

## ALFA ROMEO CODE

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(•) For the T.SPARK 2.0 16V (with M2.10.3) version refer to the details given for the 1.7 16V, as the wiring diagram is the same

**GENERAL DESCRIPTION**

The car is fitted with an electronic code system (ALFA ROMEO CODE) which inhibits the control of the engine operated by the ignition keys.

**PETROL AND JTD VERSIONS:**

Turning the key to the MARCIA position the Engine Control System Control unit (C.C.M.) requests the code from the Control unit of the ALFA ROMEO CODE system - Electronic Key Control Unit (C.C.E.). Once it has received the code, it compares it with the code in its memory (**MASTER CODE**).

If the comparison of the code received with the one memorised is positive the C.C.M. proceeds with normal electronic engine management (starting, ignition, injection, etc.).

If not, (wrong code, various faults, etc.) the C.C.M. does not carry out engine management and the car will not start.

The C.C.M. offers the possibility to start the car without having received the MASTER CODE by the emergency procedures using the Code Card or the Alfa Tester (see recovery procedures).

The code transmitted to the engine control system control unit (allowing over 4 billion combinations) is computed by an algorithm which makes each transmission between C.C.M. and C.C.E. different from the previous one. (variable, crypted code).

If the code has not been recognised correctly the ALFA ROMEO CODE warning light stays on, together with the injection system failure warning light.

**TD VERSION:**

In the TD version a special Electronic Device integrated in the Engine Stop Solenoid valve (D.E.S.M.) communicates with the C.C.E..

Turning the key to the MARCIA position, the D.E.S.M. device asks the ALFA ROMEO CODE system control unit - Electronic Key Control Unit (C.C.E.) for a code. Once it has received the code, it compares it with the memorised code (**MASTER CODE**).

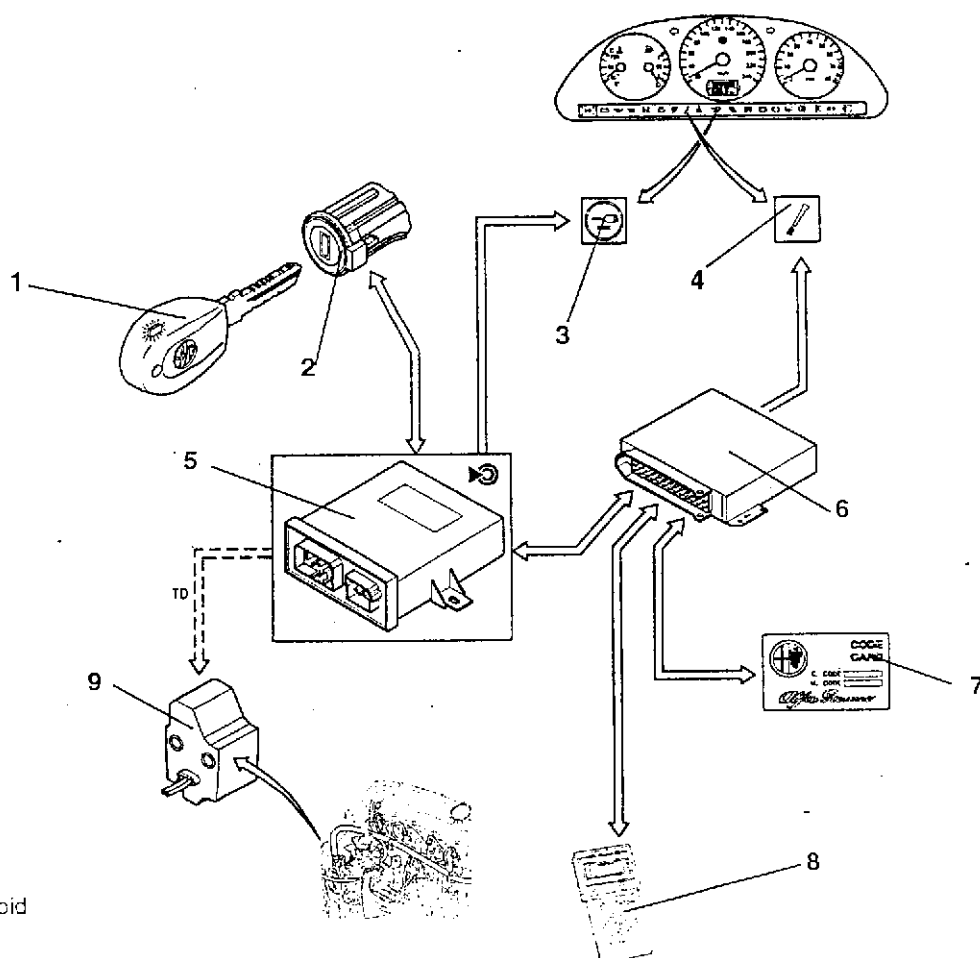
If the comparison of the code received with the one memorised is positive, the D.E.S.M. device enables the normal opening of the engine stop solenoid valve.

If not, (wrong code, various faults, etc.) the solenoid valve will not open and the engine will not start.

The C.C.M. offers the possibility to start the car without having received the MASTER CODE by the emergency procedures using the Code Card or the Alfa Tester (see recovery procedures).

**If the code has not been recognised correctly, the ALFA ROMEO CODE warning light stays on (in the TD version the injection system warning light is not present).**

*NOTE: in the following pages the D.E.S.M. device will be called C.C.M., for all the functions which remain unchanged with respect to the injection control unit of a petrol engine.*



1. Electronic key
2. Ignition lock
3. "ALFA ROMEO CODE" warning light
4. Injection failure warning light
5. ALFA ROMEO CODE Electronic key control unit
6. Injection control unit (C.C.E.)
7. Code Card
8. Alfa Romeo Tester
9. Engine stop electronic solenoid valve device (D.E.S.M.)

## DESCRIPTION OF COMPONENTS

The system comprises the following components:

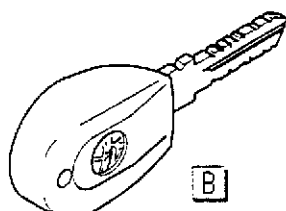
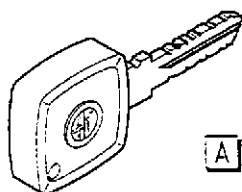
### Keys

The following are supplied:

- An electronic key **A**: "MASTER" key
- Two main electronic keys **B** (with Alfa Romeo badge)

The keys contain an electronic circuit called Transponder, which contains the code which characterises them; this is transmitted to the Electronic key control unit (C.C.E.) when the key is turned to the MARCIA position.

Each electronic key possesses its own code, which must be memorised by the system's electronic control unit.



The cars are produced with the codes of the keys supplied with them already memorised, as described below:

- The C.C.E. contains the codes of the two main keys and the MASTER CODE (code of the master key)
- The C.C.M. only contains the MASTER CODE

It is very important to keep the MASTER key most carefully, since its code is memorised, through a special specific procedure (described later), in the electronic injection control unit, therefore the two control units are linked indissolubly.

If the MASTER key goes astray or is damaged, further memorising procedures of new keys will not be possible; without the MASTER key in the event of a failure to the C.C.E. it will be necessary to change the C.C.E. and the C.C.M.

The user is advised to keep the MASTER key in a safe place outside the car. In fact, it serves as an "access key" for memorising further codes (keys). The MASTER key should only be used when needing to memorise new keys.

The Transponder inside the key comprises a minute integrated circuit (which contains the code), and a coil (which supplies the integrated circuit and transmits the code).

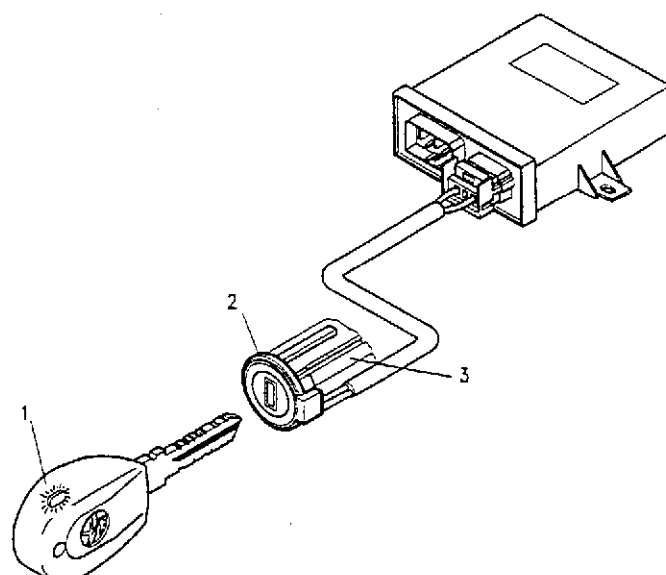
In the main keys, the Transponder is inserted in an accessible manner, while the MASTER key has the possibility to transfer the component to another MASTER key, if the need arises (for example if the ignition lock needs replacing).

The MASTER key is proof of the ownership of the car: it must therefore be present (together with the Code Card), when the car is sold.

### Aerial

The aerial is a loop coil which is wound round the ignition lock and is connected to the C.C.E. by a specific connector (see figure).

The purpose of the aerial is firstly to supply the transponder so that it can send the code and secondly to receive the Transponder signal.

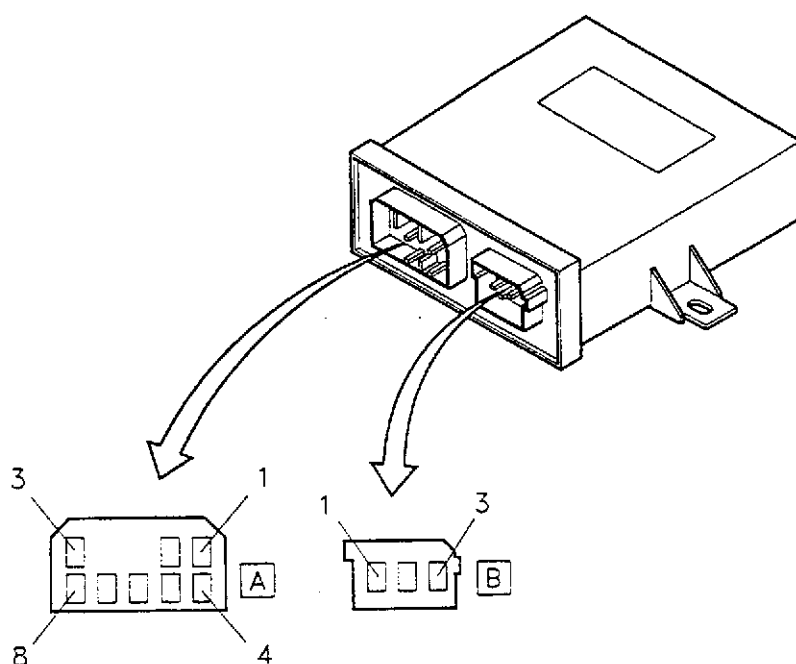


1. Transponder
2. aerial
3. ignition lock

**Electronic Key Control unit (C.C.E.)**

The C.C.E. is located under the dashboard at the right of the steering wheel ; it is interfaced with the car via two connectors: B (3-way) and A (8-way) and it has the following functions:

- It detects rotation of the key in the ignition switch to the MARCIA position
- It emits an electromagnetic field to give power and activate the Transponder of the key
- It receives and computes the secret code sent by the key
- It manages the serial line connecting with the C.C.M. control unit (petrol engines) or with the D.E.S.M. device (TD version)
- It manages the special diagnosis warning light on the instrument cluster
- It memorises up to 8 secret codes, one of which is the MASTER CODE
- It recognises connection with the Alfa Tester and allows the use of the serial line for diagnosis (only for Bosch Motronic injection - 1.7 16 v engine - and for TD engine)

**CONNECTOR A**

- pin 1: N.C.
- pin 2: warning light signal
- pin 3: direct supply
- pin 4: earth
- pin 5: diagnosis line K
- pin 6: serial line towards the C.C.M.
- pin 7: signal for outside relay (N.C.)
- pin 8: key-operated supply

**CONNECTOR B**

- pin 1: aerial signal
- pin 2: N.C.
- pin 3: aerial earth

### Engine Control System Control Unit (C.C.M.) with software (programme) for ALFA ROMEO CODE :

The engine control system control units adopted on these cars are provided with functions for management of the ALFA ROMEO CODE electronic key: these functions, which are activated when the key is turned, are the following:

- Permanent memorising of the MASTER key code (MASTER CODE) by a specific procedure carried out during production testing or when the C.C.M. is changed.
- Request of the MASTER key code to the C.C.E.
- Recognition of the MASTER CODE and engine control enabling (starting the car)
- Recognition of the message (transmitted by the C.C.E.) warning that an unauthorised key has been inserted (the car will not start).
- Recovery function via the Alfa Romeo Tester (it is necessary to know the ELECTRONIC CODE written on the Code Card)
- Recovery function by entering the ELECTRONIC CODE written on the Code Card using the accelerator pedal.
- Control of the diagnosis warning light (injection failure warning light)

**Absolutely never exchange the injection control units between cars to check whether they are working properly.**

Therefore, during fault-finding operations, avoid changing the injection control unit, if you are not sure that it is the cause of the problem on the car (firstly check the actuators and sensors and the wiring, etc.) bearing in mind that the installation of a new control unit (never used before) will involve the permanent memorising of the MASTER CODE inside it of the next key that is turned to MARCIA; therefore, from that moment onwards this control unit will only work in combination with the keys and C.C.E. of that car.

Electronic Engine Stop Solenoid Valve Device (D.E.S.M.) with software (programme) for ALFA ROMEO CODE:

**In the TD version the special electronic device D.E.S.M. is provided with the functions for management of the ALFA ROMEO CODE:**

These functions are the same as for the C.C.M. in a petrol engine, with the exception of the following differences:

- There is the recovery system via Alfa Romeo Tester, but NOT via the accelerator pedal

- There is no specific diagnosis warning light (injection failure warning light)

**Never exchange the D.E.S.M. devices between cars to check that they are working properly.**

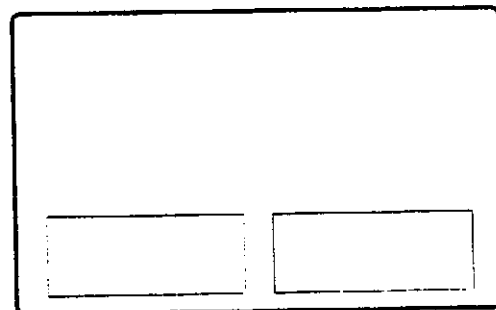
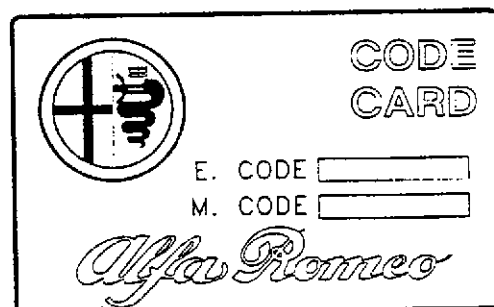
### Code Card (card with secret code)

This is a memo card the size of a credit card which is supplied with the car. (see illustration).

It contains a five-digit code (**ELECTRONIC CODE**) which makes it possible to start the engine (recovery function) when the electronic keys have been lost or damaged.

Two cards are supplied.

NOTE: Clearly this emergency procedure only takes account of the electronic code associated with the keys, and not the mechanical parts shared with other cars.



**The Code Card should not be kept in the car, but it should be kept at hand because through the code, it will be possible to start the car without the ALFA ROMEO CODE (see the specific recovery procedure).**

The Code Card, as well as the ELECTRONIC CODE ("E. CODE"), contains the mechanical code of the keys ("M. CODE"); through this code it is possible to request other keys suited to the ignition switch and to be memorised in the C.C.E.

On the back there are two special spaces for applying the labels of the transmitters supplied with the optional alarm system (V.A.S. alarm).

**OPERATION: Anti-theft strategy**

Each time the ignition key is turned to MARCIA the following main operations are carried out in sequence: The injection control unit asks the C.C.E. for the MASTER CODE (the one of the MASTER key memorised previously).

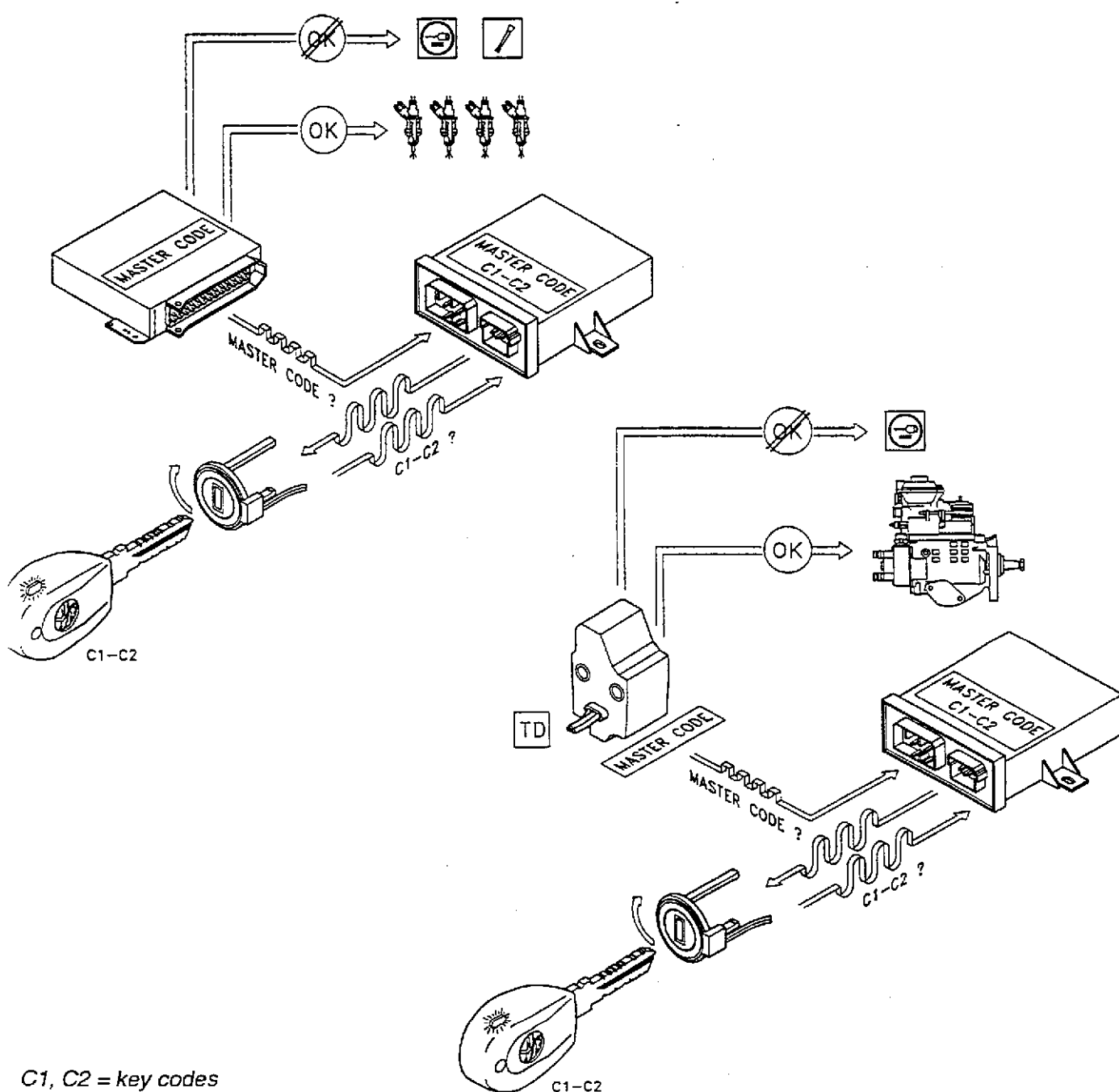
The C.C.E. checks that the code of the key engaged in the ignition lock corresponds to one of the codes contained in its memory.

If the key corresponds to one of the memorised codes:

the C.C.E. sending the MASTER CODE, to the injection control unit, **enables starting** (see illustration).

If the code of the key engaged in the ignition lock does not correspond to one of those memorised:

The C.C.E. informs the injection control unit that an extraneous key has been engaged and **starting will not be enabled** (see illustration) this situation will be indicated by the turning on of the electronic injection system failure warning light (only in petrol versions) and the ALFA ROMEO CODE warning light.



C1, C2 = key codes

### Interaction between key and C.C.E.

When the C.C.E. detects the engagement of the key it sends a signal to the ends of the aerial thereby generating an electromagnetic field.

This way the Transponder coil is inductively connected and it receives the energy to supply the integrated circuit to which it is connected.

At this point the integrated circuit transmits the code.

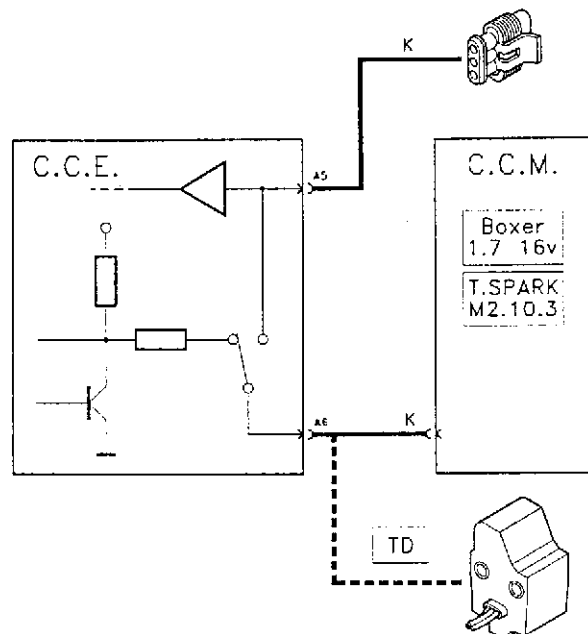
### Sharing of the serial line of the diagnosis functions and the ALFA ROMEO CODE system (Bosch Motronic M2.10.3 versions - 1.7 16v, T.SPARK 2.0 16v- and TD engines)

Inside the C.C.E. there is a shunt relay which has the purpose of enabling dialogue between the C.C.M. and the Alfa Tester or the C.C.E. itself. Pin A6 is usually dedicated to dialogue between the C.C.E. and the C.C.M. (see illustration).

Line K of the diagnosis socket is connected to the C.C.E. at pin A5.

The shunt relay is normally in such a position as to allow dialogue between the C.C.E. and the C.C.M. (default position).

When diagnosis begins connecting with the Alfa Tester (turning the ignition key to MARCIA) the C.C.E., after ending dialogue with the C.C.M. recognises the request for diagnosis and pilots the relay to connect pin A5 and A6 to one another, thereby enabling dialogue between the tester and the C.C.M.



The C.C.E. enables connection with the Alfa Tester only when the following conditions occur contemporaneously:

- There is not activity on the serial line between the C.C.E. and the C.C.M.
- A low level (of voltage) is present on pin A5 for a time of between 500ms and 5s (a low level for over 5s is considered as a short circuit towards earth)

The relay returns to the default position when there is no activity on pin A5 for over 30s.

When the control unit detects that the Alfa Tester has been engaged, it turns on the ALFA ROMEO CODE warning light to indicate correct switching of the relay.

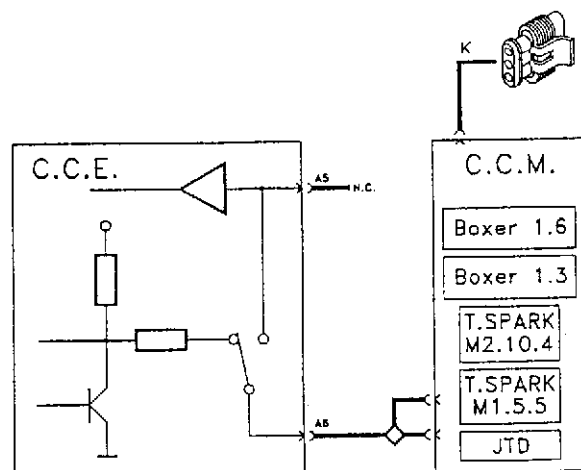
**NOTE:** in the TD version, the connection of the D.E.S.M. device with the Alfa Tester only makes it possible to detect information concerning the status of the ALFA ROMEO CODE system (see Diagnosis), but no information is given as to the injection pump, which is mechanical!!!

**Dedicated serial line between C.C.E. and C.C.M.-** (IAW versions - 1.3 engine - G.M. Rochester - 1.6 engine and BOSCH Motronic M2.10.4 - T.SPARK 16v engine and JTD)

Certain injection control units are specially provided with a serial line for dialogue between the C.C.M. and the C.C.E., using pin A6 of the C.C.E. (see illustration).

Line K of the diagnosis socket is NOT connected to pin A5, but goes directly from the C.C.M. - to the Tester.

The diagnosis line K is at all events enabled by the C.C.M. only at the end of dialogue between the C.C.M. itself and the C.C.E.



**Dialogue between C.C.E. and C.C.M.**

As mentioned previously, the C.C.E. and C.C.M. "dialogue" via a serial line formed of a single cable. The serial line is two-way, this means that the information travels sequentially from the C.C.M. to the C.C.E. and vice-versa. The information exchanged between the two control units may concern the following operating conditions:

**A) Checking the code****C.C.E. memorised C.C.M. memorised:**

Each time the key is turned to MARCIA (also during starting) the C.C.M., before starting engine management, asks the C.C.E. for the MASTER CODE. The C.C.E. can answer in one of the following three ways:

1. It sends the MASTER CODE (crypted), enabling the C.C.M. to start the car
2. It sends a code which inhibits starting the engine (if the key engaged has not been memorised, or it is a key without Transponder, aerial failure, etc.)
3. It does not answer (C.C.E. failure)

The function is governed by a programme which takes account of all the variables that might be present in the system.

**B) Memorising the codes**

These operations concern the system when at least one control unit (C.C.E. or C.C.M.) is brand new. The following instances may arise:

**C.C.E. brand new and C.C.M. brand new:**

When both the control units are brand new (C.C.E. and C.C.M.) the C.C.E. answers the request of the injection control unit sending a universal code crypted by an algorithm. This condition is indicated by a characteristic flash (1.6 Hz) of the warning light: this only takes place if the C.C.E. has detected the presence of a Transponder. Conversely, if the aerial is broken or disconnected or there is no Transponder in the key, the C.C.E. will not answer).

In this situation the system is not protected yet, and it is ready to start the key memorising procedure.

**C.C.E. memorised and C.C.M. brand new:**

When the ignition key has been turned to MARCIA the C.C.M. will ask the C.C.E. for the MASTER CODE to memorise it; the C.C.E. sends the MASTER CODE only if it has recognised a key among those memorised in the ignition lock: from this moment the MASTER CODE is memorised in the C.C.M. which is thus indissolubly linked with the car.

**C.C.E. brand new and C.C.M. with MASTER CODE memorised:**

When the ignition key has been turned to MARCIA the C.C.M. asks for the MASTER CODE to be enabled for starting. As the C.C.E. is brand new, it answers sending the universal code, only if it reads a code correctly in the Transponder. (It might be a key without Transponder or with a key with the Transponder not working or the aerial might be disconnected or damaged, etc.).

The C.C.M. prevents the engine from being started as it does not recognise the universal code: it is necessary to memorise the keys in the C.C.E., MAKING SURE THAT THE MASTER KEY IS THE ONE WHICH OPENS AND CLOSES THE PROCEDURE (see programming).

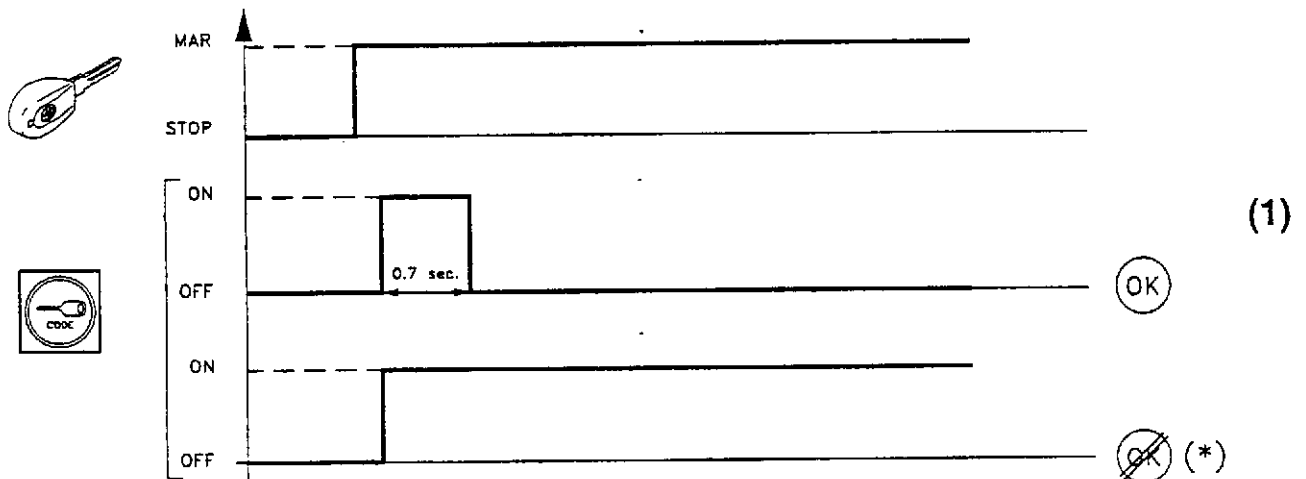


## Piloting times of the ALFA ROMEO CODE warning light

The diagnosis warning light on the instrument panel is controlled by the C.C.E. to inform the user and workshops of the system status.

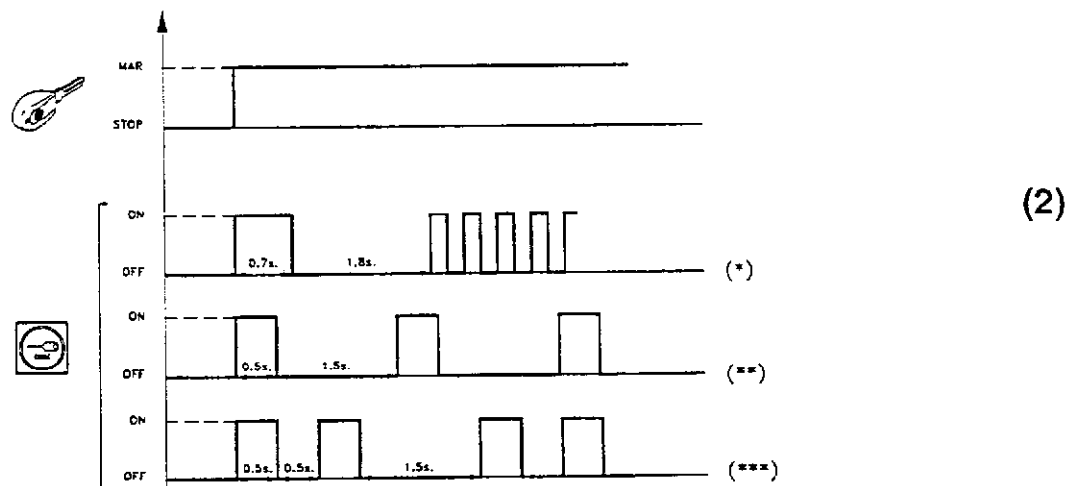
There are two types of characteristic flashing:

1. When the keys have already been memorised (see illustration) it indicates the correct operation of the system or a problem:
2. When the system is still brand new the flash (1.6 Hz after 2.5 seconds) means that the system is intact and working, the car is not protected until a key memorising procedure has been carried out, other faults detected are also indicated (see illustration)



- (\*) - Transponder not recognised/absent/faulty  
- lack of connection between C.C.E. and C.C.M.  
- aerial faulty/disconnected

- C.C.E. faulty  
- re-memorising not carried out correctly



- (\*) system intact, working but brand new, car not protected  
(\*\*) lack of connection between CCE and CCM

- (\*\*\*) - Transponder not recognised/absent/faulty  
- aerial faulty/disconnected

### WARNING!

If the ALFA ROMEO CODE warning light turns on momentarily or permanently while travelling or starting the car, this does not necessarily mean a system failure, but, in certain cases, it means a condition that can be interpreted as an attempt to manipulate the vehicle by a thief.

Should this occur, to correctly check the car, turn the engine off and move the key to STOP; then turn the key back to MARCIA: the warning light should turn on and off in less than one second.

If it stays on after this procedure, repeat the operation, leaving the key at STOP for more than 30 seconds. If the warning light still stays on when the key is in the MARCIA Position, carry out diagnosis on the ALFA ROMEO CODE system.

## PROGRAMMING THE KEYS

The system is capable of memorising up to 7 keys plus the MASTER KEY. Correct memorising needs two keys plus the MASTER key.

During production testing the keys were memorised and the system is tested and working. If the need arises, for servicing reasons, to replace faulty components or there is the need for more keys than those supplied, the key memorising procedure must be carried out. There are two types of ways to memorise the keys :

- Memorising procedure, with a brand new system (C.C.E. and C.C.M. new).
- Re-memorising procedure, which is carried out under the following circumstances:
  - the addition of other keys besides those already memorised in the C.C.E.
  - if it is absolutely necessary to change the ignition lock. In this circumstance, in fact, it is possible to keep the only the Transponder of the MASTER key of the old set of keys, which, once inserted in the new key (see specific procedure) makes it possible to memorise the other keys provided with the new ignition lock.
- changing the C.C.E.

## MEMORISING

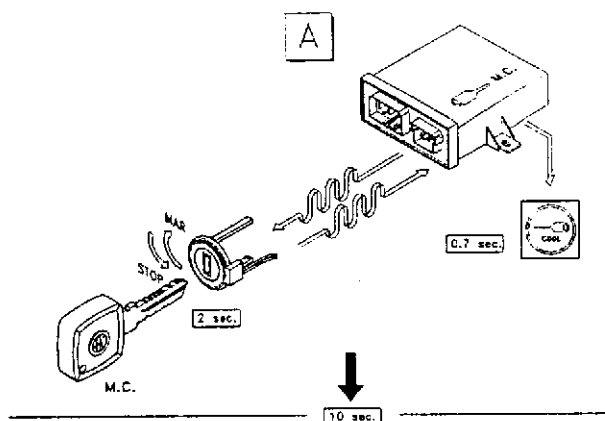
Before starting to programme the keys, it is necessary to check whether the system is brand new or if any keys have been memorised; this can be done by displaying the indications of the diagnosis warning light or connecting to the Alfa Tester. **The use of a faulty or already memorised C.C.E. would in fact involve the irreversible memorising of an incorrect code in the C.C.M. which it will no longer be possible to use in future on other cars.**

The memorising procedure is divided into two strictly consecutive phases:

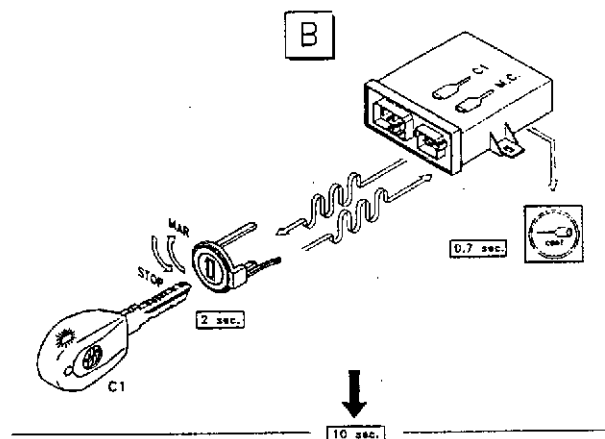
1. Memorising the keys inside the C.C.E.
2. Memorising the MASTER CODE in the engine control system control unit (if brand new)  
This is carried out only when the first one has been carried out with a positive result, turning the key to MARCIA.

**MEMORISING PROCEDURE WITH BRAND  
NEW SYSTEM**

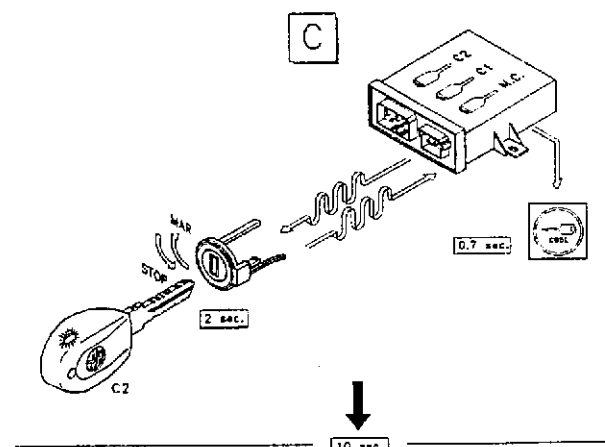
- A** Insert the **MASTER key** in the ignition lock  
Turn the MASTER key to MARCIA and move it  
back to STOP as soon as the ALFA ROMEO  
CODE warning light goes off.



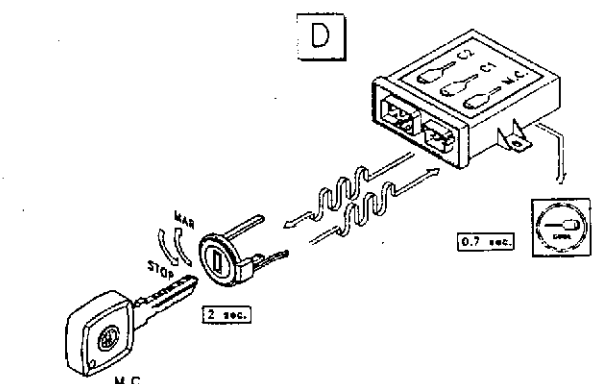
- B** Within 10 seconds:  
Remove the MASTER key from the ignition lock,  
insert a **main key** in the lock  
Turn the key to MARCIA. As soon as the ALFA  
ROMEO CODE warning light goes out, turn the  
key to the STOP position.



- C** Within 10 seconds:  
Remove the key from the ignition lock, insert a  
**second main key** in the lock.  
Turn the key to MARCIA. As soon as the ALFA  
ROMEO CODE warning light goes out, turn the  
key to the STOP position.



- D** Within 10 seconds:  
Remove the key from the ignition lock, insert **the  
MASTER key** in the ignition lock **again**  
Turn the key to MARCIA. As soon as the ALFA  
ROMEO CODE warning light goes out, move it  
back to the STOP position.



Keep the key in the STOP position for 4 - 9 seconds.



**Do not leave the key in the STOP position  
for over 10 seconds: if you do, all the mem-  
orized codes are deleted.**

M.C. = MASTER CODE C1, C2 = key codes

## Variant only for JTD engines

- Keep the key in the STOP position for 4 - 9 seconds.

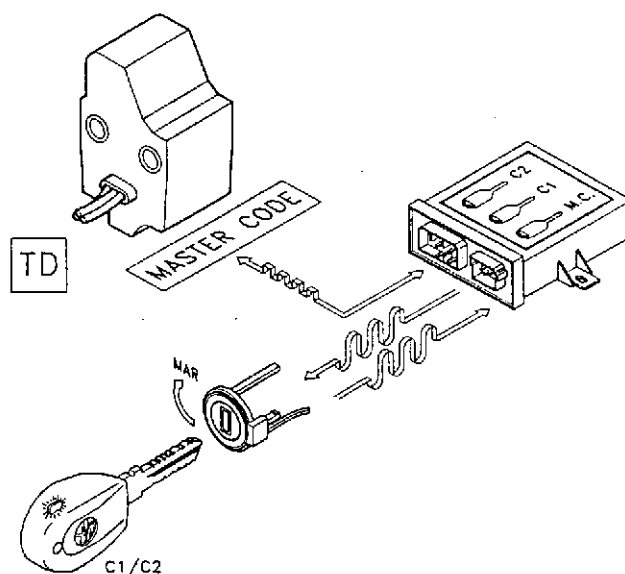
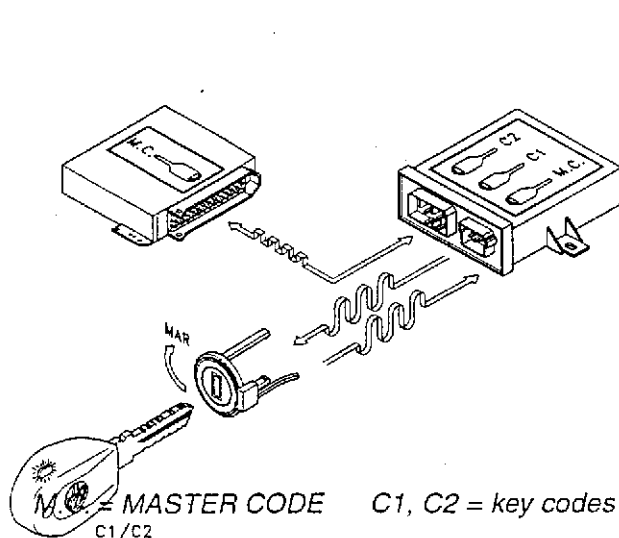


**Do not leave the key in the STOP position for over 10 seconds: if you do, all the memorized codes are deleted.**

- Turn the MASTER key to MAR. As soon as the ALFA ROMEO CODE telltale light turns off, turn the key to the STOP position.
- Repeat this operation (key turned to MAR and then STOP when the telltale light turns off) UNTIL THE TELLTALE LIGHT STAYS ON.
- Turn the key to STOP and remove it.

At this point the keys are memorised in the C.C.E.

- E** Insert any one of the memorised keys and turn it to MARCIA: the ALFA ROMEO CODE warning light will turn off and go out after 0.7 seconds. Wait for 2 seconds: if the ALFA ROMEO CODE warning light stays off, that means that the key memorising procedure has been carried out correctly, and the MASTER key code has been memorised in the injection control unit. Conversely, if the warning light flashes again (1.6 Hz), it means that the memorising procedure has not been carried out correctly.



If, for any reason and in any moment, you think you have mistaken the procedure:

- Move the key to MARCIA for more than 2 seconds or move the key to STOP for more than 10 seconds.
- Repeat the procedure from the start inserting all the keys..

As may be deduced, during the procedure the key should never be kept at MARCIA for over 2 seconds, while it should never be kept at STOP for over 10 seconds.

Each time the key is turned to MARCIA, the warning light turns on (0.7 s), indicating the correct sequence of the procedure.

The above-mentioned procedure includes three keys: the MASTER key and two main keys. Up to seven main keys may be inserted, using more keys between two insertions of the MASTER key. The MASTER key must always be inserted for the first and last time during programming.

The procedure is interrupted if the following situations occur:

- The same key is inserted twice consecutively
  - The same key is inserted twice or more times between two insertions of the MASTER key
  - A key stays at MARCIA for more than 2 seconds
- A key is kept at STOP (during the procedure) for more than 10 seconds**

## KEY RE-MEMORISING PROCEDURE

This procedure is similar to the previous one, and consists in inserting the main keys between two insertions of the MASTER Key.

During the sequence the new main keys and the old ones are inserted.

If the main keys memorised previously are not inserted, their code will be erased from the memory of the control unit.

- A** Insert the **MASTER** key in the ignition lock  
Turn the MASTER key to MARCIA and move it back to STOP as soon as the ALFA ROMEO CODE warning light goes out.

- B** Within 10 seconds:  
Remove the MASTER key from the ignition lock, insert a **main key (known or new)** in the lock. Turn the key to MARCIA : when the ALFA ROMEO CODE warning light goes out, turn the key to the STOP position.

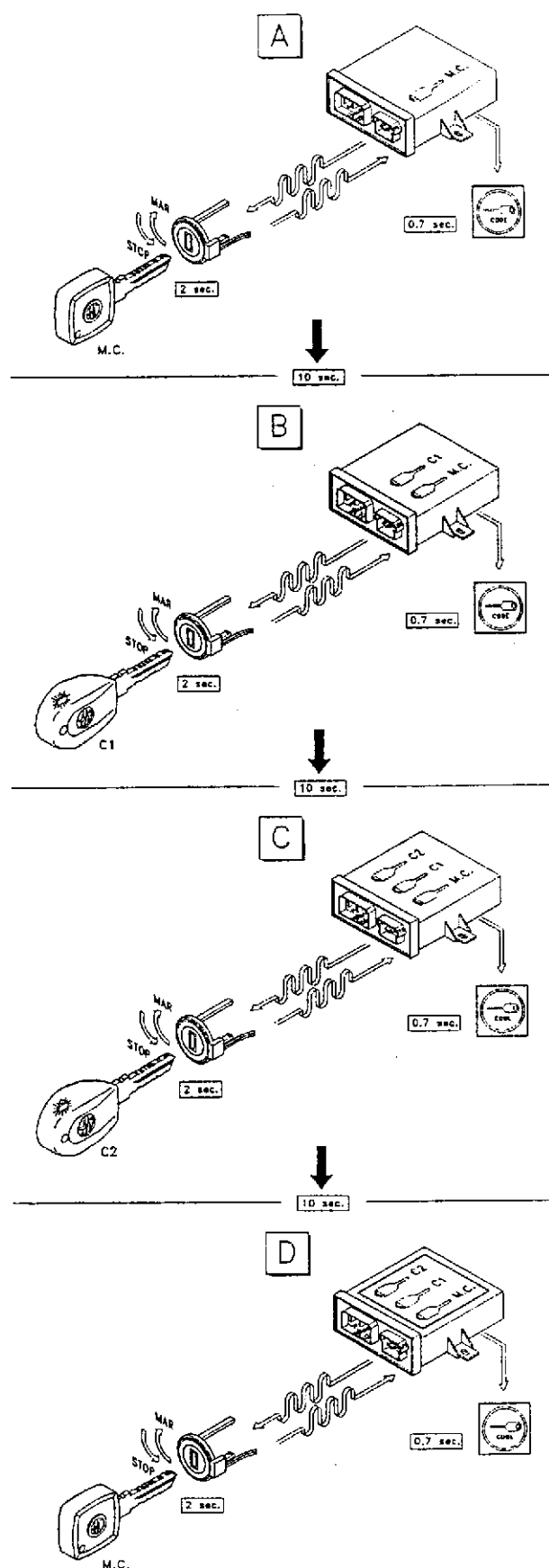
- C** Within 10 seconds:  
Insert a **second main key (known or new)** in the ignition lock  
Turn the key to MARCIA : when the ALFA ROMEO CODE warning light goes out, turn the key to the STOP position.

- D** Within 10 seconds:  
Remove the key from the ignition lock, insert the **MASTER key in the lock again**  
Turn the key to MARCIA and when the ALFA ROMEO CODE warning light goes out, move it back to the STOP position.

Keep the key in the STOP position for 4 - 9 seconds.



**Do not leave the key in the STOP position for over 10 seconds: if you do, all the memorized codes are deleted.**



M.C. = MASTER CODE    C1, C2 = key codes

If, for any reason and in any moment, you think you have mistaken the procedure:

- Move the key to MARCIA for more than 2 seconds or move the key to STOP for more than 10 seconds.
- Repeat the procedure from the start inserting all the keys..

As may be deduced, during the procedure the key should never be kept at MARCIA for over 2 seconds, while it should never be kept at STOP for over 10 seconds.

Each time the key is turned to MARCIA, the warning light turns on (0.7 s), indicating the correct sequence of the procedure.

The above-mentioned procedure includes three keys: the MASTER key and two main keys.

Up to seven main keys may be inserted, using more keys between two insertions of the MASTER key. The MASTER key must always be inserted for the first and last time during programming.

The procedure is interrupted if the following situations occur:

- The same key is inserted twice consecutively
- The same key is inserted twice or more times between two insertions of the MASTER key
- A key stays at MARCIA for more than 2 seconds
- A key is kept at STOP (during the procedure) for more than 10 seconds

**Memorising the MASTER CODE in the C.C.M. (if the latter is changed):**

This operation takes place turning the key to MARCIA after having memorised all the keys in the C.C.E.

**Warning:**

- Once the codes have been programmed, the C.C.E. is capable of transferring the MASTER CODE to the injection control unit (which stores it permanently), each time the key is turned to MARCIA.
- Do not use brand new C.C.M.s to check that the system is working properly.
- Do not swop C.C.M.s among cars.

**Memorising with brand new C.C.E. and memorised C.C.M.:**

This function is carried out following the normal memorising procedure, as if the whole system were brand new; the MASTER Key must be the same with which the injection control unit was memorised previously.

#### **WARNINGS:**

- Before starting the procedure make sure that the C.C.E. is truly brand new. The use of a faulty or already memorised C.C.E. will cause the irreversible memorisation of a wrong code in the C.C.M., which will no longer be able to be used in future on other cars.

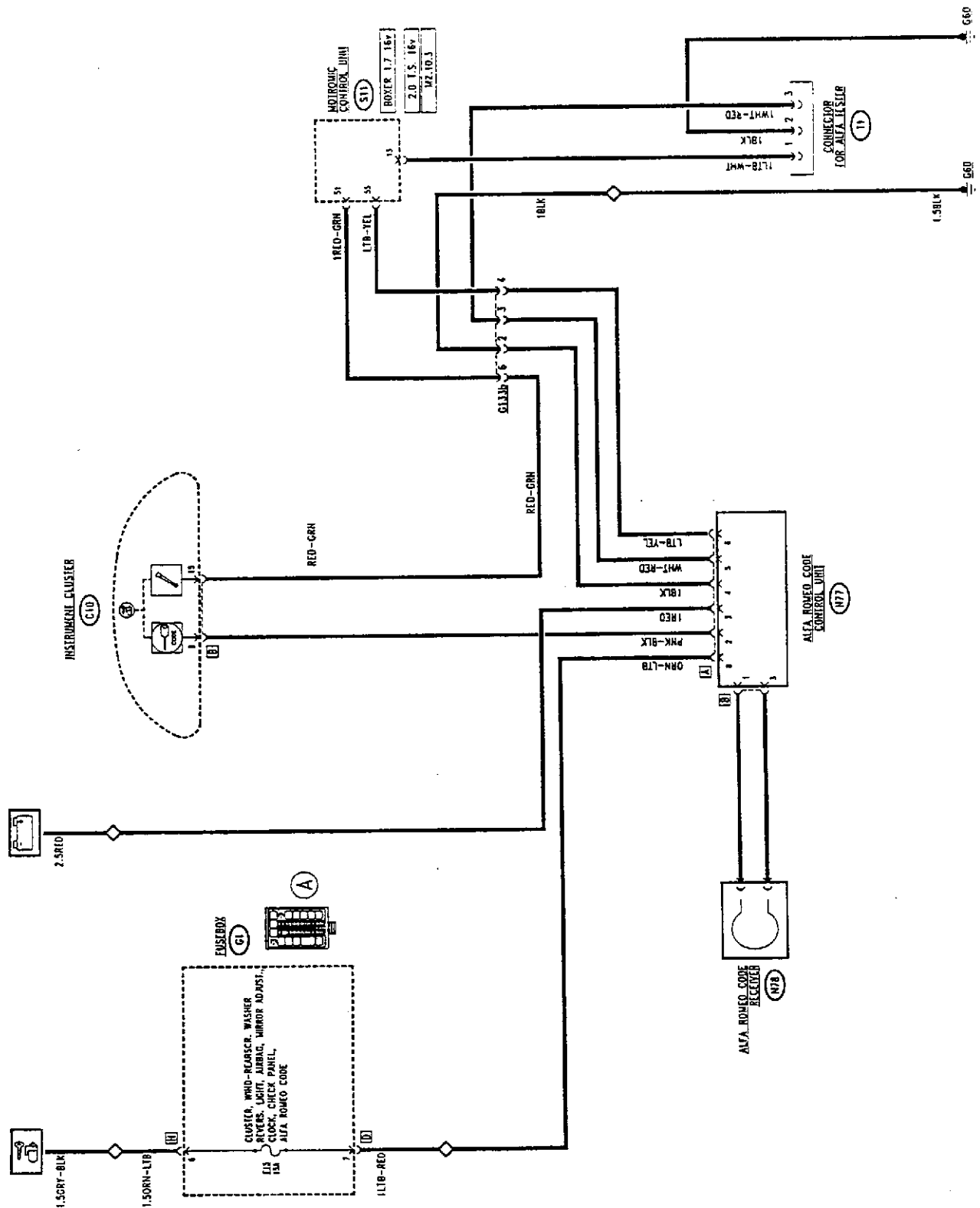
#### **WARNING:**

If the ALFA ROMEO CODE warning light stays on during re-memorisation, it means that the procedure has not been carried out correctly and it has been interrupted.

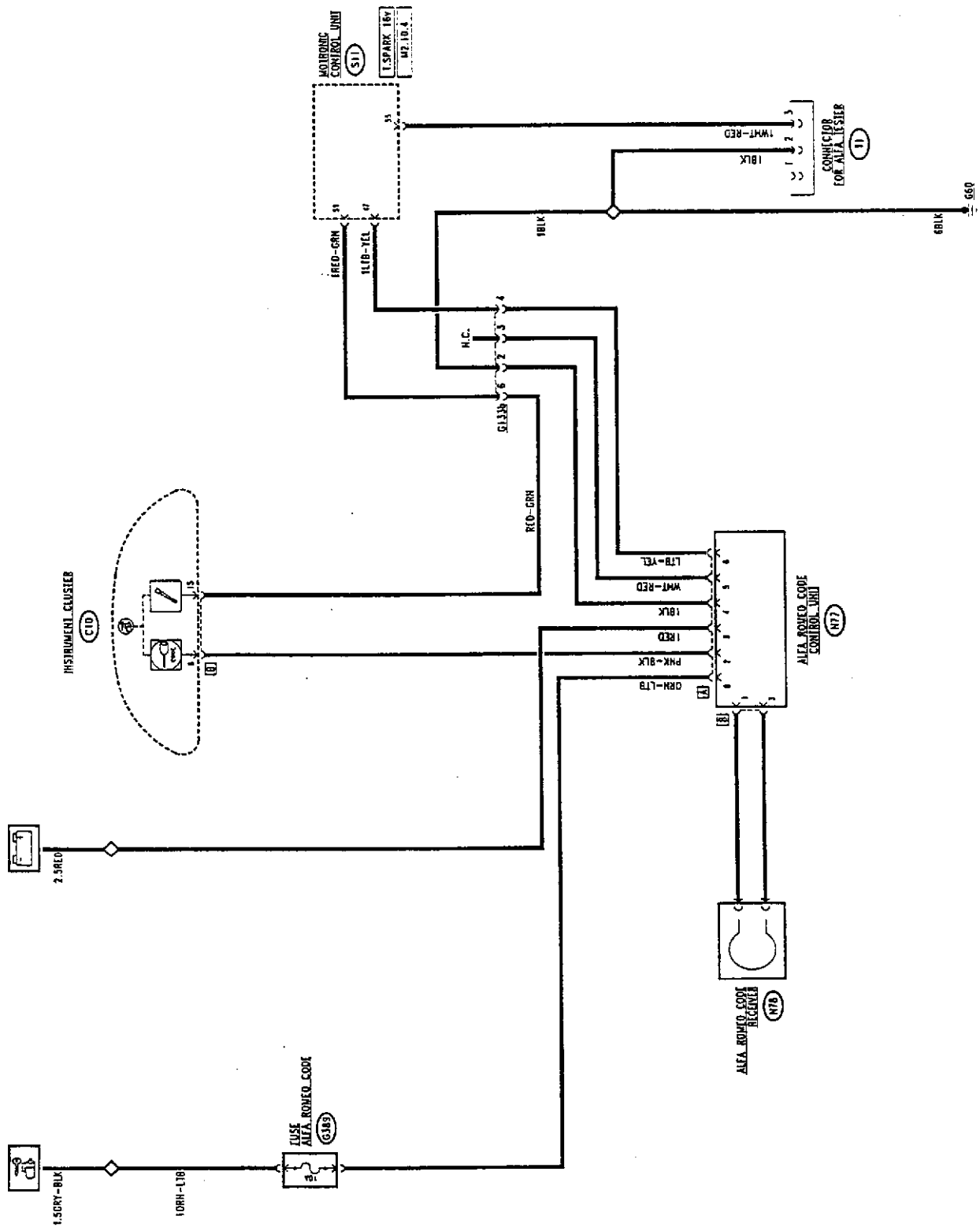
Repeat the re-memorising procedure from the start.

- If the ALFA ROMEO CODE warning light stays on when the MASTER key has been inserted twice consecutively, this does not mean a malfunctioning, but that the re-memorising procedure has been opened (key at MARCIA) and interrupted (second key at MARCIA). To resume the correct operation of the warning light, move the key to STOP.

WIRING DIAGRAM - Boxer 1.7 engine, 2.0 T.SPARK 16v engine,  
up to chassis no. ...



## WIRING DIAGRAM - T.SPARK 16v engine

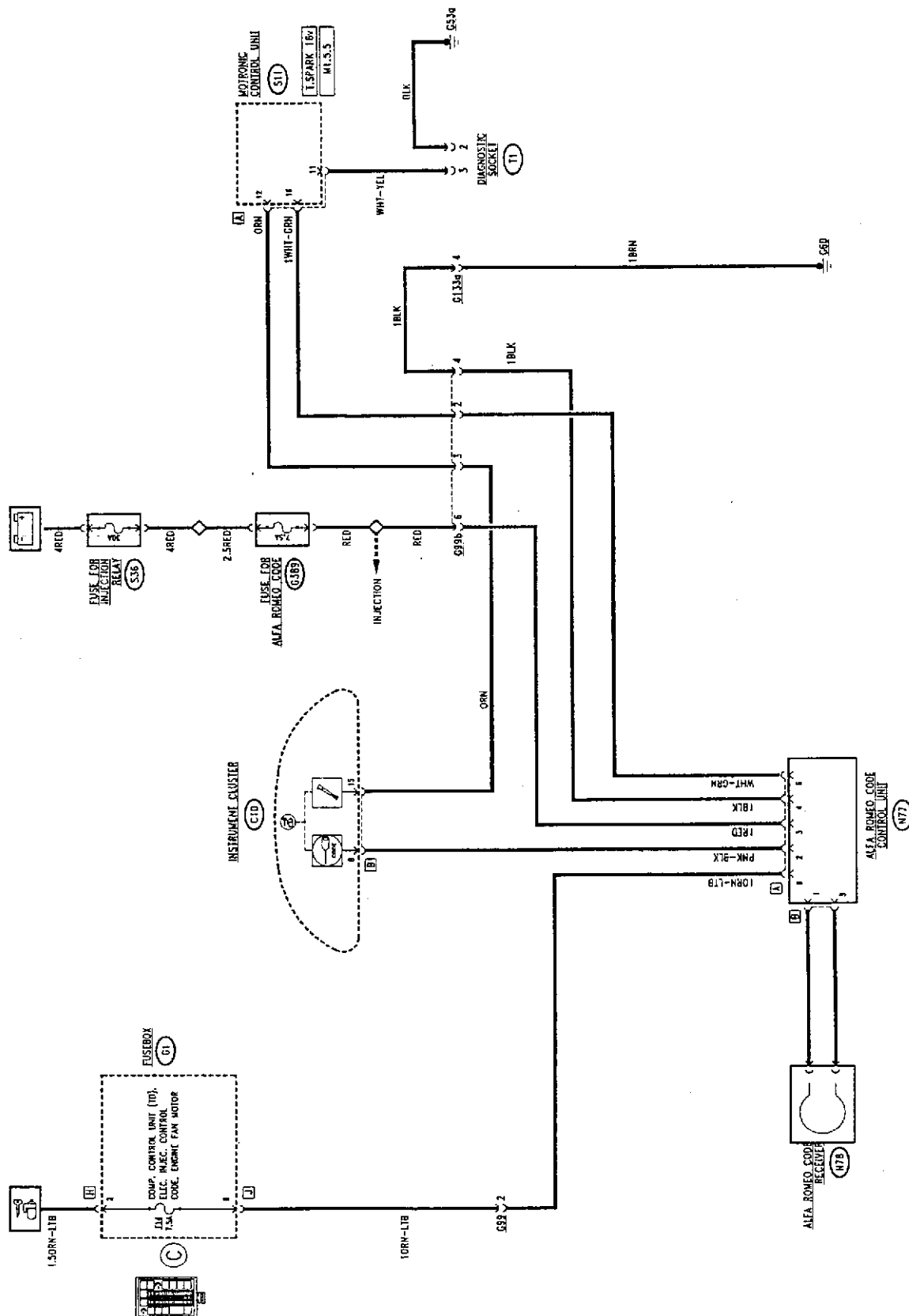




10-1996



## WIRING DIAGRAM (T.SPARK engine - from M.Y. '98)



**FUNCTIONAL DESCRIPTION (petrol engines)**

The ALFA ROMEO CODE control unit N77, to be found under the righthand side of the steering wheel, is connected via connector B to a special pair of cables to the receiver N78, consisting in a coaxial aerial with the ignition switch.

Through connector A it is connected to the Motronic injection control unit S11 or S40 - IAW and G.M. Rochester and to the other systems: at pin 8 it receives the "key-operated" supply via the line of fuse F15 of G1, - up to chassis no. ... - or the line of the specific wander fuse G389, or for box "C" from fuse F14 of G1, while pin 3 receives the direct supply and pin 4 is earthed.

The connection line with the ALFA ROMEO CODE warning light on the instrument panel C10 leaves from pin 2.

- Boxer 1.7 16v and 2.0 T.SPARK with M2.10.3: Pins 5 and 6 manage communication between the ALFA

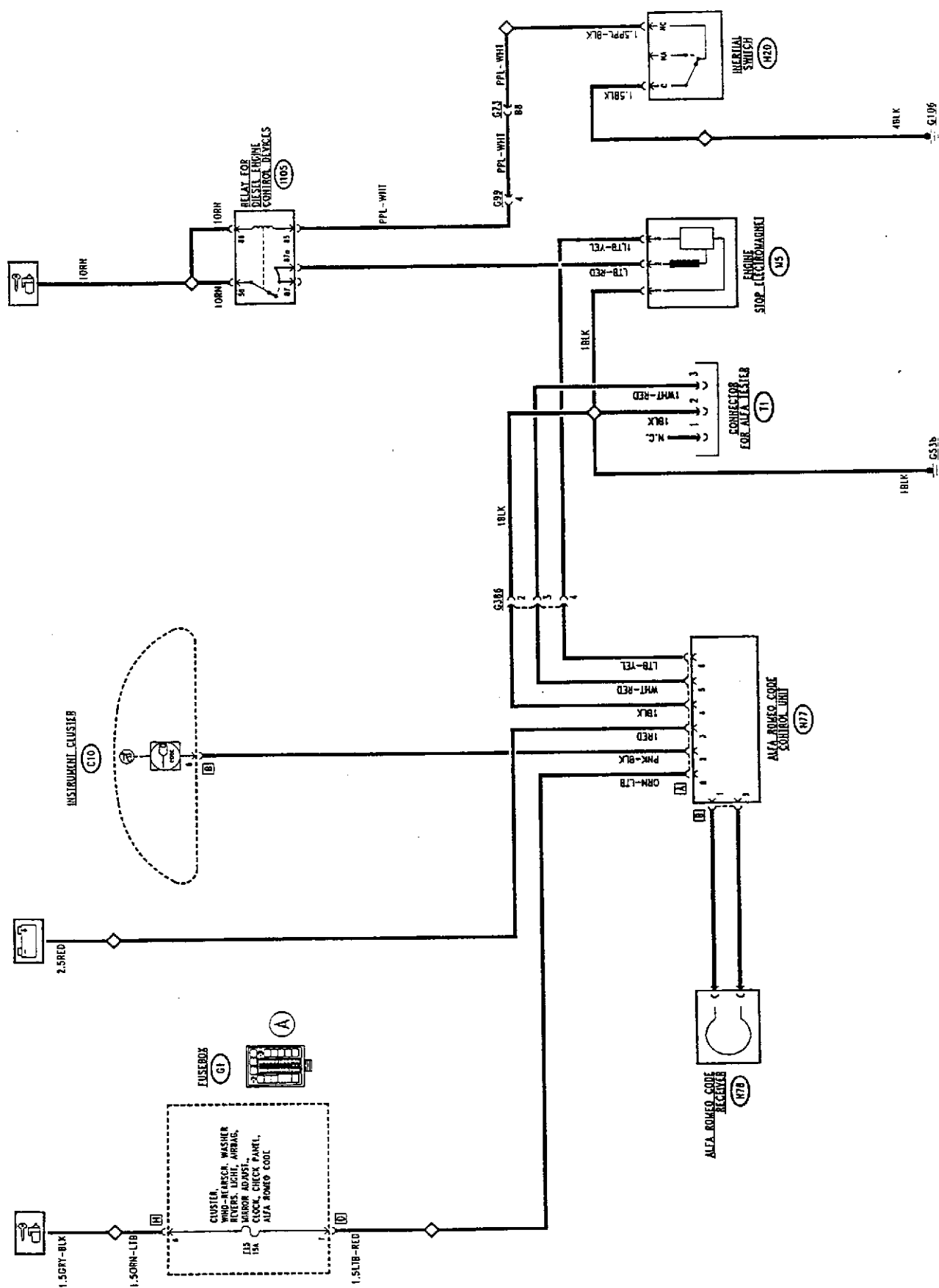
ROMEO CODE control unit N77 and the Motronic control unit S11: this communication takes place "cutting off" the diagnosis line K which leads from S11 to the diagnosis connector T1.

- Boxer 1.3 and 1.6: pin 6 manages communication between the ALFA ROMEO CODE control unit N77 and the injection control unit S40 via the special connection serial line (pin 7 of S40 for the IAW control unit and pins E10 and B11 of S40 for the G.M. Rochester control unit: in this case one pin serves for the input of the signal in the control unit and the other for the output).

- T.SPARK 16v with Motronic M2.10.4: communication between the ALFA ROMEO CODE control unit N77 - pin 6 - and control unit S11 is managed by a special direct line: between pin 6 of N77 and pin 47 of S11.

- T.SPARK 16v with Motronic M1.5.5: communication between the ALFA ROMEO CODE control unit N77 - pin 6 - and control unit S11 is managed by a special direct line: pin A16 of S11.

## WIRING DIAGRAM - TD engine











## FUNCTIONAL DESCRIPTION (TD and TD-CAT engine)

The ALFA ROMEO CODE control unit **N77**, to be found under the righthand side of the steering wheel, is connected via connector **B** to a special pair of cables to the receiver **N78**, consisting in a coaxial aerial with the ignition switch.

Through connector **A** it is connected to the engine stop electromagnet device **M5** and to the other systems: at pin 8 it receives the "key-operated" supply via the line of fuse **F15** of **G1**, (TD) or the line of the specific wander fuse **G389** (for box "C" by fuse **F14** of **G1**); the direct supply is received at pin 3 and pin 4 is earthed.

The connection line with the ALFA ROMEO CODE warning light on the instrument panel **C10** leaves from pin 2.

Pin 6 manages communication between the ALFA ROMEO CODE control unit **N77** and the engine stop electromagnet **M5** via the special serial connection line. The line of pin 5 is used for connection with the Alfa Romeo Tester **T1** for checking the ALFA ROMEO CODE system.

The solenoid valve **M5** contains an electronic device which operates the opening of the flow of fuel towards

the pump only after dialogue has been carried out correctly with the control unit **N77** (MASTER CODE recognition, etc.).

## FUNCTIONAL DESCRIPTION (JTD engine)

The ALFA ROMEO CODE control unit **N77**, to be found under the righthand side of the steering wheel, is connected via connector **B** to a special pair of cables to the receiver **N78**, consisting in a coaxial aerial with the ignition switch.

Through connector **A** it is connected to the injection control unit **S11** and to the other systems: at pin 8 it receives the "key-operated" supply through the line of fuse **F14** of **G1** -, while at pin 3 it receives the direct supply via the line of fuse **G389**, and pin 4 is earthed. The connection line with the ALFA ROMEO CODE warning light on the instrument cluster **C10** leads from pin 2.

Communication between the ALFA ROMEO CODE control unit **N77** - pin 6 - and control unit **S11** is controlled by a special direct line: pin 13 of connector **C** of **S11**.

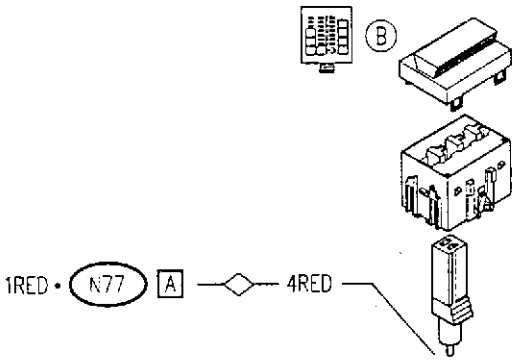
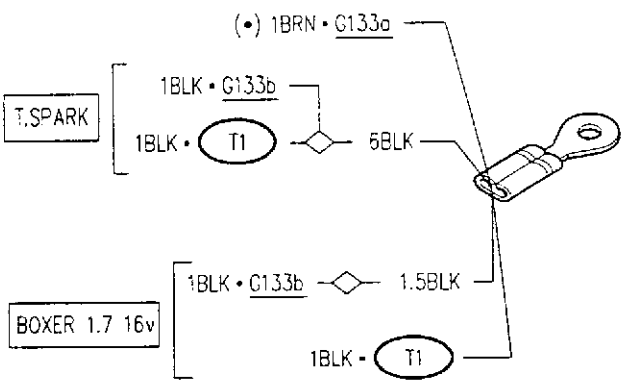
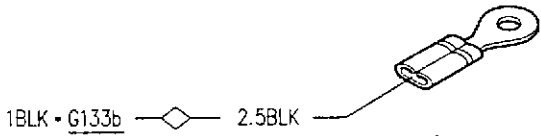
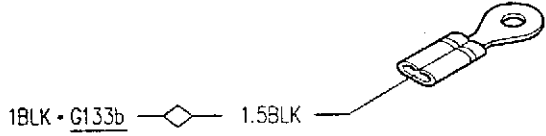
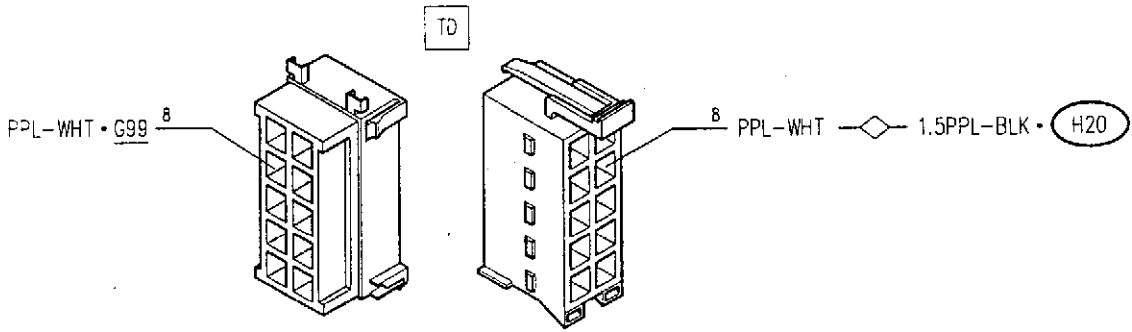
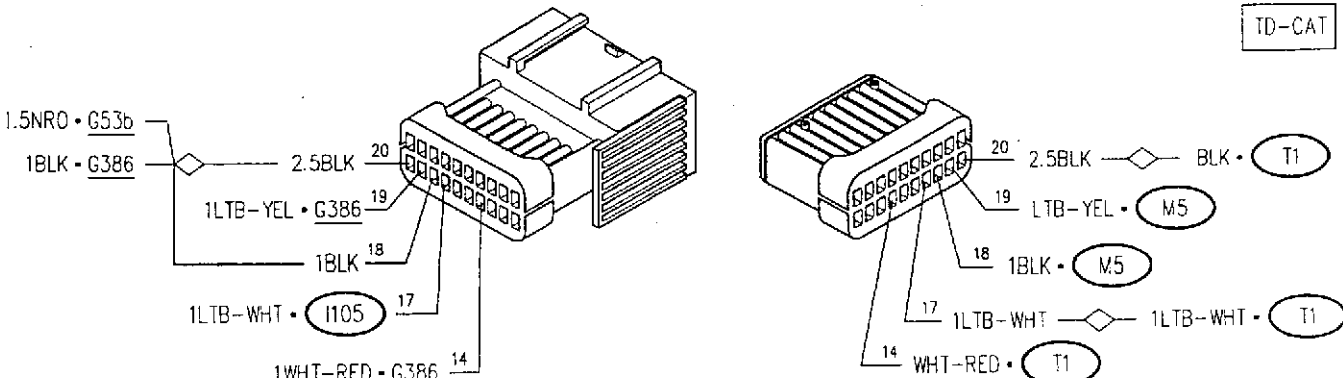
## COMPONENTS AND CONNECTORS

<p>Instrument cluster</p> <p>(C10) (B)</p>	<p>Fusebox (*)</p> <p>(G1) (D)</p>
<p>Fusebox (*)</p> <p>(G1) (H)</p>	<p>Fusebox</p> <p>(G1) (H)</p>
<p>Fusebox</p> <p>(G1) (J)</p>	<p>Fusebox</p> <p>(G1) (Q)</p>
<p>RH engine compartment earth</p> <p>G53a</p> <p>JTD</p>	<p>LH engine compartment earth</p> <p>G53b</p>

(\*) only up to chassis no. ...

(•) only M1.5.5

## COMPONENTS AND CONNECTORS (cont.d)

Branch terminal board	<b>G56</b>	Injection wiring earth	<b>G60</b>
 <p>1RED • N77 [A] — 4RED</p>		 <p>(•) 1BRN • G133a</p> <p>T.SPARK [ 1BLK • G133b 1BLK • T1 ] — 5BLK</p> <p>BOXER 1.7 16v [ 1BLK • G133b — 1.5BLK 1BLK • T1 ]</p>	
Injection wiring earth	<b>G60a</b>	Injection wiring earth	<b>G60a</b>
 <p>BOXER 1.3</p> <p>1BLK • G133b — 2.5BLK</p>		 <p>BOXER 1.6 ROCHESTER</p> <p>1BLK • G133b — 1.5BLK</p>	
Connector for rear services			<b>G73</b> [B]
 <p>TD</p> <p>PPL-WHT • G99 8</p> <p>8 PPL-WHT — 1.5PPL-BLK • H20</p>			
Engine compartment			<b>G94</b>
 <p>TD-CAT</p> <p>1.5NRO • G53b — 2.5BLK 20</p> <p>1BLK • G386 — 19</p> <p>1LTB-YEL • G386 — 18</p> <p>1BLK — 17</p> <p>1LTB-WHT • I105 — 14</p> <p>1WHT-RED • G386</p> <p>2.5BLK — BLK • T1</p> <p>LTB-YEL • M5</p> <p>1BLK • M5</p> <p>1LTB-WHT • T1</p> <p>WHT-RED • T1</p>			

(\*) only up to chassis no. ...

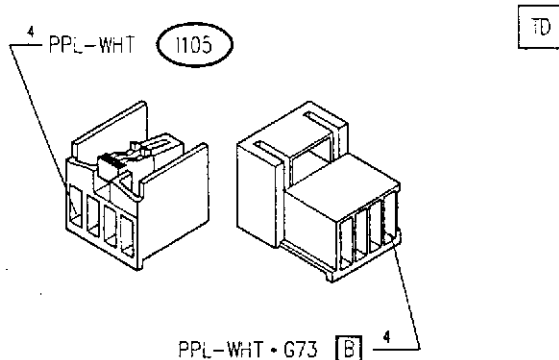
(\*) from M.Y. '98

PA493000000009

## COMPONENTS AND CONNECTORS (cont.d)

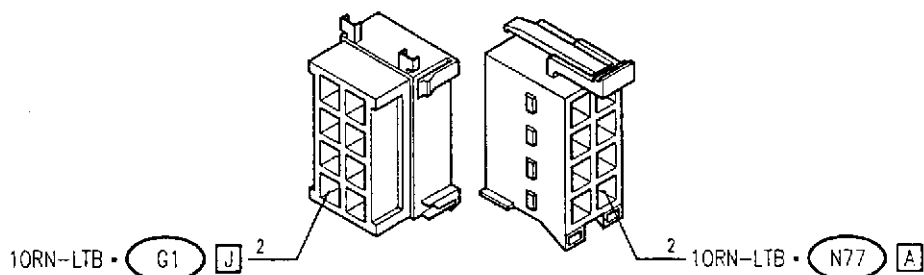
Connector for dashboard wiring/engine wiring

G99



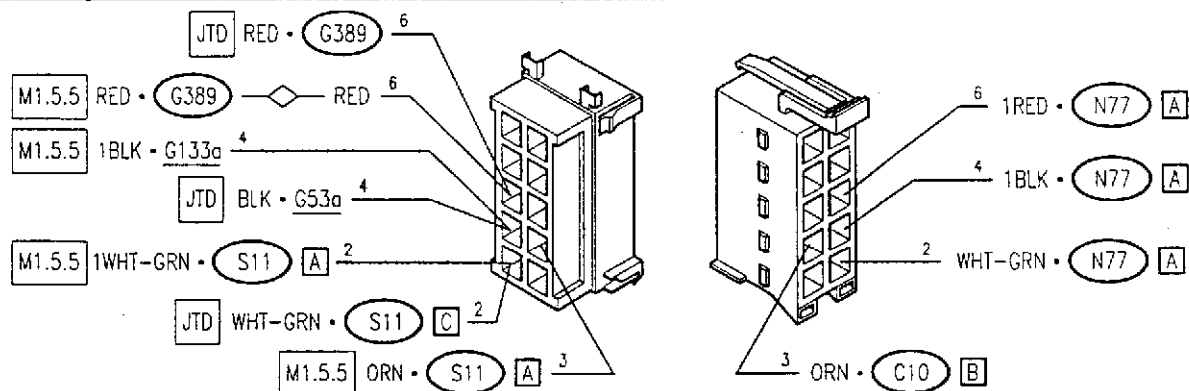
Connector for dashboard wiring/engine wiring

G99



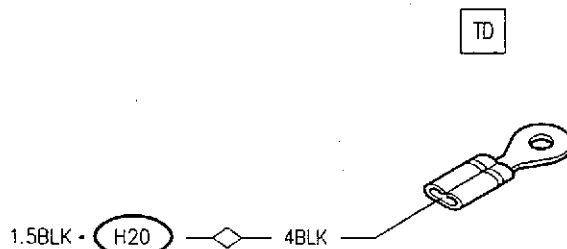
Connector for dashboard wiring/engine wiring (•)

G99b

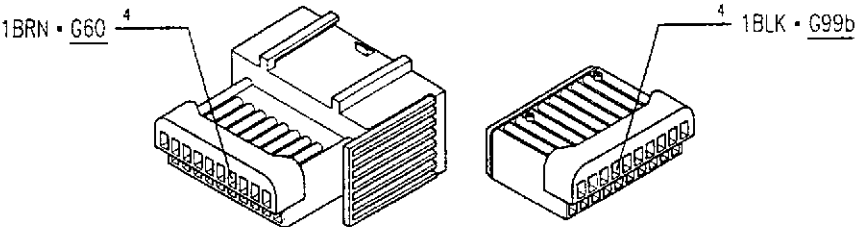
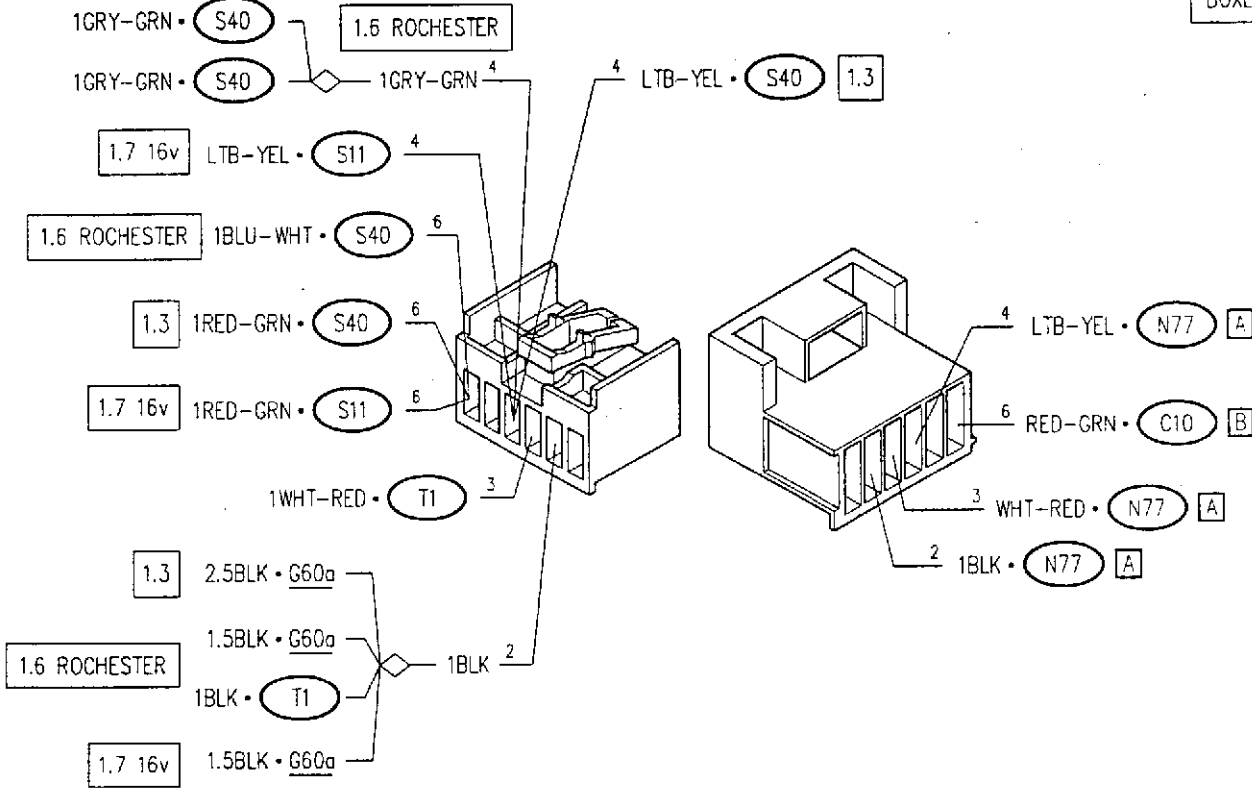
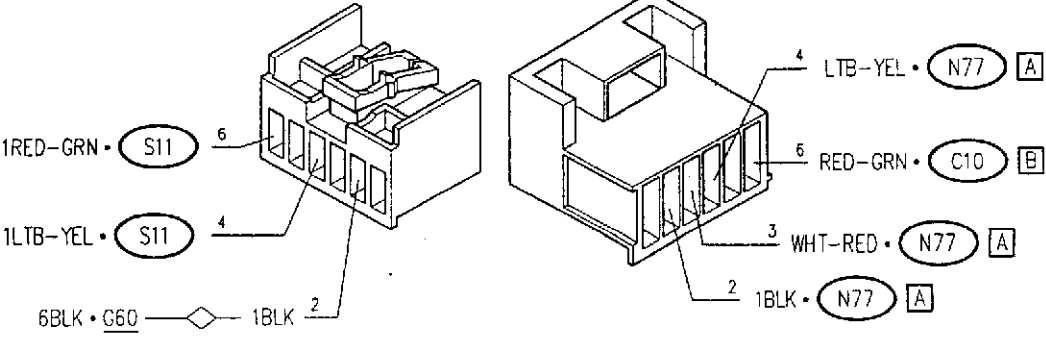


Seat cross rail earth

G106



## COMPONENTS AND CONNECTORS (cont.d)

Connector for electronic injection wiring A (•)	G133a
 <p>1BRN • G60 4</p> <p>1BLK • G99b 4</p>	
Connector for electronic injection wiring B	G133b
 <p>BOXER</p> <p>1GRY-GRN • S40 1.5 ROCHESTER</p> <p>1GRY-GRN • S40 1GRY-GRN 4</p> <p>1.7 16v LTB-YEL • S11 4</p> <p>1.6 ROCHESTER 1BLU-WHT • S40 6</p> <p>1.3 1RED-GRN • S40 6</p> <p>1.7 16v 1RED-GRN • S11 6</p> <p>1WHT-RED • T1 3</p> <p>1.3 2.5BLK • G60a</p> <p>1.6 ROCHESTER 1.5BLK • G60a</p> <p>1BLK • T1 1BLK 2</p> <p>1.7 16v 1.5BLK • G60a</p> <p>LTB-YEL • S40 1.3 4</p> <p>LTB-YEL • N77 A 4</p> <p>RED-GRN • C10 B 6</p> <p>WHT-RED • N77 A 3</p> <p>1BLK • N77 A 2</p>	
Connector for electronic injection wiring B (*)	G133b
 <p>T.SPARK</p> <p>1RED-GRN • S11 6</p> <p>1LTB-YEL • S11 4</p> <p>6BLK • G60 1BLK 2</p> <p>LTB-YEL • N77 A 4</p> <p>RED-GRN • C10 B 6</p> <p>WHT-RED • N77 A 3</p> <p>1BLK • N77 A 2</p>	

(•) from M.Y. '98

(\*) up to M.Y. '97

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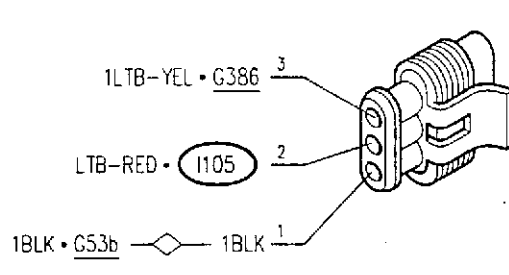
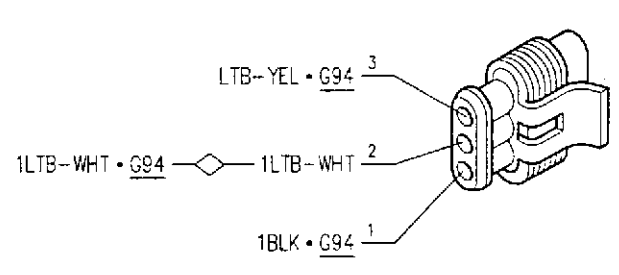
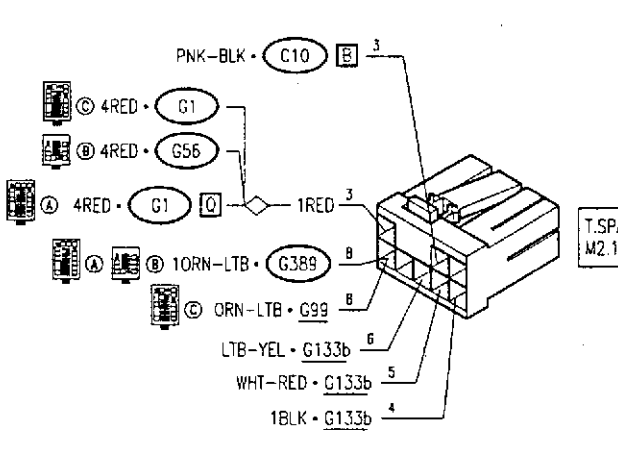
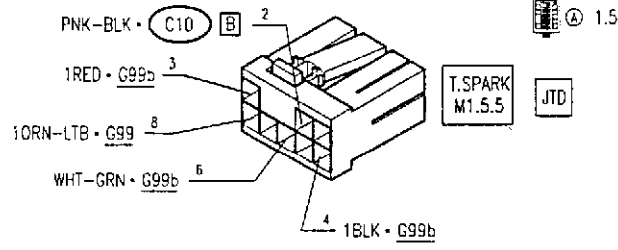
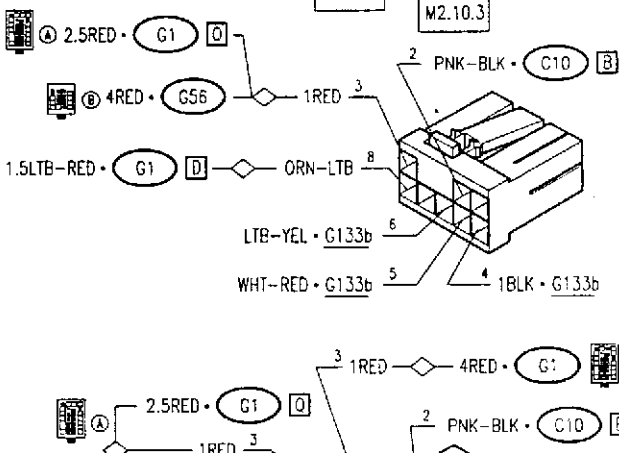
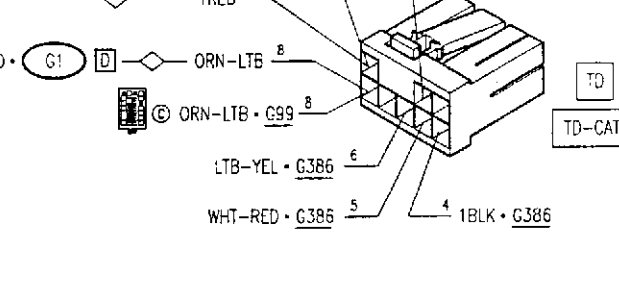
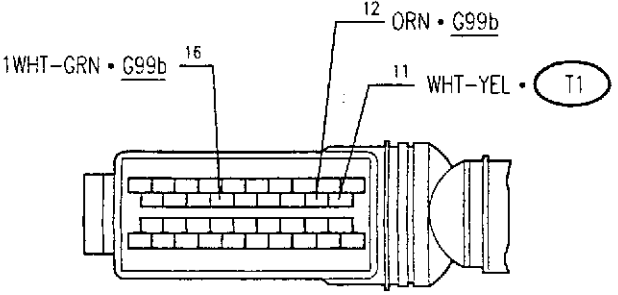
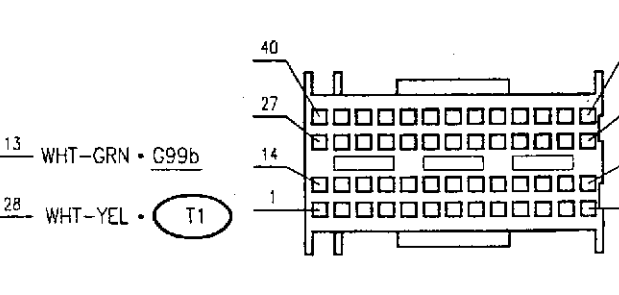
## COMPONENTS AND CONNECTORS (cont.d)

ALFA ROMEO CODE system connector		G386	
ALFA ROMEO CODE system connector		G386	
ALFA ROMEO CODE fuse (*)	G389	ALFA ROMEO CODE fuse (•)	G389
Inertial switch	H20	Relay for Diesel engine control devices	I105

(\*) up to chassis no. ...

(•) from M.Y. '98

## COMPONENTS AND CONNECTORS (cont.d)

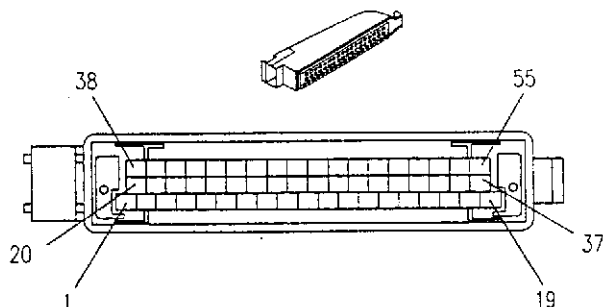
Engine stop electromagnet	M5	Engine stop electromagnet	M5		
<div>TD</div> 		<div>TD-CAT</div> 			
ALFA ROMEO CODE control unit		N77	A		
 		 			
Electronic injection control unit (M1.5.5)	S11	A	Electronic injection control unit	S11	C
					

## COMPONENTS AND CONNECTORS (cont.d)

## Motronic control unit

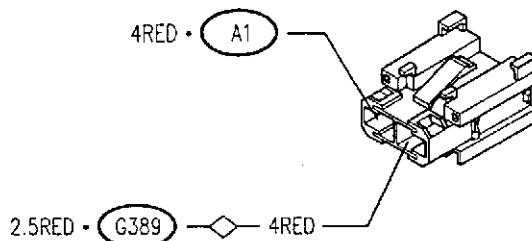
S11

- 1.7
- T.SPARK  
M2.10.3
- 13 1LTB-WHT • T1
- 51 1RED-GRN • G133b
- 55 LTB-YEL • G133b
- T.SPARK  
M2.10.4
- 47 1LTB-YEL • G133b
- 51 1RED-GRN • G133b
- 55 1LTB-WHT • T1



## Fuse for injection relay

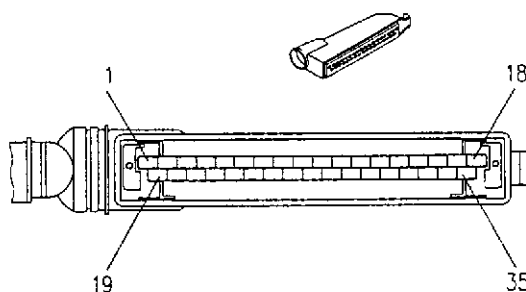
S36



## Injection/ignition control unit

S40

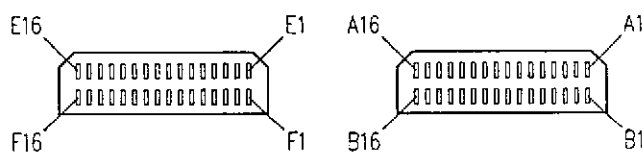
- 6 1RED-GRN • G133b
- 7 LTB-YEL • G133b
- 10 1LTB-WHT • T1
- 15 1WHT-RED • T1
- 16 2.5PPL-BLK —◇— 1PPL-BLK • T1



1.3

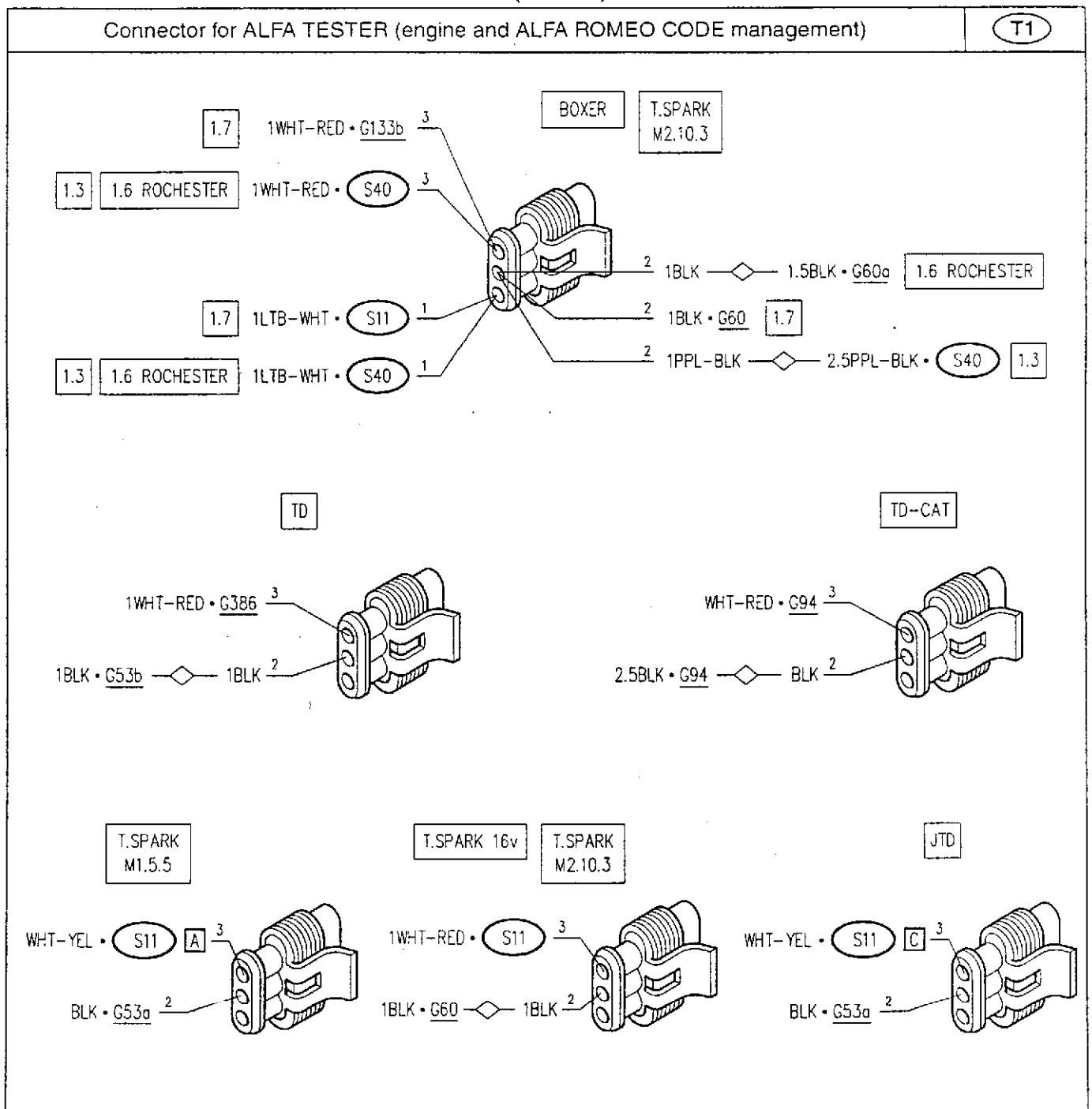
1.6 ROCHESTER

- B8 1LTB-WHT • T1
- B10 1BLU-WHT • G133b
- B11 1GRY-GRN —◇— 1GRY-GRN • G133b
- E10 1GRY-GRN
- F11 1WHT-RED • T1

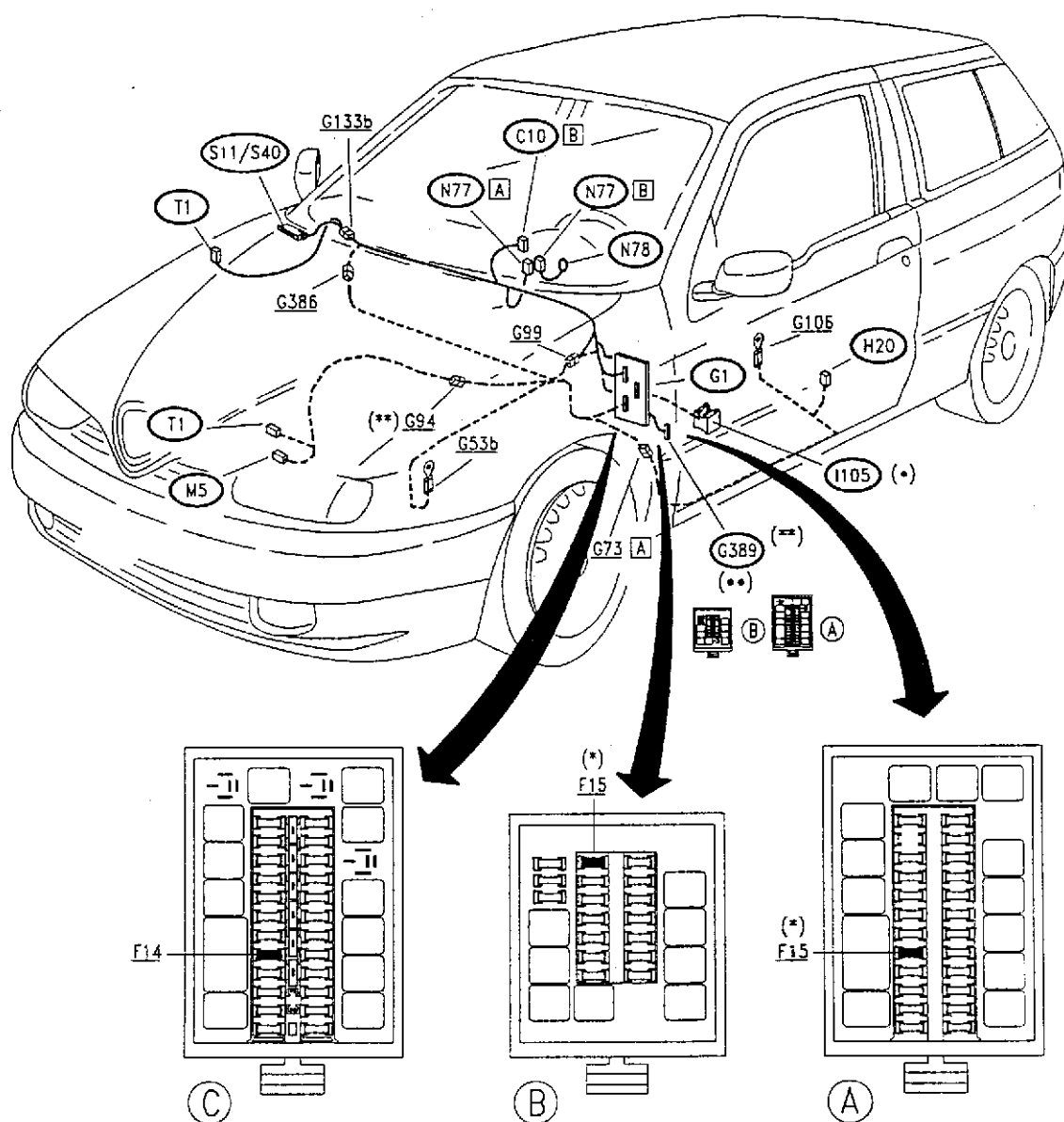




## COMPONENTS AND CONNECTORS (cont.d)



## LOCATION OF COMPONENTS (up to M.Y. '97)



----- Variant for TD

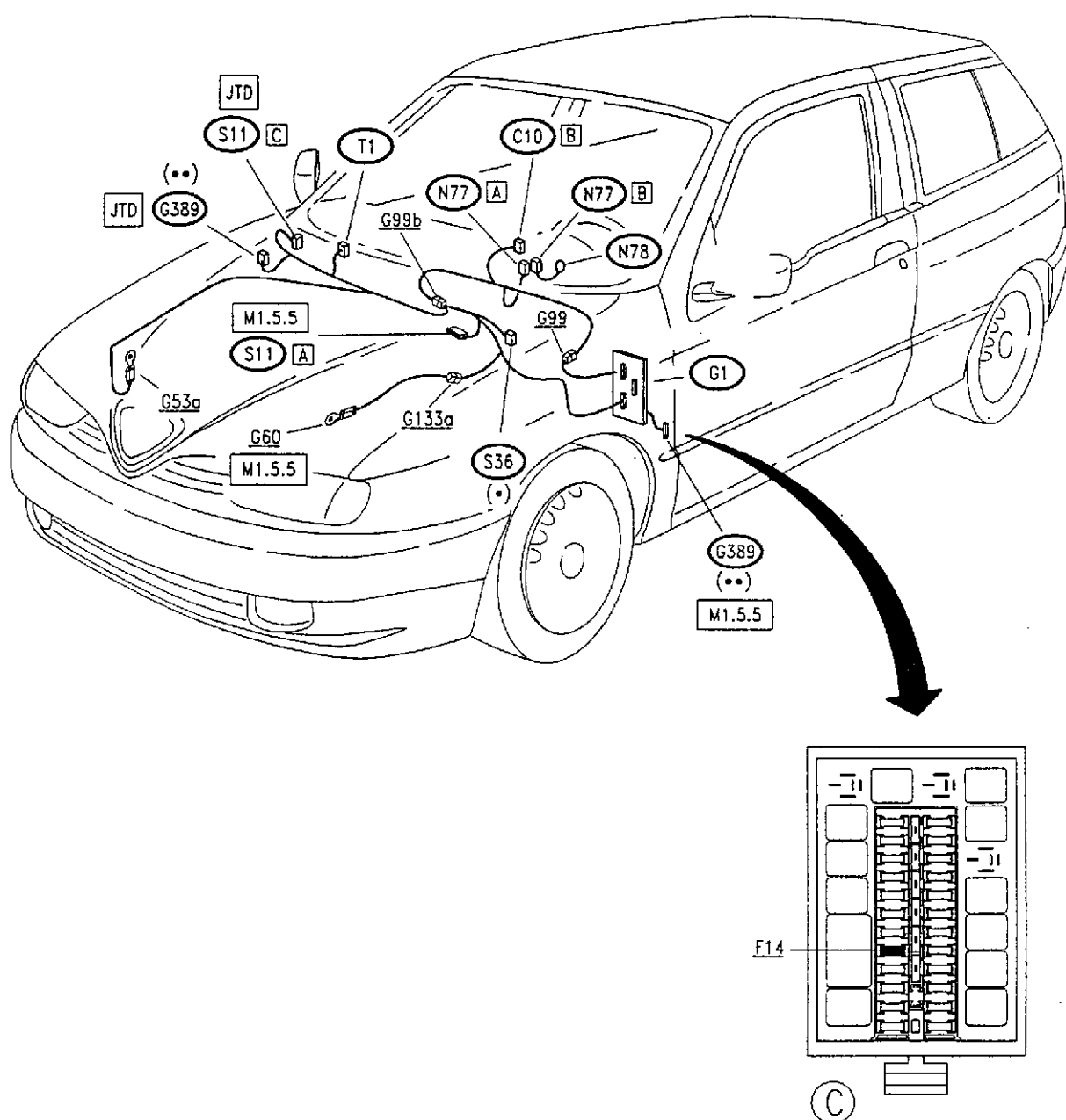
(•) grey base

(••) red fusebox

(\*) up to chassis no. ...

(\*\*) from chassis no. ...

### LOCATION OF COMPONENTS (M.Y. '98)



- (•) green fusebox
- (••) brown fusebox



## DIAGNOSIS

The C.C.E. cannot be tested directly via the Alfa Tester.

To the injection control unit, which already possesses a sophisticated self-diagnosis, the possibility has been added to test and display the more important functions of the ALFA ROMEO CODE.

Dialogue between the C.C.M. and the Alfa Tester begins when the key has been turned to MARCIA and when communication between the C.C.M. and the C.C.E. has ended.

The information, concerning the ALFA ROMEO CODE, supplied to the Alfa Tester, may belong to two different environments:

### Errors:

**generally displayed by the tester with priority depending on the importance.**

There is a counter inside the control unit, which is activated when an error is stored and it decreases each time the error is no longer present; when the counter reaches zero, the control unit erases the error from the memory.

Therefore, the error memorised can be distinguished as PRESENT or not PRESENT.

The errors memorised are:

- Serial line not active, code not received or time-out: this error indicates that the control units (C.C.E. and C.C.M.) have not succeeded in communicating and the probable causes can be line interrupted or short circuited or some problem on the actual control units (or - with brand new system - faulty or disconnected aerial or faulty or lacking Transponder).
- Received incorrect code: the injection control unit has received from the C.C.E. a code that does not correspond to its memorised MASTER CODE; the probable cause can be an exchange of the injection control unit or the use of another main key during re-memorisation.
- Incorrect code in the C.C.E.: this means that a key unknown to the control unit has been inserted and starting of the car has not been allowed.

### Parameters:

This is the environment of the Tester after connection with the C.C.M. (if no errors are present).

This environment is used to display the engineering parameters which define the status of a system.

The parameters are the following:

- brand new C.C.M.
- Starting inhibition procedure; (an un-memorised key has been inserted, the C.C.M. has not been enabled to start by the C.C.E.)
- brand new C.C.E. connected correctly

## RECOVERY PROCEDURES

**The emergency procedures should be carried out, when it is not possible to start the engine with the keys available.**

This procedure requires the possession of the Code Card; with the corresponding ELECTRONIC CODE (5-figure code written on the card. The procedure, (carried out either with the Alfa Tester or with the accelerator pedal) consists in entering the ELECTRONIC CODE directly in the injection control unit.

This procedure makes it possible to start the engine only once; the procedure must be repeated to start the engine again (or a "known" key must be inserted, i.e. already memorised in the control unit).

**Emergency starting procedure (using the accelerator pedal): NOT foreseen for the TD version**

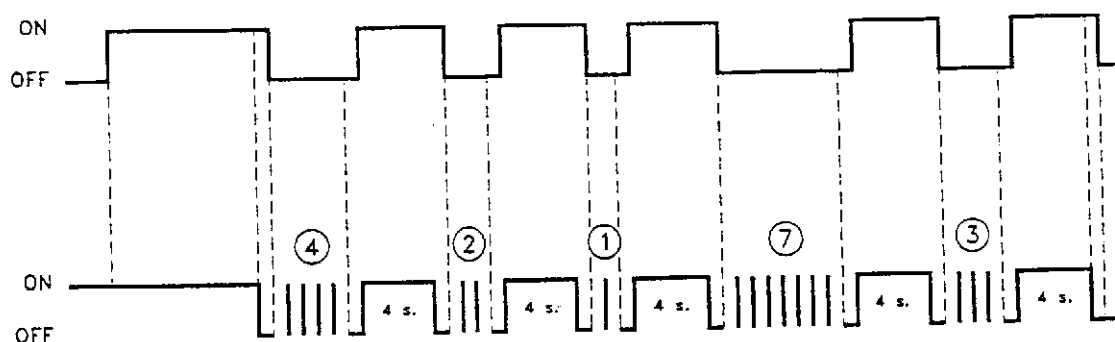
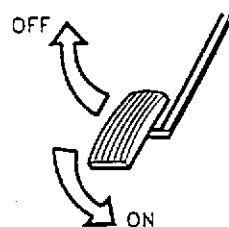
This procedure should be carried out using the accelerator pedal and carefully watching the indications of the injection control unit warning light.

- Turn the key to MARCIA
- Press the accelerator pedal and keep it pressed until the warning light goes out.
- When the warning light goes out release the accelerator pedal.
- At this point the warning light begins to flash; after the number of flashes corresponding to the first number of the code on the Code Card (ELECTRONIC CODE) depress the accelerator pedal completely.
- The warning light turns on and stays on for 4 seconds then it goes out.
- When the warning light goes out, release the accelerator pedal

- The warning light starts to flash again; after the number of flashes corresponding to the second number of the ELECTRONIC CODE, press the accelerator fully home again.
- Proceed in the same way for the other numbers of the ELECTRONIC CODE.
- Also after the last number, keep the accelerator pressed until the warning light goes out (appr. 4 seconds)
- Release the accelerator pedal.

If the warning light flashes quickly, it means that the operation has been carried out correctly, thus the car can be started: if the warning light stays on, the code has not been entered correctly, move the key to STOP and back to MARCIA again, and repeat the procedure.

**EXAMPLE: ELECTRONIC CODE = "42173"**



**NOTE :** If this procedure is not activated correctly, check the throttle potentiometer and the corresponding wiring, and also the throttle itself (throttle stroke without obstacles or sticking); also check the supply to the C.C.M..

## TRANSPONDER TRANSFER PROCEDURE

When needing to change the ignition lock or a door lock, for example, it is possible to transfer the Transponder from MASTER key to another: this way the memory of the Electronic Key Control Unit (C.C.E.) can be "re-opened" to memorise the new main keys (with new locks). Otherwise it would be necessary to change both the C.C.E. and the Master Key Control Unit (C.C.M.) as it would be impossible to re-open the memory of the latter using another Transponder.

To transfer a Transponder, proceed as follows:

1. Open the MASTER key removing the mobile part.
2. Lift the other part, acting on the two notches. Proceed carefully, in order to avoid damages to the key.
3. Remove the Transponder taking care not to damage it.
4. Insert the Transponder in another MASTER key.  
N.B.: The Transponder rests in place in the key and is not restrained.

