FIAT RITMO COURSE OUTLINE

DOCUMENTATION MODIFICATIONS / UPDATES			
Date	**Referent**	**File Name**	**Description of modification**

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1. BRIEFING

1.1 THE VEHICLE AND THE DESIGN

Exterior design is undoubtedly one of the strengths of the New Bravo.

Its appealing, sporty design is the result of in-depth studies by Fiat Style Centre aimed at restoring a strong brand image in keeping with the true essence of the masterpieces of Italian car making that marked Fiat's history.

Fiat's new challenger in the C-segment takes its styling clues from the Grande Punto to enhance Fiat's new design philosophy and brand consistency. The dynamic, streamlined design of the hatchback body conveys emotion and visual appeal combined with a sense of interior roominess and function.

The cab is roomy and easy to access thanks to the tall body, while the windscreen is more raked and its base has been moved forward to lend the car a sleek, aerodynamic design. The compact, sloping front blends smoothly with the windscreen's slanted lines and lends the car body a dynamic MPV look.

The wedge-shaped body and steep beltline provide an aggressive look, while curvy styling and minimalist design make the New Bravo look like a sculpture.

Distinctive styling cues front and rear enhance the emotional, unmistakably Italian styling.

The front end takes its styling cues from the Grande Punto: sleek headlights inspired by the tradition of Italian Grand Tourers, a narrow, rounded-contour grille and above all a striking balance between all stylistic elements. All this communicates stylish appearance and strong brand identity combined with fresh, original styling and a visible premium character compared to its sibling.

The stylish fog lights incorporating a cornering light function are flanked by massive air vents, whereas the headlamps sport a contemporary look with cylindrical lights and chrome frames.

The grille boasts Fiat's new logo installed in a recess in the bumper.

The large wraparound bumper has been designed to meet the most stringent safety standards concerning pedestrian protection and reduce damage in the event of a collision.

The clean, uncluttered, yet expressive design of the tail perfectly complements front end styling.

The tail lights recall those of the first-generation Bravo from the Nineties (one of the few car models from that period that has successfully stood the test of time in terms of appearance and styling) to lend character to the tail and perfectly blend in with other stylistic elements, such as the smoothly flowing lines of the wide rear window.

The raked rear window greatly contributes to the overall impression of power and solidity of the tail typical of Grand Tourers.

This is an unusual styling choice in this segment, traditionally focused on communicating functionality.

The result is a visibly strong shoulder that becomes apparent when seen from three-quarter views and is further emphasised by the rear light clusters which have been pushed all the way out to the very corners of the vehicle.

The broad anthracite protection shell emerging from the lower end of the bumper and flowing into the signature omega-shaped panel enhances the sporty look of the tail and complements its clean overall appearance.

Interior styling echoes the themes of bodywork design.

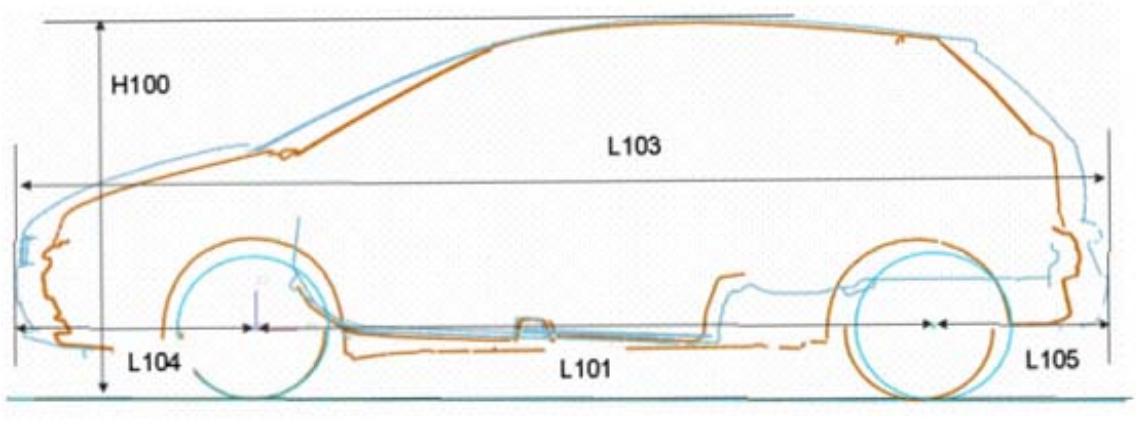
The refined, contemporary-looking dashboard offers a striking balance between moulded panels and round surfaces, yet retains an impression of minimalist design.

This is an innovative concept based on driver-oriented design, with a broad, finely finished fascia surrounding the instrument cluster and feature-packed central console.

1.2 SIZE

Exterior

Exterior dimensions reflect market expectations and the resulting stylistic choices.
Overall height is midway between the Stilo 3 and 5 door models, merging interior roominess with the dynamic driving capabilities expressed in the design. Class-leading track and width are clear indications of superior driving dynamics as well as of the comfortable feeling and sense of protection afforded to occupants.

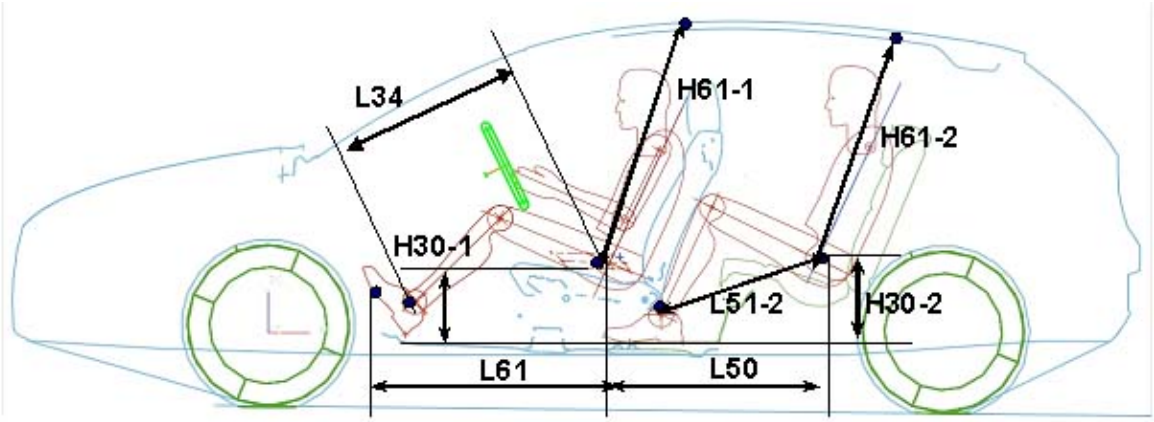


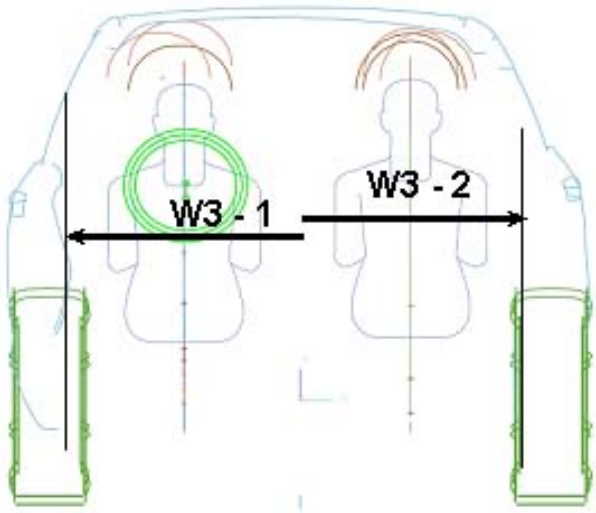
Listed in the table are the exterior dimensions of the Ritmo compared with those of the current Stilo and main competitor models.

	L101	L103	L104	L105	H100	W103	W101	W102
RITMO	2600	4336	974	762	1497	1792	1536	1532
STILO 3D	2600	4185	887	698	1454	1786	1514	1508
STILO 5D	2600	4256	896	760	1517	1756	1514	1508
FOCUS '05	2640	4342	871	831	1489	1740	1535	1531
PEUGEOT 307	2608	4202	878	716	1532	1755	1509	1505
ASTRA '05	2614	4249	871	764	1467	1754	1483	1470
GOLF V	2578	4204	880	746	1485	1759	1539	1528
CITROEN C4	2608	4255	935	712.5	1473.5	1766	1505	1497
MEGANE 5D	2623	4210	845	742	1464	1777	1518	1514

Interior dimensions

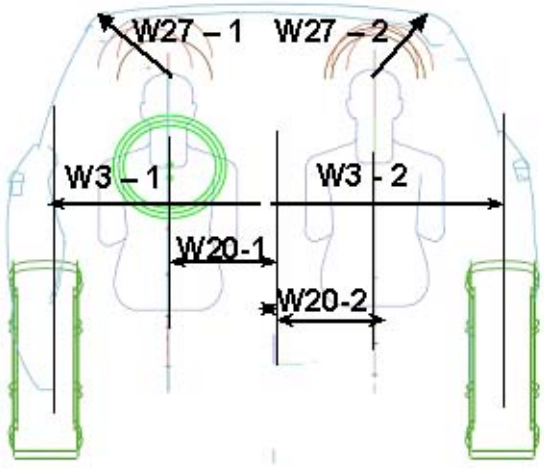
Interior dimensions of the Bravo compared to competitors





	L61	H30-1	H61-1	W3-1	L50	L51-2	H30-2	H61-2	W3-2
BRAVO	913	274	986	1410	793	900	311	960	1385
STILO 3D	916	253	986	1412	783	888	311	940	1378
STILO 5D	896	298	987	1412	803	928	351	956	1365
FOCUS ‘05	926	298	998	1408	786	908	332	978	1385
PEUGEOT 307	928	302	1011	1410	763	873	328	979	1380
ASTRA ‘05	945	283	989	1370	793	897	309	975	1342
GOLF V	932	279	987	1390	803	901	321	979	1348
CITROEN C4	946	268	993	1406	768.5	810	308.5	938	1348
MEGANE 5D	962.8	259	988	1395	751	809	302	980	1348

A comparison with competitors puts Bravo at the top of its class in terms of interior space. The comparison shows that interior space - both vertical and from side to side - is significantly greater than the segment's average, with the best-in-class interior width.
When compared with the Grande Punto, the Bravo seems to represent a giant step forward, with a significant improvement in interior roominess.



	W20-1	W20-2	W27-1	W27-2	W3-1	W3-2
BRAVO	350	333	72	63.3	1410	1385
GRANDE PUNTO	330	312	54	57	1365	1300

1.3 TRIM LEVELS

The Bravo is available in four trim levels:

Active **→ basic trim level**
Dynamic **→ mid-range trim level**
Elegance **→ top-of-line trim level for enhanced style and comfort**
Sport **→ top-of-line trim level for a sporty look**

Active

Flat black exterior door handles
Flat black side mirrors
Flat black interior door handles
Chrome air vent rims
Chrome inserts on door armrest
Brushed-finish anthracite grey dashboard fascia
Axel fabric seats and door panels in two versions (grey or blue)

Dynamic (differs from Active trim in)

Body-coloured exterior door handles
Body-coloured side mirrors
Chrome interior door handles
Chrome gauge rims
Chromed gear shifter boot frame
Chrome gear shifter shield rim
Dashboard with carbon-look crosshatch-pattern fascia in 3 colour variants (Anthracite Grey, Avio Blue or Marmotta Brown)
Inox fabric seats and door panels in 3 colour variants (Anthracite Grey, Avio Blue or Marmotta Brown) matching fascia colour

Elegance (differs from Dynamic trim in)

Chrome-coloured exterior door handles
Chromed frame on inside door handle plates
Chrome trim on window weatherstrip
Dashboard with carbon-look crosshatch-pattern fascia in 3 colour variants (Anthracite Grey, Avio Blue or Marmotta Brown)
Tecnotweed fabric seats and door panels in 3 colour variants (Anthracite Grey, Avio Blue or Marmotta Brown) matching fascia colour

Sport (differs from Elegance trim in)

Body-coloured exterior door handles
Skirts and spoiler
Metallic black interior door opener handles
Black window weatherstrip trim
Special chassis set-up
Sports pedal unit
Paint-finished brake callipers
Chromed exhaust pipe
Special instrument panel
Sports steering wheel with red or blue stitching, handbrake with red or blue stitching, gear shifter with red or blue stitching
Audio controls on steering wheel with metallic black plate
Black carbon-look crosshatch-pattern dashboard fascia
Black Sail fabric seats and door panels with red or blue stitching (matching steering wheel, handbrake and gear shifter stitching)
Sport button (vers. 1.4 T 150 bhp petrol)

1.4 ENGINES

The range of engines available at the time of the sales launch is as follows:

90 bhp 1.4 petrol engine (66 kW).
120 bhp 1.9 Multijet engine (88 kW).
150 bhp 1.9 Multijet engine (110 kW).

The table below lists available engine-and-gearbox combinations:

Engine	Clutch	Gearbox
90 bhp 1.4	AP	C514
120 bhp 1.9	Valeo	C530
150 bhp 1.9	Valeo	C530

120 and 150 bhp 1.4 turbocharged engines and a 1.6 Multijet engine will be introduced during 2007 to complement the range.

1.5 SAFETY

Fiat Bravo aims at achieving excellence in safety performance with the following ratings:

5 ★ Adult Passenger Protection

3 ★ Pedestrian Protection

4 ★ Child Protection

Model	Year	Adult Occupant Rating	Pedestrian Test Rating	Child Protection Rating
Audi A3	2003	★★★★★	★☆☆☆☆	★★★☆☆
Citroën C4	2004	★★★★½	★★★☆☆	★★★★☆
Fiat Stilo	2005	★★★★	★☆☆☆☆	★★★★☆
Ford Focus	2004	★★★★★	★★☆☆☆	★★★★☆
Mazda 3	2006	★★★★	★★☆☆☆	★★★☆☆
Nissan Almera 1.4 GX	1999	★★★★	★☆☆☆☆	★★★★☆
Opel/Vauxhall Astra	2004	★★★★★	★☆☆☆☆	★★★★☆
Peugeot 307	2001	★★★★	★★☆☆☆	
Renault Mégane	2003	★★★★★	★★☆☆☆	
Seat León	2005	★★★★	★★★☆☆	★★★★☆
Toyota Corolla	2003	★★★★	★★☆☆☆	
Volkswagen Golf	2004	★★★★★	★★★☆☆	★★★★☆

1.6 ERGONOMICS AND COMFORT

Bravo design focuses on ergonomics and comfort, placing great emphasis on ease of access, interior space and passenger accommodation. There are several factors contributing to the overall comfortable and roomy feel of the cab:

Ergonomics

- position of the pedal unit,
- steering wheel alignment,
- armrest position,
- correct position of footrest,
- shifter knob within easy reach is easier to operate
- improved visibility of instruments and key controls
- the seats offer great lateral support both in the standard and Sport configuration to hold occupant body securely during a spirited drive.

Comfort

- Protection from exterior noise intrusion
- Interior noise
- Reduction of vibration and rolling noise
- Acoustic sensitivity to excitation transmitted through solids
- Solid chassis response when riding over rough roads
- Dynamic systems: engine, intake and exhaust

These factors contribute to the Bravo's high comfort levels in line with top competitors without compromising on styling and performance.

1.7 ERGONOMICS AND INTERIOR SPACE

When evaluating cab components, customers' perception of in-cab comfort seems to focus entirely around the driver's position.
The area surrounding the driver's seat and the components located in it seems to be the key factor in determining customers' judgement on the overall comfort they can expect of a car.
As a matter of fact, nearly all components mentioned by the target when asked to list *"the most significant cab features in assessing in-cab comfort*" are located in this area.
As a result, ergonomics research aims at achieving the following goals:

- Reduction of critical transient environmental conditions: heat, cold, humidity, poor air exchange
- Reduction of disturbing factors below the perception level: noise, electromagnetic fields, bothersome air flow speed, ionising radiation, unpleasant odours, poor air hygiene, allergens, etc..
- Constant replenishment of fresh, filtered air
- Continuous, unobtrusive monitoring of significant biological parameters
- Control of in-cab environmental conditions, with the possibility of customising conditions over time, in space and according to the different needs of individual occupants.
- Air free from chemical/physical/biological contaminants and pollutants which are kept below concentrations triggering a biological response under all conditions
- Elimination of complex manual adjustments, user-friendly controls
- Continuous adaptation of driving and control systems, both globally and at each individual seat, to changing usage, environmental and psychophysical conditions

- Roominess: ability to accommodate user offering optimal posture (comfort-related) and giving a feel of space (relates to pleasantness).
- Access: ability to ensure ease of entry/exit (towards door opening, door sill, interior dimensions) with minimal changes in posture and a natural movement (vertical, transverse, longitudinal, perceived)

Ergonomics is at the core of Bravo's design. The result is a perfect balance between Styling, Safety and Customer needs in terms of comfort and roominess, ease of access, interior visibility (with an optimal layout of controls, which are all fully visible and within easy reach) and exterior visibility, aided by the generously sized side mirrors.
The Bravo offers a comfortable ride to occupants of all sizes, while achieving best-in-class boot capacity with **over 400 litres** in the standard configuration with 5 passengers.
As a matter of fact, in-cab comfort means making space available to occupants right where they need it and the Bravo boasts class-leading passenger volume. In addition, it affords a sense of protection enhanced by the quality of interior trim and upholstery.
These winning features are becoming increasingly important due to the increasing amount of time people spend driving, the growing popularity of high-end - roomier - car models and the increasing average height of the population. Bravo provides excellent comfort in terms of shoulder room both front and rear with top-of-the-class performance under all respects: roominess, ease of access, visibility and user-friendliness. This means improved comfort when getting in and out of the car and - once seated - creates a comfortable environment.
Great emphasis has been placed on occupant posture and seat configuration. Pedal position, steering wheel alignment, ideal footrest position, the shifter ensuring great ease of operation and the fully visible instruments and key controls make for a pleasant driving experience. The seats offer great lateral support to hold occupant body securely during a spirited drive.
Cab profile has been designed to generously accommodate five passengers.
Vehicle set-up has been defined according to the most advanced ergonomics concepts in line with styling and safety requirements:

1. Roominess and passenger volume

- Cab comfort
- Ease of access
- Visibility
- Load compartment
- Usability

All of these functions are associated with parameters that provide a measure of the car's ability to meet passengers' requirements in terms of comfort.
Outlined below are Bravo's dimensions compared to those of its main competitors.

1.8 ROOMINESS AND PASSENGER VOLUME

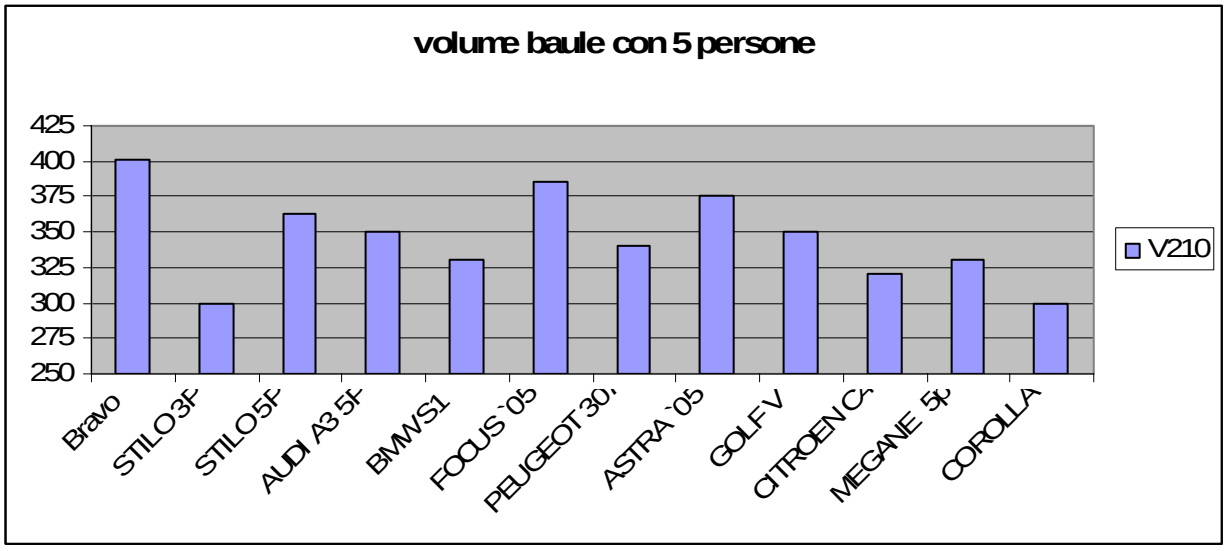
Bravo's interior space achieves an optimal balance between cab volumes, offering unexpected roominess for a car with such compact, dynamic exterior design.
Those parameters that dictate driver's and passengers' posture and seat position in the various configurations, overall cab comfort and passenger volume have been optimised so as to achieve the ideal balance between exterior styling and interior volume.
As a result, the Bravo boasts class-leading passenger volume.
Internal volumes are defined by the following dimensions: effective head room front and rear (H61-1 and H61-2), H point to Heel point front and rear (H30-1 and H30-2), accelerator to front H point (L61), H point couple distance (L50-1), maximum effective leg room - accelerator (L34), minimum effective leg room rear (L51) and shoulder room (W3-1 and W3-2).
Interior dimensions are measured in accordance with the GCIE List issued by the Global Car Information Exchange Group to establish comparable dimensional parameters among manufacturers.
Again, a comparison of individual interior dimensions according to the GCIE List puts the Bravo at the top of its class.

1.9 BOOT COMPARTMENT

The boot's regular shape has been designed to strike a balance between exterior styling and interior volume, achieving over 400 litres in the 5-seat configuration and up to 1175 litres in the 2-seat configuration.

Virtual modelling resulted in a roomy cargo compartment with ample, totally usable space.

Versatility is ensured by the folding rear seat for greatly enlarged load carrying capacity. The rear seat is split to accommodate bulky items while retaining 3 to 4-passenger seating capacity.



Wheels and Tyres

	SERIE	OPTIONAL	OPTIONAL	OPTIONAL
ACTIVE				
		431		
DYNAMIC				
		431	433	
ELEGANCE				
		431	433	435 (solo 150 cv)
SPORT				
	422	435		

2. TECHNICAL DATA

2.1 ENGINE

Engine type

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Type code	192B2000	192A8000	937A5000
Layout	Front Transversally mounted	Front Transversally mounted	Front Transversally mounted
No. of cylinders	4	4	4
Cylinder arrangement	in-line	in-line	in-line
No. of valves per cylinder	4	2	4
Cycle	Petrol	Diesel	Diesel
Timing system	2ACT	1ACT	2ACT
Fuel system	Petrol MPI	Diesel Common Rail	Diesel Common Rail

Engine specifications

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Bore (mm)	72	82	82
Stroke (mm)	84	90.4	90.4
Total displacement (cc)	1368	1910	1910
Compression ratio	11 : 1	18 ± 0.5 : 1	17.5 ± 0.5 : 1
Maximum power (kW / bhp)	66/90	88 / 120	110 / 150
Maximum power rpm	5800	4000	4000
Maximum torque (kgm / Nm)	13 / 128	26 / 255	31 / 305
Maximum torque rpm	4500	2000	2000

Injection

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Type	Bosch Me7.3.H4	BOSCH EDC16c39	BOSCH EDC16c39
Injection order	1-3-4-2	1-3-4-2	1-3-4-2

2.2 CLUTCH

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Type	Dry single-plate	Dry single-plate	Dry single-plate
Drive	Push-type	Push-type	Push-type
Control	Hydraulic control with concentric slave cylinder	Hydraulic control with concentric slave cylinder	Hydraulic control with concentric slave cylinder
Supplier	AP	Valeo	Valeo

2.3 GEARBOX

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Type	C514	C530	C530

Synchronisers on all forward gears.

2.4 BRAKES

Braking system

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Type	Hydraulic servo brake	Hydraulic servo brake	Hydraulic servo brake
Servo brake cylinder diameter	10”	10”	10”
ABS	BOSCH 8.1	BOSCH 8.1	BOSCH 8.1

Front brakes

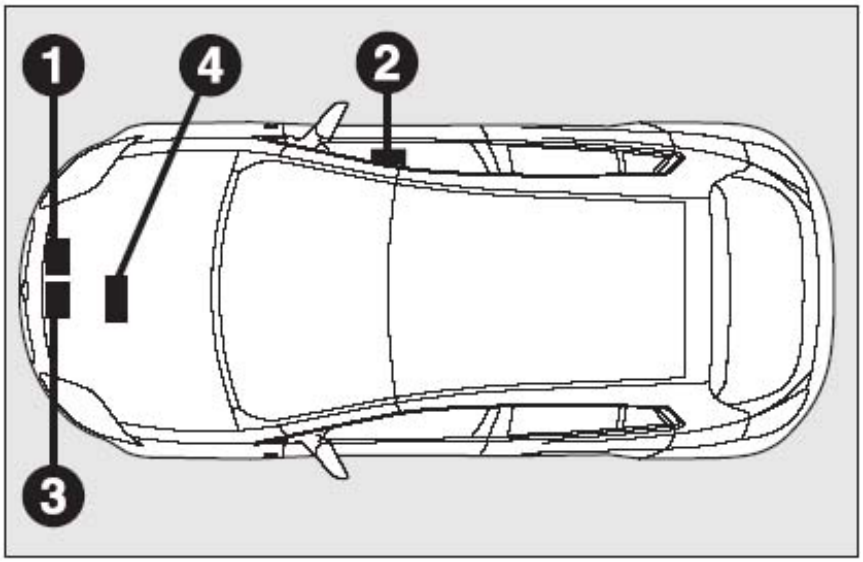
	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Disc type	Ventilated	Ventilated	Ventilated
Disc diameter (mm)	257	284	281
Nominal thickness (mm)	22	22	26
Calliper piston diameter (mm)	54	52	57

Rear brakes

	1.4 (90 bhp)	1.9 (120 bhp)	1.9 (150 bhp)
Disc type	Non-ventilated	Non-ventilated	Non-ventilated
Disc diameter (mm)	251	251	251
Nominal thickness (mm)	10	10	10

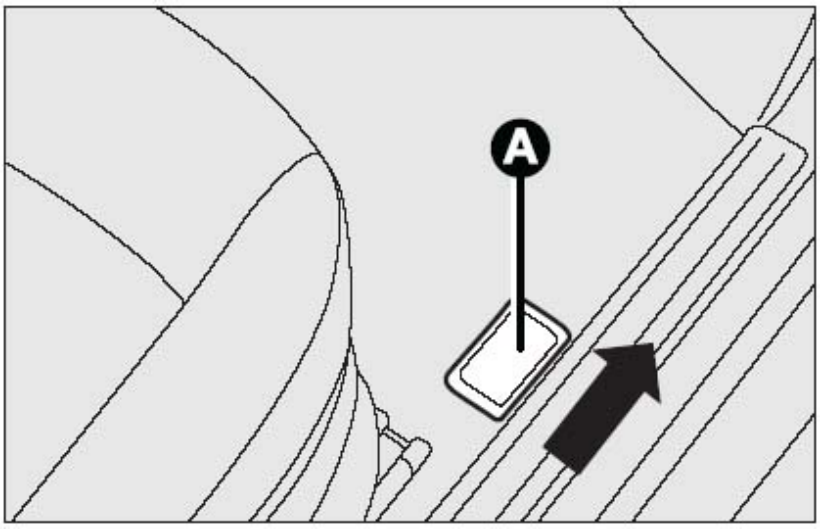
2.5 VEHICLE IDENTIFICATION

The layout of plates and identification marks is shown in the figure below:

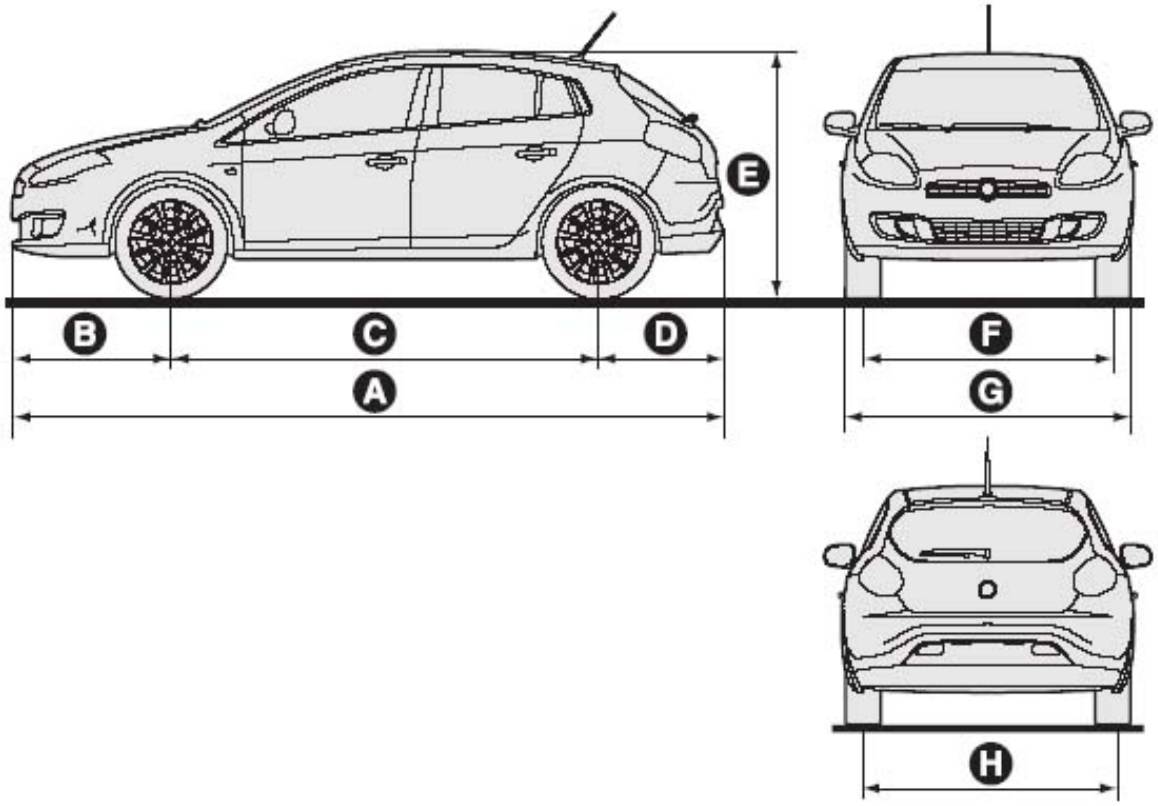


1. Data plate
2. Chassis number
3. Body paint code plate
4. Engine number

The chassis number is stamped on the cab floor, near the front right seat



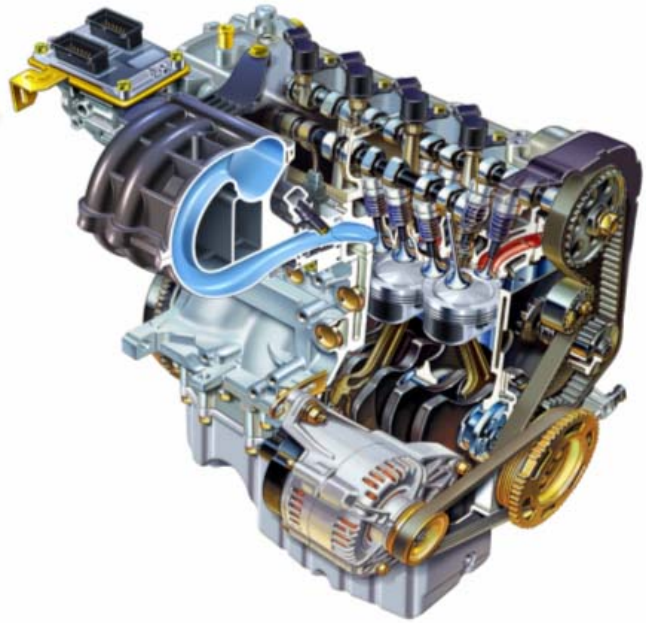
2.6 VEHICLE DIMENSIONS

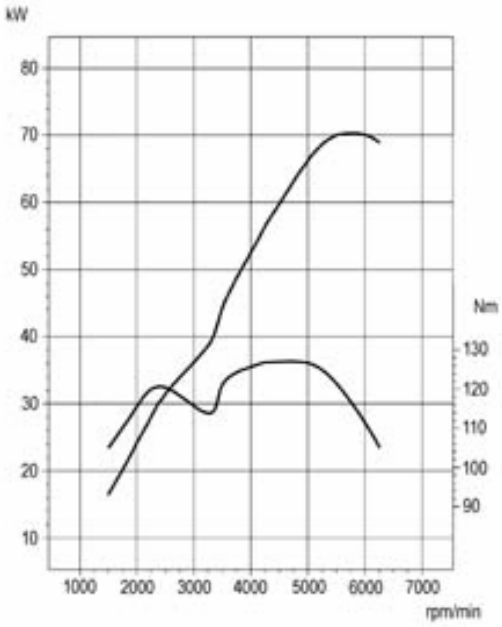


A	B	C	D	E	F	G	H
4336	974	2600	762	1498	1538	1792	1532

3. ENGINE

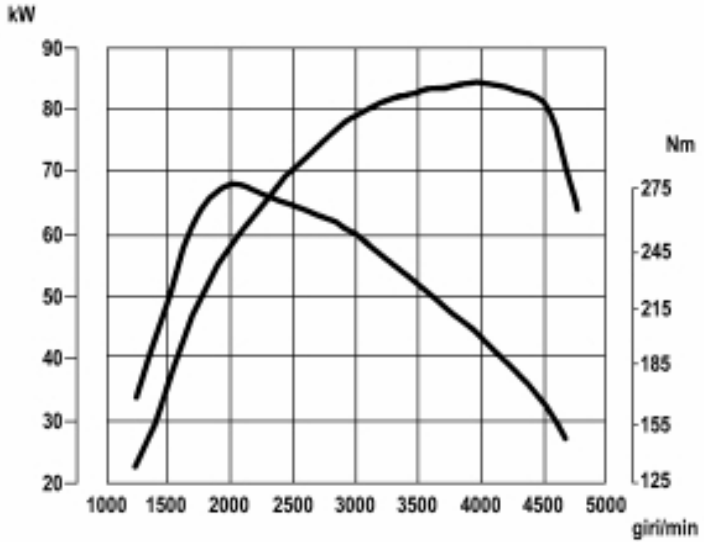
3.1 1.4 16V ENGINE DESCRIPTION





SPECIFICATIONS	1.4 16V 90 bhp
Displacement (cc)	1368
Number of cylinders	4
Valves per cylinder	4
Induction	Naturally-aspirated engine
Maximum power (bhp/kW)	90 / 66 at 6000 rpm
Maximum torque (Nm)	127 at 4500 rpm
Bore (mm)	72
Stroke (mm)	84
Compression ratio	11:1
Weight (Kg)	100
Dimensions in mm (L-W-H)	475 – 442 - 689
Emissions	EURO 4 compliant
Crankcase	Cast iron – closed deck
Cylinder head	Aluminium
Upper head section	Aluminium
Timing system	Toothed belt with automatic tensioner
Injection	MPI – absolute pressure sensor – motor-driven throttle body
Production plant	Termoli (Italy)

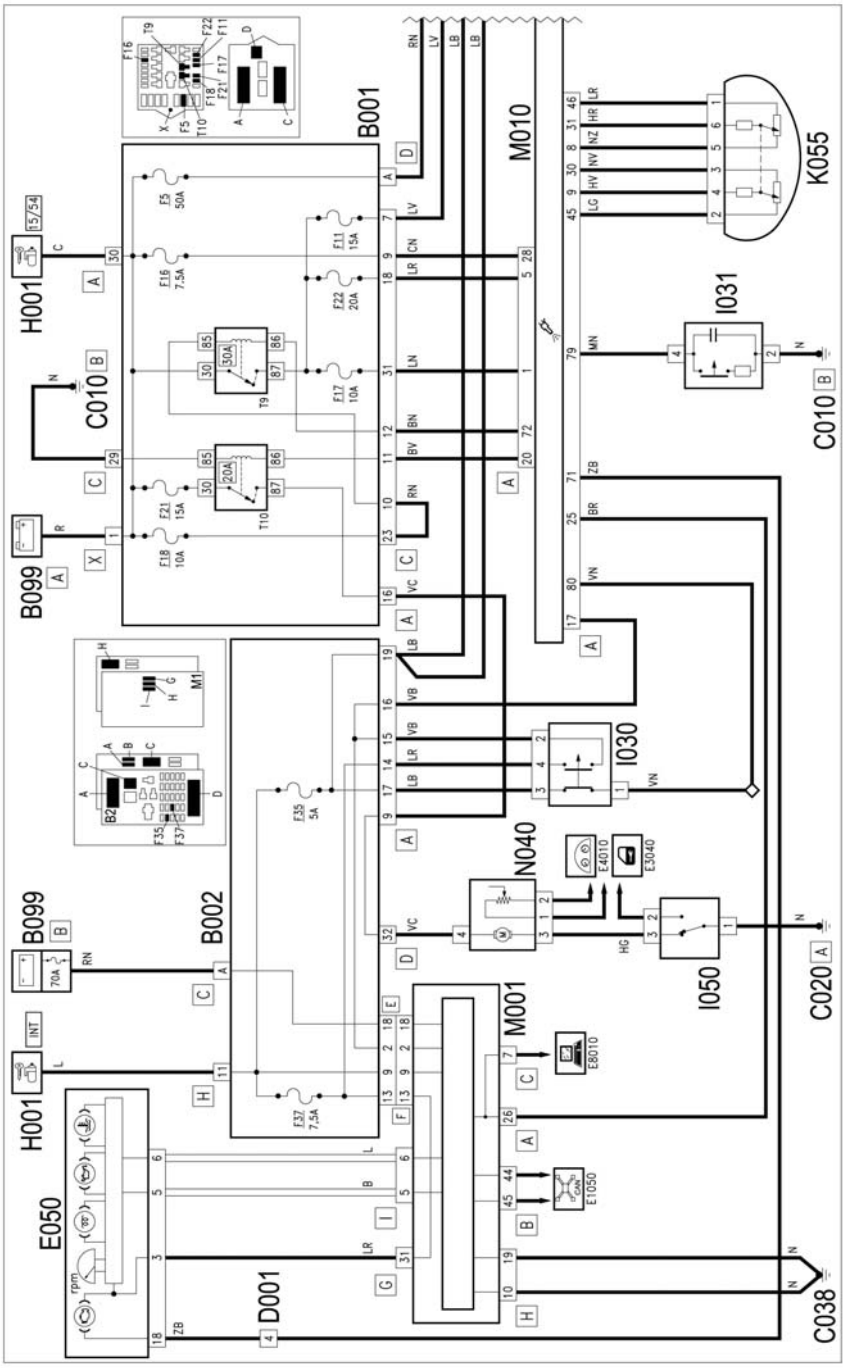
3.2 1.9 8V Multijet ENGINE DESCRIPTION

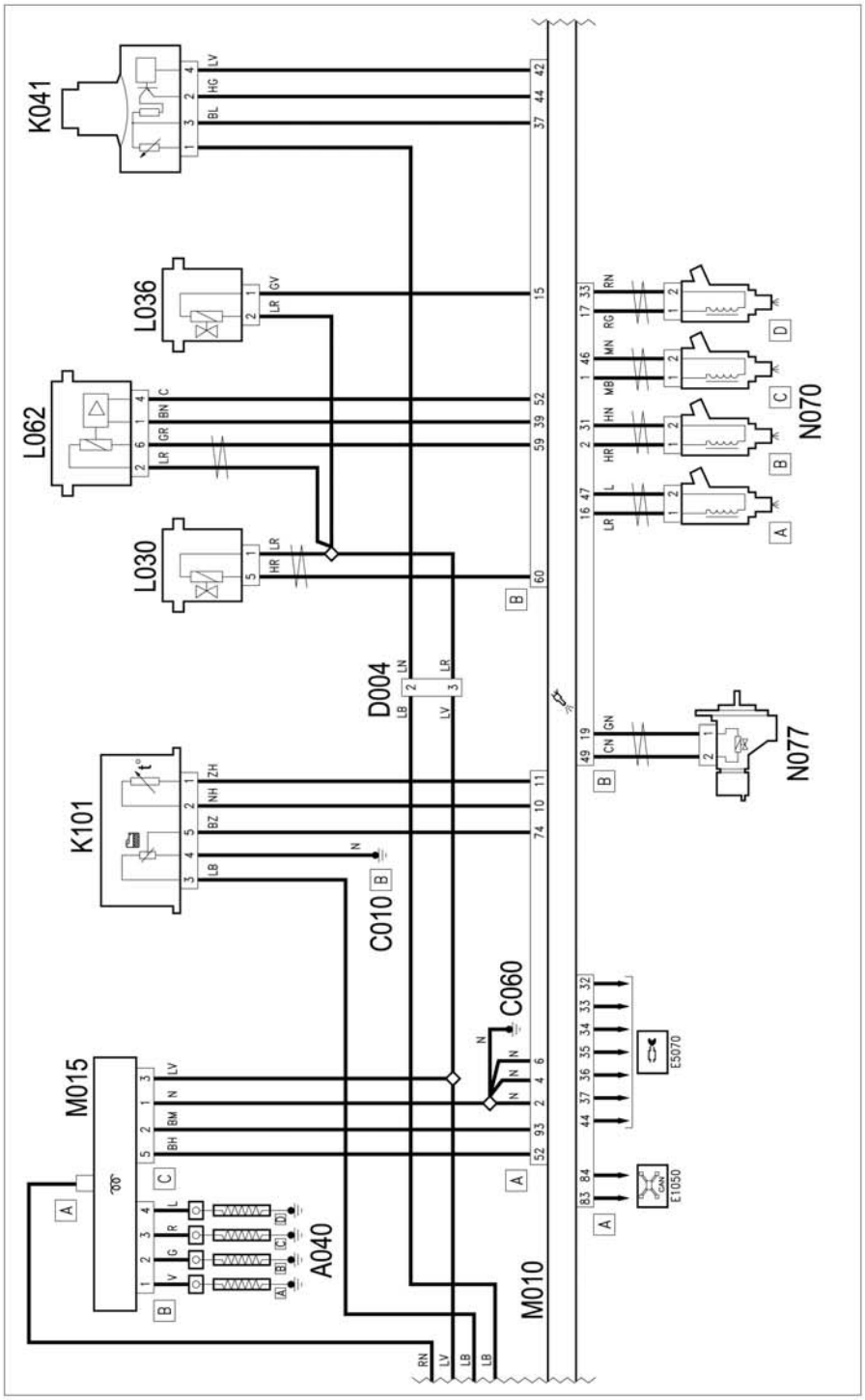


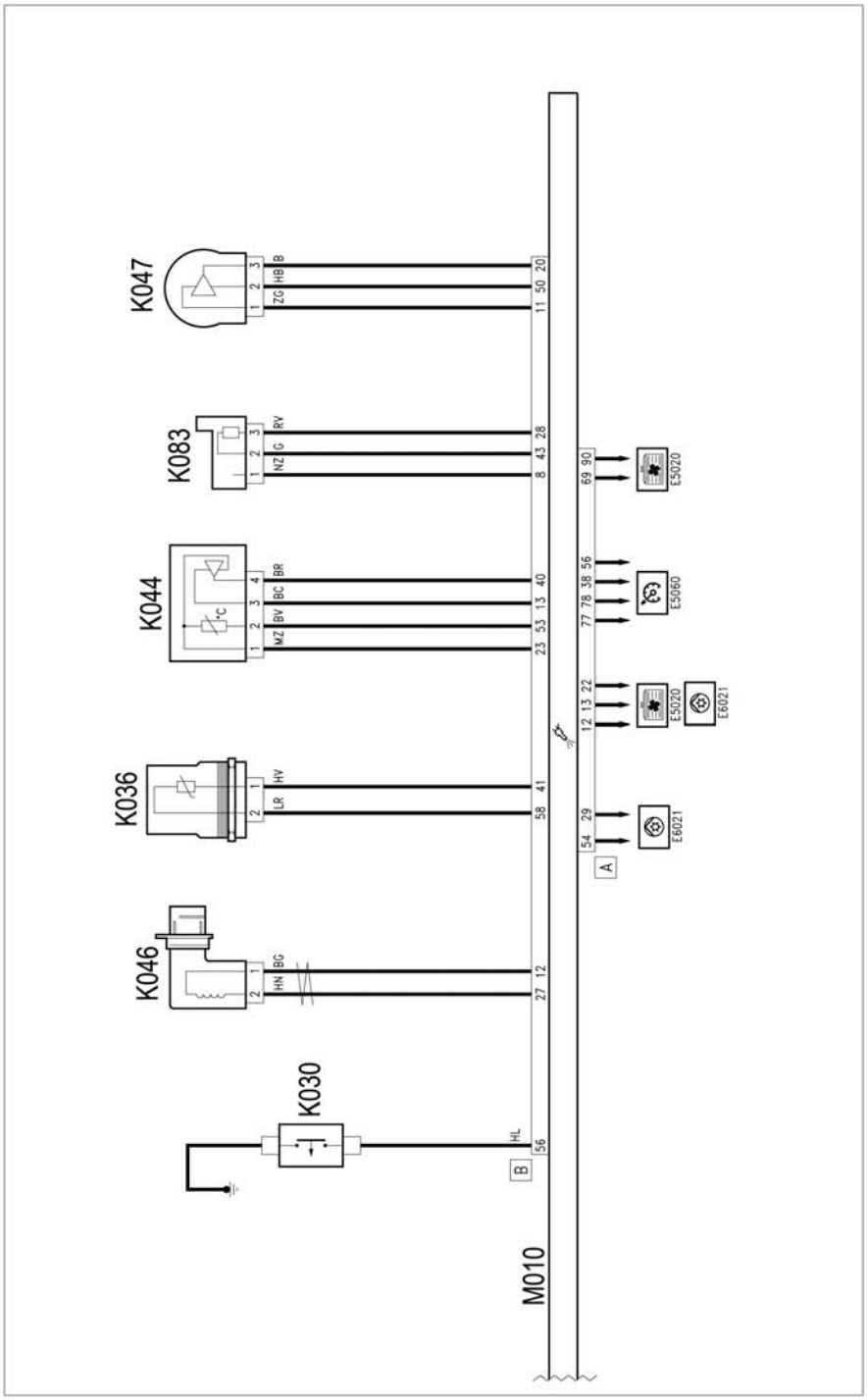
SPECIFICATIONS	1.9 8V 120 bhp Multijet
Displacement (cc)	1910
Bore (mm)	82
Stroke (mm)	90.4
Cylinder head	Aluminium alloy, two valves per cylinder
Crankcase	Cast iron – closed deck
Crankshaft	Cast iron, 5 main bearing housings, 8 counterweights
Timing system	- Single overhead camshaft driven by toothed belt - Hydraulic tappets
Fuel system	- Direct injection with variable geometry turbocharger and intercooler - Multijet engine control system
Maximum power (bhp/kW)	120 / 88 at 4000 rpm
Maximum torque (Nm)	255 Nm at 2000 rpm
Anti-pollution systems:	Linear EGR valve with cooling controlled directly by Bosch EDC16c39 engine control unit - 0.6 l pre-catalyst with high noble metal content (140gr/cu ft) - Underfloor 4-litre catalysed particulate trap with 70 gr/cu ft noble metal content → regeneration is activated by post-injection
Lubrication	Forced lubrication with gear pump Water/oil radiator with piston cooling jets
Cooling	Forced cooling with centrifugal pump
Turbocharging	Garrett VGT 17 variable geometry turbocharger with intercooler, butterfly valve controlled by control unit for improved exhaust gas recirculation doubles as anti-shudder valve for smoother engine shutdown.

Wiring diagram of 1.9 Multijet 8v engine management system

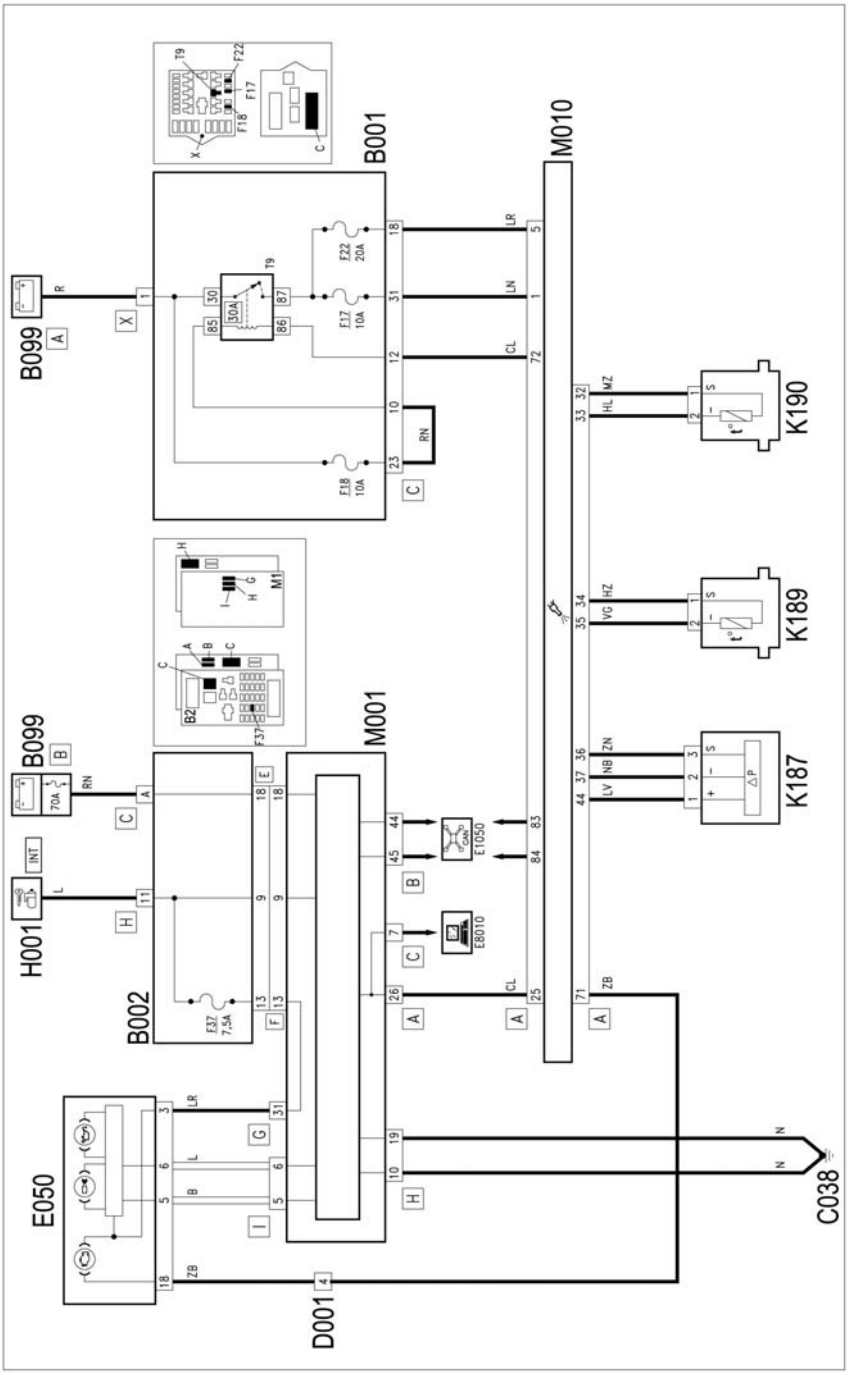
Version with DPF
E5050



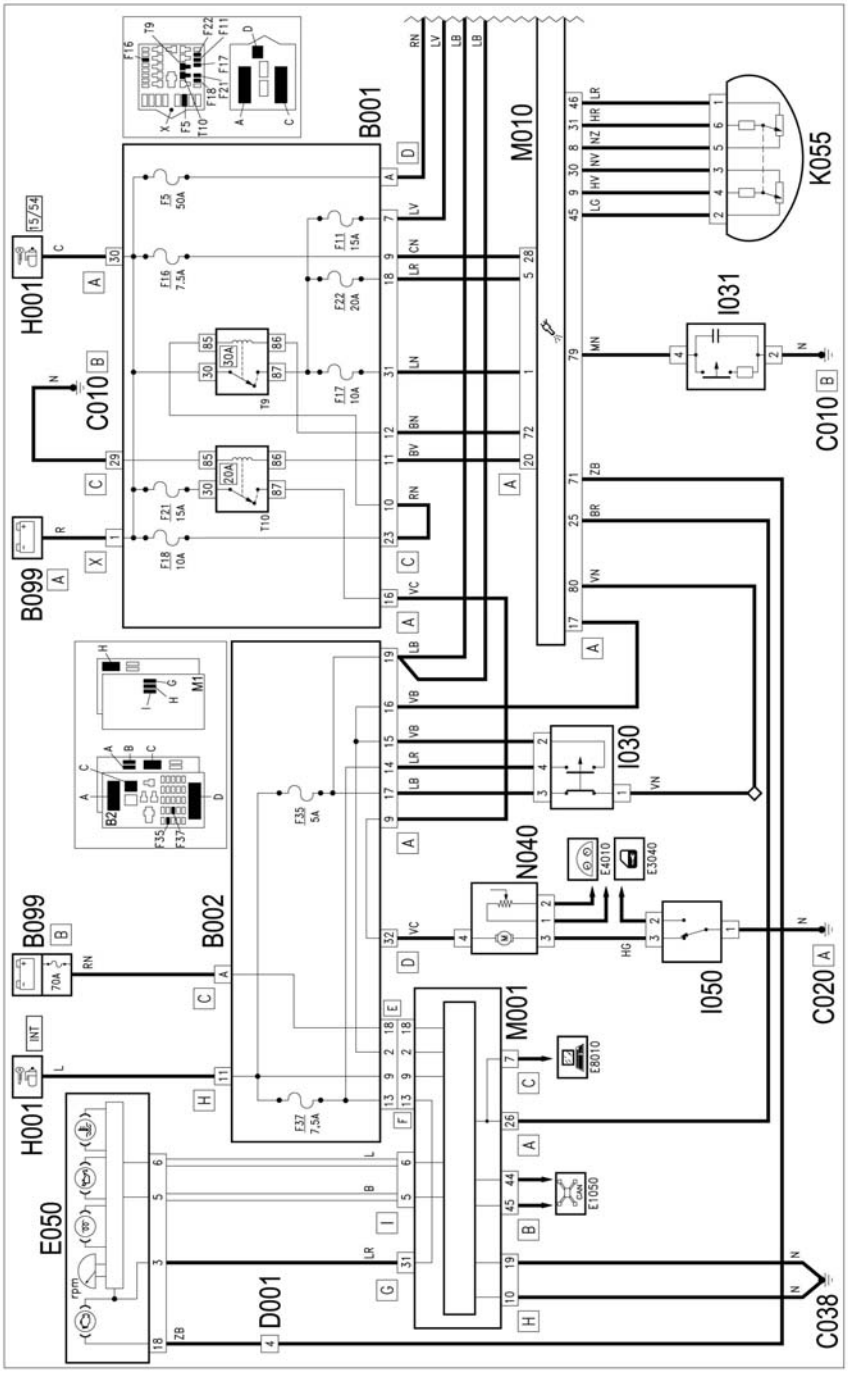


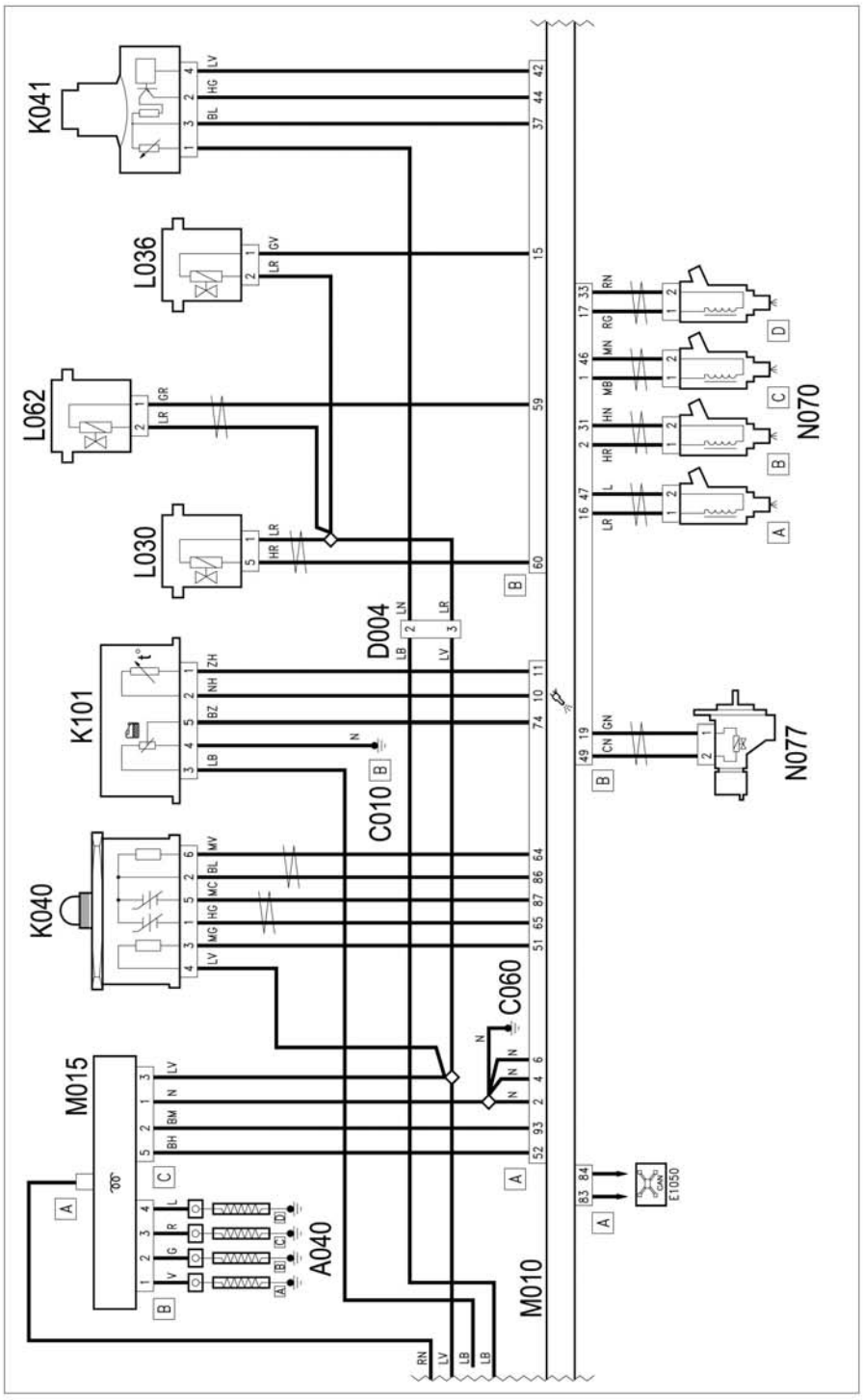


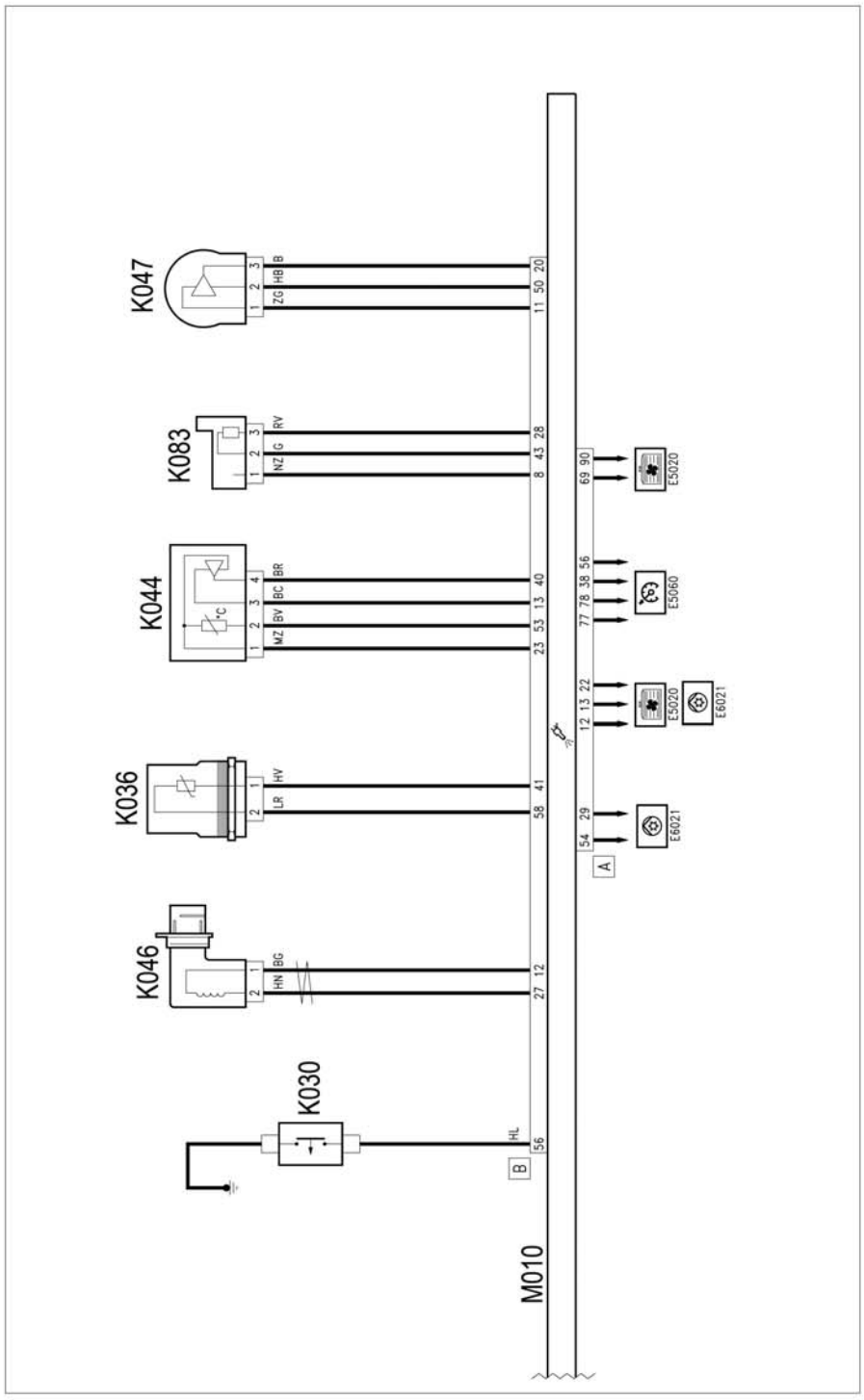
E5070
DPF



Versions without DPF
E5050



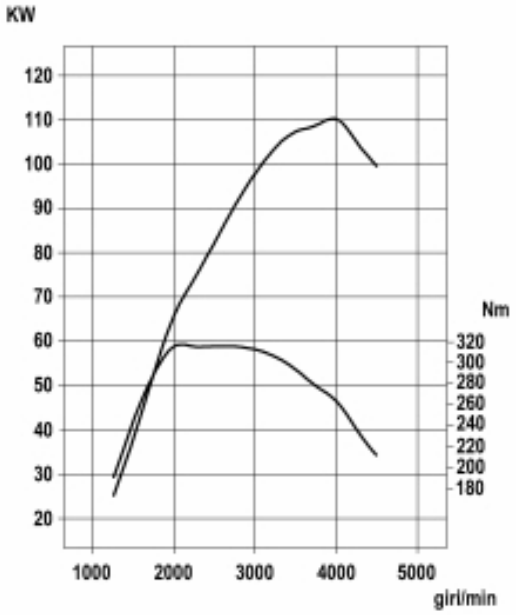




Key to components

A040. Preheating glow plugs
B001. Engine compartment connector box
B002. Connector box under dashboard
B099. Pmaxi-fuse box on battery
C001. Battery ground
C010. Front left ground
C020. Dashboard ground on passenger side
C038. Central tunnel ground
D001. Dashboard/front junction
D004. Engine/front junction
E050. Instrument panel
H001. Ignition switch
I030. Brake pedal switch
I031. Clutch pedal switch
I050. Inertia switch
K030. Engine oil pressure sensor
K036. Engine water temperature sensor
K040. Lambda sensor
K041. Air flow meter
K044. Intake air pressure and temperature sensor
K046. Rpm sensor
K047. Timing sensor
K055. Accelerator pedal potentiometer
K083. Fuel pressure sensor
K101. Fuel temperature sensor
K187. DPF differential pressure sensor
K189. Upstream Diesel Particulate Filter (DPF) temperature sensor
K190. Downstream Diesel Particulate Filter (DPF) temperature sensor
L030. EGR solenoid valve
L036. Variable turbine geometry solenoid valve
L062. Throttle body
M001. Body computer
M010. Engine control unit
M015. Glow plug preheating control unit
N040. Electric fuel pump and fuel level meter
N070. Electro-injectors
N077. Fuel regulator

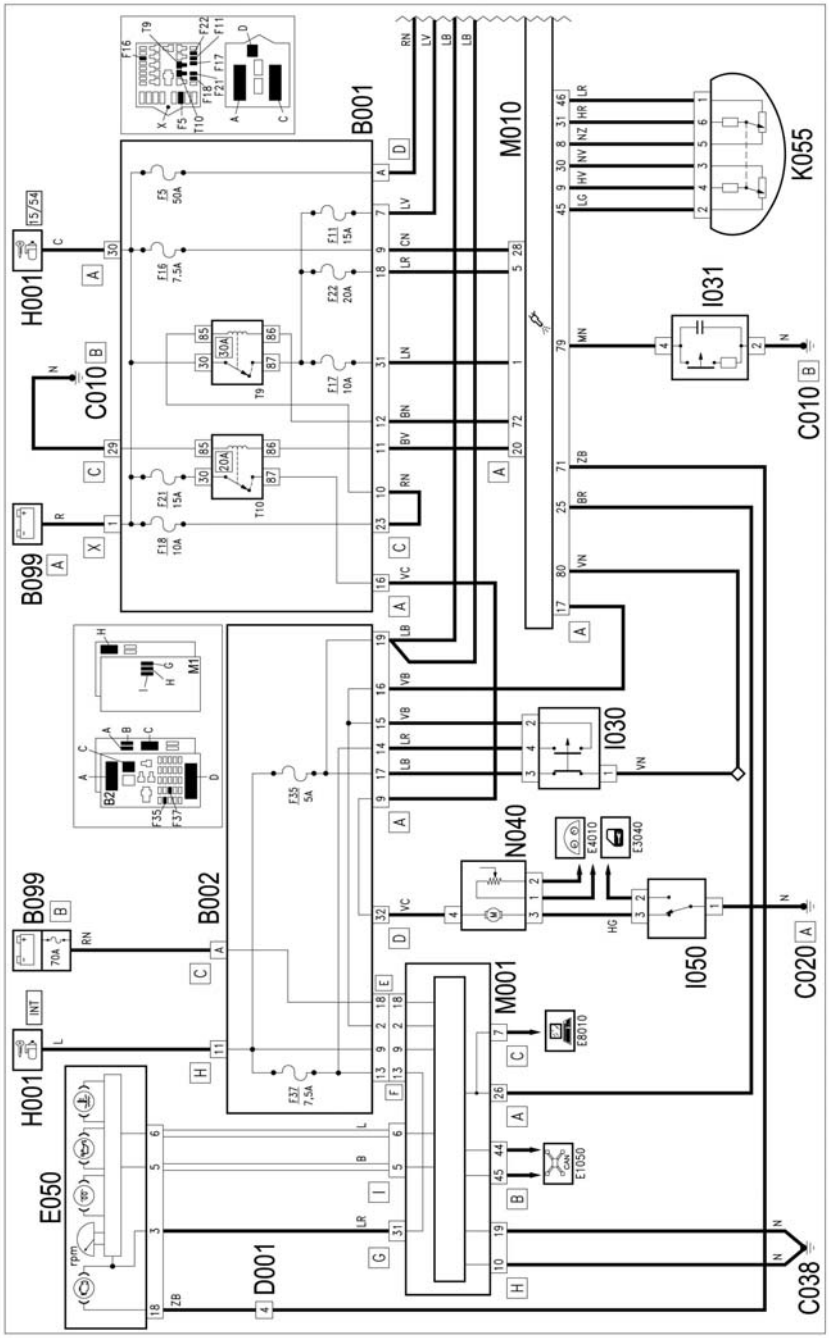
3.3 1.9 16V Multijet ENGINE DESCRIPTION

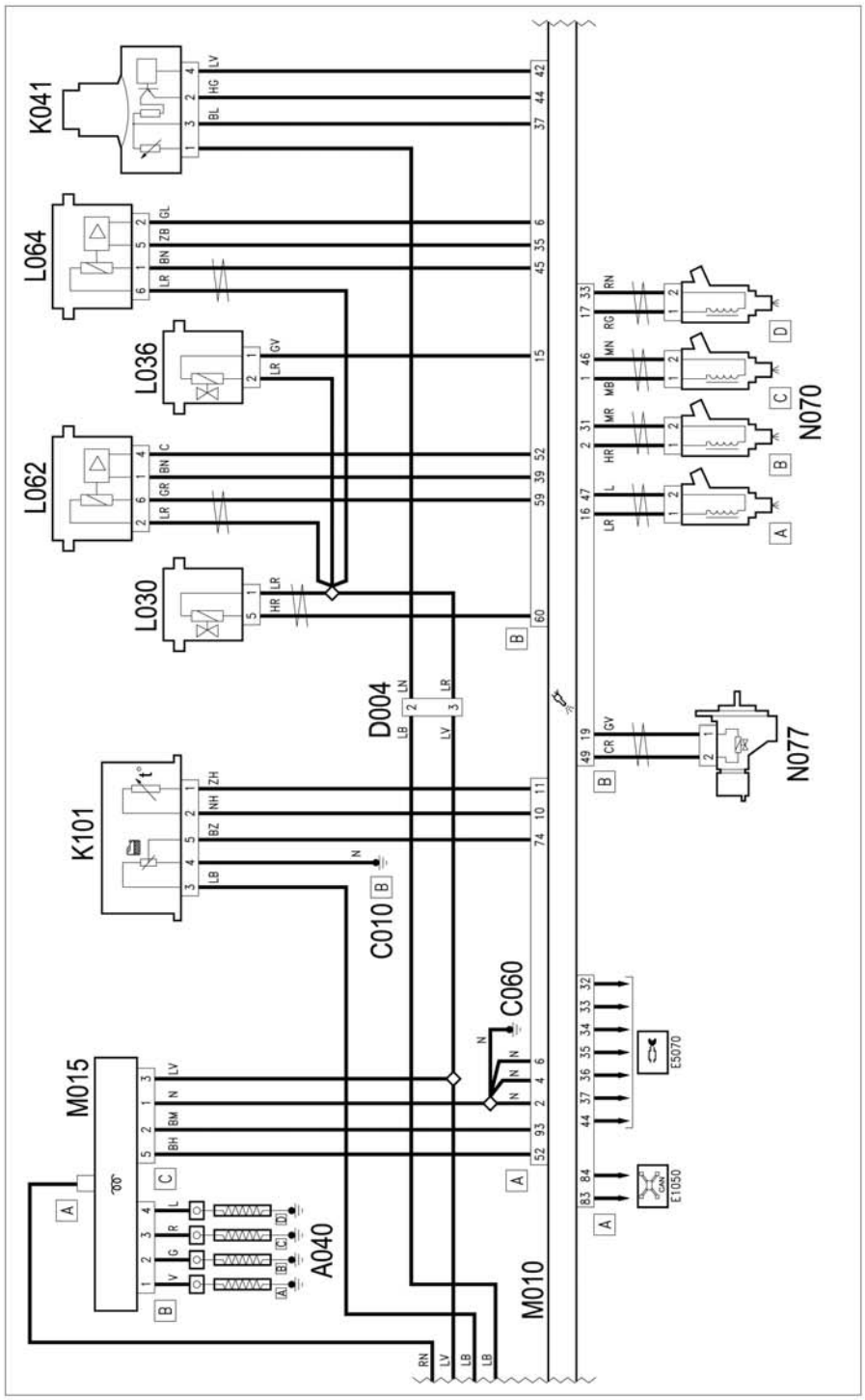


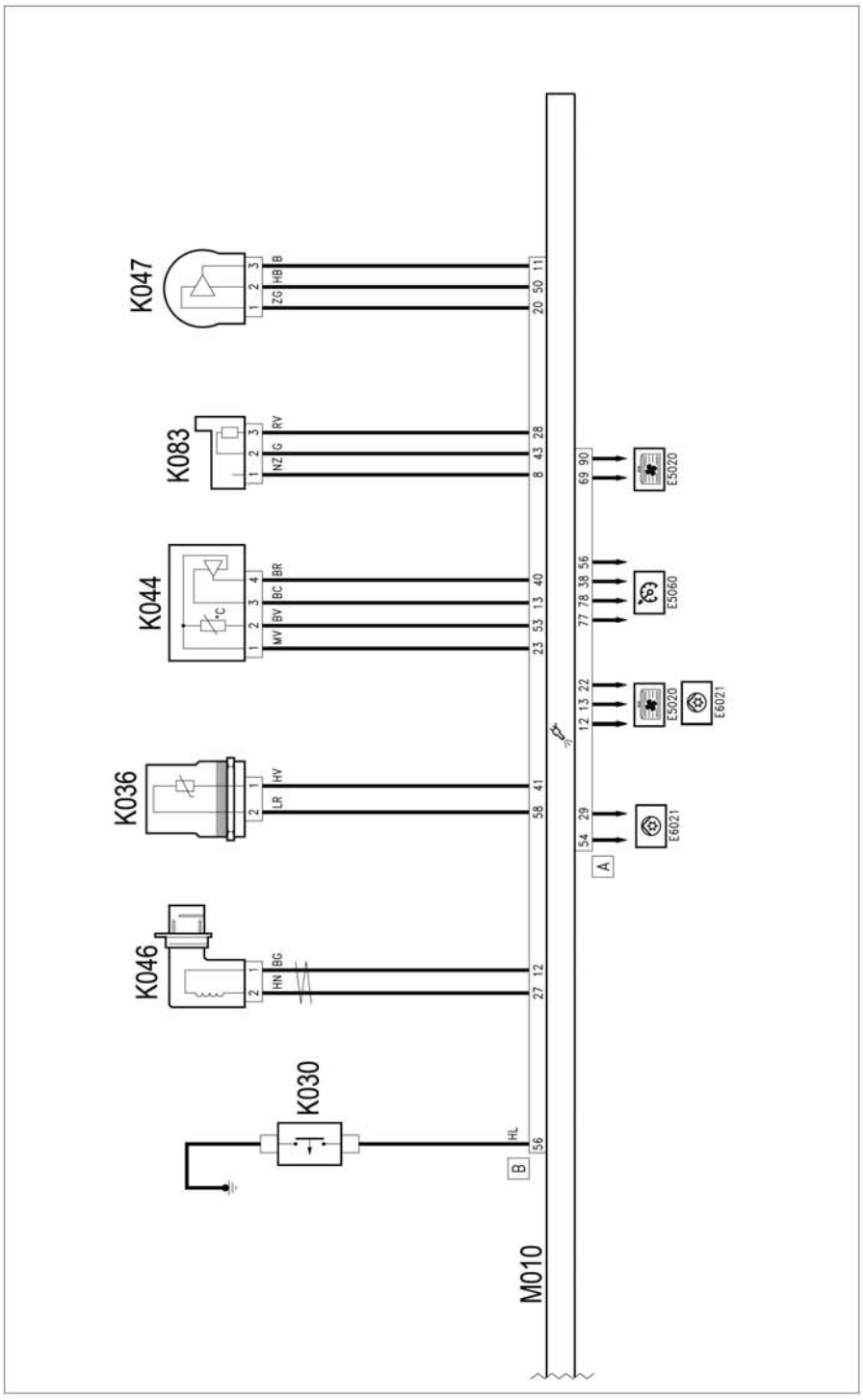
SPECIFICATIONS	1.9 16V 150 bhp Multijet
Displacement (cc)	1910
Bore (mm)	82
Stroke (mm)	90.4
Cylinder head	Aluminium alloy, two cross-flow valves per cylinder
Crankcase	Cast iron – closed deck
Crankshaft	Cast iron, 5 main bearing housings, 8 counterweights
Timing system	- Double overhead camshaft, one shaft is driven by a toothed belt, idle gear pair on second shaft - Hydraulic tappets
Fuel system	- Direct injection with variable geometry turbocharger and intercooler - Multijet engine control system
Maximum power (bhp/kW)	150 / 110 at 4000 rpm
Maximum torque (Nm)	305 Nm at 2000 rpm
Anti-pollution systems:	Linear EGR valve with cooling controlled directly by Bosch EDC16c39 engine control unit - 0.6 l pre-catalyst with high noble metal content (140gr/cu ft) - Underfloor 4-litre catalysed particulate trap with 70 gr/cu ft noble metal content → regeneration is activated by post-injection
Lubrication	Forced lubrication with gear pump Water/oil radiator with piston cooling jets
Cooling	Forced cooling with centrifugal pump
Turbocharging	Variable geometry turbocharger with intercooler, butterfly valve controlled by control unit for improved exhaust gas recirculation doubles as anti-shudder valve for smoother engine shutdown.

Wiring diagram of 1.9 Multijet 16v engine management system

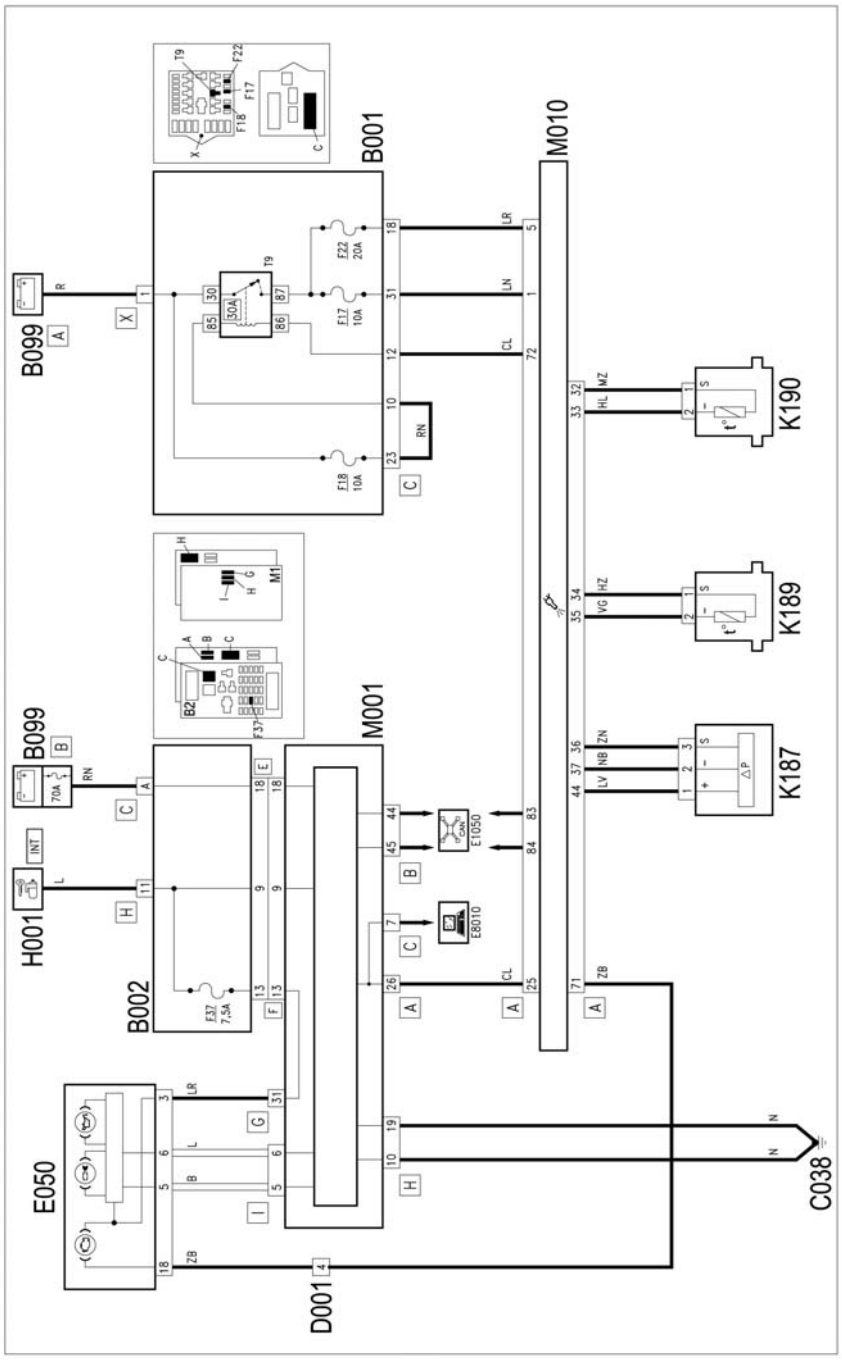
Versions with DPF
E5050



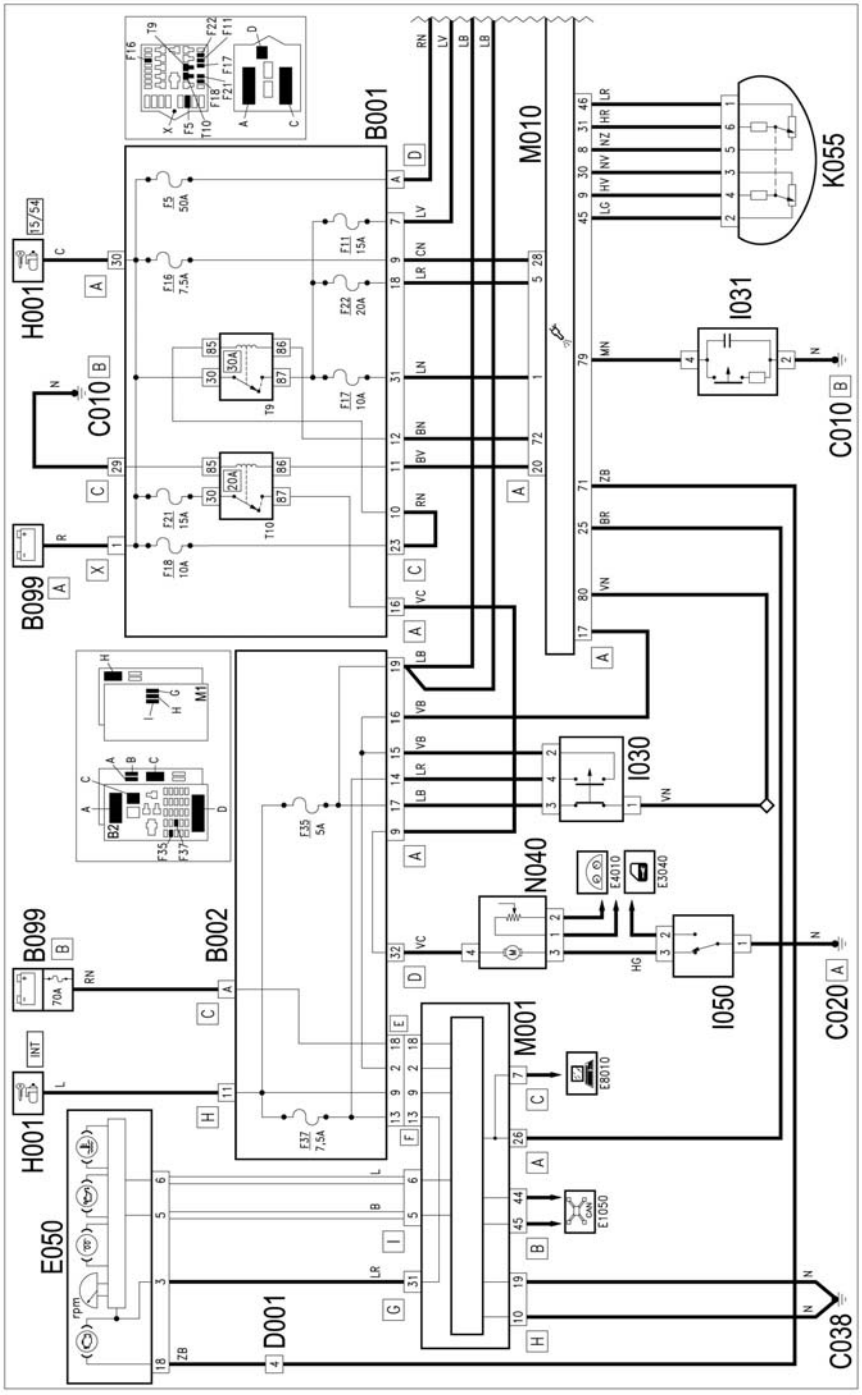


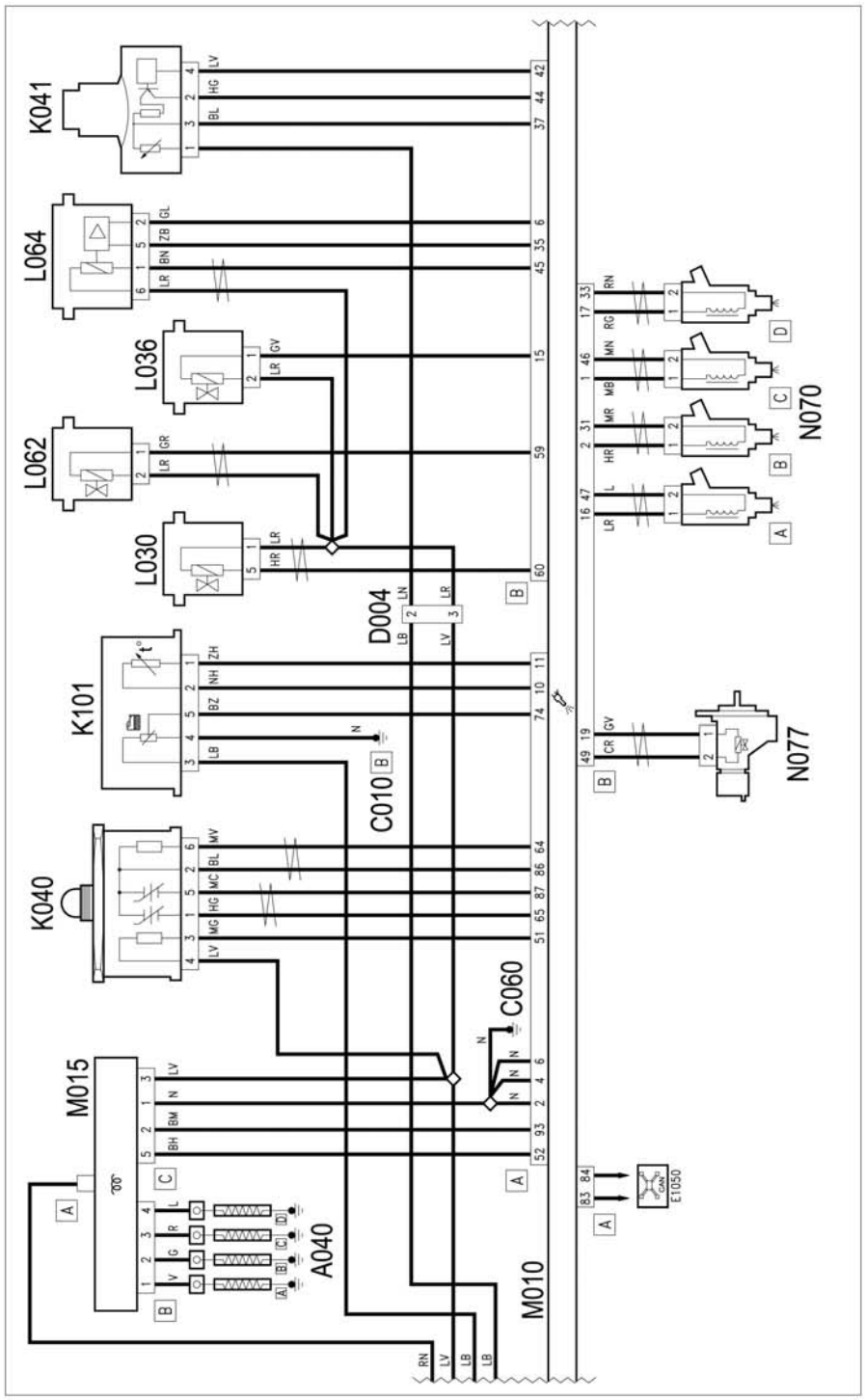


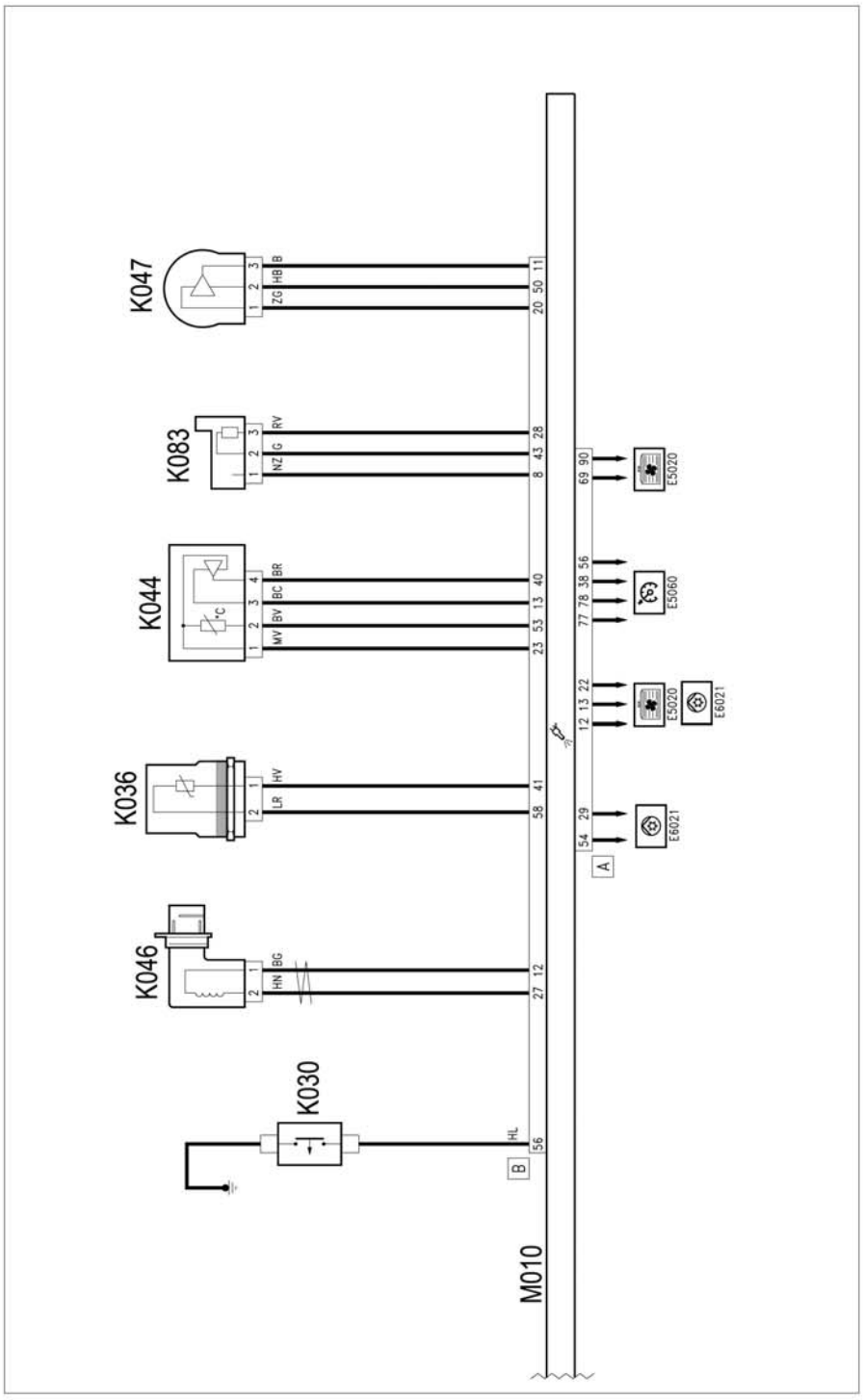
E5070
DPF



Versions without DPF
E5050







Key to components

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B001. Engine compartment connector box
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I050. Inertia switch
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K040. Lambda sensor
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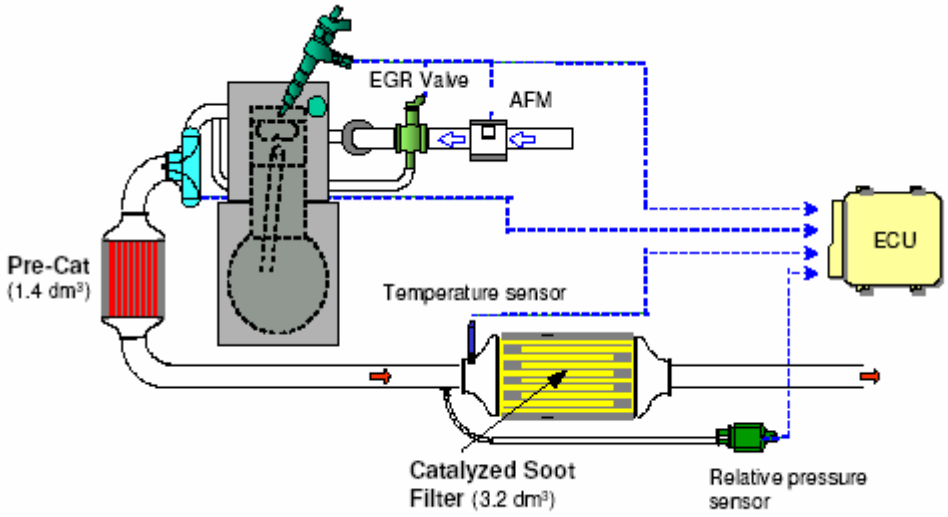
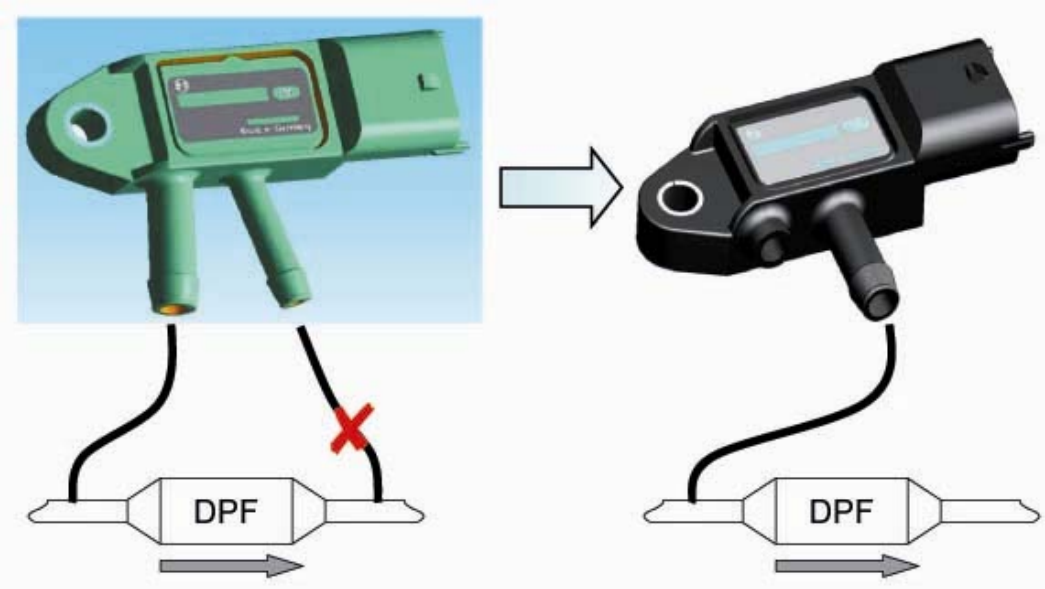
K044. Intake air pressure and temperature sensor
K046. Rpm sensor
K047. Timing sensor
K055. Accelerator pedal potentiometer
K083. Fuel pressure sensor
K101. Fuel temperature sensor
K187. DPF differential pressure sensor
K189. Upstream Diesel Particulate Filter (DPF) temperature sensor
K190. Downstream Diesel Particulate Filter (DPF) temperature sensor
L030. EGR solenoid valve
L036. Variable turbine geometry solenoid valve
L062. Throttle body
L064. Flow modulating solenoid valve
M001. Body computer
M010. Engine control unit
M015. Glow plug preheating control unit
N040. Electric fuel pump and fuel level meter
N070. Electro-injectors
N077. Fuel regulator

3.4 DPF SYSTEM DESCRIPTION

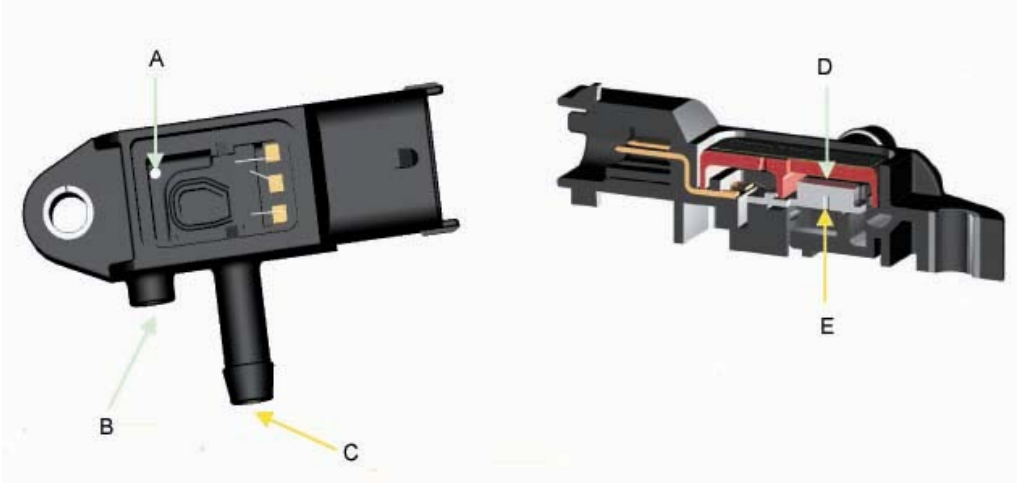
Installed in the exhaust line, the DPF uses a regeneration system to eliminate soot particles when they have built up beyond a certain limit. Particulate matter is eliminated during a post-combustion phase.



Diesel-engine Fiat Bravo models equipped with DPF use a differential pressure sensor with a single pressure port upstream of the filter; the second pressure port has been eliminated as the sensor is ported to the atmosphere; filter clogging is determined based on the difference between pressure upstream of the filter and the atmosphere and the ECU is set to process the modified differential pressure parameter appropriately.

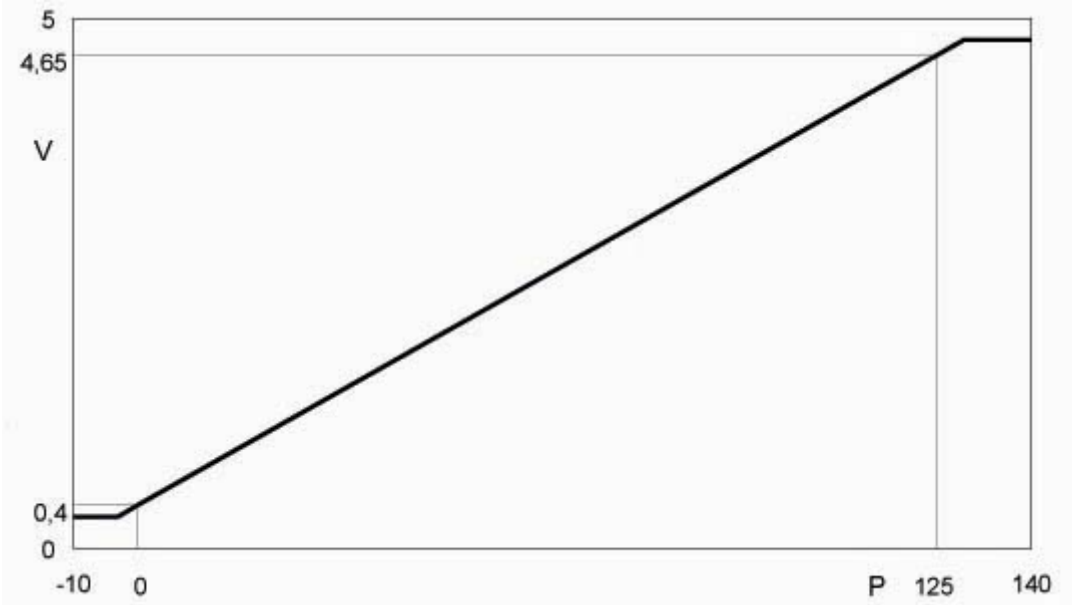


Shown in the following figure are the pressure inlets on the sensor



A. Additional port for atmospheric pressure
B. Atmospheric pressure
C. Exhaust gas pressure
D. Atmospheric pressure is applied to sensor chip
E. Exhaust gas pressure is applied to sensor chip

Characteristic curve of sensor



The graph in the figure shows pressure output signal relative to pressure P (expressed in Kpa), which is the difference between exhaust gas pressure and atmospheric pressure.

4. CLUTCH AND GEARBOX

All (petrol and Diesel) engines use clutch plates with environmentally-safe lining in accordance with European Directives concerning environmental protection. All (petrol and Diesel) engines feature a hydraulically-controlled Concentric Slave Cylinder (CSC) for clutch disengagement.
On Multijet versions, the CSC system is combined with a play take-up system that compensates for clutch plate wear to ensure consistent clutch operation throughout vehicle life.
The 1.4 16V engine is mated to the C514 gearbox that provides ease of use, low running noise and lightweight; driveline layout features a transversely mounted engine with end-on mounted gearbox and differential; gear synchronisation for all gears (including reverse) is of the brass free-ring (Borg-Warner) type and its layout is as follows: 1st and 2nd speed synchroniser ring on secondary shaft, 3rd, 4th and 5th speed synchroniser ring on main shaft, reverse synchroniser ring on intermediate shaft.
Since the 1st and 2nd speeds are most frequently used and heavily stressed in service, they use a double-cone synchroniser that reduces engagement effort by 40% compared to equally sized conventional synchronisers.
120 and 150 bhp Multijet engines are mated to the C530 gearbox, that offers superior performance and smooth operation.

5. BRAKES

The braking system uses sophisticated electronic and mechanical technology normally found on last-generation upmarket vehicles:
ABS: (Anti-Lock Braking System), prevents wheel lockout;

EBD (Electronic Braking Distribution): distributes braking power evenly to front and rear wheels;

ESP (Electronic Stability Program): electronic stability control;

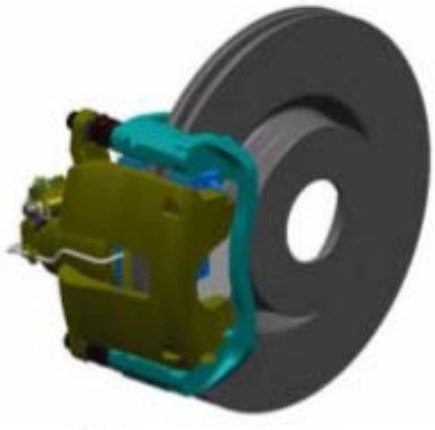
Hill Holder (with ESP): automatic feature for stopping and starting uphill with no need to operate the handbrake.

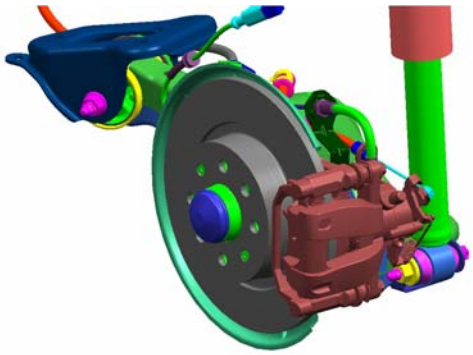
HBA system (Hydraulic Brake Assistant): electro-hydraulic brake assist system that automatically increases brake pressure in a panic braking situation (with ESP).

Bosch 8.1 ABS is the latest state-of-art technology available to date: it features a hydraulic control unit with 8 solenoid valves, 4 active sensors and 4 channels with proportioning valve; in the ESP versions, the electro-hydraulic unit features 12 solenoid valves; the steering wheel sensor is installed on the steering column, whereas the yaw sensor is located on the central floor near the central console and detects side acceleration, yaw speed and vehicle inclination (for the Hill Holder function).

The hydraulic servo braking system features a diagonally split, dual circuit design with independent circuits for each pair of diagonally opposed wheels to ensure braking and stability in the event of a brake line failure. All range models are equipped with:

- Ventilated brake discs on front wheels
- Solid brake discs on rear wheels
- ABS with EBD;
- ESP fitted as standard with Sport trim level.





Braking systems feature certain variants to suit the varying weights and power output of the different engines:

1.4 16V petrol engine:

257 x 22 mm ventilated front brake disc
Bosch ZOH brake callipers with 54 mm piston
surface area of brake pads: 43 sq cm
251 x 10 mm rear brake disc with Bosch BIRIII calliper.

1.9 120 bhp Multijet engines:

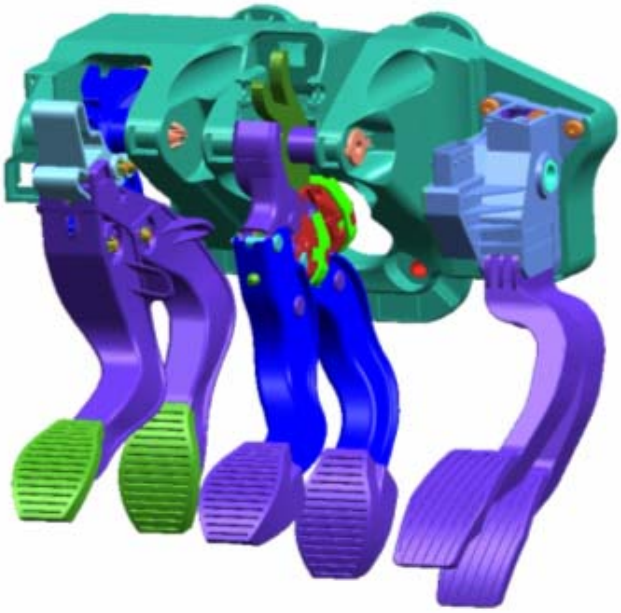
284 x 22 mm ventilated brake disc
Bosch ZOH brake callipers with 54 mm piston
surface area of brake pads: 52 sq cm
251 x 10 mm rear brake disc with Bosch BIRIII calliper.

1.9 150 bhp Multijet engine:

281 x 26 mm ventilated brake disc
Bosch ZOH brake callipers with 54 mm piston
surface area of brake pads: 57 sq cm
251 x 10 mm rear brake disc with Bosch BIRIII calliper.

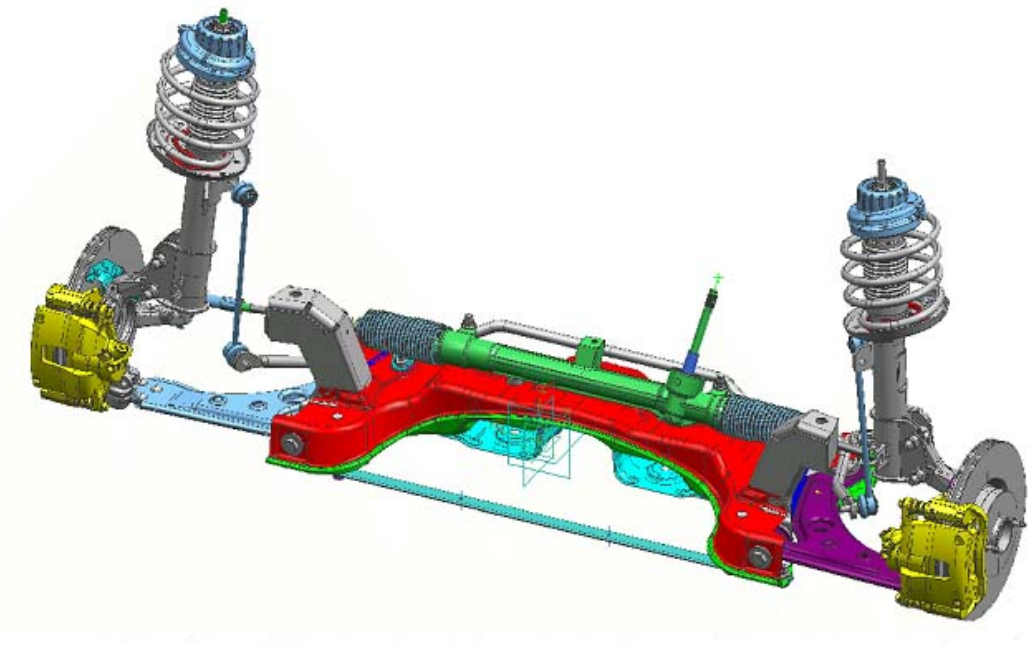
A large-size long-stroke Bosch servo brake (10” diameter) with aluminium pump provides longer pedal travel so as to ensure sufficient travel in the event of severe overheating under heavy-duty usage conditions.

The Bravo uses a pedal unit with plastic support accommodating brake, clutch and accelerator pedals. Accelerator and clutch pedals are made from plastic.
The pedal unit is equipped with an anti-intrusion system that causes the pedals to collapse in the event of a collision for improved lower limb protection.



6. SUSPENSIONS

6.1 FRONT SUSPENSION DESCRIPTION

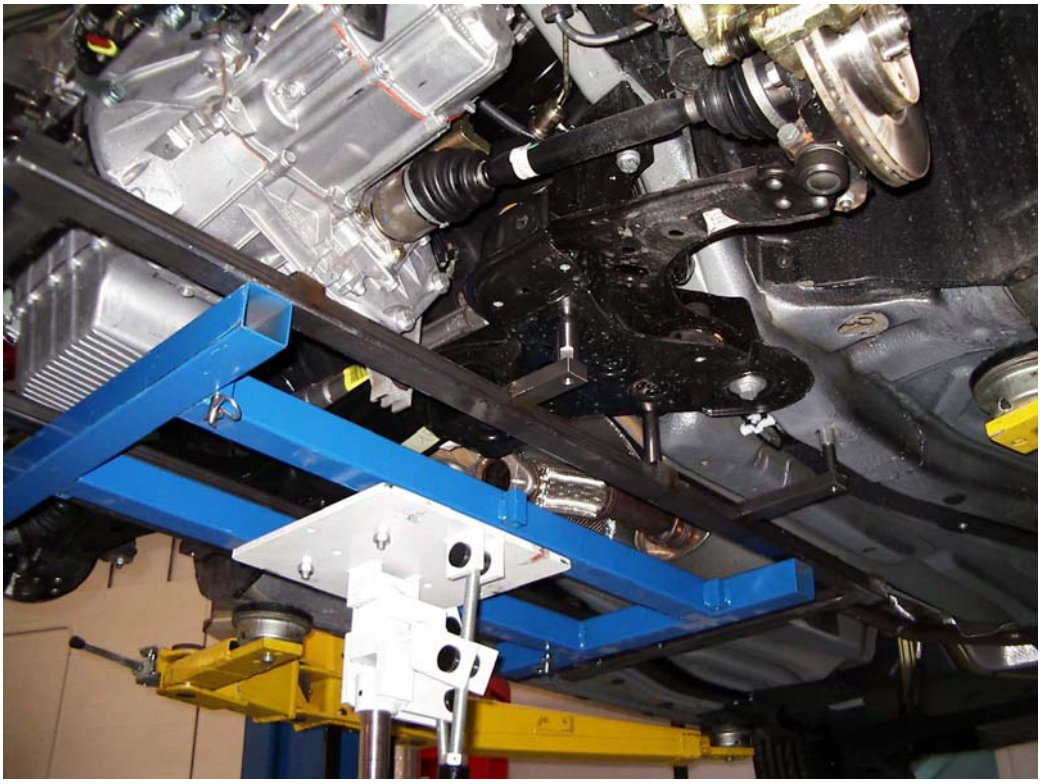


Independent Mac Pherson strut suspension with damper and spring providing dampening and acting as stressed member and wheel location device.
The key components of the suspension are outlined below:
Twin-shell pressed metal wishbones (with the patented “butterfly” layout) provide significant weight saving compared to the Stilo to reduce unsprung weight.

Extremely rigid front suspension crossbeam with a transverse linking strap close to the front link attachments.
“Dual-path” double front strut mounts filter out road vibration more efficiently, while ensuring a high level of structural rigidity for enhanced steering precision.
The anti-roll bar is stiffer than that of the Stilo for improved efficiency and is connected to the shock absorbers via link attachments for enhanced stability and prompter response when cornering.
New, stiffer coil springs use the 'side-load' technique to optimise thrust axis, so as to reduce tangential loads on the damper shaft and internal friction (system hysteresis) and provide a supple ride over minor road bumps.
Double rate telescopic hydraulic dampers with 22 mm shaft on Multijet versions and 20 mm shaft on 1.4 petrol engine versions provide high lateral rigidity and better roadholding when cornering.
In addition, rigidity and caster angle have been increased by adopting a stiffer bodyshell and a redesigned upper strut attachment to the bodyshell, resulting in improved steering precision, better feedback and enhanced comfort.

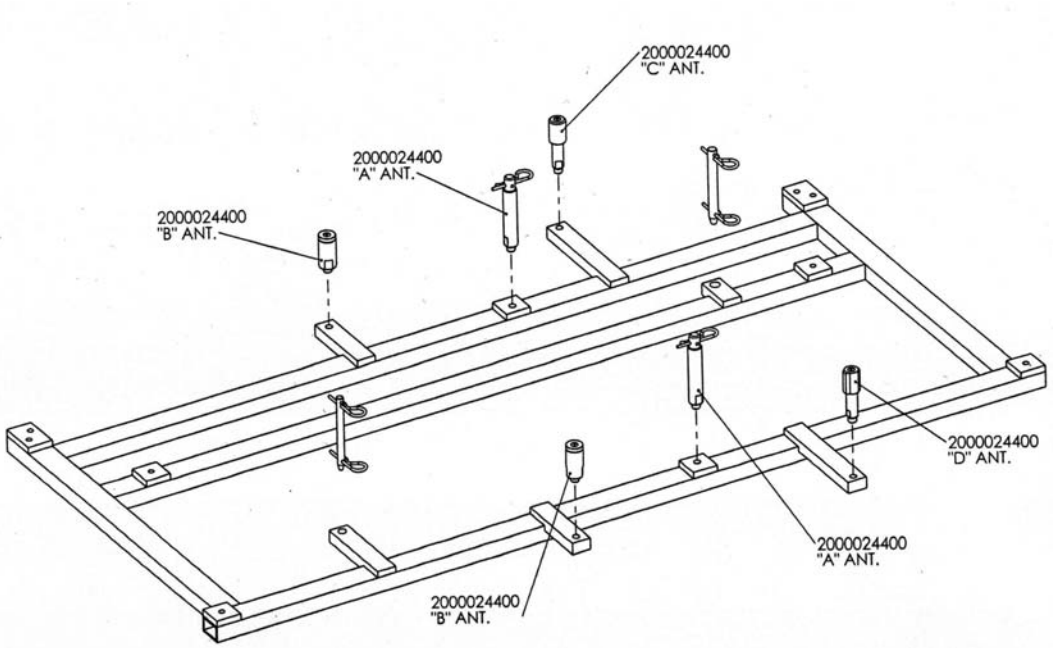
6.2 FRONT SUSPENSION INSTALLATION

Correct installation of the front suspension crossbeam requires tool 200004400 to ensure the crossbeam is accurately centred with the bodyshell; the tool has three pins on each side; two pins connect to the crossbeam and the third provides correct location

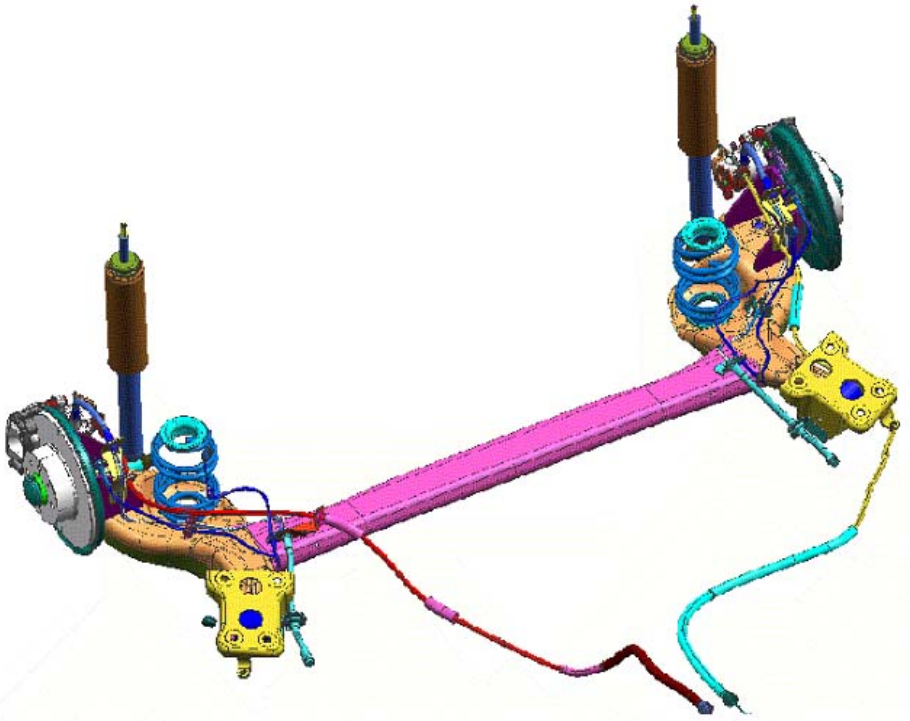


One of the crossbeam pins has a split pin to ensure safety on disassembly

How to use the tool on the front suspension crossbeam



6.3 REAR SUSPENSION DESCRIPTION

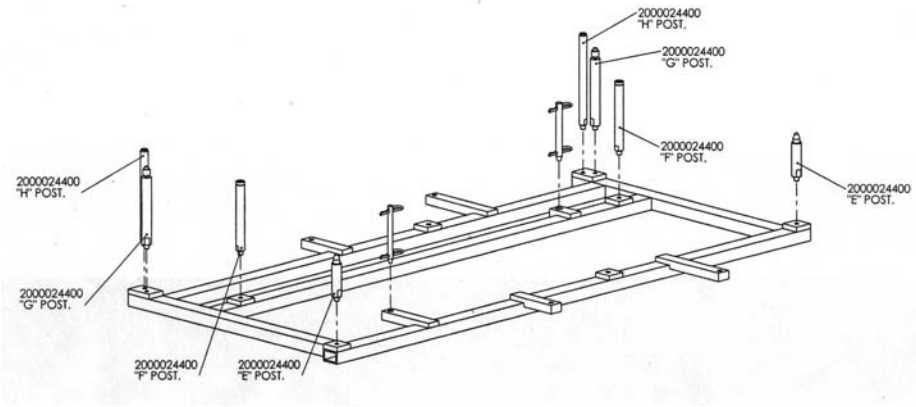


The semi-independent rear suspension with a rear torsion beam axle connecting the wheels is derived from the Stilo predecessor, however with an optimised layout.
The new tubular anti-roll bar is derived from the Stilo but is 40% stiffer, resulting in a 40% increase in anti-roll performance, which benefits both steering accuracy and roadholding.
The vertically mounted dampers are attached to the bodyshell inside the wheelarch to filter out road vibration and sound-deadening has been improved to lessen cabin noise. The torsion beam axle is made up two pressed metal side arms welded to a torsion side section with the new anti-roll bar installed inside the crossbeam and welded to the side arms.
Axle hydraulic connection bushes ensure greater longitudinal flexibility and comfort than the rubber-on-metal bushes and feature sturdier design and shoulders; the new bushes come standard on the Stilo since October 2005.

6.4 REAR SUSPENSION INSTALLATION

Correct installation of the rear suspension axle requires the tool 200004400 to ensure axle is accurately centred with the bodyshell; the tool has four pins on each side; one pin connects to the axle and the other one provides correct location to the bodyshell; another pin helps support the axle, and the fourth pin connects to the bush plate.

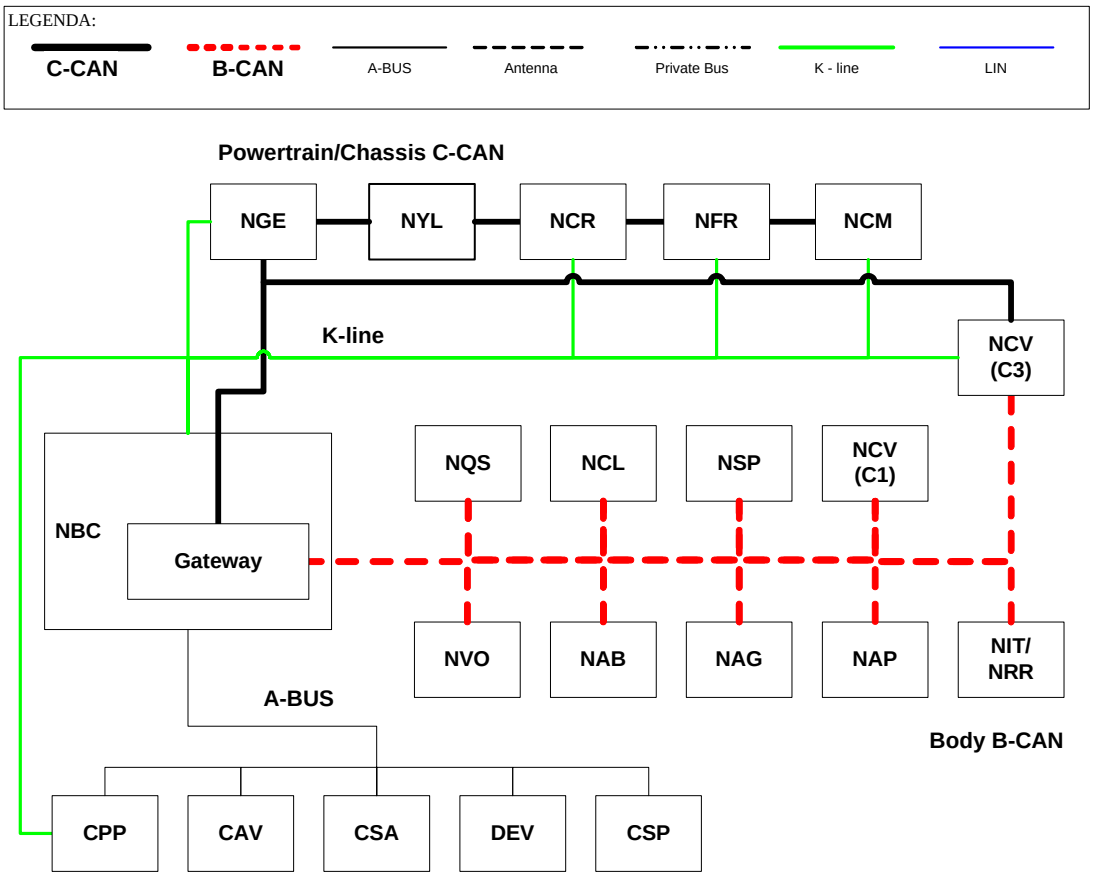
How to use the tool on the rear suspension axle



7. ELECTRIC SYSTEM

The electric system features uncluttered design with great emphasis on function. The block diagram is provided below.

7.1 GENERAL



B CAN

NBC: Body Computer Node, **NQS**: Instrument Panel Node, **NVO**: Flying Node, **NIT**: Infotainment Node, **NRR**: Radio Receiver Node, **NAB**: Airbag Node, **NCL**: Climate Control Node, **NAG**: Driver Setup Node, **NAP**: Passenger Setup Node, **NCV**: Convergence Node (C1 or C3), **NSP**: Parking Sensor Node, **DIAG_TEST**.

C CAN

NGE: Electric Power Steering Node, **NBC:** Body Computer Node, **NFR:** Braking Systems Node (ABS, ASR, ESP), **NCM:** Engine Control Node, **NYL:** Yaw Rate Sensor Node, **NCR:** Automated Sequential Gearbox Node, **NCV:** C3 Convergence Node.

A BUS

CAV: Volumetric Anti-Lift Sensor Control Unit, **DEV**: Stalk Unit, **CSA**: Antitheft Alarm Control Unit, **CSP**: Rain / Daylight Sensor Control Unit, **CPP**: Tyre Pressure Control Unit.

EMCU (Fuse control units)

CBA: Battery Control Unit, **CFO**: Supplemental Control Unit on Battery, **CGP**: Door Management Control Unit, **CPL**: Dashboard Control Unit, **CVB**: Boot Compartment Control Unit, **CVM**: Engine Compartment Control Unit.

NODE ID	CODE	SYSTEM / NODE	BUS	DIAGNOSIS	PHYSICAL LAYER	PROXI	PROGRAM.
0	NBC	Body Computer Node	B-C CAN	Yes	B CAN	Yes	Yes
1	NCM	Engine Control Node	C CAN	Yes	K line	No	Yes
2	NGE	Electric Power Steering Node	C CAN	Yes	K line	No	No
3	NQS	Instrument Panel Node	B CAN	Yes	B CAN	Yes	Yes
4	NVO	Flying Node	B CAN	No	/	No	No
5	NRR	Radio Receiver Node	B CAN	No	/	No	No
6	NFR	Brake Node	C CAN	Yes	K line	No	No
7	NIT	Infotainment Node	B CAN	Yes	B CAN	No	No
7	NCV	C1 Convergence Node	B CAN	Yes	B CAN	Yes	No
7	NCV	C3 Convergence Node	B-C CAN	Yes	B CAN	Yes	No
10	NCL	Climate Control Node	B CAN	Yes	B CAN	Yes	No
11	NCR	Automatic Transmission Node	C CAN	Yes	K line	No	No
15	NYL	Yaw Sensor Node	C CAN	No	/	No	No
18	NAG	Driver Setup Node	B CAN	Yes	B CAN	No	No
23	NAP	Passenger Setup Node	B CAN	Yes	B CAN	No	No
24	NSP	Parking Sensor Node	B CAN	Yes	B CAN	No	Yes
26	NAB	Air Bag Node	B CAN	Yes	B CAN	Yes	Yes
#	CAV	Volumetric Sensor Alarm Control Unit	A BUS	No	/	No	No
#	DEV	Stalk Module	A BUS	No	/	No	No
#	CSA	Antitheft Alarm Control Unit	A BUS	No	/	No	No
#	CSP	Rain Sensor Control Unit	A BUS	No	/	No	No
#	CPP	Tyre Pressure Control Unit	A BUS	Yes	K line	No	No

LANE CHANGE FUNCTION

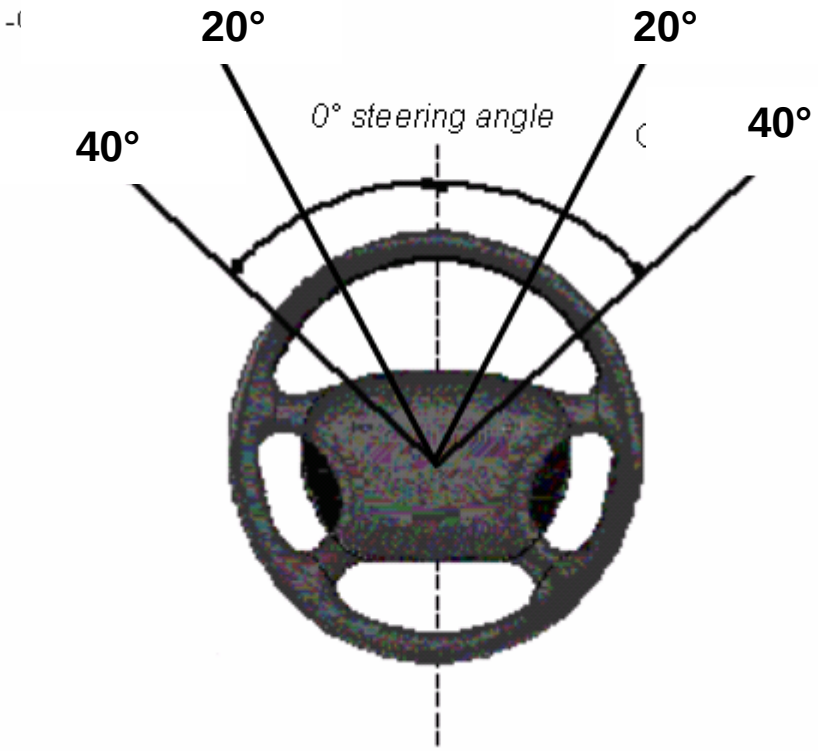
Thanks to this new function, the driver simply needs to tap the left stalk switch in the appropriate direction to signal his/her intention to change lanes; the corresponding indicator will blink three times and turn off automatically.

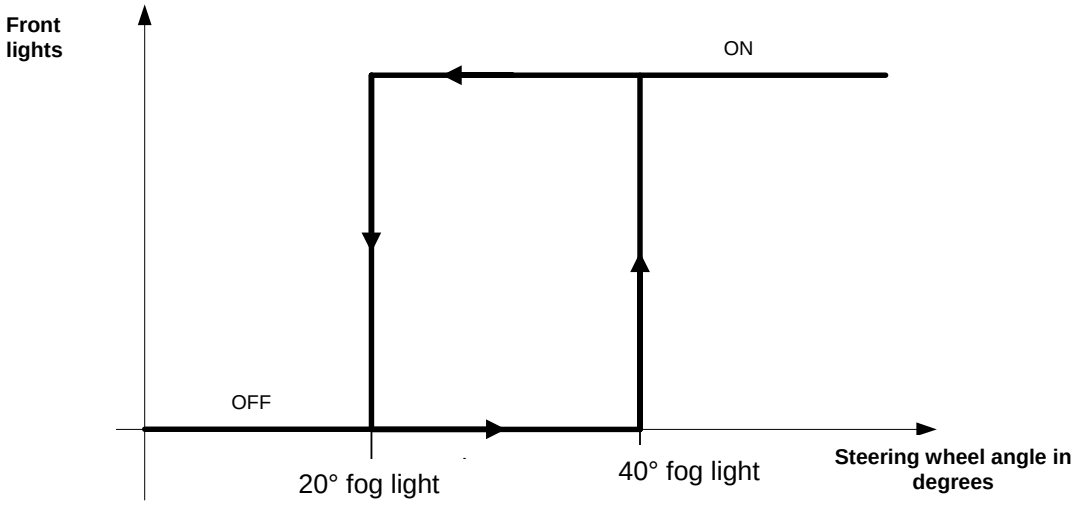
CORNERING LIGHTS FUNCTION

When running at less than 40 kph with the low beams on, turning the steering wheel through large angles or activating a direction indicator turns on a lamp incorporated in the fog light to provide additional illumination in the direction of the turn at night time.

The Body Computer Node (NBC) provides independent control for the fog lights according to steering wheel position as follows:

The right or left fog light turns on when the steering wheel angle exceeds 40° and will turn off when the steering wheel is turned back to under 20°.





*(Absolute value)

7.2 DASHBOARD

Versions

The Bravo dashboard is available in two versions depending on trim level

Version with black graphics
(for basic trim levels)

Version with white graphics
(for Blue&Me C3 option and Sport trim levels)

MATRIX dashboard

The MATRIX Dashboard adopted for the Blue&Me C3 option and Sport trim levels incorporates a reconfigurable matrix display connected to the CAN network; it comes in a standard version for both left and right drive and includes:

4 indicators with stepper motors that provide the following indications:

1. Electronic speedometer
2. Electronic rev meter
3. Fuel level (with low fuel light)
4. Engine coolant temperature (with maximum temperature warning light)

22 negative-contrast MAX LED lights (provision for 7 CAN network controlled lights, provision for 2 discreet mode controlled lights)

1 reconfigurable-matrix transmissive negative-mode STN display to view:

1. Date
2. Trip computer information (processed by the dashboard);
3. Set-up menu and related messages for set-ups / adjustments;
4. Messages concerning : function activation / service information / failures / dialogue messages / feedback with related symbols;
5. Repetition of Audio / Phone / Navigation function indications;
6. Blue&Me functions;
7. Odometer;
8. Clock;
9. External temperature and “Ice Risk” symbol;
10. Remote headlamp adjustment indication;
11. “Service” (open-ended spanner) symbol

On versions equipped with automated sequential gearbox, a dedicated area displays current shifter position and the “AUTO”, “E” and “S” symbols.

On versions equipped with the “Sport” function, a dedicated area displays the “S” symbol.

1 buzzer with 8 volume settings provides the following functions:

Alarm / warning / hazard indications;
Automated sequential gearbox alert (where fitted);
Parking sensor alert (where fitted);
Seat Belt Reminder;
Direction / hazard lights operation;
Roger beep tone at each key press;

3 buttons (“MODE”, “CAF/MODE +”, “CAF/MODE –“) on dedicated dashboard panel for “C.A.F.”, “Dimming” and “Setup Menu” settings

TRIP button on stalk switch to display Trip Computer

When the ignition key is turned to OFF with the front doors closed, the display stays off.
When the ignition key is turned to OFF and at least one front door is opened or closed, the display shows clock and odometer.

COMFORT dashboard

The COMFORT Dashboard adopted for the basic trim levels incorporates an alphanumeric display connected to the CAN network; it comes in a standard version for both left and right drive and includes:

4 indicators with stepper motors that provide the following indications:

1. Electronic speedometer
2. Electronic rev meter
3. Fuel level (with low fuel light)
4. Engine coolant temperature (with maximum temperature warning light)

30 negative-contrast MAX LED lights (provision for 1 CAN network controlled light)

1 three-line alphanumeric transmissive negative-mode STN display.

The top line holds 14 (7x5) dot matrix characters and displays :

1. Date
2. Trip computer information (processed by the dashboard);
3. Set-up menu and related messages for set-ups / adjustments;
4. Messages concerning : function activation / service information / failures / dialogue messages / feedback information;
5. Repetition of Audio / Phone function indications;
6. Blue&Me functions;

Two lower segment lines display :

1. Odometer;
2. Clock;
3. External temperature and “Ice Risk” symbol;
4. Remote headlamp adjustment indication;
5. “City” ON symbol
6. “S” symbol (“Sport” mode ON)
7. “Service” (open-ended spanner) symbol

On versions equipped with automated sequential gearbox, a dedicated area displays current shifter position and the “AUTO”, “E” and “S” symbols.

1 buzzer with 8 volume settings provides the following functions:

Alarm / warning / hazard indications;
Automated sequential gearbox alert (where fitted);
Parking sensor alert (where fitted);

Seat Belt Reminder;
Direction / hazard lights operation;
Roger beep tone at each key press;

3 buttons ("MODE", "CAF/MODE +", "CAF/MODE –") on dedicated dashboard panel for "C.A.F.", "Dimming" and "Setup Menu" settings
TRIP button on stalk switch to display Trip Computer

When the ignition key is turned to OFF with the front doors closed, the display stays off.
When the ignition key is turned to OFF and at least one front door is opened or closed, the display shows clock and odometer.

Item	DASHBOARD COMFORT	MATRIX DASHBOARD
Speedometer	X	X
Rev meter	X	X
Fuel level indicator	X	X
Engine coolant temperature indicator	X	X
Turbocharging pressure indication	–	X
Remote headlamp adjustment	X	X
Odometer	X	X
External temperature and Ice Risk	X	X
Rheostat lighting (daytime)	–	X
Rheostat lighting (night time)	X	X
Setup Menu	X	X
Time and Date	X	X
Trip Computer	X	X
Service (scheduled maintenance)	X	X
Automated sequential gearbox indications (where fitted)	X	X
Audio information repetition	X	X
Phone information repetition	X	X
Navigation information repetition	–	X
Repetition of information from Blue&Me C1	X	X
Repetition of information from Blue&Me C3	–	X
Logistic Mode	X	X
Buzzer (failures, automated sequential gearbox indications, parking sensor, SBR, direction/hazard lights operation, roger beep)	X	X
Diesel Particulate Filter + Oil life	X	X
Alternator failure	X	X
Minimum engine oil pressure	X	X
EOBD/MIL indication	X	X
Glow plug preheating / sensor failure	X	X
Water in diesel filter / sensor failure	X	X
Cruise Control	X	X
Front and rear fog lights	X (with lamp check for rear fog lights)	X (with lamp check for rear fog lights)
Direction indicators, parking lights, number plate light	X (with lamp check)	X (with lamp check)
High beam lights	X	X
Brake light lamp check	X	X

Item	DASHBOARD COMFORT	MATRIX DASHBOARD
Daylight sensor (failure and sensitivity adjustment option in menu)	X	X
Rain sensor failure	X	X
Tyre Pressure Monitoring System indications	X	X
Air bags	X	X
Passenger air bag cut-off	X	X
Seat Belt Reminder	X	X
ABS indications	X	X
ESP indications	X	X
Hill Holder indications	X	X
Handbrake activated	X	X
Brake fluid minimum level	X	X
Brake pads wear	X	X
Electric Power Steering	X	X
City Mode ON	X	X
Sport Mode ON	X	X
Immobiliser indications	X	X
Fire Prevention Switch / Fuel cut-off	X	X
Overspeed	X	X
Doors / boot / bonnet ajar	X	X
Parking sensor indications	X	X
Car Configuration and Check – PROXI	X	X

Key:

X Fitted

– Not fitted

7.3 INFOTAINMENT SYSTEM

This infotainment system aims at meeting the increasing market demand for integrated systems supporting hands-free use of mobile phones and last-generation multimedia services while safeguarding user safety.
The platform is called “Blue&Me” and is integrated in the dashboard.

Blue & Me hands-free kit for Bluetooth-based mobile phones

Blue&Me allows the connection of mobile devices (Bluetooth devices, pen drives) with minimal operations on the part of the user. Operation is user-friendly and intuitive and the voice-recognition system requires no preliminary training.

Available features comprise:

- Automatic Bluetooth phone connection.
- Manual menu controls or voice-synthesis/recognition.
- Phone book upload.
- Caller ID (number or name) display if caller is stored in phone book.
- Voice dialling by pronouncing number digit by digit (if stored in phone book) or person's name.
- Phone book scrolling on dashboard display using the steering wheel controls.
- Mute control on steering wheel.
- Personal ring tone played on the car's radio system.
- Compatible with 90% of mobile phones, can be upgraded to support new standards and phones.

The Blue&Me system is integrated in the vehicle dashboard and comprises the following modules:

Bluetooth receiver
Integrated Voice Recognition module including microphone
Integrated Text to Speech Module
Alphanumeric display integrated in dashboard
Steering wheel controls
Connection to on-board B-Can network

Functional description

-Radio with Tel-IN and Tel-MUTE inputs
-Microphone installed inside ceiling lamp
-Steering wheel controls for hands-free radio and Bluetooth phone operation
-Display on car dashboard

Minimum mobile phone requirements are a Bluetooth interface and a Hands Free profile.

Blue&Me controls.

Blue&Me and the radio are controlled from the same source through the steering wheel controls; each system responds to the appropriate commands depending on which button is pressed and which mode is active (Blue&Me will inhibit radio controls on the steering wheel when the Hands Free mode is active).
User's mobile phone connects to Blue&Me through the 2.4 GHz Bluetooth radio channel.
After a one-off pairing procedure, Blue&Me stores mobile phone address and will connect it automatically each time the phone is present in the car.

Blue&Me can store up to 5 users and will connect any given user's phone automatically the next time the ignition is switched on with no need for any manual commands. However, only one mobile phone can be connected to Blue&Me at any given time.
Blue&Me functions are only available if user has activated the appropriate Bluetooth and Hands Free Profiles with the provider. Blue&Me switches on automatically when the ignition key is turned to on. When the key is turned back to off, it switches off automatically and releases the active Bluetooth connection after a 30-second time delay designed to prevent unexpected disconnection when the vehicle is stuck in traffic or stopped at traffic lights.
A phone conversation in progress when the key is turned to off is maintained (unless displayed on the dashboard display); Blue&Me and the radio will switch off permanently when the conversation is finished.

Available languages

(Menu) text strings, voice recognition messages and text to speech messages support the following languages:
French
English
German
Italian
Spanish (Spain)
Dutch
Portuguese (Portugal)
Polish
Any changes to language settings and software updates must be performed by an authorised dealer.

Phone display provided by Blue&Me (Comfort dashboard)

The dashboard shows Blue&Me state:
- BLUETOOTH state
- Phone service provider name

Example
The dashboard also displays the information sent by Blue&Me via dynamic messages. The number of frames received depends on the number of characters sent by Blue&Me.

Blue&Me displays (Matrix dashboard)

Phone display

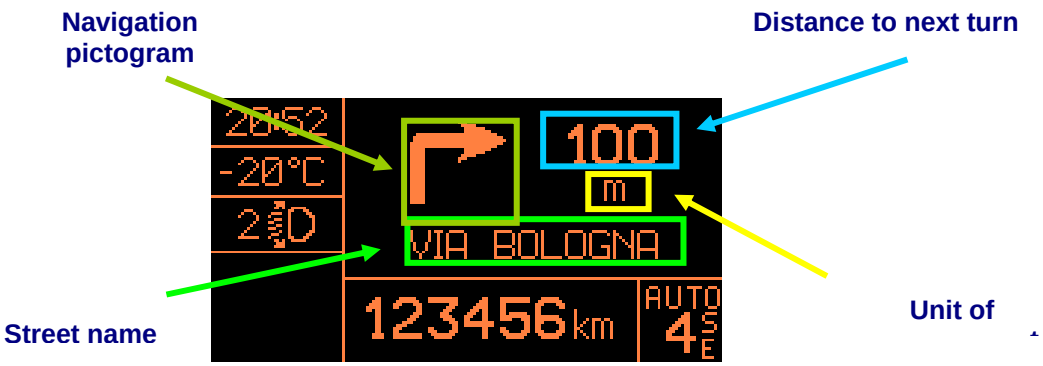
The state and information sent by Blue&Me are displayed.

Navigator display

The following information is displayed:
- Navigation pictogram
- Distance to next turn
- Unit of measurement
- Street name

Example
Repetition of Radio / Infotainment Node information (Comfort dashboard)

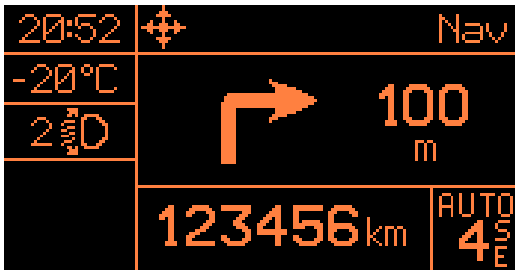
The dashboard will provide the following displays:
- Radio (from Radio Receiver and Infotainment Node)
- Phone (from Infotainment Node)
- Voice box recording (from Infotainment Node)



Repetition of Radio / Infotainment Node information (Matrix dashboard)

The dashboard will provide the following displays:

- Radio (from Radio Receiver and Infotainment Node)
- Phone (from Infotainment Node)
- Voice box recording (from Infotainment Node)
- Navigation (from Infotainment Node)



Description of BLUE & ME C3

Telematic services

The C3 system comprises C1 functions and the following added functions:

- **On Board Navigation with pictograms and voice directions** using a Pen Drive. The system provides on-screen instructions on dashboard display (pictograms) and voice directions (voice synthesis).

- **GSM Dual-Band phone** (only for communication with service provider)

- **Services:**

Service	Description
SOS	**Roadside / Medical Assistance with on-demand or automatic tracking (when an air bag is deployed)**
Insurance	**Telematic connection with insurers and access to on-line insurance packages (pay per use, discounts)**
Smart Maintenance	• **Wear limit detection and Term Reminder** • **Connection to F.A. service network**
Fleet Management	• **Vehicle tracking / visibility** • **Mileage and consumption monitoring and reporting, Diagnostics**

If the user subscribes to insurance and fleet management services, the system collects vehicle usage information and transmits such data to service provider and, under certain terms and conditions, to insurers. Such information, concerning:

- Where (region, type of roads travelled,..);
- When (day, night, week ends,..)
- Speed
- Mileage (km/month)
- Use of safety features (air bags, seat belts, etc.)
- Vehicle condition (key in switch, alarm activated, door status, etc)

enable insurers to tailor insurance policies to a specific user profile and offer significant discounts.

Functional description

- On-bard display with Matrix dashboard
- GPS/GSM antenna
- Navigation kit: USB key with preloaded map of a country/geographic area, and backup CD-ROM to store the same map or additional maps on other MP3 readers
- GSM module and SIM card (only for communication with service provider if user subscribed to other services)
- Dedicated deck-mounted control panel.

Navigation system operation

Blue&Me C3 offers a simple, intuitive pictogram-based navigation system. Main features comprise:

- Voice-activated destination selection
- Real-time route recalculation
- Map stored on USB key
- Competitive pricing

Operating instructions

When the USB key with the map is inserted into the USB port, navigation becomes available as soon as the ignition key is turned to on.

- The GPS system tracks vehicle position
- When the Nav button in the deck-mounted control panel is pressed, the system connects directly to the navigation menu, which can also be called up using the steering wheel controls
- To enter the desired destination, the user must select the initial letters of the address from the “New destination” menu using the steering wheel controls. The system offers a list of destinations and user only needs to pronounce the name of the desired destination chosen from the list to complete the selection procedure. Voice-activated destination selection is an exclusive feature of Blue&Me that eliminates the need for lengthy selection procedures.
- Full phone, music and navigation information is displayed on the dashboard.
- Users may listen to their favourite music stored on the same USB key while the navigation system is in operation.

Supported services

Thanks to the GSM module, Blue&Me C3 supports additional services that the user may subscribe under specific agreements.

The most significant among several services dedicated to the automative industry currently under development are listed below:

- SOS Roadside and Medical Assistance with vehicle tracking service
- Access to on-line insurance packages available at special pricing
- Information on Points of Interest along the route
- Fleet monitoring and management services (rent a car..)

Dedicated deck-mounted control panel

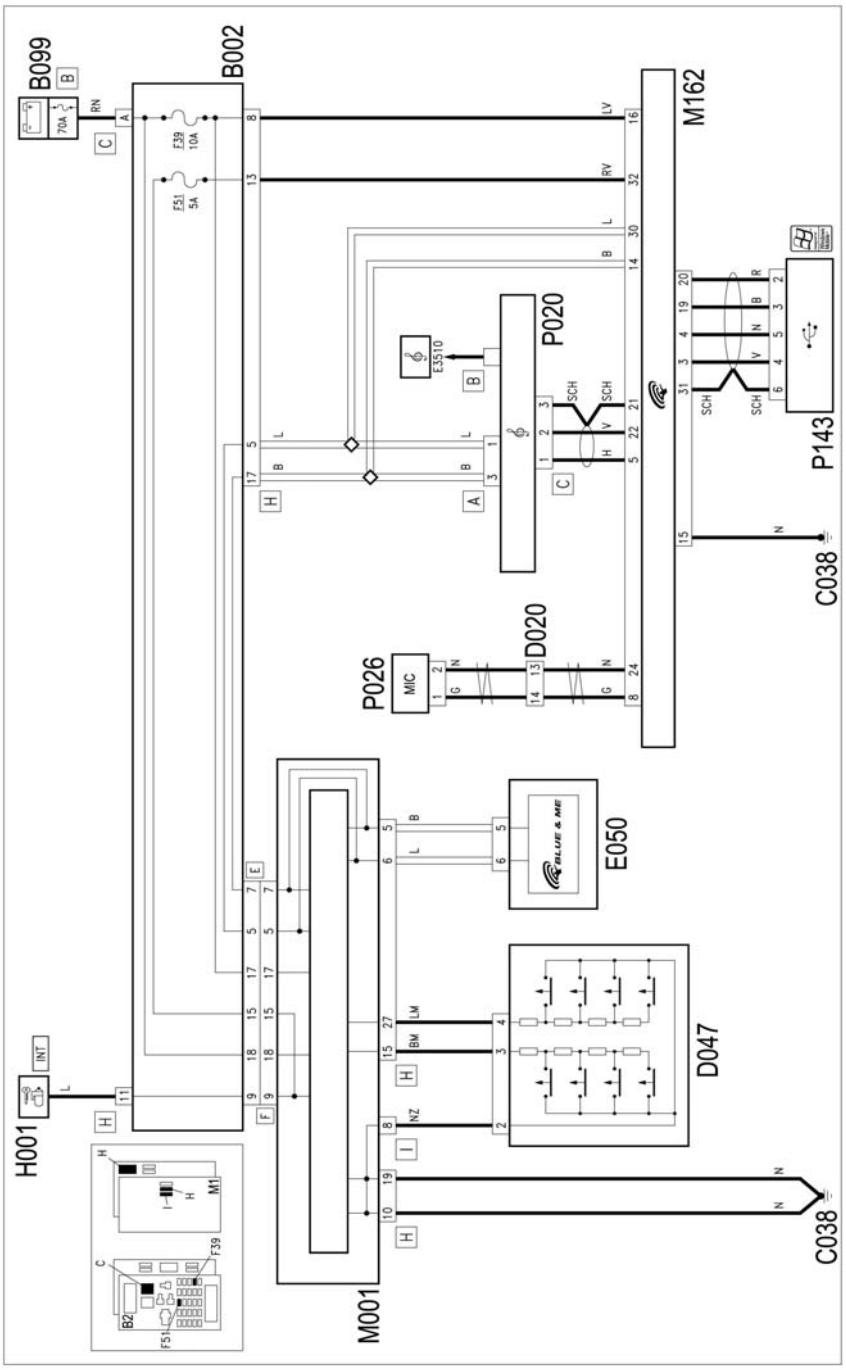
The deck-mounted navigation control panel holds three dedicated buttons.

- NAV Fast access to navigation menu
- SOS Roadside and Medical Assistance with car tracking service
- INFO Concierge Service to obtain real-time information on points of interest along the route, such as dealers, repair shops, service stations, pharmacies, restaurants, hotels, cinemas, clubs, local events, traffic and weather information.

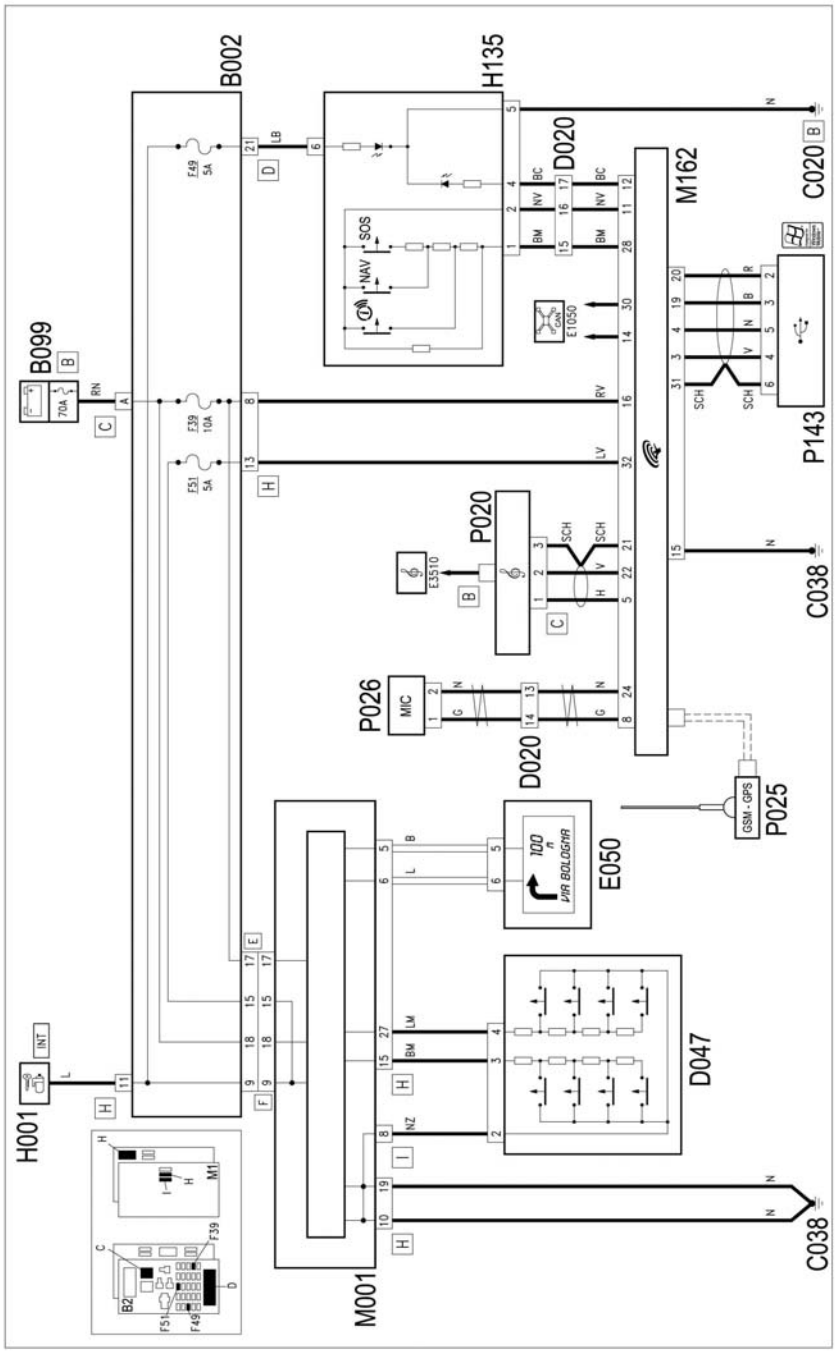
PLEASE NOTE The SOS and INFO buttons will not operate if service is not available.

Blue & Me wiring diagram

Version without navigator



Version with navigator



Key to components

B002. Connector box under dashboard
B099. Pmaxi-fuse box on battery
C038. Central tunnel ground
D020. Dashboard/rear junction
D047. Clockspring junction
E050. Instrument panel
H001. Ignition switch
M001. Body computer
M162 Bluetooth control unit.
P020. Car radio
P025. GPS/GSM antenna
P026. Hands-free phone microphone
P143. USB port

CONNECT NAV+ description

GENERAL

CONNECT Nav+ controls and provides information for the following systems and functions:
– GPS-based navigation (Global Positioning System);
– RDS (Radio Data System) radio, MP3, CD player and CD Changer audio;
– GSM (Global System for Mobile Communication) phone with WAP and SOS-call (emergency call) capabilities;
– Voice recognition (VR module) with voice synthesis and voice memory.

The CONNECT Nav+ system basically consists of:
– a control panel holding 28 buttons and 2 knobs;
– steering wheel controls (8 buttons + 1 thumbwheel)
– electronic unit accommodated inside dashboard.
User interface comprises one multi-function display for all integrated components.
Control panel trim plate and function keys feature a glossy “Black Metal” paint finish, whereas phone and CD player buttons are painted in Grand Prix Grey. The knobs sport a black soft-touch paint finish that provides a soft feel and better grip and a chrome ring up front.

Multi-function display

The display is a 256-colour 6.5” graphic TFT 16/9 Liquid Crystal Display with 400 x 240 pixel resolution.

Main features available for RADIO mode:

- Traffic information
- Alternative frequency search
- Autostore function (automatically stores stations into memory)
- Band Scan function (scans stations in the selected frequency band)
- Preset Scan function (scans through preset stations in the selected frequency band)

- Mono/Stereo selection
- PTY function
- RDS function
- Regional Mode (enables or disables regional RDS service)
- Audio setup function (Bass, Treble, Balance/Fader, Loudness)

Main features available for CD/MP3 mode:

- Shuffle function (RANDOM PLAY)
- Scan function (plays the first ten seconds of each track on the CD following track sequence on the CD)
- Compression function (audio output dynamic range compression as CD plays back)
- Define Playlist (creates a playlist to define the order the CD or MP3 tracks are to be played back)

VOICE-ACTIVATED MOBILE PHONE

CONNECT NAV+ features a SIM cardholder tray on the front for the GSM module present on NIT to control the SIM card directly.
CONNECT NAV+ provides:
– INCOMING CALLS processing
– OUTGOING CALLS processing
– Access to a list of last 10 numbers dialled to facilitate use of frequently called numbers
– Access to list of last 10 calls received
– SMS processing (Short Message Service) to send and receive short text messages
– Credit balance display for prepaid SIM card, provided that service is supported by provider
– Signal strength indication and other status messages and icons.

NAVIGATOR (NAV)

CONNECT Nav+ incorporates a navigator that provides visual and voice guidance to guide user to selected destination.
Vehicle position is tracked by the on-board GPS (Global Positioning System). The GPS is equipped with an antenna and a reception module integrated into the infotainment system.
This enables the system to process satellite signals and signals from the on-board system and supplement them with current position to determine the “estimated vehicle position”.

SCREEN ITEMS AND FUNCTIONS

The navigation system provides and processes the following key information and functions:
– GPS signal symbol, changes colour to reflect reception quality;
– Voice and visual directions with indication of distance to destination and estimated time of arrival;
– Detailed multi-colour map in different scales to provide clear indications of vehicle position, route and destination;
– Log book function lets user store preferred destinations;
– Automatic storage of last 10 destinations;
– Name of current street;
– Preferred route selection;
– Information on current position.

NAVIGATION DISPLAY

The main screen page of the navigator menu displays a preview of upcoming manoeuvres with arrows or pictograms.
The bottom pictogram shows the upcoming manoeuvre (left turn, right turn, roundabout, go straight ahead or U-turn), whereas the top pictogram represents the next manoeuvre. The number under the pictograms is the distance to the upcoming manoeuvre.

VOICE DIRECTIONS

Voice directions announce each manoeuvre and are followed by detailed instructions.

MAIN NAVIGATION SCREEN

The main navigation screen holds the following information:
– Time.
– GPS and GSM signal strength.
– Date.
– Audio information.
– Active mode (NAV).
– Vehicle location on the map (icon).
– Map scale.
The display shows the following information:
– Compass showing which direction vehicle is going in relation to North (in degrees);
– Longitude, latitude and altitude of vehicle;
– Number of visible satellites;
– Destination (only available when navigation is active);
– ETA and distance to destination (only available when navigation is active).

ON-BOARD (TRIP) COMPUTER

Pressing the TRIP button on CONNECT Nav+ front panel brings up a “Main Trip” screen that provides the following information:
- Time of arrival (only available when the navigation function is active)
- Distance to destination (only available when the navigation function is active)
- Speed limit (with overspeed buzzer alarm)
- Range
- Instantaneous consumption
- Travel time
- Distance covered
- Average speed
- Average consumption

VOICE RECOGNITION

This function enables CONNECT Nav+ Voice Control. Voice recognition enables the user to give voice commands to the system through the microphone; a brief press of the “VOICE” button on the front panel enables voice command recognition; CONNECT Nav+ then provides voice directions with step-by-step instructions to guide user to the desired function.
Pressing the “VOICE” button stops the procedure.
Voice commands are grouped into two categories:
– **voice commands without voice identification**;
– **voice commands with voice identification**.
Voice commands **without voice identification** are used to activate main operation modes (TEL, RADIO, CD, etc.).
Voice commands **with voice identification** are used to enter a contact into the phone book or select an existing contact and to enter or select navigation addresses.
Voice commands without voice recognition are recognised by the system regardless of speaker gender, voice tone or accent.
For these commands, the system requires no preliminary training and the user simply needs to follow the step-by-step instructions provided each time by the system.
When using voice commands with voice identification, the system recognises the spoken command after comparing it with a voice sample stored previously by the same speaker.

ROADSIDE ASSISTANCE AND SOS

When the “SOS” button is pressed, the display will switch to the Emergency Call screen page shown in fig. 150, regardless of the screen page displayed at the time.

The SOS menu includes the following functions:
– Medical advice (*)
– Roadside assistance (*)
– Preferred number (calls a preset phone number stored previously by the user)
– Emergency call

(*) For a free one-year subscription to these services, user should contact the service provider or the bCONNECT Service Centre. A service fee will be charged upon service renewal. If user has not subscribed to these services, the associated menu functions will be inactive and the display will read “Subscription services not enabled” .
Both functions can be selected by turning and then pressing the knob to confirm selection; after about 10 seconds a message requesting medical advice/roadside assistance is sent to bCONNECT service provider along with vehicle tracking information.

INFOMOBILITY SERVICES - “Connect” function

When the "CONNECT" button is pressed and the "Connect" function is selected using the knob, the on-board device sends a preset SMS to the bCONNECT Operations Centre with a request for information. Upon receipt of the message, bCONNECT calls the user's on-board hands-free phone number. When the phone connection is active, the user may request the desired information. If the connection cannot be activated, a warning message is displayed. Certain kinds of information will be given by the operator on the phone, whereas other kinds of information may be relayed through SMS text messages that are given priority over the current active function (MAIN, AUDIO, etc.). A window with the desired information is superimposed on the current screen page; the window provides “Save”, “Delete” and “Map” functions if the message concerns geographic information and a “Call” function if it contains a phone number.

Types of incoming messages:

- **Traffic information (“T” icon)** e.g. road work, road accidents, etc...
- **Point-of-Interest information (“i” icon)** points of interest or generic information
- **Generic information (“i” icon)** weather reports, weather conditions, etc.

“MY CAR” MENU

In the MY CAR mode, user can set a set of parameters and operation modes for the vehicle and the CONNECT Nav+ system.

Parameters and operation modes are grouped into four areas:

– LANGUAGE
– DATE & TIME
– VEHICLE (main settings of on-board instrumentation, varies according to trim level)
– CONNECT (main settings)

7.4 CLIMATE CONTROL

The range offers three different systems:

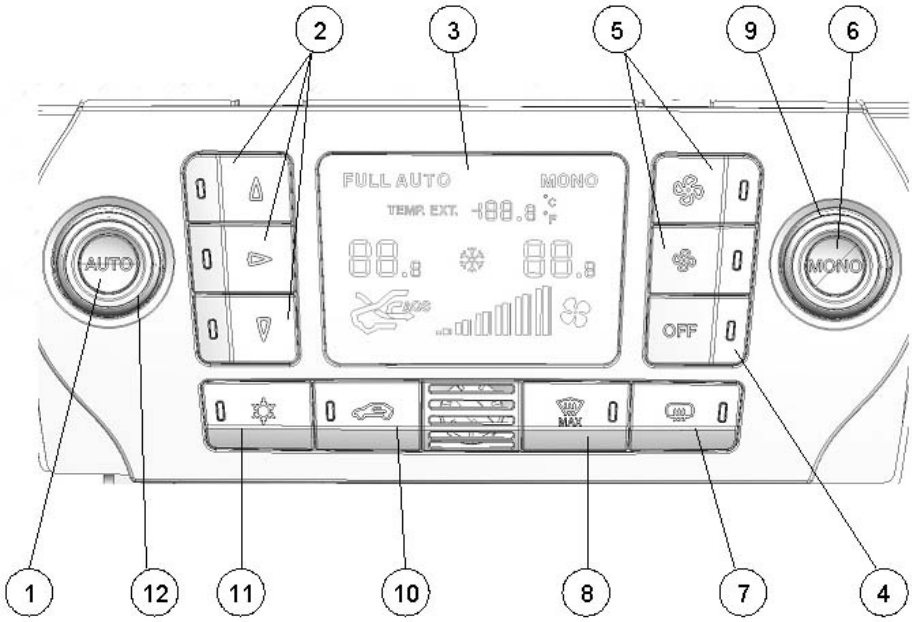
- Heater
- Manual climate control
- Bi-zone automatic climate control with **A**ir **Q**uality **S**ensor (**AQS**)

The amount of gas required to fill the climate control circuit is 500 ±40 g.

Heater control panel

Manual climate control panel

Bi-zone automatic climate control panel



1. Auto button
2. Air distribution button
3. Display
4. Control unit OFF
5. Air flow control
6. Mono button
7. Heated rear window
8. Max Def
9. Passenger side temperature control knob
10. Air recirculation
11. Compressor button
12. Driver side temperature control knob

7.5 PASSIVE SAFETY

Air bags

The occupant protection system of the New Bravo comprises:

Front collision protection system with:

- Driver and passenger front air bags
- Front impact sensor
- Front seat belts with pretensioner and load limiter
- Electronic passenger air bag defeat system (My Car)
- Driver front knee air bag (option).

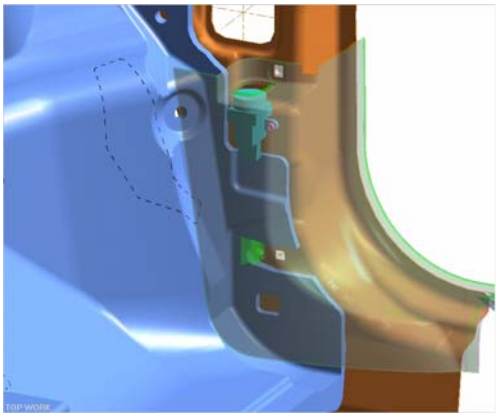
Optional *Side collision protection system* with:

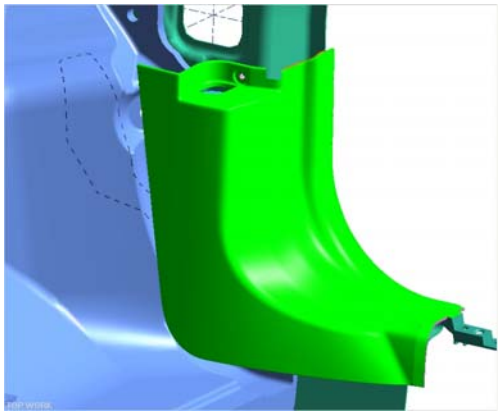
- 2 side air bags on front seats
- 2 curtain-style side air bags mounted in the roof rails above the side windows
- 2 side impact sensors.

The seats also contribute to impact protection, as they are designed to absorb part of the energy during a front or side collision.

Fire Prevention System - FPS

All petrol and Diesel engines feature an FPS (Fire Prevention System) inertia switch that shuts down the engine within a few milliseconds from the onset of a collision. The switch is located under the lining of the front right door post.
The plastic tank meets the requirements of upcoming European regulations; it is located in a protected position for the event of a collision and is designed to withstand distortion with no risks of fuel spillage. The plastic tank does not create an explosion hazard in the event of a fire.





7.6 ELECTRIC POWER STEERING

Description

Bravo is equipped with an electric power steering system. This system generates torque (force*movement) which supplements the torque applied by driver to the steering wheel to reduce steering effort.
The system consists of a steering box with a conventional rack-and-pinion system, an electric motor with a rack and pinion connected to the steering column, a torque sensor (that measures the torque applied to the steering wheel), a mode button to choose between two different assist levels (City or Normal) and a control unit that determines the amount of assistance needed.

The assist force (power assist) to be added to the steering torque applied by the driver is dependant on the following parameters:

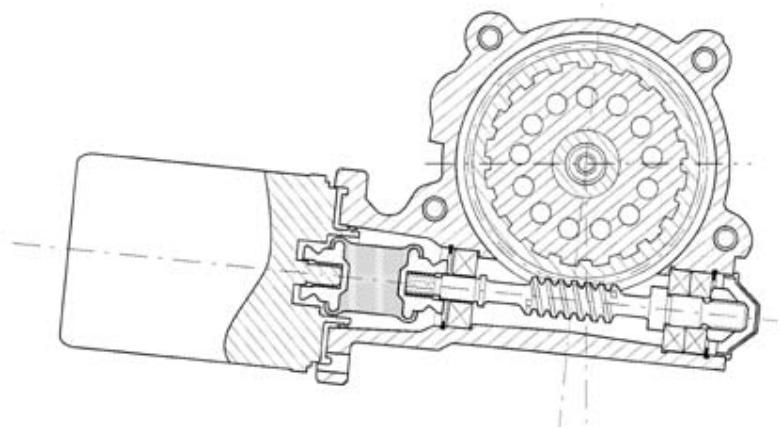
- steering torque applied by driver
- vehicle speed
- steering wheel rotation angle
- steering wheel rotation speed
- selected EPS mode (City or Normal)

This system provides the following functions under all operating conditions:

- keeps steering effort below a certain value according to selected power assist mode (City - Normal)
- ensure correct return of the steering wheel to centre position
- dampen steering wheel oscillation during return.

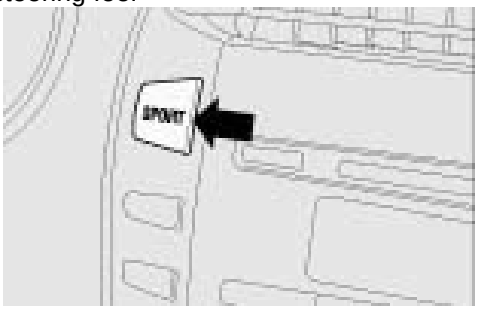
Electric power steering offers the following benefits over hydraulic systems:

- fewer components mean less weight and a simplified layout
- easier and faster installation and/or service
- the system will only draw power when power assist is required, making for improved vehicle performance and less consumption and emissions
- less operating noise improves driving comfort
-
- variable power assist depending on vehicle speed
- power assist mode (City/Normal) can be selected to suit driver's needs to facilitate parking



Note:

On SPORT versions, a SPORT mode is available instead of the CITY mode: it kicks in in under 5 seconds after the mode button is pressed to deliver faster response under acceleration and a harder steering for the appropriate steering feel



Basic control strategies

The electric power steering control unit controls the electric servomotor to provide assist torque and aid steering wheel rotation depending on steering input from the driver and vehicle speed.
The motor applies assist torque to the steering column via a worm-gear transmission to decrease manual steering effort.

Variable power assist depending on vehicle speed

Steering effort (turning torque applied to the steering wheel) decreases proportionally with increasing vehicle speed as rolling resistance will decrease at higher speeds.
The control unit uses vehicle speed inputs to reduce power assist force.

Return assist

When the steering wheel is released after steering, the geometry of the vehicle's front end will cause it to return it to centre position.
At low speed, the steering wheel is slower to return or may not return to centre fully and electric power steering actuates the servo motor to achieve faster, more accurate return.

Return assist applies the required amount of assist force depending on vehicle speed:

- maximum assist force is provided at low speeds
- minimum or no assist force is provided at high speeds

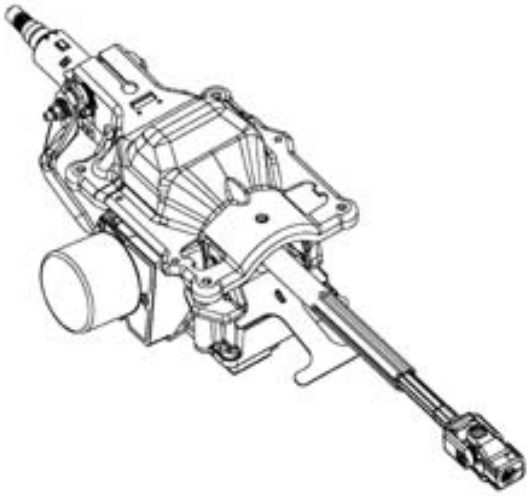
Gearmotor

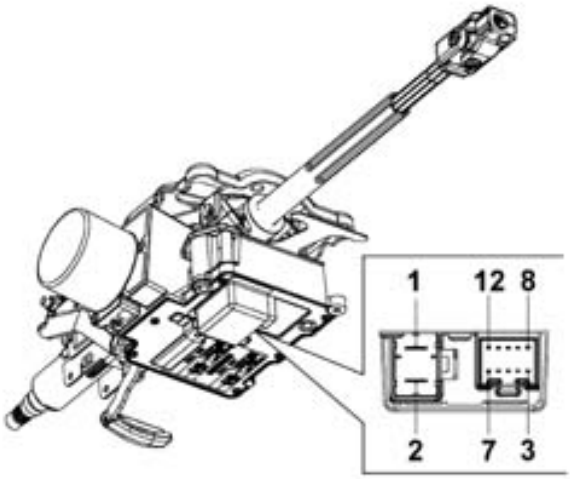
The cast aluminium housing of the gearmotor is mounted on vehicle chassis.
The gearmotor gear is integral and concentric with the steering column and is made of steel, whereas the gear wheel mounted on the output shaft is co-moulded plastic.
The metal part of the gear is integral with the electric motor shaft that transmits the steering torque (provided by the servomotor) to supplement manual torque applied by the driver.
The input and output shafts are connected by a calibrated torsion bar.
During steering, the steering resistance (torque) of the wheels is transmitted back to the output shaft and the input shaft twists the torsion bar; hence, the angle of twist between the input and output shaft is proportional to the torque applied to the steering wheel.
A torque sensor mounted inside the input shaft detects the twist between input and output shaft and sends a proportional signal to the control unit.
The gearmotor housing also accommodates the external section of the "torque and position sensor".
The input shaft sleeve is also connected to gearmotor housing, which accommodates both the ignition switch and the stalk switch.

Electric power steering pinout

The control unit has two connectors:

- a two-way power supply connector and
- a 10-way connector for CAN network and signals.

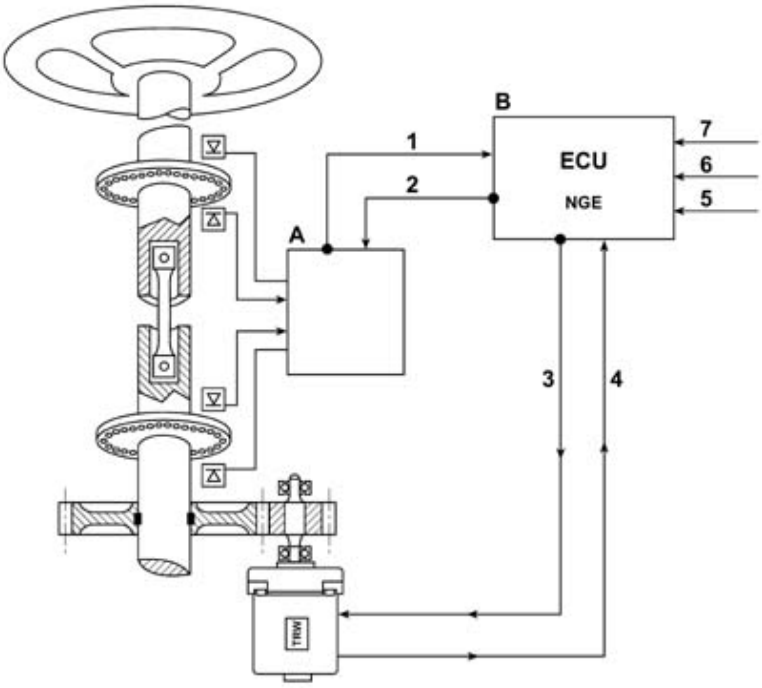




1	Battery power supply (+)
2	Battery return (-)
3	Key - on signal
4	N.C.
5	N.C.
6	K line (diagnostics)
7	Bus on CAN network
8	Bus on CAN network
9	Bus on CAN network
10	Bus on CAN network
11	N.C.
12	N.C.

Operation

The system provides steering assist by applying the torque generated by a brushless motor to the steering column via a worm and helical gear set.
A diagram showing system operation is provided below.



A - Optical torque sensor
B - Electric Power Steering Node
1 - Optical torque sensor signal
2 - Optical torque sensor power supply
3 - Motor control
4 - Motor position reading
5 - Data transfer over CAN network: vehicle speed, vehicle status, signals
6 - Connection with Body Computer Node (NBC)
7 - Power supply

The assist force (power assist) to be added to the steering torque applied by the driver is dependant on the following parameters:

- steering torque applied by driver,
- vehicle speed,
- steering wheel rotation angle,
- steering wheel rotation speed,
- selected assist mode (City or Normal).

This system provides the following functions under all operating conditions:

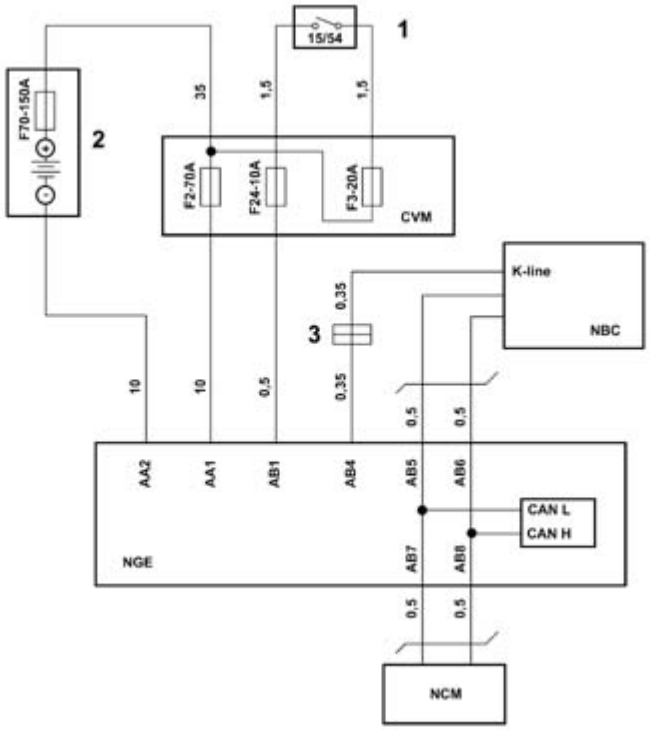
- keeps steering effort below a certain value according to selected power assist mode (City or Normal);
- ensures correct return of the steering wheel to centre position (return assist);
- dampens steering wheel oscillation during return (dampening function).

Control strategies

Assist torque is the resultant of the following forces:

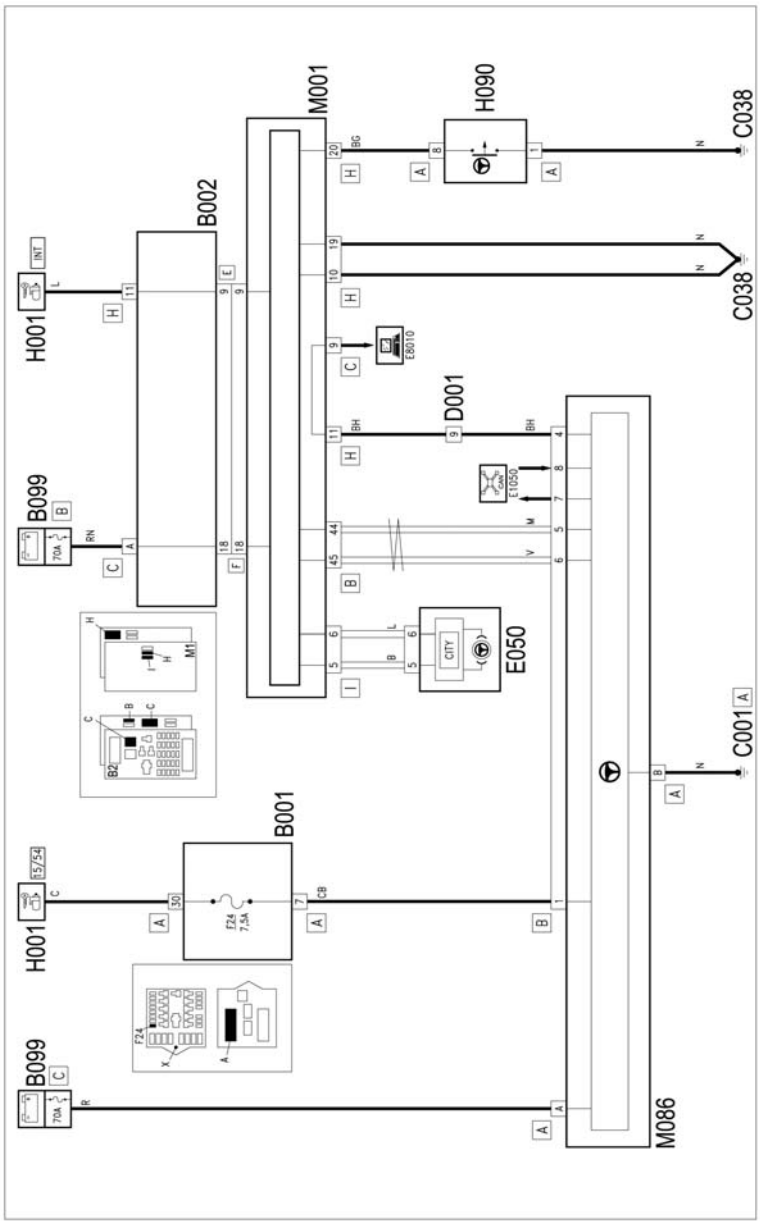
- a main component which is a function of the torques applied by the driver and supplied by selected assist mode (City or Normal);
- the "dampening" and "return assist" components, which are a function of steering speed (and torque applied by the driver) and steering wheel angle, respectively;

Electric connections



1 - Ignition switch
2 - Battery
3 - Dashboard/front connection

Electric Power Steering wiring diagram



Operation

The electric power steering system is managed by control unit M86.
The control unit is fed directly from the battery via a line protected by fuse F72 located in the maxi-fuse box on battery B99 C, at pin A of connector A of M86.
Pin B of connector A of M86 is connected to ground.
Key-on power is provided by the line protected by fuse F24 of the engine compartment control unit B1, at pin 1 of connector B of M86.
Body Computer M1 is fed directly from the battery via the line protected by the maxi-fuse of B99 at pin 18 of connector F that provides an interface with the under-dash control unit B2; key-on power (INT) is at pin 9 of connector F that provides an interface with control unit B2.
Control unit M86 is connected to the other nodes via the CAN network (pins 7-8 and 5-6 of connector B), such as Body Computer M1 and instrument panel E50, to which it sends the signals for the "Electric Power Steering malfunction light" and “CITY” mode on indication.
The CITY mode select button (that provides less steering effort) is located in the control assembly in the middle of the dashboard, driver side, H90 connector A: the "CITY mode on" signal is sent to pin 20 of connector H of M1 and relayed over the CAN network to control unit M86.
Self-diagnosis data are output to connector C of Body Computer M1; connector pin 9 receives the signals from pin 4 of connector B of M86 via the dedicated diagnostics line.

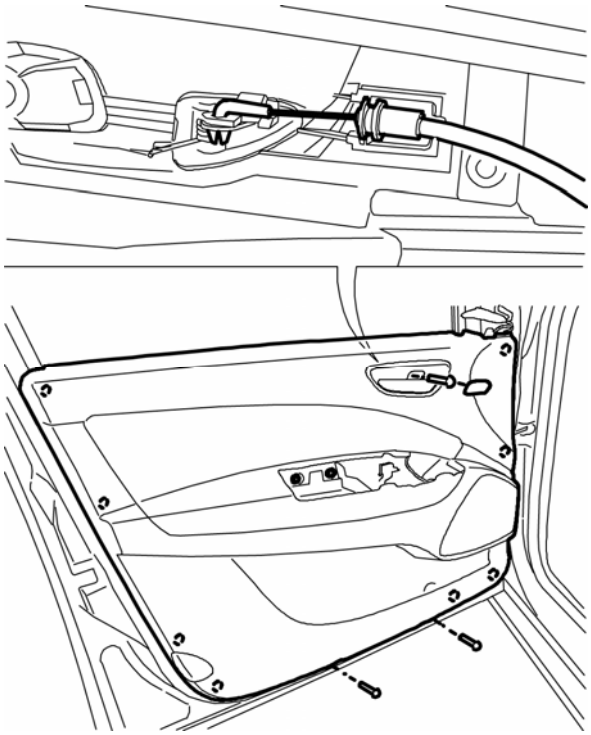
Key to components

B001. Engine compartment connector box
B002. Connector box under dashboard
B099. Pmaxi-fuse box on battery
C001. Battery ground
C038. Central tunnel ground
D001. Dashboard/front junction
E050. Instrument panel
H001. Ignition switch
H090. Switch assembly
M001. Body computer
M086. Electric power steering control unit

8. BODY

8.1 REPAIR PROCEDURES

7005E10 FRONT SIDE DOOR INNER PANEL - R&I



Perform the following operations:

Op. 7005M15 ELECTRIC WINDOW AND SIDE MIRROR SWITCH ASSEMBLY ON FRONT DOOR, DRIVER SIDE - R&I
Op. 7005E38 FRONT SIDE DOOR PULL - R&I

1. Prise off the trim cover.
2. Unscrew the screws securing the door panel.
3. Use the suitable tool to prise the door panel (3a) outwards slightly so as to disengage the retainers (3b).

Tool	Designation	Application	Validity
1878077000	Prytool	Disengage retainers	

- Lift the panel (3a) slightly to disengage the inner window weatherstrip (3c) from the door frame.
- Lift the panel (3a) slightly to disengage the inner window weatherstrip (3c) from the door frame.
4. Disengage tie-rod (4a) from the retainers (4b) and (4c) of the door inside handle.
5. Remove the door inside panel.

To refit

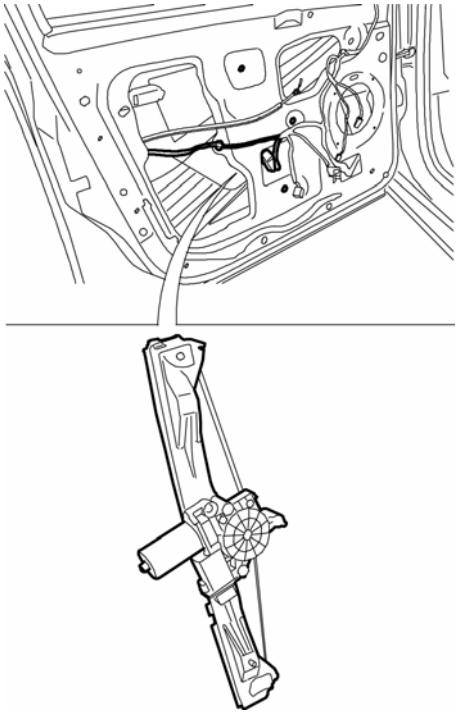
- Check the door inside panel for damage.
- Engage the tie-rod in the door inside handle retainers.
- Position the door panel and engage the inner window weatherstrip in the frame door; engage the inner retainers.
- Tighten the screws securing the door panel.
- Fit the trim cover.

Perform the following operations:

Op. 7005E38 FRONT SIDE DOOR PULL - R&I
Op. 7005M15 ELECTRIC WINDOW AND SIDE MIRROR SWITCH ASSEMBLY ON FRONT DOOR, DRIVER SIDE - R&I

- Check operation of all parts you have removed.

7005M26 WINDOW REGULATOR, FRONT DOOR, LH OR RH - R&I



Perform the following operations:

Op. 7005M15 ELECTRIC WINDOW AND SIDE MIRROR SWITCH ASSEMBLY ON FRONT DOOR, DRIVER SIDE - R&I
Op. 7005E38 FRONT SIDE DOOR PULL - R&I
Op. 7005E10 FRONT SIDE DOOR INNER PANEL - R&I
Op. 5570T91 FRONT SIDE SPEAKER (ONE), LH OR RH - R&I WITH DOOR PANEL REMOVED
Op. 7005A04 FRONT SIDE DOOR WEATHERSEAL - R&I OR WITH DOOR PANEL REMOVED
Op. 7005D15 ROLL-DOWN WINDOW GLASS (ONE), LH OR RH, FRONT SIDE DOOR - R&I

1. Disconnect the electric connector.
2. Unscrew the nuts securing the window regulator.
3. Disconnect the wiring (3b) retainer (3a).
4. Ease out the window regulator (4a) and remove it from the recess (4b).

To refit

- Check the window regulator for damage.
1. Position the window regulator (1a) and tighten the nuts (1b).
2. Connect the wiring (2b) retainer (2a).
3. Connect the electric connector.

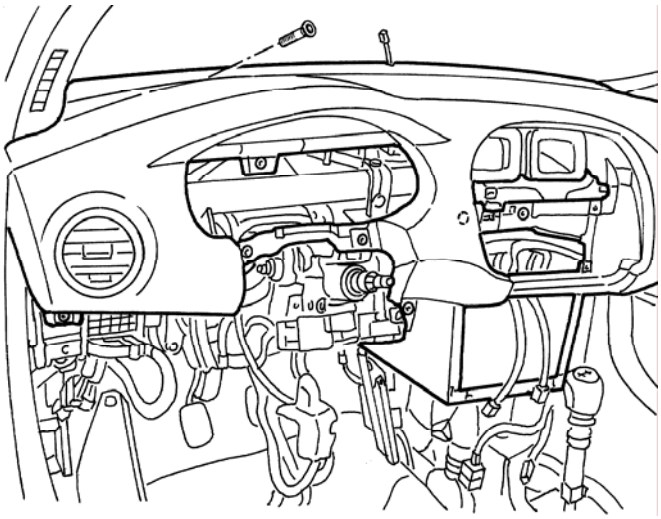
Perform the following operations:

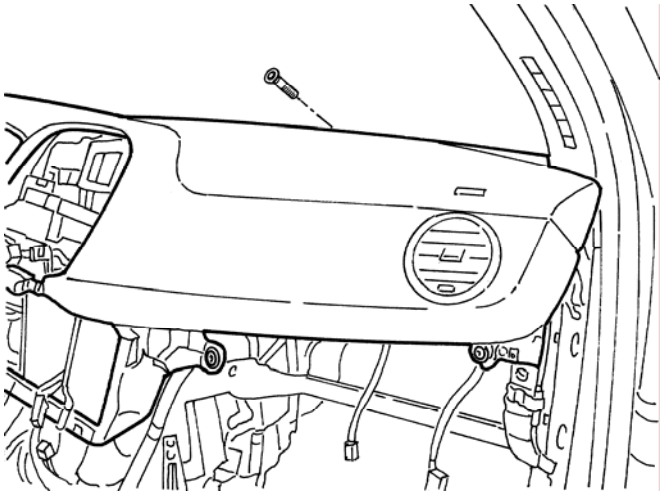
Op. 7005D15 ROLL-DOWN WINDOW GLASS (ONE), LH OR RH, FRONT SIDE DOOR - R&I
Op. 7005A04 FRONT SIDE DOOR WEATHERSEAL - R&I OR REPL.WITH DOOR PANEL REMOVED
Op. 5570T91 FRONT SIDE SPEAKER (ONE), LH OR RH - R&I WITH DOOR PANEL REMOVED
Op. 7005E10 FRONT SIDE DOOR INNER PANEL - R&I
Op. 7005E38 FRONT SIDE DOOR PULL - R&I

Initialisation procedure

If power supply has been disconnected, the anti-obstruction system must be reset as follows
- Turn the key to RUN
- Press the window switch in "manual" mode (hold down) to roll up the window until fully closed and keep holding down the switch for at least 1 second.
Anti-obstruction system and window auto roll-up/down are now operational.

7040A10 DASHBOARD TRIM PANEL - R&I





Removal

Perform the following operations:

Op. 5580C18 AIR BAG MODULE - R&I
Op. 4110A10 STEERING WHEEL - R&I FOR REPL. OR INSPECTION
Op. 7040A26 STEERING COLUMN TRIM PANEL - R&I
Op. 5550A10 COMPLETE STALK SWITCH - R&I
Op. 5560B10 DASHBOARD - R&I
Op. 5570T80 RADIO SET - R&I
Op. 7040A85 DASHBOARD CENTRAL TRIM - R&I
Op. 7040A22 DASHBOARD TRIM PANEL FINISHER (ONE) - REPL.
Op. 2125C02 GEAR SHIFTER OUTER BOOT - R&I
Op. 7040L37 GEAR SHIFTER TRIM MOULDING - R&I
Op. 7040A47 GLOVE BOX IN UNDER-DASH TRIM PANEL - R&I
Op. 5040D15 CONTROL UNIT WITH KNOBS AND BUTTONS, BI-ZONE AUTOMATIC CLIMATE CONTROL - R&I
Op. 7040A14 DASH STORAGE BOX DOOR - R&I
Op. 7040G22 BULB HOLDER/SWITCH FOR DASH BOX LIGHT - R&I

Op. 5570T49 BLUETOOTH ELECTRONIC CONTROL UNIT - R&I
Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I
Op. 7040L73 CUP HOLDER/ASH TRAY ON TUNNEL REAR TRIM PANEL - R&I
Op. 7040L70 TUNNEL TRIM PANEL REAR COVER - R&I
Op. 7040L20 TRIM PANEL ON TUNNEL - R&I
Op. 7040A65 CONSOLE SIDE CLOSURE (ONE) - R&I

Op. 7040A18 DASH STORAGE BOX - R&I
Op. 7040A37 FUSE ACCESS COVER ON DASHBOARD - R&I
Op. 7040A44 DASHBOARD LEFT SIDE TRIM PANEL - R&I
Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I
Op. 7040A30 DASHBOARD LOWER LEFT TRIM PANEL - R&I
- Or, alternatively
Op. 5580C23 DRIVER SIDE KNEE AIR BAG - R&I
Op. 5010D56 SUNLOAD SENSOR - R&I
AFTER ELECTRIC SYSTEM TEST
Op. 5010C12 WINDSCREEN DEFROST VENT - R&I
Op. 5580C22 AIR BAG MODULE - PASSENGER SIDE - R&I

1. Unscrew the screws securing the dashboard trim panel on driver side.
1. Unscrew the screws securing the dashboard trim panel on passenger side.
2. Remove dashboard trim panel.
- If needed, strip the dashboard.
Perform the following operation:

Op. 7040A27 DASHBOARD TRIM PANEL - STRIPPING AFTER REPLACEMENT

To refit

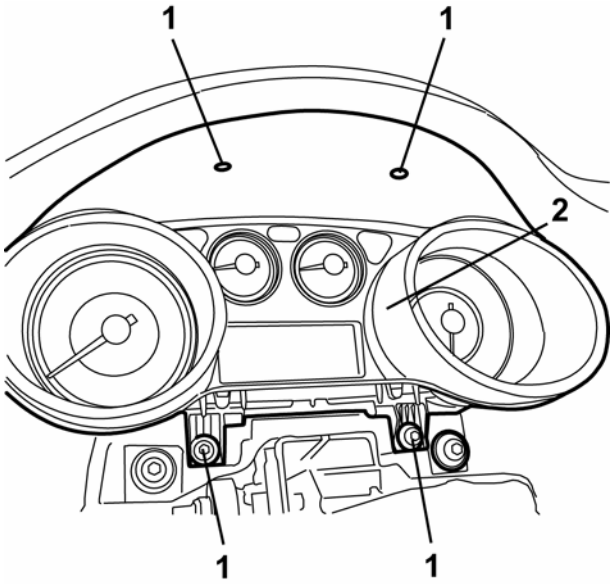
- Check the dashboard trim panel for damage.
- Position the dashboard trim panel.
Ensure all electric wires are correctly positioned to avoid interference or the wires becoming trapped between any components. Ensure the wires do not contact the clutch pedal switch.

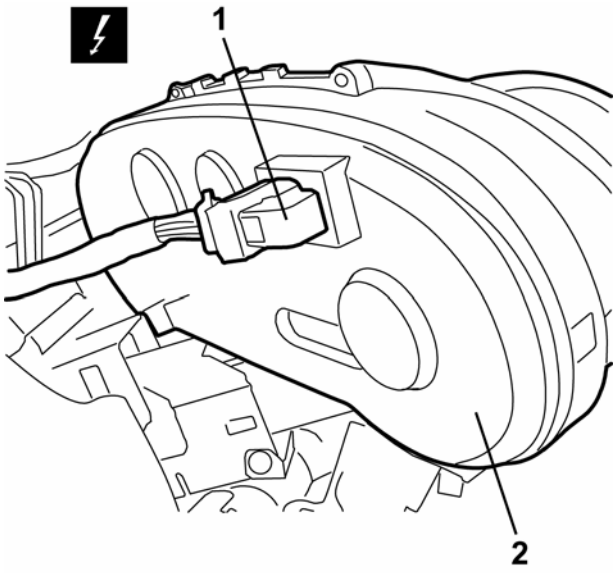
Tighten the screws securing the dashboard trim panel.
Perform the following operations:

Op. 5580C22 AIR BAG MODULE - PASSENGER SIDE - R&I
Op. 5010C12 WINDSCREEN DEFROST VENT - R&I
Op. 5010D56 SUNLOAD SENSOR - R&I AFTER ELECTRIC SYSTEM INSPECTION
Op. 5580C23 DRIVER SIDE KNEE AIR BAG - R&I
Op. 7040A30 DASHBOARD LOWER LEFT TRIM PANEL - R&I
Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I
Op. 7040A44 DASHBOARD LEFT SIDE TRIM PANEL - R&I
Op. 7040A37 FUSE ACCESS COVER ON DASHBOARD - R&I
Op. 7040A18 DASH STORAGE BOX - R&I
Op. 7040A65 CONSOLE SIDE CLOSURE (ONE) - R&I
Op. 7040L20 TRIM PANEL ON TUNNEL - R&I
Op. 7040L70 TUNNEL TRIM PANEL REAR COVER - R&I
Op. 7040L73 CUP HOLDER/ASH TRAY ON TUNNEL REAR TRIM PANEL - R&I
Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I
Op. 5570T49 BLUETOOTH ELECTRONIC CONTROL UNIT - R&I
Op. 7040G22 BULB HOLDER/SWITCH FOR DASH BOX LIGHT - R&I
Op. 7040A14 DASH STORAGE BOX DOOR - R&I
Op. 5040D15 CONTROL UNIT WITH KNOBS AND BUTTONS, BI-ZONE AUTOMATIC CLIMATE CONTROL - R&I

Op. 7040A47 GLOVE BOX IN UNDER-DASH TRIM PANEL - R&I
Op. 7040L37 GEAR SHIFTER TRIM MOULDING - R&I
Op. 2125C02 GEAR SHIFTER OUTER BOOT - R&I
Op. 7040A22 DASHBOARD TRIM PANEL FINISHER (ONE) - REPL.
Op. 7040A85 DASHBOARD CENTRAL TRIM - R&I
Op. 5570T80 RADIO SET - R&I
Op. 5560B10 DASHBOARD - R&I
Op. 5550A10 COMPLETE STALK SWITCH - R&I
Op. 7040A26 STEERING COLUMN TRIM PANEL - R&I
Op. 4110A10 STEERING WHEEL - R&I FOR REPL. OR INSPECTION
Op. 5580C18 AIR BAG MODULE - R&I
Check operation of all parts you have removed.

5560B10 DASHBOARD - R&I





Removal
Perform the following operations:

Op. 5580C18 AIR BAG MODULE - R&I
Op. 4110A10 STEERING WHEEL - R&I FOR REPL. OR INSPECTION
Op. 7040A26 STEERING COLUMN TRIM PANEL - R&I
Op. 5550A10 COMPLETE STALK SWITCH - R&I

1. Unscrew the screws.
2. Ease out the dashboard.
3. Disconnect the electric connector.
4. Remove the dashboard.

To refit

- Check the dashboard for damage.
- Connect the electric connector.
- Position the dashboard.
- Tighten the screws.

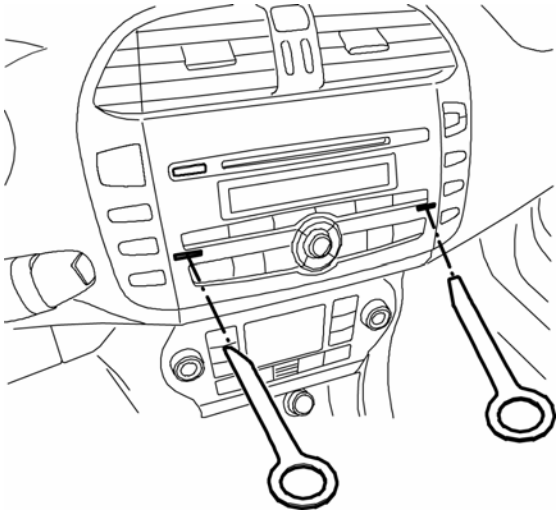
Perform the following operations:

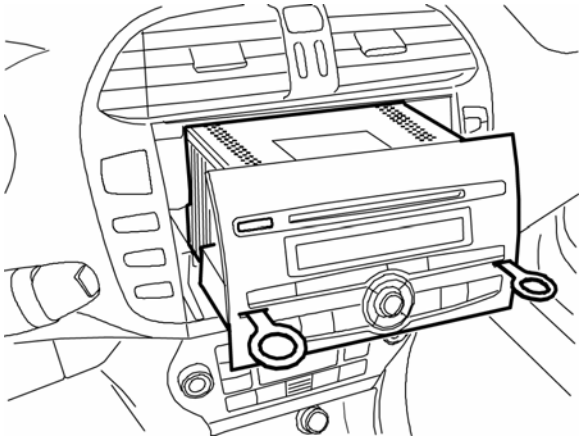
Op. 5550A10 COMPLETE STALK SWITCH - R&I
Op. 7040A26 STEERING COLUMN TRIM PANEL - R&I
Op. 4110A10 STEERING WHEEL - R&I FOR REPL. OR INSPECTION
Op. 5580C18 AIR BAG MODULE - R&I

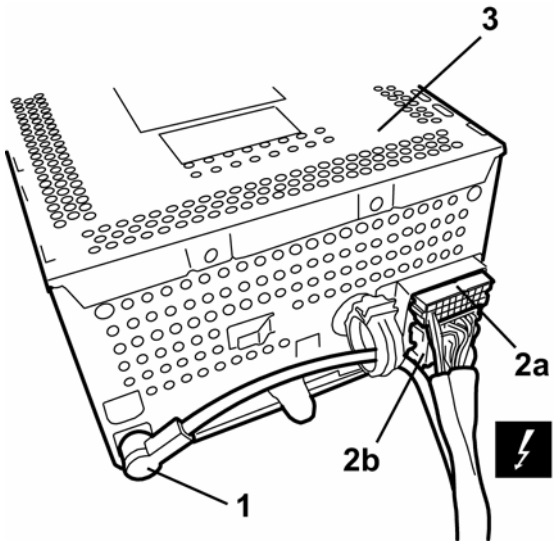
NOTE
Some CAN network nodes - including the instrument panel node - come with factory default settings. Please note that replacement panels available from Parts Service are blank. If the instrument panel needs replacing, the data stored in the Body Computer will have to be uploaded to the replacement panel by performing the “PROXI ALIGNMENT” procedure

Test instrument panel instruments for proper operation.

5570T80 RADIO SET - R&I







Removal

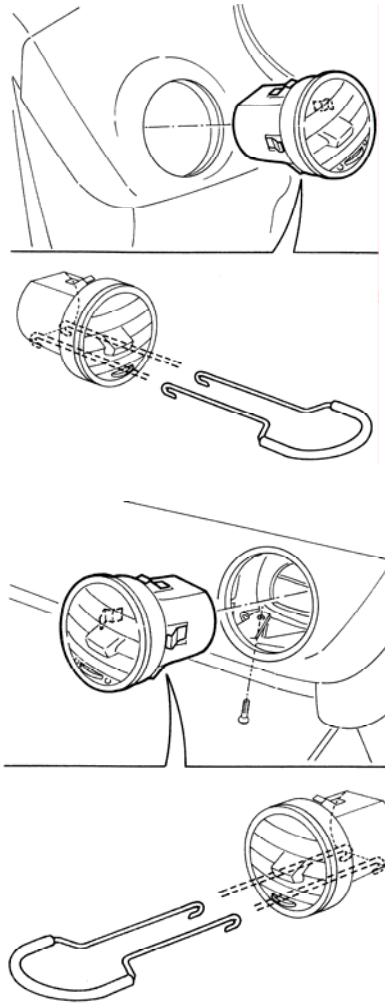
1. Insert the suitable tools (1a) (tool number 2000024200) fully home into the slots (1b) in the radio set.

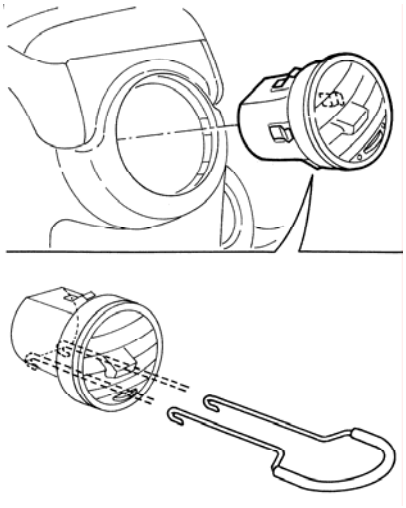
2. Grab the tools (1a); push outwards and pull towards you to ease out the radio set (1b).
3. Disconnect the antenna connector.
4. Disconnect the electric connectors (2a, 2b).
5. Remove the radio set.

To refit

- Check the radio set for damage.
- Connect the electric connectors.
- Connect the antenna connector.
- Insert the radio set back into place and engage the internal retainers. Ensure that the wires do not become trapped between any components.
- Check operation of radio set and speakers.

5010C02 DASH RIGHT SIDE AIR VENT - R&I





Removal
Perform the following operation:

Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I

1. Unscrew the screw securing the vent.
2. Set the control (2a) to Open.
3. Insert the suitable tool (3a) into the vent and hook up the inner end (3b) of the vent as shown in the figure.

Tool	Designation	Application	Validity
2000011100	Extractor	Air vents	

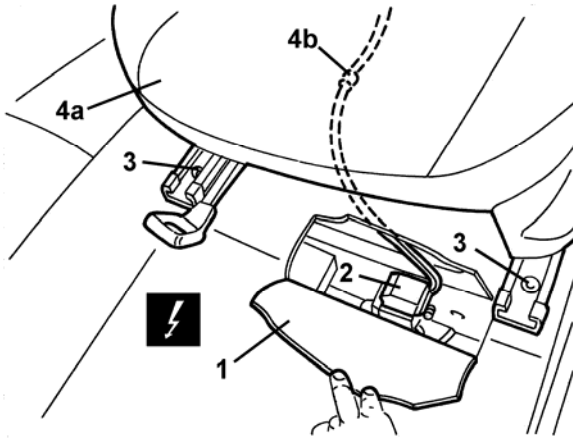
4. Use the tool (3a) to remove the vent (4a) disengaging the inner retainers (4b).

To refit
- Check the vent for damage.
- Fit the vent into place and engage the internal retainers.
- Tighten the screw securing the vent.

Perform the following operation:

Op. 7040A45 DASHBOARD RIGHT SIDE TRIM PANEL - R&I

7045A10 FRONT SEAT (ONE), LH OR RH - R&I



Removal
- Slide the front seat all the way forward and raise it as far as it will go.
1. Working on the outboard side of the seat, remove the trim plate (1a) using the suitable tool to disengage the inner retainers (1b).

Tool	Designation	Application	Validity
1878077000	Prytool	Disengaging retainers	

2. Unscrew the seat belt end retaining screw (2a) of the front seat belt (2b).
3. Unscrew the rear retaining screws.
4. Slide the seat all the way back.
5. Slide the seat all the way back.
6. Move aside the floor carpet edge.
7. Disconnect the electric connector.
8. Unscrew the front retaining screws.
9. Disengage the wiring clip (4b) and remove the seat (4a).

If the seat has a side air bag, grab the seat from head rest area and the cushion front side only.

To refit

- Check the seat for damage.
- Position the seat with the rails at rearward end of travel.
1. Engage the wiring clip.
2. Tighten the front inner retaining screw.
3. Screw in the front outer retaining screw but do not tighten yet.
4. Connect the electric connector (4a) and fit the floor carpet edge into place (4b).
- Slide the seat all the way forward.
5. Tighten the rear inner retaining screw.
6. Screw in the rear outer retaining screw (6a) but do not tighten yet.

The seat must be fastened securely to the floor and must not bind when sliding on the rails. If needed, work the floating nuts (6b) to ensure they move freely.
- Check to ensure the seat slides smoothly; slide the seat back and forward and lock the seat repeatedly to ensure the latches on both rails lock at the same time.
7. Tighten the rear outer screw.
8. Tighten the front outer screw.
9. Position the front seat belt end (1a) to the seat and screw in the screw (1c); tighten the screw to the specified torque.

10. Position the trim plate (2a) of the seat belt (2b) and engage the retainers.
Check to ensure the seat slides smoothly; slide the seat back and forward and lock the seat repeatedly to ensure the latches on both rails lock at the same time.

9. DIAGNOSTIC PROCEDURES

9.1 PARTICULATE FILTER (DPF)

Malfunction indicator light of fuel injection system/EOBD comes on - Examiner Error P1206

TROUBLE

One or more of the following problems occur:

- Fuel injection/EOBD engine control system malfunction indicator light comes on
- Poor engine performance
- Examiner indicates error P1206

PROCEDURE

When this trouble occurs, perform the tests listed below with the Examiner tester before performing forced regeneration or other repairs:

NOTE These tests must be carried out before a forced regeneration procedure and with the engine at operating temperature (water temperature 90 °C).

A. Connect the Examiner, measure the parameters listed below and report readings in the table 1 below

Table 1 – Examiner parameters/readings

no.	Parameters to be measured with Examiner	Readings
1	Differential pressure sensor pressure with engine stopped	
2	Differential pressure sensor pressure with engine running	
3	Air mass flow (let engine idle for at least 2 minutes so that EGR valve will close; air flow meter air temperature below 35 °C) NOTE Correct reading for 1.9 and 2.4JTD engines is about 480 mg/inj. Correct reading for 1.3JTD engines is between 280 and 310 mg/inj.	
4	Particulate filter clogging	
5	Particulate filter temperature	
6	Average temperature during last 5 regeneration cycles	
7	Odometer	

8	Odo count last time DPF was replaced	
9	Odo count since last regeneration	
10	Target air mass	
11	Pre-catalyist temperature (This parameter is only available for 1.9 and 2.4JTD engines with Bosch EDC16C39 Control Units)	
12	Particulate filter status	
13	Average distance covered during last 5 regeneration cycles	
14	Average life during last 5 regeneration cycles	
15	Check that IMA codes on injectors match codes viewed on Examiner	
16	Check for any additional errors	
17	Note number of forced regeneration cycles performed (Information only available for and 1.3JTD engines with Marelli 6F3 Control Units)	
18	Note the following identification numbers: SW number SW version FIAT design no. Programming date	

B. When **only error P1206 is present, omit forced regeneration** and proceed to step **G**.

C. If you find **other errors in addition to P1206**, remove error cause and delete errors, perform forced regeneration and proceed to step **D**.

D. Ensure that forced regeneration process is completed successfully and check to ensure error P1206 has disappeared.

E. After the regeneration process, measure DPF fill rate using Examiner; readings around 75% are acceptable and vehicle may be returned to Owner.

WARNING

THE PARTICULATE FILTER PARAMETER RESET PROCEDURE (UNDER EXAMINER ITEM "PARTICULATE FILTER REPLACEMENT - ONLY IF DPF IS FITTED") MUST ONLY PERFORMED AFTER REPLACING THE PARTICULATE FILTER.

F. If the forced regeneration process is aborted and/or error P1206 persists, proceed to step **G**.

G. Perform the engine tests listed in Table 2 below

Table 2 – Engine tests

no.	Test	OK	NOK - Action
0	Use Examiner SMART to measure engine water temperature with the engine at operating temperature and the vehicle running in 4th-5th gear at 70 and 90 kph	Temperature above 85°C	If temperature is less than 85°C, change the thermostat
1	Check engine oil level. (at least 2 mm below Max level)	Correct oil level.	Top up engine oil to correct level.
2	Check design number of injectors and check for any air leaks.	No air leaks, design number matches number listed in Table 3.	Change any injectors which are not to specifications.
3	Check how many washers are fitted in the injector seat and measure their thickness. (There should be only one washer)	Correct thickness is: - 2 mm on 1.9JTD and 2.4JTD - 1.5 mm on 1.3JTD.	Adjust to correct thickness.
4	Check design number of injector nozzles.	Design number matches number listed in Table 3 (number is stamped on injector end).	Change any injectors which are not to specifications. Clean gently making sure not to touch the lower end as it accommodates the calibrated injection holes.
5	Check design numbers of all glow plugs.	Design number matches number listed in Table 3.	Change any glow plugs which are not to specifications.
6	Inspect air lines running from air flow meter to engine inlet.	No leaks.	Repair to achieve proper sealing of the air intake circuit.
7	Check for oil in the air intake circuit / intercooler	No oil	Clean affected areas and check turbocharger
8	On 1.9JTD 8v engines only, check camshaft cams for wear	No wear	Change camshafts if cams are worn.

Table 3 – Design numbers of injectors, nozzles and glow plugs

Engine	1.9 JTD 8v 120CV	1.9 JTD 16v
Fiat Designed Injector	55200259	55198218
Bosch Designed Injector	0 445 110 276	0 445 110 243
Nozzle	DLLA 142 P 1607	DLLA 148 P 1347
Fiat Designed glow plugs	55200817	55187863
Bosch Designed glow plugs	0 250 202 132	276 010

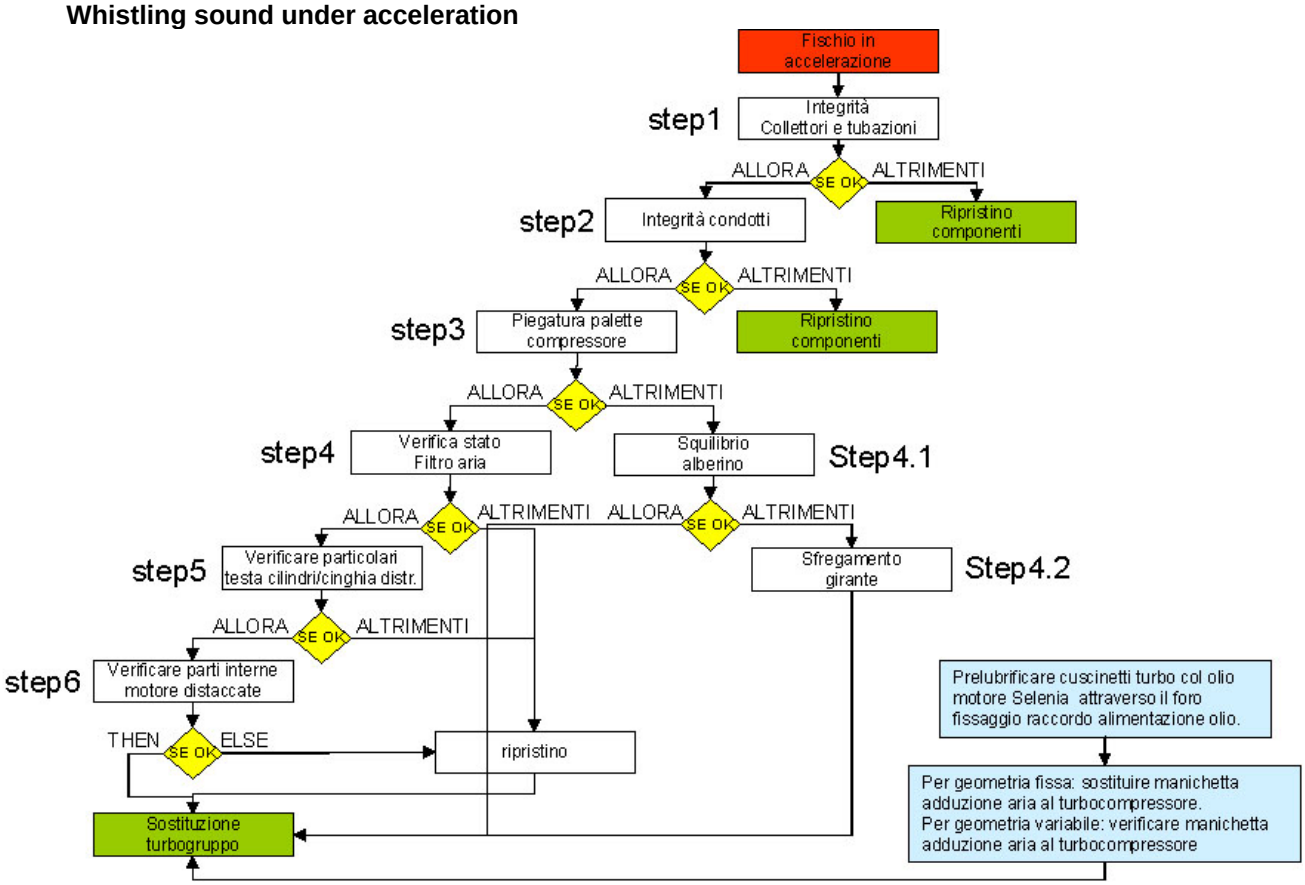
Please remember to NEVER:

- **wash the particulate filter with a water jet cleaner or similar equipment**
- **disconnect the differential pressure sensor while forced regeneration is in progress**

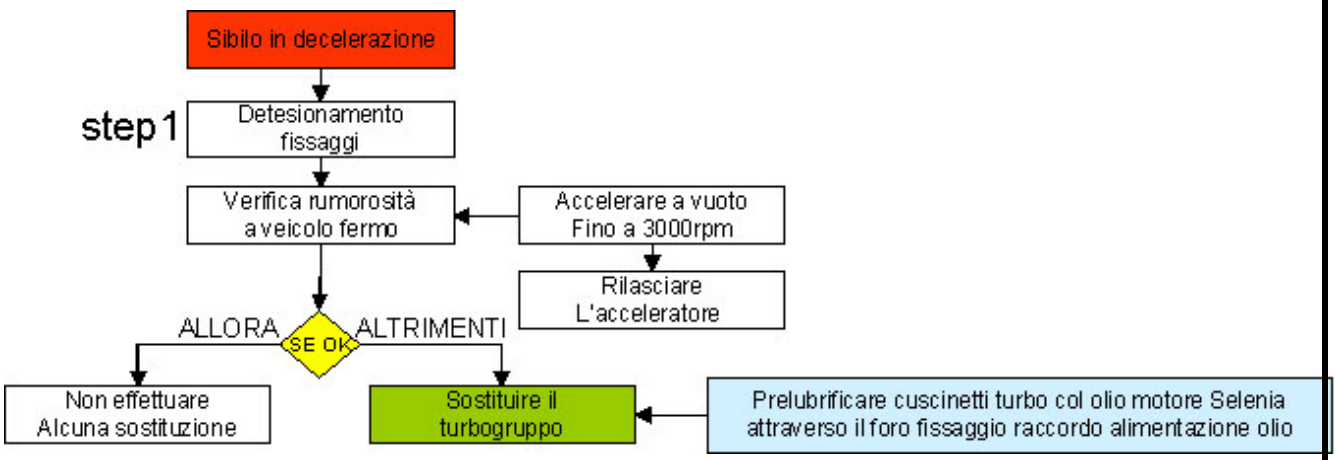
NOTE When topping up engine oil, never exceed the maximum level (ideal filling level is 2 mm below the Max mark).

9.2 TURBOCHARGER

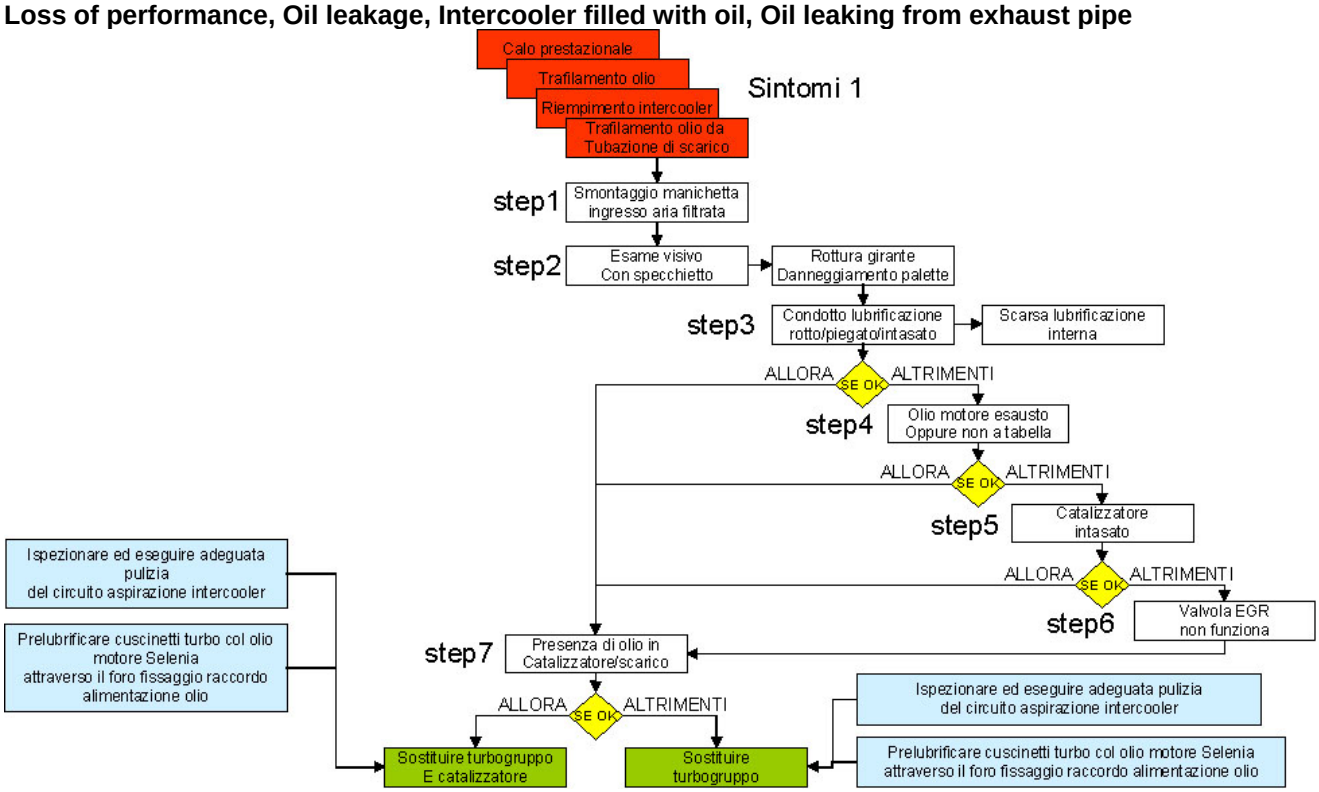
Whistling sound under acceleration



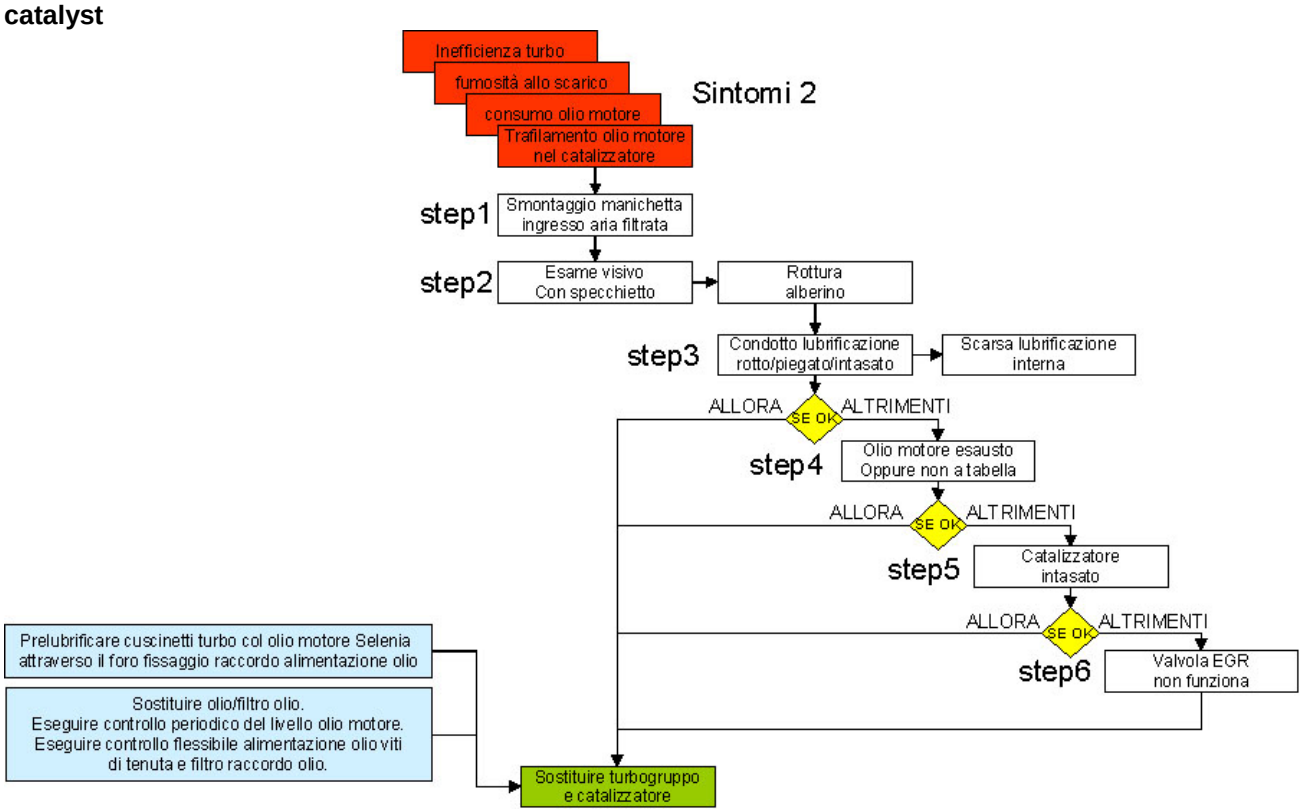
Hissing sound under acceleration



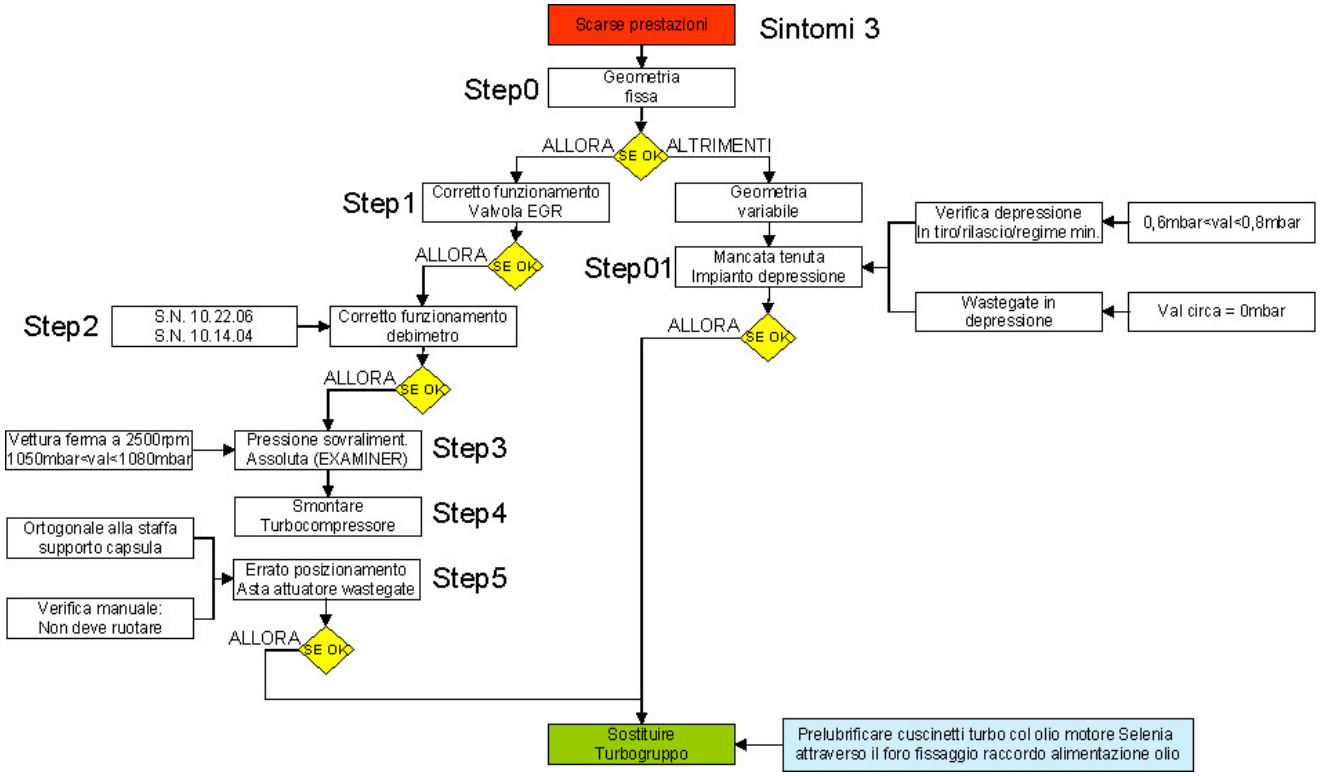
Loss of performance, Oil leakage, Intercooler filled with oil, Oil leaking from exhaust pipe



Turbocharger poorly efficient, Exhaust smoke, Engine oil consumption, Engine oil leaking into catalyst



Poor performance



9.3 TROUBLESHOOTING A BATTERY DRAINAGE PROBLEM

Examiner's **"Can Network Monitor"** function enables you to troubleshoot the causes for a battery drainage problem or a battery not holding the charge due to CAN network failure events with the key set to Stop; Examiner may be used to test the CAN network for the desired period of time (also in excess of 24 hours).

The following procedure will enable you to easily determine which control units are causing the problem:

1. Charge the battery and connect the Examiner Tester to the car's diagnostic connector; select Control Unit Test, select model and version and run the CAN Network Monitor programme included in "Other systems".

2. Launch the programme and turn the ignition key to STOP. Access the Acquisition environment, choose the network you want tested (B-CAN or C-CAN) and select acquisition time; at the end this time interval, a list of all control units that have been sending messages over the network will be displayed.

3. From the Acquisition environment you may access the Graphics and Times functions for an in-depth review of acquired information. Each screen provides PRINT and HELP buttons with a detailed description of available functions.

9.4 ELECTRIC POWER STEERING

STEERING SHAFT
Steering noise

TROUBLE

Steering noise (repeated knocking noises).

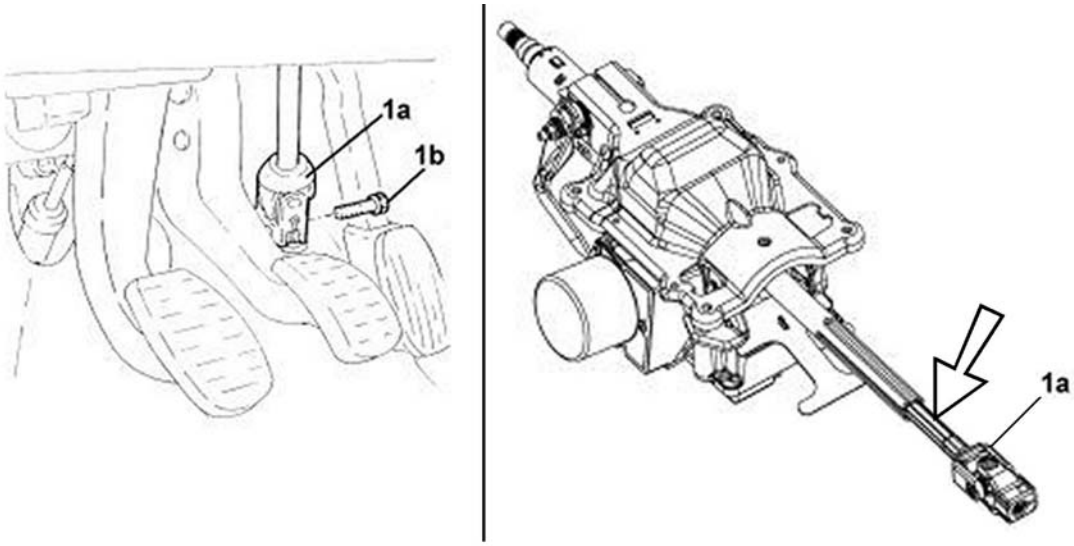
PROCEDURE

- Steer repeatedly in both directions at parking speed to check for steering noise (repeated knocking noises).
- If you find any steering noise, loosen the screw (1b - Fig.1) and detach the steering shaft yoke (1a) from the pinion.

NOTE Before disconnecting the steering shaft yoke, mark a timing mark across yoke (1a - Fig.1) and steering box pinion splines so as to ensure correct orientation when you reconnect the yoke.

- Turn the steering wheel and check for noise (ensure lower shaft does not interfere with pedals and associated components).
- Pull the lower end of the shaft as far it will go.
- Apply about 10 cc of Klübersynth LI 44-22 grease on the sliding area of the lower shaft (see arrow in Fig.1).

Fig. 1

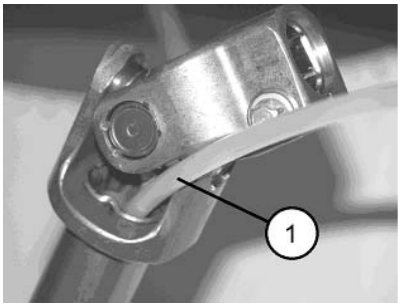


- Slide the male end of the shaft up and down (in an axial movement) so grease will fill all points of shaft female end and keep the lower end of the shaft fully extended (pulled out).
- Remove the fuse carrier cover (Op. 7040A37) to gain access to the upper section of the steering column.
- Connect a grease needle with an outer diameter of about 6 mm to a grease gun

- Insert the grease needle into the upper hole of the steering shaft (1 - Fig 2) and push until it contacts the top end of shaft male end; to verify contact, push the shaft slightly back in and observe the needle being pushed back out.

NOTE *Cut the needle tip at a 45° angle to facilitate insertion.*

Fig. 2



- Inject about 40 cc of Klübersynth LI 44-22 grease in several steps; hold the needle pushed all the way in during the process.
- Slide the male end of the shaft up and down (in an axial movement) so grease will fill all points of shaft female end.
- Refit the yoke to the steering box pinion (observe the timing mark to achieve correct orientation); do not reuse the screw (1b - Fig.1); tighten the new screw to 5.0 ÷ 6.1 daNm.

NOTE If the steering wheel is turned over more than 360° while the steering shaft is disconnected from the pinion, you will have to perform the steering angle calibration procedure using Examiner.

- Test the steering wheel to ensure the noise has disappeared.

H025 ELECTRIC POWER STEERING ASSIST FAILURE AND MALFUNCTION LIGHT ON

Steering becomes hard to turn (in both directions), all power assist is lost and malfunction light comes on
The electric power steering system is integral and concentric with the steering column. When the engine is running, the malfunction light must be off.

		Test results		
1	ELECTRIC SYSTEM TESTING	All OK	Problems found	Action
	Check for the following: - Electric connectors and terminals are correctly inserted on EPS and Body systems; - Battery terminals are at the correct torque; - EPS power supply wiring continuity See E7045 ELECTRIC POWER STEERING - Inspect and clean body ground terminals - Battery is charged (charge not less than 10.5 Volt)	Proceed to Step 1	1. Loose connections and/or no continuity at both ends of wiring 2. Battery down	1. Press wiring connectors firmly into place. If problem persists, proceed to step 2. Charge the battery
2	FAILURE MODE ASSESSMENT	All OK	Problems found	Action
	Determine when the problem occurs	End of diagnostic procedure	1. Failure occurs during starting 2. Failure occurs while car is running	1. Proceed to step 3 (if diagnosis indicates that certain parts must be replaced, enclose a printout of the diagnosis report with replaced parts and state that problem occurs during starting in the report) 2. Proceed to step 3

				(if diagnosis indicates that certain parts must be replaced, enclose a printout of the diagnosis report with replaced parts and state that problem occurs when vehicle is running in the report)
3	TESTING WITH TESTER	All OK	Problems found	Action
	Connect the tester (Examiner or other tester) to the diagnostic connector of the electric power steering node and check for any errors	End of diagnostic procedure	If any errors are found	Follow tester instructions
4	EPS CONTROL UNIT POWER SUPPLY TEST	All OK	Problems found	Action
	Check power supply to electric power steering control unit See Test 4110DC EPS CONTROL UNIT POWER SUPPLY TEST See E7045 ELECTRIC POWER STEERING	Proceed to Step 5	1. 70 A power fuse in engine compartment fuse box blown 2. + 15 power supply interrupted 3. Faulty ground connection	1. Determine why fuse blew and change fuse 2. Reconnect power supply 3. Repair ground connection
5	TESTING WITH TESTER	All OK	Problems found	Action
	Delete errors, disconnect diagnostic station and set key to Stop for about 10 sec. Start the engine and turn steering wheel lock to lock.	End of diagnostic procedure	Problem persists	Contact Technical Service for detailed information about the specific problem

	Reconnect the Examiner tester and check for any electric power steering control unit errors			

H025 ELECTRIC POWER STEERING ASSIST FAILURE WITH MALFUNCTION LIGHT OFF
Customer complains about EPS failure (hard steering) but malfunction light is off

		Inspection results		
1	WIRING TEST	All OK	Problems found	Action
	Check for the following: - Electric connectors and terminals are correctly inserted on EPS system and Body Computer - Battery terminals are at the correct torque - EPS power supply wiring continuity - Inspect and clean body ground terminals	Proceed to Step 2	Loose connections and/or no continuity at both ends of wiring	Press wiring connectors firmly into place
2	TESTING WITH TESTER	All OK	Problems found	Action
	Connect the Examiner tester and check to ensure the EPS indicator light is not malfunctioning	Proceed to Step 4	EPS indicator light malfunction	Proceed to Step 3
3	INSTRUMENT PANEL AND BODY COMPUTER TESTING	All OK	Problems found	Action
	Connect the Examiner tester and check for any instrument panel and body computer errors	Proceed to Step 4	If any errors are found	Follow tester instructions, look up error list and perform the suggested repair See table H025 ELECTRIC POWER STEERING ASSIST FAILURE AND MALFUNCTION LIGHT ON

4	OPERATION TEST	All OK	Problems found	Action
	Ensure problem has disappeared	End of diagnostic procedure	Problem persists	Contact Technical Service for detailed information about the specific problem

H029 POOR STEERING RETURN AND HEAVY STEERING

Customer complains about poor steering response and/or heavy steering

		Inspection results		
1	SETUP CHECK	All OK	Problems found	Action
	Check for correct wheel alignment and tyre wear	Proceed to Step 2	1. Worn tyres 2. Wrong tyre pressure 3. Wrong alignment	1. Change tyres. 2. Set to correct pressure 3. Align wheels
2	CHECK FOR CONSISTENT STEERING FEEL FROM LOCK TO LOCK	All OK	Problems found	Action
	With the vehicle stopped, ensure that heavy feel of steering varies while turning from lock to lock	Proceed to Step 3	Heavy feel and/or return consistent	Do not disturb the EPS system. Check for any problems in the steering box of the front suspension assembly
3	DETERMINE PROBLEM SEVERITY	All OK	Problems found	Action
	Determine the size of the problem (heavy feel of steering)	End of diagnostic procedure	1. Steering has a slightly heavy feel; problem occurs when parking 2. Steering feels very heavy	1. Do not repair or adjust; the EPS system is not supplying return assist force when vehicle is at standstill 2. Proceed to Step 4
4	WIRING TEST	All OK	Problems found	Action

	Check for the following: - Electric connectors and terminals are correctly inserted on EPS system and Body Computer - Battery terminals are at the correct torque - EPS power supply wiring continuity - Inspect and clean body ground terminals	Proceed to Step 5	Loose connections and/or no continuity at both ends of wiring	Refit wiring connectors properly
5	TESTING WITH TESTER	All OK	Problems found	Action
	Connect the Examiner tester and check for any errors	Proceed to Step 6	If any errors are found	Follow tester instructions, look up error list and perform the suggested repair
6	CITY SWITCH TEST	All OK	Problems found	Action
	Use Examiner tester to check for any City switch errors	End of diagnostic procedure	Switch and/or wiring fault	Repair to ensure correct operation.

H030 ELECTRIC POWER STEERING/CITY MODE NOT OPERATIONAL

When the CITY button is pressed, City mode does not operate and assist force is not increased

		Inspection results		
1	OPERATION TEST	All OK	Problems found	Action
	Press the CITY button and check for the following: - Associated symbol lights up on “NQS”	Proceed to Step 2	Symbol on “NQS” does not light up	Proceed to Step 4
2	CITY MODE TEST	All OK	Problems found	Action
	Road test the car to ensure assist force varies when the CITY button on the control panel is pressed	End of diagnostic procedure	Symbol on dashboard is on but assist force remains unchanged	Proceed as indicated See table H025 ELECTRIC POWER STEERING ASSIST FAILURE AND MALFUNCTION LIGHT ON
3	TESTING WITH TESTER	All OK	Problems found	Action
	Connect the tester (Examiner or other tester) to the diagnostic connector of the electric power steering node and check for the following: - Any errors in the electric power steering node - Any errors in NBC - Any errors in NCM	Proceed to Step 5	1. Errors found in the electric power steering node 2. CAN network from NGE to NBC faulty 3. CAN network from NCM to NGE faulty	1. Follow tester instructions 2. Repair electric connectors of CAN network from NGE to NBC 3. Repair electric connectors of CAN network from NCM to NGE
4	CITY BUTTON TEST	All OK	Problems found	Action
	Check for correct operation of City	Proceed to Step 5	1. City button faulty 2. Wiring interrupted	1. Change City button 2.Restore

	button See Test 7040AA CITY BUTTON TEST Check continuity of wiring connecting City button and body computer node See E7045 ELECTRIC POWER STEERING		3. Body Computer faulty	wiring continuity **Op. 7040A56** 3. Change Body Computer **Op. 5505A32**
5	OPERATION TEST	All OK	Problems found	Action
	Ensure problem has disappeared	End of diagnostic procedure	Problem persists	Replace complete steering column; if problem persists after steering column replacement, proceed to Step 6
6	TESTING WITH TESTER	All OK	Problems found	Action
	Delete errors, disconnect diagnostic station and set key to Stop for about 10 sec. Start the engine and turn steering wheel lock to lock. Reconnect the Examiner tester and check for any electric power steering control unit errors	End of diagnostic procedure	Problem persists	Change electric power steering control unit