 Relay **I1** - to be found inside fusebox "A" or outside for version-"B" - that controls the fan is supplied from the ignition block (for fusebox "B" via fuse **F15** of the

actual fusebox) and it is energized by an earth signal leading from the thermal contact **L6** which closes when the temperature of the coolant fluid reaches 92°C: this way relay **I1** sends an earth to the motor which operates the fan **P2**.
 When the temperature falls below 87°C the contact opens, the relay is de-energized and the fan stops.

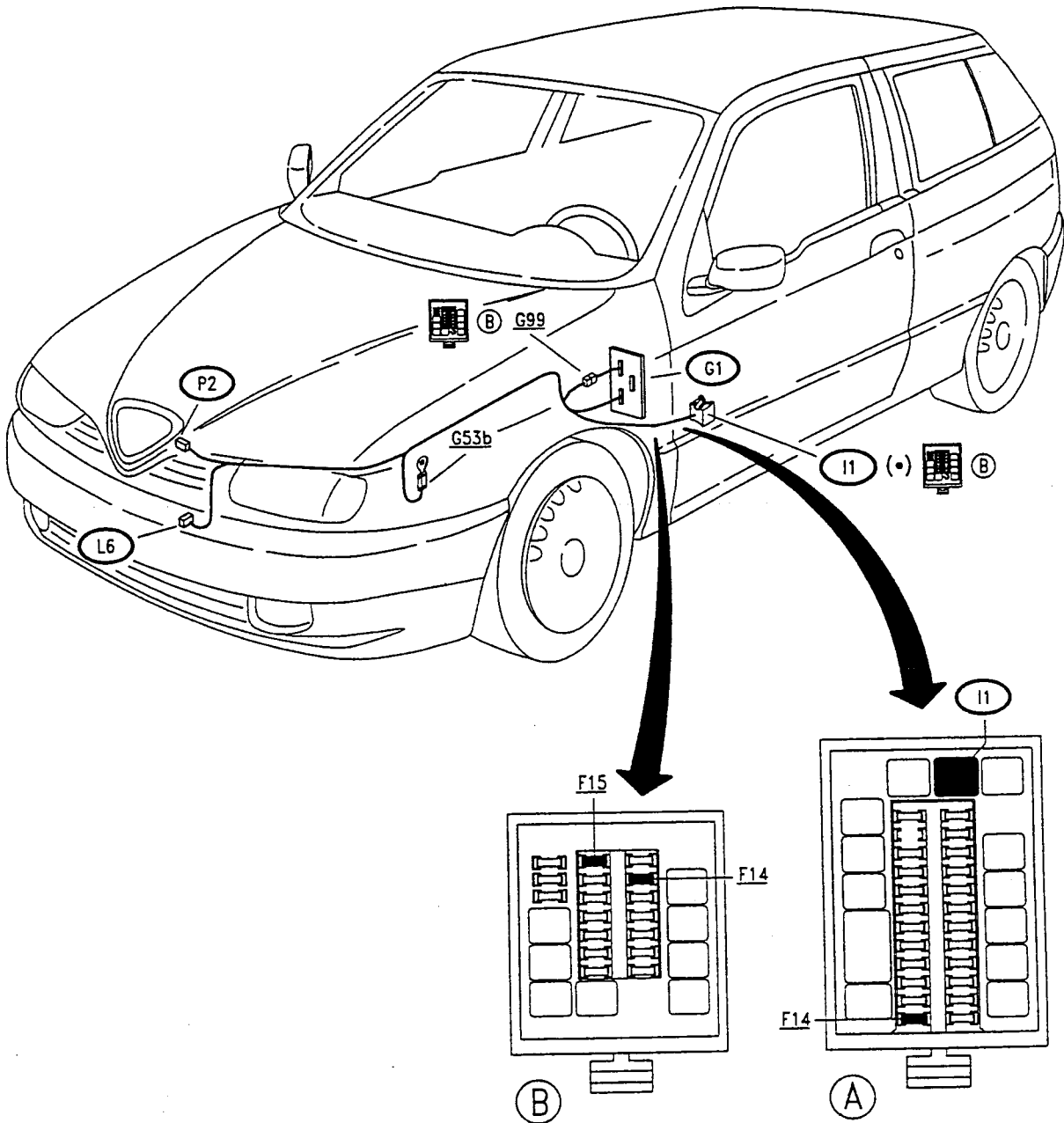
COMPONENTS AND CONNECTORS (Boxer Versions)



COMPONENTS AND CONNECTORS (cont.d)

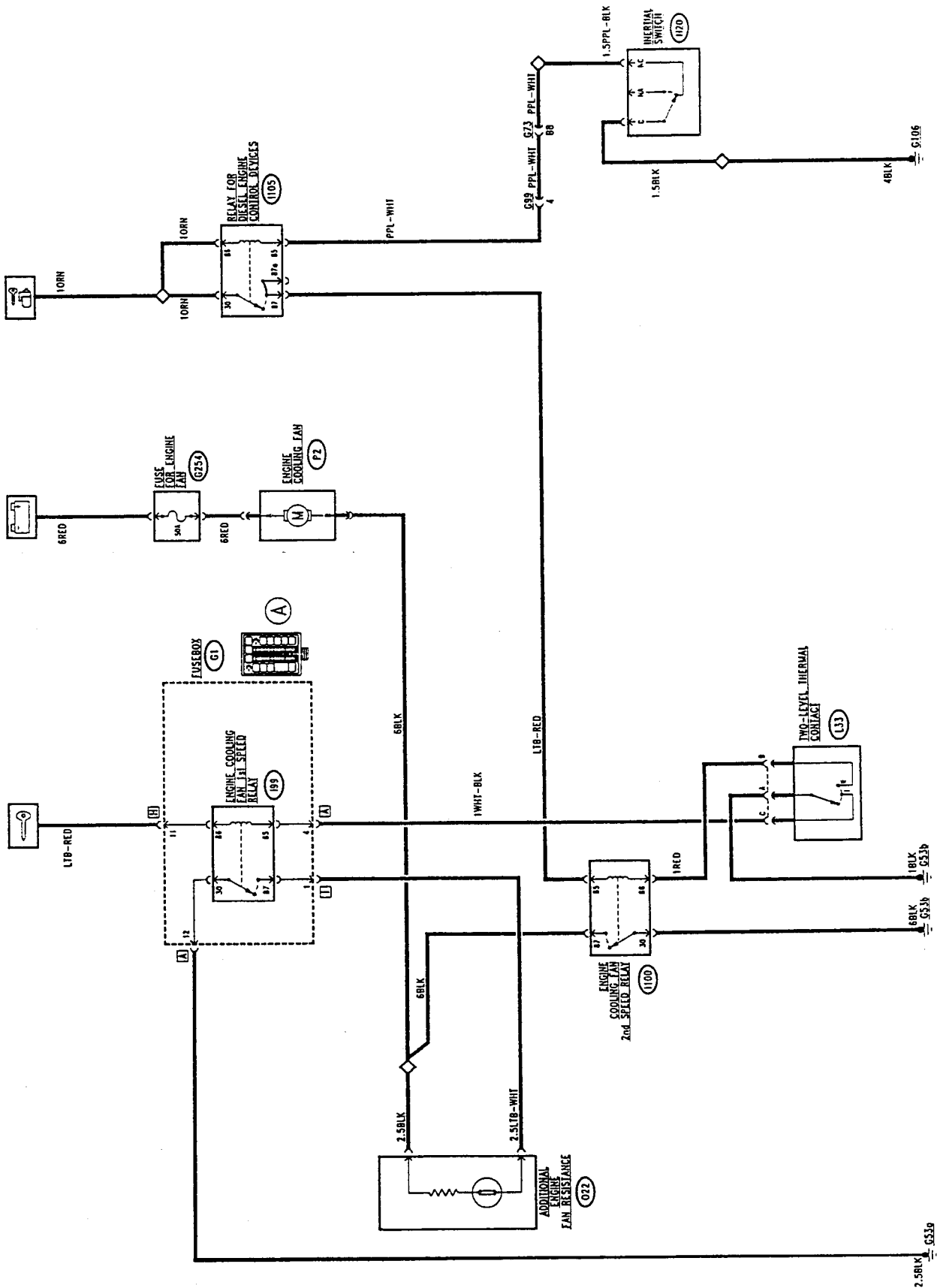
Fusebox	G1 I	LH engine compartment earth	G53b
 <p>2.5LTB-WHT • P2 1</p>		 <p>2.5BLK • I1 2.5BLK • G1 A 2.5BLK 1BLK • L6</p>	
Dashboard/engine wiring connector			G99
 <p>LTB-RED • I1 4 LTB-RED 4 LTB-RED 1.5LTB-RED • G1 D</p>			
Engine water cooling fan switch	I1	Engine cooling fan thermal contact	L6
 <p>1PPL-BLK • L6 85 2.5BLK • G53b 87 LTB-RED • G99 86 2.5LTB-WHT • P2 30</p>		 <p>1BLK • G53b A 1BLK-PPL • G1 A B 1BLK-PPL • I1 B</p>	
Engine water cooling fan			P2
 <p>2.5LTB-WHT • I1 B 2.5LTB-WHT • G1 I B 2.5RED • G1 A A</p>			

LOCATION OF COMPONENTS (Boxer Versions)



(•) yellow base

WIRING DIAGRAM (TD-CAT Version)



**FUNCTIONAL DESCRIPTION (TD,
TD-CAT Version)**

The fan **P2** is supplied with battery voltage via a special fuse, **G254** (50A), and this way it is activated through an earth at the opposite terminal: if this earth leads directly from relay **I100** the 2nd speed is activated; when it leads from relay **I99** and crosses the additional resistance **O22**, the 1st speed is activated.

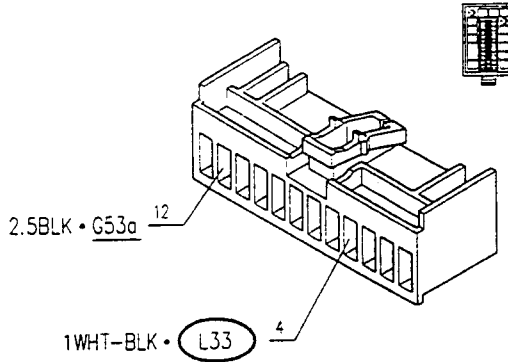
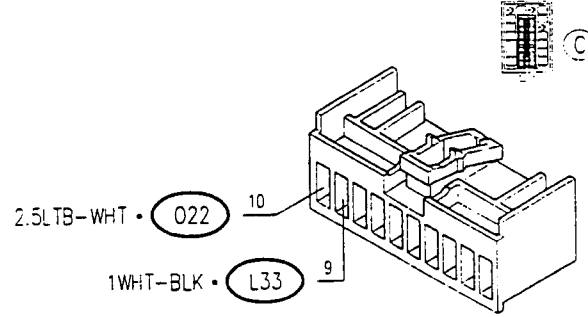
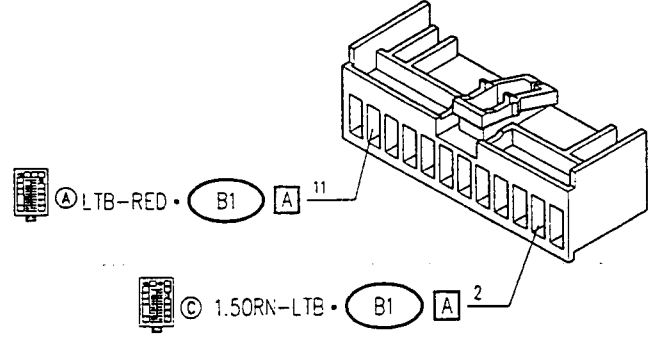
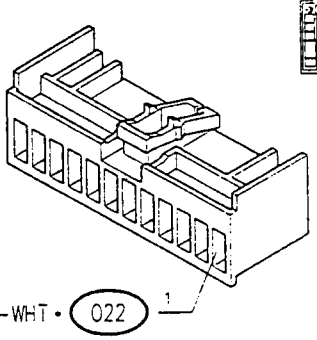
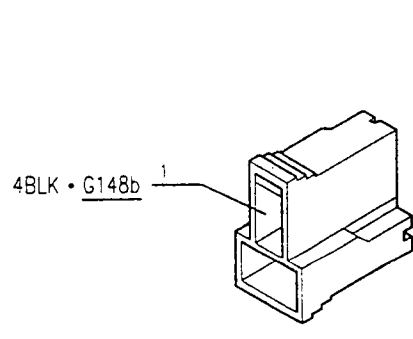
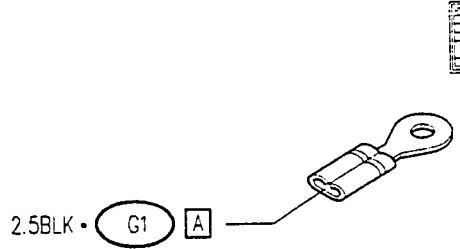
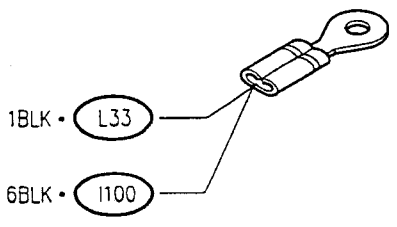
In fact, the fan operates at two different speeds, due to an additional resistance: the first speed is engaged at the first temperature level of the coolant detected by the thermal contact; the second speed cuts in at higher temperature (second level). The additional resistance is protected internally by a thermal fuse that

cuts off the electric circuit if the temperature exceeds 184°C appr.

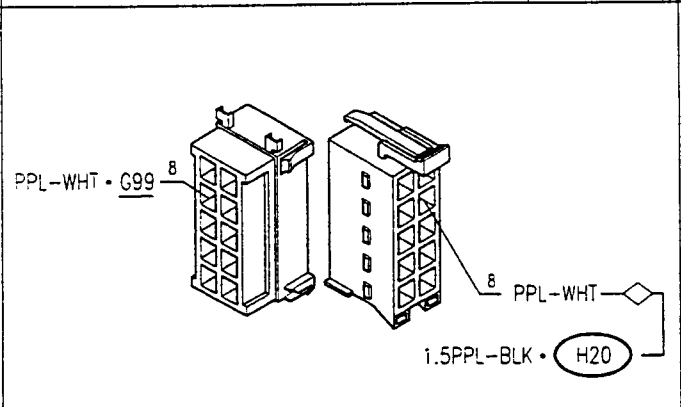
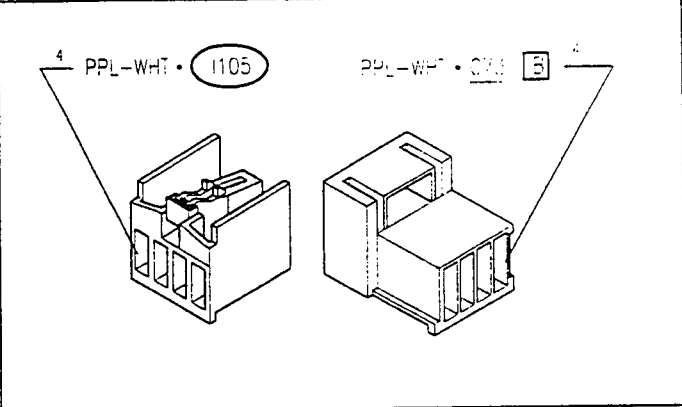
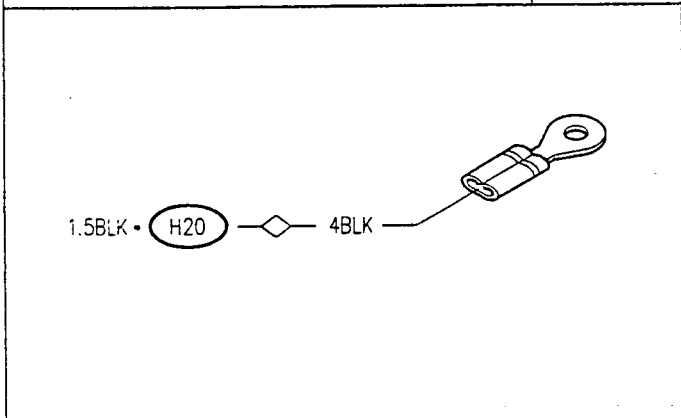
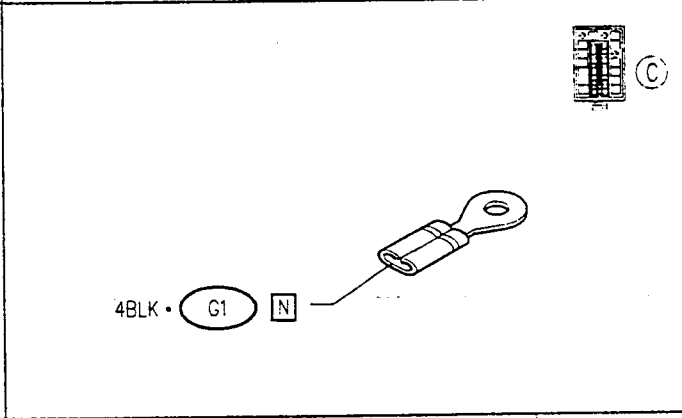
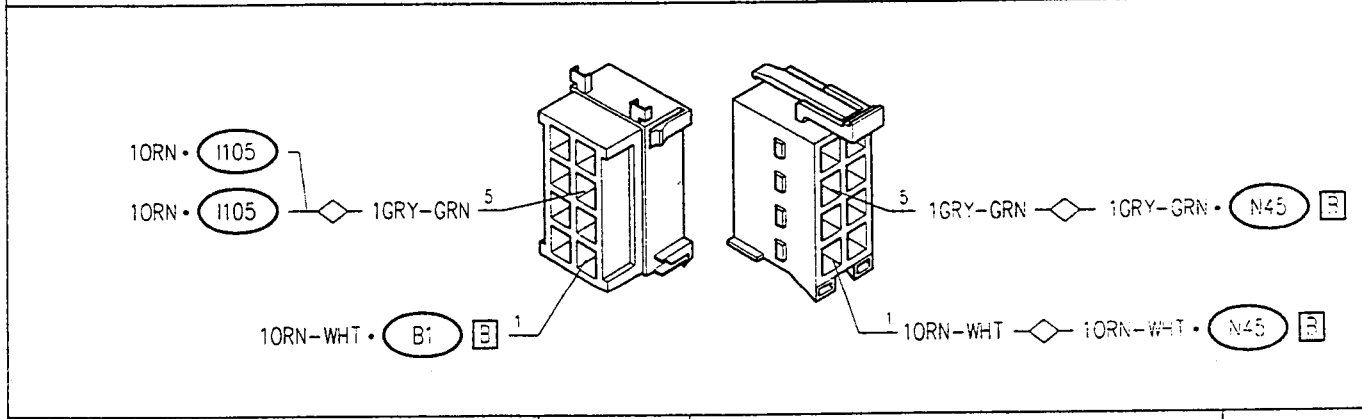
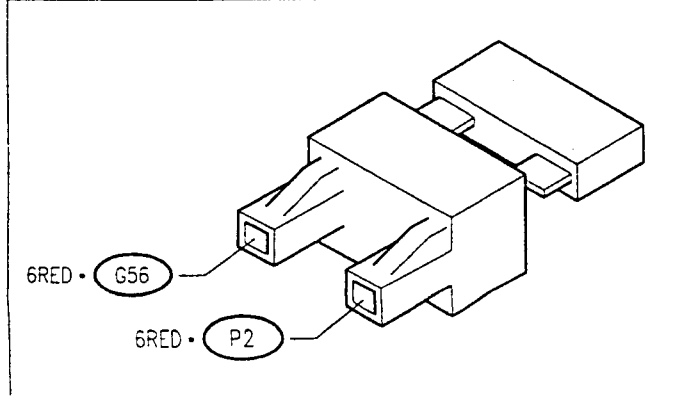
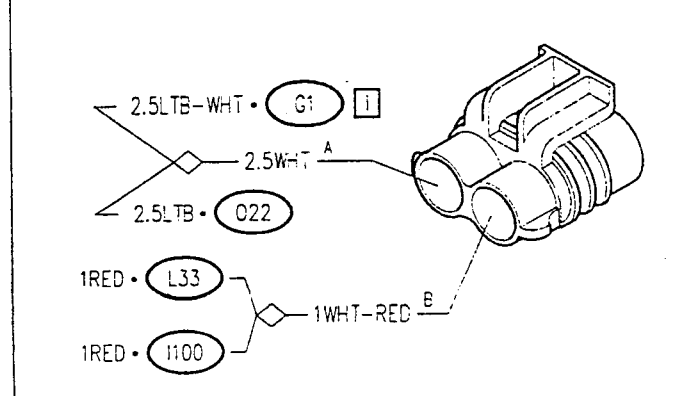
The signal from the 1st level (83-88°C) of the two-level thermal contact **L33** energizes relay **I99** - supplied from the ignition switch - thereby sending an earth signal to the additional resistance **O22** and from this to the fan, which is operated at the 1st speed.

Conversely, if the coolant fluid reaches the 2nd level (87 - 92°C) of thermal contact **L33**, the earth signal energizes the coil of relay **I100** - supplied from the ignition block via relay **I105** and - only versions without ALFA ROMEO CODE - the antitheft control unit **N45** - directly operating the fan **P2** at 2nd speed.

CONENTS AND CONNECTORS (TD, TD-CAT Version)

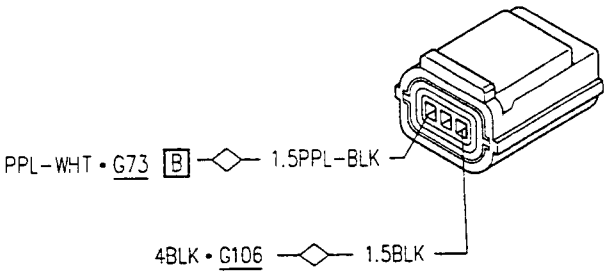
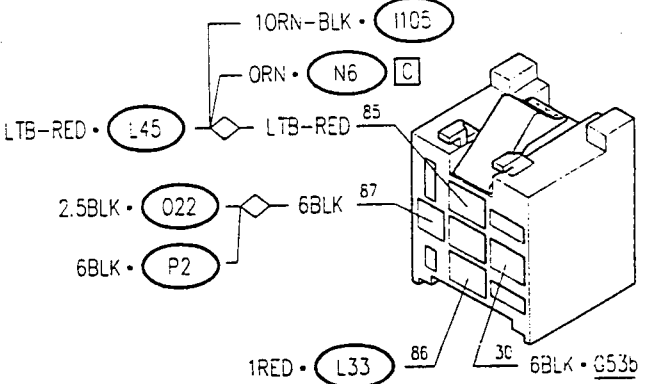
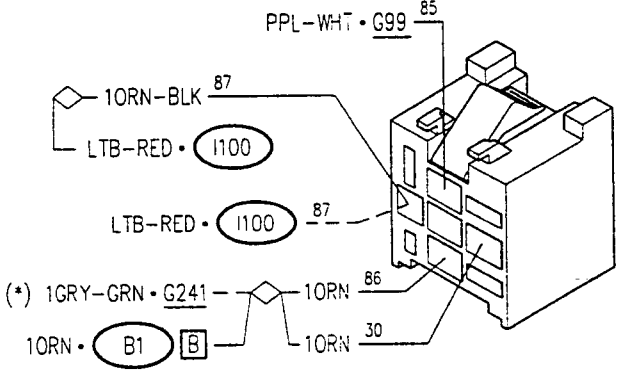
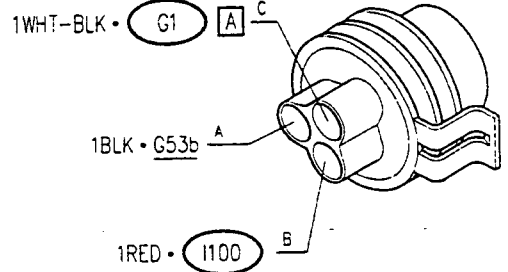
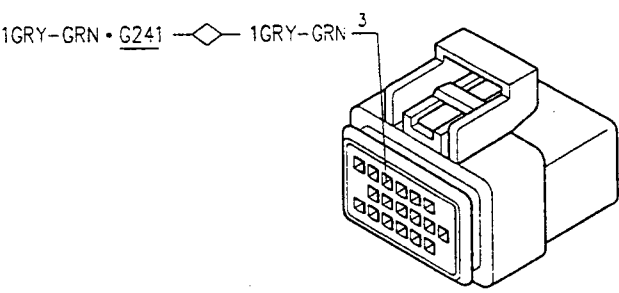
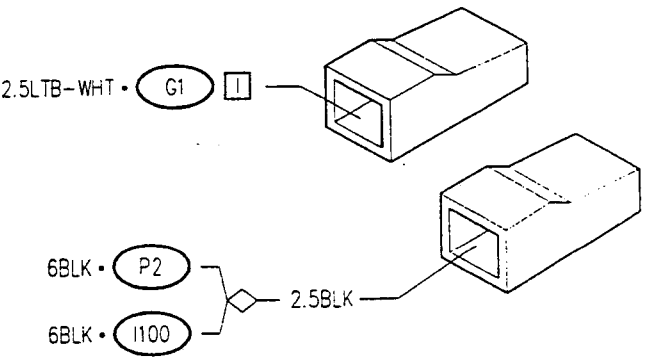
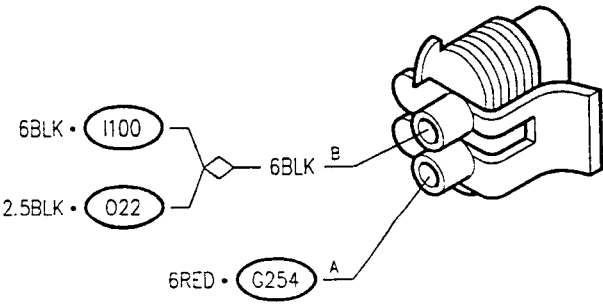
Fusebox	G1 A	Fusebox	G1 G
 <p>2.5BLK • G53a 12</p> <p>1WHT-BLK • L33 4</p>		 <p>2.5LTB-WHT • 022 10</p> <p>1WHT-BLK • L33 9</p>	
Fusebox	G1 H	Fusebox	G1 I
 <p>LTB-RED • B1 A 11</p> <p>1.5ORN-LTB • B1 A 2</p>		 <p>2.5LTB-WHT • 022 1</p>	
Fusebox	G1 N	RH engine compartment earth	G53a
 <p>4BLK • G148b 1</p>		 <p>2.5BLK • G1 A</p>	
LH engine compartment earth			G53b
 <p>1BLK • L33</p> <p>6BLK • 1100</p>			

COMPONENTS AND CONNECTORS (cont.d)

Rear services connector	G73 B	Connector for dashboard wiring/engine wiring	G99
			
Seat cross rail earth	G106	Earth under dashboard LH	G148b
			
Anti-theft device wiring connector (*)			G241
			
Fuse for engine fan	G254	Connector for engine wiring / conditioner wiring	G314
			

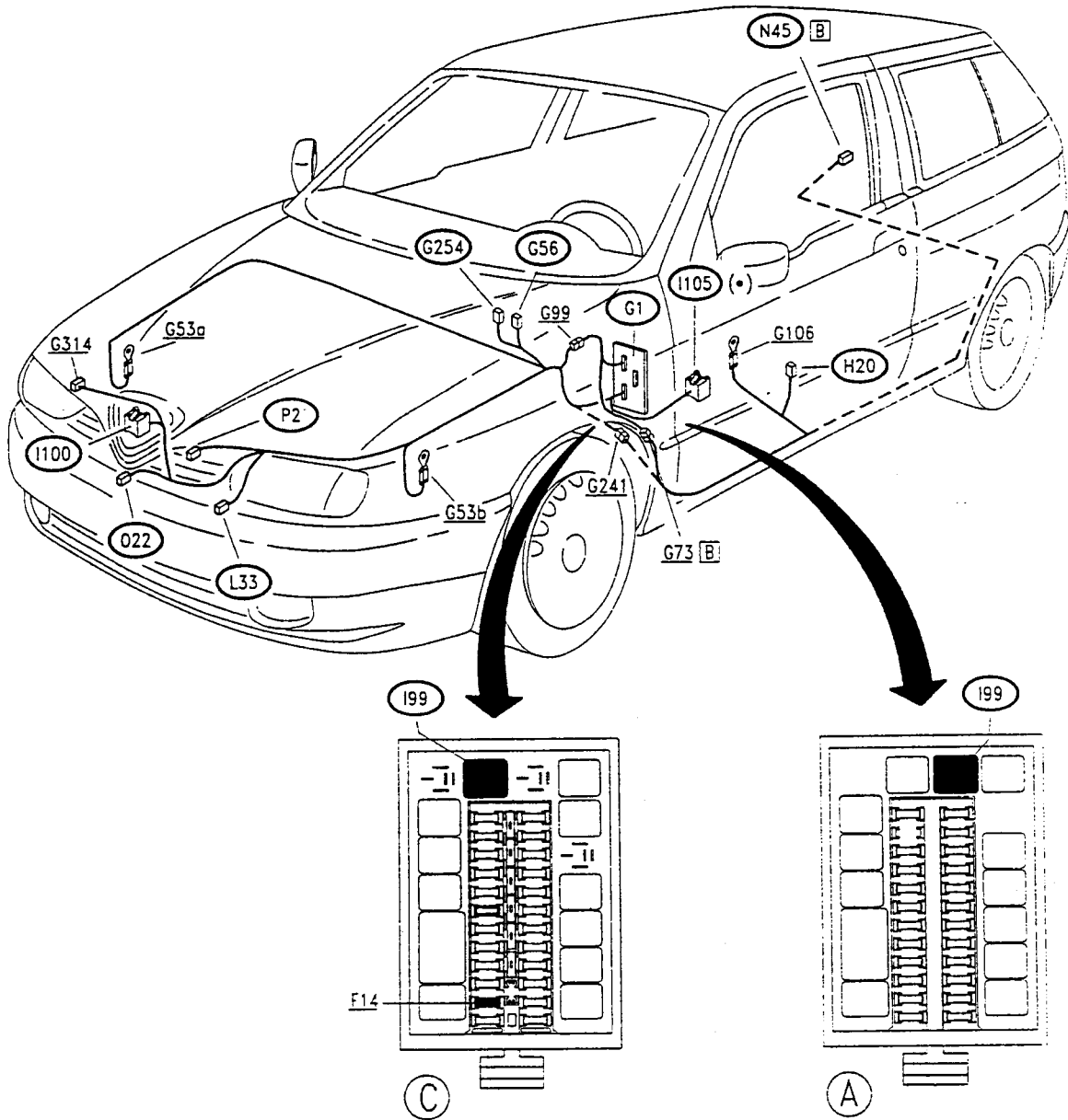
(*) versions without ALFA ROMEO CODE, but with anti-theft system system

COMPONENTS AND CONNECTORS (cont.d)

<p>Inertial switch</p>	<p>(H20)</p>	<p>Engine cooling fan 2nd speed relay</p>	<p>(1100)</p>
			
<p>Diesel engine control devices relay</p>	<p>(1105)</p>	<p>Two-level thermal contact</p>	<p>(L33)</p>
			
<p>Anti-theft control unit (*)</p>	<p>(N45) B</p>	<p>Engine cooling fan additional resistance</p>	<p>(O22)</p>
			
<p>Engine water cooling fan</p>			<p>(P2)</p>
			

(*) versions without ALFA ROMEO CODE, but with anti-theft system system
PA493000000006

LOCATION OF COMPONENTS (TD, TD-CAT version)



(•) grey fuseholder

— — — versions without ALFA ROMEO CODE, but with anti-theft system system

FUNCTIONAL DESCRIPTION**(T.SPARK version - Model Year '96)**

The fan **P2**, provides the necessary ventilation of the cooling air for the engine radiator and for the air conditioner condenser.

This fan is always supplied by battery voltage through the line protected by specific wander fuse **G254**, to be found in the branch terminal box: it is therefore operated by an earth command signal: this signal reaches it directly (2nd speed) or through the additional resistance **O22** (1st speed).

The fan **P2** is operated at the two different speeds by the two-level thermal contact **L33** which controls the temperature of the coolant in the engine radiator: when it reaches the first level, relay **I99a** is energised, which is located in the fusebox **G1**, which sends the earth signal to the fan **P2** via resistance **O22**: 1st speed.

If the second temperature level is reached, relay **I100** is energised, located on the fan duct, which sends the earth signal directly to the fan **P2**: 2nd speed.

The two relays receive the "key-operated" supply; **I100** is supplied by the line of fuse **F4** of **G1**.

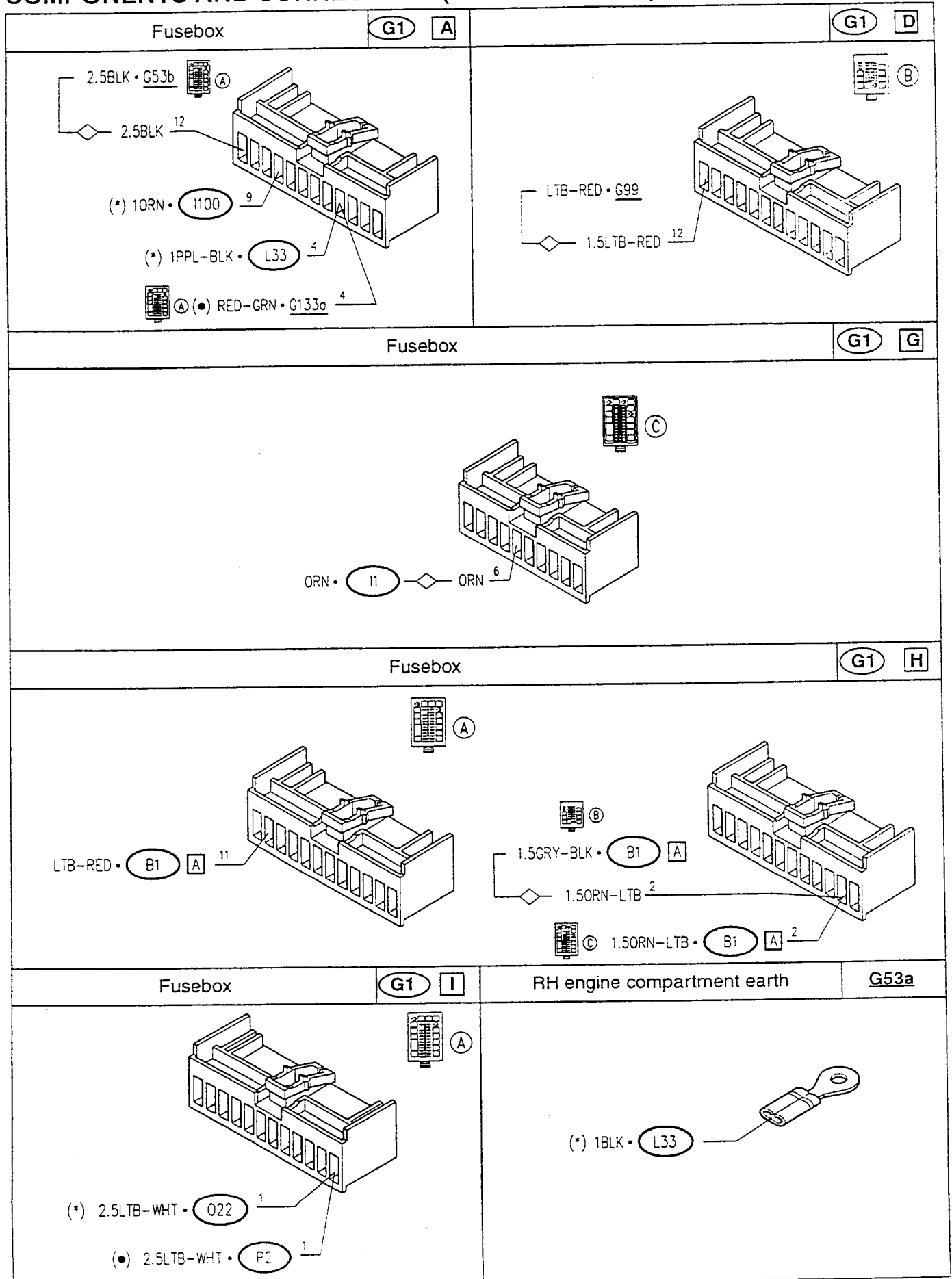
FUNCTIONAL DESCRIPTION**(T.SPARK version - Model Year '97)**

The fan **P2** is supplied directly with battery voltage via specific wander fuse **G254**.

Relay **I1** - to be found inside fusebox "A" or outside for version "B" "C" - that controls the fan is supplied from the ignition block (for fusebox "B" via fuse **F15** of the actual fusebox, for box "C" through fuse **F14**). and it is energized by an earth signal leading from control unit **S11** - pin 25 - which closes when the temperature of the coolant fluid increases 92°C: this way relay **I1** sends an earth to the motor which operates the fan **P2**.

When the temperature falls, the contact opens, the relay is de-energized and the fan stops.

COMPONENTS AND CONNECTORS (T.SPARK version)



COMPONENTS AND CONNECTORS (contd.)

LH engine compartment earth		G53b	
Branch terminal box	G56	Connector for dashboard wiring/engine wiring	G99
Connector for electronic injection wiring A			G133a
Engine cooling fan relay			I1

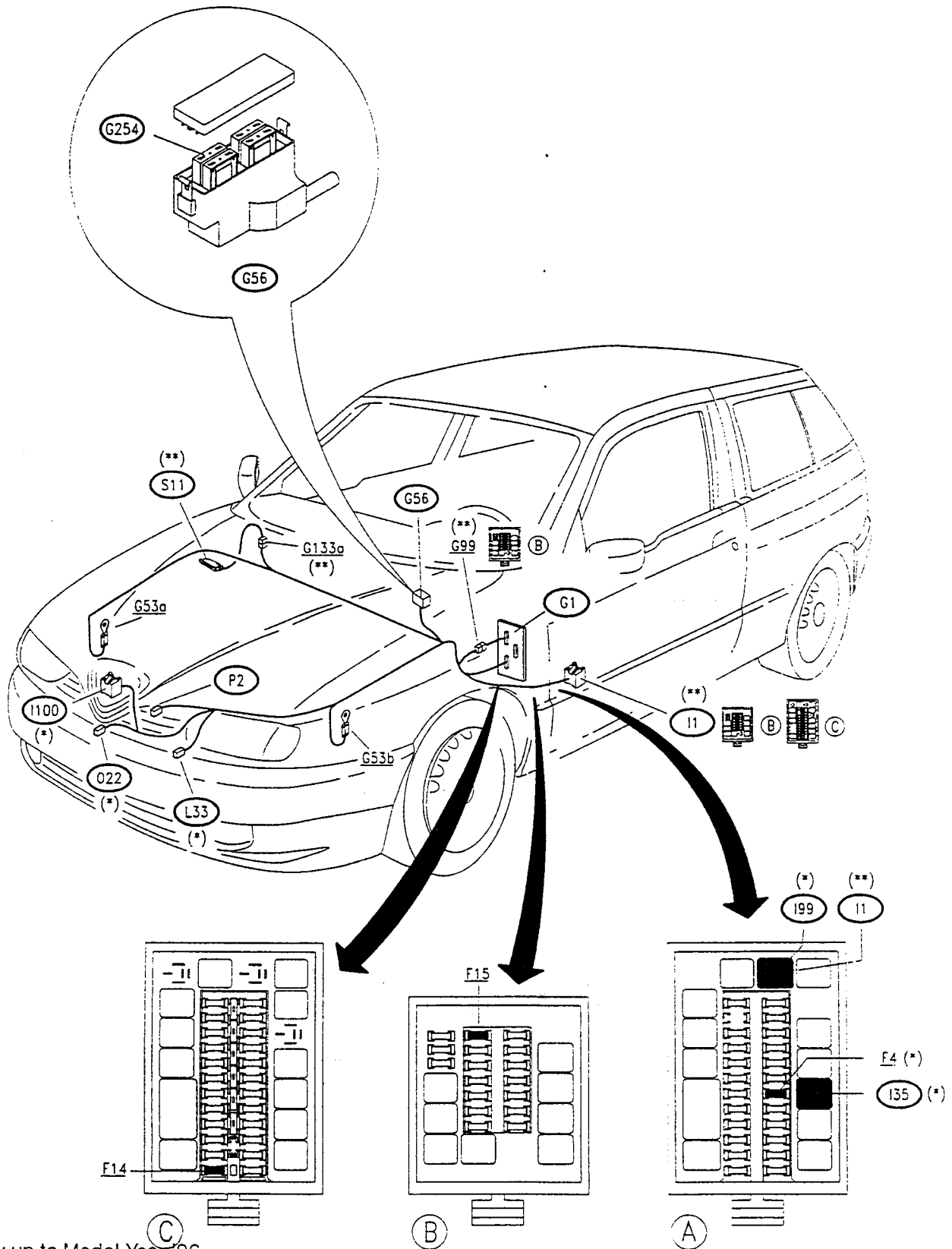
COMPONENTS AND CONNECTORS (contd.)

<p>Engine cooling fan 2nd speed relay (I100)</p> <p>1GRN-BLK • L33 85 4BLK • G53b 87 10RN • G1 A 86 2.5LTB-WHT • O22 B 4LTB-WHT • P2 4LTB-WHT 30</p>	<p>Two-level thermal contact (L33)</p> <p>1GRN-BLK • I100 C 1BLK • G53a A 1GRN-BLK • G1 A B</p>
<p>Engine fan additional resistance (O22 A)</p> <p>2.5LTB-WHT • G1 I</p>	<p>Engine fan additional resistance (O22 B)</p> <p>4LTB-WHT • I100 4LTB-WHT • P2 2.5LTB-WHT</p>
<p>Engine water cooling fan (*) (P2)</p> <p>4RED • G254 2.5LTB-WHT • O22 B 4LTB-WHT • I100 4LTB-WHT</p>	<p>Engine water cooling fan (*) (P2)</p> <p>4LTB-WHT • I100 2.5LTB-WHT • I1 E 2.5LTB-WHT • I1 B 2.5LTB-WHT • G1 B 2.5RED • G254 A 2.5RED • G254 A</p>
<p>Motronic control unit (*) (S11)</p>	
<p>25 RED-BLK • G133a</p>	

(*) Model Year '96

(*) Model Year '97

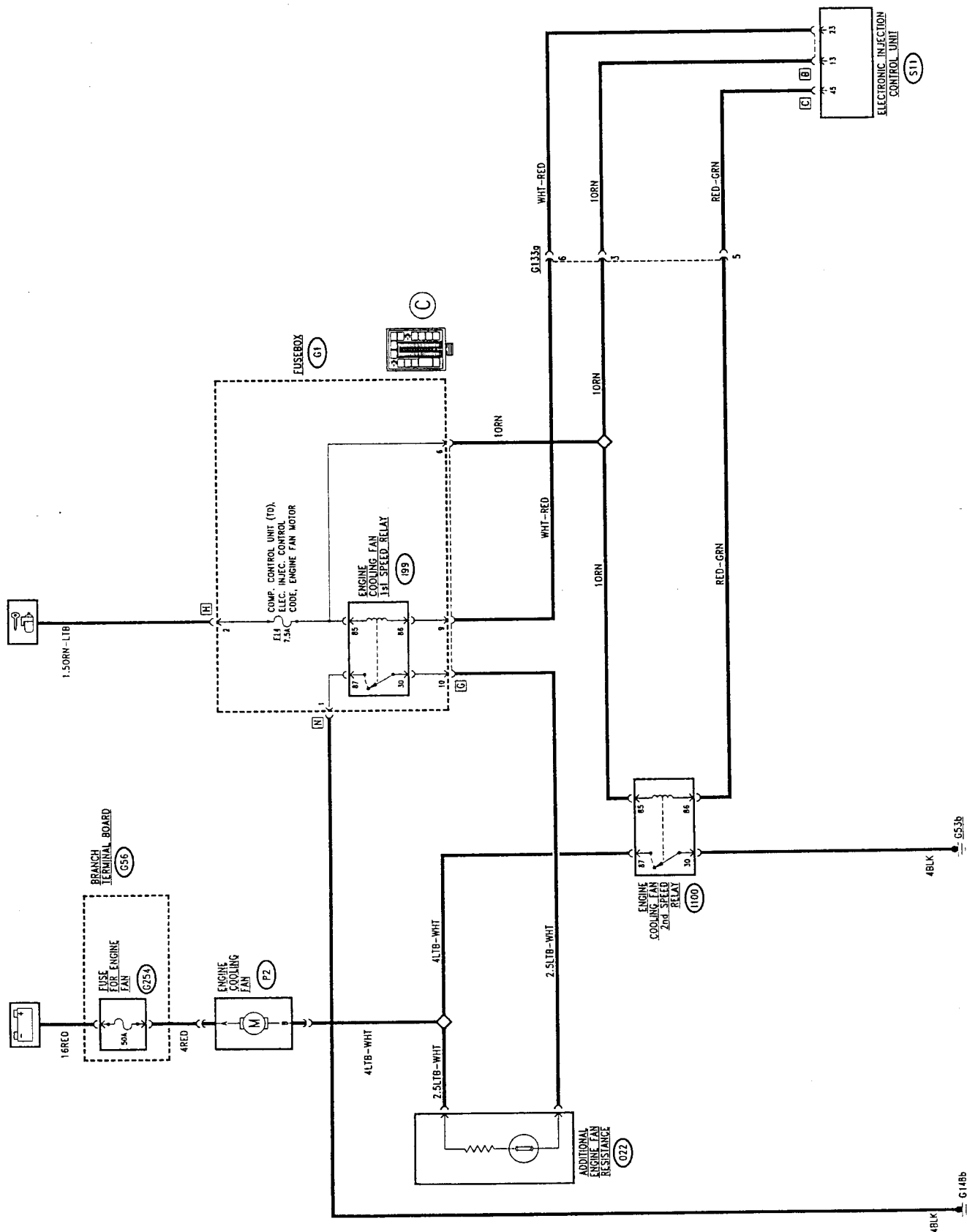
LOCATION OF COMPONENTS (T.SPARK version)



(*) only up to Model Year '96

(**) Model Year '97

WIRING DIAGRAM (JTD Version)



FUNCTIONAL DESCRIPTION

The fan **P2** is supplied with direct battery voltage via the wander fuse **G254**, located in the branch terminal box.

Relay **I99** - in fusebox **G1** - controls the fan and it receives the "key-operated" supply via fuse **F14** and is energised by an earth signal leading from the injection control unit **S11** - pin 23, connector **C** - when the engine reaches a certain temperature: this way relay

I99 sends an earth signal to the motor which operates the fan **P2** at 1st speed through resistance **O22**. When the temperature lowers, the contact opens, the relay is de-energised and the fan stops.

Conversely, if the temperature continues to rise, control unit **S11** sends a signal from pin 45 of connector **C** which energises the relay **I100**, that operates the fan **P2** directly (2nd speed).

FUNCTIONAL DESCRIPTION

The fan **P2** is supplied with direct battery voltage via the wander fuse **G254**, located in the branch terminal box.

Relay **I99** - in fusebox **G1** - controls the fan and it receives the "key-operated" supply via fuse **F14** and is energised by an earth signal leading from the injection control unit **S11** ; pin 23, connector **C** - when the engine reaches a certain temperature: this way relay

I99 sends an earth signal to the motor which operates the fan **P2** at 1st speed through resistance **O22**. When the temperature lowers, the contact opens, the relay is de-energised and the fan stops.

Conversely, if the temperature continues to rise, control unit **S11** sends a signal from pin 45 of connector **C** which energises the relay **I100**, that operates the fan **P2** directly (2nd speed).

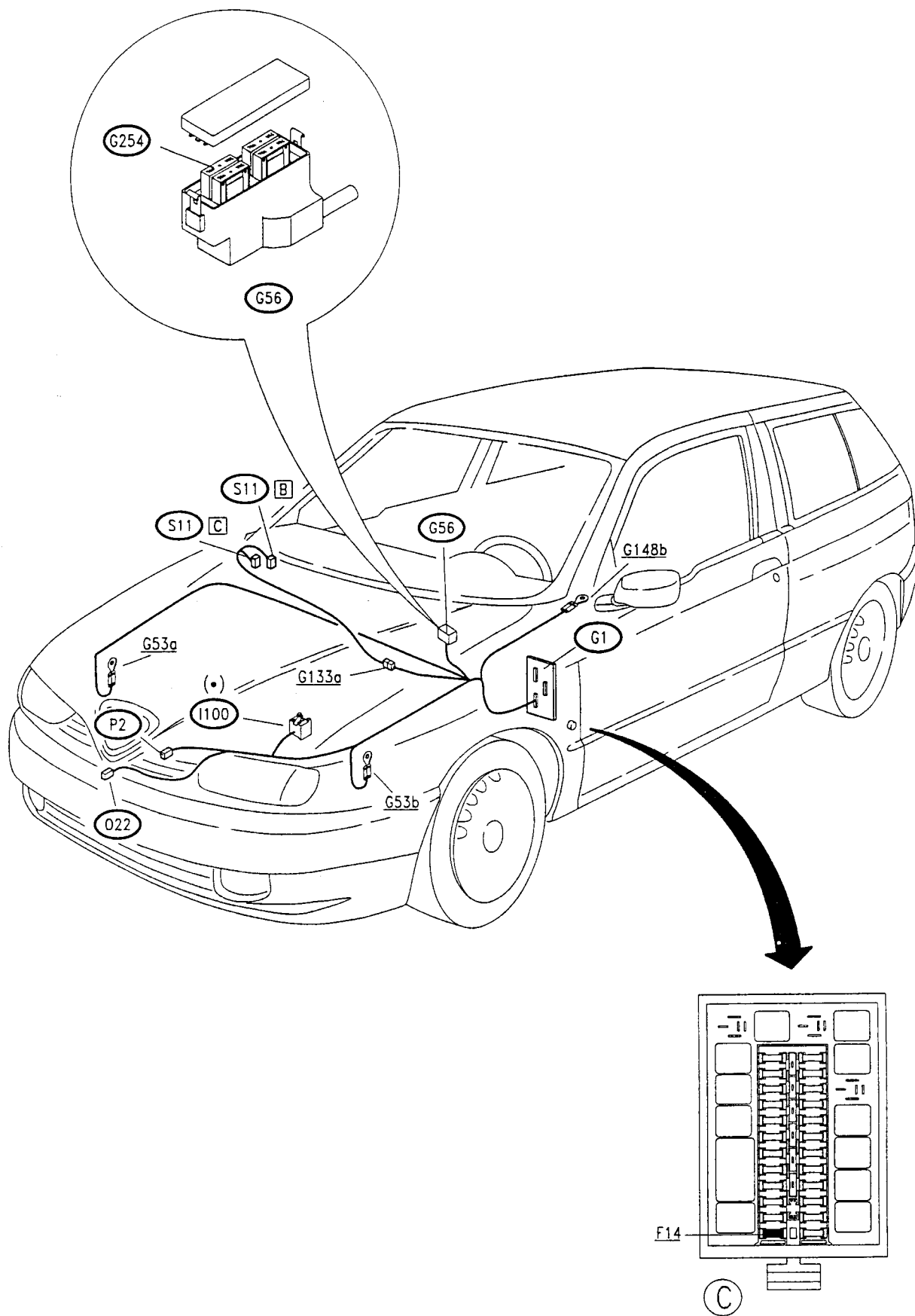
COMPONENTS AND CONNECTORS (JTD version)

<p>Fusebox</p> <p>G1 G</p>	<p>Fusebox</p> <p>G1 H</p>
<p>WHT-RED • G133a 9</p> <p>2.5LTB-WHT • 022 10</p> <p>10RN • G133a</p> <p>10RN • I100 6</p>	<p>1.50RN-LTB • B1 A 2</p>
<p>Fusebox</p> <p>G1 N</p>	<p>LH engine compartment earth</p> <p>G53b</p>
<p>4BLK • G148b 1</p>	<p>4BLK • I100</p>
<p>Connector for electronic injection wiring A</p> <p>G133a</p>	
<p>3 10RN • S11 B</p> <p>5 RED-GRN • I100</p> <p>6 WHT-RED • G1 G</p> <p>RED-GRN • S11 C</p> <p>WHT-RED • S11 B</p> <p>10RN • G1 G</p> <p>10RN 3</p>	
<p>Earth under dashboard LH</p> <p>G148b</p>	<p>Engine cooling fan 2nd speed relay</p> <p>I100</p>
<p>4BLK • G1 N</p>	<p>10RN • G133a</p> <p>10RN • G1 G</p> <p>2.5LTB-WHT • 022</p> <p>4LTB-WHT • P2</p> <p>RED-GRN • G133a</p> <p>4BLK • G53b</p> <p>85</p> <p>87</p> <p>86</p> <p>30</p>

COMPONENTS AND CONNECTORS (contd.)

<p>Additional engine fan resistance</p>	<p>O22</p>	<p>Engine cooling fan</p>	<p>P2</p>
<p>Electronic injection control unit</p>			<p>S11 B</p>
<p><u>13</u> 10RN • G133a <u>23</u> WHT-RED • G133a</p>			
<p>Electronic injection control unit</p>			<p>S11 C</p>
<p><u>45</u> RED-GRN • G133a</p>			

LOCATION OF COMPONENTS (JTD version)



(•) Black fuseholder

FAULT-FINDING TABLE

Fault		Component to be checked											
		F15 (B)	F4 (1)	F14	G254	P2	L6	L33	O22	S11	I1	I99	I100
Fan (under all circumstances)	Boxer	•		•		•					•		
	TD and T.SPARK (M.Y. '96)				•	•						•	•
	TD and T.SPARK (M.Y. '97)	•		•	•	•				•	•		
	JTD			•	•	•				•		•	
Fan (fails to start even if the coolant fluid temperature is high)	Boxer						•						
	TD and T.SPARK (M.Y. '96)		•					•					
	TD and T.SPARK (M.Y. '97)								•	•			
	JTD								•			•	
Fan at 2 different speeds	TD and T.SPARK (M.Y. '96)							•					
	JTD							•				•	

(B) Only for fusebox "B"

(1) Only T.SPARK

