GENERAL DESCRIPTION

An electronic control system supervises and regulates all the parameters of the engine, optimising performance and consumption levels through response in real time to the different operating conditions: this sophisticated latest generation system comprises a single control unit which controls both ignition and injection.

This is the M 3.7.1 version of the proven and reliable BOSCH MOTRONIC system.

FUNCTIONS OF THE SYSTEM

Sequential and timed injection (S.E.F.I.)

With this control unit injection is sequential and timed for each cylinder: the injection instant (delivery of fuel into the intake manifolds through the opening of the injectors) is not simultaneous for all the cylinders, but takes place for each cylinder in correspondence with the optimal point of injection, calculated by the control unit following special maps according to the load, speed and temperature of the engine.

Static ignition

An ignition system has been adopted with "static distribution" (with semi-conductors, without distributor). This solution makes it possible to eliminate rotary components; in addition, it does not produce external sparks thus reducing the risk of interferences; lastly it reduces the number of high voltage cables and connectors; as the power modules for controlling the primary windings of the coil are inside the control unit.

Static ignition takes place through six coils located on the cylinder head.

Each coil directly supplies a spark plug without intermediate cables.

Metering the air flow rate

The air flow meter adopted is of a more modern design known as the "hot film" type. Outside, the air-flow meter looks like a part of duct between the intake manifold and the air cleaner.

Inside the air-flow meter there is an electronic circuit and a plate that is crossed by the air which passes in the duct.

The film plate is kept at a constant temperature (appr. 120°C above the temperature of the incoming air) by a heating resistance placed in contact with it.

The mass of air flowing through the manifold tends to withdraw heat from the plate: therefore, to keep its temperature constant, a certain current needs to flow through the heating resistance: this current, suitably measured, is proportionate with the mass of flowing air.

N.B. This air flow meter measures directly the mass of air (and not the volume as in the previous versions with "floating port"), thereby eliminating problems of temperature, altitude, pressure, etc.

Cylinder detection

Following the sequential and timed injection system, a timing sensor has been introduced (cam angle sensor): this makes it possible to detect which cylinder is in the bursting stroke when the engine is started, in order to be able to start the correct injection sequence. The sensor is formed of a Hall-effect device by which the voltage signal sent to the control unit "lowers" suddenly when the tooth machined on the camshaft passes in front of the actual sensor; therefore a signal is sent every two turns of the crankshaft.

Conversely, the rpm sensor sends a reference signal for each turn of the engine and each subsequent tooth of the phonic wheel on the flywheel informs the control unit of an increase of the angular position of the crankshaft, so that injection is sent correctly to the suitable cylinder and the spark to the corresponding pair of cylinders.

Fuel pump

The control logic of the fuel pump carried out by the control unit which is mainly based on the rpm signal immediately cuts off the supply to the pump as soon as the engine stops.
Moreover, the pump will not operate with the key engaged and the engine not running.

In this car, this logic is integrated - in order to further higher the standards of safety - by the **inertial switch** device: this is an electromechanical switch which, in the event of heavy shocks, opens to cut off the circuit that takes the earth to the fuel pump, which stops instantaneously. This device is particularly important as an integration of the safety guaranteed by the logic of the control unit, especially if the car is hit from behind or in the case of other accidents in which the engine does not stop immediately.

Percentage of exhaust gas recirculation

Nox (nitric oxide) is developed at high temperatures in the combustion chambers.

To reduce these emissions an E.G.R. (Exhaust Gas Recirculation) system is adopted which by recirculating part of the exhaust gases, lowers the temperature, thus the Nox produced, in the combustion chambers. In fact, part of the exhaust gas is withdrawn through the special EGR Valve and re-admitted to the intake box where it is mixed with the intaken air and burnt again in the engine. The EGR valve is modulated by a solenoid valve controlled by the injection control unit and, as a result of the type of control, in addition to reducing the amount of Nox, consumption levels are also optimised.

The percentage of exhaust gas to be returned to the engine is established by the control unit taking account of a specific characteristic curve which depends on the load, speed and temperature of the engine.

OPERATING LOGIC

– Identification of the "operating point":

the "point of operation of the engine" is located mainly through two sensors: the rpm sensor informs the control unit of the speed of rotation of the engine; the air flow meter supplies the value of the mass of air actually entering the cylinders, defining the instantaneous volumetric yield of the engine.

– **Adjustment of injection times (quantity of fuel):** the control unit controls the injectors extremely quickly and precisely, calculating the opening time on the basis of engine load (rpm and air flow), also taking into account the battery voltage and the temperature of the engine. Injection is "sequential", i.e. the injectors are opened in correspondence of the exhaust stroke of the corresponding cylinder.

– Ignition adjustment (calculation of advances):

the control unit calculates the advance on the basis of the engine load (rpm and air flow); the value is also corrected according to the temperature of the intaken air and that of the engine.

– Cold starting control:

during cold starts the control unit uses special advance values and injection times.

When a determinate temperature/rpm ratio is reached, the control unit resumes normal operating conditions.

– Control of enrichment during acceleration:

upon the need for acceleration, the control unit increases injection in order to reach the required rpm as quickly as possible.
This function takes place through the potentiometer located on the throttle which instantaneously informs the control unit of the need to accelerate.

– Fuel cut-off during deceleration:

with the throttle closed and an engine speed above a certain threshold, the control unit de-activates fuel injection; this way the rpms decrease rapidly towards idle speed reducing the speed and fuel consumption. The cutoff threshold value varies according to the temperature of the engine and the speed of the car.

– Control of idle speed:

the adjustment of the engine idle speed is carried out through the special actuator which acts on the throttle by- pass.

This device acts as a regulator for cutting in the various services (e.g. conditioner compressor): in fact, when the throttle is closed, the actuator adjusts the by-pass gap compensating the load required by the services in order to ensure that idle speed is as constant as possible.

– Maximum Rpm limiting:

above a certain threshold the control unit automatically stops the injection of fuel preventing the engine from "over-revving".

– Combustion control -lambda sensor-:

the oxygen sensor (or "lambda" sensor) informs the control unit of the amount of oxygen at the exhaust, and therefore the correct air-fuel metering.

The optimum mixture is obtained when the lambda coefficient = 1 (optimum stoichiometric mixture). The electric signal sent by the sensor to the control unit changes abruptly when the composition of the mixture departs from lambda = 1. When the mixture is "lean" the control unit increases the amount of fuel, reducing it when the mixture is "rich" so that in this way the engine operates as far as possible around the ideal lambda rating.

The signal from the lambda sensor is processed inside the control unit by a special integrator which prevents sudden "oscillations".

The sensor is heated by an electrical resistance so that it quickly reaches the correct operating temperature (appr. 300 °C).

Through this probe it is therefore possible to adjust engine carburetion precisely. Among other items, this makes it possible to meet emission limit regulations.

– Pinging control:

Through pinging sensors the control unit is informed if any pinging or "knocking" occurs and it corrects the spark advance "delaying" it accordingly; a further correction also takes account of the air temperature, in fact when the temperature of the intake air is high, pinging is more accentuated.

The intaken air temperature sensor, to be found just downstream of the air-flow meter, is not used to calculate the engine load but to control the pinging parameters and spark advances.

– **Fuel vapour recovery:**

the fuel vapours collected from the various points of the supply circuit in a special activated carbon canister are ducted to the engine where they are burnt: this takes place through a solenoid valve which is opened by the control unit only when the engine is in a condition that allows correct combustion without adversely affecting the operation of the engine: in fact the control unit compensates this amount of incoming fuel by reducing delivery to the injectors.

– **E.G.R. valve control**

The percentage of exhaust gas to be returned to the engine is determined by the control unit taking account of a specific characteristic curve which depends on the engine load and speed: recirculation is only activated when the engine speed is between 2500 and 4000 rpm., also in relation to the temperature of the engine (higher recirculation percentage with high temperatures).

– **Connection with the air conditioner compressor:**

the control unit is connected with the air conditioner system and it cuts in the compressor in relation to operation of the engine. As this service absorbs a considerable amount of power, the control unit:

– adapts the engine idle speed each time the compressor cuts in; if the engine speed falls below 700 rpm, the compressor is turned off;

– when there is the need for power (high throttle opening speed starting from below 3500 rpm, or full load, or high engine temperature - over 117°C), it momentaneously cuts out the compressor

– when the engine is being started the compressor is disabled until normal operating conditions have been reached.

– **Connection with the ALFA ROMEO CODE system**

as soon as the Motronic control unit receives the signal that the key has been turned to MARCIA, it "asks" the ALFA ROMEO CODE system for consent to start the engine: this consent is given only if the ALFA ROMEO CODE control unit recognizes the code of the key engaged in the ignition switch as correct. This dialogue between the control units takes place on diagnosis line K already used for the Alfa Romeo Tester.

– **Self-diagnosis:**

the key has a **self-diagnosis system**, which continuously monitors the plausibility of the signals from the various sensors and compares them with the limits allowed: if these limits are exceeded, the system detects a fault and turns on the corresponding warning light on the instrument cluster.

The warning light turns on when the engine is started to indicate the initial test of the entire system (appr. 4 seconds), it then turns off if no errors have been memorised: otherwise it stays on.

For certain parameters, the control unit replaces the abnormal values with suitable mean ones so that the car can "limp" to a point of the Service Network.

These "recovery" values depend on the other correct signals and they are defined individually by the control unit operating logic.

The self-diagnosis system also enables quick and effective location of faults connecting with the ALFA ROMEO Tester (see "Fault-finding"), through which all the errors memorised can be "read". It is also possible to check the operating parameters recorded by the control unit and operate the single actuators to check whether they are working properly.

COMPONENTS

The electronic control unit receives the signals leading from the **sensors** which "read" the engine operating parameters. It processes them according to a logic stored inside in "maps" which correlate the different parameters in the best way possible and it operates the **actuators** accordingly so that the engine always works with the highest level of regularity and yield.

The sensors are the following:

– engine temperature sensor (**S7**);

– air temperature sensor (**S34**);

– sensor on throttle body (**S38**);

– rpm sensor (**S31**);

– cam angle sensor (**S52**);

– heated lambda sensor (**S35**)

– air-flow meter (**S5**);

– pinging sensors (**S20a** and **s20b**);

The actuators are the following:

– injectors (**S3**);

– ignition coils (**A8**);

– fuel pump (**P18**);

– idle adjustment actuator (**S29**);

– vapour recovery solenoid valve (**M15**) ;

– E.G.R. solenoid valve (**L46**);

The control unit is also connected with:

– the climate control unit;

- the ALFA ROMEO CODE control unit (**N77**);
- the instrument cluster (**C10**) to which it supplies the signal for turning on the diagnosis warning light and for the rev counter;
- the sensor (**L17**) from which it receives the car speed signal.

The system is completed by three relays: the first two - the main relay (**S41**), and the fuel pump relay **S12a** operate the fuel pump, the injectors, the coils and the other components of the system, while the third - the air-flow meter relay (**S12e**) supplies the corresponding component.

The supply line for the entire system is protected by fuse **S36**, while the control unit is protected by wander fuse (**S46**); another fuse protects the pump (**S47**). Lastly, there is an earth point (**G60**) on the engine. Connector **T1** enables connection with the ALFA ROMEO Tester: this is located inside the car next to the control unit.

FUNCTIONAL DESCRIPTION

The Motronic control unit **S11** controls and adjusts the entire electronic ignition and injection system; all the system supplies are protected by fuse **S36** (40A).

The control unit is supplied at pin 26 directly by the battery through fuse **S46** (7.5A). At pin 54 it receives the supply from the main relay **S41**, while at pin 56 it receives the "key- operated" supply.

Pins 55, 6, 28 and 34 are earthed and serve as reference respectively for the ignition coils, the injectors, electronic screening and the final power stages.

The main relay **S41**, acts as supply relay for the whole system; it is energized by a control signal - earth - leading from pin 27 of the control unit and consequently sends the supply (12V) to pin 54 of the control unit itself, to the fuel pump relay **S12a**, to the air-flow meter relay **S12a** to the vapour recovery solenoid valve **M15**, to the idle speed actuator **S29**, to the cam angle sensor **S52**, to the EGR solenoid valve **L46** and lastly to the injectors **S3**.

The "key-operated" supply crosses fuse **G389** and supplies the control unit at pin 56 and the primary windings of the coils **A8**.

The supply of the main relay **S41** is energized by a control signal - earth - leading from pin 1 of the control unit **S11**. Consequently, the relay supplies the resistance of the lambda sensor **S35**, the air flow meter relay **S12e**, and of course the fuel pump **P18**; this supply line is protected by a special fuse **S47** (15A).

The earth reaches the pump **P18** via the inertial switch **H20** which cuts off the circuit in the event of impact.

The control unit **S11** receives numerous signals from the different sensors, thereby keeping all the engine operating parameters under control.

Through a frequency signal sent to pins 43 and 16 of the control unit, the rpm sensor **S31** supplies information about the engine rpm; the two above-mentioned signals are very low in intensity and are therefore suitably screened.

The sensor is inductive and detects the number of revolutions of the engine through the change in a magnetic field produced by the passage of the teeth of a "phonic" wheel (60-2 teeth) fitted on the flywheel.

The cam angle sensor **S52** (timing sensor), is supplied at 12 V by the main relay **S41**, and sends a signal in frequency corresponding to the phase to pin 44 of the control unit itself.

The sensor comprises a Hall effect device due to which the voltage signal sent to the control unit "lowers" abruptly when the tooth machined on the camshaft passes in front of the sensor.

The heated lambda sensor **S35** supplies the control unit information about the correct composition of the air-fuel mixture detecting the concentration of oxygen in the exhaust gas; this takes place through the signal sent to pin 12 of the control unit, while pin 11 supplies the reference earth; The sensor is heated by a resistance to make sure that it operates correctly also when the engine is cold; the resistance is supplied by the fuel pump relay **S12a.**

The throttle body sensor **S38**, is supplied by the control unit from pin 59 and connected to the electronic earth at 72 and it sends a signal to pin 73 which is proportionate with the degree of opening of the throttle itself.

The engine temperature sensor **S7**, connected to the electronic earth at pin 72, supplies a signal to pin 78 proportionate with the temperature of the engine coolant, detected with an NTC material (resistance that lowers with the temperature).

The intaken air temperature sensor **S34**, connected to the electronic earth at pin 72, supplies a signal at pin 77 that is proportionate with the temperature of the air entering the intake box, detected with an NTC material (resistance that lowers with the temperature).

The pinging sensors **S20a and S20b**, through a frequency signal sent to pins 69 and 70 of the control unit, supplies information about the pinging conditions, while a reference earth leads from pin 71; these two signals are very low in intensity and are therefore suitably screened.

The sensor comprises a piezoelectric plate which detects the vibrations produced when the engine is running, exploiting a particular characteristic of piezoelectric materials which generate an output voltage when subjected to mechanical stresses; this voltage is filtered and analysed by the control unit which corrects the ignition parameters accordingly.

The air flow meter **S5**, is supplied by the special relay **S12e**: from pin 14 of the control unit it receives the

reference earth, while it sends a signal proportionate with the air flow to pin 41.

The air flow meter is of the "heated film" type: a diaphragm is interposed in a measurement channel, through which the intake air flows: this diaphragm is kept at a constant temperature by a heating resistance; the mass of air that crosses the measurement channel tends to withdraw heat from the diaphragm, therefore, in order to maintain its temperature constant, a certain amount of current must flow through the resistance: this current, appropriately measured, is proportionate with the mass of air flowing in the channel.

Relay **S12e**, supplied directly with 12 V by relay **S41**, is energized by the fuel pump relay **S12a** and thus supplies the meter **S5** itself.

On the basis of the signals received from the sensors and of the calculations carried out, the control unit **S11** controls the opening of the single injectors **S3** through special signals - of the duty-cycle type - pins 3 (cyl. 1), 4 (cyl. 3), 5 (cyl. 5) 31 (cyl. 2), 32 (cyl. 4) and 33 (cyl. 6). The injectors receive consent (12V) to open from the main relay **S41**.

The static ignition system is controlled by the control unit directly which automatically adjusts the advance. N.B. the power modules which generate the high voltage pulses are located inside the control unit. The control signals (earth) for the primary windings of the coil **A8** lead from the control unit, while the secondary winding sends the pulse to the spark plugs **A12**: from pin 23: for cylinder 3, pin 24: cylinder 3, pin 24: cylinder 2, pin 25: cylinder 1; pin 50 cylinder 6; pin 51 cylinder 5 and pin 52 cylinder 4.

The primary windings of the coil **A8** are supplied at 12 V ("key- operated") by relay **S42**.

The power modules inside the control unit are connected to earth via pin 55.

The idle speed adjustment actuator **S29** forms a by-pass line for the flow of air; this comprises two windings: one opens and the other closes a valve that adjusts the gap of the by- pass section; a safety spring establishes a mean opening value in the event of a failure to this device; the actuator, supplied by the main relay, **S41**, is controlled by the control unit through the duty-cycle signals of pins 29 (closing) and 2 (opening).

The vapour recovery solenoid valve **M15** allows the passage of the fuel vapours towards the engine intake where they are added to the mixture entering the combustion chamber; this valve, supplied by the main relay **S41**, is opened by the control unit when the engine is under load through a duty cycle signal from pin 36.

The E.G.R. solenoid valve **L46**, controlled by the control unit, operates the actual E.G.R. valve modulating its opening: the latter is a vacuum-operated diaphragm valve: the electropneumatic valve works by changing this vacuum which is withdrawn from the same "takeoff" used for the servobrake.

The solenoid valve is controlled from pin 9 of the control unit while it is supplied at 12 V by main relay **S41**.

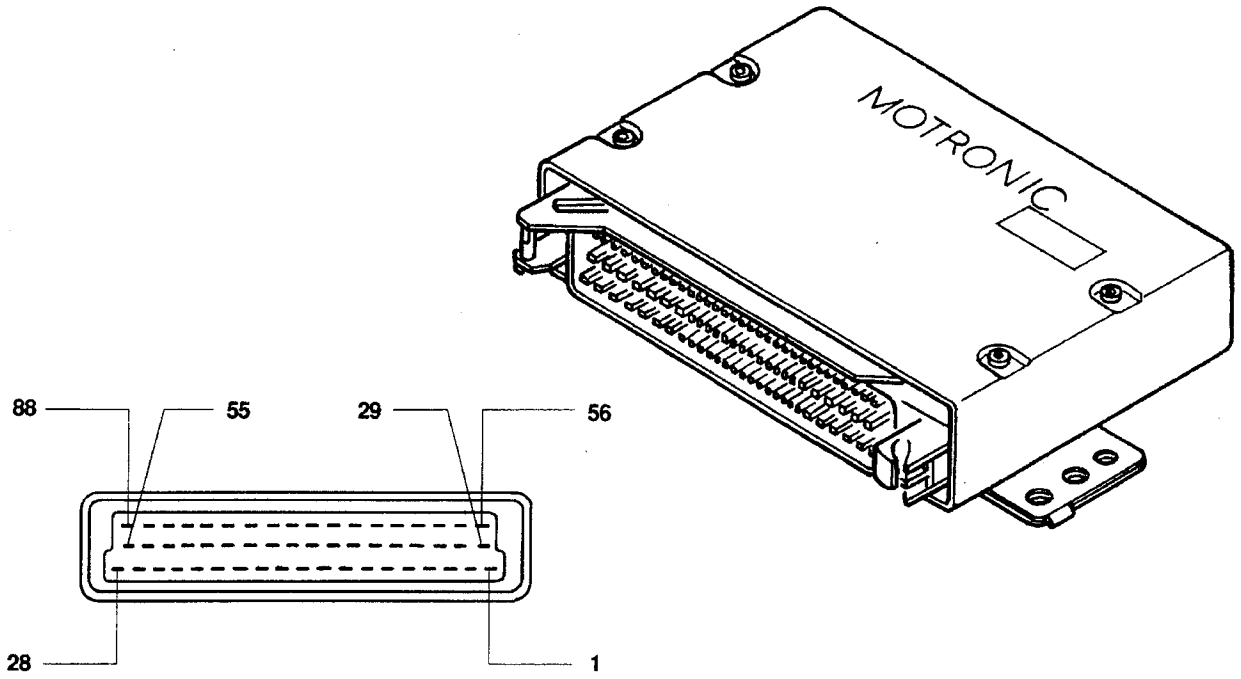
The tachometric signal (car speed) reaches the control unit at pin 42 via sensor **L17**; while from pin 47 the control unit sends a "pulse" signal to the cluster **C10** which is proportionate with the number of revolutions of the engine; the signal for the "Check Engine" diagnosis warning light on the cluster **C10** leads from pin 8.

The control unit **S11** is connected with the air conditioning system through pins 48, 64 and 65.
This makes it possible to adapt the engine idle speed to the increased power each time the compressor cuts in, or to cut it out in the case of high speed or engine loads. For further details see the "Climate Control" section.

The control unit **S11** is connected by pin 88 with the ALFA ROMEO CODE control unit **N77** via the diagnosis line K; if the ALFA ROMEO CODE does not recognise a correct "key code" it will not enable the Motronic control unit to start the engine.

The control unit possesses a self-diagnosis system which can be used through connection to the ALFA ROMEO Tester at connector **T1**; the tester receives the fault signals from the control unit through the diagnosis lines L - pin 87 - and K - pin 88 -, while the earth leads from **G131** (line K is also used by the ALFA ROMEO CODE system).

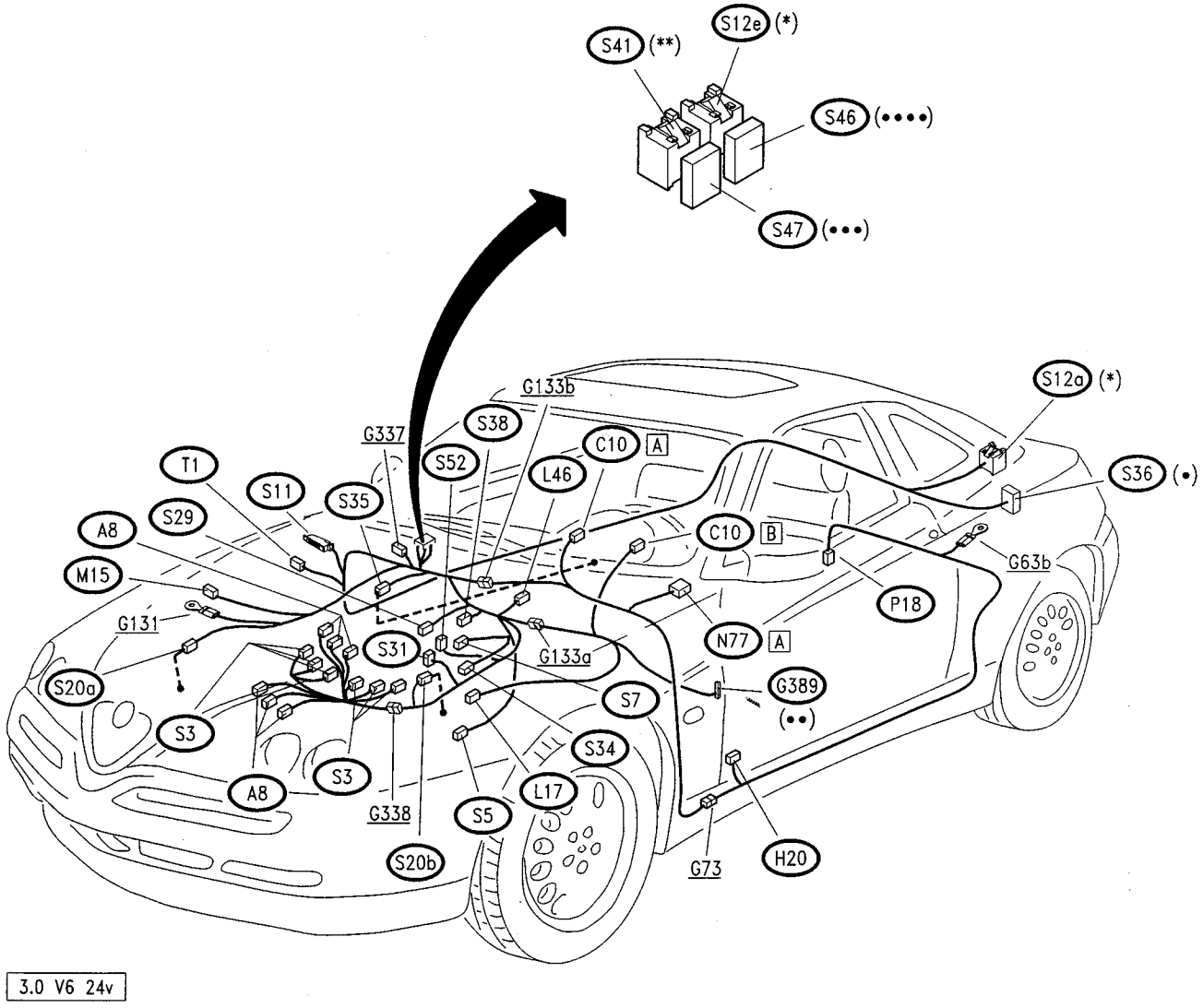
ELECTRONIC CONTROL UNIT



CONTROL UNIT PINOUT

1. Fuel pump relay consent
2. Idle actuator signal (open)
3. Injector control, cylinder no.1
4. Injector control, cylinder no.3
5. Injector control, cylinder no.5
6. Earth for final stages (injectors)
8. "Check Engine" warning light
9. E.G.R. solenoid valve control
11. Lambda sensor earth
12. Lambda sensor signal
14. Earth for air flow meter
16. Rpm sensor signal
23. Ignition cylinder no.3
24. Ignition cylinder no.2
25. Ignition cylinder no.1
26. Direct 12V supply
27. Main relay control
28. Electronic earth (sensor screening)
29. Idle speed actuator signal (closed)
31. Injector control, cylinder no.2
32. Injector control, cylinder no.4
33. Injector control, cylinder no.6
34. Earth for final stages
36. Evaporative solenoid valve signal
41. Air-flow meter signal
42. Car speed signal output
43. Rpm sensor signal
44. Camanglesensor signal
47. Engine rpm signal output
48. Climate control unit relay control
50. Ignition cylinder no. 6
51. Ignition cylinder no. 5
52. Ignition cylinder no. 4
54. Supply from main relay 12V
55. Earth for ignition
56. "Key-operated" supply
59. Reference voltage (5V) for throttle sensor
64. Climate control system signal (compressor cut in request)
65. Climate control system signal (system control)
69. Pinging sensor signal 2
70. Pinging sensor signal 1
71. Earth for pinging sensors
72. Electronic earth for sensors
73. Throttle angle sensor signal
77. Air temperature sensor signal
78. Water temperature sensor signal
87. Diagnosis, line L
88. Diagnosis, line K (also for ALFA ROMEO CODE system)

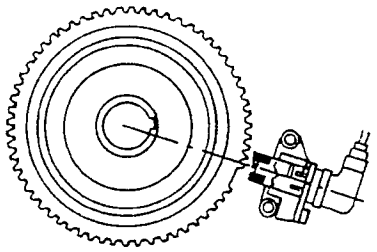
LOCATION OF COMPONENTS



(•) Black fuse holder
(••) Red fuseholder
(•••) Blue fuseholder
(••••) Violet fuseholder
(*) Black base
(**) Grey base

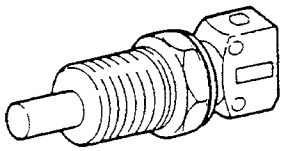
CHECKING COMPONENTS

Rpm sensor (S31)



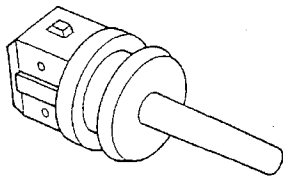
SPECIFICATIONS	
Sensor winding resistance 20 °C	~ 540 Ω
Distance (gap) between sensor and phonic wheel	0.8 ÷ 1.5 mm

Engine temperature sensor (S7)



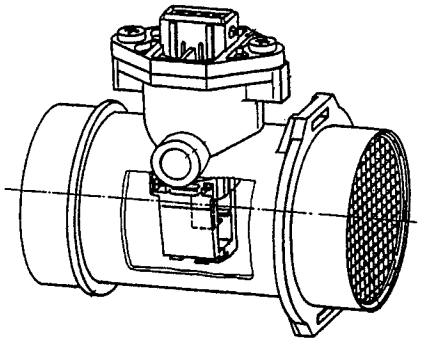
SPECIFICATIONS	
Temperature (°C)	Resistance (Ω)
- 10°C	8100 ÷ 10770 Ω
+ 20°C	2280 ÷ 2720 Ω
+ 80°C	292 ÷ 362 Ω

Intake air temperature sensor (S34)

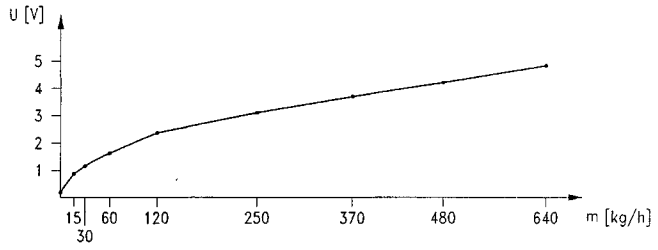


SPECIFICATIONS	
Temperature (°C)	Resistance (Ω)
- 10°C	8100 ÷ 10770 Ω
+ 20°C	2280 ÷ 2720 Ω
+ 80°C	292 ÷ 362 Ω

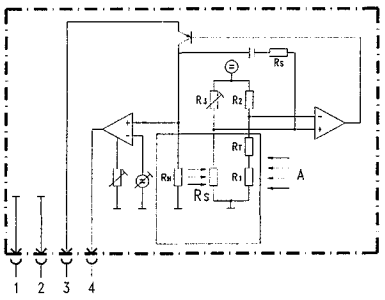
Air flow meter (S5)



SPECIFICATIONS	
Current that crosses the diaphragm:	
capacity (kg/h)	current (A)
0 640	≤ 0.25 ≤ 0.80

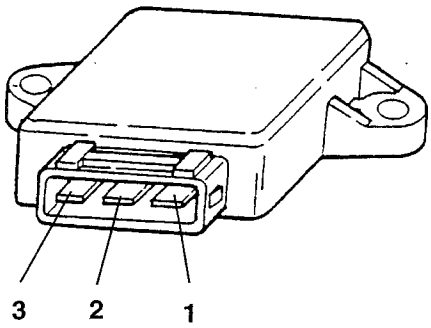


Sensor characteristic curve
m = capacity
U = voltage between pin 4 and 2



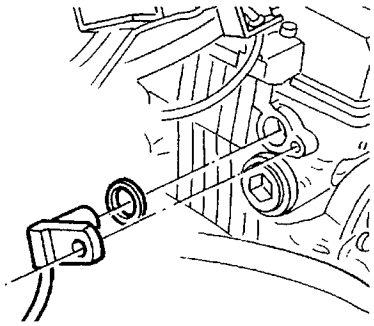
pin 1 - Earth
pin 2 - Reference earth
pin 3 - 12 V supply
pin 4 - Measurement signal
A = air
Rs = hot film sensor

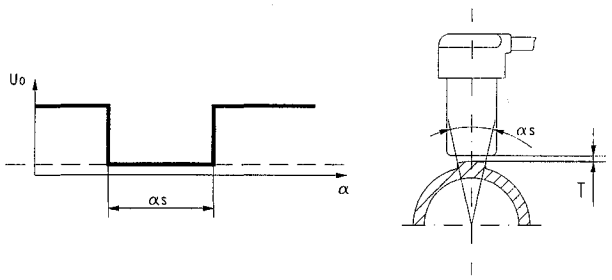
Throttle position sensor (S38)

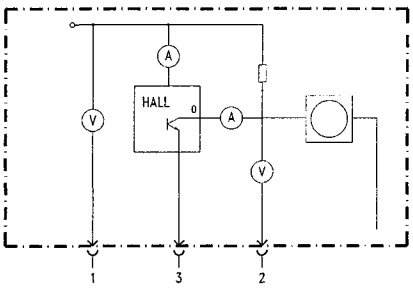


SPECIFICATIONS	
Resistance between terminals:	
1 - 2 (fixed)	≃ 2 kΩ
1 - 3 (throttle closed)	≃ 1 kΩ
1 - 3 (throttle completely open)	≃ 2.7 kΩ

Cam angle sensor (S52)

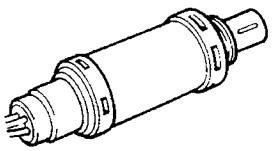


SPECIFICATIONS
The voltage signal "lowers" abruptly when the tooth machined on the camshaft passes in front of the sensor: 
Gap value T ≤ 1.5 mm



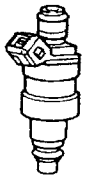
pin 1 - Supply
pin 2 - Signal output
pin 3 - Earth

Lambda sensor (S35)



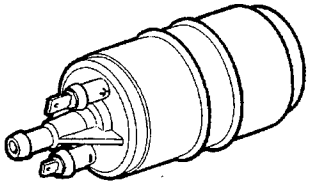
SPECIFICATIONS	
Heating resistance	3 Ω

Injectors (S3)



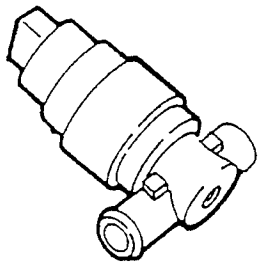
SPECIFICATIONS	
Winding resistance	appr. 6 Ω

Fuel pump (P18)



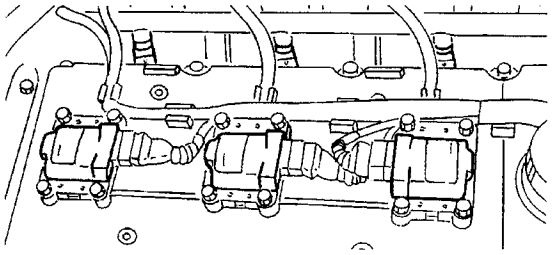
SPECIFICATIONS	
Capacity	≥120 l/h
Pressure	4 bar
Nominal voltage	12V

Idle adjustment actuator (S29)



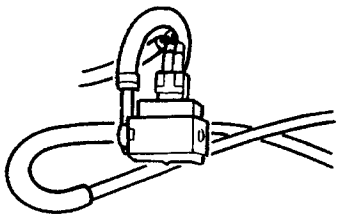
SPECIFICATIONS	
Resistance between terminals:	
1 - 3	~ 26 Ω
1 - 2	~ 13 Ω
2 - 3	~ 13 Ω

Ignition coils (A8)



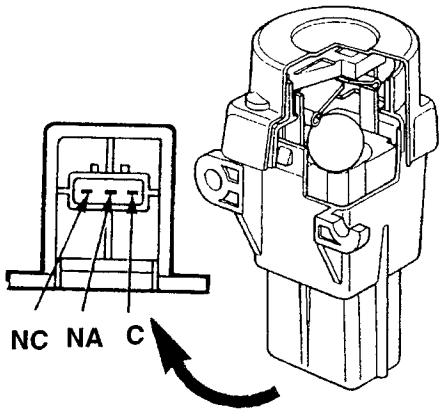
SPECIFICATIONS	
Primary resistance	- Ω
Secondary resistancesecondario	- kΩ

Evaporative solenoid valve (M15)



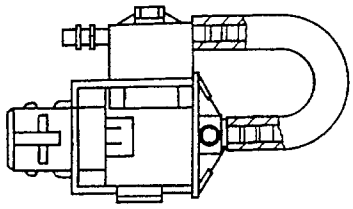
SPECIFICATIONS	
Duty-cycle signal	12 V; 10 Hz
Winding ohmic resistance	26 ± 4 Ω
When not energised the solenoid valve is normally closed	

Inertial switch (H20)



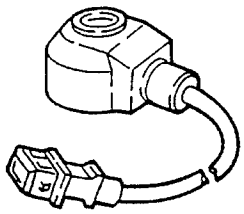
SPECIFICATIONS
Check continuity between pin NC and C: this continuity is interrupted in the event of a crash; the contact is closed again pressing the special button

E.G.R. solenoid valve (L46)



SPECIFICATIONS	
Duty Cycle signal	12V; 15.3 Hz
Winding ohmic resistance	~ 30 Ω

Pinging sensor (S20a) (S20b)



SPECIFICATIONS		
Resonance frequency		> 20 kHz
Impedence		≥ 1 MΩ
Allowed vibration	for long times	≤ 80 g
	for short times	≤ 400 g

FAULT-FINDING

The control unit possesses a self-diagnosis function which continuously checks the signals from the various sensors for plausibility and comparing them with the permissible limits: if these limits are exceeded, the system detects a fault and memorises it. It also turns on the special warning light on the instrument cluster.
For certain parameters the control unit replaces the abnormal values with appropriate mean values so that the car can "limp" to a point of the Service Network.
These values, known as "recovery" depend on the other correct signals and are defined individually by the control unit operating logic.
The self-diagnosis system also enables quick and effective location of faults connecting with the ALFA ROMEO Tester, through which the errors memorised may be "read". It is also possible to check the operating parameters recorded by the control unit and engage the single actuators to check whether they are working properly.

Diagnosis using the ALFA TESTER

N.B. Before carrying out diagnosis with the Tester, carry out the perliminary test described below (**TEST A**).

The Tester and electronic control unit should be connected as follows:

1. Power the Tester either through the cigar lighter socket or connecting it directly to the battery using the special cable.
2. Connect the socket of the Tester to the one for the control unit (to be found next to the control unit).

The information the instrument can provide is:

– display of parameters;

– display of errors;

– active diagnosis.

Error clearing

Before ending diagnosis the contents of the "permanent" memory are cancelled through the Tester.

PRELIMINARY CHECK OF BOSCH M3.7.1 SYSTEM	PROVA A

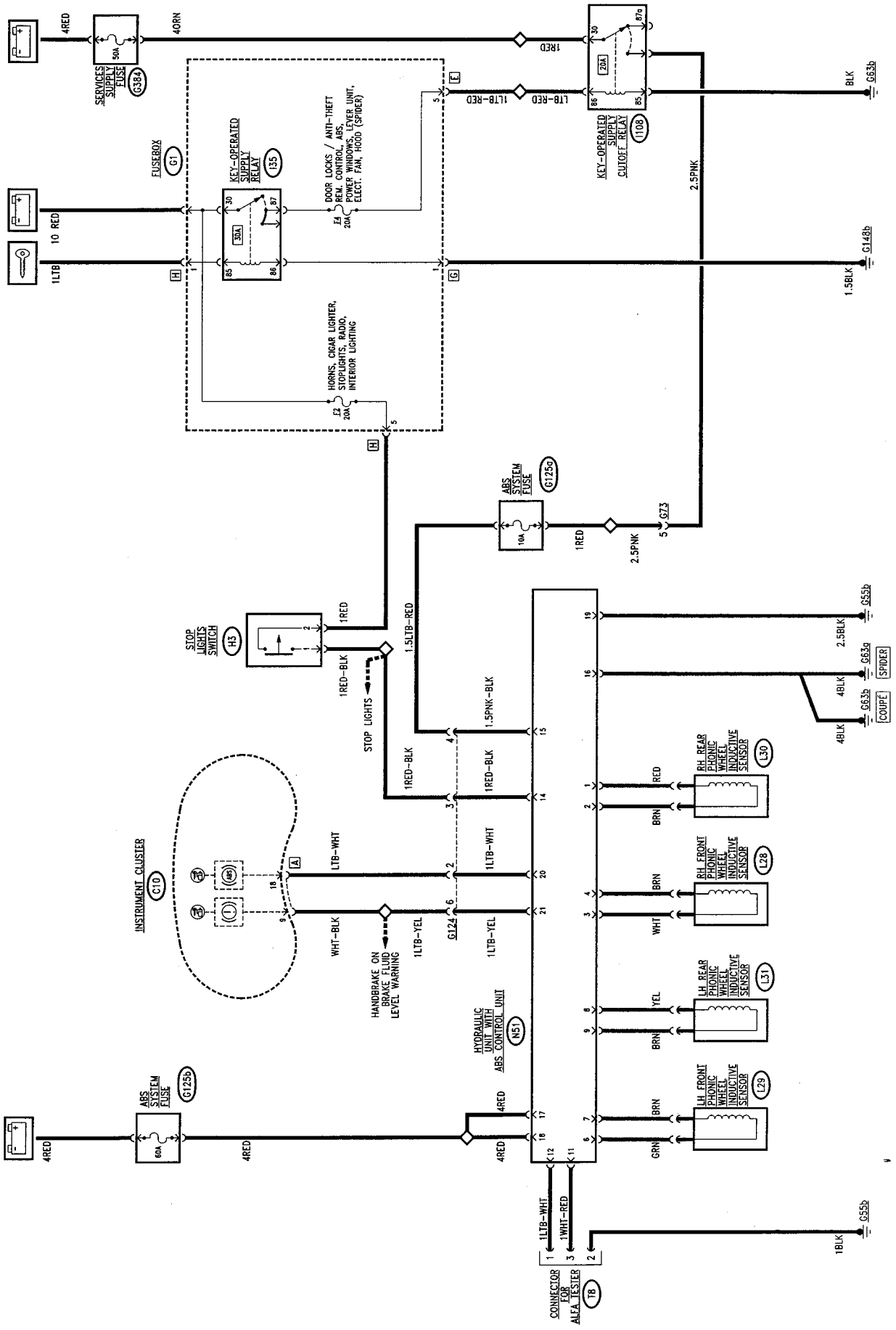
NOTE: Beforehand check that the ALFA ROMEO CODE system is working properly as it may have cut off the supply to the system!

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1 CHECK FUSE – Check the intactness of fuses **S36, S46, S47** and **G389**	OK ▶	Carry out **step A2**
	OK ▶	Replace fuses **S36**: 40A **S46**: 7.5A **S47** : 15A **G389** : 10A
A2 CHECK VOLTAGE – Check for 12 V at pin 30 of relays **S41** and **S12a** and also at pin 86 of **S41**	OK ▶	Carry out **step A3**
	OK ▶	Restore the wiring between the battery **A1** and relays **S41** and **S12a** through fuse **S47**
A3 CHECK VOLTAGE – With the key turned, check for 12 V at pin 56 of the control unit **S11**	OK ▶	Carry out **step A4**
	OK ▶	Restore the wiring between the ignition switch **B1** and the control unit **S11** through fuse **G389** and connector **G133a**
A4 CHECK RELAYS – Check that relays **S41**, **S12e** and **S12a** are working properly	OK ▶	Carry out **step A5**
	OK ▶	Replace any faulty relays
A5 CHECK CONTROL UNIT SUPPLY – Check for 12 V at pin 26 of the control unit **S11**; with the key turned 12 V also at pin 54 and 56 of **S11** and appr. 0 V (very low voltage) at pin 1 and 27 of **S11**	OK ▶	Carry out **step A6**
	OK ▶	Restore the wiring between the control unit **S11** and the relays and between the control unit and fuse **S46**
A6 CHECK EARTH – Check for an earth at pin 6 and 34, 55 e 28. Also check for an earth at pin 85 of **S12e**	OK ▶	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER
	OK ▶	Restore the wiring between **S11** and the relays and earth **G131**

ABS SYSTEM (BOSCH ABS 5.3)

INDEX

WIRING DIAGRAM



GENERAL DESCRIPTION

The electronic wheel anti-lock system **(BOSCH ABS 5.3)** adjusts the braking pressure transmitted to the wheels preventing loss of road-holding under all tyre and road conditions.

The system has been designed to integrate, and not replace, the normal mechanical braking system, guaranteeing a high degree of of safety in the event of a failure: in fact it operates on the same brake fluid as the conventional mechanical circuit.

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

In these situations, the control unit suitably operates the solenoid valves that modulate the pressure in the hydraulic circuit, eliminating wheel locking and bringing the car back to the limit of roadholding, which means that the braking distance is reduced to a minimum, without losing control of steering.
The **adjustment solenoid valves** are, in this version of the system, two (one for pressure charging and one for relief) for each wheel.

In this version, the control unit controls distribution of the braking load in the rear axle, replacing the braking load proportioning valve used previously ("EBD" function: Electronic Brake Distribution").

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

Components

The system comprises:

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

The ABS includes a self-diagnosis system which continually monitors all the system parameters and components: in the event of a failure or fault, the system cuts itself off automatically leaving the conventional servo-assisted mechanical braking system operational: the driver is alerted of this situation by a special warning light "ABS" on the instrument cluster (**C10**).

A fault on the "EBD" function turns on the "handbrake on" warning light .

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

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

FUNCTIONAL DESCRIPTION

System supply:

With a line protected by wander fuse **G125a** (10A)the key- operated voltage supplies pin 15 of the ABS control unit **N51**, the battery voltage reaches pin 17 and 18 of the same N51 from the line protected by fuse **G125b** (60A).

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

Sensors and solenoid valves:

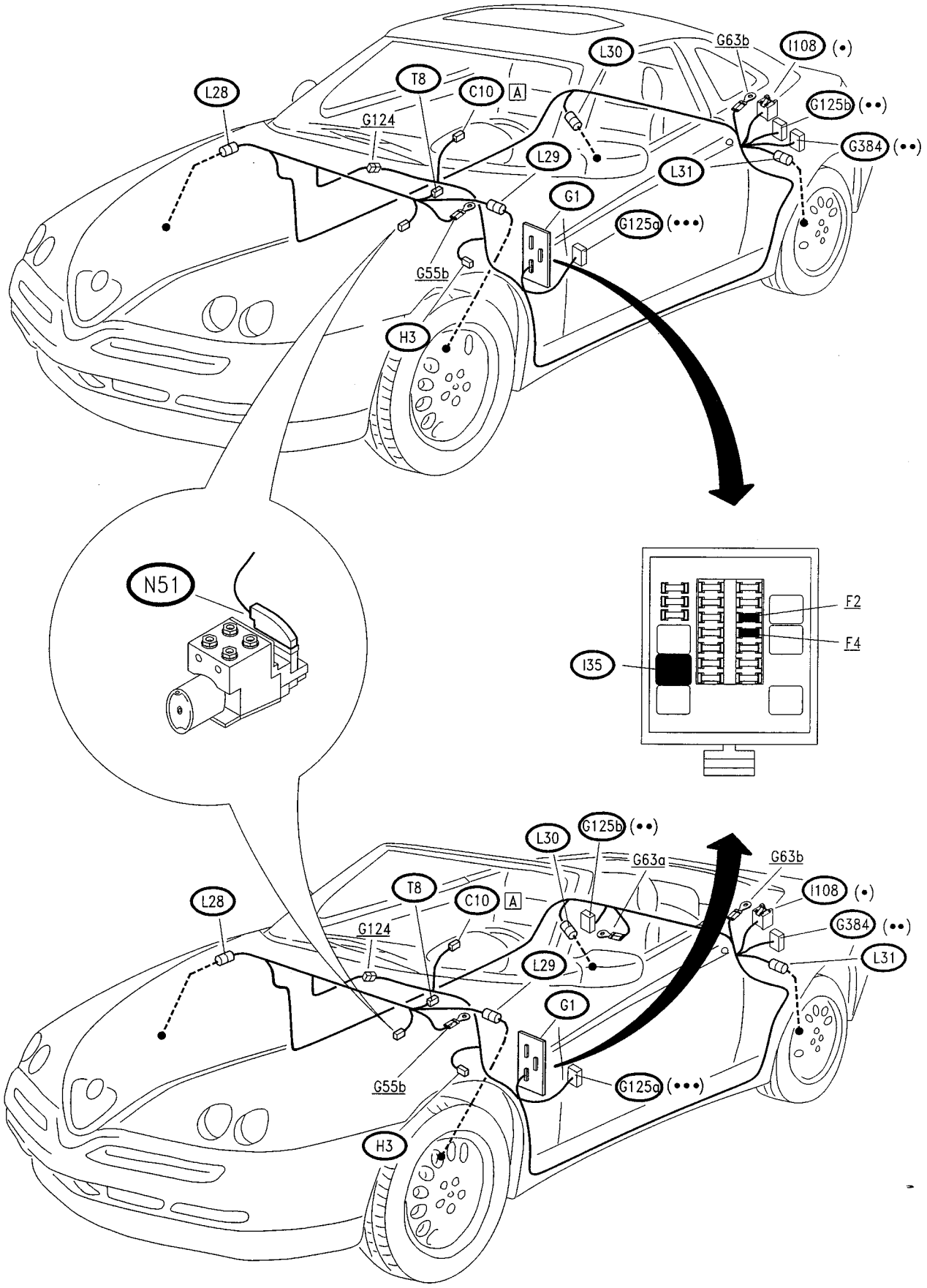
Directly inside the control unit **N51**, the module is connected with the adjustment solenoid valves, which modulate the pressure on the brakes of the four wheels; outside, it is connected with the four sensors **L28 - L29 - L30 - L31** (pin 3-4, 6-7, 1-2 and 8-9) which signal the speed of the single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

Self-diagnosis:

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

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

LOCATION OF COMPONENTS



(•) Blue base
(••) black fuseholder
(•••) red fuseholder

FAULT-FINDING

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

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

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

Fault-Finding using the Flashing Code

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

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

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

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

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

Fault-finding using the Alfa Romeo Tester

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

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

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

The instrument can give the following information:

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

Activation of diagnosis

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

Flashing code table

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

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

NOTE:
If the control unit detects an error concerning the "EBD" function it turns on both warning lights and . Fault finding through the Flashing Code or Alfa Romeo Tester is necessary.

PRELINARY SYSTEM CHECK	TEST A

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
A1 CHECK FUSES – Check the intactness of wander fuses **G125a** and **G125b**	OK ▶ ~~OK~~ ▶	Carry out step A2 Replace the fuses - **G125a** (10A) - **G125b** (60A)
A2 CHECK VOLTAGE – Check for 12 V at pin 17 and 18 of **N51**	OK ▶ ~~OK~~ ▶	Carry out **step A3** Restore the wiring between pin 17 and 18 of **N51** and fuse **G125b**
A3 CHECK VOLTAGE – Turn the ignition key and check for 12 V at pin 15 of **N51**	OK ▶ ~~OK~~ ▶	Carry out **step A4** Restore the wiring between pin 15 of **N51** and fuse **G125a**
A4 CHECK EARTH – Check that pin 16 of **N51** is earthed	OK ▶ ~~OK~~ ▶	Carry out **step A5** Restore the wiring between pin 16 of **N51** and earth **G63a** or **G63b**
A5 CHECK EARTH – Check that pin 19 of **N51** is earthed	OK ▶ ~~OK~~ ▶	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER OR FLASHING CODE Restore the wiring between pin 19 of **N51** and earth **G55b**

FAULTY BRAKE SWITCH	TEST B

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
B1 CHECK STOP LIGHTS – Check that the stop lights are working properly	OK ▶	Carry out **step B2**
	OK ▶	Replace the stop light switch **H3**, or proceed as described in the "STOP LIGHTS" section
B2 CHECK VOLTAGE – With the pedal pressed, check for 12 V at pin 14 of **N51**	OK ▶	Check and if necessary replace the electronic control unit **N51**
	OK ▶	Restore the wiring between pin 14 of **N51** and **H3**

LH FRONT SENSOR NOT CONNECTED	TEST C

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
C1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 7 and 6 of **N51**	OK ▶	Carry out **step C2**
	OK ▶	Carry out **step C3**
C2 CHECK CONTINUITY – Disconnect sensor **L29** and check continuity between the sensor and pin 7 of **N51** , and between the sensor and pin 6 of **N51**	OK ▶	Check and if necessary replace sensor **L29**.
	OK ▶	Restore the wiring between **L29** and **N51**
C3 CHECK OPEN CIRCUIT – Disconnect sensor **L29** and check for an open circuit between pin 7 and 6 of **N51** (wiring side)	OK ▶	Check and if necessary replace sensor **L29**.
	OK ▶	Restore the wiring eliminating the short circuit between the cables connecting **L29** with **N51**

RH FRONT SENSOR NOT CONNECTED	TEST D

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
D1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 4 and 3 of **N51**	OK ▶ ~~OK~~ ▶	Carry out **step D2** Carry out **step D3**
D2 CHECK CONTINUITY – Disconnect sensor **L28** and check for continuity between the sensor and pin 4 of **N51**, and between the sensor and pin 3 of **N51**	OK ▶ ~~OK~~ ▶	Check and if necessary replace sensor **L28**. Restore the wiring between **L28** and **N51**
D3 CHECK OPEN CIRCUIT – Disconnect sensor **L28** and check for an open circuit between pin 4 and 3 of **N51** (wiring side)	OK ▶ ~~OK~~ ▶	Check and if necessary replace sensor **L28**. Restore the wiring eliminating the short circuit between the cables connecting **L28** with **N51**

LH REAR SENSOR NOT CONNECTED	TEST E

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
E1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 8 and 9 of **N51**	OK ▶ ~~OK~~ ▶	Carry out **step E2** Carry out **step E3**
E2 CHECK CONTINUITY – Disconnect sensor **L31** and check continuity between the sensor and pin 8 of **N51**, and between the sensor and pin 9 of **N51**	OK ▶ ~~OK~~ ▶	Check and if necessary replace sensor **L31**. Restore the wiring between **L31** and **N51**
E3 CHECK OPEN CIRCUIT – Disconnect sensor **L31** and check for an open circuit between pin 8 and 9 of **N51** (wiring side)	OK ▶ ~~OK~~ ▶	Check and if necessary replace sensor **L31**. Restore the wiring eliminating the short circuit between the cables connecting **L31** with **N51**

RH REAR SENSOR NOT CONNECTED — TEST F

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
F1 CHECK OPEN CIRCUIT – Turn the key and check for an open circuit between pin 1 and 2 of **N51**	OK ▶	Carry out **step F2**
	~~OK~~ ▶	Carry out **step F3**
F2 CHECK CONTINUITY – Disconnect sensor **L30** and check continuity between the sensor and pin 1 of **N51** , and between the sensor and pin 2 of **N51**	OK ▶	Check and if necessary replace sensor **L30.**
	~~OK~~ ▶	Restore the wiring between **L30** and **N51**
F3 CHECK OPEN CIRCUIT – Disconnect sensor **L28** and check for an open circuit between pin 1 and 2 of **N51** (wiring side)	OK ▶	Check and if necessary replace sensor **L30.**
	~~OK~~ ▶	Restore the wiring eliminating the short circuit between the cables connecting **L30** con **N51**

INSUFFICIENT SUPPLY VOLTAGE — TEST G

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
G1 CHECK VOLTAGE – Check that the battery voltage is 12V	OK ▶	Carry out **step G2**
	~~OK~~ ▶	Restore the correct voltage charging or changing the battery **A1**
G2 CHECK VOLTAGE – Check for a voltage of 12 V at pin 17 and 18 of **N51**	OK ▶	Carry out **step G3**
	~~OK~~ ▶	Restore the wiring between pin 17 and 18 of **N51** and the battery **A1**, via fuse **G125b**
G3 CHECK VOLTAGE – With the ignition key turned, check for 12 V at pin 15 of **N51**	OK ▶	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER
	~~OK~~ ▶	Restore the wiring between pin 15 of **N51** and the key-operated cut out relay **I108**, via fuse **G125a**

"ABS" WARNING LIGHT NOT WORKING (*)	TEST H

TEST PROCEDURE	RESULT	CORRECTIVE ACTION
H1 CHECK CONTINUITY – Check continuity between pin 12 of **N51** and pin 1 of connector **T8** and between pin 11 of **N51** and pin 3 of **T8**	OK ▶	Carry out **step H2**
	~~OK~~ ▶	Restore the wiring between **N51** and connector **T8**
H2 CHECK EARTH SIGNAL – Turn the ignition key and for a few seconds, check for 0V at pin A18 of the instrument cluster **C10**	OK ▶	Replace the ABS warning light bulb on the instrument cluster **C10**
	~~OK~~ ▶	Carry out **step H3**
H3 CHECK EARTH SIGNAL – Turn the key and for a few seconds, check for 0V at pin 20 of **N51**	OK ▶	Restore the wiring between **N51** and **C10**
	~~OK~~ ▶	Replace the electronic control unit **N51**

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

KEY TO COMPONENTS

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

B MANUAL ELECTRICAL CONTROLS
B1 Ignition switch
B9 Heated rearscreen control switch
B10 Fog lights control switch
B11 Rear fog guards control switch
B12 Hazard warning lights control switch
B16 Instrument panel light dimmer button
B21a Right front power window control switch (on RH door)
B21b Right front power window control switch (on LH door)
B36 Wing mirror control switch
B40 Trip meter reset switch
B47 Sun roof motor control switch
B53 Front power window switch with automatic mechanism
B61 Fuel flap opening switch
B68 Steering column lever unit
B69 Headlamp aiming device
B87 Luggage compartment opening switch with glove box light
B98 Air recirculation switch
B99 Hood release switch
B100 Hood cover release switch
B101 Automatic hood control switch

C INSTRUMENTATION
C10 Instrument cluster
C18 Auxiliary instrument cluster

D WARNING LIGHTS
D31 Anti-theft device led indicator
D43 Signalling led for automatic hood

E EXTERIOR LIGHTS
E1a LH front direction indicator bulb
E1b RH front direction indicator bulb
E2a LH front side light bulb
E2b RH front side light bulb
E5a LH low beam light bulb
E5b RH low beam light bulb
E7a LH high beam light bulb
E7b RH low beam light bulb
E9a LH direction indicator light bulb
E9b RH direction indicator light bulb
E10a LH fog light bulb
E10b RH fog light bulb
E17a LH number plate light bulb
E17b RH number plate light bulb
E19 RH tail light cluster
E20 LH tail light cluster
E28 Third stop light
E30 Rear RH fog guard/reversing light
E31 Rear LH fog guard/reversing light

F INTERIOR LIGHTS
F3 Passenger compartment ceiling light
F5 Luggage compartment light
F8a Heating/ventilation controls light bulb a
F8b Heating ventilation controls light bulb b
F23 RH foot well light
F24 LH foot well light
F45 Light on LH front door
F46 Light on RH front door

G FUSEBOX - CONNECTORS - EARTHS
G1 Fusebox
G3 Fusebox terminal connector
G4 Free fuse
G21 Connector for RH front door wiring
G23 Connector for LH front door wiring
G38 Air conditioner wiring connector
G43 Connector for heating and ventilation control wiring
G53a RH engine compartment earth
G53b LH engine compartment earth
G55b LH side panel earth
G56 Branch terminal board
G60 Injection wiring earth
G63a RH rear earth
G63b LH rear earth
G65 Coaxial cable for aerial
G73 Connector for rear services
G73b Connector for rear services
G84 Console wiring connector
G92 Luggage compartment earth
G99 Connector for dashboard wiring/engine wiring
G115 Connector for tow bar trailer socket
G124 ABS system connector
G125a ABS system fuse
G125b ABS system fuse
G131 Earth on upper cover
G131a Earth on upper cover
G131b Earth on upper cover
G133a Connector for electronic injection wiring A
G133b Connector for electronic injection wiring B
G148b Earth under dashboard LH
G193 Connector for electric aerial wiring
G219 Connector for sun roof
G254 Fuse for engine fan
G255 Fuse for heating and ventilation fan
G261 Fuse for sun roof
G308 Connector for engine sensors
G310 Fuse for RH front power window
G312a Power window and door lock fuse
G312b Power window and door lock fuse
G313 Connector for additional conditioner wiring
G314a Connector for engine wiring / conditioner wiring A
G314b Connector for engine wiring / conditioner wiring B
G320 Connector for rear loudspeaker cables

G337 Connector for conditioner syst./injection syst.
G338 Coil and injectors connector
G380 Airbag connector
G381 Earth for airbag
G383 Connector for airbag capsule
G384 Services supply fuse
G385 Connector for wiring in front bumper
G389 Fuse for ALFA ROMEO CODE unit
G391 Rear fog guard fuse
G399 Dashboard connector for automatic hood
G400 Rear connector for automatic hood
G401 Fuse for automatic hood system
G402 Fuse for automatic hood control unit
G403 Fuse for automatic hood switch
G404 Fuse for automatic hood switch

H SWITCHES
H1 Handbrake switch
H2 Reversing light switch
H3 Stop lights switch
H9 RH front brake pad switch
H10 LH front brake pad switch
H17 Brake fluid minimum level switch
H20 Inertial switch
H24 Luggage compartment light switch
H44 Bonnet anti-theft device switch
H51 Sun roof stroke limit switch
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

I RELAYS
I2 Heated rearscreen relay
I3 Horn relay
I17 Fog light relay
I29 Fuel pump relay
I35 Key-operated supply relay
I49 Low beam relay
I50 High beam relay
I52 Luggage compartment opening relay
I53 Fuel flap opening relay
I58 Sun roof relay
I64 Side lights relay
I99 Engine cooling fan 1st speed relay
I99a Engine cooling fan 1st speed relay
I99b Engine cooling fan 1st speed relay
I100 Engine cooling fan 2nd speed relay
I106 Hood release relay
I106b Hood emergency release relay
I107a Hood cover release relay
I107b Hood cover release relay
I108 Key-operated supply cutoff relay
I109 Anti-theft switch relay
I112a RH hood closing relay
I112b LH hood closing relay
I113 Hood cover closing relay
I116 Automatic hood control relay
I117 Automatic hood electric pump relay

L SENDERS
L2 Minimum engine oil pressure
L9 Sender for fuel level gauge
L10 Sender for engine coolant temperature gauge and max. temperature warning light contact
L17 Speedometer sensor
L21 Pierbourg valve
L28 RH front phonic wheel inductive sensor
L29 LH front phonic wheel inductive sensor
L30 RH rear phonic wheel inductive sensor
L31 LH rear phonic wheel inductive sensor
L33 Two-level thermal contact
L46 E.G.R. solenoid valve

M ELETTROMAGNETS - SOLENOID VALVES
M12 Luggage compartment opening actuator electromagnet
M13 Fuel flap opening actuator electromagnet
M15 Evaporation solenoid valve
M26a LH hood release actuator electromagnet
M26b RH hood release actuator electromagnet
M27 Hood cover release actuator electromagnet
M27a LH hood cover release actuator electromagnet
M27b RH hood cover release actuator electromagnet
M28 Automatic hood solenoid valve

N ELECTRONIC DEVICES - INTERMITTENCES- TIMERS
N1 Power module
N13 Hazard warning lights and direction indicators intermittence
N14 Electronic windscreen wiper intermittence
N18 Electronic headlamp switching device
N23 Ignition control unit
N25 Rear fog guard electronic device
N45 Anti-theft device control unit
N51 Hydraulic unit with ABS control unit
N53 Anti-disturbance condenser on luggage compartment light
N60 Sun roof control unit
N67 Remote control signal receiver
N77 ALFA ROMEO CODE control unit
N78 ALFA ROMEO CODE receiver
N79 Car radio supply antidisturbance condenser
N80 Hood cover release timer
N81 Automatically-operated hood Control unit
N82 Integrated services control unit

O SERVICES
O1 Heated rearscreen
O2a High tone horn
O2b Low tone horn
O3 Aerial
O4 Car radio
O5a RH front loud-speaker
O5b LH front loud-speaker
O5c RH rear loud-speaker

O5d LH rear loud-speaker
O6 Cigar lighter - current socket
O18 RH wing mirror defroster
O19 LH wing mirror defroster
O22 Additional engine fan resistance
O22a Additional engine fan resistance
O22b Additional engine fan resistance
O31a RH Tweeter loud-speaker
O31b LH Tweeter loud-speaker
O37 Rear subwoofer speaker

P ELECTRIC MOTORS
P2 Engine cooling fan
P2a Engine cooling fan
P2b Engine cooling fan
P8 LH wing mirror motor
P9 RH wing mirror motor
P10 Front RH door lock motor
P11 Front LH door lock motor
P14 Front RH power window motor
P15 Front LH power window motor
P18 Electric fuel pump
P19 Windscreen and rearscreen washer pump
P24 Sun roof motor
P27 Windscreen wiper motor with control unit
P35a RH headlamp aiming motor
P35b LH headlamp aiming motor
P51 Automatic hood control pump

Q HEATING/VENTILATION - AIR CONDITIONING
Q1 Heater fan
Q4 Heater fan control
Q5 Heater fan speed adjustment resistance
Q9 Minimum pressure switch
Q11 Compressor electromagnetic coupling
Q15 Heating and ventilation fan relay
Q20 Min. and max. pressure switch
Q22 Electromagnetic coupling relay
Q27 Air recirculation flap control motor
Q32 Auxiliary relay for heating and ventilation
Q39 Fuse for conditioning system
Q40 Fuse for conditioning system
Q41 Set of relay and fuses for air conditioner
Q42 Conditioner fan delay device
Q65 Fuse for conditioning system
Q68 Compressor and air recirculation engagement switches
Q69 Heater fan 1st speed relay

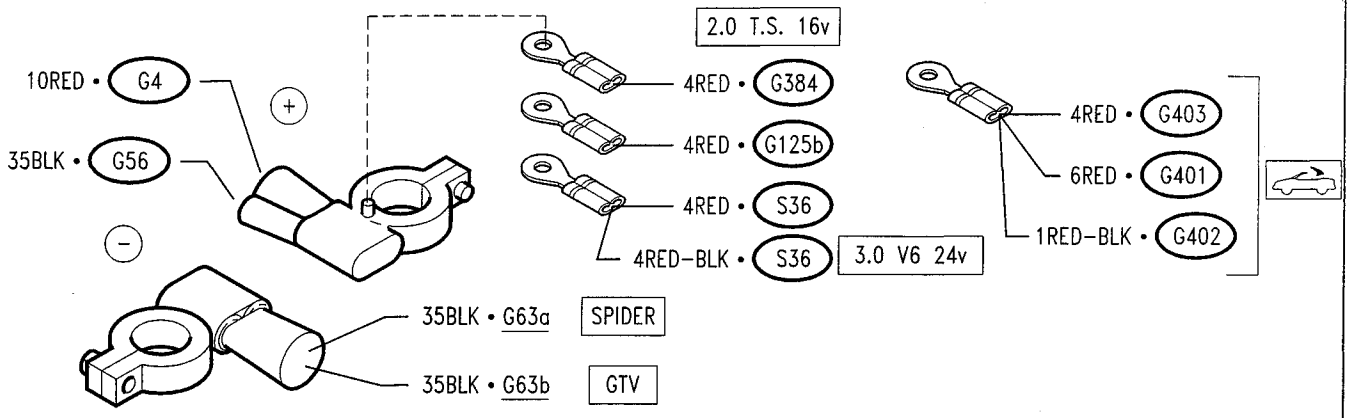
R SAFETY DEVICES
R22 Airbag control unit
R23 Capsule on steering wheel for airbag
R27 Passenger's side airbag capsule
R28 Capsule on RH pretensioner
R29 Capsule on LH pretensioner

S ELECTRONIC INJECTION
S3 Elettroinjectors
S5 Air flow meter
S7 Engine temperature sensor
S11 Motronic control unit
S12a Motronic fuel pump relay
S12c Phase variator relay
S12e Air flow meter relay
S15 Phase variator
S16 Altitude corrector
S20 Pinging sensor
S20a Pinging sensor a
S20b Pinging sensor b
S29 Idle adjustment actuator
S31 Rpm and crankshaft position sensor
S34 Air temperature sensor
S35 Heated lambda probe
S36 Fuse for injection relay
S38 Sensor on throttle body
S39 1st cylinder detection sensor
S41 Main relay
S42 Secondary relay
S43 Absolute pressure sensor
S45 Lambda probe fuse
S46 Fuse for Motronic supply
S47 Fuse for fuel pump
S52 Cam angle sensor

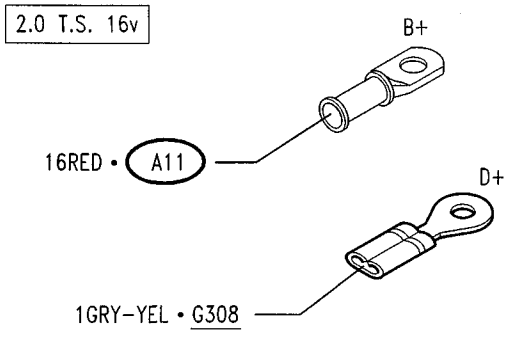
T DIAGNOSIS
T1 Connector for ALFA TESTER (Motronic and ALFA ROMEO CODE)
T3 Connector for ALFA TESTER (airbag)
T7 Connector for ALFA TESTER (anti-theft device)
T8 Connector for ALFA TESTER (ABS)
T13 Diagnosis connector for ALFA ROMEO TESTER (automatic hood)

COMPONENTS AND CONNECTORS

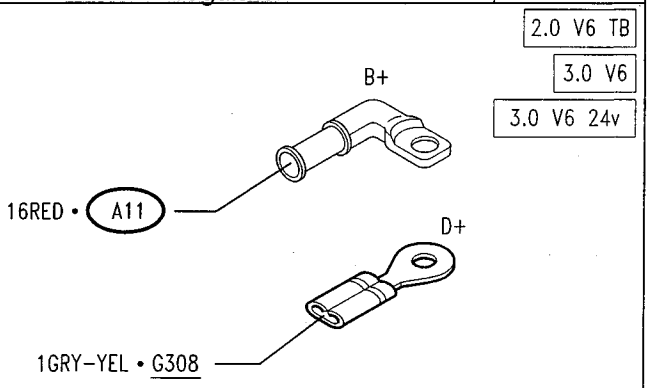
Battery — A1



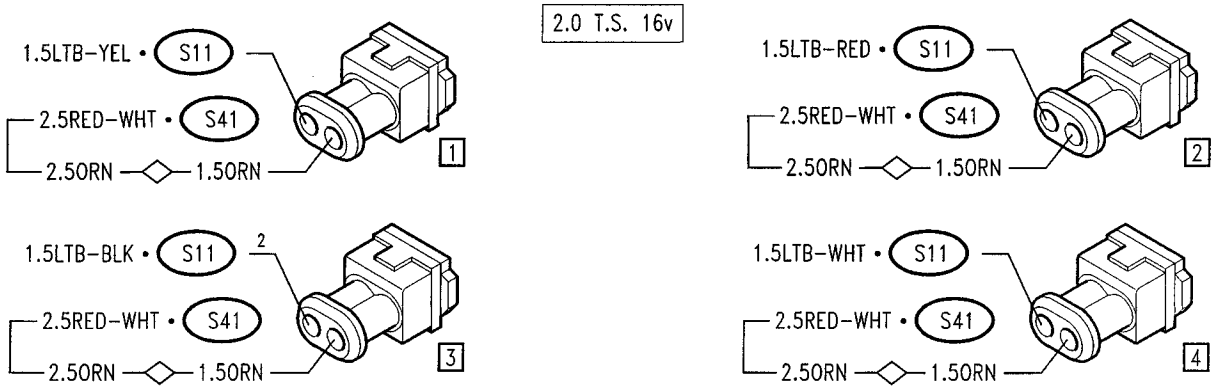
Alternator, with integrated voltage regulator — A3



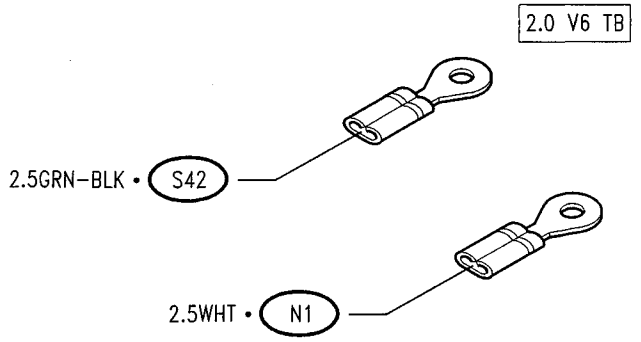
Alternator, with integrated voltage regulator — A3



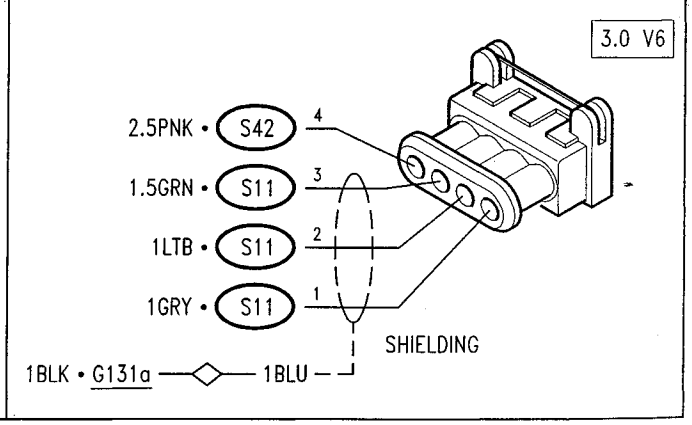
Ignition coil — A8



Ignition coil — A8

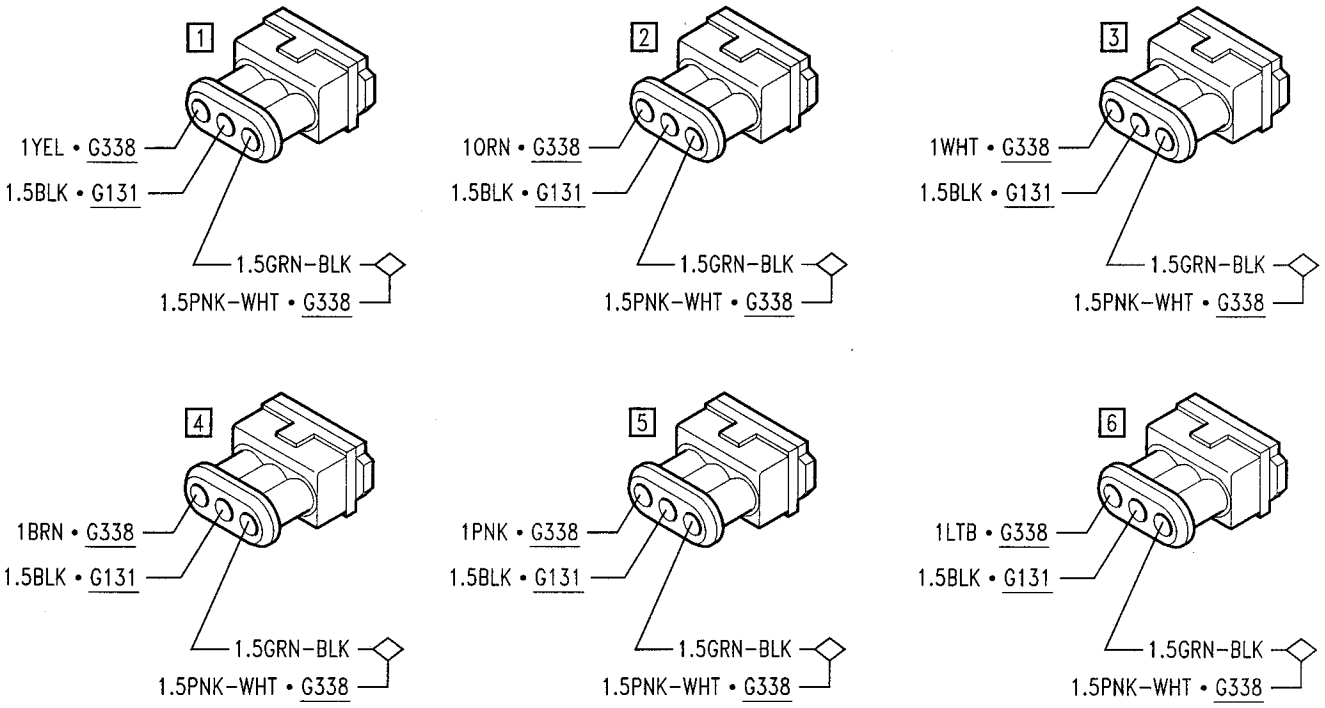


Ignition coil — A8



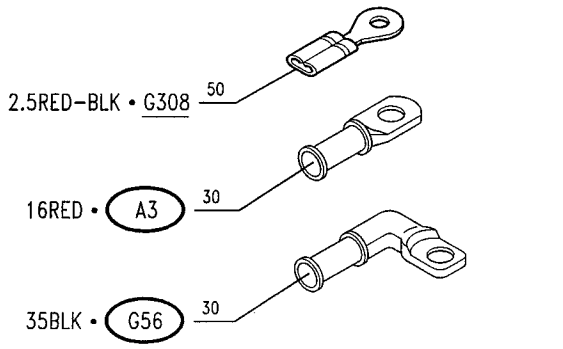
Ignition coil — A8

3.0 V6 24v



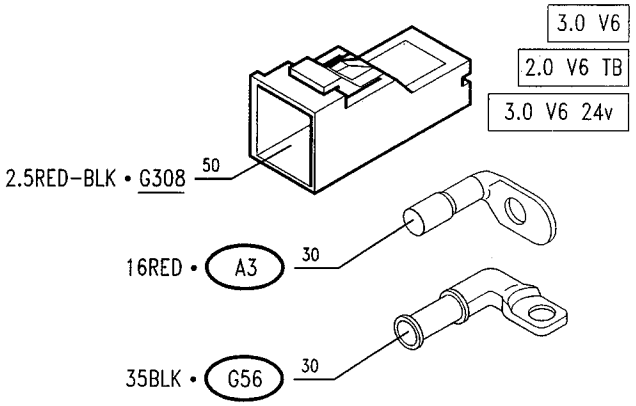
Starter motor — A11

2.0 T.S. 16v

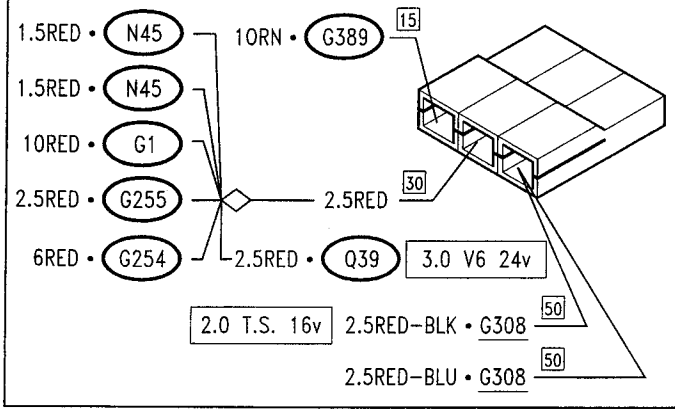


Starter motor — A11

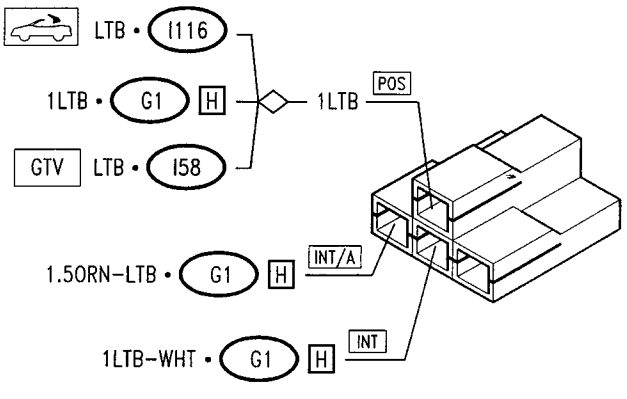
3.0 V6
2.0 V6 TB
3.0 V6 24v



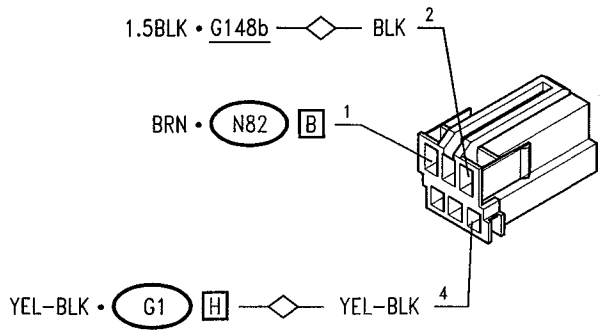
Ignition switch — B1 — A



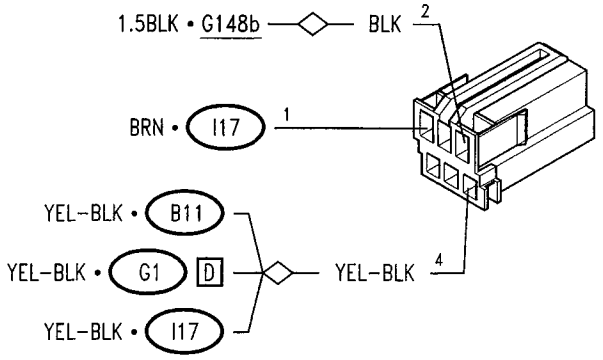
Ignition switch — B1 — B



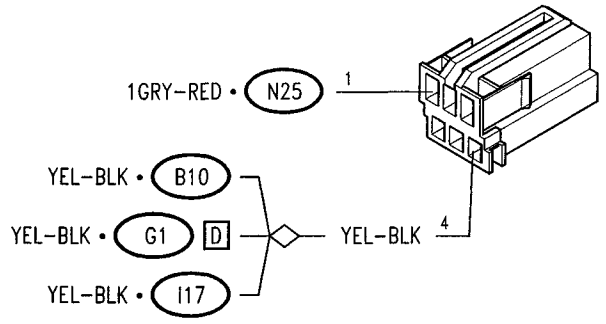
Heated rearscreen control switch — B9



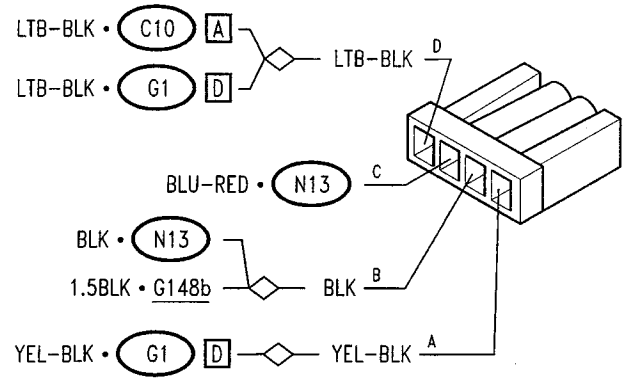
Fog lights control switch — B10



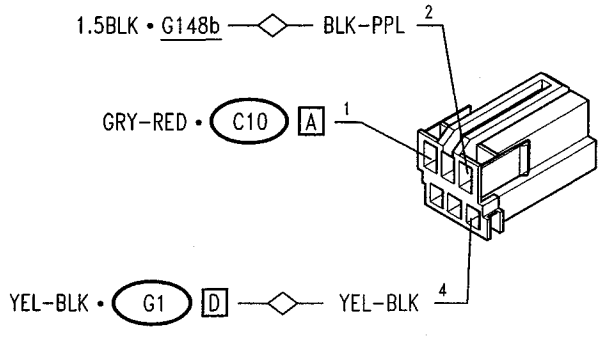
Rear fog guards control switch — B11



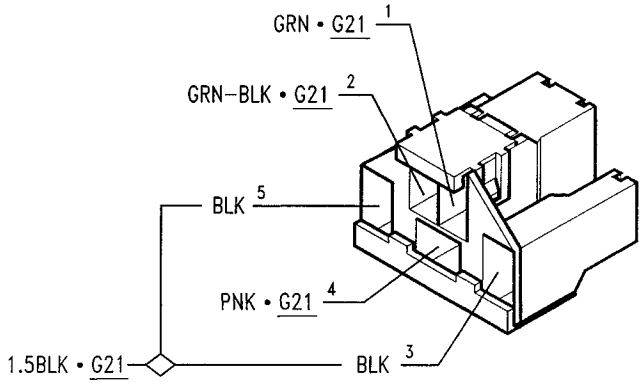
Hazard warning lights control switch — B12



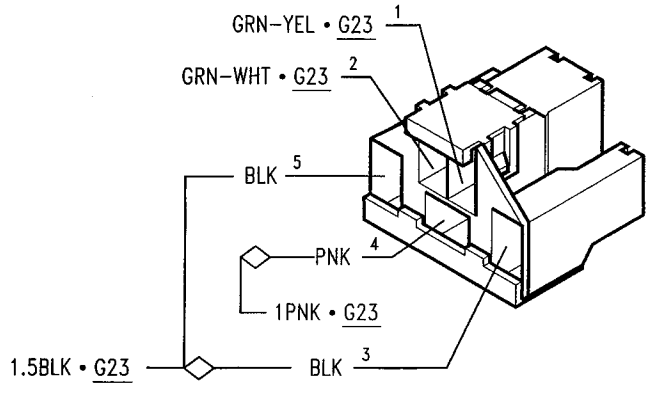
Instrument panel light dimmer button — B16



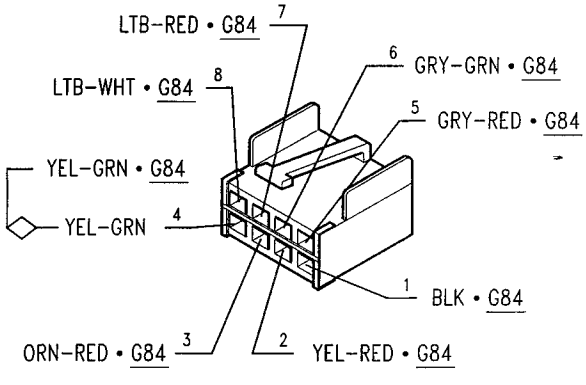
Right front power window control switch (on RH door) — B21a



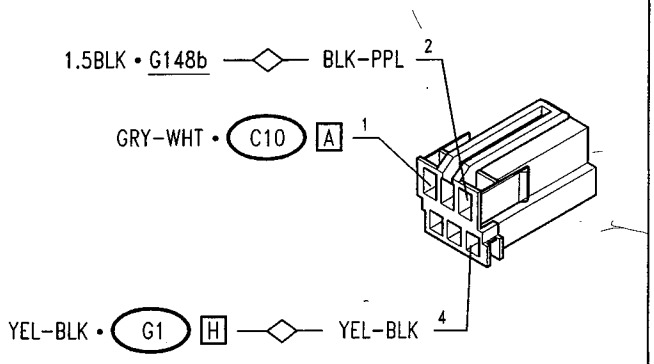
Right front power window control switch (on LH door) — B21b



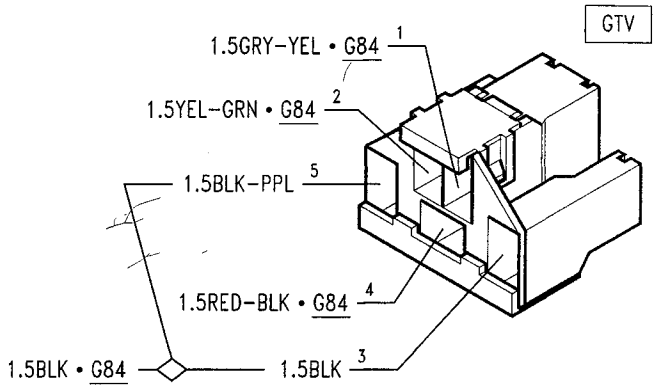
Wing mirror control switch — B36



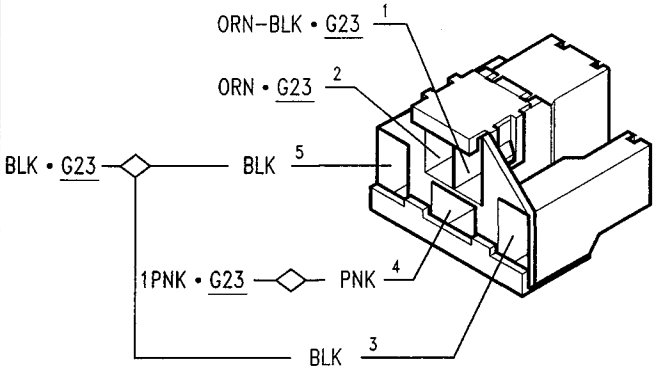
Trip meter reset switch — B40



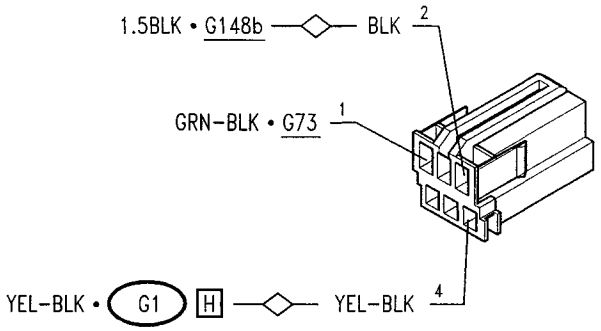
Sun roof motor control switch — B47



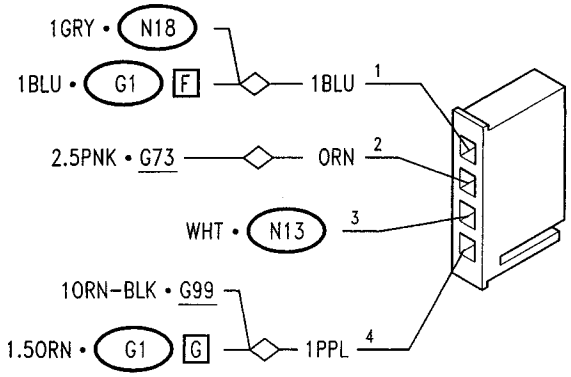
Front power window switch with automatic mechanism — B53



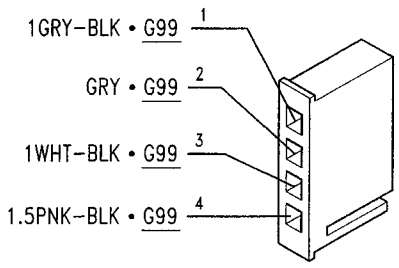
Fuel flap opening switch — B61



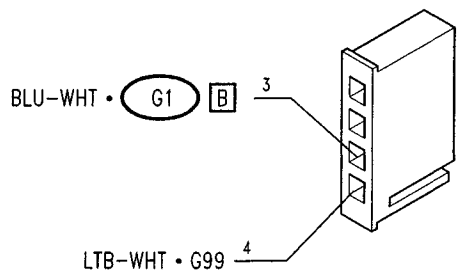
Steering column lever unit — B68 A



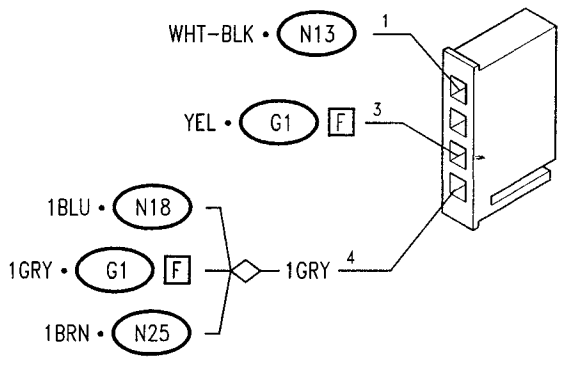
Steering column lever unit — B68 B



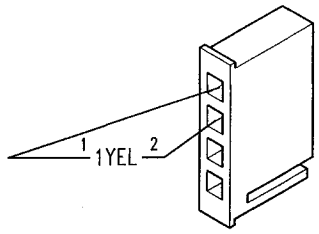
Steering column lever unit — B68 C



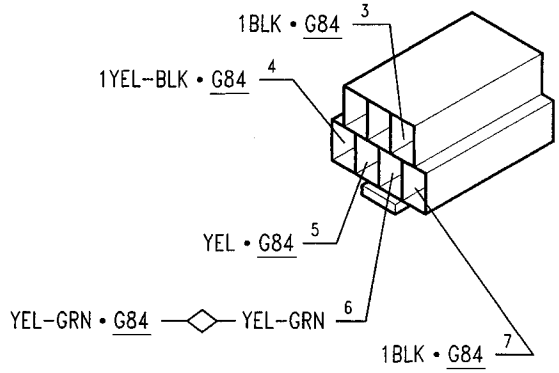
Steering column lever unit — B68 D



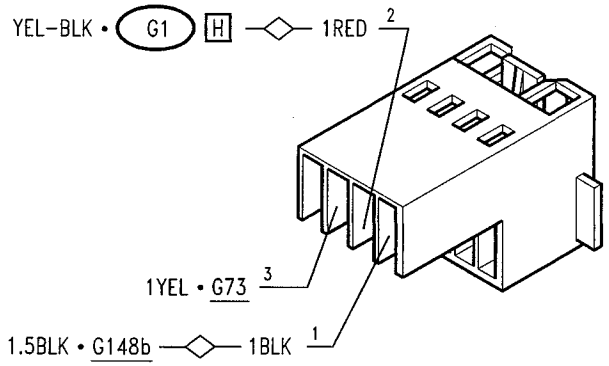
Steering column lever unit — B68 E



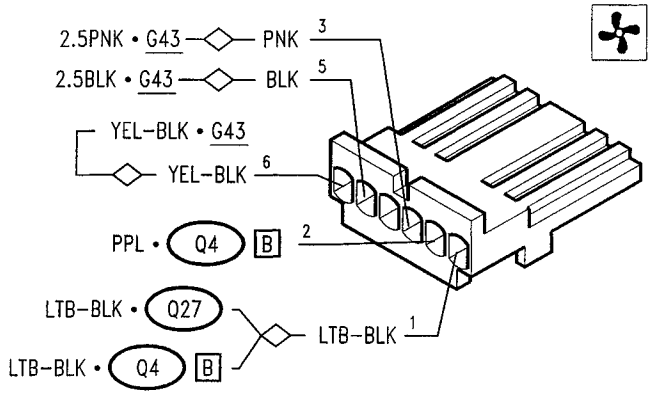
Headlamp aiming device — B69



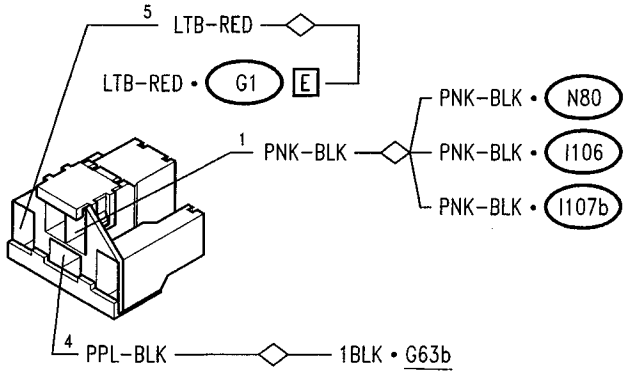
Luggage compartment opening switch with glove box light — B87



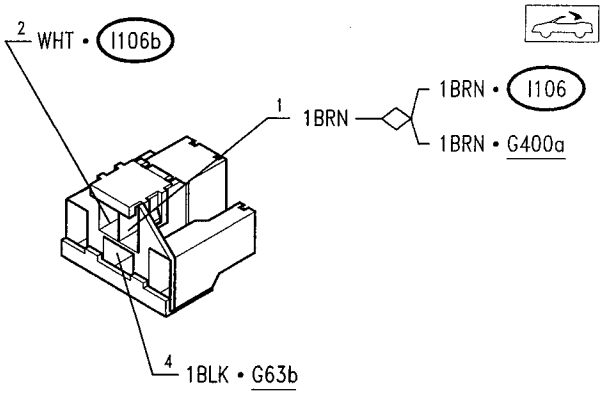
Air recirculation switch — B98



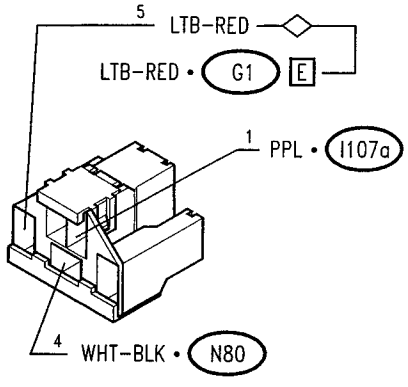
Hood release switch — B99



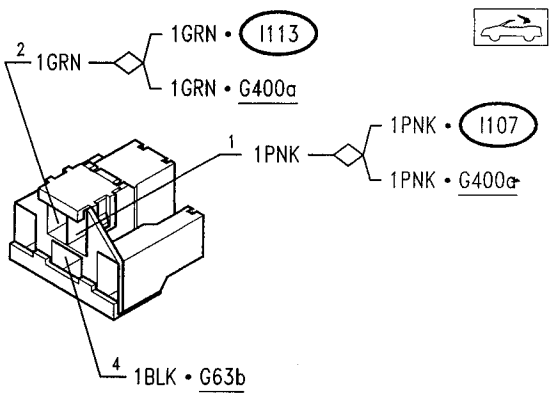
Hood release switch — B99



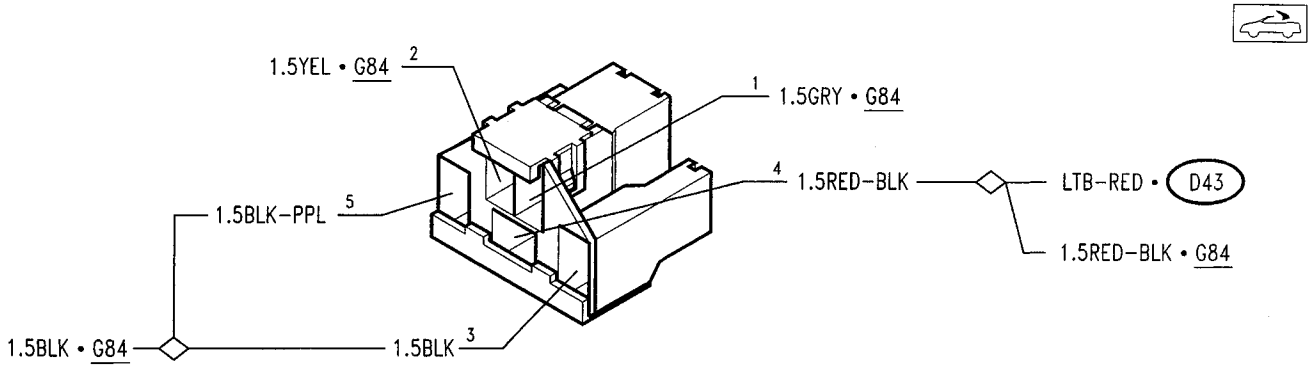
Hood cover release switch — B100



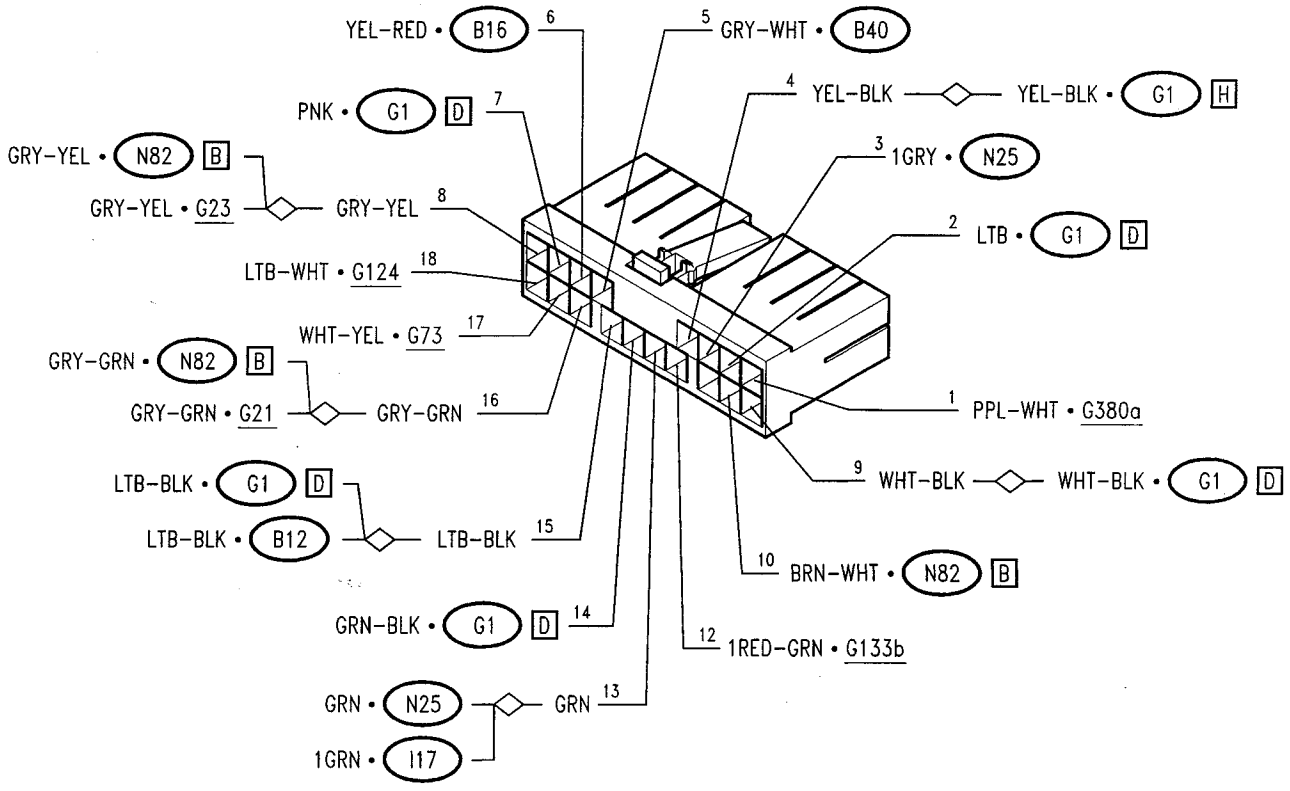
Hood cover release switch — B100



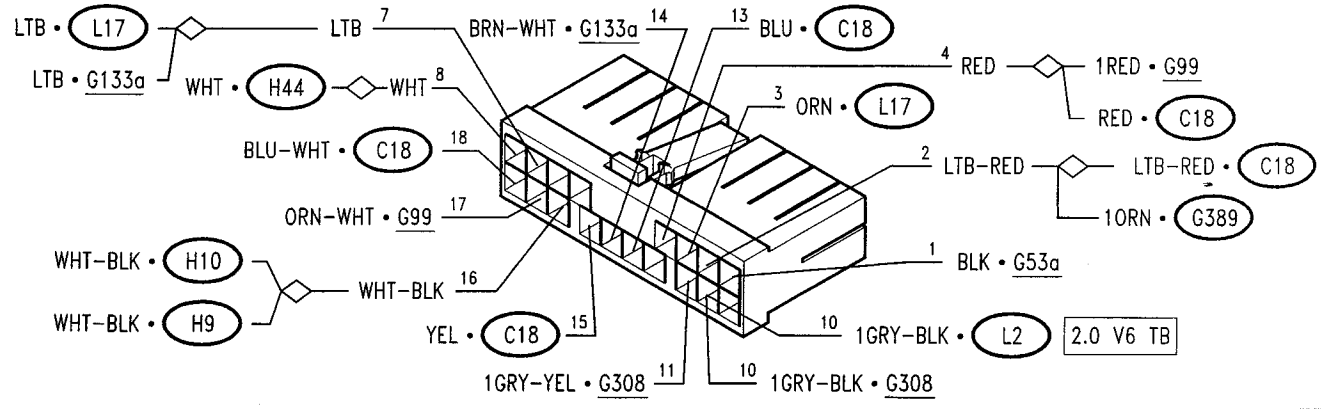
Automatic hood control switch — B101



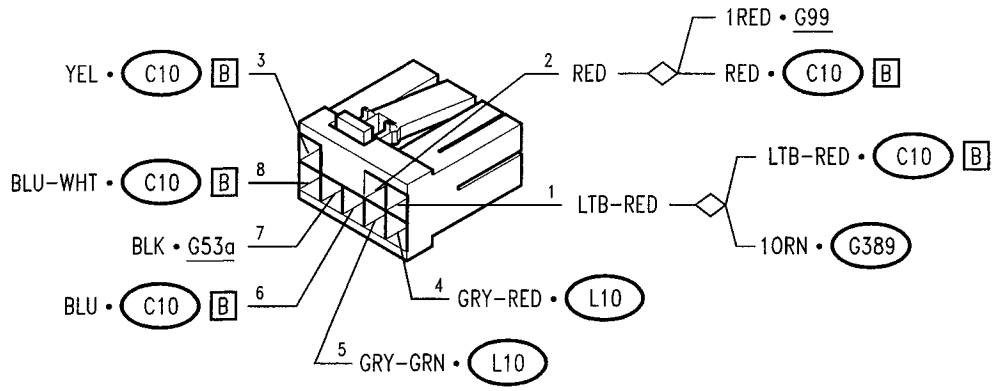
Instrument cluster — C10 A



Instrument cluster — C10 B

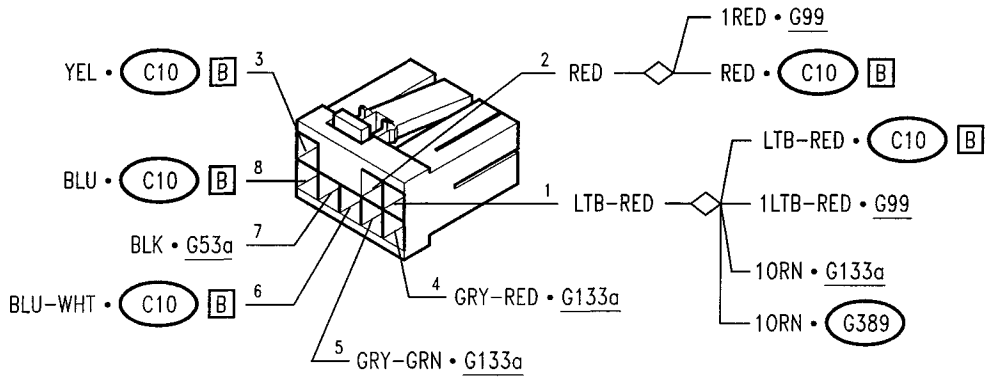


Auxiliary instrument cluster — C18

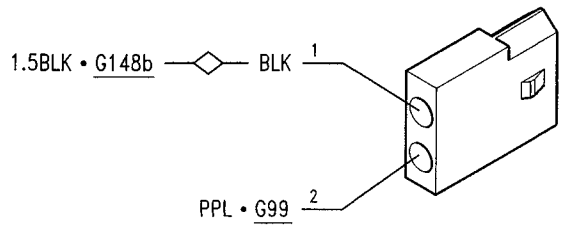


Auxiliary instrument cluster — C18

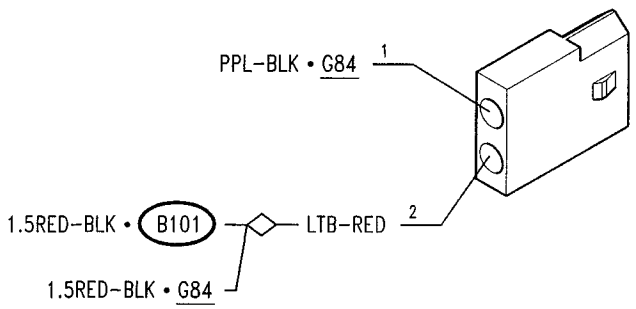
3.0 V6 24v



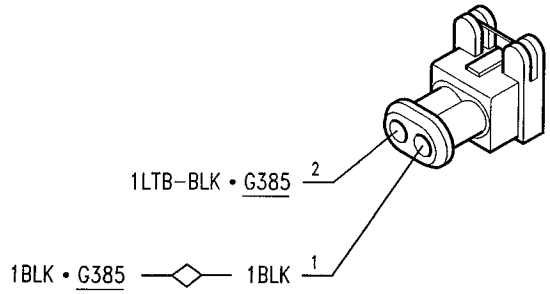
Anti-theft device led indicator — D31



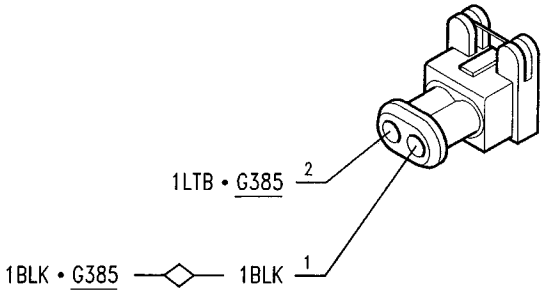
Signalling led for automatic hood — D43



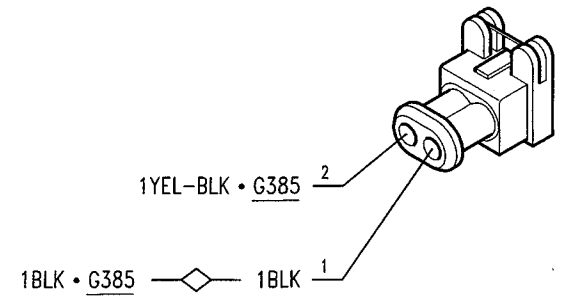
LH front direction indicator bulb — E1a



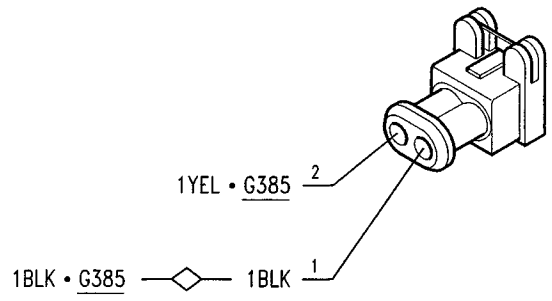
RH front direction indicator bulb — E1b



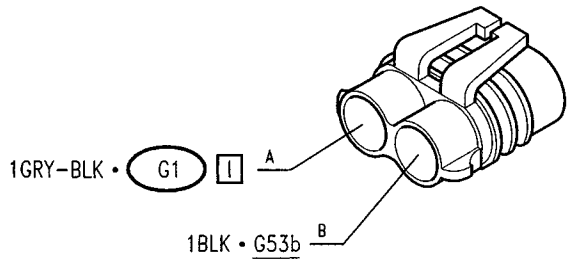
LH front side light bulb	E2a



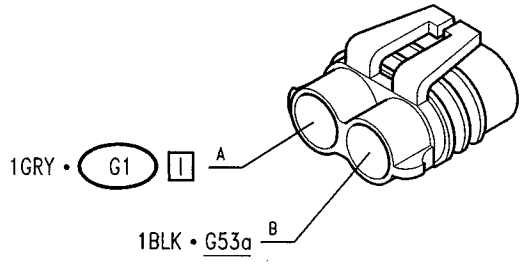
RH front side light bulb	E2b



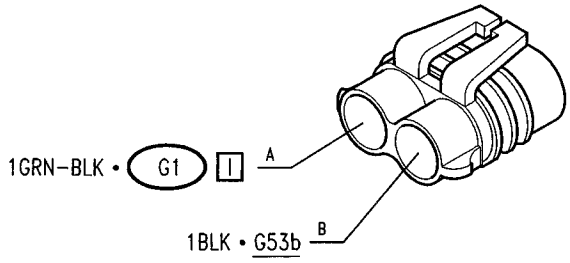
LH low beam light bulb	E5a



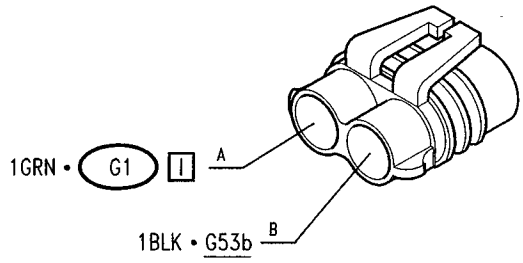
RH low beam light bulb	E5b



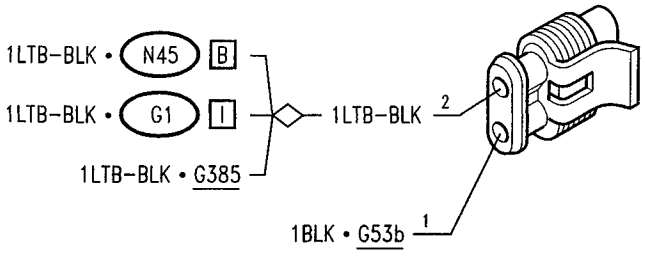
LH high beam light bulb	E7a



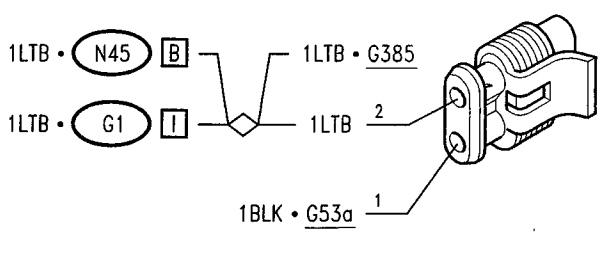
RH low beam light bulb	E7b



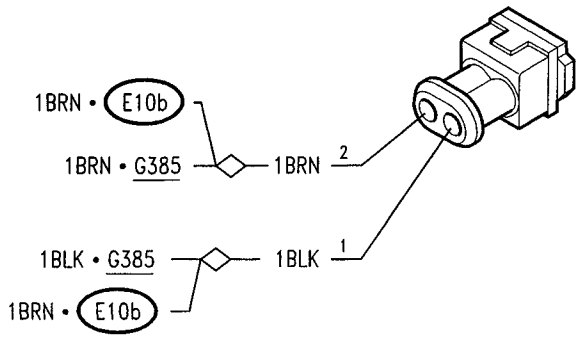
LH direction indicator light bulb	E9a



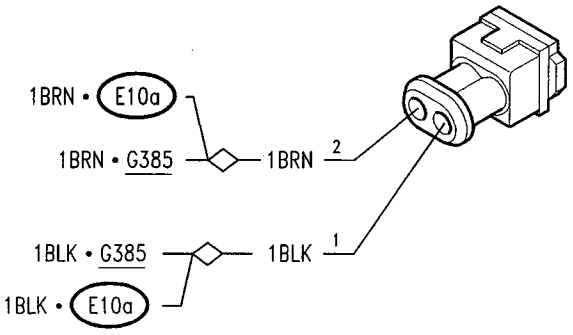
RH direction indicator light bulb	E9b



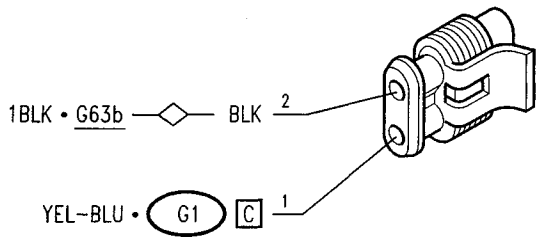
LH fog light bulb — E10a



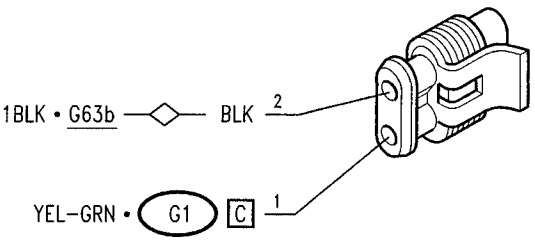
RH fog light bulb — E10b



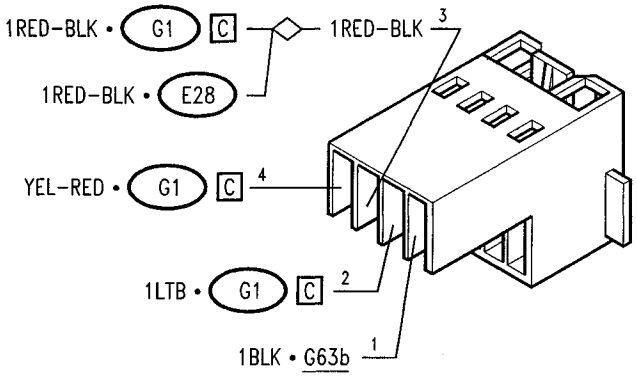
LH number plate light bulb — E17a



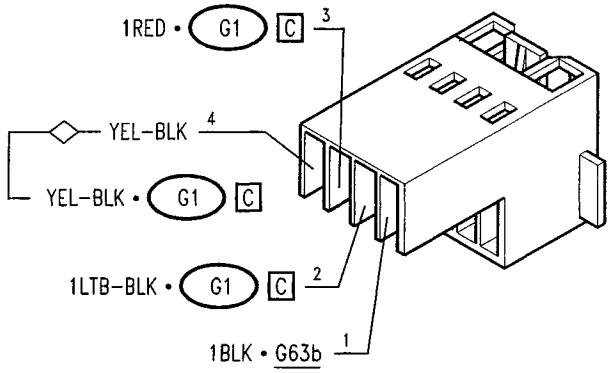
RH number plate light bulb — E17b



RH tail light cluster — E19

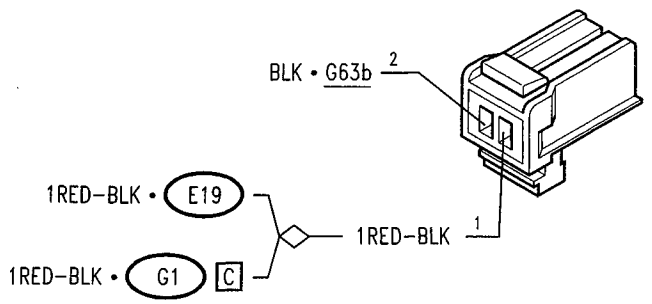


LH tail light cluster — E20



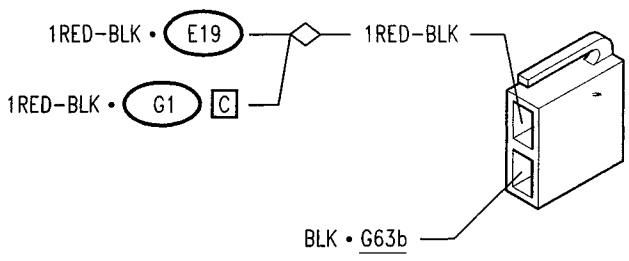
Third stop light — E28

GTV

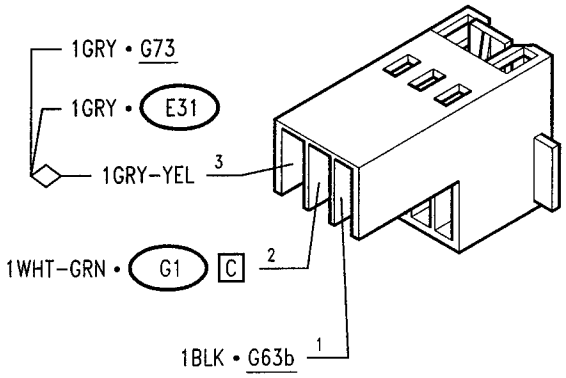


Third stop light — E28

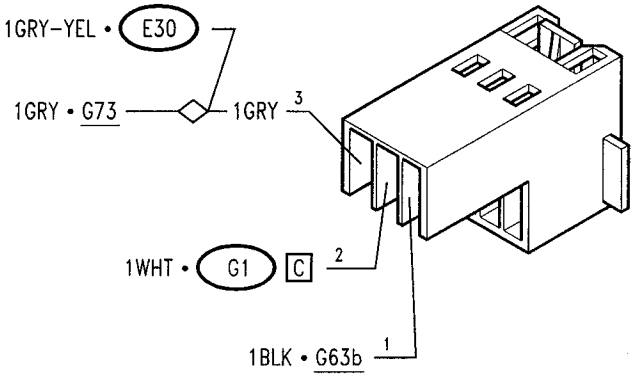
SPIDER



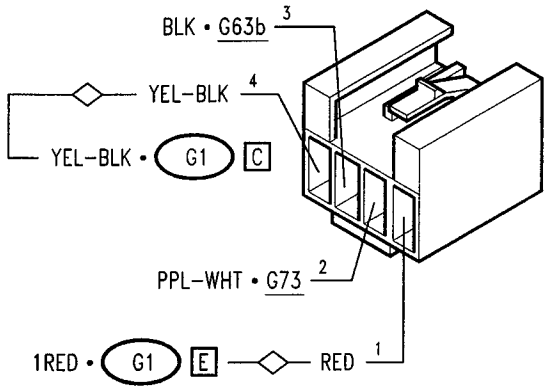
Rear RH fog guard/reversing light	E30



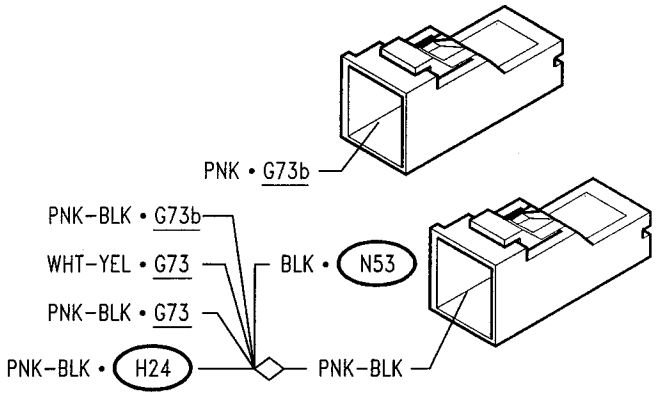
Rear LH fog guard/reversing light	E31



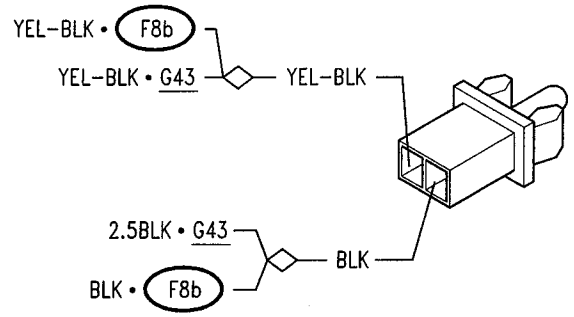
Passenger compartment ceiling light	F3



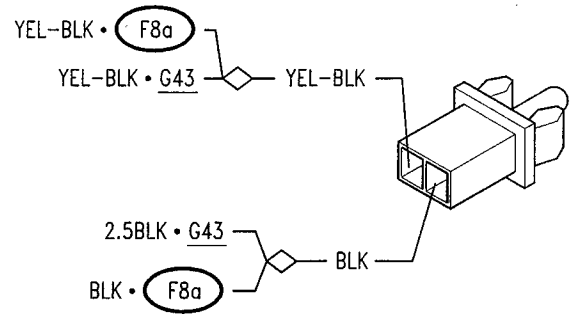
Luggage compartment light	F5



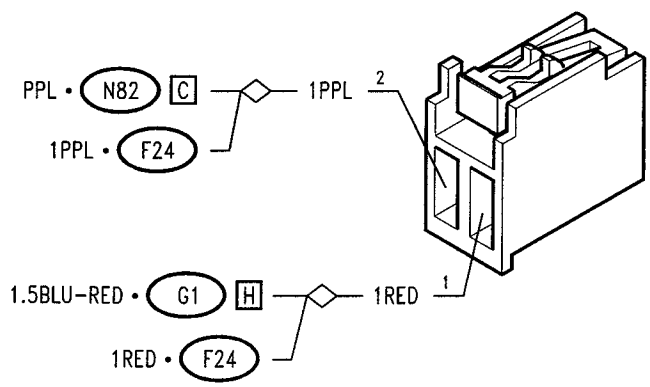
Heating/ventilation controls light bulb a	F8a



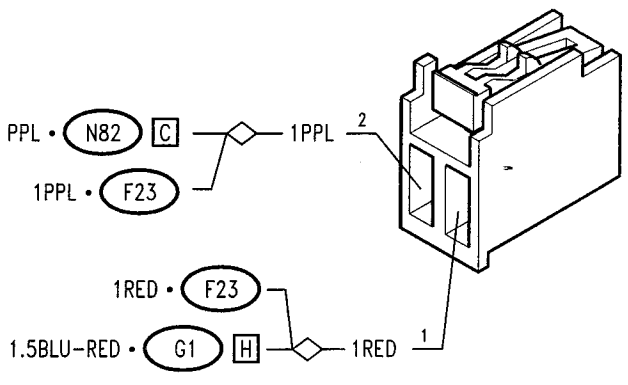
Heating ventilation controls light bulb b	F8b



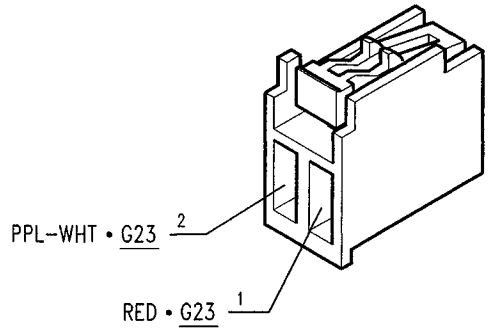
RH foot well light	F23



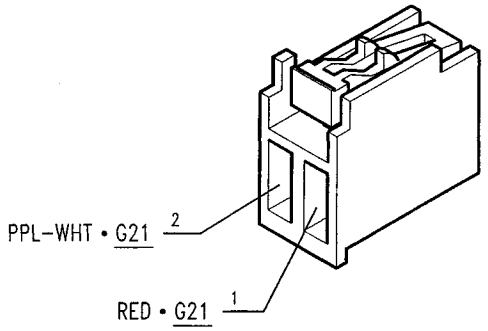
LH foot well light	F24



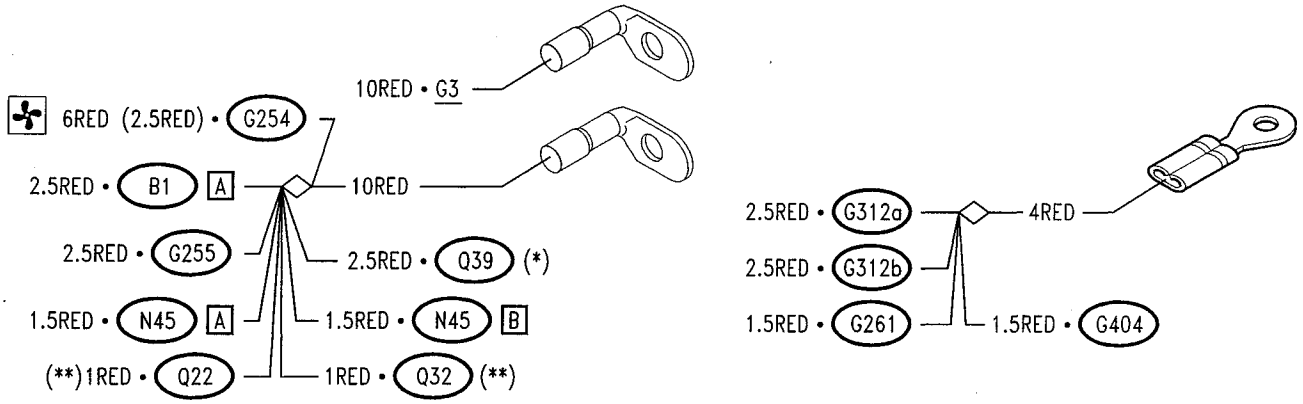
Light on LH front door	F45



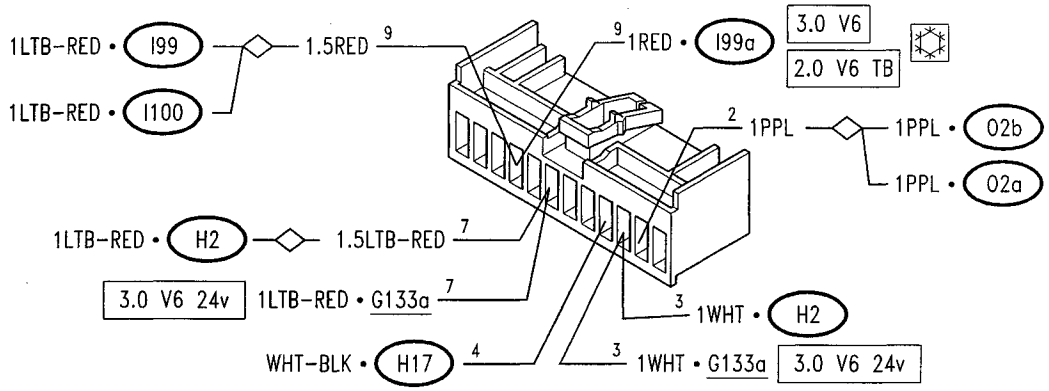
Light on RH front door	F46



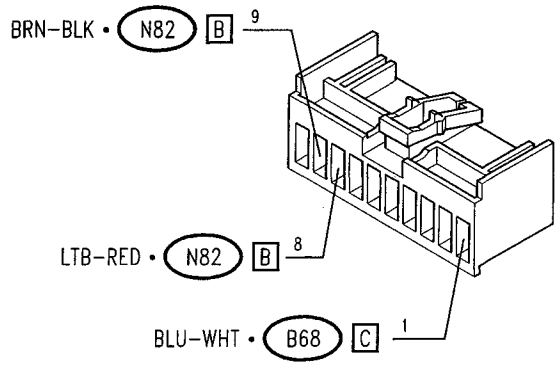
Fusebox	G1



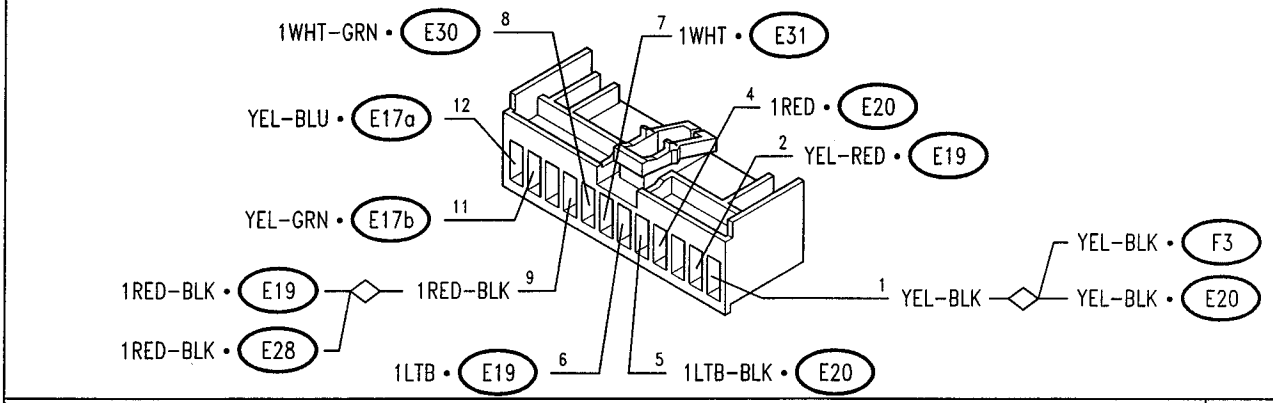
Fusebox	G1 A



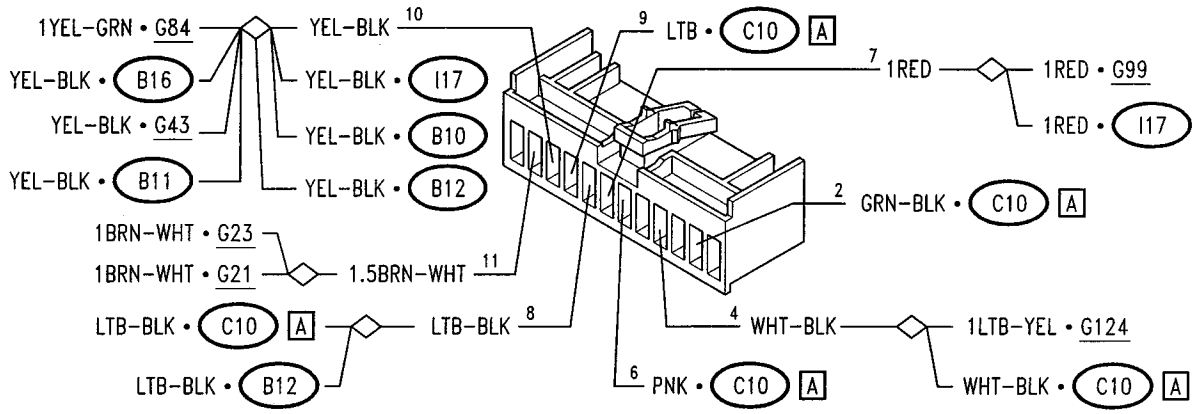
Fusebox	G1 B



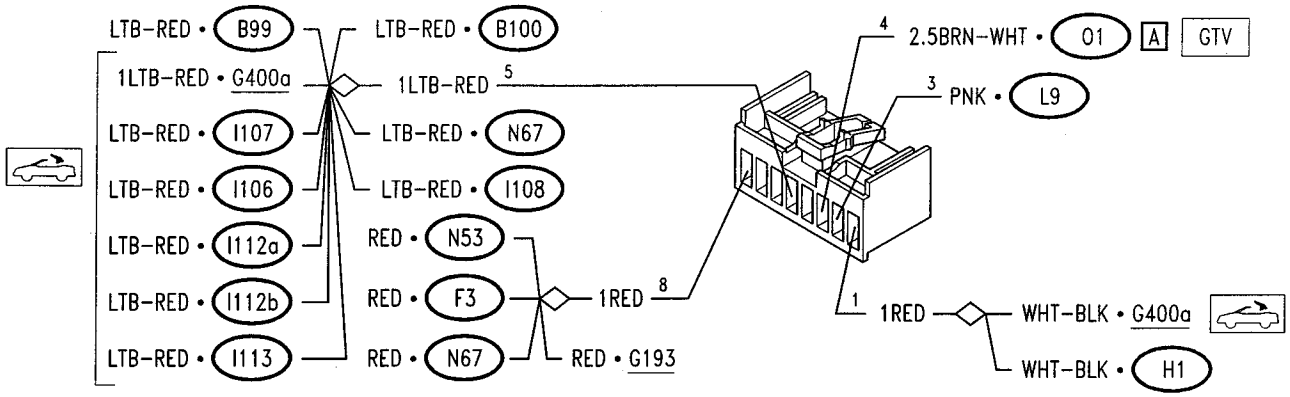
Fusebox G1 C



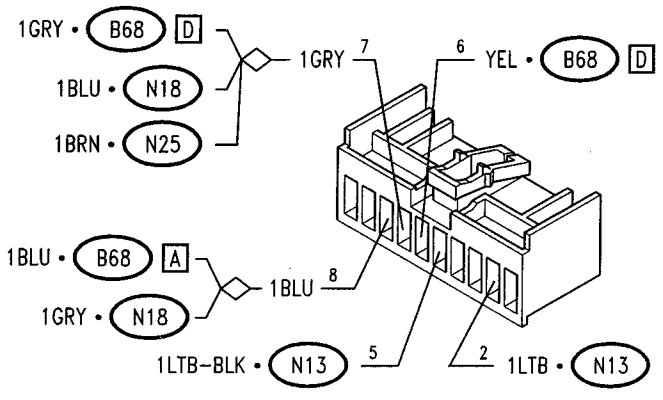
Fusebox G1 D



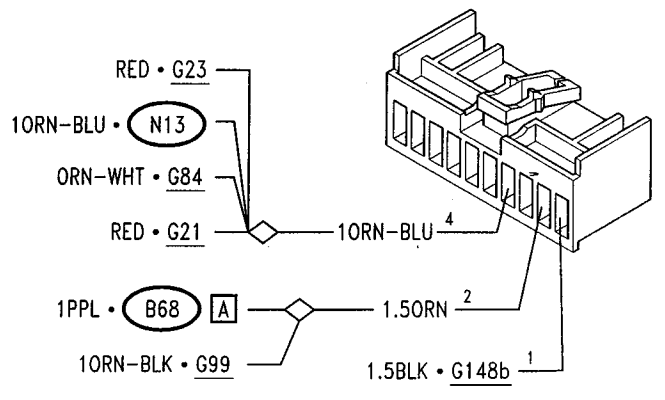
Fusebox G1 E



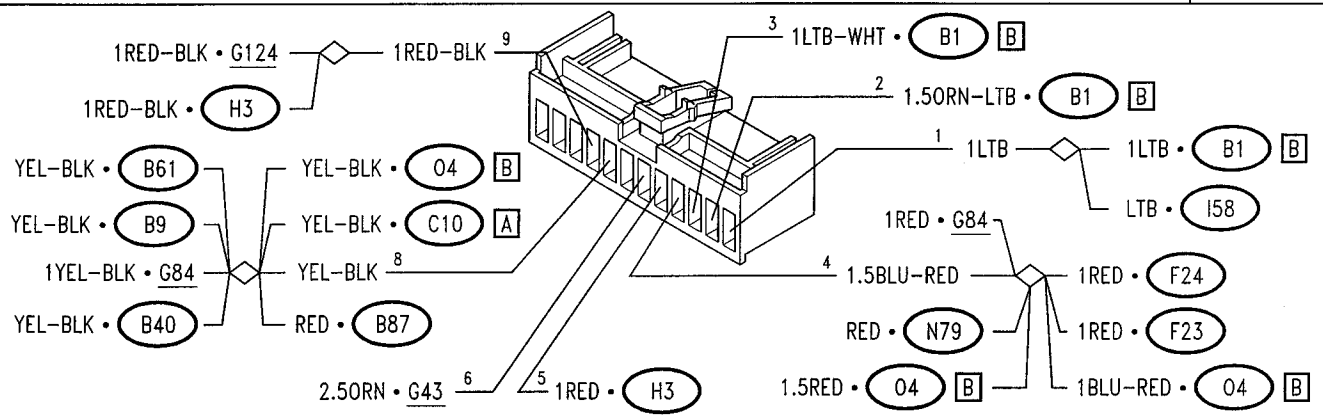
Fusebox G1 F



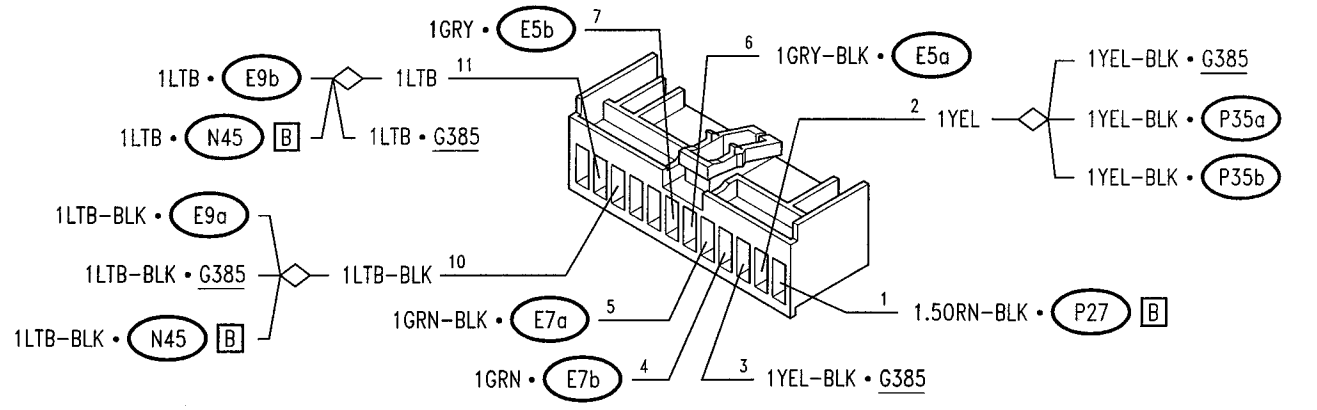
Fusebox G1 G



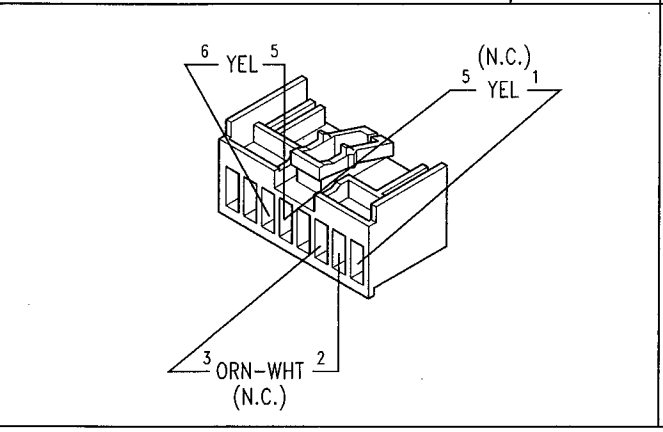
Fusebox G1 H



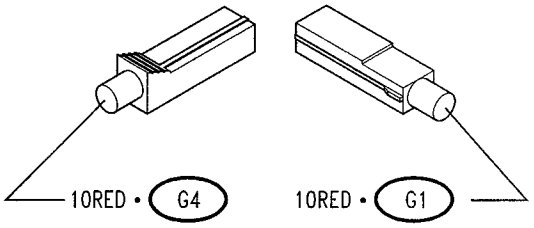
Fusebox G1 I



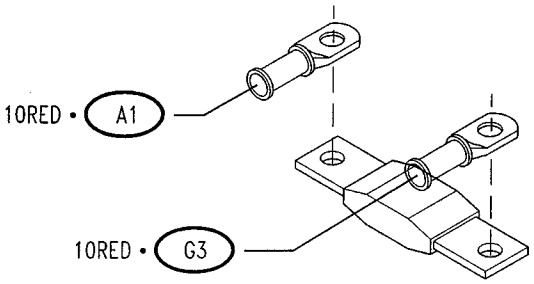
Fusebox G1 J



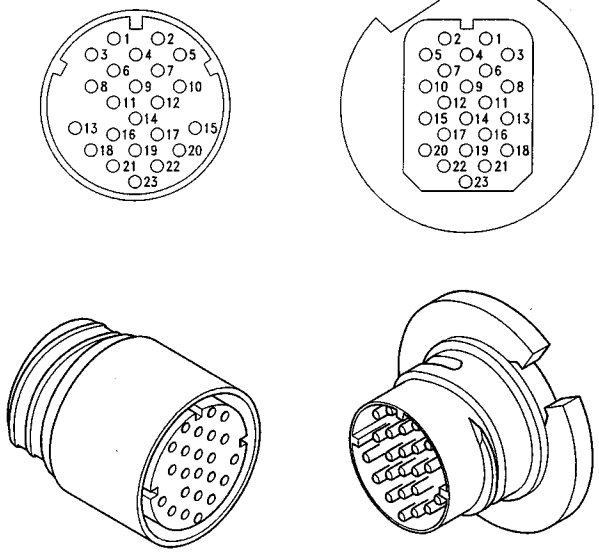
Fusebox G3



Free fuse G4



Connector for RH front door wiring (door side)	G21



1 — 1.5PNK-BLK — 1.5PNK-BLK • 05a; 1.5PNK-BLK • 031a

2 — 1.5PPL-BLK — 1.5PPL-BLK • 05a; 1.5PPL-BLK • 031a

3 — RED • F46

4 — PPL-WHT • F46

5 — 1BRN-WHT • 018

6 — GRN-BLK • B21a

7 — GRN • B21a

8 — LTB • P9

9 — N.C.

10 — N.C.

11 — 1.5GRY • P9

12 — 1.5YEL-RED • P9

13 — N.C.

14 — N.C.

15 — 1YEL • P10 [A]

16 — 1GRY • P10 [A]

17 — WHT • P10 [A]

18 — LTB • P10 [A]

19 — GRY-GRN • P10 [B]

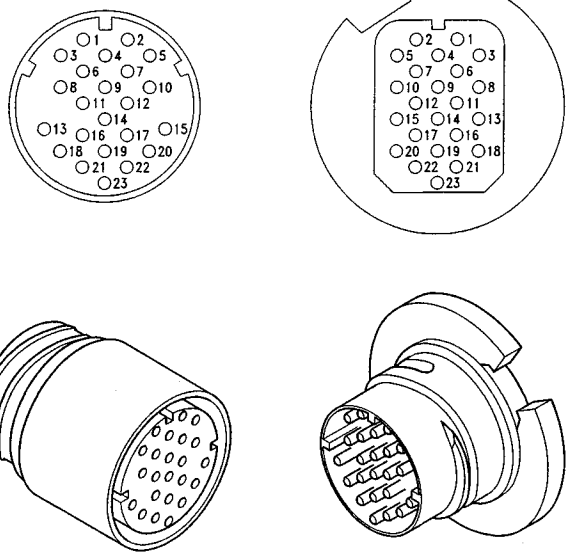
20 — 1.5PPL-WHT • P14

21 — PNK • B21a

22 — 1.5BLK — 1BLK • 018; BLK • B21a; BLK • P10 [B]; BLK • B21a

23 — 1.5WHT-RED • P14

Connector for RH front door wiring (vehicle side)	G21



1 — 1.5PNK-BLK • O4 [A]

2 — 1.5BLK-PPL • O4 [A]

3 — RED — 1ORN-BLU • G1 [G]

4 — 1PPL-WHT — PPL • N82 [C]; 1PPL-WHT • G23

5 — 1BRN-WHT — 1BRN-WHT • G23; 1.5BRN-WHT • G1 [D]

6 — 1GRN-BLK • N82 [A]

7 — 1GRN • N82 [A]

8 — LTB-WHT • G84

9 — N.C.

10 — N.C.

11 — GRY-GRN • G84

12 — YEL-RED — YEL-RED • G84

13 — N.C.

14 — N.C.

15 — 1YEL — 1YEL • G23; 1YEL • N82 [B]

16 — 1GRY — 1GRY • G23; 1GRY • N82 [B]

17 — WHT — WHT • G23; WHT • N82 [B]

18 — LTB — LTB • G23; LTB • N82 [B]

19 — GRY-GRN — GRY-GRN • G124; GRY-GRN • C10 [A]; GRY-GRN • N82 [B]

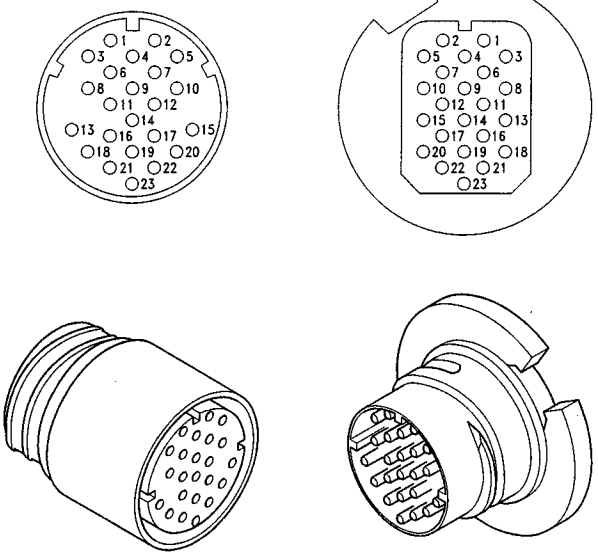
20 — 1.5PPL-WHT • N82 [A]

21 — PNK — PNK • G23; PNK • G310

22 — 1.5BLK • G148b

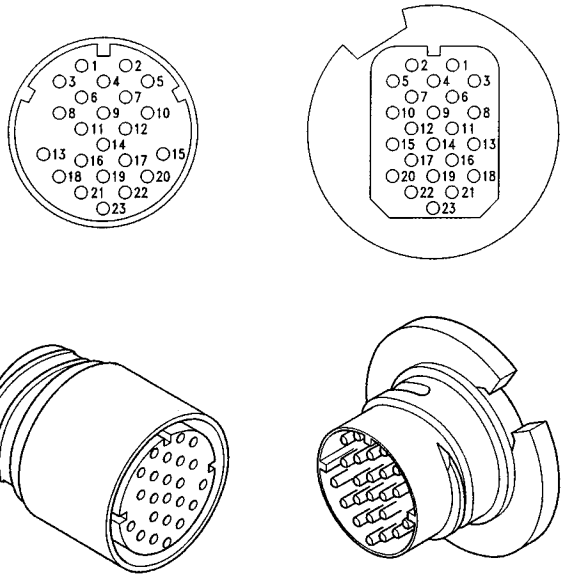
23 — 1.5WHT-RED • N82 [A]

Connector for LH front door wiring (door side)	G23



1 — 1.5RED-BLK — 1.5RED-BLK • 05b / 1.5RED-BLK • 031b
2 — 1.5WHT-BLK — 1.5WHT-BLK • 05b / 1.5WHT-BLK • 031b
3 — RED • F45
4 — GRY-WHT • F45
5 — 1BRN-WHT • 019
6 — GRN-YEL • B21b
7 — GRN-WHT • B21b
8 — LTB-RED • P8
9 — ORN-BLK • B53
10 — ORN • B53
11 — 1.5GRY-RED • P8
12 — 1.5YEL-RED • P8
13 — 1.5PPL-YEL • P15
14 — 1.5WHT-GRN • P15
15 — 1YEL • P11 [A]
16 — 1GRY • P11 [A]
17 — WHT • P11 [A]
18 — LTB • P11 [A]
19 — GRY-YEL • P11 [B]
20 — N.C.
21 — PNK — PNK • B53 / PNK • B21b
22 — BLK • B53 / BLK • B53 — 1.5BLK — 1BLK • 019 / BLK • B21b / BLK • P11 [B] / BLK • B21b
23 — N.C.

Connector for LH front door wiring (vehicle side)	G23



1 — 1.5RED-BLK • O4 [A]

2 — 1.5WHT-BLK • O4 [A]

3 — RED — 1ORN-BLU • G1 [G]; RED • G21

4 — 1PPL-WHT — PPL • N82 [C]; 1PPL-WHT • G21

5 — 1BRN-WHT — 1BRN-WHT • G21; 1.5BRN-WHT • G1 [D]

6 — 1GRN-YEL • N82 [A]

7 — 1GRN-WHT • N82 [A]

8 — LTB-RED • G84

9 — 1ORN-BLK • N82 [A]

10 — 1ORN • N82 [A]

11 — GRY-RED • G84

12 — YEL-RED — GRY-RED • G84

13 — 1.5PPL-YEL • N82 [A]

14 — 1.5WHT-GRN • N82 [A]

15 — 1YEL — 1YEL • G21; 1YEL • N82 [B]

16 — 1GRY — 1GRY • G21; 1GRY • N82 [B]

17 — WHT — WHT • G21; WHT • N82 [B]

18 — LTB — LTB • G21; LTB • N82 [B]

19 — GRY-YEL — GRY-YEL • G99; GRY-YEL • C10 [A]; GRY-YEL • N82 [B]

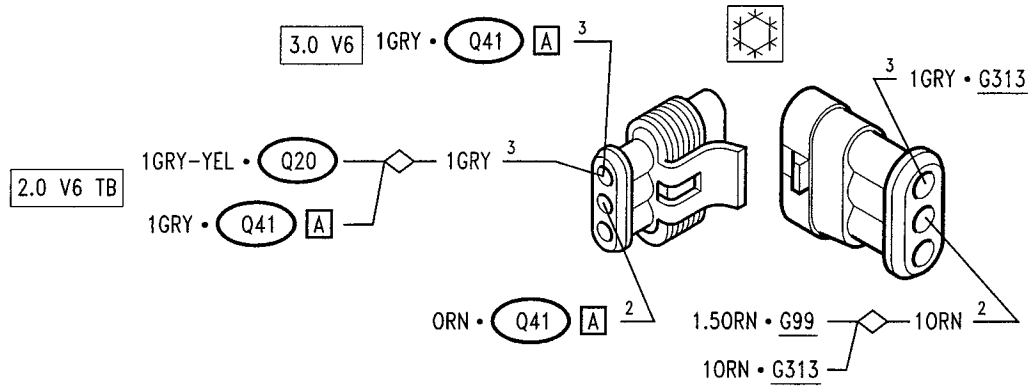
20 — N.C.

21 — PNK — PNK • G21; PNK • G310

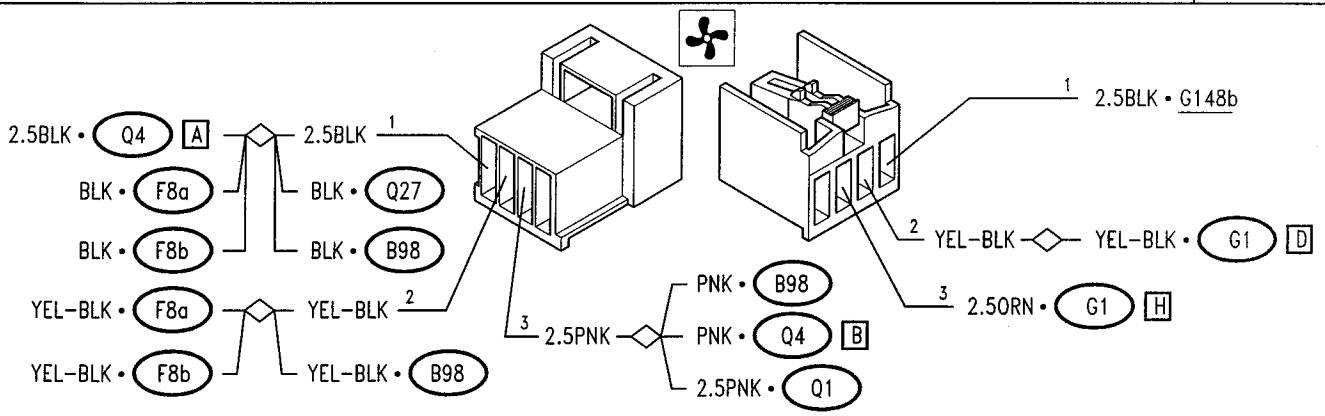
22 — 1.5BLK • G148b

23 — N.C.

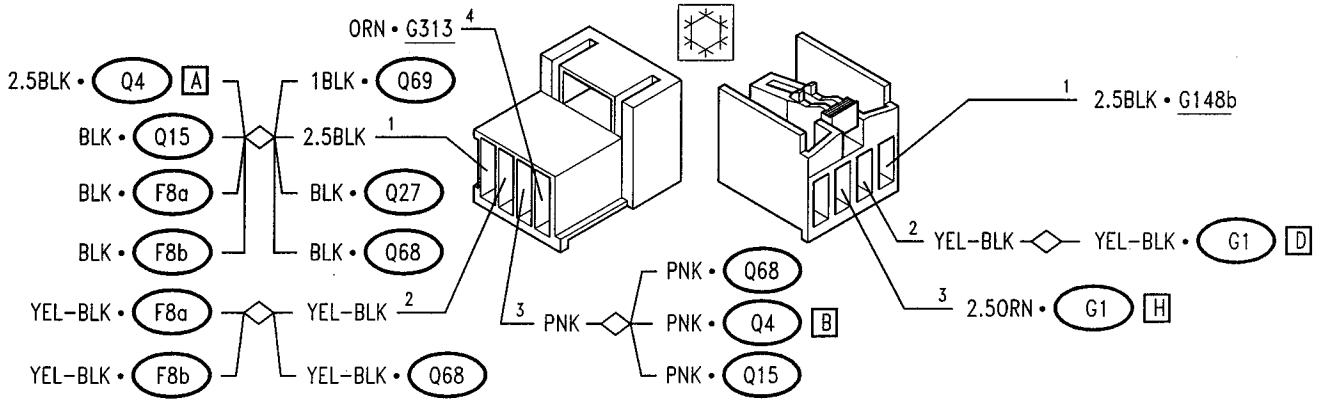
Air conditioner wiring connector — G38



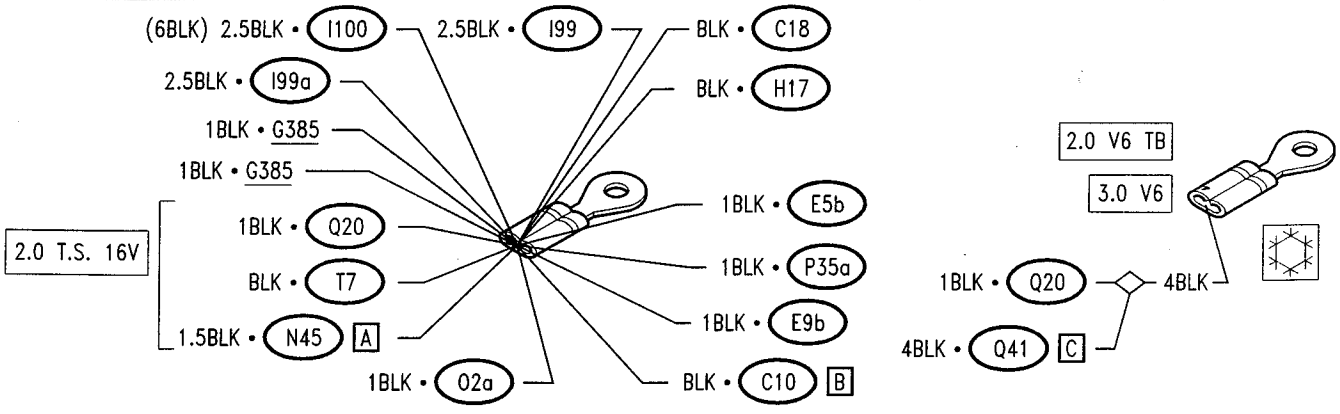
Connector for heating and ventilation control wiring — G43



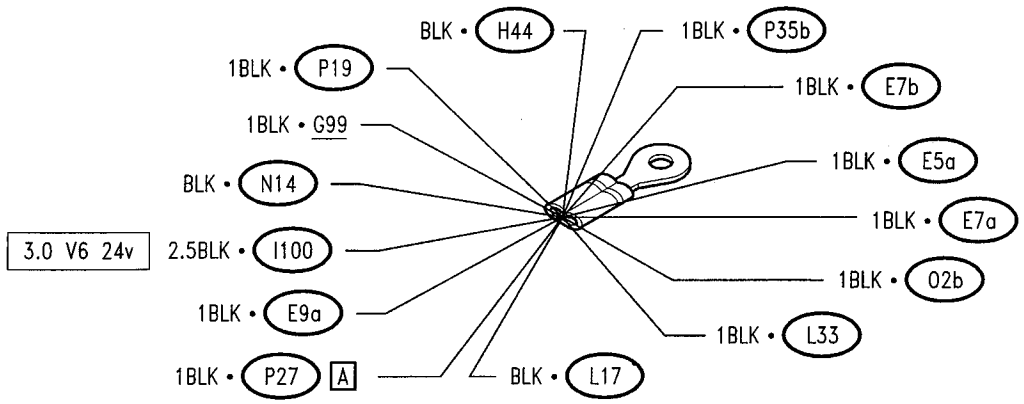
Connector for heating and ventilation control wiring — G43



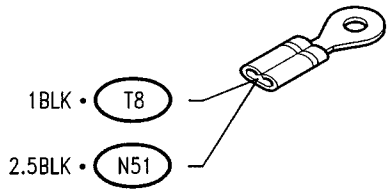
RH engine compartment earth — G53a



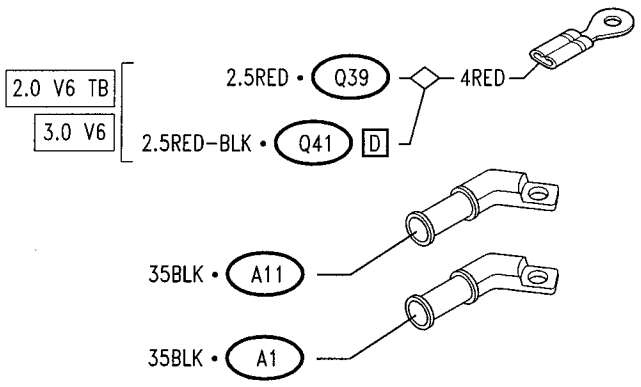
LH engine compartment earth — G53b



LH side panel earth — G55b

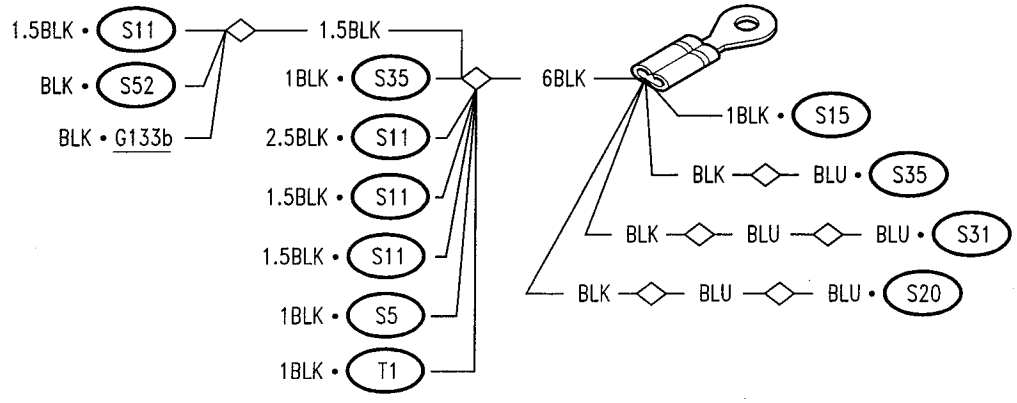


Branch terminal board — G56



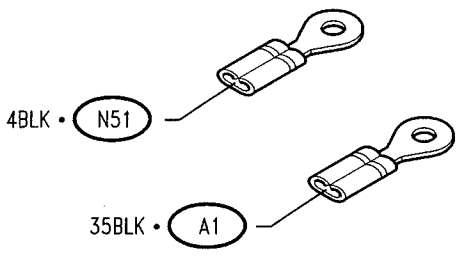
Injection wiring earth — G60

2.0 T.S. 16v

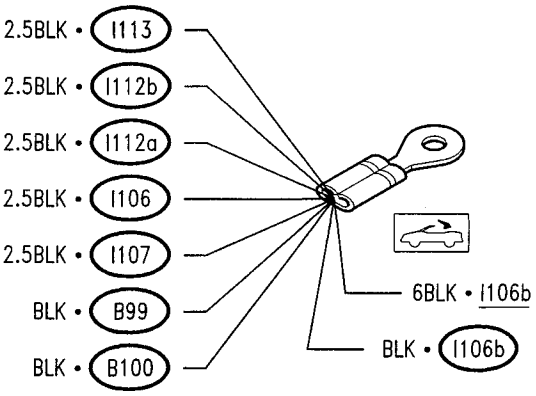


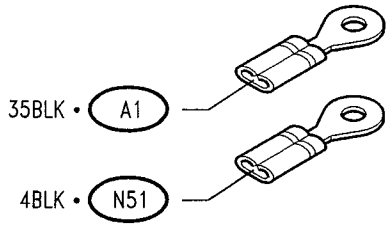
RH rear earth — G63a

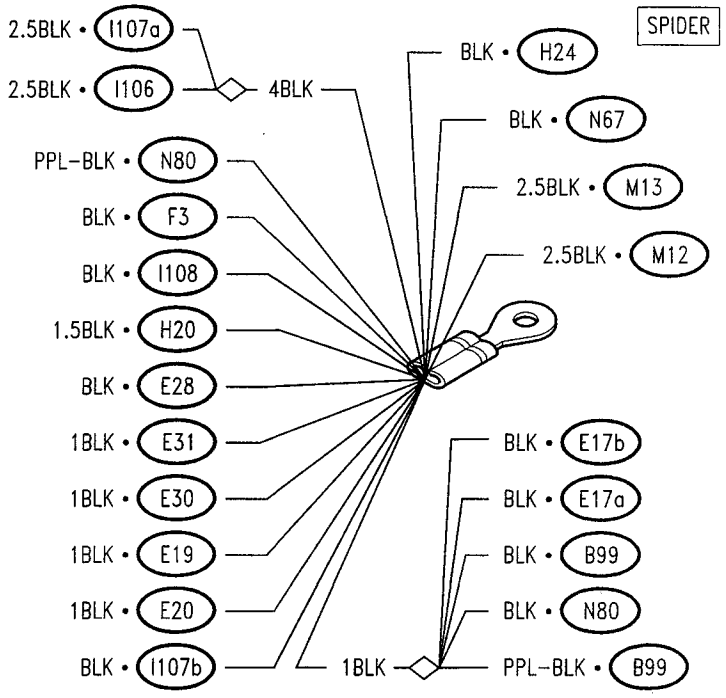
SPIDER

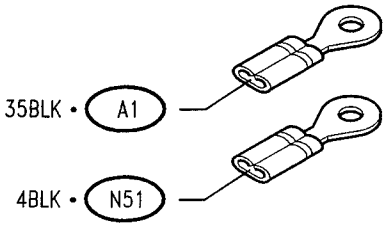


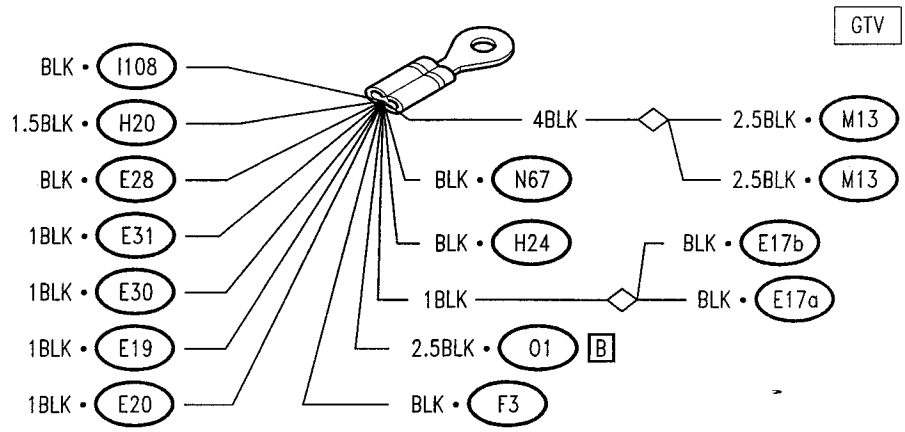
LH rear earth	G63b



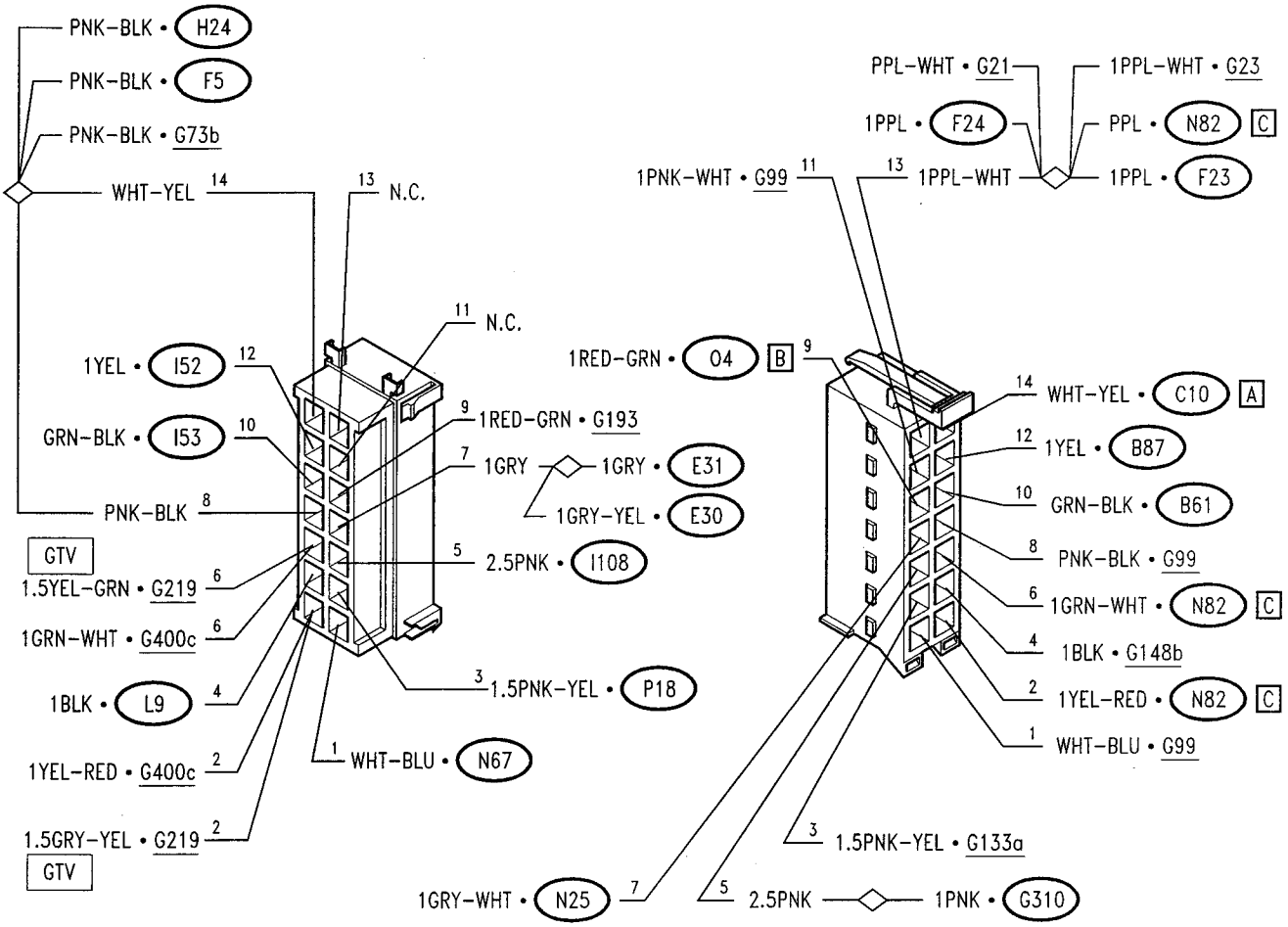




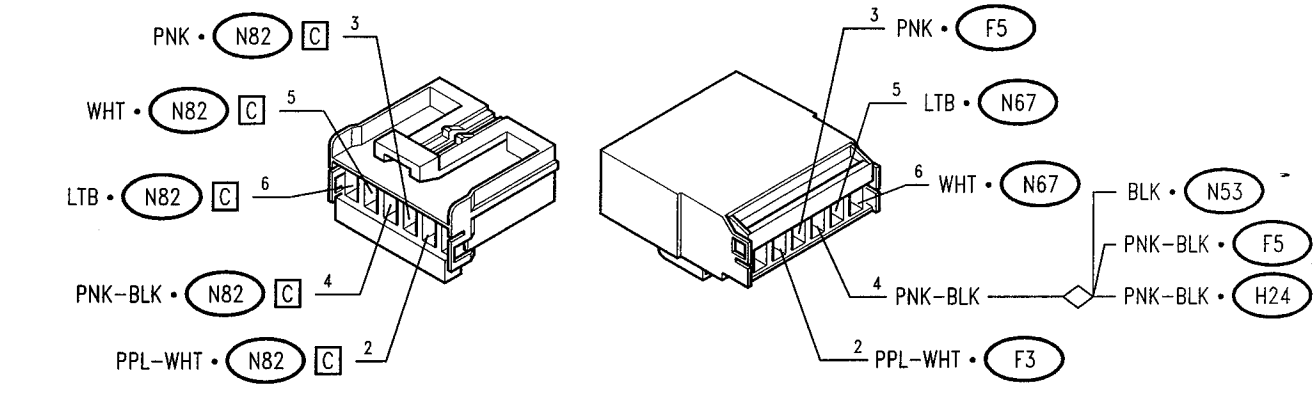




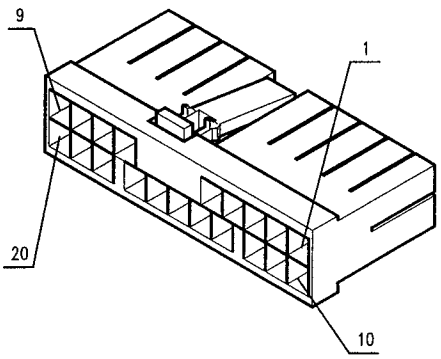
Connector for rear services — G73

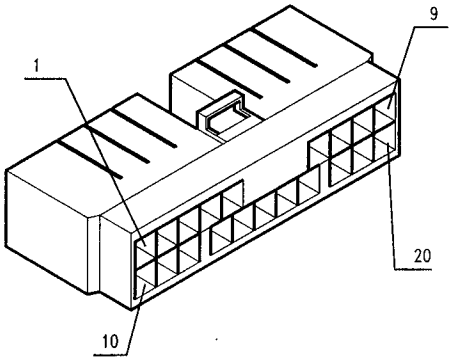


Connector for rear services — G73b



Console wiring connector	G84





1 — LTB-WHT • G23

2 — YEL-RED — YEL-RED • G21 / YEL-RED • G23

3 — GRY-RED • G21

4 — 1BLK • G148b

5 — ORN-WHT — 1ORN-BLU • G1 [G]

6 — GRY-GRN • G23

7 — GRY-GRN • G21

8 — BLK — 1.5BLK • G148b

9 — BLK • G99

10 — YEL • G99

11 — 1WHT-BLK • G148b

12 — 1RED — 1.5BLU-RED • G1 [H]

13 — 1YEL-BLK — YEL-BLK • G1 [H]

14 — GRN-WHT • G399

15 — 1YEL-GRN — YEL-BLK • G1 [D]

16 — 1.5GRY-YEL • G73

18 — 1.5YEL-GRN • G73

19 — 1.5BLK • G148b

20 — 1.5RED-BLK • I58

GTV

1 — LTB-WHT • B36

2 — YEL-RED • B36

3 — GRY-RED • B36

4 — 1BLK • B69

5 — ORN-WHT • B36

6 — GRY-GRN • B36

7 — BLK • B36

8 — GRY-GRN • B36

9 — 1BLK • B69

10 — YEL • B69

11 — 1WHT-BLK • O6

12 — 1RED • O6

13 — YEL-BLK • O6

14 — PPL-BLK • D43

15 — YEL-GRN — YEL-GRN • B36 / YEL-GRN • B69

16 — 1.5GRY-YEL • B47

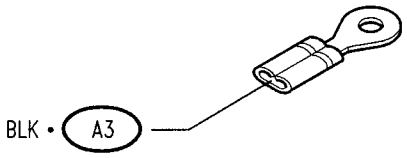
18 — 1.5YEL-GRN • B47

19 — 1.5BLK — 1.5BLK • B47 / 1.5BLK-PPL • B47

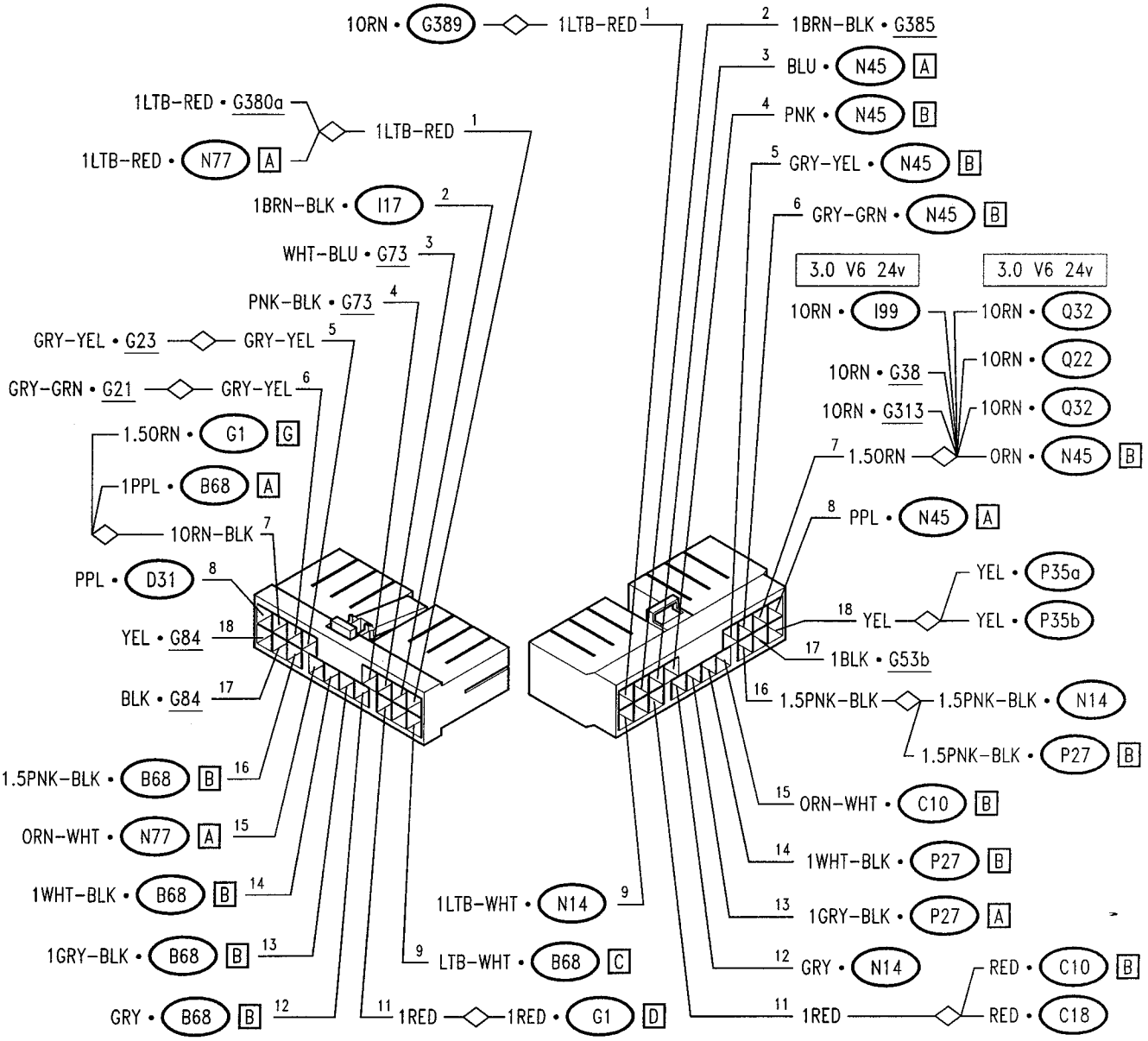
20 — 1.5RED-BLK • B47

GTV

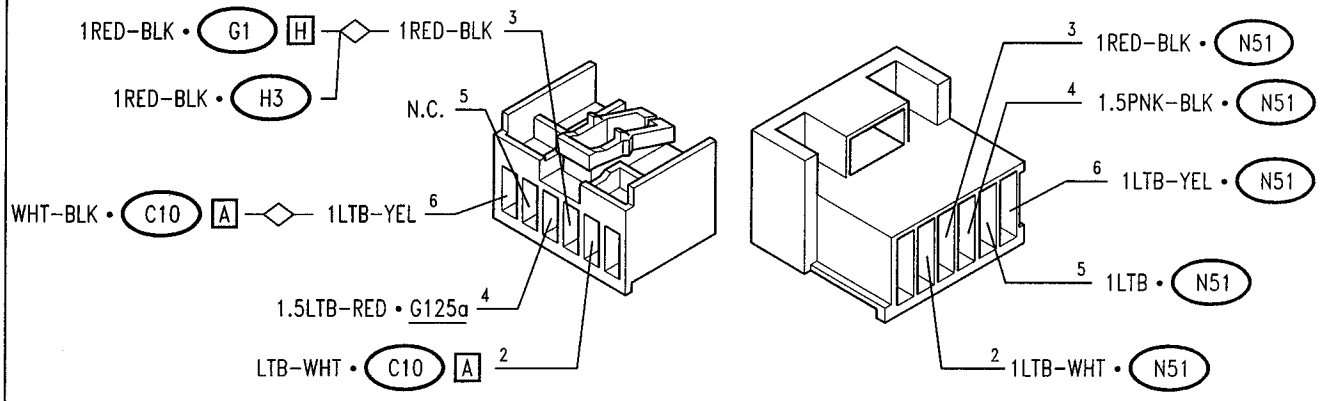
Luggage compartment earth	G92



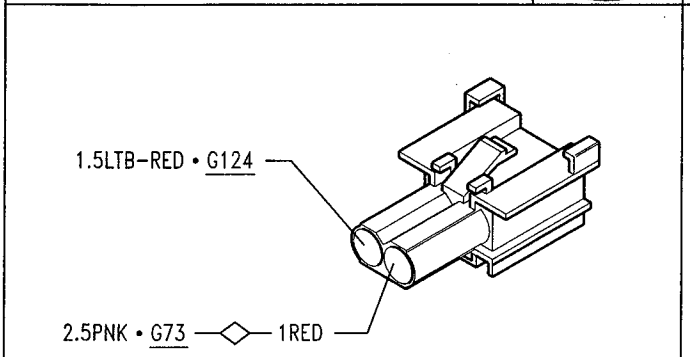
Connector for dashboard wiring/engine wiring	G99



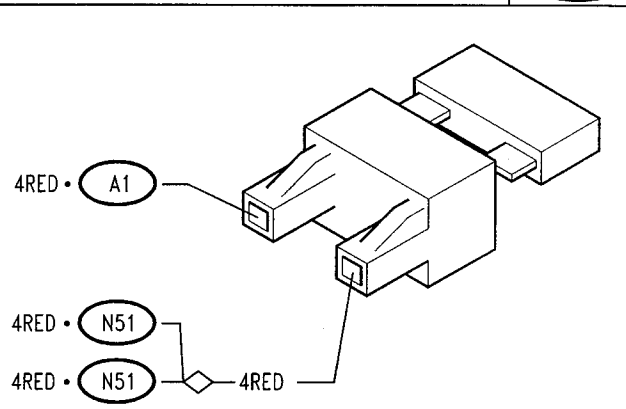
ABS system connector — G124



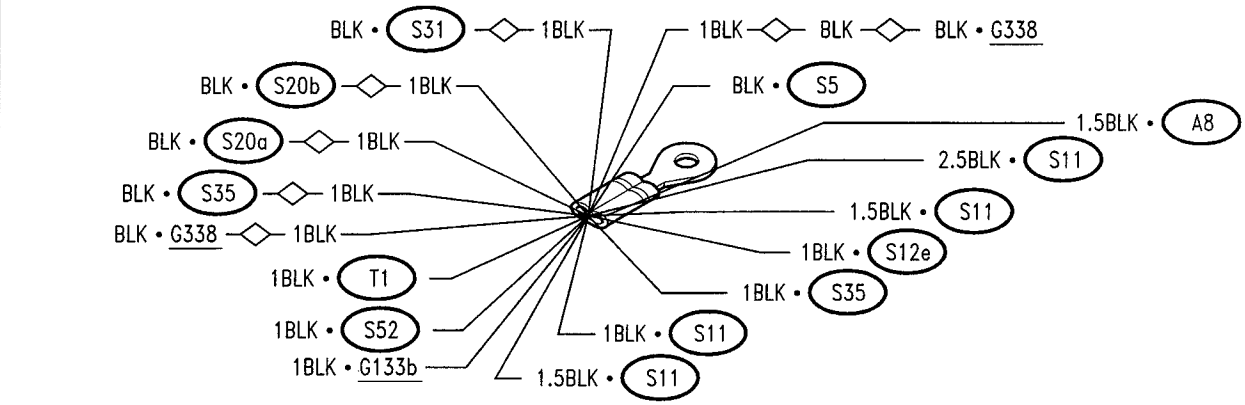
ABS system fuse — G125a



ABS system fuse — G125b

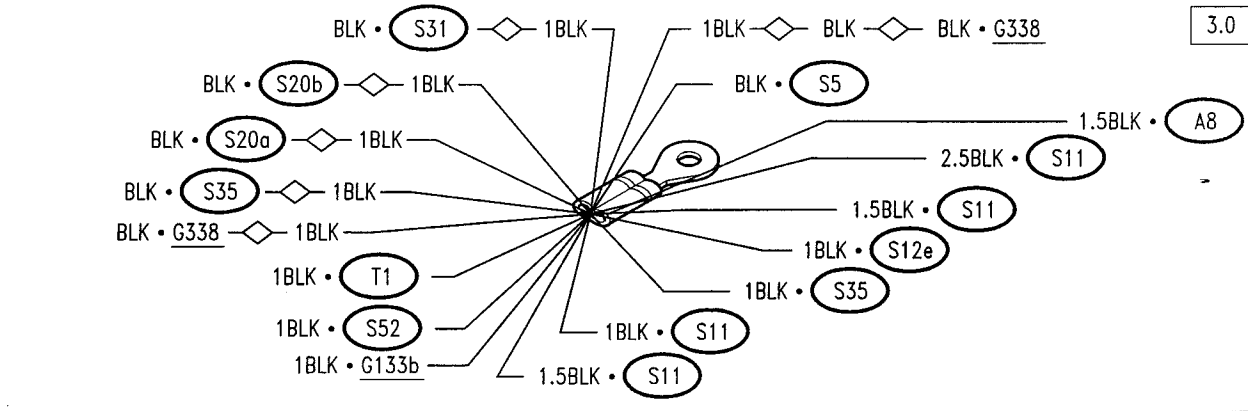


Earth on upper cover — G131

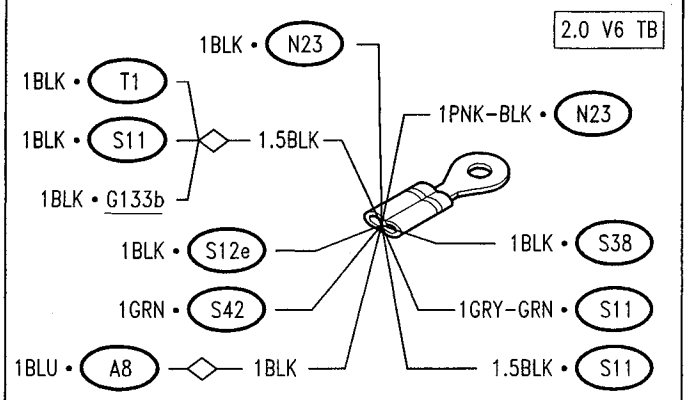


Earth on upper cover — G131

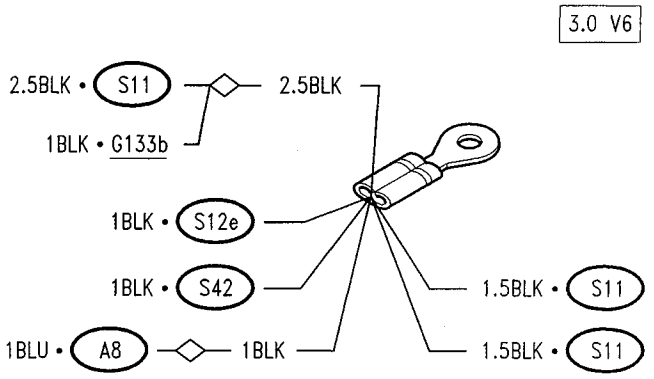
3.0 V6 24v



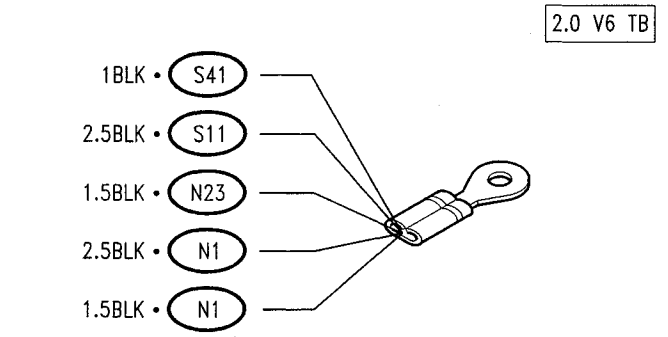
Earth on upper cover	G131a



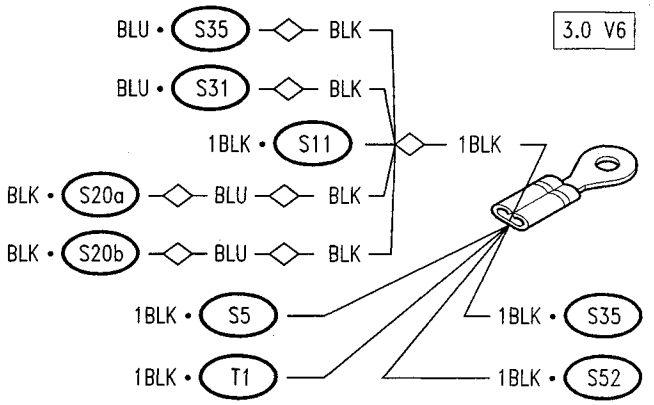
Earth on upper cover	G131a



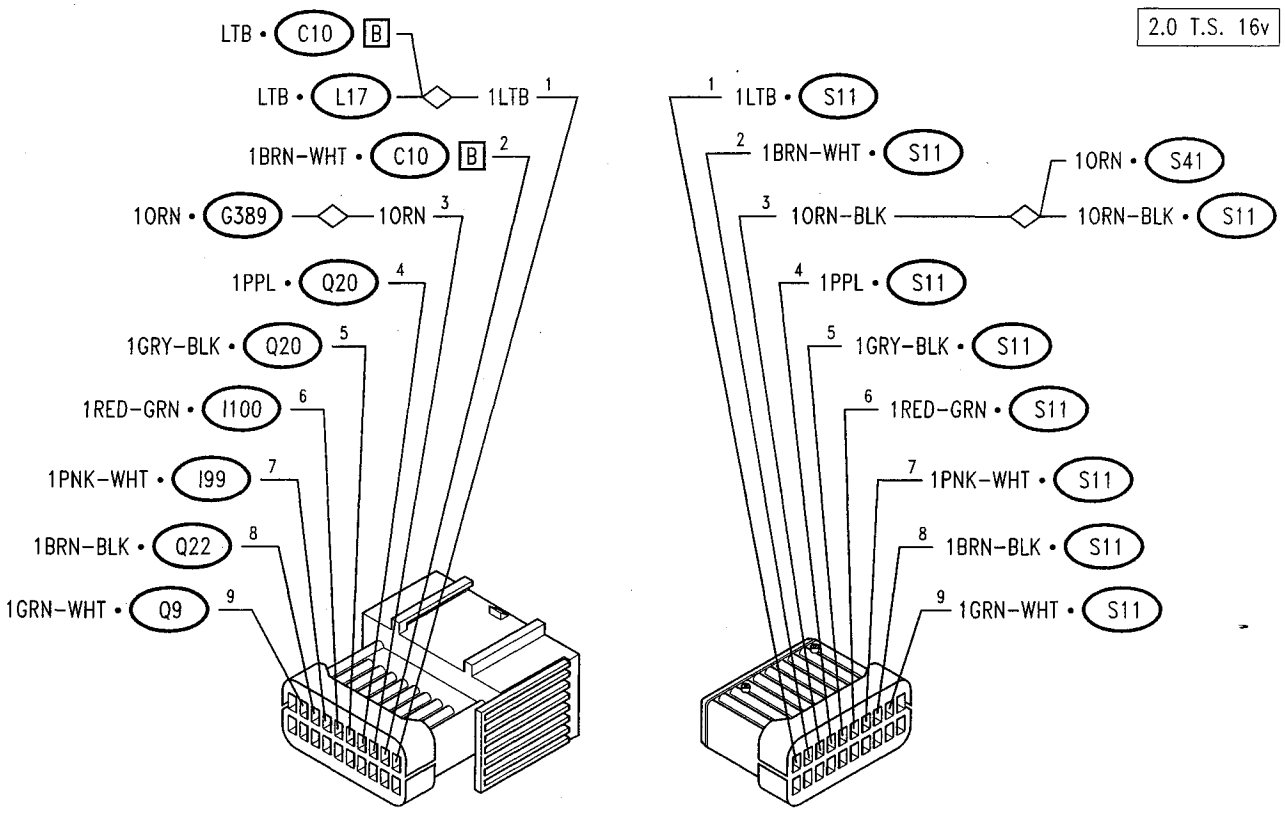
Earth on upper cover	G131b



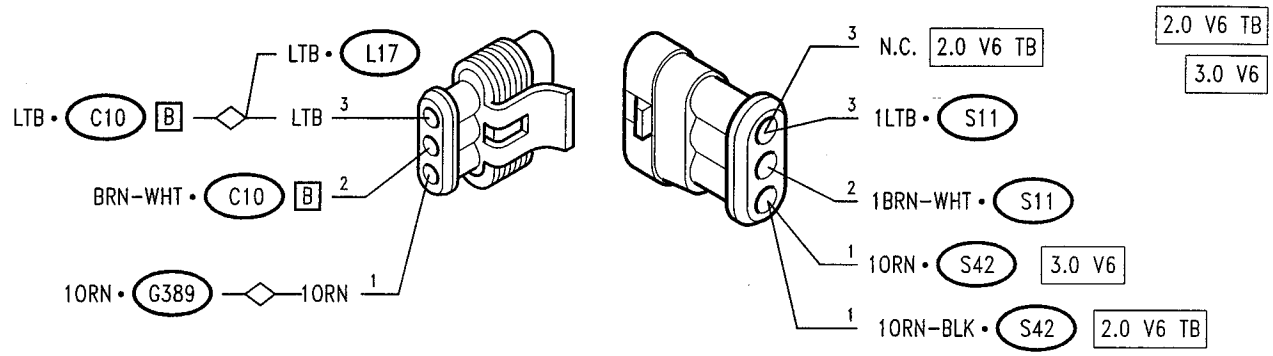
Earth on upper cover	G131b



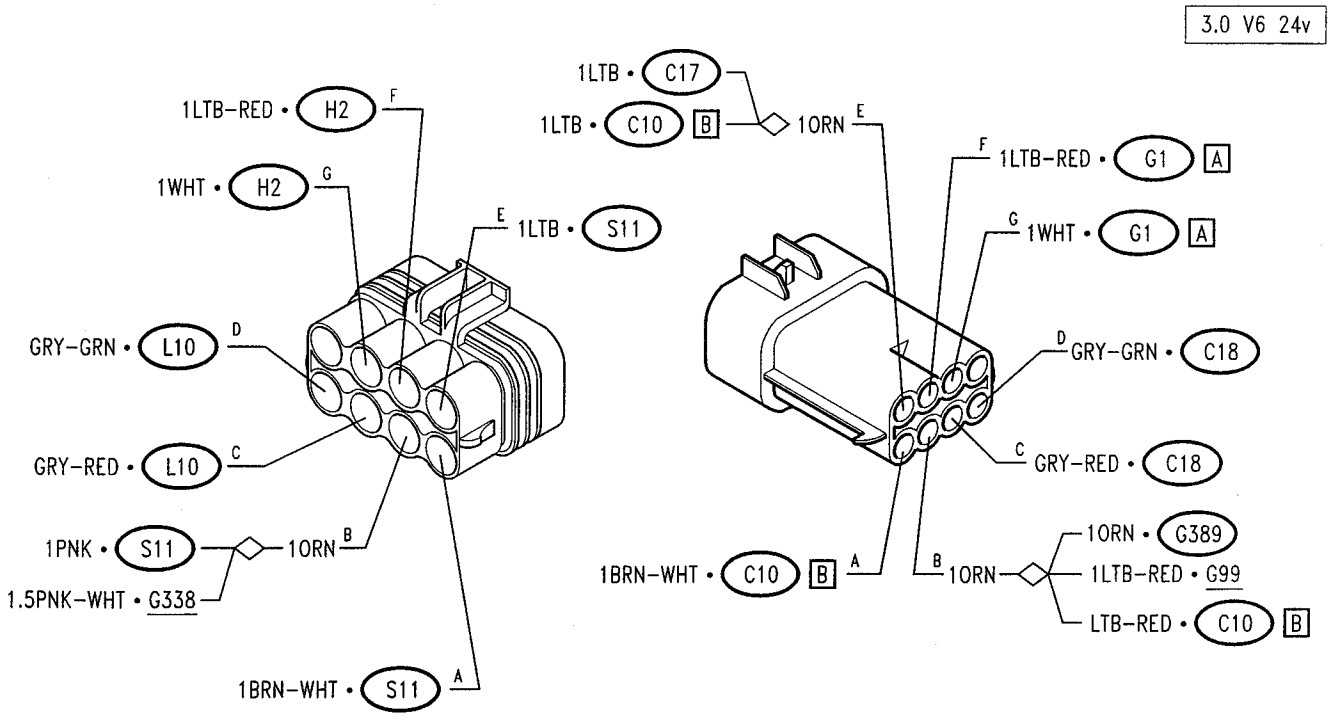
Connector for electronic injection wiring A (engine)	G133a



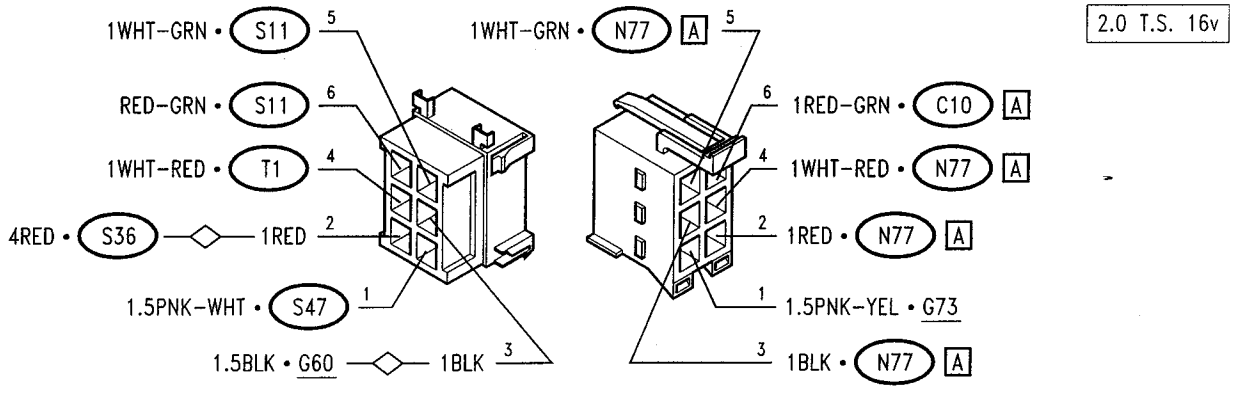
Connector for electronic injection wiring A (engine) — G133a



Connector for electronic injection wiring A (engine) — G133a

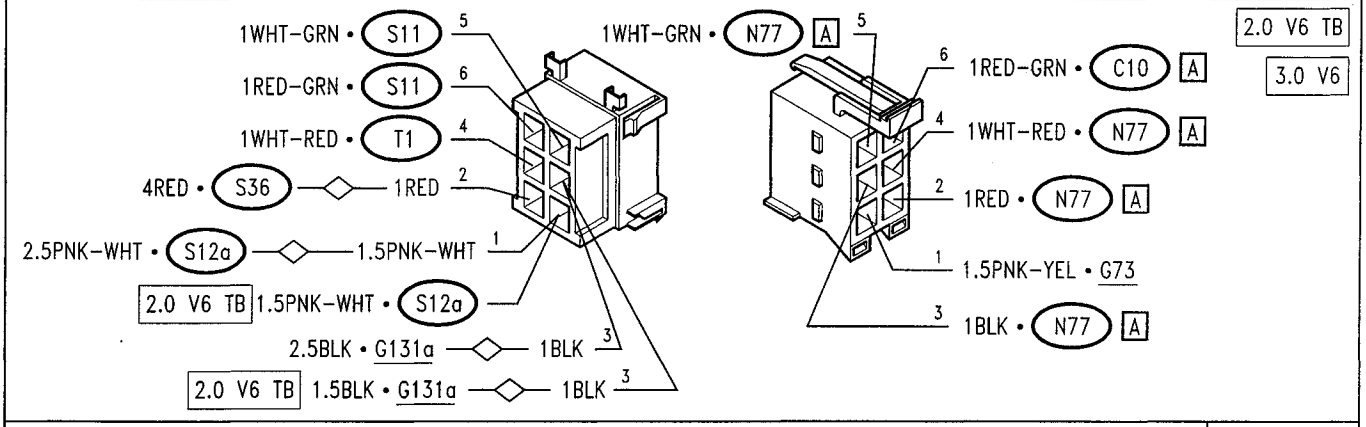


Connector for electronic injection wiring B (dashboard) — G133b



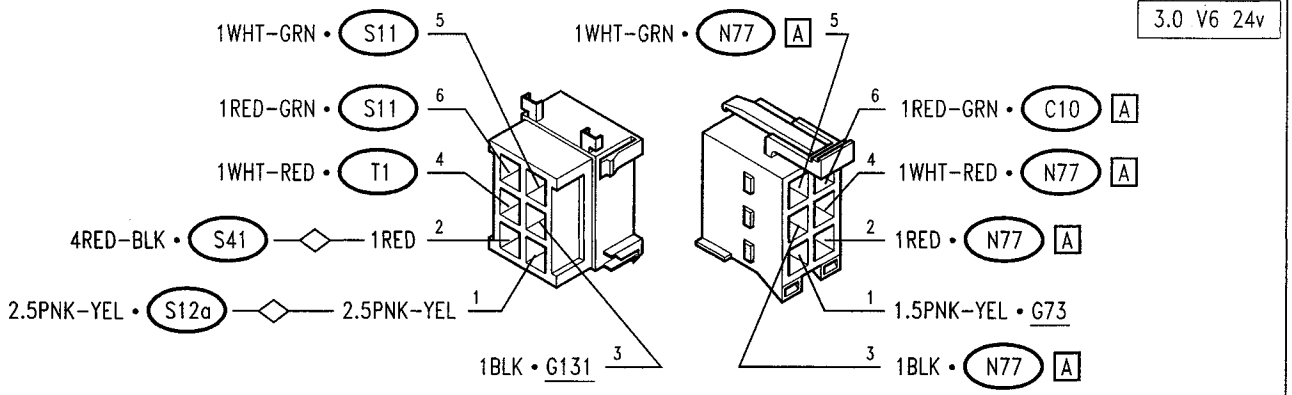
Connector for electronic injection wiring B (dashboard) — G133b

2.0 V6 TB
3.0 V6

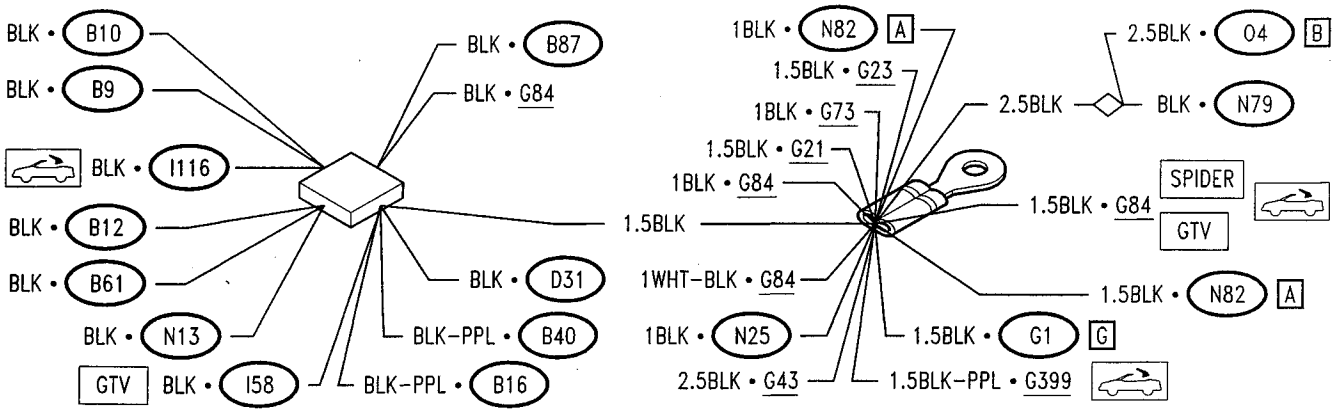


Connector for electronic injection wiring B (dashboard) — G133b

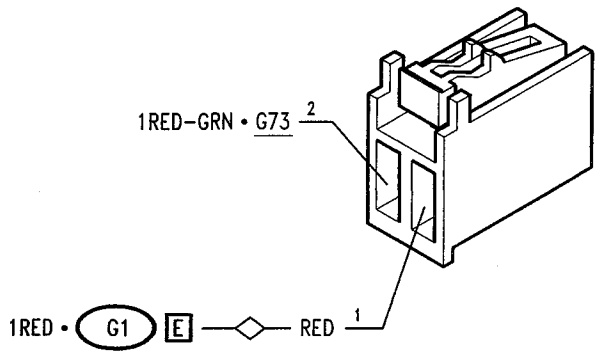
3.0 V6 24v



Earth under dashboard LH — G148b

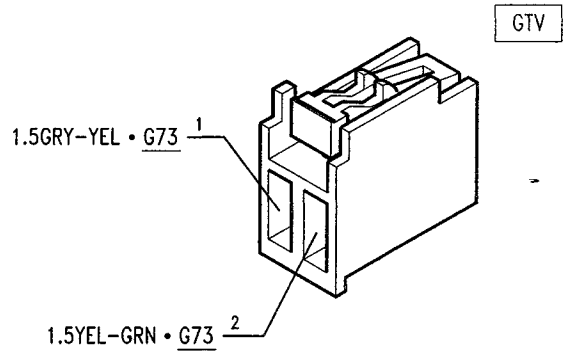


Connector for electric aerial wiring — G193



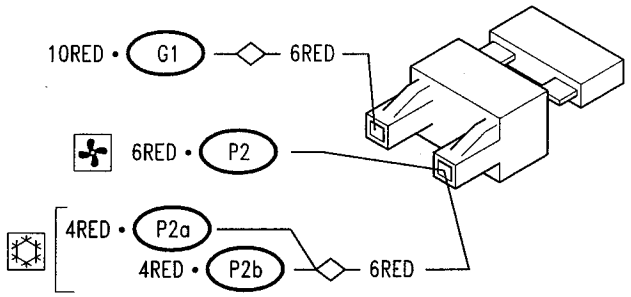
Connector for sun roof — G219

GTV



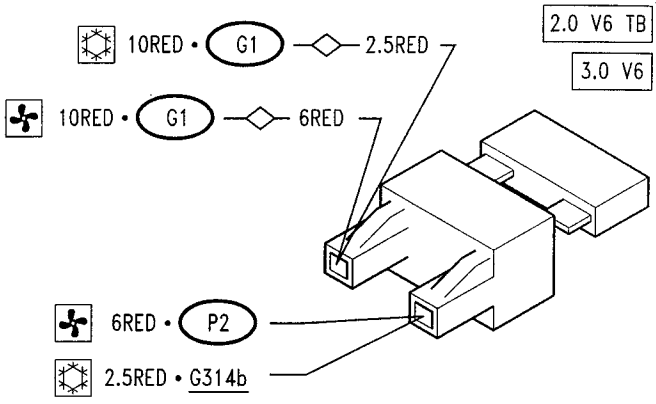
Fuse for engine fan	G254

2.0 T.S. 16v



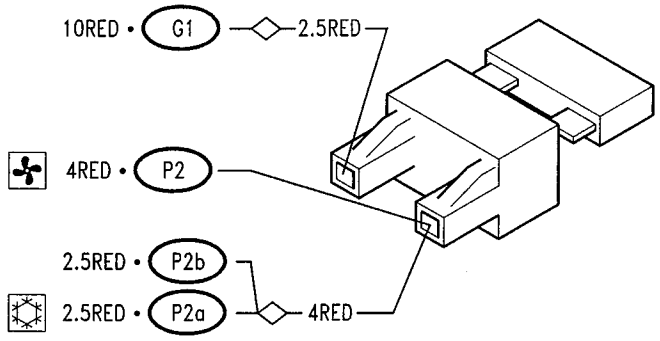
Fuse for engine fan	G254

2.0 V6 TB
3.0 V6

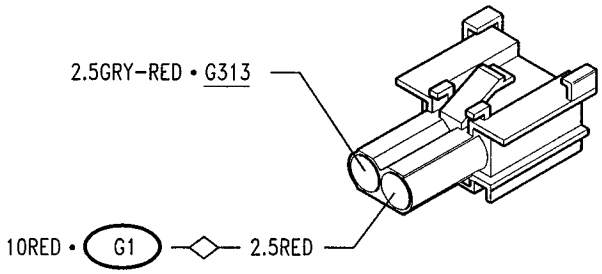


Fuse for engine fan	G254

3.0 V6 24v

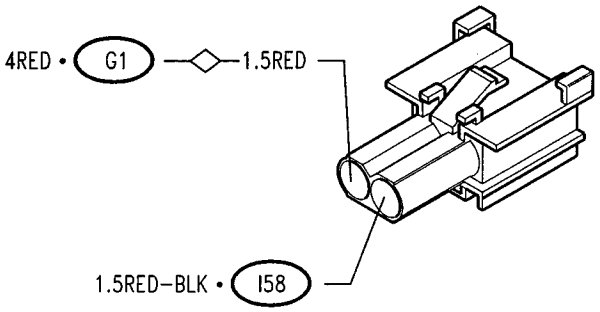


Fuse for heating and ventilation fan	G255



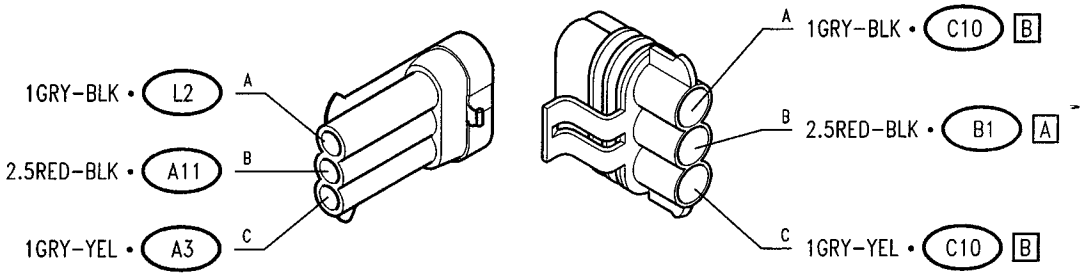
Fuse for sun roof	G261

GTV



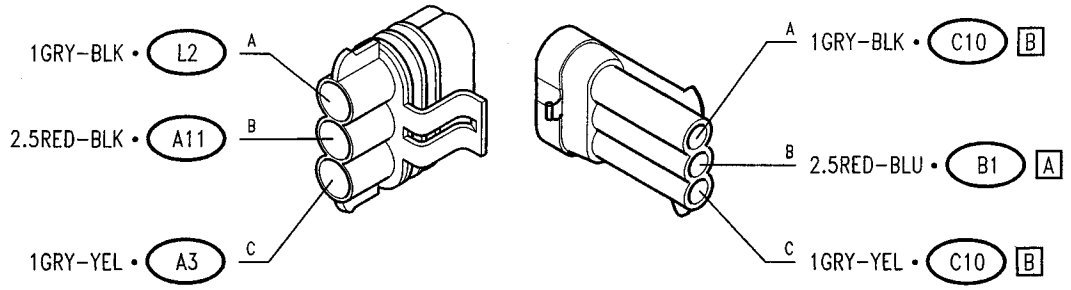
Connector for engine sensors	G308

2.0 T.S. 16v

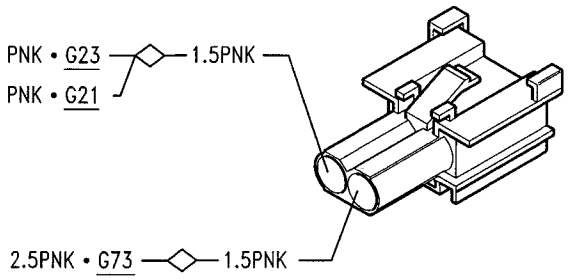


Connector for engine sensors — G308

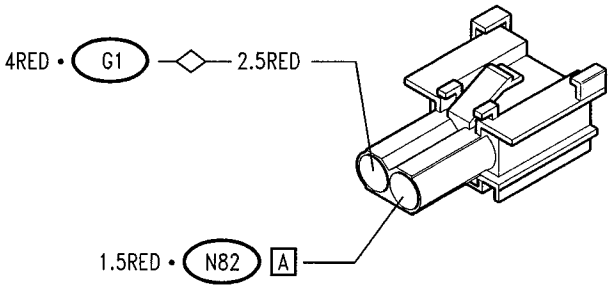
2.0 V6 TB
3.0 V6
3.0 V6 24v



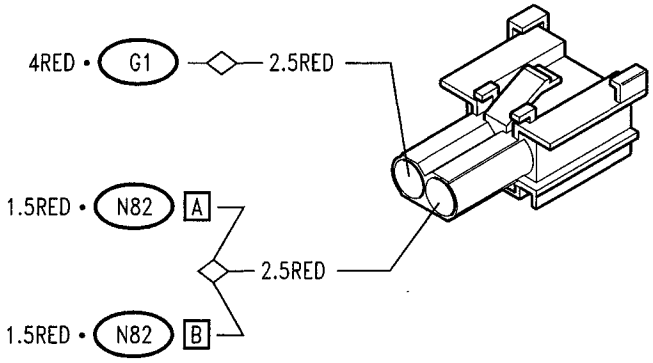
Fuse for RH front power window — G310



Power window and door lock fuse — G312a

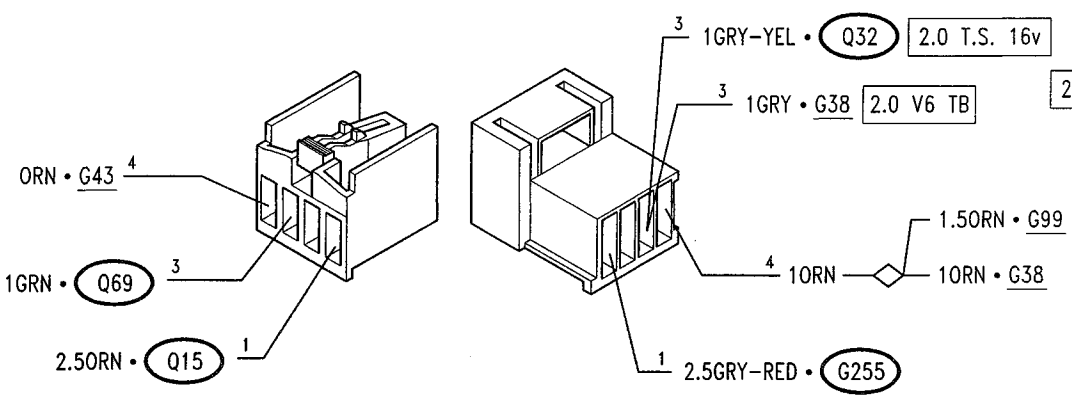


Power window and door lock fuse — G312b



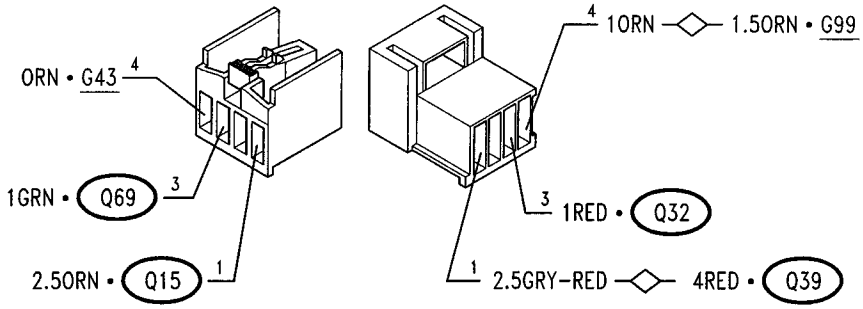
Connector for additional conditioner wiring — G313

2.0 T.S. 16v
2.0 V6 TB
3.0-V6



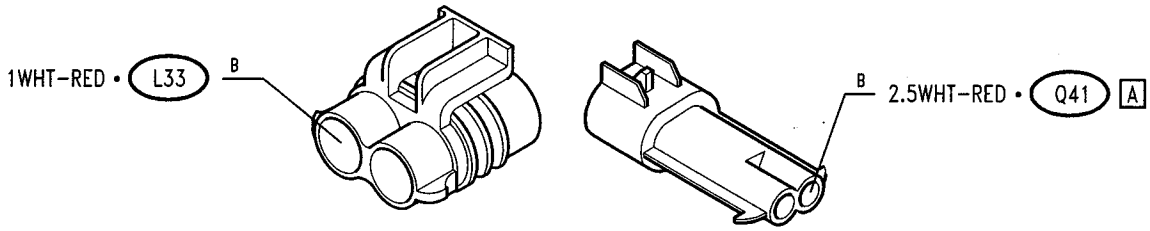
Connector for additional conditioner wiring — G313

3.0 V6 24v



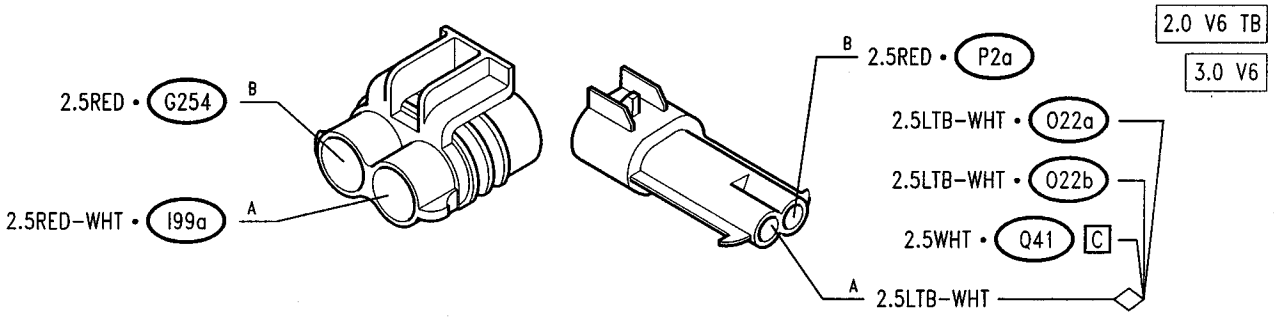
Connector for engine wiring / conditioner wiring A — G314a

2.0 V6 TB
3.0 V6



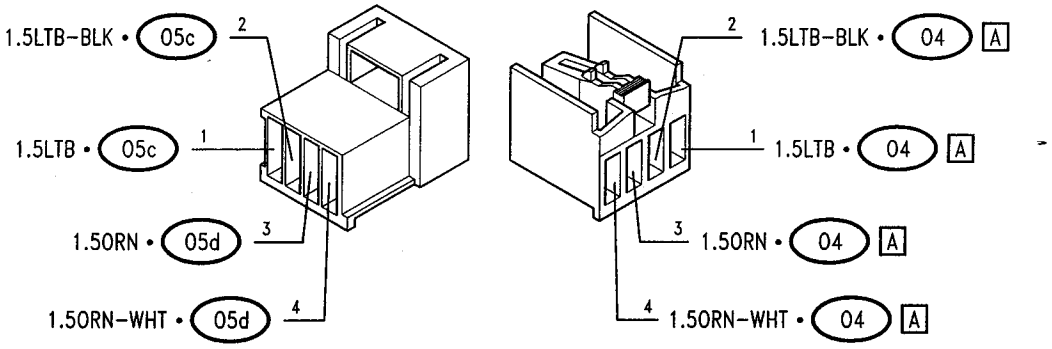
Connector for engine wiring / conditioner wiring B — G314b

2.0 V6 TB
3.0 V6



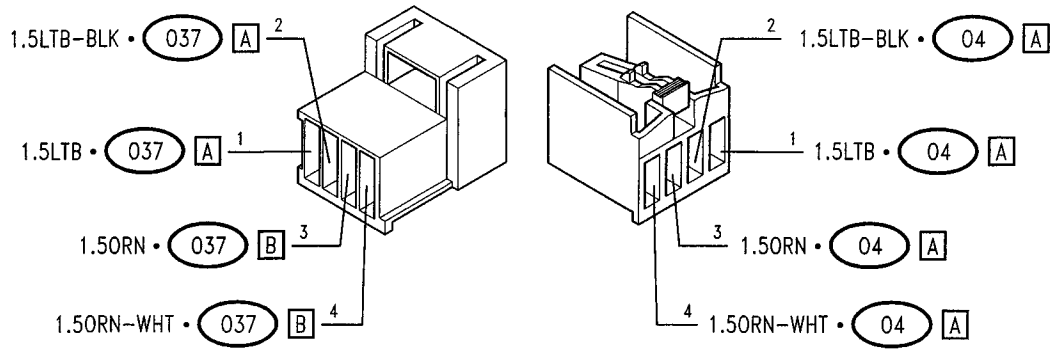
Connector for rear loudspeaker cables — G320

GTV



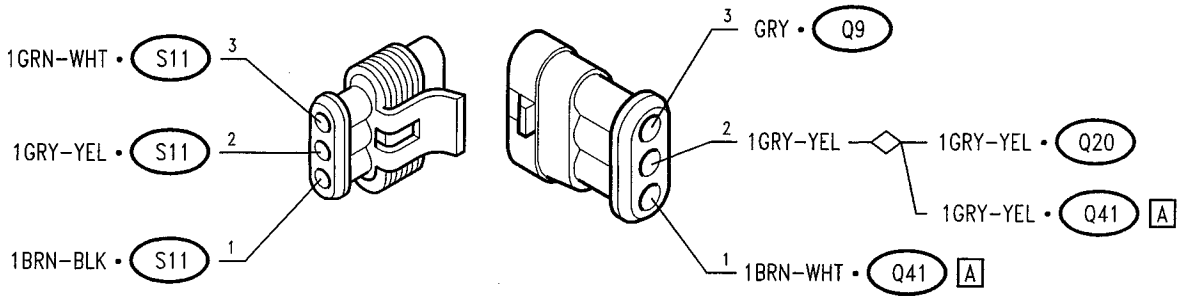
Connector for rear loudspeaker cables	G320

SPIDER



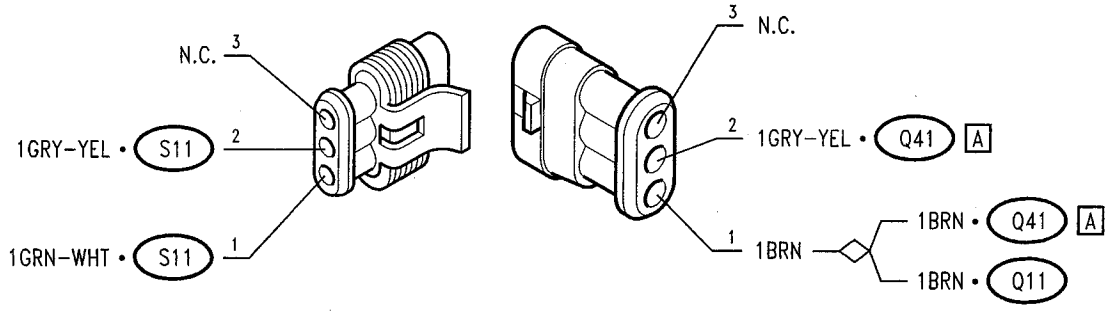
Connector for conditioner syst./injection syst.	G337

2.0 T.S. 16v



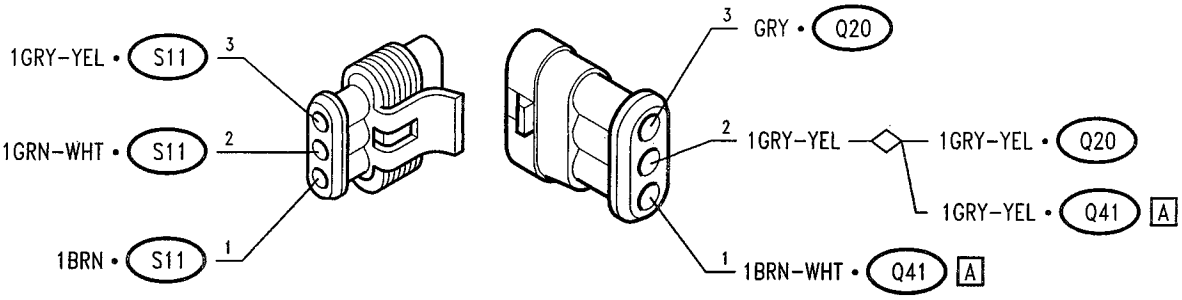
Connector for conditioner syst./injection syst.	G337

2.0 V6 TB



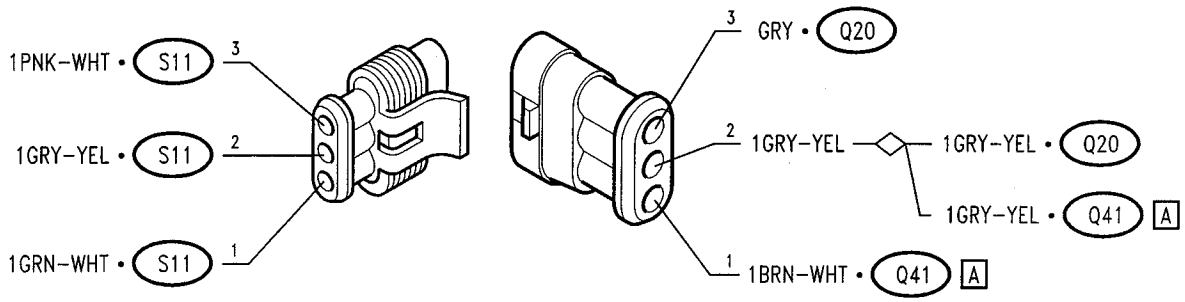
Connector for conditioner syst./injection syst.	G337

3.0 V6



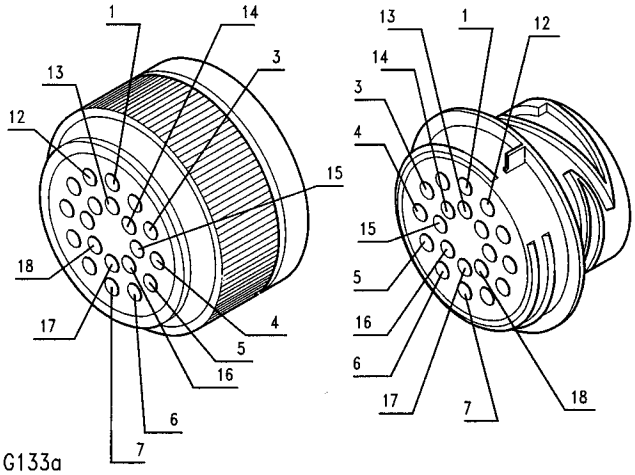
Connector for conditioner syst./injection syst. — G337

3.0 V6 24v



Coil and injectors connector — G338

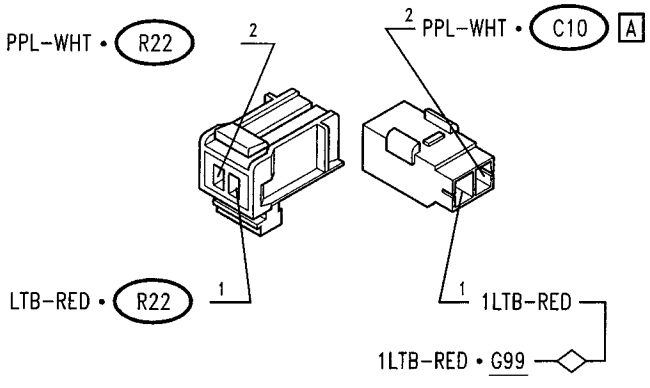
3.0 V6 24v



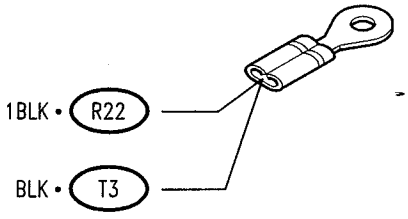
1 2.5RED
4RED-BLK • S41
3 1.5GRY-RED • S11
4 1RED-BLK • S11
5 1YEL-RED • S11
6 1LTB-RED • S11
7 1GRN-RED • S11
8 1WHT-RED • S11
12 1.5PNK-WHT — 1ORN • G133a
13 BLU • S11
14 WHT • S11
15 PNK • S11
16 RED • S11
17 BRN • S11
18 YEL • S11

1 2.5RED — 1.5RED • S3
3 1GRY-RED • S3 1
4 1RED-BLK • S3 2
5 1YEL-RED • S3 3
6 1LTB-RED • S3 4
7 1GRN-RED • S3 5
8 1WHT-RED • S3 6
12 1.5PNK-WHT
1.5GRN-BLK • A8
13 1LTB • A8 6
14 1WHT • A8 3
15 1PNK • A8 5
16 1ORN • A8 2
17 1BRN • A8 4
18 1YEL • A8 1

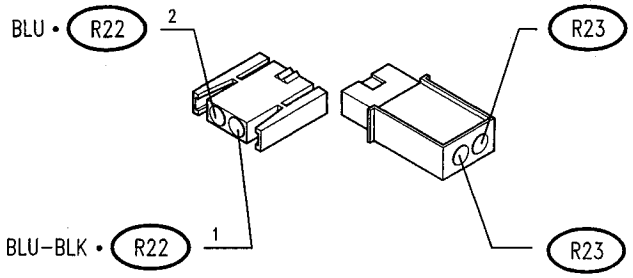
Airbag connector — G380



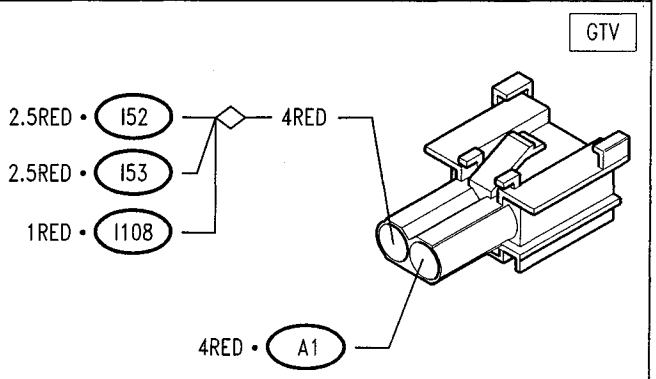
Earth for airbag — G381



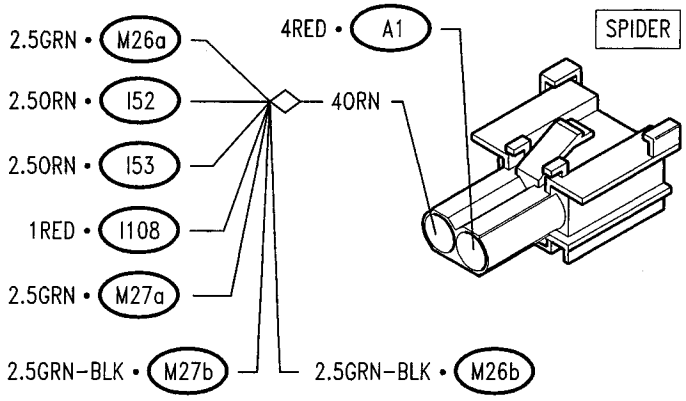
Connector for airbag capsule	G383



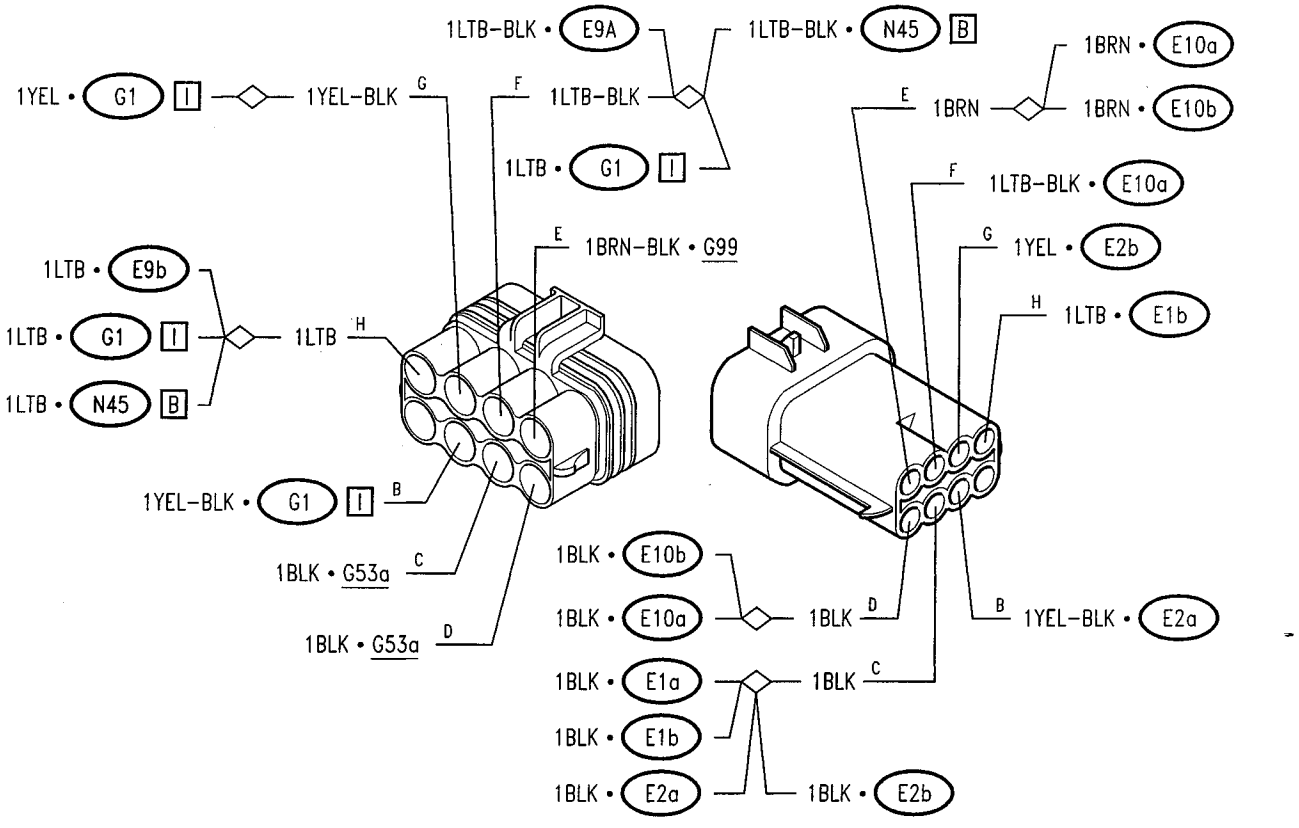
Services supply fuse	G384



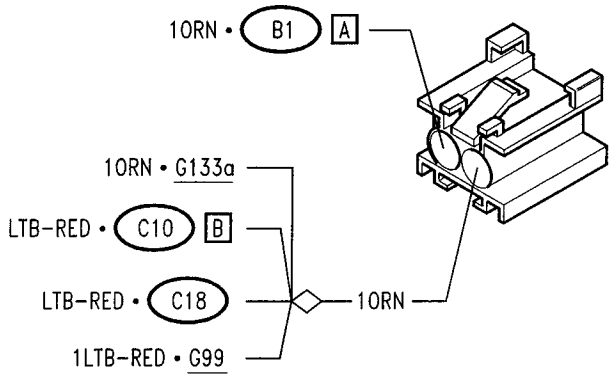
Services supply fuse	G384



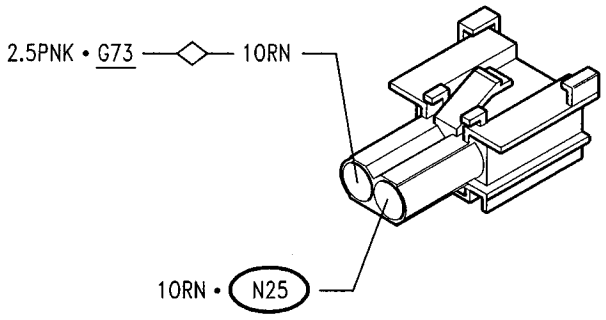
Connector for wiring in front bumper	G385



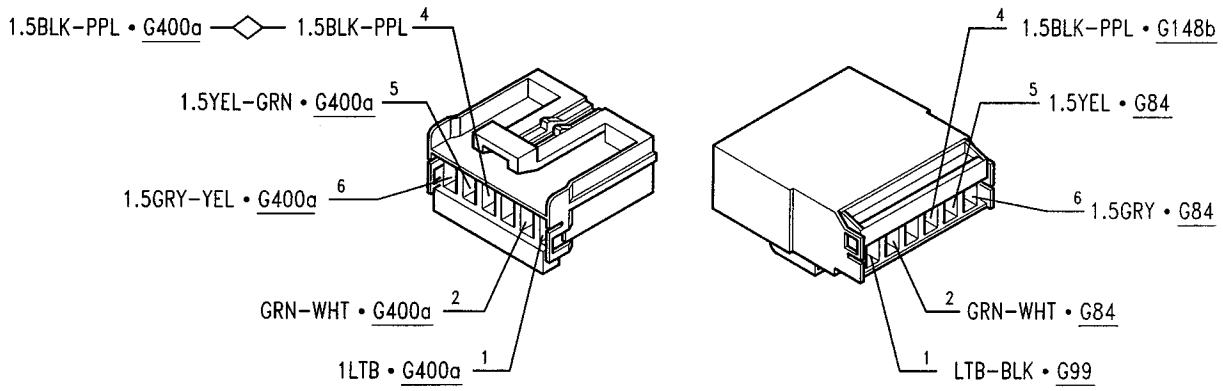
Fuse for ALFA ROMEO CODE unit	G389



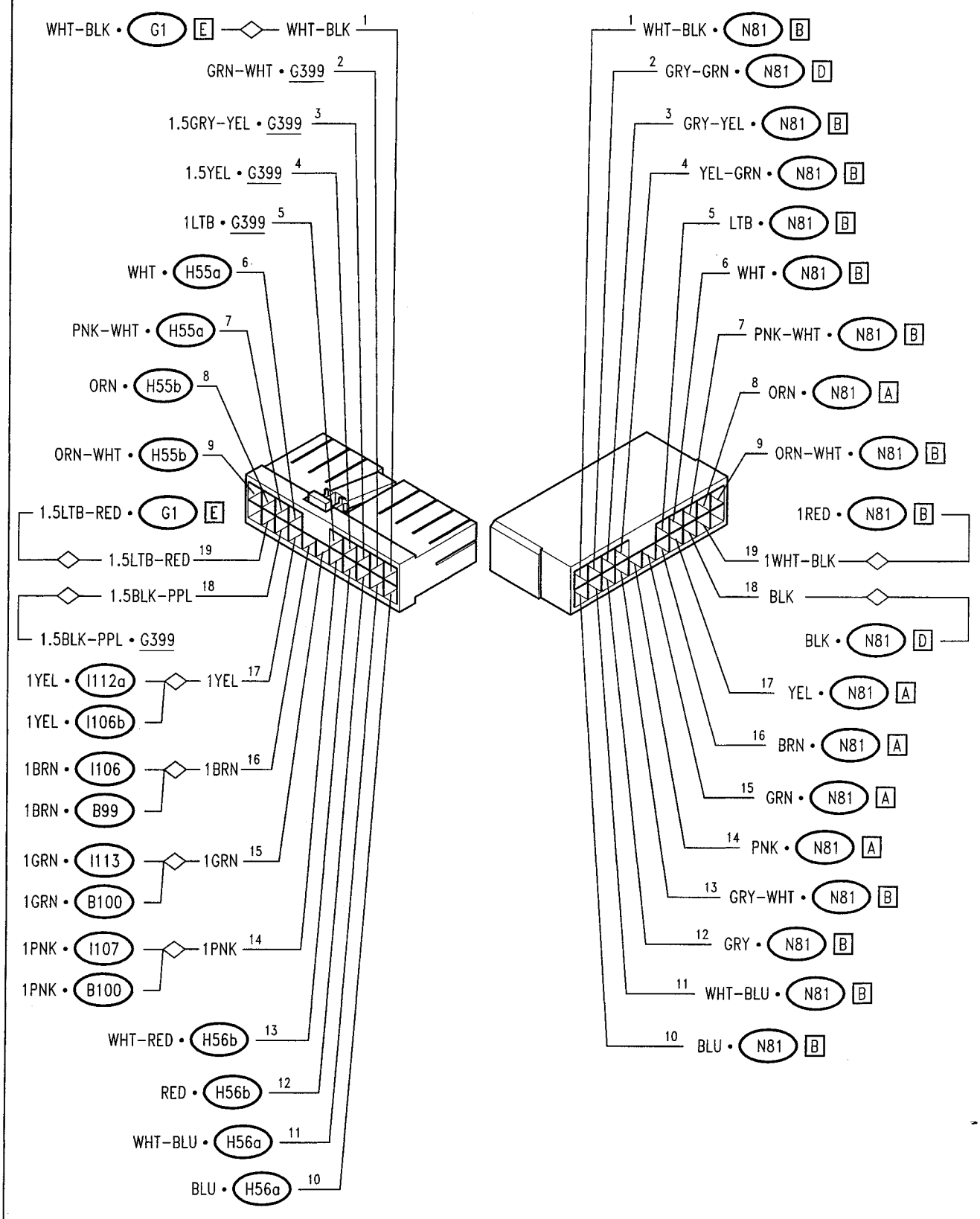
Rear fog guard fuse	G391



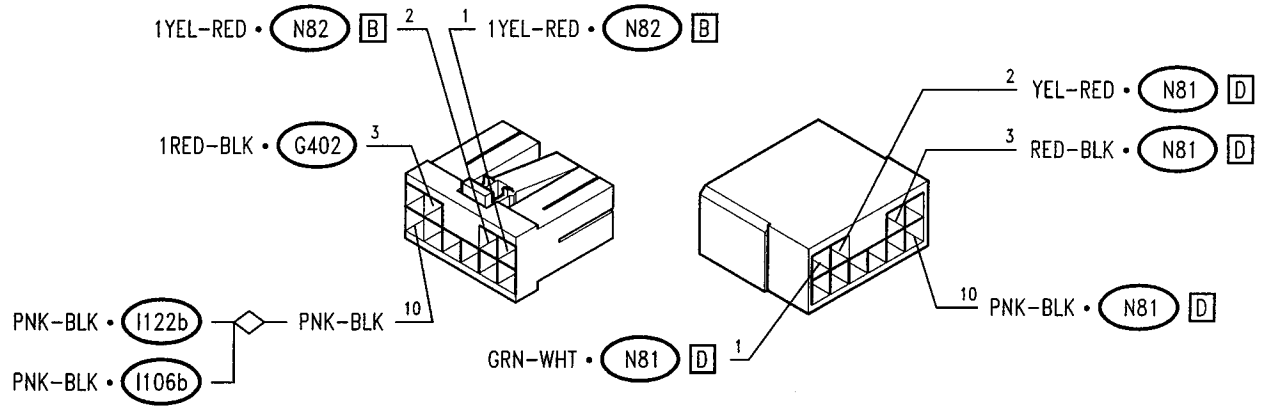
Dashboard connector for automatic hood	G399



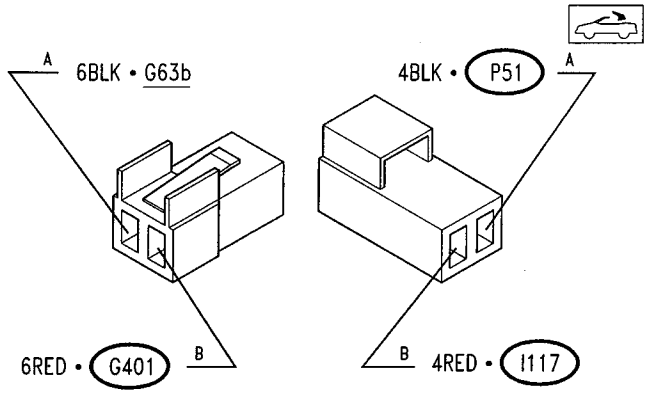
Rear connector for automatic hood | G400 A



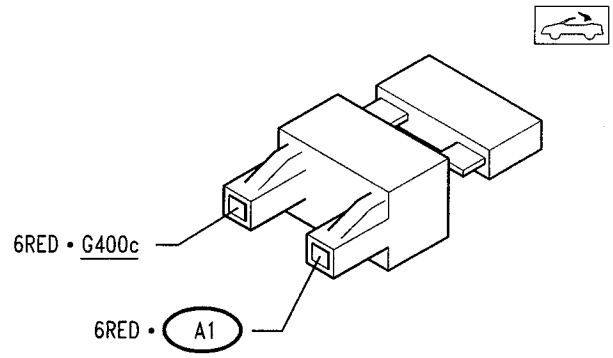
Rear connector for automatic hood — G400 B



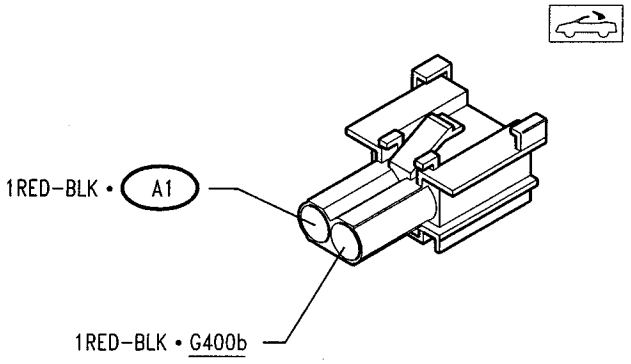
Rear connector for automatic hood — G400 C



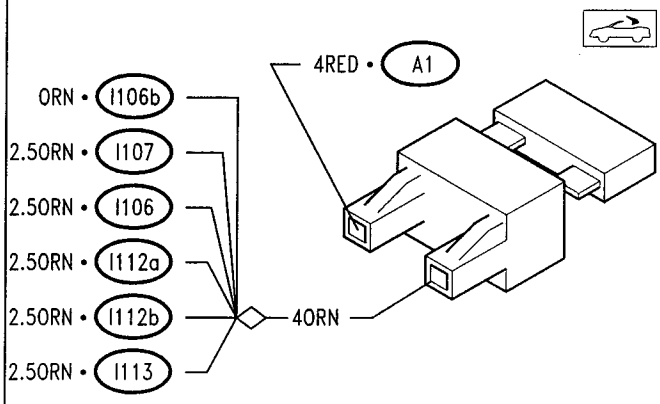
Fuse for automatic hood system — G401



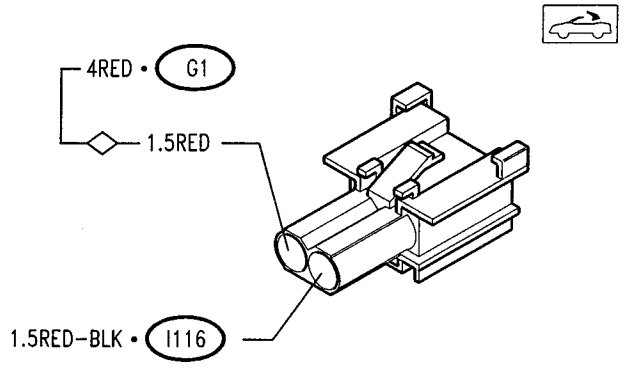
Fuse for automatic hood control unit — G402



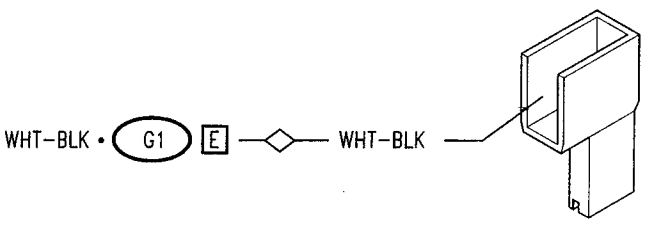
Fuse for automatic hood switch — G403



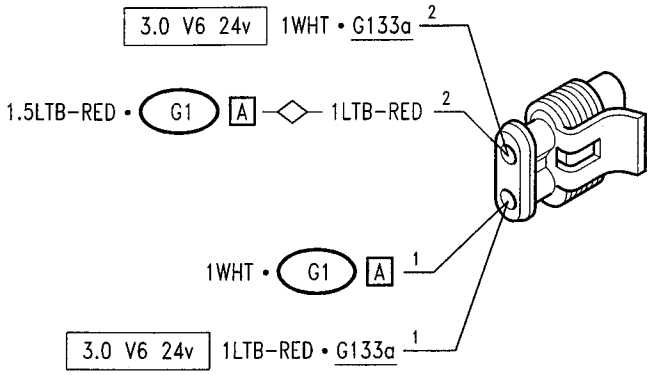
Fuse for automatic hood switch — G404



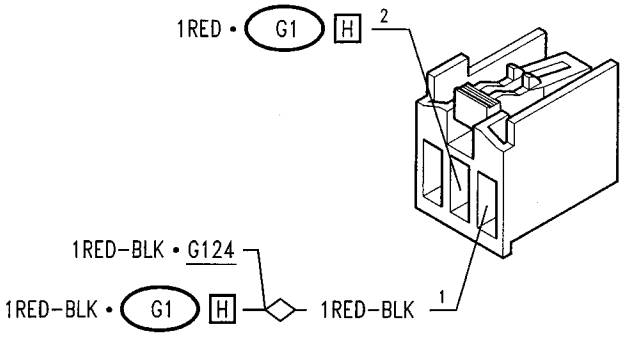
Handbrake switch — H1



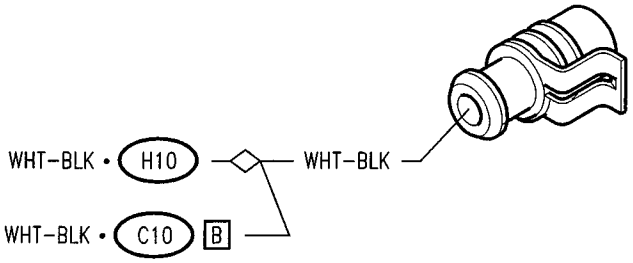
Reversing light switch — H2



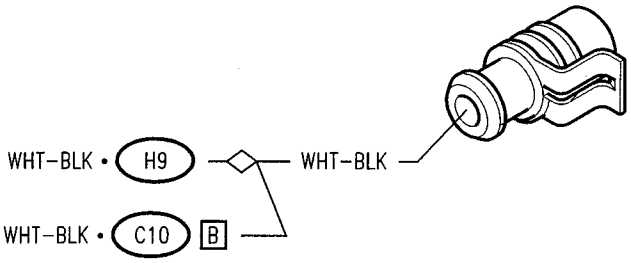
Stop lights switch — H3



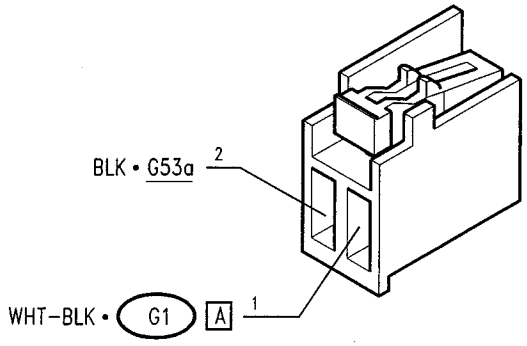
RH front brake pad switch — H9



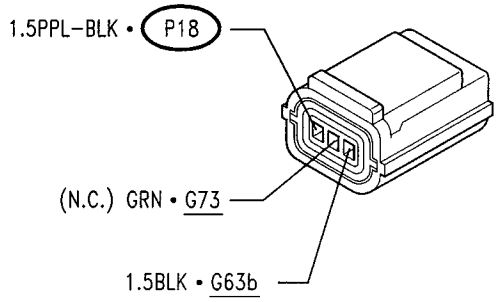
LH front brake pad switch — H10



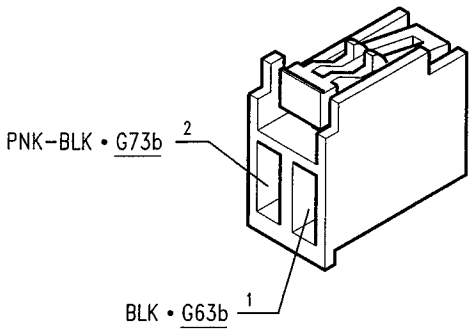
Brake fluid minimum level switch — H17



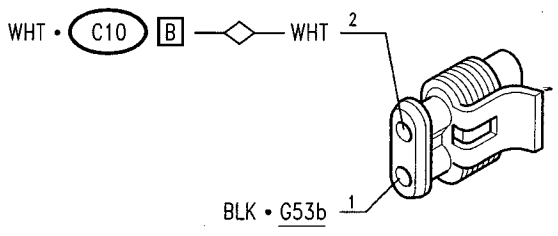
Inertial switch — H20



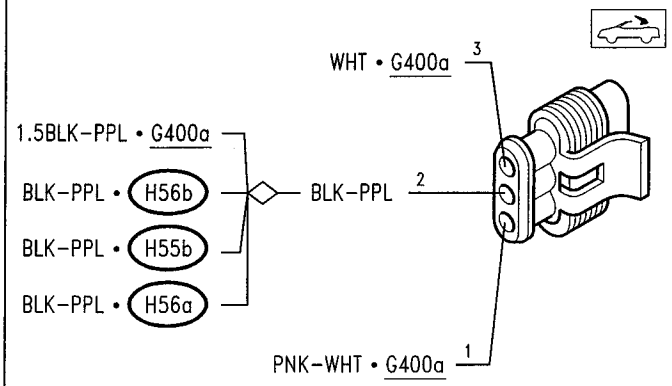
Luggage compartment light switch — H24



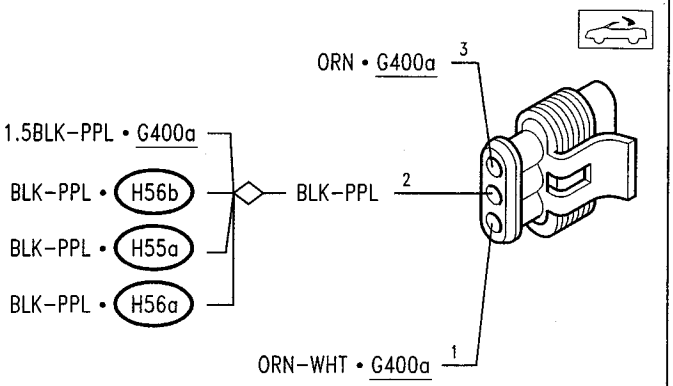
Bonnet anti-theft device switch — H44



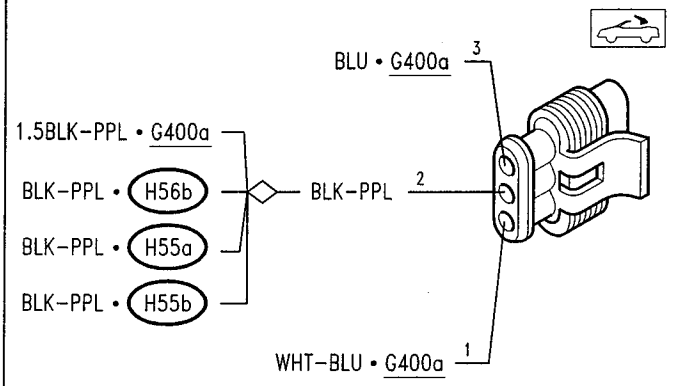
RH hood closing switch — H55a



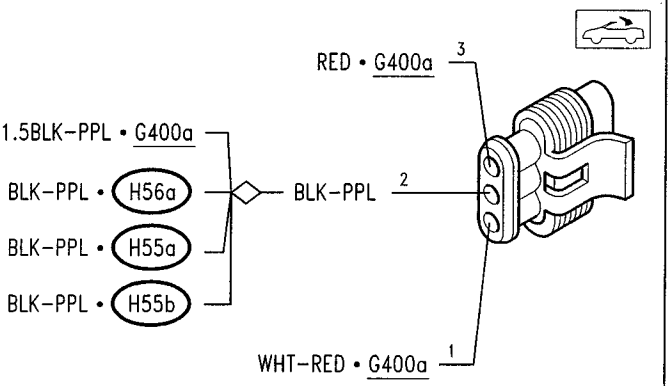
LH hood closing switch — H55b



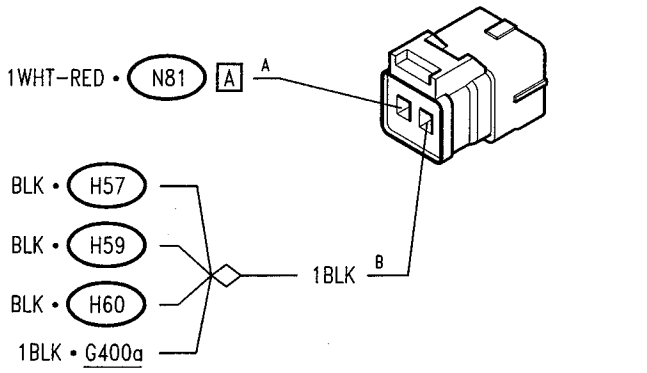
RH hood cover closing switch — H56a



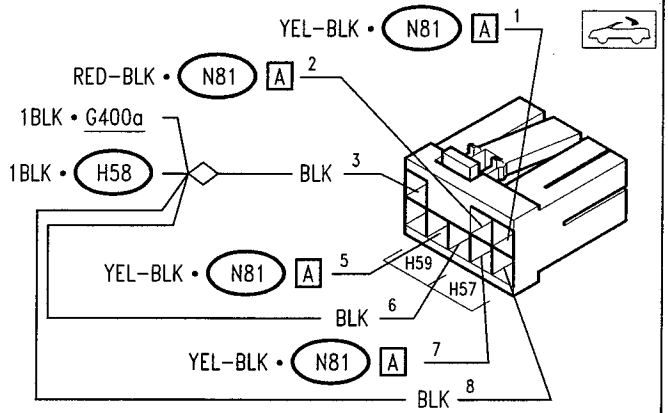
LH hood cover closing switch — H56b



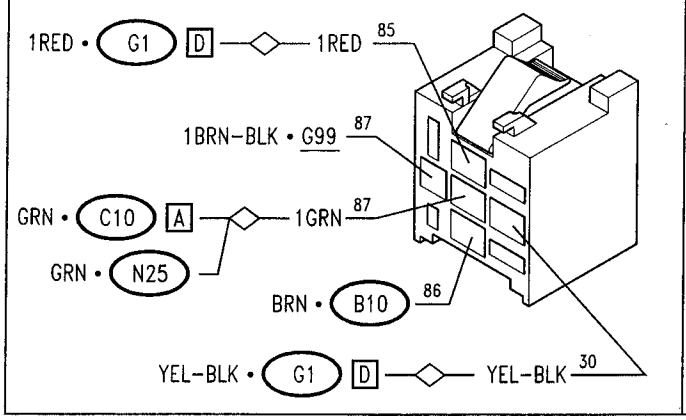
Intermediate "5th arc" switch — H58



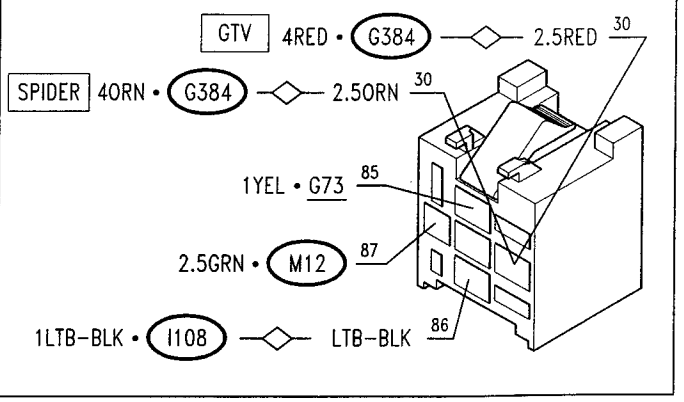
Hood position switch — H60



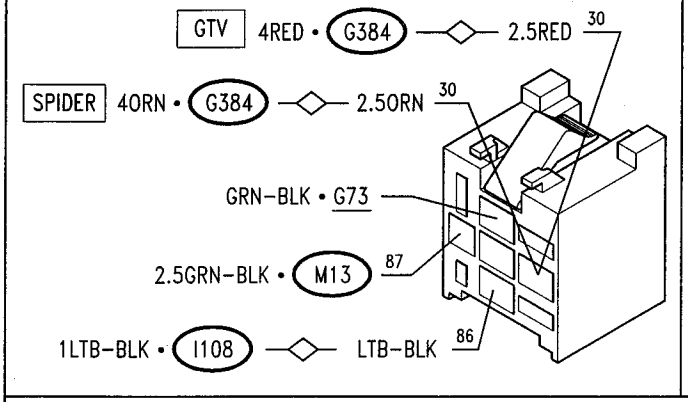
Fog light relay — I17



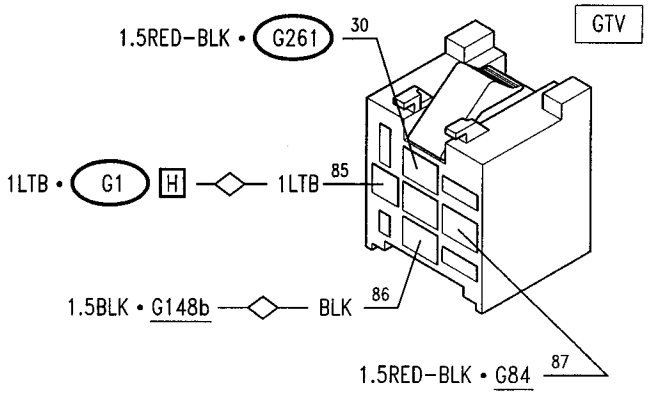
Luggage compartment opening relay — I52



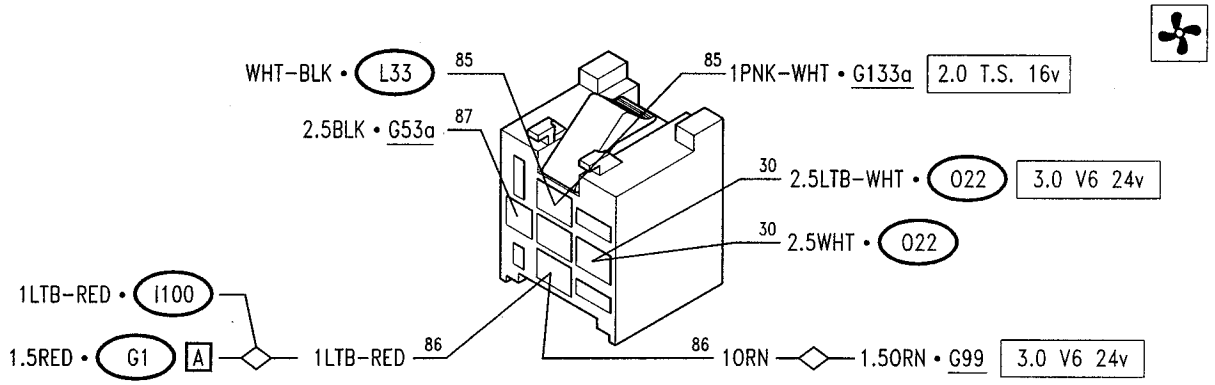
Fuel flap opening relay — I53



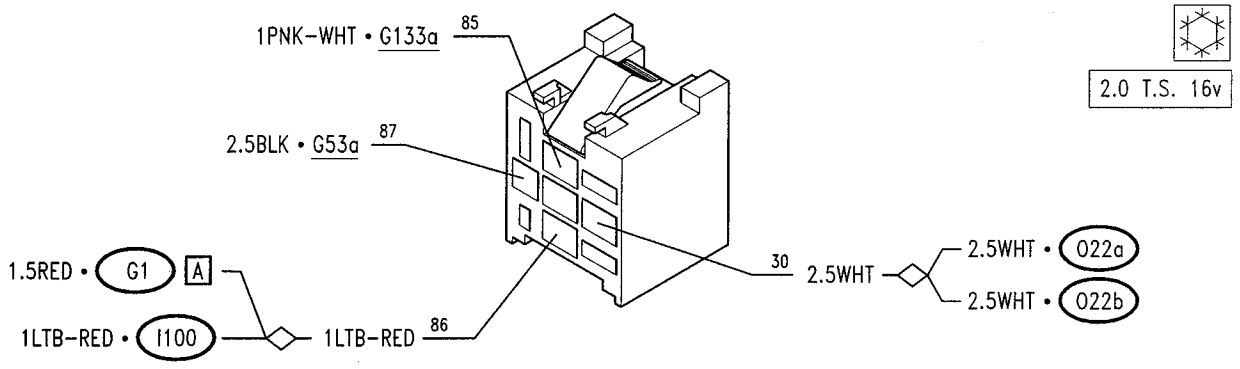
Sun roof relay — I58



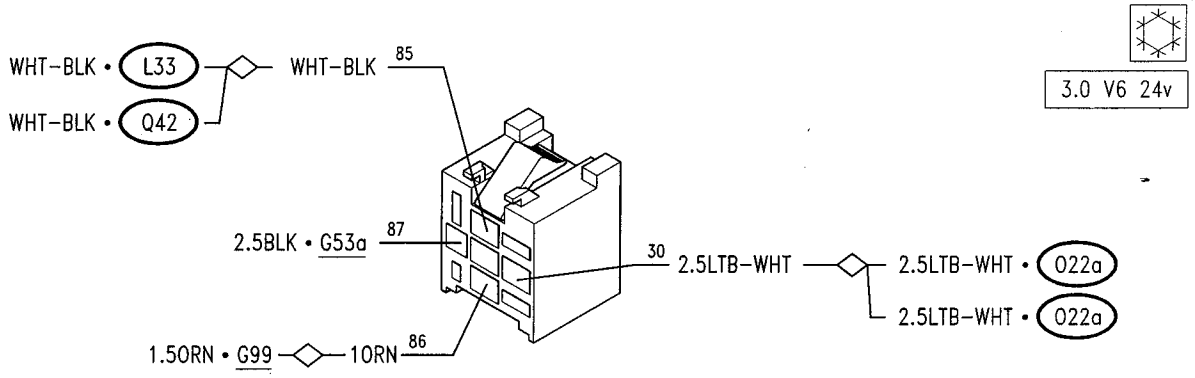
Engine cooling fan 1st speed relay — I99



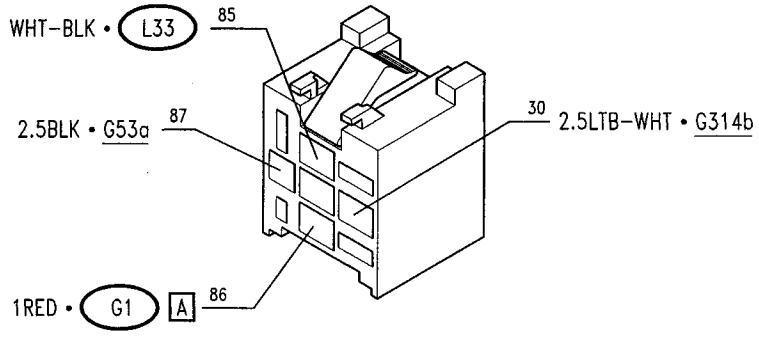
Engine cooling fan 1st speed relay — I99



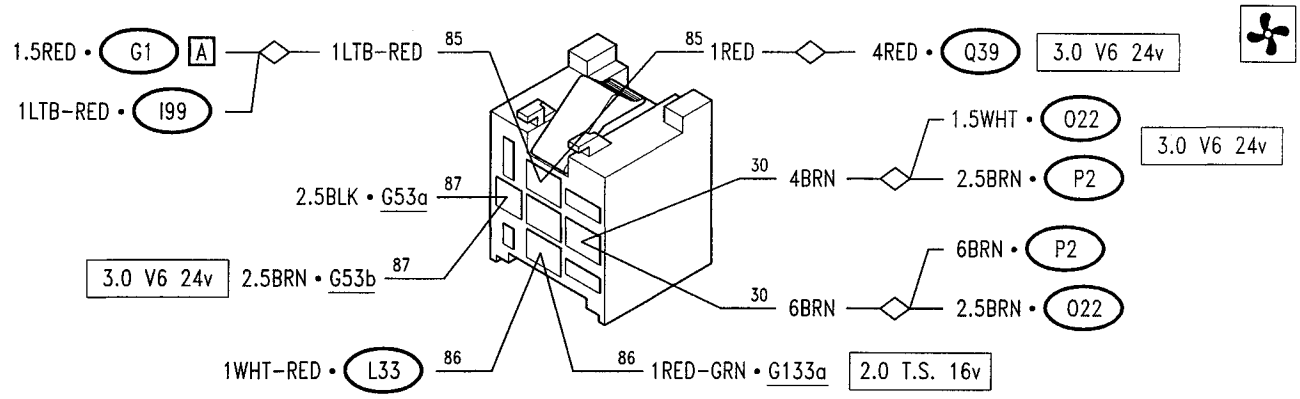
Engine cooling fan 1st speed relay — I99



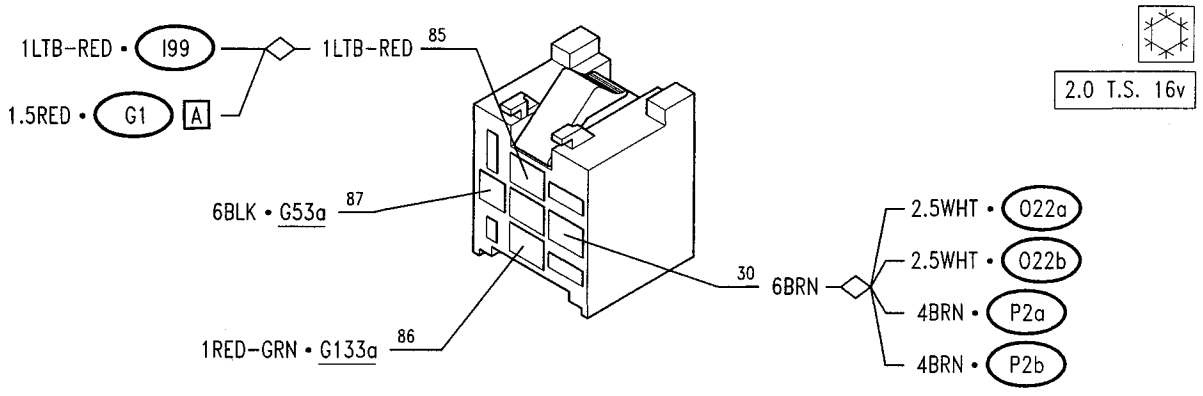
Engine cooling fan 1st speed relay — I99a



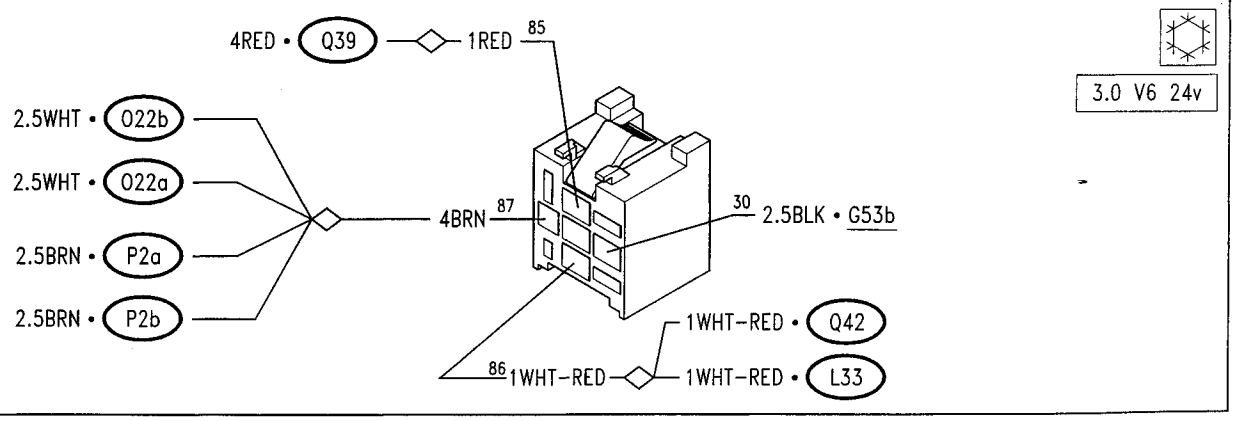
Engine cooling fan 2nd speed relay — I100



Engine cooling fan 2nd speed relay — I100

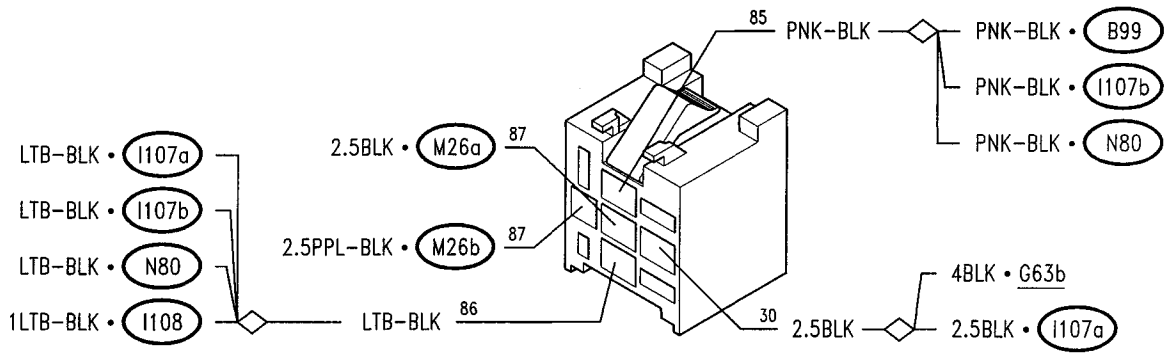


Engine cooling fan 2nd speed relay — I100

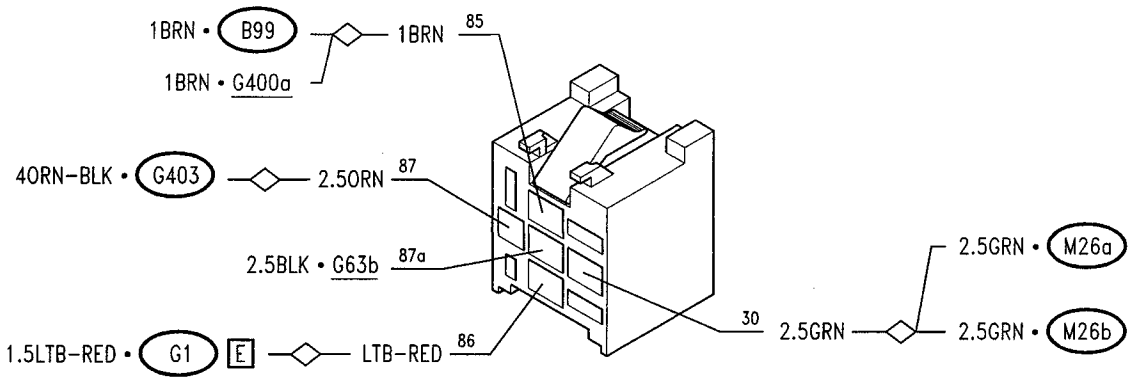


Hood release relay — I106

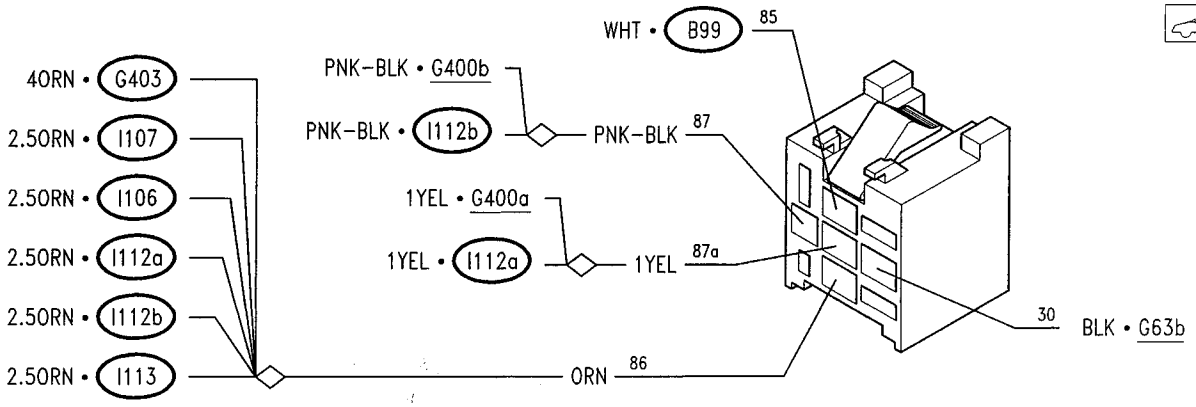
SPIDER



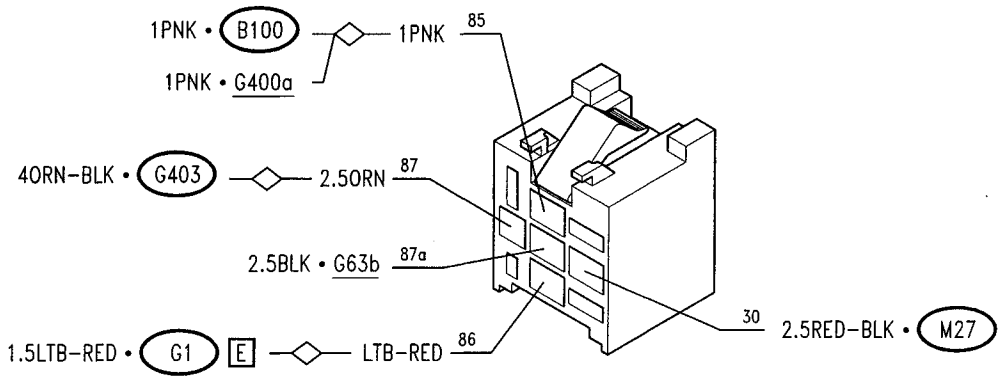
Hood emergency release relay — I106



Hood emergency release relay — I106b

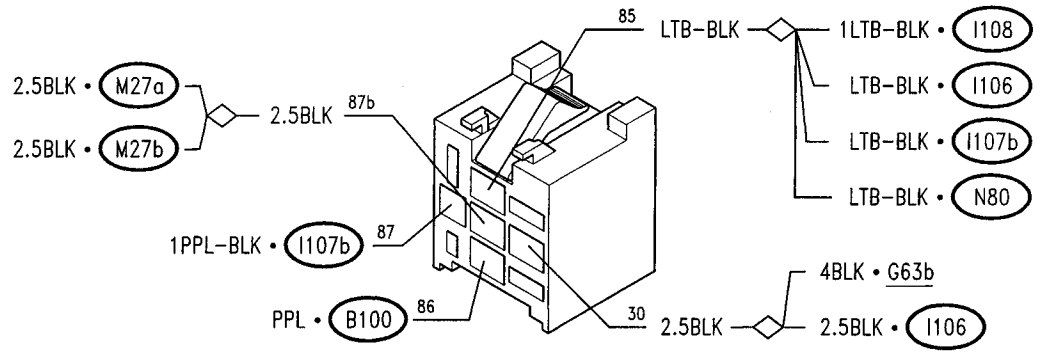


Hood cover release relay — I107



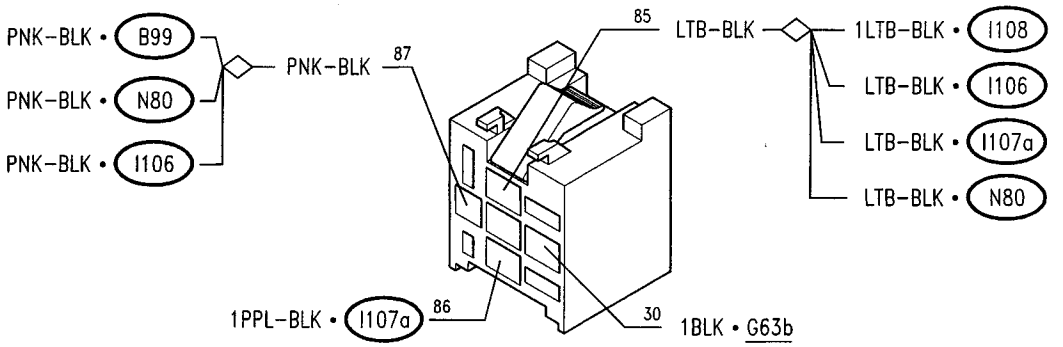
Hood cover release relay — I107a

SPIDER

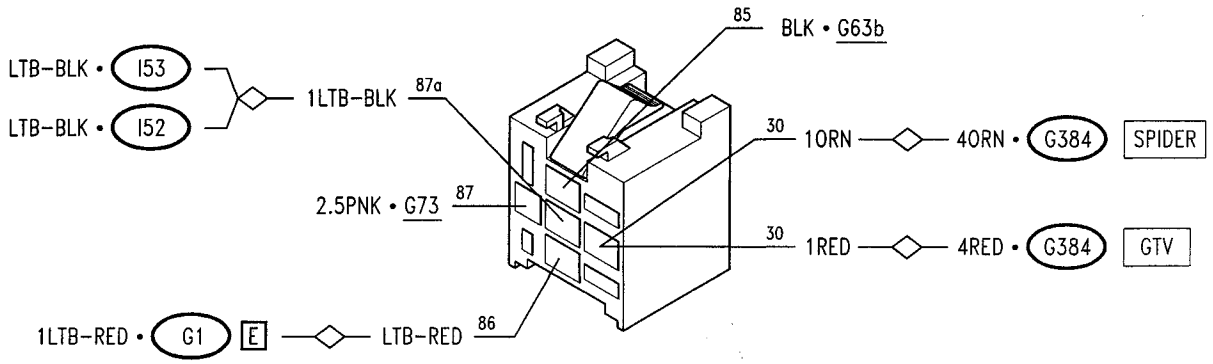


Hood cover release relay — I107b

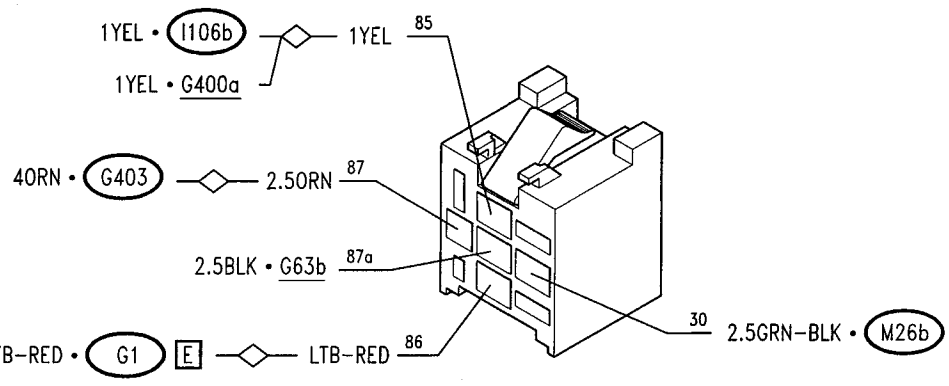
SPIDER



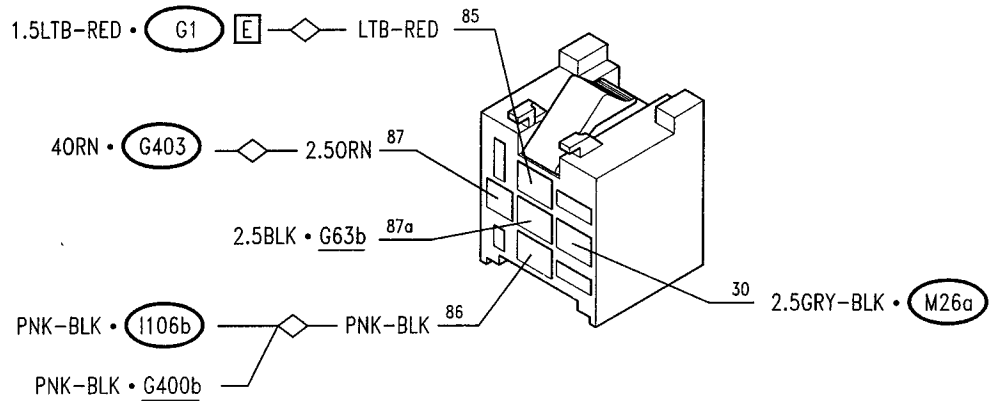
Key-operated supply cutoff relay — I108



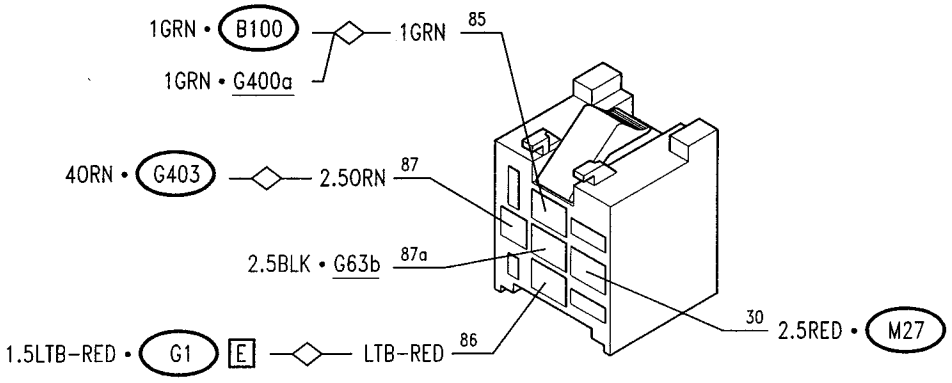
RH hood closing relay — I112a



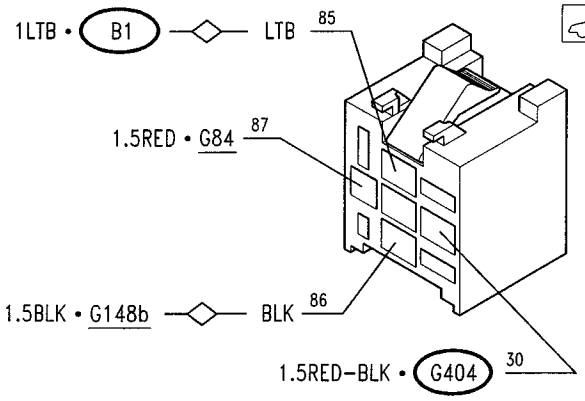
LH hood closing relay — I112b



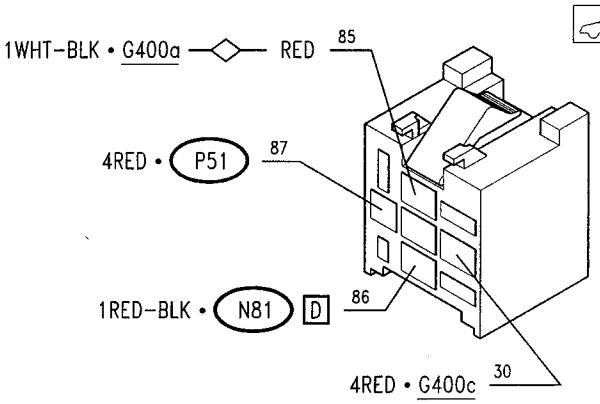
Hood cover closing relay — I113



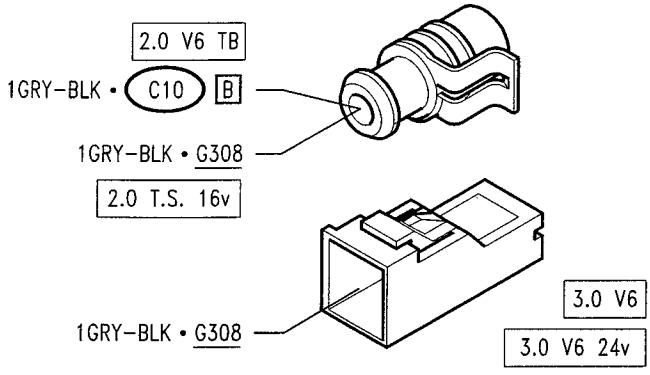
Automatic hood control relay — I116



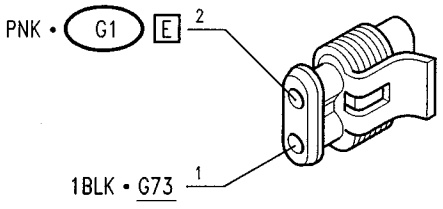
Automatic hood electric pump relay — I117



Minimum engine oil pressure — L2

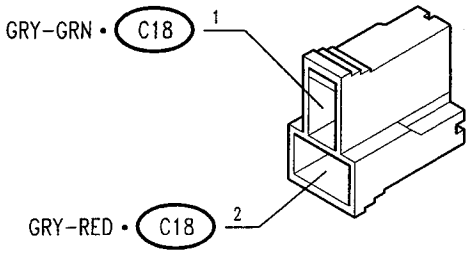


Sender for fuel level gauge — L9



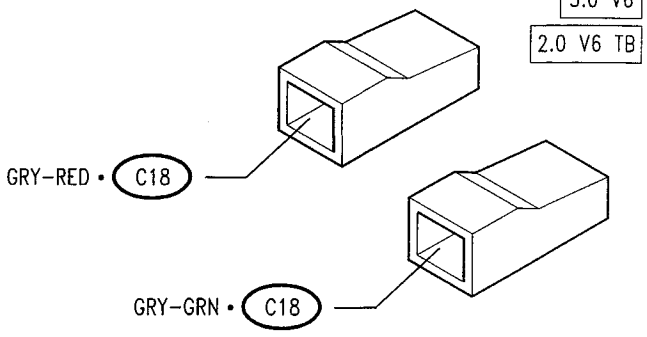
Sender for engine coolant temperature gauge and max. temperature warning light contact	L10

2.0 T.S. 16v



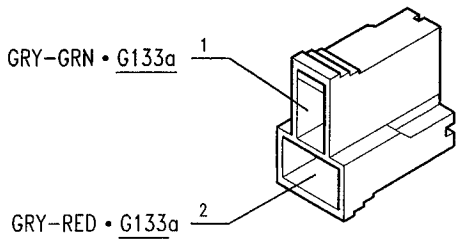
Sender for engine coolant temperature gauge and max. temperature warning light contact	L10

3.0 V6
2.0 V6 TB

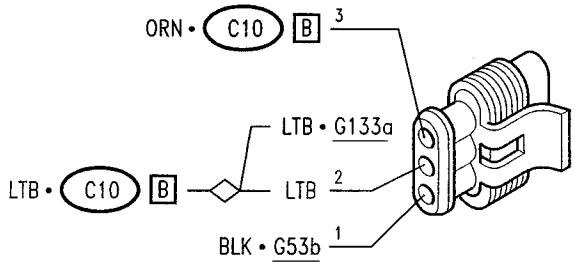


Sender for engine coolant temperature gauge and max. temperature warning light contact	L10

3.0 V6 24v

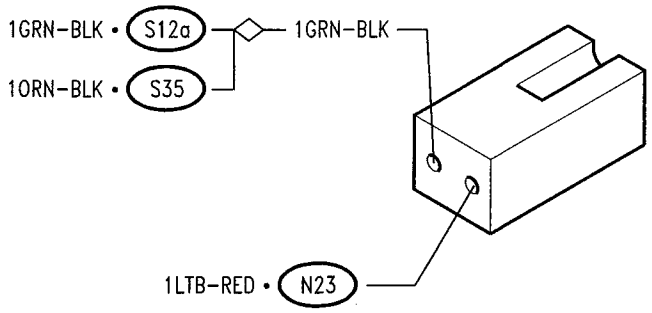


Speedometer sensor	L17

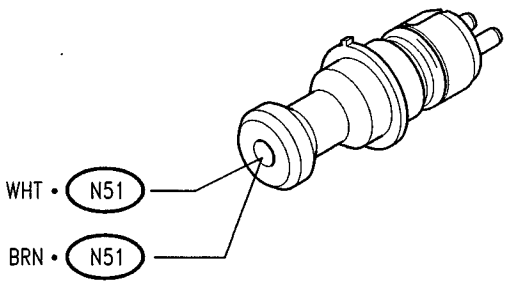


Pierbourg valve	L21

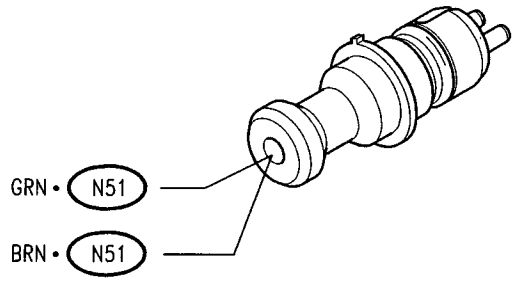
2.0 V6 TB



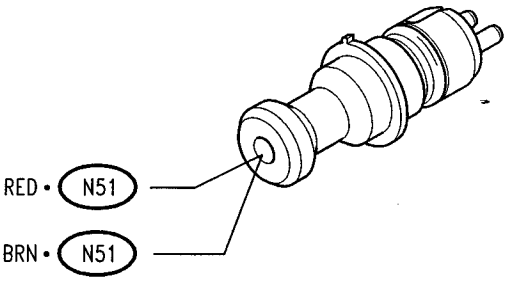
RH front phonic wheel inductive sensor	L28



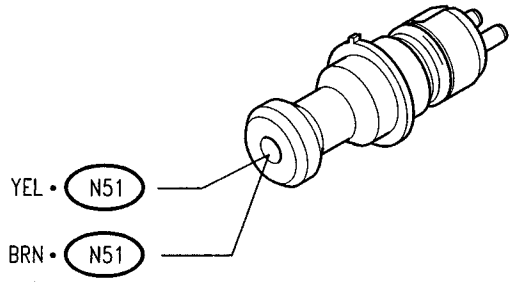
LH front phonic wheel inductive sensor	L29



RH rear phonic wheel inductive sensor	L30

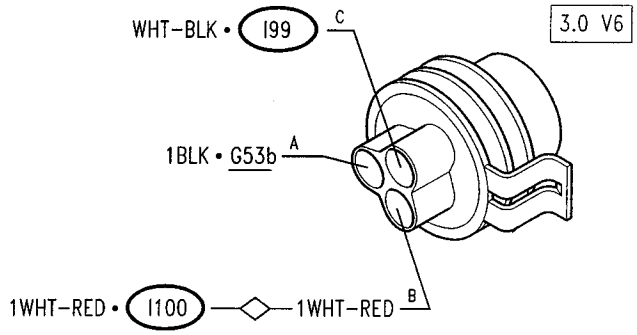


LH rear phonic wheel inductive sensor — L31



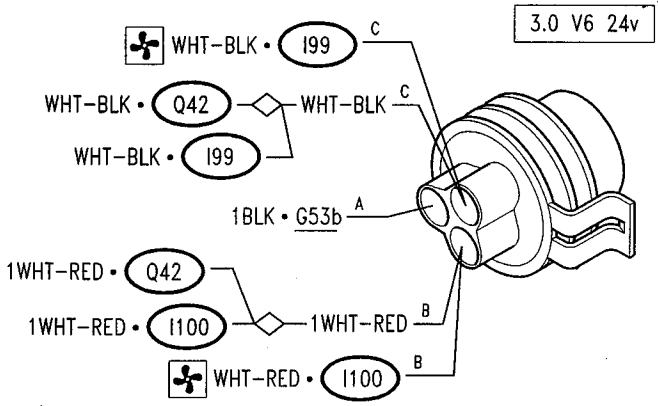
Two-level thermal contact — L33

2.0 V6 TB
3.0 V6



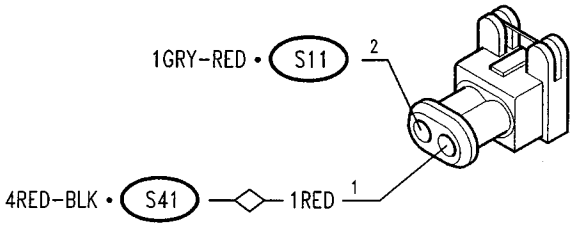
Two-level thermal contact — L33

3.0 V6 24v



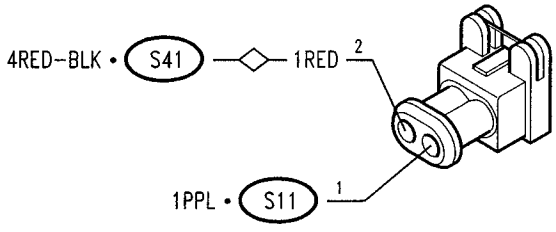
E.G.R. solenoid valve — L46

3.0 V6

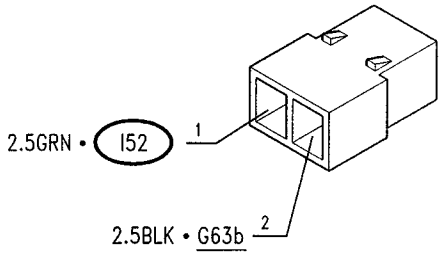


E.G.R. solenoid valve — L46

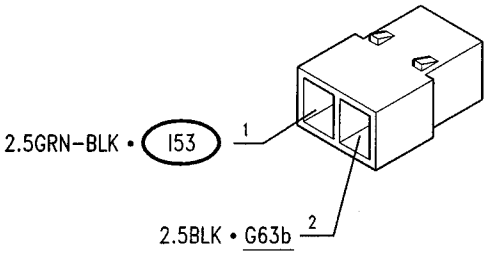
3.0 V6 24v



Luggage compartment opening actuator electromagnet — M12

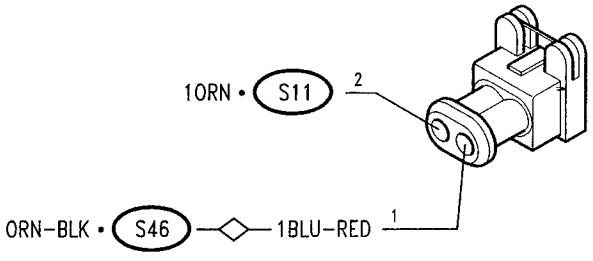


Fuel flap opening actuator electromagnet — M13



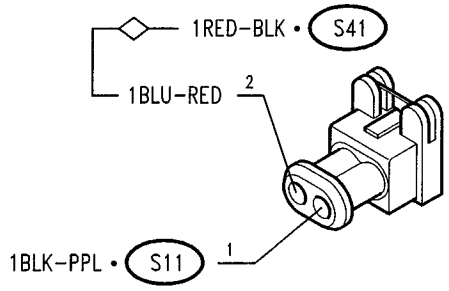
Evaporation solenoid valve — M15

2.0 T.S. 16v



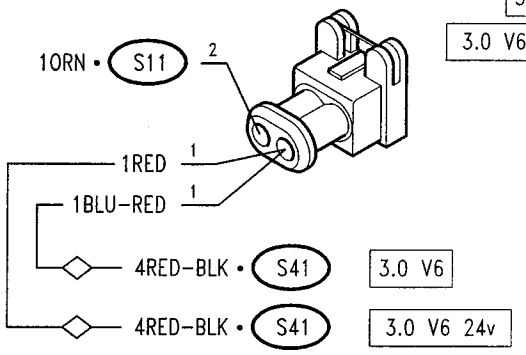
Evaporation solenoid valve — M15

2.0 V6 TB



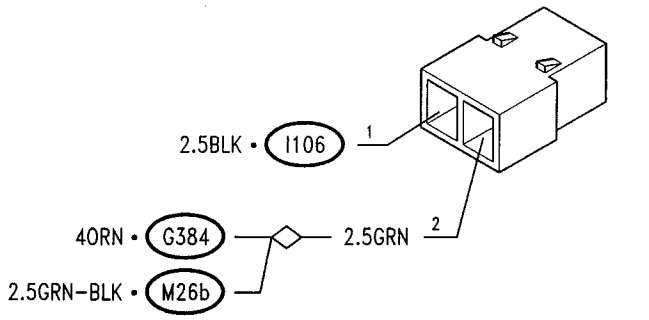
Evaporation solenoid valve — M15

3.0 V6
3.0 V6 24v

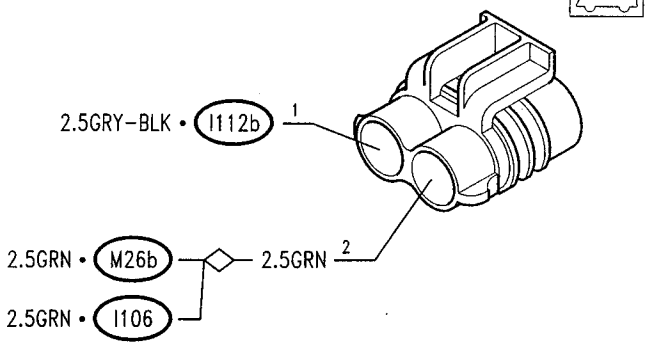


LH hood release actuator electromagnet — M26a

SPIDER

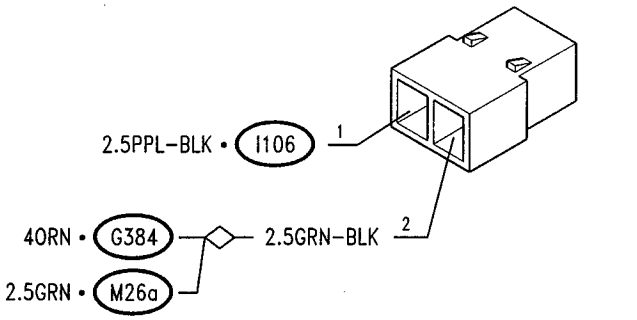


LH hood release actuator electromagnet — M26a

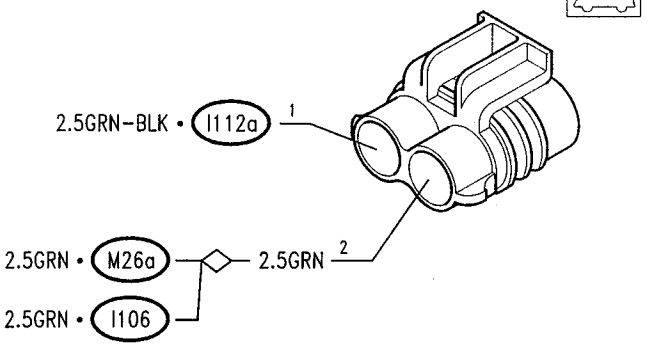


RH hood release actuator electromagnet — M26b

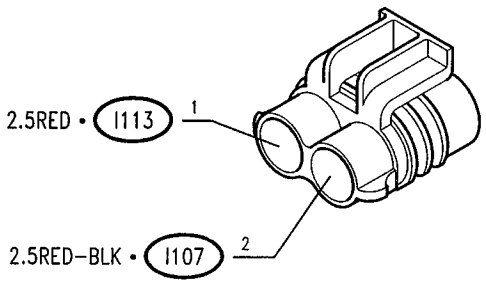
SPIDER



RH hood release actuator electromagnet — M26b

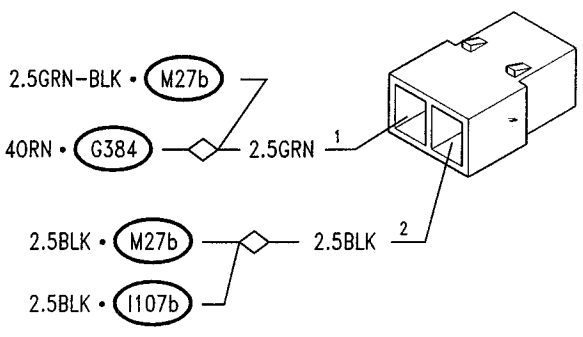


Hood cover release actuator electromagnet — M27



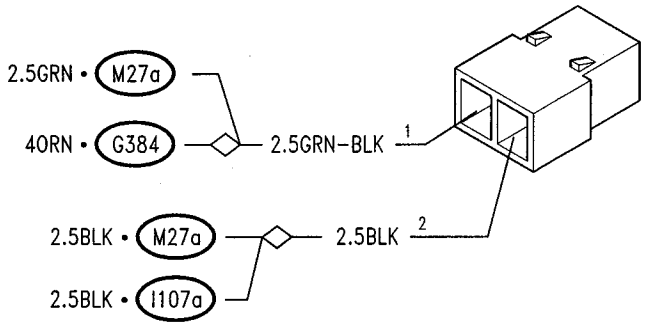
LH hood cover release actuator electromagnet — M27a

SPIDER

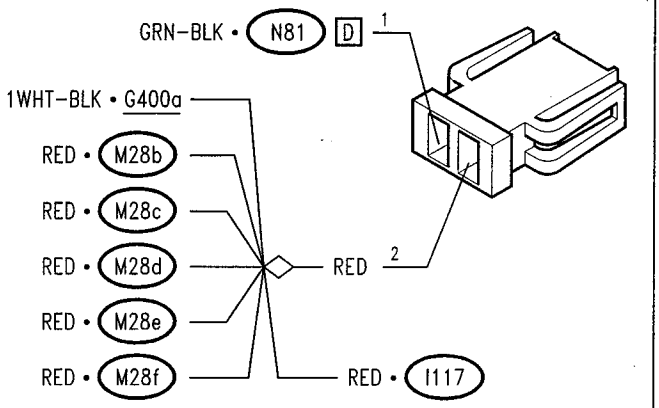


RH hood cover release actuator electromagnet — M27b

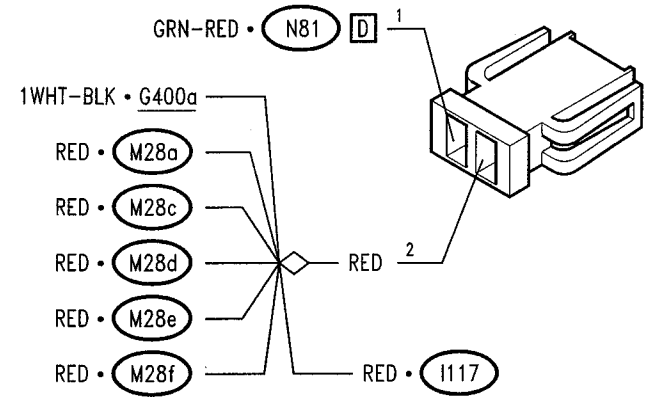
SPIDER



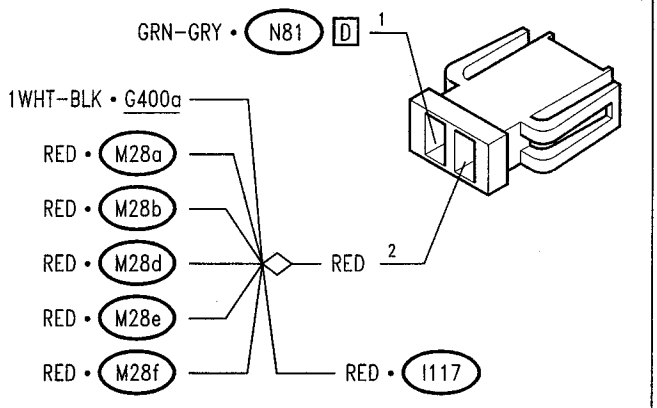
Automatic hood solenoid valve — M28 A



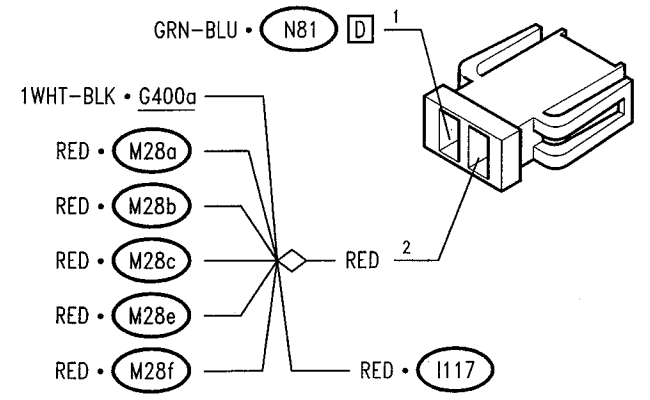
Automatic hood solenoid valve — M28 B



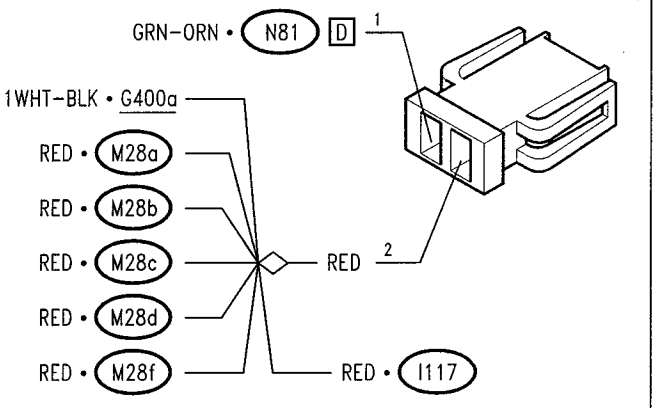
Automatic hood solenoid valve — M28 C



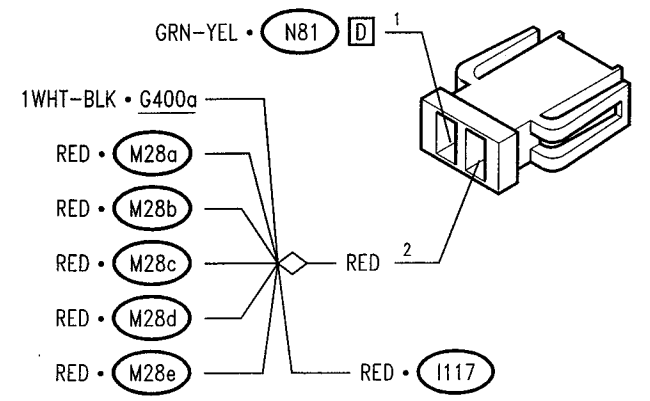
Automatic hood solenoid valve — M28 D



Automatic hood solenoid valve — M28 E

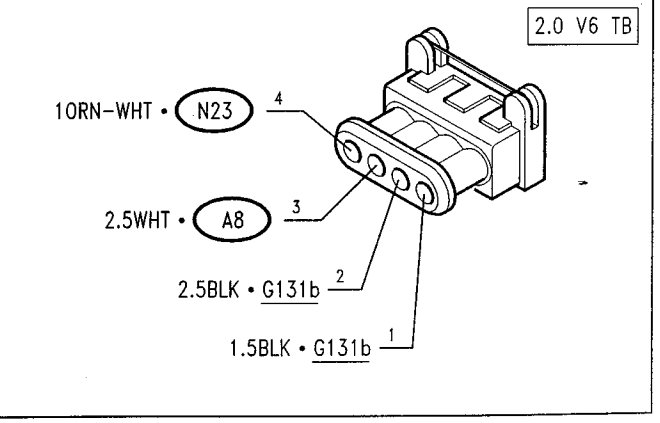


Automatic hood solenoid valve — M28 F

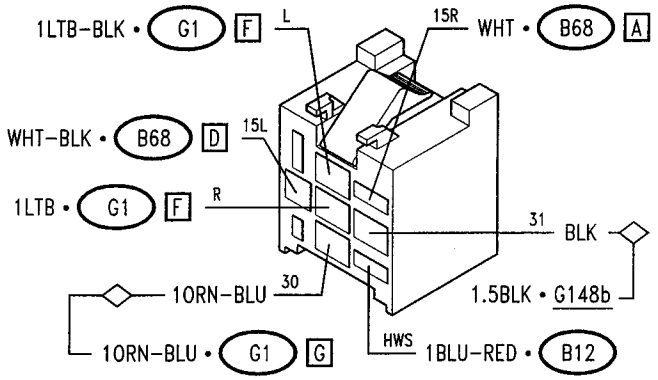


Power module — N1

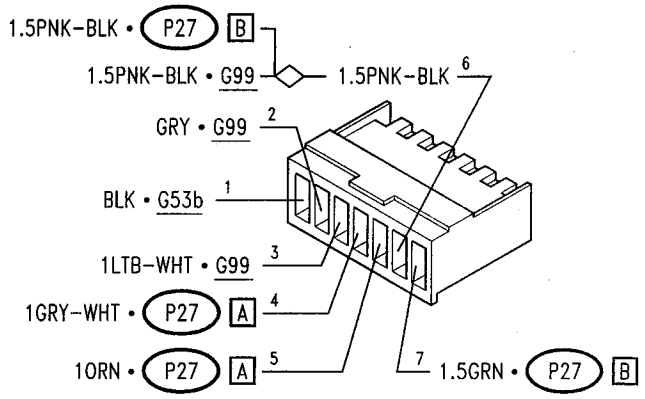
2.0 V6 TB



Hazard warning lights and direction indicators intermittence — N13

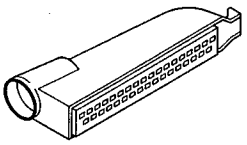


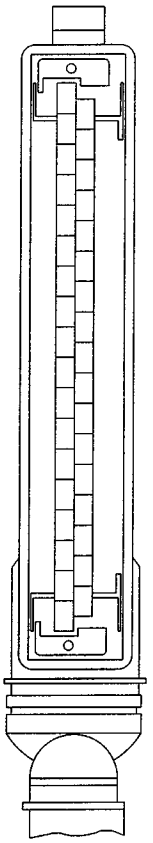
Electronic windscreen wiper intermittence — N14



Ignition control unit — N23

2.0 V6 TB

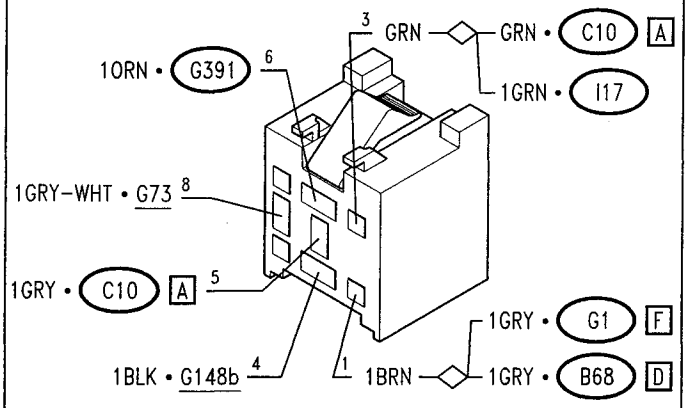




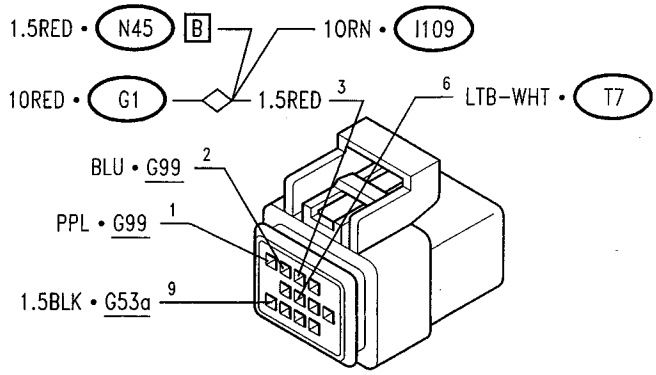
2 — 1BLK • S20a
20 — GRN • S20a
3 — 1BLK • S20b
21 — GRN • S20b
4 — 1BLK • S39
22 — YEL-BLU • S39
23 — BRN-GRN • S39
6 — 1WHT • S16
7 — 1WHT-RED • S11
8 — 1GRY-BLK — 1GRY-BLK • S12a; 1GRY-BLK • S11
10 — 1LTB • S38
11 — 1LTB-WHT — 1LTB-WHT • S11
12 — 1WHT-BLK — 1WHT-BLK • S11
13 — 1WHT • S11
15 — 1.5BLK • G131b
16 — 1YEL • S11
18 — 1BLK • G131a
19 — 1BRN • S7

24 — 1GRN — 1GRN • S11
25 — 1YEL-BLK — 1YEL-BLK • S11
26 — 2.5WHT • S11
27 — 1YEL-RED — 1YEL-RED • S38
28 — 1GRY-RED — 1GRY-RED • S38
29 — 1RED — 2.5RED • S41; 1.5RED • S11; 1ORN • S29
31 — 1PNK-BLK • G131a
32 — 1LTB-RED • L21
34 — 1ORN-WHT • N1
35 — 1RED — 4RED • S36; 4RED • S41; 2.5RED • S42; 1RED • S11; 1RED • G133b

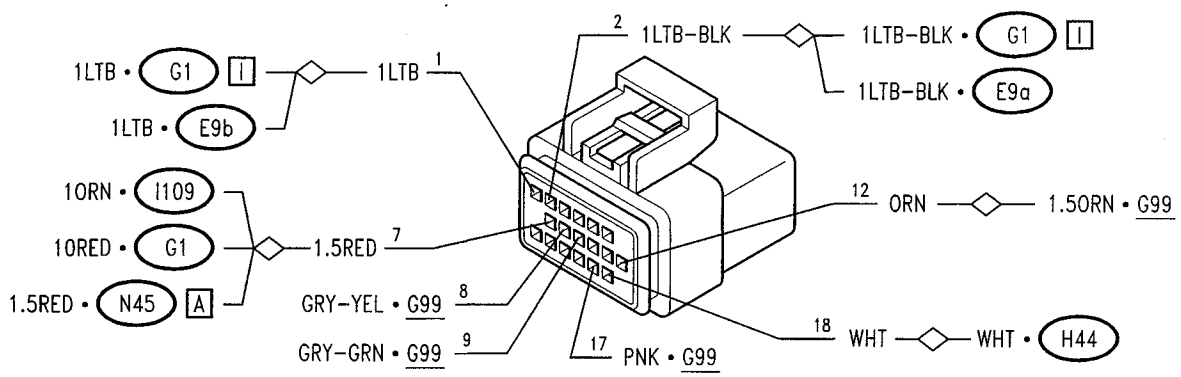
Rear fog guard electronic device — N25



Rear fog guard electronic device — N45 A

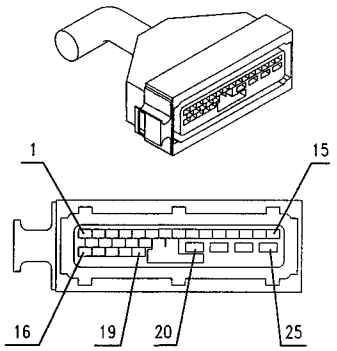


Rear fog guard electronic device — N45 B

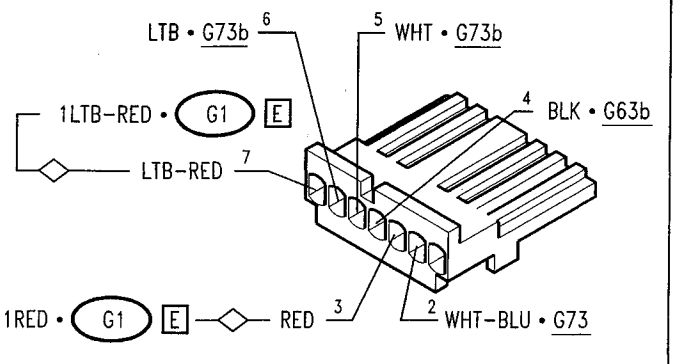


Hydraulic unit with ABS control unit — N51

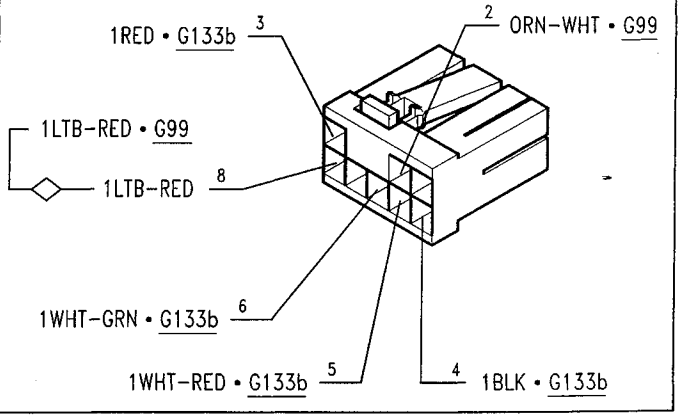
1 RED • L30	9 BRN • L31	17 4RED — 4RED • G125b
2 BRN • L30	11 1WHT-RED • T8	18 4RED
3 WHT • L28	12 1LTB-WHT • T8	19 2.5BLK • G55b
4 BRN • L28	14 1RED-BLK • G124	20 1LTB-WHT • G124
6 GRN • L29	15 1.5PNK-BLK • G124	21 1LTB-YEL • G124
7 BRN • L29	16 4BLK • G63b	22 1LTB • G124
8 YEL • L31		



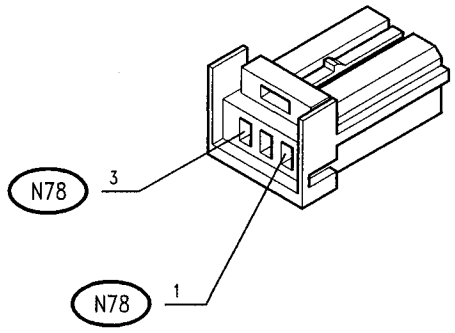
Remote control signal receiver — N67



ALFA ROMEO CODE control unit — N77 A

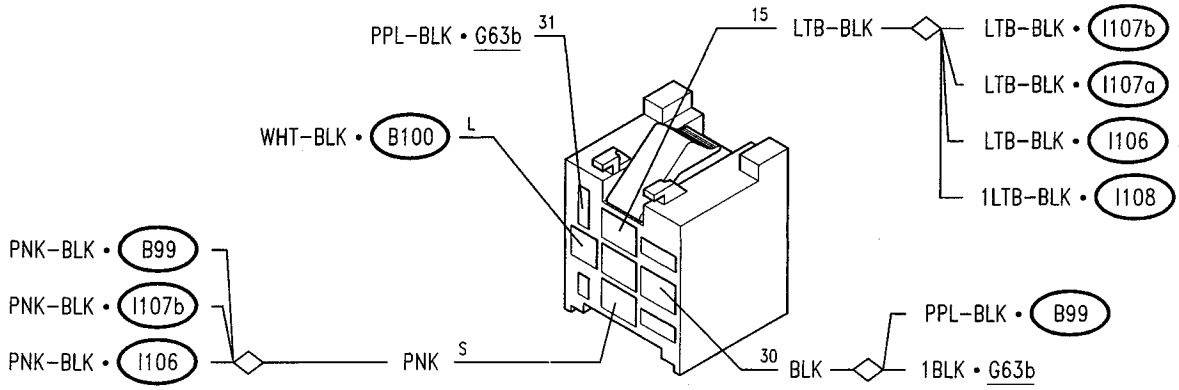


ALFA ROMEO CODE control unit — N77 B

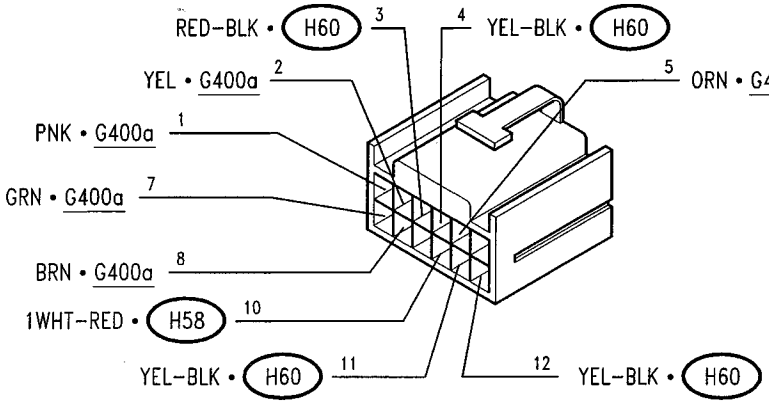


Hood cover release timer — N80

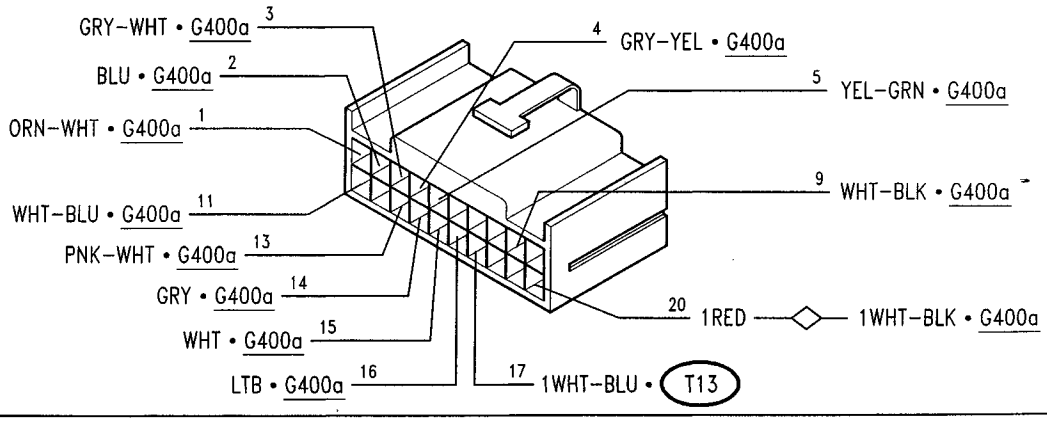
SPIDER



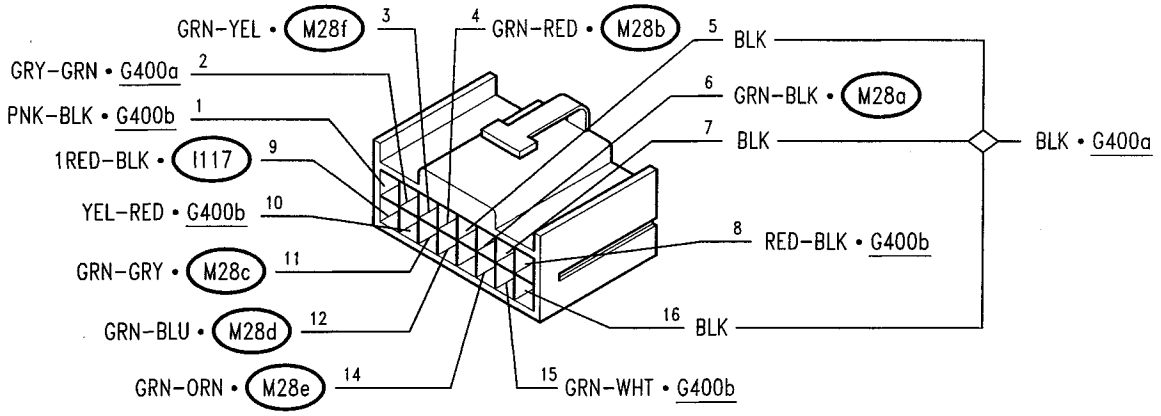
Automatic-operated hood control unit — N81 A



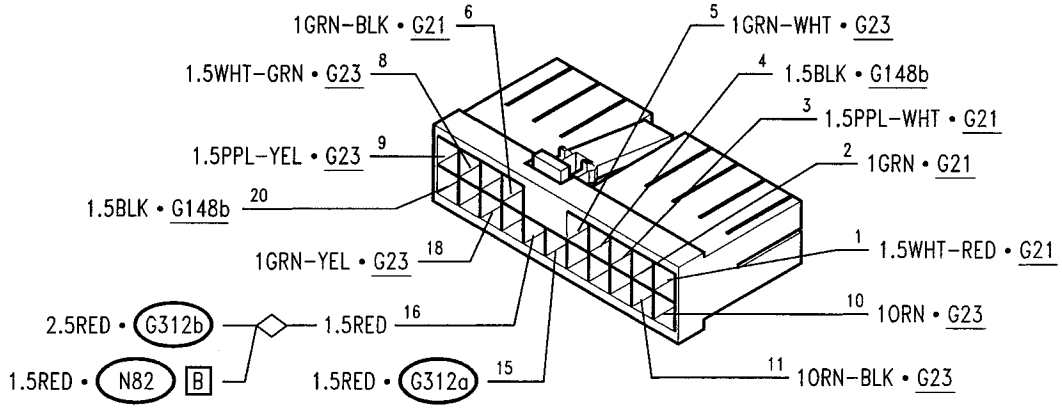
Automatic-operated hood control unit — N81 B



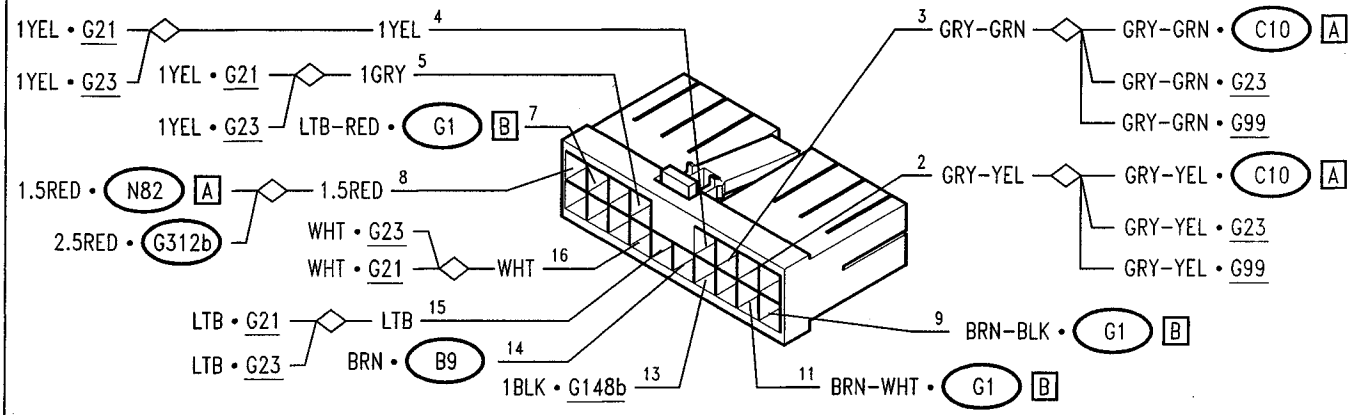
Automatic-operated hood control unit — N81 D



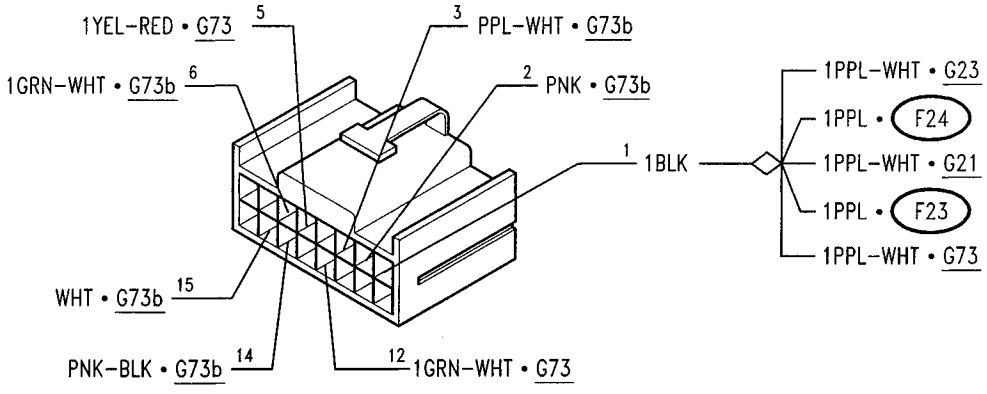
Integrated services control unit — N82 A



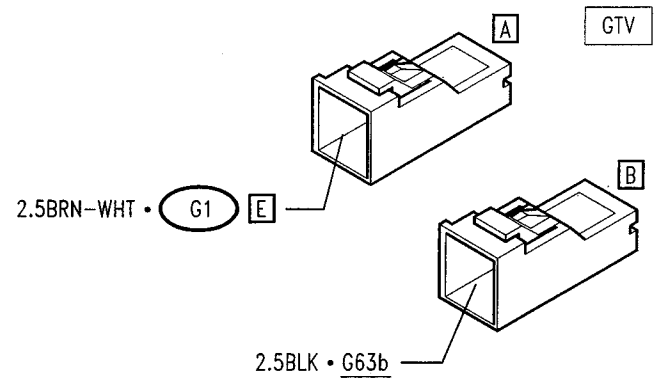
Integrated services control unit — N82 B



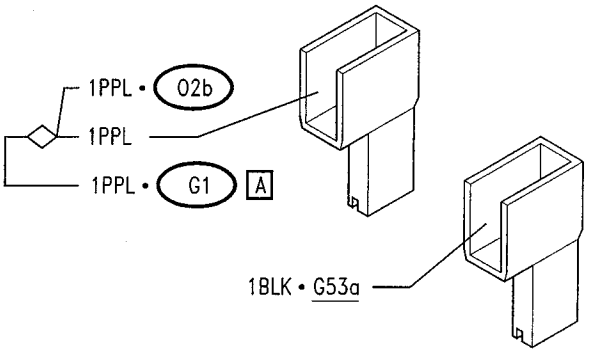
Integrated services control unit — N82 C



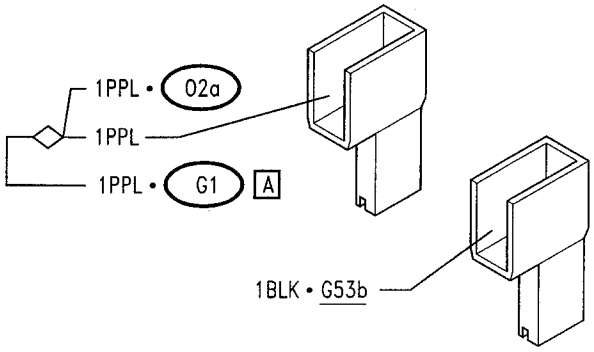
Heated rearscreen — O1



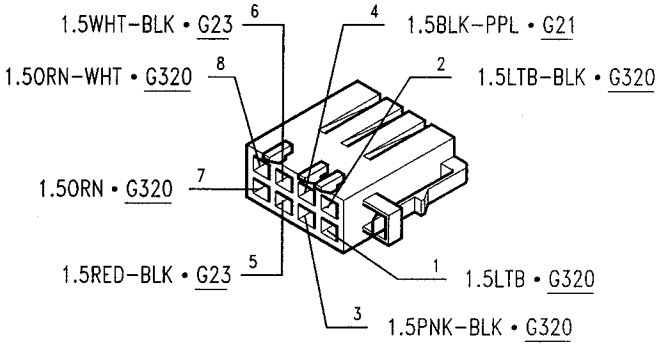
High tone horn — O2a



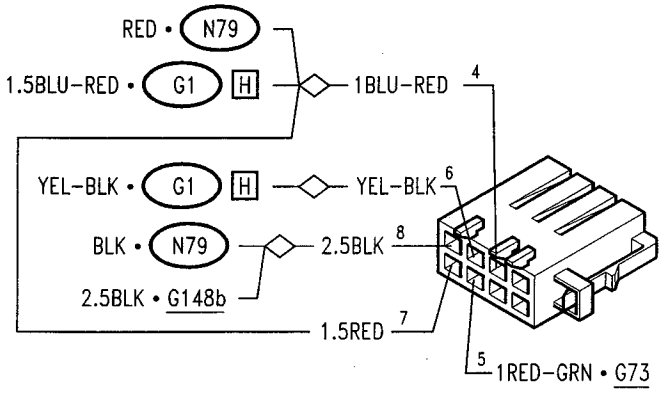
Low tone horn — O2b



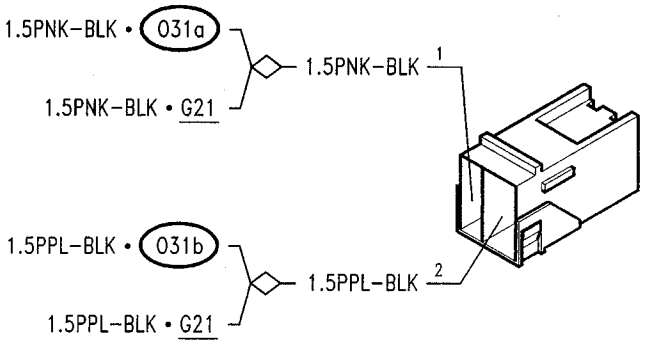
Car radio — O4 A



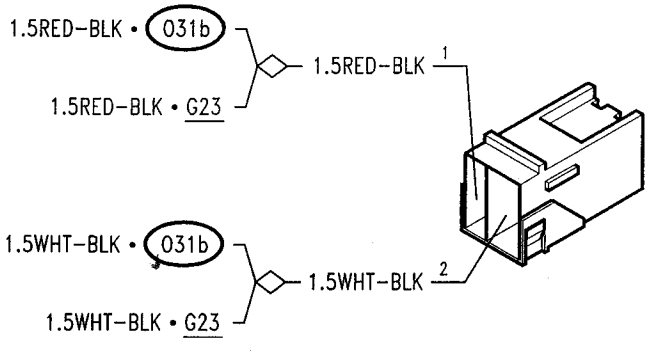
Car radio — O4 B



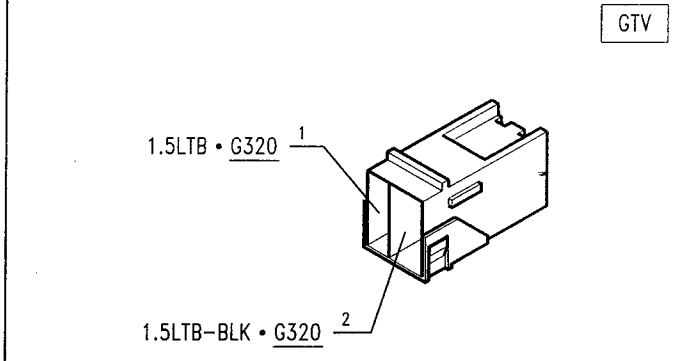
RH front loud-speaker — O5a



LH front loud-speaker — O5b

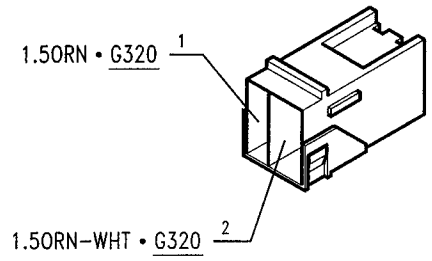


RH rear loud-speaker — O5c

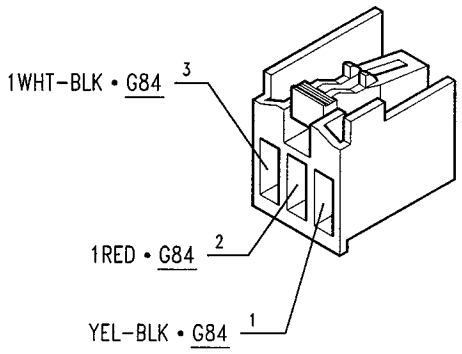


LH rear loud-speaker — O5d

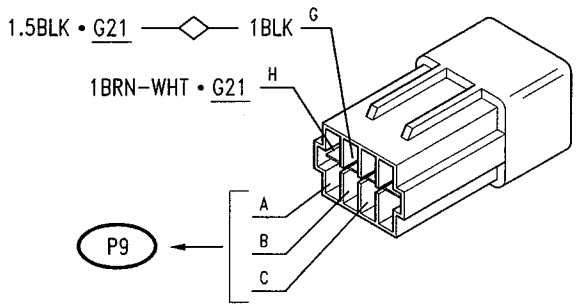
GTV



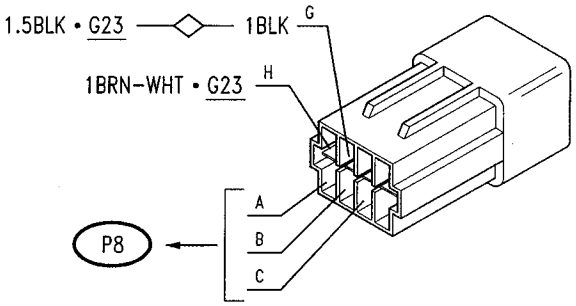
Cigar lighter - current socket — O6



RH wing mirror defroster — O18

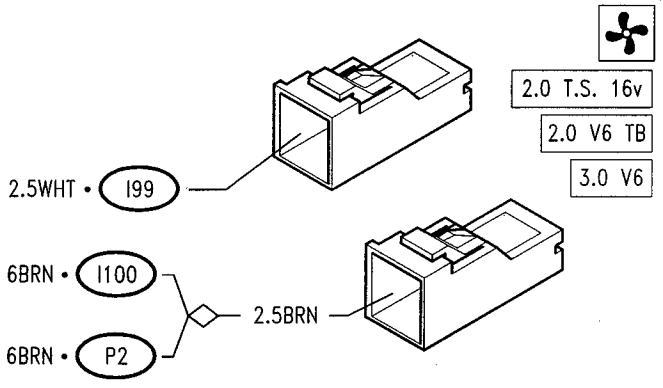


LH wing mirror defroster — O19



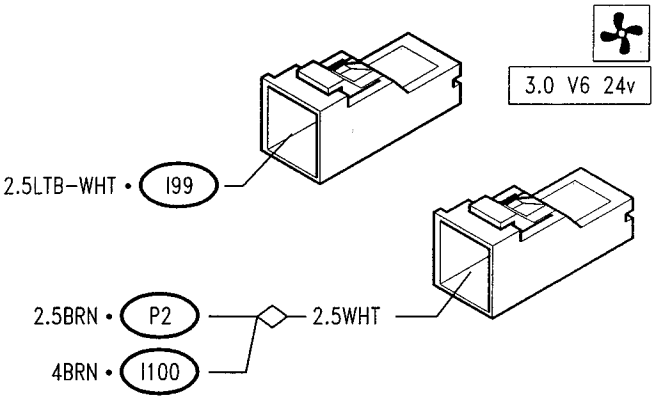
Additional engine fan resistance — O22

2.0 T.S. 16v
2.0 V6 TB
3.0 V6



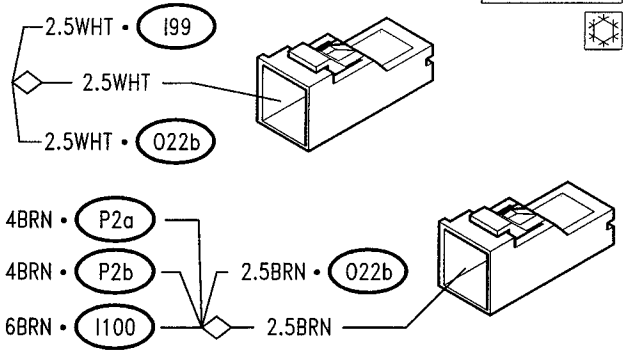
Additional engine fan resistance — O22

3.0 V6 24v



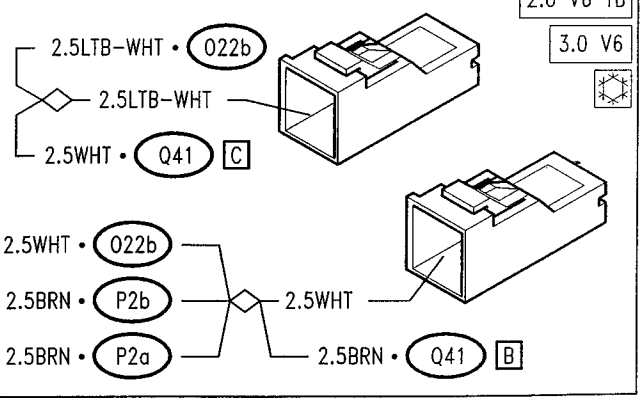
Additional engine fan resistance — O22a

2.0 T.S. 16v

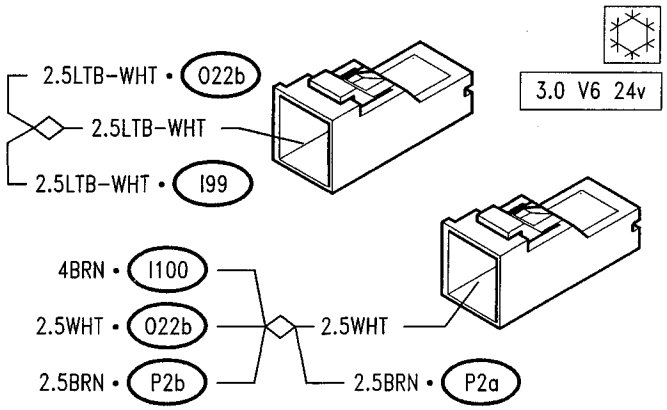


Additional engine fan resistance — O22a

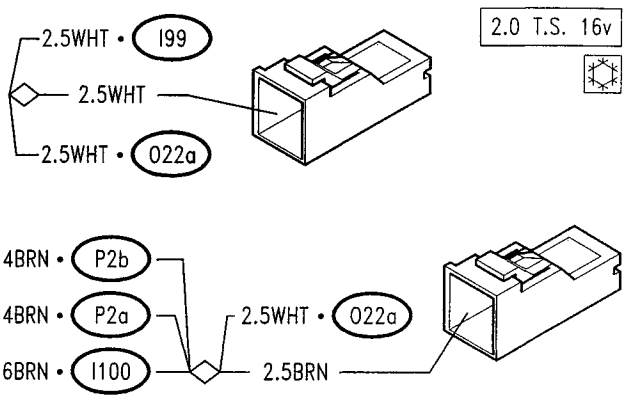
2.0 V6 TB
3.0 V6



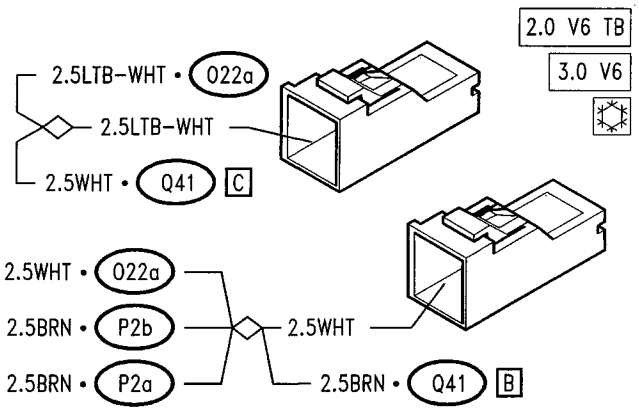
Additional engine fan resistance — O22a



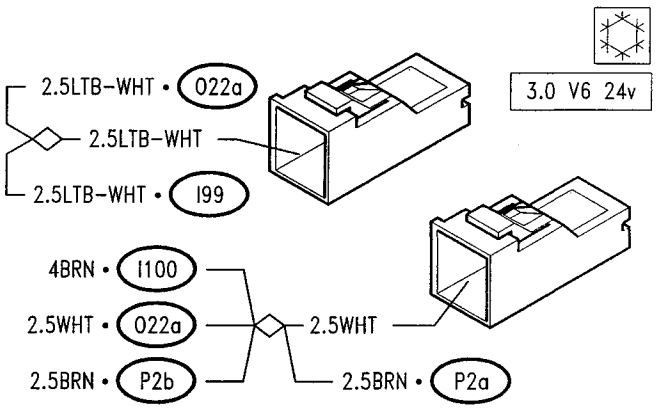
Additional engine fan resistance — O22b



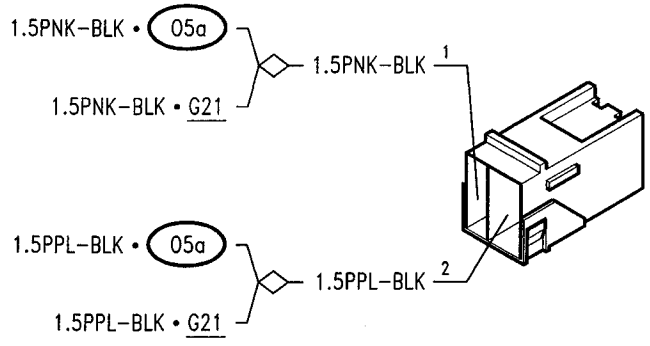
Additional engine fan resistance — O22b



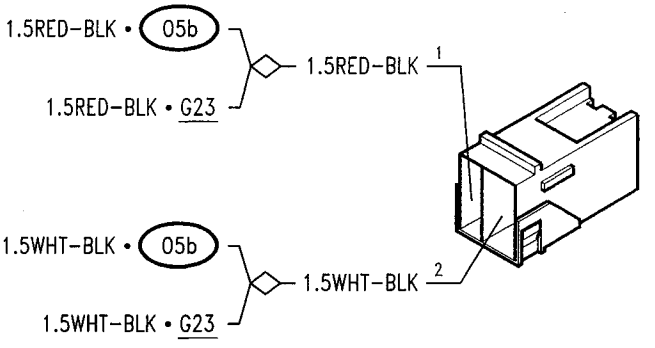
Additional engine fan resistance — O22b



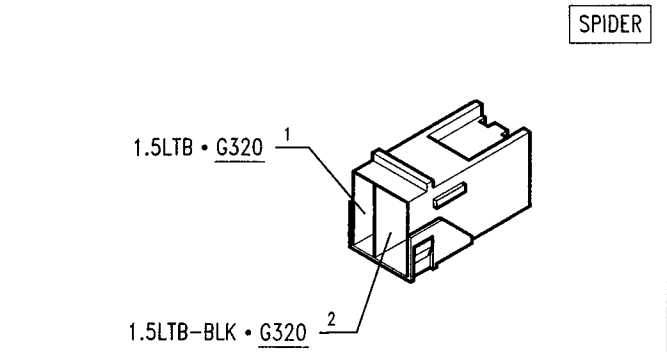
RH Tweeter loud-speaker — O31a



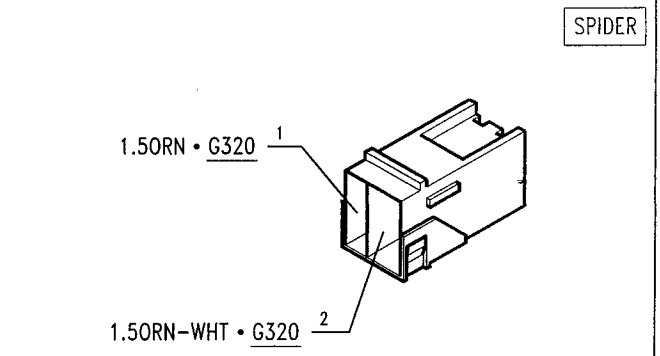
LH Tweeter loud-speaker — O31b



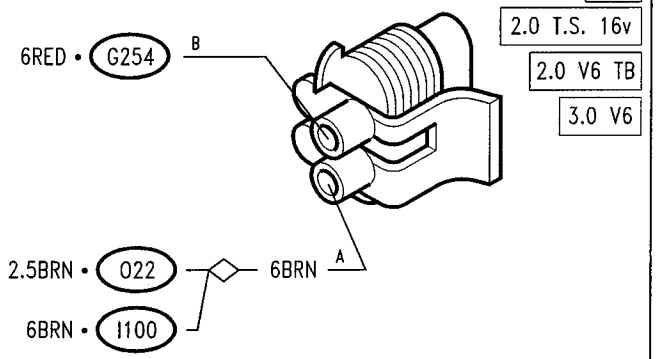
Rear subwoofer speaker — O37a



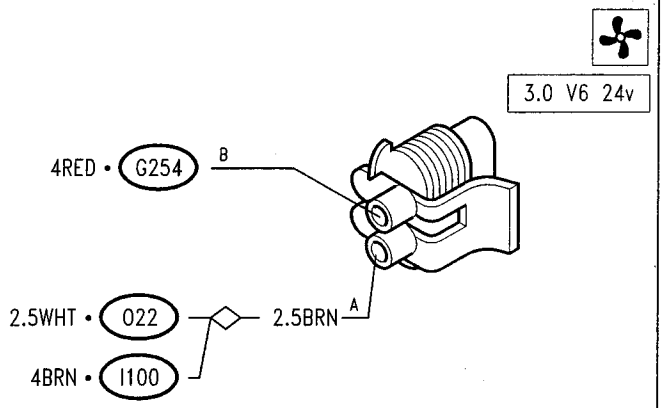
Rear subwoofer speaker — O37b



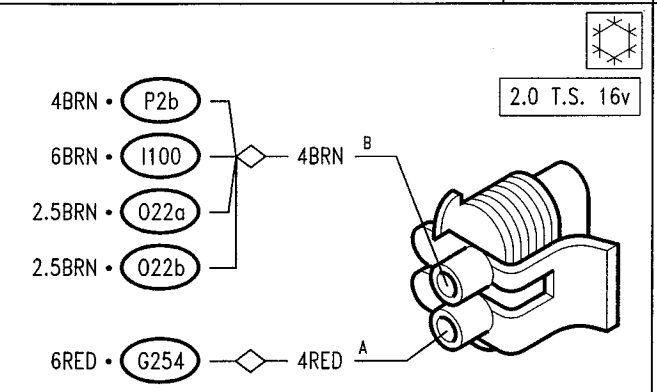
Engine cooling fan — P2



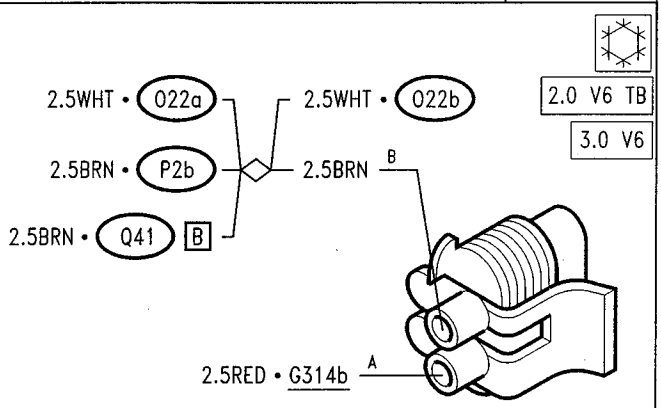
Engine cooling fan — P2



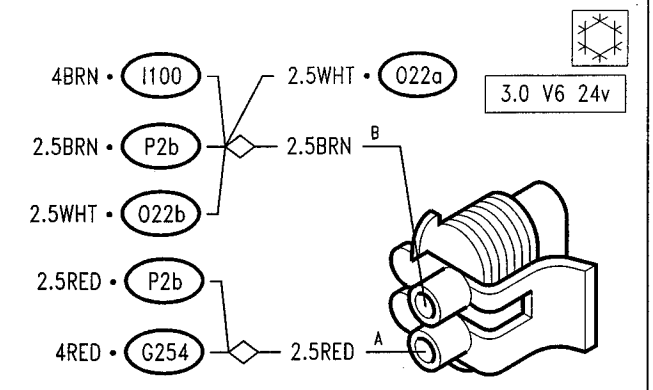
Engine cooling fan — P2a



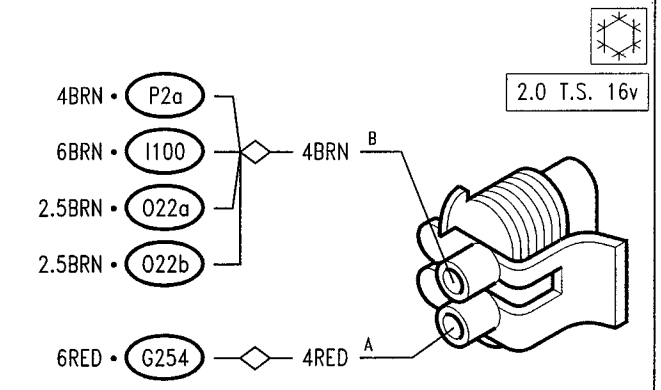
Engine cooling fan — P2a



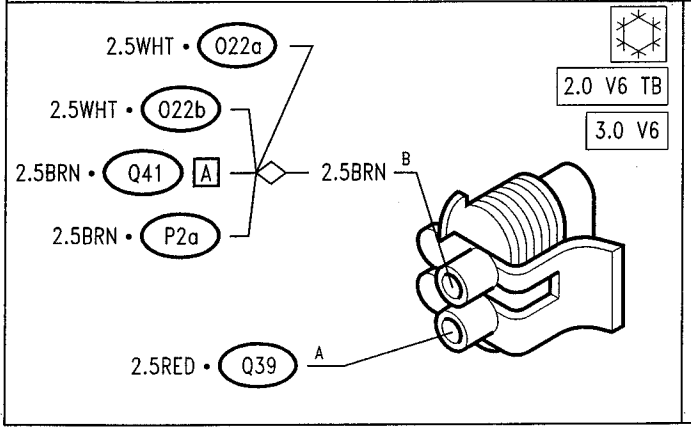
Engine cooling fan — P2a



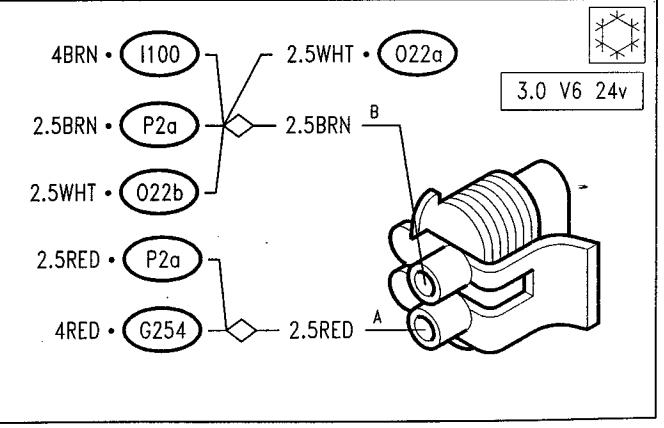
Engine cooling fan — P2b



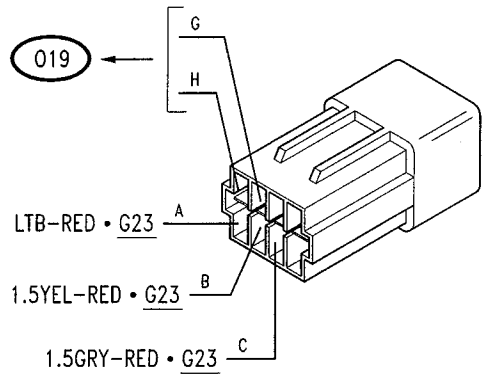
Engine cooling fan — P2b



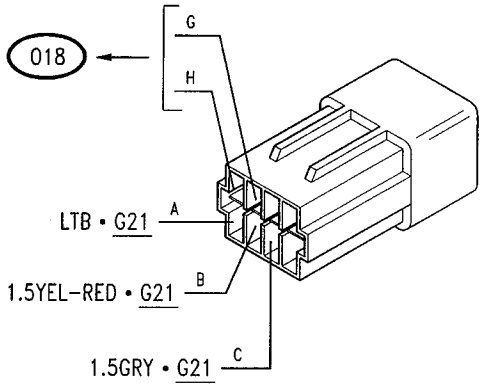
Engine cooling fan — P2b



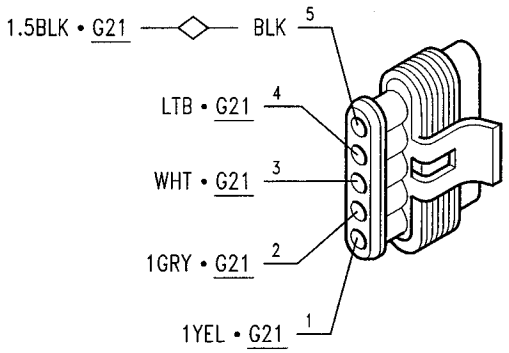
LH wing mirror motor — P8



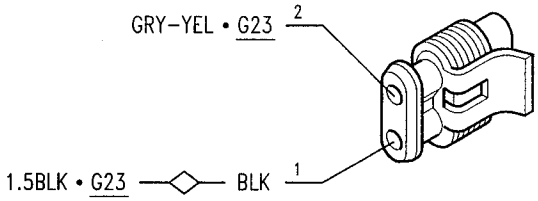
RH wing mirror motor — P9



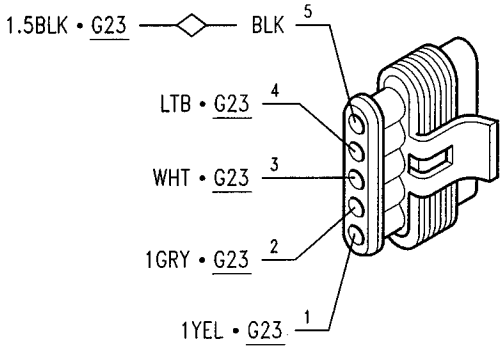
Front RH door lock motor — P10 A



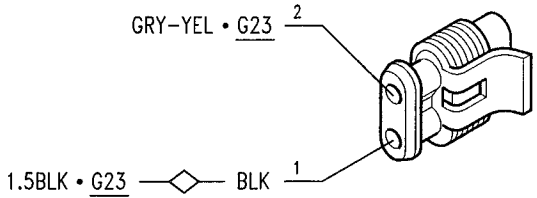
Front RH door lock motor — P10 B



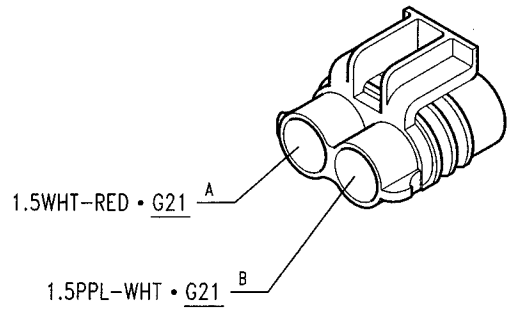
Front LH door lock motor — P11 A



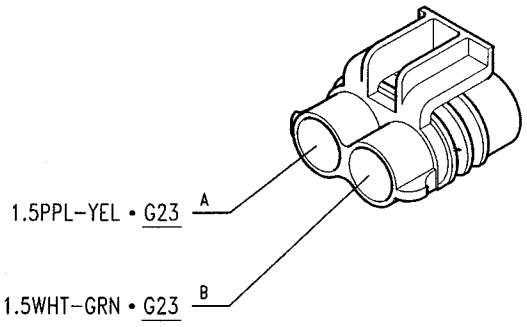
Front LH door lock motor — P11 B



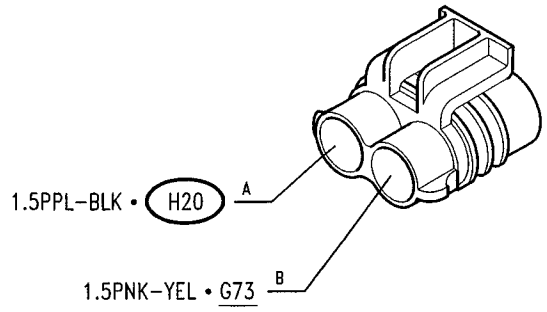
Front RH power window motor — P14



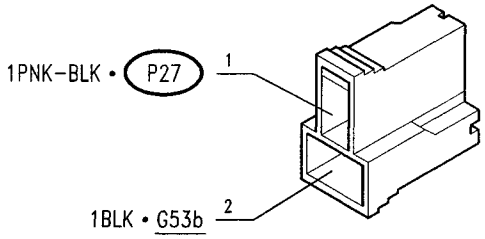
Front LH power window motor — P15



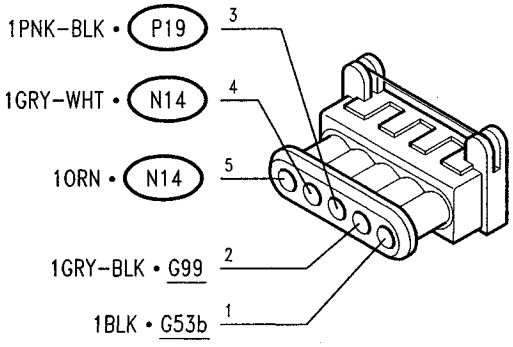
Electric fuel pump (P18)



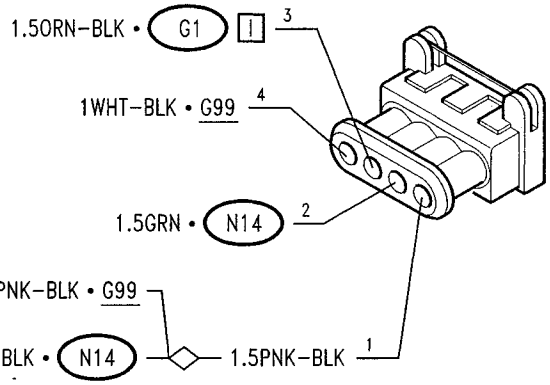
Windscreen and rearscreen washer pump (P19)



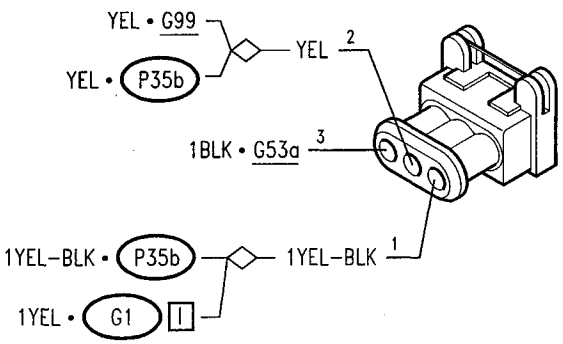
Windscreen wiper motor with control unit (P27) A



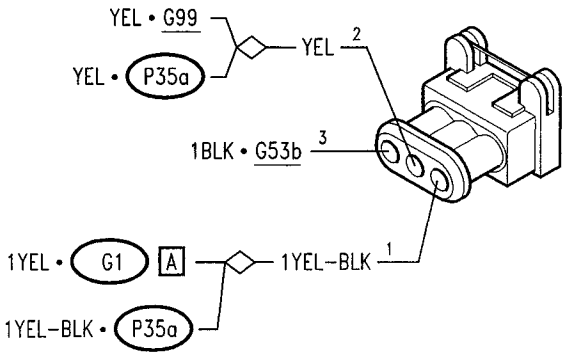
Windscreen wiper motor with control unit (P27) B



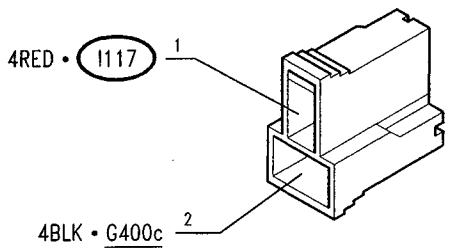
RH headlamp aiming motor (P35a)



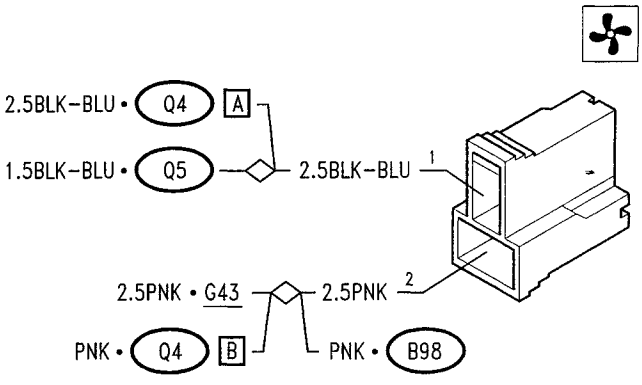
LH headlamp aiming motor (P35b)



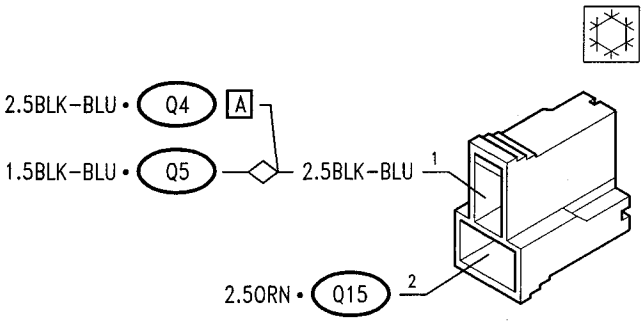
Automatic hood control pump (P51)



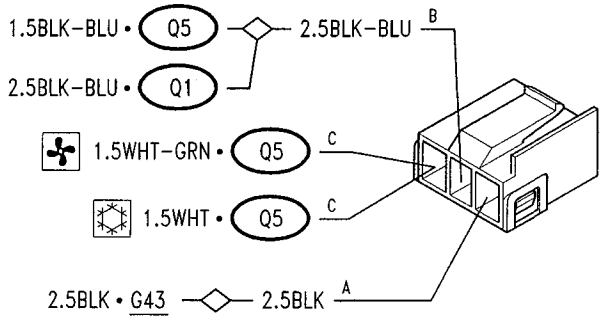
Heater fan (Q1)



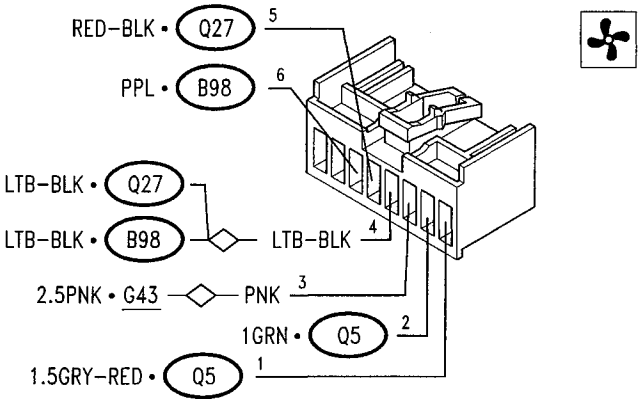
Heater fan — Q1



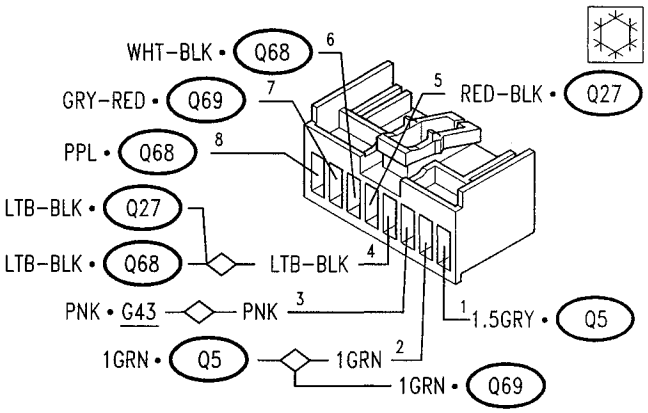
Heater fan control — Q4 A



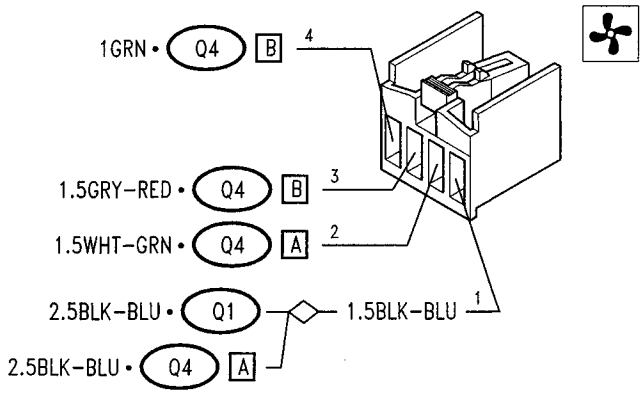
Heater fan control — Q4 B



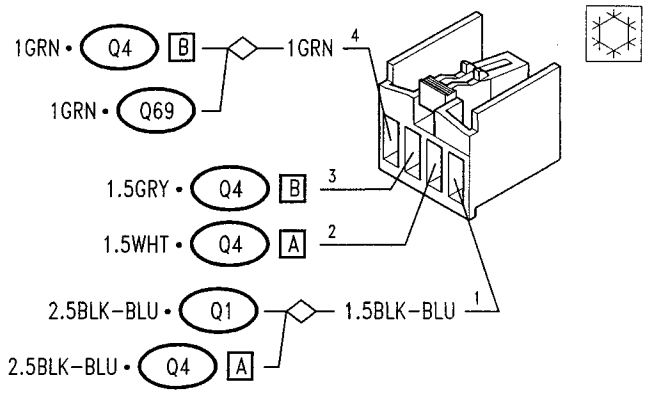
Heater fan control — Q4 B



Heater fan speed adjustment resistance — Q5

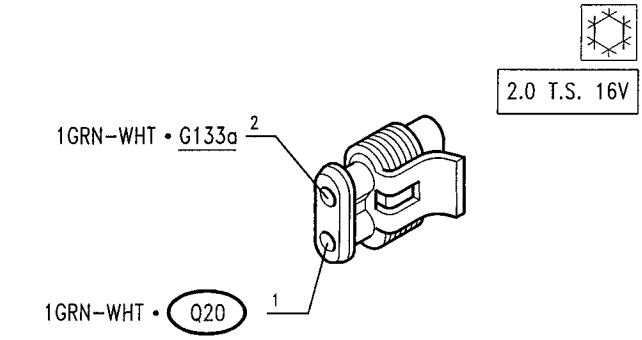


Heater fan speed adjustment resistance — Q5

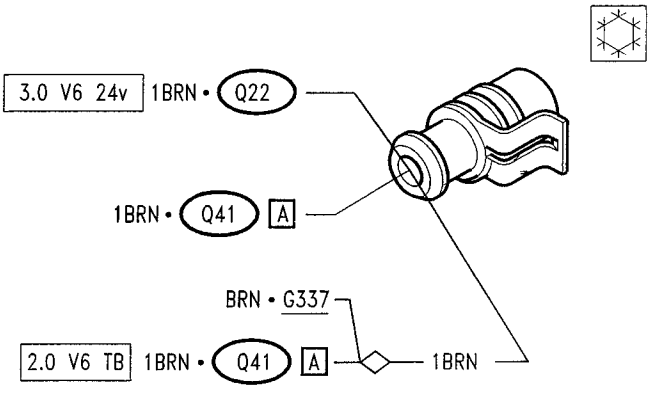


Minimum pressure switch — Q9

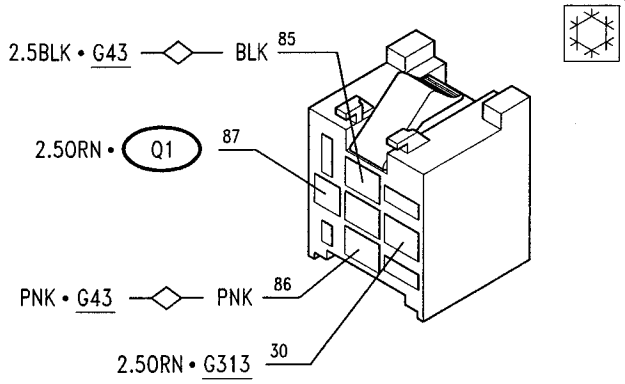
2.0 T.S. 16V



Compressor electromagnetic coupling — Q11

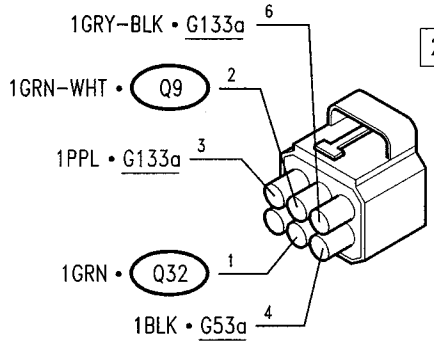


Heating and ventilation fan relay — Q15



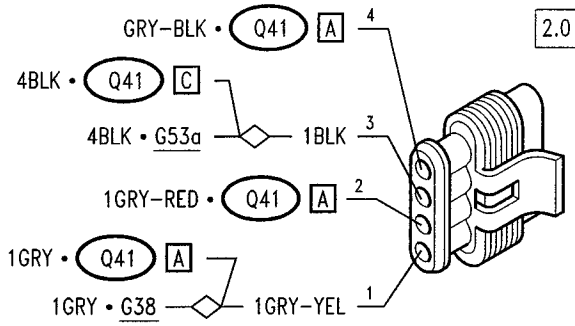
Min. and max. pressure switch — Q20

2.0 T.S. 16v



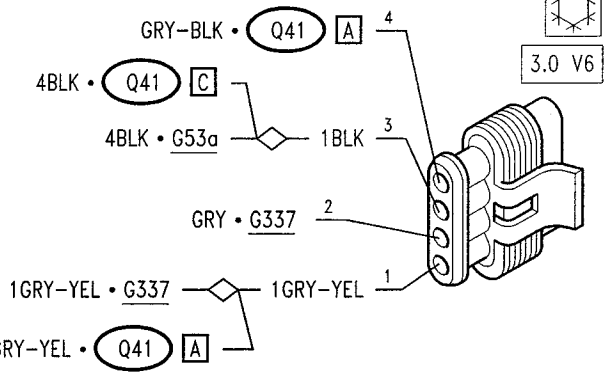
Min. and max. pressure switch — Q20

2.0 V6 TB



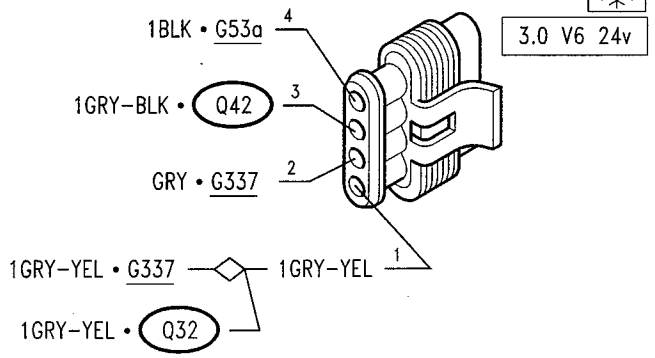
Min. and max. pressure switch — Q20

3.0 V6



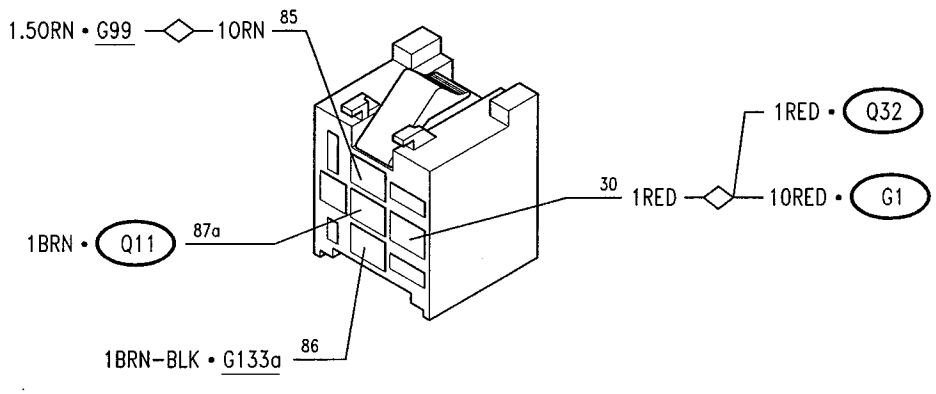
Min. and max. pressure switch — Q20

3.0 V6 24v

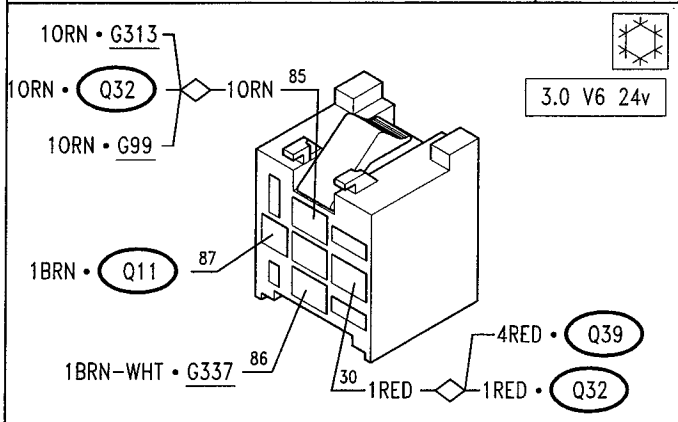


Electromagnetic coupling relay — Q22

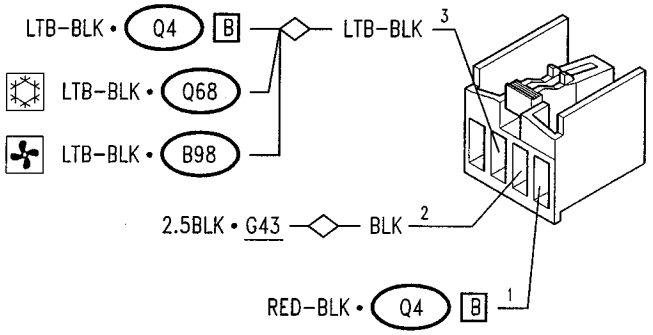
2.0 T.S. 16v



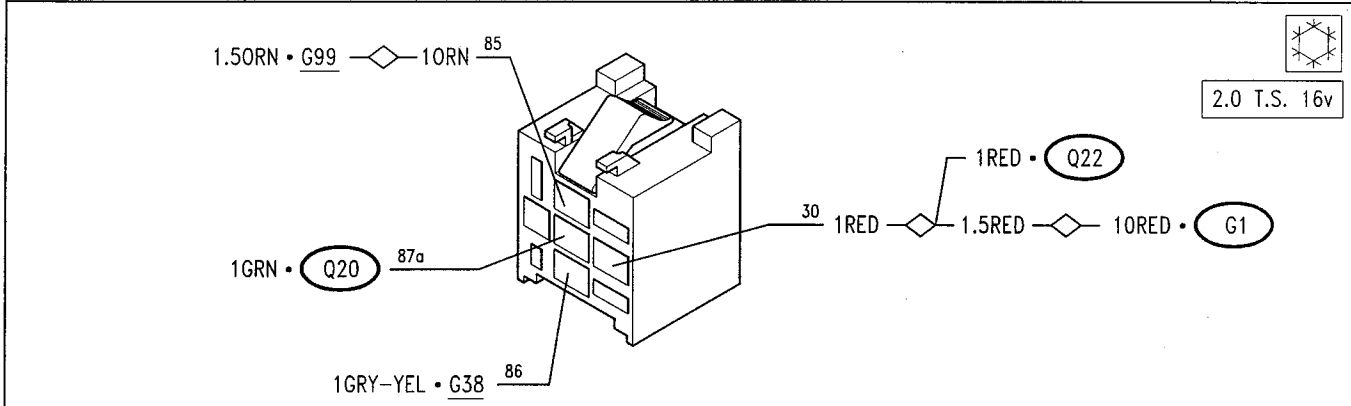
Electromagnetic coupling relay — Q22



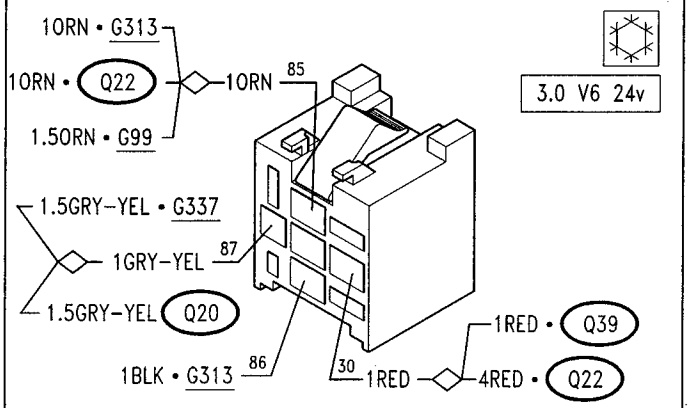
Air recirculation flap control motor — Q27



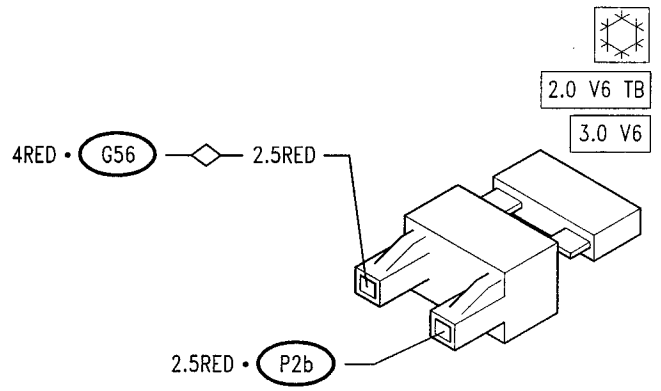
Auxiliary relay for heating and ventilation — Q32



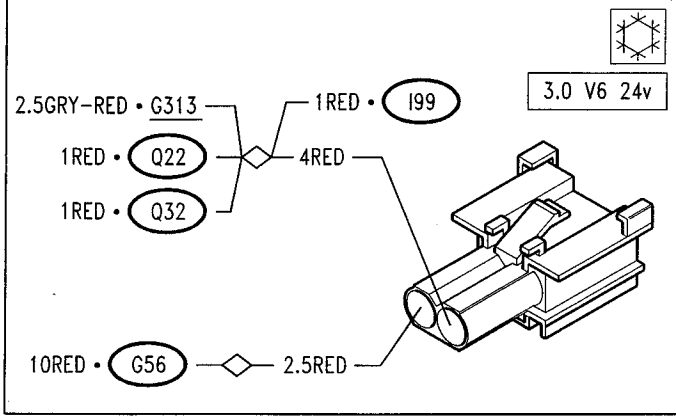
Auxiliary relay for heating and ventilation — Q32



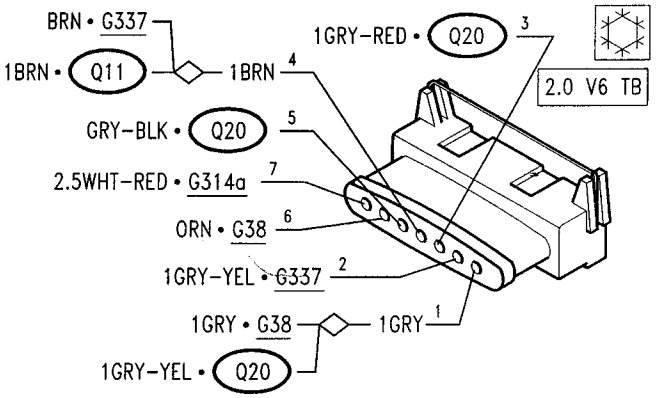
Fuse for conditioning system — Q39



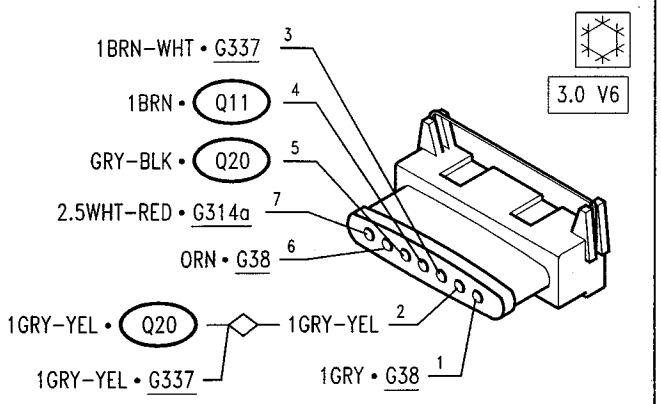
Fuse for conditioning system — Q39



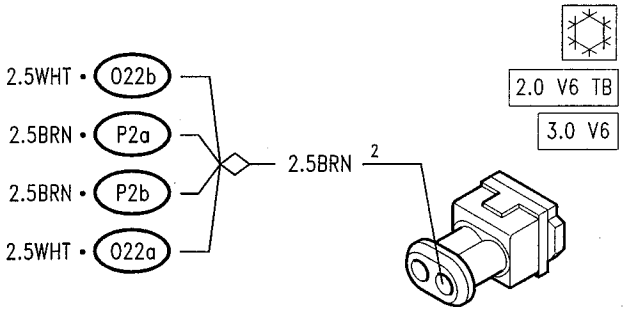
Set of relay and fuses for air conditioner — Q41 A



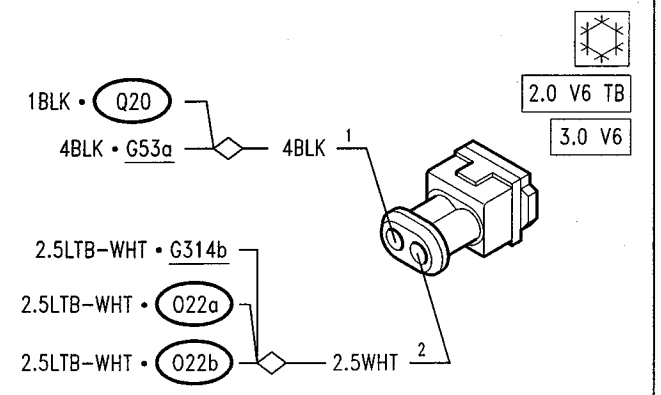
Set of relay and fuses for air conditioner Q41 A



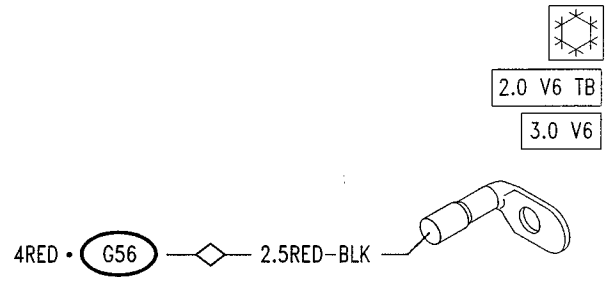
Set of relay and fuses for air conditioner Q41 B



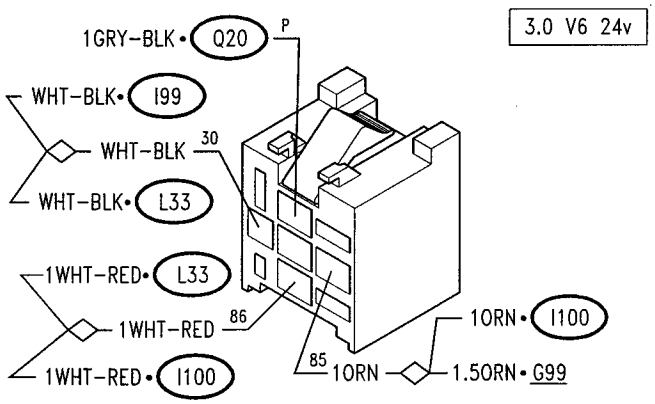
Set of relay and fuses for air conditioner Q41 C



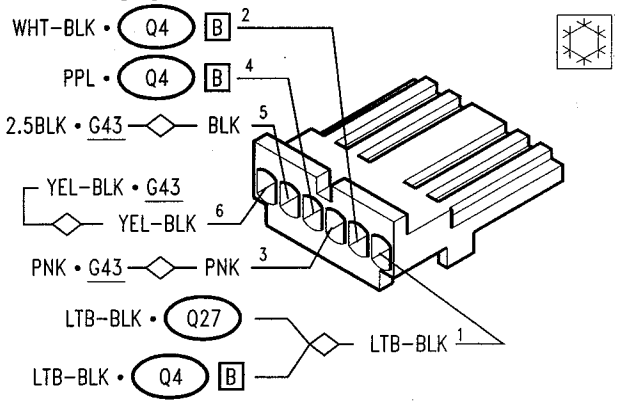
Set of relay and fuses for air conditioner Q41 D



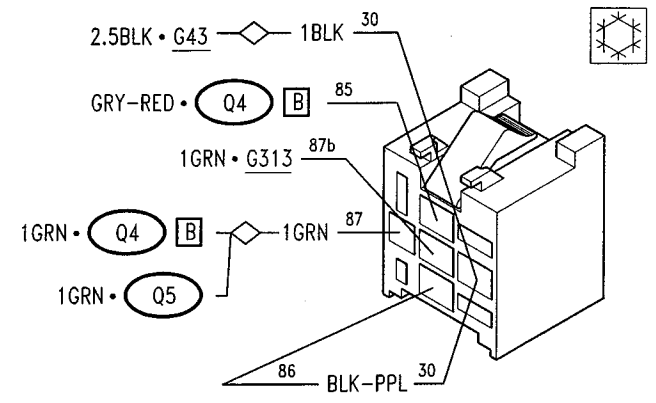
Conditioner fan delay device Q42



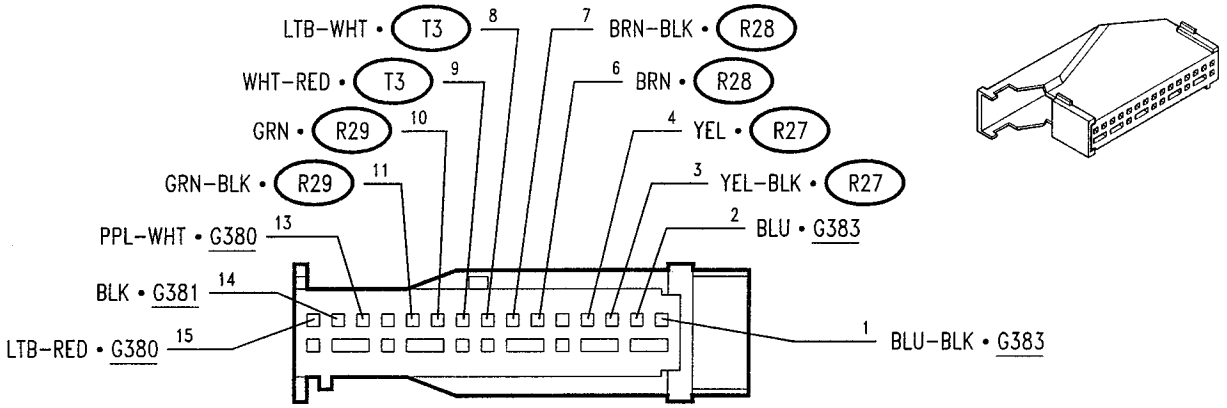
Compressor and air recirculation engagement switches Q68



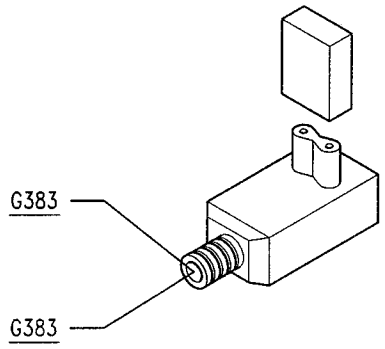
Heater fan 1st speed relay Q69



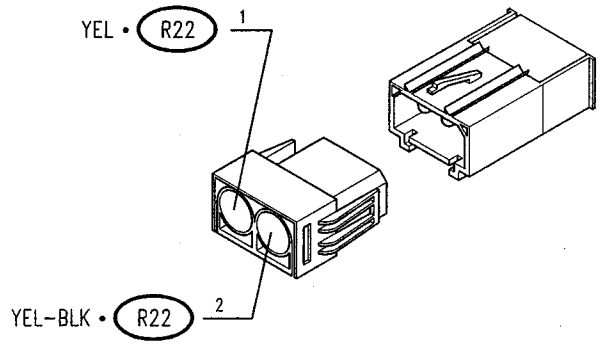
Airbag control unit — R22



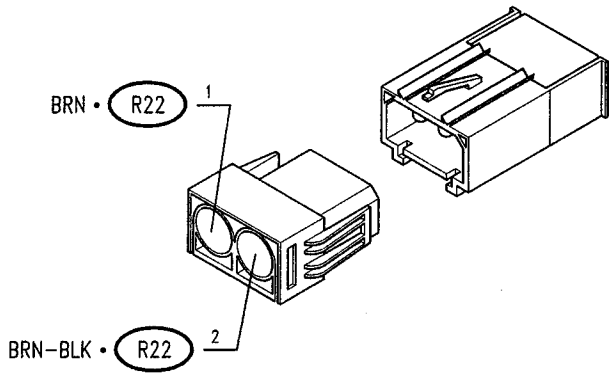
Capsule on steering wheel for airbag — R23



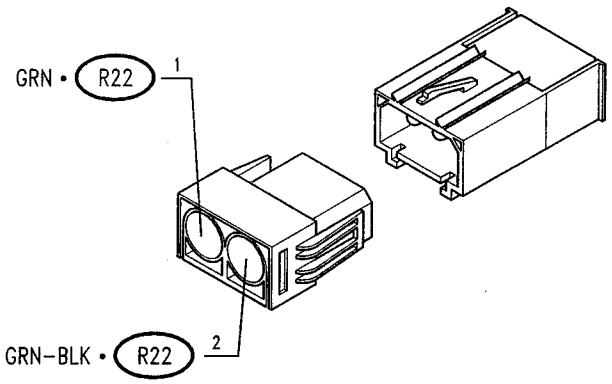
Passenger's side airbag capsule — R27



Capsule on RH pretensioner — R28

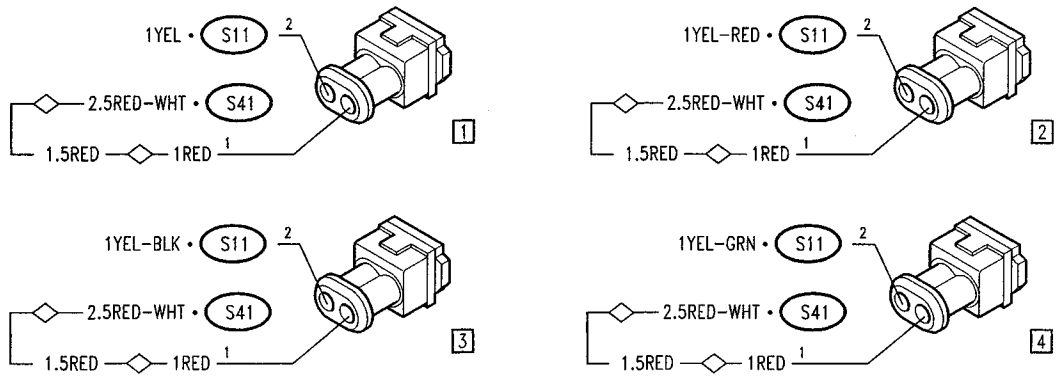


Capsule on LH pretensioner — R29



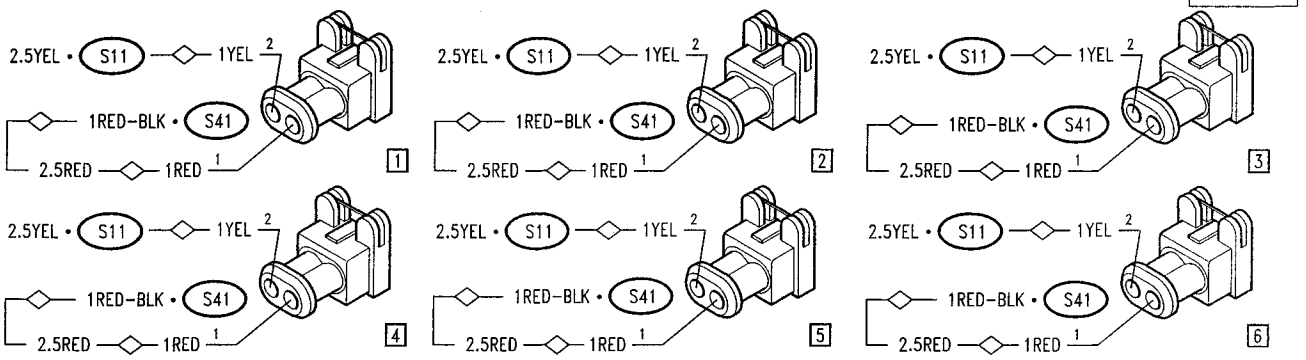
Elettroinjectors — S3

2.0 T.S. 16v



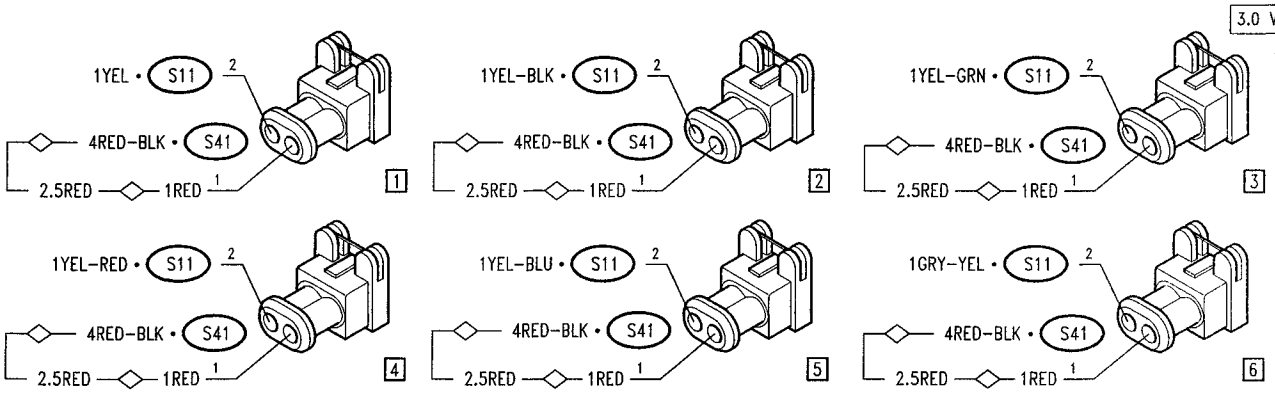
Elettroinjectors — S3

2.0 V6 TB



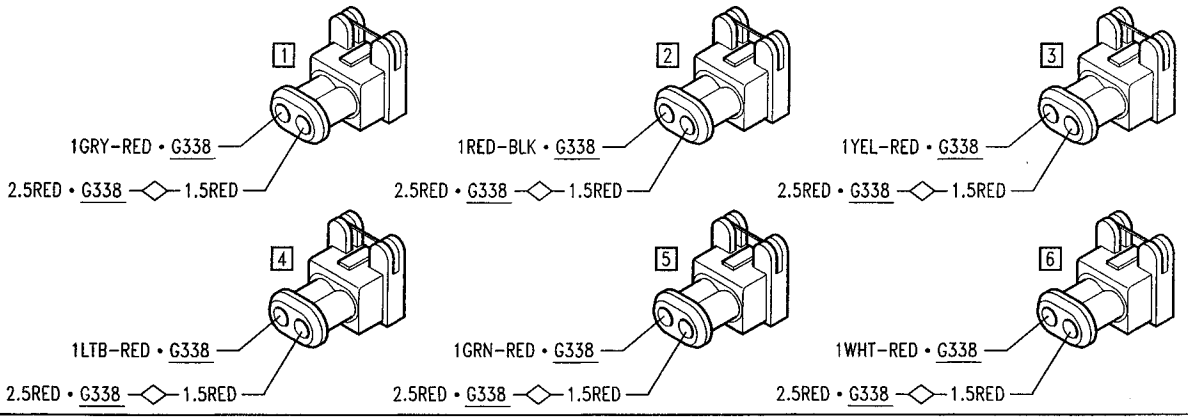
Elettroinjectors — S3

3.0 V6



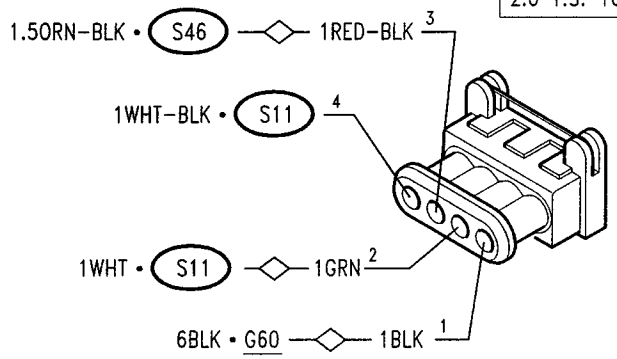
Elettroinjectors — S3

3.0 V6 24v



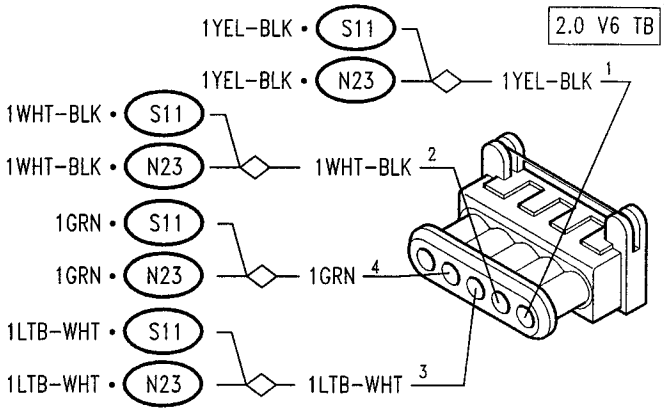
Air flow meter	S5

2.0 T.S. 16v



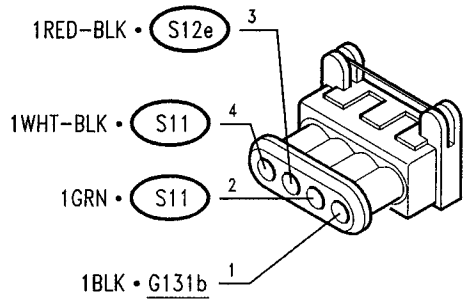
Air flow meter	S5

2.0 V6 TB



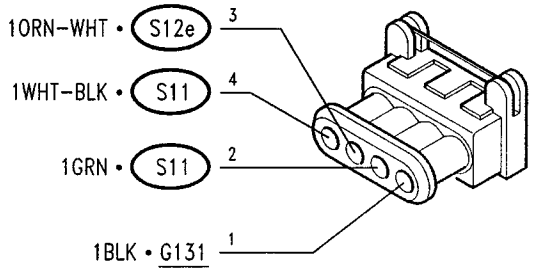
Air flow meter	S5

3.0 V6



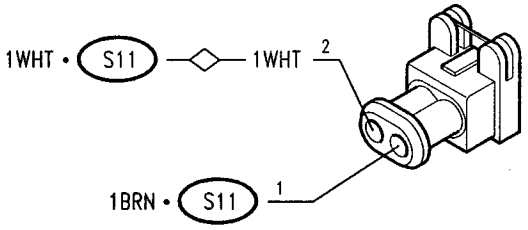
Air flow meter	S5

3.0 V6 24v



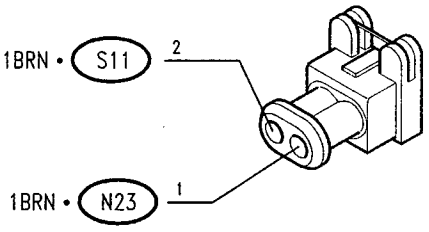
Engine temperature sensor	S7

2.0 T.S. 16v



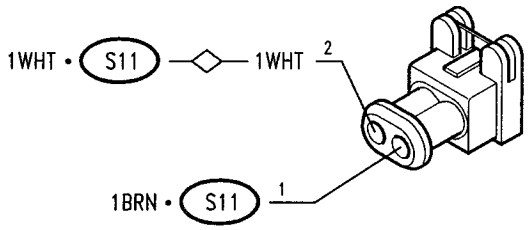
Engine temperature sensor	S7

2.0 V6 TB



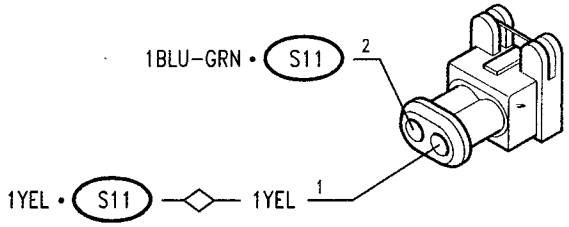
Engine temperature sensor	S7

3.0 V6



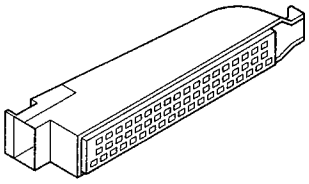
Engine temperature sensor	S7

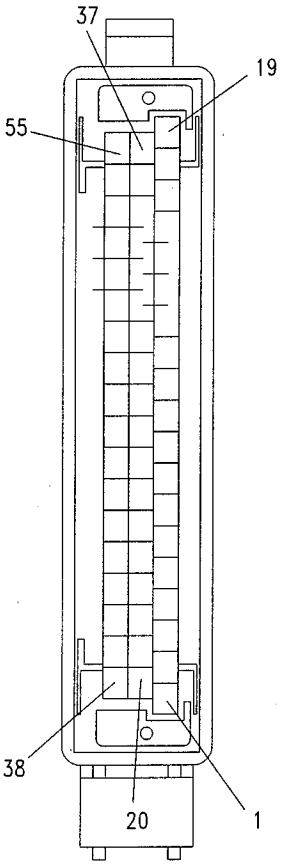
3.0 V6 24v



Motronic control unit — S11

2.0 T.S. 16V

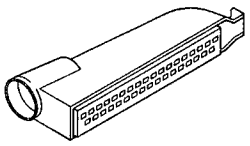


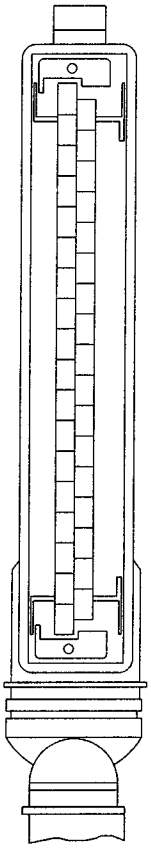


1 — 1.5LTB-YEL • A8 [1]
2 — 2.5BLK — 6BLK • G60
3 — 1GRY-BLK • S12a
4 — 1LTB-BLK • S29
5 — 1ORN • M15
6 — 1BRN-WHT • G133a
7 — 1WHT-BLK • S5
8 — 1BRN-GRN • S52
9 — 1LTB • G133a
10 — BLK • S35
11 — RED • S20
12 — 1GRY-GRN — 1LTB-WHT • S38; BLU-YEL • S52
14 — 1.5BLK
16 — 1YEL-BLK • S3 [3]
17 — 1YEL • S3 [1]
18 — 1RED — 4RED • S36
19 — 1.5BLK — 1.5BLK — 6BLK • G60
20 — 1.5LTB-BLK • A8 [3]
21 — 1.5LTB-WHT • A8 [4]
22 — 1ORN-BLK • S29
24 — 1.5BLK — 6BLK • G60
25 — RED-GRN • G133a
26 — PNK-WHT • G133a
27 — 1ORN-BLK — 1ORN-BLK • G133a; 1ORN • S41
28 — GRN • S35
30 — 1WHT — 1WHT • S34; 1WHT • S38; 1WHT • S7; 1GRN • S5; 1WHT • S20
32 — 1BRN-BLK • G133a
34 — 1YEL-RED • S3 [2]
35 — 1YEL-GRN • S3 [4]
36 — 1GRN-BLK • S41
37 — 1.5RED-BLK — 2.5RED-WHT • S41
38 — 1.5LTB-RED • A8 [2]
40 — 1GRN-WHT • G133a
43 — 1GRY-BLK • G133a
44 — PPL • G133a
45 — 1BRN • S7
47 — 1LTB-YEL • G133b
48 — BLK • S31
49 — YEL • S31
51 — RED-GRN • G133b
52 — 1BLK-PPL • S12c
53 — 1PPL-WHT • S38
54 — 1PNK-BLK • S34
55 — 1WHT-RED • T1

Motronic control unit — S11

2.0 V6 TB





1 — 2.5WHT • N23

2 — 1WHT • S38

3 — 1YEL • N23

4 — 1LTB-YEL • T1

5 — 1BLK ◇ 1.5BLK • G131a

6 — 1GRN ◇ 1GRN • N23

7 — 1WHT-BLK ◇ 1WHT-BLK • N23

9 — 1LTB-WHT ◇ 1LTB-WHT • N23

12 — 1WHT-GRN • G133b

13 — 1BRN • S7

14 — 2.5YEL ◇
- 1YEL • S3 [1]
- 1YEL • S3 [2]
- 1YEL • S3 [3]
- 1YEL • S3 [4]
- 1YEL • S3 [5]
- 1YEL • S3 [6]

16 — 2.5BLK • G131b

17 — RED-GRN • G133b

18 — 1RED ◇ 4RED • S36

20 — 1GRY-BLK ◇
- 1GRY-BLK • S12a
- 1GRY-BLK • N23

21 — 1BRN-WHT • G133a

22 — 1YEL-BLK ◇ 1YEL-BLK • N23

23 — BLU-RED ◇
- 1BLK • S31
- BLU-RED • S31

24 — 1GRN • S35

25 — 1YEL-BLK • S31

26 — 1WHT • N23

27 — 1GRY-GRN • G131a

29 — 1GRN-WHT • G337

31 — 1WHT-RED • N23

32 — 1GRY-YEL • G337

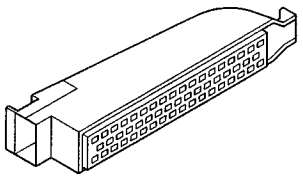
33 — 1LTB-BLK • S29

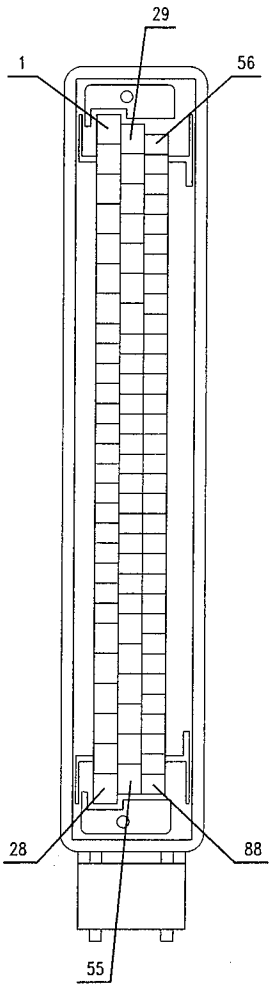
34 — 1BLK-PPL • M15

35 — 1.5RED ◇
- 2.5RED • S41
- 1RED • N23

Motronic control unit — S11

3.0 V6

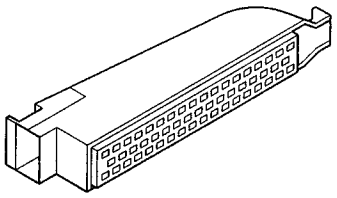


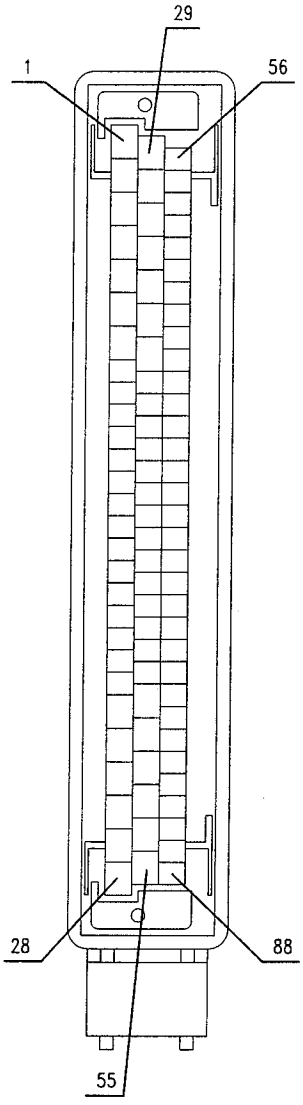


1 — 1GRY-BLK • S12a
2 — 1ORN-BLK • S29
3 — 1YEL • S3 [1]
4 — 1YEL-BLK • S3 [2]
5 — 1YEL-GRN • S3 [3]
6 — 1.5BLK • G131a
8 — 1RED-GRN • G133b
9 — 1GRY-RED • L46
11 — BLK • S35
12 — GRN • S35
14 — 1GRN • S5
16 — BLK • S31
24 — 1GRY • A8
25 — 1LTB • A8
26 — 1RED • S46
27 — 1GRN-YEL • S41
28 — 1BLK ◇ 1BLK • G131b
29 — 1LTB-BLK • S29
31 — 1YEL-RED • S3 [4]
32 — 1YEL-BLU • S3 [5]
33 — 1GRY-YEL • S3 [6]
34 — 1.5BLK • G131a
36 — 1ORN • M15
41 — 1WHT-BLK • S5
42 — 1LTB • G133a
43 — YEL • S31
44 — 1GRY • S52
47 — 1BRN-WHT • G133a
48 — 1BRN • G337
52 — 1.5GRN • A8
54 — 1.5RED-BLK ◇ 4RED-BLK • S41
55 — 2.5BLK ◇ 2.5BLK • G131a
56 — 1PNK-BLK • S42
59 — 1LTB-WHT • S38
64 — 1GRN-WHT • G337
65 — 1GRY-YEL • G337
69 — RED • S20b
70 — YEL • S20a
71 — 1BLK ◇ BLK • S20a; WHT • S20b
72 — 1WHT ◇ 1WHT • S34; 1WHT • S7; 1WHT • S38
73 — 1YEL • S38
77 — 1PNK-WHT • S34
78 — 1BRN • S7
87 — 1LTB-YEL • T1
88 — 1WHT-GRN • G133b

Motronic control unit — S11

3.0 V6 24v



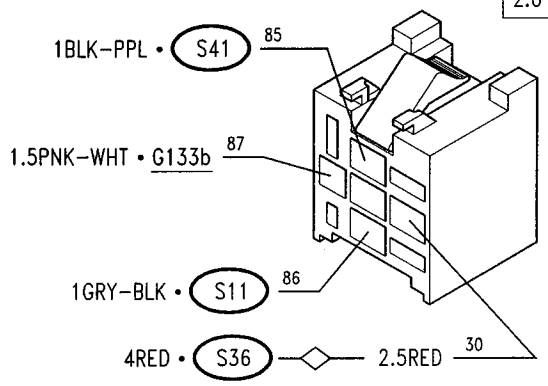


1 1RED-BLK • S12a
2 1ORN-BLK • S29
3 1.5GRY-RED • G338
4 1YEL-RED • G338
5 1GRN-RED • G338
6 1.5BLK • G131
8 1RED-GRN • G133b
9 1GRY-RED • L46
11 BLK • S35
12 GRN • S35
14 1GRN • S5
16 BLK • S31
23 WHT • G338
24 RED • G338
25 YEL • G338
26 1RED • S46
27 1PPL-BLK • S41
28 1BLK • G131
29 1LTB-BLK • S29
31 1RED-BLK • G338
32 1LTB-RED • G338
33 1WHT-RED • G338
34 1.5BLK • G131
36 1LTB • M15
41 1WHT-BLK • S5
42 1LTB • G133a

43 YEL • S31
44 1WHT-BLU • S52
47 1BRN-WHT • G133a
48 1BRN • G337
50 BLU • G338
51 WHT • G338
52 BRN • G338
54 1GRY — 4GRY • S41
55 2.5BLK • G131
56 1PNK — 1ORN • G133a
59 1PPL-WHT • S38
64 1GRN-WHT • G337
65 1GRY-YEL • G337
69 YEL • S20b
70 BLU-BLK • S20a
71 BLU — BLU • S20a
BLU • S20b
72 1YEL — 1YEL • S34
1YEL • S7
1YEL • S38
73 1WHT-BLK • S38
77 1YEL-BLU • S34
78 1BLU-GRN • S7
87 1LTB-WHT • T1
88 1WHT-GRN • G133b

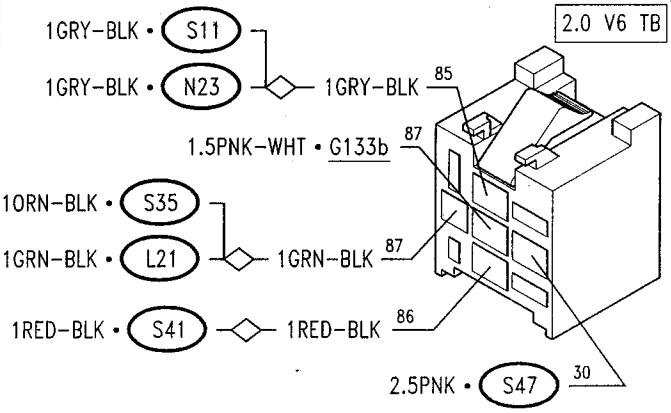
Motronic fuel pump relay — S12a

2.0 T.S. 16v



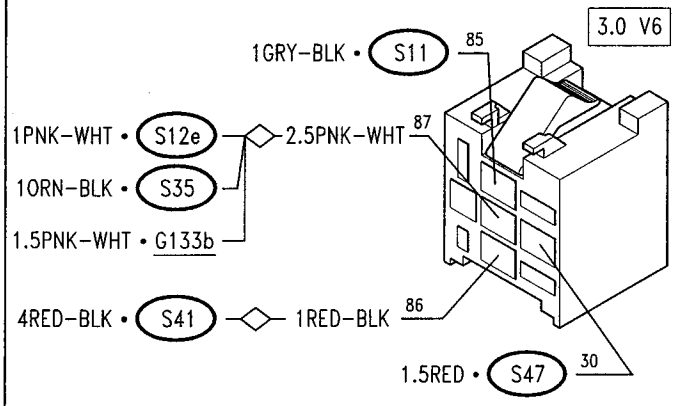
Motronic fuel pump relay — S12a

2.0 V6 TB



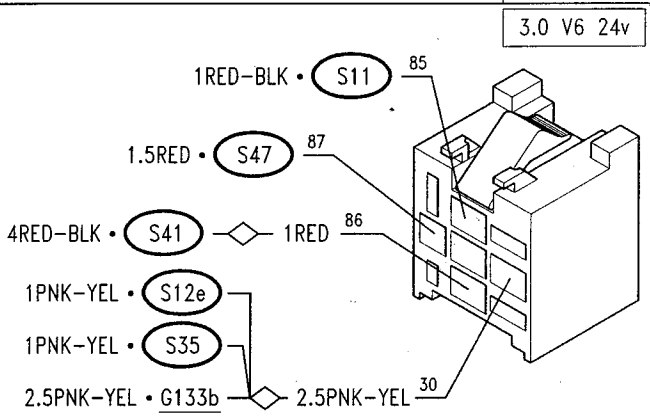
Motronic fuel pump relay — S12a

3.0 V6



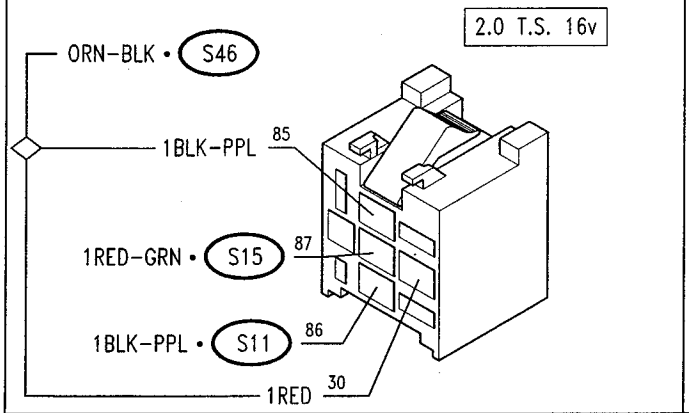
Motronic fuel pump relay — S12a

3.0 V6 24v



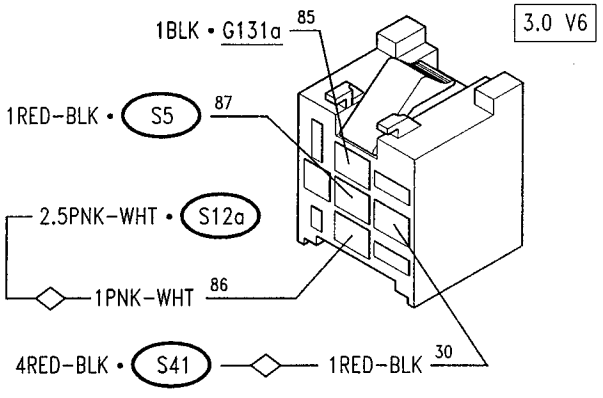
Phase variator relay — S12c

2.0 T.S. 16v



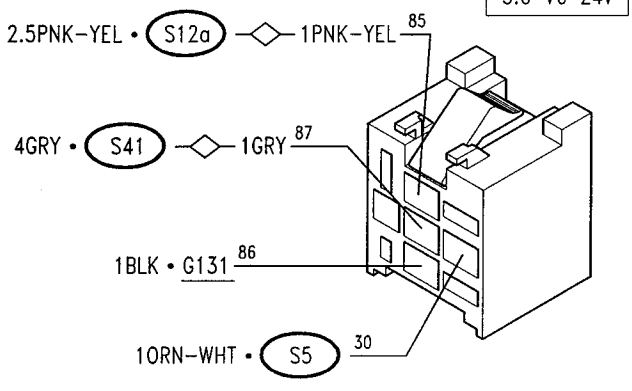
Air flow meter relay — S12e

3.0 V6



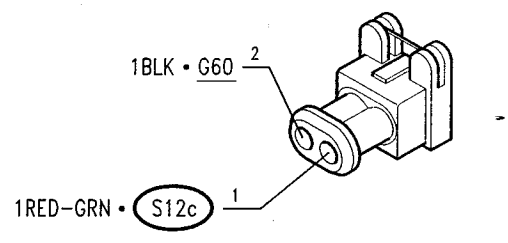
Air flow meter relay — S12e

3.0 V6 24v



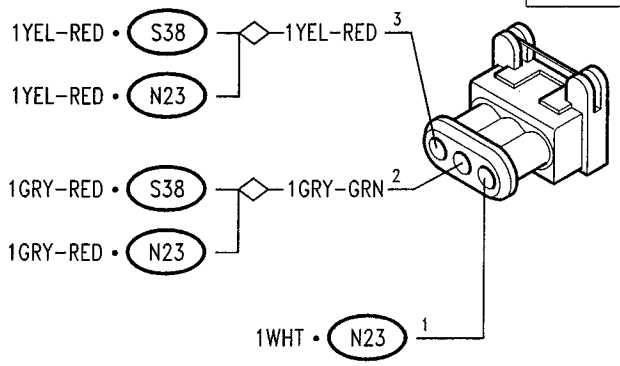
Phase variator — S15

2.0 T.S. 16v



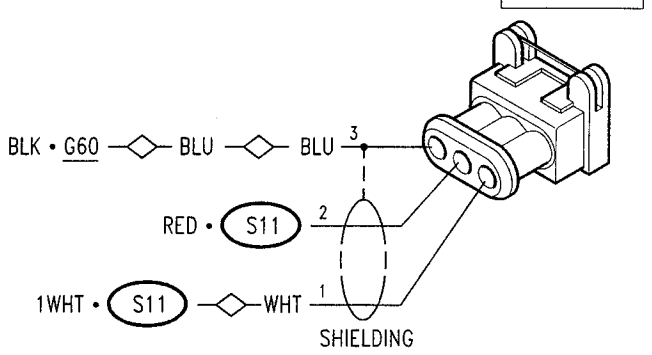
Altitude corrector — S16

2.0 V6 TB



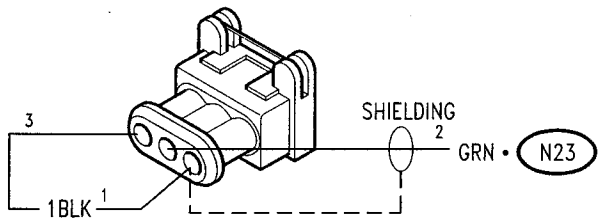
Pinging sensor — S20

2.0 T.S. 16v



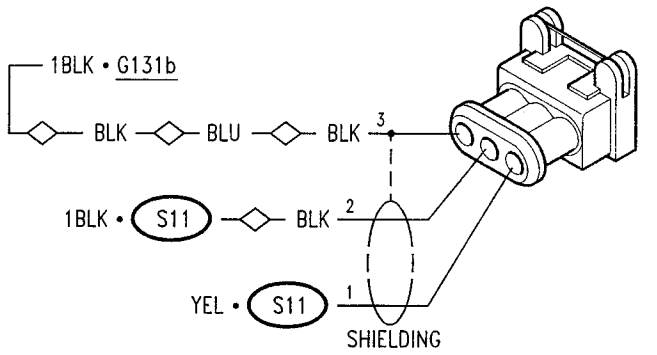
Pinging sensor a — S20a

2.0 V6 TB



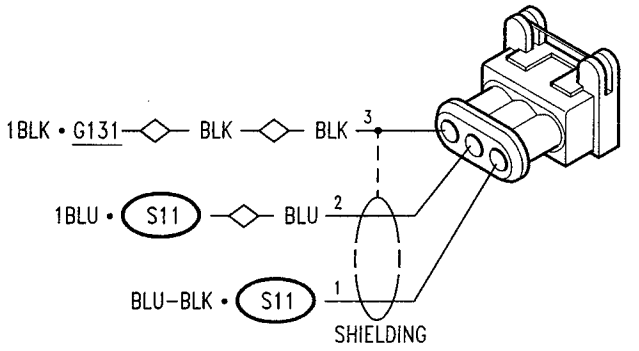
Pinging sensor a — S20a

3.0 V6



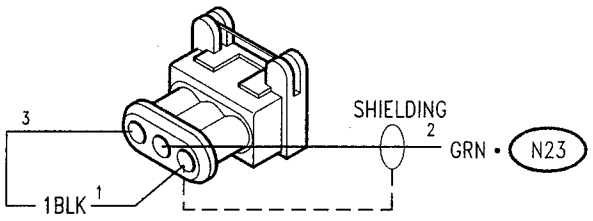
Pinging sensor a — S20a

3.0 V6 24v



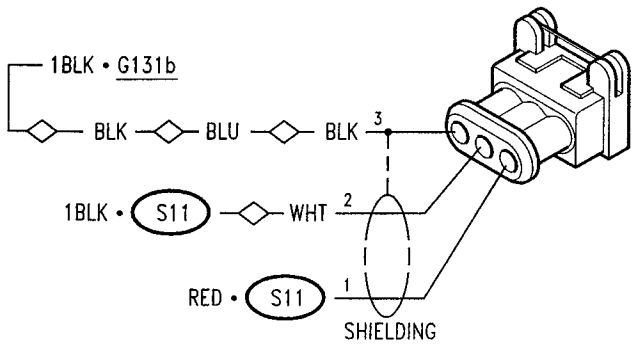
Pinging sensor b — S20b

2.0 V6 TB



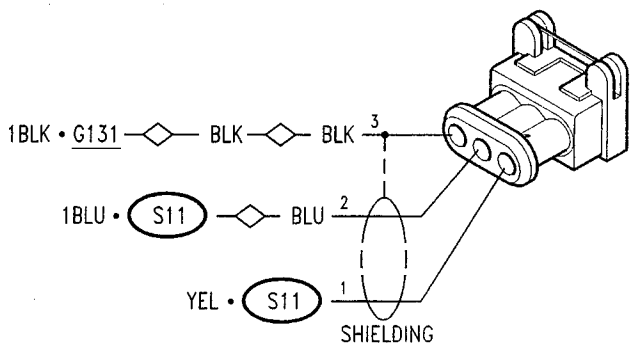
Pinging sensor b — S20b

3.0 V6



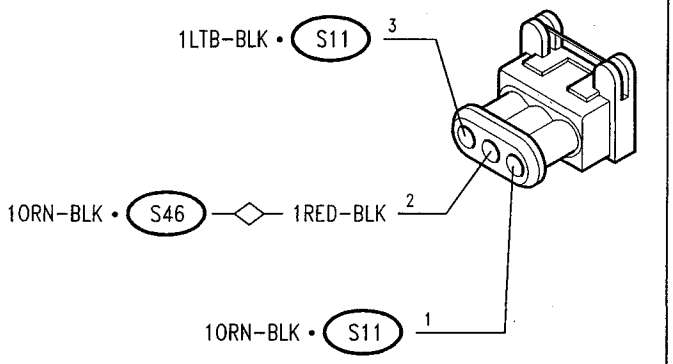
Pinging sensor b — S20b

3.0 V6 24v



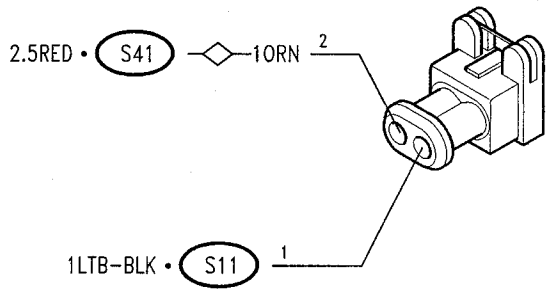
Idle adjustment actuator — S29

2.0 T.S. 16v



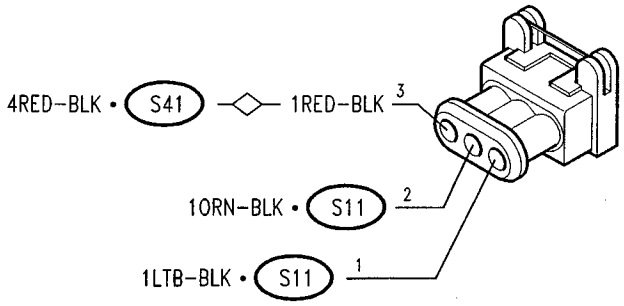
Idle adjustment actuator — S29

2.0 V6 TB



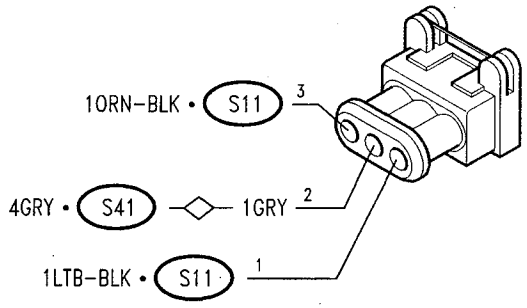
Idle adjustment actuator — S29

3.0 V6



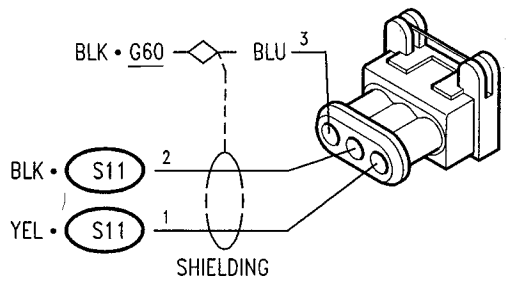
Idle adjustment actuator — S29

3.0 V6 24v



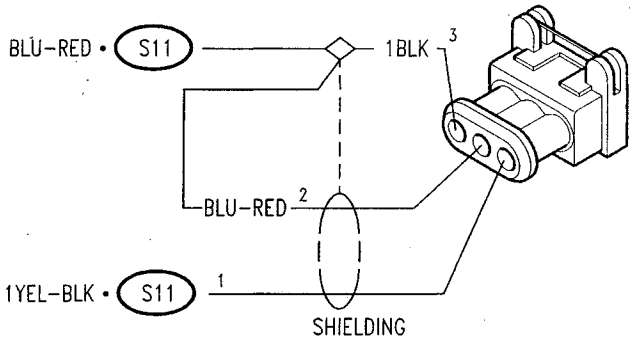
Rpm and crankshaft position sensor — S31

2.0 T.S. 16v



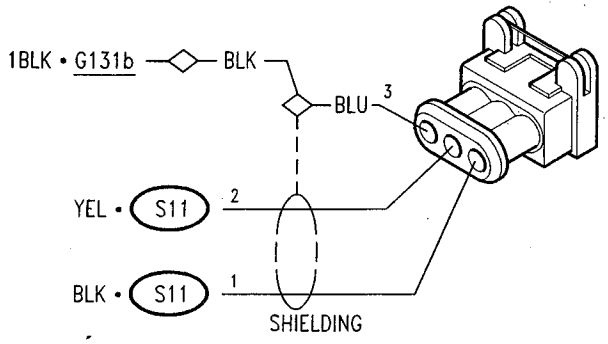
Rpm and crankshaft position sensor — S31

2.0 V6 TB



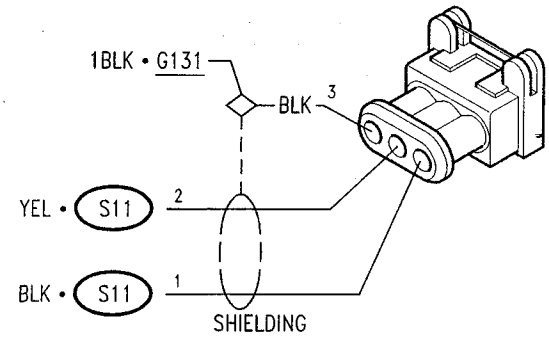
Rpm and crankshaft position sensor — S31

3.0 V6



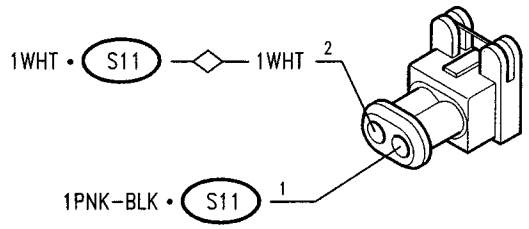
Rpm and crankshaft position sensor — S31

3.0 V6 24v



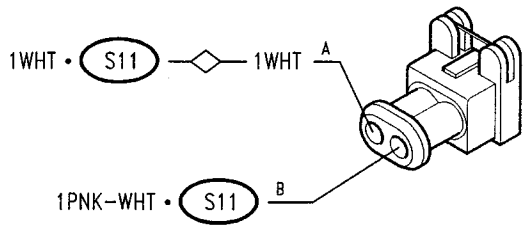
Air temperature sensor — S34

2.0 T.S. 16v



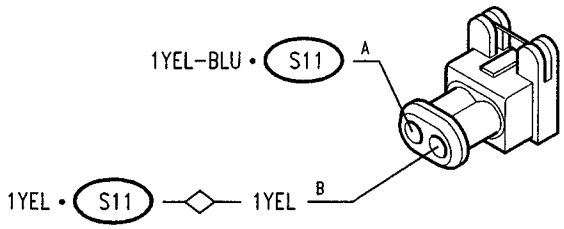
Air temperature sensor — S34

3.0 V6



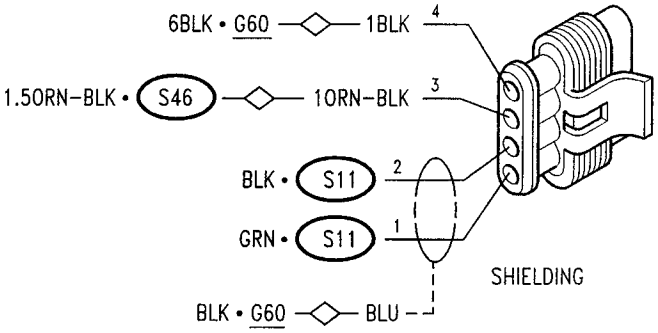
Air temperature sensor — S34

3.0 V6 24v



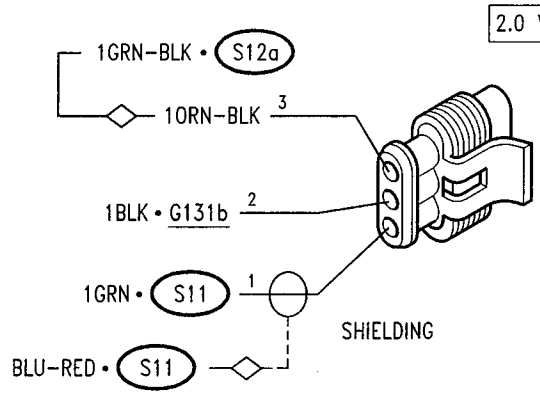
Heated lambda probe — S35

2.0 T.S. 16v



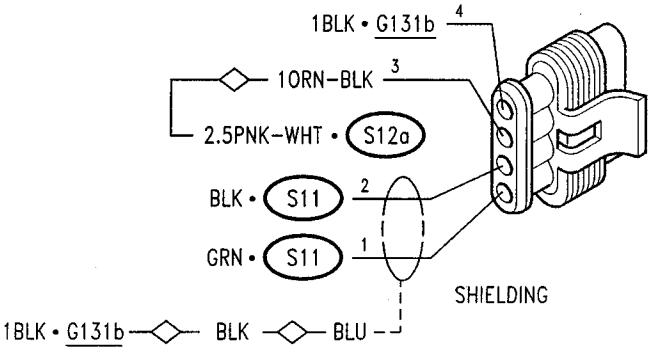
Heated lambda probe — S35

2.0 V6 TB



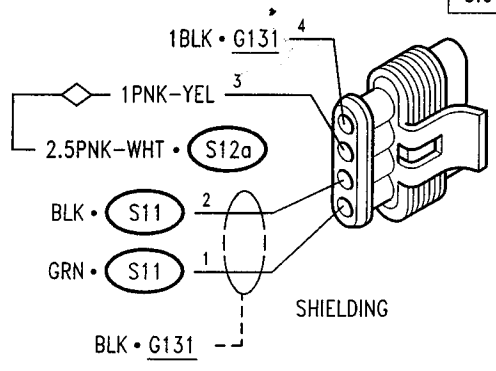
Heated lambda probe — S35

3.0 V6



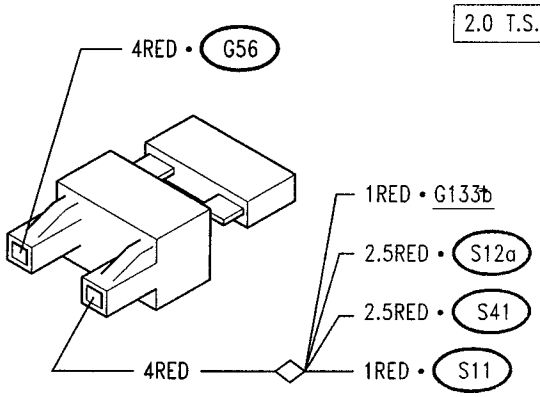
Heated lambda probe — S35

3.0 V6 24v



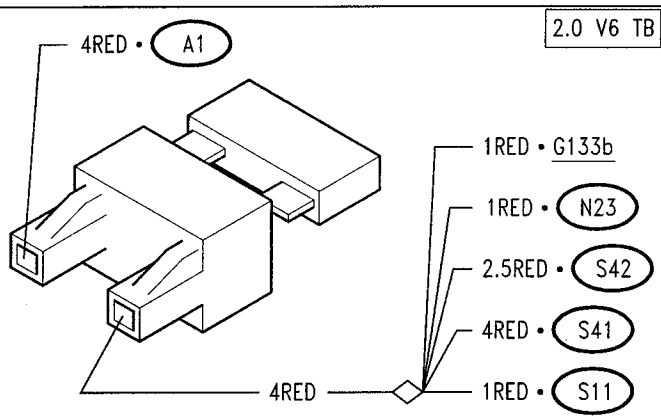
Fuse for injection relay — S36

2.0 T.S. 16v



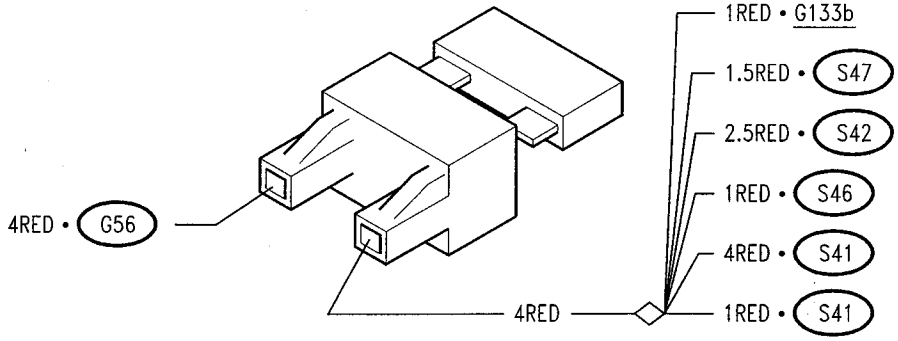
Fuse for injection relay — S36

2.0 V6 TB



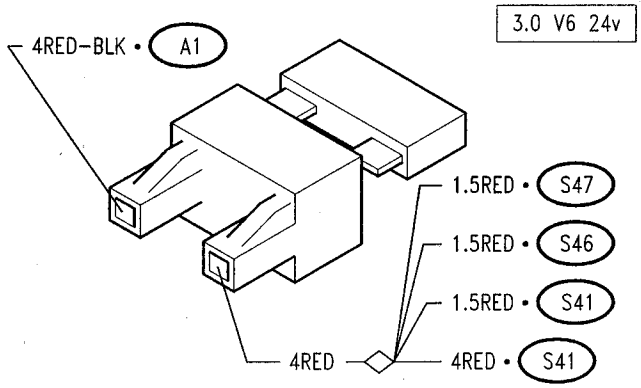
Fuse for injection relay — S36

3.0 V6



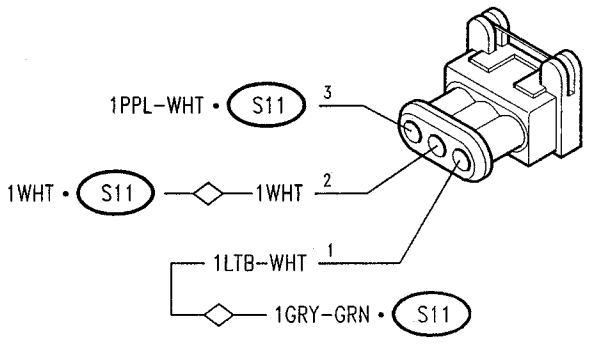
Fuse for injection relay — S36

3.0 V6 24v



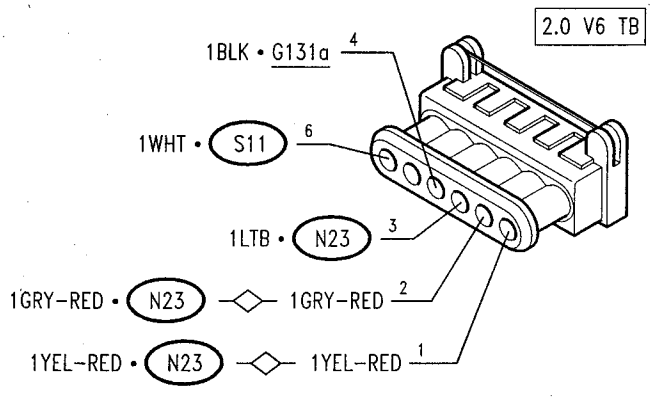
Sensor on throttle body — S38

2.0 T.S. 16v



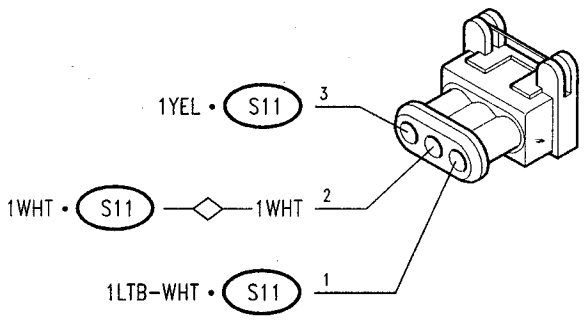
Sensor on throttle body — S38

2.0 V6 TB



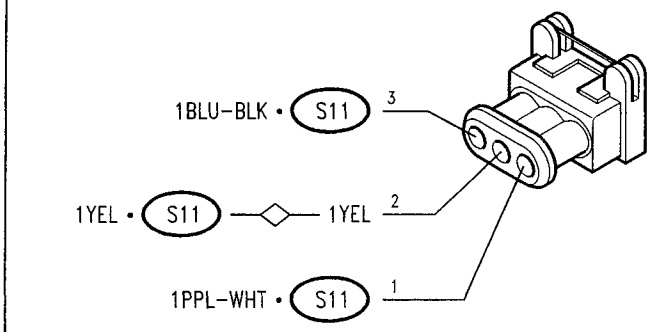
Sensor on throttle body — S38

3.0 V6



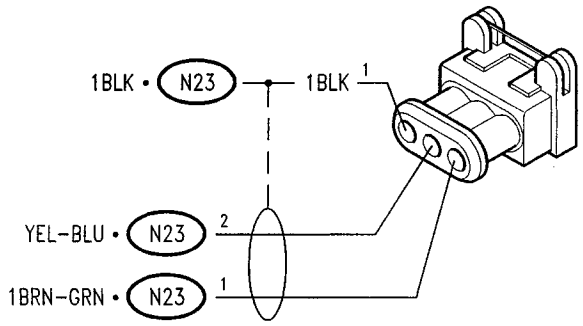
Sensor on throttle body — S38

3.0 V6 24v



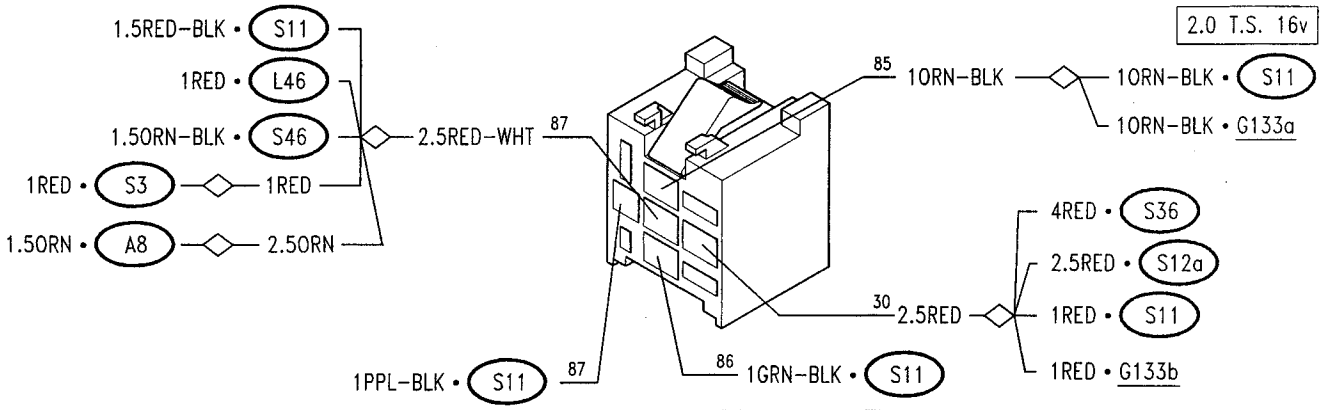
1st cylinder detection sensor — S39

2.0 V6 TB



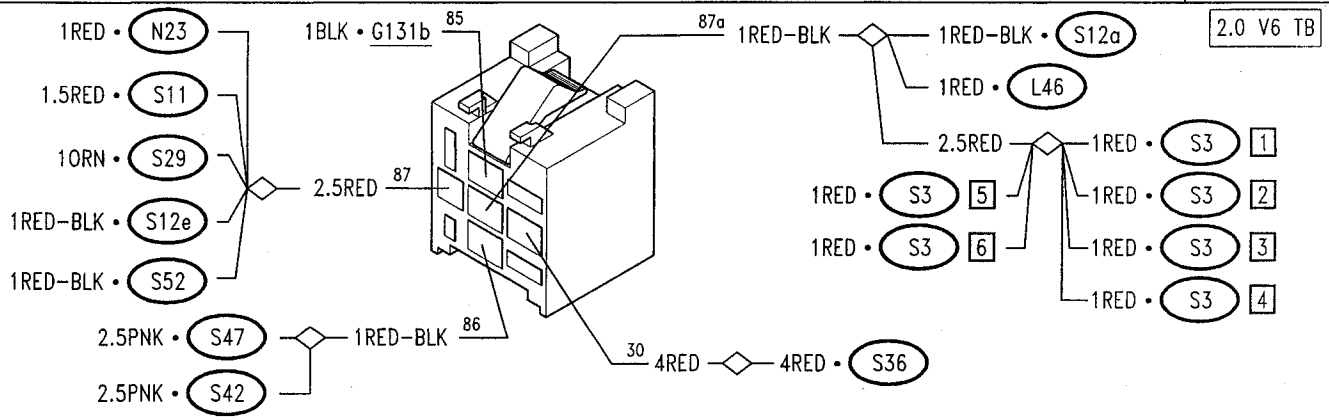
Main relay — S41

2.0 T.S. 16v



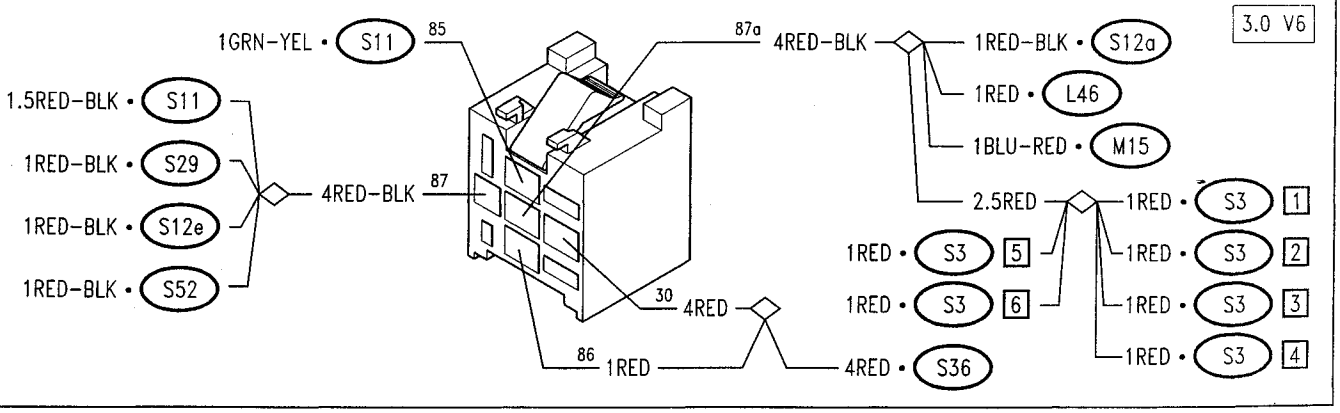
Main relay — S41

2.0 V6 TB



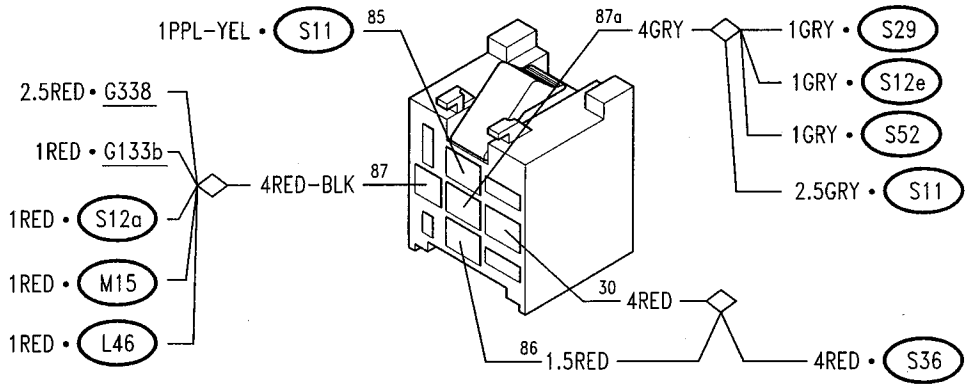
Main relay — S41

3.0 V6



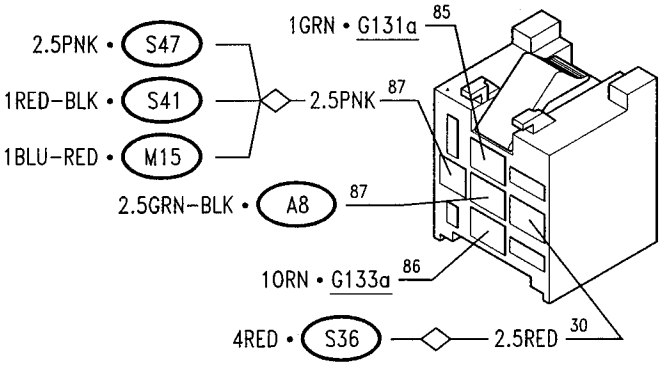
Main relay — S41

3.0 V6 24v



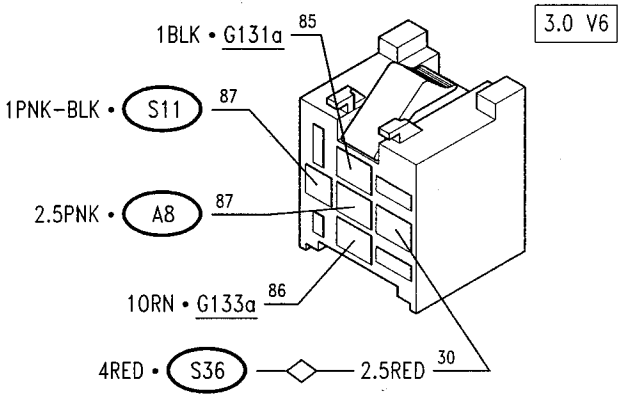
Secondary relay — S42

2.0 V6 TB



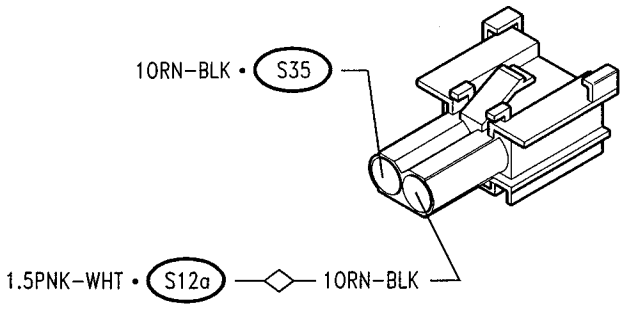
Secondary relay — S42

3.0 V6



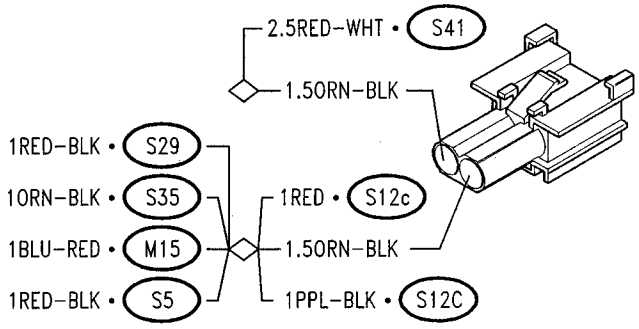
Lambda probe fuse — S45

3.0 V6



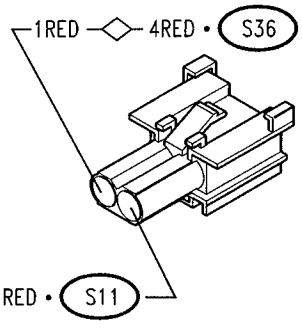
Fuse for Motronic supply — S46

2.0 T.S. 16v



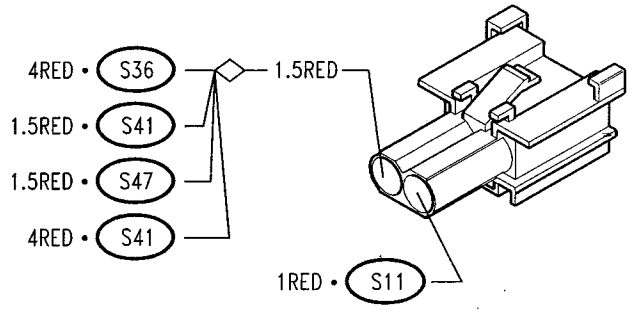
Fuse for Motronic supply — S46

3.0 V6



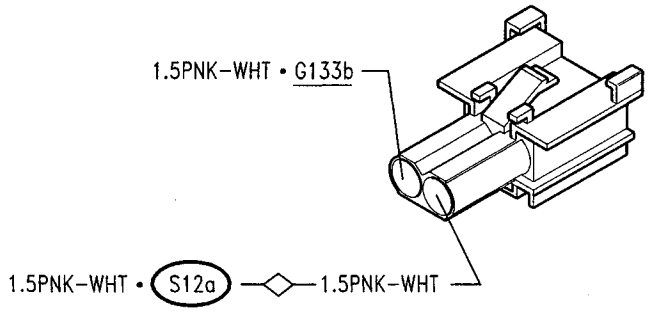
Fuse for Motronic supply — S46

3.0 V6 24v



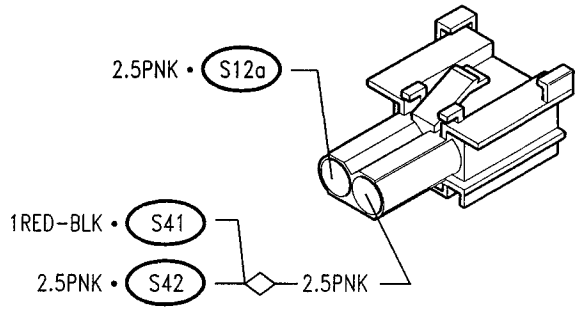
Fuse for fuel pump	S47

2.0 T.S. 16v



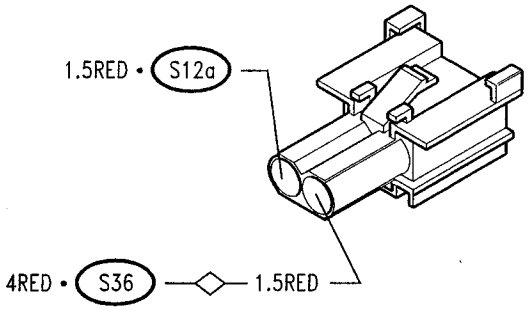
Fuse for fuel pump	S47

2.0 V6 TB



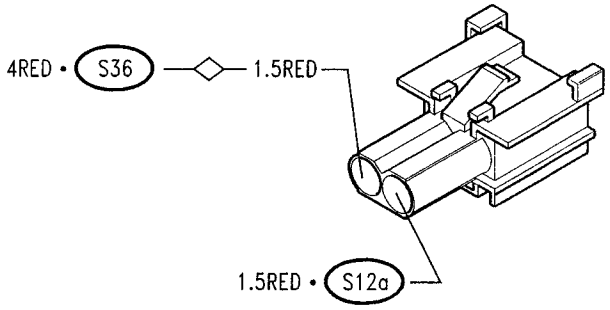
Fuse for fuel pump	S47

3.0 V6



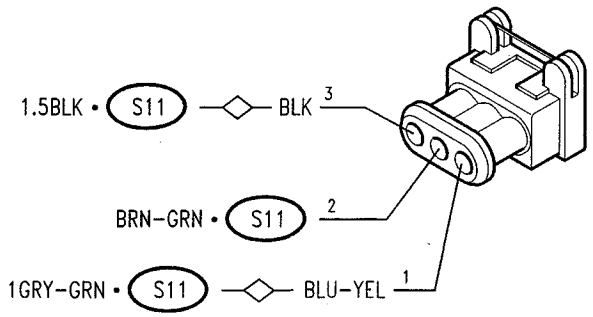
Fuse for fuel pump	S47

3.0 V6 24v



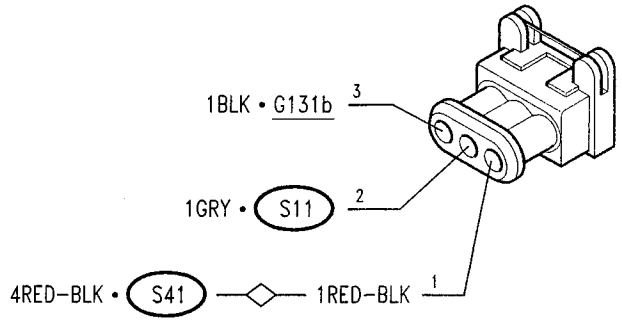
Cam angle sensor	S52

2.0 T.S. 16v



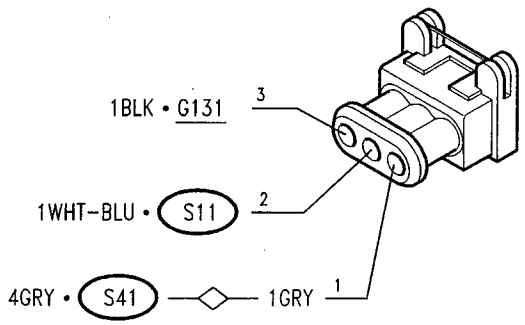
Cam angle sensor	S52

3.0 V6



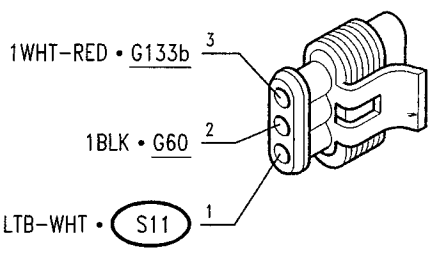
Cam angle sensor	S52

3.0 V6 24v



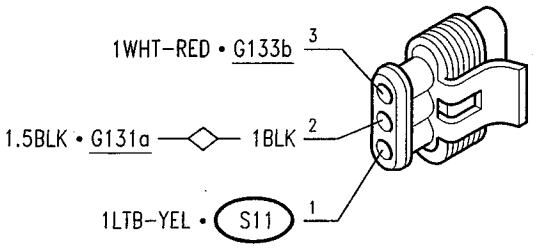
Connector for ALFA TESTER (Motronic and ALFA ROMEO CODE)	T1

2.0 T.S. 16v



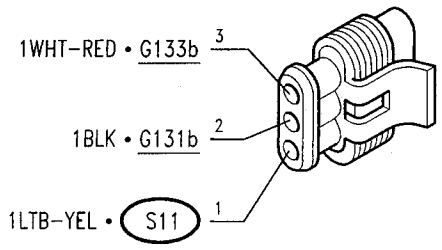
Connector for ALFA TESTER (Motronic and ALFA ROMEO CODE) — T1

2.0 V6 TB



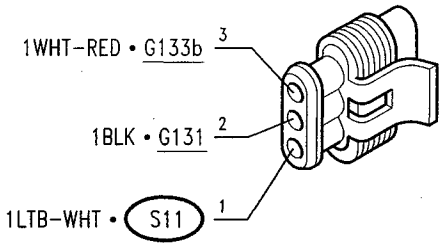
Connector for ALFA TESTER (Motronic and ALFA ROMEO CODE) — T1

3.0 V6

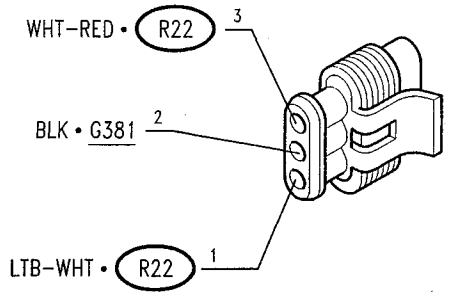


Connector for ALFA TESTER (Motronic and ALFA ROMEO CODE) — T1

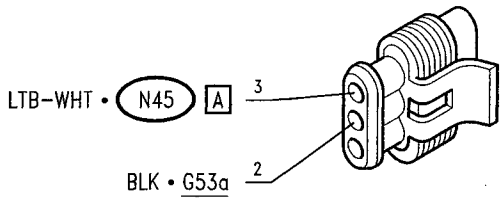
3.0 V6 24v



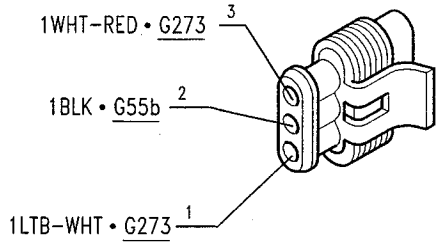
Connector for ALFA TESTER (airbag) — T3



Connector for ALFA TESTER (anti-theft device) — T7



Connector for ALFA TESTER (ABS) — T8



Diagnosis connector for ALFA ROMEO TESTER (automatic hood) — T13