

FIAT 500L

general information

IDENTIFICATION**IDENTIFICATION TABLE**

Commercial name	Fiat 500L
Marketing	since 2012
Model code	330
Engine type	1.6 Multijet
Displacement (cm³)	1.598
Power (HP)	105/120
Transmission type	C635
Number of reports	6

BODY MARKING

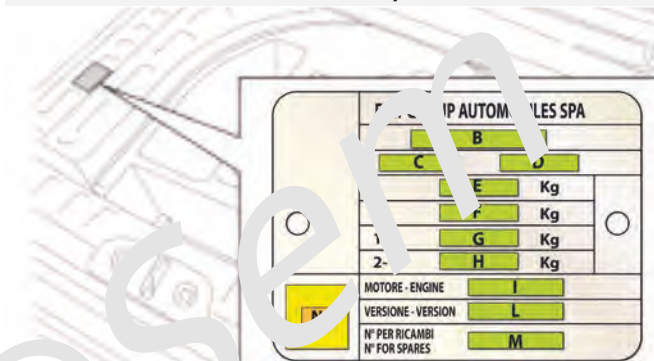
On the floor of the passenger compartment, near the right front seat, the body marking is stamped, including:

- Vehicle type
- Progressive manufacturing number of the chassis

It is accessed by sliding the special window created in the passenger compartment floor covering.

CAR IDENTIFICATION PLATE

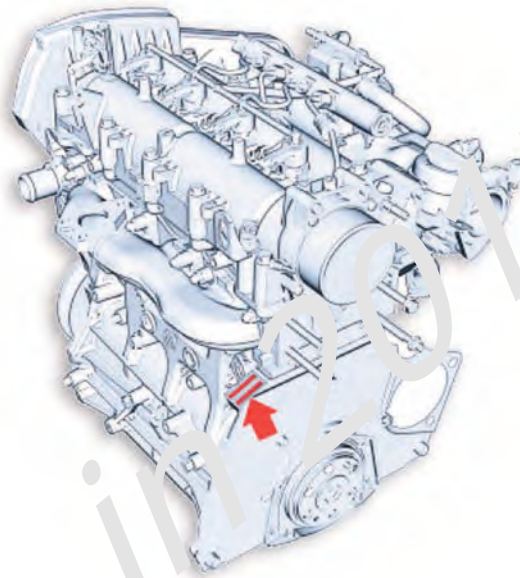
It is applied on the left side of the trunk (to access it you need to lift the lining carpet). It reports the following data.

Identification plate

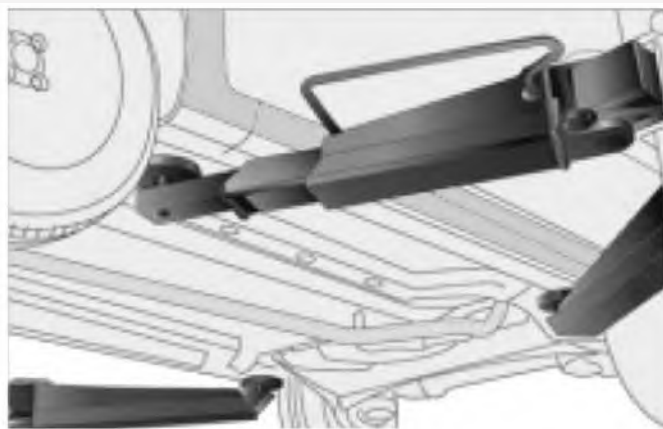
A	Approval number
C	Vehicle type identification code
D	Chassis production sequence number
E	Maximum authorised weight of the vehicle when fully loaded
F	Maximum authorised weight of the vehicle plus trailer
G	Maximum authorised weight on the first axle (front)
H	Maximum authorised weight on the second axle (rear)
THE	Engine type
THE	Body version code
M	Spare parts number
N	Correct smoke coefficient value (for diesel engines)

ENGINE NUMBER PLATE

The engine marking is stamped on the crankcase, gearbox side.

Engine marking**LIFTING**

When lifting the vehicle using a lift with arms or a workshop lift, position the ends of the arms or the lift only in the areas shown in the figure.

Car Lifting**- Attention:**

The vehicle must be lifted only laterally. After lifting the vehicle, support it with safety stands. It is strictly forbidden to lift the vehicle by positioning the workshop lift in correspondence with the wishbones and the front suspension band or in correspondence with the rear suspension bridge.

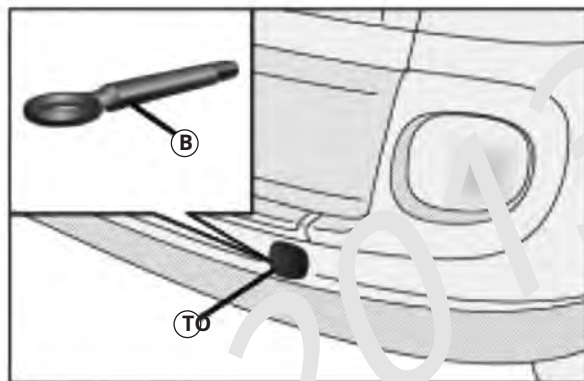
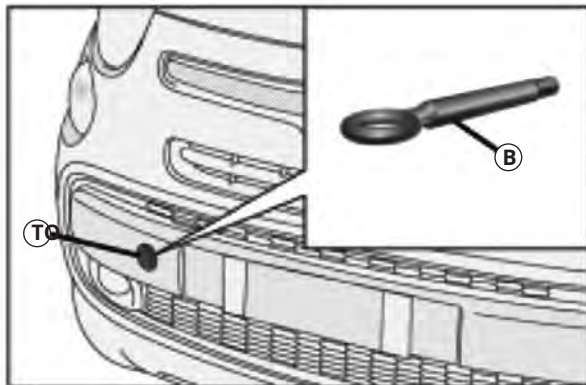
FIAT 500L

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TOWING

The vehicle is equipped with a towing ring located in the tool container, located under the boot lining.
To attach the towing ring, proceed as follows:

- unhook the cap (A) located on the front bumper or on the rear bumper in order to access the threaded pin on the body
- remove the towing ring (B) from its container
- screw the ring fully onto the front or rear threaded pin

Tow hooks**MAINTENANCE FREQUENCY**

	Thousands of kilometers	35	70	105	140	175
	Months	24	48	72	96	120
Check battery charge status and recharge if necessary (*)		•	•	•	•	•
Check tyre condition/wear and adjust pressure if necessary		•	•	•	•	•
Check operation of lighting system (headlights, direction indicators, emergency, passenger compartment, luggage compartment, instrument panel warning lights, etc.)		•	•	•	•	•
Check operation of windscreen wiper/washer system, adjust spray nozzle		•	•	•	•	•
Check the positioning/wear of the front/rear windshield wiper blades		•	•	•	•	•
Visual inspection of conditions: exterior bodywork, underbody protection, rigid and flexible sections of pipes (exhaust - fuel supply - brakes), rubber elements (boots - sleeves - bushings, etc.)		•	•	•	•	•
Check the cleanliness of the bonnet and trunk, clear and lubricate the levers		•	•	•	•	•
Check the condition and wear of the front disc brake pads and the operation of the pad wear indicator		•	•	•	•	•
Check the condition and wear of the rear disc brake pads and the operation of the pad wear indicator		•	•	•	•	•
Check and top up fluid levels (engine cooling, brakes/hydraulic clutch, windscreen washer, battery, etc.)		•	•	•	•	•
Visual check of condition of any drive belt(s) (versions without automatic tensioner)			•			
Check tension of any drive belt (versions without automatic tensioner) (or every 24 months)		•				•
Check and adjust the handbrake lever stroke if necessary		•	•	•	•	•
Exhaust emissions/smoke control		•	•	•	•	•
Check engine control system functionality (via diagnostic socket)		•	•	•	•	•
Changing the mechanical gearbox oil level				•		
Fuel filter cartridge replacement			•		•	
Necessary Drive Belt Replacement					•	
Air filter cartridge replacement		•	•	•	•	•
Engine oil and engine oil filter replacement (**) (***)						
Brake fluid replacement (or every 24 months)			•		•	
Pollen filter replacement (or every 24 months)		•	•	•	•	•

(*) To check the battery charge status, we recommend the Midtronics FGA diagnostic tool

(**) If the vehicle is used mainly on urban routes, it is necessary to replace the engine oil and oil filter every 12 months

(***) The actual interval for changing the engine oil and oil filter depends on the conditions of use of the vehicle and is indicated by a warning light or message.

(where applicable) on the instrument panel or in any case every 24 months

FIAT 500L**1. engine > technical data**

1. engine

Technical data

GENERAL INFORMATION

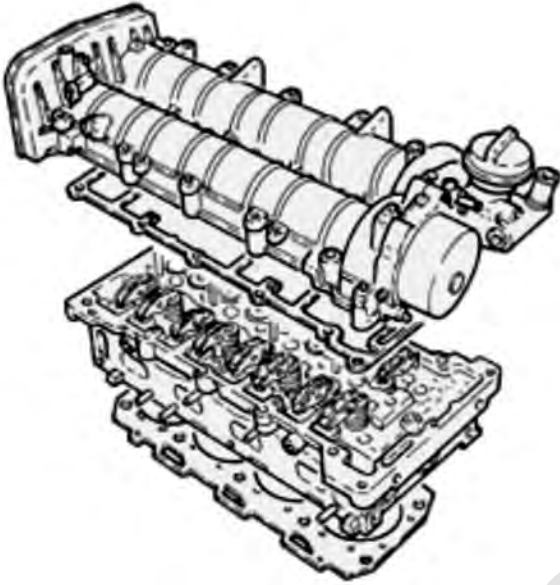
4-cylinder in-line engine, 4 valves per cylinder, supercharged with Multijet direct injection. Transverse position with cast iron block and light alloy cylinder head.

1.6 Multijet 16V engine view

	1.6 Multijet 16v 105CV	1.6 Multijet 16v 120CV
Bore (mm)	79.5	79.5
Stroke (mm)	80.5	80.5
Total displacement (cm ³)	1.598	1.598
Maximum power (kW EEC)	77	88
Maximum power (HP EEC)	105	120
Max power regime (rpm)	4,000	4,000
Maximum torque (Nm EEC)	290	300
Maximum torque (kgm EEC)	29.5	30.6
Maximum torque regime (rpm)	1,500	1,500
Idle speed (rpm)	850 ± 20	850 ± 20
Compression ratio	16.5 : 1	16.5 : 1

FIAT 500L**1. engine > technical data****HEAD GROUP****HEADSTOCK**

The cylinder head is of the monolithic type in aluminum and silicon alloy. Two overhead camshafts, in spheroidal cast iron, housed in an overhead; the control is by belt and gears. The four valves per cylinder, parallel and vertical, are positioned in the relative valve guides and controlled by rocker arms operated by the camshaft eccentrics and kept in contact with the valves by hydraulic tappets.

Header

Measure	Value
Flatness of the lower surface of the engine cylinder head (mm)	< 0.05
Nominal height of engine cylinder head (mm)	167 ± 0.1

VALVES

Sixteen valves, four valves per cylinder, in-line and different between intake and exhaust.
 Powered by double overhead camshafts and roller balancer operated by hydraulic tappets.

Measure	Value
Valve Stem Diameter - Intake (mm)	4.982 ÷ 5.000
Valve Stem Diameter - Exhaust (mm)	4.972 ÷ 4.990

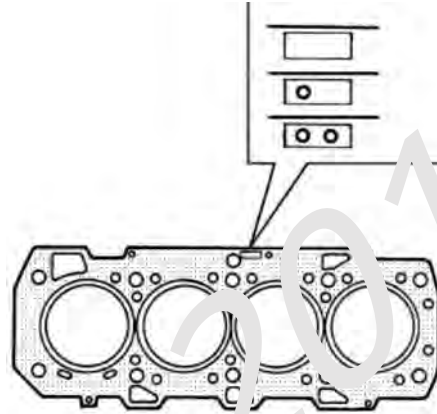
VALVE SEATS

Locations listed in the header.

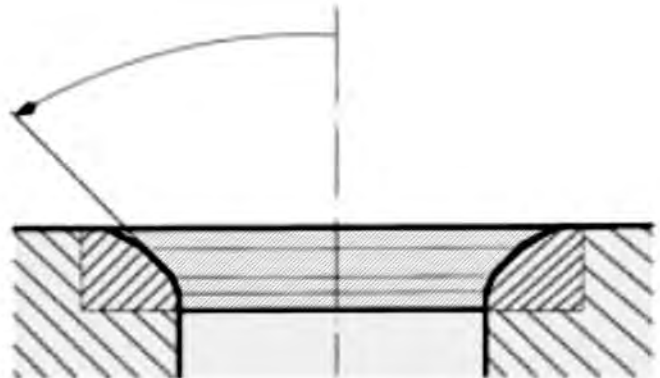
Size 1.6 16V Multijet	Value
Angle of valve seat band in contact with valves	45° 0' ± 1°
Valve seat outside diameter - intake (mm)	28.355 ÷ 28.365
Valve seat outer diameter - exhaust (mm)	26.100 ÷ 26.111

HEAD GASKET

Based on the average values of maximum piston protrusion, three different types of gasket are available, identifiable by the number of notches present. The gasket between the cylinder head and the crankcase is metallic and no tightening of the head is foreseen for the entire life of the engine.

Gasket

Size for 1.6 16V Multijet engine	Value
Cylinder head gasket thickness with maximum piston protrusion (mm)	protrusion - 0.020 ÷ +0.100 thickness (no hole) 0.82 ± 0.05
Cylinder head gasket thickness with maximum piston protrusion (mm)	protrusion + 0.101 ÷ +0.200 thickness (one hole) 0.92 ± 0.05
Cylinder head gasket thickness with maximum piston protrusion (mm)	protrusion + 0.201 ÷ +0.295 thickness (two holes) 1.02 ± 0.05

Valve seat

FIAT 500L**1. engine > technical data****VALVE GUIDES**

Return, assemble with the press in the head.

Measure	Value
Valve guide outer diameter (mm)	10.010 ÷ 10.030
Valve guide internal diameter (mm)	5.015 ÷ 5.033
Increase in external diameter of valve guide (mm)	0.05 / 0.10 / 0.25

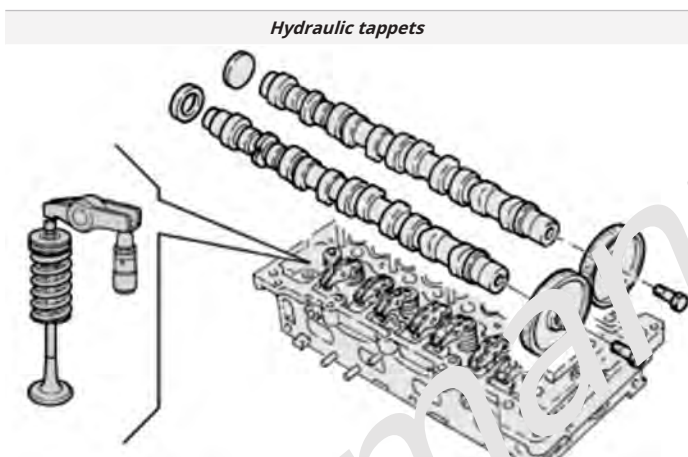
VALVE SPRINGS

Identical valve springs for intake and exhaust valves.

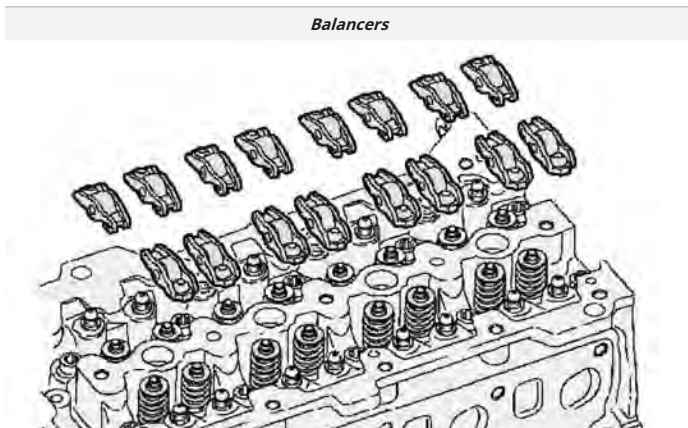
Measure	Value
Free length of valve springs (mm)	44.1
Valve spring length under load of 22.80 ÷ 25.20 Kg (mm)	34.0
Valve spring length under load of 43.90 ÷ 48.10 Kg (mm)	25.5

HYDRAULIC TAPPETS

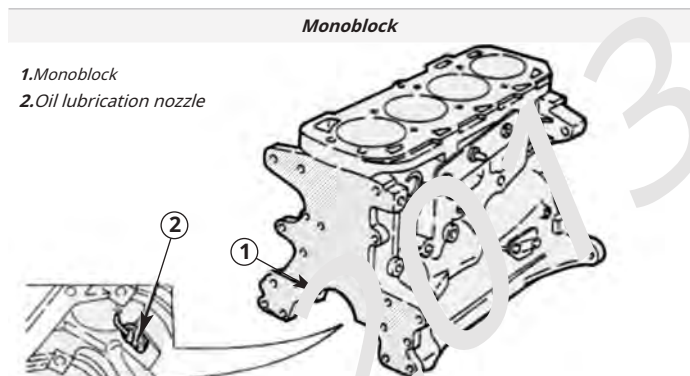
For each valve a hydraulic tappet is used, operated by a rocker arm which is in turn moved by the camshaft.

**BALANCERS**

Roller rocker arms, driven by double overhead camshafts, open the valves counteracted by hydraulic tappets.

**CYLINDER BLOCK****BASEMENT**

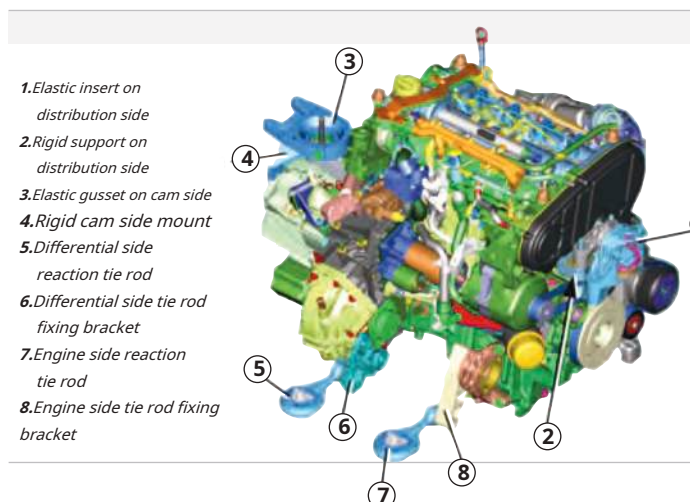
The crankcase is made of spheroidal cast iron. The cylinders are obtained directly in the crankcase and are selected in three dimensional classes plus an oversize. The crankshaft rotates on five main bearings. Special channels, created in the walls of the crankcase, allow the passage of the coolant and lubricating oil.



Size 1.6 16V Multijet	Value
Cylinder Liner Inner Diameter - Class A (mm)	79,500 ÷ 79,510
Cylinder Liner Inner Diameter - Class B (mm)	79,510 ÷ 79,520
Cylinder Liner Inner Diameter - Class C (mm)	79,520 ÷ 79,530
Measure	Value
Barrel taper (mm)	< 0.005
Increased internal diameter of barrels (mm)	0.1

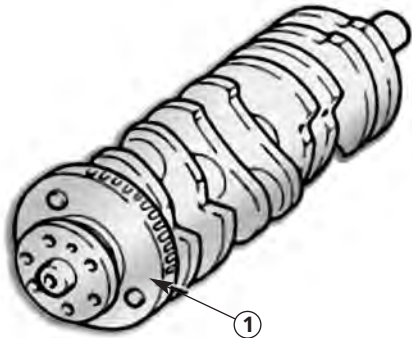
POWERTRAIN SUPPORTS

The powertrain mounts act as a structural connection between the powertrain and the body. They are sized to support the weight of the powertrain and withstand the loads resulting from the torque transmitted by the engine. Each mount is equipped with a rubber-metal pad to dampen and reduce the vibrations generated by the engine and transmitted to the body. This is a barycentric type of support, composed of two pads plus a reaction tie rod, aligned on an axis passing through the center of gravity of the engine in order to obtain reaction forces with zero arm.



FIAT 500L**1. engine > technical data****CRANK GEAR****CRANKSHAFT**

It is made of cast iron, rests on five main bearings and its axial play is regulated by two half-rings housed in the rear main bearing. Eight counterweights give the crankshaft an accurate balancing of the rotating masses. A series of channels runs internally through the crankshaft for the lubrication of the main and connecting rod journals. The tone wheel for the revolution sensor is mounted at the rear.

Crankshaft

1. Phonic wheel

Measure	Value	Validity
Diameter of main journals - Class A (mm)	52.994 ÷ 53.000	1.6 JTD 16v
Diameter of main journals - Class B (mm)	52.988 ÷ 52.994	1.6 JTD 16v
Diameter of main journals - Class C (mm)	52.982 ÷ 52.988	1.6 JTD 16v

Measure	Value	Validity
Diameter of main journal seats (mm)	56.705 ÷ 56.718	1.6 JTD 16v

Measure	Value	Validity
Crankshaft pin diameter - Class A (mm)	48.228 ÷ 48.240	1.6 JTD 16v
Crankshaft pin diameter - Class B (mm)	48.232 ÷ 48.238	1.6 JTD 16v
Crankshaft Pin Diameter - Class C (mm)	48.226 ÷ 48.232	1.6 JTD 16v

Main bearings

Measure	Value	Validity
Main Bearing Thickness - Class A (red) (mm)	1.831 ÷ 1.837	1.6 JTD 16v
Main Bearing Thickness - Class B (blue) (mm)	1.836 ÷ 1.844	1.6 JTD 16v
Main Bearing Thickness - Class C (yellow) (mm)	1.843 ÷ 1.849	1.6 JTD 16v

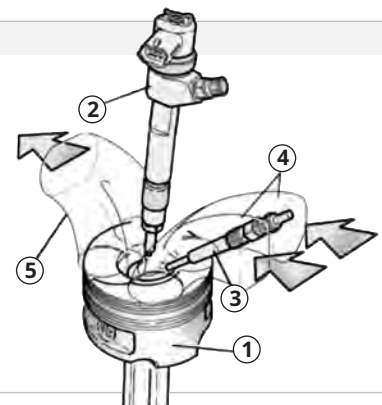
Measure	Value	Validity
Main Bearings Oversize - Class A (Brown) (mm)	0.127	1.6 JTD 16v
Main bearing half-size increase - Class B (green) (mm)	0.254	1.6 JTD 16v
Main Bearings Oversize - Class C (Black) (mm)	0.508	1.6 JTD 16v

Measure	Value	Validity
Main bearing play - crankshaft journals (mm)	0.011 ÷ 0.071	1.6 JTD 16v
Connecting rod bearing thickness - Class A (red) (mm)	1.536	1.6 JTD 16v
Connecting rod bearing thickness - Class B (blue) (mm)	1.539	1.6 JTD 16v
Connecting rod bearing thickness - Class C (yellow) (mm)	1.542	1.6 JTD 16v
Main Bearings Oversize - Class A (Brown) (mm)	0.127	1.6 JTD 16v
Main bearing half-size increase - Class B (green) (mm)	0.254	1.6 JTD 16v
Main Bearings Oversize - Class C (Black) (mm)	0.508	1.6 JTD 16v

Measure	Value	Validity
Main Bearings Oversize - Class A (Brown) (mm)	0.127	1.6 JTD 16v
Main bearing half-size increase - Class B (green) (mm)	0.127	2.0 JTD 16v
Main Bearings Oversize - Class C (Black) (mm)	0.127	2.0 JTD 16v
Main bearing half-size increase (mm)	0.254	2.0 JTD 16v

PISTONS

The pistons are silicon aluminum alloy with autothermal inserts are divided into three dimensional classes. The combustion chamber is obtained on the piston crown in 'COM A' to improve combustion efficiency.



- 1. Piston
- 2. Electroinjector
- 3. Glow plugs
- 4. Air intake
- 5. Exhaust gas outlet

Measure	Value	Validity
Piston Outer Diameter - Class A (mm)	79.440 ÷ 79.450	1.6 JTD 16v
Piston Outer Diameter - Class B (mm)	79.450 ÷ 79.460	1.6 JTD 16v
Piston Outer Diameter - Class C (mm)	79.460 ÷ 79.470	1.6 JTD 16v
Piston external diameter increase (mm)	0.1	1.6 JTD 16v
Permissible weight difference between pistons (g)	+/- 5	1.6 JTD 16v

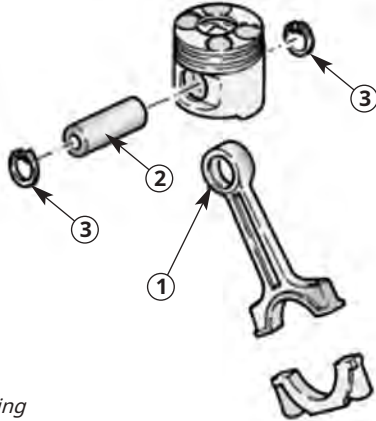
Plugs

The floating type piston pins are held in place by two expanding elastic rings which fit into the appropriate slots on the piston hubs.

Measure	Value	Validity
Pin seat diameter (mm)	25.991 ÷ 25.996	1.6 JTD 16v
Outside diameter of the pin (mm)	25.982 ÷ 25.988	1.6 JTD 16v

FIAT 500L**1. engine > technical data****CONNECTING RODS**

The connecting rods are made of hardened steel, with a copper bushing planted for coupling with the piston pin.

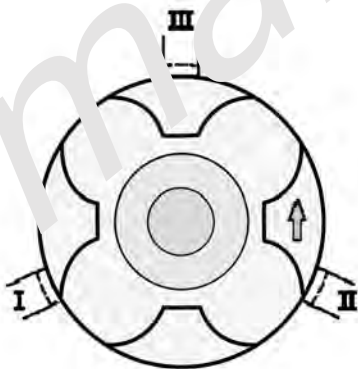
Connecting rod assembly

Measure	Value	Validity
Internal diameter of connecting rod foot bushings (mm)	26.006 ÷ 26.014	1.6 JTD 16v
Connecting rod head internal diameter (mm)	51,354 ÷ 51,366	1.6 JTD 16v
Permissible weight difference between complete connecting rods (g)	+ /- 2.5	

Measure	Value	Validity
Permissible weight difference between complete connecting rods (g)	+ /- 2.5	

BANDS

The pistons have three elastic rings. Assembly offset (I, II, III) at 120° with the "TOP" reference facing upwards.

Elastic band

Measure	Value	Validity
Thickness of 1st cylinder compression sealing ring (mm)	1.970 ÷ 2.005	1.6 JTD 16v
Thickness of 2nd cylinder compression sealing ring (mm)	1.970 ÷ 2.005	1.6 JTD 16v
Thickness of 3rd cylinder compression sealing ring (mm)	1.970 ÷ 1.990	1.6 JTD 16v

Measure	Value	Validity
1st cylinder compression sealing ring light (mm)	0.20 ÷ 0.35	1.6 JTD 16v
2nd cylinder compression sealing ring light (mm)	0.60 ÷ 0.80	1.6 JTD 16v

Measure	Value	Validity
Seal ring seat on piston - 1 to hollow (mm)	2.120 ÷ 2.140	1.6 JTD 16v
Seal ring seat on piston - 2 to hollow (mm)	1.800 ÷ 1.820	1.6 JTD 16v
Seal ring seat on piston - 3 to hollow (mm)	2.020 ÷ 2.040	1.6 JTD 16v

Measure	Value	Validity
Axial clearance of 1st cylinder compression sealing ring (mm)	0.10 ÷ 0.170	1.6 JTD 16v
Axial play 2nd cylinder compression sealing ring (mm)	0.050 ÷ 0.090	1.6 JTD 16v

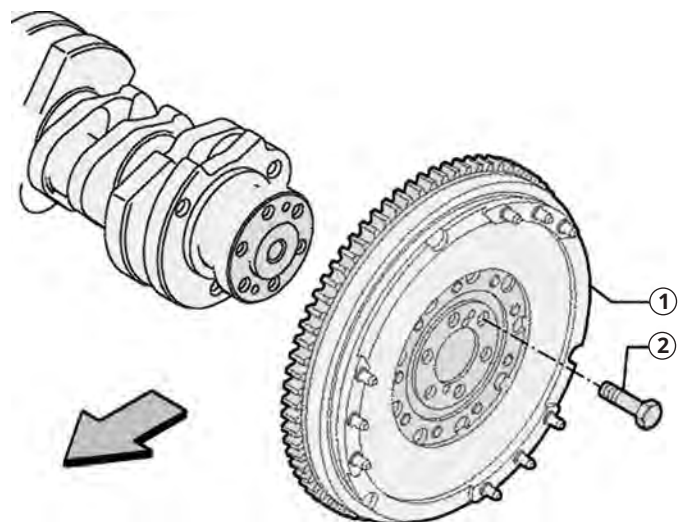
Measure	Value	Validity
Engine Piston Oil Scraper Ring Gap (mm)	0.25 ÷ 0.50	1.6 JTD 16v
Engine piston oil scraper ring axial play (mm)	0.030 ÷ 0.070	1.6 JTD 16v

FLYWHEEL

Dual mass flywheel, DVA (Double Flywheel Shock Absorber), one integral with the crankshaft and one with the primary shaft of the gearbox with an elastic torsional damping system in between.

The resonance points, which with the conventional system are located between 800 and 2,200 rpm, are moved to lower rotation speeds, outside the range of use.

The clutch, positioned between the double flywheel and the gearbox, consists of a rigid disc (without springs) which, having a reduced inertia, improves the manoeuvrability of the gearbox.

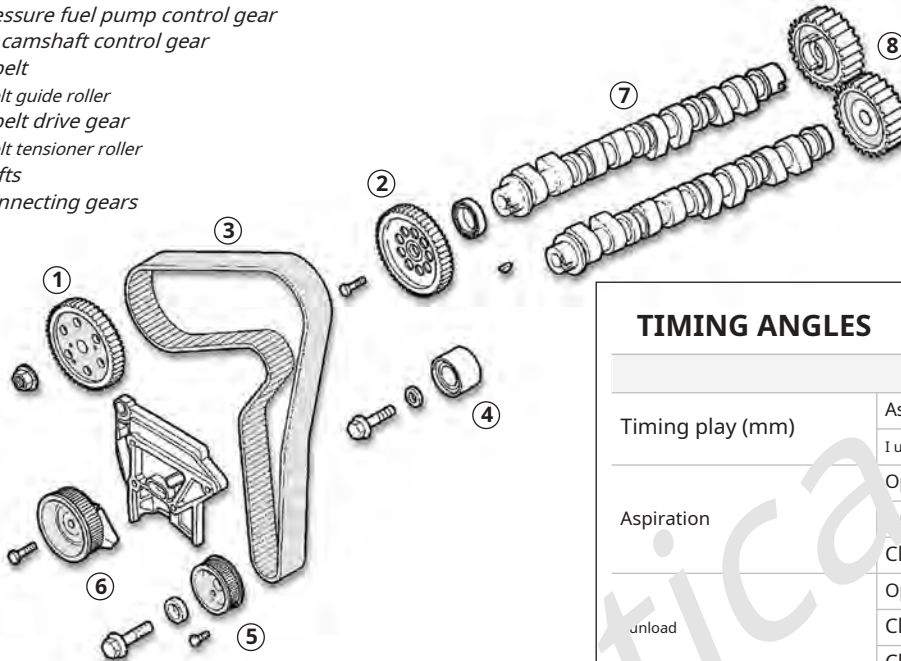
Dual mass flywheel*1. Flywheel with crown gear**2. Flywheel to crankshaft hub fixing screw*

FIAT 500L**1. engine > technical data****CINEMATICS DISTRIBUTION**

Distribution by means of two overhead camshafts. The exhaust camshaft alone is controlled by the timing belt and drives the intake camshaft by means of a series of two gears inside the cylinder head casing.

Overall distribution

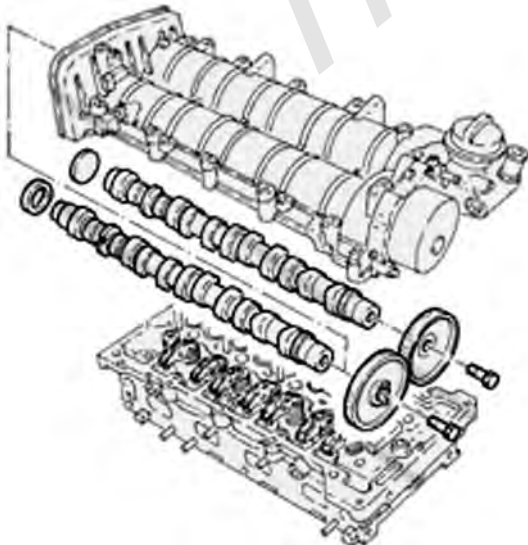
- 1.High pressure fuel pump control gear
- 2.Exhaust camshaft control gear
- 3.Timing belt
- 4.Timing belt guide roller
- 5.Timing belt drive gear
- 6.Timing belt tensioner roller
- 7.Camshafts
- 8.Shaft connecting gears

**TIMING ANGLES**

		1.6 Multijet 16v
Timing play (mm)	Aspiration	0.50
	I unload	0.50
Aspiration	Opening (before PMS)	-
	Opening (after PMS)	- 10°
	Closing (after PMI)	1.5°
I unload	Opening (before PMI)	40°
	Closing (before PMS)	-
	Closing (after PMS)	9th

CAMSHAFTS

The exhaust camshaft is driven directly by the timing belt and transmits motion to the intake camshaft, via a pair of straight-toothed gears. The exhaust camshaft also drives the vacuum pump which is keyed to the gear side. The camshafts are made of cast iron, with induction hardening of the cams.

Camshafts

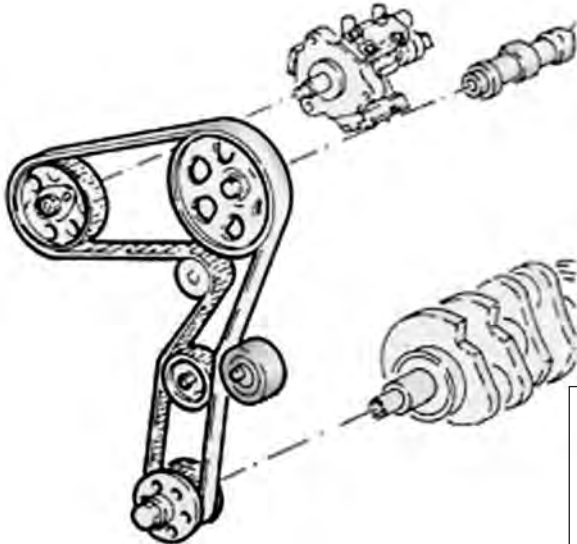
Measure	Value
Camshaft axial play (mm)	0.100 ÷ 0.230

Measure	Value
Nominal lift of intake cams (mm)	8.5
Exhaust cam nominal lift (mm)	8.0

Measure	Value
Diameter of first camshaft pin (mm)	43,600 ÷ 43,615
Diameter Second Camshaft Pin (mm)	43,400 ÷ 43,415
Diameter of third camshaft pin (mm)	43,200 ÷ 43,215
Diameter of the fourth camshaft pin (mm)	43,000 ÷ 43,015
Diameter of the fifth pin of the camshaft (mm)	30,000 ÷ 30,015
Diameter First Camshaft Support (mm)	43,646 ÷ 43,671
Diameter Second Camshaft Support (mm)	43,446 ÷ 43,471
Diameter Third Camshaft Support (mm)	43,246 ÷ 43,271
Camshaft Quarter Support Diameter (mm)	43,046 ÷ 43,071
Diameter Fifth Camshaft Support (mm)	30,045 ÷ 30,070

FIAT 500L**1. engine > technical data****TIMING BELT**

Toothed belt made of synthetic materials. Connects the crankshaft drive pulley with the tensioner pulley (in the direction of rotation), the high-pressure pump pulley and the camshaft pulley (exhaust shaft for twin-shaft engines).

Overall distribution**Maintenance frequency**

Visual inspection of timing belt and tensioner roller

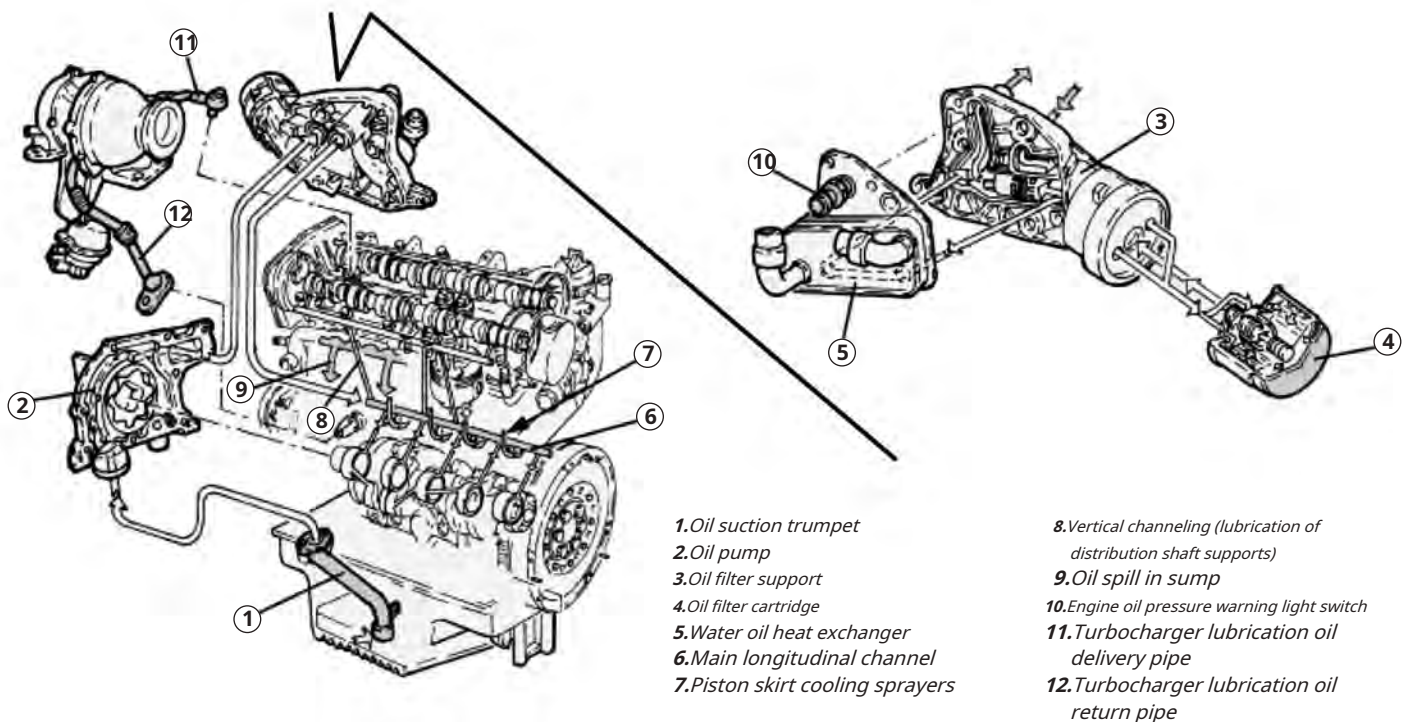
50,000 km / 2 years

Belt and roller replacement

120,000 km / 8 years

LUBRICATION

Forced lubrication by means of an oil pump driven by the crankshaft, pressure limiting valves ensure that the circuit is maintained at adequate pressure values.

Lubrication complex

1. Oil suction trumpet
2. Oil pump
3. Oil filter support
4. Oil filter cartridge
5. Water oil heat exchanger
6. Main longitudinal channel
7. Piston skirt cooling sprayers

8. Vertical channeling (lubrication of distribution shaft supports)
9. Oil spill in sump
10. Engine oil pressure warning light switch
11. Turbocharger lubrication oil delivery pipe
12. Turbocharger lubrication oil return pipe

FIAT 500L**1. engine > technical data****ENGINE OIL**

Name	Classification	Quantity (liters)
SELENIA TURBODIESEL	SAE 10W-40 - ACEA B3 - API CD	4.4
SELENIA WR DIESEL	SAE 5W-40 - ACEA B4 - API CF	4.4

OIL FILTER AND HEAT EXCHANGER

Oil filter with liquid/liquid heat exchanger for cooling the engine oil.

PRESSURE SWITCH

Engine at operating temperature and oil temperature at 100°C	1 bar minimum
	4 bar at 4,000 rpm

OIL PUMP

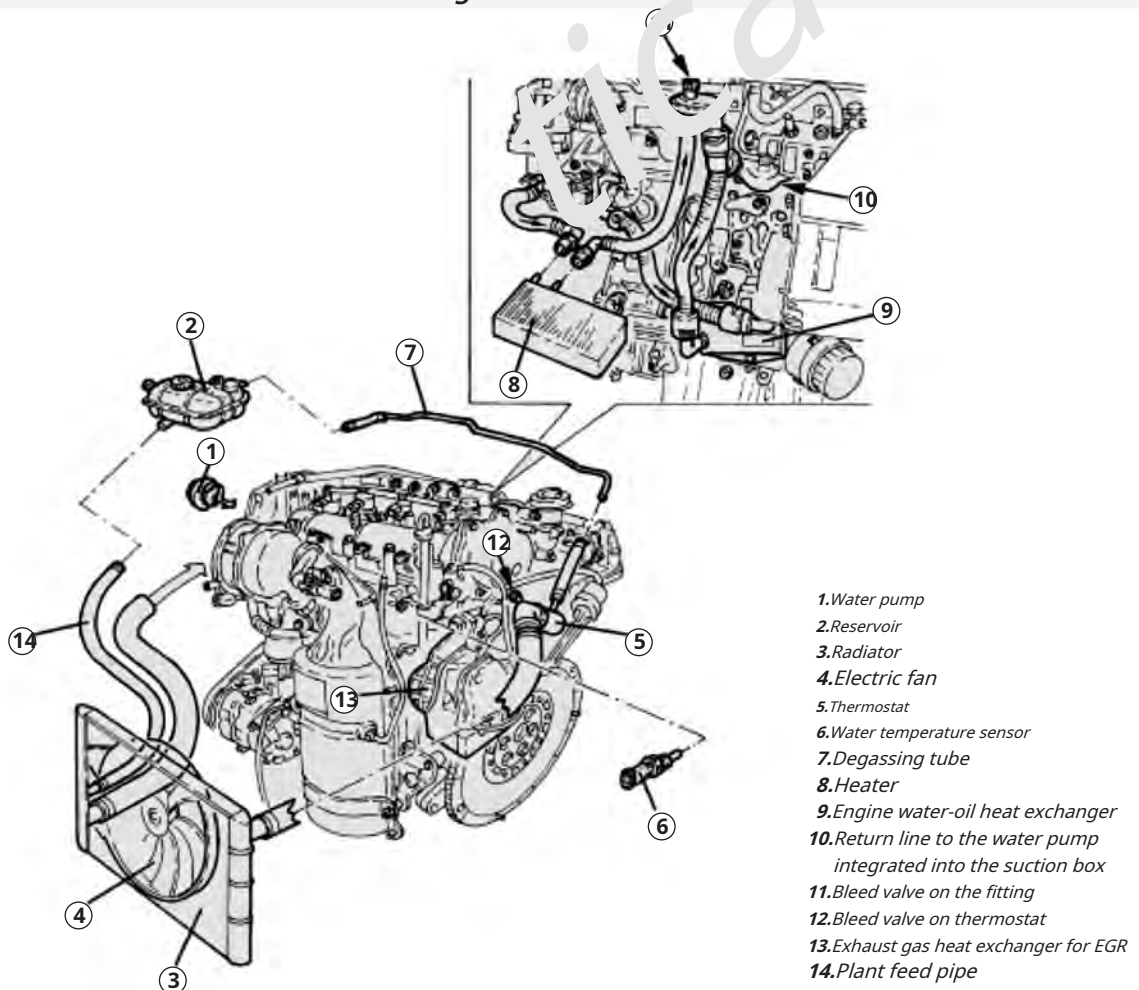
The engine oil is sucked from the sump by the vacuum created by the rotation of the gears keyed to the crankshaft.

The depression is present from the gear separation bulkhead up to the oil sump suction pipe.

Measure	Value	Validity
Engine oil pressure relief valve spring height at load of 8.78 ÷ 9.66 daN (mm)	36.0	1.6 JTD 16v
Radial clearance between pump body and driven gear (mm)	0.080 ÷ 0.100	1.6 JTD 16v

COOLING

Cooling by forced circulation of the engine coolant in a hermetic circuit.

Cooling overall

FIAT 500L**1. engine > technical data****COOLANT**

Name	Classification
Paraflu Up	CUNA NC 956-16, ASTM D3306
Amount	7.2 liters

WATER PUMP

Centrifugal vane water pump with aluminum alloy pump body and phenolic resin impeller. Fixed to the engine block and driven directly by the timing belt.

THERMOSTAT

Mounted on the rear side of the cylinder head, with the function of keeping the engine at the optimum temperature:

temperature $< 82 \pm 2^\circ \text{C}$ the thermostatic valve (closed) diverts the liquid directly to the pump

temperature $> 82 \pm 2^\circ \text{C}$ the thermostatic valve (open) directs the liquid to the radiator

RADIATOR

It is composed of a radiant mass and two lateral tanks for the inlet and outlet of the coolant.

The tubes and fins of the radiator mass are made of aluminum, the trays are made of plastic.

EXPANSION TANK

Expansion tank, in addition to its function of supplying the circuit absorbs variations in the volume of the coolant as the engine temperature varies.

Exhaust valve opening pressure (bar)	0.98
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ELECTRIC FANS

The two-speed electric cooling fan allows to increase the heat dissipation capacity of the radiator and of the air conditioning system condenser. It is controlled directly by the injection control unit.

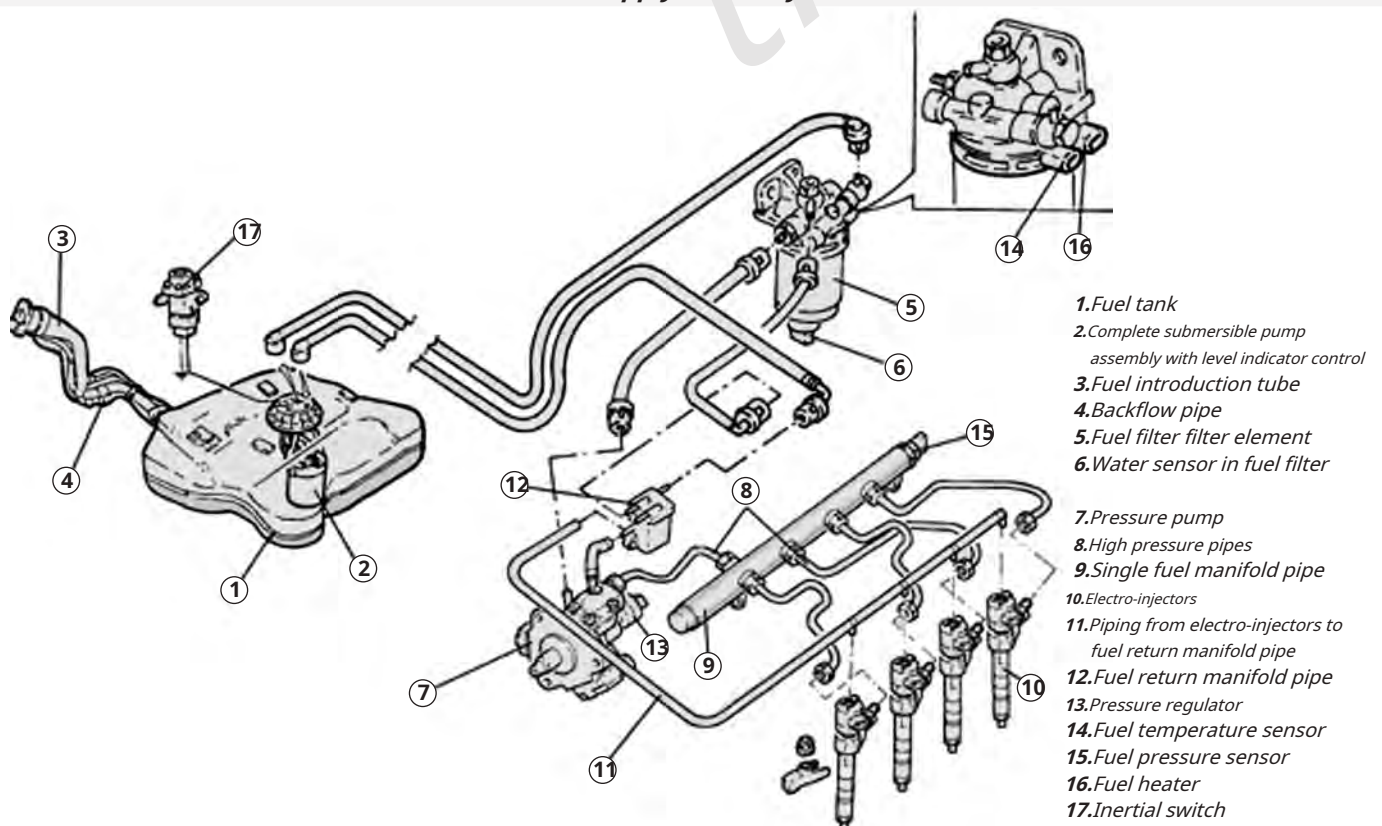
FUEL SUPPLY

The fuel supply system is divided into a low pressure circuit and a high pressure circuit. The low pressure circuit consists of an auxiliary electric pump immersed in the tank; a

fuel filter; from a fuel return manifold and connecting pipes.

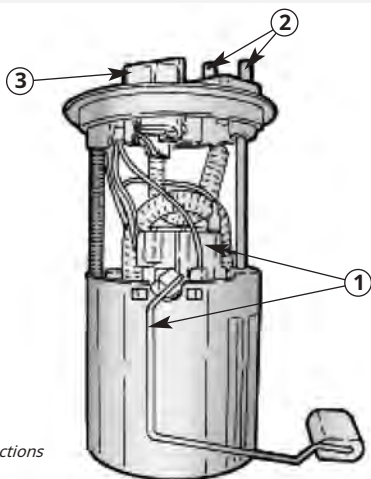
The high pressure circuit consists of the pressure pump; the single fuel manifold pipe; the electro-injectors and the connecting pipes.

Fuel supply assembly



FIAT 500L**1. engine > technical data****LOW PRESSURE PUMP**

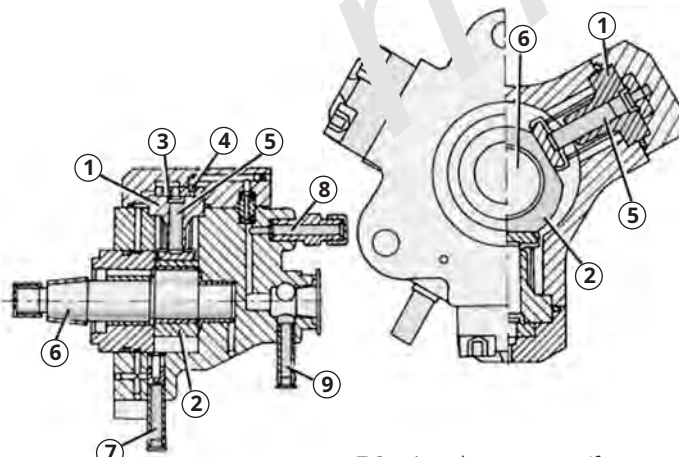
The electric fuel pump has a permanent magnet electric motor that drives the pump impeller and an end support cover that contains the electrical and hydraulic connections. Immersed in the tank, accessible from the passenger compartment, via a protective cover positioned under the rear seat cushion.

Fuel pump

- 1. Float level sensor
- 2. Flow and return connections
- 3. Electrical connection

HIGH PRESSURE FUEL PUMP

It is of the "radialjet" type with three radial pistons (total displacement 0.567 cm³) and is controlled by the timing belt with no timing requirements. The pressure pump must be supplied with a pressure of at least 0.5 bar; therefore the fuel system is equipped with an auxiliary electric pump immersed in the tank. The maximum delivery pressure reaches 1400 bar. The pressure pump is lubricated and cooled by the fuel itself through appropriate channels.

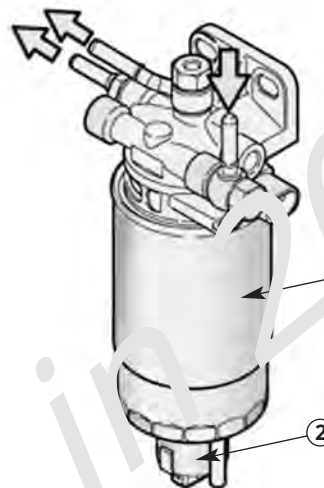
High pressure

- 1. Cylinder
- 2. Eccentric
- 3. Plate-type intake valve
- 4. Ball delivery valve
- 5. Piston
- 6. Pump shaft
- 7. Suction - low pressure (from fuel filter)
- 8. Delivery - high pressure (to the single fuel manifold)
- 9. Delivery - low pressure (to the fuel return manifold pipe)

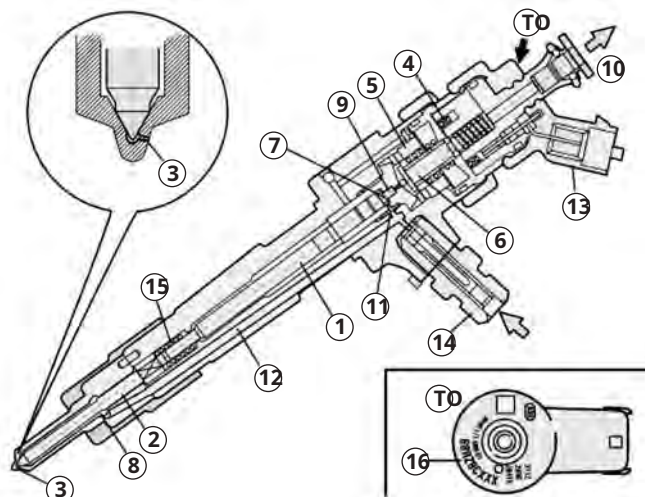
FUEL FILTER

The fuel filter is mounted in the engine compartment on the firewall. It is of the cartridge type with a filtering element (1) consisting of a pack of paper discs with a filtering surface of 5300 cm² and a filtering degree of 4 ÷ 5 m.

The sensor for the presence of water in the fuel filter (2) is mounted at the base of the cartridge.

Fuel filter**INJECTORS**

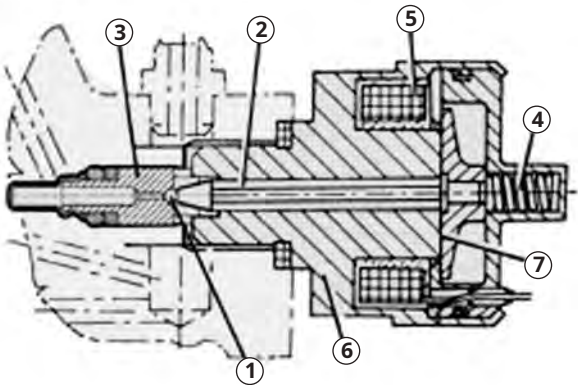
The electro-injectors are mounted on the cylinder head and controlled by the injection control unit.

Injectors

- 1. Pressure rod
- 2. Plug
- 3. Nozzle
- 4. Coil
- 5. Pilot valve
- 6. Shutter
- 7. Control area
- 8. Volume of diet
- 9. Control volume
- 10. Low pressure fuel return
- 11. Control duct
- 12. Food pipe
- 13. Electrical connection
- 14. Entrance connection
- 15. Spring
- 16. Ima Code

FIAT 500L**1. engine > technical data****PRESSURE REGULATOR**

It is mounted on the pressure pump and controlled by the injection control unit, it regulates the fuel supply pressure to the electro-injectors.

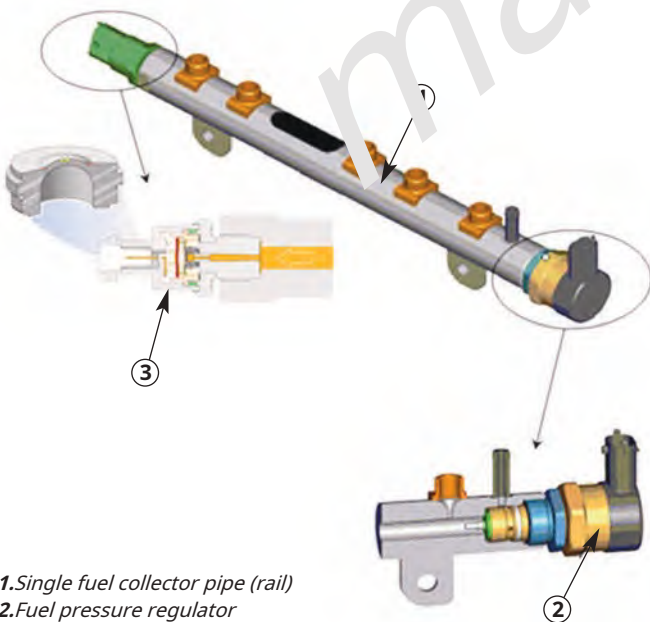
Pressure regulator

- | | | |
|------------|----------------------|----------|
| 1. Shutter | 3. Valve | 5. Coil |
| 2. Pin | 4. Spring of preload | 6. Body |
| | | 7. Still |

RAIL

The fuel distribution manifold (rail) has the purpose of dampening the pressure oscillations due to the three pump strokes that occur at each pump revolution and to the openings of the injectors.

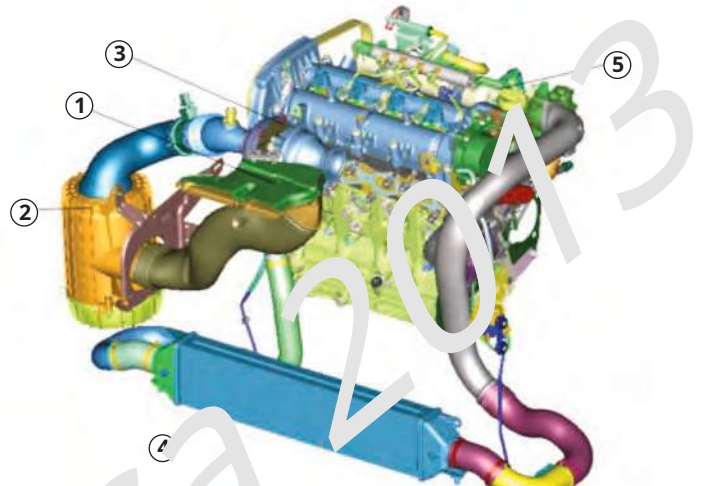
The rail, made of steel to withstand high operating pressures, has the shape of a very elongated cylinder, in which a cylindrical cavity, with a diameter of 10 mm, has been created along the entire length of the rail; the volume of the cavity is approximately 33 cm³.

Common Rail

1. Single fuel collector pipe (rail)
2. Fuel pressure regulator
3. Fuel pressure sensor

AIR SUPPLY

Air supply circuit consisting of a paper filter placed in its own box, an intake manifold and an intercooler for cooling the compressed air exiting the turbine compressor impellers.

Engine air supply assembly 16V

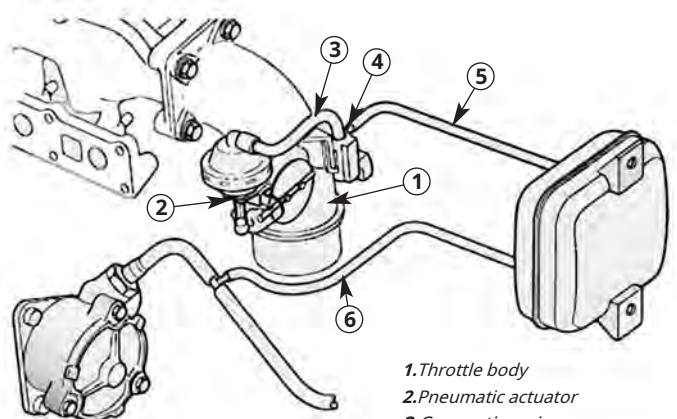
- | | |
|-----------------------------------|--|
| 1. Cold air intake | 4. Air-to-air heat exchanger (intercooler) |
| 2. Air filter | 5. Suction box |
| 3. Variable geometry turbocharger | |

AIR FILTER

Paper air filter with replaceable element.

PNEUMATIC BUTTERFLY

Pneumatically controlled throttle body. To reduce engine noise when switching off (noise generated by the dual mass flywheel DVA), a butterfly has been introduced before the intake manifold which has the task of closing the air passage to the cylinders.

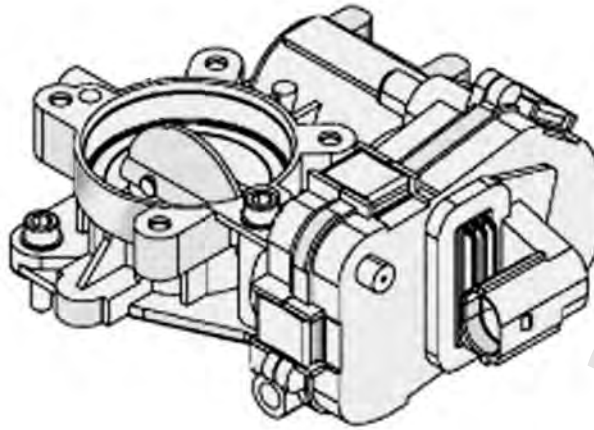
Throttle body

1. Throttle body
2. Pneumatic actuator
3. Connecting pipe
4. Pierburg Solenoid Valve
5. Vacuum tank
6. Connection pipe to the depressor

FIAT 500L**1. engine > technical data****THROTTLE BODY**

The amount of incoming air is regulated as the throttle valve opens, and is then directed into each combustion chamber.

The throttle body does not have a solenoid valve to control idle speed, but this control is performed by the throttle actuator when it opens/closes the throttle.

Motorized butterfly**SUPERCHARGING****TURBOCHARGER**

It has variable geometry (fixed geometry for the 1.6 Multijet 105 HP version) and is connected to the exhaust manifold; its purpose is to increase the volumetric efficiency of the engine.

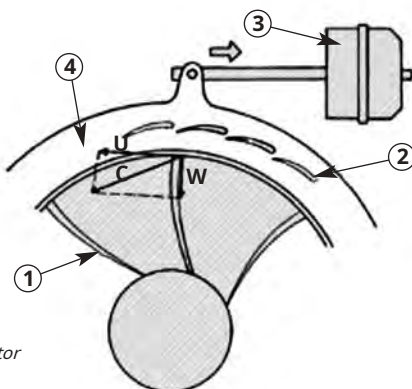
Low speed operation

When the engine is operating at low rpm, the exhaust gases have little kinetic energy: under these conditions a traditional turbine would spin slowly, providing limited boost pressure.

In the variable geometry turbine, on the other hand, the moving blades are in the maximum closed position and the small passage sections between the blades increase the speed (C) of the incoming gas.

Higher inlet velocities result in higher peripheral velocities (U) of the turbine and consequently of the compressor.

The speed of the gases passing inside the impeller is indicated by the vector (W).

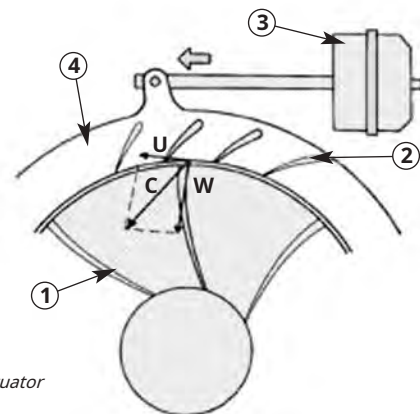
Low-speed operation

- 1. Turbine
- 2. Moving Palettes
- 3. Pneumatic actuator
- 4. Rotating ring

High-speed operation

By increasing the engine rotation speed, there is a progressive increase in the kinetic energy of the exhaust gases. Consequently, the speed of the turbine increases and therefore the boost pressure, which also acts on the actuator. The actuator, controlled by the solenoid valve, maneuvers the opening of the mobile blades via a tie rod, until reaching the maximum opening position. There is therefore an increase in the passage sections and consequent slowing down of the flow of exhaust gases that pass through the turbine at equal or lower speeds than the low speed condition.

The turbine speed decreases, to settle at a value suitable for correct engine operation at high revs.

High-speed operation

- 1. Turbine
- 2. Moving Palettes
- 3. Pneumatic actuator
- 4. Rotating ring

INTERCOOLER

Air/air intercooler, allows the reduction of the temperature of the air coming from the compressor impeller, giving a higher density.

FIAT 500L

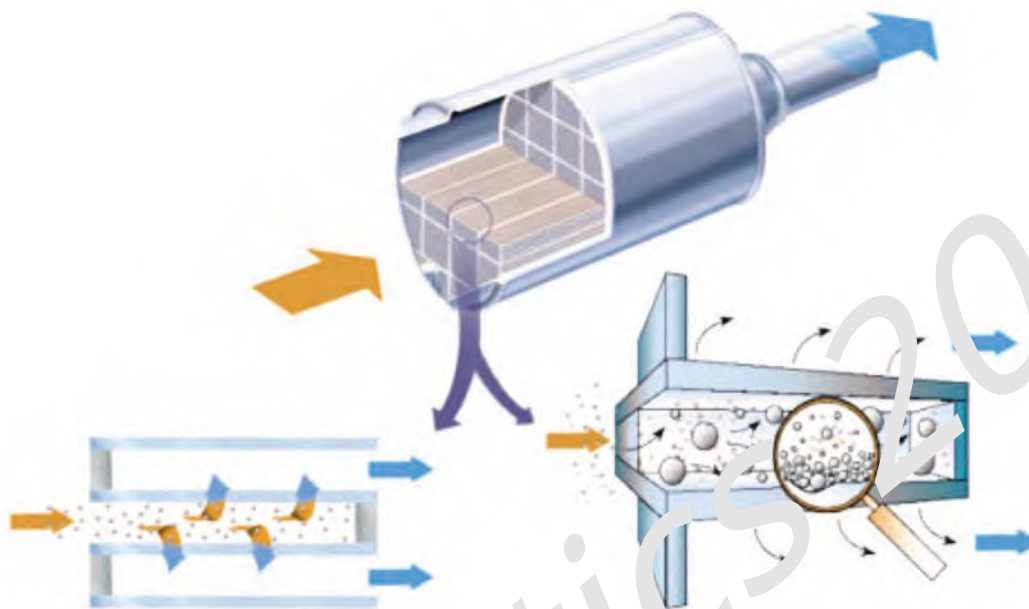
1. engine > technical data

ANTIPOLLUTION

DPF SYSTEM

It is a mechanical filter that "traps" carbon particles (particulate matter) and engine oil ash present in the exhaust gas of the diesel engine. The action of the DPF allows the carbon particles to be reduced by up to a maximum of approximately 90%.

DPF system

**How it works**

The operation of the DPF system is managed, with specific strategies, by the engine control unit. In addition to the accumulation trap, it consists of an exhaust gas temperature sensor and a differential pressure sensor. The differential pressure sensor, via specific pipes, detects the pressure of the exhaust gases upstream and downstream of the trap, signaling the control unit the gradual accumulation of particulate matter. The accumulation process of particulate matter, and the relative increase of the pressure of the exhaust gases inside the trap, depends on the engine load, the weight of the vehicle, the engine displacement and power. Therefore, it is necessary to remove the particulate matter occasionally, regenerating the trap according to a procedure that uses multiple fuel injections to raise the temperature of the exhaust gases (about 600°C) and therefore burn the particulate matter. The regeneration procedure is controlled by the injection control unit which acts on the fuel dosage (up to 5 injections in the same engine cycle per cylinder) and on the air control (EGR and supercharging pressure).

The regeneration phase takes place in a few minutes and does not affect the continuity of torque delivered by the engine compared to normal operation. When the driving profile does not allow automatic regeneration, the injection control unit, after a few failed attempts, activates the "particulate trap clogged" warning light on the instrument panel. It is therefore advisable to keep the vehicle moving until the warning light goes off.

If the "particulate trap clogged" warning light remains on, it is essential to perform forced regeneration using the diagnostic tool.

If the conditions of the particulate filter worsen (the accumulation threshold of 250% is exceeded), in addition to the "particulate trap clogged" warning light, the EOBD warning light also comes on, making forced regeneration using a diagnostic tool essential.

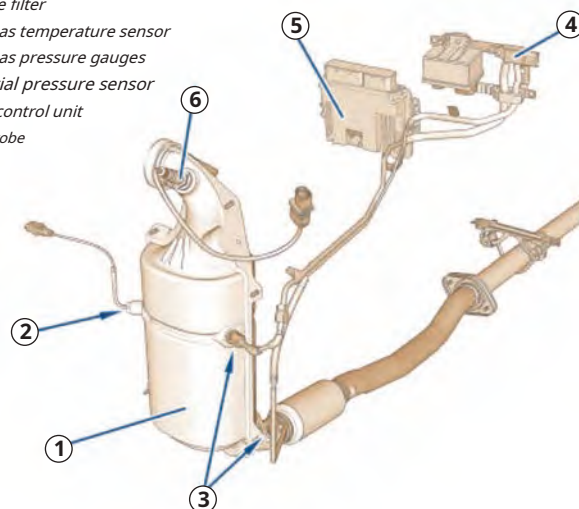
During the regeneration phase, it is possible that some particulate matter may pollute the engine oil, and it will therefore be necessary to replace it earlier than scheduled. This is indicated by the

"minimum engine oil pressure" warning light in flashing mode. This signal is given by the injection control unit based on:

- number of regenerations
- kilometers traveled
- number of engine starting cycles
- number of cold starts
- average value of engine oil temperature

DPF Filter

1. Particulate filter
2. Exhaust gas temperature sensor
3. Exhaust gas pressure gauges
4. Differential pressure sensor
5. Injection control unit
6. Lambda Probe



FIAT 500L

1. engine > technical data

EGR SYSTEM

EGR (Exhaust Gas Recirculation) is used on engines to reduce nitrogen oxide (NOx) emissions.

The mass of recirculated gases is essentially composed of air that participated in the combustion process, and combustion products (carbon dioxide, water vapour).

These last two chemical species have a higher heat capacity than the air they replace, and therefore the average heat capacity of the charge will be higher.

With the evolution of the regulations on harmful emissions, the EGR technology has also undergone a significant evolution: it has gone from the simple on-off valve to the gas modulating valve, then the exchanger for lowering the temperature of the recirculated gases was introduced. The use of the heat exchanger was necessary because the recirculated gases, being at a higher temperature than the aspirated air, increase the temperature of the charge that enters the combustion chamber, decreasing the volumetric efficiency.

By channeling the burnt gases into a heat exchanger, their temperature is lowered, thus allowing for a higher mass flow rate and a lower charge temperature with obvious benefits in terms of reducing NOx emissions.

EGR Module

The new EGR module mounted on this engine, in addition to having a new modulating valve, allows the choice of whether to cool the exhaust gases or exclude their cooling by implementing a bypass.

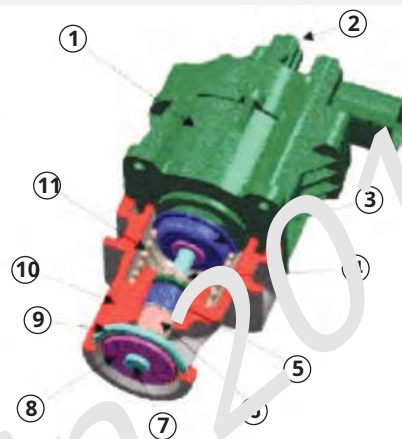
This function, completely managed by the engine control unit, allows the EGR operation to be optimised in terms of reducing nitrogen oxides, without however penalising hydrocarbon (HC) and carbon monoxide (CO) emissions.

EGR modulator valve

The modulating valve used for this engine is based on a new operating principle where the movement of the plate is implemented by a direct current motor and a special sensor detects its position.

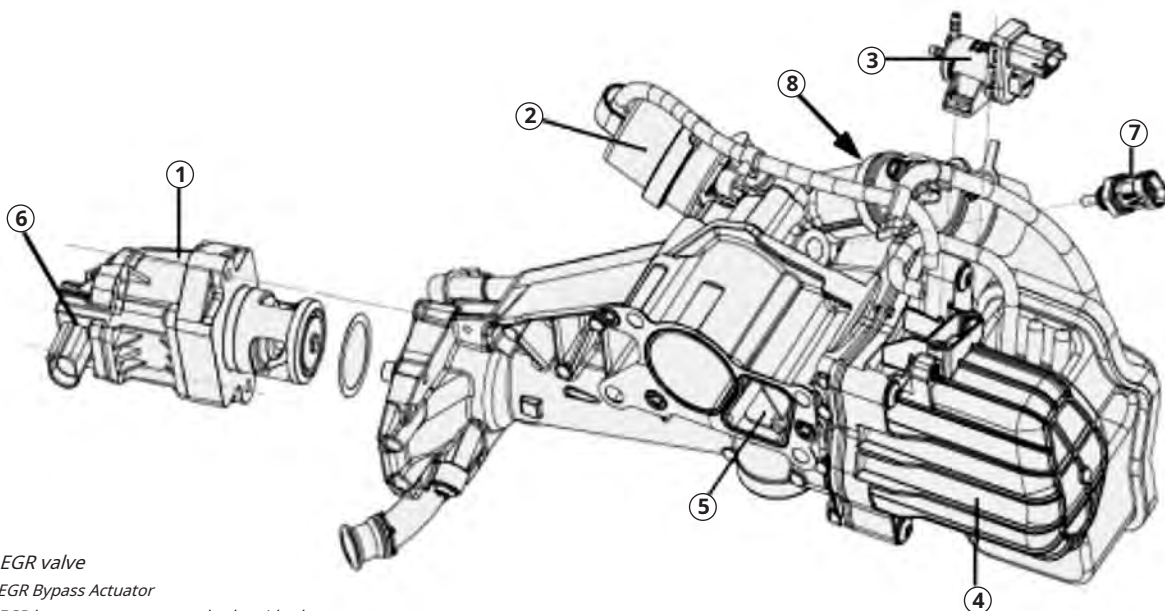
EGR modulator valve

- 1.DC motor
- 2.Valve position sensor
- 3.Spring retaining cap
- 4.Sealing system
- 5.Sliding guide
- 6.Filter seal
- 7.Valve stem
- 8.Valve
- 9.Valve seat
- 10.Valve body
- 11.Return spring



The advantages introduced by the new valve are:

- greater actuation force, therefore less sensitivity to blocking
- single plate, resulting in less sensitivity to leakage
- presence of a plate position sensor, which allows for better control and diagnosis of the functions
- less dispersion of performance, with consequent consolidation of calibrations.

EGR Module

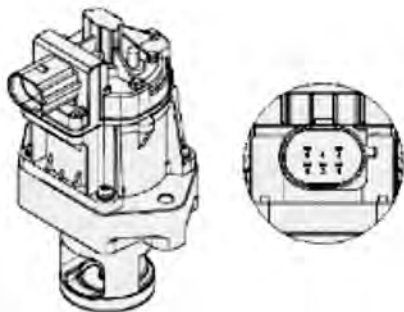
- 1.EGR valve
- 2.EGR Bypass Actuator
- 3.EGR bypass actuator control solenoid valve
- 4.EGR heat exchanger
- 5.EGR Bypass Valve
- 6.EGR valve position sensor
- 7.Engine coolant temperature sensor
- 8.Thermostat

FIAT 500L**1. engine > technical data****Valve position sensor**

This sensor detects the actual position of the valve plate, returning information in voltage between 0.5 and 4.5V.

The engine control unit takes into account the ageing of the position sensor and, at each engine shutdown, carries out a learning of the closing position drift which is then stored and used at the next start-up.

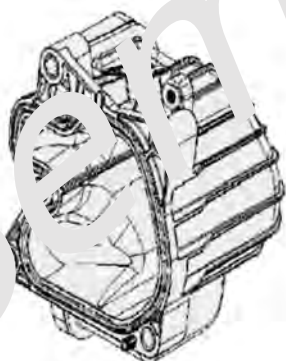
To ensure this functionality and avoid damage to the EGR valve each time it or the engine control unit is replaced, a specific learning procedure must be carried out.

Valve position sensor**EGR exchanger**

Allows the exhaust gases to cool. It may or may not be traversed by exhaust gases depending on the position of the EGR cooling by-pass valve

Technical features

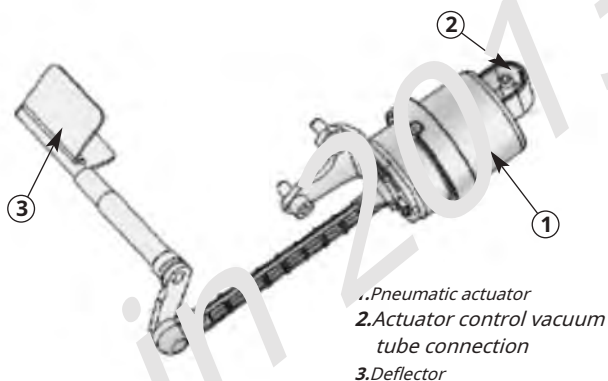
- Maximum exhaust gas temperature at inlet = 350 °C
- Maximum exhaust gas temperature at exit = 200 °C

EGR heat exchanger**EGR Cooling Bypass Actuator**

The actuator is pneumatic and works with the vacuum taken from the tank integrated in the EGR heat exchanger.

The actuator has only two positions available, in the rest position the recirculated gases pass through the heat exchanger, when the by-pass is activated, the deflector conveys the gases, through an uncooled duct, directly to the outlet of the EGR module.

The engine control unit controls the by-pass position via an ON/OFF pneumatic solenoid valve.

Pneumatic actuator**Solenoid valve control EGR by-pass actuator**

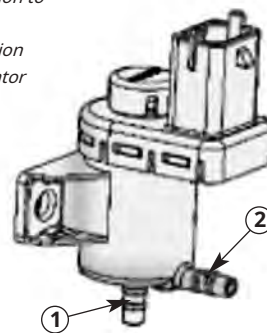
It is an electro-pneumatic switch that allows you to control the movement of the by-pass actuator.

The solenoid valve is controlled by the engine control unit with an ON-OFF command.

When powered, the vacuum reaches the actuator, while in the absence of power, the ambient pressure acts on the actuator and therefore it moves to the rest position.

Solenoid valve

1. Fitting for connection to the vacuum tank
2. Fitting for connection with by-pass actuator

**MAINTENANCE****ENGINE OIL**

Name	Classification	Quantity (liters)
SELENIA TURBODIESEL	SAE 10W-40 - ACEA B3 - API CD	4.4
SELENIA WR DIESEL	SAE 5W-40 - ACEA B4 - API CF	4.4

COOLANT

Name	Classification
Paraflu Up	CUNA NC 956-16, ASTM D3306
Amount	7.2 liters

FIAT 500L**1. engine > technical data****TIGHTENING TORQUES**

Component	Fixing	OR	Value (Nm)
Rigid support of the powertrain on the timing side to the crankcase	Screw	M10	45 ÷ 55
Elastic insert on distribution side - body side	Screw (to be replaced)	M10	45 ÷ 55
Elastic insert on distribution side - rigid support side	Nut (to be replaced)	M12	68 ÷ 82
Elastic insert on distribution side - rigid support side	Nut (to be replaced)	M12	68 ÷ 83
Elastic insert of the gearbox side support to the body	Screw (to be replaced)	M10	54 ÷ 66
Elastic insert of the gearbox side support to the body	Screw (to be replaced)	M12	77 ÷ 93
Elastic insert of the gearbox side support to the rigid support	Nut (to be replaced)	M12	90 ÷ 110
Elastic insert of the gearbox side support to the rigid support	Screw (to be replaced)	M12	45 ÷ 55 + 45°
Rigid mount of the powertrain on the gearbox side	Screw (to be replaced)	M10	50 ÷ 60
Rigid mount of the powertrain on the gearbox side	Screw (to be replaced)	M12	45 ÷ 55 + 45°
Gearbox reaction lower tie rod - bracket side on gearbox	Bolt (to be replaced)	M12	68 ÷ 82
Gearbox reaction lower tie rod - bracket side on gearbox	Bolt (to be replaced)	M12	90 ÷ 110
Gearbox reaction lower tie rod - bracket side on gearbox	Bolt (to be replaced)	M14	80 ÷ 120 + 135°
Gearbox reaction lower link - suspension crossmember side	Screw (to be replaced)	M12	12.2 ÷ 14.7
Lower reaction tie rod shifter bracket	Screw (to be replaced)	M12	81 ÷ 99
Lower reaction tie rod shifter bracket	Screw (to be replaced)	M16	121 ÷ 148
Lower reaction tie rod shifter bracket	Screw (to be replaced)	M12	45 ÷ 55 + 45°
Powertrain reaction lower tie rod - engine side	Bolt	M12	68 ÷ 83
Powertrain reaction lower tie rod - engine side	Bolt (to be replaced)	M12	72 ÷ 88
Powertrain lower reaction link - suspension crossmember side	Screw (to be replaced)	M12	121 ÷ 148
Engine bracket for lower reaction tie rod	Screw	M10	36 ÷ 44
Engine bracket for lower reaction tie rod	Nut	M10	36 ÷ 44
Valve cover	Screw	M6	8 ÷ 10
Engine upper cylinder head	Screw	M8	23 ÷ 28
Cylinder head	Screw	M12	65 +/- 3 + 90° + 90° + 90°
Engine oil drain plug	Cork	M14	18 ÷ 22
Engine oil pan	Side screws	M8	22 ÷ 27
Engine oil pan	Distribution side and gearbox side screws	M6	8 ÷ 10
Crankshaft oil seal front cover	Screw (to be replaced)	M6	8 ÷ 10
Crankshaft rear cover to crankcase	Screw (to be replaced)	M6	8 ÷ 10
Flywheel side oil seal cover	Screw (to be replaced)	M6	8 ÷ 10
Engine flywheel	Screw (to be replaced)	M12	144 ÷ 176
Balance shafts	Screw	M12	19 ÷ 21 + 100°
Ball joints	Screw	M9	24 ÷ 26 + 60°
Distribution control moving tensioner	Screw	M8	23 ÷ 28
Timing control driven pulley	Screw	M12	28 ÷ 31 + 40°
Drive toothed pulley	Left-handed screw	M16	323 ÷ 357
Fixed tensioner of the distribution control	Screw	M8	23 ÷ 28

FIAT 500L**1. engine > technical data**

Component	Fixing	OR	Value (Nm)
Timing belt tensioner support	Screw	M10	45 ÷ 55
Camshaft gears	Screw	M12	29 ÷ 32 + 40°
Fuel tank	Screw	M8	32 ÷ 39
Fuel pump assembly fixing ring nut	Ring nut	-	54 ÷ 66
Water presence sensor - fuel temperature	-	-	2 ÷ 3
Electroinjector brackets	Nut	M8	23 ÷ 28
Piping from pressure pump to fuel manifold - pressure pump side	Connection	M12	22 ÷ 24
Piping from pressure pump to fuel manifold - fuel manifold side	Connection	M14	18 ÷ 20
Pipes from fuel manifold to electro-injectors - fuel manifold side	Connection	M1	13 ÷ 20
Pipes from fuel manifold to electro-injectors - electro-injectors side	Connection	M1	22 ÷ 24
Fuel pressure sensor - fuel manifold side	-	-	65 ÷ 75
Single fuel collector pipe (rail)	Screw	M	23 ÷ 28
Pressure pump	Nut (to be replaced)	M8	23 ÷ 28
Pressure pump control pulley	Nut	M14	45 ÷ 55
Engine water temperature sensor	-	M12	18 ÷ 22
RPM sensor	Screw	M6	8 ÷ 10
Cam angle sensor	Screw	M6	8 ÷ 10
Throttle body	Screw	M8	23 ÷ 28
Pressure pump support - base side	Top screw (pre-treated with sealant - to be replaced)	M8 x 1.25 x 110	23 ÷ 28
Pressure pump support - base side	Screw	M8 x 1.25 x 35	23 ÷ 28
Pressure pump support - cylinder head side	Screw	M10 x 1.25 x 40	45 ÷ 55
Turbocharger and exhaust manifold assembly - cylinder head side	Nut (to be replaced)	M8	22 ÷ 27
Turbocharger to exhaust manifold	Nut (to be replaced)	M8	18 ÷ 22
Engine oil pressure warning light switch	-	M14	29 ÷ 35
Engine oil delivery pipe to turbocharger - turbocharger side	Connection	M10	14 ÷ 16
Engine oil delivery pipe to turbocharger - upper cylinder head side	Connection	M12	22 ÷ 27
Engine oil return pipe from turbocharger	Screw	M10	45 ÷ 55
Engine oil filler neck	Screw	M6	8 ÷ 10
Engine oil filter cover	-	-	25
Thermostat	Screw	-	8
Water pump	Screw (to be replaced)	M8	23 ÷ 28

FIAT 500L**1. engine > engine management**

Engine Management

GENERAL INFORMATION

The Common Rail EDC-16C39 is a high-pressure electronic injection system for fast direct injection diesel engines.

The main features are:

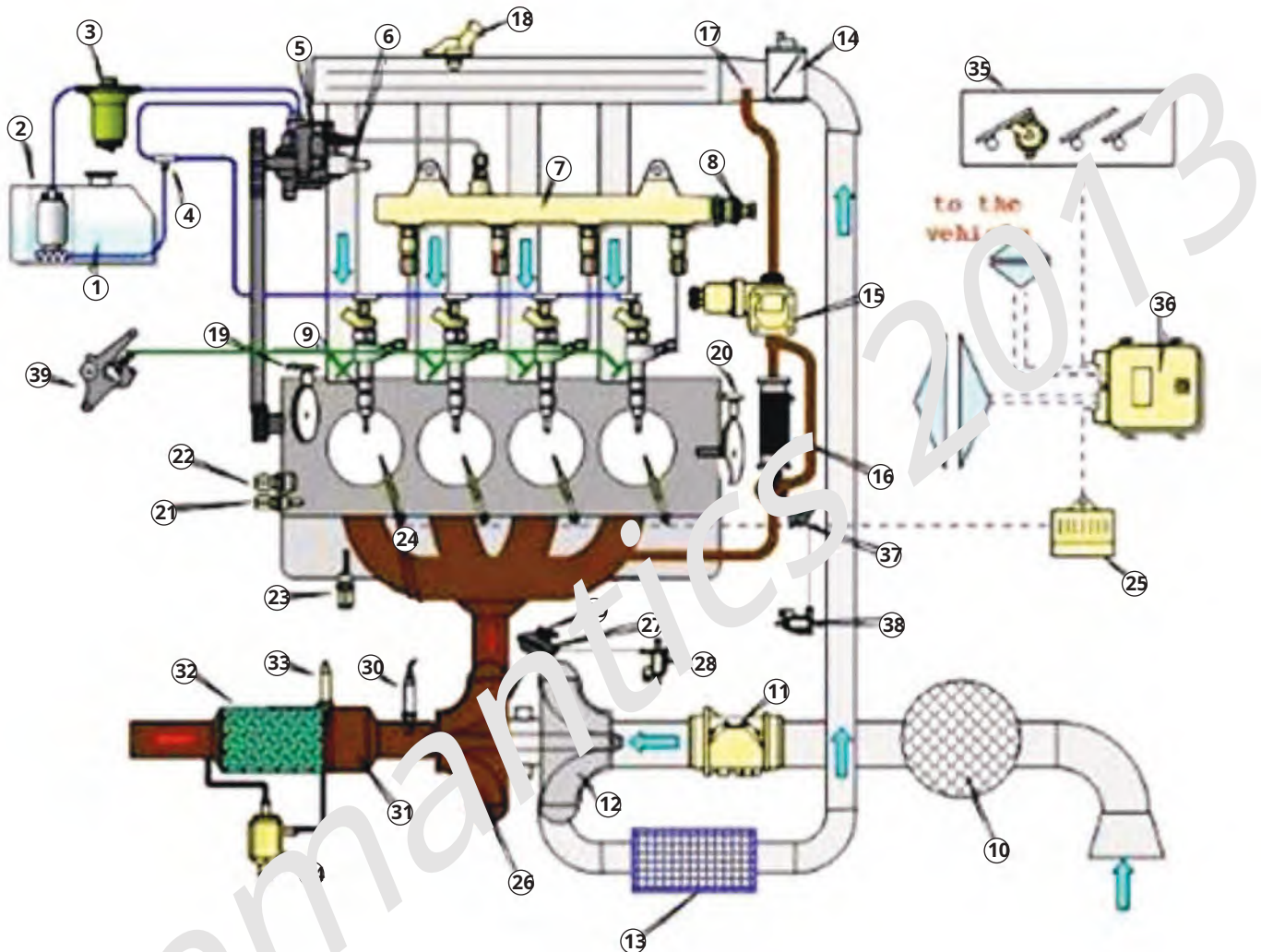
- availability of high injection pressures (1600 bar)
- possibility of modulating these pressures between 150 bar up to the maximum operating value of 1600 bar, independently of the rotation speed and engine load
- ability to operate at high engine speeds (up to 5000 rpm at full load)
- precision of injection control (advance and duration of injection)
- reduction of consumption
- reduction of emissions

The main functions of the system are essentially the following:

- fuel temperature control
- Engine coolant temperature control

- control of the quantity of fuel injected
- idle speed control
- fuel cut during release (Cut-off)
- Cylinder balance control from idle up to 3,500 rpm
- anti-sawing control
- Exhaust smoke control during acceleration
- exhaust gas recirculation (EGR) control
- maximum torque limitation control
- maximum speed limitation control
- Check the preheating glow plugs
- check of air conditioning system start (when applicable)
- auxiliary fuel pump control
- cylinder position control
- main and multiple injection advance control
- closed loop control of injection pressure
- control of the electrical balance
- IMA injector calibration



FIAT 500L**1. engine > engine management****Components**

- | | | | |
|--------------------------------|---|--|--|
| 1. Fuel tank | 13. Intercooler | 24. Glow plugs | 31. Catalyst |
| 2. Electric fuel pump | 14. Throttle body | 25. Glow plug control unit | 32. Particulate filter (DPF) |
| 3. Fuel filter | 15. EGR valve | 26. Turbine | 33. Exhaust gas temperature sensor |
| 4. Fuel return manifold | 16. EGR Heat Exchanger | 27. Variable geometry turbocharger pneumatic actuator | 34. Particulate filter differential pressure sensor |
| 5. High pressure pump | 17. Exhaust gas delivery pipe to the intake box | 28. Solenoid valve for variable geometry turbocharger pneumatic actuator control | 35. Accelerator pedal potentiometer |
| 6. Fuel pressure regulator | 18. Air pressure - temperature sensor | 29. Variable geometry turbocharger pneumatic actuator position sensor | 36. Engine control unit |
| 7. Single fuel manifold (rail) | 19. Engine speed sensor | 30. Lambda Probe | 37. EGR exhaust gas cooling bypass |
| 8. Fuel pressure sensor | 20. Phase sensor | | 38. Pneumatic actuator for exhaust gas cooling by-pass control for EGR |
| 9. Electro-injectors | 21. Coolant temperature sensor | | 39. Actuator for control of deflectors on intake box (SWIRL) |
| 10. Air filter | 22. Engine oil pressure sensor | | |
| 11. Flow meter | 23. Engine oil level sensor | | |
| 12. Air compressor | | | |

FIAT 500L**1. engine > engine management****COMPONENTS**

The Common Rail system allows for a pre-injection (pilot injection) before TDC with the advantage of reducing the pressure derivative in the combustion chamber, reducing the combustion noise value, typical of direct injection engines.

The control unit controls the amount of fuel injected by regulating the line pressure and injection timing. The information that the control unit processes to control the amount of fuel to be injected is:

- engine revolutions

- coolant temperature

- boost pressure

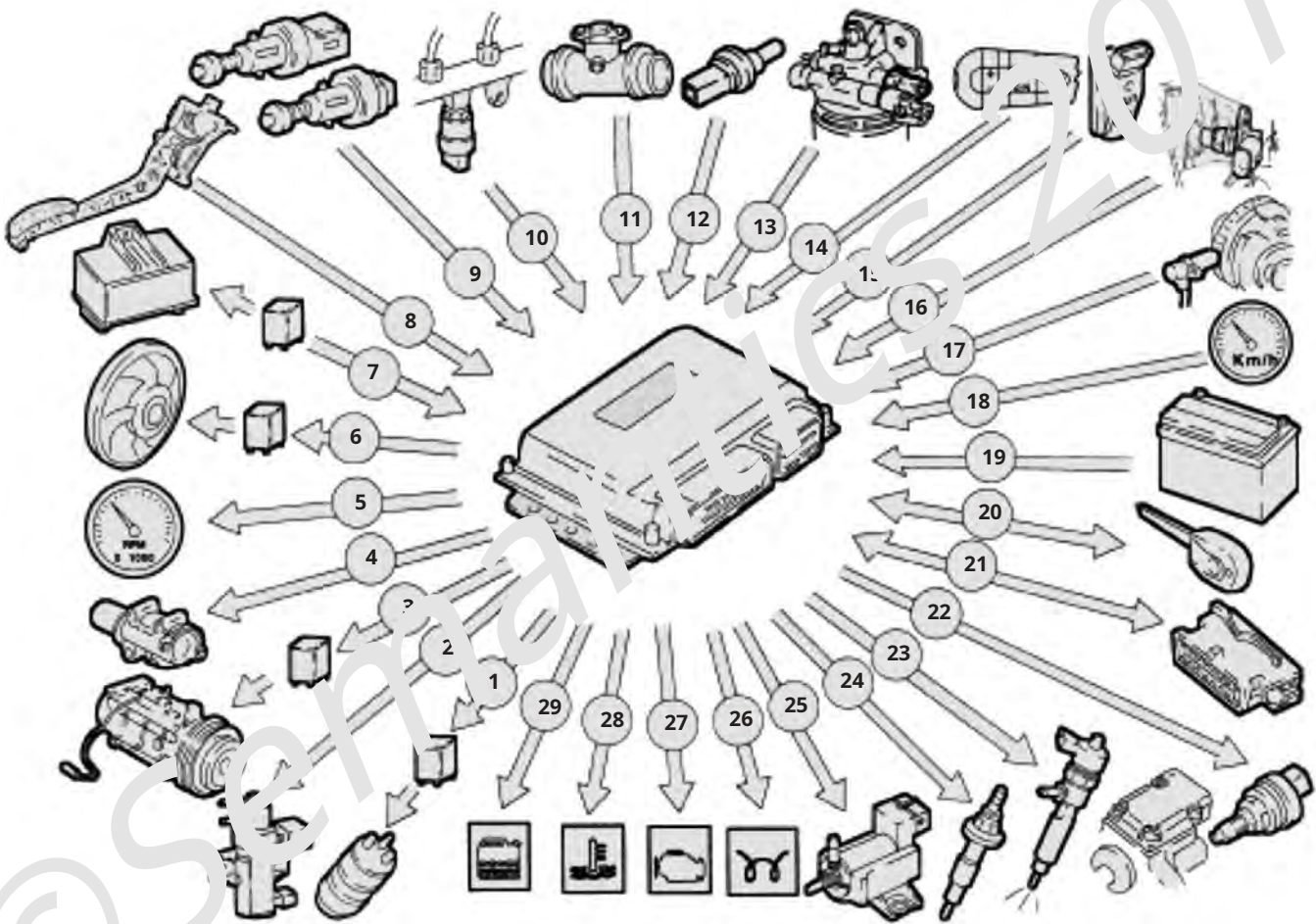
- air temperature

- quantity of air sucked in

- battery voltage

- diesel pressure

- accelerator pedal position

Components

1. Common rail fuel pump
2. Boost pressure control solenoid valve
3. Air conditioning compressor
4. EGR Solenoid Valve
5. Tachometer (via CAN network)
6. Electric fans
7. Glow plug preheating control unit
8. Accelerator pedal potentiometer

9. Brake - clutch pedal switch
10. Fuel pressure sensor
11. Flow meter
12. Coolant temperature sensor
13. Fuel temperature sensor
14. Cruise Control (where provided) (via CAN network)
15. Air pressure and temperature sensor

16. Phase sensor
17. RPM sensor
18. Speedometer (via CAN network)
19. Drums
20. FIAT CODE (via CAN network)
21. Diagnostic socket (via CAN network)
22. Pressure regulator
23. Electro-injectors
24. Glow plugs

25. Throttle solenoid valve (on throttle body)
26. Glow plug preheating warning light (via CAN network)
27. Injection warning light (via CAN network)
28. Max water temperature warning light (via CAN network)
29. Water in fuel warning light (via CAN network)

FIAT 500L

1. engine > engine management

Multijet injection

The electro-injectors in the Multijet engine system perform precisely metered injections at the exact moment and are controlled by the engine control unit up to five times per cycle.

1.	Pre-injection
2.	Main injection
3.	Main injection
4.	Main injection
5.	Post - injection

For this reason, the engine management control unit is required to know the manufacturing tolerance of each injector (IMA classification) and its mounting position.

During testing, the injectors are checked by checking their characteristics under different pressure/flow conditions. All injectors that do not fall within a certain standard are eliminated; the remaining ones are classified with a nine-character alphanumeric code, called IMA code, reported with laser writing on the upper part of the magnet.

INPUT SIGNALS**Lambda Probe**

This sensor is used to measure the oxygen content and the Lambda value (ratio between the amount of intake air and the theoretical amount of air required for complete combustion of the injected fuel) in the exhaust gases of automotive engines.

When the mass of oxygen present coincides with that necessary to burn all the fuel, the mixture is said to be stoichiometric and its ratio is equal to 14.6. In this case, Lambda conventionally assumes a unit value.

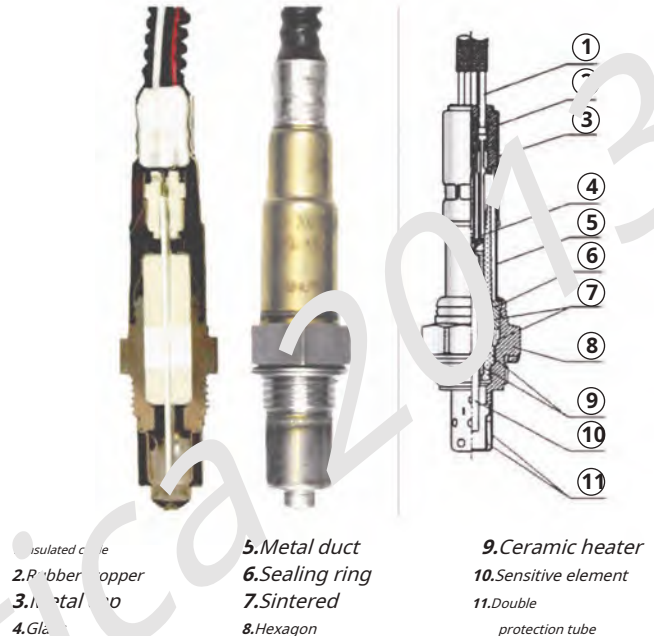
That said, we can express Lambda as the ratio between the amount of air aspirated and the amount of air required to burn the injected fuel.

Lambda values range from 0.65 (rich mixture, oxygen deficiency) to infinity (oxygen percentage equal to the percentage present in the air, approximately 20.95%).

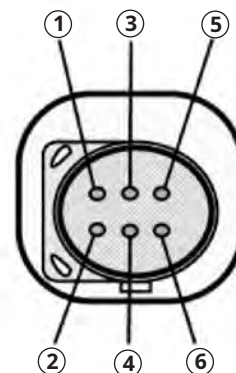
The value measured by the Lambda probe is compared with the Lambda value calculated by the engine control unit and, if necessary, changes are made to the mapping of the injectors and the air flow meter in order to maintain engine functionality and harmful emissions within the legal limits; its function is therefore to monitor the engine over time.

Lambda probe view

The sensitive element is planar, the probe is made of three layers of zirconium oxide, this particular geometry allows for a very compact sensor, with low intensity pumping currents that further reduce the power absorption of the sensor.

Probe components

Heater supply voltage rating	7.5 V
Power dissipation at 7.5V	7.5W
Lambda measuring range	from 0.8 to infinity
System tolerance	O ₂ /O ₂ = +/- 4 %
Exhaust temperature	≤ 980 °C
Exhaust pressure	≤ 2.5 bar
Diet	≥ 10.8V
Activation time	≤ 10 s
Potentiometer range	30 to 300 Ohm

Connector

1. Pumping current (I_p)
2. Virtual mass
3. Heater (-)
4. Heater (+)
5. Calibration current
6. Nerst tension

FIAT 500L**1. engine > engine management****INPUT SIGNALS****Camshaft position sensor**

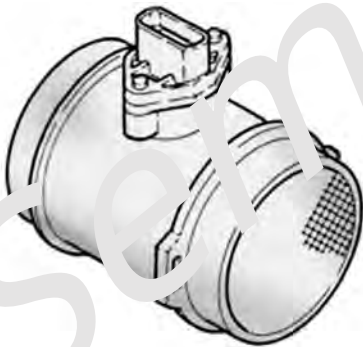
It is a Hall effect sensor, mounted on the cylinder head, facing the welded ring (on which the window is obtained) on the pulley keyed to the camshaft. Its task is to detect the engine phase during synchronization.

Phase sensor

Pin	Signal	Reference Pin
1	Mass	11 connector B
2	Signal	50 connector B
3	Power supply (+5V)	20 connector B

Intake air flow and temperature sensor

The flow meter has the task of measuring the maximum flow of air sucked from the environment; this flow is used to control the FGR and to limit exhaust smoke during load changes. It is a hot film meter, mounted on the intake duct downstream of the air filter and upstream of the compressor, it sends digital frequency signals for air flow and air temperature to the engine control unit.

Flowmeter

Diameter of passage section	70 mm
Voltage	12V nominal
Range	10÷640 kg/h
Normal flow rate	480 kg/h

Pin	Color	Signal	Reference Pin
1	Orange/Black	Power supply (+12V)	22 shunting control unit
2	Viola	Mass	44 connector B
3	Green	Temperature Signal	37 connector B
4	White/Green	Mass Air Signal	42 connector B

Coolant temperature sensor

It is mounted on the thermostat and measures the temperature of the coolant to provide the control unit with an indication of the thermal state of the engine.

This is an NTC sensor, whose active part is a negative coefficient resistor, obtained by sintering.

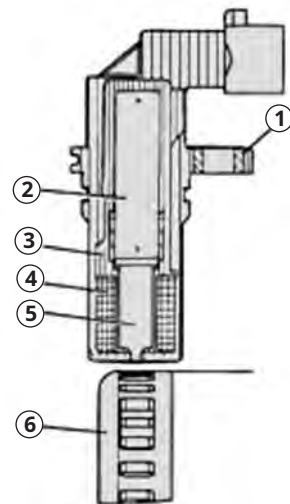
Coolant temperature sensor

The nominal resistance is between	$2.5 \text{ k}\Omega \pm 6\%$	at 20° C
	$0.15 \text{ k}\Omega \pm 2\%$	at 100° C

Pin	Color	Signal	Reference Pin
1	S	Signal	58 connector B
2	Grey / Green	Mass	41 connector B

RPM sensor

The sensor's task is to detect the rotation speed of the engine and its angular position. It is a variable magnetic reluctance transducer, mounted on the crankcase and facing the tone wheel screwed to the crankshaft (50-2 teeth).

RPM sensor section

- 1.Brass metal compass
- 2.Permanent magnet
- 3.Plastic sensor body
- 4.Coil winding
- 5.Polar core
- 6.Plonic wheel

Winding resistance	$860 \Omega \pm 10\%$ at 20° C
--------------------	--------------------------------

Pin	Color	Signal	Reference Pin
1	Brown	Signal	27 connector B
2	White	Signal	12 connector B

FIAT 500L

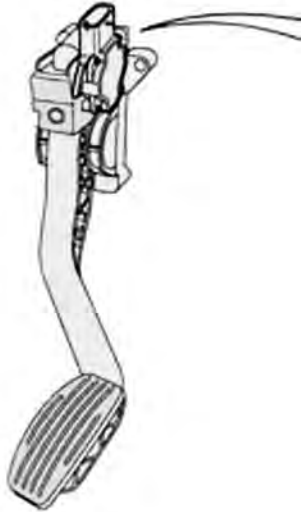
1. engine > engine management

Throttle potentiometer

The sensor, positioned on the accelerator pedal, in an axial position, consists of a shaft connected to the two potentiometers, one main and one safety.

On the shaft a helical spring ensures the right resistance to pressure, while a second spring ensures the return when released.

Accelerator pedal



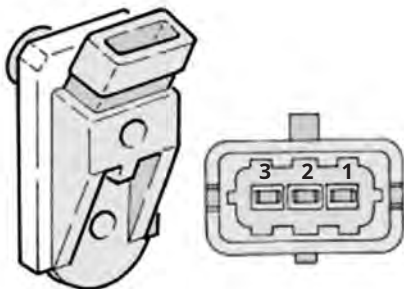
Pin	Signal	Reference Pin
1	Power supply 1 (+5V)	46 connector A
2	Power supply 2 (+5V)	45 connector A
3	Mass 1	30 A connector
4	Signal 1	9 connector A
5	Mass 2	8 connector A
6	Signal 2	connector A

Overpressure sensor

The sensor, mounted in the centre of the intake manifold, has the task of informing the injection control unit for

- adjust the injection pressure
- adjust the duration of the injection

Overpressure sensor



1.5 Volts (from ECU)

2.Mass

3.Output signal

OUTPUT SIGNALS

Preheating control unit

The glow plugs are controlled by the preheating control unit, under the direct control of the injection control unit.

Inside the preheating control unit there is an "intelligent" relay that sends a "feedback" response to the injection control unit which is thus informed of any failure of the preheating control unit or of a short circuit to ground of the glow plugs.

Pin	Signal	Reference Pin
1	Power supply (+12V)	4 Additional control unit in the engine compartment
2		
3	Pilot signal	52 connector A
4	Activation signal	Cylinder 1-2 glow plugs
5	Activation signal	Cylinder 3-4 glow plugs
6	Mass	Front mass right shaft
7	Power supply (+12V)	Drums

Injectors

The injector is a component that requires extremely high manufacturing precision. The manufacturing tolerances between the needle shaft and the high-pressure plunger are only 3µm. This extremely high precision necessarily requires maximum cleanliness during interventions on the Common Rail system. Dirt particles of the order of 1/1,000 mm can already be the cause of a failure of the Common Rail system.

Injector

**Injector A**

Pin	Signal	Reference Pin
1	Signal	16 connector B
2	Signal	47 connector B

Injector B

Pin	Signal	Reference Pin
1	Signal	2 connector B
2	Signal	31 connector B

Injector C

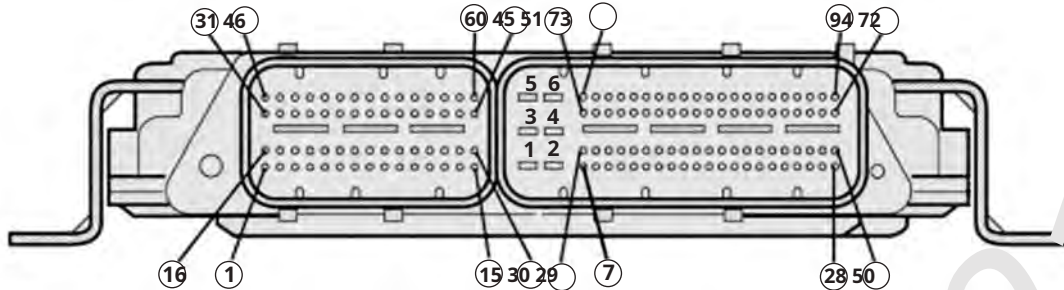
Pin	Signal	Reference Pin
1	Signal	1 connector B
2	Signal	46 connector B

Injector D

Pin	Signal	Reference Pin
1	Signal	17 connector B
2	Signal	33 connector B

FIAT 500L**1. engine > engine management****ENGINE CONTROL UNIT**

It is mounted in the engine compartment on the right side panel. The control unit is of the "flash eeprom" type, i.e. it can be reprogrammed externally without intervening on the hardware. The injection control unit has an integrated absolute pressure sensor.

Control unit and connectors**Pin Out Engine 2.0 Multijet 16V****Connector A (car wiring)**

Pin	Description
1	Battery positive
2	Battery negative
3	Battery positive
4	Battery negative
5	Battery positive
6	Battery negative
7	Turbo pressure actuator
8	Potentiometer 2 on accelerator pedal (-)
9	Potentiometer 1 signal on accelerator pedal
10	Diesel temperature sensor (-)
11	Diesel temperature sensor signal
12	Linear pressure sensor for air conditioner (-)
13	Linear pressure sensor signal for air conditioner
14	Fuel level sensor (-)
15	Fuel level sense signal
16	NC
17	Signal + Contact on brake pedal (NA)
18	NC
19	Alternator "L" signal
20	Low pressure pump relay control
21	NC
22	Linear pressure sensor for air conditioner (+)
23	Power supply 1 sensor 5V
24	Power supply 2 5V sensors
25	K-Line
26	Turbo pressure indicator signal
27	Fuel consumption signal
28	Key signal
29	Negative signal for compressor insertion relay command
30	Potentiometer 1 on accelerator pedal (-)
31	Potentiometer 2 signal on accelerator pedal

Connector A (car wiring)

Pin	Description
32	Exhaust gas temperature sensor signal 2 (only for versions with DPF)
33	Exhaust gas temperature sensor mass 2 (only for versions with DPF)
34	Exhaust gas temperature sensor signal 1 (only for versions with DPF)
35	Exhaust gas temperature sensor mass 1 (only for versions with DPF)
36	Differential pressure sensor signal (only for versions with DPF)
37	DPF differential pressure sensor mass (only for versions with DPF)
38	Resume Cruise Control
39	NC
40	Reserved digital input
41	NC
42	Reserved digital input
43	Wake-up signal
44	Differential pressure sensor (DPF) (+) (only for versions with DPF)
45	Potentiometer 1 on accelerator pedal (+)
46	Potentiometer 2 on accelerator pedal (+)
47	Immobilizer interface
48	Engine speed signal
49	Cruise Control light command
50	NC
51	Lambda sensor heater control (only for versions with Lambda probe)
52	Glow plug preheating control unit diagnosis
53	Vehicle speed sensor (-)
54	Compressor insertion request
55	Starter motor relay command
56	SET + Cruise Control
57	Reverse switch signal
58	Trinary signal air conditioning/alternator "F" signal
59	NC
60	NC

FIAT 500L**1. engine > engine management****Connector A (car wiring)**

Pin	Description
61	CAN network (low channel)
62	CAN network (high channel)
63	NC
64	Lambda sensor signal (only for versions with Lambda probe)
65	Lambda sensor signal (only for versions with Lambda probe)
66	Oil temperature sensor signal
67	NC
68	Fuel heater relay control
69	2nd level engine cooling fan
70	DPF warning light command (only for versions with DPF)
71	EOBD failure warning light
72	Main relay command negative signal
73	NC
74	Water presence sensor signal in diesel filter
75	Vehicle speed sensor signal
76	Oil temperature sensor (-)
77	Cruise "off"
78	Cruise "Set/Decrement"
79	Signal - Contact on clutch pedal
80	Brake pedal secondary switch signal
81	Quadrinary air conditioning signal
82	NC
83	CAN network (low channel)
84	CAN network (high channel)
85	NC
86	Lambda sensor mass (only for versions with Lambda probe)
87	Lambda sensor signal (only for versions with Lambda probe)
88	EGR exchanger actuator
89	Reserved analog input
90	1st level engine cooling fan
91	Low pressure pump relay command
92	Glow plug warning light command
93	Glow plug preheating activation
94	Fan relay control 3

Connector B (engine wiring)

Pin	Description
1	Injector cylinder 3 (+)
2	Injector cylinder 2 (+)
3	NC
4	Rail pressure regulator supply
5	Reserved power supply positive battery
6	NC
7	Engine RPM Sensor Screen
8	Fuel pressure sensor (-)
9	NC
10	Power supply 3 sensors 5V

Connector B (engine wiring)

Pin	Description
11	Phase sensor (+)
12	Engine speed sensor (-)
13	Turbo pressure sensor (+)
14	Power supply 2 5V sensors
15	Turbo pressure actuator
16	Injector cylinder 1 (+)
17	Injector cylinder 4 (+)
18	NC
19	Fuel pressure regulator (+)
20	Phase sensor (-)
21	Oil level sensor signal input
22	Reserved analog mass
23	Turbo pressure sensor (-)
24	NC
25	Power supply 3 sensors 5V
26	EGR position sensor power supply
27	Engine speed sensor (+)
28	Fuel pressure sensor (+)
29	Power supply 2 5V sensors
30	Positive EGR valve
31	Injector cylinder 2 (-)
32	NC
33	Injector cylinder 4 (-)
34	NC
35	NC
36	NC
37	Air temperature sensor (air flow meter)
38	NC
39	Throttle valve diagnostic mass
40	Turbo pressure sensor signal
41	Engine coolant temperature sensor (-)
42	Air flow sensor signal
43	Rail pressure sensor signal
44	Mass (flow meter)
45	NC
46	Injector cylinder 3 (-)
47	Injector cylinder 1 (-)
48	NC
49	Fuel pressure regulator (-)
50	Phase sensor signal
51	EGR position sensor mass
52	Throttle valve diagnostic signal
53	Turbo air temperature sensor signal
54	NC
55	Mass air intake temperature sensor
56	Insufficient engine oil pressure
57	EGR position sensor signal
58	Engine coolant temperature sensor signal
59	Throttle solenoid valve control
60	EGR Solenoid Valve

FIAT 500L**1. engine > engine management****Pin Out Engine 1.6 Multijet 16V****Connector A (car wiring)**

Pin	Description
1	Battery positive
2	Battery negative
3	Battery positive
4	Battery negative
5	Battery positive
6	Battery negative
7	Turbo pressure actuator
8	Potentiometer 2 on accelerator pedal (-)
9	Potentiometer 1 signal on accelerator pedal
10	Diesel temperature sensor (-)
11	Diesel temperature sensor signal
12	Linear pressure sensor for air conditioner (-)
13	Linear pressure sensor signal for air conditioner
14	Fuel level sensor (-)
15	Fuel level sense signal
16	NC
17	Signal + Contact on brake pedal (NA)
18	NC
19	Alternator "L" signal
20	Low pressure pump relay control
21	NC
22	Linear pressure sensor for air conditioner (+)
23	Power supply 1 sensor 5V
24	Power supply 2 5V sensors
25	K-Line
26	Turbo pressure indicator signal
27	Fuel consumption signal
28	Key signal
29	Negative signal for compressor insertion relay command
30	Potentiometer 1 on accelerator pedal
31	Potentiometer 2 signal on accelerator pedal
32	Exhaust gas temperature sensor signal 2 (only for versions with DPF)
33	Exhaust gas temperature sensor mass 2 (only for versions with DPF)
34	Exhaust gas temperature sensor signal 1 (only for versions with DPF)
35	Exhaust gas temperature sensor mass 1 (only for versions with DPF)
36	DPF differential pressure sensor signal (only for versions with DPF)
37	DPF differential pressure sensor mass (only for versions with DPF)
38	Resume Cruise Control
39	NC
40	Reserved digital input
41	NC
42	Reserved digital input
43	Wake-up signal
44	Differential pressure sensor (DPF) (+) (only for versions with DPF)

Connector A (car wiring)

Pin	Description
45	Potentiometer 1 on accelerator pedal (+)
46	Potentiometer 2 on accelerator pedal (+)
47	Immobilizer interface
48	Engine speed signal
49	Cruise Control light command
50	NC
51	Lambda sensor heater control (only for versions with Lambda probe)
52	Glow plug preheating control unit diagnosis
53	Vehicle speed sensor (-)
54	Compressor insertion request
55	Starter motor relay command
56	SET + Cruise Control
57	Reverse switch signal
58	Trinary signal air conditioning/alternator "F" signal
59-60	NC
61	CAN network (low channel)
62	CAN network (high channel)
63	NC
64	Lambda sensor signal (only for versions with Lambda probe)
65	Lambda sensor signal (only for versions with Lambda probe)
66	Coolant temperature sensor signal
67	NC
68	Fuel heater relay control
69	2nd level engine cooling fan
70	DPF warning light command (only for versions with DPF)
71	EOBD failure warning light
72	Main relay command negative signal
73	NC
74	Water presence sensor signal in diesel filter
75	Vehicle speed sensor signal
76	Oil temperature sensor (-)
77	Cruise "off"
78	Cruise "Set/Decrement"
79	Signal - Contact on clutch pedal
80	Brake pedal secondary switch signal
81	Quadrinary air conditioning signal
82	NC
83	CAN network (low channel)
84	CAN network (high channel)
85	NC
86	Lambda sensor mass (only for versions with Lambda probe)
87	Lambda sensor signal (only for versions with Lambda probe)
88	EGR exchanger actuator
89	Reserved analog input
90	1st level engine cooling fan
91	Low pressure pump relay command
92	Glow plug warning light command
93	Glow plug preheating activation
94	Fan relay control 3

FIAT 500L**1. engine > engine management****Connector B (engine wiring)**

Pin	Description
1	Injector cylinder 3 (+)
2	Injector cylinder 2 (+)
3	NC
4	Rail pressure regulator supply
5	Reserved power supply positive battery
6	NC
7	Engine RPM Sensor Screen
8	Fuel pressure sensor (-)
9	NC
10	Power supply 3 sensors 5V
11	Phase sensor (+)
12	Engine speed sensor (-)
13	Turbo pressure sensor (+)
14	Power supply 2 5V sensors
15	Turbo pressure actuator
16	Injector cylinder 1 (+)
17	Injector cylinder 4 (+)
18	NC
19	Fuel pressure regulator (+)
20	Phase sensor (-)
21	Oil level sensor signal input
22	Reserved analog mass
23	Turbo pressure sensor (-)
24	NC
25	Power supply 3 sensors 5V
26	EGR position sensor power supply
27	Engine speed sensor (+)
28	Fuel pressure sensor (+)
29	Power supply 2 5V sensors
30	Positive EGR engine

Connector B (engine wiring)

Pin	Description
31	Injector cylinder 2 (-)
32	NC
33	Injector cylinder 4 (-)
34	NC
35	NC
36	NC
37	Air temperature sensor (air flow meter)
38	NC
39	Throttle valve diagnostic mass
40	Turbo pressure sensor signal
41	Engine coolant temperature sensor (-)
42	Air flow sensor signal
43	Rail pressure sensor signal
44	Mass (flow meter)
45	NC
46	Injector cylinder 3 (-)
47	Injector cylinder 1 (-)
48	NC
49	Fuel pressure regulator (-)
50	Phase sensor signal
51	EGR position sensor mass
52	Throttle valve diagnostic signal
53	Turbo air temperature sensor signal
54	NC
55	Mass air intake temperature sensor
56	Insufficient engine oil pressure
57	EGR position sensor signal
58	Engine coolant temperature sensor signal
59	Throttle solenoid valve control
60	EGR Solenoid Valve

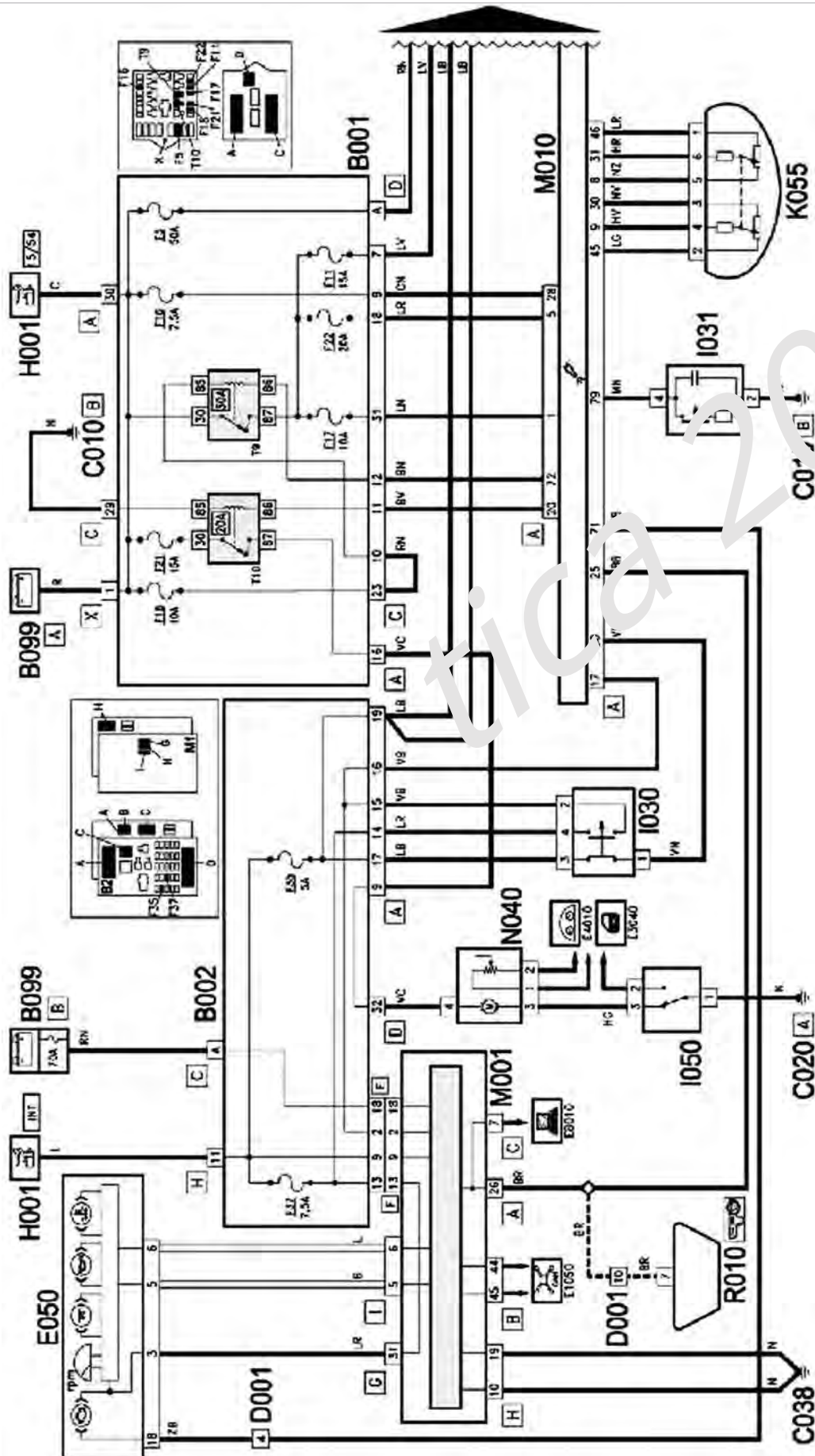


FIAT 500L**1. engine > engine management****ENGINE MANAGEMENT DIAGRAMS****ELECTRICAL DIAGRAMS LEGEND**

TO	
A040	Glow plugs
B	
B001	Engine compartment shunt control unit
B099	Maxi fuse box on battery
C	
C020	Mass dashboard passenger side
C030	Left rear mass
C060	Injection control unit mass
D	
D001	Front / dashboard junction
D004	Front / engine joint
D029	Engine cable / engine service cable junction
D097	Short circuit junction
D154	Dashboard/brake pedal switch junction
D213	Fuel tank junction
AND	
E050	Instrument panel
THE	
I030	Brake pedal switch
I031	Clutch pedal switch
I050	Inertial switch
K	
K030	Engine oil pressure sensor low
K031	Water sensor in diesel filter
K032	Engine oil level sensor
K036	Engine Coolant Temperature Sensor Sender
K041	Air flow meter
K044	Air pressure / temperature sensor
K046	RPM sensor
K047	Phase sensor
K055	Accelerator pedal potentiometer
K083	Fuel pressure sensor
K100	Temperature sensor and heating resistance
THE	
L030	ECU Solenoid Valve
L036	Variable geometry turbine control solenoid valve
M	
M001	Body Computer
M010	Engine control unit
M015	Glow plug preheating control unit
N	
N040	Electric fuel pump and level meter
N070	Electroinjector
N075	Integrated throttle body actuator
N077	Fuel pressure regulator
N087	Fuel pressure regulator on rail

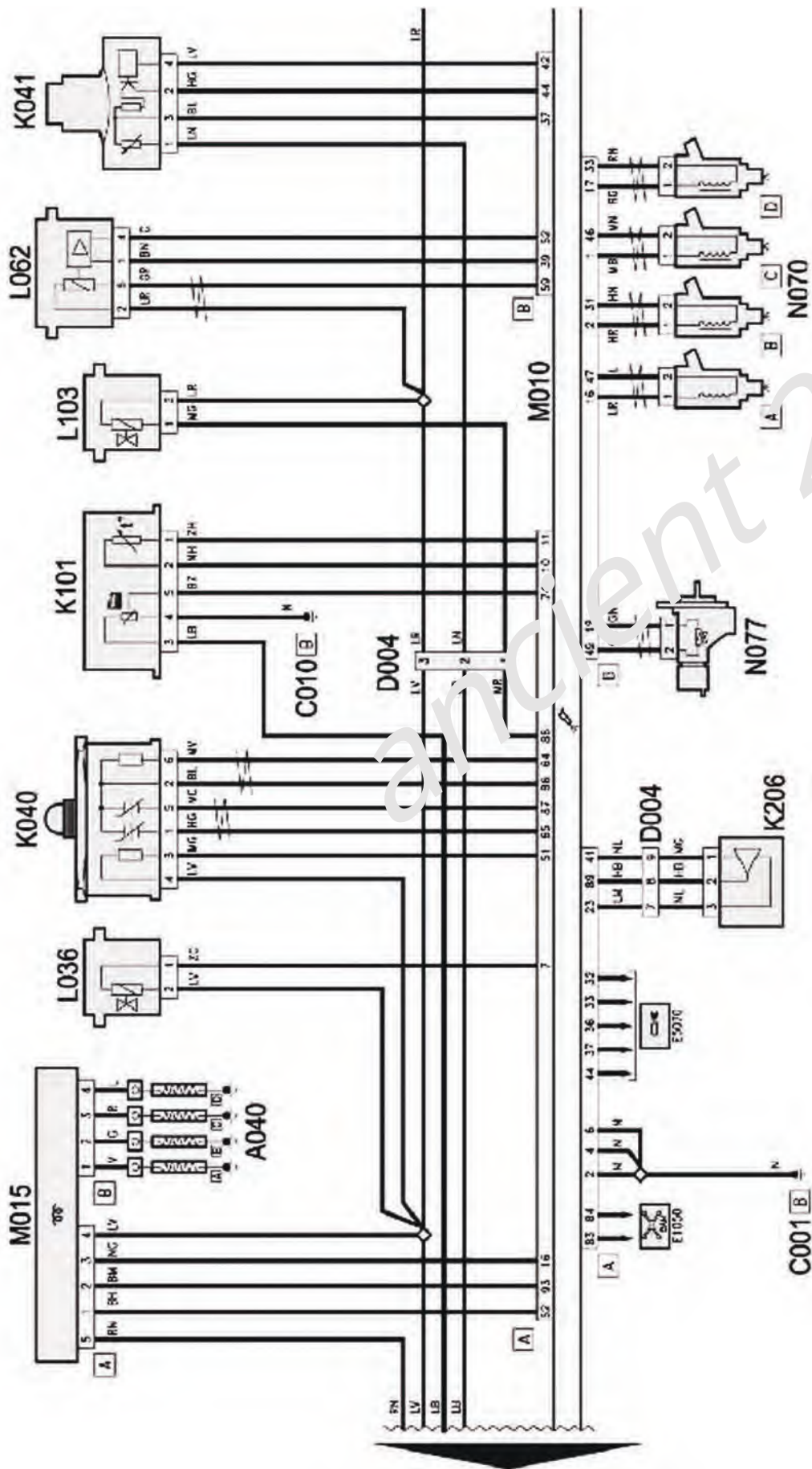
FIAT 500L

1. engine > wiring diagrams



FIAT 500L

1. engine > wiring diagrams



FIAT 500L

1. engine > maintenance operations

maintenance operations

PRECAUTIONS AND TOOLS

CONTROL UNIT RESET

ENGINE MANAGEMENT

The engine management control unit requires an appropriate reinitialization procedure following interventions on the engine.

This procedure must be carried out after replacing engine components such as: crankshaft position sensor, sensor-

king of camshaft position and motorized throttle.

Self-adaptive procedure

For the self-learning procedure, a specific diagnostic tool must be used so that the engine management control unit is able to assimilate the physical characteristics of the mounted sensors and actuators.

- Attention:

Failure to perform the engine control unit reset procedure may cause the engine to malfunction.

- Important:

For vehicles with ESP, every time the battery is disconnected, the steering angle sensor loses its basic setting. It is therefore necessary to recalibrate it using a suitable diagnostic tool.

SPECIFIC TOOLS

Tool	Name	Function
1860804001	Tablet	Disassembly/reassembly of valves
1860815000	Flange	Crankshaft rotation
2000004100	Introducer	Oil pump sealing ring introduction
1860833000	Key	Unscrew/tighten the crankcase cover screws on the timing side and gearbox side
1860834000	Key	Unscrew/tighten upper engine head screws
		Unscrew/tighten side screws of crankcase cup
1860846000	Anticouple	Flywheel stopper
1860851000	Crossroads	Powertrain support
1860854000	Extractor	Pressure pump control pulley extraction
1860898000	Anticouple	Flywheel stopper
1870739000	Extractor	Removal of electro-injectors
1870815000	Anticouple	Unscrew/tighten the timing belt pulley fixing screw
1870836000	Pegs	Unscrew/tighten the timing belt pulley fixing screw
1870894000	Extractor	Extraction of valve guide oil seal
1870896800	Introducer	Introduction of the exhaust side distribution shaft front oil seal
1870896900	Dime	Engine timing
1870897100	Extractor/Introducer	Extraction/Introduction of valve guide Valve guide oil seal introduction
1870897300	Adapter	Removal of electro-injectors
1871000000	Review stand	Engine overhaul
1871000000	Bracket	Engine positioning on inspection stand
1871000500	Introducer	Introduction of the front crankshaft oil seal
1871000600	Extractor/introducer	Extraction/insertion of valve guides
1871000700	Extractor	Removing the steering tie rod from the upright
1871001300	Vertical support	Powertrain support
1871001700	Balance	Powertrain removal/refit
1871003000	Extractor/introducer	Disassembly/reassembly of clutch mechanism
1871008500	Extractor/introducer	Extraction/insertion of valve guides
2000001400	Cork	Brake/clutch system depression
2000003000	Template	Engine timing
2000003200	Key	Removing/reattaching glow plugs
2000003900	Key	Unscrew/tighten engine oil filter cover
2000004100	Introducer	Introduction of the front crankshaft oil seal
2000024900	Clutch centering kit	Disassembly/reassembly of clutch mechanism
2000026800	Cage	Disassembly/reassembly of valves
2000026900	Pressure pump disconnect/reconnect kit	Pressure pump disconnection/reconnection
2000032400	Extractor/introducer	Extraction/introduction of valve guides and introduction of oil seals

FIAT 500L

1. engine > maintenance operations

- operations without disconnecting the engine-

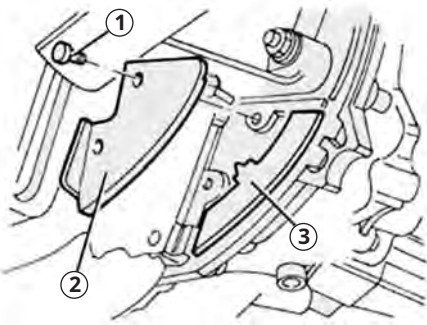
DISTRIBUTION

BELT

Dismantling

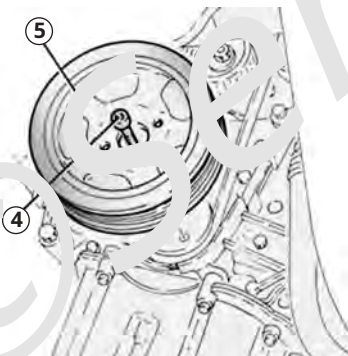
- Place the car on the lifting bridge.
- Disconnect the battery.
- Drain the air conditioning refrigerant system.
- Remove the protection under the engine.
- Remove the rigid engine support on the timing side.
- Remove the front wheels.
- Remove the additional wheel arches.
- Remove the service belt.
- Unscrew the screws (1) and remove the flywheel protection cover (2).
- Fit the flywheel locking tool (3).

Flywheel retainer assembly



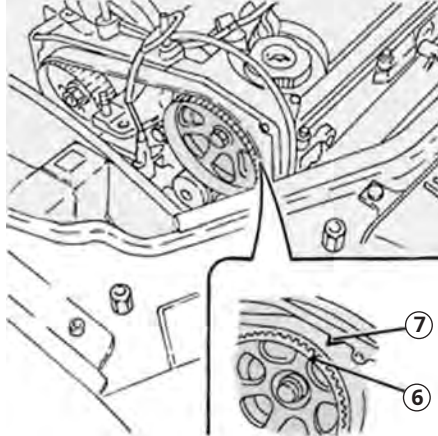
- Unscrew the screws (4) and remove the service pulley on the crankshaft (5).

Service pulley removal



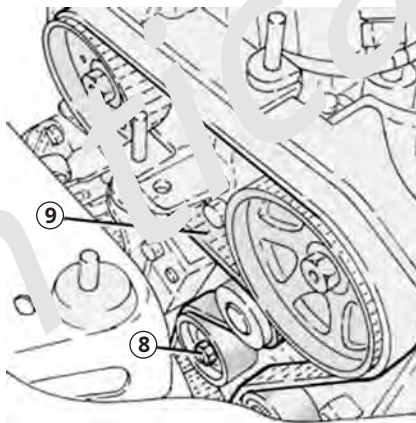
- Remove the flywheel retainer and the timing cover.
- Rotate the crankshaft in the direction of rotation until the notch on the driven toothed pulley (6) matches the notch on the valve cover (7), thus bringing the first cylinder to TDC.

Phase points



- Loosen the fixing nut of the mobile tensioner of the distribution control (8).
- Remove and detach the timing belt (9).

Timing belt removal

*Assembly*

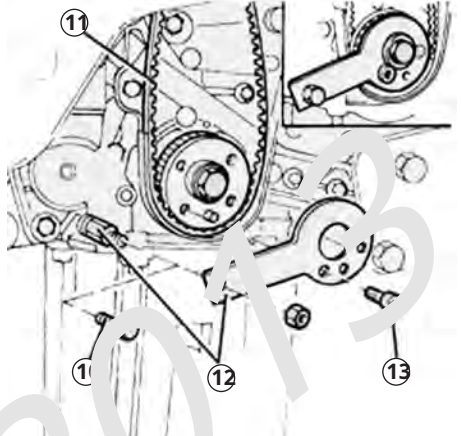
- Unscrew the screw of the front cover (10) of the base.
- Temporarily fit the timing belt (11) distribution control on the driving toothed pulley.

Note:

The arrow painted on the timing belt must match the direction of rotation of the engine. The belt must be fitted without causing sharp bends so as not to compromise the structure of the belt itself.

- Mount the template (12) and fix it with the calibrated screw (13).

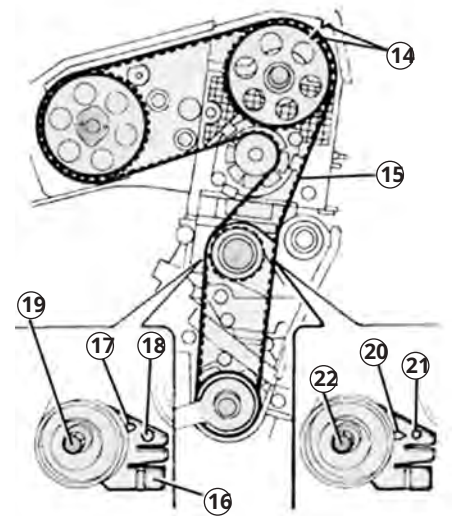
Jig assembly



- Check the alignment of the timing marks (14).
- Fully fit the timing belt (15).

- Use a screwdriver to lever the hole (16) until the tensioner index (17) reaches the maximum tensioning position (18) and in this position tighten the M8 nut (19) of the tensioner to a torque of 23 ± 28 Nm.
- Remove the timing tools.
- Turn the engine over two full revolutions to allow the belt to settle in.
- Unscrew the nut of the mobile distribution tensioner and, operating with caution, bring the tensioner index (20) in line with the reference hole (21) and in this correct tensioning position, tighten the M8 nut (22) of the tensioner to a torque of 23 ± 28 Nm.

Belt tensioning



FIAT 500L

1. engine > maintenance operations

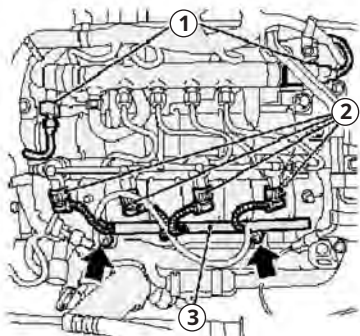
- Mount the flywheel holding tool.
- Place the service pulley back into its seat on the crankshaft and secure it with the relevant M8 screws to a torque of 23 ÷ 28 Nm.
- Remove the flywheel holding tool.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

ENGINE HEAD GROUP

HEADSTOCK

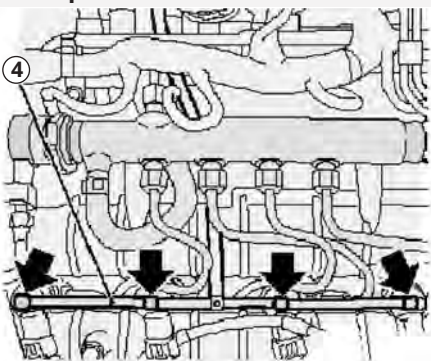
- Place the car on the lifting bridge.
- Disconnect the battery.
- Remove the timing belt.
- Disconnect the wiring harness for the engine management.
- Remove the compressor and catalyst temperature sensor connectors.
- Disconnect the engine management module wiring harness (1) (2).
- Remove the cable harness strip (3).
- Remove the fixings (arrows).

Removing connectors



- Place the cable harness to the side.
- Disconnect the vacuum line.
- Remove the vacuum hoses.
- Place the vacuum duct aside.
- Remove the fuel recovery pipe (4).
- Loosen the four retaining clips (arrows).
- Remove the fuel recovery duct.

Oil Pipe Removal



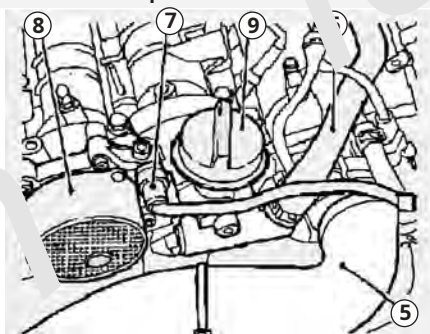
- Dismantle the high pressure line.
- Remove the injectors.

- Note:

Respect the sequence cylinder 1, 2, 3, 4 and note the positions.

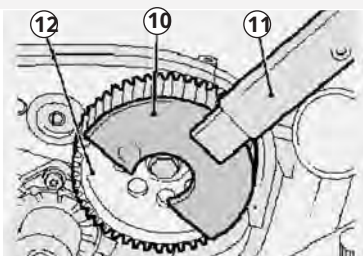
- Remove the pressure accumulator by loosening the clamp from the return hose.
- Remove the air supply hose (5) from the throttle valve.
- Remove the engine breather hose (6) from the engine oil filler neck.
- Detach the brake servo vacuum pipe (7).
- Remove the depressor (8).
- Remove the oil filler neck (9).
- Disconnect the coolant temperature wiring harness connector.

Removal of depression duct



- Remove the camshaft sensor.
- Loosen the two camshaft drive gears.
- Use a pulley stopper (10) and (11).
- Counteract the camshaft control gear (12).
- Loosen the camshaft drive gear.

Gear Removal



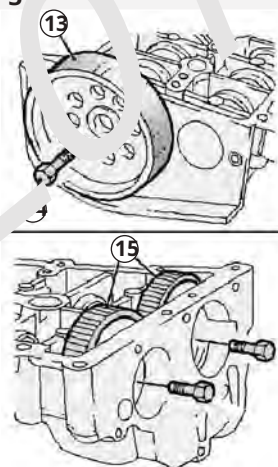
- Remove the engine transport bracket.
- Remove the small parts.
- Remove the camshaft housing.

- Attention:

Loosen the screws gradually in a spiral from the outside to the inside. Make sure that the camshaft housing comes off the cylinder head evenly.

- Remove the gasket.
- Remove the front camshaft control gear (13) and the screw (14).
- Remove the rear camshaft control gears (15).

Cover gear removal



- Remove the camshaft sealing ring (16).

- Note:

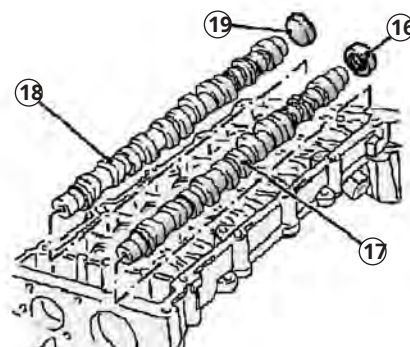
Lift using a suitable tool. Do not damage the sealing surfaces.

- Remove the camshafts (17) and (18).

- Note:

Remove the camshaft acting on the intake valves (18) with the cover (19).

Camshaft Removal



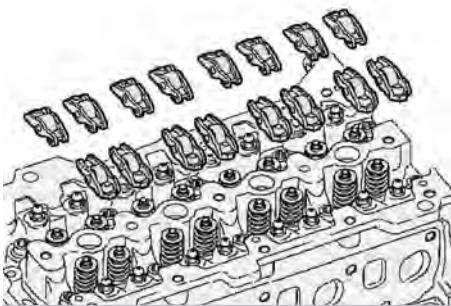
FIAT 500L

1. engine > maintenance operations

- Unscrew the screw from the high pressure fuel pump support in the cylinder head.
- **Drain the coolant.**
- Remove the coolant hoses from the thermostat body and the exhaust gas recirculation radiator.
- Remove the sixteen roller drag levers with hydraulic tappets.

- **Note:**
Pay attention to the layout.

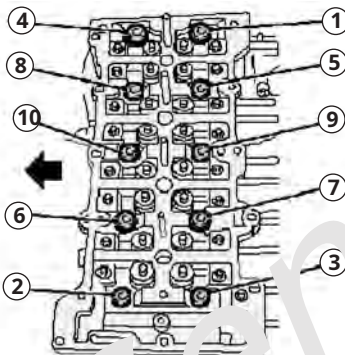
Removing rollers



- Loosen the head.

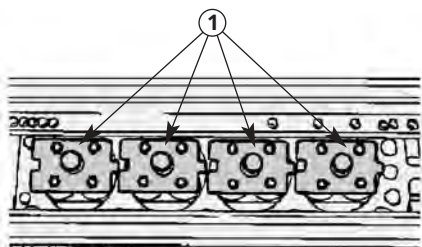
- **Note:**
Loosen the screws in the sequence shown.

Screw removal sequence



- Remove the head.
- Place the cylinder head on a suitable support for inspection.
- Place the contrast to block the valves (1).

Contrast positioning



- Remove the half cones with a suitable tool.

- Remove the valve springs.
- Remove the valves.
- Remove the valve guides.
- Check that all measurements correspond to those described in the technical data.

Assembly at the bench

- Fit the valve guides (if necessary they are available with a larger diameter).
- Fit the valves and position the stops to lock them.
- Fit the valve springs.
- Remove the head from the bracket for inspection.

Mounting on the monoblock

- Check the flatness of the cylinder head and engine block using a knife edge and feeler gauge.

Measure flatness



- Bring the first cylinder to the TDC position.
- Use a comparator (1) with suitable support.
- Place the probe on the head and reset it with a slight preload.
- Rotate the motor in the direction of rotation.

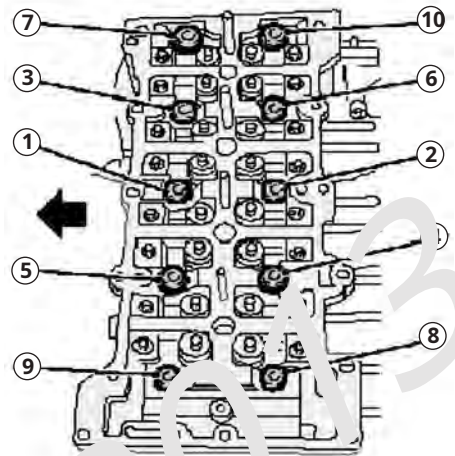
- **Note:**
Determine the highest point of cylinder 1 by turning the crankshaft.

- Measure the piston protrusion.
- Perform the measurement on the remaining pistons.
- Take the measurement on two different flat points.

- **Attention:**
The calculated maximum piston protrusion is decisive for the selection of the cylinder head gasket with the corresponding identifier.

- Replace the head gasket.
- Fix the head.
- Tighten the head fixing screws to a torque of 65 Nm + 90° + 90° + 90° in the sequence shown below.

Tightening sequence



- Insert the roller drag levers with hydraulic tappets.
- Fit the coolant hoses to the thermostat housing and exhaust gas recirculation radiator.
- Tighten the high pressure pump support fixing screw in the cylinder head.
- Prepare to assemble the two camshafts.
- Coat the bearing surfaces with engine oil.
- Insert the camshaft control gears.
- Adjust the two camshafts to the TDC of ignition cylinder 1.
- Position the 2 camshafts.
- Pay attention to the correct mounting position.
- Fit the two camshaft control gears and tighten the screws to a torque of 120 Nm.
- Place the camshaft housing in place.
- Tighten the camshaft housing fixing screws to a torque of 25 Nm.
- Fit the intake camshaft cover.
- Fit the camshaft sealing ring.
- Fit the camshaft drive gear.
- Tighten the camshaft pulley fixing screw to a torque of 120 Nm.
- Fit the camshaft sensor and tighten to a torque of 9 Nm.
- Mount the engine transport bracket and tighten the screw to a torque of 50 Nm.
- Fit the depressor and tighten the screws to a torque of 9 Nm.
- Fit the oil filler neck and tighten the screws to a torque of 9 Nm with red threadlocker.
- Connect the coolant temperature sensor connector.

FIAT 500L**1. engine > maintenance operations**

- Insert the brake booster vacuum line so that the fitting audibly locks.

- Install the engine breather hose from the engine oil filler neck.

- Fit the air supply hose and tighten the clamps to a torque of 3.5 Nm.

- Fit the pressure accumulator and tighten the fixing screws to a torque of 25 Nm.

- Fit the injectors taking care to replace the sealing rings.

- Insert the four injectors with support.

- Install high pressure ducts taking care to replace the delivery pipes.

- Tighten the M12 union nuts to a torque of 22Nm.

- Tighten the M14 union nuts to a torque of 30 Nm.

- Fit the high pressure pipe, taking care to replace the delivery pipes.

- Tighten the M12 union nuts to a torque of 23 Nm.

- Tighten the M14 union nuts to a torque of 33 Nm.

- Fit the oil recovery pipe and secure the retaining clips.

- Fit the vacuum pipe and tighten the fixing screws to a torque of 9 Nm.

- Install the engine management cable harness.

- Fit the timing belt.

- operations with engine detachment-

ENGINE OVERHAUL

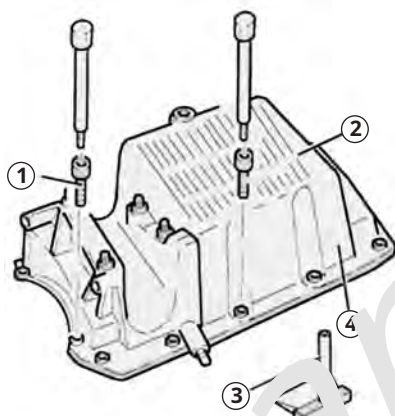
Dismantling

- Place the engine on a bench for overhaul.

- Unscrew the front, rear (1) and side screws (2) of the base cup.

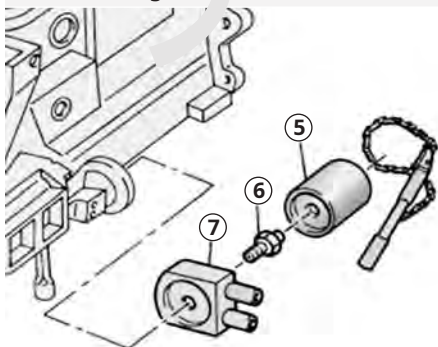
- Remove the gasket with a dedicated cutter (3) and remove the crankcase cup (4).

Cup removal



- Remove the oil filter (5), unscrew the pin (6) and remove the heat exchanger (7).

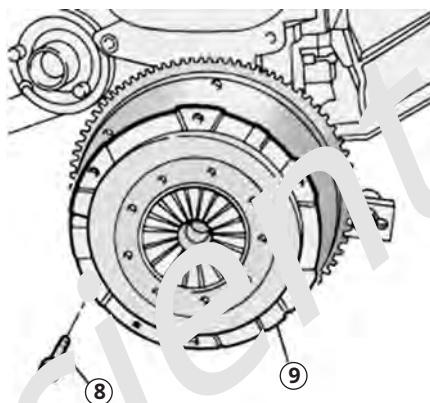
Heat exchanger removal



- Mount the flywheel holding tool.

- Unscrew the screws (8) and remove the clutch (9).

Clutch Removal

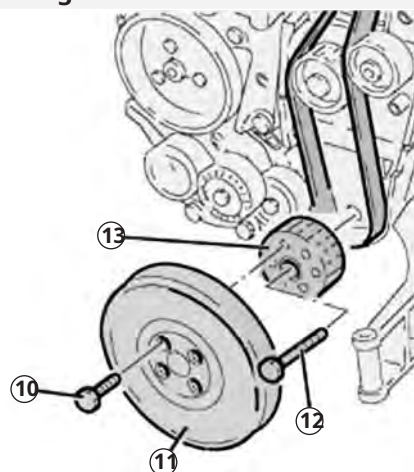


- Unscrew the screws (10) and remove the crankshaft pulley (11).

- Remove the timing belt.

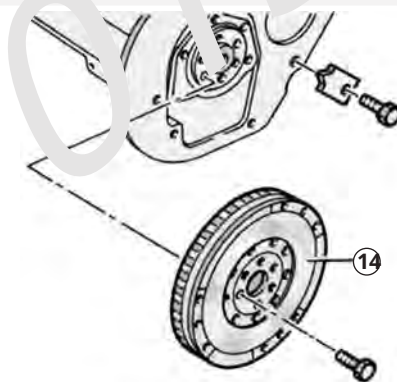
- Unscrew the left-hand screw (12) and remove the drive toothed pulley (13).

Timing belt removal



- Unscrew the screws and remove the flywheel (14).

Flywheel Removal



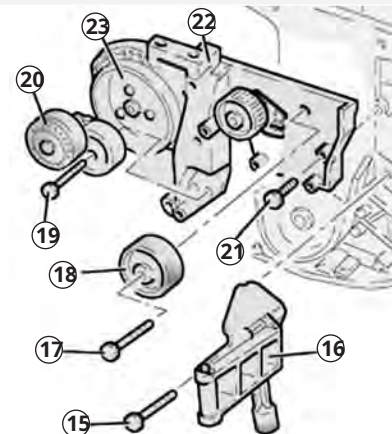
- Unscrew the screws (15) and remove the timing side powertrain support (16).

- Unscrew the screw (17) and remove the fixed tensioner of the distribution control (18).

- Unscrew the screw (19) and remove the automatic belt tensioner for the auxiliary drive belt (20).

- Unscrew the screws (21) and remove the support (22) complete with power steering pump (23) and timing belt tensioner.

Power steering pump support removal

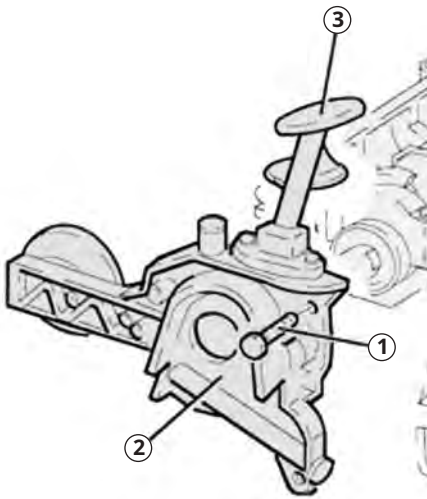


FIAT 500L

1. engine > maintenance operations

- Unscrew the screws (1) and remove the front cover of the crankcase with the integrated oil pump (2) complete with suction pipe (3).

Oil pump removal



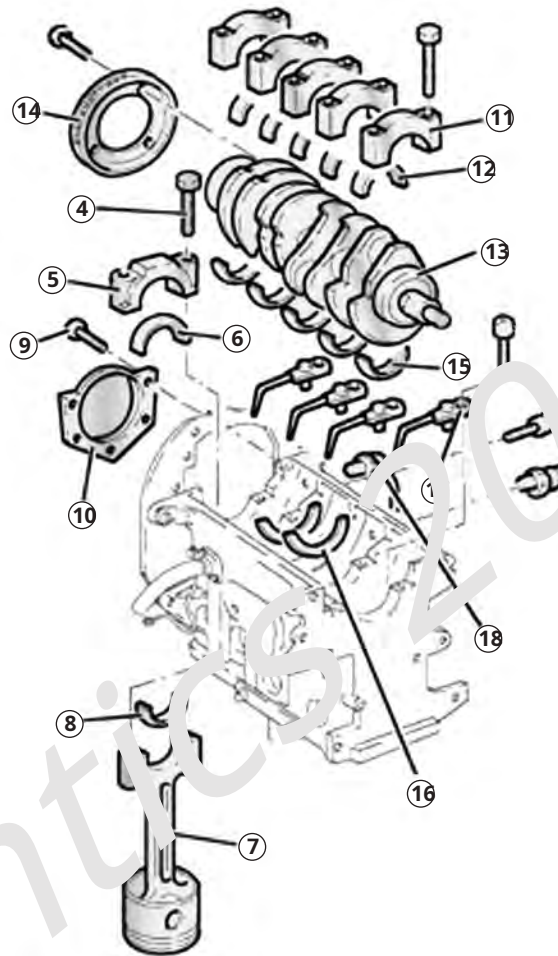
- Unscrew the screws (4) and remove the connecting rod cap (5).
 - Remove the lower connecting rod half bearing (6).
 - Remove the connecting rod/piston assembly (7).
 - Remove the upper connecting rod half bearing (8).
 - Unscrew the screws (9) and remove the rear crankcase cover (10) with the integrated oil seal ring.
 - Check that the crankshaft axial play is within the values of 0.049 ± 0.211 mm, using a magnetic base equipped with a comparator.

- Note:

If the axial play of the crankshaft does not fall within the prescribed values, during assembly, rectify the wear on the engine block and use suitably oversized thrust half rings.

- Unscrew the screws and remove the bearing caps (11).
 - Remove the lower main bearings (12).
 - Remove the crankshaft (13).
 - Unscrew the screws and remove the crankshaft tone wheel (14).
 - Remove the upper main bearing shells (15).
 - Remove the thrust half rings (16).
 - Unscrew the screws and remove the jets (17) from the base.
 - Unscrew the screw and remove the speed sensor (18).

Crankshaft Removal

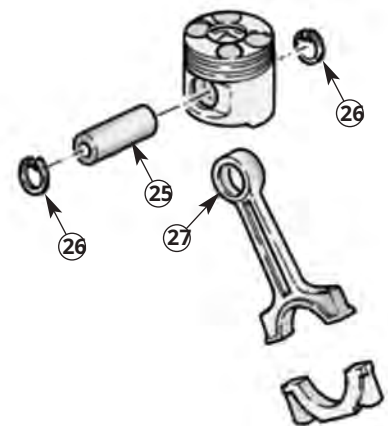


- Unscrew the screws (19) and remove the flange (20) complete with oil return pipe to the sump from the turbocharger.
 - Unscrew the fitting (21) and remove the oil delivery pipe to the turbocharger (22).
 - Unscrew the screws (23) and remove the turbocharger support bracket (24).

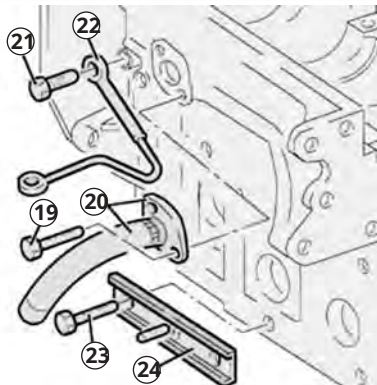
Piston and connecting rod breakdown

- Remove the elastic rings.
 - Remove the pin (25) by removing the elastic rings (26) and separate the connecting rods (27) from the pistons.

Removing the plug



Removing turbocharger pipes

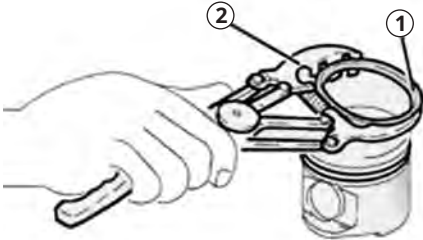


FIAT 500L

1. engine > maintenance operations

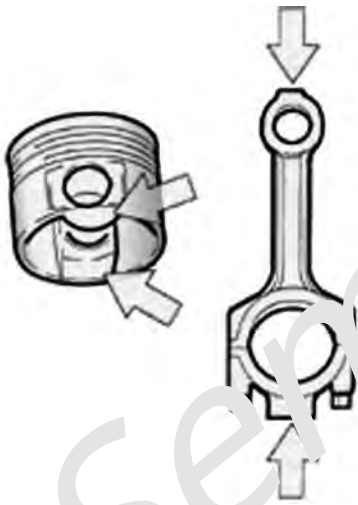
- Remove the elastic bands (1) with the dedicated extractor (2).

Removing elastic bands

**Piston check and reassembly**

- Check the squaring of the connecting rods using suitable equipment; if the squaring is imperfect, replace the connecting rod.
- Check that the weight difference between the pistons does not exceed 5 grams.
- Check that the difference in weight between the connecting rods is within 2.5 grams.
- If overweight, lighten pistons and connecting rods by working on the areas indicated below.

Rectified areas



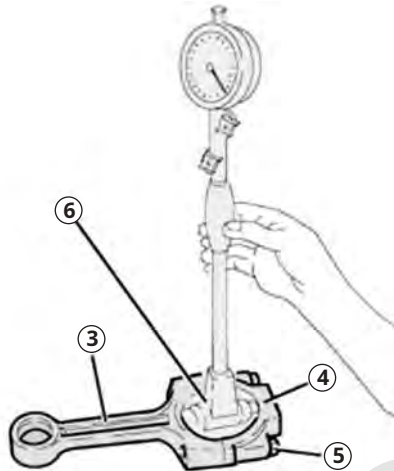
- Check that the diameter of the bushings in the pistons falls within the value of 25.999 ÷ 26.004 mm.
- Check that the external diameter of the pistons corresponds to the values given below.

Diameter	Value (mm)
Class A	81,783 ÷ 81,797
Class B	81,793 ÷ 81,807
Class C	81,803 ÷ 81,817

- Check that the external diameter of the pin falls within the value of 25.982 ÷ 25.988 mm.

- Fit the caps (4) onto the connecting rods (3) and secure them with the screws (5), check with a bore gauge (6) that the diameter of the connecting rod head falls within the values of 53.883 ÷ 53.923 mm.

Check connecting rod head diameter



- Check that the internal diameter of the connecting rod foot falls within the values of 26.006 ÷ 26.012 mm.

- Place the bands inside the cylinder and check with a feeler gauge that the elastic face gap values fall within the values shown below.

Light	Value (mm)
1st ring	0.25 ÷ 0.40
2nd ring	0.25 ÷ 0.50
Oil scraper ring	0.25 ÷ 0.50

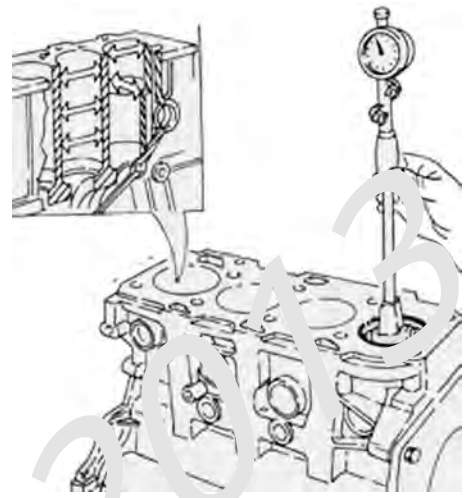
- Fit the piston rings onto the piston and check that the axial play between the second ring and its seat on the piston is within the value of 0.002 ÷ 0.006 mm.

Monoblock check and recomposition

- Thoroughly wash all dismantled components.
- Fit the water/oil sealing plugs to the crankcase.
- Lubricate all mechanical coupling components with engine oil.
- Check that the cylinder head support surface does not have cracks or superficial scratches.
- Measure the cylinder liners diameter according to the diagram below.

Cylinder liners diameter	Value (mm)
Class A	82,000 ÷ 82,010
Class B	82,010 ÷ 82,020
Class C	82,020 ÷ 82,030

Check the internal diameter of the barrels



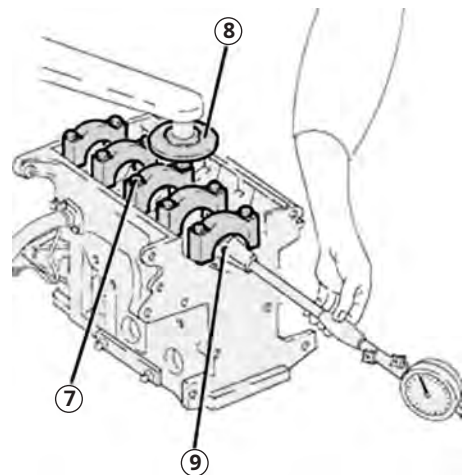
- Check that the taper of the cylinder liners is within the value of ≤0.005 mm.
- Check that the cylinder liners ovalization is within the value of ≤0.05 mm.

Note:

If the barrels have values that differ from the design values, ream them according to the 0.1 mm increase.

- Tighten the M12 screws of the main bearing caps (7) to a torque of 24 ÷ 26 Nm + 90° additional angular tightening (8).
- Check that the diameter (9) of the main pin seats falls within the values of 63.691 ÷ 63.732 mm.

Check the seat of the main pins



- Visually check the condition of the main bearings and connecting rod bearings and replace them if necessary.

FIAT 500L

1. engine > maintenance operations

- Check that the thickness of the main bearings falls within the values given below, otherwise replace them.

Thickness	Value (mm)
Class A	1,836 ÷ 1,840
Class B	1,839 ÷ 1,843
Class C	1,842 ÷ 1,846

- Check that the thickness of the connecting rod half-bearings falls within the values given below, otherwise replace them.

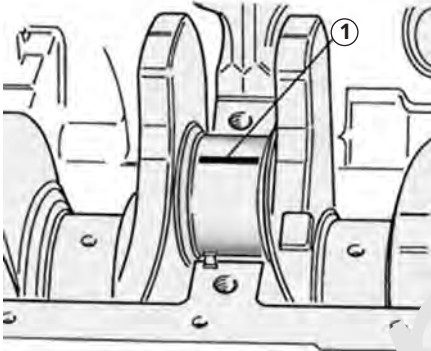
Thickness	Value (mm)
Class A	1,527 ÷ 1,531
Class B	1,530 ÷ 1,534
Class C	1,533 ÷ 1,537

- Fit the upper main bearing shells to the crankcase.

- Mount the crankshaft.

- Apply the Plastigage calibrated wire (1) to measure the play of the main journals.

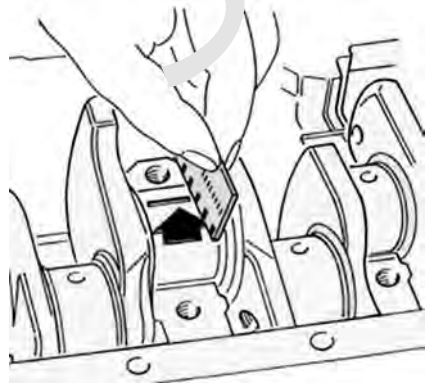
Plastigage Application



- Fit the main bearing caps complete with half-bearings and tighten the screws to a torque of 24 ÷ 26 Nm + 90°.

- Remove the bearing caps and measure the play of the pins with a special graduated gauge.

Game Check



- **Note:**

If the measured value is not within tolerance, replace the main bearing shells with others of the appropriate size and class.

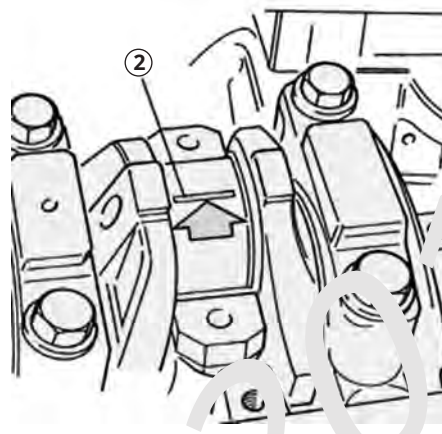
- Fit the bearing caps and tighten the M12 screws to a torque of 24 ÷ 26 Nm + 90°.

- Fit the pistons into the cylinder block.

- Fit the upper connecting rod bearings onto the big end.

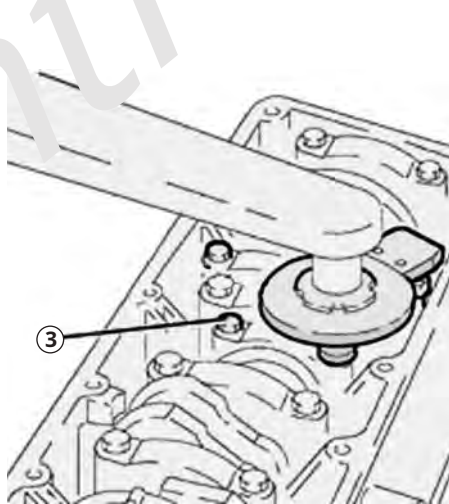
- Apply the Plastigage calibrated wire (2) to measure the clearance of the connecting rod pins.

Plastigage Application



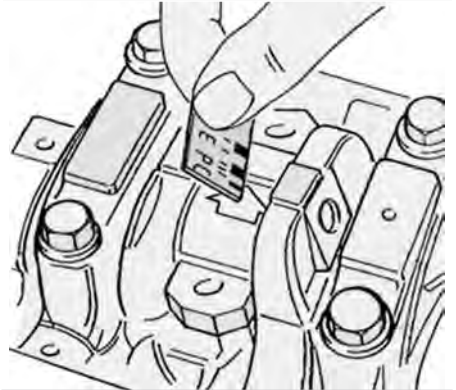
- Tighten the M9 screws (3) to a torque of 24 ÷ 26 Nm + 60°.

Tighten the connecting rod caps



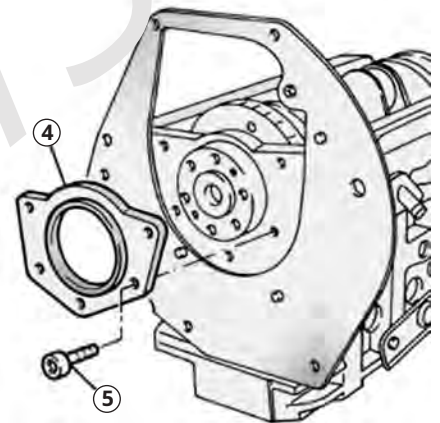
- Measure the play between the pin and the bearings using a special gauge, then retighten the connecting rod cap fixing screws in pairs according to the procedure previously indicated.

Game Check



- Fit the rear cover (4) of the crankcase with the integrated seal ring and tighten the M6 screws (5) to a torque of 8 ÷ 10 Nm.

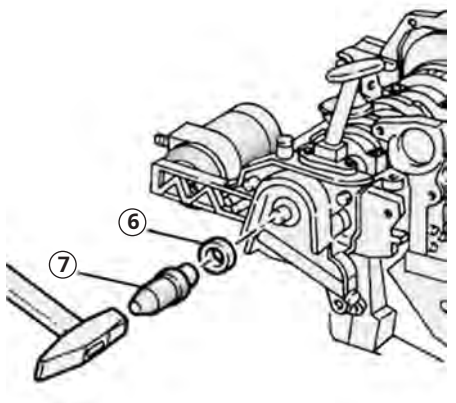
Crankcase rear assembly



- Fit the front crankcase cover with integrated oil pump complete with suction pipe and gasket and tighten the M6 screws to a torque of 8 ÷ 10 Nm.

- Fit the sealing ring (6) onto the oil pump using the introducer (7).

Seal ring assembly

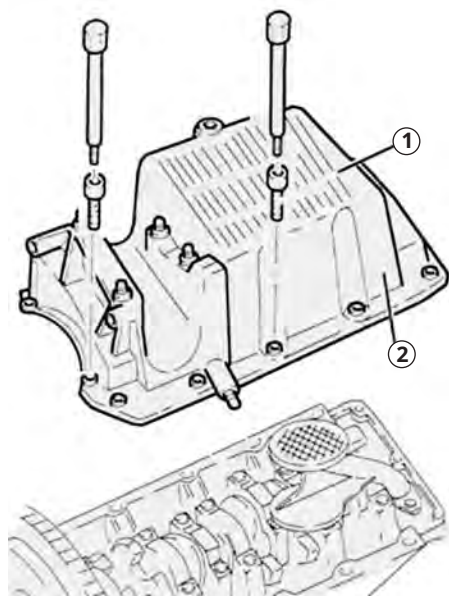


FIAT 500L

1. engine > maintenance operations

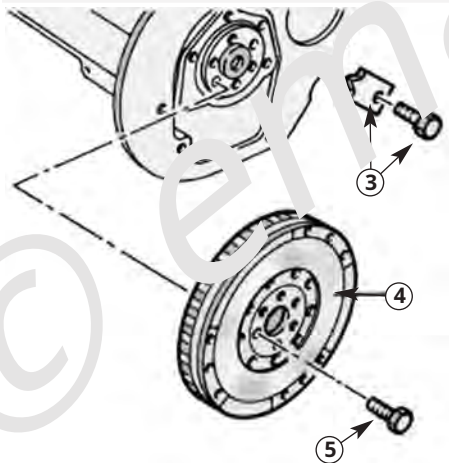
- Apply silicone sealant around the entire perimeter of the crankcase cup.
- Fit the crankcase cup.
- Tighten the side screws (1) of the cup to a torque of 21 ± 26 Nm.
- Tighten the front and rear M6 screws (2) of the cup in a crosswise pattern to a torque of 7 ± 9 Nm.

Oil pan assembly



- Fit the anti-torque tool (3).
- Mount the flywheel (4) and apply Loctite 573 threadlocker to the M12 screws (5) and tighten them to a torque of 136 ± 168 Nm.

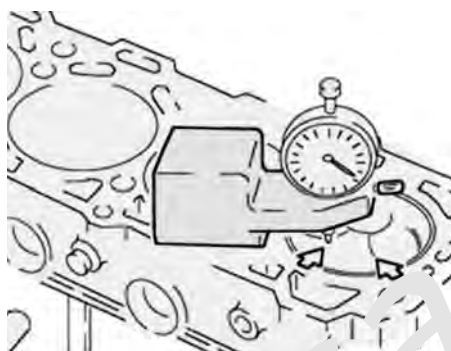
Flywheel assembly



- Fit the drive toothed pulley and tighten the M16 left-hand screw to a torque of 306 ± 378 Nm.
- Mount the power steering pump complete with support bracket.

- Fit the fixed tensioner of the timing control.
- Mount the powertrain mount on the timing side.
- Fit the automatic belt tensioner for the auxiliary drive belt.
- Mount the heat exchanger and secure it with the corresponding pin.
- Measure the piston protrusion at two points, 180° apart on the piston pin axis, and average the two values measured for each piston.

Piston protrusion measurement



- Choose the thickness of the head gasket to be used, based on the maximum value between the averages of the protrusion of each individual piston.

Protrusion of piston	Number of holes	Thickness of gasket
-0.02 ± 0.100	0	0.82 ± 0.05
0.001 ± 0.200	1	0.92 ± 0.05
0.021 ± 0.295	2	1.02 ± 0.05

- Place the cylinder head centering bushings on the crankcase.
- Fit the chosen cylinder head gasket.

- Note:

The cylinder head gasket is of the ASTADUR type. The material it is made of undergoes a polymerization process during engine operation, so that it hardens considerably during use.

- Tighten the cylinder head screws to a torque of 65 Nm + $90^\circ + 90^\circ + 90^\circ$ additional angular tightening.
- Fit the coolant manifold.

- Connect the oil inlet and return pipes to the turbocharger.
- Fit the oil return pipe guard to the turbocharger sump.
- Tighten the exhaust manifold bracket nut to the crankcase.
- Fit the gasket.

- Connect the exhaust gas recirculation pipe.

- Fit the exhaust gas recirculation pipe heat shield and tighten the bracket screw.
- Fit the turbocharger heat shield.

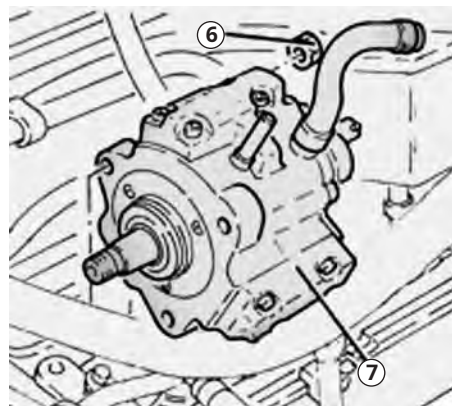
- Connect the condensate oil recovery pipe to the crankcase sump.
- Connect the oil vapor recovery pipe to the crankcase and the head.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

DIET FUEL (DIESEL) HIGH FUEL PUMP PRE SUPER

Disassembling

- Place the car on the lifting bridge.
- Disconnect the battery.
- Remove the Poly-V belt.
- Remove the timing belt.
- Unscrew the screw fixing the guide tube for the engine oil level dipstick to the pressure pump support.
- Disconnect the electrical connection from the fuel pressure regulator.
- Block the rotation of the pressure pump control pulley with two screws.
- Unscrew the nut of the pressure pump control pulley.
- Unscrew the two screws for locking the rotation of the pressure pump control pulley previously mounted.
- Remove the pressure pump control pulley with a puller.
- Unscrew the nuts (6) and remove the pressure pump (7) from its support.

Pump Removal



FIAT 500L

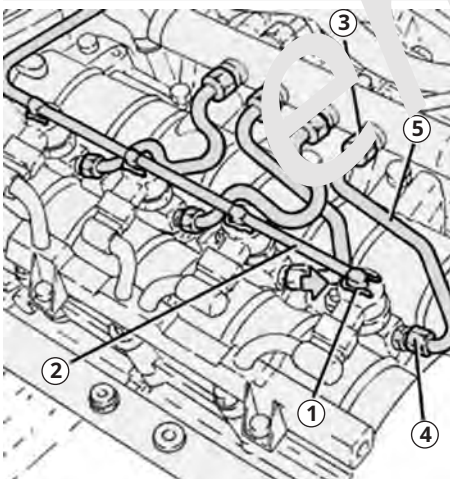
1. engine > maintenance operations

Assembly

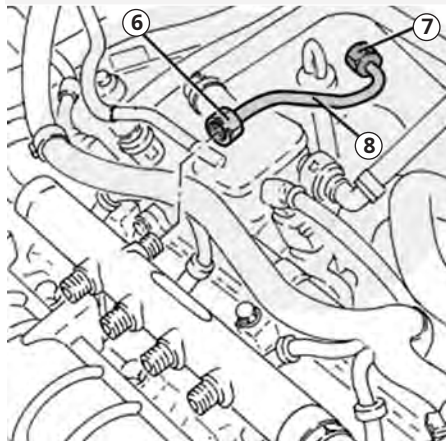
- Place the pressure pump back in its seat and tighten it with the M8 nuts (1b) to a torque of 25 Nm.
- Tighten the M14 pressure pump control pulley nut to a torque of 50 Nm.
- Connect the electrical connection to the fuel pressure regulator.
- Tighten the screw fixing the guide tube for the engine oil level dipstick to the pressure pump support.
- Place the fuel return manifold pipe complete with pipe from the electro-injectors to the fuel recovery manifold back in its seat and secure it with the relevant screws.
- Connect the fuel return pipe to the pressure pump, fuel return manifold pipe side and tighten the relative clamp.
- Connect the quick coupling of the fuel return pipe to the tank, fuel return manifold side.
- Connect the quick coupling of the fuel return pipe from the fuel filter, fuel return manifold pipe side.

FUEL DISTRIBUTOR**Dismantling**

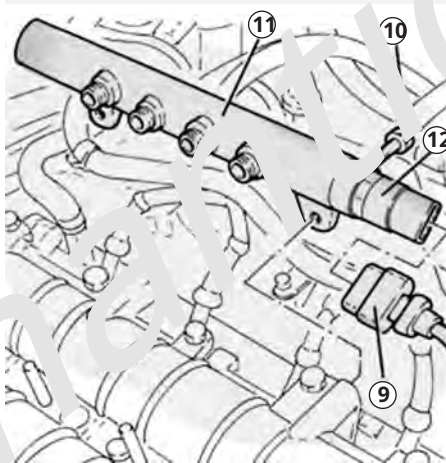
- Disconnect the battery.
- Remove the valve cover.
- Manually push the clips (1) and disconnect the pipe from the electro-injectors to the fuel recovery manifold (2), electro-injectors side and move it sideways.
- Unscrew the fittings (3), (4) and remove the pipes from the fuel manifold to the electro-injectors (5).

Pipe Removal

- Unscrew the fittings (6), (7) and remove the pipe from the pressure pump to the fuel manifold (8).

Removing fittings

- Disconnect the electrical connection (9) from the fuel pressure sensor.
- Unscrew the screws (10) and remove the single fuel manifold pipe (11) complete with fuel pressure sensor (12).

Fuel Distributor Removal**Assembly**

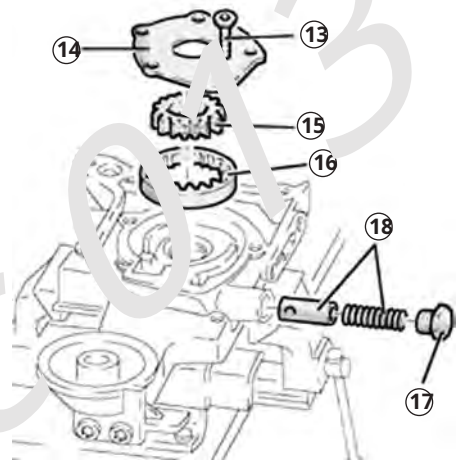
- Tighten the M14 fittings on the fuel distributor to a torque of 23 Nm.
- Proceed with assembly in the reverse order to disassembly.

LUBRICATION**OIL PUMP**

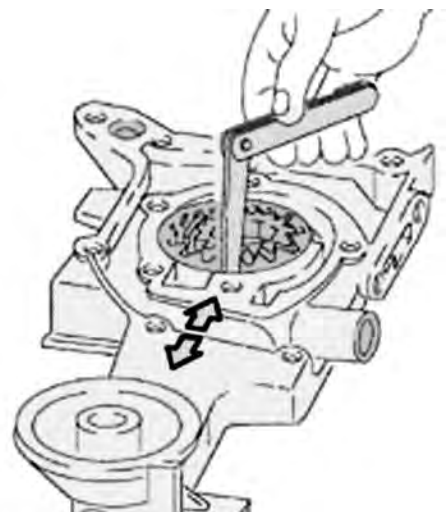
The oil pump can be removed from the engine block only with the engine positioned on the bench for overhaul.

Breakdown

- Unscrew the screws (13) with an impact screwdriver and remove the oil pump cover (14).
- Remove the drive gear (15).
- Remove the driven gear (16).
- Unscrew the cap (17) and remove the oil pressure relief valve (18).
- Remove the front crankshaft oil seal.

Oil pump breakdown**Recomposition**

- Check that the radial play between the pump body and the driven gear is between 0.080 ÷ 0.186 mm.

Check radial play

FIAT 500L**1. engine > maintenance operations**

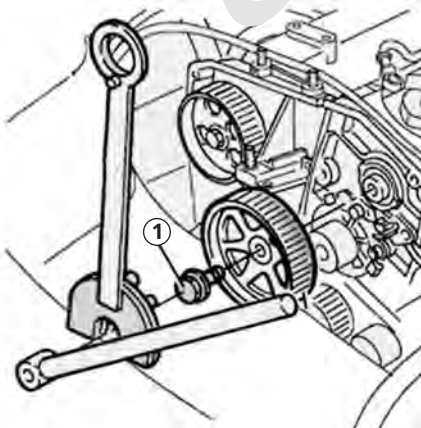
- Check that the axial play between the pump cover support surface and the upper side of the gears is between 0.025 ÷ 0.070 mm.

Check axial play

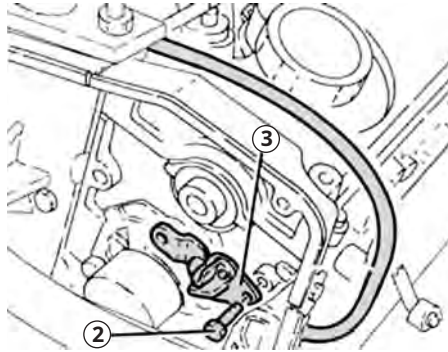
- Fit the oil pressure relief valve and tighten the cap.
- Fit the driven gear and the drive gear.
- Fit the oil pump cover.

COOLING**WATER PUMP***Dismantling*

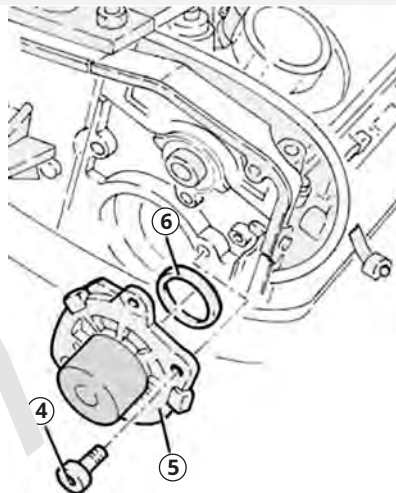
- Place the car on the lifting bridge.
- Disconnect the battery.
- Remove the protection under the engine.
- Remove the rigid engine support on the timing side.
- Remove the front wheels.
- Remove the additional wheel arch.
- Remove the service belt.
- Remove the timing belt.
- Unscrew the screw (1) of the driven toothed pulley using a lever as an anti-rotation device.

Pulley Removal

- Unscrew the screws (2) and move the phase sensor (3) without disconnecting the relevant electrical connection.

Removing the phase sensor connection

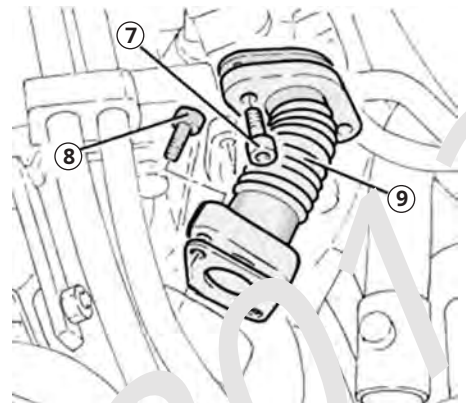
- Unscrew the screws (4) and remove the water pump (5) complete with O-Ring (6).

Water pump removal*Assembly*

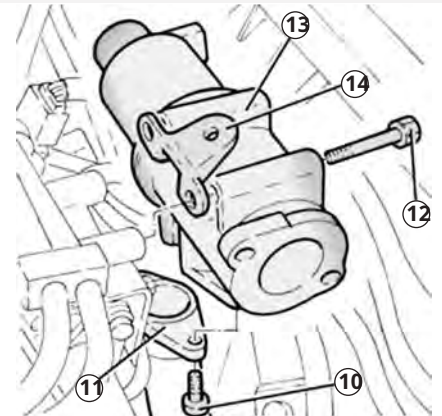
- Place the water pump complete with O-ring back in its seat and secure it with the M8 screws to a torque of 23 ÷ 28 Nm.
- Put the phase sensor back in its place.
- Tighten the M12 screw fixing the driven toothed pulley to a torque of 108 ÷ 132 Nm.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

THERMOSTAT*Dismantling*

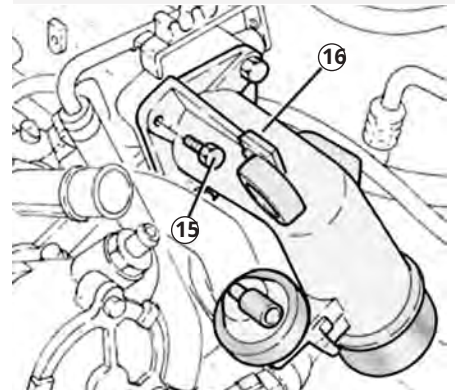
- Place the car on the lifting bridge.
- Disconnect the battery.
- Remove the protection under the engine.
- Unscrew the screws (7) and (8) and remove the rigid pipe from the EGR solenoid valve to the throttle body (9).

EGR Pipe Removal

- Disconnect the electrical connection from the EGR system solenoid valve.
- Unscrew the screws (10) and disconnect the water/exhaust gas heat exchanger (11) from the EGR solenoid valve.
- Unscrew the screws (12) and remove the EGR solenoid valve (13).
- Remove the bracket (14).

EGR exchanger removal

- Unscrew the screws (15) and remove the throttle body (16).

Throttle body removal

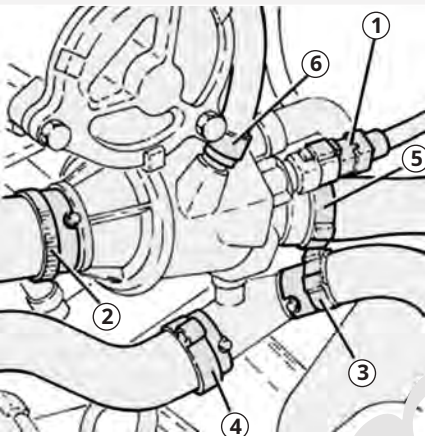
FIAT 500L

1. engine > maintenance operations

- Disconnect the electrical connection from the turbocharger vane position actuator solenoid valve.
- Disengage the turbocharger vane position actuator solenoid valve from the gearbox guard.
- Disconnect the electrical connection (1) from the engine coolant temperature sensor.
- Disconnect the upper radiator coolant inlet hose from the thermostat.

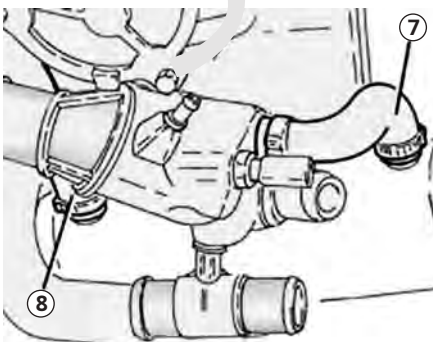
- Disconnect the outlet pipe from the air conditioning system heater (3) and the delivery pipe to the rigid liquid inlet pipe to the water pump (4) from the thermostat "T" fitting (2).
- Disconnect the pipe (5) supplying the coolant to the air conditioning system heater from the thermostat.
- Disconnect the coolant return pipe (6) from the thermostat to the engine cooling supply tank.

Removing pipes from thermostat



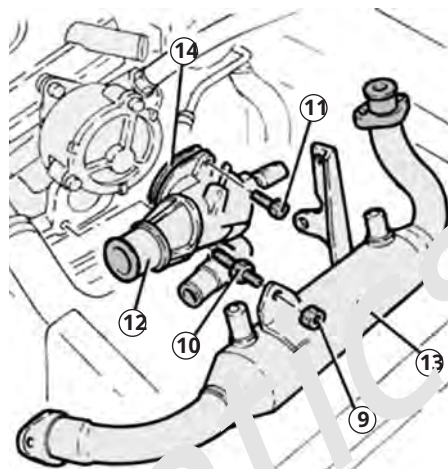
- Disconnect the engine coolant inlet pipe (7) and the engine coolant outlet pipe (8) from the EGR exhaust gas heat exchanger.

EGR Heat Exchanger Pipe Removal



- Disconnect the electrical connections from the electro-injectors and move the electrical wiring to the side.
- Unscrew the screws securing the water/exhaust gas heat exchanger for the EGR system to the cylinder head.
- Unscrew the nut (9) of the water/exhaust gas heat exchanger for the EGR system at the cylinder head.
- Unscrew the pin (10), the screw (11) and remove the thermostat (12) together with the EGR heat exchanger (13).
- Remove the thermostat gasket (14).

Thermostat Removal



Assembly

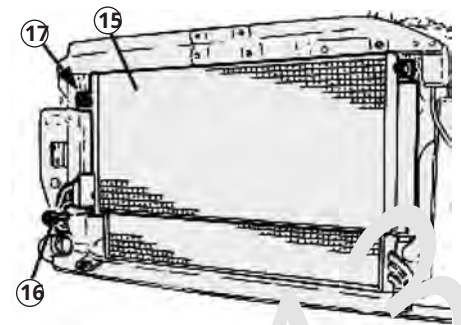
- Place the water/exhaust gas heat exchanger for the EGR system back in its place together with the thermostat gasket with its gasket.
- Tighten the pin and the M8 thermostat fixing screw to a torque of 23 + 28 Nm.
- Tighten the heat exchanger nut and screws to the cylinder head.
- Place the electrical wiring back in its place and connect the electrical connections to the electro-injectors.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

RADIATOR AND ELECTRIC FAN

Dismantling

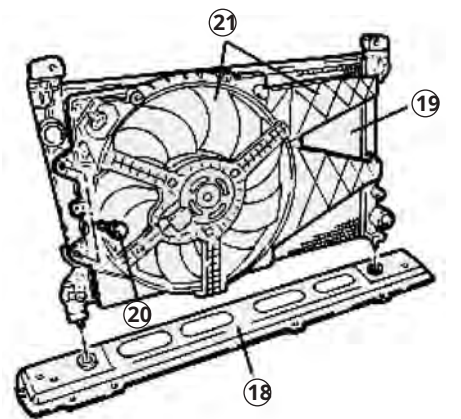
- Place the car on the lifting bridge.
- Remove the front bumper and intercooler.
- Secure the air conditioning system condenser (15) appropriately, unscrew the fixing screws (16) and compress the clip (17) to disconnect it from the radiator.

Removing condenser fixings



- Disconnect the quick coupling of the water outlet pipe from the radiator and move it to the side.
- Loosen the clamp and disconnect the system supply pipe from the radiator.
- Disconnect the radiator's electrical connection.
- Disconnect the quick coupling of the water inlet pipe to the radiator and move it to the side.
- Unscrew the top right radiator fixing screw.
- Disconnect the electrical connection of the electric fan.
- Separate the crosspiece (18) from the radiator (19).
- Unscrew the screws (20) and remove the electric fan (21).

Radiator removal with electric fan



Assembly

- Mount the electric fan and secure it with the relevant screws.
- Place the radiator on the support crosspiece.
- Connect the electrical connection of the electric fan.
- Connect the system supply pipe to the radiator and tighten the relative clamp.
- Fit and connect the water outlet pipe from the radiator with the relevant quick coupling.
- Tighten the upper radiator fixing screws.

FIAT 500L

1. engine > maintenance operations

- Connect the resistor's electrical connection.
- Fit and connect the water inlet pipe to the radiator with the relevant quick coupling.
- Proceed to refuel and bleed the cooling system.

REFUELLING AND BLEEDING

Refueling and Draining

- Close the liquid drain tap and keep the air bleed screw open.
- Proceed to fill the circuit with the prescribed liquid through the expansion tank filler neck, until the liquid comes out of the air bleed screw.
- Close the air bleed screw.
- Top up the liquid further until the tank level reaches the MAX mark.

- Fit and screw the cap onto the expansion tank tightly.

- Start the engine and leave it at idle for approximately two minutes.
- Bleed the circuit of residual air by performing periodic and gradual accelerations (every 30 seconds) up to a speed of approximately 3,000 rpm.

Note:

If during this phase you observe a decrease in the coolant inside the expansion tank, proceed with refueling until the MAX mark is reached.

- Stop the engine and let it cool.
- Top up, if necessary, with coolant until it reaches the MAX mark.

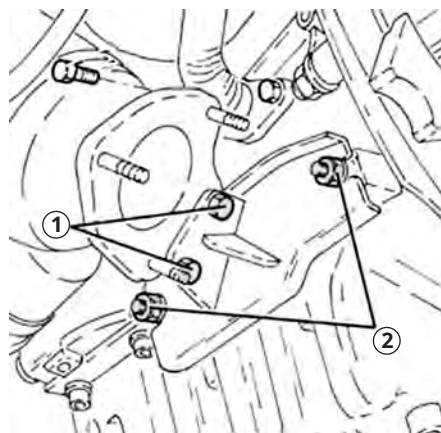
- At the end of the above operations, make sure that you have introduced into the system a quantity of liquid at least equal to that recovered during the emptying phase.

SUPERCHARGING TURBOCHARGER

Dismantling

- Place the car on the lifting bridge.
- Unscrew the screws and remove the lower and upper exhaust manifold heat shield.
- Unscrew the nuts securing the front section of the exhaust pipe to the catalytic converter.
- Disconnect the vacuum line from the variable geometry control actuator
- Loosen the clamp and disconnect the air delivery hose between the turbocharger and the heat exchanger, turbocharger side.
- Unscrew the screws (1) and nuts (2) securing the catalytic converter support bracket.
- Unscrew the screws securing the engine oil return pipe from the turbo, engine block side.

Oil Pipe Removal

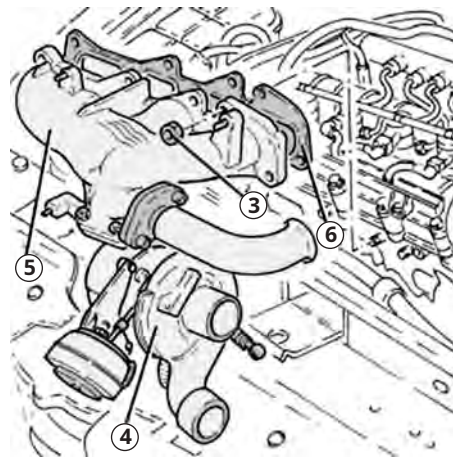


- Unscrew the fitting and disconnect the pipe supplying the engine oil to the turbocharger, on the engine block side.

- Loosen the collar and remove the catalytic converter.

- Unscrew the nuts (3) and remove the variable geometry turbocharger unit (4) complete with exhaust manifold (5) complete with gasket (6).

Turbocharger Removal

*Assembly*

Place the exhaust manifold gasket back into its seat.

- Tighten the M8 exhaust manifold nuts to a torque of 28 Nm.
- Connect the corrugated air inlet hose to the turbocharger, turbocharger side and tighten the relative clamp.
- Connect the air delivery hose between the turbocharger and the heat exchanger, turbocharger side and tighten the relative clamp.
- Fit the upper exhaust manifold heat shield and secure it with the relevant nuts.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

2. clutch

Technical data

GENERAL INFORMATION

The clutch is a dry single-disc type with spring-loaded dampers and push-release. The clutch release control is actuated by a coaxial hydraulic control device called the "CSC system".

Clutch assembly



1. Clutch disc

2. Shock absorbers

3. Clutch mechanism

4. Clutch pressure plate spring

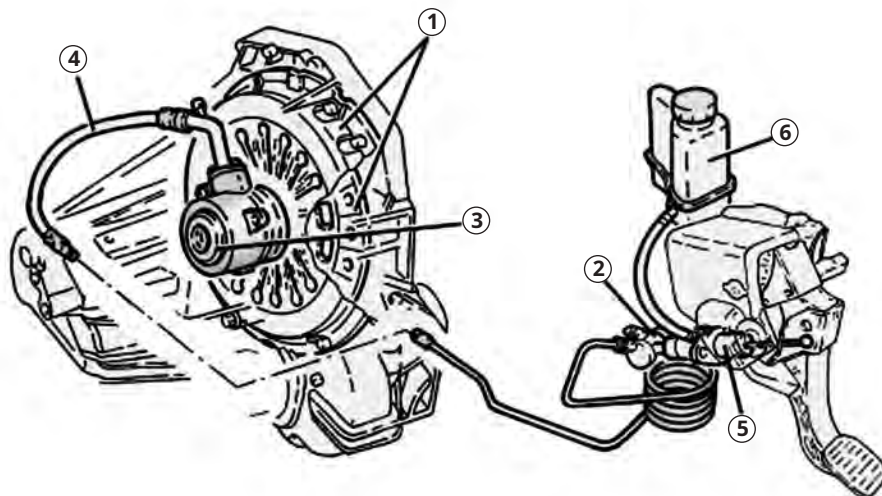
Driven disc outer diameter (mm)	235
Internal diameter of driven disc (mm)	165
Disc spring load (N)	5.800

HYDRAULIC CIRCUIT

The clutch release system is a coaxial hydraulic control called "CSC system". This type of control, which integrates the actuator

hydraulic to the thrust bearing, allows the system performance to remain unchanged throughout the operating life of the clutch and contributes to the reduction of noise and vibrations transmitted by the pedal.

Hydraulic complex



1. Clutch mechanism

2. Vibration damper

3. CSC Actuator

4. Connection pipe between pump and actuator

5. Clutch pump

6. Brake-clutch oil reservoir

FIAT 500L**2. clutch > technical data****MASTER CYLINDER CLUTCH**

The clutch is disengaged by the action of the clutch pump which sends pressurized oil, through the pipe, into the expansion chamber. The oil pressure causes the piston to move, which slides on the guide tube by means of plastic wear pads.

The piston is integral with the thrust bearing which presses on the clutch pressure plate springs, disengaging the clutch.

When the oil pressure ceases, the actuator returns to its rest position by being pushed by the pressure plate springs.

The seal against any gearbox oil leaks that could spill into the clutch bell is ensured by an oil seal ring and an O-Ring. As protection against the ingress of external agents, a rubber bellows held in place by a spring has been provided.

SECONDARY CYLINDER

The clutch slave cylinder has been designed with a plastic body and piston, to reduce weight. The actuation rod is anchored to the piston (T interface).

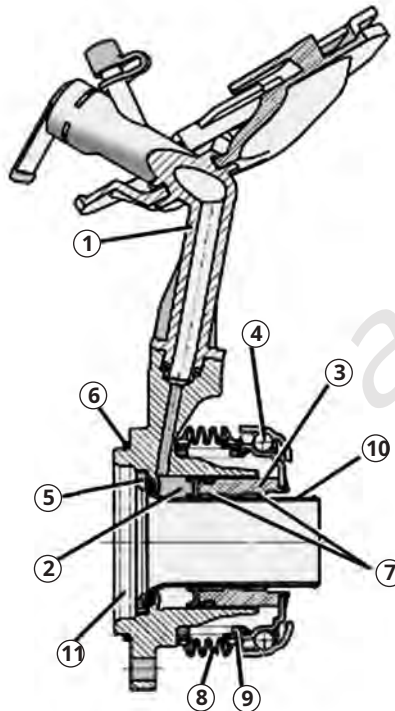
Inside the body in the piston seal sliding area there is a steel cylinder to prevent wear and deformations due to pressure.

Piston escape is prevented by a V-shaped stop fork, while a protective bellows prevents dirt from accumulating inside the cylinder.

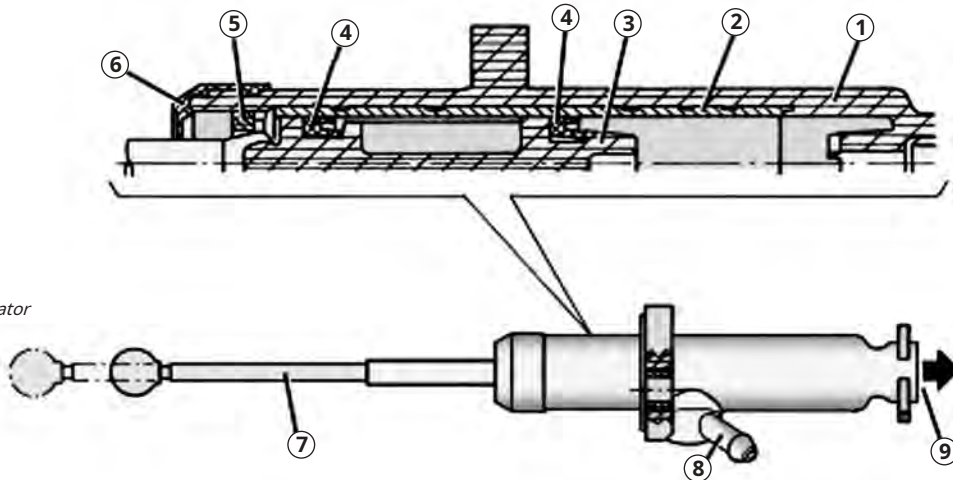
The upper and lower stroke ends of the piston in the slave cylinder also determine the extreme high and low positions of the pedal.

CSC Cylinder

- 1.Oil inlet pipe
- 2.Expansion chamber
- 3.Piston
- 4.Thrust bearing
- 5.Threaded closing flange
- 6.O-Ring
- 7.Anti-wear pads
- 8.Rubber bellows
- 9.Spring
- 10.Guide tube
- 11.Oil seal ring seat

*Secondary cylinder*

- 1.Body
- 2.Steel cylinder
- 3.Piston
- 4.Sealing gasket
- 5.Piston stop fork
- 6.Protective bellows
- 7.Drive stem
- 8.Oil inlet
- 9.Oil delivery to CSC actuator



FIAT 500L**2. clutch > maintenance operations****MAINTENANCE****CLUTCH OIL**

Products	TOP 4 PROTECTION - FMVSS n°116 DOT 4
Capacity	0.5 liters
Maintenance frequency	Drain replacement every 2 years

TIGHTENING TORQUES

Component	Fixing	OR	Nm value
Clutch mechanism	Screw	M6	12 ÷ 15
Hydraulic clutch actuator	Screw	M8	18 ÷ 22
Clutch master cylinder (pump)	Nut	M8	12 ÷ 18

maintenance operations**CLUTCH****Dismantling****Note:**

Operation to be carried out with the gearbox removed.

- Fit the flywheel torque-retaining tool (1).

- Unscrew the three clutch mechanism fixing screws by 120 degrees.

- Fit the extractor tool (2) and the centering tool (3) by screwing the pins into the seats of the previously removed screws.

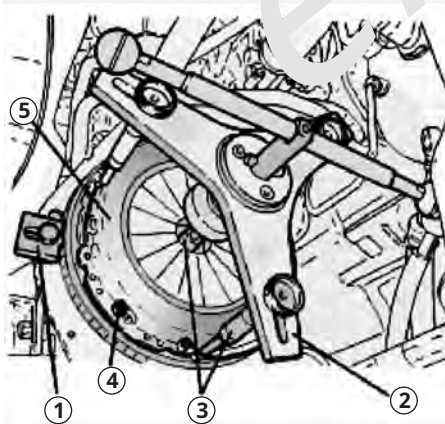
- Rotate the tool's handwheel until the pins come into contact with the disc.

- Unscrew the remaining clutch mechanism fixing screws (4).

- Unscrew the handwheel of the tool until the diaphragm spring of the clutch mechanism is unloaded.

- Remove any previously mounted tools.

- Remove the clutch mechanism (5) and the clutch disc.

Clutch assembly removal**Assembly**

- Place the clutch disc on the flywheel.

Note:

When fitting the clutch disc, observe the direction of assembly identified by the words "engine side" or "gearbox side".

- Position the clutch mechanism and rotate the tool's handwheel until the pins come into contact with the disc.

- Unscrew the handwheel of the tool until the diaphragm spring of the clutch mechanism is unloaded.

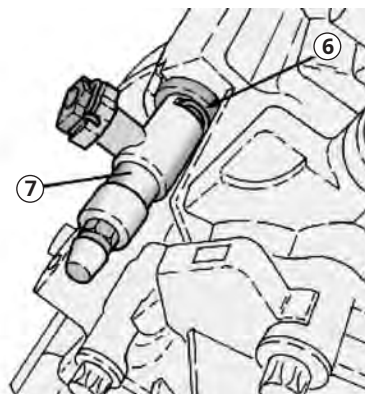
- Remove any previously mounted tools.

- Tighten the remaining clutch device fixing screws by hand.

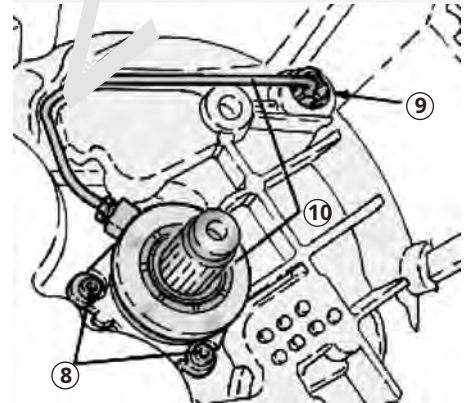
- Gradually tighten the clutch device fixing screws diagonally until a torque of $12 \div 15$ Nm is reached.

MASTER CYLINDER**Dismantling**

- Act on the clip (6) and remove the three-way fitting (7).

Removing the three-way fitting

- Unscrew the screws (8) to compress the retaining spring (9) and remove the clutch master cylinder (10).

Master cylinder removal**Assembly**

- Position the master cylinder and engage the pipe retaining clips to the gearbox.

- Tighten the clutch master cylinder fixing screws to a torque of $12 \div 18$ Nm.

- Position the three-way fitting and secure it with the relevant retaining clip.

SECONDARY CYLINDER**Dismantling**

- Place the car on the lifting bridge.

- Disconnect the battery and remove it together with its basket.

- Remove the left front wheel and its wheel arch.

- Connect a suitable container to the clutch actuator bleed valve and drain all brake/clutch fluid.

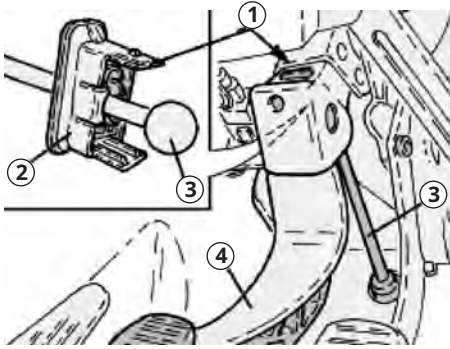
FIAT 500L

2. clutch > maintenance operations

- Compress the upper spring (1) of the retaining device (2) and disengage the push rod (3) of the secondary cylinder from the clutch pedal (4).

- Act on the clips and remove the retaining device from the tip.

Tip removal

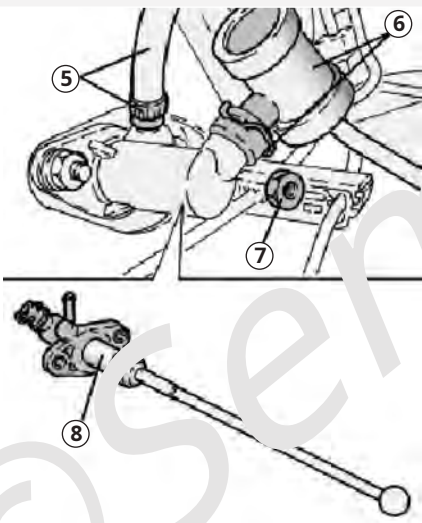


- Loosen the clamp and disconnect the clutch system feed pipe (5).

- Pull back the clip and disconnect the vibration damper from the secondary cylinder (6).

- Unscrew the nuts (7) and remove the secondary cylinder (8).

Removing the secondary cylinder



Assembly

- Position the secondary cylinder and tighten the relevant nuts to a torque of 12 ± 18 Nm.

- Connect the vibration damper to the master cylinder with the corresponding retaining clip.

- Connect the clutch system feed pipe and tighten the relative clamp.

- Fit a new retaining device to the clutch pedal.

- Press the master cylinder push rod into the retaining device on the clutch pedal.

- Proceed to bleed the clutch/brake hydraulic system.

HYDRAULIC CIRCUIT

Drain

- Remove the brake-clutch fluid reservoir cap and connect suitable equipment to the reservoir.

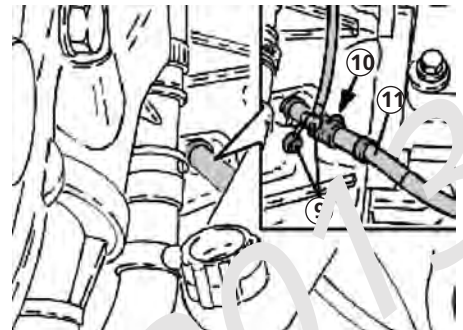
Note:

To prevent impurities from entering the brake-clutch fluid reservoir, before unscrewing the cap, thoroughly clean it and the entire upper surface of the reservoir adjacent to the filler neck.

- Remove the protective cap and connect the recovery device (pipe and tank) to the coaxial actuator bleed connection (9).

- Lift the clip (10) one click and move the hose (11) back to the bleeding position.

Removing the protective cap



- Slowly open the equipment tank tap.

- Wait until the air contained in the clutch release hydraulic system has completely escaped.

- Connect the flexible hose to the coaxial actuator and secure it with the relative retaining clip.

- Remove the recovery device (pipe and tank).

- Remove the brake-clutch bleeding equipment.

- Check that the clutch is disengaged and the gears engaged correctly.

- Check the correct fluid level in the brake/clutch reservoir.



FIAT 500L**3. c635 gearbox > technical data**

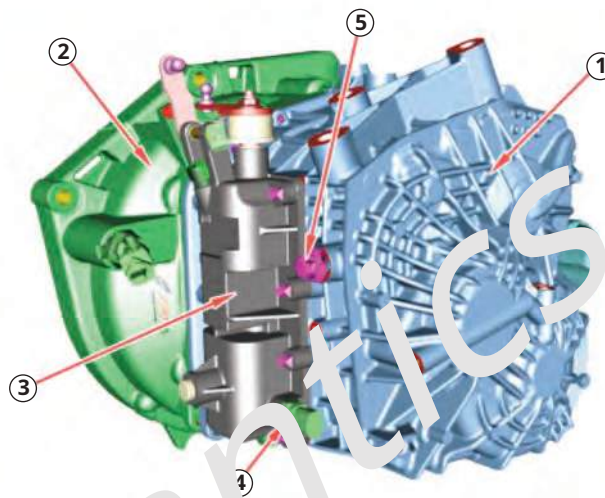
3. C635 gearbox

Technical data

GENERAL INFORMATION

The C635 manual gearbox is designed to be installed in front-wheel drive and transverse engine layout transmission schemes. It features a classic three-shaft layout and can transmit a maximum torque of 350 Nm.

Overall change



- 1. Gearbox
- 2. Clutch box
- 3. Gear selection/engagement group
- 4. Reverse light switch
- 5. RM gear support fixing screw

TRANSMISSION RATIOS

Type	5 Jtd.	C 35
THE	4.154	
	2.118	
I	1.361	
IV	0.978	
V	0.756	
YOU	0.622	
RM	4,000	

Transmission ratios

COMPONENTS

Inside the gearbox, each transmission ratio is achieved by a pair of gears that are always in mesh with each other, one of which is mounted "idle" on the respective shaft.

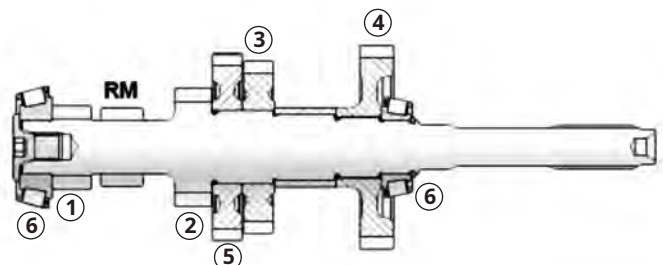
The exception is the RM, which is achieved through a train of 3 gears to reverse the direction of motion.

The primary shaft receives motion from the crankshaft; when a gear is selected, the driving torque is transferred to the secondary shaft through the relevant pair of gears and from there to the fixed transmission connected to the differential.

Primary tree

The primary shaft of the gearbox has all the gear wheels integral: in particular the gear wheels of the 1st gear, the 2nd gear and the RM are obtained directly on the shaft through mechanical processing. The 3rd gear, the 5th gear and the 4th-6th gear are keyed through a spline obtained on the shaft itself and planted with interference. The primary shaft is supported at both ends by two tapered roller bearings.

Primary tree



- 1. 1st gear gear
- 2. 2nd gear gear
- 3. 3rd gear gear
- 4. 4th-6th gear
- 5. 5th gear gear
- 6. Bearings

FIAT 500L

3. c635 gearbox > technical data

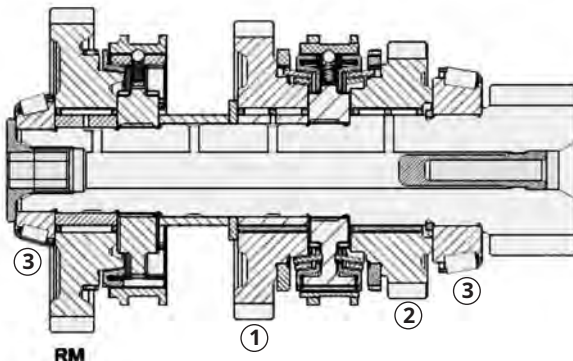
Upper secondary shaft

The upper secondary shaft carries the gear wheels that make up 3rd gear, 4th gear and reverse; these gear wheels are all mounted "idle" on needle bearings.

There are two synchronizers: one is used to make the 3rd or 4th speed gear wheels integral with the shaft, the other is used for the RM.

The synchronizers for 4th gear and RM are of the "bicone" type while the synchronizer for 3rd gear is of the "tricone" type.

The front end of the shaft houses the gear wheel that transfers motion to the differential ring gear. The upper secondary shaft is supported at both ends by two tapered roller bearings.

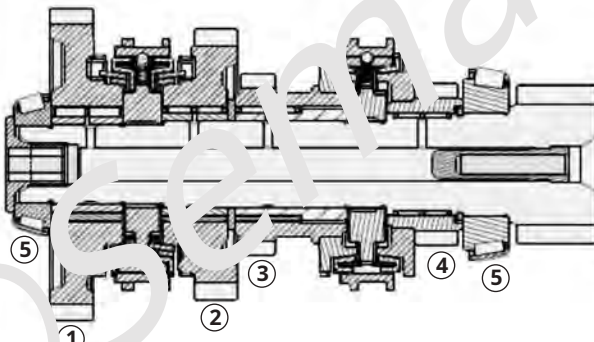
Upper secondary shaft

1.3rd gear gear 2.4th gear gear 3.Bearings

Lower secondary shaft

The gear wheels for 1st gear, 2nd gear, 5th gear and 6th gear are keyed to the lower secondary shaft.

The lower secondary shaft is supported at both ends by two tapered roller bearings.

Lower secondary shaft

1.1st gear gear 2.2nd gear gear 3.5th gear gear 4.6th gear gear 5.Bearings

Synchronizers

The C635 transmission uses two types of synchronizers:

- bicone for 4th gear, 5th gear, 6th gear and RM
- tricone for 1st gear, 2nd gear and 3rd gear.

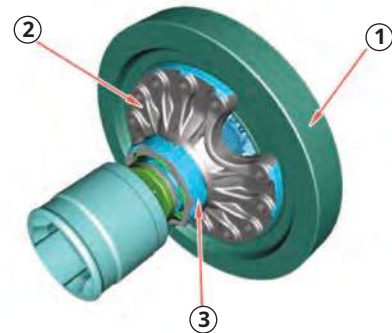
Double cone synchronizers consist of a group of two conical clutches whose purpose is to distribute the load due to the synchronization of the speeds of the gear wheel and shaft over two friction surfaces. In this way, the gear engagement maneuver is easier. Triple cone synchronizers consist of a group of three conical clutches whose purpose is to distribute the load due to the synchronization of the speeds of the gear wheel and shaft over three friction surfaces.

In this way, the gear shifting operation is made easier because it is used to optimise the continuity and progressiveness of the torque transfer between the shafts.

Differential

It is the mechanical device that allows two fundamental tasks to be carried out for the vehicle's operation:

- distribute the driving torque equally between the two half-shafts
- allow the drive wheels to assume a different rotation speed.

Differential view

1.Crown gear
2.Differential box
3.Bearing

Cogwheels

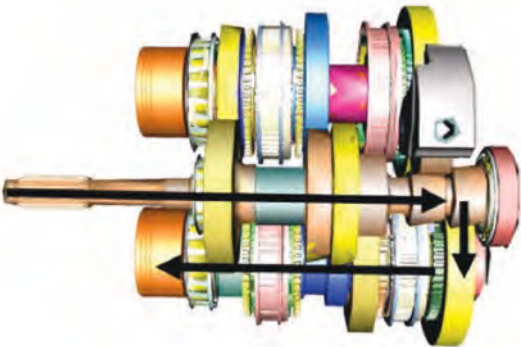
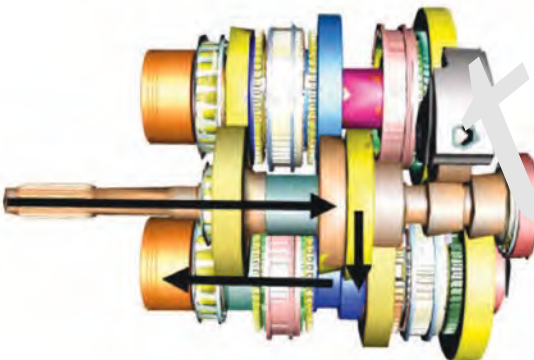
Gear wheels are subject to variable loads over time that have the characteristics of fatigue stress; for these reasons, nickel-chromium alloy steels are used that allow for strong mechanical resistance.

After being machined, the gear wheels first undergo a finishing process (shaving and grinding) and then a heat treatment (case hardening and tempering) which improves their resistance to fatigue and wear.

They are all helical teeth, which allows the transmission of higher torques than those with straight teeth of the same axial size; furthermore, helical toothed gears have a quieter operation. The high coverage factor teeth keep more teeth in mesh, to the advantage of transmission regularity.

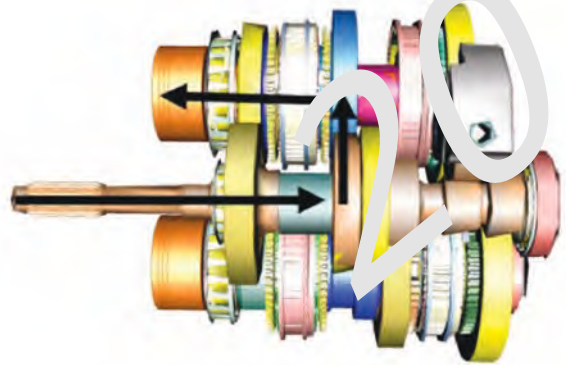
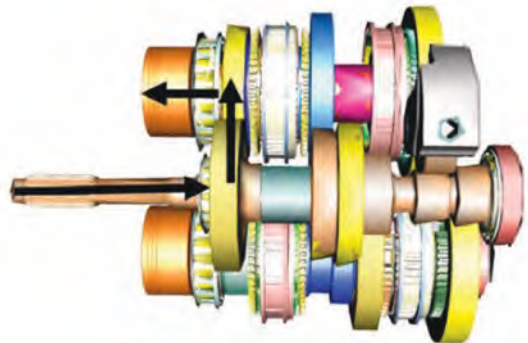
FIAT 500L**3. c635 gearbox c635 > technical data****FLOW MESH***First and second speed*

In 1st gear, the motion enters the gearbox through the primary shaft and, via the fixed drive gear, is transmitted to the driven gear of the 1st gear keyed idle on the lower secondary shaft. Operating the relevant synchronizer (of 1st and 2nd gear) makes the gear wheel integral with the secondary shaft and, via the fixed idler gear, with the differential. Moving the synchronizer in the opposite direction makes the driven gear of the 2nd gear integral with the secondary shaft; in this way the 2nd gear is created.

Gear 1 to speed***Gear 2 to speed****Third and fourth speed*

The motion enters the gearbox through the primary shaft and, via the fixed driving gear, is transferred to the driven gear, keyed to the upper secondary shaft; the actuation of the synchronizer (of 3rd and 4th gear) allows the motion to be transferred to the fixed transmission gear wheel, which is also integral with the differential crown, like the one on the lower shaft.

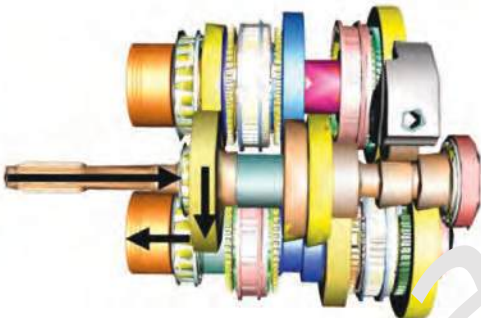
Moving the synchronizer in the opposite direction engages 4th speed.

Gear 3 to speed***Gear 4 to speed***

FIAT 500L**3. c635 gearbox > technical data*****Fifth and sixth speed***

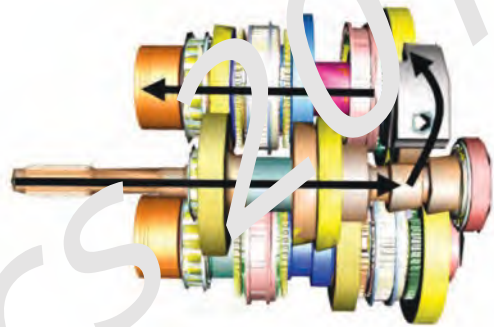
The motion enters the gearbox through the primary shaft and, via the fixed driving gear, is transferred to the driven gear, keyed to the lower secondary shaft; the actuation of the synchronizer (of 5th and 6th gear) allows the motion to be transferred to the fixed transmission gear wheel, which is also integral with the differential crown.

To engage 6th gear, the same synchronizer is operated in the opposite direction to the previous one.

Gear 5to speed***Gear 6to speed******Reverse gear***

The motion entering the gearbox is transferred from the primary shaft to the idle wheel keyed to a special support integral with the gearbox; thus it transfers the motion to the RM wheel keyed to the upper secondary shaft; at the same time this passage allows the reversal of the motion.

The RM synchronizer makes the wheel integral with the upper secondary shaft, transferring motion to the differential.

Reverse Gear**TIGHTENING TORQUES**

Component	Fixing	OR	Nm value
Mechanical oil pan change	Screw	M10	36 ÷ 44
Mechanical oil pan at engine crankcase side	Nut	M12	51 ÷ 69
Gearbox oil drain plug	Cork	M22	39 ÷ 43
Gearbox oil fill cap	Cork	M22	23 ÷ 28
Differential inner box support	Screw	M10	33 ÷ 37 + 50°
Gear selection group	Screw	M8	20
Upper fixing connecting gearbox to engine	Screw	M12	51 ÷ 69
Rear fixing of gearbox to engine connection	Nut	M12	51 ÷ 69
Upper fixing of gearbox connection to engine sump	Screw	M10	36 ÷ 44
Rear bearing plate primary and secondary shafts	Screw	M8	23 ÷ 28
Rear bearing plate primary and secondary shafts	Screw	M12	72 ÷ 88
Secondary shaft rings	Ring nut	M18	99 ÷ 121
Primary shaft ring nut	Ring nut	M14	50 ÷ 61
Gearbox	Screw	M8	23 ÷ 28
RM gear support	Screw	M12	90 ÷ 110

FIAT 500L

3. c635 gearbox > maintenance operations

maintenance operations

- operations without detachment of the gearbox-

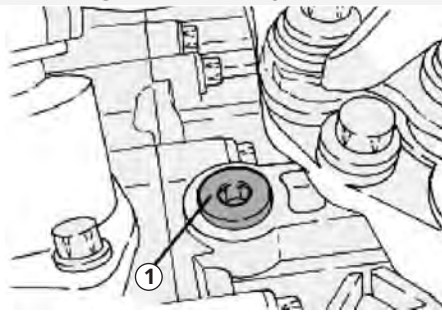
LUBRICATION

GEARBOX OIL

Level check and restore

- Place the car on the lifting bridge.
- Remove the engine guard.
- Unscrew the oil filler cap (1).

Removing the oil filler cap



- Unscrew the gearbox oil drain plug (2).
- Allow the oil to drain into a suitable container.

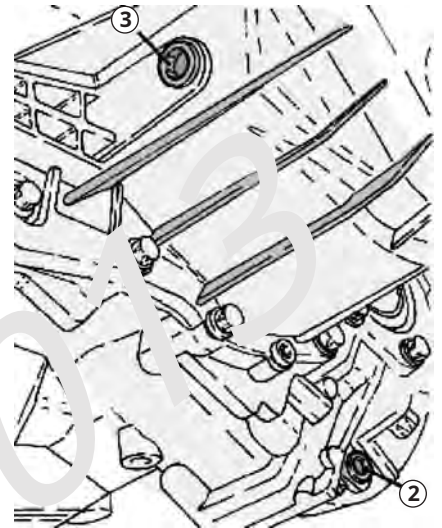
Note:

The threaded plug (3) must not be used for draining and refilling the gearbox oil. It is therefore recommended not to remove it from its location.

- Clean the drain plug and the plug seat, removing any sealant residue.

- Apply sealant (LOCTITE 510 or equivalent) to the threads of the drain plug and tighten it into its seat to a torque of 18 Nm.
- Through the filler hole, introduce the oil type TUTELA CAR THECHNYX SAE 75W/85 or equal to 1.58 litres.
- Clean the filler cap, replace it in its seat and tighten it to a torque of 23-28 Nm.

Threaded cap removal



- operations with gearbox detachment-

GEARBOX GROUP

REMOVING GEARBOX FROM THE CAR

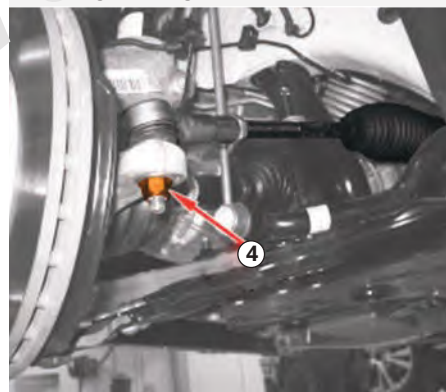
Dismantling

- Place the car on the lifting bridge.
- Remove the engine guard.
- Drain the gearbox oil.
- Empty the conditioning refrigerant circuit system.
- Drain the engine coolant.
- Remove the battery together with its basket/holder.
- Remove the engine coolant expansion tank.
- Remove the engine soundproofing cover.
- Remove the drain line.
- Remove the right axle shaft from the gearbox.
- Remove the front bumper, the front bonnet lock and the front headlights.
- Remove the flexible gear shift/selection reaction bracket.
- Remove the dent from the wheel hub retaining nut.
- Mount the anti-torque tool on the brake disc.

- Unscrew the nut securing the hub to the wheel upright.

- Unscrew the nut (4) fixing the steering tie rod to the wheel upright.

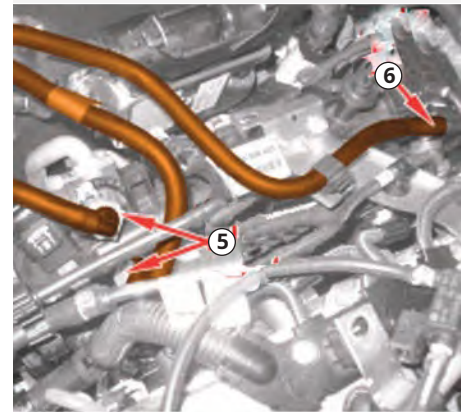
Removing the fixing nut



- Using the extractor tool, disconnect the steering tie rod from the wheel upright.
- Unscrew the bolt securing the front suspension swing arm to the wheel upright.
- Using a suitable tool, remove the left half-shaft from the differential.

- Disconnect the fuel supply/return and anti-evaporation pipes (5) and (6).

Removal of evaporation pipes



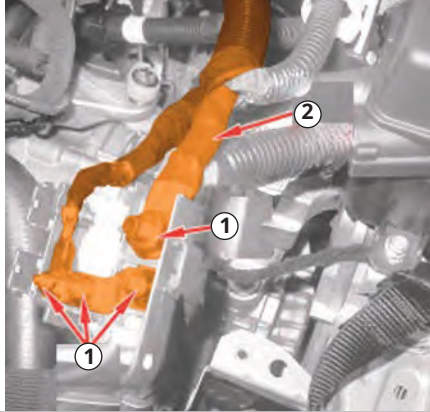
- Disconnect the electrical connection of the injection-ignition control unit.
- Unscrew the fixing nut and disconnect the low pressure refrigerant pipe, expansion valve side.
- Disconnect the quick couplings of the pipes from the heater.

FIAT 500L

3. c635 gearbox > maintenance operations

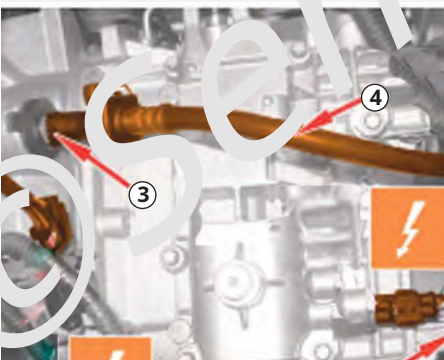
Unscrew the fixing nut (1) of the charging wiring (2).
Unscrew the wiring fixing nuts from the battery terminal.

Removing battery fasteners



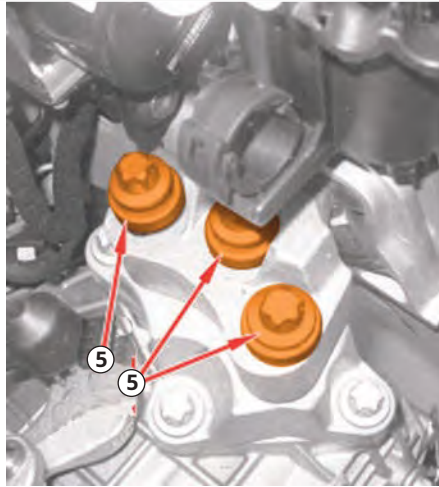
- Unscrew the fixing screws and open the fuse box cover.
- Disconnect the reverse switch junction.
- Unscrew the nut securing the mass to the body.
- Disconnect the quick coupling of the vacuum pump pipe.
- Unscrew the brake-clutch fluid reservoir cap and fit the cap tool.
- Open the retaining clip (3) and disconnect the oil delivery pipe to the clutch control actuator (4).
- Unscrew the screw and remove the ground cable and disconnect the electrical connection of the lambda probe.
- Disconnect the electrical connection of the reverse switch.

Wiring Removal



- Using a suitable hydraulic lift and the specific tool, support the powertrain by attaching the snap hooks to the hooks.
- Unscrew the fixing screws (5) of the elastic plug to the rigid powertrain support, gearbox side.

Removing the elastic plug



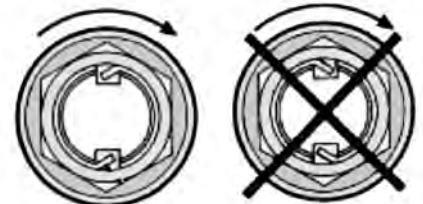
- Remove the powertrain from the engine compartment, placing it on the previously prepared platform.
- Disengage the powertrain from the support tools.
- Separate the gearbox from the engine.

Assembly

- Place the powertrain in place.
- Tighten the M12 screws fixing the elastic plug to the rigid powertrain support to a torque of $45 \pm 55 \text{ Nm}$ $\pm 45^\circ$.
- Remove the tools used to support the powertrain.
- Connect the electrical connection of the reverse switch.
- Connect the electrical connection of the lambda probe.
- Tighten the ground cable screw.
- Connect the oil delivery pipe to the clutch control actuator by securing it to the retaining clip.
- Remove the tool and screw on the brake-clutch fluid reservoir cap.
- Connect the quick coupling of the depressor pipe.

- Screw the fixing nut of the mass onto the body.
- Connect the bridle junction for reverse switch.
- Position the fuse box cover and screw in the relevant fixing screws.
- Screw the fixing nuts of the battery terminal wiring
- Screw the starter motor wiring fixing nut.
- Connect the quick couplings of the pipes from the heater.
- Connect the low pressure coolant pipe, expansion valve side and screw the fixing nut.
- Connect the electrical connection of the injection-ignition control unit.
- Connect the fuel flow, return and anti-evaporation pipes.
- Place the left half-shaft correctly in its seat in the differential.
- Tighten the new M10 bolt securing the front suspension swing arm to the wheel upright to a torque of $50 \pm 60 \text{ Nm}$.
- Connect the steering tie rod to the wheel upright and tighten the new M12 nut to a torque of $67 \pm 82 \text{ Nm}$.
- Tighten the wheel hub fixing nut as shown below.

Nut chamfering



- Connect the negative battery terminal.
- Remove the car from the lift.



4. transmission

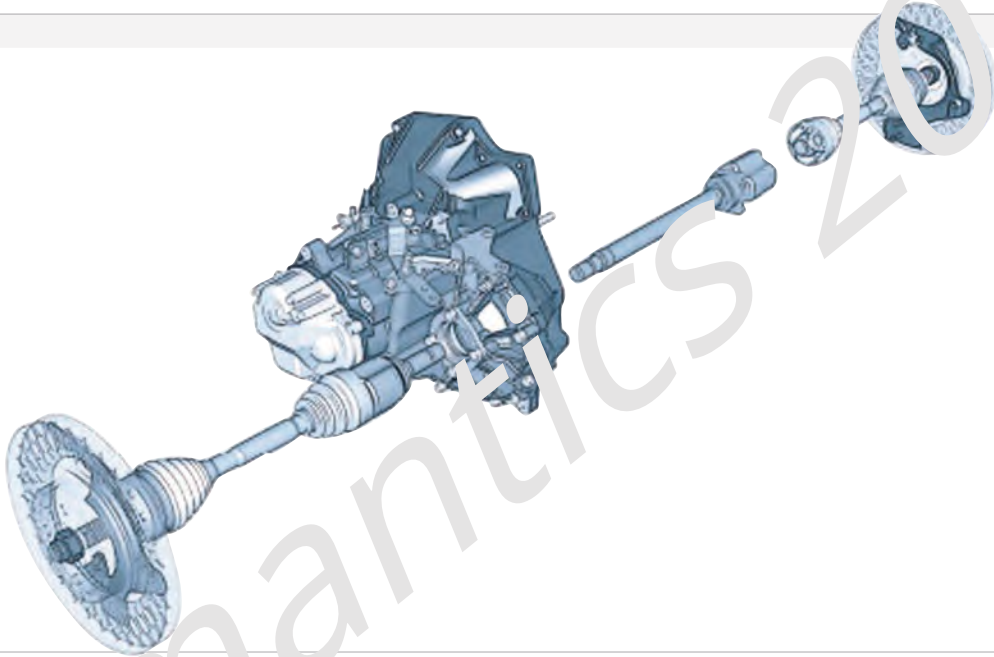
Technical data

GENERAL INFORMATION

The transmission is of the type with "homokinetic" joints on the wheel side and "tripod" joints on the gearbox side. An intermediate half-shaft transmits the motion to the right half-shaft which is the same as the left. This solution allows for

to obtain a perfectly symmetrical distribution of the driving torque on the two wheels.

This prevents the longer half-shaft from bending due to the transmitted torque, which could cause vibrations in the dynamic set-up of the vehicle.



MAINTENANCE

JOINT LUBRICATION

Wheel side CV joint (g)	85 ± 10	110 ± 10
CV joint differential side (g)	100 ± 10	110 ± 10 (*)

*) of which: 25 g in the cap and 75 g on the external track

Grease type

Wheel side joint	ALL STAR PROTECTION Contactual Technical Reference NLGI 1-2
Gearbox side joint	TUTELA 700 Contactual Technical Reference NLGI 0-1

TIGHTENING TORQUES

Component	Fixing	OR	Nm value
Right half shaft with bearing support	Screw	M8	16 ÷ 24
Intermediate half-shaft bearing support	Screw	M8	23 ÷ 28

maintenance operations

AXLE SHAFT AND JOINTS

DRIVE SHAFT

Dismantling

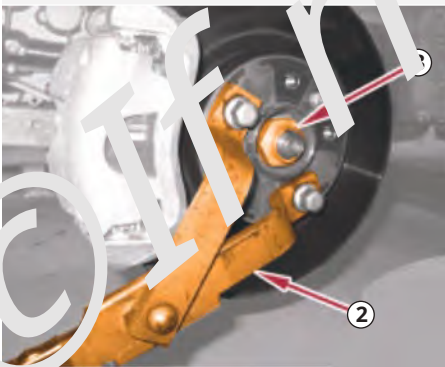
- Place the car on the lifting bridge.
- Remove the front wheels.
- Remove the engine guard.
- Remove the right and left wheel arch protection.
- Drain the gearbox oil (see operation described in chapter 3, gearbox).
- Remove the dent from the fixing nut (1) wheel hub.

Removal of bruise



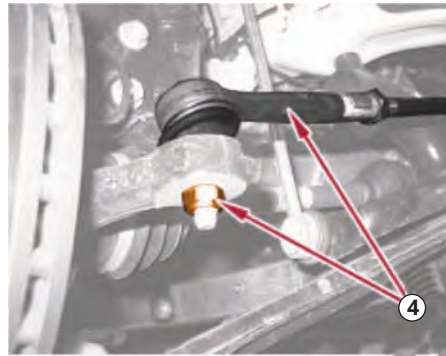
- Fit the anti-torque tool (2) onto the brake disc.
- Unscrew the nut (3) fixing the hub to the wheel upright.

Removing the wheel hub fixing



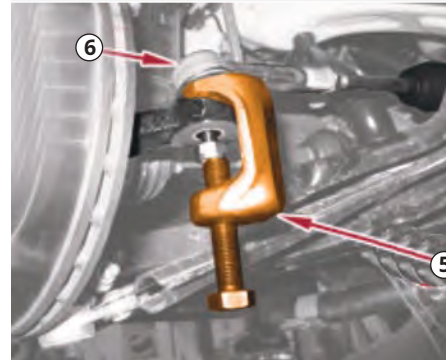
- Unscrew the nut (4) fixing the steering tie rod to the wheel upright.

Removing tie rod fixing



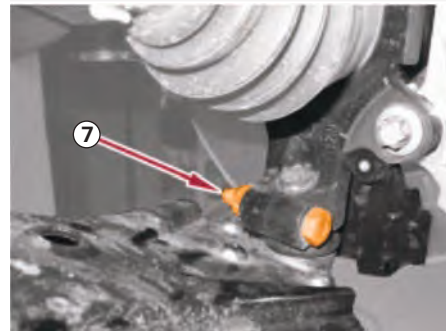
- Using the extractor tool (5), disconnect the steering tie rod (6) from the wheel upright.

Steering tie rod removal



- Unscrew the swing arm fixing bolt (7) front suspension to wheel upright.

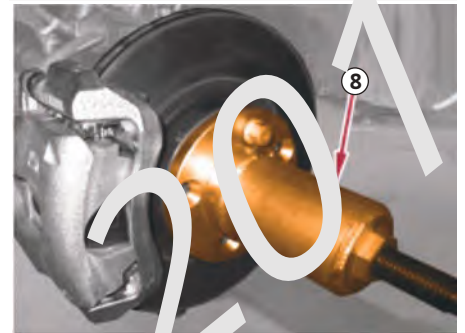
Removing the swing arm fixing



- Unscrew the screws fixing the brake disc to the wheel hub.

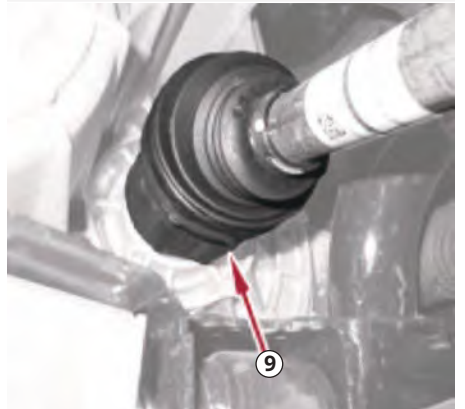
- Using the extractor tool (8), pull the left half-shaft back from the wheel hub and secure the brake disc upright assembly appropriately.

Drive shaft setback from wheel hub



- Remove the nut and tighten the M18 brake disc to wheel hub fixing screws to a torque of $10 \div 15$ Nm.
- Using a suitable tool (9), remove the left half-shaft from the differential.

Axle shaft removal

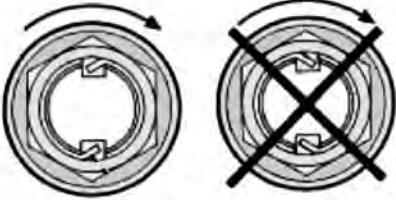


Assembly

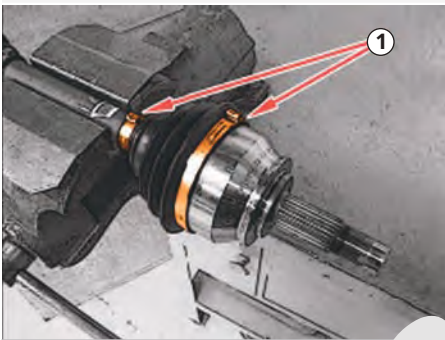
- Place the left half-shaft back in its seat, connecting it to the differential and the wheel hub.
- Connect the steering tie rod to the wheel upright and tighten the new M10 nut to a torque of $36 \div 44$ Nm.
- Tighten the new M10 bolt securing the front suspension swing arm to the wheel upright to a torque of $54 \div 66$ Nm.
- Fit the anti-torque tool and tighten the new M2 wheel hub fixing nut to a torque of $66 \div 73$ Nm + 62° .

FIAT 500L**4. transmission > maintenance operations**

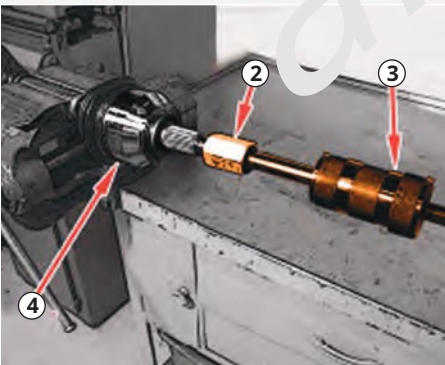
- Tighten the wheel hub fixing nut as shown below.

Wheel hub nut crush**WHEEL SIDE JOINT***Dismantling*

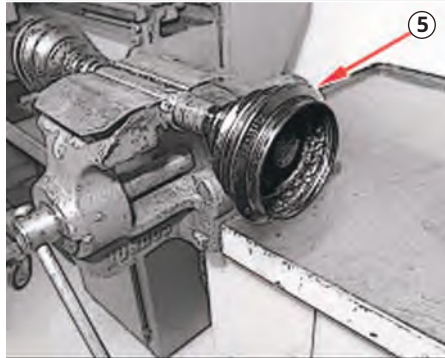
- Place the half-shaft in a vice equipped with protective jaws.
- Loosen the fastening clamps (1) of the cap and move it back.

Removing cable ties

- Using tools (2) and (3) remove the wheel-side CV joint (4).

CV Joint Removal

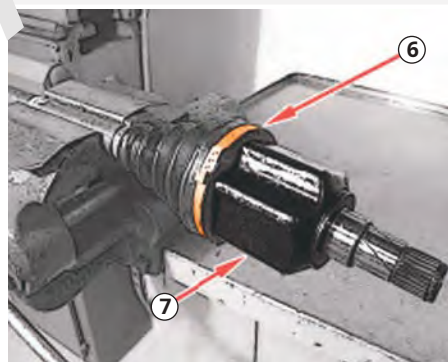
- Remove the protective cap (5) of the constant velocity joint.

Headphone Removal*Assembly*

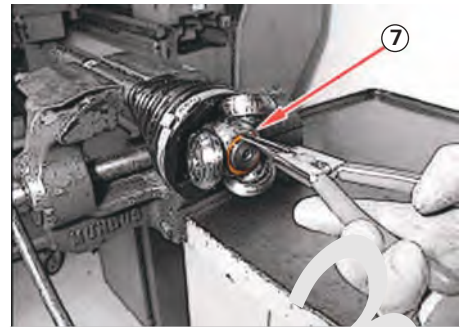
- Thoroughly wash the CV joint components and visually check that there are no traces of scoring in the balls and their seats.
- Fill the CV joint with the prescribed grease and fit a new protective boot onto the half shaft.
- Place the CV joint back in its seat and tighten the new protective boot fastening clamps.
- Remove the half shaft from the vice.

GEAR SIDE JOINT*Dismantling*

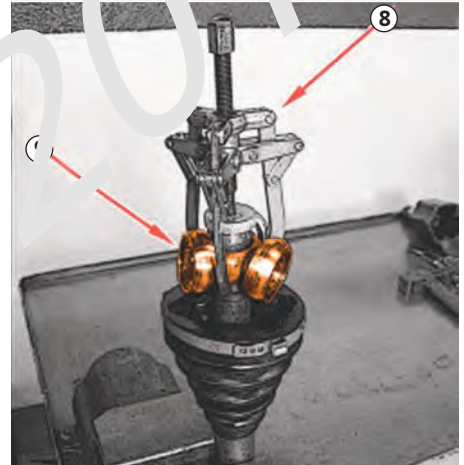
- Place the left half-shaft in a vice equipped with protective jaws.
- Loosen the clamp (6) and remove the left internal differential half-shaft (7).

Removing the clamp

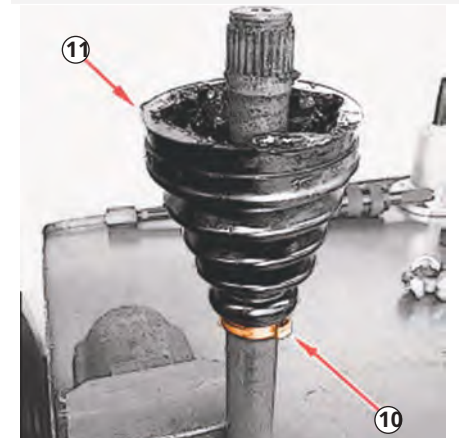
- Remove the snap ring retaining the tripod joint.

Removing the snap ring

- Using the extractor (8) remove the tripod sliding joint (9) from the half shaft.

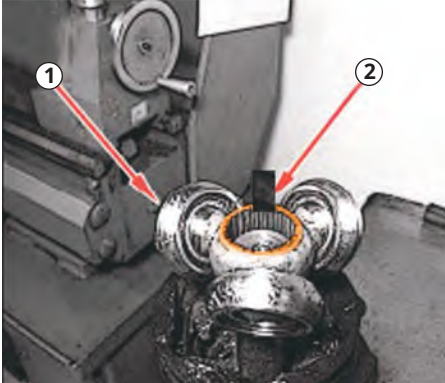
Joint Removal

- Loosen the clamp (10) and remove the protective cap (11).

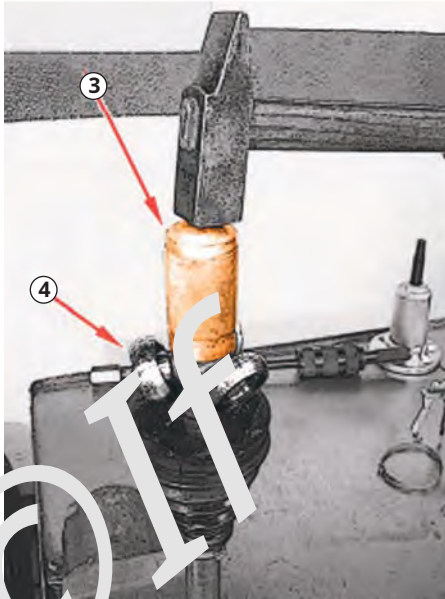
Headphone Removal

FIAT 500L**4. transmission > maintenance operations****Assembly**

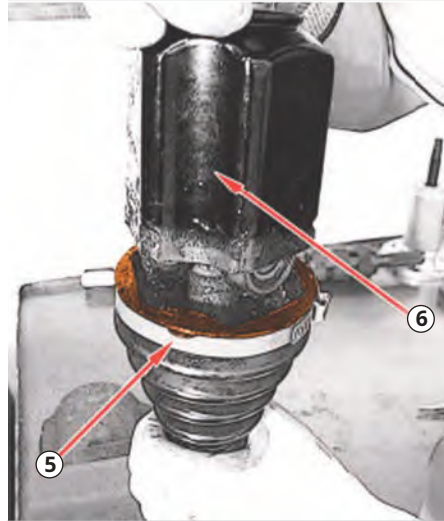
- Place the left half-shaft in a vice equipped with protective jaws.
 - Place a new protective cap and its strap back in its place.
- Place the tripod sliding joint (1) back into its seat, checking that the surface (2) is in the position shown in the figure.

Tripod joint

- Using the introduction tool (3), fit the tripod sliding joint (4).

Tripod assembly

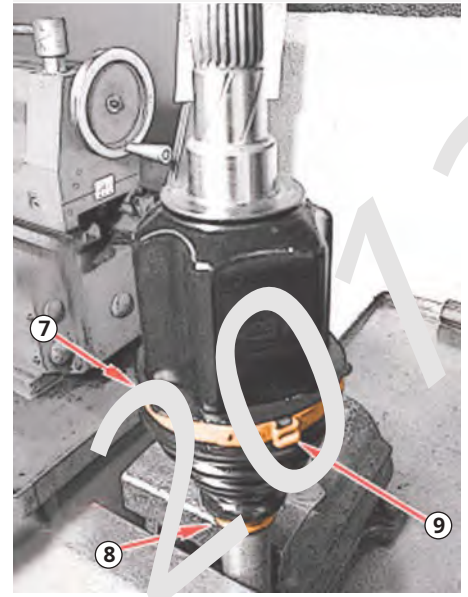
- Fit the snap ring retaining the tripod sliding joint.
- Fill the protective cap with the prescribed grease.
- Place the internal differential half-shaft back into its seat, taking care to align the edges (5) of the boot with the grooves (6).

Half-axle assembly

- Proceed to tighten the clamps (7) and (8).

- Note:

The closing clip (9) of the strap must be in the position shown in the figure.

Mounting position

- Remove the left half shaft from the vice.



5. steering

Technical data

GENERAL INFORMATION

The steering wheel structure is made of magnesium to reduce weight and increase rigidity. The steering wheel is height adjustable. The steering column is supported by a support in turn tied to a bracket; both are made of steel. These components, thanks to their high rigidity, make a significant contribution to the containment of steering wheel vibrations. The steering column has a sliding telescopic structure, to increase safety.

port in turn tied to a bracket; both are made of steel. These components, thanks to their high rigidity, make a significant contribution to the containment of steering wheel vibrations. The steering column has a sliding telescopic structure, to increase safety.

Steering view



Description	Value
Turning diameter between kerbs (m)	10.7
Number of steering wheel turns (for full steering)	3.06
Steering box ratio (mm/rev)	47
Steering wheel angle/wheel angle ratio	17.0

STEERING BOX

Its innovative feature consists in the possibility of reducing the difference between the maximum effort applied to the steering wheel, when the car is cornering or engaged in manoeuvres with high steering angles, and the effort

so minimum applied when the steering wheel is in the straight or nearly straight position. This characteristic is obtained thanks to the particular shape of the rack teeth, capable of determining variable ratios between the effort applied to the steering wheel and the force transmitted to the wheels, depending on the position assumed by the rack with respect to the pinion.

The rack teeth are cut with a variable module and pressure angle from the center to the ends, so that the pinion engages with teeth of different pitch depending on the steering angle performed. This results in a more direct ratio when the pinion operates in the central part of the rack and a more geared ratio as the pinion engages near the two ends of the rack during steering.

This results in improved steering sensitivity on straights and greater ride comfort on bends and during maneuvers.

FIAT 500L

5. steering > technical data

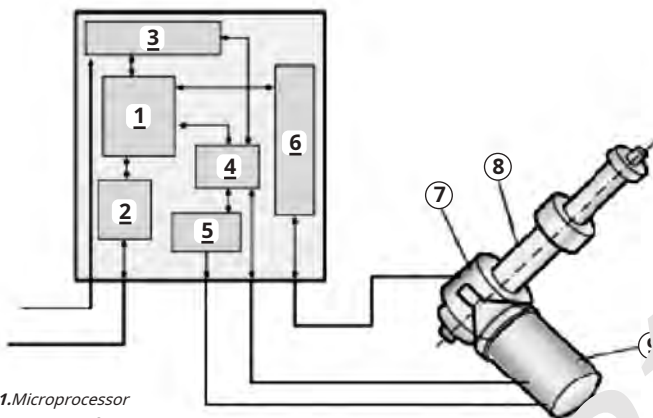
POWER STEERING

The EPS (Electrical Power Steering) power steering produced by DELPHI is a steering assistance device, the purpose of which is to lighten the effort required by the user at the steering wheel, especially during low-speed steering manoeuvres, without however making the control too light in normal driving.

The functionality of the new EPS electronic module is the ability to receive a torque overlap request from an external control unit and then apply a torque independent of that decided by the driver.

This dynamic steering torque control is the DST (Dynamic Steering Torque) function which improves driving safety and handling performance by interacting with the electronic control unit of the VDC braking system.

EPS Power Steering Assembly



1. Microprocessor
2. CAN interface
3. Power circuits
4. Motor phase drive circuit (EBMD)
5. Power Electronics (FET)
6. Analog Signal Interface
7. Position and torque sensor
8. Servomechanism
9. Electric motor (with engine position sensor)

GEAR MOTOR

The gearmotor group is composed of an aluminum casting attached to the vehicle chassis.

Located laterally to the gearmotor casting, the servomotor delivers torque to the servo gear via a worm screw with a ratio of 22:1.

The gear of the gear motor, coaxial and integral with the steering column, is made of steel, while the external crown is in co-molded plastic material. The worm screw and the gear have been designed so that the angle guarantee the reversibility of the coupling.

The metal part of the gear is planted on the output shaft, which transmits the combined steering forces (i.e. the torques of the servomotor and those of the driver).

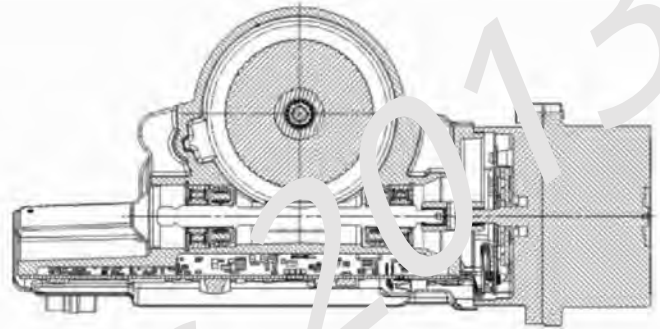
The input and output shafts are constrained to each other by a "calibrated torsion bar" that allows angular movement from +8° to -8° (mechanical limit switches prevent further increases in torsion).

The input shaft, in the presence of resistance at the wheels, twists the torsion bar, therefore, the input shaft and the output shaft are out of phase by an angle proportional to the torque applied to the steering wheel.

A torque sensor, mounted inside the gearmotor, detects the angle deviation between the input shaft and the output shaft and provides an electrical signal to the control unit proportional to the deviation.

The gearmotor box also has the task of holding the external part of the "torque and position sensor", finally the input shaft support sleeve is constrained to the box, where the steering wheel is mounted, and houses both the ignition switch and the steering column switch. The angle and axial position of the steering wheel can be adjusted in the car.

Gearmotor



BASIC OPERATION

According to the driver's needs (torque at the steering wheel) and the vehicle speed, the electronic steering node management unit (NGE) controls the electric servomotor that assists the steering column in rotation.

Via a worm gear mechanism, the motor applies torque to the steering column itself, thus relieving the driver of the steering effort.

Power assistance variable according to vehicle speed

As the vehicle speed increases, the user increases the force to be applied to the steering wheel, proportionally, also because the force resisting the wheels, with the increase in vehicle speed, decreases. Consequently, by exploiting the vehicle speed signal, the NGE implements a lower degree of driving assistability.

Active return

The return phase refers to the realignment function normally generated by the vehicle's front end geometry when the steering is released after a turn.

This function is intended to make realignment faster by having the servo motor intervene to assist the normal geometric effect.

The active return correction varies according to the vehicle speed:

It is maximum at low speeds

It is minimal at high speeds

The servomotor performs the active return of the steering wheel according to the steering angle relative to the center. The greater the steering angle, the greater the effort of the motor to realign the wheels.

Steering return oscillation damping

After releasing the steering wheel, following a turn, the car chassis generates oscillations which, if they persist for a certain period of time, can be annoying.

The servomotor reduces the amplitude of the oscillations when returning to a straight line and intervenes more at high speed.

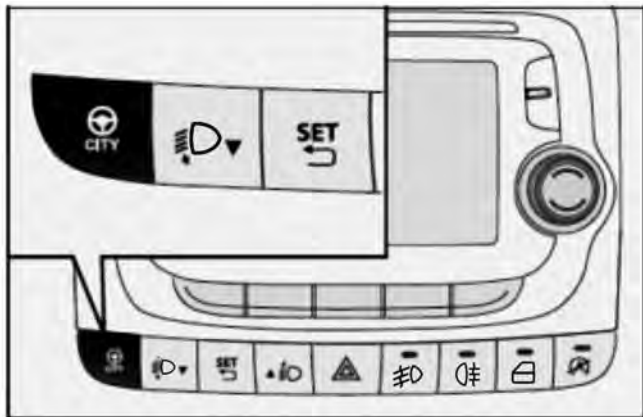
FIAT 500L

5. steering > technical data

SERVICE SIGNALS

Driving mode selection signal

On-board dashboard



The "Normal/City" function has the task of varying the assist torque as a function of the vehicle speed.

Using a monostable button on the dashboard, you can switch from a basic "Normal" configuration to a "City" or "Sport" one. The Electric Drive Node system receives the "Normal / City / Sport" signal from C-CAN and will implement the required strategy.

The Body Computer Node is responsible for receiving the analogue signal which will be changed when the button is released, turning on the relevant signal and with a torque applied by the driver greater than 1 Nm. During the key to STOP/key to gear cycle, the Body Computer Node maintains the status previously requested by the user.

Driving is always assisted and decreases as speed increases.

CAN line

The control unit is able to receive/transmit information on the CAN network. This network interface works from the key on gear to the key on stop.

Signals received / sent via CAN network

The signals received on the CAN network by the Electric Guide Node control unit are:

- Car speed
- Failure lamp status
- Engine running signal (D+)
- Diagnosis
- Vehicle speed signal error
- Normal/City/Sport mode
- Tuning type (calibration)

The signals sent on the CAN network by the Electric Guide Node are:

- System status (fault)
- Power steering activated signal Failure lamp status
- Diagnosis
- Absolute steering wheel position (only for Electric Steering Node version for applications with ESP)

ELECTRONIC CONTROL UNIT

The electronic unit processes the signals received at input from the sensors and drives the electric motor, supplying the appropriate current to obtain the desired servo torque. It also manages communication on the CAN network and performs continuous self-diagnosis of the system, to ensure its correct functioning.

On CAN network it manages communication with diagnostic tools.

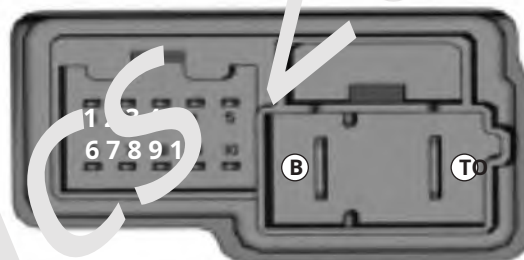
The values relating to the vehicle speed, City/Normal mode and tuning type are read on the CAN line.

The position and torque signals from the sensors represent the basic values with which the microprocessor processes the output data in terms of current supplied to the motor.

The control unit for the servo-assistance control of the guide is fixed on the body of the electric guide itself and interfaces with the wiring via two separate connectors: one with 10 pins and one with 2 pins.

Pin out

Steering control unit connector



Connector A

Pin	Description
1	INT from F-12 NBC
2	C-CAN H (1)
3	C-CAN L (1)
4	C-CAN H (2)
5	C-CAN L (2)
6	Not connected
7	Not connected
8	Not connected
9	Not connected
10	Not connected

Connector B

Pin	Description
TO	+ 30 from F-05 FDU
B	Battery mass

FIAT 500L**5. steering > technical data****TIGHTENING TORQUES**

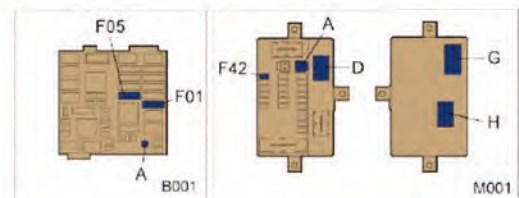
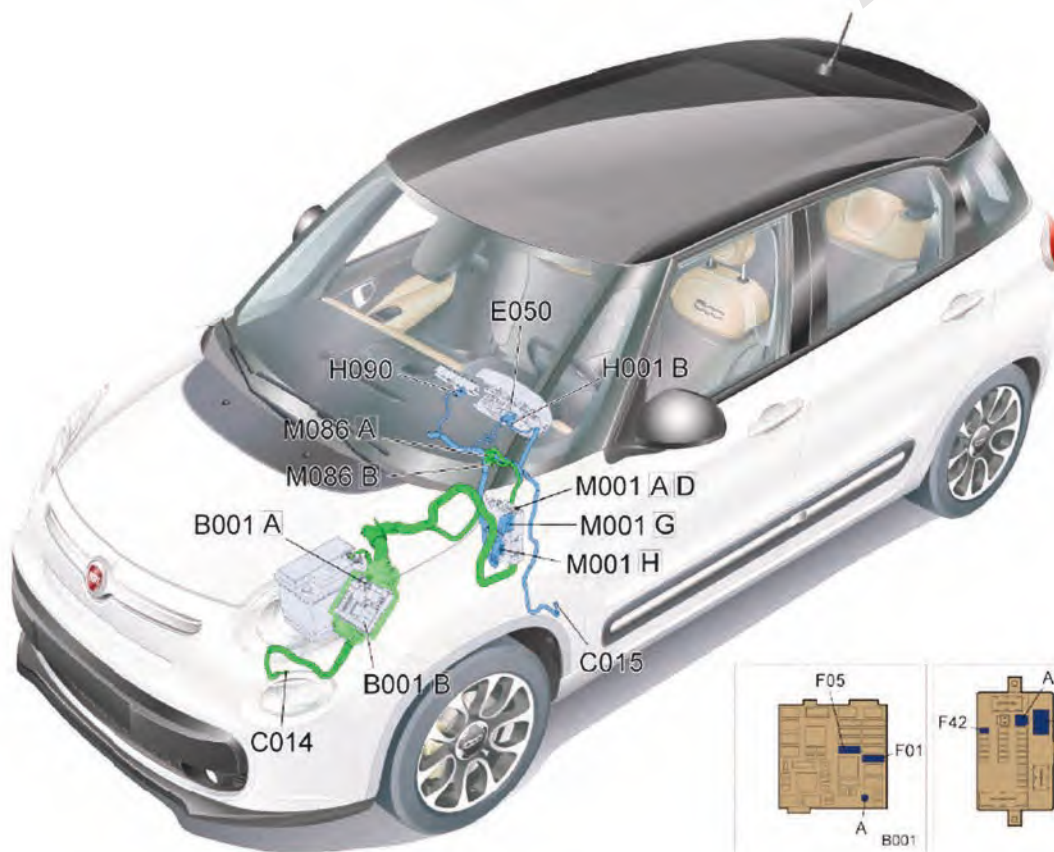
Component	Fixing	OR	Value (Nm)
Steering tie rod to strut	Nut (to be replaced)	M10	36 ÷ 44
Steering column to steering box pinion	Screw (to be replaced)	M10	50 ÷ 60
Steering column to the under-dash crossmember	Screw	M8	16 ÷ 24
Steering column to the under-dash crossmember	Nut (to be replaced)	M8	16 ÷ 24
Steering wheel	Screw	M16	45 ÷ 55
Recording tie rod	Nut	M14	45 ÷ 55
Steering box	Bolt	M12	90 ÷ 110

COLOR CODES

TO	Sky blue	M	Brown
B	White	N	Black
C	Orange	R	Red
H	Grey	V	Green
THE	Blue	Z	Viola

ELECTRICAL DIAGRAMS LEGEND

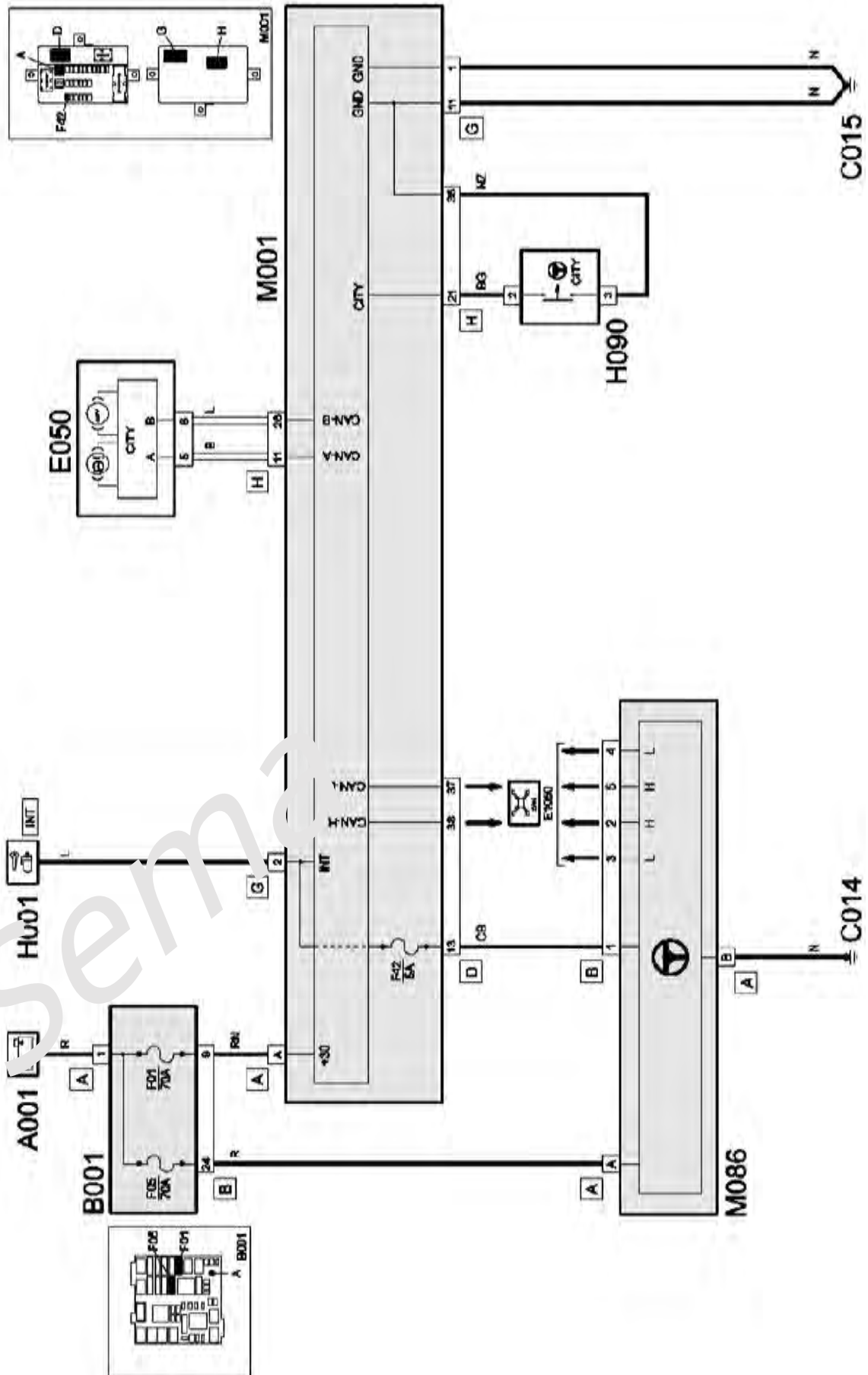
TO	
A001	Drums
B	
B001	Derivation control unit
C	
C014	Electric drive front mass
C015	Driver's side dashboard mass
AND	
E050	Instrument panel
H	
H001	Ignition switch
H090	Switch control group
M	
M001	Body Computer
M086	Electric steering control unit



View of the electrical diagram

FIAT 500L

5. steering > wiring diagrams



maintenance operations

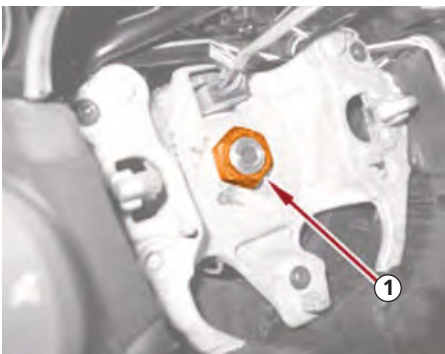
PASSENGER COMPARTMENT SIDE

STEERING WHEEL AND COLUMN

Dismantling

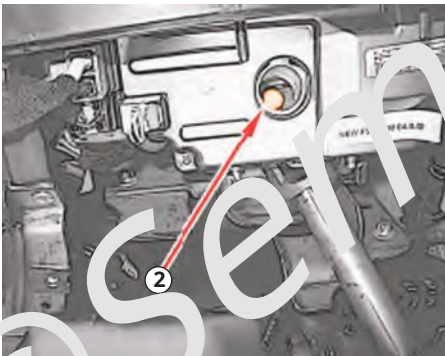
- Place the car on a flat surface and point the wheels in a straight line.
- Disconnect the electrical connection of the radio controls on the steering wheel.
- Remove the steering wheel fixing nut (1) protection.

Removing electrical connections



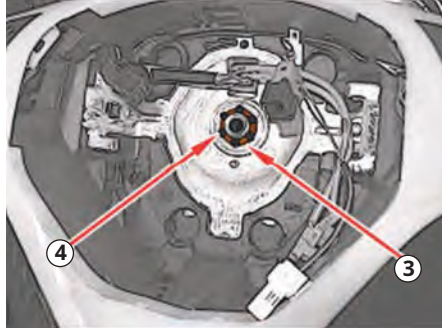
- Rotate the steering wheel until the upper intermediate shaft fixing screw is accessible, through the appropriate hole on the EPS control unit (2).

Upper steering column screw



- Release the retaining tabs (3) and unscrew the steering wheel fixing nut (4).
- Remove the steering wheel.

Steering wheel removal

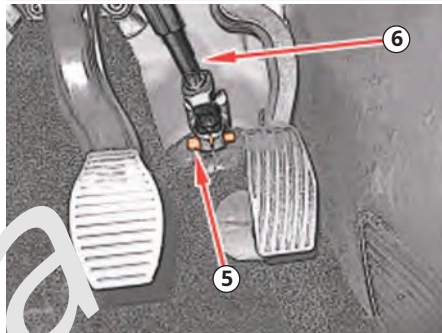


- Unscrew the screw (5) and remove the intermediate shaft (6).

Note:

Keep the steering wheel in the same position until the intermediate shaft reattachment is completed.

Steering column removal



Assembly

- Place the intermediate shaft back in its seat and tighten the new M10 screw securing it to the steering box pinion to a torque of $50 \div 60$ Nm.
- Tighten the new M8 upper screw fixing the intermediate shaft to a torque of $28 \div 33$ Nm.
- Put the steering wheel back in its place.
- Tighten the M16 nut to a torque of $45 \div 55$ Nm and engage the retaining tabs.
- Press fit the steering wheel fixing nut protector.
- Connect the electrical connection of the radio controls on the steering wheel.

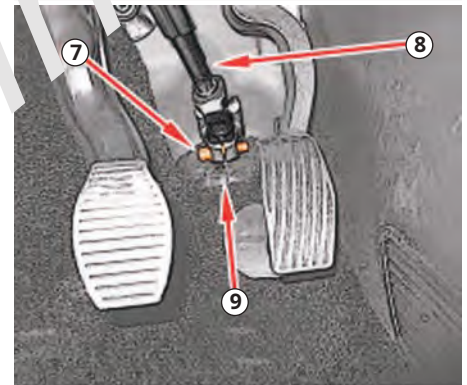
ENGINE COMPARTMENT SIDE

STEERING BOX

Dismantling

- Place the car on the lifting bridge.
- Remove the front wheels.
- Remove the front suspension cross member reinforcement.
- Remove the intermediate exhaust pipe.
- Remove the lower transmission reaction linkage.
- Remove the automatic leveling sensor of the xenon headlight system.
- Unscrew the steering column fixing screw (7) (8) to the steering box pinion.
- Remove the steering box pinion guard (9).

Removing steering column fixings

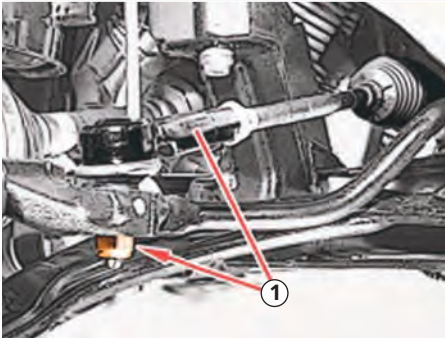


FIAT 500L

5. steering > maintenance operations

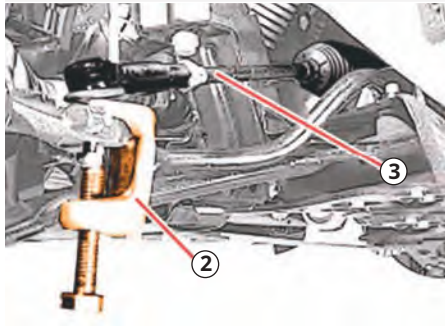
- Unscrew the steering tie rod fixing nut (1) to the left wheel upright.

Removing the steering tie rod nut



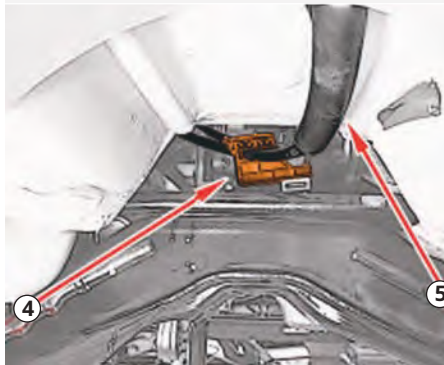
- Using the extractor (2) disconnect the steering tie rod (3) from the left wheel upright.

Steering tie rod removal



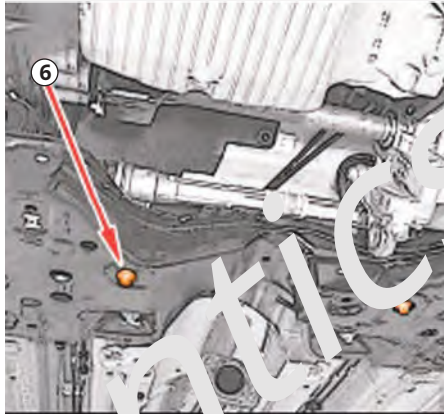
- Open the clip (4) and disengage the gear selection and engagement cables (5) from the steering box.

Removing gear shift cables



- Unscrew the steering box fixing bolts (6) to the suspension crossmember.

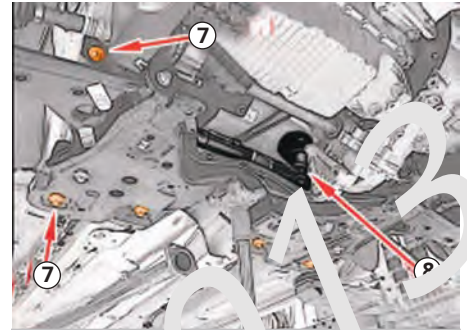
Removing steering box fixings



- Unscrew the screws fixing the front suspension crossmember (7) to the body.

- Use the hydraulic lift to lower the suspension crossmember (8) and remove the steering box.

Steering box removal



Assembly

- Place the steering box back in its place.
- Place the suspension crossmember back in its seat and tighten the M12 screws to a torque of 121 ± 148 Nm.
- Tighten the M12 bolts securing the steering box to the suspension crossmember to a torque of 90 ± 110 Nm.
- Engage the gear selection and engagement cables to the steering box and close the retaining clip.
- Connect the steering tie rod to the left wheel upright and tighten the new M10 nut to a torque of 36 ± 46 Nm.
- Proceed in the same way to connect the steering tie rod to the right wheel upright.
- Place the steering box pinion guard back into its seat, following the arrow stamped indicating the direction of travel.
- Connect the steering column to the steering box pinion and tighten to a torque of 50 ± 60 Nm.

6. suspensions

Technical data

GENERAL INFORMATION

MacPherson strut front suspension with lower wishbones. Self-twisting rigid axle rear suspension.

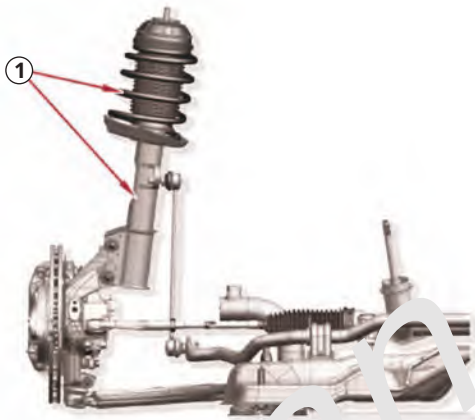
FRONT SUSPENSION

Independent front suspension, McPherson type with spheroidal cast iron wishbones anchored to an auxiliary cross member by means of elastic bushings. The upper shock absorber attachment is of the non-sprung type.

split, it has an elliptical shape, so as to guarantee the possibility of differentiating the longitudinal inclination of the suspension between mechanical guidance and power-assisted guidance.

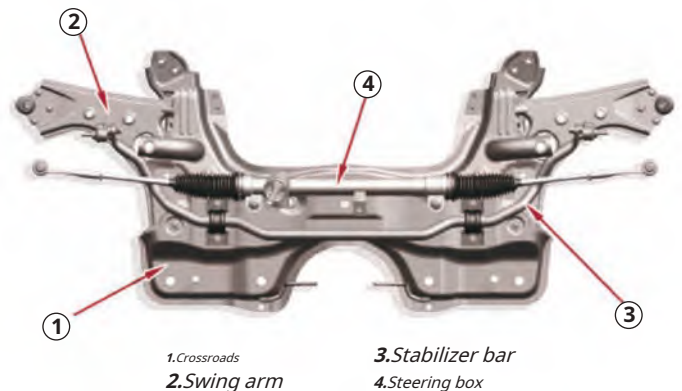
Anti-roll bar.

Front suspension



1.Spring assembly
shock absorber

Front end cradle



1.Crossroads
2.Swing arm

3.Stabilizer bar
4.Steering box

Shock absorbers

Double-acting hydraulic shock absorbers, with a 20 mm stem diameter. The end-of-stroke buffers are made of elastomer, coaxial to the shock absorbers and are equipped with a stem protection cap, they are also complete with lower brackets for fixing to the chassis, spring support plate, bracket for anchoring the brake hose and ABS sensor cable.

Type	telescopic
Open length (in stroke) (mm)	531 +/- 3.5
Close length (in stroke) (mm)	380 +/- 3
Stroke (mm)	151
Stem diameter (mm)	22

Stabilizer bar

The stabilizer bar (present only on versions with EPS power steering) is made of solid steel; it is fixed to the crossmember by means of U-bolts made up of a single sheet metal plate and a rubber part; it is connected to the shock absorber by means of a tie rod equipped with ball joints at the ends.

External diameter (mm)	25.4
Thickness (mm)	4.5
Mark color	Nobody

Springs

Offset "Side-Load" type coil spring that allows for a better reduction of tangential forces on the stem, with consequent better absorption of small bumps in the road surface.

Wire diameter (mm)	12.00 +/- 0.05
	12.30 +/- 0.05 (*)
Number of useful coils	4.32
	3.76 (*)
Propeller Sense	right-handed
Free spring height (mm)	347
	358 (*)
Spring height (mm)	78
	73 (*)
Load (daN) for resulting length 170 mm	435 +/- 3%
	461 +/- 3% (*)
Mark color	Brown + Orange; Pink + White (*)

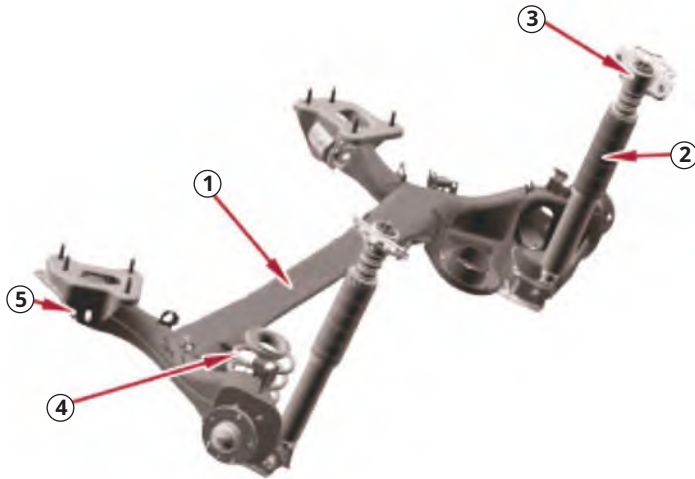
FIAT 500L

6. suspensions > technical data

REAR SUSPENSION

The rear suspension is of the "C-section torsion beam" type and semi-independent wheels. Coil springs and double-acting hydraulic shock absorbers.

Rear suspension assembly



1. Axle
2. Shock absorber
3. Shock absorber attachment bolt
4. Coil spring
5. Elastic bushing for attachment to the body

Shock absorbers

The vertical arrangement of the double-acting shock absorbers, with body attachment on the wheel arch, is soundproofed to filter out road irregularities, benefiting acoustic comfort in the passenger compartment.

Type	telescopic hydraulics
Open length (start of plugging) (mm)	644 +/- 3.5
Closed length (in stop) (mm)	437.5 +/- 3
Stroke (mm)	207
Stem diameter (mm)	11

Springs

The assembly of the rear springs involves the objectification of the angular position of the spring, obtained by contact between flat surfaces obtained on the lower support ring and on the contact sleeve welded to the bridge.

Wire diameter (mm)	11.2 +/- 0.05 11.8 +/- 0.05 (*)
Number of useful coils	4.43 5.0 (*)
Propeller Sense	right-handed
Free spring height (mm)	500 310 (*)
Spring height (mm)	116
Load (kN) for resulting length 18° min	377 +/- 3% 405 +/- 3% (*)
Mark color	Blue + Blue; Pink + Pink (*)

WHEEL GEOMETRY

To check the wheel geometry, strictly follow the load and tyre pressure conditions indicated below.

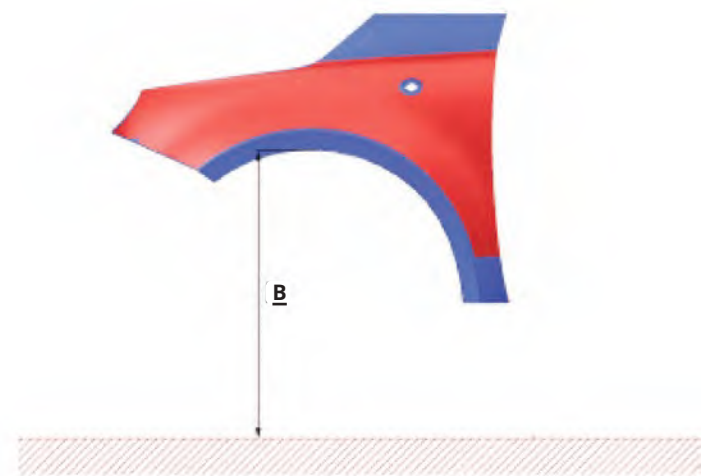
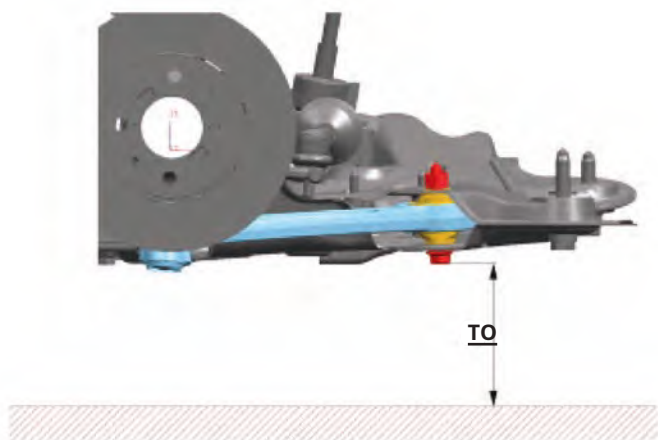
- standard load 0 (is the mass of the complete vehicle including the spare wheel, tools, accessories, refueling with 5 litres of fuel)

- standard load A (is the mass of the complete vehicle, including the spare wheel, tools, accessories, supplies (full of fuel))
- tires inflated to a pressure of 3.0 ± 0.3 bar

A. Height from ground of the head of the fixing screw (vertical) of the swing arm
B. Front wheel rim ground clearance

Quota A

Quota B



FIAT 500L**6. suspensions > technical data**

Measure	Value
Front trim (mm)	686 +/- 5 (Standard 0)
Front trim (mm)	679 +/- 5 (Standard A)
Front wheel toe-in (mm)	+ 1 +/- 1 (Standard 0 and Standard A)
Front wheel camber (degrees) with 195/65 R15 91H - 205/55 R16 91H - 225/45 R17 91V tyres	- 28' +/- 20' (Standard 0)
Front wheel camber (degrees) with 195/65 R15 91H - 205/55 R16 91H - 225/45 R17 91V tyres	- 30' +/- 20' (Standard A)
Front Wheel Camber (Degrees) with 205/55 R16 91H - 225/45 R17 91V tyres (TREKKING versions)	+ 8' +/- 20' (Standard 0)
Front Wheel Camber (Degrees) with 205/55 R16 91H - 225/45 R17 91V tyres (TREKKING versions)	+ 7' +/- 20' (Standard A)
A-pillar incidence (degrees) with sunroof or panoramic roof	+ 5°07' +/- 20' (Standard 0)
A-pillar incidence (degrees) with sunroof or panoramic roof	+ 5°08' +/- 20' (Standard A)
A-pillar caster (degrees) without sunroof or panoramic roof	+ 5°05' +/- 20' (Standard 0)
A-pillar caster (degrees) without sunroof or panoramic roof	+ 5°06' +/- 20' (Standard A)
Front pillar incidence (degrees) with sunroof or panoramic roof (TREKKING versions)	+ 5°4' +/- 20' (Standard 0)
Front pillar incidence (degrees) with sunroof or panoramic roof (TREKKING versions)	+ 5°5' +/- 20' (Standard A)
A-pillar incidence (degrees) without sunroof or panoramic roof (TREKKING versions)	- 4°50' +/- 20' (Standard 0)
A-pillar incidence (degrees) without sunroof or panoramic roof (TREKKING versions)	- 4°59' +/- 20' (Standard A)
Rear trim (mm)	703 +/- 5 (Standard 0)
Rear trim (mm)	692 +/- 5 (Standard A)
Rear trim (mm)	- (Standard 0)
Rear trim (mm)	- (Standard A)
Rear trim (mm)	704 +/- 5 (Standard 0)

Measure	Value
Rear trim (mm)	693 +/- 5 (Standard A)
Rear trim (mm)	704 +/- 5 (Standard 0)
Rear trim (mm)	693 +/- 5 (Standard A)
Rear trim (mm)	703 +/- 5 (Standard 0)
Rear trim (mm)	693 +/- 5 (Standard A)
Rear wheel toe-in (mm) with 15" rim	+ 1.5 +/- 2 (Standard 0)
Rear wheel toe-in (mm) with 15" rim	+ 1.8 +/- 2 (Standard A)
Rear wheel toe-in (mm) with 15" rim	+ 1.1 +/- 2 (Standard 0)
Rear wheel toe-in (mm) with 15" rim	+ 1.2 +/- 2 (Standard A)
Rear wheel alignment (mm) with 16" rim	+ 1.6 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 16" rim	+ 1.8 +/- 2 (Standard A)
Rear wheel alignment (mm) with 16" rim	+ 1.2 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 16" rim	+ 1.4 +/- 2 (Standard A)
Rear wheel alignment (mm) with 17" rim	+ 1.7 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 17" rim	+ 2.0 +/- 2 (Standard A)
Rear wheel alignment (mm) with 17" rim	+ 1.3 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 17" rim	+ 1.5 +/- 2 (Standard A)
Rear wheel alignment (mm) with 16" rim (7-seater configuration)	+ 1.4 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 16" rim (7-seater configuration)	+ 1.6 +/- 2 (Standard A)
Rear wheel alignment (mm) with 17" rim (7-seater configuration)	+ 1.5 +/- 2 (Standard 0)
Rear wheel alignment (mm) with 17" rim (7-seater configuration)	+ 1.7 +/- 2 (Standard A)
Rear wheel convergence (mm) with 16" rim (TREKKING versions)	+ 1.2 +/- 2 (Standard 0)
Rear wheel convergence (mm) with 16" rim (TREKKING versions)	+ 1.4 +/- 2 (Standard A)
Rear wheel convergence (mm) with 17" rim (TREKKING versions)	+ 1.3 +/- 2 (Standard 0)
Rear wheel convergence (mm) with 17" rim (TREKKING versions)	+ 1.5 +/- 2 (Standard A)
Rear Wheel Camber (Degrees)	- 1° 10' +/- 20' (Standard 0 and Standard A)



FIAT 500L**6. suspensions > maintenance operations****TIGHTENING TORQUES****FRONT SUSPENSION**

Component	Fixing	OR	Value (Nm)
Lower wishbone to upright	Bolt (to be replaced)	M10	54 ÷ 66
Front suspension cross member reinforcement	Screw	M10	50 ÷ 60
Front suspension cross member to body	Front screw	M12 x 1.25 x 115	133 ÷ 147
Front suspension cross member to body	Rear screw (to be replaced)	M12 x 1.25 x 65	135 ÷ 165
Front suspension stabilizer bar	Screw	M8	2. ÷ 27
Front suspension stabilizer bar joint	Nut (to be replaced)	M10	54 ÷ 66
Rear Wishbone Bushing to Front Suspension Crossmember	Bolt (to be replaced)	M12	108 ÷ 132 + 90°
Front wishbone bushing to front suspension crossmember	Screw	M12	108 ÷ 132 + 90°
Front wheel strut shock absorber	Bolt (to be replaced)	M12	108 ÷ 132 + 45°
Front shock absorber with end-of-stroke buffer	Screw	M12	52 ÷ 57
Front shock absorber body side	Nut	M12	52 ÷ 57

REAR SUSPENSION

Component	Fixing	OR	Value (Nm)
Rear shock absorber - rear axle side	Screw	M12	117 ÷ 143
Rear shock absorber - body side	Screw	M12	72 ÷ 88
Upper bracket to rear shock absorber	Nut	M10	32 ÷ 38
Rear suspension axle to body	Screw	M10	76 ÷ 84
Axle support fixing bushing	Bolt (to be replaced)	M12	117 ÷ 143
Sheet metal wheels	Columns	M12 x 1.25	77 ÷ 95
Alloy wheels	Columns	M12 x 1.25	110 ÷ 132

maintenance operations**SPECIFIC EQUIPMENT**

Name	Function
Extractor	Removing the front wheel hub cup
Nut wrench stem fixing shock absorber	Unscrewing/tightening spring shock absorber group fixing nut
Support	Spring compression front shock absorber
Extractor / introduction	Removing/refitting the rear axle bushing

OPERATIONAL PRECAUTIONS**Warnings**

All operations must be carried out with the utmost attention and care to avoid damage to the components.

To unlock firmly adhering parts give

light blows using an aluminum or lead hammer if ferrous materials are involved, use a wooden or resin hammer for light alloy parts. When disassembling, check that the parts that need to be marked have the reference marks.

When assembling, lubricate parts where necessary to prevent binding or seizure during initial operation.

During assembly, it is essential to respect the prescribed tightening torques and adjustment nuts. Replace gaskets, oil seals, spring washers, safety plates, self-locking nuts, pre-treated screws, yield screws and all parts that are damaged at each assembly.

Adequately protect with adhesive paper or clean rags those parts of the engine that, having remained uncovered following disassembly, present passages for the entry of dust or foreign bodies.

The replacement of detached groups or parts

must be carried out using only original spare parts: only in this way is the interchangeability and perfect functioning of the various parts ensured.

Operating modes

All operations must be carried out with the utmost attention and care to avoid personal injury. The engine compartment contains numerous moving parts, high-temperature components and live electrical cables. Strictly follow the following precautions when carrying out operations in the engine compartment: turn off the engine and wait for it to cool down, do not smoke, do not use naked flames and make sure a fire extinguisher is available nearby.

For some procedures, the use of specific equipment is indicated. The use of such equipment is essential to operate safely. Respect the safety regulations in force for workshop work.

FIAT 500L

6. suspensions > maintenance operations

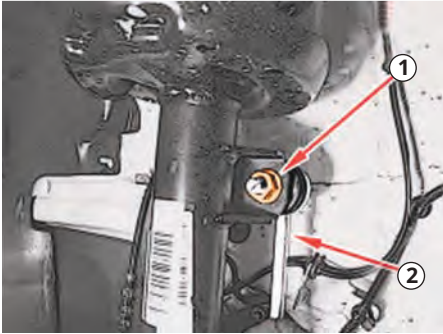
FRONT SUSPENSION

SHOCK ABSORBER AND SPRING

Dismantling

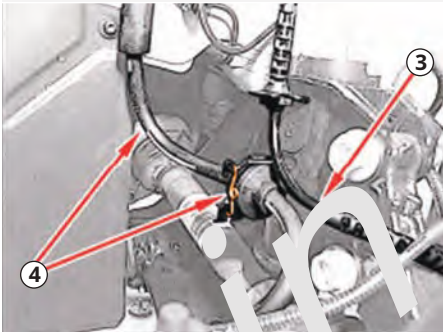
- Place the car on the lifting bridge.
- Remove the front wheels.
- Remove the windshield wiper arms.
- Remove the windshield base trim.
- Unscrew the nut (1) and disconnect the stabilizer bar joint (2) from the shock absorber.

Removing the bar joint fixing nut



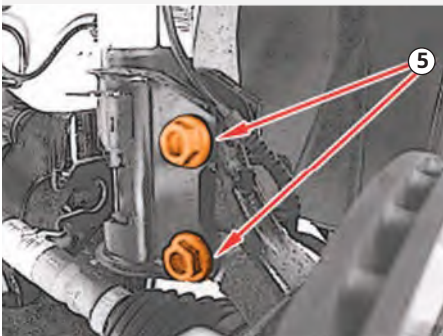
- Disconnect the ABS wheel speed sensor wiring (3) from the shock absorber.
- Open the clip (4) and disengage the brake fluid pipe from the shock absorber.

ABS Sensor Wiring Removal



- Unscrew the shock absorber fixing bolts (5) to the wheel upright.

Removing the upright fixings



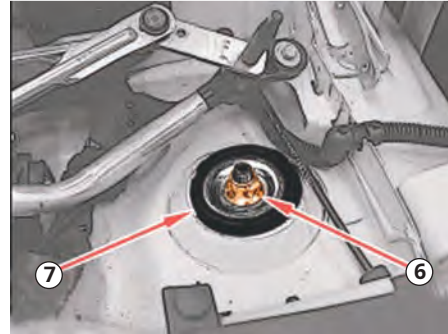
- Unscrew the nut securing the shock absorber to the body.

Note:

Before unscrewing the nut (6), insert the reaction key correctly up to the end of the hexagonal groove on the upper end of the shock absorber stem.

- Remove the elastic plate (7) from its seat.

Removing the upper fixing nut

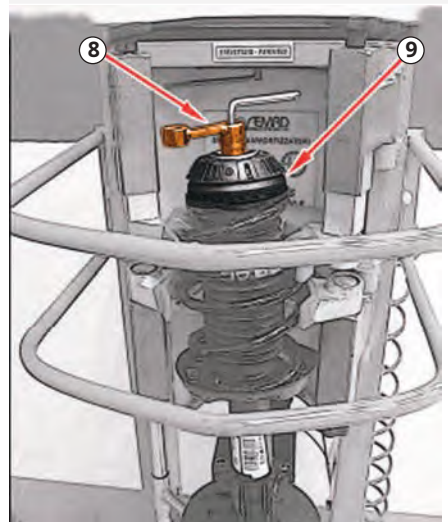


- Working from the wheel compartment, remove the spring/shock absorber assembly.

Breakdown at the bench

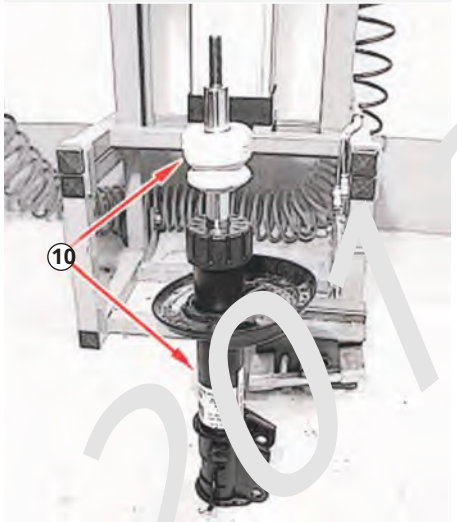
- Place the spring/shock absorber assembly on the bench for disassembly.
- Using the tool (8), unscrew the nut and remove the buffer (9).

Swab removal



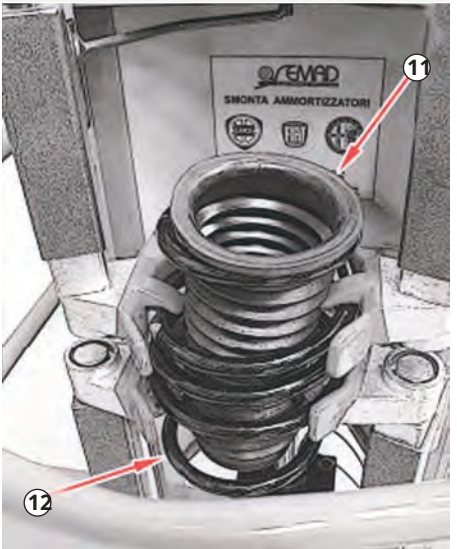
- Remove the shock absorber complete with buffer from the equipment (10).

Shock absorber breakdown



- Remove the dust cover (11).
- Unload the spring (12) and remove it from the equipment.

Spring removal

*Recomposition*

- Assemble the limit buffer, the spring and the dust sleeve to the shock absorber by compressing the latter with the specific tool.

- Place the upper spring buffer back into its seat and tighten the M12 nut securing it to the shock absorber stem to a torque of 52 ÷ 57 Nm using the tool.
- Remove the spring-shock absorber assembly from the dismantling tool.

FIAT 500L

6. suspensions > maintenance operations

Assembly

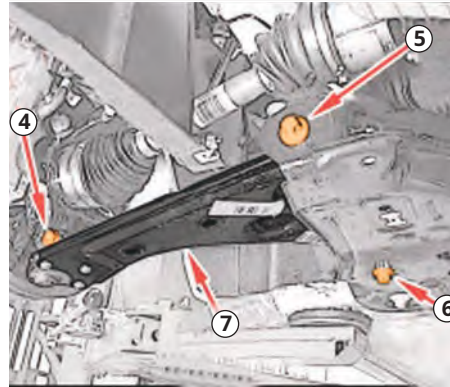
- Place the spring-shock absorber unit back in its seat and screw it in temporarily without tightening the nut securing it to the body.
- Tighten the new M12 bolts fixing the shock absorber to the wheel upright to a torque of $103 \div 126 \text{ Nm} + 45^\circ$.

Note:

For torque tightening, place the torque wrench on the nut, not the screw.

- Connect the stabilizer bar joint to the shock absorber and tighten the nut to a torque of $36 \div 44 \text{ Nm}$.
- Engage the brake fluid pipe on the shock absorber bracket and close the retaining clip.
- Engage the ABS wheel speed sensor wiring into the shock absorber bracket.
- With the vehicle on the ground, tighten the M12 nut fastening the shock absorber to the bodywork previously placed next to it to a torque of $47 \div 52 \text{ Nm}$.

- Unscrew the bolt (4) fixing the lower swing arm to the wheel upright.
- Unscrew the screw (5), the bolt (6) and remove the lower swing arm (7).

Swing arm removal**Assembly**

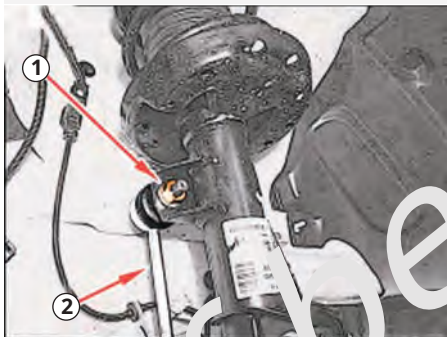
- Place the lower swing arm back in its seat and hold it in a horizontal position using a column lift.
- Tighten the new M12 bolt and the new M12 screw fixing the lower swing arm to the front suspension crossmember to a torque of $50 \div 60 \text{ Nm} + 90^\circ$.
- Connect the lower swing arm to the wheel upright and tighten the new M10 bolt to a torque of $54 \div 66 \text{ Nm}$.
- Connect the front sensor linkage for headlight adjustment/correction to the swing arm and tighten the relevant nut.
- Connect the stabilizer bar joint to the right shock absorber and tighten the M10 nut to a torque of $36 \div 44 \text{ Nm}$.

Note:

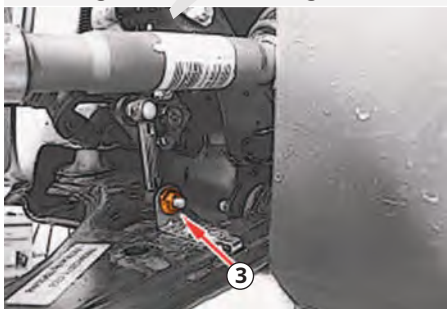
Perform a headlight position reset using diagnostic equipment.

LOWER ARM**Dismantling**

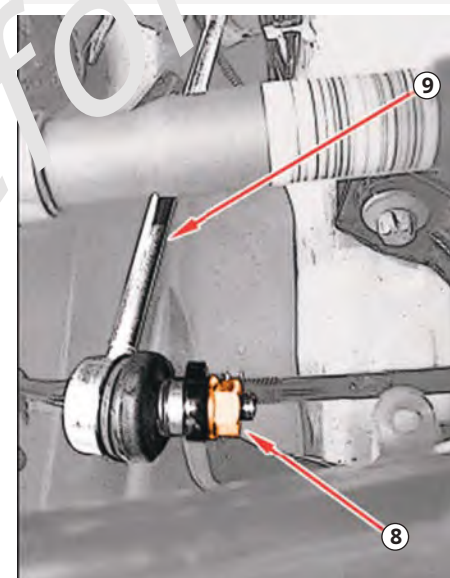
- Place the car on the lifting bridge.
- Remove the front wheels.
- Unscrew the nut (1) and disconnect the stabilizer bar joint (2) from the shock absorber.

Removing the bar joint fixing nut

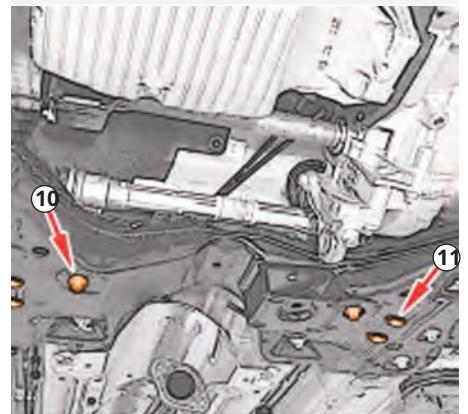
- Unscrew the nut (3) and disconnect the front sensor connecting rod for light cluster correction/adjustment (xenon headlights only).

Removing the level sensor fixing**STABILIZER BAR****Dismantling**

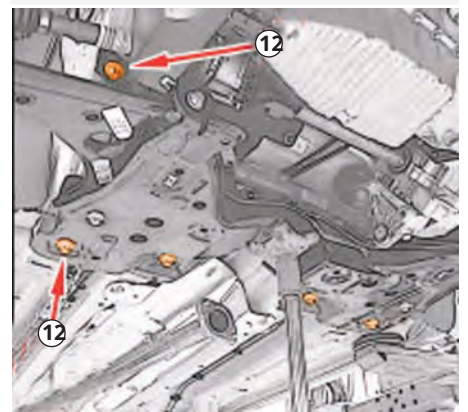
- Place the car on the lifting bridge.
- Remove the front wheels.
- Unscrew the nut and disconnect the front sensor rod for light cluster correction/adjustment (xenon headlights only).
- Unscrew the nut (8) and disconnect the right stabilizer bar joint (9).

Removing joint fasteners

- Unscrew the fixing screws (10) of the steering box to the front suspension crossmember.
- Through the appropriate holes indicated in the figure (11), unscrew the screws fixing the stabilizer bar to the front suspension crossmember.

Removing the stabilizer bar fixings

- Place a hydraulic lift under the front suspension crossmember.
- Unscrew the bolts (12) fixing the front suspension cross member to the body.

Removing cross member fixings

FIAT 500L

6. suspensions > maintenance operations

- Lower the front suspension crossmember enough to remove the stabilizer bar (1).

Removing the stabilizer bar

**Assembly**

- Put the stabilizer bar back in its place.

- Using the hydraulic lift, place the front suspension cross member back into its seat and tighten the M12 screws to a torque of $121 \div 148$ Nm.

- Tighten the M12 bolts securing the steering box to the front suspension crossmember to a torque of $90 \div 110$ Nm.
- Using the appropriate holes, tighten the M8 screws fixing the stabilizer bar to the front suspension crossmember to a torque of $23 \div 27$ Nm.
- Connect the right stabilizer bar joint and tighten the nut to a torque of $36 \div 44$ Nm.

- Connect the front sensor linkage for headlight adjustment/correction to the swing arm and tighten the relevant nut.
- Connect the stabilizer bar joint to the right shock absorber and tighten the M10 nut to a torque of $36 \div 44$ Nm.

- Slowly raise the hydraulic lift until the lower shock absorber attachment coincides with its seat on the crossmember and then tighten the relevant M12 screw to a torque of $117 \div 143$ Nm.

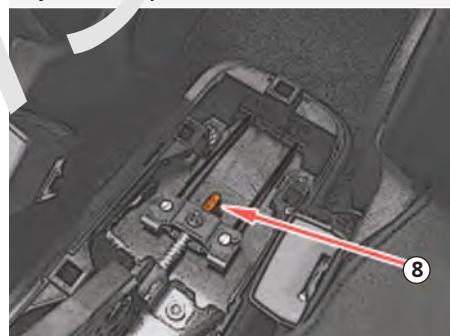
- Remove the tool used to compress the spring.
- Lower and remove the hydraulic lift.
- Connect the front sensor rod for gas discharge headlight adjustment/correction and tighten the relevant nut.

REAR AXLE

Dismantling

- Place the car on the lifting bridge.
- Remove the rear wheels. Mark the position of the adjustment nut (8) and then loosen it by at least two or three turns to ensure complete loosening of the ropes.

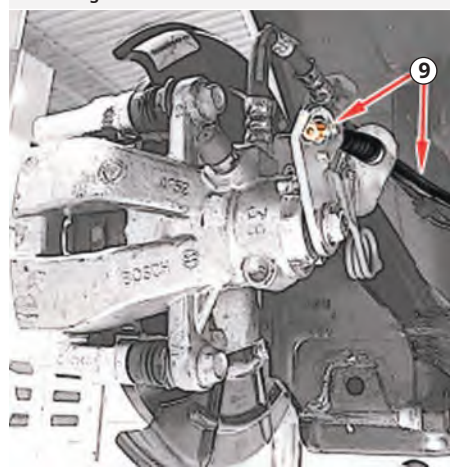
Adjustment nut position



- Unscrew the brake-clutch fluid reservoir cap and fit the tool for vacuuming the system.

- Act on the lever and disconnect the handbrake cable (9) from the brake caliper and the intermediate fixings.

Removing the handbrake cable



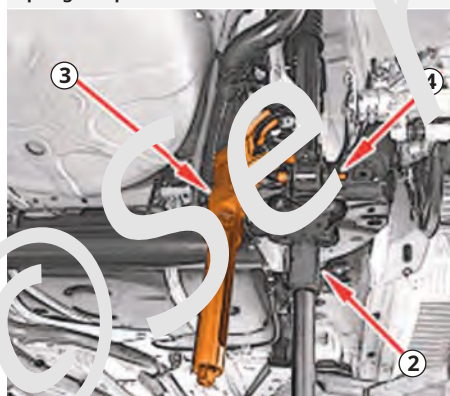
REAR SUSPENSION

SHOCK ABSORBER

Dismantling

- Place the car on the lifting bridge.
- Remove the rear wheels.
- Place a suitable hydraulic lift (2) under the rear crossmember in correspondence with the spring.
- Compress the spring using a suitable tool (3) of the type shown in the figure.
- Unscrew the screw (4) fixing the shock absorber to the suspension crossmember.

Spring compression

**Assembly**

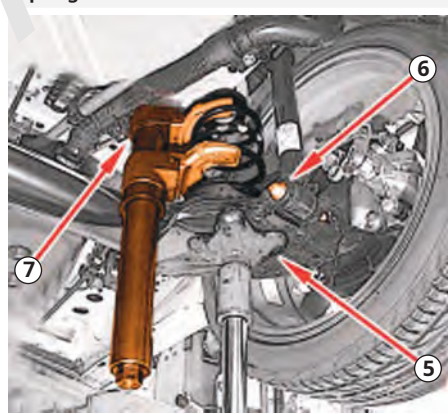
- Place the upper shock absorber attachment bracket to the body in a vice.
- Place the shock absorber stem back into its seat, inside the bracket and secure it with the relevant M10 nut to a torque of $72 \div 88$ Nm with the anti-torque tool used for removal.

SPRING

Dismantling

- Place the car on the lifting bridge.
- Remove the rear wheels.
- Unscrew the nut and disconnect the front sensor rod for correction/adjustment of the light clusters (xenon headlights).
- Place a suitable hydraulic lift (5) under the rear crossmember in correspondence with the spring.
- Unscrew the shock absorber fixing screw (6) to the suspension crossmember.
- Compress the spring using a tool (7) of the type shown in the figure.

Spring removal

**Assembly**

- Place a suitable hydraulic lift under the rear crossmember in correspondence with the spring.
- Compress the spring with the tool and then place it back into its seat.

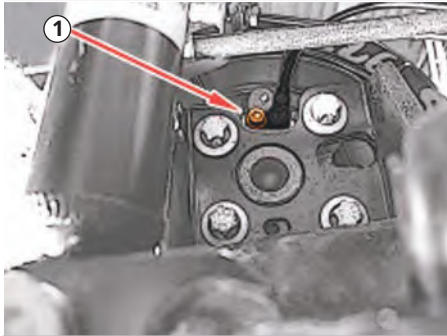
FIAT 500L

6. suspensions > maintenance operations

- Proceed in the same way for the right-hand handbrake cable.

- Unscrew the screw (1) and remove the wheel speed sensor for ABS.

Wheel rotation direction removal



- Proceed in the same way for the right-hand ABS wheel speed sensor.

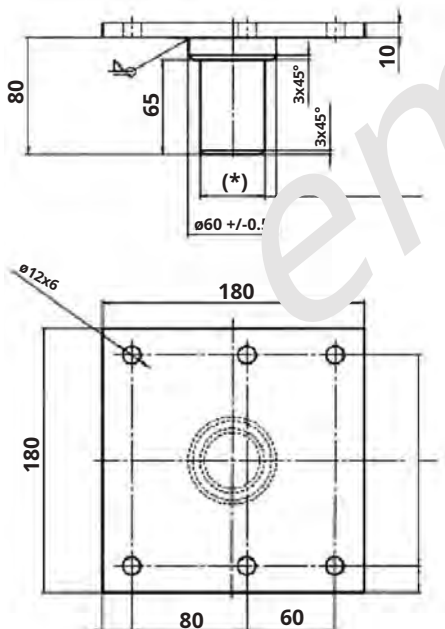
- Disconnect the intermediate fitting of the rear brake pipe.

- Unscrew the toothed washer securing the fuel tank heat shield.

- Unscrew the nut and disconnect the light cluster adjustment/correction sensor connecting rod (for xenon headlights only).

- Build a support to be positioned on a hydraulic lift according to the dimensions shown in the figure.

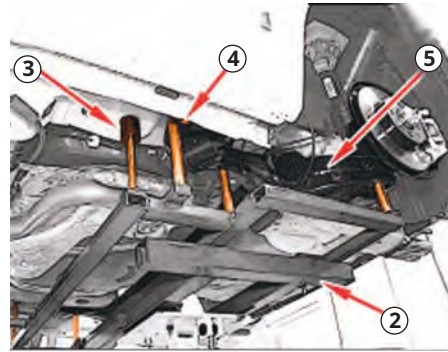
Axle support tool



- Support the rear suspension axle with the previously prepared equipment (2), taking care that the adapters (3) are positioned in the axle-body centering holes as shown in the figure.

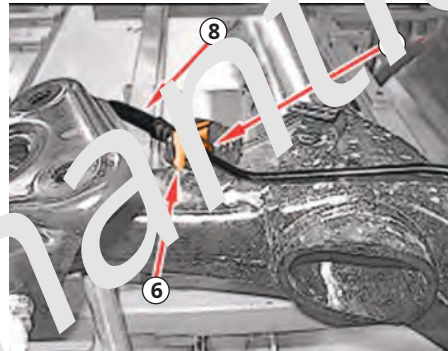
- Unscrew the screws (4) fixing the axle support to the body and remove the complete axle (5).

Removing axle support fixings



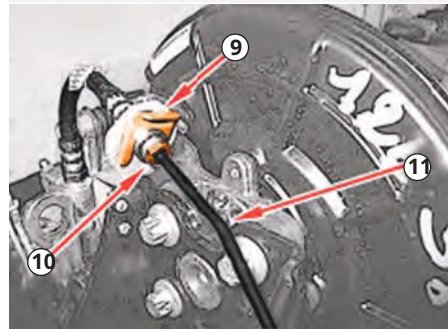
- Release the clip (6), unscrew the fitting (7) and remove the brake fluid hose (8).

Brake fluid pipe release



- Release the clip (9), unscrew the fitting (10) and remove the rigid brake fluid pipe (11).

Brake fluid rigid pipe removal



Assembly

- **Note:**

Before reassembling the rear suspension axle, check that it is not cracked or deformed. If it is, replace it.

- Place the rigid brake fluid pipe back in its seat, tighten the M10 fitting to a torque of $14 \div 18$ Nm and engage the retaining clip.

- Place the brake fluid hose back in its seat, tighten the M10 fitting to a torque of $14 \div 18$ Nm and engage the retaining clip.

- Support the rear suspension axle with the previously prepared equipment, taking care that the adapters are positioned in the axle/body centering holes.

- Tighten the M10 axle support fixing screws to the bodywork to a torque of $72 \div 88$ Nm.

- Remove the hydraulic lift with the equipment it used.

- Place the gas discharge headlight alignment/correction sensor rod back into its seat and tighten the relevant nut.

- Screw on the toothed washer securing the fuel tank heat shield.

- Tighten the M10 intermediate fitting of the rear brake pipe to a torque of $14 \div 18$ Nm.

- Place the ABS wheel speed sensor back in its seat and tighten the screw to a torque of $5 \div 8$ Nm.

- Act on the lever and connect the handbrake cable to the brake caliper and the intermediate fixings.



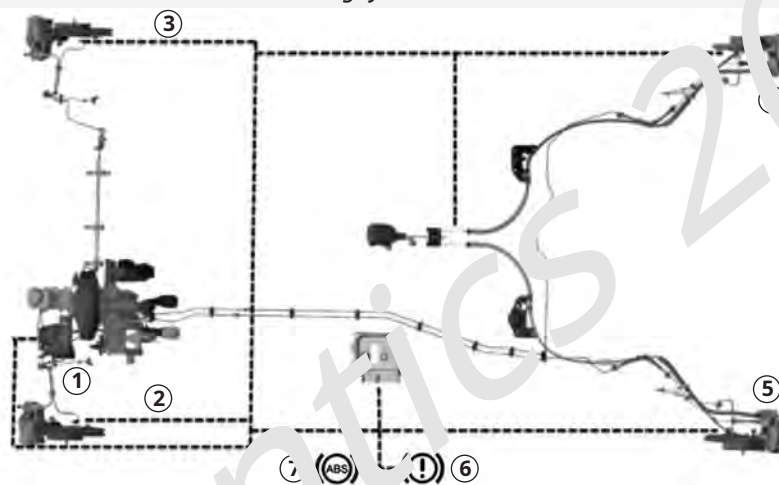
FIAT 500L**7. brakes > technical data**

7. brakes

Technical data

GENERAL INFORMATION

Hydraulic power-assisted braking system, consisting of 2 independent crossed circuits that allow, in the event of a circuit failure, braking anywhere on both sides of the vehicle. Each circuit acts on one front wheel and on the diagonally opposite rear wheel.

Braking system

1.ABS/EBD control unit

2.Front left wheel sensor

3.Front right wheel sensor

4.Rear right wheel sensor

5.Rear left wheel sensor

6.EBD warning light

7.ABS warning light

FRONT BRAKES

Self-ventilated disc brakes with single-piston floating calipers.

	0.9 TwinAir	0.9 TwinAir NATURAL POWER	1.4 16V	1.4 TJet	1.3 16V Multijet	1.6 16V Multijet 105CV	1.6 16V Multijet 120CV
Disk type	Self-ventilating						
Disc diameter (mm)	184 ± 0.2						
Nominal thickness (mm)	21.9 ÷ 22.1						
Minimum thickness after grinding (mm)	8.35pm						
Minimum thickness allowed (mm)	20.20						
Caliper piston diameter (mm)	54			57	54	57	

REAR BRAKES

Solid disc brake, floating caliper type with control cylinder.

	0.9 TwinAir	0.9 TwinAir NATURAL POWER	1.4 16V	1.3 16V Multijet	1.6 16V Multijet
Disk type	Full				
Disc diameter (mm)	251 ÷ 251.4				
Nominal thickness (mm)	9.8 ÷ 10.1				
Minimum thickness after grinding (mm)	9.35				
Minimum thickness allowed (mm)	9				
Caliper piston diameter (mm)	38				

FIAT 500L**7. brakes > technical data****BRAKE PUMP**

The brake pump is a single unit with the brake booster. The reservoir for the reserve fluid of the brake hydraulic system is press-fitted onto the upper part of the pump.

Master Cylinder Diameter	7/8"
--------------------------	------

PARKING BRAKE

The mechanical control of the handbrake consists of a lever, located between the two front seats, which operates a rocker arm to which are anchored two flexible tie rods connected to the parking brake levers, present on the rear brakes.

BRAKE FLUID

Product	DOT 4 SAE J1703
Capacity	1.0 liters

BRAKE POWER

The brake vacuum system consists of a vacuum pump, which supplies the vacuum for the operation of the brake booster to which it is connected via a pipe.

Brake booster view**Brake booster cylinder diameter** 3"**TIGHTENING TORQUES*****Braking system***

Component	Fixing	OR	Nm value
Front brake disc	Screw	M8	10 ÷ 1.5
Front brake caliper bracket	Screw	M12	100 ÷ 110
Front brake caliper	Screw (to be replaced)	-	27 ÷ 30
Rear brake caliper	Screw (to be replaced)	-	27 ÷ 30
Rear brake disc	Screw	M8	10 ÷ 15
Rear brake caliper bracket	Screw	M10	55 ÷ 6.0
Front brake caliper bleed screw	Screw	M8	8 ÷ 12
Rear brake caliper bleed screw	Screw	M10	8 ÷ 12

Plumbing system

Component	Fixing	OR	Nm value
Wheel speed sensor	Screw	M6	5 ÷ 8
Support bracket for hydraulic and electronic control unit of the ABS system	Screw	M8	23 ÷ 28
Support bracket for hydraulic and electronic control unit of the ABS system	Nut	M8	23 ÷ 28
Brake line connections	Connection	M10	14 ÷ 18
Rigid lines from hydraulic unit to front/rear right brakes - control unit side	Connection	M12	14 ÷ 18
Front brake hose - brake caliper side	Connection	M10	14 ÷ 18
ABS system electronic control unit	Screw	-	1.5 + 2.5 + 3.5
Depressor	Screw (to be replaced)	M6	4 ÷ 6 + 50°
Master cylinder (brake pump)	Nut	-	17 ÷ 23
Brake booster	Nut	M8	17 ÷ 26
Pedalboard support	Nut (to be replaced)	M8	17 ÷ 26
Vacuum tank	Screw	M6	8 ÷ 1.0

ESP SYSTEM

The braking system is of the servo-assisted hydraulic type, consisting of 2 independent crossed circuits (each circuit acts on a front wheel and on the diagonally opposite rear wheel) to ensure braking and stability even in the event of a circuit failure.

The entire range is equipped with:

- disc brake on front/rear wheels
- ABS (Antilock Braking System) with EBD (Electronic Braking Distribution)
- ESC (Electronic Stability Control) on the expected trims and markets

The braking system, produced by TRW. It is of the EBC 460 type and optimises the vehicle's traction and stability characteristics with the ESC function which includes:

- HH (Hill Holder) automatic system that allows braking and starting on slopes without using the handbrake
- HBA (Hydraulic Brake Assistant) electro-hydraulic braking assistant which automatically increases the pressure of the braking circuit during panic braking
- ASR (Anti Slip Regulation) reduces the slipping of the drive wheels by acting on the brakes and the driving torque
- MSR (Motor Schleppmoment Regelung) controls the engine brake when the accelerator is released (particularly on slippery surfaces the brake could cause the wheels to lock: the MSR system increases the torque to reduce the engine brake and the related wheel lock)
- DST (Dynamic Steering Torque) is a system integrated with the electric power steering. In particular conditions it commands the steering to implement a steering torque to encourage the driver to perform the manoeuvre in the best way
- ERM (Electronic Rollover Mitigation) the system controls the tendency of the wheels to lift off the ground in the event that the driver performs extreme manoeuvres, especially in non-optimal road conditions. In such conditions the system intervenes on the brakes and on the engine power, limiting the possibility of the wheels lifting off the ground
- TRACTION PLUS system only for Trekking versions is an aid for driving and starting off on poor grip routes

ELECTROHYDRAULIC GROUP

Its function is to regulate the fluid pressure at the brake calipers via solenoid valves with phases on:

- increase brake fluid pressure
- brake fluid pressure maintenance
- brake fluid pressure relief

The electro-hydraulic control unit consists of:

- eight two-way solenoid valves or twelve solenoid valves for the version with ESC
- a double circuit recovery electric pump
- two low pressure accumulators

SENSORS

Wheel speed sensors

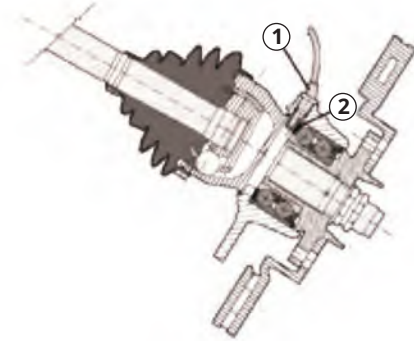
The advantages offered by the adoption of active sensors are:

- lower sensitivity to the distance between the sensor and the magnetic ring (air gap)
- reduce sensitivity to electromagnetic disturbances
- ability of the active sensor to measure wheel speed down to zero (instead of the 2.5 km/h of the passive one)
- save weight and space
- simplify the transmission joints by eliminating the tone wheels

Active sensors are composed of:

- a multipolar magnetic encoder (2) integrated into the instrument (1) wheel hub bearing
- a sensor (1) (magnetoresistive) that faces the encoder

Speed sensor

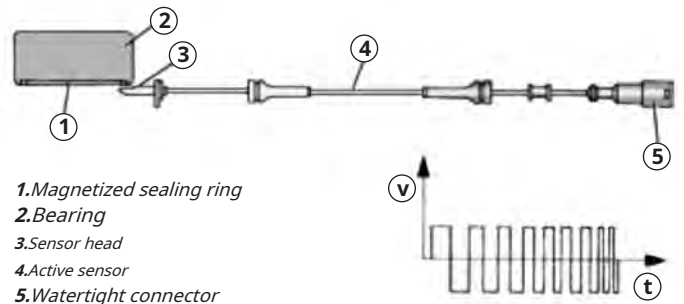


The active sensor is based on the variation of the internal electrical resistance as a function of the intensity and orientation of the lines of force of an external magnetic field (multipolar magnetic encoder), generating a type of square wave signal that varies in frequency as a function of the rotation speed of the wheel but is constant in amplitude.

The active sensor is therefore a proximity sensor and integrated electronics, connected by a cable to the ABS control unit, from which it is electrically powered, to which it transmits the vehicle speed.

The phonic wheel is a multipolar ring, an elastomer equipped with a certain quantity of magnetic particles which, through a special magnetization technique, are oriented in such a way as to form several magnets with alternating North or South polarities in a circumferential direction.

Active sensor operation



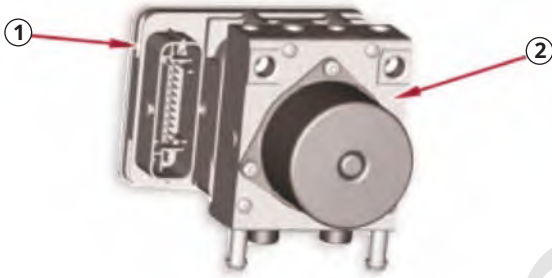
FIAT 500L**7. brakes > technical data****CONTROL UNIT**

The group is composed of an electronic control unit (1) and an electro-hydraulic control unit (2).

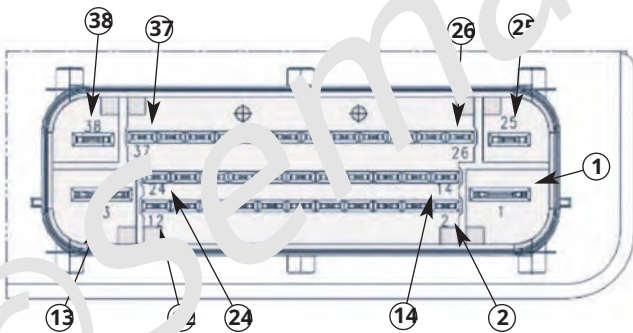
The electronic control unit has the following functions:

- acquire data from wheel speed sensors
- store the control parameters defined in the vehicle setup
- store control software
- process the acquired data
- check the braking process
- detect faults in ABS system components
- store fault codes and activate the ABS and EBD warning lights
- transmit and receive data via the C-CAN line (when provided)
- transmit and receive data via the diagnostic connector

Electro-hydraulic power unit



Electro-hydraulic control unit connector

**Pin out**

1	+30 power supply from F04 FDU (pump)
2	Positive signal from ASR/ELD disconnection command
3	Rear right wheel sensor +
4	Rear right wheel sensor -
5	C-CAN H (in)
6	C-CAN L (in)
7	Not connected
8	C-CAN L (out)
9	C-CAN H (out)
10	Front right wheel sensor +
11	Front right wheel sensor -
12	Not connected
13	Frame mass for electric pump
14	Not connected
15	Not connected
16	Not connected
17	Not connected
18	Not connected
19	Not connected
20	Not connected
21	Not connected
22	Not connected
23	Not connected
24	Not connected
25	Power supply + 30 from F23 FDU (solenoid valves)
26	Not connected
27	Not connected
28	INT from F42 BCM
29	Rear left wheel sensor +
30	Rear left wheel sensor -
31	ASR OFF LED command negative signal
32	Not connected
33	Not connected
34	Not connected
35	Front left wheel sensor +
36	Front left wheel sensor -
37	Not connected
38	Frame mass control unit/solenoid valves

FIAT 500L**7. brakes > technical data****SYSTEM ERROR CODES**

Code	Explanation
C0010-01	Front Left Inlet Valve - General Electrical Fault
C0011-01	Front Left Outlet Valve - General Electrical Fault
C0014-01	Front right inlet valve - General electrical fault
C0015-01	Front Right Outlet Valve - General Electrical Fault
C0018-01	Rear Left Inlet Valve - General Electrical Fault
C0019-01	Rear Left Outlet Valve - General Electrical Fault
C001C-01	Rear right inlet valve - General electrical fault
C001D-01	Rear right outlet valve - General electrical fault
C0020-49	Recirculation pump - Internal electronic fault
C0030-29	Front Left Magnetic Wheel - Invalid Signal
C0031-01	Front left speed sensor - General electrical fault
C0031-29	Front Left Speed Sensor - Invalid Signal
C0033-29	Front Right Magnetic Wheel - Invalid Signal
C0034-01	Front right speed sensor - Generic electrical fault
C0034-29	Front Right Speed Sensor - Invalid Signal
C0036-29	Rear Left Magnetic Wheel - Invalid Signal
C0037-01	Rear left speed sensor - Generic electrical fault
C0037-29	Rear Left Speed Sensor - Invalid Signal
C0039-29	Rear Right Magnetic Wheel - Invalid Signal
C003A-01	Rear right speed sensor - Generic electrical fault
C003A-29	Rear Right Speed Sensor - Invalid Signal
C003B-95	Irregular tire detected - Incorrect assembly
C0051-29	Power Steering (EPS) Steering Angle Sensor - Invalid Signal
C0051-54	Power Steering (EPS) Steering Angle Sensor - Missing Calibration
C0051-86	Power Steering (EPS) Steering Angle Sensor - Invalid Signal
C0061-29	Lateral Acceleration Sensor - Invalid Signal
C0062-29	Longitudinal acceleration sensor - Invalid signal
C0063-29	Yaw Sensor - Invalid Signal
C0063-49	Yaw sensor - Internal electronic fault
C006A-29	Multi-axis acceleration sensor - Invalid signal
C006A-49	Multi-axis acceleration sensor - Internal electronic fault
C006A-4B	Multi-axis acceleration sensor - Over temperature
C006A-5	Multi-Axis Acceleration Sensor - Missing Calibration
C1200-16	Battery Voltage - Circuit Voltage Below Threshold
C1200-17	Battery Voltage - Circuit Voltage Above Threshold
C1205-01	Valve Relay - General Electrical Fault
C1205-49	Valve Relay - Internal Electronic Fault
C1206-01	Injection valve 1 - Generic electrical fault
C1207-01	Injection valve 2 - Generic electrical fault
C1208-01	Pilot valve 1 - Generic electrical fault
C1209-01	Pilot valve 2 - Generic electrical fault
C120A-24	ASR Switch - Signal Stuck High

Code	Explanation
C120B-12	LED ASR - Short circuit to battery
C1210-86	Warning light communication - Invalid signal
C1211-49	Control unit - Internal electronic fault
C1211-96	Control unit - Internal component fault
C1215-24	Brake Light Switch - Signal Stuck High
C1215-29	Brake Light Switch - Invalid Signal
C1217-23	Reverse Switch - Signal Stuck Low
C1217-24	Reverse Switch - Signal Stuck High
C1218-4B	Overheat Error - Excessive Temperature
C1219-16	Pump supply voltage - Circuit voltage below threshold
C1221-86	Engine Control Unit (ECU) - Invalid Signal
U0001-87	C-CAN Bus - Missing Message
U0001-88	C-CAN Bus - Bus off
U1700-86	Body Computer Module (BCM) - Invalid Signal
U1700-87	Body Computer Module (BCM) - Missing Message
U1701-86	Engine Control Module (ECM) - Invalid Signal
U1701-87	Engine Control Module (ECM) - Missing Message
U1702-8	Power Steering (EPS) - Missing Message
U1711-86	Automatic/Robotic Transmission - NCA/NCR - Invalid Signal
U1711-87	Automatic/Robotic Transmission - NCA/NCR - Missing Message
U1755-87	Collision Mitigation Module (CMM) - Missing Message

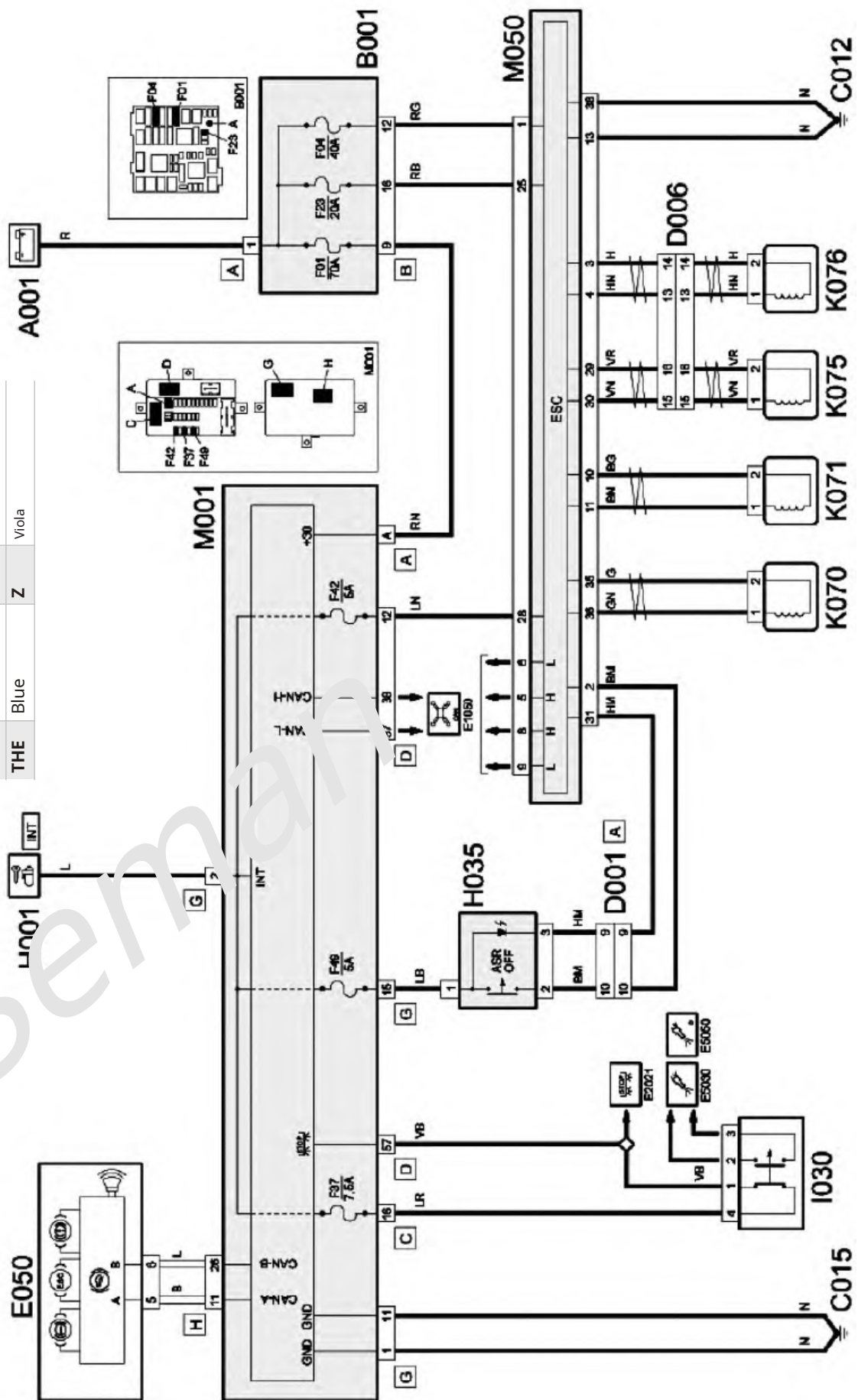
ELECTRICAL DIAGRAMS LEGEND

A001	DRUMS
B001	DERIVATION CONTROL UNIT
C012	FRONT MASS ABS
C015	DRIVER'S DASHBOARD MASS
D001	FRONT/DASHBOARD JOINT
D006	FRONT/REAR JOINT
E050	INSTRUMENT PANEL
H001	IGNITION SWITCH
H035	TUNNEL SWITCH GROUP
I030	BRAKE PEDAL SWITCH
K070	FRONT LEFT WHEEL SENSOR FOR ABS
K071	FRONT RH WHEEL SENSOR FOR ABS
K075	REAR LEFT WHEEL SENSOR FOR ABS
K076	REAR RH WHEEL SENSOR FOR ABS
M001	BODY COMPUTER
M050	ABS CONTROL UNIT

FIAT 500L

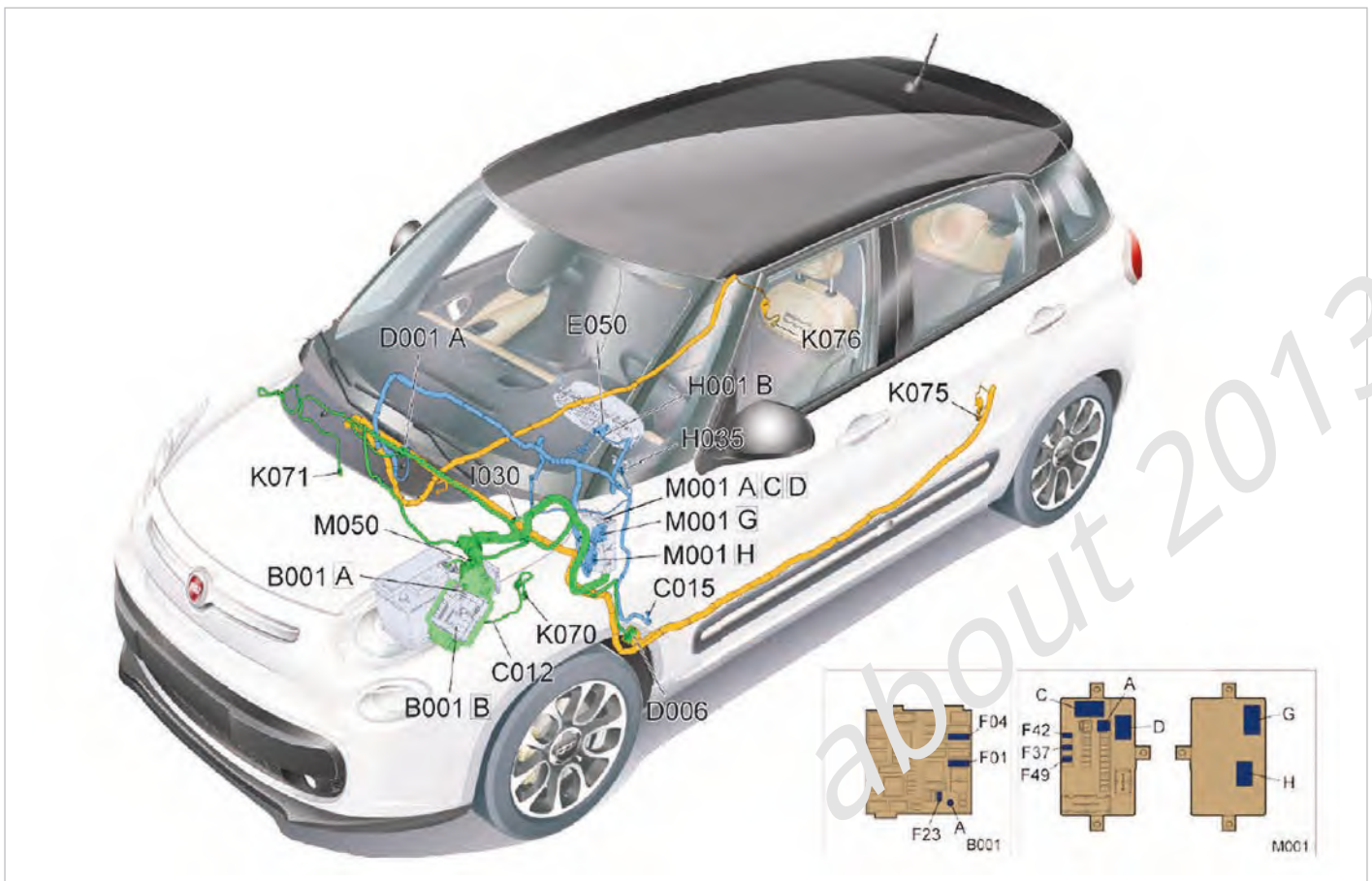
7. brakes > wiring diagrams

TO	Sky blue	M	Brown
B	White	N	Black
C	Orange	R	Red
H	Grey	V	Green
THE	Blue	Z	Viola



FIAT 500L

7. brakes > maintenance operations



View of the electrical diagram



maintenance operations

REPLACING THE SHOES

Dismantling

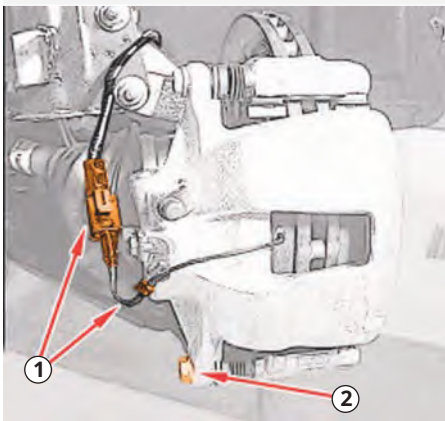
- Place the car on the lifting bridge.
- Remove the front wheels.

Note:

The brake pad wear sensor is only present on the front left caliper.

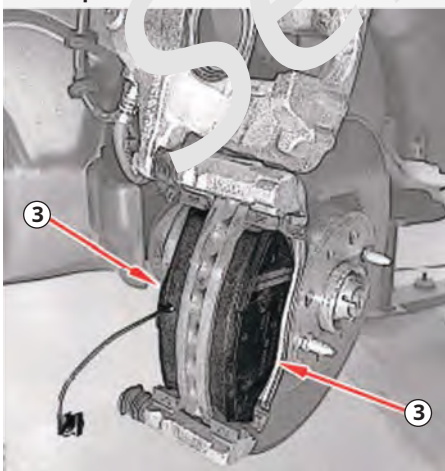
- Disconnect the electrical connection (1) of the pad wear sensor and release the wiring from the intermediate clip.
- Unscrew the lower screw (2) fixing the front brake caliper to the relative bracket.

Removing the lower caliper fixing



- Rotate the front brake caliper and secure it appropriately.
- Remove any traces of glue residue under the side fins and on the caliper piston.
- Remove the front brake pads (3) from the bracket.

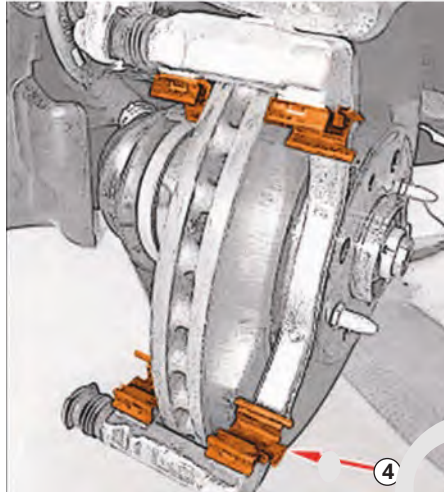
Brake pad removal



- Remove the skate slide springs

(4) from the brake caliper bracket.

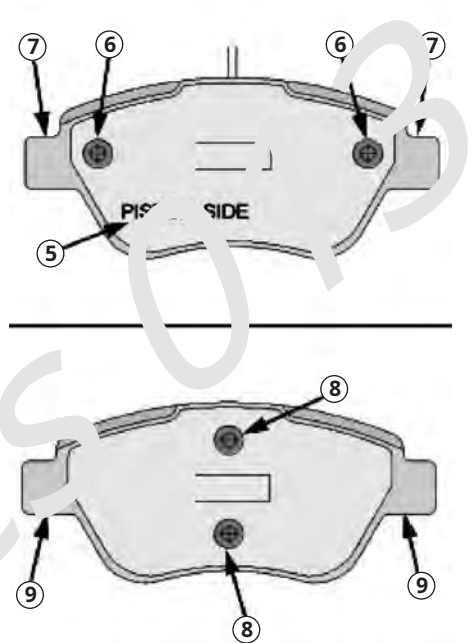
Removing sliding clips



Assembly

- Clean the spring seats on the bracket.
- Place the new sliding springs included in the brake pad kit in their seats on the bracket.
- Place the front brake pads back in their seats, respecting the piston side part (internal side of the vehicle) identified by the writing (5) "PISTON SIDE" and let the rivets (6) placed parallel to the fixing fins (7).
- Place the front brake pads back in their seats, respecting the pad on the external side of the vehicle which is identified by having the rivets (8) positioned perpendicular to the fixing fins (9).
- Remove any double-sided film protectors from the back of the skate.

Skate positioning



- Place the front brake caliper back in its place.
- Tighten a new lower screw to a torque of 27 ± 30 Nm.
- Connect the electrical connection of the pad wear sensor
- Clip the wiring into the intermediate clip.

PLIERS

Dismantling

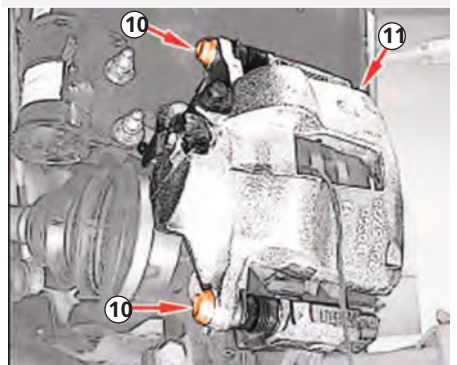
- Place the car on the lifting bridge.
- Remove the front wheels.

Note:

The brake pad wear sensor is only present on the front left caliper.

- Disconnect the electrical connection of the pad wear sensor and release the wiring from the intermediate clip.
- Unscrew the screws (10) and remove the front brake caliper (11).

Removing the caliper



FIAT 500L

7. brakes > maintenance operations

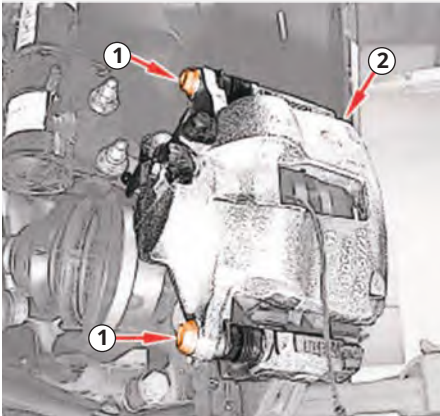
Assembly

- Place the front brake caliper back in its seat and tighten following the closing sequence, approaching with a pre-torque of 15 Nm and then tighten to a torque of $27 \div 30$ Nm starting from the upper screw).
- Connect the electrical connection of the front brake pad wear sensor and engage the relevant wiring.

DISCS**Dismantling**

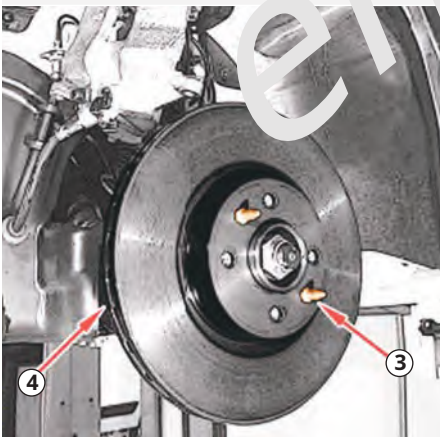
- Place the car on the lifting bridge.
- Remove the front wheels.
- Unscrew the screws (1) and remove the front brake caliper (2).

Removing the caliper (1st is also the bottom screw)



- Unscrew the fixing screws and remove the caliper bracket.
- Unscrew the screws (3) and remove the front brake disc (4).

Brake disc removal

**Assembly**

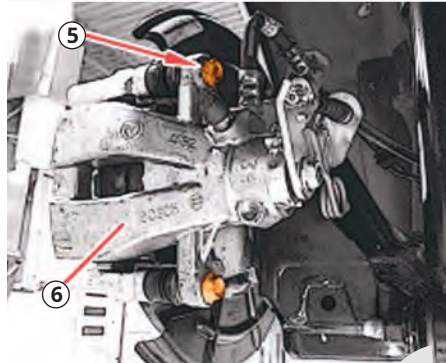
- Place the front brake disc back in its seat and tighten the screws to a torque of $10 \div 15$ Nm.

REAR BRAKES**REPLACING THE SHOES****Dismantling**

- Place the car on the lifting bridge.
- Remove the rear wheels.

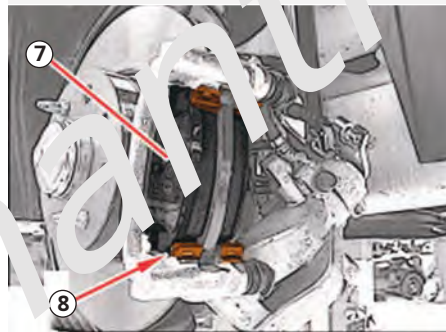
Unscrew the screws (5), release the brake caliper (6) from the bracket and move it to the side.

Removing the caliper fasteners



- Remove the rear brake pads (7) and the rear brake pad slide springs (8).

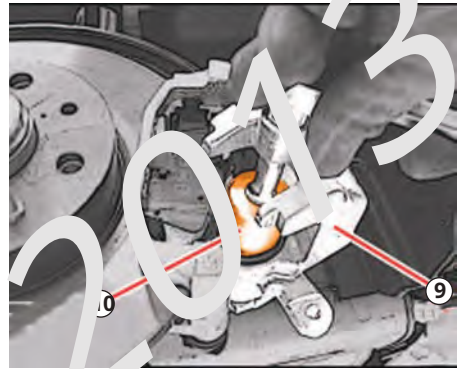
Removing rear pads

**Assembly**

- Fit new rear brake pad slide springs.

- Fit new rear brake pads.

- Place the brake caliper (9) back in its seat and tighten the upper screw.
- Using the appropriate tool (10), move back the brake caliper cylinder.

Piston retraction**Note:**

Make sure that the grooves on the brake caliper cylinder are in a horizontal position, this is to allow subsequent coupling with the notch on the brake pad.

- Complete the assembly of the brake caliper by tightening the screws to a torque of $27 \div 30$ Nm.



FIAT 500L

7. brakes > maintenance operations

PLIERS

Dismantling

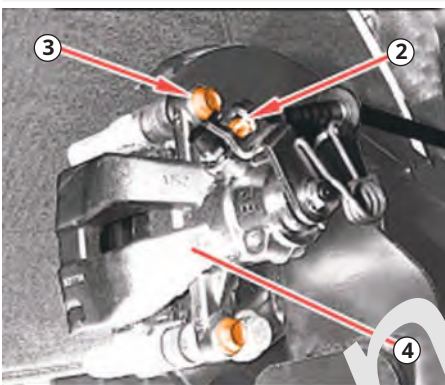
- Place the car on the lifting bridge.
- Remove the rear wheels.
- Loosen the adjusting nut (1) of the handbrake lever cable.

Handbrake adjuster nut



- Disconnect the handbrake control cable (2) from the brake caliper.
- Unscrew the screws (3) and remove the brake caliper (4).

Brake caliper removal

*Assembly*

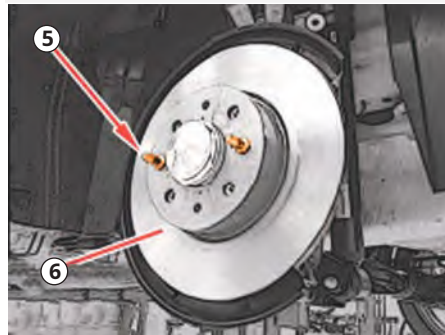
- Place the brake caliper back in its seat and tighten the screws to a torque of 27 ± 30 Nm.
- Connect the handbrake control cable to the brake caliper.

DISCS

Dismantling

- Place the car on the lifting bridge.
- Remove the rear wheels.
- Loosen the handbrake lever cable adjustment nut.
- Disconnect the handbrake control cable from the brake caliper.
- Unscrew the screws and remove the brake caliper.
- Unscrew the fixing screws and remove the caliper bracket.
- Unscrew the screws (5) and remove the brake disc (6).

Brake disc removal

*Assembly*

- Place the brake disc back in its seat and tighten the screws to a torque of 10 ± 15 Nm.
- Place the brake caliper back in its seat and tighten the screws to a torque of 27 ± 30 Nm.
- Connect the handbrake control cable to the brake caliper.

PARKING BRAKE

Regulation

- **Note:**
The parking brake adjustment must be carried out only after replacing the rear brake pads or complete calipers, as the play due to wear is taken up automatically.
- Mark the position of the adjusting nut (7) and then loosen it by at least 2 or 3 turns to ensure complete loosening of the ropes.

Handbrake adjuster nut



- Start the engine and press the brake pedal at least 10 times vigorously.
- Move the handbrake control lever to the fifth notch on the toothed sector.
- Tighten the adjusting nut on the handbrake lever until the rear wheels are braked.
- Check that with the handbrake lever in the rest position the rear wheels are free to rotate and switch off the engine.

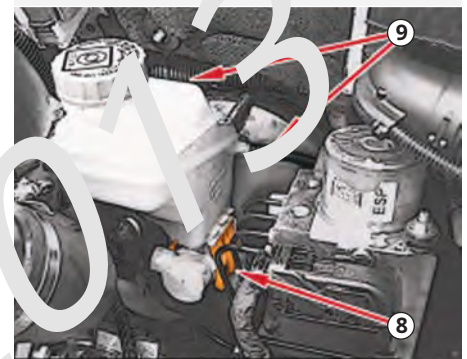
BRAKING SYSTEM

BRAKE PUMP

Dismantling

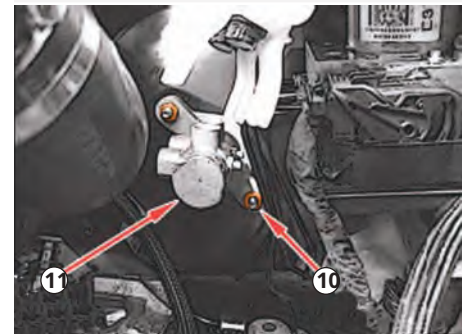
- Disconnect the battery and remove it.
- Remove the battery holder and basket.
- Remove the rigid pipes from the master cylinder to the ABS control unit.
- Act on the clips (8) to release the brake-clutch fluid reservoir (9) from the master cylinder.

Brake fluid reservoir removal



- Unscrew the nuts (10) and remove the master cylinder (11).

Brake pump removal



- Remove the O-ring (12) and the gaskets (13).

Removing the sealing ring



FIAT 500L

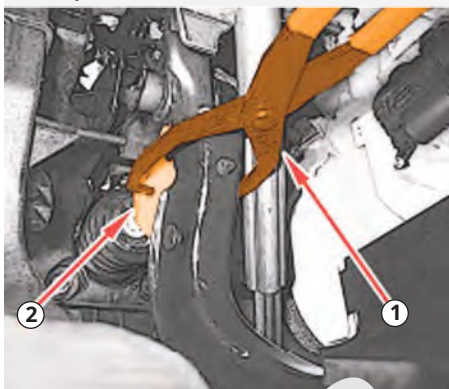
7. brakes > maintenance operations

Assembly

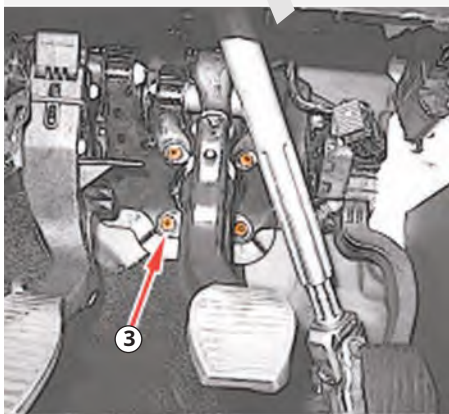
- Place the master cylinder complete with new O-ring, new gaskets in its seat and tighten the nuts to a torque of 17 ± 23 Nm.
- Place the brake/clutch fluid reservoir back in its place by engaging the retaining clips in the master cylinder pins.
- For the subsequent assembly operations, proceed in reverse order to the disassembly.

BRAKE POWER**Dismantling**

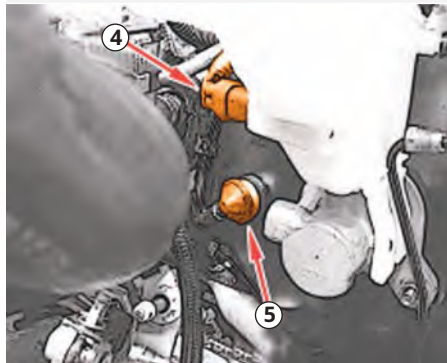
- Disconnect the battery and remove it.
- Remove the battery holder and basket.
- Remove the rigid pipes from the master cylinder to the ABS control unit.
- Remove the flexible hose from the clutch control.
- Using pliers (1) press the retaining tabs (2) and disconnect the brake booster tip from the pedal.

Brake pedal removal

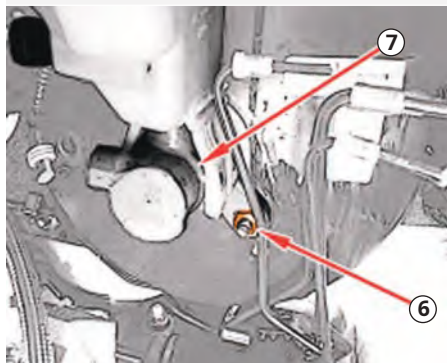
- Remove the retaining device from the brake booster tip.
- Unscrew the brake servo fixing nuts (3) to the pedal support.

Removing brake booster fixing from bracket

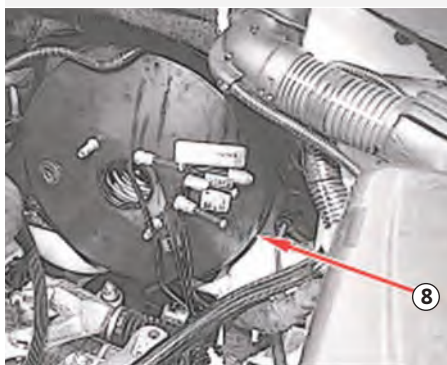
- Disconnect the electrical connection (4) of the brake-clutch fluid level sensor.
- Disconnect the one-way valve (5) from the brake booster.

One-way valve removal

- Unscrew the nuts (6) and remove the brake pump (7) complete with brake-clutch fluid reservoir.

Brake pump removal

- Remove the brake servo (8) from the support.

Brake booster removal**Assembly**

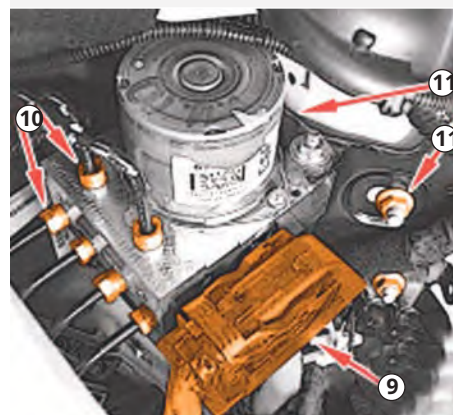
- Place the brake servo back in its seat and tighten the M8 nuts to a torque of 17 ± 26 Nm.
- Place the brake pump complete with brake-clutch fluid reservoir back in its seat and tighten the nuts to a torque of 17 ± 26 Nm.

- Push the one-way valve into the brake booster.

- Connect the electrical connection of the brake-clutch fluid level sensor.
- Fit the new retaining device to the brake pedal so that the retaining clips engage.
- Position the seat cup of the brake booster ball head.
- Move the brake booster back slightly.
- Lift the pedal and position the brake booster tip in correspondence with the retaining device.
- Press the brake pedal so as to fit the brake booster tip to its retaining device.

ABS ELECTRO-HYDRAULIC UNIT**Dismantling**

- Disconnect the battery and remove it.
- Remove the battery holder and basket.
- Disconnect the electrical connection (9) of the ABS control unit.
- Unscrew the brake fluid pipe fittings (10) from the ABS control unit.
- Unscrew the nuts and remove the support bracket (11) complete ABS control unit.

ABS control unit removal**Assembly**

- Place a vice equipped with protective jaws on the ABS control unit.
- Place the support back into its seat by engaging the elastic plugs and tightening the relevant nuts.
- Remove the complete ABS control unit support from the vice.
- Place the complete ABS control unit support back in its seat and tighten the M8 nuts to a torque of 23 ± 28 Nm.
- Tighten the M10 and M12 fittings of the brake fluid pipes from the ABS control unit to a torque of 14 ± 18 Nm.
- Connect the electrical connection of the ABS control unit.

FIAT 500L

7. brakes > maintenance operations

HYDRAULIC CIRCUIT

Refueling and bleeding

- Place the car on the lifting bridge.
- Check that the brake-clutch fluid level is between the MIN and MAX marks.
- Remove the brake-clutch fluid reservoir cap and connect suitable equipment to the reservoir.

- *Note:*

To prevent impurities from entering the brake-clutch fluid reservoir, before unscrewing the cap, thoroughly clean it and the entire upper surface of the reservoir adjacent to the filler neck.

- *Note:*

To ensure complete bleeding of the brake system, the working overpressure of the bleeding equipment must be set to 1.0 bar.

- Remove the protective cap, connect the recovery device and open the bleed valve on the brake caliper.
 - Slowly open the valve on the bleeding equipment and wait until all the air in the hydraulic system has been completely released.
-

8. electrical system

Technical data

GENERAL INFORMATION

DRUMS

The battery is located in the engine compartment. It is equipped with a visual control of the charge status.

1.6 16V Multijet	
Voltage (V)	12
Capacity (Ah)	72
Intensity (A)	570

Battery sensor operation

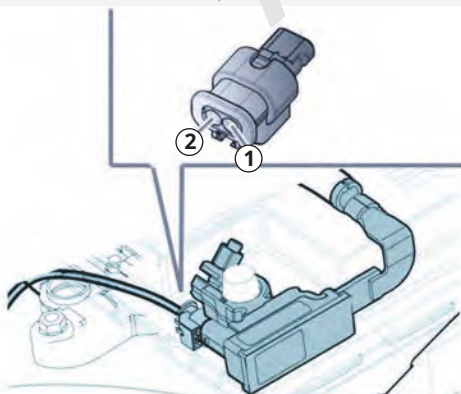
The IBS performs the following measurements, by means of its internal sensors:

- Battery voltage (V)
- Battery current (A)
- Battery temperature (°C)

These measurements are processed internally by the IBS, which calculates parameters that express the battery status:

SOC	Battery charge status: represents, as a percentage, the residual charge of the battery compared to its nominal capacity. It basically indicates how charged the battery is.
SOH	Battery health status: is an indication of the aging of the battery. It indicates the actual capacity of the battery in percentage compared to its nominal capacity. This term is due to the fact that, during operation, the battery is subject to irreversible processes that reduce its capacity to be recharged and to supply energy (battery aging).

Battery sensor

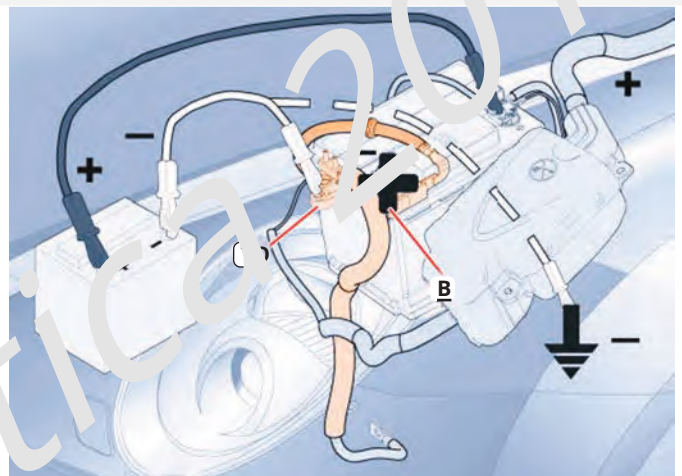


Pin	Description
1	LIN communication line
2	Power supply and voltage measurement

- Note:

In case of emergency starting with auxiliary battery, never connect the negative cable (-) of the auxiliary battery to the negative pole of the car battery "B", but either to the false pole "A", or to an engine/gearbox earth point.

Battery charger

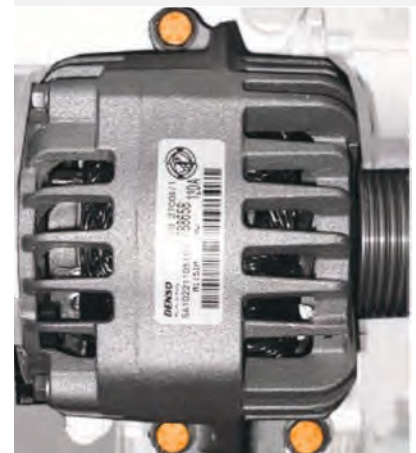


ALTERNATOR

The alternator is a rotating machine that transforms mechanical energy into electrical energy. Like all electric machines, it consists of two essential parts:

- inductor (rotor) and
- induced (stator).

Alternator



1.6 16V Multijet	
Nominal voltage (V)	13.8
Rated current (A)	50/120 with air conditioning
	50/100 without air conditioning
Voltage regulator (type)	LIN - HS100
Regulation voltage at 20 °C (V)	10.6 ÷ 16

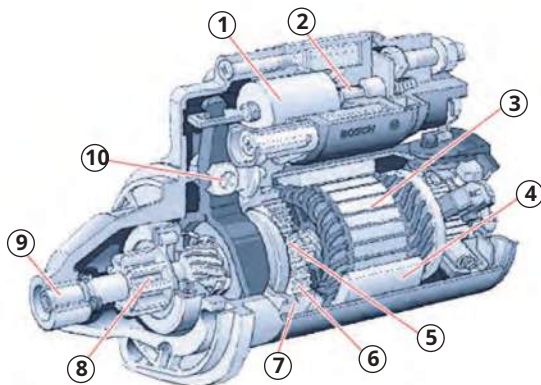
FIAT 500L

8. electrical system > technical data

STARTER MOTOR

The starting system consists of the ignition switch controlled by the key and the starter motor which is connected directly to the battery.

Starter motor



1. Enamel coated clutch contactor

2. Springs in reinforced material

3. Larger electric motor

4. Permanent magnets with increased flux and better resistance to demagnetization

5. Reducer with reduced reduction ratio

6. Roller bearing gears

7. Reducer with rubber dampers

8. Pinion with high number of teeth

9. End bushing with roller bearing

10. Reinforced lever

1.6 16V Multijet	
Type	Bosch S74L
Voltage (V)	12
Rated power (kW)	1.7
Rotation, pinion side	right-handed
Number of poles	6

MULTIPLEX NETWORK

The electrical system of this vehicle adopts the "Smart 2" architecture, specifically developed to optimally integrate the most advanced electronic functions.

This structure constitutes the "nervous system" of the car, directly controls all the body functions (access control, visibility, on-board information, comfort, etc.) and communicates with the various chassis and powertrain subsystems, optimising the size, diagnosability, reliability, weight and cost of the system.

A further advantage compared to traditional systems is the simplification of assembly by reducing the number of control units (with the same functions offered to the customer) and the number of power and signal interconnections, through the extensive use of serial communication networks (2 CAN two-wire communication networks, 1 LIN single-wire subnetwork, 1 ABC single-wire subnetwork).

Power distribution is via four junction boxes and relay/fuse holders, connected to the control elements (relays and static actuators). These boxes also act as interconnectors for the various wiring and as electrical distribution in order to ensure the highest level of electrical protection and the lowest degree of wiring complexity.

This is a simplified version of the previous "MINI FLORENCE": the structure has been simplified by managing a greater number of functions with the Body Computer.

TYRE MONITORING

TPMS SYSTEM

The system called TPMS "Tyre Pressure Monitoring System" monitors the tyre pressure, sending the necessary information to the Body Computer via B-Can network.

In particular, in the event of pressure values lower or higher than those expected, the system activates a warning on the instrument panel of insufficient pressure or puncture of one or more tyres. The tyre pressure monitoring system is a system consisting of:

- 4 RF transmitting pressure sensors located inside the tyre on the wheel rim;
- 4 LF transmitters mounted on the body in the respective wheel wells;
- 1 RF management and reception control unit mounted inside the (right) shelf supporting the hat rack;
- 1 warning light/icon indicating pressure anomalies on one or more tyres, combined with display

Warning lights



T0



B



C

T0. Warning light on comfort panel (medium) for all TPMS-related signals except failure

B. Warning light on matrix panel (high) for insufficient tyre pressure

C. Warning light on comfort panel (medium) or icon on matrix panel (high) to signal system failure

The instrument panel acquires these signals and manages the indications as shown below.

When the pressure value of one or more tyres exceeds the first CHECK threshold (nominal pressure - 0.3 bar when hot or - 0.45 bar when cold) (pressure above 3.4 bar), the TPMS warning light/icon on the instrument panel lights up and an alphanumeric message appears on the display, e.g. "Check tyre pressure", rear right or rear left. Once the signalling cycle has finished, only the warning light on the dial remains active until the correct pressure is restored.

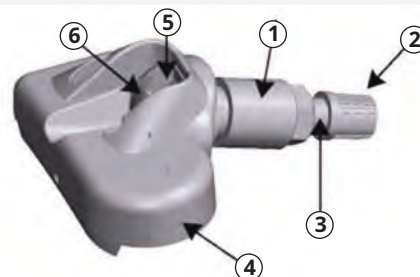
After 10 minutes the warning cycle is repeated (only once). The CHECK threshold provides a message with a specific indication of the affected tire.

Pressure sensors

The sensors are positioned inside the wheel rims in place of the normal tire inflation valve.

The sensors have the function of monitoring the pressure and temperature value of each of these and of transmitting the information to the control unit/receiver via radio frequency signal (433.92 MHz).

Wheel sensors



1. Nut

2. Valve cap

3. Valve

4. Sensor

5. Valve hole

6. Square section screw

FIAT 500L**8. electrical system > technical data**

The sensors detect the pressure and temperature inside the tire through dedicated pressure and temperature sensors which are combined with electronics for the acquisition and processing of signals and are equipped with a part dedicated to the transmission of signals via radio frequency 433.92 Mh.

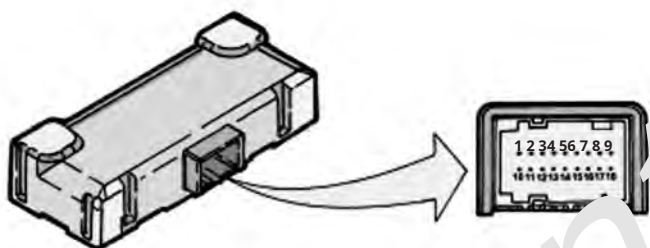
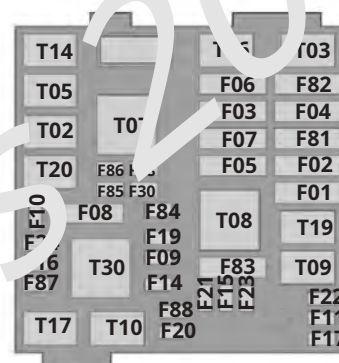
CONTROL UNIT

The CPP control unit is connected via a bridge to the rear wiring harness. The receiver electronics are contained in a non-RF shielding plastic box.

The control unit has no objectification (anti-rotation), so it must be mounted so that the connector faces the outside of the car (right side) so that it is easily accessible by inserting your hand inside the shelf.

The CPP is an electronic component that, connected to the A-Bus serial line, manages the tire pressure control function; the diagnosis is managed through the use of the K-Line serial line.

In the event of a power failure to the control unit, it is not necessary to re-memorise the sensor identification "ID" codes; the IDs and position of the sensors, as well as the error codes (diagnosis), remain stored in the control unit's EEPROM.

Control unit and connector**FUSES AND RELAYS***Engine compartment main fuse box**Engine compartment fuse and relay box*

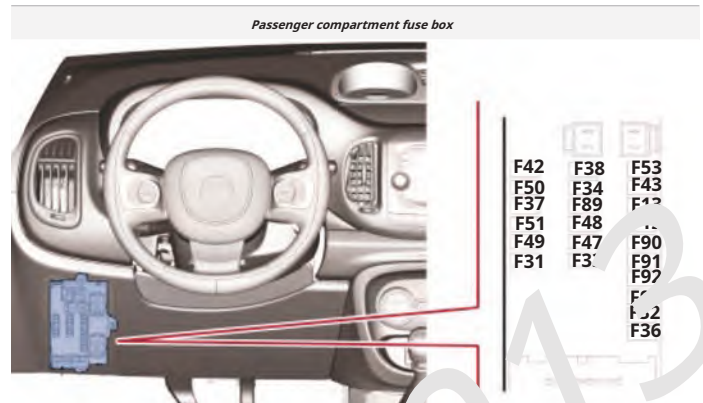
Pin	Description
1	Power supply +30 (+12V)
2	LF transmitter power supply
3	Rear left LF transmitter signal
4	Front left LF transmitter signal
5	Front right LF transmitter signal
6	Rear right LF transmitter signal
7	Not connected
8	Connection to Can_H_Bus line
9	Connection to Can_L_Bus line
10	Mass
11	Not connected
12	LF transmitter mass
13	LF transmitter mass
14	LF transmitter mass
15	LF transmitter mass
16	Power supply under key control unit (+ 15)
17	Not connected
18	Not connected

Fuse	Flow rate (A)	Protected users
F01	70	BCM body computer control unit
F02	60	Body computer control unit BCM, trunk fuse control unit CVB
F03	20	Ignition switch
F04	40	ABS/ESC brake system (pump)
F05	70	Electric drive system
F06	20/30	Low speed engine cooling fan
F07	40/50	High speed engine cooling fan
F08	40	Interior passenger compartment electric fan
F09	10	Injectors (0.9 CNG engine)
F10	15	Horn
F11	10	Power supply of secondary loads of engine system
F14	15	Robotized gearbox (control unit, solenoid valves)
F15	20	Lavazza coffee machine socket
F16	7.5	Power supply "+15/54" engine system
F17	10	Power supply of primary loads of engine system
F18	5	Power supply "+30" engine system
F19	7.5	Air conditioning compressor
F20	30	Heated rear window
F21	15	Fuel pump

FIAT 500L**8. electrical system > technical data**

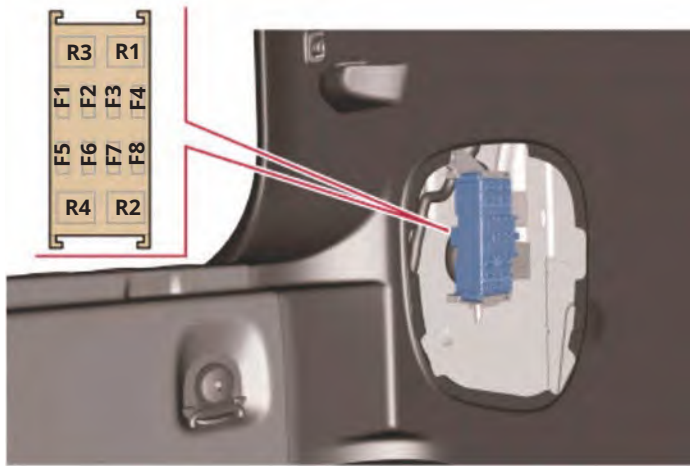
Fuse	Flow rate (A)	Protected users
F22	15	Power supply of primary loads of engine system
	20	Power supply of primary loads of engine system (1.6 JTD)
F23	20	ABS/ESC brake system (valves)
F24	-	AVAILABLE
F30	5	Blow-By Engines
F81	60	Glow plug pre-heating control unit (JTD engines)
	70	PTC heater 2 (BZ engines)
F82	40	Heated diesel filter (JTD engines)
	70	Heated windshield (BZ engines)
F83	30	Robotic gearbox servo pump
	40	PTC heater 1 (BZ engines)
F84	7.5	Gas regulation solenoid valves (0.9 CNG engine)
F85	15	Front power socket
F86	15	Boot power socket
F87	5	Battery charge status sensor (with Start & Stop)
F88	7.5	Exterior mirror defrosters

Relay	Flow rate (A)	Piloted users
T02	30	Heated diesel filter (diesel engines)
T03	20	Horn
T05	20	Air conditioning compressor
T06	30	Low speed engine cooling fan
T07	50	High speed engine cooling fan
T08	50	Interior electric fan, power sockets
T09	30	Engine control system
T10	20	Fuel pump
T14	20	Blow-By resistor for engines (0.9 Twinair engines only)
T17	30	Starter relay 1 (with Start & Stop)
	20	Injectors (0.9 CNG engine)
T19	30	Defrosting of heated rear window and external mirrors
T20	30	Starter relay 2 (with Start & Stop)
T30	30	Gas regulation solenoid valves (0.9 CNG engine)
	50	Robotic gearbox servo pump
T30	50	PTC 1 (0.9 Twinair and 1.4 16v)

Passenger compartment fuse box

Fuse	Flow rate	Protected users
F12	7.5 A	Right low beam (1.4 16v engine only)
F13	7.5 A	Left low beam (1.4 16v engine only)
F31	5 A	Power supply INT/A cigarette lighter, electric climate fan, heated seats, seat adjustment
F32	7.5 A	"+30" power supply for internal lights (1.4 16v engine only)
F33	20 A	Left rear window regulator
F34	20 A	Rear right window regulator
F36	10 A	"+30" radio power supply, climate controls, diagnostic socket, rear side ceiling lights
F37	7.5 A	INT power supply for instrument panel, brake pedal, climate controls, diagnostic socket
F38	20 A	Door and trunk lock gearmotors
F42	5 A	Power supply INT ABS/ESC, electric drive
F43	20 A	Windscreen/rear window washer pump
F47	20 A	Driver's side front window
F48	20 A	Front passenger side window lifter
F49	5 A	INT power supply for instrument and control lighting, interior mirror, rain/twilight sensor
F50	7.5 A	INT airbag power supply
F51	5 A	INT power supply reverse switch, relay coils, sunroof, sliding curtain, headlight corrector, parking sensors, radio, brake pedal, climate controls, interior mirror
F53	7.5 A	Power "+30" instrument panel
F89	-	not used
F90	7.5 A	Left high beam
F91	7.5 A	Right high beam
F92	7.5 A	Left fog/cornering light
F93	7.5 A	Right fog/cornering light



FIAT 500L**8. electrical system > technical data***Secondary box passenger compartment**Secondary passenger compartment fuse box*

Fuses	Name on stamping	Flow rate (A)	Protected users
F61	F1	15	Seat lumbar adjustment
F62	F2	15	Seat heating
F63	F3	20	HIFI system
F64	F4	-	AVAILABLE
F65	F5	20	Curtain movement
F66	F6	20	Sunroof movement
F67	F7	-	AVAILABLE
F68	F8	5	City Brake Control sensor (version with S&S)

Relay	Name on stamping	Flow rate (A)	Function
T51	R1	30	Seat heating
T52	R2	-	AVAILABLE
T53	R3	30	Seat lumbar adjustment
T54	R4	30	City Brake Control sensor (version with S&S)

FIAT 500L

8. electrical system > maintenance operations

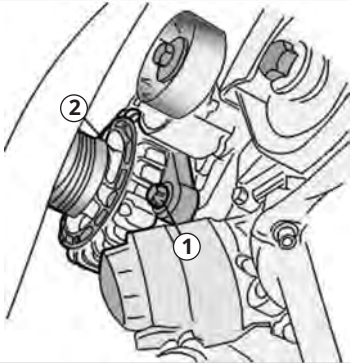
maintenance operations

ALTERNATOR

Dismantling

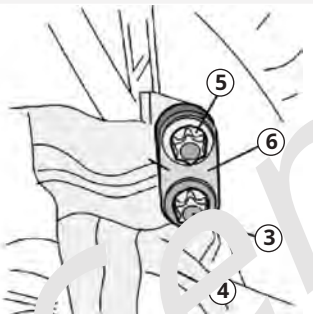
- Place the car on a lifting bridge.
- Disconnect the negative battery terminal.
- Remove the Poli-V service belt.
- Unscrew the lower screw (1) securing the alternator (2).

Lower screw removal



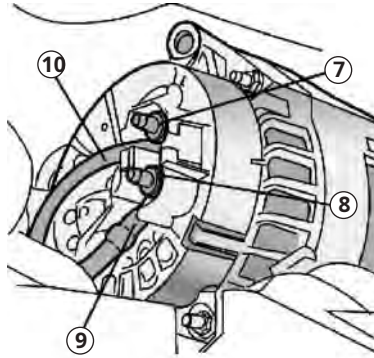
- Unscrew the upper fixing screw (3) of the alternator (4).
- Loosen the fixing screw (5) of the anchoring bracket (6).

Removing the bracket screw



- Unscrew the nuts (7) and (8) and disconnect the electrical connections (9) and (10) of the alternator by removing the latter.

Alternator Removal

*Assembly*

- Check that the alternator is not damaged.
- Position the alternator.
- Connect the alternator electrical connections and screw the fixing nut.
- Engage the alternator with the upper anchor bracket.
- Tighten the M12x1.75X30 screw of the anchor bracket and the M2X1.75X7 screw fixing the alternator to a torque of 70 Nm.
- Tighten the M12x1.75X40 lower alternator fixing screw to a torque of 70 Nm.

For the subsequent assembly operations, proceed in reverse order to the disassembly.

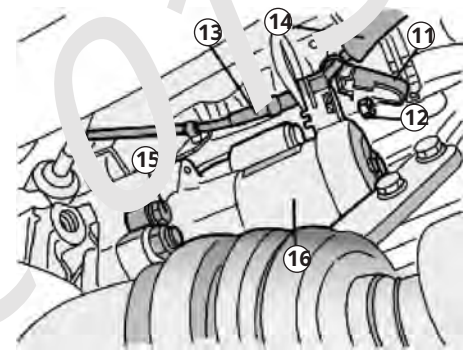
STARTER MOTOR

Dismantling

- Place the car on the lifting bridge.

- Working on the left side of the engine, unscrew the upper fixing screw of the starter motor.
- Open the protective cover of the starter motor electrical connections (11) and unscrew the nut (12).
- Disconnect the electrical connections (13) and (14) of the starter motor.
- Unscrew the lower fixing screw of the starter motor (15).
- Remove the starter motor (16).

Removing the starter motor

*Assembly*

- Check that the starter motor is not damaged.
- Place the starter motor in its seat.
- Tighten the lower fixing screw of the starter motor to a torque of $24 \div 30$ Nm.
- Connect the starter motor electrical connections.
- Screw the nut and close the protective cover.
- Tighten the upper fixing screw of the starter motor to a torque of $24 \div 30$ Nm.

FIAT 500L**8. electrical system > maintenance operations****ELECTRICAL DIAGRAMS LEGEND**

TO	
A001	Drums
A010	Alternator
A020	Starter motor
A030	Ignition coil
A040	Glow plugs
B	
B001	Engine compartment shunt control unit
B002	Under-dash shunting control unit
B016	Mirror Defrost Fuse
B037	Fuse (Maxi Fuse) Glow plugs
B045	Trunk compartment shunt control unit (Cvb)
B098	Additional fuse box
B099	Maxi Fuse Box on Battery
B106	Additional control unit for engine compartment derivation
C	
C001	Battery Mass
C010	Front left mass
C011	Front right mass
C015	Driver's side dashboard mass
C020	Mass dashboard passenger side
C030	Left rear mass
C031	Right rear mass
C038	Mass on Central Tunnel
C050	Mass Air Bag System
C053	Mass Side Bag + Head Bag
C060	Mass Injection Control Unit
D	
D001	Front / dashboard junction
D004	Front / engine joint
D006	Front/Rear Junction
D007	Alternator Junction
D008	Front Junction Air Conditioner - Heater
D015	Front/Bumper Junction
D020	Dashboard / rear junction
D021	Dashboard/air conditioner junction - Heater
D025	Motor Cables/Motor Service Cable Junction
D030	Front door joint driver's side
D031	Front passenger side door joint
D035	Rear left door junction
D036	Rear right door joint
D042	Ceiling light junction

D	
D045	Sunroof junction
D047	Spiral contact junction
D050	Fog light junction
D060	Air Bag Junction
D065	Electric guide junction
D070	Driver's seat joint
D071	Passenger seat joint
D073	Trailer Provision Junction
D079	Gearbox Sensor Junction
D081	Injector Junction
D085	Rear Junction / Tailgate
D089	Parking Sensor Junction
D097	Short Circuit Junction
D105	Rear potentiometer junction Headlight leveling corrector
D106	Rear Joint/Crossmember
D107	Dashboard-rear junction/Engine services
D110	Spiral Cable Junction and Steering Wheel Control Group
D168	Coaxial cable junction for Car Radio Antenna
D187	Front Junction Reverse Switch Bridle
D212	Bumper/Rear Junction
D213	Wheel Tank Junction
D215	Power socket/cigarette lighter junction
D217	Third Stop Junction
D217	Rear Wiring/Ceiling Lights Junction
D219	Preheating Glow Plug Junction
D259	Bridle junction dashboard
AND	
E050	Instrument Panel
F	
F010	Left projector
F011	Right projector
F015	left fog light
F016	right fog light
F020	Left side direction indicator light
F021	Right side direction indicator light
F030	Left rear light
F031	Right rear light
F032	Rear fog light
F033	Rear light Reverse
F040	Additional rear light (Third Stop)

F	
F050	Left license plate light
F051	Right license plate light
F052	License plate light cluster
F055	License plate light group and external trunk opening switch
F069	Left additional headlight
F070	Right additional headlight
G	
G010	Front ceiling light
G020	Rear Ceiling Light (Center)
G025	Left rear ceiling light
G026	Right rear ceiling light
G030	Drawer light
G031	Driver's side Sun Visor Light
G032	Passenger side Sun Visor Light
G039	Passenger Side Door Light
G040	Front Ceiling Light
G045	Air conditioner/Heater control light
G051	Front left door light (Anti-Puddle)
G052	Front right door light (Anti-Puddle)
G065	Driver's side front door handle light
G066	Front passenger door handle light
G067	Rear left door handle light
G068	Rear right door handle light
H	
H001	Ignition switch
H005	Devioguida
H007	Cruise Control Command
H015	Headlight adjustment control
H016	Radio controls on steering wheel
H020	Emergency light switch
H030	Adjustable Mirror Control
H035	Tunnel Switch Group
H042	Driver's side front window switch on dashboard
H043	Passenger side front window switch on dashboard
H044	Window lift control group on driver's side front door
H050	Power window switch on front passenger door
H053	Window switch on left rear door
H054	Window switch on right rear door

FIAT 500L**8. electrical system > maintenance operations**

H	
H060	Sunroof switch
H066	Driver's seat movement controls
H067	Controls Passenger seat movements
H075	Bag LP exclusion command
H080	Air conditioning controls
H081	Air conditioning electric fan control
H090	Control group Switches
H091	Left control panel (left control panel)
H115	Auxiliary control panel
H127	Drl always-on lights control device
H128	Fog light control
H129	Instrumentation lighting reset command
H136	Convergence Control Panel
THE	
I011	Trunk opening switch
I016	Switch on front left door
I017	Front right door switch.
I018	Switch on rear left door.
I019	Rear right door switch.
I020	Reverse light switch (gearbox bridle)
I026	Front Door Lock/Unlock Switch Side G
I030	Brake pedal switch
I030	Brake pedal switch
I031	Clutch pedal switch
I033	Switch on Outside Handle Trunk
I040	Handbrake switch
I045	Driver's side seat belt warning switch
I046	Driver's seat heating switch
I047	Passenger side seat belt switch
I050	Inertial Switch
I065	Driver's seat heating switch
I066	Passenger seat heating switch
I115	Stability Control System Switch
I143	Key Presence Recognition Switch in Ignition Block

J	
J010	Main Injection Contactor
J015	Teletuttore Fuel pump
J017	Diesel Preheating Contactor
J020	Air conditioning compressor insertion contactor
J033	Condenser cooling fan motor insertion contactor
J034	Contactor 1. Cabin air fan speed
J040	Fog light switch
J062	Seat Heating Contactor
J087	Robotized Gearbox Contactor
J147	Motorized Throttle Valve Contactor
K	
K001	Front potentiometer for headlight levelling
K002	Rear potentiometer for headlight levelling
K013	Longitudinal Acceleration Sensor
K015	Lambda Probe in Pre-catalytic
K017	Lambda Probe on Catalytic Converter
K018	Lambda Probe on Catalytic Converter -2
K019	Anti-crush sensor on left rear door
K020	Left brake pad wear sensor (switch)
K022	Anti-crush sensor on front door Lat
K023	Anti-crush sensor on front door Lat
K024	Anti-crush sensor on rear door De
K025	Brake Fluid Level Sensor (Switch)
K028	Engine Oil Pressure Sensor
K030	Engine Oil Pressure Sensor (Switch)
K031	Water sensor in diesel filter
K032	Engine Oil Level Sensor
K036	Engine Coolant Temperature Sensor/Transmitter
K039	Front Air-Bag Sensor
K040	Lambda Probe
K041	Air flow meter
K043	Integrated air temperature sensor

K	
K044	Air pressure / temperature sensor
K046	RPM sensor
K047	Phase sensor
K048	Absolute pressure sensor
K050	Heart rate sensor
K055	Accelerator pedal potentiometer
K056	Throttle Position Sensor
K058	Steering Sensor
K062	Volumetric Sensor Group for Alarm
K064	Exhaust Gas Presence Sensor
K065	Passenger presence sensor
K066	Side Air Bag Sensor, Driver Side
K067	Side Air Bag Sensor, Passenger Side
K067	Side Air Bag Sensor, Passenger Side
K070	Front Left Wheel Sensor for Abs
K071	Front Right Wheel Sensor for Abs
K074	Yaw Sensor (Vdc) (rear)
K075	Rear Left Wheel Sensor for Abs
K076	Rear wheel sensor right for Abs
K081	Fuel temperature sensor
K082	Supercharger Sensor
K083	Fuel pressure sensor
K084	Tacho sensor
K085	Rain sensor
K086	Anti-frost sensor
K087	Lower mixed air temperature sensor
K088	Upper mixed air temperature sensor
K089	Cabin air temperature sensor
K090	Solar sensor
K097	Parking sensor group
K098	Electromagnet Phase variator
K100	Temperature sensor and heating resistance Co
K101	Fuel temperature sensor and water presence in fuel filter
K110	Upper air distribution temperature sensor D
K111	Lower air distribution temperature sensor D
K112	Upper air distribution temperature sensor S
K113	Lower air distribution temperature sensor S

FIAT 500L**8. electrical system > maintenance operations**

K	
K120	Linear sensor for electric fans
K125	Rain and Twilight Sensor
K175	Driver's side front air bag sensor
K187	Differential pressure sensor Fap
K189	Particulate filter (DPF) temperature sensor upstream
K190	Downstream particulate filter (DPF) temperature sensor
K195	Outside air temperature sensor
K204	Pda Position Sensor
THE	
L010	Fuel vapour recovery solenoid valve
L020	Air conditioning compressor insertion electromagnet
L021	Air conditioning compressor insertion solenoid valve
L030	EGR Solenoid Valve
L031	PDA Solenoid Valve
L036	Variable geometry control solenoid valve Turbine
L037	Waste-Gate Solenoid Valve
L062	Throttle Body Solenoid Valve
L064	Flow Modifying Solenoid Valve
L102	Turbocharger By-Pass Solenoid Valve
M	
M001	Body Computer
M010	Engine control unit
M015	Glow plug preheating control unit
M047	Tire pressure control unit
M050	ABS control unit (rear)
M051	Braking System control unit
M054	Robotized gearbox control unit
M060	Adaptation Control Unit
M062	Trunk compartment control unit
M065	Infotainment control unit (Nit)
M066	Driver's side door control unit
M067	Passenger side door control unit
M070	Climate control unit
M072	Fan speed variator
M075	Additional heater control unit
M080	Door lock control unit
M084	Parking Sensor Control Unit
M086	Electric steering control unit

M	
M091	Yaw control unit
M092	Steering angle control unit (Nas)
M093	Steering wheel hub control unit
M094	Radio Receiver Node
M095	Sunroof control unit
M172	Multifunction screen node
M183	Cabin air fan protection diode
M184	Luggage compartment light protection diode
N	
N013	Electric fan motor Cooling Condenser
N015	Windshield wiper motor
N016	Rear window wiper motor
N020	Windscreen washer pump motor
N021	Rear window washer pump motor
N022	Electric pump motor windshield washer/rear window washer
N025	Headlight Washer Pump Motor
N030	Left headlight adjustment motor
N031	Right headlight trim adjustment motor
N035	Sunroof motor
N038	Driver's seat lumbar adjustment motor
N040	Electric fuel pump and level meter
N050	Driver's side front door lock gear motor
N051	Front passenger side door lock gearmotor
N055	Rear left door lock gear motor
N056	Rear right door lock gearmotor
N057	Trunk lock gearmotor
N058	Fuel door lock gear motor
N059	Tailgate lock gearmotor
N060	Driver's side front window motor
N061	Passenger side front window motor
N065	Rear left window lift motor
N066	Rear right window lift motor
N070	Electroinjector
N074	Minimum actuator

N	
N075	Integrated Throttle Body Actuator
N076	Phase Variator Actuator
N077	Fuel pressure regulator
N078	Left air mixing flap actuator
N079	Right air mixing flap actuator
N080	Air distribution door actuator
N081	Air mixing door actuator
N082	External air intake / recirculation door actuator
N083	Air distribution door actuator - Defroster
N085	Cabin air electric fan
N086	Electronic thermostat
N087	Fuel pressure regulator on Rail
N095	Electric drive motor
N112	Air distribution actuator Dx
N113	Air distribution actuator Sx
N126	Front left seat height adjustment motor
N127	Driver's seat sliding adjustment motor
N129	Front right seat height adjustment motor
N130	Passenger side seat slide adjustment motor
N132	Driver's seat backrest adjustment motor
N133	Passenger seat lumbar adjustment motor
N135	Passenger seat backrest adjustment motor
OR	
O030	Passenger air fan regulation resistance
O040	Left seat heater resistance
O041	Passenger Seat Heater Resistance
O050	Left windshield washer defroster resistor
O051	Right windshield washer defroster resistor

FIAT 500L**8. electrical system > maintenance operations**

P	
P005	Monotone horn
P011	Low Tone Horn
P012	Tyre pressure control unit antenna
P020	Car radio
P025	Antenna power supply/amplifier
P030	Left rear speaker
P031	Right rear speaker
P035	Speaker on front door driver side
P036	Speaker on front right door
P040	Speaker on left rear door
P041	Speaker on right rear door
P044	Parking Sensor Buzzer
P045	Driver's side front tweeter speaker
P046	Front passenger side tweeter speaker
P047	Rear Left Tweeter Speaker
P048	Rear Right Tweeter Speaker
P049	Rear Center Speaker Woofer
P050	Cigarette lighter / power socket
P051	Additional power socket
P052	Rear power socket
P055	Heated Rear Window
P060	Driver's side exterior rearview mirror
P061	Passenger side exterior rearview mirror
P065	Electronic Interior Rearview Mirror
P070	Hifi Radio Amplifier
P075	CD Player/Changer
P082	Subwoofer
P093	Antenna, alarm device and door lock receiver
P110	GPS/GSM Antenna
Q	
Q009	Driver's side air bag
Q011	Air Bag on dashboard (passenger side)
Q014	Driver's side knee airbag
Q020	Driver's side front seat belt pretensioner

Q	
Q021	Front passenger side seat belt pretensioner
Q022	Rear left seat belt pretensioner
Q023	Rear right seat belt pretensioner
Q030	Driver's side air bag
Q031	Passenger side side airbag
Q040	Driver's side window bag
Q041	Passenger Side Window Bag

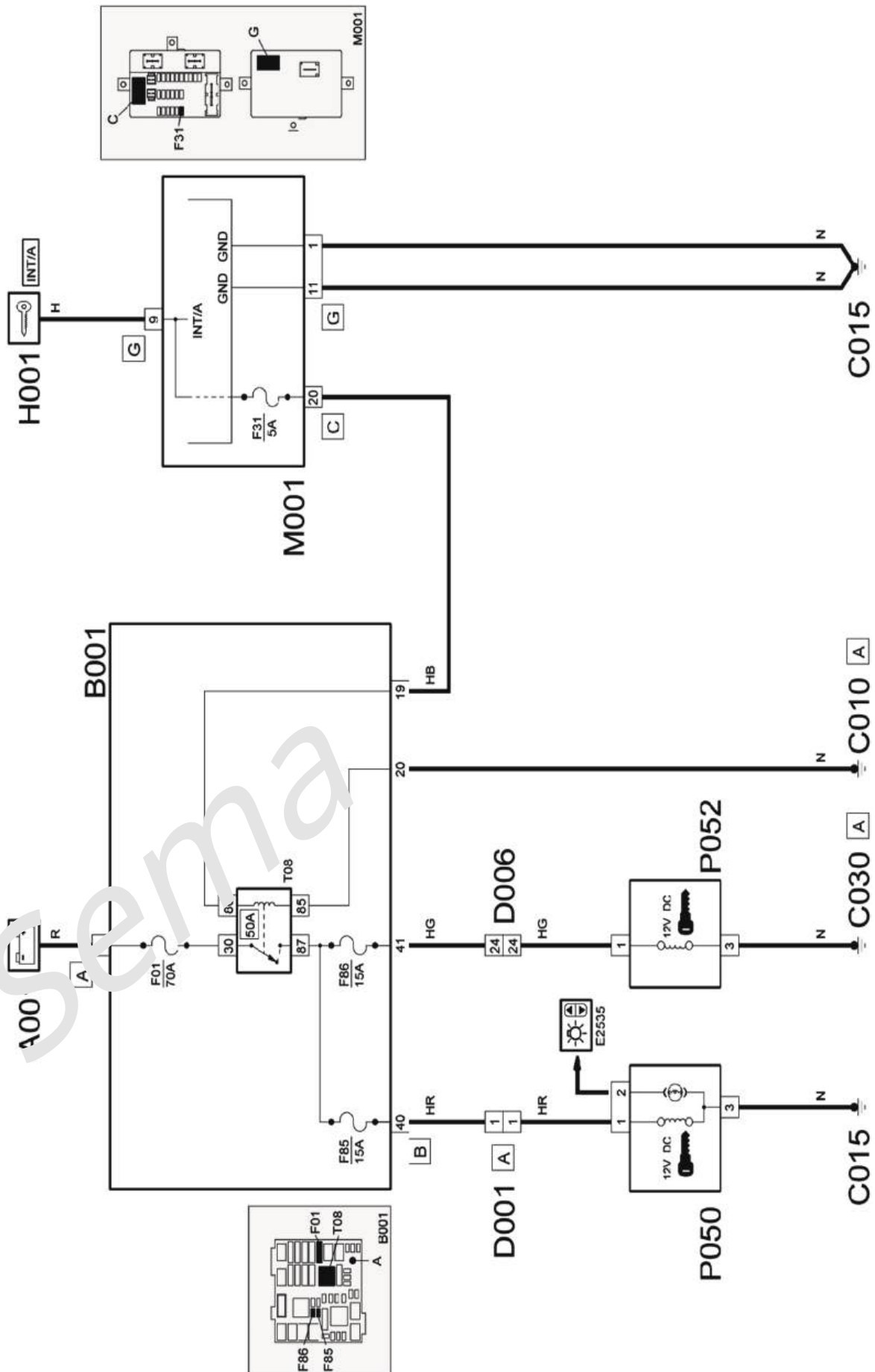
COLOR CODES

TO	Sky blue	M	Brown
B	White	N	Black
C	Orange	R	Red
H	Grey	V	Green
THE	Blue	Z	Viola



FIAT 500L

8. electrical system > wiring diagrams

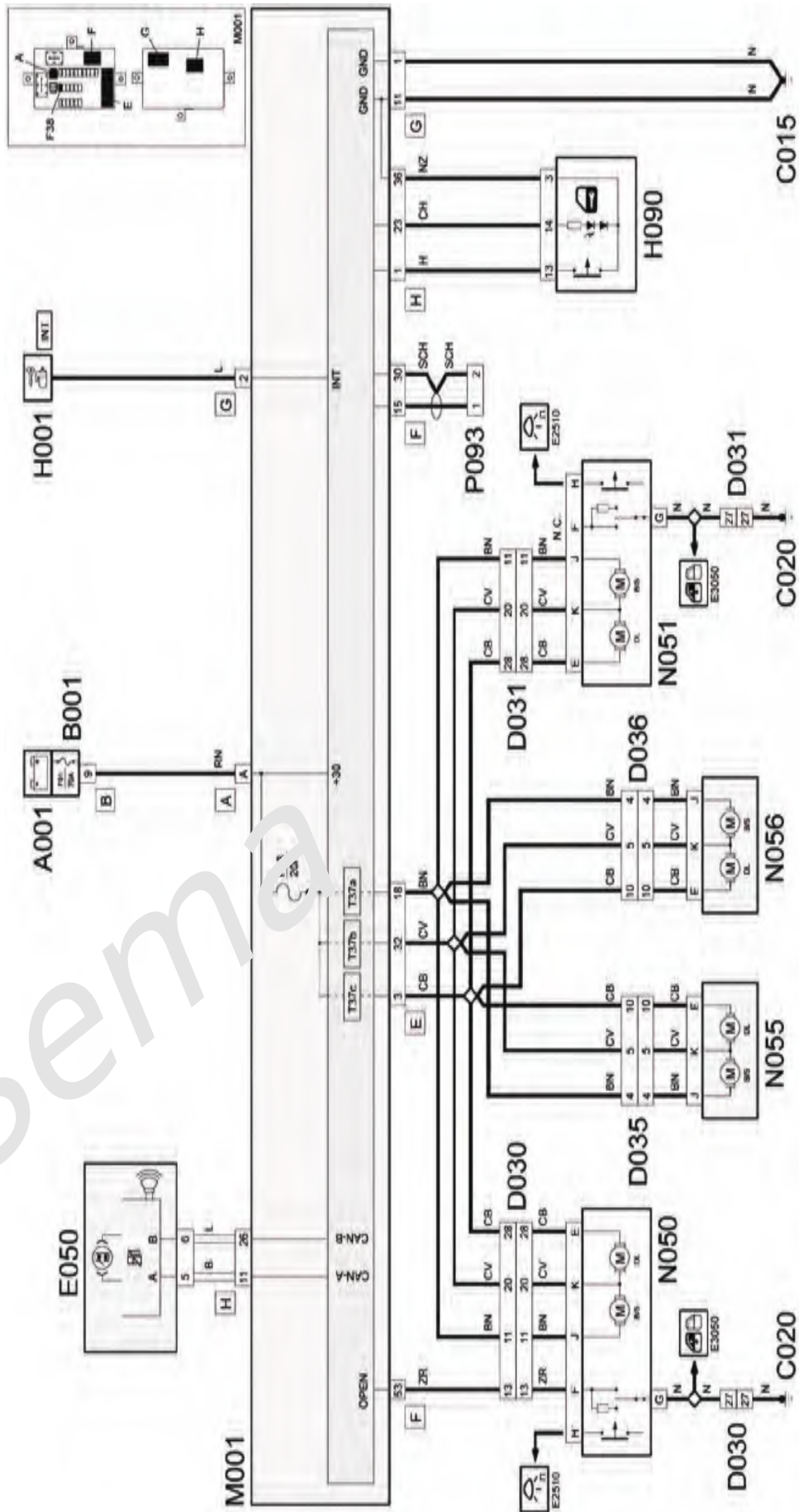


The diagram illustrates a complex electrical system with the following components and connections:

- Power Sources:** A battery (A001) and an alternator (K059) are connected to a main power line (A005).
- Relays and Switches:**
 - B099:** A multi-terminal relay at the top left, connected to the main power line and various components like F71, F72, F73, and E6015.
 - B001:** A relay in the center, connected to F01, F02, F03, F04, F05, F06, F07, F08, F09, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19, F20, F21, F22, F23, F24, F25, F26, F27, F28, F29, F30, F31, F32, F33, F34, F35, F36, F37, F38, F39, F40, F41, F42, F43, F44, F45, F46, F47, F48, F49, F50, F51, F52, F53, F54, F55, F56, F57, F58, F59, F60, F61, F62, F63, F64, F65, F66, F67, F68, F69, F70, F71, F72, F73, F74, F75, F76, F77, F78, F79, F80, F81, F82, F83, F84, F85, F86, F87, F88, F89, F90, F91, F92, F93, F94, F95, F96, F97, F98, F99, F100, F101, F102, F103, F104, F105, F106, F107, F108, F109, F110, F111, F112, F113, F114, F115, F116, F117, F118, F119, F120, F121, F122, F123, F124, F125, F126, F127, F128, F129, F130, F131, F132, F133, F134, F135, F136, F137, F138, F139, F140, F141, F142, F143, F144, F145, F146, F147, F148, F149, F150, F151, F152, F153, F154, F155, F156, F157, F158, F159, F160, F161, F162, F163, F164, F165, F166, F167, F168, F169, F170, F171, F172, F173, F174, F175, F176, F177, F178, F179, F180, F181, F182, F183, F184, F185, F186, F187, F188, F189, F190, F191, F192, F193, F194, F195, F196, F197, F198, F199, F200, F201, F202, F203, F204, F205, F206, F207, F208, F209, F210, F211, F212, F213, F214, F215, F216, F217, F218, F219, F220, F221, F222, F223, F224, F225, F226, F227, F228, F229, F230, F231, F232, F233, F234, F235, F236, F237, F238, F239, F240, F241, F242, F243, F244, F245, F246, F247, F248, F249, F250, F251, F252, F253, F254, F255, F256, F257, F258, F259, F260, F261, F262, F263, F264, F265, F266, F267, F268, F269, F270, F271, F272, F273, F274, F275, F276, F277, F278, F279, F280, F281, F282, F283, F284, F285, F286, F287, F288, F289, F290, F291, F292, F293, F294, F295, F296, F297, F298, F299, F300, F301, F302, F303, F304, F305, F306, F307, F308, F309, F310, F311, F312, F313, F314, F315, F316, F317, F318, F319, F320, F321, F322, F323, F324, F325, F326, F327, F328, F329, F330, F331, F332, F333, F334, F335, F336, F337, F338, F339, F340, F341, F342, F343, F344, F345, F346, F347, F348, F349, F350, F351, F352, F353, F354, F355, F356, F357, F358, F359, F360, F361, F362, F363, F364, F365, F366, F367, F368, F369, F370, F371, F372, F373, F374, F375, F376, F377, F378, F379, F380, F381, F382, F383, F384, F385, F386, F387, F388, F389, F390, F391, F392, F393, F394, F395, F396, F397, F398, F399, F400, F401, F402, F403, F404, F405, F406, F407, F408, F409, F410, F411, F412, F413, F414, F415, F416, F417, F418, F419, F420, F421, F422, F423, F424, F425, F426, F427, F428, F429, F430, F431, F432, F433, F434, F435, F436, F437, F438, F439, F440, F441, F442, F443, F444, F445, F446, F447, F448, F449, F450, F451, F452, F453, F454, F455, F456, F457, F458, F459, F460, F461, F462, F463, F464, F465, F466, F467, F468, F469, F470, F471, F472, F473, F474, F475, F476, F477, F478, F479, F480, F481, F482, F483, F484, F485, F486, F487, F488, F489, F490, F491, F492, F493, F494, F495, F496, F497, F498, F499, F500, F501, F502, F503, F504, F505, F506, F507, F508, F509, F510, F511, F512, F513, F514, F515, F516, F517, F518, F519, F520, F521, F522, F523, F524, F525, F526, F527, F528, F529, F530, F531, F532, F533, F534, F535, F536, F537, F538, F539, F540, F541, F542, F543, F544, F545, F546, F547, F548, F549, F550, F551, F552, F553, F554, F555, F556, F557, F558, F559, F560, F561, F562, F563, F564, F565, F566, F567, F568, F569, F570, F571, F572, F573, F574, F575, F576, F577, F578, F579, F580, F581, F582, F583, F584, F585, F586, F587, F588, F589, F590, F591, F592, F593, F594, F595, F596, F597, F598, F599, F600, F601, F602, F603, F604, F605, F606, F607, F608, F609, F610, F611, F612, F613, F614, F615, F616, F617, F618, F619, F620, F621, F622, F623, F624, F625, F626, F627, F628, F629, F630, F631, F632, F633, F634, F635, F636, F637, F638, F639, F640, F641, F642, F643, F644, F645, F646, F647, F648, F649, F650, F651, F652, F653, F654, F655, F656, F657, F658, F659, F660, F661, F662, F663, F664, F665, F666, F667, F668, F669, F670, F671, F672, F673, F674, F675, F676, F677, F678, F679, F680, F681, F682, F683, F684, F685, F686, F687, F688, F689, F690, F691, F692, F693, F694, F695, F696, F697, F698, F699, F700, F701, F702, F703, F704, F705, F706, F707, F708, F709, F710, F711, F712, F713, F714, F715, F716, F717, F718, F719, F720, F721, F722, F723, F724, F725, F726, F727, F728, F729, F730, F731, F732, F733, F734, F735, F736, F737, F738, F739, F740, F741, F742, F743, F744, F745, F746, F747, F748, F749, F750, F751, F752, F753, F754, F755, F756, F757, F758, F759, F760, F761, F762, F763, F764, F765, F766, F767, F768, F769, F770, F771, F772, F773, F774, F775, F776, F777, F778, F779, F780, F781, F782, F783, F784, F785, F786, F787, F788, F789, F790, F791, F792, F

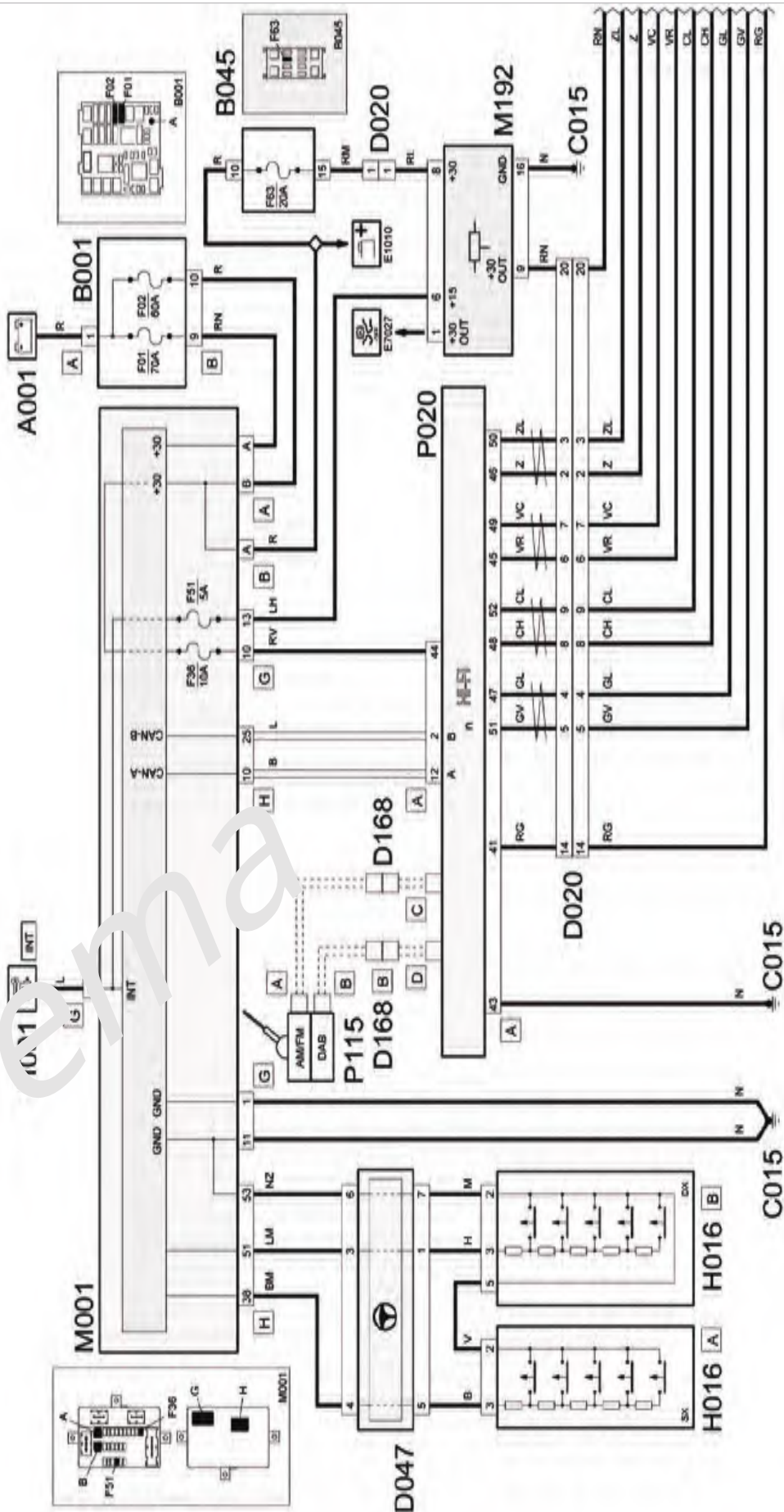
FIAT 500L

8. electrical system > wiring diagrams



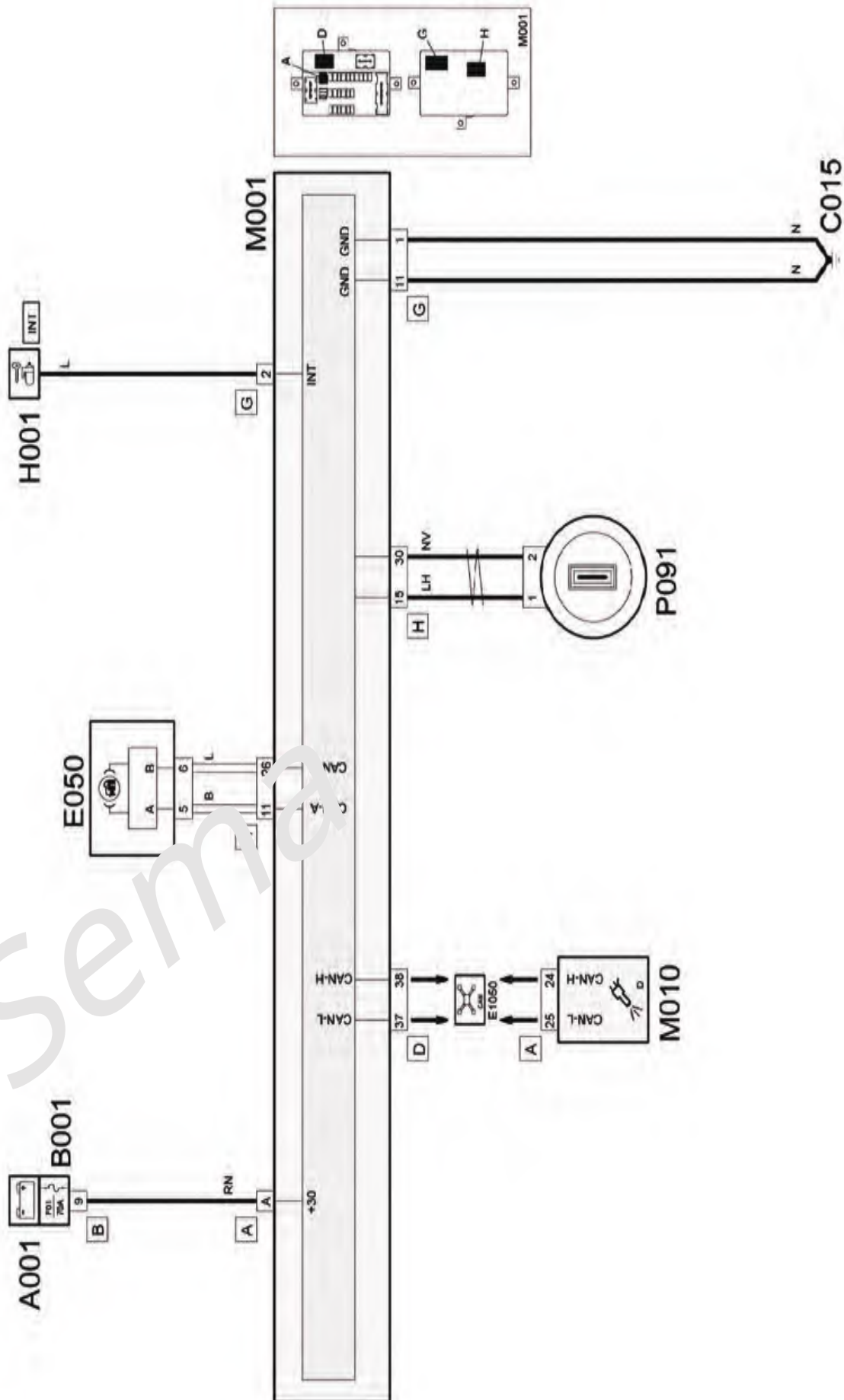
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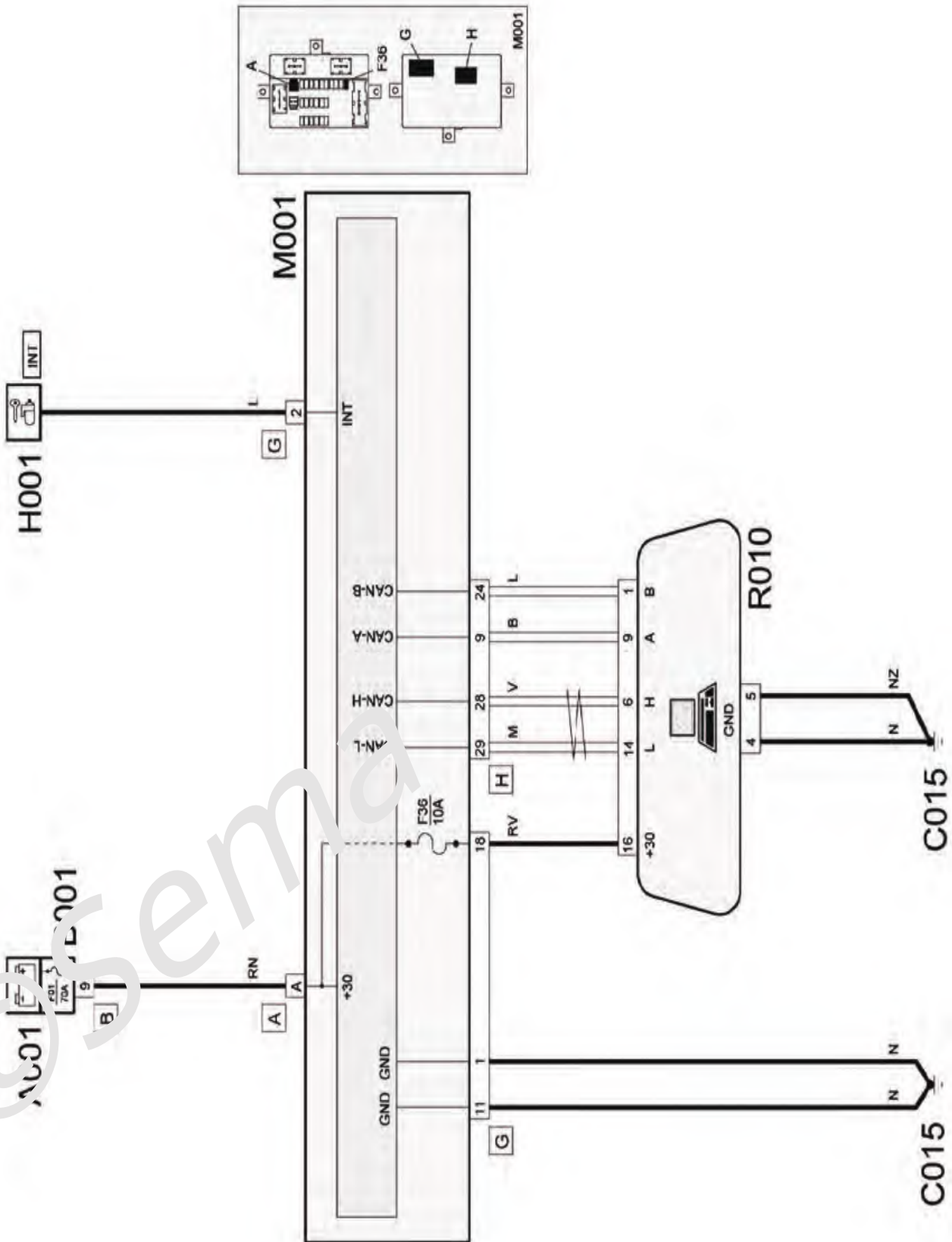
8. electrical system > wiring diagrams



P070

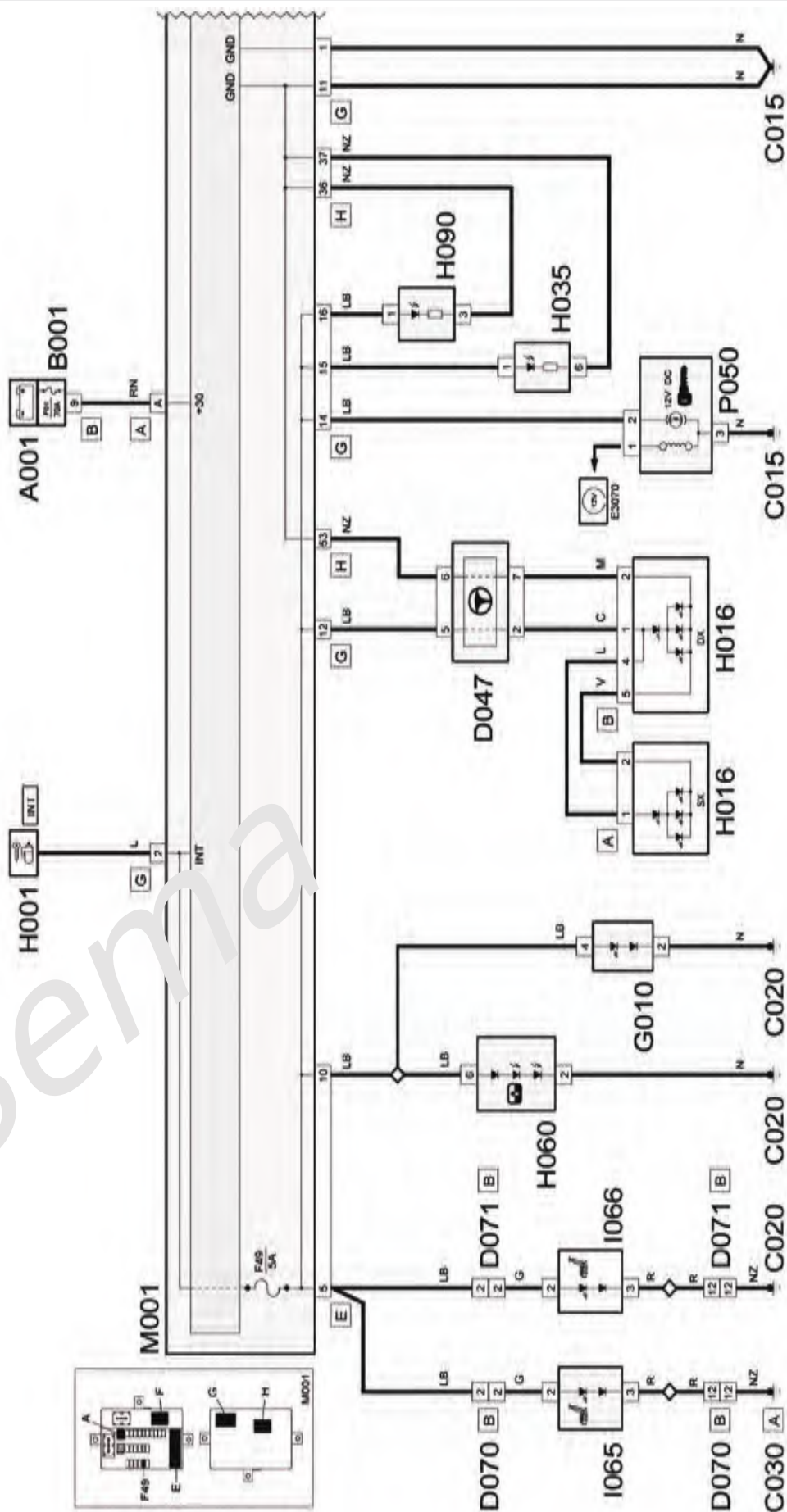


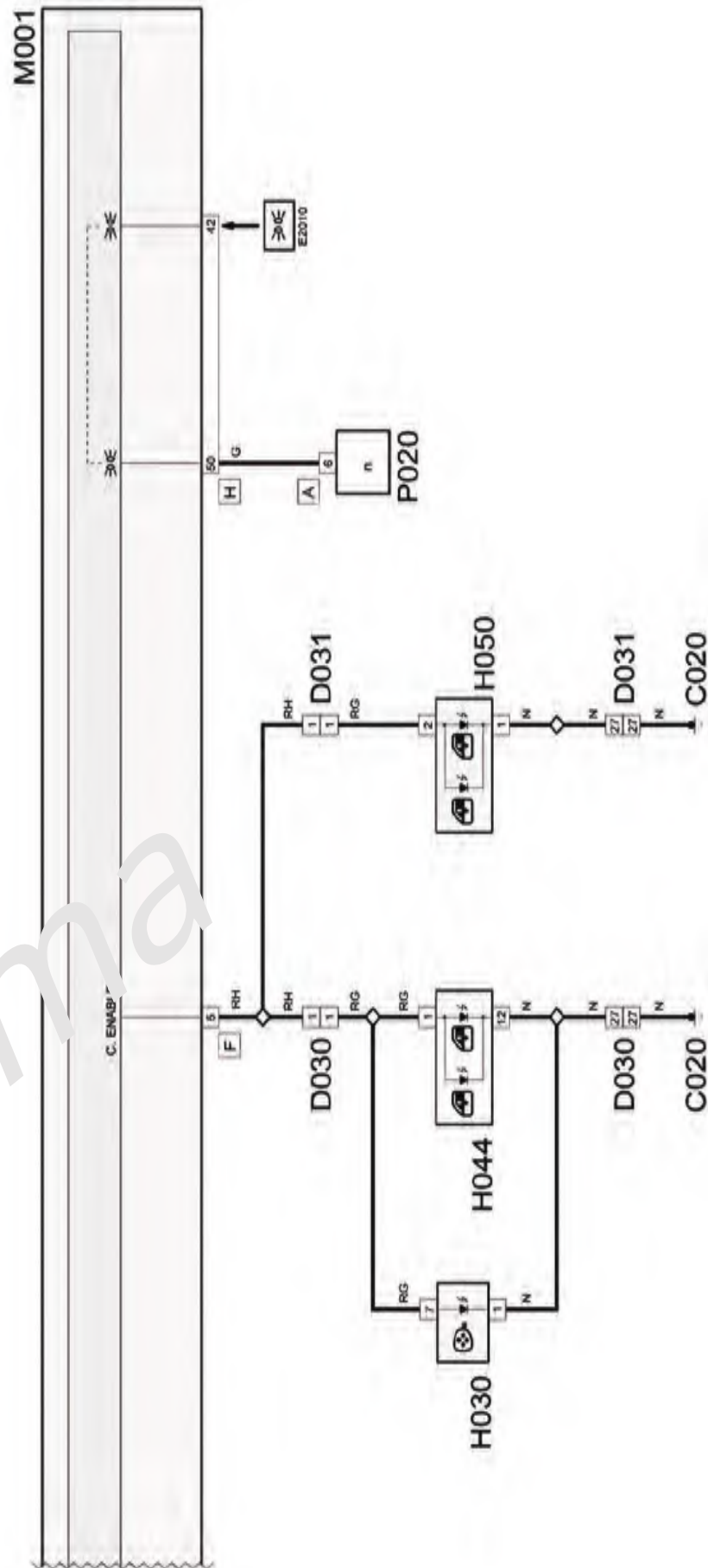
FIAT 500L**8. electrical system > wiring diagrams**

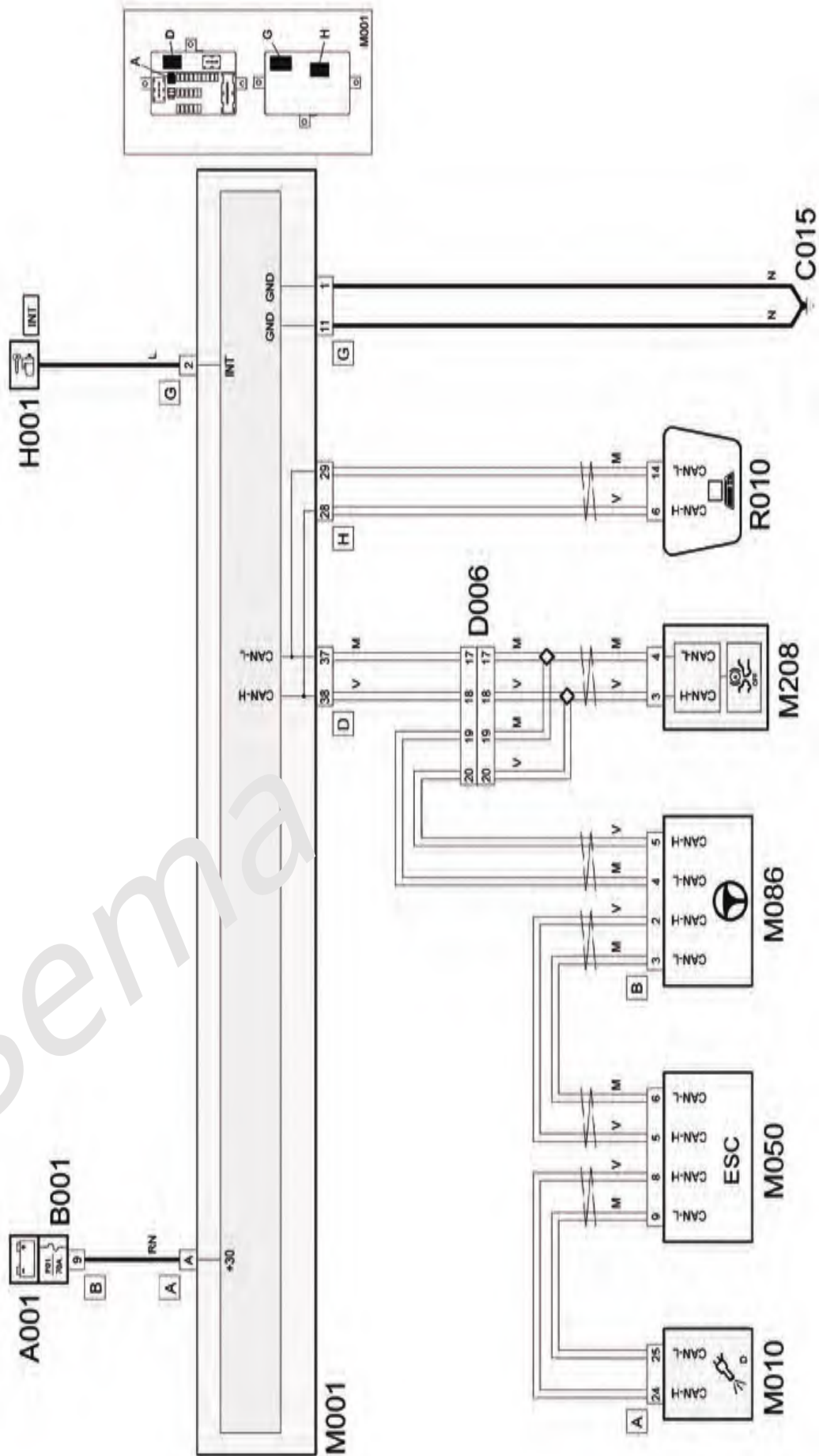
FIAT 500L**8. electrical system > wiring diagrams**

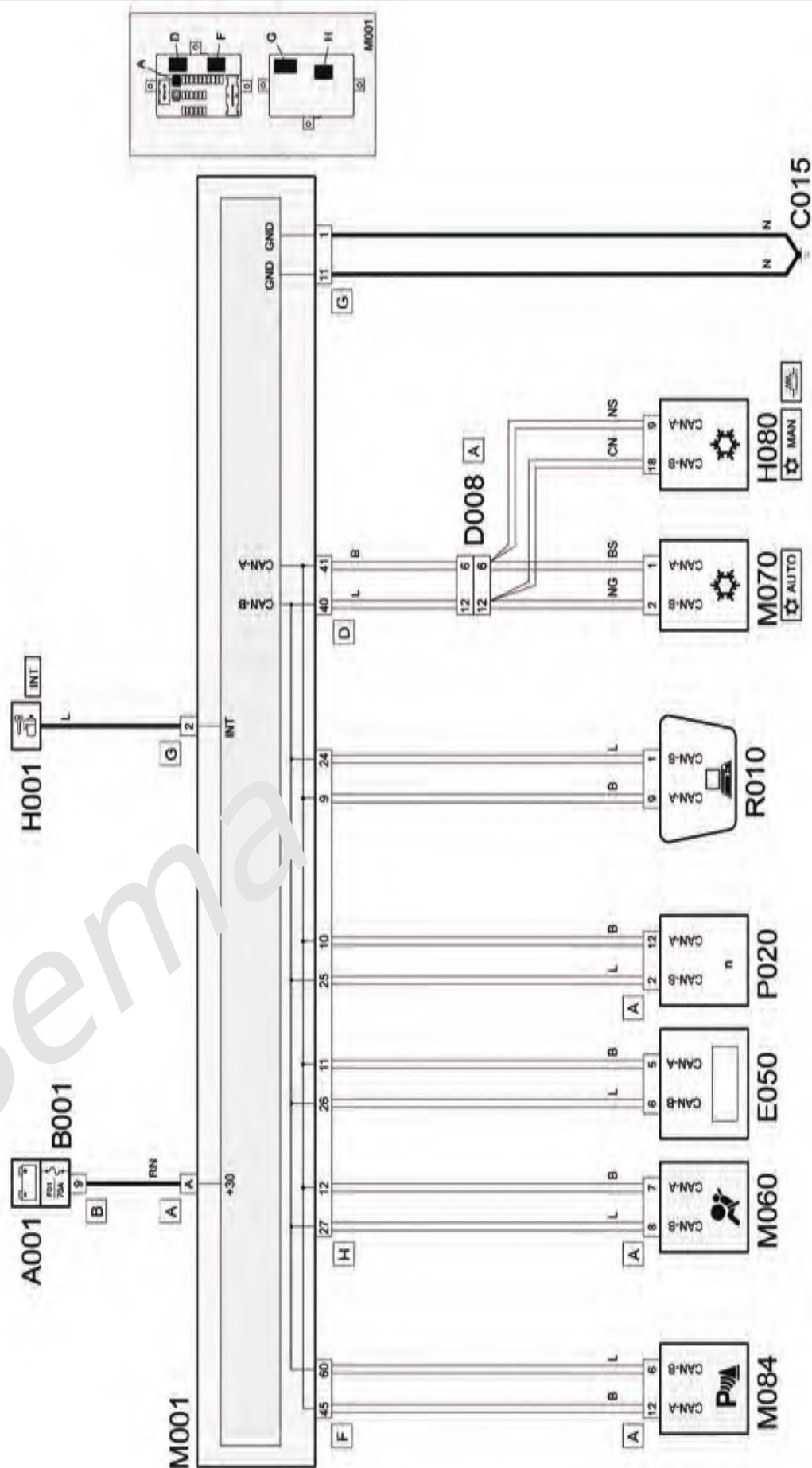
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8. electrical system > wiring diagrams



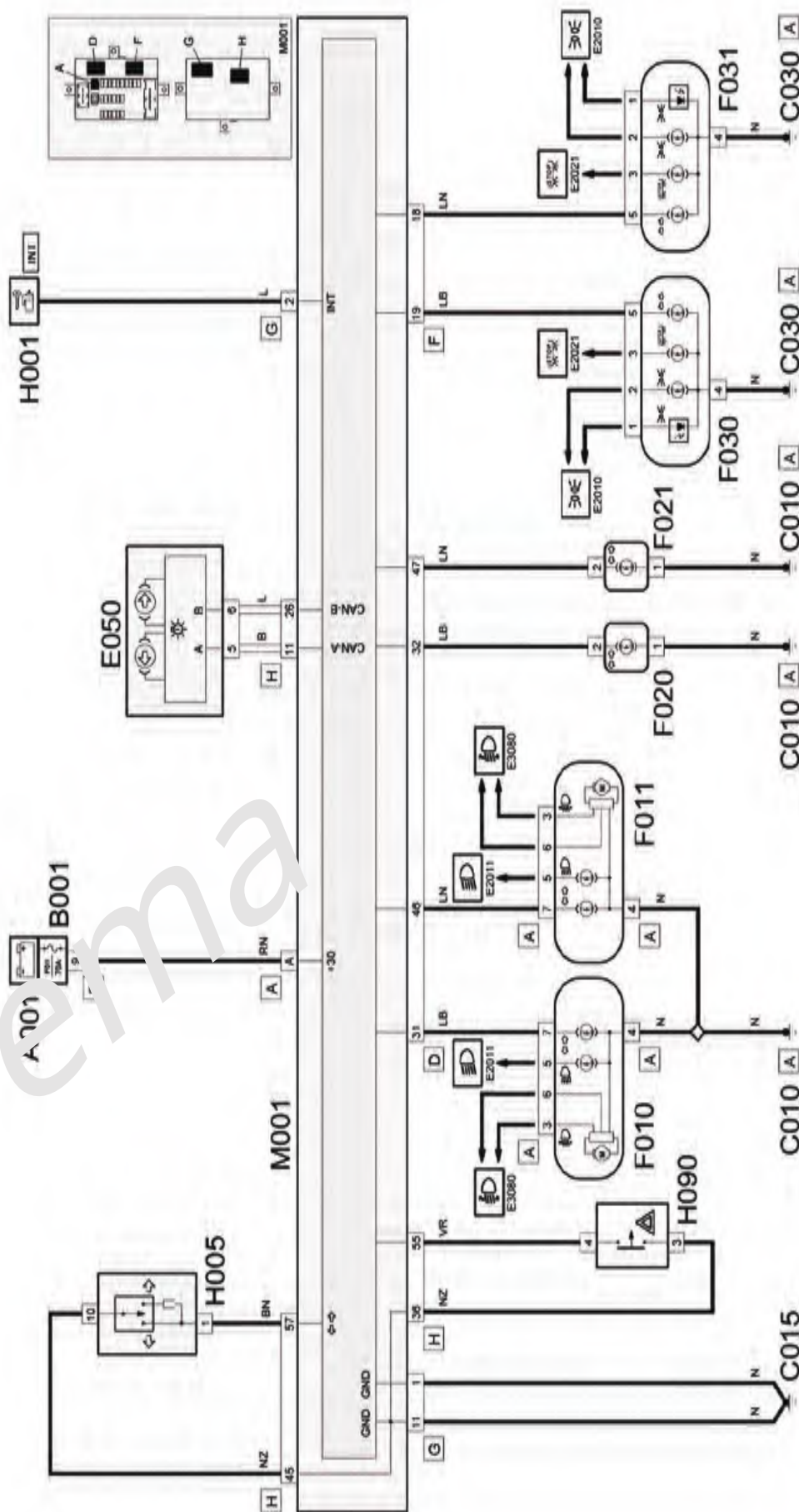
FIAT 500L**8. electrical system > wiring diagrams**

FIAT 500L**8. electrical system > wiring diagrams**

FIAT 500L**8. electrical system > wiring diagrams**

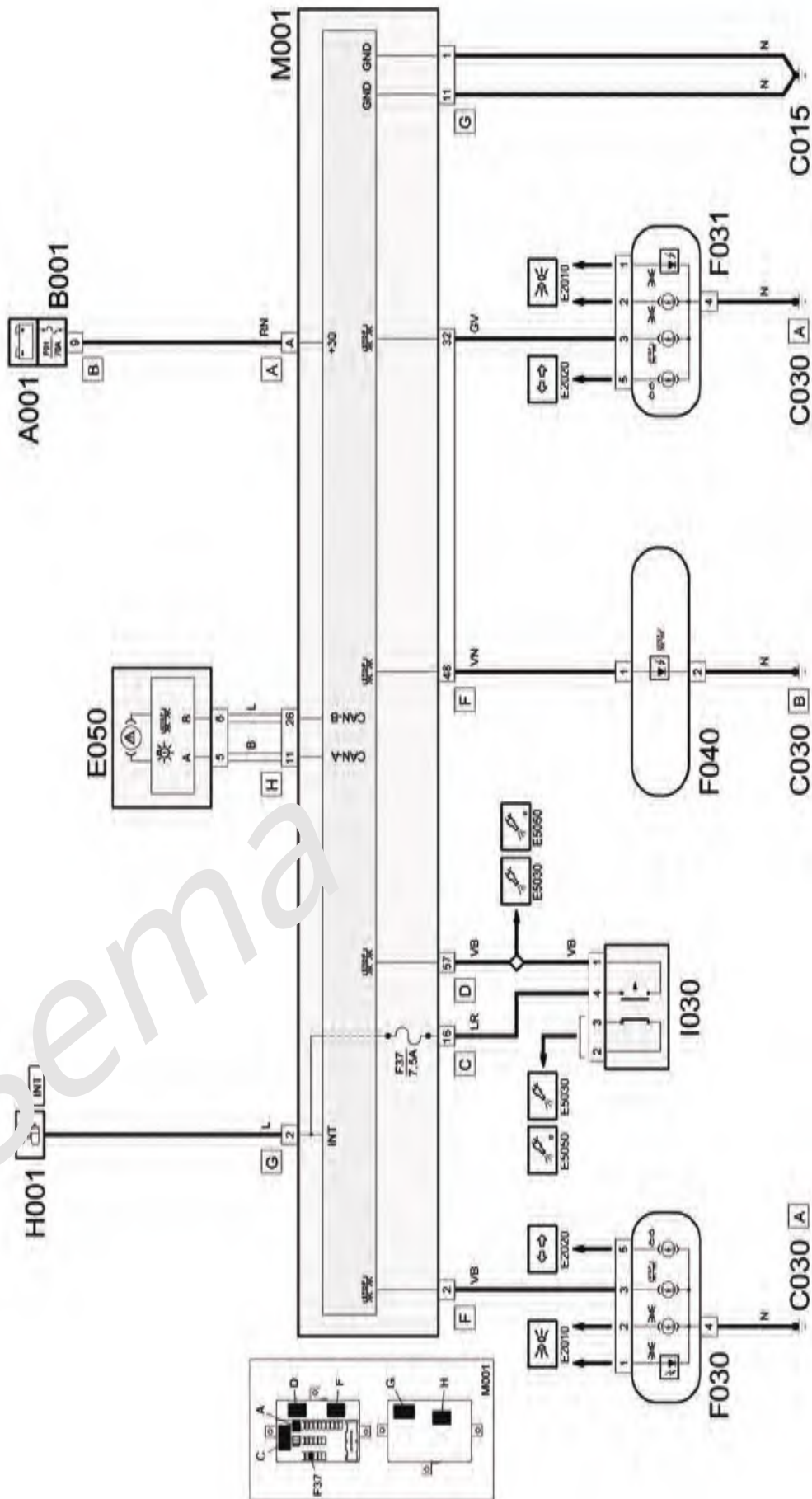
FIAT 500L

8. electrical system > wiring diagrams



FIAT 500L

8. electrical system > wiring diagrams



9. air conditioning

Technical data

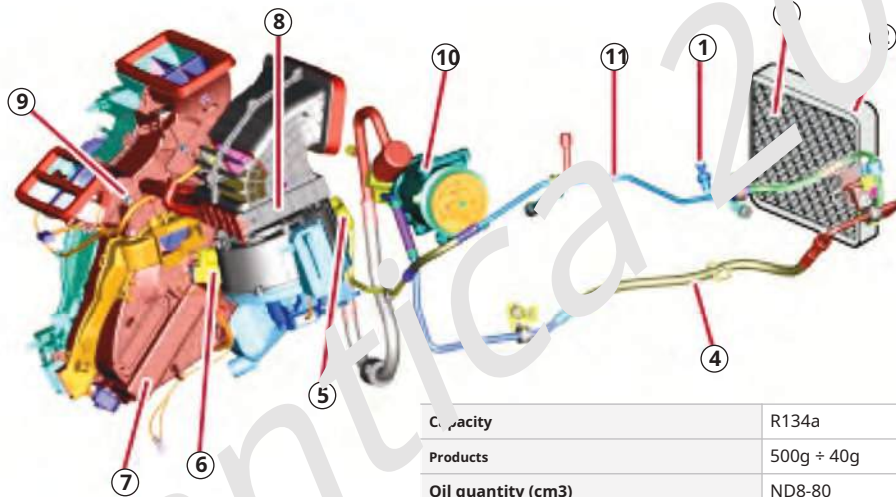
GENERAL INFORMATION

The air conditioning system fitted to the car is a system that allows the environmental characteristics of the air introduced into the passenger compartment (temperature and humidity) to be varied.

It also allows the defogging of glass surfaces and prevents pollutants from entering the passenger compartment, thus making the environment in the car healthy. The air conditioning system is ultimately a comfort factor that contributes to improving the conditions of physiological well-being of people.

Overall air conditioning system

- 1.Linear pressure switch
- 2.Capacitor
- 3.Filter drier integrated into the condenser
- 4.Low pressure piping
- 5.Expansion valve
- 6.Evaporator
- 7.Supplementary heater
- 8.Pollen filter
- 9.Conveyor/distributor group
- 10.Compressor
- 11.High pressure gas pipe

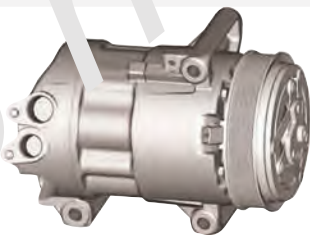


Capacity	R134a
Products	500g ÷ 40g
Oil quantity (cm3)	ND8-80

COMPRESSOR

The compressor is driven directly by the crankshaft via the service belt, and is the same for both the manual and automatic versions.

AC compressor

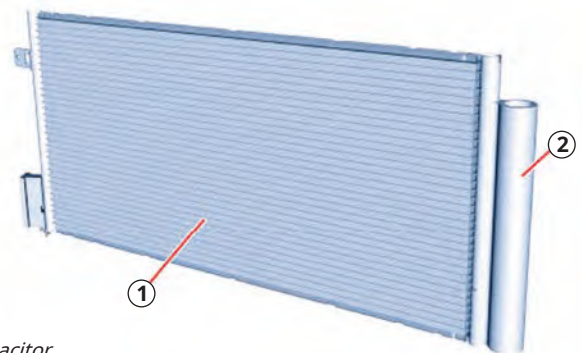


Type	Delphi 5CVC
Maximum displacement	120cc/rev
Minimum displacement	6 cc/rev
Number of cylinders	5
Maximum continuous revolutions	8,000
Maximum number of non-continuous revolutions (max 10 h)	8,500
Maximum number of non-continuous revolutions (max 10 min)	9,200
Number of revolutions min	600

CAPACITOR

The condenser is a heat exchanger located in front of the engine cooling radiator. Its task is to condense, that is, transform the refrigerant from a gaseous state to a liquid state.

Capacitor



- 1.Capacitor
- 2.Integrated filter dryer

FIAT 500L

9. air conditioning > technical data

POLLEN FILTER

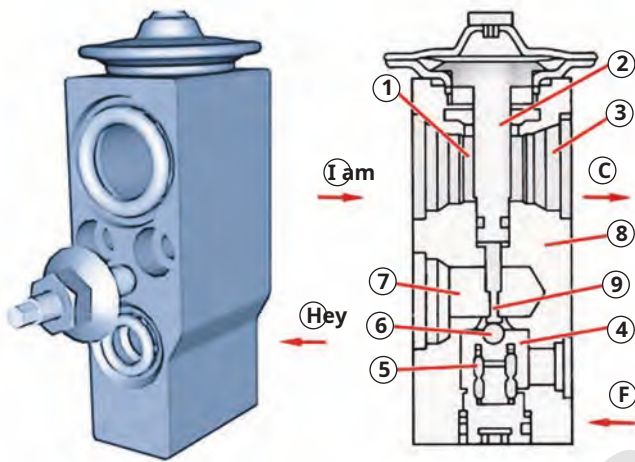
The pollen filter has the function of filtering dust from the outside air entering the passenger compartment.

The filter is present on both the manual and automatic versions of the air conditioner.

EXPANSION VALVE

The thermostatic expansion valve, mounted on the evaporator inlet/outlet pipes, has the task of regulating the flow and expansion (pressure drop) of the R134a refrigerant before entering the evaporator.

Expansion valve



1. Passage duct
outgoing fluid

2. Thermosensitive element
3. To the compressor suction
connection

4. Fluid under pressure
5. Contrast spring
6. Sphere and calibrated hole
7. Expanded fluid
(at the evaporator inlet
connection)

8. Valve body
9. Auct...
C... the compressor
F. To the evaporator fl...
Hey... evaporator inlet Eu.
Evaporator outlet

CLIMATE CONTROL MANAGEMENT

MANUAL AIR CONDITIONING

The manual air conditioner allows the user to manage the temperature and air intake in the passenger compartment by using the knobs and control buttons.

You can manually change the following parameters/functions:

- Temperature
- 5-position distribution setup
- Fan speed
- Compressor insertion
- Recirculation

The transmission of the air mixing and air distribution commands from the relevant knobs to the air conditioning box occurs by means of Bowden cables.

Recirculation is implemented by means of an electric motor. The compressor can only be activated if a fan speed is inserted.

AUTOMATIC CLIMATE CONTROL

The automatic climate control is managed by a control unit which, thanks to an extremely refined operating logic, is able to control the temperature inside the two areas of the passenger compartment by heating or cooling the air to achieve the desired comfort. The climate control system automatically regulates the following parameters/functions:

- Air temperature at the driver/passenger air vents
- Fan speed
- Driver/passenger side air distribution
- Compressor insertion
- Recirculation

SENSORS

Temperature sensors

There are four temperature sensors on the conveyor/distributor group that provide the climate control unit with a signal relating to the temperature of the air coming out of the vents, both on the right and left side. Two sensors are positioned in correspondence with the FLOOR vents, the other two inside the central dashboard vents. The system also includes the passenger compartment air sensor (housed in the climate control unit group) and the external temperature sensor (positioned in the lower area of the right external rear-view mirror).

Solar sensor

Sensor located on the upper part of the dashboard at the base of the windshield. Its task is to transform light signals (lux or kcal/m²h) into a proportional linear electrical signal. The sensor is a particular type of diode (photodiode) that has the ability to vary its conduction depending on the amount of light that hits it; in practice, the incident light that hits the small lens of the photodiode frees electrons from the crystal lattice. As a result, excess free electrons and holes appear.



FIAT 500L**9. air conditioning > technical data****ELECTRICAL DIAGRAMS LEGEND**

TO	
A001	Drums
B	
B001	Derivation Control Unit
C	
C010	Front Left Mass
C015	Mass Dashboard Driver Side
C016	Mass Air Conditioning Group
C020	Mass Dashboard Passenger Side
D	
D006	Front/Rear Junction
D008	Front Junction/Air Conditioner - Heater
D031	Front Door Junction Passenger Side
AND	
E050	Instrument Panel
H	
H001	Ignition Switch
K	
K110	Upper Air Distribution Temperature Sensor D
K111	Lower Air Distribution Temperature Sensor D
K112	Upper Air Distribution Temperature Sensor S
K113	Lower Air Distribution Temperature Sensor S
M	
M001	Body Computer
M070	Climate Control Unit
M072	Fan Speed Variator
N	
N078	Left Air Mixing Door Actuator
N079	Right Air Mixing Door Actuator
N080	Air Distribution Door Actuator

N	
N080	Air Distribution Door Actuator
N082	External Air Intake / Recirculation Door Actuator
N085	Cabin Air Electric Fan
P	
P061	Passenger Side Outside Rearview Mirror
P065	Electrochromic Interior Rearview Mirror

COLOR CODES

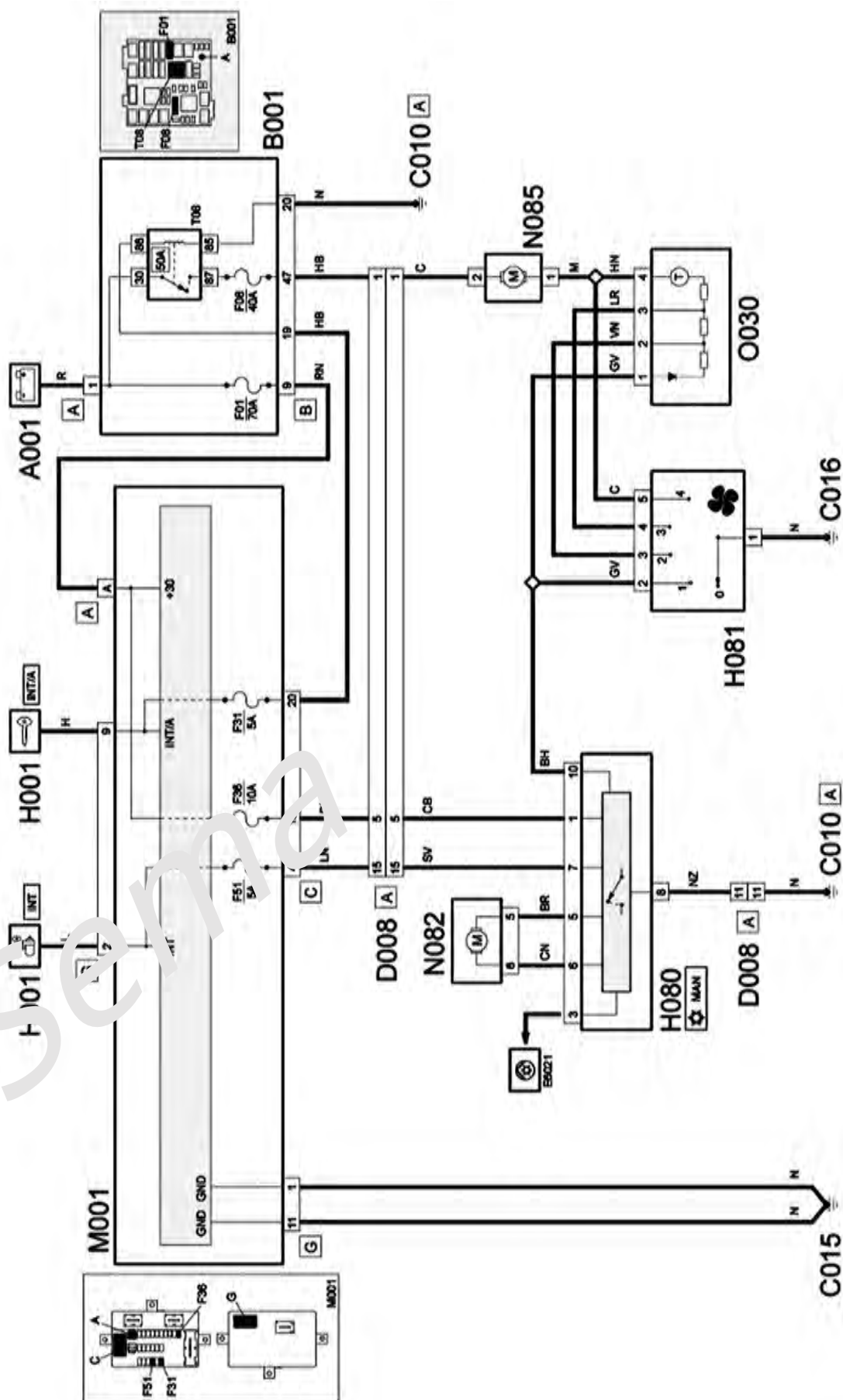
TO	Sky blue	M	Brown
B	White	N	Black
C	Orange	R	Red
H	Grey	V	Green
THE	Blue	Z	Viola

TIGHTENING TORQUES

Component	Fixing	OR	Value (Nm)
Compressor support	Screw	M10x1.25	45 ÷ 55
Evaporator inlet/outlet connection	Nut	M6	7 ÷ 11
Linear pressure switch	-	-	8
Pipe connection on capacitor	Screw	M8	18 ÷ 22
Compressor	Screw	M8x1.25x77	23 ÷ 27
Pipe connection on compressor	Screw	M8	18 ÷ 22

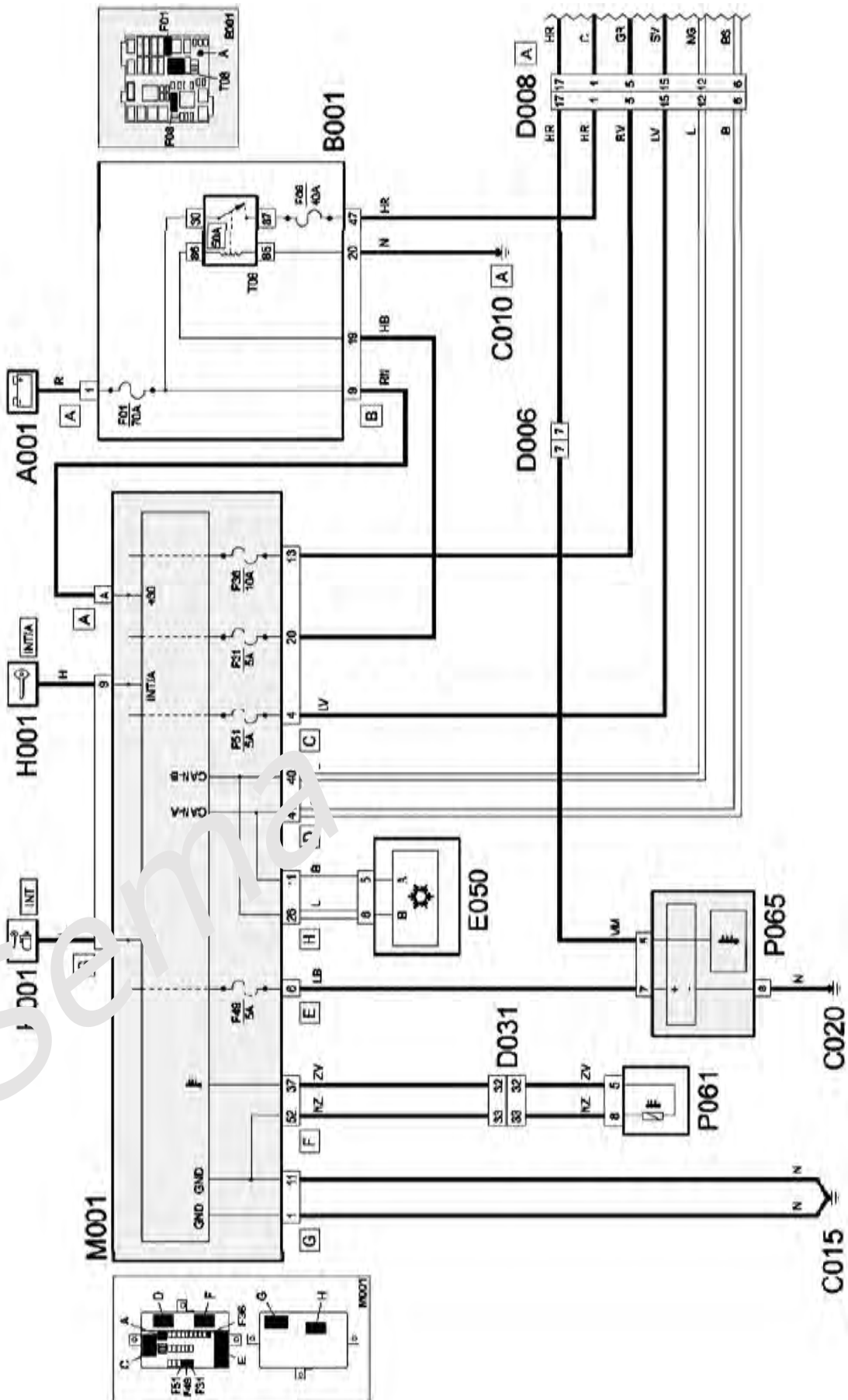
FIAT 500L

9. air conditioning > wiring diagrams



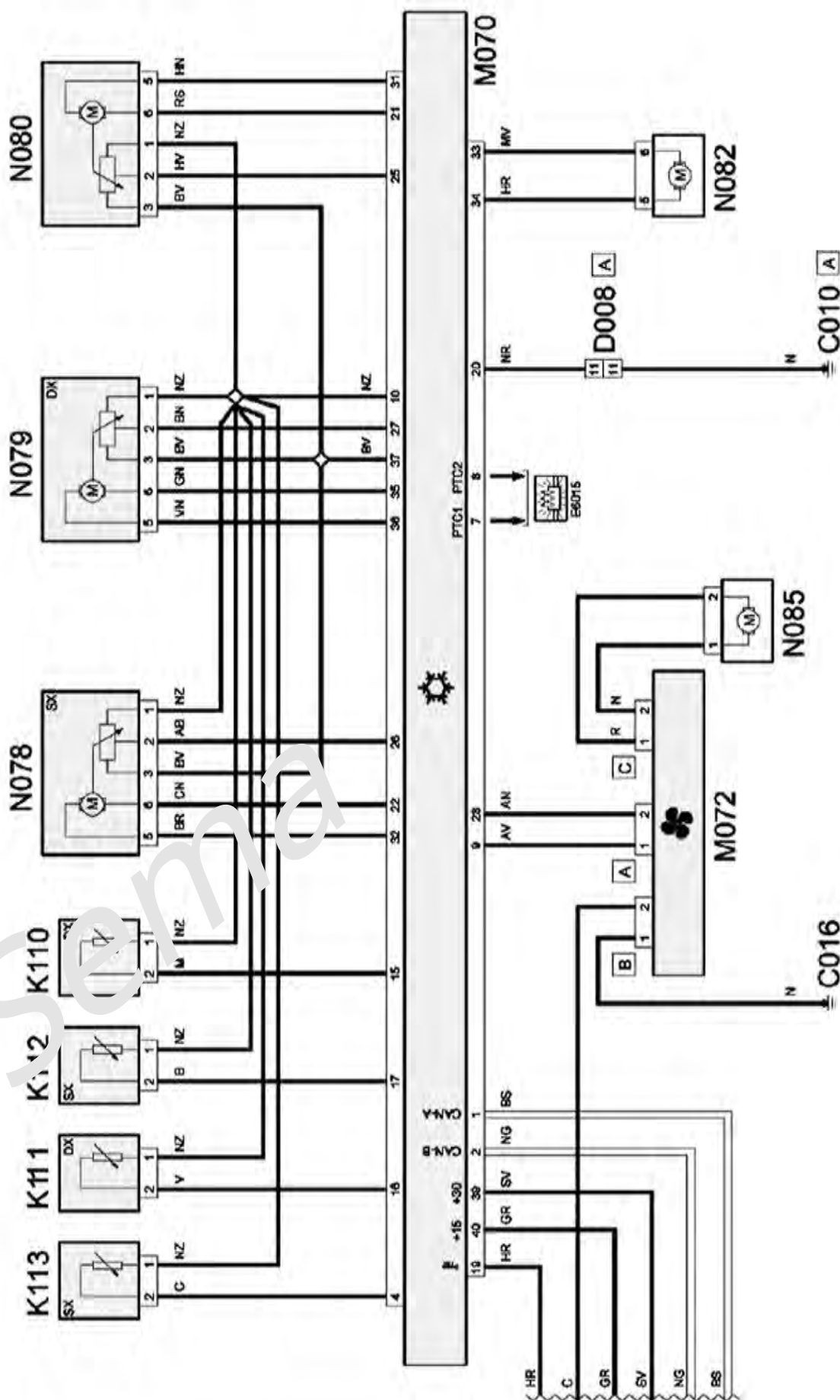
FIAT 500L

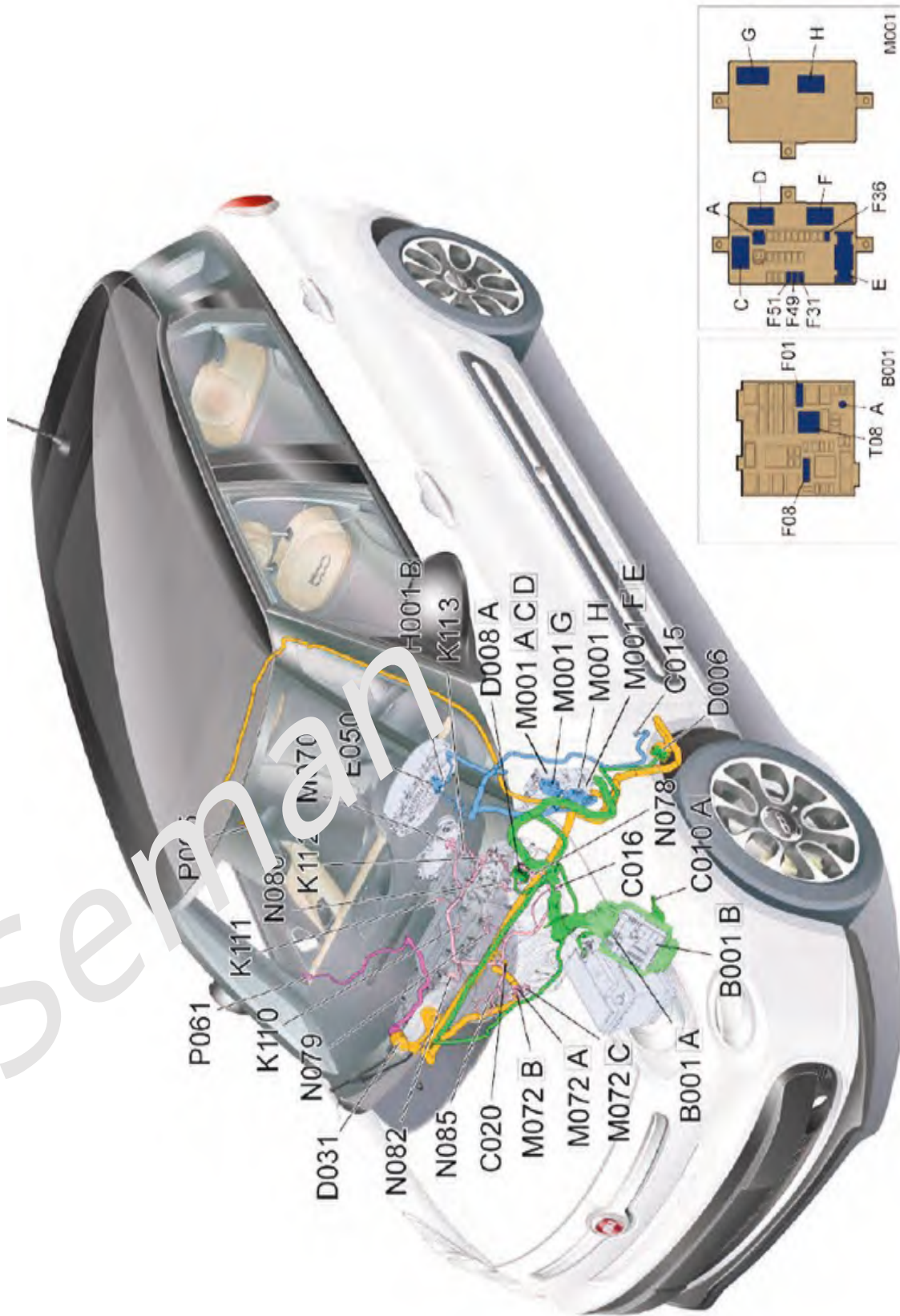
9. air conditioning > wiring diagrams



FIAT 500L

9. air conditioning > wiring diagrams



FIAT 500L**9. air conditioning > wiring diagrams**

FIAT 500L

9. air conditioning > maintenance operations

maintenance operations

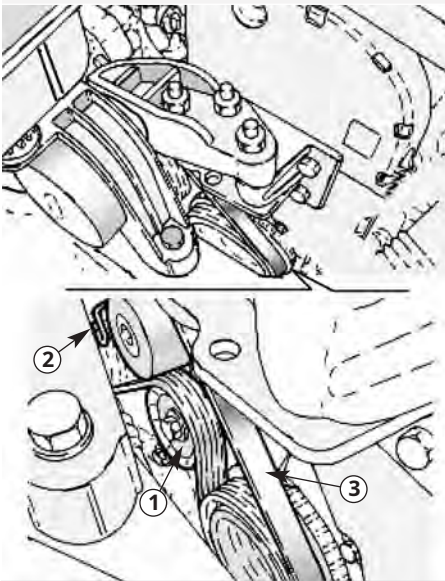
CRYOGENIC CIRCUIT

COMPRESSOR

Dismantling

- Place the car on the lifting bridge.
- Drain the coolant
- Act on the belt tensioner (1), insert the locking pin (2) and remove the single engine control belt (3).

Poly-V belt removal



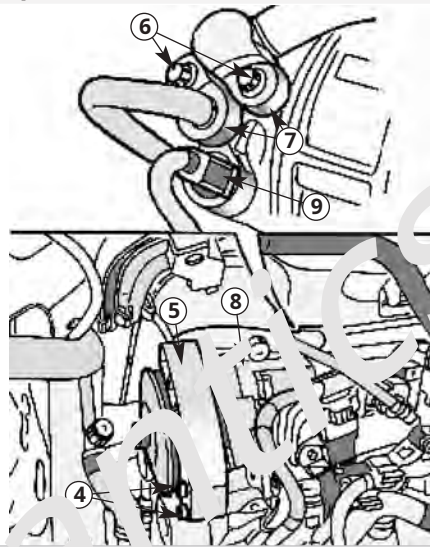
- Unscrew the screws (4) and remove the compressor belt protection (5).
- Unscrew the screws (6) and disconnect the pipe fittings (7) from the compressor (8).

Note:

Plug disconnected connections with suitable sealing caps to prevent the entry of humidity and impurities into the system.

- Disconnect the electrical connection (9).

Pipe Removal



- Unscrew the fixing screws and remove the compressor.

Assembly

- Check that the compressor is not damaged.
- Place the compressor in place.
- Tighten the M8 compressor fixing screws tighten them to a torque of 20 - 27 Nm.
- Connect the compressor's electrical connection.

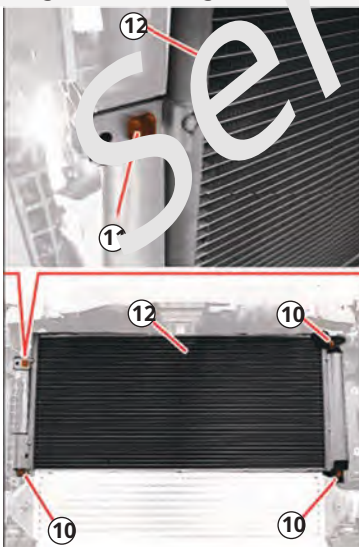
Note:

Replace the O-rings on the fittings. Use only green O-rings that are resistant to R134A refrigerant. Lubricate the threads of the fittings with compressor freeze oil.

- Connect the pipe fittings to the compressor, then secure them with the M6 screws to a torque of 7 + Nm.
- Position the compressor belt guard and secure it with the screws.
- Place the engine coolant tank in place, engaging the lower retainer, then tighten the screws.
- Recharge the refrigerant.

CAPACITOR

Removing condenser fixings

*Dismantling*

Drain the coolant.

- Remove the side engine guards, if present.
- Remove the front bumper and sacrificial crossmember.
- Unscrew the condenser fixing screws (10).
- Release the condenser retainer (11).
- Recover the capacitor (12).

Assembly

- Check that the condenser is intact and does not have any damage or dirt deposits on the finned surface.
- Place the capacitor in place.
- Engage the condenser retainer.
- Tighten the condenser fixing screws.

CHECKS AND DIAGNOSIS

Regulation pressures

Before performing any tests with the engine running, observe these preliminary conditions:

- The condenser and radiator fins must be clean.
- Condenser/cooling fan guards must be in place and without signs of damage.
- Engine at normal operating temperature.
- Air conditioning system on.
- Air conditioning/heating system fan motor switch set to maximum speed.

- Air conditioning/heating system recirculation vent set to recirculation position.
- Air conditioning/heating system temperature controls set to maximum cold position.
- Heating vent or valve completely closed (if equipped).
- Compressor drive belt(s) in good condition.
- Compressor magnetic clutch working properly.
- Pollen filter (if equipped) fitted and in good condition.
- Engine running at approximately 1,500 rpm.

10. Air bags

Technical data

GENERAL INFORMATION

The car is equipped with an electronically controlled system that activates specific restraint devices in the event of a frontal or lateral collision.

The frontal protection system includes:

- front seat belts with double pretensioner and load limiter
- driver's front airbag

- front passenger airbag
- Driver's knee airbag (optional)
- rear seat belts with load limiter
- additional front impact detection sensor

The lateral protection system consists of:

- two Side Bags housed on the front seats (optional)
- two curtain airbags, housed in the roof rails
- two impact detection sensors positioned in the central pillars.

DRIVER'S SIDE AIR BAG

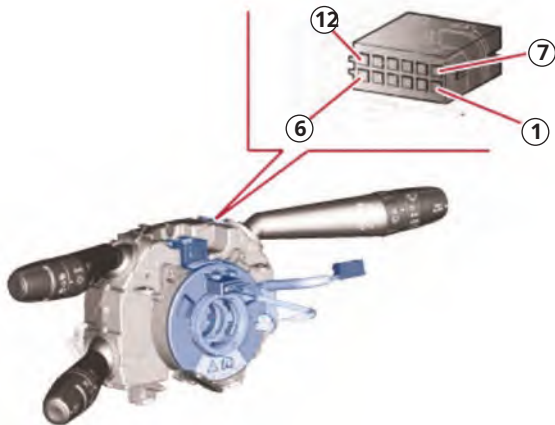
The driver's airbag consists of an instantly inflating cushion contained in a special compartment located in the centre of the steering wheel.

Driver Air Bag



Spiral cable

Spiral cable



PIN	FUNCTION
1	Reference mass for steering wheel gear shift (only for robotized gearbox)
2	Signal for steering wheel gear shift controls (only for robotized gearbox)
3	Signal from radio controls on the right-hand steering wheel
4	Signal from radio controls on the steering wheel on the left side
5	IGN from FI (steering wheel control lighting)
6	Mass radio controls on the steering wheel
7	Mass control horn and control lighting
8	Negative signal from horn command
9	Driver airbag control stage 1 (-)
10	Driver airbag control stage 1 (+)
11	not connected
12	not connected

PASSENGER AIR BAG

The passenger airbag consists of an instantly inflating cushion contained in a special compartment located in the dashboard.

Passenger Air Bag



FIAT 500L**10. air bag > technical data****SIDE WINDOW BAG**

They consist of "curtain" cushions housed behind the side roof linings and covered by special finishes which have the task of protecting the heads of the front and rear occupants in the event of a side impact, thanks to the large development surface of the cushions.

In the event of low-severity side impacts, activation of the side airbags is not required.

Window Bag**SIDE AIR BAGS**

They consist of cushions located in the backrests of the front seats that protect the chest and shoulder areas of the occupants in the event of a side impact of medium-high severity.

Side Air Bag**PRETENSIONERS**

The pretensioners are pyrotechnic devices, electrically activated via a signal from the electronic control unit, integrated into the front seat belt reel.

The same logic that controls the air bags also commands the activation of the seat belt pretensioners.

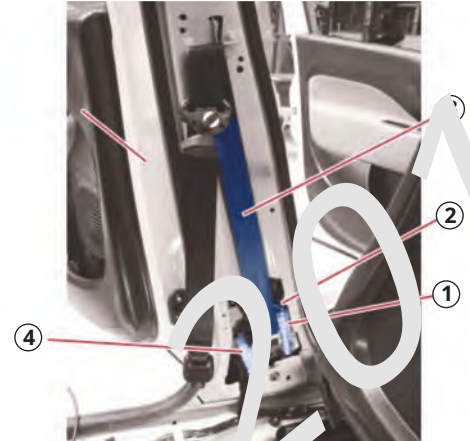
The pretensioners have the function of recovering any slack in the seat belt so as to retain the occupant against the seat back from the first moments of the impact, reducing their movement within the passenger compartment.

The seat belt retractors are also equipped with load limiters that reduce the force transmitted by the seat belts to the chest: the level of force

for which the limiters intervene is such as to considerably reduce the risk of fractures of the shoulder blades and ribs even for people with the most fragile bones.

Pretensioners

1. Gas generator
2. Electrical connector
3. Tape
4. Rewinder

**KNEE BAG**

It is located in a special compartment under the steering wheel and provides additional protection in the event of a frontal impact.

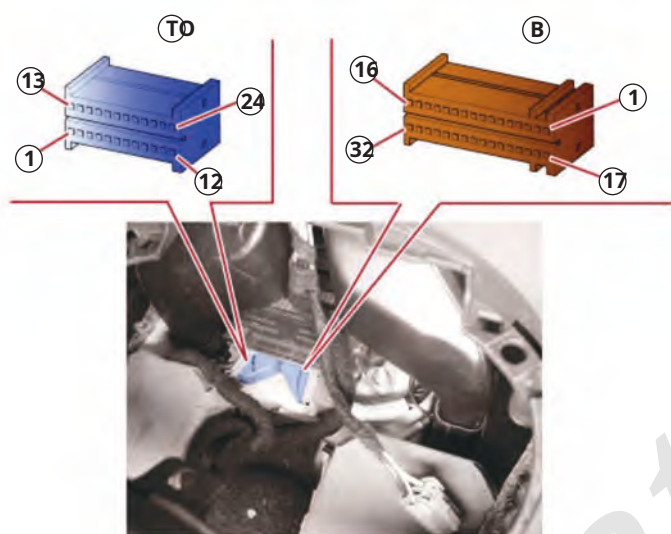
Knee Bag**SBR (SEAT BELT REMINDER)**

The Seat Belt Reminder is a system that warns the driver and front passenger if they have not fastened their seat belt.

SBR warning light

FIAT 500L**10. air bag > technical data****AIR BAG MANAGEMENT****AIR BAG CONTROL UNIT**

The control unit is the central processing unit of the occupant protection system and is rigidly fixed to the vehicle floor in correspondence with the central tunnel. It manages all the detection and activation devices of the restraint system by processing the signals that come from the various sensors scattered throughout the vehicle and from those installed inside it.

Air Bag Control Unit**Pin Out****Connector A: Front cable, 24-way black color**

PIN	FUNCTION
1	Airbag control unit mass
2	INT from F50 BCM
3	not connected
4	not connected
5	not connected
6	not connected
7	B-CAN A
8	B-CAN P
9	Signal from front impact sensor (central area), twisted
10	Front impact sensor mass (center), twisted
11	not connected
12	not connected
13	Airbag 1st stage LP (-)
14	Airbag 1st stage LP (+)
15	Airbag 1st stage LG (+)
16	Airbag 1st stage LG (-)

Connector A: Front cable, 24-way black color

PIN	FUNCTION
17	not connected
18	not connected
19	not connected
20	not connected
21	not connected
22	not connected
23	LG Knee Bag (+)
24	LG knee bag (-)

Connector B: Rear cable, 32-way brown color

PIN	FUNCTION
1	Front head bag LP (+)
2	Front head bag LP (-)
3	LG front head bag (-)
4	LG front head bag (+)
5	Front pretensioner 3rd point LP (+)
6	Front pretensioner 3rd point LP (-)
7	Front pretensioner 3rd point LG (-)
8	Front pretensioner 3rd point LG (+)
9	Front side bag LP (+)
10	Front side bag LP (-)
11	Front side bag LG (-)
12	Front side bag LG (+)
13	Front pretensioner LP riser (+)
14	Front pretensioner LP riser (-)
15	Front pretensioner LG pillar (-)
16	Front pretensioner LG pillar (+)
17	Twisted LP Side Impact Sensor Signal
18	Twisted LP Side Impact Sensor Ground
19	LG Twisted Side Impact Sensor Mass
20	LG Side Impact Sensor Signal Twisted
21	not connected
22	not connected
23	not connected
24	not connected
25	Front seat buckle switch signal LP / PPD
26	ANT LG/ ANT LP/ PPD seat buckle switch ground
27	Signal from LG front buckle switch
28	not connected
29	not connected
30	not connected
31	not connected
32	not connected

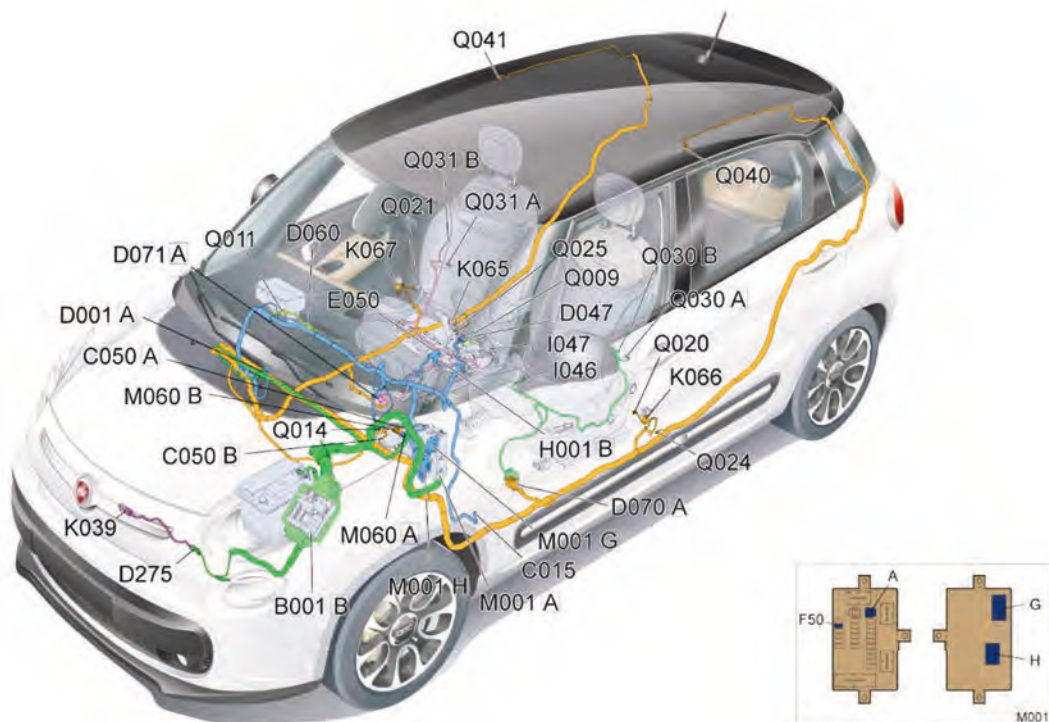
FIAT 500L**10. air bag > technical data****ELECTRICAL DIAGRAMS LEGEND**

TO	
A001	Drums
B	
B001	Derivation Control Unit
C	
C015	Mass Dashboard Driver Side
C050	Mass Air Bag System
D	
D001	Front/Dashboard Junction
D047	Spiral Contact Junction
D060	Air Bag Junction
D070	Driver's Seat Junction
D071	Passenger Seat Junction
D275	Front-End Bridle Junction
AND	
E050	Instrument Panel
H	
H001	Ignition Switch
THE	
I046	Driver Side Seat Belt Switch
I047	Passenger Side Seat Belt Switch
K	
K039	Front Air-Bag Sensor
K065	Passenger Presence Sensor
K066	Side Air Bag Sensor, Driver Side
K067	Side Air Bag Sensor, Passenger Side

M	
M001	Body Computer
M060	Air Bag Control Unit
Q	
Q009	Driver Air Bag
Q011	Dashboard Air Bag (Passenger Side)
Q014	Driver Side Knee Air Bag
Q020	Driver Side Front Seat Belt Pretensioner
Q021	Front Passenger Side Seat Belt Pretensioner
Q024	Driver's Side Front Seat Belt Anchor Pretensioner
Q025	Front Passenger Side Seat Belt Anchor Pretensioner
Q030	Driver Side Air Bag
Q031	Passenger Side Side Air Bag
Q040	Driver Side Window Bag
Q041	Window Bag Passenger Side

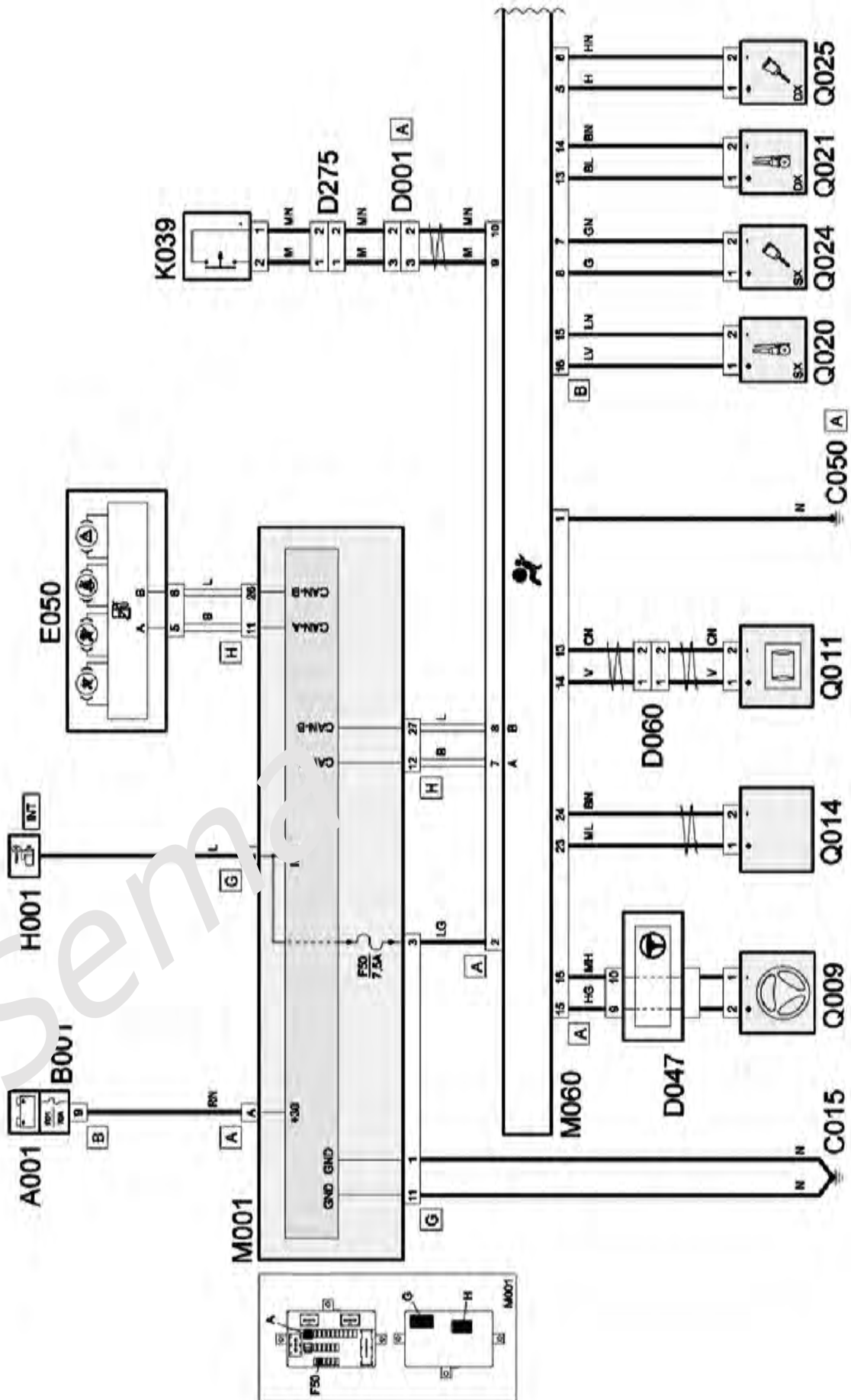
COLOR CODES

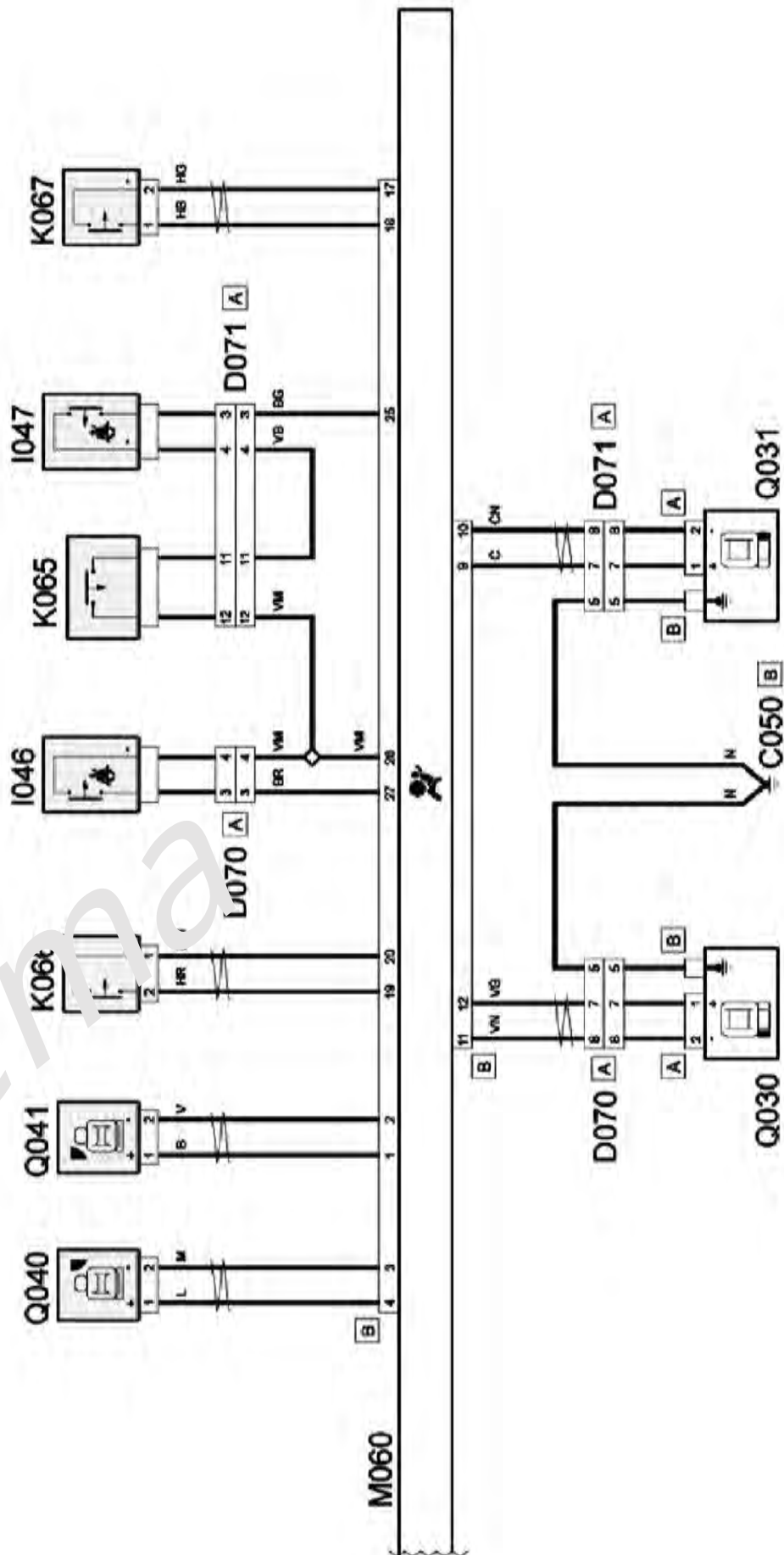
TO	Sky blue	M	Brown
B	White	N	Black
C	Orange	R	Red
H	Grey	V	Green
THE	Blue	Z	Viola

*Air Bag View*

FIAT 500L

10. air bag > wiring diagrams



FIAT 500L**10. air bag > wiring diagrams**

FIAT 500L

10. air bag > maintenance operations

maintenance operations

PRECAUTIONS

- Attention:

Before disconnecting and reconnecting the Air Bag module, it is essential to carry out the following preliminary operations to ensure the safety of the system.

1. Place the ignition key in the "STOP" position and remove it
2. Disconnect the battery terminals and isolate them
3. Wait at least 10 minutes before proceeding

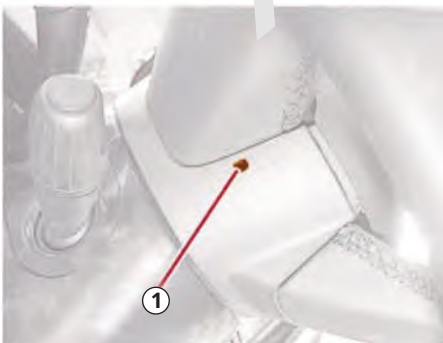
AIR BAG SYSTEM

AIR BAG AND DRIVER'S SPIRAL CABLE

*Dismantling***- Secure the system.**

- Using the tool (1), release the Air Bag module from the two retaining clips located behind the steering wheel.

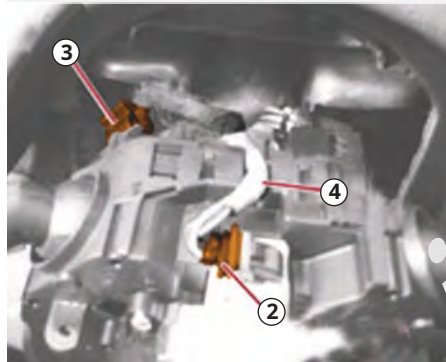
Air Bag Module Removal



- Disconnect the electrical connection of the horn.

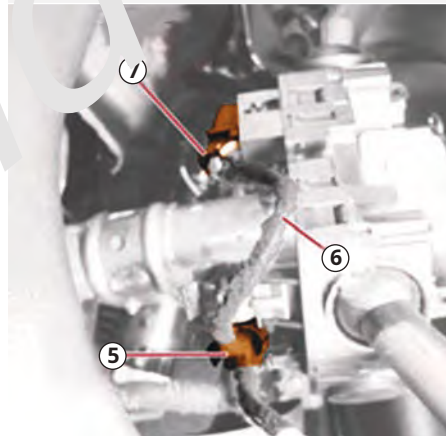
- Disconnect the electrical connections of the Air Bag module and remove the latter.
- Remove the adhesive and the steering column cover.
- Disconnect the electrical connector (2) of the spiral cable on the complete steering column switch.
- Open the retaining clips (3) and release the wiring from the steering column switch (4).

Removing electrical connections



- Loosen the fixing screw and partially remove the complete steering column switch.
- Open the retaining clip (5) and disengage the wiring (6).
- Disconnect the rear electrical connector (7).

Removing electrical connections



- Remove the steering column switch complete with spiral cable

Assembly

- Position the wiring and close the retaining clip.
- Connect the rear electrical connector.
- Position the complete steering column switch.
- Connect the electrical connector of the spiral cable to the complete steering column switch.

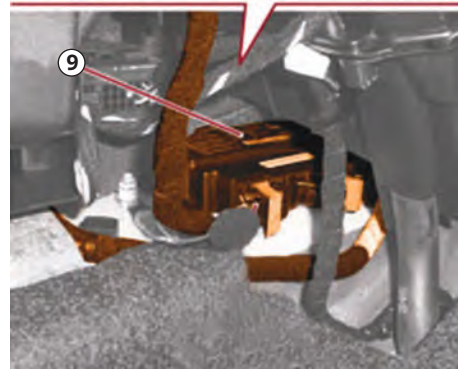
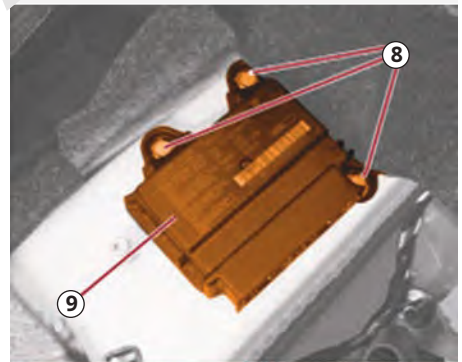
- Secure the steering column switch wiring to the retaining clip.
- Tighten the fixing screw of the complete steering column switch.
- Connect the electrical connections of the Air Bag module.
- Connect the electrical connection of the horn.
- Fit the Air Bag module into place, making sure it is correctly inserted.
- Connect the "false neutral pole" connector of the battery.

AIR BAG CONTROL UNIT

Dismantling

- Secure the system.
- Remove the side cabinet lock.
- Disconnect the electrical connections. Unscrew the fixing screws (8) and remove the Air Bag control unit (9).

Removing electrical connections

**- Attention:**

Do not hit or shake the control unit.
Do not connect the electrical connections to the control unit before having correctly fixed the control unit itself.
Make sure the battery is disconnected, however.

FIAT 500L**10. air bag > maintenance operations****- Attention:**

In case of replacement, remove the removable part of the adhesive label from the new control unit and place it in a special file reporting the vehicle data (model, registration data, chassis number) and the serial number of the old control unit. The file must be kept for any checks.

Assembly**- Note:**

The control unit, after each activation of one of the controlled systems (pretensioners, front air bags, side air bags) stores the activation in the non-erasable memory and commands the switching on of the fault warning light on the instrument panel.

- Attention:

The control unit guarantees, before being replaced, the activation of the individual devices for a maximum number of:

- *3 impacts with activation of the seat belt pretensioners only*
- *3 impacts in total (right or left) with activation of the side airbags*
- *1 impact with activation of the pretensioners and front air bags*
- *any combination of the above cases until the maximum number is reached.*

If the maximum number described has not been reached, it will be possible, after having restored the operating conditions of the system, to reuse the control unit by carrying out the RESET procedure using a diagnostic tool.

- Place the Air Bag control unit in place and tighten the fixing screws.

- Connect the electrical connections.

11. bodywork

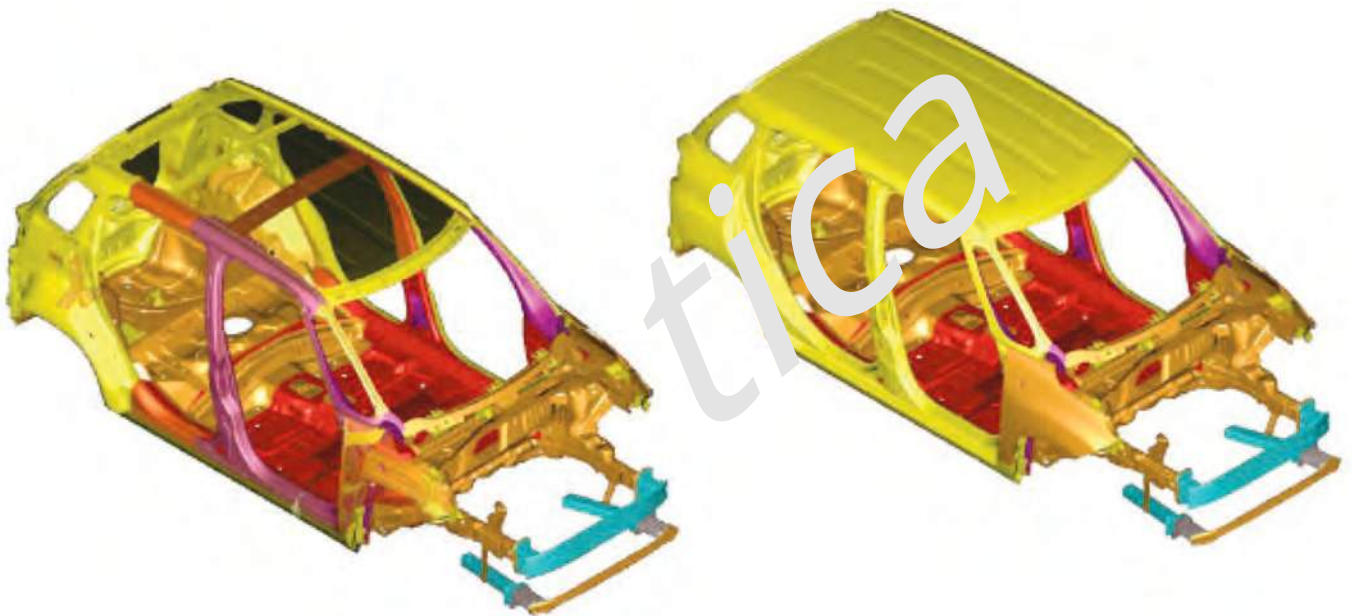
Technical data

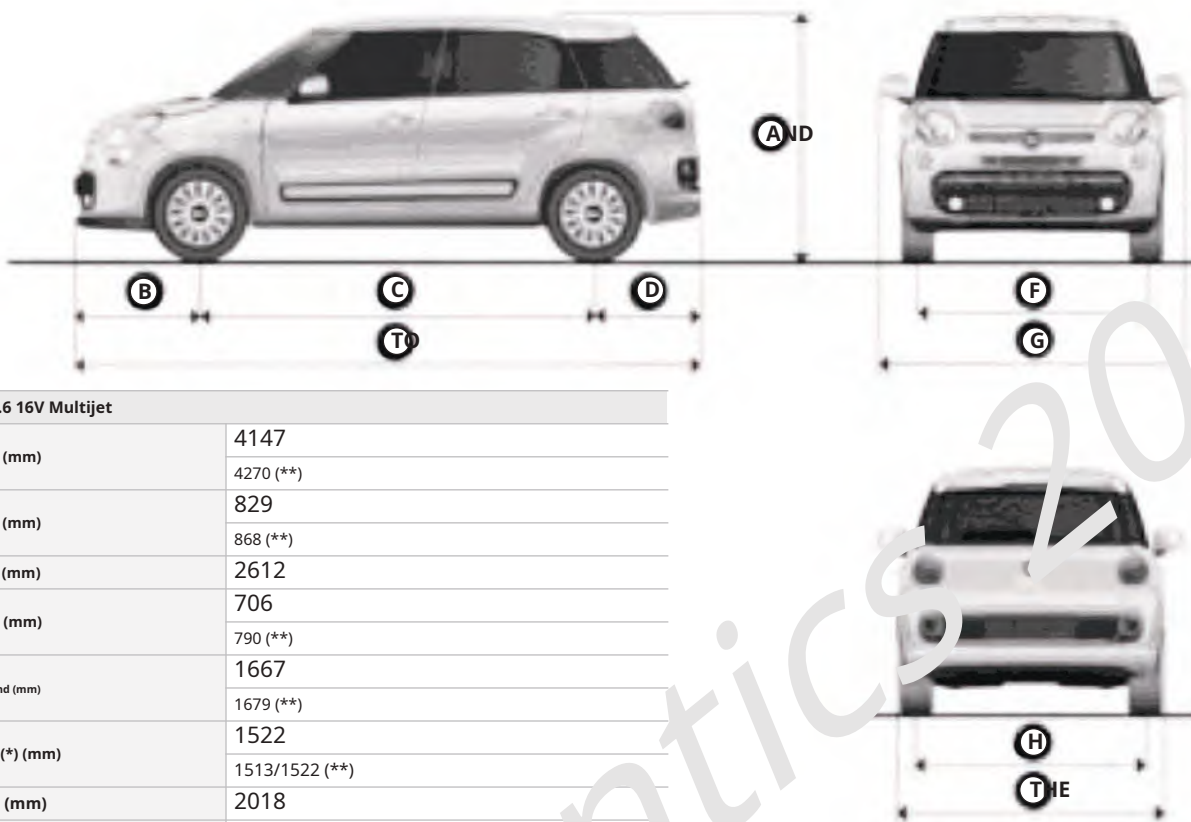
GENERAL INFORMATION

The monocoque body with high torsional and flexural rigidity ensures high safety in the event of an impact for the driver and passengers.

of the vehicle. These rigidity characteristics lead to a reduction in noise while driving, thanks to the reduced vibrations of the body, while at the same time offering greater resistance to breakage caused by use of the vehicle on very rough road surfaces.

Body view



FIAT 500L**11. bodywork > technical data****DIMENSIONS***Car dimensions***1.6 16V Multijet**

A (mm)	4147 4270 (**)
B (mm)	829 868 (**)
C (mm)	2612
D (mm)	706 790 (**)
And (mm)	1667 1679 (**)
F (*) (mm)	1522 1513/1522 (**)
G (mm)	2018
H (*) (mm)	1519 1511/1519 (**)
I (mm)	1736 1800 (**)

WEIGHTS

	1.6 16V Multijet 105CV	1.6 16V Multijet 120CV
In running order, without driver, without options (kg)	1365 1375 (*)	1370 1380 (*)
In running order, with driver, without options (kg)	1435 1445 (*)	1440 1450 (*)

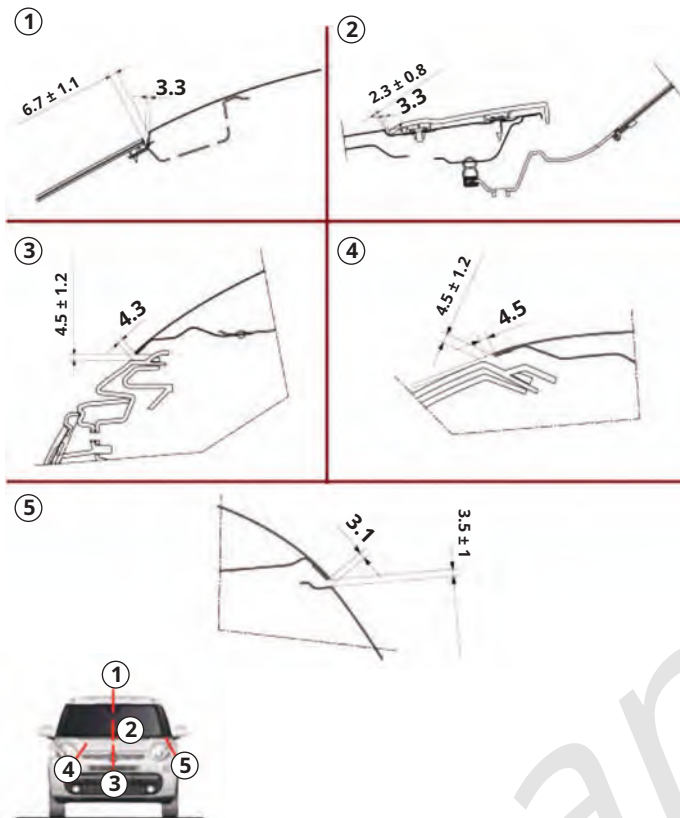
FIAT 500L

11. bodywork > technical data

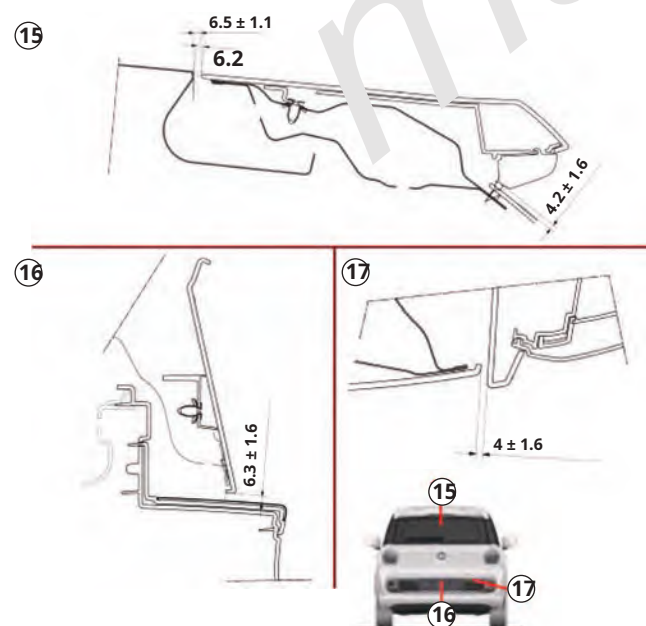
MOVING PARTS REGISTRATION

In order to facilitate and verify the disassembly operations of the moving parts, we report the value of the existing lights for an appropriate registration (measurements expressed in millimeters). The registration method is illustrated in the sections containing the procedures for detaching and reattaching the moving parts.

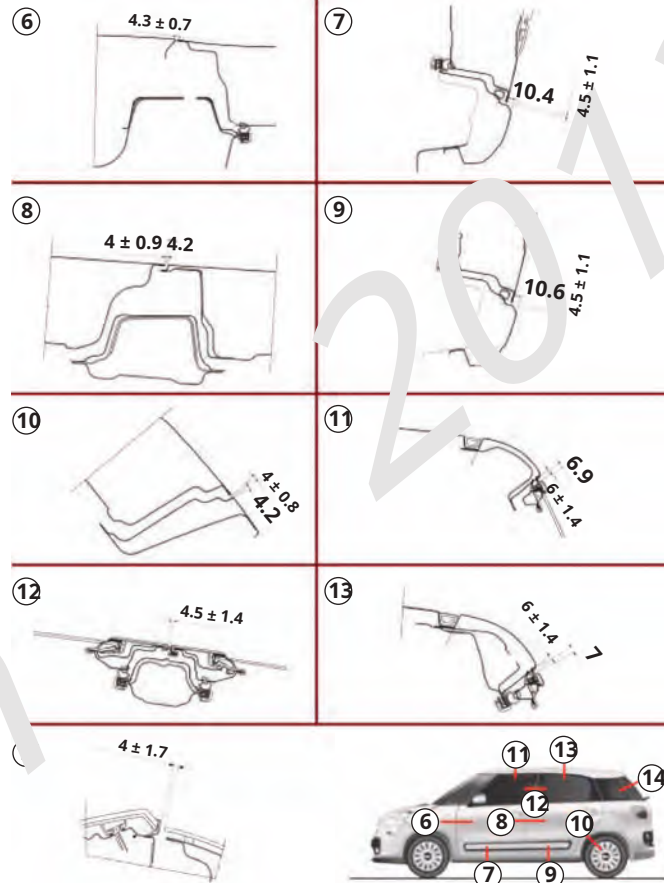
Front moving parts



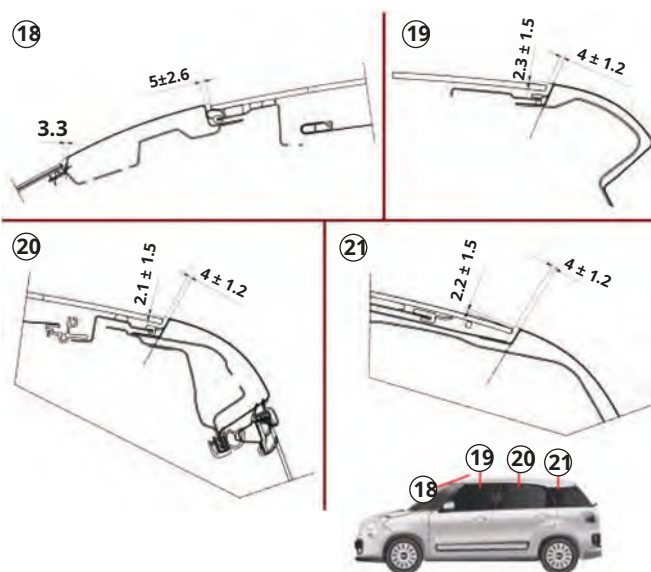
Rear moving part:



Lateral moving parts



Upper moving parts



maintenance operations

CAR EXTERIOR

FRONT BUMPER

Dismantling

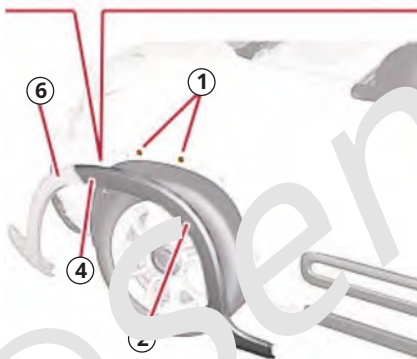
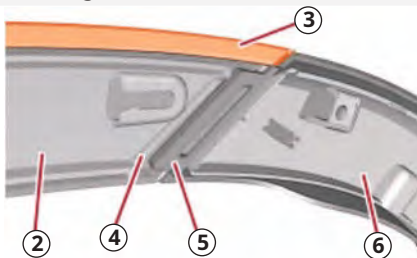
- Working on both sides of the car, carefully release the first two front retainers (1) of the front wheel arch mouldings (2), using the appropriate tool. Also carefully remove the adhesive strip (3) in the area of the two retainers.

Note:

If damaged, replace the retainers (1) during reassembly.

- Carefully disengage the ends (4) from the retainers (5) of the mouldings (6) of the front bumper.

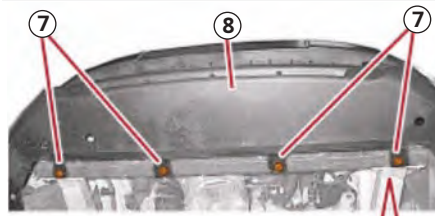
Removing the front bezel



- Loosen the screws and remove the plastic retainers (1) of the lower front bumper fixing (2).

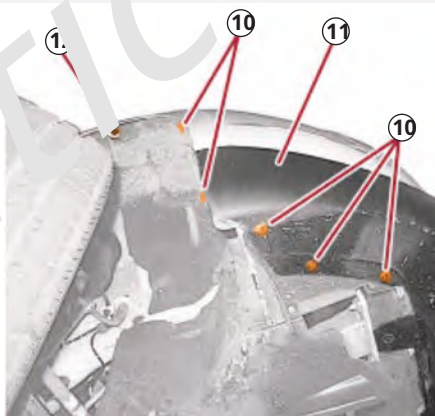
- Disconnect the electrical connection (9) of the fog light wiring.

Removing fog light connection



- Working from both sides of the car, unscrew the front screws (10) fixing the additional wheel arches to the bumper (11).
- Unscrew the screws (12) fixing the bumper to the mudguards.

Removing side fixings

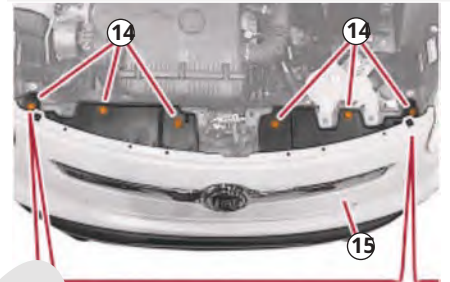


- Disconnect the electrical connections (13) of the dipped beam headlights.

- Unscrew the upper fixing screws (14) of the bumper.

- Remove the front bumper (15) by releasing it from its seat, making sure that the front wheel arch mouldings are released from the bumper.

Front bumper removal



Assembly

- Check that the front bumper is not damaged.
- Place the front bumper in place.
- Screw in the upper fixing screws.
- Connect the electrical connections of the low beam headlights.
- Working on both sides of the car, carefully engage the ends of the front wheel arch mouldings to the bumper.
- Carefully engage the two front retainers of the front wheel arch mouldings and carefully adhere the adhesive strip in the area of the two retainers.
- Lift the car.
- Screw the bumper fixing screws to the mudguards.
- Screw the front fixing screws of the additional wheel arches to the bumper.
- Engage the lower bumper fixing plastic retainers, then tighten the screws.
- If necessary, align the front bumper with the bodywork.



FIAT 500L

11. bodywork > maintenance operations

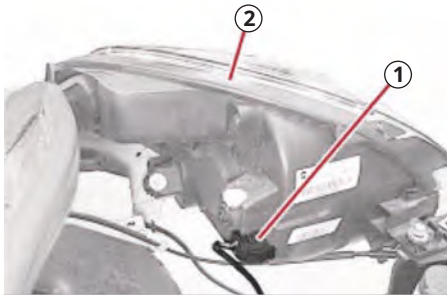
HEADLIGHTS

Dismantling

- Place the car on the lifting bridge.

- Remove the front bumper. Disconnect the electrical connection (1) of the low beam headlight (2).

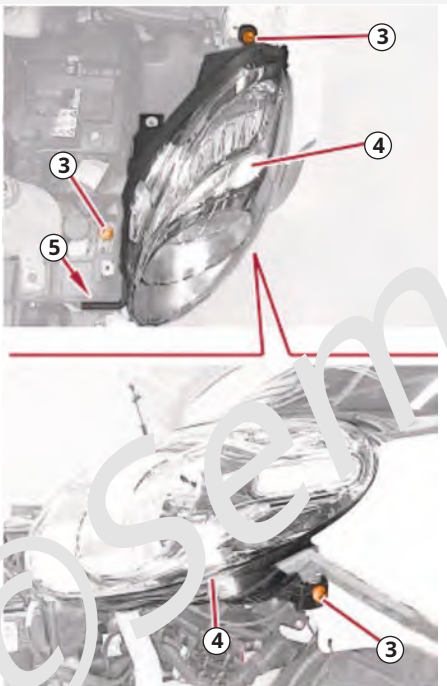
Removing electrical connections



- Unscrew the screws (3).

- Remove the low beam headlight (4) by releasing the reference pin in area (5).

Removing the front projector

*Assembly*

- Check that the low beam headlight is not damaged.

- Position the low beam headlight and engage the reference pin.

- Tighten the screws.

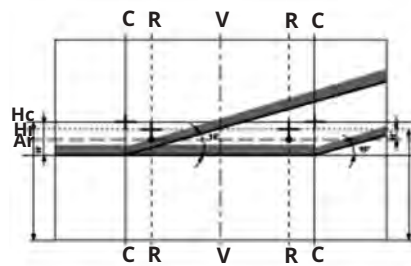
- Connect the electrical connection of the low beam headlight.

Regulation

- Place the vehicle, complete with spare wheel, tools, water and fuel reserve (approximately 8 litres), on a flat, horizontal surface, with the reference centre of the headlights 10 m from the screen; the tyre pressure of the vehicle must be as prescribed.

- The plane of symmetry of the vehicle must be exactly perpendicular to the surface of the screen and coincident with the line V - V drawn on it.

Light beam display screen



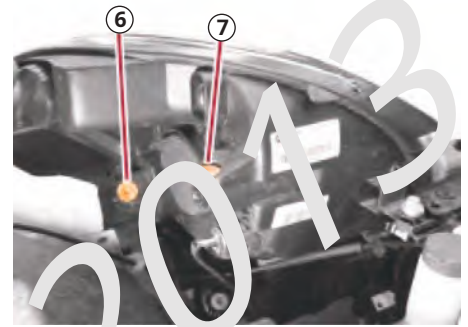
V - V	vertical, corresponding to the trace of the symmetry plane of the vehicle
C - C	corresponding to the traces of the vertical planes passing through the reference centers of the dipped beam headlamps
R - R	corresponding to the traces of the vertical planes passing through the reference centers of the high beam headlamps
HC - HC	horizontal corresponding to the height from the ground of the reference centers of the dipped beam headlamps
HP - HR	horizontal corresponding to the height from the ground of the reference centers of the main beam headlamps
AC - AC	horizontal below the HC - HC of 10 cm

- Turn on the low beam lights

- By acting on the vertical adjustment screw (6) of the optical group, make the horizontal section of the demarcation line between the dark area and the area illuminated by the light beam coincide with the AC-AC line drawn on the screen.

- Acting on the horizontal adjustment screw (7) of the optical group, make the intersection point of the two horizontal and inclined demarcation lines coincide with the respective intersection of the CC and AC-AC lines of the screen.

Low beam adjustment screws

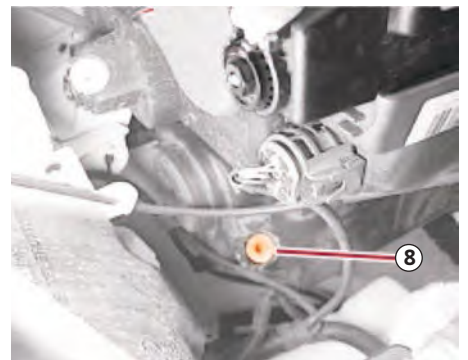


- Turn on the high beams.

- Align the light clusters on the depth beam, adjusting the position of the maximum illumination area, both of the left and right light clusters.

- Act on the orientation screw (8) of each optical group so as to make the centre of the maximum illumination area coincide with the respective intersections of the R - R and HR - HR lines.

High beam adjustment



FIAT 500L

11. bodywork > maintenance operations

REAR BUMPER

Dismantling

- Place the car on the lifting bridge.

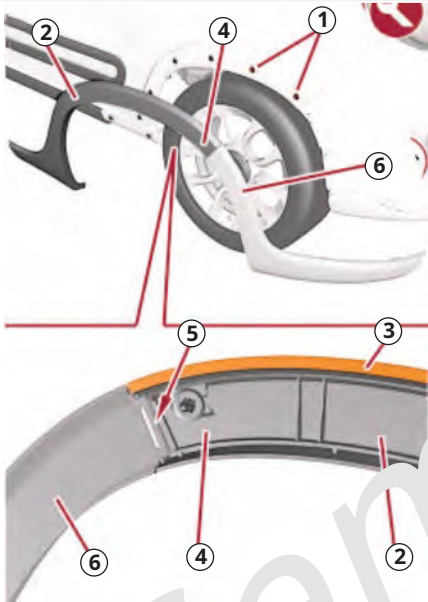
- Remove both rear lights.
- Working on both sides of the car, carefully disengage the first two rear retainers (1) of the rear wheel arch mouldings (2), using the appropriate tool, also carefully remove the adhesive strip (3) in the area of the two retainers.

Note:

If damaged during reassembly, replace the retainers (1).

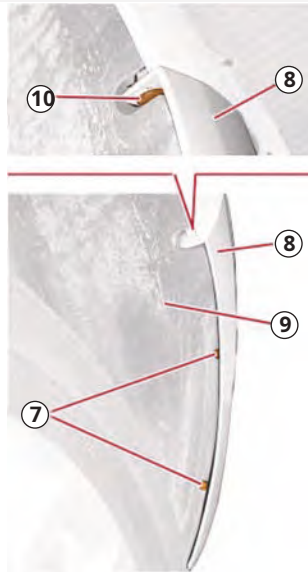
- Carefully disengage the ends (4) from the retainers (5) of the rear bumper mouldings (6).

Removing molding fasteners



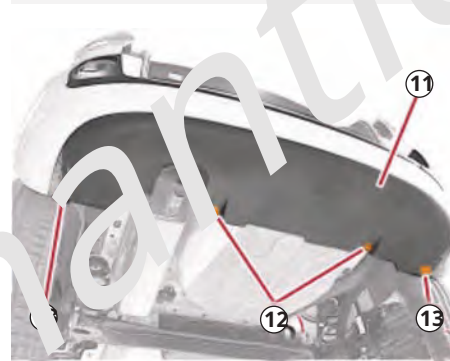
- Working on both sides of the car, unscrew the screws (7) fixing the bumper (8) to the additional wheel arches (9).
- Move the additional wheel arches slightly and unscrew the side screws (10) fixing the bumper to the body.

Removing side fixings



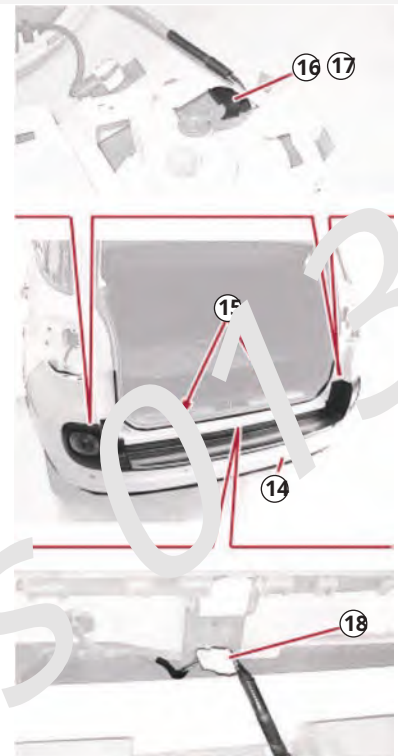
- Working under the bumper (11) unscrew the screw (12) lower fixing of the bumper itself.
- Release the side retainers (13).

Removing lower fixings



- Release the bumper (14) from the retainers, along the upper profile (15), then move it slightly away from the body.
- Disconnect the electrical connections (16) and (17) of the lower rear lights.
- Disconnect the electrical connection (18) of the parking sensor wiring.
- Recover the rear bumper.

Bumper Removal

*Assembly*

- Check that the rear bumper is not damaged.
- Place the rear bumper close to the car and connect the electrical connection of the parking sensor wiring.
- Connect the electrical connections of the lower rear lights.
- Engage the bumper in the retainers, along the upper profile.
- Lift the car.
- Working on both sides of the car, screw the bumper fixing screws to the additional wheel arches.
- Working on both sides of the car, carefully engage the ends of the rear wheel arch mouldings to the bumper.
- Carefully engage the two rear retainers of the rear wheel arch mouldings and carefully adhere the adhesive strip in the area of the two retainers.

FIAT 500L

12. Maintenance time

LABOUR TIMES

(Hours expressed in tenths; eg: 0.40 = 24 minutes)

MOTOR		SUSPENSIONS	
Type of intervention	Working hours	Type of intervention	Working hours
Powertrain		Front suspension	
Powertrain and gearbox	5.10	Frame and crosspiece	-
Powertrain	10.48	Subframe supports	-
Complete engine and gearbox replacement	-	Shock absorber	0.80
Cylinder head		Spring	0.80
Compression test	1.60	Lower arm	1.40
Camshaft/Valve Cover	1.40/1.50	Anti-roll bar	0.40
Header and gasket	7.50	Swivel/Hub Assembly	0.80
Header review	8.60	Rear suspension	
Timing chain	5.30	Rear axle	3.50
Lubrication		Shock absorber	1.10
Oil filter	0.40	Spring	0.70
Check oil pressure	0.50	Hub bearing	0.60
Oil pan	1.40	Knuckle joint	1.00
Oil pump	4.60	BRAKES	
Cooling		Braking system	
Coolant replacement	0.80	Front brake pads	0.95
Pressure testing system	0.30	Front brake caliper	0.70
Electric cooling fan	0.70	Brake disc (front)	0.70
Radiator	1.30	Brake disc (rear)	0.60
Water pump	2.80	Brake pump	1.60
Engine management and fuel supply system		Hydraulic piping	0.70
Engine management control unit	0.50	Handbrake lever adjustment	0.30
Coolant temperature sensor	0.20	ABS system	
Fuel filter	0.30	Phonic wheel	0.40
High pressure pump	3.50	Electro-hydraulic group	3.00
Injectors	0.50	ELECTRICAL SYSTEM	
Supercharging (diesel only)		Alternator	1.10
Intercooler	0.80	Starter motor	0.80
Turbocharger	1.50	AIR CONDITIONING	
Boost pressure control	-	System tightness test	1.20
CHANGE		Compressor	2.70
Rear gear shifter support	-	Capacitor	1.90
Gear linkage	0.40	Evaporator	1.40
Gear lever	0.40	Pressure sensor	1.40
Gear change	3.40	BODY	
TRANSMISSION		Front bumper	0.90
Right axle shaft (front and rear)	0.80	Rear bumper	0.80
Left axle shaft (front and rear)	1.00	Headlights (pair)	1.80
Hub bearing assembly	1.20	STEERING	
STEERING		Fog lights (pair)	0.40
Steering box	4.80	Complete door panel	
Cross tie rod	0.40	Complete door panel	
Rack sheath	0.30	Complete door panel	
Steering wheel	0.40	Complete door panel	
Steering column	2.30	Complete door panel	