

Fiat Punto



CHANGES / UPDATES DOCUMENTATION

Date	Contact	File Name	Description of Change
------	---------	-----------	-----------------------

© 2004 - Fiat Auto S.p.A.

All rights reserved. They prohibited the dissemination and reproduction by any instrument.

The processing of the material can not include specific responsibility for inadvertent errors or omissions.

The information on this media are subject to continuous updates: Fiat Auto SpA assumes no responsibility for consequences arising from the use of outdated information

This publication is for educational use only.

For technical information, and to keep the charitable purposes, you should refer to manual care and the service information of the model of vehicle.



Index



1 Briefing

1.1 General characteristics

1.1.1 Presentation

Born New Point: a new car, dynamic and exciting able to combine elegance and sportsmanship in an irresistible mix. New Point comes to reaffirm the excellence of Italian car design and the vocation of the young and sporty Fiat.

Her gritty and determined line, customized by Giugiaro, is the main attraction for young people who want a car but comfortable and treated in detail.

I'm really young and all those young spirit that New Point is aimed at: gives the car an agile driving experience and a high comfort level.

New Punto stands out from its main competitors:

STYLE: understood as the ability to understand customer expectations with the final forms and configurations that offer excitement and desire to possess.

DRIVING PLEASURE: not only as a capacity to make more pleasant and easier the arrangement in the vehicle by all occupants but as the ability of emphasize those aspects which, without prejudice to the conditions now expected discounted as safety, comfort and quality, enhance the technical characteristics of the vehicle offering driving behaviors that make a difference over the competition.

GLOSS: meaning the ability to combine the right balance between economy exercise and performance car.



The product offer **to launch** consists of two petrol engines and diesel engines by three whose main characteristics are:

Petrol engines:

1.2 8v 65 hp

1.4 8v 75 hp

Diesel engines:

1.3 Multijet 16V 75 hp

1.3 Multijet 16V 90 horses

1.9 Multijet 16V 120 hp

with four different trim levels, which are characterized by rich content and offers of engines, capable of satisfying the needs of different target to which New point is Eligibility: active, dynamic, elegance and sport.

1.1.2 The market and the customer

Today, the New Point segment accounts for 26% of car market in Europe West, that the "core market" with about 3,750,000 registrations per year. In Italy however this segment is for 37% of the market, made up 56% of gasoline and diesel engines by 44%.

FIAT has always been very present in the segment of small / medium cars and despite the sector crisis point in recent years has been the leading vehicle in Italy and the third best car sold throughout Western Europe.

Today the goal is to return to New Point market leader not only in Italy but in the rest of Europe. How? In proposing his dynamic style and expressed particular Italian design and solutions through the simple and ingenious.



This step will take forward the process of relaunching the brand started with FIAT New Panda and Idea with current and Croma.

New Point has as main objective to regain a younger audience

proposing with its dynamic character and sporty offering typically Italian styling

symbol of personality and sophistication. It is, therefore, urges men and women from the spirit youth who seek to express their own distinctive personality through chosen a strong emotional component.

To better meet customer needs, new Punto is offered in four levels construction:

ACTIVE: is addressed primarily to the youngest aged 25 to 30 years, 'constitutive' sensitive and open to the most prominent expressions of performance values; people dynamic and full of vitality, with an open mind and flexible.

DYNAMIC: For more mature young, vital and enterprising, torn between an emotional and rationality, between 30 and 45 years old, youthful energy and 'control' adult.

ELEGANCE: for mature men and women in the choice and take for granted allocations a higher category and excellent comfort and are sensitive to suggestions that tend to enter new vitality and impulsiveness in the automotive world

SPORTING: for dynamic young people and athletes looking for performance and exterior traits markedly distinctive. It caters to both men and women in sports and edgy, What the audience is looking into the car has style, emotion, comfort, safety and a good price.

What the audience is looking into the car has style, emotion, comfort, safety and a good price.



With New FIAT Punto is ready to offer:

Distinctive style and Italian

Large living space: 50 mm more than the current point

Security level aligned with the best competition

Robust

Diesel engines in their class: 1.3 75 1.9 120 hp and 90 hp

Taking into account that today the main attraction for the public purchase of the reason is the line, New Step to regain leadership in its segment relies on its own to a new modern and attractive, you launch into the world of youth with agility and versatility that distinguishes it from normal sedans two volumes.

1.2 The vehicle

1.2.1 The style

Point is a new 'Self styled lines and explicitly rooted in history and most authentic tradition and characteristic of Italian motor racing with a surprising unexpected morphology of the product that brings it into contrast with the guidelines almost all European car manufacturers.

A line from 'Real' car in which they find themselves pleasantly and originally interpreted, while respecting the *'air du temps*, Values of style, sportiness, elegance and beauty.



1.2.2 The size

External

Even the exterior dimensions are a result of market expectations and the consequent style choices, but much is due to legislative developments, in terms of protection occupants, has influenced the choices of particular forms.

The end result, for some sizes, poses new point at the top of the segment (see table below).

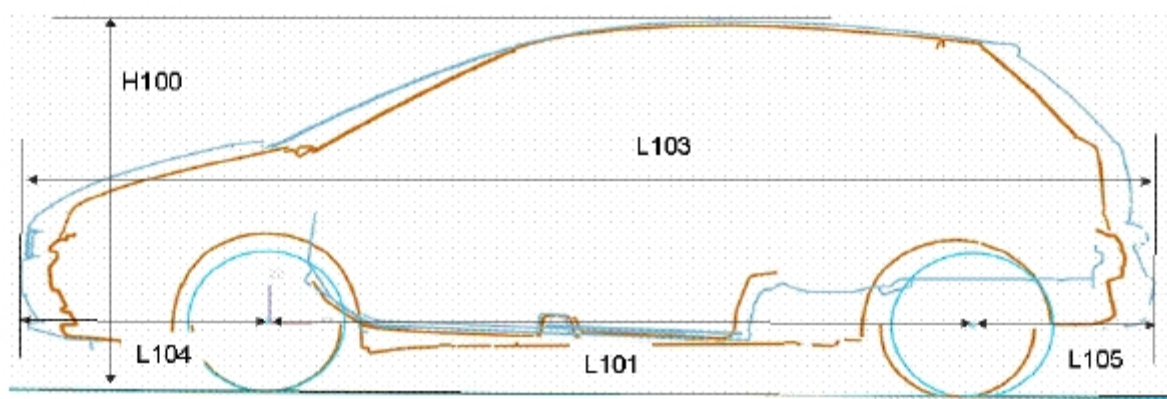


Table of comparison with the competition

	N	P	POINT	OPEL	PEUGEOT	FIESTA	RENAULT	NISSAN	TOYOTA	CITROEN	VW POLO
External dimensions (mm)	POINT		188 (5P)	5P RACE	206 5P	'02	CLIO '98	MICRA	YARIS 5P	'02 C8 5P	
L101 Step	2510		2460	2491	2441	2486	2472	2427	2373	2460	2460
L103 car length	4030		3835	3816	3837	3917	3772	3717	3607	3849	3897
Width	1687		1660	1645	1650	1680	1640	1660	1660	1670	1650
L104 Front overhang	876		775	747	787	772	714	685	710	756	800
L105 Rear Overhang	647		600	578	609	659	586	605	524	633	634
H100 Car height	1490		1480	1442	1436	1467	1418	1525	1516	1534	1465

P: Current Point

N: New Point



In summary new Punto is longer than the competing cars in its segment of about 20 cm, while it is perfectly in line for the width and height.

1.2.3 Preparations

New Point is available in four different preparations of specific content and coatings internal and customize dashboard, seats and panels:

Active, Dynamic, Elegance and Sporting.

The set ACTIVE offers as standard:

ABS

Electric power steering

power windows

dual airbags

The DYNAMIC setting offers as standard:

ACTIVE content

remote control

height-adjustable driver's seat

double back seats (5-door version)

height adjustable steering wheel

rear headrests

The ELEGANCE trim features standard:

DYNAMIC content

steering wheel and gear knob covered in leather

CD car radio



air conditioning
alloy wheels

The construction SPORTING offers as standard:

DYNAMIC content

Vehicle Dynamic Control (ESP)

fog light

alloy wheels and tires 17 "

miniskirts

Sports leather steering wheel (central pierced handles and accent stitching)

particular measuring instrument

Front sports seats with shapes (better containment)

CD car radio

air conditioning

Other content is not standard, but options are:

Knee air bag

Window-bag

Side-bag

Anti-whiplash front seats (attenuator whiplash)

Electric rear windows (5p)

Front armrest

Electrical lumbar adjustment

Automatic climate control

Cruise control

Rain sensor

Parking sensors

Pressure sensor (TPMS)



Leather upholstery
Alloy wheels (different designs and sizes)
Skydome sunroof
Rear spoiler
Side strips
Radio CD MP3
HI-FI
Bluetooth Kit
Headlight washers
Transmission 6-speed (1.3 Multijet 16v 90 HP)

1.2.4 Engines

The engines fitted to the car **commercial launch** are:

PETROL ENGINES

1.2 8V 65 hp
1.4 8V 75 hp

DIESEL ENGINES

75 bhp 1.3 Multijet 16V
90 bhp 1.3 Multijet 16 V
120 bhp 1.9 Multijet 8V



1.2.5 Changes

On New Point are four types of change that have appropriately optimized excellent maneuverability and excellent noise control speed of development.

CHANGE	GEAR	ENGINES
C 514	5	1.2 8V, 1.4 8V
C 510	5	1.3 Multijet 16V 75 and 90 hp
M20	6	90 bhp 1.3 Multijet 16 V (optional)
M32	6	120 bhp 1.9 Multijet 8V

1.2.6 Range**GASOLINE:**

			Active	Dynamic	Elegance	Sport
1.2 8V	65 HP	Manual 5 speed	X	X		
1.4 8V	77 HP	Manual 5 speed	X	X		

DIESEL:

			Active	Dynamic	Elegance	Sport
1.3 Multijet 16V	75 HP	Manual 5 speed	X	X		
1.3 Multijet 16V	90 HP	Manual 5/6 marches		X	X	
1.9 Multijet 8V	120hp	Manual 6 speed				X



1.2.7 Active Safety

For active safety is the set of technical solutions that help prevent from accidents.

Among the electronic and mechanical safety, New Point features:

ABS: All versions of the planned integrated anti-lock system that regulates the action braking in order to prevent locking of the wheels;

EBD: Electronic brake balance between front and rear wheels;

ESP active safety system for the control of the vehicle in dynamic maneuvers on the road which intervenes in emergency conditions.

ESP is standard only on Sporting. The entire range is equipped with ABS with EBD and ventilated disc brakes on front wheels (except 1.2 8v engine that drives not mounting ventilated).

1.2.8 Passive Safety

For passive safety of a vehicle's Means a set of technical solutions and product designed to protect occupants in the event of an accident. Research and the technical solutions adopted are intended to protect the occupants of the car in case frontal impact, side and rear.

With New FIAT Punto makes new progress on the security front. Fiat introduces on New Progettative technical solutions, constructive and innovative content and intelligence for best results in terms of occupant protection.



New point is equipped with a standard occupant protection system comprising:
FPS Air-Bag, Air-Bag includes driver and front passenger

A dual stage;

front seatbelts with pretensioners and load limiters;

electronic system "my car" to disable Air-Bag front and side passenger side.

Also available as an option:

Side Bag on front seats, have a protective cage and pelvis;

Bag in the Window housed under the roof girders that provide head protection
objects against highly intrusive.

In designing new Punto, Fiat has paid particular attention to the safety of children
board and the safety pedestrians.

The safety of children on New Point provides all the devices that allow
provide maximum protection now feasible to include attacks on isofix seats
rear passenger air bag and the inhibition directly by on-board computer.

Pedestrian safety has somehow influenced style choices to meet the new
legislation establishing specific conditions for the protection of pedestrians in the event of a collision.

The shell to yield, the steering column and pedals and collapsible steering
with anti-whiplash seats (optional), complete the equipment in security
passive.



1.2.9 Tyres and wheels

To optimize the performance of the car, especially with regard to the road holding, safety and ride comfort, it was decided to use the following tires:

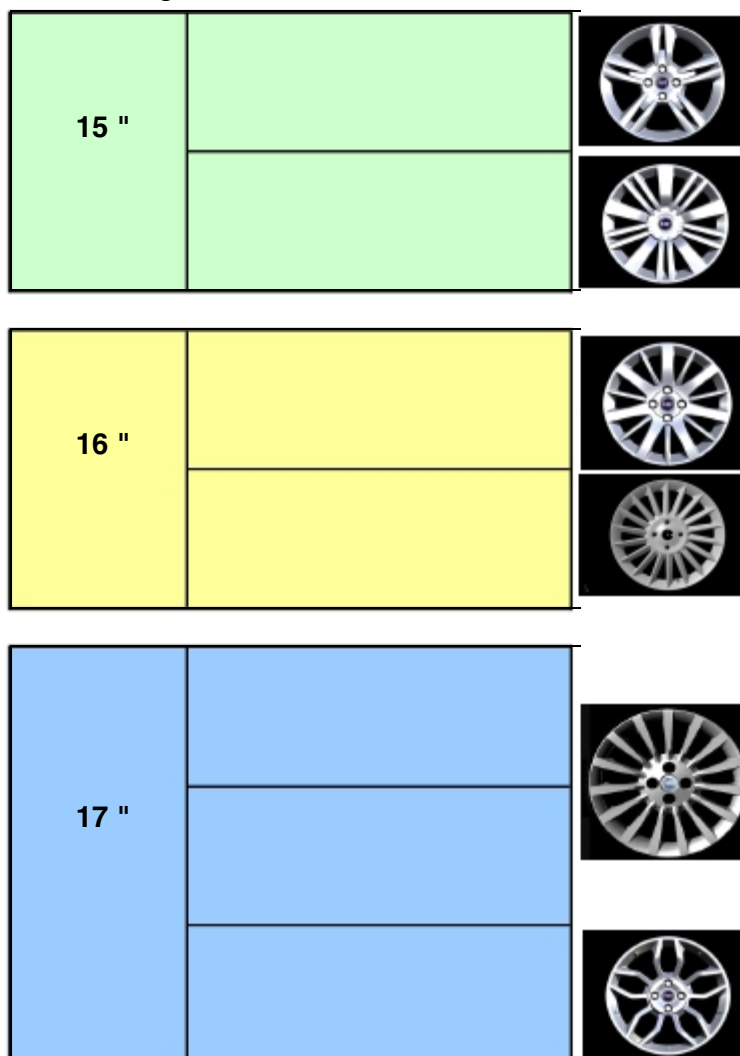
175/65 R15 - Active / Dynamic

185/65 R15 - Active (opt) / Dynamic (opt) / Elegance / Sport (opt catenabile)

195/55 R16 - Dynamic (opt) / Elegance (opt)

205/45 R17 - Elegance (opt) / Sport

As for the wheels, the new Punto has a wide range, which different styles, sizes and coatings:



1.2.10 tire repair kit

The new Punto is equipped with the new version of the kit "Fix & Go" for the repair of tires in case of punctures (holes of the maximum diameter of 4 mm).

The new kit comprises in a single component, the compressor, the canister of liquid sealant, the silicone tube for repair of the tire, the tube with a spout for the control and inflating the tire, the electric cable for feeding through the outlet lighter.



The use of KIT has been further simplified.

The procedure to repair the flat tire provides substantially connecting the power cord into the cigarette lighter socket, connect the hose silicone to the tire valve and the ignition of the compressor of the liquid sealant is automatically injected into the tire mixed with air. The repair can be say ended when the tire pressure reaches the predetermined values.

The Fix & Go can also be used to control and restore pressure tires, by connecting the appropriate tube provided with quick coupling.



1.2.11 Comfort

New Point of ergonomics and comfort has made its points of excellence (accessibility, visibility of accommodation):

the position of the pedals,
the alignment of the steering wheel,
the proper position of the armrest,
the correct position of the footrest,
the excellent maneuvering of the gearshift knob
full visibility of the instrumentation and the main controls
seats which contain excellent sections and wrap your body properly even in more dynamic driving situations.

To make the new reference point in its category in terms of comfort were deals in particular:

Isolation of the incoming noise in the cockpit
Internal noise
Filtering of the vibrations and rolling noise
Sensitivity acoustic excitation transmitted through solids
Compact car on the road roughness
Dynamical systems: engine, intake and exhaust

1.2.12 Habitability

In the analysis of the car, the customer seems to base its assessment of the Wellness mainly from the board seat.



The area around the driver's seat (and the components present in it) is configured so as the surface portion of the passenger especially significant in order to allow the customer to arrive at a final judgment about the well-being that the inside as a whole will be able to offer.

New Step in the draft ergonomics is at the center of attention. In fact it has reached a good balance between the prerogatives of Style and the indispensable requirements of the customer in terms

habitability, accessibility, visibility internal (such as the excellent layout of all controls visible and within reach) and the external visibility favored by the large size of mirrors.

New Point can comfortably accommodate clients of all sizes, with results obtained, among other things, without compromising the ability of the boot, which is at least in 263lt normal running configuration.

"To be well on board," he added, meant to find so much space, but we especially find it there where needed, new Punto has volumetric values of living space ("cubature") to top the category.

The profile of the cabin, can accommodate two passengers in the seat 3 back on the car doors, but you can request to apply for approval for fifth passenger (by adding a third rear seatbelt).

The task of setting the vehicle was conducted according to modern criteria for defining basic ergonomic functions, consistent with the stylistic and safety prerequisites:

Space and internal volume

Habitability

Accessibility

Visibility

Cargo Compartment

Usability

To these functions correspond parameters which measure the ability of the car to respond to the requirements of well-being on board the vehicle.



1.2.13 Air

The well being of those who are on board, is guaranteed by an air conditioning system that creates ideal conditions for the trip.

The 'offer range includes three different systems:

heater

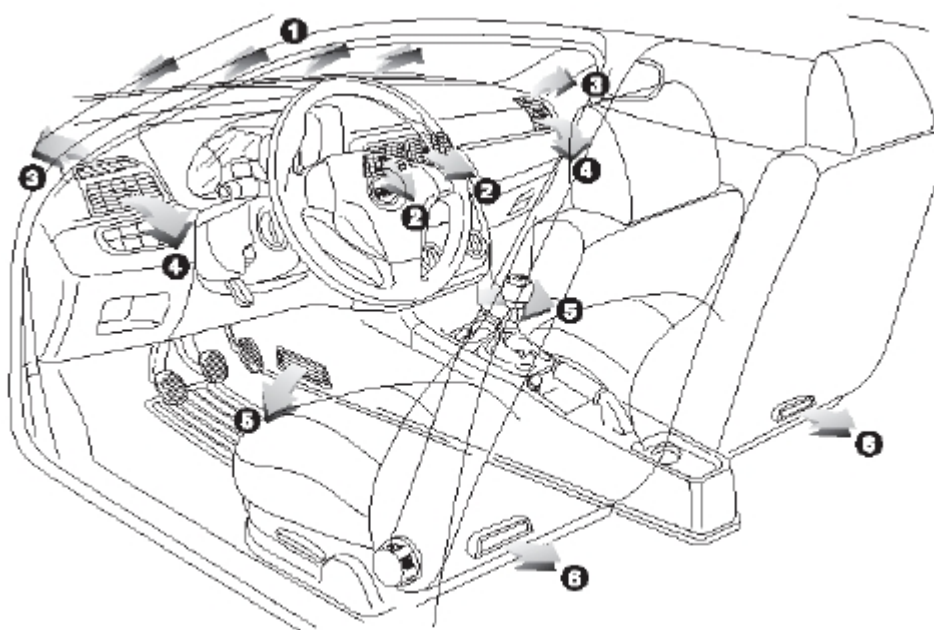
air conditioning

dual-zone automatic climate control with differentiated between driver and passenger both the temperature and air distribution.

These systems allow to divide and directing the streams in many ways, so as to ensure the desired effect, and always uniform throughout the interior.

Very useful is also the function of demisting the windscreen.

The fitting with air conditioner are provided with ducts for air distribution at the foot rear passengers.



Schematic flows and speakers



Dual-zone automatic climate control

Layout command climate

28/534

*H
e
a
t
e
r*

*A
i
r

C
o
n
d
i
t
i
o
n
e
r*



1.2.14 Sunroof

The roof of the new Punto is a specific system for large windows, called "Skydome", consisting of two glass panels: sliding front, fixed rear ..

The glasses are extended to an extent to replace more than 70% of the surface of the pavilion. In the opening phase of the moveable panel front slides out of the pavilion (position "Spoiler").



The extensive glazed roof allows plenty of light to enter.

This helps increase the feeling of space available for the occupants.

The roof aprible Skydome is equipped with sliding curtains which allow to limit the ingress of light in the cockpit.

1.2.15 Audio System

Audio sources are available based staging: Radio tuner, CD audio/MP3. The sound system on the car can be of two distinct categories:

Standard

Hi-Fi sound system

Standard system:



The system consists of n ° 6 speakers, divided into the following types:

- mid-woofer speaker 160 mm in diameter, 40W, positioned in the front doors, designed for the reproduction of the mid / low. The technology used for such components (water resistant) allowing them to withstand without damage splash of water present inside the door;
- tweeter speakers, 30W, positioned on door handles, designed to reproduce higher frequencies;
- speakers full-range of 130 mm in diameter, 40W, positioned in the rear side panels, in able to reproduce the full spectrum of audio frequencies. Even for these components is adopted the technology "water resistant".

Hi-Fi Sound System:

The system consists of n ° 6 speakers and a sub-woofer box containing an amplifier mono output channel.

The main characteristics of the components are as follows:

- mid-woofer speaker 160 mm in diameter, 40W, positioned in the front doors, designed for the best reproduction of the mid / low, even for such adopted the technology "water resistant";
- tweeter speakers, 40W, positioned on door handles, designed to reproduce higher frequencies;
- speakers full-range of 130 mm in diameter, 40W, positioned in the rear side panels, in able to reproduce the full spectrum of audio frequencies. Even for these components is adopted the technology "water resistant";
- sub-woofer box type "bass reflex", from 6.5 to 7 liters in volume, containing a speaker 130 mm in diameter, 100W for the reproduction of lower frequencies. This box is installed in the luggage compartment, right side wheel;
- mono audio power amplifier channel, positioned inside the box sub-woofer for the piloting the sub-woofer.



1.3 Lineaccessori

New Point accessories have been developed with the specific objective of giving the customer appropriate solutions to meet your needs to customize the car so emotional and functional.

The development, carried out with the involvement of the Fiat Style Centre, has had as a guideline the looking for exclusive products, consistent with the identity of the model, in its integrated form essential and practical value of the research.

The offer can be divided into the following areas:

1.3.1 Sportsmanship

To meet the requirement of living in their cars so we realized a more emotional KIT consists of side skirts, "spoiler" on the tailgate, appendices of aerodynamic front bumper giving the car a modern look aggression.

There are also a kit for alloy wheels 16 "and a 17", respectively 195/55R16 and 205/45R17 tires.

Completing the customization sports steering wheel and shift knob, leather cover aluminum pedals with rubber inserts for a more secure and comfortable.

1.3.2 Comfort - Utilities - free time

For greater ease of use are envisaged modern car anti turbulence deflectors, Kit rubber protective bumpers, side strips, interior rubber mats over or "carpets", tailored covers for the seats, holding various grid objects, a network dividing specific for the transport dogs, possibly combined with a tank semi-rigid polypropylene for easy cleaning of the luggage compartment.

The availability of an aluminum sill plate to be positioned on the internal threshold of the car complete the offering for customizing cosmetic / functional.

Especially for leisure, the accessory range offers cross bars on which

You can use the whole line of car rack specification available: SCI - BICYCLES - SURF.



For towing a trailer you can choose between two types of hooks, ball type removable. For owners of Apple I-Pod, Lineaccessori also offers a preparation for that allows its use by managing the contents through the system for radio gear.

1.3.3 Security

The active and passive protection of the car is guaranteed by a specific range of alarms and KIT from parking sensors to be placed on each side plate.

The traditional alarm, offered in a modular design with remote control activation / opening-closing doors, communicates via a CAN network with the electronic present on the vehicle. The potential break is signaled by sirens installed in the motor.

The CLEAR BOX or GSM-GPS locator is the best that current technology offers the field of automotive protection / satellite phone.

The form of matched Lineaccessori traditional alarm can have its own car always under control, clearly identifying the location and receive messages any break-ins.

The ultrasonic parking sensor, which is activated by the engagement of reverse gear signals sound barriers are not visible from the rear-view mirrors.

The Bluetooth Hands Free "MetaBlue" are also possible with confidence to telephone conversations without handling the phone, without any wire connection, handling calls with a single click of a button control and listening to the voice call directly on the audio of 'self, both in the case of the factory installed radio both in the case of device owned by the customer and even in the case of presence of the only susceptibility (speakers): safe and comfortable driving in the enforcement of traffic rules.



Child Safety

For cars equipped with specific attacks ISOFIX child seat is available for UNIVERSAL weights from 9 to 18 kg

The range is completed with traditional seats such as:

CRADLE up to 10Kg. weight;

Kiddy Life child seat weights from 9 kg. to 36 kg.



2 Specifications

2.1 Engine

2.1.1 Type of motor

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet 8V 120cv
Type Code	350A1000	199A3000	199A4000	199A2000	939A1000
Location in car	Front	Front	Front	Front	Front
Orientation	Transverse	Transverse	Transverse	Transverse	Transverse
No. of cylinders	4	4	4	4	4
Position cylinders	In line	In line	In line	In line	In line
N ° valves cylinder	2	4	2	4	2
Cycle	Eight	Diesel	Eight	Diesel	Diesel
Distribution	1ACT with variator phase	2ACT	1ACT	2ACT	1ACT
	With tappets mechanical	Rocker to finger with tappet hydraulics	With tappets mechanical	Rocker to finger with tappet hydraulics	With tappets mechanical
Fuel	Gasoline	Diesel	Gasoline	Diesel	Diesel
Supply fuel	Electronic MPI sequential phased	Injection MultiJet direct Common type Rail Turbo -geometry variable and Intercooler	Electronic MPI sequential phased	Injection MultiJet direct Common type Rail Turbo and Intercooler	Direct injection MultiJet type Common Rail with turbo geometry variable and Intercooler

2.
1.
2
D
at
a
E
n
gi
n
e

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Bore (mm)	72	69.6	70.8	69.6	82
Stroke (mm)	84	82	78.86	82	90.4
Total displacement (Cm ³)	1368	1248	1242	1248	1910
Ratio compression	11:1	17,6:1	11:1	17,6:1	18:1
Maximum power (Bhp EEC)	77	90	65	75	120
Maximum power (KW EEC)	56	66	48	55	88
System of power maximum speed (r / 1 ')	5750	4000	5500	4000	4000
Maximum torque (Nm EEC)	114	200	102.2	190	280
Maximum torque (EEC Kgm)	11.6	20.4	10.4	19.4	28.5
Conditions of maximum torque (R / 1 ')	3000	1750	3000	1750	2000
Idling (R / 1 ')	750 ± 50	n.a.	750 ± 50	n.a.	n.a.



2.2

A n g l e s o f T i m i n g

36/534

Valve clearance

Aspiration

Discharge

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Valve clearance cold operation Suction (mm)	0.3	-	0.3	-	n.a.
Valve clearance cold operation Drain (mm)	0.4	-	0.4	-	n.a.

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Opening before TDC (°)	-7 °	n.a.	1	n.a.	n.a.
Closing after PMI (°)	41 °	n.a.	47	n.a.	n.a.

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Opening the first SME (°)	57 °	n.a.	51 °	n.a.	n.a.
Closing after TDC (°)	-9 °	n.a.	-3 °	n.a.	n.a.



Injection

Ignition

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Marelli 5SF3	Marelli 6F3	Marelli 5SF3	Marelli 6F3	Bosh EDC16C9
Injection order	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Coils	F.M. BAE 940A	-	F.M. BAE 940A	-	-
Number of coils	4	-	4	-	-
Candles ignition	NGK ZKR7A- 10	-	NGK ZKR7A- 10	-	-
Unit command preheated	-	Bitron	-	n.a.	n.a.
Glow preheated	-	Beru 4L01192	-	n.a.	n.a.
Order ignition	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2	1-3-4-2



2.3 Characteristic curves of the motor

60

1
3
5

55

1
3
0

50

1
2
5

45

1
2
0

40

1
1
5

35

1
1
0

30

1
0
5

25

1
0
0

20

9
5

15

9
0

10

8
5

5

8

1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000

Speed [r / 1 ']

Engine 1.4 8V

Maximum torque: 114 Nm at 3000 r / min

Maximum power: 56 kW at 5750 r / min

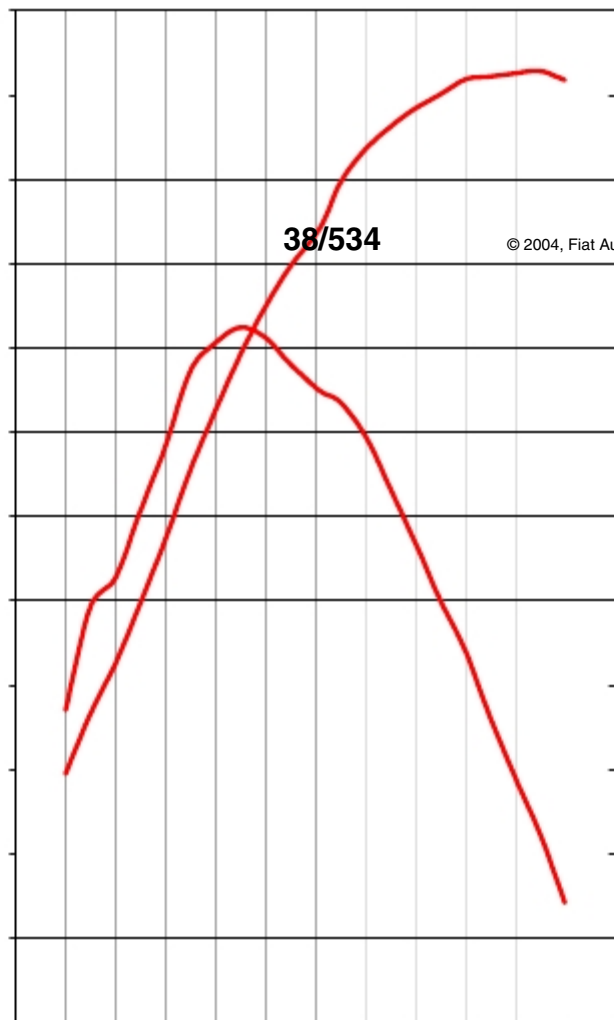
FIAT PUNTO

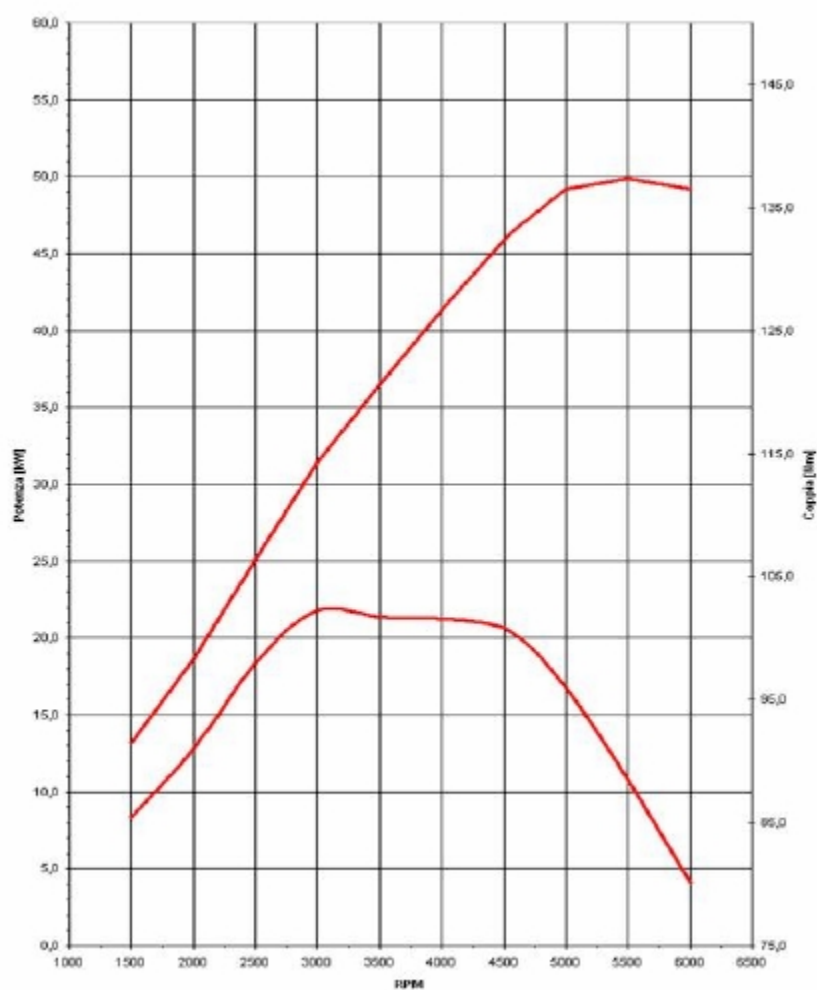
Power [kW]

38/534

© 2004, Fiat Auto S.p.A. - All rights reserved

Torque [Nm]



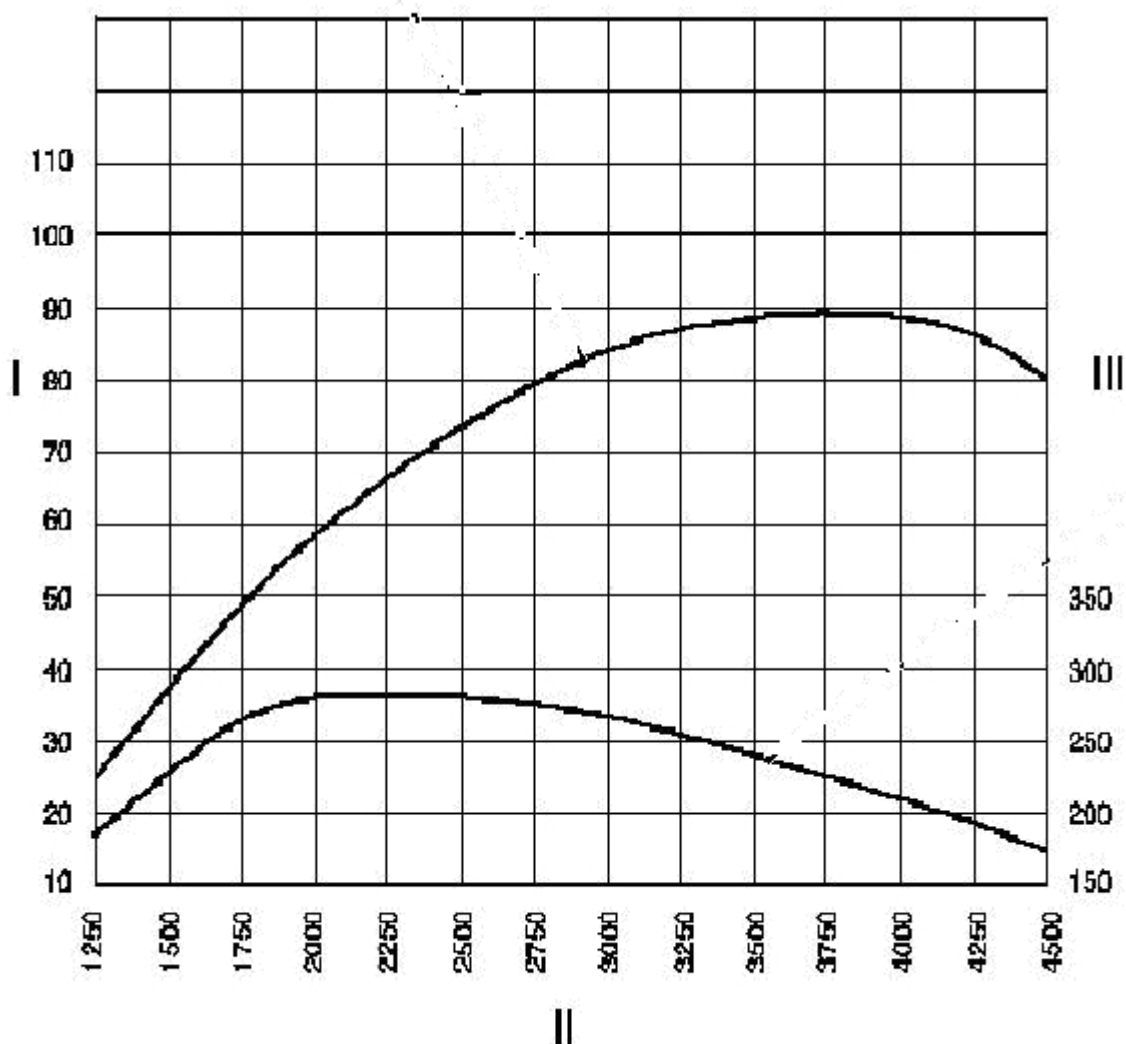


Engine 1.2 8V

Maximum torque: 102.2 Nm at 3000 r / min

Maximum power: 49.5 kW at 5500 r / min



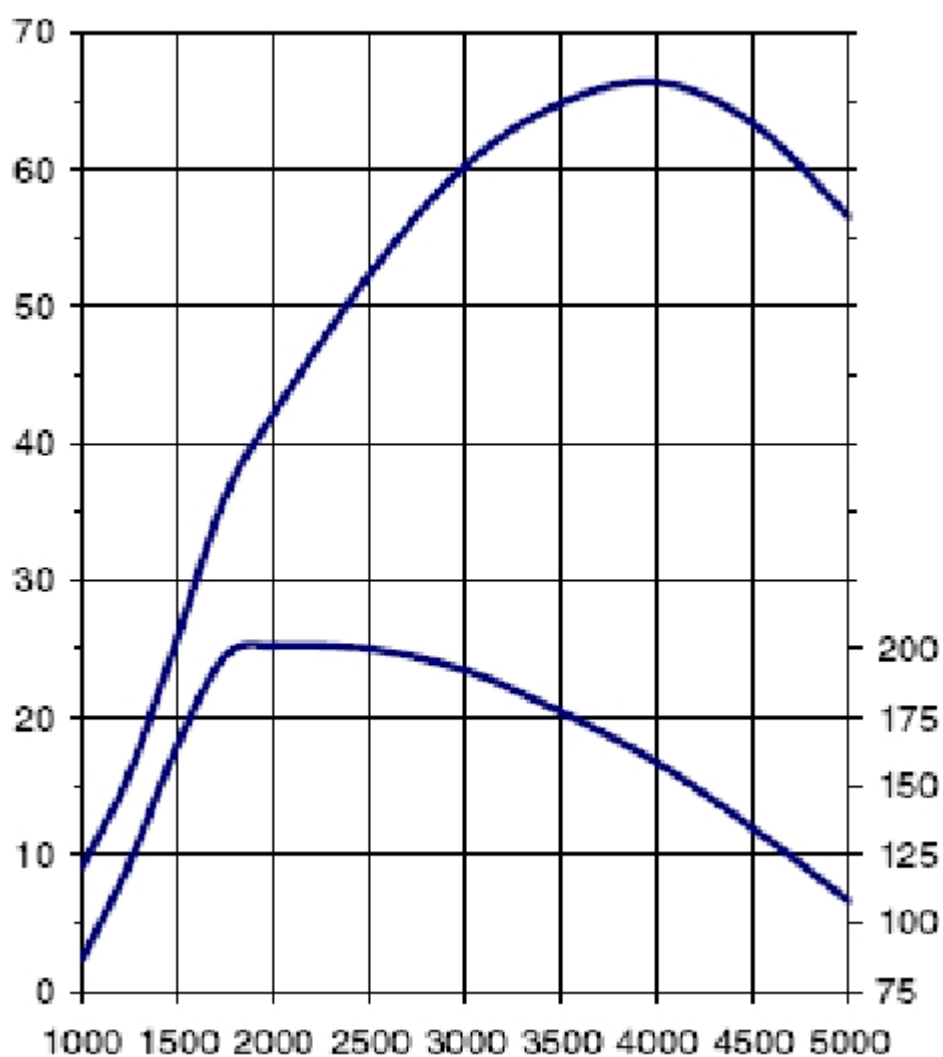


Engine 120 bhp 1.9 Multijet 8V

Maximum torque: 280 Nm at 2000 r / min

Maximum power: 88 kW at 4000 r / min





90 bhp 1.3 Multijet 16V

Maximum torque: 200 Nm at 1750 r / min

Maximum power: 66 kW at 4000 r / min



2.4 Transmi ssion

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Traction	Ant. Trans.	Ant. Trans.	Ant. Trans.	Ant. Trans.	Ant. Trans.

2.5 Clutch

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Drive	A push	A push	A push	A push	A push
Command	Hydraulic actuator external	Hydraulic external actuator	Hydraulic actuator external	Hydraulic actuator external	Hydraulic actuator external and with SAC (*)
Load spring disk (DaN)	n.a.	n.a.	n.a.	n.a.	n.a.
Supplier	Valeo	Luk	AP	Valeo	Luk

(*):-Recovery game



2
.
6
C
u
r
r
e
n
c
y

	8V/1.2 1.4 8V	1.3 Multijet 16V 75/90 hp	1.3 Multijet 16V 90 cv/1.9 Multijet 8V 120 hp
Type	C514	C510	M20/M32
Configuration	2 shafts in a cascade supported on bearings ball	2 shafts in a cascade supported on bearings ball (rear and Front shaft primary)	3 shafts supported on ball bearings
Overall length (from flywheel motor, mm)	372.75	382.5 (on axis primary)	332
Weight kg	33 Dry (34.5 with oil)	Dry 35.5 (37.3 with oil)	45 Dry (46.5 with oil) / 47 Dry (48.5 with oil)
Synchronizers	1,2,3,4,5, RM	1,2,3,4,5, RM	1,2,3,4,5,6, RM
Gears	Gearing HCR (High Contact Ratio)	HCR gears (High Contact Ratio)	Gearing HCR (High Contact Ratio)
Gear Ratio 1	3.909	3.818	3.818
Gear Ratio 2	2.158	2.053	2.053
Gear Ratio 3	1.480	1.302	1.302
Gear Ratio 4	1.121	0.959	0.959
Gear Ratio 5	0.921	0.744	0.744
Gear Ratio 6	-	-	0.614
Gear ratio RM	3.818	3.909	3.545



TECHNICAL DATA	TRACK TEACHING FIAT PUNTO	Fiat Auto S.p.A. After Sales Training
-------------------	---------------------------	--

2.7 Brakes

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Hydraulic Servo	Hydraulic Servo	Hydraulic Servo	Hydraulic Servo	Hydraulic Servo
Diameter cylinder booster	10"	10"	10"	10"	10"
Plant anti-lock	Bosch 8.0	Bosch 8.0	Bosch 8.0	Bosch 8.0	Bosch 8.0

2.7.1 Front brakes

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet 8V 120 hp
Disk-type	ventilated	ventilated	Not ventilated	ventilated	ventilated
Disc diameter (Mm)	257	284	257	257	284
Thickness Nominal (mm)	22	22	12	22	22
Type calipers	Bosch ZOH	Bosch ZOH	Bosch ZOH	Bosch ZOH	Bosch ZOH
Diameter piston Caliper (mm)	54	54	54	54	54

**2.7
.2
Re
ar
bra
ke
s**

45/534

**2
.
8
S
t
e
e
r
i
n
g**

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Drum	Drum	Drum	Drum	Disk
Drum diameter (mm)	228	228	203	228	264
Nominal Thickness (mm)	n.a.	n.a.	n.a.	n.a.	11
Type calipers	n.a.	n.a.	n.a.	n.a.	Bosch III BIR

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Electric EPS	EPS Electric	EPS Electric	EPS Electric	EPS Electric
Turning circle (m)	10.1	10.76	10.1	10.1	11
Number of turns lock to lock (for Overall steering)	2.8	2.8	2.8	2.8	2.8
Ratio steering box (Mm / rev)	51	60-44	51	60-44	60-44
Report corner steering wheel / wheel angle	15.7	13.4	15.7	13.4	13.4
Overall stroke					
Effort on the steering wheel catch (Nm)	2.5 (mod. city)	2.5 (mod. city)	2.5 (mod. city)	2.5 (mod. city)	2.5 (mod. city)



2.9 Front Suspension

Coil springs

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Wire diameter (mm)	11.2	11.5	11.2	11.5	11.8
Number of turns profit	4.32	4.82	4.32	4.82	5.32
Sense of 'propeller	Dx	Dx	Dx	Dx	Dx
Height of free spring (Mm)	353	377	353	377	402
Height spring package	60	67	60	67	75
Height of spring under load control (mm)	178	178	178	178	178



Shocks

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Shock cuts 22x32x46.5 (Diameter: stem / Piston / tube ext) Mechanical stop traditional	Shock cuts 22x32x46.5 (Diameter: stem / Piston / tube ext) Stop mechanical traditional	Shock cuts 22x32x46.5 (Diameter: stem / Piston / tube ext) Stop mechanical traditional	Shock cuts 22x32x46.5 (Diameter: rod / piston / Ext tube) Stop mechanical traditional	Shock cuts 22x32x46.5 (Diameter: rod / piston / Ext tube) Stop mechanical traditional
Length open (early tamponade) mm	527	527	527	527	527
Length closed (in beat) mm	351	351	351	351	351
Stroke (mm)	176	176	176	176	176

(Different setting)

Front stabilizer bar

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Bar diameter (Mm)	18	19	n.a.	n.a.	n.a.

2.10 Rear Suspension

Coil springs

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet 8V 120 hp
Diameter of wire (Mm)	10.5	10.5	n.a.	n.a.	n.a.
Number of turns profit	4.2	4.2	n.a.	n.a.	n.a.
Sense of 'propeller	Dx	Dx	n.a.	n.a.	n.a.
Height of spring free (mm)	291.5	279	n.a.	n.a.	n.a.
Height of spring Theoretical Project	155	155	n.a.	n.a.	n.a.
Height of spring pack (mm)	58	58	n.a.	n.a.	n.a.



Shocks

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Type	Shock cuts 14.2x27x38 (Diameter: stem / piston / tube ext) Mechanical stop traditional	Shock cuts 14.2x27x38 (Diameter: stem / piston / tube ext) Mechanical stop traditional	Shock cuts 14.2x27x38 (Diameter: stem / piston / ext tube) Stop mechanical traditional	Shock cuts 14.2x27x38 (Diameter: rod / piston / Ext tube) Stop mechanical traditional	Shock cuts 14.2x27x38 (Diameter: rod / piston / Ext tube) Stop mechanical traditional
Length open (early tamponade, (Mm)	651.0	651.0	651.0	651.0	651.0
Length closed (in joke, (mm)	388.0	388.0	388.0	388.0	388.0
Stroke (mm)	263	263	263	263	263

Stabilizer bar: absent, replaced by torsion of suitable thickness

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet 8V 120 hp
Bridge "soft" (Mm)	4.5	4.5	4.5	4.5	4.5
Bridge "medium" (Mm)	5.9	5.9	5.9	5.9	5.9
Bridge "Hard" (Mm)	7.1	7.1	7.1	7.1	7.1

Crossbar

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Bridge "soft" (Mm)	4.5	4.5	n.a.	n.a.	n.a.
Bridge "Medium" (Mm)	5.9	5.9	n.a.	n.a.	n.a.
Bridge "Hard" (Mm)	7.1	7.1	n.a.	n.a.	n.a.

2.11 Suspension and steering angles suspensions

Standard A = unladen including spare wheel, tools, accessories, supplies, full fuel

Standard 0 = downloads including spare wheel, tools, accessories, supplies, with 5 liters of fuel

NB Only the convergence of the front wheels can be adjusted in the workshop



2.11.1 Front

Convergence

Engines	Tyres	Standard 0	Standard A
1.2 8V	175/65 R15 84T	+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.2 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 16V	185/65 R15 88T	+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Multijet 16V 90 hp		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 16V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Multijet 16V 90 hp		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
120 bhp 1.9 Multijet 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 16V	195/55 R16 87H	+ 2 mm + / - 1 mm	+ 1.87 mm + / - 1mm
120 bhp 1.9 Multijet 8V		+ 2 mm + / - 1 mm	+ 1.87 mm + / - 1mm



Camber

Engines	Tyres	Standard 0	Standard A
1.2 8V	175/65 R15 84T	-22 ' + / - 20'	-27 ' + / - 20'
1.4 8V		-22 ' + / - 20'	-27 ' + / - 20'
1.2 8V		-22 ' + / - 20'	-27 ' + / - 20'
1.4 8V		-22 ' + / - 20'	-27 ' + / - 20'
1.4 16V	185/65 R15 88T	-26 ' + / - 20'	-28 ' + / - 20'
1.3 Multijet 16V 90 hp		-26 ' + / - 20'	-28 ' + / - 20'
1.4 16V		-26 ' + / - 20'	-28 ' + / - 20'
1.3 Multijet 16V 90 hp		-26 ' + / - 20'	-28 ' + / - 20'
120 bhp 1.9 Multijet 8V		-26 ' + / - 20'	-28 ' + / - 20'
1.4 16V	195/55 R16 87H	-19 ' + / - 20'	-21 ' + / - 20'
120 bhp 1.9 Multijet 8V		-19 ' + / - 20'	-21 ' + / - 20'



2.11.2 Rear

Convergence

Engines	Tyres	Standard 0	Standard A
1.2 8V	175/65 R15 84T	+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.4 8V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.2 8V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.4 8V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.4 16V	185/65 R15 88T	+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.3 Multijet 16V 90 hp		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.4 16V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.3 Multijet 16V 90 hp		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
120 bhp 1.9 Multijet 8V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
1.4 16V	195/55 R16 87H	+1.3 Mm + /-2mm	+1.5 Mm + /-2mm
120 bhp 1.9 Multijet 8V		+1.3 Mm + /-2mm	+1.5 Mm + /-2mm



Camber

Engines	Tyres	Standard 0	Standard A
1.2 8V	175/65 R15 84T	-1 ° + / -20 '	-1 ° + / -20 '
1.4 8V		-1 ° + / -20 '	-1 ° + / -20 '
1.2 8V		-1 ° + / -20 '	-1 ° + / -20 '
1.4 8V		-1 ° + / -20 '	-1 ° + / -20 '
1.4 16V	185/65 R15 88T	-1 ° + / -20 '	-1 ° + / -20 '
1.3 Multijet 16V 90 hp		-1 ° + / -20 '	-1 ° + / -20 '
1.4 16V		-1 ° + / -20 '	-1 ° + / -20 '
1.3 Multijet 16V 90 hp		-1 ° + / -20 '	-1 ° + / -20 '
120 bhp 1.9 Multijet 8V		-1 ° + / -20 '	-1 ° + / -20 '
1.4 16V	195/55 R16 87H	-1 ° + / -20 '	-1 ° + / -20 '
120 bhp 1.9 Multijet 8V		-1 ° + / -20 '	-1 ° + / -20 '



2.12 Battery and Alternator

Version without air conditioning

	1.4 8V	1.3 Multi 16V
Battery (Ah)	40	50
Alternator (A)	70	75

Versions with air conditioning

	1.4 8V	1.3 Multijet 16V
Battery (Ah)	50	50
Alternator (A)	70	90

2.13 Fluids and Lubricants

Oils and fluids

Product Features Recommended

	1.4 8V	1.3 Multijet
Engine Oil	Selenia K	Selenia K
Transmission fluid / differential front	Protects car Techno	Protects car Multi
Brake Fluid	Protection Top 4	Protection Top 4
Radiator fluid	Paraflu up to 50%	Paraflu up to 50%



Fats

Product Features Recommended

	1.4 8V	1.3 Multijet 16V 90
CV joint		
Front side differential	Protection MRM Zero	Protection Star 3
CV joint front wheel side	Star Protection	Protection Star 5
Wheel hubs, tie rods steering, various organs	n.a.	n.a.
Lubrication protection organs underbody	n.a.	n.a.
Lubrication brake circuit components	n.a.	n.a.
Steering box and rack	n.a.	n.a.

Lubricant properties

Oils Quantity:

	1.4 8V	1.3 Multijet 16V 90
Engine oil (quantity for substitution regular cup and filter, l)	2.6	3.2
Oil gearbox / differential front (Kg)	1.5	2.08

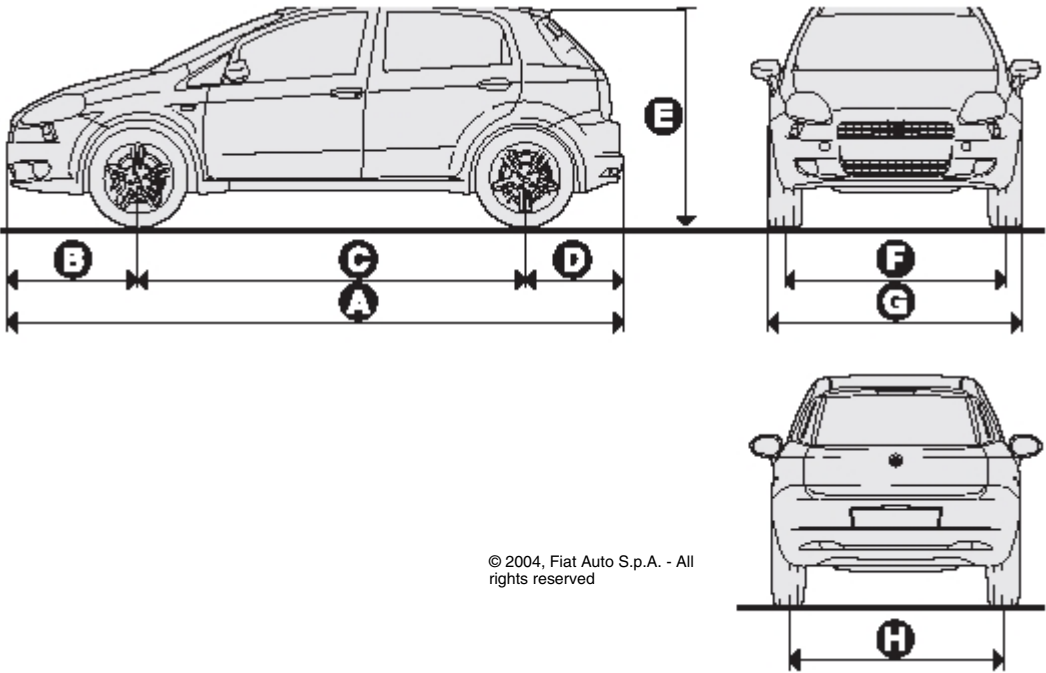


2.14 Characteristics car

2
·
1
4
·
1
D
i
m
e
n
s
i
o
n
s

FIAT
PUNTO

	1.4 8V	1.3 Multijet 16V 90	1.5
A	4030	4030	403
B	875	875	875
C	2510	2510	251
D	645	645	645
It	1490	1490	149
F	1473	1473	147
G	1687	1687	168
H	1466	1466	146



© 2004, Fiat Auto S.p.A. - All rights reserved



2.14.2 Performance

	1.4 8V	1.3 Multijet 16V
Maximum Speed (Km / h)	170	185
Acceleration (s, 0-100 Km / h, 2 pers. + 20 kg)	12	12

* = Exhibition sporting

2.14.3 Supplies

	1.4 8V	1.3 Multi 16V
Fuel (L)	45	45
Fuel (liters)	(5-7)	(5-7)
Cooling system (L)	5.27	7.4
Engine oil and filter (liters)	2.6	3.2
Circuit brakes (kg)	0.5	0.5



2.14.4 Consumption

(Dir 199/100/CE liters per 100 km)

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Urban	7.7	5.9	7.9	5.9	7.5 (* 7.6)
Suburban	5.2	3.9	5.1	4.0	4.5 (* 4.6)
Combined	6.1	4.6	6.1	4.7	5.6 (* 5.7)

* = Exhibition sporting

2.14.5 Emissions

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
CO2 (g / km)	145	122	145	123	149 (* 150)

* = Exhibition sporting

All engines comply with Euro 4 emission limits.

2.14.6 Tyres

	1.4 8V	1.3 Multijet 16V 90 hp	1.2 8V	1.3 Multijet 16V 75 hp	1.9 Multijet V8 120 hp
Equipment serial	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T 195/55 R16 87H 205/45 R17 88V	175/65 R15 84T 185/65 R15 88T	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T 195/55 R16 87H 205/45 R17 88V
Wheels snow	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T 195/55 R16 87H	175/65 R15 84T 185/65 R15 88T	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T 195/55 R16 87H
Rotate stock	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T	175/65 R15 84T 185/65 R15 88T	175/65 R15 84T 185/65 R15 88T	185/65 R15 88T



2.14.7 Inflation Pressures (bar)**Version 1.4 8V**

Measure	Pressure inflation medium load front	Pressure inflation medium load back	Pressure inflation full load front	Pressure inflation full load back
175/65 R 15 84T	2.2	2.1	2.2	2.2
185/65 R 15 88T	2.2	2.0	2.2	2.2

Version 1.3 16V Multijet 90 hp

Measure	Pressure inflation medium load front	Pressure inflation medium load back	Pressure inflation full load front	Pressure inflation full load back
185/65 R 15 88T	2.3	2.1	2.3	2.3
195/55 R 16 87H	2.3	2.1	2.4	2.4
205/45 R 17 88V	2.4	2.2	2.5	2.4



Version 1.2 8v

Measure	Pressure inflation medium load	Pre: infl: mec load
175/65 R 15 84T	2.2	2.1
185/65 R 15 88T	2.2	2.0

Version 1.3 Multijet 16V 75hp

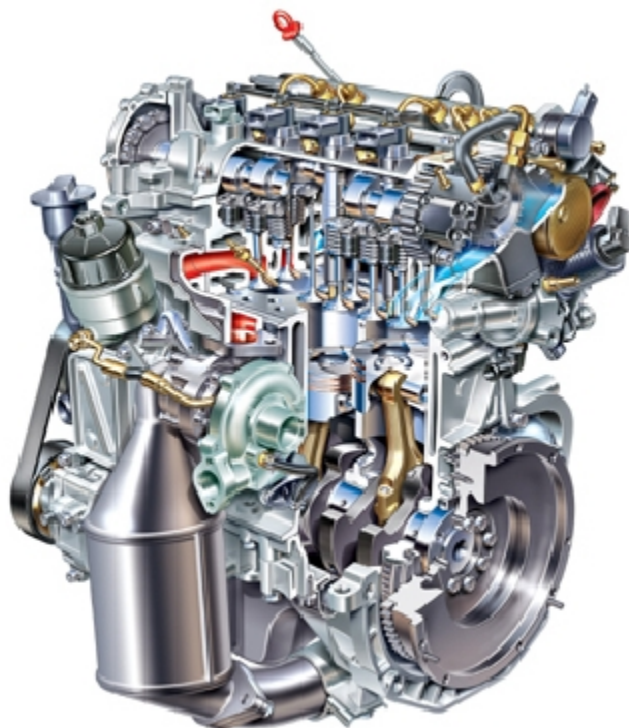
Measure	Pressure inflation medium load	Pre: infl: mec load
175/65 R 15 84T	2.4	2.1
185/65 R 15 88T	2.3	2.1

Version 1.9 8v Multijet 120 bhp

Measure	Pressure inflation medium load	Pre: infl: mec load
185/65 R15 88H	2.4	2.2
195/55 R 16 87H	2.4	2.2
205/45 R 17 88V	2.6	2.3



3 Engine 1.3 16V Multijet 75 hp and 90



3.1 General

Turbocharged diesel engine, direct injection without pre-chamber, 4-cylinder, 1248 cc, four valves per cylinder with hydraulic tappets, camshafts in the head with transmission motorcycle gear, air supercharger with turbocharger and intercooler, the empty weight 137 kg (75 hp) 139 kg (90 hp), electronic injection Magneti Marelli MJD 6F3 Common Rail.

These engines adopt a fuel injection system for diesel engines with high pressure fast "Magneti Marelli Common Rail" fully managed by a central Multijet MJD6F3



This engine is able to provide the following benefits:

maximum power of 55 kW (75 hp) EEC at 4000 rpm / min, 66 kw (90 HP) EEC at 4000 r / min

maximum torque 190 Nm (19.4 kgm) at 1750 rpm EEC / min, 200 Nm (20.4 kgm) at 1750 rev / min

For the reduction of polluting emissions these engines are equipped with:

- Exhaust system with oxidising catalytic converter;
- EGR exhaust gas recirculation system (modified to 90 hp) with heat exchanger
- Plant vapors blow / crankcase gases.
- Or UEGO lambda sensor (temperature sensor DPF opt only 90 hp)
- New pressure regulator 2 DRV
- New rail pressure sensor 4 RDS

The group is a system composed by the motor and all the installations involved in its Operation:

- Fuel system fuel;
- Plant supercharging air;
- Engine cooling system;
- Exhaust system with catalytic converter;
- Plant Oil vapors blow;
- Implantation of exhaust gas recirculation E.G.R. with heat exchanger;

The optimization of the functioning of these plants is achieved by an electronic system of governed by a control unit.

Understanding the logical operation of the unit allows you to have a

Overall the entire system



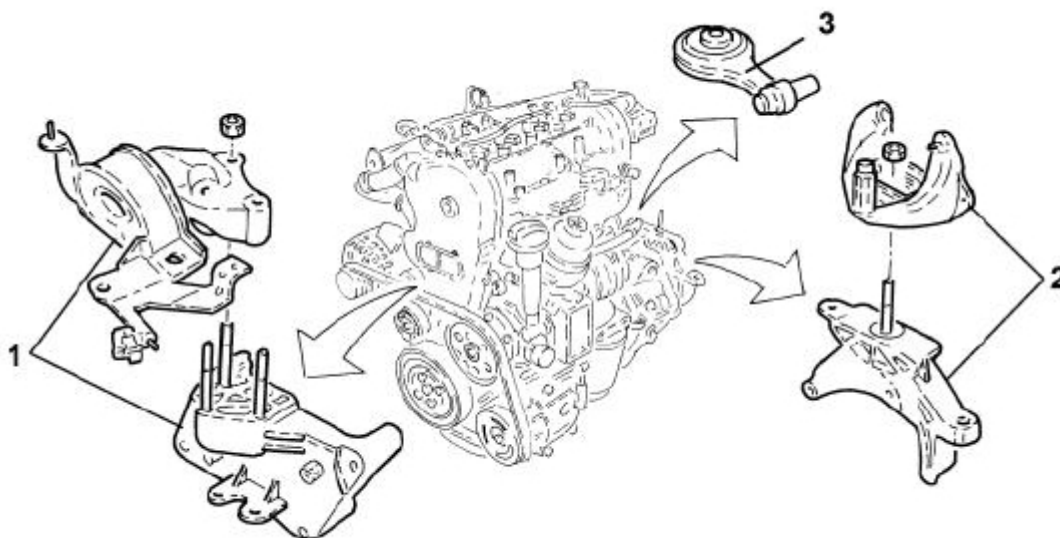
3.2 Components

3.2.1 supports of the powerplant

The supports of the drive train have the function of structural connection between powertrain and chassis.

They are sized to carry the weight of the powerplant and withstand the loads arising from torque transmitted from the engine. Modified to support the 90 hp and torque values of weight 200 Nm more

Each support is provided with a gusset rubber - metal that has the task of damping the vibrations generated by the engine, reducing the vibrations transmitted in large part to the body. It is a powerplant support barycentric type, consisting of two blocks plus a reaction rod, which acts as a tie rod, in which the new media are aligned on an axis passing through the center of gravity of the engine in order to obtain reaction forces with arm nullo. In more 'on 90 and cv' was introduced additional support for the right axle shaft.

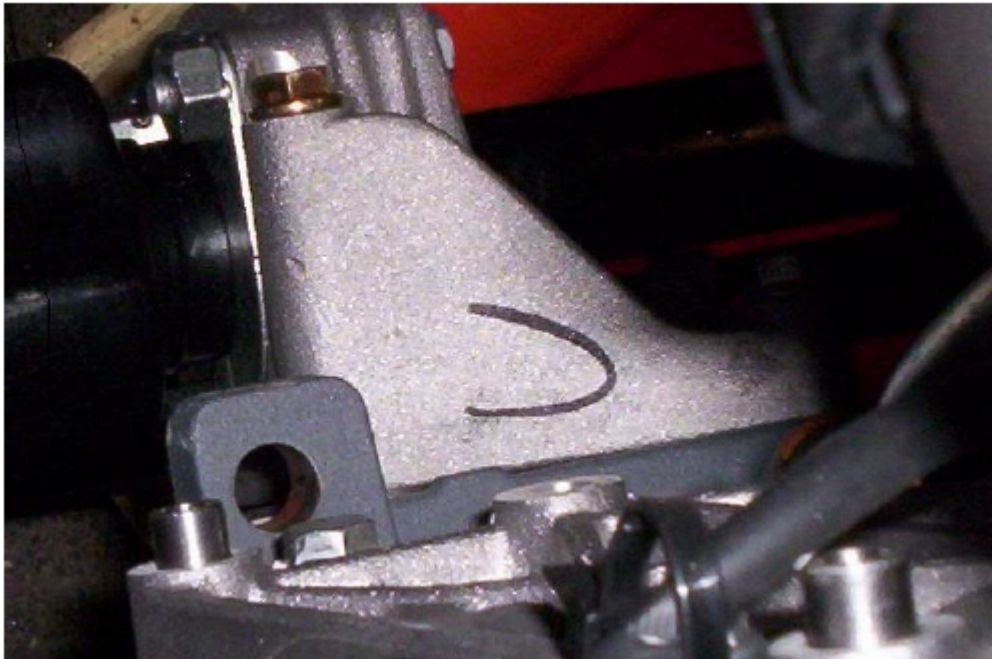


1 side support distribution

2 Support transmission side

3 Tie reaction





Support the right axle shaft 1.3 Multijet 90 hp

3.2.2 Crankcase

The base is cast iron.

The cylinders are cut into the base and are available in three size classes plus a mark.

- Class A
- Class B
- Class C

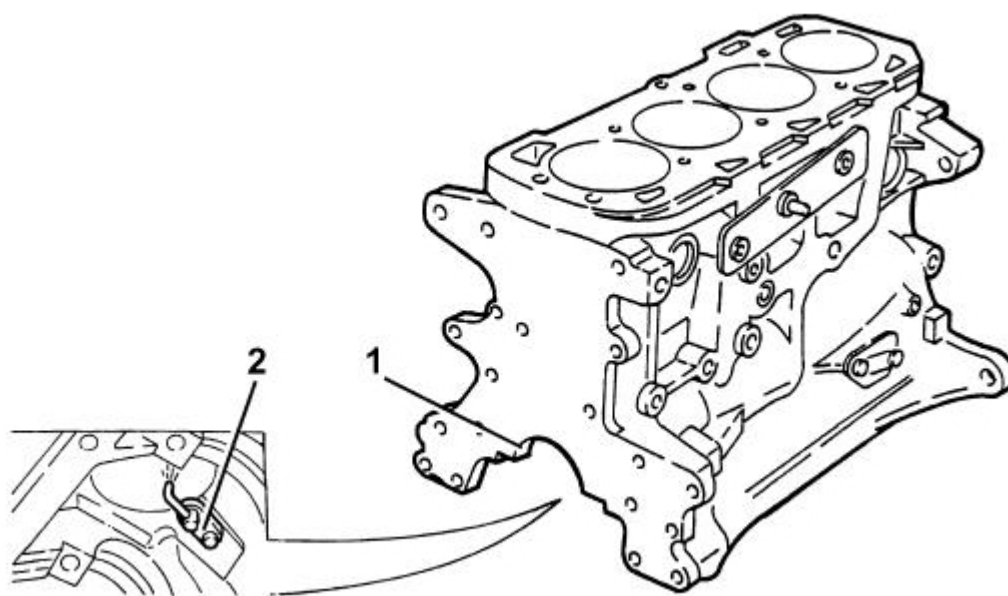
Plus a surcharge

L 'of the motor shaft is supported by five main bearings (1).

Special ducts formed in the walls of the base, allow the passage of coolant and lubricating oil.

In the lower part of each cylinder is installed a jet (2) from which the oil is sprayed on the piston crown to cool and fall to ensure the lubrication of the pin.





3.2.3 Base lower

The lower base is made of aluminum alloy die-cast, with the bearing caps in cast iron.

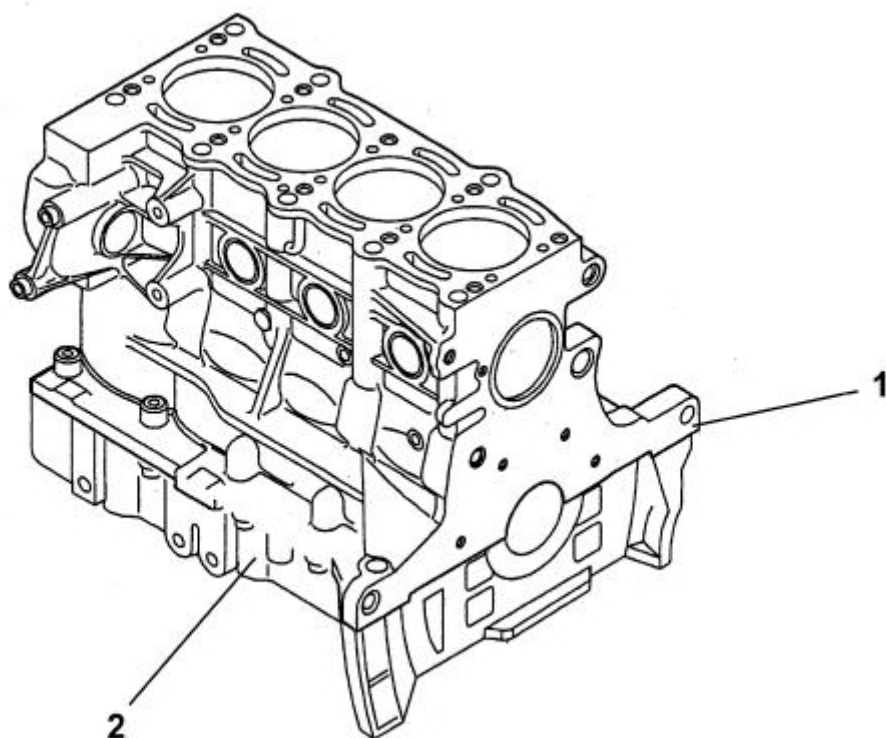
The finishing media and bearing caps are made in conjunction with the upper crankcase.

Coupling with the upper crankcase is achieved by means of screws and dowels centering, which guarantee the precision of assembly.

Interposed between the two bases is a bead of sealant to prevent leakage of engine oil.

The figure below shows the upper block (1) and the lower base (2).





3.2.4 CYLINDER HEAD

The cylinder head is monolithic alloy of aluminum and silicon.

Two camshafts in the head, ductile iron, housed in an overhead, the command is Mixed-chain gears.

The four valves per cylinder, parallel and vertical, are placed in the appropriate guide controlled by valves and rocker arms actuated by the cams of the camshaft and maintained at Contact the valves via hydraulic tappets.

The valve guides are planted in their seats in the cylinder head interference. The improvement of the internal diameter is achieved, after mounting, with reamer specific.

Compared to the cylinder heads with pre-chamber, the entire combustion process takes place in the combustion chamber formed in the piston.

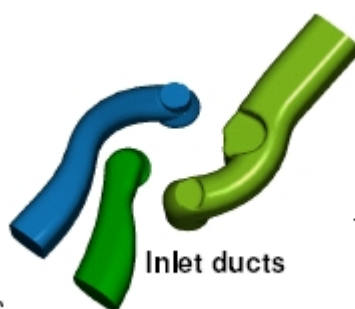
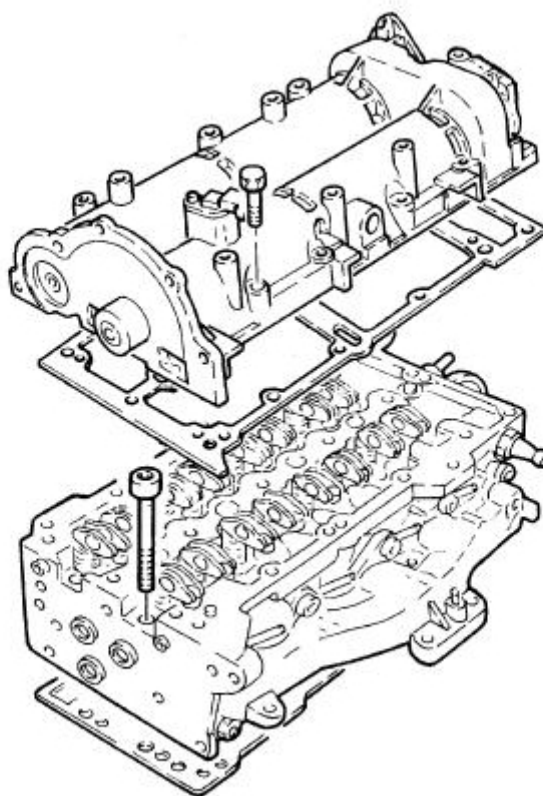
The seal between the cylinder head and the base is metal and there are no riserraggi of head for the whole life of the engine.

The 90 bhp engine, the combustion system has necessarily been modified to improve the flows into and out.

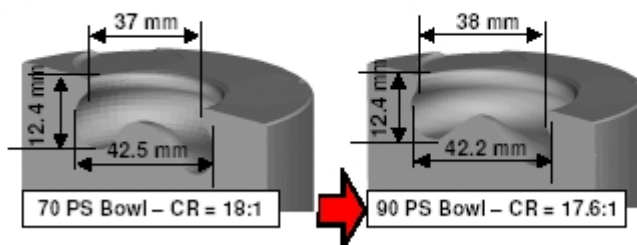
The design of the inlet ducts and was modified by increasing the flow capacity while has been improved volumetric efficiency at high speeds as a result of a reduction in the level Swirl

The design of combustion chambers has been changed, increasing the diameter and consequently reducing the compression ratio from 18:1 to 17.6:1.



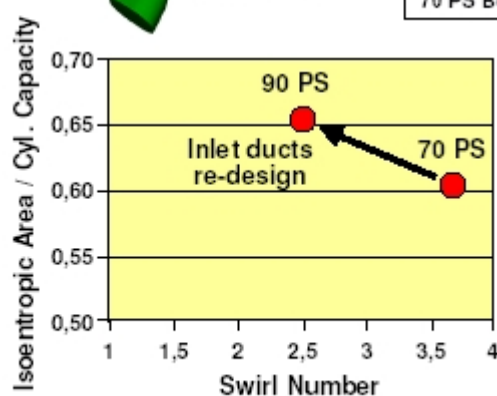


Inlet ducts



70 PS Bowl – CR = 18:1

90 PS Bowl – CR = 17.6:1



Nozzle features		70 PS	90 PS
Type	KS - microsac		
Holes number		5	6
Nominal hole diam (mm)		0.13	0.12
Flow rate (cm³/30s)		270	280



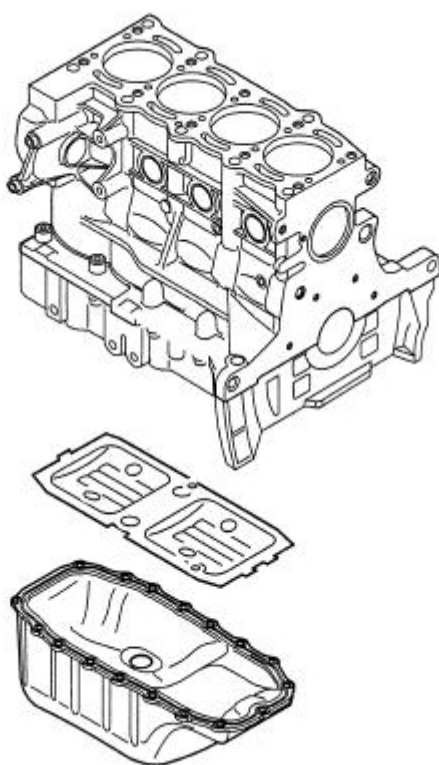
3.2.5 Cup and base covers

The oil sump of the base is a structural part of the engine with mechanical functions which has the task to accommodate the lubrication oil of the engine.

E 'consists of stamped steel and includes a threaded hole with cap to allow oil motor.

The seal with the base is obtained by a cordon of silicone sealant.

Between the base and cup engine oil is interposed a bulkhead that, in addition to avoiding the shaking engine oil (due to movement of the vehicle and of the 'shaft), guarantees that the level remains constant.



3.2.6 Oil seals on crankshaft

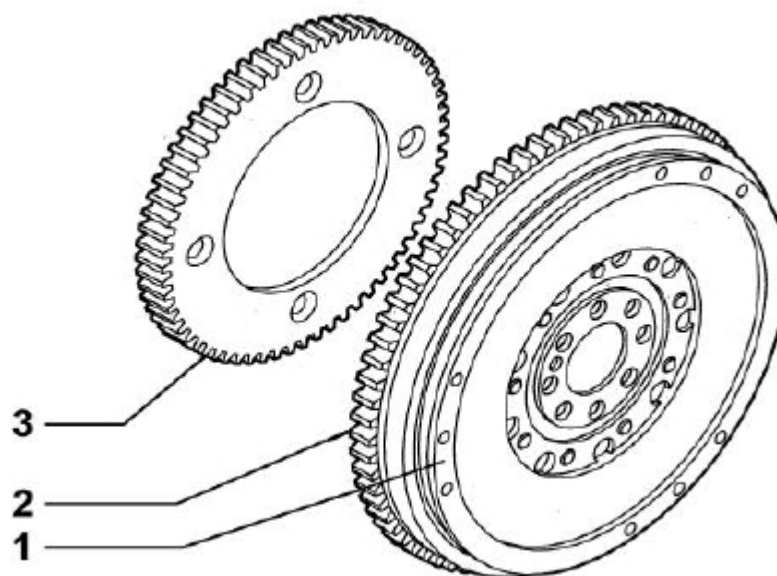
The seal on the front of the motor shaft is formed by a ring seal mounted on the timing cover.

The rear seal of the motor shaft is formed by an oil seal ring inserted directly into the recess between the base and crankcase.

3.2.7 Flywheel

The flywheel is made of cast iron with steel ring gear shown.

The flywheel is fixed by means of a flange with bolts to the motor shaft, toward the motor side is fixed a toothed wheel for the rpm sensor.



1 Flywheel

2 Sprocket reported

3 Pole wheel for speed

Operation



The flywheel is the organ that makes the uniform rotation of the motor, storing energy during the active phases (expansion) and releasing it during the passive phases.

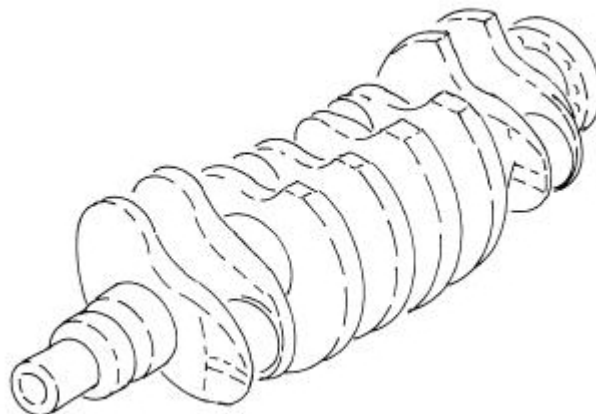
The flywheel is designed to allow the engine to idle without stopping or win the work of friction developed by the latter during the load operation.

3.2.8 Crankshaft

It 's forged steel, rests on five main bearings and its axial clearance is regulated by housed in two split main bearing center.

Eight crankshaft counterweights give a careful balancing of rotating masses.

A series of ducts along internally the drive shaft for the lubrication of journals and connecting rod.



3.2.9 Pistons

The pistons made of aluminum alloy with the silicon anti-friction inserts are divided into three classes dimensional.

Class A 69.520 + 69.530 (75 hp) nd (90 hp)

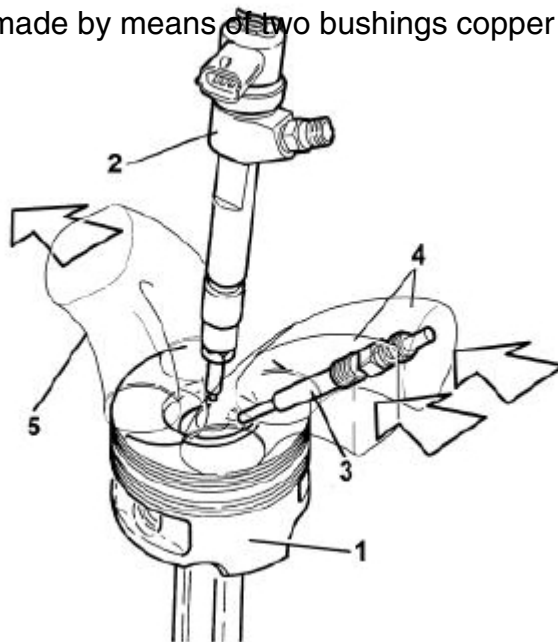
Class B 69.530 + 69.540 (75 hp) nd (90 hp)

Class C 69.540 + 69.550 (75 hp) nd (90 hp)

On the piston crown is formed in the combustion chamber "OMEGA" to improve the combustion efficiency. (see cylinder head)

Inside of the plug is formed a channel through which flows the oil sent to the sprayers, ensuring a better cooling of the piston itself.

The coupling with the pin is made by means of two bushings copper alloy.



1 Piston

2 electro-

3 Glow plugs

4 Air Inlet

5 Exhaust gas outlet

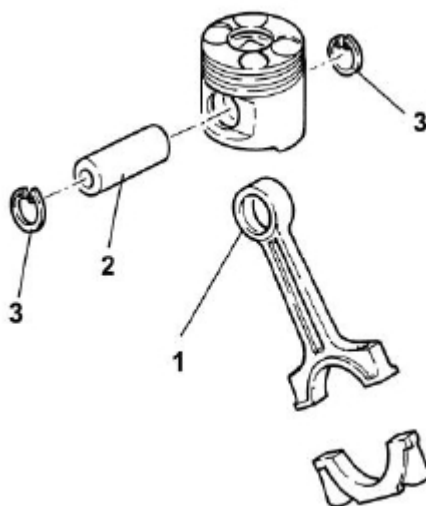


3.2.10 Connecting Rods

The connecting rods are made of hardened steel with copper sleeve (1) planted to mate with the pin (2) of the piston.

The pins of the float type, are retained by two elastic rings expansion (3) that are based on groove formed within the housing of the plug.

Coupling rod cap with machined surfaces. To withstand the pressure values specified in 90 hp, the connecting rod bearings above have been changed. See diagram



Con rod bearing

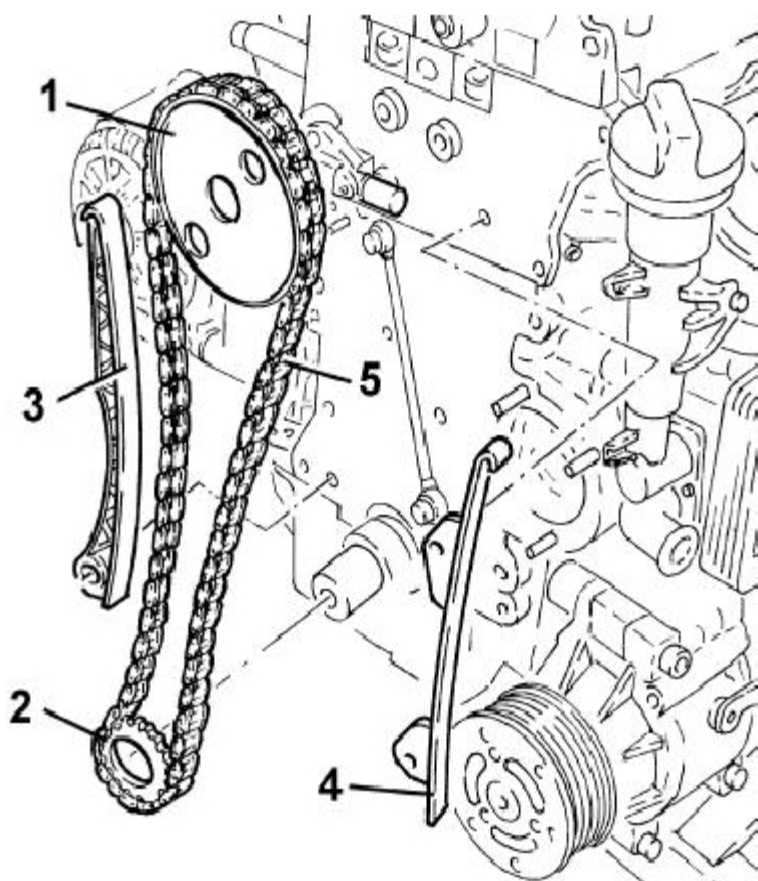
New material due to increased specific pressure:

	70HP	90HP
Main bearing (lower)	AS16	AS16
Main bearing (upper)	AS16	AS16
Conrod (lower side)	CL157	CL157
Conrod (upper side)	CL118	CL119



3.2.11 Distribution control

The control of distribution is controlled directly through the chain.



- 1 driven gear
- 2 Driving gear
- 3 Mobile Skate
- 4 shoe drive
- 5 Chain Distribution



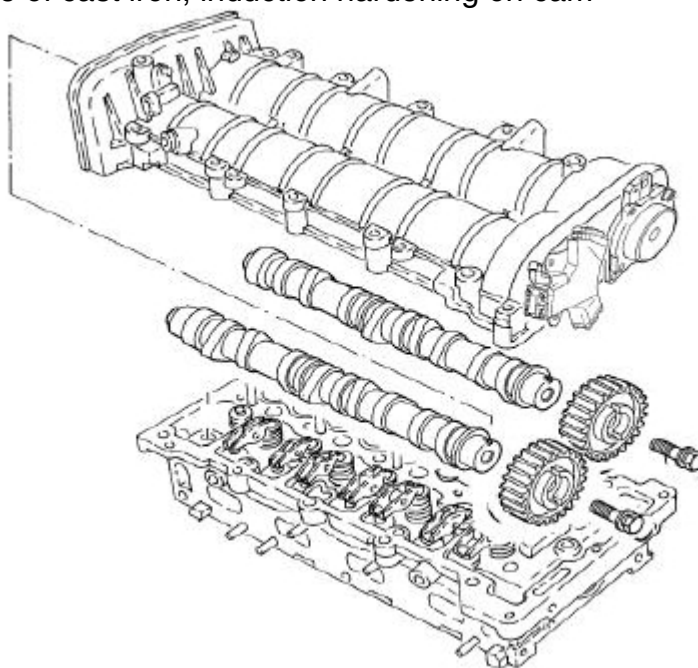
3.2.12 Tie the timing chain



The tension of the chain distribution is carried out by an automatic tensioner (which limits the maintenance operations) to oil pressure mounted within the distribution on the monobloc and acts on the movable shoe.

3.2.13 camshafts in the upper crown

Two camshafts made of cast iron, induction hardening on cam



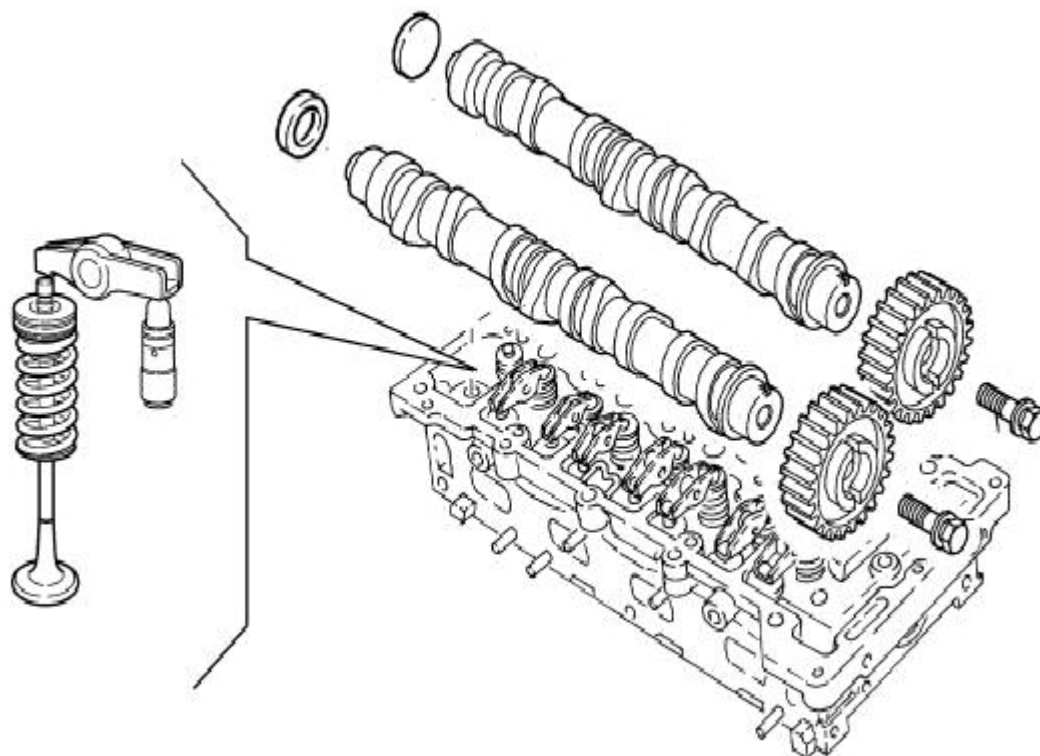
The camshaft exhaust side is controlled directly from the chain and transmits the motion distribution to the shaft suction side, via a pair of straight cut gears.

The camshaft exhaust side also controls the high-pressure pump, while the suction side controls the vacuum.

3.2.14 Lifter

For each valve is used a hydraulic tappet actuated by a rocker arm in turn moved from the axis to the camshaft.

The rockers are made so as to avoid serious damage to other organs of the motor in case of breaking or scalettamento of the distribution chain, in fact, thanks to a section to fracture deforming predetermined absorb the stresses caused by the contact of the valves with the pistons.



Intake-exhaust valve diameter 21.47 mm



3.2.15 preheating unit

characteristics

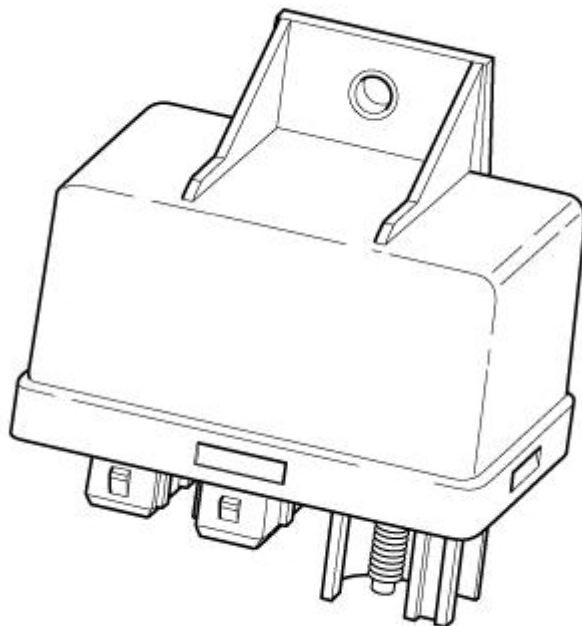
The device is interfaced to and controlled by the engine control system according to the protocol EOBD. E 'state project in order to fulfill all the functions of driving and monitoring the state of operation of the individual glow plugs during the preheating phase of the diesel engine.

The control unit incorporates a protection for high current and voltage surges and is equipped with a logic

nusibile electronic self resetting.

The device can be mounted, given the characteristics and thermal resistance external, directly in the engine compartment.

The unit is protected on all terminals from possible electrical connections with inversions Battery polarity and is constructed to withstand all the stresses present in the car.



The unit provides the following connection terminals:



Terminal	Name
30	Direct connection to the battery positive (+Vbat) to
G1, G2, G3, G4	the power of
86	the glow plugs
31	Output for connection of the glow plugs
ST	
K	Power from the engine control unit
A	Connection to ground (GND)
	Input for start signal supplied to the control motor control
	Input for start signal supplied to the control motor control
	Output for the diagnosis directed to the control unit engine

3.2.16 Turbocharger

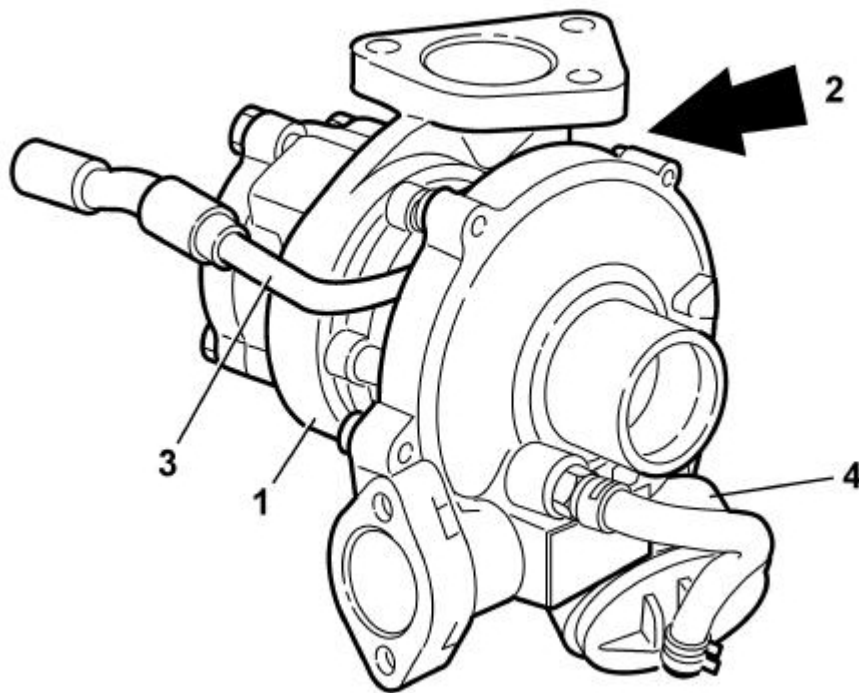
The turbocharger (1) is connected to the exhaust manifold; has the purpose to increase the engine's volumetric efficiency.

E 'consists essentially of two impellers keyed on the same shaft, which rotates on floating bearings lubricated by a derivation (3) of the engine lubrication circuit.

80/534

	© 2004, Fiat Auto S.p.A. - All rights reserved





1 Turbocharger

2 Waste gate

3 Derivation of the lubrication circuit

4 Pneumatic

The oil used, disposing of the large amount of heat given off by the exhaust gas to the turbine. On the turbocharger is mounted a valve WASTE - GATE (2) controlled by a pneumatic actuator (4), which allows to divide the passage of the exhaust gas to the turbine, depending on the pressure reached at the compressor outlet.

BORG WARNER VNT turbocharger 90 hp

The MJTD 90 hp 1.3 engine features a new generation of turbochargers, the VNT turbocharger (Variable Nozzle Turbines). The drive of the blades of the



solenoid valve is. With this technology it is possible to achieve optimal turbocharger at all speeds.

The aim of a turbocharger

The purpose of a turbocharger is to obtain high torques, and then further performance of the motor. This is possible by compressing the intake air. Due to the higher density at each stage Suction can be entered into the combustion chamber of the engine greater amount of oxygen. The higher content of oxygen improves combustion and is therefore increase the power.

The thermal energy and kinetic energy of the exhaust gases of the engine is used to operate the turbine exhaust gas turbocharger. The gas turbine exhaust drives the compressor. This compresses the air sucked by heating. The air is again cooled in the intercooler.

Operation

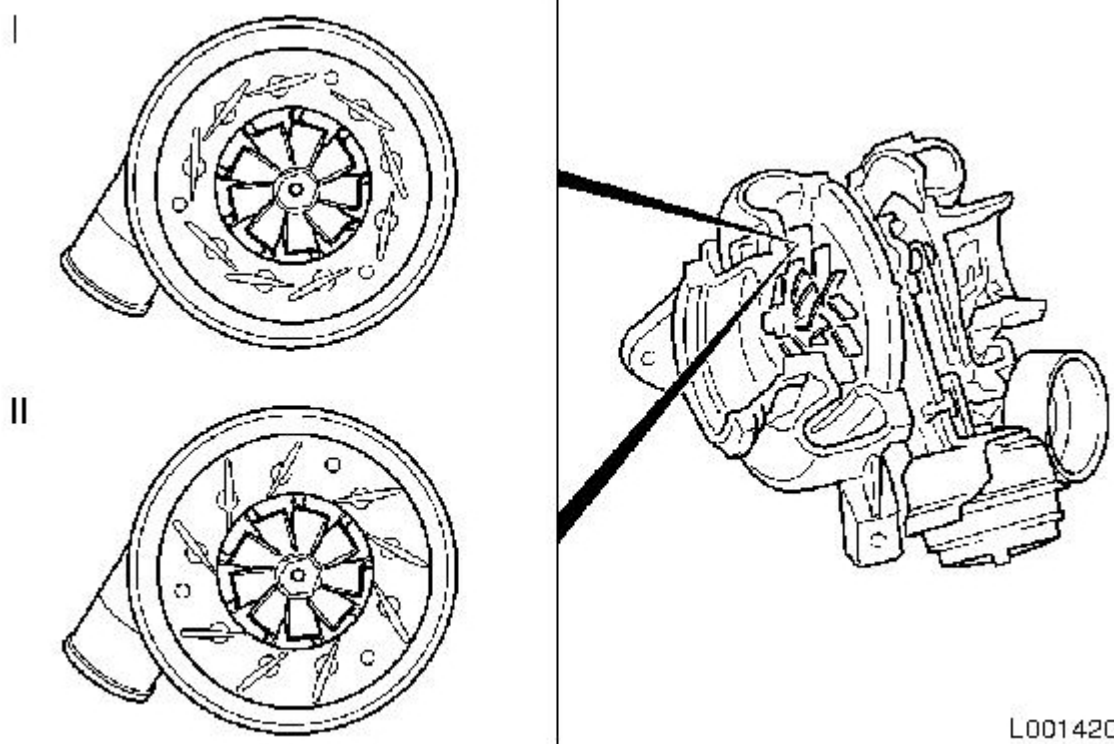
At low engine speeds the vanes of the distributor of the turbocharger are driven electrically and positioned (i) by depression so that the flow of exhaust gas impinges on the outer edge of the turbine blades. This causes a narrowing of the flow of the exhaust gases and leads to an increase of the speed of flow of exhaust gas and the boost pressure. According to the law of the lever this involves a pair greater at low speeds.

If the number of revolutions of the engine increases the input section of the exhaust gas is increased by the displacement of the vanes of the distributor (II). Now the gas particles more preferably do not affect the outer edge of the vanes of the distributor, but are distributed along the entire length of the vanes. The turbocharger works with a lower efficiency, which however is offset by the increased volume of exhaust gas to high engine speeds.



If, however, is required the maximum power of the engine (eg. When overtaking) the electro-pneumatically operated pallet are moved into position for low speed, which significantly increases the performance of the turbine and hence the pressure of charge and provides the maximum engine power.

View of the turbocharger



L0014202

1. Number of revolutions of the engine and low amount of exhaust gas reduced
2. Number of revolutions of the engine high and large amount of exhaust gas



3.2.17 Intake manifold

The intake manifold is made of plastic material, receives air under pressure, cooled intercooler, and conveys it directly to the cylinder head.

It is mounted on the sensor overpressure connected to the injection unit, at the entrance of the manifold is positioned a diffuser for the insertion of the exhaust gases coming from the valve E.G.R. directed towards the cylinders.

3.2.18 Exhaust pipes and silencers

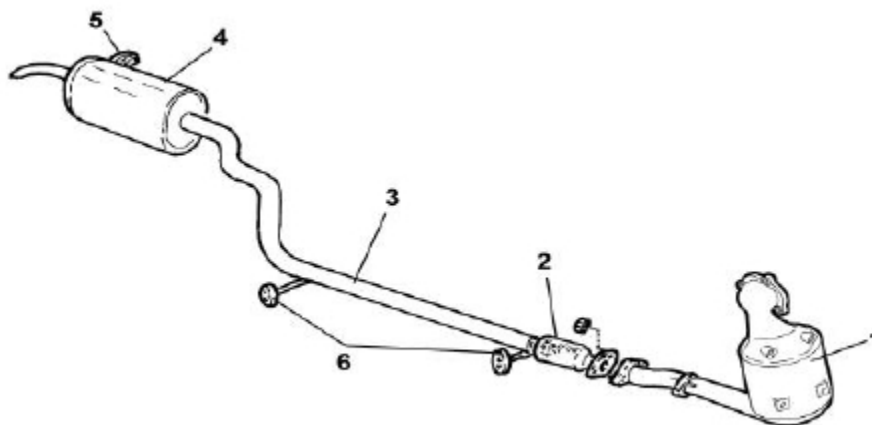
The exhaust gases flow into the engine through the manifold to the turbocharger, and then to the oxidising catalytic converter (1).

In the front part of the discharge pipe is a flexible element (2) for limit the transmission of vibrations.

The rear portion of the exhaust is constituted by an intermediate pipe (3) and the silencer rear (4).

Appropriate protections limiting the radiation of heat to the body.

The supporting of the various components is realized by means of supports (5) and snap rings (6) attached to the underbody.

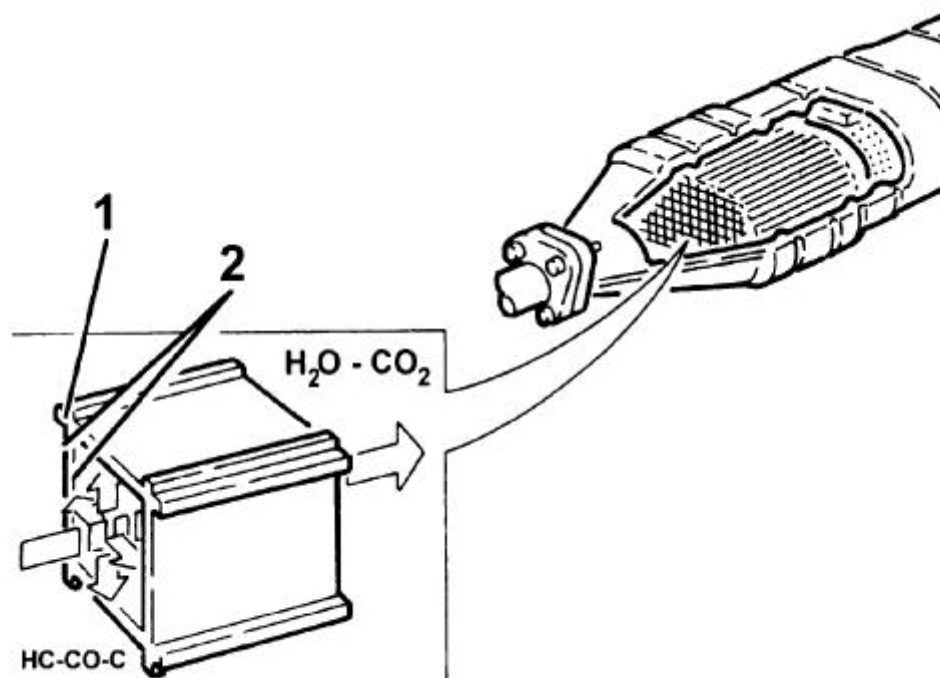


3.2.19 Exhaust emission control system

3.3 Catalytic converter

The oxidation catalyst is a device for post-treatment to oxidize the CO, HC and particulate matter, turning it into carbon dioxide (CO₂) and water vapor (H₂O).

The catalytic converter consists of a monolith honeycomb ceramic (1), whose cells are impregnated with platinum (2), substance catalyzing the oxidation reactions.



Operation

The exhaust gases that pass through the cells heat up the catalyst, triggering the conversion of pollutants into inert compounds.

The chemical reaction of oxidation of CO, HC, and the particulate is effective with temperatures between 200 and 350 ° C.

In fact above 350 ° C begin to oxidize the sulfur content in diesel fuel, giving rise to anhydride and sulfur trioxide.



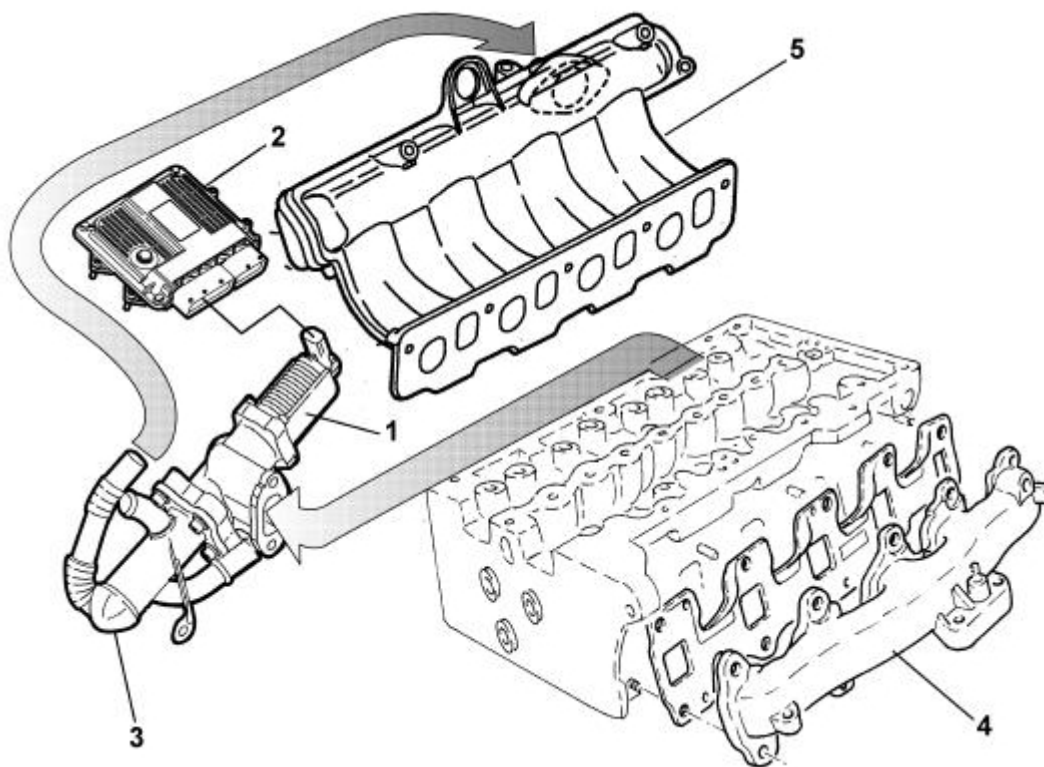
3.3.1 Plant exhaust gas recirculation (E.G.R.)

This system allows to send a suction part ($5 \div 15\%$) of the exhaust gas, in certain operating conditions.

In so doing lowers the peak temperature in the combustion chamber, containing the formation of oxides of nitrogen (NOx).

The solenoid valve E.G.R. (1) controlled by the injection control unit (2) performs the function of re-enter the aspiration of the motor part of the exhaust gases collected from the manifold discharge (4).

A heat exchanger (3) allows the partial cooling of the exhaust gases further lowering the temperature of the combustion chamber.



Solenoid E.G.R.
Injection control unit
Heat exchanger
Exhaust Manifold
Intake manifold air

Operation

The injection control unit, coolant temperature > 20 ° C and the engine between 800 and 3000 rev / min, the pilot with a square wave signal the solenoid E.G.R.

The variation of this signal allows the coil of EGR moving a shutter, thereby regulating the flow of flue gases from the exhaust manifold to the intake manifold; is results in two outcomes:

less air is introduced;

is lowered the combustion temperature (due to the presence of inert gases), reducing
Consequently, the formation of NOx (nitrogen oxides).

The injection control unit is kept informed on the amount of recirculated gas, from information from the flow meter, for if a certain RPM is expected

the aspiration of a given quantity of air (Qam) and the value sent by the flow meter (Qar) is lower, the difference (Qgr) is the value of the amount of recirculated gas.

$$Q_{am} - Q_{ar} = Q_{gr}$$

Qam - theoretical air quantity stored

Qar - Royal Air Quantity

Qgr - Quantity recirculated gases

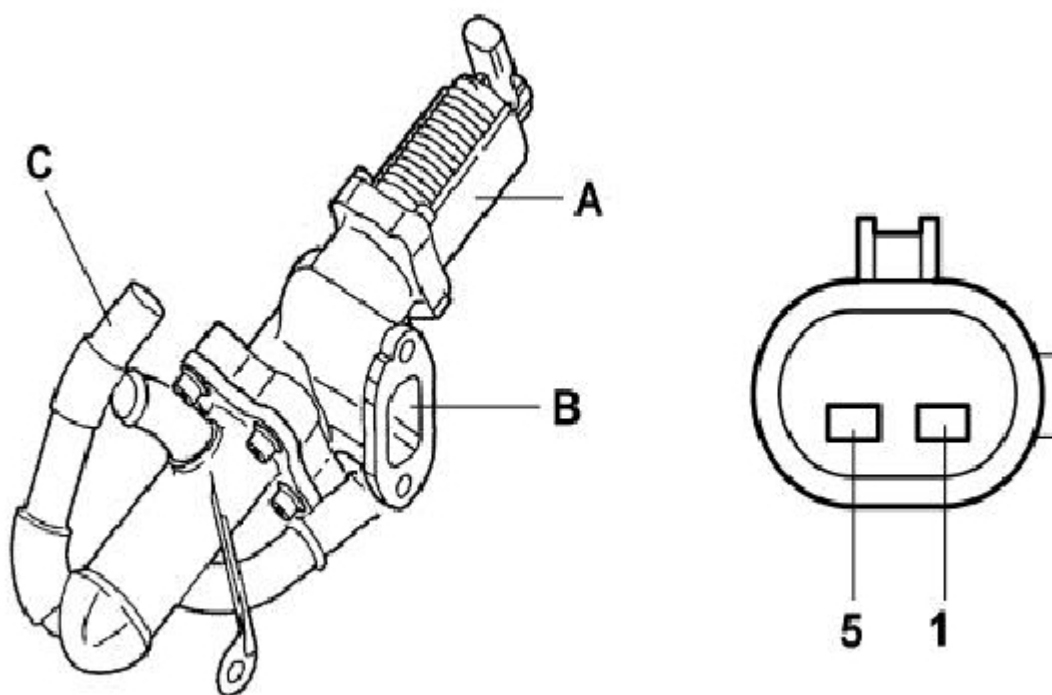


The signal of atmospheric pressure is used in piloting the solenoid EGR for recognize the condition of travel at height, so as to reduce the amount of gas recirculated and avoid the smokiness of the engine.

Solenoid E.G.R.

The solenoid valve E.G.R. Pierburg, mounted on the cylinder head, has the task of modulating the passage of the exhaust gas inlet as a function of the command of the control unit of injection.

The modulation occurs through the internal solenoid, controlled by the PWM control unit, which actuates the control rod of the internal valve which, once opened, carries the gas in the intake manifold.



Valve body E.G.R.

Gas inlet from the exhaust manifold

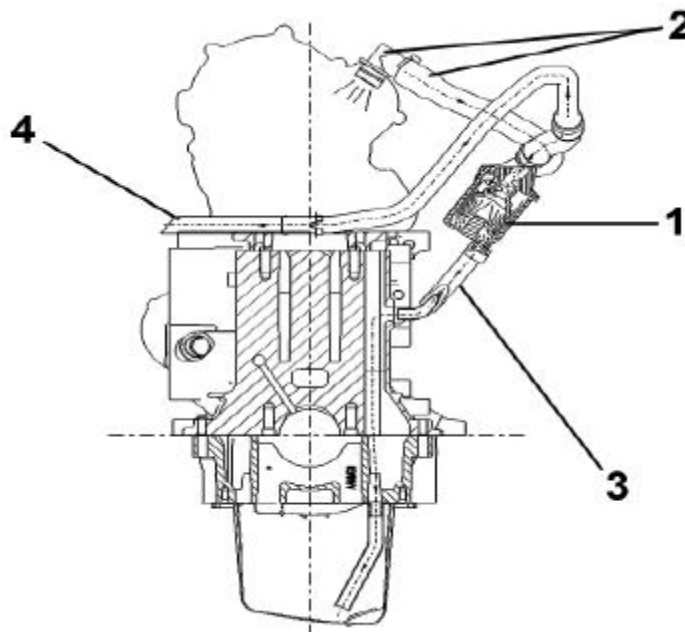
Gas outlet to the intake manifold

Positive solenoid

Negative solenoid

3.3.2 vapor recirculation system / crankcase gases

The emission control of the oil vapor is produced by an oil separator (1) that collects vapors from the basement and cover distribution by piping (2). The condensed vapors through a pipe (3) back in the cup, while those not condensed through a pipe (4) are sent to the suction sleeve turbocharger air.



1 oil separator

2 Output oil vapor from the cover

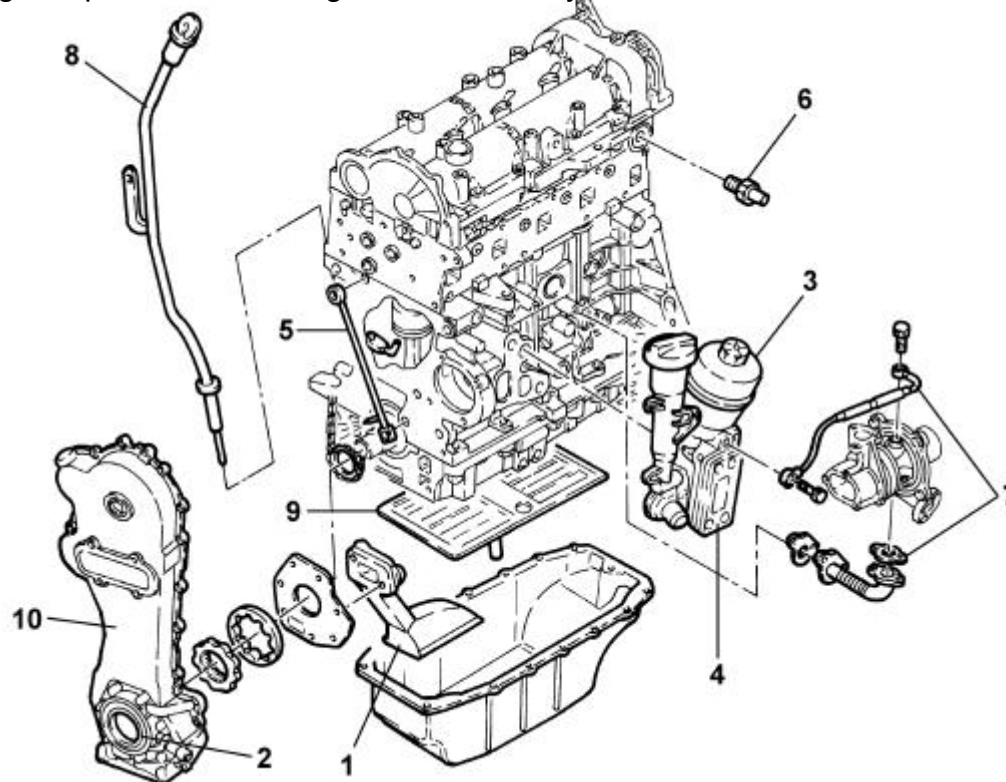
Return 3 cup condensed vapors

4 suction hose sending fumes



3.3.3 Engine oil lubrication circuit

The following is represented the engine lubrication system.



Float with a filter screen

Oil pump

oil filter (with replaceable cartridge)

Heat exchanger (water oil) cooling engine oil

Sprayer (lubrication distribution chain)

Switch for engine oil pressure warning light

Hoses turbocharger lubrication

Check engine oil level dipstick

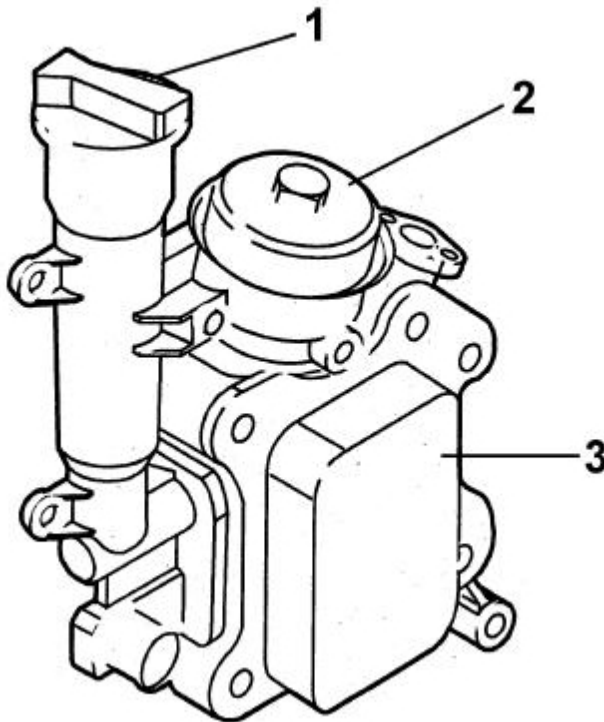
Bulkhead scrape oil and engine oil level maintenance

Timing chain cover



3.3.4 Group oil filter and heat exchanger

This group integrates both the filter element that the heat exchanger has the laterally cap for the introduction of the oil.



- 1 Oil filling plug
- 2 Cover the filter element
- 3 Oil-water heat exchanger

3.3.5 Engine oil pump

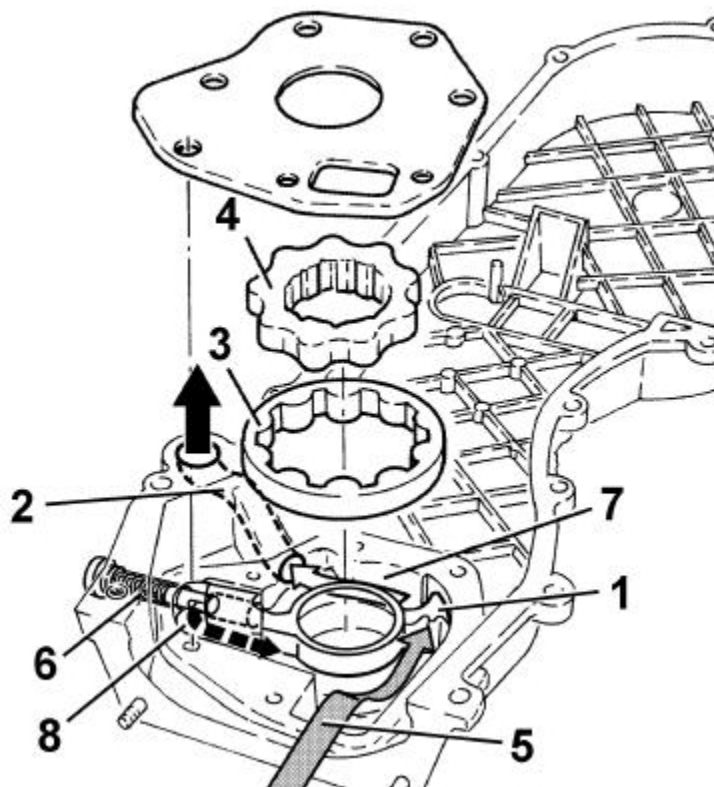
The engine oil is sucked from the cup by means of the vacuum created by the rotation of the gear keyed on the motor shaft.

The depression is present from the separation partition (1) of the gear until the suction cup oil.



The pressure is developed instead from the separation partition (1) in all conduits oil delivery of the engine (2).

When the pressure exceeds the value of 5 bar, the thrust exerted on the relief valve (6) wins the reaction of the spring and moves below the valve to open up the duct (8) of connection between pressure chamber (7) and the low pressure chamber (5).



1 bulkhead separating

Oil delivery pipe 2

3 driven gear

4 Driving gear

5 Room of low pressure

6 relief valve

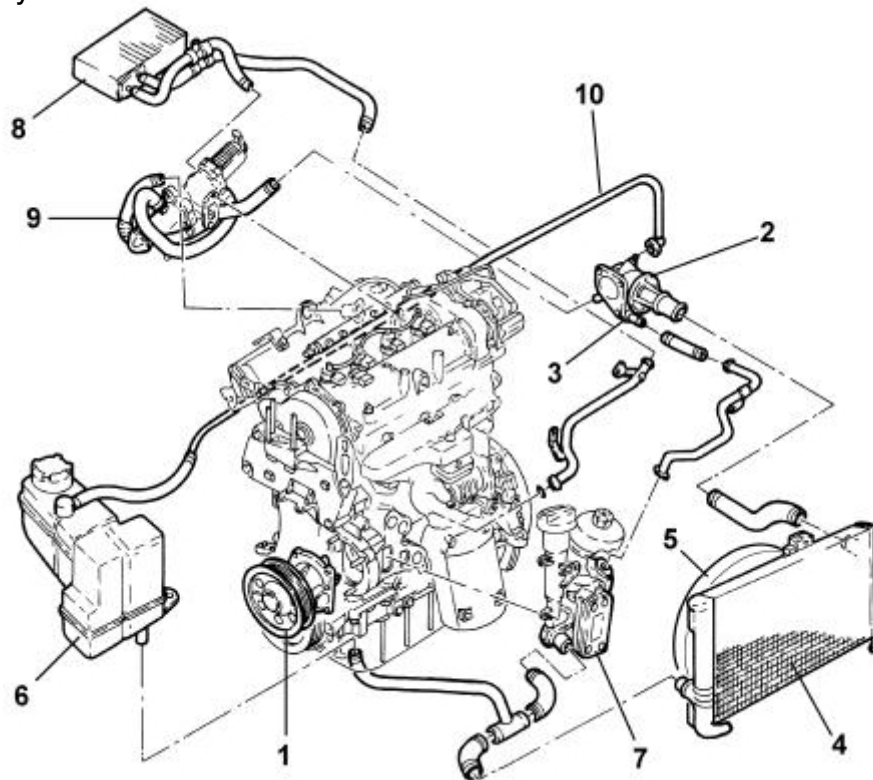
7 Pressure chamber

8 pipe connection between high and low pressure



3.3.6 Engine Cooling

Engine cooling system



Water Pump

Engine coolant temperature sensor

Thermostat

Radiator

Electric

Power Tank

Oil cooler engine

Heating radiator inside the car

Heat exchanger the exhaust gases E.G.R.

Recirculation water pipe



3.3.7 Tank and cooler engine

3.4 Tank Engine cooling power

The reservoir in addition to the function of feeding the circuit absorbs the variations in volume of coolant, the temperature changes of the engine.

Through a dedicated valve set, contained in the cap pressurized, we obtain:

escape of air from the circuit collection from the pipe coming from the thermostat
entry of air when the circuit is in depression (because of the cooling engine).

Cooler engine

E 'consists of a radiator core and two side trays for the input and the output of the coolant.

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

3.4.1 Water Pump and Thermostat



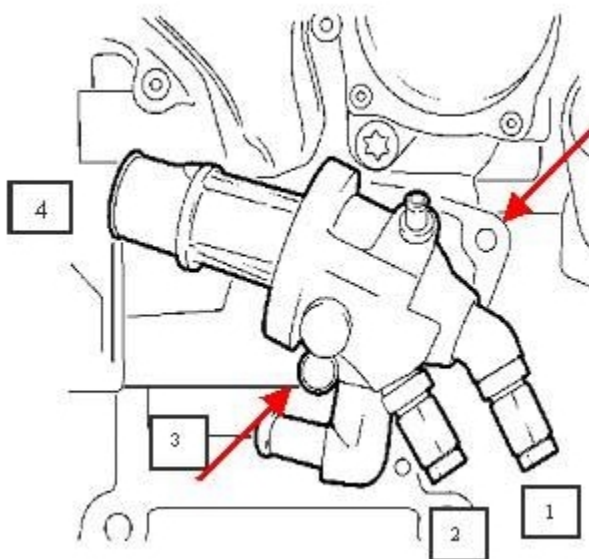
Water Pump



It 'kind of centrifugal vane pump casing and impeller shaft in phenolic resin steel.

Fixed to the base engine and driven directly by the belt of the services.

Thermostat



EGR-1 output

2 temperature sensor

3 oil filter output

4 out radiator



Mounted on the rear side of the cylinder head, with the function of keeping the motor to the optimal temperature

with temperature $<80 \pm 2^{\circ} \text{C}$, the thermostatic valve (closed) diverts the liquid directly into the pump

with temperature $> 80 \pm 2^{\circ} \text{C}$, the thermostatic valve (open) conveys the liquid cooling to the radiator.

Thermostat is mounted on the engine water temperature sensor linked to the central injection and the control panel

3.4.2 Water Temperature Control Devices

Blowers

The electric cooling, two-speed can increase the capacity of disposal of the heat radiator and / or air conditioning system of the capacitor.

They are controlled directly by the engine control unit according to a specific logic operation

3.4.3

3.5 Service command

Constitution

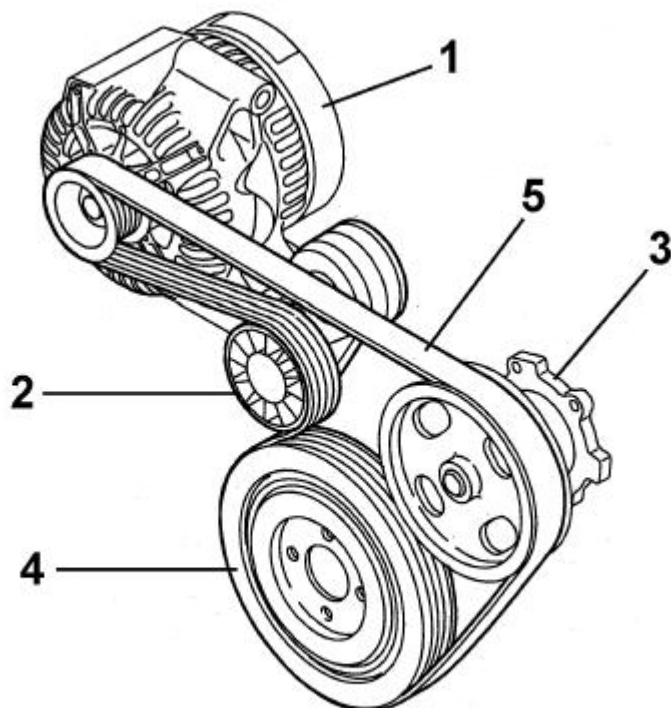
The belt unique command organs motor (5) Poly-V type, controls the alternator (1), the water pump (3) and, where applicable, the air conditioning compressor (6).

The tensioning is carried out through automatic tensioner (2) which excludes operations scheduled maintenance.

The crankshaft pulley (4) has an integrated elastic field that reduces the vibrations



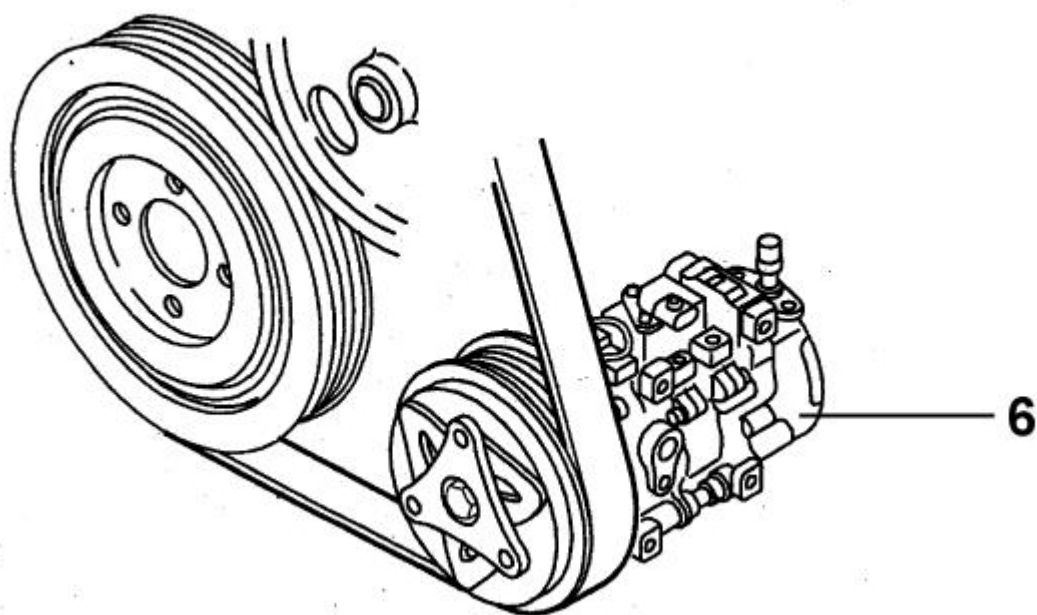
torsional stress on the motor and belt and then on the subsidiary bodies of the motor.



Alternator
Tensioner
Water Pump
Crankshaft pulley
Drive belt motor organs



For models with air conditioning.



3.6 Power System

3.6.1 Characteristics

This fuel injection system uses a high injection pressure controlled electronically, and a mode of delivery of fuel made from an injection main and one or more pilot injections (according to the conditions of engine operation), controlled electronically by injection through the electro- (CR1MI2.2); such a system is able to carry up to five injections cycle (based on operating conditions of the engine itself).

The pressure value is one of the key parameters for the optimization of Fuel consumption and exhaust smoke.

The management with more pilot injections makes possible a preheating chamber combustion in order to avoid the pressure peak caused by a rapid combustion, ensuring a smoother operation and allows to further reduce emissions.

The adjustment of the injection pressure is possible thanks to the constructive characteristics of the system that is equipped with pressure pump, pressure regulator, pressure sensor and electro-separated, all managed by a unit. In this way, the injection pressure is independent of the speed of rotation of the motor.

The main characteristics of the fuel system are:

high injection pressure of 1400 bar (75 hp) 1600 bar (90 hp)

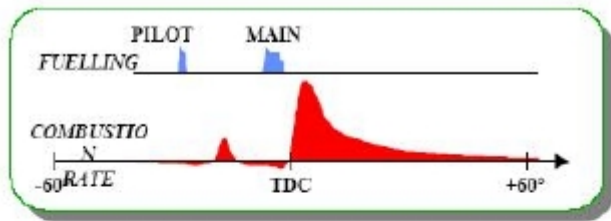
injection pressure adjustable from 150 to 1400/1600 bar in every working condition of the engine;

introduction of fuel up to 50 mm³/ciclo in a regime between 100 and 5200 rev / min;

control precision injection and as early as that term;

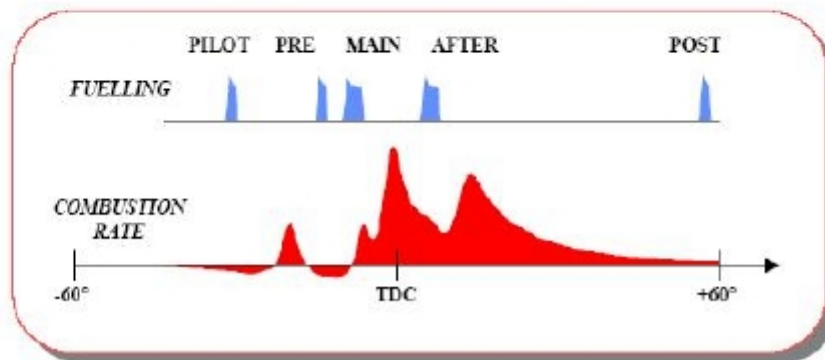
one or two pilot injections before P.M.S. managed in function of the number of turns and the load engine that allow you to distribute more evenly the pressure chamber combustion with a lower noise level.





Dalla Iniezione pilota

Alla iniezione Multipla



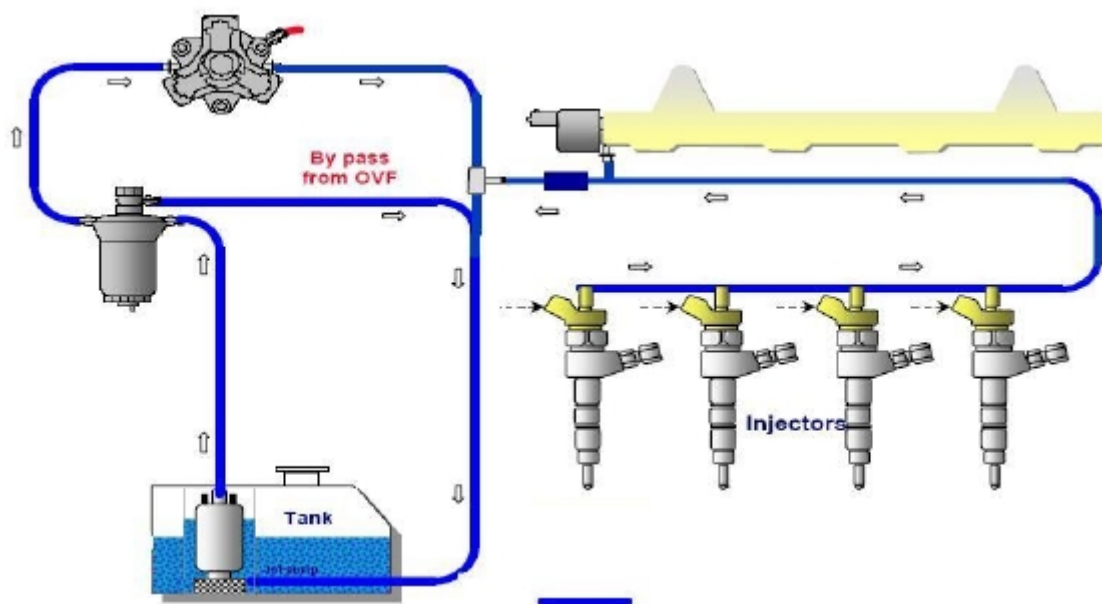
Constitution

The fuel system of the fuel is divided into low-pressure circuit and the high pressure circuit.

low-pressure circuit

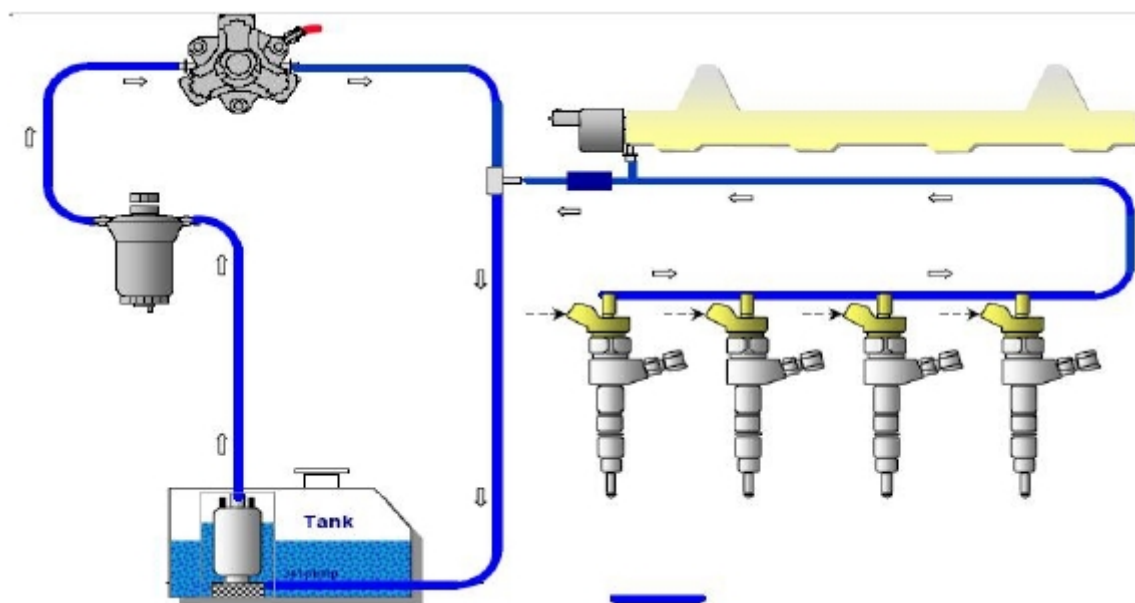
- An auxiliary electric pump submerged in the tank;
- Fuel filter inside cartridge;
- Return fuel hose manifold;
- The connecting pipes.





Low line pressure

Low-pressure circuit 75 hp



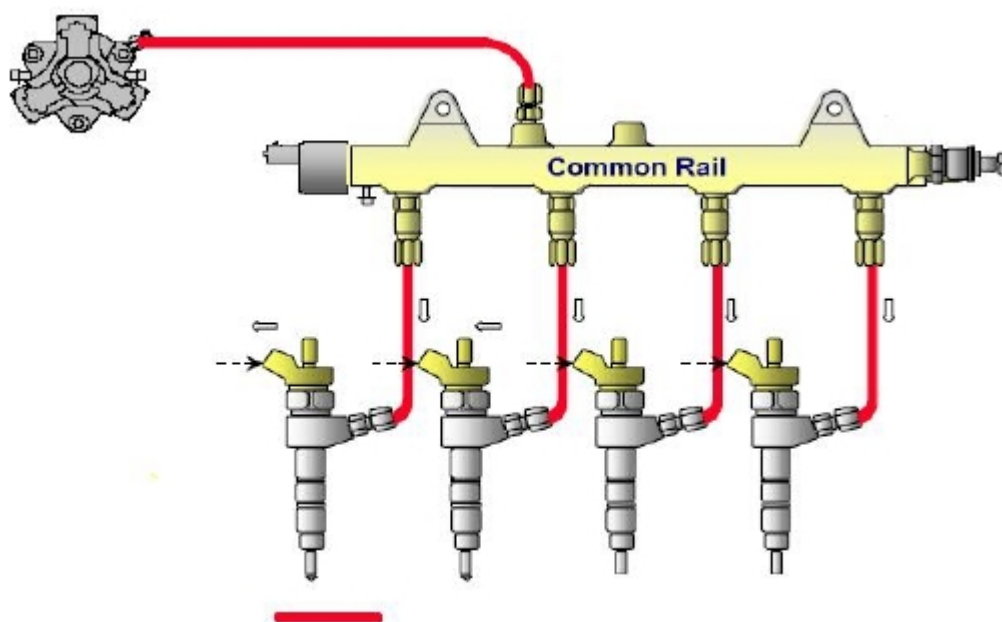
Low line pressure

Low-pressure circuit 90 hp



the high pressure circuit is constituted

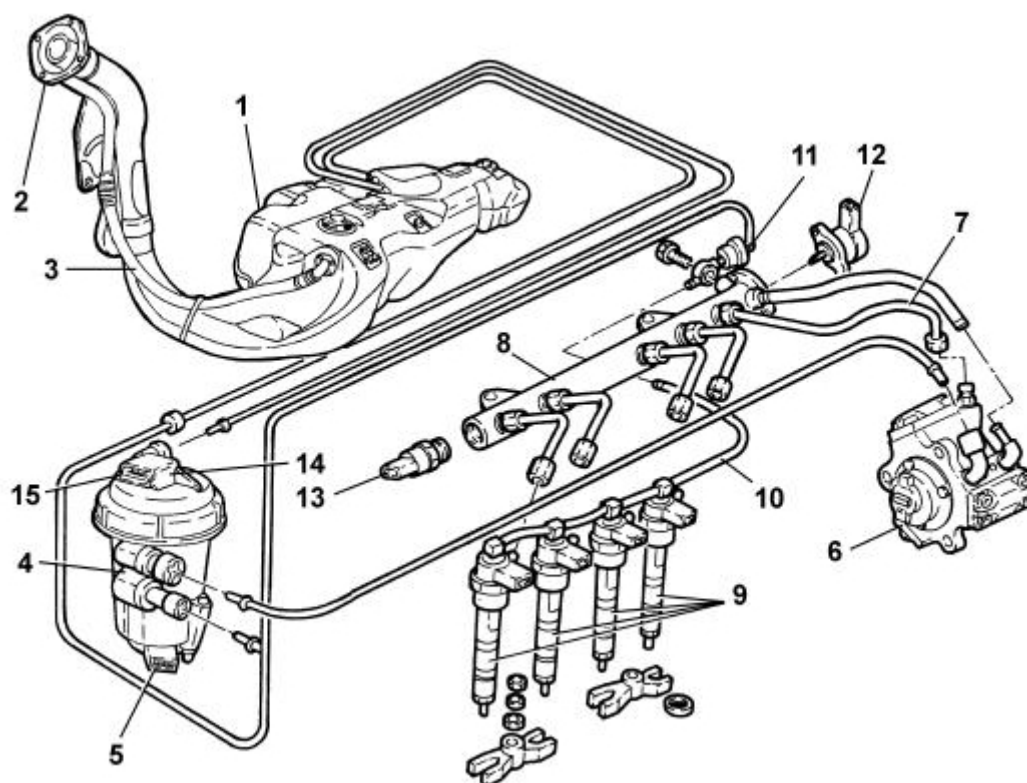
- Pump Pressure: CP1 (75 hp) CP1H (90 hp)
- Single fuel manifold with pressure regulator and pressure sensor
- Integrated;
- The electro CR1MI2.2
- Piping connection



High pressure line

75hp injectors and 90cv = CR1MI2.2





Total

- 1 Fuel Tank
- 2 fuel introduction pipe
- 3 Pipe reflux
- 4 Fuel filter
- 5 Sensor to detect water in fuel filter
- 6 Pump Pressure
- 7 High Pressure Hoses
- 8 single fuel manifold (rail)
- Electro 9 (CR1MI2.2)
- Pipe 10 by electro-tube fuel manifold return
- 11 fuel return hose manifold
- 12 Pressure regulator DRV (2)



13 fuel pressure sensor (RDS 4)

14 Fuel temperature sensor

15 Heater fuel tank 1 fuel

3.6.2 High-pressure pump Bosch CP1 (75 hp)

Features

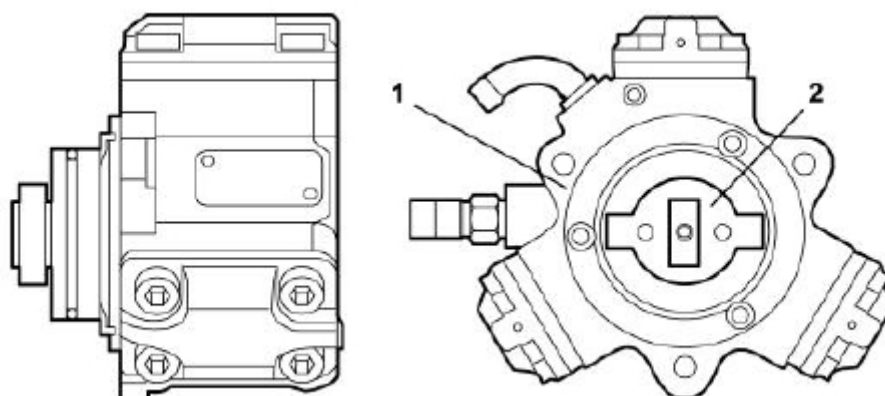
The high pressure pump is the type CP1 Compact three-piston radial (radialjet). The range is 567 mm³/giro and the speed of rotation being mounted on the camshaft (via coupling oldham) is equal to half the speed of rotation of the motor shaft (reduction ratio 2:1) and does not require phasing. The pump is lubricated and cooled by the flow of fuel that runs through it: the flow rate required is supplied by low-pressure pump. This feeds the pump with an amount of fuel always superior to the needs of motor in order to create a recirculation of the fuel to the tank, in so doing is obtained the lubrication (priority) and the cooling of the pump.

The movement of the pistons is determined by an eccentric integral with the pump shaft: this actuates a polygonal ring which acts on the foot of the plunger.

Each pump unit is equipped with a suction valve to the plate and of a discharge to sphere.

The pump is equipped with a valve called "shutoff valve": this allows to protect the pump in the case of low flow from the delivery of low pressure, enabling maintain lubrication of the compressor pumps and eccentric mechanism



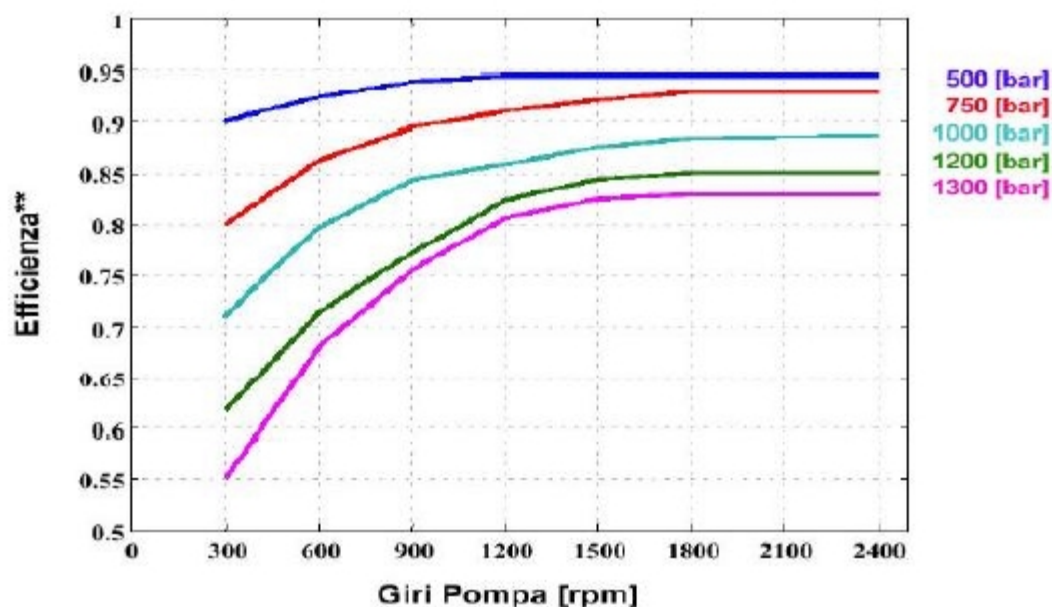


1 Pump Pressure

2 coupling (oldham) connection with camshaft



Efficienze pompa Idraulica



efficienza Pompa
- cresce con i giri
- decresce con la pressione

Structure

Each pumping unit consists of: three pistons (5) driven by an eccentric (2) integral with the pump shaft (6); an intake valve to the plate for each piston (3); a valve discharge ball for each piston (4). The pump pressure must be supplied with a pressure of at least 0.7 bar, so the fuel system is equipped with a auxiliary electric pump submerged in the tank. The maximum discharge pressure reaches 1400 bar.

The pressure pump is lubricated and cooled by the same fuel using appropriate ducts.



three pumping

P
u
m
p

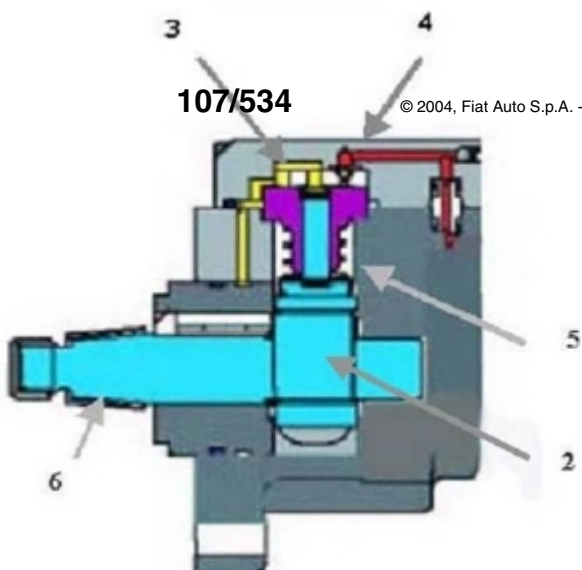
s
e
c
t
i
o
n

Vie
w
of
the

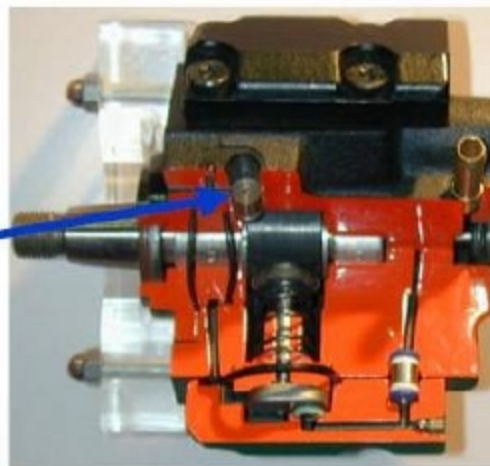
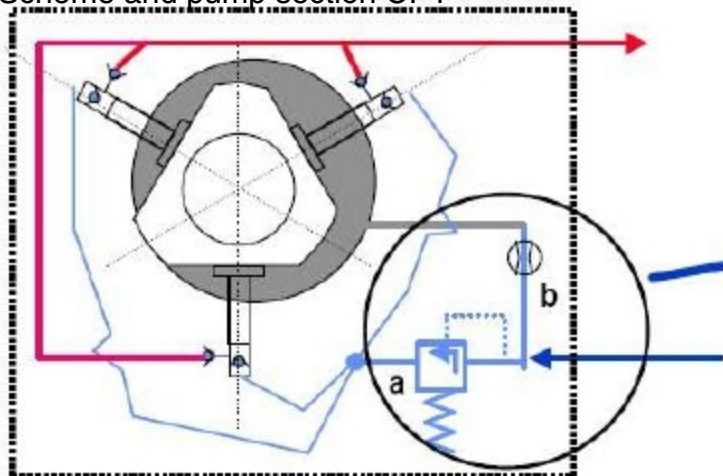
Fiat Punto

107/534

© 2004, Fiat Auto S.p.A. - All rights reserved



Scheme and pump section CP1



CP1 pump section

to: Shut-off valve
b: Lube



**3.6.3 CP1H
Bosch high
pressure
pump (90 hp)**

Output High
pressure

F
l
o
w
r
e
t
u
r
n

Low entry
pressure

Valve KUEV

M-PROP

Features

In the engine 90 hp uses the high-pressure pump Bosch CP1H, which represents evolution of CP1. The high-pressure pump now makes available a pressure of in the rail system up to 1600 bar. This was obtained by reinforcement of the drive, modified valve units and measures for increasing the robustness of the body. For ensure a sufficient fuel in the high-pressure pump is arranged to achieve a total flow of 160 l / h.

The required flow rate is adjusted in a continuous manner through the solenoid valve M-PROP

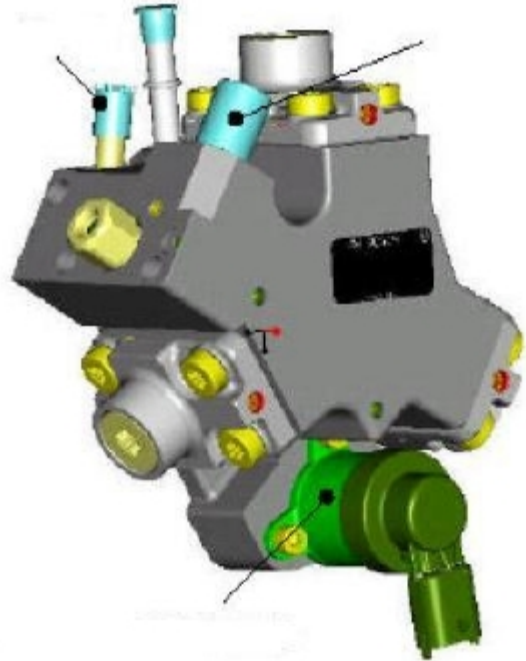
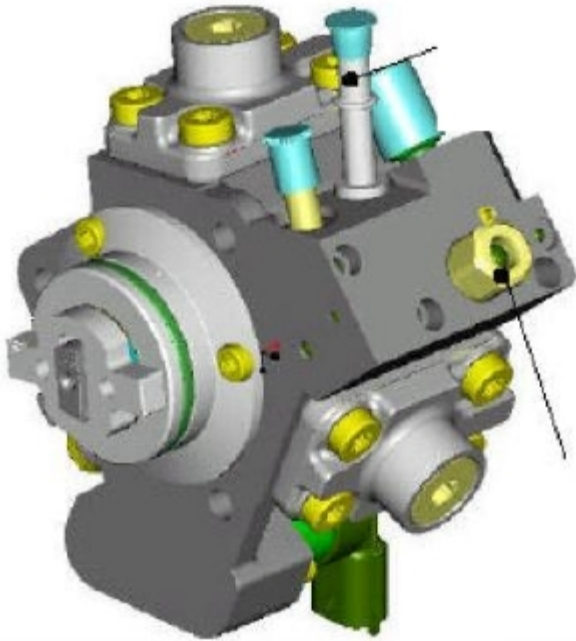
which is on the high pressure pump. This valve adjusts the amount of fuel

entered into the needs of the rail system. With this adjustment of the flow rate is not reduced only the absorption of power of the high-pressure pump, but also lowered

Fiat Punto

109/534

© 2004, Fiat Auto S.p.A. - All rights reserved



the maximum temperature of the fuel. The supply pressure required for the high-pressure pump is made available by a pump for supplying fuel electrically operated which is in the form of the tank. The volume flow of the high-pressure pump is distributed as follows:

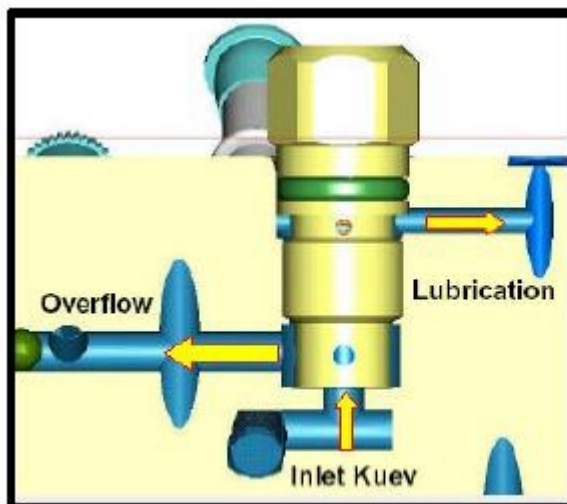
about 22% is injected from the injectors and burned in the cylinder

about 28% serves to lubricate the high pressure pump and is recovered via the valve KUEV

about 50% excess fuel is recovered via the pressure accumulator and the injectors

Valve KUEV

It's a mechanical valve and has the task of maintaining a constant pressure inside the Pump avoiding pressure surges can damage going to download the possible over-pressure and to regulate the flow of fuel is cooled with cooling and lubrication of the eccentric shaft and pumping of the CP1-H.

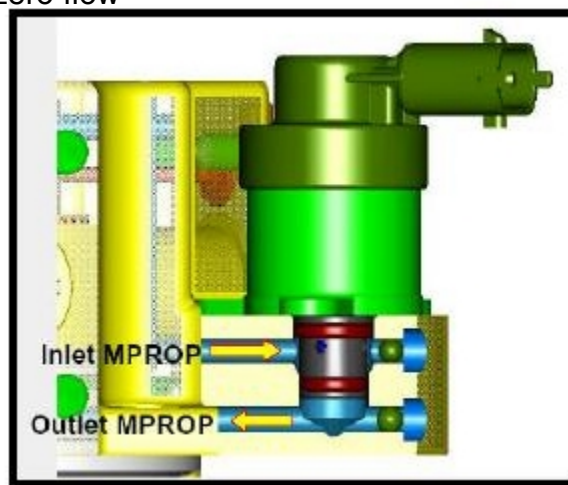


Valve M-PROP

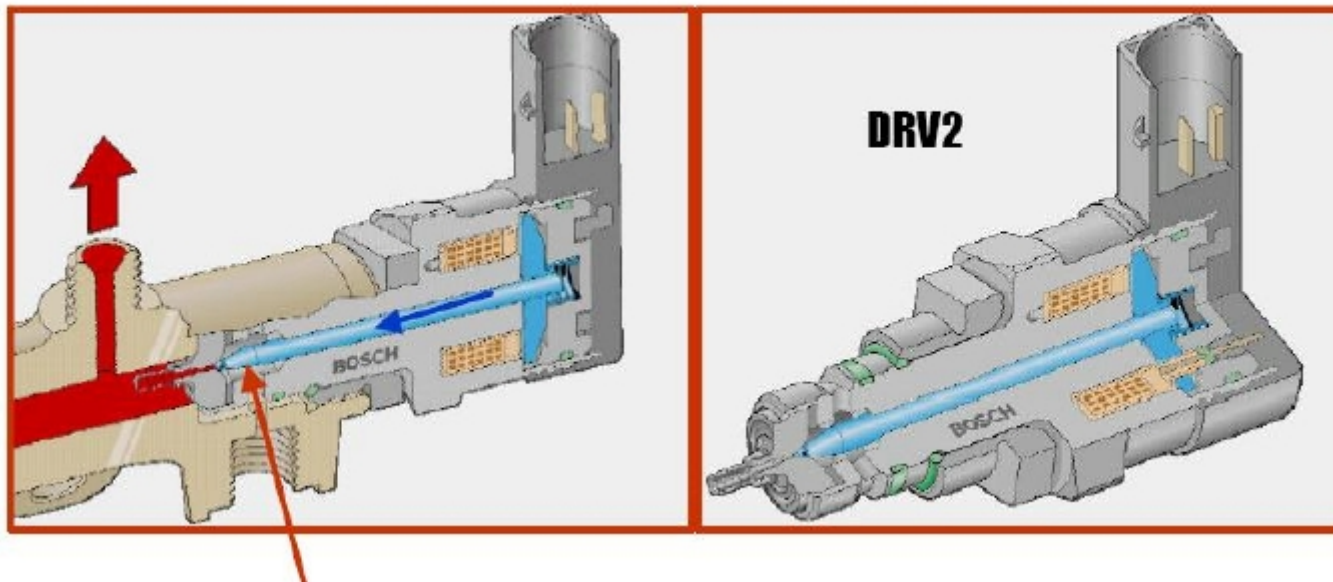
Electronic control valve serves to modulate the flow of power from the circuit of low pressure to high-pressure pump by rotating a flap internal to the valve commanded directly from the ECM.

@ I = 0 amp maximum
(even
disconnected)

@ I = 2.5 amp zero flow



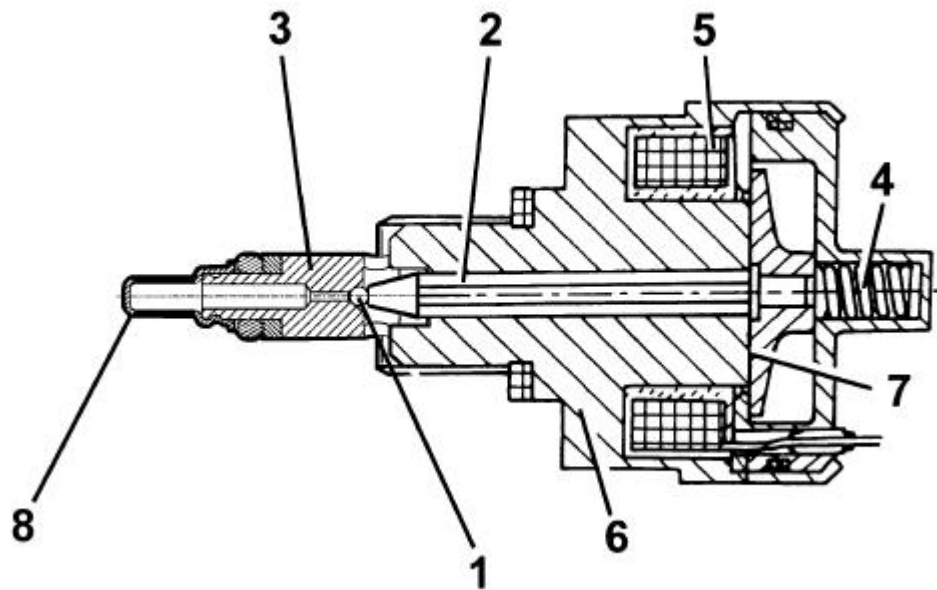
Pressure regulator DRV 2



E 'mounted on the rail and controlled by the injection control unit, controls the pressure of the fuel supply to the electro-injectors.

The pressure regulator is mainly formed by:





Shutter 1 ball

2 Stud

3 Valve

4 spring preload (maximum pressure of 50 bar required)

5 Reel

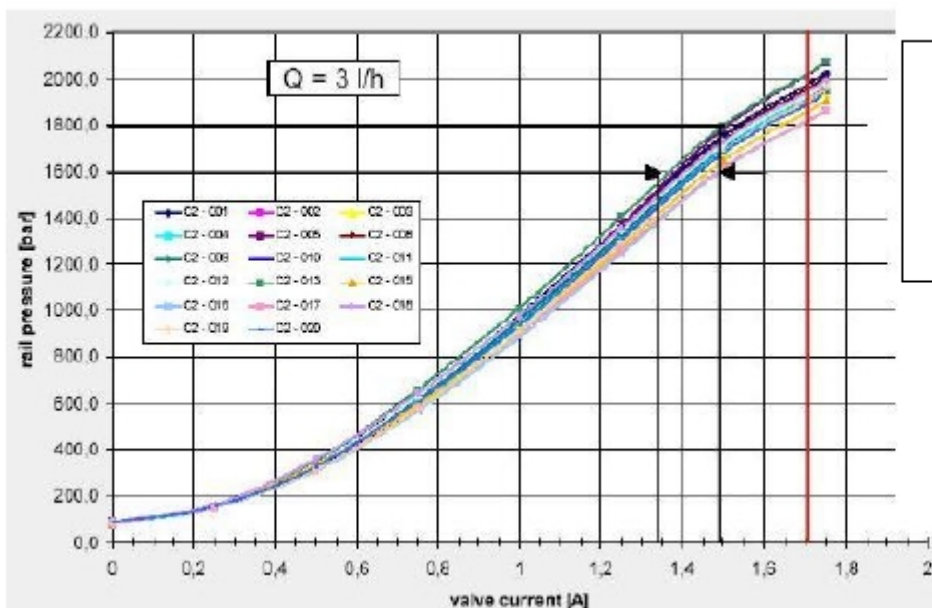
6 Body

Still 7

8 Filter

Chart current as a function of the PILOT DUTY (% PWM)





Pressure regulator
The OFF P = 50 bar
PWM 1000 Hz
The 1600 bar @ 1.3 A

Pressures driving parameters:

75 hp

Pressure 250 bar rail engine idling

Maximum engine speed rail pressure 1400 bar

90 hp

Pressure 250 bar rail engine idling

Maximum engine speed rail pressure 1600 bar

3.6.4 Electro and pipes

Electro-MI 2.2 CR1

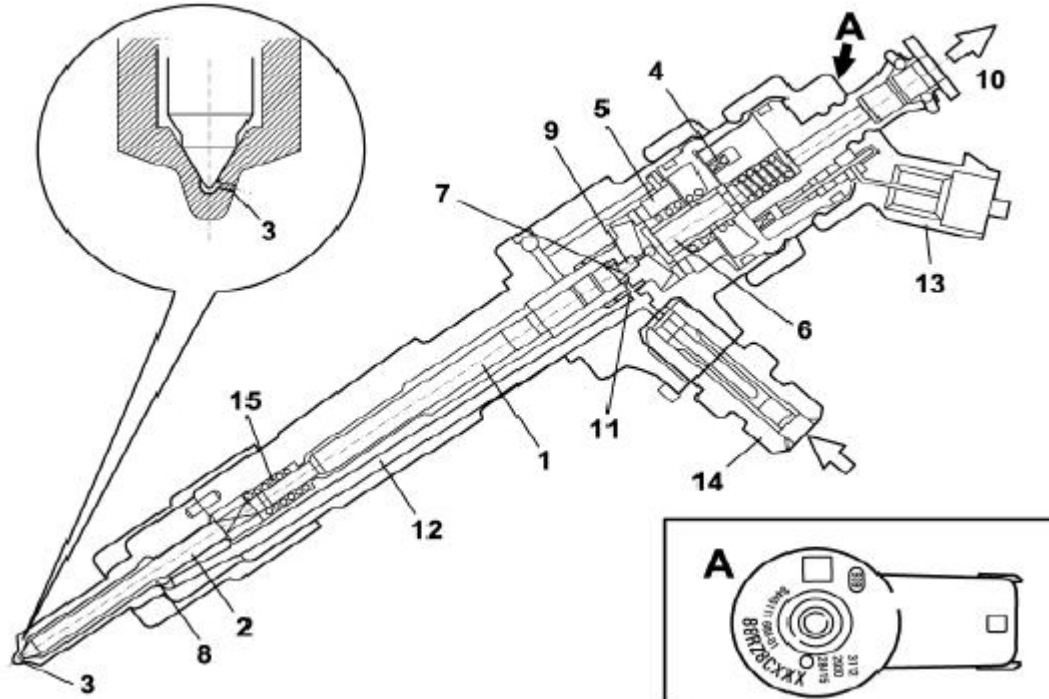
The injectors are mounted on the cylinder head and driven by the engine control unit.

The electro-injector can be divided into two parts:



- 1 actuator / nozzle
- 2 solenoid control

The operation of the electro can be divided into three phases.



POSITION OF REST, the coil (4) is de-energized and the shutter (6) is in the closed position and does not allow introduction of fuel into the cylinder $F_c > F_a$ (F_c : due to the pressure of line which acts on the control unit 7 of the rod 1; F_a : due to the pressure line that acts in the volume of food 8).

INJECTION START, the coil (4) is energized and causes the raising the shutter (6). The fuel of the control volume (9) flows to the return manifold (10) causing a lack of pressure on the control (7). At the same time the pressure line through the conduit of food (12) exerts in the volume of food (8) a force $F_a > F_c$ causing the raising of the plug (2) resulting in the introduction of fuel



into the cylinders through the holes (3) that in the injector CR1 MI 2.2 are 6 of the diameter of 0.121 mm one of a range of 280 to 100 bar cm³/30s

END INJECTION, the coil (4) is de-energized and returns to the closed position the shutter (6) which re-creates a balance of forces such as to return to the closed position the plug (2) and Consequently finish the injection.

Classification IMA

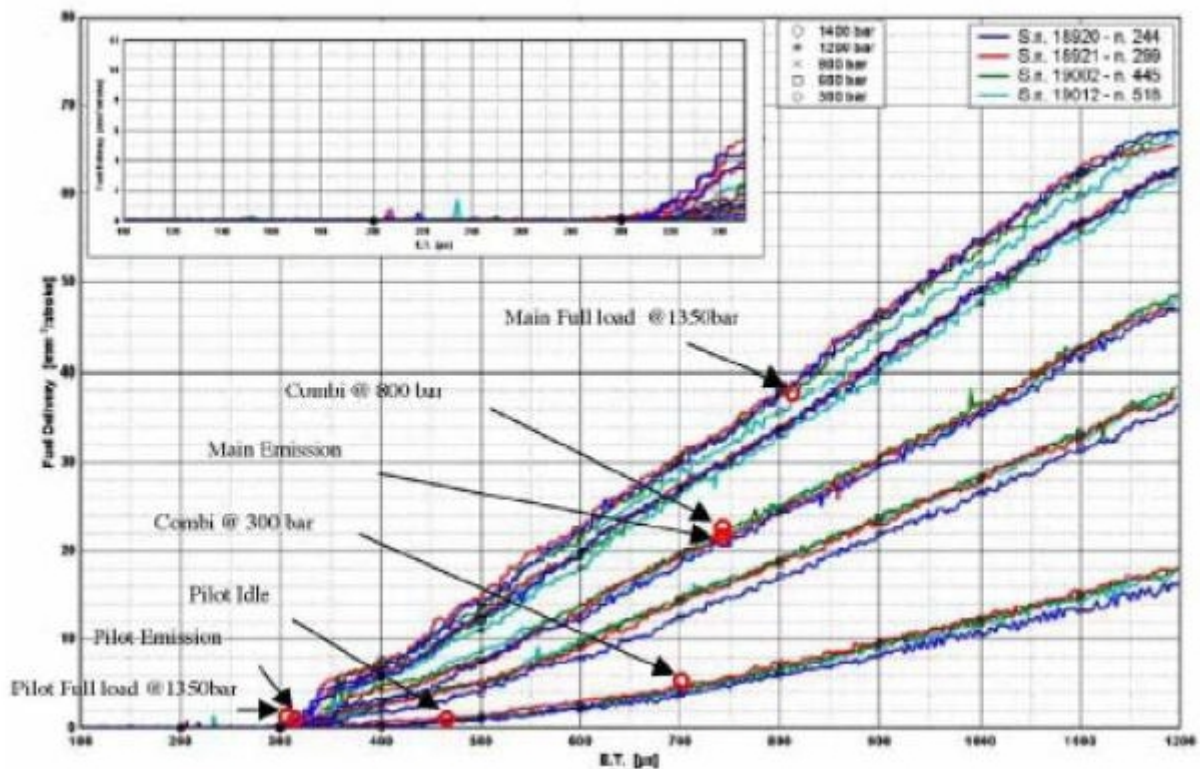
The classification method injectors with IMA is a procedure that aims to improve engine performance and emissions appropriately combining the design feature of each injector with the strategy control software within the control unit motor.

In this way you can recover the manufacturing tolerances: each injector is tested of 7 points of operation characteristic, associated with particular conditions of pressure fuel and time control, that reproduce the typical points of operation of the engine (Minimum, fully loaded, etc. ..);

characteristic points are named:

- Main at full load
- Main emission at
- Pilot at emission
- Pilot at full load
- Pilot at idle
- Combi at 800 Bar
- Combi at 300 Bar





In the graph shows the characteristic curves of 4 injectors as a function of time command (ET) for different levels of rail pressure. The ordinate shows the amount of fuel delivery per injection (mm³/ciclo), with the points highlighted are those which are measures taken for the IMA classification.

The characteristics of each electro-injector are identified by a series of 9 characters alphanumeric characters printed on the body of the same plant from BOSCH.

The factories of the engine POWERTRAIN have the responsibility to implement and interpret the IMA codes of each electrical injector (by reading with camera) in order to combine them with the consideration cylinder on which is mounted and produce a label which is affixed to the timing belt cover. The factories of body FIAT align units motor control strategies with their software management through appropriate equipment line testing, which interprets the data reported in the label and executes the operation with the services diagnostic described below.

The new units and spare parts to those supplied are delivered with FIAT IMA standard code with the default value 00 hex, the cars that mount units NOT



still classified can be moved even before you have performed the operation with the equipment of diagnosis suitable; in these conditions, prior to performing the IMA classification, the MIL (malfunction indicator lamp) for every Power On (Key in RUN position - engine stopped or running) will be managed in ways Blink (flashing) and in memory errors will be present with an error code P1301 was "present" to grading completed.

A rating error occurred and svalidato P1301 will automatically become intermittently until the OFF-Key.

To ensure that the DTC gates (automatically) from the memory errors it is necessary perform a KeyOff - On Key (complete with power latch) after classifying the four injectors.

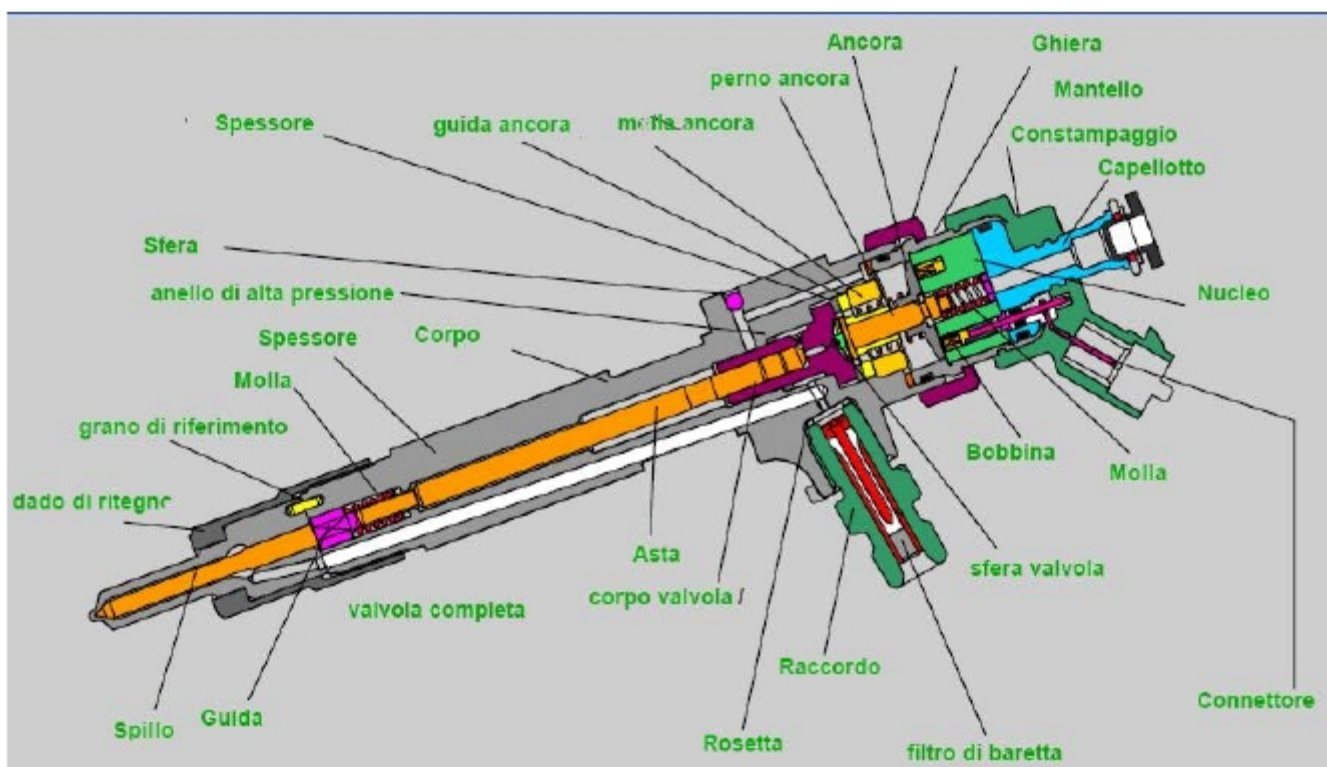
Once erased from memory errors, the DTC can never occur at all stages of life of the unit, it is not possible, once that's done, back in the ccm condition rating of virgin run.

The classification must be done ALWAYS FIAT factory production and Assistance whenever it is necessary to replace the injector-/ cc unit.

The classification will not be completed until even one of the cylinders / injectors has value 0x00; the transaction must necessarily be performed in the RUN position and with KEY ENGINE OFF.

Below the design the electro-

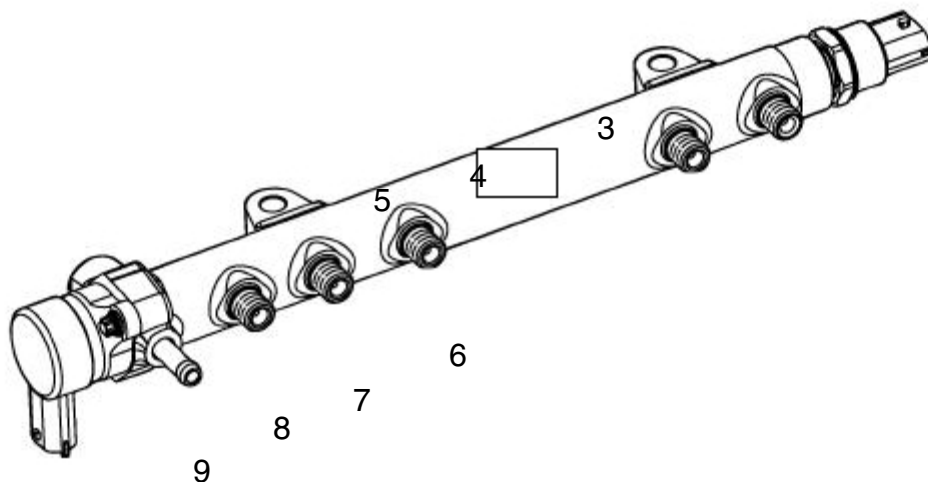




CODE IMA

3.6.5 single fuel manifold tube





21

- 1 COMMON RAIL (FR / LWR)
- 2 CONTROL VALVE Quantity '(DRV 2)
- 3 PRESSURE SENSOR (RDS 4)
- 4 5 6 7 POWER INJECTOR CR1-MI 2.2
- 8 BY HIGH PRESSURE POWER (CP1 / CP1H)
- 9 REBOUND (OVER FLOW)

The single fuel manifold (rail) is a standard two types of forged rail-FR for 75 hp engine. The other standard laser-welded rail to LWR THE POWER 90 hp is mounted on the cylinder head intake side.

With its volume of about 20 cm³ dampens the oscillations of the fuel pressure due to: to the operation of the pump pressure opening of the electro.

The difference between the two rails are in the process of manufacture is a forged (FR), the other built with laser welding (LWR), which give a more accurate implementation and capacity for resistance to high pressures (1600 bar) higher

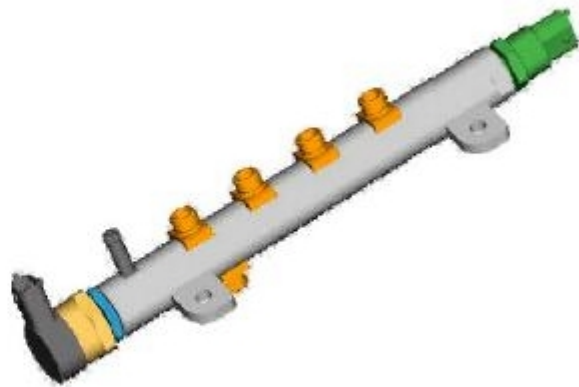


On one side of the discharge manifold RAIL is mounted the pressure sensor fuel (RDS 4) and the other is connected to the pressure regulator (RDS 4)

The hydraulic connections (high pressure) between the collector-collector-pump and injectors are carried out using steel pipes having an inner diameter 2 mm outer diameter and 6 mm. on which we must be careful to use special keys for assembly / disassembly and use the torque wrench for tightening, which should not exceed 20 Nm



Standard **F**orged Rail - **FR**



Standard **L**aser **W**elded Rail -**LWR**



3.6.6

Fuel tank and parts

Total immersed pump complete command level indicator

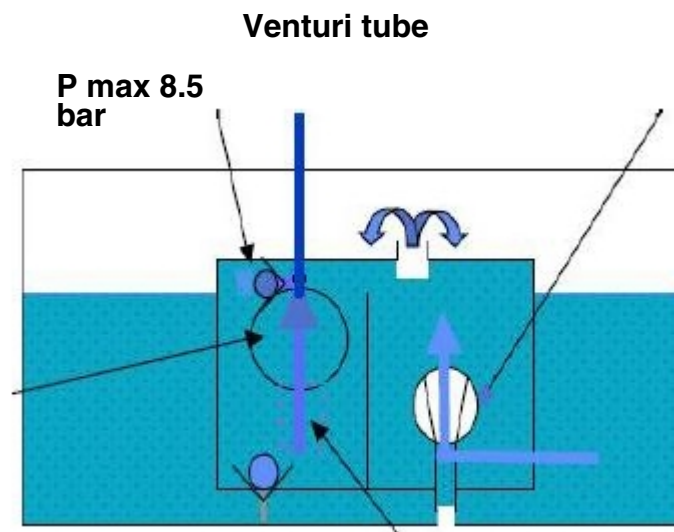
The fuel pump is assembled into a single overall level meter and the fuel filter, so the components are individually replaceable.

The electric pump fuel has the function of feeding the high pressure pump. It is completely immersed in the fuel inside the tank. The pump assembly is constructed so as to obtain the maximum level of fuel in the area of draft.

This function is realized by means of a venturi located on the return pipe to the draft compared to that of the tank. The pumping unit is of the type needle roller and allows a flow rate of 160 liters / hour.



Pump basket



Electric pump

Pre filter

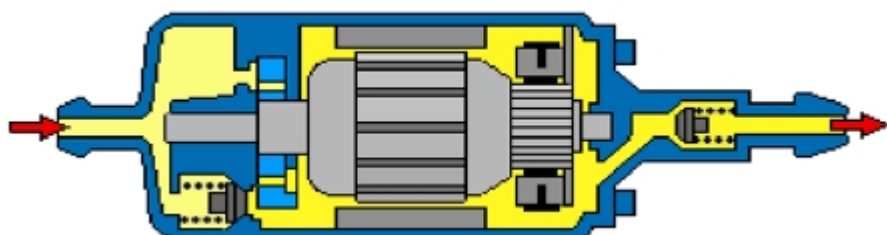
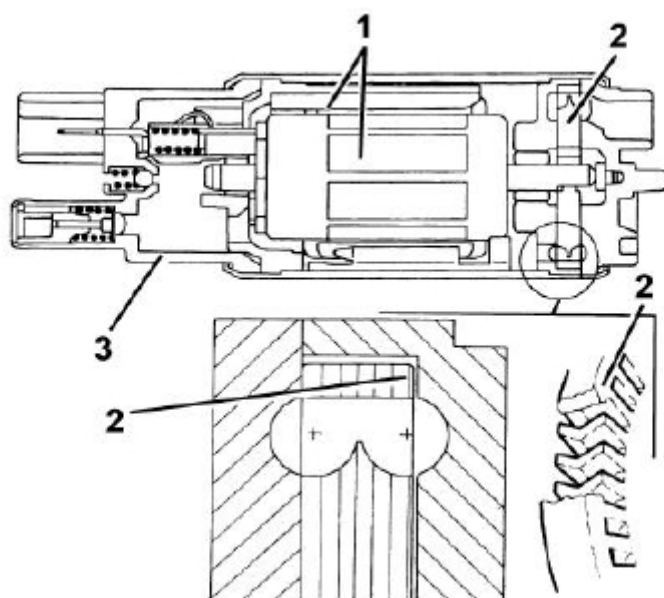
The fuel pump has an electric motor with permanent magnet (1), which controls the pump impeller (2) and a lid support terminal (3) that contains the electrical and hydraulic connections.

The stadium is the electric-type single-flow high-performance peripheral Low-voltage and temperature.

The advantages compared to the electric pumps that operate according to the volumetric principle, are:

- Low weight;
- Small.





Supply

Current consumption

Pressure

Scope

13 volts

4/6A

2 to 4 bar

160 L / h

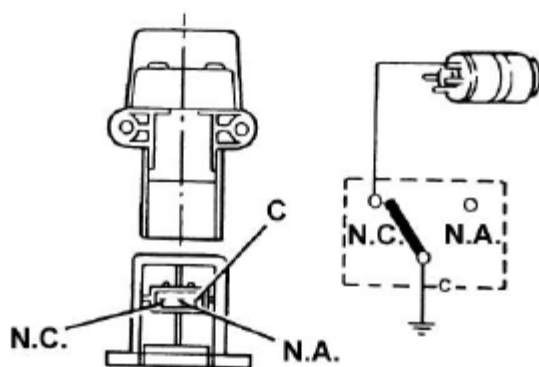


3.6.7 Inertia switch

The inertia switch is mounted on the right side under the dashboard on the passenger side. In case of crash

the vehicle stops with the grounding of the electric and fuel

Therefore the fuel supply to the system of injection.



A steel ball (1) mounted in a conical shape (2), is normally held locked by the force of attraction of a magnet adjacent.

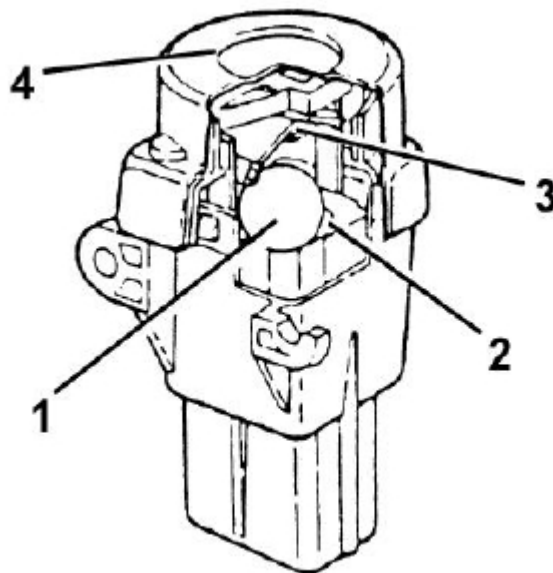


Under specific loads of acceleration, the ball is released from the magnetic latch and gradually exits from the support with a conical form with an upward movement, according to the angle of the cone.

Above the ball is located a quick-release mechanism (3) which forms the electrical circuit normally closed (N.C.).

When the mechanism is hit by the ball, it changes position, the circuit from NC in circuit normally open (NO), interrupting the ground circuit of the electric fuel.

The switch can be reset by pushing a button protected by a flexible cover (4).



NOTE: After a collision however minor, if you smell fuel or notice losses from the fuel system does not replace the switch, but to seek first the fault and restore it, to avoid risk of fire.

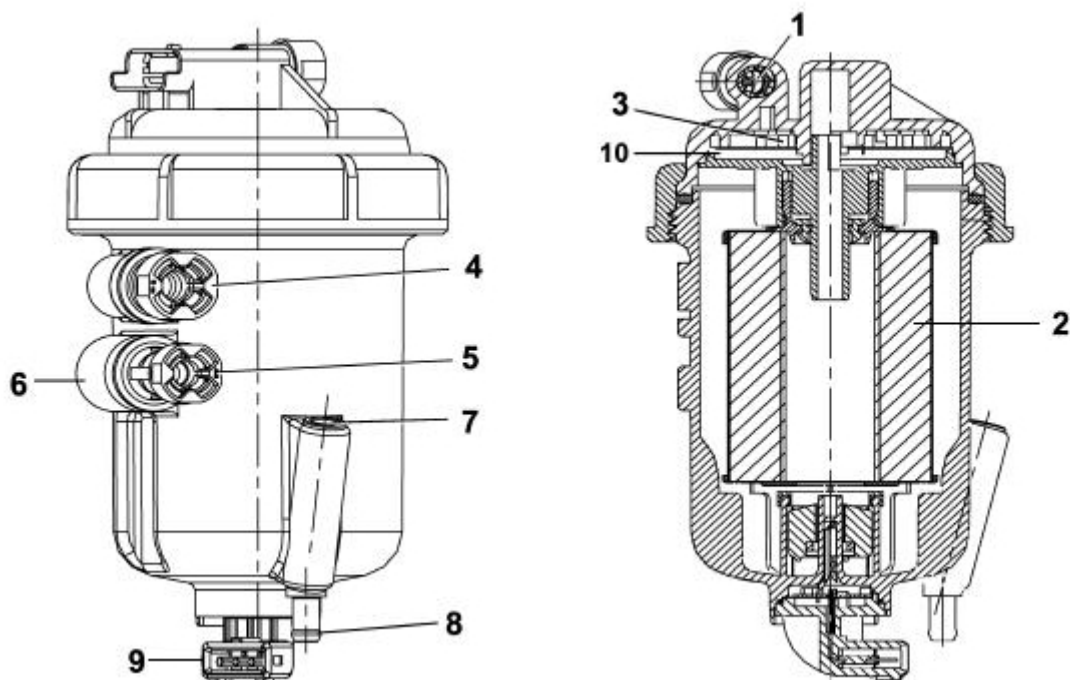
Otherwise if not noticed losses and the car is able to press the restart button to reactivate the pump.



3.6.8 Fuel Filters

Description of components

The fuel filter (GREEN FILTER) is mounted in the engine compartment right side. The filter consists of a plastic housing that contains within itself a cartridge filter synthetic material with high performance in terms of efficiency, durability and separation water.



1 Input diesel

2 filter cartridge (comes complete with the 'o-ring seal)

Temperature sensor 3

4 Output from the plant diesel injection

5 Output from the diesel fuel control valve to the tank

6 internal relief valve outlet

7 Screw for operating purge water

8 Zone water drainage



9 Electrical WIF
10 diesel heater



Water sensor

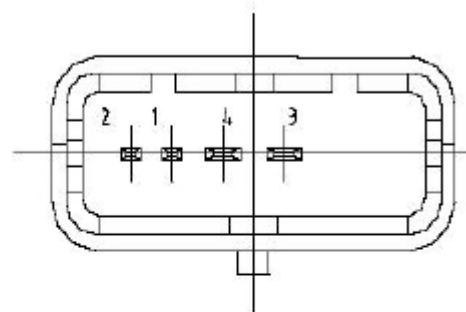
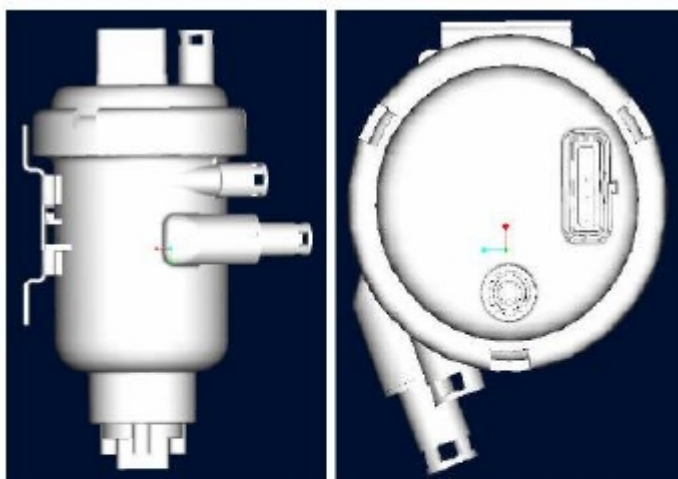
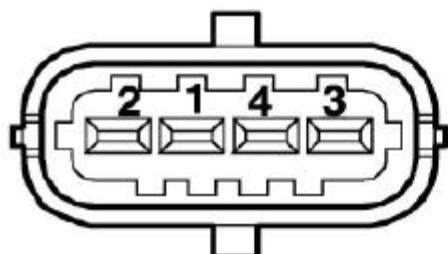
3.6.9 Device and sensor temperature heating fuel

The fuel filter is fitted with a device for preheating fuel and a sensor fuel temperature by means of an NTC thermistor mounted inside the cover.

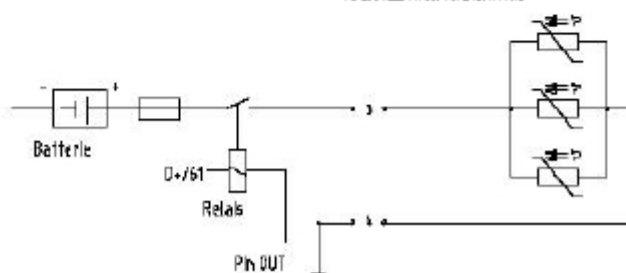
The heater is controlled by the injection control unit as a function of the sensor signal temperature fuel

To see the specific fuel temperature sensor.

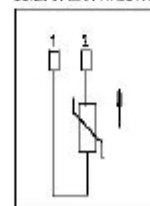




SCHEMA ELETTRICO RISCALDATORE



SCHEMA ELETTRICO INT



PIN OUT
1 MASS SENSOR

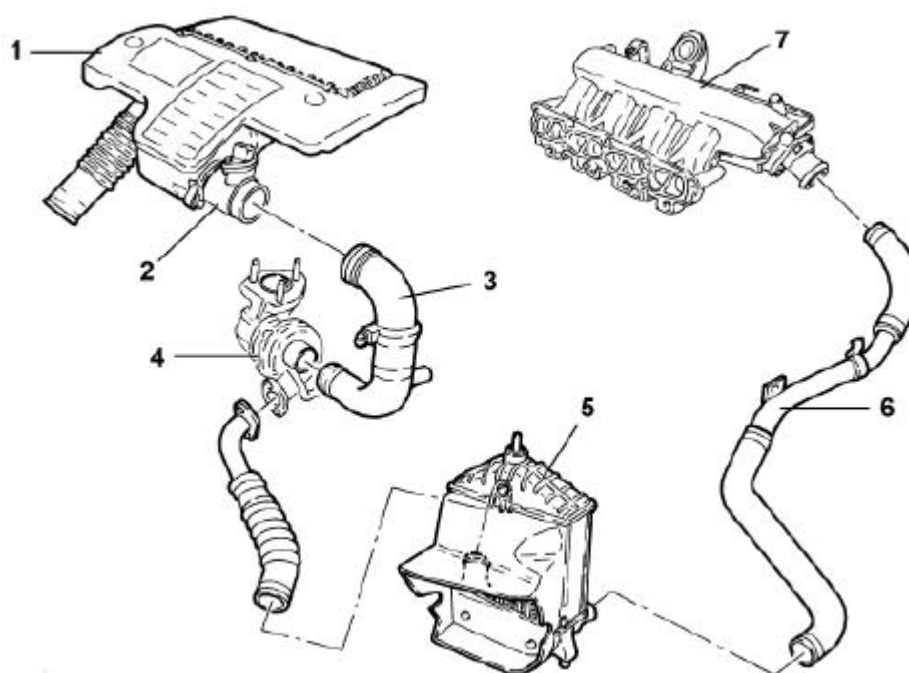


2 TEMPERATURE SIGNAL (analog output to ECM)

3 POWER 12 V (ECM)

4 MASS

3.7 Air supply motor circuit



1 Air filter complete with resonator

2 digital flow meter

3 Pipe Connection with turbocharger

4 turbocharger with wastegate (75 hp) VNT valve VGT (90 hp)

5 air-air heat exchanger (intercooler)

6 intercooler hose connection - Air intake manifold



7 Air intake (manifold)

3.8 Diesel engine control unit MJD 6F3

3.8.1 Characteristics

The Common Rail Magneti Marelli MJD 6F3 is a fuel injection system with high pressure (1400 bar 75 hp), (1600 bar 90 hp)

With the ability to modulate these pressures between 150 bar up to the maximum operating of 1400/1600 bars, regardless of the rotation speed and the engine load;
ability to operate at high engine speeds (up to 5000 rev / min at full load);
control precision injection (early injection duration);

- Reduction of consumption;
- Reduction of emissions.

The main functions of the system are essentially the following:

Fuel temperature control;
check engine coolant temperature;
fuel injection quantity control;
Control of idle speed;
cutting of the fuel in the release phase (Cut-off);
balance control cylinders to a minimum;
antiseghettamento control;
control exhaust smoke on acceleration;
control exhaust gas recirculation (E.G.R.);
Maximum torque limit control;
control the maximum speed limit;
control glow plugs;
control entry into feature air conditioning (if applicable);



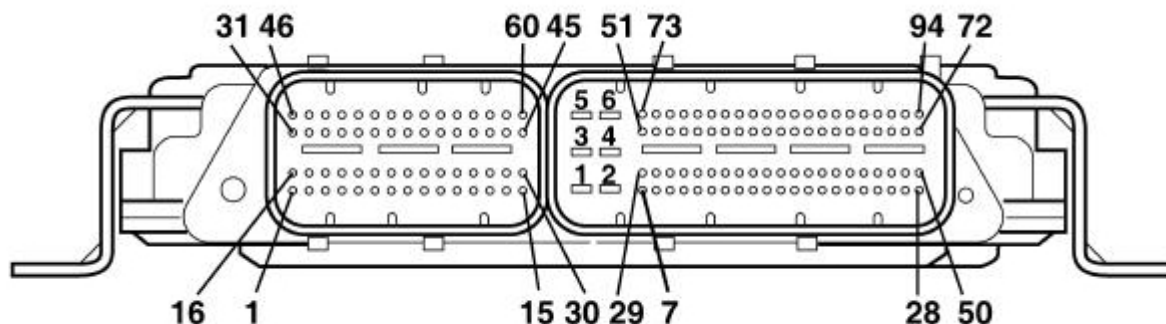
auxiliary fuel pump control;
monitoring the position of cylinders for timing;
main advance control and multiple injections;
closed-loop control of the injection pressure;
budgetary control systems;
IMA injector calibration.

And 'mounted in the engine compartment.

The unit is a "flash e.p.r.o.m." that is programmable from the outside without intervening hardware.

The injection unit has an integrated absolute pressure sensor.

3.8.2 PIN-OUT



CONNECTOR A

Positive injector cylinder 4

Not logged in

Not logged in

Positive fuel pressure regulator

Positive from main relay



Negative fuel pressure sensor

Not logged in

Positive fuel pressure sensor

Low engine oil pressure sensor signal

Air temperature signal flow meter

Not logged in

Not logged in

Not logged in

Signal flow meter air flow

Negative solenoid E.G.R.

Negative injector cylinder 1

Positive injector cylinder 2

Not logged in

Not logged in

Not logged in

Negative phase sensor

Not logged in

Positive boost pressure sensor and air intake temperature

Negative boost sensor and inlet air temperature

Positive phase sensor

Not logged in

Negative flow meter

Not logged in

Engine coolant temperature sensor ground.

Not logged in

Negative injector cylinder 3

Not logged in

Not logged in

Negative fuel pressure regulator



Not logged in
Not logged in
Not logged in
Fuel Pressure Sensor Signal
Not logged in
Positive flow meter
Signal pressure turbo
Not logged in
Positive RPM sensor
Not logged in
Not logged in
Negative injector cylinder 4
Negative injector cylinder 1
Negative injector cylinder 3
Negative injector cylinder 2
Not logged in
Not logged in
Not logged in
Not logged in
Engine coolant temperature sensor signal
Not logged in
Signal timing sensor
Not logged in
Not logged in
Negative rpm sensor
1. Not logged in

Connector B



ground power unit

Ground power unit

Ground power unit

12v power unit

12v power unit

12v power unit

Command (-) 1 electric fan

Command (-) electric fan 2

Not logged in

Negative linear sensor conditioner compressor

Not logged in

Not logged in

Bulk fuel temperature sensor

Not logged in

Positive track 2 of the accelerator pedal potentiometer

Not logged in

Not logged in

Not logged in

Not logged in

Not logged in

Not logged in

Not logged in

Power under lock and key

Not logged in

Not logged in

Not logged in

Not logged in

Request input from climate control button

Signal speed automatic gearbox for motor



Not logged in
Not logged in
Negative Track 2 throttle potentiometer
Not logged in
Not logged in
Negative Track 1 throttle potentiometer
Not logged in
Positive linear sensor conditioner compressor
Not logged in
Not logged in
1 High-speed CAN line
Track 2 throttle potentiometer signal
Not logged in
Not logged in
Not logged in
Not logged in
Not logged in
1. Not logged in
Not logged in
Not logged in
Direct supply from battery
Not logged in
Not logged in
Not logged in
Not logged in
Not logged in
Not logged in
Not logged in
Not logged in



Not logged in
Not logged in
Fuel Temperature Sensor Signal
Not logged in
Not logged in
1 H high-speed CAN line
Track 1 Signal throttle potentiometer
Communication line W
Not logged in
Signal switch brake pedal (N.C.)
Not logged in
Admission diagnosis preheating unit
Not logged in
Not logged in
Not logged in
Glow plug control relay
Fuel pump relay control
Fuel heater relay control
Not logged in
Injection system failure warning light (MIL)
Compressor control air conditioning
The main relay control
Not logged in
Not logged in
Power Track 1 throttle potentiometer
Not logged in
Not logged in
Not logged in
Linear sensor signal conditioner



K-line diagnostic

Not logged in

Sensor signal in the presence of water diesel filter

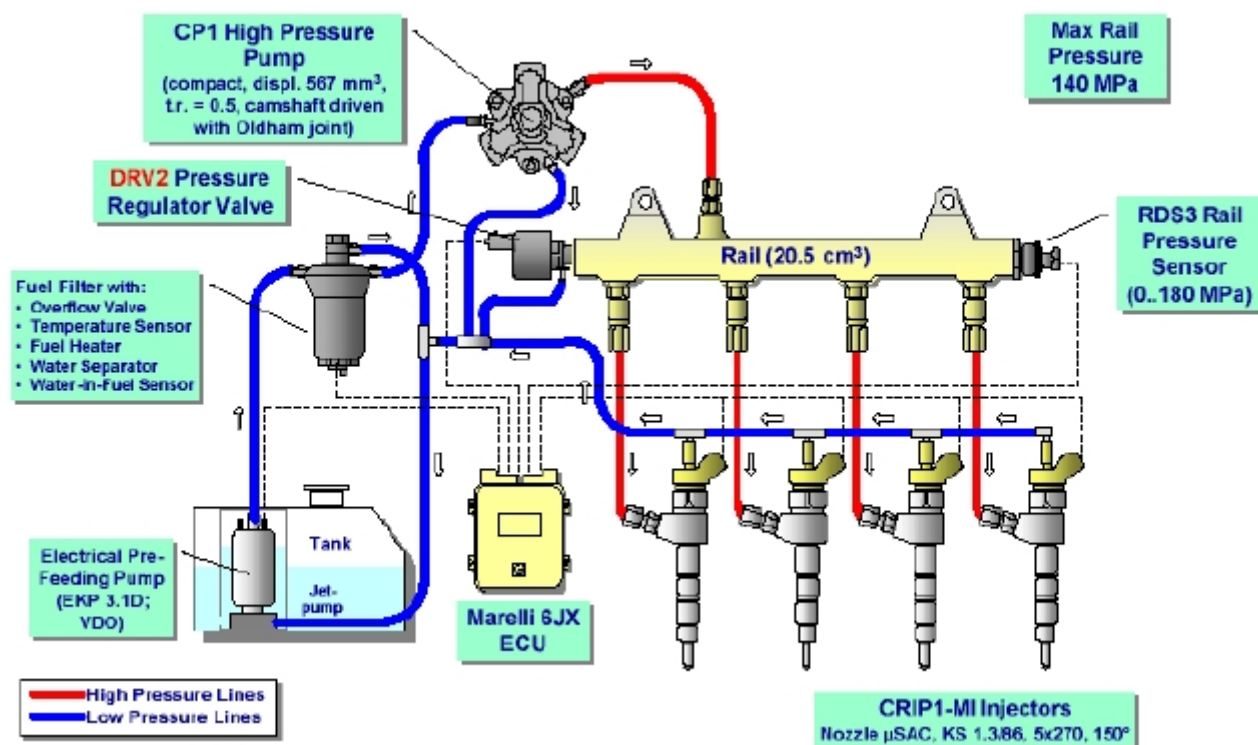
Not logged in

Signal brake pedal switch normally open

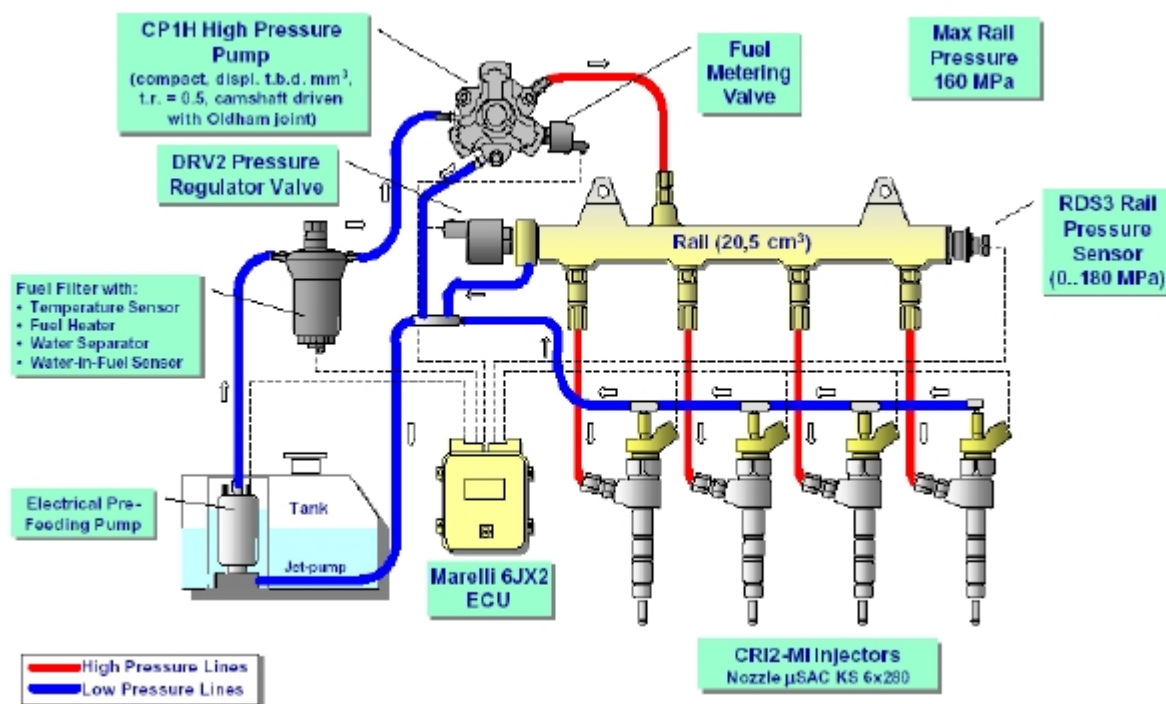
2. Clutch pedal switch

3.8.3 Types of configuration

System 75 hp pump CP1



Control valve control system 90 hp with quantities downstream of the pump CP1 H



3.8.4 Operation

Operating logic

The engine control system MARELLI MJD6F3 Euro 4 with EOBD is equipped to control multiple injections from which it derives its name Multijet, a brief description below

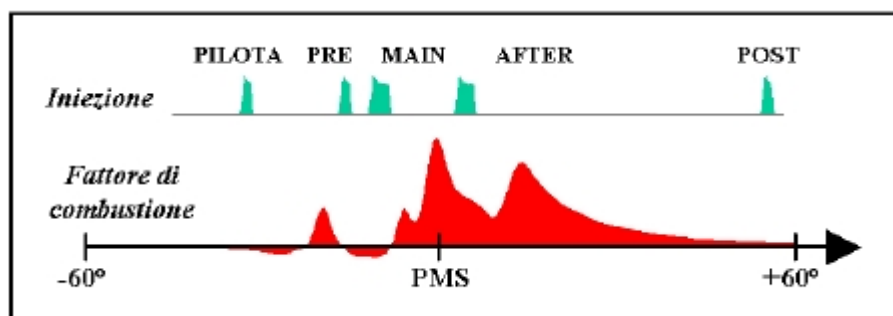


Multiple injections:

The strategy of operation with multiple injections allows the control in a precise manner the combustion process within the cylinder. The injections are modulated to avoid pressure gradients too high which would cause an increase in the noise combustion and unnecessary mechanical stress.

Through multiple injections are able to significantly lower the pollutants, maintaining optimum engine performance. The engine control unit has the potential to make up to 5 injections per engine cycle known as:

- Injection PILOT
- Injection PRE
- MAIN injection
- Injection AFTER
- POST injection



In this application you can find 4 work areas:

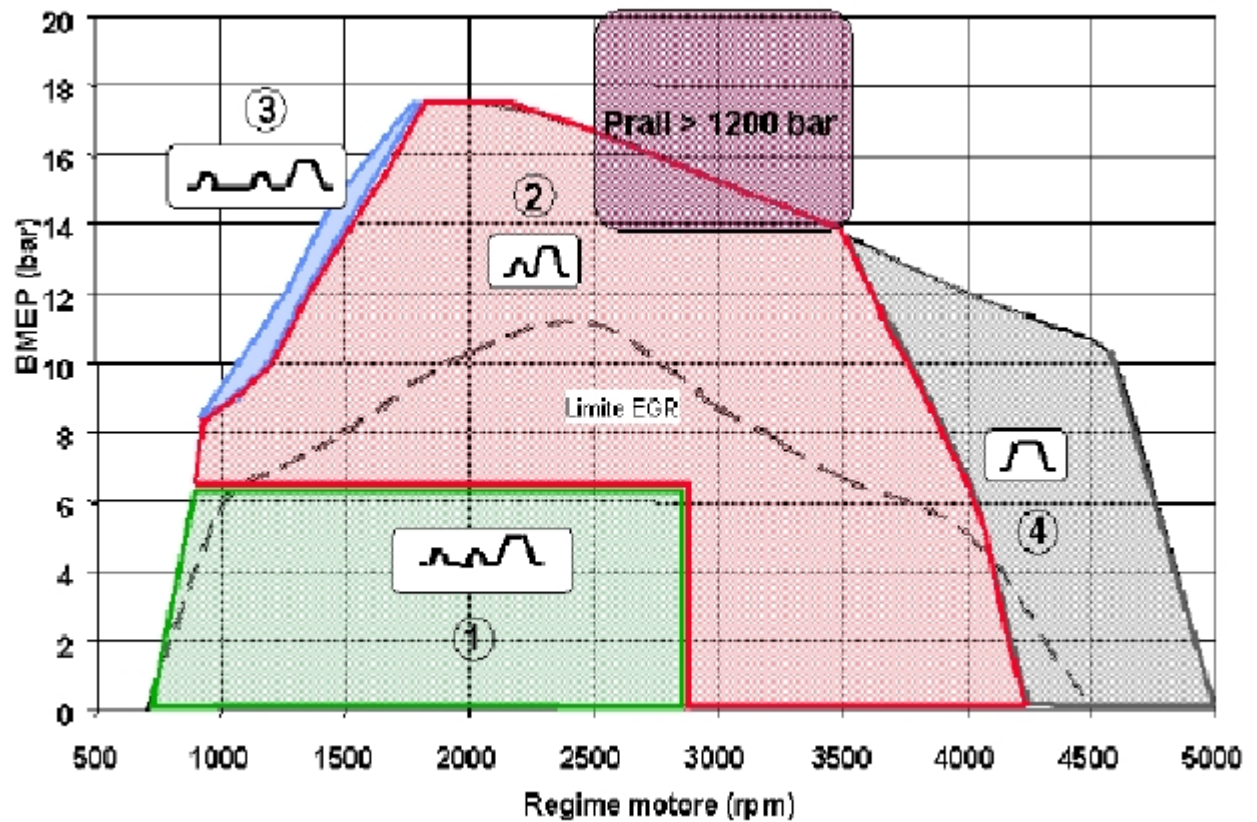
1 injection PILOT PRE + + MAIN

2 + injection PRE MAIN

3 injection PILOT PRE + + MAIN (with dwell time time between the pilot and pre > 1000 usec.)

4 MAIN injection



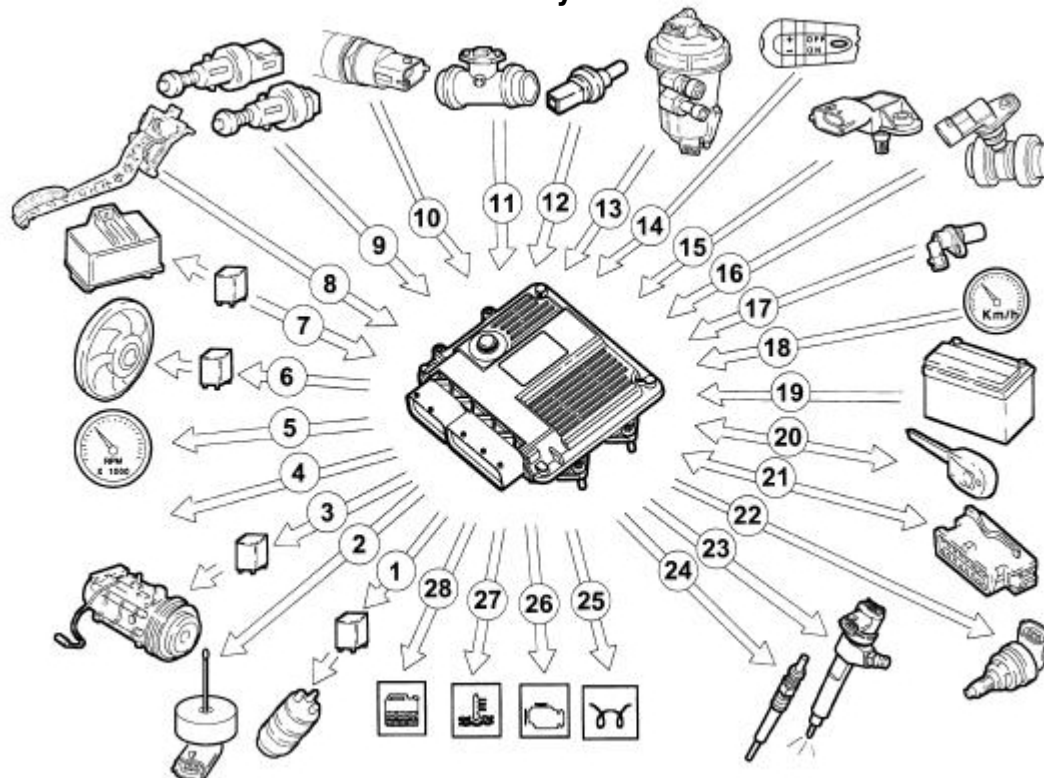


The information that the control unit processes to control the amount of fuel to be injected are:

- RPM;
- Coolant temperature;
- Boost pressure;
- Air temperature (from flowmeter)
- Intake air quantity;
- Battery power;
- Oil pressure;
- Accelerator pedal position;
- Oil temperature.



3.8.5 Schema information in entry / exit control



- 1 Auxiliary Fuel Pump
- 2 Sensor to detect water in diesel
- 3 air conditioner compressor (if equipped)
- 4 Solenoid E.G.R.
- 5 Tachometer
- 6 Blower
- 7 preheating unit
- 8 accelerator pedal potentiometer double track
- 9 Double brake pedal switch - Clutch pedal switch
- Fuel pressure sensor 10
- 11 flow meter
- Coolant temperature sensor 12



13 Fuel temperature sensor
14 Cruise Control (if applicable)
Sensor 15 is gauge
Phase sensor 16
17 rpm sensor
18 Speedometer
19 Battery
20 FIAT CODE (body computer)
21 Socket for diagnosis
22 Pressure Regulator
Electro 23
24 Glow plugs
25 glow plug light
26 Light Injection
Maximum water temperature indicator 27
28 water in fuel warning light



3.9 Self-diagnosis

The self-diagnosis system of the control unit checks the signals from the sensors comparing the data with the permitted limit.

3.9.1 FAULT STARTING:

light on until the engine is started indicates test phase;

light off after engine start shows no damage to components that affect the security of the system;

light on the engine is running indicates failure.



3.9.2 FAULT IN OPERATION:

Illuminates to indicate failure;

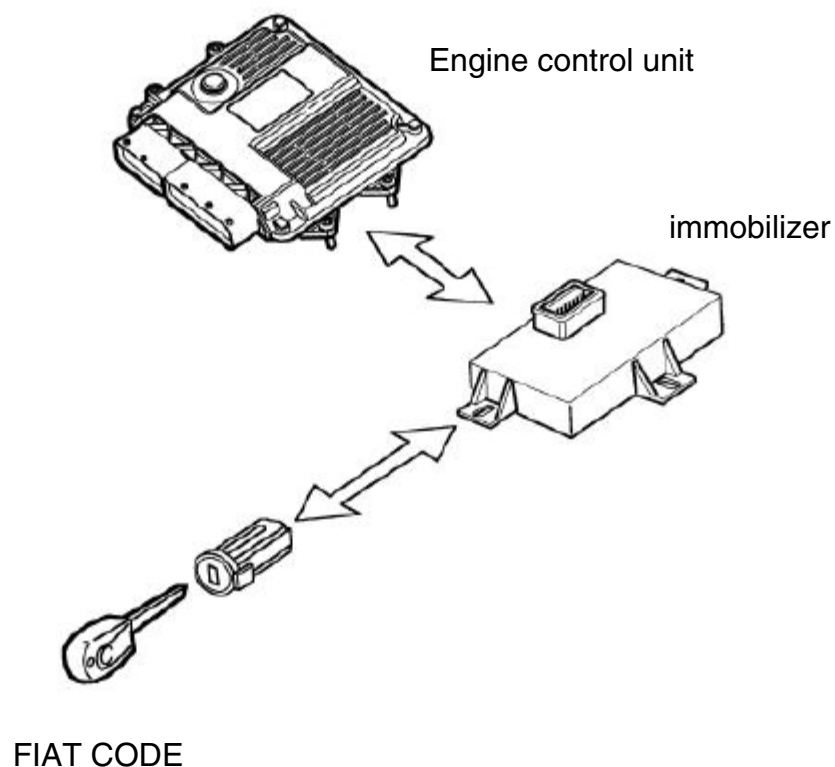
No light means no damage to components that compromise system security.

RECOVERY

The control unit defines each time the type of recovery as a function of the components in failure.
The parameters of recovery are managed by non-faulty.

3.9.3 Recognition FIAT CODE

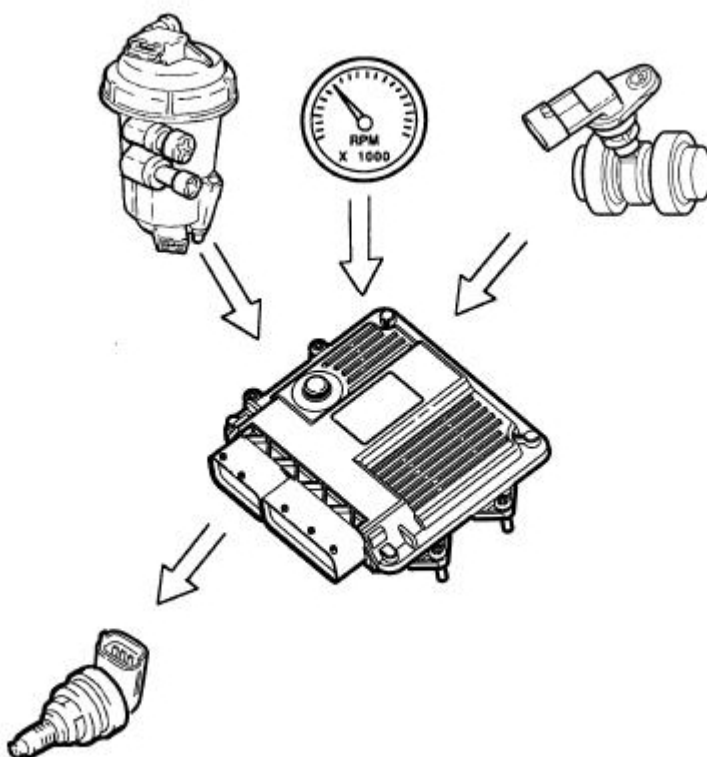
The control unit when it receives the signal of the key in "MAR" communicates with the body computer through the function to get the start-CODE.



3.10 Controls

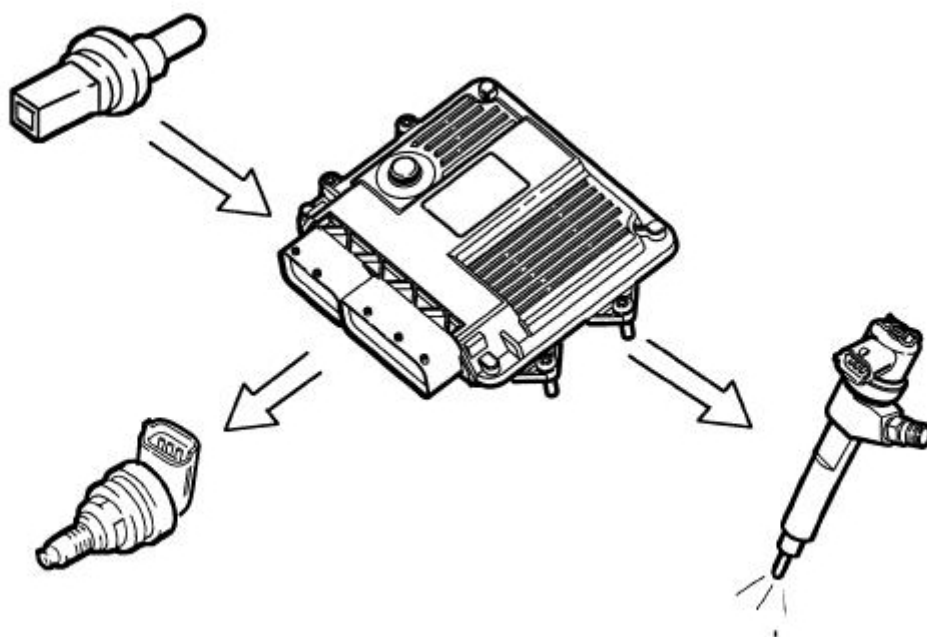
3.10.1 Fuel Temperature Control

With fuel temperature of 80 ° C, detected by the sensor in the fuel filter, the ECM controls the pressure regulator in order to reduce the line pressure and if it is not sufficient to reduce also the quantity of fuel injected.



3.10.2 Checking the engine coolant temperature

With the engine coolant temperature above 105 ° C, the ECM
reduces the amount of fuel injected (reduces the engine power);
commands the electro cooling fans;
light comes on coolant temperature.



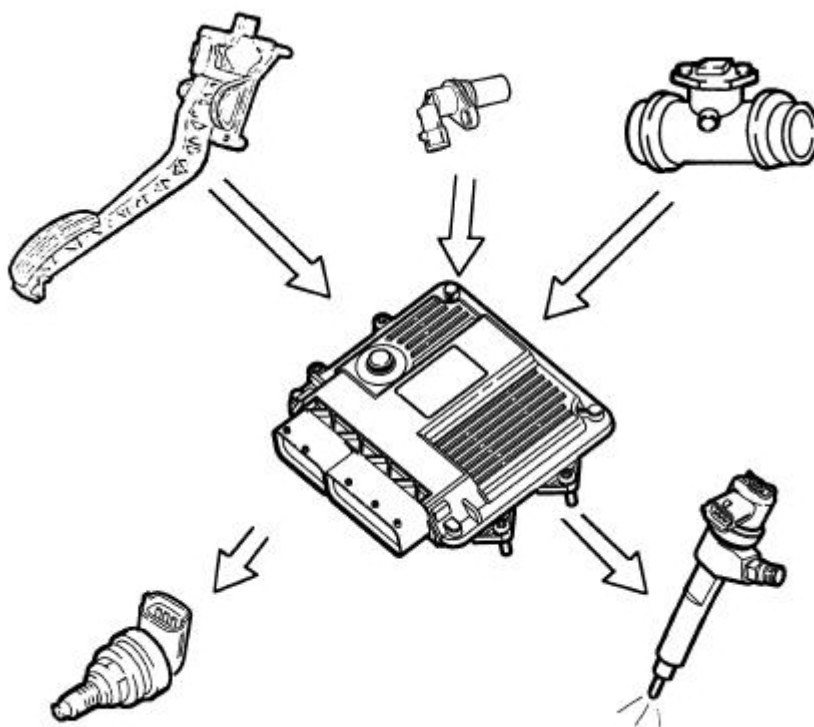
3.10.3 Control qunantità fuel injected

The control unit according to the signals coming from the sensors and to the values recorded:

controls the pressure regulator;

varying the time of injections "pilot" throughout the RPM range;

varies the injection time of the "main".



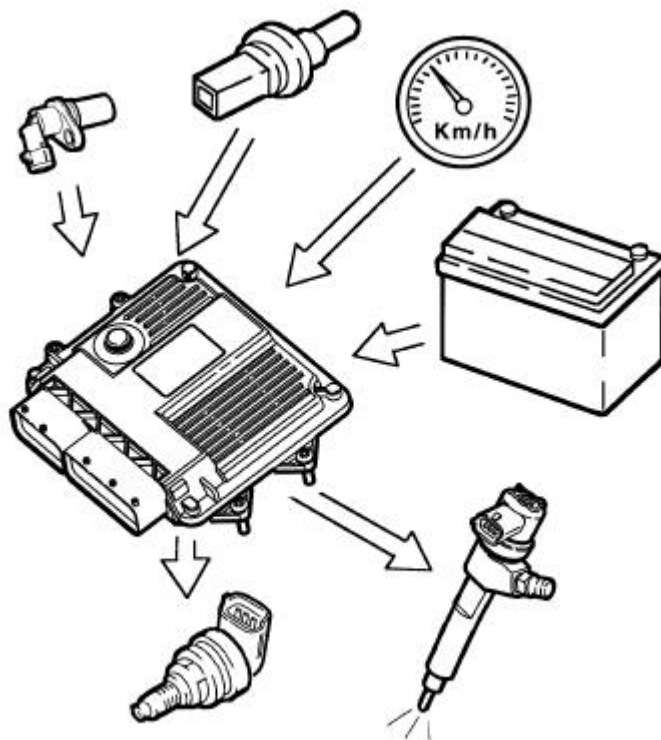
3.10.4 Control of idle speed

The computer processes the signals from various sensors (RPM; temperature motor vehicle speed) and adjusts the amount of fuel injected:

controls the pressure regulator; drv2

varies the injection timing of the electrical injectors. CR1MI2.2

Within certain limits the system takes into account the battery voltage.



3.10.5 Cutting of the fuel in the release phase (Cut-off)

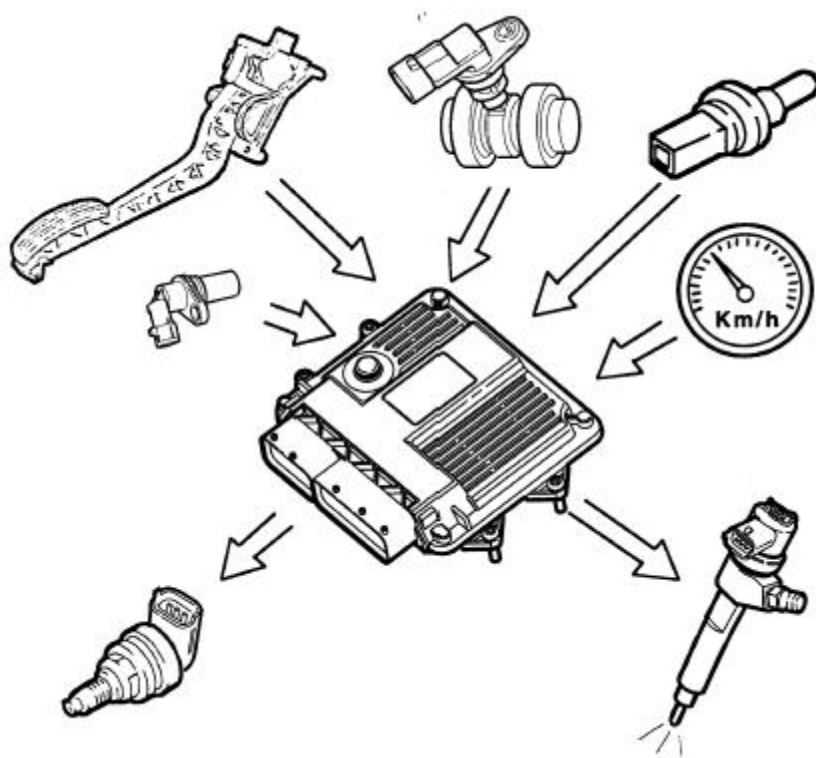
The control unit during release of the accelerator pedal implements the following logic:

Positioned to zero the injection time;

Varies partially the injection time of the electro before reaching the

idle;

Controlling the fuel pressure regulator.

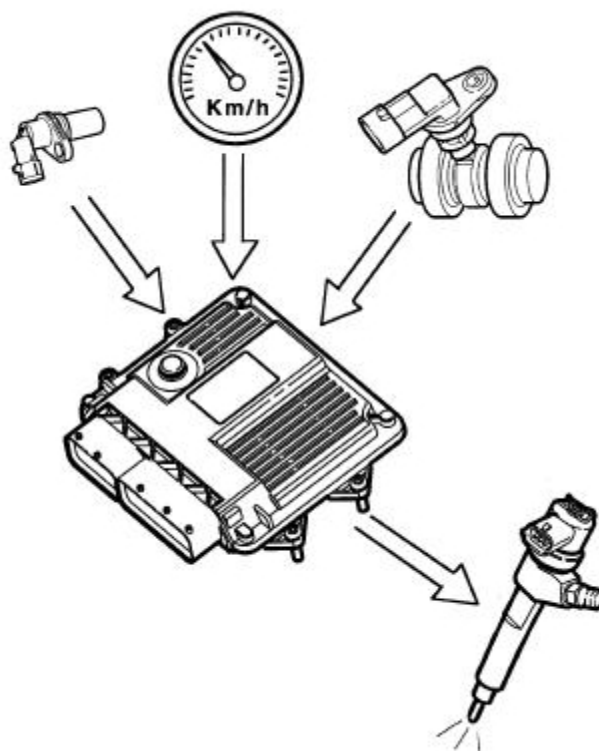


3.10.6 balance control cylinders to a minimum

The control unit according to the signals received from the sensors (engine speed; vehicle speed; sensor phase)

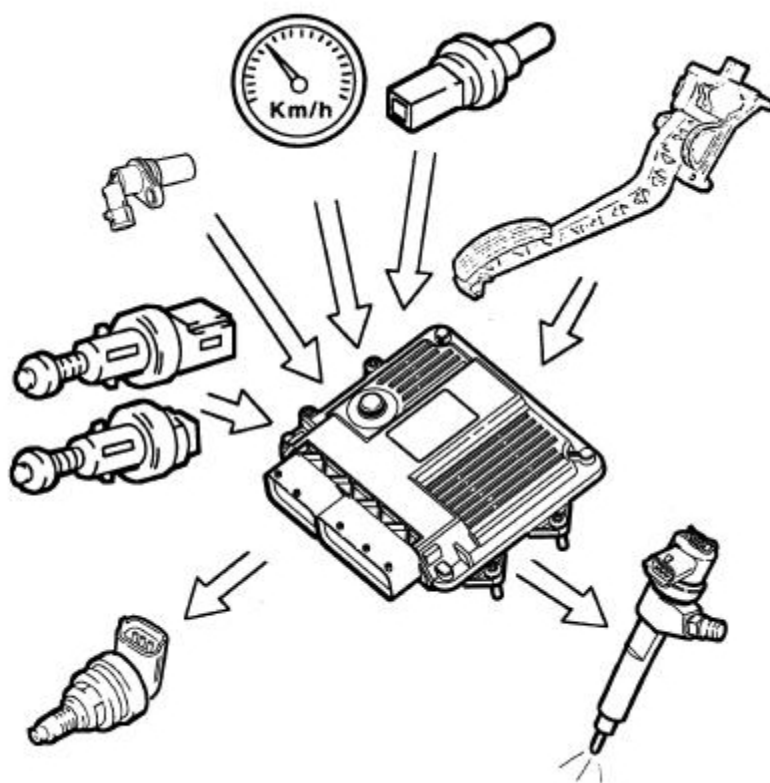
controls the regularity of the pair up to a minimum:

varies the amount of fuel injected in the individual electro-injectors (varying the injection time).



3.10.7 Control antiseghettamento

The control unit processes the signals received from various sensors (engine speed, speed vehicle, engine temperature, potentiometer accelerator pedal, brake switch and clutch) and corrects the amount of fuel to be injected in order to improve the driveability by reducing the strattonamenti running through the opening time of the electro-CR1MI2.2 and the valve quantity control drv2

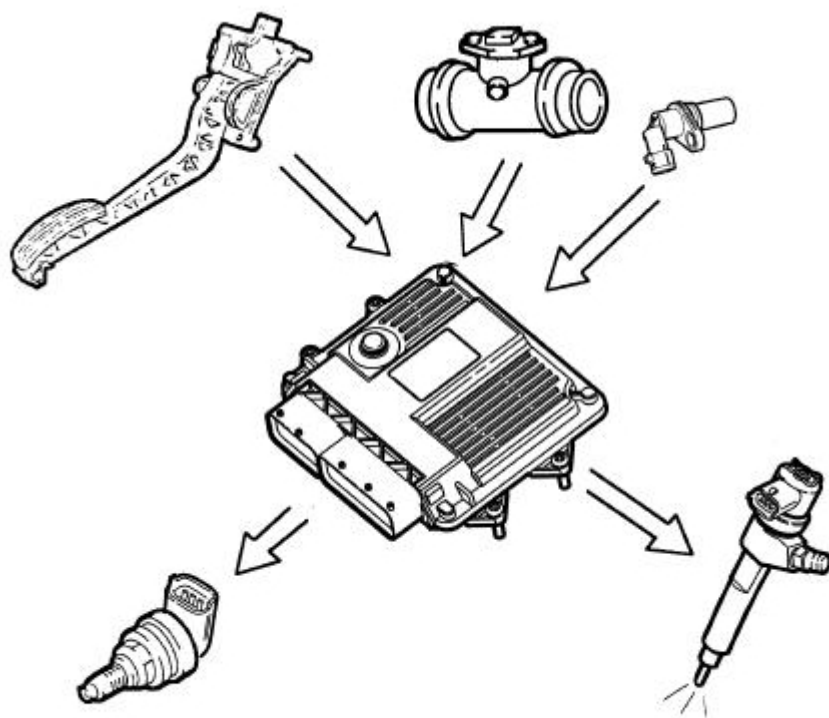


3.10.8 Control exhaust smoke on acceleration

In order to limit the smoke in the fast transient, the control unit based on the signals received from the

potentiometer accelerator pedal, the flow meter and engine speed, limits the amount of fuel to be injected by:

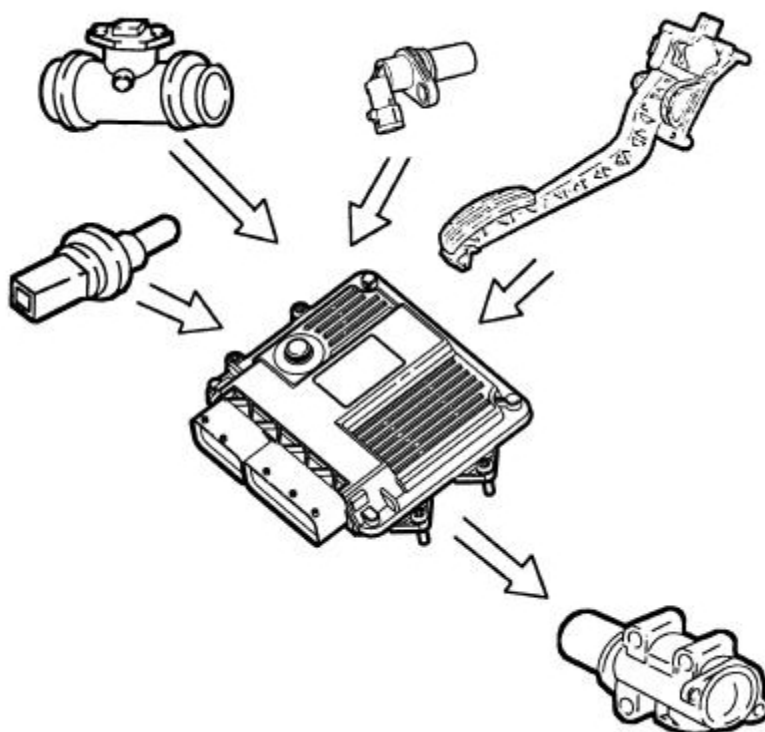
- Pressure regulator drv2
- Injection time of the electro. CR1MI2.2



3.10.9 control exhaust gas recirculation (EGR)

Depending on the legislation anti pollution EURO 3/4, the control unit according to the load motor and the signal from the potentiometer accelerator pedal, limits the amount of fresh air sucked in, by implementing the partial suction of exhaust gases, by:

adjusting the opening of the valve E.G.R. electrical



3.10.10 Maximum torque limit control

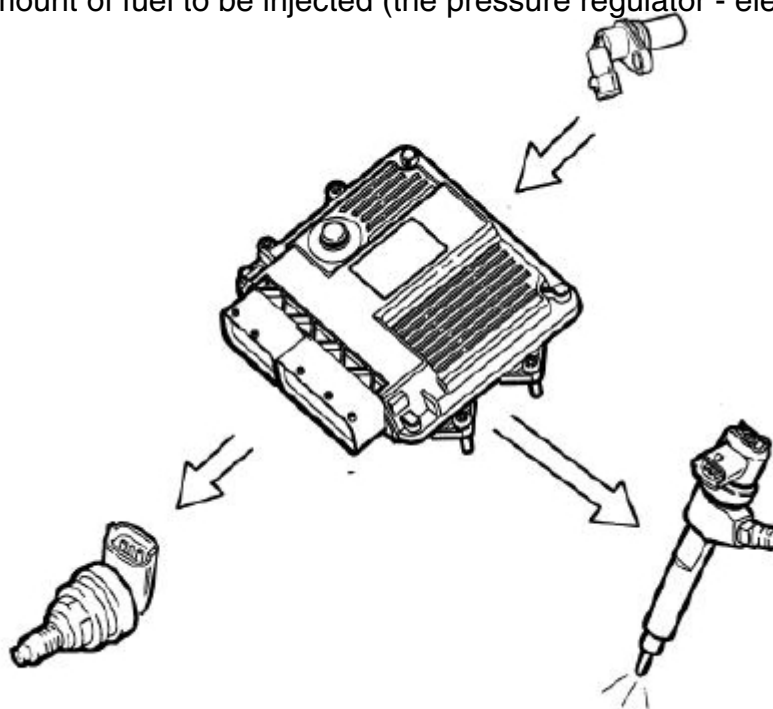
The control unit according to the number of revolutions calculated on predefined maps:

- The torque limit;
- Smoke (limit) admitted.

Compare these minimum values and corrects them with other parameters:

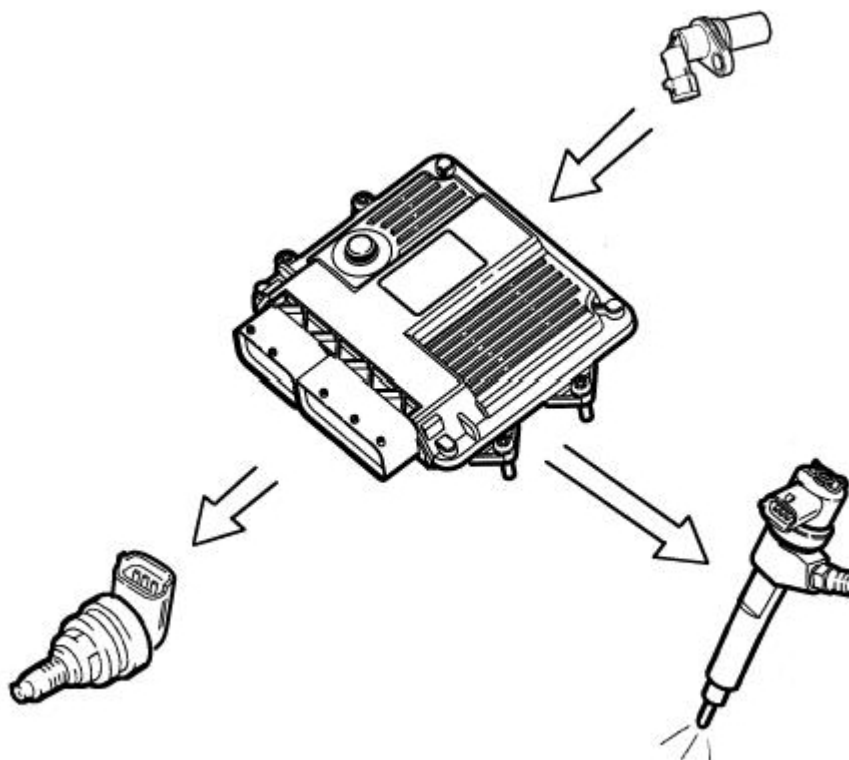
- Coolant temperature;
- Number of engine revolutions;
- Car speed;
- Air temperature,

and controls the amount of fuel to be injected (the pressure regulator - electroinjectors).



3.10.11 Control the maximum speed limit

The controller, when the engine comes to 5200 rev / min, interrupts the driving of the injectors and consequently reduces the supply pressure.

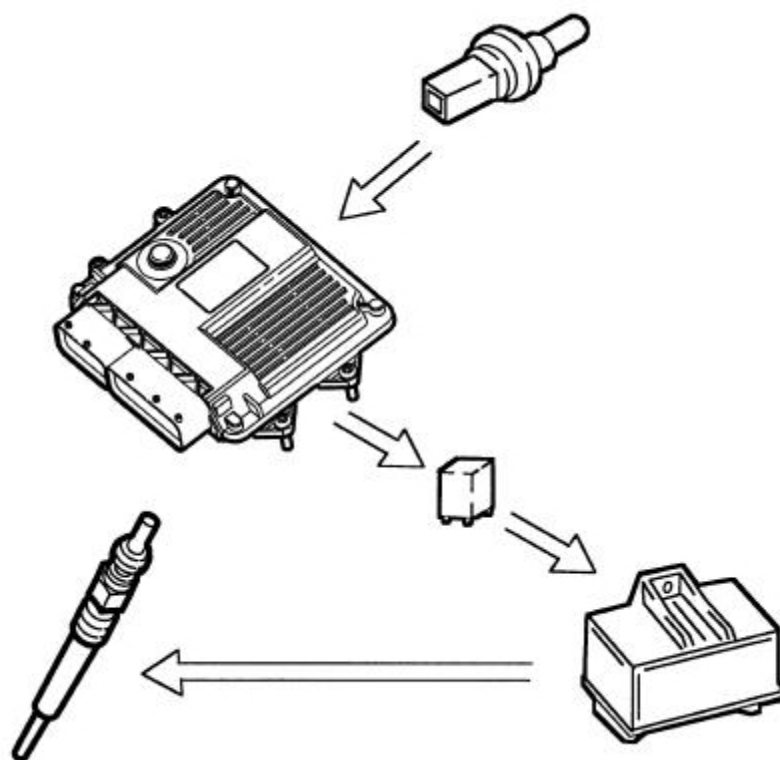


3.10.12

C h e c k i n g g l o w p l u g s

The injection control unit in the step of:

- Goodwill;
- Post-startup
- Manages the operation of the timer unit (BITRON) glow plugs in
- A function of engine temperature.



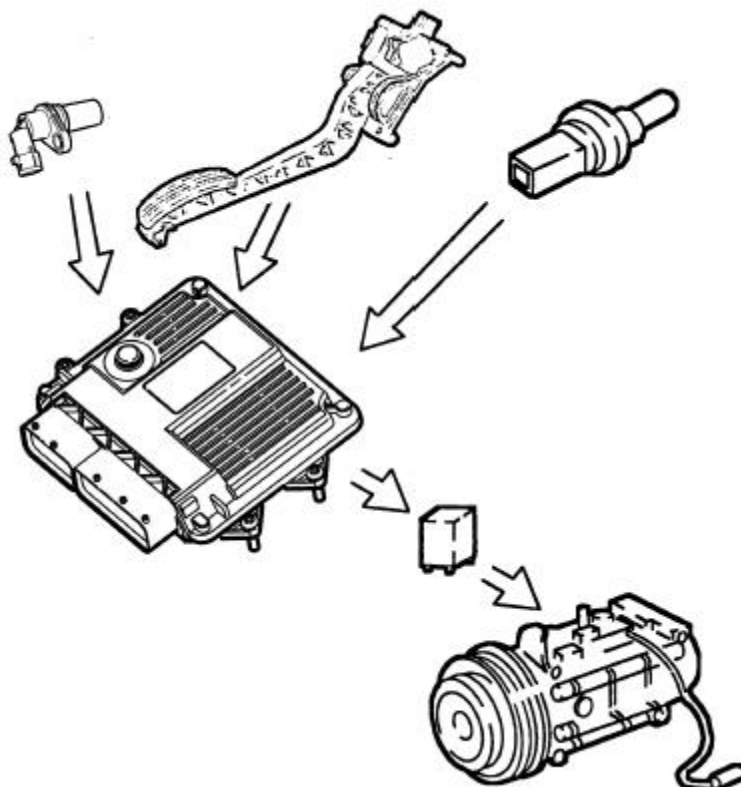
© 2004, Fiat Auto S.p.A. - All rights reserved



3.10.13 Control entry into operation of the air conditioning

The control unit controls the air conditioning compressor:

inserting / disinsierendolo when you press the corresponding switch;
disinsierendolo momentarily (several seconds) during strong acceleration or
request for maximum power.

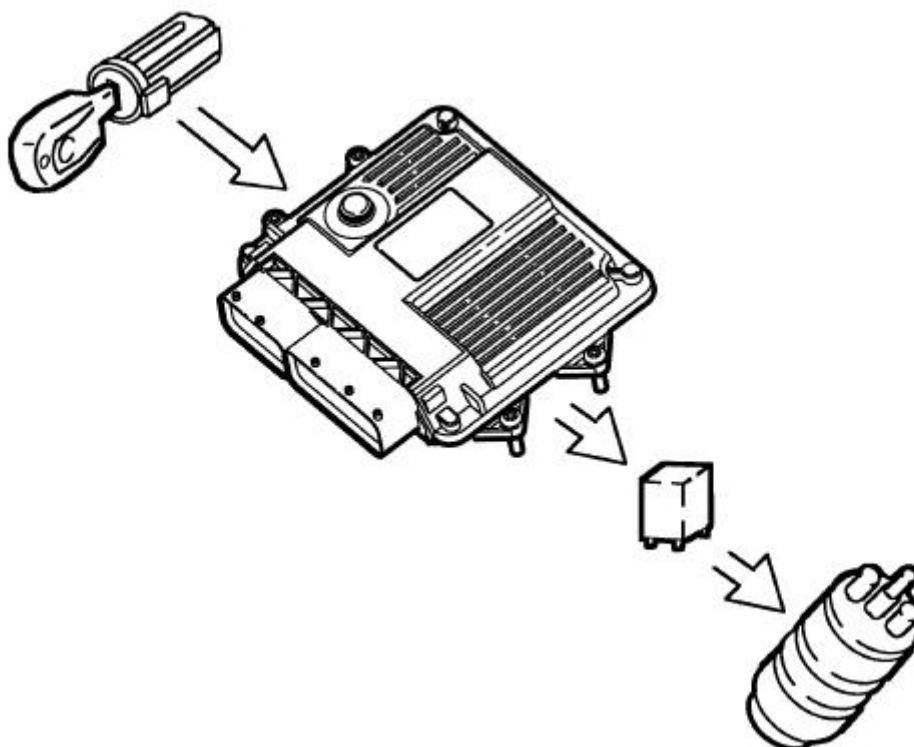


3.10.14 Auxiliary fuel pump control

The control unit regardless of rpm:

auxiliary fuel pump feeds the key to MAR;

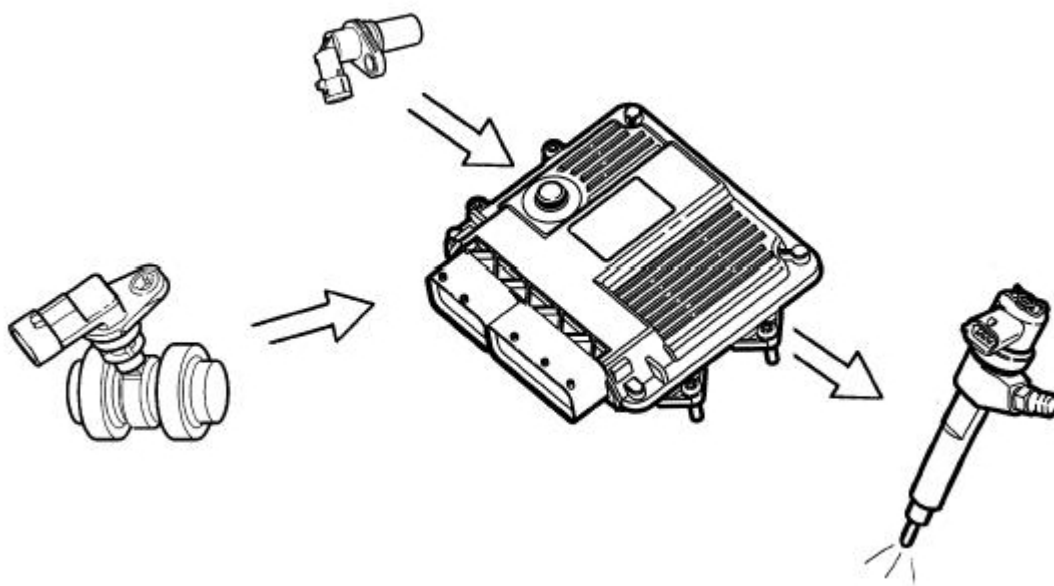
excludes the power of the booster pump when the engine is not started within a few seconds.



3.10.15

M o n i t o r i n g t h e p o s i t i o n o f t h e c y l i n d e r s

The control unit during each motor revolution recognizes which cylinder is in power stroke through the phase sensor and controls the sequence of injection to the cylinder appropriate.



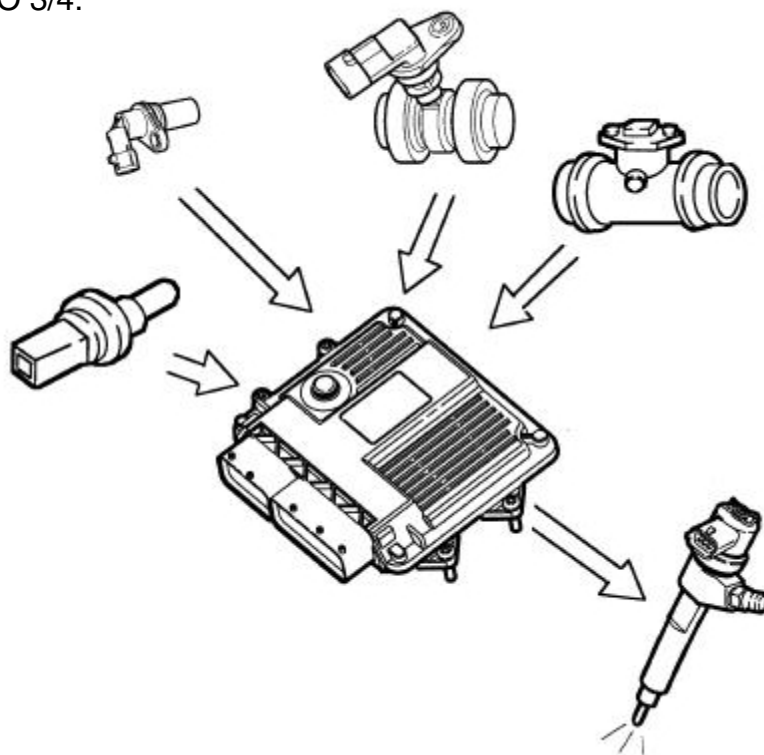
160/534

© 2004, Fiat Auto S.p.A. - All rights reserved



3.10.16 Advance control pilot injection and main injection

The control unit according to the signals from the various sensors (engine temperature; rpm engine; sensor cam shaft; air mass meter including the pressure sensor absolutely integrated in the unit itself), determines a second internal mapping, the point injection optimal, not only in function of the ride comfort, but also the respect of emission limit EURO 3/4.



3.10.17 Closed-loop control of the injection pressure

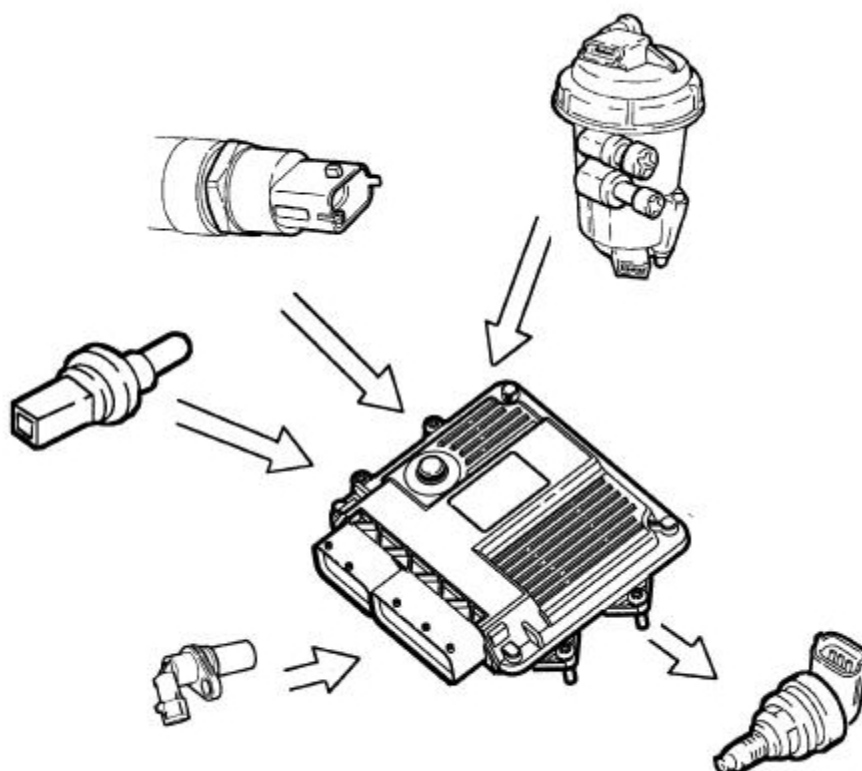
The control unit on the basis of engine load, determined from processing of the signals from the various sensors (engine RPM, engine temperature, rail pressure sensor RDS4; temperature fuel) controls the regulator in order to obtain a line pressure of optimal.

3.10.18 Control of the electricity balance

The controller according to the battery voltage varies the idling:

increases the time of injection of the electro-CR1MI2.2
regulates the line pressure, through the pressure regulator drv2

© 2004, Fiat Auto S.p.A. - All
rights reserved



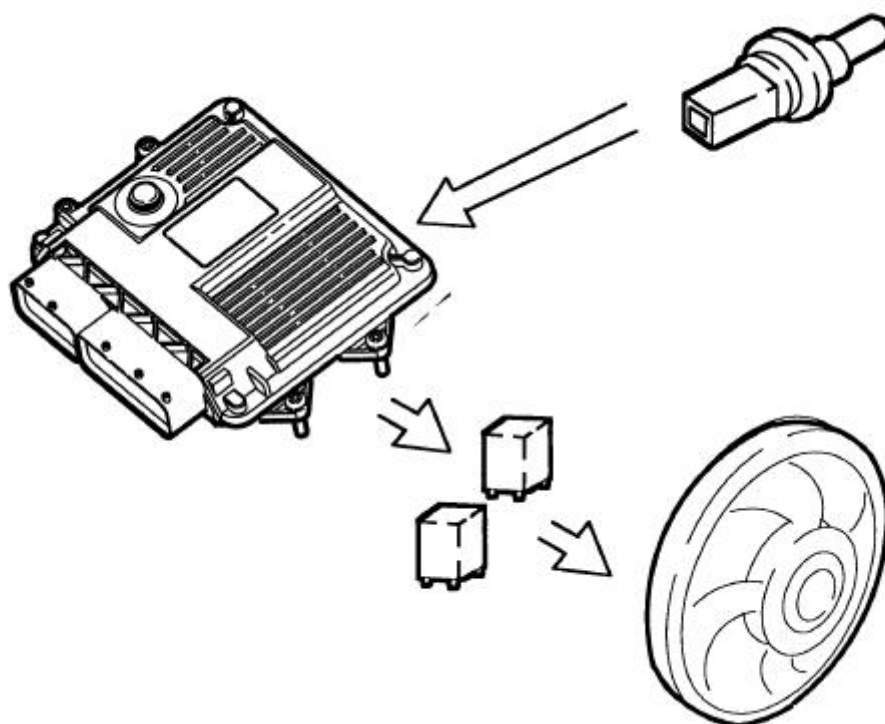
3.10.19

C o n t r o l e l e c t r o f a n s

The control unit, depending on the engine water temperature and pressure of the fluid refrigerant in air conditioning, controls:

the insertion of the electro fans to the first or second speed.

163/534



© 2004, Fiat Auto S.p.A. - All rights reserved



3.10.20 Control System Cruise Control (if applicable)

The control unit, depending on the position of the control lever cruise control, pilot directly the amount of fuel injected to control and maintain the car speed stored.

An indicator on the dashboard, activated by the control unit indicates the operating status or deactivation of the system.

The cruise control is temporarily disabled:

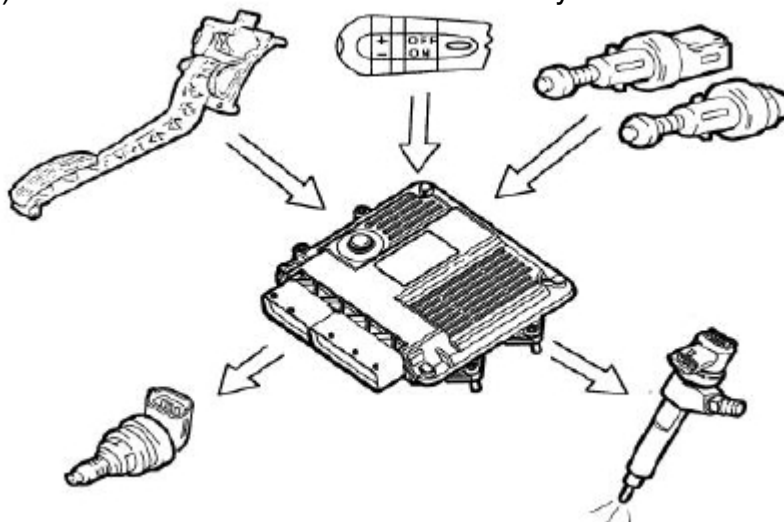
by actuating the brake,

operating the clutch;

with the "resume" to return to the stored speed.

The cruise control is not disabled if required acceleration (eg overtaking) and automatically restores the car to the set speed when you release the accelerator.

The ASR (antispin) overrides the cruise control for security reasons.



Component Summary

Components / functions

HFM6

Drv2

High pressure pump

Boost Pressure Sensor +

T.aria

Supercharging pressure sensor

without T.aria

DPF

Turbo actuator

Maximum rail pressure

Injectors

Regulation system

Functions

3.11 Sensors

Rpm sensor

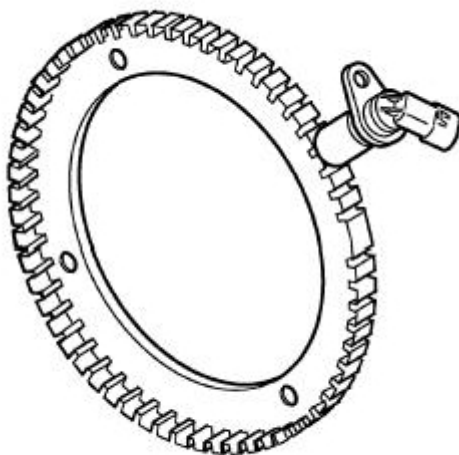
It's mounted on the base and "faces" on the gear wheel placed on the flywheel.

It's of the inductive type, ie it works by the variation of the magnetic field generated by the passage of the teeth of the phonic wheel (60 - 2 teeth).

The injection control unit uses the signal of the rpm sensor for:

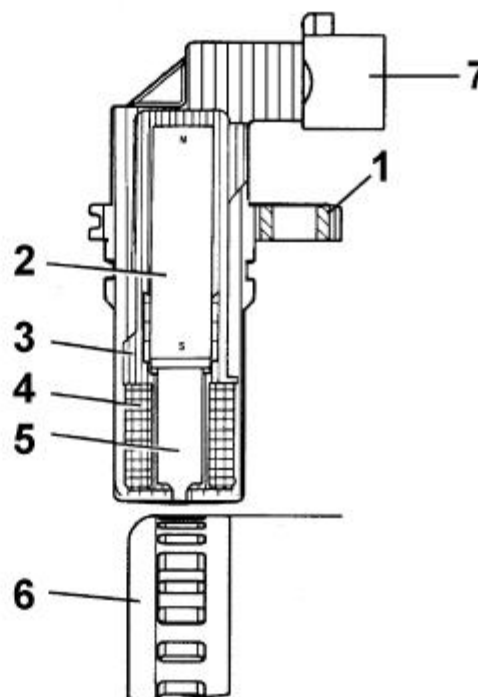
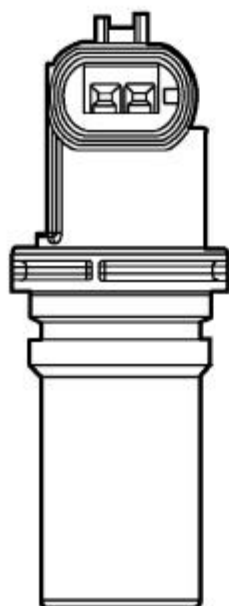
determining the speed of rotation of the motor

determine the angular position of the crankshaft.



The figure shows the rpm sensor into its components.





- 1 Compass brass metal
- 2 Permanent Magnet
- 3 Plastic Body Sensor
- 4 Coil Winding
- 5 Cord Polar
- 6 Ring gear or tone wheel
- 7-wire coaxial cable or electrical connection

PIN-OUT

Pin	Name	Signal Type
1	Turn of the wheel phonic (A)	Exit frequency
2	Turn of the wheel phonic (B)	Exit frequency

Specifications

Winding resistance 790 ohms \pm 20%

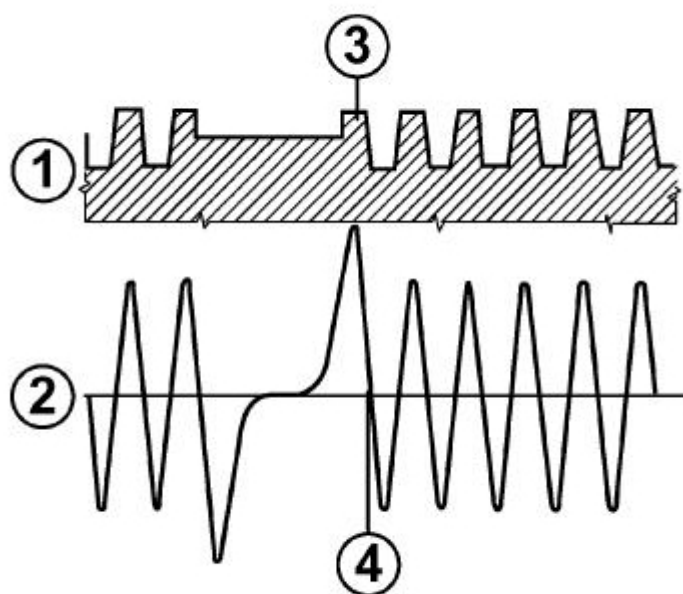


Winding resistance $680 \text{ mH} \pm 20\%$ ($f = 1 \text{ kHz}$)

The prescribed distance (air gap) to obtain correct signals, between the end of the sensor and the phonic wheel must be between $0.8 \div 1.5 \text{ mm}$.

This distance is not adjustable, so if you find an air gap to the value of out of tolerance, verify the integrity of the sensor and the gear wheel.

In the graph shows the output signal of the sensor in relation to the horizontal development the gear wheel.



1 Profile sprocket

2 speed sensor signal

3 Tooth reference

4 point detection for recognition PMS

Operation

The transition from full to empty, due to the presence or absence of the tooth, determines a change of magnetic flux sufficient to generate an alternating voltage induced,



deriving from the count of the teeth placed on a ring (or phonic wheel).

The frequency and amplitude of the voltage sent to the electronic control unit provides the same the measurement of the angular velocity of the crankshaft.

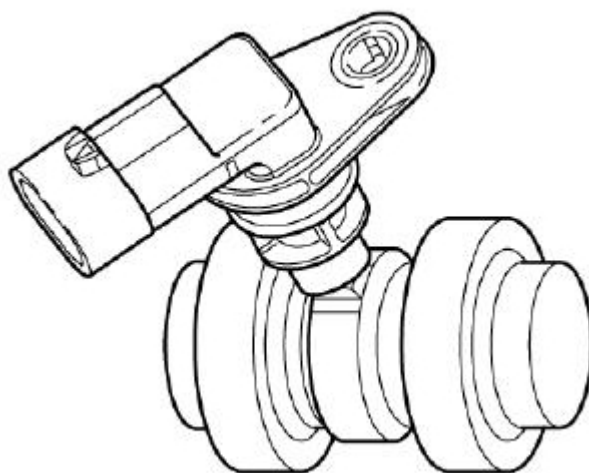
Cam angle sensor or phase

It is a Hall effect sensor. It is installed on the overhead at the shaft of distribution outlet side.

On the latter there is provided a tooth that allows the sensor to signal the position of phase timing of the engine.

The injection control unit uses the signal of the phase sensor to know the PMS eventually of the compression, and in the starting phase to synchronize the injections with respect to the position of the pistons.

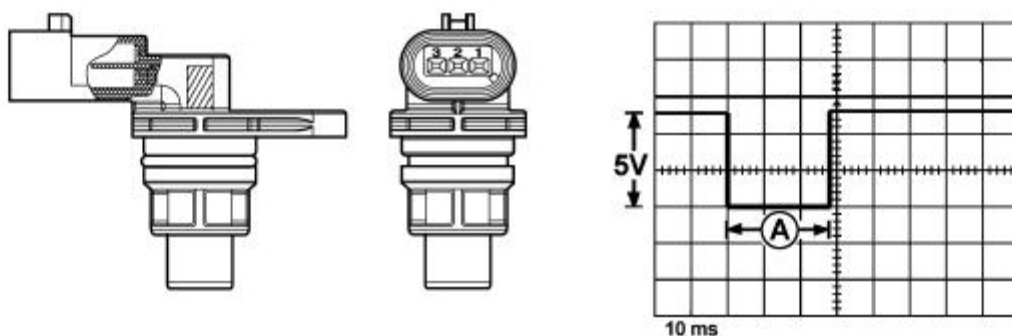
timing sensor



Operation

Current flows through a semiconductor layer, immersed in a magnetic field normal (Lines of force perpendicular to the direction of the current) generates at its terminals a difference in potential, known as tension in the "Hall".

If the intensity of the current remains constant, the voltage generated depends only on the intensity of the magnetic field; is sufficient so that the intensity of the magnetic field varies periodically to obtain a modulated electric signal, whose frequency is proportional to the speed with which changes the magnetic field. To achieve this change, the sensor is approached periodically by a tooth formed on the inner part of the pulley.



PIN-OUT

Pin	Name	Type signal
1	Mass	Mass
2	Phase signal	Exit frequency
3	Supply	Input 12 V

In the specific case of the phase sensor, it is powered by the engine control unit 5 Volt.



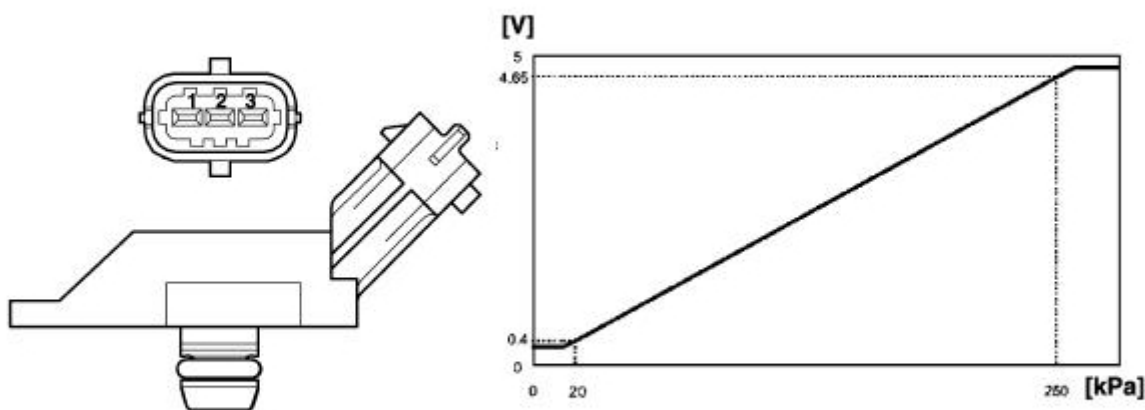
Every time the rotor passes in front of the sensor is to generate, for the Hall effect, a variation of the output voltage from the sensor; this variation occurs for the entire duration of the passage in front of the sensor rotor after which the signal returns to the initial value (5V).

NB the control unit in case of failure of the sensor uses an internal mapping emergency that will allow the motor to start, however,

Boost pressure sensor

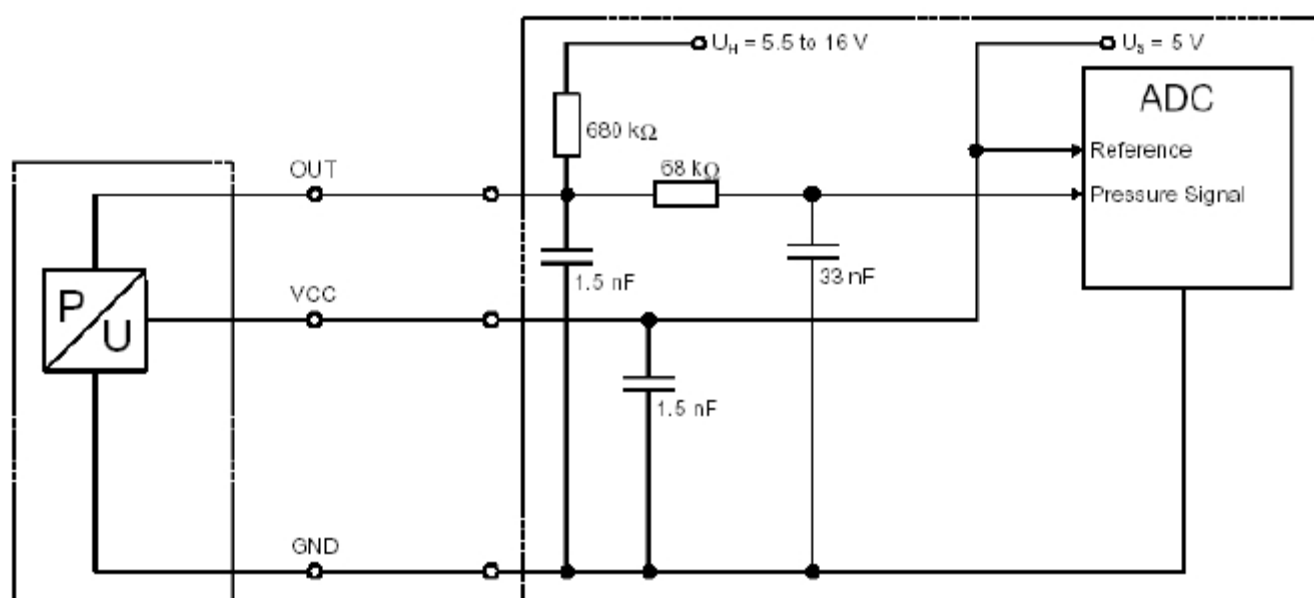
The pressure sensor of supercharging is mounted on the intake manifold and allows to measure a suction pressure up to the value of 1.5 bar (corresponding to 2.5 bar absolute).

The sensing element is constituted by a piezoresistive element whose signal is amplified by an electronic circuit integrated in the sensor. The sensor is powered directly from electronic control unit with a voltage of 5V, and outputs the voltage directly proportional to the supercharge pressure.

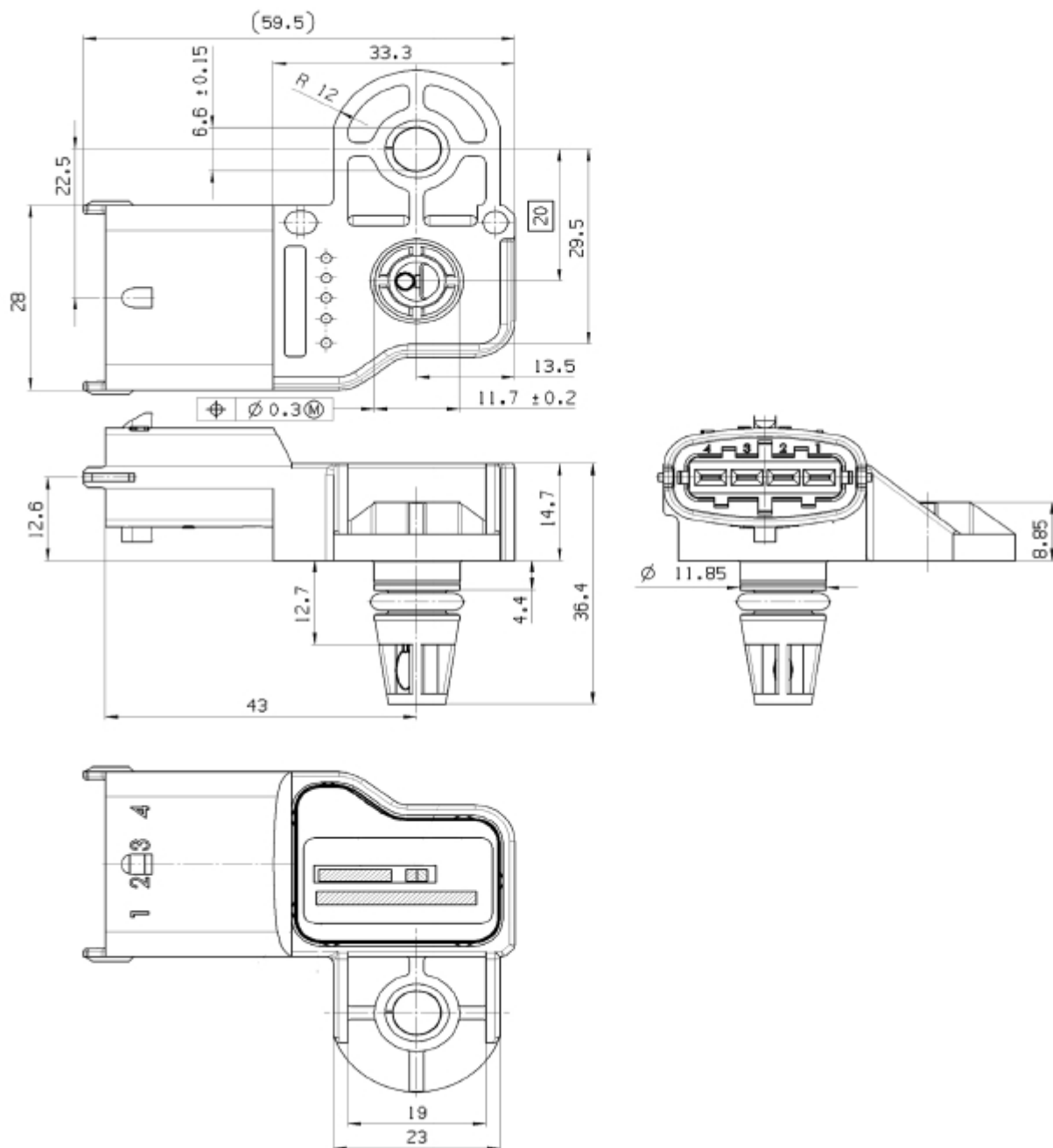


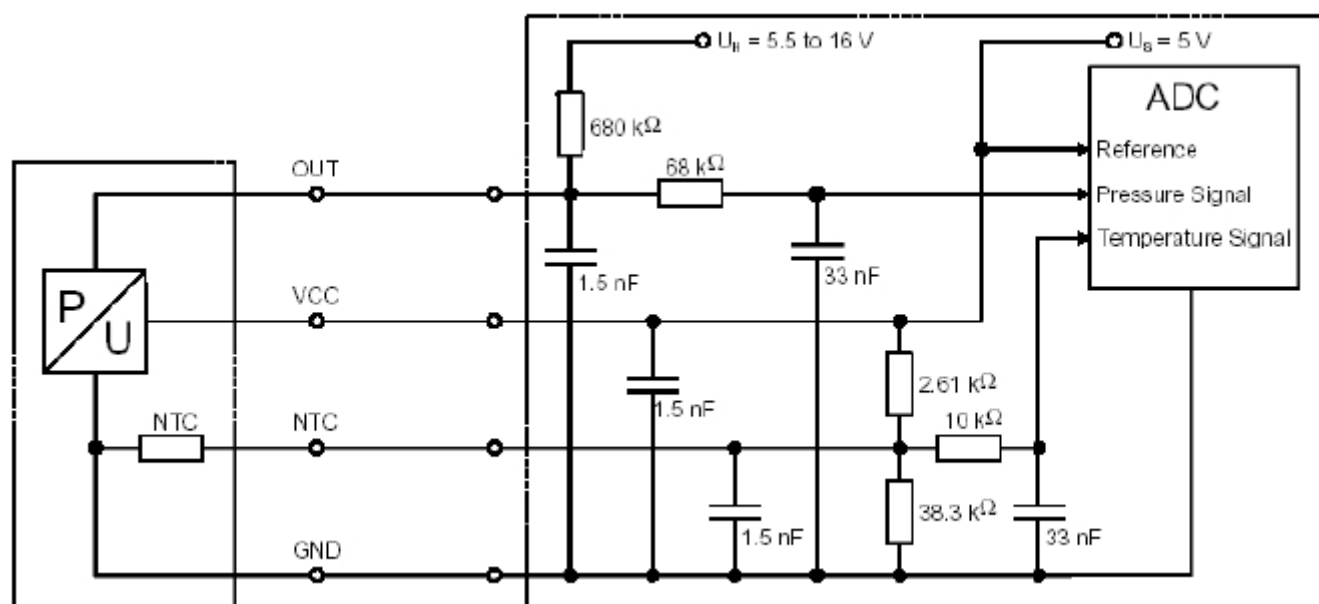
Pinout sensor overpressure

Pin	Name	Type signal
1	Supply	5V Input
2	Mass	Mass
3	Sensor Output	Exit Analog



In the sensor configuration 90 hp also integrates the temperature sensor
Boost





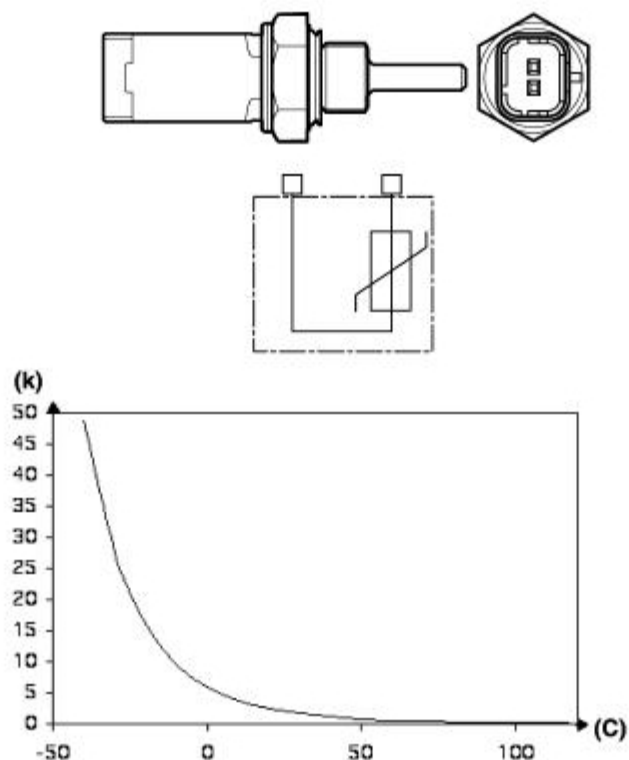
Pin-out

- 1 output signal pressure
- 2 power supply unit 5 v
- 3 output temperature signal
- 4 ground



Engine coolant temperature sensor

It is mounted on the thermostat and detects the temperature of the water by means of an NTC having negative coefficient of resistance.



Features engine water temperature sensor

Temperature (° C)	Resistance (Kohm)
-40	48.80
-30	27.41
-20	15.97
-10	9.62
0	5.97



10	3.81
20	2.5
30	1.68
40	1.15
50	0.81
60	0.58
70	0.42
80	0.31
90	0.23
100	0.18
110	0.14
120	0.11
130	0.08

3.12 Air flow meter (flow meter) with integrated temperature sensor

Air HFM 6

The advantages of the new flow meter are:

Greater protection of the sensitive element in the sensor against impurities

the air (particles, water, oil vapor, etc..)

Greater accuracy of measurements.

The differences between the flow meter HFM6 and earlier are:

Digital signals of temperature and air flow

Four-wire electrical connection.

Different channeling of the air flow which invests the sensitive element of measurement (new by-pass).

Turret heat-sealed to the duct flushing air.



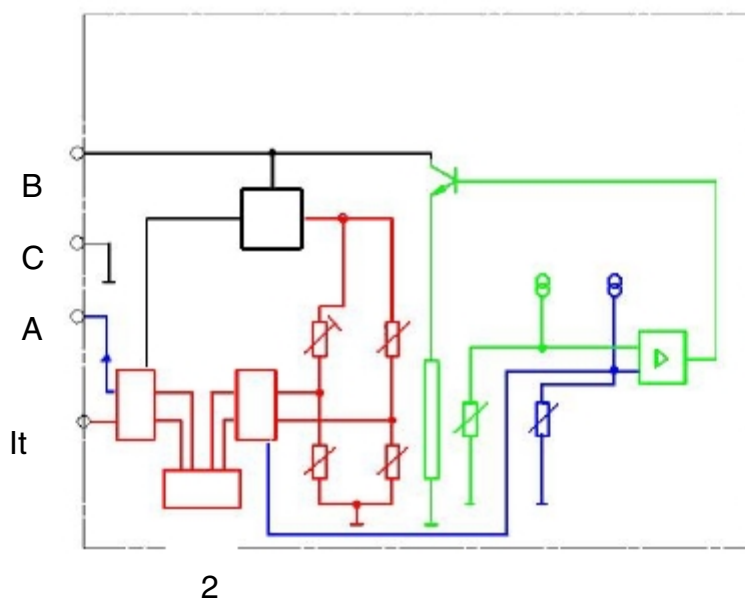
Protection grid to the outlet section of the duct flushing air (with the function of condensation of oil vapors).

The flow meter HFM6, has a new plastic grid (1) positioned on the outlet section of the duct sensor housing, which has the function of protecting the measuring sensor (Sensing element) from the blow-by vapors that may riflussare during the off state of the motor.

In the digital flow meter the turret (2) is heat sealed to the duct housing the sensor, and therefore inseparable from it. In the analogue flow meter tower is attached to the conduit for means of two screws.



Diagram digital meter mass air intake temperature



A = digital output temperature value

B = 12v

C = mass

E = digital output value of air flow

1 = function generator

2 = data memory

3 = A / D converter

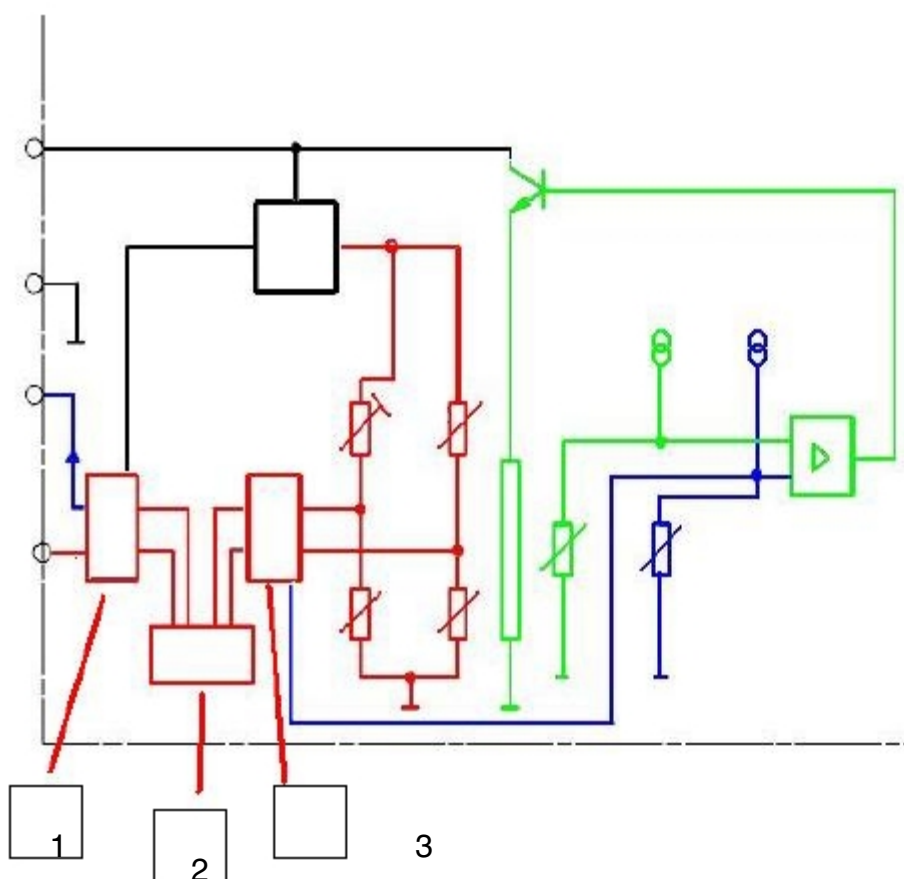
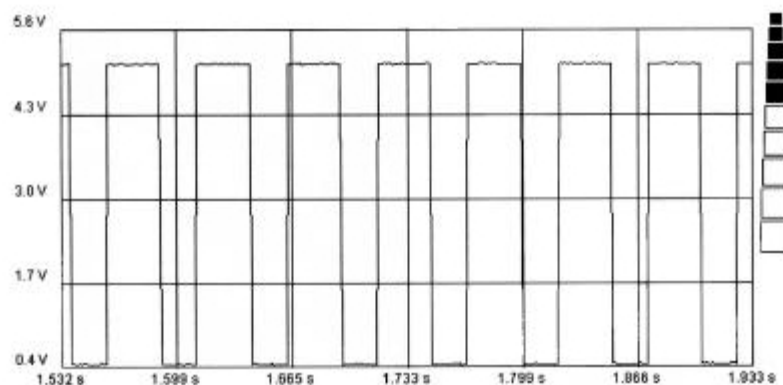
Flow meter DIGITAL OPERATION

Performance temperature signal

In debimetre the digital temperature value, sent to the engine control unit, is a signal of type PWM duty cycle (fixed frequency).

The working voltage is 5 volts and the measurement range is between -50 ° C to +150 ° C (with a consequent value of duty cycle of between 10% and 90%)





The variation of the resistive values is converted from analogue to logic thanks to a "Analog Digital Converter" (3). The data obtained is stored in a memory data

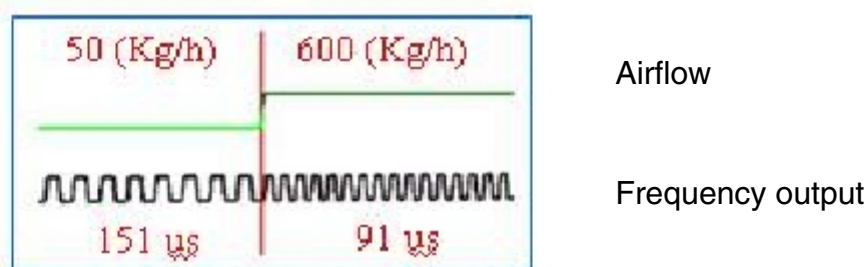


(2). And thanks to a "Function Generator" (1) the data is sent to the control unit Engine.

Performance Signal AIR FLOW

In the digital flow meter, the signal sent to the engine control unit has an amplitude of 5 Volts and is variable in frequency from 1.4 kHz and 12 kHz.:

To an increase of incoming air capacity corresponds to an increase in the frequency of the output signal from the meter (and consequently a decrease of the value of period).



Flow meter digital signal AIR FLOW

To detect and verify the signal amplitude (voltage 5Volt), it is necessary the use of a voltmeter graph. To detect the frequency value and sufficient to use a multimeter with selected the frequency measurement and the related caps connected one on the ground pin flow meter and a signal on the pin on the air flow.

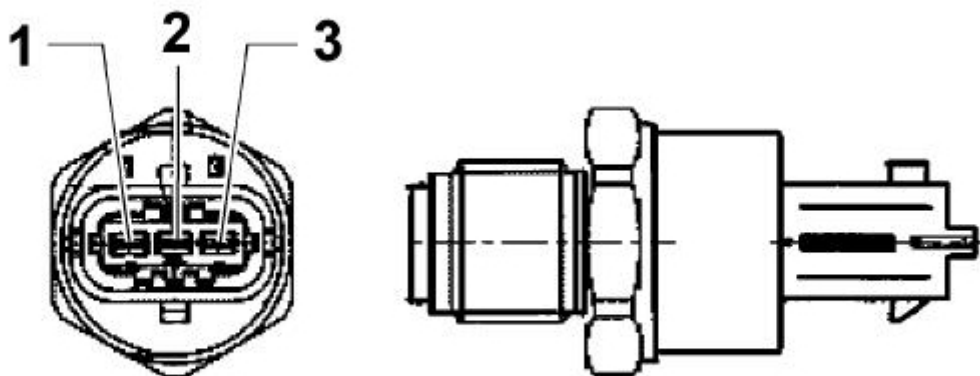


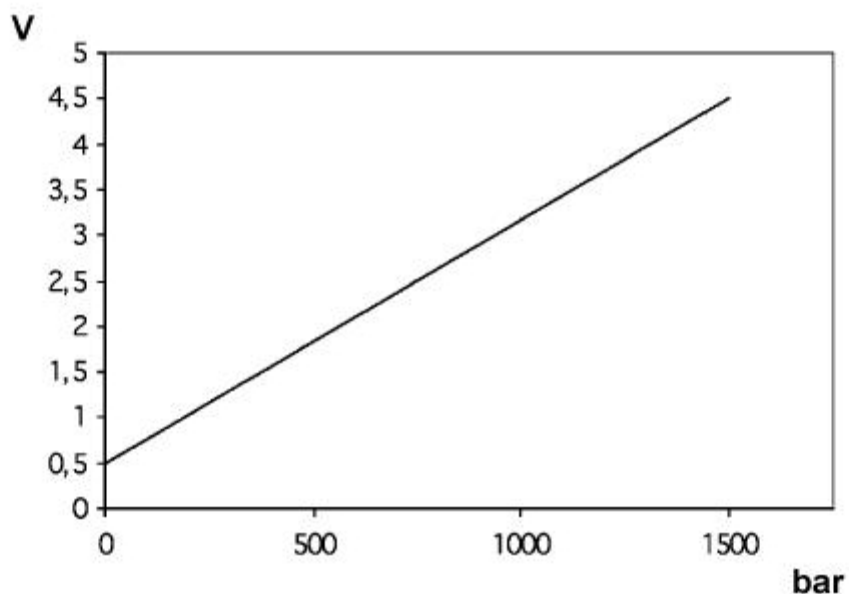
RDS fuel pressure sensor 4

It is attached to the end of the single fuel manifold "rail" and has the task of providing to the injection unit a signal of "feedback" to:

adjust the injection pressure;
adjust the duration of injection.

The sensor is powered directly by the engine control unit with a voltage 5V. The output voltage varies linearly between 0.5V (0 bar) and 4.5 V (1500 bar).





Pinout fuel pressure sensor

Pin	Name	Type signal
1	Mass	Mass
2	Sensor Output	Exit Analog
3	Supply	5V Input

In case of failure of the sensor unit through the mapping of emergency commands the quantity control valve drv2 to erecting the minimum pressure of 100 bar (250 bar to 350 bar). N.B. the engine can 'start and run with the faulty sensor.

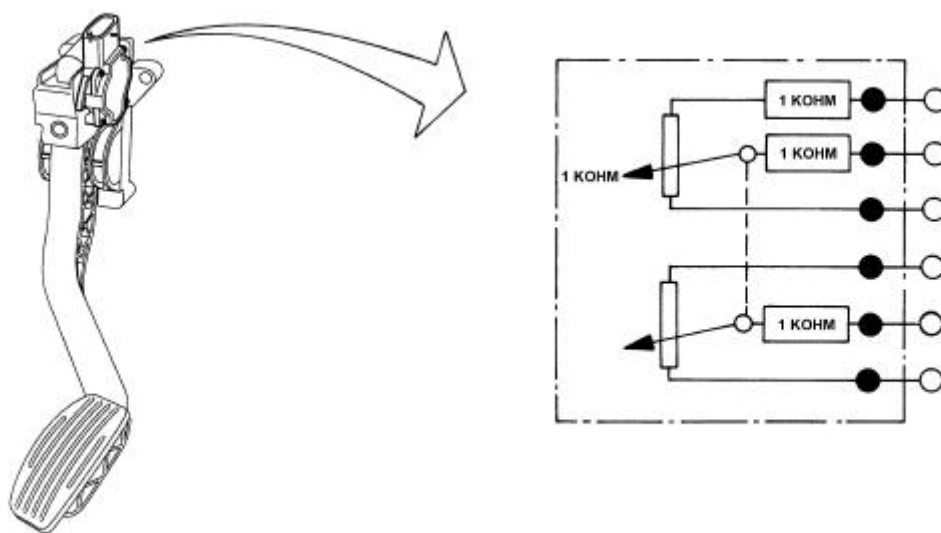


Potentiometer accelerator pedal

The sensor is constituted by a casing fixed to the accelerator pedal, within which, in axial position, is placed a shaft connected to the two potentiometers: the main one and of safety.

On the shaft a helical spring ensures the correct pressure resistance, while a second spring assures the return of release.

The reading of the redundant signal allows to continuously monitor the plausibility of measured values, in order to ensure complete driving safety even in case of failure.



Operation

The position of the accelerator pedal is converted into an electric voltage signal and sent to the control unit from the potentiometer connected to its foot.

The accelerator pedal position signal is processed together with information relating the number of revolutions to derive the injection timing and the relative pressure.



Pin	Name	Type signal
1	Supply Track 2	Input 5v
2	Supply Track 1	Input 5v
3	Ground Track 1	Mass
4	Track 1 Signal	Exit Analog
5	Ground Track 2	Mass
6	Signal track 2	Exit Analog

Specifications Sensor Bosch

Supply voltage: $5V \pm 0.3V$

Resistance to terminal sliders knobs: $1 \pm 0.4 \text{ Kohm Kohm}$

Resistance Track 1: $1.2 \pm 0.4 \text{ Kohm Kohm}$

Resistance Track 2: $1.7 \pm 0.8 \text{ Kohm Kohm}$

Specifications Sensor hella

Supply voltage: $5V \pm 0.3V$

Resistance to terminal sliders knobs: $1 \pm 0.4 \text{ Kohm Kohm}$

Resistance Track 1: $0.9 \text{ Kohm } 1.4 \text{ Kohm} \pm 35\% \pm 35\% \dots$

Track 2 Resistance: $1.2 \text{ ohm} \pm 35\% \dots 35\% \pm 2.0 \text{ Kohm}$



e: 12 V;

**VGT
sole
noid
3.13**

S
o
l
e
n
o
i
d
v
a
l
v
e
;
R

a
t
t
e
d
v
o
lt
a
g

FEATURES

ELECTRIC ACTUATOR

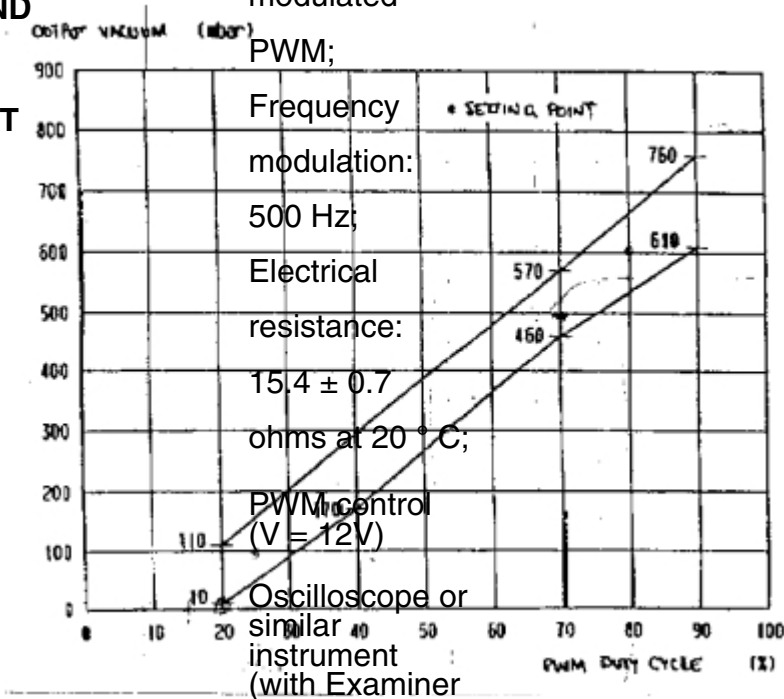
TYPE COMMAND

METHOD 'OF
MEASUREMENT

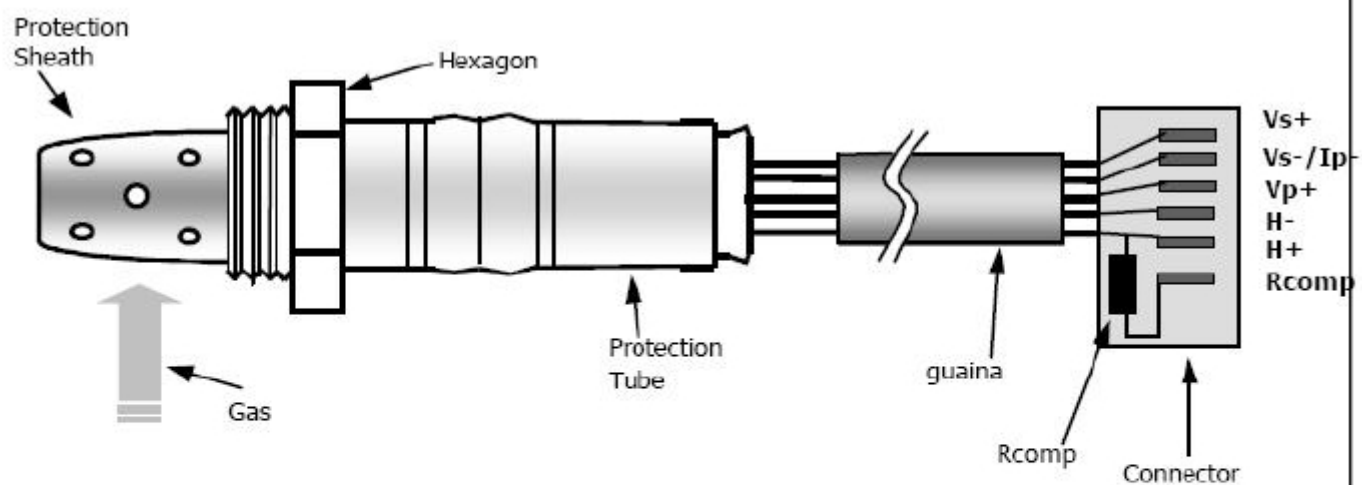
Operating
Voltage Range:

10 to 16 V;
Control signal:
square wave
modulated

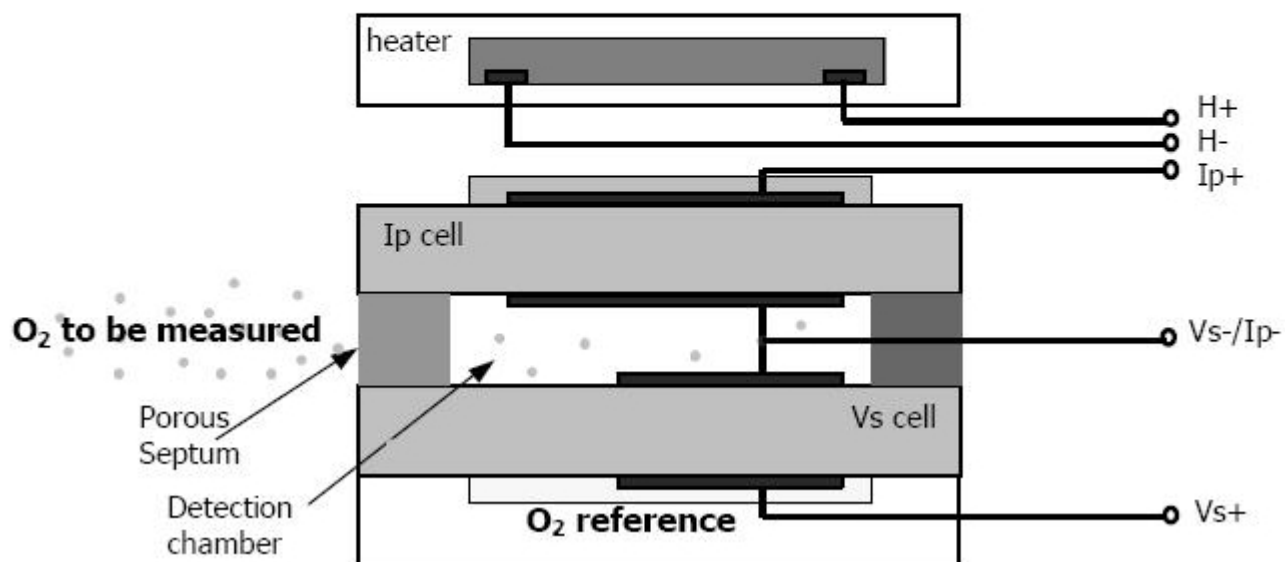
PWM;
Frequency
modulation:
500 Hz;
Electrical
resistance:
 15.4 ± 0.7
ohms at 20 °C;
PWM control
(V = 12V)
Oscilloscope or
similar
instrument
(with Examiner
SMA)



UEGO lambda sensor



UEGO Sensor: Universal Exhaust Gas Oxygen Sensor



4 1.4 8 Valve Engine

4.1 Fundamentals

The development of the 1.4 8V has created a shift of 8V Fire engine in cars segment B and light commercial vehicles. The engine performance is comparable to Fire 1.2 16V MPI, with better fuel consumption and greater cost competitiveness.

The development of the motor 1.4 8v, has led to a 6% reduction of fuel consumption (NED) through two actions:

The modification of the valve train with lighter mass and the adoption of valve springs at low load, reduced fuel consumption by 2%. (NEDC)

The application of the CVCP (continuous variable valve timing) V8 engine helped to reduce the fuel consumption by 4%

The power and especially the low-end torque of this engine enhance the qualities of elasticity of the Fiat Punto, ensuring a smooth and ready to shoot without the need for downshifting, with very good fuel consumption

The adoption of the continuous variable valve timing and a new concept of combustion chamber variable turbulence significantly reduces fuel consumption and exhaust emissions, especially in city and suburban.

The new combustion chamber, with a compression ratio increased to 11.0, combined with the new inlet and exhaust, the new intake manifold and timings of the optimized distribution, ensures spirited performance, fuel economy and low emissions.

The 1.4 engine complies with the Euro 4.

The main features are most important:

engine in-line four-cylinder OHC 8-valve;
tested in aluminum alloy;



control of the valves by means of a camshaft and mechanical tappets in glasses and registration;
continuous variable valve timing, electronically controlled hydraulic system;
cast-iron block;
a combustion chamber with variable turbulence;
Liquid cooling with forced circulation by centrifugal pump attached to basement and sealed circuit. Radiator and additional expansion tank;
distribution of the motor through a toothed belt;
flexible flywheel with a consequent reduction of the vibrations of the powerplant transmitted inside the 'cockpit';
motorized throttle body and drive-by-wire control unit PCB mounted on the motor;
a gear pump for lubrication;
a crank connecting rod - optimized for the purpose of reducing piston reciprocating masses, because
main excitation vibration motor;
Coils in a single block, ignition (spark, elimination) and control
detonation cylinder to cylinder;
Marelli engine control unit of type "torque-based" (resistant to mechanical stress and thermal engine);
values of consumption and exhaust gas very low;
diagnosis via EOBD;
2 heated oxygen sensors and three-way catalyst;
Meets the Euro 4 standard.

The 'optimization of the timing of the distribution and the' adoption of this new engine:
varied continuous phase electronically controlled hydraulic
variable turbulence combustion chamber
intake and exhaust specific
intake manifold specific



allows the car brilliant performance and recirculation in the combustion chamber of a substantial part of the exhaust gas (approximately 25%), thus significantly reducing the consumption of fuel and exhaust emissions when driving under partial load.



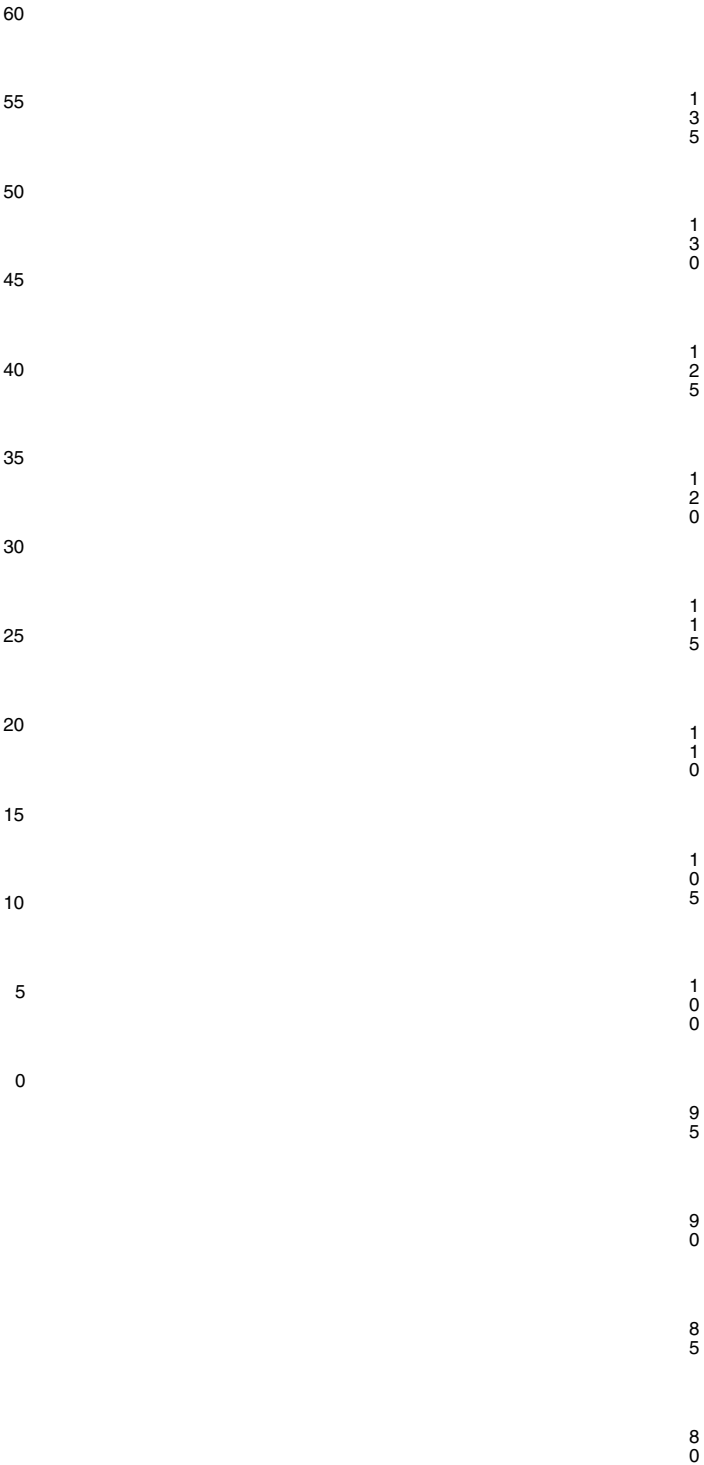
Specifications 1.4-liter 8-valve

Motor type	1.4 8v
Displacement	1368 cm ³
Bore	72 mm
Race	84 mm
Diameter intake valves	n.a.
Diameter exhaust valves	n.a.
Maximum power / speed	57 KW / 6000
	rpm



Maximum power / speed	75 hp / 6000 rpm
Maximum torque / speed	115 Nm / 3000 rpm
Compression ratio	11: 1
Engine control unit	Marelli 5SF3
Antipollution legislation	Euro 4

Torque curve and power curve



Speed [r / 1 ']

Fiat Grande Punto

191/534

© 2004, Fiat Auto S.p.A. - All rights reserved



Engine Identification Codes

ENGINE	1.4 8V
CODE TYPE	350A1000

4.2 unit injection - Ignition IAW 5SF

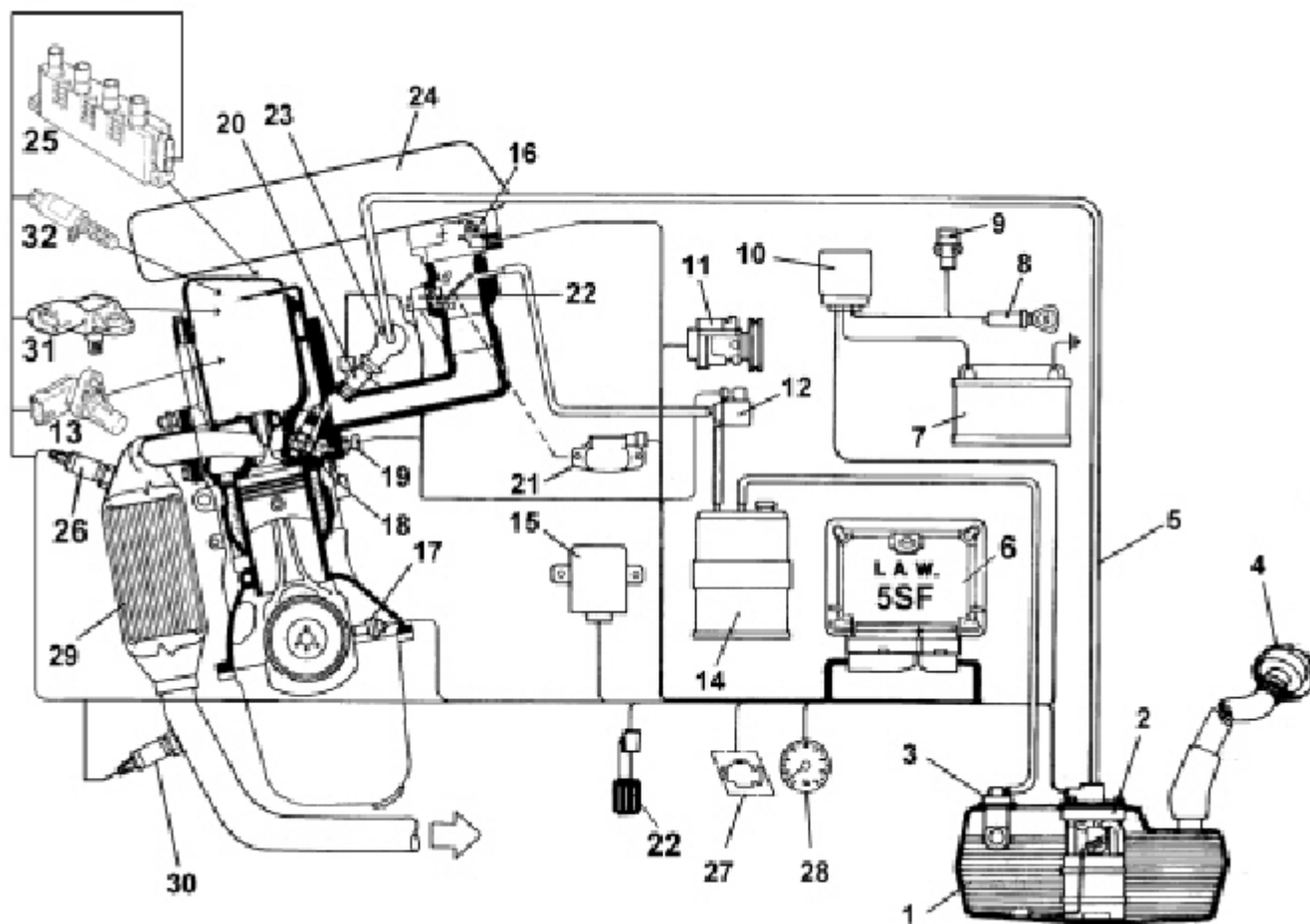
4.2.1 Architecture of the injection system

The 'system Marelli IAW 5SF belongs to the category of integrated systems:

- Digital electronic ignition with inductive discharge
- Static distribution
- Electronic fuel injection type sequenced (1-3-4-2).



The figure below shows the 'system in general.



Fuel

Fuel Pump

Multifunctional valve

Safety valve

Fuel delivery pipe

Electronic unit injection-ignition

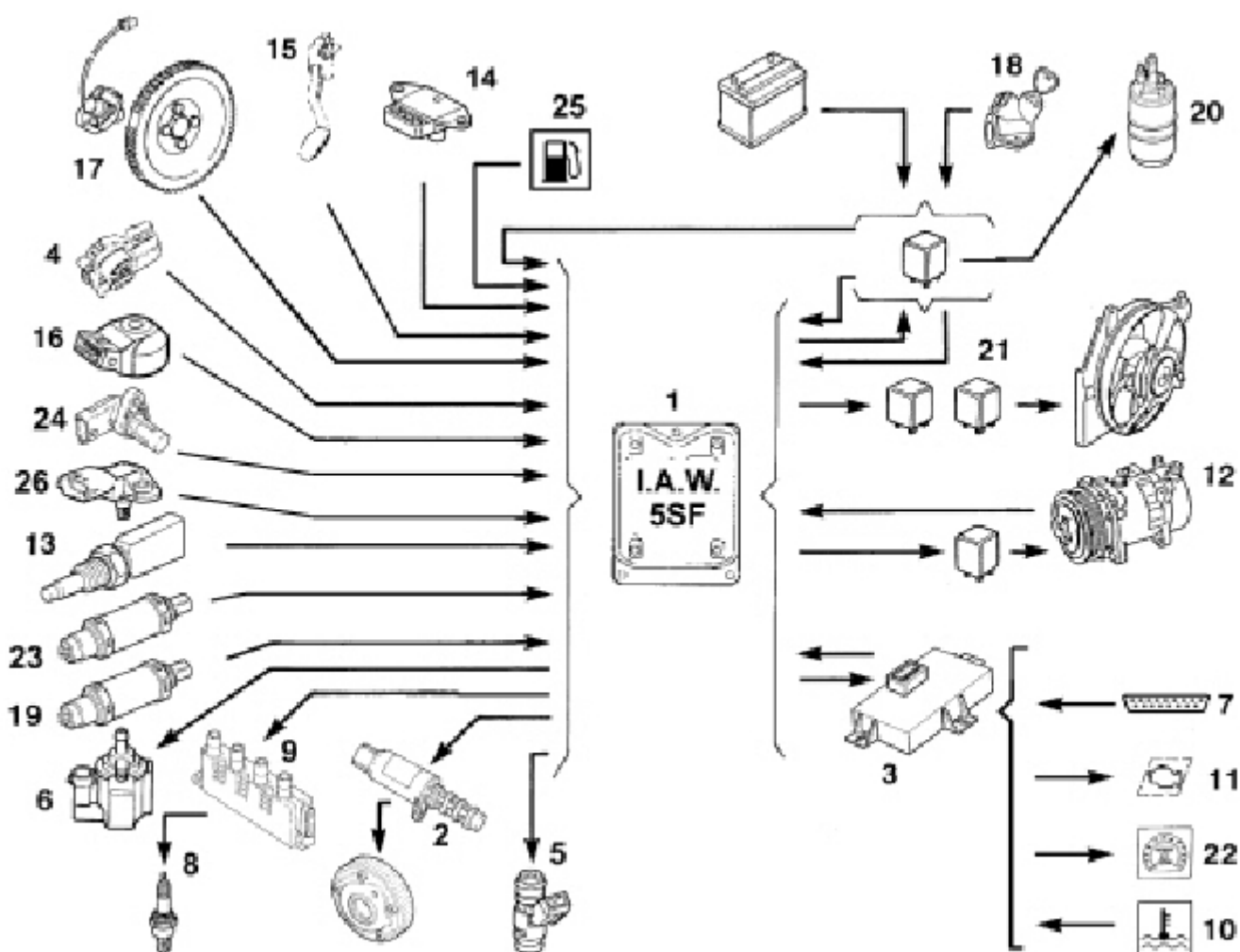
Battery

Ignition Switch



Inertia switch
Unit derived from the engine compartment
Cooling System
Solenoid intercettatrice fuel vapors
Phase sensor injection
Activated carbon filter
Body Computer (diagnostic socket and signal Fiat CODE)
Absolute pressure sensor and temperature
Rpm sensor and PMS
Spark
Coolant temperature sensor
Electro
Throttle control actuator and the throttle position sensor
Potentiometer accelerator pedal
Manifold Fuel
Air Filter
Ignition coils
Lambda sensor (upstream)
Malfunction indicator light system
Rev counter
Catalyst
Lambda sensor (downstream)
Barometric pressure sensor
Solenoid pilot phase shifter
Schema information in entry / exit control
Schema information in entry / exit control





Electronic control unit

Solenoid pilot phase shifter

Body Computer (with integrated control unit Fiat CODE)

Throttle control actuator and the throttle position sensor

Electro

Solenoid fuel vapors

Diagnostic socket

Spark



Ignition coils
Excessive engine coolant temperature indicator
Failure warning light injection
Air-conditioning unit
Engine coolant temperature sensor
Intake air temperature sensor and pressure
Accelerator pedal sensor
Knock sensor
Rpm sensor and PMS
Ignition Switch
Lambda probe (pre-catalyst)
Fuel Pump
Contactors control high and low speed electric fan heater
Speedometer / odometer
Lambda (post-catalyst)
Injection timing sensor
Fuel Level Sensor
Atmospheric pressure sensor



4.2.2 Features

The control unit is mounted in the engine compartment of a support integral to the motor (see photo) and is in

able to withstand high temperatures.

And 'one unit of digital microprocessor type characterized by high calculation capacity, low energy and lack of maintenance.

The task of the 'electronic control unit is to process the signals from the various sensors through 'application of the algorithms and software to control the driving of the actuators (particularly electrical injectors, ignition coils and a motorized throttle) in order to achieve the best possible operation of the engine.

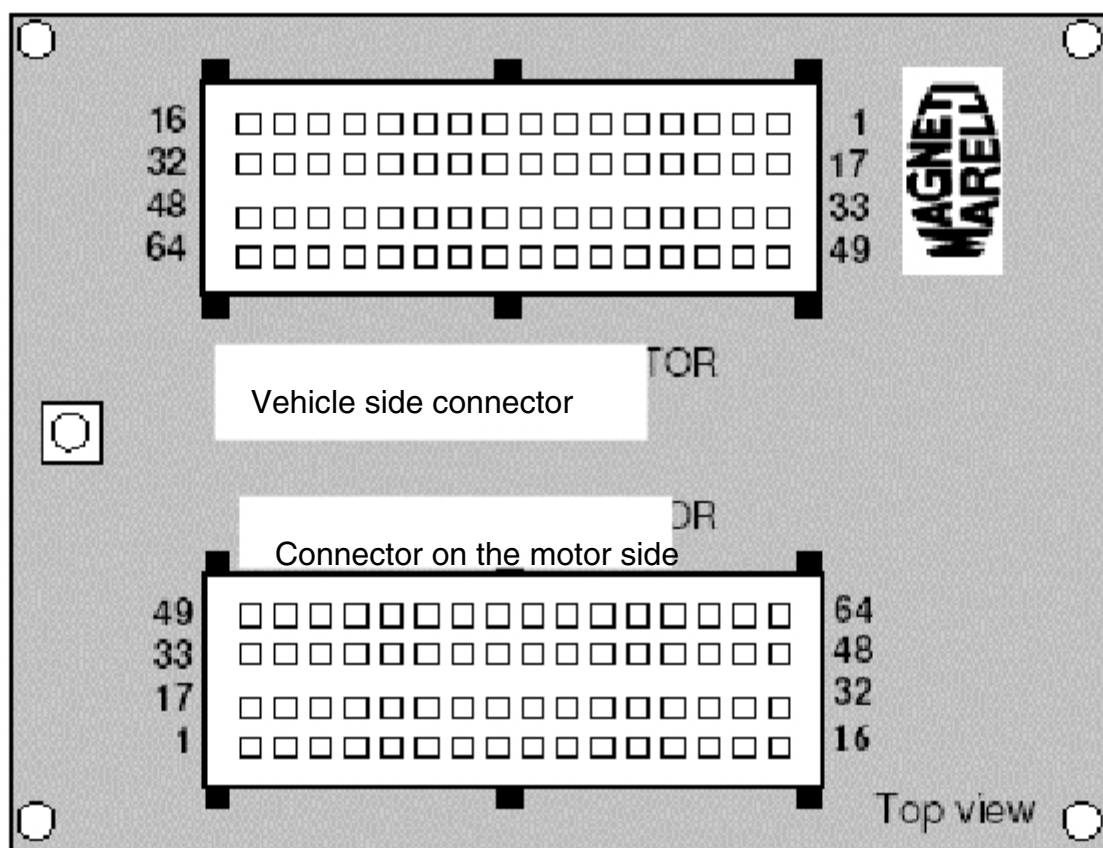
The 'adoption of the Fiat CODE protection system does not allow the exchange of units between Fiat Punto different from the same engine.



ECM (engine control unit)



Pin - out unit



A vehicle side connector Tyco 3-284272-0

Pin	I / O / S	Source supply	Function	Maximum contents
1	S	Battery +30	Battery output voltage	@ 13.5 V 6.4 A
2	S	+5 V (ECU)	Accelerator pedal power potentiometer 1	100 mA @ 5 V
3	S	+5 V (ECU)	Accelerator pedal power potentiometer sensor 2 and Ac linear pressure	100 mA @ 5 V
4			Offline	
5	The		AC linear pressure sensor	0.01 mA @ 5 V
6			Offline	
7			Offline	
8	The		Oil level switch motote (not used)	10 mA @ 12 V
9			Offline	
10			Offline	
11			Offline	
12			Offline	
13			Offline	
14			Offline	
15	S	sig_GND (ECU)	Mass accelerator pedal potentiometer sensor 2 and Ac linear pressure	
16	The		contactor (+ key)	5 mA @ 16 V
17	O		Contactor Motor Control System	13.5 V @ 400 mA
18			Offline	
19	I / O		Alternator signal D +	24 mA @ 5 V
20			Offline	
21			Offline	
22			Offline	
23			Offline	



24			Offline	
25			Offline	
26	The		Switch to reverse gear	13.5 V @ 10 mA
27			Offline	
28			Offline	
29			Offline	

Pin	I / O / S	Source supply	Function	Maximum content
30			Offline	
31			Offline	
32	The		Clutch pedal switch	13.5 V @ 10 mA
33			Offline	
34			Offline	
35	The		Tachometer pulse generator	10 mA @ 5 V
36	The		Engine oil condition sensor	2 mA @ 5 V
37			Offline	
38	The		Signal accelerator pedal potentiometer 2	0.01 mA @ 5 V
39	The		Oil temperature sensor	5 mA @ 5 V
40	O		Starter motor contactor	13.5 V @ 500 mA
41			Offline	
42			Offline	
43			Offline	
44			Offline	
45	S	Sig_GND (ECU)	Mass accelerator pedal potentiometer 1	
46			Offline	
47	S	Main relay	contactor motor control system	@ 13.5 V 6.4 A
48	S	main relay	contactor motor control system	@ 13.5 V 6.4 A
49	I / O		Can-C L	-
50	I / O		Can C-H	-
51	The		Signal accelerator pedal potentiometer 1	0.01 mA @ 5 V
52	The		Light switch brake pedal	13.5 V @ 10 mA
53			Offline	



54			Offline	
55	The		Engine oil pressure sensor	4 mA @ 5 V
56	O		Fuel Pump Contactor	13.5 V @ 500 mA
57			Offline	
58	O		RPM signal mot. for MTA	13.5 V @ 40 mA
59	O		2 electric fan contactor engine cooling	13.5 V @ 300 mA
60			Offline	
61			Offline	
62	O		Compressor contactor A / C	13.5 V @ 200 mA

Pin	I / O / S	Source supply	Function	Maximum content
63	O		Electric fan contactor 1raffreddamento engine	13.5 V @ 200 mA
64	O		malfunction indicator light	13.5 V @ 200 mA

Connector B Side Motor Tyco 2-284272-9

Pin	I / O / S	Source supply	Function	Maximum contents
1	O		4 coil control	9 A @ 16 V
2	O		VVT Solenoid	
3	O		Control coil 3	9 A @ 16 V
4	S		Power supply from main relay VVT Solenoid	
5	S	Pow_GND	A motor mass	
6	S	Pow_GND	A motor mass	
7	S	sig_GND (ECU)	Phase mass sensor / sensor air temperature / pressure sensor Atmospheric	
8			Offline	
9	The		Engine speed sensor	10 mA @ 5 V
10			Offline	
11			Offline	
12			Offline	



13	S	+5 V (ECU)	Phase power sensor / sensor air temperature / pressure sensor Atmospheric	100 mA @ 5 V
14			Offline	
15	S	+5 V (ECU)	Power sensor throttle body	100 mA @ 5 V
16			Offline	
17	O		1 coil control	9 A @ 16 V
18			Offline	
19	O		2 coil control	9 A @ 16 V
20			Offline	
21	S	Pow_GND	A motor mass	
22	S	Pow_GND	A motor mass	
23	The		Engine speed sensor	10 mA @ 5 V
24	The		Phase sensor	2 mA @ 5 V
25			Offline	
26			Offline	
27			Offline	

Pin	I / O / S	Source supply	Function	Maximum content
28			Offline	
29			Offline	
30	The		Throttle position sensor 2	0.01 mA @ 16 V
31	The		Pressure intake duct	0.1 mA @ 5 V
32	O		Lambda sensor upstream of the catalyst	1.4 A @ 16 V
33	O		Injector cylinder 4	1.2 A @ 16 V
34	O		injector cylinder 2	1.2 A @ 16 V
35	S	sig_GND (ECU)	Mass sensor throttle body	
36	S	sig_GND (ECU)	Ground water temperature sensor engine	
37			Offline	
38			Offline	
39			Offline	
40			Offline	
41	The		Detonation sensor	0.01 mA @ 5 V
42	The		Lambda probe downstream of the catalyst	0.01 mA @ 5 V



43	The	Lambda probe upstream of the catalyst	0.01 mA @ 5 V	
44	The	Throttle position sensor 1	0.01 mA @ 16 V	
45	The	Engine coolant temperature sensor	5 mA @ 5 V	
46		Offline		
47		Offline		
48	S	sig_GND (ECU)	Mass detonation sensor	0.01 mA @ 5 V
49	O		Injector, cylinder 3	1.2 A @ 16 V
50	O		Injector cylinder 1	1.2 A @ 16 V
51	O		Canister solenoid valve	1.2 A @ 16 V
52	O		Negative actuator throttle body	6 A @ 16 V
53			Offline	
54			Offline	
55			Offline	
56			Offline	
57	O		Positive actuator throttle body	6 A @ 16 V

Pin	I / O / S	Source supply	Function	Maximum content
58	S	sig_GND (ECU)	Mass lambda probe downstream of the catalyst	0.01 mA @ 5 V
59			Offline	
60	S	sig_GND (ECU)	Mass lambda probe upstream of the catalyst	0.01 mA @ 5 V
61	The		Atmospheric pressure sensor	
62			Offline	
63	The		Intake air temperature	2.5 mA @ 5 V
64	O		Lambda probe downstream of the catalyst	1.4 A @ 16 V



4.3 Components

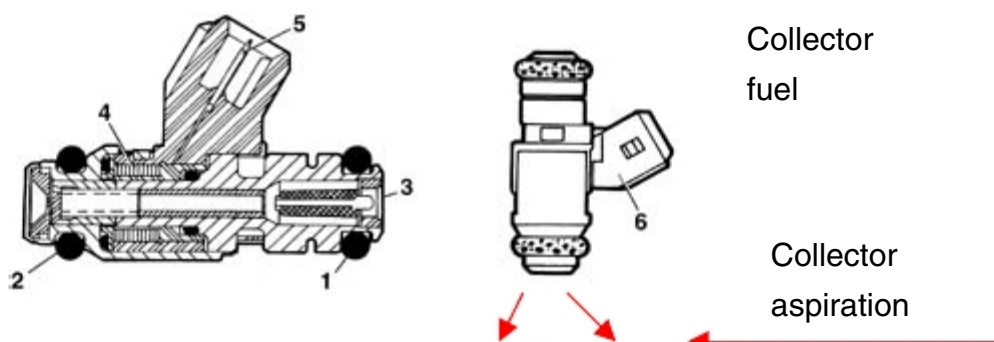
4.3.1 Electro

Description

The injectors are of the miniature type (Pico), powered by 12 V and have a internal resistance of $13.8 \div 15.2$ ohms at 20°C .

The fixing of the injectors is performed by the fuel manifold, which presses the same in the respective seats formed in the ducts of the intake manifold, while the O-rings (1) and (2) in fluoro rubber, ensure the seal on the intake manifold and the fuel manifold.

L" fuel supply takes place from the upper part (3) of the electrical injector", whose body contains the" winding (4) connected to the terminals (5) of the electrical connector (6).



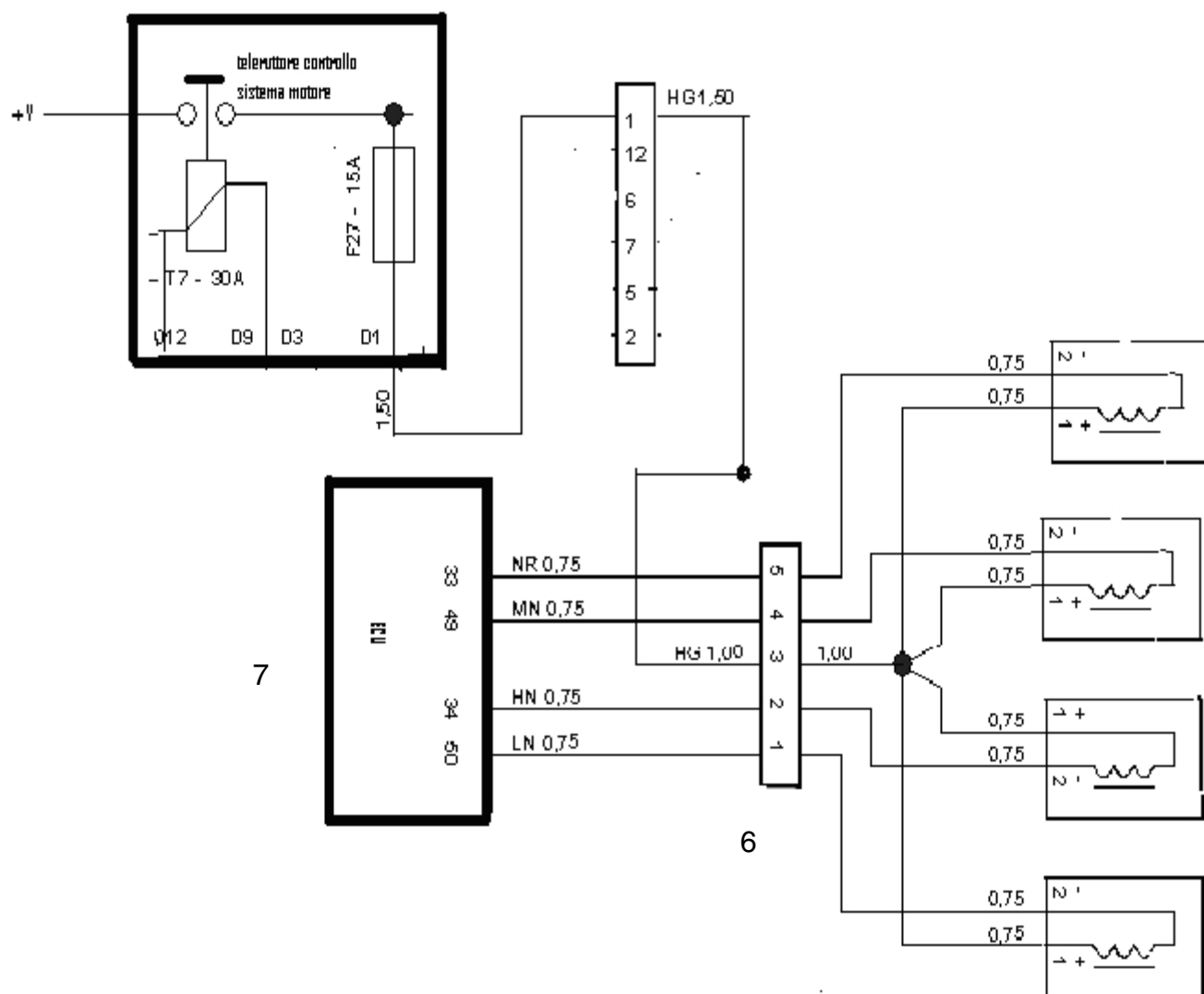
The jet fuel at a pressure of 3.5 bar absolute," comes from injector polverizzandosi instantaneously.

Operation

The control logic of the injectors is of the "phased sequential", ie the four injectors are controlled according to the phases of intake of the individual cylinders.



Electrical Characteristics



1,2,3,4: Electro

5,6: Junction

7: ECM

8: FDU (contactor motor control)



Location of vehicle



Housing injectors on the intake pipe



Pin-out

Component

1 electro-

Component

Electro-

2

Component	I / O	S	Function	Connector	Pin	Pin	Pin	object	object	object	Pin
			component	recipient	recipient	recipient					
								Supply			
	1	S	3 (joint)	1 (joint)	D1 (FDU)			Battery			
Electro-injector 3											
	2	I	4 (Junction)	-				Command 49 (ECM			
								3 electro-B connector)			

Component

Electro-

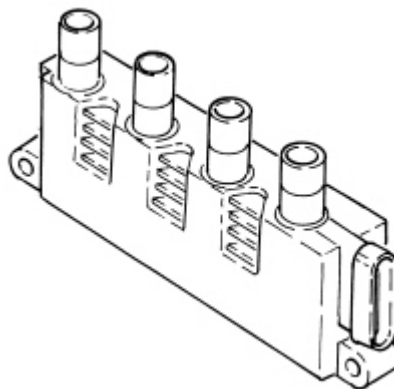
4



4.3.2 Ignition Coils

Description

The coils are integrated into a single body fixed on the engine head and are of the type closed magnetic circuit, formed by a reed valve whose central core, steel silicon interrupted by a thin air gap, leads both windings.



Operation

The windings are covered by a container of molded plastic and isolated by immersion in a compound of epoxy resin and quartz which gives them their exceptional properties dielectric, mechanical and thermal could also withstand high temperatures.

The proximity of the primary to the magnetic core reduces the loss of magnetic flux making the "best fit" on the secondary.



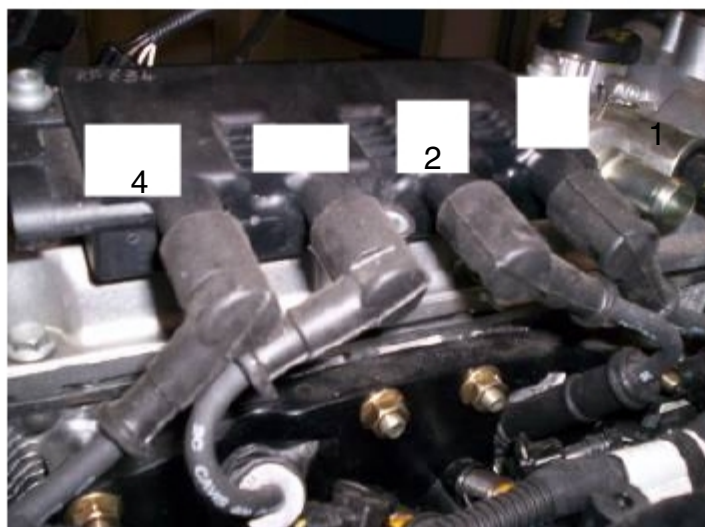
NOTE: When installing the ignition module, first tighten the two screws to 'external and finally the central one to the specified torque, otherwise you risk breaking the form.

Location components



1,1,2: Order of tightening the screws of the ignition module



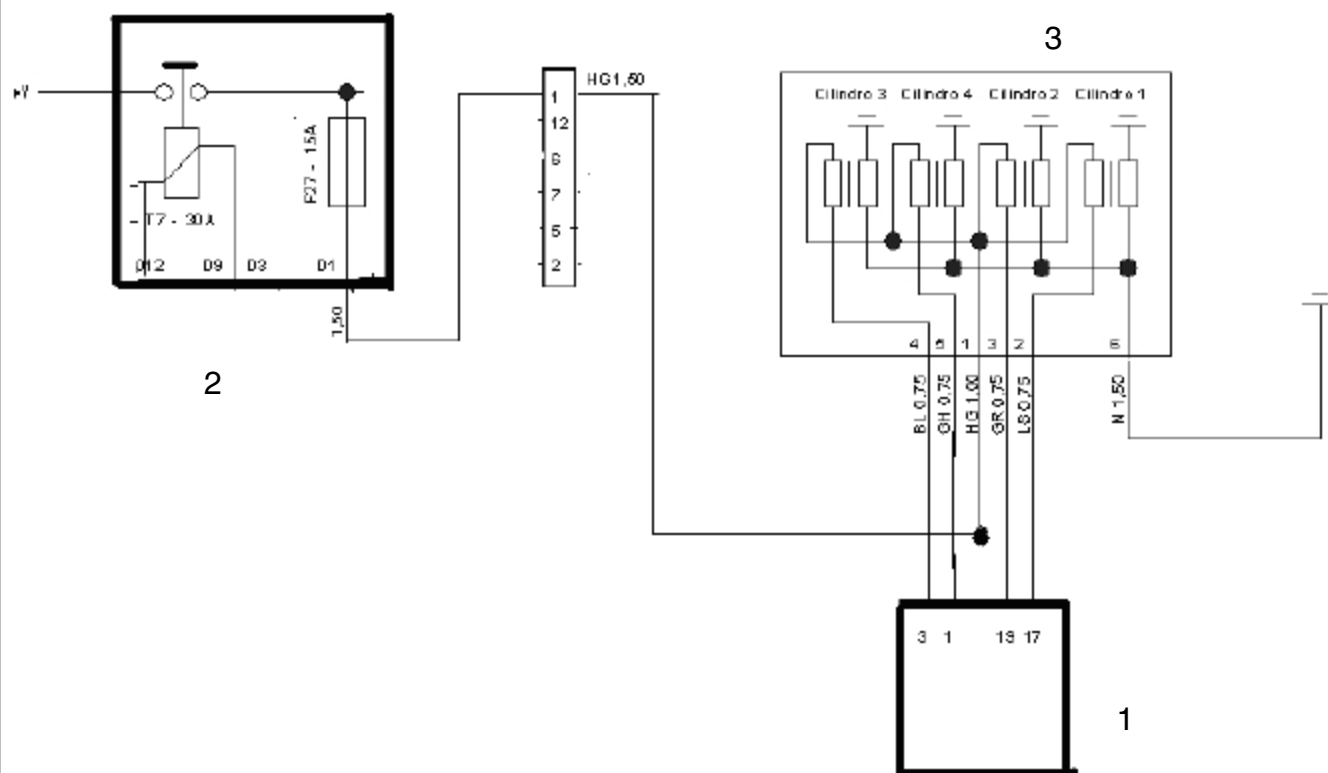


Electrical Characteristics

Primary circuit resistance: $0.5 \text{ ohms} \pm 10\%$ at $23 \pm 3^\circ \text{C}$

Secondary circuit resistance: $6.0 \text{ ohms} \pm 10\%$ at $23 \pm 3^\circ \text{C}$.





1: ECM

2: FDU (contactor motor control)

3: Ignition Module

4: Junction

5: Ground Motor B



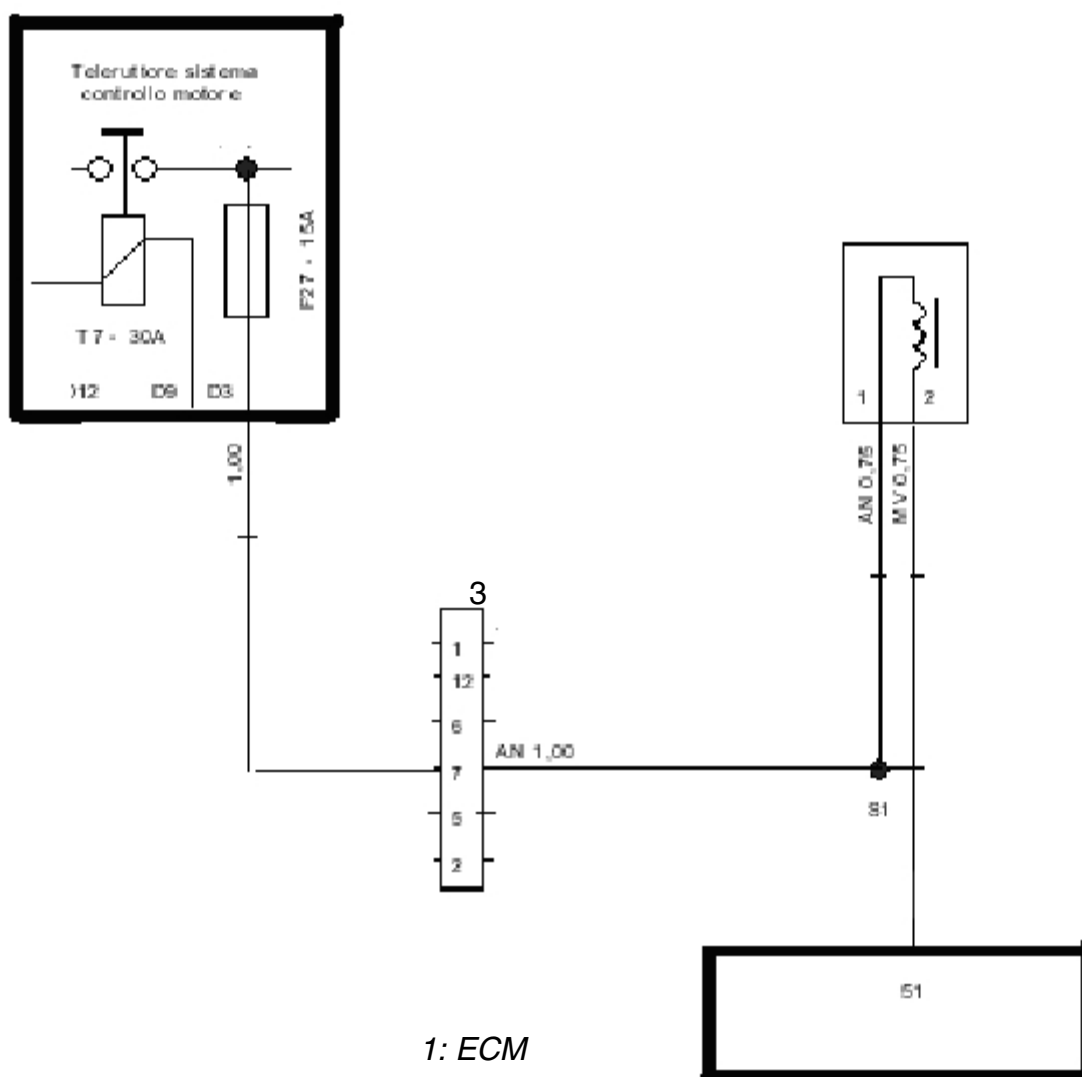
Pin-out

Component
Coils



4.3.3 Solenoid petrol vapor recovery (canister)

Electrical Characteristics



Location of vehicle



Canister



Pin-out

Component

Solenoid

vapor recovery

gasoline



4.3.4 Throttle Body

Description

It is fixed to the intake manifold and adjusts the amount of air sucked by the engine. The injection control unit as a function of the signal from the potentiometer pedal accelerator," controls the throttle opening by means of a DC motor integrated in the throttle body.

Operation

L" throttle opening is 0 ° to 82 ° so including the adjustment of the system minimum. - The throttle body is equipped with two integrated potentiometers so that the control unit injection learns if one of the two breaks.

In case of failure of the two potentiometers or in the absence of power, as a function of position of the accelerator pedal, the control unit applies a strategy of recovery with resulting in degraded operating noticeable by the driver and disable the diagnosis EOBD.

The replacement of the throttle body or the engine control unit or the intake manifold Air" does not require the execution of self-learning procedure.

Location of vehicle



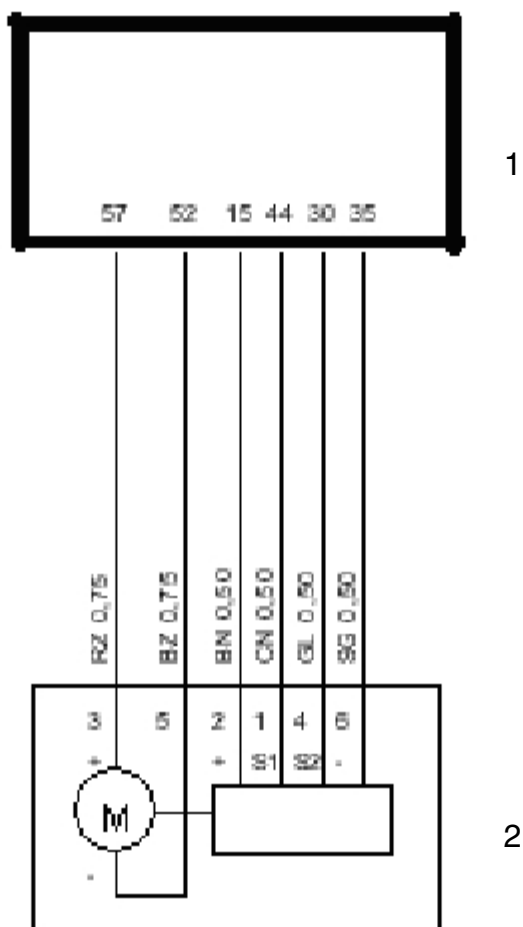
Potentiometers



Moped



Electrical Characteristics



1: ECM

2: Actuator Butterfly



Pin-out

Component
Throttle body

Recovery:

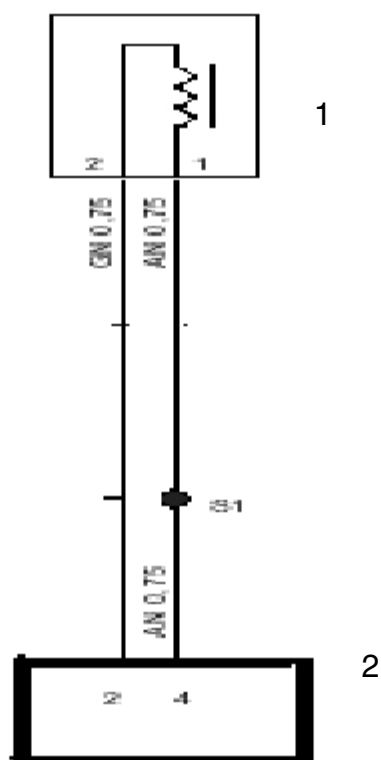
In case of failure is set to a value calculated from the values read from the sensor absolute pressure and, if this is a fault, is imposed on a fixed value equal to 50 ° Opening butterfly.

Strategies are barred dash-pot, self-adaptation of the minimum and the title mix.



4.3.5 Hydraulic valve adjustment phase camshaft

Electrical characteristics:

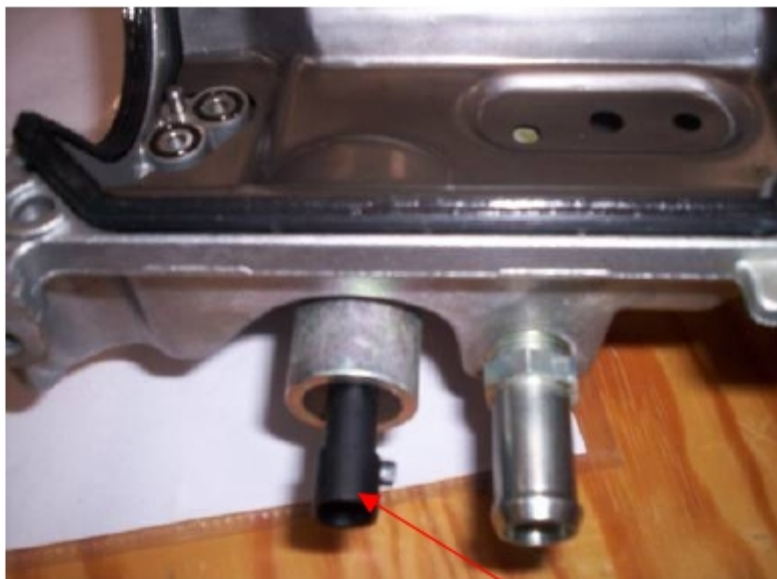


1: Valve Camshaft Phase Adjustment

2: ECM



Location of vehicle



Valve
phase adjustment



Pin-out

Component

Valve

Recovery

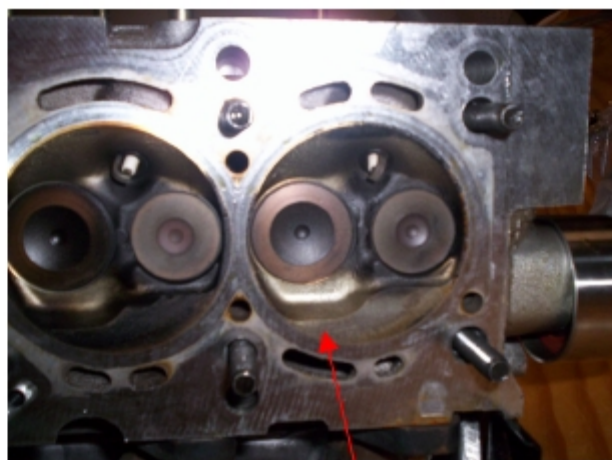
In the case of variable phase locked in a position (maximum advance, maximum delay, or intermediate position) for mechanical failure or short circuit of the drive 'solenoid driving the drive, the 'solenoid is no longer controlled by the ECM.

If you drive slow, the ECM controls the 'solenoid to keep the drive in position of maximum advance (rest position)



4.3.6 Head

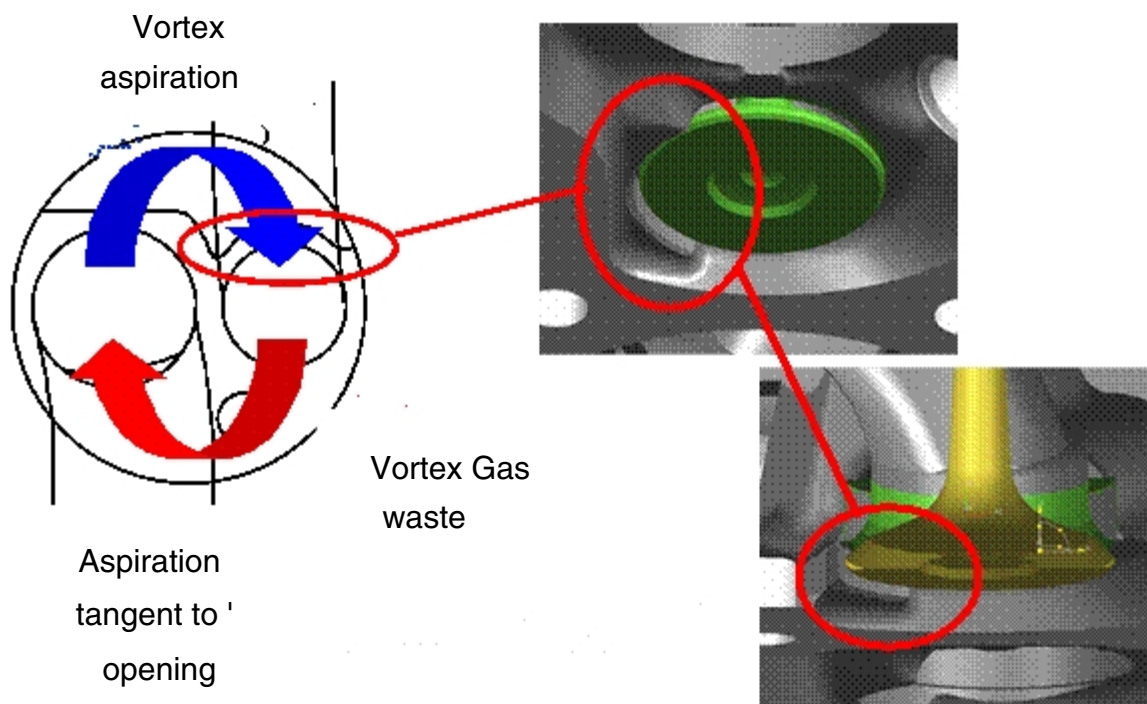
The aluminum cylinder head is characterized by a form (fig. a) particular which allows having a combustion chamber to turbulence variabile. Questo together with the new ducts timings of the intake and exhaust and optimized distribution, performance guarantees bright, low power and low emissioni. Questo system can recirculate in combustion chamber a substantial part of the exhaust gas (about 25%)



Pictured

Masking
exhaust gas

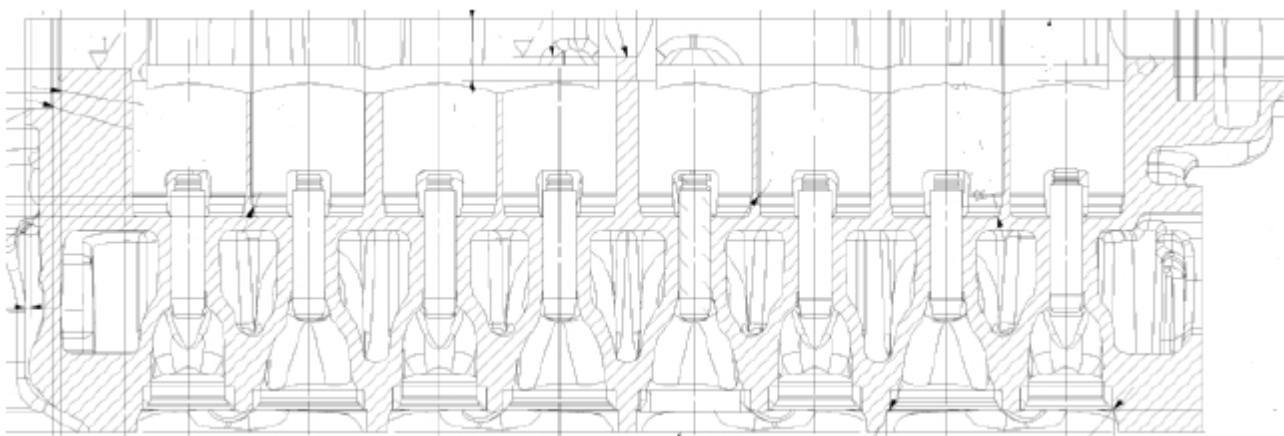
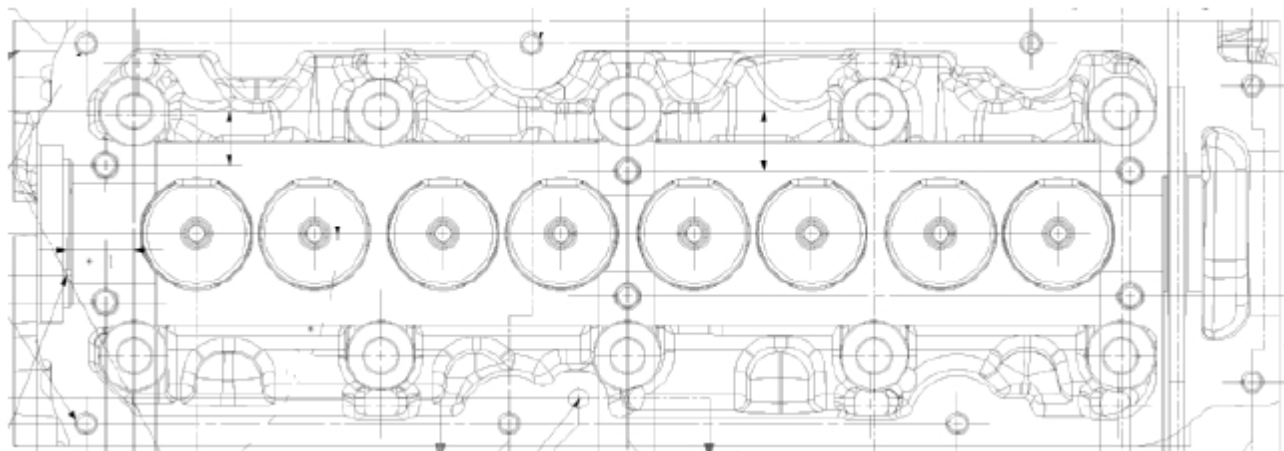




Vortex system variable



Technical Drawing



227/534

4
.
3
.
7
P
i
s
t
o
n
s



4.3.8 Intake manifold

New intake manifold.



4.3.9 Continuous timing variator CVCP

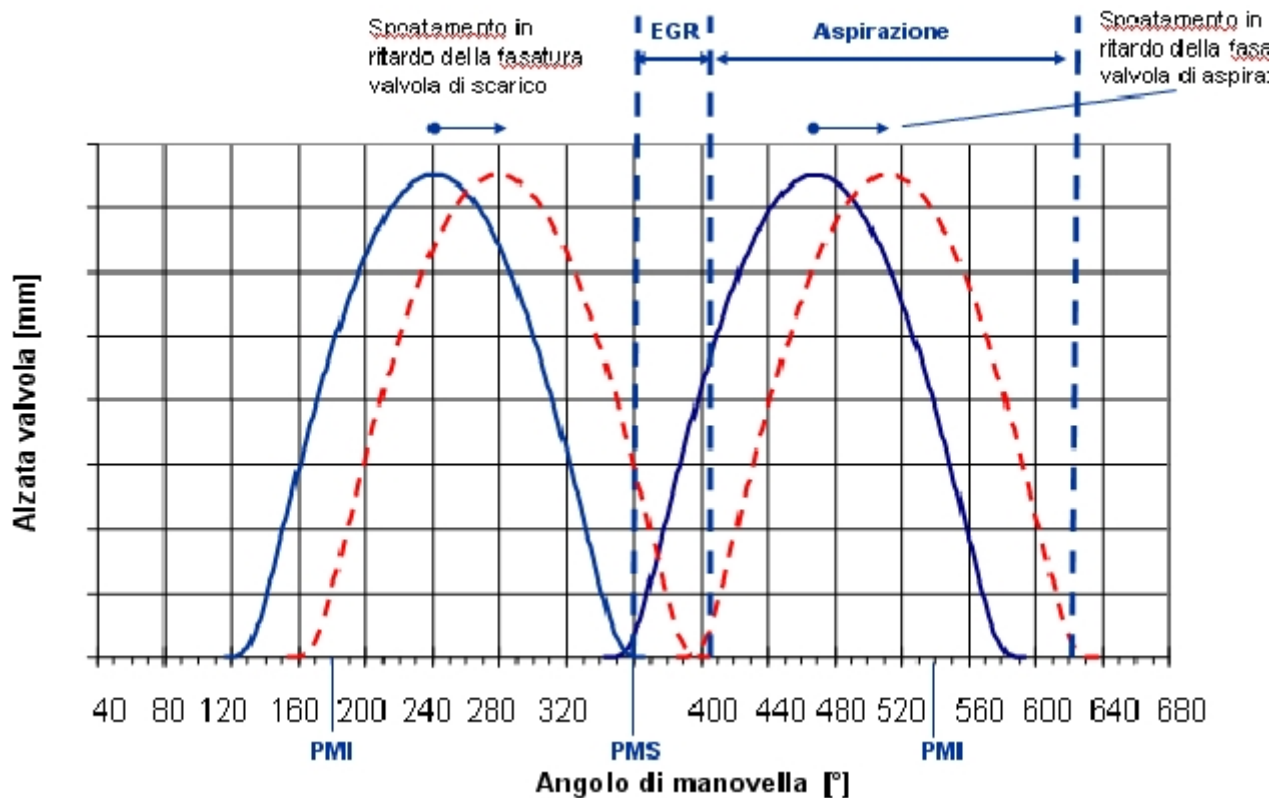
The Fire 1.4 8v has a continuously variable valve timing (*Continuous Variable Cam Phaser*), i.e. of a device able to modify, during operation, the position of the shaft to camshaft relative to the crankshaft in a continuous manner to obtain, so, a variation of the timing engine.

In this way, at every moment the engine operates with the ignition timing optimal in terms of fuel consumption.

Approx. 5% reduction of consumption on the NEDC

The phase shifter changes the timing of the engine in the direction of the delay. Delaying the 'opening of the intake valve and the closing of the exhaust valve, a part of the intake stroke (greater, the greater is the scalettamento of phase shifter) is done with closed intake valve and exhaust valve still open, so that part of the combustion gases are sucked from the exhaust (EGR). These gases are to occupy part of the volume of the cylinder (reduction of the displacement). To let the same amount of fresh air and then get the same engine performance (Same torque / power) at that point of operation, it should be more open the butterfly. The operation of the engine, at equal performance, with more open throttle reduces pumping losses that occur in parts of the charge phase (phases exhaust-intake), thus obtaining a reduction in fuel consumption.





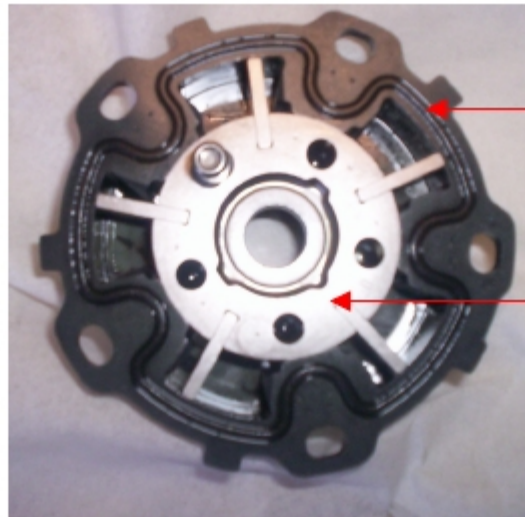
Description

The CVCP is completely managed by the engine control unit (ECM) that:
 detects the position of the camshaft through the phase sensor
 this position changes depending on the operating point of the engine according to a map calibrated
 keeps under control the position of the camshaft



The CVCP is constituted by:

a rotor integral with the shaft cam which can rotate with respect to the pulley (Stator) move from the crankshaft.



Stator

Rotor



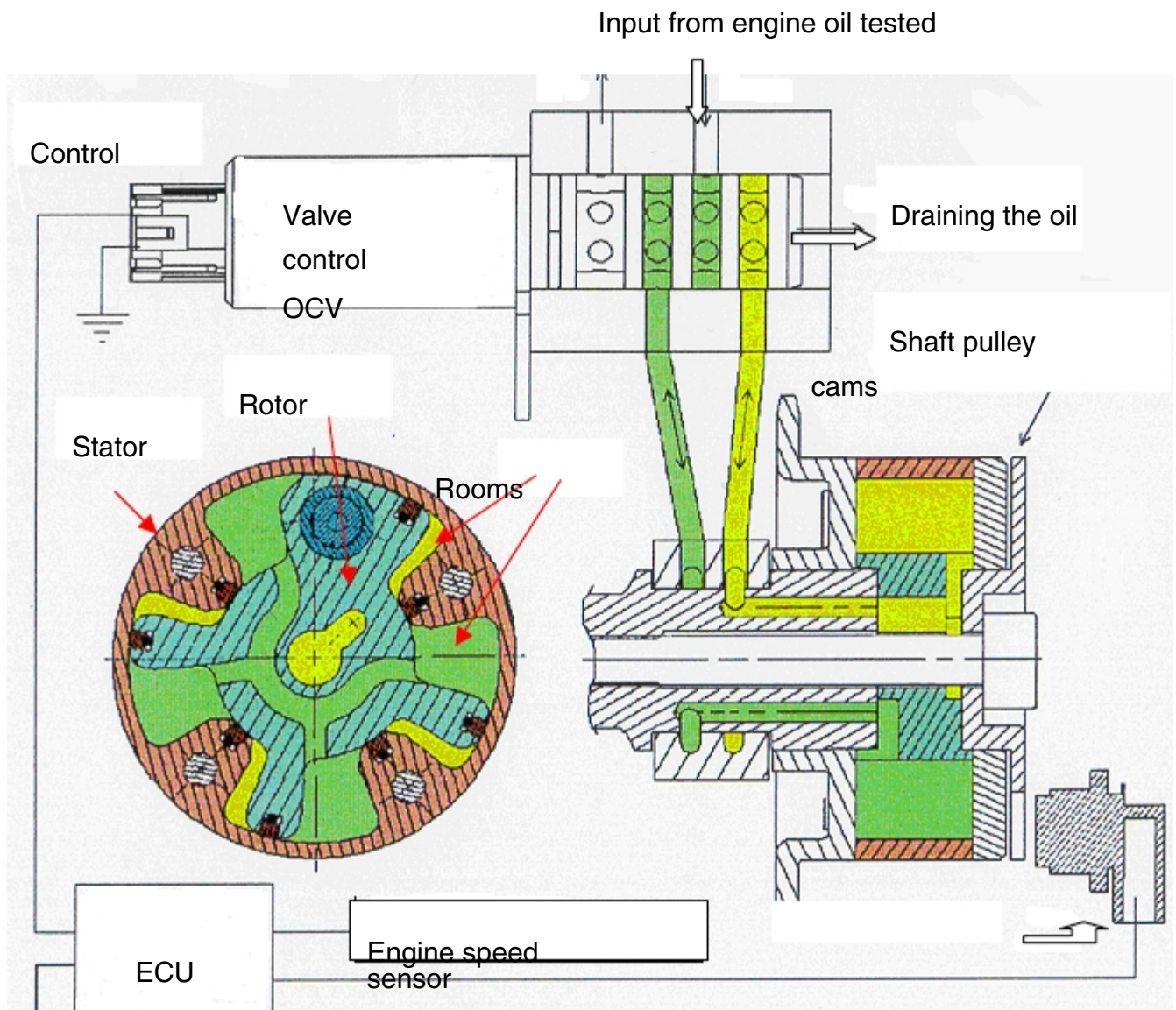
a solenoid valve spool which allows the inflow of oil into the compartments putting in Communication compartments in advance or delay the oil channels in the cylinder head



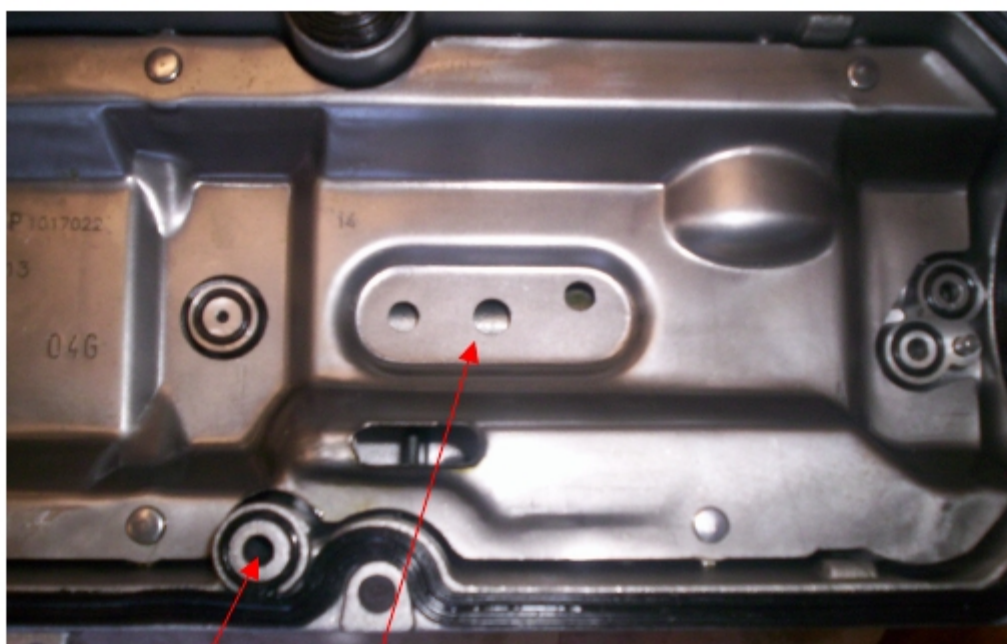
Location of vehicle



Operation



The oil enters the engine valve cover in step 1, the channel continues to the right (2)



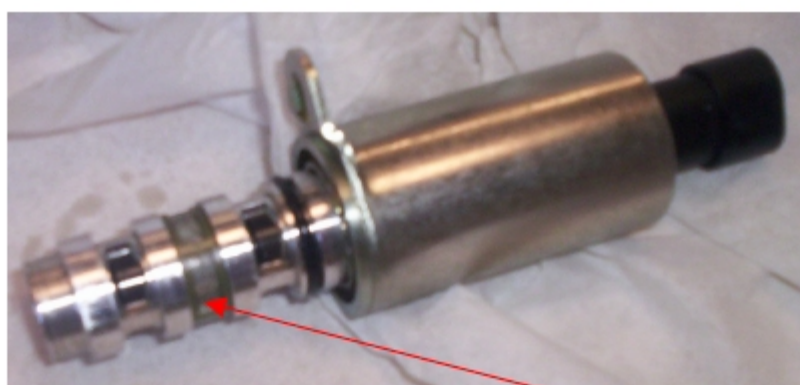
1

2

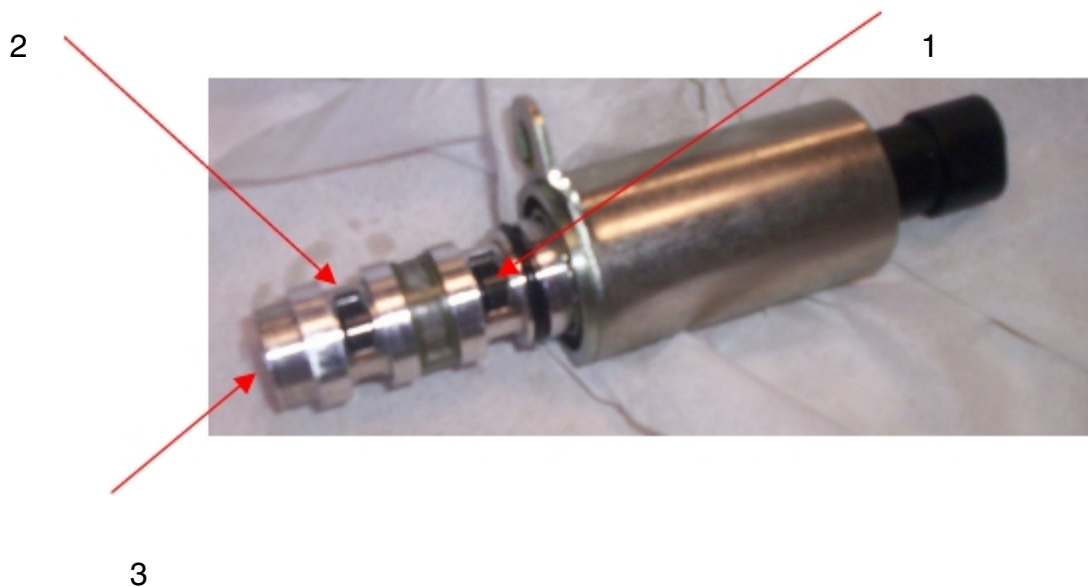


The engine oil arrives at the seat of the slide valve through a hole (flywheel side) in valve cover (1).

L 'oil enters the valve through a filter (2).



L 'solenoid valve spool connects the rooms in advance or delay of the rotor with the channels of the 'oil in the cylinder head, through two holes (1.2). A hole transmits the 'oil pressure to move the vanes of the rotor, while the other is placed in communication with the exhaust (3) from 'solenoid. Then the holes (1, 2) act always one of entrance (Direction variable) and one exit (head) depending on the stage if it be delayed or advanced by the engine control unit.

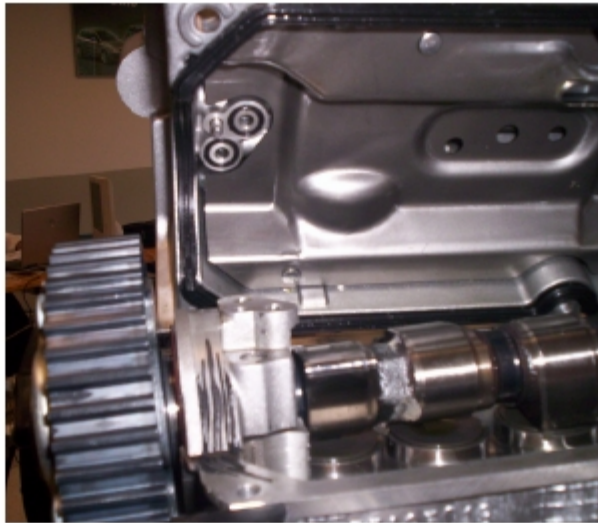


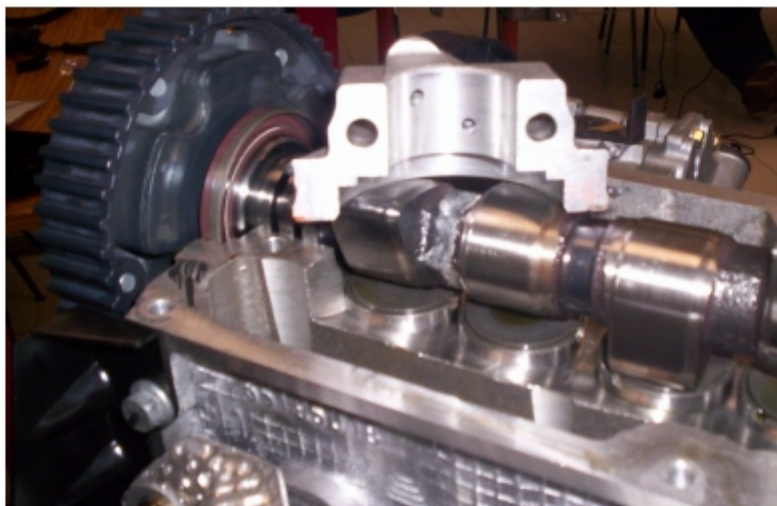
In the subsequent figures (a, b, c, d) shows the section that connects the 'solenoid valve and the phase shifter



t
o

b





c



d

As mentioned previously the phase shifter is constituted by a rotor and a stator. The rotor is provided with vanes and moves under the pressure of the 'oil on the same engine. To the two sides of each of these pallets are created, two compartments (compartment compartment advance and delay): the engine oil can flow, or in a compartment or in 'other. The pressure of the 'oil which enters a compartment pushes the pallet on one side and the 'oil present in ' Another compartment is discharged into the cylinder head, through the 'solenoid (as shown previously one of the two holes on 'solenoid valve is placed in communication by



same with the exhaust). This produces the rotation of the rotor and therefore of 'camshaft in a certain direction (advance or delay).

If the 'oil either enters into a compartment and in' other continuously for the same time, it has a dynamic balance of the pressures at the two sides of the rotor which therefore remains stationary.

The position of advance is the position of rest, in fact the spring that acts as a flexible coupling"" (There is no play of avoiding 'camshaft especially in start-up to low pressure oil) is loaded in position in advance.

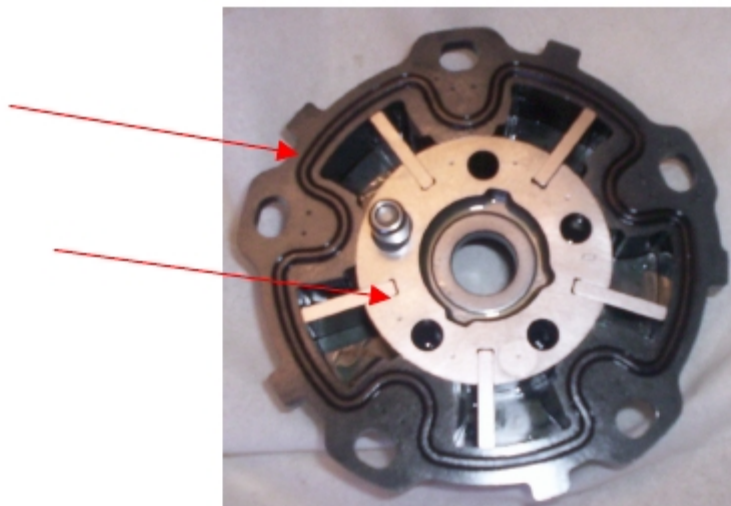


spring



Stator

Rotor





Vanes on the rotor

Effects of variation in the timing delay



4.4 Sensors

4.4.1 detonation sensor

Description

The knock sensor, piezoelectric type, is mounted on the base and detects the intensity" Vibration caused by the detonation in the combustion chambers.

The detonations generate a mechanical impact on a piezoelectric crystal that sends a signal to the control unit, based on this signal the engine control unit provides for reducing the ignition advance until the disappearance of the phenomenon. Later, the advance is gradually restored to baseline.

Location of vehicle



1: phase sensor

1



Operation

The molecules of a quartz crystal are characterized by an electrical polarization.

Under resting conditions (A) the molecules do not have a particular orientation.

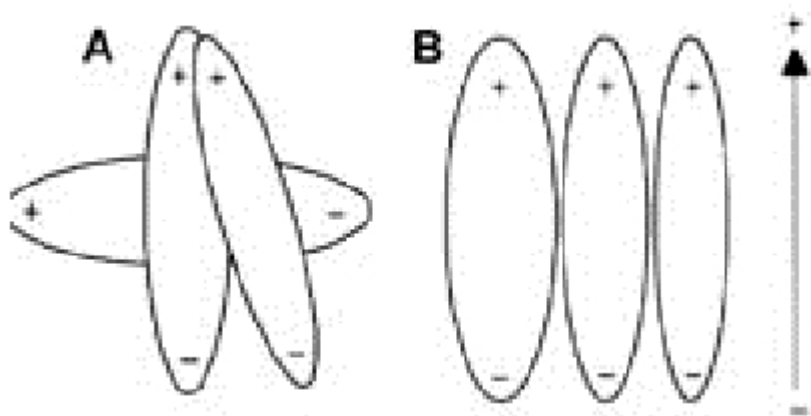
When the crystal is subjected to a pressure or to a collision (B), they are oriented in such a way much more marked as the higher the pressure to which the crystal is subjected (characteristic of quartz)

This orientation produces a voltage across the crystal. This voltage is then result of the vibrations produced by the explosion in the various cylinders.

In the engine control unit are mapped to the amplitudes of 'reference wave (operation correct the engine).

The engine control unit incorporates the amplitudes d 'wave different from those of reference, such as

misfiring, then activates an emergency response plan



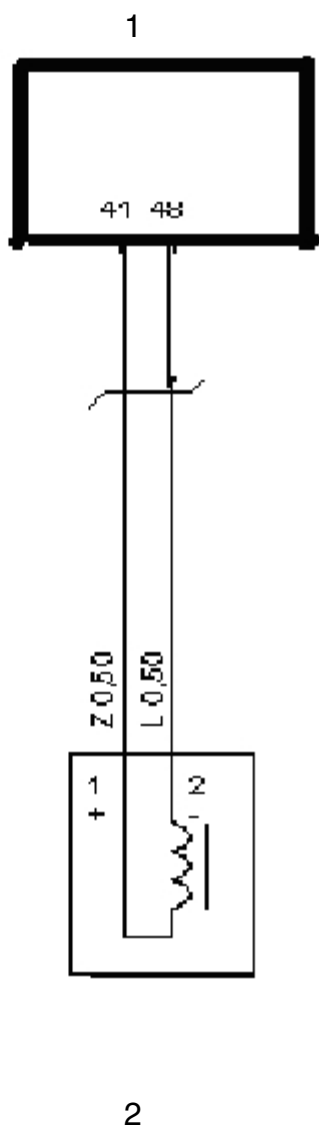
A. Rest position

B. Position under pressure



Electrical Characteristics

- Resistance: 532 ÷ 588 ohms at 20 ° C.



1: ECM

2: detonation sensor



Pin-out

Component

Sensor

detonation

Recovery

In case of failure of the sensor, the engine control unit implements the maps"" of more conservative ignition advance for the Protection of the engine.



4.4.2 Oxygen Sensor

Description

The oxygen sensors are two: one upstream and one downstream of the catalyst

The lambda probe prior to the catalyst serves to check the result of combustion. The control unit analyzes the signal and corrects the stoichiometric ratio so as to maintain burning always within the limits required for emissions.

The lambda probe after the catalyst serves to control the real efficiency of the catalyst: the controller and check its signal through the MIL indicates the deterioration of catalyst.



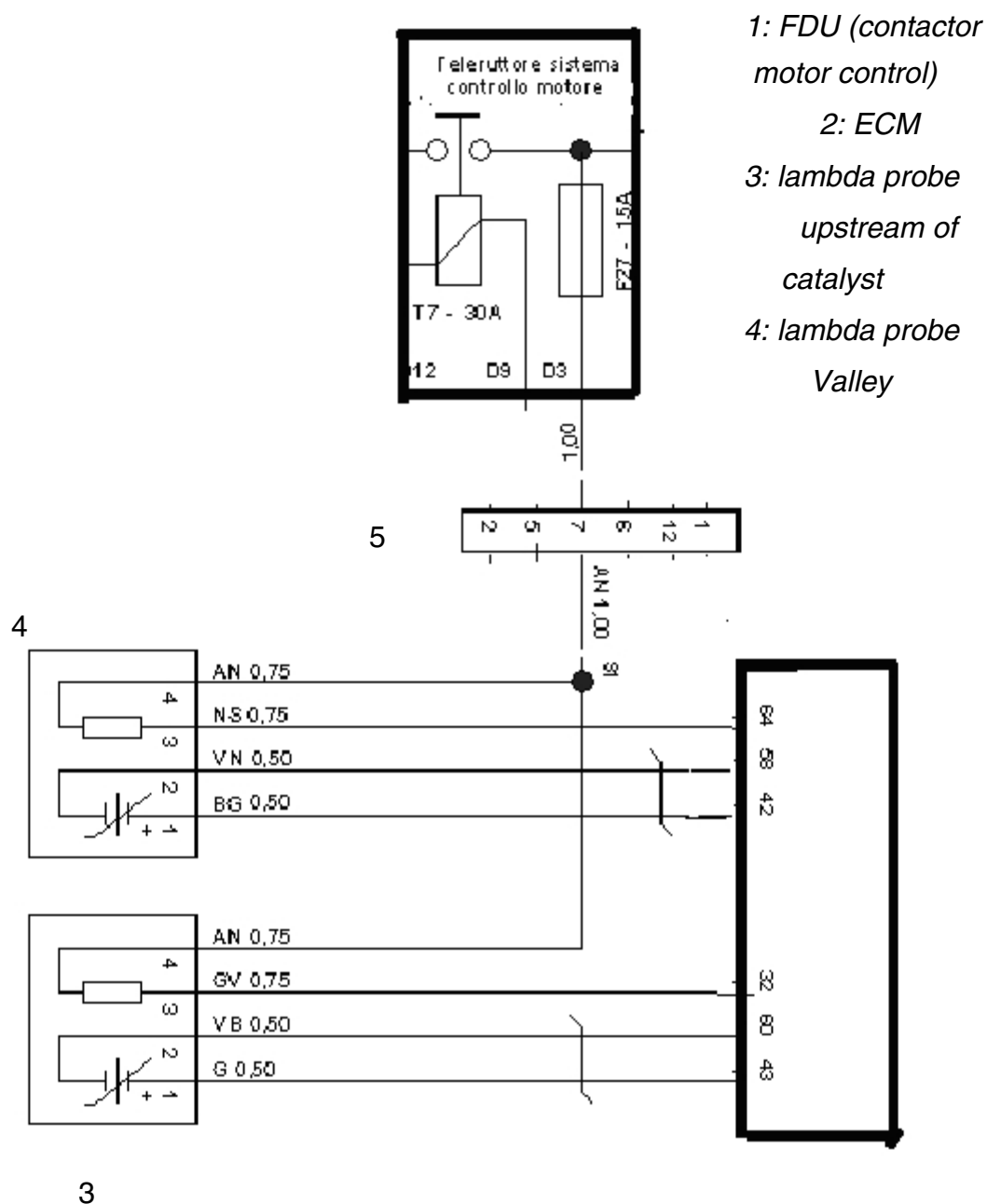
Location of vehicle



- 1: lambda sensor upstream of the catalyst*
2: lambda probe downstream of the catalyst



Electrical Characteristics



Pin-out

Component		Pin connector component	I / O / S	Function	Pin object recipient	Notes
Probe lambda upstream of catalyst	1		O	Lambda probe signal	43 (ECM B connector)	-
	2		S	Mass to ECU	60 (ECM B connector)	-
	3		The	Command warming lambda probe	32 (ECM B connector)	-
	4	S		Battery power	7 (Junction)	The wire continues up to the FDU pin D3

Component	Pin connector component	I / O / S	Function	Pin object recipient	Notes
Lambda probe downstream of catalyst	1	O	Lambda probe signal	42 (ECM B connector)	-
	2	S	Mass to ECU	58 (ECM B connector)	-
	3	The	Heating control to lambda	64 (ECM B connector)	-
	4	S	Power supply will be battery	7 (Junction)	The wire continues up to FDU to pin D3

4.4.3 Sensor engine revs

Description:

It is mounted on the base and "faces" on the gear wheel placed on the pulley
" of the crankshaft.



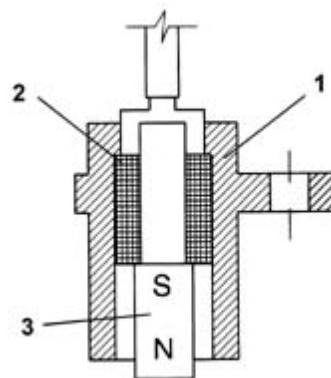
It is of the inductive type, ie it works by the variation of the magnetic field generated by the passage of the teeth of the phonic wheel (60-2 teeth).

The injection control unit uses the signal of the rpm sensor for:

- determining the speed of rotation
- determine the angular position of crankshaft".

Operation:

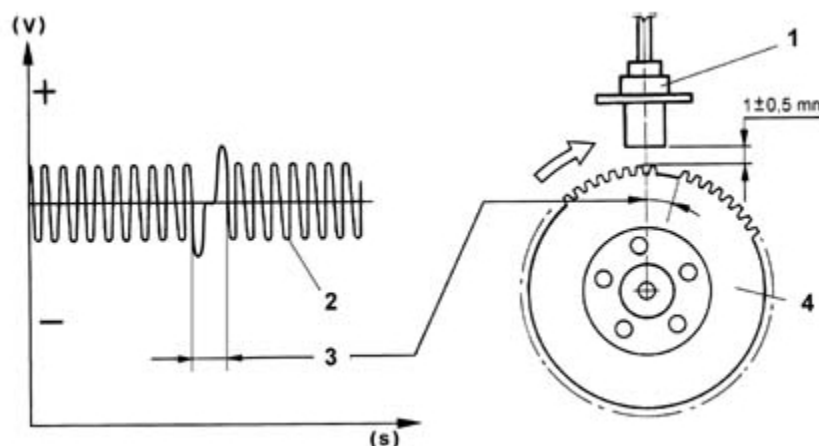
The sensor is constituted by a tubular case (1) inside which there is a magnet Permanent (3) and an electrical winding (2)



The magnetic flux created by the magnet (3) undergoes, due to the passage of the teeth of phonic wheel, of the oscillations due to the change of air gap.

These oscillations induce an electromotive force in winding" (2) to the ends of which is to alternatively find a positive voltage (tooth facing the sensor) and negative (hollow facing the sensor).





1, sensor

2, Signal output

3, signal corresponding to the two missing teeth

4, pulley crankshaft tone wheel

The peak value of the output voltage of the sensor depends on other factors being equal, by the distance between the sensor and the tooth (gap).

On the phonic wheel are formed sixty teeth, two of which are removed to create a reference: the step of the wheel thus corresponds to an angle of 6° (360° divided by 60 teeth). The point of synchronism is recognized at the end of the first tooth next to the space of two missed teeth: when this passes under the sensor, the engine is located with the pair of pistons 1-4 at 114° BTDC.

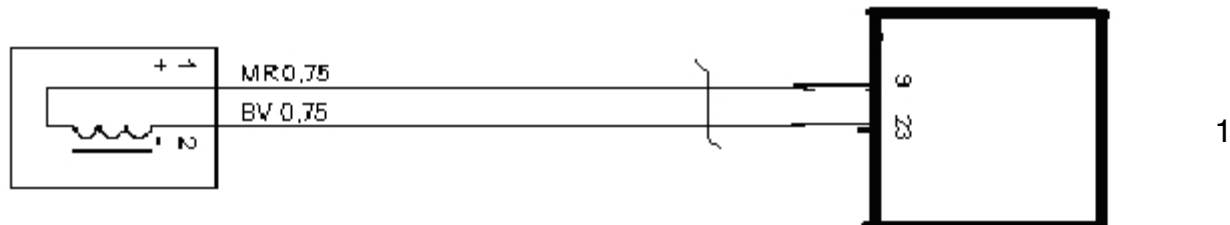
Electrical characteristics:

resistance = $1134 \div 1386$ ohms at 20° C.

The prescribed distance (air gap) to obtain correct signals," between the ends of the sensor and the phonic wheel must be between 0.5 to 1.5 mm.



2



1: speed sensor





*The seat of the engine speed sensor has no adjustments, then there are
The problems for mounting the sensor*

Pin-out

Component

Sensor number

RPM



4.4.4 Phase sensor

Description:

The sensor is of the type greenhouse "Hall". A semiconductor layer from the current path, immersed in a magnetic field normal generates at its ends a potential difference, voltage known as "Hall".



1: Phase sensor



Operation

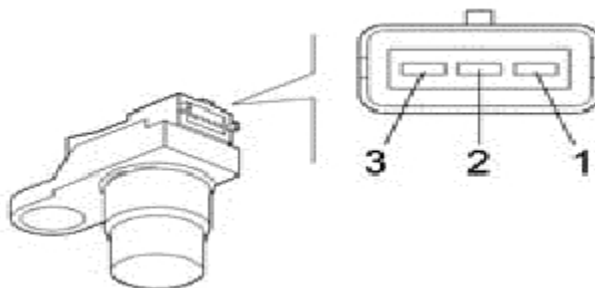
The pulley on 'camshaft consists of 4 rilievi. Nella rotation of the pulley distance between pulley and phase sensor varies and is generated a signal of low voltage For each relief.

Conversely, where not present these reliefs the sensor generates a voltage signal more high.

It follows that the high signal alternates with low signal four times each engine cycle.

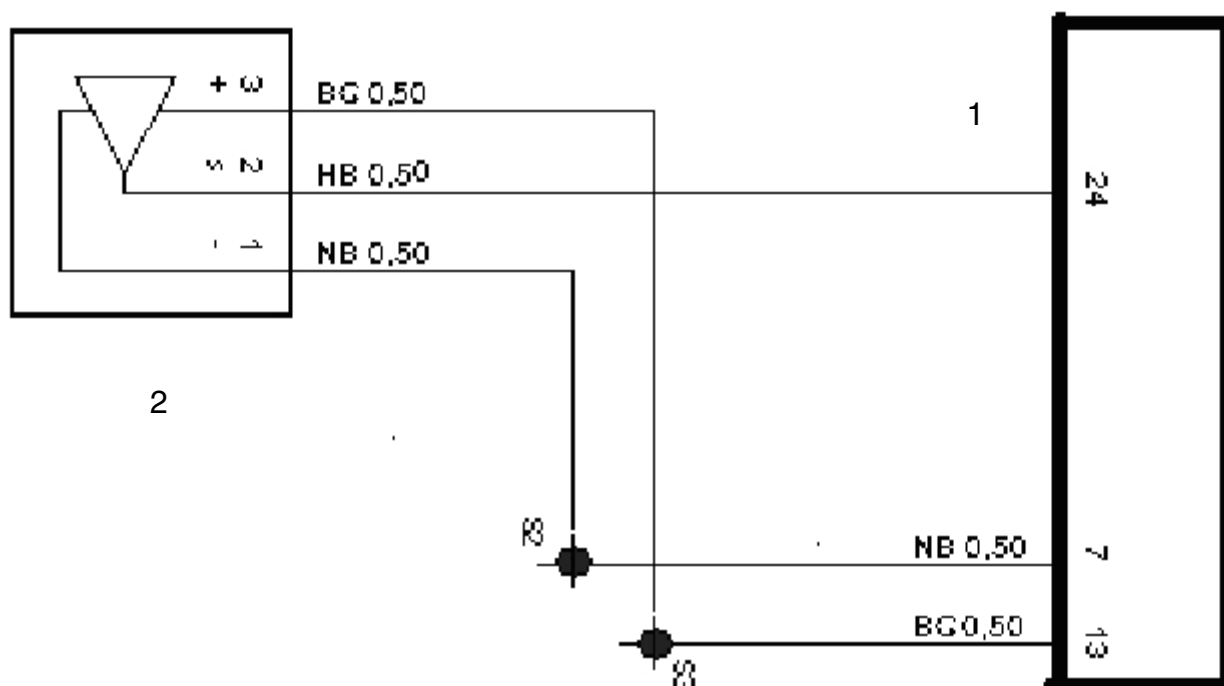
This signal together with the signal speed and PMS allows the controller to recognize the cylinders and to determine the point of injection and ignition.

Electrical Characteristics



- 1: Mass*
- 2: Output signal or*
- 3: Voltage*
- supply*





1: ECM

2: Phase sensor



Pin-out

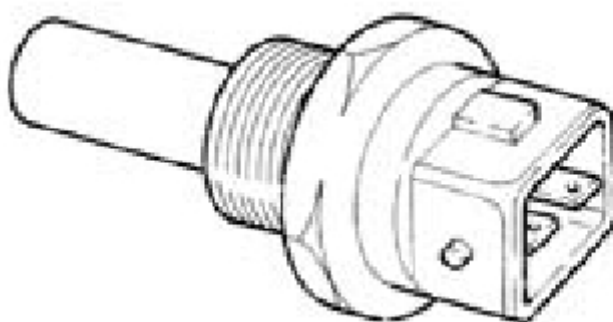
Component
<div><div>Sensor</div><div>phase</div></div>



4.4.5 Engine coolant temperature sensor

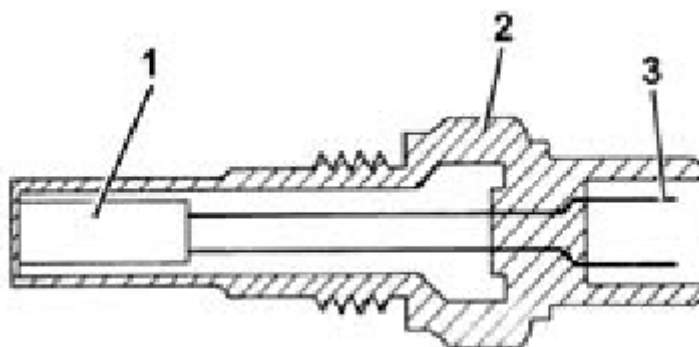
Description

It is mounted on the thermostatic group and detects the temperature of the water" by means of a sensor NTC having a negative coefficient of resistance.



Constitution

The following figure illustrates the formation of the sensor.



1: Resistance NTC

2: Body Sensor

3: Electrical connector



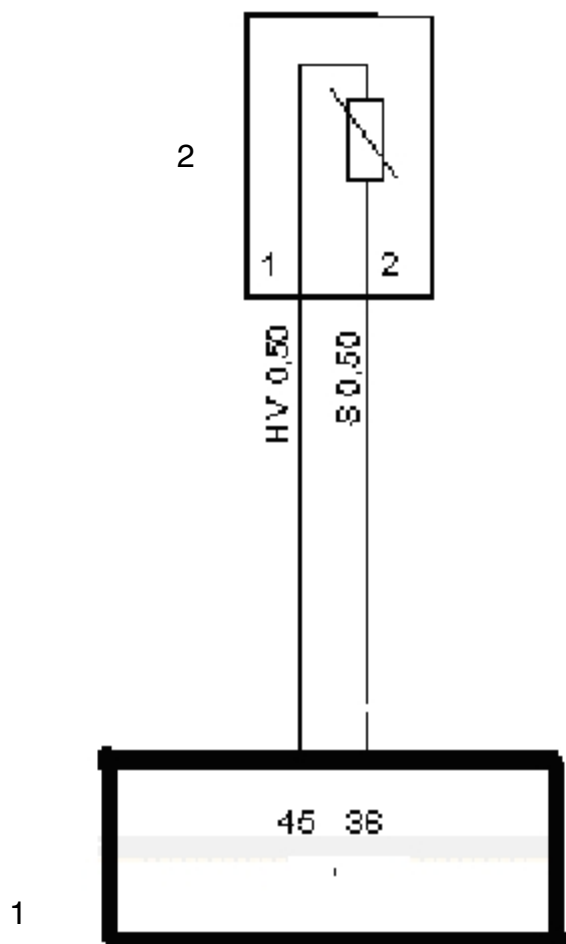
Operation

For the NTC element relative to injection system, the reference voltage is 5 volts; as the input circuit in the control unit is designed as voltage divider, this voltage is partitioned between resistance present in the control unit and the resistance of the NTC sensor. It follows that the control unit is able to evaluate changes in the resistance of the sensor through changes of the voltage and thus obtain the temperature information.

° C	Ω
-20	15971
-10	9620
0	5975
10	3816
20	2502
25	2044
30	1679
40	1152
50	807
60	576
70	418
80	309
90	231
100	176



Electrical characteristics:



1: ECM

2: Engine coolant temperature sensor



Pin-out

Component

Sensor

temperature

water

engine

Recovery:

Coolant temperature sensor

In case of failure of the ECU inhibits the 'self-adaptation of mixture strength minimum.

Requires the 'last value of temperature detected in the case did not correspond to that of regime the ECU it gradually increases as a function of time from 'engine start up to reach 80 ° C.

Is activated the cooling fan radiator.



4.4.6 Pressure and temperature sensor intake air

Description:

The pressure sensor and air intake temperature is an integrated component which has the function of detecting the pressure and the temperature of the air"" to the internal manifold suction.

Both the information needed to control unit to define the amount of air sucked by the engine, this information is then used to calculate the time of injection and ignition timing. The sensor is mounted on the intake manifold.

Location of vehicle



Temperature sensor / Intake air pressure



Operation:

The air temperature sensor is constituted by an NTC thermistor (temperature coefficient Negative).

The resistance presented by the sensor decreases at higher temperatures".

The input circuit control unit realizes a division of the reference voltage between 5 volts the resistance of the sensor and a fixed reference value, obtaining a voltage proportional to the resistance, and then to the temperature.

L" sensitive element of the pressure sensor is constituted by a Wheatstone bridge screen-printed on a membrane made of ceramic material.

On one face of the membrane is present the absolute vacuum of reference, while on the other" face acts depression present in the intake manifold.

The signal (of a piezoresistive) resulting from the deformation affected the membrane, before being sent to the engine control unit, is amplified by a circuit electronic content in the same support that houses the ceramic membrane.

The diaphragm, with the engine off, flexes according to the value of atmospheric pressure; it has so Insert key," the exact information of the altitude.

During operation of the engine, the effect of the vacuum" a proxy action

Mechanical on the membrane of the sensor, which flexes by varying the value of resistances.

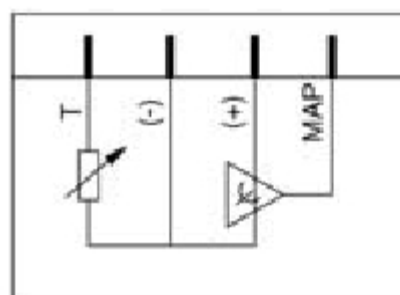
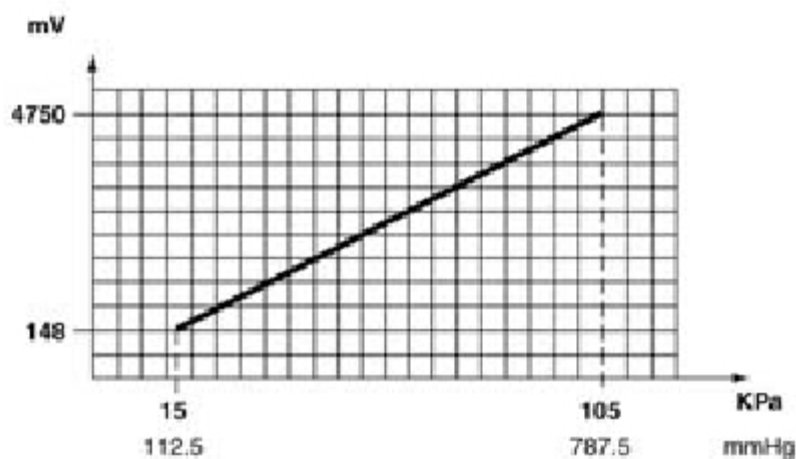
" Since the power is kept strictly constant (5V) from the control, by varying the value of the resistances, changes the value of the output voltage.



Electrical characteristics:

The following figure shows the electrical characteristics of the sensor.

T °C	Ω	$\pm \Omega \%$
-40*	49.933	13.6
-30	26.628	12.1
-20	15.701	10.8
-10	9.539	9.6
0	5.959	8.5
+10*	3.820	7.4
+20	2.509	6.5
+25	2.051	6.0
+30	1.686	6.0
+40	1.157	5.9
+50	0.810	5.8
+60	0.578	5.7
+70	0.419	5.6
+80	0.309	5.5
+85	0.263	5.5
+90	0.231	5.5
+100	0.176	5.4
+110	0.135	6.0
+120	0.105	6.5
+125	0.092	6.7
+130	0.083	7.0



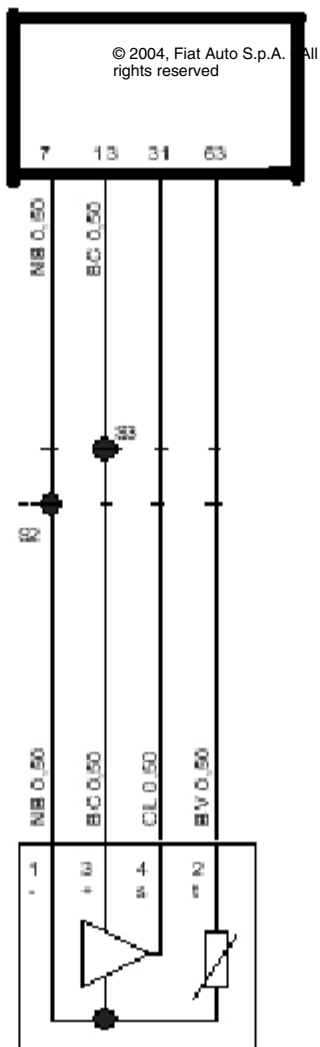
1

2

1
:
E
C
M

2: *Temperature
sensor / Intake
air pressure*

Punto



Pin-out

Component
Sensor pressure temp. Air flow

Recovery:

If the 'error is to' start-up;

- Assumes a value of 50 ° C;
- Is inhibited 'self-adaptation of the title.

If the 'error is present in other conditions:

- Is stored by the 'last valid value is updated according to the coolant temperature

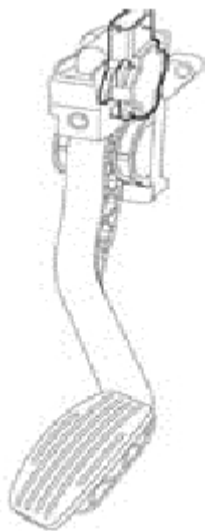


4.4.7 potentiometer accelerator pedal

Description:

The accelerator pedal has two integrated potentiometers:

- a main
- a safety



Operation

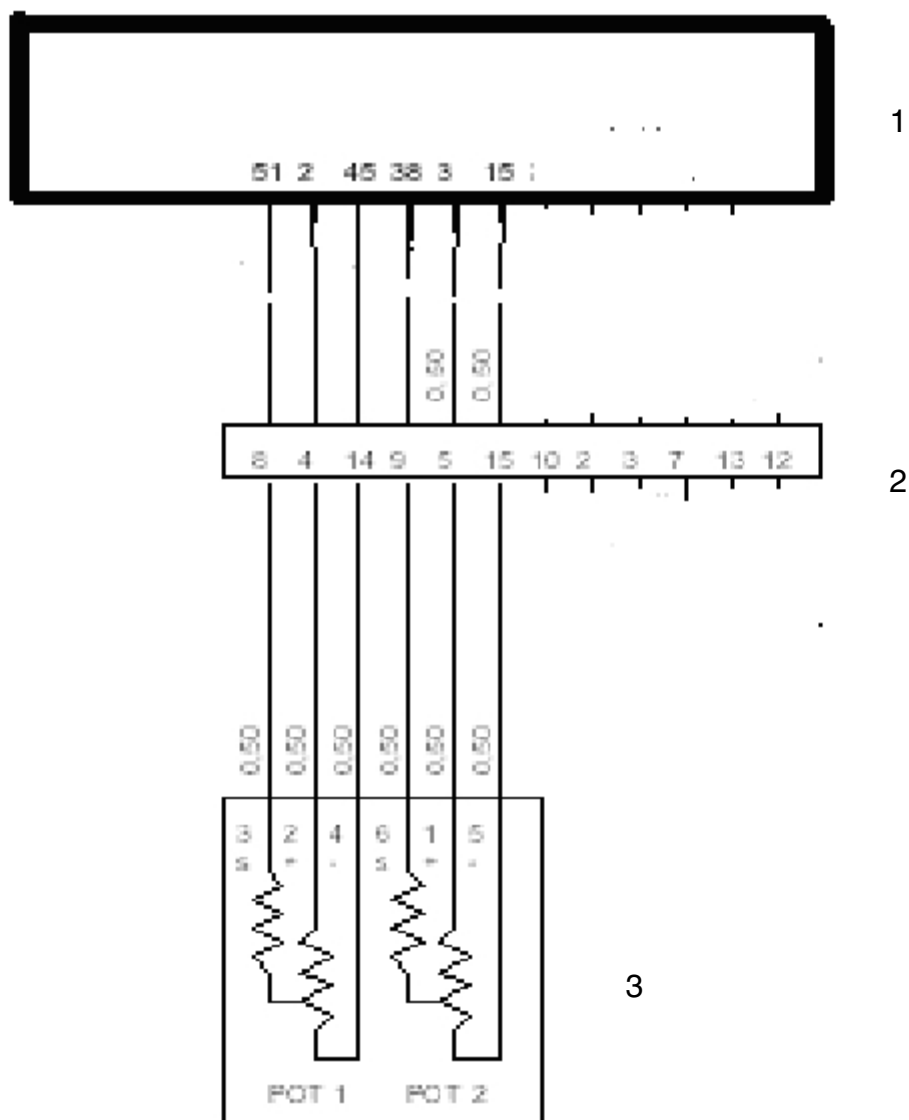
The sensor is constituted by a casing, fixed to the support accelerator pedal, at" internal of which, in axial position, is placed a shaft connected to the potentiometer double track.

" Tree on a helical spring ensures the correct pressure resistance while a second spring assures the return of release.

Operating range from 0 ° to 70 °; mechanical stop to 88 °.



Electrical characteristics:



1: ECM

2: Junction

3: Dual potentiometer accelerator pedal

Pin-out



Component

Potentiometer

accelerator

Recovery:

The engine control unit performs the following strategies "recovery" in the following conditions:
in case of failure of one of the two potentiometers" allows the throttle opening up to a maximum of 40 ° in a very long time
in the event of complete failure of the two potentiometers" excludes the throttle opening.



4.4.8 Linear Sensor A / C

Description:

The linear sensor A / C controls the correct operation of replacing the task quadrinary of the pressure switch. The sensor, analyzing in a continuous and uniform pressure circuit of the 'air-conditioning unit, provides real-time engine control unit to the pressure changes making it more flexible management of a trigger.

Location of vehicle



1: linear pressure sensor A / C (located on the duct of high pressure)





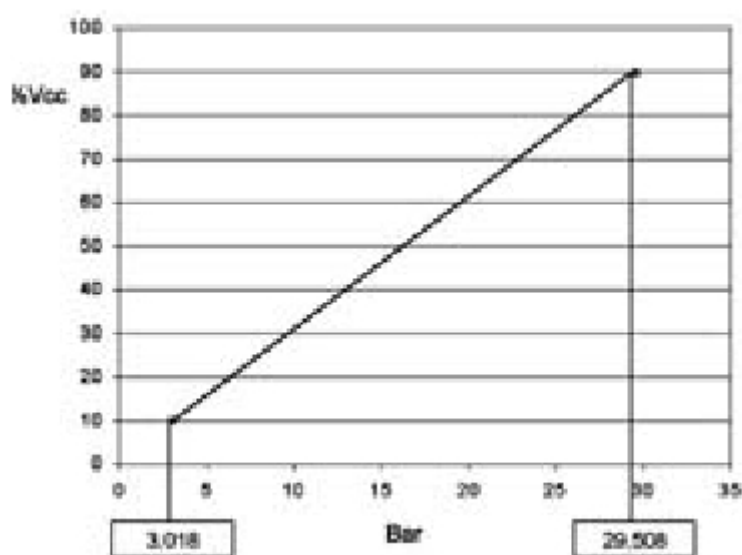
1: High-pressure pipe
2: low-pressure pipe

Operation:

After each increase of pressure corresponds to a voltage signal used by the control unit engine to activate the speed of 'fan and disconnect the compressor if the pressure rises or falls beyond the limits allowed (safety function).

The range of use of the linear sensor varies from 3.018 bar to 29.508 bar according to the following characteristic pressure (Bar) - percentage output voltage (Vcc%)



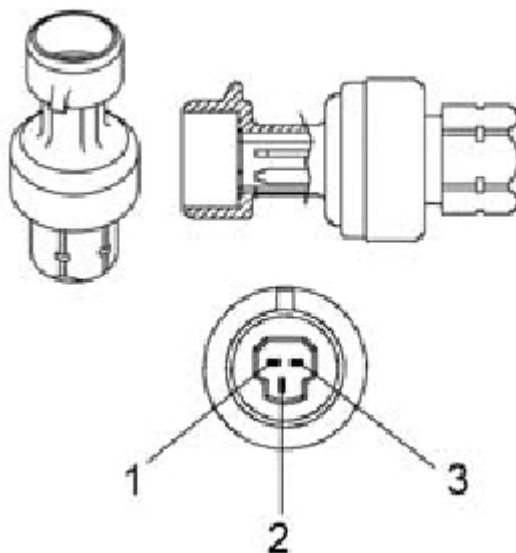


The consent to 'drive the compressor and the adjustment of the speed of the' electric fan, as a function of the pressure variation, is in this range of pressures; below and above these values the compressor is turned off as a condition of safeguards to prevent any damage to the 'plant itself.

The power supply may have a variation of $\pm 10\%$ and the temperature of use of the sensor is compressed between -5°C and 80°C



Electrical characteristics:

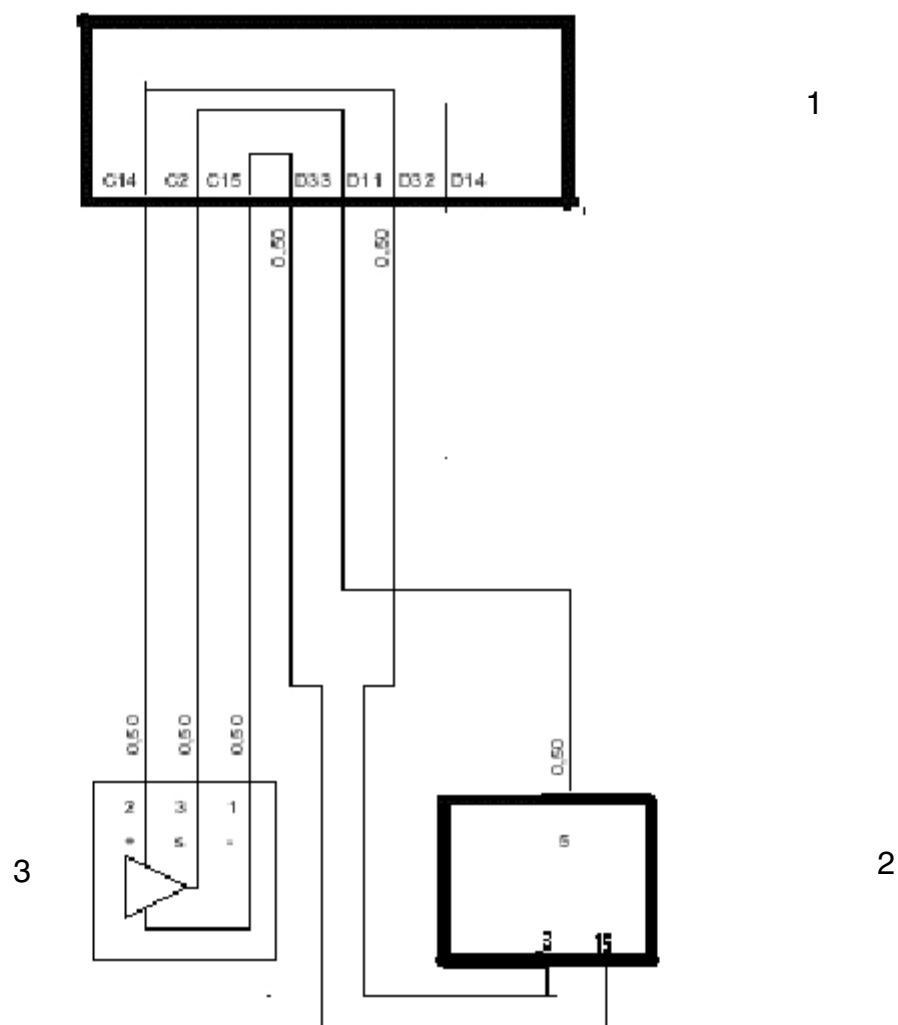


1: Mass

2: Power supply

3: Output signal





1: FDU

2: ECM

3: linear pressure sensor A / C



Pin-out

Component
Linear sensor
A / C



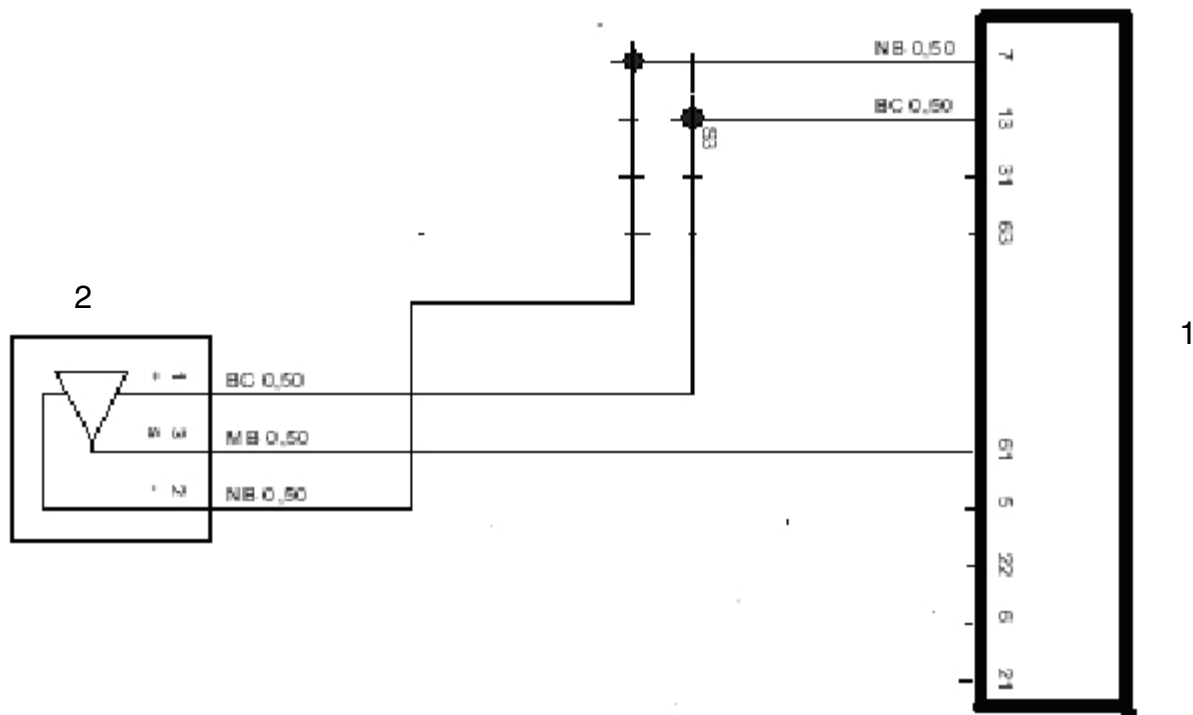
Atmospheric pressure sensor



Atmospheric pressure sensor



Electrical characteristics:



1: ECM

2: Atmospheric Pressure Sensor



Location of vehicle



Location atmospheric pressure sensor



Pin-out

Component

Sensor

pressure

Atmospheric

Recovery:

In the case of failure of the sensor, as the value of atmospheric pressure is considered that present in the intake manifold to the Key-on, or under full load (throttle wide open).



4.5 Operating logic



4.5.1 Self-adaptation of 'plant

The unit is equipped with self-adaptive functions that have the task of recognizing changes that occur in the motor due to processes of adjustment in time and to aging, both of the components, that the motor itself.

These changes are stored in the form of changes to the basic mapping, and are intended to adapt the operation of the system to the progressive deterioration of the engine and components with respect to the characteristics to new.

This feature also allows adaptive offset the inevitable diversity (due to manufacturing tolerances) of components being optionally substituted.

The control unit from" analysis of exhaust gases, changes the mapping of base with respect to new characteristics to the motor.



The adaptive parameters are not cleared with the detachment of the battery.

4.5.2 Self-diagnosis and recovery

The self-diagnostic system control unit controls the correct operation of the facility" and this indicates a malfunction by means of a lamp (mil) on the instrument panel with color and ideogram standardized by European legislation.

This LED indicates whether the fault management engine that abnormalities detected by strategies EOBD diagnosis.

The operating logic of the indicator light (MIL) is the following:

with key inserted and turned instrument panel, the light comes on and stays on until engine start occurred.

The self-diagnosis system of the control unit checks the signals from the sensors comparing the data with the permitted limit.

Fault signals" to start the engine:

the failure or switching off of the lamp to start the engine taken place indicates the presence of a error stored in the ECU.

Report faults during operation:

The lightning flash indicates possible damage to the catalyst
the presence of misfire (engine misfire).

the ignition of the lamp with a fixed light indicates the presence of errors or engine management of errors

EOBD diagnosis.

The control unit defines each time the type of recovery as a function of the components in failure.

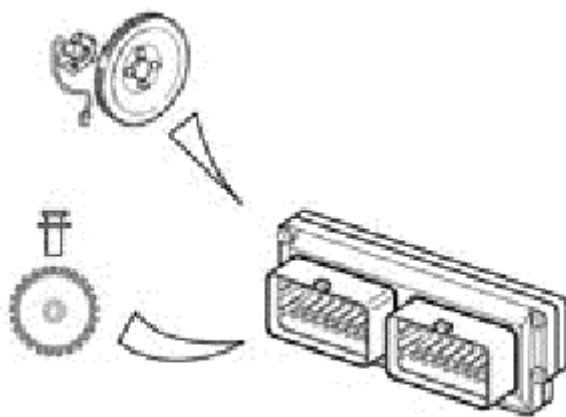
The parameters of recovery are managed by non-faulty.



4.5.3 Recognition of the position of the cylinders

The signal phase motor, in conjunction with the signal of engine revolutions and the top dead (PMS), allows the engine control unit to recognize the sequence of the cylinders in order to implement the 'phased injection.

This signal is generated by a Hall effect sensor, positioned on the valve cover in obtained at the encoder wheel on the pulley of 'camshaft.



4.5.4 Combustion Control - lambda probes

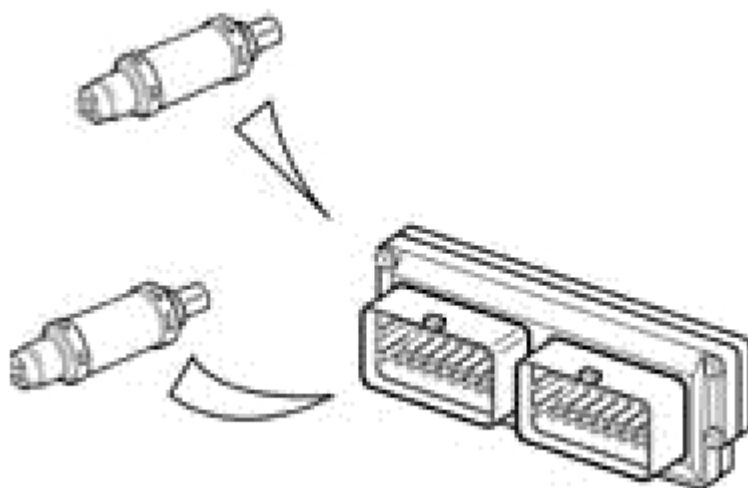
EOBD systems in oxygen sensors, all of the same type but not interchangeable, they are placed a first (pre-catalyst) and one after (post-catalyst) of the catalyst system. The pre-catalyst sensor determines the control of the title on a 1 ° ring (closed loop of the probe pre-catalyst).

The probe post-catalyst is used for the diagnosis catalyst and to modulate finely control parameters of 1 ring.

In this 'optical' s adaptivity of the second ring has the purpose to recover both the dispersions production, both the slow drifts that the response of the probes pre-catalyst can report against aging and poisoning.



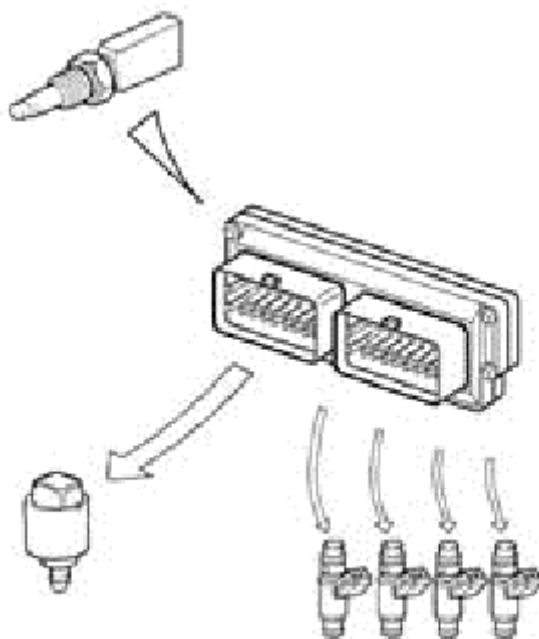
This control is referred to as the control of 2 ° ring (closed loop of the probe post-catalyst).



4.5.5 Operation Cold

In these conditions there is a natural depletion of the mixture due to the poor turbulence of the particles of the fuel at low temperatures, a 'reduced evaporation and strong condensation in the inner walls of the intake manifold, all enhanced by the increased viscosity of the lubricating oil that", as is known, at low temperatures increases the resistance to rolling of the mechanical organs of the motor.

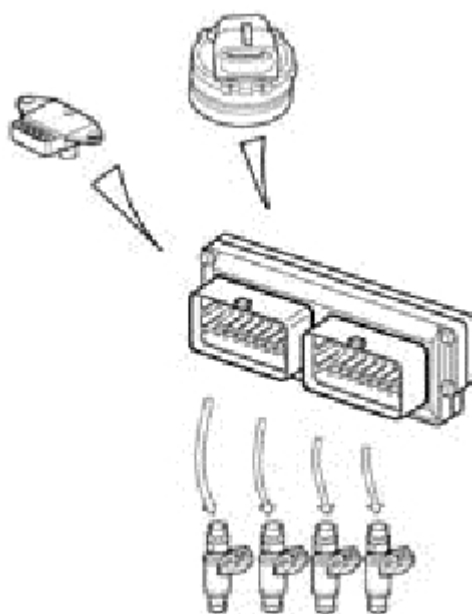
The electronic control unit recognizes this condition according to the temperature signal of the coolant, increasing the time base d 'injection.



4.5.6 Operation at full load

The full load condition is detected, by the control unit, by means of the values supplied by the throttle position sensor and absolute pressure.

Under full load it is necessary to increase the base time of injection" to get the maximum power delivered by the engine.



4.5.7 Operation in deceleration

During this stage of use of the engine there is the superposition of two strategies:

- A transitional strategy to maintain the stoichiometric amount fuel supplied to the engine (less pollution), this phase is recognized by the control unit when the signal of the throttle potentiometer from a value of voltage high passes to a lower value
- A strategy to accompany the soft lower speed for implement the change in output torque (engine brake reduced).

4.5.8 Atmospheric correction

The atmospheric pressure varies as a function of determining a change in altitude" of 'volumetric efficiency such as to require a correction of the title base (time d" injection).

The correction of the injection time will be a function of the variation of altitude and will be updated automatically by the electronic control unit to each engine shutdown and in certain conditions of throttle position and speed (typically at low rpm and wide open throttle) (dynamic adaptation of the atmospheric correction).

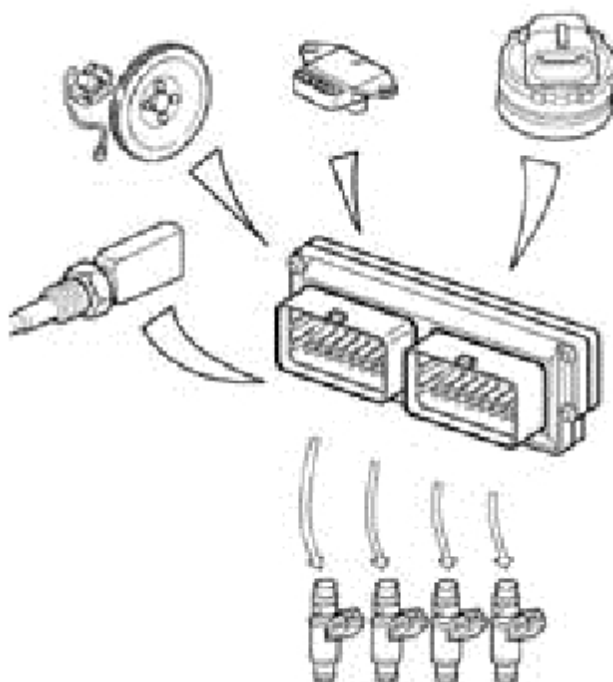
Operation in cut-off

The cut-off strategy (cutting fuel) is implemented when the ECU recognizes the position of the accelerator pedal released: percentage = 0% pedal and the engine speed exceeds about 1350 r / min (the value is indicative variable based on some parameters, including mainly temperature and gear).

The recognition of the accelerator pedal is not released or the engine speed less than 1270 rev / min (reference value variable for different models) Rehabilitate the" power of the engine.



For very high speeds is carried out the cut-off even under conditions of the butterfly valve does not completely closed, but with pressure in the intake manifold particularly low (Partial cut-off).



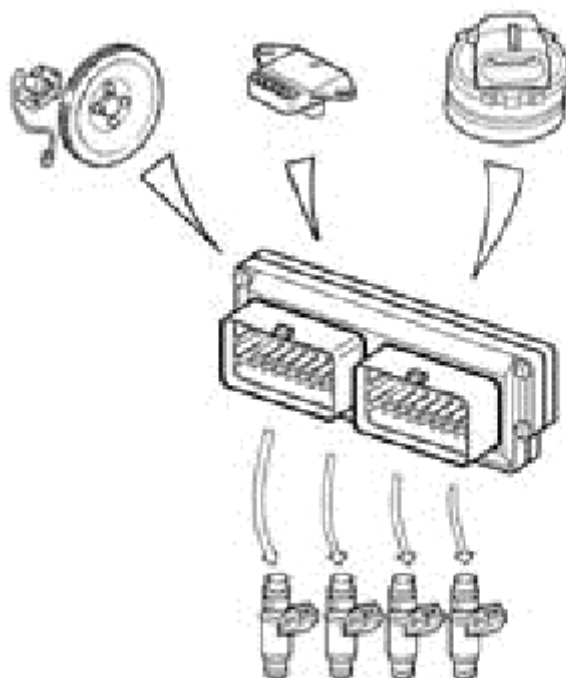
4.5.9 Acceleration operation

In this phase the control unit to increase adequately the amount of fuel required by the engine (to obtain the maximum torque) as a function of signals coming from the following components:

- Throttle
- Speed sensor and P. M. S.

The injection time" base" is multiplied by a coefficient as a function of engine coolant temperature, the speed of the throttle opening accelerator and increased pressure in the intake manifold.

If the abrupt variation of the injection time is calculated when the 'injector is already closed, the control unit to reopen the 'primer (extra pulse), to compensate for the title with quickly, subsequent injections are instead already increased in accordance with the coefficients first mentioned.

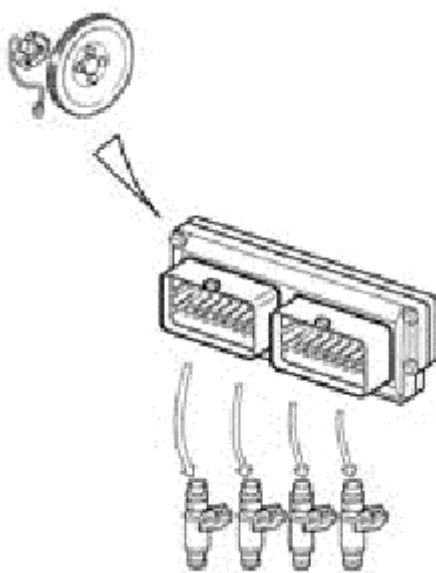


4.5.10 Protection against over-revving

When the rotational speed of the motor exceeds the value of 6530 rev / min imposed by manufacturer, the engine itself is to be in critical operating conditions"".

When the electronic control unit recognizes the overcoming of the system mentioned above, inhibits the driving the electrical injectors.

When the engine speed falls to a critical value (6500 rpm / min) is restored pilot.



4.5.11 Command fuel pump

The 'fuel pump is driven by the engine control unit via a remote control switch.

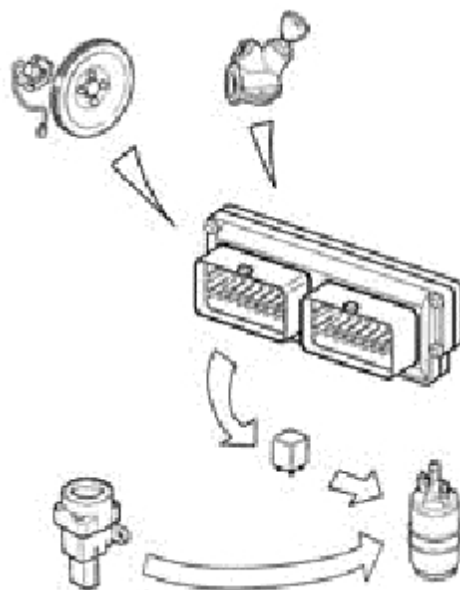
The 'stopping of the pump is:

- If the engine falls below about 40 rev / min
- After a certain time (about 6 seconds) with the ignition switch in position

Tues

without being made the 'starters (consensus timed).

- If the 'inertia switch is tripped.

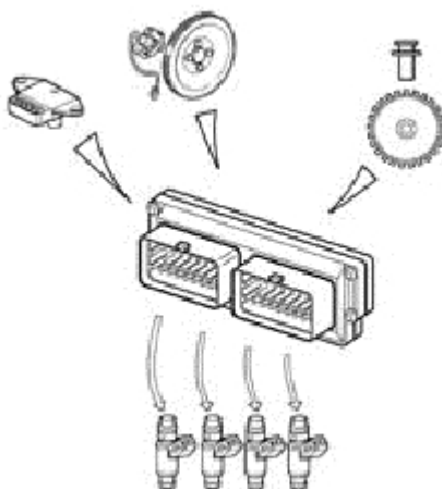


4.5.12 Command electro

The command is of the type of the electro-phased sequential, ie the individual injections correspond to the phases of intake of the individual cylinders.

However, in the starting phase the electrical injectors are driven in parallel a first time (Full group).

The timing of the command electroinjectors is variable as a function of engine speed and the Intake air pressure in order to improve the filling of the cylinders with benefits in consumption, driveability and pollution.



4.5.13 Control of detonation

The strategy has the task of detecting the presence of the phenomenon of detonation (knock head), through 'processing signal from the respective sensor.

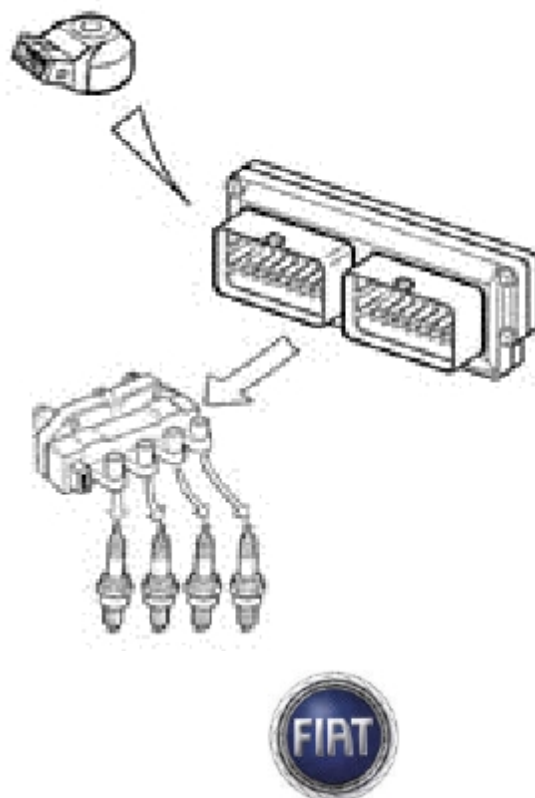


The strategy continually compares the signal from the sensor with a threshold value, that is continuously updated to take account of the noise of the base and of the 'aging of the engine.

In the case where the system recognizes the presence of detonation, the strategy provides for reducing the 'lead-in to the disappearance of the phenomenon. Following the 'advance is gradually restored to the baseline value or until the next occurrence of the phenomenon. In particular, the increases in advance are implemented gradually, while the reductions are implemented immediately.

Under conditions of acceleration, the strategy uses a higher threshold, to take account of increased noise of the motor in such a condition.

The strategy is also equipped with a self-adaptive function, which shall be stored in a non-permanent reductions of 'advance that recur continuously, in to adapt the 'advance to the different conditions in which you came to see the engine (For example, use of fuel with a low octane number). The strategy is able to restore the 'advance to the threshold value stored if they are the conditions that have resulted in the reduction.



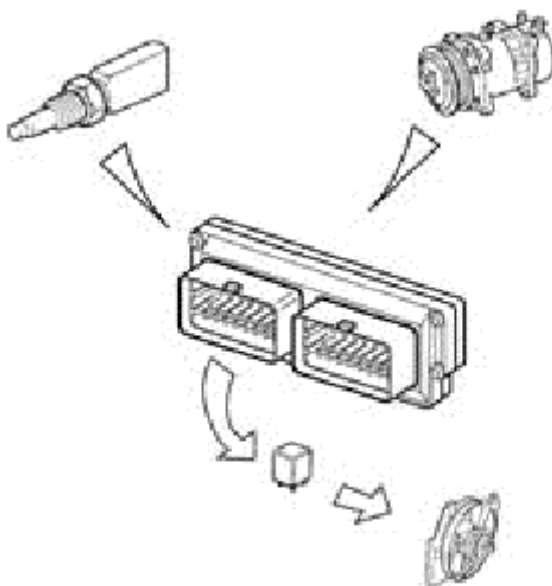
4.5.14 Management radiator electric fan

The controller directly controls the operation of 'the radiator cooling fan function of the temperature of engine coolant and of the 'insertion of' plant conditioning.

The 'electric fan will engage when the temperature exceeds 95 ° C (first speed) and 105 ° C (Second speed).

The disconnection takes place with a hysteresis of 3 ° C below the threshold of insertion (values indicative variables for the various models based on experimental evidence).

The functions of high and low speed are managed by 'intervention of specific places in contactors control unit of the 'air conditioning system and controlled by the control unit.



4.5.15 Management of the engine idle speed control



The control unit recognizes the condition of minimum through the position in "" of the release accelerator pedal. The control unit for controlling the idle speed as a function of user input signals and brake pedal / clutch drives the engine throttle position.

The idle speed is expected to heat 750 ± 50 rev / min.

4.5.16 phase thermal water drainage

The number of revolutions is corrected depending mainly on the temperature of the liquid engine cooling.

When the temperature reaches the optimal management of the minimum depends only on the signal coming from the sensor of engine revolutions; to 'inclusion of external loads, the control unit controls the 'actuator control throttle to adjust engine speed to have occurred conditions and manage the engine load supporting the minimum.

4.5.17 Management of the fuel vapor recirculation

The strategy controls the position of 'intercettatrice vapor valve as follows;

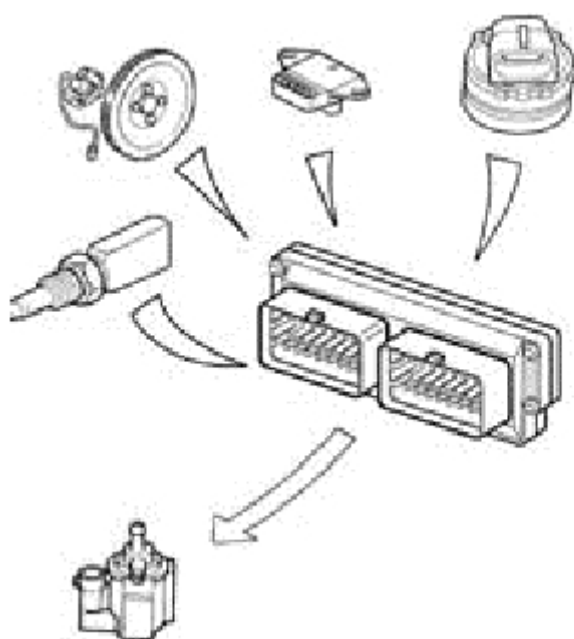
- During the starting phase the 'solenoid valve remains closed, preventing the vapor enrich the fuel mixture too; this condition persists until the engine coolant has not reached 65°C ;
- Engine electronic control unit sends the temperature regime to 'solenoid signal square wave (duty - cycle) that modulates the 'opening.

In this way the control unit controls the amount of the fuel vapor sent to ' suction, thus avoiding substantial variations of the license of the mixture.



To improve the operation of the engine, is inhibited command of 'solenoid valve, retaining the same closure position, in the operating conditions listed below:

- Butterfly valve in the closed position
- Lower speed to 1500 rev / min
- Intake manifold pressure to a lower limit value calculated by the control unit function of the number of revolutions



4.5.18 Management of 'climate

The power-control unit is operatively connected to 'air conditioning system,
as:

- Receives the request for input by the compressor and related interventions (Additional air);
- Gives its consent to 'insert compressor when the conditions are verified considered by the strategies;
- Receives' information on the state of the switch operates smoothly and the related interventions (Radiator cooling fan control).

If the engine is idling, the controller increases the 'opening of the butterfly and therefore of the scope of the 'air in advance with respect to' activation of the compressor and vice versa shows the butterfly in the normal position behind the detachment of the compressor.

The controller automatically controls the separation of the compressor:

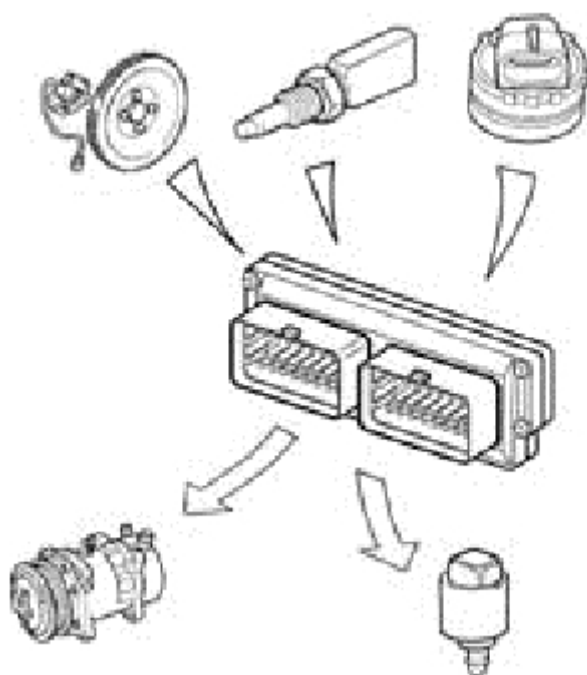
- For engine coolant temperature higher than 120 ° C;
- To engine speed below 650 r / min.

The compressor will automatically hangs up when the engine speed rises again 750 r / min.



The controller commands the detachment of the temporary compressor (for a few seconds):

- Under conditions of high power demand of the engine (strong acceleration);
- The engine torque.



4.5.19 Management of the phase shifter

The phase shifter is completely managed by the engine control unit that:

detects the position of 'camshaft through the phase sensor;
this position changes depending on the operating point of the engine according to a map calibrated;
keeps under control the position of 'camshaft.

The movement of the phase shifter takes place by means of the pressure of the 'engine oil that flows in rooms in advance / retard. A spool valve is the flow 'oil or in the receptacle advance (the drive moves, then, in the sense of 'advance, which is the rest position) or in vain for the delay (the speed you move, then, in the sense of delay) or alternatively in those of early and late on an ongoing basis (the drive is controlled position).

The control unit controls the 'solenoid pilot drive with a command of the duty-cycle.

4.6 Procedures

4.6.1 Procedure mounting position of self-learning 'camshaft

When and why do the procedure?

This procedure allows the ECM self learning the position of the camshaft with respect to the encoder wheel in order to diagnose abnormalities of assembly.

The procedure is performed again in the following cases:

Intervention / Replacing the phonic wheel



Intervention / Replacing the sensor turns
Intervention / Replacement Sensor Phase
Intervention / replacement camshaft
Intervention / Replacing shaft
Intervention / replacement phase shifter
Disassembly of Cylinder Head
Intervention / Replacing the Timing Belt
Replacing / Reprogramming the ECM

NOTE: In the event that the ECM is moved from one car to another it is necessary entail rescheduling the procedure

What are the tools needed?

Diagnosis Tool Examiner

Operations required to perform the procedure:

The self-learning procedure is fully automatic. It begins with the phase cranking time and ends after 30 seconds or as long as they fulfill the following conditions of approval ::

Enabling conditions for the execution of the procedure:

The temperature of the engine coolant must exceed 20 ° C During
Start-up is necessary that the accelerator pedal is fully released or the
rotation speed of the engine is between 650 and 1300 rpm
After 30 seconds from the contact switch key to OFF and
wait for the recording of data in permanent memory.



At the end of the procedure are the following possible cases:

Reading Memory Errors	Possible Problem	Actions
DTC P 0016 [76]	The timing engine does not fall the permissible tolerance.	Essential to remove the motor check the timing and the current
DTC P 0016 [76]		Repeat the procedure
No DTC	Not met the conditions of enabling the execution of procedure	None
No DTC	The timing engine is included in tolerances allowed.	If this condition occurs immediately after reprogramming Repeat the procedure, otherwise requires no action
	Not met the conditions of enabling the execution of procedure	

In the case where a car is placed in circulation with a timing engine which does not falls within the tolerances allowed, you may get break in the engine itself.

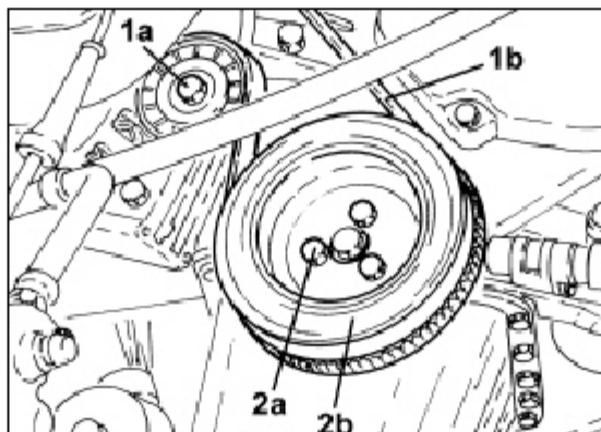
© 2004, Fiat Auto S.p.A. - All
rights reserved



4.6.2 Distribution control removal and installation for phase

Use a wrench on the tensioner counterclockwise (first) and remove the belt unique device control motor (1b)

Unscrew the screws (2 a) and remove the crankshaft pulley (2 b)



*Tensioner
mobile*



Crankshaft pulley (2 b)

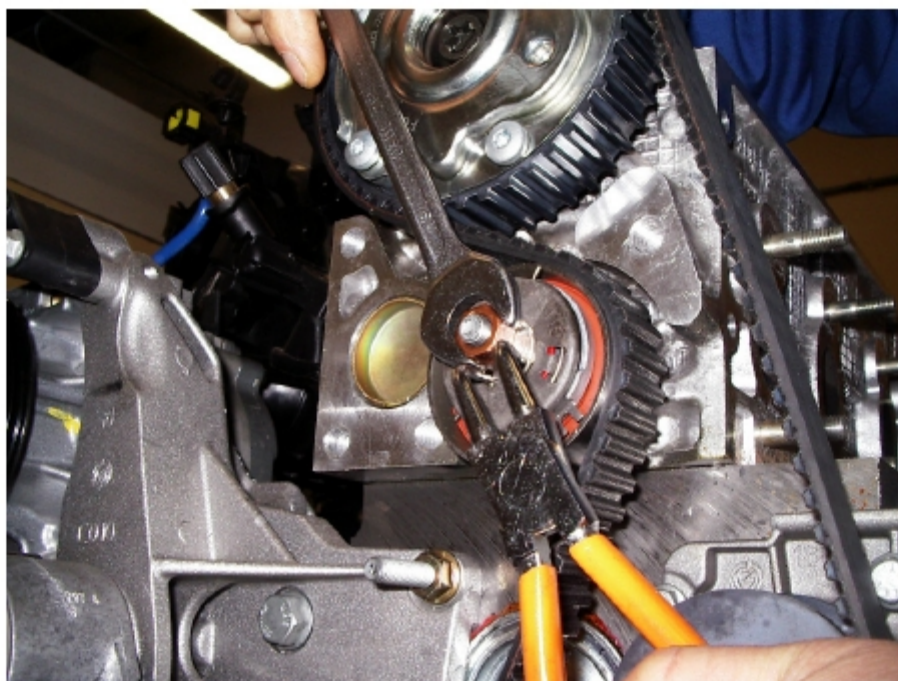
302/534

*T
e
n
s
i
o
n
e
r*

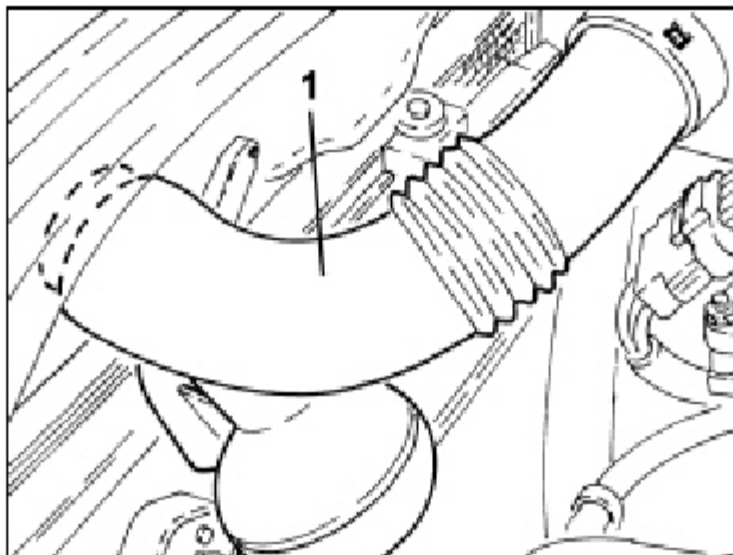
*M
o
b
i
l
e*

*(
1*

*a
)*



Compress the clips and remove the sleeve of the cold air intake



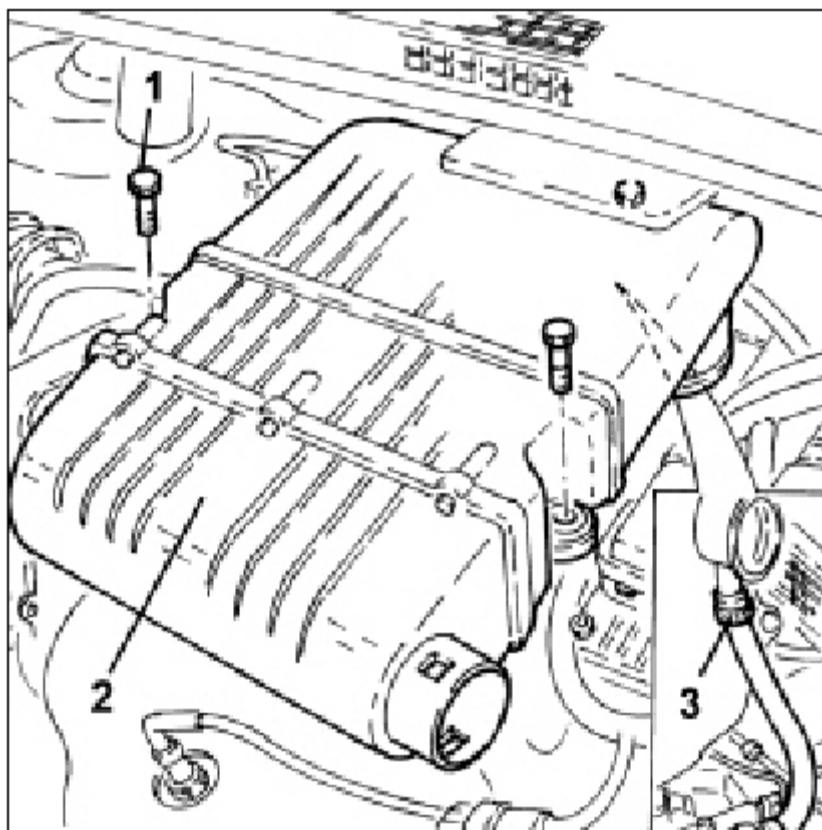
Air intake hose



Unscrew the screws securing the air filter

Lift the air filter

Loosen the clamp and disconnect the hose from the steam engine oil filter and remove air



305/534

*F
i
x
i
n
g*

*s
c
r
e
w
s*

a

i

r

f

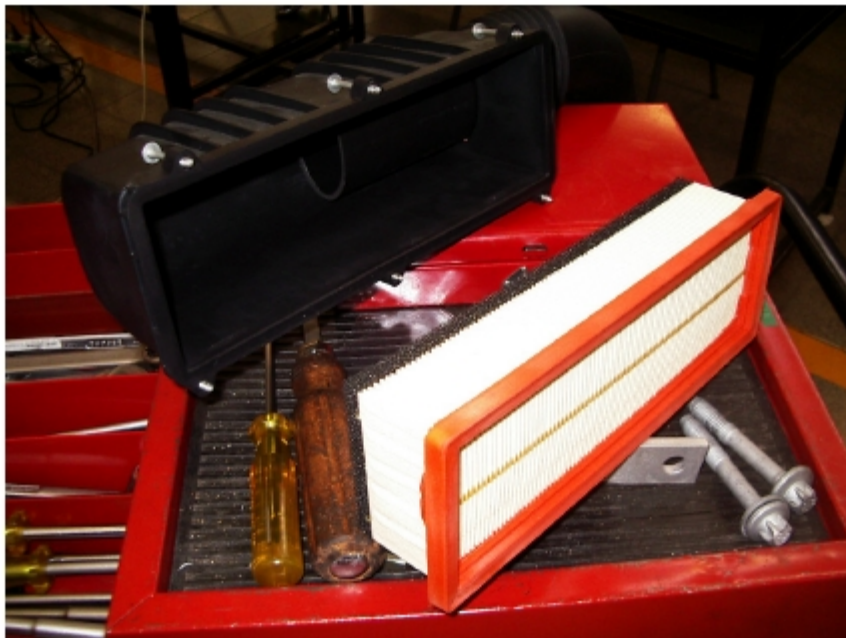
i

l

t

e

r

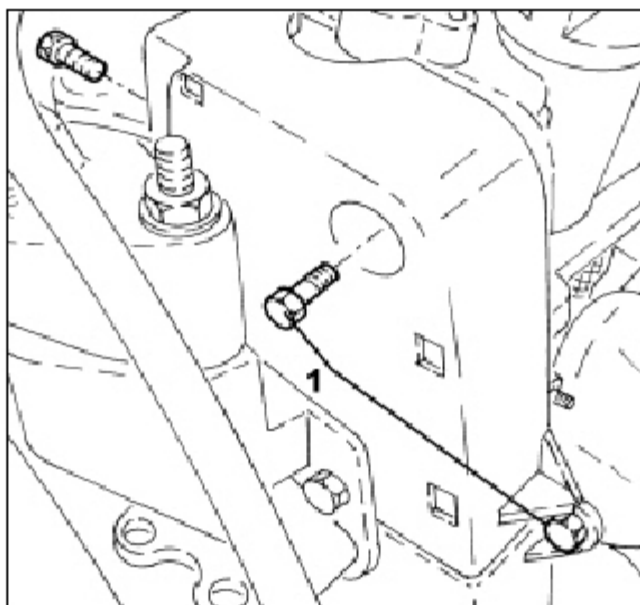




*Vapor hose
engine oil*

1. Unscrew the screws securing top cover protection of timing





Protection of the upper and lower timing belt

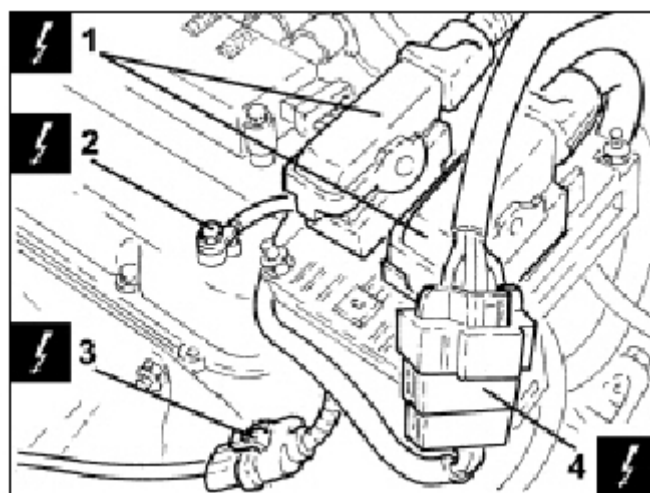


Disconnect electrical connections from the control unit

Disconnect the ground wire

Disconnect the electrical connection of the lambda sensor upstream of the catalyst

Disconnect the motor anterior junction



309/534

*Lambda
problem
upstream
of
the*

catalyst

with

relative

catalyst

with

relative

catalyst

with

relative

catalyst

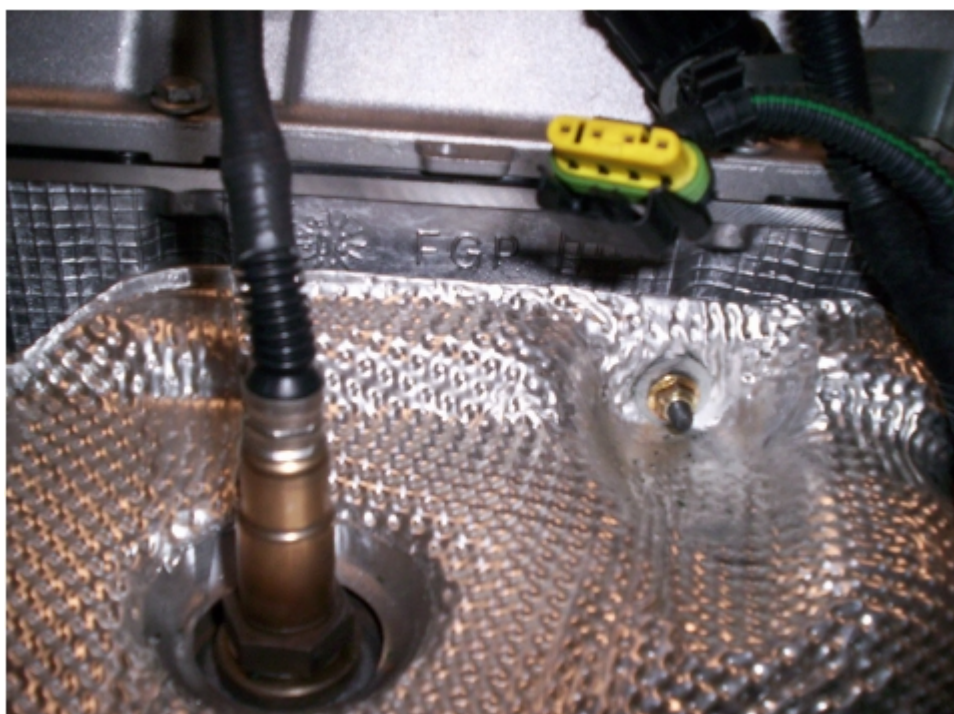
with

relative

catalyst

with

relative

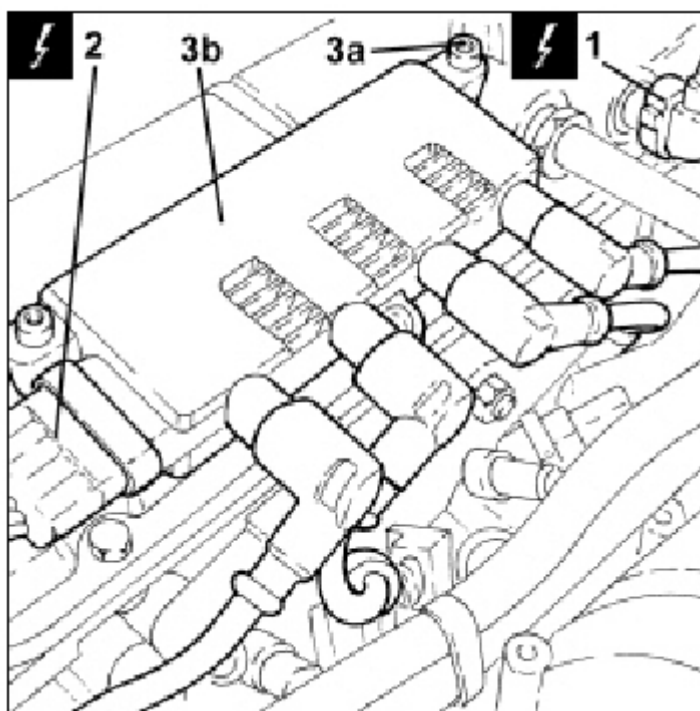


Disconnect the electrical connection of 'variable valve timing control solenoid

Disconnect the electrical connection from the module ignition coils

Unscrew the screws (3 in) and remove the ignition coil module (3 b)

Remove the electrical connection from the phase sensor



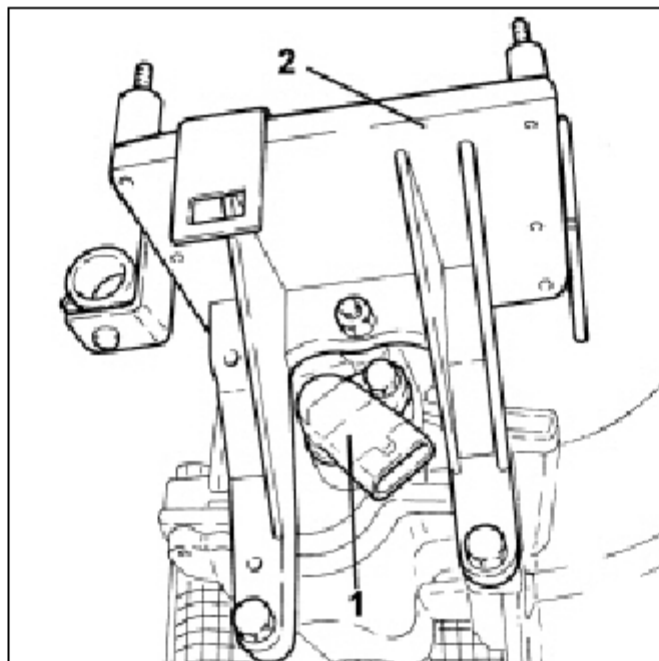
*Module
ignition
coils*

*With variable
valve timing
control
solenoid*



Unscrew and remove the timing sensor

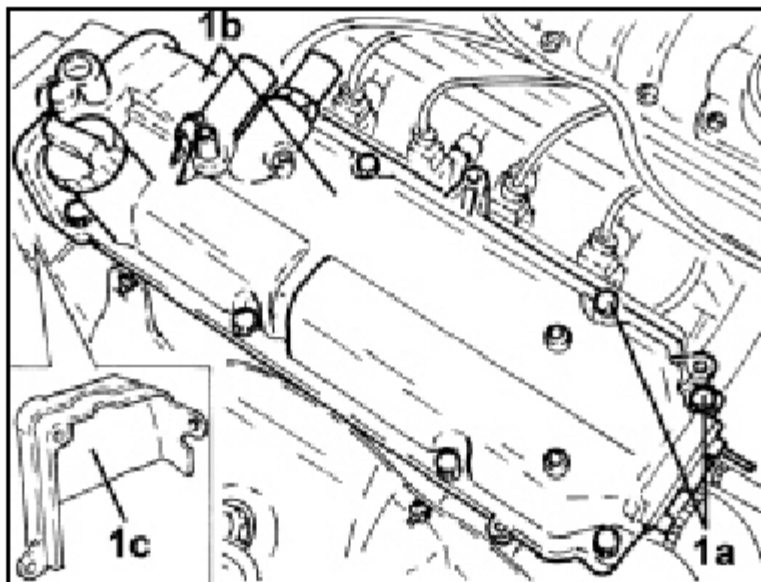
Unscrew the screws and remove the engine control unit



Phase sensor



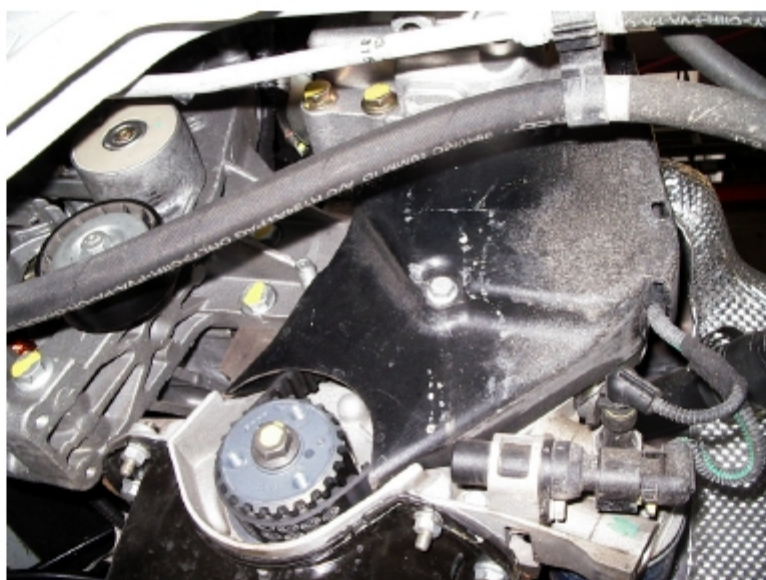
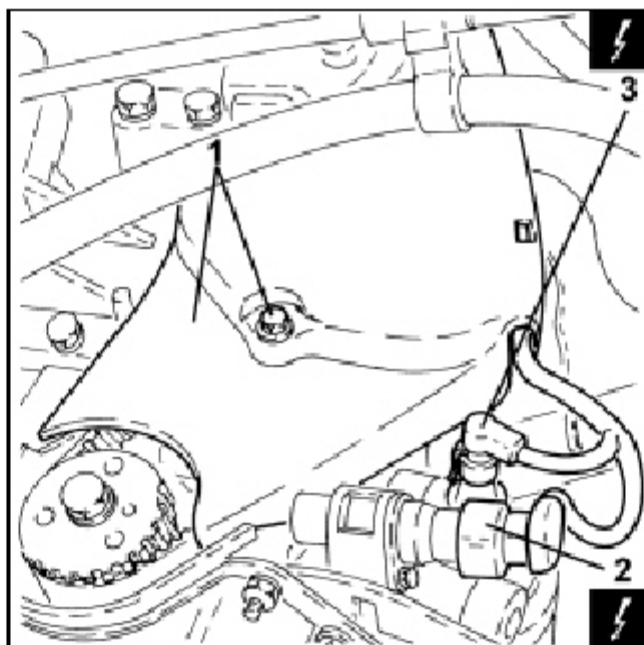
1. Unscrew the screws (1 a), remove the valve cover (1 b) and the upper cover belt distribution (1 c)



Timing belt upper cover



Unscrew the screws and remove the lower timing belt cover
Disconnect the electrical connection of the rpm sensor
Disconnect the connection of 'minimum oil pressure switch



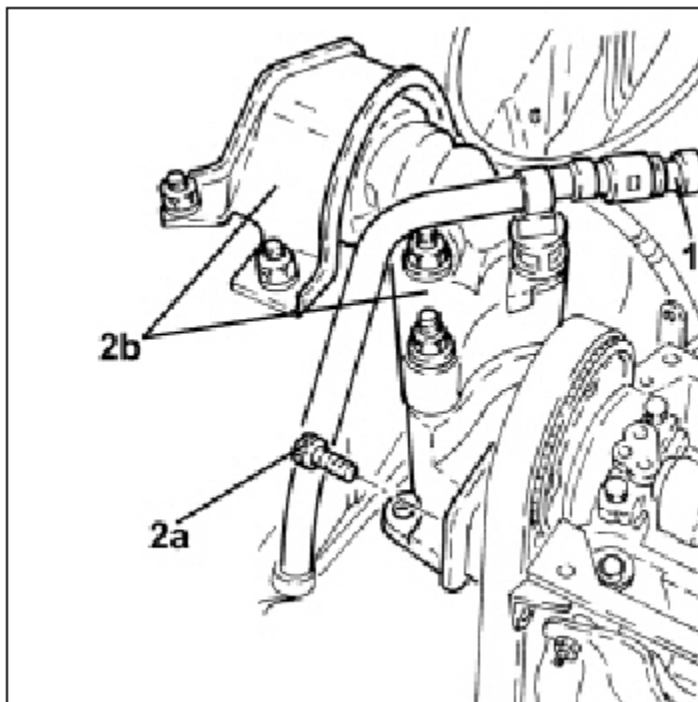
*Lower cover
timing belt*



Disconnect the junction of the intermediate pipe degassing

Place a lift arm under the engine oil sump

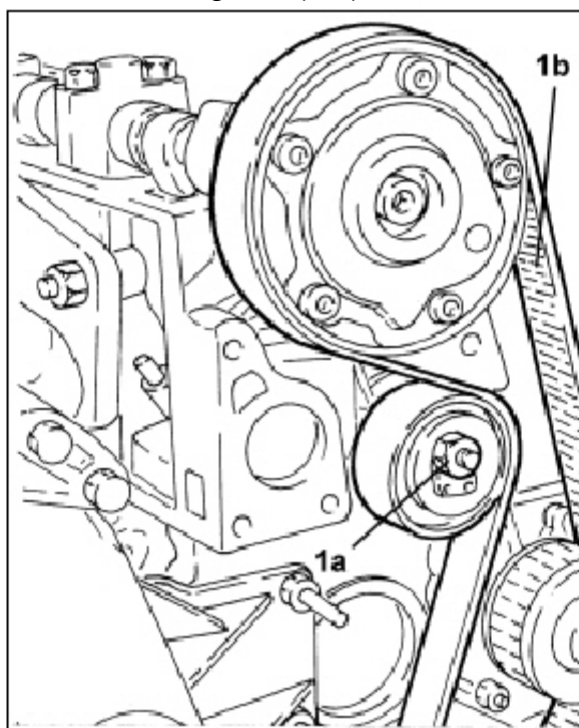
Unscrew the fasteners (2 a) and remove the powerplant system side (2 b)

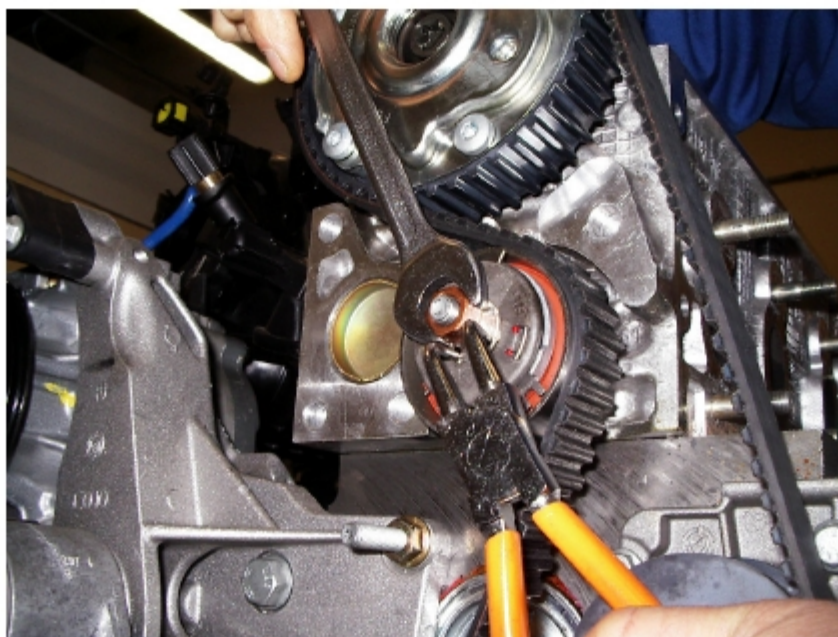




*Support powerplant
distribution side*

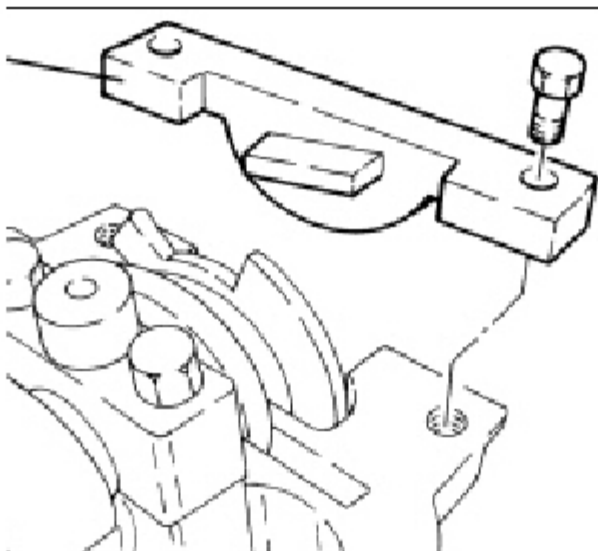
Acting on rails (1 a) and remove the timing belt (1 b)

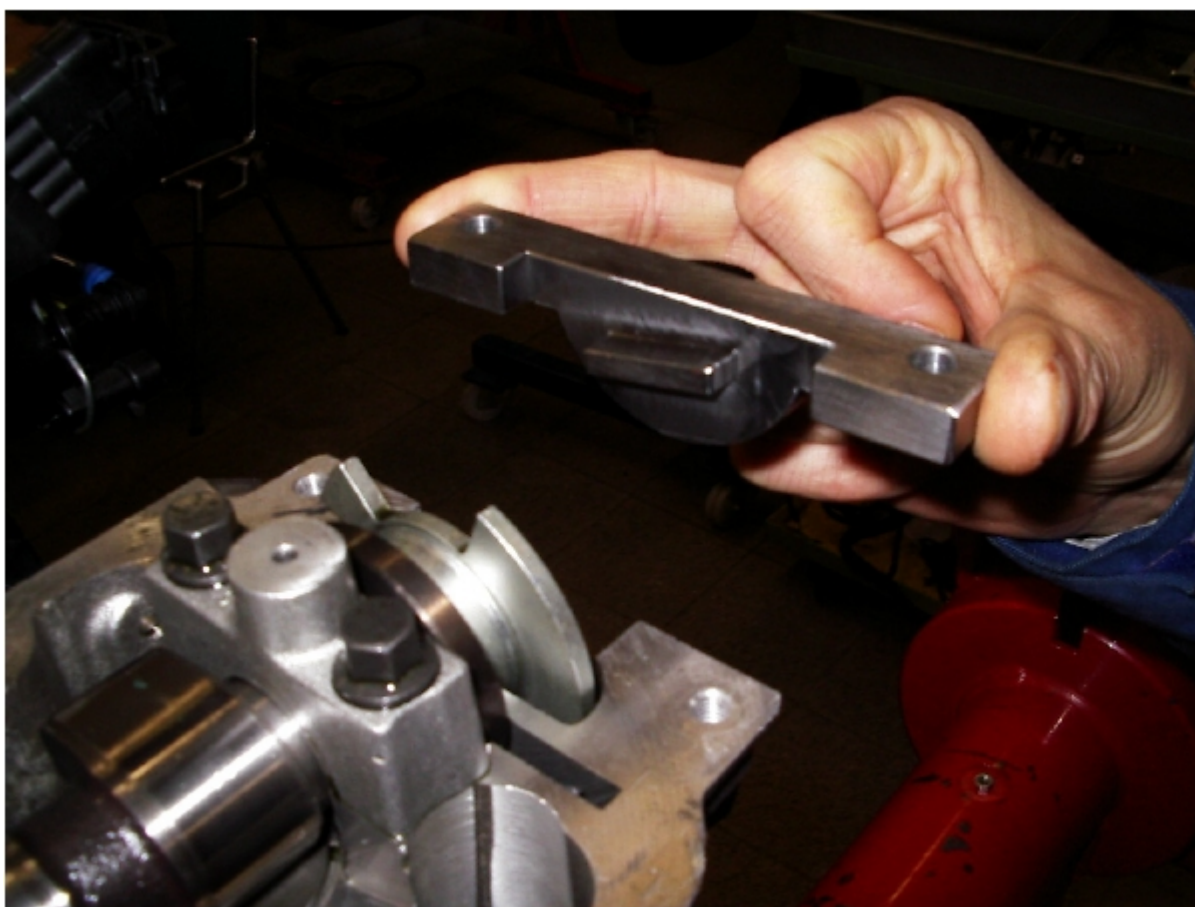




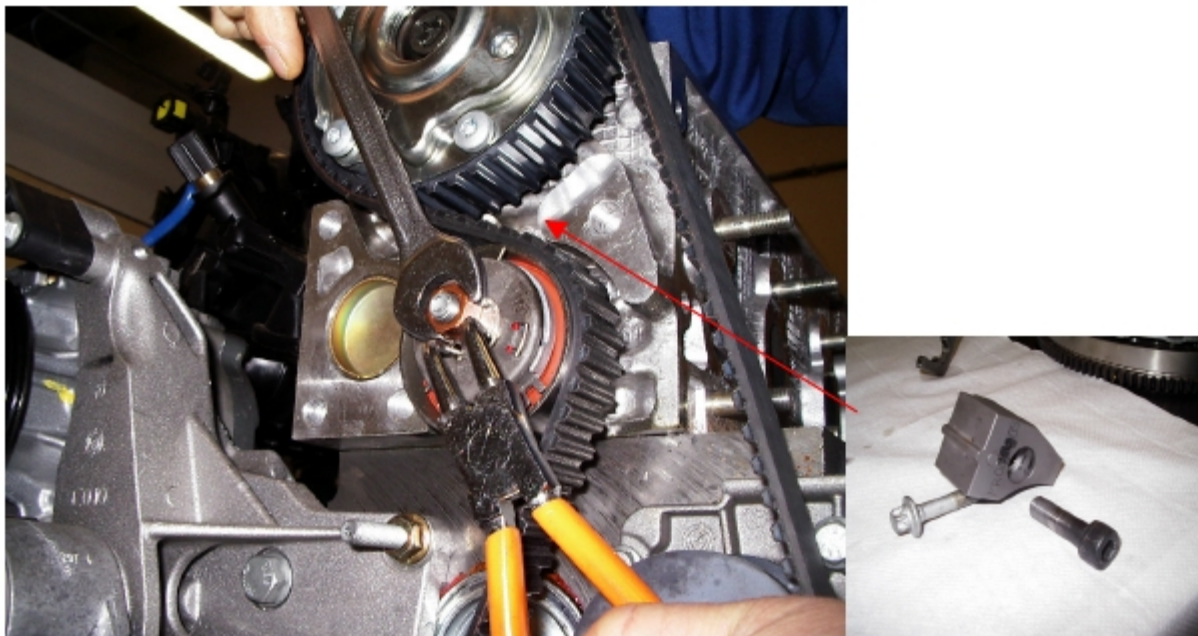
Tensioner Mobile

Mount the template (2000004400) on the rear shank of 'camshaft

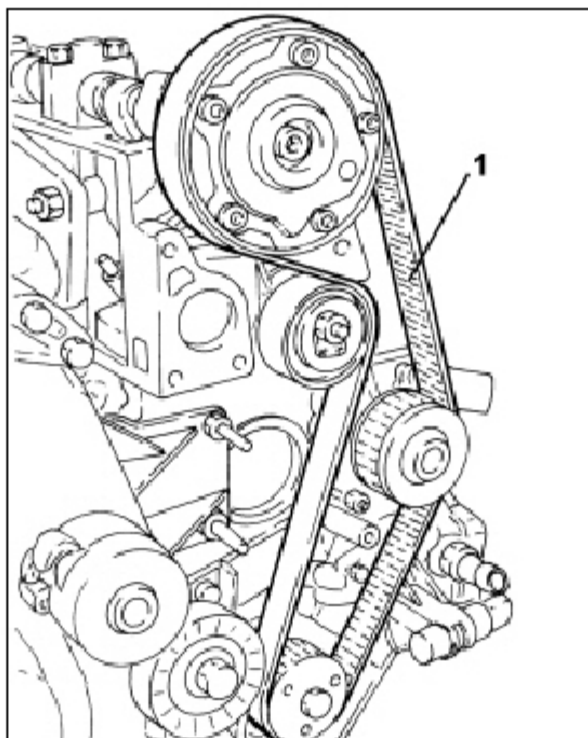




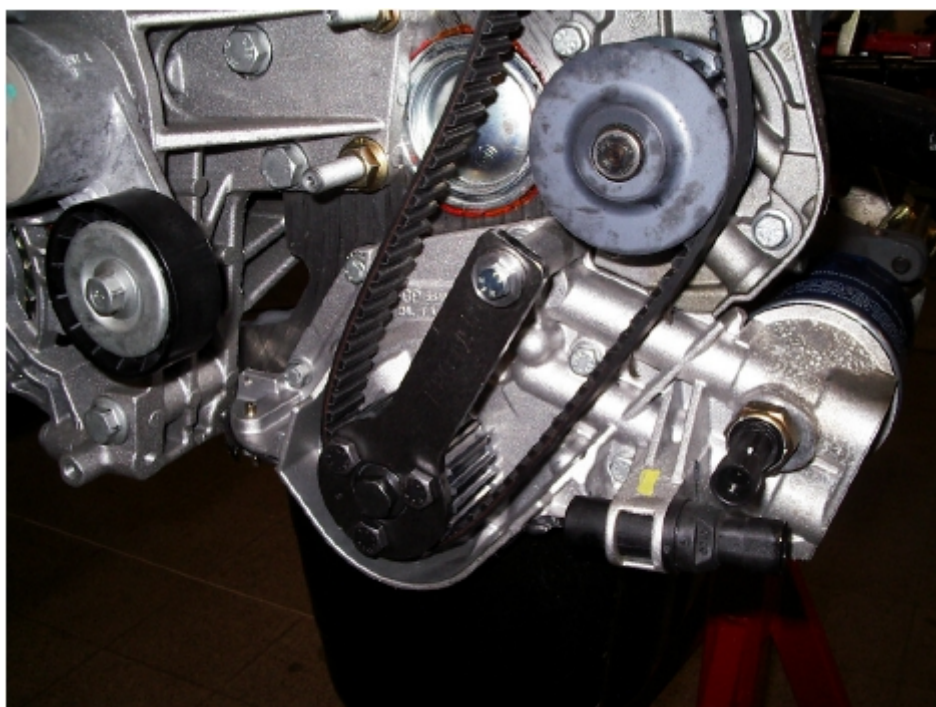
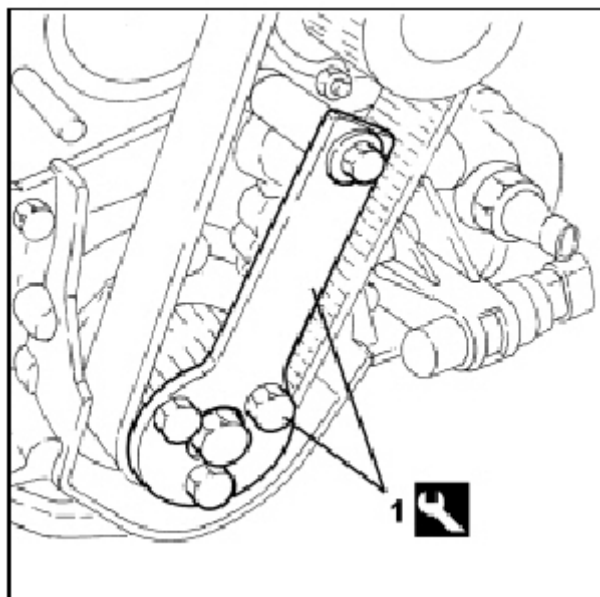
Mount the template that captures the pulley of 'camshaft

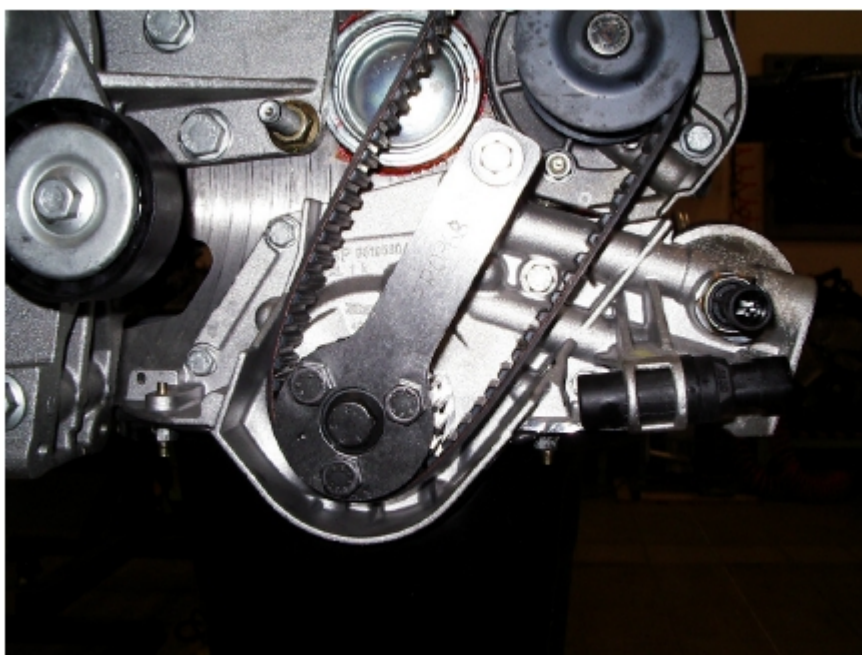


Fit the timing belt

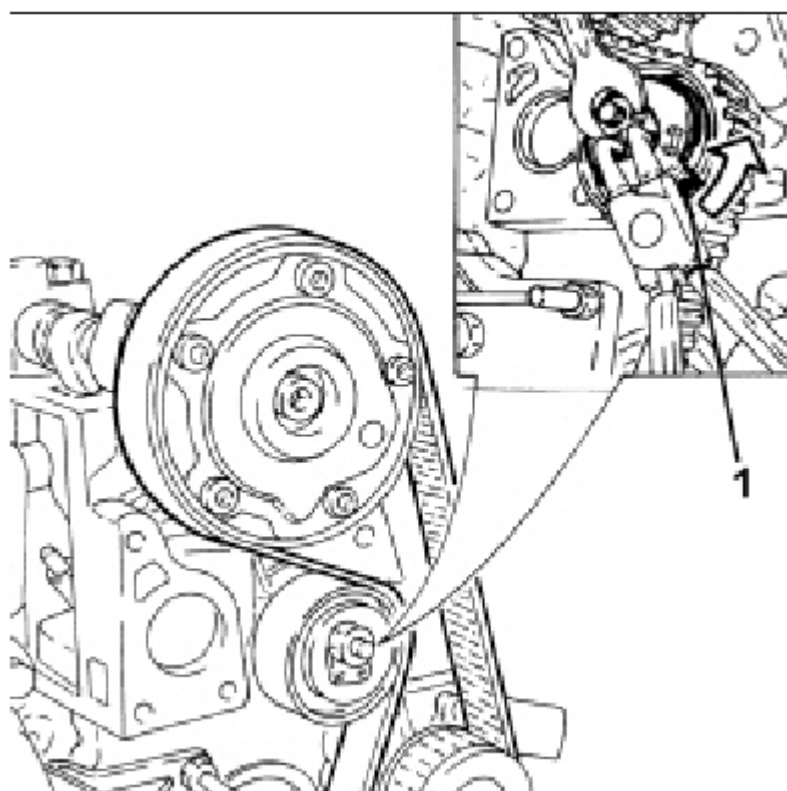


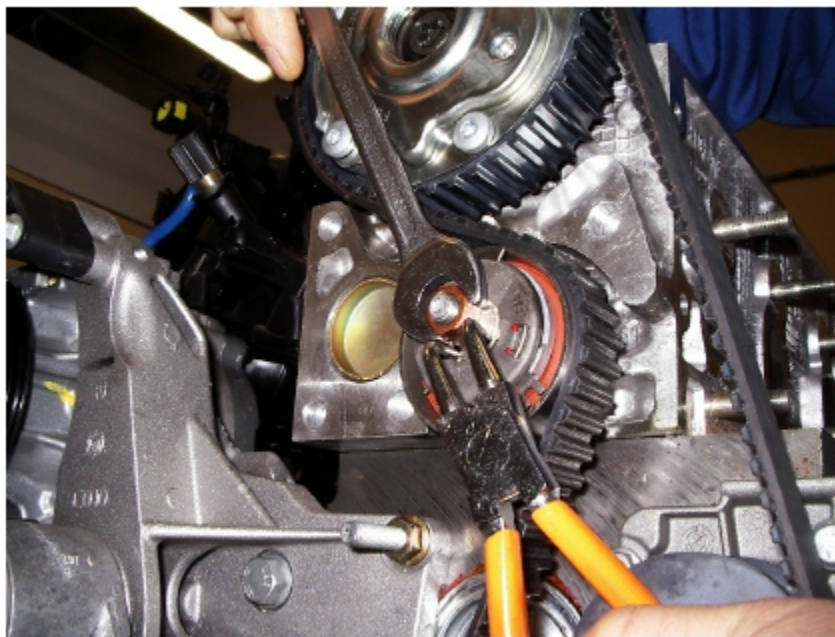
Install the crankshaft timing template (2000004500) on the pulley





Proceed as in the figure to bring into contact the fork of reference of the automatic tensioner





Remove the templates previously mounted and make a couple of engine revolutions to seat the timing belt engine

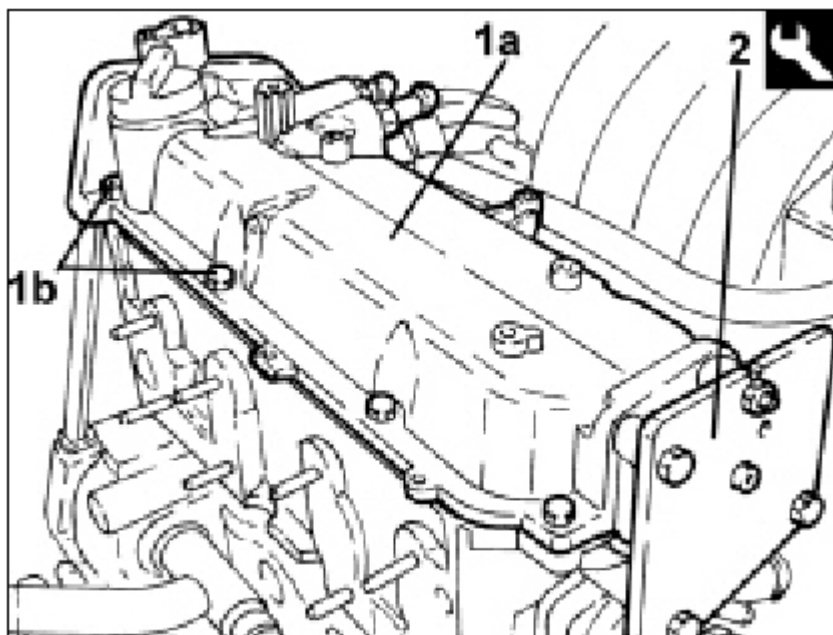
Loosen the nut of the tensioner and turn the front fork until it coincide with the rear fork

Tighten the tensioner mounting as to the specified torque (2.5 ÷ 3.0 bar)

Assemble the templates previously removed to verify the commissioning phase of the motor



Place the valve cover on the head (1 in) and pull the screws (1 b)
Install the 'centering tool valve cover (2000004300)





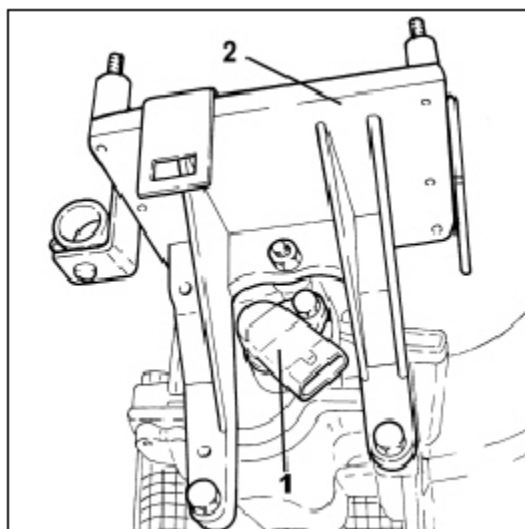
Tighten to torque the bolts on the valve cover previously approached
(0.8 ÷ 1.0 bar)

Remove the 'centering tool mounted above the valve cover

Mount the sensor phase

Mount the engine control unit





Mount the holder powerplant system side and secure with hardware torque prescribed ($5.4 \div 6.6$ bar), and elastic inserts front support ($4.5 \div 5.5$ bar)

Remove the lift arm of the engine oil sump

Connect the junction of the intermediate tube degassing

Connect the electrical connection of the rpm sensor

Connect the electrical connection of the 'minimum oil pressure switch

Mount the bottom cover to protect the timing belt and secure it with its screws

Install the crankshaft pulley and tighten the screws to the specified torque ($2.2 \div 2.7$ bar)

Adjust the belt tensioner and fit the subsidiary bodies

Mount the top cover of the timing belt

Install the ignition coil module and tighten the screws to the specified torque ($0.8 \div 1.0$ bar)

Connect the electrical connection module ignition coils

Connect the electrical connection of the phase sensor

Connect the motor anterior junction

Connect the electrical connection of the lambda sensor upstream of the catalyst

Connect the ground wire from the engine control unit

Connect the electrical connections of the injection unit



List of tools

Type**Dima****Code of
the
particular****Dima**

2000004500

Tool

2000004400

2000004300

Function

Crankshaft timing

Camshaft timing

Centering rocker cover



5 Change M20

5.1 Features

The change M20 / 6 belongs to a new family of transmissions with three axles designed to improving ease of operation and more compact than traditional foreign exchange two axes.

This type of exchange and 'able to sustain and transmit high torque values (230 Nm), it follows the 'pairing with most diesel engines' performance: 1.3 Multijet 16V 90 hp

The main features are:

Excellent handling of the gear linkage.
excellent synchronization.
high torque.
dimensions.

The configuration of the transverse type 3-shaft and differential.

For all the gear teeth are provided HCR (High Contact Ratio).

For all the gears and the final is expected to finishing after heat treatment, to guarantee absolute accuracy of the teeth and then silence.

the box gearing and clutch housing are optimized for lightness, and absorption noise through FEM calculation method (Finite Element Method).

The synchronization on all forward gears and reverse, is of free-ring (Borg-Warner) brass and is disposed on the trees are better than, for 3 and 4 ^ ^ speed and reverse, lower for 1 ^, 2 ^, 5 th and 6 th speed.

On 1st / 2nd speed gears used more and more stressed in use customer, the synchronizer is achieved triple cone, while on 3 and 4 ^ ^ is the double-cone synchronizer for this and



ensure efforts in graft significantly reduced compared to a synchronizer traditional size of single cone

The new control system that offers the internal gear 4 selection plans, with Central positioning of the gear bearings, gives the advantage of having a low hysteresis, consequently reducing the burden of gear selection.

The lubrication of the gearing and of the mechanisms inside the gearbox is made dynamically, using oil flows channeled through holes on the boxes, and trees;

This allows better performance in the transmission of torque and greater efficiency to the effects wear / maneuverability even at low temperatures through the use of multigrade oil.

5.2 Components

5.2.1 Synchronization

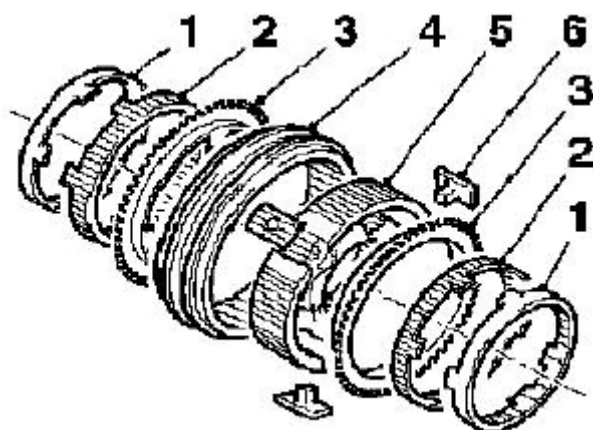
In exchange M32-6 is used to synchronize perfected already mounted in the gearbox Manual F40. The slides and springs synchronization hitherto used are no longer used and have been replaced by blocks of thrust. Even for the individual gears are used precise timings. We use two-and three-cone synchronizations. The following shows the timings used for the respective gears.

1 st / 2 nd gear

For these two gears is used to synchronize to three cones.

1. Inner synchronizer ring
2. Intermediate ring
3. Synchronizer ring
4. Sleeve coupling
5. Synchronizer hub
6. Anchors thrust

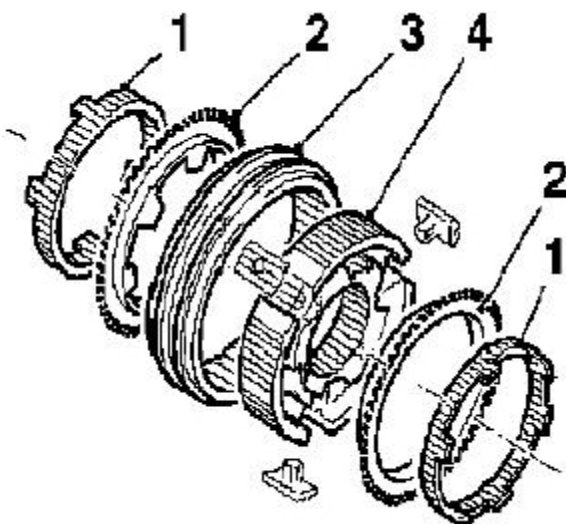




3 rd / 4 th march

For these two gears is used to synchronize the two cones

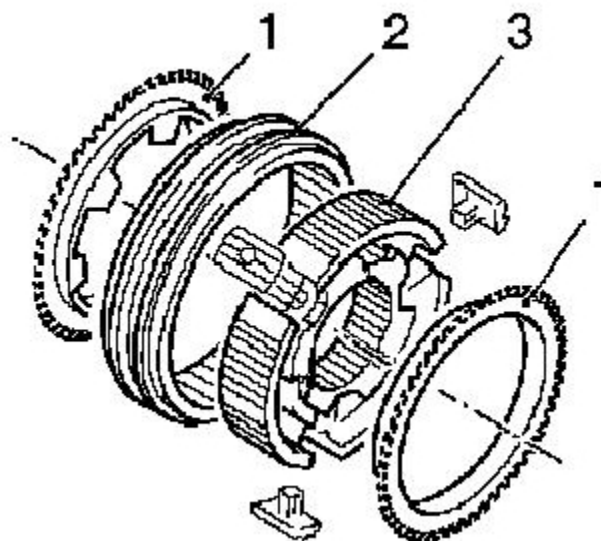
1. Intermediate ring
2. Synchronizing ring
3. Sleeve coupling
4. Synchronizer hub



5 th / 6 th gear

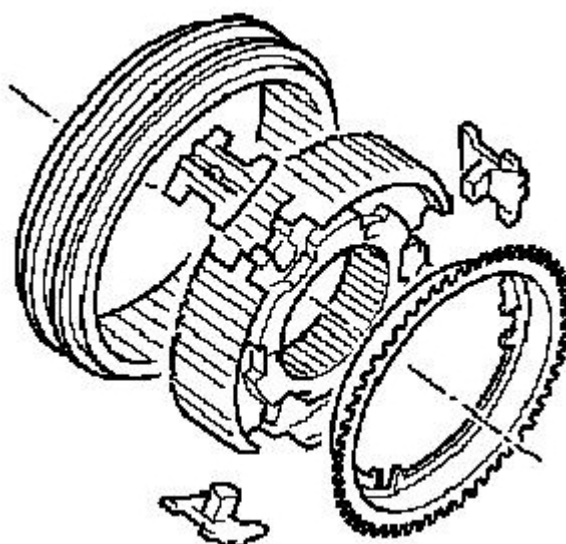
For these two gears is used to synchronize to a single cone

1. Synchronizing ring
2. Sleeve coupling
3. Synchronizer hub

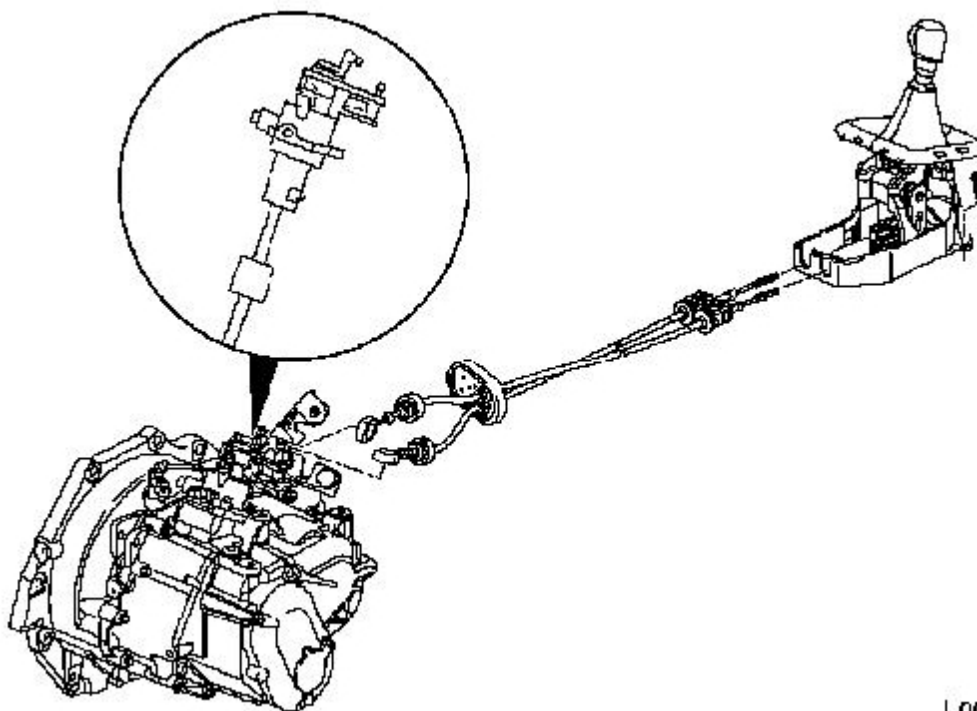


Reverse

The reverse also receives a synchronization to a single cone as the 5 th / 6 th gear.



5.2.2 Command

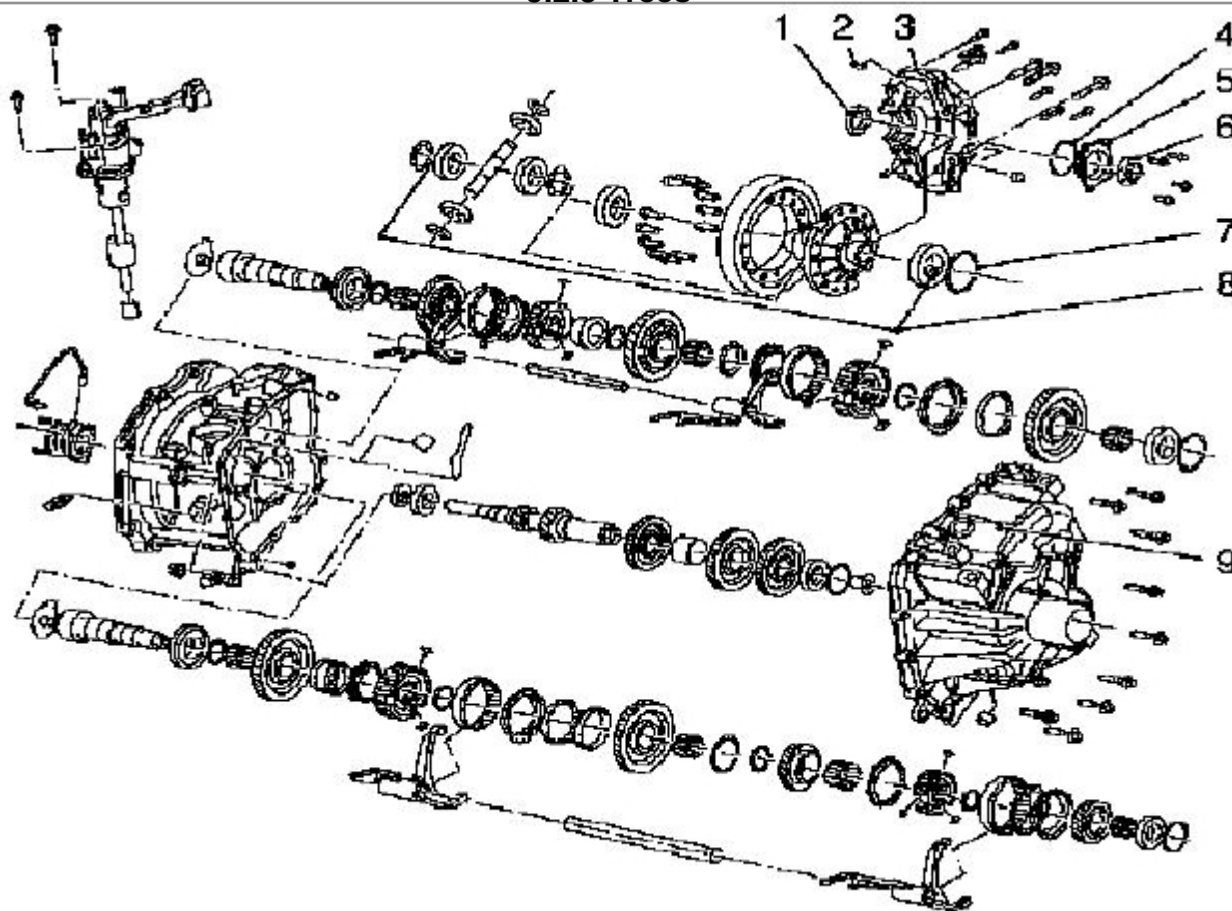


L0009679

The manual transmission M20-6 receives a tie rod. The individual gears are selected through the central control unit.

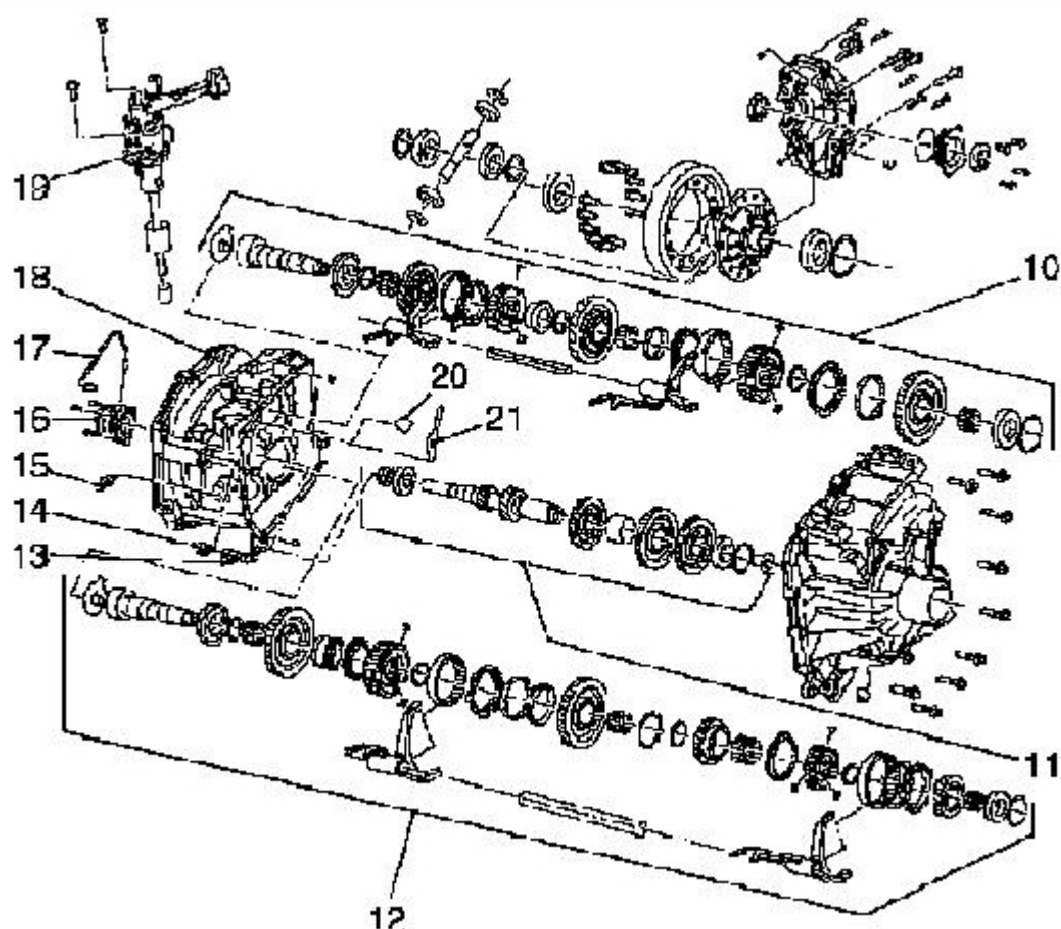


5.2.3 Trees

*Total*

1. The axle shaft seal
2. Guide bushing of the differential case
3. The differential case
4. Sealing flange of the sealing ring of the axle shaft
5. Sealing flange of the sealing ring of the axle shaft
6. The axle shaft seal
7. Differential
8. Differential unit
9. Gearbox

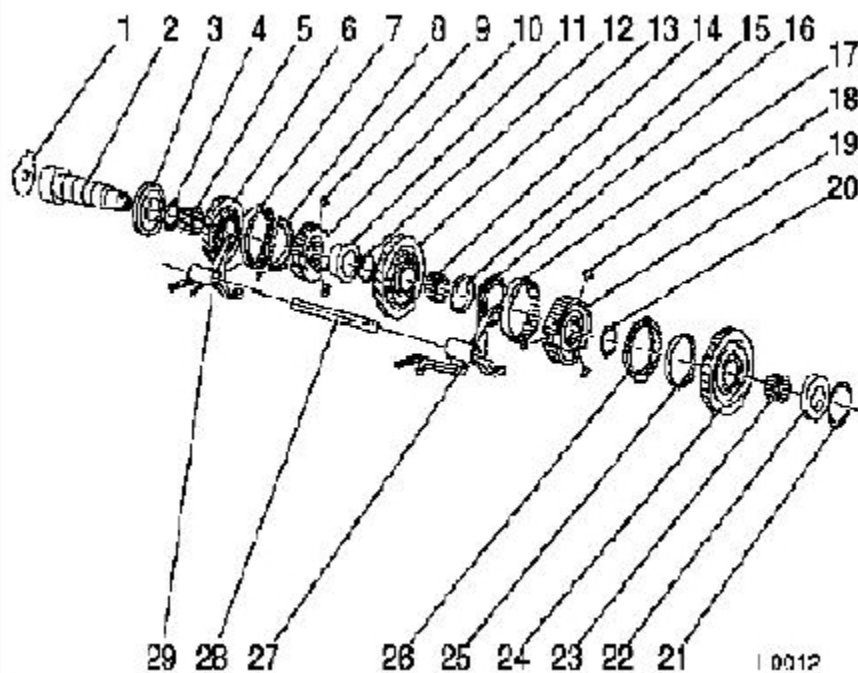




Total

- 10. Group of primary upper
- 11. Group of the tree of direct
- 12. Shaft lower primary
- 13. Vent fitting clutch
- 14. Compass mounting
- 15. Switch reversing lamps
- 16. Disengaging the central
- 17. Pipe pressure
- 18. Clutch housing
- 19. Group shift
- 20. Magnet





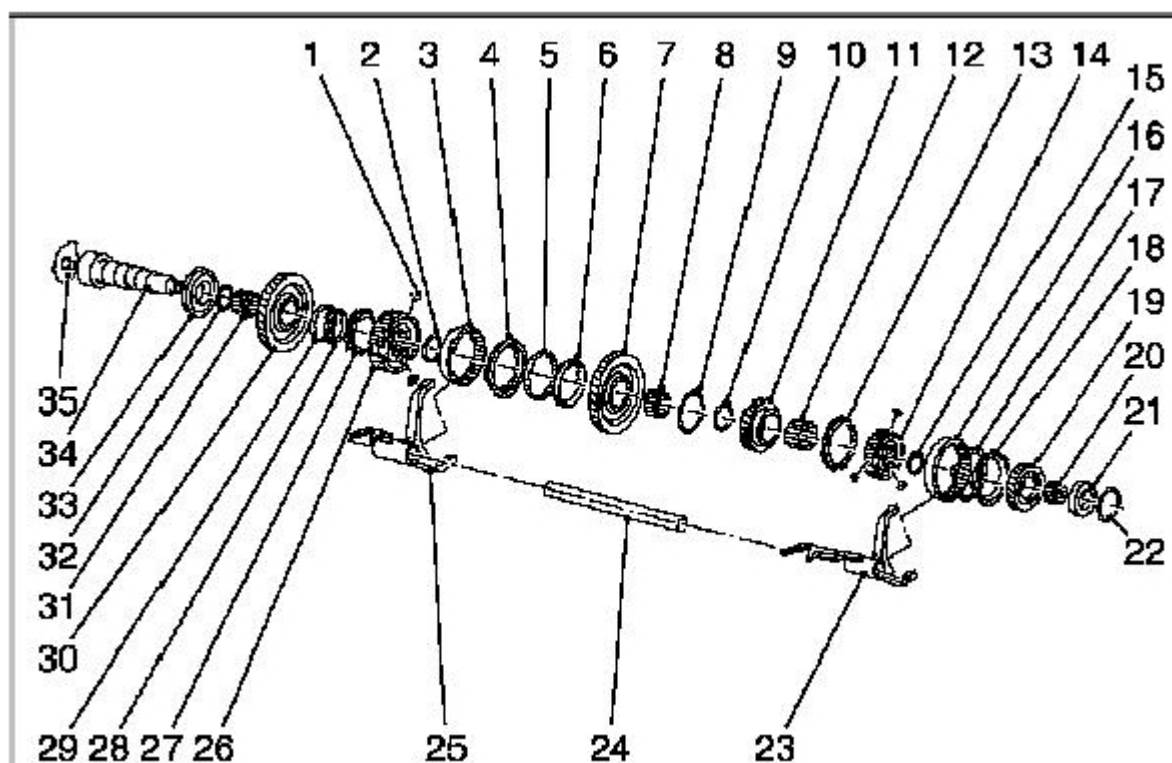
available components of the primary upper

1. Oil recovery pipe
2. Upper shaft
3. Needle bearing upper shaft
4. Circlip
5. Needle roller bearings, reverse
6. Reverse Gear (led)
7. Sleeve reverse engagement
8. Reverse gear synchronizer ring
9. Pressure Piece
10. Synchronizer hub
11. Spacer sleeve
12. Circlip
13. Gear 3 rd gear (duct)
14. Needle bearing gear 3rd gear
15. Intermediate ring



- 16. Synchronizing ring
- 17. Coupling sleeve 3 ° / 4 ° run
- 18. Tassello thrust
- 19. Synchronizer hub
- 20. Circlip
- 21. Differential
- 22. Roller bearing shaft
- 23. Needle bearing gear 4th gear
- 24. Gear 4 th march
- 25. Intermediate ring
- 26. Synchronizing ring
- 27. Fork clutch 3 rd / 4 th march
- 28. Pin of the shift lever
- 29. Fork of reverse engagement





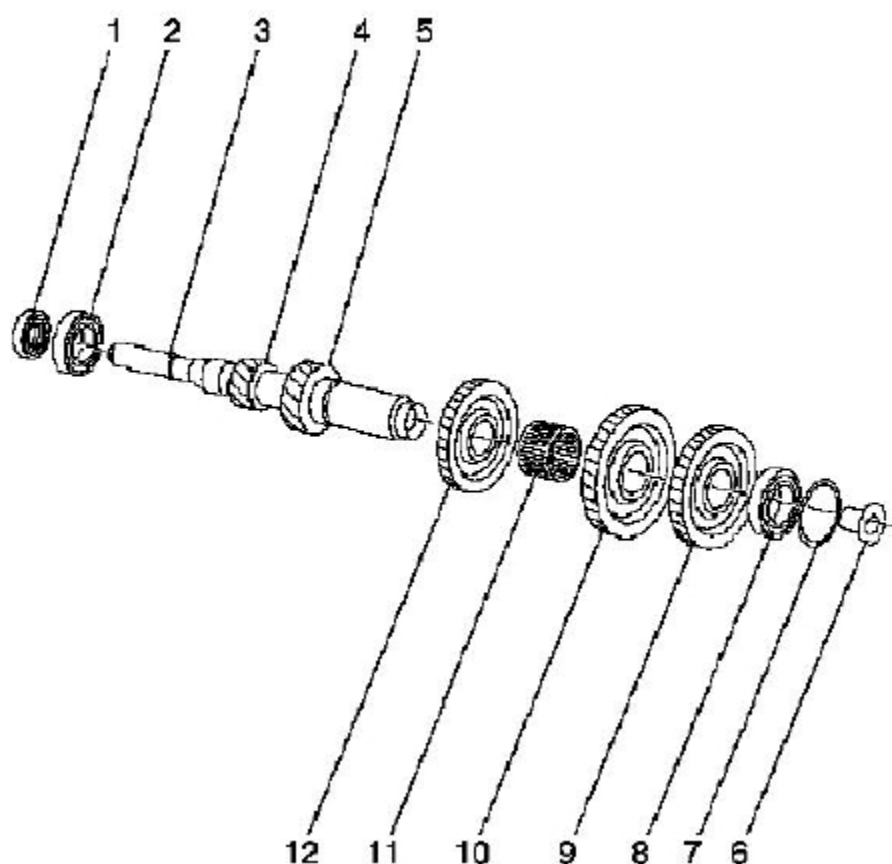
available components of the primary lower

1. Pressure Piece
2. Circlip
3. Coupling sleeve 1 st / 2 nd gear
4. Synchronizer ring
5. Synchronizer ring
6. Inner synchronizer ring
7. Gear 2nd gear (duct)
8. Needle bearing gear 2nd gear
9. Ring closure
10. Thrust Washer
11. Gear 5 th gear (duct)
12. Needle bearing gear 2nd gear
13. Synchronizing ring
14. Pressure Piece
15. Synchronizer hub



16. Circlip
17. Coupling sleeve 5 th / 6 th gear
18. Synchronizing ring
19. Gear 6 th gear (duct)
20. Needle roller bearings 6 th march
21. Roller bearing shaft
22. Differential
23. Fork graft 5 th / 6 th gear
24. Pin of the shift lever
25. Fork graft 1^a / 2^a gear
26. Synchronizer hub
27. Synchronizer ring
28. Intermediate ring
29. Inner synchronizer ring
30. Gear 1st gear (duct)
31. Needle bearing gearing 1st gear
32. Circlip
33. Roller bearing shaft
34. Main shaft
35. Oil recovery pipe



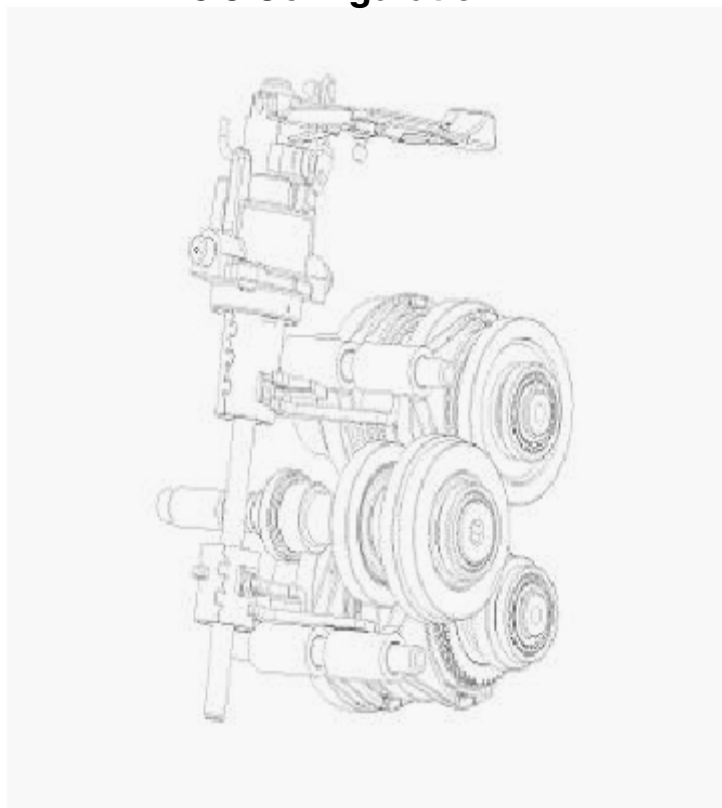


provision of direct drive shaft components

1. Shaft seal of direct
2. Needle roller bearings
3. Tree of direct
4. Gear 1st gear (engine)
5. Gear 2nd gear (engine)
6. Screw the shaft of the direct
7. Differential
8. Direct bearing of the
9. Gear 6 first gear (engine)
10. Gear 4 th gear (engine)
11. Spacer sleeve
12. Gear 3 rd / 5 th march



5.3 Configuration



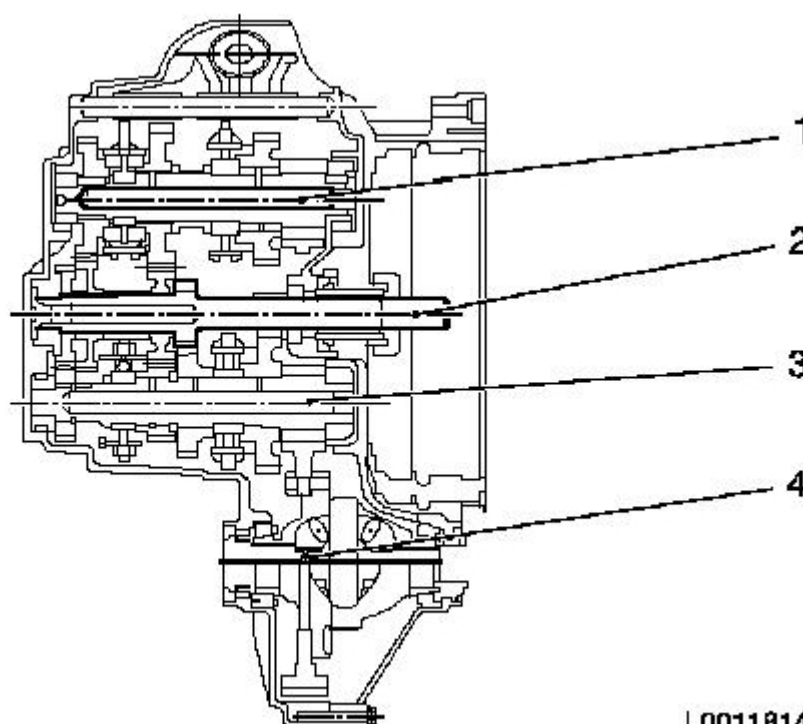
3 transverse shafts supported on ball bearings

6 forward + reverse

Torque Range 230 Nm

Overall length (from flywheel) = 332mm





L0011814

Arrangement of trees

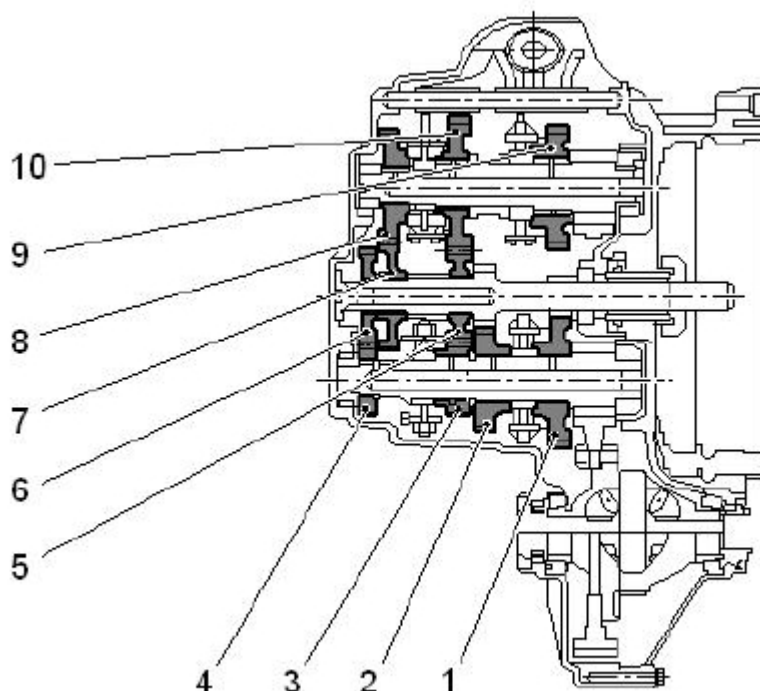
The following image shows the section according to the provision of the trees principle of the 3 trees in exchange M20/6marce

- 1. Upper shaft
- 3. Shaft bottom
- 2. Tree of direct
- 4. Differential

In this exchange are used tapered roller bearings angular contact for all trees. These bearings require a certain play of the bearing and a bearing preload. In production play and preload the bearings must be obtained by using washers compensation in oblique tapered roller bearings in the gearbox.



5.4 Disposition of gear shifting



available for shifting gears on their tree.

1. Gear 1st gear
2. Gear 2nd gear
3. Gear 5 th march
4. Gear 6 first gear
5. Type 3 rd / 5 th march
6. Gear 6 first gear
7. Gear 4 th march
8. Gear 4 th march
9. Reverse Gear
10. Type 3 first gear

A particular advantage of this change to 3 trees is that the gear of the 3rd gear the shaft of the direct drive is also used for the 5th gear.



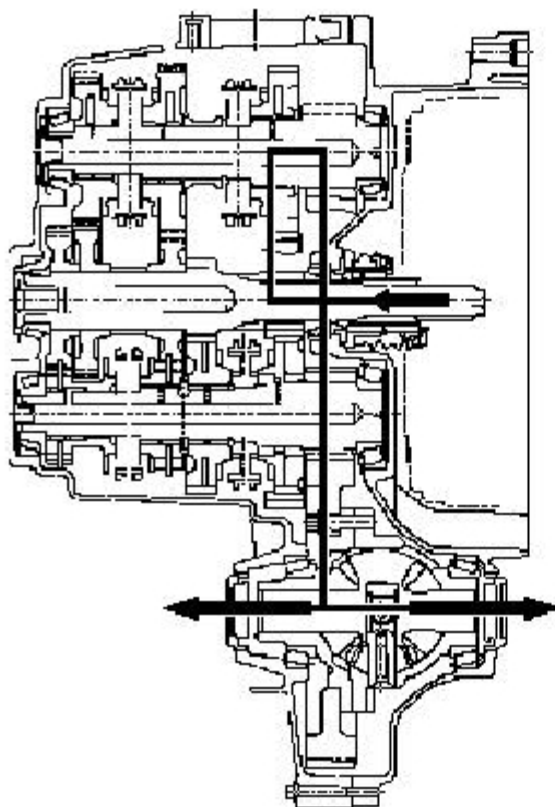
5.5 Path of the individual kinematic relations







Reverse



6 Brakes

6.1 Description

The braking system used on New Point, in its most complete, includes:

ABS: Anti-lock braking system;

EBD: Braking distributor electronic between front and rear wheels;

ESP: Electronic stability control car (on request);

ASR: Traction control

MSR: Wheel anti-lock function in case of excessive engine braking

Hill-holder (ESP): allows automatic stopping and restarting of roads slope without using the handbrake.

HBA: Assist in emergency braking.

The braking system is hydraulic power-assisted, consisting of 2 independent circuits cross (each circuit acts on a front wheel and the rear diagonally opposite) to guarantee braking and stability even in case of failure of a circuit.

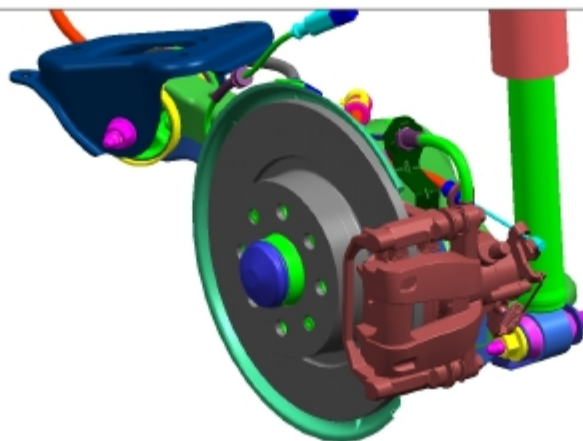
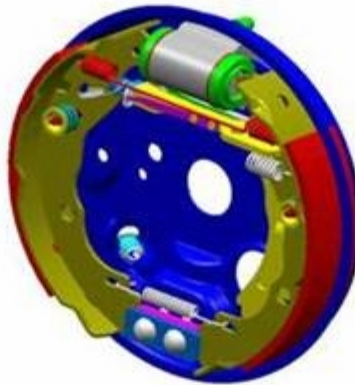


Rear disc

347/534

*Ve
ntil
ate
d
fron
t
dis
c*

*R
e
a
r
d
r
u
m*



The braking system, for the differences in weight and installed power of the different engines, has led to the following differences:

1.2 8v engine:

solid front disc of diameter 257 x 12 mm

ZOH Bosch brake calipers with piston diameter 54 mm

surface of the brake pads: 43 cm²

rear drum with a diameter of 203 mm

1.4 8v engines, 70hp and 1.3jtd:

ventilated front disc diameter 257 x 22 mm

ZOH Bosch brake calipers with piston diameter 54 mm

surface of the brake pads: 43 cm²

Rear drum diameter 228 mm



Engine 1.3jtd 90cv:

ventilated front disc diameter 284 x 22 mm

ZOH Bosch brake calipers with piston diameter 54 mm

surface of the brake pads: 52 cm²

Rear drum diameter 228 mm

120 bhp 1.9 JTD Engine:

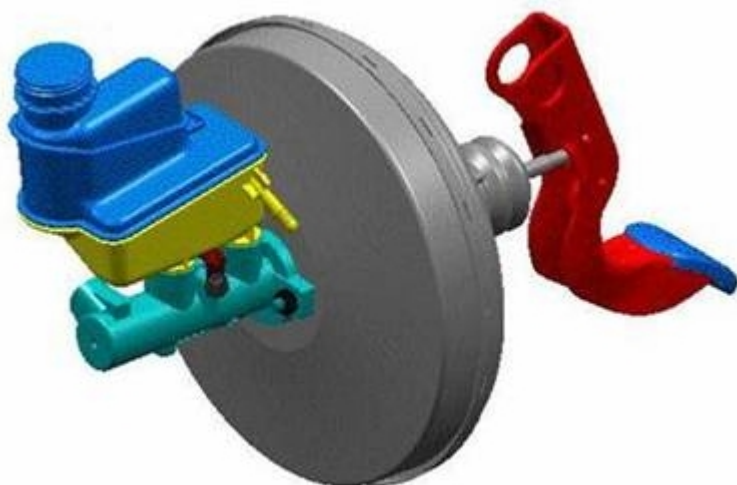
ventilated front disc diameter 284 x 22 mm

ZOH Bosch brake calipers with piston diameter 54 mm

surface of the brake pads: 52 cm²

264x11 solid disc brake caliper BIR Woods III

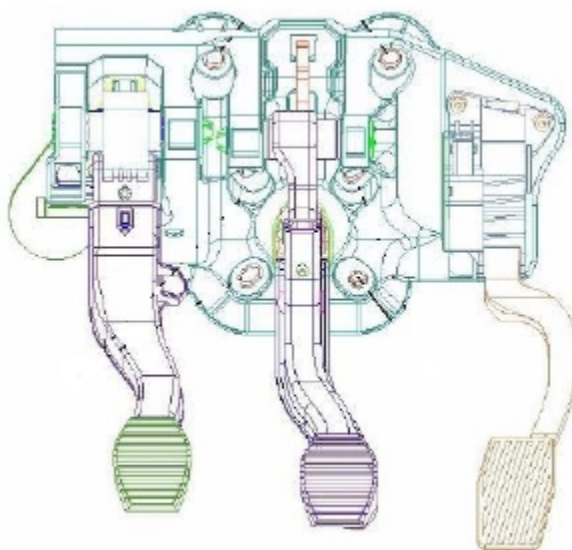
6.2 Thruster



New point of a servo is used by 10", pump 15/16" tank.



6.3 Foot



For New Point was adopted with a pedal support in plastic material, which houses the brake pedal, clutch and accelerator pedal. The accelerator and clutch pedals are plastic.

The pedal has a device that allows the brake pedal to collapse in case of impact, limiting the minimum intrusion into the passenger compartment and any leg injuries.

In the event of a release is necessary to replace the pedal.





The pedal board is composed of the following components:

support pedals made of plastic material

accelerator pedal in plastic material, with potentiometer

brake pedal metallic material

clutch pedal plastic



6.4 ABS system

New Punto comes standard on all versions Bosch 8.0 ABS anti-lock system, EBD (Electronic Brake force Distribution) integrated, which adjusts the braking so prevent locking of the rear wheels, guaranteeing in any condition the proper distribution braking action on the axes.

The Bosch 8.0 ABS system is among the most advanced systems available today. The system consists the following components: an electro-hydraulic control unit with 12 valves, 4 active sensors and 4 channels with offset (or distributor) braking.

The specific characteristics in terms of active safety are:

guarantee to each wheel close to locking, compatibly with the adhesion available, the highest possible braking

safeguard in extreme situations, close to locking wheels, full control of the car maximum responsiveness

ability to automatically adapt to different operating conditions

weight of the unit

Active sensors have the function to detect the speed to the wheels.

The fundamental characteristic of the active sensors is that the signal is processed directly from the sensor.

With the ability to detect very low speeds (2.7 km / h), the active sensors increase the accuracy of the systems on-board navigation.

The information gathered by the sensors of the ABS assets are also used to update, through the satellite location system GPS, (Global Position System), the position car on the maps stored in memory: it is therefore essential to the continued information, even at low speeds, on the path of the car to calculate the exact position of the vehicle.



**6.4.1
Schem
atic
ABS**

Sens ABS post. Left

Sens ABS
post. dx

Sens ABS front. Left

S
e
n
s
A
B
S
f
r
o
n
t
.
d
x

CVM

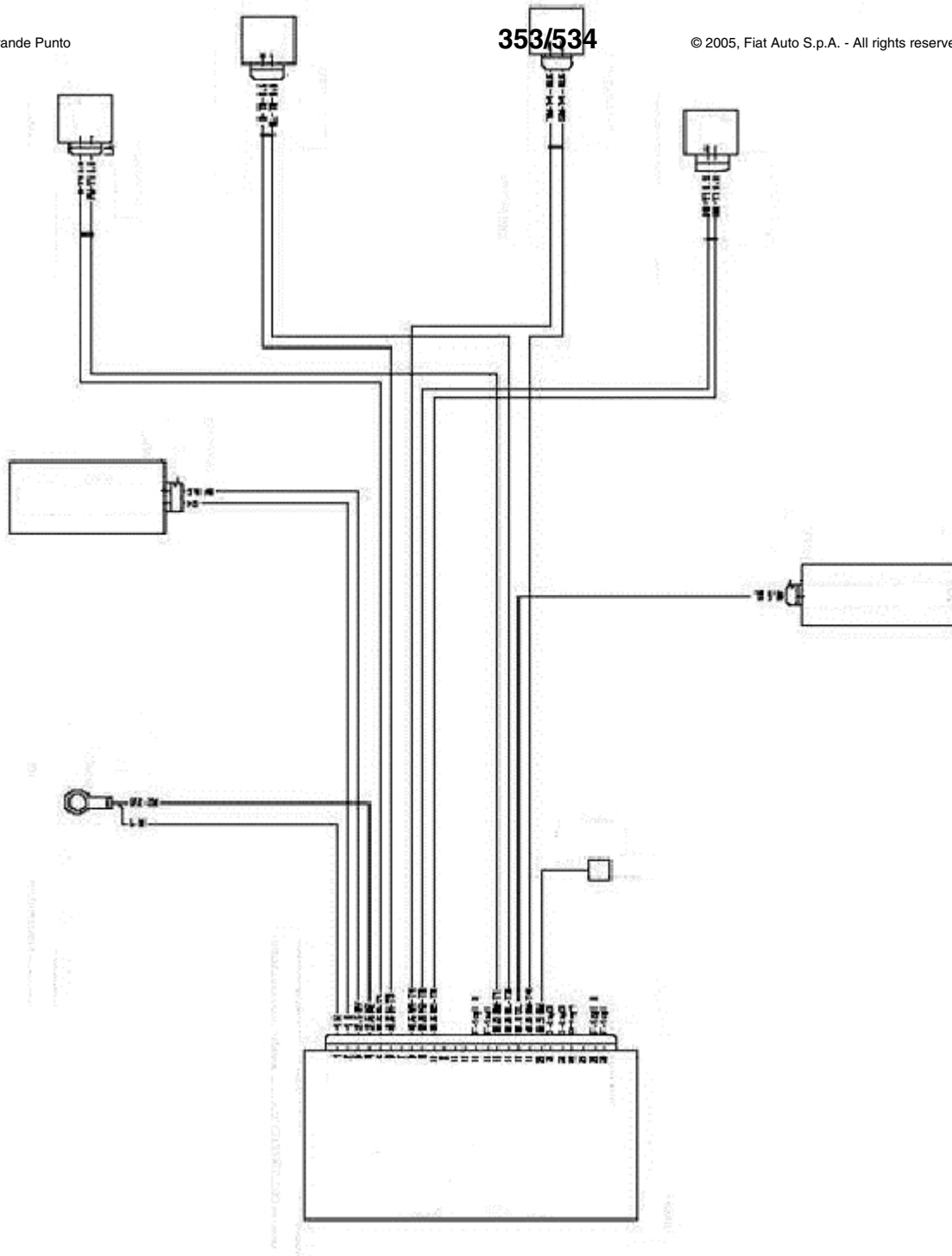
BCM

Mass

Fiat Grande Punto

353/534

© 2005, Fiat Auto S.p.A. - All rights reserved

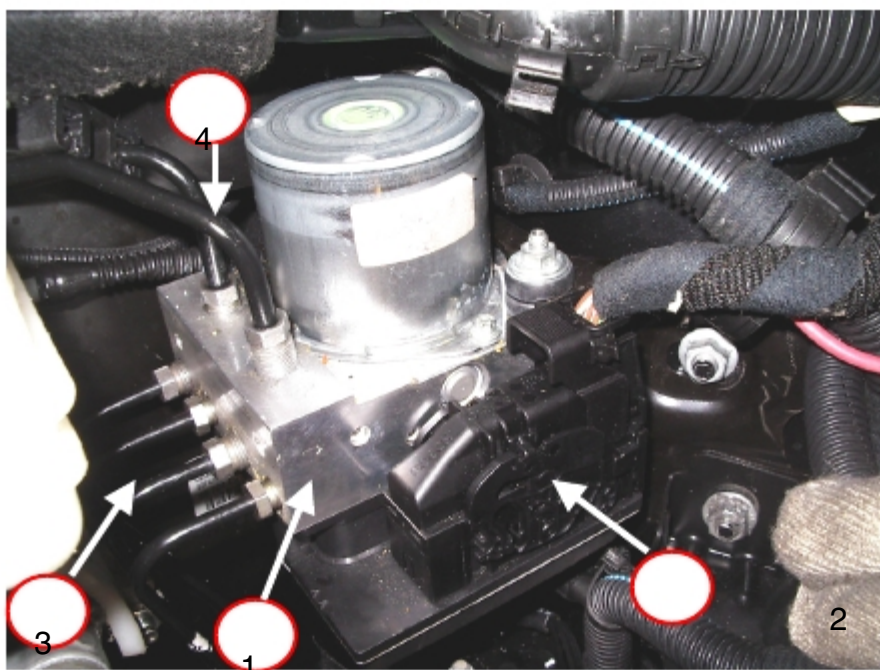


Pin-ou centralinat ABS



6.4.2 Hydraulic ABS

The electrohydraulic ABS (1) is connected to the pump to the brake calipers and through the pipes of the braking system and, together with the electronic control unit (2), forms the group Electrohydraulic control. The group, mounted in a vertical position, presents on the side 4 fittings (3): 2 for the front and two tubes for the rear. Also on the upper part (4) has two pipes coming from the master cylinder.



ABS hydraulic unit



6.5 E.S.P.

The ESP, or Electronic Stability Program is an active safety system for the control of the vehicle in dynamic maneuvers which intervenes in emergency conditions. It is designed to correct the trajectory of the car in case of abrupt maneuvers often unintended increasing, especially on slippery surfaces, active safety. The ESP reacts, in fact, quickly to both the oversteer to understeer of the vehicle and is arranged to return the vehicle in conditions of stability allowing the driver to maintain full control of the vehicle.

The system continuously monitors the state of motion of the vehicle (acceleration lateral, longitudinal and angular speed, adhesion to the ground) and the settings of the driver (Steering wheel angle, accelerator pedal). If he considers that the car is next to a condition of instability (skidding, understeer, oversteer, etc..), corrects the motion of the vehicle by the control of drive torque and braking torque by applying a suitable separately on each of the four wheels.

The direction control is done by exploiting the longitudinal grip of the tire: the different braking between the two sides of the car generates a pair of straightening (Yawing) that stabilizes the car.

The management of the ESP function is entrusted to the ABS control unit that, by processing the values of quantities acquired from the various sensors (lateral acceleration, yaw rate sensor, sensor steering angle, wheel speed sensors and pressure sensors), by means of algorithms implemented in the software, monitors the parameters of the dynamic control (slip of the wheels, drifts of axles, trim angle) and interprets any errors committed by the driver carrying appropriate interventions in order to bring the car back under stable conditions.

The plant consists of the following components:

4 wheel speed sensors installed in special locations on the front and rear uprights

A lateral acceleration sensor and yaw contained in a single device mounted on the central tunnel;

1 electrohydraulic unit mounted in its holder in the engine compartment;



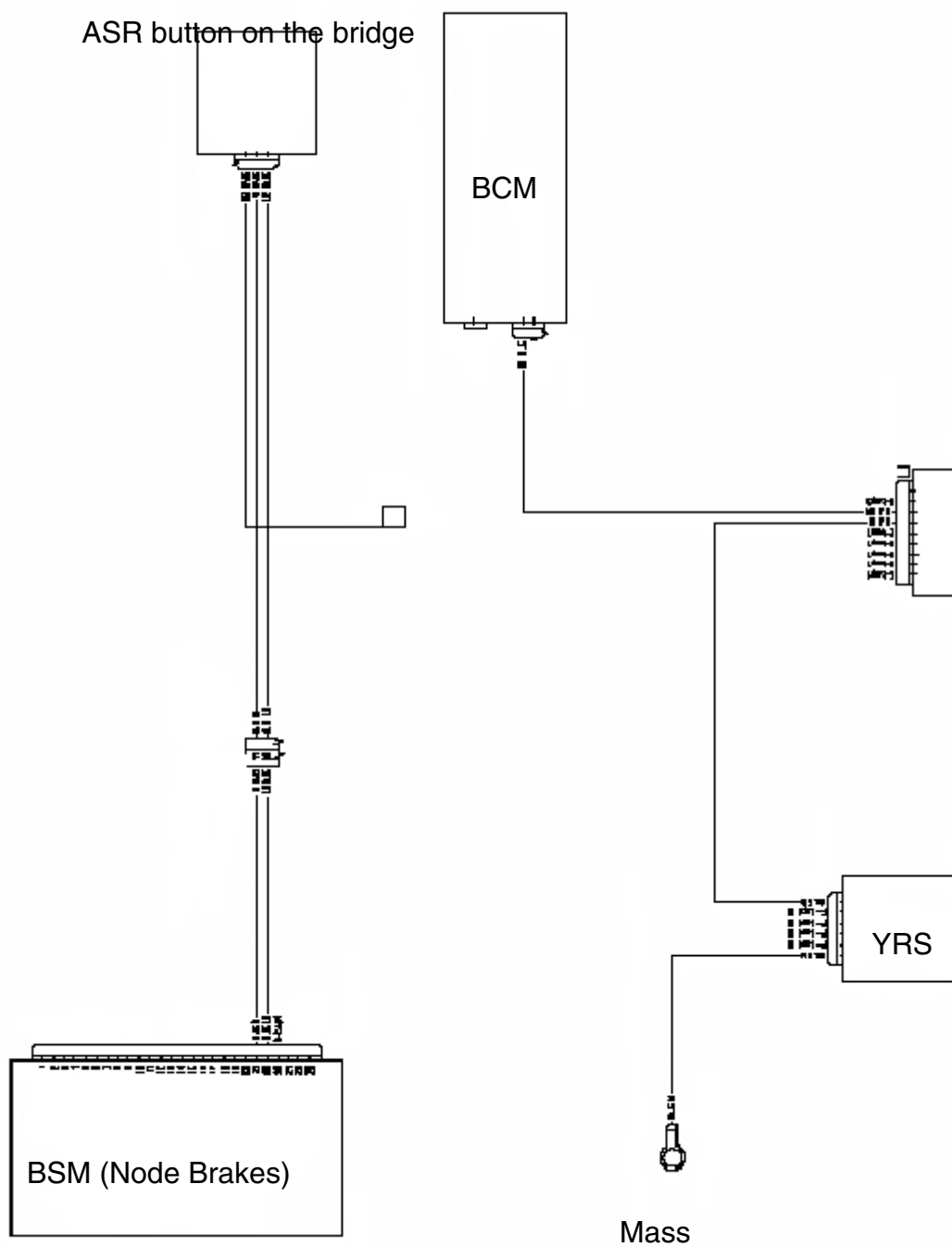
1 switch on the brake pedal;
an ON / OFF button to switch off the ASR, mounted on the dashboard;
1 steering angle sensor integrated in the steering column;
1 longitudinal acceleration sensor (**YRS**) integrated in the yaw rate sensor (only with opt Hill Holder)

Besides the sensors mentioned above and of course the control unit, the system interfaces with:
High-speed CAN line (interview with ABS controller engine / automatic transmission control unit);
power unit (pump brake specific);
motorized throttle body (petrol versions; interview with ASR);
panel (active warning lights);
steering angle sensor mounted on the steering column;
yaw sensors allocated on the floor in the central area the center console (for lateral acceleration and tilt sensing vehicle);
specific unit installed in the engine compartment.

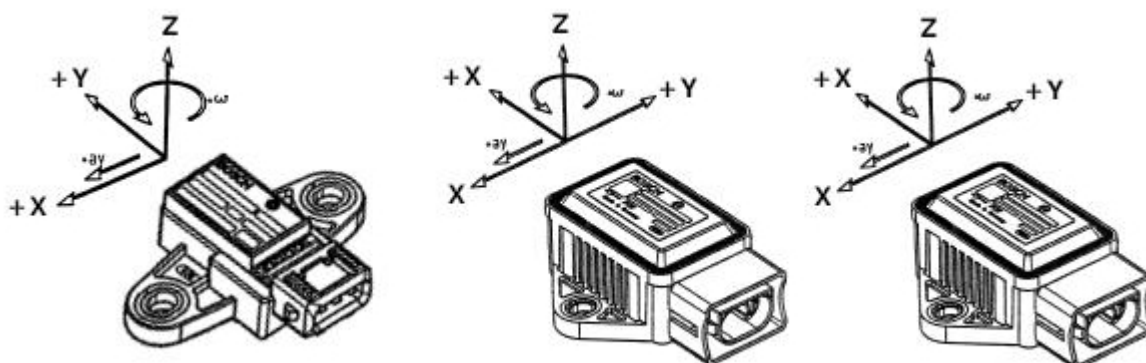
The E. Sp is activated automatically when the car and can not be deactivated.



6.5.1 Schematic ESP



6.5.2 YRS (Yaw Rate Sensor)



The YRS is mounted with the arrow stamped on the casing facing the direction of travel and with the connector facing the rear of the car.

This node integrates in a single component sensors yaw rate, acceleration longitudinal and lateral acceleration.



6.5.3 A.S.R. (Anti Slip Regulator)

It is a function of traction control of the car that is automatically activated in the event of slippage of one or both driving wheels. This feature is only available with ESP.

Depending on the condition of slip, are activated two different control systems:

If the shift affects both drive wheels, ASR intervenes by reducing power transmitted by the engine;

if it concerns only a slip of the drive wheels, automatic braking intervenes the wheel that slips.

The action of the ASR system is particularly useful in the following conditions:

shift in the curve of the inner wheel, due to dynamic load changes or excessive speeding;

excessive power transmitted to the wheels, also in relation to road conditions;

accelerating on slippery, snowy or icy;

loss of grip on wet roads.

Arming / Disarming A.S.R.

The ASR is automatically inserted at each starting of the engine.

While driving, you can disconnect and then re-insert the ASR by pressing a switch located between the controls on the dashboard.





Traveling on snow, with snow chains, may be useful to disconnect ASR: in these conditions in fact slippage of the driving wheels during take-off allows gain greater traction.

For the correct operation of the ASR system it is essential that the tires are of the same type on all wheels in perfect condition and especially the type, brand and size prescribed.

6.5.4 M.S.R

It is a function, an integral part of the ASR, which intervenes in case of sudden escalation, restoring torque to the engine. In this way avoids excessive drag on the drive wheels which, especially in poor traction conditions, can cause loss of adhesion of car.

6.5.5 Hill Holder

In conjunction with ESP, also comes the "hill-holder". It supports driver when starting on a slope. The function, in fact, by combining information

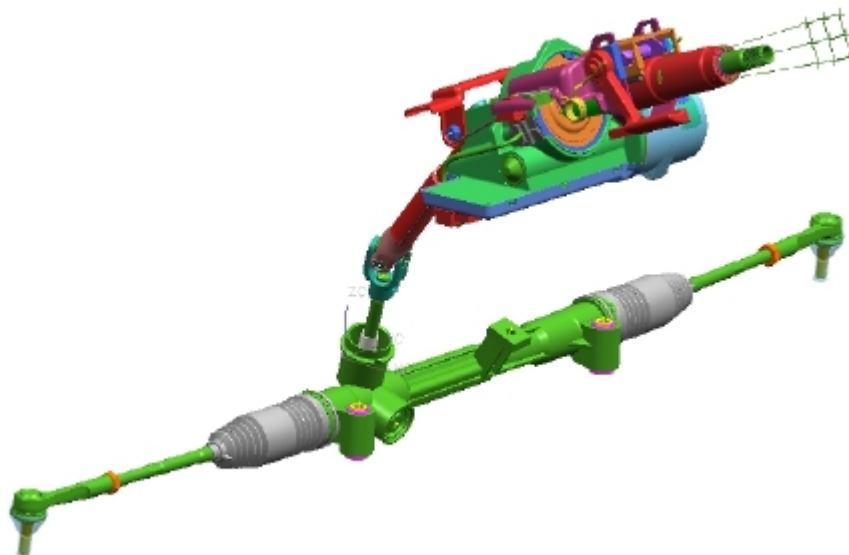


collected through special sensors pedals, gearbox and engine control unit, provides automatically the braking torque required to maintain the vehicle is stationary until the time when the driver releases the clutch and the torque is sufficient to check the car.



7 Electrical Guide

7.1 Description



All versions of the new Punto are fitted with electric power steering system, said E.P.S. (Electric Power Steering).

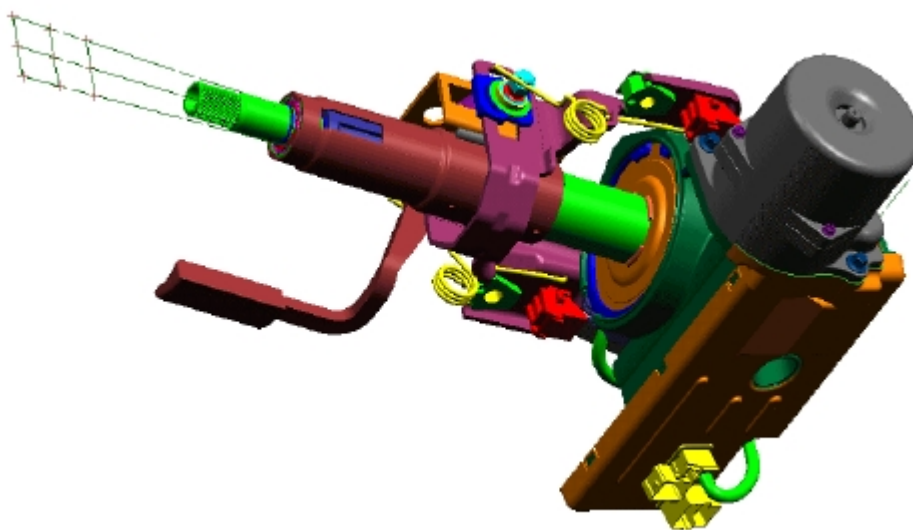
The steering of the new Punto is designed to provide the driver with the least effort steering wheel when parking, combined with precision and safety in speed, For a complete turning of the steering wheel requires 2.8 turns and the car makes a U in 10.1 m between curbs (crank with longer stroke, with tire 175), or 10.76 m (Rack with short stroke, with all other types of tire).

The electric power steering is actuated by an electric motor more compact is lighter than previous systems.

It consists of a steering column with integrated electric drive system and a control unit specification.



7.2 Electric Power Steering (EPS)



Standard on all versions. The power assist is provided by an electric motor located within the dashboard, which transfers the torque generated directly on a toothed wheel coaxial and integral with the steering column.

The torque supplied to the input by the driver is detected by a potentiometric sensor to sliding contacts.

The electric steering column, on the New Fiat Punto also integrates the steering angle sensor, this signal is also used by the ESP control unit (when present). And 'necessary the steering angle sensor reset via diagnostic tool when working welfare.

The driver can choose between two driving programs (City and Normal) selectable button on the bridge.



*Button "city"*

The first maximizes comfort when parking, with efforts on driving record for the segment (2.5 Nm 4-6 against the traditional power steering), the second provides a average performance in the parking lot, but allows for optimal progressivity of the effort steering wheel at low speed, especially under conditions of poor grip on the road. Both programs, however, provide variable power as a function of vehicle speed (Progressive power assist), but without compromises in performance between parking and quality control of the steering gear.

For each setup / operator with a specific calibration of both programs.



Unit

The control unit processes the received signals input from the sensors and drives the electric motor, delivering the current appropriate to obtain the pair of interlocking desired. Also manages the communication network and performs a self-CAN-C continuous system, to ensure proper operation.

The values of vehicle speed and the alternator, are read on the line C-CAN.

The position signals and torque coming from the sensors representing the values of the base with the which the microprocessor processes the output data in terms of current supplied to the engine.

The control unit for controlling dell'asservimento of the guide is fixed on the body dell'elettroguida.



7.3 Steering Box

Adopts two driving reports.

Specifications for gasoline:

reduction ratio: 51 mm / rev

ratio steering angle / wheel angle: 15.7° steering wheel / castor

turns lock to lock: 2.8 for a turning circle (curb to curb) of 10.1m

Specifications for diesel engines:

reduction ratio: 60-44 mm / rev

ratio steering angle / wheel angle: 13.4° steering wheel / castor wheel in the center and $18.2^\circ / ^\circ$
wheel

limit

turns lock to lock: 2.8 for a turning circle (curb to curb): 10.76 m



7.4 Steering column guide

The steering column is composed of two coaxial sections. Contributes decisively to avoid dangerous intrusion of the steering wheel in the cockpit in case of frontal impact.

The lower section has a sliding sleeve to maintain a fixed position of the steering wheel impact. the loading the sliding max is obtained by means of 8kg and injected plastic insert. The tract top, designed to allow adjustment of the position of the steering wheel, is:

Sliding for axial adjustment (if required or already planned in setting)

tilting for vertical adjustment (if required or already planned in setting)

The steering column is supported by a support in turn bound to a bracket both in steel. These components, thanks to their high rigidity, they give a relevant contribution to the containment of the steering wheel vibrations.

This allows to achieve the objectives of:

passive safety of vehicle

driving comfort

A further contribution to safety performance is given by the collapsibility of the steering column. The device is based on capsules (Wafer) with magnesium injection molding. During a The shock absorbing steering column collapses causing a controlled energy. All determines a considerable reduction of the load received by the chest of the occupant during a collision.



8 Suspension

8.1 Description

The suspensions are the result of a New Point of comprehensive new model previous year.

The main differences with respect to these models are known:

Wide track and tire size larger than the current point (range 15 to 17 inch wheels with tires 175/65 15 "to 205/45 17", compared to 14 and 15 inches with tires 165/70 14 "185/55 15" Point).

Geometry arm front suspension with lower triangular rectangle designed to separate the effect of braking loads from the cornering ensuring the best balance in all driving conditions. The new front geometry allowed also contain the turning circle of the car to values similar to the current model, while adopting wider wheels and larger pitch.

Suspension, rear torsion beam made with the aim of increasing the structural rigidity and to increase the flexibility of the suspension under load obtained by optimizing the bushing connecting bridge to the body. The study of the new suspension has also affected the shape of the collision in order to improve the dynamic response when cornering.

Particular attention has been paid in the design of components to address issues relating to vehicle comfort, adopting technical solutions typical of cars of a higher class, as the use of the plug dome type "split" ("dual-path") front and

Vertical positioning of the shock at the rear, as this would have allowed limit the effect of the vibration generated in the road surface, without altering the structural rigidity at the expense of steering precision.

Increased size of flexible bushes to improve the filtering of road roughness and increase driving comfort.



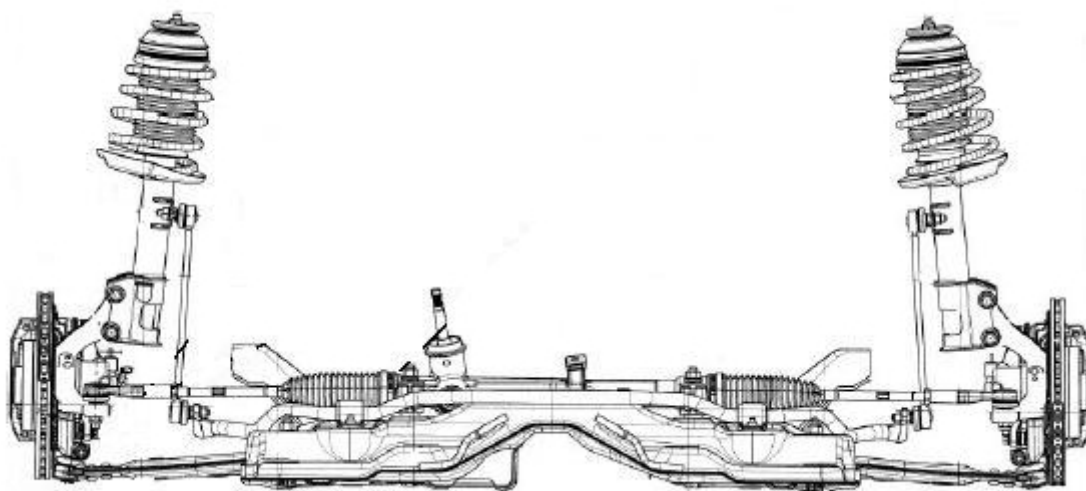
Dampers with 22 mm on all versions to increase the boundary conditions of cornering stability.

Increased structural rigidity of the front cross member anchor suspension to get a better acoustic and vibrational comfort.

Both the front and rear suspension, as already mentioned, have undergone an increase of roadway from the current point, both to adapt to the larger exterior of the new model and to an improvement in the driving stability (an average of 70 mm front and 75 mm rear).

8.2 Front Suspension

8.2.1 General



Front suspension: wheels have independent MacPherson system.

In particular, the main components of this layout are:

Biguscio wishbones in pressed steel instead of cast iron as the current point, with a significant weight reduction.



Adoption of the rubber bushings with more volume than those taken on a point, for enhance comfort (absorbing small bumps) while ensuring excellent roadholding and cornering stability.

Front suspension crossbeam with high structural rigidity, with a "strip" cross link near the front strut attachments (except 1.2 8V)

Reinforced uprights for better cornering grip.

Anchors dome type "split" (diagram "dual-path") to improve filtering road vibration while providing excellent structural rigidity for precision driving.

Bar with shock absorber anchorage rods instead of the arm oscillating, which allows the stabilizing efficiency and improve the promptness of dynamic response when cornering.

Helical springs off-axis for optimizing the thrust axis, in order to reduce the forces tangential on the damper shaft and internal friction, which improves absorption of minor surface roughness.

Double-acting telescopic hydraulic shock absorbers with a shaft diameter of 22 mm on all versions for high lateral stiffness and improve handling in curves.

It 'was further increased stiffness of the attack to the body. The greater stiffness of the dome upper attachment (aluminum) allows to obtain a reduction of noise in input frame, obtaining an improvement in comfort.

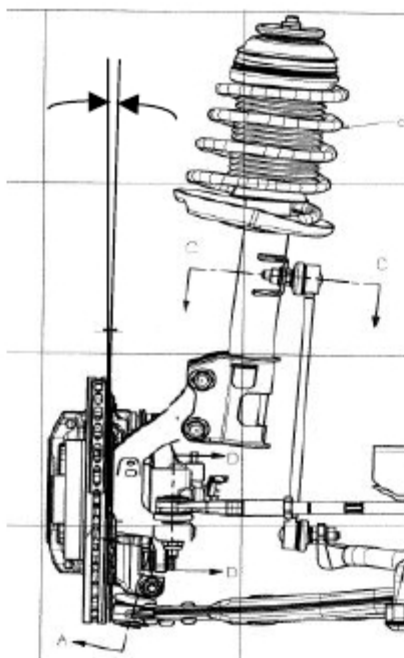
The crosspiece of the front suspensions is the lowest point of the car, because the struts of the body has been lowered to improve performance in crash tests.

On the front suspension is only possible to adjust the convergence.



8.2.2 Characteristic angles:

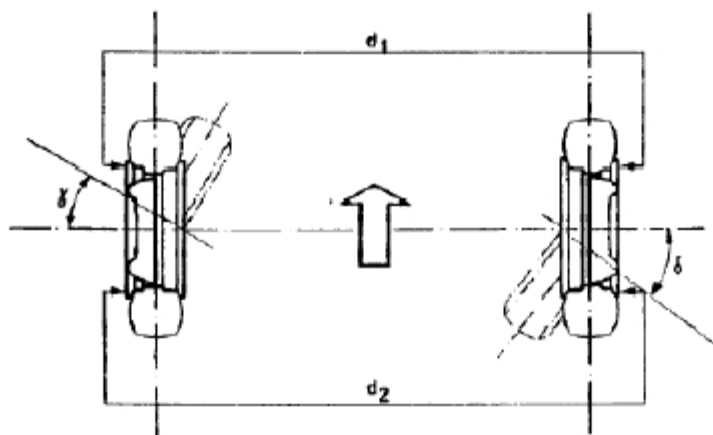
Camber



ENGINES	TIRES	Loading conditions	
		STD. O	STD. A
1.2 8V	175/65 R15 84T	-22' + / - 20'	-27' + / - 20'
1.4 8V.L.E		-22' + / - 20'	-27' + / - 20'
1.3 Mjet 70 hp		-22' + / - 20'	-27' + / - 20'
1.2 8V		-22' + / - 20'	-27' + / - 20'
1.3 Mjet 70 hp		-22' + / - 20'	-27' + / - 20'
1.4 8V		-22' + / - 20'	-27' + / - 20'
1.3 Mjet 90 hp	185/65 R15 88T	-26' + / - 20'	-28' + / - 20'
1.3 Mjet 90 hp		-26' + / - 20'	-28' + / - 20'
120 hp 1.9 Mjet		-26' + / - 20'	-28' + / - 20'
120 hp 1.9 Mjet	195/55 R16 87H	-19' + / - 20'	-21' + / - 20'



Convergence



**L
o
a
d
i
n
g

c
o
n
d
i
t
i
o
n
s**

ENGINES	TIRES	STD. O	STD. A
1.2 8V	175/65 R15 84T	+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Mjet 70 hp		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.2 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Mjet 70 hp		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.4 8V		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Mjet 90 hp	185/65 R15 88T	+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.3 Mjet 90 hp		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.9 Mjet		+ 2 mm + / - 1 mm	+ 1.88 mm + / - 1mm
1.9 Mjet	195/55 R16 87h	+ 2 mm + / - 1 mm	+ 1.87 mm + / - 1mm

Shown in mm (d2 - d1, see figure above).

Can be adjusted only the convergence, in a traditional way, by acting on the tie rod nuts steering.

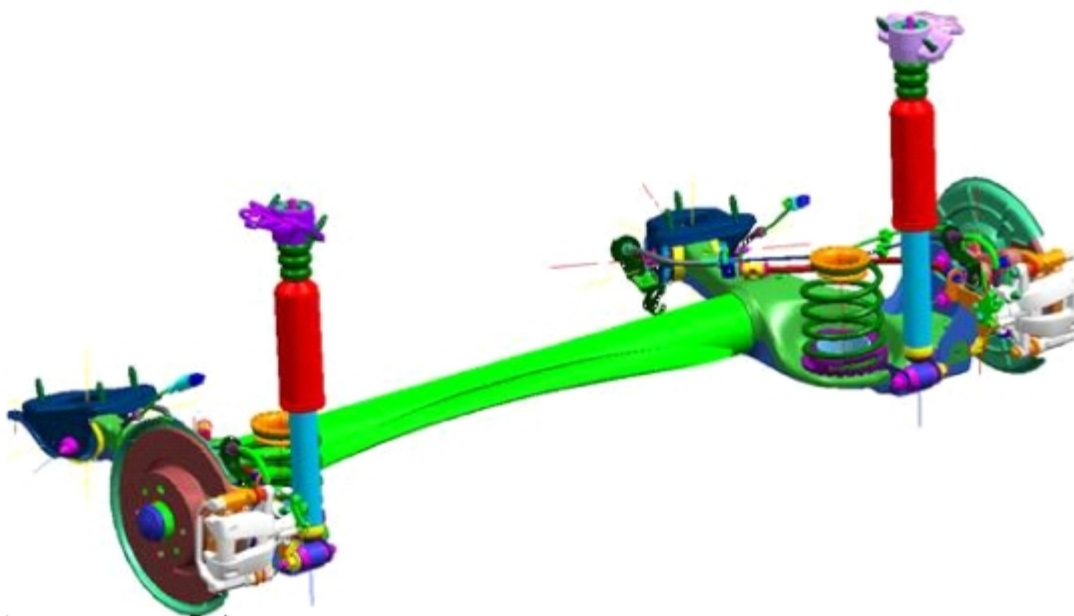
374/534

© 2005, Fiat Auto S.p.A. - All rights reserved



8.3 Rear Suspension

8.3.1 General



The new Punto adopts the wheels interconnected by a torsion beam, consists of a bent sheet metal pipe, with the middle section open.

The attacks on enlarged body and the optimization of the profile torque allowed to obtain more structural rigidity while reducing weight.

The particular shape of the profile torque (with different thicknesses depending on the versions) has allowed us to obtain optimum roll stiffness stabilizer even without resorting the addition of anti-roll bar on new point will therefore not be present on the anti-roll bar no version.

The vertical dampers attached to the bodyshell inside the wheel has allowed optimal filtering of surface roughness for the benefit of acoustic comfort in cockpit.

You can not adjust neither convergence nor camber: the correct values are then insured in the assembly phase.



8.3.2 Characteristic angles

Camber

ENGINES	TIRES	Loading conditions	
		STD. O	STD. A
1.2 8V	175/65 R15 84T	-1 ° + / - 20 '	-1 ° + / - 20 '
1.4 8V.L.E		-1 ° + / - 20 '	-1 ° + / - 20 '
1.3 Mjet 70 hp		-1 ° + / - 20 '	-1 ° + / - 20 '
1.2 8V		-1 ° + / - 20 '	-1 ° + / - 20 '
1.3 Mjet 70 hp		-1 ° + / - 20 '	-1 ° + / - 20 '
1.4 8V		-1 ° + / - 20 '	-1 ° + / - 20 '
1.2 JTD (90 hp)	185/65 R15 88T	-1 ° + / - 20 '	-1 ° + / - 20 '
1.2 JTD (90 hp)		-1 ° + / - 20 '	-1 ° + / - 20 '
1.9 JTD		-1 ° + / - 20 '	-1 ° + / - 20 '
1.9 JTD	195/55 R16 87H	-1 ° + / - 20 '	-1 ° + / - 20 '



Convergence

ENGINES	TIRES	Loading conditions	
		STD. O	STD. A
1.2 8V	175/65 R15 84T	+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.4 8V		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.3 Mjet 70 hp		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.2 8V		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.3 Mjet 70 hp		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.4 8V		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.3 Mjet 90 hp	185/65 R15 88T	+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.3 Mjet 90 hp		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.9 Mjet		+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm
1.9 Mjet	195/55 R16 87h	+ 1.3 mm + / - 2 mm	+ 1.5 mm + / - 2mm

NB: you can not mount the wheels of the previous models point of New Point, in As the size (for example the distance between the bolts) are varied: a forcing in this sense should be to affect the integrity of the components wheel hub and, especially, the driving safety.



9 Electrical

9.1 Overview of the system

The technology used for the 'electrical system of the new Punto is based on complex architecture called "family.1", used for the first time on a FIAT.

Modular plant

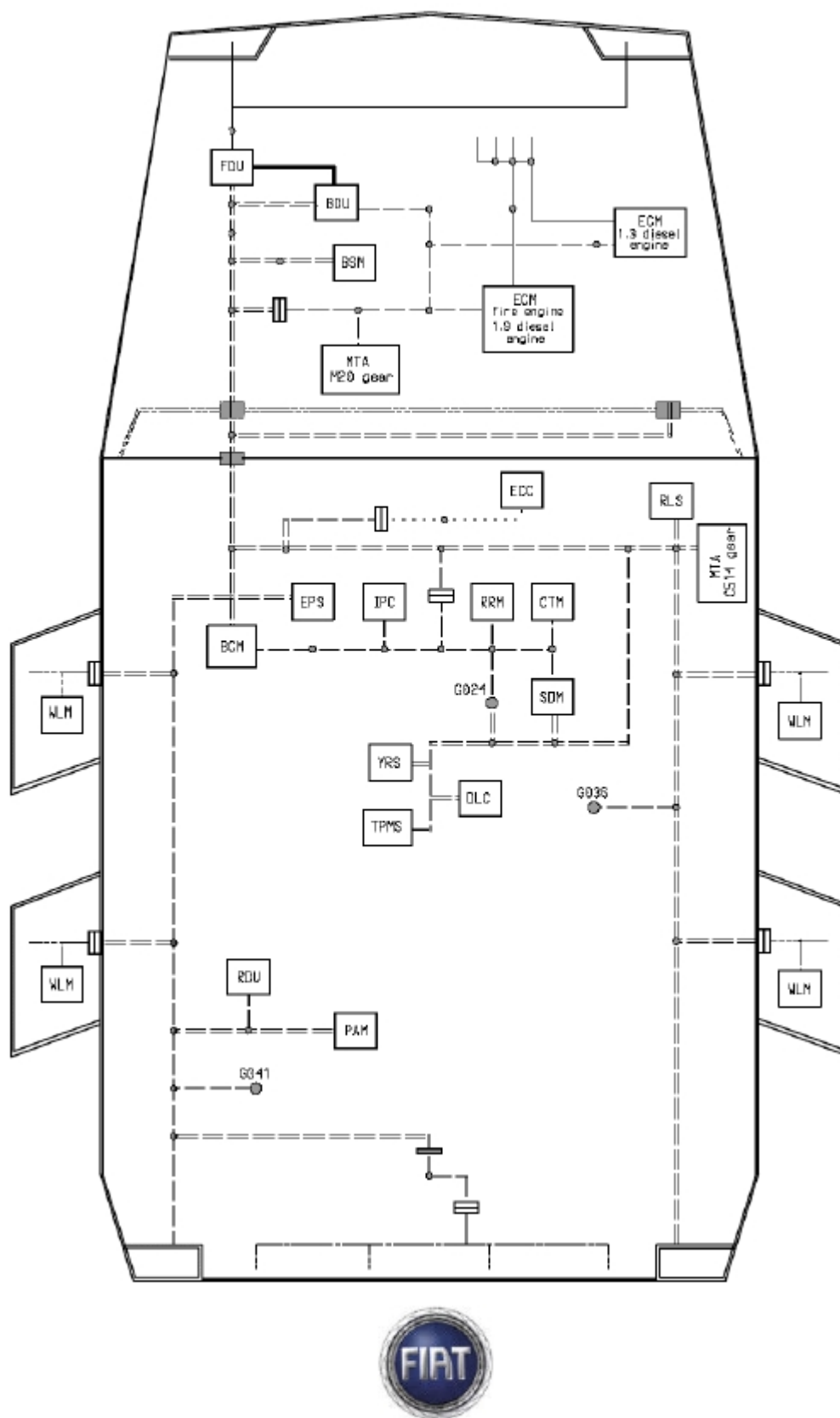
To obtain the minimum number of families of wiring, each circuit belonging to a coupling cutting keeps the same position inside the joint, irrespective of the trim level; also the position and type of joint on the car is not a function of the trim level.

To safeguard the modular cables together is expected that the inputs / outputs for each unit do not differ by trim level / engine, by position the connector to cable interface / terminal / connector.



9.1.1

General Features



BCM
CTM
ECC
IPC
WFP
RRM
SDM
TPMS
BSM
ECM
EPS
MTA
YRS
RLS
DLC
RDU
FDU
BDU
WLM

9.1.2 Networks and serial lines

Family 1 The architecture, developed specifically for the new Punto, operates the plant the vehicle's electrical.

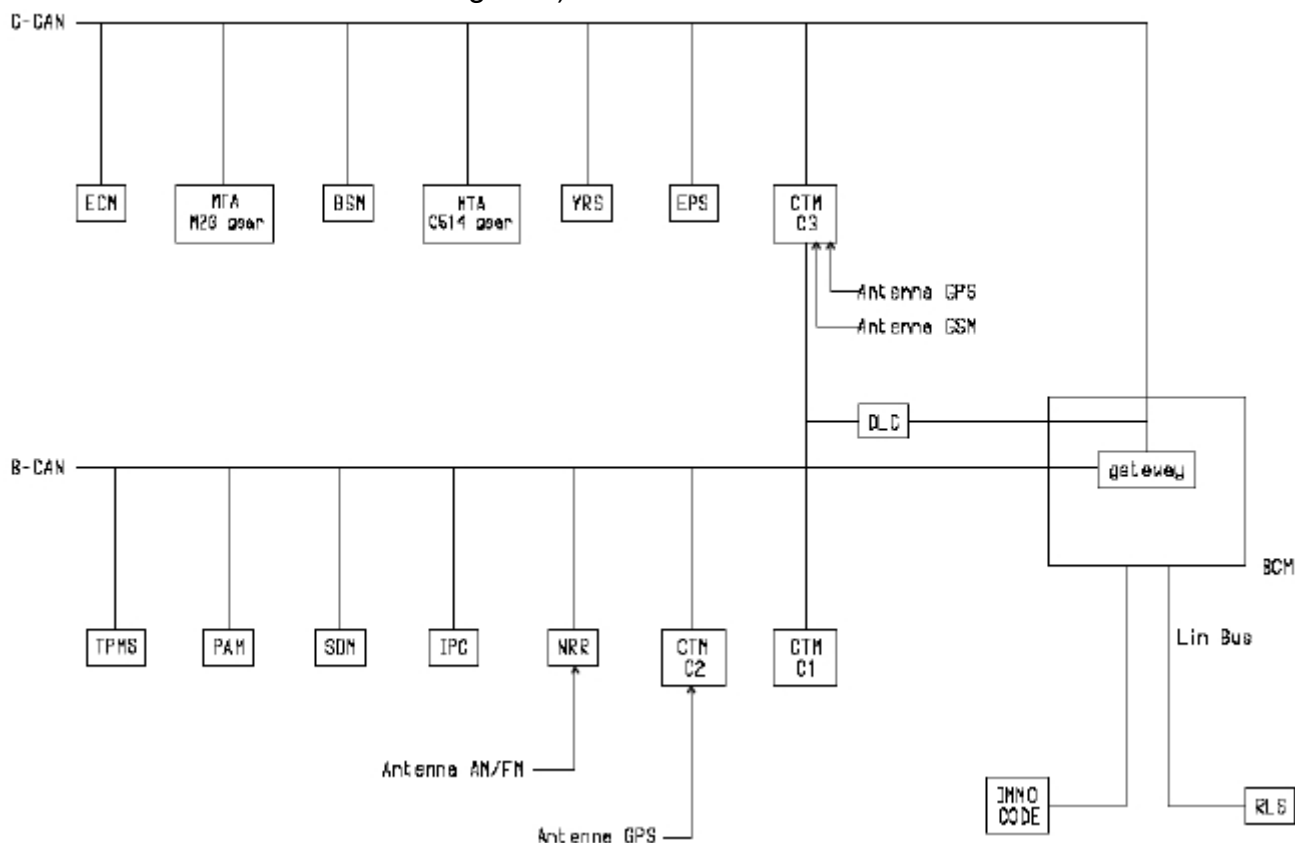
For the optimization of the system, the architecture follows the topological approach Regional: each ECU (electronic or electromechanical) is placed in position with respect to functions managed.

This allows to minimize the system of distribution of power and signals, even extended through the use of networks of serial communication, favoring the solution of problems of size, reliability, weight, cost.



For node includes an electric with a CAN interface.

The more complete structure is composed of two communication networks that connect CAN nodes belonging to two different areas (dynamic control of the vehicle, and disclosure of edge / functions of the body), and a serial line complementary "LIN bus" (used for the first time on a Fiat model in this segment).



The architecture is compatible with various solutions of interfacing user (Available commands, allocation and how to display information).

The electrical protection (fuses) and the contactors are grouped in units of distribution of power, position in the engine compartment and dashboard. These units serve Also from interconnecting the various wiring and electrical distribution.



9.1.3 Network Architecture

The more complete structure is composed of two communication networks connected through a CAN gateway for the transfer of information common:

NAME
B-CAN
C-CAN
LIN

B-CAN Network for the management of the standard functions of body / infotelematic.

C-CAN network for dynamic control of the vehicle.

The gateway for communication between C and B-CAN-CAN is located in the Nodes Body Computer.

It 'also a serial line LIN communication between the control computer and the Body control unit of the rain sensor: in this case the Node body computer has the function of gateway between the serial line CAN and LIN networks.

For the first time on a model Fiat the diagnosis of the nodes, in B and C-CAN-CAN, is realized via CAN line, using a protocol of the CAN (ISO 14229).

Features B-CAN Network

Transmission speed

, Tops number of nodes connectable to the network

Maximum length of network

Features C-CAN Network

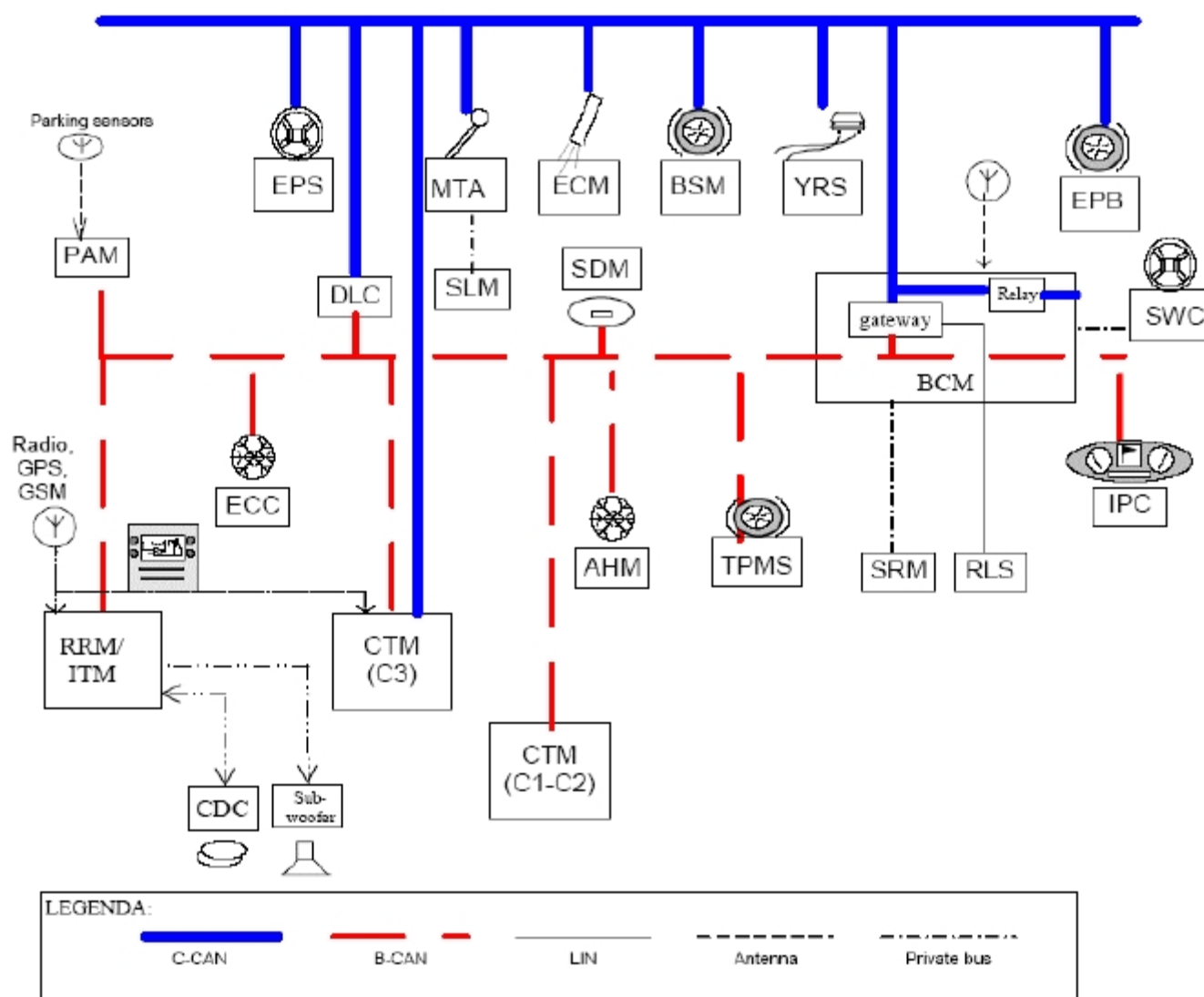
Transmission speed

, Tops number of nodes connectable to the network

Maximum length of network



Optional full network architecture



Architecture Diagnostics

The situation of the architecture diagnostics, both for the control units that are integrated on the network CAN (nodes), and for those not equipped with a CAN interface, is summarized by the following table:

System / node	Bus	Diagnosis	Communication
Tyre pressure control	B-CAN	One	B-CAN
Audio Amplifier	/	No	/
Rain sensor control unit	LIN	No	/
System / node	Bus	Diagnosis	Communication
Unit Sunroof	/	No	/
Node Air Bag	B-CAN	One	B-CAN
Node Body Computer	B-C CAN	One	B-C CAN
Climate Node	B-CAN	One	B-CAN
Node Convergence	B-CAN	One	B-CAN
	B-C CAN		B-C CAN
Node Instrument Panel	B-CAN	One	B-CAN
Node Radio Receiver	B-CAN	No	/
Parking Sensor Node	B-CAN	One	B-CAN
Node Supplemental Heater	B-CAN	One	B-CAN
Node Control Engine	C-CAN	One	C-CAN
Robotic Node Change	C-CAN	One	C-CAN
Node Braking	C-CAN	One	C-CAN
Knot Guide Electric	C-CAN	One	C-CAN
Yaw Sensor Node	C-CAN	No	/

Some stations and nodes are referred to as "having no diagnosis," although functionality self-diagnosis (eg, Rain sensor control unit), because it does not have a protocol Diagnostic implemented and their errors are detected through the diagnosis of other units (eg BCM).



9.1.4 Adapter Tool Diagnosis

To the point of diagnosis, establishing a network of serial type CAN HIGH SPEED, is essential to the new High Speed Cable A16HS. It 'also need to install on Examiner release 6.30 or later to access all the features.

The interface High Speed Can A16HS is composed of a standard connector EOBD, a Bantamate female connector (for connection to Examiner) that conttene a circuit Electronic and LED yellow / green indication of operating status.

Diagnosis and Installation

Insert the interface between High Speed Can A16HS car diagnostic socket and extension cable Examiner. After connecting the power LED blinks, then blinks green drive.

After activation of the communication with the controller on-line Can the LED remains solid, but turns yellow. If the LED continuously flashing yellow means there is was a communication error.

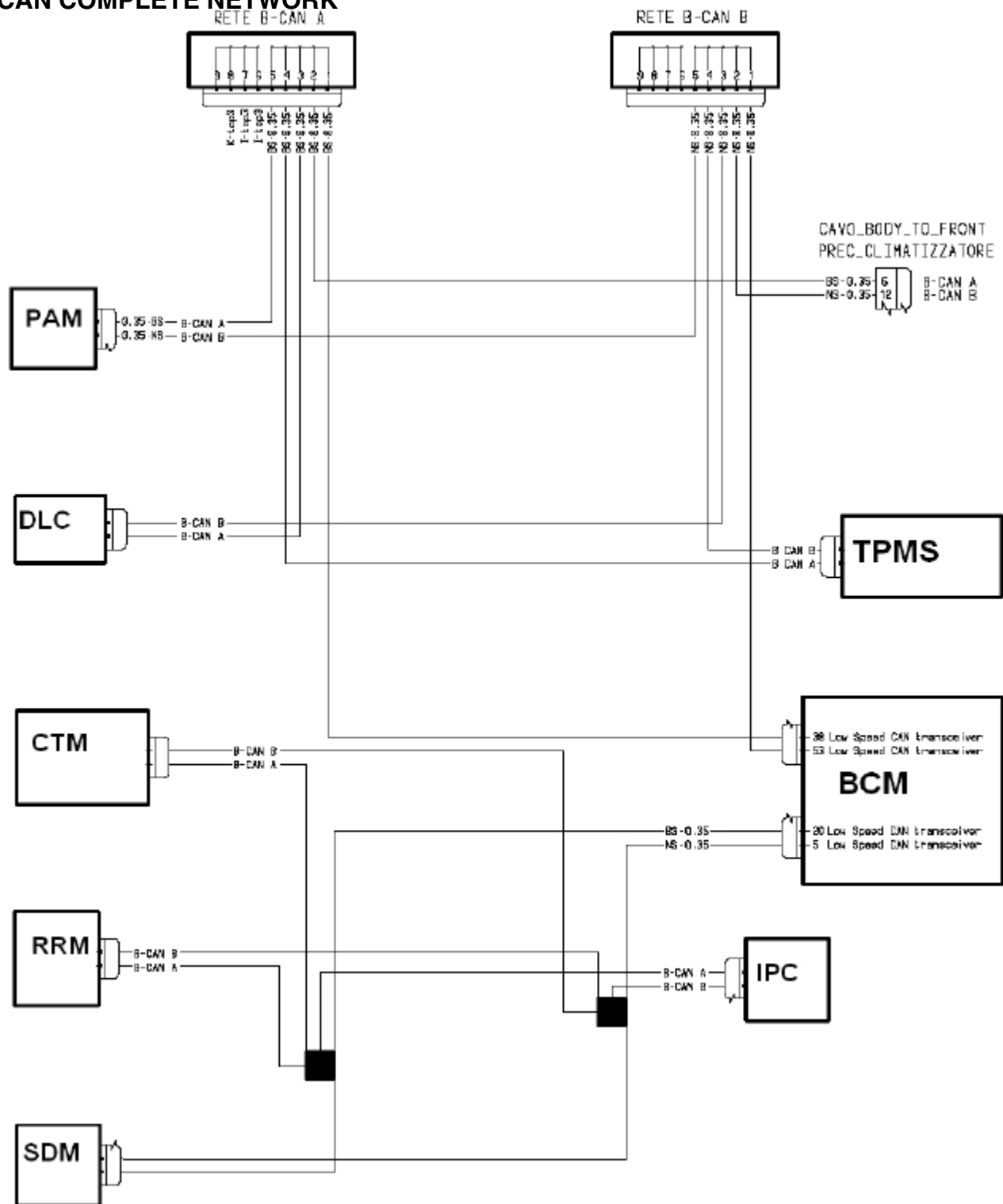
Termination resistors network C-CAN

Node	Description	Termination resistor	
		This	Absent
BCM	Node Body Computer	X	
BSM	Node Brakes		X
CTM	Convergence		X
EPS	Node Steering		X
YRS	Yaw Sensor		X
MTA	Automatic transmission		X
ECM	Node Motor Control	X	

The termination resistor network C-CAN is present in the ECM and the BCM and has to both the value of 120 ohms.

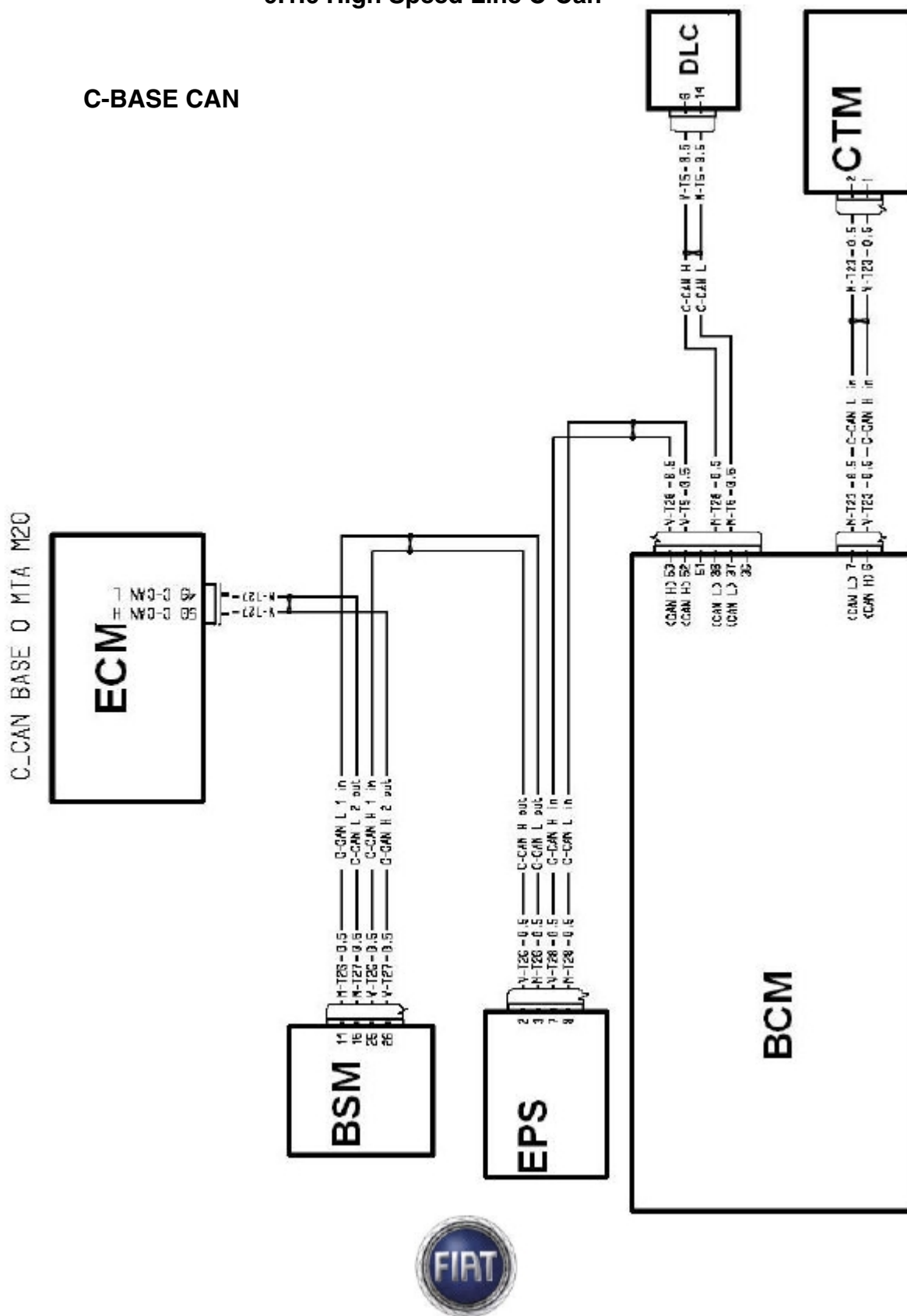




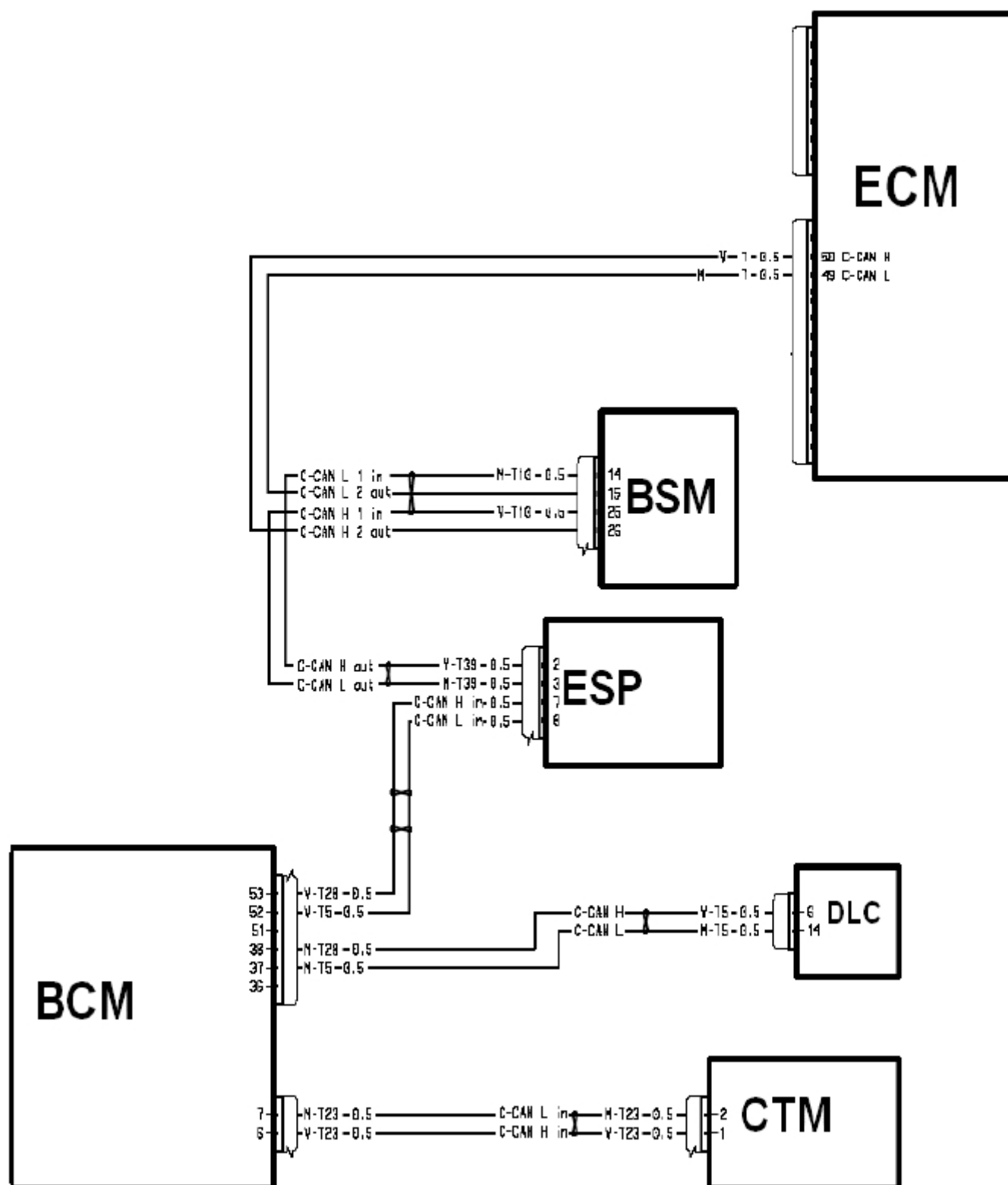
B-CAN COMPLETE NETWORK

9.1.6 High Speed Line C-Can

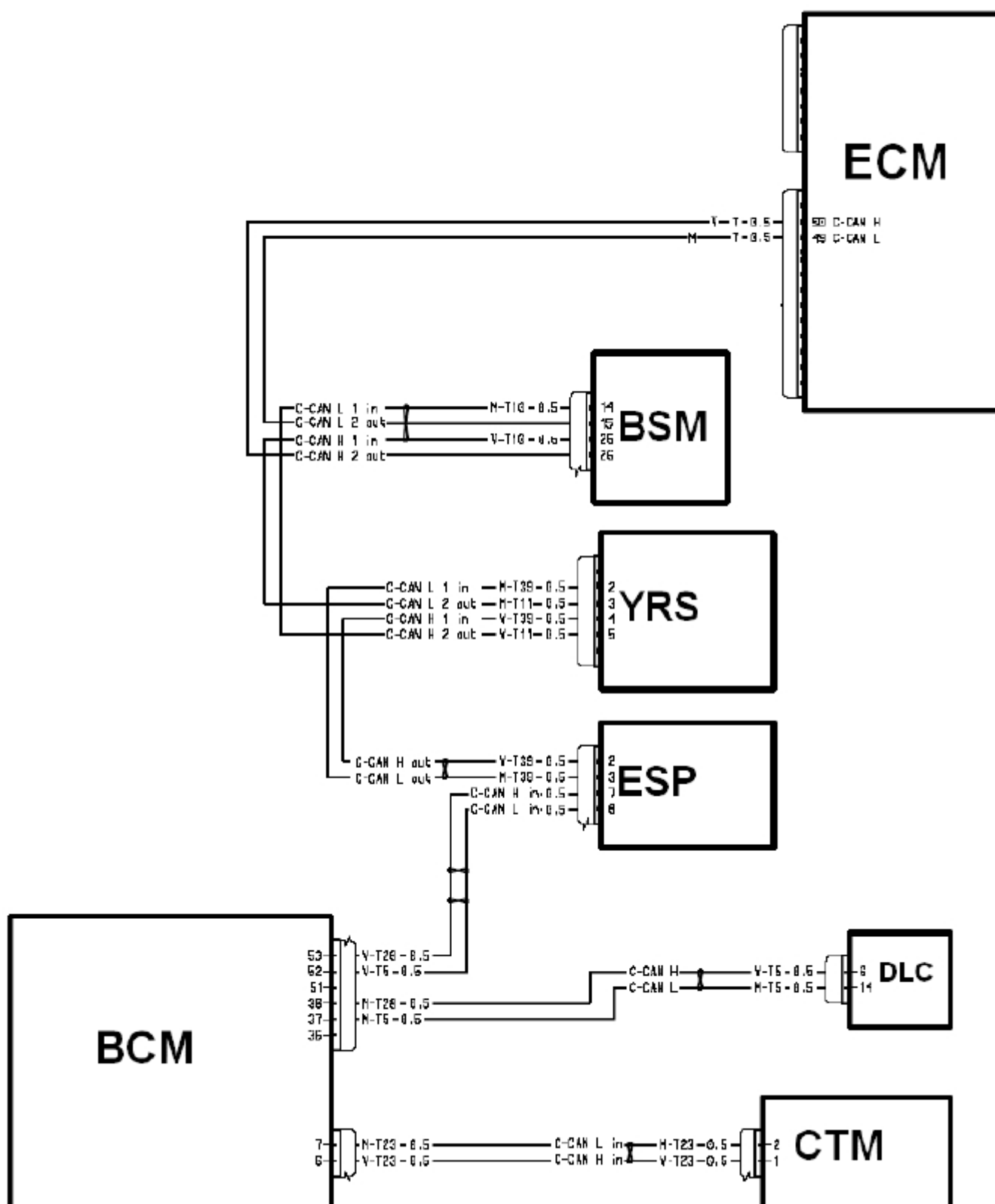
C-BASE CAN



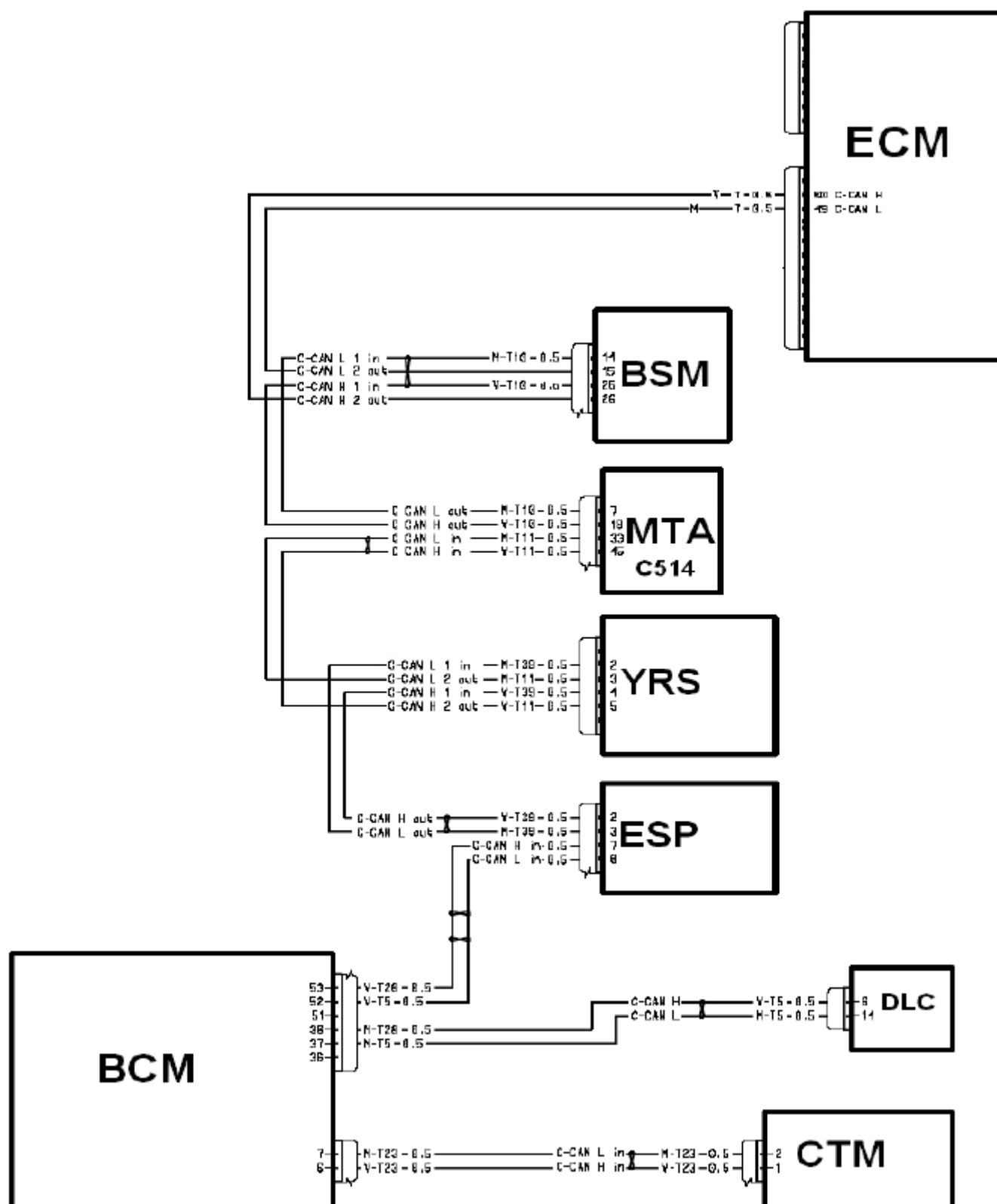
**C-CAN
with MTA
Without
ESP**



**C-CAN
with
ESP
Without
MTA**



**C514 and C-
CAN MTA ESP**



LIN Line



9.1.7 Unit Holders / Contactors

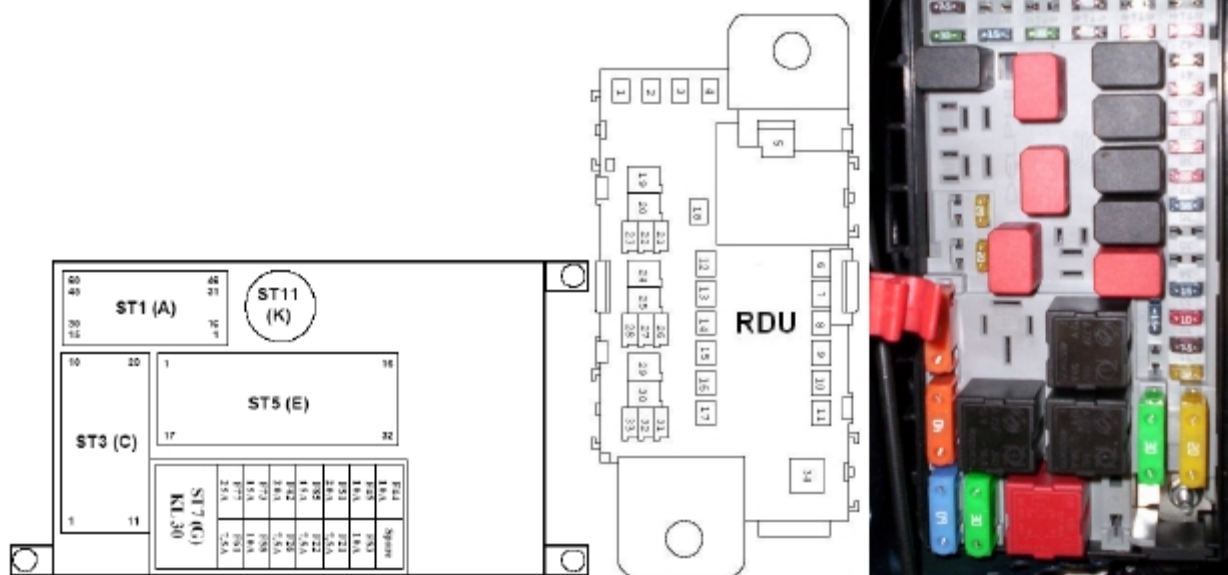
Points are a number of new types of power distribution units made with 3 different technologies:

Power PCB;

Circuit sliced;

With a sliced hard-wired circuit.

In particular, we have:



Controller Node Body Computer (BCM-Body Computer Module), made with Power PCB.

Engine compartment unit (FDU - Front Distribution Unit), made of sliced loop.

Fusibili unit on battery positive pole (BDU - Battery Distribution Unit), made sliced circuit.



Optional unit fuses on the positive battery (BDU-S Battery Distribution Unit-supplementary), made of sliced loop.

Trunk compartment unit (RDU - Rear Distribution Unit), sliced hard-wired circuit.

BCM fuses

F21

F22

F26

F42

F44

F45

F51

F53

F58

F61

F73

F77

F85

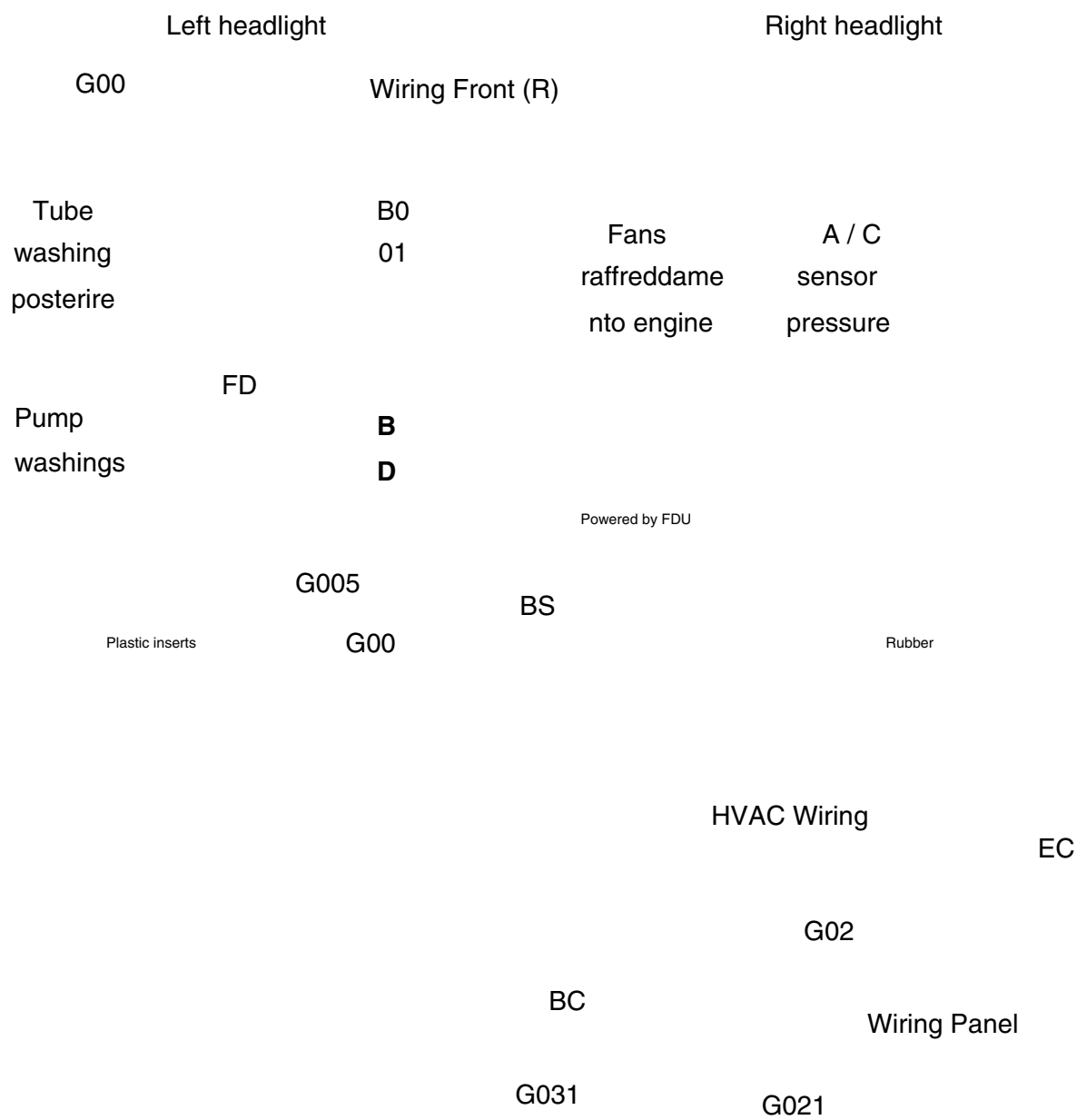


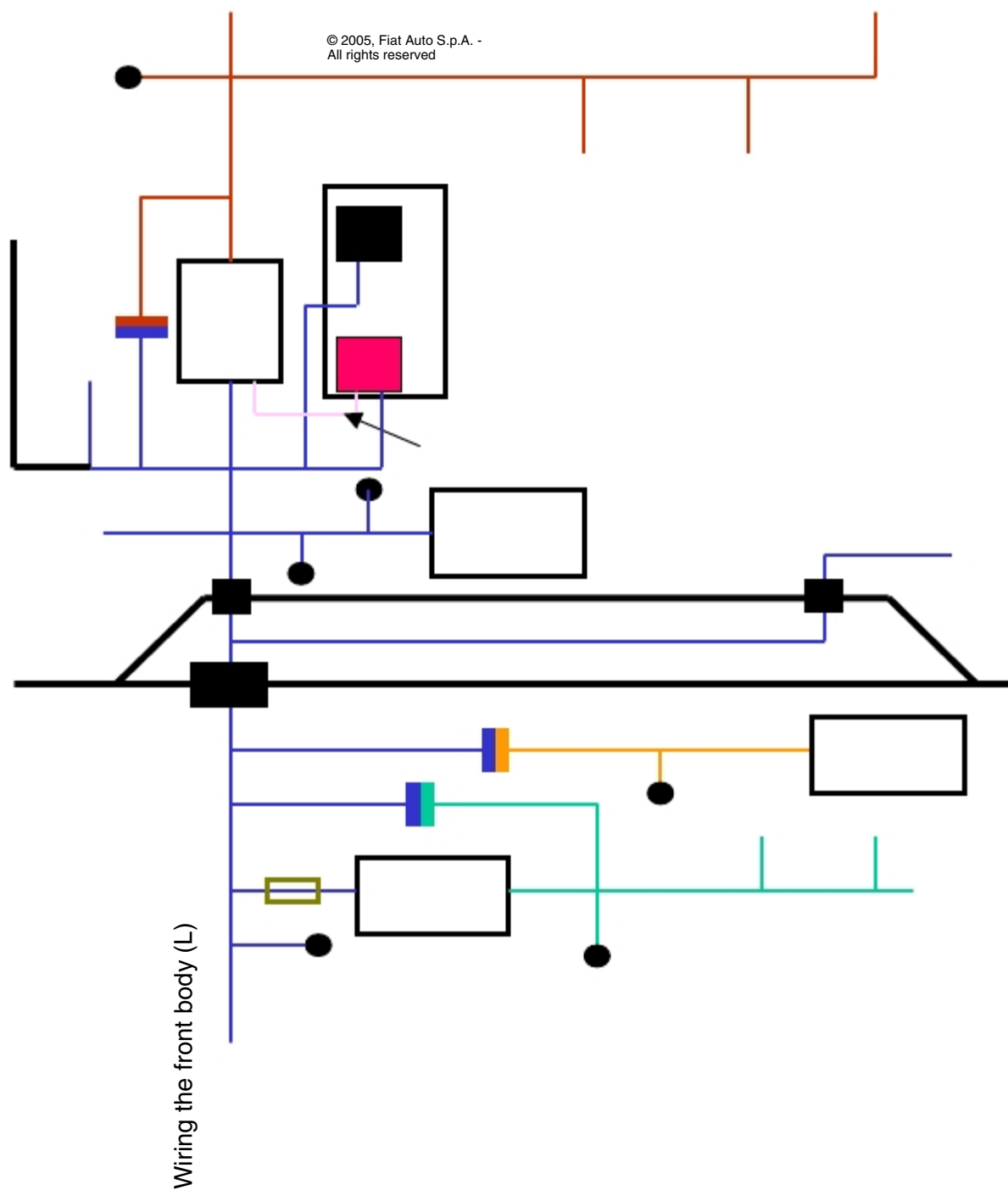
Fuses FDU

Identif. ID	Identif.v component
01	
10	
53	
09	
08	
38	
39	
40	
41	
05	
47	
50	
48	
46	
34	
30	
33	
51	
25	
27	
37	
42	
49	
29	
29	
04	
54	
36	
32	
31	
45	
02	
43	
26	
28	
52	
44	



Table 1:
Engine
Compartment





**Table 2:
Power
Engine**

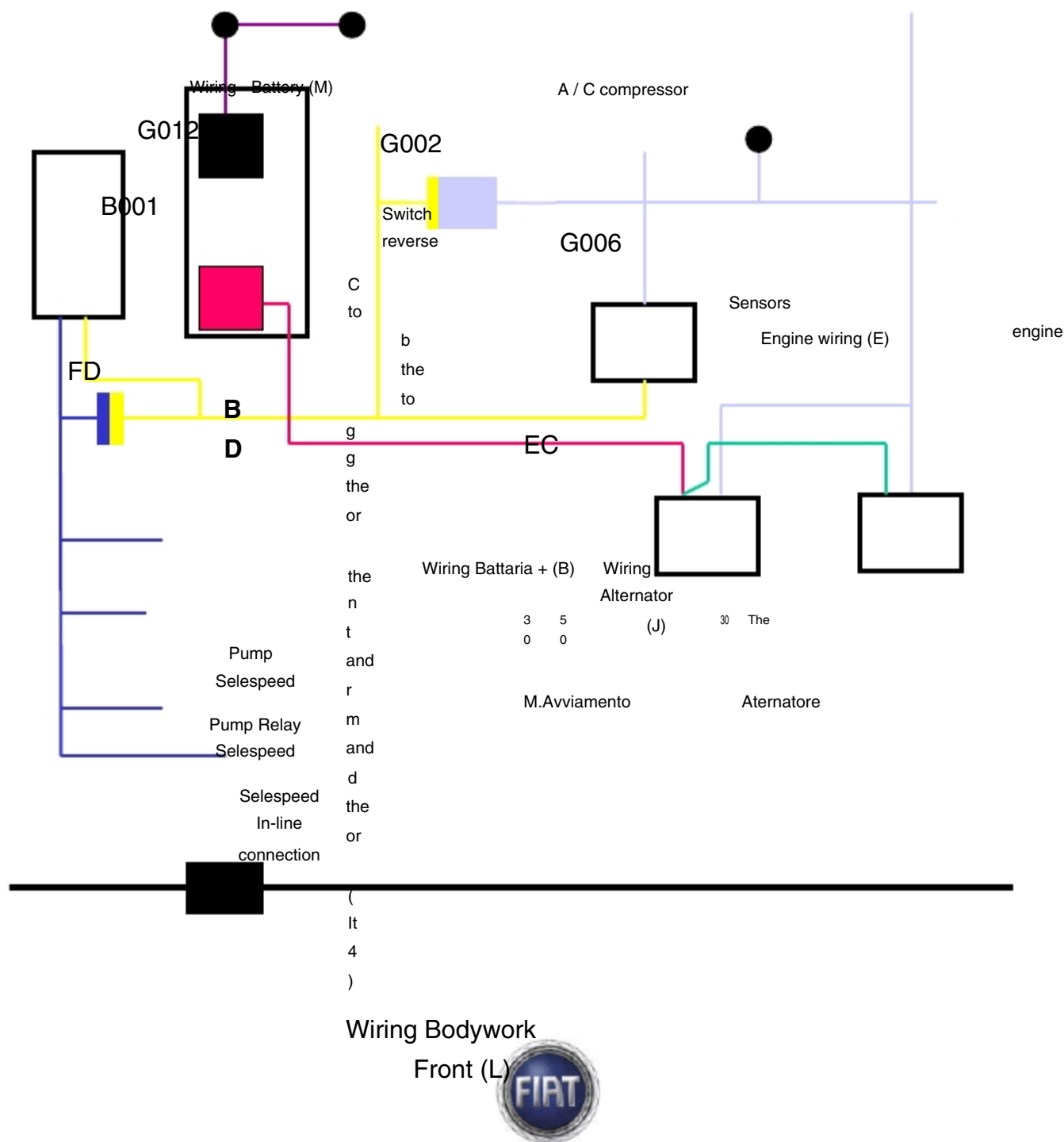
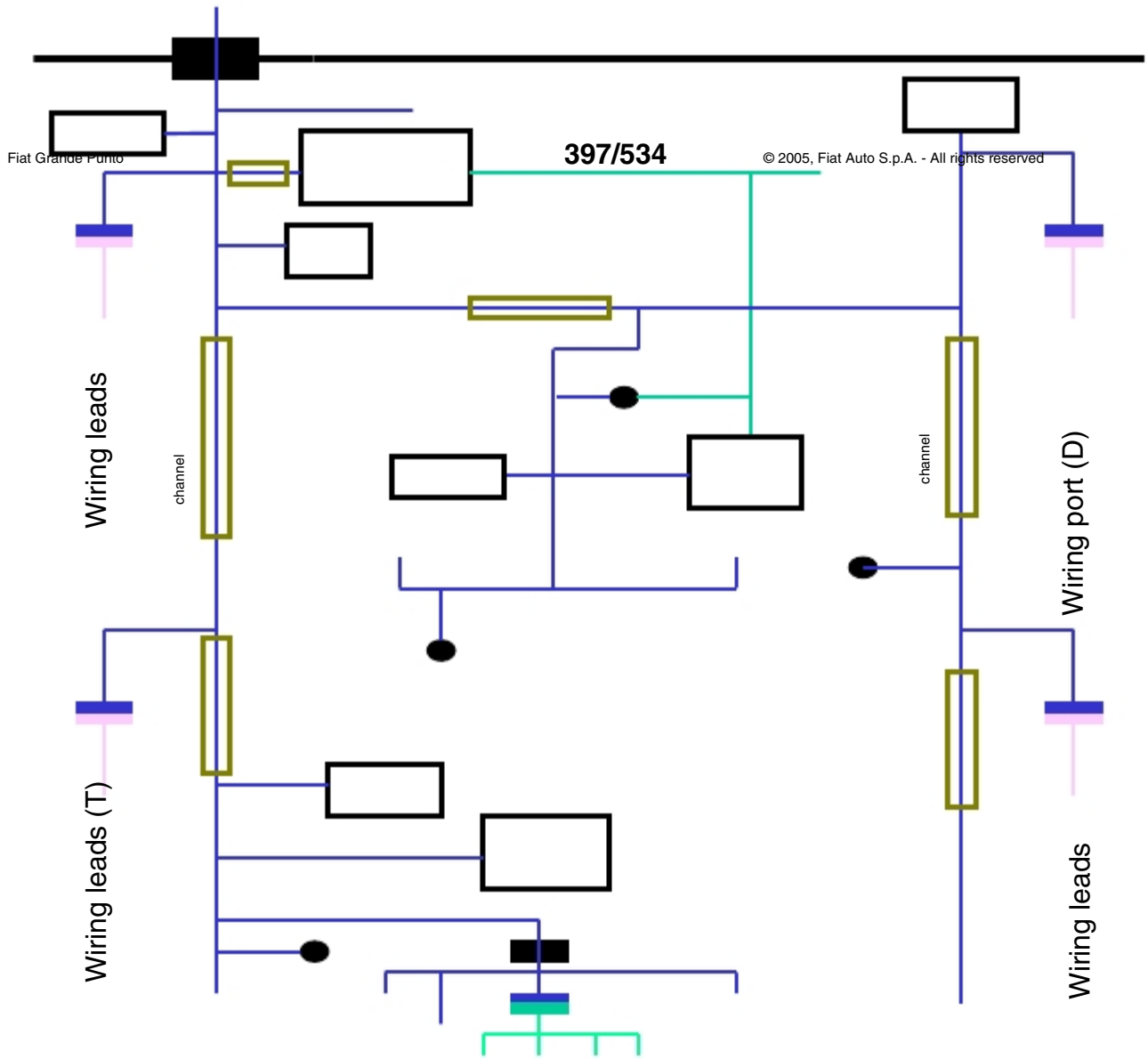


Table 3: Body MTA C514

	Switch	
DL		Pedal Wiring Cockpit (P)
	BC	
	EP	
	Wiring Body Front (L)	
	YR	G02 4
	Seat front	SD Seat G03
		front
	G033 predisposition	
	RDU	
		WFP
	G041	Bumper Wiring rear (X)
Taillight left	Light	so rs Light reverse
	fog	
	License plate light	
	Wiring sensor	



9.1.9 Electronic Components

The architecture "family.1", consists of the elements in the table below:

Name
TPMS (Tire Pressure sensing unit)
WFP (Parking Sensor Node)
Audio amplifier hi-fi
BCM (Node Body Computer)
IPC (Node Instrument Panel)
RRM (Node Radio Receiver)
CTM (Node Convergence)
RLS (Rain sensor control unit)
SRM (Unit Sunroof)
SDM (Node Air Bag)
MTA (Node Exchange Robotic petrol version) (1.4 Fire)
MTA (Node Exchange Robotic diesel version) (1.3 jtd 90 hp)
ECC (Node HVAC)
ECM (Node Control Engine)
BSM (Node Braking system)
YRS (Sensor Yaw)
EPS (Knot Guide Electric)
AHM (Supplemental Heater Node)

The components are derived components that differ for the implementation HW / SW from components mounted on the reference models (eg New Croma).



Module user commands

The architecture "family.1" New Point provides the integration of user commands in door modules switches.

The list of modules is contained in the table, along with the rest of the commands.

Modules
CDC, DRC (Doors, windows Command Post. / Anter. Side pass.)
Stop Switch
CSM (Command Module stalk-guide)
Switch on Clutch
Aft controls on the driver's side front door
CSS (Swimming Central Commands)
ELC (Swimming Controls Left)
Gear shift lever
Steering wheel controls for acoustic and audio / telephone
Command panel roof / ceiling of infotainment

The derived components have the same interface to the vehicle wiring harness (Scheme Electrical / connector) of the reference model.



9.2 Description of Components

9.2.1 the engine control unit (FDU):

The control unit FDU is a central branch circuits with splicing, installed in a airtight container placed in the engine compartment in the area left projector, which supports fuses and contactors, and acts as a protection of electric loads.

Node FDU and 'interconnected to' Body Together cables front to 'Together cables Front and to 'pre-wired cables together services engine.



Functions

THE front distribution node manages the following functions:

cleaning headlights

Left and right outside mirrors

heated rear window

Lighter



horns

ventilatore Engine Cooling

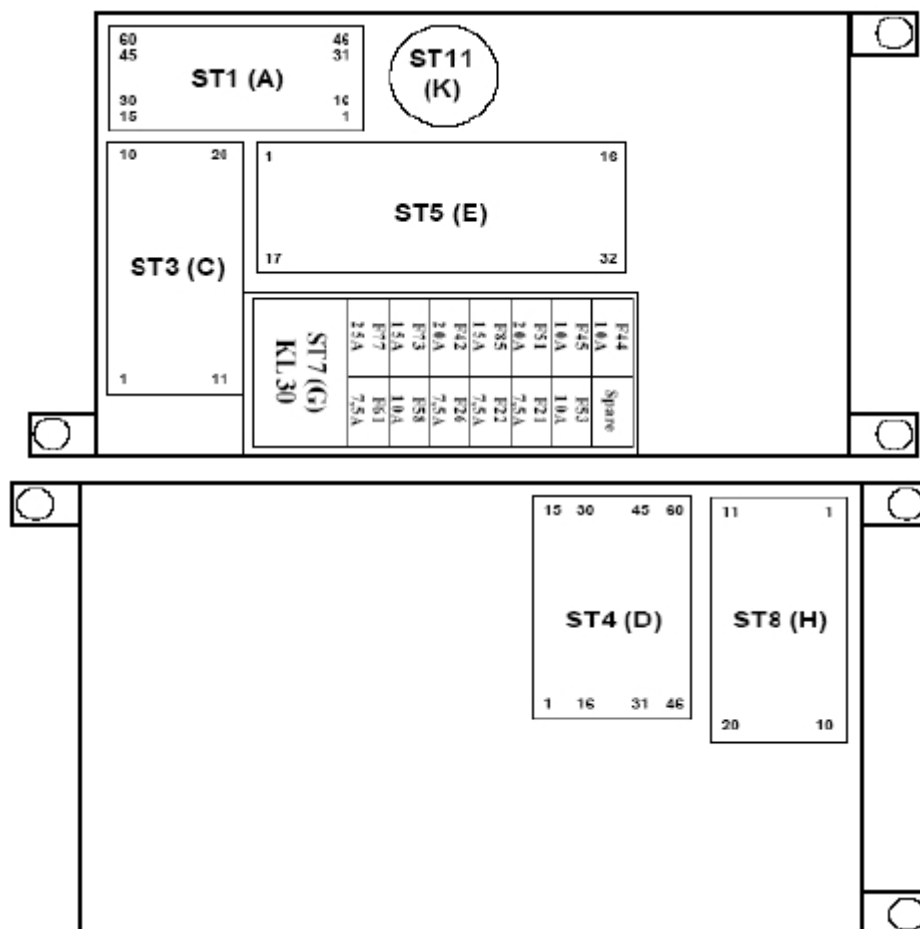
9.2.2 Baggage Compartment Node

This node is placed in the luggage compartment in the lower left side near the headlight rear. Also houses some fuses to protect the systems it manages.



Node Body Computer is located within the instrument panel lower left side left under the command panel, easy to identify because of fuses based dashboard holder (see figure below).

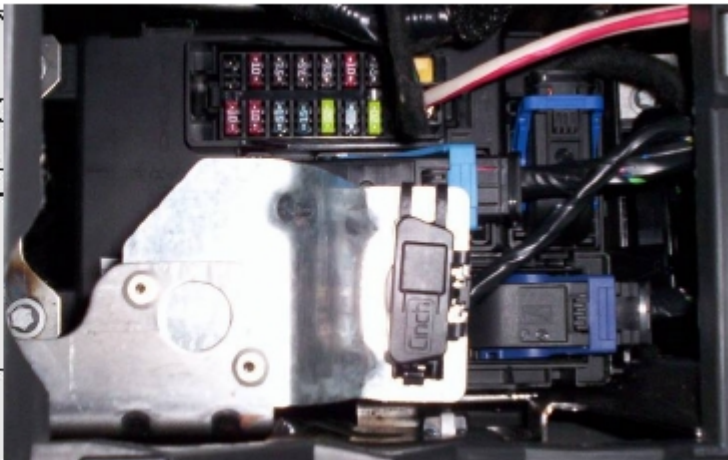
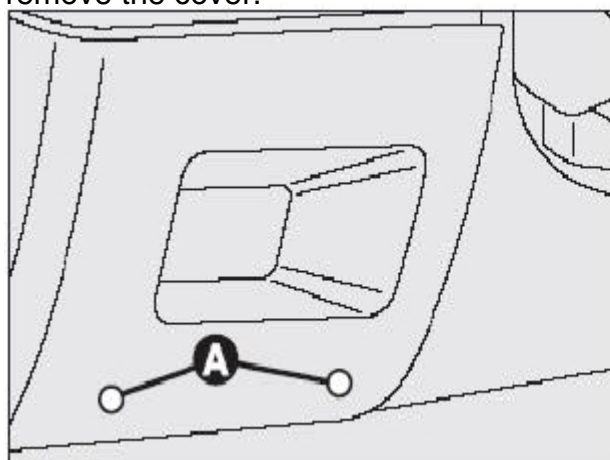
Node Body Computer is interconnected to 'Together cables and front bodywork to' Together cable bridge.



Location of vehicle



To access the unit holders of the instrument panel, unscrew the screws **A** and remove the cover.



Functions managed

The Node is a component body computer BCM electrical / electronic function that performs both electrical power distribution (power PCB) is a function of network management of serial vehicle and the following functions:

Interior lighting interior

External lighting (position, stop, low beam, high beam)

Lighting direction (arrows)

Lighting Reversing

Wiping

Rear window defroster

Lock / unlock doors and trunk

Fuel level

Fuel pump

Managing and monitoring key state

Gateway between the network and the network CAN B-C-CAN and LIN and between B-CAN.

The BCM interfaces are provided for the antennas and RF remote control immobilizer.



Pin-out

Connector LA

Pin

1

2

7

4

5

3

6

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30



31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60



L
C

Pin	Description
1	Light front right arrow
2	Light control front
3	right
4	Ceiling light control
5	Command
6	permissible of the
7	right front
8	
9	
10	
11	right front parking light
12	Left front parking
13	light
14	light arrow right front
15	light arrow right side
16	light arrow right rear
17	rear fog light
18	central brake light
19	license plate light
20	Right brake light
	left brake light
	Right tail light
	left tail light
	light the left side
	arrow
	the left arrow light
	poateriore

© 2005, Fiat Auto S.p.A. - All rights reserved

Connector PD



8
9
10
11
12
13
14
15

16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40



Pin
1
2
3
4
5
6
7
8
9

THE
Connector

Description

power door deadlocks Command Rear sky

command center lights

Light the cigarette Pam Power, TPMS,

lighter roof

Wash pump control Rain sensor power

bidirectional 41 brake switch

command sky lights 42 normally open

destro 43 interrttore clutch

44

45

46

47

Fiat Grande Punto

408/534

© 2005, Fiat Auto S.p.A. - All rights reserved

49

50

51

52

53

54

55

56

57

58

59

60



10	n.u.
11	n.u.
12	n.u.
13	n.u.
14	bidirectional pump
15	control wash (back)
16	power rear wiper
17	control switch
18	power high-speed
19	wiper control
20	n.u.
21	power door lock
22	control
23	power control
24	locking / unlocking
25	doors Central
26	module power
27	brakes
28	power enable
29	feature comfort
30	Power brake switch
31	power button asr
32	Power eps
	power front fixture
	power rear ceiling
Pin	Power front puddle
1	lights
2	light power trunk
	power socket eobd
	power trunk lock
	Door unlock
	command guidance
	low-speed front
	wipers power

Antenna RF Signal

	rf antenna mass i
	p

Fiat Grande Punto

409/534

© 2005, Fiat Auto S.p.A. - All rights reserved



**L
G

c
o
n
n
e
c
t
o
r**

Pin	Description
1	+ 30
2	n.u.
3	power radio
4	n.u.
5	IPC + 15
6	EPS + 15
7	SDM + 15
8	Power EOBD
9	n.u.
10	BCM mass
11	Esl + 30
12	Power diplay
13	Phone + 30
14	reserve
15	power lights glove
16	boxes
17	Power glove box
18	lights
19	power lights elc
20	reserve
	n.u.
	n.u.

[illegible]

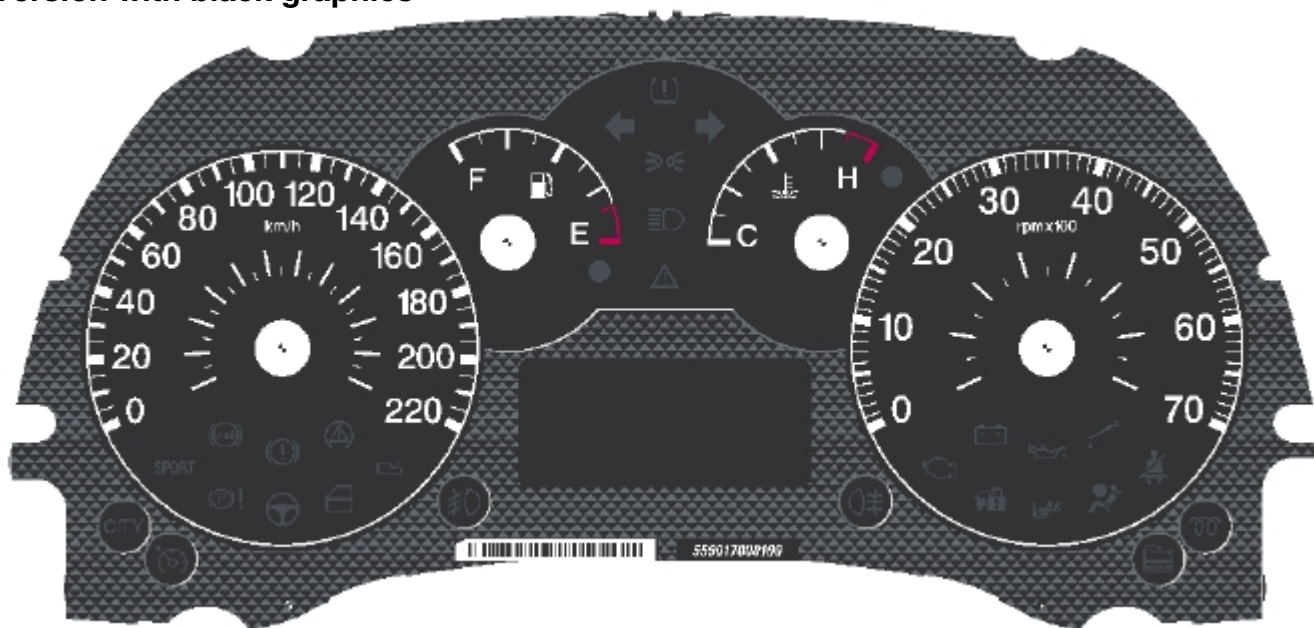
9.2.4 Node Instrument (CPI):

Features

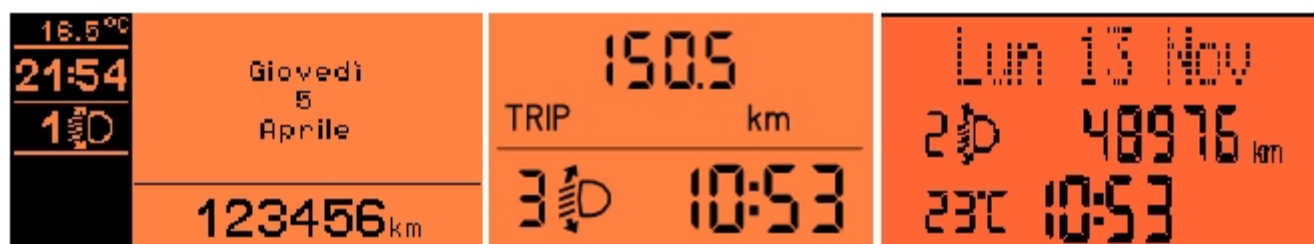
The study of the instrumentation of 199 was characterized by establishing a "*family feeling*" With the other Fiat models of her generation, such Stilo, Punto Face Lifting, and Panda, all characterized the surrounding light orange.

Node Framework Tools (IPC) is an electronic component connected to the B-CAN and all ' cables along the bridge, captures some user controls and manages the menu 'car and Control of 'set-projectors. The connector is also provided for interfacing discrete with other vehicle systems (motor control) and is available in two versions with three types of Display:

Version with black graphics



PLANT	Fiat Auto S.p.A.	
ELECTRIC	TRACK TEACHING FIAT PUNTO	After Sales Training

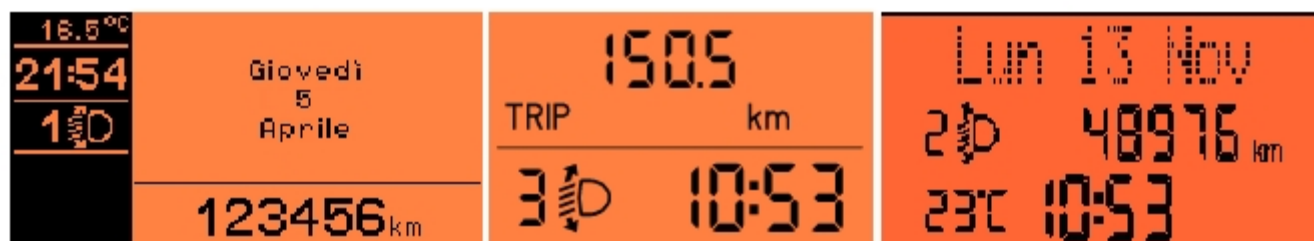
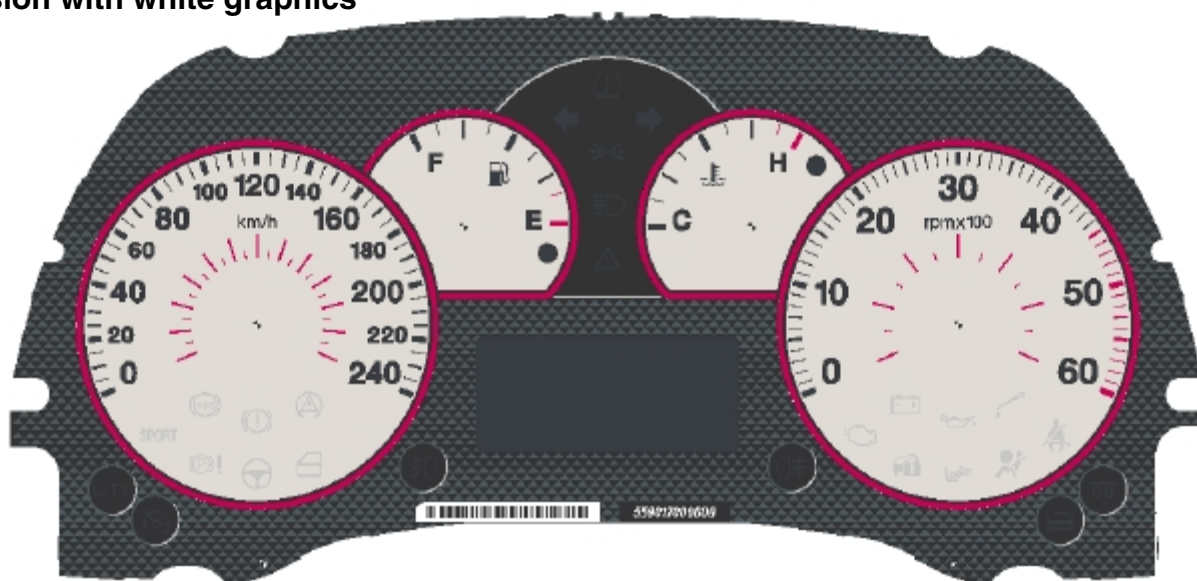


Display Modal

Display facilities

Display MATRX

Version with white graphics



Display Modal

Display facilities

Matrix Display

It's a panel with reconfigurable display matrix, connected to the B-CAN unified drive versions for left and right, and it includes various indicators.

The electronic architecture of the indicators is realized by a microprocessor and stepper motors step, with guaranteed precision and continuity (no shots and jamming) of full scale and reading within the boundary conditions of operation.



With 30, 28 and 23 LED lights up pop (Modal order, facilities, Matrix) - contrast negative (2 predispositions lights activated by the CAN network).

Speedometer

The instrument panel Maggiore slightly the actual speed value, for reasons of safety. The increase is a calculation dependent on the context. At Key-ON, the indicator goes value 0 (zero) km / h (or mph / h) and the instrument panel then displays the information car speed.

Rev counter

At Key-ON, the indicator takes the value 0 (zero) RPM and the instrument panel displays then the information of engine revolutions. It 's also a logic Sway tachometer in conditions of the engine is running at a minimum.

Fuel gauge

After 2 seconds the Key-ON, the indicator displays the fuel level information.

The 'indication corresponding to' start of the "fuel" is colored red, and the light inherent is made with amber LEDs, positioned in the graphical indicator. The calibration indicator guarantees maximum precision at the beginning of the red zone.

Engine coolant temperature indicator

After 2 seconds the Key-ON, the indicator displays the temperature information liquid engine cooling.

The 'indication corresponding to' start of the "danger zone" is colored red, and the light inherent is made with red LED, located in the graphical indicator. The calibration indicator guarantees maximum precision at the beginning of the red zone.

Behavior of 'index:

- If the temperature is 50 ° C the index is positioned on the first notch / graduation of the scale.
- For temperatures between 50 ÷ 80 ° C the index moves in a linear fashion.



- For temperatures from 80 to 115 ° C (*normal operation*), The index remains in stable position to the center.
- For temperatures between 115 ÷ 124 ° C (upward) and between 120 to 115 ° C (downhill) index moves in a linear fashion.
- For temperatures up to 124 ° C (uphill), the index remains at the start sector red danger scale (124 ° C to 130 ° C).
- For temperatures of 124 ° C you turn on the lamp max. coolant temperature engine and at the same time the index is positioned at full scale.

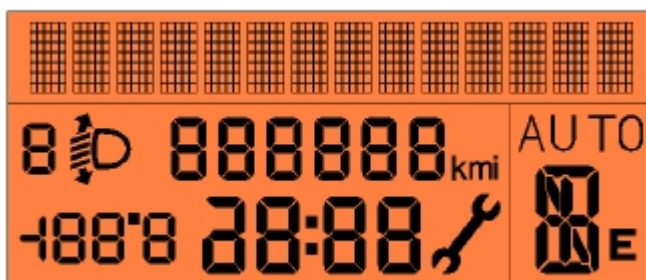
MODAL framework Edge

Dimensions
Viewable area
Supply



Panel edge COMFORT

Dimensions
Viewable area
Pixel size
Max size interpixel
Supply



OBD MATRIX

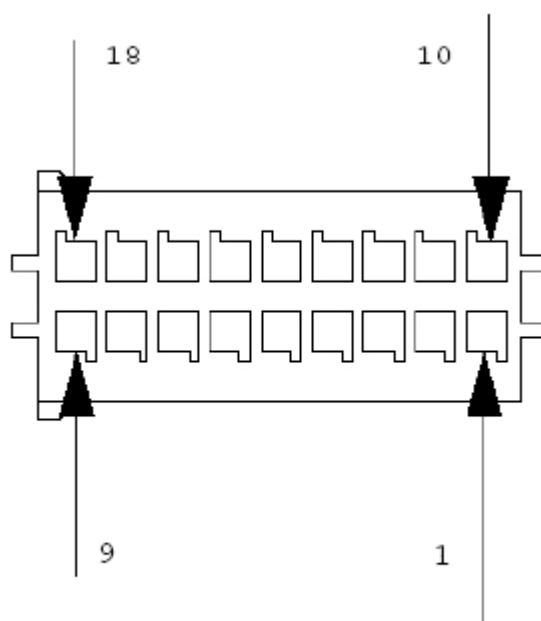
Dimensions
Viewable area
Pixel size
Max size interpixel



Location of vehicle

The IPC has its place in the driver's side dashboard.

Pin in / out Picture Tools



0/08347/07
E003-PA



PIN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

IPC Functions

Acquisition of the line CAN-B signal was AirBag (ON, OFF, Flash) comes from the SDM.

Transmission on the B-CAN, through the signal light Airbag, Status Indicator

Airbag (ON, OFF, Fail)

Diagnosis of light and airbag warning light Front Passenger Airbag Deactivation and storage in IPC for service (permanently until they are repaired).

If the signal is from B SDM-CAN is late, the 'CPI must accenderer the airbag warning light.



Trip Computer

The trip computer allows you to view the display on the instrument panel, the relative quantities the route, consumption and mileage of the car.

Comfort for executives and Matrix are two ways to Trip Computer (A and B) completely independent of each other, whose display on the display is activated by the pressing the "TRIP" (dedicated), located on the right lever of the stalk.

Modal is provided for under the single mode Trip A.

The display mode of display data from the driver follows an order set (see list below):

TRIP A

Distance traveled
Autonomy
Average consumption
Average speed
Walking time

Instant Consumption
Autonomy

TRIP B

Distance traveled
Average
consumption
Average speed
Walking time

The sizes displayed can be expressed according to the Metric System (Km, km / h, km / l, l/100km) or according to the Imperial System (mi, mph, mpg), chosen by the driver (see menu set-up).

The 'reset the Trip Computer (new mission) is made:

- "Manually" from the user, through the long press of the button "TRIP"
- "Automatically" when the distance reaches its maximum value [9999.9 km (l) for executives Comfort / Matrix or 3999.9 km (mi) framework for Modal] or when the time -
- Distance reaches the value of 99:59 (99 hours and 59 minutes)
 - After each reconnection of the battery.

© 2005, Fiat Auto S.p.A. - All
rights reserved



On reaching the maximum mileage on the odometer displayed partial, it display returns to 0.0.



Example (for framework Modal)

Voices of the Trip Computer

Autonomy [Km] or [l]: indicates the estimated distance still possible through the fuel time contained in the tank and assuming to continue to run maintaining the same driving behavior.

Distance traveled [Km] or [l]: shows (from 0 to 9999.9 square for Comfort / Matrix, from 0 to 3999.9 framework for Modal) the distance traveled by car from the beginning of the mission, ie when a reset is performed by the driver. The indication is consistent with what displayed on the odometer total. The display is updated every 0.1 km.

Average consumption [Km / s] or [l/100km] or [MPG]: indicates the average since the beginning of the mission. For the

Modal is not under the selected units [km / s].

Instant fuel consumption [Km / s] or [l/100km] or [MPG]: indicates the current fuel consumption constantly. The driver to perceive the differences in consumption due to the driving style.

For the modal framework is not the selectable measurement units [km / s].

Average speed [Km / h] or [mph] is calculated from the start the mission.

Walking time [Hh: mm]: indicates the time elapsed since the beginning of the mission between 0:00 and 99:59,

with resolution and update equal to 1 minute. The maximal value possible, the count is reset automatically.



Menu Set-Up

The functions of the menu set-ups are activated only when the car stops at exception of the function: "Speed limit" (selection on / off and speed limit threshold speed limit).

By pressing the buttons "Menu / Esc", "+" and "-" you can make different operations of choice / adjustments / settings screen sizes.

If there is no operation for a period of time, is restored standard screen.

Modal panel:

Speed selection and setting of the threshold limit speed: words "SPEED" in place odometer, written "km / h" or "mph" depending on the unit of measurement set, "OFF" or "ON" and speed limit to the place of the clock, with the range between 30 and 250 km / h (20-155 mph) and step equal to 5 km / h (5 mph)

Setting the clock: with the word "Hour" in place of odometer

Adjusting the buzzer (only for alarms / faults / warnings / keypress) from 0 (mute) to 7 (Vol. max.) With the word "buzz" instead odometer

Setting units of measure (distances): word "Unit" instead odometer

Paintings Comfort / Matrix:

Speed selection and setting of the threshold limit speed

Twilight sensor sensitivity level adjustment (if any)

Activation / deactivation Trip "B"

Adjusting Clock and 12h/24h time format

Setting the date

Repeat on / off audio information

Enable / disable automatic locking doors / trunk more than 20 km / h

Setting units of measurement (distance, fuel consumption, temperature)



Setting the language (English, Italian, German, Portuguese, Spanish, French, Dutch, Polish)

Volume buzzer for alarms / faults / warnings

Buzzer volume button operation (roger beep)

Reactivation Seat Belt Reminder

Showing maturity coupon (km / mi)

Activating / deactivating the passenger airbag



Initial Setup - Initialize tools

The following table shows the settings of the tools that the customer finds the time

Purchase:

Feature
Speed Limit (On / Off)
Speed Limit (Threshold)
Sensor sensitivity twilight (1 ... 3)
Trip B (On / Off)
Setting the clock (Hh / mm)
Time format (12h/24h)
Setup Date (Dd / mm / yyyy)
Repeat info Audio (On / Off)
Lock doors / trunk speed> 20 km / h (On / Off)
Units of distance (Km / mi)
Units of consumption (Km / l, l/100km, mpg)
Units of temperature (° C /



° F)

Language

(Italian, English,
German, Portuguese,
Spanish, French,
Dutch, Polish)

Buzzer volume (0 ... 7)

Volume keys (0 ... 7)

Reactivation SBR

Service (km or mi)

Activation /

airbag deactivation

passenger



Report Planned Maintenance (paintings Comfort / Matrix)

When the scheduled maintenance (so-called "cutting") is about to expire provided, appears automatically at the Key-On (check after the procedure initial), the message "Service" icon and "wrench" and the number of miles (or miles) that are missing to the maintenance of the vehicle.

The display screen of the display information can also be request by the user, selecting a specific item from the menu Set-Up, regardless of the deadlines: the display shows the miles (or miles) missing. In this case "Wrench" appears.

The plan provides for Planned Maintenance No. 9 "coupon", structured in such a way that each takes place within 30000 km (or 18000 mi) from the previous year.

Display automatically

The first expiration message is displayed automatically once the key-on if the miles (or miles) to maturity are planned 2000 km (1240 mi).

Subsequently, the message is displayed once the key-on with the following thresholds:

1800, 1600, 1400, 1200, 1000, 800, 600, 400, 200, 100, 50 km

1240, 1116, 992, 868, 744, 620, 496, 372, 248, 124, 62, 31 miles is no longer displayed during the period.

Reached the expiration limit (0 km / mi), displays the message "Service expired ". The display can be stopped by pressing the "Menu / Esc" to part of the driver.

Viewing on request

The term can be viewed on demand at any time via a specific entry Menu Set-Up.



Reached the expiration limit (0 km / mi), displays the message "Service expired".

Once you finish viewing the 9 coupons

After exhausting all 9 coupons no longer receive any message automatic and can no longer be required to select the corresponding menu item set-up (No longer active).

Reset the part of the service network

At each scheduled date, you must:

reset the counter "km" (or miles) to the baseline values, with the aid of diagnosis;

store the successful completion of scheduled maintenance (service); must

thus cutting off the last remaining trace occurred, by indicating: date

cutting / no cutting done / kilometers covered. These stored data are retained even in case of disconnecting the vehicle battery.

Replacing the dashboard

When replacing the control panel:

restore km / paths I present nell'odometro total;

read the number of coupons made and rewrite them in the new instrument panel:

read the counter km / me missing the next scheduled maintenance planned and rewrite them in the new panel.

Other functions:



Watch.

For pictures and Comfort Modal indication of hours / minutes is always present is the Key-
Key to the ON-OFF. Matrix framework for the indication of hours / minutes is displayed only at
Key-ON, Key-OFF to the clock is not displayed.

The time adjustment is a menu item set-up.

For Comfort and paintings by Matrix Set-Up can select the "24h" (0-23h) or
how "12h" (1-12 h). The indications "AM" and "PM" is not displayed. For the control
Modal you can see the only way "24" will not being present on the item
the setup menu.

Headlight alignment corrector "C.A.F."

Correction Headlamp provides 4 default locations of vertically oriented
projectors.

These 4 positions are obtained by pressing the "+ CAF" (the beam lights up) and "CAF-" (the
light beam is lowered): an electric motor located inside the projector will rotate
parabolas in an automatic way.

The current position of the projector is indicated by the icon on the control panel of
inclination projectors and by the corresponding number (0 to 3).

The buttons on the CAF are active only at key on and with the low beams on.

A key-off, the function is disabled and the instrument panel stores the location of
Headlight alignment correction. When the low beams are no longer active, handling
is insensitive and maintained the current position of the parabolas headlights.

At Key-On and in the presence of low beam control active, the symbol is lit
"Corrector Headlamp" and the number of current position on the display by
instruments.

On shutdown for low beam, the symbol and the relative number is turned off and is
off function.



Function "speed limit"

E 'can set a limit speed (range between 30 and 250 km / h step of 5 km / h; steps of 20-155 mph and 5 mph) that, when exceeded, the following active reporting procedure to the driver:

Viewing its message over speed limit. For the modal framework:

written "Speed" setting (instead odometer), written "km / h" or "mph" on the second unit measurement set and fixed written indicating the speed limit exceeded with the unit of measurement km / mi (instead of the clock).

Acoustic signal of the buzzer.

The message disappears concluded the cycle of warning and / or when the vehicle speed drops below 5 km / h (or equivalent value in mph) relative to the value set limit.

"Follow Me Home"

Lets have a 'timed lighting outside the car (low beam) also the car is turned off (to return home, security, etc..).

The display on the instrument panel displays the message "F XXX" or "Follow me xxxS" where:

- "F" (for the framework Modal) or "Follow me (for executives Comfort and Matrix) is the message

"Follow Me Home"

- "XXX" are the second set with lighting stalk. To the max. are

7 pulses allowed the stalk (210 seconds)

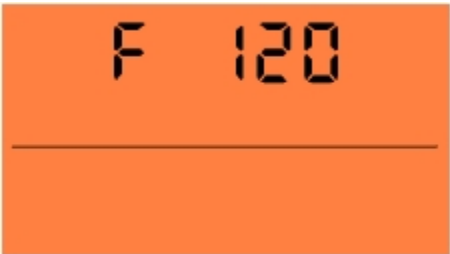
The display of the written persists for about 20 seconds of the last pulse given, unless deactivation of the function (from stalk).

EXAMPLE (for the framework Modal)

Fiat Grande Punto

426/534

© 2005, Fiat Auto S.p.A. - All rights reserved



Function Duallogic (automatic transmission) (paintings Comfort / Matrix)

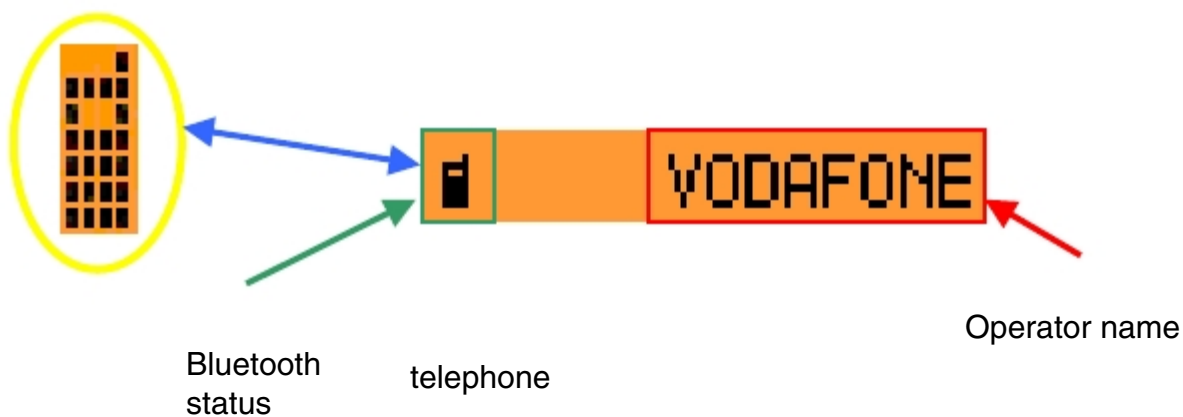
The instrument panel is able to handle all the functions related to the views concerning the automatic gearbox.

The exchange of information is always kept this in any condition operation.

Views phone Convergence (context Comfort)

The picture shows the status Convergence:

- State BLUETOOTH
- Name telephone operator

**Example**

The panel also displays information sent from Convergence through a multi-message dynamic. The number of frames that can be received depends on the number of characters sent by Convergence.

TTS LEVEL 

MARIO ROSSI

▲BOOK / LAST▼

Examples

Convergence of views (Framework Matrix)

Views phone

Shows the status information sent from Convergence and Convergence of a single screen.

Views Navigator

Displays the following information:

Pictogram navigation

Distance to next turn

Unit of measure

Street Name

Logistic Mode

The function can be activated / deactivated only by Network Diagnostics, reduces consumption (power consumption) to prevent battery drain.

In particular, the control panel inhibits the following views (in the key-off and the key-on):



watch

Odometer (also opening / closing the front doors)

Warnings and alerts

Viewing messages (pictures Comfort and Matrix)

The messages on the display are divided into four different classes:

Abnormal high priority

Abnormal background

Information (eg doors / trunk open)

Feedback (eg ASR on / off)

The occurrence of faults on the car, you see:

the light (and / or icon on the display matrix) corresponding to the anomaly

the message corresponding to the description of the anomaly and / or actions to be performed by

of the driver. The display is illuminated with the maximum intensity (with the exception of the

"Danger

ice "and the feedback messages).

For the most relevant reports will also sound an audible

simultaneously to display the message. All information contained

in the display area for displaying the messages are being replaced by

information about the anomaly.

The messages are repeated at every key-on until it is resolved the cause of the

malfunction. In any case, the display can be interrupted by the pressure of the

"Menu / Esc" by the driver. After viewing the message and

If the trouble condition persists, the light stays on (and / or icon of Matrix framework).

In case of multiple faults present simultaneously, the display in a "rolling"

each of the posts / ideograms relating thereto for the duration of a cycle of display.

All messages in the four classes described above are managed:



Framework for Comfort: String display with 1.5-second duration each and a maximum of 5 rows, making up a display cycle framework for the Matrix of single screen

The display duration can vary depending on the class of the message itself:

- High priority anomalies: 20 seconds (for square matrix) or 8 cycles (for framework Comfort)
- Anomalies background / information: 10 seconds (for square matrix) or 4 cycles (for square Comfort)
- Feedback: 5/2 (for square matrix) or 1 cycle (for framework Comfort)

Abnormalities that require checking with the engine running:

The following reports are to be displayed only with the engine running:

- Icon "battery charge" (Framework for Matrix)
- Message "Insufficient engine oil pressure"
- Message "Have engine"

Viewing messages (framework Modal)

The framework Modal anomalies are indicated by the lighting of the lamps for.

Also see the following messages:

- Exceeded the
- speed limit (for
10 seconds)
Intervention
inertia switch:
is displayed, in
place
odometer, the
relative

message, which will remain fixed until such intervention remains.

Exceeding speed limit

Intervention
inertia switch

Buzzer (Buzzer)

Some features and warnings are also indicated by a beep.

The instrument panel has a buzzer (beeper) system, which performs the following functions:

Fiat Grande Punto

430/534

© 2005, Fiat Auto S.p.A. - All rights reserved



- Alarm signals / warnings / hazards;
- Reports required by automatic gearbox (if present);
- Reported Parking sensors (if present);
- Warning safety belts;
- Tic-toc directional lights / emergency;
- "Roger Beep" button operation.

The acoustic signals may be different in intensity and frequency, depending on the function reported.

The relative volume of the alarm can be set to a value of zero

(Excluding signaling) except for the automated transmission of reports, sensor parking, SBR and tic-toc directional lights / emergency for which there is a minimum volume different from zero.

The priority of access between the various signals is controlled by a table of priorities under board.

Diagnostic LEDs

Is scheduled for the following indicators of the diagnosis LEDs (if present): dashboards store and transmit over the CAN network status (ON / OFF) of lights and the presence or absence of their possible failure:

Handbrake on / low brake fluid level / EBD failure

ABS system failure

Intervention / ESP system failure

Failure plant AIR-BAG

Disable AIR-BAG passenger

Seat belts are not fastened (SBR)

Failure of electric driving

Reporting seat belts are not fastened

It can be 3 types, in automatic mode:



A) *Cycle of the first warning:*
Signaling by indicator.

The indicator "safety belt" indicates that the failure to lock the seat belt itself (Driver or passenger side), lighting up steadily since the key-on.

B) *Cycle of Warning:* Signaling via LED + buzzer.

The indicator on the dial flashes and the buzzer sounds so intermittently over a period of time equal to 90s if there occurs any of the following conditions:

Elapsed time of 60s and vehicle speed > 10 km / h

Vehicle speed > 25 km / h

Distance traveled > 500 m

If the belts are fastened throughout the cycle, the cycle stops warning and automatically repeats itself only when it is detected again the condition of belt not connected.

How to exclude cycle Warning : The driver can deactivate the warning cycle in temporarily before the key-on (hooking up your / belts and front / s, holding / and at least 20s with key on and slacciandola / s) or permanently, only through the intervention of 'Technical Assistance. The warning becomes active again at any Key-on (if mode of temporary exclusion).

How to wake cycle Warning : The driver can activate the warning cycle (if permanently disabled) through the intervention of the Technical Framework for Modal or through a special item of the setup menu for executives Comfort and Matrix. This item disappears after Returning the cycle of warnings.

Display of outdoor temperature

Available pictures for Comfort and Matrix.

The 'external temperature indicator (if present on the sensor) is guaranteed provided of the standard screen.

And 'possible to select from the menu of the Set-Up Unit of measure: in degrees Centigrade "--- ° C "or degrees Fahrenheit" --- ° F ".



Danger / warning: "Ice"

Available pictures for Comfort and Matrix.

In order to warn the driver of the possible presence of ice on the roadway, where the external temperature detected is less than or equal to 3 ° C, the display of the picture type Comfort, it displays the warning message:

the outside temperature flashing (for the duration of the message)

its icon (a "snow") (Matrix part only)

The reporting cycle is executed once after detection of the temperature external equal to 3 ° C and can be repeated only if the same temperature reaches the T value > 6 ° C and then again at T > 3 ° C.

Danger / warning: "Door / boot open"

In order to warn the driver of the presence of one or more doors or boot open, is displayed on the display the corresponding message as soon as there is an opening.

The indicator / icon remains on until the car has all the doors and the trunk fully closed. Also an acoustic signal is activated with the doors open and moving car.

Tyre Pressure Management (OPT TPMS)

Available only on boards Comfort and Matrix.

The TPMS monitors the tire pressure monitoring two thresholds corresponding to conditions of insufficient pressure and drilling.

Upon successful completion of each of these thresholds will trigger the warning light / icon signal and the corresponding display message. In the event of a puncture, the framework also sends an acoustic signal.

There is also a signal (light / icon + message) failure TPMS.

Operating conditions

During the starting phase of the thermal engine are subject to the following degradations functional:

loss of the display backlight

dimming of the backlight panel (graphics and indexes)

Exhausted all the transition functions are restored.

However, must be guaranteed at this stage, even upon a possible reset during the cranking, maintenance and reuse of data in memory for:

Clock / Date

Trip Computer (A and B)

Trip Odometer (which is part of the Trip Computer)

They are also not permitted following the loss of data / parameters:

Total Odometer

logical parameters for display and calculation (eg thresholds Sway tachometer, check times, recovery times, delay times, etc ...).

data EOL, Proxi, DTC

levels of CAF and the level of attenuation luminosità (dimming)

setting parameters (setting) of the set-up menu stored by the user

Following the reset while cranking the framework must also:

- Perform a consistency check on the data not be stored in EEPROM and restored

valid data

- Restart the step of checking at key-on as follows:

Check spies: again for the lights controlled by the framework, continuous lights controlled by signal discretely

Indicators: zeroing is allowed to make full recovery

Phase "Check the Key-ON" again.

Messages Auto Service: are redisplayed.

Check the Key Step-On

Fiat Grande Punto

434/534

© 2005, Fiat Auto S.p.A. - All rights reserved



For each Key-On begins the phase of checking of all the electronic control units on board vehicle with the ignition of some lights on the dial.

For dashboards Comfort and Matrix:

The picture shows the standard display (time and date).

If the phase of the check showing abnormalities, they appear after 5 seconds the key-on.

Lighting

The lighting in the instrument panel is divided in different modes, as follows:

active with the lights on: indicators, graphic display

working with key inserted (key-on): display

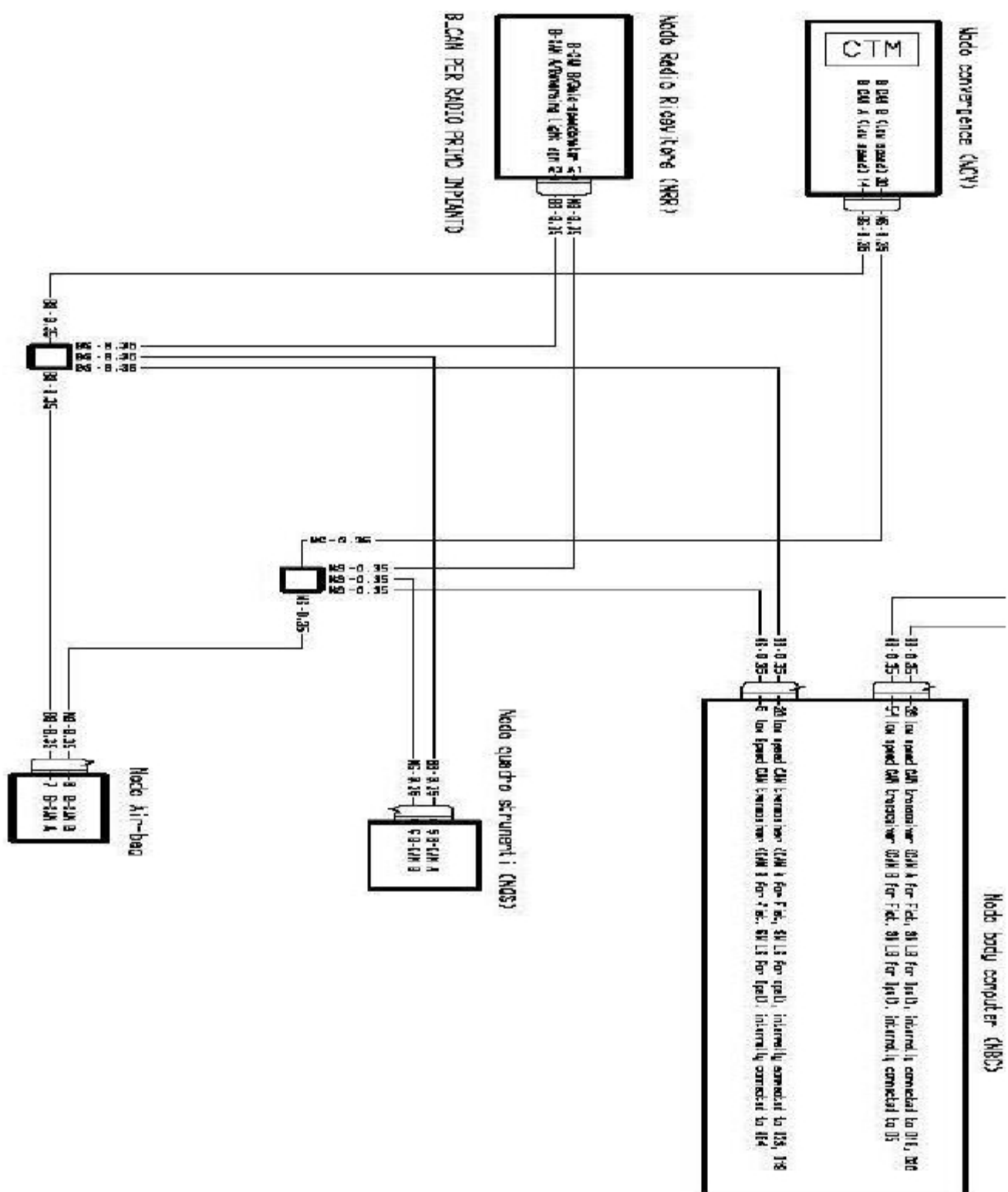
9.2.5 Form controls stalk (CSM):

The column switch module CSM commands includes commands outdoor lighting (lights on the lever to the left) and controls wiping and washing windows / rear window (located on the wiper lever right).

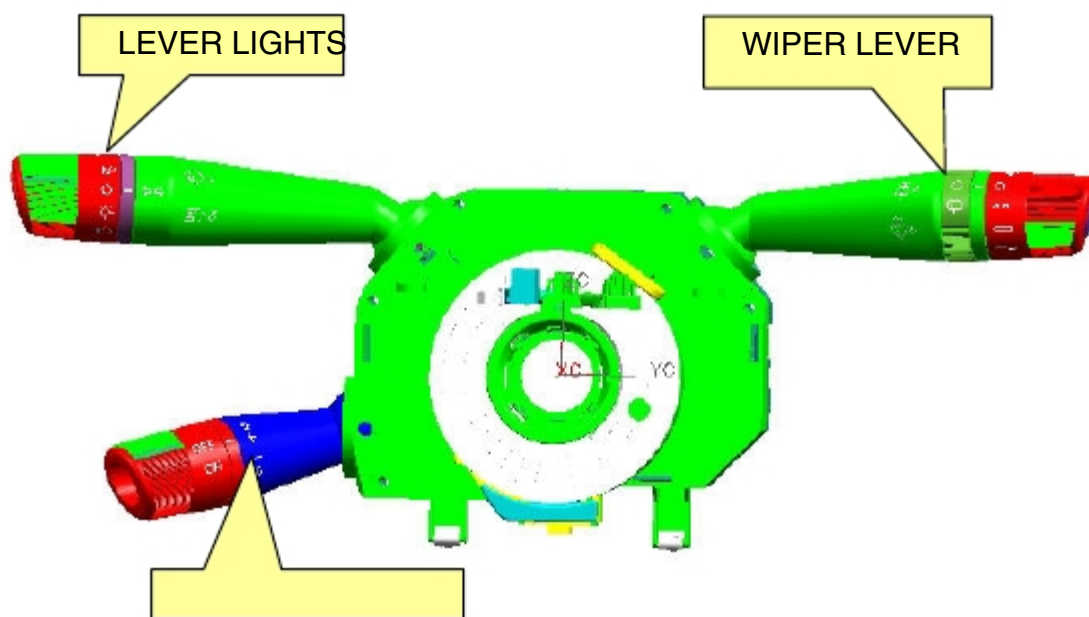
The module can 'hold the Trip This feature on all specifications and function Cruise
Optional control

It connects via the 'Together cable bridge.





Generality



Lever controls the light



The commands associated with this lever are:

Switch lights;

Switch Flash Lights - Dazzling fixed;

Direction lights and lane change;

The controls made operating the levers in the following ways:

Movement on the plane of the steering wheel in both directions and two-step (the first unstable, the second stable);

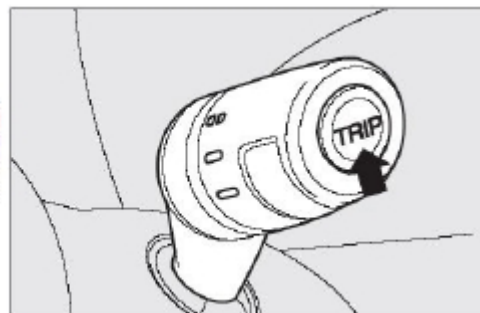
Movement toward the driver to pull double release (unstable);

Rotating bezel with 3 or 4 shots;



Switch lights: is a ring 3 position STABLE placed at the end of the lever and is driven rotating it along the axis of the lever.

Wiper control lever



Command wiper: the windscreen wiper is controlled by a ring 3 position STABLE placed at the end of the lever and is operated by turning along the axis of the lever. And 'possible choose between 3 speed: intermittent / automatic, continuous speed first, second constant speed.

Command washer: the command to enable the bidirectional pump for the washing of the front window is done by pulling the lever toward the steering wheel. The drive is UNSTABLE for which the lever is released it must return to the rest position by reopening the contacts.

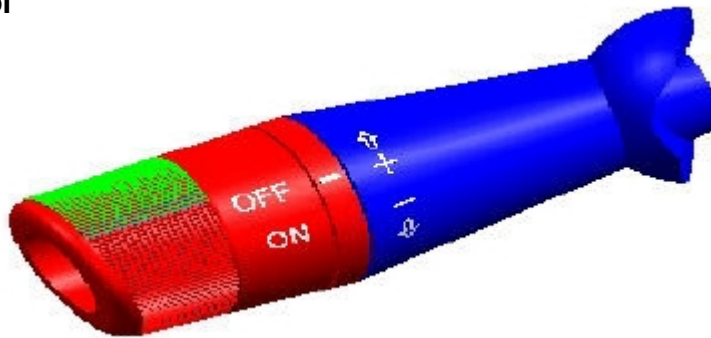
Rear wiper command: the rear wiper is controlled by rotating a ring with 2 positions STABLE placed in the middle of the lever.

Command Rear window washer: the command to enable the bidirectional pump for the washing of the rear window is achieved by pushing the lever towards the dash. The drive is UNSTABLE for which the lever is released it must return to the rest position by reopening the contact.

Key function for TRIP: pressing the button UNSTABLE placed at the end of the lever, is controlled at the edge of the TRIP board.



Lever-Cruise Control



The system, operated by the engine control unit, allows to easily maintain the car speed set, regardless of variations of driving conditions

Functions of Devio Guide

Switch Flash Lights - Dazzling fixed: the command "Flash Light" by pulling the lever from the rest position towards the steering wheel rim and not overcome by making the first Shooting (contact "flash lights"). The drive is so UNSTABLE release lever to this must return to the rest position by reopening the contact "flash lights".

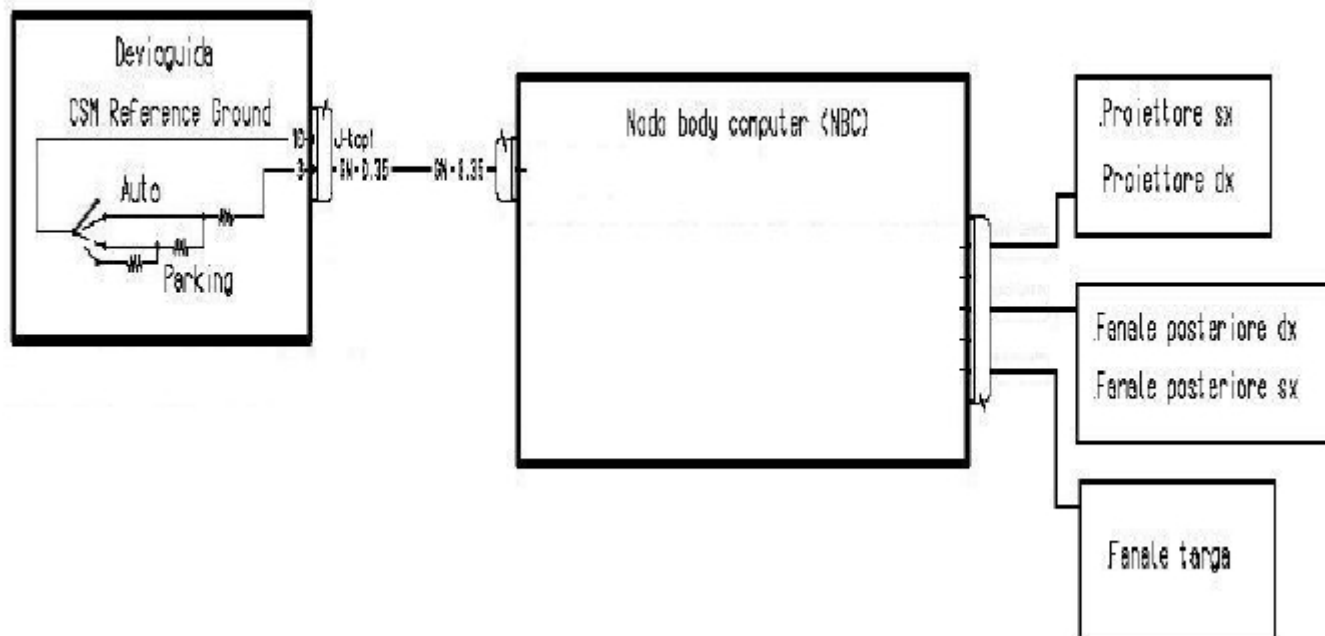
The "High Beam fixed" it by pulling the lever as the lights flash but making make a longer stroke, up to the second step (contact "bright lights"). Also in this case, the drive is of type UNSTABLE (the return to the rest position of the lever makes reopen contact order "bright lights" and "flash lights").

To turn off the headlights should be re-pull the lever up to the high beam position, as for the ignition.

Light switches direction and lane change: command is obtained by making the lever translations of the plane of the steering wheel in both directions, at the top and bottom. The translation of

lever, for each direction of rotation, comprises two distinct modes of activation of the same electrical contact, UNSTABLE defined a "lane change" and a STABLE defined "change direction." The "lane change" is enabled with an angular lower than that required for activation of the "change direction".



Schema activation Lights

Wiping manual mode: moving the ring of column switch lever, located at right of the driver, on one of three positions:

intermittence

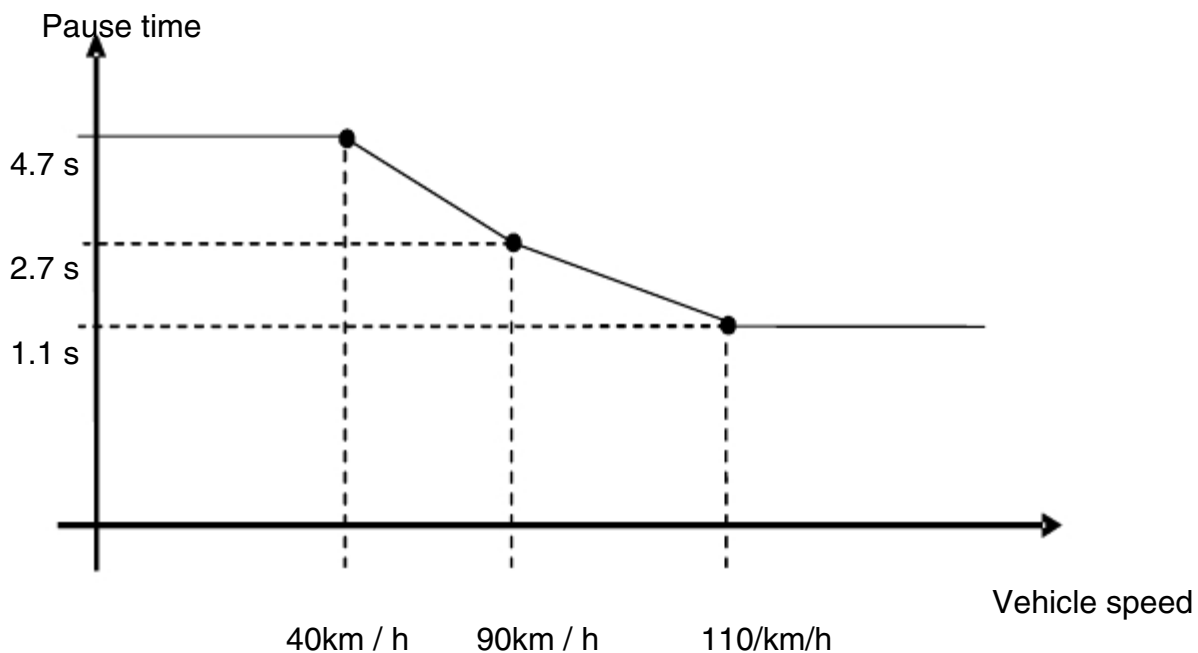
first constant velocity

second continuous speed

Is obtained by the actuation of the wiper motor as follows.

Blinking: The wiper is driven at the speed before but with a pause between stop and another, variable depending on the speed the car, following the chart below:





First speed continuous: the wiper at first speed is controlled to 45 beats / minute

Second-speed continuous: the wiper is controlled at the second speed to 65 beats / minute.



Wiping auto mode (rain sensor):.

The rain sensor is activated by moving the ring of the right lever in the position of the stalk intermittently-automatic. In this way we obtain the adjustment of the frequency of beats of the wiper according to the quantity of water present on the windshield.

This frequency can vary from no stroke (not present rain - dry crystal) up to the second constant velocity (heavy rain - wet crystal).

Activating the rain sensor controls the execution of a stroke of the wipers as feedback of insertion of the sensor. The user can vary the sensitivity of the rain sensor, acting on the menu set-up of car dashboard.

If you turn off the car leaving the ring of the handle to the intermittent-automatic, at the next start, is not performed any wiping cycle even in the presence of rain, this allows to avoid accidental actuation.

To restore the automatic operation of the system, the user must move the ring from Intermittent automatic position-position return and any other intermittently-Automatic.

By restoring the operation of rain sensor wiper sweep occurs, regardless of the conditions of the glass to alert you to the reactivation occurred.



When you move the ring of column switch from position 1 to position speed ^ intermittently-automatic, runs the wiper sweep of successful activation of rain sensor.

If during operation of rain sensor will change the sensitivity, increasing the value, one wiper sweep is performed to confirm the change has been made.

In case of failure of the rain sensor (sensor failure), you have the following strategies:

If the failure occurs at 'activation (action of the ring from its resting to

Auto-position intermittent) wiper is controlled immediately intermittently, regardless of whether or not to rain on glass

If it occurs during the operation (ring already in place intermittently-automatic: rain sensor activated): the wiper is controlled according to the last command sent by rain sensor until the user does not select other speeds (first and second, continuous) or disable the operation of the wiper (the OFF position of the ring) in the case in which to conduct an maneuvers of the above mentioned a possible call of the position intermittently-automatic, runs into intermittent wipers, regardless by the presence or not of rain on glass.

In any such case, the instrument panel indicates the failure of the sensor, this allows user to highlight the incorrect operation of the sensor. The indication of failure remains active until the fault disappears.

Cleaning intelligent front: Pulling the right-hand column switch will result in the actuation of the washing front. Maintaining more than 0.5 sec, the lever is pulled in more will get the automatic operation of the wiper in the first constant velocity. When you release the command as well turn off the washing will be carried further 3 beats cleaning windshield plus an additional brushed after 6 seconds (to remove any dripping).

In the case where, before the command of washing by hand lever, the wiper had already been actuated, the logic of intelligent washing shall have effect only in the activation of the same intermittently.



Operation in manual wiper: moving the lever ring

rear wiper column switch, located to the right of the driver activates the ON position

wiper as follows:

Intermittency: with a pause between a stroke and the other equal to 2.7 s

Slave to the wiper (in case of simultaneous request): synchronous operation at a frequency equal to half of the wiper

In continues, with reverse gear.

Intelligent Cleaning Rear: Pushing the right-hand column switch will result in the actuation of the rear washing. Maintaining more than 0.5 s the lever is pushed in more will get the automatic operation of the wipers in continuous speed. Controlled release well off the washing will be carried out further cleaning of the rear window 3 lines longer additional sweep after 6 seconds (to remove any drips).

In the case where, before the command for washing, as a lever, the rear wiper had already been operated,

the logic of intelligent washing shall have effect only in intermittent activation of the same.





Cleaning projectors: With dipped beam switched on, the cleaning request from the front stalk, is commanded to wash projectors for 1.2 s.

Cruise-Control function works: The system works by the following operations:

- Storage speed is reached, discrete and continuous increase in speed (set +);
- Storage speed is reached, discrete and continuous decrease in speed (Sep -);
- Call of the stored speed (resume).

A warning light on, turned the engine control unit, indicates the operation status of the system.

To activate the system, turn the dial "on / off" to "On" switch, bringing the vehicle to the desired speed (the speed of the car will still be greater than 40 km / h) and act on the commands "set +" or "set-" you can now release the accelerator and let operate automatically on cruise control.

This system can work within the allowed range of rpm of the engine and can handle vehicles with speed change both manual and Robotic, but the adjustment of system not involved in the following cases:

- Crowds
- Reverse
- 1st gear (with manual gearbox).
- At speeds below 40 km / h.

The cruise control can be disabled by simply pressing the brake or clutch pressure Button "res" (resume) then allow to bring itself under the conditions of speed previously set in memory.

If instead you type is not disabled by a request for acceleration of the driver (eg for a pass) but the car automatically returns to the set speed as soon as the accelerator is released.

The action of switching off from the main dial switches the system and remove any speed previously set.



For security reasons, the ASR (Anti-Slip) has priority on cruise control.
Has to intervene, it is automatically re-activate the cruise control function
at the last speed value stored in memory.

"Set" function: This function, activated by discrete action of the lever towards the + sign
or towards the - sign, you can set the cruise control and maintain the speed of
vehicle to the value corresponding to the instant in which the lever is operated.

Function "accelerated": This feature allows you to increase the speed of the car
previously set in the cruise control so as to generate, as long as the lever is
maintained operated in the +, a constant gradient acceleration. To
lever is released, the system maintains and stores the new speed reached by car.

Function "tip up": This feature allows you to increase the speed of the car
set earlier in the cruise control to a constant value to every short-acting
(Followed by release) of the lever towards the sign +, creating an increase of speed through
steps of equal width. the lever is released, the system maintains and stores the new
speed reached by car.

Function "decelerated" This feature allows you to decrease the speed of the car
previously set in the cruise control so as to generate, as long as the lever is
maintained in the driven direction - a deceleration ramp with constant gradient. To
lever is released, the system maintains and stores the new speed reached by car. The
system can only reduce the set speed and not the actual case the engine is already in
dragged (eg car and driving down long).

Function "tip down": This feature allows you to reduce the speed of the car
set earlier in the cruise control to a constant value to every short-acting
(Followed by release) of the lever towards the sign "-", creating a speed reduction through



steps of equal width. the lever is released, the system maintains and stores the new speed reached by car.

Function "resume": this function allows, by pressing the res, of the car back to the last value stored speed cruise control, if for special conditions (eg a pressure on the clutch or brake) the cruise control has been off. If the change is mechanical it is advisable to keep the same gear previously chosen.

If not yet been stored a speed value or if the conditions of the car does not permit, the keypress has no effect.

Function "on / off" This function enables and disables the cruise control system through actuation of the locking ring.

Manual disconnection:

Switch to dial in to the "off";

Switching off the engine or key-off;

Intervention on the brakes (including handbrake), remains the last stored speed set, called up by pressing the resume button (res);

Intervention on the clutch still remembers the last speed set, callable by pressing the resume button (res);

Request for change of gear by a lever with Dualogic gearbox in manual mode remains remembers the last speed set, called up by pressing the resume button (Res);

Vehicle speed below the minimum laid down (40 Km / h), still remembers the last set speed, recalled by pressing the resume button (res);

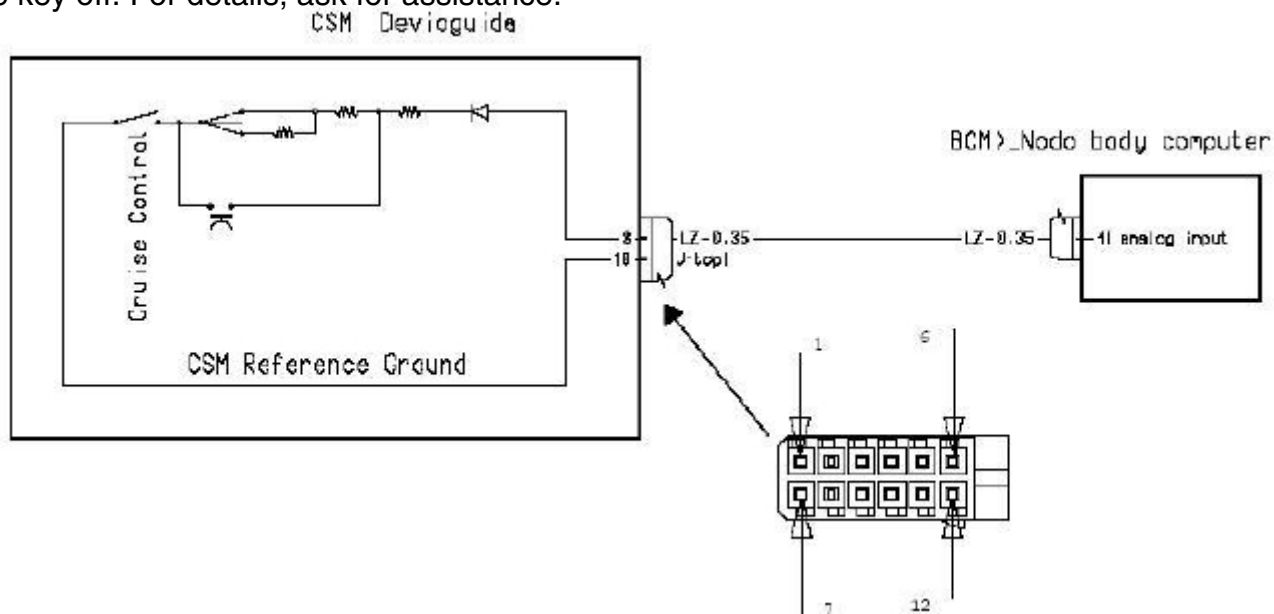
Intervention on the accelerator: in this case the system is not actually switched off, but the request of acceleration has precedence over the system, allowing the maneuver required by the driver, cruise control is active, however, no need to press the resume (Res) to return to previous conditions once the acceleration.



Automatic shutoff:

The cruise control is temporarily disabled in the case of ABS intervention or the VDC (higher than a maximum time allowed); still remembers the last set speed, recalled by pressing the resume button (res).

The cruise control is switched off automatically in case of accidental activation or misdirection keys on the lever, acceleration exceeding a predetermined limit, in this case it is possible restore function by acting at the main switch (On / Off) to OFF and Ignition and starting again from scratch in the operations of setting the desired speed. In the presence of faults on the cruise or the cruise control system is disabled until the engine the key off. For details, ask for assistance.

**9.2.6 Node Radio receiver (RRM)**

Node RRM Radio receiver is an electronic component connected to the network and to B-CAN. Along the bridge cables.

Node RRM Radio receiver interface is provided with an external audio amplifier, with the CD changer and an external module for the management of GSM systems (telephony) and GPS (Navigation).



9.2.7 Rear Parking Sensor Node (PAM)

Generality

The parking assistance system provides the driver when reversing, information away during the approach to obstacles behind the vehicle. This device can assist the parking maneuver, since it allows the identification of obstacles outside the field of vision of the driver.

The information of presence / distance of the obstacle is transmitted to the driver notices acoustic pulse, whose frequency varies with the distance of the vehicle from the obstacle. Integrating the visual information directly with the acoustic generated by the system, the driver can avoid collisions.

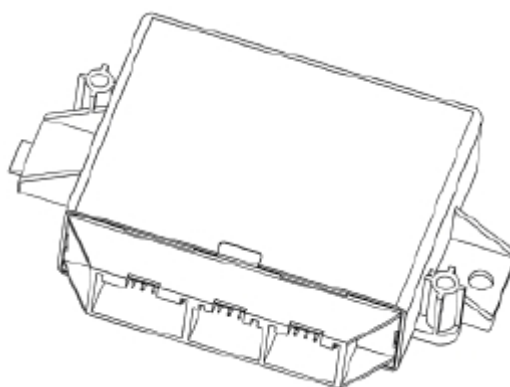
The parking sensor node PAM is an electronic component connected to the B-CAN and to 'Together cables to front body to act as a driving aid when maneuvering with reverse gear, rear recognizing obstacles. Parking sensors on Node PAM interfaces are provided for the sensors on the rear bumper, trailer for the control and a buzzer inserted in the Node framework tool IPC.

The parking assistance system of the new Fiat Punto consists of the following components:

- Ultrasonic sensors on rear bumper
- A dedicated electronic control unit



Ultrasonic sensor active



Design of
Electronic
Control



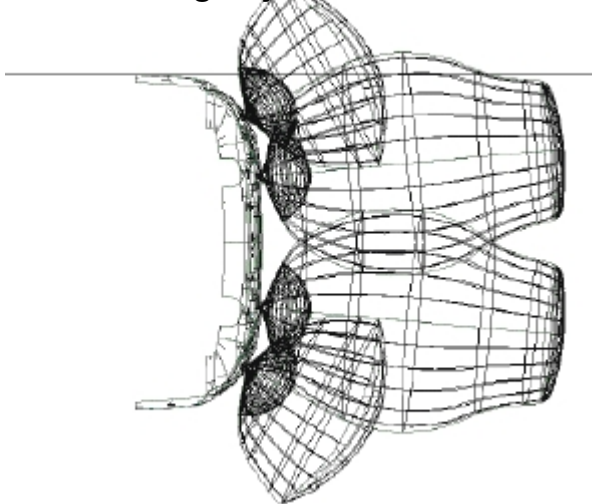
The electronic control unit activates and controls the functionality of the sensors, processes the signals

received and activates the buzzer.

The sensors are of the electronic components to the ultrasonic technology, and act as transmitters / receivers, intelligent, with a technique of triangulation: it allows a better detection in critical situations or in the presence of small obstacles.

The emitted pulses are reflected by obstructions in the path of reggio, the so transducer receives an echo which is converted into a digital signal and sent to the control unit electronics. The buzzer is located inside the instrument panel, also reported the activation of the system when reverse and the possible fault.

Area Coverage System



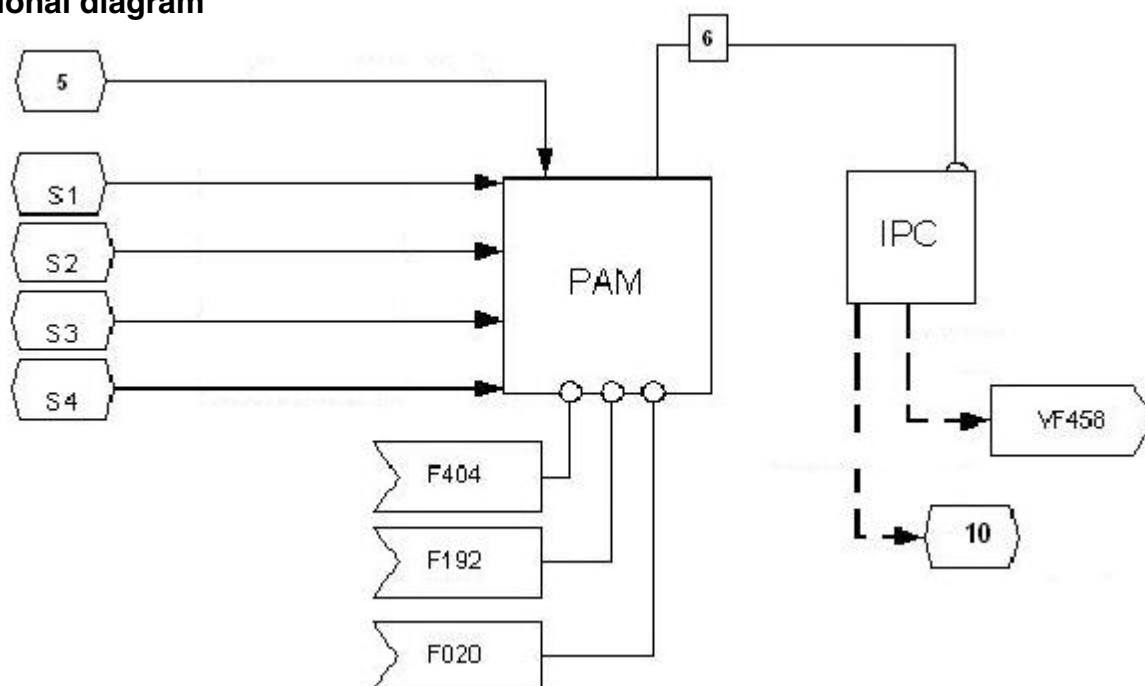
Functions Node parking WFP

- Acquisition of signals from ultrasonic rear sensors.
- Acquisition presence tow bar (when the tow bar is present the system must be disabled).
- Outside temperature signal acquisition strategy for diagnosis (see diagnosis specification).



- Management Parking sensors.
- Transmission on the B-CAN parking sensor for proper operation.
- Transmission on the line B-CAN for the request to the IPC of the activation of the acoustic signal
Discovery obstacle.
- Acquisition of the line CAN-B activation required the presence of tone
obstacle.
- Acquisition of the line CAN-B for the correct operation of parking sensor.
- Indication of system failure.
- Enable tone discovery obstacle.



Functional diagram

S1-S2-S3-S4

5

6

F404

F192

VF458

F020

10

Activation and deactivation of the system

When you turn the car (ignition key in position "Mar") is executed test of self-diagnosis unit and sensors, the system is activated when you insert the reverse and turns off when the reverse gear is disengaged.

The acoustic signal emitted by the system alerts the driver that the vehicle is approaching an obstacle. It is formed from sound signals to pulse, the duration of the signal is constant,



while the pause between the signals is directly proportional to the distance of the obstacle: pulse in rapid succession indicate the presence of an object very close.

A continuous signal indicates that it is at a distance from the obstacle less than 30 cm. If they are multiple obstacles, it is reported that more closely approaching. The acoustic signal ceases immediately if the distance of the obstacle increases.

The cycle sound remains constant if the distance measured by the sensors central remains unchanged while, if this situation occurs for the lateral sensors, the signal is interrupted after 3 seconds (to avoid such warnings when maneuvering along walls parallel to the axis the vehicle).

Is not carried out signaling of obstacles in the event of presence rear trailer.

The system covers the middle zones and side rear of the car.

In the case of an obstacle placed in the posterior median area, it is detected at distances less than 1.50 m. In the case of an obstacle placed in the lateral area, this is recognized in distances of less than 0.6 m.

Working Conditions

Working Conditions

Ignition off (+30)

Ignition on (+15)

Timed with ignition off

Off during startup

Off with Low battery

Diagnosis

At the power control unit performs a self-test diagnostics and sensors.

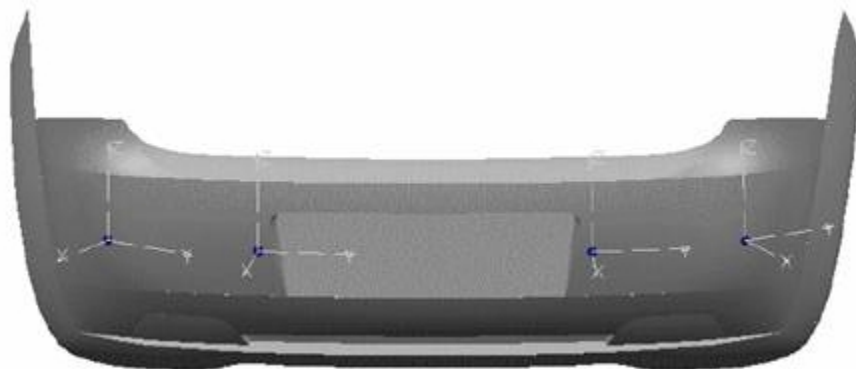
The sensors are diagnosed continuously during operation of the system.



The failure of even one sensor inhibits the functioning of the entire system: in this case the system is self-rule and sends a failure message.

Any faults / errors are reported immediately via the control panel and acoustically.

Positioning of Sensors maximum



9.2.8 External Audio Amplifier for hi-fi

The external audio amplifier is an electronic component connected via the 'Together cables body to front. The 'audio amplifier receives the signals from the audio outputs of the radio receiver node

RRM. RRM from the Node radio receiver also receives the consent for activation.

9.2.9 Cable Coiled

The coiled cord is a component of interconnection provided with the completed form controls CSM column switch and provides the connection between the 'Together cables dashboard, the controls on the steering wheel (SWC) (sound system and telephone system) and the air bag modules.



9.2.10 Rain sensor control unit (RLS)

The control unit rain sensor (RLS) is an electronic component connected to the Node Body BCM computer through a serial line LIN and manages, together with a control knob located on column switch module CSM, the function:

adjusting wiper speed lines.

The rain sensor unit is connected by means of specific RLS bridle placed on mirror rear view mirror, which connects to 'Together wiring front bodywork. Composed by a sensor infrared LED is installed on the front glass of the vehicle can detect the presence of rain and, consequently, to manage the wiping as a function of the water on the windscreen.



9.2.11 brake pedal switch

It 'a switch provided on the brake pedal and it' connected to 'Together cables to front body. Acts as a brake pedal to provide status indication, the units that require, the state of the pedal itself.



It 'a command with two contacts (NO + NC) with separate power supplies and with the same Along side interface cables.

The units that require 'an indication of the state of the brake pedal are:

Body control computers

Engine control unit

Brake system control unit, in two versions: ABS, ESP

Automatic transmission

9.2.12 Swimming Controls on Front Door Side Help (DDC)

The aft controls on the front driver's side door DDC is a module that integrates the different controls on the driver's side front door, and interfaces with the 'Together cable port front driver's side. The aft controls DDC receives power for lighting ideograms and for the proper operation of the controls. Depending on trim level, can accommodate the following commands:

Control, electric front windows

Control electric rear windows (if any)

Inhibitory control electric rear windows (if pres.) With corresponding LED

Electric mirrors external switch

Joystick control, electric mirrors external

Give us your power window controls are three versions depending on grade car with three different types of control power window motors.

The basic version, Electric window controls directly control the motors of only windows driver and front passenger side without electronic control of motors themselves. This version is not 'intended to manage the electric rear windows.

The second version is an electronic module for the management of the ascent and descent Only the driver's side front electric window regulator in automatic mode.



The command front passenger Electric window controls instead directly passenger side power window motor without electronic control of the motor itself.

Even on that version is not 'intended to manage the electric rear windows.

The third version we manage both the electric front windows and the management of the electric rear windows: in this case, the commands are acquired by a module e place to 'internal power window motor. This version is planned functionality with automatic both uphill and downhill for all four windows with anti-pinch protection.

On this version, and 'also provided the command to disable the power window controls placed on the rear doors complete with its signaling.

Command power window on passenger side front door (CDC):



The Command window regulator on the passenger side front door connects through the 'Together cables passenger side front door to deliver the command to its engine power window and receives the power supply for lighting and ideogram for the correct operation of the command the same.

To control the passenger side front window regulator come in two versions depending on of 'construction.

The basic version of the Command window regulator directly controls the electric motor on door Front passenger side without electronic control of the motor itself.

The second version of the command window regulator and 'acquired by an electronic form to place' inside of the electric motor on the passenger side front door. In this version is planned functionality automatically be uphill and downhill with pinch protection.



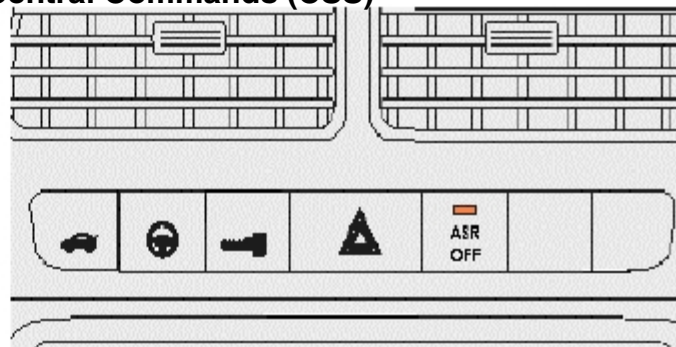
Electric power window control of rear doors (DRC)

The Command of the rear door left side and right side is connected via the DRC 'Together cables on the back door and it 'acquired by an electronic mail to' internal motor on the rear door power window with automatic function of both uphill and downhill anti-pinch protection.

The command receives the power supply for lighting and for the proper ideogram operation of the command from the command post on the bridge of disinhibition controls on the front driver's side door.

Clutch Pedal Switch on 9.2.13:

The clutch pedal switch signal is a switch provided on the clutch pedal and it 'linked by 'Together cables to front body. The status of the pedal unit motor control.

9.2.14 Swimming Central Commands (CSS)

The swim platform features the following CSS command buttons:



"City" for on / off mode electric drive on the City

Disarming ASR and its indicator light (LED on button)

Lock / Unlock doors and related LED (LED signaling function has been blocking ports

When the button is pressed and has continuous light, LED has the same function of deterrence when the car is locked from the outside flashing-lights)

Opening Trunk

Hazard button for the flashing lights of emergency

"ECO" mode to function 'Economy versions with automatic transmission

9.2.15 Swimming Controls Left (ELC)



The left aft controls ELC is a module that integrates controls on the outside of wheel and body computer interface to the Node to Node BCM and IPC instrument panel through The 'Together cable bridge.

The left aft controls ELC receives power for lighting and characters contains the following commands:

Fog light

Rear fog light

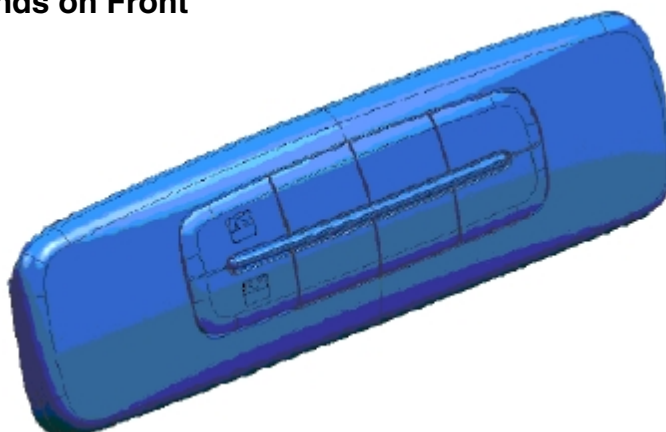
Setting correction projectors

Mode

Adjusting mode + / mode - (regulate different functions depending on the instrument)



Ceiling Flange commands on Front



The escutcheon commands on front roof lamp integrates the commands for opening and closing of the roof, which are interfaced to the control unit via electric sunroof bridge dedicated, and the commands to the Node Convergence, which are connected mediante the Together Body front cables.

9.2.16 Tyre Pressure Monitoring System TPMS

The TPMS (tire management) monitors two thresholds, tire pressure monitoring corresponding to the conditions of insufficient pressure and drilling. Upon successful completion of each of these thresholds will trigger the warning light / alarm icon (only available on Comfort framework) and the corresponding display message. In the event of a puncture, the framework also sends an acoustic signal. There is also a signal (light / icon + message) failure TPMS.



9.3 Centraliz e Closures

G e n e r a l i t y

-
89.3
.1

With the car keys are provided in duplicate.
With these are also given the CODE Card

A the electronic code;

B the mechanical code of the keys to communicate

Fiat Dealership in the event of a request for duplicate keys.

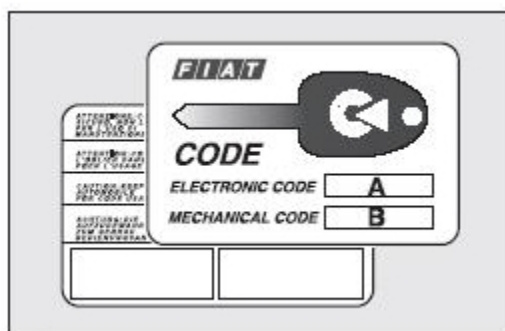
You should always carry the code electronically.

WARNING To ensure the full efficiency of the electronic device to the keys,
do not leave themselves exposed to sunlight.

Fiat Grande Punto

462/534

© 2005, Fiat Auto S.p.A. - All rights reserved



Below are summarized the main features can be activated with the key (with and without remote control):

Key Type	Unlock locks	Blocking locks outside	Insertion Dead lock (Where applicable)	Unlock locks	Discesa crystals	Climb crystals
Key mechanics	Rotation key counter wards (the side guide)	Key rotation clockwise (Driver side)	-	-		
Key remote control	Rotation key counter wards (the side guide)	Key rotation clockwise (Driver side)	-	-		
Key remote control	Short press button on	Short press button on	Double pressure of button	Pressure on button	Pressure prolonged on button	Pressure prolonged on button
Flashing indicators of direction (Only key remote control)	2 Flashes	1 flash	3 Flashes	2 Flashes	1 2 Flashes	Flashing
Led deterrence	Off	Fixed lighting for about 3 seconds and after flashing deterrence	Double flashing and successivament or flashing deterrence	Flashes Flashing deterrenz to	Of TIME OUT or	deterrence

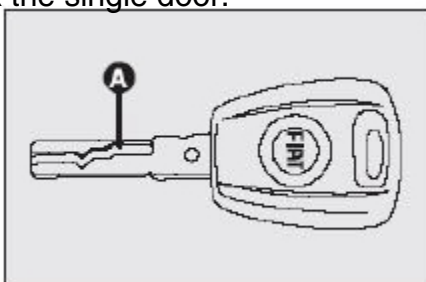
System Components



The mechanical key

It is used to enter the vehicle, lock / unlock doors driver / passenger, an insert which is encoded mechanically coupled to the pawl locks driver and passenger front. The insert is removable from the key head to the point of use.

The latch of the door guide mounted on the handle will unlock all doors using the mechanical key, mantras of the pawl passenger's door, installed on handle, but allows you to unlock the single door.



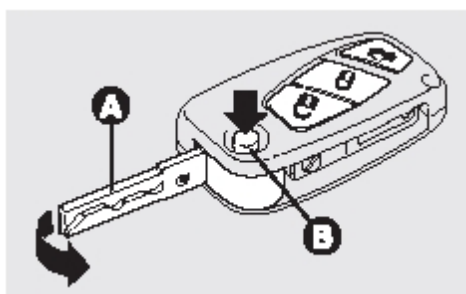
The metal part **A** the key is fixed.

Key fob

The key is formed by a metal insert retractable A and a handle that encloses. To extract the metal insert is necessary to press the appropriate button B reinsert the handle while you have to keep holding the button and rotate the metal insert in the handle until it clicks to lock that ensure proper closure.

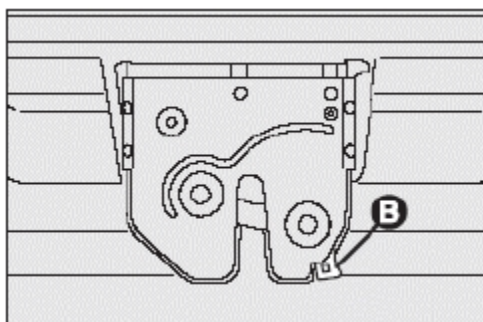
The key operates the starter device and the locks of the front doors.





Tailgate

If you select the "driver's door unlock independent", the trunk is not unlocked (the customer has requested that the single point of access to the car 'driver's door'). The trunk is always independent from the state of doors and can be opened only by specific command.



In case the battery does not dispense sufficient energy for the functionality of the handle / lock electricity, the trunk and 'still unlocked and can be opened by actuation lever dell'apposita accessible by removing a flange placed on the battivaligia. Is not present on the tailgate a pawl. From inside you can open the door (if not working electrical system) also activated by a mechanical safety through a flange in the upper part of the battivaligia of the tailgate.



9.3.1 System Functions

Lock / unlock doors

The system locks door locks can drive all of the various camera car.

E 'can block centrally, from the outside door locks by inserting the key in mechanical pawl (port driver) and turning.

It is not possible to lock the doors of the car in the event that one or more ports are not completely closed. In this case a luminous signal warns of the failure block.

In the case in which the tailgate is opened, the doors lock but an acoustic signal warns of an anomaly.

If the car is locked from the outside, the keys to lock / unlock the doors are centralized are turned off and rehabilitated to the next unlocking of the car.

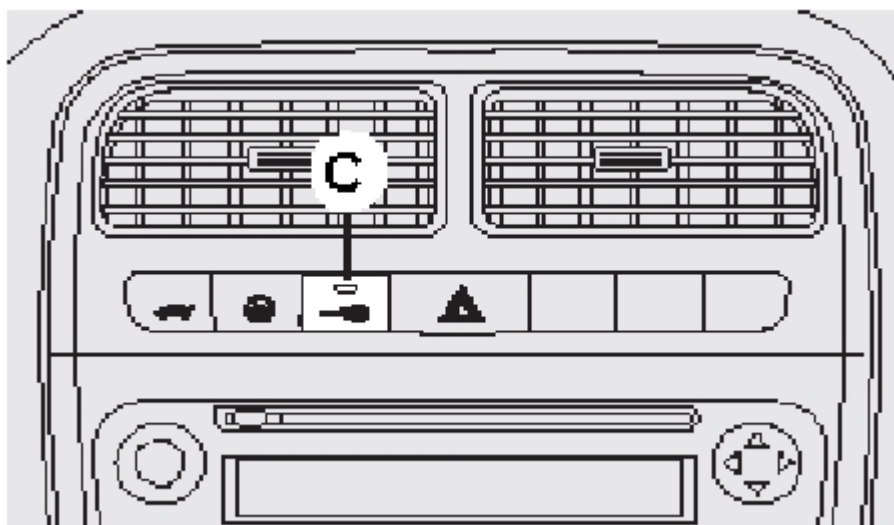
Turning Lock / Unlock:

From the center stack can be operated via the C button lock / unlock doors and the tailgate. The button distance.



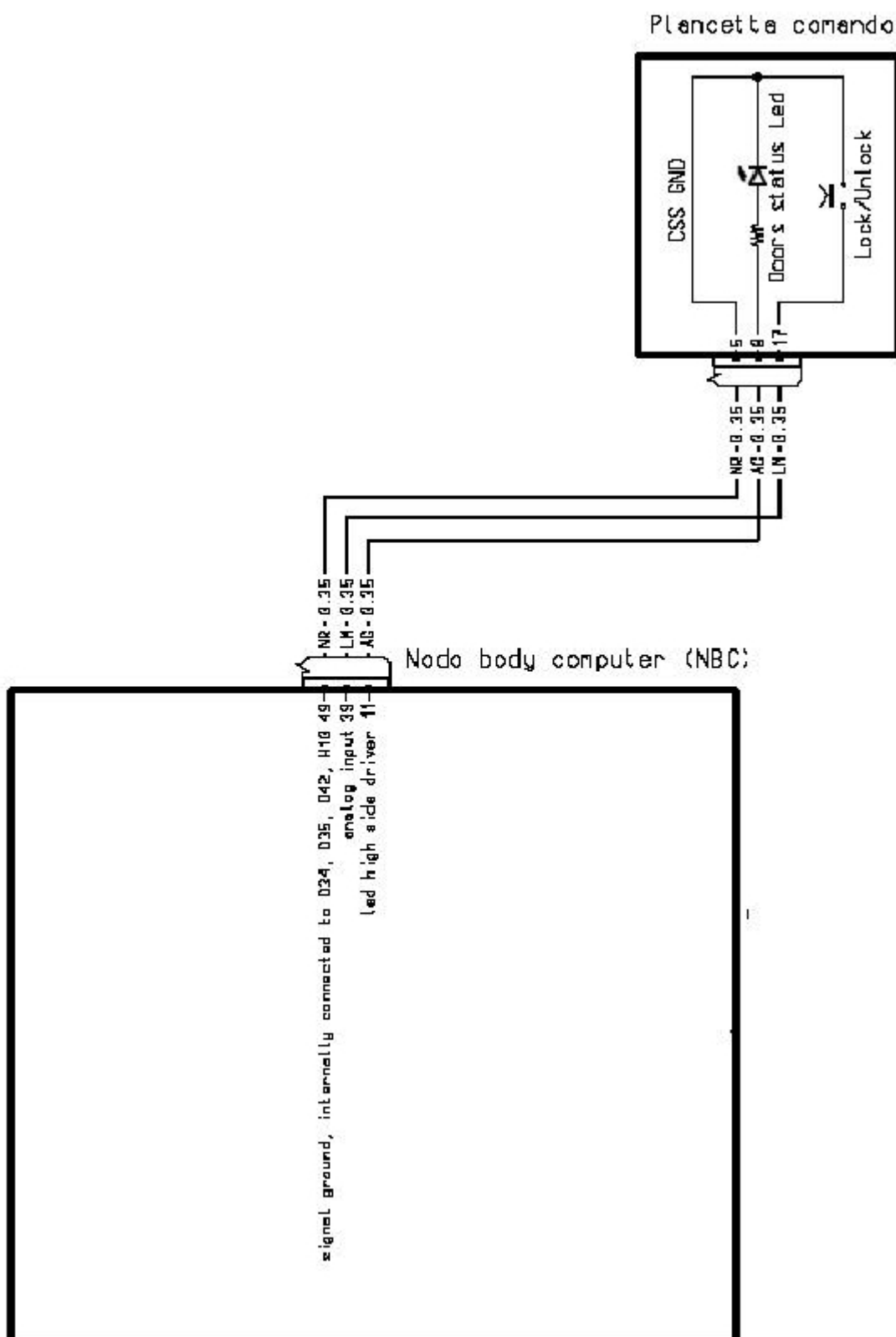
Instead of driving the open tailgate to

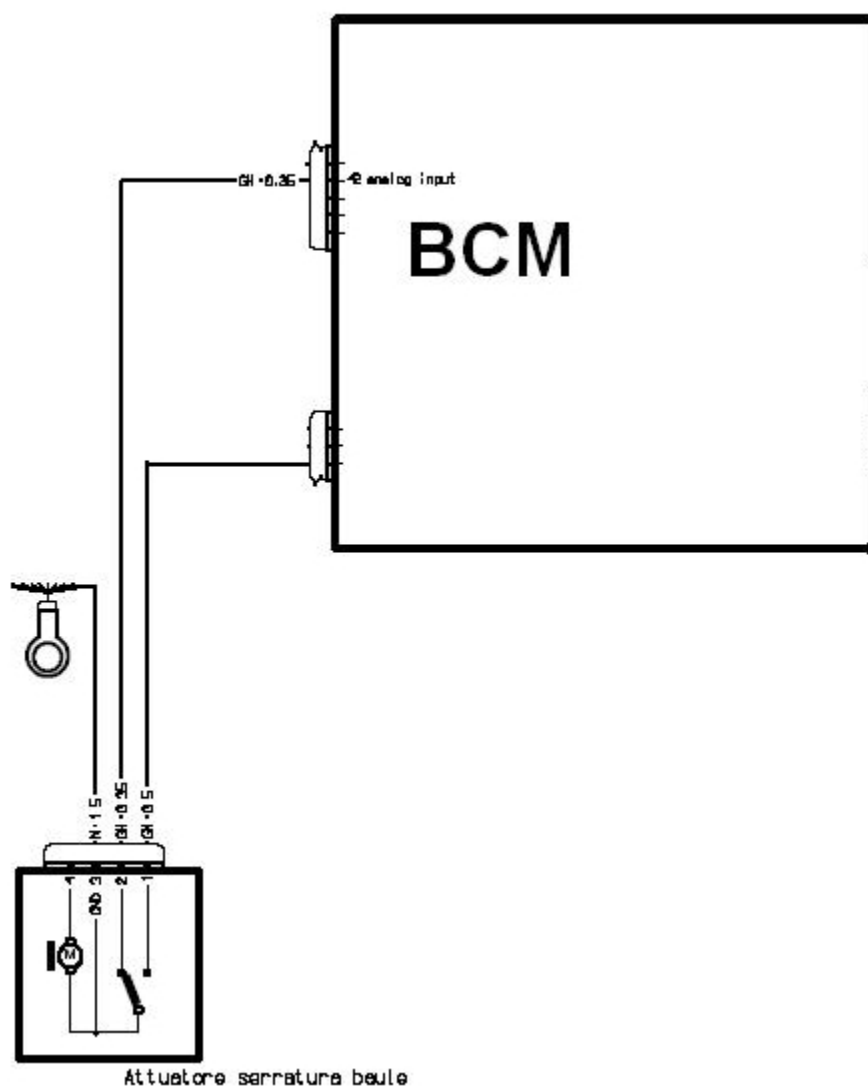




Doing the doors lock, the LED will light for about 3 seconds and then begins to flash (Function of deterrence). If doing the blocking ports, one or more doors or the tailgate trunk are not closed properly, the LED blinks rapidly along with the indicators.







Automatic central locking when car is in motion (Autoclose)

This function, after activation (On), allows the activation of the automatic lock ports exceeded the speed of 20 km / h.

To activate (On) or disable (Off) this function, proceed as follows:

- Press the button **MENU ESC** with a short press, the display displays a submenu;
- Press the button **MENU ESC** by short, so the display shows Flashing (On) or (Off) (according to what was previously set);
- Press the button **+** or **-** to make the choice;



- Press the button **MENU ESC** Short press to return to the submenu screen or press the button long press to return to the main menu screen without storing;
- Press the button again **MENU ESC** Long press to return to the screen standard or to the main menu depending on where you are in the menu.

Dead Lock Device

It is a safety device (where provided) which inhibits the operation of:

interior handles;

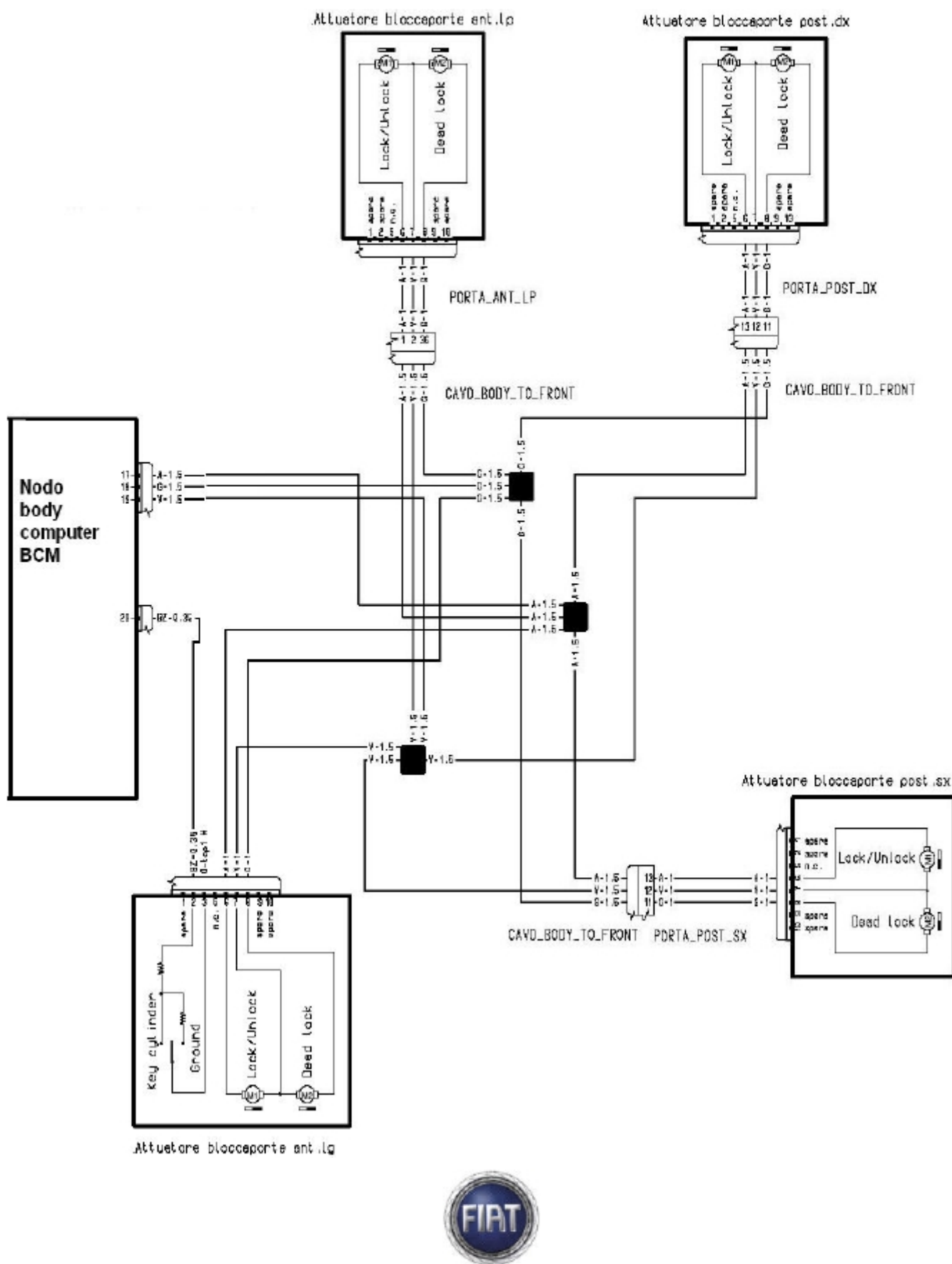
button lock / unlock;

thereby preventing the opening of doors from the inside of the passenger compartment in the case where both

An attempt was made of tampering (such as breakage of a glass).

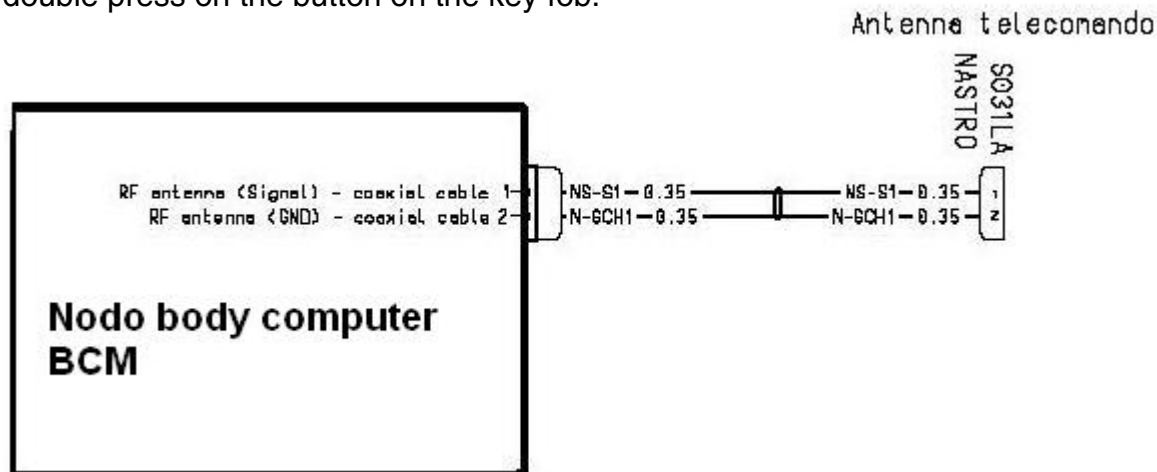
The dead lock device represents the best possible protection against attempts to burglary. He therefore recommends the insertion every time you must leave your vehicle parked.





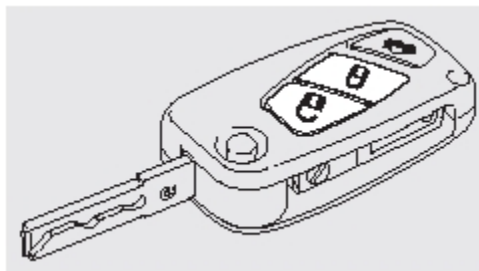
Insert and remove the device

The device is automatically inserted on all the doors in the event that it carries out a Quick double press on the button on the key fob.



The completion of the insertion site is indicated by 3 flashes of the indicators and by a flashing LED located on the button located between the controls on the dashboard.

The device does not fit if one or more ports are not properly closed: this prevents that a person can enter the interior of the car and opened the door, closing it, remain closed inside the passenger compartment.



The device is automatically disabled on all ports in the following cases:
performing a rotation of the mechanical key starter in the open position in driver's door.

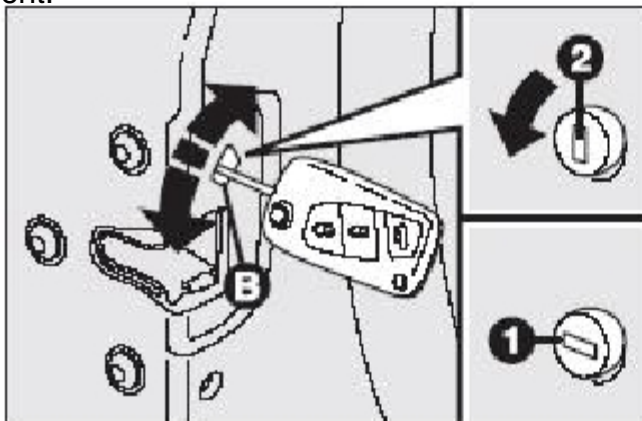
performing the operation by remote unlocking doors.

turning the ignition key in position.



Emergency device to lock the rear doors

The rear doors are equipped with a device that allows to close in the absence of Current.



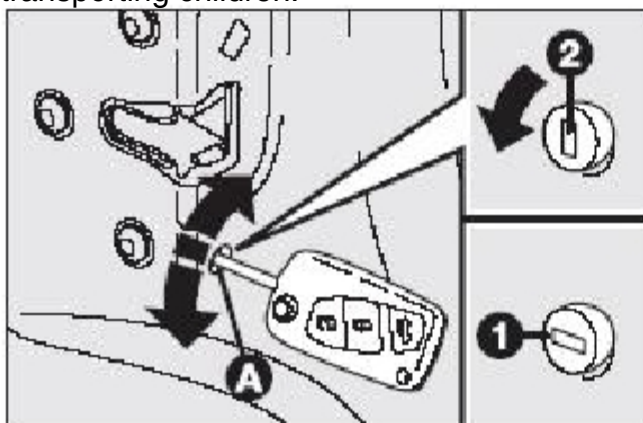
In this case, you must:

- Insert the ignition key in the latch B;
- Rotate the device from position 2 to position 1 and close the door.

A device inserted to open the rear doors, acting on the inside door handles car.

CHILD SAFETY device (5-door versions)

It is the device that prevents opening the rear doors from inside, to use when are transporting children.



The device is inserted only in open court.



- Position 1 - device inserted (locked door);

Position 2 - off device (door opened from inside).

The device is also included making the release of the electric doors.

NOTE: Do not operate the emergency locking rear doors simultaneously the child safety device.

9.4 power windows

9.4.1 General

On the front door of the driver's side power window controls are managed both the electric front doors (standard across the range) and the rear doors (where available).

The other ports are controlled directly your window regulator.

Handling and operation (with only front windows)

Version without automatic

The front power windows can be movomentati only in manual mode: startup and the arrest of the crystal is determined manually by the user through the pressure of ' special command, the release of this last, the engine stops. For both sides, right- Left, function windows lifter is activated only under lock and key.

Following the key-off, for a time of 3 minutes, it is possible to make the actuation of the glass front only in manual mode. After this time delay the system acquires more.

Version with automatic driver's side



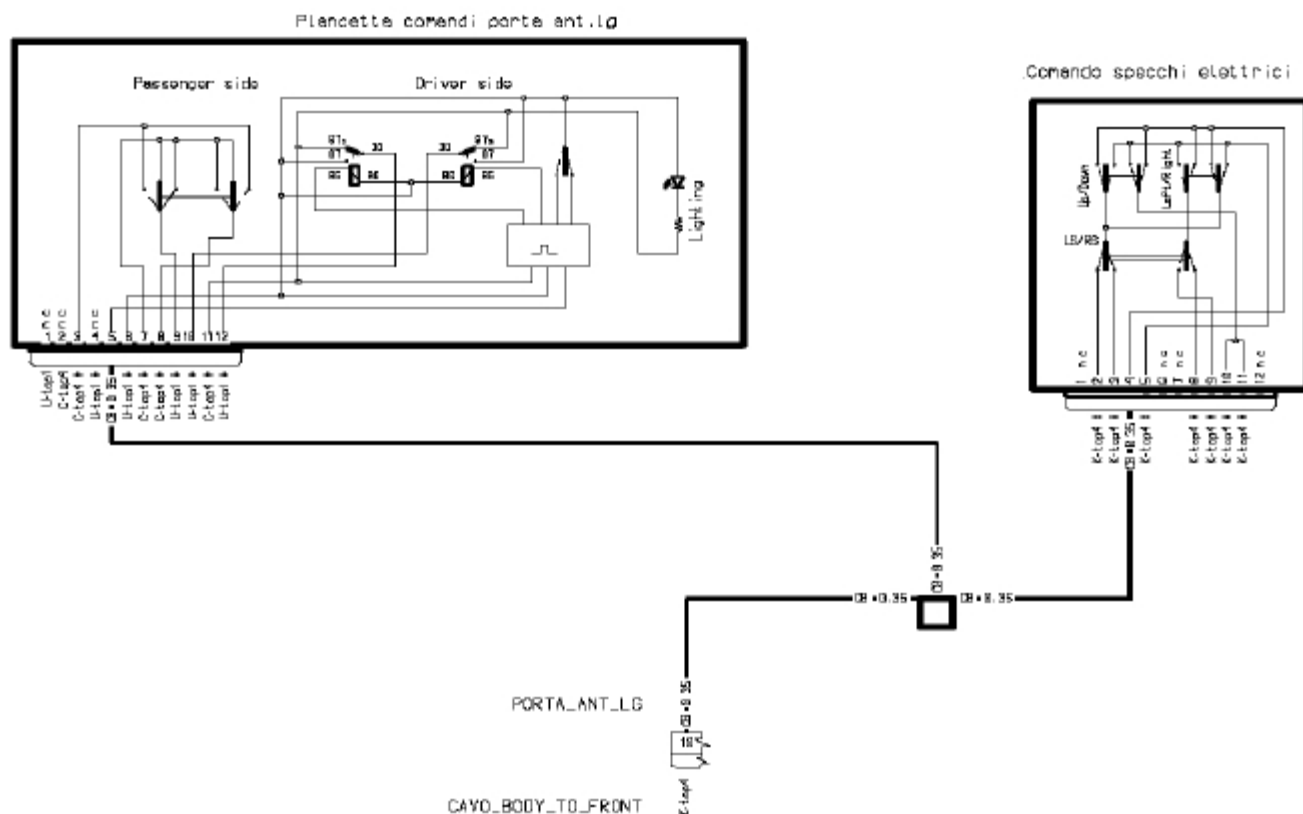
The driver side window regulator can 'be moved either manually or automatically. The crystal passenger side can 'only be moved manually.

For both sides, right-left, the function windows lifter is activated only under lock and key.

Following the key-off, for a time of 3 minutes, it is possible to make the actuation of the glass front only in manual mode. After this time delay the system acquires more new commands.



ALZACRISTALLI ANTERIORI con AUTOMATISMO E SENZA ANTIPINCH GSX E GDV
BASIC VERSION



Handling and operation (with 4 windows)

All windows can be moved either manually so that automatic, according to the logic described herein:

manually:

the starting and stopping of the crystal is determined manually by the user by means of the button pressure control with short (one-time $50\text{ ms} < t < 300\text{ ms}$) the release of this last, the motor stops.

automatically:

the start of the crystal is determined manually by the user through the command button

Long press (for a time $t > 300\text{ms}$), the power window is not active when pressing the control buttons for a time less than 50 ms.

The operation dell'alzacristallo stops when the movement is in progress and automatic pressed again or the command to climb or descent.

For all windows, the function lift-glass is activated only under lock and key, with the exception of opening / closing windows by remote control and centralized in the period timed out key as described below.

Following the key-off, for a time of 3 minutes, it is possible to make the actuation of the glass Front either manually or automatically. At the end of this timing system does not acquire more new commands.

In the event that, during the time delay, is detected the opening of one of the doors, not are acquired more new commands, but any that are completed received before the opening door.

If the key-off turns out to be one of the doors already open, the commands are completed might have been received before the opening door.

The movement of the crystal driver's side is managed by local commands.

The movement of the crystal on the passenger side is managed by both local and those commands driver's side.

The movement of the rear window is managed by both the local controls (one crystal), which from those of the driver's side.



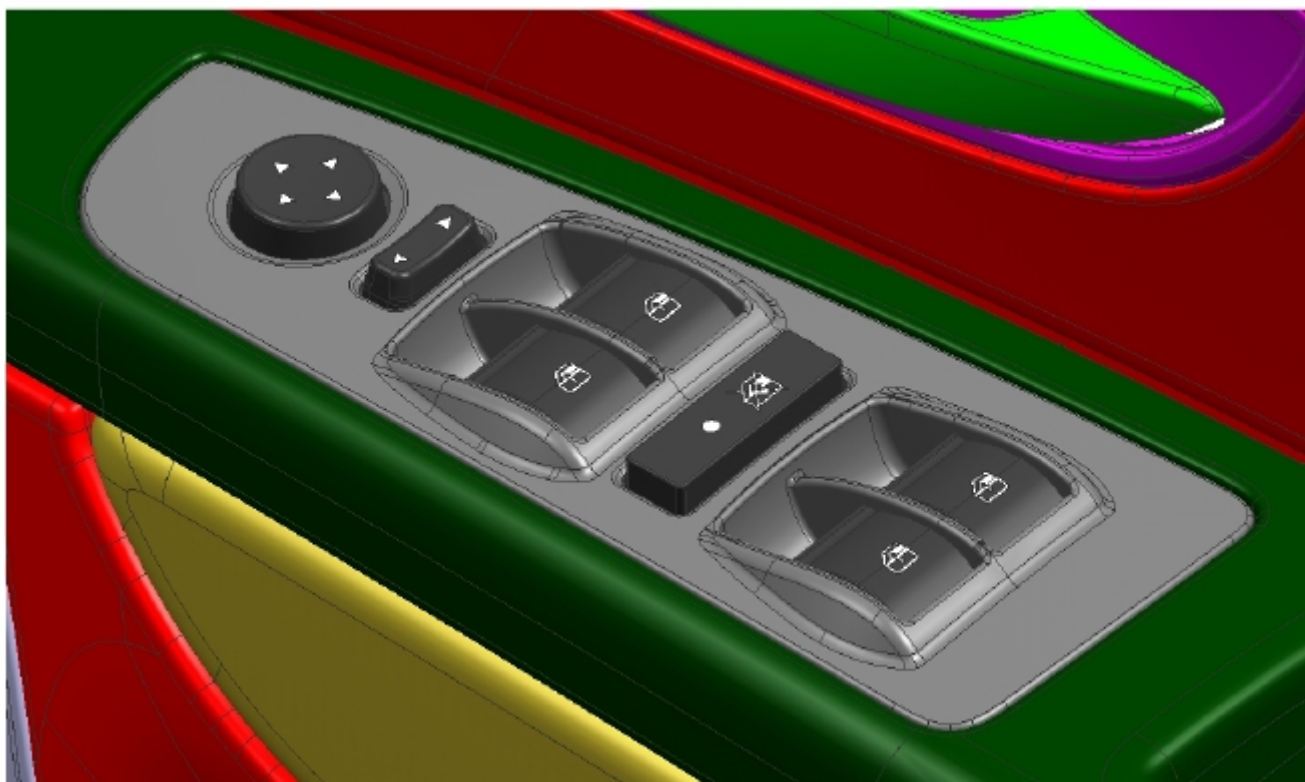
Faceplate controls electric windows



On the inside of the driver's door armrest are located two or (where applicable) five switches that control, with the ignition key in position:

- Open / close the left front window;
- Open / close front window right;
- Open / close glass rear left (where applicable);
- Open / close glass rear right corner (where applicable);
- Inhibition control switches located on the rear doors (where applicable).





Enabling centralized crystals (with 4 windows)

It is a feature that allows, in a single operation, the total closure of the side windows.

The central locking function can be performed by remote control or pawl lock (the handle outside the front door driver side) is activated only at key-off.

The activation of the closing / opening of the crystals is not centralized for simultaneous 4 crystals, , but responds to a programmed sequence.





Safety device pinch

The versions with 4 electric windows (front and rear) are fitted with a system Safety able to recognize the presence of an obstacle during the movement in closure of the crystal; the occurrence of this event, the system stops the stroke of the crystal and, depending on the position of the glass, it also reverses the motion.

This system guarantees the reversal of the motion is detected whenever dell'alzacristallo the presence of an obstacle (eg, finger, hand) during the stroke of the crystal, thus avoiding the accidental crushing. This content confers to the model a high degree of Safety also for the possible inadvertent operation by children on board. It allows to implement the super / super and opening / closing the windows when you leave the car. The anti-crushing function is active both during the operation manual the auto glass.

Can be defined two zones "reverse" and "non-inversion" of the system antipiziccamiento: the area "inversion" corresponds to the space between 200mm from the top edge and the upper edge of the same the "zone of non-inversion" corresponds to the remaining space.

If, during the upward movement of the crystal, is detected the presence of an obstacle in "Inversion zone", the system will stop the upward movement and reverses the engine immediately.

If, instead, is detected the presence of an obstacle in the "zone of non-inversion", the system stop the upward movement of the crystal.

During this time is not accepted any type of command.

If the nip guard intervened five times within a minute or turns out to be a failure in the automatic operation is inhibited in ascent of the crystal, permitting it only in increments of half a second, with button release for the maneuver Next.

To restore the system to function properly you must meet one of Recovery following conditions:



a key-off operation - key-on

a movement downwards of the glass in question by the user.

In the event of battery removal and installation will be necessary to perform the following steps to restore the proper functioning of the front windows:

bring the crystal front right or left at the bottom end stop and hold the opening command activated for a time between 5 and 10 sec. Then run the same procedure to the limit higher, holding the command of closures always for a time between 5 and 10 sec.

9.5 Outdoor Lighting

Introduction and Components

Parking lights

When the user turns on the parking lights (key ON) or requires "Parking lights" or "Follow Me Home" (key-OFF), the onboard computer controls the activation of the lamps Position (Left / Right-front / rear). Except for the "Follow Me Home", certain requests also include the lighting of the license plate lights.

Low beam / high beam

With low beam lights on, the presence of the command disables the lights flashing lights beam. The subsequent deactivation of the control light beam, always with Active beam control, involves the re-ignition of the low beam.

Parking lights

This feature allows you to turn on the lights and license plate with the car OFF key, to indicate the presence of the vehicle on its parking (parking).

The activation is achieved only through the key-off operation of lights on the ring column switch Or low beam
OFF position.



Turning off lights will be obtained by moving the dial on the stalk Key to the ON or OFF the car. This last operation will reset the function, and the onboard computer will control the lights according to the selected command on the ring stalk.

For future reference the Key OFF function will not work. To activate it will must repeat the activation described above.

Fog lights

The fog lights switching is done by pressing the 'fog lights' only if they have turned on the lights. Are turned off if you press the the same button or if the lights are switched off position.

And switch on the lights and switch on the position does not fog lights. The board computer also activates the indication on the panel.

With fog lights switched on, switching to the Key-OFF turns off and the next Key-ON, fog lights remain off: their needs every time the ignition command button.

With just under lit and fog lights on, a start-up does not determine the reset control fog.

License plate lights

The ignition of the 2 bulbs external plate occurs in correspondence to the request for position or turning on lights "Parking lights".

For every lamp license plate light, active-controlled activation, is performed diagnosis, possibly indicating 'registration plate light failure' on the instrument panel (key ON).

Rear fog lights

The fog light is turned on by pressing the 'fog lights' only if they have the lights on or the fog and low beam (with the only lights switched positions), while the shutdown is achieved by pressing the same button again



used for the ignition is switched off or if the low beams or fog lamps (with sun lights switched positions).

If you turn off the fog light occurred through fog and low beam, the reignition of the low beams or fog lamps does not re-ignition of the light rear fog light. For them it is necessary to restart the command button.

At switch on the rear fog light, also activates the indication of context.

With fog light on, turn off the car (Key-OFF) implies its off. The next Key-ON, the rear fog lights are turned off.

For the rear fog lamp, the onboard computer performs the diagnosis: the recognition of malfunction lamp turns on a corresponding signal 'failure fog'.

Directional lights / emergency

To the left stick controls the direction of the stalk-guide in Key-ON, the onboard computer pilot lamps individually direction lights of the selected side of the vehicle (front, Side and rear or left front, side and rear right).

Simultaneously with driving lamps, it generates an acoustic signal internal to the vehicle. Repositioning the lever position lights and other signs of direction is switched off.

The lights lights if lighted, the Key-OFF are switched off.

At the command of emergency lights, both in Key-ON-OFF Key to that, a trip computer all pilot and 6 lamps of direction (front, side and rear, left and right), with even activation of the LED and audible emergency button inside the passenger compartment.

If the "Light of direction" to activate the emergency button, the lights / signs already active continue to operate intermittently, without interruption or delay.

If an abnormality is detected on one of the lamps in front or rear direction of on the vehicle selected for the "Lights of direction" or more for the "lights emergency, "while the indication of power failure, is increased the flashing frequency of the corresponding visual indication and audible signal. NB:



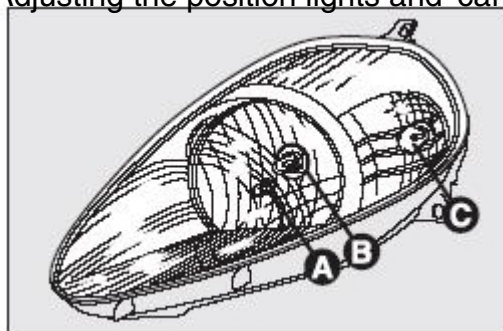
Remains unchanged the frequency of flashing LEDs and any outside lights on emergency button.

Stoplight

Pressing the brake pedal are the two lighted lamps and stop the "Third Stop." For each lamp lights and stop "Third Stop" is performed the diagnosis. To recognition of an anomaly, a failure alarm signal on the instrument panel

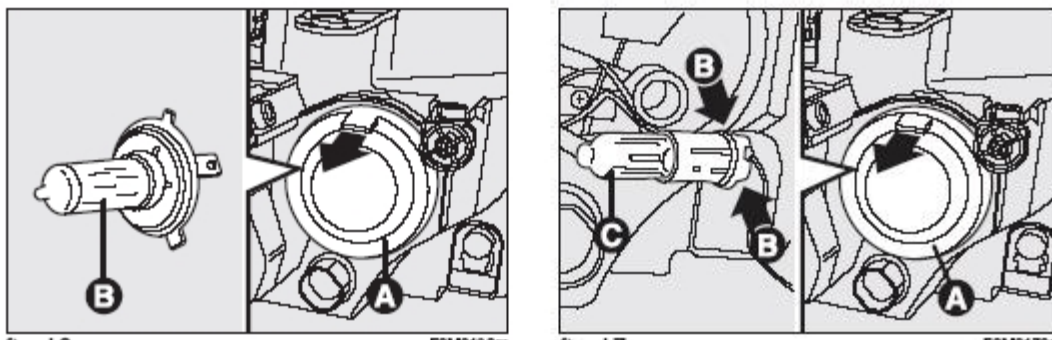
Projectors

The headlamps of the new design of glass containing light bulbs position **A** (W 5 W bulb), low beam / high beam **B** (H4 lamp 55/60w) and direction **C** (PY 21 W lamp). Adjusting the position lights and 'carried by electric motors.



Replacement lamps: to replace the low beam lamps / lights, position must remove the rubber stopper **A** press-fitted on the back of the group Optical. Release the bulb H4 **B** and remove it. For lamps position W5W **C** extract it from seat **B** (All without removing the headlight of the car). For lamps indicators of direction must steer the front wheels left or right towards the outside in order to have access to the flap on the wheel arches which must be unlocked by rotating the device block counter-clockwise. At this point you have access to the removal of the cover lampholders must be removed by turning it counterclockwise.





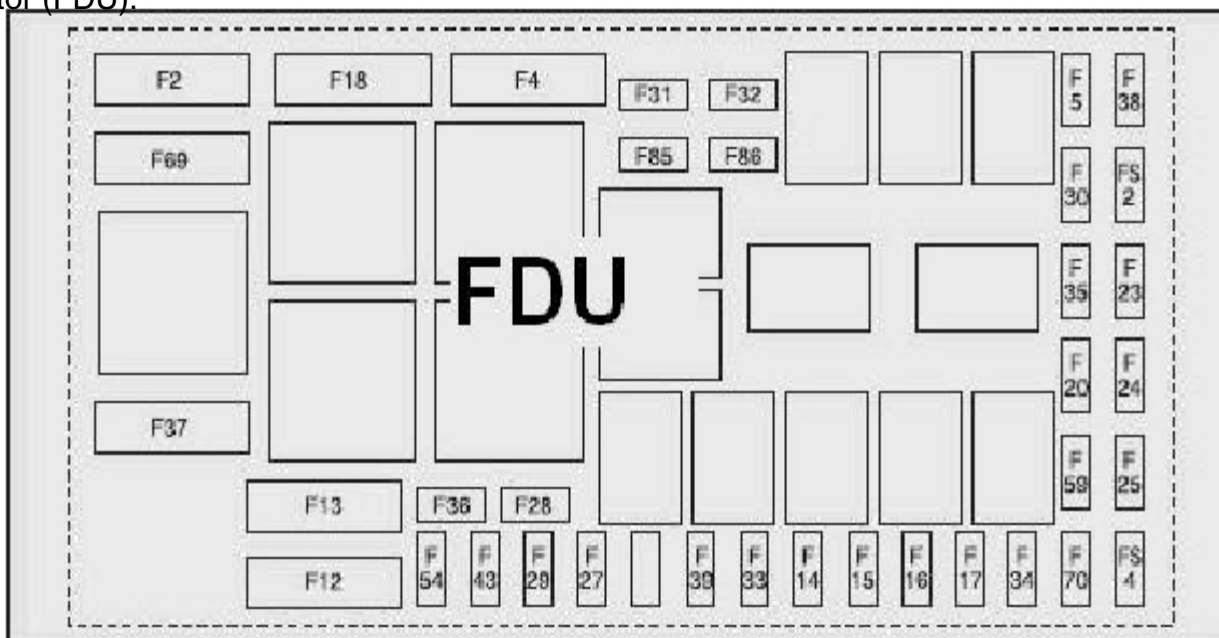
Replacement fuse protection: are located within the engine compartment unit (CVM). Left low beam fuse F14, F15, right, left main beam F16 Right F17.

Fog lights

Integrated into the bumper (where applicable) use a H1 bulb.

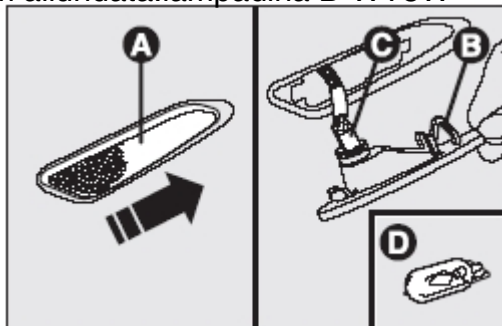
Replacement bulb: To replace the bulb, unscrew the cap to release the retaining clip and remove the lamp. (the lighthouse is not to be removed from the bumper)

Fuse Replacement: The F31 fuse protection are within the control compartment motor (FDU).



Side Repeater

Fender-mounted anteriore form allundata.lampadina **D** WY5W

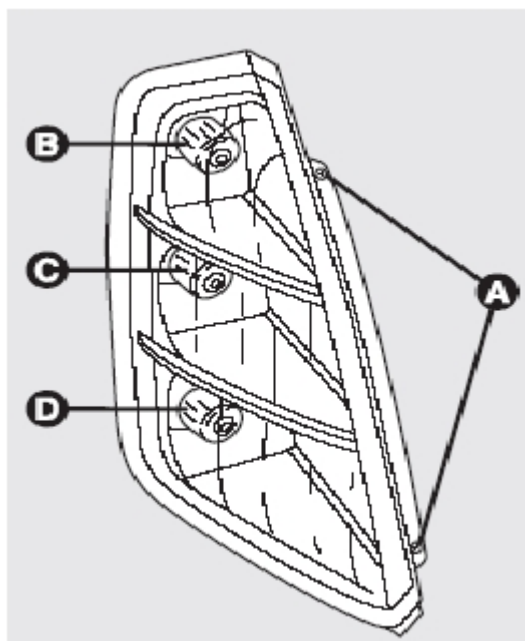


Replacement bulb: Push the lens **A** so as to compress the clip **B** then remove the group. Rotate the connector **C** then remove the bulb **D**

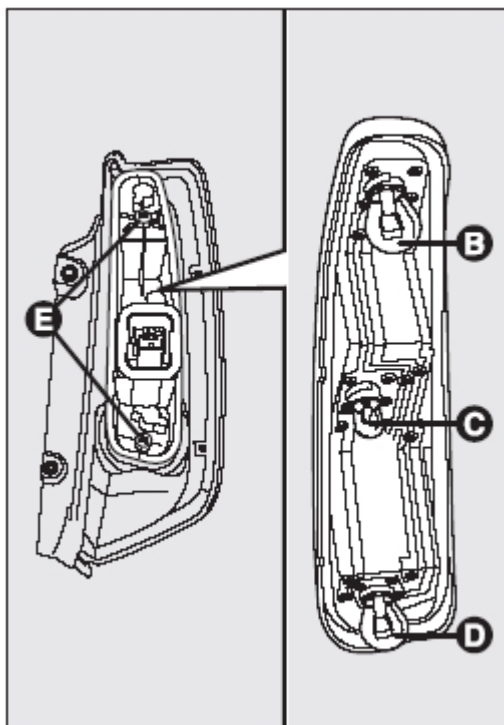
Rear lights fixed

Taillights housed on the rear pillar of uniform color red with distribution

Features: Dual position with bulbs **C** R5W, stop / position **D** P21/5W and direction **B** P21W in the vertical direction. The screws **A** serve to remove the headlights from post for replacement bulbs.



Replacement bulbs: Once you remove the headlight from the riser, unscrew the screw **It** for liberarare the holder.

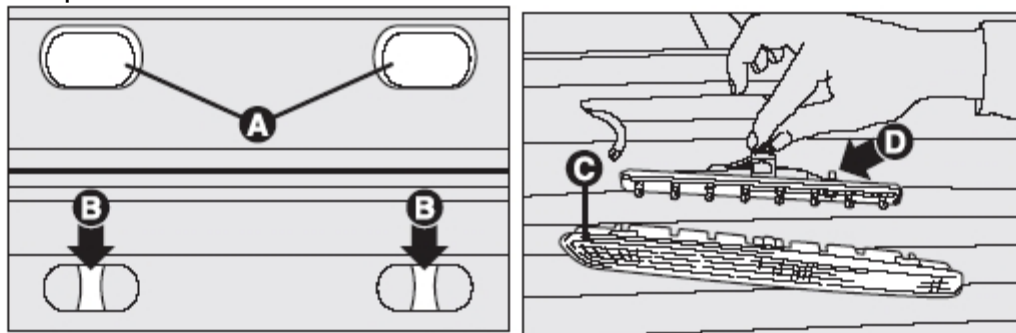


Beacon brakelight

Beacon placed outside, positioned above the heated rear window, includes the function of wiping (cleaning liquid nozzle spitting) and features bright place from 8 bulbs



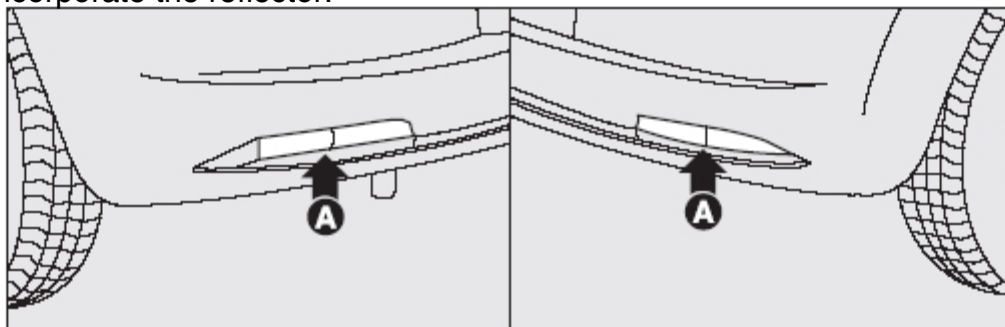
Replacement bulbs: open the rear door to remove the caps **A** (Rubber) press on devices **B** and extract the transparent **C** disconnect the connector and acting so contrapposto sulle fins **D** pull out the lamp bulbs mounted pressure and replace them.



NOTE: pay attention to the hose nozzle wiping.

Rear fog lights / reversing

Recessed lights mounted on the rear bumper. Rear fog lamp P21W left side **A**, Reversing lamp P21W right side **A** (For the left-hand drive version). Reverse guide right. Also incorporate the reflector.



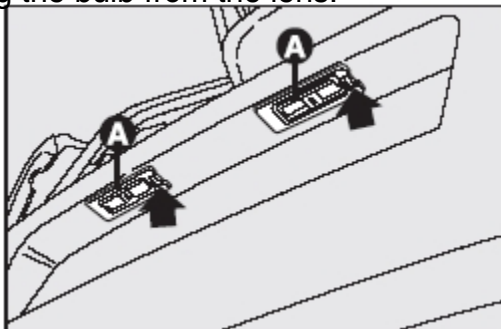
Replacement bulbs: From under the bumper disconnect the connector, unscrew the portalampada. if an ali not be removed from the bumper.

License plate lights



Two lights with lamps W5W collected on the rear bumper. With excellent uniformity of light distribution, which allows good visibility of the plaque.

Replacement bulbs: Acting on tabs **A** to free and transparent from the bumper replace the bulbs by removing the bulb from the lens.



Functions

The diagnosis is performed by on-board computer controlled activation is active as follows:

Side
Front
Back

On recognition of an NA Node Radio receiver (RRM) omalia of a lamp, the computer edge points (the Key-ON) an indication of failure lights.

Headlamp adjustment: operates with the ignition key in position "**MAR**" and lights beams on.

When the car is loaded, leans back, causing a rise the light beam. In this case, therefore, need to re the correct orientation.

For adjustment, use the buttons indicated by the arrows and put the trim on command. The instrument panel provides a visual indication of the relative position adjustment.

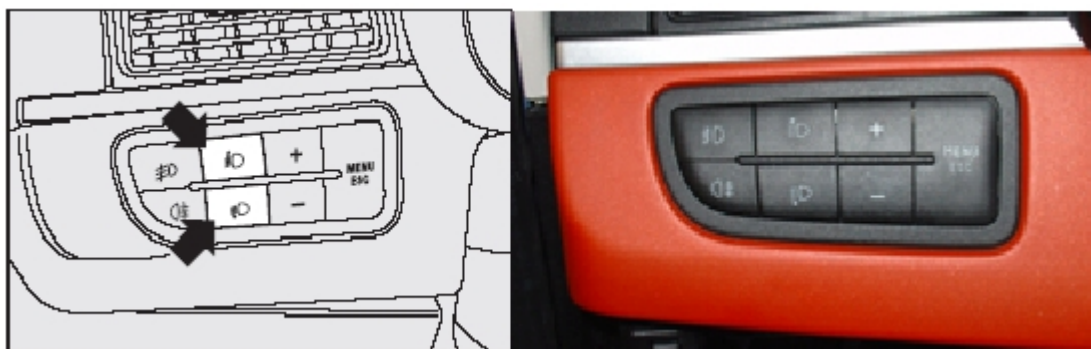


Position **0** - One or two people in the front seats.

Position **1** - Five people.

Position **2** - Five people + load in the trunk.

Position **3** - Driver's maximum allowable load all stowed in the trunk.



Follow me home: This feature allows you to control the lighting of the timer sidelights (no Plate Lights) and dipped immediately after turning off the car.

The function can only be activated within 2 minutes from Key-OFF, using the zip command guiding lights dimmer switch (activation follow me home).

Time increment, follow me home: with lights and dipped beam switched on, for each command flash lights, the onboard computer increases by an additional 30 seconds, the time for the permanence lights on, for a total time of up to 210 seconds. The command to increase the residence time of lights is valid if it were provided less than 7 commands after the last activation of Follow Me Home and the function is still active.

Disabling the function: the maintenance of control lights flash for more than 2 seconds

Because off lights and dipped beam, reset the counter for the time lights stay lit up and reset the counter of the 7 valid commands.

NB: The deactivation command need not be given within 2 minutes from the Key-OFF, nor should it be one of the 7 valid commands to increase the residence time lights on. To be valid it is sufficient that the follow me home function is active.



After decommissioning, it is possible to reactivate the follow me home, always pressing the lever lights flash within 2 minutes from Key-OFF.

The switching from Key to Key-OFF-ON, Follow Me Home with active involve its off.

End of the function: when the time is spent lights on, there is deactivation of Follow Me Home, then turn off the lights and the beam.

9.6 SOUND SYSTEM

Audio sources are: radio tuner, CD audio/MP3. The sound system on the car can be of two distinct categories:

Standard

Hi-Fi sound
system

General features of the Standard System

The system consists of n ° 6 speakers, divided into the following types:

mid-woofer
speaker 160
mm in
diameter, 40W,
positioned in
the front doors,

designed for

the

reproduction of

the mid / low.

The technology

used to

these

components

(water

resistant)

allowing them

to withstand

without damage rear side
splashes of water able to
present inside the reproduce the
door; full spectrum of
audio
tweeter speakers, frequencies.
30W, positioned
on door handles, Also for these
designed to reproduce
higher components is
frequencies; adopted
speakers full- technology
range of 130 mm "water
in diameter, 40W, resistant".
positioned in the

Fiat Grande Punto

491/534

© 2005, Fiat Auto S.p.A. - All rights reserved



General characteristics of the Hi-Fi sound system

The system consists of n ° 6 speakers and a sub-woofer box containing an amplifier mono output channel.

The main characteristics of the components are as follows:

mid-woofer
speaker 160
mm in
diameter, 40W,
positioned in
the front doors,

designed for
the best
reproduction of
the mid / low,
even for such
adopted the
technology
"water
resistant".

tweeter
speakers, 40W,
positioned on
door handles,
designed to
reproduce

higher
frequencies.

speakers full-
range of 130
mm in
diameter, 40W,
positioned in
the rear side

able to
reproduce the
full spectrum of
audio
frequencies.

Also for these
components is
adopted

technology reproduction of

"water lower
resistant". frequencies.

box sub- The box
woofer bass- is positioned in
reflex, from the boot, right-
6.5 to 7 liters the boot, right-
in volume, side wheel.
containing a speaker

130 mm in mono audio
diameter, power amplifier
channel,
100W for the positioned
sub-woofer
to drive the sub-woofer.

RADIO

Fiat Grande Punto

492/534

© 2005, Fiat Auto S.p.A. - All rights reserved



Node Radio receiver (RRM) is contained in a DIN slot, while the flange front Radio occupies an on-dash DIN slot and a half.

There are two versions: CD Radio, and Radio CD/MP3.

All versions are prearranged for the connection with the CAN interface at low speed B-CAN to allow conversation with other nodes of the system.

Through this interface are transferred:

- Code theft;

- Ignition Control
(logically OFF);

- Volume control
as a function of
vehicle speed;

- Lighting
control;

- Steering wheel
remote
controls, where
required;

- Repeat radio
information on
dashboard.

Main Features

- Audio Music
Power: 4x30W

- 7-band graphic
equalizer

- Digital Tuner

- Large
integrated
alphanumeric
display (20
characters +
for RDS

- control icons)

- Menu is easy
to manage to
adjust the
settings of the
radio interfaces
and any

- External (CD
changer,

vehicle speed
(menu
selectable)

Specified time
radio off
(immediately or
after 20
minutes
Key-Off)

- Power antenna.

- Power antenna.

© 2005, Fiat Auto S.p.A. - All rights reserved



Remote control
from the
steering wheel.

Interfacing with
Blaupunkt CD
changer via the
external bus
line

Private.

Possibility to
connect to
hands-free kits
for mobile
phones.

Active control
of the Hi-Fi,
(where
applicable).

Features Radio (Radio CD/MP3 Radio and CD)

Digital tuner high selectivity (digital selection with variable bandwidth
dynamically)

FM
Multiricerca.

Possibility of
selecting the
function Hi-Cut
(High-Cut:
acute reduction
in dynamic

According to
the signal RF)

Autostore
(automatic
storage
stations with
better signal)

RDS (Radio
Data System)
with EON, AF
(Alternative
Frequency),
TA, TP, PTY
and

REG function
(user
selectable)

TA (Traffic

Announcements)

Automatic and manual station

PTY automatic
Search TP
(Traffic Program)
automatic

Ability to control Local / Distance for automatic frequency

Possibility of storage:

18 FM stations
(6 of which can be stored using Autostore).

6 MW stations.

6 LW stations.

6 types of programs PTY stations (FM only)

Scan mode
(short listening to a station and automatically switch to that

later):



Scan the
frequency band
used.

Scan stations
stored on.

CD Features

Motorized
loading and
ejection

Pause

Select previous
/ next track

FF / REW F-

TPM function
(Track Program
Memory) for 30
CDs with 40
songs each

Scan the traces

Mix Function

Repeat Track
Function

CD Naming (8
characters for
30 CDs)

CD Display
(Display disk
name / elapsed
track)

Audio CDs
printed, CD-R
and CD-RW

Features MP3 CD

Pause

Motorized loading FF / REW F-
and ejection

Scan the traces

MP3-Info-

Directory
selection up /
down

Selection of track
up / down

Mix function
(random play of
tracks in a
folder / around
the
disk)

Fiat Grande Punto

495/534

© 2005, Fiat Auto S.p.A. - All rights reserved



Repeat
function (a
single track or
a single folder)

MP3 Display
(folder, ID3-
TAG, elapsed
track time, file
name)

Audio CDs or
data, print, CD-
R and CD-RW

Audio Features

Bass

Treble

Balance

Fader

Loudness

7-band EQ:
Preset
(default), Rock,
Jazz, Classic,
User

(Customizable)

Audio
Blaupunkt CD-
CHANGER

Features Blaupunkt CD Changer from 10 dischi1

Motorized
loading and
ejection

Selecting CD
and song
selection (up &
down)



Pause

FF / REW F-

Scan

CD Track
Repeat and
Repeat
Function

Function Mix
(CD -
magazine)

TPM function
(Track Program
Memory)

CD Naming (8
characters for
30 CDs)

Phone Features section

Telephone
mute function
on / off;

Telephone
book function
(volume control
phone volume
knob).

Radio controls on steering wheel

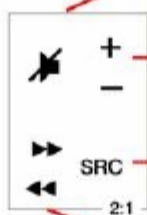
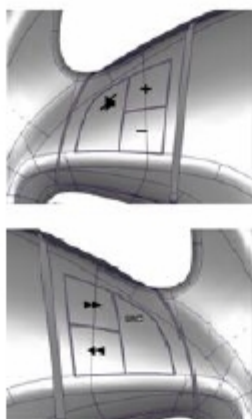
In the presence of radio remote controls are always provided at the wheel. See Figures below.

Activate MUTE voice / radio ESC

Adjust radio volume + / -

Search radio sound source
SRC

Scroll list up / down



9.7 Airbag

9.7.1 General

The security benefits guaranteed by the New Punto arise from a careful integration between the structural components, the high number of specific devices constituting the system protection of occupants:

- Frontal impact
- Rear-end collision
- Side impact
- Tipping

These results are significantly better than those required to indicate a risk of injury Occupying virtually nil.

Frontal impact

They evaluated two types of impact between the vehicle in a frontal impact: one made at a rate of 64 km / h against a deformable barrier representative of a head-on collision between two cars, one representative of an impact against a fixed obstacle and infinitely rigid, is done at 56 km / h against a fixed, rigid barrier.

New point is in a position in the event of a frontal impact to hold the load in the trunk which if not properly restrained can lash out violently against the passengers.

Side impact

The front and rear passenger safety is guaranteed in the new Punto in shock lateral high speed through two types of main test, the impact, simulates the impact between two cars running at 50 km / h and the size of colliding with fixed obstacles reduced transverse poles or trees which are the most dangerous type of collision which can happen to motorists. Thanks to the robust architecture and the use of structural materials with high absorption efficiency of energy, of New point the levels of intrusion into



these types of tests were very low and allow not generate significant stress inertial on the occupants, however, efficiently absorbed by the system to Air-Bag side.

Rear impact

The focus in rear impact tests is addressed, from a structural viewpoint, the containment of the deformation of the passenger and to the absence of damage to the reservoir that could cause a fire.

Protection of children

New Step Up also features all the devices that offer maximum safety for children now feasible. The main devices that make it effective are:
Isofix attachments on rear seats for proper installation of child car seat
inhibition directly from the passenger air bag on-board computer to protect your car seat installed



Description

The occupant protection system of New Point consists of the following components:
Air-Bag driver and front passenger dual stage activation;

Front seatbelts with pre-tensioners electronically controlled and load limiters;

Electronic system for disabled passenger Air-Bag.

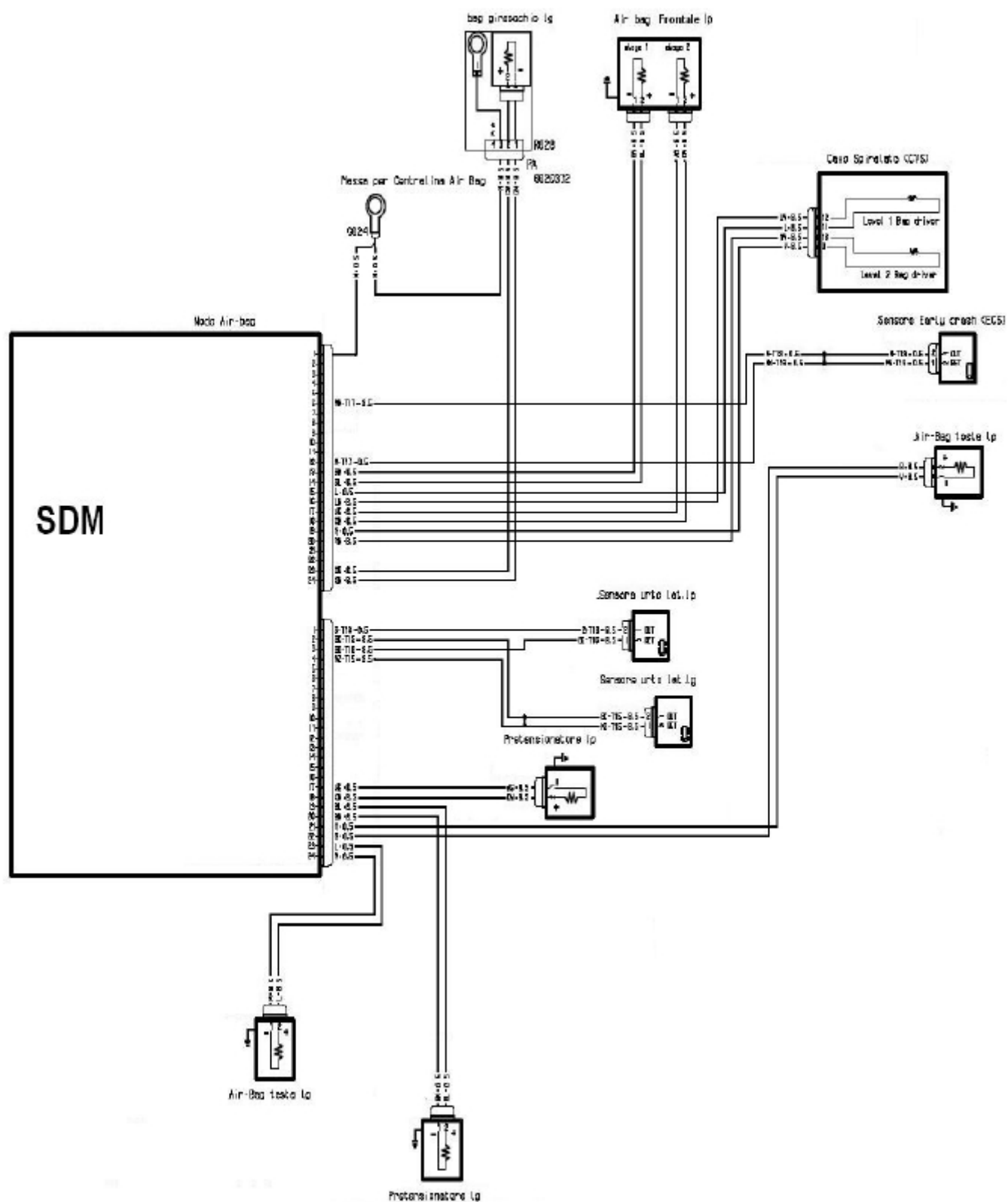


It 'also available as an option, a protection system with two side seats Bag front and two curtain airbags housed in the girders under the roof and two detection sensors side impact.

The protection system is also supported in the collapsible steering column and seats constructed to absorb the energy during the impact front and side.

On New Fiat Punto were introduced in the front seat head restraints adjustable for height with block downhill, which was associated with (optional) the new biomechanical system **antiwiplash**. The system antiwiplash intervenes in case of impact as a result of the strong transfer of load caused by the body resting on the back after the shock and allows the headrest another approach to the head of the occupant attutendone the blow.



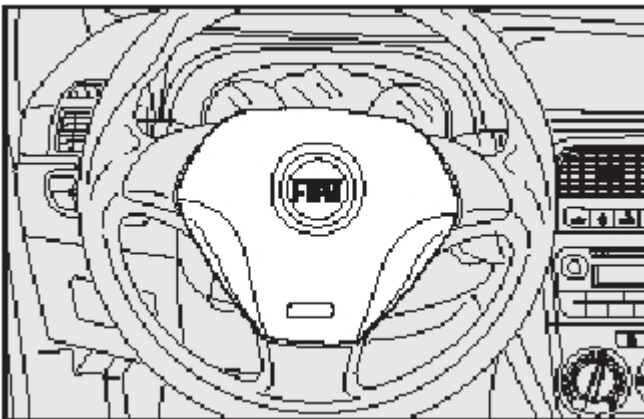


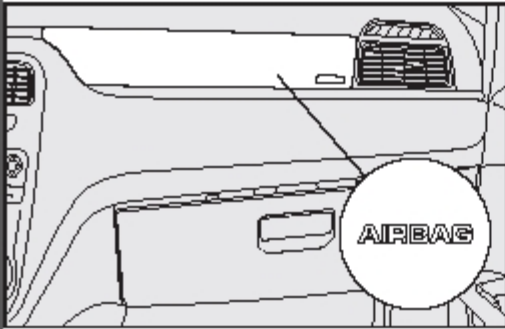
9.7.2 The Air-Bag Smart 2

The occupant protection in frontal impact is by an innovative restraint system said Air-Bag Smart 2 as it is able to automatically adjust the parameters of activation as a function of the severity of the accident.

Air-Bag Front driver and passenger two-stage activation, the consideration that the existing restraint systems are necessarily sized to ensure adequate protection in only 10% of the total frontal accidents, have been developed of Air-Bag double trigger. When the shock is to control the average severity Electronic controls only the first stage activation of the Air-Bag avoiding the placing of energy is not necessary for the protection of the occupant. Conversely, for very severe shocks, the control unit activates both stages in order to be able to absorb the greater kinetic energy occupant before it impacts against the steering wheel or dashboard.

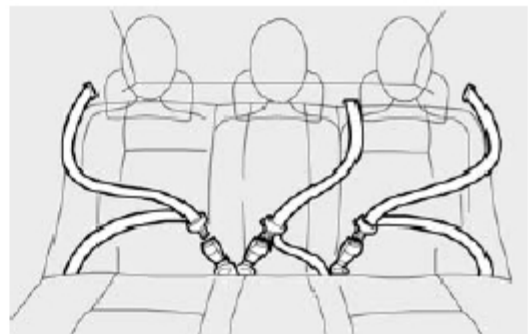
Front airbags for driver's side: consists of a cushion with instantaneous inflation contained in a compartment located in the center of the steering wheel.



**Forntale passenger side airbags (where fitted)**

It consists of a cushion with instantaneous inflation content in a special compartment located in the dashboard panel and cushion with greater volume than that of the driver's side.

Seat belts with pretensioners and load limiters: The same sensors that controls the Air-Bag controls activation of the safety belt pretensioners. They have the function of recovering any slack of the belt of the belt and coupling since the first moments of impact the occupant of the vehicle by reducing the total displacement occupant in the passenger compartment. The belts are also equipped with limiters load decrease the force transmitted through integrating the chest belts on seats Front with Air Bag-in function occupant.



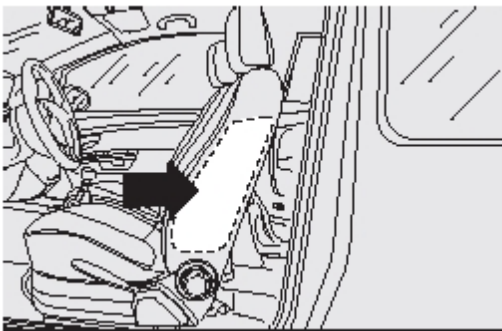
Passenger presence detection sensor. The sensor allows detection of the presence of the passenger and possibly alert the user to fasten their belts security through an audible telltale on the dashboard.

Additional sensor decentralized detection collision. The sensor of additional deceleration of the car seat on the front structure (ECS - Early Crash Sensor) helps main control unit to anticipate the intervention of the Air-Bag compared to a system traditional, eliminating the risk of minor injuries resulting from the activation phase of the Air-Bag, so that phase will be completed before the occupant starts its motion progress against the steering wheel or dashboard.



The system of lateral protection

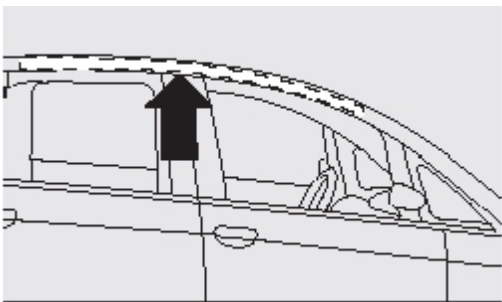
Air-Bag front side: are of a chest / pelvis and ensure the panels together port the protection of critical areas of the body such as ribs, abdomen and pelvic area. Their installation of seat guarantees maximum efficiency regardless of location of the same.



AIR BAG Side Front Thoracic / Pelvic (SIDE BAG) (where applicable)

They consist of two types of pillows, inflating Instant, housed in the seat backs and have the work to protect the thorax and pelvis of occupants in the event of a side impact of severity medium-high.

Air-Bag-down list: are activated along with side air bags (if present) and interpose between occupant and vehicle exterior preventing contact of the head against objects, highly intrusive. Because its range is from the front pillar to the luggage compartment, the bag in down to protect both the front and rear passengers.



AIR BAG Side Head Protection (WINDOW BAG) (Where applicable)

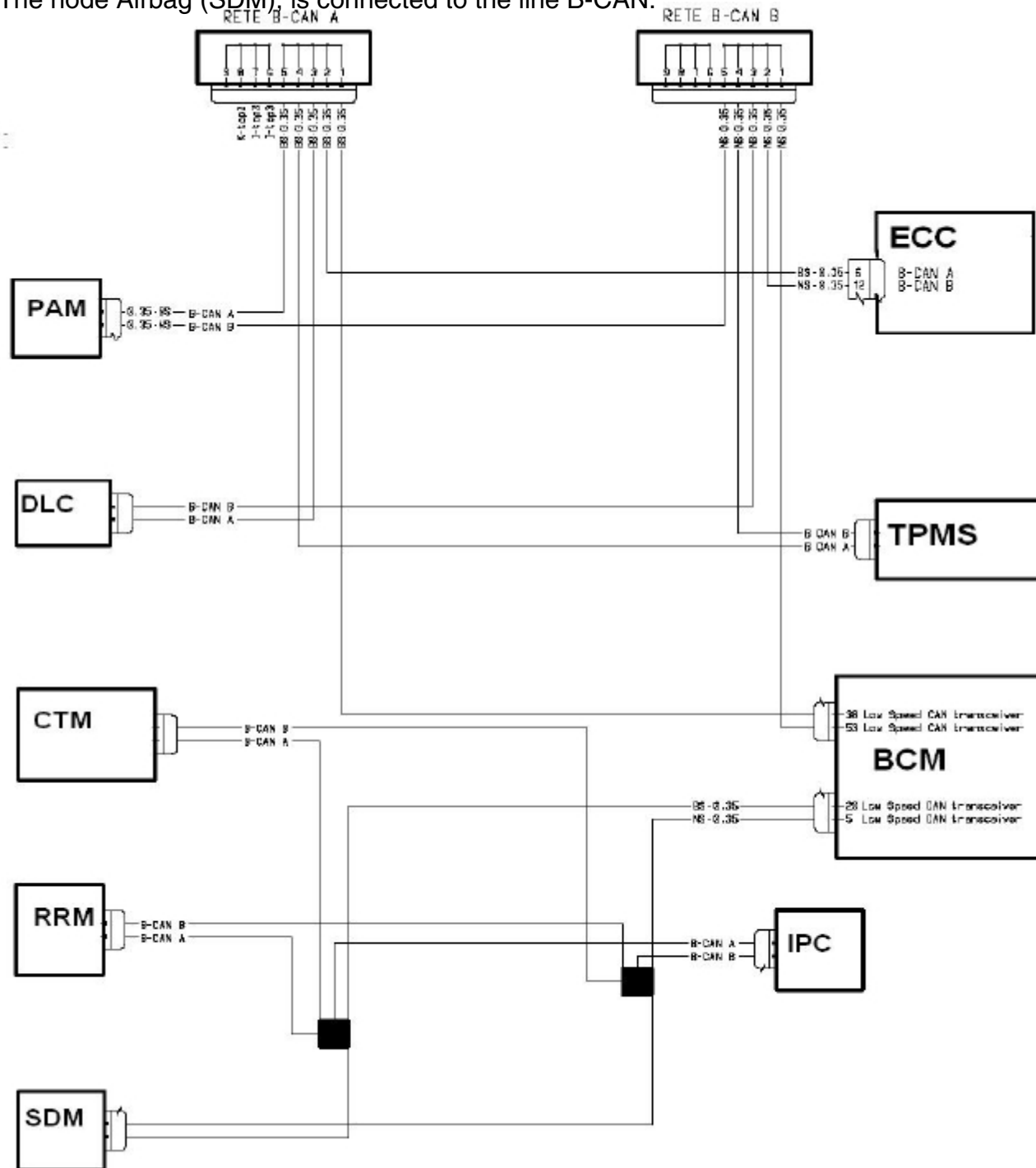
They have two pillows to "pop" protection behind the side panels of the roof and covered by special finishes. Their job is to protect the heads of

front and rear occupants in a side impact, thanks to the developed area pillows.



Links

The node Airbag (SDM), is connected to the line B-CAN.



9.7.3 Node Airbag SDM

It represents the heart of the occupant protection system and is located on the tunnel Front. Simultaneously handles all detection devices and system activation restraint by processing the signals that come from various sensors throughout the car and those installed inside which and how many protection devices activate in the event of accident.

It's also able to prevent their activation when the collision is not severe enough. A capacitor, which acts as a reserve of energy, ensures the full functionality of the front Bag even in the absence of power from the electrical system (when, for example the collision causes the batteries to rupture or power cables).

The algorithm used for frontal impact situations is called in slang "Crash Severity Algorithm" as it is able to distinguish whether the collision is medium or high stringency so as to appropriately control the activation of Air-Bag-stage.

SDM functions

Acquisition of system failures.

Transmission on the B-line signal was AirBag CAN (ON, OFF, Flash)

Capture from line B-CAN through Airbag indicator, status indicator (ON, OFF, Fail)

Storing the state of the airbag indicator (ON, OFF, Fail) in real time, also present also the memory of the crash occurred, but to be permanent.

If a fault occurs on the airbag warning light, SDM must carry the warning Disabling Aibag On a passenger in a position for 4 sec.

If the test phase is not complete, via the diagnostic tool outside, the unit of the control must control the airbag warning light flashing indefinitely, until receipt of correct command from 'external diagnostic equipment.

Acquisition of data from various sensors and front side.



Activation of the various airbags and pretenzionatori.

Passenger side front airbag deactivation.

Cutting the fuel supply.

Disable Passenger Air-Bag: on the control panel setup menu allows the user to deactivate the passenger airbag making it possible to safely install a child seat child turned back road. The deactivation is signaled by a special light on the instrument panel.

Activation / deactivation of the passenger side air bags front and side protection thorax / pelvic (side bags) (where applicable) (BAG P)

This feature allows you to activate / deactivate the passenger side air bag, but does not exclude the side airbag head protection (window-bags) (where applicable).

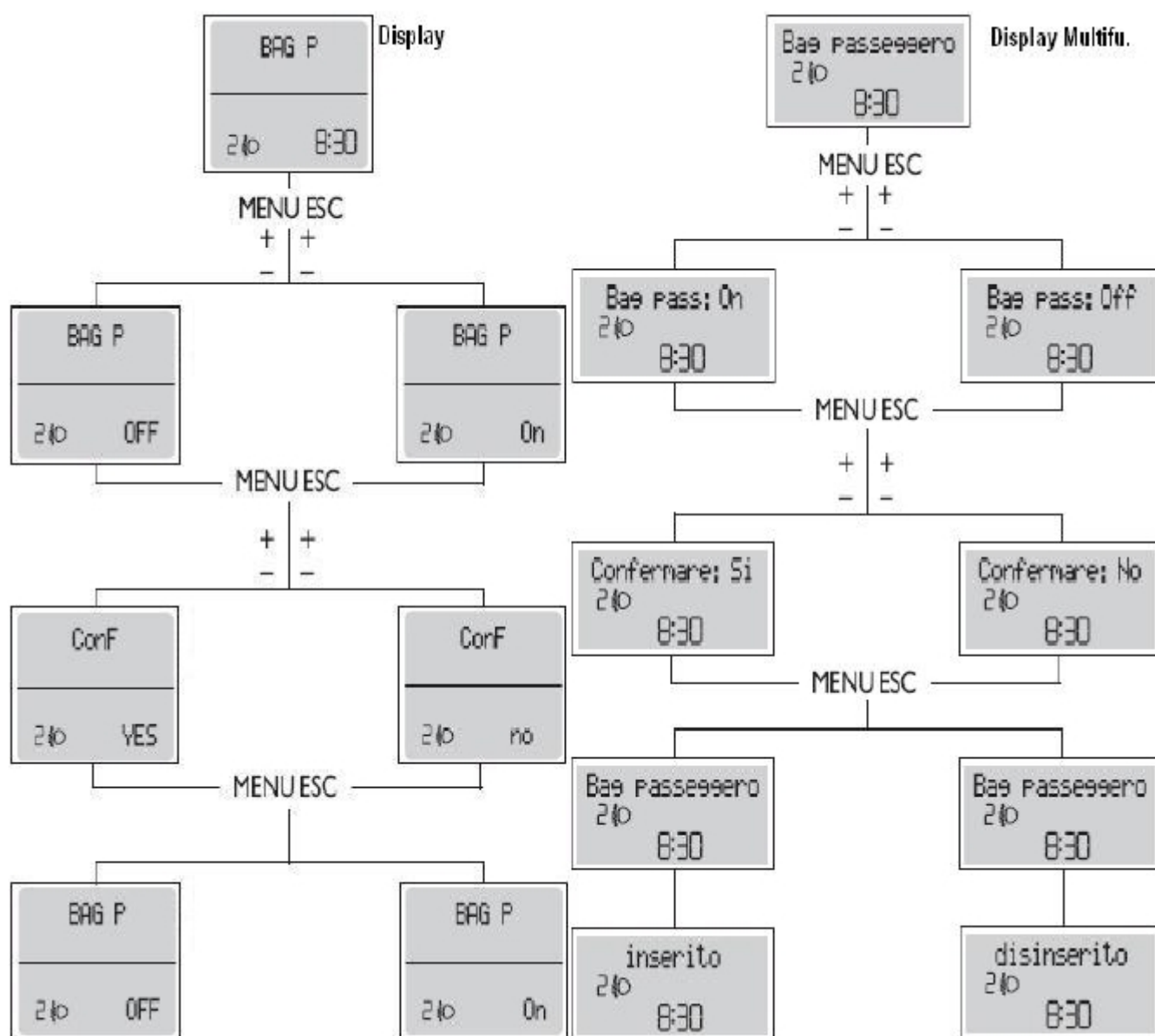
Proceed as follows:

press the button **MENU ESC** and, after displaying the message on the display (BAG P OFF Pass or Bag: Off) (to disable) or post (P BAG Bag On or Pass: On) (for activated) by pressing the buttons + or - Press the button again **MENU ESC**; the display shows the message confirmation request;

by pressing the + or - select (YES) (to confirm activation / deactivation) or (No) (to quit);

press the MENU button Short press ESC, you receive a message confirm choice and return to the screen or press the menu button long press to return to standard screen without saving.





9.7.4 Diagosi and recovery

Airbag warning light (SDM side)

Based on the airbag state signal in B-CAN, the SDM communicates to 'IPC in certain conditions:

- Failure to Aibag system (the airbag warning light comes on to signal from the SDM);
- Test not completed (the airbag warning light flashes from a signal from the SDM).
- Check on the Key (the airbag warning light turns on automatically by a combination set by 'IPC for 4 sec, the signal comes from the SDM).

by 'other side of the IPC to the SDM sends, via the B-CAN, the signal light Airbag inform the SDM for the diagnosis of the state of light.

.At key on

- It will be shown the warning for 20 s if, after the typical time tAB (15 s) by key-on, the light is still on.
- If after the typical time tAB (15s) the signal from the SDM, during the display the message, then the message remains active for no more than 5 s.

Conditions work	Function	Notes
Off +30	Signal not available	
Power in Key (+15)	Signal (CrashOutputSts) available	The function is excluded during the first 4 seconds after key on
Turning off	Signal not available	
Cut off during start	Signale (CrashOutputSts) available	The function is excluded during the first 4 seconds after key on. The function is provided by a reserve internal energy at the start of motor or Oltro event in which lacks



		nance. Below 6 volts the node off. When the voltage goes up the node has the same behavior of the Power in the preceding paragraph Key +15.
Cut off with battery discharge	Signal (CrashOutputSts) available	The function is provided by a reserve of internal energy for a time maximum of 150 msec.

In an impact the SDM transmits, via line B-CAN, an appropriate signal of an impact (STATUS SDM.CrashOutputSts), this signal informs the network when it happened and the type.

Node Airbag performs its functions as reported in the table:

Functions	Airbag lateral side guide	Airbag lateral passengers.	Airbag Anter.	X Accelerom. internal	Y Accelerom. internal	X Function security	Threshold Intervention
Protection Front			X	X		X	Pretenzione anteriore
Protection Lateral	X	X			X		Limiter laterale
Protection Posterior.				X			TBD
Cutting Carburetor.			X	X	X	X	



Recovery

R1 = X Accelerometer Signal: Activation inhibited

Accelerometer Signal Y: Airbags Front and Pretenzionatori Insured and Side Airbags Head inhibited.

Power Reserve: Activation uninsured

ASIC: Activation Insured

Microprocessor: Activation Inhibited

Memory: Activation Inhibited (ECU reset)

Safing Sensor: Airbag Fraontale pretenzionatori and inhibited, and Dark Side insured.

R2 = Activation unsafe due to failures.

R3 = In the case of
 the shock unit
 will activate.

R4 = Inhibit starting of the engine and front passenger airbags Passenger airbag warning light.

R5 = Activation assured.

R6 = Activation
 Inhibited by the
 unit.

R7 = The CAN communication stops for 1 sec. The passenger airbag is disabled when this time.

R8 = Relative
 inhibition
 dell'Airbeg side
 and head. The
 Side and head
 are opposed

Sure. The Froteli and Pretenzionatori are sure.

R9 = This activation.
 Can be erased
 from the
 memory of the
 events, when

all the following conditions are true:

- If it is not an airbag and pretensioner
- If it is the third of attivazione pretenzionatori
- If you activate the third side dell'Airbagit

R10 = Front Airbags & Airbag Passenggero inhibited and passenger's airbag warning light Lights

If R11 = status indicator or switch off passenger airbag is not clear
(Notice that either are defective or message out of time) the light

alarm will be activated immediately and the passenger airbag off.

Fiat Grande Punto

511/534

© 2005, Fiat Auto S.p.A. - All rights reserved

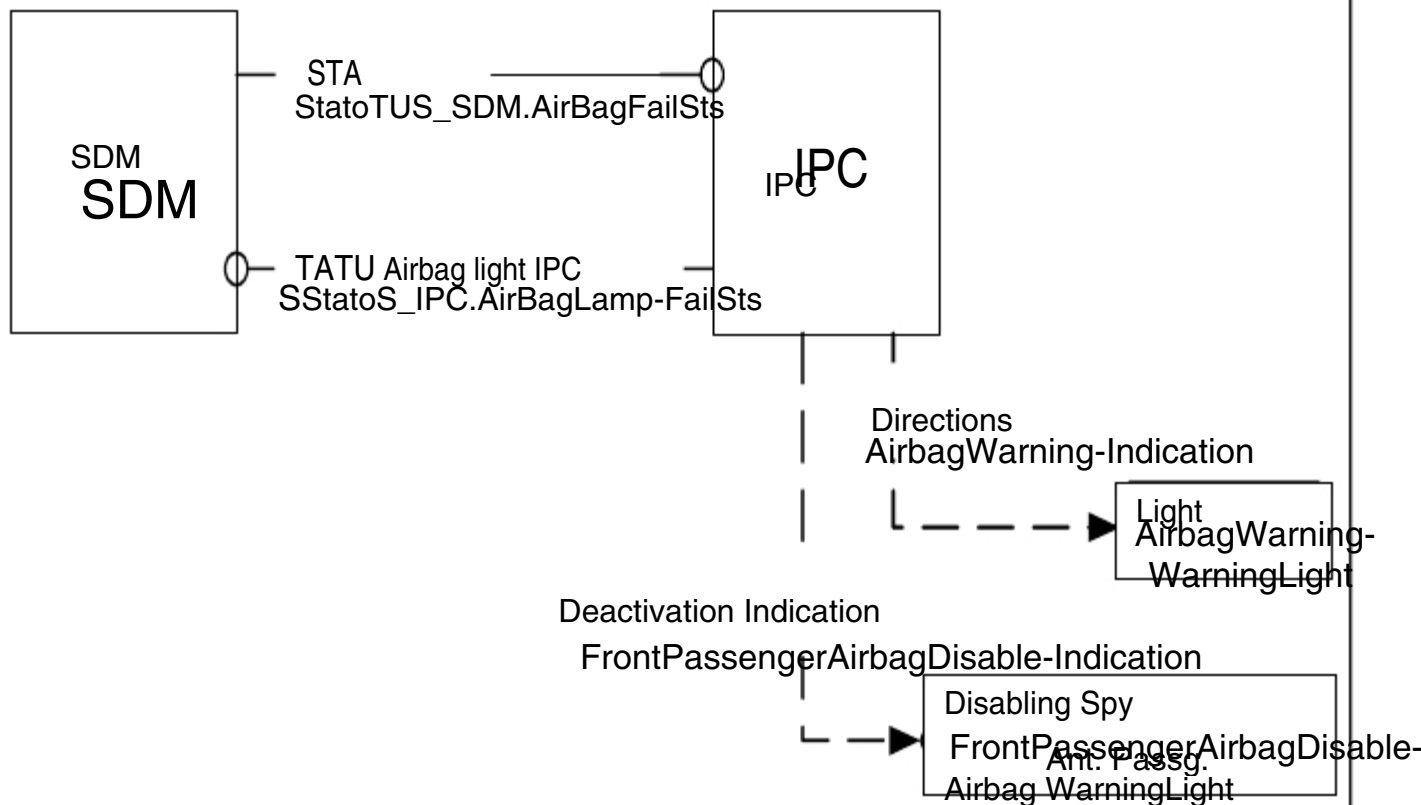


DTC	Description
B0108	Front Driver Side Bag, Value too low, see page 122
B0108	Front Driver Side Bag, Value too high, see page 122
B0109	Front Passenger Side Bag, see page 123
B0109	Front Passenger Side Bag, see page 123
B0109	Front Passenger Side Bag, see page 123
B0109	Front Passenger Side Bag, see page 123
B0110	Front Passenger Airbag Disable Switch, Short to Battery, see page 123
B0110	Front Passenger Airbag Disable Switch, Value too low, see page 123
B0110	Front Passenger Airbag Disable Switch, Value too high, see page 124
B0110	Front Passenger airbag Disable Switch, Defective Signal, see page 124
B0110	Front Passenger Airbag Disable Switch, Plausibility, see page 124
B0111	Front Driver Side Satellite, Defective Signal, see page 124
B0111	Front Driver Side Satellite, Internal Error, see page 124
B0112	Front Passenger Side Satellite, Defective Signal, see page 125
B0112	Front Passenger Side Satellite, Internal Error, see page 125
B0113	Front Driver Airbag, 2nd Stage, Short to Ground, see page 125
B0113	Front Driver Airbag, 2nd Stage, Short to Battery, see page 125
B0113	Front Driver Airbag, 2nd Stage, Value too low, see page 125
B0113	Front Driver Airbag, 2nd Stage, Value too high, see page 125
B0114	Driver Head Bag, Short to Ground, see page 126
B0114	Driver Head Bag, Short to Battery, see page 126
B0114	Driver Head Bag, Value too low, see page 126
B0114	Driver Head Bag, Value too high, see page 126
B0115	Passenger Head Bag, Short to Ground, see page 126
B0115	Passenger Head Bag, Short to Battery, see page 127
B0115	Passenger Head Bag, Value too low, see page 127
B0115	Passenger Head Bag, Value too high, see page 127
B0116	Driver Knee Bag, Short to Ground, see page 127
B0116	Driver Knee Bag, Short to Battery, see page 127
B0116	Driver Knee Bag, Value too low, see page 128
B0116	Driver Knee Bag, Value too high, see page 128
B0117	(Driver) Early Crash Sensor, Defective Signal, see page 128
B0117	(Driver) Early Crash Sensor, Internal Error, see page 128
B0118	Configuration Mismatch, see page 128
B0119	Pretensioner Crash Data, see page 128
B0120	Front Airbag and Pretensioner Crash Data, see page 129
B0121	Driver Side Crash Data, see page 129
B0122	Passenger Side Crash Data, see page 129
U0001	CAN no message, see page 129
U0001	Can bus-off, see page 129
U1700	BCM signal below allowable, see page 129
U1700	NQS node mute, see page 129
U1703	NQS signal below allowable, see page 129
U1703	NQS node mute, see page 129



Airbag warning light

This report describes how the SDM system status, error status and test exists.



Airbag Indicator (CPI side)

At key-on, in the presence of Spies AIR-BAG, AIR-BAG and Disabling passenger will kept burning from 'IPC, the KEY-ON Turns on for a predetermined time, regardless from the signals coming from the SDM.

After this time of Check, the management of the lights will again be based on signals that receive from the SDM.

Warning messages from 'Airbag (IPC side)

SDM began working at the Key-on diagnostics, so the system can detect problems Airbag.



Spy Report:

Errors Class To all those at risk of incorrect activations minimum of squibs

Airbag. For this type of error the light stays on when the error is intermittent
been correctly to reset the ECU.

Class B all those errors that do not cause risks to incur activation of squibs degli
Airbag. For this type of error the light stays on for 30 seconds and then turns off.

9.8 The fire protection

In the late 90's with the introduction of new European regulations relating to the crash tests and with the introduction of the fuel injection system, has become indispensable by Fiat Auto the need to redefine the design of heavy shell and the redefinition of lay-out of various systems on the vehicle.

All the Fiat Punto, the various body components, is therefore set to the rigorous compliance with the latest and strictest internal Fiat safety against fire.

Fire Prevention System - FPS

Of all petrol and diesel is the inertia switch (FPS English Fire Prevention System) that allows the immediate stopping of the engine a few milliseconds from the beginning of impact.

The plastic tank, which already meets future directive, is located in a protected area in case of collision, and the ability to withstand any deformation without risk of leakage fuel. moreover, being plastic, does not generate risks of explosion in case of fire car.

Electrical System engine compartment



The disconnection of the main positive high-power cables is performed directly on the pole battery positive through a box including fuses. This solution avoids the presence of cable runs are not protected by a fuse and then exposed to accidental short circuits. All cables are electrically isolated and inserted into coatings for corrugated mechanical protection against possible risks of abrasion. The electrical insulation of the power cable of the starter motor / battery is of a material with high resistance to abrasion and cutting with a path objectified using specific hardware.

Electrical system inside cabin

All cables are protected by a fuse located in interconnective units placed in the engine compartment (FDU front left side), the passenger compartment (BCM, the left side under the dashboard) or luggage compartment (RDU, wired on cable car and positioned near the left tail light). All cable routes are well defined to guarantee the absence of pinching during installation of finishes.



10 Air Conditioner

10.1 General

10.1.1 Configuration of the system

The 'offer range includes three different systems:

heater

air conditioning

dual-zone automatic climate control with differentiated between driver and passenger both the temperature and air distribution.

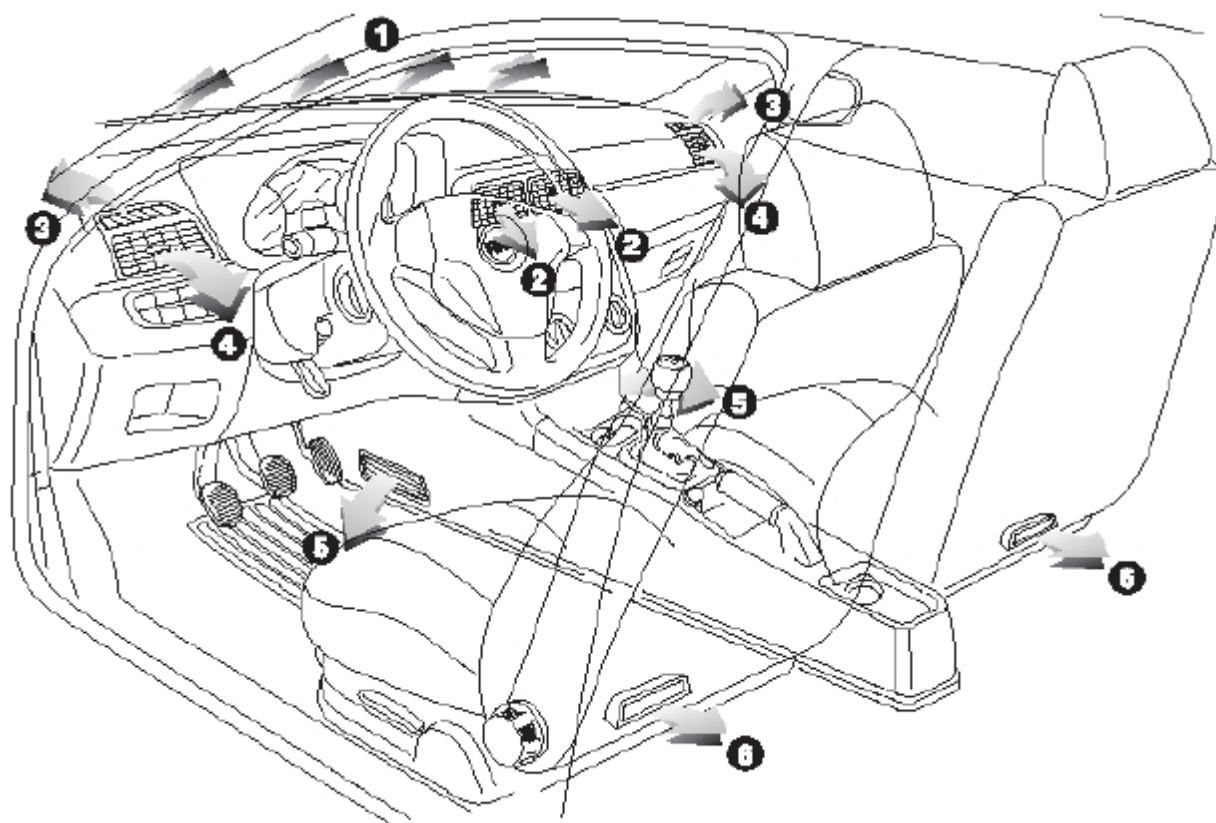
The versions conditioned (heated on a OPT) are provided with ducts for the air distribution to the rear passengers' feet.

The heater and air conditioner controls have the same layout features 3 knobs, the left knob to adjust the temperature of the air introduced into passenger compartment, the central speed of the fan (4 speed) and the right adjustment of the air distribution (5 positions appear in the area surrounding the knob).

In the definition of the particular shape of the knobs and controls was privileged ergonomics rather than style, getting an intuitive, with good prehensile.

Inside the flange there are also the keys of the recirculation control, heated rear window and the of the compressor (for air conditioning).



10.1.2 Air Flows

*Schematic flows and
speakers*



10.2 Components

10.2.1 unit ECC (Electronic Climate Control)

As mentioned above, the automatic climate exists in only one configuration bi-area, this version is the only one to use the ECC.

Pin-out ECC:

No.	I / O	Description
1		CAN L
2		CAN H
3	N.C.	N.C.
4	N.C.	N.C.
5	O	PWM output
6	N.C.	N.C.
7	O	Power Sensor for Radiation
8	N.C.	N.C.
9	The	Temperature Sensor Signal 1
10	The	Irradiance Sensor Signal
11	O	Mass sensors
12	O	-
13	N.C.	N.C.
14	N.C.	N.C.
15	N.C.	N.C.
16	N.C.	N.C.
17	The	4 Temperature Sensor Signal
18	The	3 Temperature Sensor Signal
19	The	Irradiance Sensor Signal
20	The	Temperature Sensor Signal 2
21	N.C.	N.C.
22	O	-
23	N.C.	N.C.
24	O	-



25	The	Mixing motor position signal sx
26	The	Motor position signal mixing dx
27	The	Motor position signal distribution right
28	The	Left motor position signal distribution
29	The	Fan Input
30	The	Supply
31	O	Power scooters mixing and distribution
32	O	-
33	O	-
34	O	-
35	O	-
36	O	-
37	O	-
38	O	-
39	The	+ 15
40	O	Mass

10.2.2 Actuators and sensors

The air conditioner system is composed of:

A) controls (knobs, buttons and display).

B) Sensors:

interior temperature;

outside temperature;

mixed air temperature dashboard left / right;

temperature standing L / R;

sun sensor.

C) Implementations:

mixed L / R;

recirculation;

Air distribution feet - dashboard - DEF SX



Air distribution feet - dashboard - DEF DX;

fan speed;

disabling the compressor;

MAX DEF;

heated rear window function.

D) lines of connection with:

CAN Body Computer.

10.2.3 Compressor

New point is equipped with compressor and magnetic clutch without Denso 5SL12 variable displacement. It allows to vary in a gradual way the scope of the cooling fluid that reaches the evaporator, and consequently also the presence of frost sensor not be redundant, and therefore is not installed on your system.

The adjustment is based on the value of suction pressure, according to the following logic:
low pressure, the displacement of the compressor tends to the minimum value;
high pressure, increasing displacement.

This control logic refers to the following practical conditions:

"Low pressure" means that the load imposed on the air conditioner is not of sufficient magnitude to require a high flow rate of fluid.

"High pressure" means that it imposes a significant burden to the climate and the amount necessary for the cooling fluid is high.

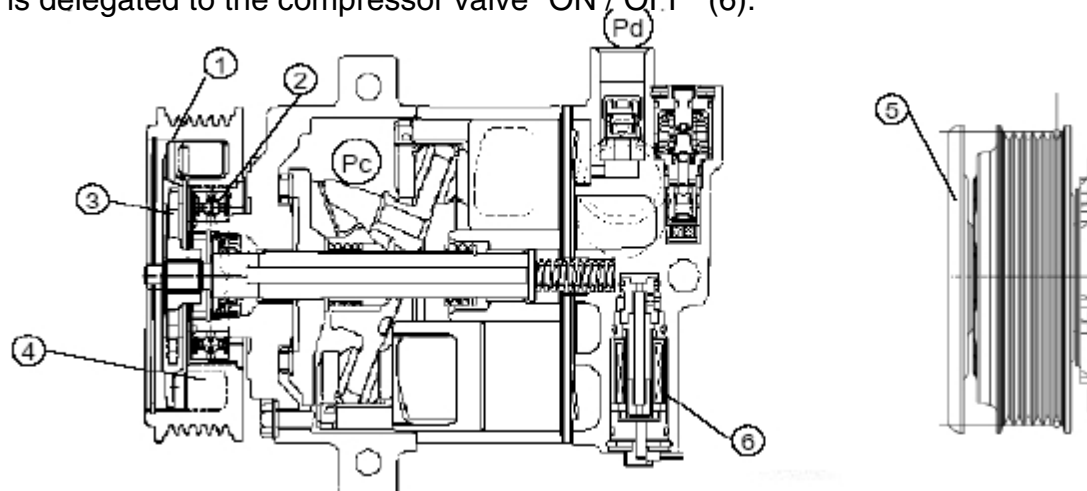
Operation

The motion of the pulley is continuously trasmesso the shaft of the compressor by means of jumpers called "limiter" (3) which have the function, in the event of seizure for failure of the compressor, to stop allowing the pulley does not stop and thus not break the auxiliary belt.



In order to also reduce the torque fluctuations which produce noise are also adopted dampers called "dumpers" (4) and an inertial mass (5) fixed directly on the shaft.

As always the motion transmitted to the shaft of the compressor power off and Power is delegated to the compressor valve "ON / OFF" (6).



compressor section

Specifications

The compressor 12 can 5SL vary its flow rate due to changes in load demands to the system, the changed conditions of external temperature and / or moisture, abrupt variations of the load motor.

The main features are:

direction of rotation: clockwise

Maximum continuous speed: 8500

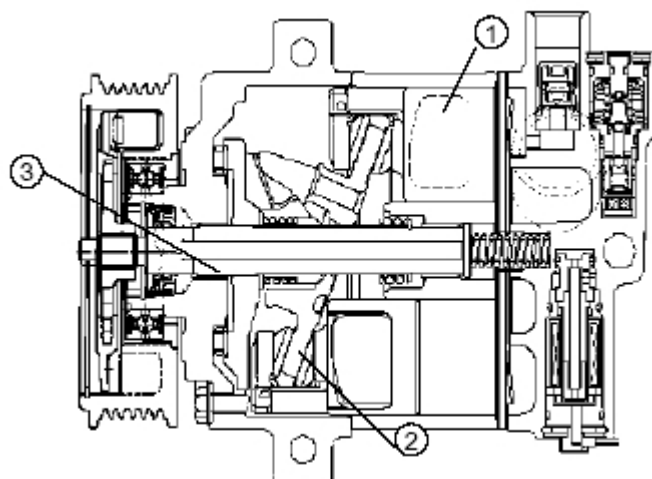
Piston number: 5

displacement min: 0 cm³/rev

Maximum capacity: 126 cm³/rev

lubricant quantity: 80 cm³





The compressor consists of 5 pistons (1) fixed to a wobble plate (2). The pistons move in the cylinders, formed in the body of the compressor, and are put in motion by the oscillations of the plate. The motion of the plate is generated by the rotation transmission shaft (3).

The latter is set in rotation from the pulley, connected to the motor by means of the belt auxiliary; the flow of cooling fluid is regulated by varying the displacement of the compressor, varying the inclination of the plate-connecting rods (2).



10.2.4 Filters and capacitor

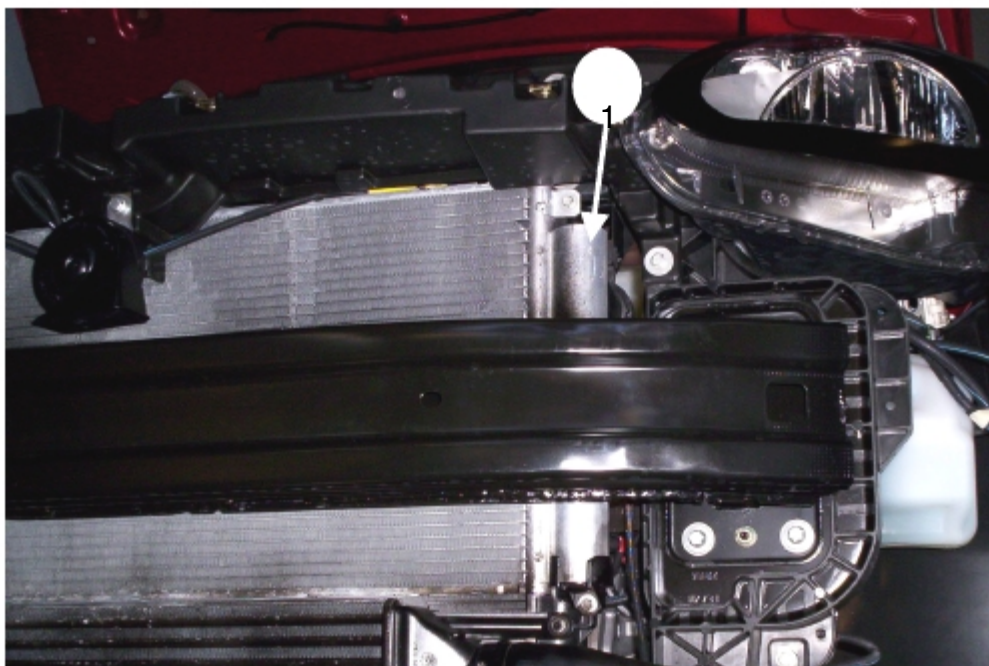
The condenser is a heat exchanger placed in front of the radiator cooling motor.

The refrigerant in the gaseous state through the condenser tubes and liquefies (On average at a temperature of 60 C.

The condenser is lapped from the outside air produced by the advancement of the car. When the car is stopped or running in the column, the flow of air is generated by the fan of the radiator motor.

An insufficient heat exchange in the condenser increases the pressure in the system and causes the partial condensation of the fluid, reducing the efficiency of the plant.

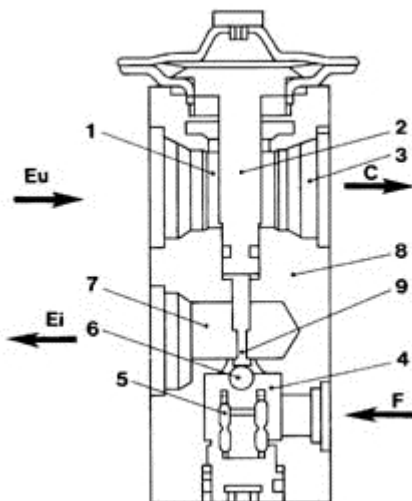
On the right side of the capacitor is recessed for the drier filter (1), of the form cylindrical, fully integrated. This solution allows to optimize the layout plant.



The pollen filter is rectangular in shape, replaceable by removing the protective plastic that is located inside the passenger side under the glove compartment.

10.2.5 expansion valve

The figure below shows a section of the expansion valve and identifies the main parties.



1, duct smooth transition at the evaporator outlet

2, heat-sensitive element

3, the compressor suction connection

4, fluid under pressure

5, pressure spring

6, ball and orifice

7, fluid foam (the evaporator inlet connection)

8, the valve body

9, Auction

C, the compressor

F, the filter drier

And, evaporator inlet

Eu, evaporator outlet



10.2.6 Fluids

The oil of the compressor (80 cm³) is of type ND8, should not be replaced.
The amount of refrigerant R134a is 500 + / - 40 g for all engines: Points connecting the equipment to recharge vary from model to model, but are always easily identifiable.

10.3 Operating logic

The layout of the controls varies depending on the configuration of air conditioning (heating, Manual air conditioning, dual-zone automatic climate control.

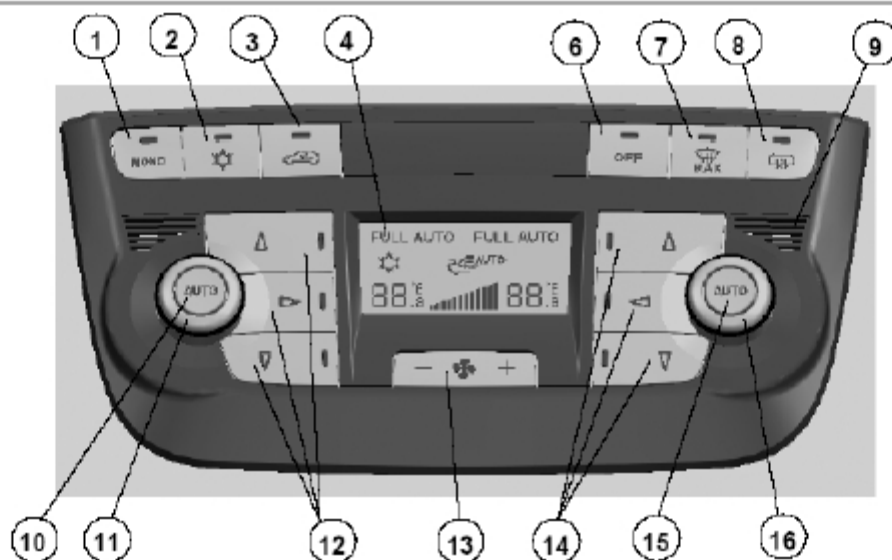


Heater



Air Conditioner





Dual-zone automatic climate control

In relation to Fig. dual-zone automatic climate control, the buttons have the following function:

- 1) Button selected control temperature only MONO / differentiated (yellow LED).
- 2) control switch enabling / disabling the compressor (yellow LED).
- 3) air recirculation control switch (yellow LED).
- 4) Display.
- 6) OFF command button off of the system. (Yellow LED).
- 7) MAX DEF command button (yellow LED).
- 8) Rear window (yellow LED).
- 9) Grid Security cabin temperature sensor.
- 10) SX AUTO button to automatically control the temperature SX, SX distribution, fan, compressor and recirculation.
- 11) Temperature selection knob's side.
- 12) Radio Buttons air distribution SX (3 green LED).
- 13) rocker button Fan speed (increase / decrease).
- 14) Radio Buttons DX air distribution (3 green LED).



15) DX AUTO button to automatically control the temperature DX, DX distribution, fan, compressor and recirculation.

16) Temperature selection knob on the passenger side.

The system allows to adapt the cabin air temperature, in the driver's side and in the passenger side, to that required in automatic. You can also select manually the air flow, air distribution, switching off the compressor, state the recirculation and the function of MAX DEF (with which one has the automatic insertion of the rear window heat), you can also manage, through the MONO button, the system in single-zone, bringing the and temperature distribution in the passenger cabin request to that required by driver.

The operating logic is based on the equivalent temperature.

10.4 Diagnosis

Procedure proxatura unit

Through appropriate control logic of the sensors and control with "self-learning" of the actuators, the control unit is able to record and store a series of anomalies and faults that may occur in the system.

You can read the errors stored by connecting to the diagnostic socket of the Body Computer.

This operation is used to make the system learn the position of end of stroke of the actuators of electric air conditioning unit.

Using computerized diagnostic equipment, activate the prescribed procedure.

This operation must be repeated with the substitution of at least one of the actuators.

In case of interruption of the procedure.



11 Sunroof

11.1 Description

The roof of the new Punto is a specific system for large windows, called "Skydome", consisting of two glass panels of which one fixed rear and one front and sliding of a thin front baffle with function.

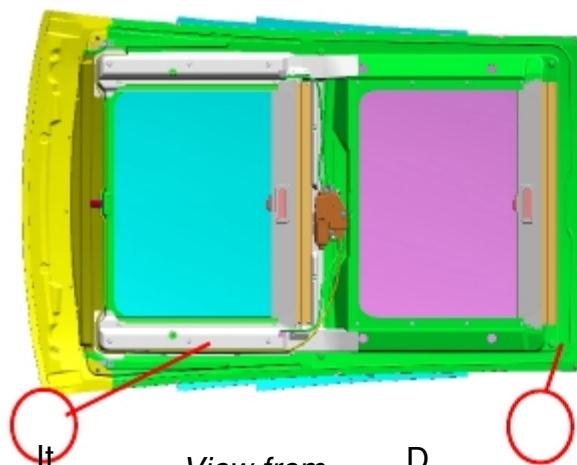
The glasses are extended to an extent to replace more than 70% of the surface of the sheet metal pavilion.

The glazing, when closed, allows the entry of external light and from the possibility of the passenger compartment of the car to see the outside and, during opening, allows the opening of the compartment roof for about half of its surface.

In the opening phase of the moveable panel front slides out of the pavilion (position "Spoiler").

In particular, the sunroof is as follows:





It

*View from
below*

D

*Side View*

a sheet metal frame on which are fixed the other components (D);
a system of right and left mechanisms, fixed to the frame, for moving the front glass panel, driven by electric motor via a wire spiral (S);
two panels of tempered glass, 4 mm thick low value of energy transmission and light of which the front (A) movable with movement of the spoiler, and the rear (B) fixed glued to the frame;
a front lamella (C) with function deflector (which is raised to the opening of the roof);
two sunshades roller (front and rear) Polyester with handling manual two-position (open / closed).



The movement of the roof takes place by means of:

Control Pad



electric motor and control panel sunroof (integrated)

motor-unit integrated

pin-out motor unit

1.Key - on (+15)

2. Speed signal from node brakes

3. Power supply (+30)

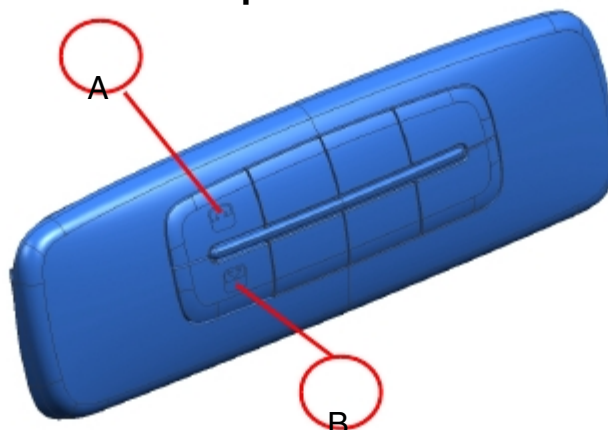
4. Mass

5. N.C.

6. N.C.



11.2 Operation



escutcheon commands

The operation of the sunroof "Skydome" by pressing the release button (A) and closing (B) in the flange close to the ceiling front center. The logic of operation described below is achieved by the actuation of an electric motor managed by a computer. **The movement of the sunroof, through key command, are permitted only with ignition on (Key-ON).**

11.2.1 Opening Roof

Pressing the button (opening side), with a Key-ON, allows two modes of opening Glass front panel:

Automatic: Through a normal button press on the "open" (for a time > 300 ms), completely enclosed by glass panel front door "to open spoiler" (Ensuring less wind noise), then pressing on the same side of the button, the front glass panel is brought into position of maximum opening. After the Initial command to open the glass panel can be stopped at intermediate positions pressing the button again.

Manual: By a short press of the button (for a time $60 < T < 300$ ms), from completely closed, the front glass panel moves in proportion to the time T press the button and stops in position to release the button. With pressures on same side of the button later and always in the time T between $60 < T < 300$



ms, the panel moves in increments until it reaches the position of maximum opening. This function allows the user to position the front panel in intermediate positions with respect than the maximum.

11.2.2 Closing the roof

Similarly for the opening, pressing the button (closing side), only with Key-ON, allows two modes of operation, automatically or manually, with the same modalities of button gives opening:

Automatic: Through a normal button press on the "open" (for > 300 ms), to be completely open, the front glass panel is brought into position "open to spoiler ", a second press of the command takes the panel in the door panel position in the closed position. After an initial command to open the glass panel can be stopped in intermediate positions by pressing the button again.

Manual: By a short press of the button (for a time $60 < T < 300$ ms), from fully open the front glass panel moves in proportion to the time T pressure on the button between $60 < T < 300$ ms and stops in the release position of the button; with pressures on the same side of the button later and always in the time T between $60 < T < 300$ ms, the panel will move in increments until it reaches the position closure.



11.2.3 Shades

The adjustment of the brightness inside passenger compartment is allowed through the use of 2 tendons

parasol: one for the movable panel front and one for the fixed rear. The tendon

Polyester is sun, each slide and roller blind, with shoes

sliding, avoiding the undermining of the guides. Their openness is manual and can

only be fully open or fully closed. The closing of the curtain

Parasol is independent of the opening position of the front panel.

11.3 pinch and closing the roof

The system of anti-pinch, managed by the electronic control unit, as well as being consistent with as required by Directive 2000/4/EC, is active during closing horizontal and vertical front panel after meeting an obstacle (eg finger, hand):

in the horizontal motion of closure is active throughout the entire stroke (if it is open more than 4 mm) and in

Following the meeting of an obstacle on the front side of the panel glass, ensures the inversion of motion for a stroke equal to 100 mm from the point of inversion motion;

in the vertical motion of closure is active (if open more than 4 mm from the wire seal), following encounter an obstacle on the rear side of the panel glass ensures the inversion of the motion until it reaches the open position of a compass.

In both cases, the load that determines the reversal is <100 N, as required by Directive 2000/4/EC. The possibility of pinching from inside the vehicle in the lateral zones of the panel is avoided by the adoption of side shields that prevent access to danger areas.



11.4 Handling of Emergency

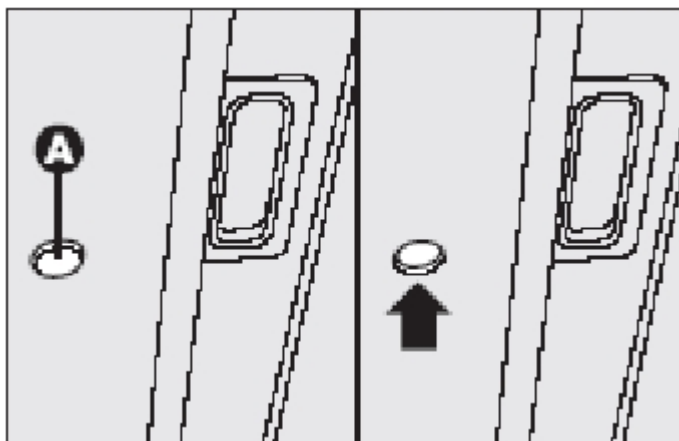
In case of emergency or maintenance without power supply it is possible to perform manually opening / closing of the front panel glass, performing the following operations:

remove the protective cap located on the inner lining, between the two sunshades

remove the Allen wrench supplied in the tool box located in the

trunk

To insert the key in place and rotate (clockwise to open the roof, counterclockwise to close it)



11.5 Initialization

In the case of detachment of the battery or emergency manual handling of the crystal is must initialize the motor of the roof.

It operates with the following steps:

hold down the A button in the closed position

hold the button so that, in spurts, the roof closes completely

wait, after complete closure of the roof, that the electric motor stops completely.

