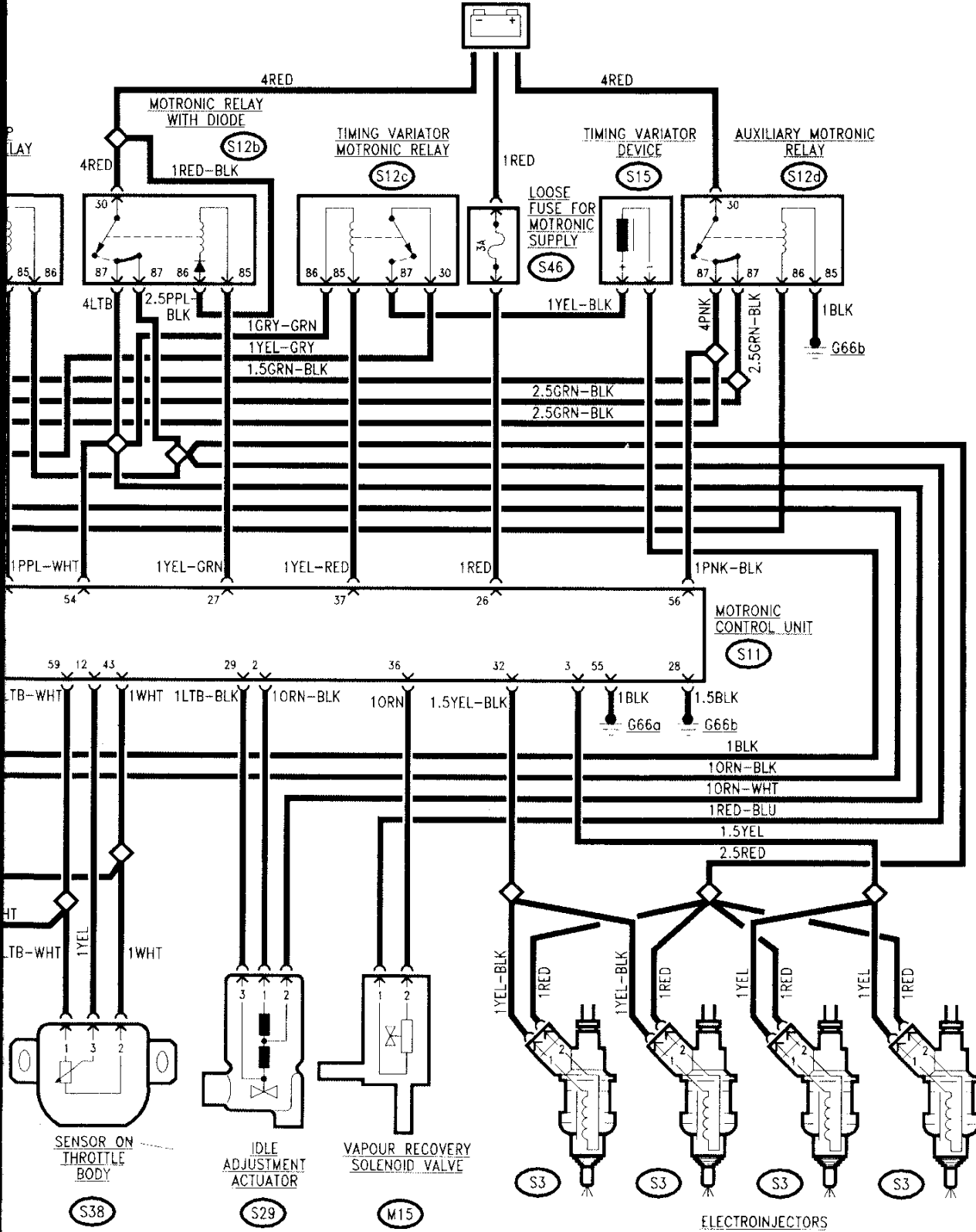


SPARK ENGINES

Wiring Diagram



Functional Description

The Motronic control unit **S11** controls and regulates the entire electronic ignition and injection system.

The control unit is supplied by the battery at pin 26 via fuse **S46** (3A).

The auxiliary Motronic relay **S12d**, excited by the signal resulting from the ignition key being in the "marcia" position, delivers power supply to the control unit, pin 56, and supplies the fuel pump relay **S12c**, and the main windings of coils **A8a** and **A8b**.

The Motronic relay with diode **S12b**, excited by a negative signal from the control unit from pin 27, sends a return signal to the control unit itself, pin 54, supplies the fuel pump relay **S12c** and gives a permit signal to the vapour recovery solenoid valve **M15**, the idle speed actuator **S29** and to the injectors **S3**.

The electric fuel pump **P18** is controlled by the relative relay **S12c**, which is excited by the control unit with a negative signal from pin 1. The power supply to the pump is protected by fuse **S47** (7.5A).

The control unit **S11** receives numerous signals from the various sensors and is therefore able to keep all the parameters regarding the operation of the engine under control.

The r.p.m. and timing sensor **S31** supplies information regarding the engine r.p.m. and timing through the signals sent to pins 67 and 68 from the control unit. These two signals are of low intensity and are suitably shielded.

The sensor is of the induction type and detects the number of revolutions of the engine through the variation in the magnetic field produced by the passage of the teeth on a phonic wheel installed on the crankshaft pulley; the wheel has 60 teeth, two of which are missing which makes it possible to determine the timing.

The throttle body sensor **S38**, supplied by the control unit from pins 43 and 59, generates a signal, through a potentiometer, which is sent to pin 12 and which is proportional to the angle to which the throttle valve opens.

The engine temperature sensor **S7**, supplied by the control unit from pin 43, supplies a signal at pin 78 which is proportional to the temperature of the engine coolant, measured by a NTC material (resistance which diminishes when the temperature falls).

The air-flow meter **S5**, supplied by the control unit from pins 14 and 59 sends it two signals: the first, to pin 41, is proportional to the flow of air and is generated by a potentiometer connected to the rotation of a mobile vent; the second, at pin 77, comes from a sensor (NTC) which generates a signal which is proportional to the temperature of the intake air.

The heated lambda probe **S35** supplies the control unit with information regarding the correct composition of the air-fuel mixture, measuring the concentration of oxygen in the exhaust gas; this is carried out through the signals sent to pins 70 and 71 of the control unit. These two signals are of low intensity and are therefore adequately shielded. The probe is heated by a resistance in order to ensure a correct functioning even when cold; the resistance is supplied by the fuel pump relay **S12d** and is protected by a specific fuse **S45** (7.5A).

The control unit **S11** controls then opening of the injectors **S3** via pins 3 and 32, on the basis of the signals received from the sensors and the calculations made. The injectors receive the permit to open from relay **S12b**. The static type ignition is directly controlled by the control unit which automatically regulates the advance. A negative signal is sent by the control unit, from pins 24, 25, 51 and 52 to the power modules **N1a** and **N1b** which generate the high voltage impulses sent to the coils **A8a** and **A8b** and from these to the spark plugs **A12**.

There are four double output coils grouped in twos in groups **A8a** and **A8b**, each connected to two spark plugs of two different cylinders: the main windings are supplied by modules **N1**, the secondary winding send the impulse to the spark plugs **A12**.

The timing variator **S15** mechanically controls the timing advance during intake. It is controlled by the relative relay **S12c** which, supplied by relays **S12b** and **S12d**, is excited through a negative signal from the control unit, pin 37, and supplies the timing variator **S15**. This signal operates the actuator which controls the flow of oil to the hydraulic group of the device regulating camshaft rotation.

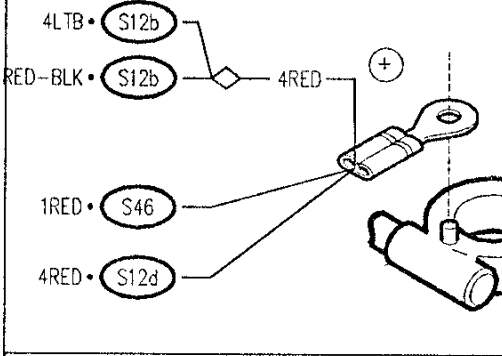
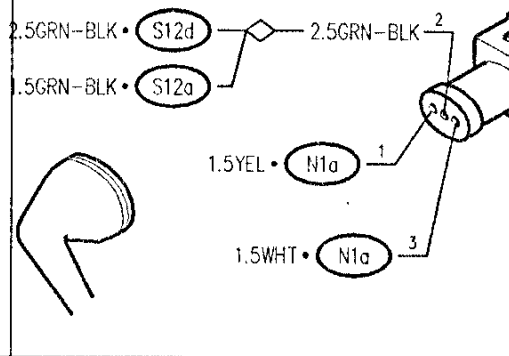
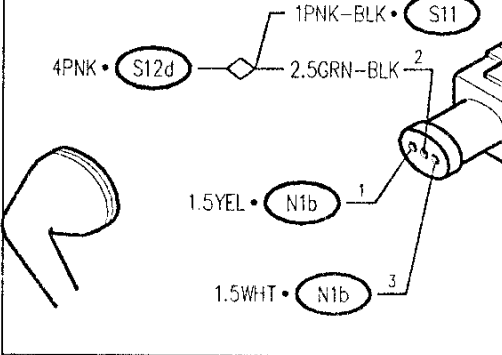
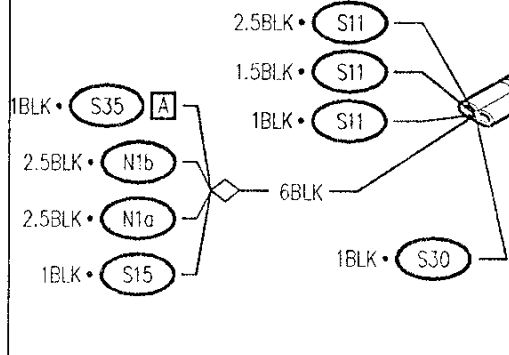
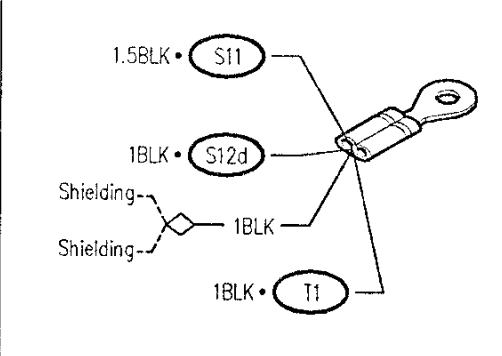
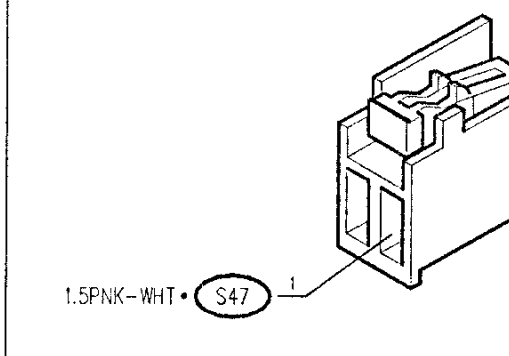
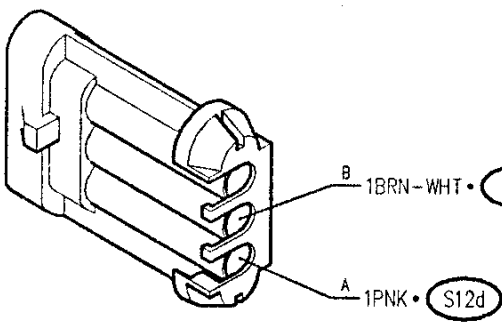
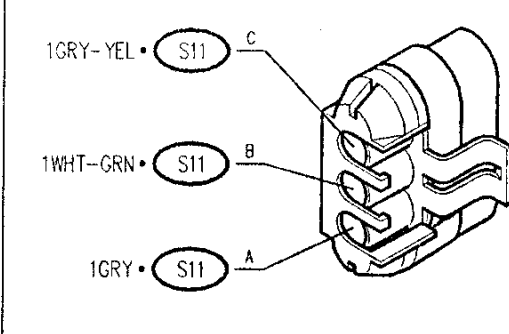
The idle adjustment actuator **S29** makes up an air flow by-pass line and is composed by two windings: one operates the opening and the other the closure of a box regulating the gap in the by-pass section. A safety spring fixes an average opening value in the event of a malfunction in the device. The actuator is controlled by the

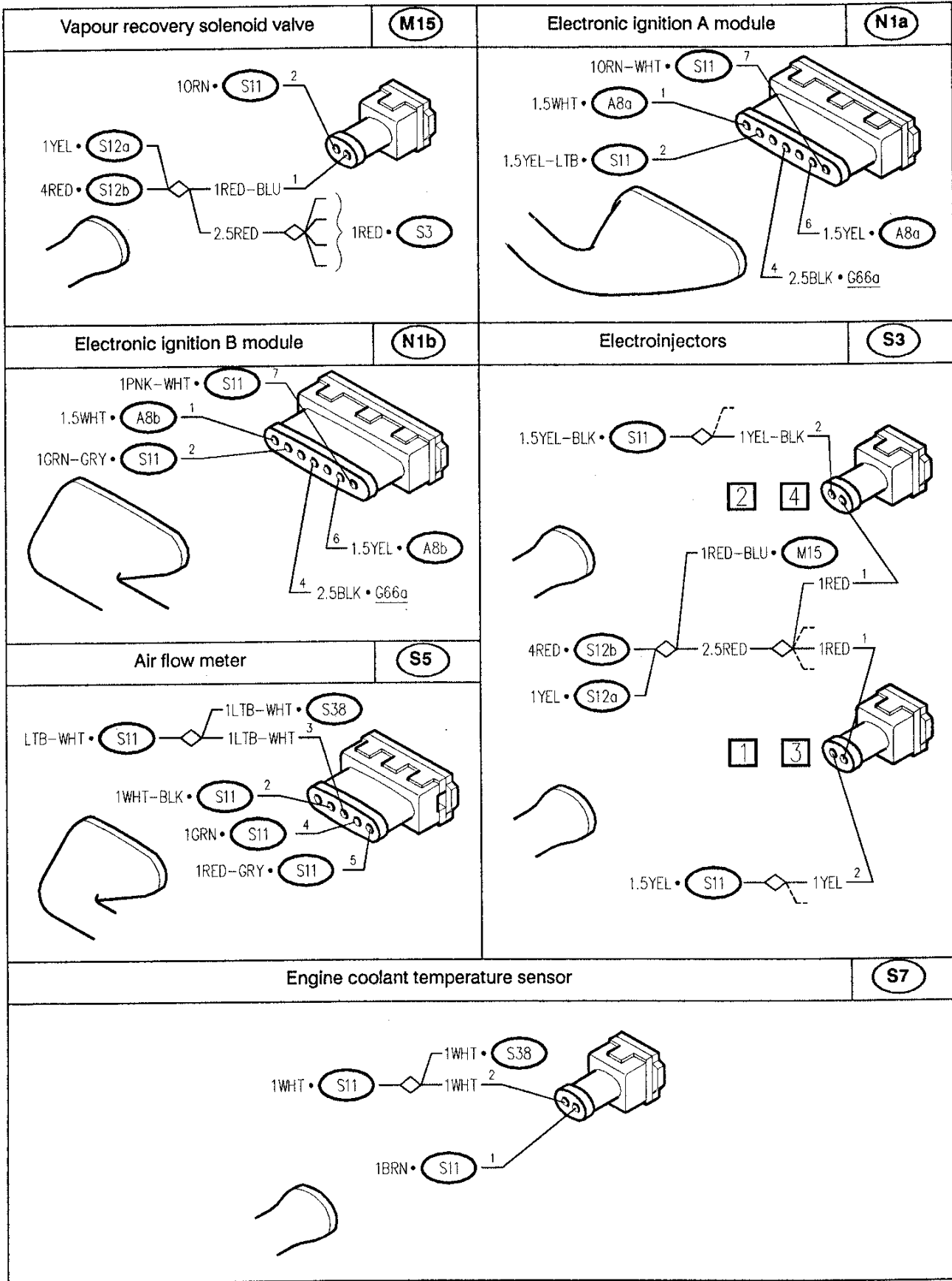
control unit through the signals of pins 2 and 29. The vapour recover solenoid valve **M15** permits the passage of the fuel vapours towards the engine where they are added to the mixture which enters in the combustion chamber. A signal from pin 36 is opened by the control unit when the engine is under loading conditions. The control unit is equipped with a self-diagnosis system which can be used when it is connected to connector **T1** of the ALFA ROMEO Tester; malfunction signals reach the connector from the control unit, pins 87 and 88 and the signal from the Motronic wiring ground **G66**.

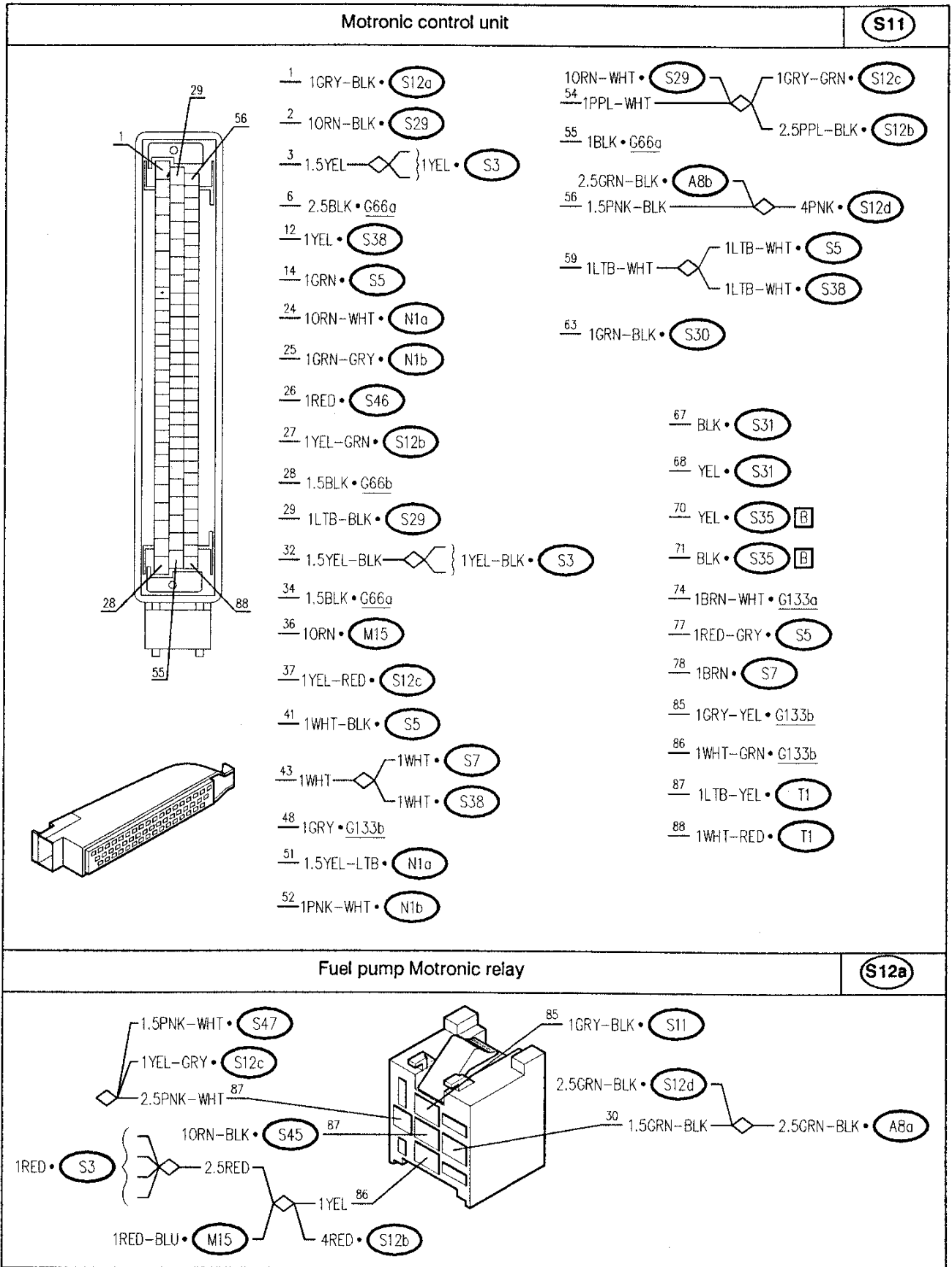
The same control unit is used for engines with different cubic capacity; a special switch **S30**, connected to the control unit at pin 63 makes it possible, if the control unit is to be replaced, to adapt it to the desired engine.

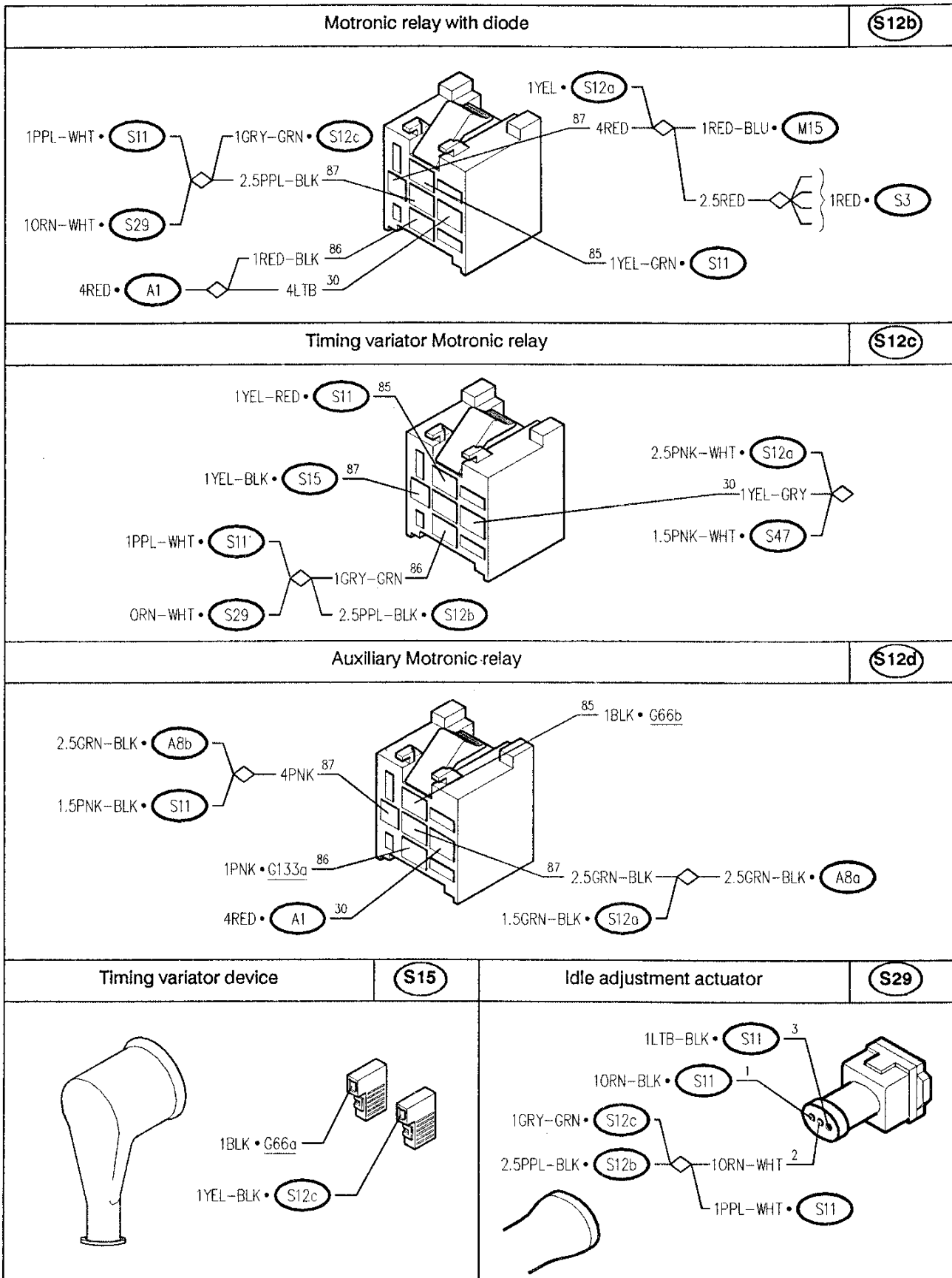
- contact closed = 1800 cc engine.
- contact open = 2000 cc engine.

Components and Connectors

<p>Battery</p> <p>A1</p> 		<p>Ignition coil A</p> <p>A8a</p> 	
<p>Ignition coil B</p> <p>A8b</p> 		<p>Motronic wiring ground</p> <p>G66a</p> 	
<p>Motronic wiring ground</p> <p>G66b</p> 		<p>Connector for fuel pump</p> <p>G107</p> 	
<p>Electronic ignition-injection wiring A connection</p> <p>G133a</p> 		<p>Electronic ignition-injection wiring B connection</p> <p>G133b</p> 	



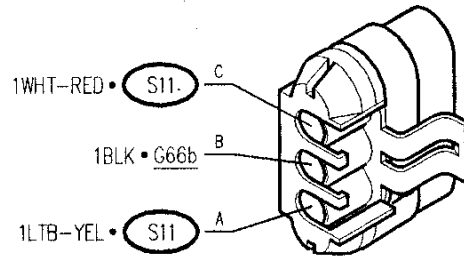




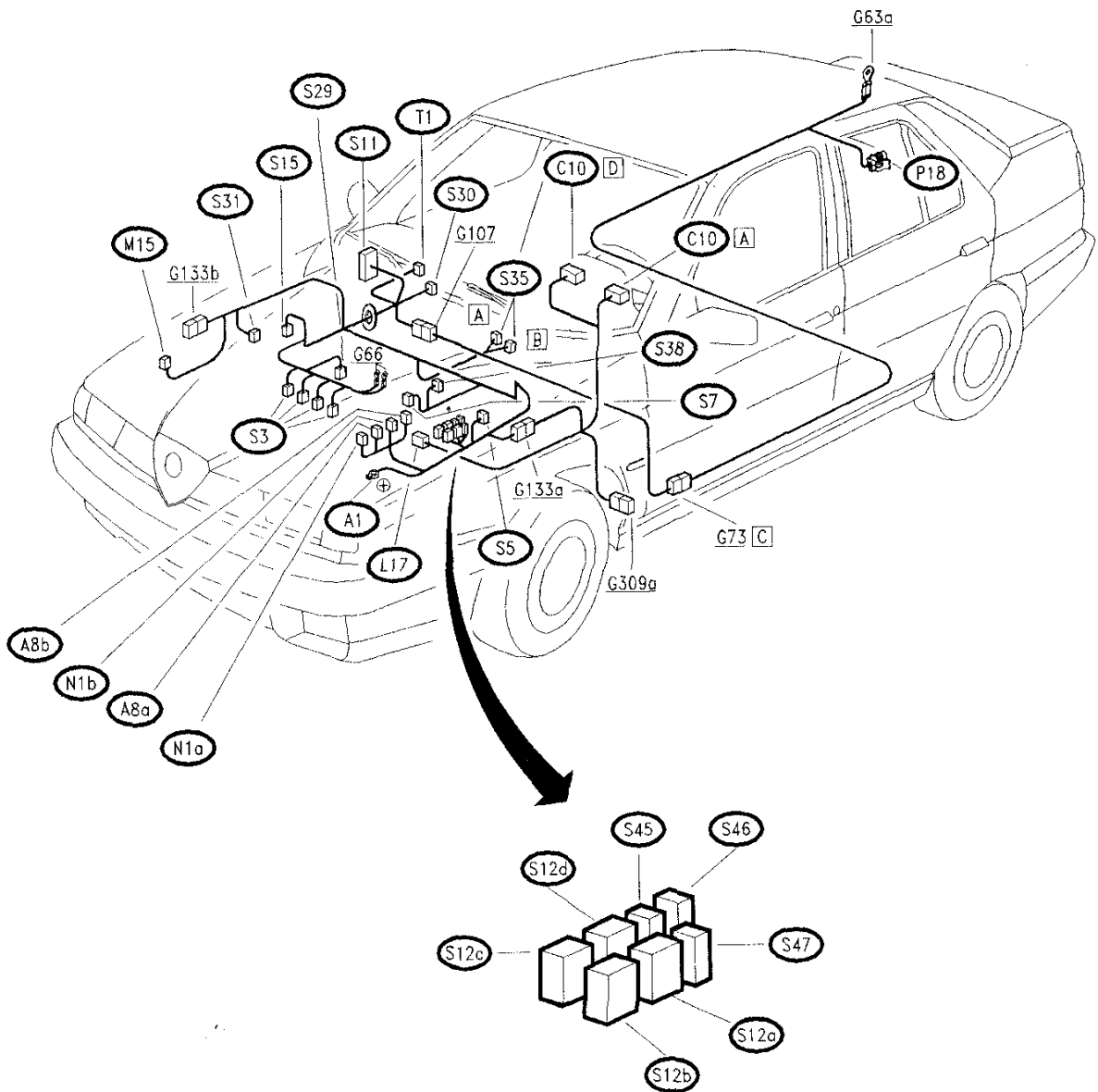
<p>Motronic control unit switch connector</p>	<p>S30</p>	<p>Revolution and timing sensor</p>	<p>S31</p>
<p>Heated Lambda probe</p>	<p>S35 A</p>	<p>Heated Lambda probe</p>	<p>S35 B</p>
<p>Sensor on throttle body</p>	<p>S38</p>	<p>Loose fuse for Lambda probe</p>	<p>S45</p>
<p>Loose fuse for Motronic supply</p>	<p>S46</p>	<p>Loose fuse for fuel pump</p>	<p>S47</p>

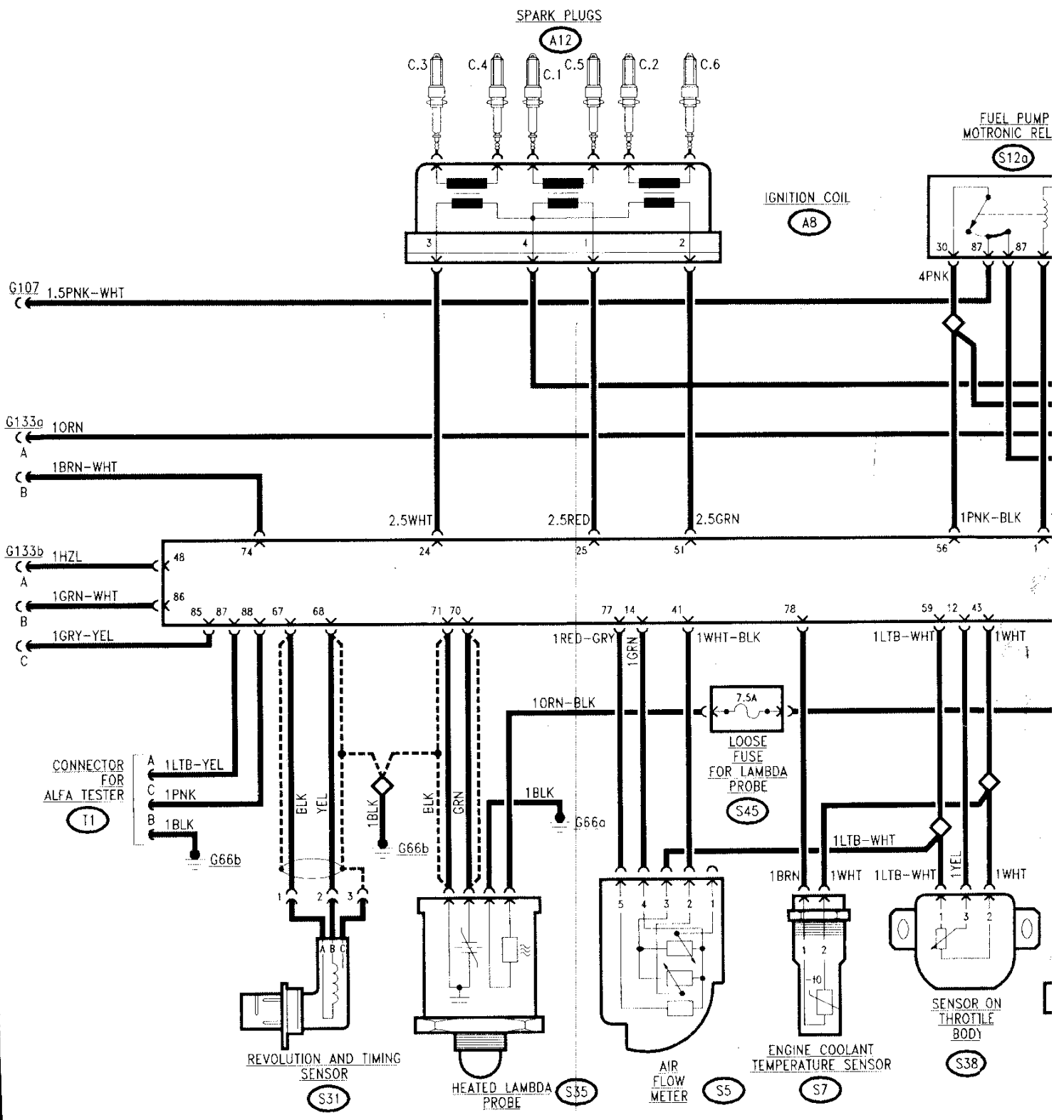
Connector for ALFA TESTER

T1



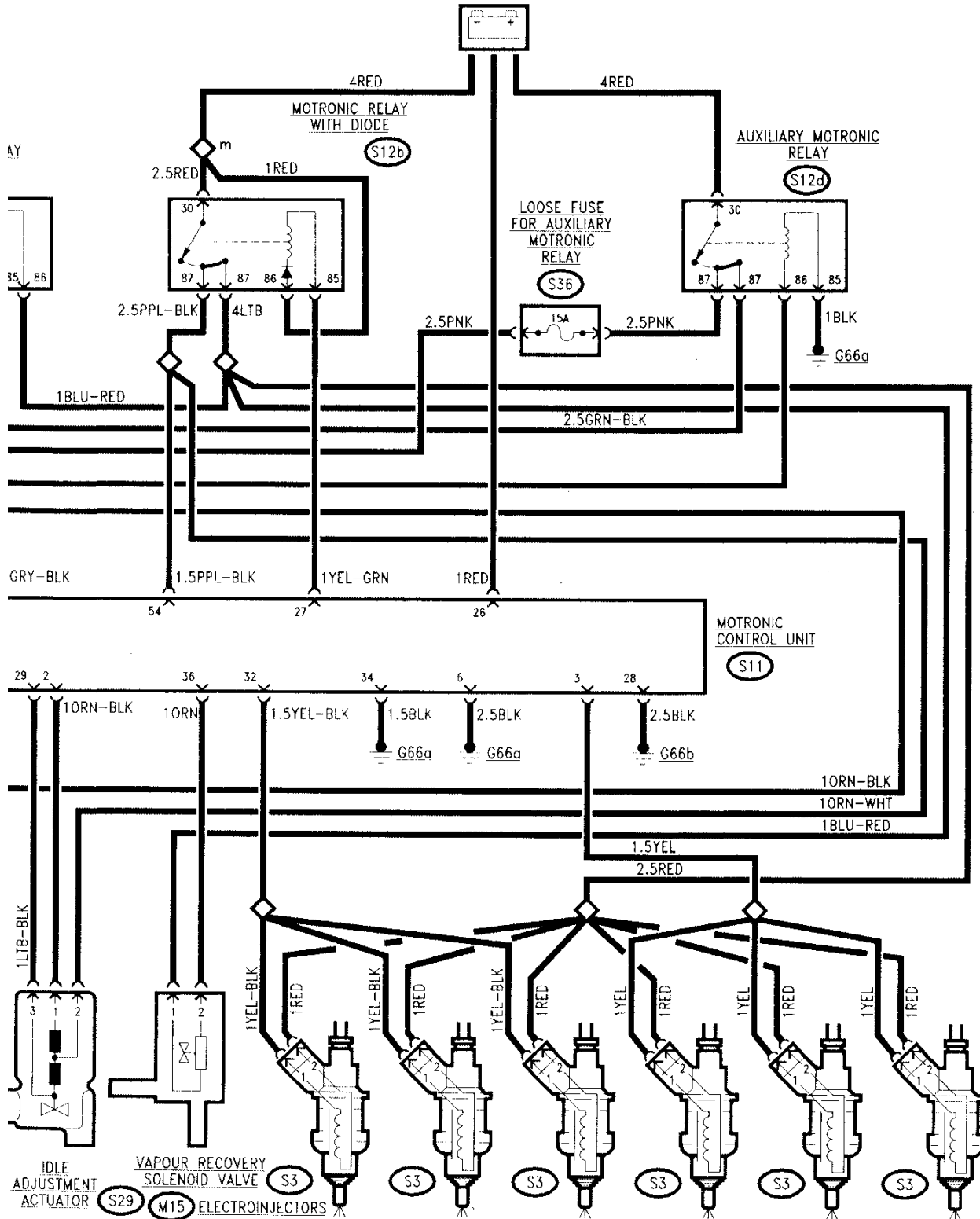
Location of Components





V ENGINE

Wiring Diagram



Functional Description

The model for the 6 cylinder engine differs from that of the T.SPARK engine only in the aspects described below.

For the all else, refer to the previous functional description.

The control unit is supplied at pin 26 directly from the battery with no intervening fuse.

The auxillary Motronic relay **S12d**, sends supply from the control unit, pin 56 and the fuse **S36** (15A) is inserted on this line.

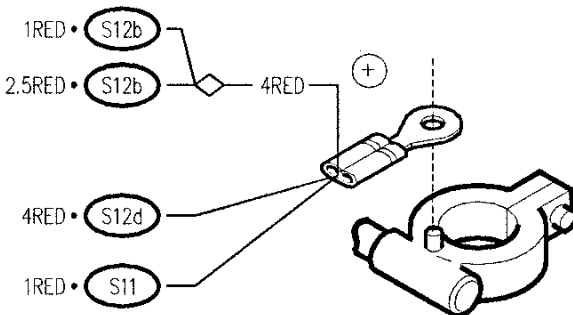
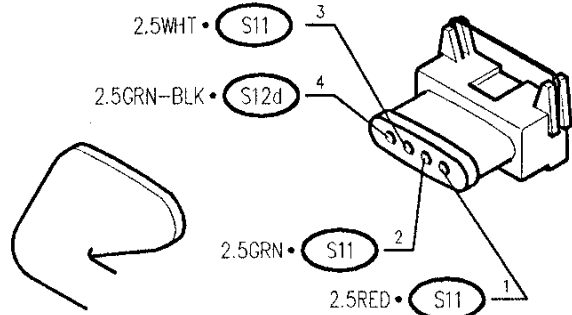
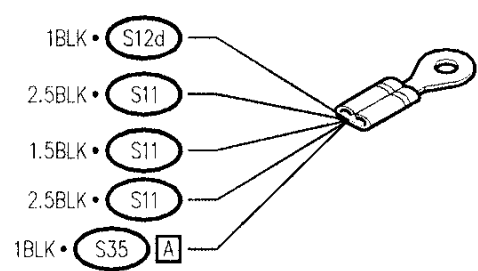
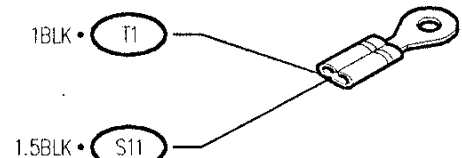
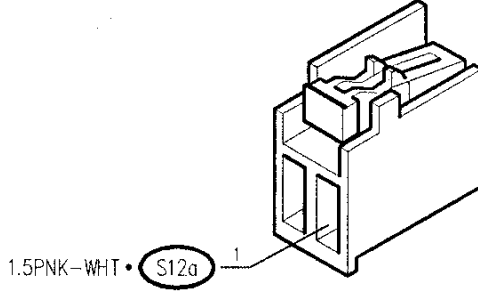
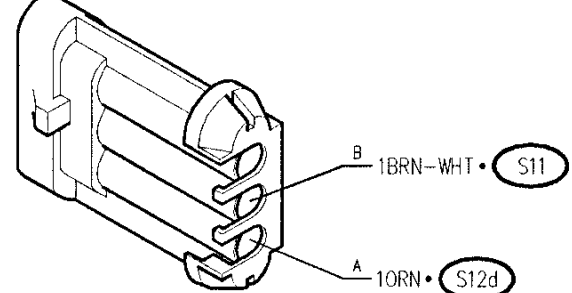
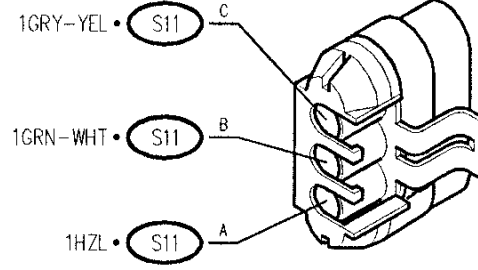
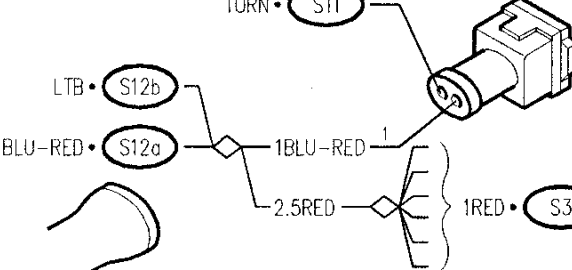
The electric fuel pump **P18** is controlled by the relative relay **S12c**, but the power supply is not protected by a fuse.

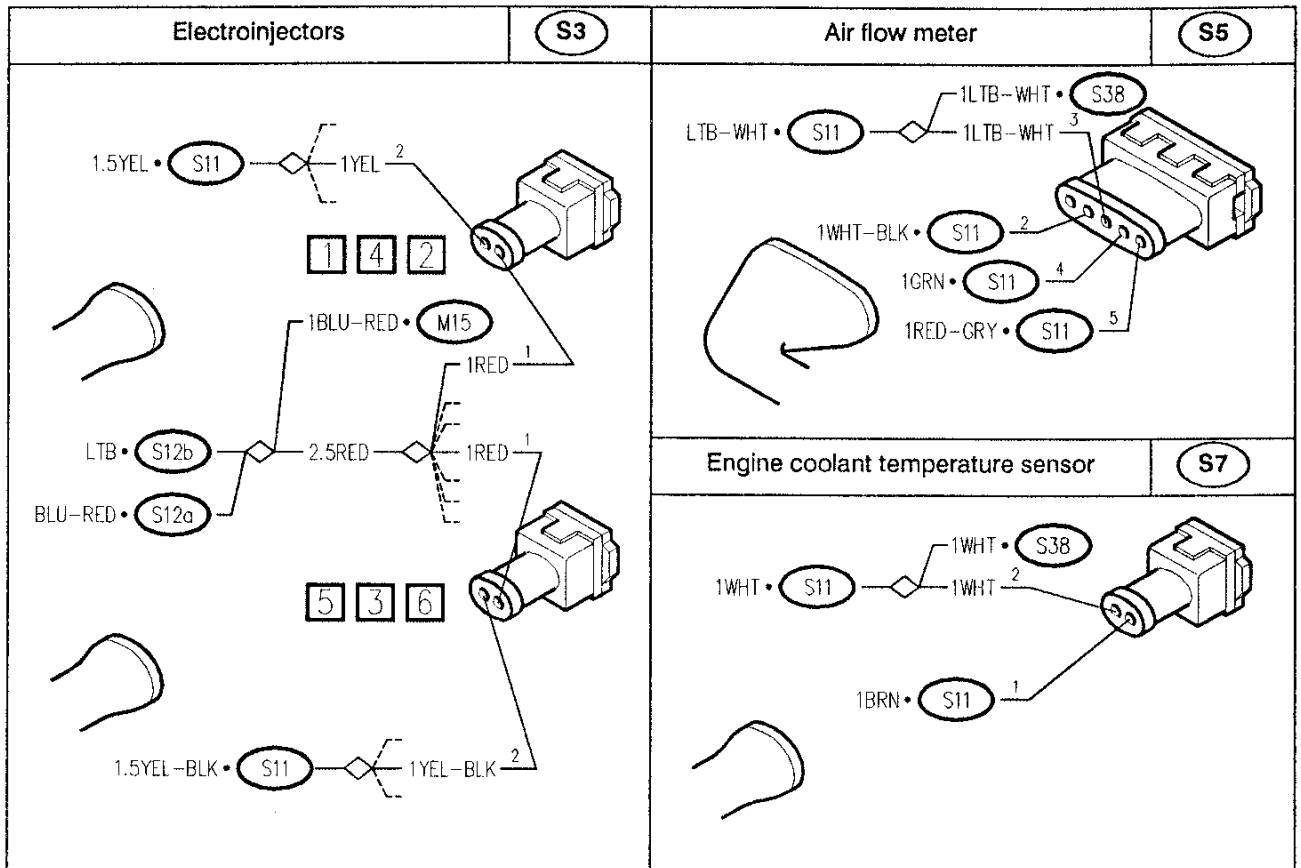
Ignition is of the static type and is regulated by a signal sent from the control unit, from pins 24, 25 and 51, directly to group **A8** (three double coils) equipped with six outputs, transmitting the impulse to the spark plugs. A power module is also incorporated in the group and this generates the high voltage impulses which are sent to the spark plugs **A12**.

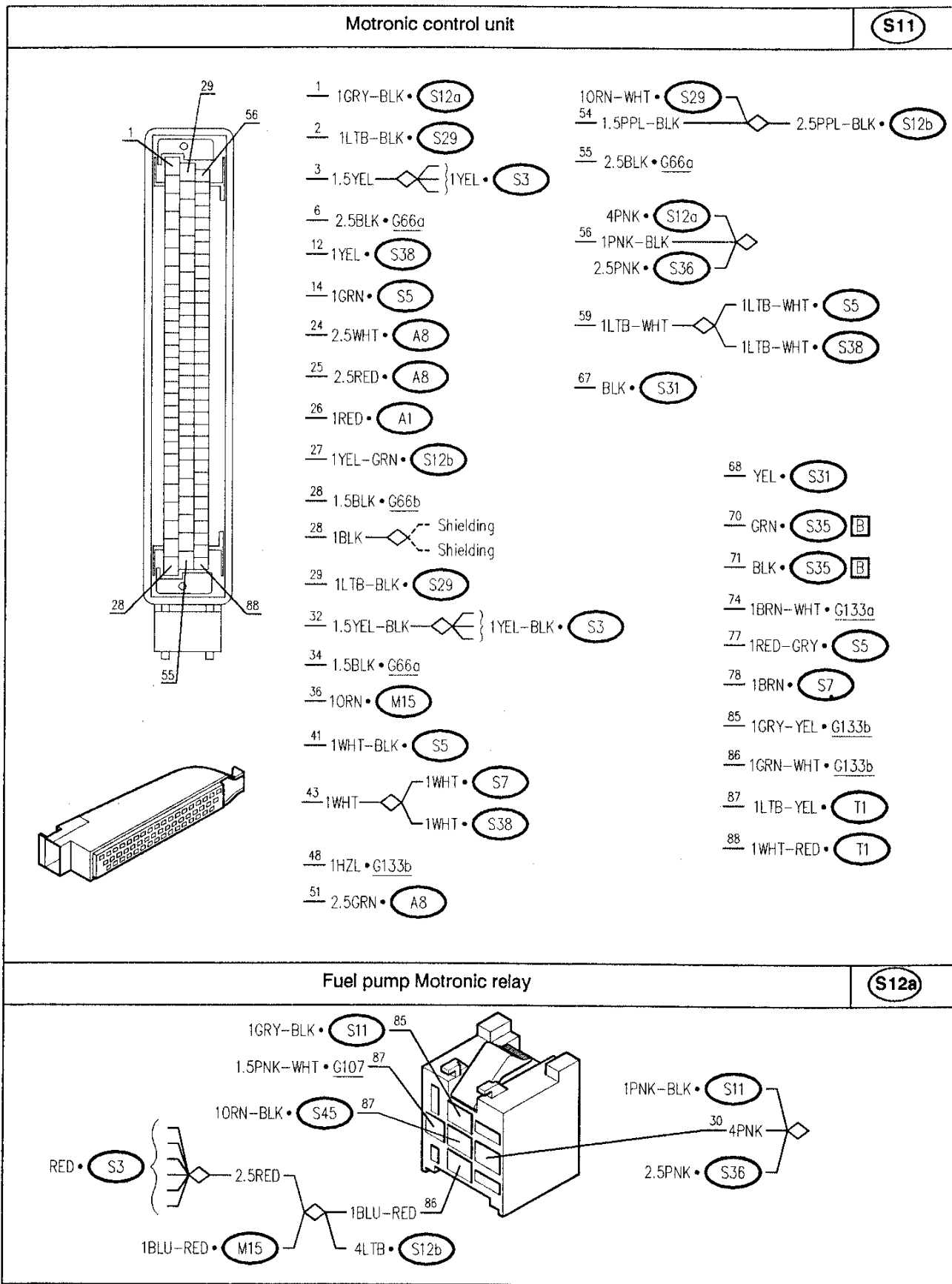
There is no timing variator **S15**, in the 6 cylinder models; as a result there is also no relay **S12c**.

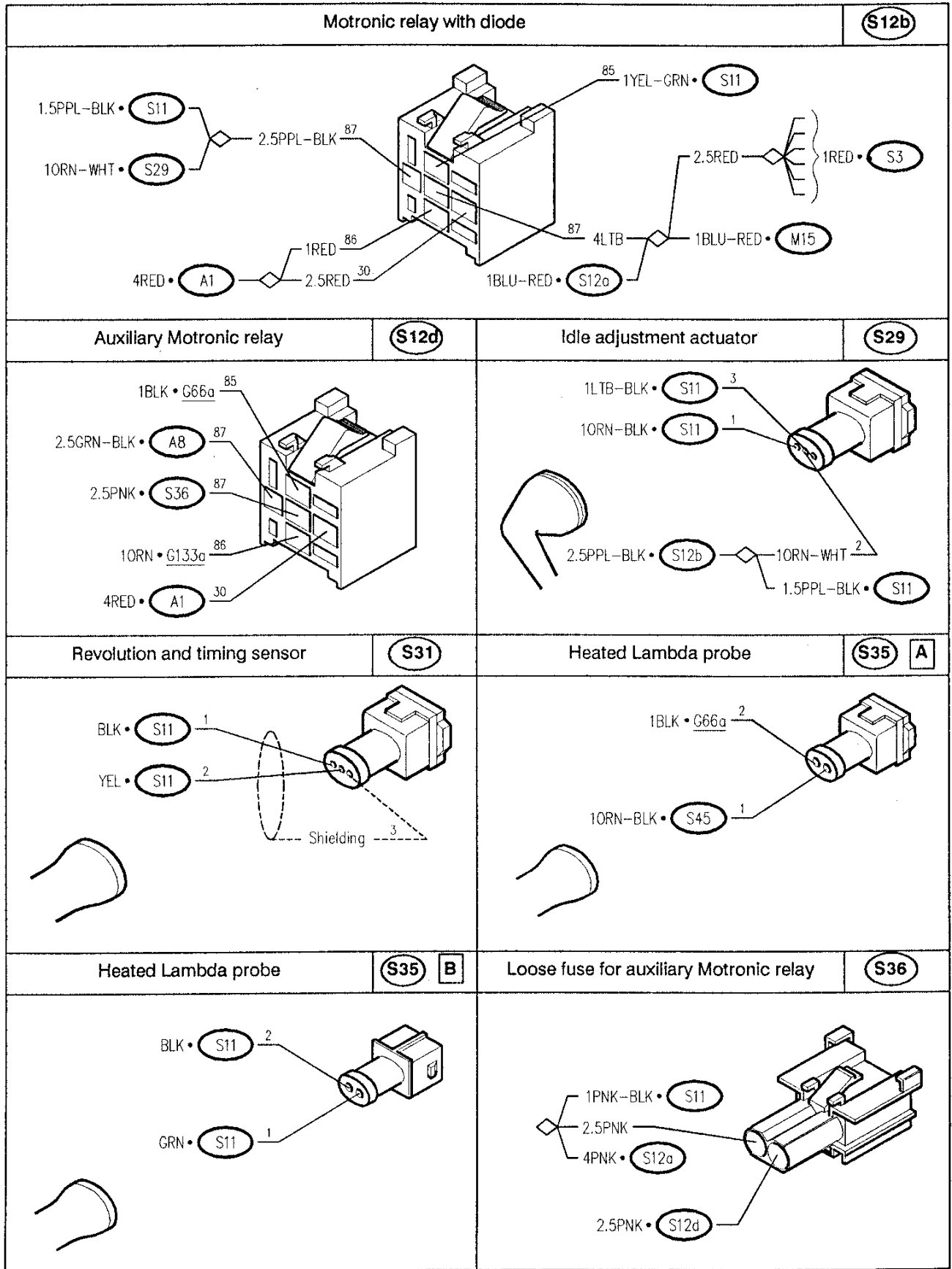
This control unit is not used for engines of differing cubic capacity and therefore the relative switch **S30** is also not present.

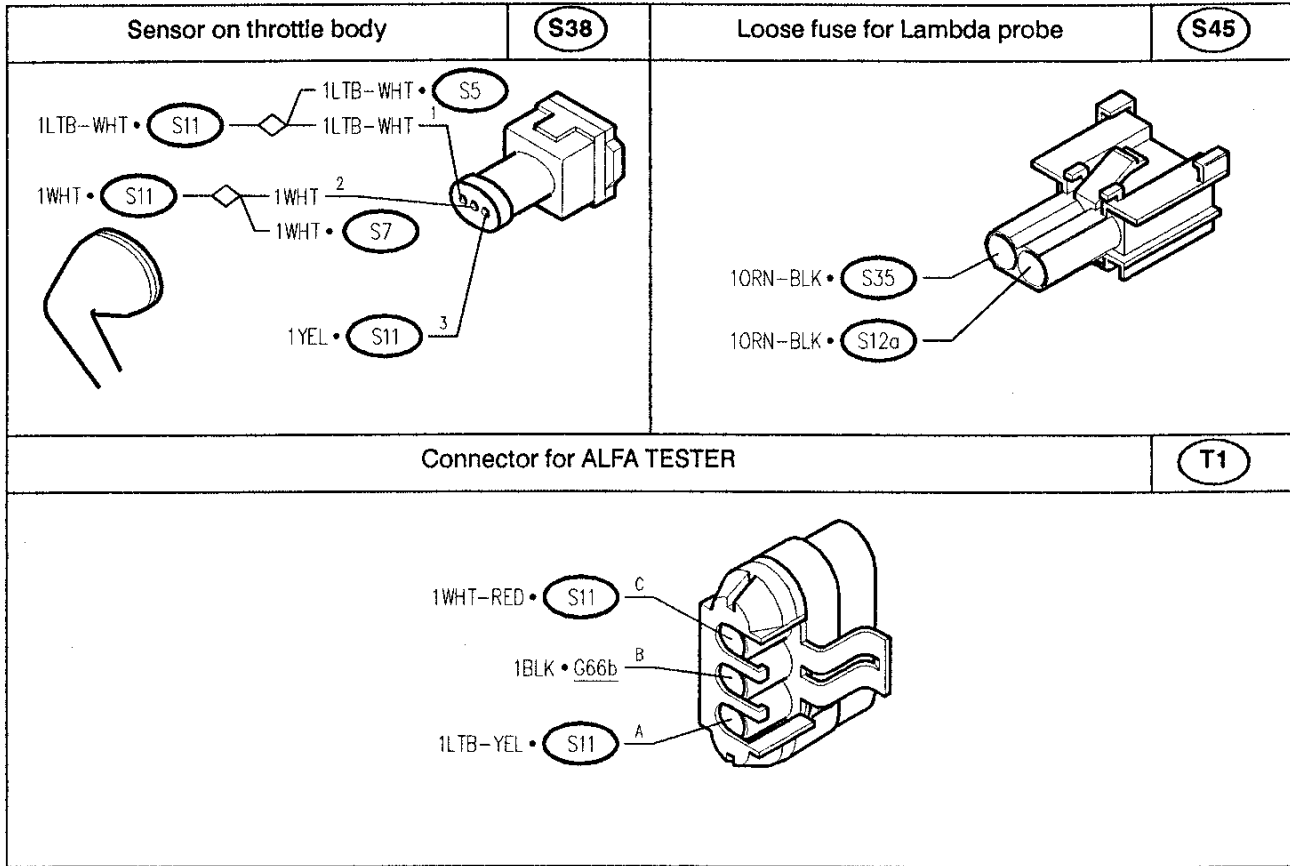
Components and Connectors

<p>Battery</p> <p>A1</p>  <p>1RED • S12b 2.5RED • S12b 4RED (+) 4RED • S12d 1RED • S11</p>	<p>Ignition coil</p> <p>A8</p>  <p>2.5WHT • S11 2.5GRN-BLK • S12d 2.5GRN • S11 2.5RED • S11</p>
<p>Motronic wiring ground</p> <p>G66a</p>	<p>Motronic wiring ground</p> <p>G66b</p>
 <p>1BLK • S12d 2.5BLK • S11 1.5BLK • S11 2.5BLK • S11 1BLK • S35</p>	 <p>1BLK • T1 1.5BLK • S11</p>
<p>Connector for fuel pump</p> <p>G107</p>	<p>Electronic ignition-injection wiring A connection</p> <p>G133a</p>
 <p>1.5PNK-WHT • S12a</p>	 <p>1BRN-WHT • S11 10RN • S12d</p>
<p>Electronic ignition-injection wiring B connection</p> <p>G133b</p>	<p>Vapour recovery solenoid valve</p> <p>M15</p>
 <p>1GRY-YEL • S11 1GRN-WHT • S11 1HZL • S11</p>	 <p>10RN • S11 1BLU-RED • S12a 2.5RED 1RED • S3</p>

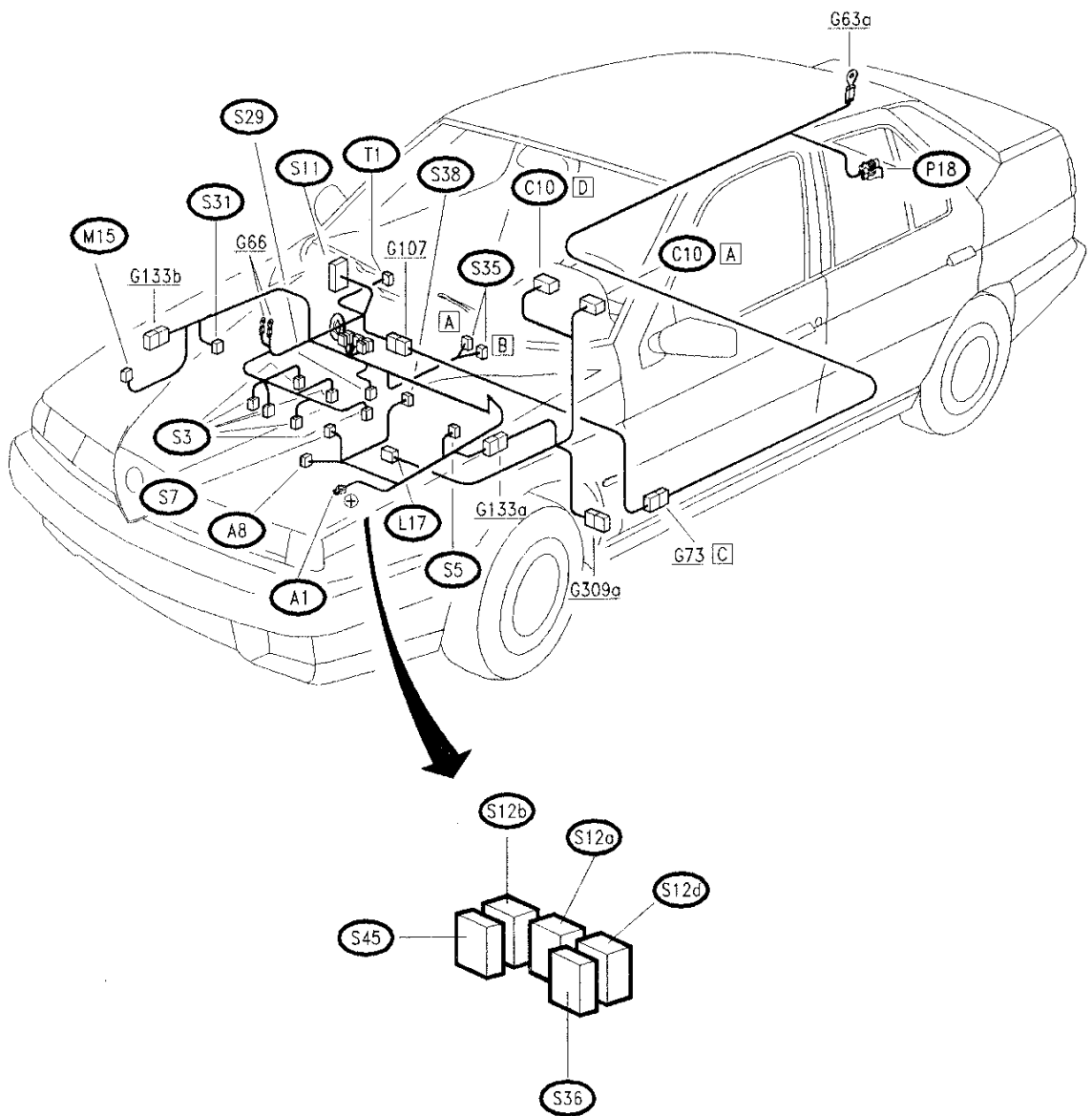






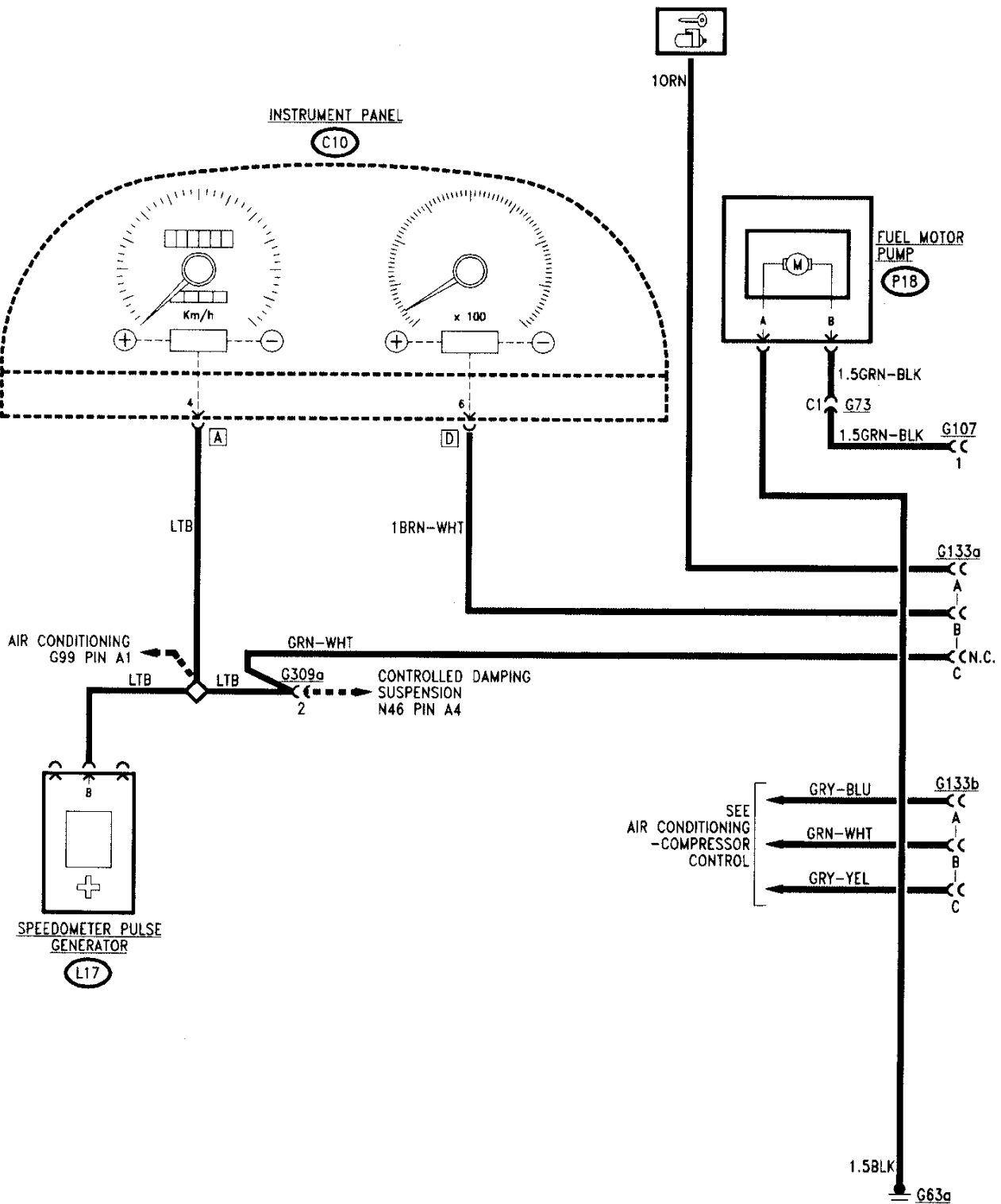


Location of Components



VEHICLE INTERFACE

Wiring Diagram



Functional Description

The motronic wiring is connected to the connectors of the vehicle via connectors **G133a**, **G133b** and **G107**.

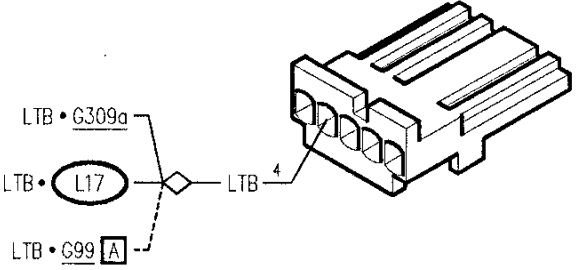
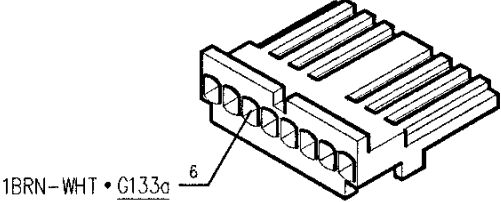
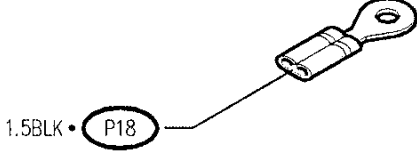
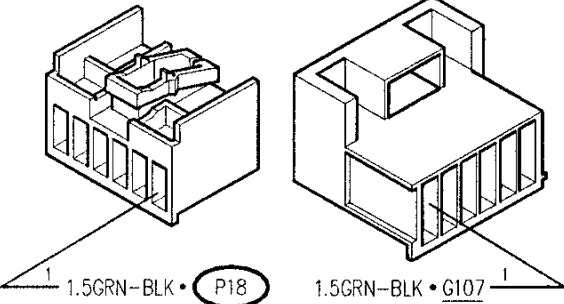
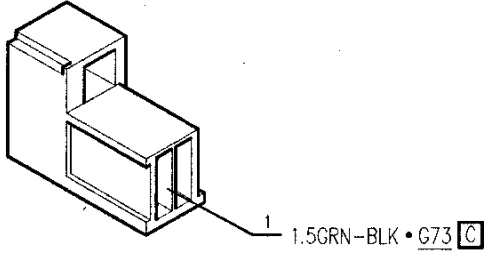
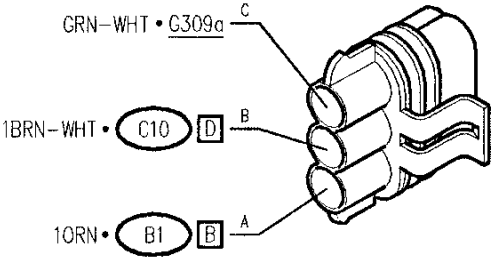
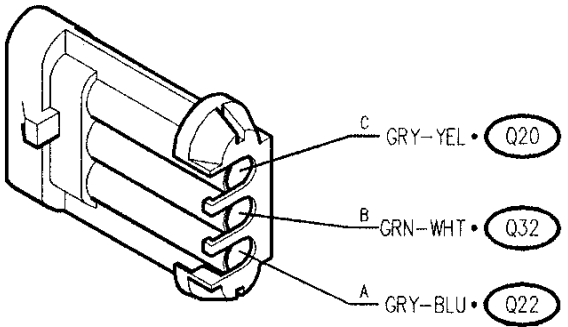
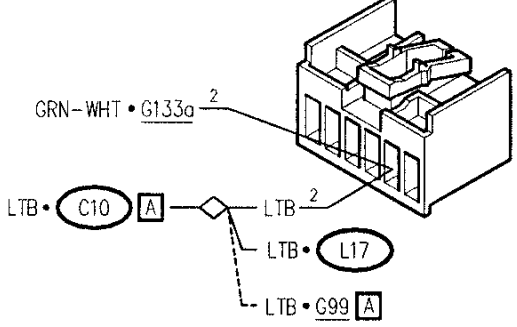
The control unit is constantly updated as to the engine r.p.m. through the r.p.m. and timing sensor **S31**: this information is sent to the rev counter located on the instrument panel **C10**, via the signal of pin 74 and connector **G133a**.

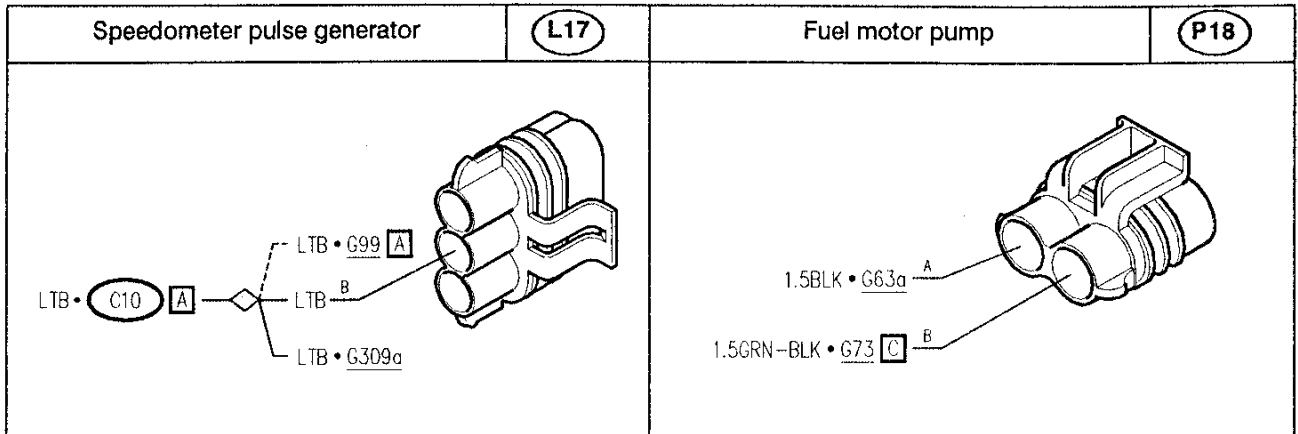
The control unit **S11** is connected by pins 48, 85 and 86 to the air conditioning system via connector **G133b**.

This permits the engine idle speed to be adapted to the increase in power each time the compressor is engaged. In addition, if the engine requires a large power increase (high acceleration), the control unit sends a signal which momentarily interrupts the power supply to the compressor (for greater detail regarding this point refer to "Air conditioning: compressor control")

The electric fuel pump **P18** is connected via the connector **G107**.

Components and Connectors

<p>Instrument panel</p>	<p>C10 A</p>	<p>Instrument panel</p>	<p>C10 D</p>
			
<p>Rear right ground</p>	<p>G63a</p>	<p>Connector for rear services</p>	<p>G73 C</p>
			
<p>Connector for fuel pump</p>	<p>G107</p>	<p>Electronic ignition-injection wiring A connection</p>	<p>G133a</p>
			
<p>Electronic ignition-injection wiring B connection</p>	<p>G133b</p>	<p>Controlled damping suspension A connection</p>	<p>G309a</p>
			



TROUBLESHOOTING

NOTE: for a complete fault diagnosis regarding the MOTRONIC M 1.7 electronic ignition and injection system, refer to "REPAIR MANUAL - MOTORS", Group 04. Only the tests for checking the functioning of the electrical components of the system (from **TEST C** to **TEST M**) are given below.

Each test is considered separately, to be carried out only in order to check the relative component.

Any malfunctions indicated by the user of the vehicle leading to these tests are indicated in the "REPAIR MANUAL - MOTORS", Group 04.

A particular example is given by **TEST A** (TS) or **TEST B** (6V), which searches for the cause of an incorrect or absent power supply affecting the entire system.

The last test - **TEST N** (TS) or **TEST O** (6V) - is a global verification of the system starting from the malfunctions indicated by the user: ignition problems.

For other problems indicated by the user (problems regarding fuel supply and idle r.p.m due to the engagement of the compressor) can be found in other sections or in the above mentioned publication.

NOTE: in addition to this fault diagnosis any faults can be quickly identified by connecting up to the control unit **S11** using the Alfa Romeo Tester (see special publications)

Malfunction								
	A1	S46	S36	S12b	S12c	S12a	S12c	S38
System power supply (TS)	•	•		•	•			
System power supply (6V)	•		•	•	•			
Throttle valve sensor								•
Engine temperature sensor								
Air-flow meter								
Idle speed actuator								
Lambda probe								
Air temperature sensor								
Fuel pump						•		
Vapour recovery solenoid valve								
R.P.M. and timing sensor								
Electroinjectors								
Timing variator (TS only)							•	
Irregular ignition (TS)								
Irregular ignition (6V)								
Irregular fuel supply								
Irregular idle speed (a.c. compressor)								

*

**

TROUBLESHOOTING TABLE

Component															Test
S7	S5	S29	S35	P18	M15	S31	S3	S15	S11	S45	S47	A12	A8	N1	
									•						A
									•						B
															C
•															D
	•														E
		•													F
			•							•					G
	•														H
				•					•		•				I
					•										J
						•									K
							•								L
								•	•						M
												•	•	•	N
												•	•		O
															*
															**

See test I, or "REPAIR MANUAL - MOTORS", Group 04.

See test F, or the section "Heating, ventilation and air conditioning"

NO POWER SUPPLY TO SYSTEM (T.SPARK models)	TEST A
---	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK BATTERY VOLTAGE - Check that the battery voltage is 12V	(OK) → (X) →	Carry out step A2 Restore the correct voltage by recharging or replacing the battery A1 NOTE: if the battery voltage falls below 12 V, even if only slightly, not only this but also the electronic systems could be negatively affected
A2	CHECK FUSE - Check for damage of wander fuse S46	(OK) → (X) →	Carry out step A3 Replace fuse (3A)
A3	CHECK RELAYS - Check for correct functioning of relays S12b and S12d	(OK) → (X) →	Carry out step A4 Replace faulty relays
A4	CHECK GROUND - Check that pins 6, 28, 34 and 55 of control unit S11 are grounded (0V)	(OK) → (X) →	Carry out step A5 Restore wiring between pins in question and grounds G66a and G66b (BLK)

(continues)

NO POWER SUPPLY TO SYSTEM (T.SPARK models)	TEST A
---	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A5	CHECK VOLTAGE	(OK) ➔	Carry out step A6
– Check for 12 V at pin 26 of control unit S11		(OK) ➔	Restore wiring between pin 26 of S11 and the battery A1 , across wander fuse S46 (RED)
A6	CHECK VOLTAGE	(OK) ➔	Carry out step A12
– With engine running, verify 12 V at pin 54 of control unit S11		(OK) ➔	Carry out step A7
A7	CHECK VOLTAGE	(OK) ➔	Restore wiring between pin 54 of S11 and pin 87 of S12b , across the solder (PPL-WHT and PPL-BLK)
– With engine running, verify 12 V at pin 87 of relay S12b		(OK) ➔	Carry out step A8
A8	CHECK VOLTAGE	(OK) ➔	Carry out step A9
– Check for 12 V at pin 30 of relay S12b		(OK) ➔	Restore wiring between the battery A1 and pin 30 of S12b , across the solder (RED and LTB)

(continues)







NO POWER SUPPLY TO SYSTEM (T.SPARK models)	TEST A
---	---------------









TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A9	CHECK VOLTAGE	OK →	Carry out step A10
– Check for 12 V at pin 86 of relay S12b		OK →	
A10	CHECK GROUND	OK →	Carry out step A12
– With engine running, check for a ground (0V) at pin 85 of S12b		OK →	Carry out step A11
A11	CHECK GROUND	OK →	Restore wiring between pin 27 of S11 and pin 85 of S12b (YEL-GRN)
– With engine running, check for a ground signal (0V) at pin 27 of S11		OK →	Replace control unit S11
A12	CHECK VOLTAGE	OK →	The system is correctly powered. If the anomaly continues, replace the control unit S11
– With key in ignition, verify 12 V at pin 56 of control unit S11		OK →	

(continues)

NO POWER SUPPLY TO SYSTEM (T.SPARK models)

TEST A

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A13	CHECK VOLTAGE		Carry out step A14
- With key in ignition, verify 12 V at pin 87 of relay S12d			Restore wiring between pin 87 of S12d and pin 56 of S11 , across the solder (PNK and PNK-BLK)
A14	CHECK VOLTAGE		Carry out step A15
- Check for 12 V at pin 30 of relay S12d			Restore wiring between the battery A1 and pin 30 of S12d (RED)
A15	CHECK VOLTAGE		Restore wiring between pin 85 of S12d and ground G66b (BLK)
- With ignition key engaged, verify 12 V at pin 86 of relay S12d			Restore wiring between pin 86 of S12d and ignition switch B1 , across pin A of connector G133a (PNK and ORN)

NO POWER SUPPLY TO SYSTEM (6V model)		TEST B	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK BATTERY VOLTAGE	 ➔	Carry out step B2
--	Check that battery voltage is 12V	 ➔	Restore the correct voltage by recharging or replacing the battery A1 NOTE: if the battery voltage falls below 12 V, even if only slightly, not only this but also the electronic systems could be negatively affected
B2	CHECK FUSE	 ➔	Carry out step B3
--	Check for damage of wander fuse S36	 ➔	Replace fuse (15A)
B3	CHECK RELAYS	 ➔	Carry out step B4
--	Check for correct functioning of relays S12b and S12d	 ➔	Replace faulty relays
B4	CHECK GROUND	 ➔	Carry out step B5
--	Check that pins 6, 28, 34 and 55 of control unit S11 are grounded (0V)	 ➔	Restore wiring between pins in question and grounds G66a and G66b (BLK)

(continues)

NO POWER SUPPLY TO SYSTEM (6V model)	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B5	CHECK VOLTAGE	OK →	Carry out step B6
– Check for 12 V at pin 26 of control unit S11		OK →	Restore wiring between pin 26 of S11 and the battery A1 (RED)
B6	CHECK VOLTAGE	OK →	Carry out step B12
– With engine running, verify 12 V at pin 54 of control unit S11		OK →	Carry out step B7
B7	CHECK VOLTAGE	OK →	Restore wiring between pin 54 of S11 and pin 87 of S12b , across the solder (PPL-BLK)
– With engine running, verify 12 V at pin 87 of relay S12b		OK →	Carry out step B8
B8	CHECK VOLTAGE	OK →	Carry out step B9
– Check for 12 V at pin 30 of relay S12b		OK →	Restore wiring between the battery A1 and pin 30 of S12b , across the solder (RED)

(continues)









NO POWER SUPPLY TO SYSTEM (6V model)	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B9	CHECK VOLTAGE	(OK) ➔	Carry out step B10
	– Check for 12 V at pin 86 of relay S12b	(OK) ➔	
			Restore wiring between pin 86 and pin 30 of S12b (RED)
B10	CHECK GROUND	(OK) ➔	Carry out step B12
	– With engine running, check for a ground (0V) at pin 85 of S12b	(OK) ➔	Carry out step B11
B11	CHECK GROUND	(OK) ➔	Restore wiring between pin 27 of S11 and pin 85 of S12b (YEL-GRN)
	– With engine running, check for a ground signal (0V) at pin 27 of S11	(OK) ➔	Replace the control unit S11
B12	CHECK VOLTAGE	(OK) ➔	The system is correctly powered. If the anomaly persists, replace the control unit S11
	– With key in ignition, verify 12 V at pin 56 of control unit S11	(OK) ➔	Carry out step B13

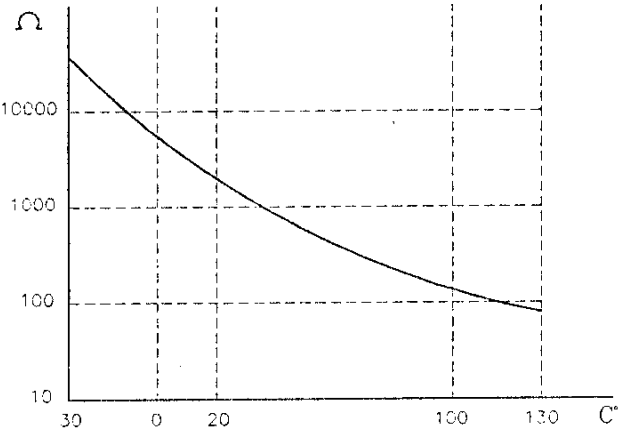
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NO POWER SUPPLY TO SYSTEM (6V model)	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B13	CHECK VOLTAGE	OK →	Carry out step B14
- With key in ignition, verify 12 V at pin 87 of relay S12d		OK →	Restore wiring between pin 87 of S12d and pin 56 of S11 , across wander fuse S36 and the solder (PNK)
B14	CHECK VOLTAGE	OK →	Carry out step B15
- Check for 12 V at pin 30 of relay S12d		OK →	Restore wiring between the battery A1 and pin 30 of S12d (RED)
B15	CHECK VOLTAGE	OK →	Restore wiring between pin 85 of S12d and ground G66a (BLK)
- With ignition key engaged, verify 12 V at pin 86 of relay S12d		OK →	Restore wiring between pin 86 of S12d and ignition switch B1 , across pin A of connector G133a (ORN)

CHECK THROTTLE VALVE SENSOR		TEST C	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK SENSOR	 ➔	Carry out step C2
	– Check that the resistance value between pins 2 and 3 of S38 varies in relation to the degree of opening of the throttle valve: between approximately 1 kΩ with valve closed and 2.7 kΩ with valve completely open	 ➔	Replace the throttle valve sensor S38
C2	CHECK CONTINUITY	 ➔	Carry out step C3
	– Check for continuity between pin 2 of S38 and pin 43 of control unit S11	 ➔	Restore wiring between pin 2 of S38 and pin 43 of control unit S11 , across the solder (WHT)
C3	CHECK CONTINUITY	 ➔	Carry out step C4
	– Check for continuity between pin 1 of S38 and pin 59 of control unit S11	 ➔	Restore wiring between pin 1 of S38 and pin 59 of control unit S11 , across the solder (LTB-WHT)
C4	CHECK CONTINUITY	 ➔	the sensor in question functions correctly: check the control unit S11 or other components
	– Check for continuity between pin 3 of S38 and pin 12 of control unit S11	 ➔	Restore wiring between pin 3 of S38 and pin 12 of control unit S11 (YEL)

CHECK ENGINE TEMPERATURE SENSOR	TEST D
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION												
D1	CHECK SENSOR - Check that the resistance value measured at the ends of S7 varies with the changes in temperature in accordance with the relevant table (e.g. carry out a test at environmental temperature and one around 100°C)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;"> OK → </div> <div> OK → </div> </div>	Carry out step D2 Replace engine temperature sensor S7												
 <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <caption>Approximate data points from the graph</caption> <thead> <tr> <th>Temperature (°C)</th> <th>Resistance (Ω)</th> </tr> </thead> <tbody> <tr><td>30</td><td>10000</td></tr> <tr><td>0</td><td>1000</td></tr> <tr><td>20</td><td>500</td></tr> <tr><td>100</td><td>100</td></tr> <tr><td>130</td><td>50</td></tr> </tbody> </table>		Temperature (°C)	Resistance (Ω)	30	10000	0	1000	20	500	100	100	130	50		
Temperature (°C)	Resistance (Ω)														
30	10000														
0	1000														
20	500														
100	100														
130	50														
D2	CHECK CONTINUITY - Check for continuity between pin 1 of S7 and pin 78 of control unit S11	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;"> OK → </div> <div> OK → </div> </div>	Carry out step D3 Restore wiring between pin 1 of S7 and pin 78 of control unit S11 (BRN)												
D3	CHECK CONTINUITY - Check for continuity between pin 2 of S7 and pin 43 of control unit S11	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 20px;"> OK → </div> <div> OK → </div> </div>	The sensor in question functions correctly: check the control unit S11 or other components Restore wiring between pin 2 of S7 and pin 43 of control unit S11 , across the solder (WHT)												









CHECK AIR-FLOW METER	TEST E
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	CHECK METER	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step E2
- Check operation of air-flow meter S5 and carry out the following tests: - check for a resistance value between pins 4 and 3 of S5 of approximately 350Ω with the shutter closed - check for a resistance value between pins 2 and 3 of S5 of approximately 400Ω with shutter closed; manually operate the shutter and check that the value increases smoothly, without abrupt changes		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace air-flow meter S5
E2	CHECK CONTINUITY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step E3
- Check for continuity between pin 4 of S5 and pin 14 of control unit S11		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between pin 4 of S5 and pin 14 of control unit S11 (GRN)
E3	CHECK CONTINUITY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step E4
- Check for continuity between pin 3 of S5 and pin 59 of control unit S11		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between pin 3 of S5 and pin 59 of control unit S11 , across the solder (LTB-WHT)

(continues)

CHECK AIR-FLOW METER	TEST E
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E4	<p style="margin: 0;">CHECK CONTINUITY</p> <ul style="list-style-type: none"> - Check for continuity between pin 2 of S5 and pin 41 of control unit S11 	<p style="margin: 0; text-align: center;">  → </p> <p style="margin: 10px 0 0 0; text-align: center;">  → </p>	<p style="margin: 0;">The air-flow meter in question functions correctly: check the control unit S11 or other components</p> <p style="margin: 10px 0 0 0;">Restore wiring between pin 2 of S5 and pin 41 of control unit S11 (WHT-BLK)</p>







CHECK IDLE SPEED ADJUSTMENT ACTUATOR		TEST F	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F1	CHECK ACTUATOR	 ➔	Carry out step F2
	<ul style="list-style-type: none"> - Check impedance value: <ul style="list-style-type: none"> • of approximately 13 Ω between pins 2 and 3 of S29 • of approximately 26 Ω between pins 1 and 3 of S29 	 ➔	Replace idle speed adjustment actuator S29
F2	CHECK VOLTAGE	 ➔	Carry out step F3
	<ul style="list-style-type: none"> - With engine running, verify 12 V at pin 2 of S29 	 ➔	Restore wiring between pin 2 of S29 and pin 87 of relay S12b , across the solder (ORN-WHT and PPL-BLK)
F3	CHECK CONTINUITY	 ➔	Carry out step F4
	<ul style="list-style-type: none"> - Check for continuity between pin 3 of S29 and pin 29 of control unit S11 	 ➔	Restore wiring between pin 3 of S29 and pin 29 of control unit S11 (LTB-BLK)
F4	CHECK CONTINUITY	 ➔	Idle actuator in question functions correctly: check the control unit S11 or other components
	<ul style="list-style-type: none"> - Check for continuity between pin 1 of S29 and pin 2 of control unit S11 	 ➔	Restore wiring between pin 1 of S29 and pin 2 of control unit S11 (ORN-BLK)

CHECK LAMBDA PROBE	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G1	CHECK AIR SUPPLY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step G2
– Check for damage of air intake duct of air cleaner		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Clean or replace the affected parts
G2	CHECK SPARK PLUGS AND INJECTORS	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step G3
– Check for damage of spark plugs A12 and injectors S3 (see also test L)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Clean or replace affected parts
G3	CHECK FUSE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step G4
– Check for damage of wander fuse S45		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace fuse (7.5 A)
G4	CHECK PROBE RESISTANCE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step G5
– Check that between ends of the resistance of probe S35 (pin A1 and A2) there is a resistance of approximately 3 Ω		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace probe S35

(continues)

CHECK LAMBDA PROBE	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G5	CHECK VOLTAGE	<div style="text-align: center;">  → </div>	Carry out step G6
- With engine running, verify 12 V at pin A1 of probe S35		<div style="text-align: center;">  → </div>	Restore wiring between pin A1 of S45 and pin 87 of relay S12a , across fuse S45 (ORN-BLK)
G6	CHECK GROUND	<div style="text-align: center;">  → </div>	Carry out step G7
- Check that pin A2 of probe S35 is grounded (0V)		<div style="text-align: center;">  → </div>	Restore wiring between pin A2 of S35 and ground G66a , across the solder (BLK)
G7	CHECK SIGNAL	<div style="text-align: center;">  → </div>	Carry out step G8
- Start the engine and wait until it is idling. Check for a difference in voltage between pins B1 and B2 of S35 of between 0.1 and 1 V		<div style="text-align: center;">  → </div>	Replace probe S35

(continues)

CHECK LAMBDA PROBE	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G8	CHECK SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	<p>The lambda probe in question functions correctly: check the control unit S11 or other components</p>
<p>– Operating as for the previous step, check the signal at pins 70 and 71 of control unit S11</p>		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	<p>Restore wiring between:</p> <ul style="list-style-type: none"> • pin 71 of S11 and pin B2 of S35 (BLK) • pin 70 of S11 and pin B1 of S35 (TS:YEL - 6V:GRN) <p>Check also the shielding plait, which must be grounded.</p>



CHECK AIR TEMPERATURE SENSOR	TEST H
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NOTE: the air temperature sensor is incorporated in the air-flow meter **S5**

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
H1	<p style="text-align: center;">CHECK SENSOR</p> <p>– Check that the resistance value between pins 5 and 1 of air-flow meter S5 (with a built-in air temperature sensor) varies with the temperature in accordance with the relative table (e.g. carry out a test at environmental temperature and one around 100 °C)</p>	<p style="text-align: center;">(OK) ➔</p> <p style="text-align: center;">(OK) ➔</p>	<p>Carry out step H2</p> <p>Replace air-flow meter S5</p>
H2	<p style="text-align: center;">CHECK CONTINUITY</p> <p>– Check for continuity between pin 5 of S5 and pin 77 of control unit S11</p>	<p style="text-align: center;">(OK) ➔</p> <p style="text-align: center;">(OK) ➔</p>	<p>Carry out step H3</p> <p>Restore wiring between pin 5 of S5 and pin 77 of control unit S11, across the solder (RED-GRY)</p>

(continues)

CHECK AIR TEMPERATURE SENSOR	TEST H
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
H3	<p>CHECK CONTINUITY</p> <p>– Check for continuity between pin 4 of S5 and pin 14 of control unit S11</p>	<p style="text-align: center;">  → </p> <p style="text-align: center;">  → </p>	<p>The air temperature sensor (located in the air-flow meter) in question functions correctly: check the control unit S11 or other components</p> <p>Restore wiring between pin 4 of S5 and pin 14 of control unit S11 (GRN)</p>

CHECK FUEL PUMP		TEST I	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
I1	CHECK FUSE	 ➔	Carry out step I2
	<ul style="list-style-type: none"> - Check for damage of wander fuse: - (TS) S47 - (6V) S36 	 ➔	Replace fuse: - (TS: 7.5A) - (6V: 15A)
I2	CHECK RELAY	 ➔	Carry out step I3
	<ul style="list-style-type: none"> - Check for correct functioning of fuel pump relay S12a 	 ➔	Replace faulty relay
I3	CHECK VOLTAGE	 ➔	Carry out step I4
	<ul style="list-style-type: none"> - With key in ignition, verify 12 V at pin 30 of relay S12a 	 ➔	Restore wiring between: - (TS) pin 30 of S12a and pin 87 of S12d (GRN-BLK) - (6V) pin 30 of S12a and pin 87 of S12d , across the solder and fuse S36 (PNK)

(continues)

CHECK FUEL PUMP	TEST I
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
I4	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step I5
- With key in ignition, verify 12 V at pin 86 of relay S12a		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between: - (TS) pin 86 of S12a and pin 87 of S12b , across the solder (YEL and RED) - (6V) pin 86 of S12a and pin 87 of S12b , across the solder (BLU-RED and LTB)
I5	CHECK GROUND SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step I7
- With engine running check for a ground signal (0V) at pin 85 of S12a		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step I6
I6	CHECK GROUND SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between pin 1 of S11 and pin 85 of S12a (GRY- BLK)
- With engine running check for a ground signal (0V) at pin 1 of control unit S11		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Check and if necessary replace the control unit S11







(continues)

CHECK FUEL PUMP	TEST I
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
17	CHECK VOLTAGE	<div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">OK</div> <div style="font-size: 20px; margin: 0 5px;">➔</div>	Carry out step 18
- With engine running, verify 12 V at pin B of fuel pump P18		<div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;"> <div style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: flex; align-items: center; justify-content: center; margin: 0 2px;">OK</div> <div style="font-size: 20px; margin: 0 5px;">➔</div> </div>	
- Restore wiring between: - (TS) pin B of P18 and pin 87 of S12a , across pin C1 of connector G73 , pin 1 of connector G107 , wander fuse S47 and the solder (GRN-BLK and PNK-WHT) - (6V) pin B of P18 and pin 87 of S12a , across pin C1 of connector G73 and pin 1 of connector G107 (GRN-BLK and PNK-WHT)			
18	CHECK VOLTAGE	<div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;">OK</div> <div style="font-size: 20px; margin: 0 5px;">➔</div>	Replace pump P18
- Check that pin A of P18 is grounded (0V)		<div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 5px;"> <div style="border: 1px solid black; border-radius: 50%; width: 15px; height: 15px; display: flex; align-items: center; justify-content: center; margin: 0 2px;">OK</div> <div style="font-size: 20px; margin: 0 5px;">➔</div> </div>	
- Restore wiring between pin A of P18 and ground G63a (BLK)			







CHECK VAPOUR RECOVERY SOLENOID VALVE

TEST J

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
J1	CHECK SOLENOID VALVE - With engine warm, accelerate revving slightly and check for 0V at pin 2 of solenoid valve M15		Carry out step J2
			Carry out step J3
J2	CHECK VOLTAGE - With engine running, verify 12 V at pin 1 of M15		Replace solenoid valve M15
			Restore wiring between pin 1 of M15 and pin 87 of S12b , across the solder (TS: RED-BLU and RED 6V:RED-BLU and LTB)
J3	CHECK CONTINUITY - Check for continuity between pin 2 of M15 and pin 36 of control unit S11		The vapour recovery solenoid valve in question functions correctly: check the control unit S11 or other components
			Restore wiring between pin 2 of M15 and pin 36 of control unit S11 (ORN).

CHECK R.P.M. AND TIMING SENSOR	TEST K
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
K1	CHECK AIR GAP	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step K2
– Check for correct air gap value between the sensor and the crankshaft pulley (see "REPAIR MANUAL-MOTORS", Group 04)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore correct air gap value
K2	CHECK SENSOR	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step K3
– With engine running, check for a signal that varies in frequency between pins 1 and 2 of r.p.m. and timing sensor S31 . This signal varies with the engine r.p.m.		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace sensor S31
K3	CHECK CONTINUITY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	The r.p.m. and timing sensor in question functions correctly: check the control unit S11 or other components
– Check for continuity between: <ul style="list-style-type: none"> • pin 2 of S31 and pin 68 of control unit S11 • pin 1 of S31 and pin 67 of control unit S11 		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between: <ul style="list-style-type: none"> • pin 2 of S31 and pin 68 of control unit S11 (YEL) • pin 1 of S31 and pin 67 of control unit S11 (BLK) Check also the shielding plait, which must be grounded.

CHECK ELECTROINJECTORS		TEST L	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
L1	CHECK ELECTROINJECTORS	 ➔	Carry out step L2
<ul style="list-style-type: none"> - Check for damage and correct mechanical functioning of the electroinjectors S3 (see "REPAIR MANUAL-MOTORS", Group 04) Check also that the resistance value at the tips of an injector S3 is approximately 16 Ω 		 ➔	Replace faulty injectors
L2	CHECK VOLTAGE	 ➔	Carry out step L3
<ul style="list-style-type: none"> - With engine running, verify 12 V at pins 2 of electroinjectors S3 		 ➔	Restore wiring between pin 2 of injectors and pin 87 of S12b , across the solders (TS: RED; 6V: RED and LTB)
L3	CHECK CONTINUITY	 ➔	The injectors in question function correctly: check the control unit S11 or other components
<ul style="list-style-type: none"> - Check for continuity between: <ul style="list-style-type: none"> • (*) pin 1 of injectors S3 and pin 32 of control unit S11 • (**) pin 1 of injectors S3 and pin 3 of control unit S11 		 ➔	Restore wiring between: <ul style="list-style-type: none"> • (*) pin 1 of injectors S3 and pin 32 of control unit S11, across the solder (YEL-BLK) • (**) pin 1 of injectors S3 and pin 3 of control unit S11, across the solder (YEL)

(*) TS: cylinders 2 and 4 - 6V: cylinders 3, 5 and 6

(**) TS: cylinders 1 and 3 - 6V: cylinders 1, 2 and 4









CHECK TIMING VARIATOR	TEST M
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NOTE: the timing variator **S15**, and relative relay **S12c**, are only fitted to the engines of the **T.SPARK** models

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
M1	CHECK RELAY	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	Carry out step M2
	– Check for correct functioning of timing variator relay S12c	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	
M2	CHECK VOLTAGE	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	Carry out step M3
	– With engine running, verify 12 V at pin 30 of relay S12c	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	
M3	CHECK VOLTAGE	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	Carry out step M4
	– With key in ignition, verify 12 V at pin 86 of relay S12c	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	
M4	CHECK GROUND SIGNAL	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	Carry out step M6
	– With engine running check for a ground signal (0V) at pin 85 of S12c	<div style="display: flex; align-items: center; gap: 10px;"> OK ➔ </div>	

(continues)

CHECK TIMING VARIATOR	TEST M
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
M5	CHECK GROUND SIGNAL		
<ul style="list-style-type: none"> - With engine running check for a ground signal (0V) at pin 37 of control unit S11 		 →	Restore wiring between pin 37 of S11 and pin 85 of S12c (YEL-RED)
		 →	Check and if necessary replace the control unit S11
M6	CHECK TIMING VARIATOR		
<ul style="list-style-type: none"> - Check for damage and correct mechanical operation of timing variator S15 (see "REPAIR MANUAL-MOTORS", Group 04) Check also that the resistance value at the tips of S15 is approximately 10 Ω 		 →	Carry out step M7
		 →	Replace timing variator S15
M7	CHECK GROUND		
<ul style="list-style-type: none"> - Check for 0V at pin with BLK wire of timing variator S15 		 →	Carry out step M8
		 →	Restore wiring between M15 and ground G66a across the solder (BLK)
M8	CHECK CONTINUITY		
<ul style="list-style-type: none"> - Check for continuity between pin with wire (YEL-BLK) of S15 and pin 87 of relay S12c 		 →	The timing variator in question functions correctly: check the control unit S11 or other components
		 →	Restore wiring between S15 and pin 87 of relay S12c (YEL-BLK)

IRREGULAR IGNITION (T.SPARK models)	TEST N
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
N1	CHECK SPARK PLUGS	<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Carry out step N2
– <ul style="list-style-type: none"> • Visually check the condition of the spark plugs. • Check that the spark strikes regularly: remove the spark plug and, without disconnecting it from the cable, connect it to ground: in this way the spark should strike regularly. 		<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Replace faulty spark plugs A12
N2	CHECK CABLES	<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Carry out step N3
– <ul style="list-style-type: none"> • Check that the cables connecting the coils and spark plugs are not damaged. • Check for a total resistance between coils and spark plugs, including the suppressors of approximately 6 kΩ 		<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Replace the faulty cables or suppressor
N3	CHECK COILS	<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Carry out step N4
– Check the total resistances of the circuits of coils A8a and A8b : <ul style="list-style-type: none"> • main (pin 2-1 and pin 2-3) approximately 0.5 Ω • secondary approximately 14 kΩ 		<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Replace faulty coil/s A8a or A8b
N4	CHECK VOLTAGE	<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Carry out step N6
– Check for 12 V at pins 2 of coils A8a and A8b		<div style="display: flex; align-items: center; gap: 10px;"> (OK) ➔ </div>	Carry out step N5

(continues)

IRREGULAR IGNITION (T.SPARK models)	TEST N
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
N5	CHECK VOLTAGE		
- Check for 12 V at pin 87 of relay S12d		<div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">OK</div> <div style="font-size: 24px; margin-right: 5px;">➔</div> </div>	Restore wiring between pin 2 of A8a and A8b and pin 87 of S12d , across the solder (GRN-BLK)
		<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">OK</div> <div style="font-size: 24px; margin-right: 5px;">➔</div> </div>	Carry out test A
N6	CHECK CONTINUITY		
- Check for continuity between: <ul style="list-style-type: none"> • pin 3 of A8a and pin 1 of N1a • pin 3 of A8b and pin 1 of N1b • pin 1 of A8a and pin 6 of N1a • pin 1 of A8b and pin 6 of N1b 		<div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">OK</div> <div style="font-size: 24px; margin-right: 5px;">➔</div> </div>	Carry out step N7
		<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">OK</div> <div style="font-size: 24px; margin-right: 5px;">➔</div> </div>	Restore wiring between: <ul style="list-style-type: none"> • pin 3 of A8a and pin 1 of N1a (WHT) • pin 3 of A8b and pin 1 of N1b (YEL) • pin 1 of A8a and pin 6 of N1a (WHT) • pin 1 of A8b and pin 6 of N1b (YEL)

(continues)

IRREGULAR IGNITION (T.SPARK models)	TEST N
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
N7	CHECK CONTINUITY — Check for continuity between modules N1a and N1b and the control unit S11 , and precisely between: <ul style="list-style-type: none"> • pin 7 of N1a and pin 24 of S11 • pin 2 of N1a and pin 51 of S11 • pin 7 of N1b and pin 52 of S11 • pin 2 of N1b and pin 25 of S11 	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 20px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div> </div>	Replace the electronic module N1a or N1b Restore wiring between: <ul style="list-style-type: none"> • pin 7 of N1a and pin 24 of S11 (ORN-WHT) • pin 2 of N1a and pin 51 of S11 (YEL-LTB) • pin 7 of N1b and pin 52 of S11 (PNK-WHT) • pin 2 of N1b and pin 25 of S11 (GRN-GRY)

IRREGULAR IGNITION (6V model)	TEST O
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
O1	CHECK SPARK PLUGS	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Carry out step O2
– <ul style="list-style-type: none"> • Visually check the condition of the spark plugs. • Check that the spark strikes regularly: remove the spark plug and, without disconnecting it from the cable, connect it to ground: in this way the spark should strike regularly. 		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Replace faulty spark plugs A12
O2	CHECK CABLES	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Carry out step O3
– <ul style="list-style-type: none"> • Check that the cables connecting the coils and spark plugs are not damaged. • Check for a total resistance between coils and spark plugs , including the supressors of approximately 2.5 kΩ 		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Replace the faulty cables or supressor
O3	CHECK COIL	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Carry out step O4
– Check total resistances of circuits of coil A8 : <ul style="list-style-type: none"> • main (pin 1-4, 2-4 and 3-4) approximately 0.5 Ω • secondary approximately 14.5 kΩ 		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Replace coil A8
O4	CHECK VOLTAGE	<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Carry out step O6
– Check for 12 V at pin 4 of coil A8		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Carry out step O5

(continues)

IRREGULAR IGNITION (6V model)	TEST O
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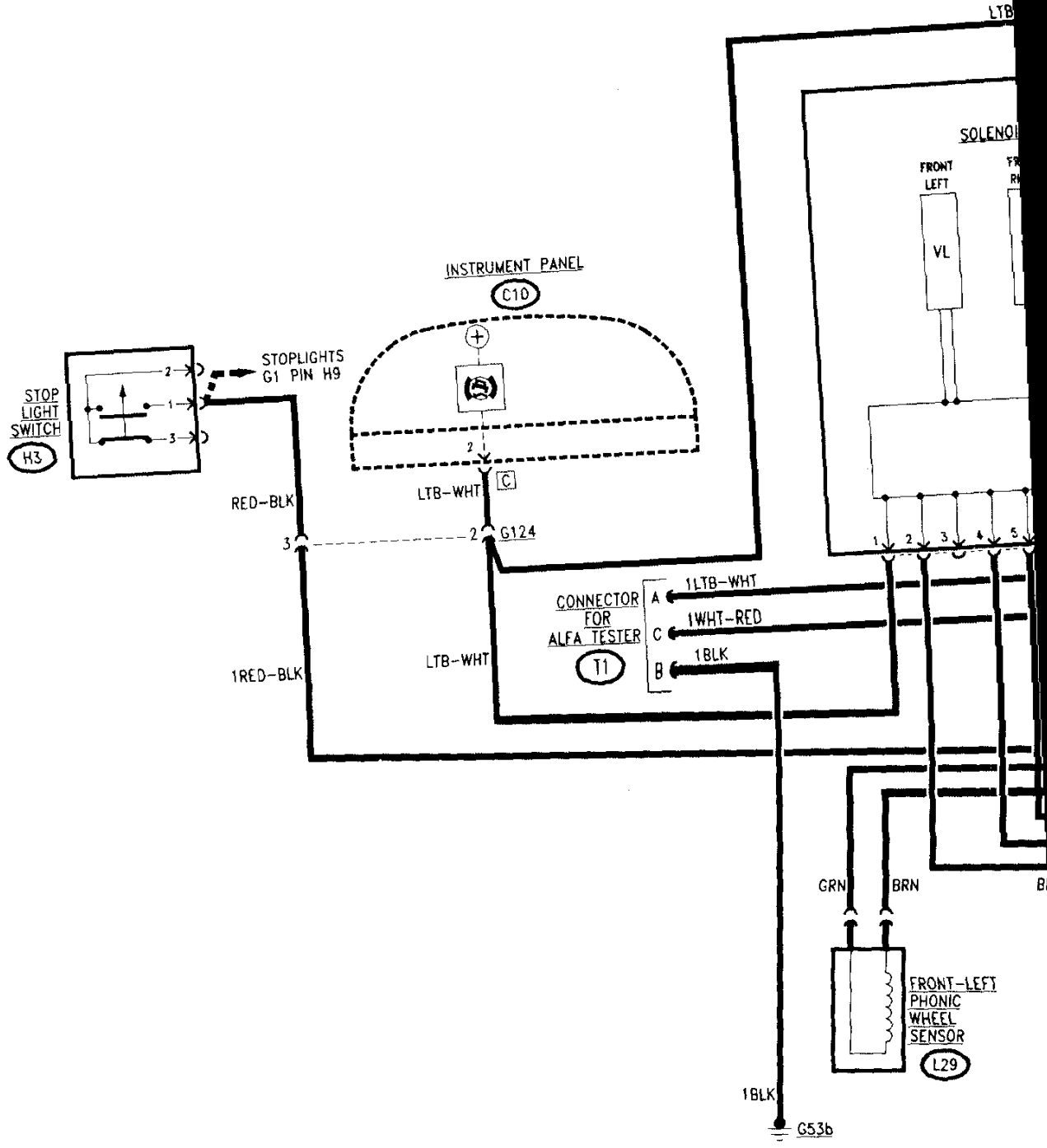
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
O5	CHECK VOLTAGE	<div style="display: flex; justify-content: center; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Restore wiring between pin 4 of A8 and pin 87 of S12d (GRN- BLK)
- Check for 12 V at pin 87 of relay S12d			
		<div style="display: flex; justify-content: center; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out test B
O6	CHECK CONTINUITY	<div style="display: flex; justify-content: center; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Replace coil A8
- Check for continuity between coil A8 and the control unit S11 , and precisely between: <ul style="list-style-type: none"> • pin 3 of A8 and pin 24 of S11 • pin 2 of A8 and pin 51 of S11 • pin 1 of A8 and pin 25 of S11 			
		<div style="display: flex; justify-content: center; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Restore wiring between: <ul style="list-style-type: none"> • pin 3 of A8 and pin 24 of S11 (WHT) • pin 2 of A8 and pin 51 of S11 (GRN) • pin 1 of A8 and pin 25 of S11 (RED)

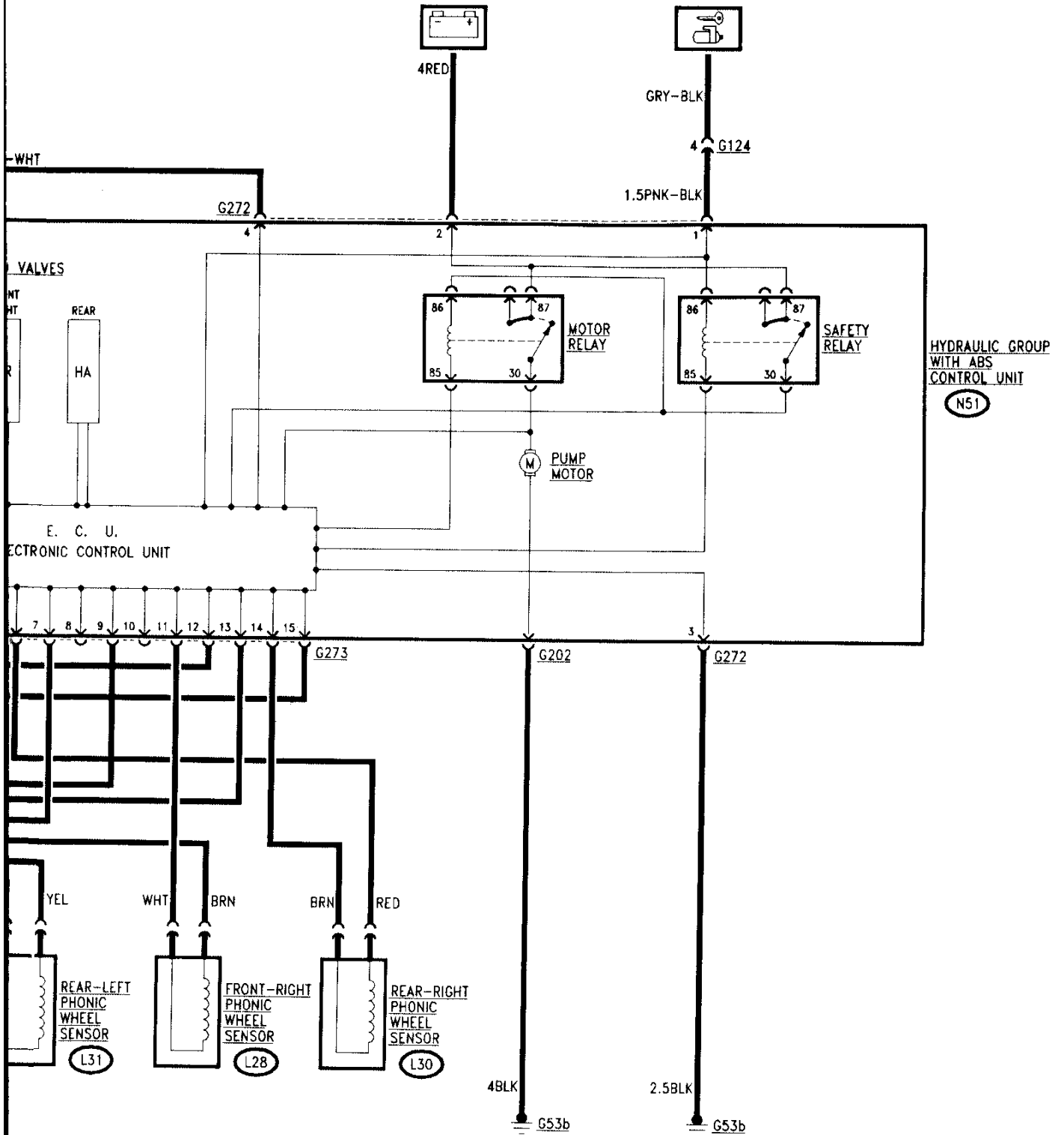
ABS SYSTEM

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TROUBLESHOOTING	

ABS SYSTEM

WIRING DIAGRAM





GENERAL DESCRIPTION

The vehicle is equipped with an electronic system to prevent the wheels of the vehicle from locking (ABS).

This system regulates the braking pressure transmitted to the wheels, preventing loss of road-holding under all tyre and road conditions.

The system has been designed to integrate, and not substitute, the normal mechanical braking system, guaranteeing a high degree of safety in the event of a braking anomaly. The intervention is carried out on the same brake fluid found in traditional mechanical circuits.

Four sensors located on the four wheels communicate the speed of the wheels to the control unit, showing up locking situations affecting the wheels, skidding and loss of road-holding.

In these situations, the control unit actuates solenoid valves which regulate the pressure in the hydraulic circuit, eliminating wheel locking and restoring road-holding which means that braking distance is reduced to a minimum without loss of steering control.

There are only three solenoid regulating valves in this version of the system: one for each of the two front wheels and one common to both the rear wheels which are regulated in parallel by a sequential control valve.

The system is composed of:

- four magnetic induction sensors which measure wheel speed **L28**; **L29**; **L30**; **L31**.
- an integrated hydraulic/electronic control unit **N51**, where the following components are located:
 - electronic control module
 - three solenoid valves
 - brake fluid pump
 - safety relay
 - pump control relay
- self-diagnosis connector **T1**
- brake switch **H3** (the same switch which also lights up the stop lights) which signals the braking state to the system.

The ABS system includes a self-diagnosis system which continually monitors all the components and the operating parameters of the system. In the event of a malfunc-

tion or fault the system automatically cuts itself out leaving the traditional servo-assisted braking system operational: this is communicated to the driver by way of the warning lamp located on the instrument panel.

Connecting up to the diagnosis connector (**T1**) located near the control unit, it is possible to use the signals of the flashig code to rapidly identify the faulty component (see Troubleshooting).

The connector **T1** can also be used to connect the ALFA ROMEO Tester system.

The "ABS malfunction" warning lamp also comes on when the vehicle is started and will go out after a few seconds, thus signalling to the driver that the initial system testing has been carried out and no anomaly found.

FUNCTIONAL DESCRIPTION

The key-operated supply powers the coil of the safety relay via pin 1 of connector **G272**. The safety relay is located inside control unit **N51**, which supplies the electronic module and the engine relay coil with battery voltage, coming from pin 2 of **G272**. Following a command from the electronic module, this actuates the pump motor.

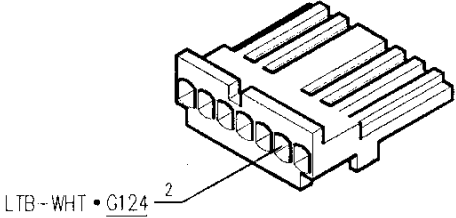
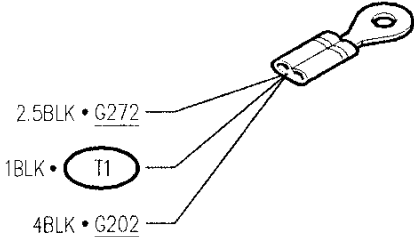
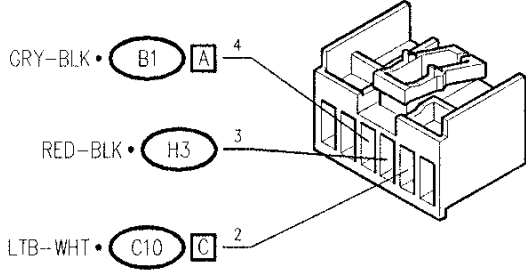
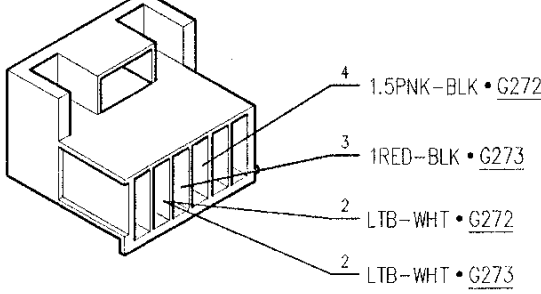
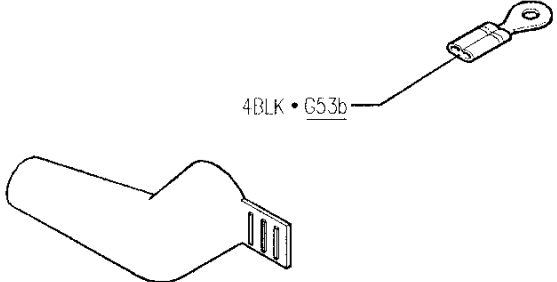
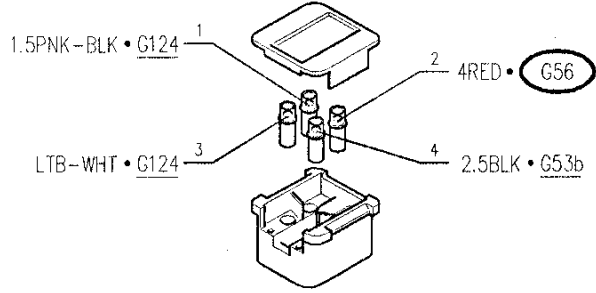
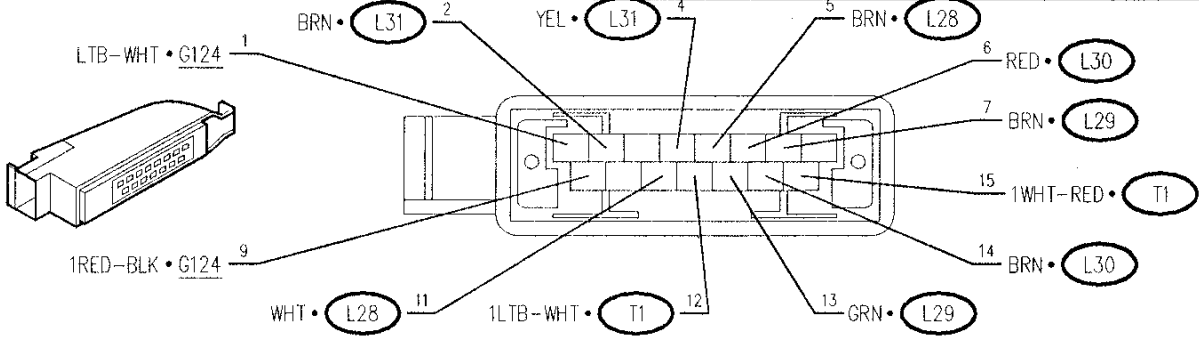
The electronic module and the relays are connected to ground via pin 3 of connector **G272**, while the pump is grounded through connector **G202**.

Inside the control unit, the module is connected to the three regulating solenoid valves while externally it is connected via connector **G273**, to the four sensors **L28** - **L29** - **L30** - **L31** which signal the speed of the individual wheels, and to the brake switch **H3**. The consensus signal from the brake switch prevents the system from intervening when the brake pedal is not depressed.

When the control unit detects a problem via the self-diagnosis function, it sends a signal to the instrument panel **C10** which then lights up the "ABS malfunction" warning lamp; this signal is dependant upon the malfunctioning of the electronic module - pin 1 of connector **G273** - or of the hydraulic control - pin 4 of **G272**.

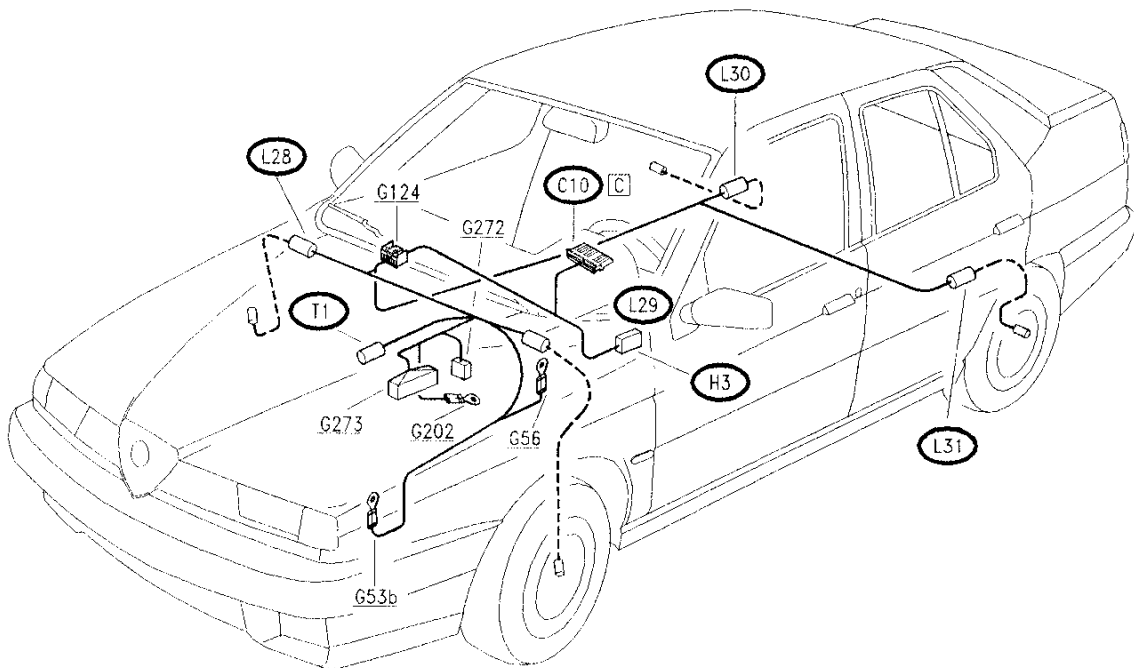
The diagnosis connector **T1**, can be used to connect the control unit to the ALFA ROMEO Tester or to permit "reading" of the flashing code (see Troubleshooting).

COMPONENTS AND CONNECTORS

Instrument panel	C10 C	Branch terminal board	G56
 <p>LTB-WHT • G124 2</p>		 <p>2.5BLK • G272 1BLK • T1 4BLK • G202</p>	
Connector for ABS system			G124
 <p>GRY-BLK • B1 RED-BLK • H3 LTB-WHT • C10</p>		 <p>1.5PNK-BLK • G272 1RED-BLK • G273 LTB-WHT • G272 LTB-WHT • G273</p>	
ABS system ground connector	G202	Connector for ABS hydraulic group	G272
 <p>4BLK • G53b</p>		 <p>1.5PNK-BLK • G124 4RED • G56 LTB-WHT • G124 2.5BLK • G53b</p>	
Connector for ABS control unit			G273
 <p>LTB-WHT • G124 BRN • L31 YEL • L31 BRN • L28 RED • L30 BRN • L29 15 1WHT-RED • T1 14 BRN • L30 13 GRN • L29 12 1LTB-WHT • T1 11 WHT • L28 9 1RED-BLK • G124</p>			

Stop light switch		(H3)
Front-right phonic wheel sensor	(L28)	Front-left phonic wheel sensor
Rear-right phonic wheel sensor	(L30)	Rear-left phonic wheel sensor
Connector for ALFA TESTER		(T1)

LOCATION OF COMPONENTS



TROUBLESHOOTING USING THE SELF-DIAGNOSIS FUNCTION

The self-diagnosis function with which this system is equipped makes a rapid identification of the faulty components possible by following the indications given by a FLASHING CODE which is actuated in the following way:

- connect the line of pin A, connector T1 to ground (LTB- WHT)
- provide power to the ABS control unit N51 (key-operated supply)

- read the sequence of impulses which appear on the "ABS malfunction" warning light located on the instrument panel C10:
 - code "12" will appear three times to indicate correct operation: if this does not occur, carry out **test A**
 - the codes of the stored errors will appear (each repeated three times): carry out the test indicated in the following table
 - code "12" will appear another three times to indicate the end of the sequence

NOTE: To reset the stored codes, disconnect the line of pin A, connector T1 and actuate the ignition switch 20 times (or use the ALFA ROMEO Tester)

TROUBLESHOOTING TABLE

CODE	MALFUNCTION	SEE TEST
12	Beginning and end of diagnosis	-
No code	Control unit anomaly and self-diagnosis	A
16	Faulty front left solenoid valve (VL)	Check solenoid valve impedance (1.5÷2.5 Ω) and the connections between control unit and solenoid valve; if necessary replace the solenoid valve
17	Faulty front right solenoid valve (VR)	Check solenoid valve impedance (1.5÷2.5 Ω) and the connections between control unit and solenoid valve; if necessary replace the solenoid valve
18	Faulty rear (HA) solenoid valve	Check solenoid valve impedance (1.5÷2.5 Ω) and the connections between control unit and solenoid valve; if necessary replace the solenoid valve
19	Faulty safety relay	B
25	Incorrect number of teeth on phonic wheel	Replace the affected phonic wheel (see "REPAIR MANUAL-MECHANICAL UNITS" - Group 22)
35	Faulty pump motor	C
37	Faulty brake switch (H3)	D
39	Faulty front left sensor (L29)	Check sensor impedance (approximately 1 KΩ); replace it if necessary. Carry out successive test E .
41	Front left sensor (L29) not connected	E
42	Faulty front right sensor (L28)	Check sensor impedance (approximately 1 KΩ); replace it if necessary. Carry out successive test F .
43	Front right sensor (L28) not connected	F
44	Faulty rear left sensor (L31)	Check sensor impedance (approximately 1 KΩ); replace it if necessary. Carry out successive test G .
45	Rear left sensor (L31) not connected	G
46	Faulty rear right sensor (L30)	Check sensor impedance (approximately 1 KΩ); replace it if necessary. Carry out successive test H .
47	Rear right sensor (L30) not connected	H
48	Insufficient voltage	I
55	Faulty electronic control unit	Replace the control unit, located in N51

AUTOMATIC CHECKING UPON IGNITION:







when the vehicle is started the "ABS malfunction" warning lamp located on the instrument panel will come on for approximately 2 secs., and will then go out indicating that the system is operating correctly.

If the lamp stays on, carry out diagnosis using the flashing code as shown above.

If the warning lamp does not come on, carry out **test A**.

















TROUBLESHOOTING

GENERAL MALFUNCTIONING OF SYSTEM	TEST A
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK RELAY	 ➔	Carry out step A2
	– Check safety relay (in group N51)	 ➔	Replace relay if faulty
A2	CHECK VOLTAGE	 ➔	Carry out step A3
	– Check for 12 V at pin 2 of G272	 ➔	Restore wiring between pin 2 of G272 and terminal board G56 (RED)
A3	CHECK VOLTAGE	 ➔	Carry out step A4
	– Engage the ignition key and check for 12 V at pin 1 of G272	 ➔	Restore wiring between pin 1 of G272 and ignition switch B1 , across pin 4 of G124 (PNK-BLK and GRY-BLK)



(continues)

GENERAL MALFUNCTIONING OF SYSTEM	TEST A
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A4	CHECK GROUND	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Carry out step A5
– Check that G202 is grounded		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Restore wiring between G202 and ground G53b (BLK)
A5	CHECK GROUND	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Carry out step A6
– Check that pin 3 of G272 is grounded		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Restore wiring between pin 3 of G272 and ground G53b (BLK)
A6	CHECK CONTINUITY	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Carry out step A7
– Check continuity between pin 12 of G273 and pin A of the connector T1		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Restore wiring between pin 12 of G273 and pin A of the connector T1 (LTB-WHT)
A7	CHECK GROUND SIGNAL	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Replace "ABS malfunction" warning lamp located on the instrument panel C10
– Engage the ignition key and for a few seconds check for 0V at pin C2 of the instrument panel C10		<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>	Carry out step A8

(continues)

GENERAL MALFUNCTIONING OF SYSTEM	TEST A
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A8	CHECK GROUND SIGNAL	 →	Restore wiring between pin 1 of G273 and pin C2 of C10 , across pin 2 of G124 (LTB-WHT). Also check the wiring between pin 4 of G272 and pin 2 of G124 (LTB-WHT).
	– Engage the ignition key and for a few seconds check for 0V at pin 1 of G273	 →	Replace the electronic control unit located in N51

FAULTY SAFETY RELAY	TEST B
----------------------------	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK RELAY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step B2
- Check for correct functioning of the safety relay (in group N51)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Replace relay
B2	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step B3
- Check for 12 V at pin 87 of the safety relay		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Check the connection between pin 2 of G272 and pin 87 of the safety relay. If interrupted, replace group N51
B3	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step B4
- Engage the ignition key and check for 12 V at pin 86 of the safety relay		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Check the connection between pin 1 of G272 and pin 86 of safety relay. If interrupted, replace group N51

(continues)

FAULTY SAFETY RELAY	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B4	CHECK CONTINUITY		
- Check continuity between pin 85 of the safety relay and control unit			Replace the control unit located in N51
			
			If connection is interrupted, replace group N51

FAULTY PUMP MOTOR	TEST C
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK RELAY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step C2
– Check for correct functioning of the motor relay (in group N51)		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace relay, located in N51
C2	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step C3
– Check for 12 V at pin 87 of the motor relay		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Check the connection between pin 2 of G272 and pin 87 of the motor relay. If interrupted, replace group N51
C3	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step C4
– Engage the ignition key and check for 12 V at pin 86 of the motor relay		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Check the connection between pin 30 of the safety relay and pin 86 of the motor relay. If interrupted, replace group N51



(continues)

FAULTY PUMP MOTOR	TEST C
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C4	<p style="text-align: center;">CHECK CONTINUITY</p> <p>– Check continuity between pin 85 of the motor relay and control unit</p>	<p style="text-align: center;">OK →</p> <p style="text-align: center;">OK →</p>	<p>Carry out step C5</p> <p>If connection is interrupted, replace group N51</p>
C5	<p style="text-align: center;">CHECK VOLTAGE</p> <p>– With ignition key engaged check for 12V between the two pins of the pump motor</p>	<p style="text-align: center;">OK →</p> <p style="text-align: center;">OK →</p>	<p>Replace pump motor located in N51</p> <p>Carry out step C6</p>
C6	<p style="text-align: center;">CHECK GROUND</p> <p>– Check for 0 V at pin (-) of the pump motor</p>	<p style="text-align: center;">OK →</p> <p style="text-align: center;">OK →</p>	<p>Carry out step C7</p> <p>Check the connection between pin (-) of the pump motor and G202. If interrupted, replace group N51</p>

(continues)







FAULTY PUMP MOTOR	TEST C
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C7	CHECK CONTINUITY - Check continuity between pin 30 of the pump relay and pin (+) of the pump motor	 →	Check and if necessary replace the control unit located in N51
		 →	Check the connection between pin 30 of the motor relay and the pump motor. If interrupted, replace group N51

FAULTY BRAKE SWITCH	TEST D
----------------------------	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
D1	CHECK STOP LIGHTS - Check for correct functioning of the stop lights	<div style="display: flex; align-items: center; margin-bottom: 10px;"> OK ➔ </div> <div style="display: flex; align-items: center;"> OK ➔ </div>	Carry out step D2 Replace stop lights switch H3 , or follow procedure described in the "Stop-lights" section
D2	CHECK VOLTAGE - With pedal depressed, check for 12 V at pin 9 of G273	<div style="display: flex; align-items: center; margin-bottom: 10px;"> OK ➔ </div> <div style="display: flex; align-items: center;"> OK ➔ </div>	Check and if necessary replace the control unit located in N51 Restore wiring between pin 9 of G273 and pin 1 of H3 , across pin 3 of G124 (RED-BLK)







FRONT LEFT SENSOR NOT CONNECTED	TEST E
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	CHECK FOR OPEN CIRCUIT	 ➔	Carry out step E2
- Engage the ignition key and check that the circuit is open between pins 7 and 13 of G273		 ➔	Carry out step E3
E2	CHECK CONTINUITY	 ➔	Check and if necessary replace the sensor L29 .
- Disconnect the sensor L29 and check continuity between the sensor and pin 7 of G273 , and between sensor and pin 13 of G273		 ➔	Restore wiring between: <ul style="list-style-type: none"> • sensor L29 and pin 7 of G273 (BRN) • sensor L29 and pin 13 of G273 (GRN)
E3	CHECK FOR OPEN CIRCUIT	 ➔	Check and if necessary replace the sensor L29 .
- Disconnect the sensor L29 and check that the circuit is open between pins 7 and 13 of G273 (wiring side)		 ➔	Restore wiring eliminating short circuit between wires BRN and GRN connecting L29 with G273







FRONT RIGHT SENSOR NOT CONNECTED	TEST F
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F1	CHECK FOR OPEN CIRCUIT	(OK) ➔	Carry out step F2
- Engage the ignition key and check that the circuit is open between pins 5 and 11 of G273		(OK) ➔	Carry out step F3
F2	CHECK CONTINUITY	(OK) ➔	Check and if necessary replace the sensor L28 .
- Disconnect the sensor L28 and check continuity between the sensor and pin 5 of G273 , and between sensor and pin 11 of G273		(OK) ➔	Restore wiring between: <ul style="list-style-type: none"> • sensor L28 and pin 5 of G273 (BRN) • sensor L28 and pin 11 of G273 (WHT)
F3	CHECK FOR OPEN CIRCUIT	(OK) ➔	Check and if necessary replace the sensor L28 .
- Disconnect the sensor L28 and check that the circuit is open between pins 5 and 11 of G273 (wiring side)		(OK) ➔	Restore wiring eliminating short circuit between wires BRN and WHT connecting L28 with G273







REAR LEFT SENSOR NOT CONNECTED	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G1	CHECK FOR OPEN CIRCUIT	 →  →	Carry out step G2 Carry out step G3
- Engage the ignition key and check that the circuit is open between pins 4 and 2 of G273			
G2	CHECK CONTINUITY	 →  →	Check and if necessary replace the sensor L31 . Restore wiring between: <ul style="list-style-type: none"> • sensor L31 and pin 4 of G273 (YEL) • sensor L31 and pin 2 of G273 (BRN)
- Disconnect the sensor L31 and check continuity between the sensor and pin 4 of G273 , and between sensor and pin 2 of G273			
G3	CHECK FOR OPEN CIRCUIT	 →  →	Check and if necessary replace the sensor L31 . Restore wiring eliminating short circuit between wires BRN and YEL connecting L31 with G273
- Disconnect the sensor L31 and check that the circuit is open between pins 4 and 2 of G273 (wiring side)			

REAR RIGHT SENSOR NOT CONNECTED	TEST H
--	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
H1	CHECK FOR OPEN CIRCUIT	 ➔	Carry out step H2
– Engage the ignition key and check that the circuit is open between pins 6 and 14 of G273			
		 ➔	Carry out step H3
H2	CHECK CONTINUITY	 ➔	Check and if necessary replace the sensor L30 .
– Disconnect the sensor L30 and check continuity between the sensor and pin 6 of G273 , and between sensor and pin 14 of G273			
		 ➔	Restore wiring between: <ul style="list-style-type: none"> • sensor L30 and pin 6 of G273 (RED) • sensor L30 and pin 14 of G273 (BRN)
H3	CHECK FOR OPEN CIRCUIT	 ➔	Check and if necessary replace the sensor L30 .
– Disconnect the sensor L28 and check that the circuit is open between pins 6 and 14 of G273 (wiring side)			
		 ➔	Restore wiring eliminating short circuit between wires BRN and RED connecting L30 with G273

INSUFFICIENT VOLTAGE	TEST I
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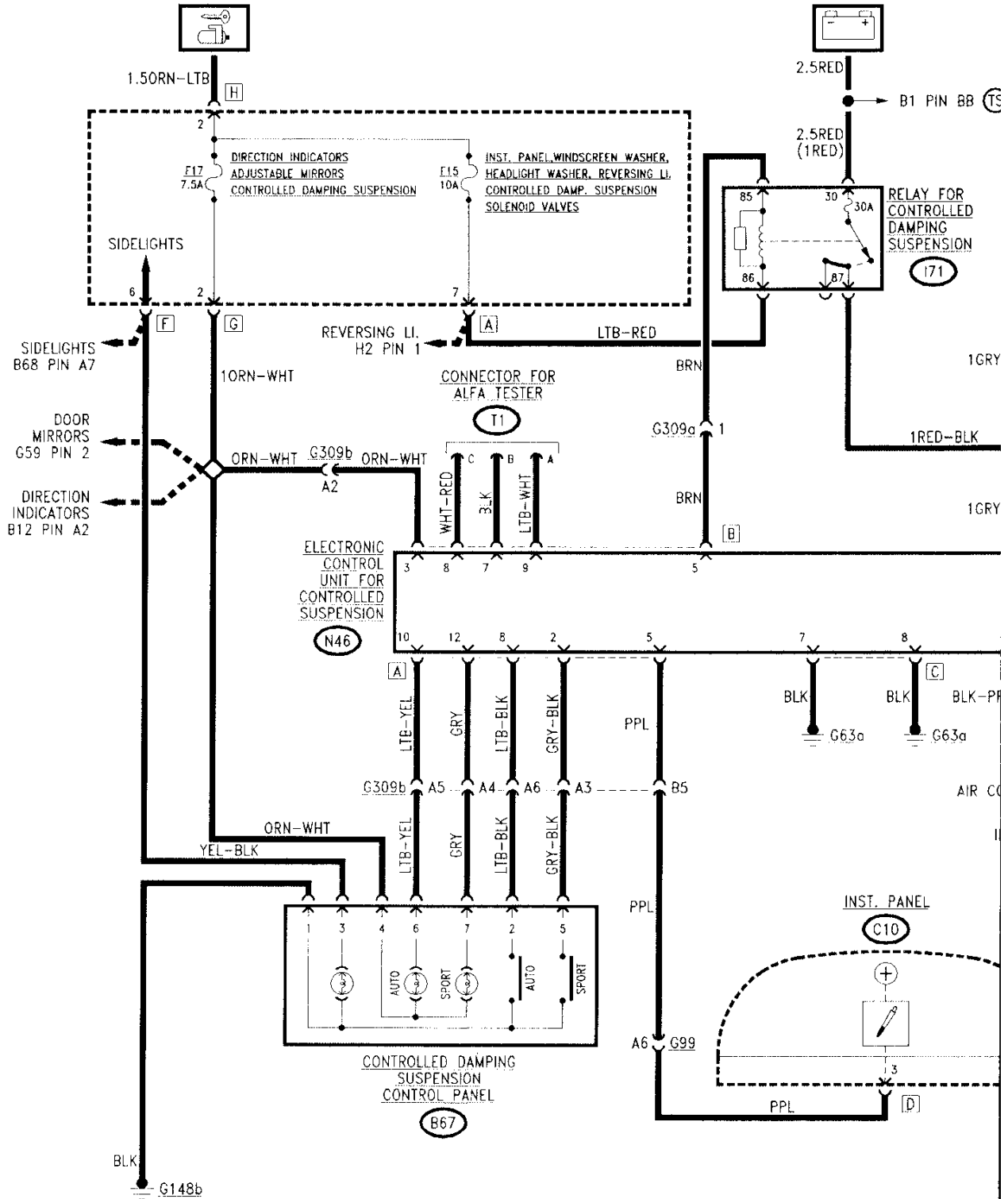
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
I1	CHECK VOLTAGE	<div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center;">  </div>	<p>Carry out step I2</p> <p>Restore the correct voltage by recharging or replacing the battery A1 NOTE: if battery voltage falls below 12 V, even if only slightly, not only this but other electronic systems also could be negatively affected</p>
- Check that battery voltage is 12V			
I2	CHECK VOLTAGE	<div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center;">  </div>	<p>Carry out step I3</p> <p>Restore wiring between pin 2 of G272 and battery A1 (RED)</p>
- Check for a voltage of 12 V at pin 2 of G272			
I3	CHECK VOLTAGE	<div style="text-align: center; margin-bottom: 10px;">  </div> <div style="text-align: center;">  </div>	<p>Check the connector. Check and if necessary replace the control unit located in N51</p> <p>Restore wiring between pin 1 of G272 and the ignition switch B1 (PNK-BLK and GRY-BLK)</p>
- With ignition key engaged, check for a voltage of 12 V at pin 1 of G272			

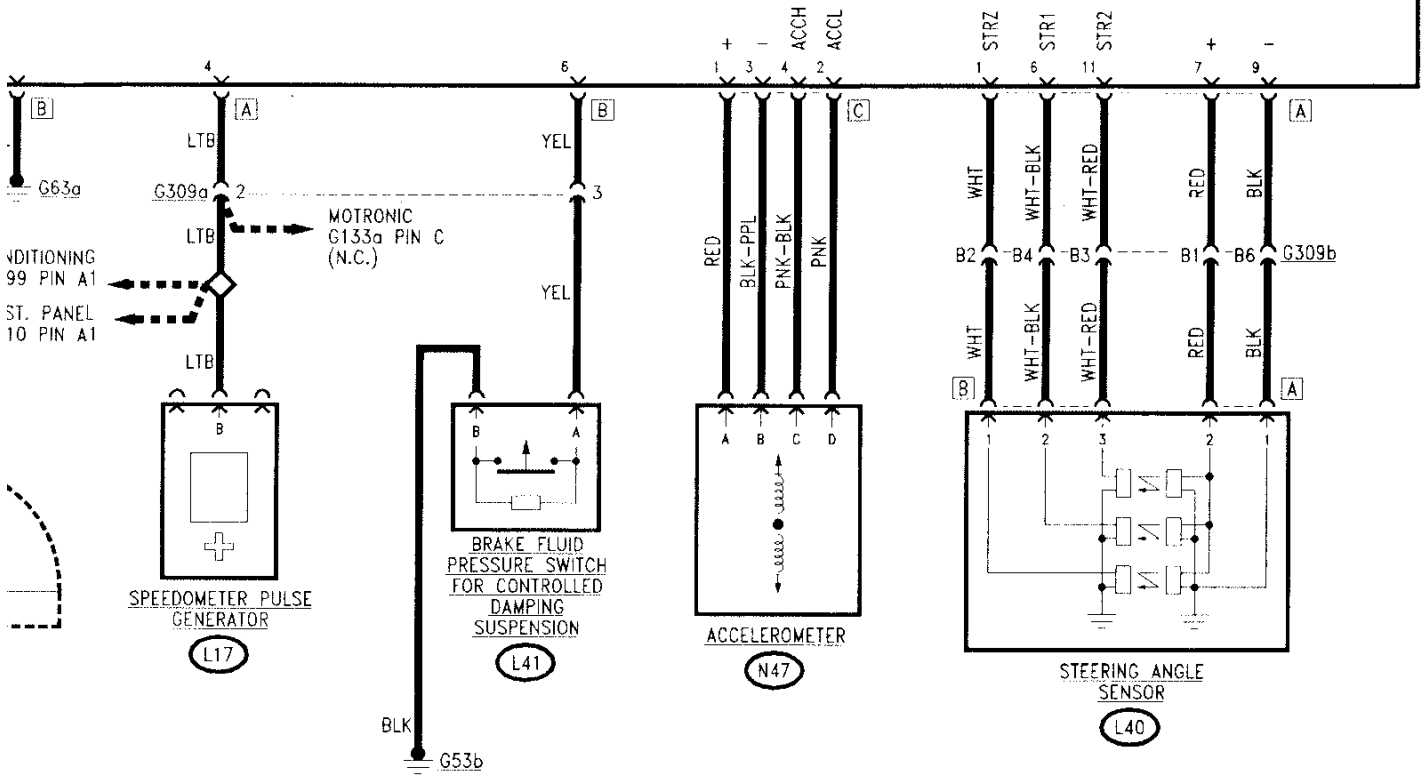
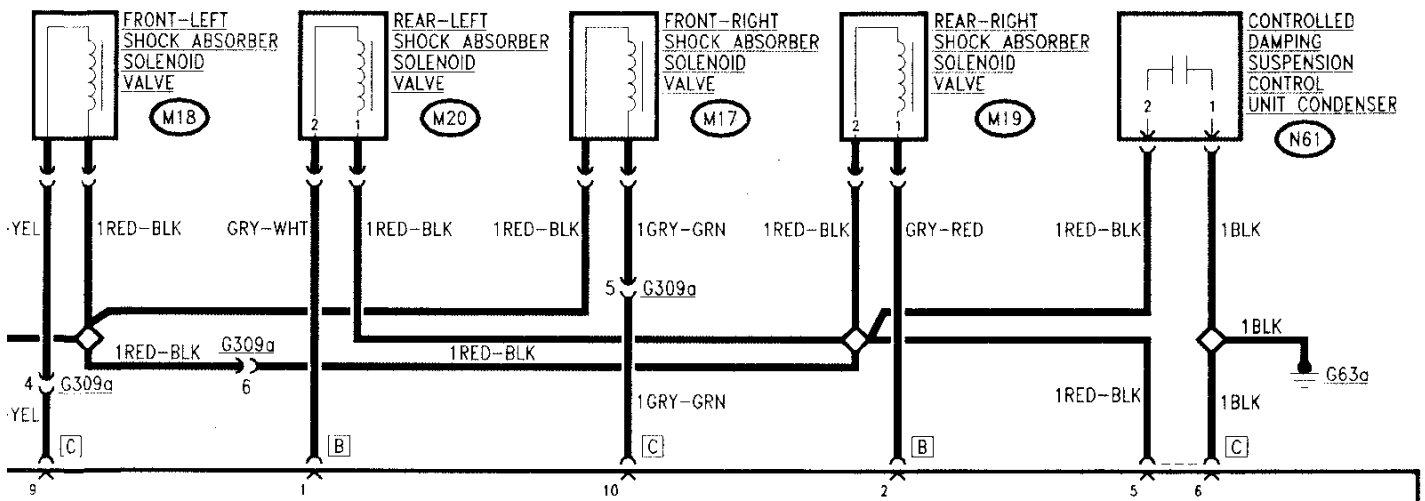
CONTROLLED DAMPING SUSPENSION

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WIRING DIAGRAM





GENERAL DESCRIPTION

The electronic system controlling the suspension varies the setting of the four shock absorbers, in real time, on the basis of the variations in driving and road conditions detected by the relevant sensors. This means that road holding and comfort are greatly increased.

Depending on the choice of the driver, the system operates with two different intervention procedures:

- "AUTO" which entrusts the control of the shock absorbers to the electronic system under all driving conditions;
- "SPORT" which locks the setting to "rigid" permitting high performance sports driving.

The choice between the two possibilities is made by acting on one of two buttons located on the relative control panel **B67** equipped with leds which signal the selected option.

PRINCIPLES OF OPERATION:

The electronic control unit **N46** varies the setting of the suspension by acting on solenoid valves **M17-M18-M19-M20** which adjust the flow of oil within the shock absorbers.

The rigidity varies in relation to the speed of the vehicle, detected by the speedometer sensor **L17**.

At extremely low speed (below approximately 5 km/h) the setting remains rigid, thus avoiding excessive springiness during manoeuvring or when driving on rough roads. For speeds between approximately 10 and 30 km/h the soft setting of the steering is employed ensuring ease of driving and greater comfort, while a rigid setting controls accelerating and braking.

At higher speeds the system increases the rigidity when one of the sensors signals particular road or driving conditions, for example:

- sudden changes in direction or tight bends, through the steering angle sensor **L40**, which measures angles and speed of rotation of the steering wheel;

- bumps or roughness through the accelerometer **N47** which detects relevant vertical accelerations;
- sudden braking detected by the brake fluid pressure switch **L41**, which intervenes when the pressure of the brake fluid is higher than 20 bars;
- increasing speed, detected by the speedometer sensor **L17**, proportionally increases the rigidity of the system (above 150 km/h, for example. it is rigid under all conditions).

SELF-DIAGNOSIS:

The system automatically and continuously controls its own operation (self-diagnosis): any anomalies which are picked up, are signalled by the control unit via the relative warning lamp located on the instrument panel and, at the same time, the system is set to the "rigid" position whatever the option selected. The warning light will stay on, as long as the key is in the ignition, until the fault has been rectified.

It will therefore be necessary to carry out the troubleshooting as indicated below. An electronic diagnosis is also possible by connecting connector **T1** to the ALFA ROMEO Tester.

During starting the warning light comes on for 2 - 3 seconds, then, if no malfunctions have been detected, it goes out. This makes it possible to easily check the correct operation of the system.

FUNCTIONAL DESCRIPTION

The system is controlled by the control unit **N46**, located under the rear seat.

The supply to the control unit is key-operated via fuse **F17** (7.5 A) in fusebox **G1**.

The same line also supplies the control panel **B67**, which is in addition connected to the sidelights circuit so that the control panel is lit.

This is connected via four signals to the control unit: a ground signal (from pin 2 for the "AUTO" logic, from pin 5 for the "SPORT" logic) is sent to the control unit when the switch of the chosen option is pressed, which informs the control unit. A "feed-back" signal (at pin 6 or 7) lights up the relative warning lamp.

A specific line connects the control unit to the instrument panel **C10** (pin 3 of connector D) to which the processed malfunction signal is sent by the self-diagnosis function.

The control unit is also connected with three signals at the connector for the system diagnosis **T1**.

The control unit receives signals from the sensors to which it is directly connected;

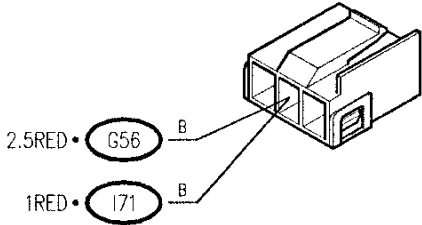
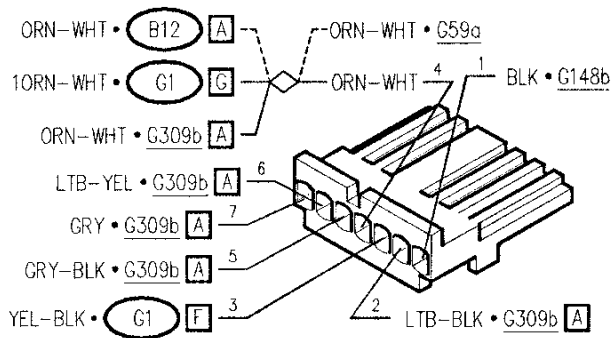
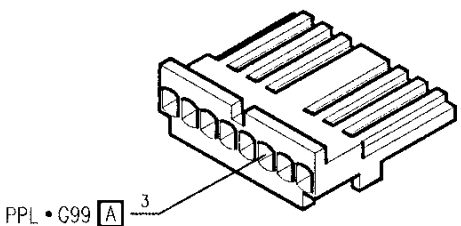
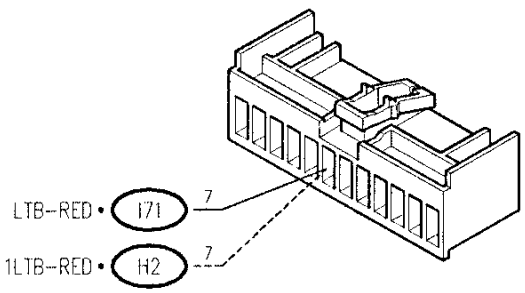
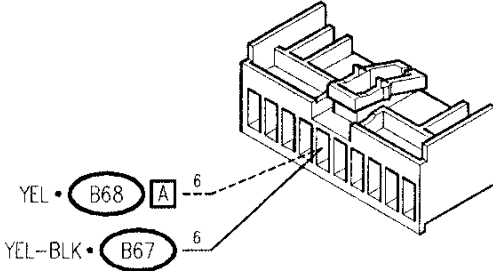
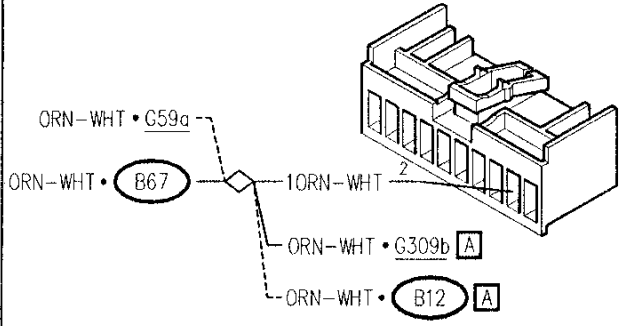
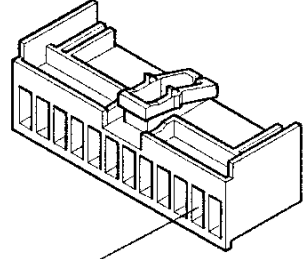
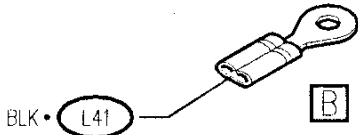
- three signals from the steering angle sensor **L40**: three leds and three photoconductive diodes measure the steering angles and transform them into impulses; the first signal (STR-Z), from pin 1B, indicates rectilinear direction and the others (STR1 and STR2), from pins 2B and 3B, send an impulse approximately every 18° of steering angle spread so that the control unit is signalled each 9°. Power supply and ground reach pins 2A and 1A respectively of the sensor.

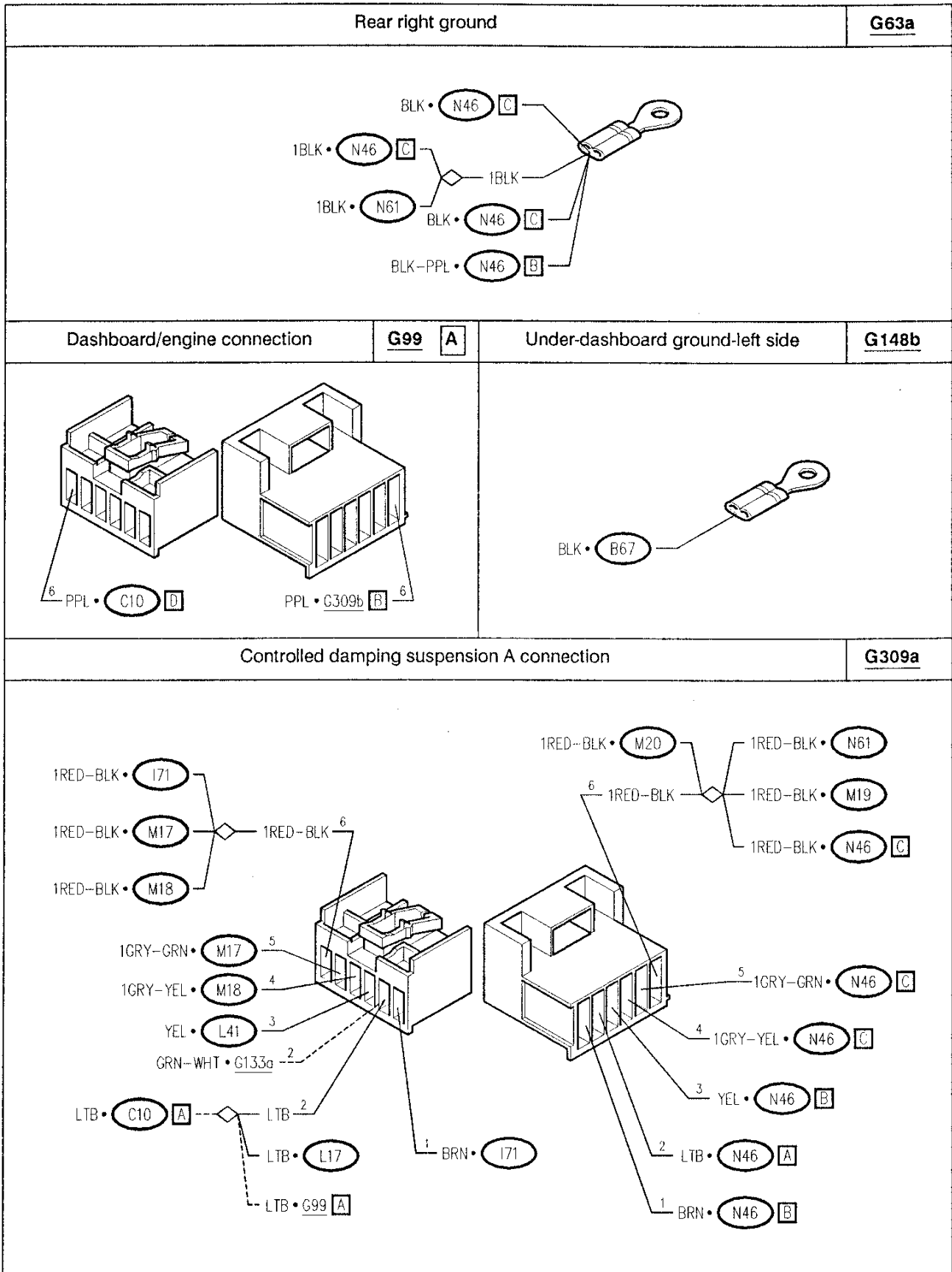
- two signals from the accelerometer **N47**: the vertical acceleration of the vehicle cause impulses to be sent to the control unit. These impulses correspond to two acceleration values: the first (ACCL) signals low acceleration (0.08g), pin D; the second (ACCH) high acceleration (0.16g), pin C. Pins B and A receive ground and supply respectively.
- a speed signal from the speedometer **L17**
- a braking signal from the brake fluid pressure switch **L41**

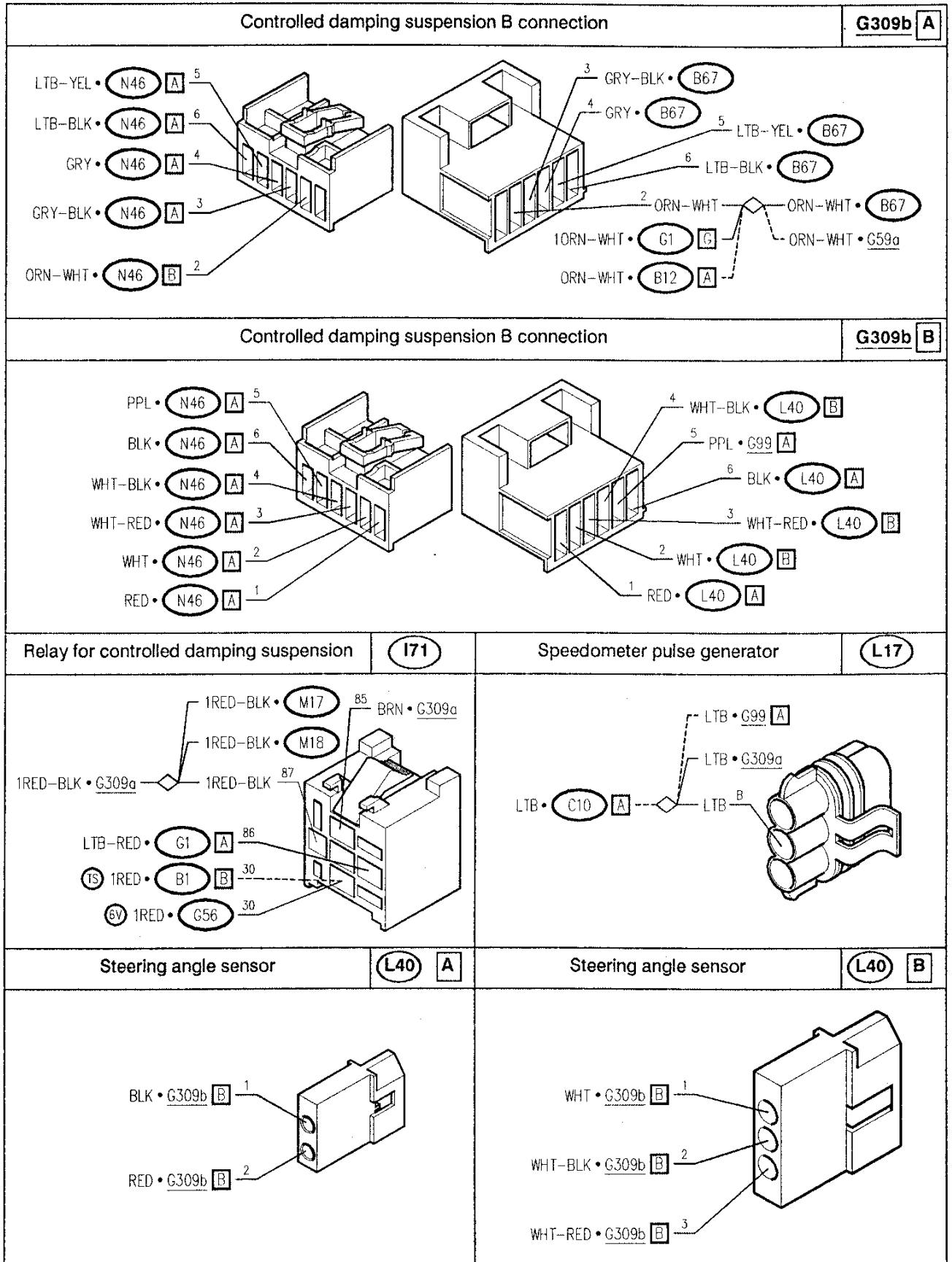
Processing of these signals by the stored logic of the control unit prepares the signals which are then sent to the solenoid valve controlling the shock absorbers (**M17** front right; **M18** front left; **M19** rear right and **M20** rear left).

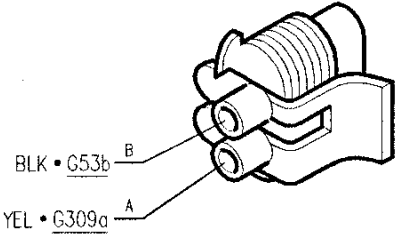
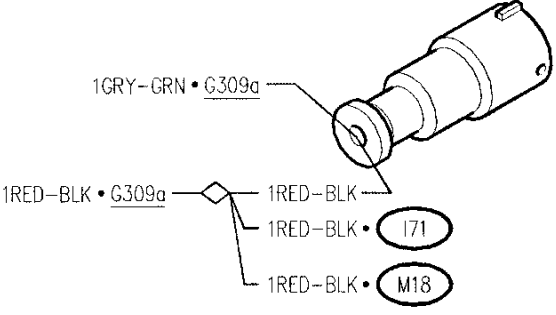
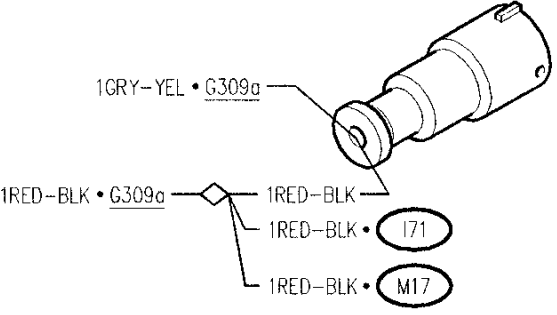
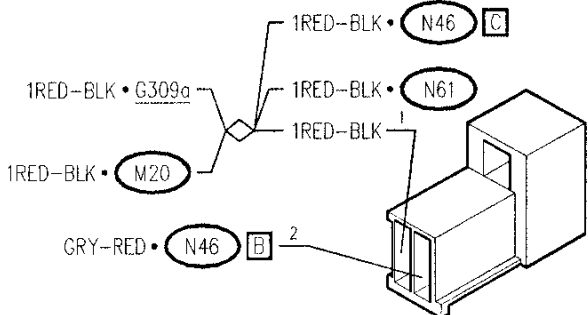
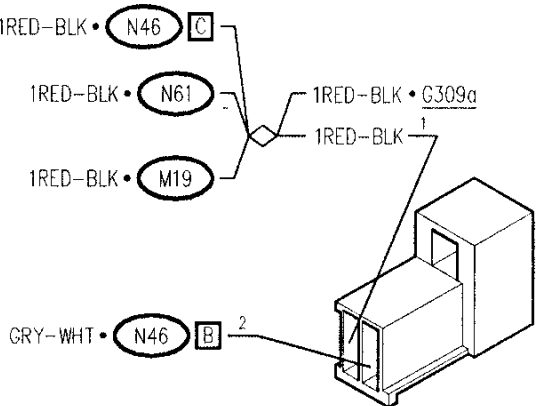
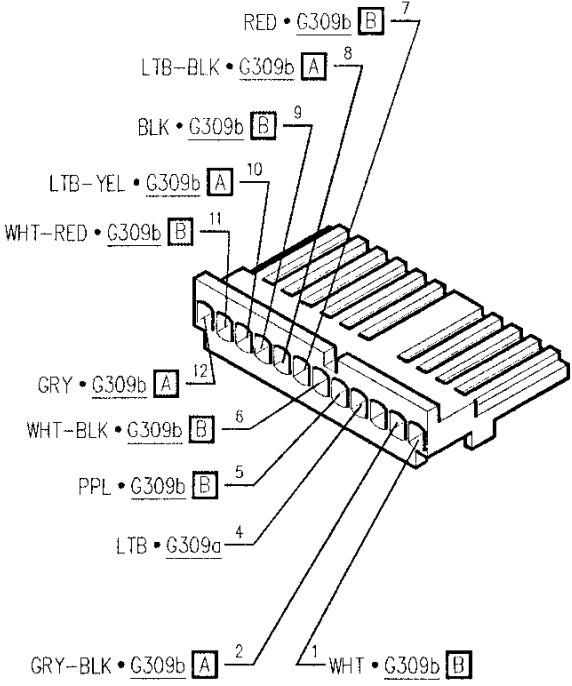
In addition to the control signal coming from the control unit, each solenoid valve receives current from a relative relay with incorporated 30A fuse **I71**, of which the coil, under key operated supply via fuse **F15** (10 A) in fusebox **G1**, is grounded by the control unit itself in this way powering the solenoid valve with voltage from the battery. A 0.22 μ F) condenser **N61** has been installed to avoid radio interference on the wiring.

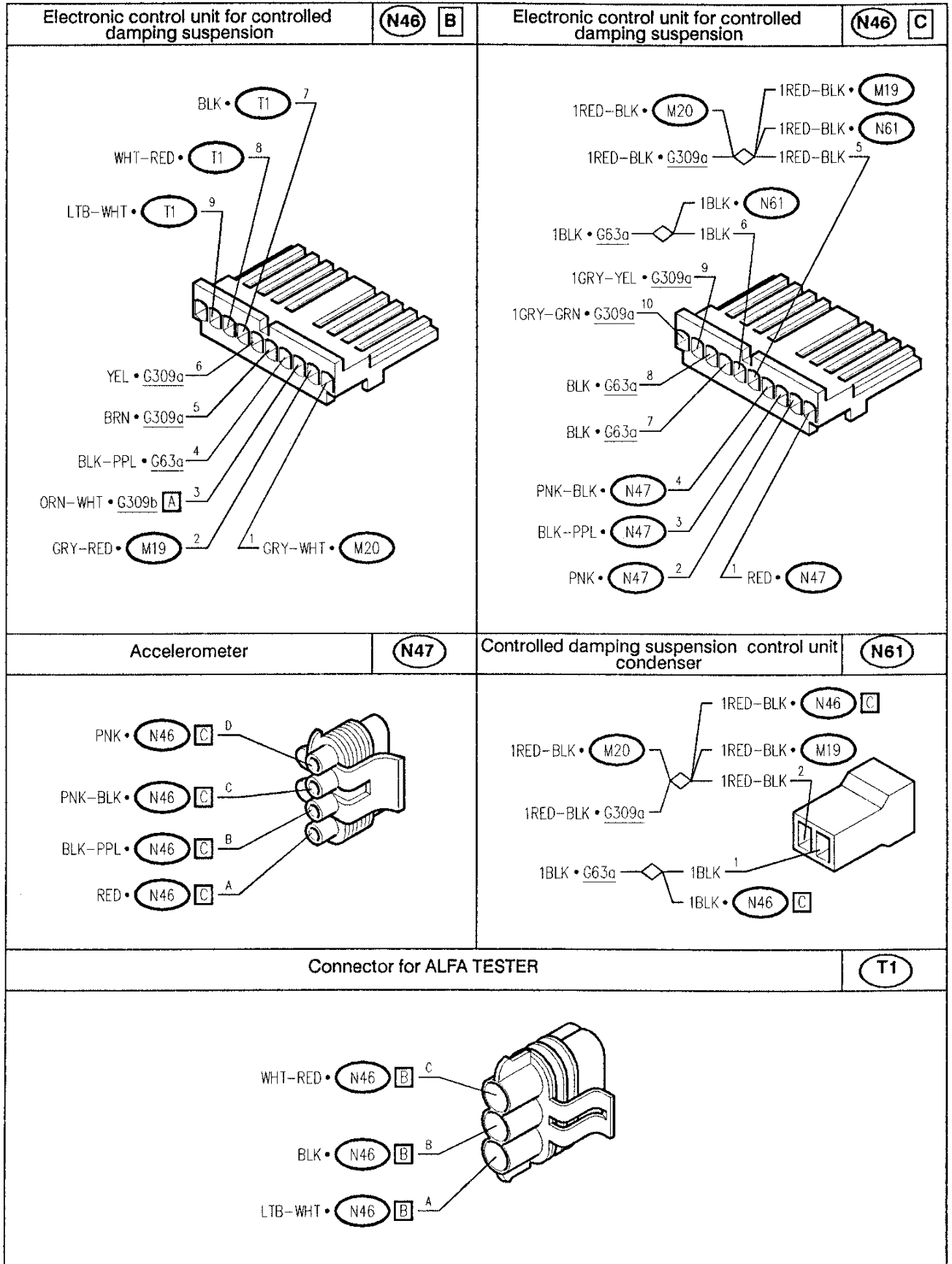
COMPONENTS AND CONNECTORS

<p>Ignition switch</p>	<p>(B1) B</p>	<p>Controlled damping suspension control panel</p>	<p>(B67)</p>
 <p>2.5RED • G56 B 1RED • I71 B</p>		 <p>ORN-WHT • B12 A 1ORN-WHT • G1 G ORN-WHT • G309b A LTB-YEL • G309b A GRY • G309b A GRY-BLK • G309b A YEL-BLK • G1 F ORN-WHT • G59a ORN-WHT 4 BLK • G148b 1 LTB-BLK • G309b A 2 6 7 5 3</p>	
<p>Instrument panel</p>	<p>(C10) D</p>	<p>Fusebox</p>	<p>(G1) A</p>
 <p>PPL • C99 A 3</p>		 <p>LTB-RED • I71 7 1LTB-RED • H2 7</p>	
<p>Fusebox</p>	<p>(G1) F</p>	<p>Fusebox</p>	<p>(G1) G</p>
 <p>YEL • B68 A 6 YEL-BLK • B67 6</p>		 <p>ORN-WHT • G59a ORN-WHT • B67 1ORN-WHT 2 ORN-WHT • G309b A ORN-WHT • B12 A 6</p>	
<p>Fusebox</p>	<p>(G1) H</p>	<p>Engine compartment ground-left side</p>	<p>G53b</p>
 <p>1.5ORN-LTB • B1 A 2</p>		 <p>BLK • L41 B</p>	

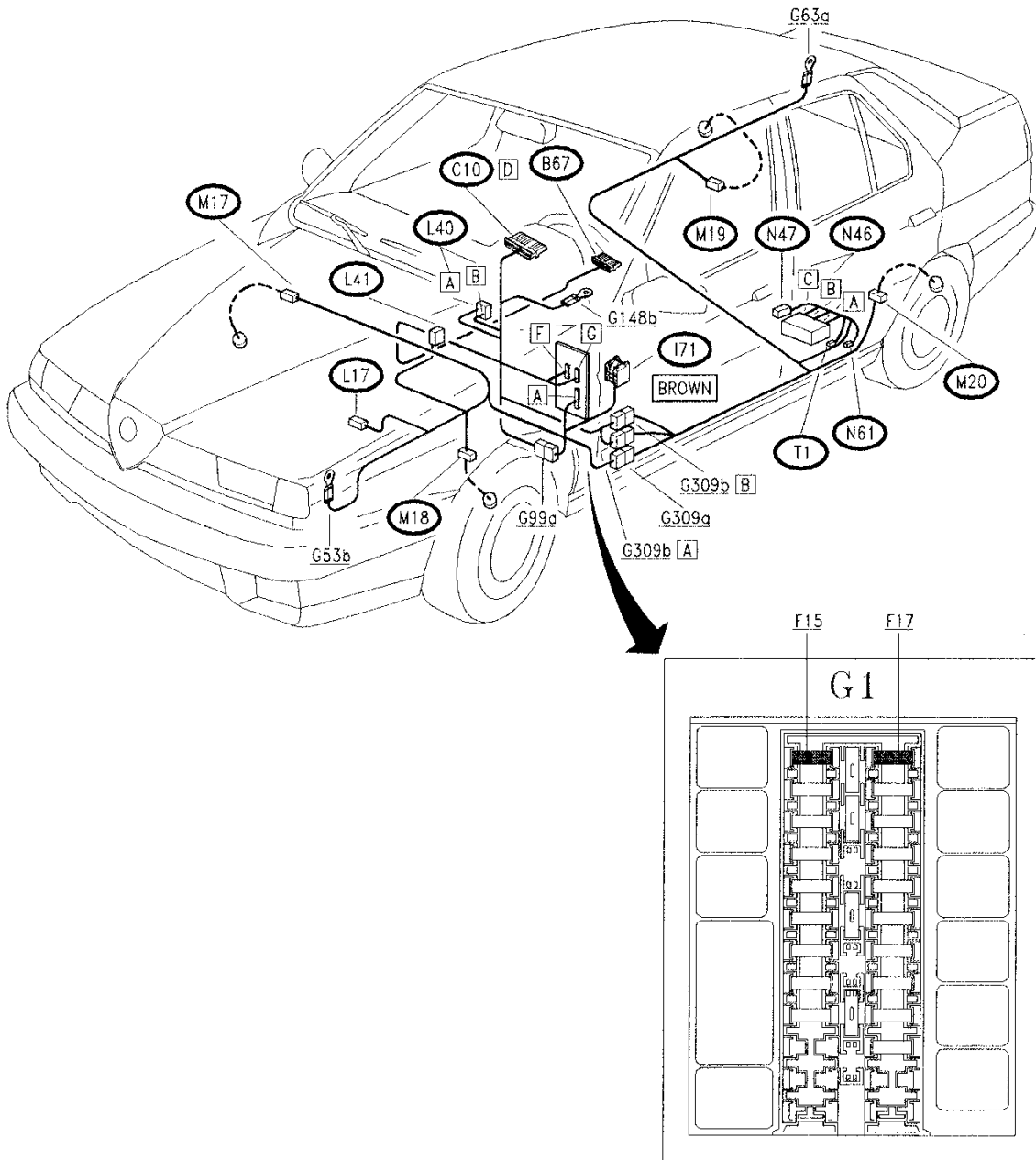




<p>Brake fluid pressure switch for controlled damping suspension</p>	<p>(L41)</p>	<p>Front-right shock absorber solenoid valve</p>	<p>(M17)</p>
			
<p>Front-left shock absorber solenoid valve</p>	<p>(M18)</p>	<p>Rear-right shock absorber solenoid valve</p>	<p>(M19)</p>
			
<p>Rear-left shock absorber solenoid valve</p>	<p>(M20)</p>	<p>Electronic control unit for controlled damping suspension</p>	<p>(N46) (A)</p>
			



LOCATION OF COMPONENTS



TROUBLESHOOTING EMPLOYING SELF-DIAGNOSIS

The self diagnosis function with which this system is equipped signal any anomalies or malfunctions affecting one of the system components of the system through the illumination of a warning lamp in the instrument panel.

N.B.: during starting, the warning light will come on for 2 - 3 seconds, then, if no anomaly has been found, it will go out confirming that the entire system is functioning correctly.

On the other hand, if an anomaly has been detected, the warning lamp stays on until the fault has been rectified.

The component affected by the anomaly is not however indicated and it is therefore necessary to carry out all the relevant tests (from **TEST A** to **TEST F**)

If the fault persists, or is not adequately indicated, look for a fault in the control unit **N46 (TEST H)** or in the control panel **B67 (TEST G)**.

If the warning light does not come on for 2-3 seconds during starting, carry out **TEST I**.









NOTE: in addition to this troubleshooting it is possible to rapidly identify any faults by connecting up to the control unit **N46** using the **ALFA ROMEO Tester** (see relevant publications)

TROUBLESHOOTING TABLE

Malfunction	Component										Test	
	F15	F17	I71	N47	M17+M20	L41	L17	L40	B67	N46		C10
Suspension relay	•		•							•		A
Accelerometer				•						•		B
Solenoid valves					•							C
Braking sensor						•						D
Speedometer sensor							•					E
Steering sensor								•		•		F
Control panel		•							•	•		G
Electronic control unit		•								•		H
Warning lamp on instrument panel										•	•	I

TROUBLESHOOTING

CHECK SUSPENSION RELAY	TEST A
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK FUSE	 ➔	Carry out step A2
	– Check for damage of fuse incorporated in the suspension relay I71	 ➔	Replace fuse (30A)
A2	CHECK FUSE	 ➔	Carry out step A3
	– Check for damage of fuse F15 in fusebox G1	 ➔	Replace fuse (10A)
A3	CHECK RELAY	 ➔	Carry out step A4
	– Check for correct functioning of relay I71	 ➔	Replace relay I71
A4	CHECK VOLTAGE	 ➔	Carry out step A5
	– Check for 12 V at pin 30 of relay I71	 ➔	Restore wiring between pin 30 of I71 and branch terminal board G56 (RED)

(continues)

CHECK SUSPENSION RELAY	TEST A
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A5	CHECK VOLTAGE	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> OK ➔ </div> <div style="display: flex; align-items: center;"> OK ➔ </div> </div>	Carry out step A6 Restore wiring between pin 86 of I71 and pin A7 of G1 (LTB-RED)
– Engage the ignition key and check for 12 V at pin 86 of I71			
A6	CHECK CONTINUITY	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> OK ➔ </div> <div style="display: flex; align-items: center;"> OK ➔ </div> </div>	Carry out step A7 Restore wiring between pin 85 of I71 and pin B5 of N46 , across pin 1 of connector G309a (BRN)
– Check continuity between pin 85 of I71 and pin B5 of control unit N46			
A7	CHECK SIGNAL	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; align-items: center; margin-bottom: 10px;"> OK ➔ </div> <div style="display: flex; align-items: center;"> OK ➔ </div> </div>	Carry out test B Check and if necessary replace control unit N46
– With ignition key engaged, check for ground signal (0V) at pin B5 of control unit N46			

CHECK ACCELEROMETER	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK "ACCH" SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step B2
- Separate the accelerometer N47 from the control unit N46 ; place it on the bottom of the vehicle and, leaving it connected, rotate the ignition key: <ul style="list-style-type: none"> • check that when subjecting it to a light knock (e.g. letting a ball-bearing fall on the accelerometer), a variation in voltage is detected (from 1 to 5 V) at pin C4 of control unit N46 		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step B3
B2	CHECK "ACCL" SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out test C
- Proceeding as for the previous step, check for a variation in voltage at pin C2 of control unit N46		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step B3
B3	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step B5
- Engage the ignition key and check for a difference in voltage of at least 5 V between pins A and B of accelerometer N47		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step B4
B4	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between: <ul style="list-style-type: none"> • pin C1 of N46 and pin A of N47 (RED) • pin C3 of N46 and pin B of N47 (BLK-PPL)
- Engage the ignition key and check for a difference in voltage of at least 5 V between pins C1 and C3 of control unit N46		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Check and if necessary replace electronic control unit N46

(continues)

CHECK ACCELEROMETER	TEST B
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B5	CHECK CONTINUITY		
- Check continuity between: <ul style="list-style-type: none"> • pin C4 of N46 and pin C of N47 • pin C2 of N46 and pin D of N47 		(OK) →	Replace accelerometer N47
		(OK) →	Restore wiring between: <ul style="list-style-type: none"> • pin C4 of N46 and pin C of N47 (PNK-BLK) • pin C2 of N46 and pin D of N47 (PNK)

CHECK SHOCK ABSORBER SOLENOID VALVES	TEST C
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C1	CHECK SOLENOID VALVES – Check for an impedance of approximately $3 \pm 3.3 \Omega$ at the terminals of the solenoid valves M17, M18, M19, M20	<div style="text-align: center;">  </div> <div style="text-align: center;">  </div>	Carry out step C2 Replace the faulty solenoid valve(s)
C2	CHECK CONTINUITY – Check continuity between pin 87 of relay I71 and pin C5 of control unit N46	<div style="text-align: center;">  </div> <div style="text-align: center;">  </div>	Carry out step C3 Restore wiring between pin 87 of I71 and pin C5 of control unit N46 , across pin 6 of connector G309a and the solders (RED-BLK)

(continues)

CHECK SHOCK ABSORBER SOLENOID VALVES	TEST C
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C3	<p style="margin: 0;">CHECK CONTINUITY</p> <p style="margin: 5px 0 0 20px;">– Check continuity between pin 87 of relay I71 and solenoid valves (terminal with RED-BLK wire)</p>	<p style="margin: 0; text-align: center;">(OK) ➔</p> <p style="margin: 10px 0 0 0; text-align: center;">(OK) ➔</p>	<p style="margin: 0;">Carry out step C4</p> <p style="margin: 10px 0 0 0;">Restore wiring between:</p> <ul style="list-style-type: none"> • pin 87 of I71 and solenoid valve M18, across the solder (RED-BLK) • pin 87 of I71 and solenoid valve M17, across the solder (RED-BLK) • pin 87 of I71 and solenoid valve M20, across pin 6 of connector G309a and the solders (RED-BLK) • pin 87 of I71 and solenoid valve M19, across pin 6 of connector G309a and the solders (RED-BLK)
C4	<p style="margin: 0;">CHECK CONTINUITY</p> <p style="margin: 5px 0 0 20px;">– Check continuity between pin C9 of control unit N46 and solenoid valve M18</p>	<p style="margin: 0; text-align: center;">(OK) ➔</p> <p style="margin: 10px 0 0 0; text-align: center;">(OK) ➔</p>	<p style="margin: 0;">Carry out step C5</p> <p style="margin: 10px 0 0 0;">Restore wiring between pin C9 of control unit N46 and solenoid valve M18, across pin 4 of connector G309a (GRY- YEL)</p>

(continues)





CHECK SHOCK ABSORBER SOLENOID VALVES		TEST C	
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
C5	CHECK CONTINUITY	 →	Carry out step C6
– Check continuity between pin C10 of control unit N46 and solenoid valve M17		 →	Restore wiring between pin C10 of control unit N46 and solenoid valve M17 , across pin 5 of connector G309a (GRY-GRN)
C6	CHECK CONTINUITY	 →	Carry out step C7
– Check continuity between pin B1 of control unit N46 and solenoid valve M20		 →	Restore wiring between pin B1 of control unit N46 and solenoid valve M20 (GRY-WHT)
C7	CHECK CONTINUITY	 →	Carry out test D
– Check continuity between pin B2 of control unit N46 and solenoid valve M19		 →	Restore wiring between pin B2 of control unit N46 and solenoid valve M19 (GRY-RED)

CHECK BRAKING SENSOR

TEST D

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
D1	CHECK SENSOR	OK →	Carry out step D2
	– Check for a resistance of approximately 2200 Ω between pin A and B of sensor L41	OK →	Replace sensor L41
D2	CHECK SENSOR	OK →	Carry out step D3
	– Fully depress the brake pedal and check for a short circuit between pins A and B of sensor L41	OK →	Replace sensor L41
D3	CHECK GROUND	OK →	Carry out step D4
	– Check that pin B of L41 is grounded	OK →	Restore wiring between pin B of L41 and ground G53b (BLK)
D4	CHECK CONTINUITY	OK →	Carry out test E
	– Check continuity between pin A of L41 and pin B6 of N46	OK →	Restore wiring between pin A of L41 and pin B6 of N46 . across pin 3 of connector G309a (YEL)

CHECK SPEEDOMETER SIGNAL	TEST E
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
E1	<p style="margin: 0;">CHECK SPEEDOMETER</p> <p style="margin: 5px 0 0 0;">– Check for correct functioning of the speedometer on the instrument panel C10</p>	<p style="margin: 0; text-align: center;">  </p> <p style="margin: 10px 0 0 0;">→</p> <p style="margin: 0; text-align: center;">  </p> <p style="margin: 10px 0 0 0;">→</p>	<p style="margin: 0;">Carry out step E2</p> <p style="margin: 10px 0 0 0;">Refer to the fault diagnosis relative to the speedometer in the section "Instrument Panel"</p>
E2	<p style="margin: 0;">CHECK SIGNAL</p> <p style="margin: 5px 0 0 0;">– Check for a speedometer signal by proceeding as follows:</p> <ul style="list-style-type: none"> • connect pins C and A of sensor L17 respectively to 12V and ground • insert the shaft of an electric motor in the sensor • check that, varying the speed of the electric motor, the signal reaching pin A4 of control unit N46 varies in frequency between 1 and 7.5 V 	<p style="margin: 0; text-align: center;">  </p> <p style="margin: 10px 0 0 0;">→</p> <p style="margin: 0; text-align: center;">  </p> <p style="margin: 10px 0 0 0;">→</p>	<p style="margin: 0;">Carry out test F</p> <p style="margin: 10px 0 0 0;">Restore wiring between pin B of L17 and pin A4 of N46, across pin 2 of connector G309a and the solder (LTB)</p>







CHECK STEERING SENSOR	TEST F
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NOTE: Check that the steering is aligned correctly before carrying out this test (see "REPAIR MANUAL - MECHANICAL UNITS", Group 21)

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F1	CHECK "STRZ" SIGNAL	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F2
	- With the wheels perfectly aligned, engage the ignition key and check for 0V at pin A1 of control unit N46 . Check for a variation in voltage when rotating the steering wheel.	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F4
F2	CHECK "STR1" SIGNAL	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F3
	- With the wheels perfectly aligned, engage the ignition key and check for voltage of 3-5 V at pin A6 of control unit N46 . Rotating the steering wheel check that the voltage decreases to 0 V every 18° and viceversa.	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F8
F3	CHECK "STR2" SIGNAL	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out test H
	- With the wheels perfectly aligned, engage the ignition key and check for a voltage of 0 V at pin A11 of control unit N46 . Rotating the steering wheel check that the voltage increases to 3-5 V every 18° and vice-versa.	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F9
F4	CHECK VOLTAGE	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F7
	- Engage the ignition key and check for a difference in voltage of at least 5 V between pins A1 and A2 of sensor L40	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center;">OK</div> <div style="font-size: 20px;">➔</div> </div>	Carry out step F5





(continues)

CHECK STEERING SENSOR	TEST F
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F5	CHECK VOLTAGE		
– Engage the ignition key and check for a difference in voltage of at least 5 V between pins A7 and A9 of control unit N46		 ➔	Restore wiring between: <ul style="list-style-type: none"> • pin A7 of N46 and pin A2 of N47, across pin B1 of connector G309b (RED) • pin A9 of N46 and pin A1 of N47, across pin B6 of connector G309b (BLK)
		 ➔	Carry out step F6
F6	CHECK SENSOR		
– Engage the ignition key and, disconnecting sensor L40 , check for a difference in voltage lower than 5 V between pins A1 and A2 of sensor L40		 ➔	Check and if necessary replace electronic control unit N46
		 ➔	Replace sensor L40
F7	CHECK CONTINUITY		
– Check continuity between pin A1 of N46 and pin B1 of L40		 ➔	Replace sensor L40
		 ➔	Restore wiring between pin A1 of N46 and pin B1 of L40 , across pin B2 of connector G309b (WHT)

(continues)

CHECK STEERING SENSOR	TEST F
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
F8	CHECK CONTINUITY	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Replace sensor L40
- Check continuity between pin A6 of N46 and pin B2 of L40		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Restore wiring between pin A6 of N46 and pin B2 of L40 , across pin B4 of connector G309b (WHT-BLK)
F9	CHECK CONTINUITY	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Replace sensor L40
- Check continuity between pin A11 of N46 and pin B3 of L40		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="font-size: 2em;">➔</div> </div>	Restore wiring between pin A11 of N46 and pin B3 of L40 , across pin B3 of connector G309b (WHT-RED)

CHECK CONTROL PANEL	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G1	CHECK FUSE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step G2
– Check for damage of fuse F17 in fusebox G1		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Replace fuse (7.5A)
G2	CHECK VOLTAGE	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step G3
– Check for 12 V at pin 4 of panel B67		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Restore wiring between pin 4 of B67 and pin G2 of G1 , across the solder (ORN-WHT)
G3	CHECK GROUND	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step G4
– Check for 0 V at pin 1 of panel B67		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Restore wiring between pin 1 of B67 and ground G148b (BLK)
G4	CHECK LIGHTING	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step G6
– Check that, with sidelights on, the panel lights up		<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px;">➔</div> </div>	Carry out step G5









(continues)

CHECK CONTROL PANEL	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G5	CHECK VOLTAGE	OK →	Replace panel B67
	– With sidelights on, check for 12 V at pin 3 of B67	OK →	Restore wiring between pin 3 of B67 and pin F6 of G1 (YEL-BLK)
G6	CHECK SIGNAL	OK →	Carry out step G7
	– Pressing the "AUTO" button, check for a ground signal (0V) at pin A8 of control unit N46	OK →	Carry out step G8
G7	CHECK SIGNAL	OK →	Carry out step G10
	– Pressing the "SPORT" button, check for a ground signal (0V) at pin A2 of control unit N46	OK →	Carry out step G9
G8	CHECK SIGNAL	OK →	Restore wiring between pin A8 of N46 and pin 2 of B67 , across pin A6 of connector G309b (LTB-BLK)
	– After pressing the "AUTO" button, check for a ground signal (0V) at pin 2 of panel B67	OK →	Replace the panel B67

(continues)

CHECK CONTROL PANEL	TEST G
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
G9	CHECK SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div>	Restore wiring between pin A2 of N46 and pin 5 of B67 , across pin A3 of connector G309b (GRY-BLK)
– After pressing the "SPORT" button, check for a ground signal (0V) at pin 5 of panel B67			Replace panel B67
G10	CHECK LED WARNING LAMPS	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div>	Carry out test H
– Check that, pressing the "AUTO" or "SPORT" buttons, the relative led lights up			Carry out step G11
G11	CHECK SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div>	Replace panel B67
– Pressing the "AUTO" button, check for 0 V at pin 6 of panel B67 Pressing the "SPORT" button, check for 0 V at pin 7 of panel B67			Carry out step G12
G12	CHECK SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">  </div> <div style="margin-right: 10px;">➔</div> </div>	Restore wiring between pin 6 of B67 and pin A10 of N46 , across pin A5 of connector G309b (LTB-YEL) Restore wiring between pin 7 of B67 and pin A17 of N46 , across pin A4 of connector G309b (GRY)
– Pressing the "AUTO" button, check for 0 V at pin A10 of control unit N46 Pressing the "SPORT" button, check for 0 V at pin A12 of control unit N46			Check and if necessary replace control unit N46
– Pressing the "AUTO" button, check for 0 V at pin A10 of control unit N46 Pressing the "SPORT" button, check for 0 V at pin A12 of control unit N46			Check and if necessary replace control unit N46

CHECKING POWER SUPPLY TO CONTROL UNIT	TEST H
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
H1	CHECK FUSE	OK ➔	Carry out step H2
– Check for damage of fuse F17 in fusebox G1		OK ➔	Replace fuse (7.5A)
H2	CHECK VOLTAGE	OK ➔	Carry out step H3
– Check for 12 V at pin B3 of control unit N46		OK ➔	Restore wiring between pin B3 of N46 and pin G2 of G1 , across pin A2 of connector G309b and the solder (ORN-WHT)
H3	CHECK GROUND	OK ➔	If all the preceding tests have been carried out, check and if necessary replace the control unit N46
– Check that pins B4 , C6 , C7 , and C8 of control unit N46 are grounded (0 V)		OK ➔	Restore wiring between: <ul style="list-style-type: none"> • pin B4 of N46 and ground G63a (BLK-PPL) • pin C6 of N46 and ground G63a, across the solder (BLK) • pin C7 of N46 and ground G63a (BLK) • pin C8 of N46 and ground G63a (BLK)

SUSPENSION SYSTEM MALFUNCTION WARNING LIGHT NOT WORKING	TEST I
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TEST PROCEDURE		RESULT	CORRECTIVE ACTION
I1	CHECK WARNING LAMP	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out all the tests from TEST A to TEST F . If no malfunction is detected, replace the control unit N46
	– Engage the ignition key and check that "suspension system malfunction" warning lamp comes on on the instrument panel C10 : the warning lamps stays on	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step I2
I2	CHECK GROUND SIGNAL	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Replace the relative warning lamp on the instrument panel C10
	– Engage the ignition key and for a few seconds, check for a signal of 0 V at pin D3 of instrument panel C10	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Carry out step I3
I3	CHECK CONTINUITY	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Check and if necessary replace control unit N46
	– Check continuity between pin D3 of C10 and pin A5 of N46	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin-right: 10px;">OK</div> <div style="font-size: 24px; margin-right: 10px;">➔</div> </div>	Restore wiring between pin D3 of C10 and pin A5 of N46 , across pin A6 of connector G99 and pin B5 of connector G309b (PPL)

COMPONENTS KEY

COMPONENTS KEY**A STARTING - RECHARGING**

- A1 Battery
- A3 Alternator, with integral voltage regulator
- A8 Ignition coil
- A8a Ignition coil A
- A8b Ignition coil B
- A11 Starter motor
- A12 Spark plugs

B MANUAL ELECTRICAL CONTROLS

- B1 Ignition switch
- B10 Fog light control switch
- B12 Hazard warning lights control switch
- B16 Instrument panel lighting rheostat
- B21a Front right power window control switch (on right door)
- B21b Front right power window control switch (on left door)
- B23a Rear right power window control switch (on console)
- B23b Rear right power window control switch (on door)
- B24a Rear left power window control switch (on console)
- B24b Rear left power window control switch (on door)
- B25 Rear power window consensus switch
- B27 Front left seat height control switch
- B28 Front left backrest control switch
- B29 Front right backrest control switch
- B36 Door mirror double control switch
- B47 Sunroof motor control switch
- B51 Front left seat heater control switch
- B52 Front right seat longitudinal adjusting switch
- B53 Front power window switch with automatism
- B54 Front left seat longitudinal adjusting switch
- B62 Front right seat heater control switch
- B63 Front right seat height control switch
- B67 Controlled damping suspension control panel
- B68 Lever group
- B69 Headlight alignment control device
- B87 Boot opening switch with glove glovebox box light

C INSTRUMENTS

- C10 Instrument panel
- C16 Check panel display with clock

E EXTERNAL LIGHTS

- E9a Left direction indicator light bulb
- E9b Right direction indicator light bulb
- E10a Left fog light bulb
- E10b Right fog light bulb
- E17a Left numberplate light bulb
- E17b Right numberplate light bulb
- E23 Front right optical unit
- E24 Front left optical unit
- E25 Right tail light (fixed part)
- E26 Left tail light (fixed part)
- E30 Central rear right fog-light/reversing light
- E31 Central rear left fog-light/reversing light

F INTERIOR LIGHTS

- F3 Passenger compartment courtesy light
- F5 Luggage compartment courtesy light
- F8 Heater/ventilation controls lighting lamp
- F16 Ignition switch light
- F35 Central courtesy light with passenger compartment lighting controls
- F39 Central air vent illumination lamp
- F40 Right air vent illumination lamp
- F41 Air vent illumination lamp on tunnel
- F42 Left air vent illumination lamp
- F43a Left seat controls illumination light
- F43b Right seat controls illumination light

G FUSEBOX - CONNECTORS - GROUNDS

- G1 Fusebox
- G5 Multiple connector
- G8 Single connector
- G21 Connector for front right door wiring
- G23 Connector for front left door wiring
- G25 Connector for rear right door wiring
- G27 Connector for rear right door wiring
- G28a Connector between rear right door wiring and power window switch
- G30 Connector for door lock
- G31a Connector between rear left door wiring and power window switch
- G38 Connector for air conditioner wiring
- G53a Engine compartment ground - right side
- G53b Engine compartment ground - left side
- G56 Branch terminal board
- G59a Right connector for electric door mirror
- G59b Left connector for electric door mirror
- G63a Rear right ground

- G63b Rear left ground
- G66 Motronic wiring ground
- G73 Connector for rear services
- G95m Connector for sunroof
- G99 Dashboard/engine connection
- G107 Connector for fuel pump
- G124 Connector for ABS system
- G125 Free fuse for ABS system
- G133a Electronic ignition/injection wiring A connection
- G133b Electronic ignition/injection wiring B connection
- G148a Under-dashboard ground - right side
- G148b Under-dashboard ground - left side
- G155a Right seat adjustment wiring connection
- G155b Left seat adjustment wiring connection
- G193 Preset connection for electric aerial
- G195 Preset connection for rear-left loud-speaker
- G196 Preset connection for rear-right loud-speaker
- G202 ABS system ground connector
- G217 Preset connection for front-left loud-speaker
- G218 Preset connection for front-right loud-speaker
- G219 Connector for sunroof
- G240 Fuse for front seats
- G247 Fuse for rear power windows
- G254 Electric fan motor fuse
- G272 Connector for ABS hydraulic group
- G273 Connector for ABS control unit
- G280 Radio wiring intermediate connector
- G305 Connector for rear power windows and seat adjustment
- G306 Engine wiring / right engine wiring connection
- G307 Rear wiring / luggage compartment wiring connection
- G308 Engine sensors coupling
- G309a Controlled damping suspension A connection
- G309b Controlled damping suspension B connection
- G310 Fuse for front-right power window
- G311 Fuse for front-left power window
- G312 Fuse for headlight washer
- G313 Connector for air conditioner supplementary wiring
- G314a Engine / air conditioner wiring A connection
- G314b Engine / air conditioner wiring B connection
- G315a Connection for right seat-adjustment motors
- G315b Connection for left seat-adjustment motors
- G318 Ground on gearbox

H SWITCHES

- H1 Handbrake switch
- H2 Reversing light switch
- H3 Stop light switch
- H5 Front-left door open indicator switch
- H6 Front-right door open indicator switch
- H10 Front-left brake pad switch
- H17 Brake fluid minimum level switch
- H24 Luggage compartment lamp switch
- H51 Sunroof stop limit switch

I RELAYS

- I1 Engine cooling fan relay
- I2 Heated rear window relay
- I3 *Horn relay*
- I13 Rear power window relay
- I17 Fog-light relay
- I25 Rear fog light relay
- I35 Key-operated supply relay
- I49 Dipped beam headlight
- I50 Main beam headlight
- I52 Boot lid opening relay
- I58 Sunroof relay
- I64 Sidelights relay
- I65 Fog-light consensus relay
- I67 Day-light exclusion relay
- I71 Relay for controlled damping suspension
- I87 Left seat warming pad relay
- I88 Right seat warming pad relay

L SENDERS

- L2 Engine oil minimum pressure switch
- L5 Engine coolant max. temperature warning lamp thermal switch
- L6 Thermal switch for engine cooling electric fan
- L7 Engine coolant temperature sender
- L8 Oil pressure gauge sender
- L9 Fuel level gauge sender
- L10 Sender for engine coolant temperature gauge and max. temperature warning lamp contact
- L12 Engine oil level sensor
- L13 Windscreen washer liquid level sensor
- L14 Engine coolant level sensor
- L17 Speedometer pulse generator
- L28 Front-right phonic wheel sensor
- L29 Front-left phonic wheel sensor
- L30 Rear-right phonic wheel sensor

- L31 Rear-left phonic wheel sensor
- L33 Two-stage thermocontact
- L40 Steering angle sensor
- L41 Brake fluid pressure switch for controlled damping suspension
- L44 Motor oil temperature sender

M SOLENOIDS - SOLENOID VALVES

- M12 Boot lid opening actuator solenoid
- M15 Vapour recovery solenoid valve
- M17 Front-right shock absorber solenoid valve
- M18 Front-left shock absorber solenoid valve
- M19 Rear-right shock absorber solenoid valve
- M20 Rear-left shock absorber solenoid valve

N ELECTRONIC DEVICES- INTERMITTENCES - TIMERS

- N1 Electronic ignition module
- N1a Electronic ignition A module
- N1b Electronic ignition B module
- N10 Courtesy light timer
- N11 Door locking control unit
- N12 Headlight washer timer
- N13 Hazard warning lights and direction indicators intermittence
- N14 Electronic windscreen wiper intermittence
- N38 Power window control unit
- N46 Electronic control unit for controlled damping suspension
- N47 Accelerometer
- N49 Aerial control unit - Heated rear window
- N51 Hydraulic group with ABS control unit
- N58 Seat adjustment control unit
- N59 Check Panel control unit
- N60 Sunroof control unit
- N61 Controlled damping suspension control unit condenser

O ANCILLARY EQUIPMENT

- O1 Heated rear window
- O2 Horn
- O4 Radio
- O5 Loud-speaker
- O6 Cigar lighter
- O14 Front-left seat warming pad
- O17 Front-right seat warming pad
- O18 Right door mirror defroster
- O19 Left door mirror defroster
- O22 Additional engine cooling fan resistance

P ELECTRIC MOTORS

- P1 Windscreen wiper motor
- P2 Engine cooling fan motor
- P5 Front-left seat adjustment motor
- P6 Front-right backrest adjustment motor
- P7 Front-left backrest adjustment motor
- P8 Motor for electric door mirror - left side
- P9 Motor for electric door mirror - right side
- P10 Front-right door locking motor
- P11 Front-left door locking motor
- P12 Rear-right door locking motor
- P13 Rear-left door locking motor
- P14 Front-right power window motor
- P15 Front-left power window motor
- P16 Rear-right power window motor
- P17 Rear-left power window motor
- P18 Fuel motor pump
- P19 Windscreen washer pump
- P20 Headlight washer pump
- P24 Sunroof motor
- P28 Front-right seat longitudinal adjusting motor
- P29 Front-left seat longitudinal adjusting motor
- P30 Front-right seat adjustment motor
- P35a Right headlight alignment adjustment motor
- P35b Left headlight alignment adjustment motor

Q HEATER/VENTILATION - AIR CONDITIONING

- Q1 Heating/ventilation electric fan
- Q4 Heating/ventilation electric fan control knob
- Q5 Heater fan speed rheostat
- Q9 Minimum pressure switch
- Q11 Compressor electromagnetic coupling
- Q14 Supplementary conditioner fan relay
- Q20 Min. and max. pressure switch (Trinary)
- Q21a Automatic control check unit
- Q22 Electromagnetic coupling control relay
- Q24 Outside air temperature sensor
- Q25a Upper mixed air temperature sensor
- Q25b Lower mixed air temperature sensor
- Q27 Air recirculation vent control motor
- Q30a Air distribution motor
- Q30b Warm/cold air mixing motor
- Q31 Conditioning unit fan speed adjuster
- Q32 Heater/ventilation auxiliary relay
- Q33 Passenger compartment temperature sensor with motor
- Q35 Loose fuse for air-conditioning system - 40 A

- Q36 Air conditioning system ground
- Q39 Loose fuse for air-conditioning system - 30 A
- Q40 Loose fuse for air-conditioning system - 15 A
- Q41 Air conditioning relay and fuses assembly
- Q42 Air conditioning fan delaying device
- Q43 Loose fuse for conditioning system - 50 A

R SAFETY DEVICES

- R9 Switch on seat belts

S ELECTRONIC INJECTION

- S3 Electroinjectors
- S5 Air flow gauge meter
- S7 Engine coolant temperature sensor
- S11 Motronic control unit
- S12a Fuel pump Motronic relay
- S12b Motronic relay with diode
- S12c Timing variator Motronic relay
- S12d Auxiliary Motronic relay
- S15 Timing variator device
- S29 Idle adjustment actuator
- S30 Motronic control unit switch connector
- S31 Revolution and timing sensor
- S35 Heated lambda probe
- S36 Loose fuse for auxillary Motronic relay
- S38 Sensor on throttle body
- S45 Loose fuse for Lambda probe
- S46 Loose fuse for Motronic supply
- S47 Loose fuse for fuel pump

T DIAGNOSIS

- T1 Connector for ALFA TESTER



SERVICE

ASSISTENZA TECNICA

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Fiat Auto S.p.A.

Publication n°PA4655E0000000

1st Edition - 07/91

Printed in Italy by Tip. Bogliani - Torino

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