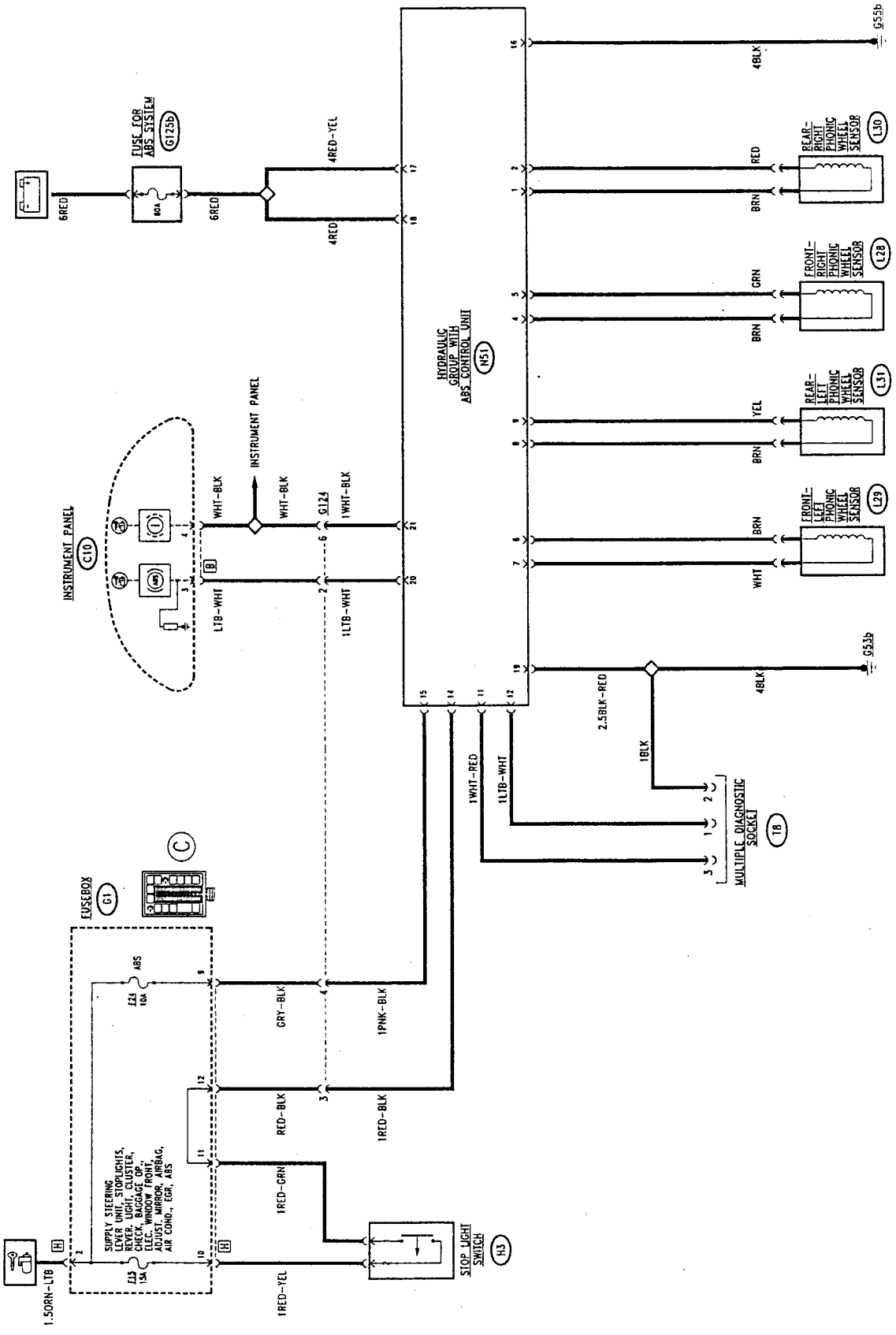
# ABS SYSTEM (BOSCH 5.3 ABS with "EBD")

## INHALTSVERZEICHNIS

ELEKTRISCHES SCHALTBILD . . . . . 39B-2
ALLGEMEINE BESCHREIBUNG . . . . . 39B-3
FUNKTIONSBESCHREIBUNG . . . . . 39B-3
KOMPONENTEN UND VERBINDER . . . . . 39B-4
ANORDNUNG DER KOMPONENTEN . . . . . 39B-6
DEFEKTSUCHE . . . . . 39B-7

**From Model Year '98 replaces the previous 5.3 system.**

## WIRING DIAGRAM



## GENERAL DESCRIPTION

The electronic anti wheel locking systen (BOSCH 5.3 ABS) adjusts the braking pressure transmitted to the wheels preventing lack of grip under all conditions of the tyres and road surfaces.

**In this version, the control unit also controls distribution of the braking load also on the rear axle, replacing the mechanical braking distributor used previously ("EBD" function: Electronic Brake Distribution").**

**The system has been designed to integrate and not replace the normal mechanical braking system, thereby ensuring effective safety in the event of faults: the device works on the same brake fluid as the conventional, mechanical circuit.**

Four sensors, on the four wheels, constantly signal to the electronic control unit the speed of each wheel, thus recording wheel locking, skidding and loss of grip conditions.

In these situations the control unit suitably controls the solenoid valves which modulate the pressure in the hydraulic circuit, eliminating locking and bringing the vehicle back to the grip limit, which makes it possible to obtain the shortest braking distance possible, without losing control over steering.
In this version of the system there are two **adjustment solenoid valves** (one for pressure load and one for pressure relief) for each wheel.

**For further details on how the hydraulic system works, see GROUP 33-BRAKES.**

### Components

**The system comprises:**

- four magnetic induction sensors which read the speed of the wheels: **L28**; **L29**; **L30**; **L31**.
  The sensors are of the "active" type, i.e. they contain a Hall-effect pick-up device which faces a magnetic coder integrated in the hub bearing: in these conditions, the signal is less affected by electromagnetic interferences and by temperature.
- the integrated electronic and hydraulic control unit **N51**, which houses the following:
  - the electronic control module (CPU)
  - eight solenoid valves
  - two brake fluid pumps with associated motor
  - two damping accumulators and two reservoirs
  - a safety valve
- the standardised connector for self-diagnosis **T20**
- the brake switch **H3** (the same one that turns on the braking lights) which signals the braking condition to the system.

The ABS includes a self-diagnosis system which continuously keeps all the system components and parameters under control: in the event of faults or failures, the system cuts itself off automatically, while however leaving the conventional mechanical power-assisted system operational: the driver is alerted of this situation by the special "ABS" warning light on the instrument cluster (**C10**).
This telltale light is the so-called "intelligent" type: : it turns on not only if the system detects an anomaly, but also in cases of lack of contact or short circuit to earth of the circuit that connects the telltale light to the relative control unit thanks to a special internal pilot circuit which checks proper connection.
A fault in the "EBD" function turns on the "handbrake on" warning light .

Connector **T8** also allows connection to the system with the Diagnosis tools available for the Service Network.

## FUNCTIONAL DESCRIPTION

### System supply:

With a line protected by fuse **F15** of the fusebox **G1**, the "key-operated" voltage supplies pin 15 of the AB control unit **N51**, the battery voltage reaches pin 17 and 18 of **N51** from the line protected by wander fuse **G125b** (60A).

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

### Sensors and solenoid valves

The module is connected, directly inside the control unit **N51**, 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 3-4, 6-7, 1-2 and 8-9) which signal the speed of the single wheels, and with the brake switch **H3** (pin 14) which sends an enable signal: in fact, operation of the ABS system is cut off if the brake pedal is not pressed.

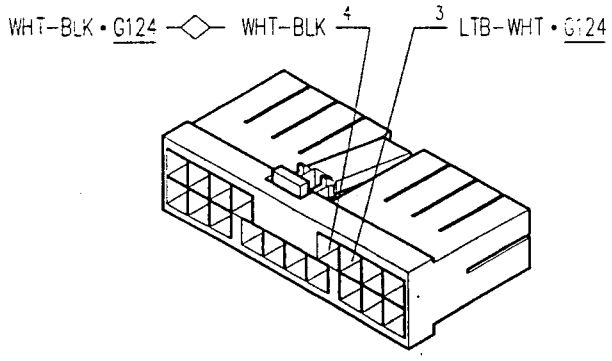
### Self-diagnosis:

When the control unit detects problems through the self- diagnosis function associated with the "ABS" system, it sends a signal to the instrument cluster **C10** which turns on the "ABS failure" warning light: this signal is sent from pin 20.
If the problems involve the "EBD" function, the handbrake warning light is turned on, from pin 21.

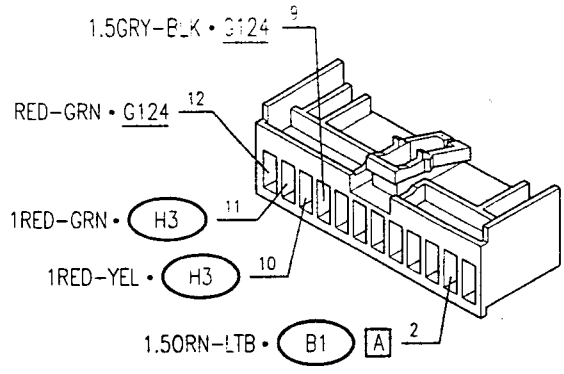
The diagnosis connector **T8** connected to pin 11 and 12 allows connection of the control unit with the diagnosis tools of the Service Network.

## COMPONENTS AND CONNECTORS

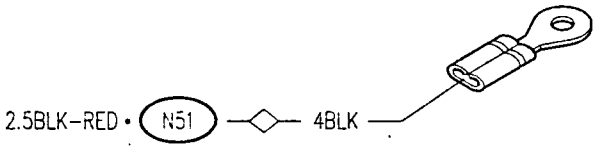
| Instrument cluster | C10 B |
|---|---|



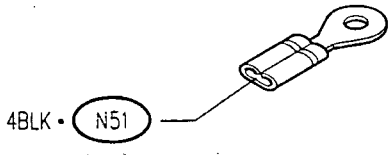

| Fusebox | G1 H |
|---|---|



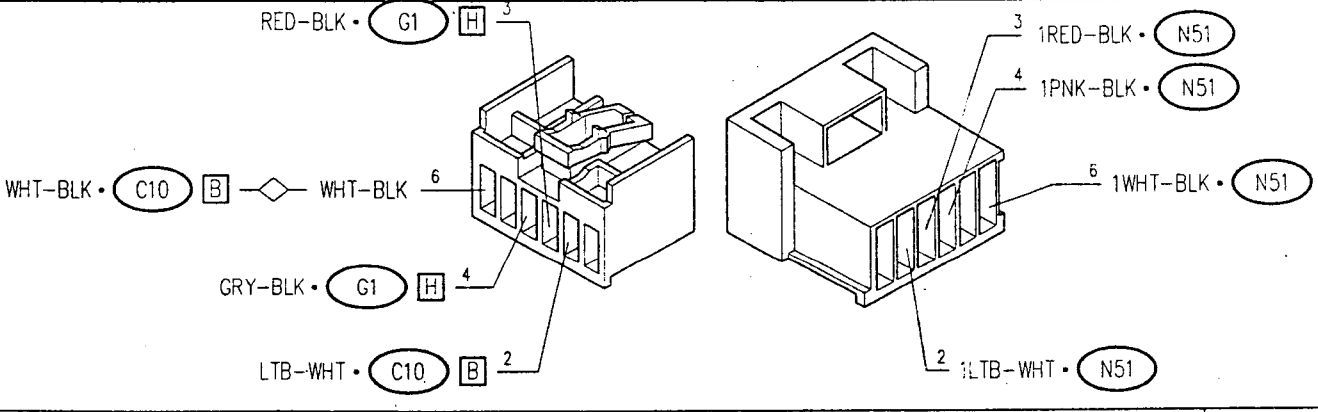

| LH engine compartment earth | G53b |
|---|---|



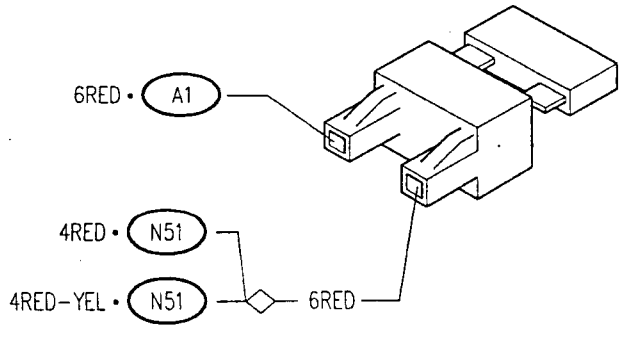

| LH side panel earth | G55b |
|---|---|




| ABS system connector | G124 |
|---|---|




| ABS system fuse | G125b |
|---|---|



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  - a safety valve
- the standardised connector for self-diagnosis **T20**
- the brake switch **H3** (the same one that turns on the braking lights) which signals the braking condition to the system.

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Connector **T20** also allows connection to the system with the Diagnosis tools available for the Service Network.

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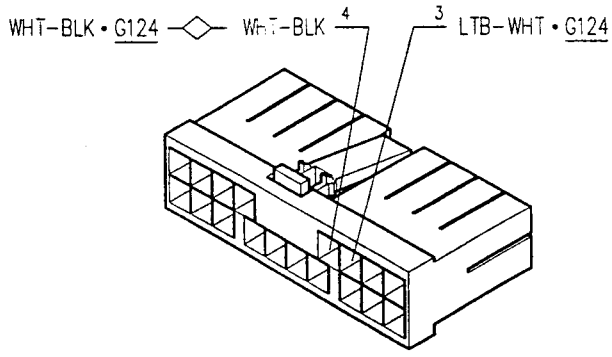
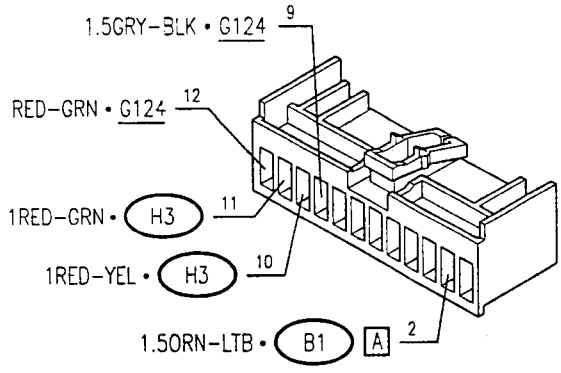
The diagnosis connector **T20** connected to pin 11 allows connection of the control unit with the diagnosis tools of the Service Network.

## COMPONENTS AND CONNECTORS

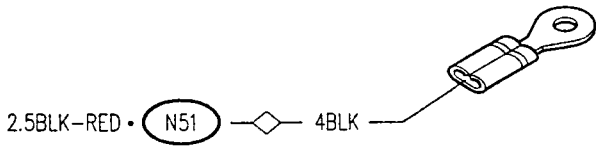
| Instrument cluster | C10 B |
|---|---|



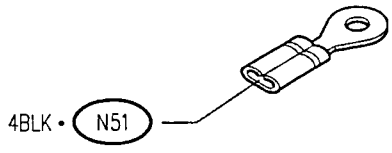

| Fusebox | G1 H |
|---|---|



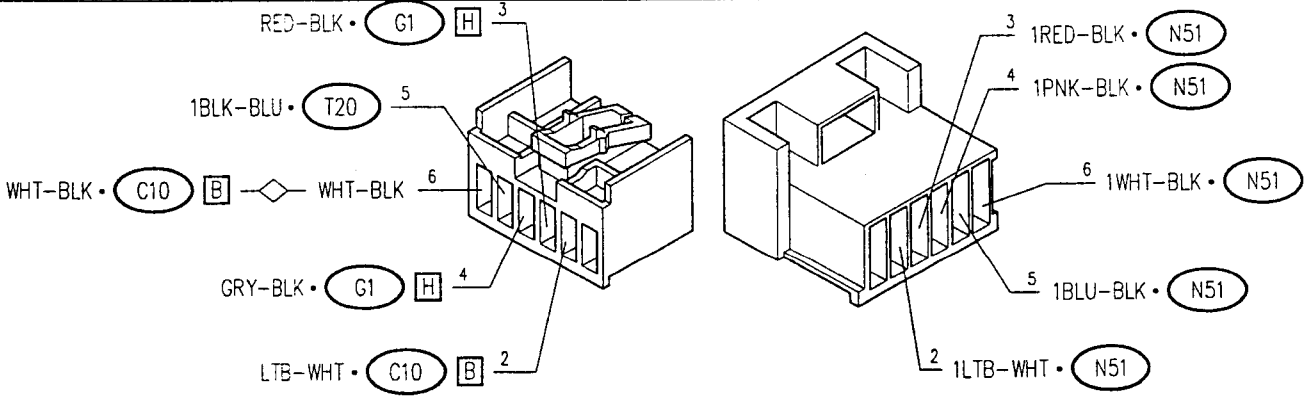

| LH engine compartment earth | G53b |
|---|---|



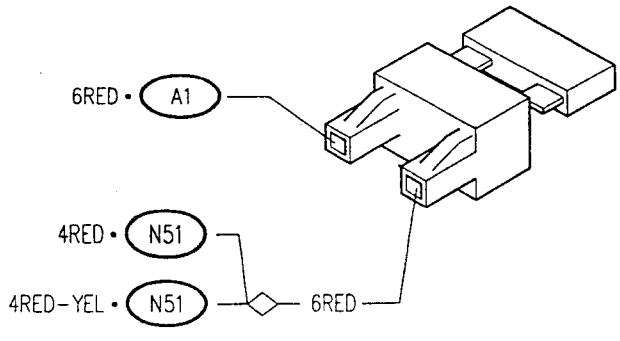

| LH side panel earth | G55b |
|---|---|




| ABS system connector | G124 |
|---|---|

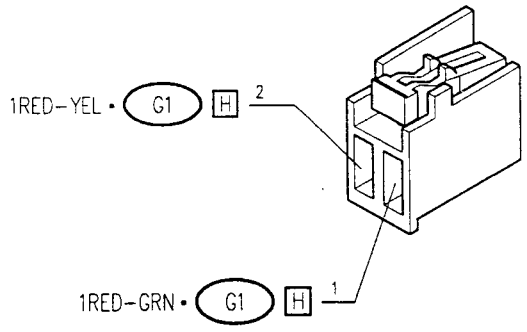



| ABS system fuse | G125b |
|---|---|

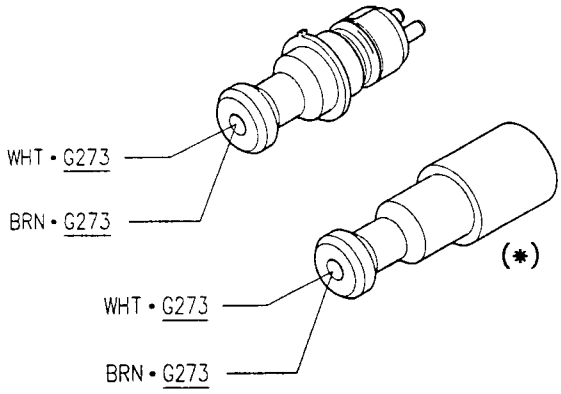


## COMPONENTS AND CONNECTORS (cont.d)

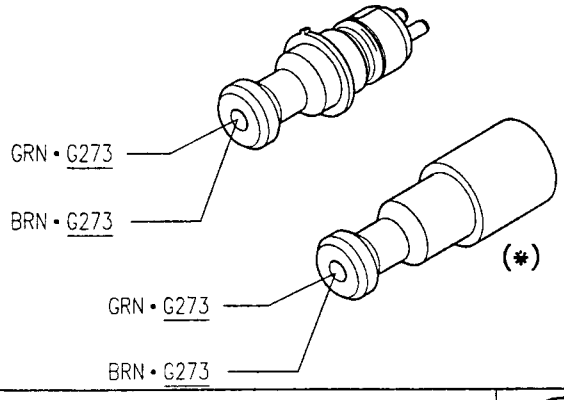
| Brake light switch | H3 |
|---|---|



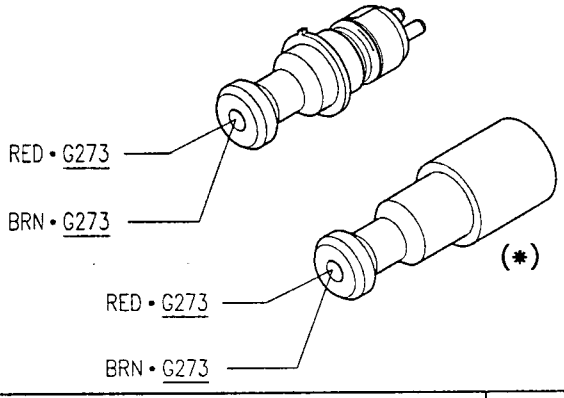

| RH front phonic wheel inductive sensor | L28 |
|---|---|



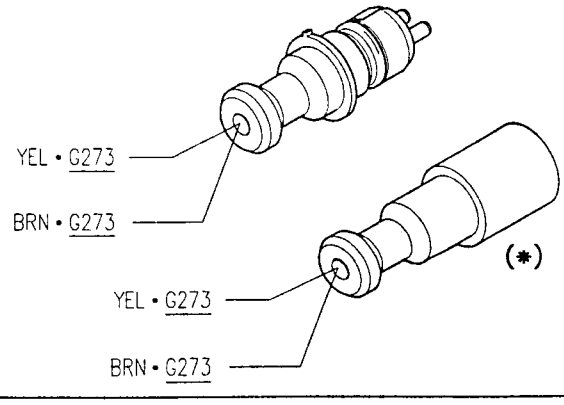

| LH front phonic wheel inductive sensor | L29 |
|---|---|



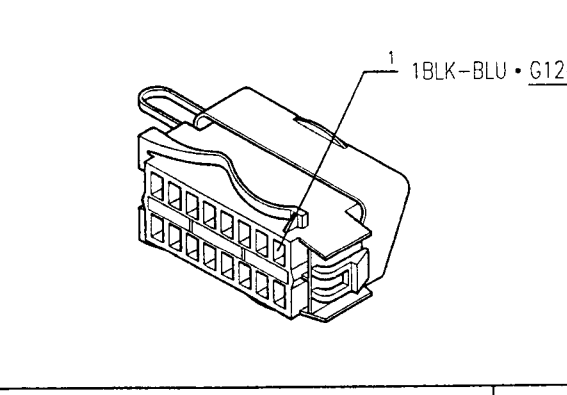

| RH rear phonic wheel inductive sensor | L30 |
|---|---|



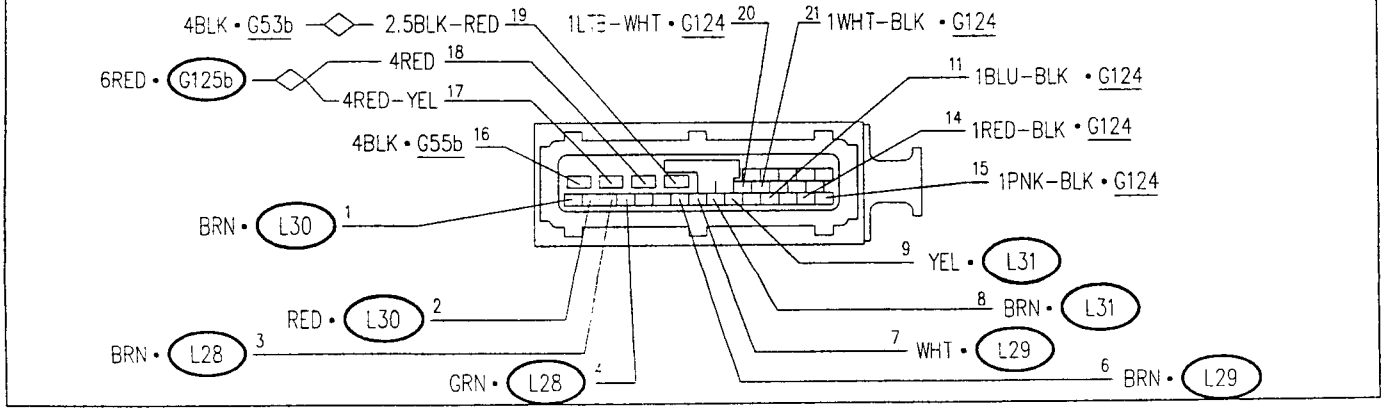

| LH rear phonic wheel inductive sensor | L31 |
|---|---|




| Standardised diagnosis connector | T20 |
|---|---|

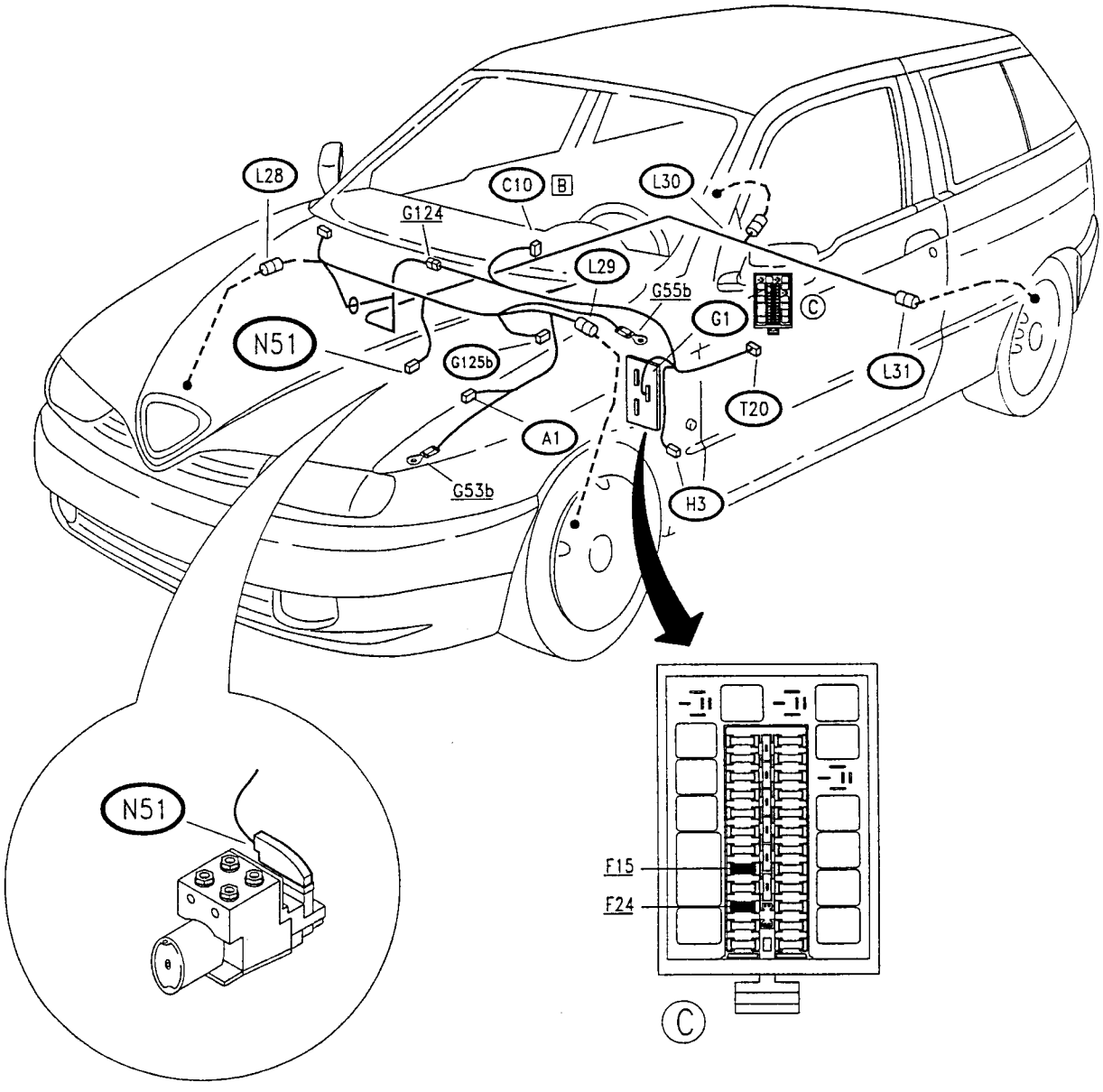



| ABS control unit | N51 |
|---|---|



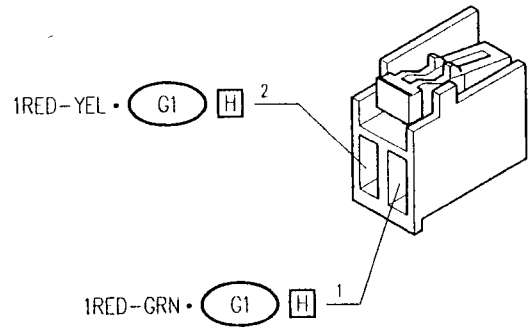

(*) Version with "ACTIVE SENSORS"

## LOCATION OF COMPONENTS

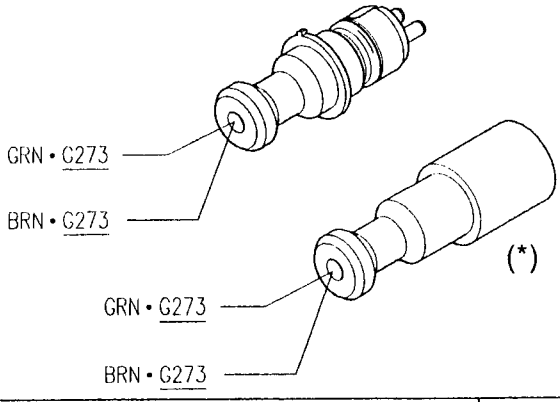


## COMPONENTS AND CONNECTORS (cont.d)

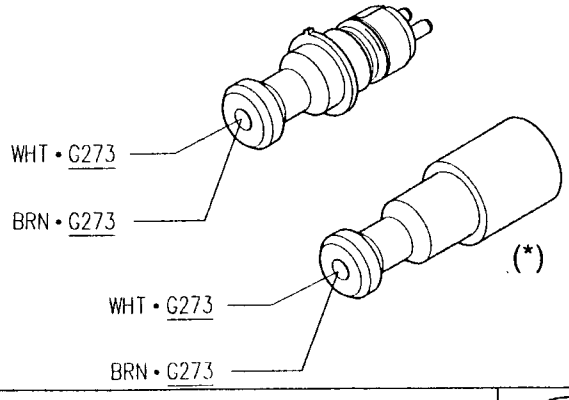
| Brake light switch | H3 |
|---|---|



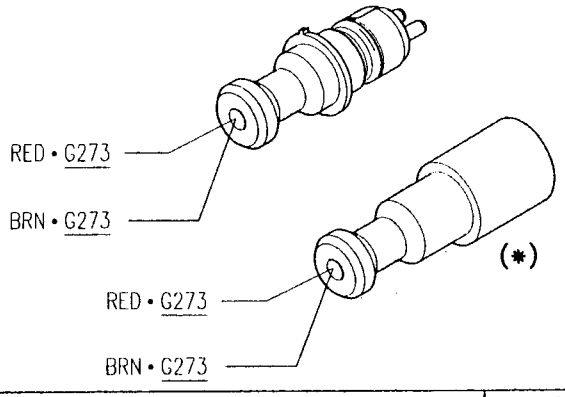

| RH front phonic wheel inductive sensor | L28 |
|---|---|



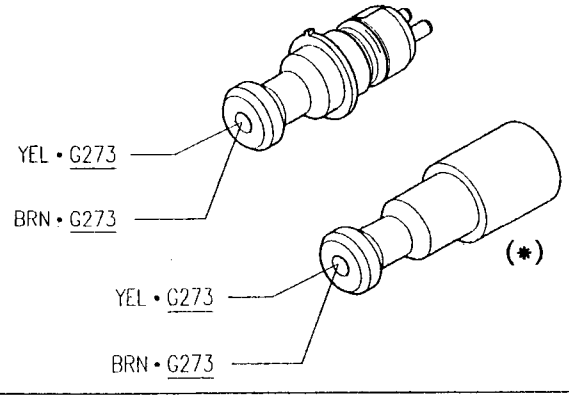

| LH front phonic wheel inductive sensor | L29 |
|---|---|



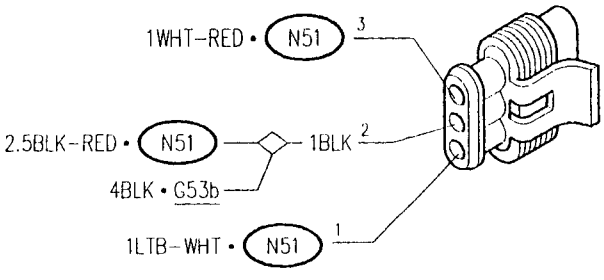

| RH rear phonic wheel inductive sensor | L30 |
|---|---|



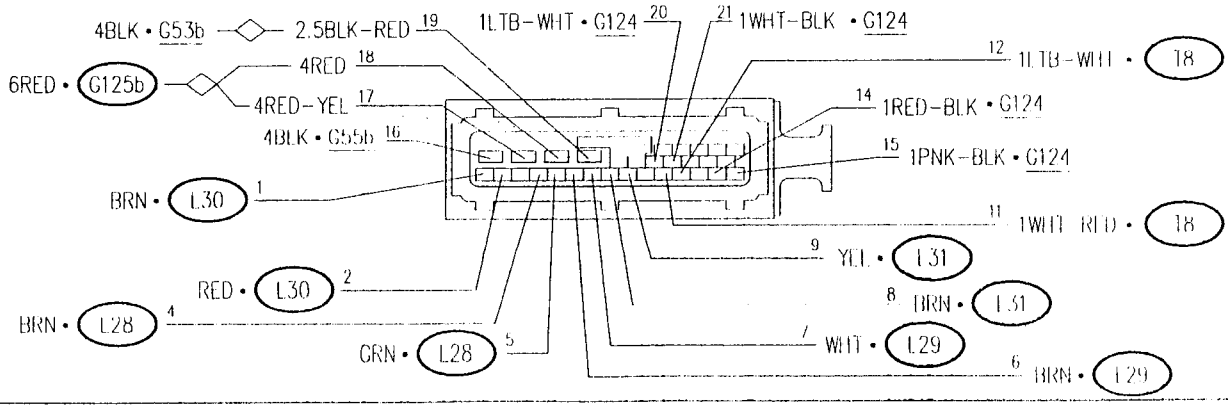

| LH rear phonic wheel inductive sensor | L31 |
|---|---|




| Connector for ALFA TESTER (ABS) | T8 |
|---|---|

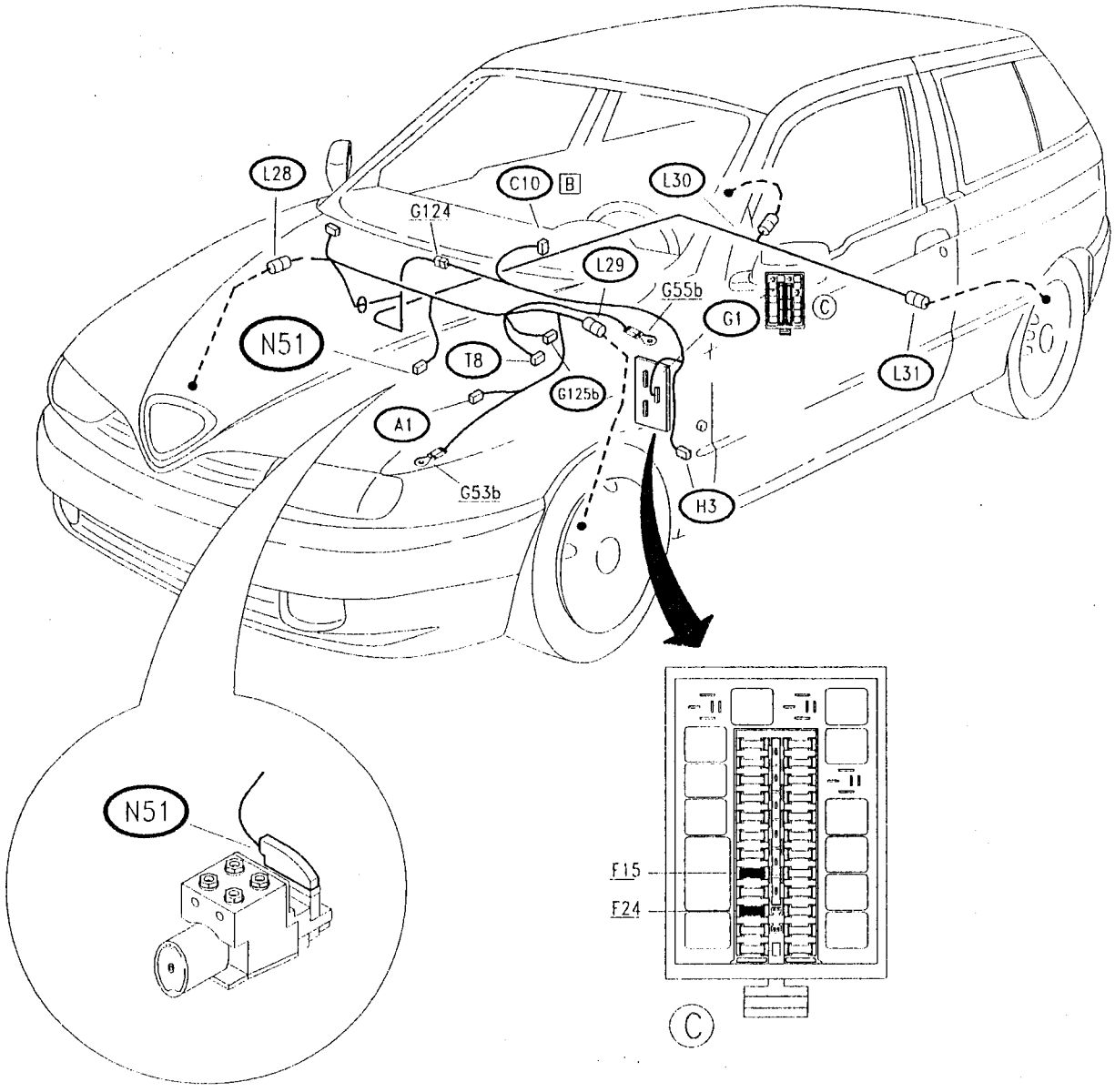



| ABS control unit | N51 |
|---|---|




(*) Version with "ACTIVE SENSORS"

## LOCATION OF COMPONENTS



## FAULT-FINDING

**AUTOMATIC CHECK AT SWITCH ON:** when the car is started the "ABS failure" warning light on the instrument cluster turns on for approx. 2 sec., then it goes out to indicate correct operation of the system.
If the warning light stays on, carry out diagnosis connecting the Service Network diagnosis tool to connector **T20**.

If the light fails to turn on, carry out **test B.**

**N.B.: When the control unit detects an error in the "ABS" function and turns on the warning light at the same time it deactivates the system, therefore the vehicle brakes with the conventional system only.**
**When the control unit also detects an error in the "EBD" function", it turns on both warning lights e . In these conditions rear braking distribution control is also deactivated and the car should be driven very carefully.**

## PRELIMINARY SYSTEM CHECK — TEST A

| TEST PROCEDURE | RESULT | CORRECTIVE ACTION |
|---|---|---|
| **A1** CHECK FUSES<br>– Check that wander fuses **F15** and **G125b** are intact | OK ▶ | Carry out **step A2** |
| | ~~OK~~ ▶ | Replace the fuses<br>- **F15** (15A)<br>- **G125b** (60A) |
| **A2** CHECK VOLTAGE<br>– Check for 12 V at pin 17 and 18 of **N51** | OK ▶ | Carry out **step A3** |
| | ~~OK~~ ▶ | Restore the wiring between pin 17 and 18 of **N51** and fuse **G125b** |
| **A3** CHECK VOLTAGE<br>– Turn the key and check for 12 V at pin 15 of **N51** | OK ▶ | Carry out **step A4** |
| | ~~OK~~ ▶ | Restore the wiring between pin 15 of **N51** and the control box **G1** |
| **A4** CHECK EARTH<br>– Check that pin 16 of **N51** is earthed | OK ▶ | Carry out **step A5** |
| | ~~OK~~ ▶ | Restore the wiring between pin 16 of **N51** and earth **G55b** |
| **A5** CHECK EARTH<br>– Check that pin 19 of **N51** is earthed | OK ▶ | CONTINUE DIAGNOSIS USING THE DIAGNOSIS TOOLS |
| | ~~OK~~ ▶ | Restore the wiring between pin 19 of **N51** and earth **G53b** |

| "ABS" WARNING LIGHT NOT WORKING (*) | TEST B |
|---|---|

| TEST PROCEDURE | RESULT | CORRECTIVE ACTION |
|---|---|---|
| **B1** CHECK CONTINUITY<br>– Check for continuity between pin 12 of **N51** and pin 1 of connector **T8** and between pin 11 of **N51** and pin 3 of **T8** | OK ▶<br>~~OK~~ ▶ | Carry out **step B2**<br>Restore the wiring between **N51** and connector **T8** |
| **B2** CHECK EARTH SIGNAL<br>– Turn the key and check for 0V, for a few seconds at pin B3 of the instrument cluster **C10** | OK ▶<br>~~OK~~ ▶ | Replace the ABS warning light on the instrument cluster **C10**<br>Carry out **step B3** |
| **B3** CHECK EARTH SIGNAL<br>– Turn the key and check for 0V, for a few seconds at pin 20 of **N51** | OK ▶<br>~~OK~~ ▶ | Restore the wiring between **N51** and **C10**<br>Replace the electronic control unit **N51** |

(*) To check whether the "EBD" warning light is working, simply pull the handbrake! In the event of a fault, proceed as described in the "Instrument Cluster" section.