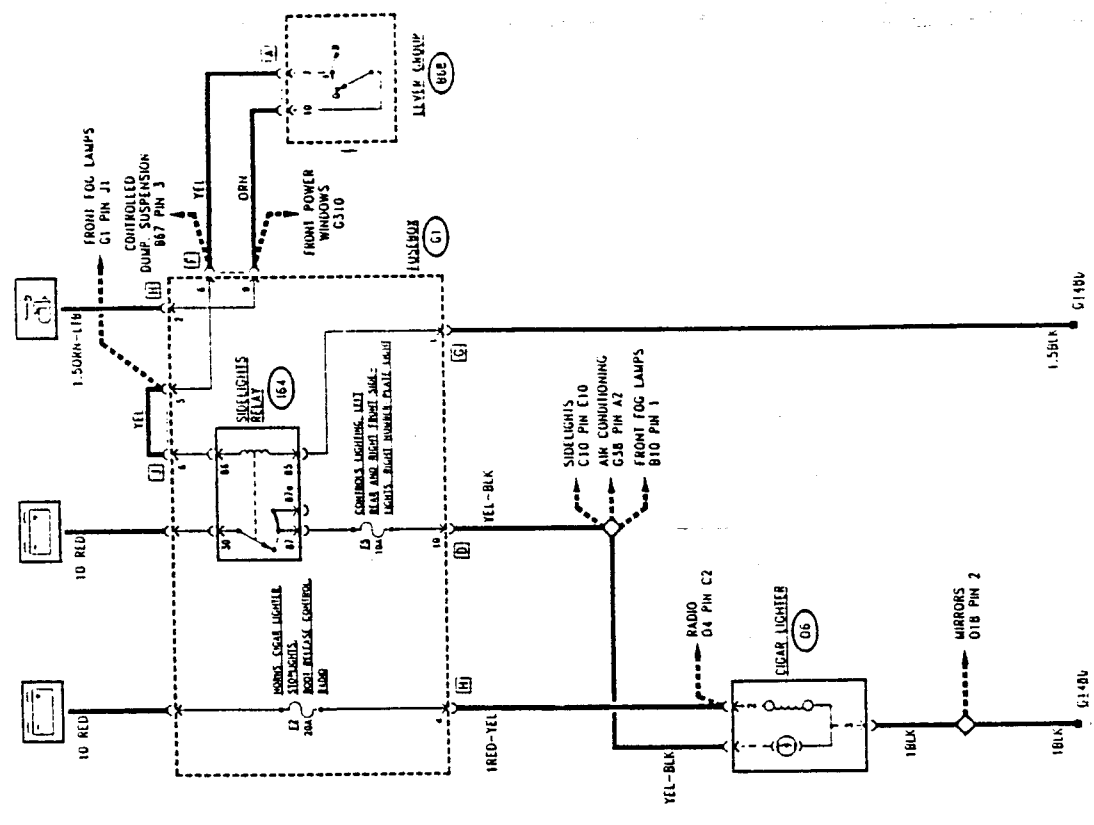


WIRING DIAGRAM



CIGAR LIGHTER

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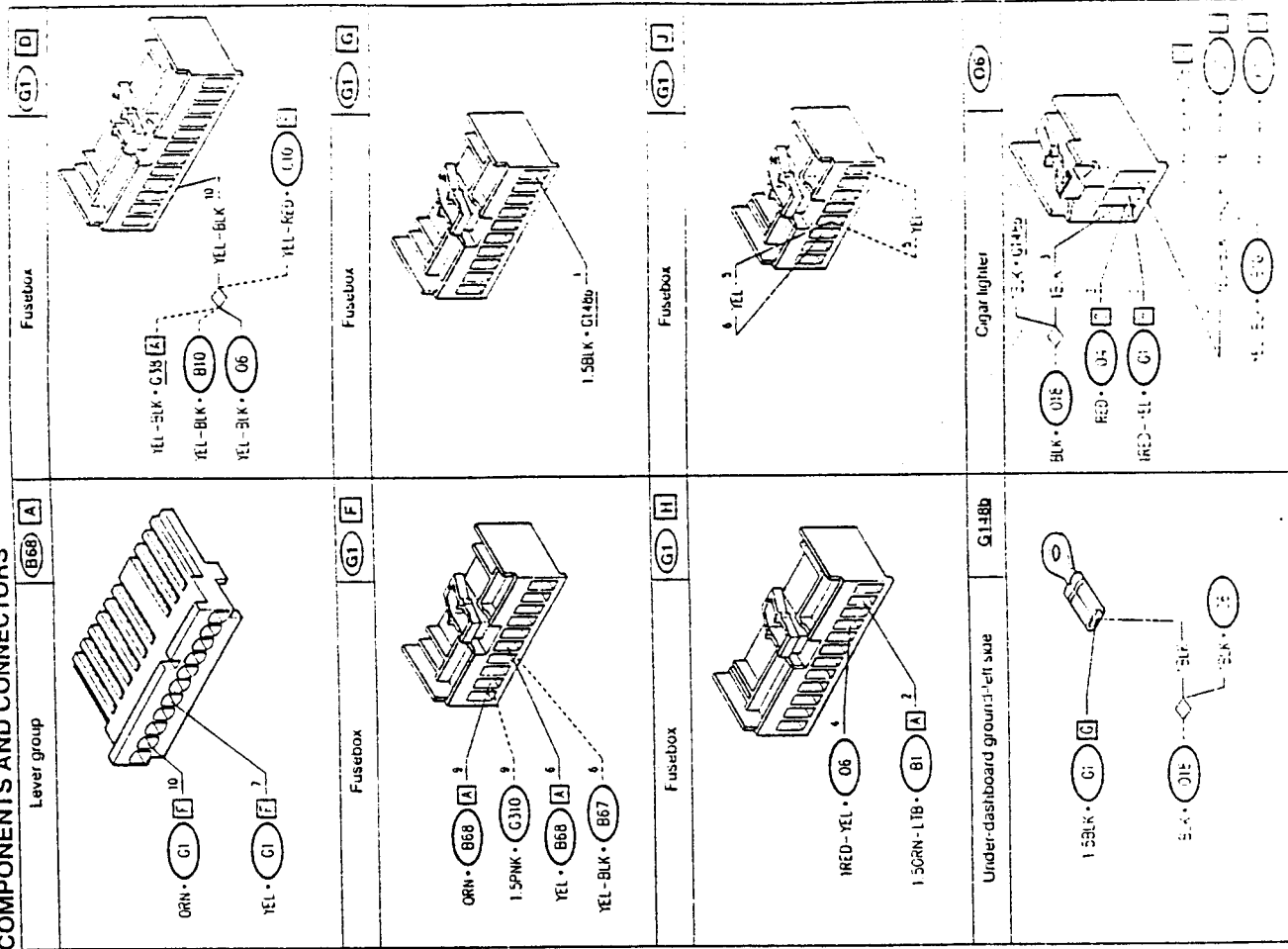
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COMPONENTS AND CONNECTORS



GENERAL DESCRIPTION

There are three ashtrays for the occupants of the vehicle, one in the center of the dashboard for the front seats and two in the rear door panels for the rear seats.

The cigar lighter resistance is located in the front ashtray (illuminated inside when the sidelights are selected) and can be engaged by pressing it into its socket after a few seconds it pops out ready for use.

This socket, of the standard type, can also be used for the connection of other

instruments or apparatus (as long as they operate on a 12V supply).

The socket is continuously supplied and for this reason can be used at any time even when the ignition key is disengaged.

FUNCTIONAL DESCRIPTION

The socket for the cigar lighter resistance O6 is supplied directly by battery voltage through fuse F2 (20A) in fusebox G1, which protects the circuit.

The lamp lighting the front ashtray O6 is illuminated when the sidelights are selected; it is supplied, when the switch on the lever group B68 is selected, by the voltage from the sidelights relay I64 through fuse F5 (10A) located in fusebox G1.

TROUBLESHOOTING TABLE

Malfunction	Component		Test
	F2	O6	
Cigar lighter - power socket	•	•	A
Ashtray light		•	B

TROUBLESHOOTING

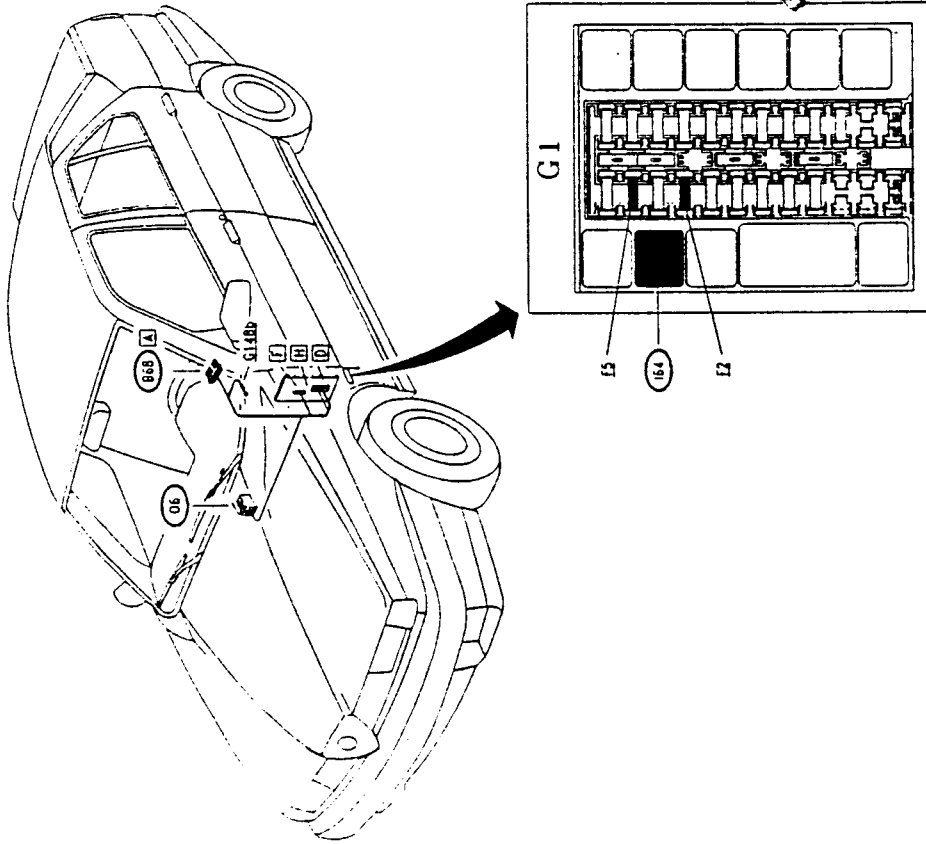
CIGAR LIGHTER - SOCKET - NOT WORKING		TEST A
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1 CHECK FUSE -- Check for damage of fuse F2 in fusebox G1	OK	Carry out step A2
	OK	Replace fuse (20A)
A2 CHECK VOLTAGE -- Verify 12V between pins 2 and 3 of cigar lighter O6	OK	Replace cigar lighter O6
	OK	Carry out step A3
A3 CHECK VOLTAGE -- Verify 12V at pin 2 of O6	OK	Restore wiring between pin 3 of O6 and ground G148b, also across the solder (BLK)
	OK	Restore wiring between pin H4 of G1 and pin 2 of O6 (RED- YEL)

ASHTRAY LIGHT NOT WORKING

NOTE: If the cigar lighter socket is also not working, first carry out test A

ASHTRAY LIGHT NOT WORKING		TEST B
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1 CHECK VOLTAGE -- With sidelights on, verify 12V between pins 1 and 3 of O6	OK	Carry out step B2
	OK	Carry out step B3
B2 CHECK BULB -- Check for damage of front ashtray lamp	OK	Check and if necessary replace the complete cigar lighter/ashtray unit O6
	OK	Replace bulb
B3 CHECK VOLTAGE -- With sidelights on, verify 12V at pin 1 of O6	OK	Restore wiring between pin 3 of O6 and ground G148b also across the solder (BLK)
	OK	Carry out step B4
B4 CHECK VOLTAGE -- With sidelights on, verify 12V at pin D10 of G1	OK	Restore wiring between pins I of O6 and pin D10 of G1 also across the solder (YEL-BLK)
	OK	Check the sidelights circuit (see "Sidelights") and specifically fuse F5 of G1

LOCATION OF COMPONENTS

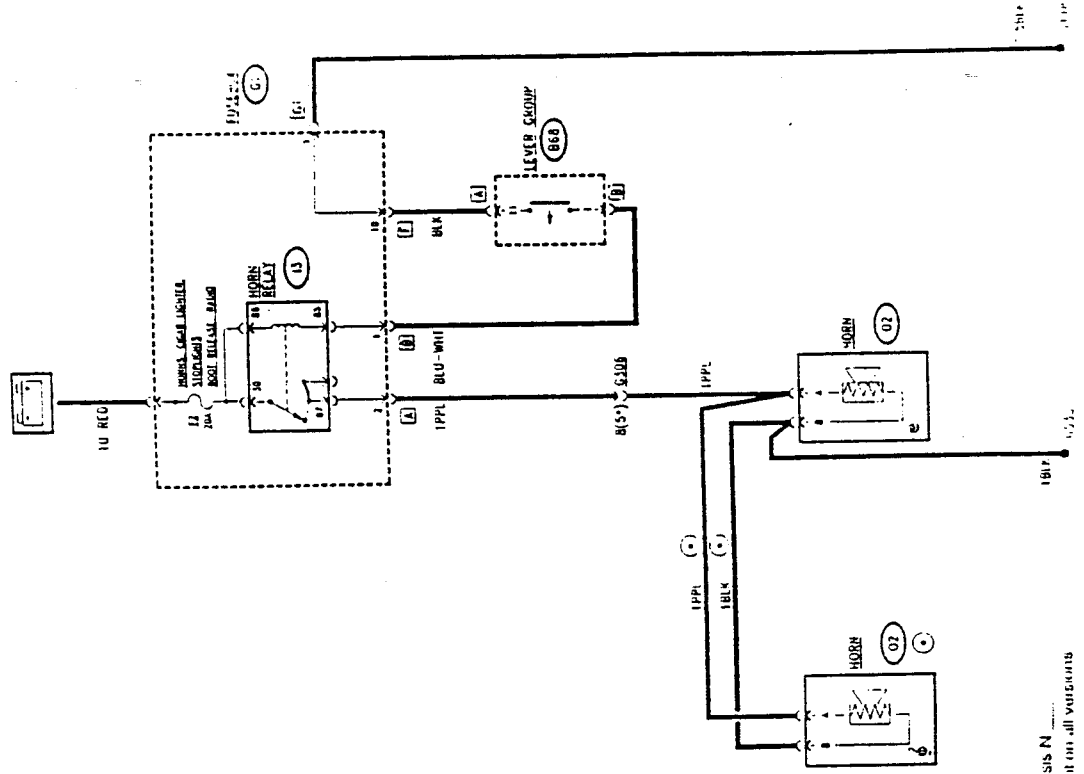


WIRING DIAGRAM

# HORNS

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(\*) from chassis N  
 (\*) not present on all versions

**GENERAL DESCRIPTION**

The vehicle is equipped with an acoustic warning system, formed by two horns of different tone, one with a high tone and one with a low tone. The two horns are activated simultaneously. For some vehicles a simplified system is used with a single horn.

The horns are activated in the traditional way by pressing the button located in the centre of the steering wheel.

For obvious reasons of safety, the horns can be sounded at any moment, even when the ignition key is disengaged.

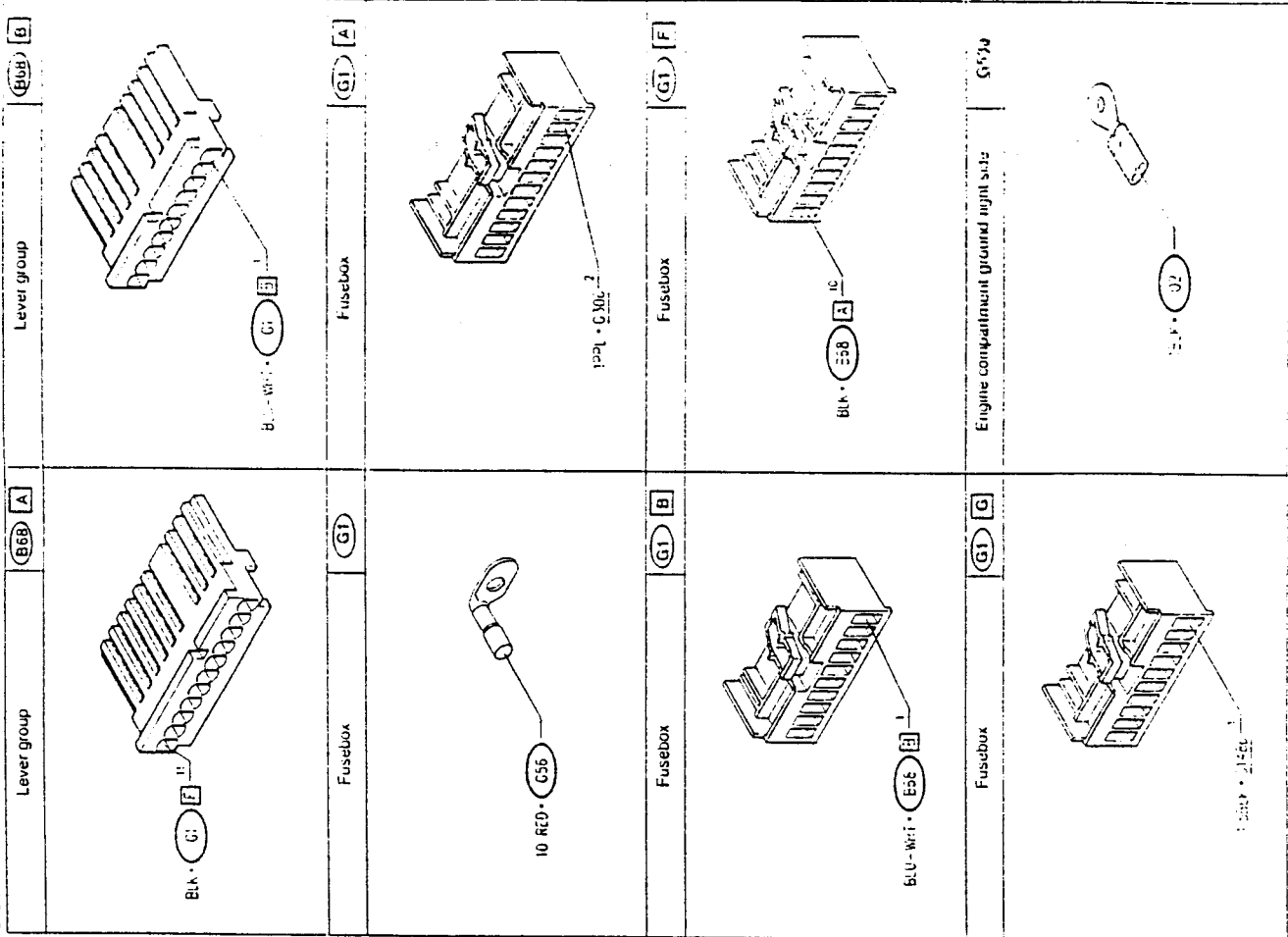
The horn relay I3, located in fusebox G1, is supplied by battery voltage through fuse F2 (20A), in G1.

The coil of the relay I3 is excited by an ground signal originating from the switch connected to the lever group B68.

In this way the supply is sent from the relay to the horns O2, which are already grounded.

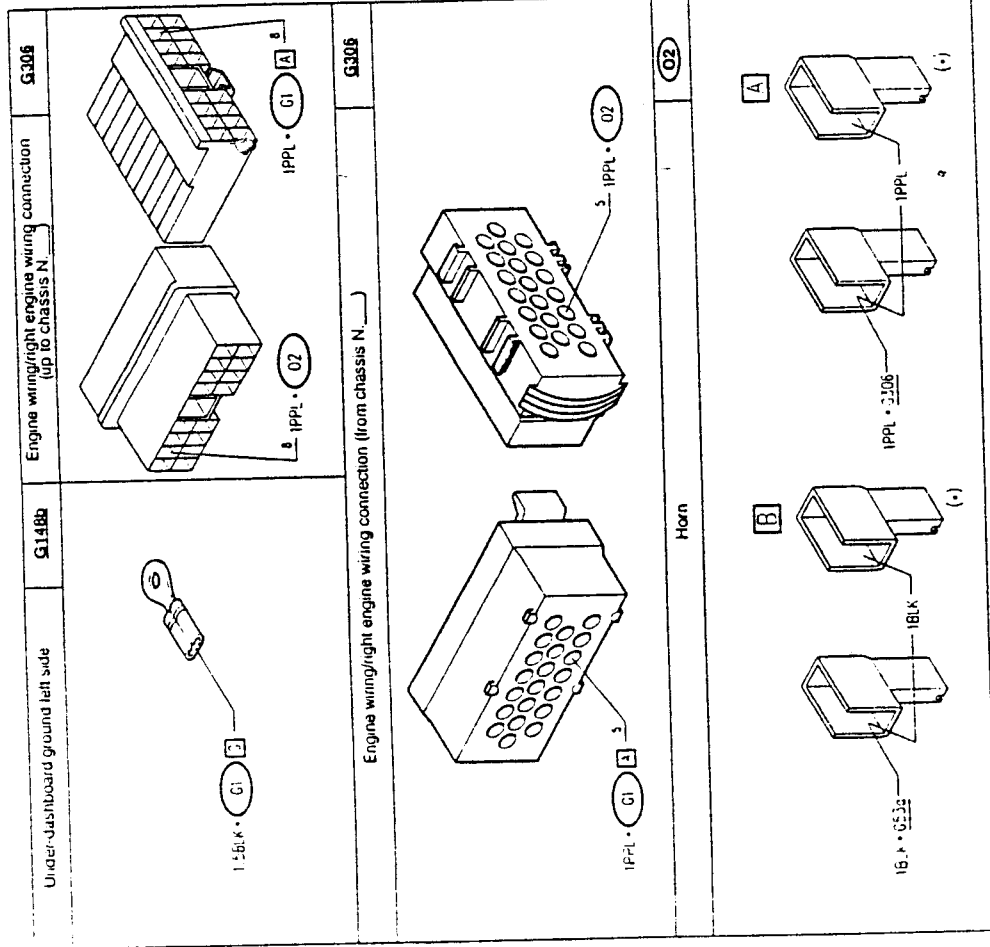
**FUNCTIONAL DESCRIPTION**

**COMPONENTS AND CONNECTORS**



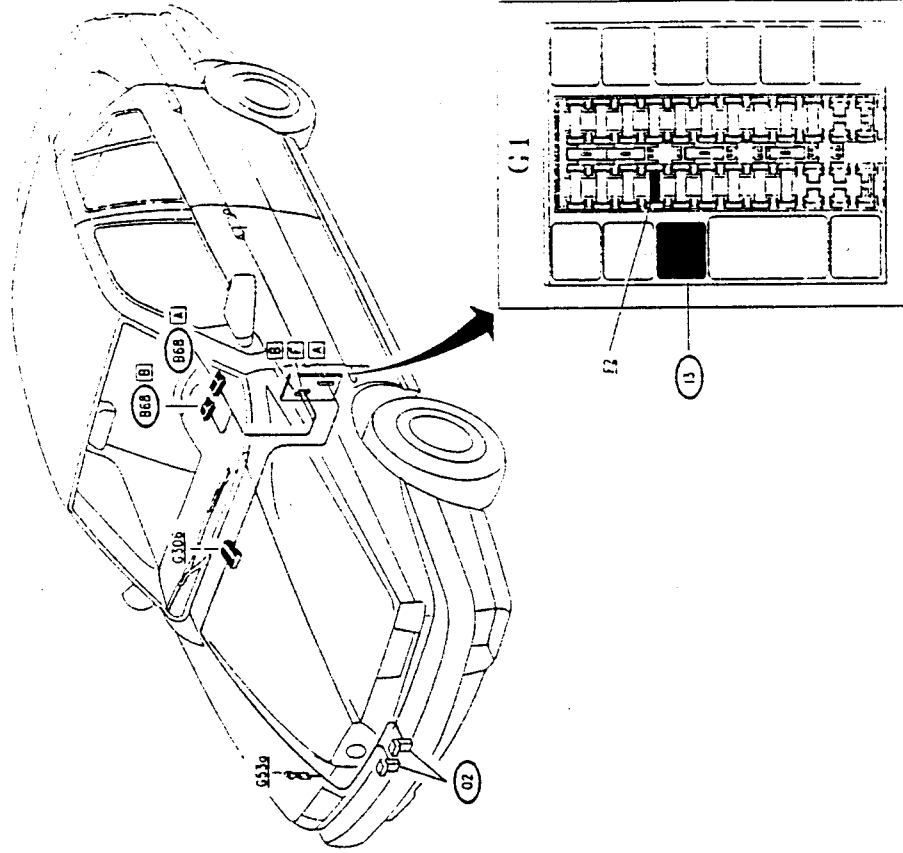
**TROUBLESHOOTING TABLE**

Malfunction	Component			Test
	F2	O2	I3 (B68)	
Horns not working	•	•	•	A
Horns working badly (out of tune)		•		B



(\*) not present on all versions

LOCATION OF COMPONENTS



HORNS WORKING BADLY (out of tune)

TEST B

NOTE: if the horns are "out of tune", one of the two horns (either the higher or lower tone) is not working correctly  
N.B. SOME VERSIONS HAVE ONLY A SINGLE HORN.

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK VOLTAGE - Actuating the horns, verify 12V between pins A and B of both horns O2	OK	Replace defective horn
B2	CHECK VOLTAGE - Actuating the horns, verify 12V at pin A of both horns O2	OK	Restore wiring between pins B of O2 and the ground G53a (BLK) Restore wiring between pins A of the two horns O2 (PPL)

TROUBLESHOOTING

HORNS NOT WORKING

TEST A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1   CHECK FUSE - Check for damage of fuse F2 of fusebox G1	OK	Carry out step A2
A2   CHECK RELAY - Check for correct functioning of horns relay I3	OK	Replace fuse (20A)
A3   CHECK VOLTAGE - Actuating horns, verify 12V between pins A and B of the two horns O2	OK	Carry out step A3
A4   CHECK VOLTAGE - Actuating the horns, verify 12V at pin A of the two horns O2	OK	Replace relay I3
A5   CHECK GROUND - Check that pins B of the two horns O2 are grounded (0V)	OK	Replace defective horns
A6   CHECK SWITCH - Pressing the horn button, located in the centre of the steering wheel, check continuity between pin A11 and B1 of the lever group B68	OK	Carry out step A4
A7   CHECK GROUND - Verify 0V at pin A11 of B68	OK	Carry out step A5
	OK	Restore wiring between pin A2 of G1 and pin B(5*) of G306, and between pin B(5*) of G306 and pin A of the two horns O2 (PPL)
	OK	Carry out step A6
	OK	Restore wiring between pins B of O2 and ground G53a (BLK)
	OK	Carry out step A7
	OK	Replace central part of lever group B68
	OK	Restore wiring between pin B1 of B68 and pin B1 of G1 (BLU-WHT)
	OK	Restore wiring between pin A11 of B68 and pin F10 of G1 (BLK)

(\*) Horn chassis N

# WINDSCREEN WASHER-WIPERS HEADLIGHT WASHERS

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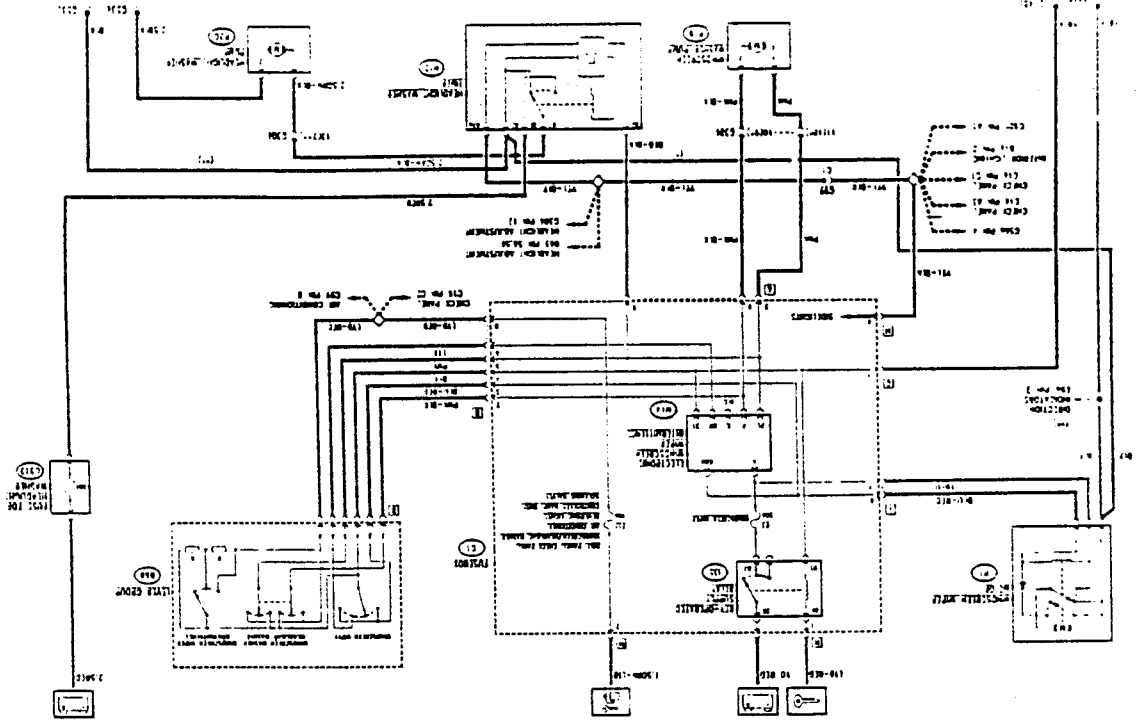
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TROUBLESHOOTING . . . . . 18-8

## WIRING DIAGRAM





GENERAL DESCRIPTION

With the lever on the right-hand side of the steering wheel it is possible to engage the various windscreen wiper-washer and headlight washer functions. The windscreen wiper device is equipped with both continuous and intermittent functions with variable speeds pushing the lever upwards and holding it in this position will select the continuous function (75 passes per minute), interrupted when the lever is released, (the lever is pushed downwards until it plays, in the first position the intermittent function is engaged and in the second the continuous function is engaged. They remain engaged until the lever is once again pushed upwards. With the lever in the rest position a knurled switch makes it possible to select the different intermittency lengths (45, 75 and 10 passes per minute approximately).

The windscreen washer function is selected by lightly pulling the lever; in this way the washer pump is actuated and at the same time the windscreen wipers are actuated for 3-4 seconds or until the lever is released.

With the sidelights on, the same controls automatically actuate the headlight washers; this is an electro-pneumatic device where a pump sends a detergent liquid to a pressure operated telescopic nozzle which comes out of the bumper bar and sprays a powerful jet of liquid

onto the headlight unit, when the pressure diminishes, it is retracted. A timer actuates the headlight washer pump with successive impulses lasting approximately half a second.

NOTE: Actuating the windscreen washer (and headlight washer) if there is no detergent liquid in the reservoir may damage the pump.

The entire system is regulated by a windscreen wiper intermittency device which controls the windscreen wiper motor, the windscreen washer pump and the headlight washer device (timer and relative pump).

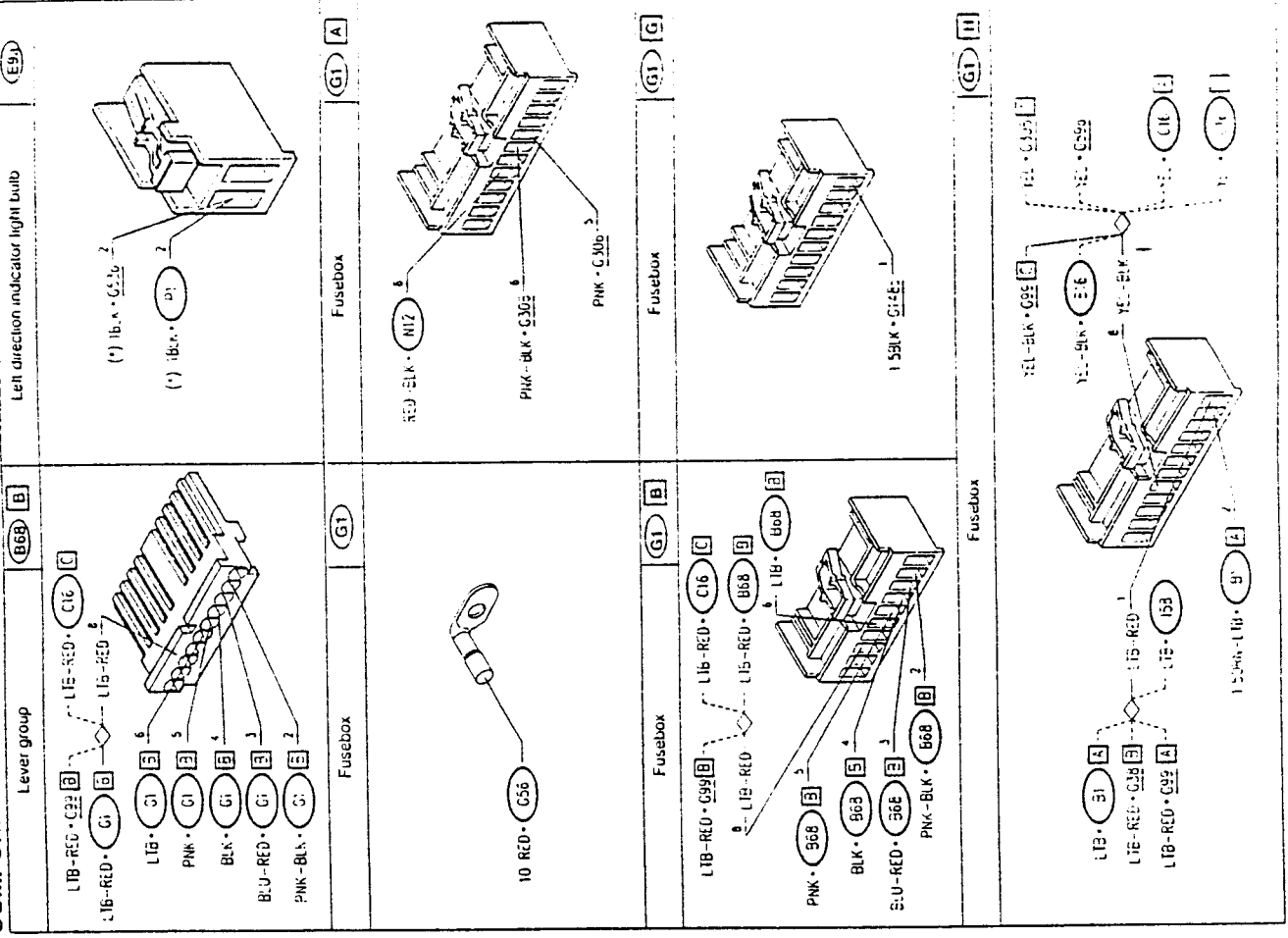
The windscreen wiper and washer can be actuated with the ignition key inserted and the headlight washer as already mentioned, will only work if the sidelights are on.

FUNCTIONAL DESCRIPTION

The windscreen wiper intermittency N14, located in fusebox G1, is lum-key supplied via the key-operated supply relay B5 and the fuse F3 (20A), in G1.

The windscreen wiper switch on the lever group B68, when actuated, sends one of two different signals depending on the function which has been selected, from pin 3 for continuous speed and from pin 6 for the intermittent speed.

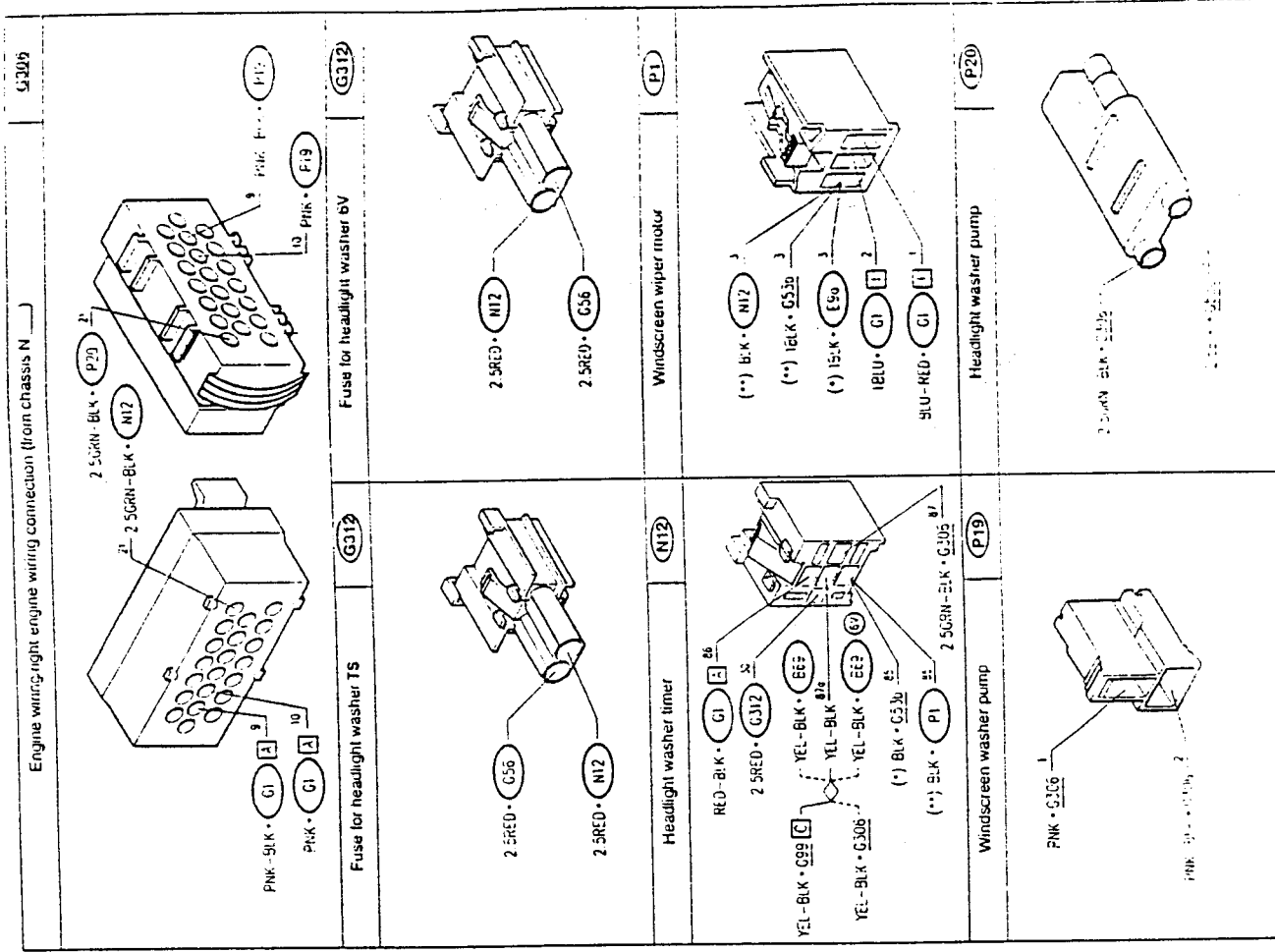
COMPONENTS AND CONNECTORS



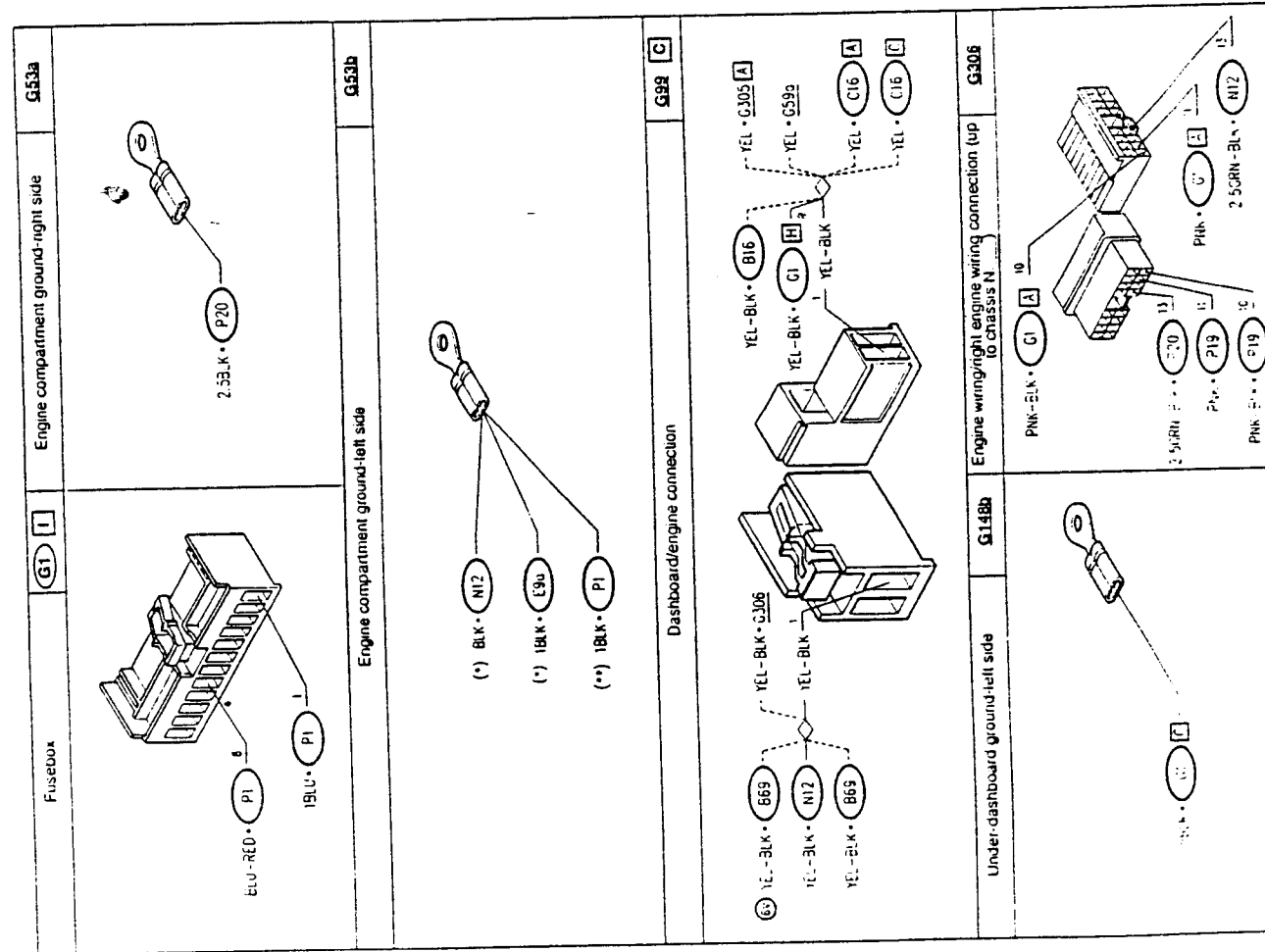
TROUBLESHOOTING TABLE

Malfunction	Component								Test	
	E3	P1	N14	B68	E15	P19	G312	N12		P20
Windscreen wiper (cont. speed)	•	•	•	•						A
Windscreen wiper intermittency			•	•						B
Windscreen washer			•	•						C
Headlight washer								•	•	D

(\*) Up to chassis N



(\*) up to chassis N  
(\*\*) from chassis N  
11-1993



(\*) up to chassis N  
(\*\*) from chassis N  
11-1993

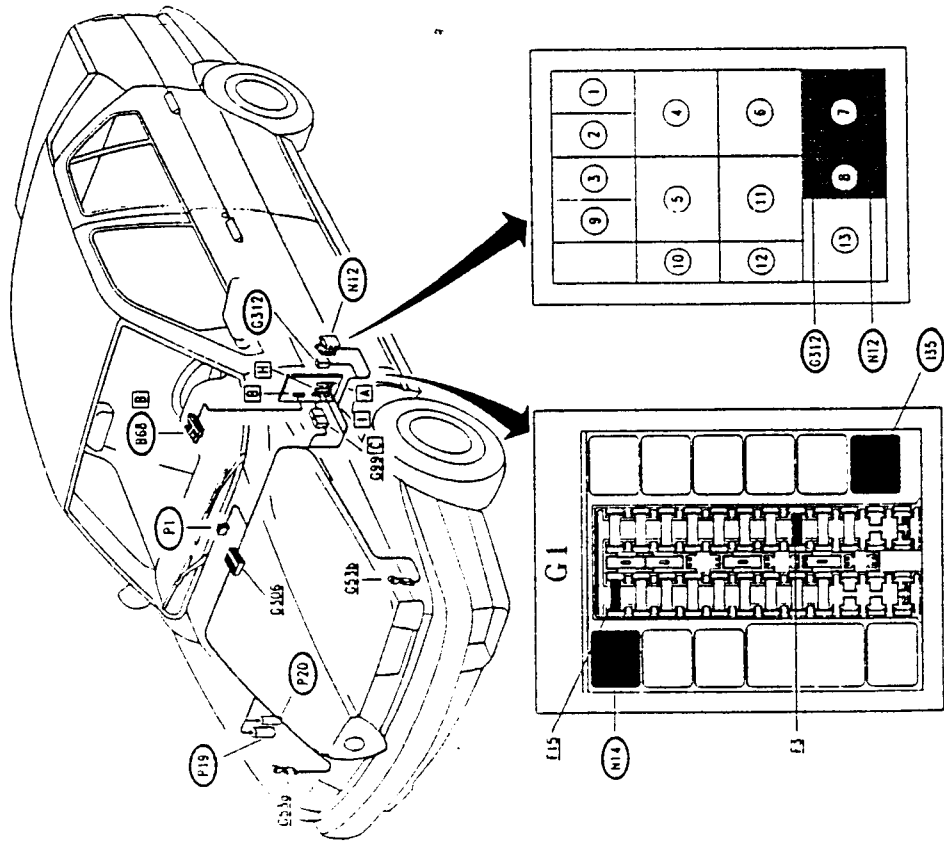
TROUBLESHOOTING

WINDSCREEN WIPERS NOT WORKING (continuous speed)	TEST A
--	--------

NOTE: If the following circuits are also not working rear window and door mirror defroster, interior fan, seat adjustment and heating, rear power windows, etc., check and if necessary replace the key-operated supply relay I35

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK FUSE</b> - Check for damage of fuse F3 in fusebox G1	OK <del>OK</del>	Carry out step A2 Replace fuse (20A)
<b>A2 CHECK GROUND</b> - Check that pin 3 of P1 is grounded (0V)	OK <del>OK</del>	Carry out step A3 Restore wiring between pin 3 of P1 and ground G53b, (across pin 2 of light E9a up to chassis N...) (BLK)
<b>A3 CHECK VOLTAGE</b> - With ignition key engaged and windscreen wiper function (continuous speed) engaged, check that pin 1 of P1 is grounded (0V)	OK <del>OK</del>	Carry out step A4 Carry out step A5
<b>A4 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V at pin 2 of windscreen wiper motor P1	OK <del>OK</del>	Replace windscreen wiper motor group P1 Restore wiring between pin 11 of G1 and pin 2 of P1 (BLU)
<b>A5 CHECK GROUND</b> - With ignition key engaged and windscreen wiper function (continuous speed) engaged, verify 0V at pin 18 of G1	OK <del>OK</del>	Restore wiring between pin 18 of G1 and pin 1 of motor P1 (BLU-RED) Carry out step A6
<b>A6 CHECK GROUND</b> - With ignition key engaged and windscreen wiper function (continuous speed) engaged, verify 0V at pin B3 of lever group B68	OK <del>OK</del>	Restore wiring between pin B3 of G1 and pin B3 of B68 (BLU-RED) Carry out step A7
<b>A7 CHECK LEVER GROUP</b> - Engage the windscreen wiper function (continuous speed) and check continuity between pins B3 and B4 of lever group B68	OK <del>OK</del>	Restore wiring between pin B4 of G1 and pin B4 of B68 (BLK) Replace lever group B68, right-hand part

LOCATION OF COMPONENTS



# 18-9

## WINDSCREEN WASHER-WIPERS HEADLIGHT WASHERS

WINDSCREEN WIPERS NOT WORKING (Intermittence)		TEST B
---	--	--------

NOTE: Continuous speed functions normally however, if this is not the case first carry out the preceding test A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK GROUND - With ignition key engaged and windscreen wiper function (intermittent) engaged, verify 0V at pin B6 of G1	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Replace the electronic device of intermittence N14  Carry out <b>step B2</b>
<b>B2</b> CHECK LEVER GROUP - Engage the windscreen wiper function (intermittent) and check continuity between pins B6 and B4 of lever group B68 Also check that the resistance between pin B6 and pin B4 varies when the lower intermittence speeds are selected: <ul style="list-style-type: none"> <li>• intermediate speed: approx 1.300 Ω</li> <li>• minimum speed: approx 4.700 Ω</li> </ul>	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Restore wiring between pin B6 of G1 and pin B6 of B68 (LTB)  Replace lever group B68, right-hand part

WINDSCREEN WASHER NOT WORKING		TEST C
-------------------------------	--	--------

NOTE: the windscreen wipers should operate for a few seconds together with the windscreen washer; if this is not so check and if necessary replace the intermittence N14

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C1</b> CHECK FUSE - Check for damage of fuse F15 in fusebox G1	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Carry out <b>step C2</b>  Replace if fuse (10A)
<b>C2</b> CHECK VOLTAGE - With ignition key engaged, actuate the windscreen washer function and verify 12V between pin 1 and 2 of windscreen washer pump P19	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Replace if motor of P19  Carry out <b>step C3</b>
<b>C3</b> CHECK VOLTAGE - With ignition key engaged, actuate the windscreen washer function and verify 12V between pin A5 and A6 of G1	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Restore wiring between pin A5 of G1 and pin 1 of P19, across pin 11(10*) of connector G306 (PNK); pin A6 of G1 and pin 2 of P19, across pin 10(9*) of connector G306 (PNK-BLK)  Carry out <b>step C4</b>

(continues)

(\* ) from chassis N...

# 18-10

## WINDSCREEN WASHER-WIPERS HEADLIGHT WASHERS

WINDSCREEN WASHER NOT WORKING		TEST C
-------------------------------	--	--------

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C4</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V at pin B8 of lever group B68	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Carry out <b>step C5</b>  Restore wiring between pin B8 of G1 and pin B8 of B68 also across the solder (LTB-RED)
<b>C5</b> CHECK LEVER GROUP - Engage the windscreen wiper function and check continuity between pins B2 and B8, and between pins B5 and B8 of lever group B68	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Restore wiring between: <ul style="list-style-type: none"> <li>• pin B2 of G1 and pin B2 of B68 (PNK-BLK)</li> <li>• pin B5 of G1 and pin B5 of B68 (PNK)</li> </ul> Replace lever group B68, right-hand part

HEADLIGHT WASHER FUNCTION NOT WORKING		TEST D
---------------------------------------	--	--------

NOTE: the windscreen washer however functions normally; if this is not the case, first carry out the preceding test C  
 N.B.: the headlight washer function will only operate when the sidelights are switched on

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D1</b> CHECK FUSE - Check for damage of wander fuse G312	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Carry out <b>step D2</b>  Replace if fuse (20A)
<b>D2</b> CHECK VOLTAGE - With ignition key engaged and sidelights on, actuate the windscreen wiper/washer function and verify, for at least half a second, 12V between pin 1 and 2 of the headlamp washer pump P20	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Replace motor of P20  Carry out <b>step D3</b>
<b>D3</b> CHECK GROUND - Check that pin 2 of pump P20 is grounded (0V)	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Carry out <b>step D4</b>  Restore wiring between pin 2 of P20 and ground G53a (BLK)
<b>D4</b> CHECK VOLTAGE - Verify 12 V at pin 30 of timer N12	<input type="radio"/> OK <input checked="" type="radio"/> <del>OK</del>	Carry out <b>step D5</b>  Restore wiring between pin 30 of N12 and washer fuse G312 (RED)

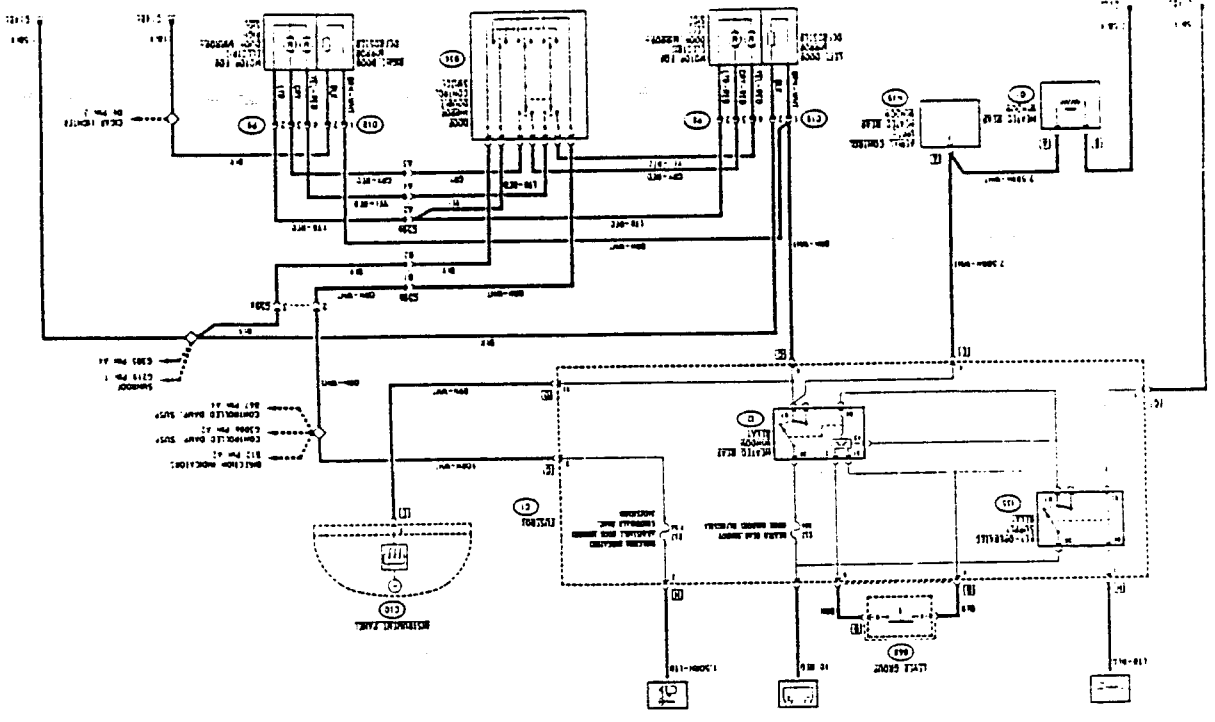
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HEADLIGHT WASHER FUNCTION NOT WORKING TEST D

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>D5</b> CHECK GROUND</p> <p>- Check that pin 85 of timer N12 is grounded (0V)</p>	<p>OK <input type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step D6</p> <p>Restore wiring between pin 85 of N12 and ground G53b (from chassis N____ across pin 3 of windscreen wiper P1) (BLK)</p>
<p><b>D6</b> CHECK VOLTAGE</p> <p>- With sidelights on, verify 12V at pin 87a of timer N12</p>	<p>OK <input type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step D7</p> <p>Restore wiring between pin 87a of N12 and pin H8 of G1, across pin C1 of connector G89 and the two solders. Also check that the sidelights are operating correctly (see "Sidelights")</p>
<p><b>D7</b> CHECK GROUND</p> <p>- Activate the windscreen wiper/washer function and verify 0V at pin 86 of timer N12</p>	<p>OK <input type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step D8</p> <p>Restore wiring between pin 86 of N12 and pin A8 of G1 (RED-BLK)</p>
<p><b>D8</b> CHECK VOLTAGE</p> <p>- With ignition key engaged and sidelights on, activate the windscreen wiper/washer function and verify, for at least half a second, 12V at pin 87 of timer N12</p>	<p>OK <input type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Restore wiring between pin 87 of N12 and pin 1 of P20, across pin 13(21*) of connector G306 (GRN-BLK)</p> <p>Replace timer N12</p>

(\*): from chassis N\_\_\_\_

WIRING DIAGRAM



# HEATED REAR WINDOW HEATED ADJUSTABLE REAR-VIEW MIRRORS

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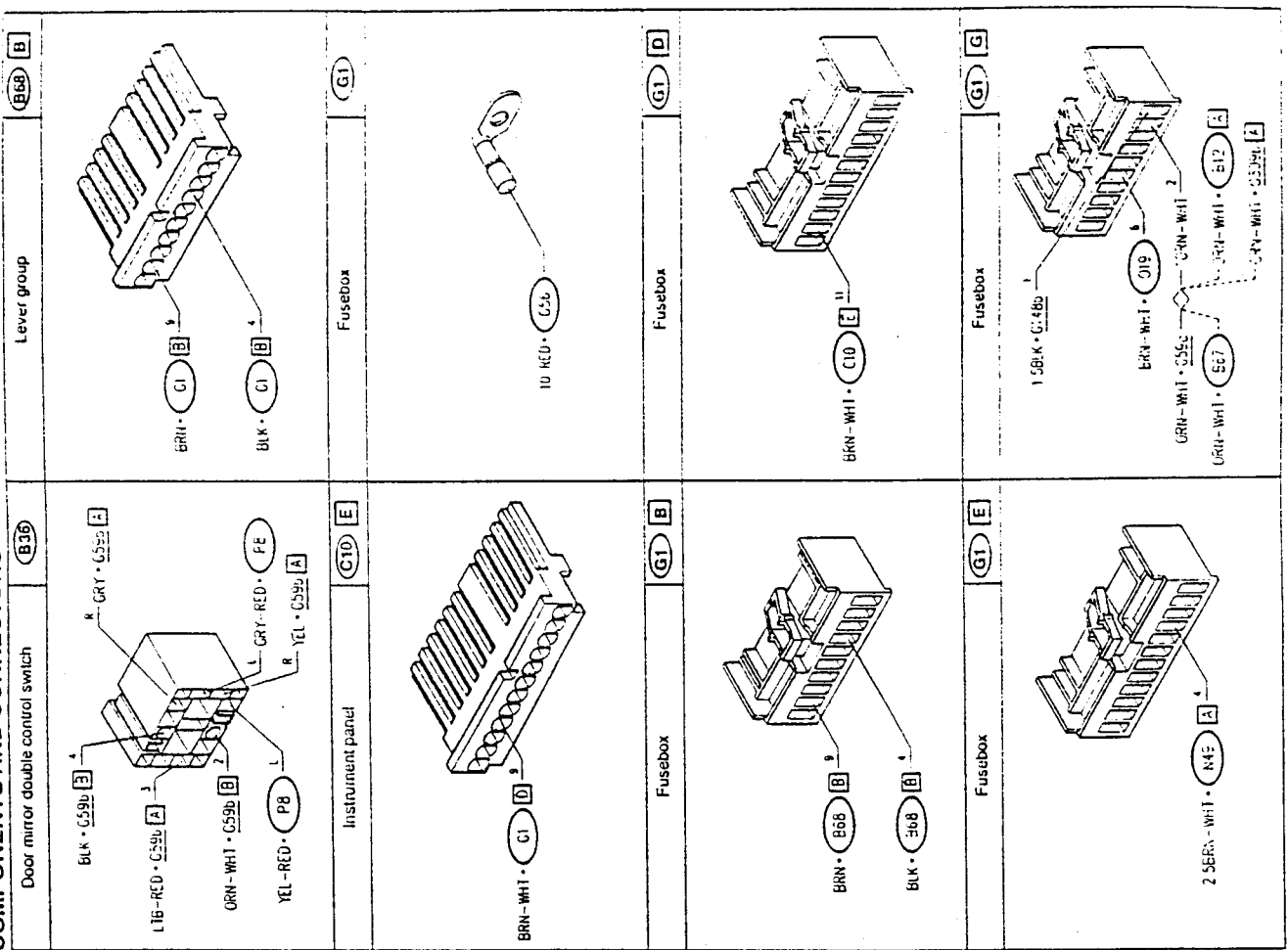
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COMPONENTS AND CONNECTORS



**GENERAL DESCRIPTION**  
 Heated rear window and defrosting of door mirrors.  
 A lead wire is incorporated in the rear windshield and the door mirrors which heats and therefore rapidly demists and/or defrosts the surfaces in contact with it when a current is passed through it.  
 This device is actuated by pushing the relay switch on the lever group, the resistances are deactivated automatically (20 minutes after the initial activation) and 10 minutes after successive actuations) through a timer incorporated in the heated rear window relay.  
 A warning light on the instrument panel signals that the function has been exercised.

**FUNCTIONAL DESCRIPTION**  
**Heated rear window and defrosting of door mirrors.**  
 The key operated supply relay 135 powers the coil of the heated rear window relay 12 and the incorporated timer, the coil is excited by a ground signal from the timer when this receives (pin S) the command signal from the switch on the lever group B68.  
 Both relay 135 and relay 12 are located in fusebox G1.  
 When the relay contact closes 12 battery voltage supplies the line which, protected by fuse F12 (30A) in G1, reaches the heated rear window O1 and the resistances of the door mirrors O19 (left) and O18 (right).  
 Power supply to the heated rear window O1 passes via the control unit N49 which also commands the antenna function incorporated in the rear window (see "Radio").  
 20 minutes after the switch on the lever group B68 is actuated (successively every 10 minutes), the timer deactivates the coil 12, and disconnects all the circuits.

**Adjustment of door mirrors**  
 The two door mirrors are adjusted through a switch which commands two electric motors located in each of the two mirrors (one motor rotates the mirror horizontally and the other vertically).  
 A single switch actuates both mirrors, left and right as a selector makes it possible to switch from one to the other.

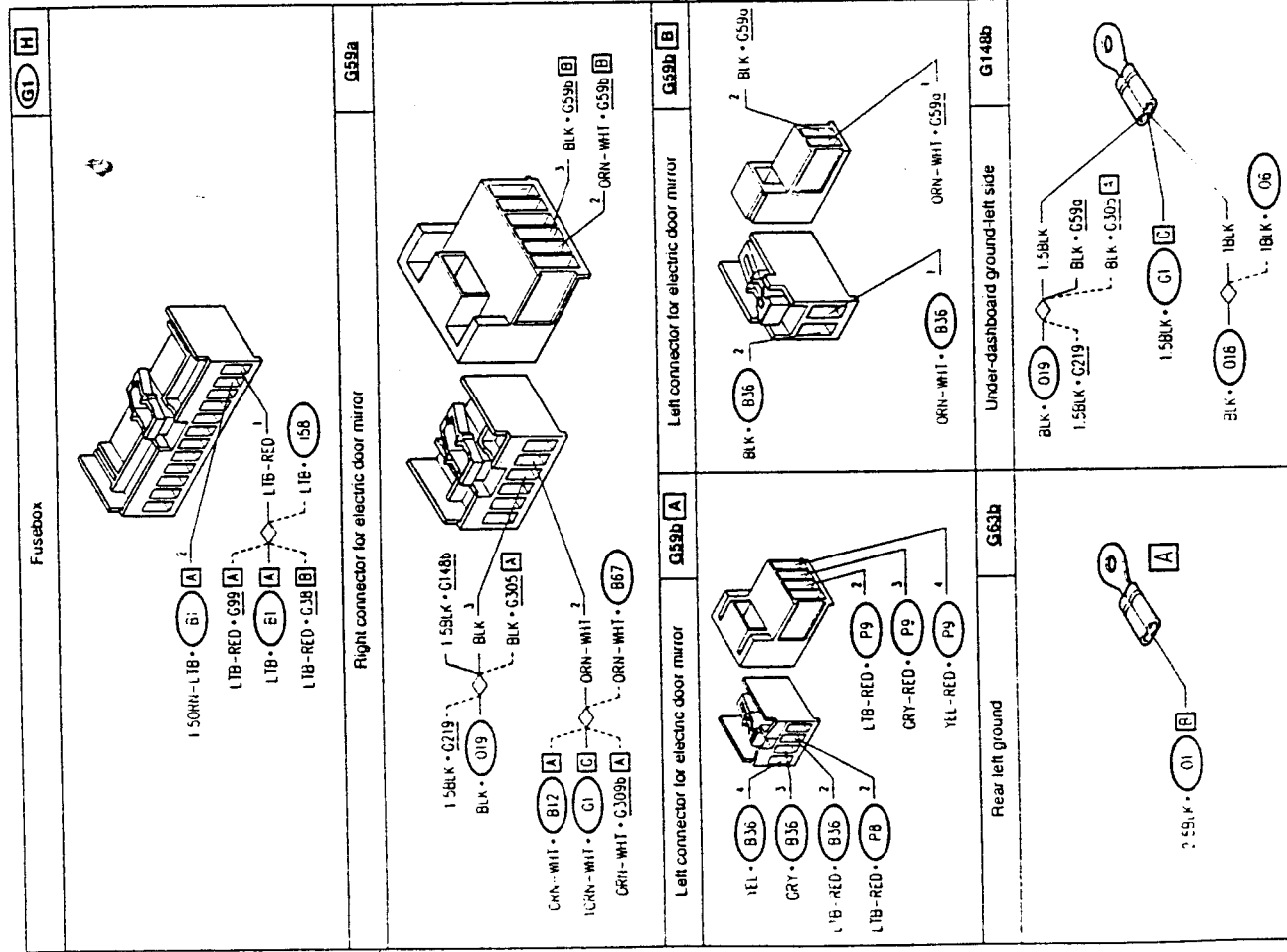
**Adjusting of door mirrors**  
 The double switch B36 commands the electric motors located in the mirror P8 (left) and P9 (right).  
 The switch is lum-key supplied through fuse F17 (7.5 A) in fusebox G1.  
 By actuating the switch in one of the two possible directions, positive and ground signals are sent to one of the two mirrors which determine the direction of rotation. Depending on the position of the selector either the right P9 (output signal from pins R of B36) or left-hand motors P8 (signals from pins L of B36) are connected.

TROUBLESHOOTING TABLE

Malfunction	Component											Test
	E12	B68	O1	O18	O19	G10	E1Z	P8	P9	B36		
Defrosting	•	•										A
Rear window			•									B
LH door mirror (defrosting)				•								C
RH door mirror (defrosting)					•							D
Rear window warning lamp						•						E
Door mirror adjustment							•					F
LH door mirror (adjustment)								•				G
RH door mirror (adjustment)									•			H

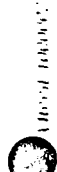
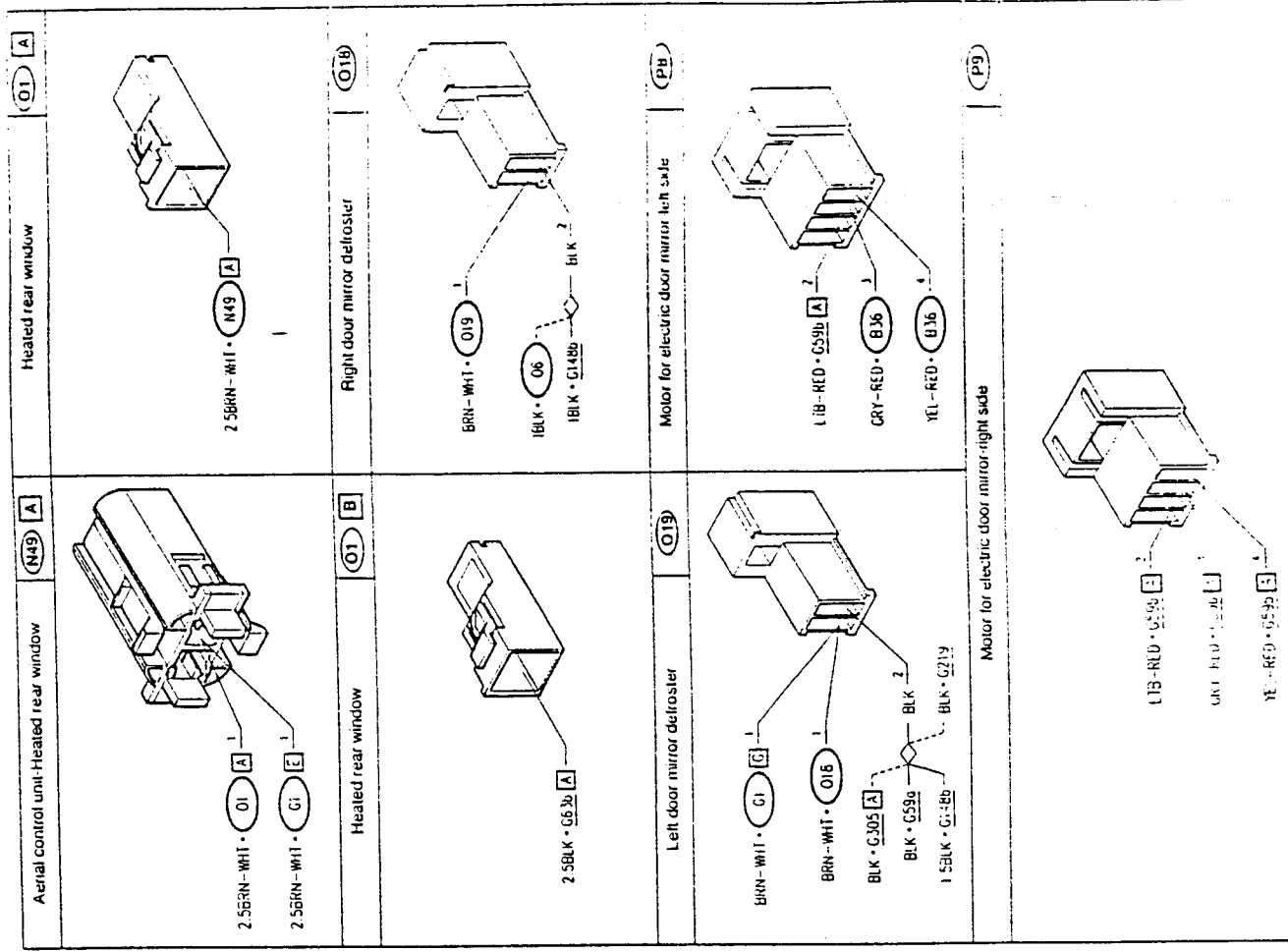
# 19-5

## HEATED REAR WINDOW HEATED ADJUSTABLE REAR-VIEW MIRRORS



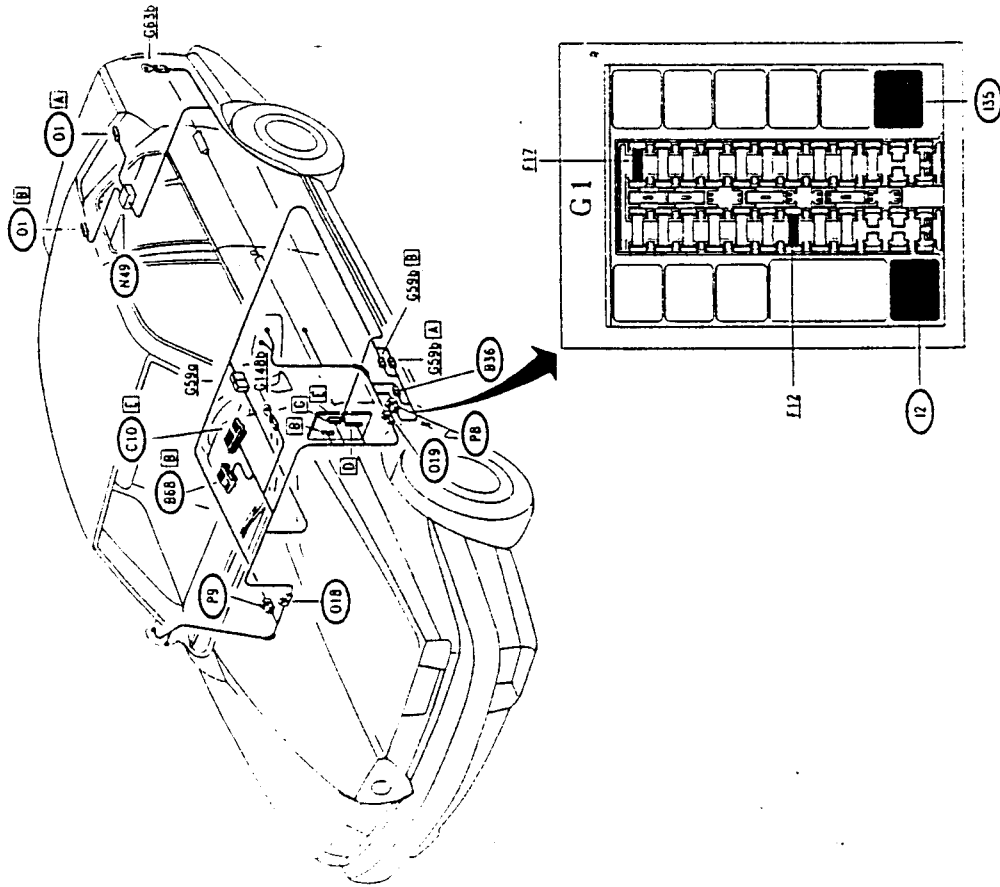
# 19-6

## HEATED REAR WINDOW HEATED ADJUSTABLE REAR-VIEW MIRRORS





LOCATION OF COMPONENTS



TROUBLESHOOTING

TEST A

NONE OF THE DEFROSTERS (REAR WINDOW AND DOOR MIRRORS) WORKING

NOTE: if the following circuits are also not working: windshield wipers, interior fan, seat adjustment and heating, test power windows, etc., check and if necessary replace the key-operated supply relay I35

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK FUSE</b> - Check for damage of fuse F12 of fusebox G1	OK OK OK	Carry out step A2 Replace fuse (30A)
<b>A2 CHECK RELAY</b> - Check for correct functioning of heated rear window relay I2 N.B.: the relay incorporated in the timer deactivates the coil after 20 minutes from the actuation signal (pin S) and after 10 minutes for successive actuations	OK OK OK	Carry out step A3 Replace relay I2
<b>A3 CHECK GROUND</b> - Check that pin B4 of lever group B68 is grounded (0V)	OK OK OK	Carry out step A4 Restore wiring between pin B4 of B68 and pin B4 of G1 (BLK)
<b>A4 CHECK LEVER GROUP</b> - Pressing the switch to engage the defroster function, check continuity between pins B4 and B9 of lever group B68	OK OK OK	Restore wiring between pin B9 of B68 and pin B9 of G1 (BRN) Replace lever group B68, right-hand part

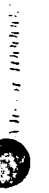
HEATED REAR WINDOW NOT WORKING		TEST B
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK VOLTAGE - With defroster function engaged, verify 12V between pins A and B of heated rear window O1	OK <del>OK</del>	Replace rear window containing the defroster resistance O1  Carry out step B2
<b>B2</b> CHECK GROUND - Check that pin B of rear window O1 is grounded (0V)	OK <del>OK</del>	Carry out step B3  Restore wiring between pin B of O1 and ground G63b (BLK)
<b>B3</b> CHECK VOLTAGE - With defroster function engaged, verify 12V at pin 1 of antenna-heated rear window control unit N49	OK <del>OK</del>	Restore wiring between pin A1 of control unit N49 and pin A of heated rear window O1 (BRN-WHT)  Restore wiring between pin A1 of control unit N49 and pin E4 of G1 (BRN-WHT)

LEFT-HAND DOOR MIRROR DEFROSTER NOT WORKING		TEST C
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C1</b> CHECK VOLTAGE - With defroster function engaged, verify 12V between pins 1 and 2 of the left-hand door mirror defroster O19	OK <del>OK</del>	Replace the left-hand door mirror containing the defroster resistance O19  Carry out step C2
<b>C2</b> CHECK GROUND - Check that pin 2 of the defroster O19 is grounded (0V)	OK <del>OK</del>	Restore wiring between pin 1 of O19 and pin G6 of G1 (BRN-WHT) NOTE: in this case the right-hand door mirror will also not be working O18 (see Test D)  Restore wiring between pin 2 of O19 and ground G148b, also across the solder (BLK)

RIGHT-HAND DOOR MIRROR DEFROSTER NOT WORKING		TEST D
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D1</b> CHECK VOLTAGE - With defroster function engaged, verify 12V between pins 1 and 2 of the right-hand door mirror defroster O18	OK <del>OK</del>	Replace the right-hand door mirror containing the defroster resistance O18  Carry out step D2
<b>D2</b> CHECK GROUND - Check that pin 2 of the defroster O18 is grounded (0V)	OK <del>OK</del>	Restore wiring between pin 1 of O18 and pin C6 of G1 across pin 1 of O19 (BRN-WHT) NOTE: in this case the left-hand door mirror will also not be working O19 (see Test C)  Restore wiring between pin 2 of O18 and ground G148b, also across the solder (BLK)

HEATED REAR WINDOW WARNING LAMP ON INSTRUMENT PANEL NOT WORKING		TEST E
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>E1</b> CHECK GROUND - With defroster function engaged, verify ground signal 0 V at pin E9 of instrument panel C10	OK <del>OK</del>	Carry out step E2  Restore wiring between pin D11 of G1 and pin E9 of C10 (BRN-WHT)
<b>E2</b> CHECK WARNING LAMP - Check for damage of the heated rear window warning lamp, in the instrument panel C10	OK <del>OK</del>	Check and if necessary replace the complete instrument panel C10  Replace the warning lamp

NOTE: The defroster function works normally however

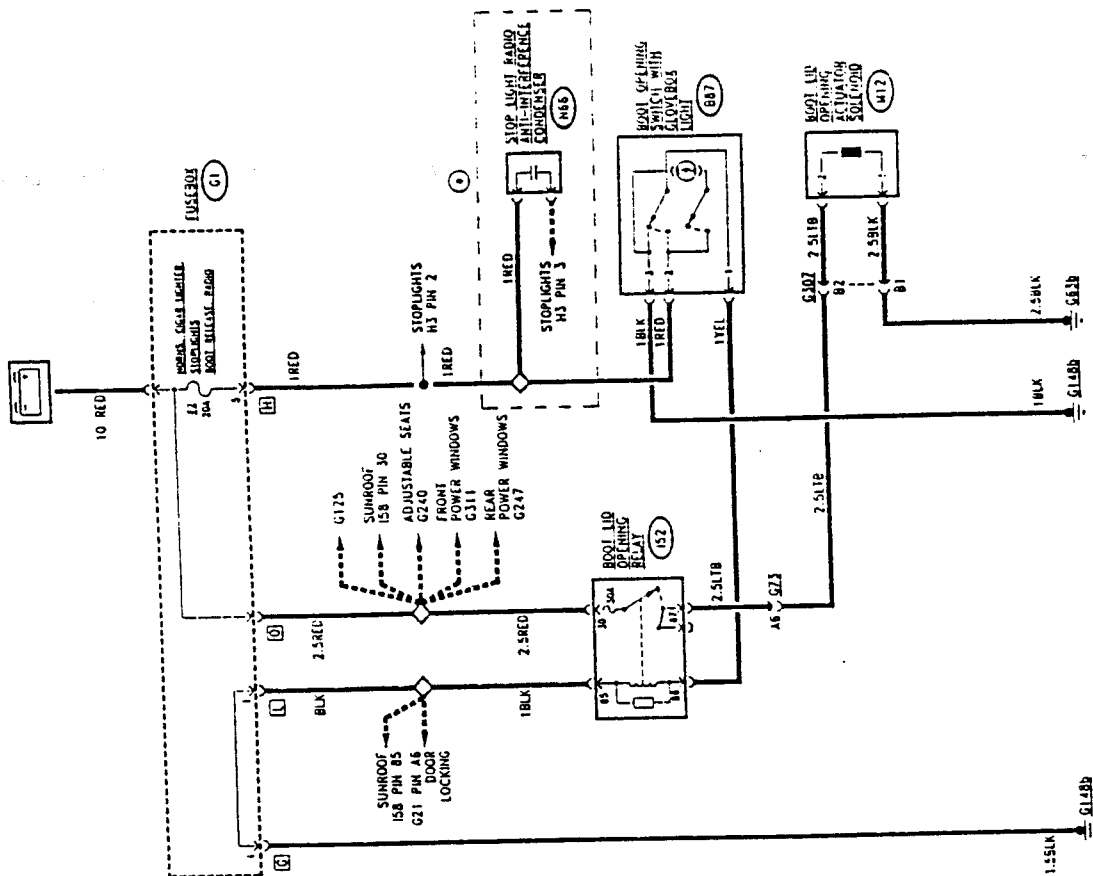


DOOR MIRROR ADJUSTMENT NOT WORKING			TEST F
TEST PROCEDURE	RESULT	CORRECTIVE ACTION	
<b>F1 CHECK FUSE</b> - Check for damage of fuse F17 of fusebox G1	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Carry out step F2 Replace fuse (7.5A)	
<b>F2 CHECK VOLTAGE</b> - With ignition key engaged, verify 12 V between pins 2 and 4 of the door mirror adjustment switch B36	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Replace double switch B36 Carry out step F3	
<b>F3 CHECK VOLTAGE</b> - With ignition key engaged, verify 12 V between pins 2 and 3 of connector G59a	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Restore wiring between: • pin 2 of G59a and pin 2 of B36, across pin B1 of connector G59b (ORN-WHT) • pin 3 of G59a and pin 4 of B36 across pin B2 of connector G59b (BLK)	
	OK <input checked="" type="checkbox"/>	Restore wiring between: • pin 2 of G59a and pin G2 of G1, also across the solder (ORN-WHT) • pin 3 of G59a and ground G148b, also across the solder (BLK)	

LEFT-HAND DOOR MIRROR ADJUSTMENT NOT WORKING			TEST G
TEST PROCEDURE	RESULT	CORRECTIVE ACTION	
<b>G1 CHECK VOLTAGE</b> - With ignition key engaged, select lever group for left-hand door mirror, actuate the switch and verify 12 V between pins 2 and 3 and between pins 2 and 4 of motor group P8	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Replace motor group P8 in left-hand door mirror Carry out step G2	
<b>G2 CHECK VOLTAGE</b> - With ignition key engaged, select lever group for left-hand door mirror, actuate the switch and verify 12 V between pins 3 and L of switch B36	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Replace double switch B36 Restore wiring between: • pin 3 of B36 and pin 2 of P8, across pin A2 of connector G59b (LTB-RED) • one of the pins L of B36 and pin 3 of P8 (GRY-RED) • the other pin L of B36 and pin 4 of P8 (YEL-RED)	

RIGHT-HAND DOOR MIRROR ADJUSTMENT NOT WORKING			TEST H
TEST PROCEDURE	RESULT	CORRECTIVE ACTION	
<b>H1 CHECK VOLTAGE</b> - With ignition key engaged, select lever group for right-hand door mirror, actuate the switch and verify 12 V between pins 2 and 3 and between pins 2 and 4 of motor group P9	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Replace motor group P9 in right-hand door mirror Carry out step H2	
<b>H2 CHECK VOLTAGE</b> - With ignition key engaged, select lever group for right-hand door mirror, actuate the switch and verify 12 V between pins 3 and R of switch B36	OK <input checked="" type="checkbox"/> OK <input checked="" type="checkbox"/>	Replace double switch B36 Restore wiring between: • pin 3 of B36 and pin 2 of P9, across pin A2 of connector G59b (LTB-RED) • one of the pins R of B36 and pin 3 of P9, across pin A3 of connector G59b (GRY and GRY-RED) • the other pin R of B36 and pin 4 of P9, across pin A4 of connector G59b (YEL and YEL-RED)	

WIRING DIAGRAM



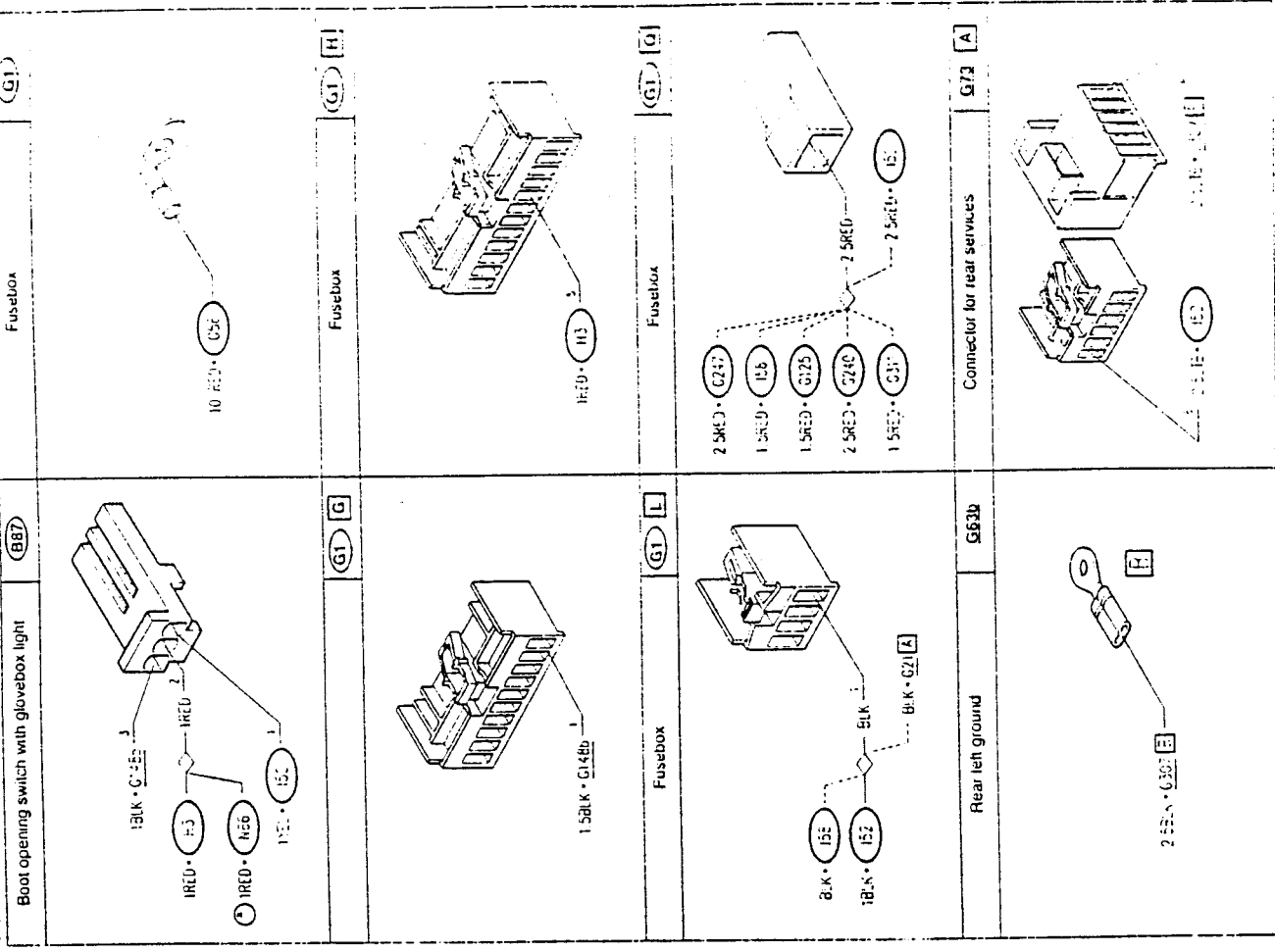
# BOOT RELEASE CONTROL

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(\*) variation from chassis N 2521

COMPONENTS AND CONNECTORS



GENERAL DESCRIPTION

The boot lid can be opened either from outside the vehicle by inserting the key into the rear lock, or from inside the vehicle by an electric control. If or safety reasons the switch which controls the opening of the boot lid lock through a solenoid, is located inside the glovebox on the dashboard. When the glovebox is opened a light automatically comes on which illuminates it and enables the switch to be easily located.

A radio anti-interference condenser has been fitted to vehicles from chassis N 2521 to prevent disturbances from the boot release switch.

FUNCTIONAL DESCRIPTION

The boot lid opening relay 152 controls the system. The relay is powered directly by the battery through the circuits of fusebox G1. The coil is grounded on one side and is excited by a positive signal originating from the boot opening switch B87. The battery voltage, after passing fuse F2 (20A) of G1 is transmitted on closure of the contact of switch B87, to the coil of relay 152.

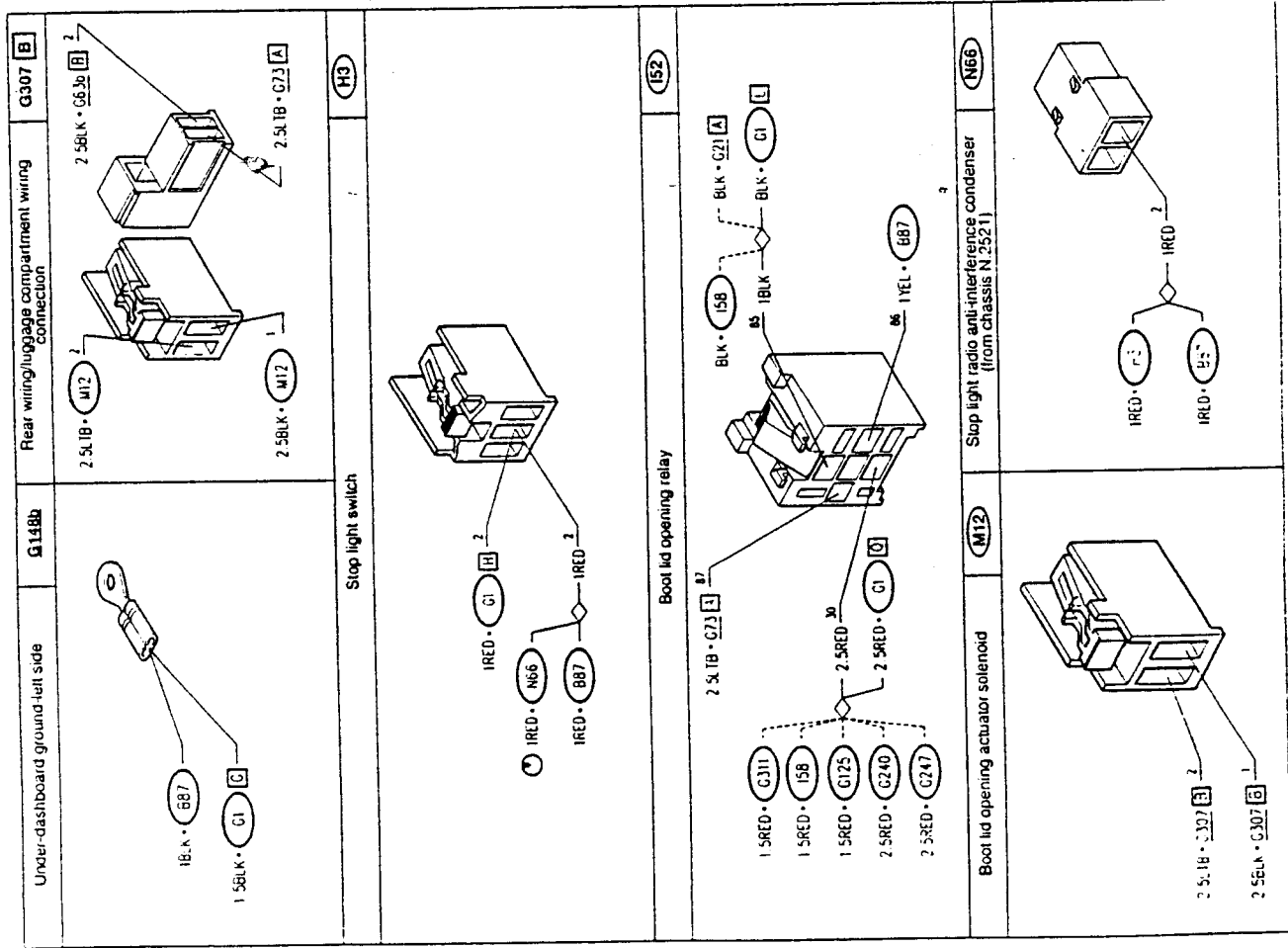
The relay, protected by a fuse (30A) sends voltage to the boot lid opening actuator solenoid M12 which opens the lock.

Another contact of switch B87 closes automatically when the glovebox is opened and illuminates the glovebox light incorporated in switch B87 using the same supply routed through fuse F2.

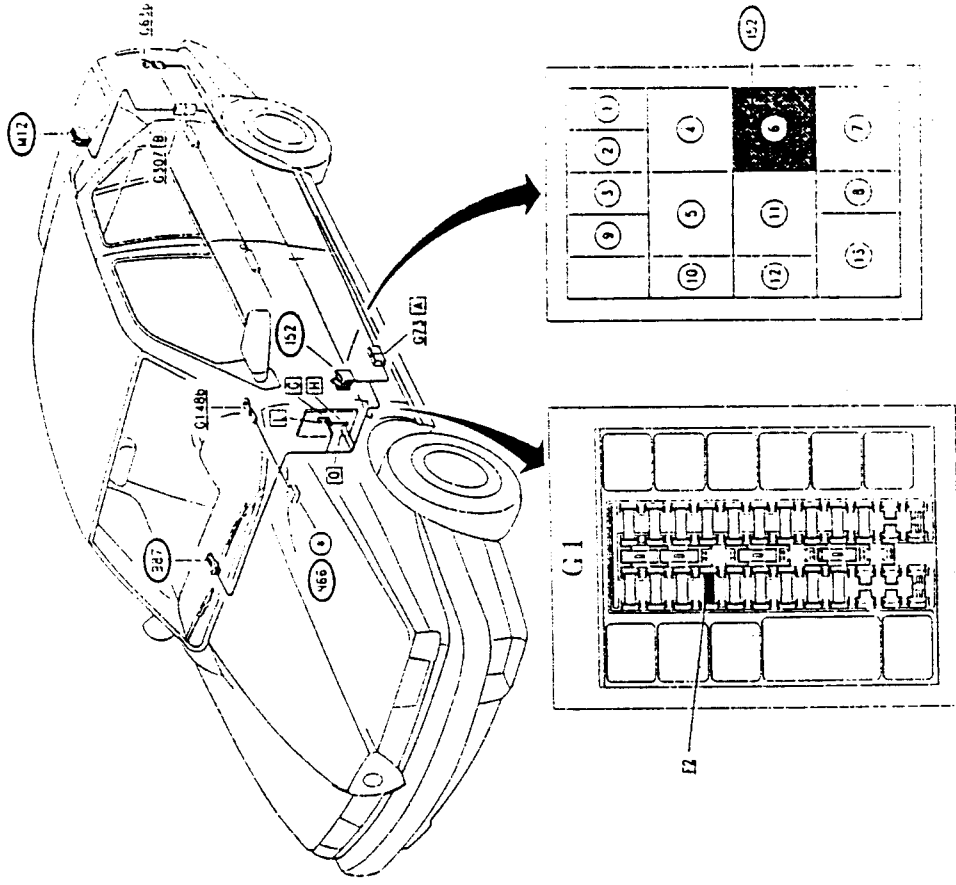
The anti-interference condenser N66 is connected to the power supply of switch B87.

TROUBLESHOOTING TABLE

Malfunction	Component		Test
	F2	M12 (B87)	
Boot opening device not working	•	•	A
Glovebox lamp not working	•	•	B



LOCATION OF COMPONENTS



From chassis N 30 723  
 Up to chassis N 30 732  
**I52 - RED relay holder**  
 (\*) from chassis N 2521

TEST A

BOOT LID OPENING DEVICE NOT WORKING

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A8 CHECK GROUND - Check that pin 85 of I52 is grounded (0V)	OK	Carry out step A9
	OK	Restore wiring between pin 85 of I52 and pin 1 of G1, if necessary, also by soldering (BLK)
A9 CHECK VOLTAGE - Verify 12V at pin 30 of relay I52	OK	Restore wiring between pin 87 of I52 and pin 2 of M12 through pin A6 of connector G73 and pin B2 of connector G307 (LTB)
	OK	Restore wiring between pin 30 of I52 and pin G of G1, if necessary, also by soldering (RED)

TEST B

INTERNAL LIGHT IS NOT ILLUMINATED WHEN GLOVEBOX IS OPENED

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1 CHECK FUSE - Check for damage of fuse F2 in fusebox G1	OK	Carry out step B2
	OK	Replace fuse (20A)
B2 CHECK VOLTAGE - With glovebox open, verify 12V between pins 2 and 3 of switch B87	OK	Carry out step B3
	OK	Carry out step B4
B3 CHECK BULB - Check for damage of glove box light bulb, inserted in switch B87	OK	Replace complete switch B87
	OK	Replace bulb
B4 CHECK VOLTAGE - Verify 12V at pin 2 of switch B87	OK	Restore wiring between pins 3 of B87 and ground G148b (BLK)
	OK	Restore wiring between pin 2 of B87 and pin 11 of G1 through pin 2 of switch H3 (RED) N.B. If the stop lights are also not working (see "Stop Lights")

TEST A

TROUBLESHOOTING

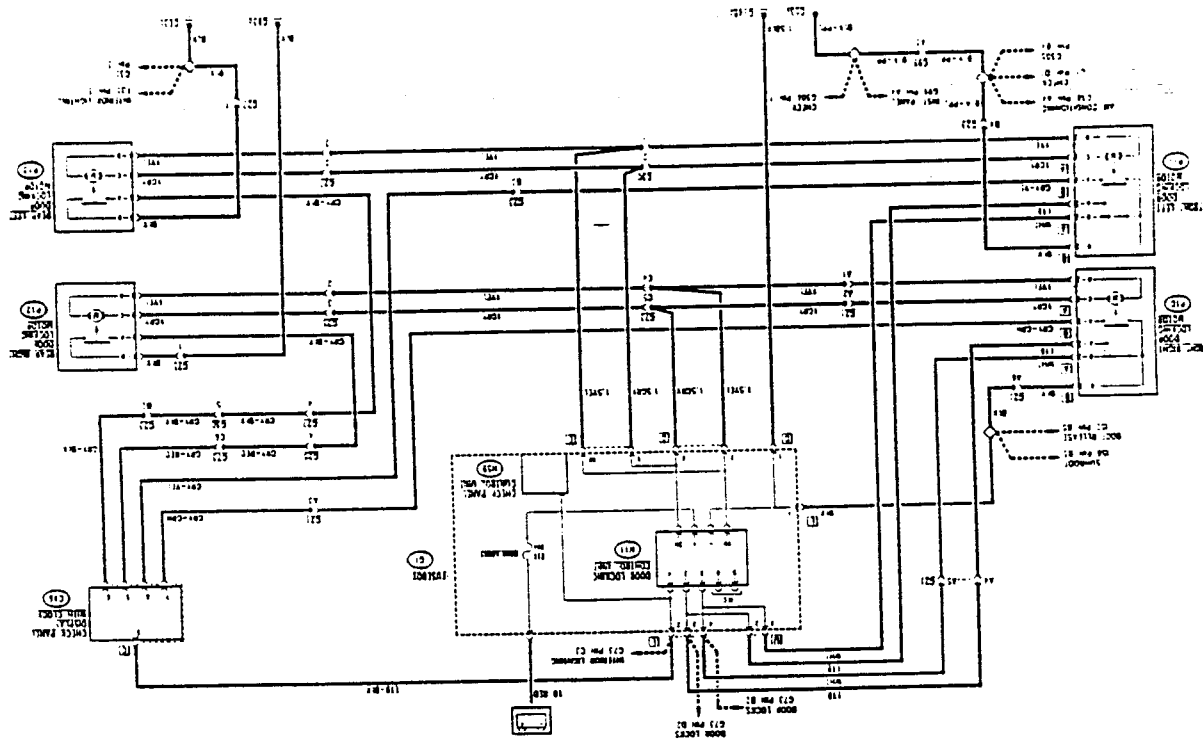
BOOT LID OPENING DEVICE NOT WORKING

NOTE: if the glovebox light is not working, also carry out test B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1 CHECK FUSE - Check for damage of fuse F2 in fusebox G1	OK	Carry out step A2
	OK	Replace fuse (20A)
A2 CHECK RELAY - Check correct functioning of boot lid opening relay I52, and relative fuse	OK	Carry out step A3
	OK	Replace relay I52 or fuse (30A)
A3 CHECK VOLTAGE - Verify 12V between pins 1 and 2 of solenoid M12	OK	Check functioning, and if necessary replace the solenoid M12
	OK	Carry out step A4
A4 CHECK GROUND - Check that pin 1 of M12 is grounded (0V)	OK	Carry out step A5
	OK	Restore wiring between pin 1 of M12 and ground G63b, through pin B1 of the connector G307 (BLK)
A5 CHECK VOLTAGE - Verify 12V at pin 2 of switch B87	OK	Carry out step A6
	OK	Restore wiring between pin 2 of B87 and pin H5 of G1, through pin 2 of switch H3 (RED) (from chassis N 2521 also across solder) N.B. If the stop lights are also not working (see "Stop Lights")
A6 CHECK VOLTAGE - Activating the boot release switch, verify 12V at pin 1 of switch B87	OK	Carry out step A7
	OK	Check functioning and if necessary replace switch B87
A7 CHECK VOLTAGE - Activating the boot release switch, verify 12V at pin 86 of relay I52	OK	Carry out step A8
	OK	Restore wiring between pin 86 of I52 and pin 1 of switch B87 (YEL)

(Continued)

WIRING DIAGRAM



DOOR LOCKING SYSTEM

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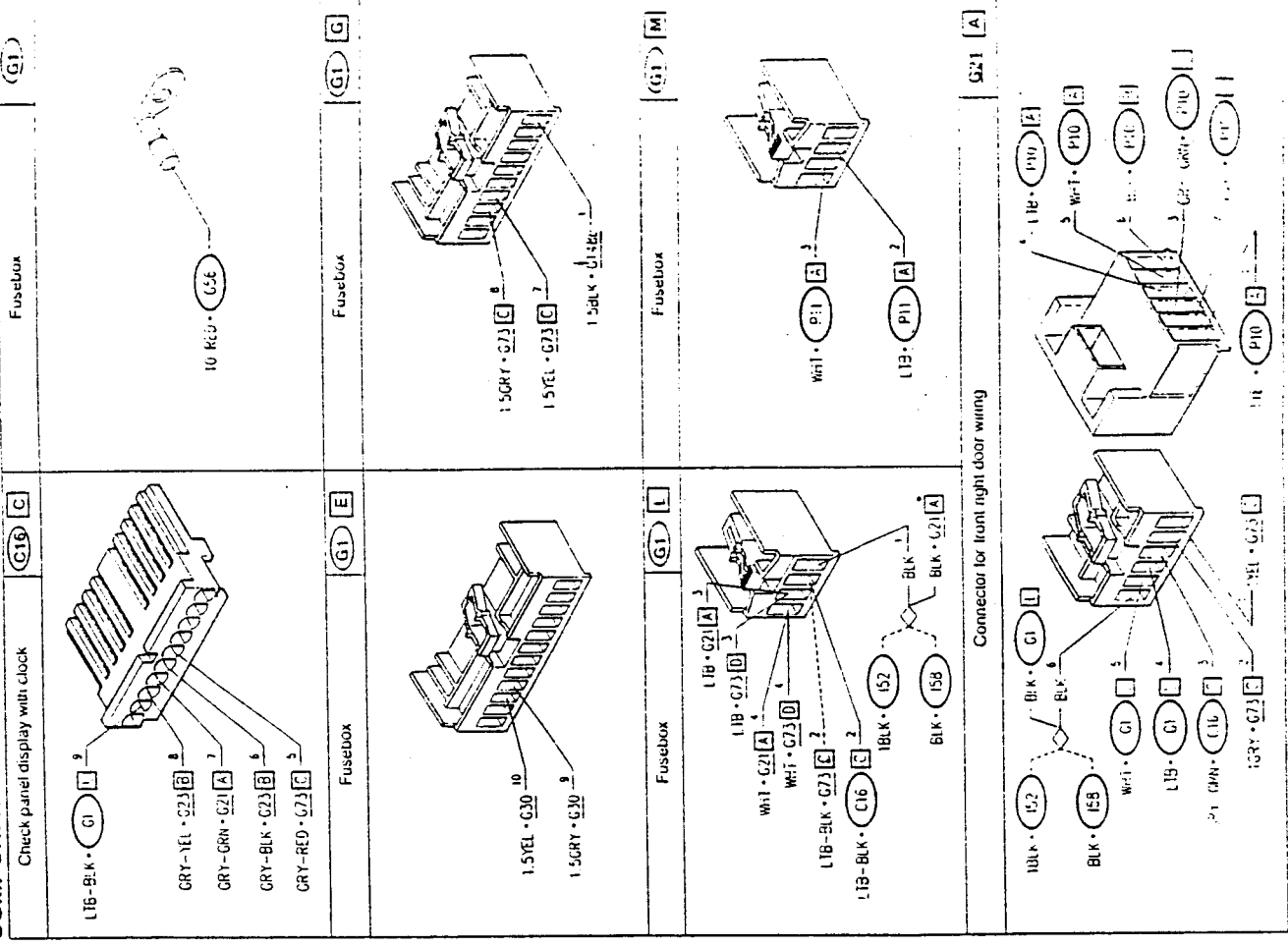
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COMPONENTS AND CONNECTORS



GENERAL DESCRIPTION

The door locking system is formed by an electronic control unit which controls and commands the door locks, each of these is composed of a gearmotor for locking/releasing the locks, a control switch (connected to the electric circuit for the front doors only) and a switch signaling that the doors are open.

The logic of the control unit does not permit the blocking/releasing of the locks if a "door open" signal reaches it through the Check Panel (see "Check Panel").

The correct closure of all four doors permits the simultaneous activation of the gearmotors acting on either the control switches, from inside by the buttons, or from the outside with the key

from the switches of the front right P10 and front left P11 door locking motors; this signal is also "controlled" by the Check Panel control unit N59 (see "Check Panel").

The logic of the control unit N11 checks that there are no doors open; no signal must therefore reach pin 4 from the Check Panel display C16 which collects all the signals from the "door open" switches of the four door locks P10 front right, P11 front left, P12 rear right, and P13 rear left (see also "Check Panel"). If all the doors are closed correctly, the control unit simultaneously sends a lock signal (pin 1M) or an unlock signal (pin 2M) to the gearmotors of the four door locks P10, P11, P12 and P13.

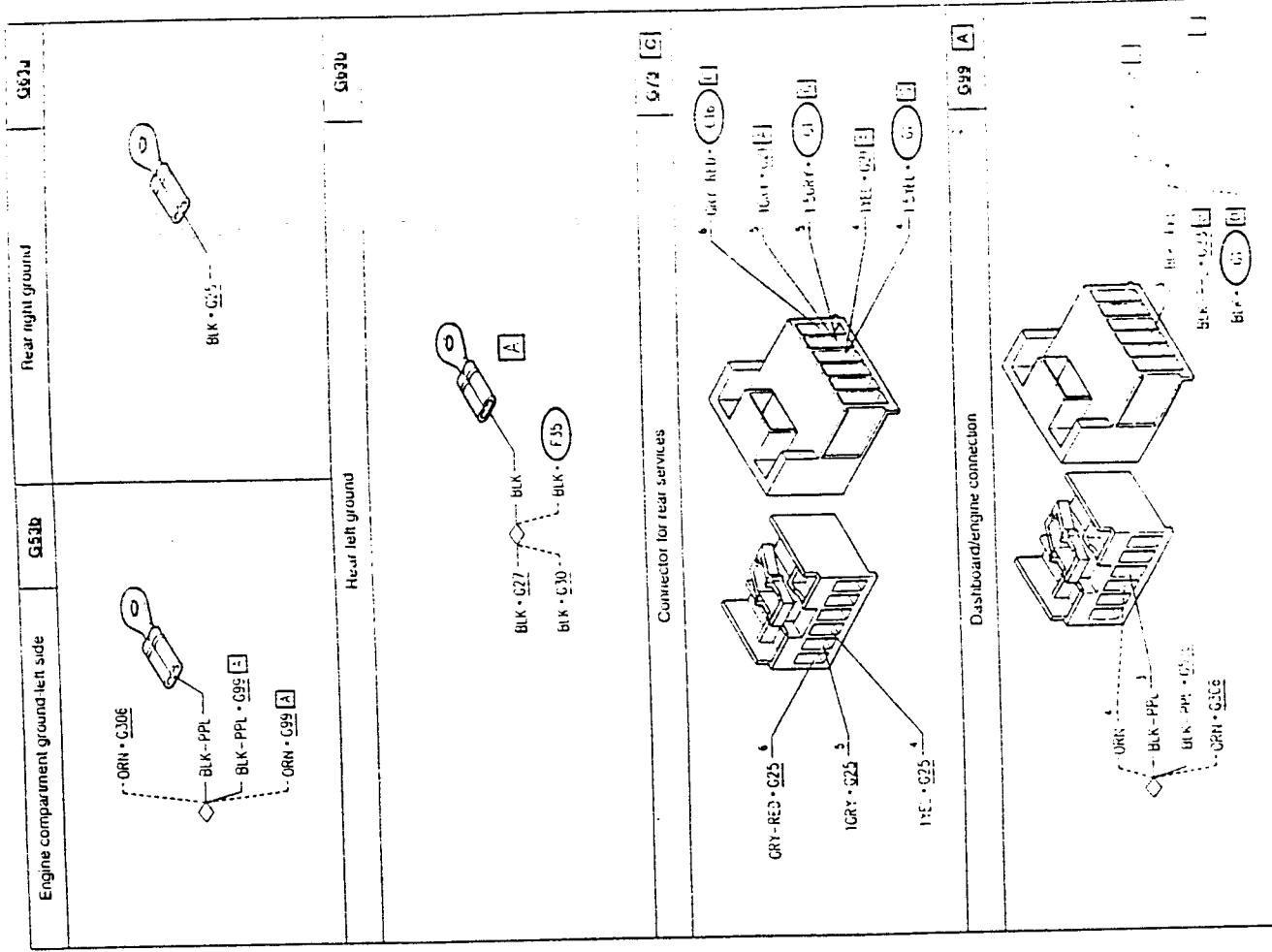
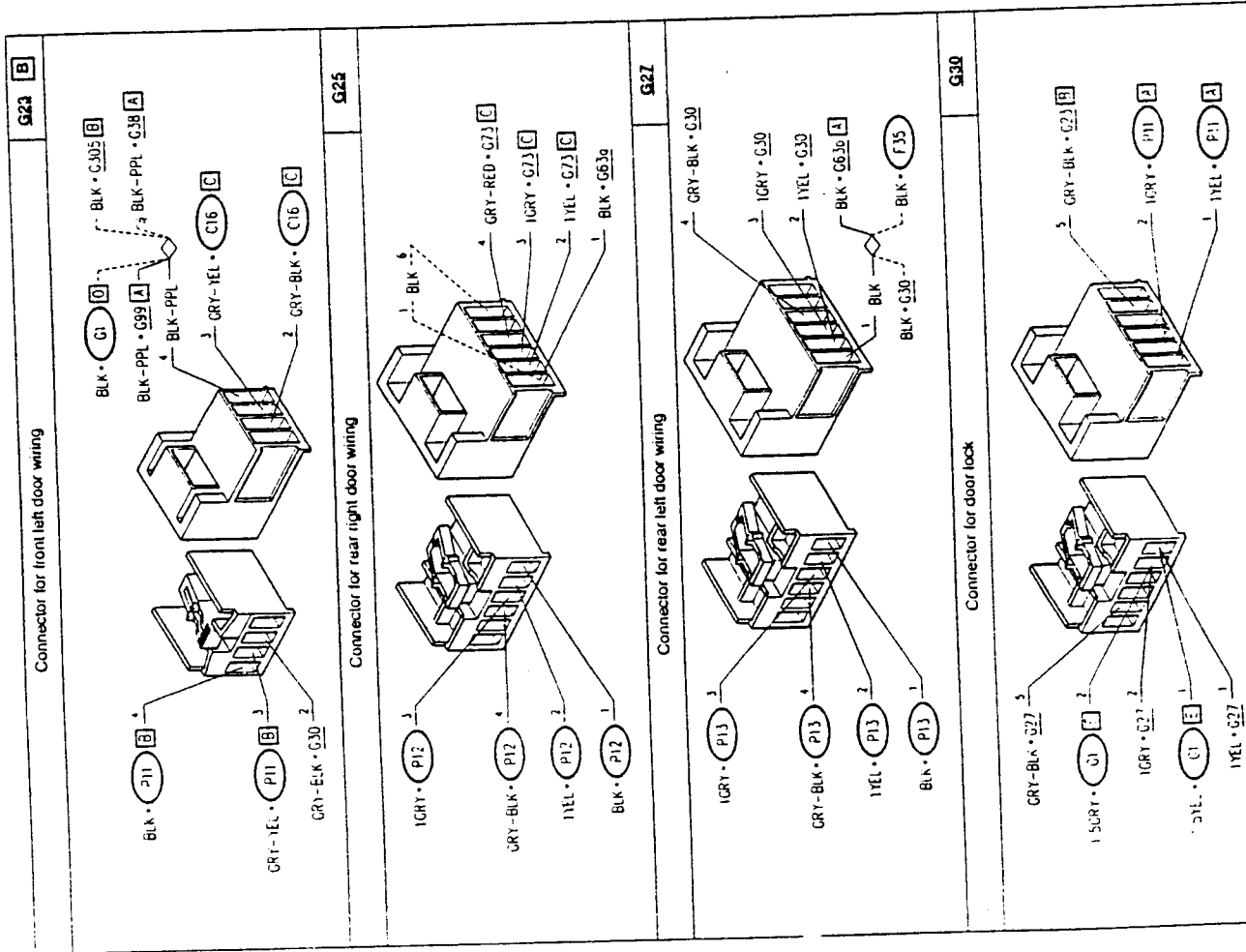
FUNCTIONAL DESCRIPTION

TION

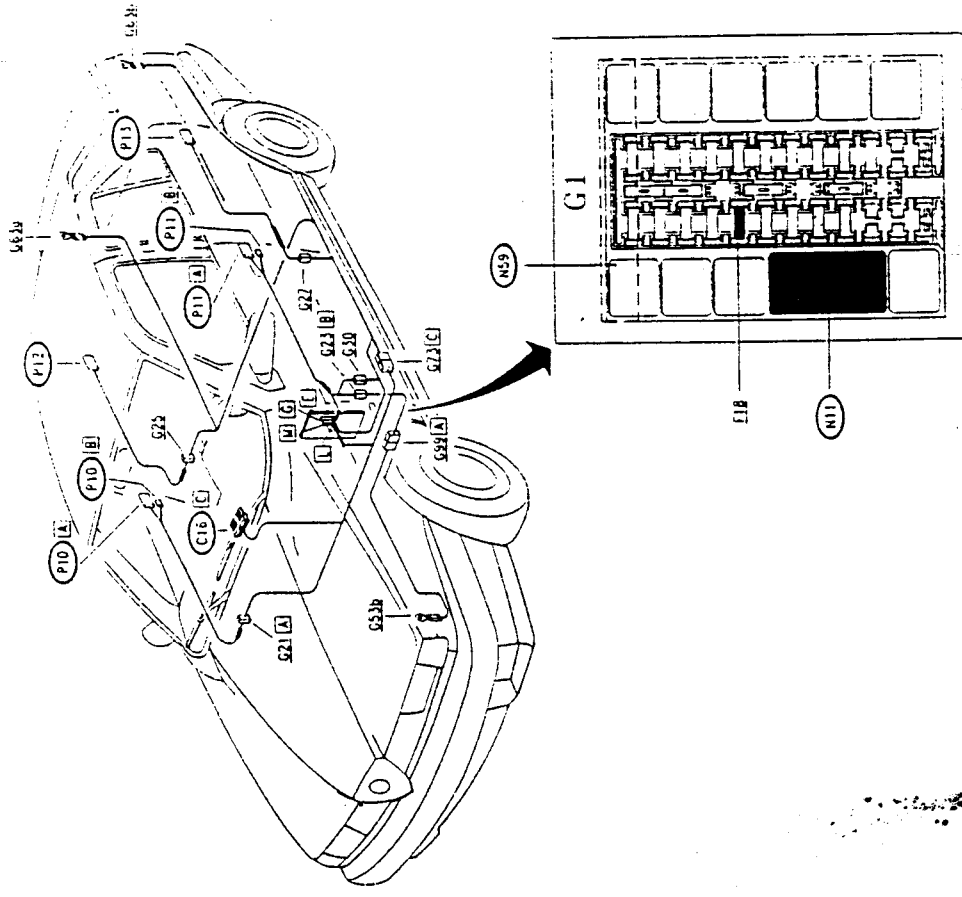
The door locking control unit N11 is located in the fusebox G1. It is supplied by battery voltage through fuse F18 (20A) and is grounded. Pins 2 and 3 receive a signal interpreted as a lock/unlock command originating

TROUBLESHOOTING TABLE

Malfunction	Component							Test
	E18	N11	P10	P11	P12	P13	P15	
Door locks not working	•	•						A
Front left door open				•				B
Front right door open				•				C
Rear left door open					•			D
Rear right door open						•		E
Front left motor							•	F
Front right motor							•	G
Rear left motor							•	H
Rear right motor							•	I



LOCATION OF COMPONENTS



<p>Under dashboard ground-left side</p> <p>G1</p>	<p>Front-right door locking motor</p> <p>YEL - G21 [A] GRY - G21 [A] WHT - G21 [E] LFB - G21 [A]</p>
<p>Front-right door locking motor</p> <p>BLK - G21 [B] WHT - G21 [A]</p>	<p>Front-left door locking motor</p> <p>YEL - G30 [D] GRY - G30 [C] WHT - G1 [N] LFB - G1 [N]</p>
<p>Front-left door locking motor</p> <p>BLK - G21 [B] WHT - G21 [A]</p>	<p>Rear-right door locking motor</p> <p>YEL - G25 [D] GRY - G25 [C] BLK - G25 [B] GRY-BLK - G25 [A]</p>
<p>Rear-left door locking motor</p> <p>YEL - G27 [D] GRY - G27 [C] BLK - G27 [B] GRY-BLK - G27 [A]</p>	<p>Rear-left door locking motor</p>

TROUBLESHOOTING

DOOR LOCKING DEVICE NOT WORKING		TEST A
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1   CHECK FUSE - Check for damage of fuse F18 in fusebox G1	OK <del>OK</del>	Carry out step A2 Replace fuse (20A)
A2   CHECK DOOR OPEN SIGNAL - Check signal at pin 4 of door locking device N11: • with all doors closed, no signal • with one door open, ground signal (0V)	OK <del>OK</del>	Carry out step A3 Restore wiring between pin L2 of G1 and pin C9 of Check Panel display C16 (LTB-BLK)
A3   CHECK FRONT RIGHT DOOR SWITCH - Check switch of P10: • With switch P10 in locked position check the continuity between pins BB and AA. • With switch P10 in unlocked position check the continuity between pins BB and AB	OK <del>OK</del>	Carry out step A4 Replace door locking device P10
A4   CHECK FRONT LEFT DOOR SWITCH - Check switch of P11: • With switch P11 in locked position check the continuity between pins BB and AA. • With switch P11 in unlocked position check the continuity between pins BB and AB	OK <del>OK</del>	Carry out step A5 Replace the door locking device P11
A5   CHECK LOCKING SIGNAL - Check signal at pin 3 of door locking device N11: • actuating the door lock, passes from no signal to ground signal (0V)	OK <del>OK</del>	Carry out step A6 Restore wiring between pin L3 of G1 and pin AA of P10, across pin A4 of connector G21 (LTB) and between pin M2 of G1 and pin AA of P11 (LTB)
A6   CHECK UNLOCK SIGNAL - Check signal at pin 2 of door locking device N11: • actuating the door lock, passes from no signal to ground signal (0V)	OK <del>OK</del>	Check and if necessary replace door lock control unit N11 Restore wiring between pin L4 of G1 and pin AB of P10, across pin A5 of connector G21 (WHT) and between pin M3 of G1 and pin AB of P11 (WHT)

Note: If the device signalling door open is also not working, first carry out tests B, C, D or E

ON OPENING FRONT LEFT DOOR, CORRESPONDING LED ON DISPLAY NOT WORKING

TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1   CHECK GROUND - Opening front left door, verify 0V at pin BA of door locking device P11	OK <del>OK</del>	Restore wiring between pin BA of P11 and pin C2B of Check Panel display C16, across pin B3 of connector G23 (GRY-YEL) Carry out step B2
B2   CHECK GROUND - Verify 0V at pin BB of door locking device P11	OK <del>OK</del>	Replace door locking device P11 Restore wiring between pin BB of P11 and ground G53b, across pin B4 of connector G23, pin A3 of connector G99 and the two solders (B1 K)

ON OPENING FRONT RIGHT DOOR, CORRESPONDING LED ON DISPLAY NOT WORKING

TEST C

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
C1   CHECK GROUND - Opening the front right door, verify 0V at pin BA of door locking device P10	OK <del>OK</del>	Restore wiring between pin BA of P10 and pin C7 of Check Panel display C16, across pin A3 of connector G21 (GRY-GRN) Carry out step C2
C2   CHECK GROUND - Verify 0V at pin BB of door locking device P10	OK <del>OK</del>	Replace door locking device P10 Restore wiring between pin BB of P10 and pin L1 of G1, across pin A6 of connector G21 and the solder (B1 K)

FRONT LEFT DOOR LOCK MOTOR NOT WORKING		TEST F
TEST PROCEDURE		CORRECTIVE ACTION
F1	CHECK MOTOR - Check for damage of door lock motor P11: the circuit between pins AC and AD of P11 must not be open	OK Carry out step F2 Replace complete device P11
F2	CHECK VOLTAGE - Actuating door locking (or unlocking), verify 12V between pin E9 and E10 of G1	OK Restore wiring between: - pin E9 of G1 and pin AC of P11, across pin 2 of connector G30 (GRY) - pin E10 of G1 and pin AD of P11, across pin 1 of connector G30 (YEL) Check and if necessary replace door lock control unit N11

FRONT RIGHT DOOR LOCK MOTOR NOT WORKING		TEST G
TEST PROCEDURE		CORRECTIVE ACTION
G1	CHECK MOTOR - Check for damage of door lock motor P10: the circuit between pins AC and AD of P10 must not be open	OK Carry out step G2 Replace complete device P10
G2	CHECK VOLTAGE - Actuating door locking (or unlocking), verify 12V between pin G7 and G8 of G1	OK Restore wiring between: - pin G8 of G1 and pin AC of P10, across pin C5 of connector G73 and pin A2 of connector G21 (SHY) - pin G7 of G1 and pin AD of P10, across pin C4 of connector G73 and pin A1 of connector G21 (YEL) Check and if necessary replace door lock control unit N11

ON OPENING REAR LEFT DOOR, CORRESPONDING LED ON DISPLAY NOT WORKING		TEST D
TEST PROCEDURE		CORRECTIVE ACTION
D1	CHECK GROUND - Opening rear left door, verify 0V at pin A of door locking device P13	OK Restore wiring between pin A of P13 and pin C6 of Check Panel display C16, across pin 4 of connector G27, pin 5 of connector G30 and B2 of connector G23 (GRY-BLK) Carry out step D2
D2	CHECK GROUND - Verify 0V at pin B of door locking device P13	OK Replace door locking device P13 Restore wiring between pin B of P13 and ground G63b, across pins 1 and 6 of connector G27 and the solder (BLK)

ON OPENING REAR RIGHT DOOR, CORRESPONDING LED ON DISPLAY NOT WORKING		TEST E
TEST PROCEDURE		CORRECTIVE ACTION
E1	CHECK GROUND - Opening the rear right door, verify 0V at pin A of door locking device P12	OK Restore wiring between pin A of P12 and pin C5 of Check Panel display C16, across pin 4 of connector G25, pin C6 of connector G27 (GRY-BLK and GRV-RED) Carry out step E2
E2	CHECK GROUND - Verify 0V at pin B of door locking device P12	OK Replace door locking device P12 Restore wiring between pin B of P12 and ground G63a, across pin 1 of connector G25 (BLK)

REAR LEFT DOOR LOCK MOTOR NOT WORKING		TEST H
TEST PROCEDURE		CORRECTIVE ACTION
H1	CHECK MOTOR - Check for damage of door lock motor P13; the circuit between pins C and D of P13 must not be open	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p> <p>Carry out step H2</p> <p>Replace complete device P13</p>
H2	CHECK VOLTAGE - Actuating door locking (or unlocking), verify 12V between pin E9 and E10 of G1	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p> <p>Restore wiring between: - pin E9 of G1 and pin C of P13, across pin 2 of connector G30 and pin 3 of connector G27 (GRY) - pin E10 of G1 and pin D of P13, across pin 1 of connector G30 and pin 2 of connector G27 (YEL)</p> <p>Check and if necessary replace door lock control unit N11</p>

REAR RIGHT DOOR LOCK MOTOR NOT WORKING		TEST I
TEST PROCEDURE		CORRECTIVE ACTION
I1	CHECK MOTOR - Check for damage of door lock motor P12; the circuit between pins C and D of P12 must not be open	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p> <p>Carry out step I2</p> <p>Replace complete device P12</p>
I2	CHECK VOLTAGE - Actuating door locking (or unlocking), verify 12V between pin G7 and G8 of G1	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p> <p>Restore wiring between: - pin G8 of G1 and pin C of P12 across pin C5 of connector G73 and pin 3 of connector G25 (GRY) - pin G7 of G1 and pin D of P12 across pin C4 of connector G73 and pin 2 of connector G25 (YEL)</p> <p>Check and if necessary replace door lock control unit N11</p>

# DOOR LOCKS WITH REMOTE CONTROL

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## GENERAL DESCRIPTION

For some versions a door locking device with remote control is available that enables the doors to be opened and closed at a distance. This action is signalled by the simultaneous flashing of the direction indicators.

It is an infrared device formed by a transmitter and a receiver.

The transmitter, protected by a shock-proof rubber covering, is composed of a printed circuit and an infrared emitter. It is supplied by a 2 to 3V battery and sends a beam in the direction it is pointed each time the relevant button is pressed.

A led comes on each time a signal is emitted.

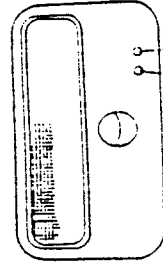
The receiver, incorporated in the rear rooflight, is an electronic device which captures the infrared signal by way of a half-sphere protruding from the receiver itself. A led also lights up on the receiver when the signal is captured and a button permits a secret control code number to be stored. The half-sphere shape enables it to capture signals through 360 degrees as long as the transmitter is within 4 meters of the receiver.

Once the infrared signal has been captured the receiver sends a signal to the door lock electronic control unit controlling the locking and unlocking of the locks similar to the manual command (by way of the key or switch on the front doors).

The receiver also sends a signal which, by way of an appropriate relay activates the direction indicators for about three seconds in order to advise the operator visually that the doors have in fact been correctly locked.

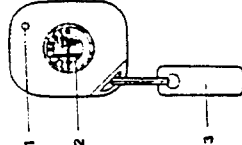
**NOTE:**

In this section only the components and wiring which permit the remote operation of the door locking device are dealt with. For a detailed description and for the fault diagnosis relative to this device the preceding section "Door locking system" should be consulted.



Receiver

- 1 - MemORIZATION button
- 2 - Led



Transmitter

- 1 - Led
- 2 - Control button
- 3 - Transmitter code label

## MEMORIZATION OF THE SECRET CODE

The transmitter has a six digit code stored in its memory which cannot be modified (it results a combination chosen from 2 million possibilities).

Each receiver, and therefore each vehicle, can be synchronized with one or more transmitters (up to a maximum of 6) and memorize the relative codes.

**N.B.** When new, the receivers are programmed with a universal code which permits testing of the system at the end of the production line with a standard transmitter.

When the vehicle is delivered to the owner the universal code is replaced with that of the transmitter supplied to each client (this code number is printed on the label accompanying the transmitter)

**NOTE:** for security reasons, whenever a signal reaches the receiver which is different from the memorized code, the receiver remains inactive for about 10 seconds slowing down and therefore almost totally excluding the possibility of manipulating the device with an automatic code generator.

These procedures can be followed to memorize the code numbers.

## A. PERSONALIZATION OF THE RECEIVER:

The transmitter code is entered on the receiver (code printed on the relative label) and the universal code is simultaneously cancelled.

Operate as follows:

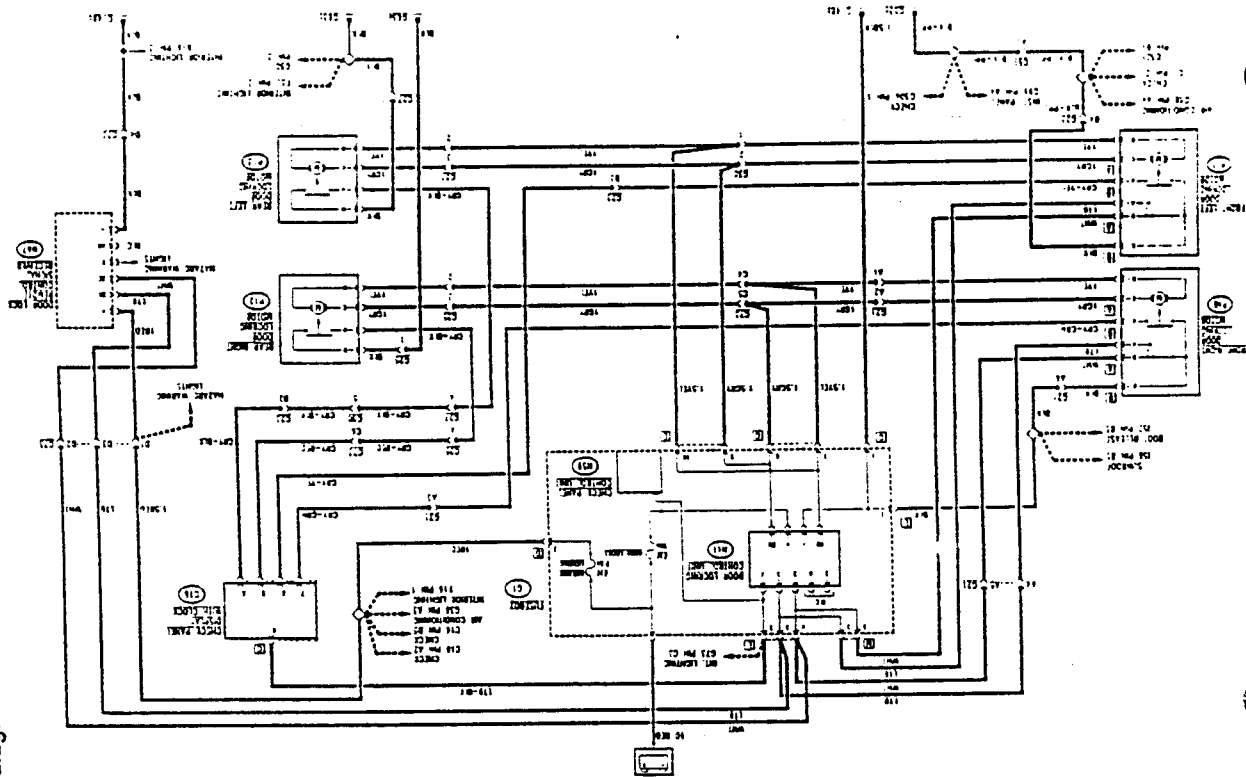
1. Press the button on the receiver
2. Keeping the button pressed, check that the led comes on to indicate that the receiver is ready to store the new code number.
3. Without releasing the button on the receiver, press and release the button on the transmitter.
4. Check that the led goes out to indicate that the code number has been received. Release the button on the receiver.
5. The led will flash for about 8 seconds, confirming the cancellation of the universal code and the memorization of the code relative to the transmitter entered at stage 3.
6. By pressing the button on the receiver again while the led is still flashing the process can be repeated and other code numbers pertaining to other transmitters can be stored (up to a maximum of 6).

## B. MEMORIZING NEW CODES:

New codes belonging to other transmitters can be stored (as long as this has not been already carried out at step b of procedure A).

- Proceed as follows:
1. Press the button on the receiver
- Keeping the button pressed, check that the led flashes briefly after about one second

**DOOR OPENING/CLOSING**  
Wiring diagram



then as the third digit etc. up to the sixth one.

4. After the six operations, if the code has been correctly entered, the led will begin to flash for 8 seconds.
5. Press the button on the receiver and keep it pressed and check that the led comes on to indicate that the receiver is ready to accept a new code number.
6. Keeping the button on the receiver pressed, press and release the button on the new transmitter which is to memorize the new number and replace the old number.
7. Check that the led goes out to indicate that the code number has been memorized. Release the button on the receiver.
8. The led will flash for about 8 seconds confirming that the new code number relative to the new transmitter has been stored.

**C. MANUAL PROGRAMMING:**

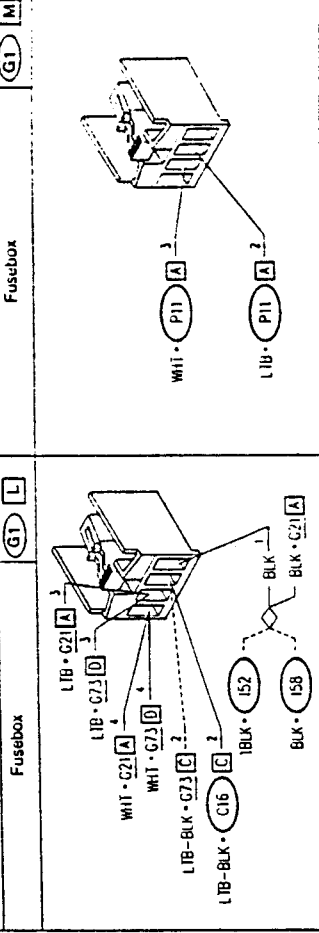
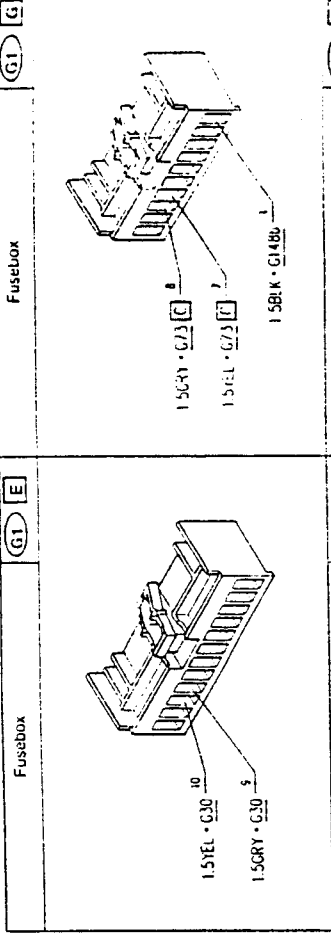
If the transmitter (the code of which is stored in the receiver) is lost, the receiver can be programmed manually as long as the label containing the transmitter code number has been kept. The code number is simply programmed into the new transmitter. Proceed as follows, using the six digits of the code number printed on the label:

1. Press the button on the receiver twice. Check that the led flashes three times and then stays off for about 2 seconds.
2. When the led comes on again, press the button on the receiver the same number of times as the first digit of the code number printed on the label (if this digit is "0" do not press the button). After about 2 seconds from the last time the button was pressed the led will come on for a few seconds.
3. When the led comes on again, press the button on the receiver the same number of times as the second digit of the code number printed on the label;

2. Without releasing the button on the receiver, press and release the button on the transmitter of which the code number has already been memorized by the receiver.
3. Without releasing the button, check that the led comes on to indicate that the receiver is ready to accept the new code.
4. Again, without releasing the button on the receiver, press and release the button on the new transmitter (the code number of which is to be stored in addition to the preceding numbers).
5. Check that the led goes out to indicate that the code number has been stored. Release the button on the receiver.
6. The led will flash for about 8 seconds confirming that the new code relative to the transmitter stored at stage 4 has been memorized.

**NOTE:** Up to six code numbers can be stored in the receiver.





verts the earth signal of pin 3C and pin 2A in the same way as happens mechanically by way of the front right P10 and left P11 hand door lock switches. This signal is sent to pins 2 and 3 of the door lock control unit N11 which, after the appropriate checks, locks or unlocks the doors.

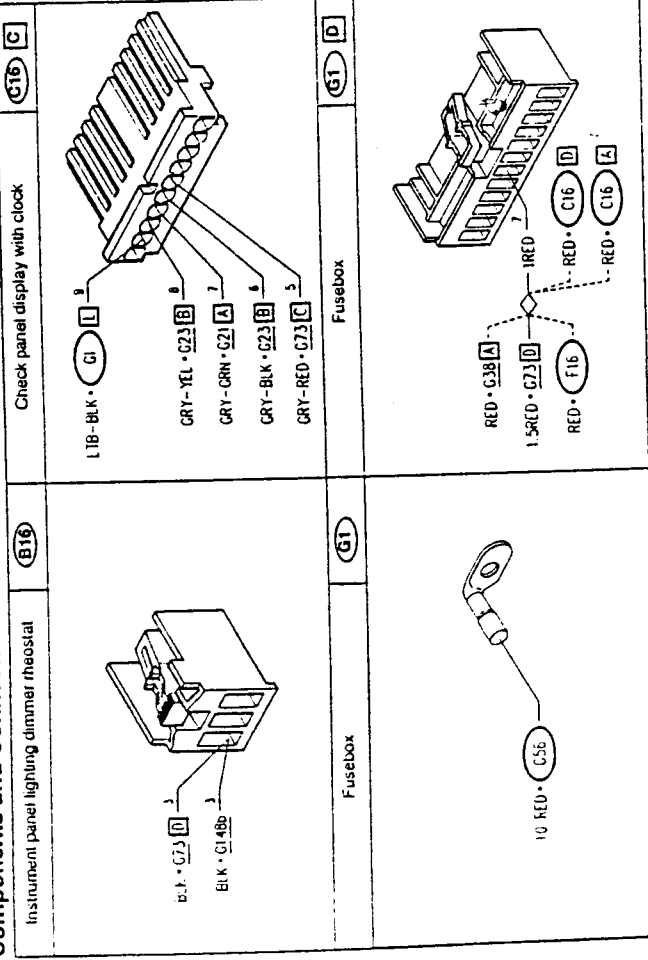
**Functional description**

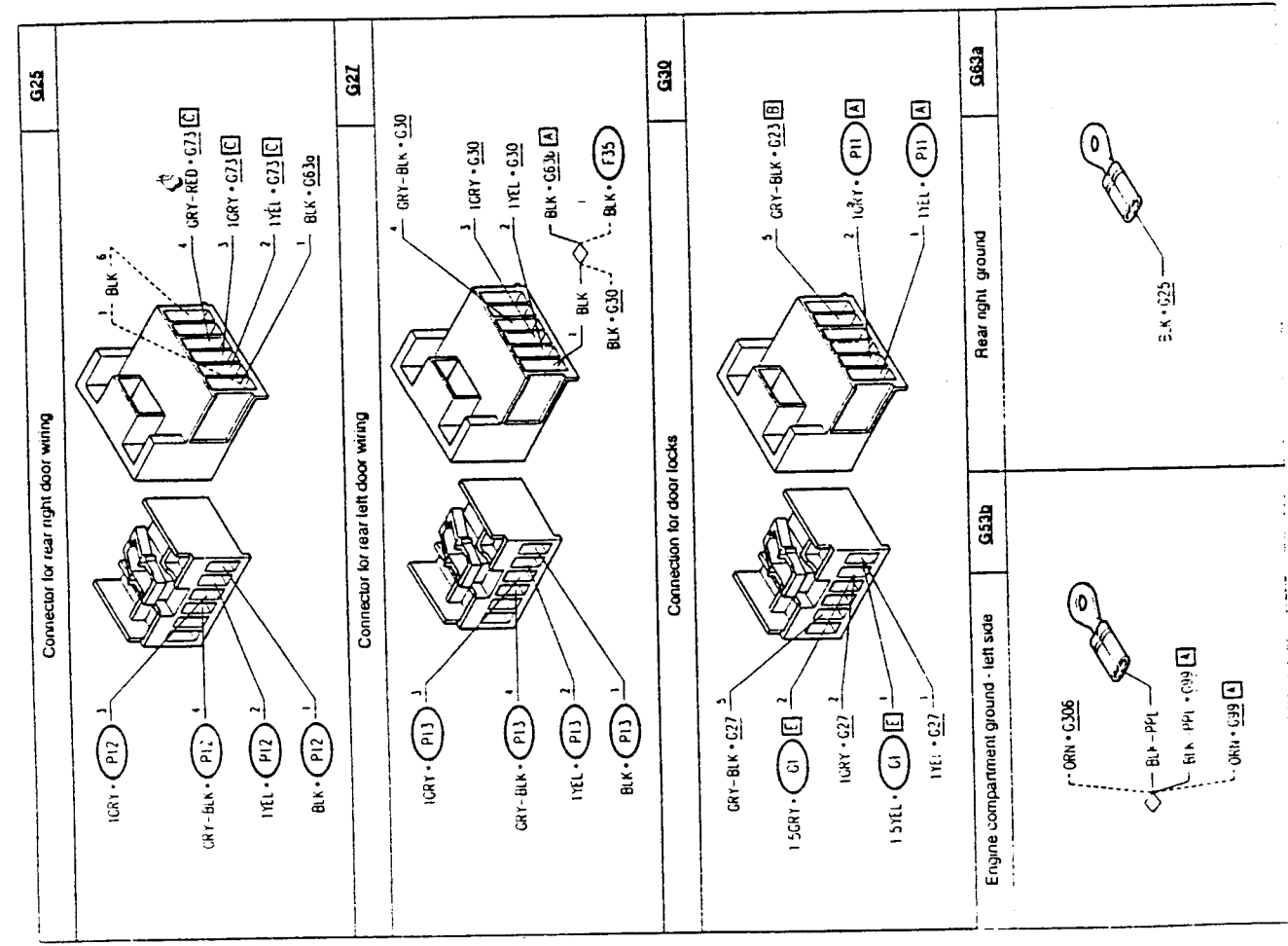
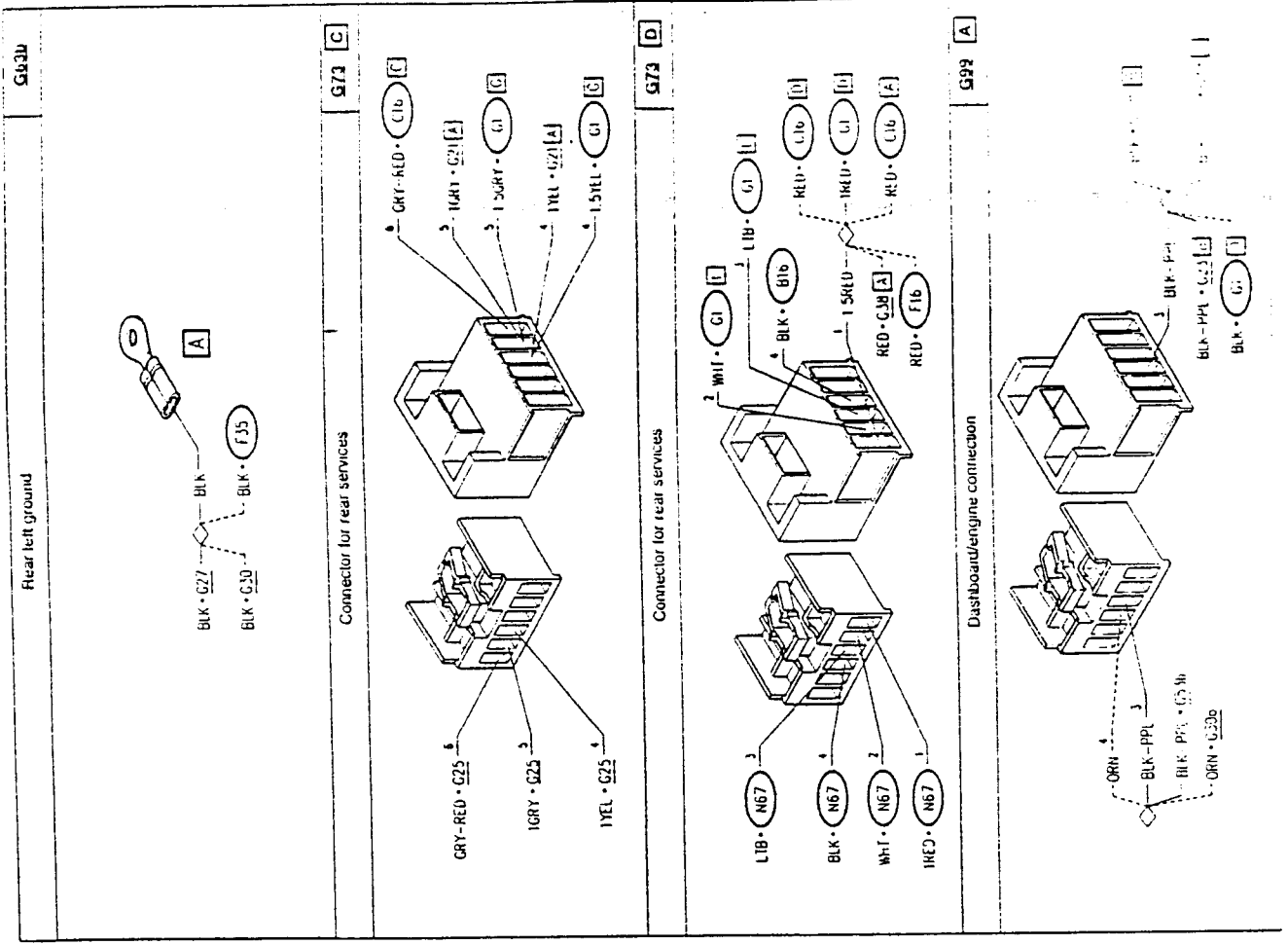
The receiver N67 is located in the container which houses the passenger compartment roof light F3. It is supplied (pin+) by battery voltage through fuse F16 of fusebox G1. Pin (-) is connected to ground G148b.

When the receiver N67 receives the infrared signal from the transmitter, it in-

duces the remaining parts of the system function in the same way as the mechanically controlled door locking system (see "Door locking system").

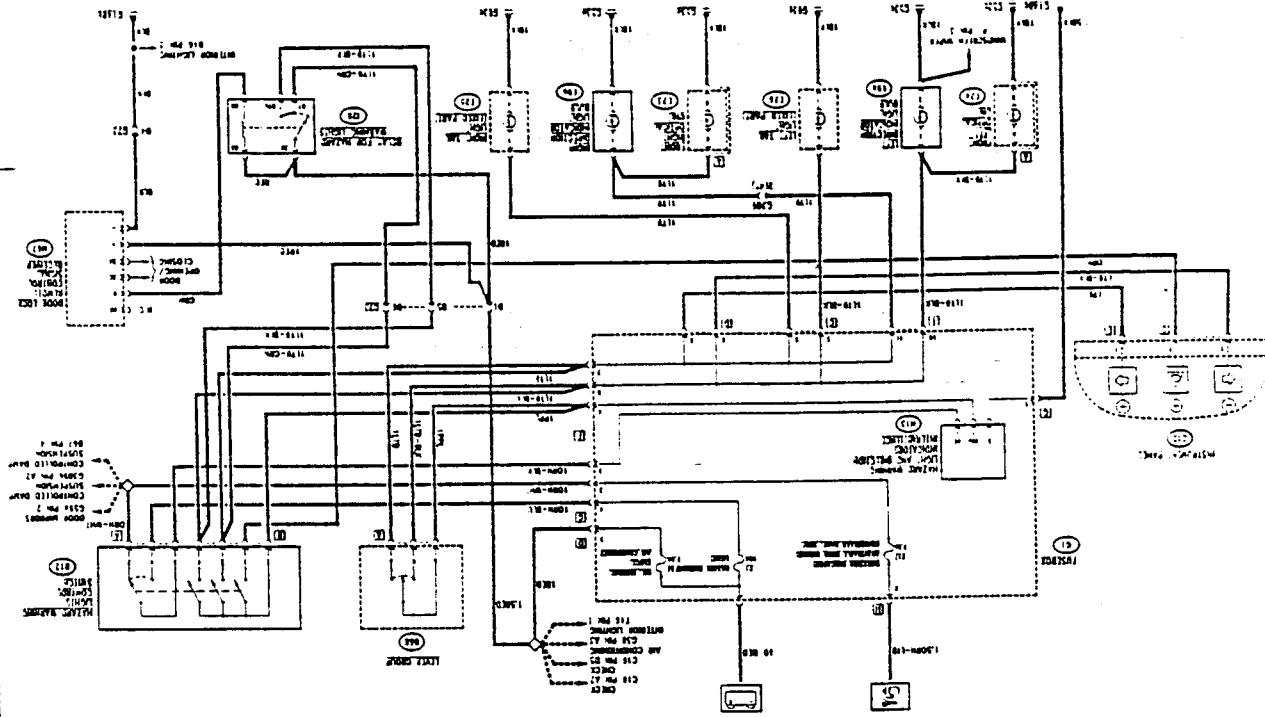
**Components and Connectors**





DIRECTION INDICATORS - FLASHING

Wiring diagram



Under-dashboard ground - left side	K67	<p>15EL-C1</p>	Door lock remote control signal receiver
Front-right door locking motor	P10	P10	P10
Front-left door locking motor	P11	P11	P11
Rear-right door locking motor	P12	P12	P12
Rear-left door locking motor	P13	P13	P13

**Functional description**

The receiver N67 is located in the container that houses the passenger compartment roof light F3.

It is supplied (+) by battery voltage through fuse F16 of fusebox G1. The pin (-) is connected to ground G148b.

When the receiver N67 receives an infrared signal from the transmitter, it sends the appropriate signals to pin 2A in order to lock the doors.

At the same time it sends an earth signal from pin R. This signal activates the hazard warning lights relay B2.

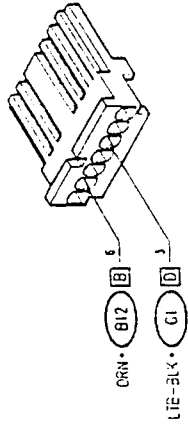
This relay is supplied and activated by battery voltage through fuse F16 of the fusebox G1. The signal that reaches it from the receiver N67 ensures that two power supplies are sent to pins 2 and 4 of the hazard warning lights switch B12.

These signals have the same result as that obtained by pressing switch B12 (excluding the lighting of the hazard warning lights warning lamp on the in-

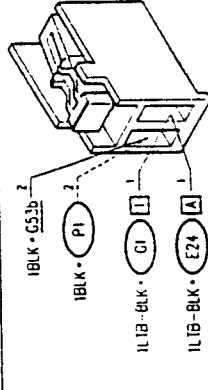
strument panel). They supply all the direction indicators with the characteristic flashing (for greater detail see the section "Direction indicators and hazard warning lights").

**N.B.:** The signal sent by receiver N67 lasts only 3 seconds and the activation of the direction indicators is therefore limited to this length of time in order to inform the driver that the doors have been locked.

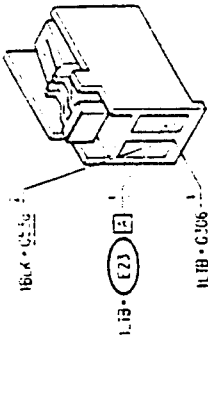
**Instrument panel**



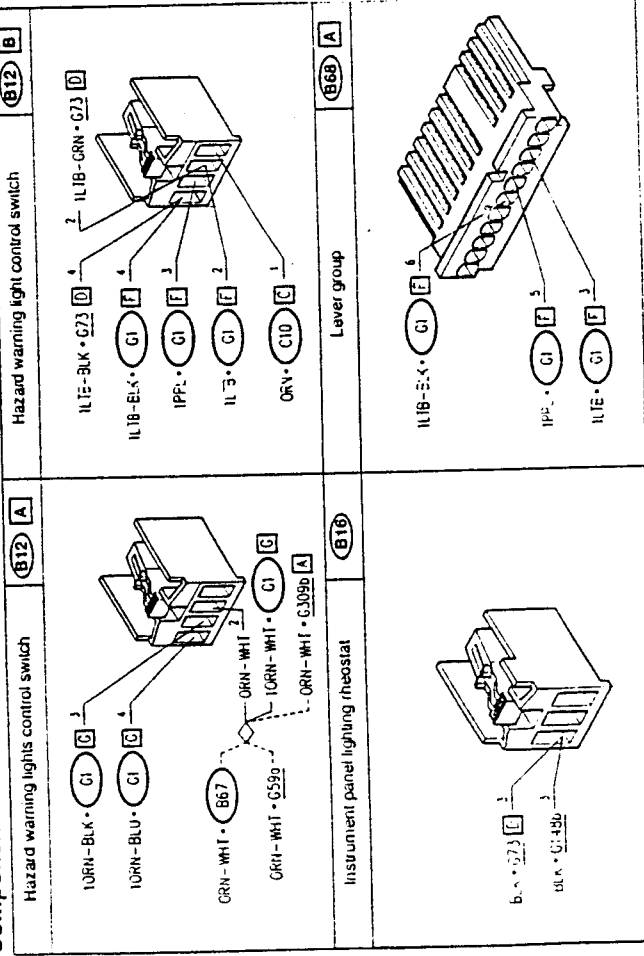
Left direction indicator light bulb



Right direction indicator light bulb



**Components and Connectors**

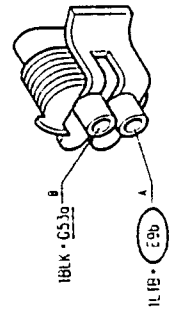
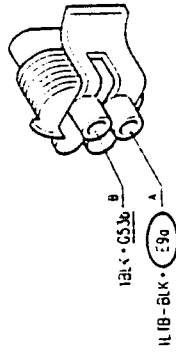


Instrument panel (C10)

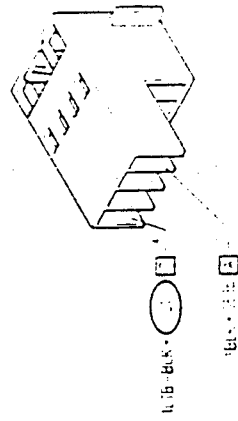
Instrument panel (C)

Front left optical unit (E23)

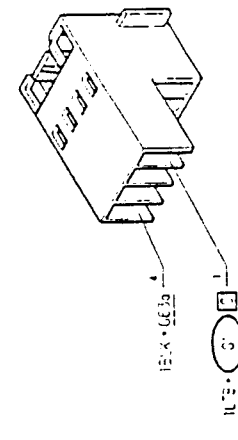
Front right optical unit (E23)

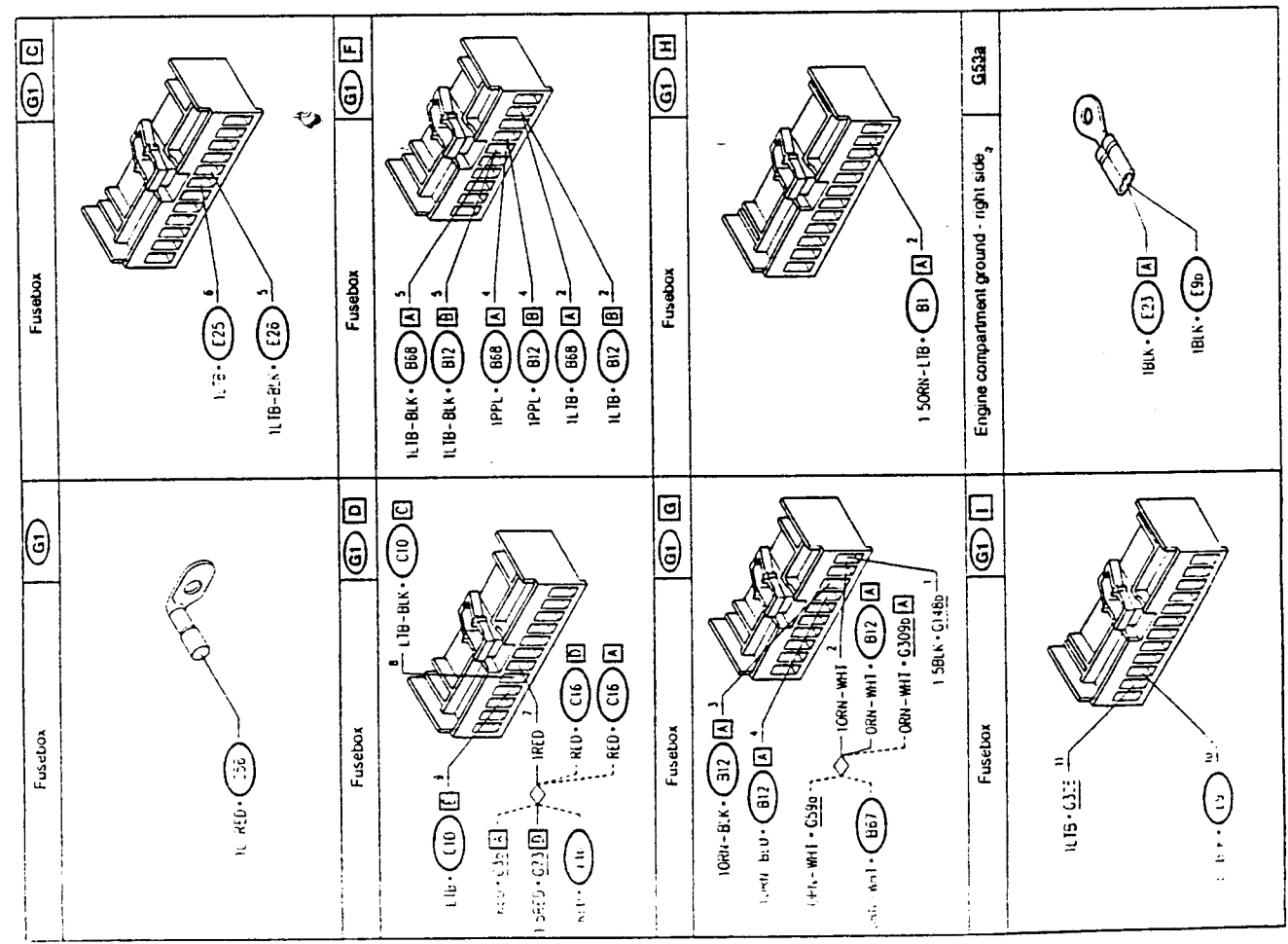
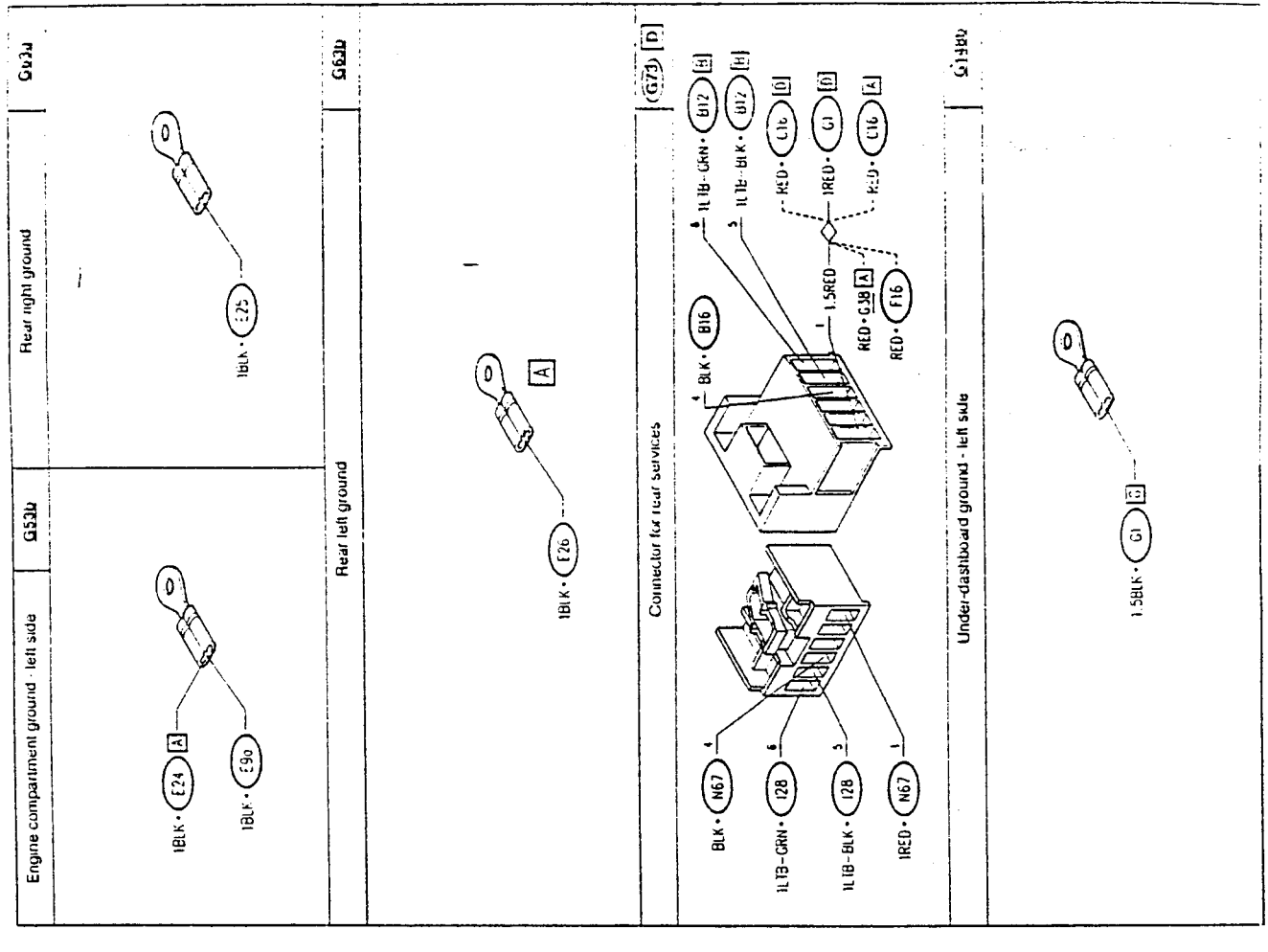


Left tail light (fixed part) (E26)

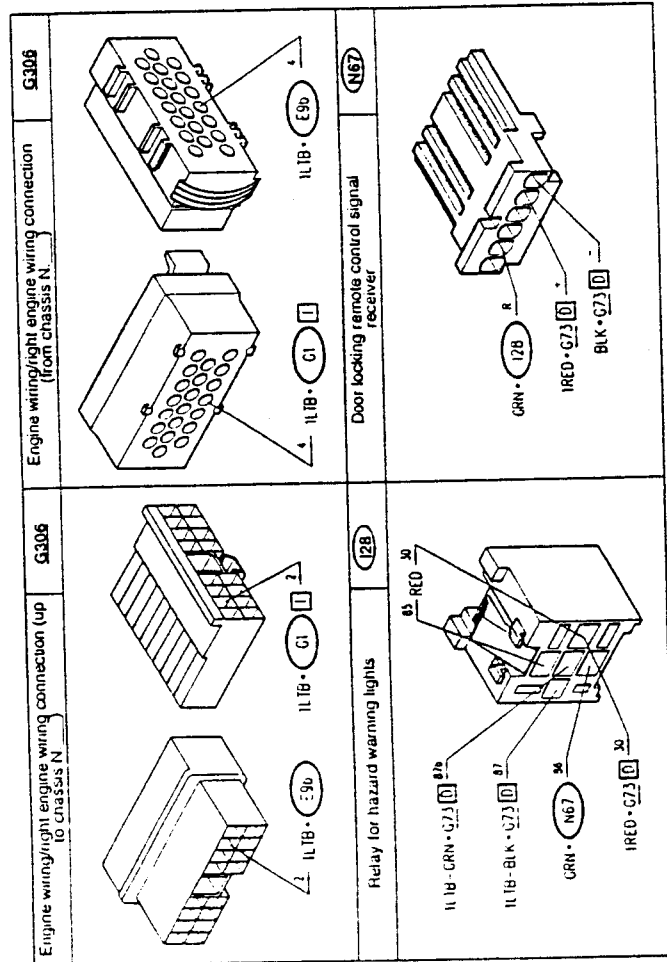
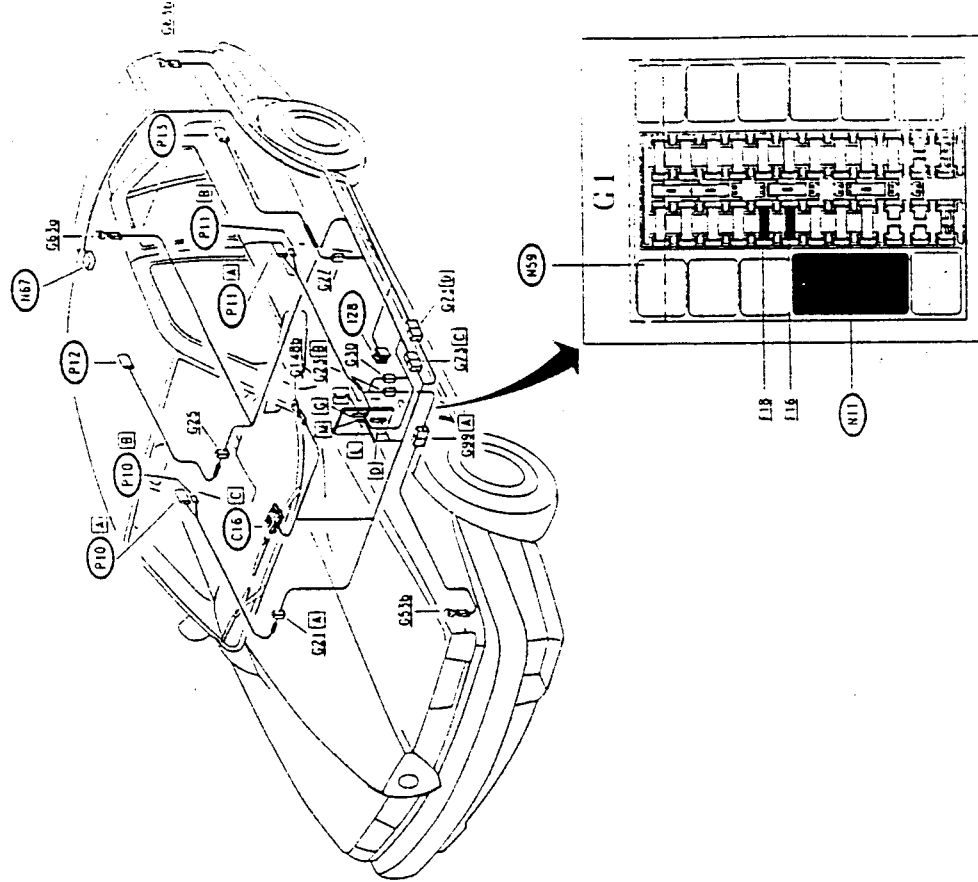


Right tail light (fixed part) (E25)





LOCATION OF COMPONENTS



TROUBLESHOOTING TABLE

Malfunction	Component			Test
	N67	N11	E16	
Neither door locking nor flashing signal working	• (*)		•	A
Door locks not working	•	•		B
Flashing signal not working	•		•	C

(\*) Receiver N67, and relative transmitter.

**TROUBLESHOOTING**

**THE REMOTE DOOR LOCKING DEVICE NOT WORKING  
(AND CONSEQUENTLY THE DIRECTION INDICATORS DO NOT FLASH)**

**TEST A**

NOTE: If the mechanical door locking function also does not work, first see the Troubleshooting in the section "Door locking system".

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK TRANSMITTER</b> - Check that the batteries of the transmitter are not flat (the correct emission of the infrared rays is signalled by the illumination of the led on the transmitter itself)	OK <del>OK</del>	Carry out step A2  Replace the battery of the transmitter if the signal is not getting through check and if necessary replace the transmitter. N.B.: in this case it will be necessary to memorize a new code on receiver N67 (see "Memorizing of the secret code").
<b>A2 CHECK RECEIVER</b> - Check that the infrared signal is being picked up by the receiver N67 (the correct reception of a signal is indicated by the illumination of the led located on the receiver itself)	OK <del>OK</del>	Carry out step A3  Carefully clean the surface of the half-sphere. Check and if necessary replace the receiver N67. N.B.: in this case it will be necessary to follow the code memorization procedure on the new receiver N67 to store the previous code or the code of a new transmitter (see "Memorization of the secret code")
<b>A3 CHECK FUSE</b> - Check fuse F16 in fusebox G1 for damage	OK <del>OK</del>	Carry out step A4  Replace the fuse (7.5A)
<b>A4 CHECK GROUND</b> - Check for 0V at pin (-) of the receiver device N67	OK <del>OK</del>	Carry out step A5  Restore wiring between pin (-) of N67 and ground G148b, across pin D4 of connector G73 and pin 3 of rheostat B16 (BLK)
<b>A5 CHECK VOLTAGE</b> - Check for 12 V at pin (+) of receiver device N67	OK <del>OK</del>	Replace the receiver N67 N.B.: in this case it will be necessary to follow the code memorization procedure on the new receiver N67 to store the previous code or the code of a new transmitter (see "Memorization of the secret code")  Restore wiring between pin (+) of N67 and pin D7 of fusebox G1, across pin D1 of connector G73 and the solder (RED)

**THE REMOTE DOOR LOCKING DEVICE NOT WORKING  
(BUT THE DIRECTION INDICATORS FUNCTION NORMALLY)**

**TEST B**

NOTE: If the mechanical door locking function also does not work, first see the Troubleshooting in the section "Door locking system".

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1 CHECK LOCK SIGNAL</b> - Activate the door locking system, and check that the ground signal reaches pin L3 of fusebox G1 for about half a second, and consequently pin 3 of the door locking device N11	OK <del>OK</del>	Carry out step B3  Carry out step B2
<b>B2 CHECK RECEIVER</b> - Activate the door locking system, and check that a ground signal is emitted by pin 2A of receiver N67 for about half a second	OK <del>OK</del>	Restore wiring between pin L3 of G1 and pin 2A of receiver N67, across pin D3 of connector G73 (11B)  Replace the receiver N67 N.B.: in this case it will be necessary to follow the code memorization procedure on the new receiver N67 to store the previous code or the code of a new transmitter (see "Memorization of the secret code")
<b>B3 CHECK LOCK SIGNAL</b> - Activate the door locking system, and check that the ground signal reaches pin L4 of fusebox G1, for about half a second, and consequently pin 2 of the door locking device N11	OK <del>OK</del>	Check locking device N11. N.B.: in this case the door locking/unlocking system will be inoperative both electrically and mechanically (see "Door locking system")
<b>B4 CHECK RECEIVER</b> - Activate the door locking system, and check that a ground signal of about half a second is emitted by pin 3C of receiver N67	OK <del>OK</del>	Carry out step B4  Restore wiring between pin L4 of G1 and pin 3C of receiver N67, across pin D2 of connector G73 (W11)
	OK <del>OK</del>	Replace the receiver N67. N.B.: in this case it will be necessary to follow the code memorization procedure on the new receiver N67 to store the previous code or the code of a new transmitter (see "Memorization of the secret code")

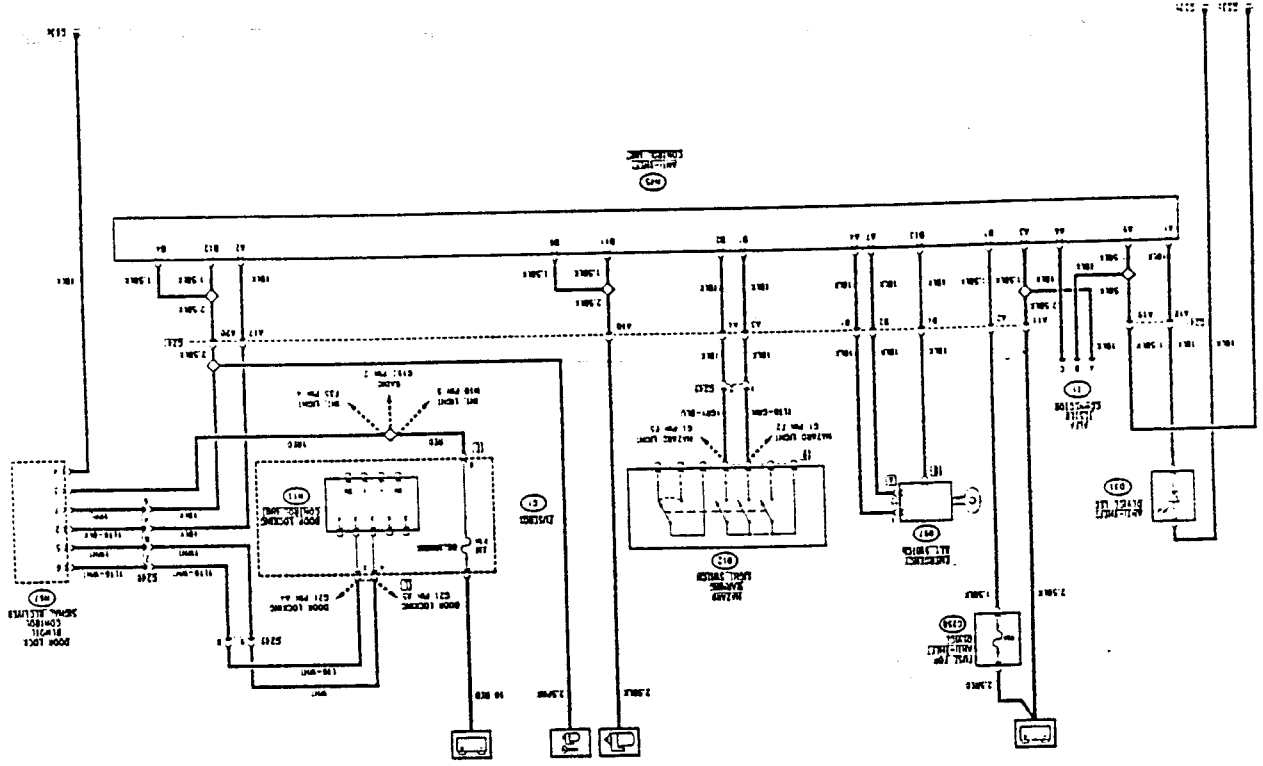
THE REMOTE DOOR LOCKING DEVICE WORKS CORRECTLY, BUT THE DIRECTION INDICATORS DO NOT FLASH TEST C

NOTE: If the direction indicators/hazard warning lights do not flash even when operated manually, first consult the Troubleshooting in section "Direction indicators and hazard warning lights"

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>C1 CHECK RELAY</b></p> <p>- Check for the correct operation of relay I28</p>	<p>OK <input checked="" type="checkbox"/></p> <p>OK <input type="checkbox"/></p>	<p>Carry out step C2</p> <p>Replace the relay I28</p>
<p><b>C2 CHECK RECEIVER</b></p> <p>- Lock the doors, check that a ground signal of about 3 seconds is emitted from pin R of receiver N67</p>	<p>OK <input checked="" type="checkbox"/></p> <p>OK <input type="checkbox"/></p>	<p>Carry out step C3</p> <p>Replace the receiver N67. N.B.: in this case it will be necessary to follow the code memorization procedure on the new receiver N67 to store the previous code or the code of a new transmitter (see "Memorization of the secret code")</p>
<p><b>C3 CHECK EARTH SIGNAL</b></p> <p>- Lock the doors, check that a ground signal of about 3 seconds reaches pin 86 of relay I28</p>	<p>OK <input checked="" type="checkbox"/></p> <p>OK <input type="checkbox"/></p>	<p>Carry out step C4</p> <p>Restore wiring between pin 86 of relay I28 and pin R of receiver N67 (GRN)</p>
<p><b>C4 CHECK VOLTAGE</b></p> <p>- Check for 12 V at pins 30 and 85 of relay I28</p>	<p>OK <input checked="" type="checkbox"/></p> <p>OK <input type="checkbox"/></p>	<p>Carry out step C5</p> <p>Restore wiring between pin 85 and pin 30 of I28 and between pin 30 of I28 and pin D7 of G1, across pin D1 of connector G73 and the solder (RED)</p>
<p><b>C5 CHECK VOLTAGE</b></p> <p>- Lock the doors, check that a 12 V signal of about three seconds reaches pin pins B2 and B4 of switch B12</p>	<p>OK <input checked="" type="checkbox"/></p> <p>OK <input type="checkbox"/></p>	<p>In this case the hazard warning lights will also not be working (see "Direction indicators and hazard warning lights")</p> <p>Restore wiring between: - pin 87 of I28 and pin B2 of B12, across pin D6 of connector G73 (LTB GRN) - pin 87b of I28 and pin B4 of B12, across pin D5 of connector G73 (LTB-BLK)</p>



WIRING DIAGRAM A



N B All the wires located in the luggage compartment: are BLACK (BK) in order to decrease the risk of tampering if the luggage compartment is opened without triggering the switch (H44)

# ANTI-THEFT DEVICE

**INDEX**

- WIRING DIAGRAM . . . . . 21B-2
- GENERAL DESCRIPTION . . . . . 21B-4
- FUNCTIONAL DESCRIPTION . . . . . 21B-7
- COMPONENTS AND CONNECTORS . . . . . 21B-8
- LOCATION OF COMPONENTS . . . . . 21B-14
- FAULT DIAGNOSIS . . . . . 21B-15

GENERAL DESCRIPTION

As an optional the vehicle can be set for the installation of an anti-theft device coupled with the remote controlled centralized locking system.

The device used is of the perimeter/volumetric (V.A.S.) type fitted with a single compact unit which includes the electronic control unit and the siren. The system is "universal" as it offers the possibility of using the remote control to set the control unit according to the requirements of the various countries (acoustic level and exclusion of flashing of hazard warning lights).

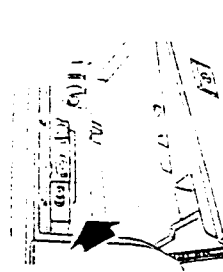
NOTE: THE V.A.S. ALARM SYSTEM IS, FOR THIS VERSION, COMBINED WITH THE ALFA ROMEO CODE SYSTEM: THIS WAY DOUBLE PROTECTION FOR ENGINE STARTING IS GIVEN:

- INHIBITING OF THE IGNITION-INJECTION CONTROL UNIT (ALFA ROMEO CODE);

- IGNITION/INJECTION CONTROL UNIT SUPPLY CUT OFF (V.A.S.). The transmitter, protected by a rubber shock-proof shell is composed of a printed circuit and an infrared emitter. It is battery powered (2 3 V lithium batteries) and each time the relative button is pressed it sends an infrared beam in the direction in which it is pointed. It is an infrared device and continually transmits the code number for the entire time during which the button is pressed. A led comes on each time a signal is emitted.

The electronic control unit also includes a siren of the compact type and is located under the front left hand sissy behind the lockat. The siren operates with different intensity depending on the programming for the various countries. (See instructions given below)

The emergency key used to deactivate the system is located in an easily accessible position in the glovebox next to the glovebox light itself

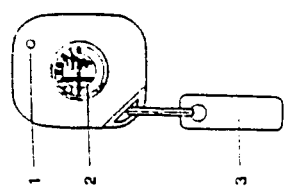
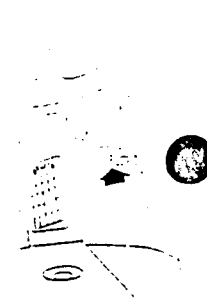


The same switches used for the door locking system are used to control the doors and boot (see "Door locking system")

The bonnet is covered by a switch. All the switches signal the "open state of the doors or bonnet/boob controlled (closed - earth signal to control unit)

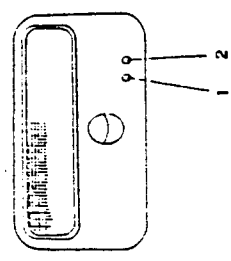
The two volumetric sensors make it possible to increase the surveillance ensuring that the vehicle is not broken into. These are located above the rear doors. They are operating as a transmitter and the other as a receiver. The ultrasonic beam which is emitted from the first (fit on the left) is captured in the car on the left hand side (on the right hand side) otherwise an alarm signal is sent to the electronic control unit

The systems led (red) of the high efficiency type is located on the dashboard to the left of the steering wheel and signals the state of the system and any anomalies. (See description below)

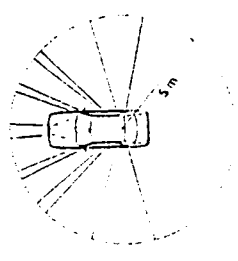


Transmitter  
1 - Led  
2 - Command button  
3 - Plaque showing transmitter code

The receiver, built into the rear roof light is an electronic device which captures the infrared signal through a protruding dome on the receiver itself. A led will also come on on the receiver when the signal is received while a button permits the memorization of the secret access code. The particular shape of the dome enables the signal to be captured through 360 degrees as long as the transmitter is no more than 5 metres from the receiver (see shaded area in diagram).

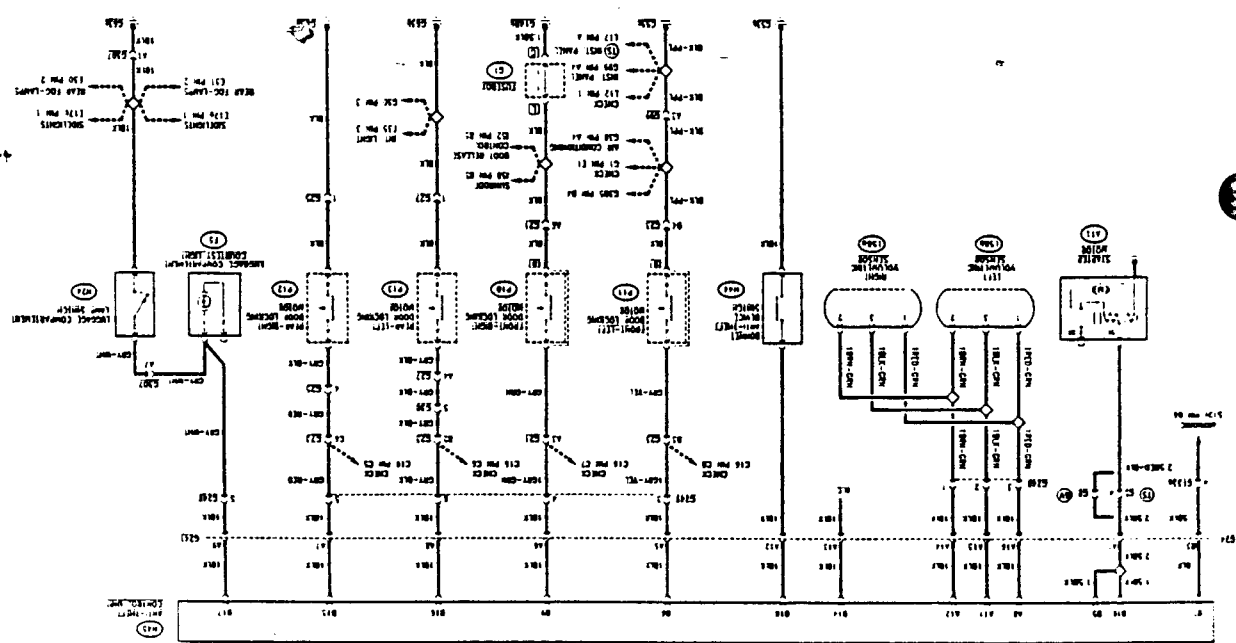


Receiver  
1 - Store button  
2 - Led



Shaded areas and operating radius of remote control

WIRING DIAGRAM B



The wiring listed in the message component are B.L. or (B.K.) in order to decrease the risk of tampering if the engine compartment is opened without triggering the switch (H.A.S.)

**OPERATION**

**ENABLING/DISABLING**

It is only possible to enable the alarm when the ignition key is in the STOP position.

ENABLING is possible by pressing the button on the transmitter.

DISABLING is obtained by pressing the same button once again.

To obtain the most efficient switching, press the button until a visual and acoustic signal are noted (lead back).

If B The system is protected against unauthorised recording of the secret code.

**Enabling**

Press the button whilst pointing the transmitter towards the receiver dome. Acoustic and optical signals will be noted (for the markets/versions foreseen).

**Disabling**

Press the button pointing the transmitter towards the receiver dome. Also for disabling acoustic and optical signals will be noted (for the markets/versions foreseen).

**COMPLETE DEACTIVATION OF THE SYSTEM**

If the batteries of the transmitter are flat or the systems not working properly, the alarm system can be deactivated using the emergency key on the control unit. When the car is delivered this emergency key must be in the "ON" position. Turning the key to "OFF" the system is deactivated completely. In the specific versions for some markets, only the batteries inside the control unit/siren are

deactivated, leaving the alarm system activated as it is still supplied by the car battery.

With the key at "OFF" the surveillance of the cable cutting/battery disconnection is no longer activated.

Set this key to "OFF" and disconnect the battery cable if the vehicle is left unused for long periods (over 1 month).

**"SURVEILLANCE" MODE**

During the "surveillance" mode (car out self-diagnosis (indicated by the flashing of the LED at 4 Hz), if a fault is found, the LED will identify it through a special flashing code as shown in table 1.

- checks the doors, bonnet and tailgate;
- checks that the battery is connected and that the leads are intact;
- checks that the ignition key is not being tampered with;
- checks movements inside the passenger compartment (volumetric sensors).

- cuts off the supply to the starter motor (provided that the key is turned to MARCIA) and deactivates the engine electronic control unit.

**ALARM MODE**

The system enters the alarm mode when one of the surveillance sensors detects an abnormal situation.

The alarm mode can trigger a warning system to the outside (activation of the siren and blinkers, with times varying according to the versions/markets). There are other countermeasures such as: cutting off the engine supply (Motronic control unit supply) and starter motor supply cut off.

The alarm ceases:

Table 2: Signals indicating alarms

N. Flashes*	Component with alarm
1 Flash	Right front door
2 Flashes	Left front door
3 Flashes	Rh door rear
4 Flashes	LH rear door
5 Flashes	Volumetric sensors
6 Flashes	Bonnet
7 Flashes	Tailgate
8 Flashes	Key-operated supply cut off
9 Flashes	Battery supply cut off
10 Flashes	At least 3 causes of alarm contemporaneously

(\*): If there is more than one, the alarm codes are presented in sequence.

The flashes last for 0.5 sec. with an interval of 1.5 sec. between them.

In addition to the automatic SELF-DIAGNOSIS described here, it is also possible to check the system by MANUAL DIAGNOSIS (see "FAULT-FINDING").

**INHIBITING THE INTERIOR SURVEILLANCE SYSTEM**

It is possible to inhibit interior surveillance in one of the following ways:

- a) in close sequence (prior to enabling the alarm system): starting from the MARCIA position, move the key to: STOP, MARCIA, STOP.

Confirmation of the initiation of the interior surveillance system is given by the lighting up of the dissuasion LED for approx. 2 sec.

b) starting from the key in the MARCIA position, press the button on the receiver (for less than 0.5 sec.) no longer than 6 sec. before turning the key to STOP. Confirmation that the interior surveillance system is deactivated is given by the lighting up of the LED on the ceiling light for approx. 2 sec.

The next time the key is turned to MARCIA the interior surveillance system is re-enabled.

**WARNING:** It will be possible to turn the key to MARCIA for a maximum of 30 sec. without re-enabling the interior surveillance system (for example to allow the closing of electric windows which may have been left open accidentally).

**SELF-ENABLING (only for certain Markets)**

The self-enabling system ensures that the alarm system is partially enabled automatically after a certain period of time - 4 minutes - from when the car is left by the driver.

This takes place under the following two conditions:

- ignition key moved from MARCIA to STOP;
- opening followed by closing of the driver's door.

The surveillance system operates in the same way as when activated by the remote control with the exception of the following points.

- the doors are not locked;
- interior surveillance is not activated.

The opening of the driver's door before the delay time for self-enabling - 4 minutes - stops and resets the counter. The closing of the door will make the counter resume from the beginning.

In order to regain possession of the car, the owner must disable the system via the remote control, which must be pressed twice in two separate phases:

- the first press activates the alarm system completely;
- the second one deactivates the alarm system and opens the doors.

**PROGRAMMING THE TRANSMITTER**

Upon leaving the factory the receiver contains a "UNIVERSAL" code which can be controlled by a "UNIVERSAL" transmitter for inspection and moving the car in the factory. On delivery it is therefore necessary to reprogramme the receiver with the transmitter code so that only the owner will have authorised use of the vehicle.

There are two possible programming modes

- a) before entering the password SIMPLIFIED PROGRAMMING;
- b) after entering the password PROTECTED PROGRAMMING.

The reprogramming of a transmitter must be carried out with

- the alarm system deactivated (by remote control), the warning led on the panel must be off;
- the emergency key at "OFF";
- the ignition key at STOP.

that the receiver on the ceiling lamp is correctly powered.

2. Keeping the receiver button D pushed, press the transmitter button B, point it towards the receiver, but at least 20 cm. from it; the led of transmitter A, must flash no more than once.

3. LED C lights continuously indicating that the code has been memorised; at this point the operator can release button D to end programming.

In the 3 sec. following the release of the button, it is possible to programme the country code to suit the country in which the car will be used.

This is performed by pressing in quick succession the button of the receiver D, as shown in table 3.

If the button is not pressed, the country code defaults to E.E.C. In the event of further memory storage operations, the last one remains in the memory.

If the procedure has been carried out correctly, the LED on receiver C will flash 6 times, indicating that the code has been memorised on both the ceiling light receiver and in the control unit, if not, LED C will flash 18 times and it will be necessary to repeat the entire procedure starting from point 1 of simplified programming, after checking the correct connection between the control unit and the ceiling lamp

Table 3: Country Codes

No. of presses	Country
1	ITALY
2	GERMANY (*)
3	FRANCE
4	SWITZERLAND
5	UNITED KINGDOM
6	HOLLAND
7	USA
8	EEC
9 / 10	Others

(\*) Not used in this country, because in this country a specific control unit with a special operating logic is foreseen. As it is not easy to carry out this procedure in such a short time as 3 seconds, a different procedure for entering the Country code is recommended. To do this, proceed as follows:

- open the bonnet;
- turn the ignition key from MARCIA to STOP; within 15 seconds the bonnet button must be pressed 7 times in quick succession in less than 10 seconds; 5 beeps will indicate entry in MANUAL DIAGNOSIS (see FAULT-FINDING). During these 5 beeps press the bonnet switch once again. A last long beep will signal the acceptance of this new operation;

- keep the button pressed throughout the duration of the long beep. The latter signals entry into the country programming mode, thus the possibility to enter the country code;
- release the switch and press it within 10 seconds the number of times mentioned in table 3 to select the operating mode of the country required (each press will have a feedback beep)

N.B. To enter another remote control repeat the operations from point 1 of simplified programming, provided that the memory has been "locked" as described below.

PROTECTED PROGRAMMING

To prevent unauthorised persons from entering their own code, it is necessary to protect ("lock") the memory; this operation takes place automatically after 256 activations/deactivations of the alarm system, or by entering the password (locking the memory manually)

does not correspond to any of the remote controls memorised. In this case, when LED C goes off, the correct Password should be entered beginning from point 1.

With the correct entry of the password the memory is "locked".

From now onwards, if attempts are made to memorise a new remote control, after transmitting the new code, LED C on the ceiling light will stop flashing to indicate that the operation is unsuccessful.

In this case, to enter the code of the new remote control the memory has to be "re-opened" by the following procedure

Memory opening

When the memory has been "locked" further remote control codes are entered by "manual memory opening".

The memory is opened as follows:

1. Press the button on receiver D for appr. 2 seconds; LED C will flash for the whole time in which the button is pressed.
2. Release button D, after appr. 2 seconds LED C will flash once indicating the possibility to enter the first digit of the password.
3. Press the button of the receiver D the number of times corresponding to the first figure of the password (for example if the Password is 5.2.0.3, press 5 times). Each time the button is pressed, LED C lights up briefly to confirm.
4. After appr. 2 seconds from the last press on button D (the fifth in the example) led C will flash again to ask for the next figure.
5. Proceed as described above for all the other figures.

NOTE:

When the password (see example) contains a "0" there is no need to press button D, simply wait for the request for confirmation of entry indicated by the next flash

When the four figures of the Password have been entered, the LED on the receiver C can behave as follows:

- it does not light up, this means that the Password has been entered correctly and that it belongs to one of the codes of the remote controls memorised;
- it stays on continuously for several seconds meaning that the password has not been entered correctly or it

is not correctly written, not present in the memory. Repeat the memory opening operations (with the correct password) from point 1.

- it starts flashing, this means that the password has been entered correctly (memory opening) and that it belongs to one of the remote control codes memorised

At this point to memorise the code of the new transmitter proceed as described at point 1 of "Simplified programming"

When the new remote control has been entered the memory returns to the "locked" mode.

N.B.: The alarm system is activated, deactivated only by the code of the last transmitter memorised correctly (with the key at "OFF")

In fact this code is memorised Content previously by both the receiver and the alarm control unit

Any transmitters memorised previously in the receiver, though they have different codes, utilise the code of the last transmitter memorised to control the alarm system.

If the alarm system is activated, the alarm system will regularly continue to be activated by a transmitter and subsequently by the other transmitter is memorised, with the alarm system key at "OFF", the code of this subsequent transmitter is memorised by the receiver, which regularly operates central door locking, while the code of the first transmitter remains in the control unit. Under these conditions the alarm system can no longer be controlled by the transmitter, which can only operate door opening/closing.

Simply setting the alarm system key to "ON" and memorising another transmitter, the problem remains unsolved, as the system can only be reset once a new code only if this has been memorised with the alarm system key at "OFF" and in such case, after the transmitter it is necessary to open the memory (as described previously) and the last transmitter and then, to activate, enter the other transmitters.

it stays on continuously meaning that the password has not been entered

When the Password has been entered, the LED C can behave as follows

- it stays on continuously meaning that the password has not been entered

**WARNING:** It should be noted that each single component of the anti-theft system installed on the car becomes an integral part of it and must not be altered or tested on other cars even if of the same model. Therefore, never exchange control units and/or receivers between two vehicles. If a control unit is replaced, the memorising procedure must be repeated "re-opening" the memory. If a receiver (ceiling lamp) is changed, simplified programming must be carried out followed by protected programming.

**FUNCTIONAL DESCRIPTION**

The anti-theft system is controlled by the electronic control unit N45 which is integrated with the siren.

The control unit is powered directly by the battery at pin A3 and crosses fuse G258 (15A) at pin B7. The key-activated supply reaches pins B4 and B12.

Pin A9 is earthed (G53b).

The system activation signal comes from receiver N67 to pin A2 of the control unit.

Through the receiver N67 the opening/closing of the doors using the door locking control unit N11 in fusebox G1 is activated (for greater detail see "Door locking devices").

The control unit controls the closing of the doors and bonnet/boot through the door switches P11, P10, P13, P12 (these are the same as those for the door locking device) which send an earth to pins B8, B9, B16 and B15. The bonnet is controlled by the switch H44 which is connected to pin B18 and the boot by switch H24 (which lights the luggage compartment light - see "Internal lighting") which is connected to pin B17.

The two volumetric sensors L58a (right, which acts as a receiver) and L58b (left, transmitter) receive power supply and earth from pins A8 and A11 of the control unit while the alarm signal returns to pin A12.

In addition to closing the doors, earned out directly by the receiver N67, the control unit activates the "blinker" (flashing

of the hazard warning lights) sending a signal to switch B12 through which these lights are activated manually, from pin B1 for the right-hand lights and from pin B2 for the left-hand lights.

Pin A1 of the control unit sends a 12V signal to the LED D31 when the conditions require it.

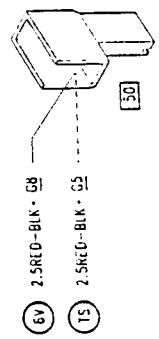
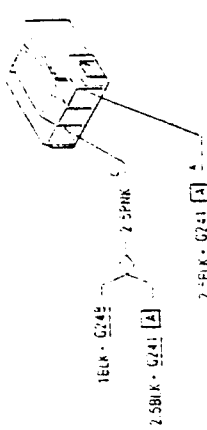
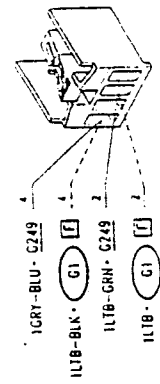

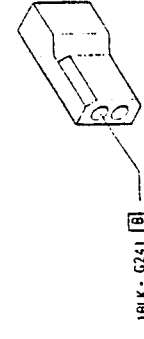
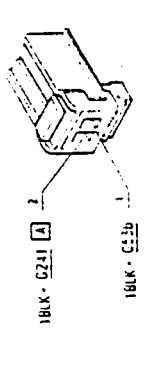
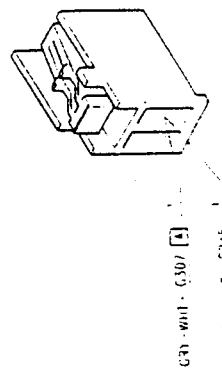
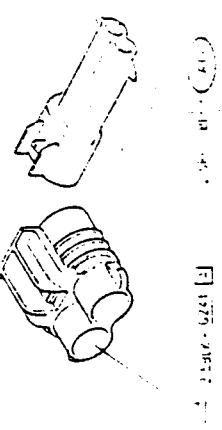
The emergency key B97 makes it possible to disengage the system immediately by connection to the control unit: the common power supply starts from pin B13 and returns to pin A7 when the key is in the ON position and to pin A4 when the key is in the OFF position.

The anti-theft system intercepts the "key to starting position" signal (pins B6 and B11) which is passed on to the starter motor A11 (from pin B5 to pin B10) only if the system is not subject to an alarm.

In the event of an alarm the power supply to the electronic injection control unit S11 are cut off. This power supply (12V) is sent from pin B3 to S11.

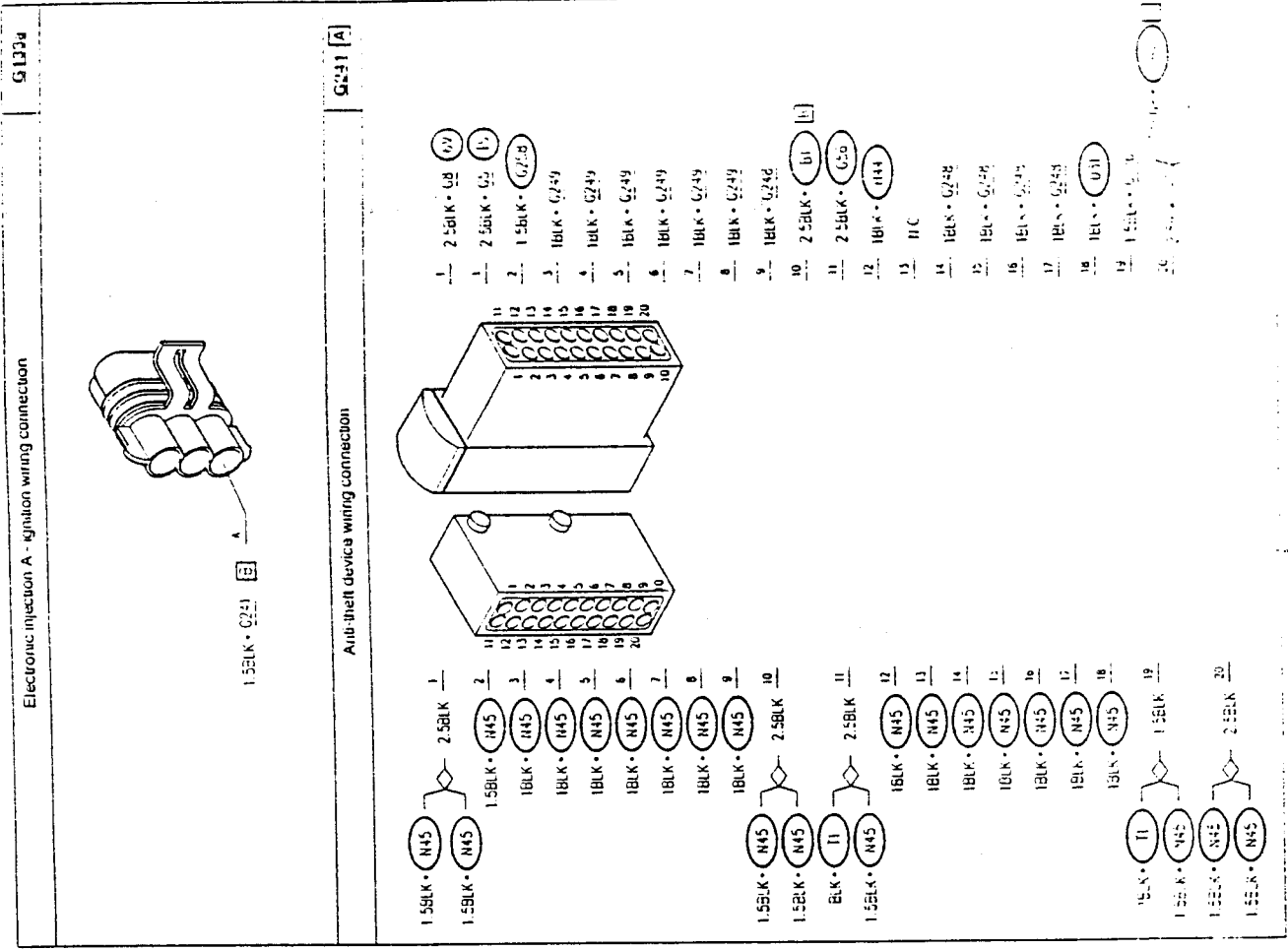
The system can be connected to the Alfa Romeo Testler through connector T7. The diagnosis signal - line K - leaves pin A6 of the control unit.

**COMPONENTS AND CONNECTORS**

<p>Starter motor</p> <p>(A11)</p> 	<p>Ignition switch</p> <p>(U1)</p> 
<p>Hazard warning light switch</p> <p>(B12) (B)</p> 	<p>Emergency key switch</p> <p>(B97) (A)</p> 
<p>Emergency key switch</p> <p>(B97) (B)</p> 	<p>Anti-theft device led</p> <p>(U1)</p> 
<p>Luggage compartment light</p> <p>(F5)</p> 	<p>Multiple connection</p> <p>(G5)</p> 

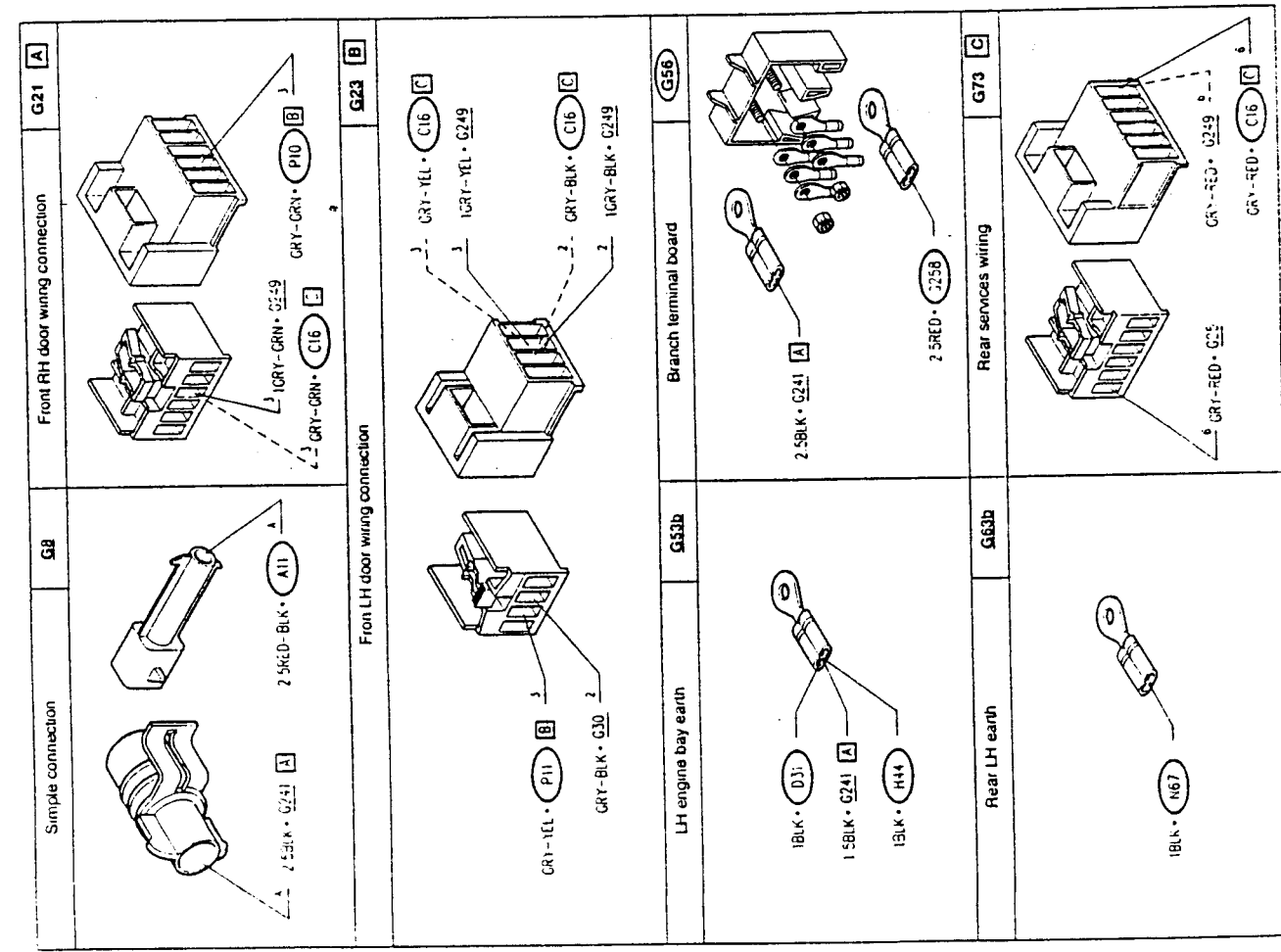
21B-10

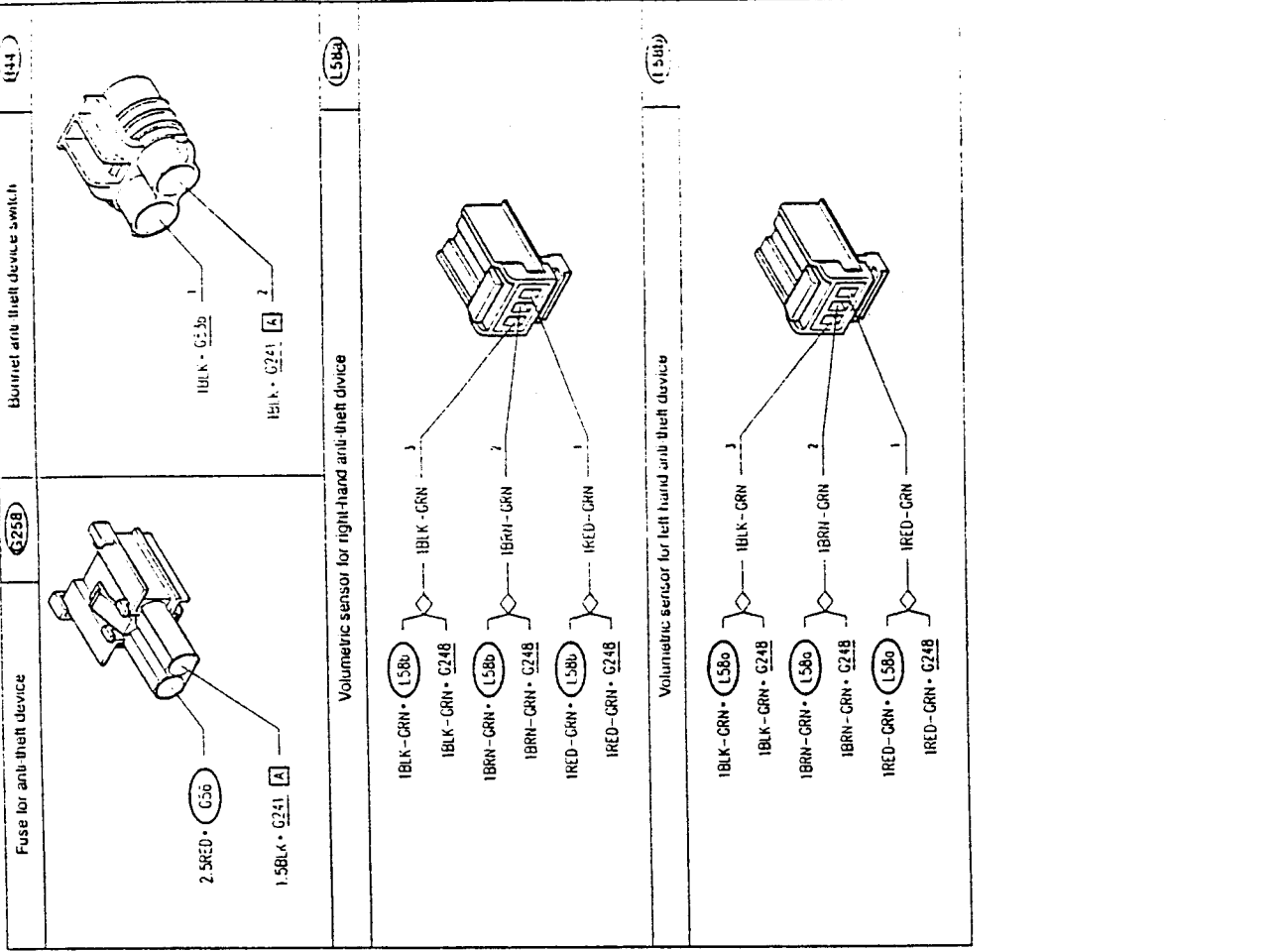
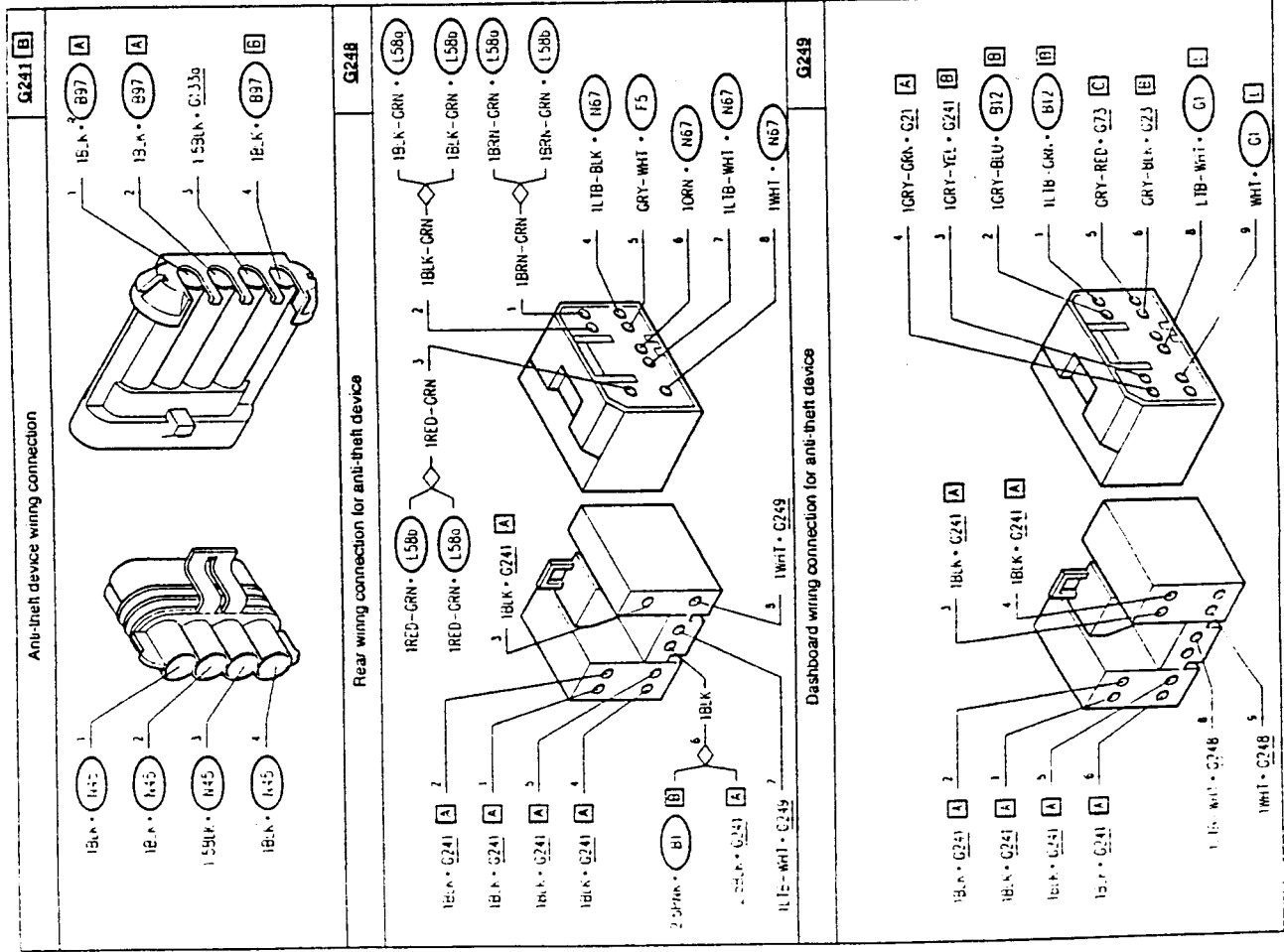
ANTI-THEFT DEVICE



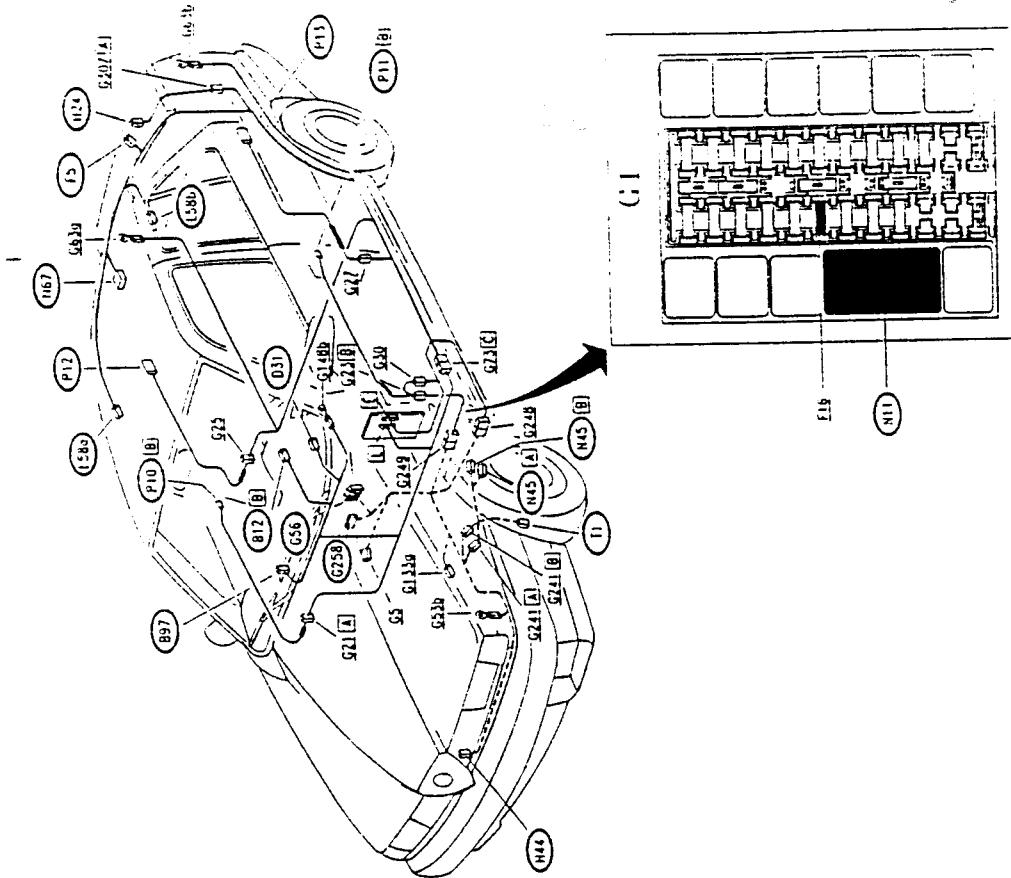
21B-9

ANTI-THEFT DEVICE

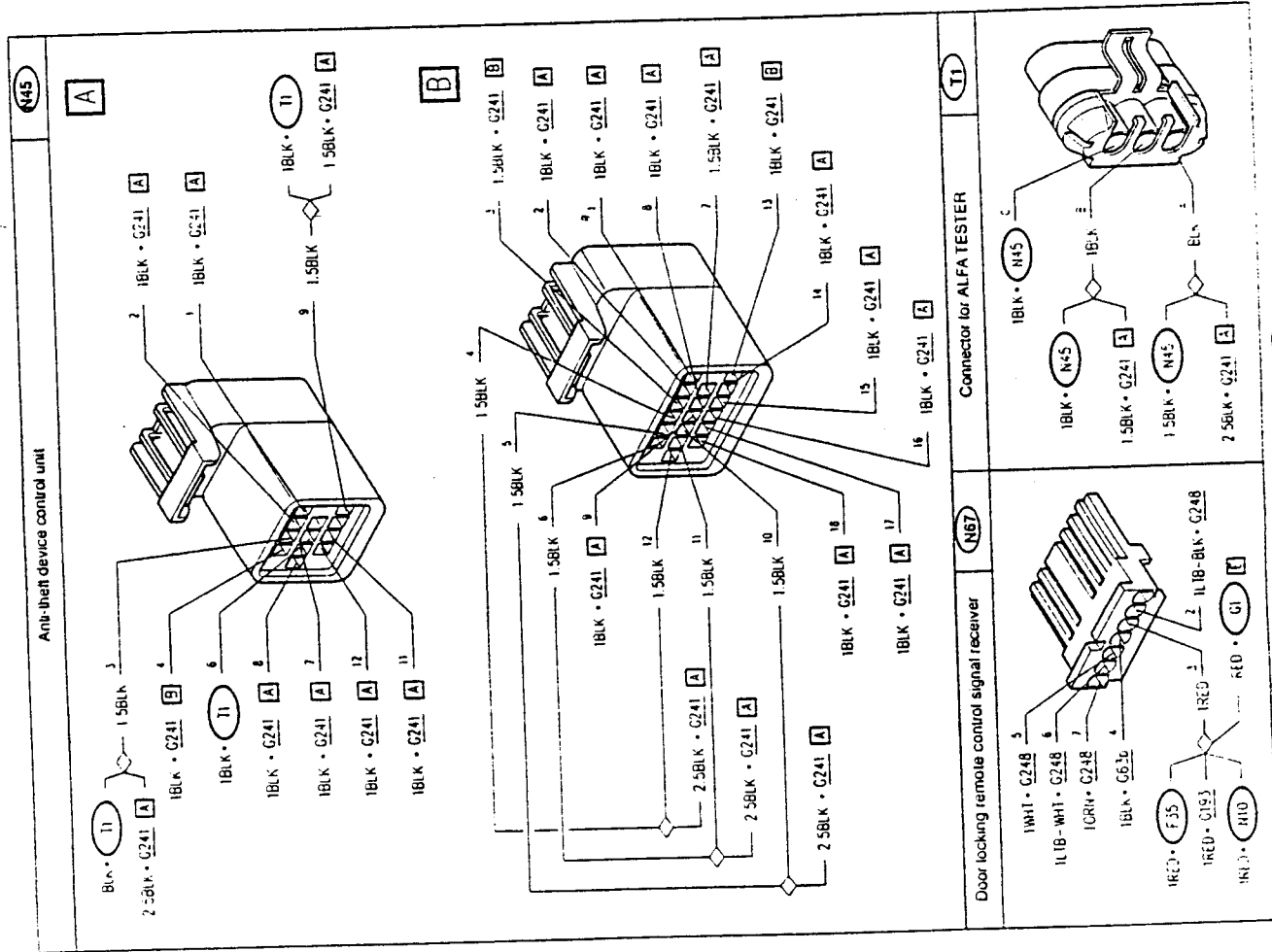




LOCATION OF COMPONENTS



N.B.: All the wires located in the luggage compartment are (BLACK (BLK) in order to decrease the risk of tampering if the alarm is opened without triggering the alarm (144)





**FAULT DIAGNOSIS**

When activated the system automatically carries out a SELF-DIAGNOSIS which indicates possible malfunctions via the flashing of the led

Mode of flashing of led	Meaning	Carry out test
5 Hz, lasting 2,5 secs	Door/bonnet/boot left open or switch broken Volumetric sensors broken	check correct closure of doors and bonnet/boot. Engage and disengage the system. Count the number of times the led flashes and proceed following the indications given in the table below.
1c Hz, lasting 2,5 secs.	Fault in the electronic circuits of the control unit	replace the control unit N45
No flashing	Malfunction affecting led	J

Also, then the system is switched off it will communicate any alarms detected once again by flashing the led:

Number of times led flashes	Components triggering alarm	Carry out test
1 Impulse	Front right-hand door	A
2 Impulses	Front left-hand door	B
3 Impulses	Rear right-hand door	C
4 Impulses	Rear left-hand door	D
5 Impulses	Volumetric sensors	E
6 Impulses	Bonnet	F
7 Impulses	Boot	G
8 Impulses	Interruption in key-activated supply	H
9 Impulses	Interruption in supply to battery	I
10 Impulses	At least three simultaneous causes of an alarm	Repeat the engagement/disengagement of the system. If necessary carry out all the above tests.

**MANUAL DIAGNOSIS**

The MANUAL DIAGNOSIS function can be carried out by opening the bonnet and moving the ignition key from the RUN position to the STOP position. Within 15 seconds the button on the bonnet must be pressed 7 times in succession within 15 seconds. % beeps will signal the beginning of the manual diagnosis. After 10 seconds the blinker will flash once (500 ms).

When this mode is entered the self-diagnosis procedure of the volumetric sensors connected to the VAS control unit will be automatically started. If the test is possible the hazard warning lights will flash 3 times and the VAS control unit will emit 3 beeps. After this first phase activate the various switches on the doors and boot. Each variation in the state of the switches will correspond to a brief flash of the hazard warning lights and a beep accompanied by the flashing of the led on the instrument panel. When the RUN contact is engaged the siren will sound briefly ( 500 ms) and the hazard warning lights will flash (2.5 secs). This final operation will end the manual diagnosis test.

It is also possible to leave the MANUAL DIAGNOSIS by not activating anything

for 30 seconds. When the programmed left the hazard warning lights will come on for about 2.5 seconds and a beep will be heard.

Following the MANUAL DIAGNOSIS where necessary, carry out one of the previously indicated tests

**N.B.:** In addition to this fault diagnosis it is possible to rapidly identify a fault by hooking up to the Alfa Romeo Tester (see appropriate publications).

Malfunction	Carry out test
The siren does not function	Replace the control unit N45 with built-in siren
The signalling led does not work	J
The emergency key does not work	K
The anti-theft device does not activate the blinker function	L
The remote control does not work	M
The anti-theft device completely blocks the starter motor	N
The anti-theft device completely blocks the engine	O

Other tests are suggested by anomalies encountered directly and indicated by the user.

# 21B-18 ANTI-THEFT DEVICE

TEST C

## CHECK CONTACT OF REAR RIGHT-HAND DOOR

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C1 CHECK DOOR LOCKING SYSTEM</b> - Check for correct operation of door locking system, relative to rear right-hand door	OK <del>OK</del>	Carry out step C2  Follow the indications given in the FAULT DIAGNOSIS in the section "DOOR LOCKING SYSTEM"
<b>C2 CHECK SIGNALLING OF CHECK PANEL</b> - Check that, when the door is opened the corresponding light comes on on the Check Panel	OK <del>OK</del>	Carry out step C3  Follow the indications given in the FAULT DIAGNOSIS in the section "CHECK PANEL"
<b>C3 CHECK EARTH</b> - With door open, check for 0 V (earth) at pin B15 of anti-theft device control unit N45	OK <del>OK</del>	Replace the control unit N45  Restore wiring between pin B15 of control unit N45 and pin C6 of connector G73, across pin 5 of connector G249 and pin A7 of connector G241 (GRY RED and BLK)

TEST D

## CHECK CONTACT ON REAR LEFT-HAND DOOR

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D1 CHECK DOOR LOCKING SYSTEM</b> - Check for correct operation of door locking system, relative to the rear left-hand door	OK <del>OK</del>	Carry out step D2  Follow the indications given in the FAULT DIAGNOSIS in the section "DOOR LOCKING SYSTEM"
<b>D2 CHECK SIGNALLING OF CHECK PANEL</b> - Check that, when the door is opened, the corresponding light comes on on the Check Panel	OK <del>OK</del>	Carry out step D3  Follow the indications given in the FAULT DIAGNOSIS in the section "CHECK PANEL"
<b>D3 CHECK EARTH</b> - With door open, check for 0 V (earth) at pin B16 of anti-theft device control unit N45	OK <del>OK</del>	Replace the control unit N45  Restore wiring between pin B16 of control unit N45 and pin B2 of connector G23, across pin 6 of connector G249 and pin A8 of connector G241 (GRY BLK and BLK)

# 21B-17 ANTI-THEFT DEVICE

TEST A

## CHECK FRONT RIGHT-HAND DOOR WIRING

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK DOOR LOCKING SYSTEM</b> - Check for correct operation of door locking system, relative to the front right-hand door	OK <del>OK</del>	Carry out step A2  Follow the indications given in the FAULT DIAGNOSIS in section "DOOR LOCKING SYSTEM"
<b>A2 CHECK SIGNALLING OF CHECK PANEL</b> - Check that, with the door open, the led on the check panel comes on	OK <del>OK</del>	Carry out step A3  Follow the indications given in the FAULT DIAGNOSIS in the section "CHECK PANEL"
<b>A3 CHECK EARTH</b> - With door open, check for 0 V (earth) at pin B9 of anti-theft device control unit N45	OK <del>OK</del>	Replace the control unit N45  Restore wiring between pin B9 of control unit N45 and pin A3 of connector G21, across pin 4 of connector G249 and pin A6 of connector G241 (GRY-GRN and BLK)

TEST B

## CHECK CONTACT OF FRONT LEFT-HAND DOOR

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1 CHECK DOOR LOCKING SYSTEM</b> - Check for correct operation of door locking system, relative to the front left-hand door	OK <del>OK</del>	Carry out step B2  Follow the indications given in the FAULT DIAGNOSIS in the section "DOOR LOCKING SYSTEM"
<b>B2 CHECK SIGNALLING OF CHECK PANEL</b> - Check that, when the door is opened the corresponding light comes on on the Check Panel	OK <del>OK</del>	Carry out step B3  Follow the indications given in the FAULT DIAGNOSIS in the section "CHECK PANEL"
<b>B3 CHECK EARTH</b> - With door open, check for 0 V (earth) at pin B8 of anti-theft device control unit N45	OK <del>OK</del>	Replace the control unit N45  Restore wiring between pin B8 of control unit N45 and pin B3 of connector G23, across pin 3 of connector G249 and pin A5 of connector G241 (GRY-YEL and BLK)

CHECK CONTACT ON BONNET TEST F

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F1	CHECK CONTACT - Check that contact H44 is correctly fitted together with the relative female component on the bonnet	OK	Carry out step F2
		OK	Fix or replace contact H44 or the relative female component
F2	CHECK EARTH - With bonnet open, check for an earth on both terminals of switch H44	OK	Carry out step F3
		OK	Restore wiring between H44 and earth G55b (BLK)
F3	CHECK EARTH - With bonnet open, check for 0 V (earth) at pin B18 of anti-theft device control unit N45	OK	Replace the control unit N45
		OK	Restore wiring between switch H44 and pin B18 of control unit N45, across pin A12 of connector G241 (BLK)

CHECK CONTACT ON BOOT TEST G

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G1	CHECK LUGGAGE COMPARTMENT LIGHT - Check that when the boot is opened the light F5 comes on	OK	Carry out step G2
		OK	Follow the indications given in the FAULT DIAGNOSIS in the section "INTERNAL LIGHTING"
G2	CHECK EARTH - With boot open, check for 0 V (earth) at pin B17 of anti-theft device control unit N45	OK	Replace the control unit N45
		OK	Restore wiring between pin 1 of roof light F5 and pin B17 of control unit N45, across pin 5 of connector G248 and pin A9 of connector G241 (GRY-WHT and BLK)

CHECK VOLUMETRIC SENSORS TEST E

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	CHECK CONTINUITY - Check for continuity between sensors and control unit - between pin A8 of N45 and pins 1 of sensors L58a and L58b - between pin A11 of N45 and pins 3 of sensors L58a and L58b - between pin A12 of N45 and pins 2 of sensors L58a and L58b	OK	Carry out step E2
		OK	Restore wiring between: - pin A8 of N45 and pin 1 of L58a and L58b across pin 3 of connector G248 and pin A16 of G241 (RED-GRN and BLK) - pin A11 of N45 and pin 3 of L58a and L58b, across pin 2 of connector G248 and pin A15 of G241 (BLK-GRN and BLK) - pin A12 of N45 and pin 2 of L58a and L58b (*), across pin 1 of connector G248 and pin A14 of G241 (BRN-GRN and BLK)
E2	CHECK SENSORS - When the system is operating, take the signals between sensors L58a and L58b and the control unit N45 (and g) intercept them on the connector (field open) G214 A located in the engine bay, but with the contact H44 closed. Check the connector G241 A for: - 12 V at pin A16 - 0 V at pin A15 - 12 V at pin A14 (which becomes 0 V of any movement is detected in the passenger compartment: alarm signals)	OK	Replace the control unit N45
		OK	Replace one of the two sensors L58a or L58b

(\* ) The sensor L58b (LH) acts as a TRANSMITTER, while L58a (RH) acts as a RECEIVER of ultrasound: for this reason the cable from pin 2 of L58b to pin A12 of control unit N45 IS NOT NORMALLY USED.  
N.B. if the two sensors are wrongly fitted - i.e. and transmitter on the right and receiver on the left - the system will still function! In this case the other cable will be used.

CHECK LED		TEST J
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p>J1 CHECK LED</p> <p>- Disconnect the led D31 and check its operation (applying for example, 5 V to the terminals)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step J2</p> <p>Replace led D31</p>
<p>J2 CHECK CONTINUITY</p> <p>- Check for continuity between:</p> <ul style="list-style-type: none"> <li>- one of the terminals of the led D31 and earth G53b</li> <li>- the other terminal of the led D31 and pin A1 of control unit N45</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Replace the control unit N45</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>- D31 and earth G53b (lit K)</li> <li>- D31 and pin A1 of N45 across pin A8 of connector G24 (BLK)</li> </ul>

THE EMERGENCY KEY DOES NOT WORK

TEST K

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p>K1 CHECK SWITCH</p> <p>- Check for correct operation of switch B97</p> <ul style="list-style-type: none"> <li>- in the OFF position the contact between pins A1 and B is closed</li> <li>- in the ON position the contact between pins A2 and B is closed</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step K2</p> <p>Replace switch B97</p>
<p>K2 CHECK CONTINUITY</p> <p>- Check for continuity between:</p> <ul style="list-style-type: none"> <li>- pin A1 of B97 and pin A4 of N45</li> <li>- pin A2 of B97 and pin A7 of N45</li> <li>- pin B of B97 and pin B13 of N45</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Replace the control unit N45</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>- pin A1 of B97 and pin A4 of N45, across pin B1 of G241 (BLK)</li> <li>- pin A2 of B97 and pin A7 of N45, across pin B2 of G241 (BLK)</li> <li>- pin B of B97 and pin B13 of N45, across pin B4 of G241 (BLK)</li> </ul>

CHECK POWER SUPPLY TO CONTROL UNIT (KEY-ACTIVATED)		TEST H
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p>H1 CHECK VOLTAGE</p> <p>- With ignition key engaged, check for 12 V at pins B4 and B12 of control unit N45</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step H2</p> <p>Restore wiring between pin B4 and B12 of N45 and ignition switch B1, across pin A20 of connector G241 and the solders (PNK and BLK)</p>
<p>H2 CHECK EARTH</p> <p>- Check that pin A9 of control unit N45 is earthed (0 V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace the control unit N45</p> <p>Restore wiring between pin A9 of N45 and earth G53b across pin A19 of G241 (BLK)</p>

CHECK POWER SUPPLY TO CONTROL UNIT (DIRECT FROM BATTERY)

TEST I

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p>I1 CHECK FUSE</p> <p>- Check for damage of fuse G258, located in the engine bay near the branch terminal board</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step I2</p> <p>Replace fuse G258 (15 A)</p>
<p>I2 CHECK VOLTAGE</p> <p>- Check for 12 V at pins B7 and A3 of control unit N45</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step I3</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>- pin A3 of N45 and the branch terminal board, across pin A11 of G241 and the solder (BLK)</li> <li>- pin B7 of N45 and the branch terminal board, across pin A2 of G241 and relay box G258 (BLK and RED)</li> </ul>
<p>I3 CHECK EARTH</p> <p>- Check that pin A9 of control unit N45 is earthed (0 V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace the control unit N45</p> <p>Restore wiring between pin A9 of N45 and earth G53b across pin A19 of G241 (BLK)</p>

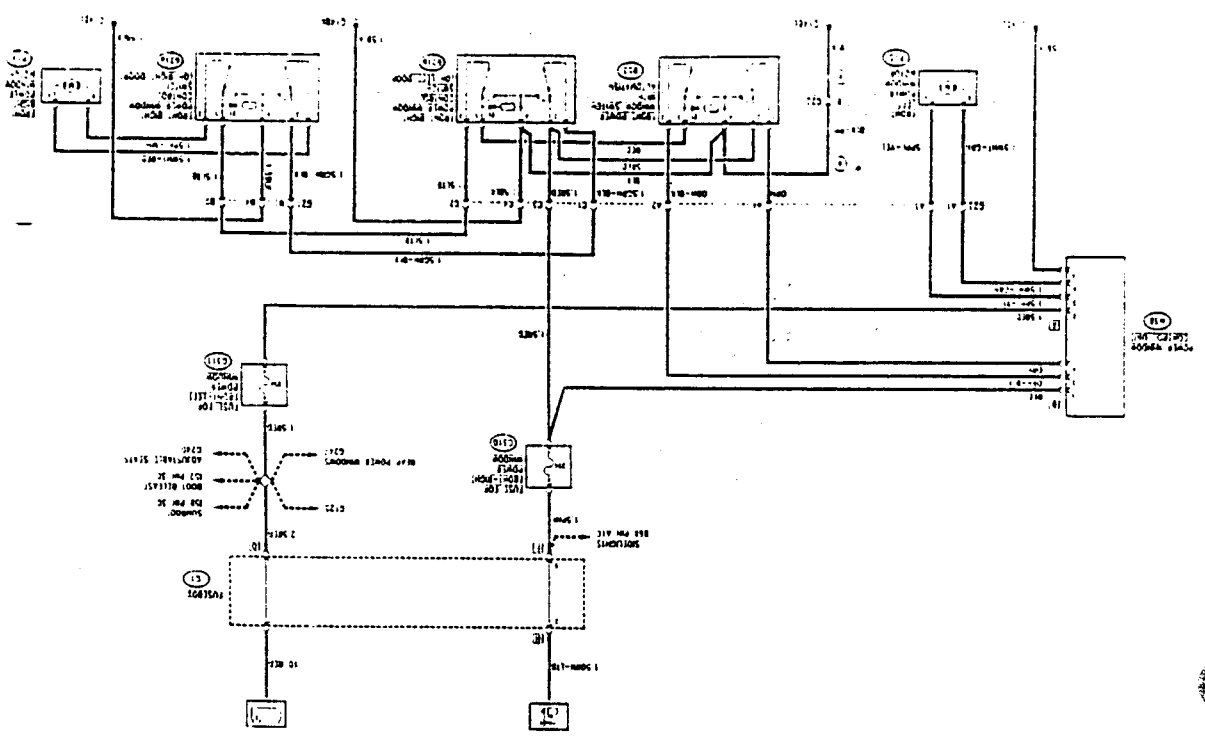
THE ANTI-THEFT DEVICE DOES NOT FLASH THE HAZARD WARNING LIGHTS		TEST L
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>L1</b> CHECK OPERATION OF BLINKER FUNCTION - Check for correct operation of the hazard warning lights activated manually	OK <del>OK</del>	Carry out step L2  Follow the indications given in the FAULT DIAGNOSIS in the section "DIRECTION INDICATORS AND HAZARD WARNING LIGHTS"
<b>L2</b> CHECK CONTINUITY - Check for continuity between: - pin B1 of control unit N45 and pin B2 of switch B12 - pin B2 of N45 and pin B4 of B12	OK <del>OK</del>	Replaces the control unit N45  Restore wiring between: - pin B1 of N45 and pin B2 of B12 across pin 1 of connector G249 (BLK and LTB-GRN) - pin B2 of N45 and pin B4 of B12 across pin 2 of G249 (BLK and GRY-BLN)

THE REMOTE CONTROL DOES NOT WORK		TEST M
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>M1</b> CHECK REMOTE CONTROL - Check for correct operation of remote control for the locking/unlocking of the doors	OK <del>OK</del>	Carry out step M2  Follow the indications given in the FAULT DIAGNOSIS in the section "DOOR LOCKING SYSTEM WITH REMOTE CONTROL"
<b>M2</b> CHECK CONTINUITY - Check continuity between pin 2 of receiver N67 and pin A2 of control unit N45	OK <del>OK</del>	Replace the control unit N45  Restore wiring between pin 2 of N67 and pin A2 of N45, across pin 4 of G248 and pin A17 of G241 (LTB-BLK and BLK)

THE ANTI-THEFT DEVICE COMPLETELY BLOCKS THE STARTER MOTOR		TEST N
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>N1</b> CHECK VOLTAGE - With the key in the AVVIAMENTO position, check for 12 V at pins B6 and B11 of control unit N45	OK <del>OK</del>	Carry out step N2  Restore wiring between pin B6 and B11 of N45 and ignition switch, across solder and pin A10 of G241 (Bl K)
<b>N2</b> CHECK VOLTAGE - With the key in the AVVIAMENTO position, check for 12 V at pins B5 and B10 of N45	OK <del>OK</del>	Check the starter motor A11 with relative cables. See section "STARTING AND CHARGING"  Replace the control unit N45

THE ANTI-THEFT DEVICE COMPLETELY BLOCKS THE ENGINE		TEST O
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>O1</b> CHECK VOLTAGE - With the key in the RUN position, check for 12 V at pin B3 of control unit N45	OK <del>OK</del>	Restore wiring between pin B3 of N45 and the Motorclic wiring (pin A of G133a), across pin B3 of G241 (Bl K)  Replace the control unit N45

WIRING DIAGRAM



# FRONT POWER WINDOWS

(Off-side Window with Automatic Raising Device\*)

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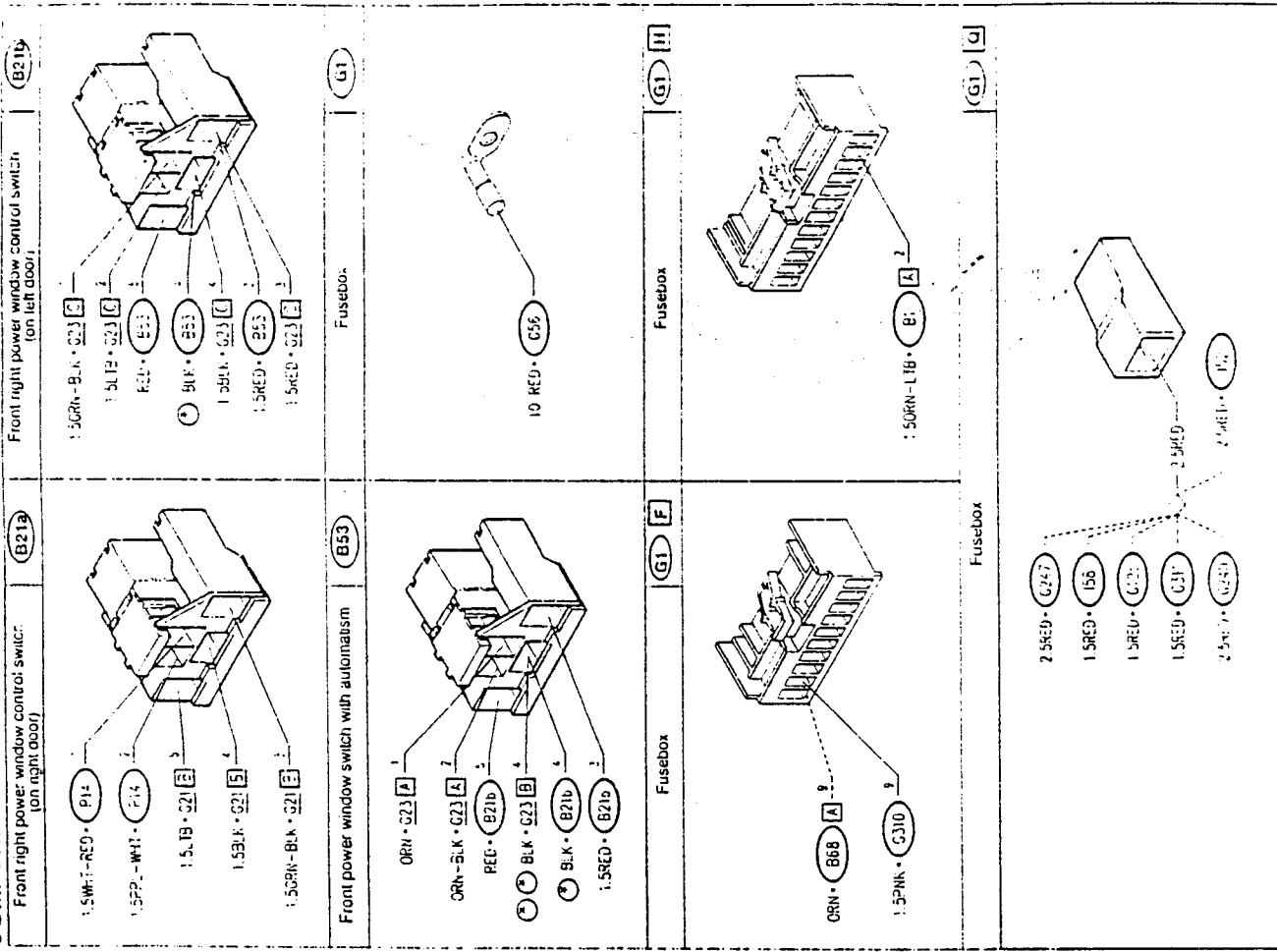
LOCATION OF COMPONENTS . . . . . 22-7

TROUBLESHOOTING . . . . . 22-8

(\* ) If the off-side window does not have an automatic raising device see successive Section.22A



COMPONENTS AND CONNECTORS



motor P15 on the side where the contact was closed, determining in this way the direction of rotation of the motor. The actuation signals (raising or lowering) for the left-hand window motor P15 leave from pins 3 and 4 of connector A of N38.

Pin 1 of connector A of N38 is connected to ground.

The actuation of the right-hand power window is directly controlled by one of the two switches B21 (B21a located on the right-hand door, B21b on the left) connected in series.

The key operated supply passes fuse G310 (25A) and the negative signal from ground G148b.

The motor of the right-hand window P14 is in this way actuated by the double switch B21 in either one direction or the other depending on the origin of the positive or negative signal.

aises the front right-hand window is of the traditional type: when the button is pressed the window is raised or lowered; it is equipped with two control switches, one on the right-hand door and one on the left-hand door.

FUNCTIONAL DESCRIPTION

The power window control unit N38 is supplied at pin 2 of connector A by voltage from the battery via fuse G311 (25A) protecting the left-hand power window.

The key operated supply reaches pin 1 of connector B via fuse G310 (25A) which also protects the right-hand power window.

Consensus signals for the raising and lowering of the window reach pins 3 and 4 of connector B from the left-hand window control switch B53.

This double switch sends and ground to the control unit and then to the electric

GENERAL DESCRIPTION  
Operation of the left-hand power window (driver's side) is of the automatic type (\*) controlled by a control unit which actuates it in accordance with the following logic

- acting on one of the two buttons and keeping it pressed, the window is raised or lowered normally until the button is released.

- a short impulse (less than 300 ms approx.) actuates the electric motor which automatically stops when the stop limit is reached (window completely open or closed);

- an even shorter impulse (less than 50 ms approx.) is considered by the control unit as an accidental shock and no action will result.

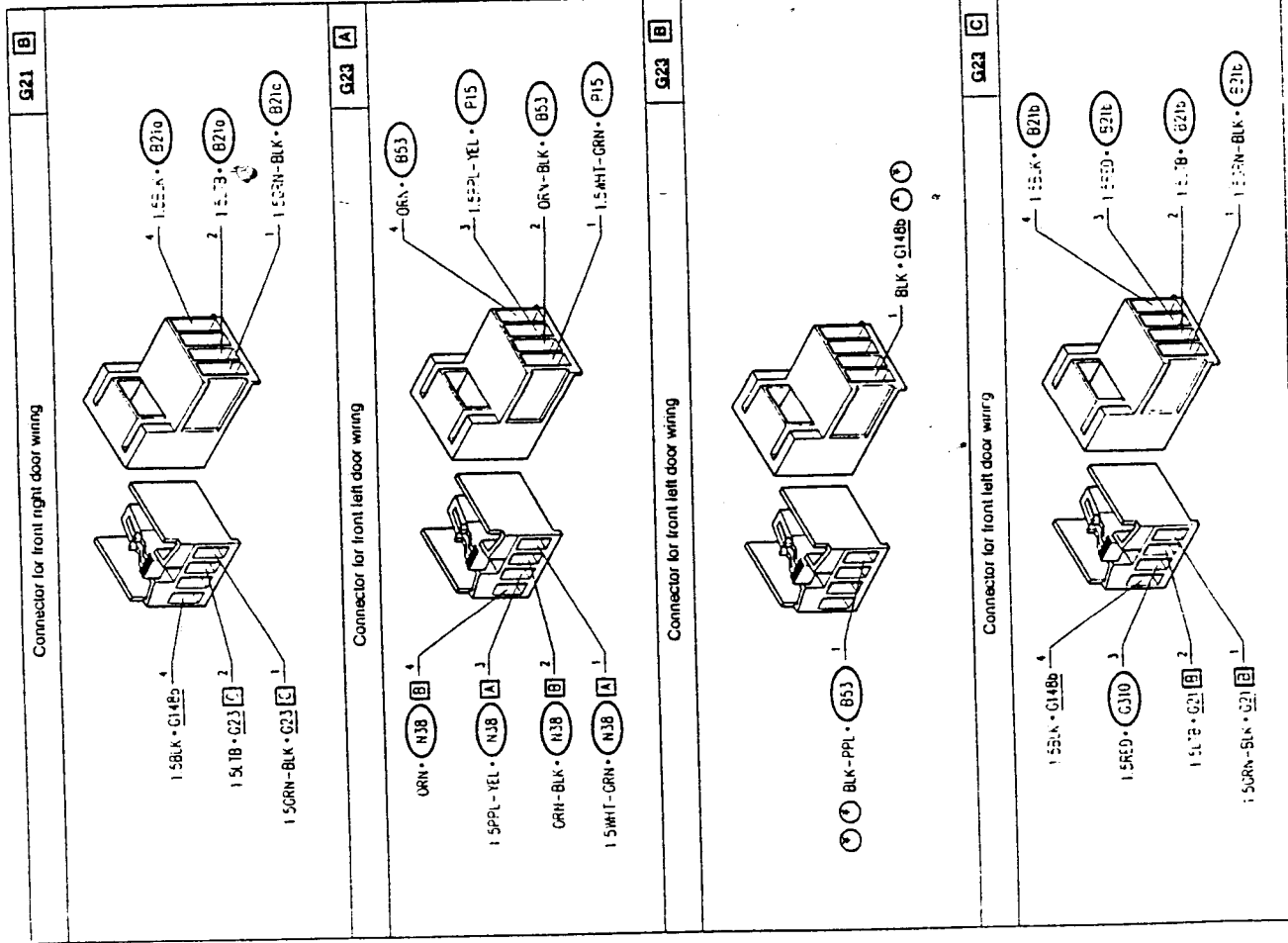
All the power windows are turn-key operated  
The electrical mechanism which adju-

TROUBLESHOOTING TABLE

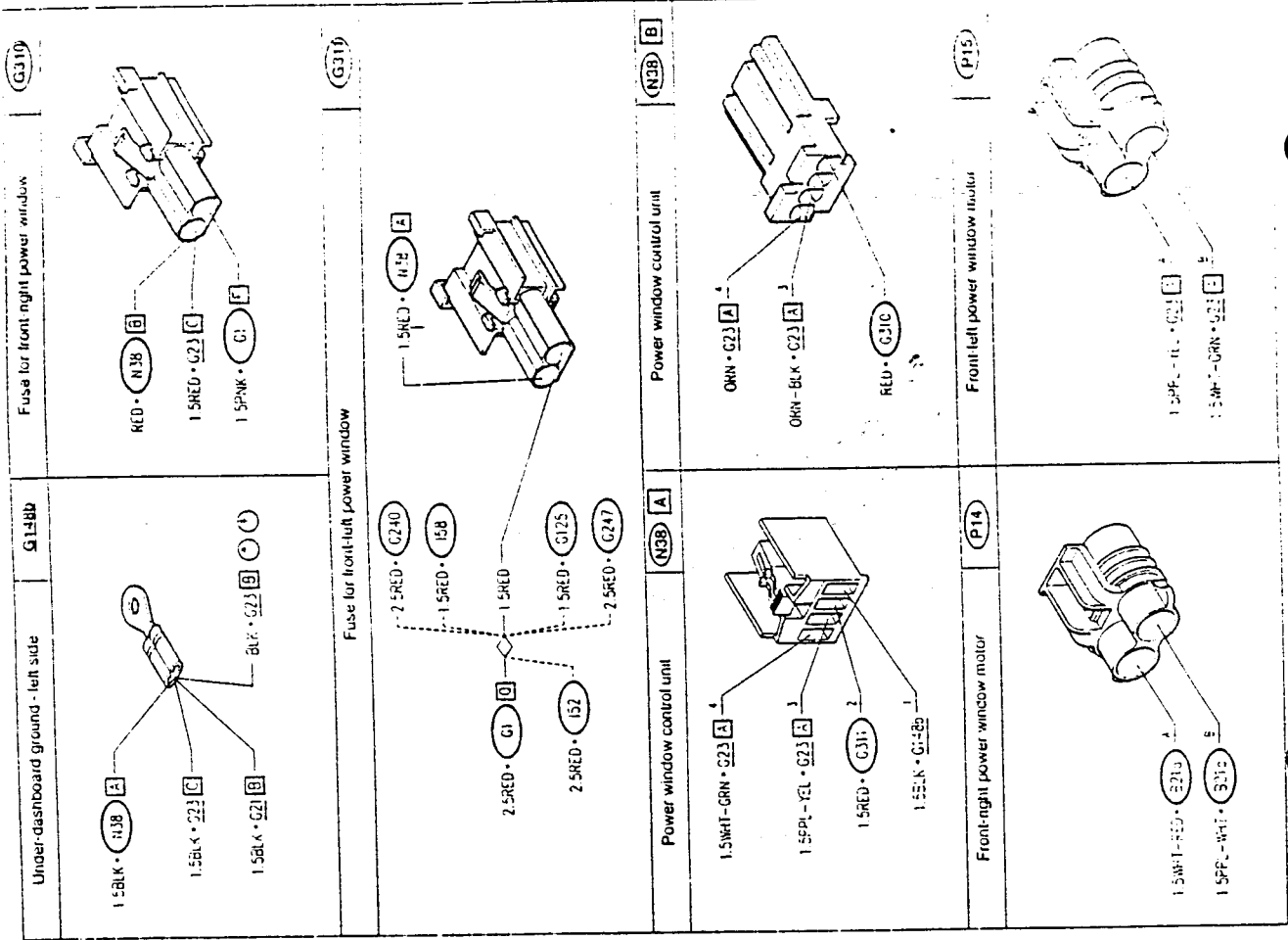
Malfunction	Component						Test
	N38	G310	G311	B21	B53	P15	
Front left power window	.	.	.	.	.	.	A
Front right power window	.	.	.	.	.	.	B

(\*) If the off-side window does not have an automatic raising device see successive Section 22A

(\*) Up to chassis N 2520 (\*) from chassis N 2521



(\*) from chassis N 2521



(\*) from chassis N 2521



TROUBLESHOOTING

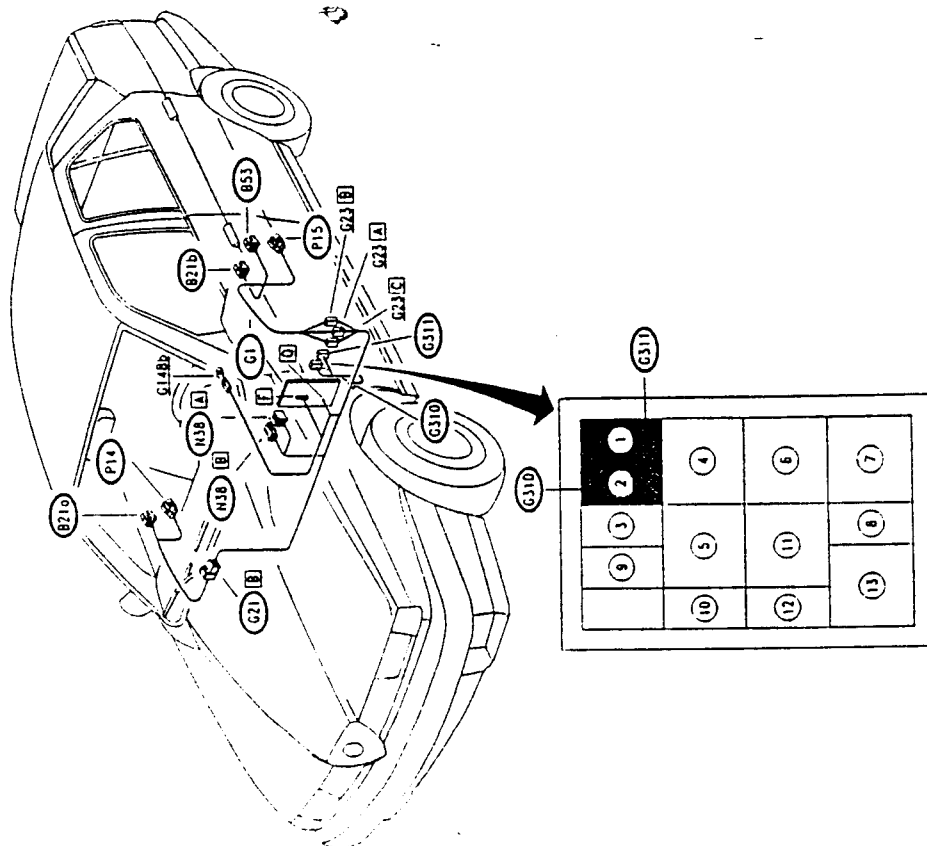
FRONT LEFT-HAND POWER WINDOW NOT WORKING

TEST A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK FUSE</b> - Check for damage of wander fuse G311	OK <del>OK</del>	Carry out step A2 Replace fuse (25A)
<b>A2 CHECK FUSE</b> - Check for damage of wander fuse G310	OK <del>OK</del>	Carry out step A3 Replace fuse (25A) N.B. in this case the front right-hand power window will also not be working (see successive test B)
<b>A3 CHECK VOLTAGE</b> - Verify 12V between pins A2 and A1 of power windows control unit N38	OK <del>OK</del>	Carry out step A5 Carry out step A4
<b>A4 CHECK VOLTAGE</b> - Verify 12 V at pin A2 of control unit N38	OK <del>OK</del>	Restore wiring between pin A1 of N38 and ground G148b (BLK)
<b>A5 CHECK VOLTAGE</b> - With ignition key engaged, verify 12 V at pin B1 of control unit N38	OK <del>OK</del>	Restore wiring between pin A2 of N38 and pin G of G1, across wander fuse G311 and the solder (HE11)
<b>A6 CHECK VOLTAGE</b> - With ignition key engaged and activating switch B53 in one of the two directions, verify 12 V between pins B3 and B4 of control unit N38	OK <del>OK</del>	Carry out step A6 Restore wiring between pin B1 of N38 and pin F9 of G1, across wander fuse G310 (RED and PNK)

(Continued)

LOCATION OF COMPONENTS



From chassis N 30.733  
 Up to chassis N 30.732  
 G311 - WHITE fuse holder  
 G310 - BROWN fuse holder

FRONT LEFT-HAND POWER WINDOW NOT WORKING TEST A

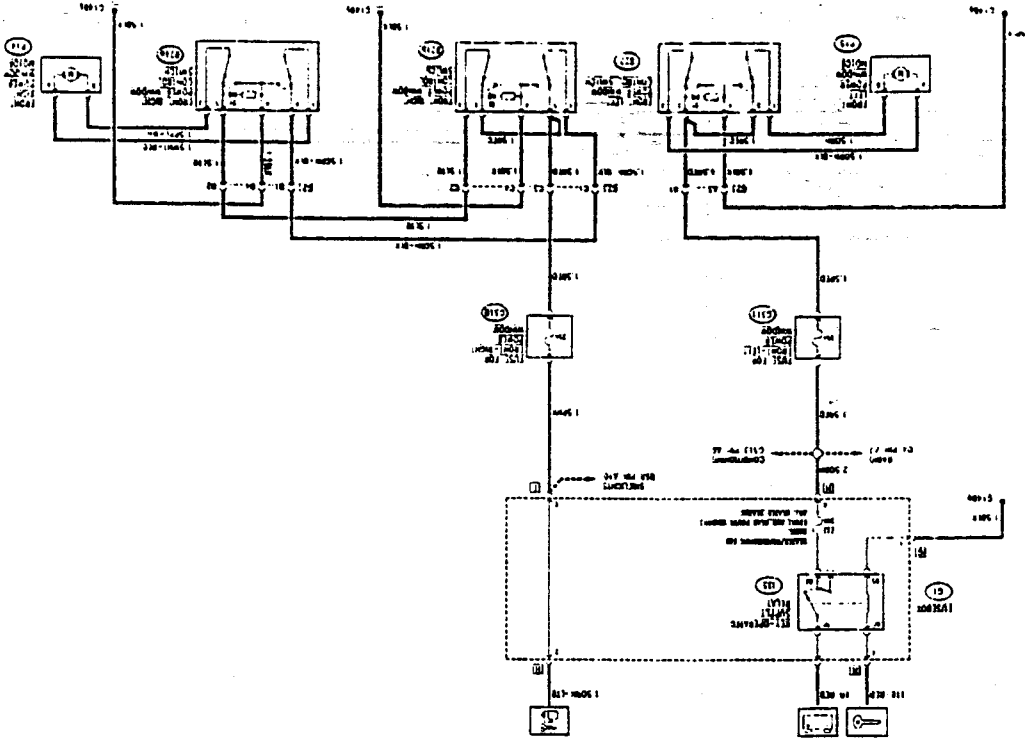
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>A7</b> CHECK VOLTAGE</p> <p>- With ignition key engaged and activating switch B53 in one of the two directions, verify 12 V between pins 1 and 2 of switch B53</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 1 of B53 and pin B4 of N38, across pin A4 of connector G23 (ORN)</li> <li>• pin 2 of B53 and pin B3 of N38, across pin A2 of connector G23 (ORN-BLK)</li> </ul> <p>Carry out step A8</p>
<p><b>A8</b> CHECK GROUND</p> <p>- Check that pin 4 of B53 is grounded (0V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step A9</p> <p>Restore wiring between pin 4 of B53 and ground G148b (*) across pin 4 of connector G306 (BLK) (**) across pin B1 of connector G23 (BLK-PPL and BLK)</p>
<p><b>A9</b> CHECK VOLTAGE</p> <p>- With ignition key engaged, verify 12 V at pins 3 and 5 of B53</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace switch B53</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 3 of B53 and fuse G310, across pin 3 of B21b and pin C3 of connector G23 (RED)</li> <li>• pin 5 of B53 and pin 5 of B21b (RED)</li> </ul>
<p><b>A10</b> CHECK VOLTAGE</p> <p>- With ignition key engaged and activating switch B53 in one of the two directions, verify 12 V between pins A4 and A3 of control unit N38</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step A11</p> <p>Replace control unit N38</p>
<p><b>A11</b> CHECK MOTOR</p> <p>- With ignition key engaged and activating switch B53 in one of the two directions, verify 12 V between pins A and B of motor P15</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace motor P15</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin A4 of N38 and pin B of P15, across pin A1 of connector G23 (WHT-GRN)</li> <li>• pin A3 of N38 and pin A of P15, across pin A3 of connector G23 (PPL-YEL)</li> </ul>

(\*) up to chassis N.2520  
 (\*\*) from chassis N.2521

FRONT RIGHT-HAND POWER WINDOW NOT WORKING

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>B1</b> CHECK FUSE</p> <p>- Check for damage of wander fuse G310</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step B2</p> <p>Replace fuse (25A)</p>
<p><b>B2</b> CHECK VOLTAGE</p> <p>- With ignition key engaged and activating switch B21a in one of the two directions, verify 12 V between pins 1 and 2 of switch B21a</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step B3</p> <p>Carry out step B4</p>
<p><b>B3</b> CHECK MOTOR</p> <p>- With ignition key engaged and activating switch B21a in one of the two directions, verify 12 V between pins A and B of motor P14</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace motor P14</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 1 of B21a and pin A of P14 (WHT-BLK)</li> <li>• pin 2 of B21a and pin B of P14 (PPL-WHT)</li> </ul>
<p><b>B4</b> CHECK VOLTAGE</p> <p>- With ignition key engaged, verify 12 V between pin 3 and 4 of switch B21a, and between pin 5 and 4 of the same switch</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace switch B21a</p> <p>Carry out step B5</p>
<p><b>B5</b> CHECK GROUND</p> <p>- Check that pin 4 of B21a is grounded (0V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step B6</p> <p>Restore wiring between pin 4 of B21a and ground G148b, across pin BA of connector G21 (BLK)</p>
<p><b>B6</b> CHECK VOLTAGE</p> <p>- With ignition key engaged and activating switch B21b in one of the two directions, verify 12 V between pins 1 and 2 of switch B21b</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 1 of B21b and pin 3 of B21a, across pin C1 of connector G23 and pin B1 of connector G21 (WHT-BLK)</li> <li>• pin 2 of B21b and pin 5 of B21a, across pin C2 of connector G23 and pin B2 of connector G21 (L1B)</li> </ul> <p>Carry out step B7</p>
<p><b>B7</b> CHECK VOLTAGE</p> <p>- With ignition key engaged, verify 12 V between pin 3 and 4 of switch B21b, and between pin 5 and 4 of the same switch.</p>	<p>OK</p> <p><del>OK</del></p>	<p>Replace switch B21b</p> <p>Carry out step B8</p>
<p><b>B8</b> CHECK GROUND</p> <p>- Check that pin 4 of B21b is grounded (0V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 3 of B21b and fuse G310, across pin C1 of connector G23 (RED)</li> <li>• pin 4 of B21b and pin 4 of B21a, across pin C4 of connector G23 (BLK)</li> </ul>

WIRING DIAGRAM



# FRONT POWER WINDOWS

(Operation without Automatic Raising Device\*)

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(\*) If the off-side window is equipped with an automatic raising device see preceding Section 22

**GENERAL DESCRIPTION**

An electrical mechanism permits operation of the front windows when the buttons located on the relative doors are pressed.

The door on the driver's side is also fitted with a button which operates the window on the passenger's side.

N.B. The power windows are "key-activated" and cannot be opened if the ignition key is not engaged.

**FUNCTIONAL DESCRIPTION**

The operation of the left-hand power window is controlled by switch B22.

The key-activated power supply is delivered through fuse G310 (25A) and the negative earth signal through G148b.

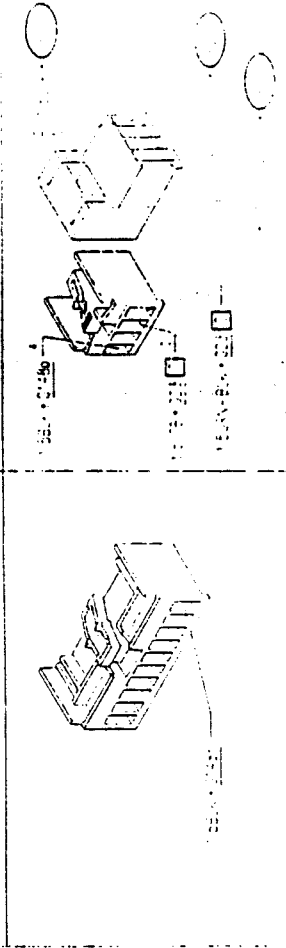
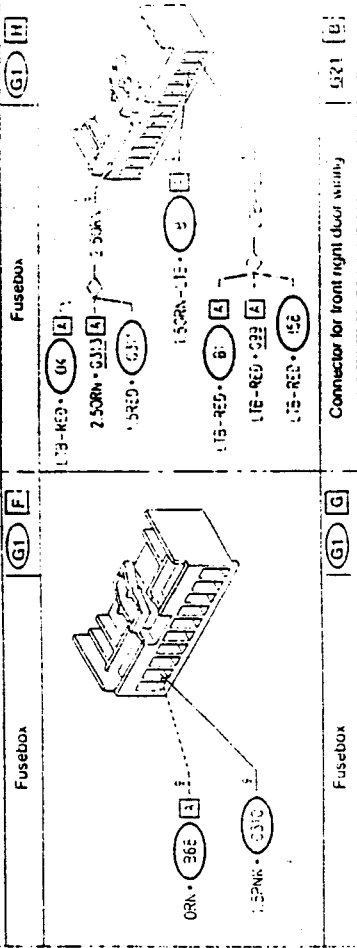
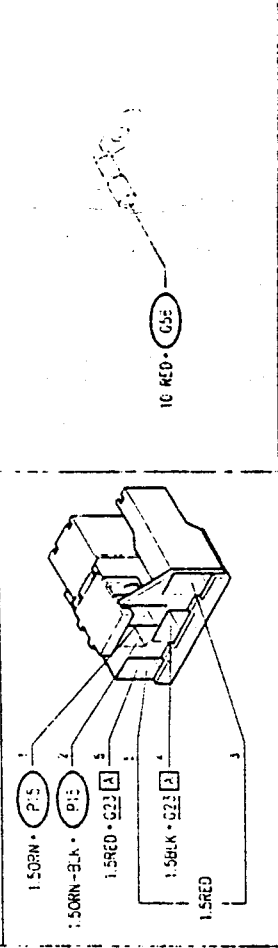
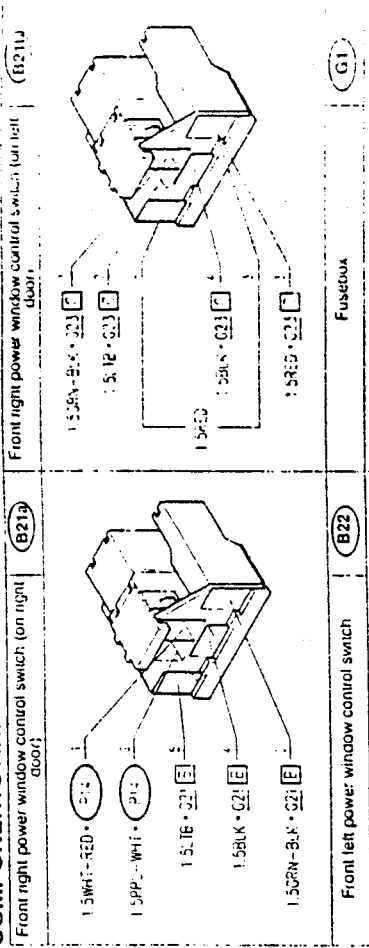
The double switch delivers power and earth to the motor P15 according to the part in which the contact was closed thus determining the direction of rotation of the motor itself and raising or lowering the window.

The operation of the right-hand power window is controlled by one of two switches B21 (B21a located on the right-hand door, B21b on the left) which are connected in series.

The "Key activated" power supply is delivered via fuse G310 (25A) and the negative earth signal from earth G148b.

The motor of the right-hand window P14 is thus activated by a double switch B21 in one direction or another depending on the closing of the contact.

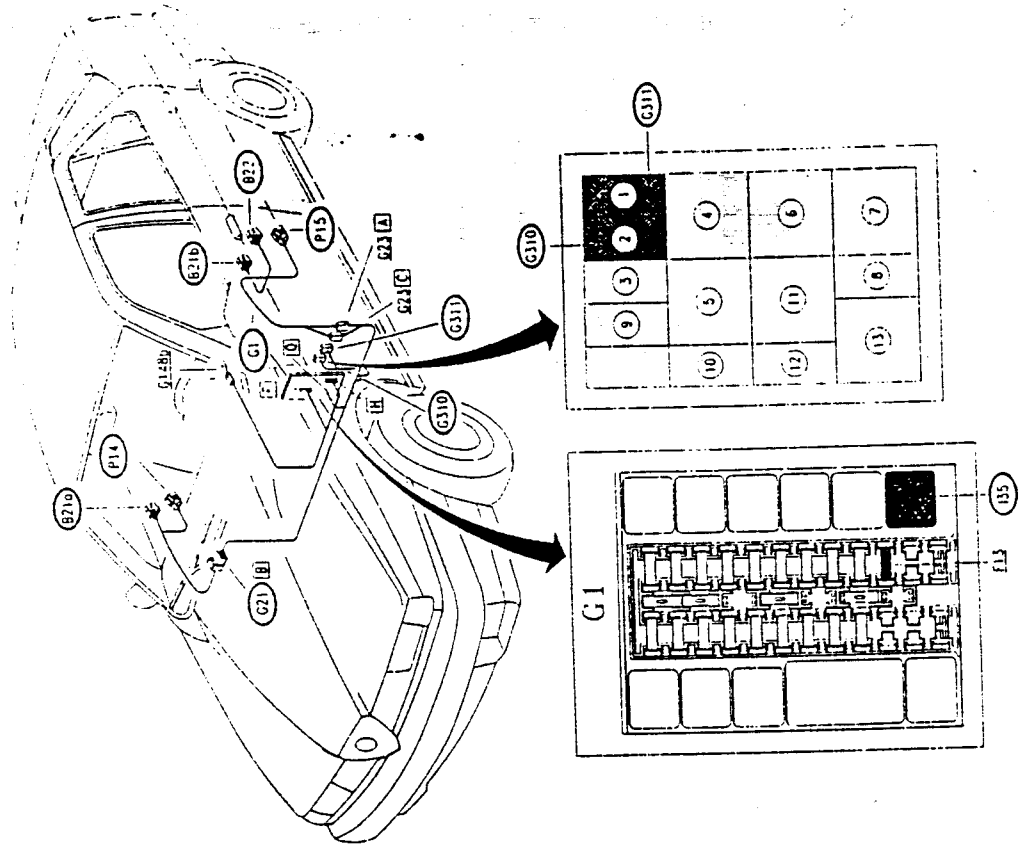
**COMPONENTS AND CONNECTORS**



**FAULT DIAGNOSIS TABLE**

Malfunction	Component						Test
	E13	G310	G311	B21	B22	P14	
Front LH power window	•	•	•	•	•	•	A
Front RH power window	•	•	•	•	•	•	B

LOCATION OF COMPONENTS



<p>Connector for front left door wiring</p> <p>1.5RED • G23 [C] 1.5BLK • G24 [A] 1.5RED • B22 [C] 1.5BLK • B21 [C] 1.5RED • B21 [C] 1.5BLK • B21 [C] 1.5CRN • BLK • E21 [C] 1.5BLK • B21 [C] 1.5RED • B21 [C] 1.5CRN • BLK • G21 [B] 1.5BLK • B21 [C] 1.5RED • B21 [C]</p>	<p>Under-dash-board ground - left side</p> <p>1.5R • G23 [A] 1.5BLK • G23 [C] 1.5R • G21 [B] 1.5BLK • G1 [C]</p>	<p>Fuse for front-right power window</p> <p>1.5RED • G23 [C] 1.5PNK • G1 [E]</p>	<p>Front-night power window motor</p> <p>1.5WHI • RED • B21 [C] 1.5PPL • WHI • B21 [C]</p>
<p>Connector for front left door wiring</p> <p>1.5BLK • B22 [C] 1.5RED • B22 [C] 1.5RED • B22 [C] 1.5BLK • B21 [C]</p>	<p>Under-dash-board ground - left side</p> <p>1.5R • G23 [A] 1.5BLK • G1 [C]</p>	<p>Fuse for front-left power window</p> <p>1.5RED • G23 [A] 1.5WHI • G23 [C] 1.5RED • G23 [A] 1.5WHI • G23 [C]</p>	<p>Front-left power window motor</p> <p>1.5CRN • BLK • B22 [C] 1.5CRN • B22 [C]</p>

# 22A-7

## FRONT POWER WINDOWS

### TROUBLESHOOTING

FRONT LEFT-HAND POWER WINDOW NOT WORKING		TEST A
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1</b>   CHECK FUSE - Check for damage of wander fuse G311	OK	Carry out step A2
	<del>OK</del>	Replace fuse (25A)
<b>A2</b>   CHECK VOLTAGE - With ignition key engaged check for 12V on fuse G311	OK	Carry out step A3
	<del>OK</del>	Restore wiring between fuse G311 and fusebox G1, pin H8 across solder (RED and ORN). Also check fuse F13 and relay I35 of fusebox G1
<b>A3</b>   CHECK VOLTAGE - With ignition key engaged and activating switch B22 in one of the two directions, verify 12 V between pins 1 and 2 of switch itself	OK	Carry out step A4
	<del>OK</del>	Carry out step A5
<b>A4</b>   CHECK MOTOR - With ignition key engaged and activating switch B22 in one of the two directions, verify 12 V between pins A and B of motor P15	OK	Replace motor P15
	<del>OK</del>	Restore wiring between: • pin 1 of B22 and pin B of P15 (ORN) • pin 2 of B22b and pin A of P15 (ORN-BLK)
<b>A5</b>   CHECK VOLTAGE - With ignition key engaged, verify 12 V between pin 3 and 4 of switch B22, and between pin 5 and 4 of the same switch	OK	Replace switch B22
	<del>OK</del>	Carry out step A6
<b>A6</b>   CHECK GROUND - Check that pin 4 of B22 is grounded (0V)	OK	Restore wiring between: • pin 5 of B22 and fuse G311, across pin A1 of connector G23 (RED) • pin 3 of B22 and pin 5 of B22 (RED)
	<del>OK</del>	Restore wiring between pin 4 of B22 and ground G148b, across pin A3 of connector G23 (BLK)

# 22A-8

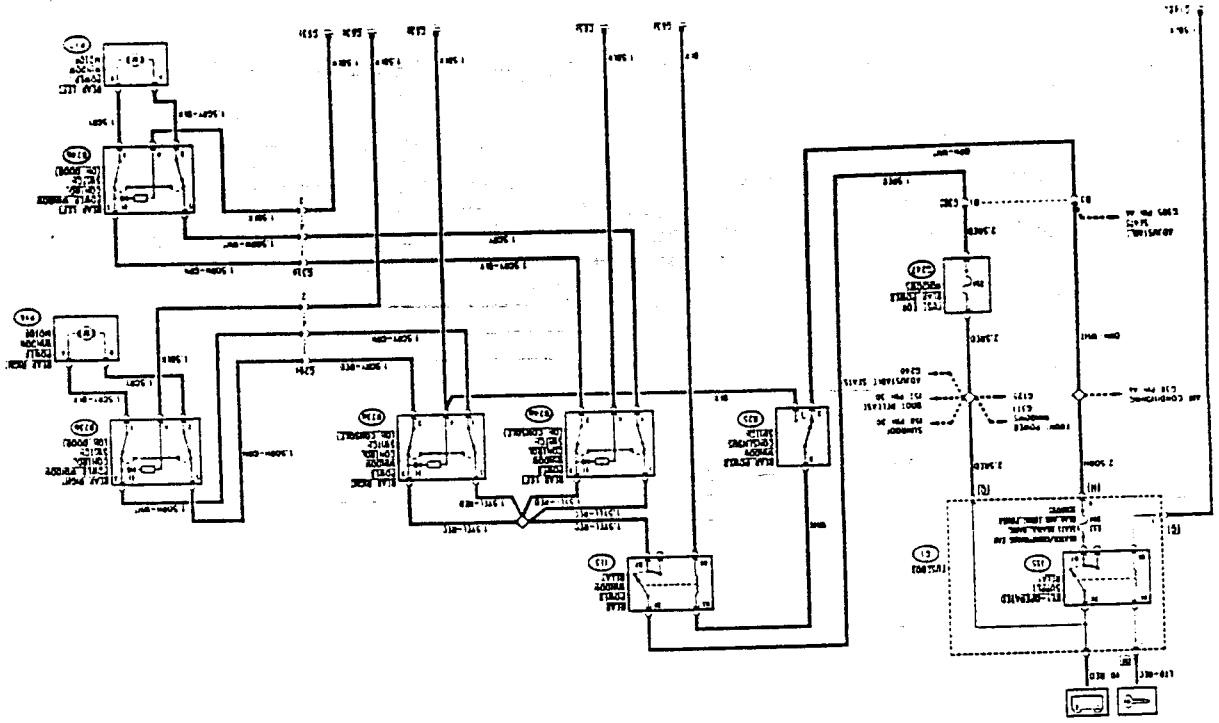
## FRONT POWER WINDOWS

### FRONT RIGHT-HAND POWER WINDOW NOT WORKING

### TEST B

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
<b>B1</b>   CHECK FUSE - Check for damage of wander fuse G310	OK	Carry out step B2	
	<del>OK</del>	Replace fuse (25A)	
<b>B2</b>   CHECK VOLTAGE - With ignition key engaged and activating switch B21a in one of the two directions, verify 12 V between pins 1 and 2 of switch B21a	OK	Carry out step B3	
	<del>OK</del>	Carry out step B4	
<b>B3</b>   CHECK MOTOR - With ignition key engaged and activating switch B21a in one of the two directions, verify 12 V between pins A and B of motor P14	OK	Replace motor P14	
	<del>OK</del>	Restore wiring between: • pin 1 of B21a and pin A of P14 (WHI-RED) • pin 2 of B21a and pin B of P14 (PPL-WHT)	
<b>B4</b>   CHECK VOLTAGE - With ignition key engaged, verify 12 V between pin 3 and 4 of switch B21a, and between pin 5 and 4 of the same switch	OK	Replace switch B21a	
	<del>OK</del>	Carry out step B5	
<b>B5</b>   CHECK GROUND - Check that pin 4 of B21a is grounded (0V)	OK	Carry out step B6	
	<del>OK</del>	Restore wiring between pin 4 of B21a and ground G148b, across pin B4 of connector G21 (BLK)	
<b>B6</b>   CHECK VOLTAGE - With ignition key engaged and activating switch B21b in one of the two directions, verify 12 V between pins 1 and 2 of switch B21b	OK	Restore wiring between: • pin 1 of B21b and pin 3 of B21a, across pin C1 of connector G23 and pin B1 of connector G21 (SILV-BLK) • pin 2 of B21b and pin 5 of B21a, across pin C2 of connector G23 and pin B2 of connector G21 (L1B)	
	<del>OK</del>	Carry out step B7	
<b>B7</b>   CHECK VOLTAGE - With ignition key engaged, verify 12 V between pin 3 and 4 of switch B21b, and between pin 5 and 4 of the same switch	OK	Replace switch B21b	
	<del>OK</del>	Carry out step B8	
<b>B8</b>   CHECK GROUND - Check that pin 4 of B21b is grounded (0V)	OK	Restore wiring between: • pin 3 of B21b and fuse G310, across pin A1 of connector G23 (RED) • pin 5 of B21b and pin 3 of B21b (RED)	
	<del>OK</del>	Restore wiring between pin 4 of B21b and ground G148b, across pin C4 of connector G23 (BLK)	

WIRING DIAGRAM



REAR POWER WINDOWS

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TROUBLESHOOTING . . . . . 23-8

**GENERAL DESCRIPTION**

The electric mechanism which actuates the rear power windows is of the traditional type (when a button is pressed the window is raised or lowered) with two control switches for each window, one on the relative door and one on the central console operable from the front seats.

For safety reasons a consensus switch, located on the central console, makes it possible to cut off the power supply to all the switches.

Operation of the rear power windows is only possible when the ignition key is inserted.

**FUNCTIONAL DESCRIPTION**

**TION**

The rear power windows relay 113 supplies and controls the entire system.

The coil of the relay is excited by a key-operated signal coming from the key-operated supply relay 135 and by fuse F13 (20A) in fusebox G1; this supply passes via the rear power windows consensus safety switch B25: when actuated, this removes the excitation from the coil of 113, and interrupts the power supply to the circuit.

When the coil of the relay is excited, the switches are supplied with voltage from the battery through rear power windows fuse G247 (25A).

Each window can be controlled by two different switches: one located on the central console (B23a right and B24a left), and one located on the relative door (B23b right and B24b left). Each pair of switches is connected in series.

The power supply reaches the switches from relay 113 and the negative signal from ground G63b.

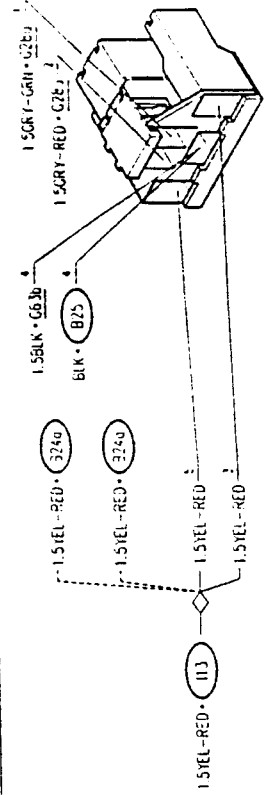
The double switches supplied by motors P16 and P17, send supply and ground, inverting the signals depending on the contact which has been closed and in this way determining the direction of rotation of the motor.

**TROUBLESHOOTING TABLE**

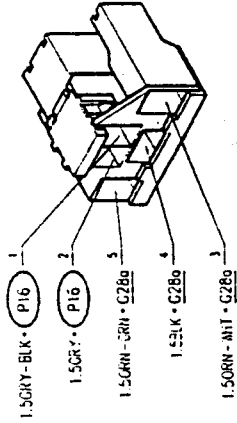
Malfunction	Component						Test	
	E13	G247	113	B25	B24	B23		P16
Rear power windows	•	•	•	•				
Rear left power window					•		•	
Rear right power window						•		•

**COMPONENTS AND CONNECTORS**

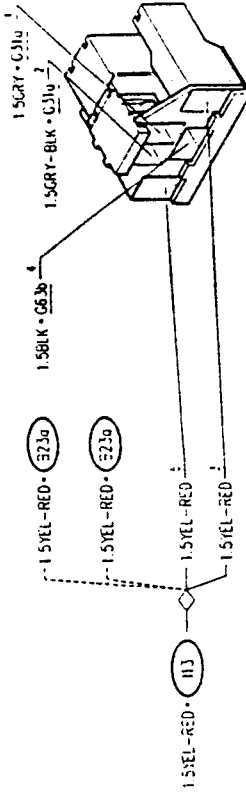
Rear right power window control switch (on console)



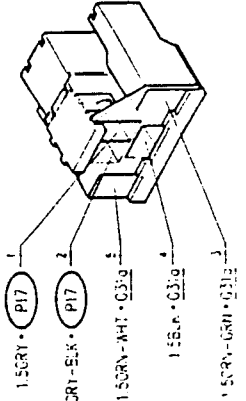
Rear right power window control switch (on door)



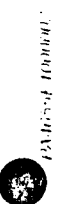
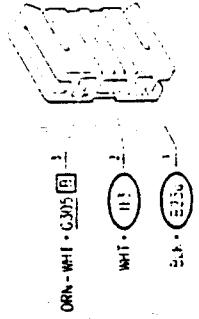
Rear left power window control switch (on console)



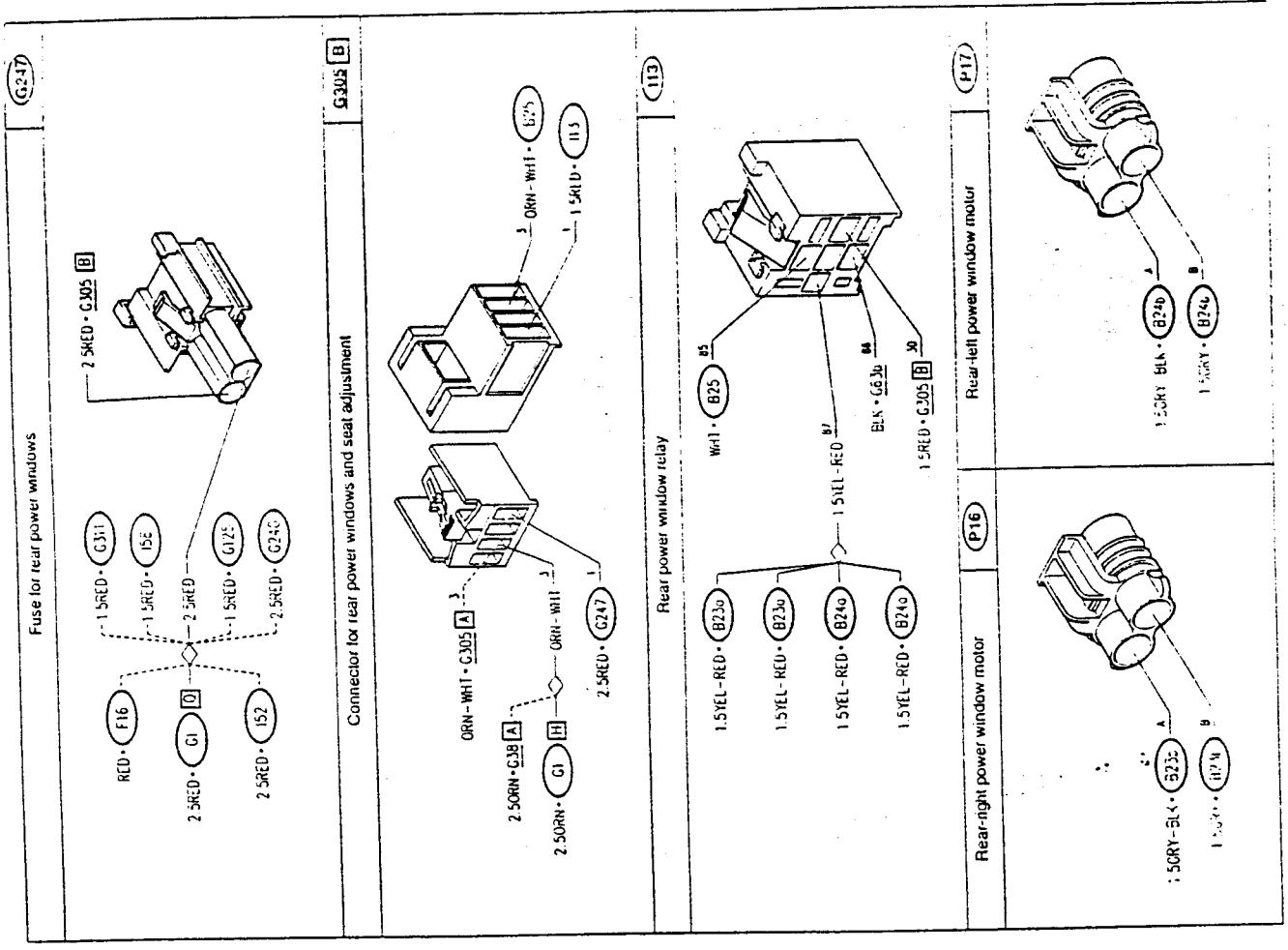
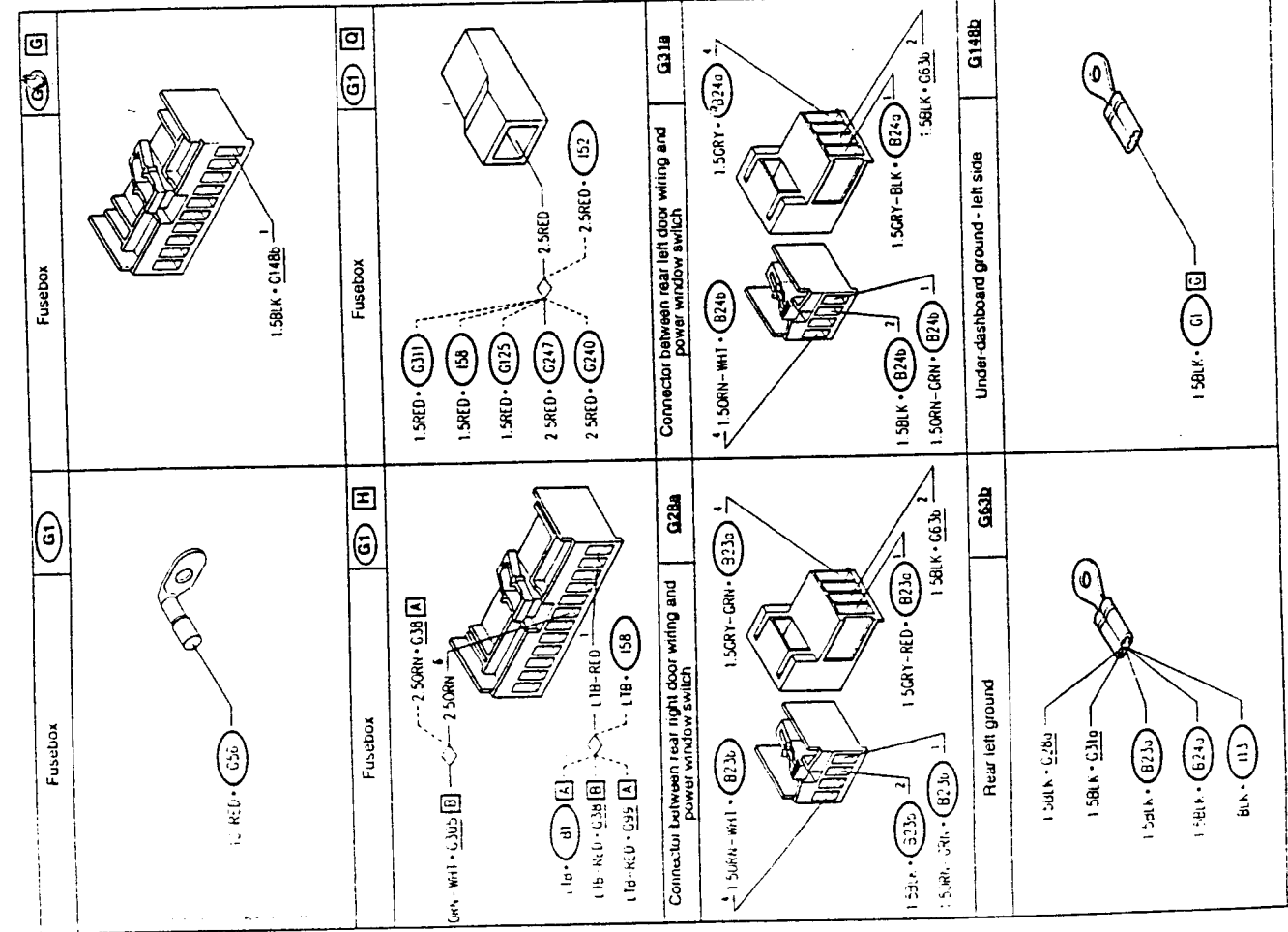
Rear left power window control switch (on door)



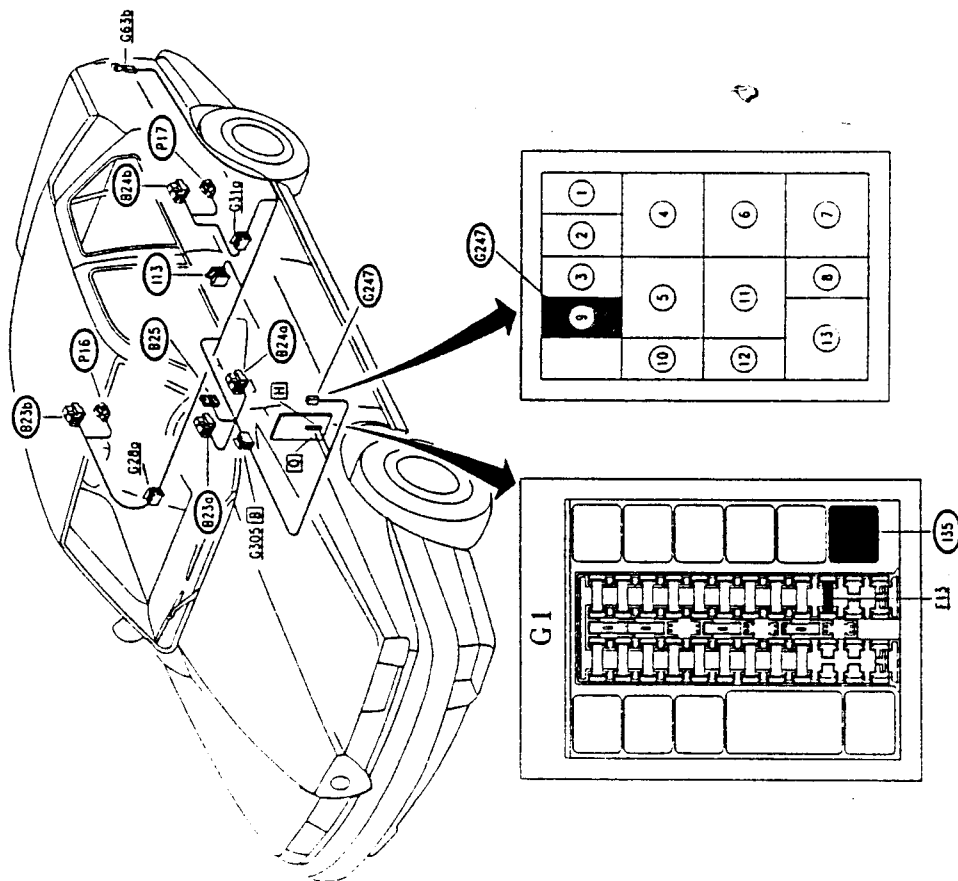
Rear power window consensus switch







LOCATION OF COMPONENTS



From chassis N.30.733  
 Up to chassis N.30.732  
 G247 = fuse holder BLUE

TROUBLESHOOTING

REAR POWER WINDOWS NOT WORKING

TEST A

NOTE: if the following circuits are also not working: windshield wipers, interior ventilator, rear windshield and rear view mirror demister, seal adjustment and heating, etc., check and if necessary replace the key-operated supply relay I35.

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK FUSE	OK	Carry out step A2
	- Check for damage of wander fuse G247	OK	Replace fuse (25A)
A2	CHECK FUSE	OK	Carry out step A3
	- Check for damage of fuse F13 in fusebox G1	OK	Replace fuse (20A)
A3	CHECK RELAY	OK	Carry out step A4
	- Check for correct functioning of rear power windows relay I13	OK	Replace relay I13
A4	CHECK SWITCH	OK	Carry out step A5
	- Check for correct functioning of rear power windows consensus switch B25: • with switch off check continuity between pins 3 and 2 ( and open circuit between pins 1 and 2 ) • vice-versa with the switch on	OK	Replace switch B25
A5	CHECK VOLTAGE	OK	Carry out step A6
	- With ignition key engaged, verify 12 V at pin 3 of switch B25 *	OK	Restore wiring between pin 3 of B25 and pin 116 of G1, across pin B3 of connector G305 and the solder (CHHT WHT and ORN)

(continued)

REAR POWER WINDOWS NOT WORKING		TEST A
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A6</b> CHECK VOLTAGE - With ignition key engaged and switch B25 in the off position, verify 12V at pin 85 of I13	OK OK	Carry out step A7 Restore wiring between pin 2 of B25 and pin 85 of I13 (WHT)
<b>A7</b> CHECK GROUND - With ignition key engaged and switch B25 at the on position, verify 0 V at pin 85 of I13	OK OK	Carry out step A8 Restore wiring between pin 1 of B25 and ground G63b, across pin 4 of B23a (BLK)
<b>A8</b> CHECK VOLTAGE - Verify 12V at pin 30 of I13	OK OK	Restore wiring between pin 86 of I13 and ground G63b (BLK) Restore wiring between pin 30 of I13 and pin O of G1, across pin B1 of connector G305, warden fuse G247 and the solder (RED)

REAR LEFT-HAND POWER WINDOW NOT WORKING		TEST B
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK VOLTAGE - With ignition key engaged and activating switch B24b in one of the two directions, verify 12 V between pins 1 and 2 of switch B24b	OK OK	Carry out step B2 Carry out step B3 Replace motor P17 Restore wiring between: • pin 2 of B24b and pin B of P17 (GRY-BLK) • pin 1 of B24b and pin A of P17 (GRY)
<b>B2</b> CHECK MOTOR - With ignition key engaged and activating switch B24b in one of the two directions, verify 12 V between pins A and B of motor P17	OK OK	Replace switch B24b Carry out step B4 Carry out step B5
<b>B3</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V between pin 3 and 4 of switch B24b, and between pin 5 and 4 of the same switch	OK OK	Restore wiring between pin 4 of B24b and ground G63b, across pin 2 of connector G31a (BLK)
<b>B4</b> CHECK GROUND - Check that pin 4 of B24b is grounded (0V)	OK OK	Restore wiring between: • pin 1 of B24a and pin 5 of B24b, across pin 4 of connector G31a (GRY and ORN-WHT) • pin 2 of B24a and pin 3 of B24b, across pin 1 of connector G31a (GRY-BLK and ORN-WHT)
<b>B5</b> CHECK VOLTAGE - With ignition key engaged and activating switch B24a in one of the two directions, verify 12 V between pins 1 and 2 of switch B24a	OK OK	Carry out step B6 Replace switch B24a Carry out step B7
<b>B6</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V between pin 3 and 4 of switch B24a, and between pin 5 and 4 of the same switch	OK OK	Restore wiring between: • pin 3 of B24a and pin 87 of relay I13, also across the solder (YEL-RED) • pin 5 of B24a and pin 87 of relay I13, also across the solder (YEL-RED)
<b>B7</b> CHECK GROUND - Check that pin 4 of B24a is grounded (0V)	OK OK	Restore wiring between pin 4 of B24a and ground G63b (BLK)

REAR RIGHT-HAND POWER WINDOW NOT WORKING

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK VOLTAGE	OK	Carry out step C2
	- With ignition key engaged and activating switch B23b in one of the two directions, verify 12 V between pins 1 and 2 of switch B23b	OK	Carry out step C3
C2	CHECK MOTOR	OK	Replace motor P16
	- With ignition key engaged and activating switch B23b in one of the two directions, verify 12 V between pins A and B of motor P16	OK	Restore wiring between: • pin 2 of B23b and pin B of P16 (GRY) • pin 1 of B23b and pin A of P16 (GRY-BLK)
C3	CHECK VOLTAGE	OK	Replace switch B23b
	- With ignition key engaged, verify 12 V between pin 3 and 4 of switch B23b, and between pin 5 and 4 of the same switch	OK	Carry out step C4
C4	CHECK GROUND	OK	Carry out step C5
	- Check that pin 4 of B23b is grounded (0V)	OK	Restore wiring between pin 4 of B23b and ground G63b, across pin 2 of connector G28a (BLK)
C5	CHECK VOLTAGE	OK	Restore wiring between: • pin 1 of B23a and pin 3 of B23b, across pin 4 of connector G28a (GRY-GRN and ORN-WHT) • pin 2 of B23a and pin 5 of B23b, across pin 1 of connector G28a (GRY-RED and ORN-GRN)
	- With ignition key engaged and activating switch B23a in one of the two directions, verify 12 V between pins 1 and 2 of switch B23a	OK	Carry out step C6
C6	CHECK VOLTAGE	OK	Replace switch B23a
	- With ignition key engaged, verify 12 V between pin 3 and 4 of switch B23a, and between pin 5 and 4 of the same switch	OK	Carry out step C7
C7	CHECK GROUND	OK	Restore wiring between: • pin 3 of B23a and pin 87 of relay I13, also across the solder (YEL-RED) • pin 5 of B23a and pin 87 of relay I13, also across the solder (YEL-RED)
	- Check that pin 4 of B23a is grounded (0V)	OK	Restore wiring between pin 4 of B23a and ground G63b (BLK)

# ADJUSTABLE HEATED SEATING

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## GENERAL DESCRIPTION

The front seats are available with an electrically operated mechanism enabling both driver and passenger to adjust the seats to the best position for driving and for comfort.

In addition, a heater (composed of two pads located in the cushion and in the backrest) makes it possible to warm the seats, eliminating the disadvantages which, in areas with a harsh climate, are caused by when the inside of the vehicle is cold after it has been left in the open for long periods.

The system of seat regulation is formed by three groups of electric motors which operate respectively on the runners for longitudinal regulation, the height adjustment mechanism and the tilt mechanism for the backrest.

These motors are actuated by special switches and the entire system is managed by a control unit which protects the circuits of the motors themselves and controls the operation (engagement, stop limit etc.). The control unit is located under the rear seat.

The system of seat warming is formed

by two resistors actuated by a switch and a relay; heating is interrupted automatically once a certain temperature is reached.

All the switches which control a seat are located on the seat itself one on each side. The switches are illuminated.

## FUNCTIONAL DESCRIPTION

The seating control unit N58 is supplied by the battery through fuse G240 (30A), and is connected to ground G63b; it receives a key-operated supply signal through the key-operated supply relay I35 and fuse F13 (20A) in fusebox G1.

The control unit N58 "manages" the operation of the three seat regulation groups for each seat, each group composed of two parallel electric motors (P30, P6 and P28 for the right-hand seat and P5, P7 and P29 for the left hand seat).

The motors are actuated by their respective switches (B63, B29 and B52 for the right-hand seat and B27, B28 and B54 for the left-hand seat), controlled by

the control unit N58

The switches are of the double control type: sending two signals to the motor, one inverting positive and negative in order to change the direction of travel.

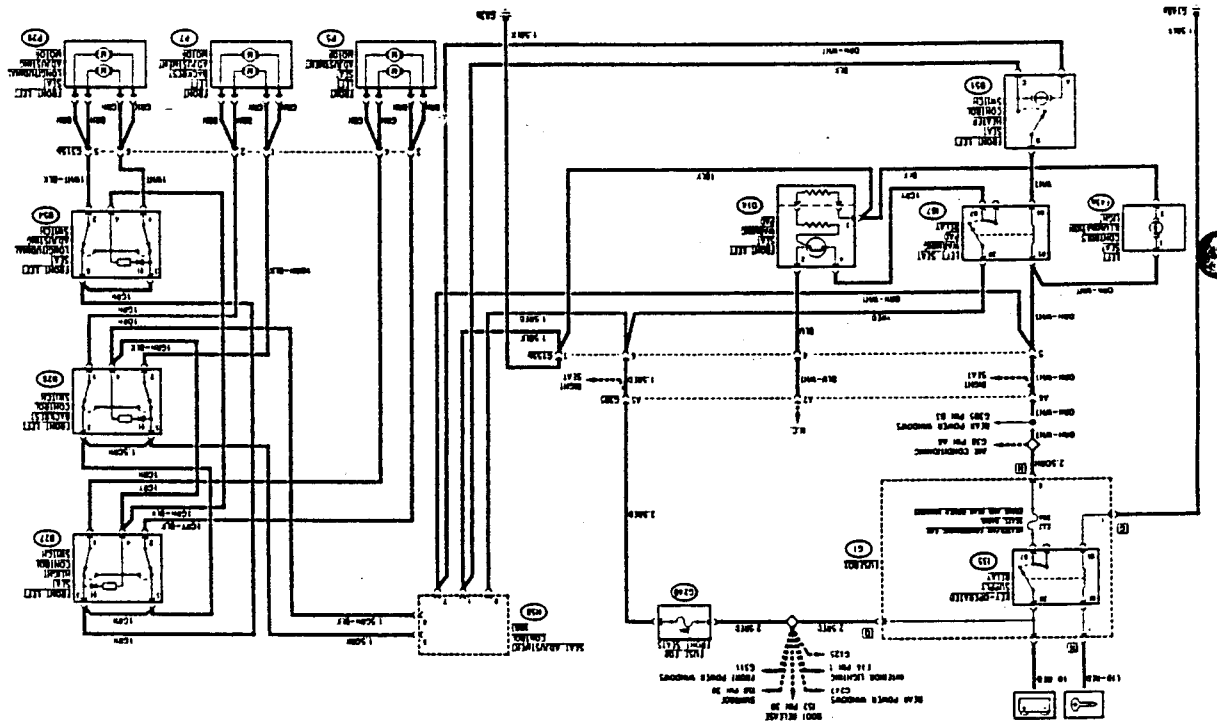
The seat warming pad relays I88 (right) and I87 (left) are turn-key supplied through key-operated supply relay I35 and fuse F13 (20A), both located in fusebox G1.

The warming pad resistance O17 (right-hand seat) and O14 (left-hand seat), connected to ground, are supplied respectively by battery voltage. This is actuated by switches B62 (right) and B51 (left) which, when closed, send a ground signal to the relative coil.

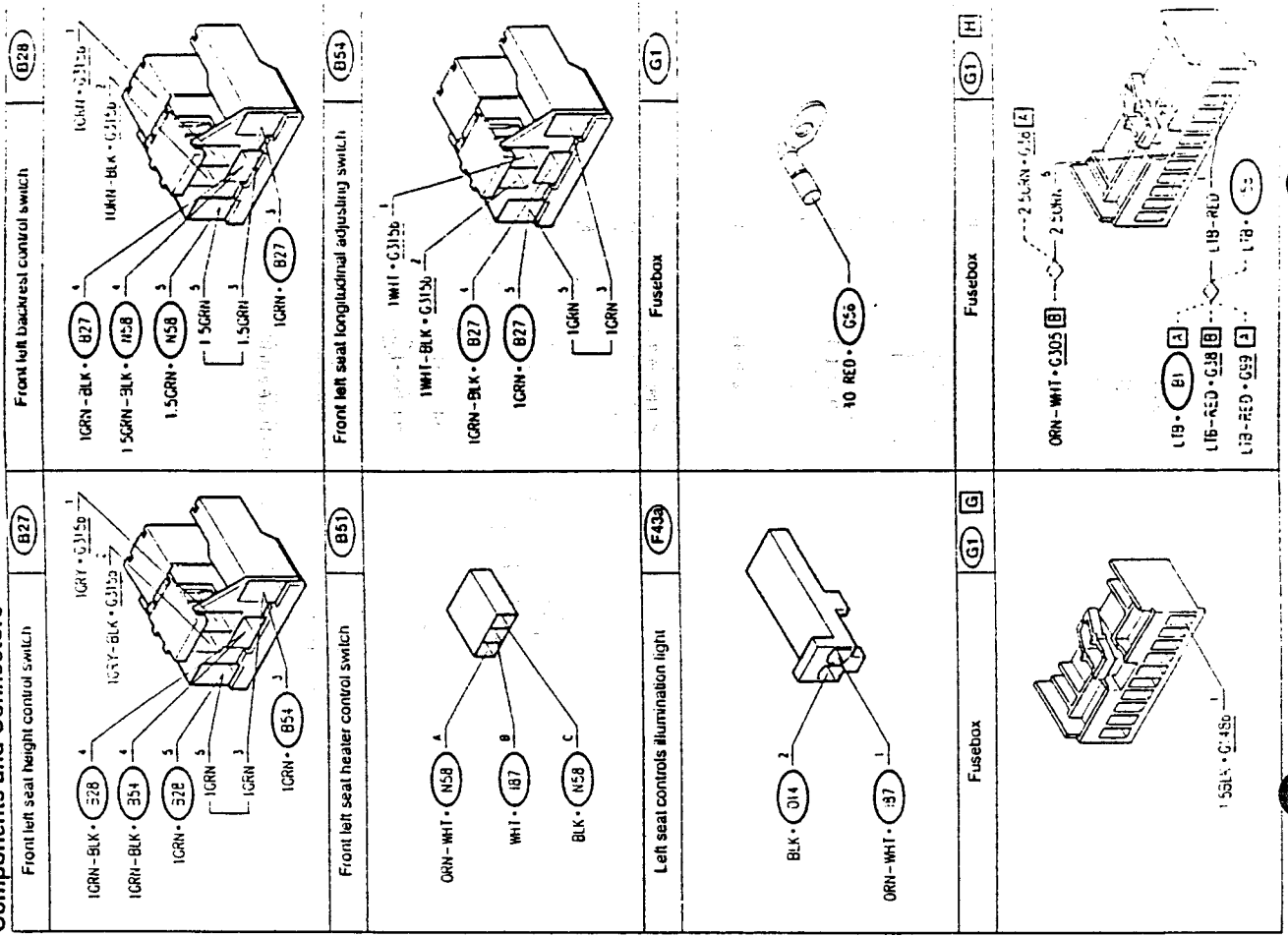
A thermal switch inside the warming pads automatically deactivates the resistances when a temperature of approximately 26°C is reached.

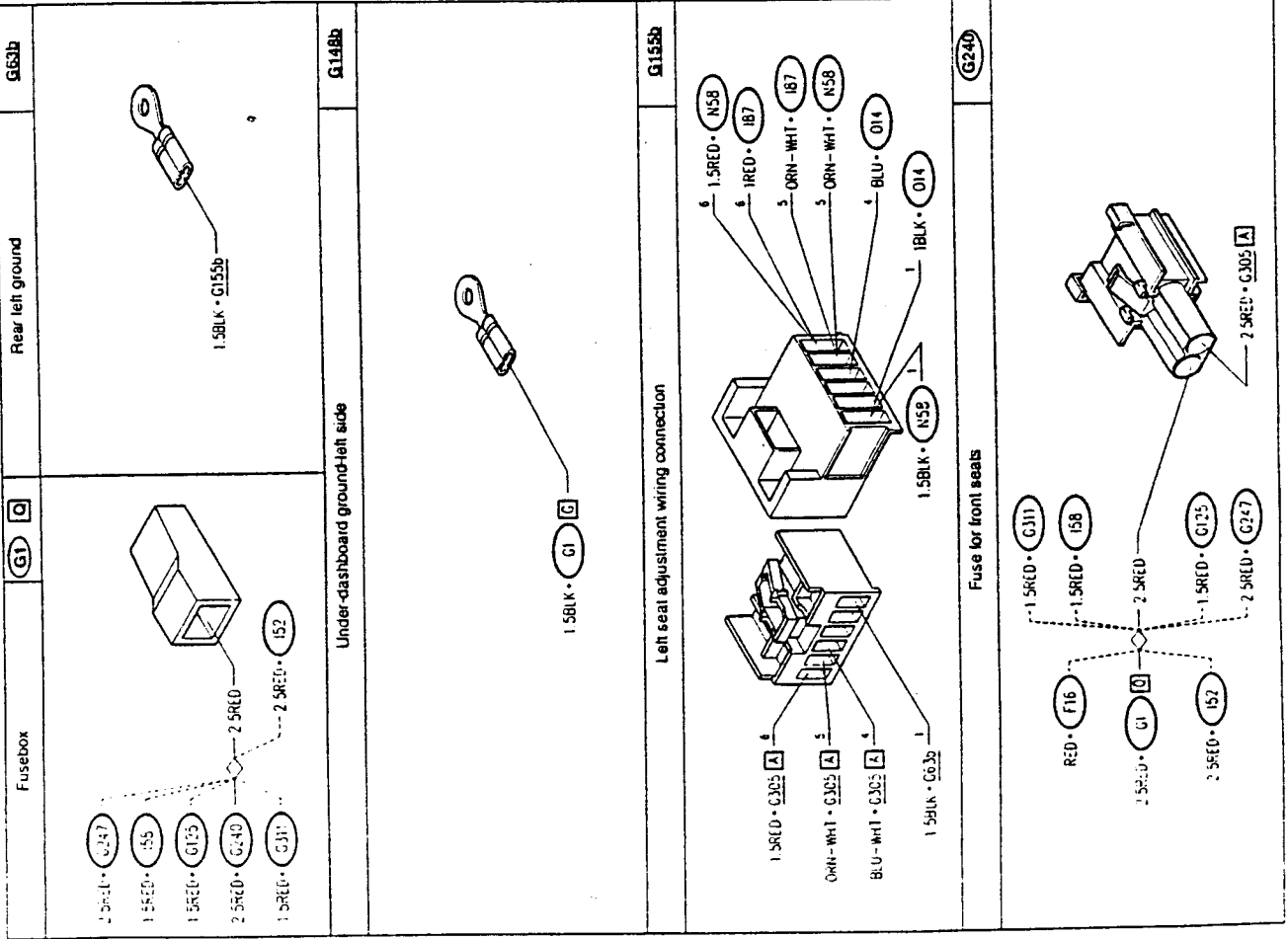
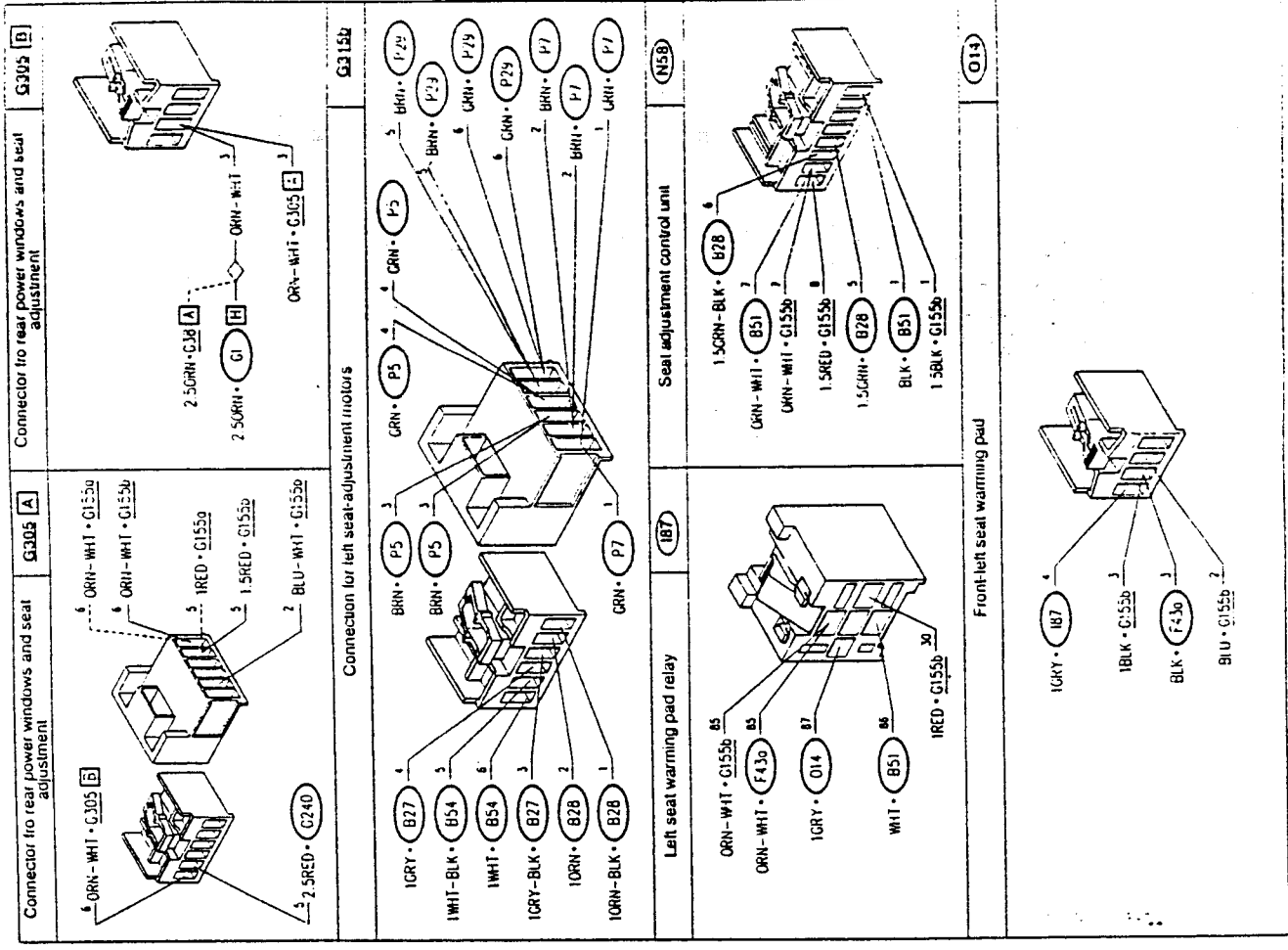
Two lamps light up the seat controls F43 and those inside switches B52 and B51 are turn-key supplied, and light up the ideograms indicating the functions of the various switches.

LEFT-HAND SEAT  
Wiring Diagram



Components and Connectors





24-7

ADJUSTABLE HEATED SEATING

RIGHT-HAND SEAT  
Wiring Diagram

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ADJUSTABLE HEATED SEATING

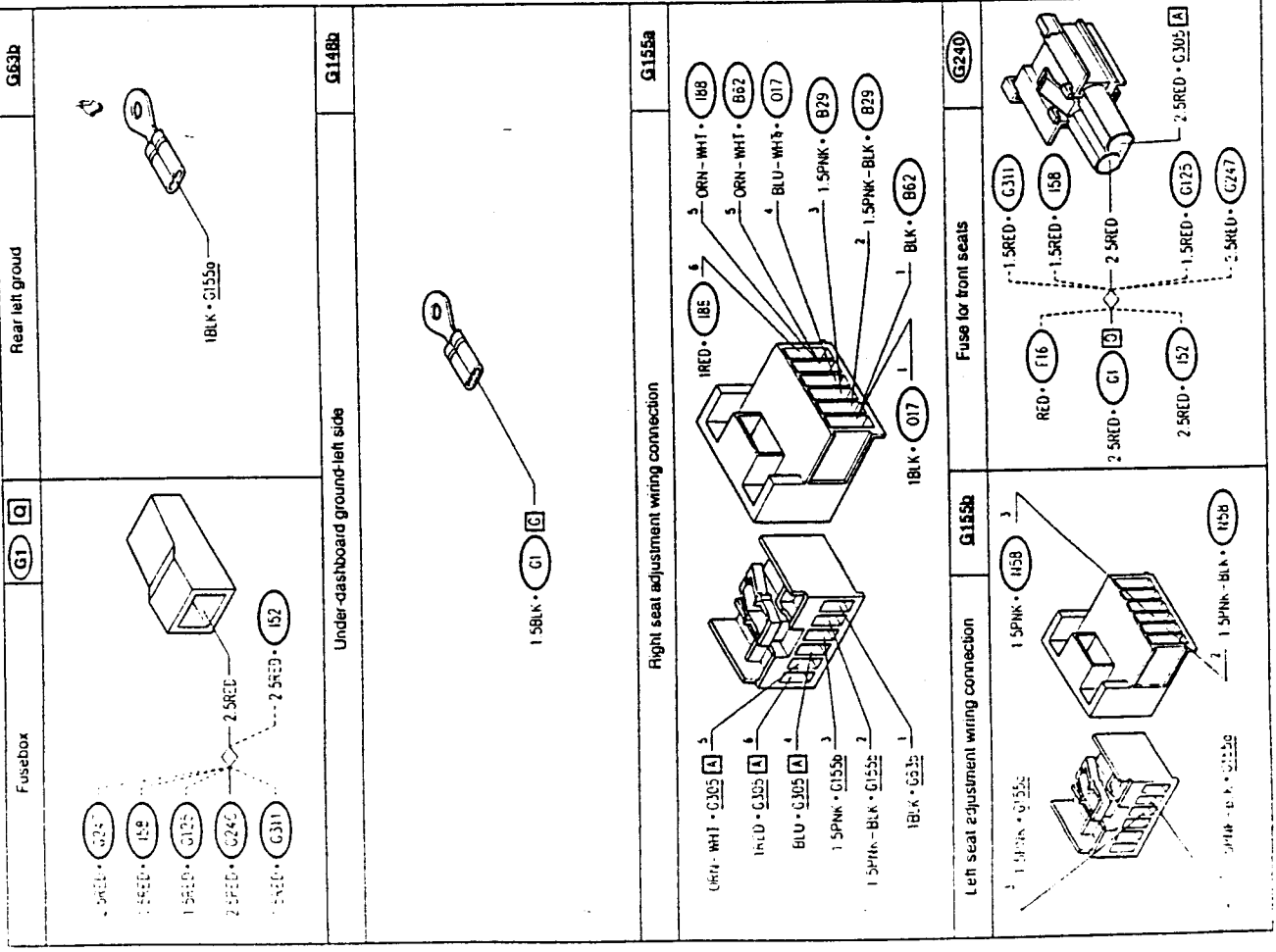
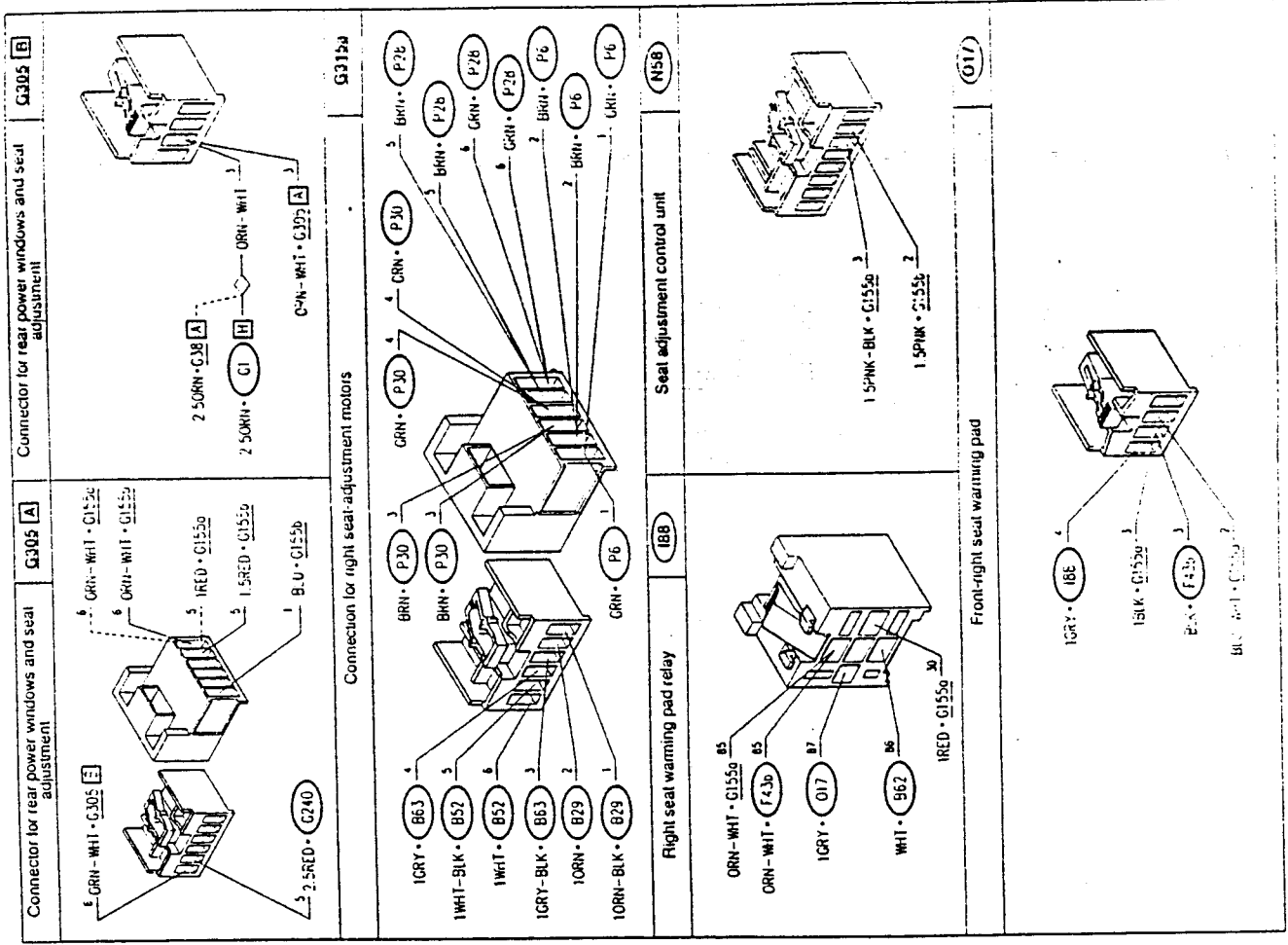
Components and Connectors

<p>Front right backrest control switch (B29)</p>	<p>Front right seat longitudinal adjusting switch (B52)</p>
<p>Front right seat heater control switch (B62)</p>	<p>Front right seat height control switch (B63)</p>
<p>Right seat controls illumination light (F43B)</p>	<p>Fusebox (G1)</p>
<p>Fusebox (G1)</p>	<p>Fusebox (G1)</p>

11-1993

PA-4655-F 1009002







TROUBLESHOOTING

SEAT ADJUSTMENT NOT WORKING		TEST A
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1 CHECK FUSE - Check for damage of wander fuse G240	OK <del>OK</del>	Carry out step A2 Replace fuse (30A)
A2 CHECK FUSE - Check for damage of fuse F13 in fusebox G1	OK <del>OK</del>	Carry out step A3 Replace fuse (20A)
A3 CHECK GROUND - Check that pin 1 of N58 is grounded (0V)	OK <del>OK</del>	Carry out step A4 Restore wiring between pin 1 of N58 and ground G63b, across pin 1 of connector G155b (BLK)
A4 CHECK VOLTAGE - Verify 12V at pin 8 of seat control unit N58	OK <del>OK</del>	Carry out step A6 Carry out step A5
A5 CHECK VOLTAGE - Verify 12V at one of the wander fuse terminals Q240	OK <del>OK</del>	Restore wiring between pin 8 of N58 and fuse Q240, across pin 6 of connector G155b and pin A5 of connector G305 (RED) Restore wiring between fuse Q240 and pin Q of G1, also across the solder (RED)
A6 CHECK VOLTAGE - With ignition key engaged, verify 12V at pin 7 of seat control unit N58	OK <del>OK</del>	Check and if necessary substitute the seat control unit N58 Restore wiring between pin 7 of N58 and pin H6 of G1, across pin 5 of connector G155b, pins A6 and B3 of connector G305 and the solder (GRN-WHT and ORN)

LONGITUDINAL ADJUSTMENT OF RIGHT-HAND SEAT NOT WORKING

TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1 CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 3 and 2 of control unit N58	OK <del>OK</del>	Carry out step B2 Check and if necessary replace control unit N58 N.B. In this case the other right-hand seat adjustment functions will also not be working
B2 CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 3 and 4 of switch B52, and also between pins 5 and 4 of the same	OK <del>OK</del>	Carry out step B3 Restore wiring between: • pin 4 of B52 and pin 3 of control unit N58, across pin 4 of B63, pin 4 of B29, pin 2 of connector G155a and pin 2 of connector G155b (PNK-BLK) • pin 3 and 5 of B52 and pin 2 of control unit N58, across pin 3 and 5 of B63, pin 3 and 5 of B29, pin 3 of connector G155a and pin 3 of connector G155b (P-1JK)
B3 CHECK SWITCH - With ignition key engaged and operating switch B52 in one of the two directions, verify 12 V between pins 1 and 2 of B52	OK <del>OK</del>	Carry out step B4 Substitute switch B52
B4 CHECK MOTORS - With ignition key engaged and operating switch B52 in one of the two directions, verify 12 V between pins 6 and 5 of connector G315a	OK <del>OK</del>	Check wiring between connector G315a and motors P28 (GRN and BRN), or replace P28 motors if faulty Restore wiring between: • pin 2 of B52 and pin 5 of G315a (WHT-BLK) • pin 1 of B52 and pin 6 of G315a (WHT)

BACKREST ADJUSTMENT OF RIGHT-HAND SEAT NOT WORKING TEST C

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK VOLTAGE	OK	Carry out step C2  Check and if necessary replace control unit N58 N.B. In this case the other functions of the right-hand seat will also not be working
	- With ignition key engaged, verify 12V between pins 3 and 2 of control unit N58	<del>OK</del>	
C2	CHECK VOLTAGE	OK	Carry out step C3  Restore wiring between: • pin 4 of B29 and pin 3 of control unit N58, across pin 2 of connector G155a and pin 2 of connector G155b (PNK-BLK) • pin 3 and 5 of B29 and pin 2 of control unit N58, across pin 3 of connector G155a and pin 3 of connector G155b (PNK)
	- With ignition key engaged, verify 12V between pins 3 and 4 of switch B29, and also between pins 5 and 4 of the same	<del>OK</del>	
C3	CHECK SWITCH	OK	Carry out step C4  Substitute switch B29
	- With ignition key engaged and operating switch B29 in one of the two directions, verify 12 V between pins 1 and 2 of B29	<del>OK</del>	
C4	CHECK MOTORS	OK	Check wiring between connector G315a and motors P6 (GRN and BRN), or replace faulty motors P6  Restore wiring between: • pin 1 of B29 and pin 2 of G315a (ORN) • pin 2 of B29 and pin 1 of G315a (ORN-BLK)
	- With ignition key engaged and operating switch B29 in one of the two directions, verify 12 V between pins 1 and 2 of connector G315a	<del>OK</del>	

HEIGHT ADJUSTMENT OF RIGHT-HAND SEAT NOT WORKING TEST D

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
D1	CHECK VOLTAGE	OK	Carry out step D2  Check and if necessary replace control unit N58 N.B. In this case the other functions of the right-hand seat will also not be working
	- With ignition key engaged, verify 12V between pins 3 and 2 of control unit N58	<del>OK</del>	
D2	CHECK VOLTAGE	OK	Carry out step D3  Restore wiring between: • pin 4 of B63 and pin 3 of control unit N58, across pin 4 of B29, pin 2 of connector G155a and pin 2 of connector G155b (PNK-BLK) • pin 3 and 5 of B52 and pin 2 of control unit N58, across pin 3 and 5 of B29, pin 3 of connector G155a and pin 3 of connector G155b (PNK)
	- With ignition key engaged, verify 12V between pins 3 and 4 of switch B63, and also between pins 5 and 4 of the same	<del>OK</del>	
D3	CHECK SWITCH	OK	Carry out step D4  Substitute switch B63
	- With ignition key engaged and operating switch B63 in one of the two directions, verify 12 V between pins 1 and 2 of B63	<del>OK</del>	
D4	CHECK MOTORS	OK	Check wiring between connector G315a and motors P30 (GRN and BRN), or replace P30 motors if faulty  Restore wiring between: • pin 2 of B63 and pin 3 of G315a (GRY-BLK) • pin 1 of B63 and pin 4 of G315a (GRY)
	- With ignition key engaged and operating switch B63 in one of the two directions, verify 12 V between pins 3 and 4 of connector G315a	<del>OK</del>	

LONGITUDINAL ADJUSTMENT OF LEFT-HAND SEAT NOT WORKING TEST E

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 6 and 5 of control unit N58	OK <del>OK</del>	Carry out step E2  Check and if necessary replace control unit N58 N.B. In this case the other functions of the left-hand seat will also not be working
E2	CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 3 and 4 of switch B54, and also between pins 5 and 4 of the same	OK <del>OK</del>	Carry out step E3  Restore wiring between: • pin 4 of B54 and pin 6 of control unit N58, across pin 4 of B27 and pin 4 of B28 (GRN-BLK) • pin 3 and 5 of B54 and pin 5 of control unit N58, across pin 3 and 5 of B27, and pin 3 and 5 of B28 (GRN)
E3	CHECK SWITCH - With ignition key engaged and operating switch B54 in one of the two directions, verify 12 V between pins 1 and 2 of the same B54	OK <del>OK</del>	Carry out step E4  Substitute switch B54
E4	CHECK MOTORS - With ignition key engaged and operating switch B54 in one of the two directions, verify 12 V between pins 6 and 5 of connector G315b	OK <del>OK</del>	Check wiring between connector G315b and motors P29 (GRN and BRN), or replace motors P29 if faulty  Restore wiring between: • pin 2 of B54 and pin 5 of G315b (WHT-BLK) • pin 1 of B54 and pin 6 of G315b (WHT)

BACKREST ADJUSTMENT OF LEFT-HAND SEAT NOT WORKING TEST F

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F1	CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 6 and 5 of control unit N58	OK <del>OK</del>	Carry out step F2  Check and if necessary replace control unit N58 N.B. In this case the other functions of the left hand seat will also not be working
F2	CHECK VOLTAGE - With ignition key engaged, verify 12V between pins 3 and 4 of switch B28, and also between pins 5 and 4 of the same	OK <del>OK</del>	Carry out step F3  Restore wiring between: • pin 4 of B28 and pin 6 of control unit N58, (if it is BLK) • pin 3 and 5 of B28 and pin 5 of control unit N58 (GRN)
F3	CHECK SWITCH - With ignition key engaged and operating switch B28 in one of the two directions, verify 12 V between pins 1 and 2 of B28	OK <del>OK</del>	Carry out step F4  Substitute switch B28
F4	CHECK MOTORS - With ignition key engaged and operating switch B28 in one of the two directions, verify 12 V between pins 1 and 2 of connector G315b	OK <del>OK</del>	Check wiring between connector G315b and motors P7 (GRN and BRN), or replace P7 motors if faulty  Restore wiring between: • pin 1 of B28 and pin 2 of G315b (ORH) • pin 2 of B28 and pin 1 of G315b (ORH BLK)

HEIGHT ADJUSTMENT OF LEFT-HAND SEAT NOT WORKING TEST G

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G1	CHECK VOLTAGE	OK	Carry out step G2
	- With ignition key engaged, verify 12V between pins 6 and 5 of control unit N58	<del>OK</del>	Check and if necessary replace control unit N58 N.B. In this case the other functions of the left-hand seat will also not be working
G2	CHECK VOLTAGE	OK	Carry out step G3
	- With ignition key engaged, verify 12V between pins 3 and 4 of switch B27, and also between pins 5 and 4 of the same	<del>OK</del>	Restore wiring between: • pin 4 of B27 and pin 6 of control unit N58, across pin 4 of B28 (GRN-BLK) • pin 3 and 5 of B27 and pin 5 of control unit N58, across pin 3 and 5 of B28 (GRN)
G3	CHECK SWITCH	OK	Carry out step G4
	- With ignition key engaged and operating switch B27 in one of the two directions, verify 12 V between pins 1 and 2 of B27	<del>OK</del>	Substitute switch B27
G4	CHECK MOTORS	OK	Check wiring between connector G315b and motors P5 (GRN and BRN), or replace faulty motors P5
	- With ignition key engaged and operating switch B27 in one of the two directions, verify 12 V between pins 3 and 4 of connector G315b	<del>OK</del>	Restore wiring between: • pin 2 of B27 and pin 3 of G315b (GRY-BLK) • pin 1 of B27 and pin 4 of G315b (GRY)

RIGHT-HAND SEAT HEATER NOT WORKING TEST H

NOTE: before carrying out this test, ensure that the seat adjustment mechanism is operating correctly, if not carry out test A and, if necessary, the successive tests before following the indications given below.

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
H1	CHECK RELAY	OK	Carry out step H2
	- Check for correct operation of right-hand seat heater relay I88	<del>OK</del>	Replace relay I88
H2	CHECK HEATER	OK	Check and if necessary replace the resistances of heater O17.
	- With ignition key engaged, switch on the seat heater and verify 12 V between pins 3 and 4 of heater O17	<del>OK</del>	N.B. If the heater is working, but doesn't switch off automatically when a set temperature is reached (approx. 26°C), check the thermal switch and if necessary replace it
H3	CHECK GROUND	OK	Carry out step H4
	- Check that pin 3 of O17 is grounded (0V)	<del>OK</del>	Restore wiring between pin 3 of O17 and ground G63b, across pin 1 of connector G155a (BLK)
H4	CHECK VOLTAGE	OK	Restore wiring between pin 87 of I88 and pin 4 of O17 (GRY)
	- With ignition key engaged and heater on, verify 12 V at pin 87 of relay I88	<del>OK</del>	Carry out step H5
H5	CHECK VOLTAGE	OK	Carry out step H6
	- With ignition key engaged, verify 12V at pin 85 of relay I88	<del>OK</del>	Restore wiring between pin 85 of I88 and pin 16 of G1, across pin 5 of connector G155a, pins A6 and B1 of connector G305 and the solder (GRN-WHT and GRN)
H6	CHECK VOLTAGE	OK	Carry out step H7
	- Verify 12 V at pin 30 of relay I88	<del>OK</del>	Restore wiring between pin 30 of I88 and pin 9 of G1, across pin 6 of connector G155a, pin A5 of connector G305, warden fuse G240 and the solder (RED)

RIGHT-HAND SEAT HEATER NOT WORKING		TEST H
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
H7 CHECK SWITCH - With heater on, check continuity between pins B and C of right hand seat heater control switch B62	OK <del>OK</del>	Carry out step H8 Substitute switch B62
H8 CHECK GROUND - Check that pin C of switch B62 is grounded (0V)	OK <del>OK</del>	Restore wiring between pin B of B62 and pin 86 of relay I88 (WHIT) Restore wiring between pin C of B62 and ground G63b, across pin 1 of connector G155a (BLK)

LEFT-HAND SEAT HEATER NOT WORKING

NOTE: before carrying out this test, ensure that the seat adjustment mechanism is operating correctly; if not carry out test A and, if necessary, the successive tests before following the indications given below.

LEFT-HAND SEAT HEATER NOT WORKING		TEST I
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
I1 CHECK RELAY - Check for correct operation of left-hand seat heater relay I87	OK <del>OK</del>	Carry out step I2 Substitute relay I87
I2 CHECK HEATER - With ignition key engaged, switch on the seat heater and verify 12 V between pins 3 and 4 of heater O14	OK <del>OK</del>	Check and if necessary replace the resistances of heater O14. N.B. If the heater is working, but doesn't switch off automatically when a set temperature is reached (approx. 26°C) check the thermal switch and if necessary replace it
I3 CHECK GROUND - Check that pin 3 of O14 is grounded (0V)	OK <del>OK</del>	Carry out step I3 Carry out step I4 Restore wiring between pin 3 of O14 and ground G63b, across pin 1 of connector G155b (BLK)

(continues)

LEFT-HAND SEAT HEATER NOT WORKING		TEST I
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
I4 CHECK VOLTAGE - With ignition key engaged and heater on, verify 12 V at pin 87 of relay I87	OK <del>OK</del>	Restore wiring between pin 87 of I87 and pin 4 of O14 (GRY) Carry out step I5
I5 CHECK VOLTAGE - With ignition key engaged, verify 12V at pin 85 of relay I87	OK <del>OK</del>	Carry out step I6 Restore wiring between pin 85 of I87 and pin I16 of G1, across pin 5 of connector G155b, pins A6 and B3 of connector G305 and the solder (OHT-WHT and C/H/T)
I6 CHECK VOLTAGE - Verify 12 V at pin 30 of relay I87	OK <del>OK</del>	Carry out step I7 Restore wiring between pin 30 of I87 and pin O of G1, across pin 6 of connector G155b, pin A5 of connector G305, warden fuse G240 and the solder (H/L/D)
I7 CHECK SWITCH - A heater on, check continuity between pins B and C of left-hand seat heater control switch B51	OK <del>OK</del>	Carry out step I8 Substitute switch B51
I8 CHECK GROUND - Check that pin C of switch B51 is grounded (0V)	OK <del>OK</del>	Restore wiring between pin B of B51 and pin I8b of relay I87 (WHT) Restore wiring between pin C of B51 and ground G63b, across pin 1 of control unit N58 and pin 1 of connector G155b (BLK)

RIGHT-HAND SEAT CONTROLS DO NOT LIGHT UP

TEST J

NOTE: however seat adjustment functions normally

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
J1	CHECK BULB	OK	Substitute bulb of F43b
	- Verify, with ignition key engaged, 12 V between pins 1 and 2 of light F43b	OK	Carry out step J2
J2	CHECK GROUND	OK	Restore wiring between pin 1 of F43b and pin 85 of relay 1B8 (ORN-WHT)
	- Check that pin 2 of F43b is grounded (0V)	OK	Restore wiring between pin 2 of F43b and pin 3 of O17 (BLK)

LEFT-HAND SEAT CONTROLS DO NOT LIGHT UP

TEST K

NOTE: however seat adjustment functions normally

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
K1	CHECK BULB	OK	Substitute bulb of F43a
	- Verify, with ignition key engaged, 12 V between pins 1 and 2 of light F43a	OK	Carry out step K2
K2	CHECK GROUND	OK	Restore wiring between pin 1 of F43a and pin 85 of relay 1B7 (ORN-WHT)
	- Check that pin 2 of F43a is grounded (0V)	OK	Restore wiring between pin 2 of F43a and pin 3 of O14 (BLK)

RIGHT-HAND SEAT HEATER CONTROLS DO NOT LIGHT UP

TEST L

NOTE: however the seat heater functions normally

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
L1	CHECK BULB	OK	Substitute bulb in B62
	- Verify, with ignition key engaged, 12 V between pins A and C of switch B62	OK	Restore wiring between pin A of B62 and pin 5 of connector G155a (ORN-WHT)

LEFT-HAND SEAT HEATER CONTROLS DO NOT LIGHT UP

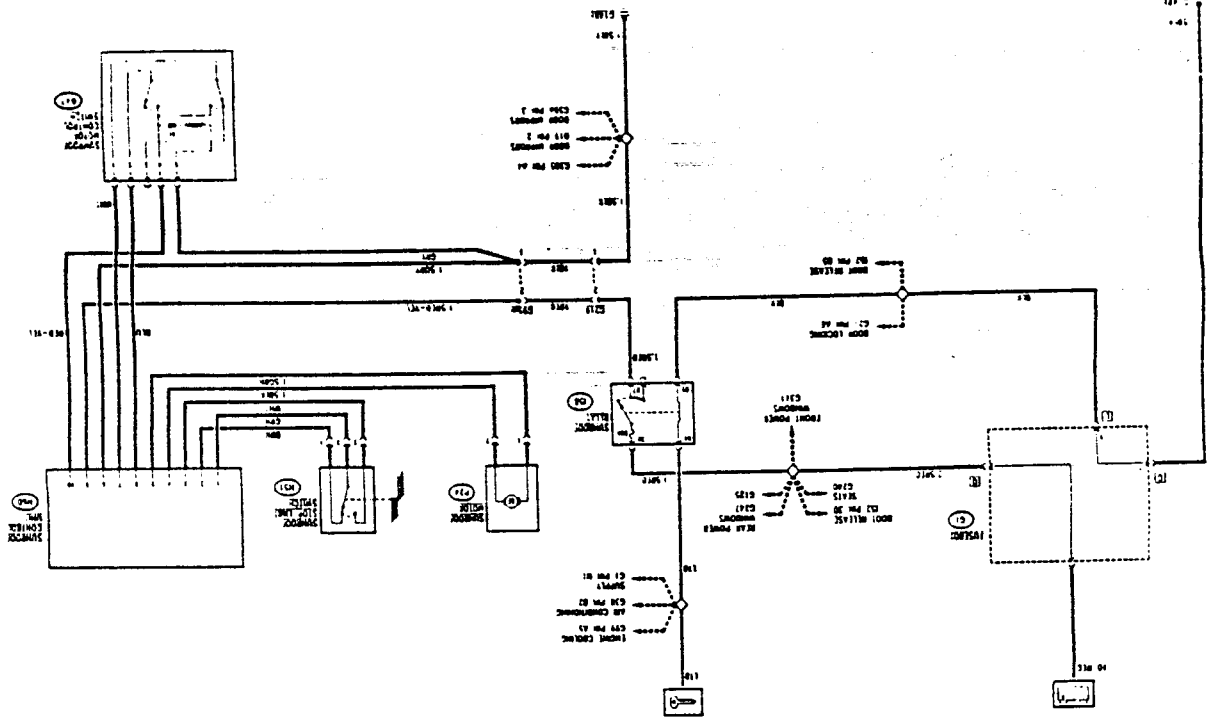
TEST M

NOTE: however seat heating functions normally

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
M1	CHECK BULB	OK	Substitute bulb in B51
	- Verify, with ignition key engaged, 12 V between pins A and C of switch B51	OK	Restore wiring between pin A of B62 and pin 5 of connector G155b, across pin 7 of control unit N56 (ORN-WHT)



WIRING DIAGRAM (INALFA Version)



# SUNROOF

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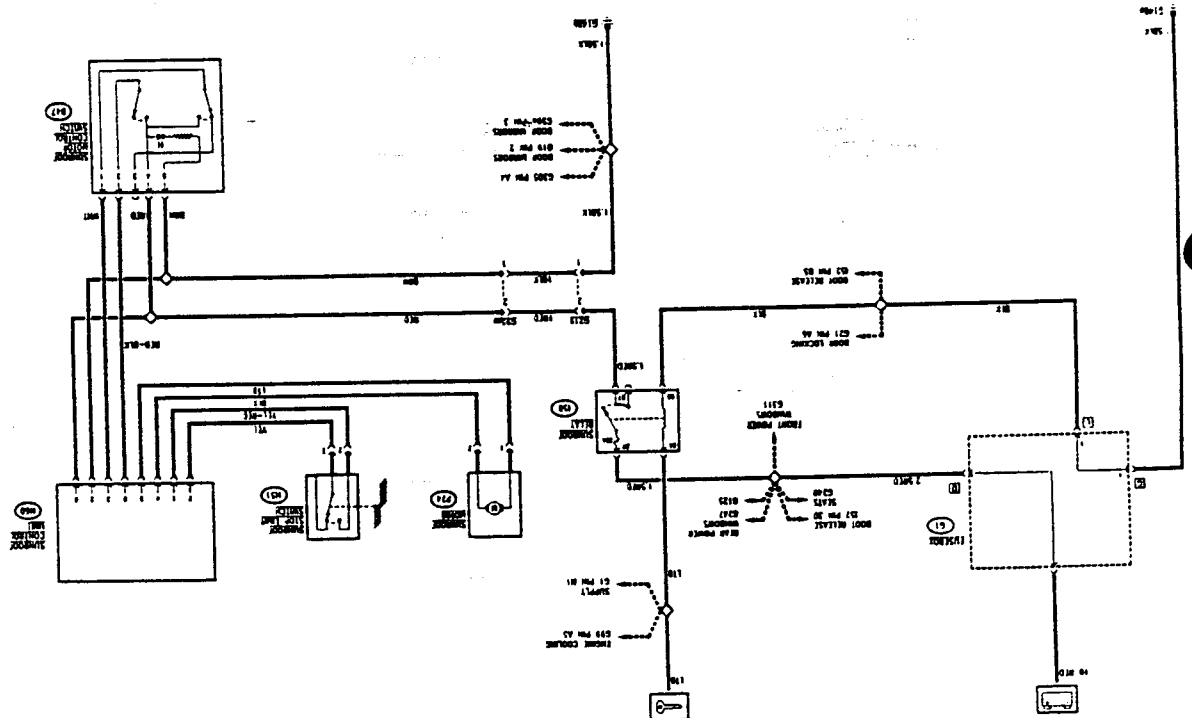
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WIRING DIAGRAM (WEBASTO Version)



FOREWORD

Two different versions of the sunroof fitted to the 155 are supplied:

- up to chassis N... supplier INALFA
- from chassis N... supplier WEBASTO.

The second model is composed of a single compact control unit component group, switch and motor but the operation logic is the same.

The two versions are identical from the outside.

For the mechanical part of the two versions refer to the manual "155 - REPAIR INSTRUCTIONS - MECHANICAL GROUPS - Group 75".

GENERAL DESCRIPTION

The sliding roof permits an additional ventilation of the passenger compartment during warm weather and when necessary will guarantee a rapid air recirculation, and therefore increase passenger comfort.

The mobile part of the roof is composed of a plexiglass panel and an interior sliding blind which enters the space between roof and interior roof panel.

A double switch located near the central front roof light activates an electric motor which operates in two different ways: in the first, the motor raises the panel to the "quarter light" position and in the second opens the panel while at the same time drawing back the blind.

When the roof is subsequently closed, the blind, which can also be manually operated, is "accompanied" for a short stretch of the advancing panel (for greater details refer to "REPAIR MANUAL-BODY", Group 75).

The entire system is electronically controlled by a control unit which regulates the various functions.

The roof can only be opened when the ignition key is inserted.

FUNCTIONAL DESCRIPTION (INALFA Sunroof)

The sunroof control system is supplied by a relay I58, with an incorporated 30A protecting fuse. The relay I58 is turn-key excited and supplies the sunroof control unit N60.

This control unit N60 receives the activation signals via switch B47, and sends command signals to the motor P24; the stop limit switch H51 signals the position of the sunroof to the control unit and stops the motor as necessary.

FUNCTIONAL DESCRIPTION (WEBASTO Sunroof)

The sunroof's command system is supplied by relay I58 with a built-in 30A fuse. The power supply for the system is only activated when the ignition key is engaged at pin 2 of the connection G95m. Pin 1 of this connection supplies the reference earth.

The system is composed of a single functional unit composed of:

- control unit N60;
- command switch B47;
- motor P24;
- stop limit contact H51.

The control unit N60 receives the activation signal from switch B47 and commands the motor P24, taking any stop limit signals originating from switch H51 into account.

The system operates, according to the following logic:

The switch B47 commands the opening or closing of the sunroof. Pin 4 of the switch is supplied with 12V. When the button is activated in one direction it controls the opening of the roof closing the contact on pin 2 delivering 12 V to pin 8 of the control unit. If the switch is operated in the opposite direction the roof is closed, closing the contact on pin 1 and sending 12 V to pin 3 of the control unit.

Control unit N60 is supplied with 12V at pin 6 while pin 2 is earthed.

Pins 3 and 8 receive command signals from the switch B47; pins 1 and 7 are connected with the stop limit switch H51 in which the contact is closed when the roof is completely closed. It opens as soon as the motor is activated.

Pins 4 and 5 are connected to motor P24 activating it in the two directions sending 12V and earth to pins A and B in accordance with the following logic:

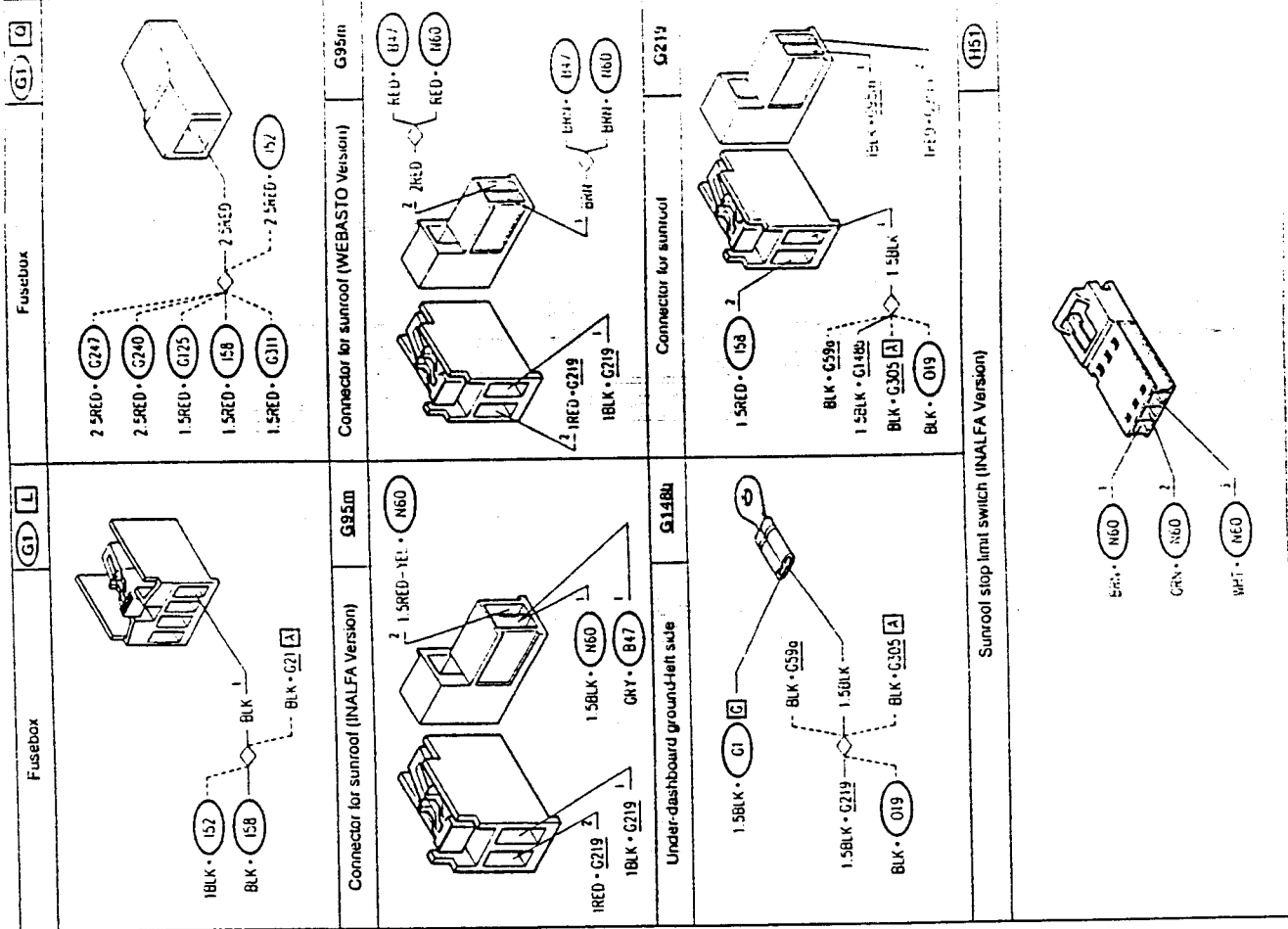
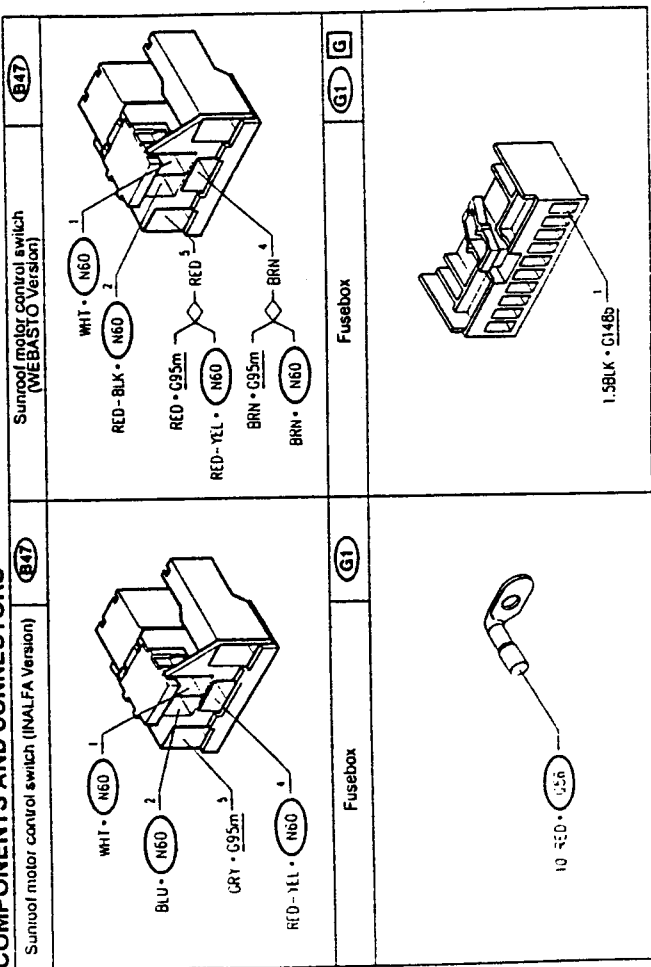
- sunroof closed or completely open earth at both pin A and pin B (motor is stationary)
- roof closing horizontally 12 V to pin B, earth at pin A
- roof opening horizontally 12 V to pin A and earth at pin B
- deflector opening 12 V at pin B and earth at pin A
- deflector closing 12 V at pin A and earth at pin B

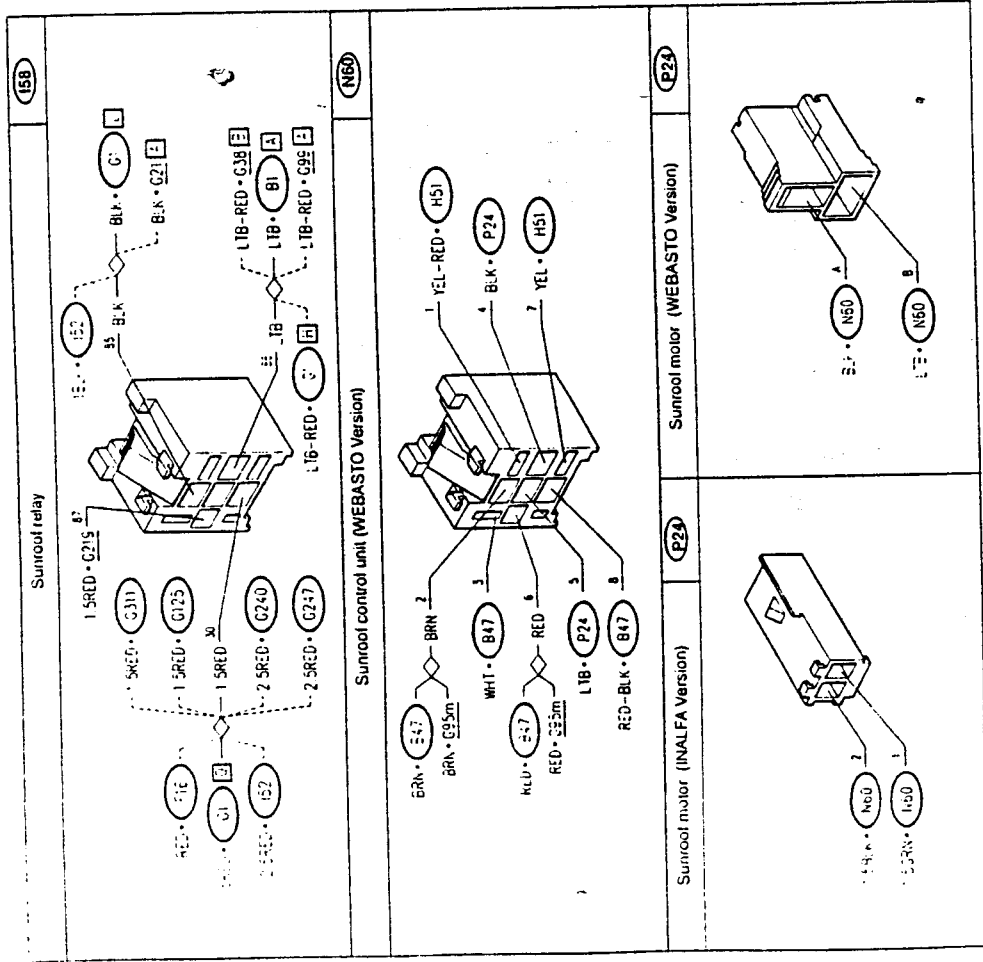
**TROUBLESHOOTING TABLE**

Malfunction	Component				Test
	15B	N60	P24	B47	
Sunroof not working	•	•	•	•	A
Sunroof does not close correctly		•			B/C

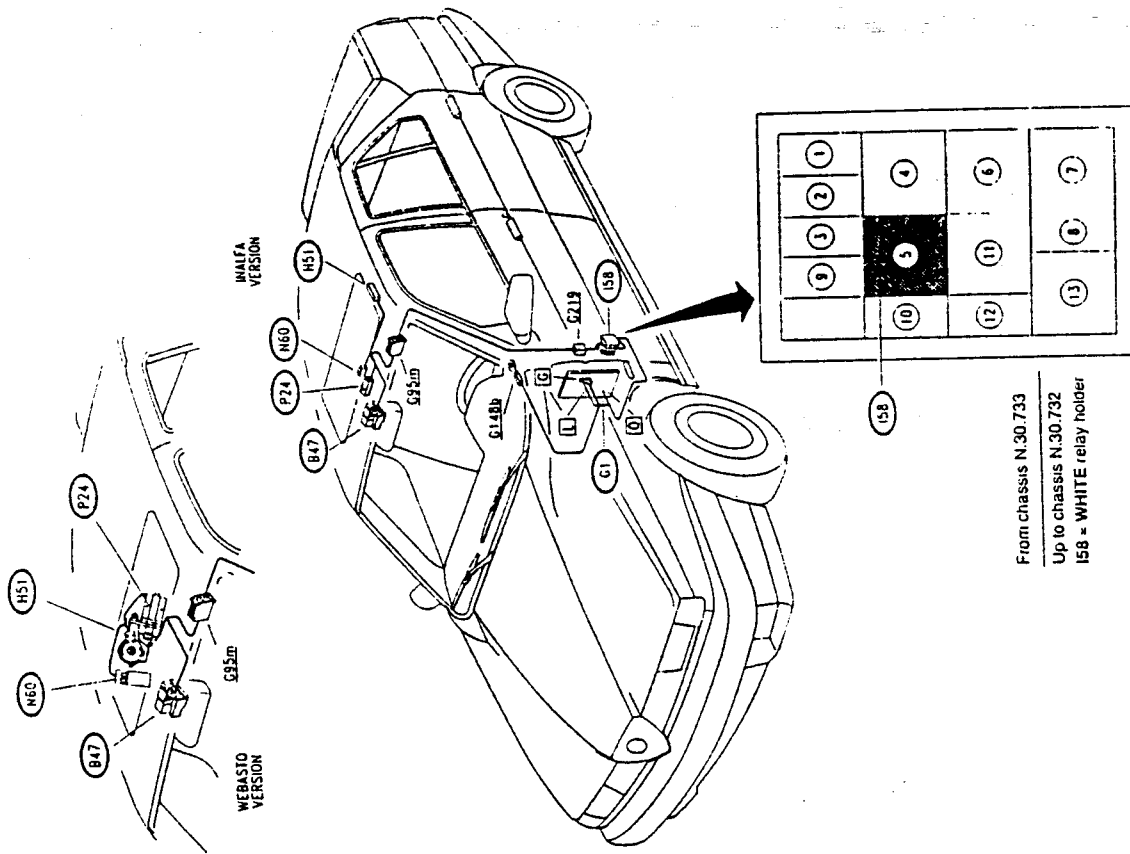
(\*) WEBASTO version: P24 and H51 are grouped together in a single sunroof command unit N60

**COMPONENTS AND CONNECTORS**





LOCATION OF COMPONENTS



TROUBLESHOOTING

SUNROOF NOT WORKING

TEST A

NOTE: the sun roof may suffer malfunctions affecting the mechanical parts: blockage, noises, vibrations etc. In this test only the malfunctions of an electric type are considered: if no solution is found refer to the "REPAIR MANUAL - BODY", Group 75.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK RELAY</b> - Check for correct functioning of sunroof relay I58, with relative fuse	OK	Carry out step A2
	<del>OK</del>	Replace relay I58 or fuse (30A)
<b>A2 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V between pins 1 and 2 of connector G95m	OK	Carry out step A7
	<del>OK</del>	Carry out step A3
<b>A3 CHECK GROUND</b> - Check that pin 1 of G95m is grounded (0V)	OK	Carry out step A4
	<del>OK</del>	Restore wiring between pin 1 of G95m and ground G148b, across pin 1 of connector G219 and the solder (BLK)
<b>A4 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V at pin 87 of relay I58	OK	Restore wiring between pin 87 of I58 and pin 2 of G95m, across pin 2 of connector G219 (RED)
	<del>OK</del>	Carry out step A5
<b>A5 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V at pin 86 of relay I58	OK	Carry out step A6
	<del>OK</del>	Restore wiring between pin 86 of I58 and the ignition switch, also across the solder (LTB)
<b>A6 CHECK VOLTAGE</b> - Verify 12V at pin 30 of relay I58	OK	Restore wiring between pin 85 of I58 and pin L1 of G1, also across the solder (BLK)
	<del>OK</del>	Restore wiring between pin 30 of I58 and pin Q of G1, also across the solder (RED)

(continues)

SUNROOF NOT WORKING

TEST A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A7 CHECK VOLTAGE</b> - With ignition key engaged, check for 12V between (INALFA version) pins 8 and 9 of the sunroof control unit N60 • (WEBASTO version) pins 2 and 6 of N60	OK	Proceed to step A8
	<del>OK</del>	Restore wiring between: • (INALFA version) • pin 2 of G95m and pin 9 of N60 (RED-YEL) • pin 1 of G95m and pin 8 of N60 (GRY) • (WEBASTO version) • pin 2 of G95m and pin 6 of N60 (RED) • pin 1 of G95m and pin 2 of N60 (BRR)
<b>A8 CHECK VOLTAGE</b> - Activate the sunroof and check for 12V between pins 4 and 5 of control unit N60	OK	Proceed to step A9
	<del>OK</del>	Proceed to step A10
<b>A9 CHECK VOLTAGE</b> - Activate the sunroof and check for 12V between pins 1 and 2 (INALFA version) or A and B (WEBASTO version) of the pump motor P24: • roof closed or completely open: check that earth is at pin A2 and B/1 (the motor is stationary); • Roof closing horizontally: 12V at pin B/1, earth at pin A2 • roof closing horizontally: 12V at pin A2 earth at pin B/1 • opening quarterlight: 12V at pin B/1 earth at pin A2 • quarterlight closing: 12V at pin A2 earth at pin B/1	OK	Replace the sunroof motor P24 (WEBASTO version: the entire sunroof group)
	<del>OK</del>	Restore the wiring between: • (INALFA version) • pin 2 of P24 and pin 4 of control unit N60 (GHN) • pin 1 of P24 and pin 5 of control unit N60 (BLK) • (WEBASTO version) • pin A of P24 and pin 4 of control unit N60 (BLK) • pin B of P24 and pin 5 of control unit N60 (LTB)
<b>A10 CHECK SWITCH</b> - Open the sunroof (or lower it down from the quarterlight position) and check for continuity between pins 2 and 4 of switch B47. Close the sunroof (or open to the quarterlight position) and check for continuity between pins 1 and 4 of B47	OK	Proceed to step A11
	<del>OK</del>	Replace switch B47
<b>A11 CHECK CONTINUITY</b> - Operate as in step A10 and check for continuity between pins of N60 (wiring side) • (INALFA version) pins 10 and 7 • (WEBASTO version) pins 6 and 3 during opening and between the pins of N60 it self • (INALFA version) pins 10 and 6 • (WEBASTO version) pins 6 and 8 during closing	OK	Replace the control unit N60
	<del>OK</del>	Restore wiring between: • (INALFA version) • pin 1 of B47 and pin 7 of N60 (WHIT) • pin 2 of B47 and pin 6 of N60 (BLU) • pin 4 of B47 and pin 10 of N60 (RED-YEL) • (WEBASTO version) • pin 1 of B47 and pin 3 of N60 (WHIT) • pin 2 of B47 and pin 8 of N60 (RED-BLK) • pin 4 of B47 and pin 6 of N60 (RED)

<b>ROOF DOES NOT CLOSE CORRECTLY (INALFA Version)</b>		<b>TEST B</b>
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NOTE: the sun roof may suffer malfunctions affecting the mechanical parts: blockage, noises, vibrations etc. In this test only the malfunctions of an electric type are considered: if no solution is found refer to the "REPAIR MANUAL - BODY", Group 75.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK STOP LIMIT SWITCH - With roof completely closed, verify continuity between pins 3 and 2 and open circuit between pins 3 and 1 of switch H51; and with roof open, check continuity between pins 3 and 1 and open circuit between pins 3 and 2 of H51	OK <del>OK</del>	Carry out step B2  Replace switch H51
<b>B2</b> CHECK CONTINUITY - Operating as at previous step (B1), check for continuity between pins 3 and 1 of N60 (wiring side) with roof closed, and between pins 3 and 2 of N60 with roof open	OK <del>OK</del>	Replace control unit N60  Restore wiring between: • pin 2 of H51 and pin 1 of N60 (GRN) • pin 1 of H51 and pin 2 of N60 (BRN) • pin 3 of H51 and pin 3 of N60 (WHT)

<b>ROOF DOES NOT CLOSE CORRECTLY (WEBASTO Version)</b>		<b>TEST C</b>
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NOTE: the sun roof may suffer malfunctions affecting the mechanical parts: blockage, noises, vibrations etc. In this test only the malfunctions of an electric type are considered: if no solution is found refer to the "REPAIR MANUAL - BODY", Group 75.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C1</b> CHECK STOP LIMIT SWITCH - with sunroof completely closed check for continuity between pins 1 and 2 of switch H51 and with roof open check for circuit open between pins 1 and 2 of H51	OK <del>OK</del>	Proceed to step C2  Replace the entire sunroof group
<b>C2</b> CHECK CONTINUITY - Proceeding as in step C1 check for continuity between pins 7 and 1 of N60 (wiring side) with roof closed, and for circuit open between the same pins with roof open.	OK <del>OK</del>	Replace the control unit N60 or the entire sunroof group  Restore wiring between: - pin H51 and pin 1 of N60 (YEL-RED) - pin 1 of H51 and pin 7 of N60 (YEL) or replace the entire sunroof group

# HEATING-VENTILATION AND AIR CONDITIONING

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### GENERAL DESCRIPTION

The climate (temperature and humidity) within the passenger compartment is controlled by the following systems:

- MANUALLY CONTROLLED HEATER
- AUTOMATIC HEATING/VENTILATION SYSTEM WITH AIR CONDITIONER

### AUTOMATICALLY REGULATED HEATER

### MANUALLY CONTROLLED AIR CONDITIONER

The various systems gave a common heater-distributor-conveyor group which in the first two cases is adjusted manually and in the other cases by electric motors.

The control panel located on the dashboard however, differs.

The system with air conditioner (auto-

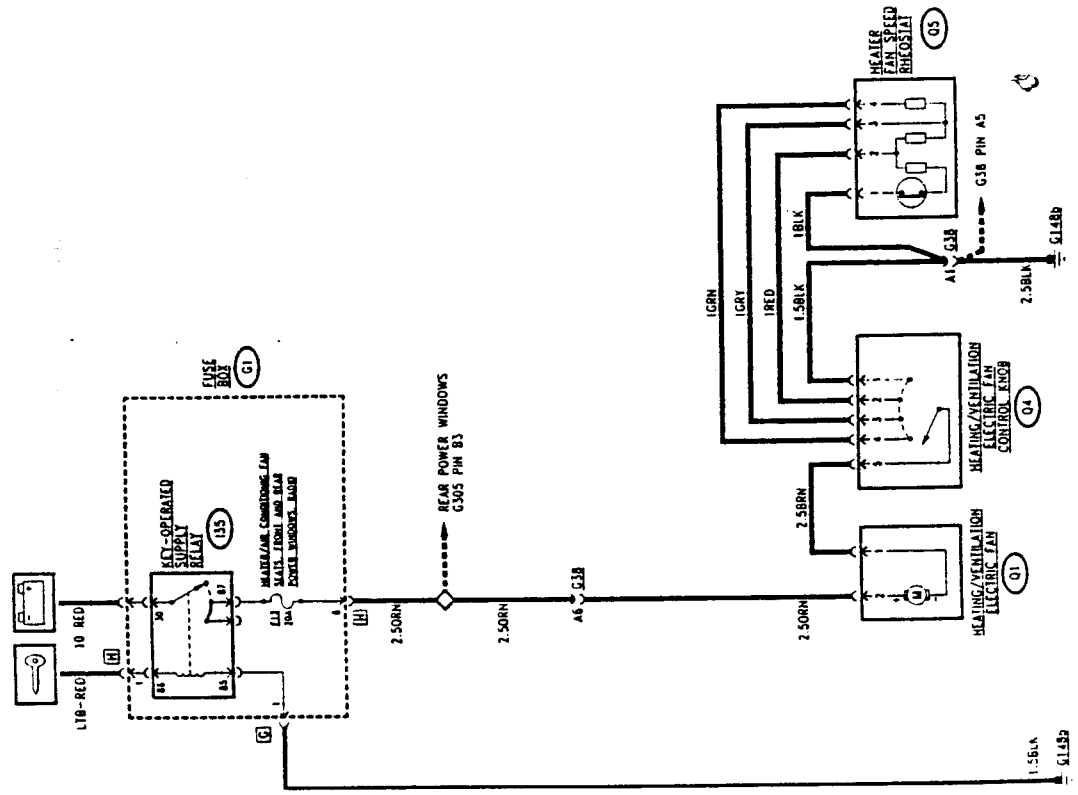
matic or manual) includes a closed circuit air cooling system using a refrigerant fluid and composed of compressor, condenser and evaporator and relative accessories.

N.B.

Up to chassis N \_\_\_\_ the coolant used is the traditional FREON R12 while from chassis N \_\_\_\_ the ecological fluid R134a is used instead.

MANUALLY CONTROLLED HEATER

Wiring Diagram



General Description

Heating and ventilation using the manually regulated heater is controlled by acting on the three knobs of the control assembly located on the dashboard; these controls act on the heater- distributor-conveyor group as described below:

The first knob from the left, by way of a flexible transmission, mechanically controls first the opening of the vent which regulates the flow of air, and then the rotation of the knob controls a switch which engages the regulated four-speed electric fan.

**NOTE:** The electric fan can only be operated when the ignition key is engaged.

The central control knob mechanically controls the warm/cold air mixing vent; if it is rotated fully to the left it cuts

out the heater by closing a specific tap. **NOTE:** the heater is composed of a heat exchanger which exploits the engine cooling liquid in order to heat the air directed towards the passenger compartment; it is supplied through the engine cooling system piping.

The right-hand knob regulates the distribution of the air flow, again through a mechanical transmission, to the air distributor vents sending air to the passenger compartment following the directions depicted by the ideograms.

Functional Description

**NOTE:** only the speed of the electric fan is controlled electrically.

The heating-ventilation electric fan O1 is powered by battery voltage through the key-operated services relay 135 located

in fusebox G1. Its coil is excited by voltage coming from the ignition block with the key engaged; after passing the relay, the battery voltage also passes fuse F10 (20A) in fusebox G1.

The electric fan motor O1 is operated by an ground signal coming from the control knob O4. Its ground crosses the fan speed rheostat O5, which is formed by three resistances in series and which determine the four different speeds of the electric motor.

The rheostat O5 is incorporated in a thermometric safety switch which deactivates the circuit if a temperature of 90-5°C is exceeded.

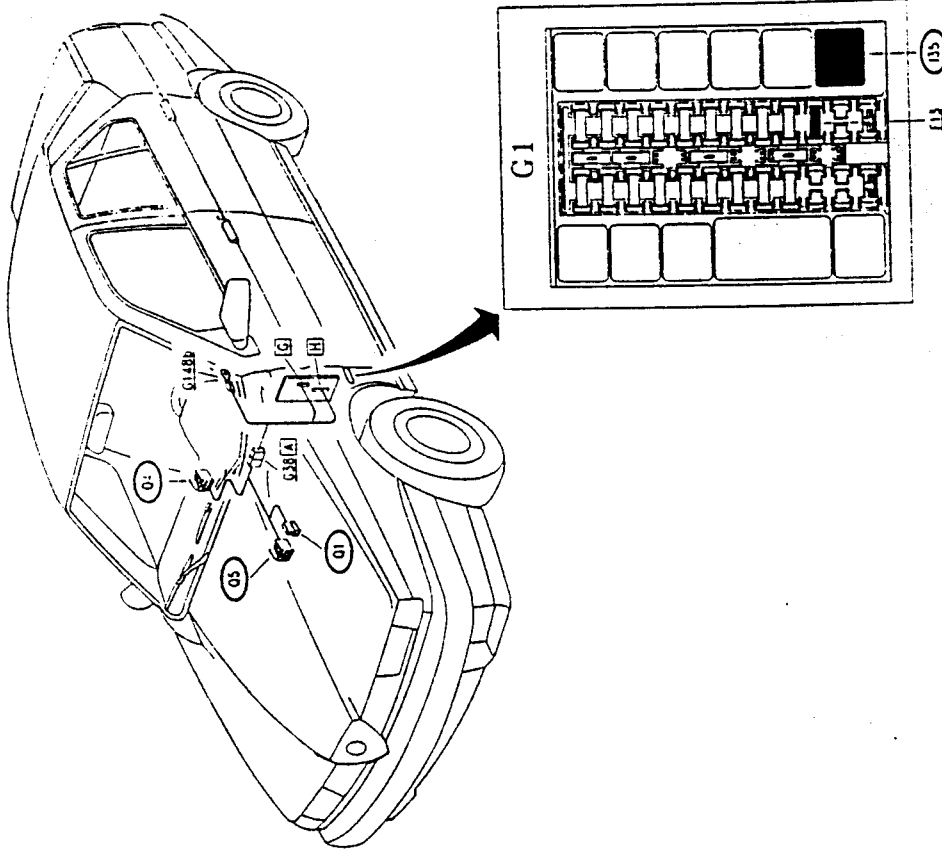
**NOTE:** to illuminate the controls refer to the section "Internal Lighting".



Components and Connectors

<p>Fusebox</p> <p>ORN-WHT • C305 2 50RN • C38 2 50RN LTB • BT LTB-RED • C99 LTB-RED • C38 LTB • 15B LTB-RED LTB • 15B</p>	<p>Connector for air conditioner wiring</p> <p>ORN-WHT • C305 2 50RN 2 50RN 2 50RN • G1 BLK BLK 2 5BLK • G148b 2 50RN • G1 6 2 50RN • Q1 1 1BLK • Q5 1 15BLK • Q4</p>	<p>Under-dashboard ground-left side</p> <p>1 5BLK • G1</p>	<p>Heating/ventilation electric fan control knob</p> <p>2 5BRN • Q1 1 1GRN • Q5 1 1GRY • Q5 1 1RED • Q5 1 1BLK • C38</p>
<p>Heating/ventilation electric fan</p> <p>2 5BRN • Q4 2 50RN • C38</p>	<p>Heating/ventilation electric fan</p> <p>2 5BRN • Q4 2 50RN • C38</p>	<p>Heater fan speed rheostat</p> <p>1 1GRN • Q4 1 1GRY • Q4 1 1RED • Q4 1 1BLK • C38</p>	<p>Heater fan speed rheostat</p> <p>1 1GRN • Q4 1 1GRY • Q4 1 1RED • Q4 1 1BLK • C38</p>

Location of Components



perature: the outside air temperature, located in the lower part of the left-hand door mirror, and the passenger compartment air temperature sensor located behind a moulding on the dashboard, this sensor is automatically ventilated by a motor.

- minimum pressure switch (defrosters), shuts-off the compressor when the pressure is too low (<1.7-1.8 bars) as this would risk freezing the evaporator. It also protects the compressor from sudden drops in pressure caused, for example, by a leakage in the system.

**Air cooling system**

The air cooling system is a closed circuit system in which a fluid condenses and evaporates drawing off heat from the air in the conveyor-distributor.

- It is mainly composed of the following:
  - compressor, actuated by a crankshaft belt and actuated or deactivated by an electromagnetic coupling controlled by the conditioning system;
  - condenser, installed in front of the engine coolant radiator; when the vehicle is stationary, air necessary for the heat exchange is supplied by actuating the engine radiator fan;
  - evaporator, located in the conveyor-distributor this is an exchanger which cools the air

- dehydrator accumulator, which separates the fluid in its liquid and gaseous states. It also serves as an accumulation reservoir;
- expansion valve which diminishes the pressure of the fluid as necessary;
- three-level pressure switch (primary), controls the safety and correct functioning of the fluid circuit:
  - engages the radiator fan when necessary (e.g. when the vehicle is stationary) which prevents an increase in pressure at the condenser (intervention at 15 bars);
  - shuts-off the compressor deactivating the electromagnetic coupling if the pressure reaches excessive and therefore dangerous levels (in excess of 25 bars) or values are

the passenger compartment and is not mixed with air from the outside.

- "OFF" button: the system is completely deactivated.
- air flow buttons: make it possible to direct air flow in specific directions as shown in the relative ideograms: windshield demisting, air flow directed forward, directed forward and towards the floor, directed towards the floor only.

**Air conveyor-distributor**

Both the heater (which heats the air by transferring it from the engine coolant) and the evaporator (which cools the air subtracting heat to the freon in the cooling system) are located in the air conveyor-distributor.

- The vents regulating air flow are electrically controlled by actuators: air distribution motor, warm/cool air mixing motor and air recirculation vent control motor.
- The air recirculation vent control motor is a simple motor with only two positions (open/closed). The first two actuators are coupled with a potentiometer through which the angles of rotation of the vent are adjusted: specific types of air distribution within the passenger compartment correspond to specific angles of the vent.

- The electric fan which sends a flow of air to the passenger compartment is regulated by an electronic variator which is also fixed to the conveyor and constantly varies the speed; the device supplies the control unit with information regarding the operating temperature. A protecting thermocouple intervenes when the temperature reaches the point where it may damage the device itself.
- In addition, two mixed air temperature sensors are located on the conveyor: one lower and one upper. These are NTC elements (resistance decreases when the temperature rises) which send a signal to the control unit which is proportional to the temperature of the air passing them.
- Another two sensors provide signals which are proportional to the air temperature.

**AUTOMATIC HEATING-VENTILATION SYSTEM WITH AIR CONDITIONER**

**Description**

The control panel located on the dashboard is the front part of the electronic unit which automatically regulates the operation of the system.

Once the desired temperature has been set, the control system can either be left to automatic operation (AUTO button) or to manual operation (MANUAL button) or modified; in this way the system automatically carries out all the functions necessary to bring the passenger compartment to the temperature selected by the occupants of the vehicle through the button (TEMP) and shown on the relative display.

The electronic system carries out this regulation through information received from temperature sensors (outside, inside and mixed air), and controlled by the actuators which move the vents of the air conveyor-distributors (air intake, mixing and distribution); it also actuates the heater if the air needs to be heated or the cooling system compressor if the air needs to be cooled.

In addition, the compressor cut-in signal is "filtered" by the electronic ignition and injection system's control unit (see "Motoric ignition and injection system") for the necessary permit.

The heating-ventilation system control unit also receives the speedometer signal from the relative sensor through which the logic system considers or ignores certain temperature values (e.g. a progressive increase in the outside air temperature will not be considered at speeds lower than 30 km/h).

The system memorizes the last temperature setting, even if the ignition key is not engaged, and re-sets it again the next time the vehicle is started.

The temperature selected is not always reached immediately; regulation time depends mainly on the difference between the actual temperature and the

The system operating with the R134a can easily be recognized as "R134a" is stamped on the main components.

Given the different physical characteristics of this fluid it has been necessary to modify the type of materials used and the calibration of certain parts. Generally speaking these modifications are as follows:

- increased heat exchange areas of the evaporator and condenser given the increased operating temperature
- adoption of an expansion valve with a modified calibration
- adoption of a loading/discharging valve of the rapid engagement type and of a larger size (to prevent concretion to unsuitable loading apparatus).
- use of a specific oil to lubricate the compressor.
- adoption of a variable DC compressor which makes it possible for it to adapt itself to the request from the system without continual engagement/disengagement of the compressor coupling. The variation in delivery of the coolant depends on the pressure and makes it possible to vary the quantity of cold air produced in response to a request from the system.

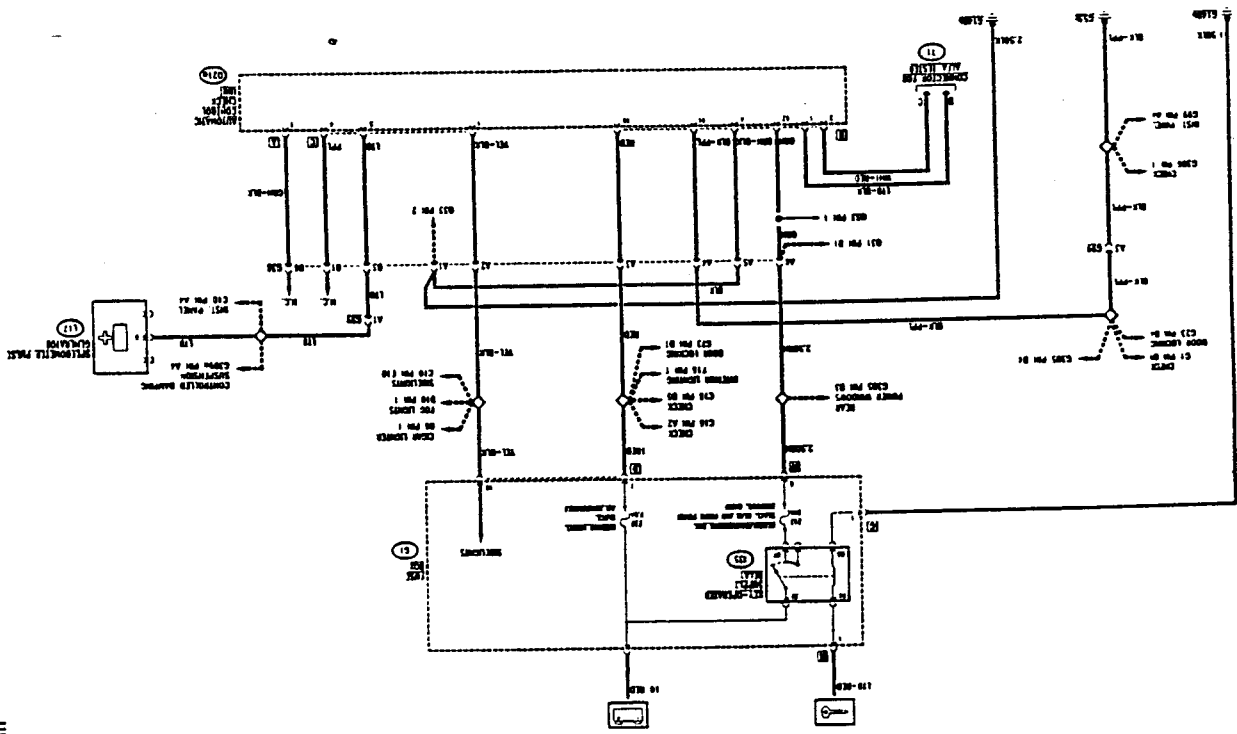
For greater details regarding the components of the system refer to "MECHANICAL GROUPS", Group B0, "HEATING AND VENTILATION".

**WARNING:**

The wiring diagram relative to the unit malic heater-ventilator with contribution has been subdivided into six parts for ease of consultation

- control unit: supply and diagnosis;
- temperature sensors;
- vent actuators;
- interior electric fan;
- compressor control;

**Control unit: supply and diagnosis**  
Wiring Diagram



**Functional Description**

The electronic control unit Q21a, by way of the sensors and actuators connected to it, controls and regulates the flow of air into the passenger compartment adjusting the temperature to the set value. The power supply reaches the control unit Q21a:

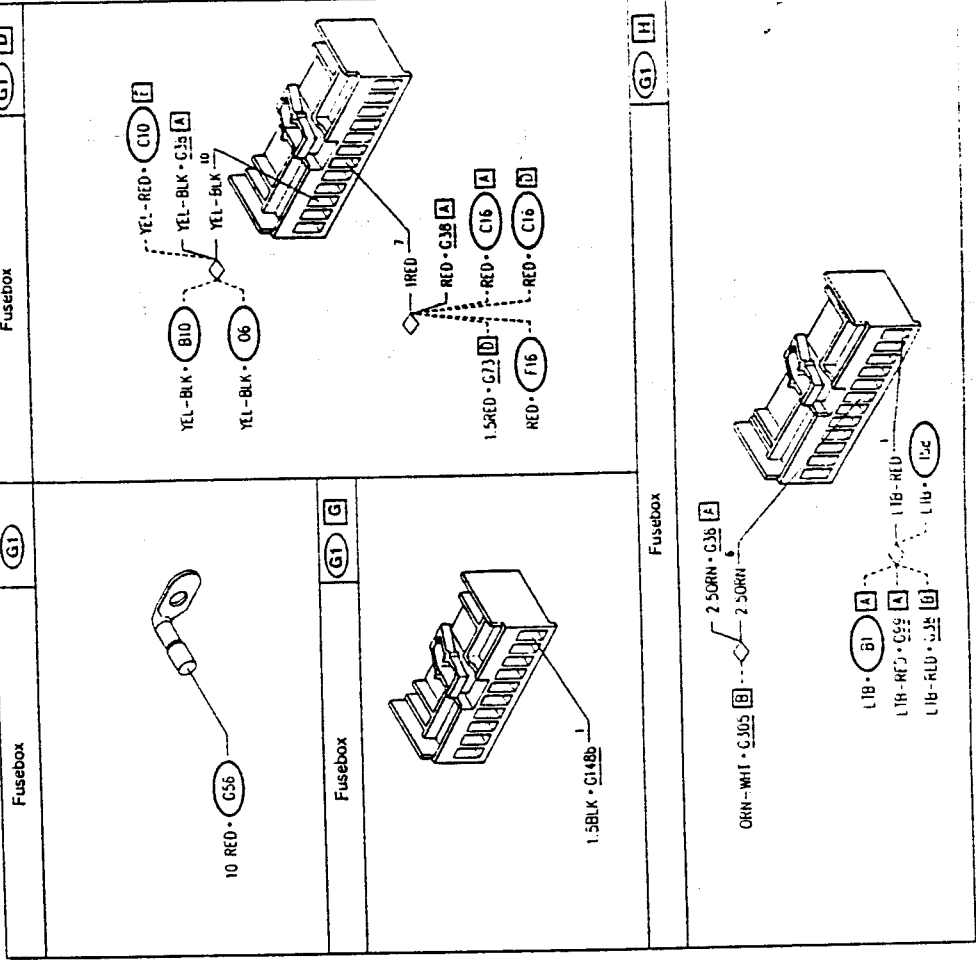
- directly, with battery voltage to pin 10 of connector B after passing fuse F10 (7.5A) in fusebox G1 (power supply to internal memory etc.);
- with Key-operated supply to pin 12 of connector B, through relay 135 and fuse F13 (20A) in fusebox G1 (supply of "power").

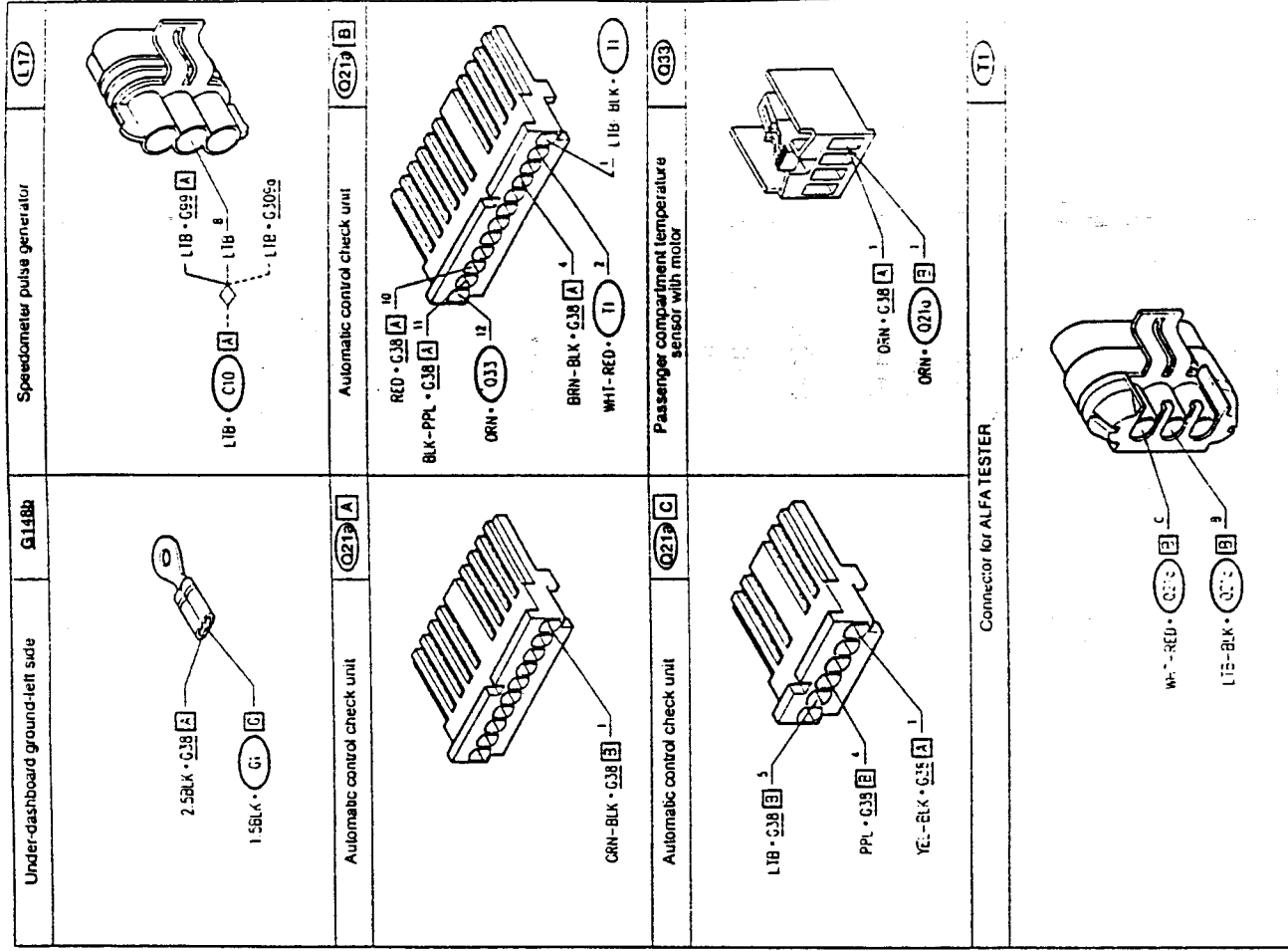
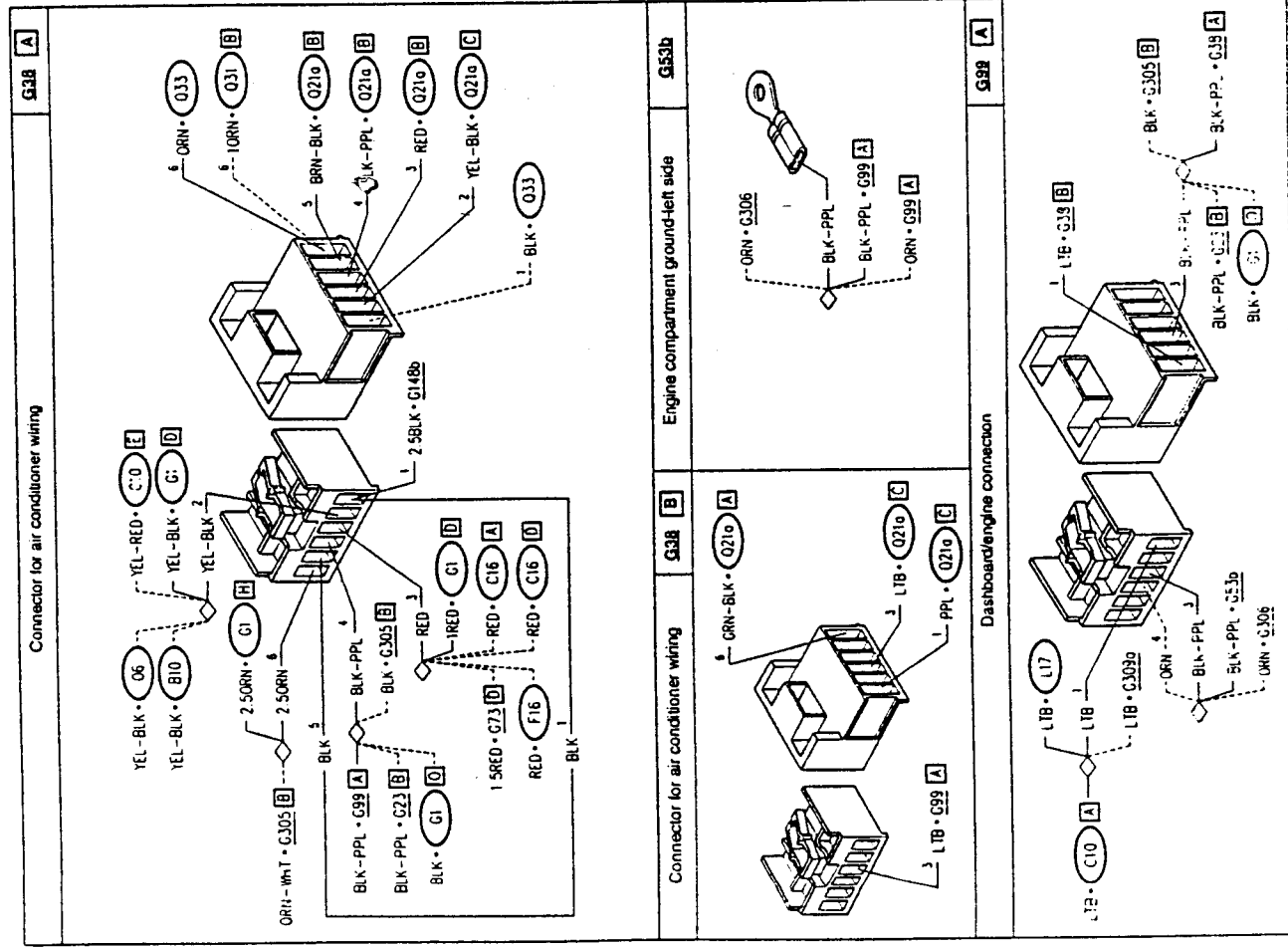
The control panel - the front part of the control unit itself - is lit when the side-

lights are on via the line which supplies pin one of connector C of Q21a. The speedometer signal reaches pin 5 of connector C from the relative sensor L17.

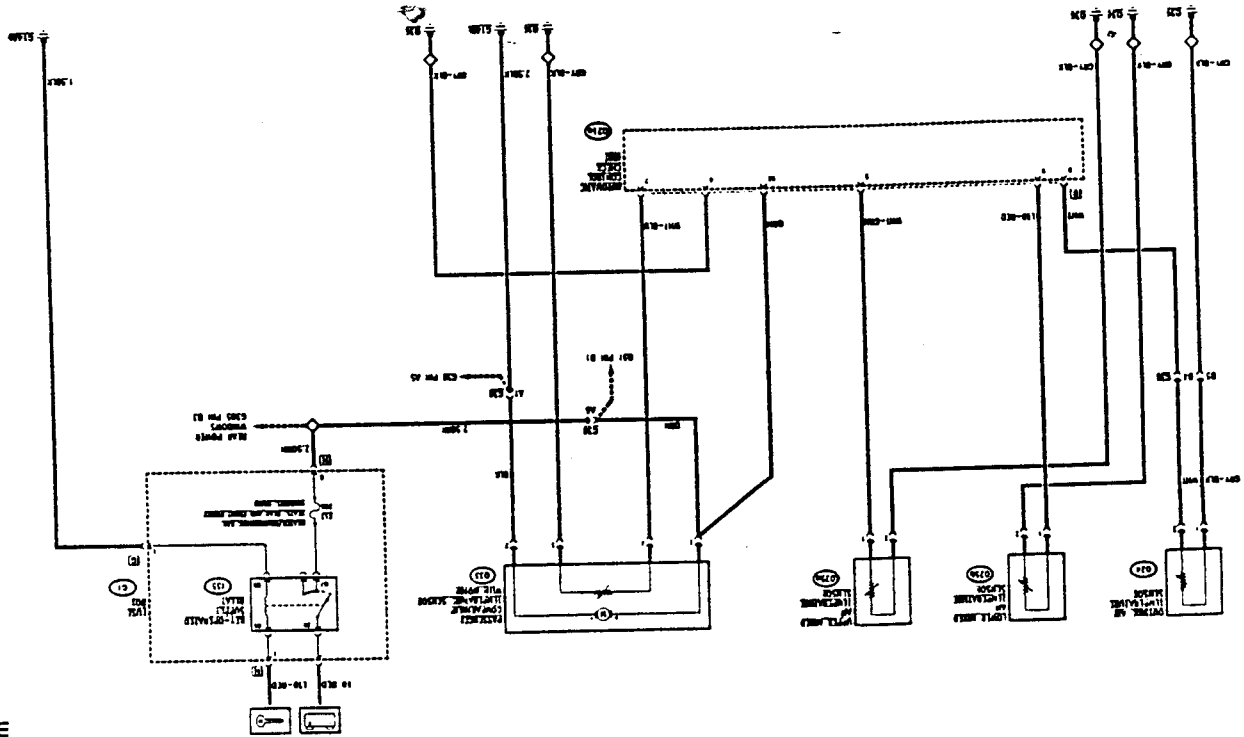
Pins 1 and 2 of connector B send two signals to connector T1 for the ALFA ROMEO Tester, which are used to "read" the self-diagnosis of the system

**Components and Connectors**





Temperature Sensors  
Wiring Diagram

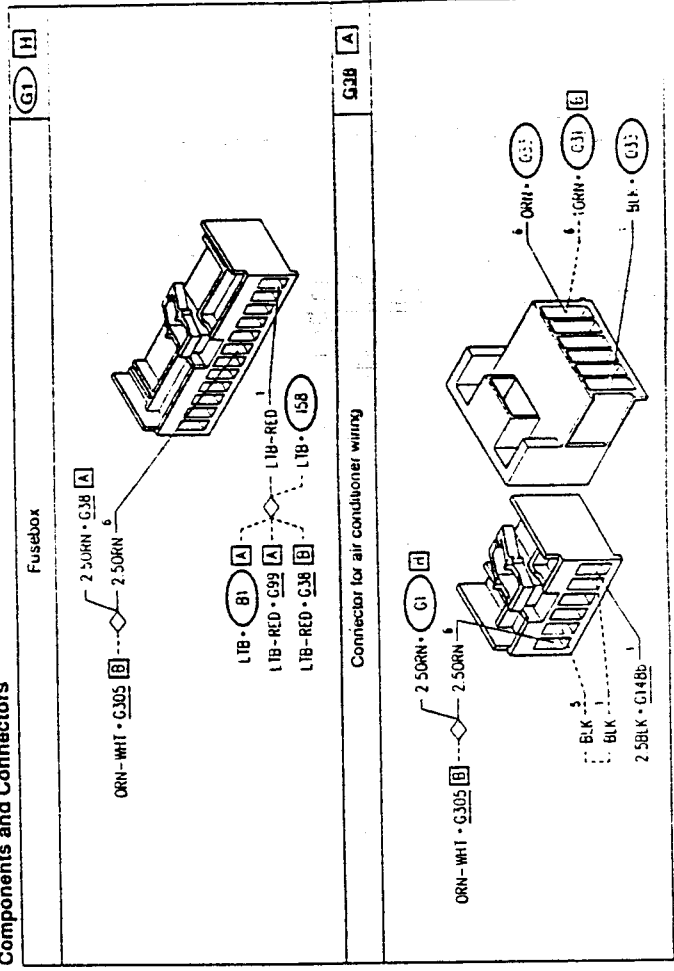


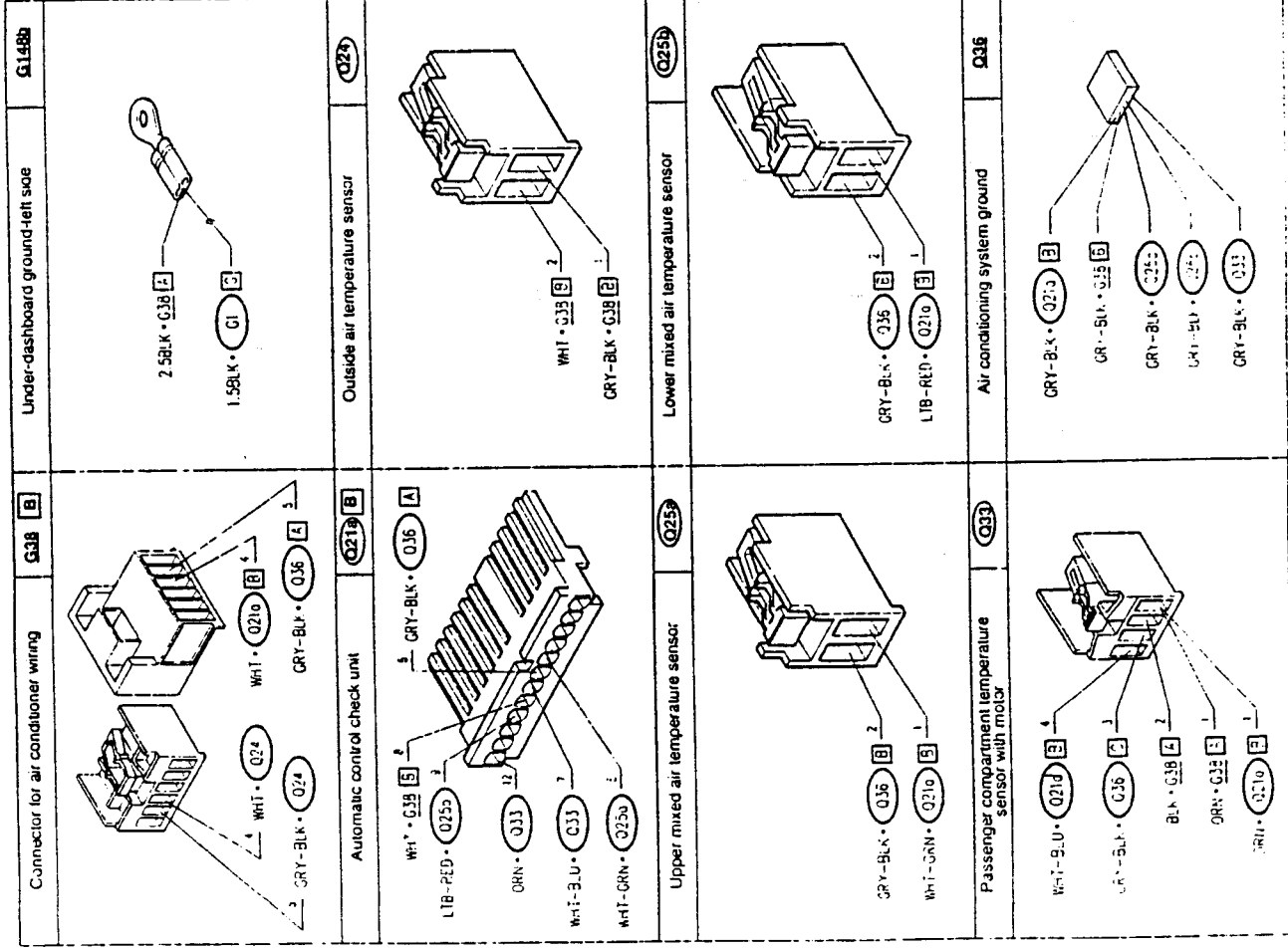
Functional Description

The upper and lower mixed air temperature sensors, Q25a and Q25b, are connected at connector B, to pins 5 and 9 respectively.  
The passenger compartment temperature sensor Q33 sends the temperature signal to pin 7 of connector B; this sensor has an incorporated ventilation

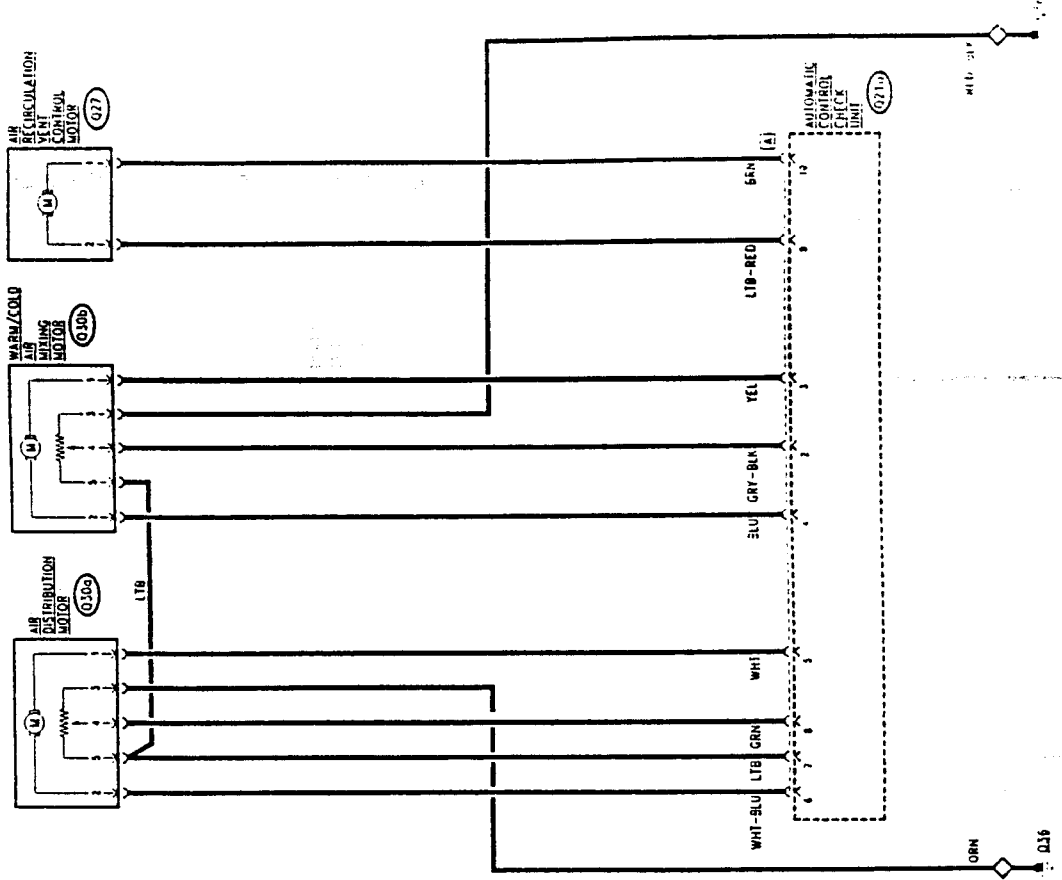
motor supplied by the same line which, coming from relay Q35 and fuse F13 (20A) in fusebox G1, supplies the control unit Q21a.  
Pin 5 of connector B supplies the "return earth" for the sensors

Components and Connectors





Vent Actuators  
Wiring Diagram



Functional Description

The vent actuators operate according to the indications supplied by the control unit in order to optimize the air flow in accordance with calculations carried out by the internal logic of the control unit itself.

The air distribution motor Q30a receives power supply and ground directly from the control unit Q21a, at connector A et

pins 5 and 6 respectively, the relative adjustment potentiometer is supplied by the control unit by pin 7 of connector A and is directly connected to ground. It sends the regulation signal to pin 2 of connector A.

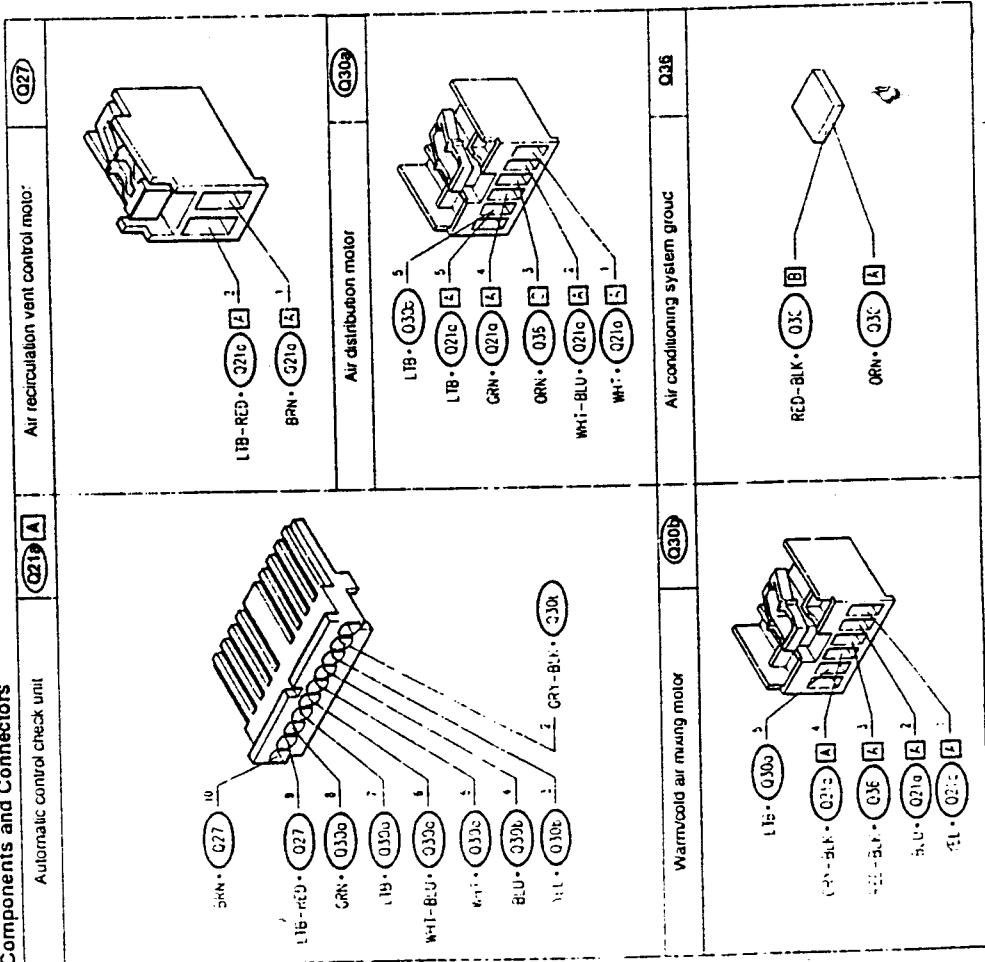
The air recirculation vent control motor Q27 (of the open/closed type without regulation) receives power from pin 9 of connector A and ground from pin 10 of connector A of control unit Q21a.

Similarly the warm and cold air mixing motor Q30b receives its power supply and ground at pins 3 and 4 of connector A; the adjustment potentiometer is supplied

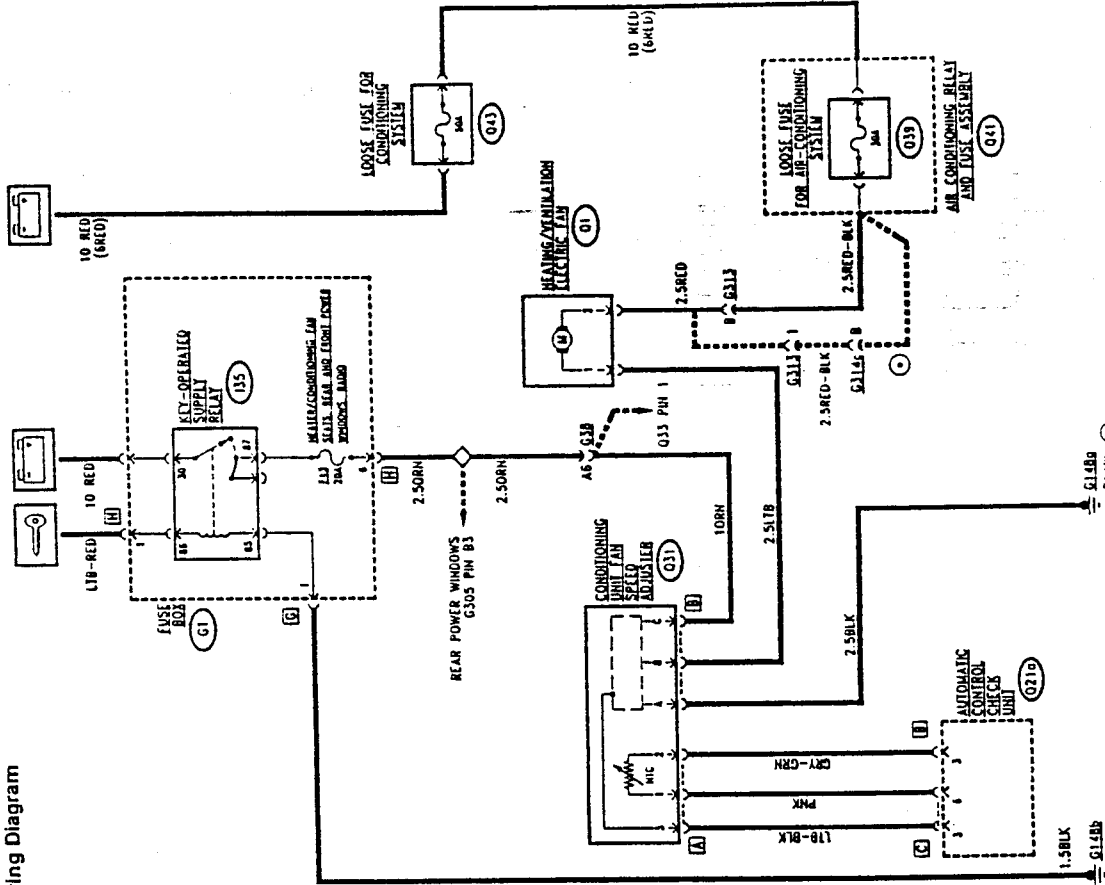
by pin 7 of connector A and is directly connected to ground. It sends the regulation signal to pin 2 of connector A.

The air recirculation vent control motor Q27 (of the open/closed type without regulation) receives power from pin 9 of connector A and ground from pin 10 of connector A of control unit Q21a.

Components and Connectors



Interior Electric Fan Wiring Diagram



(\*) Variation from chassis N

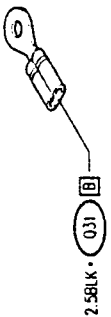
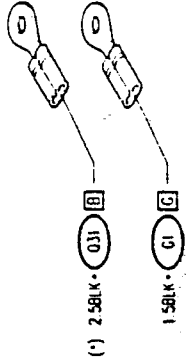
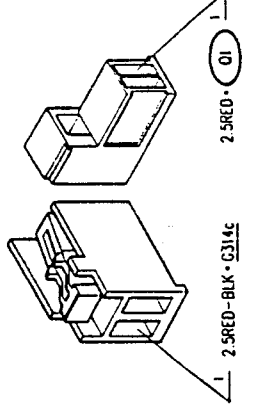
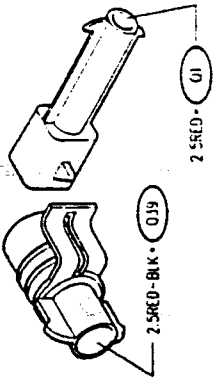
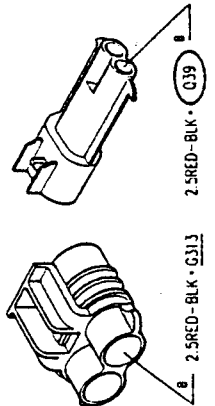
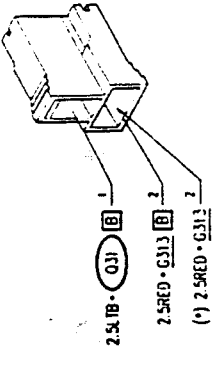
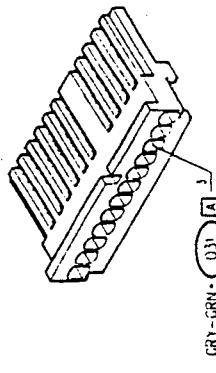
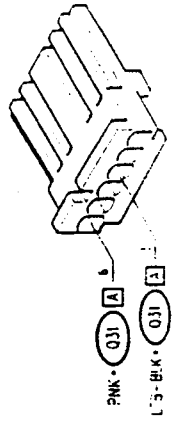
**Functional Description**

The air conditioner electric fan speed adjuster Q31 is supplied by the line coming from relay J35 and fuse F13 (20A) in fusebox G1; it is connected to ground and to the control unit Q21a by the signal at pin 3 of the control unit connector; it is also connected to the heating-ventila-

tion electric fan Q1 to which it sends a negative signal which regulates the speed. The incorporated temperature sensor is connected to the control unit Q21a at pin 6 of connector C and pin 3 of connector B.

The fan Q1 is supplied directly by battery voltage via fuse Q39 (30A) located in the relays and fuses assembly Q41.

Starting from chassis N\_\_\_ the layout of the air conditioner wiring has been changed without though modifying the connections described above.

<p>Under-dash-board ground-right side (No longer present after chassis N___)</p>  <p>2.58LK · Q31 · B</p>	<p>Under-dash-board ground-left side</p>  <p>(*) 2.58LK · Q31 · B 1.58LK · G1 · G</p>	<p>G148a</p>	<p>G148b</p>
<p>Connector for air conditioner supplementary wiring (*)</p>  <p>1 2.5RED-BLK · Q314c 2 2.5RED · Q1</p>	<p>Connector for air conditioner supplementary wiring (present up to chassis N___)</p>  <p>2.5RED-BLK · Q319 2.5RED · Q1</p>	<p>G313</p>	<p>G313 B</p>
<p>Engine / air conditioner wiring C connection (*)</p>  <p>1 2.5RED-BLK · Q313 2 2.5RED-BLK · Q39</p>	<p>Heating-ventilation electric fan</p>  <p>2.5IB · Q31 2.5RED · Q313 (*) 2.5RED · Q313</p>	<p>G314c</p>	<p>Q1</p>
<p>Automatic control check unit</p>  <p>GRN-GRN · Q31 · A</p>	<p>Automatic control check unit</p>  <p>PKK · Q31 · A L'3-BLK · Q31</p>	<p>Q21a B</p>	<p>Q21a C</p>

(\*) from chassis N\_\_\_

**Functional Description**

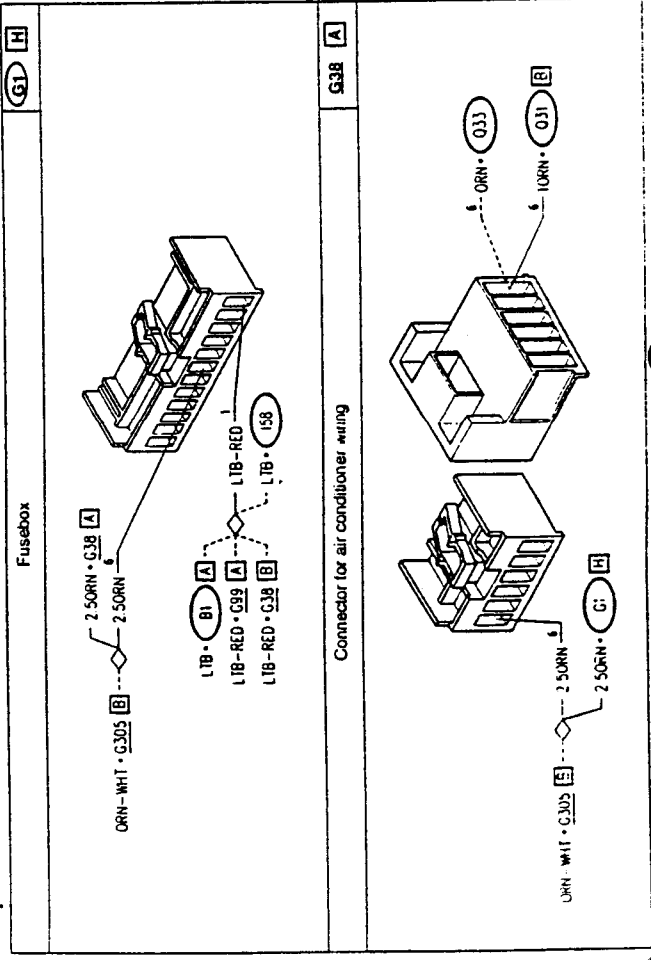
The air conditioner electric fan speed adjuster Q31 is supplied by the line coming from relay J35 and fuse F13 (20A) in fusebox G1; it is connected to ground and to the control unit Q21a by the signal at pin 3 of the control unit connector; it is also connected to the heating-ventila-

tion electric fan Q1 to which it sends a negative signal which regulates the speed. The incorporated temperature sensor is connected to the control unit Q21a at pin 6 of connector C and pin 3 of connector B.

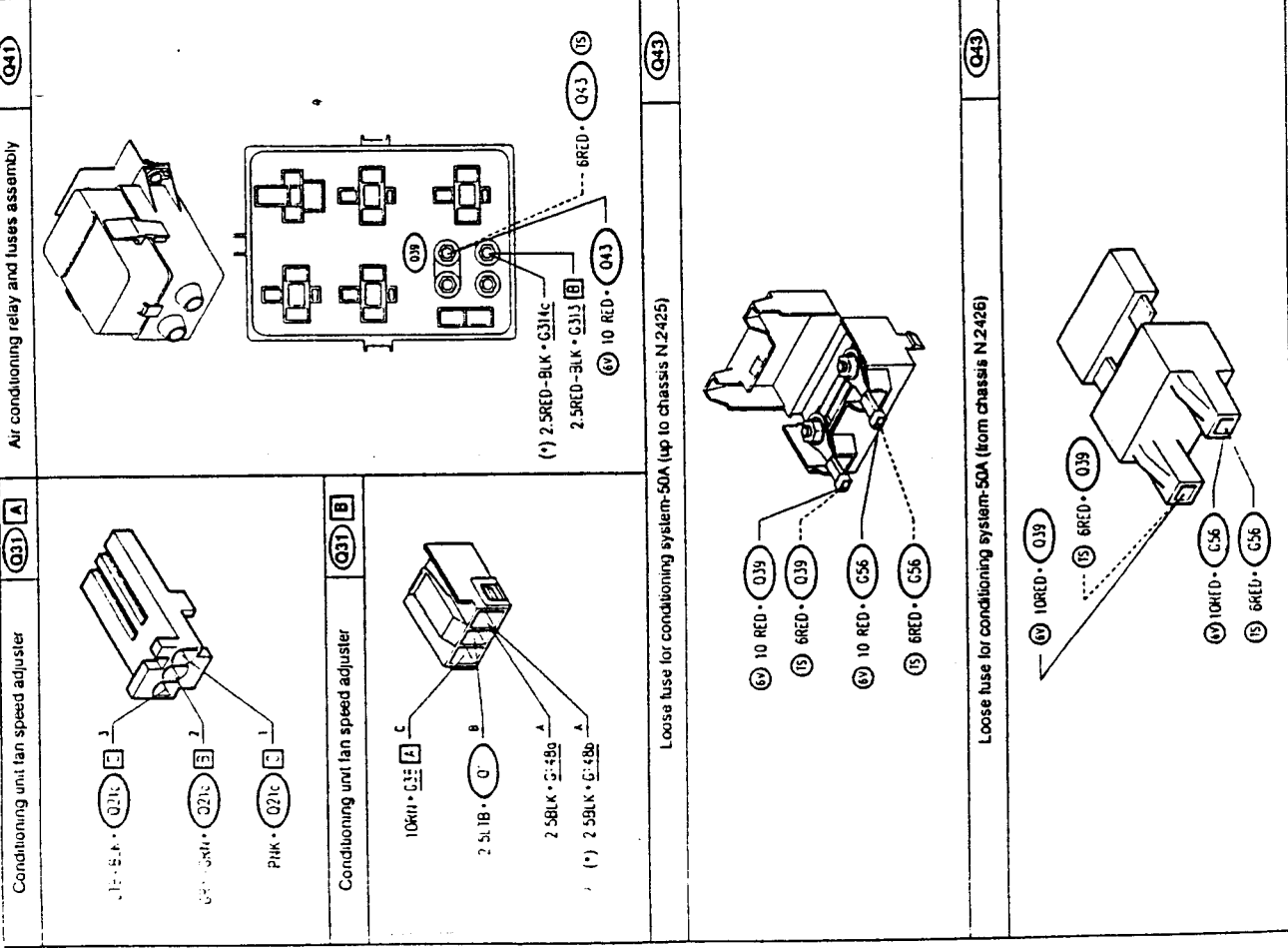
The fan Q1 is supplied directly by battery voltage via fuse Q39 (30A) located in the relays and fuses assembly Q41.

Starting from chassis N\_\_\_ the layout of the air conditioner wiring has been changed without though modifying the connections described above.

**Components and Connectors**

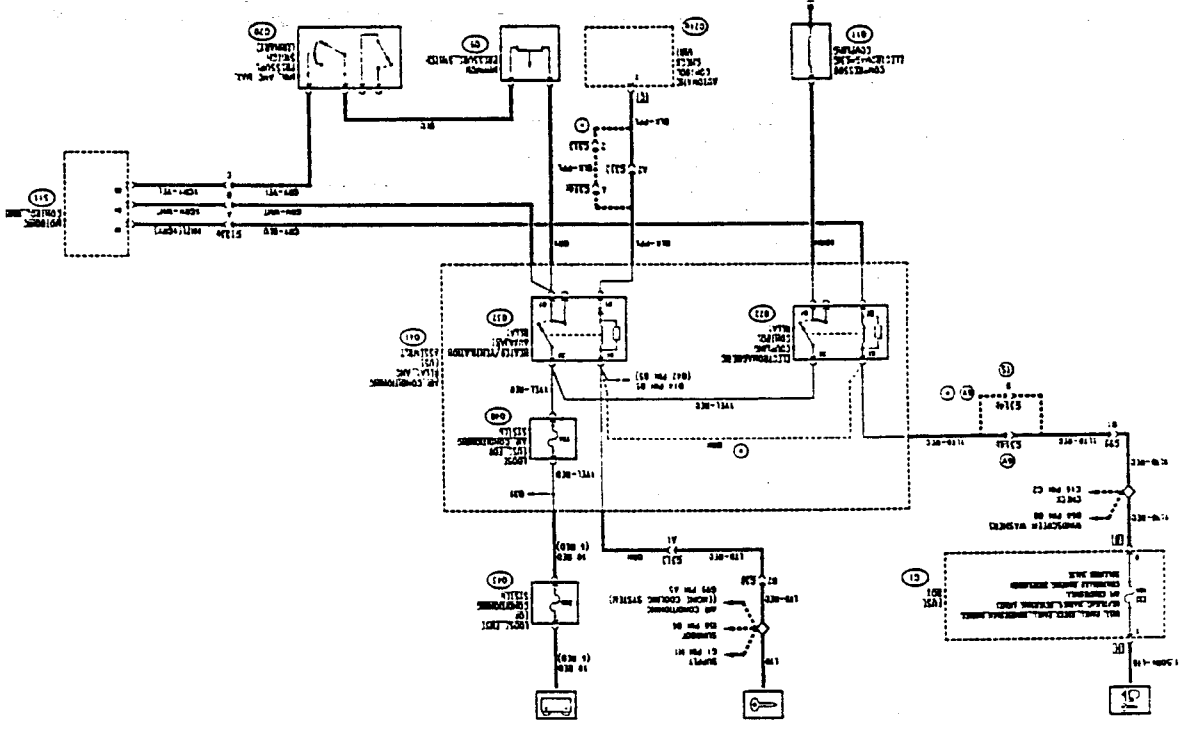






(\*) from chassis N.2426  
PA4655E1000002

Compressor Control  
Wiring Diagram



Electronic ignition-injection wiring B connection		G3130b
<p>1 CRY-YEL • S11 2 GRN-WHT • S11 3 BLK • S11 4 IGRY • S11 5 CRY-YEL • Q20 6 GRN-WHT • Q20 7 GRN-WHT • Q32 8 CRY-BLU • Q22</p>	<p>1 BLK-PPK • Q21o 2 GRN • Q32 3 LIB-RED • Q18 4 PPL-BLK • Q32</p>	<p>Connector for air conditioner supplementary wiring (present up to chassis N___)</p> <p>G313 A</p>
<p>1 BLK-PPK • Q21o 2 BLK-PPK • G314c</p>	<p>1 LIB-RED • Q22 2 LIB-RED • Q99</p>	<p>Connector for air conditioner supplementary wiring (*)</p> <p>G313</p> <p>Engine air conditioner wiring B connection</p> <p>G314b</p> <p>Engine air conditioner wiring B connection 6V (present up to chassis N___)</p> <p>G314b</p>
<p>1 BLK-PPK • G311 2 LIB-RED • Q32</p>	<p>1 CRY • Q32 2 BLU • Q20</p>	<p>Engine air conditioner wiring C connection (*)</p> <p>G314c</p> <p>Minimum pressure switch (up to chassis N 2425)</p> <p>O9</p>

Functional Description

The compressor electromagnetic coupling Q11 is actuated by the relative relay Q22, located in the relays and fuses assembly Q41.

The relays Q22 and Q32, located in group Q41, have a key-operated supply to the coils (the line which supplies Q22 (and also Q32 - starting from chassis N\_\_\_) is protected by fuse F15 (10A) of G1); the power line however, is supplied by battery voltage via fuse Q40 (15A), also located in group Q41, and across fuse Q43 (50A) which protects the entire system.

The relay Q22 is excited by the Motronic supply and injection system and consequently supplies battery voltage to coupling Q11, in accordance with the following logic:

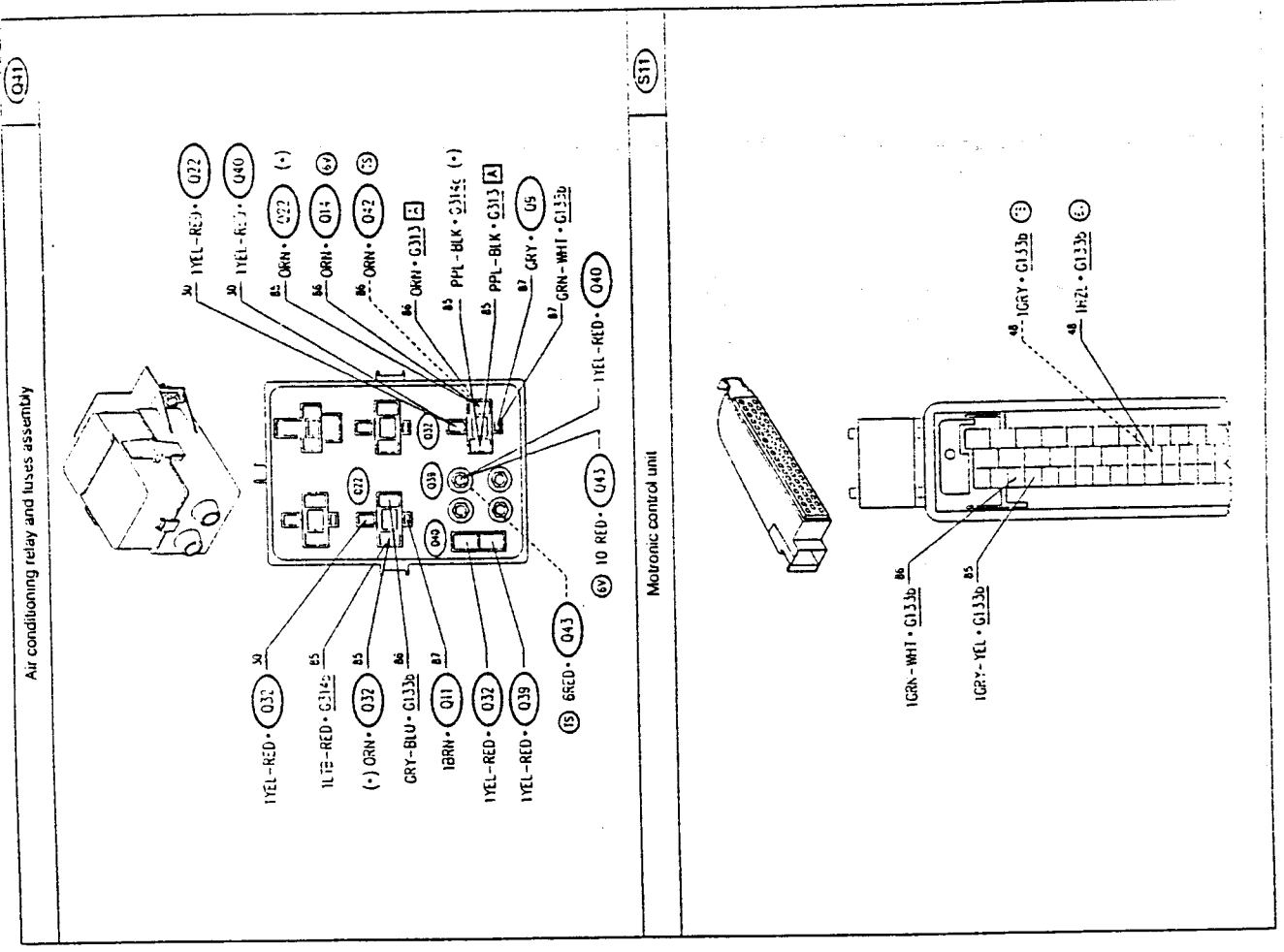
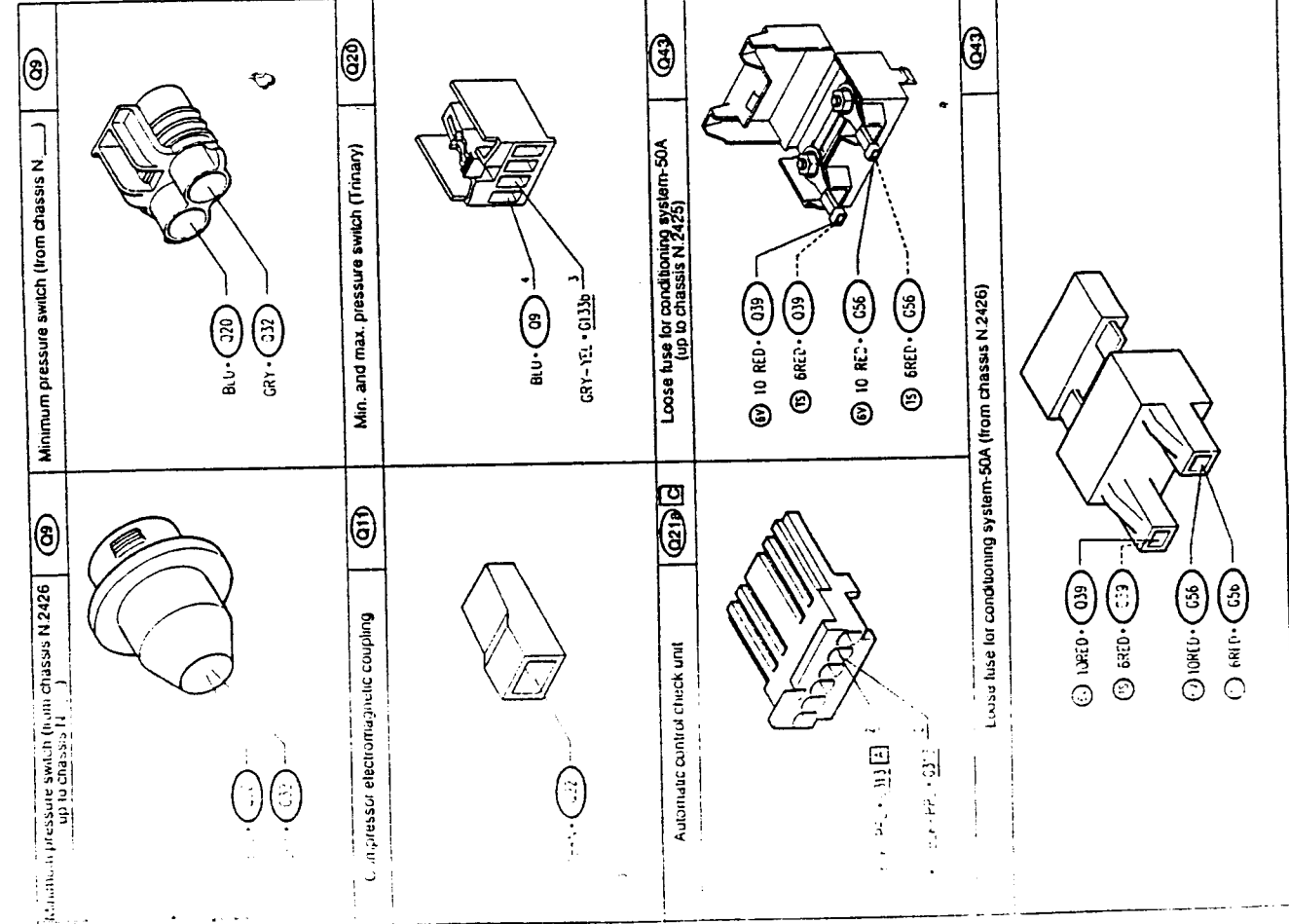
- relay Q32 is excited by the electronic control unit Q21a when the logic system of the control unit requests the intervention of the compressor to activate the air cooling system;
- relay Q32 consequently sends a control signal to the Motronic control unit S11, pin 86
- the control unit "sends on" this signal, from pin 48 of S11, to relay Q22 which engages the compressor, but only after the internal logic has verified certain conditions (e.g. the compressor does not cut in when maximum power is requested by the engine). Additionally, the control unit checks that the signal at pin 85 of S11 is not interrupted. This signal comes from the

minimum pressure switch (defroster) O9 and from the minimum and maximum pressure switch (primary) Q20 which intervenes when the pressure in the cooling system is too high or too low; in this case the control signal is not sent on to activate the compressor.

Starting from chassis N\_\_\_ the layout of the air conditioner wiring has been changed with modification of the connections only as described above.

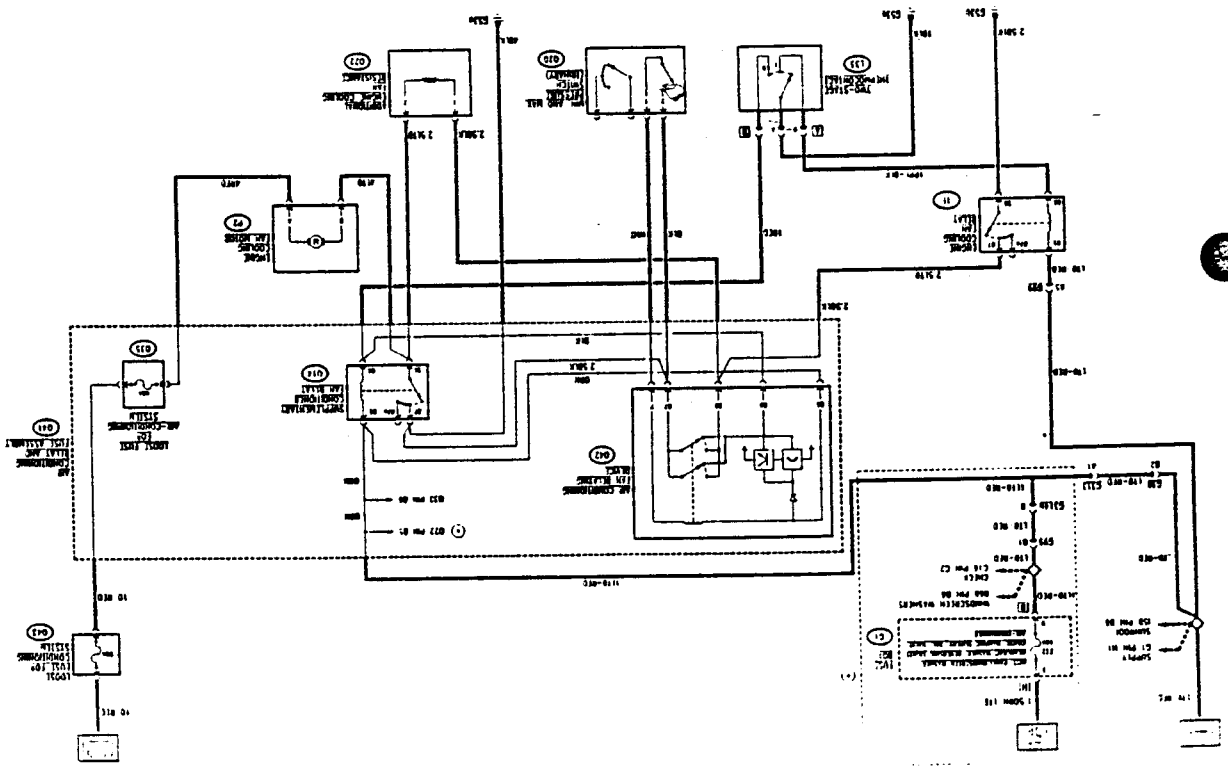
Components and Connectors

<p>1 LIB-RED • B68 2 LIB-RED • C16 3 LIB-RED • Q99</p>	<p>1 50RN-LIB • B1</p>	<p>Fusebox</p> <p>G1 H</p>
<p>1 LIB-RED • Q32 2 LIB-RED • Q99 3 LIB • Q32 4 LIB-RED • Q99 5 LIB • B1</p>	<p>1 LIB-RED • G314b 2 LIB-RED • C16 3 LIB-RED • B68 4 LIB-RED • C1</p>	<p>Connector for air conditioner wiring</p> <p>G38 B</p> <p>Dashboard/engine connection</p> <p>G39 B</p>



Engine electric fan control - Model 6V

Wiring Diagram



\* variation from chassis N

Functional Description

The delaying device Q42, located in group Q41, controls the cutting-in of the electric fan to improve the cooling of the air conditioning system compressor.

The electric fan P2 is controlled by a supplementary relay Q14, and is supplied by battery voltage through fuse Q35 (40A), also in Q41.

The key-operated voltage supplies the coil and the electronic devices of the delay system, the fan relay R1 and supplementary relay Q14 -pin 85 (from

chassis N — the coil of Q14 is powered with a key-operated supply from the line of fuse F15 (10A) of G1), the coil of the delay device Q42 is excited by an ground signal - pin P - coming from the binary pressure switch Q20 provoking the transmission of an ground signal - pin 30 - to the additional resistance O22 and from it to the fan P2, which then cuts-in at 1st speed.

Level 1 (87-92°C) of the thermocontact L33 causes the actuation of the relay R1 and sends an ground signal directly to the additional resistance O22.

After about 10 seconds, if the control signal persists (or level 2 of thermocontact L33 is reached (92-97°C)) the delay device Q42 -pin 86- (or the level 2 contact of L33) send an ground signal which excites the coil of the supplementary relay Q14 and actuates the electric fan P2 at 2nd speed

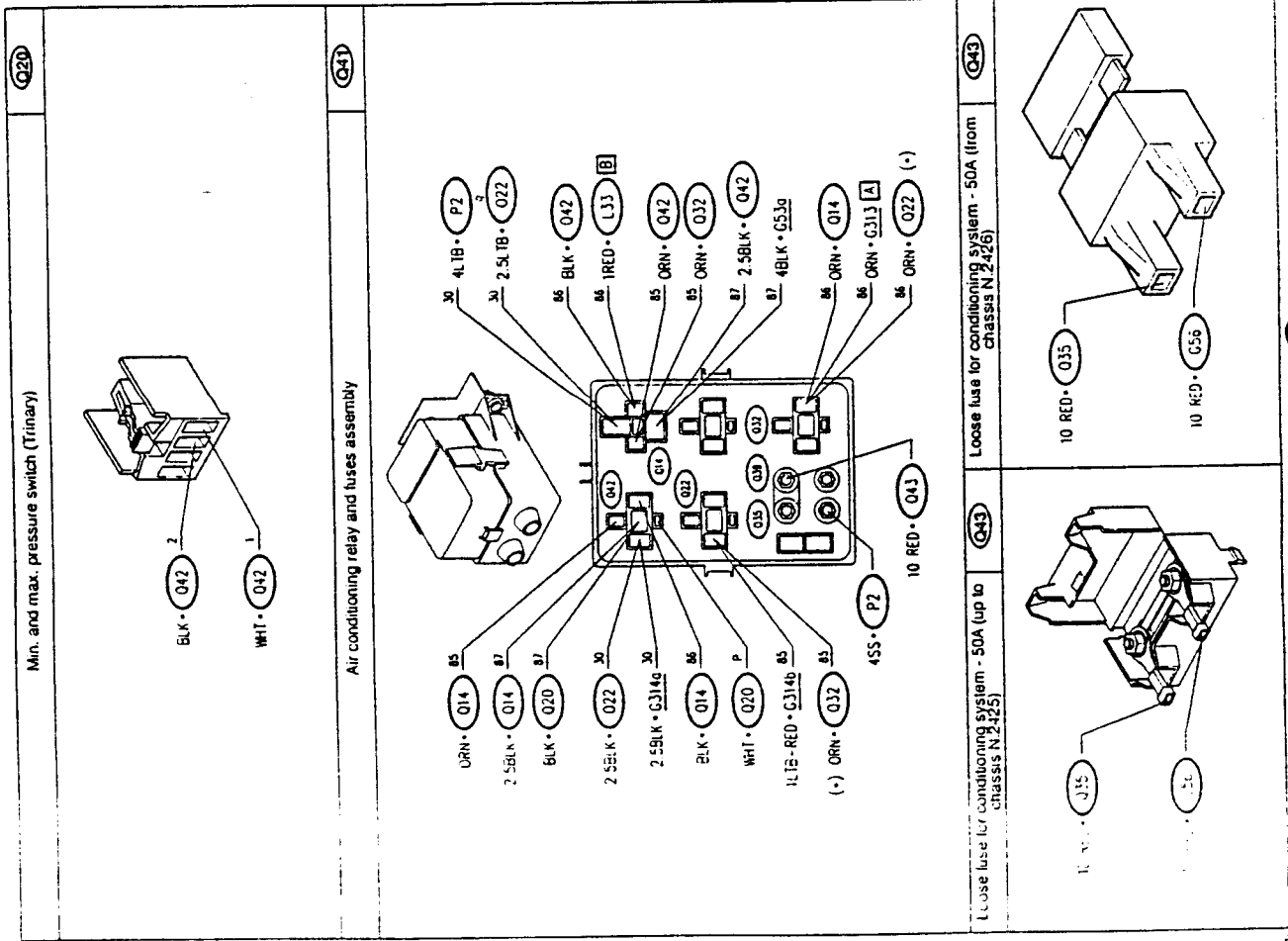
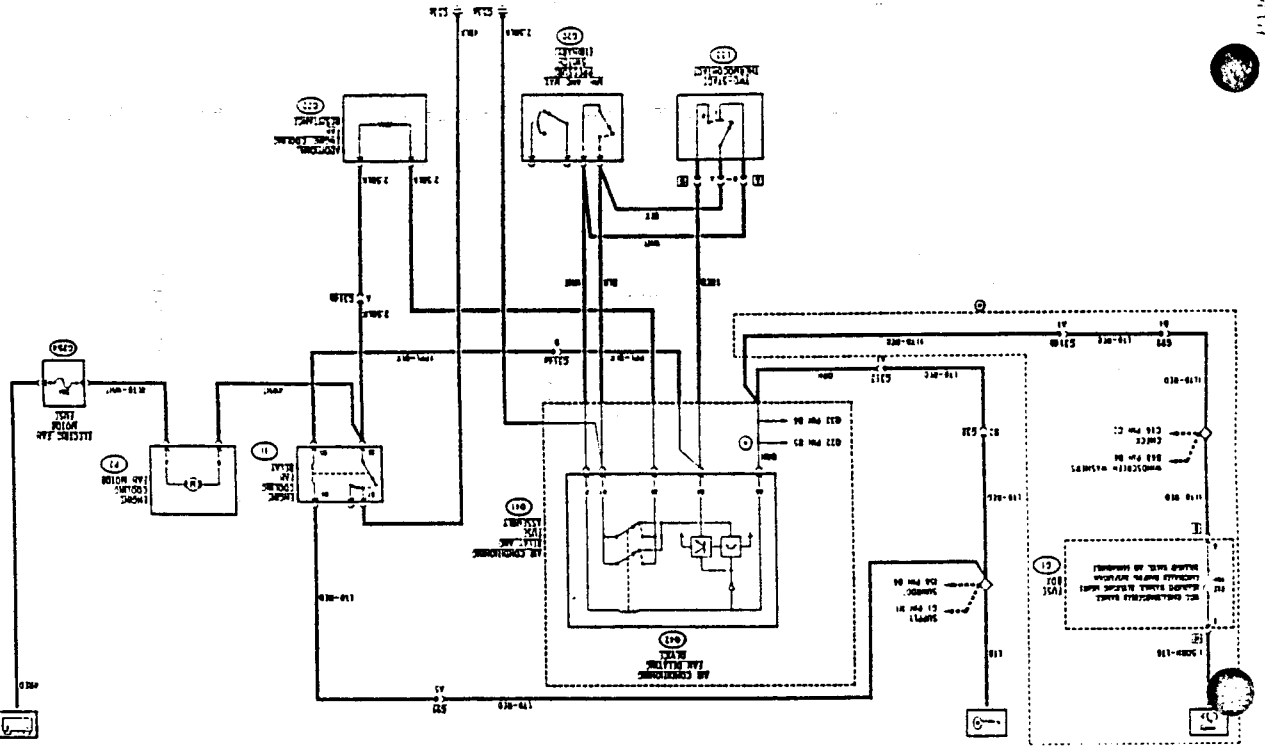
Starting from chassis N — the layout of the air conditioner wiring has been changed with modification of the connections only as described above.

<p><b>Components and Connectors</b></p> <p>Fusebox (*)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Fusebox (*)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Fusebox (*)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Fusebox (*)</p> <p>1.50RA-LTB-021 (A) 2</p>
<p>Connector for air conditioner supplementary wiring (present up to chassis N)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Engine compartment ground-right side</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Dashboard/engine connection</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Dashboard/engine connection (*)</p> <p>1.50RA-LTB-021 (A) 2</p>

<p>Connector for air conditioner supplementary wiring (present up to chassis N)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Engine air conditioner wiring B connection (*)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Engine air conditioner wiring A connection</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Engine cooling fan relay</p> <p>1.50RA-LTB-021 (A) 2</p>
<p>Connector for air conditioner supplementary wiring (present up to chassis N)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Two-stage thermocontact</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Two-stage thermocontact</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Engine cooling fan motor</p> <p>1.50RA-LTB-021 (A) 2</p>
<p>Connector for air conditioner supplementary wiring (present up to chassis N)</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Additional engine cooling fan resistance</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Additional engine cooling fan resistance</p> <p>1.50RA-LTB-021 (A) 2</p>	<p>Additional engine cooling fan resistance</p> <p>1.50RA-LTB-021 (A) 2</p>

Engine electric fan control - Twin Spark model

Wiring Diagram



Functional Description

The delaying device Q42, located in group Q41, controls the cutting in of the electric fan to improve the cooling of the air conditioning system compressor. The key-operated voltage supplies the car and the electronic devices of the relay system Q42, pin 65 (from chassis P) and the "key-operated" supply come from the line of fuse F15 (10A) of G1). The coil is excited by an ground signal from P, which can come from either the

primary pressure switch Q20, or from level 1 (87-92°C) of the two-stage thermostat L33; this causes an ground signal to be sent - pin 30 - to the additional resistance Q22 and from there to the electric engine cooling fan P2, which is then operated at the 1st speed.

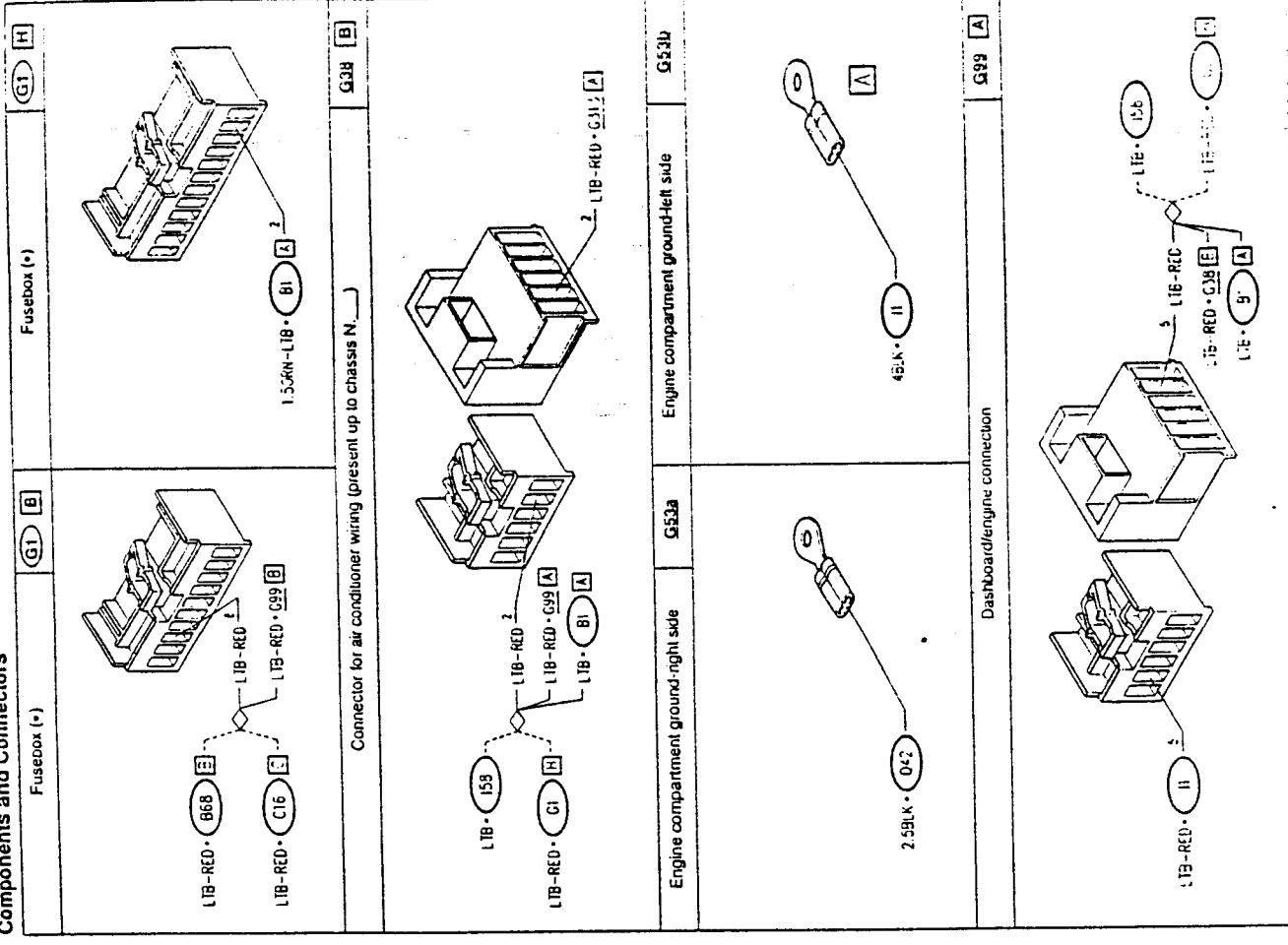
The electric fan P2 is constantly supplied by battery voltage through the special fuse, G254 (40A).

After about 10 seconds, if the control signal persists, or if level 2 of thermo-

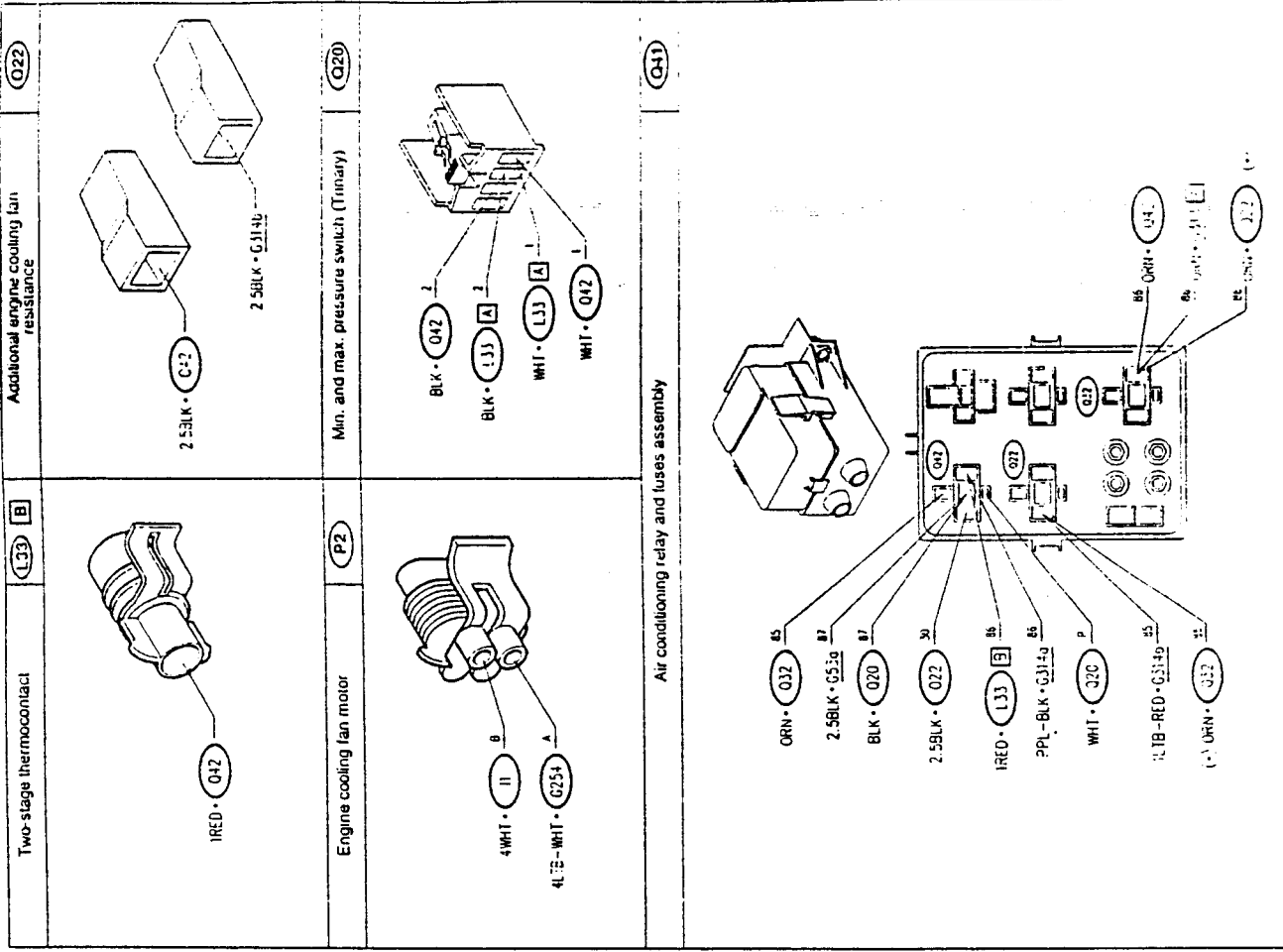
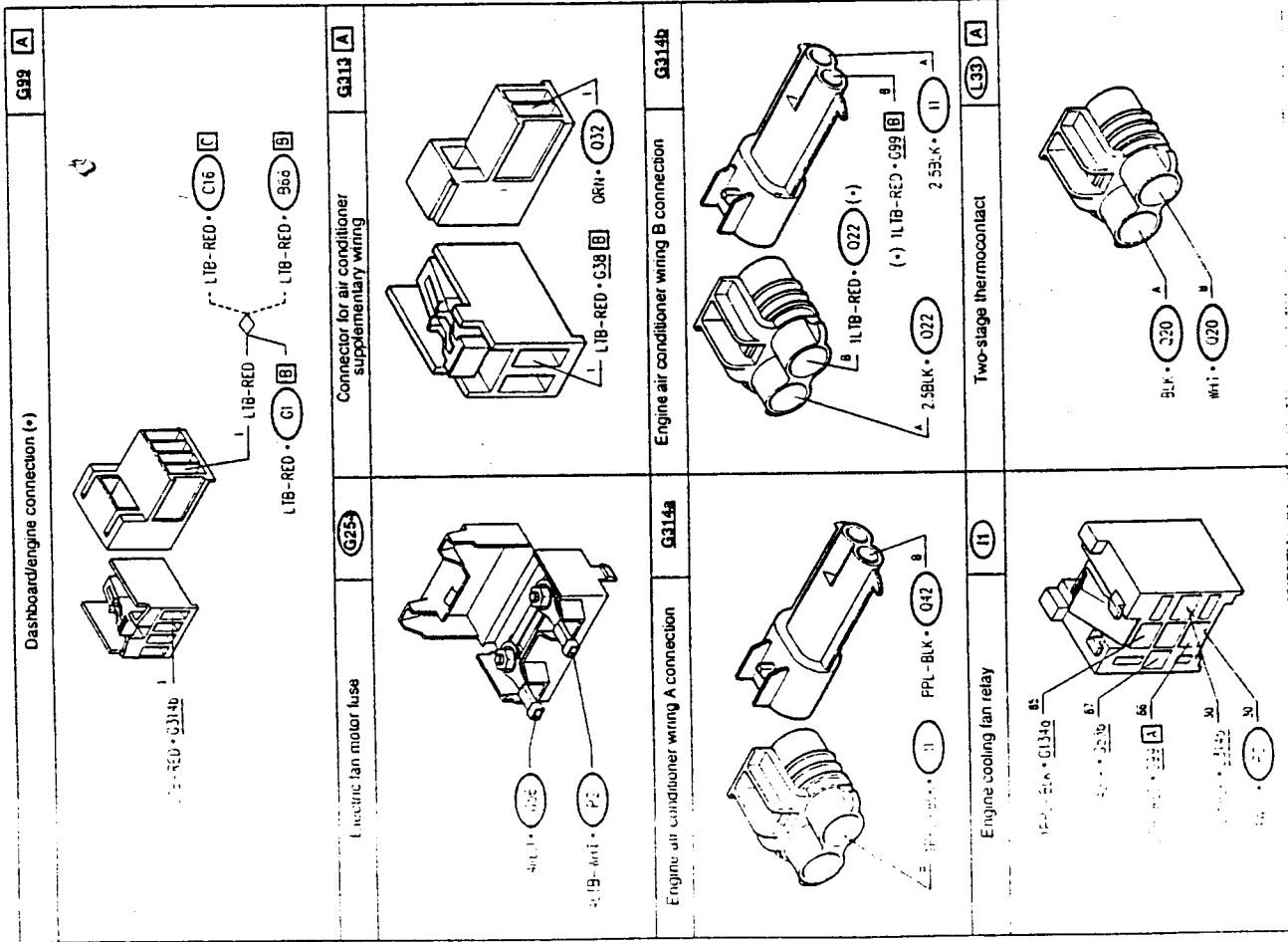
contact L33 is reached (92-97°C), the delay device Q42 sends - pin 86 - an ground signal which excites the coil of the fan relay R1, and actuates the fan itself P2 at the 2nd speed.

Starting from chassis N, the layout of the air conditioner wiring has been changed with modification of the connections only as described above.

Components and Connectors



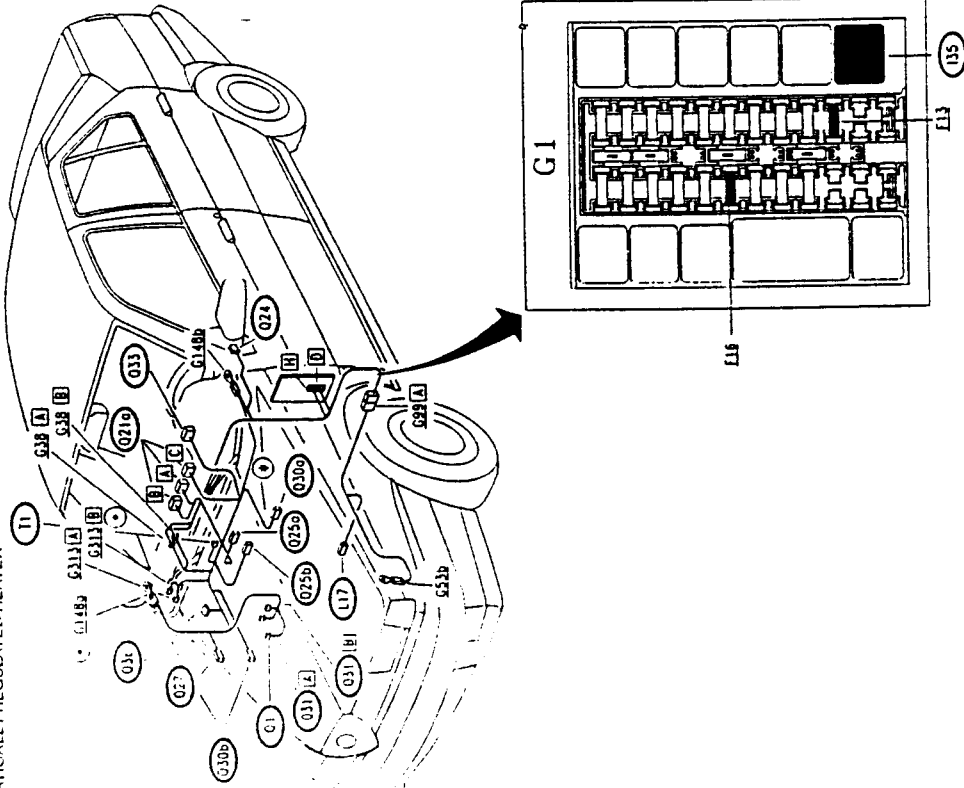
(+) from chassis N, 11-1993





Location of Components

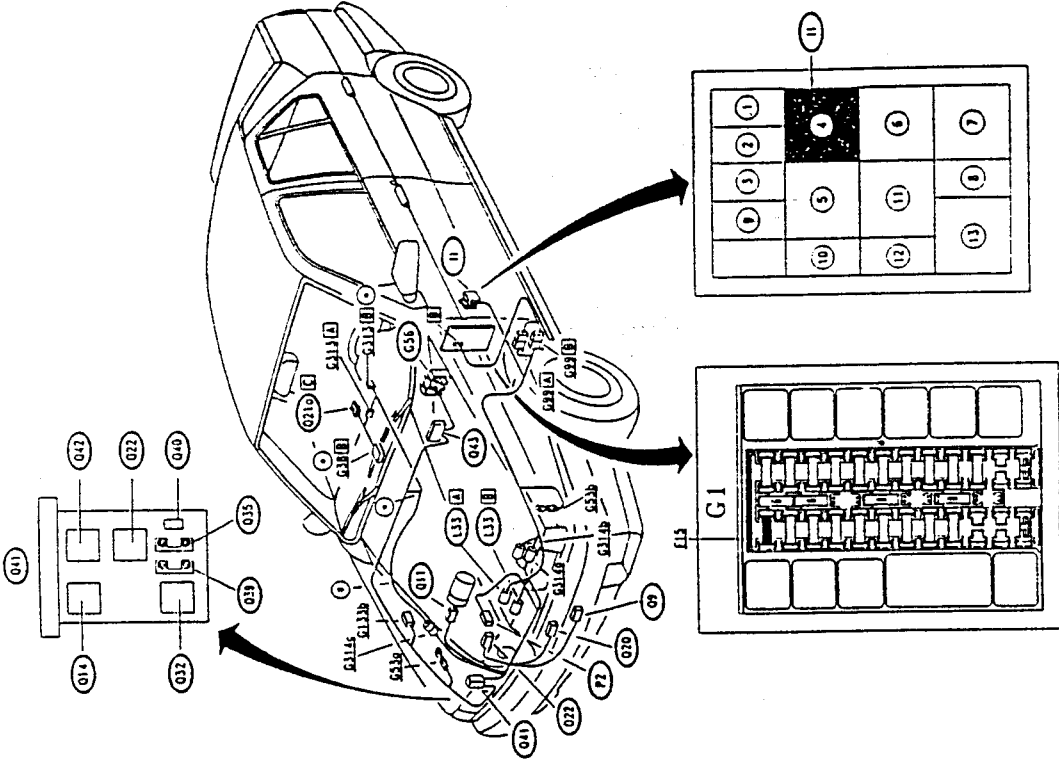
- Parts common to
- AUTOMATIC HEATING-VENTILATION SYSTEM WITH AIR CONDITIONER
  - AUTOMATICALLY REGULATED HEATER



(\*) present up to chassis N. 11-1993  
 (\*) from chassis N. 11-1993

Location of Components  
 (Version 6V)

only  
 AUTOMATIC HEATING-VENTILATION SYSTEM WITH AIR CONDITIONER

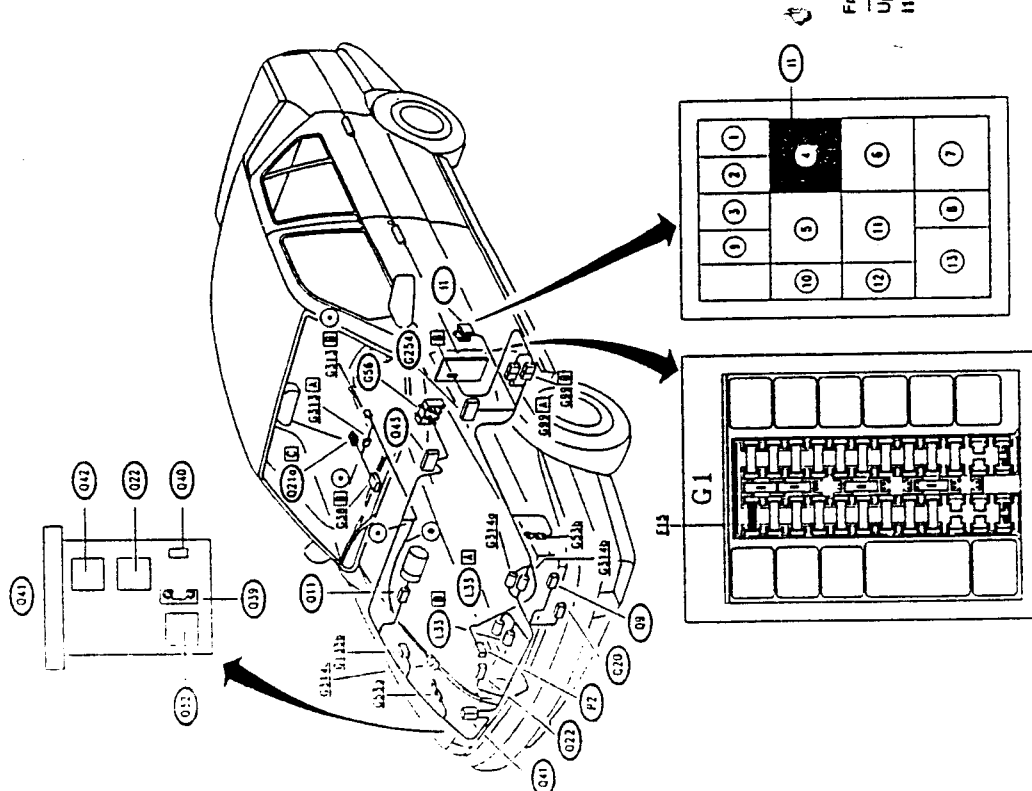


From chassis N.30 733  
 Up to chassis N.30 732  
 11 - GREEN relay holder

(\*) present up to chassis N. 11-1993  
 (\*) from chassis N. 11-1993

**Location of Components  
(Version Twin Spark)**

only  
AUTOMATIC HEATING/VENTILATION SYSTEM WITH AIR CONDITIONER



From chassis N.30.733  
Up to chassis N.30.732  
11 - GREEN relay holder

(\*) Present up to chassis N...  
(\*) From chassis H...

**AUTOMATICALLY REGULATED HEATER**

**Description**

The automatically regulated heater is entirely controlled by the air conditioning electronic control unit but it is not possible to cool the air as there is no compressor or relative system.

The control unit however optimizes the flow of air and provides the exact temperature requested during cold weather, and, as far as possible, attempts to bring the temperature as near as possible to that requested during warm weather.

This logic is governed by the control unit Q21a:

pin 2 of connector C, which sends the signal to activate the compressor, is not connected.

The control panel, the front part of the control unit itself, is slightly different; for obvious reasons the "ECON" button is not present.

The wiring diagram relative to the automatically regulated heater is the same as that for the preceding air conditioner but only the following should be considered:

- control unit: supply and diagnosis;
- temperature sensors;
- vent actuators;
- interior electric fan;

**MANUALLY CONTROLLED AIR CONDITIONER**

**General Description**

The system with a manually controlled air conditioner integrates a simple but functional heater with the air recirculation function and the production of cold and dehumidified air obtained by the insertion of a compressor and relative cooling system.

**Electric Fan**

The control assembly located on the dashboard is composed of three knobs.

The first knob on the left controls the electric fan through a four-speed regulator (three resistances in series are inserted) gradually thus obtaining the different speeds.

When the knob is in the OFF position the power supply to the entire system, including the engagement of the compressor, is interrupted.

When in the "0" position the electric fan is stationary, unless the compressor has been engaged; in this case an appropriate relay automatically commands the power supply of the electric fan at the first speed.

The successive positions command the various speeds.

The central knob mechanically controls the mixing of cold and hot air.

The right-hand knob regulates, once again mechanically, the distribution of the flow of air according to the directions shown by the pictograms.

**Recirculation**

The recirculation function makes it possible to draw air from inside the passenger compartment for treatment thus excluding the flow of air from outside the vehicle in disagreeable situations (bad smells, smoke or in badly ventilated tunnels etc.).

This recirculation is obtained through the actuation of a button which commands a motor closing the shutter on the external air duct and at the same time opening that on the duct recirculating air within the passenger compartment.

(For greater details refer to the successive description: "Electric Fan Control and Recirculation")

**Cooling system**

The cooling system is activated through a button on the control panel and produces cool and dehumidified air. It is a closed circuit system where the fluid condenses and evaporates withdrawing heat from the air in the conveyor distributor.

It is mainly composed of the following parts:

- Compressor. This is activated through a belt by the crankshaft. It is engaged and disengaged through an electromagnetic coupling controlled by a control unit which takes into account a series of operating conditions relative to the system itself and the engine.
- Condenser. This is installed in front of the engine cooling liquid radiator when the vehicle is stationary the air necessary for the heat exchange is supplied by activating the electric fan relative to the engine radiator.
- Evaporator. This is an exchanger which cools the air and is located in the conveyor distributor.

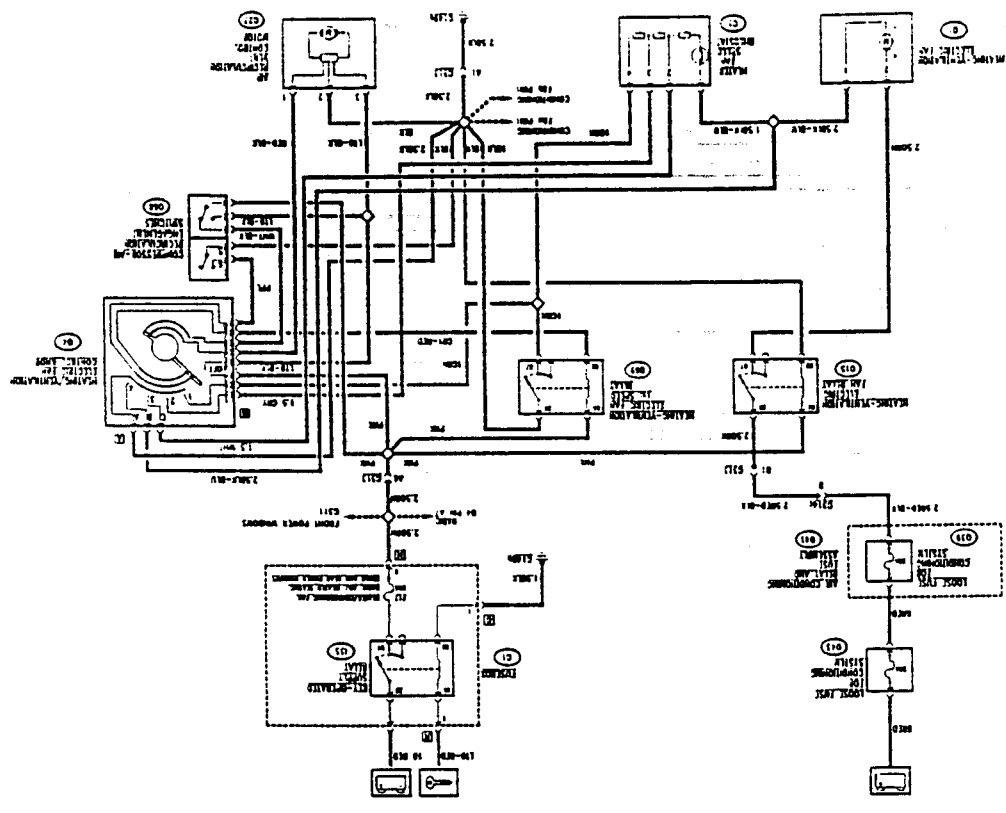
- Accumulator-dehydrator: This separates the fluid in a liquid state from that in a gaseous state. It also functions as an accumulation tank.
- Expansion valve: This suitably diminishes the pressure of the fluid.
- Three-level pressure switch (primary): This controls the safety and correct operation of the fluid circuit.
  - it engages the radiator fan when necessary (e.g. when the vehicle is stationary) thus preventing an increase in pressure on the condenser (intervention at about 15.5 bars).
  - it stops the compressor, deactivating the electromagnet coupling if the pressure reaches excessively high and therefore dangerous pressures (above 25 bars) or pressures which are too low to guarantee the correct operation (below 2.5 bars).
- Minimum pressure switch (defroster): disconnects the compressor when the pressure is too low (< 1.7-1.8 bars) as this could cause the evaporator to freeze. In addition it protects the compressor from sudden falls in pressure caused for example, by a leaking circuit.

**WARNING:**  
From chassis N... the system uses the ecological fluid R134a. Refer to the indications given above in the section "AUTOMATIC HEATING AND VENTILATION".

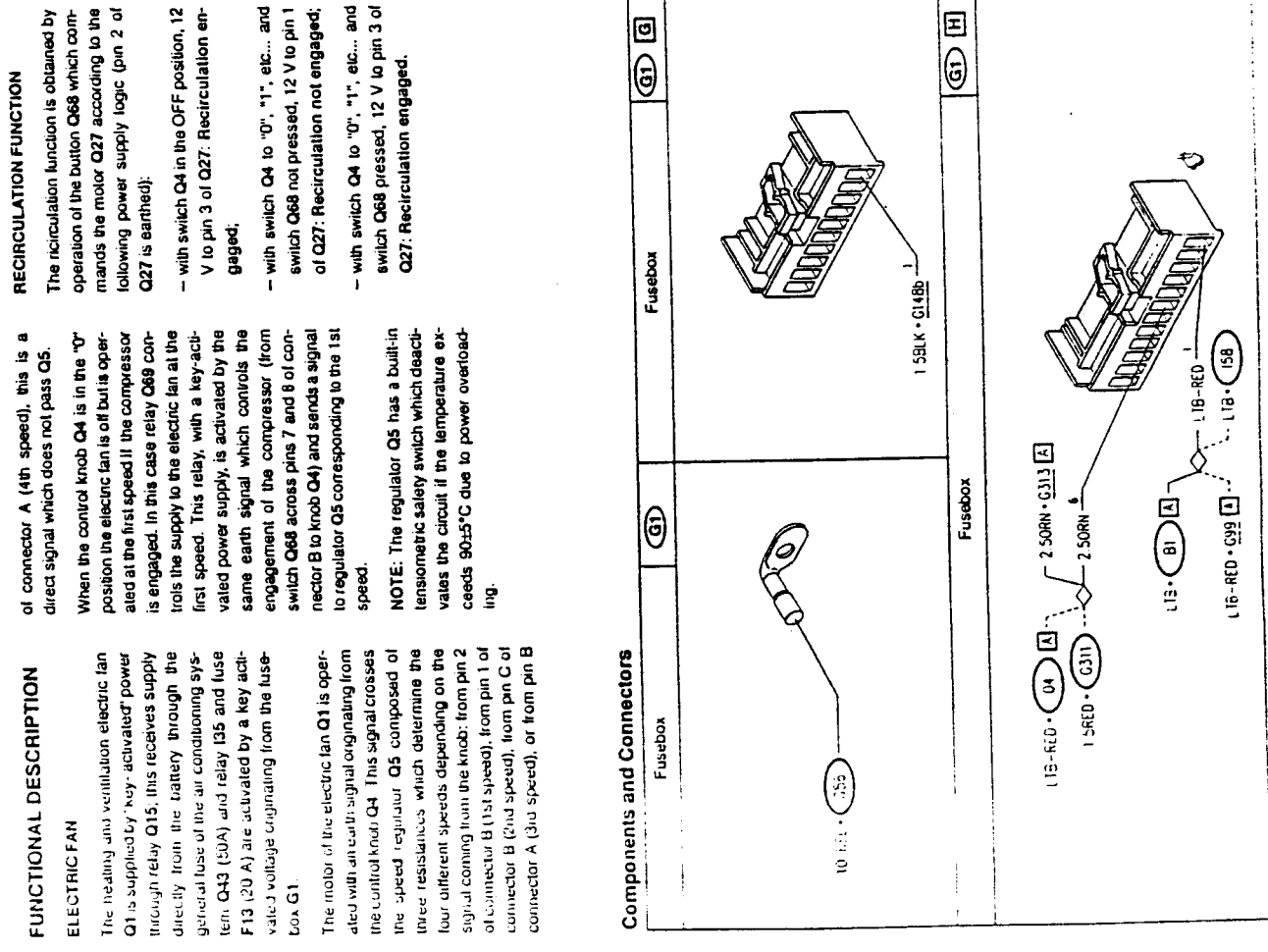
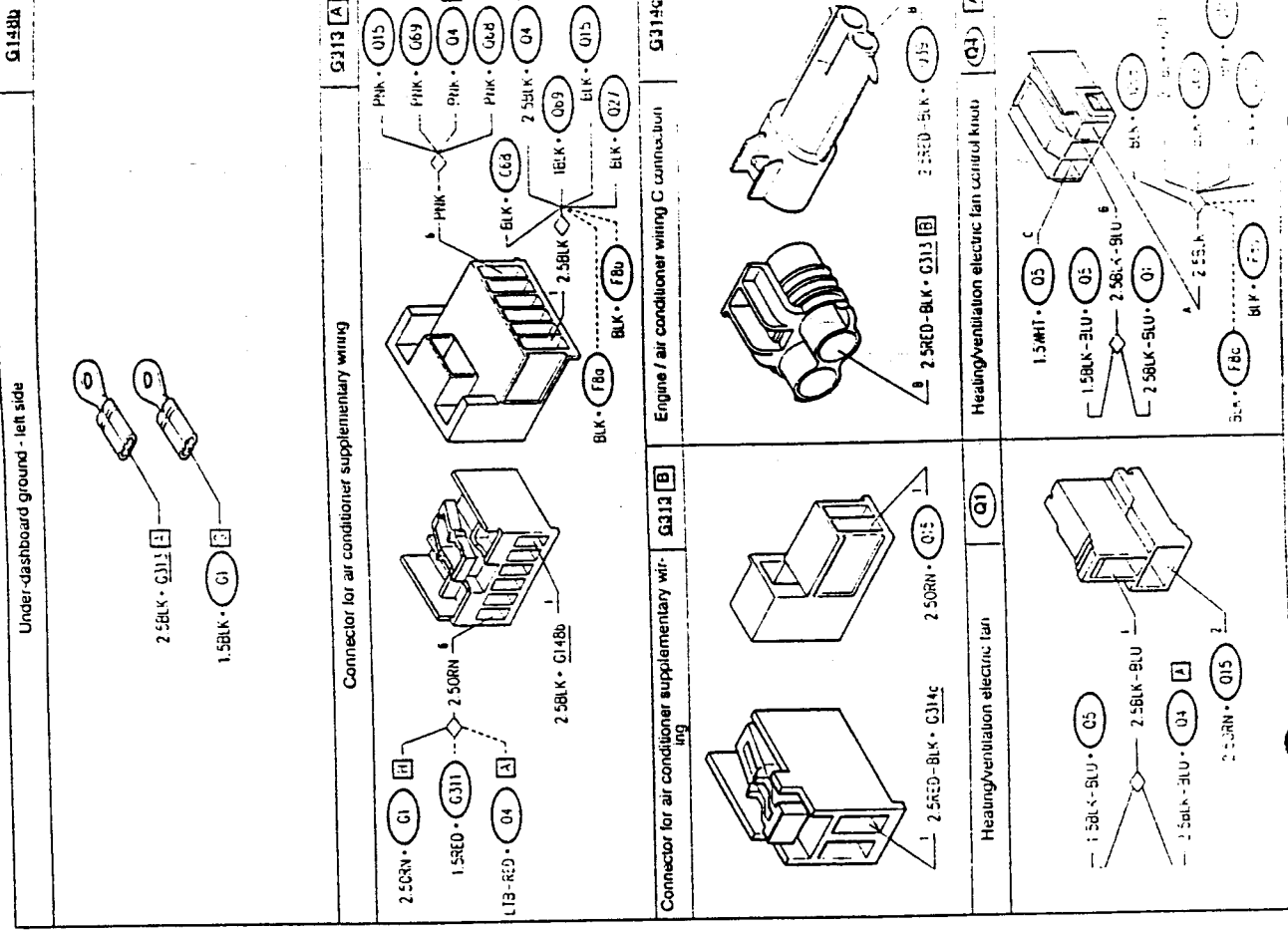
**Control of engine electric fan**

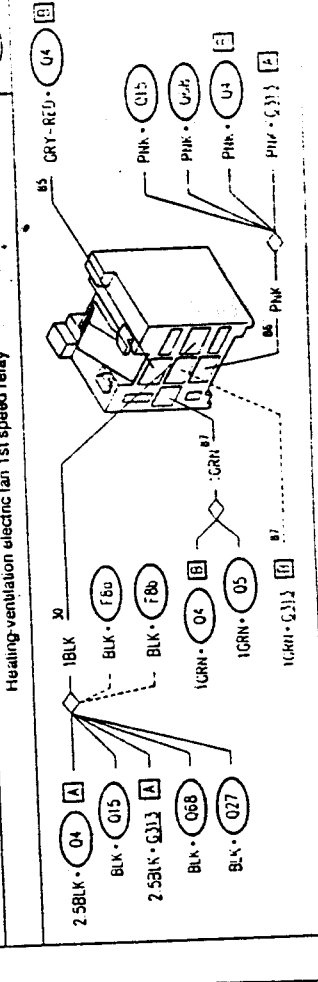
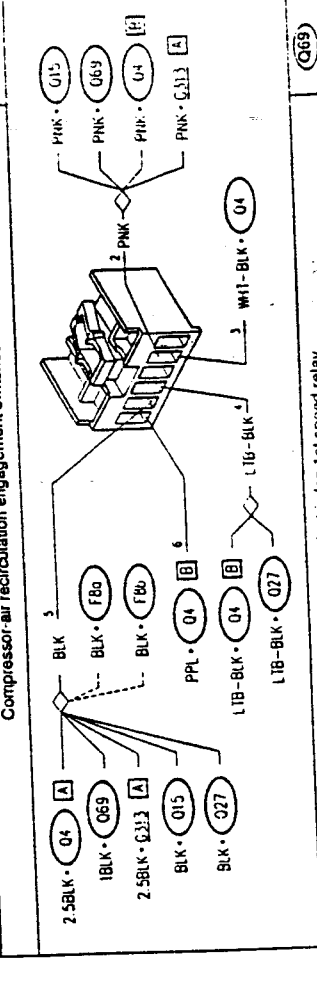
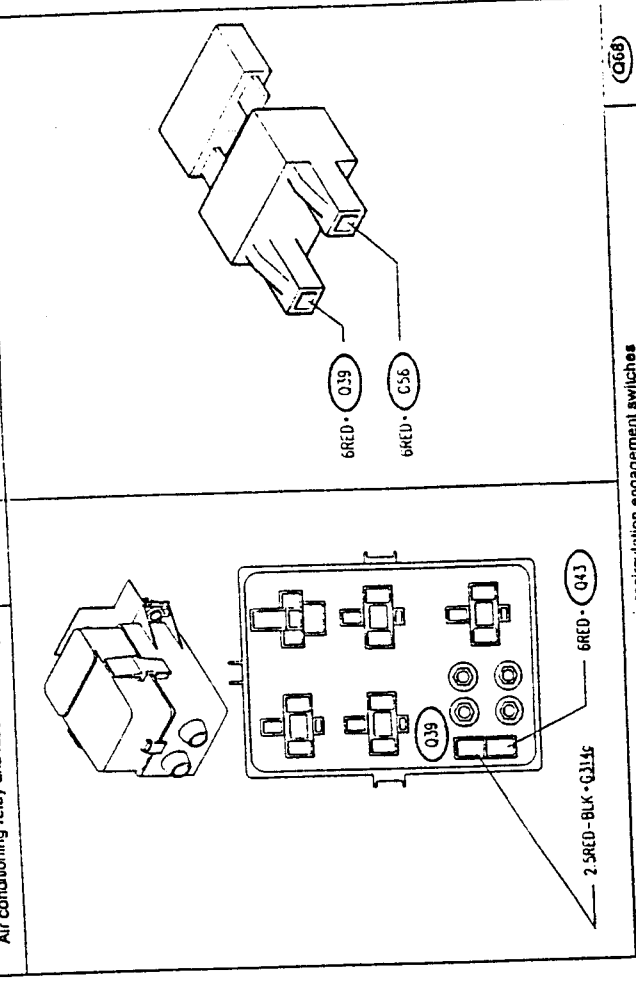
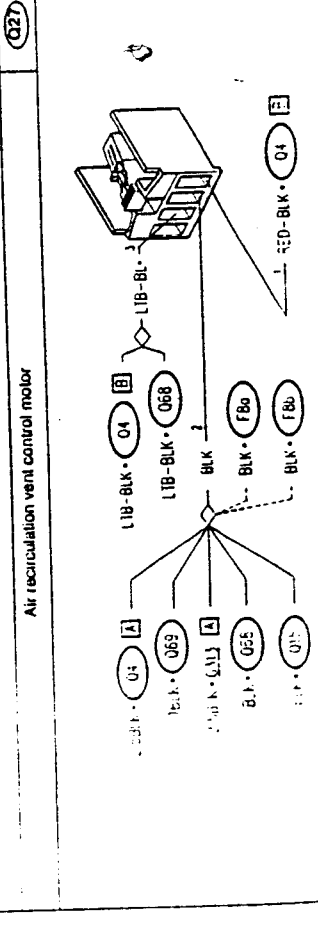
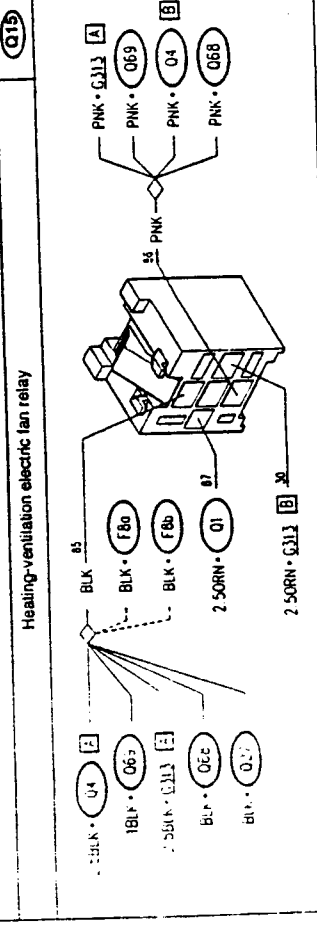
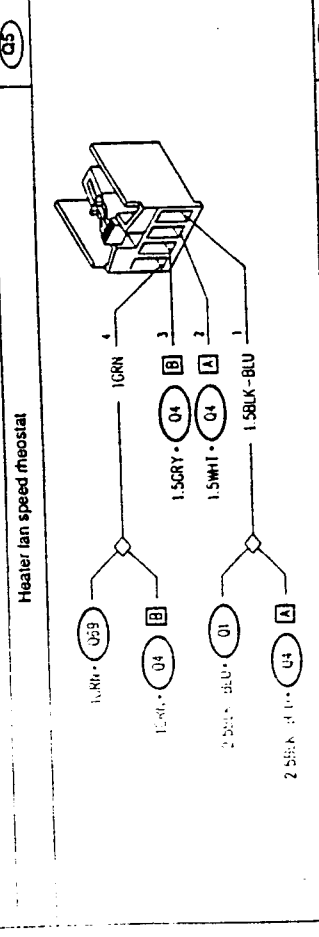
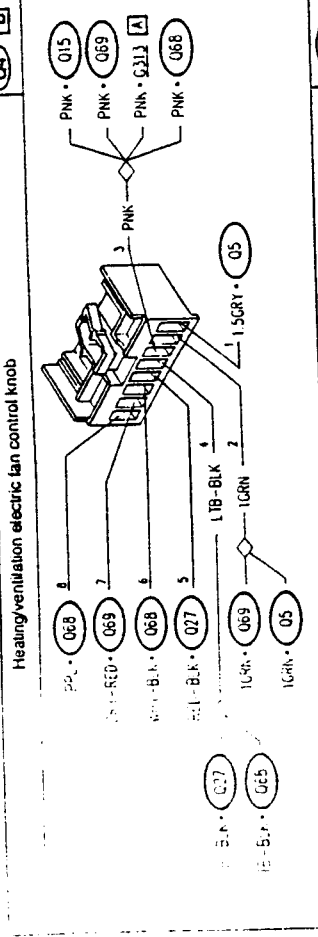
When the vehicle is travelling at low speed the cooling action caused by dynamic air flow on the condenser diminishes and it is therefore necessary to engage the electric fan which cools the engine radiator and the condenser itself. This is carried out by a binary pressure switch which intervenes preventing an increase in pressure on the condenser (above 15.5 bars). The engagement of the engine electric fan starts off at the first speed and then, after approximately ten seconds (measured by an appropriate timer), if the conditions still persist, the speed gradually increases to the second level. (For greater detail refer to the successive description: "Engine electric fan control").

**Electric Fan Control and Recirculation Wiring diagram**



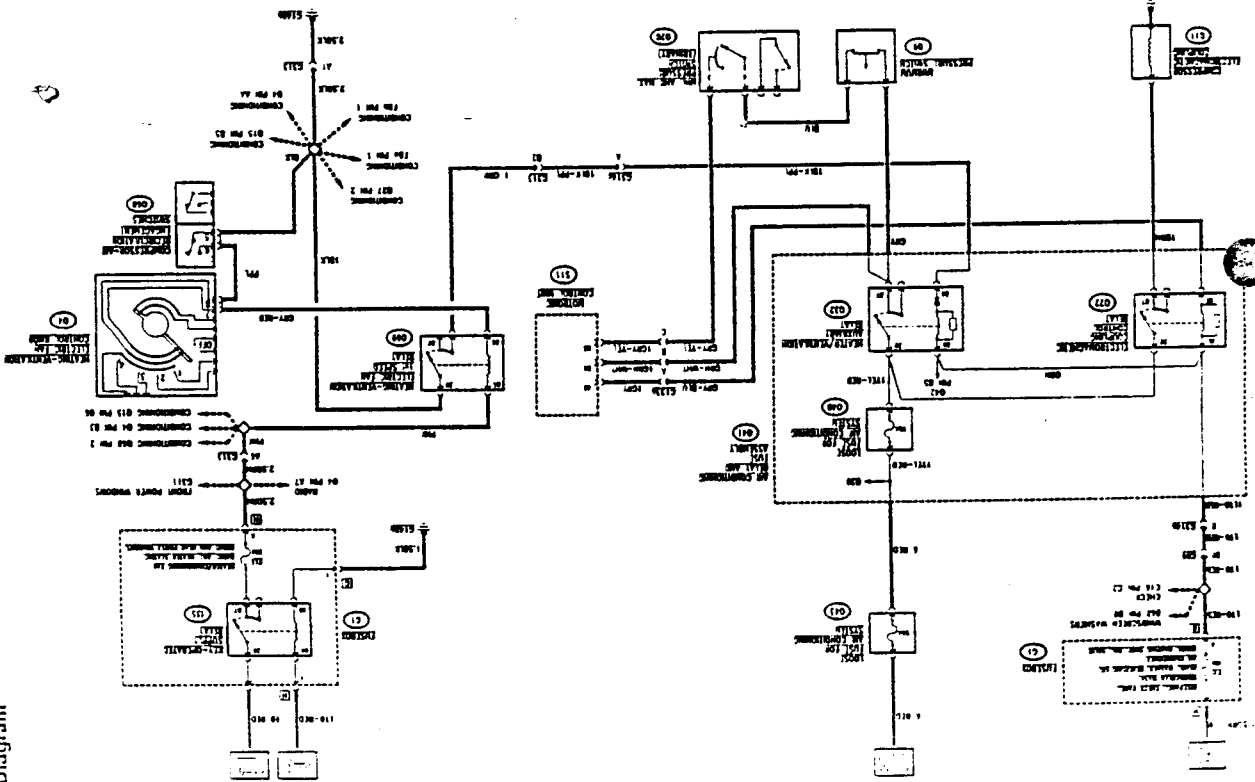
- Numerous fuses protect the system's power supply:
- fuse F13 (20 A) in fusebox G1
  - fuse F15 (10 A) in fusebox G1
  - general fuse for power supply to air conditioning relay and fuse group (Q43): 50 A
  - fuse in air conditioning fuse and relay group (Q40): 15 A
  - fuse in air conditioning fuse and relay group (Q39): 30 A
  - wander fuse for engine electric fan (G254): 50 A.
- The wiring diagrams and descriptions divided under the following functions are given below:
- Electric fan control and recirculation
  - Engagement of compressor
  - Engine electric fan control;
- NOTE:**  
for the illumination of the controls refer to the section "Internal Lighting".





Engagement of Compressor

Wiring Diagram



Functional Description

The electromagnetic coupling which activates the compressor Q11 is controlled by relay Q22 located in the relay and fuse unit Q41.

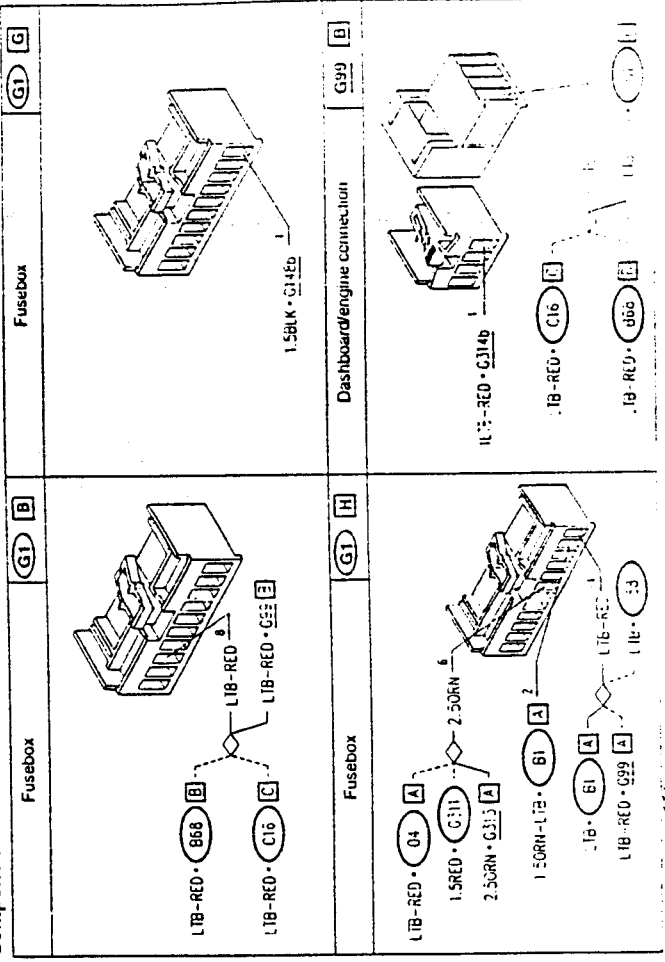
Relays Q22 and Q23 located in unit Q41 have a key-activated coil (line protected by fuse F15 (10A) in G1). The power line on the other hand is supplied with battery voltage through fuse Q40 (15A) also located in unit Q41 and through fuse Q43 (50A) which protects the entire system.

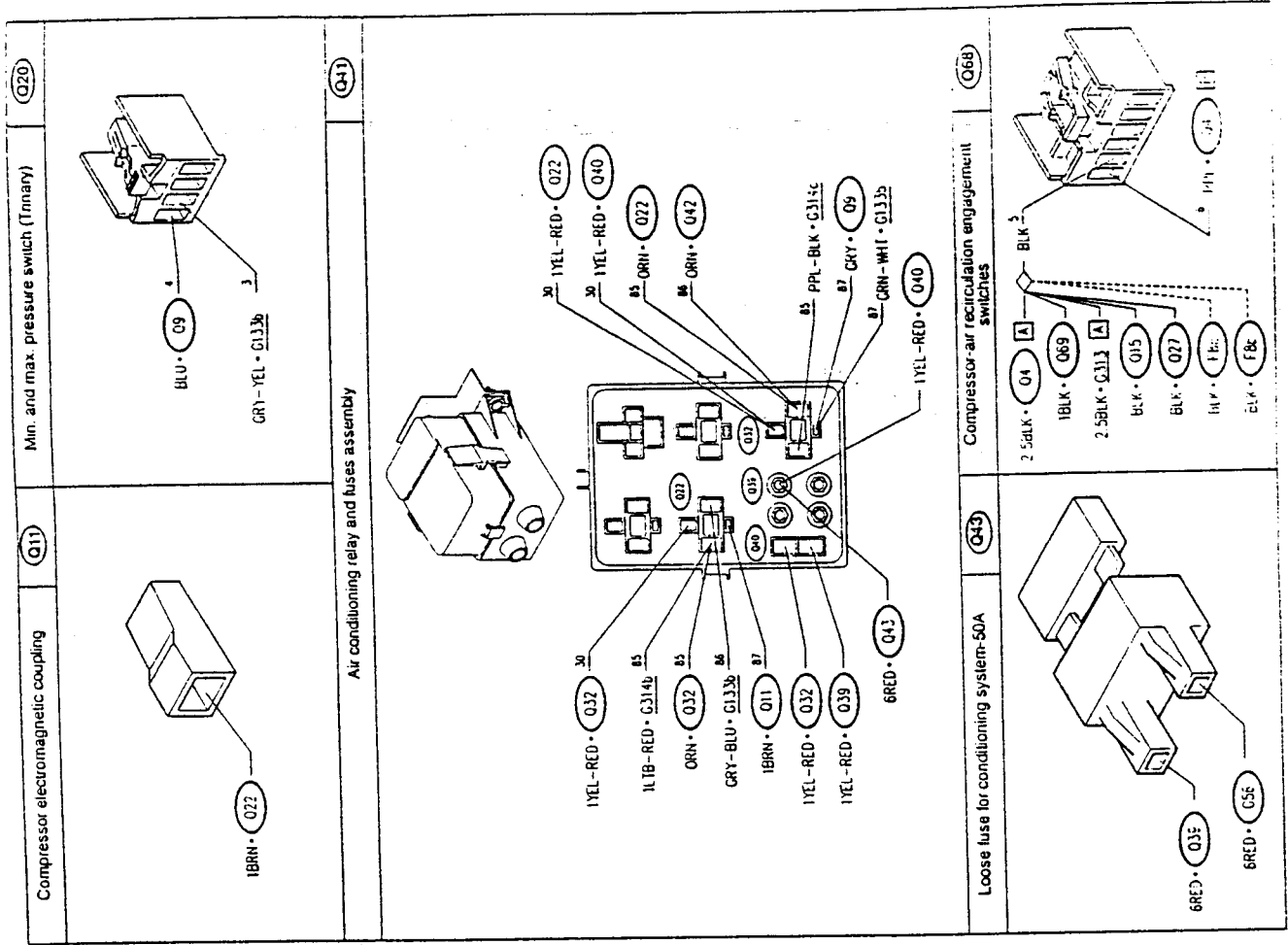
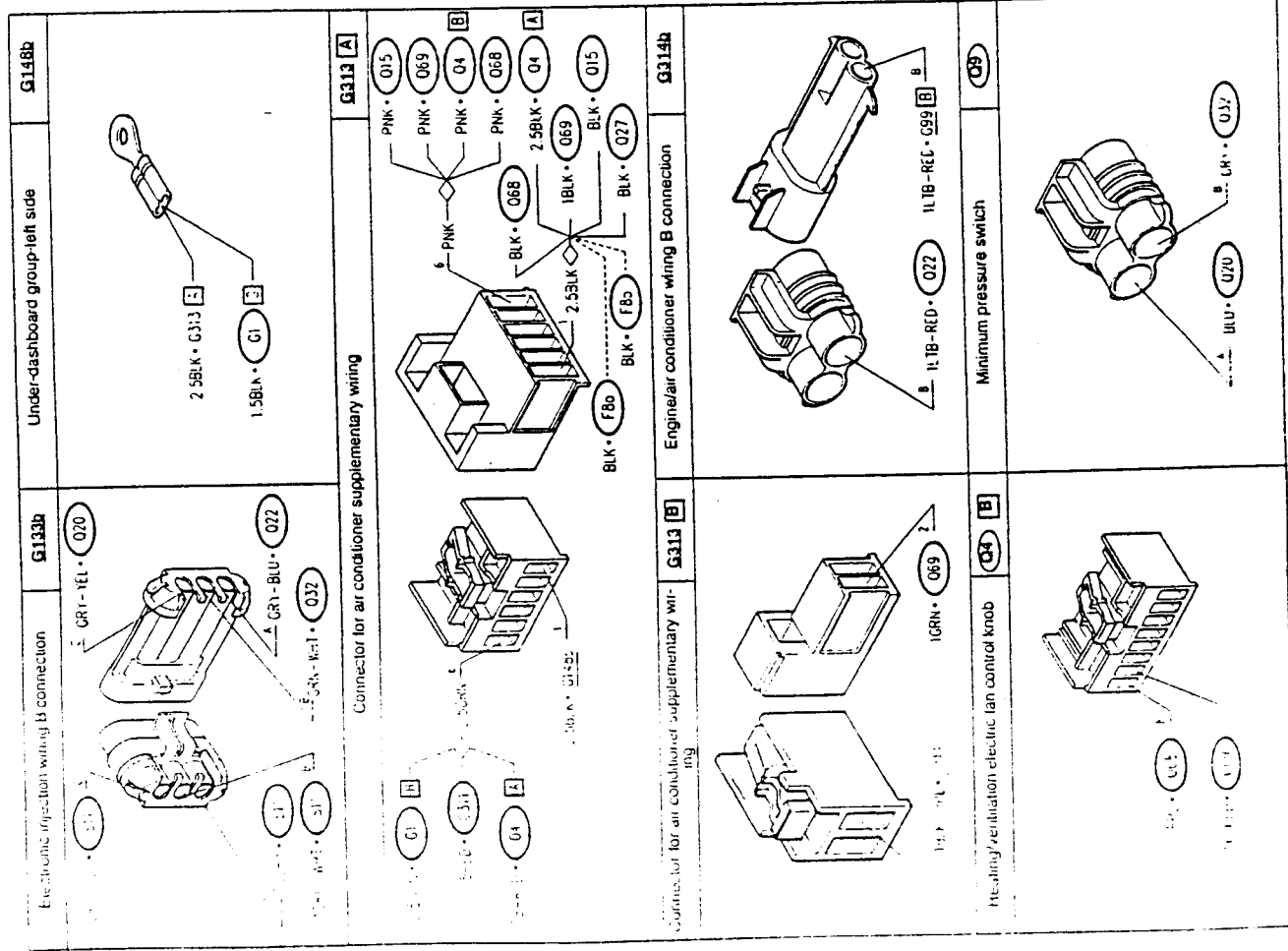
The relay Q22 is activated by the Motronic ignition/injection system and consequently supplies 12 volts to the electromagnetic coupling in accordance with the following logic:

- The relay Q22 is activated by a signal coming from relay Q69 which is in turn activated by a signal coming from the compressor engagement switch Q68. This signal crosses the control knob Q4 and interrupts it when the knob is in the OFF position. In this state the compressor cannot be engaged. At the same time this signal commands the engagement of the electric fan at the first speed (Electric Fan Control and Recirculation).
- Relay Q32 consequently sends a command signal to the pin 86 of the Motronic control unit S11.
- The control unit returns this signal from pin 48 of S11 to relay Q22 thus

engaging the compressor but only after the internal logic has checked certain conditions (e.g. that the compressor is not engaged when minimum power is required from the engine). The control unit also checks that the signal at pin 85 of S11 coming from the minimum pressure switch (defroster) Q9 and from the minimum and maximum pressure switch (interior) Q20 is not interrupted, a situation which occurs when the pressure in the cooling system is either too high or too low in which case the command signal is not returned to activate the compressor.

Components and Connectors









**Functional Description**

The wiring device Q42, located in the engine compartment, controls the cooling fan in the event of a high engine temperature. The cooling fan is controlled by the electronic delay device Q42, pin 85. The coil is activated by an electronic signal - pin P - which can come

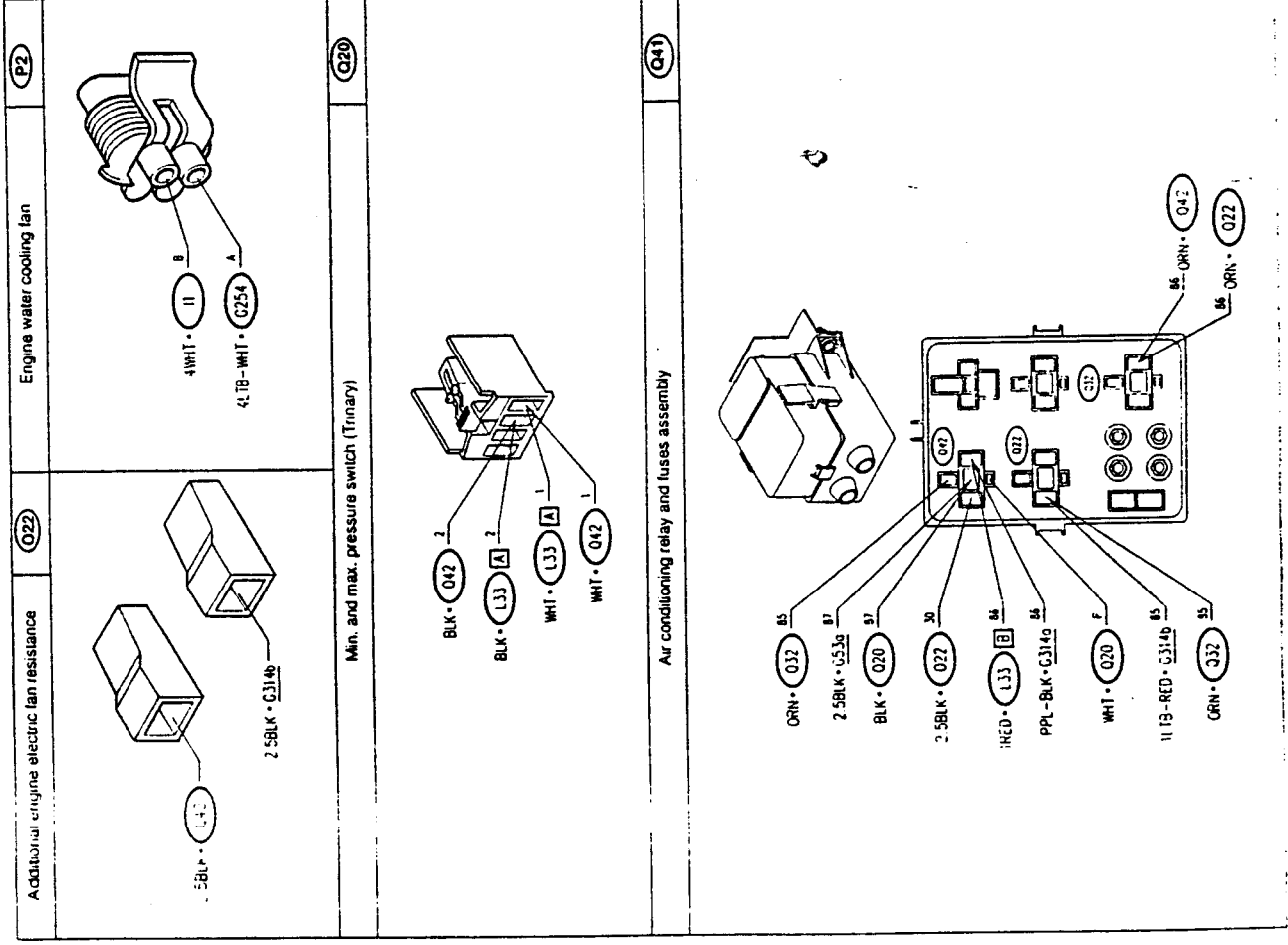
from either the primary pressure switch Q20, or from level 1 (87-92°C) of the two-stage thermocontact L33; this causes an ground signal to be sent - pin 30 - to the additional resistance O22 and from there to the electric engine cooling fan P2, which is then operated at the 1st speed.

The electric fan P2 is constantly supplied by battery voltage through the special fuse, G254 (40A). After about 10 seconds, if the control signal persists, or if level 2 of thermocontact L33 is reached (92-97°C), the delay device Q42 sends - pin 86 - an ground signal which excites the coil of the fan relay I1, and actuates the fan itself P2 at the 2nd speed.

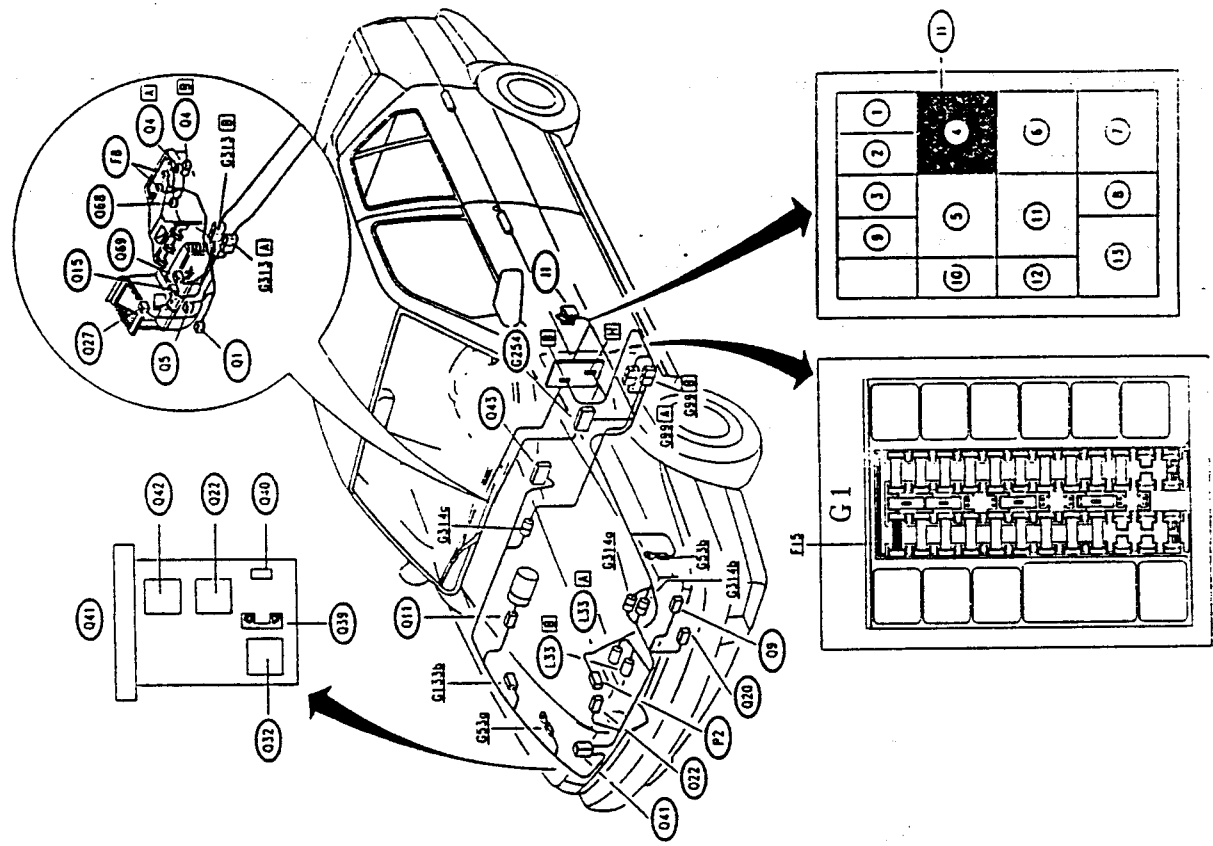
**Components and Connectors**

<p>Engine compartment ground - right side</p> <p>G53a</p>	<p>Engine compartment ground - left side</p> <p>G53b</p>

<p>Dashboard/engine connection</p> <p>G99 A</p>	<p>Dashboard/engine connection</p> <p>G99 B</p>
<p>Electric fan motor fuse</p> <p>G254</p>	<p>Engine/air conditioner wiring A connection</p> <p>G314a</p>
<p>Engine/air conditioner wiring B connection</p> <p>G314b</p>	<p>Engine cooling fan relay</p> <p>I1</p>
<p>Two-stage thermocontact</p> <p>L33 A</p>	<p>Two-stage thermocontact</p> <p>L33 B</p>



**Location of Components**  
(SPECIFIC SECTION FOR MANUALLY OPERATED AIR CONDITIONER)



**TROUBLESHOOTING HEATING-VENTILATION SYSTEM**

- B** - Fault diagnosis for manually controlled air conditioner
- C** - Fault diagnosis for automatic air conditioner/heater (following the self-diagnosis of the control unit Q21a)
- D** - Fault diagnosis for the air conditioning system: compressor command and electric fan control.

**N.B.:**

Parts A, B, and C refers only to the conveyor/distributor located under the dashboard.  
Part D refers to the system in the engine compartment.

**NOTE:**

The fault diagnosis in this section is divided into four distinct parts

- A** - Fault diagnosis for manual heater

**A - MANUAL HEATER**

**TROUBLESHOOTING TABLE**

Multifunction	Component			Test
	Q1	Q5	E13	
Fan does not cut in	.	.	.	A
The fan does not cut in at the correct speed	.	.	.	B

**NOTE:** Air distribution within the passenger compartment and the heating/cooling of the air are mechanically controlled. For this reason, if anomalies should occur, e.g. heating/cooling not working, incorrect air distribution etc., refer to "155 - REPAIR MANUAL - BODY", Group 80 - Air conditioning.

**ELECTRIC FAN DOES NOT CUT IN**

**TEST A**

**NOTE:** If the following circuits are also not working: windshield wipers, front power windows, heated rear windscreen and mirror defrosting, seat adjustment and heating, etc., check and if necessary replace the key-operated supply relay I35.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK FUSE</b> - Check for damage of fuse F13 in fusebox G1	OK <del>OK</del>	Carry out step A2 Replace the fuse (20A)
<b>A2 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V between pins 1 and 2 of the fan Q1	OK <del>OK</del>	Replace fan Q1 Carry out step A3
<b>A3 CHECK CONTINUITY</b> - Check continuity between pin 2 of Q1 and pin H6 of G1	OK <del>OK</del>	Carry out step A4 Restore wiring between pin 2 of Q1 and pin H6 of G1, across pin A6 of connector G38 and the subber (JHTN)
<b>A4 CHECK GROUND</b> - Check that pin 1 of the fan control Q4 is grounded (0V)	OK <del>OK</del>	Carry out step A5 Restore wiring between pin 1 of Q4 and ground G148b, across pin A1 of connector G38 (BLK)
<b>A5 CHECK CONTROL KNOB</b> - Engage maximum speed and check that pin 5 of Q4 is grounded (0V)	OK <del>OK</del>	Restore wiring between pin 1 of Q1 and pin 5 of Q4 (BRN) Replace control knob Q4

ELECTRIC FAN DOES NOT CUT IN AT DIFFERENT SPEED

TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK REGULATOR - Check regulation resistances Q5, checking the following values: • between pin 1 and 4: 3.55 Ω approx. • between pin 1 and 3: 1.35 Ω approx. • between pin 1 and 2: 0.35 Ω approx.	OK <del>OK</del>	Carry out step B2 Replace regulator Q5
<b>B2</b> CHECK CONTROL KNOB - Check the correct functioning of the fan control Q4, verifying continuity between the pins in accordance with the following: 1. speed: continuity between pins 5 and 4 2. speed: continuity between pins 5 and 3 3. speed: continuity between pins 5 and 2 4. speed (max): continuity between pins 5 and 1 Also check that the circuit is open between the pins not indicated	OK <del>OK</del>	Carry out step B3 Replace control knob Q4
<b>B3</b> CHECK CONTINUITY - Check continuity between: • pin 2 of Q4 and pin 2 of Q5 • pin 3 of Q4 and pin 3 of Q5 • pin 4 of Q4 and pin 4 of Q5	OK <del>OK</del>	Restore wiring between pin 1 of Q5 and ground G148b, across pin A1 of connector G38 (BLK)  Restore wiring between: • pin 2 of Q4 and pin 2 of Q5 (RED) • pin 3 of Q4 and pin 3 of Q5 (GRY) • pin 4 of Q4 and pin 4 of Q5 (GRN)

TRUBLESHOOTING TABLE

Malfunction	Component										Test	
	E13	Q43	Q339	Q15	Q1	Q5	Q4	Q59	Q27	Q68		
The electric fan does not come on	•	•	•	•	•							A
The electric fan does not come on at the various speeds						•						B
The electric fan does not come on at the 1st speed when the air conditioning compressor is engaged							•					C
The air recirculation function does not come on								•				D

THE ELECTRIC FAN DOES NOT COME ON TEST A

NOTE: In cases where the following circuits are also not working: windshield wipers, front power windows, defroster, seats etc., check and if necessary replace the key activated power supply relay.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1   CHECK FUSE Check for damage to fuse F13 of fusebox G1	OK <input checked="" type="checkbox"/>	Proceed to step A2
	<del>OK</del> <input checked="" type="checkbox"/>	Substitute the fuse (20A)
A2   CHECK FUSE Check for damage of wiper fuses Q39 and Q43 located in the relay and fuse group Q41 and next to the branch terminal board respectively	OK <input checked="" type="checkbox"/>	Proceed to step A3
	<del>OK</del> <input checked="" type="checkbox"/>	Replace the fuses (30 A and 50 A respectively)
A3   CHECK VOLTAGE With ignition key engaged, check for 12V at pin 2 of electric fan Q1	OK <input checked="" type="checkbox"/>	Proceed to step A8
	<del>OK</del> <input checked="" type="checkbox"/>	Proceed to step A4
A4   CHECK RELAY Check operation of relay Q15, located on sub-distributor group	OK <input checked="" type="checkbox"/>	Proceed to step A5
	<del>OK</del> <input checked="" type="checkbox"/>	Substitute relay if faulty
A5   CHECK EARTH Check that pin 85 of relay Q15 is earthed	OK <input checked="" type="checkbox"/>	Proceed to step A6
	<del>OK</del> <input checked="" type="checkbox"/>	Restore wiring between pin 85 of Q15 and earth G148b, across the solder and pin A1 of connector G313 (BLK)
A6   CHECK VOLTAGE Check for 12V at pin 30 of relay Q15	OK <input checked="" type="checkbox"/>	Proceed to step A7
	<del>OK</del> <input checked="" type="checkbox"/>	Restore wiring between pin 30 of Q15 and fuse Q39, across pin B1 of connector G313, pin B of connector G314c (ORN, RED-BLK)

(continued)

THE ELECTRIC FAN DOES NOT COME ON TEST A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A7   CHECK VOLTAGE With ignition key engaged, check for 12V at pin 86 of relay Q15	OK <input checked="" type="checkbox"/>	Restore wiring between pin 87 of Q15 and pin 2 of electric fan Q1 (ORN)
	<del>OK</del> <input checked="" type="checkbox"/>	Restore wiring between pin 86 of Q15 and pin 6 of connector H of fusebox G1, across the solders and pin A6 of connector G313 (PNK and ORN)
A8   CHECK FAN Exercising extreme caution, apply 12V between pins 1 and 2 of electric fan, and check for correct operation	OK <input checked="" type="checkbox"/>	Proceed to step A9
	<del>OK</del> <input checked="" type="checkbox"/>	Substitute the fan Q1
A9   CHECK EARTH Check that pin AA of control knob Q4 is earthed	OK <input checked="" type="checkbox"/>	Restore wiring between pin AB of Q4 and pin 1 of electric fan between Q1, across the solder (BLK-BLU)
	<del>OK</del> <input checked="" type="checkbox"/>	Restore wiring between pin AA of Q4 and earth G148b, across the solder and pin A1 of connector G313 (BLK)

THE ELECTRIC FAN DOES NOT COME ON AT THE VARIOUS SPEEDS		TEST B
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>B1   CHECK REGULATOR</b></p> <p>- Check the regulation resistances Q5, and check the values</p> <ul style="list-style-type: none"> <li>• between pin 1 and 4: 2.9 Ω approximately</li> <li>• between pin 1 and 3: 0.8 Ω approximately</li> <li>• between pin 1 and 2: 0.3 Ω approximately</li> </ul> <p>Also check the calibration of the thermal contact inside the regulator, which opens at 90 ± 5°C and closes at 80±5°C</p>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step B2</p> <p>Substitute the regulator Q5</p>
<p><b>B2   CHECK CONTROL KNOB</b></p> <p>- Check for correct operation of fan control Q4, ensuring continuity between the pins in accordance with the following:</p> <ul style="list-style-type: none"> <li>- 1 speed: continuity between pin AA and B2</li> <li>- 2 speed: continuity between pin AA and B1</li> <li>- 3 speed: continuity between pin AA and AC</li> <li>- 4 speed (max): continuity between pin AA and AB.</li> </ul> <p>Check that circuit is open between these pins when knob is at "0"</p> <p>Also check continuity between pins B3 and B4 when knob is in "OFF" position and circuit is open when the knob is turned to "0"</p>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step B3</p> <p>Substitute the control knob Q4</p>
<p><b>B3   CHECK CONTINUITY</b></p> <p>- Check for continuity between:</p> <ul style="list-style-type: none"> <li>• pin AC of Q4 and pin 2 of Q5</li> <li>• pin B1 of Q4 and pin 3 of Q5</li> <li>• pin B2 of Q4 and pin 4 of Q5</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between pin 1 of Q5 and pin 1 of Q1 (BLK-BLU)</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin AC of Q4 and pin 2 of Q5 (WHIT)</li> <li>• pin B1 of Q4 and pin 3 of Q5 (GRY)</li> <li>• pin B2 of Q4 and pin 4 of Q5 across the solder (GRN)</li> </ul>

**THE ELECTRIC FAN DOES NOT COME ON AT THE 1ST SPEED WHEN THE AIR CONDITIONING COMPRESSOR IS ENGAGED**

N.B. The electric fan however comes on normally when the knob Q4, is operated. If not carry out tests A and B.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>C1   CHECK ENGAGEMENT OF COMPRESSOR</b></p> <p>- Check that, when button Q68 is pressed, the compressor is really engaged</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between pin B7 of relay Q69, and pin 4 of resistance Q5, across the solder (GRN)</p> <p>Carry out the tests indicated below to check the engagement of the compressor</p>

THE AIR RECIRCULATION FUNCTION DOES NOT COME ON		TEST D
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>D1   CHECK EARTH</b></p> <p>- Check that pin 2 of motor Q27 is earthed</p>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step D2</p> <p>Restore wiring between pin 2 of Q27 and earth G148b, across the solder and pin A1 of connector G313 (BLK)</p>
<p><b>D2   CHECK MOTOR</b></p> <p>- Check for correct operation of motor Q27:</p> <ul style="list-style-type: none"> <li>- with pin 2 earthed and pin 3 at 12V, the spindle rotates clockwise</li> <li>- with pin 2 earthed and pin 1 at 12 V, the spindle rotates anticlockwise</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step D3</p> <p>Substitute the motor Q27</p>
<p><b>D3   CHECK SWITCH</b></p> <p>- Check for correct operation of switch Q68:</p> <ul style="list-style-type: none"> <li>- button not pressed:</li> <li>• contact closed between pins 2 and 3;</li> <li>• contact open between pins 2 and 4;</li> <li>- button pressed:</li> <li>• contact open between pins 2 and 3;</li> <li>• contact closed between pins 2 and 4</li> </ul>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step D4</p> <p>Substitute switch Q68</p>
<p><b>D4   CHECK CONTROL KNOB</b></p> <p>- Check operation of control knob Q4: in particular check electrical continuity between pins B4 and B5 with knob at "0", "1", "2", etc.; check continuity between pins B3 and B4 with knob at "OFF"</p>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step D5</p> <p>Substitute control knob Q4</p>
<p><b>D5   CHECK VOLTAGE</b></p> <p>- With ignition key engaged and knob Q4 to "OFF", check for 12 V at pin 3 of motor Q27</p>	<p>OK</p> <p><del>OK</del></p>	<p>Proceed to step D6</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>- pin 6 of connector H of fusebox G1 and pin B3 of knob Q4, across the solders and pin A6 of connector G313 (ORN and PNK);</li> <li>- pin B4 of Q4 and pin 3 of Q27, across the solder (115 BLK);</li> <li>- pin B4 of Q4 and pin 4 of Q68, across the solder (115-BLK)</li> </ul>
<p><b>D6   CHECK VOLTAGE</b></p> <p>- With ignition key engaged and knob Q4 to "0", check for 12V at pin 1 of motor Q27</p>	<p>OK</p> <p><del>OK</del></p>	<p>Substitute motor Q27</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>- pin 6 of connector H of fusebox G1 and pin 2 of Q4d across the solders and pin A6 of connector G313 (ORN and PNK);</li> <li>- pin 3 of Q68 and pin B5 of Q4 (WHIT BLK)</li> <li>- pin B5 of Q4 and pin 1 of Q27 (BLU BLK)</li> </ul>

C- AUTOMATIC AIR CONDITIONER/HEATER

appropriate error code, which appears on the upper display (TEMP). In this case proceed to the fault diagnosis following the indications given in the following table.

Signalling of anomalies during operation

During the automatic operation of the system (AUTO button), some important anomalies are signalled through an ap-

Table with 3 columns: CODE, ANOMALY, CORRECTIVE ACTION. Rows include error codes E1, E2, E3 and their corresponding anomalies and corrective actions.

On-board Self-diagnosis

The following automatic diagnosis makes it possible to check the correct functioning of the conditioning system rapidly and without operations on the vehicle. In the event of an anomaly, the function makes it possible to identify the relevant component immediately.

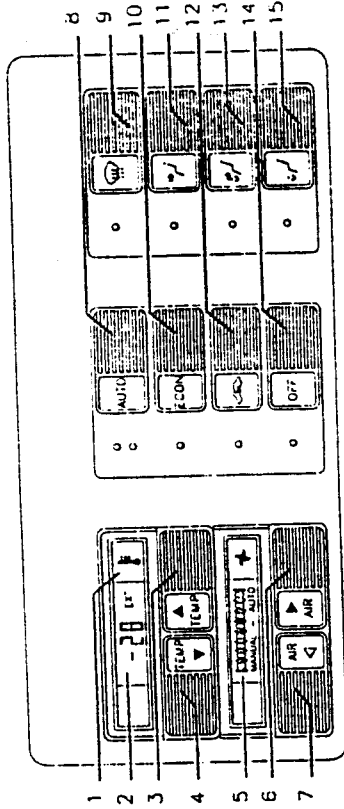
below, the following are checked in this sequence: 1. the control unit Q21a 2. Control unit control keys 3. sensors (Q33, Q24, Q25a, Q25b, L17, Q31) 4. actuators (Q1, Q31, Q30a, Q30b, Q11, Q21)

The codes which may appear on the upper "TEMP" display are ordered as shown in the chart below from a minimum value of 0 to a maximum value of FF (e.g. C5 is "larger" than BF and "smaller" than d1).

Hexadecimal code chart showing combinations of letters A-F and digits 0-F in a grid format.




NOTE: one of two versions of the heating-ventilation control unit Q21a may be fitted (A or B). These are interchangeable and differ only in the points indicated in the following diagnosis. For a preliminary identification of the

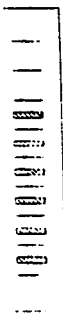
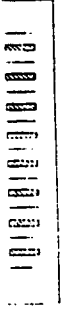
control unit refer to the initialization procedure (password) of the ALFA ROMEO tester (see relative Publications). If the display values do not correspond to those required, replace the indicated parts or carry out the tests described



- 1. Key "EXT"
2. Display "TEMP"
3. Key "TEMP+"
4. Key "TEMP-"
5. Display "AIR"
6. Key "AIR+"
7. Key "AIR-"
8. Key "AUTO"
9. Key "DEF"
10. Key "ECON"
11. Key "VENT"
12. Key "RIC"
13. Key "BI-LEVEL"
14. Key "OFF"
15. Key "FLOOR"

TROUBLESHOOTING TABLE by means of Self-diagnosis

STEP	SEE TEST																										
<p>Execute strictly following the sequence, the operations relevant to the procedure phases.</p> <p><b>1. Phase: control unit check</b></p> <p>1. Rotate the ignition key to the "RUN" position at the same time holding the "AUTO" key down. The indications shown in the diagram should appear on the display and the leds on the "AUTO" (upper led), "ECON", "OFF", "DEF.", and "BI-LEVEL" buttons should light up.</p>  <p>2. Push the "RIC" button: the indications shown in the diagram should appear on the on the two displays, and the leds on the "AUTO" (lower led), "RIC", "VENT.", and "FLOOR" buttons should light up.</p>  <p>Pressing the "RIC" key again will return the system to the state shown in the preceding diagram</p> <p>N.B.: if no indication appears, check the power supply</p> <p><b>2. Phase: keyboard check</b></p> <p>1. Press the "AUTO" key: four bars should appear on the lower display (AIR)</p>  <p>2. Press the various keys in succession and check that the letters and numbers shown in the table appear on the upper display (TEMP) for each one. N.B. do not press the "AUTO" key: this will advance the system to the next phase!</p> <table border="1" data-bbox="1149 1678 1444 1995"> <thead> <tr> <th>KEY</th> <th>IDENTIFICATION CODE</th> </tr> </thead> <tbody> <tr><td>EXT</td><td>E</td></tr> <tr><td>TEMP+</td><td>6</td></tr> <tr><td>TEMP-</td><td>5</td></tr> <tr><td>AIR+</td><td>2</td></tr> <tr><td>AIR-</td><td>1</td></tr> <tr><td>ECON</td><td>4</td></tr> <tr><td>RIC</td><td>d</td></tr> <tr><td>OFF</td><td>7</td></tr> <tr><td>DEF</td><td>9</td></tr> <tr><td>VENT</td><td>b</td></tr> <tr><td>BI-LEVEL</td><td>c</td></tr> <tr><td>FLOOR</td><td>A</td></tr> </tbody> </table>	KEY	IDENTIFICATION CODE	EXT	E	TEMP+	6	TEMP-	5	AIR+	2	AIR-	1	ECON	4	RIC	d	OFF	7	DEF	9	VENT	b	BI-LEVEL	c	FLOOR	A	<p>SEE TEST</p> <p>TEST A</p> <p>If the indications on the display and the leds does not correspond to the above, replace control unit Q21a</p> <p>If the indications on the display and the leds does not correspond to the above, replace control unit Q21a</p>
KEY	IDENTIFICATION CODE																										
EXT	E																										
TEMP+	6																										
TEMP-	5																										
AIR+	2																										
AIR-	1																										
ECON	4																										
RIC	d																										
OFF	7																										
DEF	9																										
VENT	b																										
BI-LEVEL	c																										
FLOOR	A																										

STEP	SEE TEST
<p><b>3. Phase: sensor check</b></p> <p>NOTE: all of the following tests should be carried out when the vehicle is in the workshop (external temperature and internal temperature of the vehicle stabilized between 10 and 30°C)</p> <p>1. Press the "AUTO" key: six bars should appear on the lower display (AIR)</p>  <p>2. Press the "AIR-" key: the temperature reading inside the passenger compartment should appear on the upper display (TEMP). If not, check the sensor Q33</p> <p>3. Press the "AIR+" key: the outside air temperature reading should appear on the upper display (TEMP). If not, check the sensor Q24</p> <p>4. Press the "TEMP+" key and then the "TEMP-" key: the mixed air temperature readings sent to the upper and lower parts of the passenger compartment should appear on the upper display (TEMP). If not, check the sensors Q25a and Q25b</p> <p>5. Press the "OFF" key for at least 2 seconds: as the vehicle is stationary, the value 0 should appear on the upper display (TEMP). (The value 1 appears if the vehicle were running at a minimum speed of 30 km/h) If not check the speedometer sensor connection L17</p> <p>6. Press the "RIC" key: a value representing the position of the air distribution vents should appear on the upper display (TEMP) (see point 10 of phase 4)</p> <p>7. Press the "ECON" key (version A) or the "VENT" key (version B): a code will appear, based on the functioning of the electronic regulator, on the upper display (TEMP). Any other code apart from "00" or "FF" guarantees the correct operation. If not, check the regulator Q31</p> <p><b>4. Phase: actuator check</b></p> <p>1. Press the "AUTO" key: eight bars should appear on the lower display (AIR)</p>  <p>2. Repeatedly press the "AIR+" key: each time it is pressed, the electric fan should be heard to gradually increase in speed, and 26 identification codes should appear in sequence on the upper display (TEMP) starting from value "C" until value "3F". (see code sequence chart) If not, check the fan Q1 and relative regulator Q31</p> <p>3. Repeatedly press the "AIR-" key: each time it is pressed, the electric fan should be heard to gradually decrease in speed, and 26 identification codes should appear in sequence on the upper display (TEMP) starting from value "3F" until value "C". (see code sequence chart) If not, check the fan Q1 and relative regulator Q31</p>	<p>TEST B</p> <p>TEST C</p> <p>TEST D and E</p> <p>TEST F</p> <p>TEST G</p> <p>TEST H</p> <p>TEST H</p>



STEP	SEE TEST
<p>4. Press the "ECUOFF" key a few times; the compressor electromagnetic coupling engage-ment (led) should be activated and deactivated and at the same time the relative leds should light up and go out. If not checked, correct column of compressor Q11</p>	<p>TEST I Refer also to test A of the following troubleshooting ("Compressor does not cut-in")</p>
<p>5. Press the "TEMP+" key; a sequence of identification codes should appear on the upper display (TEMP) up to a value limit of "32" (max cod) If not, check motors Q30a and Q30b</p>	<p>TEST J and K</p>
<p>6. Press the "EXT" key; a sequence of identification codes should appear on the upper display (TEMP) up to a value limit of "7a" or "7b" (maxing tap open, vent intermediate position) If not, check motors Q30a and Q30b</p>	<p>TEST J and K</p>
<p>7. Press the "TEMP+" key; a sequence of identification codes should appear on the upper display (TEMP) up to a value limit of "C7" (version A) or "C2" (version B)(max. hot) If not, check motors Q30a and Q30b</p>	<p>TEST J and K</p>
<p>8. Press the "RIC" key; air recirculation within the passenger compartment should be activated and the relative led should light up If not, check motor Q27</p>	<p>TEST L</p>
<p>9. Press the "RIC" key again; outside air intake should be activated and the relative led should light up If not, check motor Q27</p>	<p>TEST L</p>
<p>10. Press the "DEF", "VEH1", "BILEVEL", "FLOOR" keys in sequence. Each time a different key is pressed the relative led should come on the upper display (TEMP) and a sequence of identification codes should appear which stop when they identify a certain position of the air distribution vents, as illustrated:</p>	<p>TEST M</p>

KEY	CODE Version A	CODE Version B
DEF	05	2 C5 (*)
VEH1	20	52E (*)
BILEVEL	62	5C
FLOOR	94	8F

(\*) See code sequence chart  
If these codes do not appear correctly, check the motor Q30a  
**NOTE:**  
The self diagnosis terminates with this last operation: to return the system to normal operation, press the "AUTO" key  
If all the indications correspond, the system is functioning correctly; if not, carry out the tests which follow in order to identify the anomaly and restore correct operation

"RUN" position, the previously stored settings should now be operational once again and no changes should have occurred (temperature set to "HI", fan at maximum speed, air flow with recirculation and a certain distribution)  
If the settings are not stored, replace the control unit Q21a

- Press the "TEMP+" a few times, until the identification code "HI" appears on the upper display (TEMP)
- Press the "AIR+" key until the fan reaches maximum speed and eight bars appear on the lower display (AIR)
- Press the "RIC" key and one of the right-hand keys (air distribution) the one set automatically.
- Rotate the key to the "STOP" position; a few moments later rotate it to the

**MEMORY CHECK**  
The automatic diagnosis makes it possible to check the capacity to memorize the temperature set by the control unit Q21a  
Operate as follows:  
- Rotate the ignition key to the "RUN" position  
- Press the "AUTO" key

CHECK CONTROL UNIT POWER SUPPLY TEST A

NOTE: If the following circuits are also not working: windshield wipers, front power windows rear windshield and mirror defrosting, seat adjustment and heating etc., check and if necessary replace the key-operated supply relay (35).

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>A1 CHECK FUSE</b> - Check for damage of fuse F13 in fusebox G1	OK	Carry out step A2
	OK	Replace the fuse (20A)
<b>A2 CHECK FUSE</b> - Check for damage of fuse F16 in fusebox G1	OK	Carry out step A3
	OK	Replace the fuse (7.5A)
<b>A3 CHECK VOLTAGE</b> - Verify 12V at pin B10 of control unit Q21a	OK	Carry out step A4
	OK	Restore wiring between pin D7 of G1 and pin B10 of Q21a, across pin A3 of connector G38 and the solder (RED)
<b>A4 CHECK VOLTAGE</b> - With ignition key engaged, verify 12V at pin B12 of control unit Q21a	OK	Carry out step A5
	OK	Restore wiring between pin H6 of G1 and pin B12 of Q21a, across sensor Q33, pin A6 of connector G38 and the solder (ORN)
<b>A5 CHECK GROUND</b> - Check that pins B4 and B11 of control unit Q21a are grounded (0V)	OK	Carry out step A6
	OK	Restore wiring between: • pin B4 of Q21a and ground G148b across pins A5 and A1 of connector G38 (BRN-BLK and BLK) • pin B11 of Q21a and ground G53b across pin A4 of connector G38, pin A3 of connector G99 and the solders (BLK-PPL)
<b>A6 CHECK VOLTAGE</b> - With headlights on, verify 12V at pin C1 of control unit Q21a	OK	If the displays and leds do not come on, replace the control unit Q21a
	OK	Restore wiring between pin D10 of G1 and pin C1 of Q21a, across pin A2 of connector G38 and the solder (YEL-BLK)

CHECK PASSENGER COMPARTMENT TEMPERATURE SENSOR TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1 SELF-DIAGNOSIS</b> - During the self-diagnosis procedure an incorrect passenger compartment temperature value appears (even if plausible)	OK	Carry out step B4
	OK	Carry out step B2
<b>B2 SELF-DIAGNOSIS</b> - During the self-test "06" will be displayed	OK	Carry out step B6
	OK	Carry out step B3
<b>B3 SELF-DIAGNOSIS</b> - During the self-test "45" will be displayed	OK	Carry out step B9
	OK	Carry out step B4
<b>B4 CHECK VOLTAGE</b> - Verify 12 V at pin 1 of sensor Q33	OK	Carry out step B5
	OK	Restore wiring between pin 1 of Q33 and pin H6 of G1, across pin A6 of connector G38 and the solder (ORHT)
<b>B5 CHECK GROUND</b> - Check that pin 2 of sensor Q33 is grounded (0V)	OK	Replace sensor Q33
	OK	Restore wiring between pin 2 of Q33 and ground G148b, across pin A1 of connector G38 (BLK)
<b>B6 SELF-DIAGNOSIS (CHECK SENSOR)</b> - Disconnect sensor Q33 and bridge pins 3 and 4: "G" is displayed	OK	Carry out step B7
	OK	("45" displayed) Replace sensor Q33
<b>B7 CHECK CONTINUITY</b> - Check continuity between pin 4 of Q33 and pin B7 of control unit Q21a	OK	Carry out step B8
	OK	Restore wiring between pin 4 of Q33 and pin B7 of control unit Q21a (WHIT-BLU)

(CONTINUED)



CHECK MIXED AIR TEMPERATURE SENSOR (UPPER)		TEST D
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D3 SELF-DIAGNOSIS</b> - During the self-test "79" will be displayed	OK	Carry out step D7
	<del>OK</del>	Carry out step D4
<b>D4 SELF-DIAGNOSIS (CHECK SENSOR)</b> - Disconnect sensor Q25a and bridge pins 1 and 2: "0" displayed	OK	Carry out step D5
	<del>OK</del>	("79" displayed) Replace sensor Q25a
<b>D5 CHECK CONTINUITY</b> - Check continuity between pin 1 of Q25a and pin B5 of control unit Q21a	OK	Carry out step D6
	<del>OK</del>	Restore wiring between pin 1 of Q25a and pin B5 of control unit Q21a (WHT-GRN)
<b>D6 CHECK GROUND</b> - Check that pin 2 of sensor Q25a is grounded (0V)	OK	Check and if necessary replace control unit Q21a
	<del>OK</del>	Restore wiring between pin 2 of Q25a and ground Q36 (GRY-BLK)
<b>D7 SELF-DIAGNOSIS (SHORT CIRCUIT CHECK)</b> - Disconnect sensor Q25a: "0" displayed	OK	Replace sensor Q25a
	<del>OK</del>	("79" displayed) Carry out step D8
<b>D8 CHECK VOLTAGE</b> - Check for voltage (> 0V) at pin 1 of sensor Q25a	OK	Check and if necessary replace control unit Q21a
	<del>OK</del>	Restore wiring between pin 1 of Q25a and pin B5 of control unit Q21a (WHT-GRN)

CHECK MIXED AIR TEMPERATURE SENSOR (LOWER)		TEST E
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>E1 SELF-DIAGNOSIS</b> - During the self-diagnosis procedure an incorrect lower heater/conveyor group mixed air temperature value appears (even if plausible)	OK	Replace sensor Q25b
	<del>OK</del>	Carry out step E2
<b>E2 SELF-DIAGNOSIS</b> - During the self-test "0" will be displayed	OK	Carry out step E4
	<del>OK</del>	Carry out step E3
<b>E3 SELF-DIAGNOSIS</b> - During the self-test "79" will be displayed	OK	Carry out step E7
	<del>OK</del>	Carry out step E4
<b>E4 SELF-DIAGNOSIS (CHECK SENSOR)</b> - Disconnect sensor Q25b and bridge pins 1 and 2: "0" displayed	OK	Carry out step E5
	<del>OK</del>	("79" displayed) Replace sensor Q25b
<b>E5 CHECK CONTINUITY</b> - Check continuity between pin 1 of Q25b and pin B9 of control unit Q21a	OK	Carry out step E6
	<del>OK</del>	Restore wiring between pin 1 of Q25b and pin B9 of control unit Q21a (LTB-RED)
<b>E6 CHECK GROUND</b> - Check that pin 2 of sensor Q25b is grounded (0V)	OK	Check and if necessary replace control unit Q21a
	<del>OK</del>	Restore wiring between pin 2 of Q25b and ground Q36 (GRY-BLK)
<b>E7 SELF-DIAGNOSIS (SHORT CIRCUIT CHECK)</b> - Disconnect sensor Q25b: "0" displayed	OK	Replace sensor Q25b
	<del>OK</del>	("79" displayed) Carry out step E8
<b>E8 CHECK VOLTAGE</b> - Check for voltage (> 0V) at pin 1 of sensor Q25b	OK	Check and if necessary replace control unit Q21a
	<del>OK</del>	Restore wiring between pin 1 of Q25b and pin B9 of control unit Q21a (LTB-RED)

CHECK SPEEDOMETER SIGNAL		TEST F
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>F1</b> CHECK SPEEDOMETER - On instrument panel C10 check for correct functionality of speedometer	OK <input checked="" type="radio"/>	Carry out step F2
	OK <input type="radio"/>	Refer to the troubleshooting relative to the speedometer in the section "Instrument Panel"
<b>F2</b> CHECK SENSOR - Check the speedometer signal operating as follows: • connect pins C and A of sensor L17 to 12V and ground respectively • insert the shaft of an electric motor in the sensor • varying the speed of the electric motor, check that there is a variation in the frequency of the signal (between 1 and 7.5 V) reaching pin C5 of control unit Q21a	OK <input checked="" type="radio"/>	Check and if necessary replace control unit Q21a
	OK <input type="radio"/>	Restore wiring between pin B of L17 and pin B5 of Q21a, across pin B3 of connector G38, pin A1 of connector Q99 and the solder (L17B)

CHECK TEMPERATURE SENSOR IN THE SPEED VARIATOR DEVICE TEST G

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>G1</b> SELF-DIAGNOSIS - During the self-diagnosis procedure an incorrect air temperature around the electric fan appears (even if plausible)	OK <input checked="" type="radio"/>	Replace regulator Q31
	OK <input type="radio"/>	Carry out step Q2
<b>G2</b> SELF-DIAGNOSIS - During the self-test "FF" will be displayed	OK <input checked="" type="radio"/>	Carry out step G4
	OK <input type="radio"/>	Carry out step G3
<b>G3</b> SELF-DIAGNOSIS - During the self-test "FF" will be displayed	OK <input checked="" type="radio"/>	Carry out step G7
	OK <input type="radio"/>	Carry out step G4
<b>G4</b> SELF-DIAGNOSIS (CHECK SENSOR) - Disconnect the regulator Q31 and bridge pins A1 and A2 "U" displayed	OK <input checked="" type="radio"/>	Carry out step G5
	OK <input type="radio"/>	("FF" displayed) Replace the regulator Q31

(continues)

CHECK TEMPERATURE SENSOR IN THE SPEED VARIATOR DEVICE		TEST G
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>G5</b> CHECK CONTINUITY - Check continuity between pin A1 of Q31 and pin C6 of control unit Q21a	OK <input checked="" type="radio"/>	Carry out step G6
	OK <input type="radio"/>	Restore wiring between pin A1 of Q31 and pin C6 of control unit Q21a (PNK)
<b>G6</b> CHECK CONTINUITY - Check continuity between pin A2 of Q31 and pin B3 of control unit Q21a	OK <input checked="" type="radio"/>	Check and if necessary replace control unit Q21a
	OK <input type="radio"/>	Restore wiring between pin A2 of Q31 and pin B3 of control unit Q21a (GRY-GRN)
<b>G7</b> SELF-DIAGNOSIS (SHORT CIRCUIT CHECK) - Disconnect the regulator Q31: "U" displayed	OK <input checked="" type="radio"/>	Replace the regulator Q31
	OK <input type="radio"/>	("FF" displayed) Carry out step G8
<b>G8</b> CHECK VOLTAGE - Check for voltage (0V) between pins A1 and A2 of regulator Q31	OK <input checked="" type="radio"/>	Check and if necessary replace control unit Q21a
	OK <input type="radio"/>	Restore wiring between: • pin A2 of Q31 and pin B3 of control unit Q21a (GRN) • pin A1 of Q31 and pin C6 of control unit Q21a (PNK)

CHECK ELECTRIC FAN WITH RELATIVE SPEED REGULATOR TEST H

NOTE: If the no part of the conditioner is working, first refer to test A; if it is only the fan which is not working, carry out the following test H.

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>H1</b> CHECK FUSE - Check for damage of fuse F13 in fusebox G1	OK <input checked="" type="radio"/>	Carry out step H2
	OK <input type="radio"/>	Replace the fuse (20A)
<b>H2</b> CHECK FUSE - Check for damage of wander fuse Q43	OK <input checked="" type="radio"/>	Carry out step H3
	OK <input type="radio"/>	Replace the fuse (50 A)

(continues)

CHECK ELECTRIC FAN WITH RELATIVE SPEED REGULATOR		TEST H
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
H3 CHECK FUSE - Check for damage of fuse Q39, located in group Q41	OK <del>OK</del>	Carry out step H4 Replace the fuse (30 A)
H4 CHECK VOLTAGE - Verify 12V at pin 2 of electric fan Q1	OK <del>OK</del>	Carry out step H5 Restore wiring between pin 2 of Q1 and the terminal block G56, across fuses Q43 and Q39 and pin B of connector G313 (from chassis N...: pin 1 of G313 and pin B of G314c) (RED, RED-BLK and RED)
H5 CHECK VOLTAGE - With ignition key engaged, verify 12V at pin BC of regulator Q31	OK <del>OK</del>	Carry out step H6 Restore wiring between pin H6 of G1 and pin BC of Q31, across pin A6 of connector G38 and the solder (ORN)
H6 CHECK GROUND - Check that pin BA of regulator Q31 is grounded (0V)	OK <del>OK</del>	Carry out step H7 Restore wiring between pin BA of Q31 and ground G148a (BLK)
H7 CHECK VOLTAGE - Engage the electric fan and check for voltage (between 0 and 5 V) at pin A3 of regulator Q31	OK <del>OK</del>	Carry out step H9 Carry out step H8

(continues)

CHECK ELECTRIC FAN WITH RELATIVE SPEED REGULATOR		TEST H
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
H8 CHECK VOLTAGE - Engage the electric fan and check for voltage (between 0 and 5 V) in output from pin C3 of control unit Q21a	OK <del>OK</del>	Restore wiring between pin A3 of Q31 and pin C3 of Q21a (LTB-BLK) Check and if necessary replace control unit Q21a
H9 CHECK GROUND SIGNAL - Engage the electric fan and check that the output signal decreases when the speed increases (0V at max speed) from pin BB of regulator Q31	OK <del>OK</del>	Carry out step H10 Replace regulator Q31
H10 CHECK GROUND SIGNAL - Engage the electric fan and check that the output signal decreases when the speed increases (0V at max speed) at pin 1 of electric fan Q1	OK <del>OK</del>	Replace electric fan Q1 Restore wiring between pin BB of Q31 and pin 1 of Q1 (LTB)

CHECK COMPRESSOR ACTUATING SIGNAL		TEST I
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
I1 CHECK GROUND SIGNAL - Actuating the compressor (e.g. requesting a very cold temperature... - N.B. the "ECON" key must not be pressed) check for a ground signal (0V) in output from pin C2 of control unit Q21a	OK <del>OK</del>	Carry out step I2 Check and if necessary replace control unit Q21a
I2 CHECK GROUND SIGNAL - Actuating the compressor (e.g. requesting a very cold temperature) check for and ground signal (0V) at pin 85 of relay Q32, contained in group Q41	OK <del>OK</del>	Refer to test A of following troubleshooting ("Compressor does not cut in") Restore wiring between pin C2 of Q21a and pin 85 of Q32, across pin A2 of connector G313 (from chassis N...: pin A of G314c and pin 2 of G313 (BLK-PPL)

CHECK AIR DISTRIBUTION MOTOR

TEST J

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>J1</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting air directed towards level "FLOOR" key) and verify 12 V between pins 1 and 2 of motor Q30a</p> <p>N.B.: the voltage is inverted when the motor changes direction</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step J3</p> <p>Carry out step J2</p>
<p><b>J2</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting air directed towards level "FLOOR" key) and verify 12 V between pins A5 and A6 of control unit Q21a</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 1 of Q30a and pin A5 of Q21a (WHT)</li> <li>• pin 2 of Q30a and pin A6 of Q21a (WHT-BLU)</li> </ul> <p>Check and if necessary replace control unit Q21a</p>
<p><b>J3</b> CHECK GROUND</p> <p>— Check that pin 3 of motor Q30a is grounded (0V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step J4</p> <p>Restore wiring between pin 3 of Q30a and ground Q36 (ORN)</p>
<p><b>J4</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting air directed towards level "FLOOR" key) and check that the voltage between pins 4 and 5 of the motor Q30a varies when the vent moves</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step J5</p> <p>Replace motor Q30a</p>
<p><b>J5</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting air directed towards level "FLOOR" key) and check that the voltage between pins A7 and A8 of control unit Q21a varies when the distribution vent moves</p>	<p>OK</p> <p><del>OK</del></p>	<p>Check and if necessary replace control unit Q21a</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 4 of Q30a and pin A8 of Q21a (GRN)</li> <li>• pin 5 of Q30a and pin A7 of Q21a (LTB)</li> </ul>

CHECK AIR MIXING MOTOR

TEST K

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>K1</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting very cold or very hot air) and verify 12 V between pins 1 and 2 of the motor Q30b</p> <p>N.B.: voltage is inverted when the motor changes direction</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step K3</p> <p>Carry out step K2</p>
<p><b>K2</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting very cold or very hot air) and verify 12 V between pins A5 and A6 of control unit Q21a</p>	<p>OK</p> <p><del>OK</del></p>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 1 of Q30b and pin A3 of Q21a (YEL)</li> <li>• pin 2 of Q30b and pin A4 of Q21a (BLU)</li> </ul> <p>Check and if necessary replace control unit Q21a</p>
<p><b>K3</b> CHECK GROUND</p> <p>— Check that pin 3 of motor Q30b is grounded (0V)</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step K4</p> <p>Restore wiring between pin 3 of Q30b and ground Q36 (RED-BLK)</p>
<p><b>K4</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting very cold or very hot air) and check that the voltage between pins 4 and 5 of motor Q30b varies when the air mixing vents move</p>	<p>OK</p> <p><del>OK</del></p>	<p>Carry out step K5</p> <p>Replace motor Q30b</p>
<p><b>K5</b> CHECK VOLTAGE</p> <p>— Actuate the motor (e.g. requesting very cold or very hot air) and check that the voltage between pins A7 and A2 of control unit Q21a varies when the air mixing vents move</p>	<p>OK</p> <p><del>OK</del></p>	<p>Check and if necessary replace control unit Q21a</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 4 of Q30b and pin A2 of Q21a (GRY-BLK)</li> <li>• pin 5 of Q30b and pin A7 of Q21a, across pin 5 of Q30a (LTB)</li> </ul>

CHECK AIR RECIRCULATION MOTOR		TEST L
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>L1</b> CHECK VOLTAGE Operate the motor (opening or closing the recirculation function) and verify 12 V between pins 1 and 2 of motor Q27 NB: voltage is inverted when the motor changes direction	OK OK	Replace motor Q27 Carry out step L2
<b>L2</b> CHECK VOLTAGE Operate the motor (opening or closing the recirculation function) and verify 12 V between pins A9 and A10 of control unit Q21a	OK OK	Restore wiring between: • pin 1 of Q27 and pin A10 of Q21a (BRN-YEL) • pin 2 of Q27 and pin A9 of Q21a (LTB-RED) Check and if necessary replace control unit Q21a

CHECK POSITION OF AIR DISTRIBUTION MOTOR VENTS		TEST M										
TEST PROCEDURE	RESULT	CORRECTIVE ACTION										
<b>M1</b> SELF DIAGNOSIS During the self-diagnosis procedure identification codes appear which differ by one unit from those indicated in the table corresponding to the various types of air distribution: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>KEY</th> <th>IDENTIFICATION CODE</th> </tr> </thead> <tbody> <tr> <td>DEF</td> <td>05</td> </tr> <tr> <td>VENT</td> <td>26</td> </tr> <tr> <td>BILVEL</td> <td>62</td> </tr> <tr> <td>FLOOR</td> <td>94</td> </tr> </tbody> </table>	KEY	IDENTIFICATION CODE	DEF	05	VENT	26	BILVEL	62	FLOOR	94	OK OK	Act on the regulation and setting screws of the motor position transducers (see "REPAIR MANUAL-BODY", Group 80 - Air conditioning) Carry out step M2
KEY	IDENTIFICATION CODE											
DEF	05											
VENT	26											
BILVEL	62											
FLOOR	94											
<b>M2</b> SELF DIAGNOSIS During the self-diagnosis procedure identification codes appear which differ greatly from those indicated in the preceding table	OK OK	Replace motor Q30a Check motor connections (see test J)										

D - AIR CONDITIONING SYSTEM: COMPRESSOR COMMAND AND ENGINE ELECTRIC FAN CONTROL

Troubleshooting Table

Malfunction	Component													Test
	Q11	E15	F13*	Q40	Q43	Q22	Q32	Q8	Q20	S11	Q69	Q68	Q4*	
Compressor does not cut in	•	•	•	•	•	•	•	•	•	•	•	•	•	A
Compressor pulley slips	•													B

\* Only for manual air conditioner

Malfunction	Component													Test
	S25*	P2	T1	Q32	Q33	Q14	Q43	L33	Q20	Q22				
Electric fan does not cut in	•	•	•	•	•	•	•	•	•	•	•	•	•	C*
Electric fan does not cut in for high engine water temperatures														D**
Electric fan does not cut in when the vehicle is stationary and with compressor engaged														E*
														F**
														G*
														H**

\* T. SPARK

\*\* 6V



THE AIR CONDITIONING COMPRESSOR DOES NOT COME ON TEST A

TEST STEP	RESULT	CORRECTIVE ACTION
A6 CHECK EARTH - Check that pin 5 of switch Q68 and pin 30 of relay Q69 are earthed	OK <del>OK</del>	Proceed to step A7 Restore wiring between pin 5 of Q68 and between pin 30 of Q69 with the earth G148b, across the solder and pin A1 of connector G313 (BLK)
A7 CHECK RELAY - Check operation of relay Q69, located on the conveyer/heater group	OK <del>OK</del>	Proceed to step A8 Replace relay Q69 if faulty
A8 CHECK VOLTAGE - With ignition key engaged, check for 12 V at pin 86 of relay Q69	OK <del>OK</del>	Proceed to step A9 Restore wiring between pin 86 of Q69 and pin 6 of connector H of G1, across the solders and pin A of connector G313 (PNK and ORN)
A9 CHECK CONTINUITY - Check for continuity between pin 85 of relay Q69 and pin 7 of connector B of knob Q4, and between pin 8 of the same and pin 6 of switch Q68	OK <del>OK</del>	Proceed to step A10 Restore the wiring (GRY-RED and PPL)
A10 CHECK SWITCH - Check for correct operation of compressor engagement switch Q88: the circuit between pins 5 and 6 closes when the button is pressed	OK <del>OK</del>	Proceed to step A11 Replace switch Q88
A11 CHECK CONTROL KNOB - Check operation of the control knob Q4: in particular check for electrical continuity between pins 7 and 8 of connector B, with knob in the "OFF" position	OK <del>OK</del>	Restore wiring between pin 87 of Q69 and pin 85 of Q32, across pin B2 of G313 and pin A of G314c (GRY and BLK-PPL) Replace the control knob Q4
A12 CHECK VOLTAGE - Run the compressor and check for 12 V at pin 87 of relay Q22	OK <del>OK</del>	Proceed to step A13 Proceed to step A14

(Continued)

THE AIR CONDITIONING COMPRESSOR DOES NOT COME ON TEST A

1. If not automatic air conditioners: before carrying out this test check the control unit Q21, automatically using the self-diagnosis capability with regard to step 4 of phase 4.

NOTE: if the fluid contained in the system is at an extremely low pressure (below 1.7 - 1.8 bars) due to leaks for example, the electromagnetic coupling Q11 will not start the compressor as the pressure switch Q9 prevents its activation; also check that the oil level is not empty (see "Loss - REPAIR MANUAL - BODY" Group 80 "Heating and ventilation")

TEST STEP	RESULT	CORRECTIVE ACTION
A1 CHECK FUSE - Check for damage of water fuse Q43	OK <del>OK</del>	Proceed to step A2 Replace fuse (50A)
A2 CHECK FUSE - Check for damage of fuse Q40, contained in group Q41	OK <del>OK</del>	Proceed to step A3 Replace fuse (15A)
A3 CHECK FUSE - Check for damage of fuse F15 in fusebox G1 (for manual air conditioner only - F13)	OK <del>OK</del>	Proceed to step A4 Replace fuse F15 (10A) or F13 (20A)
A4 CHECK RELAYS - Check for operation of relay Q22 and Q32, contained in group Q41	OK <del>OK</del>	Proceed to step A5 Replace the faulty relays
A5 CHECK EARTH SIGNAL - Automatic Air Conditioner: Run the compressor (for example requesting an extremely low temperature - N.B. the "ECON" button must not be pressed) Check for an earth signal (0V) at pin 85 of relay Q32, contained in group Q41 - Manual Air Conditioner: Press the appropriate button Q68 and run the compressor Q68, check for an earth signal (0V) at pin 85 of relay Q32. NOTE: carry out this test when the engine is cold and, at the speed	OK <del>OK</del>	Proceed to step A12 Automatic Air Conditioner: Restore wiring between pin C2 of Q21a and pin 85 of Q32, across pin A2 of connector G313 (from chassis N...; pin A of G314c and pin 3 of G313) (BLK-PPL) Manual Air Conditioner: Proceed to step A6

(continues)

THE AIR CONDITIONING COMPRESSOR DOES NOT COME ON		TEST A
TEST STEP	RESULT	CORRECTIVE ACTION
A13   CHECK VOLTAGE - Run the compressor and check for 12 V at electromagnetic compressor Q11	OK <del>OK</del>	Check for correct operation of the engagement coupling of the compressor Q11 (see also test B)  Restore wiring between pin 87 of Q22 and Q11 (BRN)
A14   CHECK VOLTAGE - With ignition key engaged, check for 12 V at pin 86 of relay Q32	OK <del>OK</del>	Proceed to step A15  Restore wiring between pin 86 of Q32 and ignition block B1, across pin A1 of connector G313, pin B2 of connector G38 and solder (ORN, LTB-RED and LTB) Manual conditioner and automatic air conditioner from chassis N...; restore wiring between pin 86 of Q32 pin 85 of Q22 and pin B8 of G1, across connector G314b, pin B1 of connector G99 and solder (ORN and LTB-RED)
A15   CHECK VOLTAGE - Check for 12 V at pin 30 of relay Q32	OK <del>OK</del>	Proceed to step A16  Restore wiring between pin 30 of Q32 and terminal board G56, across fuses Q39 and Q40, contained in Q41, and wandler fuse #43 (YEL-RED and RED)
A16   CHECK VOLTAGE - Run the compressor and check for 12 V at pin 86 of Motronic control unit S11	OK <del>OK</del>	Proceed to step A17  Restore wiring between pin 87 of Q32 and pin 86 of S11, across pin B of connector G133b (GRN-WHT)
A17   CHECK VOLTAGE - Run the compressor and check for 12 V at pin 85 of Motronic control unit S11 N.B.: ensure that the operating pressure of the refrigerant circuit is between 1.72 and 25 bars; otherwise check the circuit (see "155 - REPAIR MATERIAL - BODY", Group 80 "Heating and ventilation")	OK <del>OK</del>	Proceed to step A22  Proceed to step A18
A18   CHECK VOLTAGE - Run the compressor and check for 12 V at pin with GRY cable of pressure switch Q8	OK <del>OK</del>	Proceed to step A19  Restore wiring between pin 87 of Q32 and Q8 (GRY)

(continues)



THE AIR CONDITIONING COMPRESSOR DOES NOT COME ON		TEST A
TEST STEP	RESULT	CORRECTIVE ACTION
A19   CHECK PRESSURE SWITCH - Check for correct calibration of minimum pressure switch Q9; with pressure above 1.72 bars (PREON R12) or 1.8 bars (R134a) check that the circuit between the two terminals is closed and that vice-versa at lower pressure the circuit opens	OK <del>OK</del>	Proceed to step A20  Replace pressure switch Q9
A20   CHECK VOLTAGE - Run the compressor and check for 12 V at pin 4 of pressure switch Q20	OK <del>OK</del>	Proceed to step A21  Restore wiring between pin 4 of Q20 and Q9 (BLU)
A21   CHECK TRINARY PRESSURE SWITCH - Check for correct calibration of the minimum and maximum pressure switches (Tertiary) Q20; with pressures between 2.5 and 25 bars approx. the circuit between pins 3 and 4 is closed; vice-versa at pressures above or below the circuit opens	OK <del>OK</del>	Restore wiring between pin 3 of Q20 and pin 85 of S11, across pin C of connector G133b (GHY-YEL)  Replace tertiary pressure switch Q20
A22   CHECK VOLTAGE - With ignition key engaged, check for 12 V at pin 85 of relay Q22	OK <del>OK</del>	Proceed to step A23  Restore wiring between pin 85 of Q22 and pin B8 of G1, across connector G314b, pin B1 of connector G99 and solder (LTB-RED)
A23   CHECK VOLTAGE - Check for 12 V at pin 30 of relay Q22	OK <del>OK</del>	Proceed to step A24  Restore wiring between pin 30 of Q22 and pin 30 of Q32 (YEL- RED)
A24   CHECK EARTH SIGNAL - Run the compressor and check for 0 V at pin 48 of Motronic control unit S11. N.B.: check for correct pressure conditions (see step A17)	OK <del>OK</del>	Restore wiring between pin 48 of S11 and pin 86 of relay Q22, across pin A of connector G133b (YS- GRY and GRY-BLU; 6V: HLN and GRY-BLU)  Check and if necessary replace the control unit S11

ELECTRIC COOLING FAN DOES NOT CUT IN (T.SPARK) TEST C

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C5</b> CHECK VOLTAGE - Verify 12 V at pin A of electric fan P2	OK <del>OK</del>	Substitute fan motor P2  Restore wiring between pin A of P2 and terminal board G56, across fuse G254 (LTB-WHT and RED)
<b>C6</b> CHECK CONTINUITY - Check continuity between pin B of P2 and pin 30 of I1	OK <del>OK</del>	Carry out step C7  Restore wiring between pin B of P2 and pin 30 of I1 (WHT)
<b>C7</b> CHECK GROUND - Check that pin 87 of I1 is grounded (0V)	OK <del>OK</del>	Carry out step C8  Restore wiring between pin 30 of I1 and ground G53b (BLK)
<b>C8</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V at pin 86 of relay I1	OK <del>OK</del>	Carry out step C9  Restore wiring between pin 86 of I1 and ignition switch B1, across pin A5 of connector G99 and the solder (LTB-RED and LTB)
<b>C9</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V at pin 85 of delay device Q42	OK <del>OK</del>	Carry out step C10  Restore wiring between pin 85 of Q42 and ignition switch B1, across pin 86 of relay Q32, pin A1 of connector G313, pin B2 of connector G38 and the solder (ORN, LTB-RED and LTB) For the manual air conditioner and automatic air conditioner from chassis N... Restore wiring between pin 85 of Q42, Q32, Q22 and pin B8 of G1 across connector G314b pin B1 of connector G99 and the solder (ORN and LTB-RED)
<b>C10</b> CHECK GROUND - Check that pin 87 of Q42 is grounded (0V)	OK <del>OK</del>	Carry out step C11  Restore wiring between pin 87 of Q42 and ground G53a (BLK)

(continues)

AIR CONDITIONING COMPRESSOR PULLEY SLIPS TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>B1</b> CHECK VOLTAGE - Operate the compressor and verify 12 V at electric electromagnetic coupling Q11	OK <del>OK</del>	Carry out step B2  Check power line of electromagnetic coupling (see also previous test A)
<b>B2</b> CHECK POWER SUPPLY - Operate the compressor attaching a snap-on ammeter on the power line check for an absorption current of approximately 4A	OK <del>OK</del>	Check the condition of the drive belt and of the compressor pulley (see "REPAIR MANUAL-BODY"). Substitute electromagnetic coupling Q11, if the coil is interrupted (reading of 0A) or if the coils are short circuiting (in excess of 4A)

ELECTRIC COOLING FAN DOES NOT CUT IN (T.SPARK) TEST C

If B2 does not cut in under any circumstances

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C1</b> CHECK FUSE - Check for damage of winder fuse G254	OK <del>OK</del>	Carry out step C2  Substitute fuse (50A)
<b>C2</b> CHECK RELAY - Check functioning of relay I1	OK <del>OK</del>	Carry out step C3  Substitute relay I1
<b>C3</b> CHECK DELAY DEVICE - Check for correct functioning of delay device Q42, by applying pin 85 with 12 V and grounding pin P, the circuit between pins 30 and 87 closes; there will be a ground signal at pin 86, delayed by 8-12 sec. in relation to the activation of the coil	OK <del>OK</del>	Carry out step C4  Substitute delay device Q42
<b>C4</b> CHECK ELECTRIC FAN - Paying particular attention, ground pin B of electric fan P2 and check that the fan starts	OK <del>OK</del>	Carry out step C5  Carry out step C6  Carry out step C5

(continues)

ELECTRIC COOLING FAN DOES NOT CUT IN (T.SPARK)		TEST C
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>C11</b> CHECK CONTINUITY - Check continuity between: • pin 30 of Q42 and pin 1 of resistance O22 • pin 2 of O22 and pin 30 of I1	OK OK	Carry out step C12  Restore wiring between: • pin 30 of Q42 and pin 1 of resistance O22 (BLK) • pin 2 of O22 and pin 30 of I1, across pin A of connector G314b (BLK)
<b>C12</b> CHECK RESISTANCE - Check for a resistance of 0.23 Ω between pins 1 and 2 of supplementary resistance O22	OK OK	Restore wiring between pin B of Q42 and pin 85 of I1, across pin B of connector G314a (PPL-BLK)  Substitute resistance O22

ELECTRIC COOLING FAN DOES NOT CUT IN (6V)

N.B.: it does not cut in under any circumstances

ELECTRIC COOLING FAN DOES NOT CUT IN (6V)		TEST D
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D1</b> CHECK FUSE - Check for damage of wander fuse Q43	OK OK	Carry out step D2  Substitute fuse (50A)
<b>D2</b> CHECK FUSE - Check for damage of fuse Q35, located in group Q41	OK OK	Carry out step D3  Substitute fuse (40A)
<b>D3</b> CHECK RELAY - Check functioning of relay Q14, located in group Q41	OK OK	Carry out step D4  Substitute relay Q14
<b>D4</b> CHECK DELAY DEVICE - Check for correct functioning of delay device Q42, located in Q41: supplying pin 85 with 12 V and grounding pin P, the circuit between pins 30 and 87 closes; there will be a ground signal at pin 86, delayed by 8-12 sec. in relation to the activation of the coil	OK OK	Carry out step D5  Substitute delay device Q42

(continues)

ELECTRIC COOLING FAN DOES NOT CUT IN (6V)		TEST D
TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<b>D5</b> CHECK ELECTRIC FAN - Paying particular attention, ground pin B of electric fan P2, and check that the fan starts	OK OK	Carry out step D7  Carry out step D8
<b>D6</b> CHECK VOLTAGE - Verify 12 V at pin A of electric fan P2	OK OK	Substitute the fan motor P2  Restore wiring between pin A of P2 and terminal board G56, across fuses Q35 and Q43 (RED)
<b>D7</b> CHECK CONTINUITY - Check continuity between pin B of P2 and pin 30 of Q14	OK OK	Carry out step D8  Restore wiring between pin B of P2 and pin 30 of Q14 (LTB)
<b>D8</b> CHECK GROUND - Check that pin 87 of Q14 is grounded (0V)	OK OK	Carry out step D9  Restore wiring between pin 87 of Q14 and ground G53a (BLK)
<b>D9</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V at pin 85 of relay Q14	OK OK	Carry out step D10  Restore wiring between pin 85 of Q14 and ignition switch B1, across pin 86 of Q32, pin A1 of connector G313, pin B2 of connector G38 and the solder (ORN, LTB-RED and LTB) From chassis N...: Restore wiring between pin 85 of Q42, Q32, Q22 and pin 88 of G1 across connector G314b pin B1 of connector G399 and the solder (ORN and LTB-RED)
<b>D10</b> CHECK VOLTAGE - With ignition key engaged, verify 12 V at pin 85 of delay device Q42	OK OK	Carry out step D11  Restore wiring between pin 85 of Q42 and pin 85 of Q14 (ORN)
<b>D11</b> CHECK GROUND - Check that pin 87 of Q42 is grounded (0V)	OK OK	Carry out step D12  Restore wiring between pin 87 of Q42 and ground G53a, across pin 87 of Q14 (EL-K)

(continues)

ELECTRIC COOLING FAN DOES NOT CUT IN (6V) TEST D

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>D12</b> CHECK CONTINUITY</p> <p>Check continuity between:</p> <ul style="list-style-type: none"> <li>• pin 30 of Q42 and pin 1 of resistance Q22</li> <li>• pin 2 of Q22 and pin 30 of Q14</li> </ul>	<p>OK</p> <p>OK</p>	<p>Carry out step D13</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin 30 of Q42 and pin 1 of resistance Q22 (BLK)</li> <li>• pin 2 of Q22 and pin 30 of Q14 (LTB)</li> </ul>
<p><b>D13</b> CHECK RESISTANCE</p> <p>Check for a resistance of 0.23 Ω between pins 1 and 2 of supplementary resistance Q22</p>	<p>OK</p> <p>OK</p>	<p>Restore wiring between pin 86 of Q42 and pin 86 of Q14 (BLK)</p> <p>Replace resistance Q22</p>

THE ELECTRIC FAN DOES NOT CUT-IN AT HIGH ENGINE COOLANT TEMPERATURES (T.SPARK) TEST E

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>E1</b> CHECK THERMOCONTACT</p> <p>Check for correct setting of thermocontact L33:</p> <ul style="list-style-type: none"> <li>• when the bulb reaches 87°C the contact between pins A and B of connector A closes</li> <li>• when it reaches 92°C the contact between pin A of connector A and connector B closes</li> </ul>	<p>OK</p> <p>OK</p>	<p>Carry out step E2</p> <p>Substitute thermocontact L33</p>
<p><b>E2</b> CHECK GROUND</p> <p>Check that pin AA of L33 is grounded (0V)</p>	<p>OK</p> <p>OK</p>	<p>Carry out step E3</p> <p>Restore wiring between pin AA of L33 and ground G53a, across pin 2 of Q20 and pin 87 of Q42 (BLK)</p>
<p><b>E3</b> CHECK CONTINUITY</p> <p>Check continuity between:</p> <ul style="list-style-type: none"> <li>• pin AB of L33 and pin P of delay device Q42</li> <li>• pin B of L33 and pin 86 of delay device Q42</li> </ul>	<p>OK</p> <p>OK</p>	<p>Check for correct functioning of delay device Q42 and of relay I1 (see previous test C)</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin AB of L33 and pin P of delay device Q42, across pin 1 of Q20 (WHT)</li> <li>• pin B of L33 and pin 86 of delay device Q42 (RED)</li> </ul>

THE ELECTRIC FAN DOES NOT CUT-IN AT HIGH ENGINE COOLANT TEMPERATURES (6V) TEST F

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>F1</b> CHECK THERMOCONTACT</p> <p>Check for correct setting of thermocontact L33:</p> <ul style="list-style-type: none"> <li>• when the bulb reaches 87°C the contact between pins A and B of connector A closes</li> <li>• when it reaches 92°C the contact between pin A of connector A and connector B closes</li> </ul>	<p>OK</p> <p>OK</p>	<p>Carry out step F2</p> <p>Substitute thermocontact L33</p>
<p><b>F2</b> CHECK RELAY</p> <p>Check functioning of relay I1</p>	<p>OK</p> <p>OK</p>	<p>Carry out step F3</p> <p>Substitute relay I1</p>
<p><b>F3</b> CHECK GROUND</p> <p>Check that pin AA of L33 is grounded (0V)</p>	<p>OK</p> <p>OK</p>	<p>Carry out step F4</p> <p>Restore wiring between pin AA of L33 and ground G53b (BLK)</p>
<p><b>F4</b> CHECK CONTINUITY</p> <p>Check continuity between:</p> <ul style="list-style-type: none"> <li>• pin AB of L33 and pin 86 of relay I1</li> <li>• pin B of L33 and pin 86 of relay Q14</li> </ul>	<p>OK</p> <p>OK</p>	<p>Carry out step F5</p> <p>Restore wiring between:</p> <ul style="list-style-type: none"> <li>• pin AB of L33 and pin 86 of relay I1 (PPL-BLK)</li> <li>• pin B of L33 and pin 86 of relay Q14 (RED)</li> </ul>
<p><b>F5</b> CHECK GROUND</p> <p>Check that pin 30 of I1 is grounded (0V)</p>	<p>OK</p> <p>OK</p>	<p>Carry out step F6</p> <p>Restore wiring between pin 30 of I1 and ground G53b (BLK)</p>
<p><b>F6</b> CHECK VOLTAGE</p> <p>With ignition key engaged, verify 12 V at pin 85 of relay I1</p>	<p>OK</p> <p>OK</p>	<p>Carry out step F7</p> <p>Restore wiring between pin 85 of I1 and ignition switch B1, across pin A5 of connector G99 and the solder (LTB-RED and LTB)</p>
<p><b>F7</b> CHECK CONTINUITY</p> <p>Check continuity between pin 87 of I1 and pin 30 of delay device Q42</p>	<p>OK</p> <p>OK</p>	<p>Check for correct functioning of delay device Q42 and of relay Q14 (see previous test D)</p> <p>Restore wiring between pin 87 of I1 and pin 30 of delay device Q42, across pin A of connector G314a (LTB and BLK)</p>

<p><b>THE ELECTRIC FAN DOES NOT CUT-IN WHEN THE VEHICLE IS STATIONARY WITH THE COMPRESSOR IS ENGAGED (I.e. WHEN CONDITIONER FLUID PRESSURE IS HIGH) (T.SPARK)</b></p>	<p><b>TEST G</b></p>
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>G1 CHECK TIRIARY PRESSURE SWITCH</b>                      - Check for correct setting of minimum and maximum pressure switch (Tinary) Q20: when the pressure exceeds about 15.5 bars the circuit between pins 1 and 2 closes.</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step G2</p> <p>Substitute Tinary pressure switch Q20</p>
<p><b>G2 CHECK GROUND</b>                      - Check that pin 2 of Q20 is grounded (0V)</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step G3</p> <p>Restore wiring between pin 2 of Q20 and ground G53a, across pin 87 of Q42 (BLK)</p>
<p><b>G3 CHECK CONTINUITY</b>                      - Check continuity between pin 1 of Q20 and pin P of delay device Q42</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Check for correct functioning of delay device Q42 and of relay I1 (see previous test C)</p> <p>Restore wiring between pin 1 of Q20 and pin P of delay device Q42 (WHT)</p>

<p><b>THE ELECTRIC FAN DOES NOT CUT-IN WHEN THE VEHICLE IS STATIONARY WITH THE COMPRESSOR IS ENGAGED (I.e. WHEN CONDITIONER FLUID PRESSURE IS HIGH) (6V)</b></p>	<p><b>TEST H</b></p>
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
<p><b>H1 CHECK TIRIARY PRESSURE SWITCH</b>                      - Check for correct setting of minimum and maximum pressure switch (Tinary) Q20: when the pressure exceeds about 15.5 bars the circuit between pins 1 and 2 closes.</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step H2</p> <p>Substitute Tinary pressure switch Q20</p>
<p><b>H2 CHECK GROUND</b>                      - Check that pin 2 of Q20 is grounded (0V)</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Carry out step H3</p> <p>Restore wiring between pin 2 of Q20 and ground G53a, across pin 87 of Q42 and pin 87 of Q14 (BLK)</p>
<p><b>H3 CHECK CONTINUITY</b>                      - Check continuity between pin 1 of Q20 and pin P of delay device Q42</p>	<p>OK <input checked="" type="checkbox"/></p> <p><del>OK</del> <input type="checkbox"/></p>	<p>Check for correct functioning of delay device Q42 and of relay Q14 (see previous test D)</p> <p>Restore wiring between pin 1 of Q20 and pin P of delay device Q42 (WHT)</p>