Alfa 4C

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02.13

Version: all models

0000 0 000 AA **NEW 4C MODEL**
Main features and technical specifications – Network Information

The new Alfa Romeo compact 2-seater coupé, with rear drive and central engine, is called 4C.
The new model is shown in Fig. 1 and is featured by:

- 4-cylinder, 1750 Turbo Petrol aluminium engine.
- Alfa Twin Clutch Transmission (TCT).
- New Alfa DNA selector with Race mode.
- Structural and bearing carbon chassis.
- Weight/power ratio: lower than 4 kg/HP.

Fig. 1 - Alfa 4C

The identification data, dimensions, main technical specifications and a short description of the main innovative/important features of the new model can be found in the following pages.

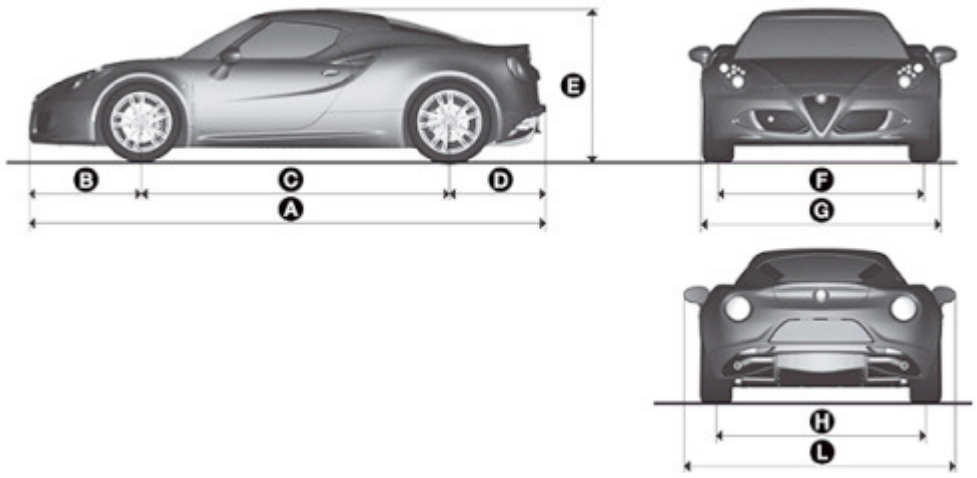
IDENTIFICATION DATA

Engine codes and bodywork versions

VERSION	ENGINE	BODYWORK
1750 Turbo Petrol	960A1000	960CXB1A 01

DIMENSIONS

Fig. 2 - Vehicle dimensions in mm (unladen and with standard tyres)



A	B	C	D	E	F	G	H	L
3990	864	2380	746	1184 *	1639	1868	1606	2090

(*) Height is measured with vehicle unladen.
Small variations in size are possible depending on the dimensions of the rims
Luggage compartment volume: 110 dm³ (V.D.A. standards)

ENGINE

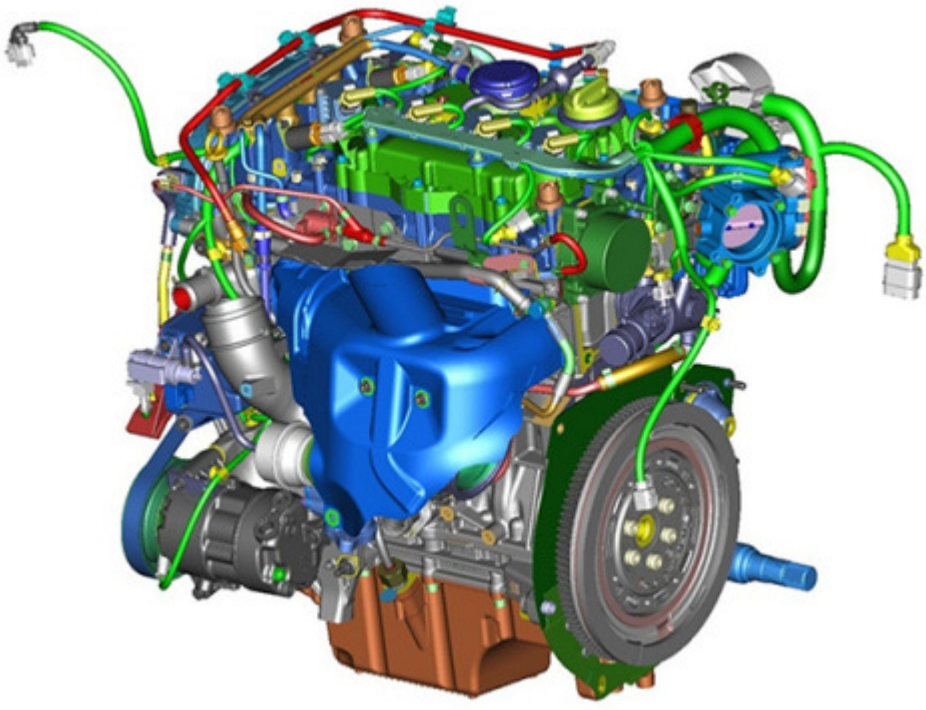
The Alfa 4C engine is 1750 Turbo petrol Euro 6 type, in a central transversal position.
This engine represents an evolution of the power unit mounted on Giulietta Quadrifoglio Verde version; it has an innovative aluminium block and special intake and exhaust systems, optimised to further enhance the vehicle sports "soul".
The main specifications are listed hereby:

1750 Turbo Petrol (240 HP)	
Engine marking	960A1000
Total displacement	1742 cm³
EC max. power	177 kW – 240 HP (*)
At a speed of	6000 rpm
EC max. torque	350 Nm (35.7 kgm) (*)
At a speed of	2100 ÷ 4000 rpm
Timing system	DOHC
Fuel supply	Electronically controlled phased sequential multipoint electronic injection with turbo and intercooler
Max. speed	258 km/h
Acceleration 0÷100 km/h	4.5 seconds

(*) Values obtained using 98 RON unleaded petrol.

ENGINE DESCRIPTION

The 1750 Turbo Petrol 240 HP engine, shown in Fig. 3, is an overhead 4-cylinder on line type, with petrol fuel supply, timing through double stage continuous variation, direct injection and supercharged.
Fig. 3 - 1750 Turbo Petrol engine

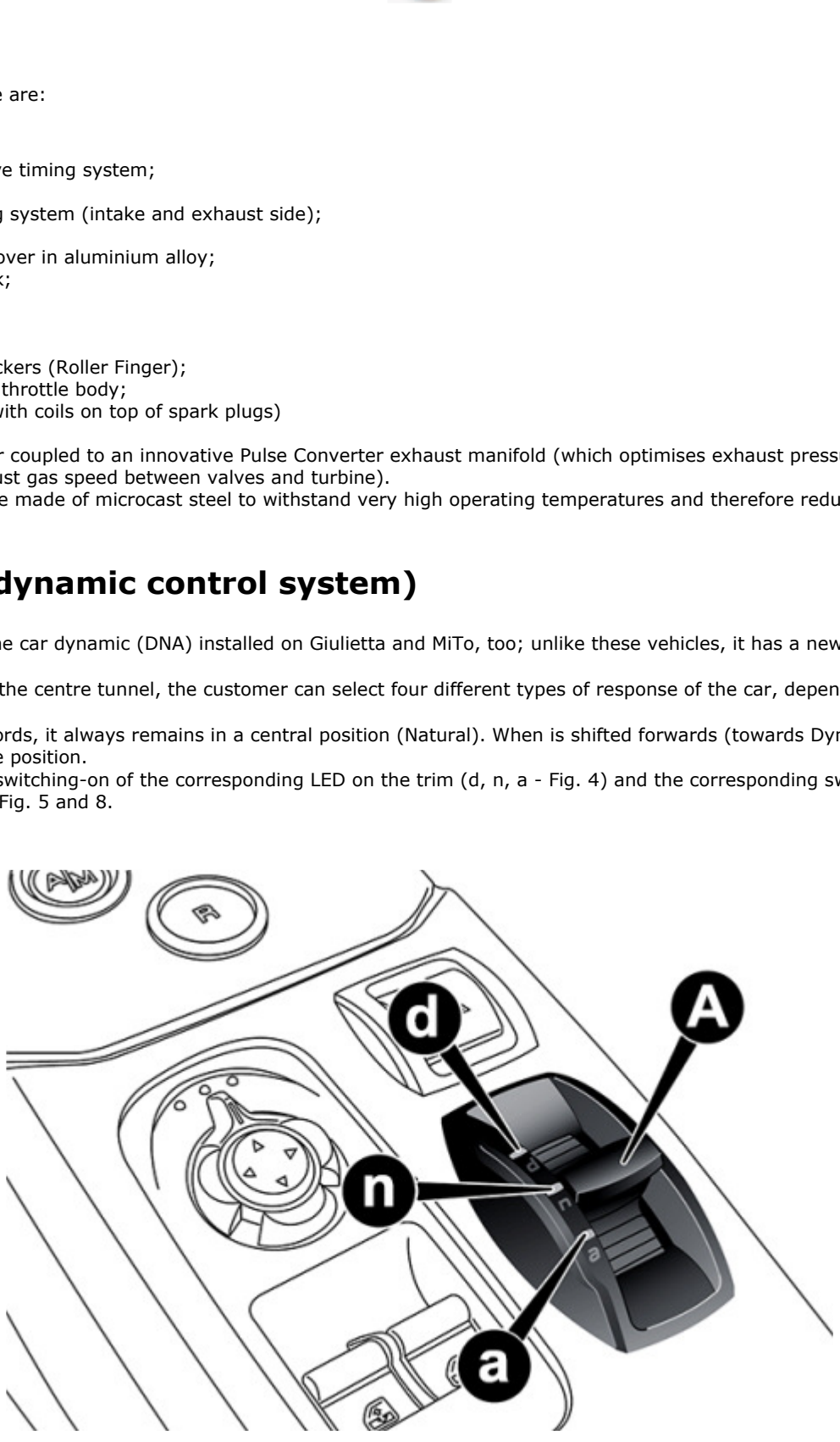


The main features of the new 240 HP engine are:

- four cylinder in-line arrangement;
- dual overhead camshaft with 16-valve timing system;
- petrol direct injection fuel system;
- dual continuous variable valve timing system (intake and exhaust side);
- aluminium block;
- cylinder head, oil sump and timing cover in aluminium alloy;
- cylinder liners embedded in the block;
- hydraulic tappets;
- water pump inside the head;
- oil filter built into the engine block;
- timing with belt control and roller rockers (Roller Finger);
- electronic accelerator and motorised throttle body;
- ignition system with 4 coils on top (with coils on top of spark plugs)
- two oxygen sensors;
- use of a fixed geometry turbocharger coupled to an innovative Pulse Converter exhaust manifold (which optimises exhaust pressure pulses to increase torque at low engine speed; in practice, it increases exhaust gas speed between valves and turbine).
- Both the manifold and the turbine are made of microcast steel to withstand very high operating temperatures and therefore reduce consumption on motorways at medium-to-high speed.

Alfa DNA SYSTEM (Car dynamic control system)

Alfa 4C comes with the control system for the car dynamic (DNA) installed on Giulietta and MiTo, too; unlike these vehicles, it has a new configuration: **Race** along with Dynamic, Natural and All Weather modes.
Through the selector (A - Fig. 4) located on the centre tunnel, the customer can select four different types of response of the car, depending on the driving requirements and road conditions:
The selector is monostable type. In other words, it always remains in a central position (Natural). When is shifted forwards (towards Dynamic) or backwards (towards All Weather), once it is released, it goes back to the stable position.
The engaged driving mode is shown by the switching-on of the corresponding LED on the trim (d, n, a - Fig. 4) and the corresponding switching-on of the corresponding wording "dna" on the instrument panel, as shown in Fig. 5 and 8.
Fig. 4 - DNA selector



A - Selector lever
d - Dynamic or Race: mode for sports driving.
n - Natural: mode for driving in normal conditions.

a - All Weather: driving mode for poor grip conditions (such as rain, snow, etc.).
The DNA selector is electrically connected to the Body Computer which notifies the nodes/control units (engine control module, instrument panel, VDC/ASR) involved of the configuration selected.
According to the configuration selected by the user, each control unit involved is self-configured to use the maps and its operating strategies.
Here below are listed, for each mode, the engagement reporting and the configurations used by the control units/nodes.

Natural mode

the LED next to the letter "n" on the selector (Fig. 4) switches on and the "n" in the instrument panel comes on (Fig. 5).

- **ESC/ASR:** intervention thresholds aimed at providing comfort and safety in normal grip and driving conditions.
- **Electronic Q2:** the system is calibrated to ensure the best driving comfort.
- **Engine:** standard response.
- **Transmission:** standard response both in manual and automatic mode.

Fig. 5 - Natural mode

Dynamic Mode

- **Engagement:** move and briefly press (about one second) the lever from the Natural to Dynamic mode. The Dynamic configuration will be set when the LED lights up next to letter "d" on the selector (Fig. 4) and the letter "d" (Fig. 6) lights up in red on the instrument panel.
- **ESC/ASR:** intervention thresholds aiming at a sports driving, ensuring car stability; RAB function activated (RAB - Ready Alert Brakes - pre-approaching of brake pads).
- **Electronic Q2:** the system is calibrated to increase traction whilst accelerating on bends, improving the agility of the car.
- **Engine:** faster response of the torque with the same position of the accelerator.
- **Transmission:** it can be set in sports mode, reducing the gearshifting time both in manual and automatic mode.

Fig. 6 - Dynamic mode

All Weather Mode

- **Engagement:** move and briefly press for a few seconds the lever from the Natural to Dynamic mode. The All Weather configuration will be set when the LED lights up next to letter "a" on the selector (Fig. 4) and the letter "a" (Fig. 7) lights up in blue on the instrument panel.
- **ESC/ASR:** intervention thresholds aimed at ensuring maximum safety in low-grip driving conditions.

- **Electronic Q2:** the system is deactivated.
- **Engine:** more gradual response of the torque with the same position of the accelerator
- **Transmission:** both in manual and automatic mode, torque is transmitted more gradually due to the more gradual distribution of engine torque

Fig. 7 - All Weather mode

Race mode

- **Engagement:** move and briefly press (about 5 seconds) the lever from the Natural to Dynamic mode. The Race configuration will be set when the graph of the longitudinal and transversal G accelerations is shown in the instrument panel (Fig. 8).
- **ESC/ASR:** the system is deactivated in order to ensure the fullest sensation of sportiness, leaving the driver in full control of the vehicle. When the vehicle is in unstable conditions, the ESC reactivates automatically when the brake pedal is pressed until the ABS intervenes, thus returning the vehicle to stable conditions. RAB function activated (RAB - Ready Alert Brakes - brake pad pre-approaching).
- **"Electronic Q2:** the system is calibrated to increase traction whilst accelerating on bends, improving the agility of the car.

- **Engine:** faster response of the torque with the same position of the accelerator.
- **Transmission:** the transmission is only manual mode, the automatic mode is not available. Sports mapping adoption and reduction of the gear shifting time as much as possible.

Fig. 8 - Race mode

C635 TCT transmission

Alfa 4C has a 6-speed automatic transmission with controls on the steering wheel and double clutch, called C635 TCT (Twin Clutch Transmission), already installed on MiTo and Giulietta.
The automatic transmission type C635 TCT is a 3-shaft gearbox with max. transmissible torque of 350 Nm, coupled to an electro-hydraulic assembly.
The specific features are:

- Six synchronised ratios
- Max. torque that can be transmitted: 350 Nm
- Three shafts, one input (main) shaft plus two layshafts (upper and lower);
- Main shaft formed by two reciprocally coaxial shafts.
- Double dry clutch
- Double hydraulic actuator for the clutches.
- Brake on differential for "Parking" function
- Transmission housing divided in two aluminium half-casings
- Electro-hydraulic unit for clutch and gearshifting handling
- Special electronic control unit

For a more detailed description of the transmission and its main components, refer to SN 00.01.11 for Giulietta

Transmission ratios

The C635 TCT transmission has the following ratios:

1st	**2**nd	**3**rd	**4**th	**5**th	**6**th	**R**	**Axle**
1: 3.900	1: 2.269	1: 1.435	1: 0.978	1: 0.754	1: 0.622	1: 4.000	1: 4.118

Operating mode

The transmission can operate in two operating modes (except when the Race mode is selected):

- manual type (MANUAL), in which the driver decides directly when to change gear;
- fully automatic (AUTO), in which the system decides when to make the gear change.

When the Race mode is selected, the only allowed operating mode is MANUAL.
To engage/release the operation mode (AUTO/MANUAL) press the A/M button on the transmission control trim (Fig. 9); the same trim contains the buttons to select the first gear (1), reverse (R) and neutral (N).
In manual mode, the levers on the steering wheel let the driver make a sequential gear shifting.
Fig. 9 – Transmission control trim

BRAKING SYSTEM

Assisted hydraulic brake servo system, formed by two independent and crossed circuits and front/rear disc brakes.
The car has a standard ESC (Electronic Stability Control) system, including the following electronic systems for assisted braking and vehicle dynamic control:

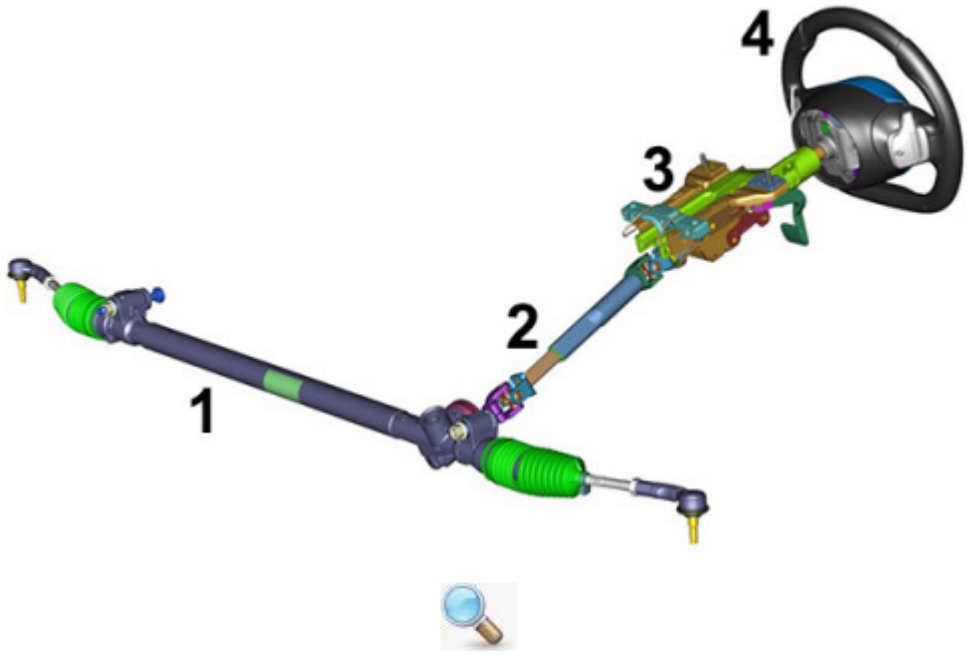
- **ABS:** wheel anti-lock braking system
- **EBD:** electronic brakeforce distribution between the front and rear wheels.
- **CBC:** optimises braking force on the 4 wheels while braking in curves.
- **ASR:** traction control via management of the brakes and engine control module.
- **DTC:** engine brake control by means of engine control module management.
- **Hill Holder:** uphill starting assistance system.
- **HBA:** automatic increase in braking pressure during emergency braking.
- **E-Q2 (ELECTRONIC Q2):** torque transfer unit between drive wheels while accelerating in curves.
- **RAB:** pre-approaching of front and rear brake pads (pre-fill) (only if Dynamic or Race mode are engaged).

System specifications

- 10" brake servo with 17/16" pump
- Front brakes with self-ventilated discs 305 x 28 mm Fixed caliper with 4 pistons, Ø 38 mm.
- Rear brakes with self-ventilated discs 292 x 22 mm Floating caliper Ø 41 mm

STEERING CONTROL

The steering system has been designed to guarantee the best performances for the driver during sporty driving together with excellent handling and limited effort during parking manoeuvres.
Alfa 4C steering system is pinion-rack type, it has no power assistance and the minimum turning circle is 11 metres.
The steering system includes (Fig. 10):
1. Steering box
2. Collapsible shaft
3. Steering mounting
4. Steering wheel
Fig. 10 – Steering control



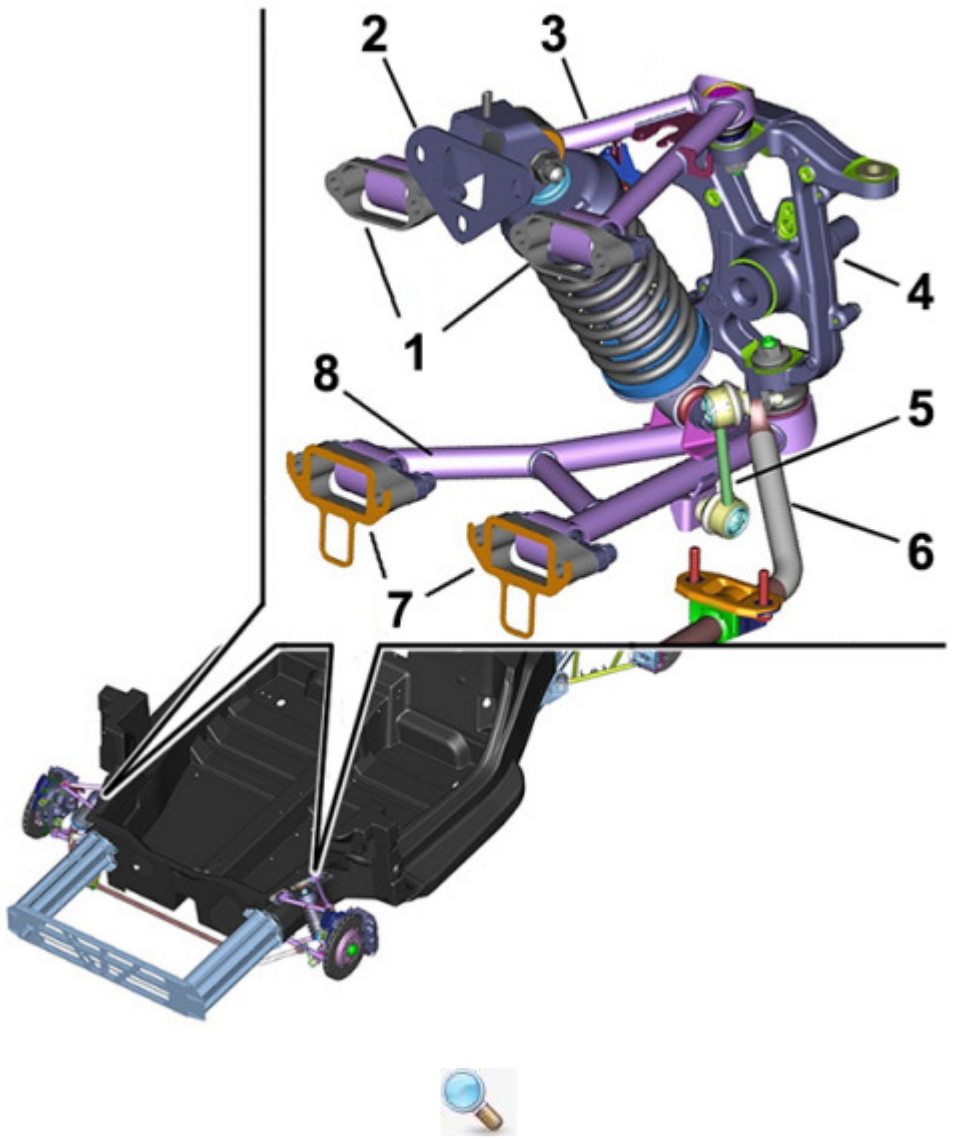
SUSPENSION

The vehicle is equipped with two types of suspension:

- Overlapped wishbones in the front part
- MacPherson in the rear part

Front suspension

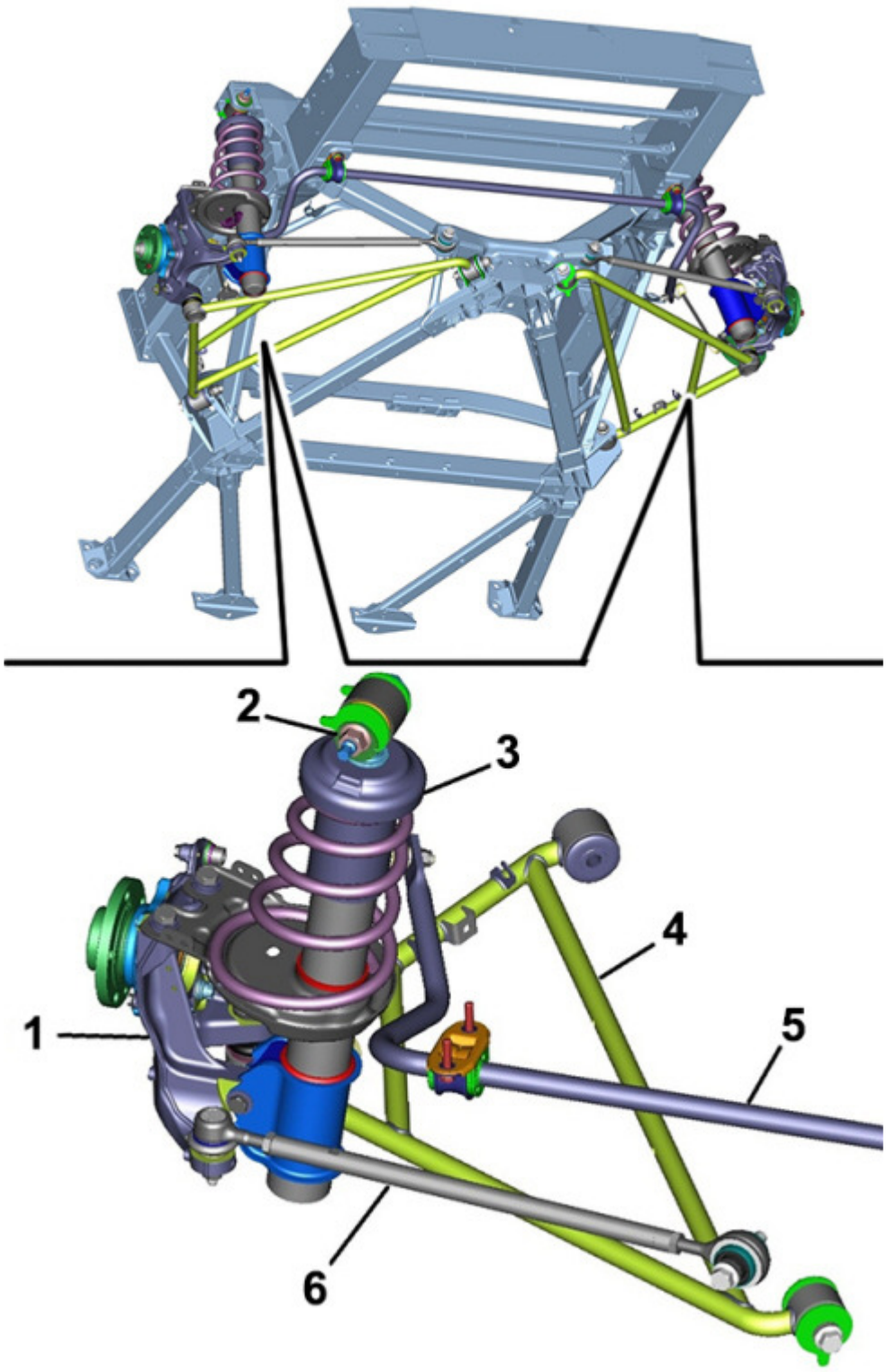
Front suspension features overlapped wishbones (Fig. 11).
Thanks to this type of solution, the kinematic movements can be controlled very well, in particular for the recovery of camber during juddering movements (with a higher road holding). In addition, the wheel toe-in angle can be adjusted through the heads of the steering box.
The two wishbones have a different size to allow the steering knuckle, and the wheel, to move. Front suspension is connected to the carbon fibre body through mountings.
Fig. 11 – Front suspension



1. Mountings on upper wishbone body
2. Mounting on shock absorber body (upper side)
3.Upper wishbone
4. Steering knuckle
5. Connecting rod for anti-roll bar
6. Anti-roll bar
7. Lower wishbone mountings on the body
8. Lower wishbone

Rear suspension

The rear suspension is MacPherson type (Fig. 12).
This allows the camber and toe-in angles of the rear wheels to be adjusted.
The rear suspension is connected to the rear aluminium chassis.
Fig. 12 – Rear suspension



1. Steering knuckle
2. Cam for toe-in adjustment
3. Shock absorber
4.Lower wishbone
5. Anti-roll bar
6. Rod for camber adjustment

WHEELS

Cold tyre inflation pressure (in bar) - wheel dimensions in inches (")

Wheels	Rims	Tyres provided	Snow tyres	Inflation pressure
Front	7JX17 H2 ET 33	205/45 R17 88Y	205/45 R17 88Y M+S	1.8
	7JX18 H2 ET 33	205/40 R18 86Y	205/40 R18 86Y M+S	1.8
Rear	8JX18 H2 ET 44	235/40 R18 95Y	235/40 R18 95Y M+S	2.0
	8.5JX19 H2 ET 49	235/35 R19 91Y	235/35 R19 91Y M+S	2.0

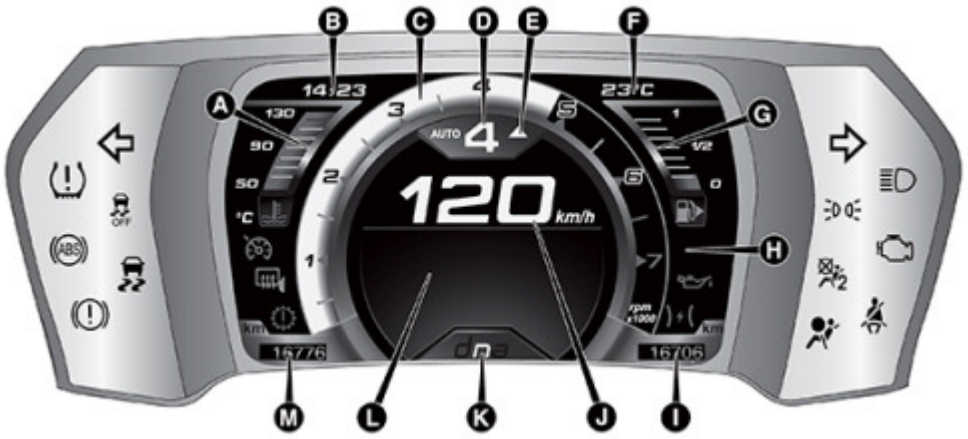
Remind the customer that:
- Reduced size snow chains with a maximum projection of 7 mm beyond the tyre profile can be fitted on cars equipped with 235/40 R18 rear tyres.
- When the tyres are warm, the inflation pressure should be +0.3 bar vs. the prescribed figure. However, recheck that the value is correct with the tyre cold.
- With snow tyres, add +0.2 bar to the pressure value prescribed for standard tyres.
- If necessary, lift the car, making reference to the paragraph "Lifting the car".

The Alfa 4C has no spare wheel or space-saver wheel; the car is equipped with a tyre quick repair device, called **Fix&Go Automatic kit** located in the luggage compartment.

DISPLAY IN INSTRUMENT PANEL

The instrument panel adopts different graphics layout according to the mode chosen by the user with the DNA selector (see previous Figures from 5 to 8).

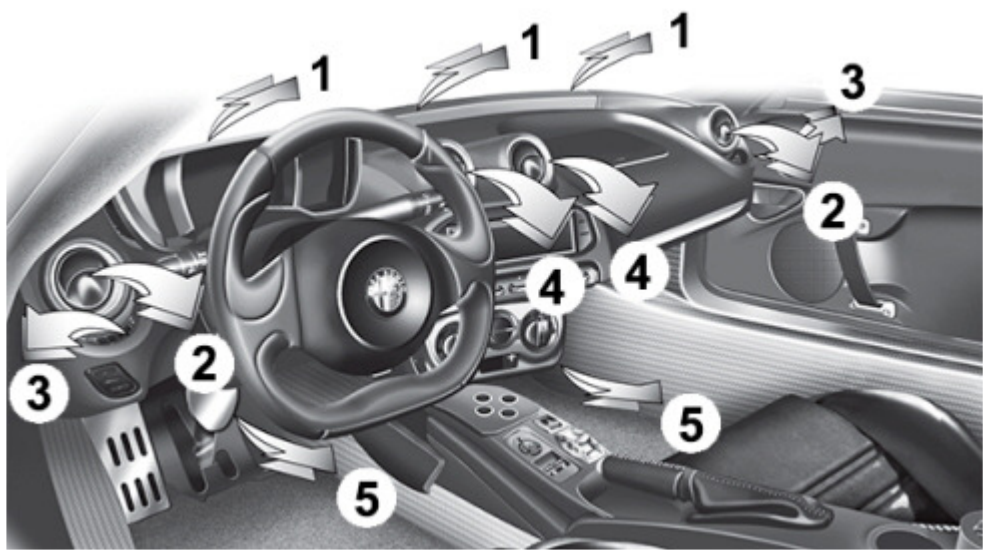
Fig. 13 - Instrument panel



A. Engine coolant temperature indicator
B. Time
C. Rev counter
D. Mode/gear engaged indicator
E. Gear shifting suggestion (Gear Shift Indicator). The system operates only when the transmission is in manual mode
F . Outside temperature
G. Fuel level gauge (the triangle on the right side of the symbol indicates the side of the car with the fuel filler)
H. Area dedicated to the display of the digital warning light related to the displayed message
I. Trip meter
J. Speedometer (speed indicator)
K. "Alfa DNA" system driving mode
L. Messages or information on display
M. Milometer

CLIMATE CONTROL

Air distribution inside the Alfa 4C passenger compartment is shown in Fig. 14.
The Alfa 4C has a manual climate control system with variable flow Delphi compressor, electromagnetic clutch. It uses the new R1234yf.
The evaporator and the expansion valve of the Alfa 4C climate control system form a single unit and cannot be replaced individually.
Fig. 14 - Air distribution



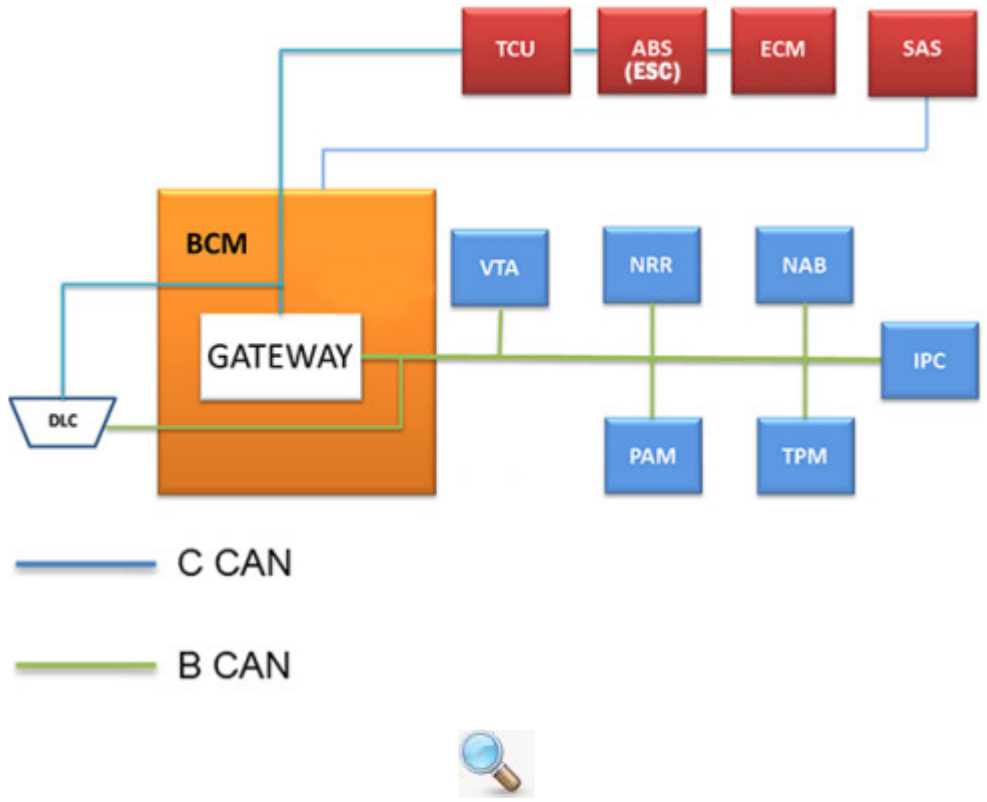
1. Fixed upper vents
2.Directable and adjustable side vents
3.Fixed vents for side windows
4. Adjustable and directable central air vents
5. Passenger compartment footwell vents

NETWORK ARCHITECTURE

The architecture is made up of 2 CAN communication networks that connect NODES belonging to two different areas, one for the control of the vehicle dynamics (C-CAN) and one for the so-called "body-related" functions (B-CAN).

All electric/electronic devices and control units containing a specific interface (Network Interface) that permits the transmission and reception of data, information and signals that travel through CANs are called Nodes.

The two C-CAN and B-CAN networks are physically separated, but both flow into the Body Computer Node (BCM), which is considered the MASTER node for the two networks; it is also the GATEWAY which allows the transfer of information/data from one network to another.
Fig. 15 - Network architecture



The electronic control units sharing data on C-CAN are:

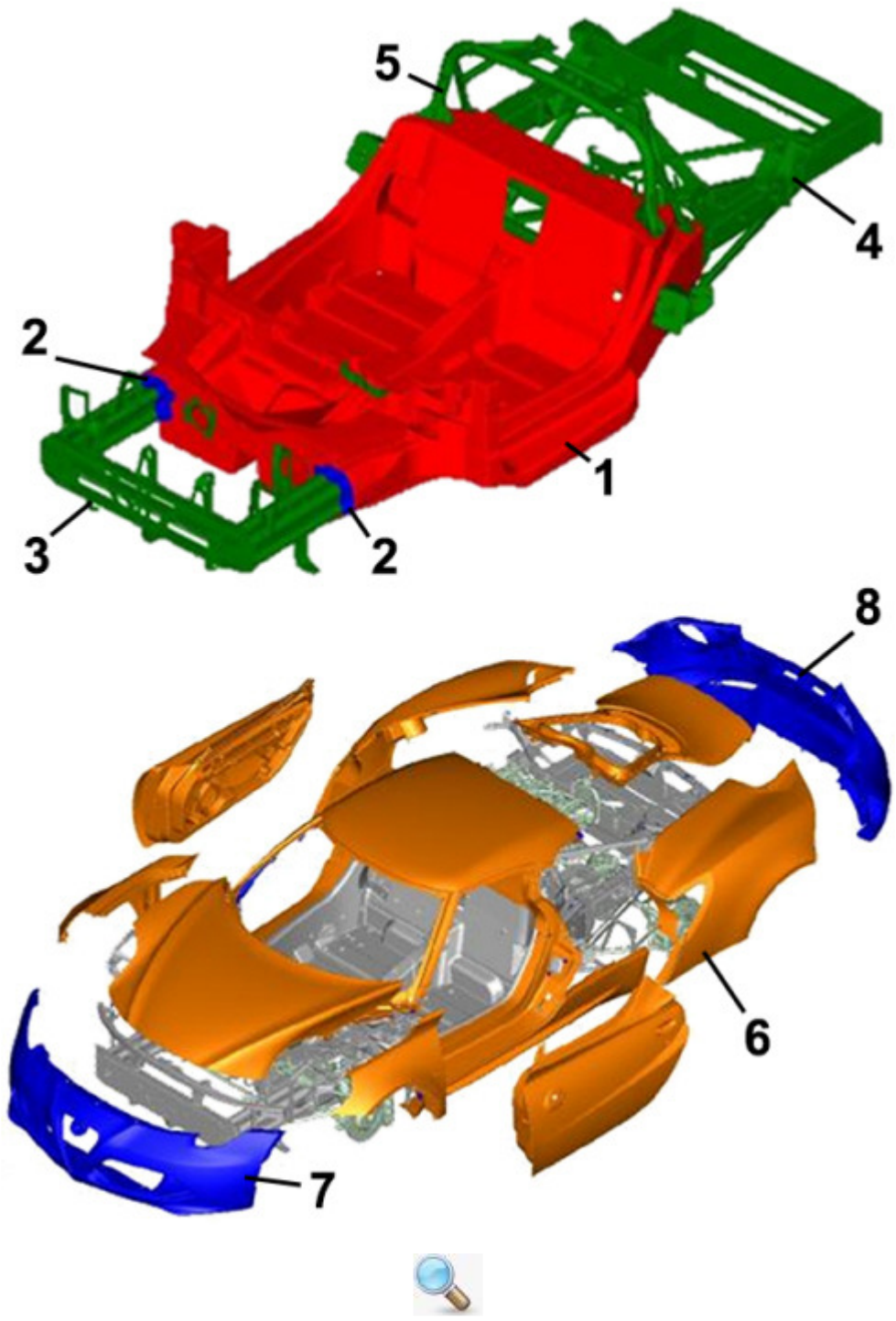
- BCM - Body Computer Node (Body Computer Module)
- TCU - Robotised gearbox node (Twin Clutch Unit)
- ABS/ESC - Brake Node (BSM - Brake System Module)
- ECM - Engine Control Node (Engine Control Module)
- SAS - Steering Angle Sensor (Steering Angle Sensor)
- DLC - Diagnosis port (Data Link Connector)

The electronic control units sharing data on B-CAN are:

- IPC - Instrument Panel Node (Instrument Panel Cluster)
- NAB - Airbag Node
- TPM - Tyre pressure control node (Tyre Pressure Module)
- NRR - Radio Receiver Node (Radio Receiver Module)
- PAM - Parking sensor node (Parking Assistance Module)
- VTA - Anti-theft node (Vehicle Theft Alarm)

BODY AND BODYWORK

As shown in Fig. 16, the body of 4C is in carbon fibre.
The body (1) houses the passenger compartment and includes the coupling points for front suspensions.
In the different carbon layers steel brackets (2) were placed both at the front and at the back, where front (3) and rear (4) aluminium frames are screwed.
A sturdy high resistance steel roll-bar (5) is positioned behind the passengers. This prevents passenger compartment deformation in the event of roll over. The roll-bar is also screwed onto the carbon chassis, thanks to two steel brackets with threaded holes inside the carbon layers.
The aluminium structure protects against frontal impacts, while the second aluminium structure creates a "cradle" on the back, to which the mechanical part of the car (engine and transmission) is attached, and includes the attachments of the rear suspension and a further lower structure with controlled deformation, which protects against rear impacts.
The mobile parts (6) are in SMC (Sheet Moulding Compound), usually known as fibreglass, while front (7) and rear (8) bumpers are in polyurethane.
Fig. 16 – Elements of the bodywork



NETWORK INTERVENTIONS

- For the routine P.D.I. operations, refer to the Op. 0010A14 of the Service Manual.
- For the Scheduled Servicing Plan, refer to section Technical Data - General Information of the Service manual.

LIFTING THE CAR

The low ground clearance and the presence of side shirts on the Alfa 4C require the use of the following tools if the car needs to be lifted with an arm lift:

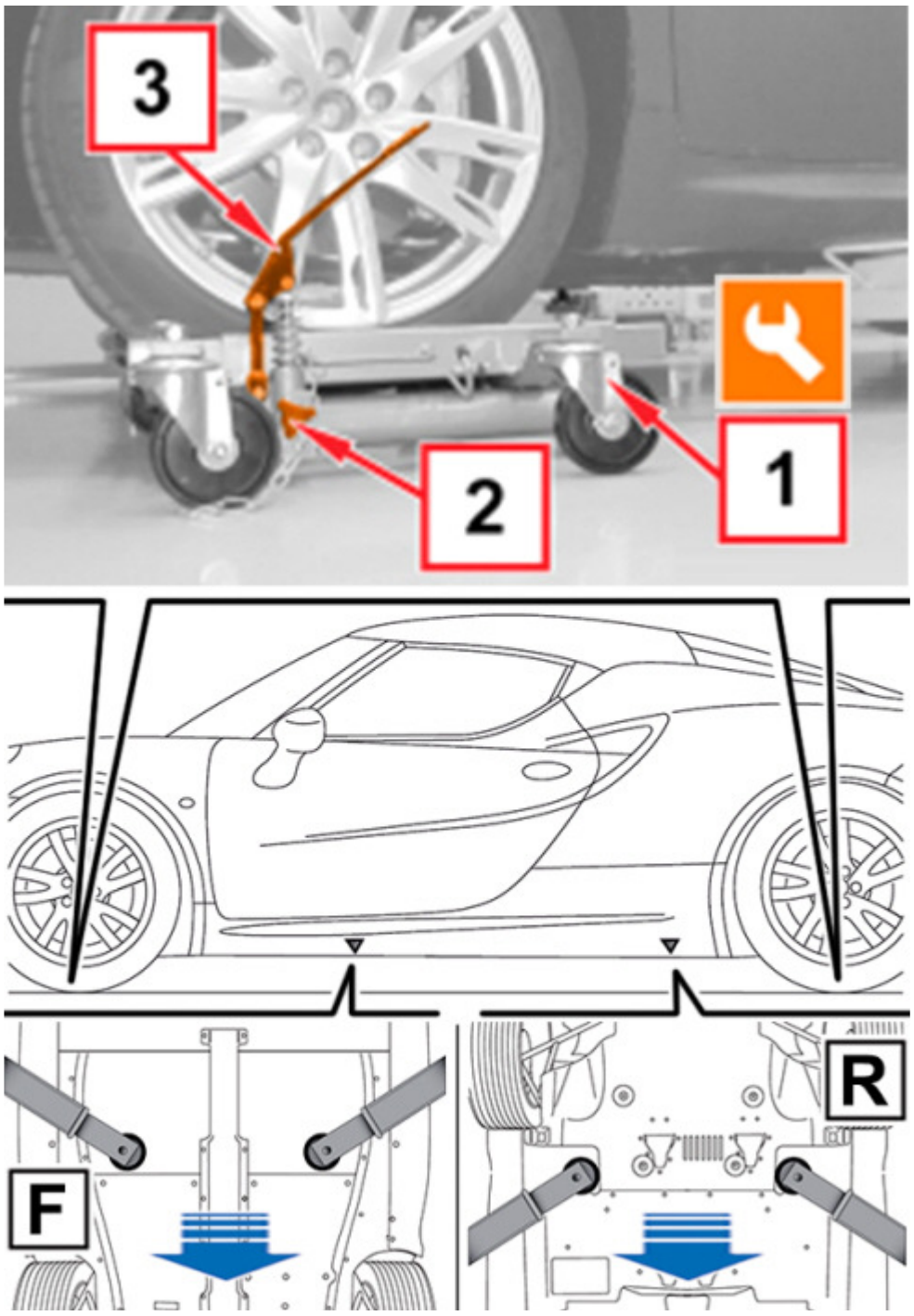
- 2014100000 - Right lifting trolley
- 2014101000 - Left lifting trolley

To lift the vehicle, proceed as follows (Fig. 17):

- Position the lifting trolleys
- Operate the valve (2) to adapt the trolley to the dimension of the front wheel.
- Close the valve (2) to lock the lifting trolley.
- Press the pedal (3) to lift the vehicle and correctly position the lift arms
- Place the lifting arms next to the marks (triangles) on the side skirts.
- Place the laying mounting next to the points F (front) and R (rear)

While positioning the car on the arm lift, remember that the power unit is located on the back axle and influences weight distribution: the shortest arms must hold the rear axle, while the longest axle must hold the front axle.

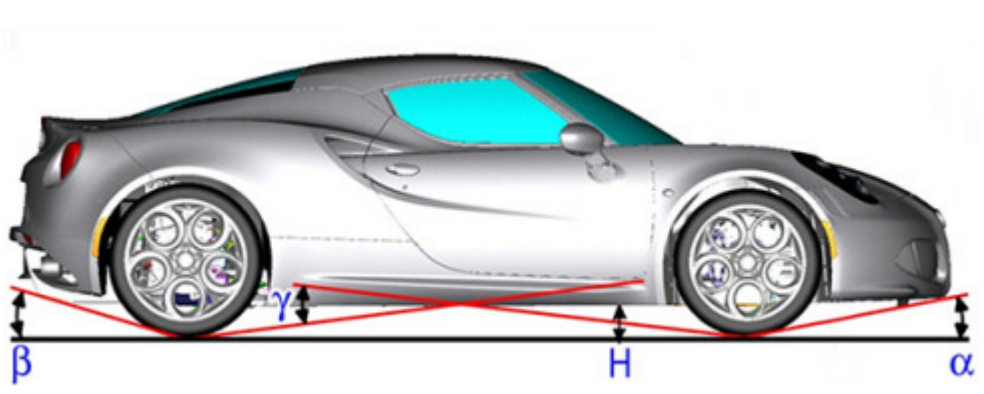
Fig. 17 – Lifting of the car



Due to the high sportiveness of the Alfa 4C, special attention should be paid to the lifting with the arm lift, to all procedures involving car handling including the loading/unloading from the car transporter/breakdown truck, travelling on ramps and humps, etc.
Fig. 18 and the relevant table hereby give the following values:

- Approach angle (α)
- Departure angle (β)
- Breakover angle (γ)
- Minimum ground clearance (H)

Fig. 18 - Approach angles and min. ground clearance



Version	Standard	α (°)	β (°)	γ (°)	H (mm)
Base	A	10.8	14.8	11.7	117.5
	B	10.0	14.9	10.8	111.0
	C	9.3	14.9	9.9	102.2

Sports setup	A	9.6	15.0	10.7	109.8
	B	8.8	15.1	10.0	105.0
	C	8.1	15.1	9.1	92.2

Standard A = car in running order (full fuel tank and fluids at the required levels), without passengers
Standard B = car in running order, with the driver only
Standard C = car in running order with driver, passenger and luggage (full load)

CLIMATE CONTROL SYSTEM

The Alfa 4C uses the new fluid R-1234yf: in the case of service operations, always comply with the following instructions:

- Comply with the precautions and safety standards described in the procedures (Op. 5040) of the Service Manual
- The coolant fluid R-1234yf cannot be mixed with R134a and R12 (Freon) used in the climate control systems of previous cars; therefore, NEVER use fluids R134a and R12 on Alfa 4C cars.
- All the system components have been specifically designed for the use of R-1234yf and are not interchangeable with those from earlier vehicles using R134a and R12.
- There is a special draining/collection system for R-1234yf fluid.
- The fluid R-1234yf accidentally flowing out from the climate control system or from the emptying/recovery/recharging device can be toxic if it is close to open flames.
- The fluid R-1234yf is flammable in the presence of open flames, and releases hydrofluoric acid if exposed to contact with heat sources of approximately 350°C or higher.

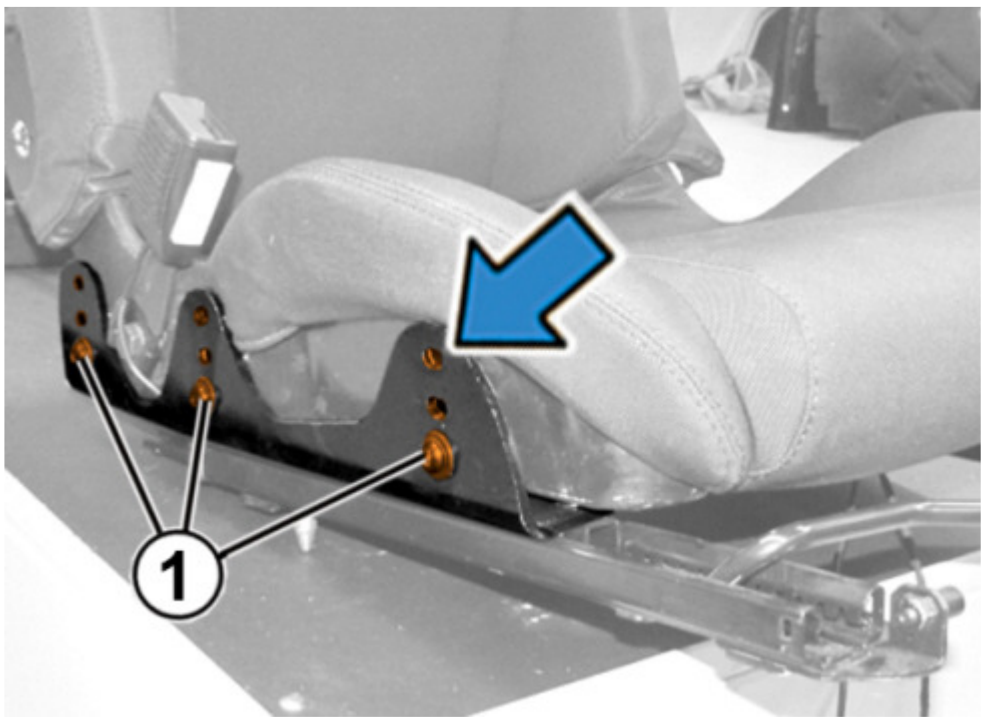
DRIVER'S SEAT HEIGHT ADJUSTMENT

To find the best driving position, the driver seat height can be adjusted in three different positions.
To perform this adjustment you need to:

- Remove the seat (see Op. 7045A10 of the Service Manual).
- On both sides, undo the fixing screws (1– Fig. 19).
- Lift or lower the seat and tighten the screws in the hole corresponding to the required height; the three holes determine the three preset positions for the seat height adjustment.

It is advisable to adjust the seat to the lowest possible position, in order to achieve optimum perception of the car’s movement and awareness when driving. The height of the seat must always take the driver’s stature into account: the optimal awareness attainable through a low driving position must never compromise external visibility from inside the car.

Fig. 19 – Height adjustment of the driver's seat



DAMAGE ON BODY

In the case of damage/strains to the carbon body, it is compulsory to **Open an eCONTACT ticket** entering the following compulsory information:

- Detailed description of the accident showing the first impact area and the sequence of events of the accident
- In the field "Fault found" wrote the possible/probable damage on the carbon bodywork
- General pictures of the car conditions after the accident
- General picture of the underbody
- Detailed picture of the bodywork with marks visible with the naked eye or measured through endoscope; refer to appendix 3 and following to detect the critical areas on the bodywork depending on the accident type