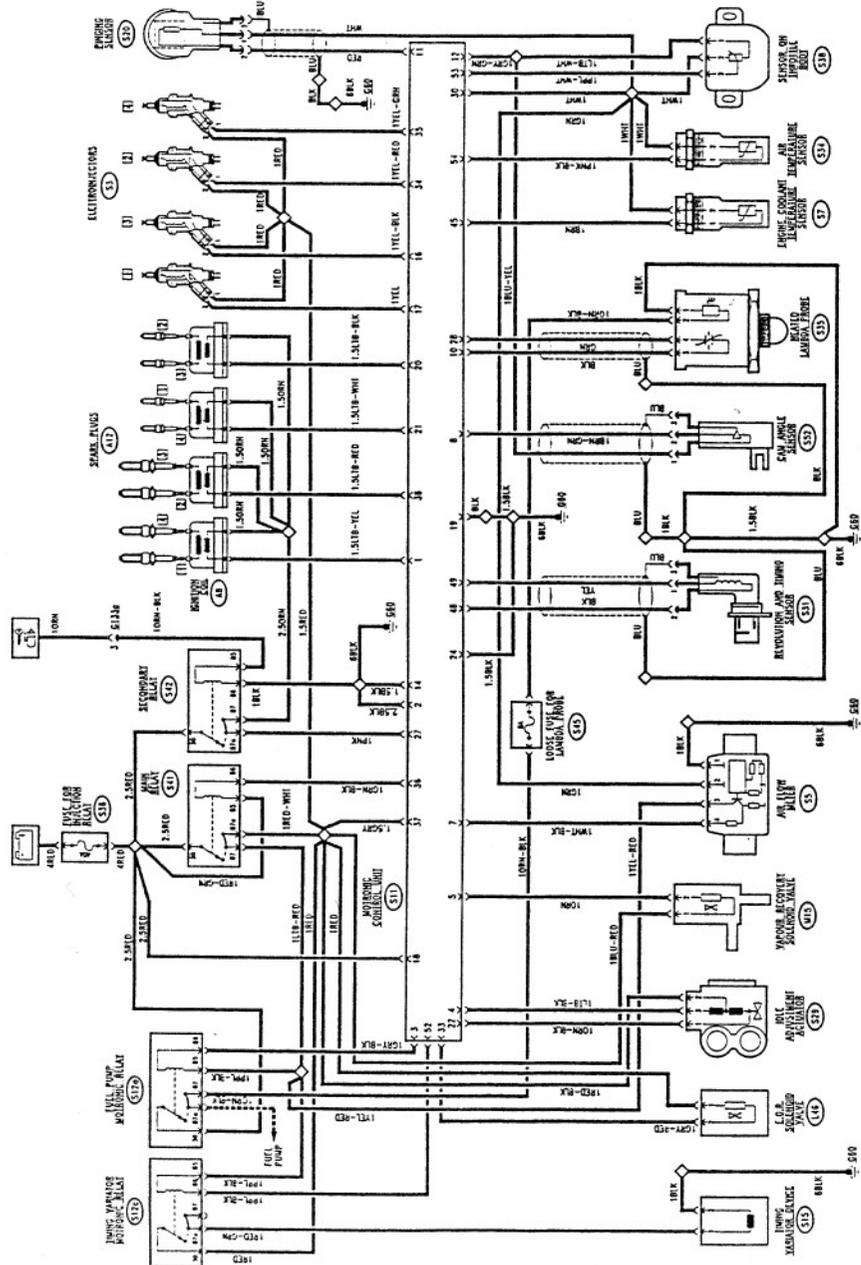


**CONTROL SYSTEM -
BOSCH MOTRONIC M2.10.4
Models 1.6 - 1.8 - 2.0 T. Spark 16V (Version '96)**

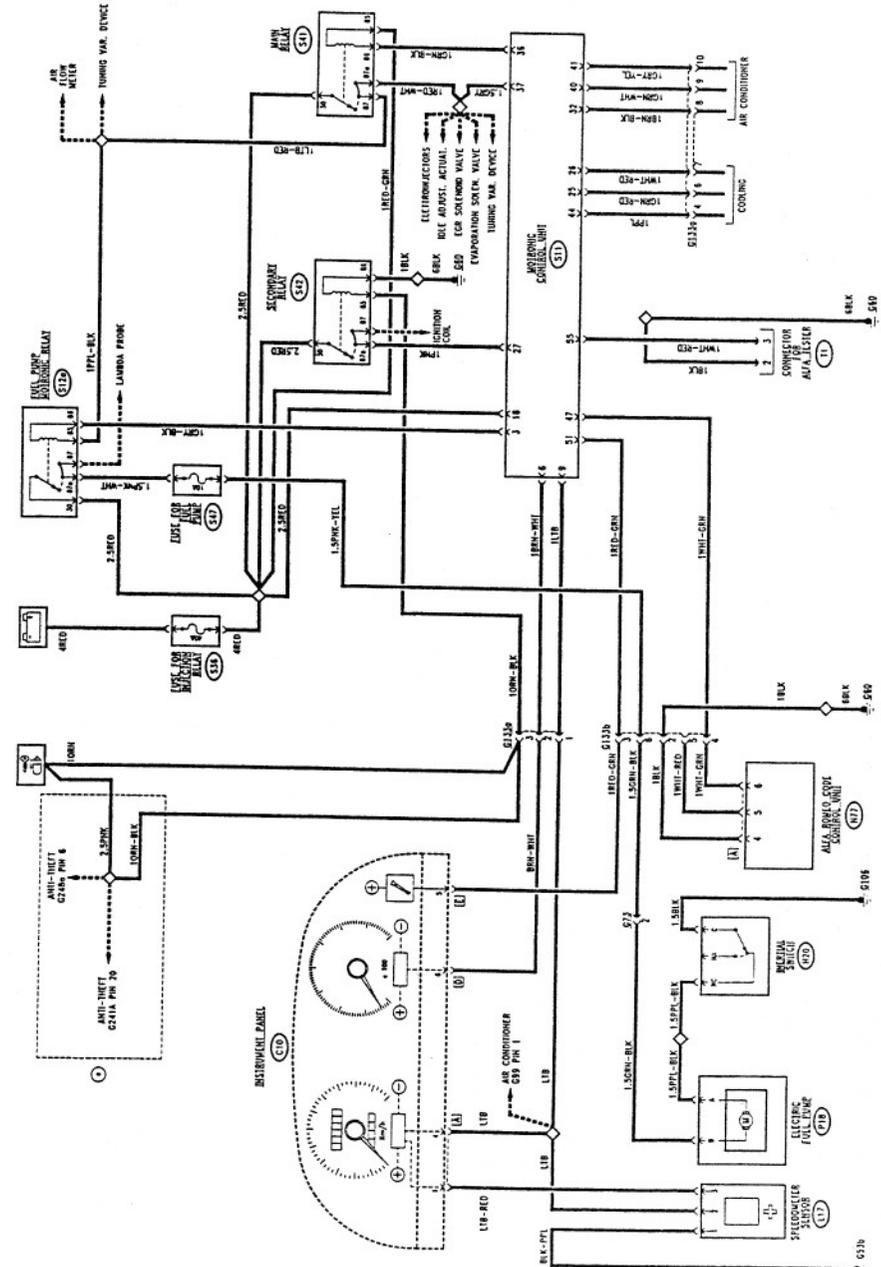
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WIRING DIAGRAM A



WIRING DIAGRAM B



(*) versions with anti-theft device

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 consists of a single control unit which controls both ignition (static with lost spark) and injection (timed).

This is the M 2.10.4 version of the proven and reliable BOSCH MOTRONIC system.

Compared with the previous versions this new M 2.10.4 system adopts a control unit - with 55 pins - with advanced design and production technology, it also possesses many possibilities for inserting auxiliary functions.

As a result of the use of new sensors and revision of the control programmes, the system makes it possible to achieve considerable improvements in terms of consumption and emission levels and vehicle handling.

Another feature of this system is self-adaptation, i.e. the capability to recognise the changes that take place in the engine and to compensate them, according to functions which mainly correct:

- the mixture titration
- the carburetion parameters according to the command of the evaporative solenoid valve
- an adaptive programme for idle speed control.

FUNCTIONS OF THE SYSTEM

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

With this control unit, fuel injection is sequential and timed for each cylinder: the injection instant (delivery of fuel into the intake manifolds by the opening of the injectors) is not simultaneous for all the cylinders, but takes place for each cylinder in correspondence with the op-

timal point of injection, calculated by the control unit according to special maps depending on the load, speed and temperature of the engine.

NOTE: the instant considered in the design of the maps is that of the start of injection (the cylinder is in the exhaust stroke - intake valve still closed).

Static ignition

An electronic 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 four coils, according to the so-called "lost spark" logic: this solution exploits the different pressures and environments existing contemporaneously in a pair of cylinders: when one of the cylinders approaches the bursting stroke, with a mixture of air and fuel, the corresponding cylinder is at the end of the exhaust stroke in the presence of exhaust gas.

In a 4-cylinder in line engine, the paired cylinders are 1/4 and 2/3.

The solution adopted for this engine (T.SPARK and 16 valves) has required the adoption of a larger "central" spark plug and a smaller "side" spark plug.

Each of the four coils supply the spark plug of the cylinder below and simultaneously that of the paired cylinder.

NOTE:

This way it is impossible to invert the spark plug cables during servicing operations.

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 into the duct. The film plate is kept at a constant temperature (appr. 120°C over 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.).

This air-flow meter does not incorporate the intake air temperature sensor, which is separate and to be found just upstream of the actual air-flow meter.

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, which sharply lowers the voltage signal sent to the control unit when the tooth machined on the camshaft pulley passes in front of the 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 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 complex control logic of the fuel pump carried out by the control unit (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.

Timing variator

This T.SPARK 16 valve engine is fitted with an electro-mechanical-hydraulic timing variator which is connected to the camshaft and controls and adjusts intake timing (advance) in such a way that a larger amount of air is taken in. This device is activated by the control unit only after exceeding a determinate rpm and engine load to avoid adversely affecting correct operation of the engine at low speeds.

Exhaust gas recirculation

NOx (nitric oxides) are generated by the high temperatures in the combustion chamber. 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 owing to the type of control it is possible to optimise fuel consumption, in addition to reducing NOx.

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 "engine catching point" 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 very 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 and timed", 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: ignition is "static" as described previously.

- 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 load 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 rpm falls rapidly towards idle speed, thereby reducing speed and fuel consumption. The cut-off 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 fitted directly on the throttle body which acts on the throttle by-pass. This also acts as a regulator for the cutting in of the various services (eg. conditioner compressor): in fact, when the throttle is closed, this valve adjusts the by-pass gap compensating the load required by the services in order to ensure that idle speed is as constant as possible. The system also commands the turning on of the radiator cooling fans, if necessary, compensating the engine idle speed.

- 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 probe-:

the oxygen sensor (or "lambda" probe) 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 probe 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": this way the engine operates as far as possible around the ideal lambda rating.

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

The probe 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.

- Timing variator control:

The electro-mechanical-hydraulic timing variator, connected to the camshaft, controls and adjusts the intake timing according to the load and rpm of the engine. This device is activated by the control unit at higher engine operating speeds (above 1.600 rpm and with load above 30%).

- Knocking control:

Through a knock sensor the control unit is informed if any ping or "knocking" occurs and it corrects the spark advance "delaying" it accordingly.

- Fuel vapour recovery:

the fuel vapours collected from the various points of the supply circuit in a special active 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 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 compressor 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 is engaged; if the speed falls below the idle speed rate, the compressor is cut off;

- in the event of the need for high power, over 6000 rpm (high throttle opening speed), or full load, or high engine temperature (above 117°C), the compressor is momentarily disengaged;

- when the engine is started it prevents the compressor from being engaged until normal operating conditions are reached.

- Connection with the radiator cooling fan:

in this version the cooling fan control thermal contact on the radiator has been eliminated. The command to the fan for 1st and 2nd speed is supplied by the injection control unit, in relation to the temperature measured by the engine coolant temperature sensor of the MOTRONIC system.

- Connection with ALFA ROMEO CODE system:

On cars fitted with "electronic key" (ALFA ROMEO CODE), as soon as the Motronic control unit receives the signal that the key is at "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 two control units takes place on diagnosis line K already used for the Alfa Romeo Tester.

- Self-diagnosis:

The control unit possesses a 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 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 displayed. 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 measure 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);
- knock sensor (S20);

The actuators are the following:

- electroinjectors (S3);
- ignition coils (A8);
- fuel pump (P18);
- idle adjustment actuator (S29);
- vapour recovery solenoid valve (M15);
- E.G.R. solenoid valve (L46);
- timing variator (S15).

The control unit is also connected with:

- the climate control unit;

- the cooling system, to which it sends the command to engage the fan;

- 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 tachometric sensor (L17) from which it receives the car speed signal.

The system is completed by four relays: the first three - the main relay (S41), secondary relay S42 and the fuel pump relay S12a operate the fuel pump, the injectors, the coils and the other components of the system, while the fourth - the timing variator relay (S12c) - supplies the timing variator solenoid.

The supply line for the entire system is protected by fuse S36; other special fuses protect the pump (S47), and the lambda probe resistance (S45).

Lastly, there is an earth point (G60) on the engine.

Connector T1 enables connection with the ALFA ROMEO Tester: this is located in the engine compartment in an accessible position.

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 18 directly by the battery through fuse S36. At pin 37 it receives the supply from the main relay S41, while at pin 27 it receives the "key-operated" supply from the secondary relay S42.

Pins 2, 14, 19 and 24 are earthed and serve as reference respectively for the ignition, the injectors, electronic screening and the final power stages.

The control unit is also connected with:

Two relays control the entire system:

The main switch S41, acts as supply relay for the whole system; it is energised by a command signal - earth - leading from pin 36 of the control unit, as a result it sends the supply (12V) to pin 37 of the control unit, to the fuel pump relay S12a, timing variator relay S12c, fuel vapour solenoid valve M15, idle actuator S29, EGR solenoid valve L46, air flow meter S5 and lastly, to the injectors S3.

The secondary relay S42, energized by the "key-operated" supply, supplies the control unit at pin 27 and the primary windings of the coils A8.

The fuel pump relay S12a, supplied by the main relay S41, is energized by a control signal - earth - leading from pin 3 of the control unit S11. Consequently the relay supplies the resistance of the lambda probe S35 and of course the fuel pump P18; this supply line is protected by a special fuse S47 (10A).

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 48 and 49 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 crankshaft.

The cam angle sensor S52 (timing sensor), supplied at 5 V by pin 12 of the control unit, and sends a signal in frequency corresponding to the phase to pin 8 of the control unit itself; these two signals are very low in intensity and are therefore suitably screened.

The sensor comprises a Hall effect device due to which the voltage signal sent to the control unit "lowers" abruptly when the hollow 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 28 of the control unit, while pin 10 supplies the reference earth; these two signals are very low in intensity and are therefore suitably screened.

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 and it is protected by a specific fuse S45 (8A).

The throttle body sensor S38, is supplied by the control unit from pins 12 and 30 and through a potentiometer it sends a signal to pin 53 which is proportionate with the degree of opening of the throttle itself.

The engine temperature sensor S7, connected to the electronic earth at pin 30, supplies a signal to pin 45 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 30, supplies a signal at pin 54 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 knock sensor S20, through a frequency signal sent to pin 11 of the control unit, supplies information about the knocking conditions, while an electronic earth leads from pin 30; 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 pie-

zoelectric 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 relay S41: from pin 30 of the control unit it receives the reference earth, while it sends a signal proportionate with the air flow to pin 7.

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.

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 17 (cyl. 1), 34 (cyl. 2), 16 (cyl. 3) and 35 (cyl. 4). 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.

From this lead the command signals (earth) for the main windings of the coils A8, while the secondary sends the pulse to the spark plugs A12: from pin 1 and 21 for cylinders 1-4 and from pin 38 and 20 for cylinders 2-3.

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

The power modules inside the control unit are connected to earth via pin 2.

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; it is controlled by the control unit through the duty-cycle signals of pins 22 (closing) and 4 (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 5.

The E.G.R. solenoid valve L46, controlled by the control unit, operates the actual F.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 33 of the control unit while it is supplied at 12 V by main relay S41.

The timing variator S15 mechanically controls timing advance at the intake; it is operated by the corresponding relay S12c: this relay is supplied by relay S41 and it is energized via a negative signal from the control unit (pin 52), thus supplying the timing variator S15: this signal operates the actuator which controls the flow of oil in the hydraulic unit of the device that adjusts camshaft rotation.

The tachometric signal (car speed) reaches the control unit at pin 9 via sensor L17; while from pin 6 the control unit sends a "pulse" signal to the cluster which is proportionate with the number of revolutions of the engine; the signal for the "Check Engine" warning light on the cluster C10 leads from pin 51.

The control unit S11 is connected with the air conditioning system through pins 32, 40 and 41.

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 controls and adjusts the system for engaging the engine water cooling fan P2.

Pins 26 and 25 send the command respectively for engaging the first and second fanspeed, while pin 44 receives from the trinary Q20 consent (earth) for engaging the second speed, which is "relayed" via pin 25.

This is necessary when the car is at a

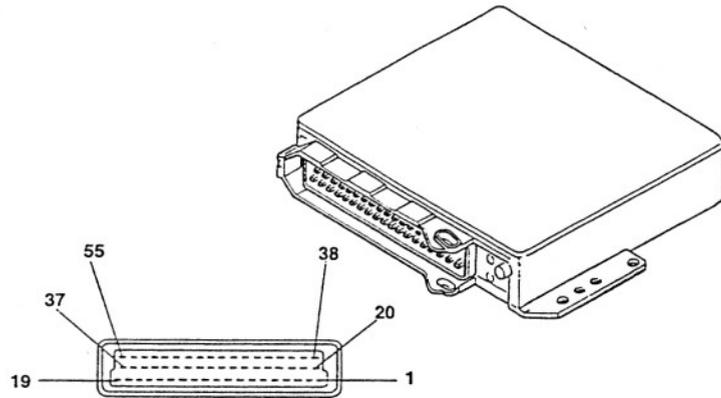
standstill to enhance thermal exchange at the condenser, thereby avoiding a pressure build up in the system.

The control unit S11 is connected from pin 47 with the ALFA ROMEO CODE control unit N77 through a serial line; if the ALFA ROMEO CODE system 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

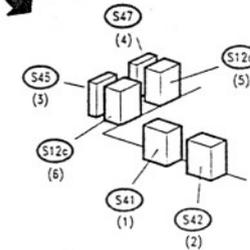
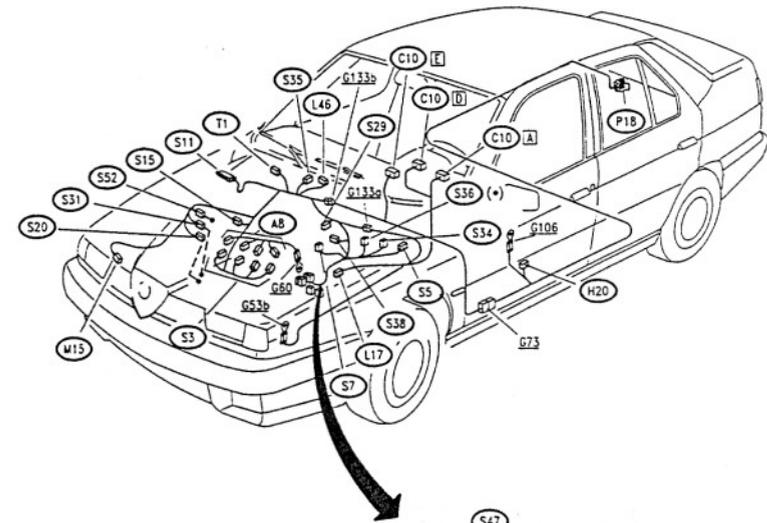
connection to the ALFA ROMEO Tester at connector T1; the tester receives the fault signals from the control unit through the diagnosis line K - pin 55 -, while the earth leads from G60.

LOCATION OF COMPONENTS



CONTROL UNIT PIN-OUTS

- | | |
|---|--|
| 1. Ignition coil control - cyl. 1 and 4 - | 30. Electronic earth for sensors |
| 2. Earth for ignition | 31. N.C. |
| 3. Fuel pump relay control | 32. Conditioner compressor relay control |
| 4. Idle actuator control - opening | 33. E.G.R. solenoid valve control |
| 5. Evaporative solenoid valve control | 34. Injector cyl. 2 |
| 6. Rev counter signal | 35. Injector cyl. 4 |
| 7. Air flow meter signal | 36. Main relay control |
| 8. Timing signal | 37. Supply from main relay |
| 9. Car speed signal | 38. Cyl. 2 and 3 ignition coil control |
| 10. Lambda probe earth | 39. N.C. |
| 11. Knock sensor signal | 40. Conditioning system control |
| 12. Stabilized voltage (5V) for sensors | 41. Compressor cut-in request |
| 13. N.C. | 42. N.C. |
| 14. Earth for injectors | 43. N.C. |
| 15. N.C. | 44. Trinary signal |
| 16. Cyl. 3 injector | 45. Engine temperature signal |
| 17. Cyl. 1 injector | 46. N.C. |
| 18. Direct supply | 47. Connection line with ALFA ROMEO CODE |
| 19. Electronic screening earth | 48. Signal for rpm sensor |
| 20. Ignition coil control - cyl. 3 and 2 | 49. Rpm sensor signal |
| 21. Ignition coil control - cyl. 4 and 1 | 50. N.C. |
| 22. Idle speed actuator control - closing | 51. "Check Engine" warning light |
| 23. N.C. | 52. Timing variator control |
| 24. Earth for final stages | 53. Throttle position signal |
| 25. Fan 2nd speed command | 54. Intaken air temperature signal |
| 26. Fan 1st speed command | 55. Diagnosis line K |
| 27. "Key-operated" supply, from secondary relay | |
| 28. Lambda probe signal | |
| 29. N.C. | |



- (•) Black fuseholder
- (1) Black base
- (2) Black base
- (3) Brown fuseholder
- (4) Red fuseholder
- (5) Black base
- (6) Black base

CHECKING COMPONENTS

See Models 2.0 T. SPARK 16V (Version '95) with the exception of the following.

PRELIMINARY CHECK OF THE BOSCH M2.10 SYSTEM	TEST A
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NOTE: Check beforehand that the ALFA ROMEO CODE is working properly which might have cut off the supply to the system!

TEST PROCEDURE		RESULT	CORRECTIVE ACTION
A1	CHECK FUSE	<input checked="" type="radio"/> OK ▶	Carry out step A2
	– Check intactness of fuses S36 and S47	<input type="radio"/> OK ▶	Change fuses S36: 40A S47 : 10A
A2	CHECK VOLTAGE	<input checked="" type="radio"/> OK ▶	Carry out step A3
	– Check for 12 V at pin 30 of relays S41, S42 and S12a and also at pin 86 of S41	<input type="radio"/> OK ▶	Restore the wiring between the battery A1 and relays S41, S42 and S12a
A3	CHECK VOLTAGE	<input checked="" type="radio"/> OK ▶	Carry out step A4
	– With the key turned, check for 12 V at pin 85 of relay S42	<input type="radio"/> OK ▶	Restore the wiring between the ignition switch B1 and relay S42
A4	CHECK RELAYS	<input checked="" type="radio"/> OK ▶	Carry out step A5
	– Check the correct operation of relays S41, S42 and S12a	<input type="radio"/> OK ▶	Change any faulty relays
A5	CHECK CONTROL UNIT SUPPLY	<input checked="" type="radio"/> OK ▶	Carry out step A6
	– Check for 12 V at pin 18 of control unit S11; with the key turned 12 V also at pins 27 and 37 of S11 and appr. 0 V (very low voltage) at pin 3 and 36 of S11	<input type="radio"/> OK ▶	Restore the wiring between the control unit S11 and the relays and between the control unit and fuse S36
A6	CHECK EARTH	<input checked="" type="radio"/> OK ▶	CONTINUE DIAGNOSIS USING THE ALFA ROMEO TESTER
	– Check for an earth at pins 19 and 24. Also check for an earth at pin 86 of S42	<input type="radio"/> OK ▶	Restore the wiring between S11 and the relays and earth G60