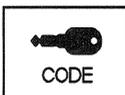


Operations index

Op.	Symbol	Description	Validity
E7010		CODE	05/99 ▶ 10/00 ▶
E7015		ALARMS	10/00 ▶
E7020		ABS	
E7030		AIRBAG	 10/00 ▶  10/00 ▶
E7040		AUTOMATIC CLUTCH	
E7045		ELECTRIC STEERING	02/99 ▶ 10/00 ▶

E70

ELECTRICAL DRAWINGS
Car electronic systems



List of functions

- DESCRIPTION
- WIRING DIAGRAM
- DESCRIPTION OF OPERATION

- COMPONENTS
- COMPONENT LAYOUT

DESCRIPTION

To increase protection against theft, an electronic engine lock system is applied, called "FIAT CODE".

The keys are fitted with an electronic "Transponder" device that transmits a coded signal to a special electronic "CODE" control unit.

The Code control unit contains a secret code used in the dialogue with the key Transponder inserted in the ignition switch. If the control unit acknowledges the code, it enables the engine activation.

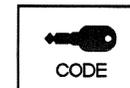
In fact, inside the control unit all the codes of the enabled keys and the code used for dialogue between Code control unit and e.i. control unit that manages the engine are stored: when the key is turned to RUN the first time, if the key is correctly acknowledged, the code is transferred onto the e.i. control unit, that remains permanently bound to the Code control unit.

For further details see **DESCRIPTION AND OPERATION: 5580E.**

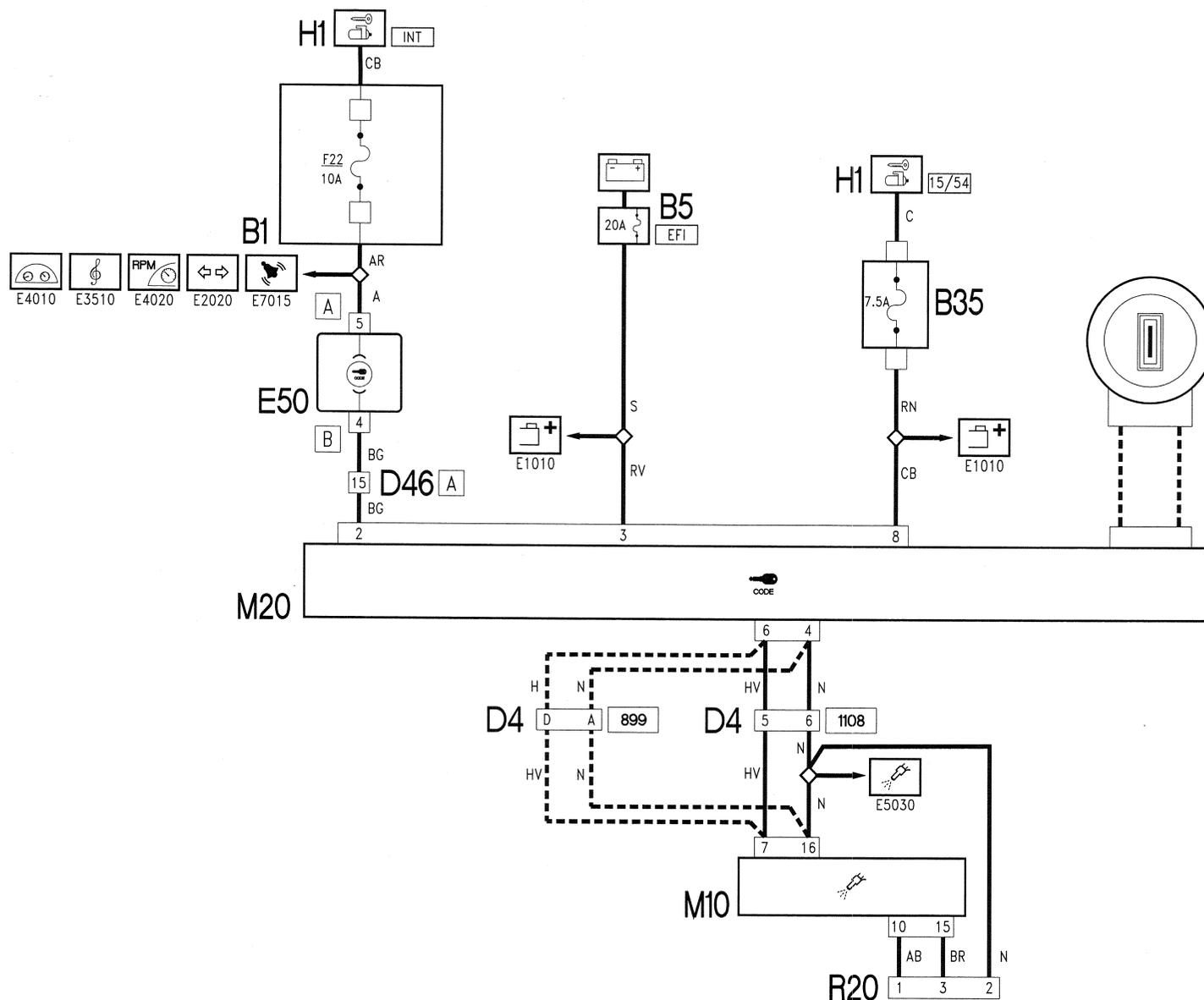
The Code system power supply lines are protected by the maxifuse and power supply fuse situated near the e.i. control unit, and that also protect the injection system.

E7010

ELECTRICAL DIAGRAMS CODE



WIRING DIAGRAM



187E170101100001E1SES



DESCRIPTION OF OPERATION

The CODE control unit **M20** is applied on pin 3 by the battery from maxifuse EFI line of **B5**,

The ignition switch power supply (15/54) arrives to pin 8 through the line protected by injection and Code memory fuse **B35**.

Pin 4 is connected to a "controlled" earth through injection control unit **M10** (pin 16).

The line coming from pin 6 is the serial line connecting to the engine control unit (pin 7 of **M10**) through which the key acknowledgement dialogue takes place and the code exchange.

Through this serial line it is also possible to "read" the control unit diagnostics system, connecting to the diagnostic socket for e.i. **R20**.

The diagnostics system also generates the signal for the "CODE fault warning light", located in cluster **E50**, by pin 2 of control unit **M20**.

Cluster **E50** is powered through ignition switch(INT) to pin 5 of connector A from the line protected by fuse **B11**: when the earth signal arrives on pin 4 of connector B , the " CODE fault" warning light switches on.

A second connector of the control unit links up through two cables with the aerial, located coaxially on the ignition switch to be able to "sense" the insertion and turning of the key.

COMPONENTS

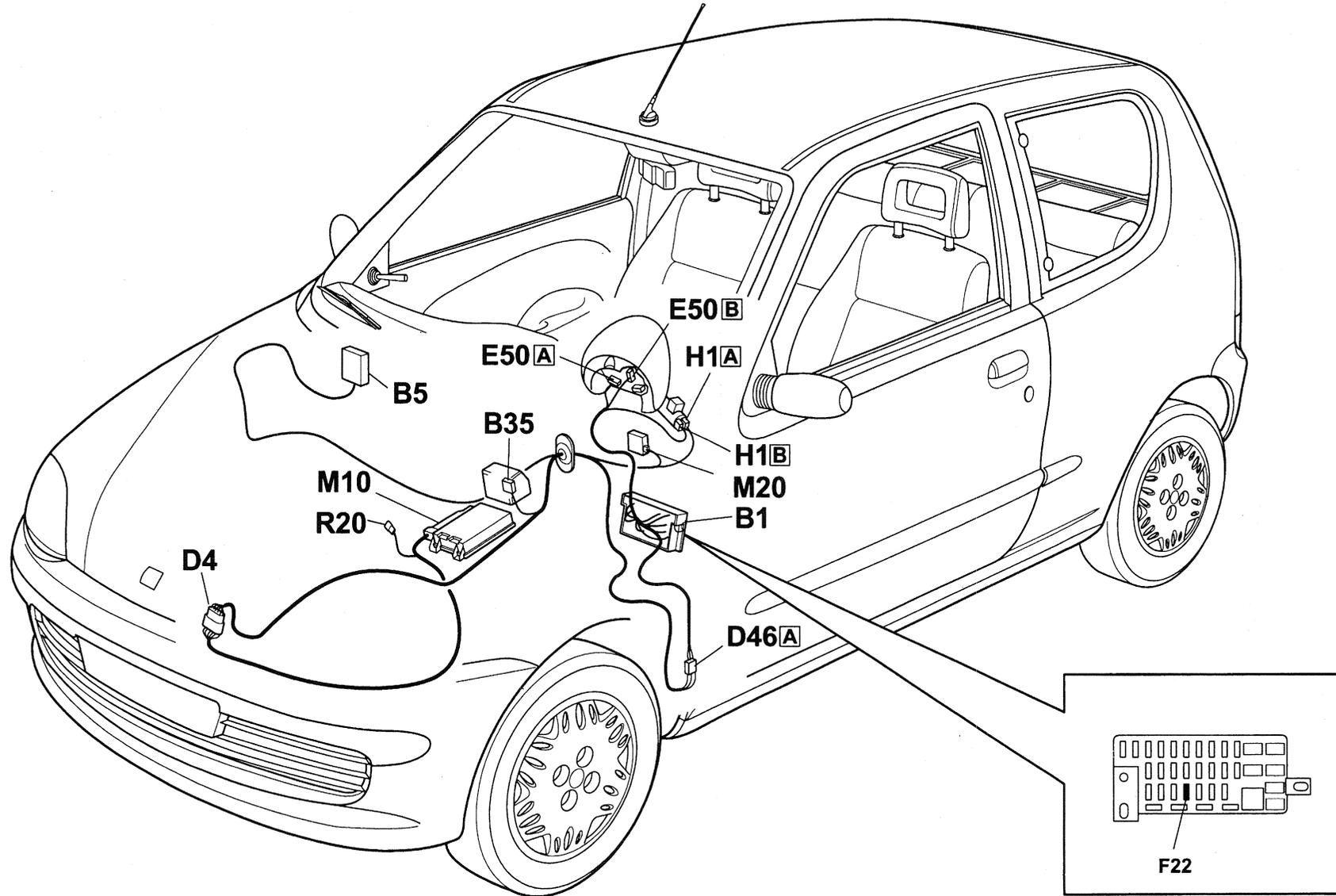
<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
B1	Fuse carrier	5505A
B5	MAXI FUSE box	-
B35	CODE and injection memories fuse	-
D4	Front/engine connection	-
D46	Front/dashboard - rear connection	-
E50	Cluster	5560B
H1	Ignition switch	5520A
M10	Engine control unit	-
M20	CODE control unit	5580E
R20	Diagnostic socket for e.i.	-

E7010

ELECTRICAL DIAGRAMS CODE



COMPONENT LAYOUT



187E170101100001E1CEU



Operation index

- DESCRIPTION
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- DESCRIPTION OF OPERATION
- COMPONENTS
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DESCRIPTION

10/00 ▶

To increase protection against theft attempts, an electronic immobilizer system known as the 'FIAT CODE' system has been adopted.

The keys are fitted with an electronic Transponder device, which sends a coded signal to a special CODE electronic control unit.

The Code control unit contains a secret code used in the dialogue with the transponder in the key inserted in the ignition. If the control unit recognizes the code sent, it allows the engine to be started up

The control unit contains all enabled key codes in its memory, together with the code used in the communication between Code control unit and engine management unit. When the key is turned to ON for for the first time, if the key is identified correctly, the code is transferred to the engine management unit and is then indelibly linked to the Code control unit.

For more details **Characteristic of working principle 5580E** Anti-theft device .
The Code control unit has supply lines protected by the maxifuse and the shunt fuse located near the i.e. control unit which also protect the injection system.



DESCRIPTION OF OPERATION

10/00 ▶

The CODE control unit **M20** is supplied at pin 3 by the battery via the 20A EFI maxifuse of **B5** and the 7.5A fuse **B35**.

The supply controlled by the ignition (15/54) reaches pin 8 through the line protected by the 7.5A fuse **B25**.

Pin 4 is connected directly to earth **C13**.

The connection between pin 6 of the Code control unit **M20** and pin 7 of the engine management control unit **M10** is the serial type; the recognition dialogue for the key and the exchange of codes takes place via this connection.

The control unit **M20** is connected, via pin 5, to the diagnostic coupling **R10**.

The autodiagnostic system produces the signal, via pin 2, for the 'CODE failure' warning light located in the instrument panel **E50**, connector B pin 11.

The instrument panel **E50** is supplied via pin 18 connector A by the 10A fuse 22 of B1. Fuse **F22** is supplied by the ignition switch via the contact INT; when there is an earth signal, produced by the control unit **M20**, at pin 11 of the instrument panel **E50**, the 'CODE failure' warning light comes on.

A second control unit connector is connected via two leads to the aerial, fitted coaxially to the ignition key, in order to detect key insertion and rotation.

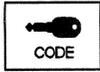
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
M10	Engine management ECU	1056A
M20	CODE ECU	5580E
R10	Multiple tester connection	-
R20	Diagnostic coupling for i.e.	-

COMPONENTS

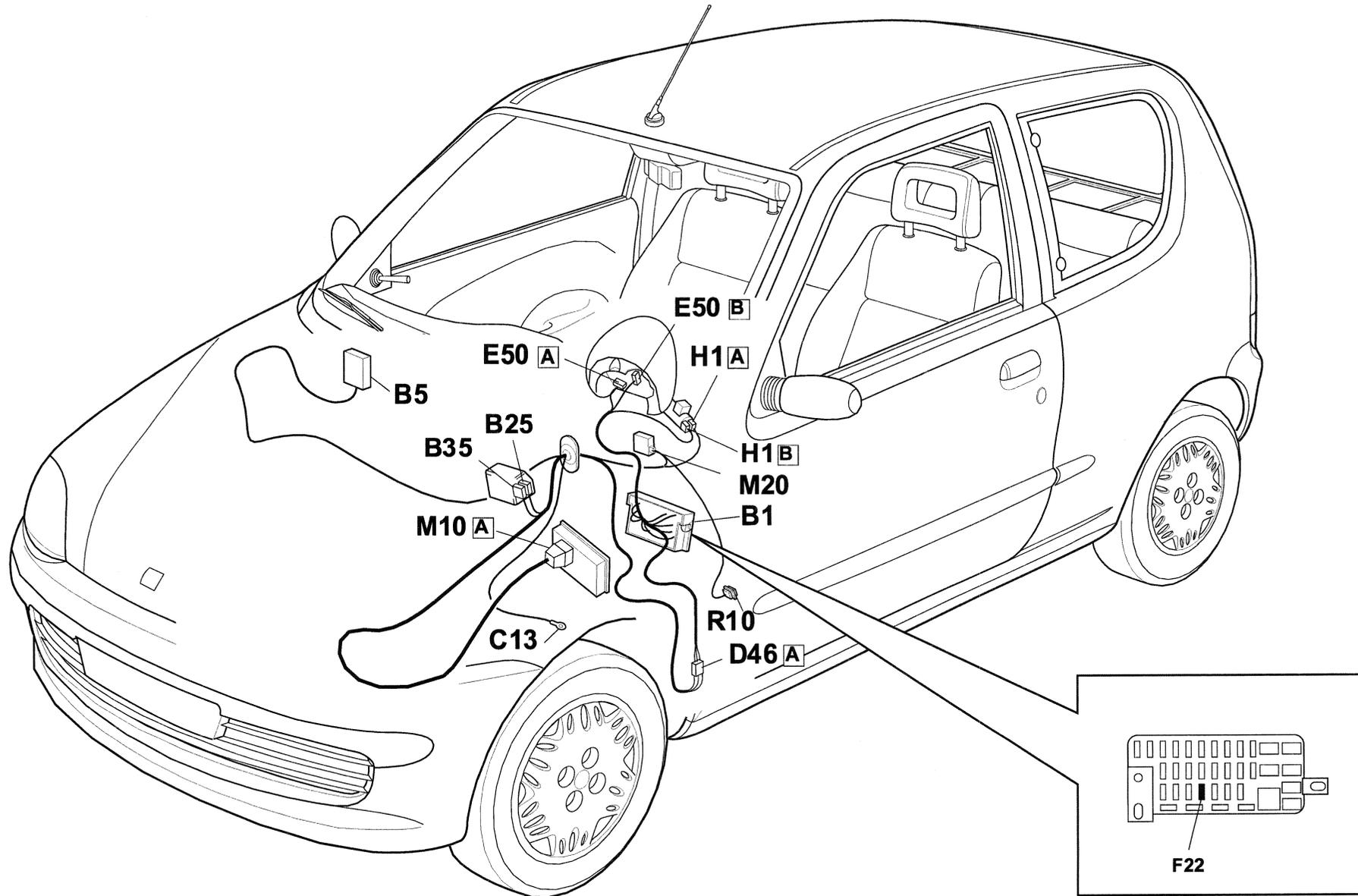
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
B01	Junction unit	-
B05	MAXI FUSE box	-
B25	Fuse. for services controlled by ignition 15/54	-
B35	Injection memory and CODE fuse	-
C13	Front earth on left side panel	-
D04	Front / engine coupling	-
D46	Rear dashboard./ front- coupling	-
E50	Instrument panel	5560B
H01	Ignition switch	5520A
M10	Engine management ECU	-

E7010

ELECTRICAL DRAWINGS CODE



COMPONENTS LAYOUT



187.00.00.ELV.70.059...TO...U.02.P.816.EPS



List of functions

- DESCRIPTION
- WIRING DIAGRAM
- DESCRIPTION OF OPERATION

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DESCRIPTION

The alarm system offers the car protection against break-in by volumetric and perimetral supervision.

An electronic control unit controls:

- the state of the doors and bonnets, through switches in the locks (perimetral supervision)
- the presence of a moving object inside the passenger compartment, through volumetric sensors. (volumetric supervision)
- the integrity of the system power supply cables (direct from the battery and from the ignition switch)
- the activation of the ignition switch

The control unit has a diagnostic function that finds and memorises faults and failures of the control unit itself and the system components, and checks the integrity of the connection cables.

The control unit also memorises the number of activations and alarms that have taken place.

The control unit operation logic can be modified so as to conform to laws concerning alarm systems in force on the various Markets .

The electronic control unit also incorporates the siren and the emergency key: it is connected in the front, in the engine compartment, in front of the battery.

The emergency key enables the cutting off of the system, for example, when making repairs or if the car is left off the road for long periods.

The receiver is an electronic device that receives the signal from the transmitter and incorporates the volumetric sensors: it is located in the front ceiling light. The volumetric sensors control there are no break ins into the car: they are both "double" sensors, with a sender and a receiver: the wave transmitted by one of them (sender) has to reach the other (receiver): if it does not an alarm signal is sent to the control unit.

The doors are controlled using the same switches as the door lock system. A special switch is located on the engine bonnet lock, whereas to signal that the boot is open the contact board connecting to the tailgate cables is used.

The deterrent LED is on the dashboard on the steering column covering: it indicates the state of the system(on, off etc.) and also any failures.

For further details see **DESCRIPTION AND OPERATION: 5580E.**

The alarm system control unit has a direct power supply, protected by a junction unit fuse and the power supply from the ignition switch protected by the fuse near the e.i. that also protects the injection system.

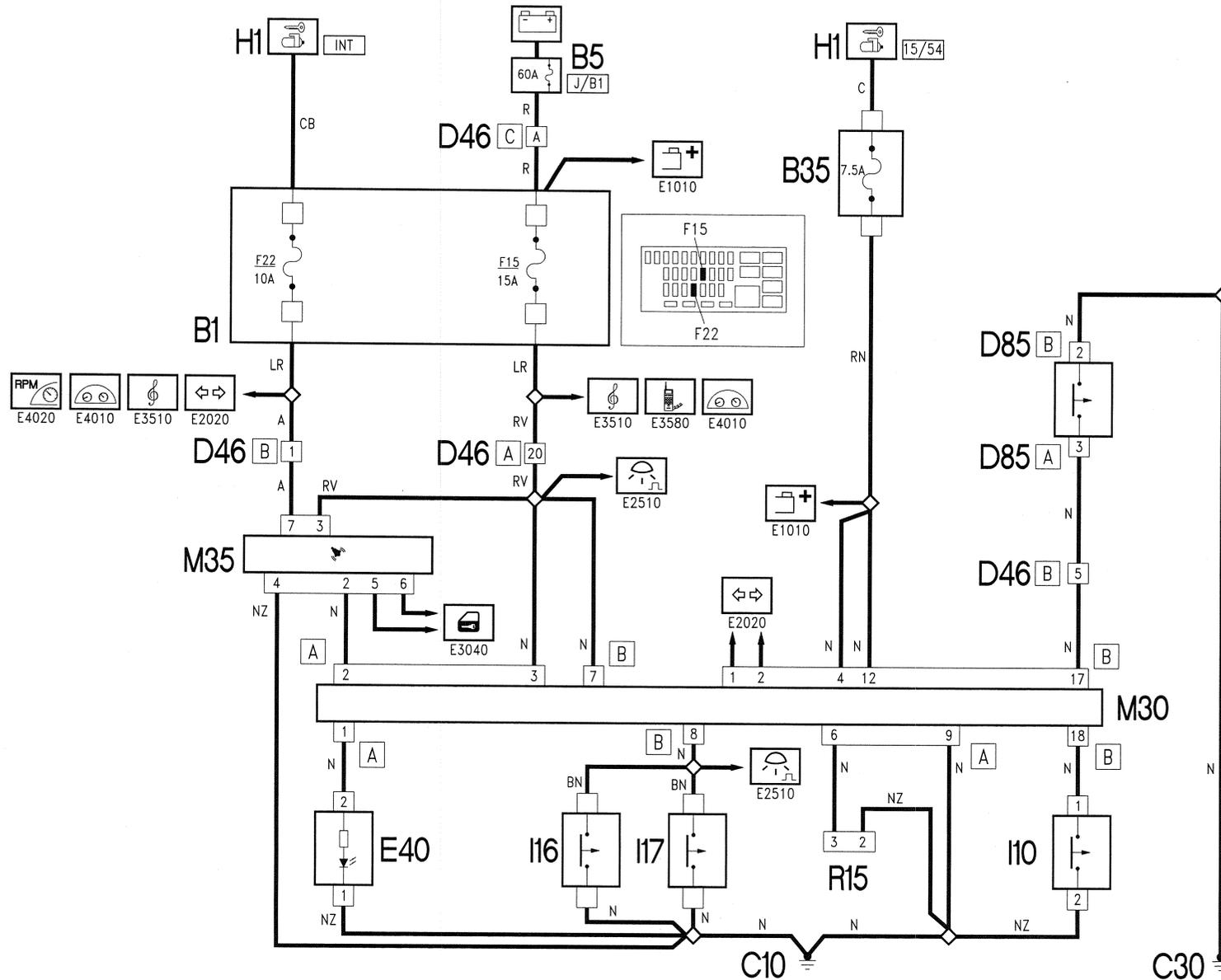
The remote control receiver has direct power supply lines and from ignition switch protected by two fuses of the junction unit.

E7015

ELECTRICAL DIAGRAMS ALARMS



WIRING DIAGRAM



187E170151100001E1SES



DESCRIPTION OF OPERATION

The alarm system is managed by the alarm control unit **M30**.

The control unit is supplied directly from the battery on pin 3 of connector A and pin 7 of connector B (power supply for the turn lights) from the line protected by the fuse of junction unit **B1**.

The ignition switch power supply (15/54) reaches pins 4 and 12 of connector B of control unit **M30**, through the line protected by injection and CODE memory fuse **B35**.

Pin 9 of connector A is earth.

Control unit **M30** controls the door closing through switches **I16** and **I17** that, if the door is open, send an earth signal to pin 8 of connector B. (the same switches that switch on the interior lighting; see also E2510 - CEILING LIGHTS).

The engine compartment is controlled by switch **I10**, that connects to pin 18 of connector B, the boot from rear/tailgate contact board **D85**, that connects to pin 17 of connector B.

Pin 1, connector A of **M30** sends the signal to the alarm LED **E40**.

Pins 1 and 2 on connector B of **M30** output the signals for the turn lights (see E2020 - TURN/ HAZARD LIGHTS).

Control unit **M30** has a diagnostics system, that can be used connecting to alarm diagnostic socket **R15**: this receives signals from pin 6 on connector A of **M30**.

Alarm remote control receiver **M35** is supplied direct from the battery to pin 3 from the line protected by fuse **F15** and to pin 7 from the power supply line (INT) protected by fuse **F22**; both fuses are in junction unit **B1**.

Pin 4 of **M35** is earth.

The 'lock doors' and 'unlock doors' signals are output from **M35** (pins 5 and 6) (see E3040 - DOOR LOCKS).

Control unit **M30** and receiver **M35** are connected by a serial line from pin 2, connector A of **M30** to pin 2 of **M35**.

COMPONENTS

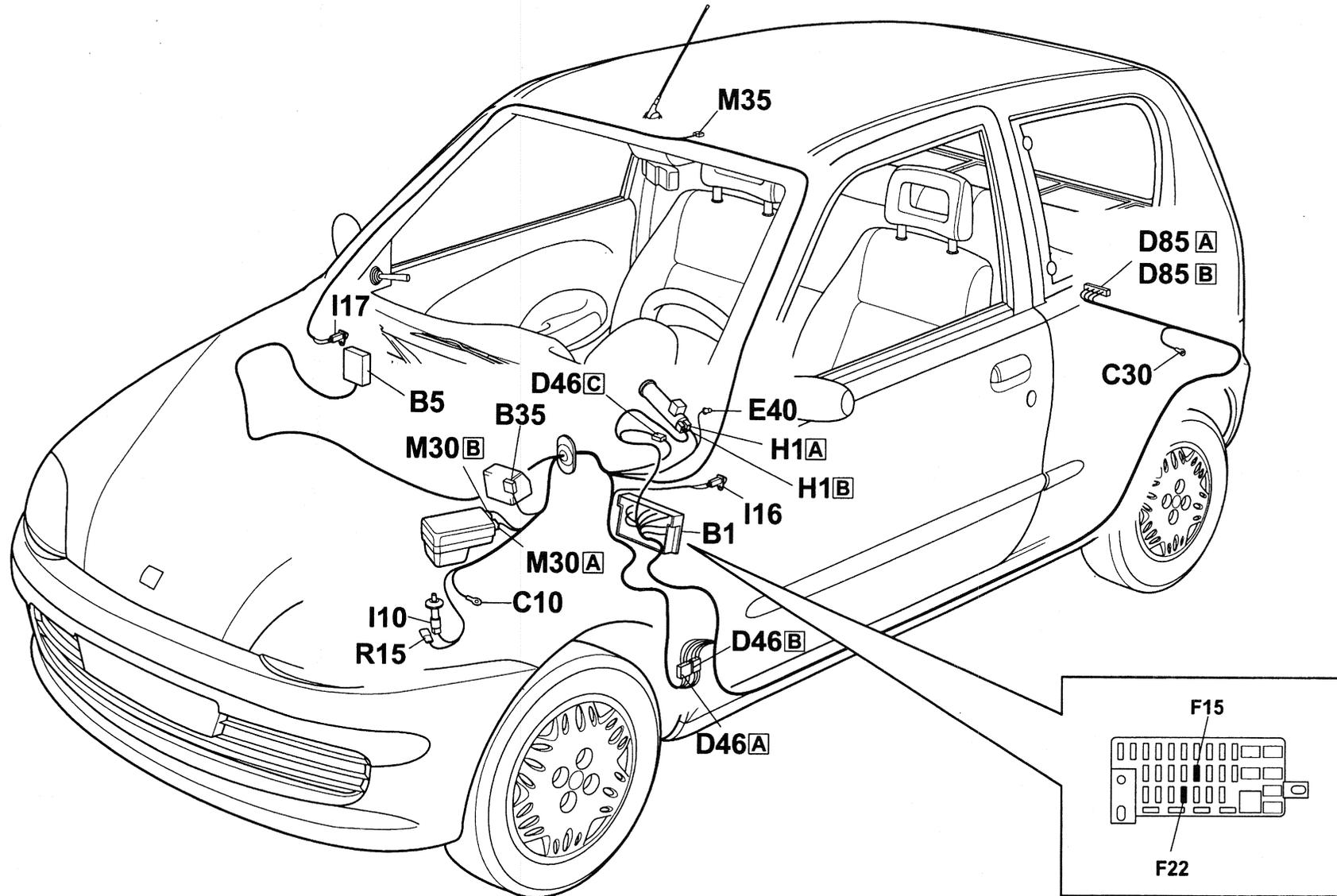
<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
B1	Fuse carrier	5505A
B5	MAXI FUSE box	-
B35	CODE and injection memories fuse	-
C10	Front left earth	-
C30	Rear left earth	-
D46	Front/dashboard - rear connection	-
D85	Rear/tailgate contact board	5505A
E40	Alarm LED	5580E
H1	Ignition switch	5520A
I10	Bonnet release switch	5580E
I16	Ceiling lamp switch on front left door.	7040E
I17	Ceiling lamp switch on front right door.	7040E
M30	Alarm control unit	5580E
M35	Alarm remote control receiver	5580E
R15	Alarm diagnostic socket	-

E7015

ELECTRICAL DIAGRAMS ALARMS



COMPONENT LAYOUT



187E170151100001E1CEU



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- DESCRIPTION OF OPERATION

- COMPONENTS
- COMPONENTS LAYOUT

DESCRIPTION

10/00 ▶

The intruder alarm system offers volumetric and perimeter protection.

An electronic control unit monitors the following:

- status of doors, boot and bonnet via switches in the locks (perimeter control)
- the presence of a moving object inside the passenger compartment, via volumetric sensors. (volumetric control)
- the condition of the system supply cables (both directly from the battery and those controlled by the ignition)
- the operation of ignition switch

The control unit is equipped with a self-test function which detects and memorizes faults in the control unit itself and the system components and also checks the condition of the connecting cables.

The control unit also memorizes the number of times the alarm is activated and set off.

The control unit operating software may be altered to meet regulations governing the use of alarm systems applicable in different markets.

The electronic control unit also incorporates the siren and the emergency key: it is located at the front, in the engine compartment, in front of the battery. The emergency key makes it possible to cut out the system, for example in the case of repair operations or if the vehicle is not used for long periods.

The receiver is an electronic device which receives the transmitter signal and incorporates the volumetric sensors: it is located in the front courtesy light. The volumetric sensors check that there are no intrusions in the vehicle: both are 'double' sensors, i.e. consisting of an emitter and a receiver: the wave transmitted by one of the two (emitter) is received by the other (receiver): otherwise an alarm signal it sent to the control unit.

The same switches as the central locking system are used to check the doors. There is a special switch in the bonnet lid lock, whilst the contact board connected to the tailgate cables is used to signal that the boot lid is open.

The deterrent LED in the steering column cover signals the status of the system (on, off, etc.) plus any faults.

For more details **Characteristic of working principle 5580E** Anti-theft device .

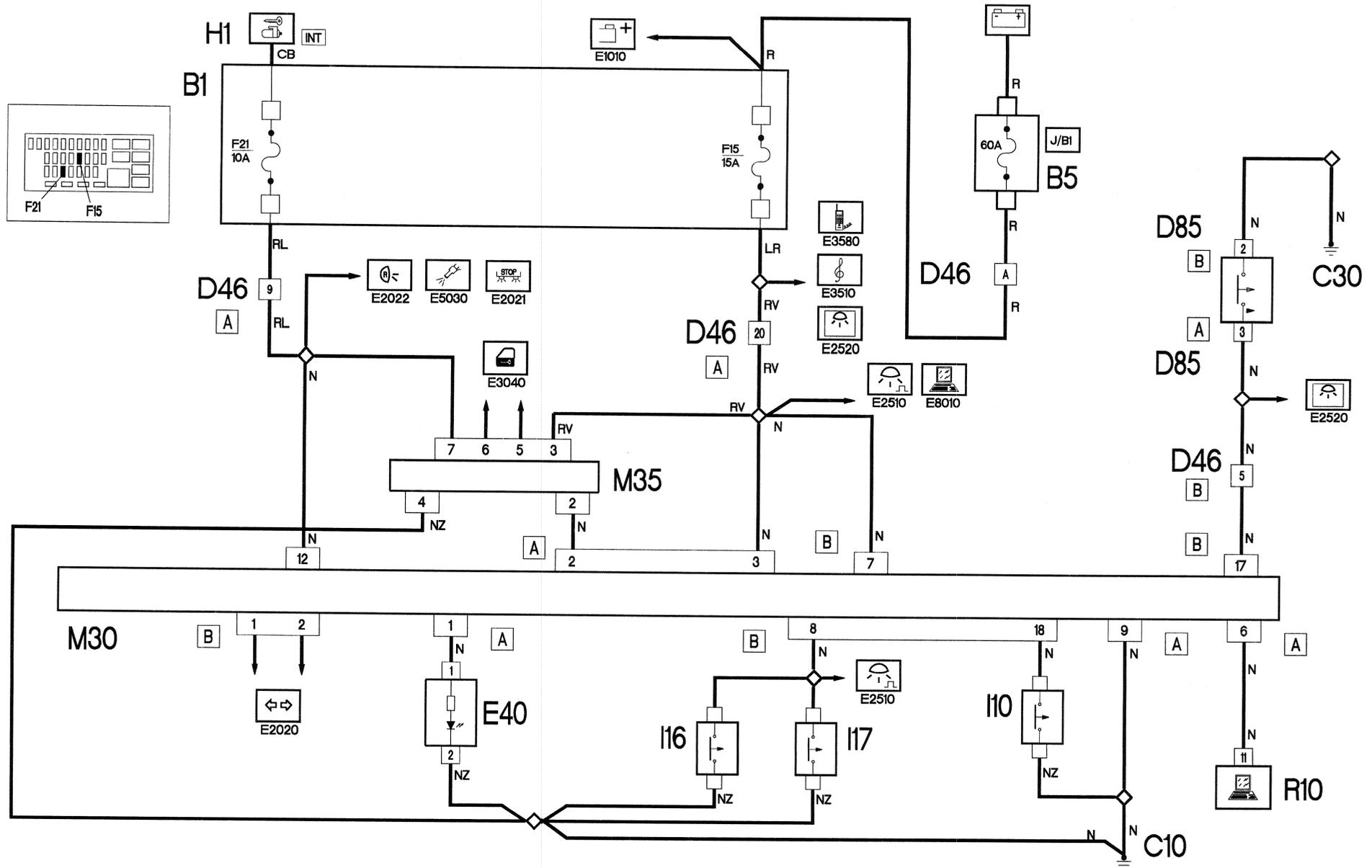
The alarm system control unit has a direct supply protected by a fuse in the junction unit and the line controlled by the ignition is protected by the shunt fuse located near the i.e. control unit which also protects the injection system. The remote control receiver has direct supply lines and supply lines controlled by the ignition protected by two fuses located in the junction unit.

E7015

ELECTRICAL DRAWINGS ALARMS



WIRING DIAGRAM



187.00.00.ELV.70.059_15_U.01.P.B15.EPS



DESCRIPTION OF OPERATION

10/00 ►

The alarm system is managed by the alarm control unit **M30**.
The control unit is supplied directly by the battery at pin 3 of connector A and at pin 7 of connector B via the line protected by fuse **F15** of the junction unit **B1**. Fuse **F15** is supplied by the battery via the 60A maxifuse housed in **B5**.
The supply controlled by the ignition (15/54) reaches pin 12 of connector B of control unit **M30** via the line protected by fuse **F21**.
Pin 9 of connector A is earthed at **C10**.
The control unit **M30** controls the closure of the doors via switches **I16** and **I17**, whilst the bonnet and boot lids are controlled by switch **I10** and contact board **D85**, respectively.

The operating logic is as follows:

- If a door is opened, the relevant switch **I16** or **I17** sends an earth signal to control unit **M30** via pin 8 of connector B (the same switches light up the courtesy light; **Wiring diagram E2510** ROOF LAMP);
- If the bonnet lid is opened, the switch **I10** sends an earth signal to the control unit at pin 18 of connector B of control unit **M30**;
- Lastly, if the boot is opened, the switch in the tailgate contact board **D85** sends an earth signal to pin 17 of connector B of the control unit **M30**.

Switches **I10**, **I16** and **I17** lead to earth **C10**, whilst the contact board **D85** leads to earth **C30**.

Pin 1 of connector A of **M30** sends a control signal to alarm LED **E40** pin 1, whilst pin 2 of alarm LED **E40** is connected to earth **C10**.

Pins 1 and 2 of connector B of **M30** produce control signals for the direction indicators **Wiring diagram E2020** TURN/ HAZARD LIGHTS .

The autodiagnostic data can be read by connecting to connector **R10**; the control unit sends diagnostic signals to connector **R10** via pin 6 of connector A of **M30**.

The receiver for the remote control **M35** is supplied directly by the battery at pin 3 from the line protected by fuse **F15** and at pin 7 from the line controlled by the ignition (INT) protected by fuse **F22**; both fuses are located in junction unit **B1**.

Pin 4 of **M35** is earthed at **C10**.

M35 (pins 5 and 6) issue door lock and door release signals **Wiring diagram E3040** DOOR LOCKING DEVICE .

The control unit **M30** and the receiver **M35** are connected via a serial line from pin 2 of connector A of **M30** to pin 2 of **M35**.

COMPONENTS

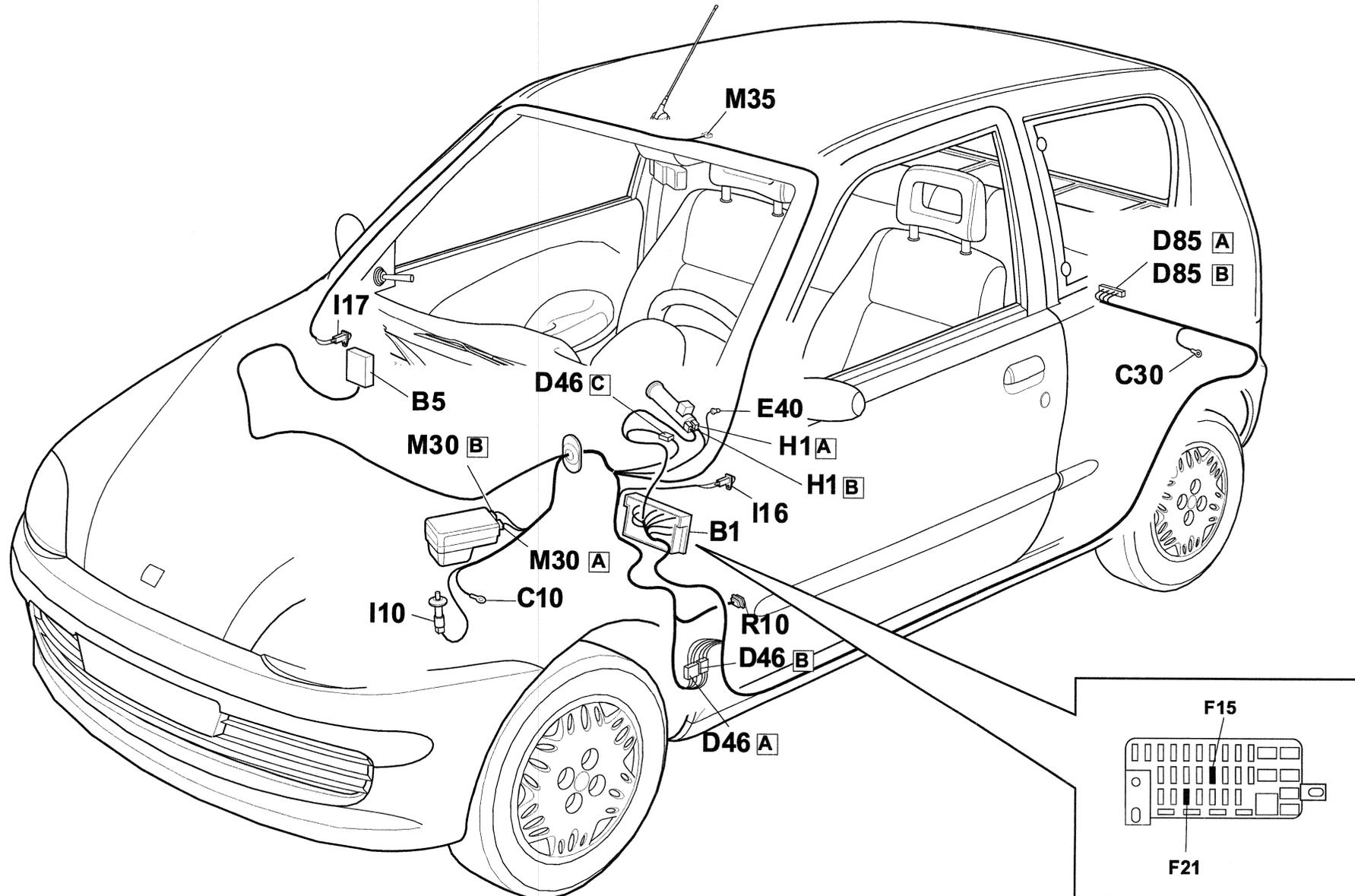
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
B01	Junction unit	-
B05	MAXI FUSE box	-
B35	Injection memory and CODE fuse	-
C10	Left front. earth	-
C30	Left rear earth	-
D46	Rear dashboard./ front- coupling	-
D85	Rear/tailgate contact board	5505A
E40	Alarm LED	5580E
H01	Ignition switch	5520A
I10	Bonnet opening switch	5580E
I16	Courtesy light control switch on left front. door.	7040E
I17	Courtesy light control switch on right front. door.	7040E
M30	Alarm control unit	-
M35	Alarm remote control receiver	5580E
R10	Multiple tester connection	-
R15	Diagnostic coupling for alarm	-

E7015

ELECTRICAL DRAWINGS ALARMS



COMPONENTS LAYOUT



197.00.00.ELV.70.069...15...U.02.P.815.EPS

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DESCRIPTION

The wheel anti-locking system (ABS BOSCH 5.3) adjusts the brake force transferred to the wheels preventing loss of grip in all tyre and road conditions.

This system was designed to integrate the normal mechanical braking system and to ensure adequate safety in the event of faults. This is because the system works with the same brake fluid as the traditional mechanical circuit.

Four sensors, located on the four wheels, constantly signal the speed of each wheel to the ECU consequently recording wheel locking, creeping or loss of grip.

In these situations, the ECU suitably controls a set of solenoid valves which modulate the pressure in the hydraulic circuit eliminating the locked condition and taking the vehicle to grip limit. This ensures shorter braking distances and steering control.

There are two solenoid valves (one to charge pressure and the other to discharge pressure) for each wheel.

The sensors are active. They consist of a Hall effect sensor which faces a magnetic encoder built into the wheel hub bearing. This protects the signal from electromagnetic noise and temperature variations.

Furthermore, the ECU distributes the brake force to the rear axle replacing the previously used mechanical brake force distribution system (EBD function).

The ECU is equipped with a self-test function. The warning light is lit on the instrument panel and the system is deactivated when an error is found. In these conditions the vehicle brakes with the traditional braking system only.

When the ECU detects an error in the EBD function, the ECU lights up the "ABS failure", "low brake fluid" and "handbrake" warning lights.

In these conditions, the rear brake force distribution function is deactivated and the vehicle should be driven with care.

The power lines to the ECU and to the various system components (sensors and actuators) are protected by a 60 A specific maxifuse and by fuse F3 (10A) located in the fusebox B1.



DESCRIPTION OF OPERATION

The ABS ECU **M50** is powered (to pins 17 and 18) directly by the battery via the line protected by the ABS maxifuse in B07.

The ignition switch power (15/54) reaches pin 15 via fuse F3 in fusebox B1.

The ECU is connected to earth via pins 16 and 19. The four sensors **K70**, **K71**, **K75**, **K76** send the wheel speed signals to ECU **M50** pins 6-7, 4-5, 8-9 and 1 - 2.

The brake pedal switch **I30** sends an enable signal to ECU **M50** pin 14: the ABS system is in fact cut out when the brake pedal is not pressed.

The ABS includes a self-test system. When the ECU detects problems related to the ABS, it sends a signal to instrument **E50** pin 20 which signals the ABS system failure. If the problems also relate to the "EBD" function, the ECU sends a signal to instrument **E50** pin 21 for the "low brake fluid and hand-brake" warning light.

These earth signals light up the warning lights, as instrument **E50** is ignition switch powered (INT) via the line protected by fuse F22 in fusebox **B1**.

The self-test data can be read by connecting to connector **R23** which is reached by the ECU **M50** signals from pin 11 and pin 12 via the specific diagnostic line.

COMPONENTS

<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
B1	Fusebox	A5505
B 07	ABS fuse (MAXI FUSE)	-
C10	Left-hand front earth	-
C 12	ABS front earth	-
C20	Right-hand dashboard earth	-
D 05	ABS joint	-
D 95	Intermediate ABS joint	-
D46	Front rear dashboard joint	-
E50	Instrument panel	-
H1	Ignition switch	A5520
I30	Brake pedal switch	D5550
K 70	Front LH ABS sensor	A3340
K 71	Front RH ABS sensor	A3340
K 75	Rear LH ABS sensor	A3340
K 76	Rear RH ABS sensor	A3340
R 23	ABS diagnostic socket	-

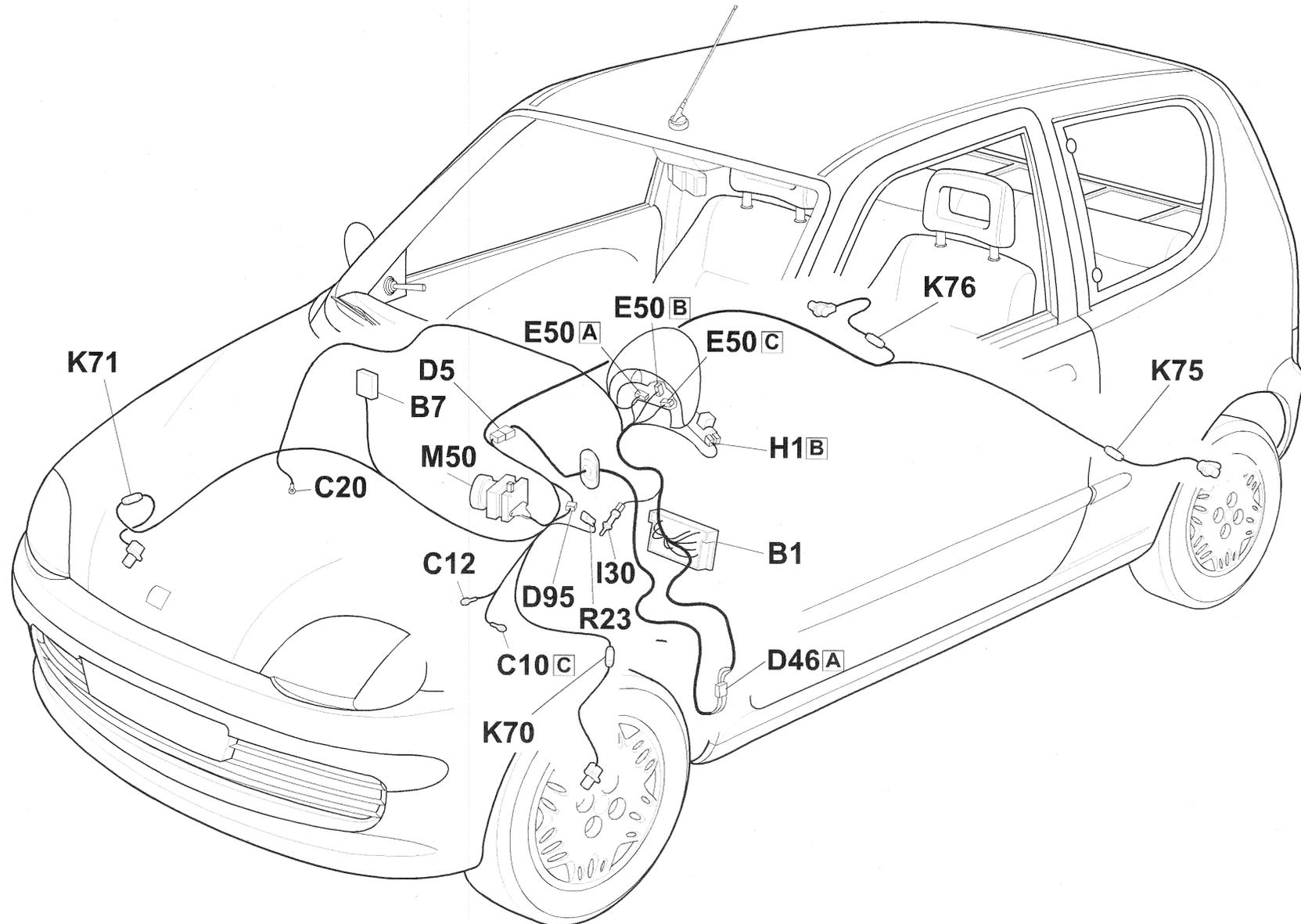
E7020

WIRING DIAGRAMS

ABS 899 1108



COMPONENT LAYOUT



7020



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DESCRIPTION

The electronic anti-lock brake system (BOSCH 5.3 ABS) governs braking pressure sent to the wheels and prevents loss of grip under all tyre and road surface conditions.

The system is designed to complement the normal mechanical braking system and not to replace it. In this way it ensures effective safety in the case of anomalies: the ABS uses the same fluid as the conventional mechanical braking system.

Four sensors fitted to the four wheels inform the electronic control unit of wheel speed at every moment. In this way, they detect wheel lock, wheel slip and loss of grip.

Under these conditions, the control unit sends specific instructions to solenoids that modulate hydraulic circuit pressure to eliminate lock and restore the car to within grip limits. This ensures the shortest possible stopping distance, without losing control of the steering.

Two adjustment solenoids (one for pressure charging, the other for pressure discharging) are fitted for each wheel.

The 'active' type sensors consists of a Hall effect receiver facing a magnetic codifier incorporated in the hub bearing; under these circumstances the signal is less affected by electro-magnetic interference and by the temperature.

The control unit also controls brake force distribution over the rear axle and thus replaces the mechanical load proportioning valve used previously (EBD function: Electronic Brake Distribution).

The control unit is equipped with a self-diagnostic function: when an error occurs in the ABS system, the warning light is turned on and the system is simultaneously deactivated. Under these conditions, the car brakes using only the conventional system. Under these conditions, the car brakes using only the conventional system.

When the control unit detects an error in the EBD function, it simultaneously turns on the 'insufficient brake fluid level' and 'handbrake on' warning light as well as the ABS warning light.

Under these conditions, the rear brake distribution control is also deactivated and the car must be driven with great care.

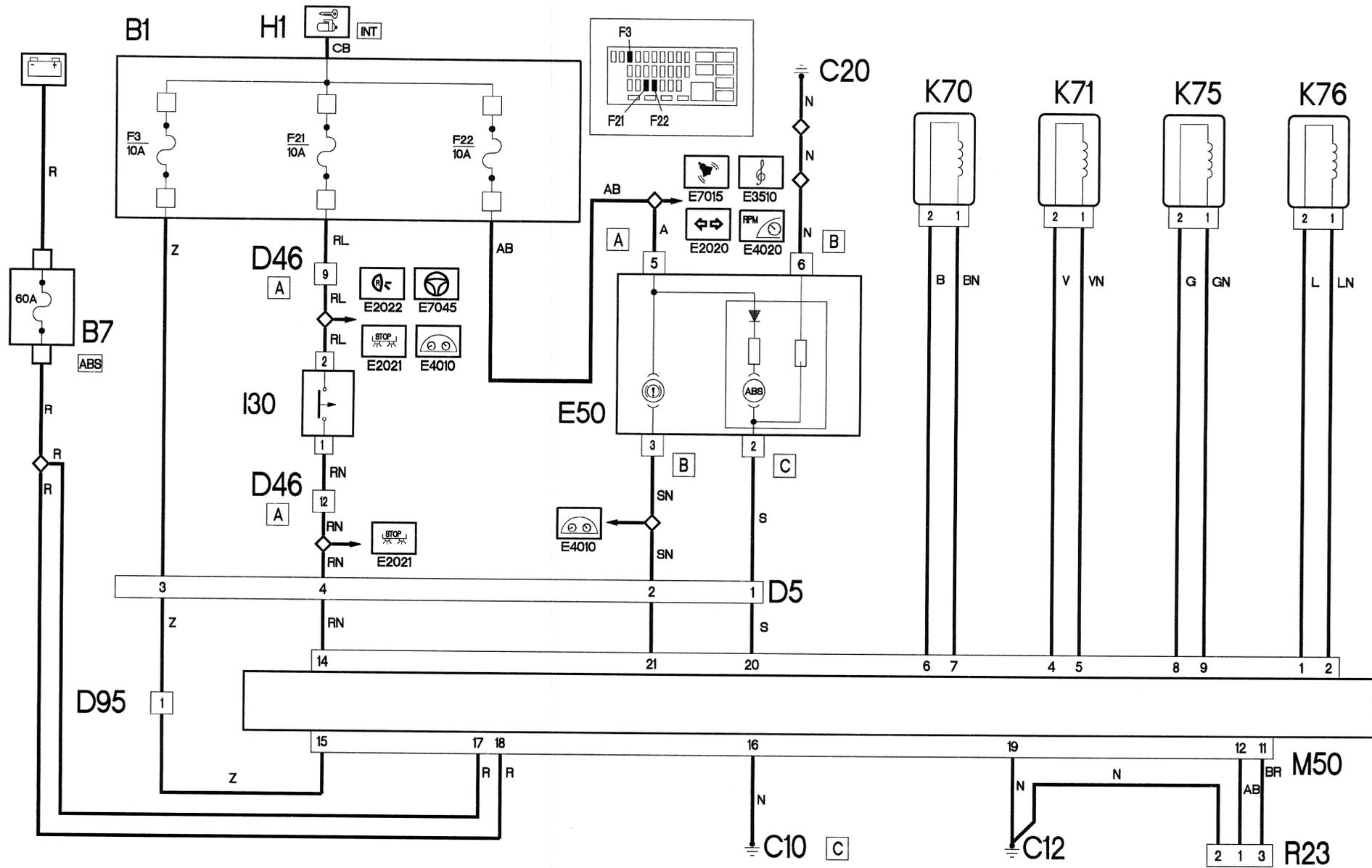
The supply lines for the control unit and the various system components (sensors and actuators) are protected by a specific 60A maxifuse and fuse F3 (10A) located in the junction unit **B1**.

E7020

ELECTRICAL DRAWINGS ABS



WIRING DIAGRAM





DESCRIPTION OF OPERATION

ABS electronic control unit **M50** is supplied (at pins 17 and 18) directly by the battery via a line protected by ABS maxifuse B07.

The supply controlled by the ignition (15/54) reaches pin 15 via fuse **F3** of junction unit **B1**.

The control unit is earthed by pins 16 and 19. The four sensors **K70**, **K71**, **K75**, **K76** send wheel speed signals to pins 6-7, 4-5, 8-9 and 1-2 of **M50** respectively.

Brake pedal switch **I30** sends an enablement signal to pin 14 of control unit **M50**: the ABS cannot intervene unless the brake pedal is pressed;

The ABS includes an autodiagnostic system: when the control unit detects problems relating to the ABS function it sends a signal from pin 20 to the instrument panel **E50** which contains the 'ABS failure' warning light. If the problems involve the EBD function, the control unit also sends a signal from pin 21 to instrument **E50** to the 'insufficient brake fluid level' and 'handbrake applied' warning light.

These are earth signals and make the warning lights come on because the instrument panel **E50** supply is controlled by the ignition (INT) from the line protected by fuse **F22** of the junction unit **B1**.

The self-test data can be read by connecting to connector **R23**: it receives signals from pin 12 of the control unit **M50** via the special diagnostic line.

<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
I30	Brake pedal switch	5550D
K70	Left. front wheel sensor for ABS	3340A
K71	Right. front wheel sensor for ABS	3340A
K75	.Left rear wheel sensor for ABS	3340A
K76	.Right rear wheel sensor for ABS	3340A
M50	ABS control unit	-
M50	ABS control unit	3340A
R10	Multiple tester connection	-
R23	Diagnostic coupling for ABS	-
R23	Diagnostic coupling for Air Bag	-

COMPONENTS

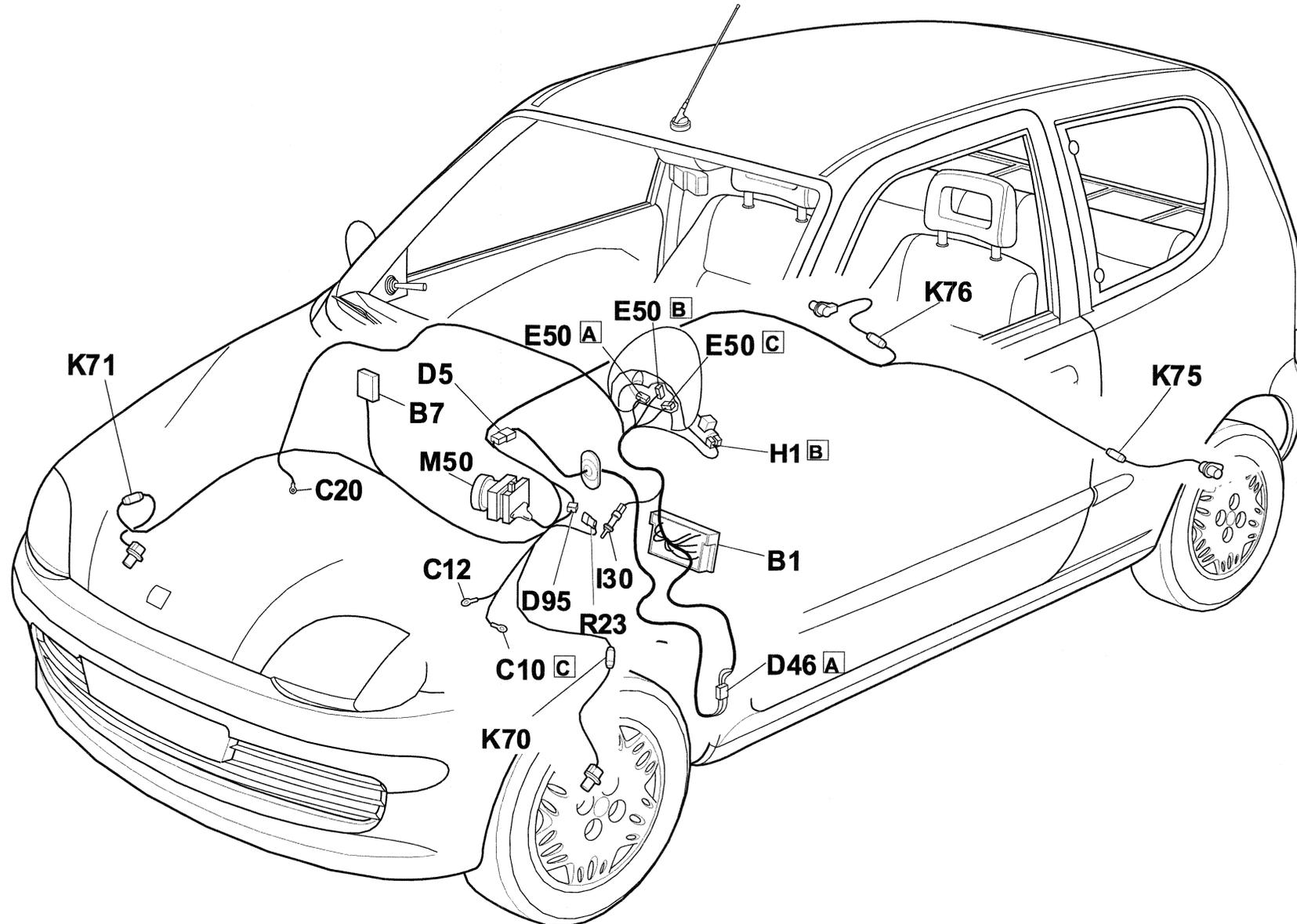
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
B01	Junction unit	-
B07	(MAXI FUSE) for ABS	-
C10	Left front. earth	-
C12	ABS front. earth	-
C20	Radio phone earth	-
C20	Right dashboard earth	-
D05	ABS coupling	-
D46	Rear dashboard./ front- coupling	-
D95	ABS intermediate coupling	-
E50	Instrument panel	5560B
H01	Ignition switch	5520A

E7020

ELECTRICAL DRAWINGS ABS



COMPONENTS LAYOUT



506.907/06 12/2000



Function contents

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DESCRIPTION

The car has an electronically controlled safety system that, in a serious frontal crash, activates the air bags on the driver's and passenger's sides.

NOTE: *if the car is only fitted with air bag on the driver's side, the system is mechanical; if there is also the air bag on the passenger's side, the electronic system described here is installed.*

An electronic control unit manages the whole system, controlling all the components and activating the air bags when necessary.

The control unit is located under the car centre structure and is rigidly fixed to the bodywork: in this way the deceleration sensors inside it are close to the barycentre and detect very accurately the decelerations of the whole car.

The air bag module, driver's side is located in the centre of the steering wheel; it is installed on a tilting plate that enables the control of the horns. The plate is housed in a metal container that contains the folded cushion and the device that generates the gas to fill the cushion.

A "clock spring" device permits the air bag module cables to follow the turning of the steering wheel without danger of breaks.

The passenger's airbag is on the dashboard, above the glove compartment, and is fastened on the car cross member by a bracket.

The passenger side airbag can be deactivated by means of a specific switch with the vehicle key. The switch is located under the centre of the dashboard. When the switch is turned OFF, the ECU will light the specific "passenger airbag disable" warning light.

The control unit is provided with a diagnostics system:

- it finds and memorises any faults
 - recognises the various components and type of fault
 - indicates that these faults have occurred through the relevant warning light
- Also the system activations after a serious crash are memorised by the control unit.

For further details see **DESCRIPTION AND OPERATION: 5580C**.

The system control unit power supply line is protected by a fuse of the junction unit.

Caution: when operating on the air bag system scrupulously follow the current safety standards. For further details see. PROCEDURES 5580C"



DESCRIPTION OF OPERATION

The Airbag control unit **M60** is powered through the ignition switch(INT) on pin 15 from the line protected by fuse **F23** of junction unit **B1**.

Pin 14 is connected to airbag system earth **C50**, and so is pin 23, that indicates that the system is the "complete" version that includes the passenger's airbag.

When, based on the control logic, a crash of a certain severity is detected, the control unit sends the signals to activate the modules:

- to the driver's airbag **Q9**, through the clock spring on steering wheel **Q10** (from pins 1 and 2);

- to airbag on passenger's side **Q11** (from pins 3 and 4);

Pins 5 and 24 connect with the passenger airbag disable switch **H75**.

When the system diagnostics find a fault or a crash has been recorded, control unit **M60** sends a signal from pin 13 for the " Air Bag fault" warning light , located in cluster **E50**.. This earth signal switches on the warning light spia, since cluster 0 is supplied from the ignition switch (INT) by the line protected by fuse **F22** of junction unit **B1**. In the same way pin 20 of **M60** sends the signal for the " passenger airbag disable " warning light.

The diagnostics data reading can be carried out connecting to airbag diagnostic socket **R25**: this receives the signals from pins 8 and 9 from control unit **M60**.

COMPONENTS

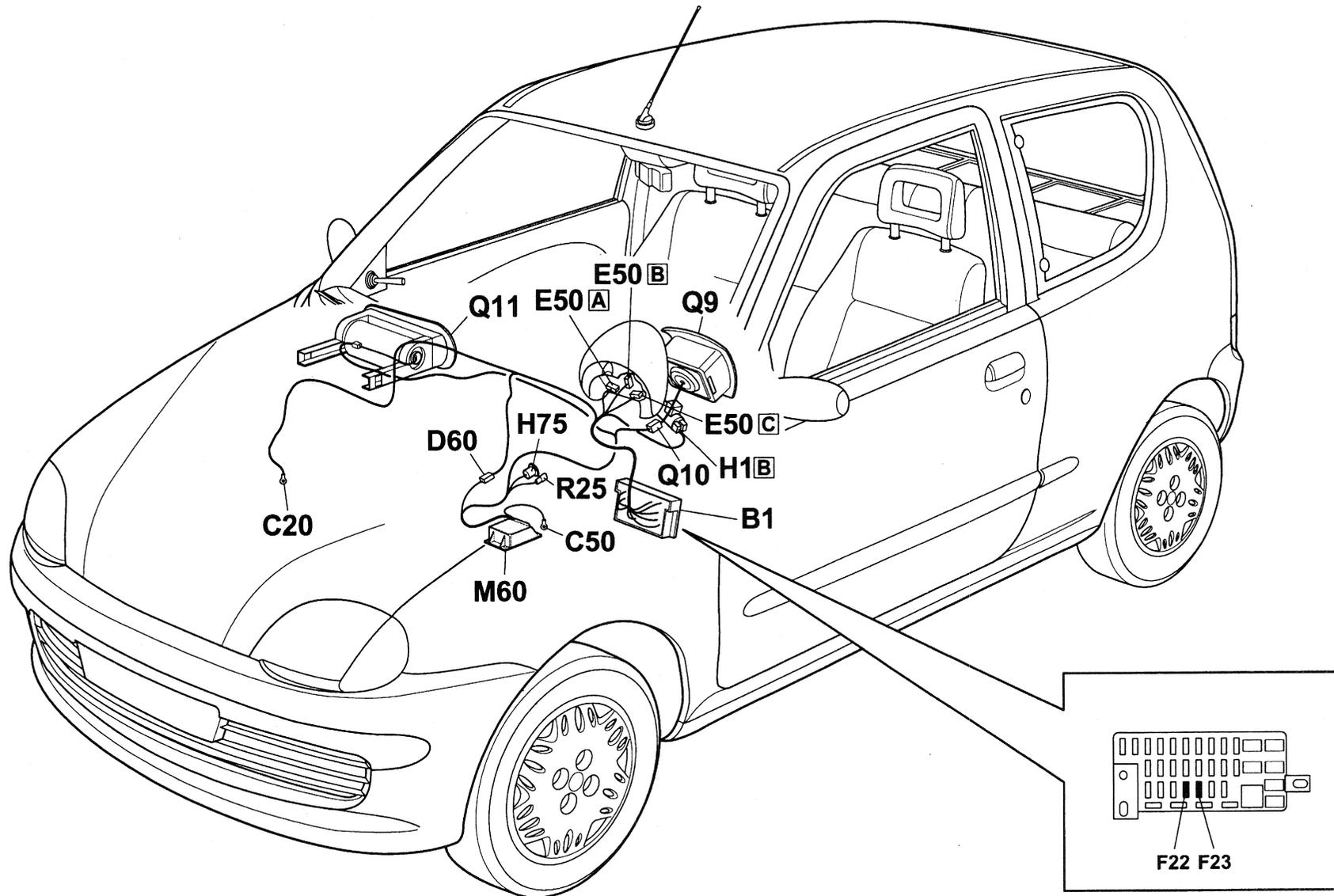
<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
B1	Fuse carrier	5505A
C20	Right dashboard earth	5505A
C50	Air Bag system earth	-
D60	Air Bag connection	-
E50	Cluster	5560B
H1	Ignition switch	5520A
H75	Passenger airbag disable switch	-
M60	Air Bag control unit	-
Q9	Driver's Air Bag	5580C
Q10	Clock spring on steering wheele	-
Q11	Air Bag on dashboard (passenger side)	5580C
R25	Air Bag diagnostic socket	-

E7030

ELECTRICAL DIAGRAMS AIRBAG



COMPONENT LAYOUT



187E170301100001E1CEU



Operation index

- DESCRIPTION
- WIRING DIAGRAM
- DESCRIPTION OF OPERATION

- COMPONENTS
- COMPONENTS LAYOUT

DESCRIPTION

10/00 ▶

The car is fitted with an electronically-controlled safety system which, in the case of a front-end crash of some severity, activates the driver's and passenger's Air Bags.

The electronic control unit manages the entire system, checking all the components and when necessary activating the Air Bags.

The control unit is located under the centre console and is rigidly fixed to the bodyshell: in this way the deceleration sensors located inside it are close to the centre of gravity and detect deceleration for the entire vehicle accurately.

The driver's Air Bag module is located in the centre of the steering wheel; it is fitted on a tilting plate which enables the horn to be operated. The plate houses a metal container which holds the folded airbag and a gas generator that inflates the bag.

A clock spring device allows the airbag module connection leads to turn with the steering wheel without the risk of breakage.

The passenger airbag is located on the fascia, above the glove compartment, and is fastened directly to the car crossmember via a special bracket.

The passenger Air Bag can be deactivated via a special switch, which can be operated by a key, located under the dashboard in the centre. When the key is turned to OFF, the control unit also controls the activation of a passenger air bag disablement warning light on the instrument panel.

The control unit comes with a self-diagnostic function.

- it detects and memorizes any faults
- it recognizes the various components and the type of fault
- it signals the onset of these faults via the special warning light

System activations following a particularly serious impact are memorized by the control unit.

For more details **Characteristic of working principle 5580C** Air bag system .

The system control unit supply line is protected by a fuse located in the junction unit.



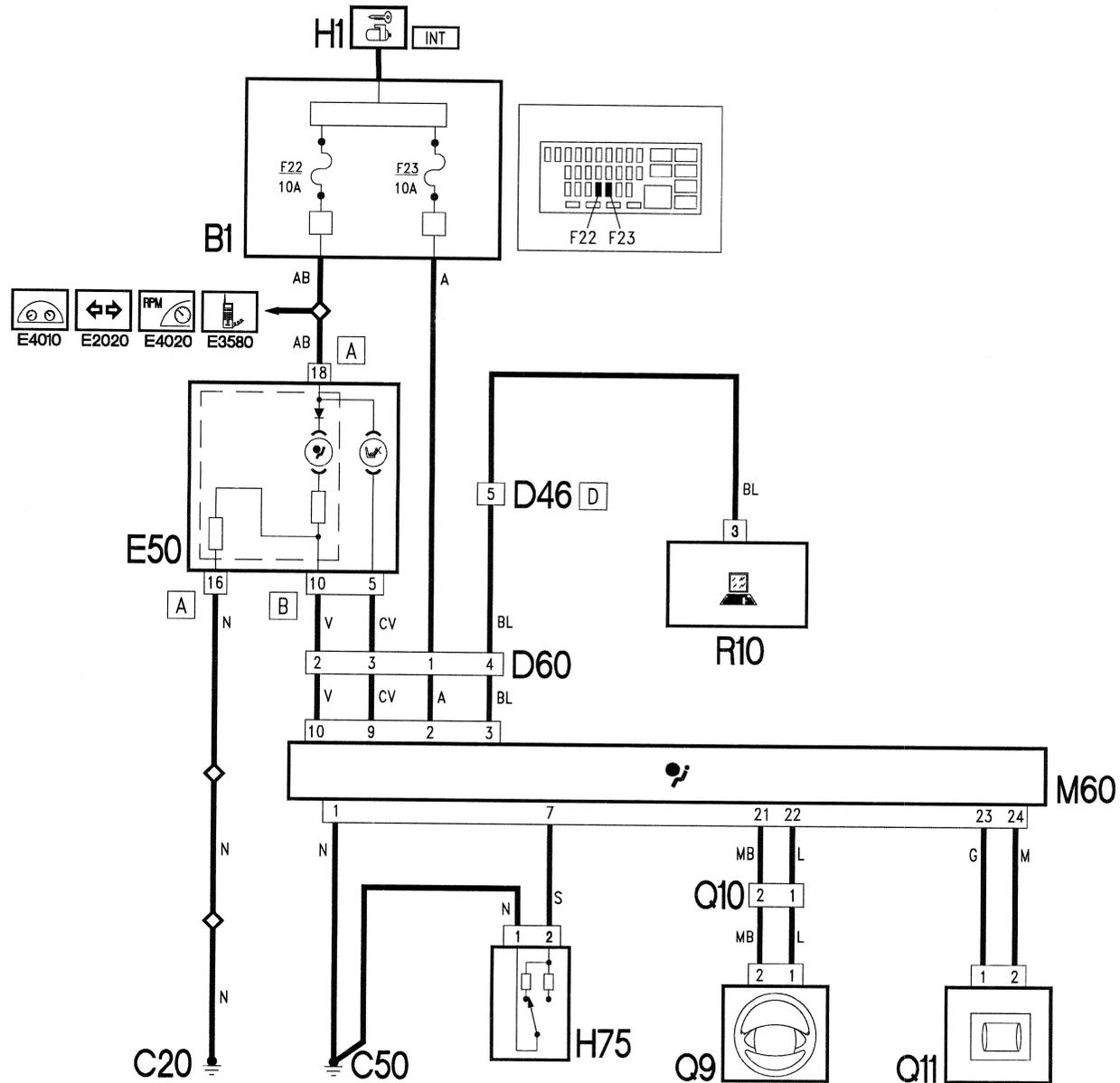
When operations are carried out to the Air Bag system the recommended safety instructions must be followed precisely. For further details see PROCEDURES 5580C

E7030

ELECTRICAL DRAWINGS AIRBAG



WIRING DIAGRAM



12V BATTERY V. 2000V 30... 12V 12 ASSEMBLY



DESCRIPTION OF OPERATION

10/00 ►

The control unit for the Air Bag system **M60** is controlled by the ignition (INT) at pin 2 by the line protected by fuse **F23** of the junction unit **B1**, whilst pin 1 is connected to earth **C50**.

When an impact of a set severity (determined by the control software) is detected, the control unit sends control signals to set off the modules:

- to driver's Air Bag **Q9**, via the steering wheel clockspring **Q10** (via pins 21 and 22):
- to the passenger airbag **Q11** (pins 23 and 24).

Pin 7 is connected to the passenger Air Bag disabling key; via **H65** it is possible to exclude the intervention of the passenger Air Bag in the case of an impact. When the system self-diagnostic function detects a fault or an impact is detected, control unit **M60** sends a signal from pin 10 to the Air Bag failure warning light located in instrument panel **E50**, switching it on. The instrument **E50** is supplied by the line protected by fuse **F22** of the junction unit **B1**. Similarly, pin 9 of **M60** sends the signal for the 'passenger disabling' warning light. The autodiagnostic data can be read by connecting to connector **R10**; The control unit sends diagnostic signals, via pin 3, to connector **R10**.

COMPONENTS

<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
B01	Junction unit	-
C20	Radio phone earth	-
C20	Right dashboard earth	-
C50	Air Bag earth	-
D46	Rear dashboard./ front- coupling	-
D60	Air Bag connection	-
E50	Instrument panel	5560B
H01	Ignition switch	5520A
H75	Passenger's Air Bag disablement switch	5580C
M60	Air Bag control unit	5580C

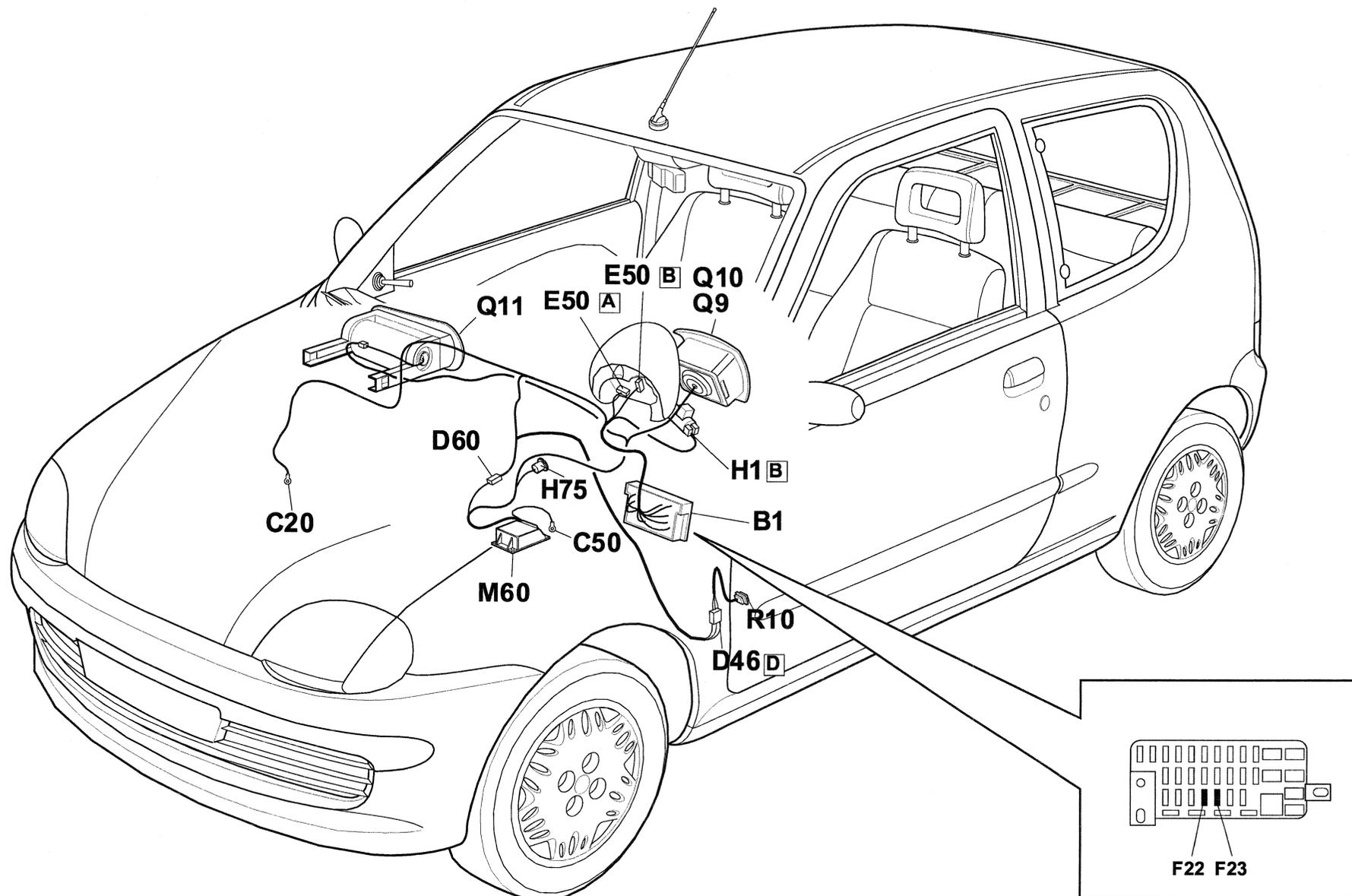
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
Q09	Driver's Air Bag	5580C
Q10	Clock spring on steering wheel	5580C
Q11	Air Bag in dashboard (passenger side)	5580C
R10	Multiple tester connection	-
R25	Diagnostic coupling for Air Bag	-

E7030

ELECTRICAL DRAWINGS AIRBAG



COMPONENTS LAYOUT



506.907/06 12/2000



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DESCRIPTION



The car is fitted with an electronically-controlled safety system which, in the case of a front-end crash of some severity, activates the driver's Air Bag.

The electronic control unit manages the entire system, checking all the components and when necessary activating the Air Bags.

The control unit is located under the centre console and is rigidly fixed to the bodyshell: in this way the deceleration sensors located inside it are close to the centre of gravity and detect deceleration for the entire vehicle accurately.

The driver's Air Bag module is located in the centre of the steering wheel; it is fitted on a tilting plate which enables the horn to be operated. The plate houses a metal container which holds the folded airbag and a gas generator that inflates the bag.

A clock spring device allows the airbag module connection leads to turn with the steering wheel without the risk of breakage.

The control unit comes with a self-diagnostic function.

- it detects and memorizes any faults
- it recognizes the various components and the type of fault
- it signals the onset of these faults via the special warning light

System activations following a particularly serious impact are memorized by the control unit.

For more details **Characteristic of working principle 5580C** Air bag system .

The system control unit supply line is protected by a fuse located in the junction unit.



*When operations are carried out to the Air Bag system the recommended safety instructions must be followed precisely.
For further details see PROCEDURES 5580C*



DESCRIPTION OF OPERATION

10/00

The control unit for the Air Bag system **M60** is controlled by the ignition (INT) at pin 2 by the line protected by fuse **F23** of the junction unit **B1**, whilst pin 1 is connected to earth **C50**.

When an impact of a set severity (determined by the control software) is detected, the control unit sends control signals to set off the driver's Air Bag module **Q9** via the clock spring on the steering wheel **Q10** (pins 21 and 22).

When the system self-diagnostic function detects a fault or an impact is detected, control unit **M60** sends a signal from pin 10 to the Air Bag fault warning light, located in instrument panel **E50**, switching it on. The instrument **E50** is supplied by the line protected by fuse **F22** of the junction unit **B1**.

The autodiagnostic data can be read by connecting to connector **R10**; The control unit sends diagnostic signals, via pin 3, to connector **R10**.

<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
R25	Diagnostic coupling for Air Bag	-

COMPONENTS

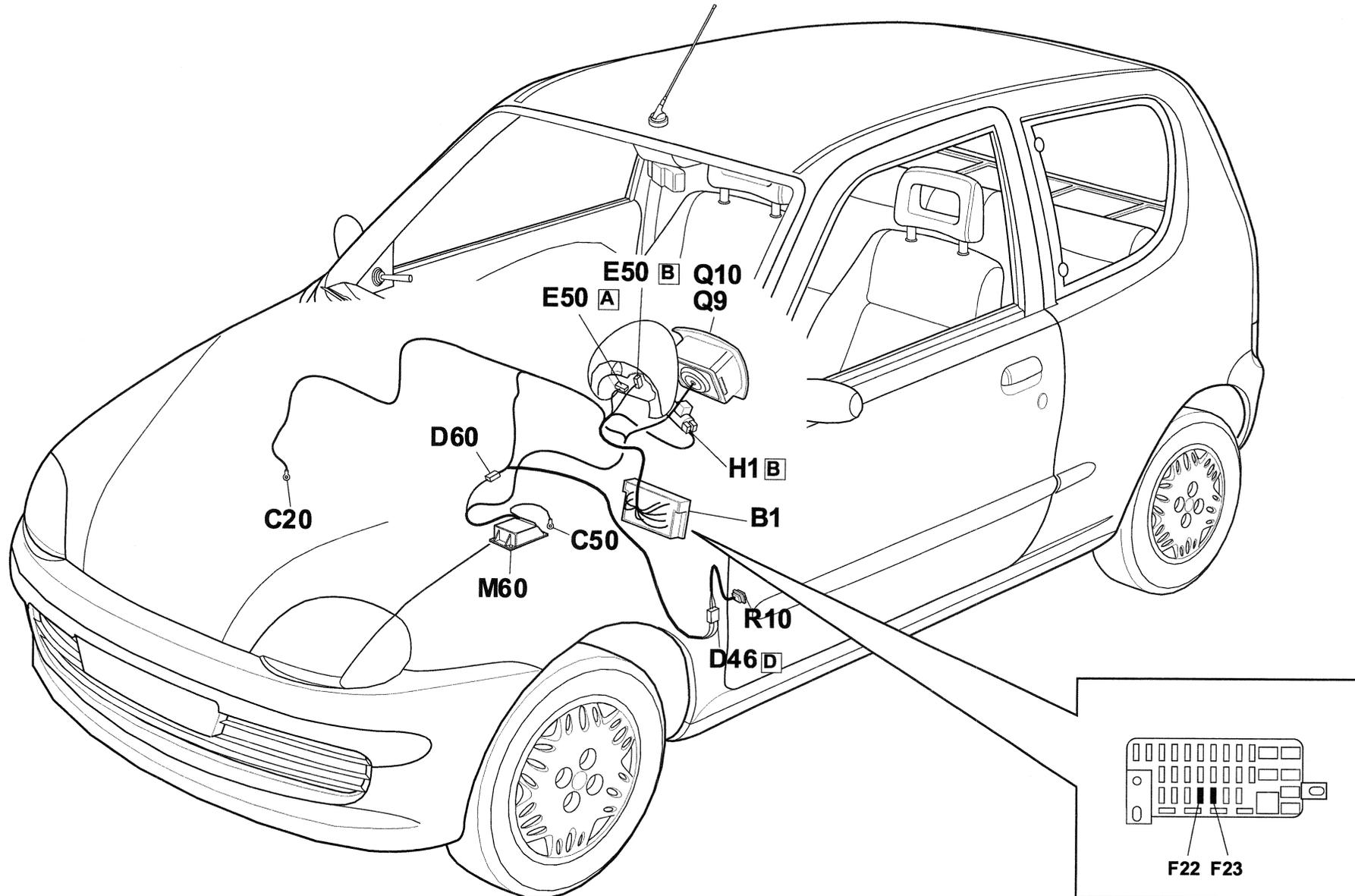
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
B01	Junction unit	-
C20	Radio phone earth	-
C20	Right dashboard earth	-
C50	Air Bag earth	-
D46	Rear dashboard./ front- coupling	-
D60	Air Bag connection	-
E50	Instrument panel	5560B
H01	Ignition switch	5520A
H75	Passenger's Air Bag disablement switch	5580C
M60	Air Bag control unit	5580C
Q09	Driver's Air Bag	5580C
Q10	Clock spring on steering wheel	5580C
Q11	Air Bag in dashboard (passenger side)	5580C
R10	Multiple tester connection	-

E7030

ELECTRICAL DRAWINGS AIRBAG



COMPONENTS LAYOUT





List of functions

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DESCRIPTION

An electronically controlled system manages automatically the clutch insertion and release operations, replacing the traditional pedal control. This ensures the ideal regulation both when starting and stopping the car, and when changing gear.

A special control unit manages the whole system.

The control unit receives signals from the sensors that detect :

- the intention to change gear (sensor on gear lever);
- the current gear (two position sensors indicate the current gear or idling)
- accelerator pedal pressure (throttle position sensor).

The control unit then sends a command to an electric motor (d.c.) through a power module: this motor electromechanically activates, through a hydraulic connection, the traditional clutch control, consisting of a master cylinder, actuator cylinder etc..

A potentiometric position sensor acts as feedback to inform the control unit of the actual position of the piston controlled by the motor.

A solenoid valve enables the clutch engagement even if there is a system failure.

Furthermore, the control unit actuates a safety and alarm logic that detects mistaken or hazardous manoeuvres by the driver and warns through a buzzer, or by inhibiting the car start-up (consent to starter motor).

The control unit also has a diagnostics system to find system faults and actuate an emergency logic.

For further details, see **DESCRIPTION AND OPERATION 1820E**,

The system is controlled by the control unit in the engine compartment near the electro-hydraulic group containing the electromechanical actuator and by two relays, also located in the engine compartment, near the e.i. control unit..

The power supply lines for the control unit and system components (sensors and actuators) are protected by two fuses located near the two relays.

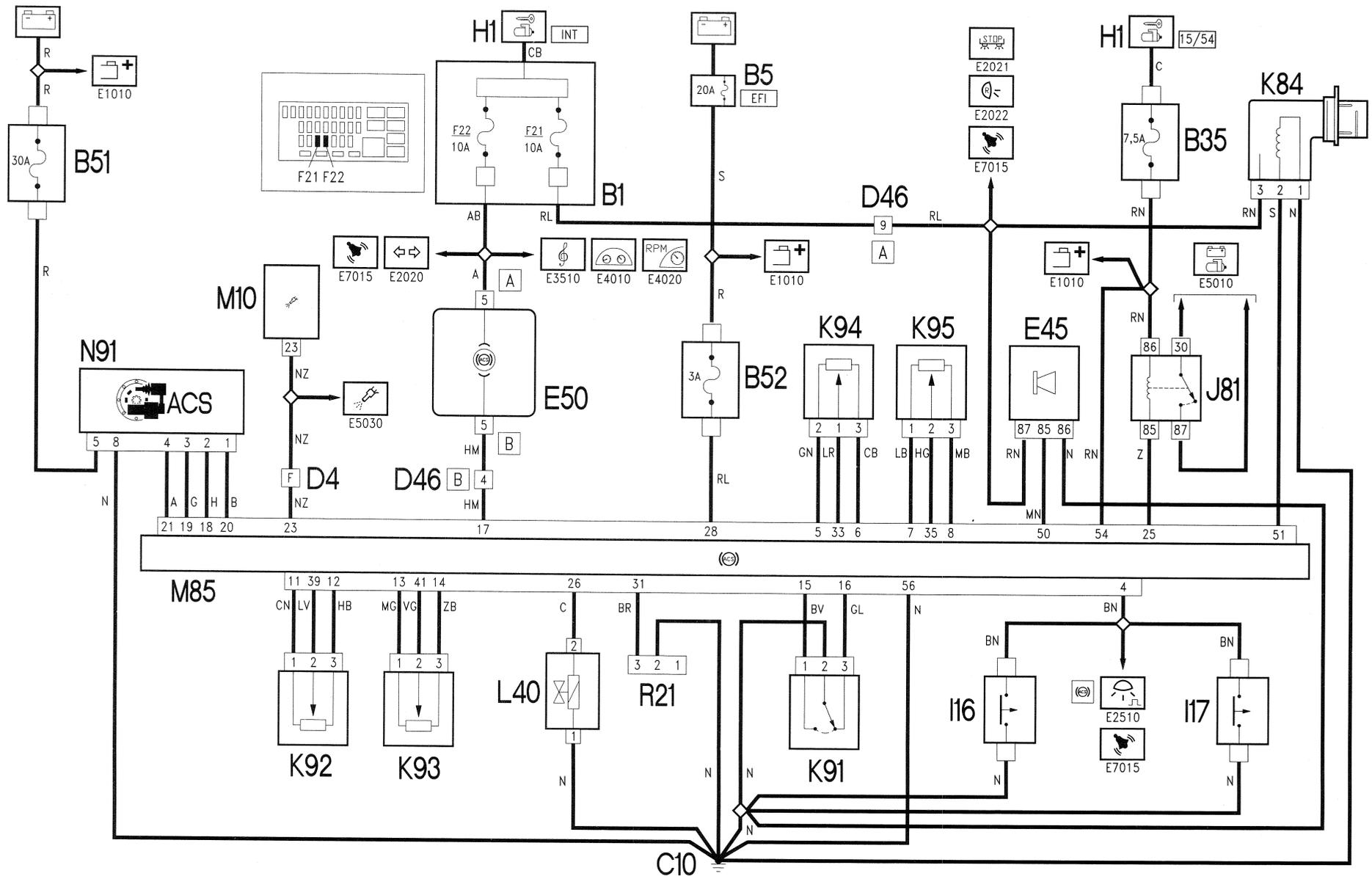
The power module that controls the electro-machanical actuator is supplied by a power supply fuse in the engine compartment, next to the MAXI FUSES.

E7040

ELECTRICAL DIAGRAMS AUTOMATIC CLUTCH 899



WIRING DIAGRAM



187E170400100001E1SES



DESCRIPTION OF OPERATION

Control unit **M85** controls and regulates the entire automatic clutch system. The control unit direct power supply arrives (pin 28) from the battery on the line protected by maxifuse EFI of **B5** and by automatic clutch fusebox **B52**. The ignition switch power supply (15/54) arrives (pin 54) from the line protected by injection and CODE memory fuse **B35**. Control unit pin 56 is earthed. Engine control unit **M85** receives the signals from the sensors. The sensor on gear lever K91 is connected to pins 15 and 16 of **M85**, supplying information concerning the gear lever movements. Sensors **K92** and **K93** are connected respectively to pins 11, 12, 39 and 13, 14, 41 of **M85**, supplying information on the gear inserted. Sensor **K94**, through a potentiometer, detects the throttle position and informs control unit **M85** through pins 5, 6 and 33. Vehicle speed sensor **K84** detects the car speed: it is supplied through the ignition switch (INT) by the line protected by fuse **F21** of **B1** and is connected to control unit **M85** on pin 51. Control unit **M85**, through power module **N91** controls the clutch electric motor (pins 18, 19, 20 and 21 of **M85**). Module **N91** receives its power supply directly from the battery through the line protected by air conditioner/automatic clutch fuse **B51**. Position sensor **K95** supplies a feedback to the control unit concerning the actual position of the piston controlled by the engine. (connection to pins 7, 8 and 35 of **M85**). Solenoid valve **L40** is controlled by the control unit (pin 26) for clutch energising if there is a system failure. The control unit safety and alarm logic receives the doors open signal (pin 4) from switches **I16** and **I17** (the same signals that switch on the front ceiling lamp) (see E2510 CEILING LAMPS). Pin 25 of **M85** sends a start enable signal to energise relay **J81** that inhibits the power supply to the starter motor if the automatic clutch control unit logic does not send a consent. (see also E5010 STARTING AND RECHARGING). In the case of an alarm the control unit commands the automatic clutch buzzer **E45** through the signal from pin 50 of **M85**. The buzzer is supplied from the ignition switch power supply (INT) by the line protected by fuse **F21** of **B1**. E.i. control unit **M10** sends a signal to pin 23 of **M85** that is proportional to the engine revs.

The control unit has a diagnostics system that can be used by connecting it to electronic clutch diagnostic socket **R21**: this receives signals from pin 31 of **M85**. The diagnostics system also generates the signal for the "ACS automatic clutch fault" warning light, on cluster **E50**, that is output from pin 17 of control unit **M85**. Cluster **E50** is fed by ignition switch power supply (INT) from the line protected by fuse **F22** of junction unit **B1**.



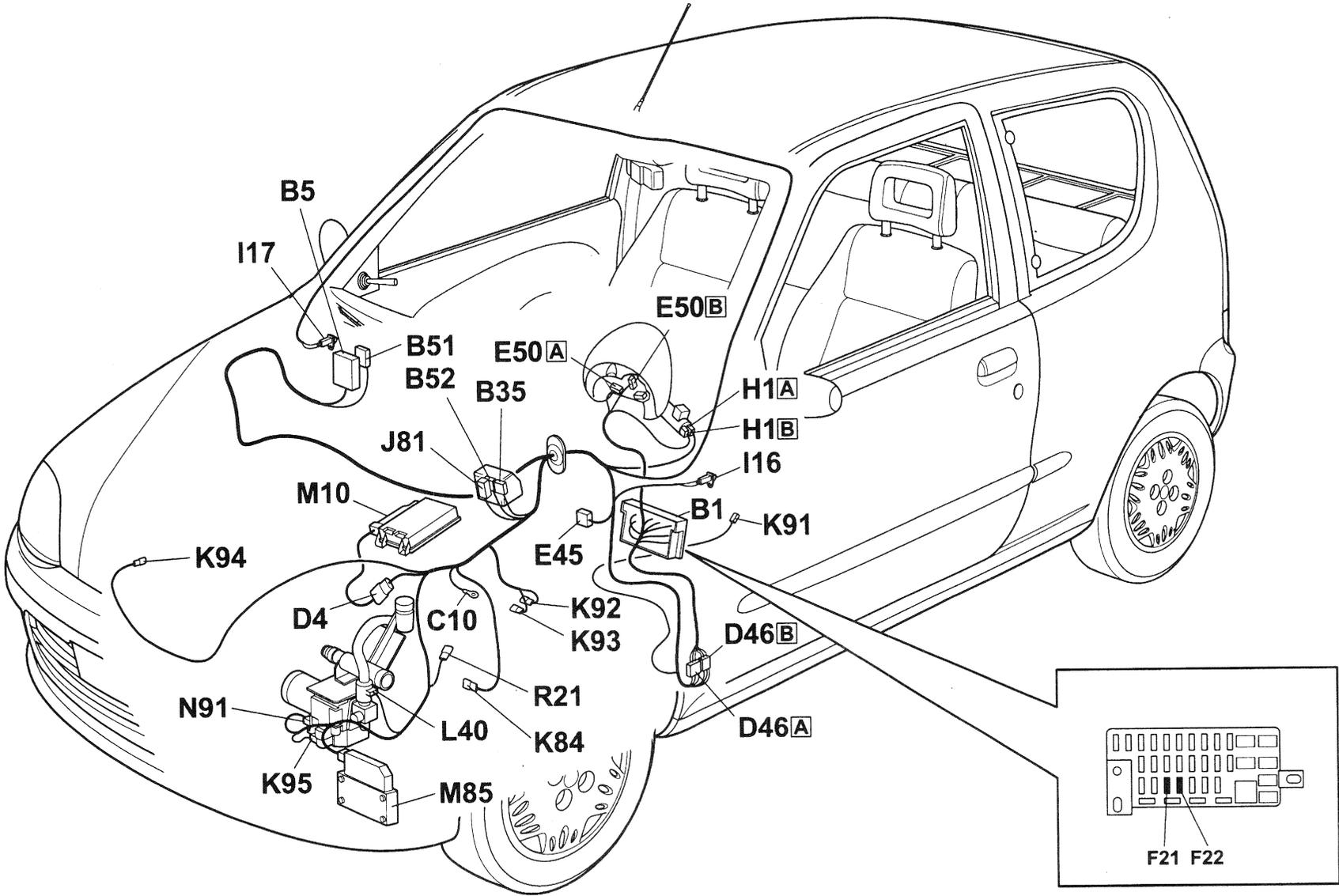
COMPONENTS

<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
B1	Fuse carrier	5505A
B5	MAXI FUSE box	-
B35	CODE and injection memories fuse	-
B51	Aiur conditioner/automatic clutch fuse	-
B52	Automatic clutch fusebox	-
C10	Front left earth	-
D4	Front/engine connection	-
D46	Front/dashboard - rear connection	-
E45	Automatic clutch buzzer	-
E50	Cluster	5560B
H1	Ignition switch	5520A
I16	Ceiling lamp switch on front left door	7040E
I17	Ceiling lamp switch on front right door	7040E
J81	Startup inhibit relay	1820E
K84	Vehicle speed sensor	-
K91	Sensor on gear lever(automatic clutch)	-
K92	Gear position sensor A (automatic clutch)	-
K93	Gear position sensor B (automatic clutch)	-

<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
K94	Throttle position sensor (automatic clutch)	-
K95	Clutch position sensor	-
L40	Automatic clutch solenoid valve	-
M85	Automatic clutch control unit	1820E
N91	Power module for automatic clutch motor	-
R21	Electronic clutch diagnostic socket	-



COMPONENT LAYOUT



187E170400100001E1CEU



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DESCRIPTION

The NSK - EMPAS Electrical Power Assisted Steering system is a device with the purpose of reducing the effort applied to the steering wheel by exploiting the torque of an electrical motor.

This assistance is offered by an electrical motor which by means of a gear pair applies a torque to the steering column to facilitate steering operations when the vehicle is stationary or travelling at low speeds without making the steering wheel too light in normal driving conditions.

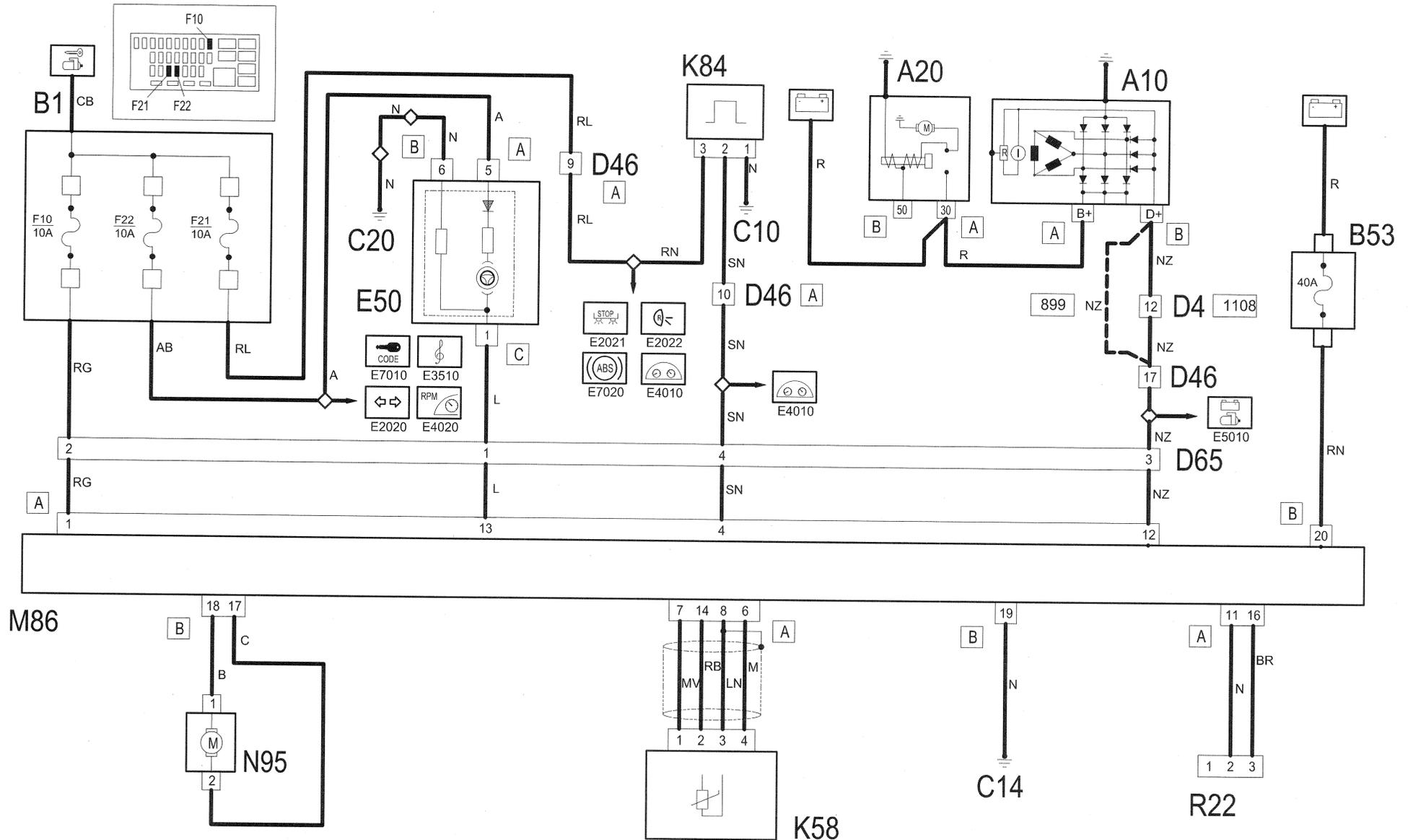
The ECU is governed by strategies which manage the system functions. By processing the input data and according to the data mapped in specific areas, the ECU defines the direction of rotation and the electrical motor supply current. It then controls output to obtain the required steering assistance. The instrument panel includes an electrical power assisted steering warning light. Furthermore, a diagnostic socket is located near the ECU for system troubleshooting.

E7045

WIRING DIAGRAMS ELECTRICAL POWER ASSISTED STEERING



WIRING DIAGRAM



SE7045



DESCRIPTION OF OPERATION

The ECU **M86** is directly powered to pin 20 by the battery via the line protected by the electrical steering MAXIFUSE **B53**. Furthermore, the ECU **M86** is powered to pin 1 via fusebox B1 with F10 (10 A).

The D+ signal from the alternator A10 reaches ECU **M86** pin 12 via joint D4. ECU **M86** pin 19 is connected to earth **C14**. A tachometer signal **K84** reaches ECU **M86** pin 4 via joint D46.

ECU **M86** directly controls the steering motor **N95** via pins 17 and 18, while the signals of potentiometer **K58** (effort sensor) located on the steering column reach pins 6 - 7 - 8 - 14.

The electrical steering includes a self-test feature. When the ECU detects problems related to the power steering function, it sends a signal to instrument **E50** pin 13.

The self-test data can be read by connecting to connector **R22** which is reached by the signals from ECU **M86** pin 11 and pin 16 via the specific diagnostic line.

COMPONENTS

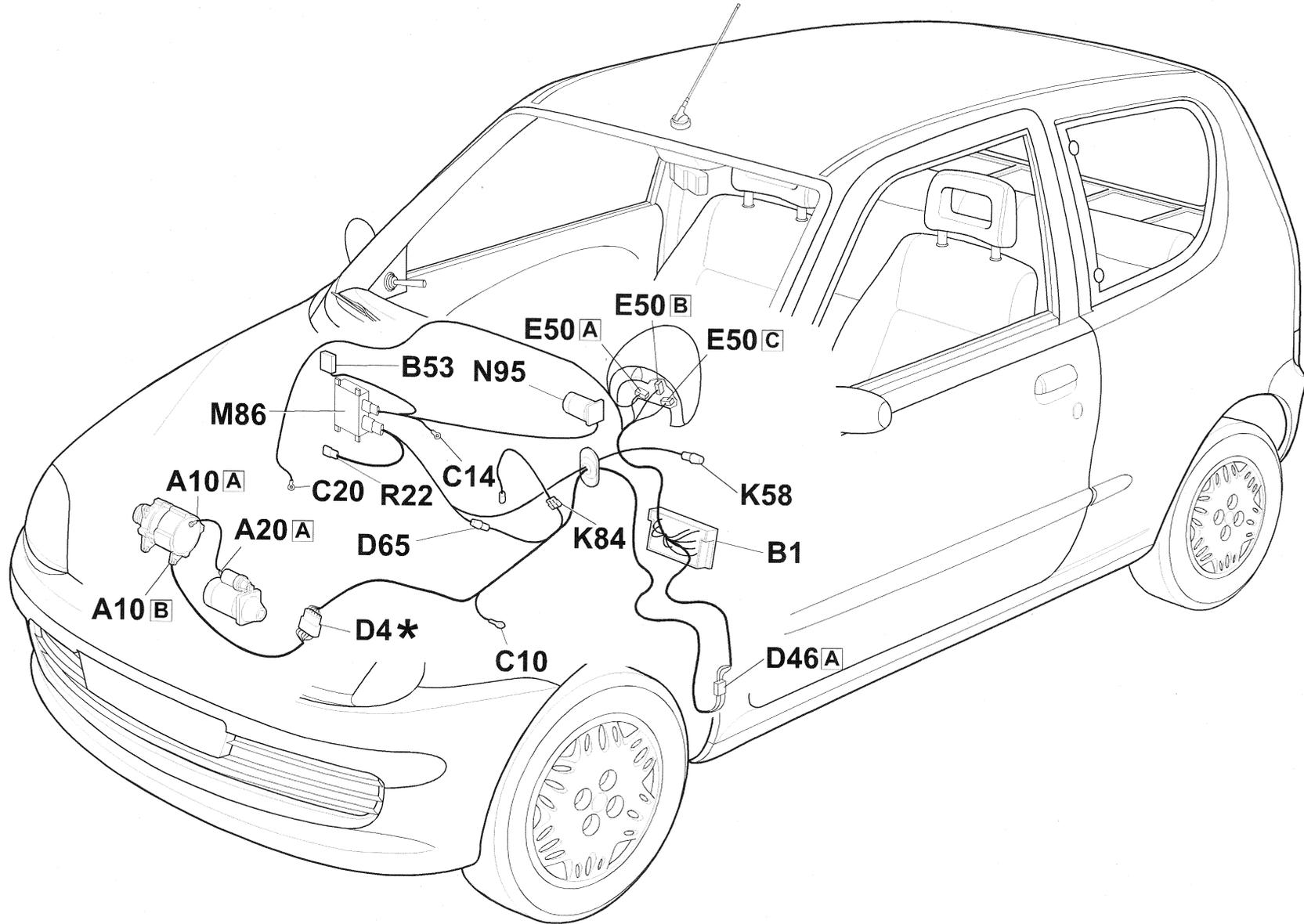
<i>Code component</i>	<i>Description</i>	<i>Unit reference</i>
A10	Alternator	E5010
A20	Starter motor	E5010
B1	Fusebox	5505A
B 53	Electrical steering ECU fuse	-
C10	Front left-hand earth	-
C 14	Electrical steering earth	-
C20	Right-hand dashboard earth	-
D4	Front engine joint	-
D46	Front rear dashboard joint	-
D 65	Electrical steering joint	-
E50	Instrument panel	-
K 58	Steering sensor	-
K84	Tachometer sensor	-
M 86	Electrical steering ECU	-
N 95	Electrical steering motor	-
R 22	Electrical steering diagnostic joint	-

E7045

WIRING DIAGRAMS ELECTRICAL POWER ASSISTED STEERING



COMPONENT LAYOUT



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DESCRIPTION

10/00 ▶

The NSK - EMPAS Electrical Power Assisted Steering system reduces the effort required to steer the car by using the torque produced by an electric motor.

This assistance is supplied by an electric motor that applies a torque to the steering column via a gear set. This torque aids steering manoeuvres when the car is at a standstill or moving at low speed without making the steering too light during normal driving.

The electronic control unit contains a management programme which consists of a set of strategies designed to manage system control functions.

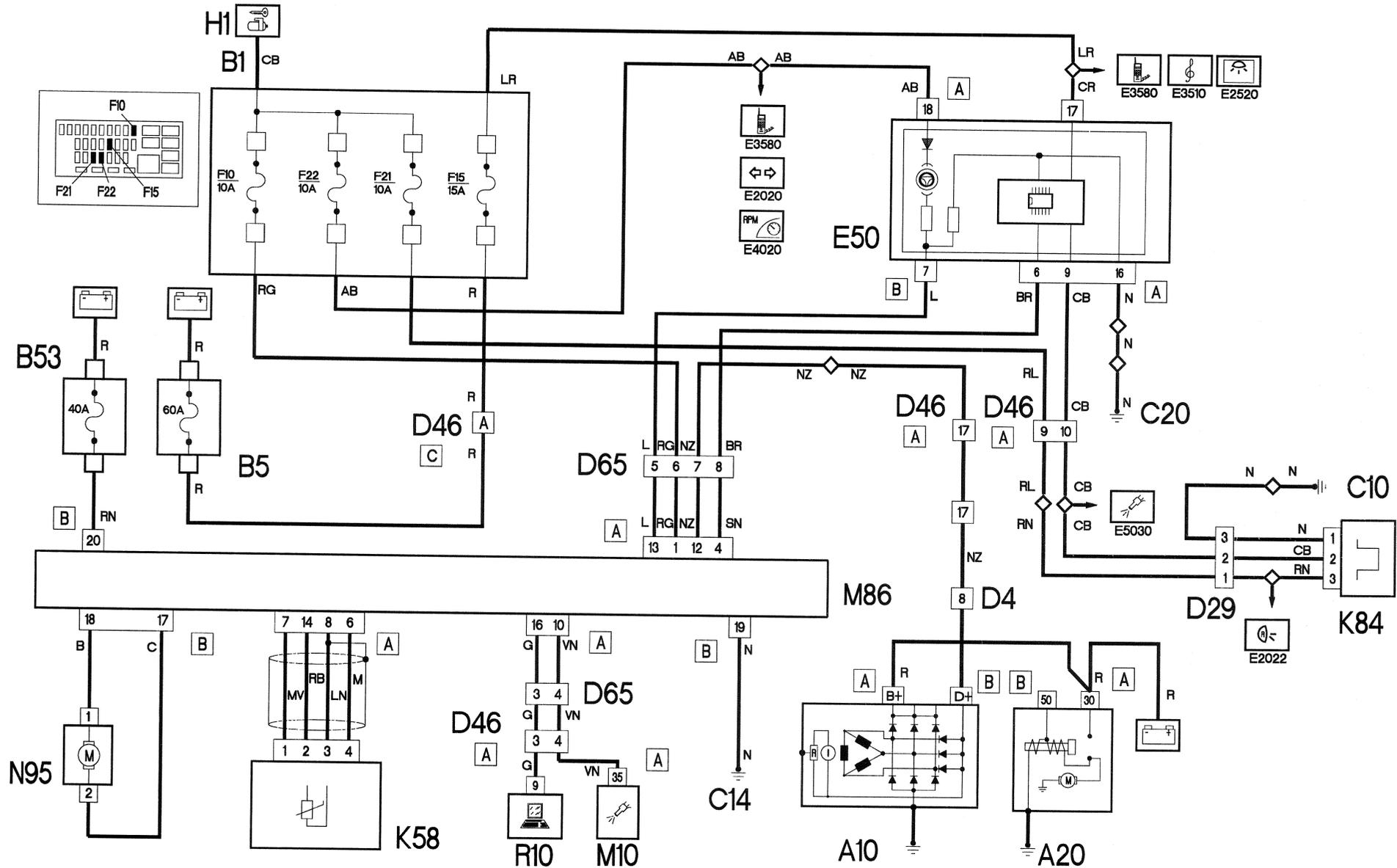
The control unit software processes incoming information to determine direction of rotation and electrical motor current. It then controls the supply of power to achieve the desired power steering effect.

The instrument panel includes an electrical steering failure warning light which comes on if there is a fault in the system.

E7045

ELECTRICAL DRAWINGS ELECTRIC STEERING

WIRING DIAGRAM



1/14/00 ON L.L.V. 01/16/00 ... SAN 31/01/00 LPS

DESCRIPTION OF OPERATION

10/00 ▶

The electronic control unit **M86** is supplied directly at pin 20 directly by the battery by a line protected by the 40A electric power assisted steering MAXI-FUSE **B53**; in addition, there is a supply controlled by the ignition at pin 1 via the junction unit **B1** with 10A fuse F10.

A D+ signal reaches pin 12 of the electronic control unit **M86** from the alternator **A10** via the coupling D4.

Pin 19 of the electronic control unit **M86** is connected to earth **C14**; a signal amplified by the instrument panel **E50** connector A pin 6 reaches pin 4 of the electronic control unit **M86**.

The speedometer sensor **K84** is connected to the instrument panel **E50** amplifier via pin 9 of connector A of **E50**. The amplifier for the speedometer signal is supplied via pin 17 of connector A of the instrument panel **E50** at the battery positive, via the line protected by 15A fuse **F15** of junction unit **B1** and by the 60A maxifuse **B5**. The speedometer sensor **K84** is supplied via fuse **F21** of **B1**, whilst it is connected to earth **C10** via pin 3.

The electronic control unit **M86** controls the steering electric motor **N95** directly via pins 17 and 18, whilst signals reach pins 6, 7, 8, 14 from the potentiometer **K58** (effort sensor) located on the steering column.

Pin 10 of connector A of the control unit **M86** is connected to pin 35 of the engine management control unit **M10**.

The electric power assisted steering includes an autodiagnostic system; when the control unit **M86** detects problems relating to the power assisted steering function, it sends a signal from pin 13 to the electric steering failure warning light in the instrument panel **E50**. The warning light is supplied, via connector A pin 18 of the instrument panel **E50**, by 10A fuse **F22** of **B1**.

The autodiagnostic data can be read by connecting to connector **R22** : the control unit **M86** sends diagnostic signals, via pin 16, to the coupling **R10**.

COMPONENTS

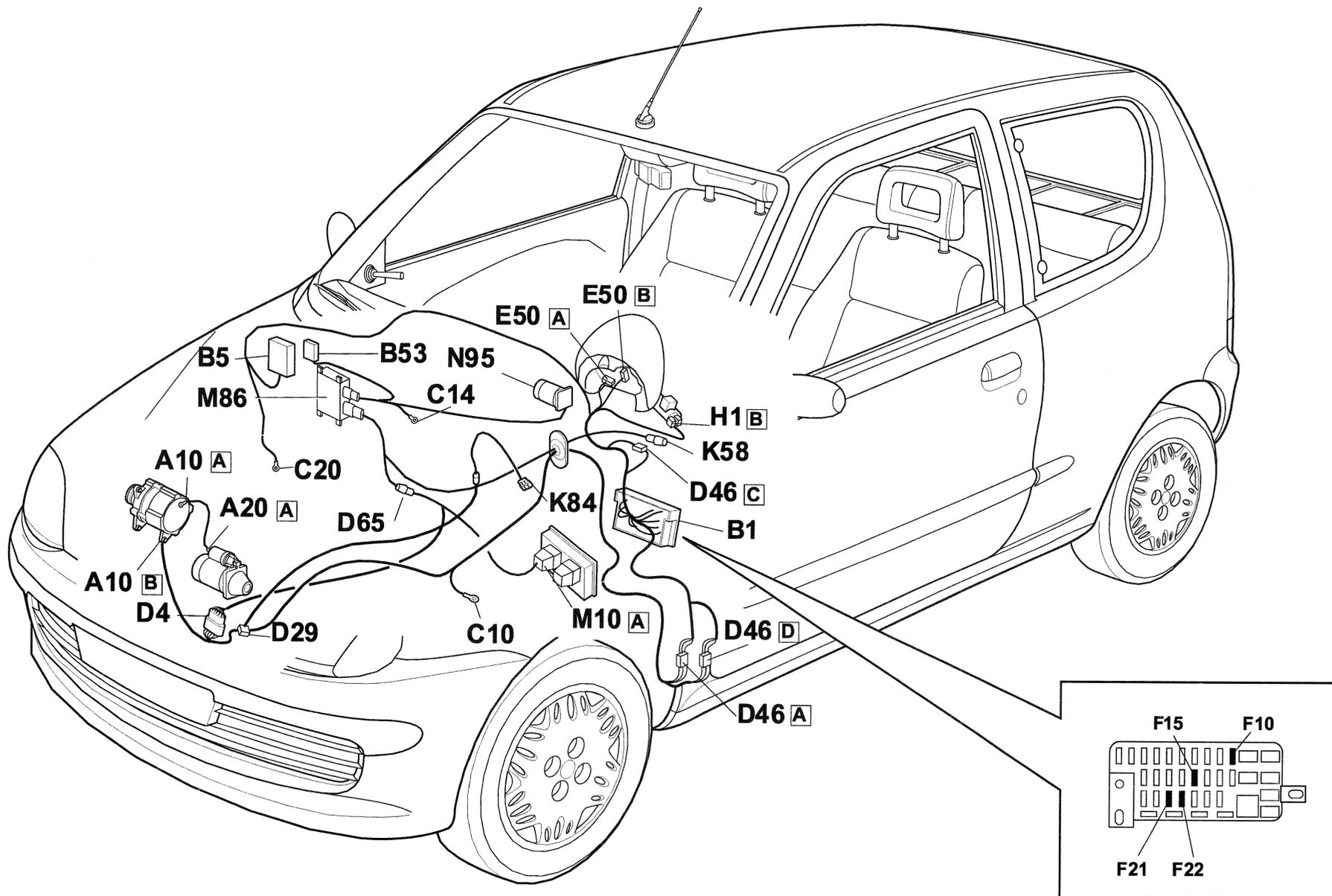
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
A10	Alternator	5530A
A20	Starter' motor	5520B
B01	Junction unit	-
B53	Electric steering control unit fuse	-
C10	Left front. earth	-

<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
C14	Electric earth	-
C20	Radio phone earth	-
C20	Right dashboard earth	-
D04	Front / engine coupling	-
D29	Engine /engine services cables coupling	-
D46	Rear dashboard./ front- coupling	-
D65	Electric steering coupling	-
E50	Instrument panel	5560B
K58	Steering sensor	-
K84	Speedometer sensor	2180A
M10	Engine management ECU	-
M86	Electric steering control unit	4110D
N95	Electric steering motor	4110D
R10	Multiple tester connection	-
R22	Diagnostic coupling for electric steering	-

E7045

ELECTRICAL DRAWINGS ELECTRIC STEERING

COMPONENTS LAYOUT



Operations index

<i>Op.</i>	<i>Symbol</i>	<i>Description</i>	<i>Validity</i>
E8010		DIAGNOSTICS MULTIPLE CONNECTOR	10/00 ▶

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DESCRIPTION

10/00 ▶

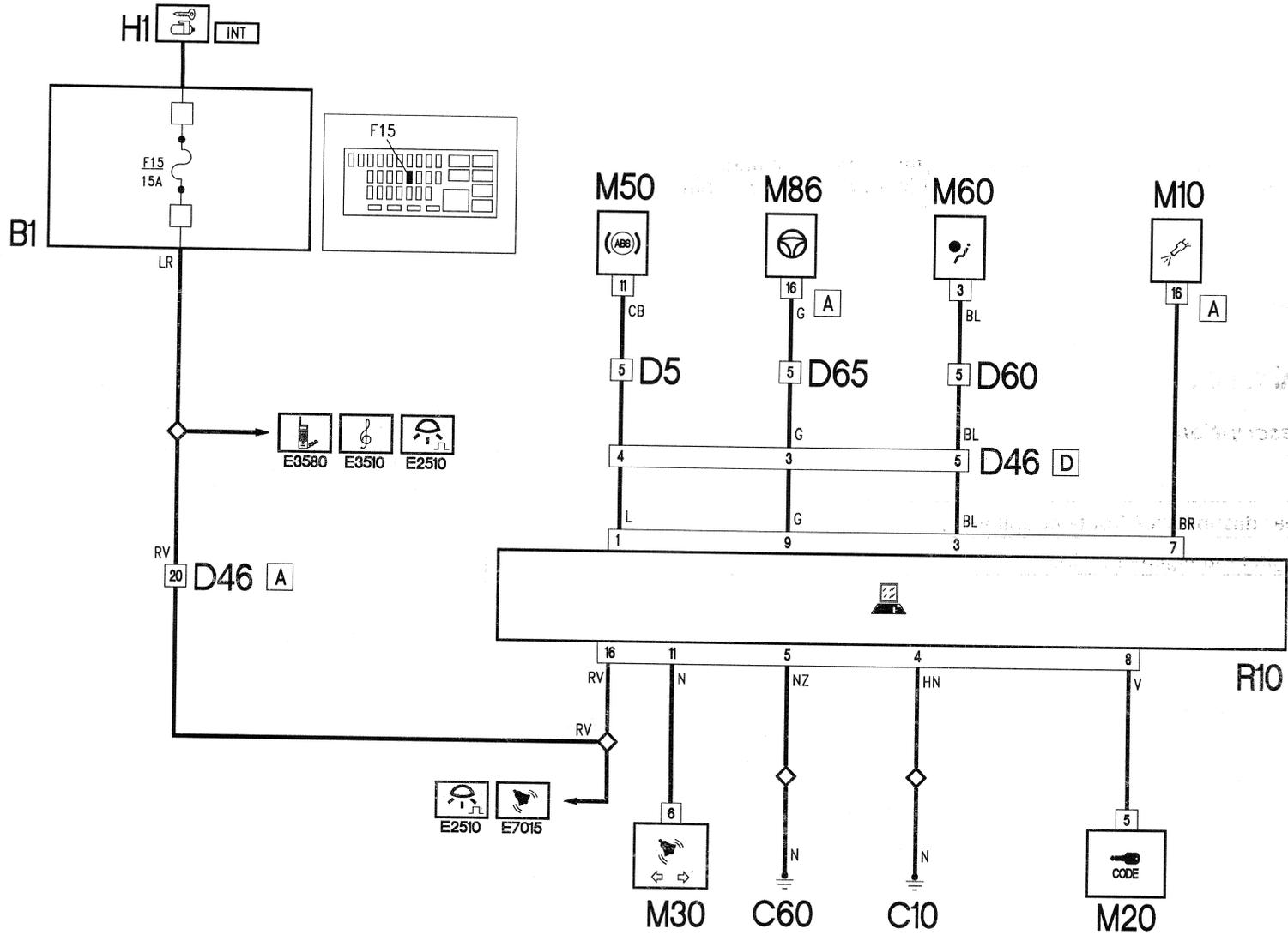
Using the multiple diagnostic coupling R10 it is possible to connect the equipment needed for the diagnosis of the control units for the electronic systems which make up the electrical equipment.

E8010

ELECTRICAL DRAWINGS DIAGNOSTICS MULTIPLE CONNECTOR



WIRING DIAGRAM





DESCRIPTION OF OPERATION

10/00 ▶

The multiple diagnostic coupling **R10** is supplied directly by the battery pin 16, via the 15A fuse **F15** and the 60A fuse of **B5**.
Earths **C10** and **C13** lead to pins 4 and 5, respectively.

The control units for the electronic systems are connected to the coupling:

- Engine management control unit **M10** connector A pin 16 connected to pin 7 of **R10**.
- CODE control unit **M20** pin 5 connected to pin 8 of **R10**.
- Alarm control unit **M30** connector B pin 6 connected to pin 11 of **R10**.
- ABS control unit **M50** pin 11 connected to pin 1 of **R10**.
- Air Bag control unit **M60** pin 3 connected to pin 3 of **R10**.

COMPONENTS

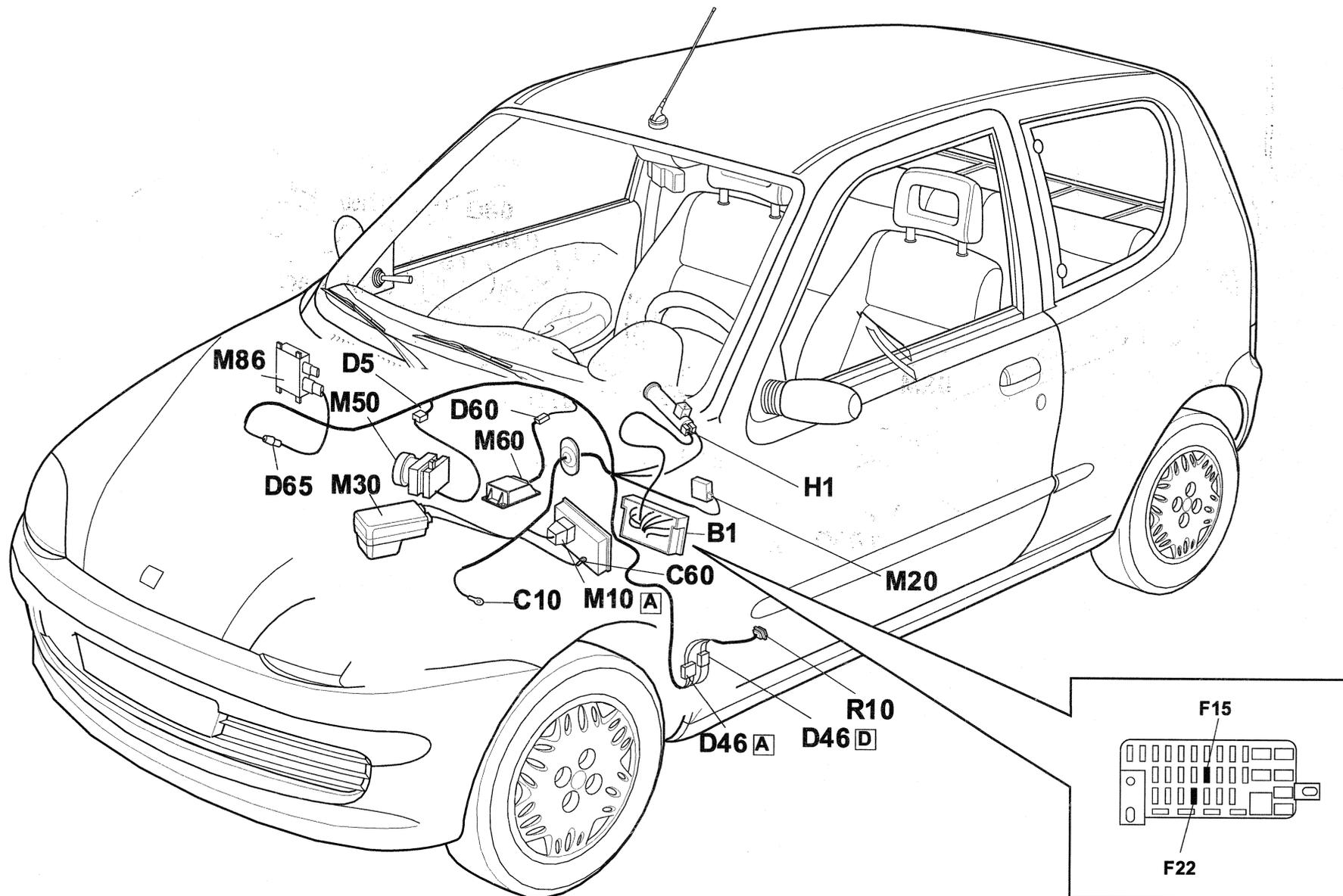
<i>Component code</i>	<i>Description</i>	<i>Assembly drawing reference</i>
D46	Rear dashboard./ front- coupling	-
M10	Engine management ECU	-

E8010

ELECTRICAL DRAWINGS DIAGNOSTICS MULTIPLE CONNECTOR



COMPONENTS LAYOUT



506.907/06_12/2000