



DIESEL ENGINES ELECTRONIC MANAGEMENT

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DIESEL ENGINES ELECTRONIC MANAGEMENT - Description

An electronic management system supervises and governs all engine parameters. It optimises performance and fuel consumption by responding in real time to different service conditions.

The Diesel engine is fitted with a COMMON RAIL UNIJET injection system. This features a high, electronically-controlled injection pressure. Fuel delivery, termed a pilot injection, is optimised by the electronic control unit via the injector and not managed by the pump.

The system uses signals received from numerous sensors to control actuators. It is connected to the following systems:

- fuel supply;
- air supply system;
- heater plugs;
- accelerator pedal;
- engine cooling;
- fuel preheating.

For further details, see DESCRIPTION AND OPERATION 1060.

Supply lines to the control unit and the various system components (sensors and actuators) are protected by a special maxifuse and another protects the steering wheel fuses, located with the relays in a service tank (behind the engine bulkhead).

Glow plug preheating is protected by a dedicated maxifuse located in the engine bay.

DIESEL ENGINES ELECTRONIC MANAGEMENT - Functional description

Engine control unit M10 manages the electronic ignition and injection system.

System power is distributed by main injection relay J10.

When ignition key sends an INT/A supply via fuse F16 of control unit B1, power is sent to pin 47 connector A of control unit M10 and the coils of relays J10 and J15.

The control unit then energises the coil of relay J10 via pin 31 of connector A and fuel pump relay J15 from pin 30 of connector A.

The connector contact takes power from the battery via MAXIFUSE B80 that supplies fuel pump N40 via F3 of B1.

The pump earth is supplied by inertia switch I50, which cuts off the fuel flow in the case of impact.

The contact of main relay J10, supplied from the battery via MAXIFUSE B80, distributes power to the following devices:

via fuse B40 to:

- 1) glow plug preheating control unit M15 at pin 3 connector A,
- 2) diesel preheating relay coil J17,
- 3) EGR solenoid L30 (exhaust gas recirculation),
- 4) turbine variable geometry control solenoid L36,
- 5) air flow meter K41 (pin 2),

via fuse B35 to:

- 6) fuel pump relay coil J15,
- 7) control unit M10 pin 4.

When a signal from ignition switch INT/A is detected, control unit M10 controls timed activation of glow plug preheating control unit M15 via pins 22 and 66 connector A and the glow plug preheating warning light on control panel E50 via pin 14.

The supply to control unit M15 is controlled by the battery via fuse B37.

Control unit M10 energises diesel preheating relay coil J17 via pin 111.

The contact of J17 supplies diesel preheating coil O20 via fuse B39.

Coil O20 is earthed C10.

When the fuel reaches the correct temperature, this is detected by control unit M10 via pins 82-83 and via thermal contact O20A and coil O20 is consequently deactivated.

Control unit M10 controls the various engine service parameters by means of input signals from the following sensors:

- rpm sensor this supplies a frequency signal proportional to engine rpm.
- timing sensor K47; this is supplied from pins 102 - 103 - 104 of connector B and sends the control unit a frequency signal representing engine phase.
- engine temperature sensor K36 at pins 84 and 85 connector B; this supplies a signal proportional to engine coolant temperature. It contains a transmitter for the instrument panel (see E4010 - ON-BOARD INSTRUMENT)
- Fuel pressure sensor K83 at pins 90-91-92, via which the injection control unit receives a feed-back signal to govern injection pressure and duration.
- turbo pressure sensor K82 at pins 93-94-95 of the turbocharger
- air flow sensor K41 at pins 86-88-89-97; This sends a signal proportional to the air flow rate.

Accelerator pedal K55 is fitted with two built-in potentiometers (a main one and a safety back-up). These are connected to control unit M10 via pins 76-77-78-79-80-81 connector A.

The purpose of the above potentiometers is to notify the control unit of accelerator pedal position and thus the engine power requirement.

On the basis of signals received from the accelerator pedal and the various sensors, control unit M10 supplies the injectors from pins 117 and 118 and controls them via pins 114-115-119-120-121 connector 3.

Control unit M10 also controls the following solenoids:

- via pins 108 and 109 connector B, fuel pressure regulator N77 with a modulated signal to regulate accumulator pressure according to engine load.
- via pin 16 connector A, EGR solenoid L30 for the control of exhaust gas recirculation;
- via pin 17 connector A, the turbine variable geometry control solenoid L36 to maintain rpm constant.

Table E5030 shows other electrical/electronic systems on the vehicle that interact with control unit M10

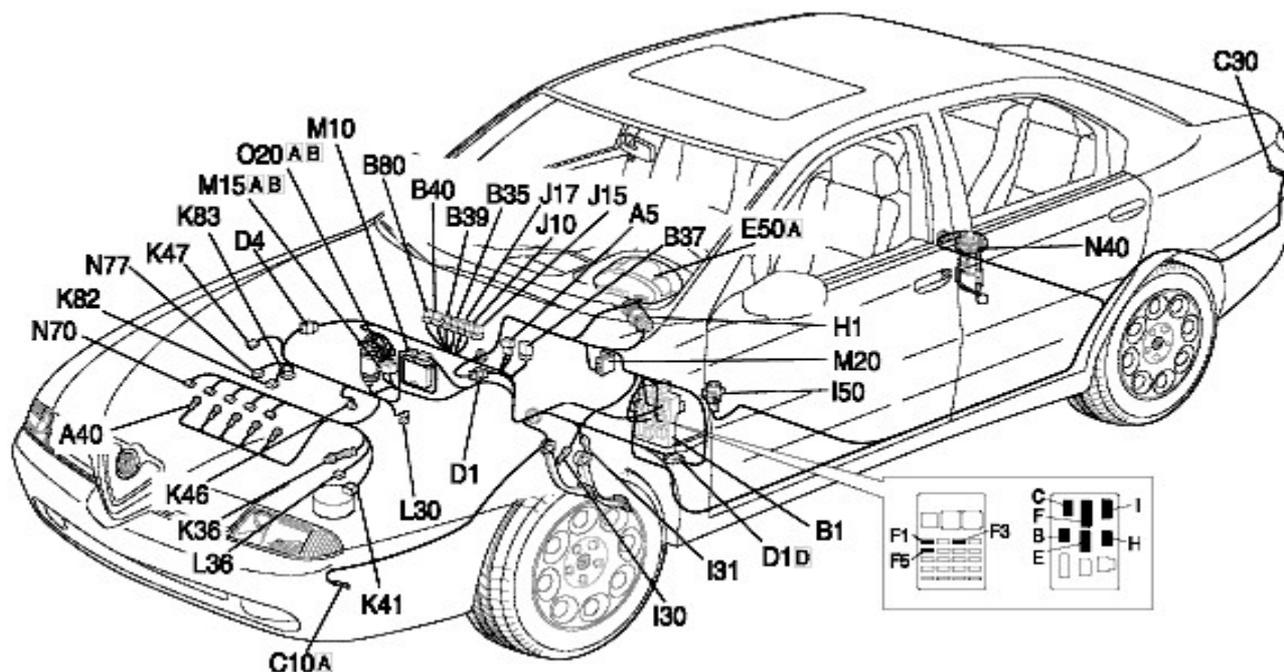
- pins 19-20-51-52 connector A control ENGINE COOLING E5020;
- pin 11 connector A receives a signal from ALFA ROMEO CODE control unit E7010;
- pins 18-60 connector A refer to COMPRESSOR ACTIVATION E6021 to adjust engine speed to increased load whenever this is activated, or deactivate it when engine speed and load are high;
- pins 47-110 connector A interact with on-board INSTRUMENT PANEL E4010;
- pin 59 connector A receives a signal from the brake pedal (see E7020 ABS without VDC);
- pins 23-53-54-55-56-57-61 refer to CRUISE CONTROL system E5060;

Control unit M10 is equipped with a self-diagnostic system.

Connector A is connected to pin 7 of connector R10 via pin 48. this system can be used to analyse the injection system using external diagnostic instruments.

Control unit M10 also sends an earth signal via pin 21 to turn on the injection fault warning light on instrument panel E50 .

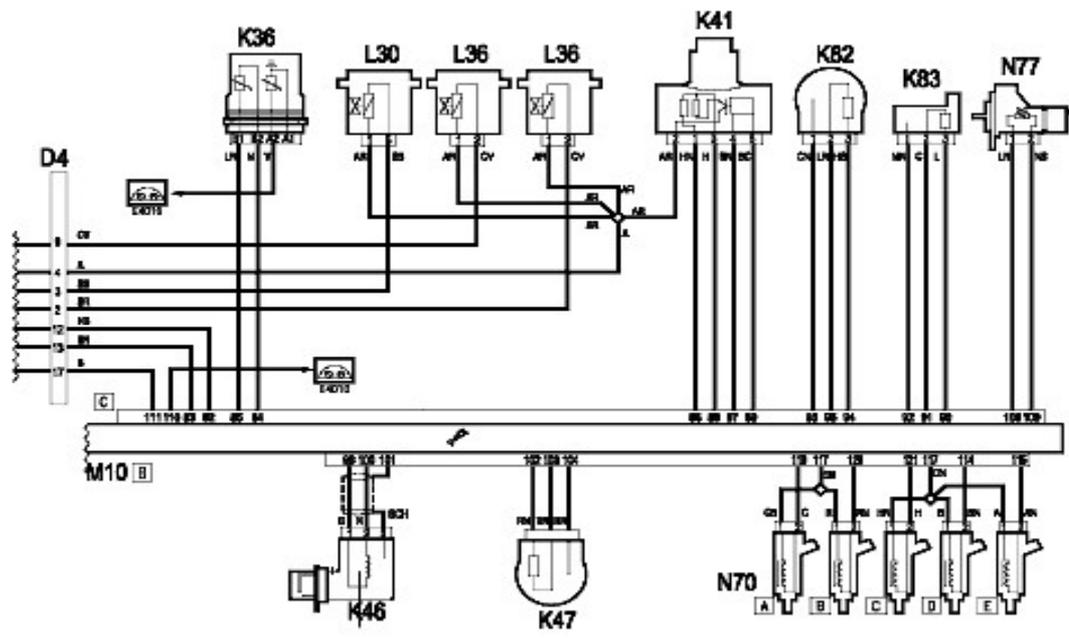
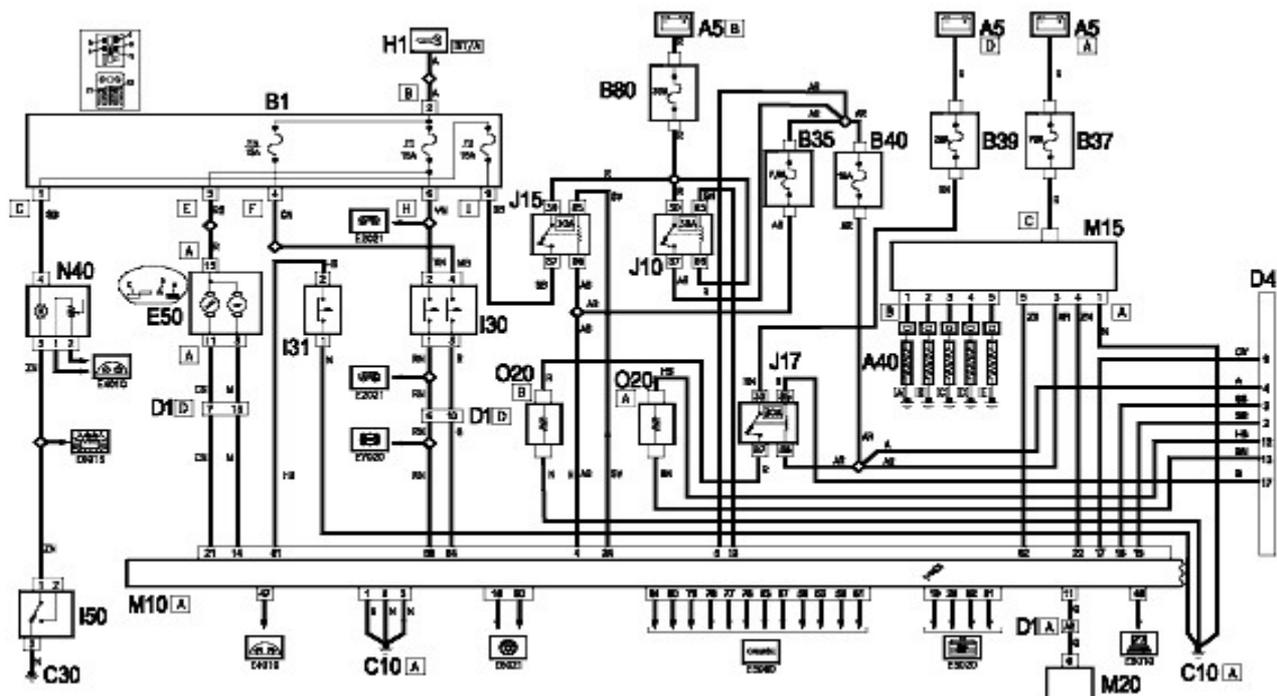
DIESEL ENGINES ELECTRONIC MANAGEMENT - Location of components



Component code	Name	Assembly reference
A5	Terminal board	-
A10	Alternator	5530A
A40	Heater plugs	5520C
A40	Spark plugs	-
B1	Junction unit	-
B1	Junction unit	5505A
B1	Junction unit	5505A
B2	Dashboard junction unit (CPL)	-
B2	Junction unit	-
B2	Junction unit	5505A
B35	7.5A fuse holder	-
B37	Spark plugs MAXI FUSE	-
B39	Diesel pre-heating fuse	-
B40	Fuel injection services supply fuse	-
B80	i.e. MAXI FUSE	-
B99	Battery fuses junction unit (CBA)	5530B
C10	Front left earth	-
C30	Rear left earth	-
C31	Rear right earth	-
C40	Chassis earth for I.E system.	-
C40	Engine earth	5505A
D1	Dashboard-i.e coupling.	-
D1	Front-dashboard coupling	-
D4	Engine front connection	-
D4	Front-engine prewiring coupling	-
D5	ABS plus ANTISPIN coupling	-
D5	ABS plus antispin connection	-
D6	Rear - front coupling	-
D7	Recharging front connection	-
D19	Dashboard / battery coupling	-
D23	Dashboard-i.e coupling.	-
D83	CAE-front coupling	-
D83	Front-automatic transmission coupling	-
E50	Instrument panel	-
E50	Instrument panel	5560B
H1	Ignition switch	5520A
I30	Brake pedal switch	5550D

I31	Clutch pedal switch	1060G
I31	Clutch pedal switch	5580A
I50	Inertial switch	1040A
J10	Fuel injection main relay	1056B
J10	Fuel injection main relay	1060G
J15	Fuel pump relay	1056B
J17	Diesel preheating relay	1044C
K100	Diesel filter heater	-
K36	Engine coolant temperature sensor-sender unit	-
K36	Engine coolant temperature sensor-sender unit	1088E
K41	Air flow meter	-
K41	Air flow meter	1056B
K41	Air flow meter	1060G
K46	Rpm sensor	-
K46	Rpm sensor	5510C
K47	Cam angle sensor	-
K47	Cam angle sensor	5510C
K55	Accelerator pedal potentiometer	1068A
K58	Steering sensor	-
K81	Fuel temperature sensor	1060G
K82	Turbocharging sensor	-
K82	Turbocharging sensor	1060G
K83	Fuel pressure sensor	-
K83	Fuel pressure sensor	1060G
L30	EGR electric fan	-
L30	EGR electric fan	1080C
L36	Variable geometry turbine fan	-
L62	Butterfly casing solenoid valve	-
M10	Engine management control unit	-
M10	Engine management control unit	1056B
M15	Heater plugs control unit	-
M15	Plug preheating control unit	-
M20	CODE control unit	5580E
M50	ABS control unit	3340A
M55	CAE control unit	-
N40	Fuel pump and sender unit	-
N40	Fuel pump and sender unit	5540B
N40	Fuel pump and sender unit	5540B
N70	Injector	-
N70	Injector	1056B
N70	Injector	1060F
N77	Fuel pressure regulator	-
O20	Diesel preheating resistor	1044D
R10	Multiple tester connection	-

DIESEL ENGINES ELECTRONIC MANAGEMENT - Wiring diagram



Component code	Name	Assembly reference
A5	Terminal board	-
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A40	Heater plugs	5520C
A40	Spark plugs	-
B1	Junction unit	-
B1	Junction unit	5505A

B1	Junction unit	5505A
B2	Dashboard junction unit (CPL)	-
B2	Junction unit	-
B2	Junction unit	5505A
B35	7.5A fuse holder	-
B37	Spark plugs MAXI FUSE	-
B39	Diesel pre-heating fuse	-
B40	Fuel injection services supply fuse	-
B80	i.e. MAXI FUSE	-
B99	Battery fuses junction unit (CBA)	5530B
C10	Front left earth	-
C30	Rear left earth	-
C31	Rear right earth	-
C40	Chassis earth for I.E system.	-
C40	Engine earth	5505A
D1	Dashboard-i.e coupling.	-
D1	Front-dashboard coupling	-
D4	Engine front connection	-
D4	Front-engine prewiring coupling	-
D5	ABS plus ANTISPIN coupling	-
D5	ABS plus antispin connection	-
D6	Rear - front coupling	-
D7	Recharging front connection	-
D19	Dashboard / battery coupling	-
D23	Dashboard-i.e coupling.	-
D83	CAE-front coupling	-
D83	Front-automatic transmission coupling	-
E50	Instrument panel	-
E50	Instrument panel	5560B
H1	Ignition switch	5520A
I30	Brake pedal switch	5550D
I31	Clutch pedal switch	1060G
I31	Clutch pedal switch	5580A
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J10	Fuel injection main relay	1056B
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J15	Fuel pump relay	1056B
J17	Diesel preheating relay	1044C
K100	Diesel filter heater	-
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K46	Rpm sensor	-
K46	Rpm sensor	5510C
K47	Cam angle sensor	-
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K55	Accelerator pedal potentiometer	1068A
K58	Steering sensor	-
K81	Fuel temperature sensor	1060G
K82	Turbocharging sensor	-
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L36	Variable geometry turbine fan	-
L62	Butterfly casing solenoid valve	-
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M10	Engine management control unit	1056B
M15	Heater plugs control unit	-
M15	Plug preheating control unit	-
M20	CODE control unit	5580E
M50	ABS control unit	3340A
M55	CAE control unit	-
N40	Fuel pump and sender unit	-
N40	Fuel pump and sender unit	5540B
N40	Fuel pump and sender unit	5540B
N70	Injector	-
N70	Injector	1056B

N77	Injector	1060F
O20	Fuel pressure regulator	-
R10	Diesel preheating resistor	1044D
	Multiple tester connection	-