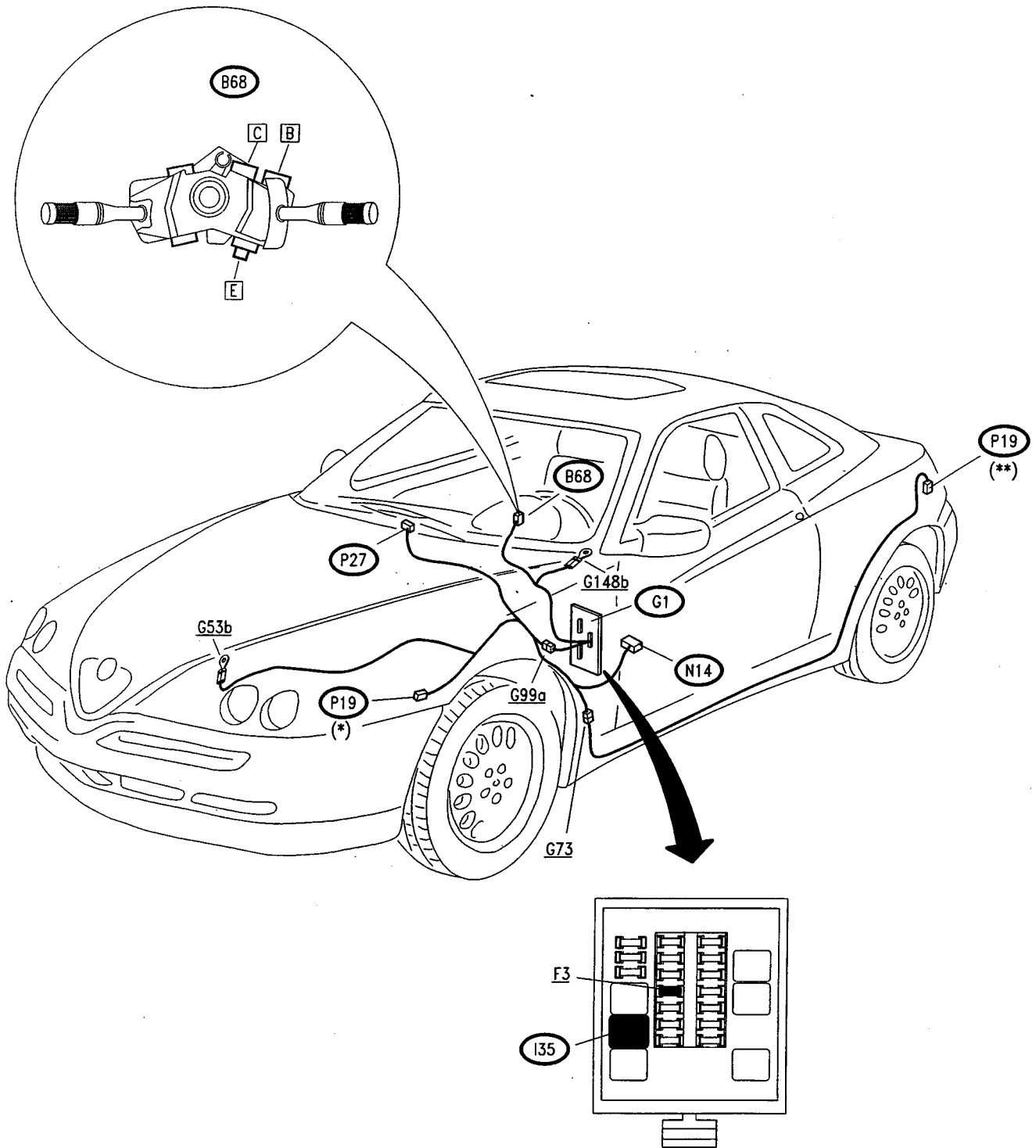


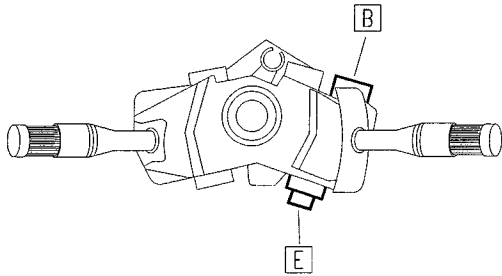
LOCATION OF COMPONENTS



(**) Only 2.0 V6 TB

CHECKING COMPONENTS

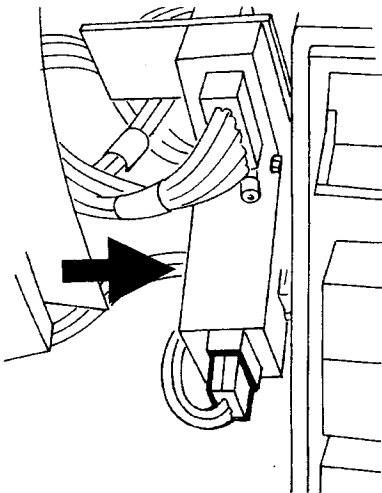
Steering column lever unit (B68)



Check operation of intermittence:
 resistance between pins B1 and E2 in relation to
 the position of the ring

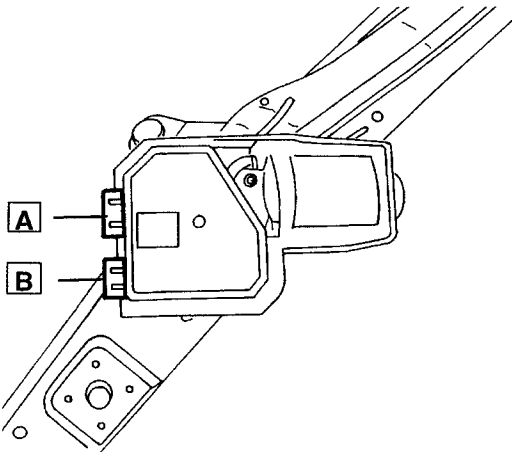
Position	Resistance [kΩ]	Speed [cycles/min]
1	2 ± 20%	27
2	23 ± 20%	15
3	36 ± 20%	12
4	47 ± 20%	10
5	66 ± 20%	8

Electronic windscreen wiper device (N14)



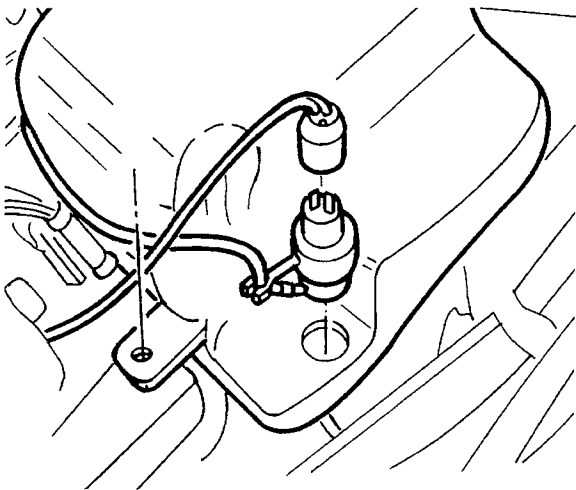
Checking the device: see **TEST A**

Windscreen wiper motor with control unit (P27)



Checking the device: see **TEST B**

Windscreen washer pump (P19)



SPECIFICATIONS	
Max. voltage	13.5 V
Current	≤ 4 A
Flow rate	≥ 3.5 l/min.
Pressure	≥ 1.7 bar

CHECK ELECTRONIC WINDSCREEN WIPER DEVICE (N14)	TEST A
---	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK VOLTAGE	OK →	Carry out step A2
	– Disconnect device N14 and check on the base, with the key at RUN, for 12V between pins 1 and 6	OK →	
A2	CHECK COMMAND SIGNALS	OK →	Carry out step A3
	– Reconnect device N14 . Operating the windscreen wiper at first speed, check for 12V at pin 3; in the same way operating the second speed, for 12V at pin 2	OK →	
A3	CHECK ACTUATING SIGNALS	OK →	Device N14 IS WORKING PROPERLY. Check motor P27
	– Operating the windscreen wiper at first speed, check for 12V at pin 4 of N14 ; with the second speed at pin 5	OK →	

CHECK WINDSCREEN WIPER MOTOR WITH CONTROL UNIT (P27)	TEST B
---	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
B1	CHECK VOLTAGE	OK →	Carry out step B2
	– Disconnect device P27 and check, with the key at RUN, for 12V between pins A1 and B3 of P27	OK →	
B2	CHECK WINDSCREEN WIPER COMMAND SIGNALS	OK →	Carry out step B3
	– Reconnect device P27 . Check the operation of the windscreen wiper at first speed, applying 12V at pin A4 of P27 , at second speed with 12V at pin A5	OK →	
B3	CHECK INTERMITTENCE SIGNAL	OK →	DEVICE P27 IS WORKING PROPERLY. Check the connections with N14 and B68
	– Check intermittent operation applying a variable signal at pin B4 of P27	OK →	

NOTE: If the windscreen wiper stops along its stroke and does **not** return automatically to the end of the stroke, check the connection between **N14** (pin 7) and **P27** (pin B2)

INDICATORS AND WARNING LIGHTS

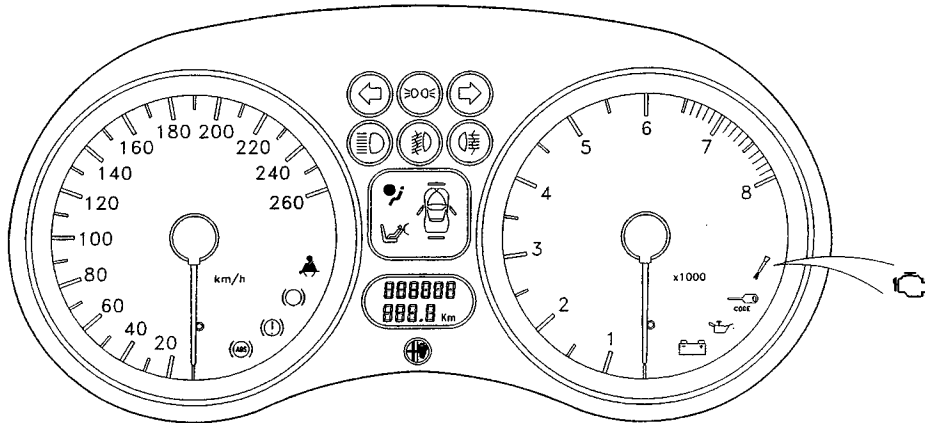
INDEX



















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INSTRUMENT PANEL POWER AND LIGHTING - CLOCK	13-8
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INSTRUMENT PANEL

The main instrument panel **C10** provides all the indications and information on vehicle status required for safe and comfortable driving. The instrument is analogue, with two large dials for the tachometer and the

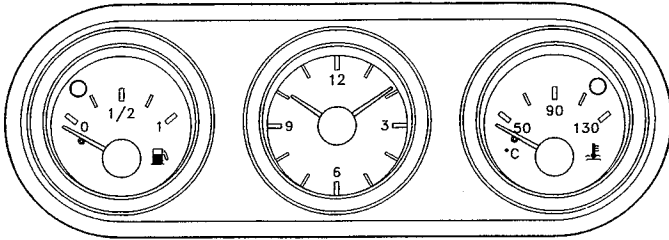
rpm counter. A set of clearly visible warning lights to complete the information provided to the driver.



- | | | | |
|--|-----------------------------------|---|--|
|  | LH direction indicators |  | ABS system failure |
|  | side/taillights |  | handbrake and brake fluid level, EBD system failure |
|  | RH direction indicators |  | worn brake pads |
|  | main beam headlights |  | seat belts |
|  | fog lights |  | alternator |
|  | rear fog lights |  | minimum oil pressure |
|  | airbag system failure |  | electronic key system |
|  | passenger side airbag deactivated |  | injection system failure (Check Engine) |
|  | door/boot/bonnet open |  | injection system failure (EOBD) (starting from October 2000) |

AUXILIARY INSTRUMENT PANEL

The auxiliary instrument panel **C18** is located in the centre of the dashboard and contains the coolant temperature gauge, the fuel level gauge and the respective warning lights. It also contains an analogue clock.

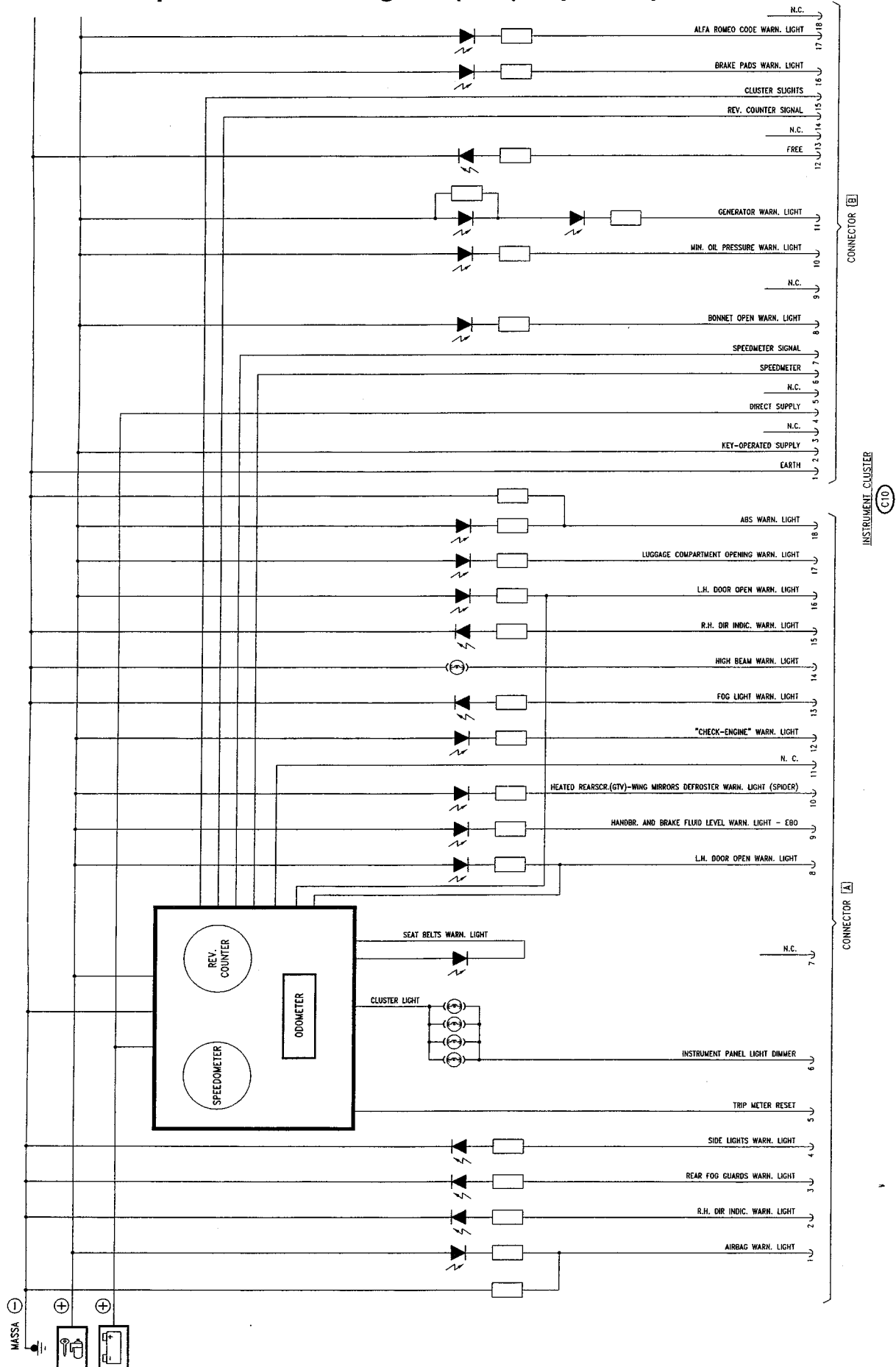


INTERNAL DIAGRAM (printed circuit)

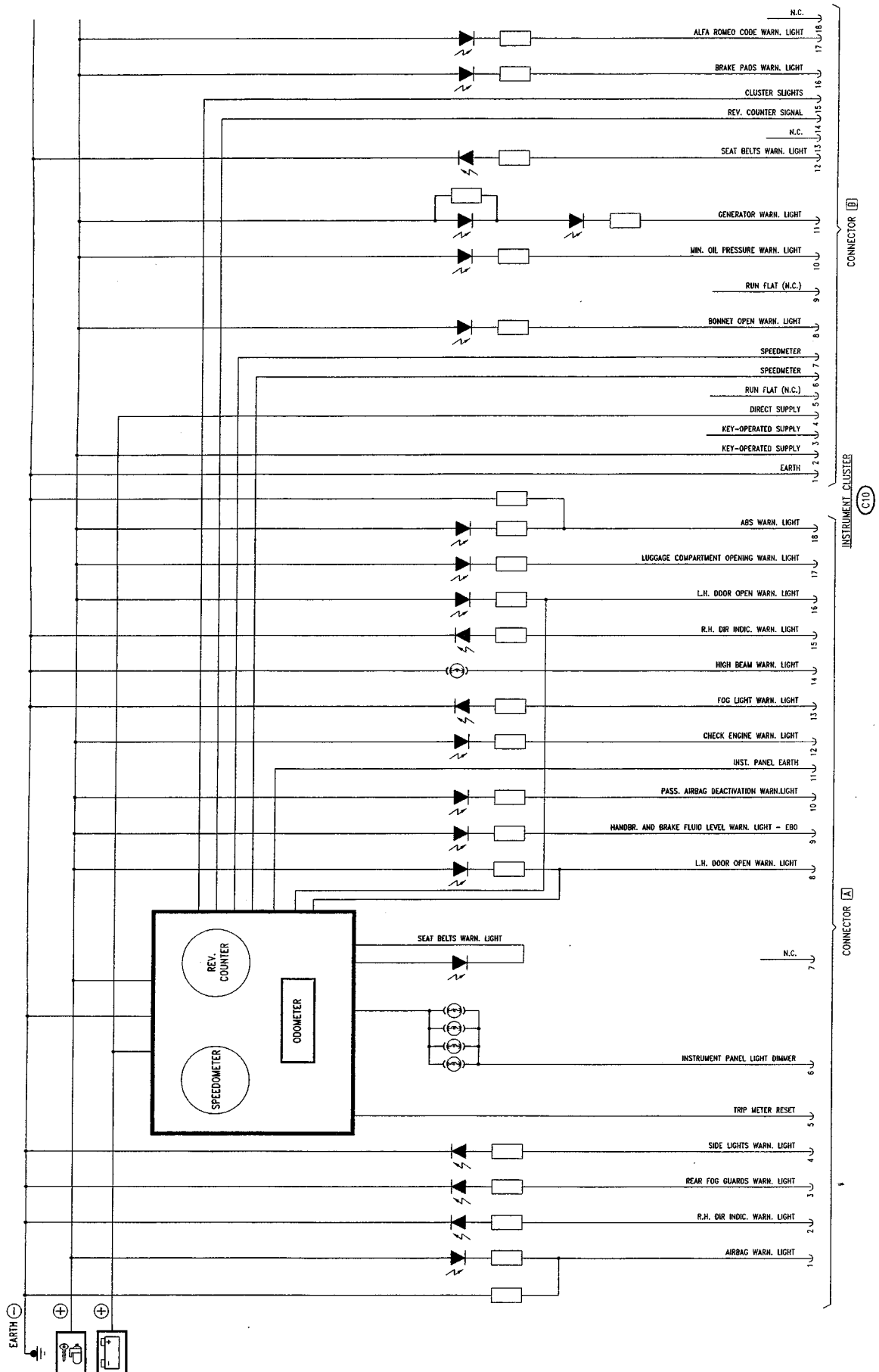
These wiring diagrams show the printed circuit and the connections in instrument panel **C10** and auxiliary panel **C18**. The other diagrams showing external connections of each panel, in fact, only show the concerned line, while this diagram offers an overall view of the entire **C10** and **C18** panels.

NOTE: Non all output pins are connected in all versions. Consequently, diagram **C10** may show lines which are not used (e.g. not connected to warning lights) but however included in the printed circuit, which is the same for all versions.

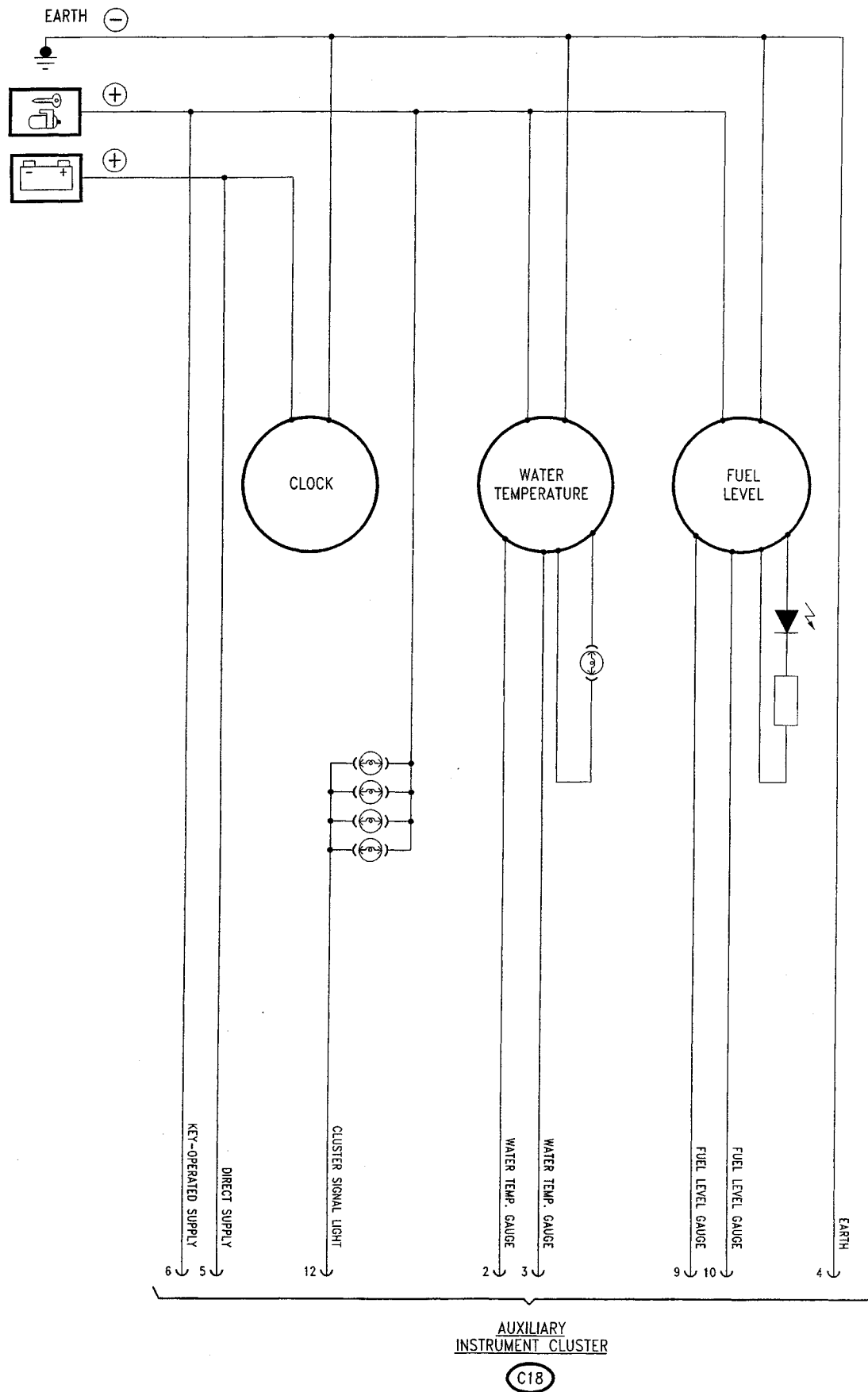
Main instrument panel internal diagram (C10) - up to September 2000



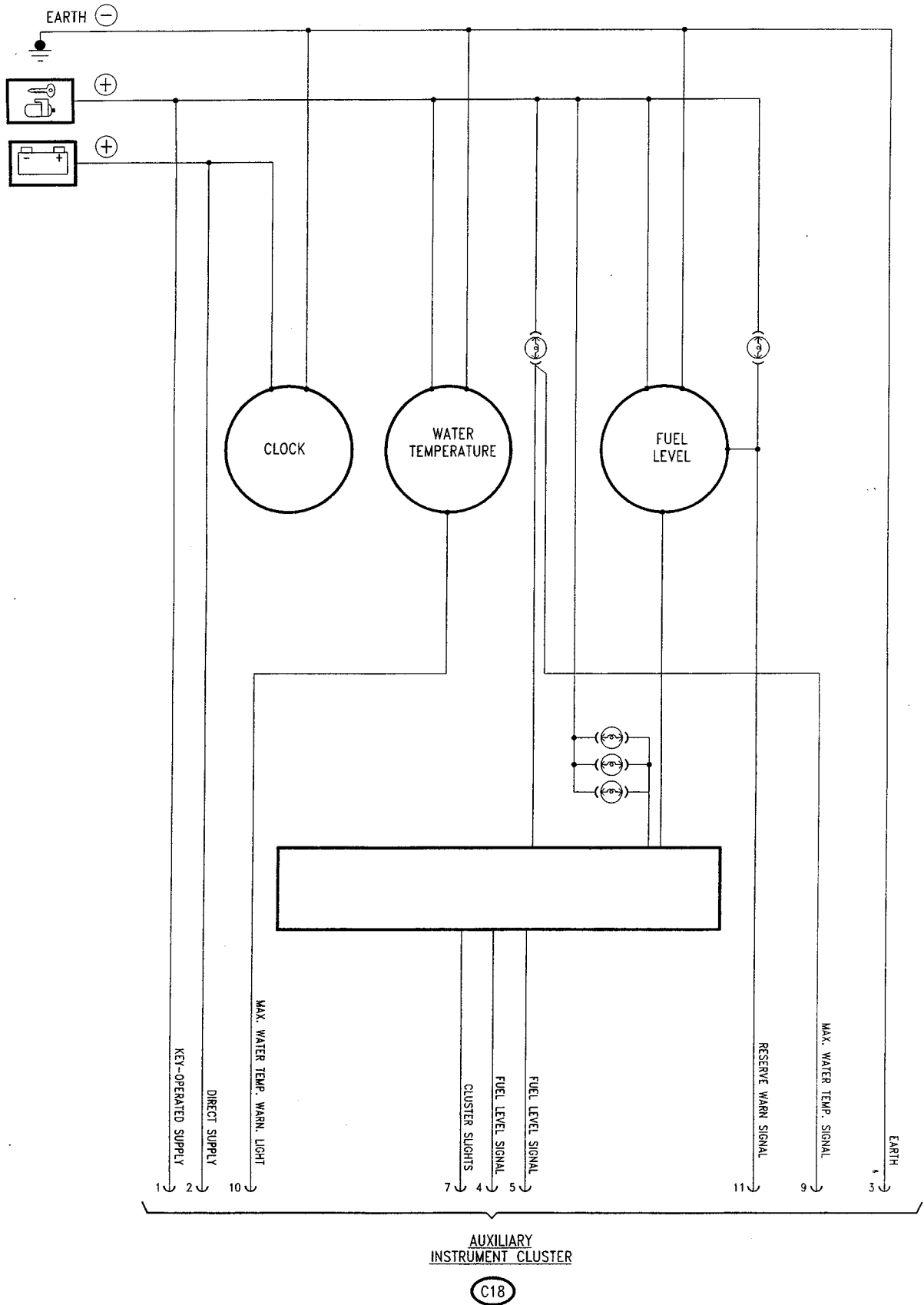
Main instrument panel internal diagram (C10) - up to October 2000



Auxiliary instrument panel internal diagram (C18) - up to September 2000




Auxiliary instrument panel internal diagram (C18) - starting from October 2000



INSTRUMENT PANEL POWER AND LIGHTING - CLOCK

The main instrument panel **C10** and the auxiliary panel **C18** are directly powered via fuse **F14** and ignition switch powered via fuse **F15** in fusebox **G1**. Connections are to panel **C10** connector B pins 4 and 2 and to panel **C18** pins 5 and 6. Panel **C10** is connected to earth via the wire from connector B pin 1, while panel **C18** is connected to earth via pin 4.

The two panels are lit by a set of bulbs (replaceable). Light can be dimmed by means of switch **B16** which allows several light level settings by pressing the buttons  several times: a signal intercepted between **C10** connector A pins 6 and 11 reach the

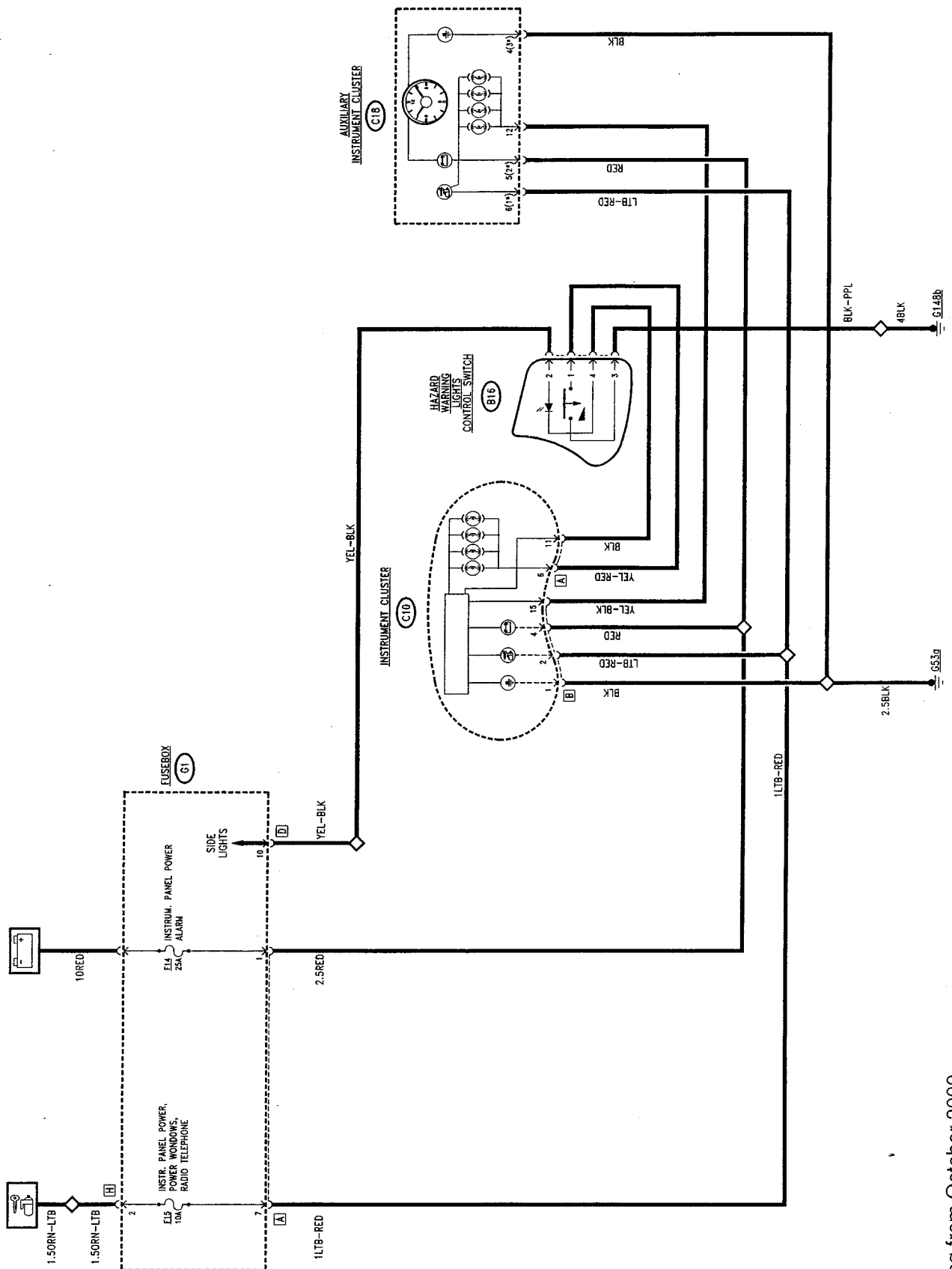
internal panel electronic device. Device power - variable from 12V (max intensity) to 5V (min intensity) via ten intermediate steps - reaches panel **C10** bulbs and - via the line from **C10** connector B pin 15 to **C18** pin 12 - instrument panel **C18**.

Clock

The clock, fitted in instrument panel **C18**, is directly powered via fuse **F14** in fusebox **G1** to pin 5 while pin 6 is connected to earth.

N.B.: The clock stops when the battery is disconnected; consequently, it should be reset when the power is restored.

Wiring diagram




(*) starting from October 2000


MAIN INSTRUMENT PANEL: GAUGES AND WARNING LIGHTS

The main instrument panel **C10** contains several gauges and warning lights.

The **rpm signal** reaches instrument panel **C10** connector B pin 14 from the engine management injection/ignition ECU **S11** which processes the engine rpm signal.

The **tachometer signal** is provided by the ABS ECU **N51** (to connector B pin 7). This signal is also sent to the injection/ignition ECU and to the climate control ECU, which both require vehicle speed data.


Switch **B40**  is used to **reset the trip counter**; it sends an earth signal to the **C10** internal electronic device (connector A pin 5).


N.B. The seat belt warning light  is **NOT connected to the seat belt buckle. The warning light does not come on to indicate the seat belt has not been buckled up but is lit by an electronic device in C10 for six seconds at key-on in any case (regardless of whether the seat belts are buckled up or whether the engine is running) and will then go out.**


Starting from October 2000 , the warning light will be operated by a special switch **H64**, on the driver's


seat belt attachment, which is connected to pin 12 of connector B of **C10**.

Two warning lights alert the driver of problems to the **braking system**.

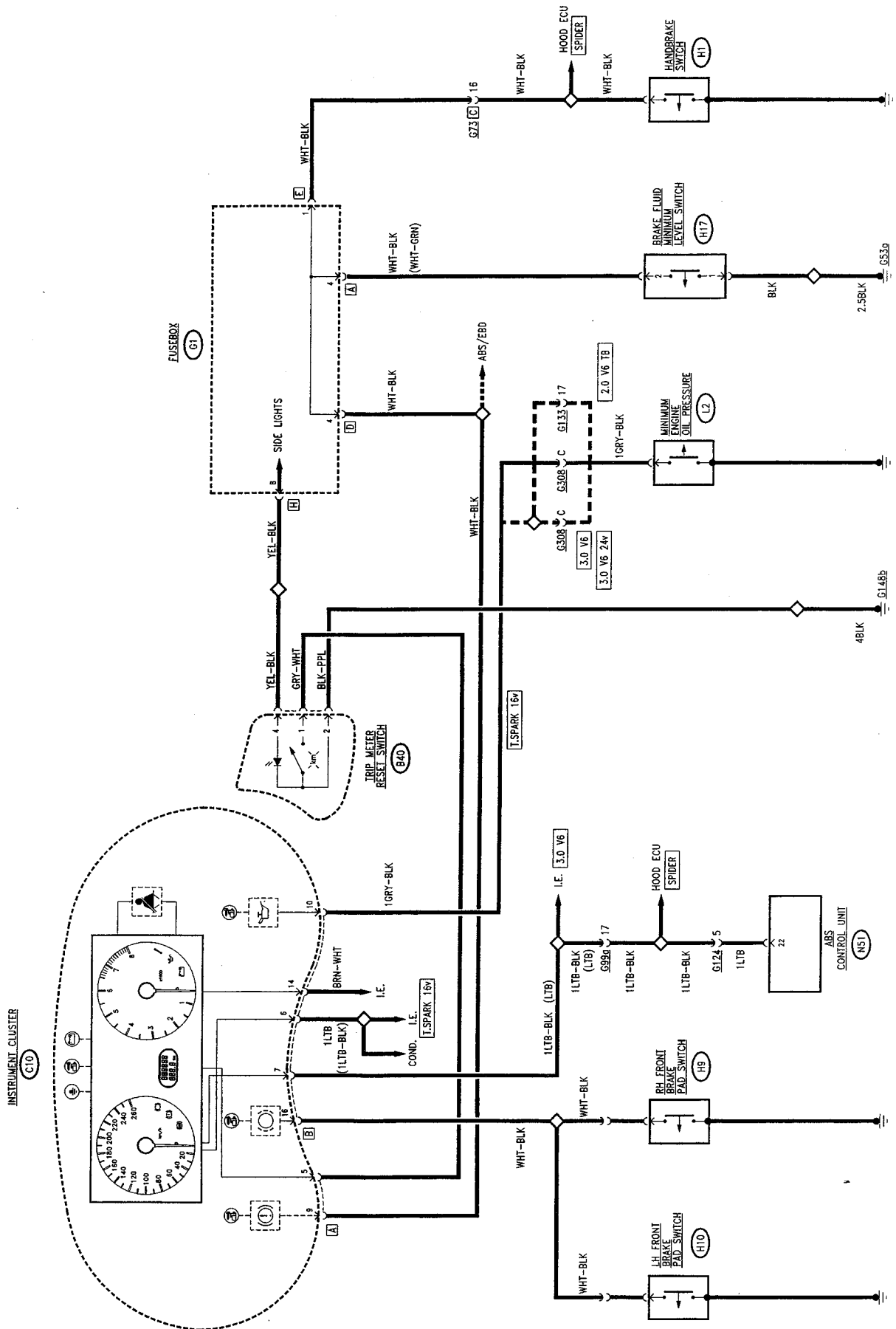
The two brake pad switches **H9** (right-hand) and **H10** (left-hand) consist of a micro-switch located on the pad which closes to earth when the pad is excessively thin. A signal is sent to panel **C10** connector B pin 16. The "**worn brake pad**"  warning light is lit.

The handbrake switch **H1** closes when the handbrake lever is lifted. It sends a signal to panel **C10** connector A pin 9 lighting the "**handbrake engaged**" warning light .

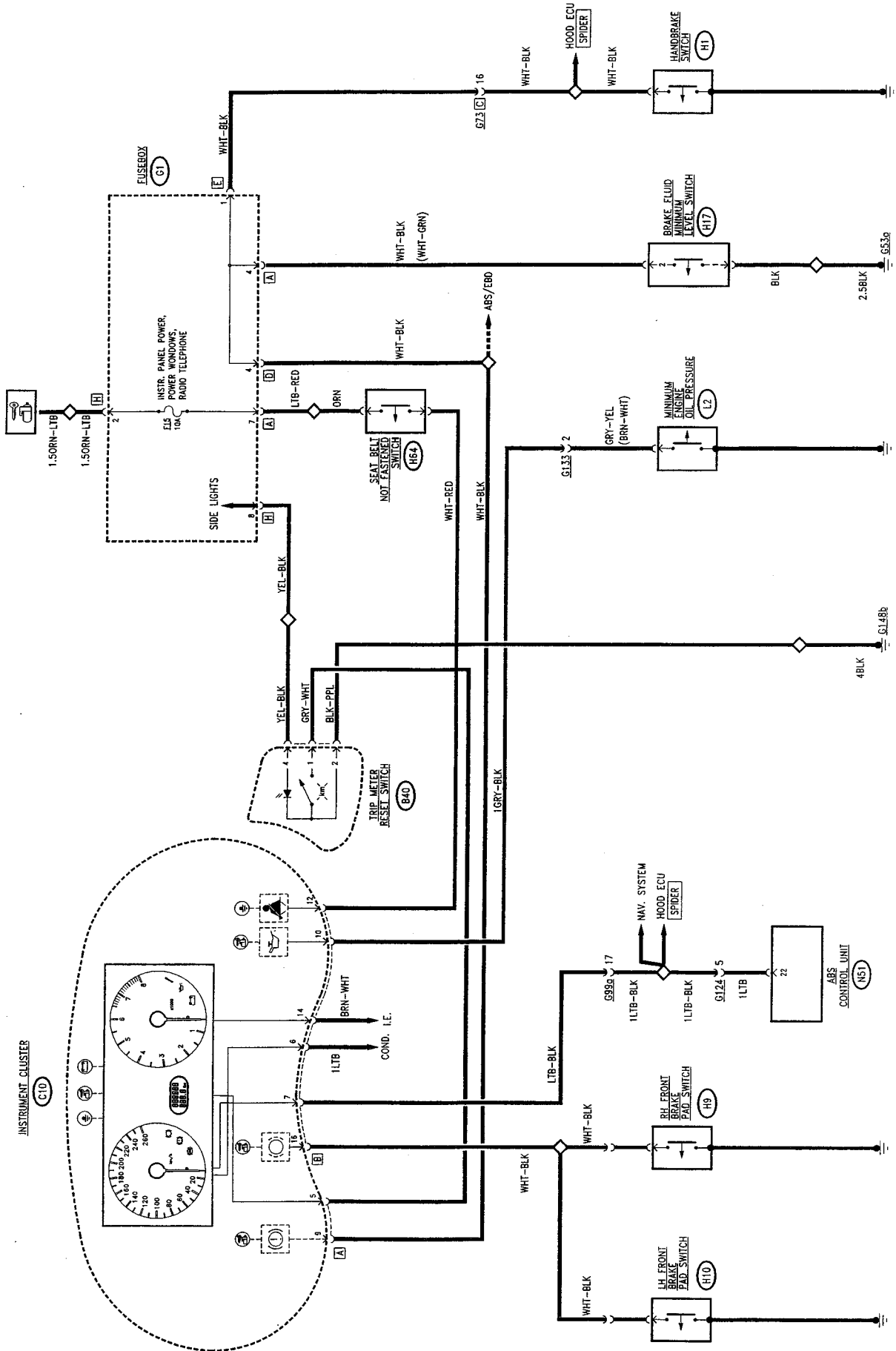
The warning light  also comes on to signal "**low brake fluid**" via switch **H17** located in the fluid reservoir: this is a floating device which closes a contact when the level in the braking system reservoir falls below a certain reference value. This warning light also comes on to signal an EBD electronic braking control system failure (see section "ABS").

The minimum oil pressure switch **L2** fitted on the crankcase closes when the pressure drops under a certain threshold and sends an earth signal to panel **C10** connector B pin 10 and the "**minimum oil pressure**" warning light comes on .

Wiring diagram (up to September 2000)



Wiring diagram (starting from October 2000 )



**AUXILIARY INSTRUMENT PANEL:
GAUGES AND WARNING LIGHTS**

The auxiliary instrument panel **C18** contains two gauges and respective warning lights.

The **engine coolant temperature** is constantly shown by an analogue gauge. Excessive values are signalled by the "**maximum coolant temperature**" warning light **L7**.

Engine temperature transmitter **L7** generates a signal which is proportional to the fluid temperature to panel **C18** pin 9.

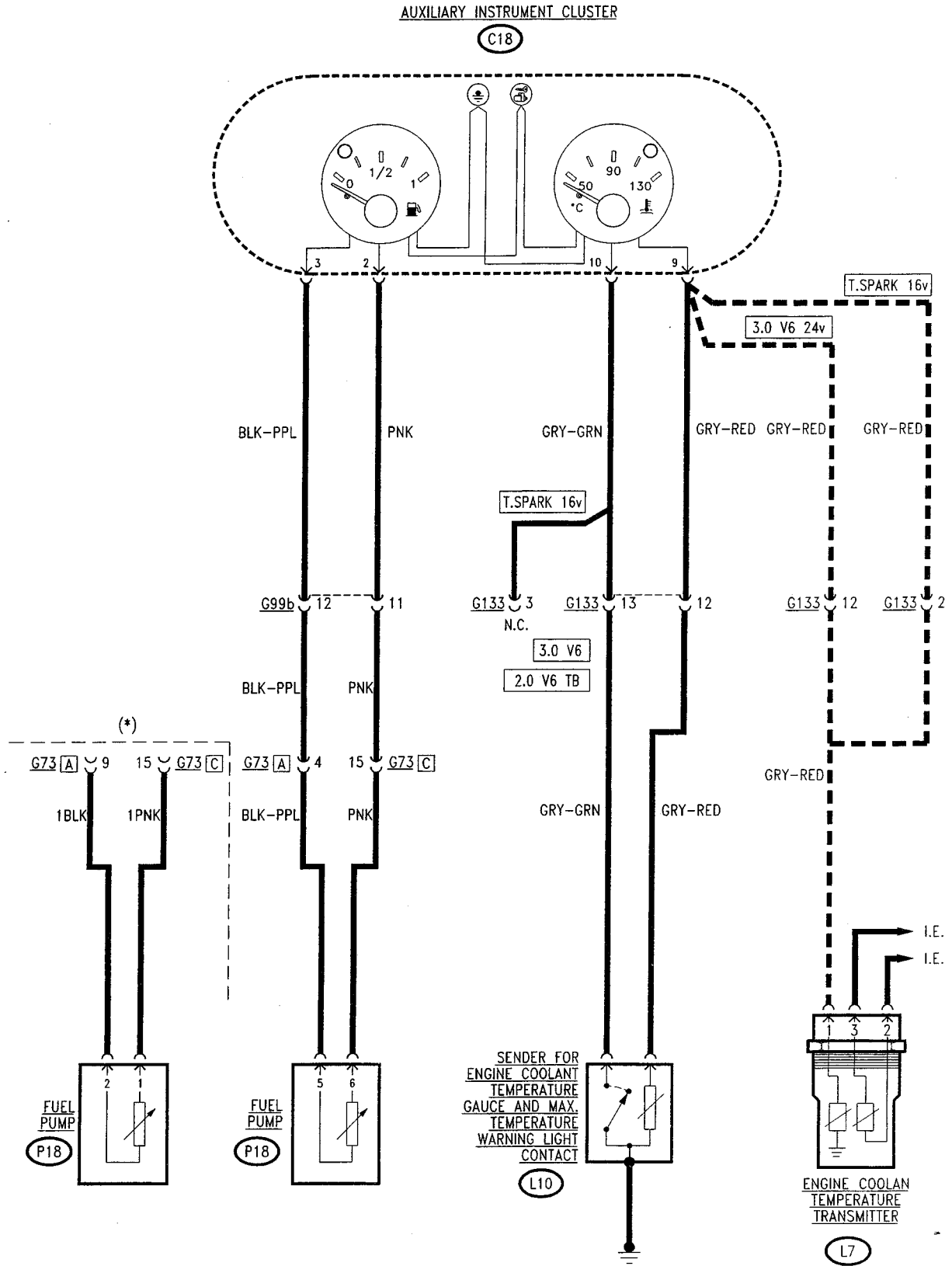
The warning lights are controlled by the electronic device which manages the gauge in **C18** (starting from October 2000 (EURO 3 engine type); the panel receives a high engine temperature signal from the engine management control unit **S11** and processes it checking whether it is consistent with the one coming from the sensor **L7**.

3.0 V6 e 2.0 V6 TB engines up to September 2000:
The engine coolant transmitter and maximum temperature contact **L10** is fitted on the engine head. It includes a thermistor which closes to earth when the coolant reaches a certain temperature threshold. The first signal is sent to panel **C18** pin 9 and the latter to pin 10.

The **fuel level sensor** is submerged in the fuel tank - integrated in pump **P18** - and the resistance value varies with the level of fuel in the tank. A reference earth signal is sent to **C18** pin 3 while a signal proportional to the fuel level in the tanks is sent to panel from **P18** to panel **C18** pin 2.

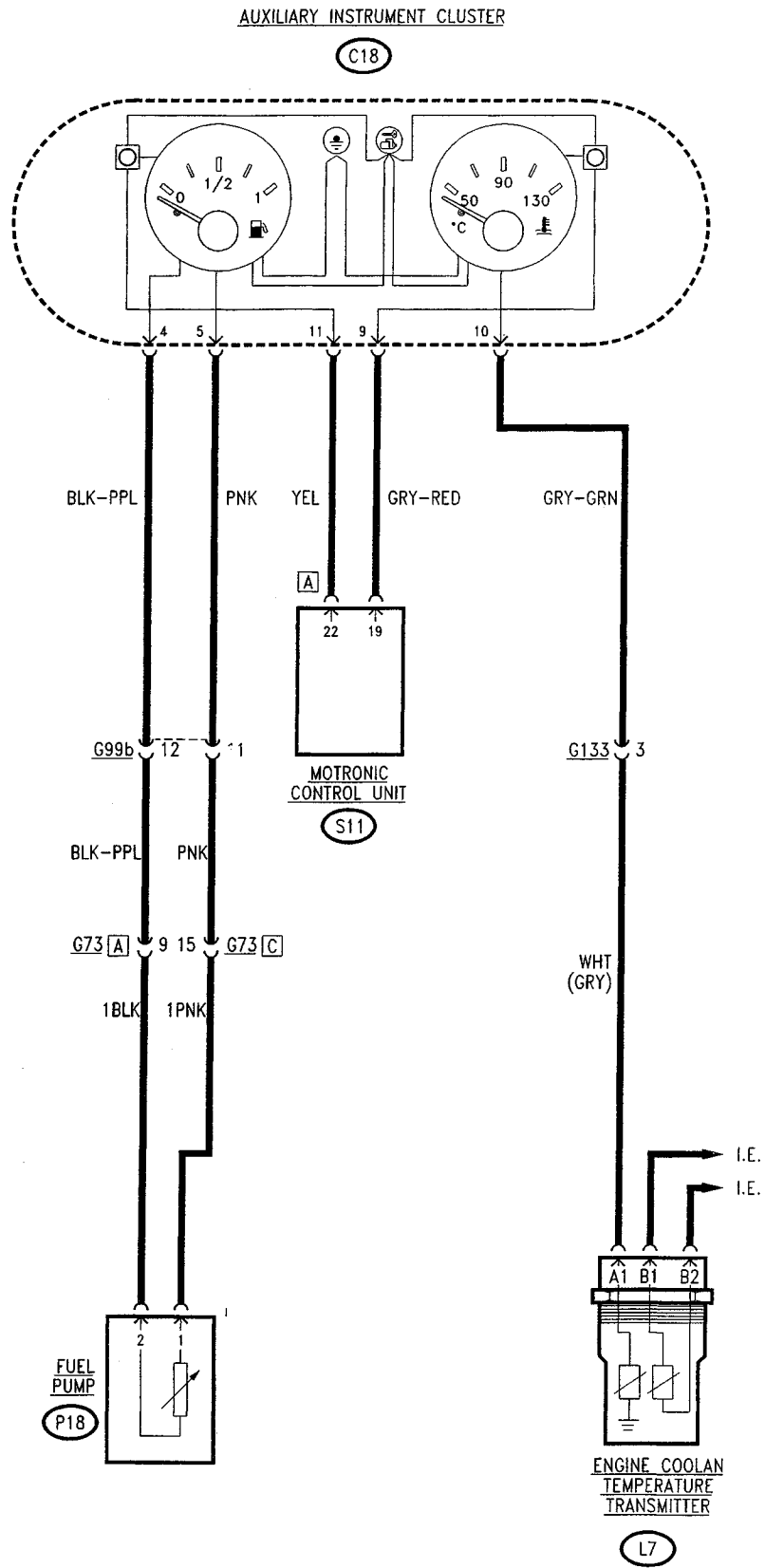
The "reserve" warning light is controlled by the electronic device which manages the gauge in **C18** (starting from October 2000 (EURO 3 engine type) the engine management control unit **S11** will also be receiving a fuel reserve signal sent using the control logic.

Wiring diagram (up to September 2000)

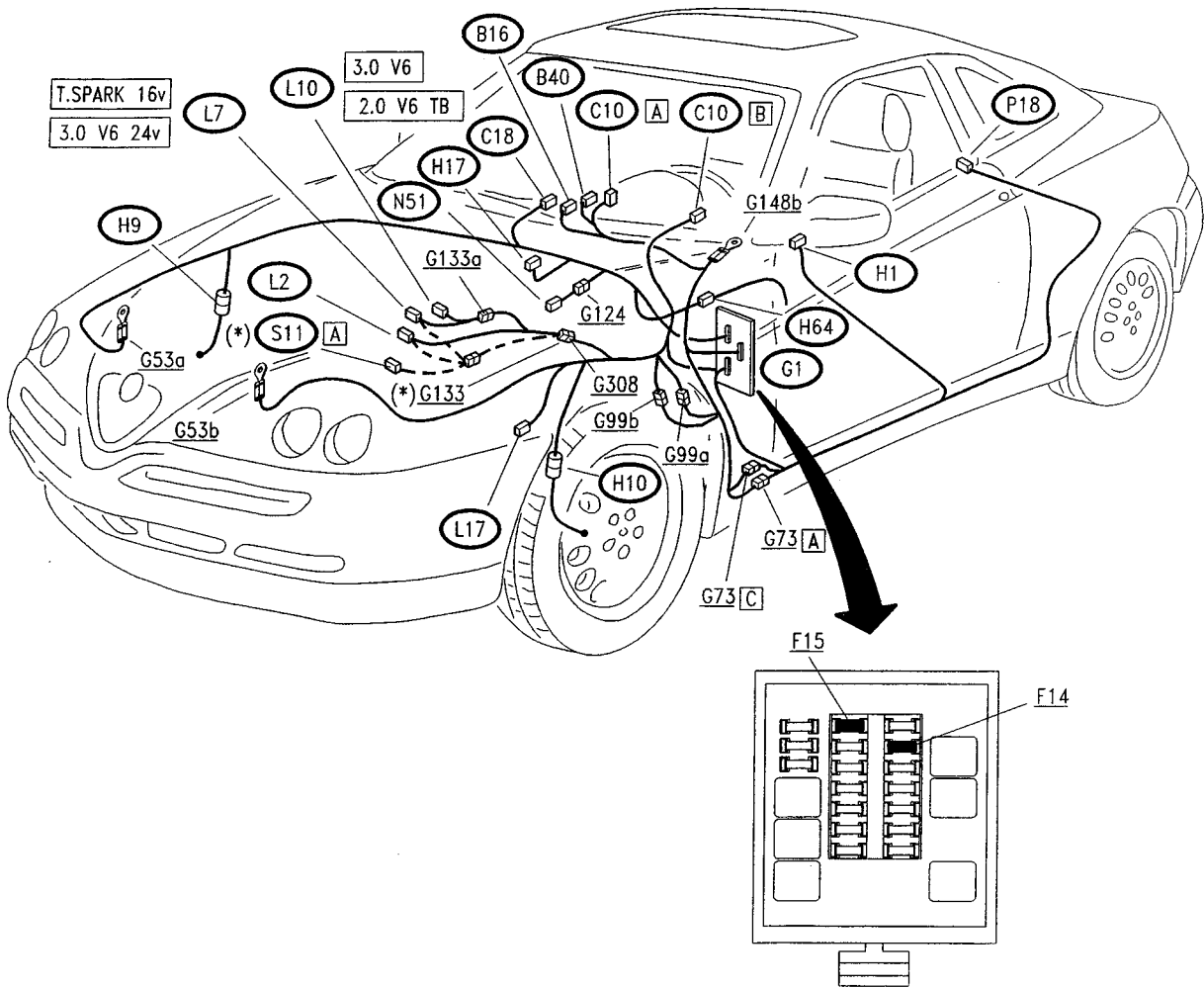


---- from November '99

Wiring diagram (starting from October 2000 )



COMPONENT LOCATION



--- starting from October 2000

TROUBLE SHOOTING TABLE

NOTE: The following faults (e.g. "the warning light does not work") summarise all the cases in which the warning light operation is not correct; e.g. the warning light comes on to signal a non-existent fault or vice versa (a failure is not signalled by the warning light), etc. Seek any warning light faults not described in this section, in the specific section for the system they refer to; e.g. for the main beam warning light, see section "Main and dipped beam headlights".

Fault	Component to be checked															
	F15	F14	C10 (1)	C18 (2)	B16	B40	N51	L2	L10 L7	S11 (**)	P18	H17	H1	H9	H10	H64
The main panel is off (does not work)	•	•	•													
The auxiliary panel is off (does not work)	•	•		•												
The main panel light does not come on			•		•											
The auxiliary panel light does not come on			•	•	•											
Tachometer			•				•									
Rpm counter			•													
Trip counter reset			•			•										
Clock		•		•												
Coolant temperature gauge				•					•							
Fuel gauge and reserve warning light			•	•							•					
Handbrake and minimum brake fluid level warning light (*)			•									•	•			
Brake pads worn			•											•	•	
Seat belt warning light (**)			•													•
Minimum oil pressure warning light			•					•								
Max coolant temperature warning light				•					•	•						

(*) This warning light also comes on to signal an electronic braking control system failure (see section "ABS").

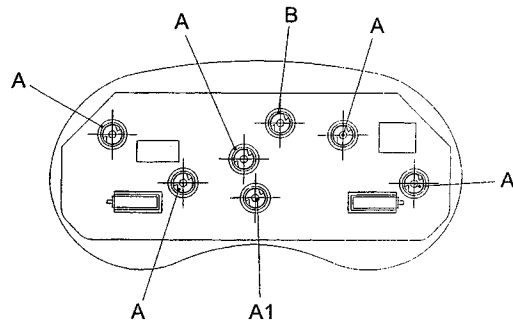
(**) Starting from October 2000.

IMPORTANT: The main instrument panel and the auxiliary instrument panels are single components. All the internal connections are made on a printed circuit which links the instrument contacts and the various warning lights. **Consequently, no repairs can be made (including the replacement of simple warning light bulbs) with the exception of the following:**

(1) Main instrument panel: (C10)

Replaceable:

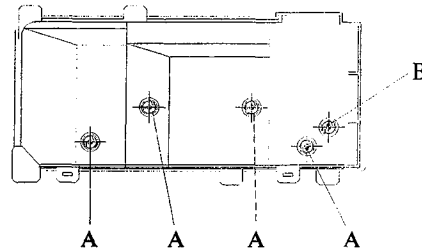
- instrument panel bulbs (A) (1.2W);
- display light bulb A1 (1W, long life)
- main beam warning light (B) (2W).



(2) Auxiliary instrument panel: (C18)

Replaceable

- Panel warning light (A) (1.2W);
- maximum coolant temperature (B) (2W).

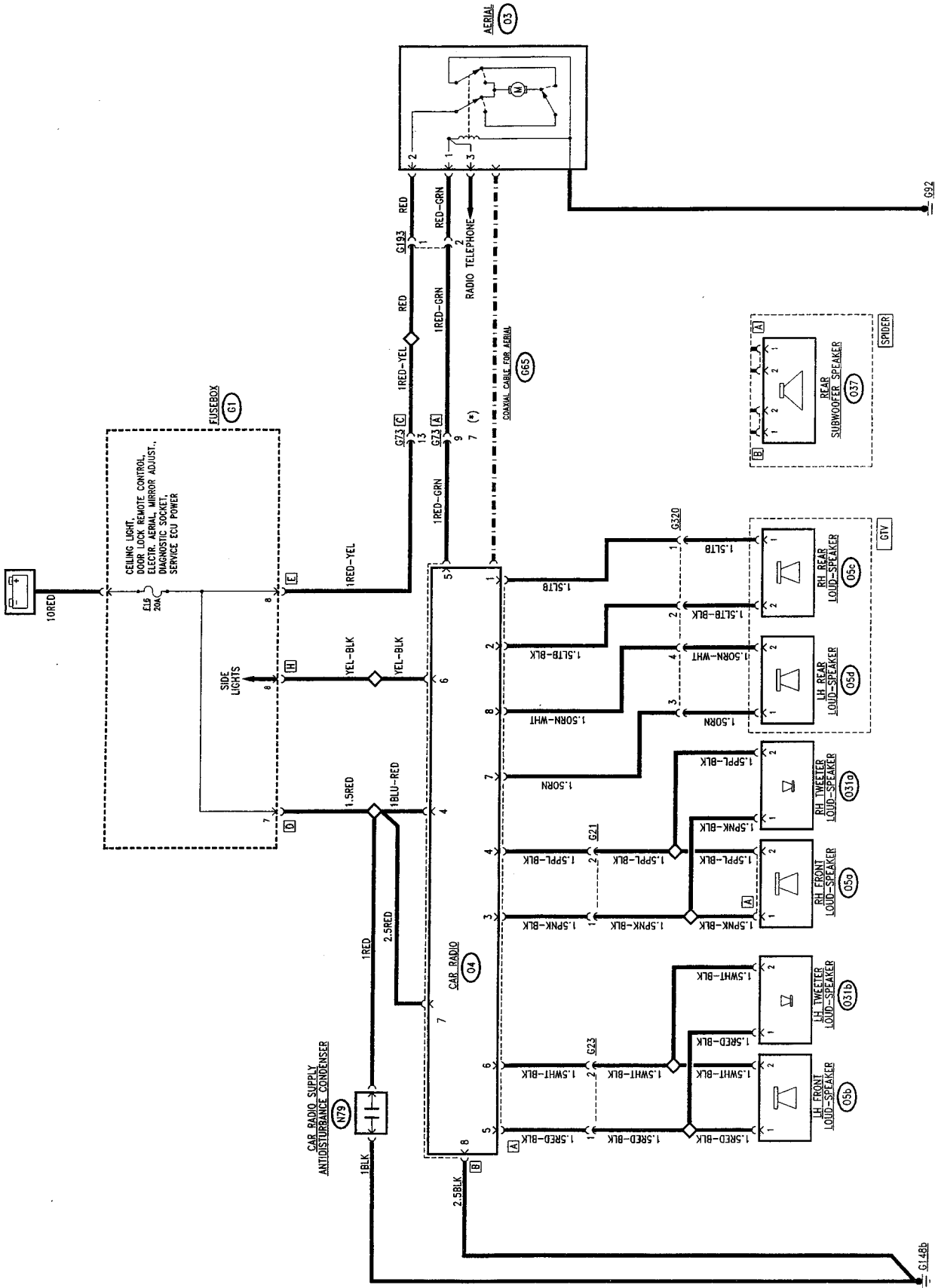


CAR RADIO

INDEX

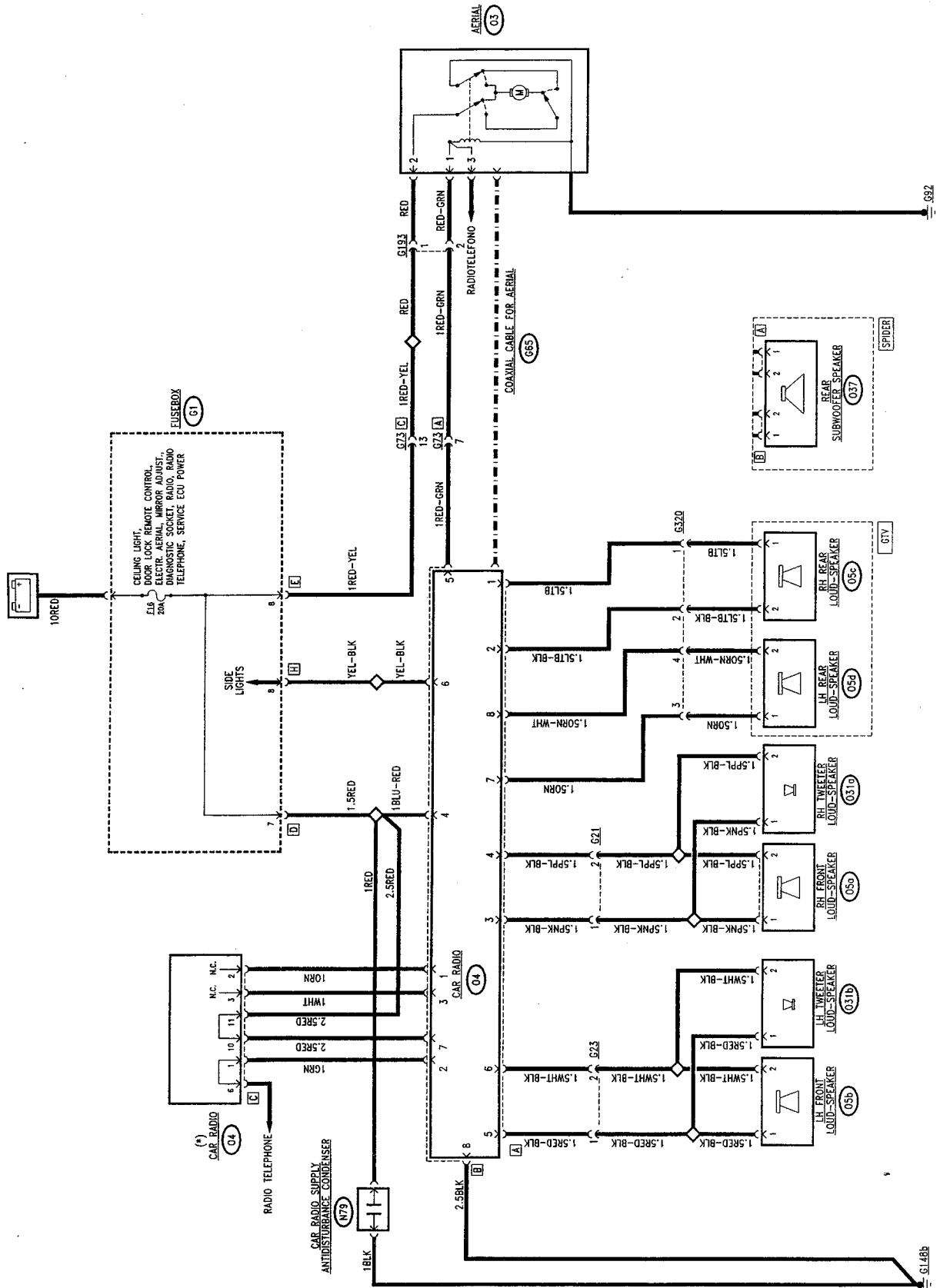
WIRING DIAGRAM	14-2
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CLARION RADIO WITH CD PLAYER (from may 2000)	14-5
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WIRING DIAGRAM (up to September 2000)



--- (*) from November '99

WIRING DIAGRAM (Starting from October 2000)



(*) bridge replacing the radio navigation system, if this is not present.

GENERAL DESCRIPTION

The car is fitted with a provision for the installation of a car radio system complete with loud speakers.

The system includes all the wirings necessary, already connected to the "base" wiring loom of the car, with two 130x180mm front loudspeakers with 2 separate tweeters, and two 165 mm, two-way rear loudspeakers (GTV) or a single 165 mm rear sub-woofer loudspeaker (SPIDER).

The front speakers are located at the sides in the lower sections of the doors, with the tweeters on the pillar and the rear ones are on the shelf behind the seat (GTV) or in the centre behind the console (SPIDER).

The electric aerial is extended by a motor operated when the radio is switched on; it is located on the lefthand side of the boot lid and is connected with the radio by a coaxial cable.

The pre-installed supply for the radio is both key-operated and direct from the battery; this also makes it possible to memorise tuning, safety codes, etc. in the radio set.

In order to ensure very high sound quality under all conditions of use, a number of anti-disturbance suppressors have been fitted: this enables "electronic silencing" of the electric services that might interfere on the radio circuit:

- a suppressor in the boot lock;
- an aluminium sheet on the bonnet sound-deadening, earthed with a suitable braid;

- two condensers on the radio power supply.

FUNCTIONAL DESCRIPTION

Radio **O4** is directly powered by the battery via fuse **F16** in fusebox **G1** to connector B pins 4 and 7.

Pin 8 of connector B is earthed.

Pin 6 receives the "sidelights on" signal used for lighting the radio controls.

The cables with the signals to the speakers leave from connector A of **O4**.

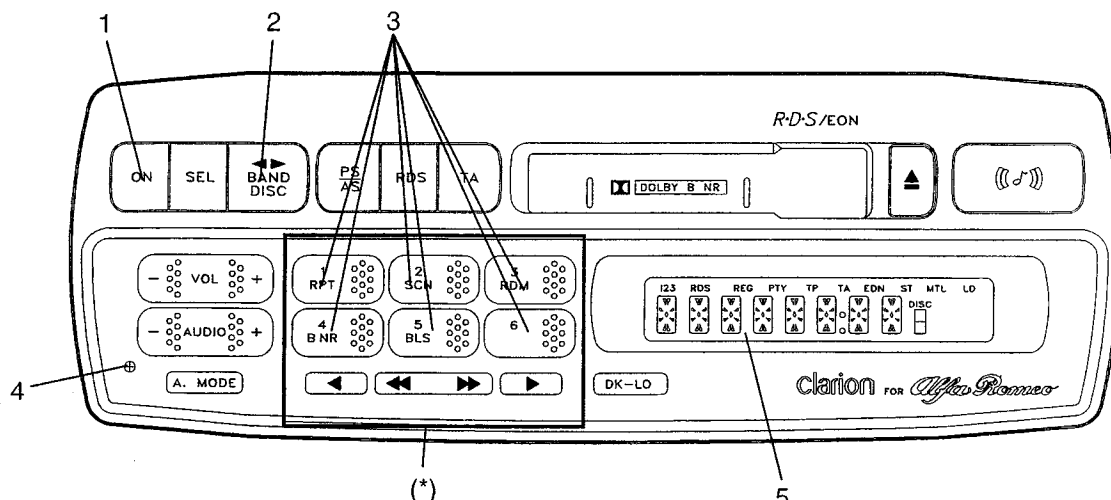
The aerial **A3** is connected to the radio by the special screened coaxial cable **G65**.

A signal also leaves pin 5 of connector B of **O4** which operates the motor of the electric aerial and extends it completely; when the radio signal ceases, the motor is operated in the reverse direction and the aerial is retracted completely.

The aerial **A3** is powered via the line of fuse **F16** of **G1**.

The suppressor **N79** is inserted on the radio supply. Other suppressors are to be found near the services that would be more likely to interfere on the radio circuit.

On the versions with preparation for the radio navigation system and radio phone (connector **O4C**) pin 2 receives the MUTE signal from the telephone, pin 1 receives the speedometer signal, pin 3 receives the reverse signal.

CLARION RADIO (up to april 2000)

1. ON/OFF switch
2. Frequency band selector
3. Pre-select buttons
4. Antitheft led
5. Display
- (*) Removable control panel

Antitheft system

The radio is fitted with a removable control panel (*) which must be removed when leaving the car to make the system unusable: removing the panel, the supply to the whole radio system is cut off and restored automatically when the panel is put back on again.

For further protection the set has a built-in anti-theft system with a secret code.

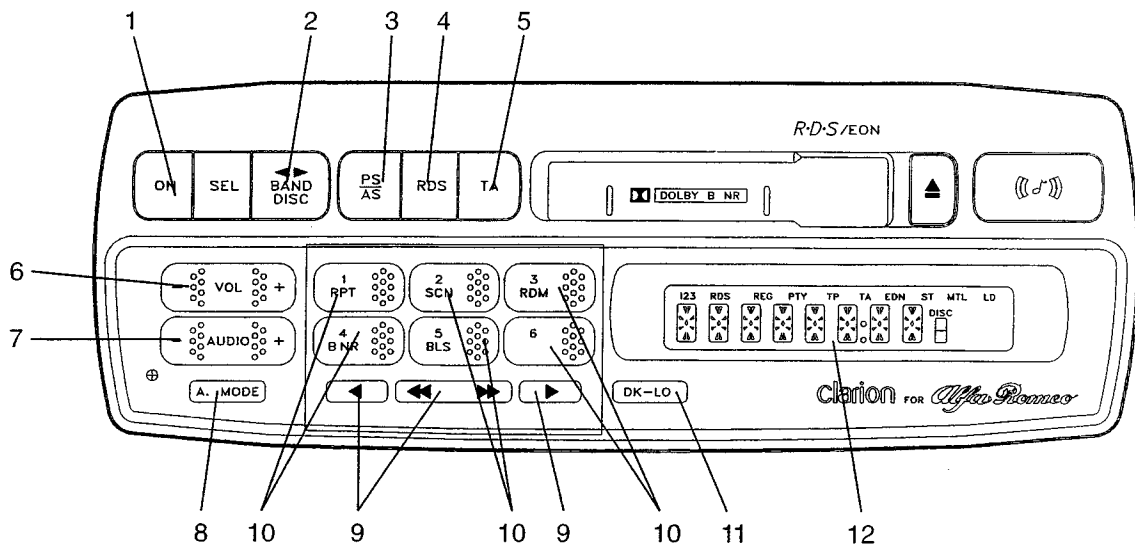
This system makes the set inoperative if for some reason it has been cut off: for example also if the battery is disconnected.

To make the radio work again it is necessary to enter the secret code given on the Customer Card, as follows:

- press the ON/OFF switch (1): the display will show the prompt "CODE IN";
- enter the secret code using the pre-select buttons (3); the number entered will be shown on the display;
- if the **number is correct** the radio turns on (the display will show the radio frequency);
- if the **number is wrong** the number itself stays on the display; press the BAND button (2) for at least 3 seconds and repeat the operation.

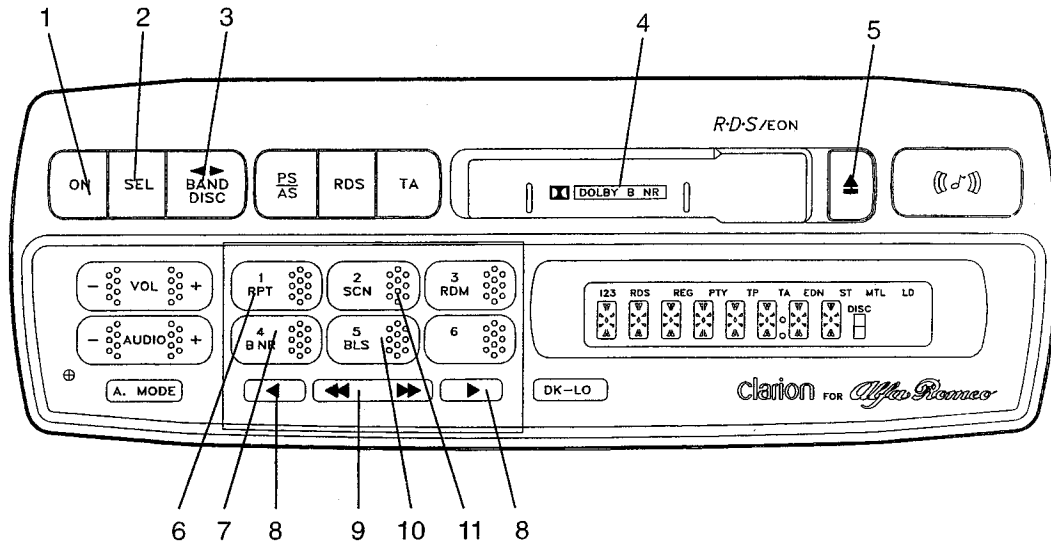
N.B. After three incorrect entries the radio will remain blocked for one hour; after a subsequent attempt it will be necessary to wait another hour and so on).

The antitheft indicator (4) signals the presence of this system when the car is not running.

OPERATION OF THE RADIO:

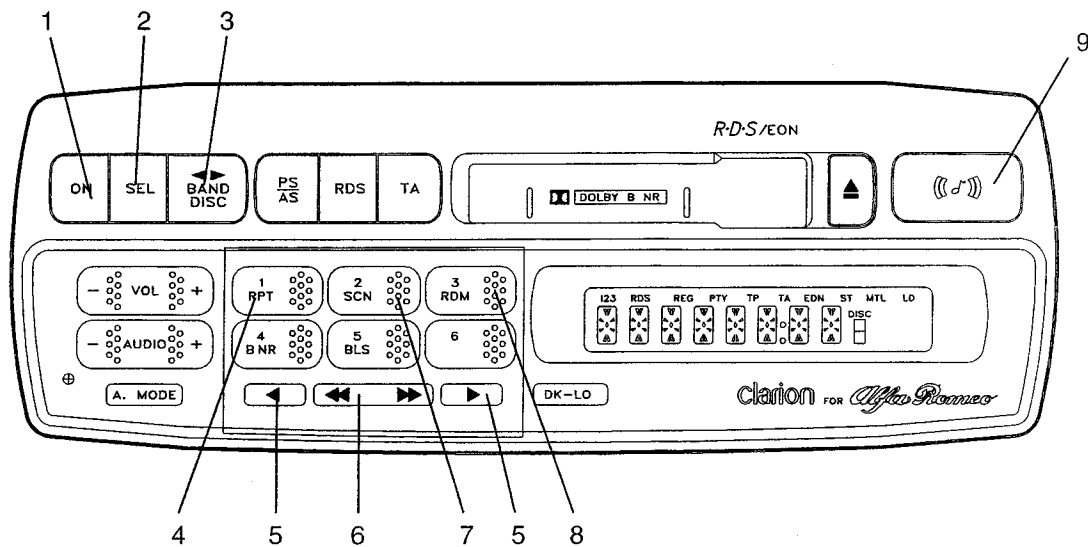
- | | |
|--|-------------------------------|
| 1. ON/OFF switch | 7. Sound adjustment buttons |
| 2. Band selector | 8. Sound mode selector switch |
| 3. Preselector button, scan/automatic memorising off | 9. Tuner buttons |
| 4. RDS button | 10. Pre-selector buttons |
| 5. TA button (Traffic Announcements) | 11. DX-LO tuner button |
| 6. Volume adjustment buttons | 12. Display |

MAGNETIC TAPE PLAYER OPERATION:



- | | |
|-------------------------|----------------------------|
| 1. ON/OFF switch | 7. Dolby switch |
| 2. Mode selector switch | 8. Fast forward buttons |
| 3. Player switch | 9. APC buttons |
| 4. Cassette lid | 10. Empty tape skip button |
| 5. Eject button | 11. Tape scan switch |
| 6. Repeat switch | |

CD CHANGE OPERATION:



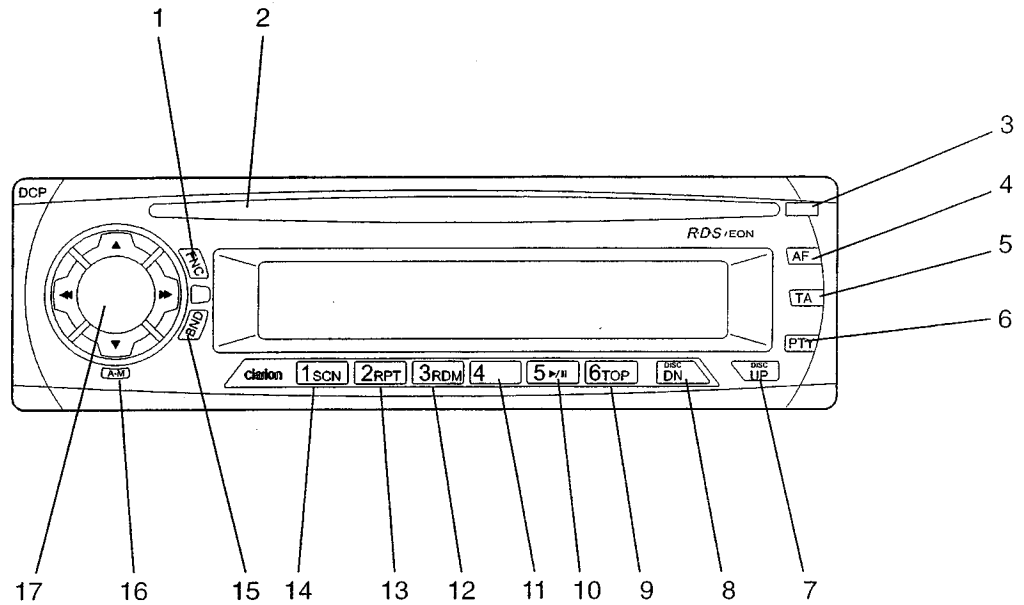
- | | |
|----------------------------|---------------------------|
| 1. ON/OFF switch | 6. Track selector buttons |
| 2. CD mode selector switch | 7. Scan switch |
| 3. CD selector | 8. Random switch |
| 4. Repeat switch | 9. Sound timbre switch |
| 5. Fast rewind buttons | |

WARNING!

The CD CHANGE system contains a laser system and is classified as a "CLASS 1 LASER PRODUCT". For correct use of the set, the Owner's Manual should be read carefully. Do not open the casing to avoid direct exposure to laser beams.

THE USE OF CONTROLS OR ADJUSTMENTS OR THE APPLICATION OF PROCEDURES OTHER THAN THOSE SPECIFIED IN THE OWNER'S MANUAL MAY RESULT IN EXPOSURE TO HARMFUL RADIATIONS.

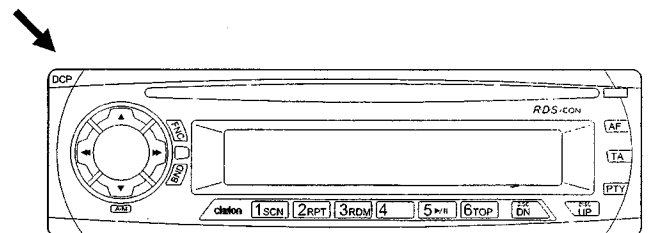
CLARION RADIO WITH CD PLAYER (from May 2000)



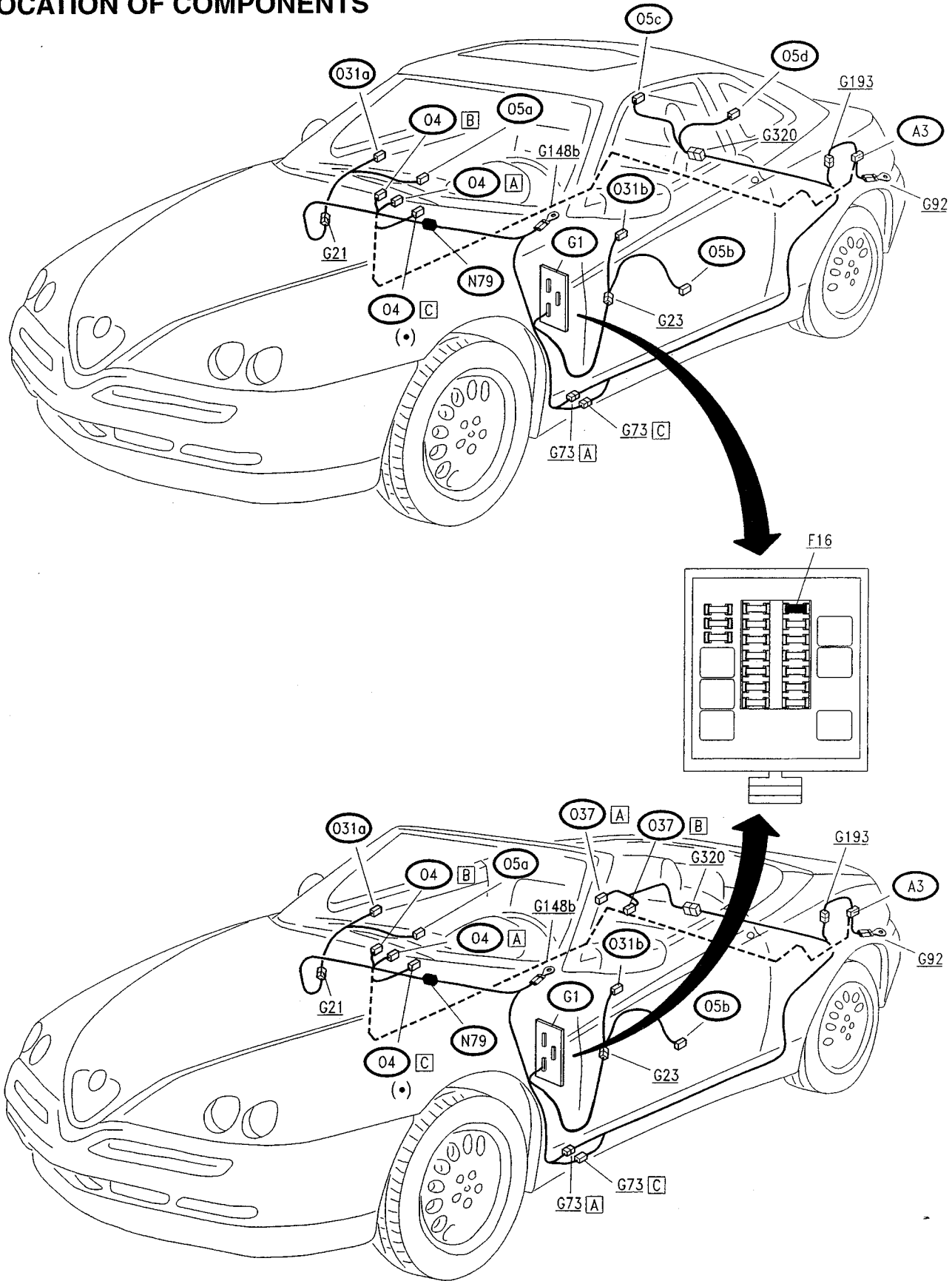
- | | |
|---|--|
| <ul style="list-style-type: none"> 1. On/off button (POWER) Radio, Compact disc (FNC) function selection button 2. CD compartment 3. CD eject button 4. Alternative frequency (AF) search function selection button 5. Traffic news (TA) function selection button 6. PTY NEWS (PTY) function selection button 7. Next disc selection button (DISC UP) 8. Previous disc selection button (DISC DN) 9-14. Station pre-selection buttons | <ul style="list-style-type: none"> 9. CD selection button (TOP) 10. Play/pause button 12. Random CD function selection button (RDM) 13. Track repeat selection button (RPT) 14. Track scan button (SCN) 15. Band selection, manual tuning button (BND) 16. Audio mode (A-M) selection button Loudness selection button (LOUD) 17. Volume adjustment (VOL) and CD track search (SRCH) buttons |
|---|--|

Antitheft system

The radio is fitted with a removable control panel which must be removed when leaving the car to make the system unusable: removing the panel, the supply to the whole radio system is cut off and restored automatically when the panel is put back on again.



LOCATION OF COMPONENTS



----- coaxial aerial cable

(*) preparation for radio navigation system (from October 2000)

FAULTFINDING TABLE

Fault	Component to be checked									
	F16	O4	O5a-O31a	O5b-O31b	O5c	O5d	O37	G65	A3	
Radio power failure	•	•								
Poor reception		•						•	•	
Aerial sticks in	•	•								•
Front speaker/RH tweeter not working		•	•							
Front speaker/LH tweeter not working		•		•						
RH rear speaker not working (GTV)		•			•					
LH rear speaker not working (GTV)		•				•				
Rear speaker not working (SPIDER)		•					•			
Interference from other electric services (•)		•						•		

- (•) If the system hisses or other signals indicating interferences, check that the connection to the wiring loom is correct and that the suppressor condensers **N79** locate near the radio and **N53** near the boot lock are working properly; also check that the sound deadening on the bonnet is fastened correctly.

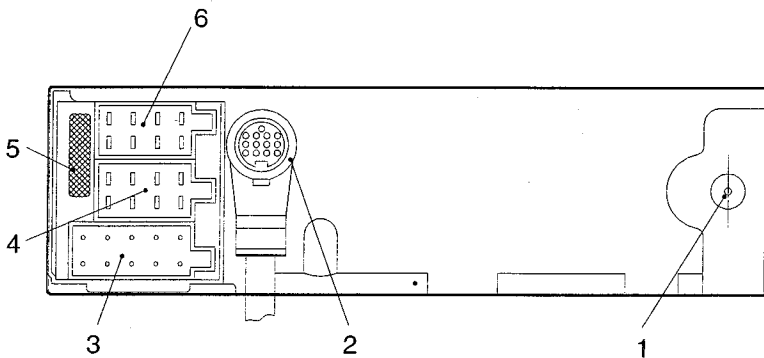
CHECKING COMPONENTS

CAR RADIO (O4)

Further details on the features and operation of the radio are given in the "INSTRUCTIONS FOR USE" provided with it.

Also in the event of malfunctions of certain specific functions of the radio, consult the "INSTRUCTIONS FOR USE". Additionally:

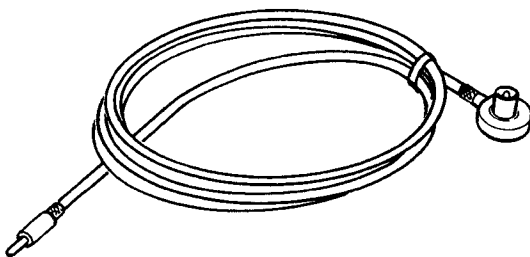
- Also check that the additional fuse (10A) on the back of the radio is intact (pos. 5 of illustration); change it if necessary.
- In the event of hissing noises or other signs of malfunctioning of the system due to interferences, check that the anti-disturbance condensers **N79** near the radio, and **N53** in the boot lock are correctly connected and working properly.



rear view of connectors side:

- 1 - aerial coaxial cable connection socket **G65**
- 2 - connector for connecting C.D. player
- 3 - unconnected connector
- 4 - connector **(O4) A**
- 5 - additional fuse (10A)
- 6 - connector **(O4) B**

Coaxial aerial cable (G65)



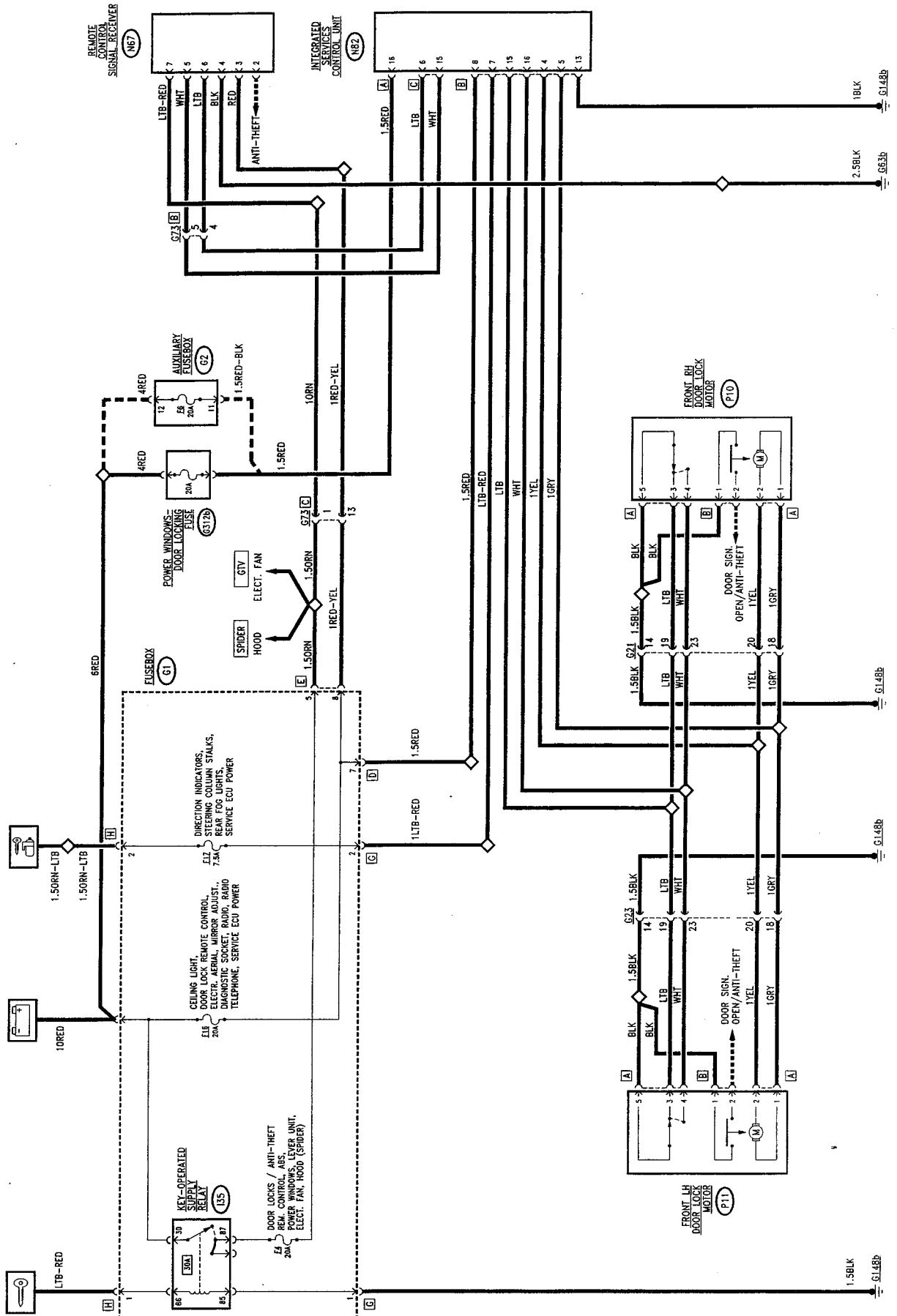
SPECIFICATIONS	
Characteristic impedance	150 Ω ± 10%
Resistance of internal wire	≤ 1 Ω/m
Total capacity (measured on the plug-radio side)	50 ± 90 pF

DOOR LOCKING SYSTEM

INDEX

WIRING DIAGRAM	15-2
GENERAL DESCRIPTION	15-4
FUNCTIONAL DESCRIPTION	15-4
LOCATION OF COMPONENTS	15-5
FAULTFINDING TABLE	15-6
CHECKING COMPONENTS	15-6

WIRING DIAGRAM (from November '99)



--- starting from October 2000

GENERAL DESCRIPTION

The door locking device is controlled by the integrated electronic control unit **N82** which checks and controls the door locks; each of these comprises a gear motor for locking/releasing the lock, a control switch and a door open signalling switch. The latter is used by the Instrument Cluste (see "Instrument Cluster") and by the alarm system (see "Alarm System").

The gear motors are both operated simultaneously from inside through the knobs or from outside using the key.

NOTA: the control unit logic includes a series of check and safety operations:

- each time they are operated, it reads the position of the switches. If this position does not match the one corresponding to the action carried out, a repulsion is activated; if it does correspond to the action carried out everything remains regular. Repulsion takes place both after a locking or releasing manoeuvre;
- the moment the motors are controlled to close and the operation is not performed correctly - i.e. the controls disagree - or a door is open (only for locking) the circuit performs the opposite manoeuvre to try to re-align the locks;
- if the control unit detects more consecutive and complete lock/release manoeuvres - at least 8 within 20 seconds - the system cuts in operating the manoeuvre limiting device, i.e. the system is inhibited in the release position for 30 seconds;

- if the battery voltage falls below 9 V, the system stops working.

FUNCTIONAL DESCRIPTION

The control unit **N82** is located next to the fusebox **G1**.

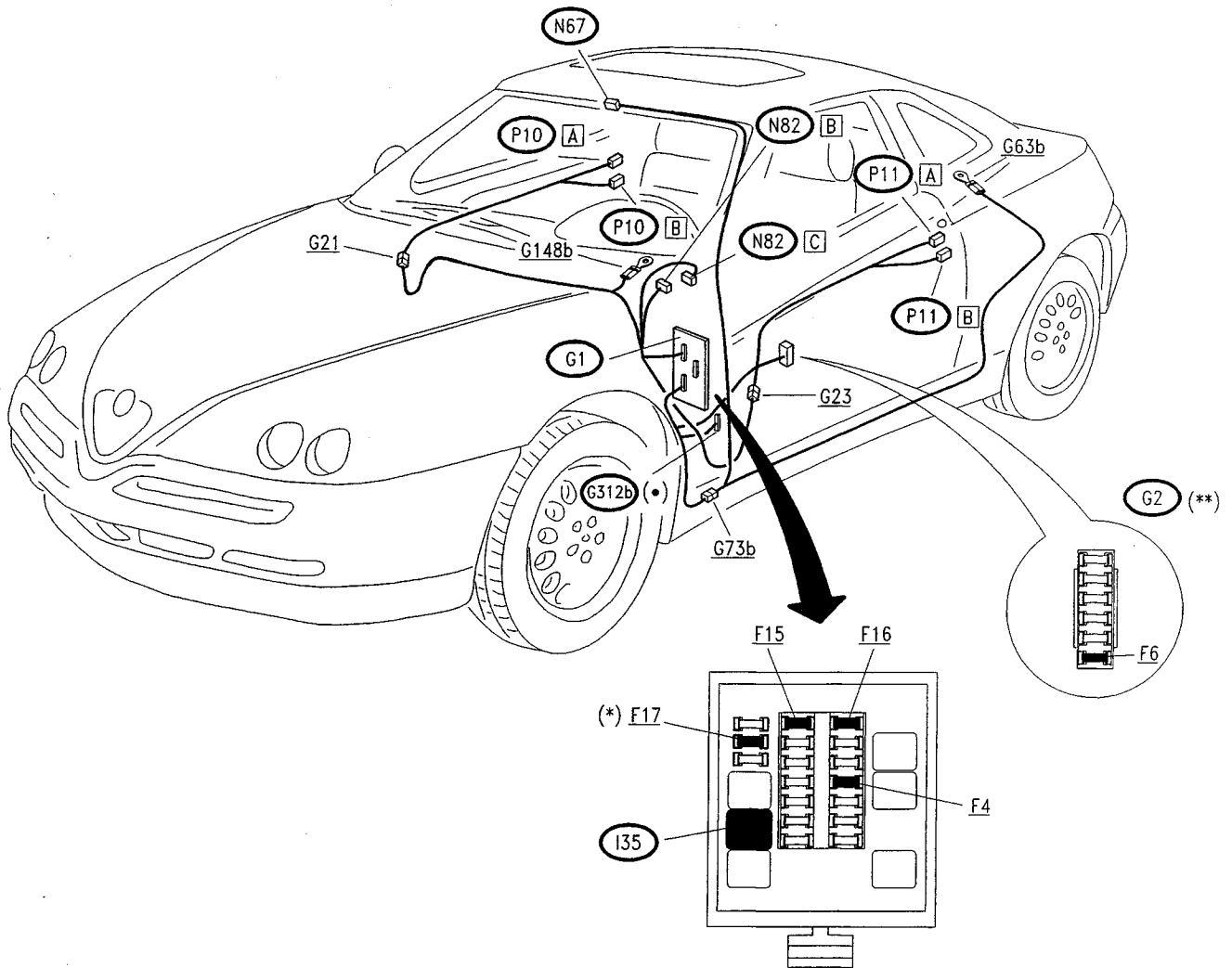
It is powered (pin B8) by the battery via fuse **F16** in **G1** and (pin A16) via individual fuse **G312b** while pin B13 is connected to earth.

It receives a supply from the battery pin B8 through fuse **F16** of **G1** and at pin **A18** of fuse **G312b**, (starting from October 2000, from fuse **F6** of the additional fuse box **G2**); whilst it is earthed at pin **B13**; the supply, on the other hand, is controlled by the ignition, at pin **B7** from the line for fuse **F15** (**F17** from November '99) of **G1**.

At pins B15 and B16 it receives an earth signal which represents the lock or release control from the switches of the front right **P10** and left **P11** door locking devices, or it receives similar signals from the remote control signal receiver **N67**: pin C6 and C15.

The control unit logic performs the checks mentioned previously and sends the lock signal (pin B5 12V and B6 earth) or unlocking signal (pin B4 12V and B5 earth) simultaneously to the door locking device gear-motors **P10** and **P11**.

LOCATION OF COMPONENTS



- (•) Yellow fuseholder
- (*) starting from November '99.
- (**) starting from October 2000

FAULT-FINDING TABLE

WARNING: The control unit safety logic envisages that, **in the event of a mechanical fault** on one of the door locking devices integrated with the lock, the **lock itself stays open**. In the unlikely event that the doors remain closed and locked, it is still possible to open the locks manually : using the key from outside or raising the knobs from inside.

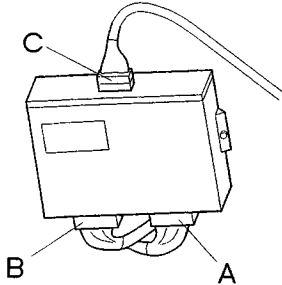
N.B.: the cut off of the supply does not "release" closed doors!! Only when the supply is resumed, will closed doors open.

Fault	Component to be checked									
	G312b	G2	F15	F17 (*)	F4	F16	N82	P10	P11	N67
Entire door locking system	•	•	•	•		•	•			
Door locking remote control does not work					•	•				•
LH front door									•	
RH front door							•			

(*) from November '99

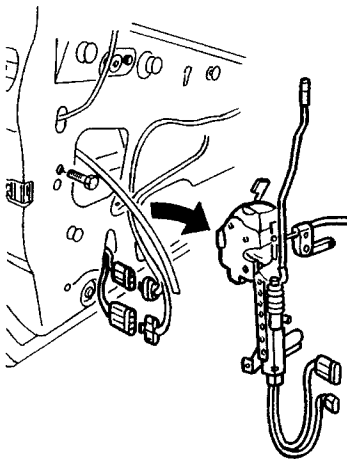
CHECK COMPONENTS

Integrated services control unit **N82**



Check the device **TEST A**

Door locking gear motor **P10** - **P11**



SPECIFICATIONS	
door closed	continuity between pin 1 and 2 of connector B
door open	a.c. between pin 1 and 2 of connector B
lock control	continuity is interrupted between pin 5 and 3 and is established between pin 5 and 4 of connector A
release control	continuity is interrupted between pin 5 and 4 and is established between pin 5 and 3 of connector A
motor operation	applying 12V between pins 1 and 2 of connector A

CHECK SERVICES CONTROL UNIT (N82) - DOOR LOCKING FUNCTION	TEST A
--	---------------

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1 CHECK VOLTAGE – Check for 12V at pins A16 and B8 of N82		OK →	Carry out step A2
		OK →	Check fuse G312b and fuse F16 in G1
A2 CHECK VOLTAGE – With the key at MARCIA, check for 12V at pin B7 of N82		OK →	Carry out step A3
		OK →	Check fuse F15 or F17 of G1
A3 CHECK EARTH – Check that pin B13 of N82 is at earth		OK →	Carry out step A4
		OK →	Restore the wiring between N82 connector B and earth G148b
A4 CHECK LOCK/RELEASE CONTROL SIGNAL – Operate the door lock or release using the key and check for the passage of an earth signal from pin B15 to pin B16 of N82 or vice versa In the same way operate lock and release with the remote control at pins C6 and C15		OK →	Carry out step A5
		OK →	Restore the wiring between N82 and the door lock motor (P10 RH or P11 LH) or replace the latter
A5 CHECK LOCKING/RELEASING ACTION – Operate the door lock and release and check for 12V between pins 7 B4 and B5 of N82		OK →	THE CONTROL UNIT N82 IS WORKING PROPERLY: Check the door lock motor P10 or P11 and the associated connections
		OK →	Replace the control unit N82

ALARM SYSTEM (V.A.S.)

INDEX

GENERAL DESCRIPTION	16-2
WIRING DIAGRAM	16-3
FUNCTIONAL DESCRIPTION	16-4
LOCATION OF COMPONENTS	16-5

GENERAL DESCRIPTION

Upon request the car is fitted with an alarm system combined with the door locking system with remote control.

The Vehicle Alarm System V.A.S. is a system which offers perimeter protection: it is able to survey the state of the doors and bonnets; the system is controlled by a single compact unit which comprises the electronic control unit and siren.

The system is "universal" as it offers the possibility to configure the control unit according to the require-

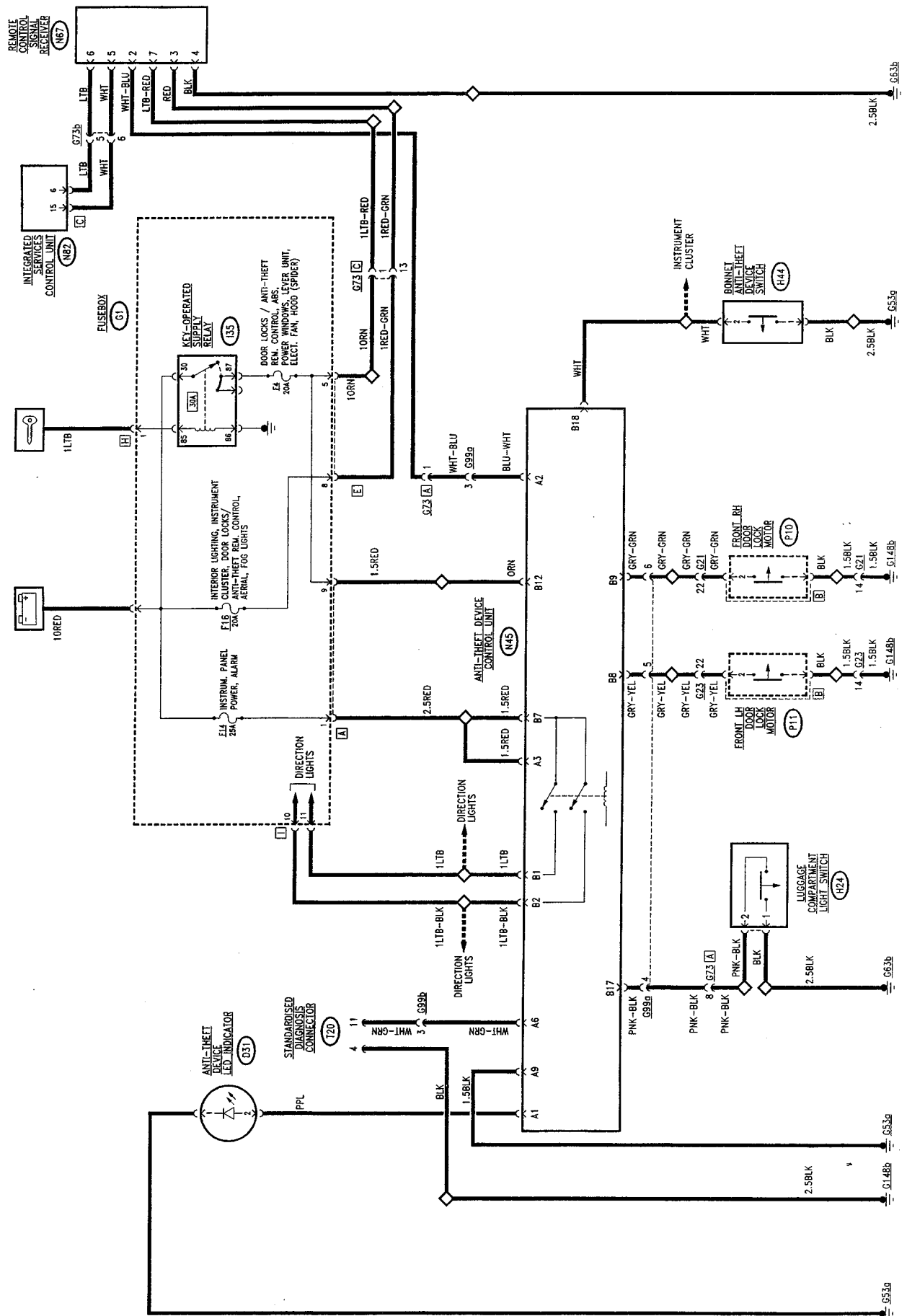
ments of the different countries (alarm sound level and types of light flashing for activation/deactivation).

In addition, a sophisticated self-diagnosis system controls:

- intermittent and permanent errors or faults;
- number of activations of the system and the number of alarms sounded;
- specific faults of the control unit;

**FOR FURTHER DETAILS SEE THE SPECIFIC
"ALARM SYSTEM" PUBLICATION
PA50050000000.**

WIRING DIAGRAM



FUNCTIONAL DESCRIPTION

The alarm system is controlled by the electronic control unit **N45** integrated with the siren and emergency key.

The control unit is supplied directly by the battery at pin A3 via fuse **F14** of fusebox **G1**; with the same line also pin B7 is supplied (blinker supply); the key-operated supply reaches pin B12 via fuse **F4** of fusebox **G1**.

Pin A9 is earthed (**G53a**).

The system activation signal from the receiver **N67** reaches pin A2 of the control unit, through the **serial connection line**.

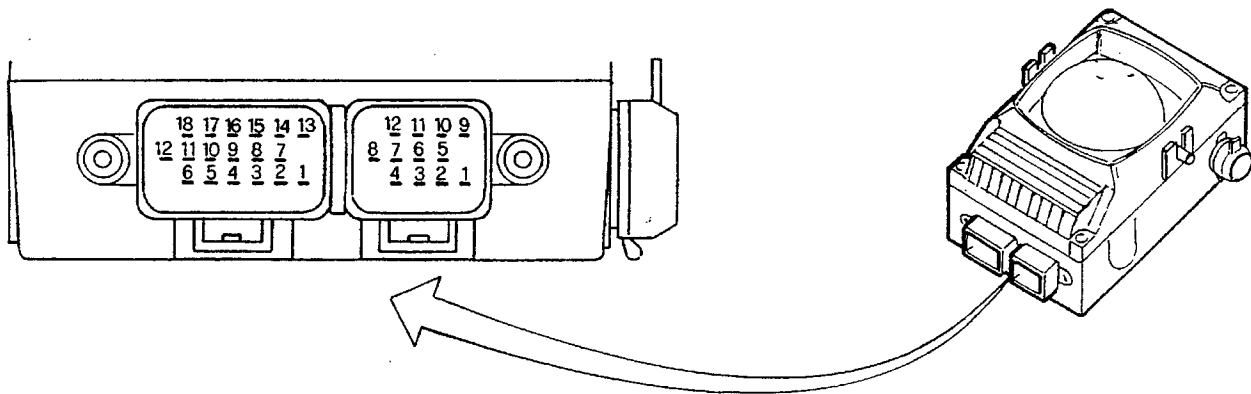
The receiver **N67** controls opening/locking of the doors, through the integrated services control unit **N82** of fusebox **G1** (for further details see "Door locking system").

The control unit monitors locking of the doors, boot and bonnet via switches **P11** and **P10** of the doors (the same as the door locking device) which respectively send an earth signal to pin B8 and B9. The bonnet is controlled by switch **H44**, which is connected at pin B18, and the boot by switch **H24** (which also turns on the boot light) which is connected at pin B17.

In addition to locking the doors, carried out directly by the receiver **N67**, the control unit activates the blinkers (hazard warning light flashing) sending an intermittent: from pin B1 for the right hand lights and from pin B2 for the left hand lights.

Pin A1 of the control unit sends a "duty-cycle" signal to led **D31** when conditions so require.

Lastly, the system may be connected with the diagnostic equipments through connector **T20** -pin 11-; the diagnosis signal - line K - leads from pin A6 of the control unit.

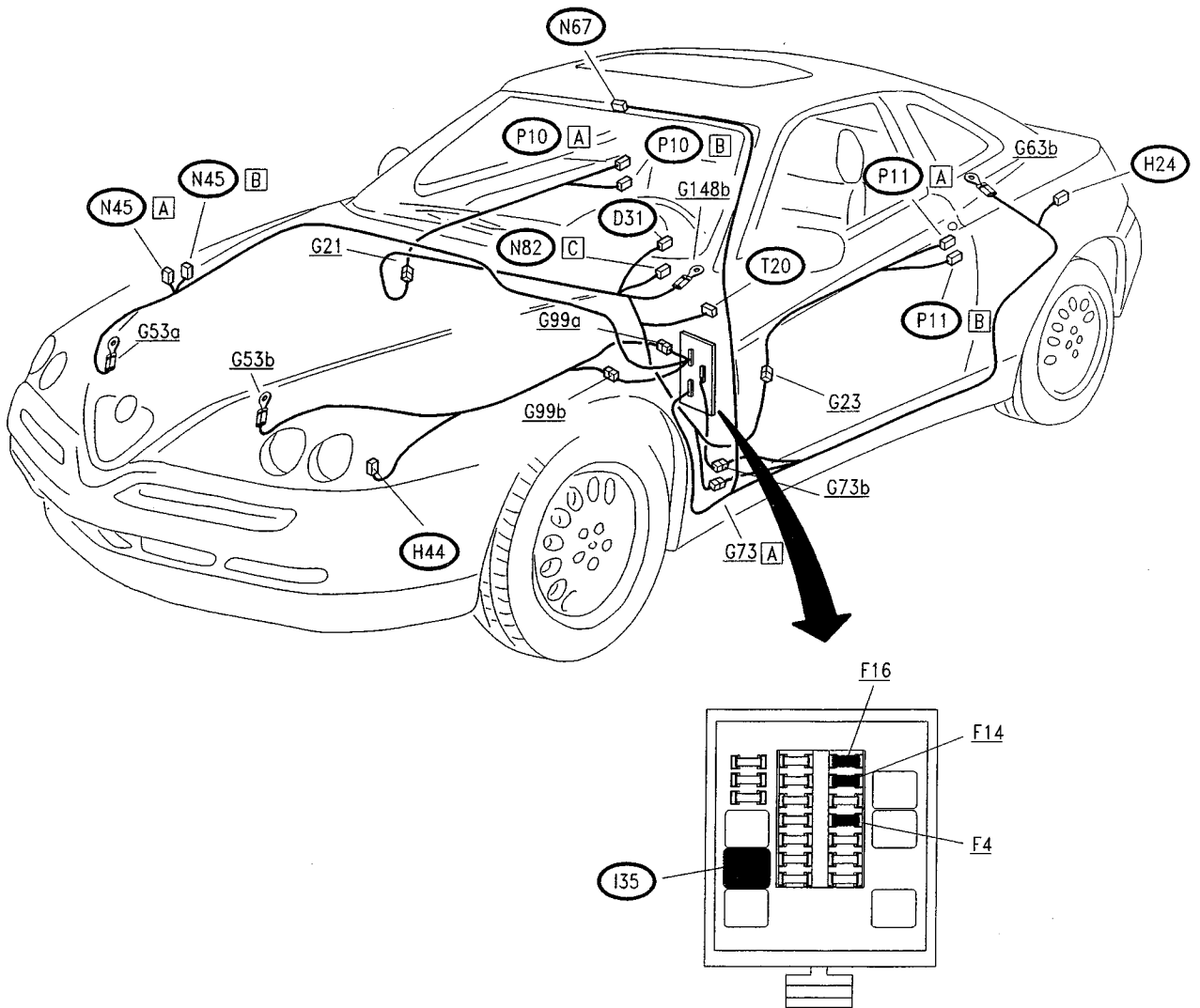


CONTROL UNIT PIN-OUT

- | | | |
|---|---------------------------------------|--------------------------------------|
| A1 Signalling led command | B1 Command for RH direction indicator | B11 Provision for two-colour led (*) |
| A2 Serial connection line with receiver (roof lamp) | B2 Command for LH direction indicator | B12 "Key-operated" supply |
| A3 Direct supply | B3 Provision for relay contact (*) | B13 Emergency key supply (*) |
| A4 Emergency key-OFF (*) | B4 Provision for relay supply (*) | B14 Check signal (*) |
| A5 N.C. | B5 Provision for relay contact (*) | B15 RH rear door open signal (*) |
| A6 Diagnosis line K | B6 Provision for relay supply (*) | B16 LH rear door open signal (*) |
| A7 Emergency key-ON (*) | B7 Blinker supply | B17 Boot open signal |
| A8 Supply for volumetric sensors (*) | B8 LH front door open signal | B18 Bonnet open signal |
| A9 Control unit earth | B9 RH front door open signal | |
| A10 Engine serial line provision (*) | B10 Provision for two-colour led (*) | |
| A11 Earth for volumetric sensors (*) | | |
| A12 Signal for volumetric sensors (*) | | |

(*) Outputs not connected in this version

LOCATION OF COMPONENTS

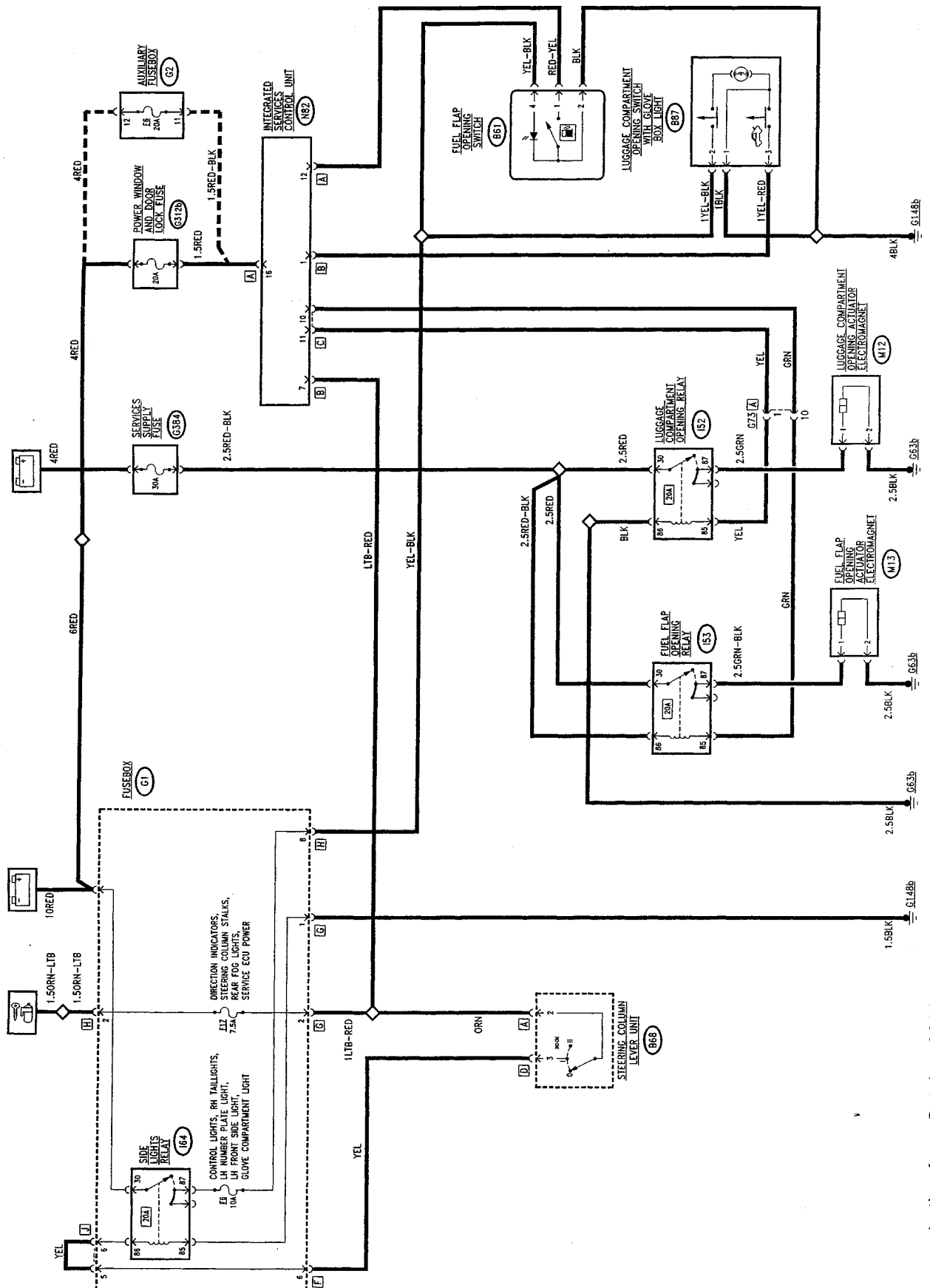


LUGGAGE COMPARTMENT AND FUEL FLAP OPENING CONTROL

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FUNCTIONAL DESCRIPTION	17-4
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FAULTFINDING TABLE	17-6
CHECK COMPONENTS	17-6

WIRING DIAGRAM (from November '99)



--- starting from October 2000

GENERAL DESCRIPTION

In addition to using the key in the rear lock, the **luggage compartment** can also be opened from inside the car through an electrical control.

The switch that opens the lock by an electromagnetic control is to be found in the glove box.

This box is lit when the sidelights are on by a light on this switch when it is opened.

This device only works with the ignition key at STOP, otherwise the lock must be opened manually.

The **fuel flap** is opened by an electrical control by the switch on the dashboard which operates the corresponding electromagnet.

This device too, only operates with the ignition key at STOP.

The two relays which operate the devices, the supply fuse and the "key-operated cut out" are located in the rear compartment.

From November '99 the two functions are managed by the services control unit according to the following logic: the opening of the boot lid and the fuel flap are only enabled if there is no signal controlled by the ignition (i.e. with the ignition key switched OFF or extracted).

FUNCTIONAL DESCRIPTION

The boot opening electromagnet **M12** is controlled by relay switch **I52**: this is supplied on the power line by battery voltage via floating fuse **G384** and on the energizing line by relay switch **I108**: this switch sends the supply to relay **I52** and to the other release devices if it does not "receive" the signal that the key is at "MARCIA"; in fact, when the key is turned it cuts off the supply; the command signal - earth signal to energize relay **I52** - leads from the special switch **B87** located in the glove box; the energized relay supplies electromagnet **M12** which triggers the boot lock.

The switch in **C16** is illuminated when the side lights are on.

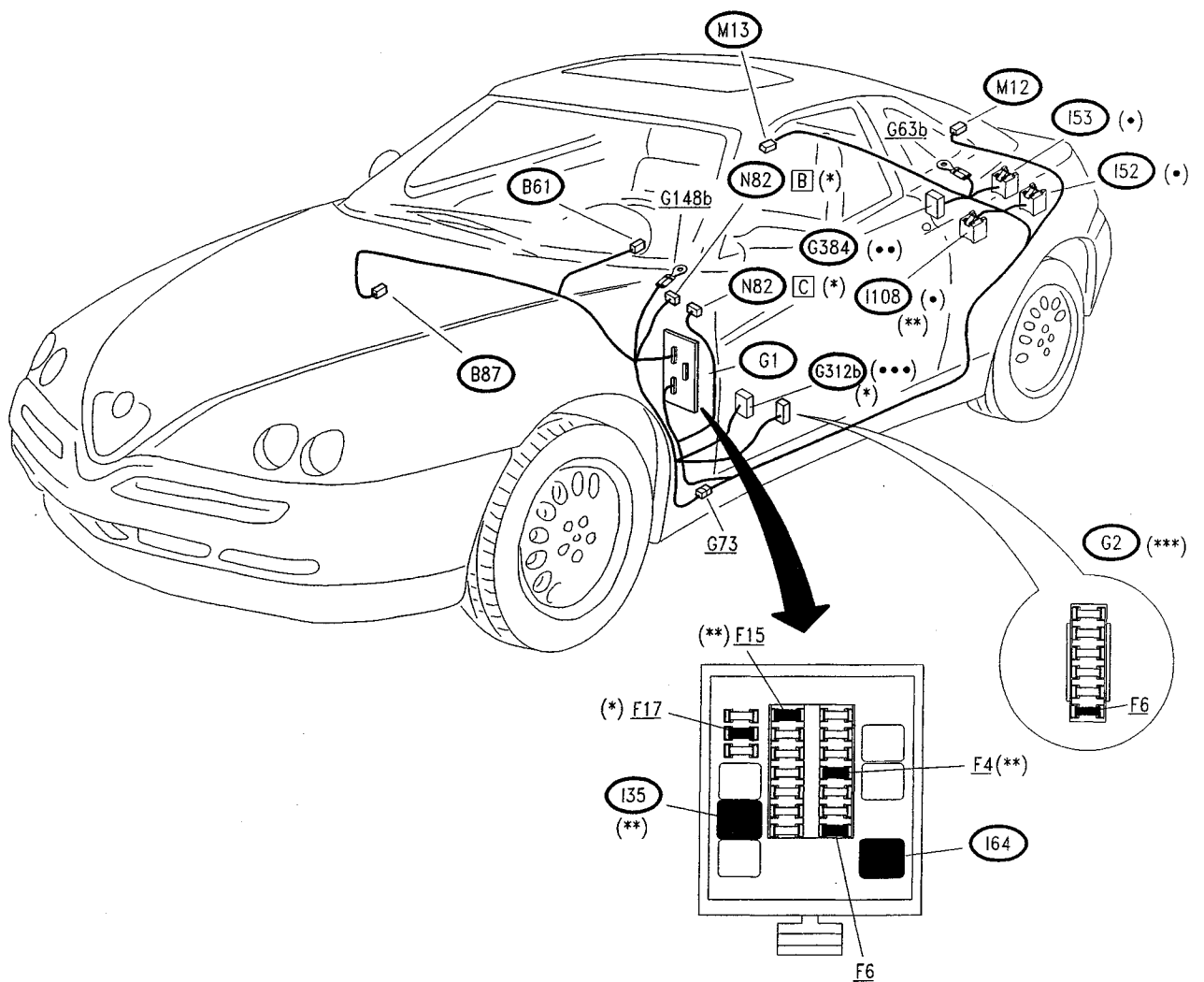
NOTE: switch **B87** incorporates a pushbutton which turns on a light when the glovebox is opened; the supply for this light leads from fuse **F6** of **G1**, sidelights line

The fuel flap opening electromagnet **M13** is controlled by relay **I53** in the same way as described for the luggage compartment opening.

The control switch **B61** is to be found on the dashboard and it is illuminated when the side lights are on.

From November '99, the control for switch **B87** reaches the services control unit **N82**, pin **B1** which sends the command - pin C11 - which energizes the relay **I52**. The command for the switch **B61** reaches **N82**, pin A12 which sends the command - pin C10 - to the relay **I53**.

LOCATION OF COMPONENTS



- (*) starting from November '99
- (**) only up to November '99
- (***) starting from October 2000
- (•) Black base
- (••) Green fuseholder
- (•••) Yellow fuseholder

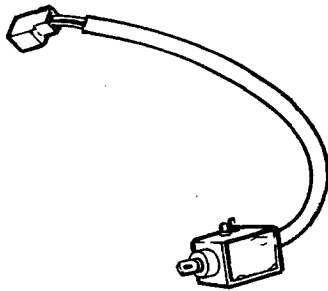
FAULTFINDING TABLE

Failure	Component to be checked										
	F17 (*)	F6	G384	M12	M13	I52	I53	B87	B67	I108	N82 (*)
Boot opening control	•		•	•		•		•		•	•
Fuel flap opening control	•		•		•		•		•	•	•
Fuel flap opening switch lighting (with sidelights on)									•		
Glove box lighting (with glove box open)		•						•			

(*) from November '99

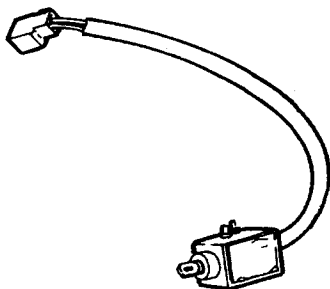
CHECK COMPONENTS

Boot opening electromagnet (M12)



SPECIFICATIONS	
Nominal voltage	12V
Absorbed current	31A
Magnetic core stroke	7 ± 0.5 mm

Fuel flap opening electromagnet (M13)



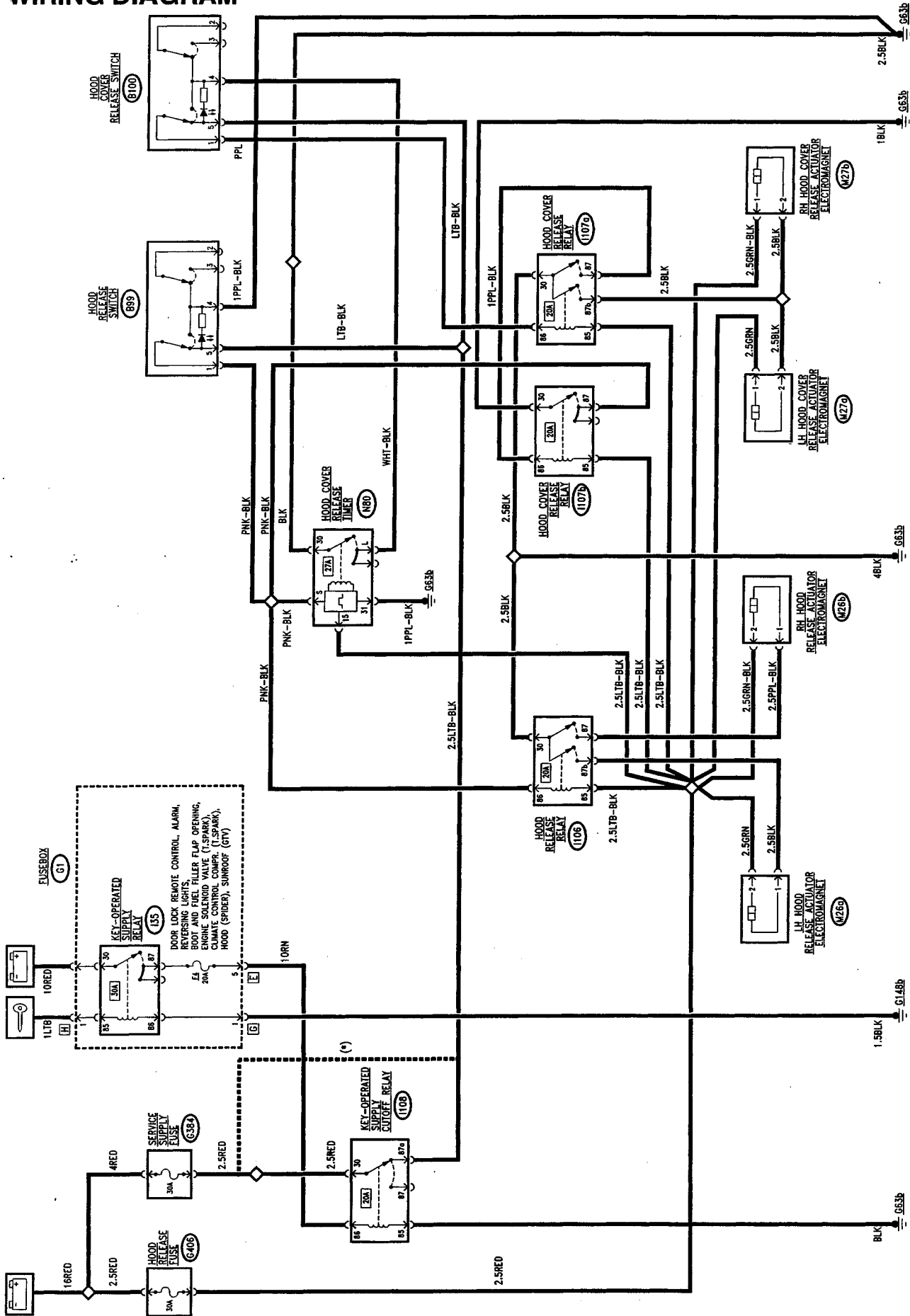
SPECIFICATIONS	
Nominal voltage	12V
Absorbed current	31A
Magnetic core stroke	7 ± 0.5 mm

HOOD (SPIDER only)

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WIRING DIAGRAM	18-2
GENERAL DESCRIPTION	18-3
FUNCTIONAL DESCRIPTION	18-3
LOCATION OF COMPONENTS	18-4
FAULTFINDING TABLE	18-5
CHECK COMPONENTS	18-5

WIRING DIAGRAM



(*) --- from November '99

GENERAL DESCRIPTION

In the SPIDER, opening/closing the hood is facilitated by two electrical actuators: the first one releases the hood at the rear when it is closed; the second one opens the hood cover so that the hood can be folded in or taken out.

For each of these functions a special switch commands one or more relays which in turn operate a pair of release actuators. The switches are located on the rear side panel behind the driver's seat.

N.B. Both devices can be operated only with the ignition key removed or in the STOP position. The hood cover can only be released after the hood has been released.

All the operating relays, the supply fuse are to be found in the boot.

FUNCTIONAL DESCRIPTION

The electromagnets **M26a** and **M26b** which operate the release of the hood are powered with battery voltage via wander fuse **G406** (30A); the earth signal is received from the corresponding relay **I106**, which has the energizing line leading from relay **I108** - this is a shunt which sends the power to **I106** and the other relays only when it "feels" the signal of the key turned to "MARCIA"; in fact when the key is turned this supply cuts out. The signal that energizes relay **I106** leads from switch **B99** behind the driver's seat: the energized relay supplies the two electromagnets **M26a** and **M26b** which release the rear fastening of the hood.

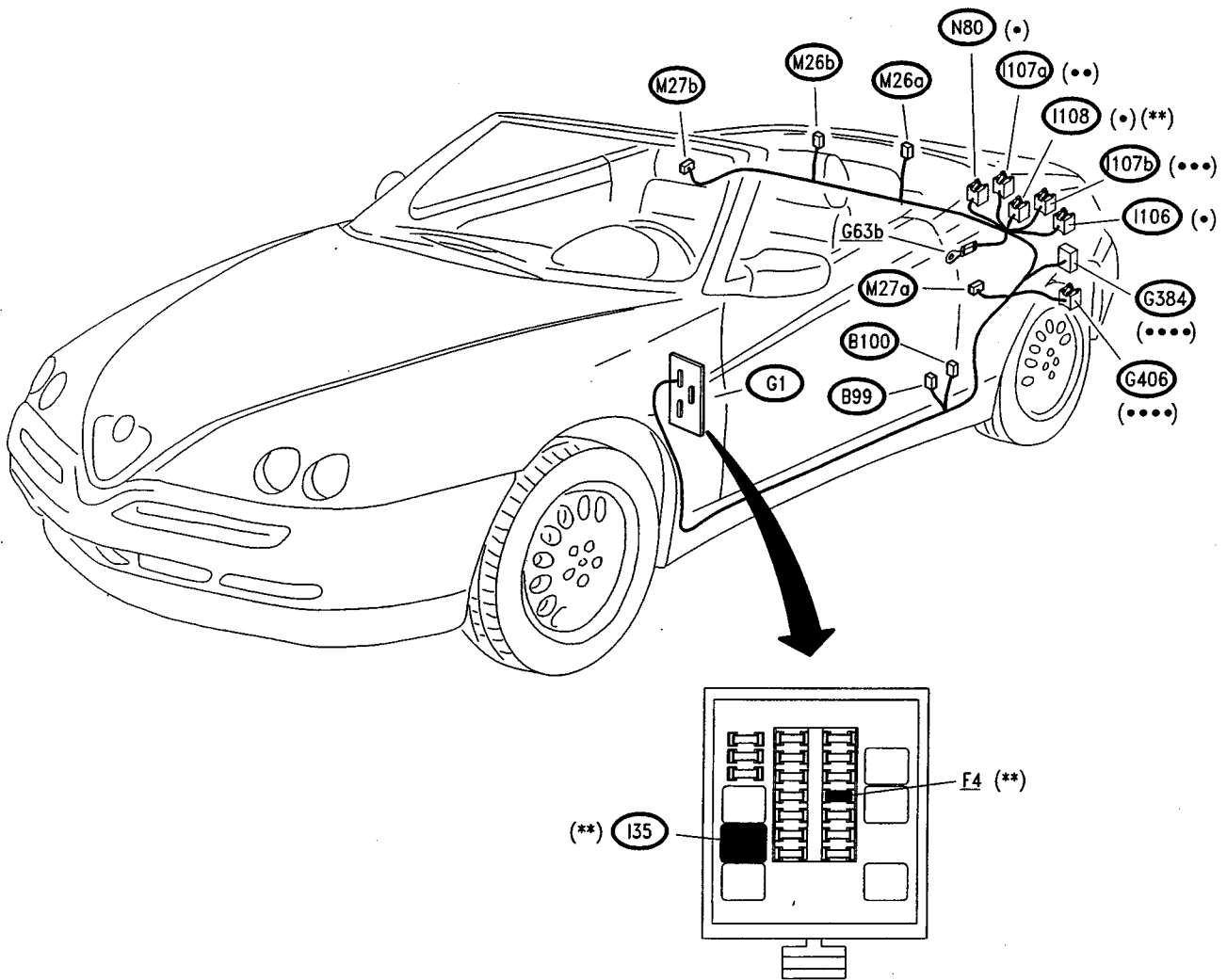
The hood cover is only released when the hood has been released previously: this takes place via the timer **N80** and the two relays **I107a** and **I107b**. The "hood release" control signal energizes timer **N80** (pin S) which for appr. 20 minutes sends an earth signal to switch **B100** which is active only in this case. This is the only possible way to send a control signal to energize relay **I107a** which sends an earth signal to the two electromagnets **M27a** and **M27b** which release the fastening of the hood cover - the two electromagnets are powered with battery voltage via wander fuse **G406** -.

Relay **I107a**, and **I107b**, have a common energising line from fuse **G406**.

Simultaneously another earth signal - **I107a** has a double contact - is sent, via the other relay **I107b**, to pin S of timer **N80**, to cut out timing.

Switch **B99** is lit with the key at MARCIA, while switch **B100** only lights up when it can be pressed.

LOCATION OF COMPONENTS



(**) only up to November '99

(•) Black base

(••) Red base

(•••) Brown base

(••••) Green fuseholder

FAULTFINDING TABLE

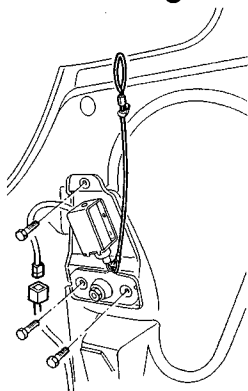
Fault	Component to be checked										
	G406	M26a	M26b	M27a	M27b	I106	I107a	I107b	B99	B100	N80
Hood release control	•	•	•			•			•		
Hood cover release control (*)	•			•	•		•	•		•	•
Release switches lighting (**)									•	•	

(*) N.B. this function can only be operated after releasing the hood.

(**) Switch B100 is only illuminated when hood cover releasing is possible (after the hood has been locked).

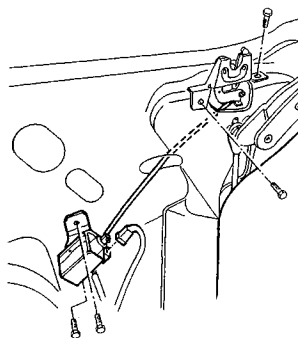
CHECK COMPONENTS

Hood release electromagnet **M26a** **M26b**



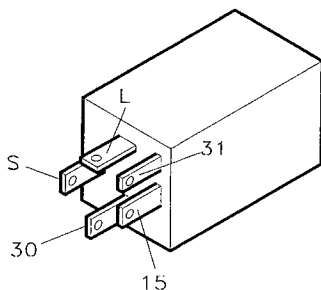
SPECIFICATIONS	
Nominal voltage	12V
Absorbed current	31A
Magnetic core stroke	10 ± 0.5 mm

Hood cover release electromagnet **M27a** **M27b**



SPECIFICATIONS	
Nominal voltage	12V
Absorbed current	31A
Magnetic core stroke	7 ± 0.5 mm

Hood cover release timer **N80**



Check the device: see **TEST A**

CHECK HOOD COVER RELEASE TIMER (N80)	TEST A
---	---------------

	TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1	CHECK VOLTAGE	(OK) →	Carry out step A2
	– Disconnect device N80 and check on the base for 0V at pins 30 and 31; with the ignition key at MARCIA, 12V between pins 15 and 30	(OK) →	Check floating fuse G406 . Restore the wiring between N80 and earth G63b
A2	CHECK COMMAND SIGNAL	(OK) →	Insert device N80 on the base and continue with step A3
	– Operate switch B99 and check for an earth at pin S of N80	(OK) →	Restore the wiring between B99 and N80 , and between B99 and earth G63b
A3	CHECK HOOD COVER OPERATION	(OK) →	DEVICE N80 IS WORKING PROPERLY. Check the other components of the system and their connections
	– Operate switch B99 and check for 12V at pin L of N80	(OK) →	CHANGE DEVICE N80

AUTOMATICALLY-OPERATED HOOD (SPIDER only)

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LOCATION OF COMPONENTS	18A-15
FAULT FINDING	18A-17

INTRODUCTION

The entire electrohydraulic system is governed by a specific electronic control unit.

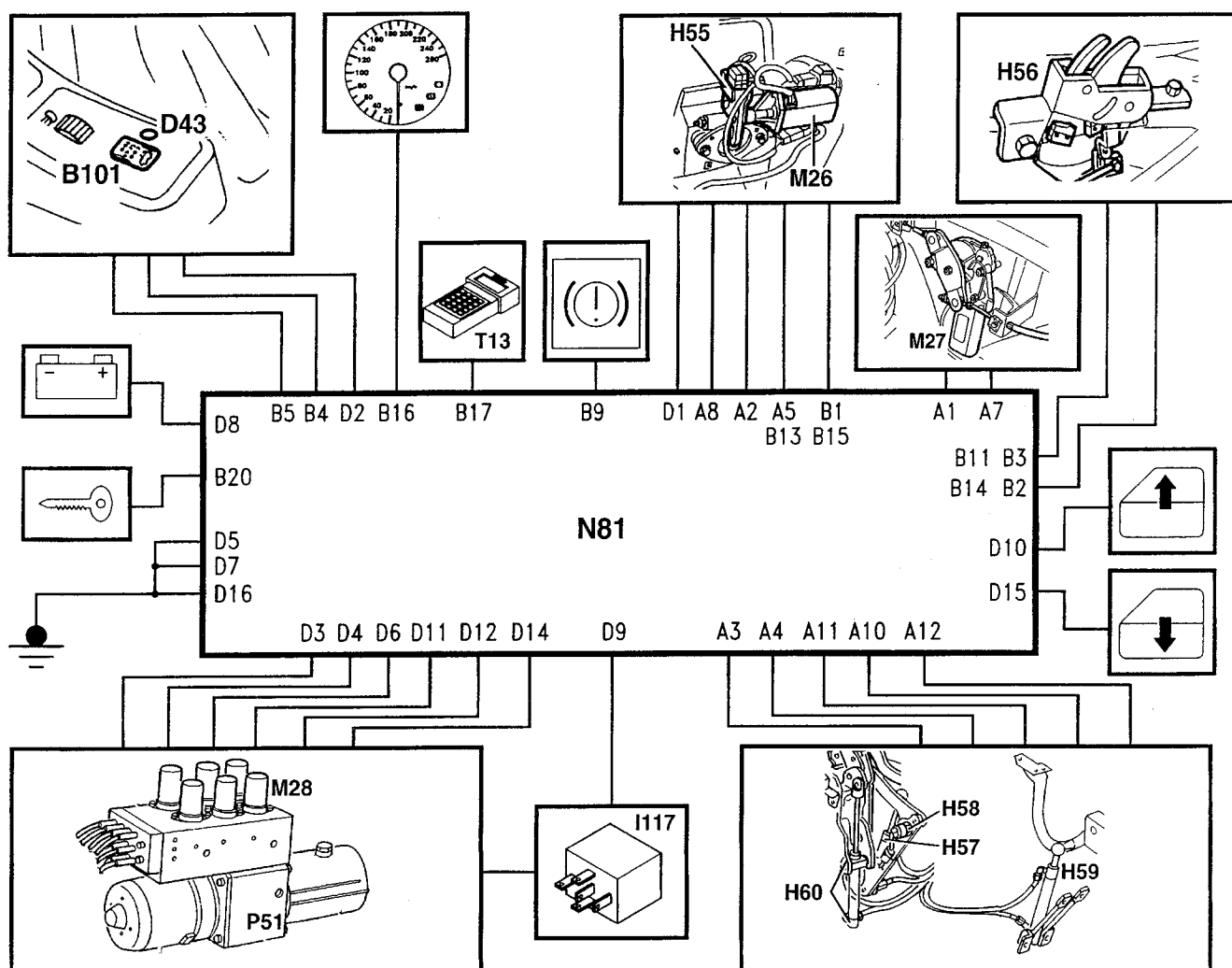
The control unit receives the position signals from the sensors (switched) located on the locks of the hood and and of the hood cover and on the hood operating cylinders.

It also receives the consent signals to operate the system: key at MARCIA, handbrake engaged and car speed.

On the basis of the memorised logic and the command signal leading from the control button, the control unit controls the solenoid valves of the hydraulic system and the electric locks.

Other output signals are sent to the led and to the diagnosis connector.

The figure below summarizes the flow of signals going in and out of the control unit.



NOTE: the components are identified by the code used in the wiring diagrams

B101 Automatic hood control switch
D43 Signalling led for automatic hood
H55a RH hood closing switch
H55b LH hood closing switch
H56a RH hood cover closing switch
H56b LH hood cover closing switch
H57 5th arc raised switch
H58 Intermediate 5th arc switch
H59 Hood cover raised switch
H60 Hood position switch

I117 Automatic hood electric pump relay
M26a LH hood release actuator
M26b RH hood release actuator
M27 Hood cover release actuator
M28 Automatic hood solenoid valves
N81 Automatic hood control unit
P51 Automatic hood control pump
T13 Diagnosis connector for Alfa Romeo Tester

Operating logic carried out by the control unit

OPENING CYCLE:

1. lowering of the windows

the windows are lowered for appr. 1 second.

2. hood closing

the hood closing solenoid valves (no.4) and the electric pump are operated; the solenoid valve remains active also at the signal from "hood closed" switch;

3. opening of 5th arc locks

the release relay of the two locks is activated until the signal of the "5th arc lowered" switch is received. The hood closing solenoid valve (no.4) remains active to keep the hood in position;

4. 5th arc raising

the 5th arc raising solenoid valve (no.6) is activated: after 0.6 seconds from the signal from the "5th arc raised" switch operations continue with step 5;

5. hood cover lock opening

the 5th arc raising solenoid valve (no. 6) remains active, and the hood cover lock release relay is activated: when the signal is received from the "hood cover release" switch the relay remains active for another 0.2 seconds;

6. hood cover opening

the 5th arc raising solenoid valve (no. 6) remains active while the hood cover opening solenoid valve (no. 1) is also activated: at the signal from the "hood cover raised" switch operations continue with the next step;

7. 5th arc lowering

the hood cover opening solenoid valve (no. 1) remains activated while the 5th arc lowering solenoid (no. 5) is also activated and then deactivated after 0.2 seconds from the signal from the "intermediate 5th arc" switch.

8. hood opening

the hood cover opening solenoid valve (no.1) remains activated while the hood opening solenoid valve (no. 4) is also activated; at the signal from the "hood open" switch the hood cover opening solenoid valve is deactivated, and after 0.5 seconds operations continue with step 9.

9. hood cover closing

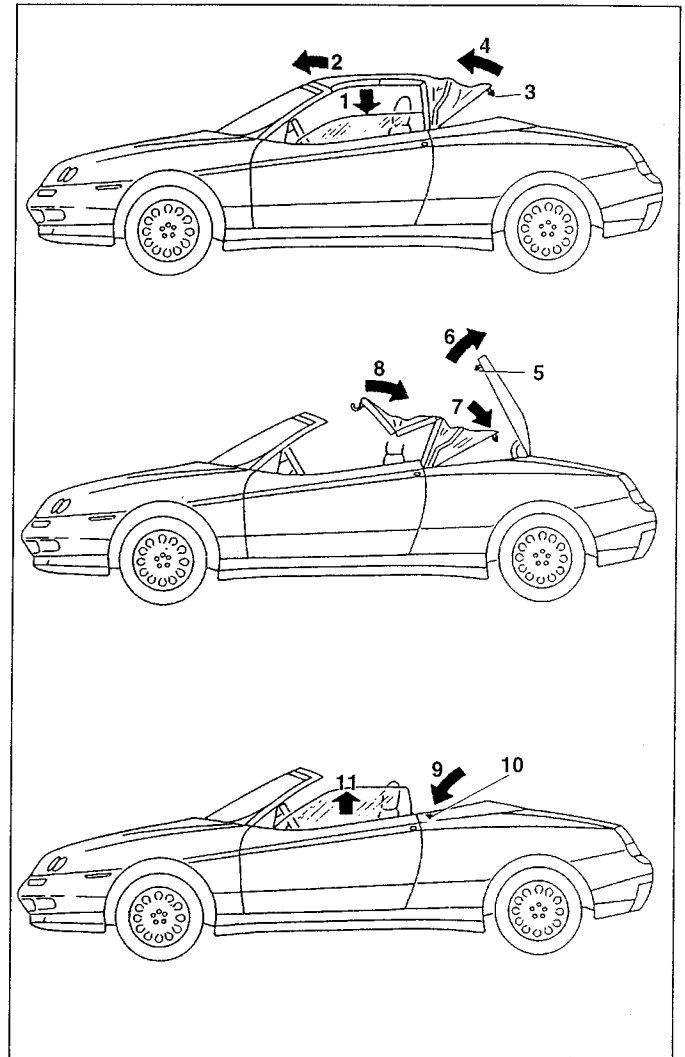
the hood cover closing solenoid valve (no. 2) is activated: at the signal from the "hood cover closed" switch the electric pump is deactivated, while the solenoid valve remains active;

10. hood cover lock closing

the hood cover lock closing relay is activated: when the signal from the "hood cover lock closed" switches is received the relay remains active for another 0.2 seconds;

11. window closing

as soon as the hood cover is closed again, the windows are highered for a maximum of 12 seconds. Releasing the system operation button during this last operation the windows stop.



CLOSING CYCLE

1. hood cover lock opening and lowering of the windows

the hood cover lock release relay is activated: when the signal is received from the "hood cover release" switches the relay remains active for another 0.2 seconds.

Simultaneously the windows are lowered for appr. 1 second;

2. hood cover opening

the hood cover opening solenoid valve (no. 1) is activated: after 0.5 seconds from the signal from the "hood cover raised" switch operations continue with step 3;

3. hood closing

The hood cover opening solenoid valve (no. 1) remains activated while also the hood closing solenoid valve (no. 3) is activated and then deactivated at the signal from the "hood closed" switch;

4. 5th arc raising

The hood cover opening solenoid valve (no. 1) remains activated while the 5th arc raising solenoid valve (no. 6) is also activated; at the signal from the "5th arc raised" switch the hood cover opening solenoid valve is deactivated, and after 1 second operations continue with step 5;

5. hood cover closing

the 5th arc raising solenoid valve (no. 6) remains active while the hood cover closing solenoid valve (no. 2) is activated until receiving the signal from the "hood cover closed" switch;

6. hood cover lock closing

the hood cover lock closing relay is activated: when the signal is received from the "hood cover lock closed" switches the relay remains active for another 0.2 seconds.

7. 5th arc lowering and locks closing

the hood opening and closing solenoid valves (no. 3 and 4) are activated to keep the hood in position; at the signal from the "intermediate 5th arc" switch the relay for closing the two locks is activated remaining active for 0.5 seconds from the signal of the "5th arc locks closed" switches.

The 5th arc lowering solenoid valve (no. 5) is also activated and then deactivated after 1 second from the signal from the "5th arc closed" switch

8. facilitated front catching

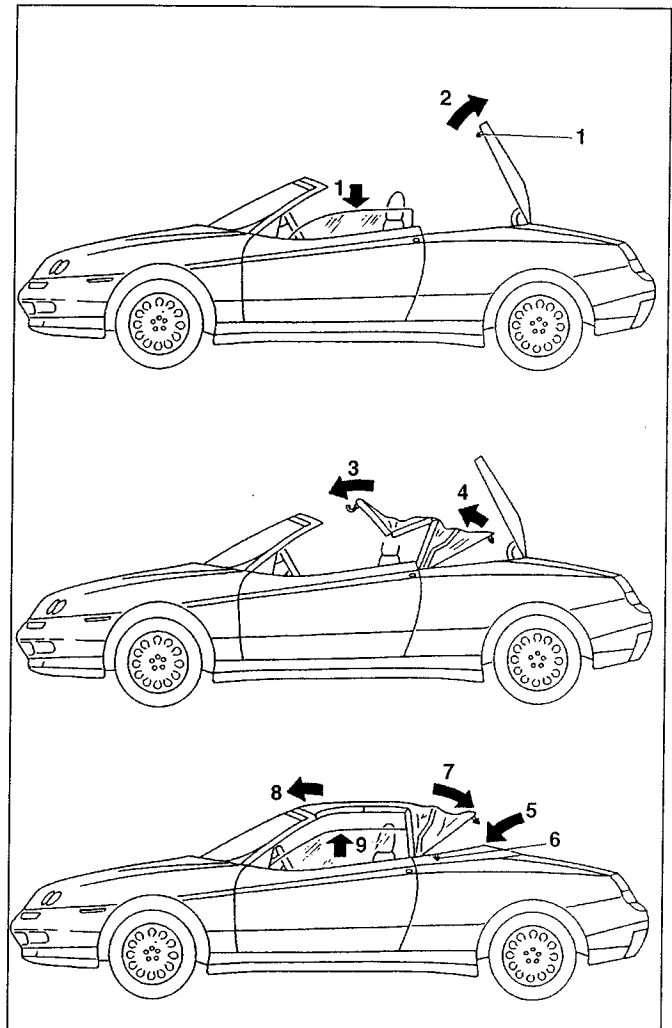
the hood opening solenoid valve (no. 4) is deactivated to lower the pressure in the hood cylinders, thereby facilitating manual catching of the hood to the windscreen.

At this point the led goes off, while the hood closing solenoid valve (no. 3) remains active for another 20 seconds;

9. windows closing

pressing the button again - within 25 seconds - the windows are highered for a maximum of 12 seconds.

Releasing the system operating button during this operation the windows stop.



Electronic control unit (N81)

The electronic control unit is housed in the rear console of the passenger compartment next to the electrohydraulic unit:

CONTROL UNIT PIN-OUTS:

connector A

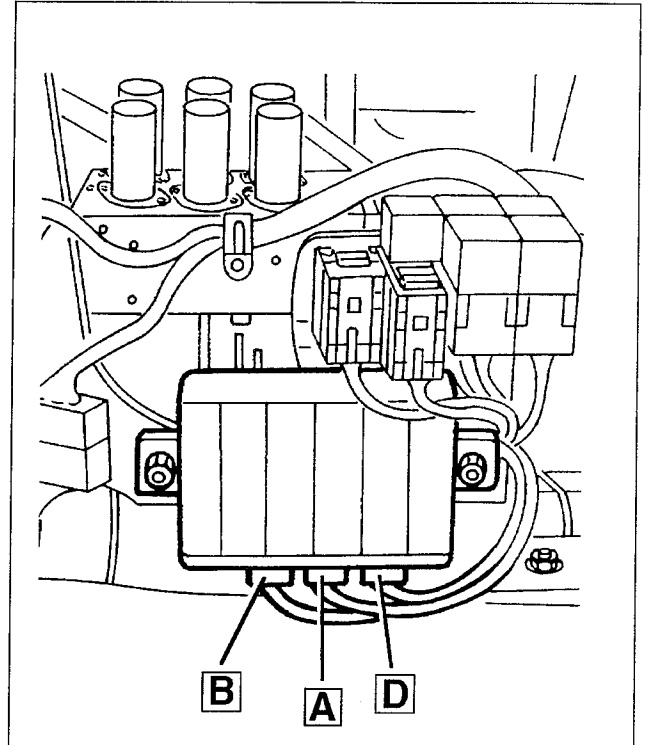
- 1 hood cover release command
- 2 RH hood closing command
- 3 hood position switch signal (lowered)
- 4 hood position switch signal (raised)
- 5 LH hood closing switch signal (approached)
- 7 hood cover closing command
- 8 hood release command
- 10 5th arc intermediate switch signal
- 11 5th arc raised switch signal
- 12 hood cover raised switch signal connector B:

connector B

- 1 LH hood closing switch signal (locked)
- 2 RH hood cover closing switch signal (approached)
- 3 LH hood cover closing switch signal (locked)
- 4 command signal from switch (closing)
- 5 command signal from switch (opening)
- 9 handbrake engaged signal
- 11 RH hood cover closing switch signal (locked)
- 13 RH hood closing switch switch signal (locked)
- 14 LH hood cover closing switch signal (approached)
- 15 RH hood closing switch signal (approached)
- 16 tachometric signal
- 17 diagnosis line K
- 20 key-operated supply

connector D

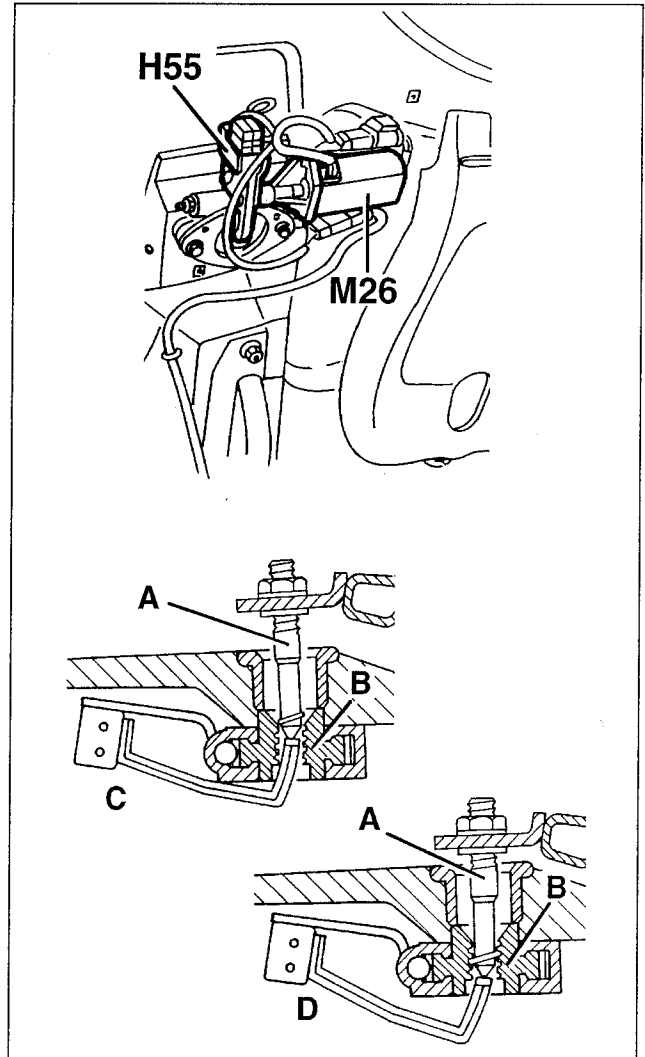
- 1 LH hood closing command
- 2 luminous led signal
- 3 command for solenoid valve no. 6 (5th arc raising)
- 4 command for solenoid valve no. 2 (hood cover closing)
- 5 earth
- 6 command for solenoid valve no. 1 (hood cover opening)
- 7 earth
- 8 direct supply
- 9 pump relay command
- 10 power window rising command
- 11 command for solenoid valve no. 3 (hood opening)
- 12 command for solenoid valve no. 4 (hood closing)
- 14 command for solenoid valve no. 5 (5th arc lowering)
- 15 power window lowering command
- 16 earth



Hood locks

The two locks that lock the 5th arc of the hood on the hood cover are formed of a threaded pin (A) which engages on a lead screw (B) operated by a motor. (M26a/b)

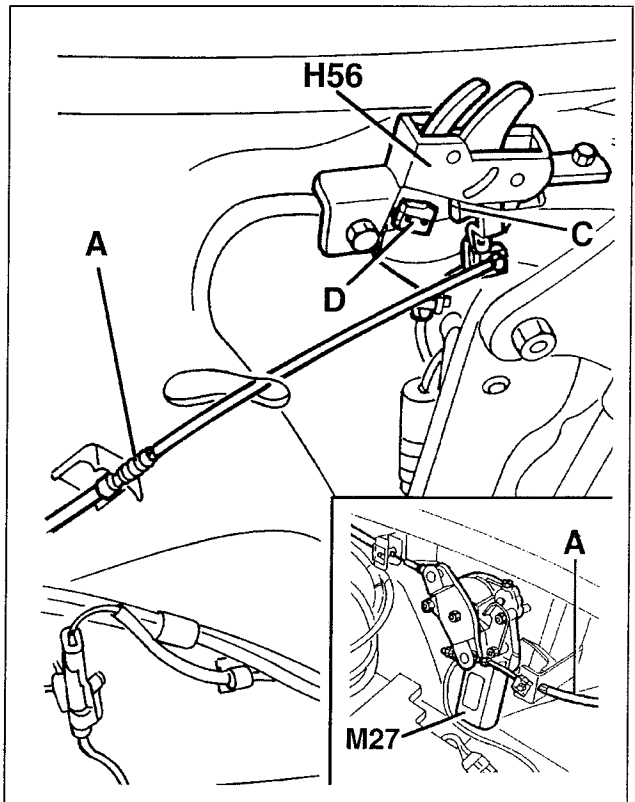
On the lock there is a microswitch (H55a/b) with two contacts: the first (C) signals the "approach" of the 5th arc pin to the lead screw, while the second (D) signals the clamping of the lock.



Hood cover locks

The two hood cover locks are controlled by the centre gear motor (M27) through cables (A).

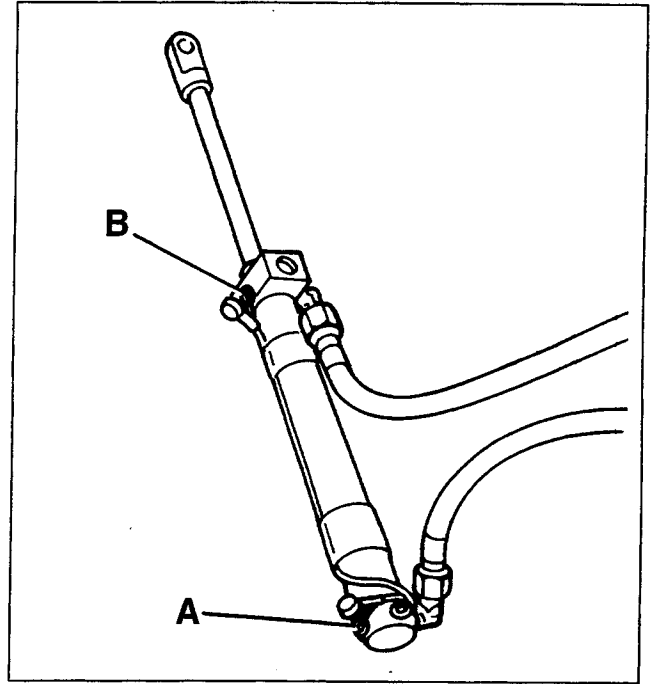
Also on these locks there is a microswitch (H56a/b) with two contacts: the first (C) signals the "approach" of the hood cover to the lock, while the second (D) signals the clamping of the lock.



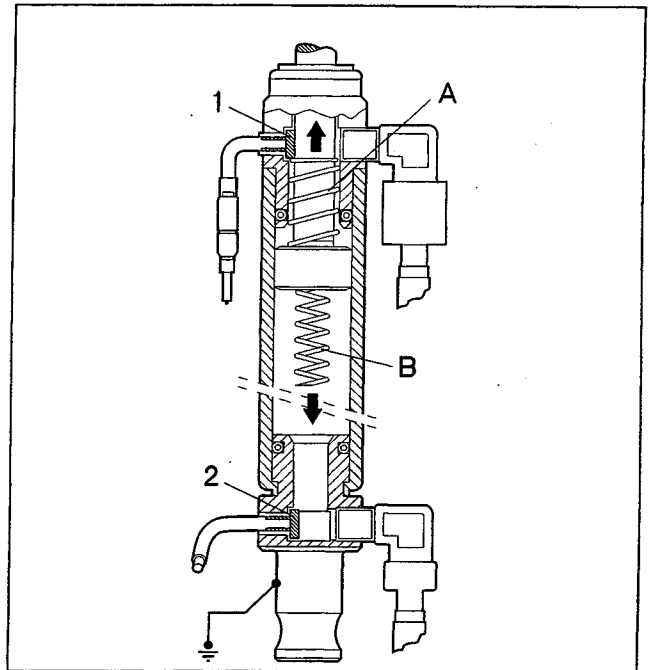
Switches on cylinders

On the operating cylinders of the **left hand side** there are four switches, namely:

- 5th arc raised switch (**H57**), on the 5th arc cylinder;
- hood cover raised switch (**H59**), on the hood cover cylinder;
- hood position switch (**H60**) on the hood cylinder: this comprises two contacts : the first (A) signals that the hood is lowered, the second (B) that the hood is raised.

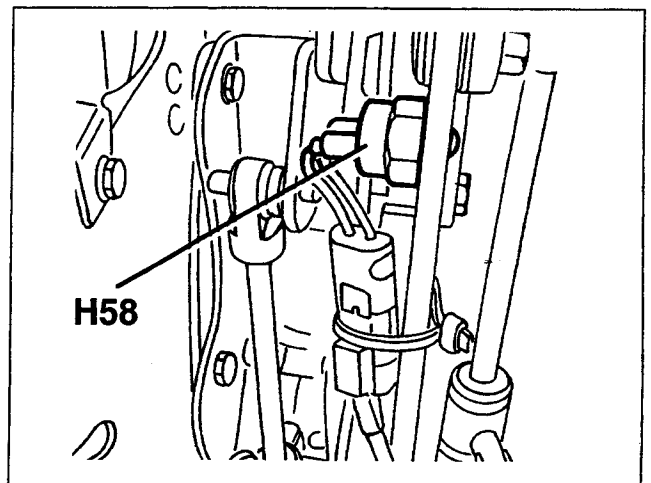


These four switches comprise an electric contact (1), which connects to earth via the spring (A) with the PISTON RAISED or (only for the hood cylinder) an electric contact (2) which connects to earth via spring (B) with the PISTON LOWERED.



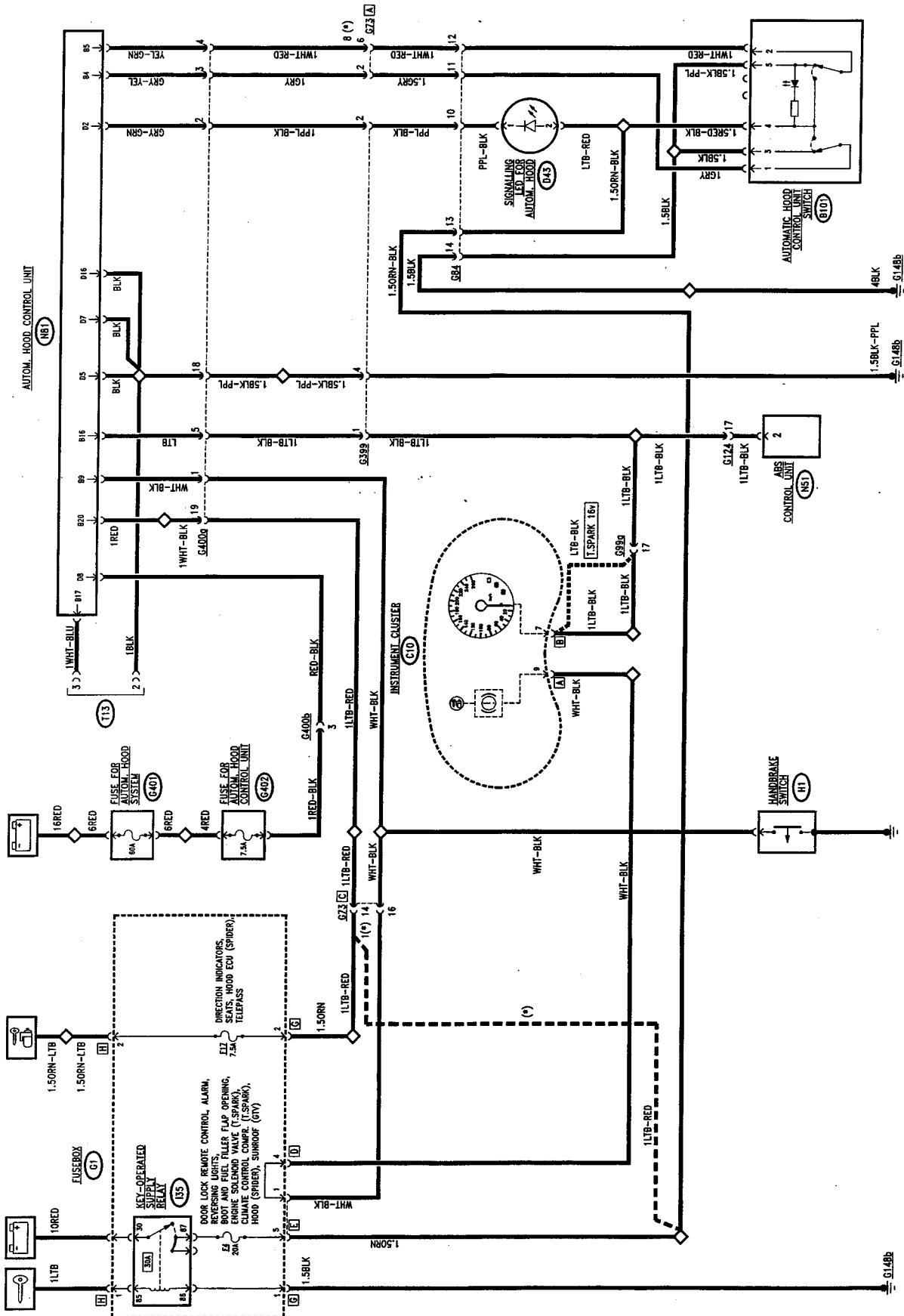
Intermediate 5th arc switch

This is a ball contact (**H58**) which connects to earth when the frame of the 5th arc takes a precise position during the closing of the 5th arc itself: this allows the control unit to operate the motors of the pins of the 5th arc locks a few seconds before the 5th arc is completely closed in order to obtain improved "catching" between the pin and the lock.



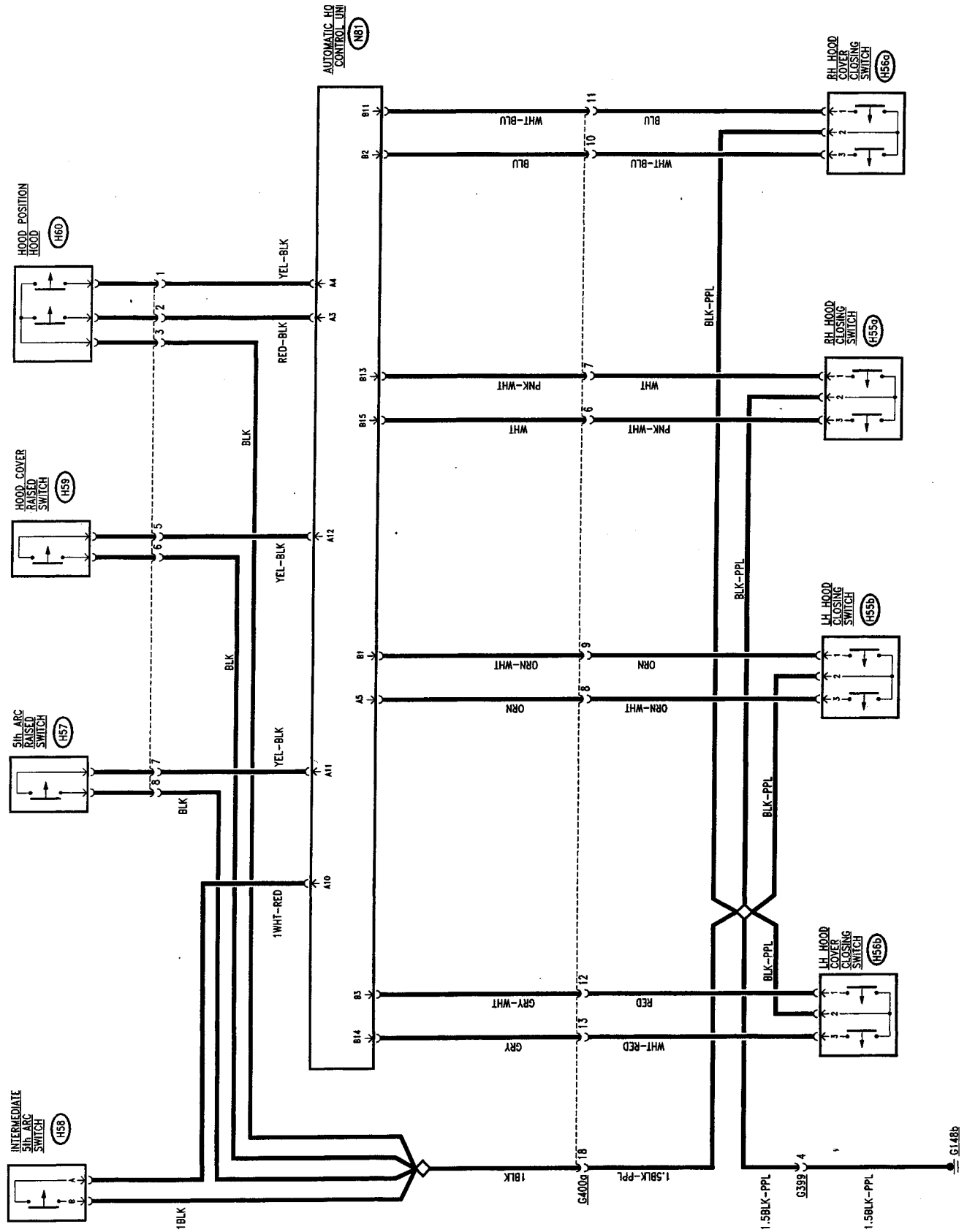
WIRING DIAGRAMS

1. CONTROL UNIT AND CONSENT SIGNALS

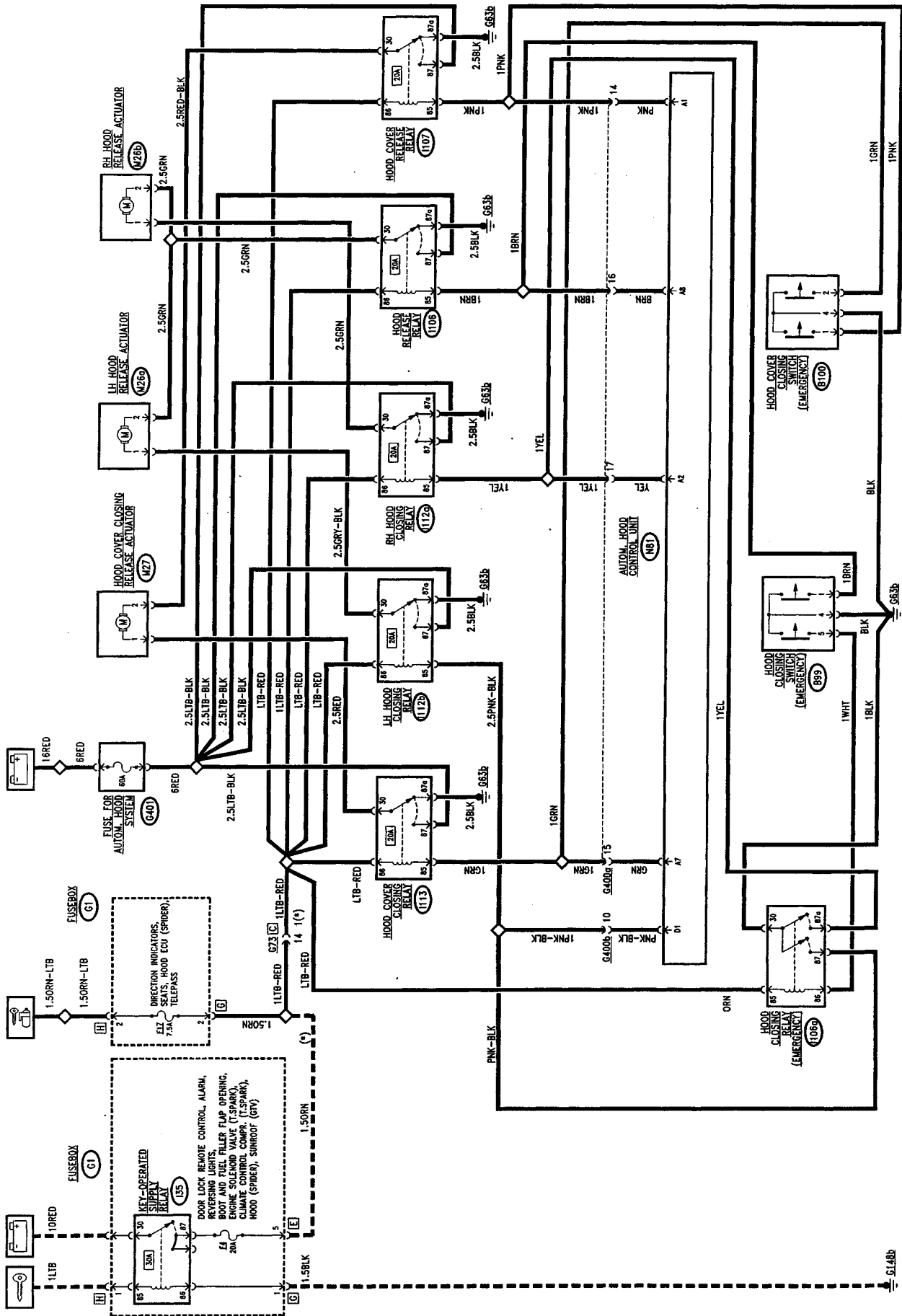


(*) --- from November '99

2. CONTROL SWITCHES

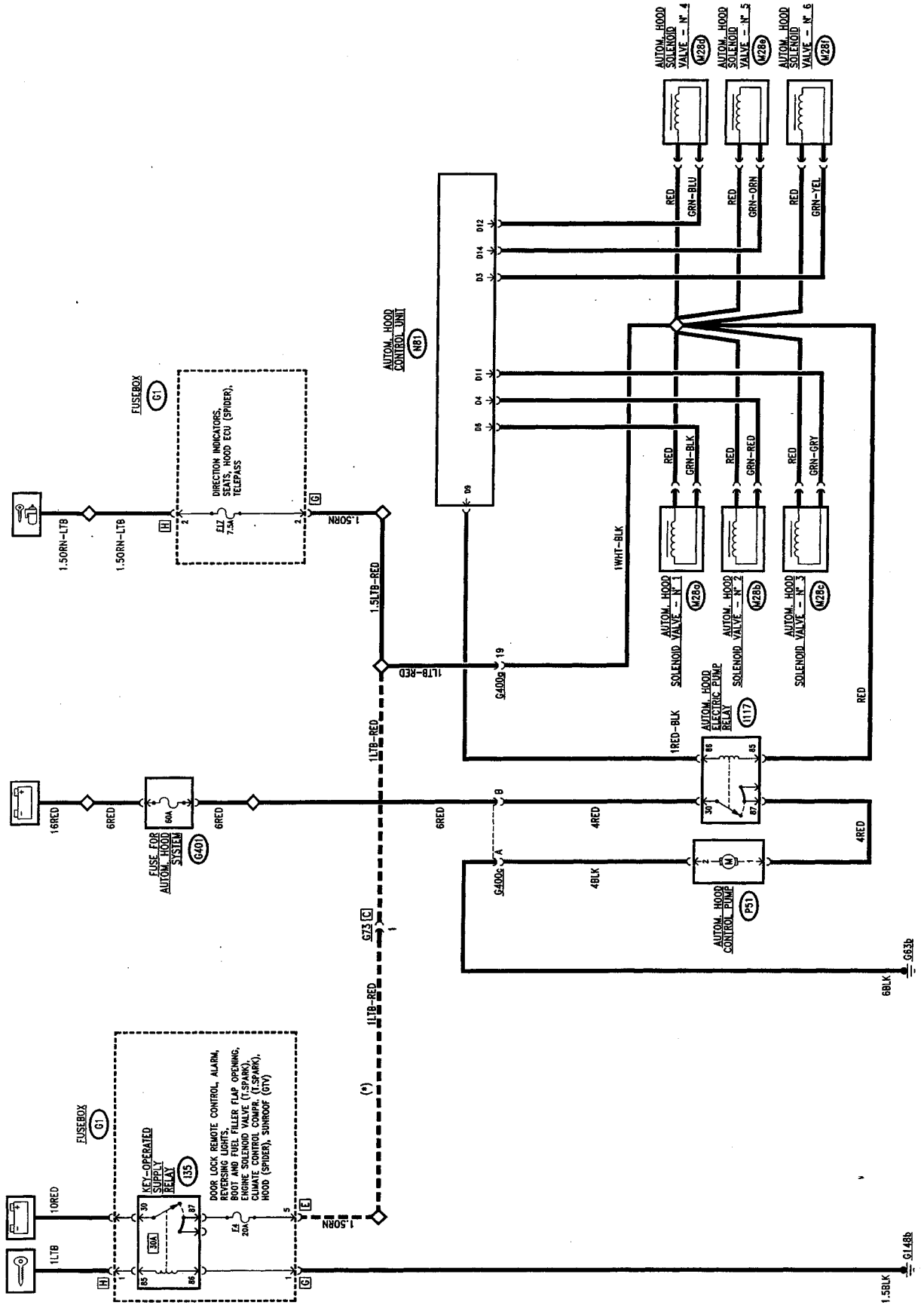


3. OPERATION OF LOCKS

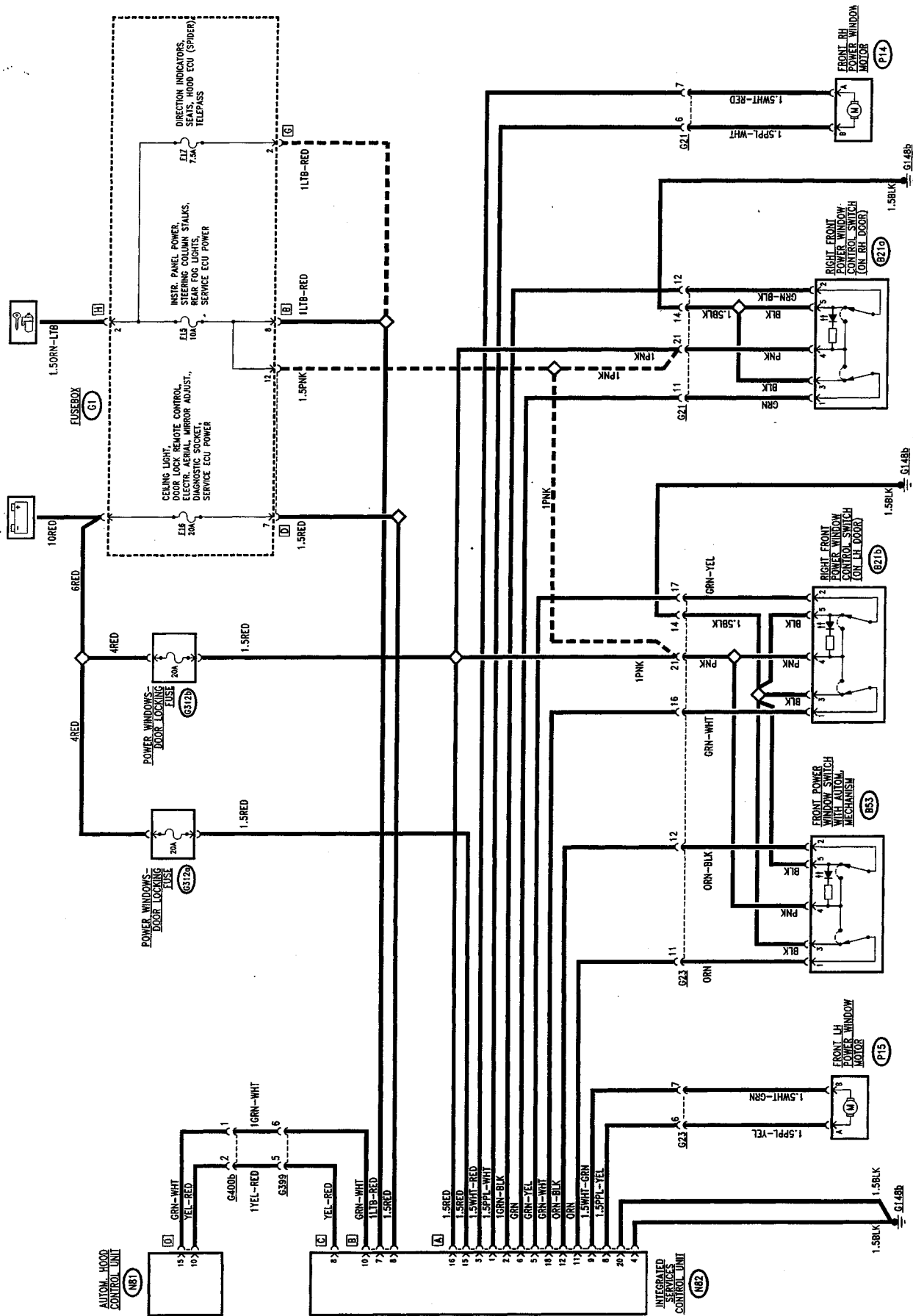


(*) --- from November '99

4. HYDRAULIC SYSTEM CONTROL



5. POWER WINDOWS CONTROL



(*) --- from November '99

FUNCTIONAL DESCRIPTION

The electronic control unit **N81** controls the entire electrohydraulic system that automatically opens/closes the hood.

ECU **N81** is powered at 12V direct to pin D8 via the line protected by the general fuse protecting system **G401** (60A) by fuse **G402** (7.5A), and with "key-operated" 12V at pin B20 through the line of fuse **F17** (**F4** from November '99) of fusebox **G1**; pins D5, D7 and D16 are earthed.

Operation of the hood takes place pressing the special button **B101**, to be found on the centre tunnel. A 12V and an earth signal is sent alternately to indicate opening and closing: 12V to pin B4 (hood closing) and 12 V to pin B5 (hood opening); the 12V are supplied by the ignition switch via fuse **F4** in **G1**.

Next to the button there is a luminous led **D43** supplied with "key-operated" 12V like button **B101**, and turned on by the control unit, from pin D2, to indicate that the system is working correctly or the occurrence of faults.

The control unit receives a series of consent signals from the switches and from the other systems of the car.

The "handbrake engaged" signal reaches pin B9 : this is the same signal that switch **H1** sends to the warning light on the instrument cluster **C10**; pin B16 receives the tachometric.

Two sets of switches are located on the locks of the hood and hood cover and on the hood operating cylinders.

NOTE : all the switches are N.O. and, if they are closed, they send an earth signal to the control unit.

The switches on the lock of the left-hand hood **H55b** and the right-hand hood **H55a** send two earth signals: one indicates that the hood has approached the lock (signals to pin A5 and B15), the other that the lock is actually closed (signals at pin B1 and B13).

In the same way for the locks of the left-hand **H56b** and right-hand hood cover **H56a**, "approach" signals are sent to pin B14 and B2 and the closing ones to pin B3 and B11.

The hood cover raised switch **H59** is to be found on the left control cylinder and it signals the control unit - pin A12 - the maximum raising position.

The double hood position switch **H60** is located on the left control cylinder and signals the control unit the hood maximum raising position - pin A4 - and the maximum lowering position - pin A3.

The 5th arc raised switch **H57** is located on the left control cylinder and signals the control unit - pin A11 - the maximum raising position of the 5th arc.

The 5th arc intermediate switch **H58** (ball contact) is located on the control linkage in such a position as to signal the control unit - pin A10 - that the 5th arc is lowering so as to operate the lock motors.

As a result of the information received by the sensors, the control unit commands the locking and releasing of the locks of the hood and hood cover, and adjusts, through an electric pump and six solenoid valves, the hydraulic hood raising and lowering system.

The two hood locks (right and left) are controlled by two motors **M26a** and **M26b** which close or open the lock as the 12V/earth supply at the two terminals varies: this takes place via the hood release relay **I106** and the two hood closing relays **I112a** and **I112b**.

These are diverters which are energised by the "key-operated" line of fuse **F17** (**F4** from November '99) of fusebox **G1** and by a command signal leading from the control unit **N81**: respectively from pin A2 for closing the RH lock, D1 for closing the LH lock, and A8 for releasing the hood: if energised the relay reverses the supply on the motors, the direct supply of which leads from fuse **G401** (60A).

In the same way the hood cover lock - only one, in the central position - is controlled by motor **M27** which closes or opens the lock as the 12V/earth supply at the terminals varies: this takes place via the hood cover release relay **I107** and locking relay **I113**. These are diverters energised by the "key-operated" of fuse **F17** of fusebox **G1** and by a command signal leading from the control unit **N81**: respectively from pin A7 for closing the lock and A1 for releasing: if energised the relay reverses the supply on the motors, the direct supply of which leads from a special fuse **G401** (60A).

Two emergency switches make it possible to manually operate the hood, locking and releasing the locks. Switch **B100** corresponding to the hood cover lock sends an earth signal to the release relay **I107** or to the locking one **I113** in the same way as takes place through the control unit during automatic operation. Switch **B99** corresponding to the hood lock sends an earth signal to the release relay **I106** or to the locking relay **I112a** and **I112b**.

The control unit also controls the operation of the hydraulic circuit that controls the six pistons for raising/lowering the hood cover, 5th arc and the hood itself.

The electric pump **P51** pressurises the hydraulic operating fluid when it is supplied by the control unit **N81** via the power relay **I117**; this is supplied by the line of fuse **G401** (60A) and energised with the "key-operated" supply and by command signal of the control unit - pin D9.

The six solenoid valves are also ignition switch powered via fuse **F17** (**F4** from November '99) in **G1** and are directly controlled by the ECU:

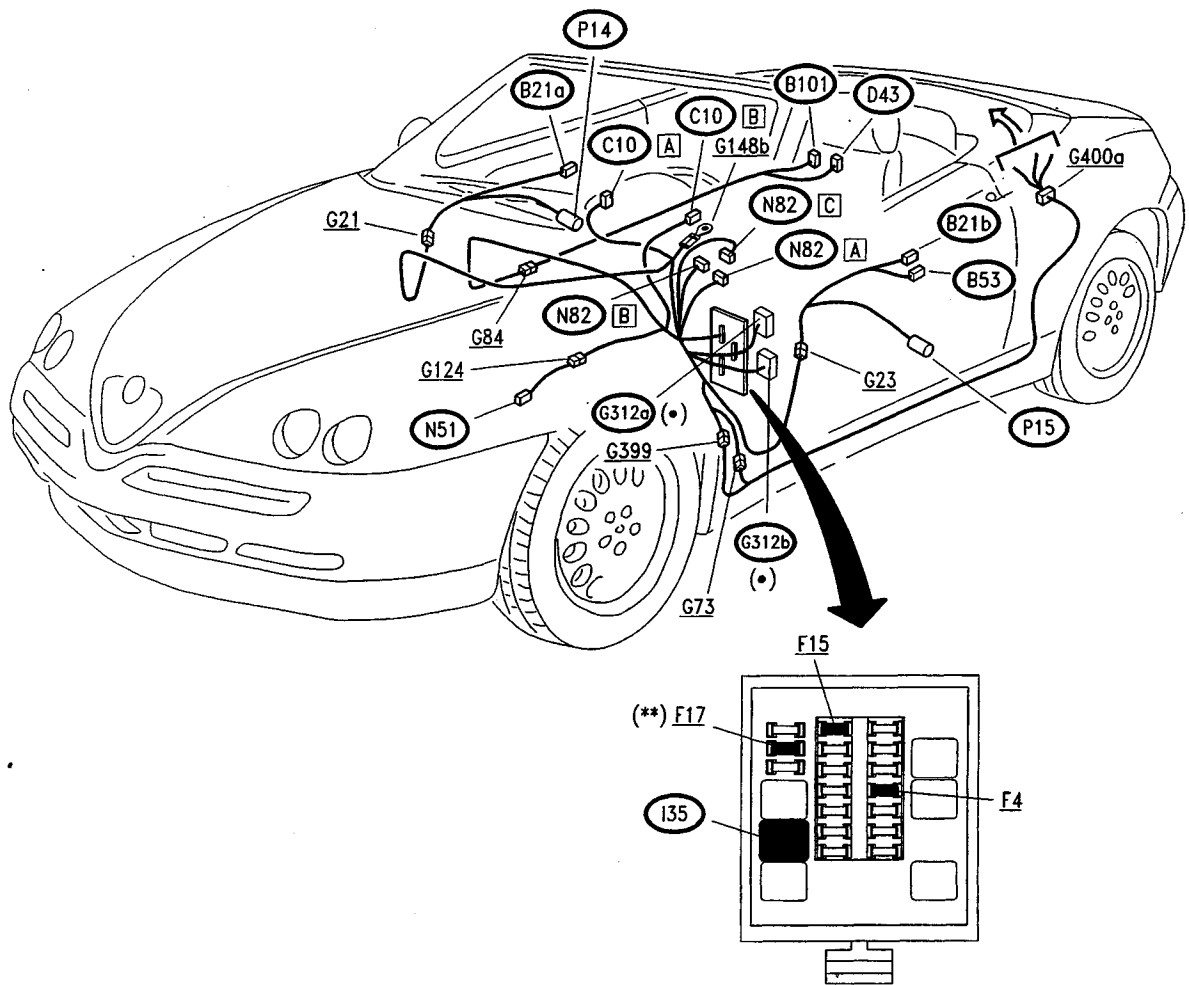
- pin D6 controls solenoid valve no. 1 **M28a** (hood cover opening)
- pin D4 controls solenoid valve no. 2 **M28b** (hood cover closing)
- pin D11 controls solenoid valve no. 3 **M28c** (hood closing)
- pin D12 controls solenoid valve no. 4 **M28d** (hood opening)
- pin D14 controls solenoid valve no. 5 **M28e** (5th arc lowering)
- pin D3 controls solenoid valve no. 6 **M28f** (5th arc raising)

During hood opening/closing, the control unit **N81** also controls raising or lowering of the door windows. This takes place through the services control unit **N82** which controls the ordinary operation of the power windows, the control unit signal for lowering the windows - pin D15 - reaches pin C8 of **N82**, which operates the motors **P15** and **P14** (for further details, see the "Power Windows" section).

In the same way the control unit signal for raising the windows - pin D10 - reaches pin B10 of **N82** which controls motors **P15** and **P14**.

The control unit **N81** memorises any faults detected during operation: this information may be read using the ALFA ROMEO TESTER connected with the diagnosis socket **T13**, and the outgoing signal - line K - from pin B17 of the control unit itself.

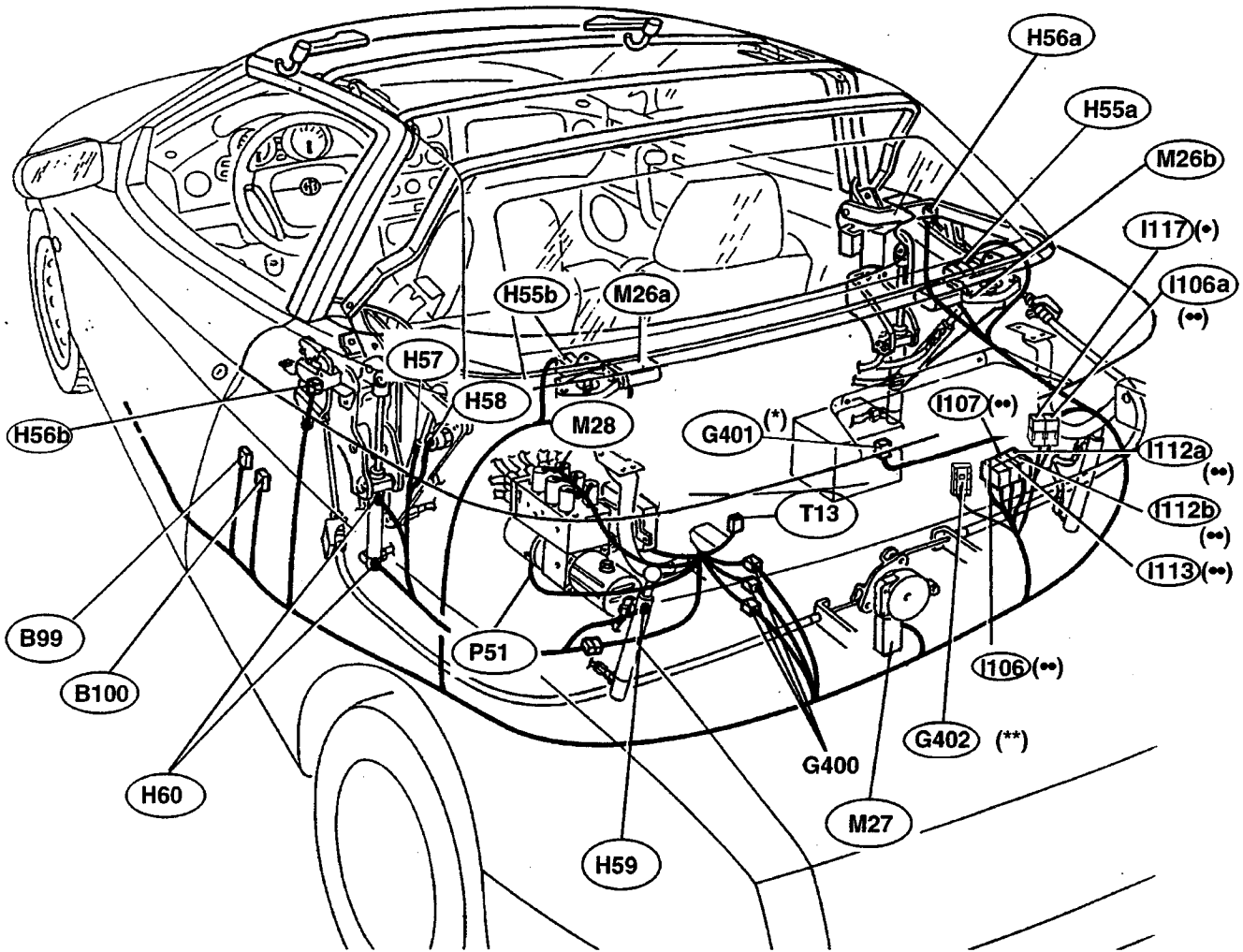
LOCATION OF COMPONENTS (1/2)



(**) only up to November '99

(•) Yellow fuse holder

LOCATION OF COMPONENTS (2/2)



(•) Black base
(••) Brown base

(*) Black fuse holder
(**) Brown fuse holder

FAULT FINDING

INITIAL TEST: turning the ignition key to MARCIA, the control unit carries out a self-diagnosis test of the entire system. If the result of this test is positive, the led at the side of the control button flashes for 1.5 seconds then goes off: conversely, if faults are detected, the led flashes for 10 seconds

- If the **led starts to flash**, this means that the system has memorised an operating fault. Try again moving the key to STOP and back to MARCIA, then proceed with Fault-finding as described in the following pages.
- If the **led flashes only with the button pressed**, this means that a manoeuvre error has been detected. For instance the handbrake has not been engaged.
- If the **led flashes upon completion of the operation**, or stays on permanently, this means that the hood is not correctly locked (open or closed).

The errors memorised may be "read" using the ALFA ROMEO TESTER connected to the diagnosis socket with the outgoing signal - line K - of the control unit itself.

When the control unit detects an error, the system is blocked and sets to "PAUSE":

this means that all the solenoid valves are supplied, while the pump is stopped: this way the hydraulic pistons are locked and the hood stops in the position in which it was. This lasts only 5 minutes (to avoid draining the battery), after which the valves are de-activated, but the led stays on.

In this case it is necessary to release the control button, press it again, or move the key to STOP, then back to MARCIA and press the button again.

Types of detectable errors:

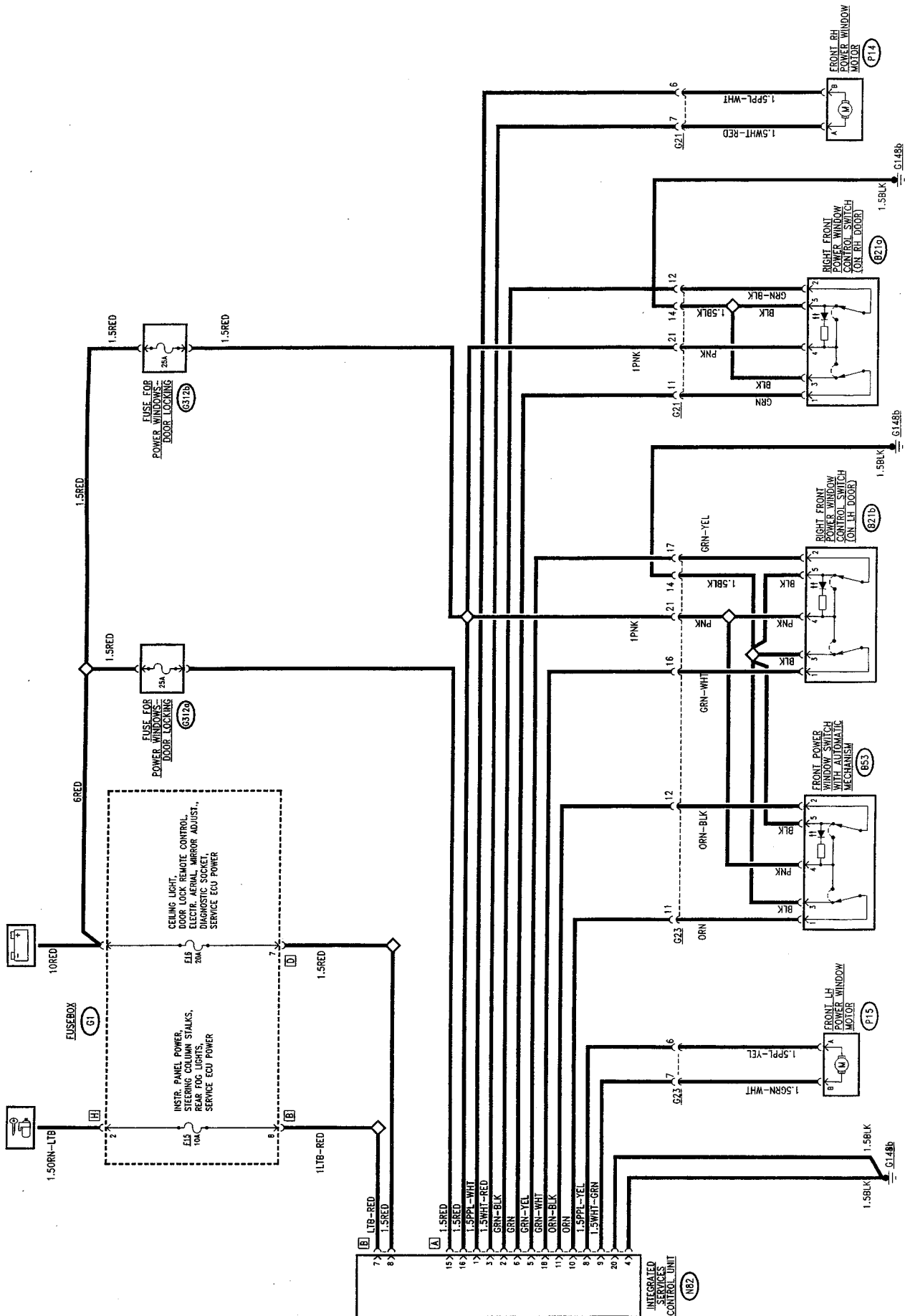
- **sequence performance times too long:** each step of the operating sequences has a maximum available time: upon exceeding this limit the control unit detects an error and flashes the led;
- **input signal not consistent:** as the whole sequence is pre-programmed, the control unit detects an abnormal signal, i.e. unforeseen: for example certain signals must not change during a certain step of the sequence: in this case the control unit detects an error and flashes the led;
- **short circuit on output signals:** any short circuits or overloads on the outputs are detected: in this case it is necessary to move the key to STOP and then back to MARCIA: if the led flashes for 10 seconds and then goes off, the fault persists and it is necessary to carry out the fault-finding procedure using the ALFA ROMEO TESTER.
- **open circuit on output signals:** any open circuits or breaks on the outputs are detected: in this case the control unit detects an error and flashes the led;

POWER WINDOWS

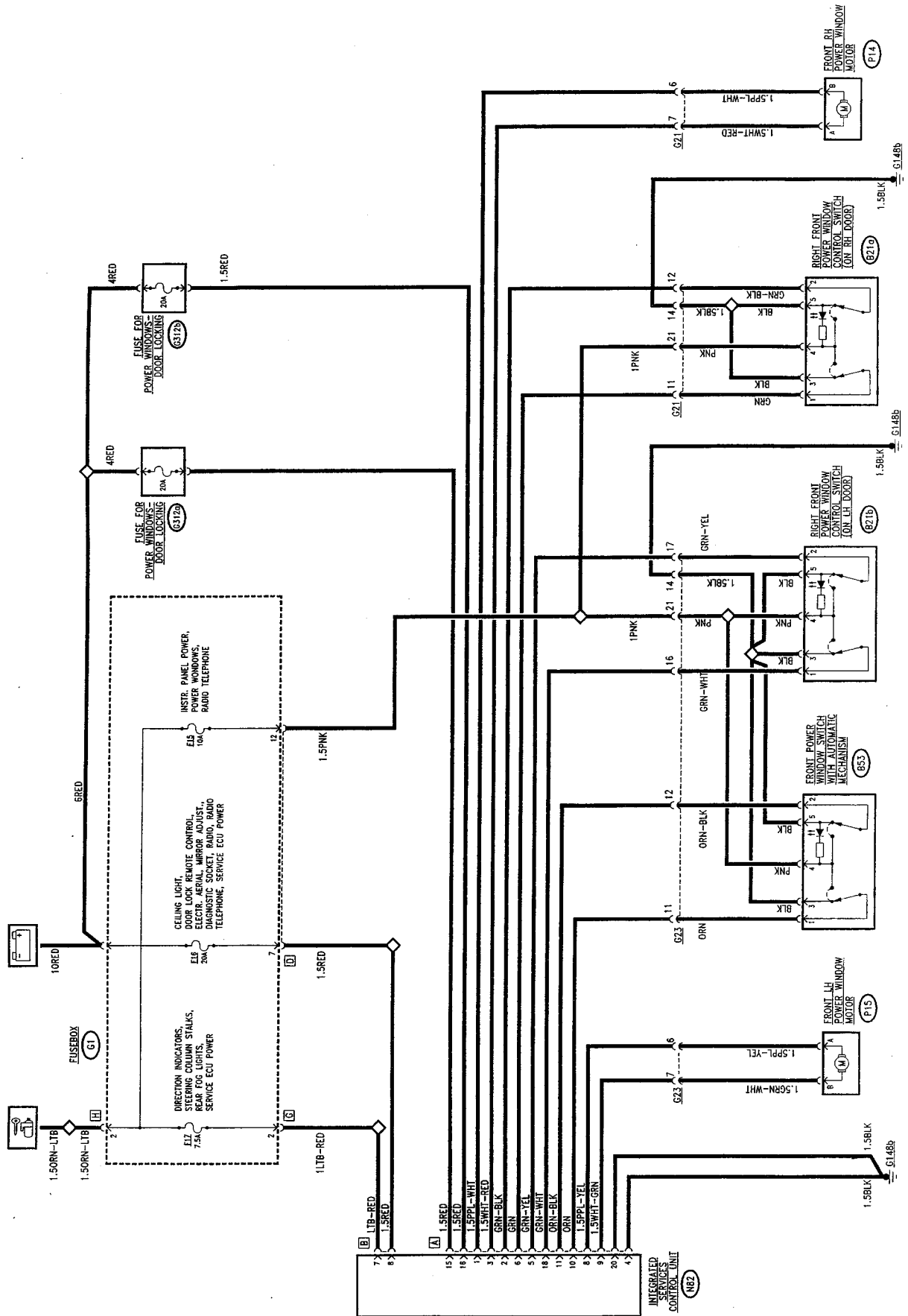
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WIRING DIAGRAM



WIRING DIAGRAM (from November '99)



GENERAL DESCRIPTION

Operation of the power windows is controlled by the integrated services control unit which operates them according to the following logic:

The driver's window is raised and lowered automatically, while the passenger's window is only lowered. Operation is manual when the button activating time is between 60 and 300 milliseconds.

Conversely, operation is automatic when the activating time is over 300 milliseconds.

Pressing the button in the opposite direction stops the window.

This operating logic works with the "key-operated" supply.

Safety systems

The stopping of the power windows (turning off the engine electrical supply) is determined by reaching the glass upper or lower limit switch, or if an obstacle is in the way blocking the window itself. This is adjusted through the engine direct current control which is self-adaptive.

The electronic control unit acts as follows:

- in the event of an interruption of the motor control signal during operation, the control unit de-energises the system in a max. time of 500 milliseconds: this interruption is detected when the current absorbed by the power window motor, controlled in current, becomes lower than approx. 0.8 A;
- if there is a fault on the control buttons (short circuit, or buttons remained pressed) when the control unit is activated, operation of the corresponding control is disabled, until the fault disappears (or the button is released) for more than 60 milliseconds.

Up-down function (starting from June 2000)

For the correct matching of the window with the door seal, it is a good idea to always close the window completely with the door shut: the up-down strategy described below has been adopted for this purpose:

- when opening one of the doors, the window for this door - if it is closed - should be lowered by about **4 mm**; the next time the door is closed again, the

window should be raised to the upper end of travel position.

- if the window is closed with the door open, the window is closed, but only to within **4 mm** of the upper end of travel position, the travel only continues if the door is closed.

This strategy is achieved by means of a switch in the electric window motor which, suitably calibrated, detects the position of the window through a cam secured to the actual motor.

FUNCTIONAL DESCRIPTION (up to may 2000)

ECU **N82** (pin B8) is directly powered via fuse **F16** in G1 and to pins A15 and A16.

The "key-operated" enable signal reaches pin B7 through fuse **F15** (**F17** from November '99) of **G1**.

Driver's window

Pins A10 and A11 respectively receive the control signals for raising and lowering leading from the control switch of the left window **B53**.

In fact, this double switch sends an earth to the control unit from the part in which the contact has been closed (pin 1 = up; pin 2 = down).

The operating signals (up or down) leave pins A8 and A9 of **N82** for the left window motor **P15**: 12 V and earth are inverted to change the direction of rotation. Pin A20 is connected to earth.

Passenger's window

Pin A5 and A18 receive the control signals respectively for lowering and raising leading from the control switch of the right window **B21b**.

So do pins A6 and A2 from switch **B21a**.

The supply for the two switches is controlled by the ignition by fuse **G312b** (from fuse **F15** of **G1** starting from November '99): the operating signals (up or down) leave pins A1 and A3 of **N82** for the right window motor **P14**: 12 V and earth are inverted to change the direction of rotation.

Pin A4 is connected to earth.

FUNCTIONAL DESCRIPTION (starting from June 2000)

The control unit **N82** directly supplies pin B8, via the fuse **F16** of **G1** and pins A15 and A16 via fuses **F5** and **F6** located in the additional fuse box **G2**.

The go ahead signal controlled by the ignition, on the other hand, reaches pin B7 via fuse **F17** of **G1**.

Driver's window

Control signals for raising and lowering, respectively, reach pins A10 and A11 from the left window control switch **B53**.

This dual switch sends an earth to the control unit from the part in which the contact has been closed (pin 1 = upwards; pin 2 = downwards). Operating signals (upwards or downwards) leave pins A8 and A9 of **N82** for the left window motor **P15**: 12 V and earth are reversed to change the direction of rotation. The signal from the position switch **H62** reaches pin B12; the door open signal from the switch in the lock **P11** reaches pin B2.

Lastly, pin A20 is earthed.

Passenger window

The control signals for the upwards and downwards movements reach pins A5 and A18 from the right window control switch **B21b**. Similarly the signals from switch **B21a** reach pins A6 and A2.

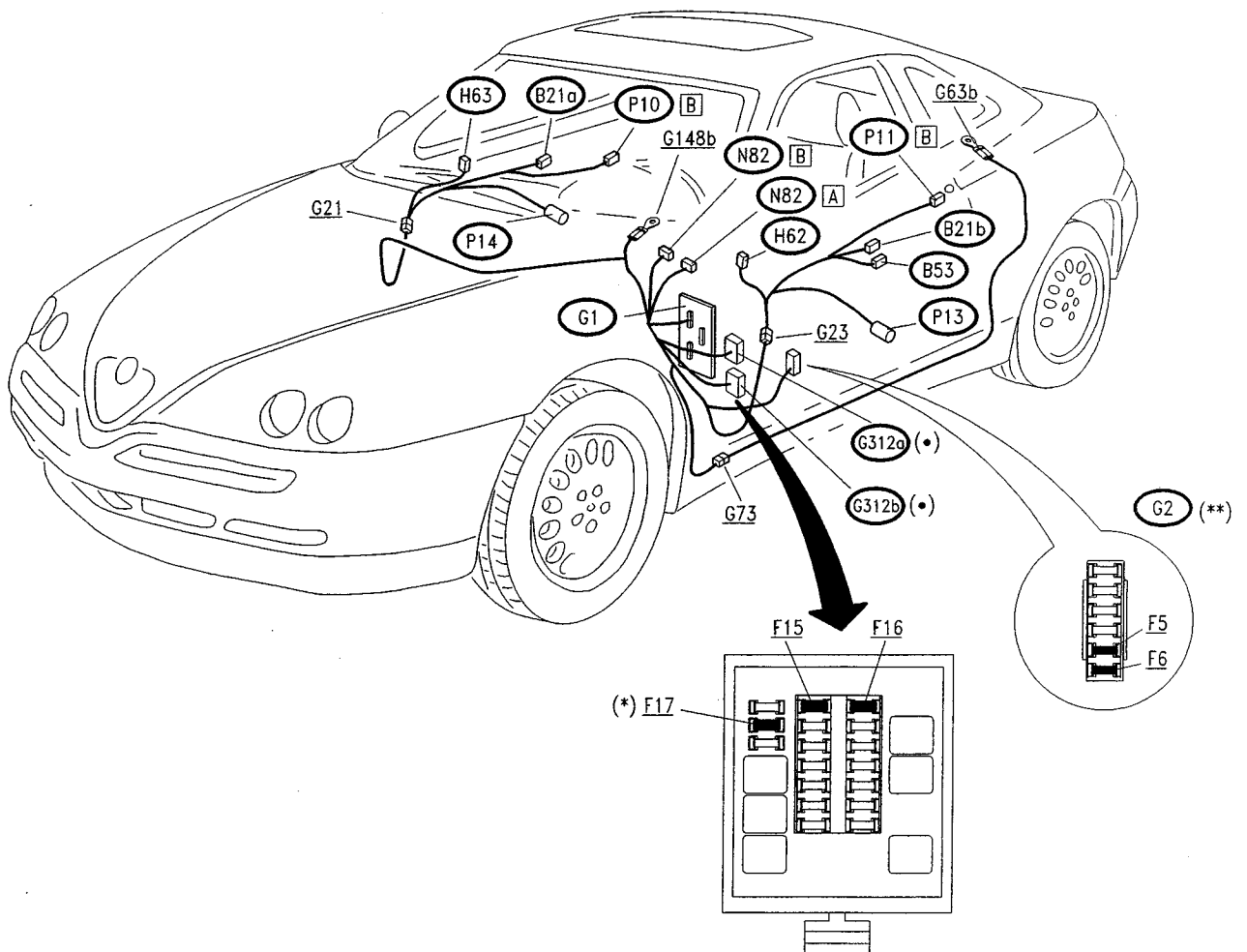
The supply for the two switches is controlled by the ignition from fuse **F15** of **G1**.

Operating signals (upwards or downwards) leave pins A1 and A3 of **N82** for the right window motor **P14**: 12 V and earth are reversed to change the direction of rotation.

Pin A7 receives the signal from the position switch **H63**; pin B3 receives the door open signal from the switch in the lock **P10**.

Lastly, pin A4 is earthed.

LOCATION OF COMPONENTS



- (*) starting from November '99
- (**) starting from October 2000
- (•) Yellow fuseholder

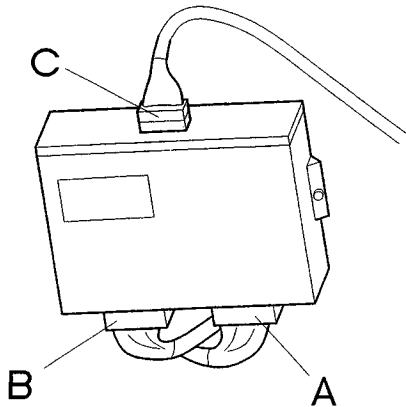
FAULT-FINDING TABLE

Fault	Component to be checked										
	F16	G312a	G312b	F15	F17 (*)	P14	P15	N82	B53	B21a	B21b
LH power window, under all circumstances		•		•	•		•	•	•		
LH power window, automatic operation	•	•						•			
RH power window		•			•	•		•		•	•

(*) from November '99

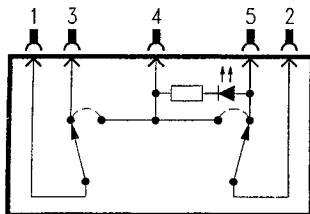
CHECK COMPONENTS

Integrated services control unit **N82**



Check power window function **test A**











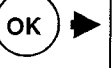
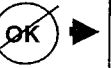
Power window switches **B21a** **B21b** **B53**



SPECIFICATIONS
<p><u>Check operation:</u> at rest: continuity between pins 3 and 1 and between pins 2 and 5, a.c. between the other pins operating button for raising: continuity between pins 4 and 1; a.c. between the other pins operating button for lowering: continuity between pins 4 and 2, a.c. between the other pins</p>

CHECK SERVICES CONTROL UNIT (N82) - POWER WINDOW FUNCTION	TEST A
--	---------------

Work with the component with the connectors fitted, working from the casble input side

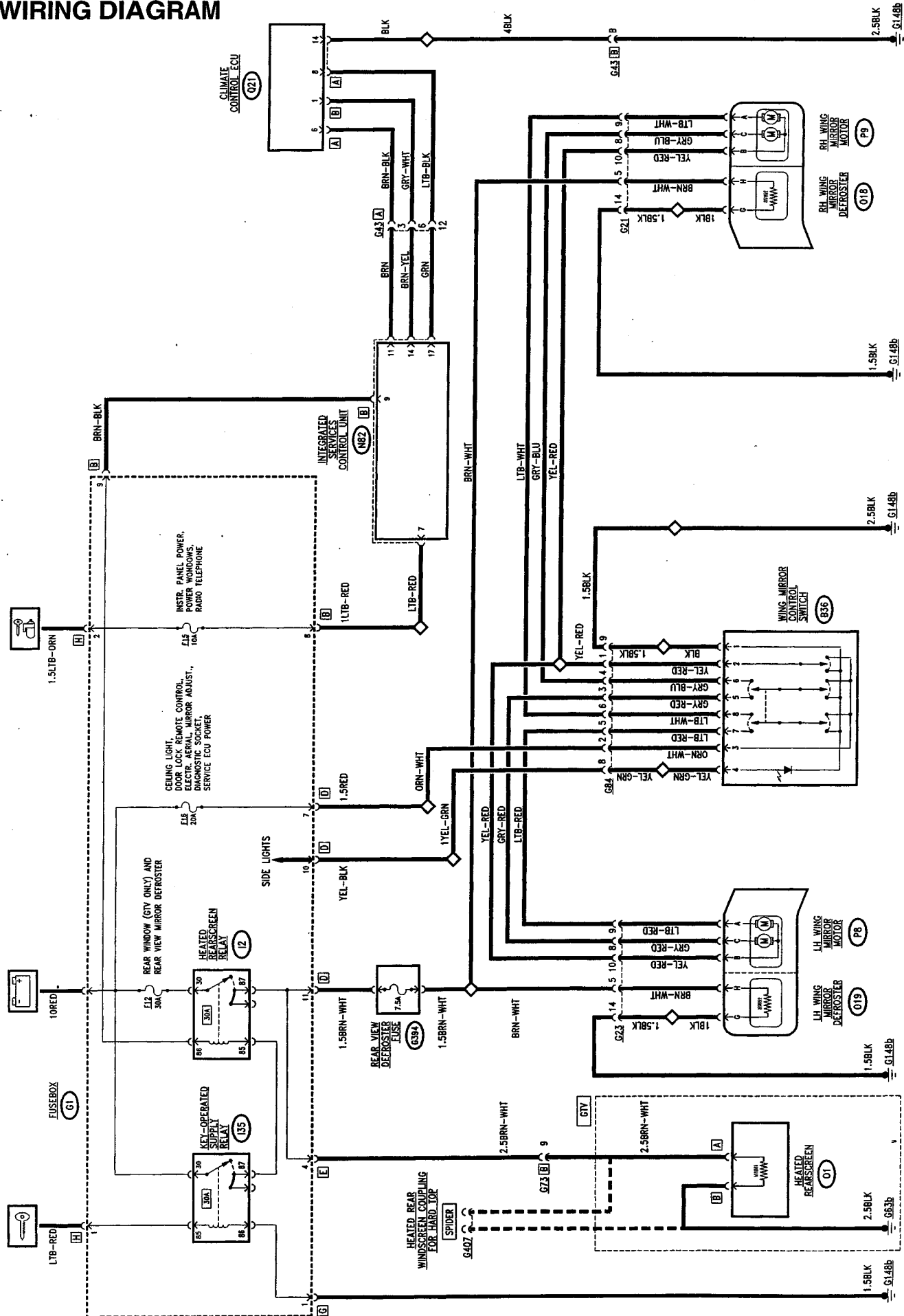
TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK VOLTAGE		Carry out step A2
	– Check for 12V at pins A15, A16, B8 of N82		Check fuse F16 in G1 and individual fuses G312 and G132b . Restore the wiring between N82 , connector B and C and the above-mentioned fuses
A2	CHECK EARTH		Carry out step A3
	– Check that pins A20 and A4 of N82 are earthed		Restore the wiring between N82 connector A and earth G148b
A3	CHECK VOLTAGE		Carry out step A3
	– With the key at MARCIA, check for 12V at pin B7 of N82		Check fuse F15 (F17) of G1 . Restore the wiring between N82 connector B and G1
A4	CHECK MANUAL OPERATION		Carry out step A5
	– Pressing the switch of the driver's power window B53 , check for 12V between pins A8 and A9 of N82 ; this voltage ceases when the button is released		Carry out step A4
A5	CHECK MANUAL OPERATION		Replace device N38
	– Pressing the switch B53 , check for a voltage of 12V between pins A10 and A11 of N82		Restore the wiring between N82 and switch B53 , or replace the latter
A6	CHECK AUTOMATIC OPERATION		CONTROL UNIT N82 IS WORKING PROPERLY. Check the connections with the other components
	– With the key at MARCIA, pressing switch B53 check: <ul style="list-style-type: none"> • for 12V direct current between pins A8 and A9 if the button is pressed for less than 300 ms • no voltage if the button is pressed for less than 60 ms • 12V direct current until the window closes if the button is pressed for more than 300 ms 		Change the control unit N82

HEATED REAR WINDOW REAR VIEW MIRROR DEFROSTING AND ADJUSTMENT

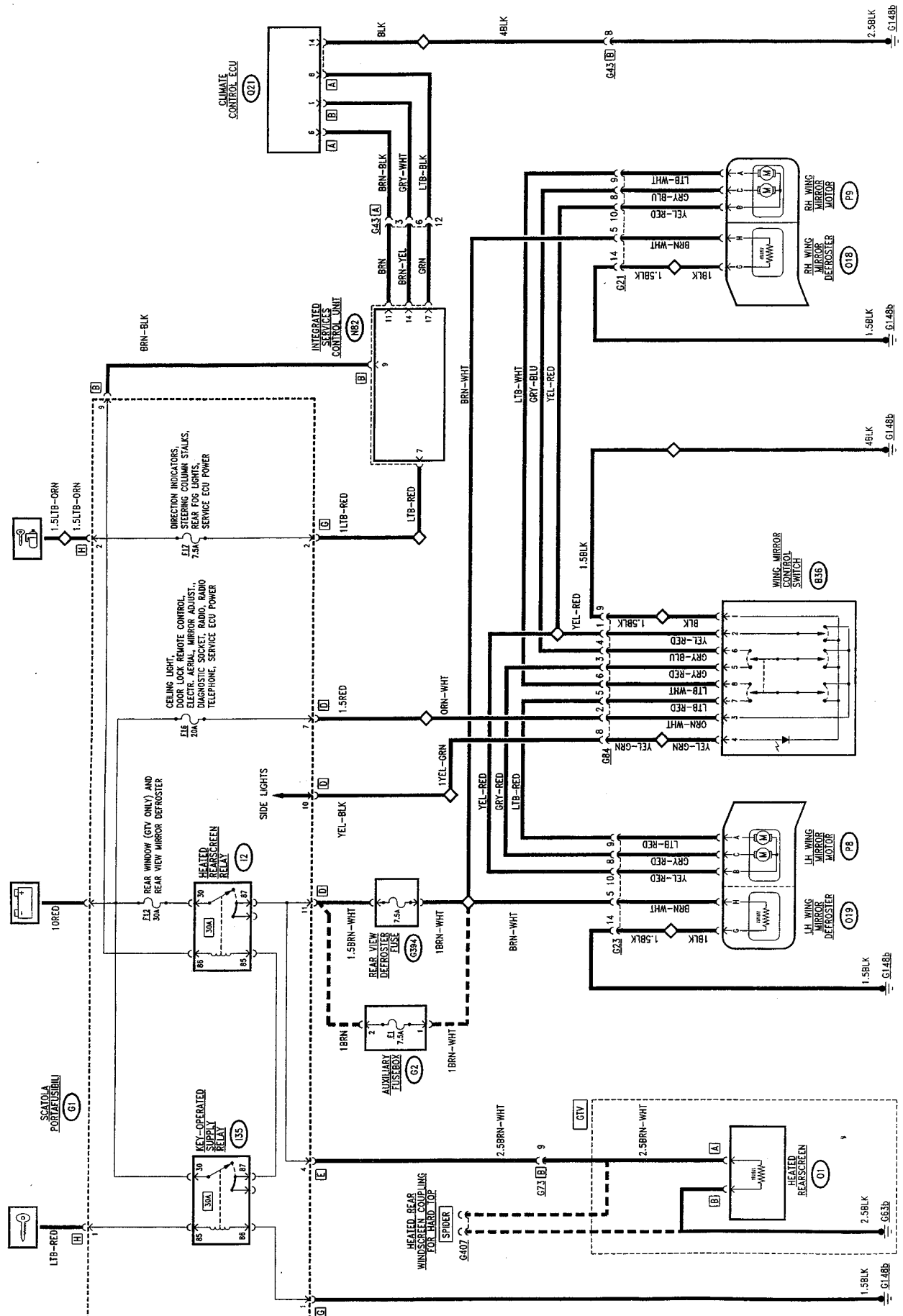
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WIRING DIAGRAM



WIRING DIAGRAM (from November '99)



--- starting from October 2000

GENERAL DESCRIPTION

Defrosting

The rear window (**GTV only**) and the door rear view mirrors feature a built-in conductor which heats the contact surfaces when crossed by current thus ensuring rapid demisting and/or defrosting. The device is operated by means of the button fitted in the climate control panel **Q21**. Operation is controlled by the integrated service ECU **N82** according to the following logic:

- with key at MAR, the "on" signal is received from the switch (or from the "quick demisting" function");
- power is cut when the key is either turned to STOP or removed, or when the "off" signal is received.

If neither signal is received, the timer powers the resistance for 20 MINUTES according to the following specific control logic:

- power on ALWAYS for the first 10 MINUTES;
- DURING THE FOLLOWING 10 MINUTES the power is cut if the battery voltage drops to under 11.6V (and is restored if the voltage rises and exceeds 13V).

The heated rear window operation always switches the rear view mirror defroster on (also fitted on SPIDER). This control logic is controlled by the integrated service ECU: the climate control/heater ECU only "houses" the control button and the respective LED but does not play any role in the operation logic.

The button control always has higher priority with respect to the "fast demisting" function; e.g. if the rear window "fast demisting" function is switched on automatically and the button is pressed, the heated rear window will be switched off.

The respective LED on the button will come on when the heated rear window is on.

For SPIDERS with a Hard Top, there is a special socket for connecting the rear windscreen incorporated in the actual Hard Top, located on the left panel.

Rear view mirror adjustment

The two door rear view mirrors can be adjusted by means of a specific switch which controls two motors located in each of the mirrors (one motor turns the mirror on the horizontal axis and the other on the vertical axis).

A single switch is used to operate both the left-hand and right-hand mirror. A switch is used to control either one or the other.

FUNCTIONAL DESCRIPTION

Defrosting

The rear window relay **I2** is powered via fuse **F12** in fusebox **G1**. The coil is powered via the ignition switch and is energised by an earth signal from ECU **N82** - pin 9.

When relay **I2** contact closes, the battery voltage powers the line to the heated rear window **O1** (**GTV ONLY**) and the door rear view mirror resistance **O19** (left-hand) and **O18** (right-hand) via fuse **G394** (starting from October 2000, via fuse **F1** of the additional fuse box **G2**).

For SPIDERS, the supply is sent to socket **G407** to which the Hard Top is connected.

The supply for control unit **N82** is controlled by the ignition from the line for fuse **F15** (F17 starting from November '99) for junction unit **G1** (pin 7 of connector B).

ECU **N82** is powered via the ignition switch via fuse **F15** in fusebox **G1** (connector B pin 7).

When an earth signal is received (connector B pin 14) from the climate control ECU **Q21** (heated rear window button pressed), it energises relay coil **I2** (connector B pin 9) according to the operating logic described above. In a similar fashion, when the "fast demisting" function is on, ECU **P21** sends a signal to **N82** connector B pin 17.

When the resistance is switched on, a signal is sent (from **N82** connector B pin 11) to light the LED on the control button on the climate control ECU **Q21**.

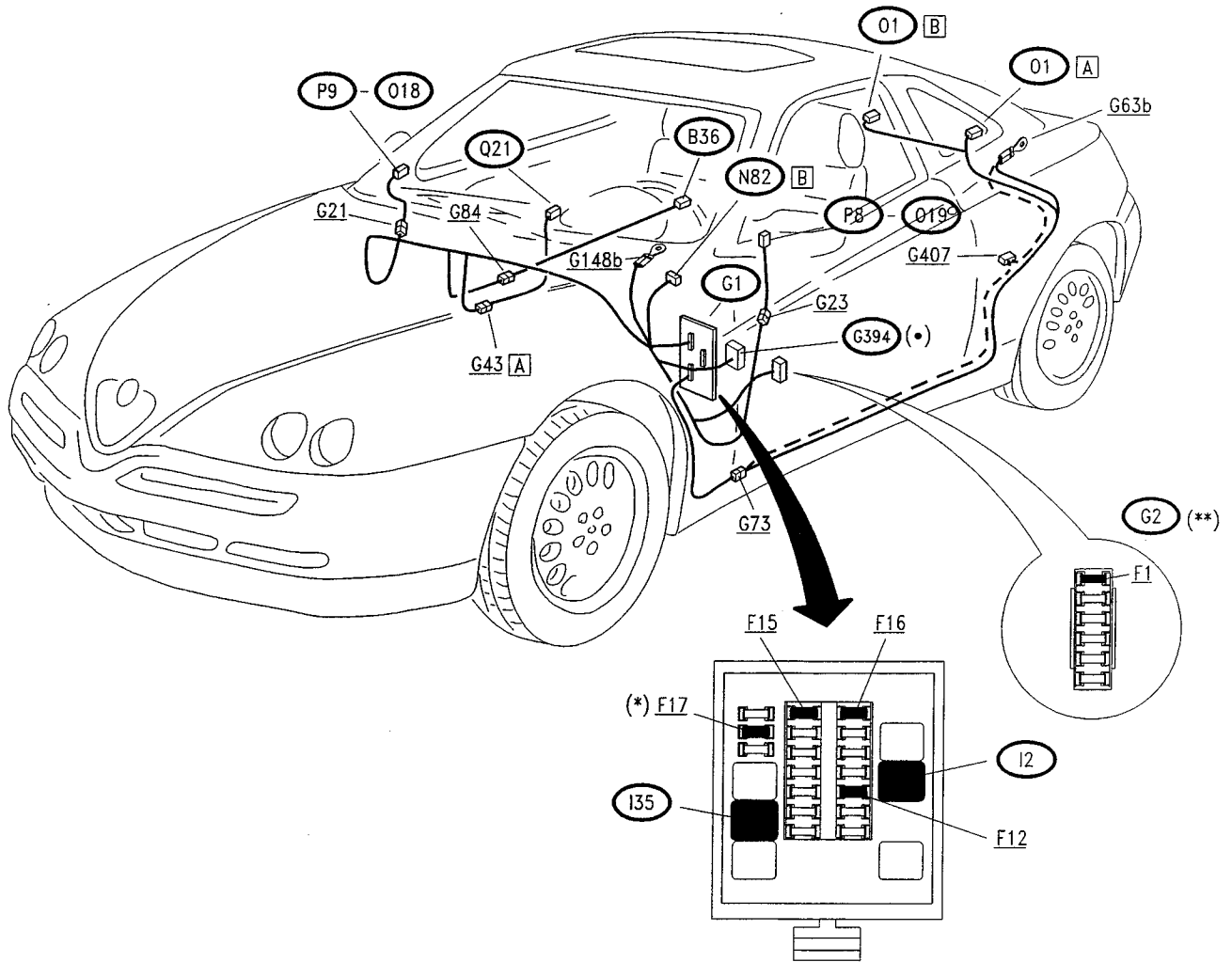
Rear view mirror adjustment

The double switch **B36** controls the two motors in the mirrors **P8** (left) and **P9** (right).

The switch is directly powered - pin 3 - via fuse **F16** in fusebox **G1**; pin 1 is connected to earth.

By operating switch **B36** in either direction, positive and earth is sent to one of the two motors (as well as the common, pin 2) to define direction of rotation. According to the position of the switch either the right-hand motors **P9** (output signals from **B36** pins 6 and 8) or the left-hand motors **P8** (signals from **B36** pins 5 and 7) are connected. The switch is light by a LED which is switched on with the side/taillights (pin 4).

COMPONENT LOCATION



--- Spider with "Hard Top"

(*) from November '99

(**) starting from October 2000

(•) Brown fusebox

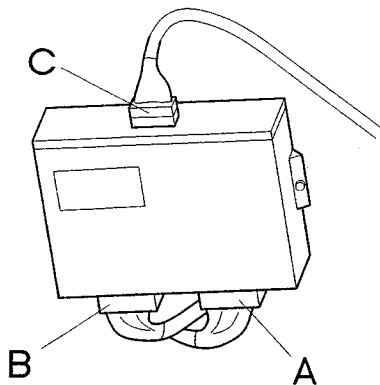
TROUBLE SHOOTING TABLE

Fault	Component to be checked														
	G394	G2	F15	F17 (*)	F12	I2	Q21	O1	O19	O18	F16	P8	P9	B36	N82
Defrosting, all circumstances		•	•	•	•	•	•								•
Rear window defrosting (GTV only)								•							•
LH rear view mirror defrosting	•								•						
RH rear view mirror defrosting	•									•					
Rear window warning light							•								
Rear view mirror adjustment all circumstances											•			•	
LH rear view mirror adjustment												•		•	
RH rear view mirror adjustment													•	•	

(*) from November '99

COMPONENT CHECK

Integrated service ECU (N82)

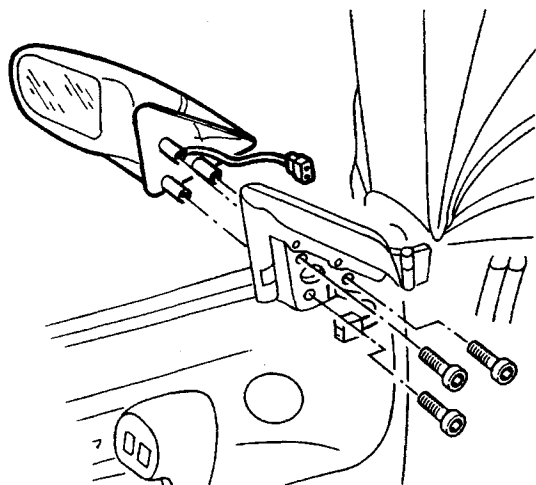


Heated rear window functional check **Test A**

Rear view mirrors

O18-P9

O19-P8

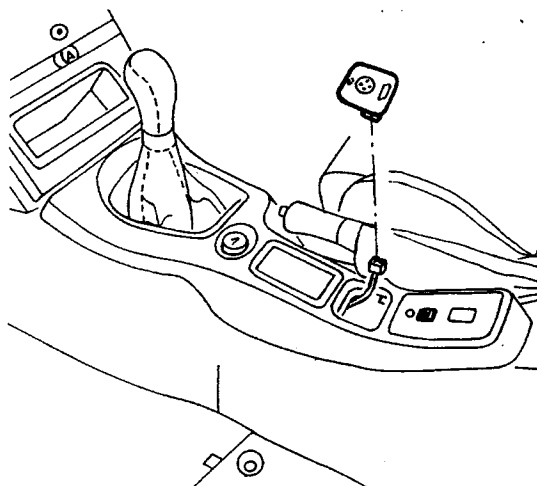


TECHNICAL FEATURES	
Defrosting resistance (between connection pins G and H)	10 Ω

TECHNICAL FEATURES	
Mirror adjustment motors	
upwards rotation	12V at pin C, earth at pin B
downwards rotation	12V at pin B, earth at pin C
rightwards rotation	12V at pin B, earth at pin A
leftwards rotation	12V at pin A, earth at pin B

Double door rear view mirror control switch

B36



Device check: see Test B

SERVICE ECU CHECK (N82) - REAR WINDOW FUNCTION	TEST A
---	---------------

	TEST STEP	OUTCOME	CORRECTIVE ACTION
A1	CHECK VOLTAGE - With key at MAR, check for 12V at N82 pin B7	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	Go to Step A2 Check fuse F15 (F17) in G1
A2	CHECK REAR WINDOW ON SIGNAL - Switch the rear window on and check for earth signal at N82 pin B14	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	Go to Step A3 Restoring wiring between N82 and ECU Q21
A3	CHECK REAR WINDOW TIMER SIGNAL - With key at MAR, switch the rear window on and check for earth signal at N82 pin B7	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	ECU N82 works regularly. Check connections with other components Restore wiring between N82 and G1

CHECK DOUBLE REAR WINDOW MIRROR CONTROL SWITCH (B36)	TEST B
---	---------------

	TEST STEP	OUTCOME	CORRECTIVE ACTION
B1	CHECK VOLTAGE - Check for 12V between B36 pins 1 and 3	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	Go to Step B2 Check fuse F16. Restore wiring between B36 and fuse-box G1
B2	CHECK VOLTAGE - Check for 12V at B36 pin 4 with side/taillights on	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	Go to Step B3 Check correct operation of side/taillight; also check wiring between B36 and G1
B3	CHECK VOLTAGE - Turn the switch to operate left-hand mirror and check for: - 12V between mirror P9 pins A and B turning the switch to the left and to the right - 12V between mirror P9 pins B and C turning the switch upwards and downwards Proceed in a similar way for the right-hand mirror and check for: - 12V between mirror P8 pins A and B turning the switch to the left and to the right - 12V between mirror P8 pins B and C turning the switch upwards and downwards	<input type="radio"/> OK → <input checked="" type="radio"/> OK →	SWITCH B36 WORKS CORRECTLY. Check connection with other components. Go to Step B4

CHECK DOUBLE REAR WINDOW MIRROR CONTROL SWITCH B36	TEST B
---	---------------

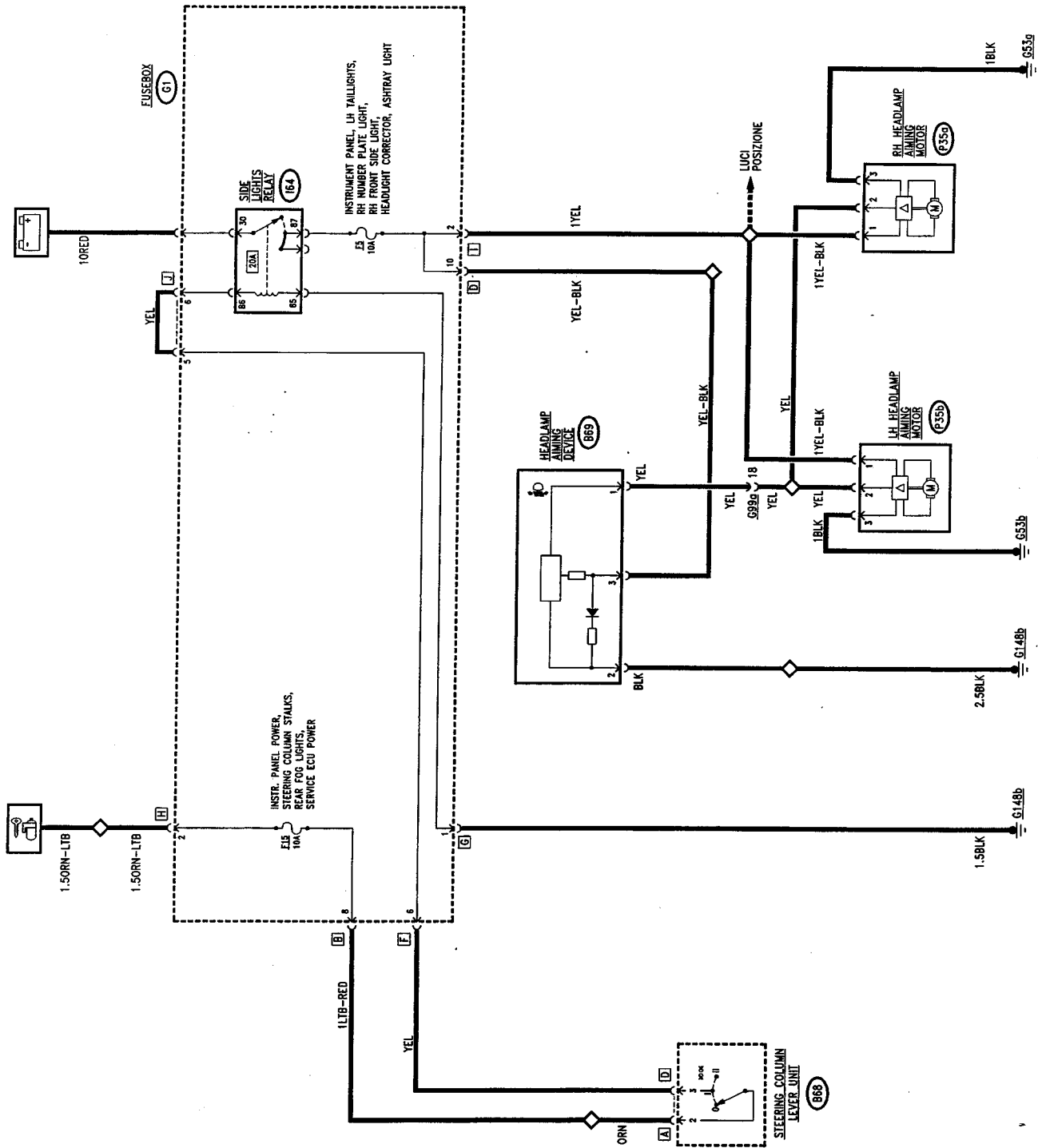
	TEST STEP	OUTCOME	CORRECTIVE ACTION
B4	<p>CHECK VOLTAGE</p> <p>– Turn the switch to operate left-hand mirror and check for the following at B36:</p> <ul style="list-style-type: none"> - 12V between pins 7 and 2 turning the switch to the left and to the right - 12V between pins 5 and 2 turning the switch upwards and downwards <p>Proceed in a similar way for the right-hand mirror and check for:</p> <ul style="list-style-type: none"> - 12V between pins 8 and 2 turning the switch to the left and to the right - 12V between pins 6 and 2 turning the switch upwards and downwards 	<p>OK ➔</p> <p>OK ➔</p>	<p>Restore wiring between B36 and P9 (RH) or P8 (LH), or replace one of the two motors.</p> <p>REPLACE SWITCH B36</p>

HEADLAMP AIMING DEVICE

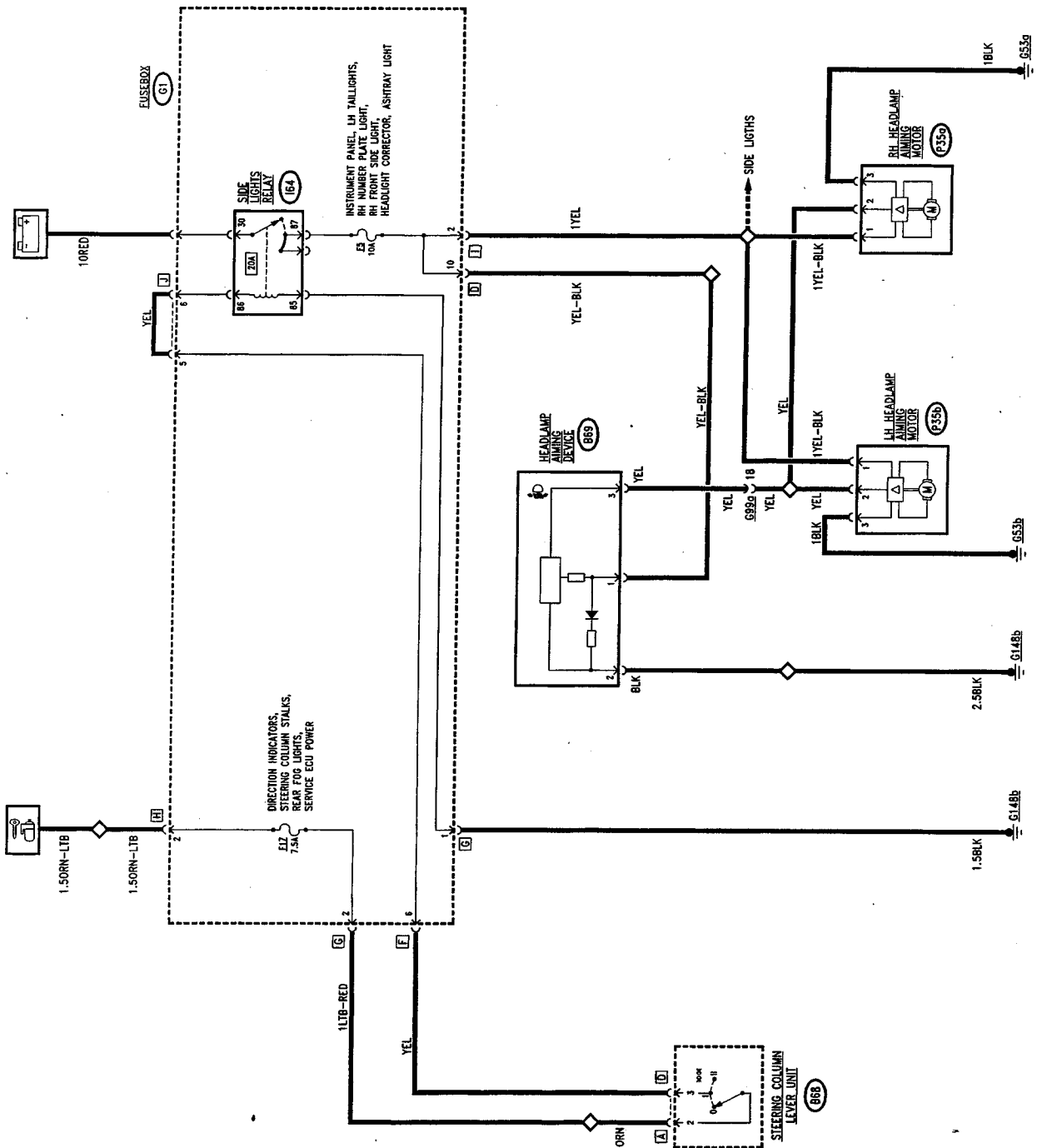
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WIRING DIAGRAM



WIRING DIAGRAM (from November '99)




GENERAL DESCRIPTION

The car offers the possibility to adjust the headlight beam in relation to the load directly from the driver's seat.

In this way the problem or inconveniences caused by incorrect headlamp aiming is avoided and the delicate task of direct lamp adjustment is simplified (this is not substituted by the electrical device but integrated with it).

The adjustment device consists of a motor fitted on each of the two headlamps which suitably slopes them to lower the beam when the car is heavily loaded and raise it when the load is lightened.

The driver operates the system directly by turning a knob located on the dashboard, next to the instrument panel, which allows four positions to be chosen according to the following table:

Position of knob 	Load conditions
0	driver only or driver and passenger on front seat
1	all seats occupied
2	all seats occupied plus load in luggage compartment (until reaching max. allowed load on rear axle)
3	driver plus load in luggage compartment until reaching max. allowed load on rear axle)

The system can be operated only when the side lights are on; it is completely de-activated when they are off.

NOTE: for safety reasons the system is designed so that in the event of a failure it cannot be moved to a higher position than the one it is already at.

FUNCTIONAL DESCRIPTION

The headlamp aiming device **B69** is supplied at pin 3 by a line leading from the side lights circuit from fuse **F5**: this line receives voltage only when the side lights are on.

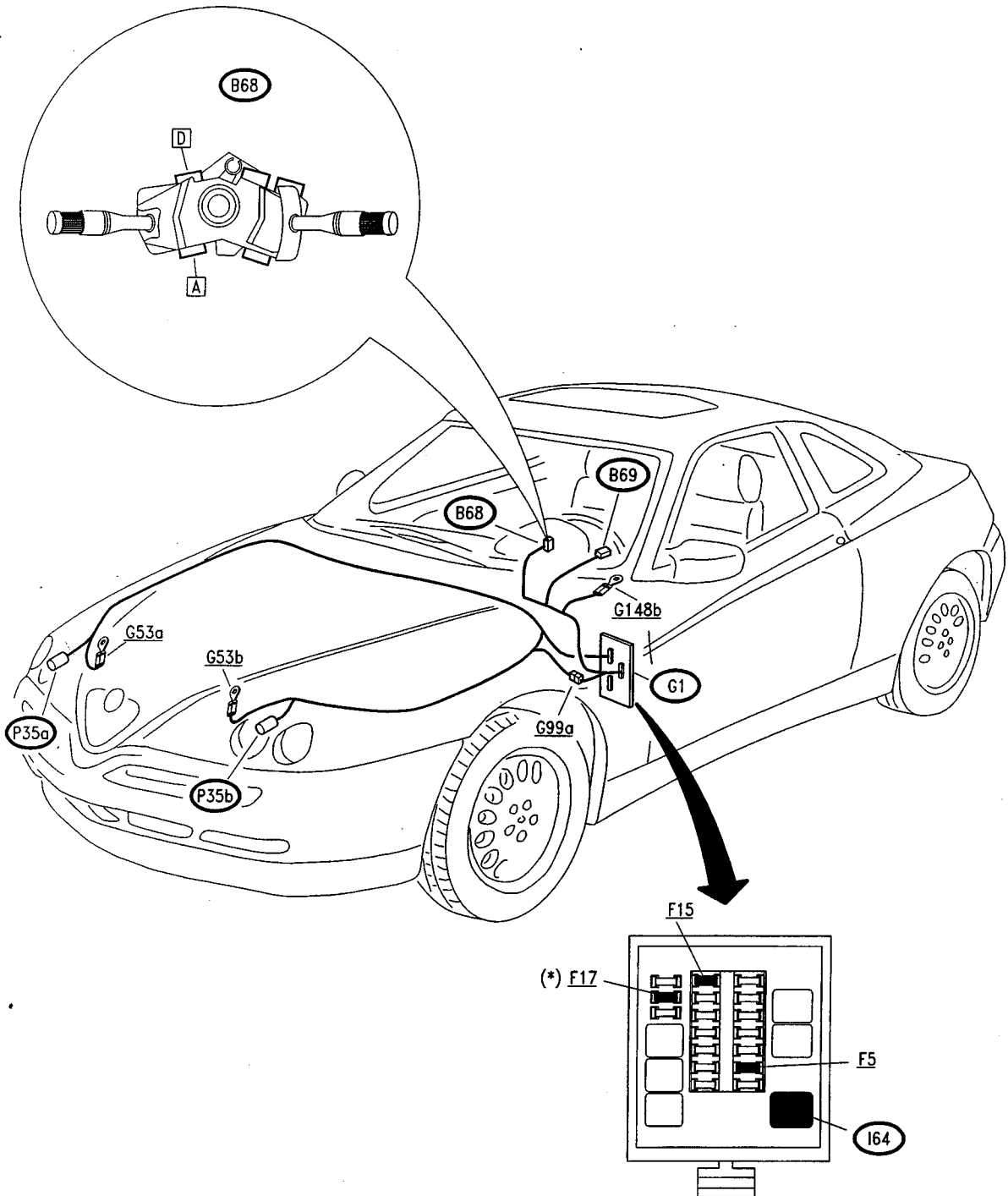
The same supply (pin 58) turns on the led inside device **B69** itself which illuminates the ideogram identifying the function.

Pins 2 of device **B69** are earthed, while the adjustment signal obtained by pressing the four-position selection knob leads from pin 1. This signal varies the output voltage through a potentiometer (100% voltage at position "0"; with voltage decreasing for the successive positions).

Motors **P35a** and **P35b** are formed by a motor in the strict sense of the word controlled by a transducer and an electronic control unit which establishes the stroke on the basis of the voltage of the adjustment signal reaching pins 2, from device **B69**.

The devices are supplied at pins 1, by the same line as fuse **F5**, while pins 3 are earthed.

LOCATION OF COMPONENTS



(*) from November '99