

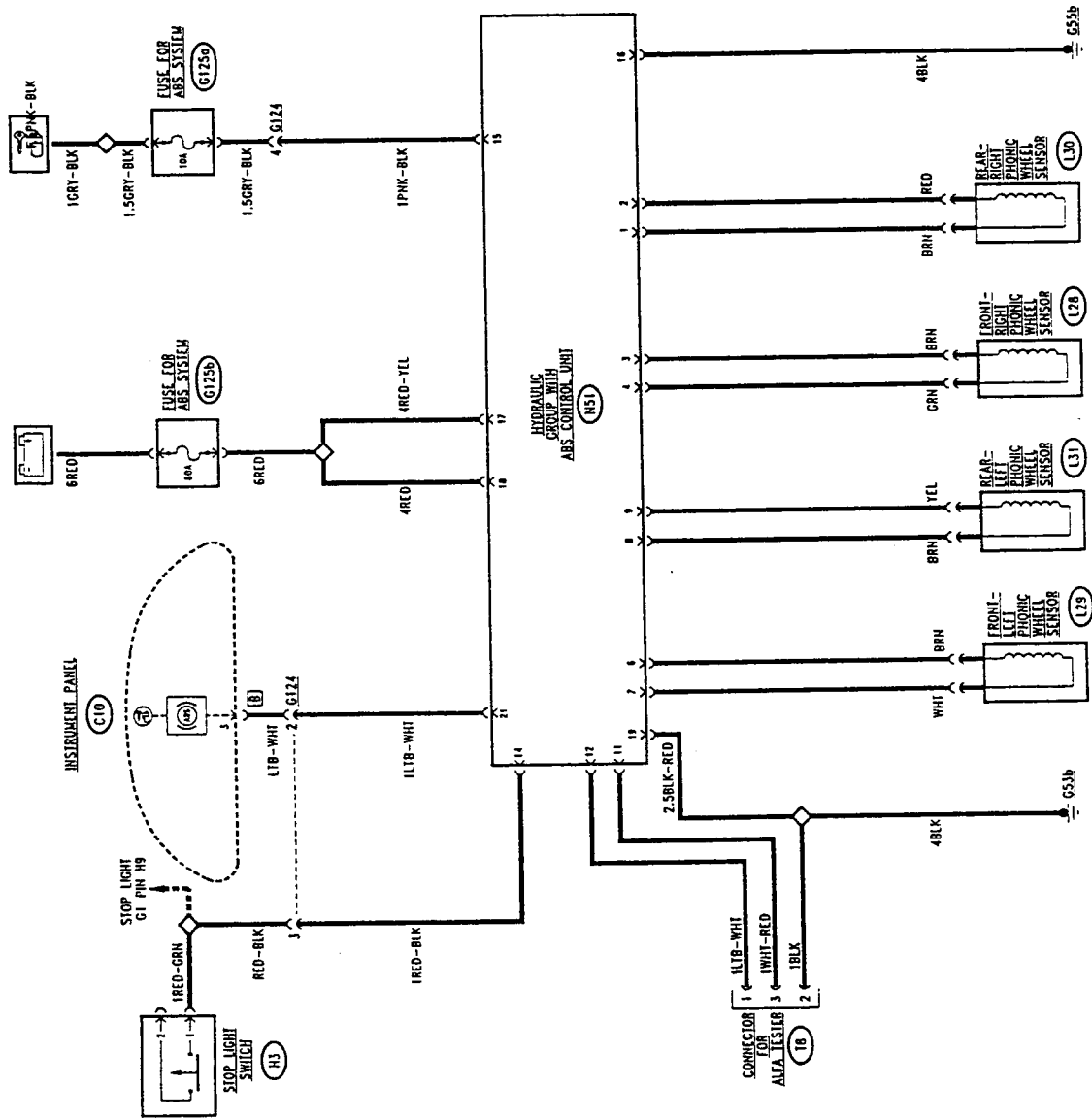
ABS SYSTEM (BOSCH ABS 5.3)

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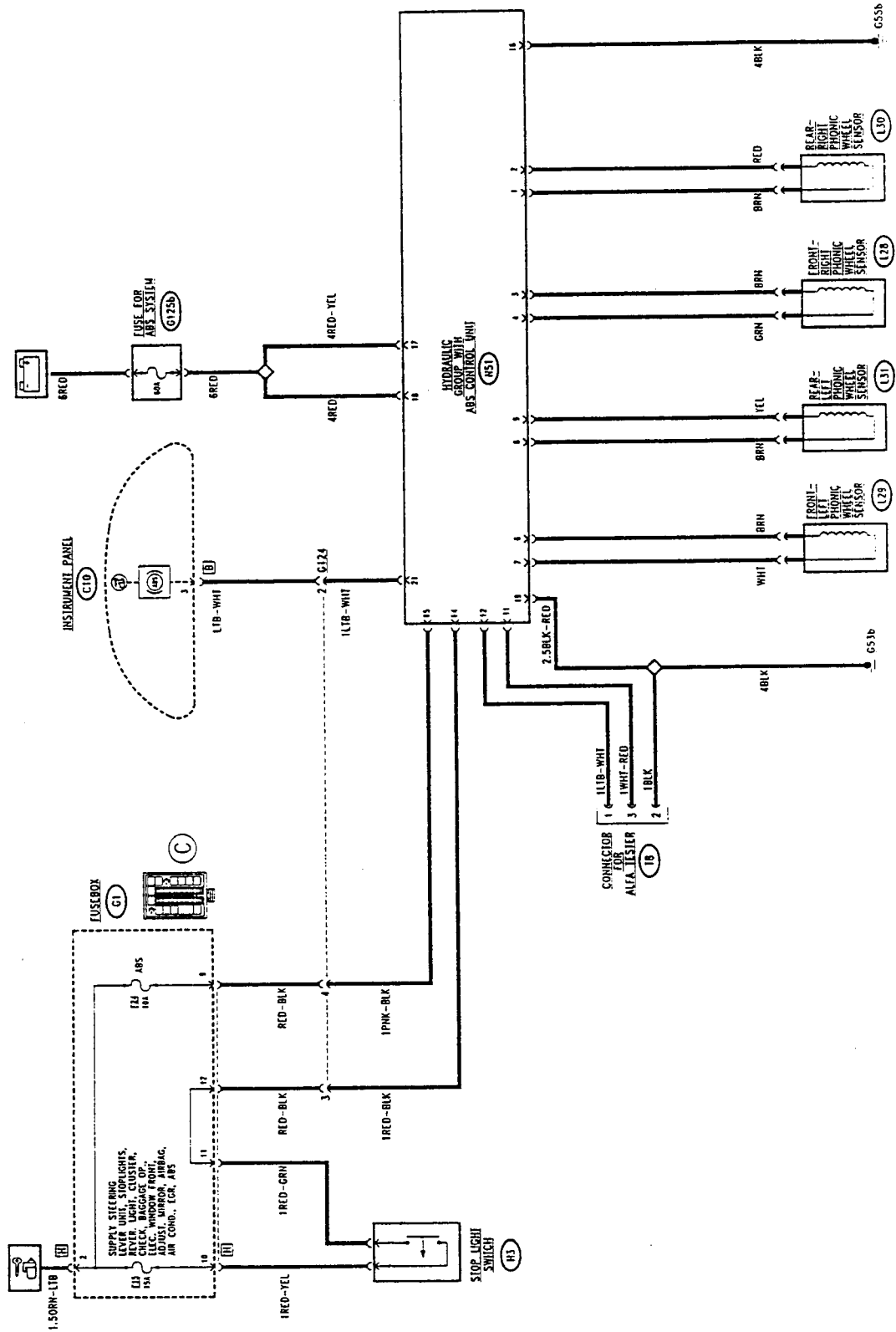
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**From chassis no. ... it replaces the previous
BOSCH 2E ABS system**

WIRING DIAGRAM



WIRING DIAGRAM



GENERAL DESCRIPTION

The electronic wheel anti-lock system (**BOSCH ABS 5.3**) adjusts 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 replace, the normal mechanical braking system, guaranteeing a high degree of safety in the event of a failure: in fact it operates on the same brake fluid as the conventional mechanical circuit.

Four sensors, located on the four wheels, inform the electronic control unit of the speed of each wheel continuously, thereby recording locking situations affecting the wheels, skidding and loss of grip.

In these situations, the control unit suitably operates the solenoid valves that modulate the pressure in the hydraulic circuit, eliminating wheel locking and bringing the car back to the limit of roadholding, which means that the braking distance is reduced to a minimum, without losing control of steering.

The **adjustment solenoid valves** are, in this version of the system, two (one for pressure charging and one for relief) for each wheel.

For further details on the hydraulic operation of the system see **GROUP 33-BRAKES**.

Components

The system comprises:

- four magnetic induction sensors which read the speed of the wheels: **L28; L29; L30; L31**.
- the integrated electronic and hydraulic control unit **N51**, which houses the following:
 - the electronic control module (CPU)
 - the eight solenoid valves
 - two brake fluid pumps with corresponding motor
 - two damping accumulators and two reservoirs
 - a safety valve
- the connector for self-diagnosis **T8**
- the brake switch **H3** (the same that turns on the stop lights) which signals the system the braking condition.

The ABS includes a self-diagnosis system which continually monitors all the system parameters and com-

ponents: in the event of a failure or fault, the system cuts itself off automatically leaving the conventional servo-assisted mechanical braking system operational: the driver is alerted of this situation by a special warning light on the instrument cluster (**C10**).

Suitably connecting to the diagnosis connector (**T8**) located next to the control unit, it is possible to use the signals of the flashing code to quickly locate the faulty component (see "Fault-finding").

The connector **T8** can also be used to connect to the ALFA ROMEO Tester system.

FUNCTIONAL DESCRIPTION

System supply:

With a line protected by wander fuse **G125a** the "key-operated" voltage supplies, (10A) pin 15 of the ABS control unit **N51**, for box "C" the supply line is protected by fuse **F24** inside box **G1**.

The battery voltage reaches pin 17 and 18 of the same **N51** from the line protected by fuse **G125b** (60A).

The electronic control unit is connected to earth via pin 19 of **N51**, while the pump is via pin 16.

Sensors and solenoid valves:

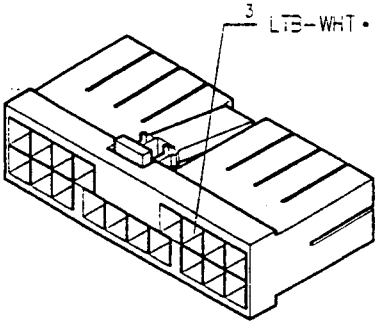
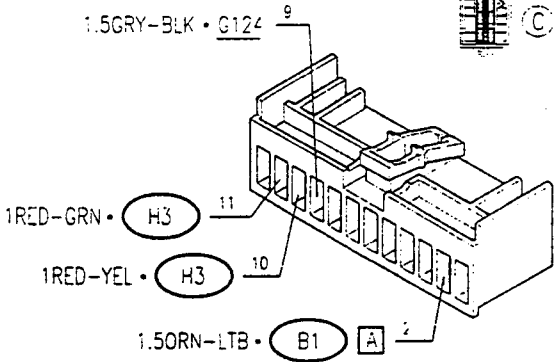
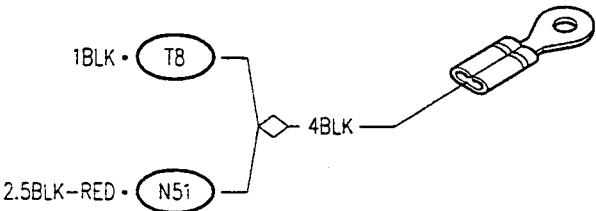
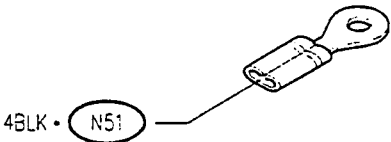
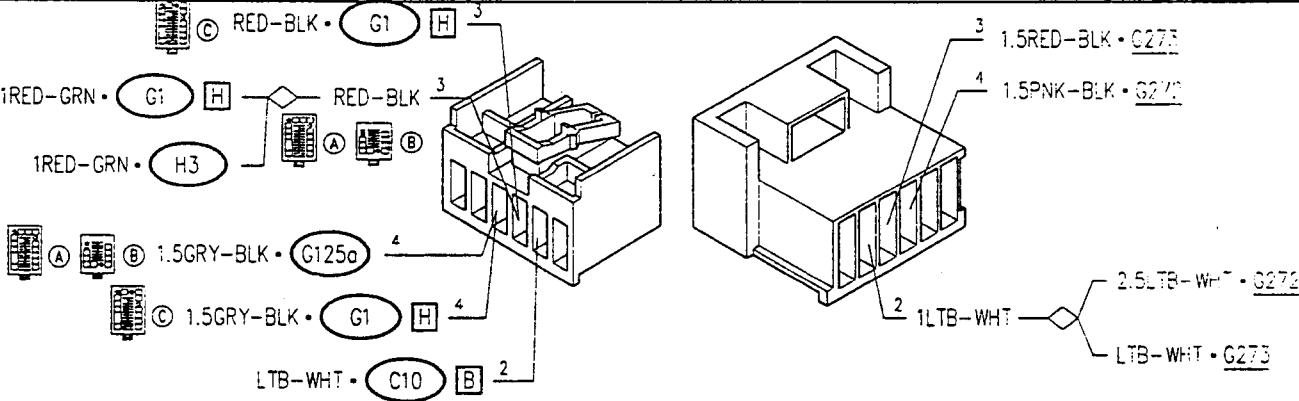
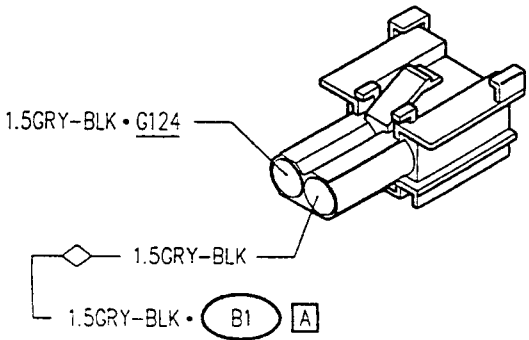
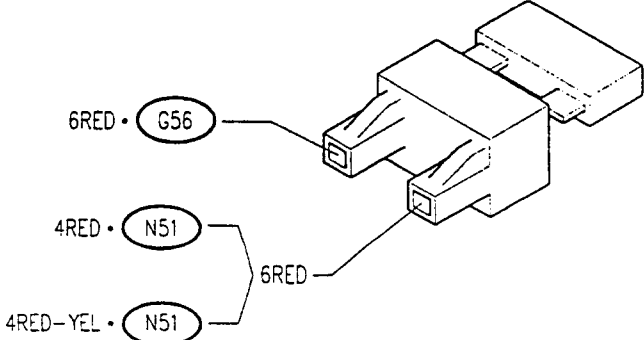
Directly inside the control unit **N51**, the module is connected with the adjustment solenoid valves, which modulate the pressure on the brakes of the four wheels; outside, it is connected with the four sensors **L28 - L29 - L30 - L31** (pin 1-2, 3-4, 6-7 and 8-9) which signal the speed of the single wheels, and with the brake switch **H3** (pin 14), which sends a consent signal: in fact the ABS system cannot come into operation if the brake pedal is not pressed.

Self-diagnosis:

When the control unit detects problems through the self-diagnosis function, it sends a signal to the instrument cluster **C10** which turns on the ABS warning light: this signal is sent to pin 21.

The diagnosis connector **T8** connected to pin 11, 12 and 19 allows connection of the control unit with the ALFA ROMEO Tester or "reading" of the flashing code (see "Fault-finding").

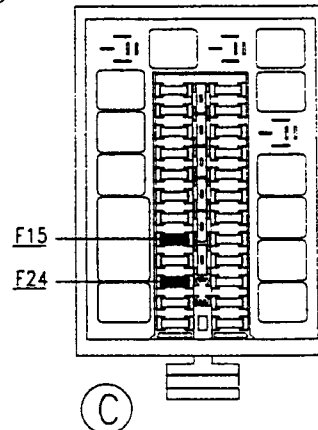
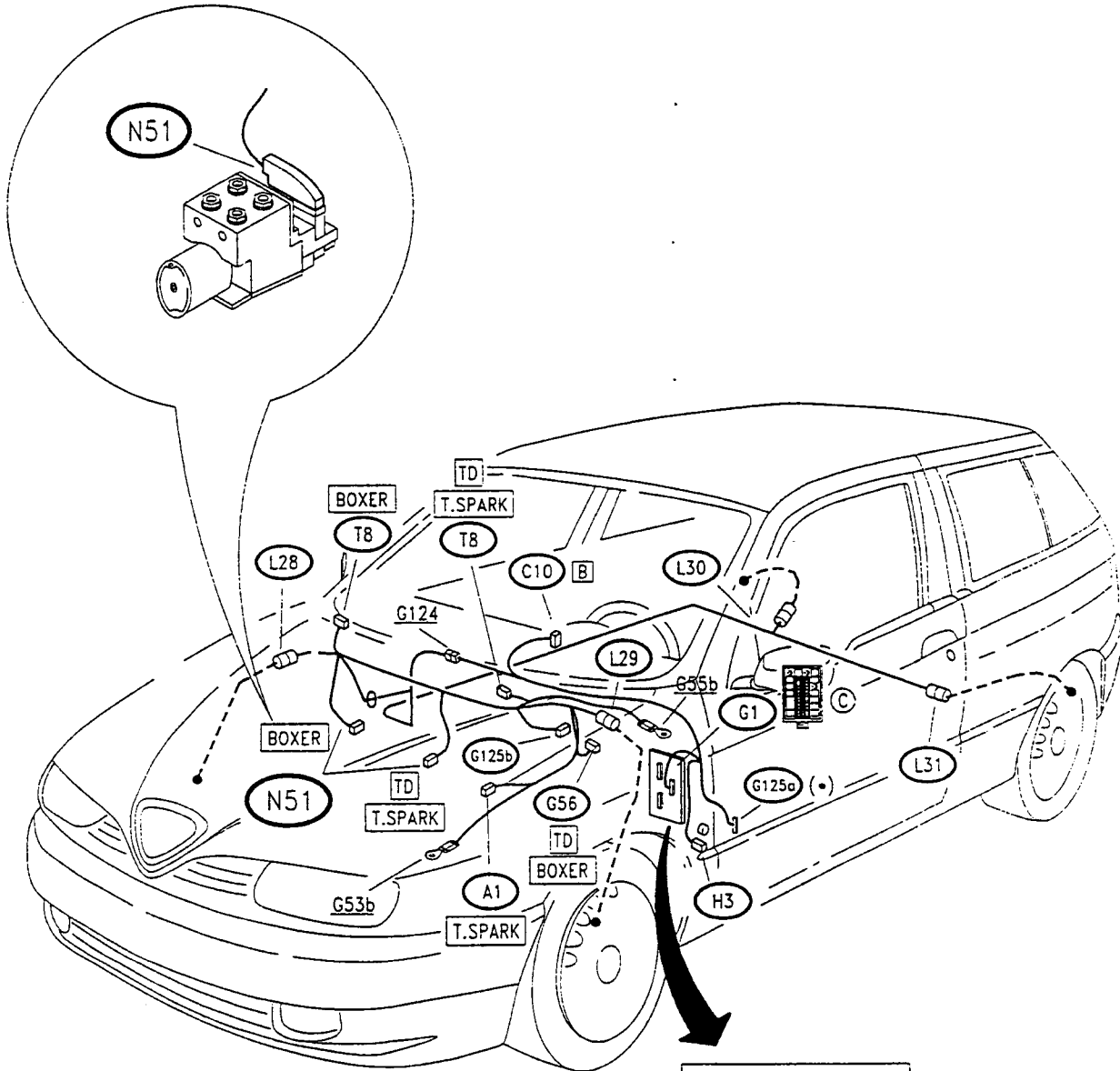
COMPONENTS AND CONNECTORS

Instrument cluster	C10 B	Fusebox	G1 H
			
LH engine compartment earth	G53b	LH wing earth	G55b
			
ABS system connector			G124
			
ABS system wander fuse	G125a	ABS system wander fuse	G125b
			

COMPONENTS AND CONNECTORS (continued)

<p>Stop lights switch</p>	<p>(H3)</p>	<p>RH front phonic wheel inductive sensor</p>	<p>(L28)</p>
<p>LH front phonic wheel inductive sensor</p>	<p>(L29)</p>	<p>RH rear phonic wheel inductive sensor</p>	<p>(L30)</p>
<p>LH rear phonic wheel inductive sensor</p>	<p>(L31)</p>	<p>Connector for ALFA TESTER (ABS)</p>	<p>(T8)</p>
<p>ABS control unit</p>			<p>(N51)</p>

LOCATION OF COMPONENTS



(•) red fuseholder up to chassis n° ___

FAULT-FINDING

AUTOMATIC CHECK UPON IGNITION: when the car is started the "ABS warning light" on the instrument cluster turns on for appr. 2 secs., then it goes off meaning that the system is working properly. If the warning light stays on, carry out diagnosis using the flashing code, as mentioned previously.

If the warning light does not turn on, carry out **test H**.

Fault-Finding using the Flashing Code

The self-diagnosis system with which this system is fitted, makes it possible to quickly locate a faulty component following the instructions of a **FLASHING CODE**, which is activated as follows:

- earth the line of pin 1 of connector T8 (LIGHT BLUE-WHITE cable)
- power the ABS control unit N51 (turning the ignition key to MARCIA)

Read the sequence of flashes on the "ABS warning light" on the instrument cluster C10:

- after appr. 3 seconds for three times code "12" appears, meaning correct operation: if this does not occur, carry out **test H**
- after another 3 seconds appr. the codes of the errors memorised appear (each repeated three times) at appr. 3 sec. intervals (see table on following page)
- at the end, code "12" appears for another three times, indicating the end of the sequence
- of disconnecting pin 1 of T8, after 2 seconds the system resumes normal operation.

NOTE: Resetting the memorised code is obtained by of disconnecting the line of pin 1 of T8 and engaging the ignition switch 20 times (or using the ALFA ROMEO Tester)

Fault-finding using the Alfa Romeo Tester

N.B. Before carrying out diagnosis with the Tester, perform the preliminary check described later (TEST A); if the warning light is not working properly also carry out TEST H.

The connection between the TESTER and the control unit must be made as follows:

1. Supply the TESTER either through the cigar lighter socket or connecting directly to the battery using the special lead.
2. Connect the TESTER socket to the control unit (the socket is near the control unit).

The instrument can give the following information:

- parameter display;
- error display;
- active diagnosis.

Activation of diagnosis

Diagnostic conversation is started with the engine stopped and the ignition key at MARCIA.

Flashing code table

NOTE: The error code is formed of two digits and is displayed by a number of flashes equalling the first digit followed by a 1 second pause and then a number of flashes equalling the second digit.

CODICE	DESCRIPTION	CORRECTIVE ACTION
12	Start and end of procedure	-
No code	Control unit or diagnosis function fault	Carry out test A
16	Faulty LH front load solenoid valve	Replace the electronic unit group
17	Faulty RH front load solenoid valve	Replace the electronic unit group
19	Faulty solenoid valve supply relay	Replace the electronic unit group
25	Damaged phonic wheel (regardless of which)	Replace the phonic wheel (see GROUP 33)
26	Faulty LH rear load solenoid valve	Replace the electronic unit group
27	Faulty RH rear load solenoid valve	Replace the electronic unit group
28	Faulty LH front relief solenoid valve	Replace the electronic unit group
29	Faulty RH front relief solenoid valve	Replace the electronic unit group
31	Faulty LH rear relief solenoid valve	Replace the electronic unit group
32	Faulty RH rear relief solenoid valve	Replace the electronic unit group
35	Faulty recovery pump	Replace the electronic unit group
37	Inefficient brake pedal switch	Carry out test B
39	LH front wheel speed sensor absent	Carry out test C
41	LH front wheel speed sensor discontinuous or irregular	Carry out test C
42	RH front wheel speed sensor absent	Carry out test D
43	RH front wheel speed sensor discontinuous or irregular	Carry out test D
44	LH rear wheel speed sensor absent	Carry out test E
45	LH rear wheel sensor signal discontinuous or irregular	Carry out test E
46	RH rear wheel speed sensor absent	Carry out test F
47	RH rear wheel sensor signal discontinuous or irregular	Carry out test F
48	Low battery voltage	Carry out test G
55	Faulty electronic control unit	Replace the electronic unit group
56	Flashing code activation procedure fault	Carry out test A
74	Inefficient warning light wiring on instrument cluster	Carry out test M

PRELIMINARY SYSTEM CHECK	TEST A
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	TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1	CHECK FUSES	OK →	Carry out step A2
	- Check the intactness of wander fuses G125a and G125b	OK →	Replace the fuses - G125a (10A) - G125b (60A)
A2	CHECK VOLTAGE	OK →	Carry out step A3
	- Check for 12 V at pin 17 and 18 of N51	OK →	Restore the wiring between pin 17 and 18 of N51 and fuse G125b
A3	CHECK VOLTAGE	OK →	Carry out step A4
	- Turn the ignition key and check for 12 V at pin 15 of N51	OK →	Restore the wiring between pin 15 of N51 and fuse G125a
A4	CHECK EARTH	OK →	Carry out step A5
	- Check that pin 16 of N51 is earthed	OK →	Restore the wiring between pin 16 of N51 and earth G55b
A5	CHECK EARTH	OK →	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER OR FLASHING CODE
	- Check that pin 19 of N51 is earthed	OK →	Restore the wiring between pin 19 of N51 and earth G53b

FAULTY BRAKE SWITCH	TEST B
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1 CHECK STOP LIGHTS – Check that the stop lights are working properly	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Carry out step B2 Replace the stop light switch H3, or proceed as described in the "STOP LIGHTS" section
B2 CHECK VOLTAGE – With the pedal pressed, check for 12 V at pin 14 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Check and if necessary replace the electronic control unit N51 Restore the wiring between pin 14 of N51 and H3

LH FRONT SENSOR NOT CONNECTED	TEST C
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
C1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 7 and 6 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Carry out step C2 Carry out step C3
C2 CHECK CONTINUITY – Disconnect sensor L29 and check continuity between the sensor and pin 7 of N51 , and between the sensor and pin 6 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Check and if necessary replace sensor L29. Restore the wiring between L29 and N51
C3 CHECK OPEN CIRCUIT – Disconnect sensor L29 and check for an open circuit between pin 7 and 6 of N51 (wiring side)	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Check and if necessary replace sensor L29. Restore the wiring eliminating the short circuit between the cables connecting L29 with N51

RH FRONT SENSOR NOT CONNECTED	TEST D
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
D1 CHECK OPEN CIRCUIT - Turn the key and check for an open circuit between pin 4 and 3 of N51	(OK) → (OK) →	Carry out step D2 Carry out step D3
D2 CHECK CONTINUITY - Disconnect sensor L28 and check for continuity between the sensor and pin 4 of N51, and between the sensor and pin 3 of N51	(OK) → (OK) →	Check and if necessary replace sensor L28. Restore the wiring between L28 and N51
D3 CHECK OPEN CIRCUIT - Disconnect sensor L28 and check for an open circuit between pin 4 and 3 of N51 (wiring side)	(OK) → (OK) →	Check and if necessary replace sensor L28. Restore the wiring eliminating the short circuit between the cables connecting L28 with N51

LH REAR SENSOR NOT CONNECTED	TEST E
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
E1 CHECK OPEN CIRCUIT - Turn the key and check for an open circuit between pin 8 and 9 of N51	(OK) → (OK) →	Carry out step E2 Carry out step E3
E2 CHECK CONTINUITY - Disconnect sensor L31 and check continuity between the sensor and pin 8 of N51, and between the sensor and pin 9 of N51	(OK) → (OK) →	Check and if necessary replace sensor L31. Restore the wiring between L31 and N51
E3 CHECK OPEN CIRCUIT - Disconnect sensor L31 and check for an open circuit between pin 8 and 9 of N51 (wiring side)	(OK) → (OK) →	Check and if necessary replace sensor L31. Restore the wiring eliminating the short circuit between the cables connecting L31 with N51

RH REAR SENSOR NOT CONNECTED	TEST F
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
F1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 1 and 2 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Carry out step F2 Carry out step F3
F2 CHECK CONTINUITY – Disconnect sensor L30 and check continuity between the sensor and pin 1 of N51 , and between the sensor and pin 2 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Check and if necessary replace sensor L30 . Restore the wiring between L30 and N51
F3 CHECK OPEN CIRCUIT – Disconnect sensor L28 and check for an open circuit between pin 1 and 2 of N51 (wiring side)	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Check and if necessary replace sensor L30 . Restore the wiring eliminating the short circuit between the cables connecting L30 con N51

INSUFFICIENT SUPPLY VOLTAGE	TEST G
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
G1 CHECK VOLTAGE – Check that the battery voltage is 12V	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Carry out step G2 Restore the correct voltage charging or changing the battery A1
G2 CHECK VOLTAGE – Check for a voltage of 12 V at pin 17 and 18 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	Carry out step G3 Restore the wiring between pin 17 and 18 of N51 and the battery A1 , via fuse G125b
G3 CHECK VOLTAGE – With the ignition key turned, check for 12 V at pin 15 of N51	<input checked="" type="radio"/> OK → <input type="radio"/> OK →	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER Restore the wiring between pin 15 of N51 and the ignition switch B1 via fuse G125a

"ABS" WARNING LIGHT NOT WORKING	TEST H
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TEST PROCEDURE	RESULT	CORRECTIVE ACTION
H1 CHECK CONTINUITY – Check continuity between pin 12 of N51 and pin 1 of connector T8 and between pin 11 of N51 and pin 3 of T8	(OK) → (OK) →	Carry out step H2 Restore the wiring between N51 and connector T8
H2 CHECK EARTH SIGNAL – Turn the ignition key and for a few seconds, check for 0V at pin B3 of the instrument cluster C10	(OK) → (OK) →	Replace the ABS warning light bulb on the instrument cluster C10 Carry out step H3
H3 CHECK EARTH SIGNAL – Turn the key and for a few seconds, check for 0V at pin 21 of N51	(OK) → (OK) →	Restore the wiring between N51 and C10 Replace the electronic control unit N51

