CLIO CUP

USER MANUAL

E. Chassis

RENAULT SPORT

RENAULT

4 CHASSIS

CONTENTS

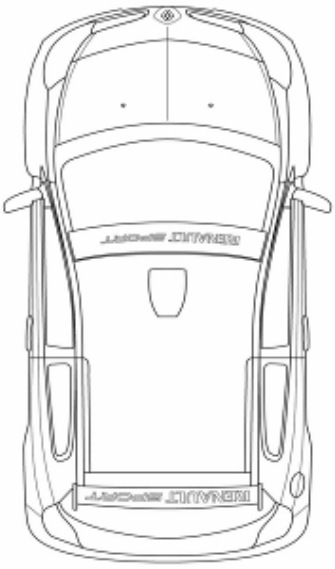
4.1 SETUP

The following Clio Cup settings apply with a 70kg driver and 40kg of fuel on board.

CLIO CUP 2009 BASIC SETTINGS

Front track
1,528mm
Body height at front
110mm
Front anti-roll bar
22mm

	Front left wheel			Front right wheel
Camber	-3°10'	Unsprung mass		-3°10'
Alignment (+ opening)	-0°10'	53kg	53kg	-0°10'
Castor angle	6°20'	Sprung mass		6°20'
Pivot	11°15'	317kg	317kg	11°15'
Spring	75N/mm	Total mass		75N/mm
Stop	35mm	370kg	370kg	35mm



Wheel base 2,585mm

Tyre pressure *when warm* 2.0 bar

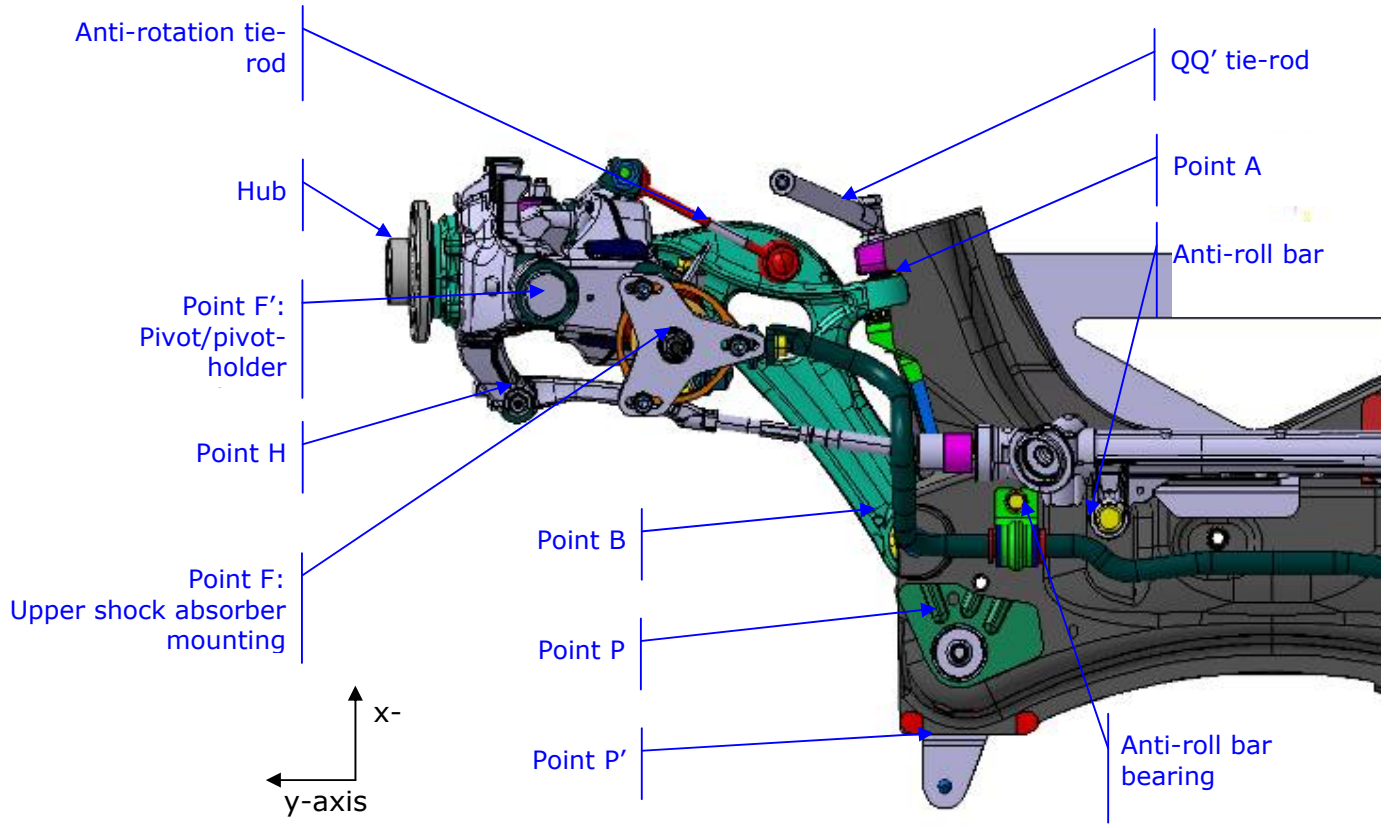
	Rear left wheel			Rear right wheel
Camber	-2°30'	Unsprung mass		-2°30'
Alignment (+ opening)		38kg	38kg	0°10'
Castor angle	-	Sprung mass		-
Pivot	-	172kg	172kg	-
Spring	130N/mm	Total mass		130N/mm
Stop	50mm	210kg	210kg	50mm

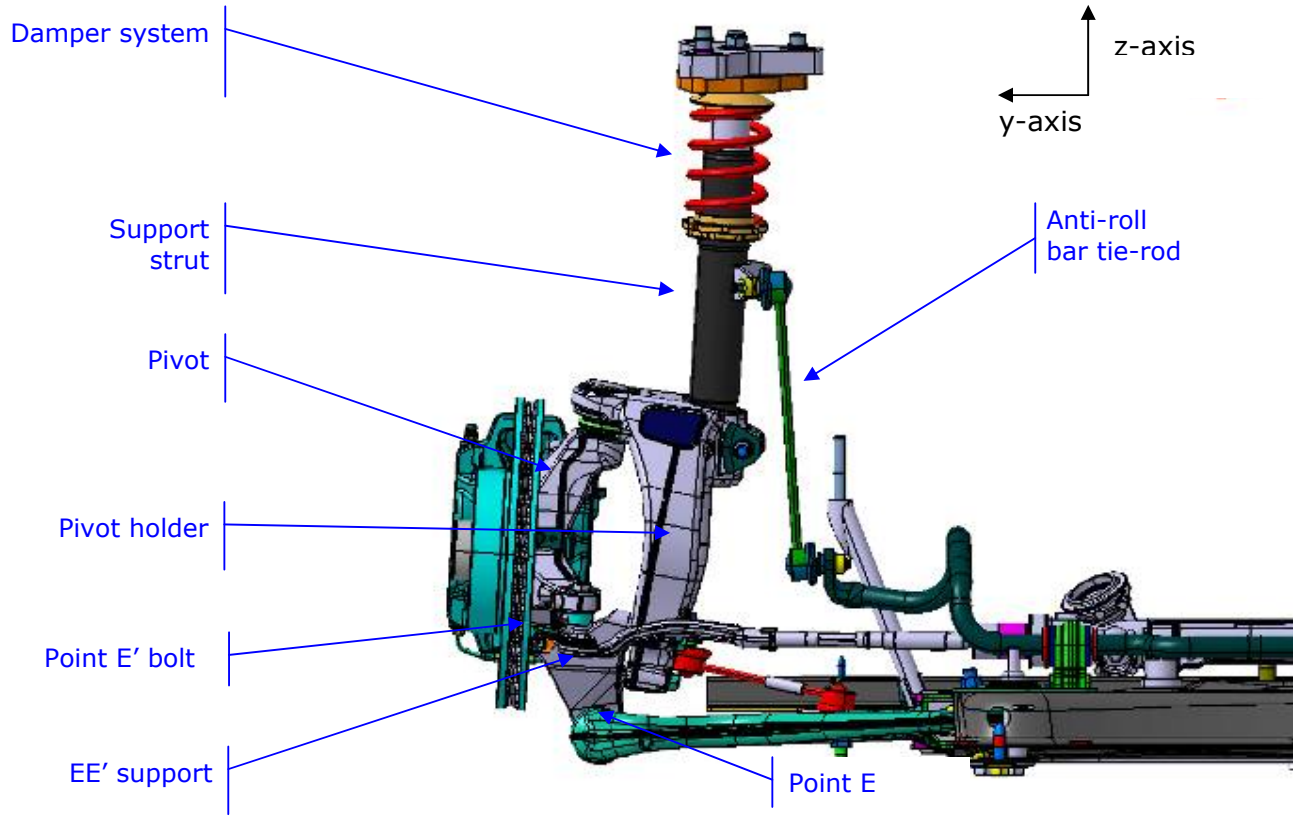
Rear track
1520mm
Body height at rear
210mm
Rear anti-roll bar
-

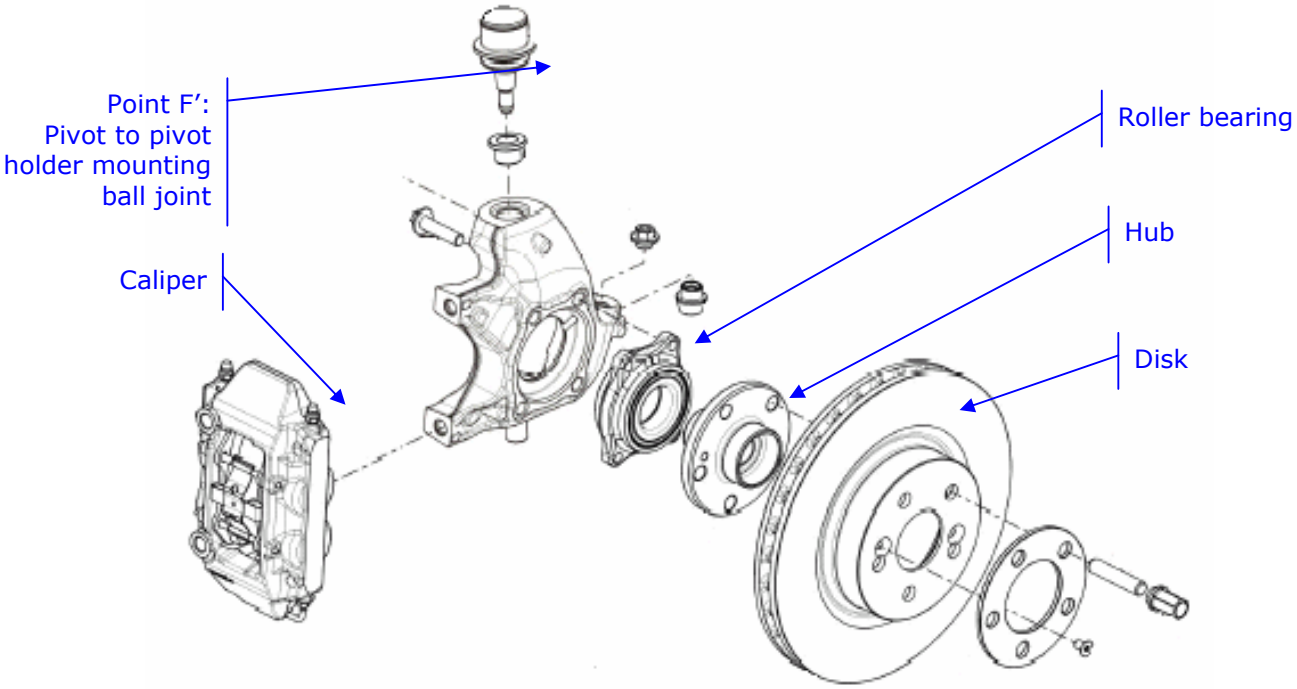
4.2 FRONT AXLE

4.2.1 PRESENTATION AND CHARACTERISTICS

The front axle is a double axis strut type suspension system.




Damper system
Support strut
Pivot
Pivot holder
Point E' bolt
EE' support
z-axis
y-axis
Anti-roll bar tie-rod
Point E


Point F': Pivot to pivot holder mounting ball joint
Caliper
Roller bearing
Hub
Disk

Hinges

- Wishbones **(6)**:
  - Subframe side: by ball joint link.
  - Wheel side: by ball joint link.
- Upper pivot and shock absorber: by ball joint link.

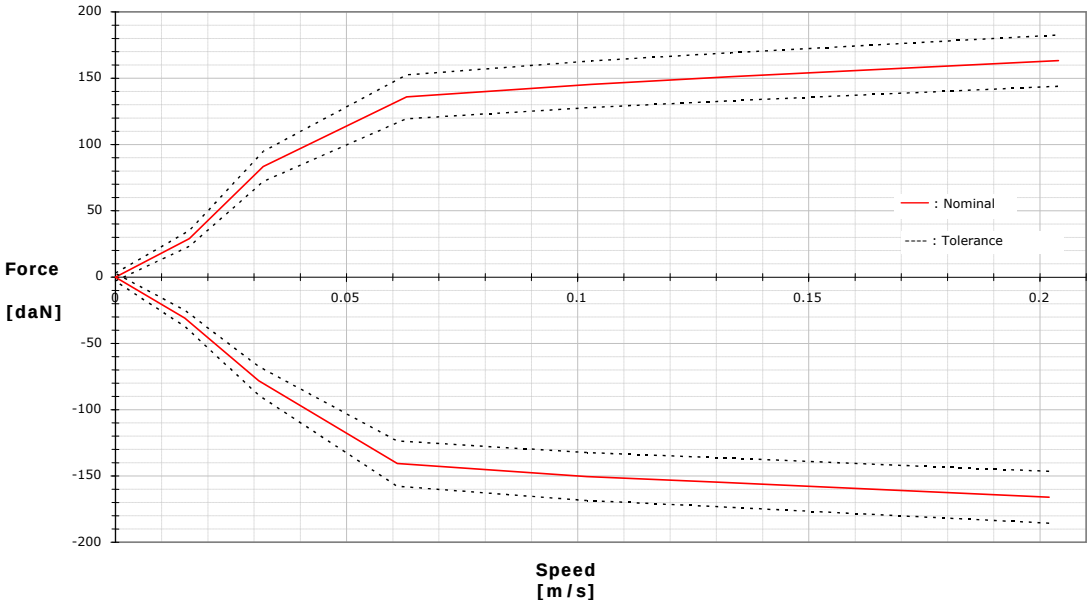
Suspension

- Suspension spring: 75N/mm.
- Bump stop
  - length: 35mm,
  - diameter: 34mm.

Damping

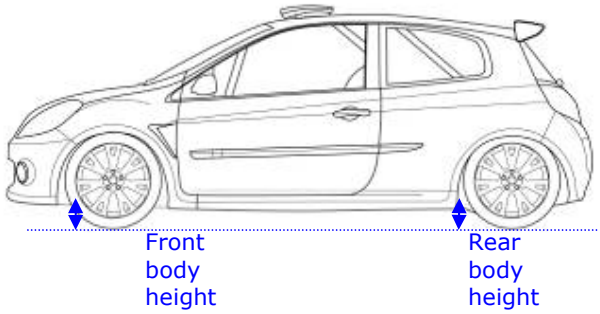
The shock absorbers are not adjustable, they must not be opened.
They are provided with seal paint. The lack of, or damage to this paint can be considered as a technical non-compliance.

Effect of shock absorber movement speed on stress



4.2.2 GEOMETRY INSPECTION

Body height measurement points



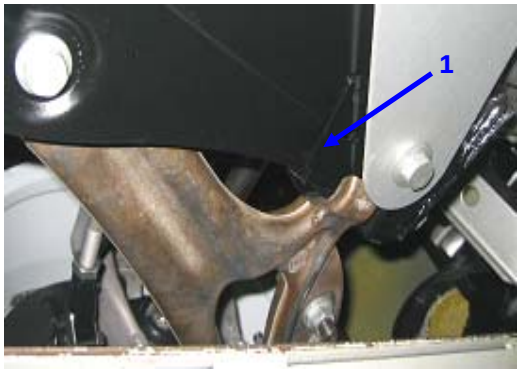
- Conditions

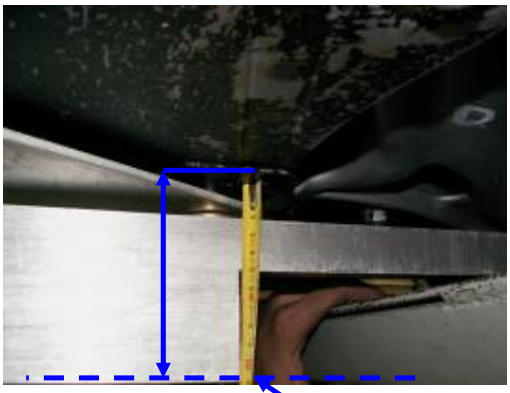
Body height measurement is performed:

- With the driver on board.
- On a flat surface.
- With 50L of fuel in the tank.
- With new or identically worn tyres.
- Tyre pressure at 2 bars.

- Measuring the front body height

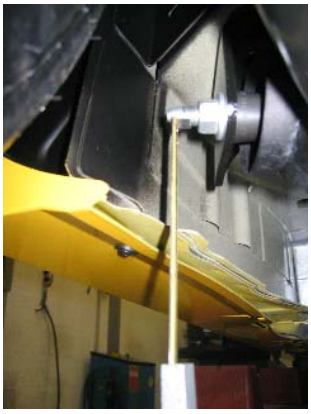
The front body height is measured at the level of the lower front wishbone mounting **(1)**.





- Measuring the rear body height

The rear body height is measured at the level of the rear axle point A bolt.



Angle inspection

- Preliminary checks

Before checking the axle angles, check (and correct if necessary) the following points:

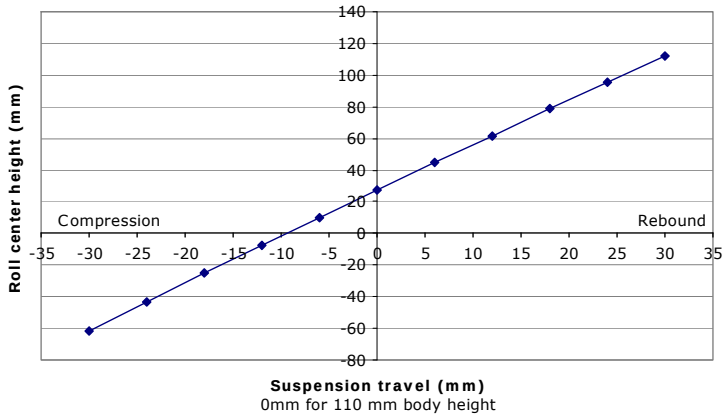
- Tyre symmetry on a given axle:
  - Pressure
  - Wear
- Hinges:
  - Condition of flexible bearings
  - Ball joint clearance
  - Bearing clearance
- Wheel run-out (max. 0.3mm)
- Body and cup height symmetry

- Front axle diagnostics

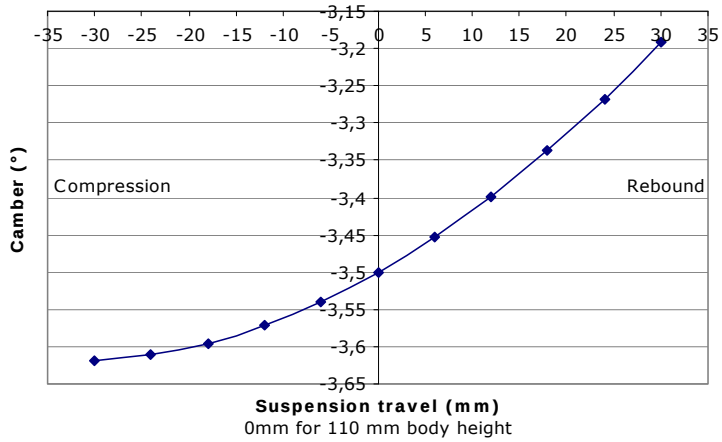
Incident	Possible cause(s)
Faulty castor angle	- Distorted wishbone - Distorted side member or subframe-axle
Camber + pivot correct overall, but: - Individual faulty camber - Individual pivot wrong.	- Distorted wishbone - Distorted side member or subframe-axle
Camber correct, but faulty pivot	- Distorted pivot
Pivot correct, but faulty camber	- Distorted pivot
Faulty variation in wheel alignment	- Steering unit mounting on subframe
Wheel alignment off by more than 6mm	- Distorted left or right-hand hub carrier

4.2.3 GEOMETRY VARIATIONS

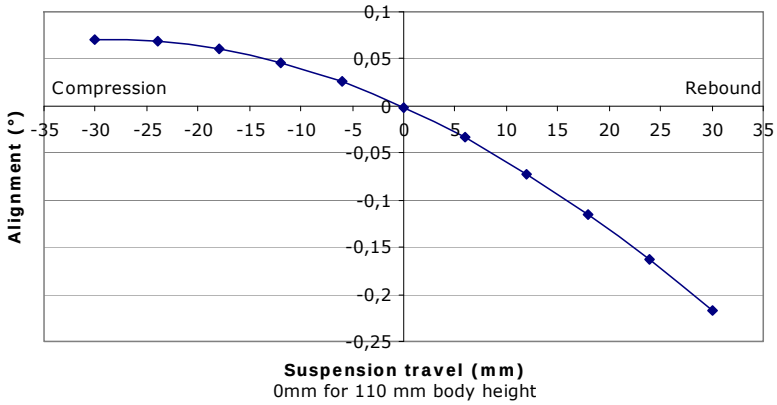
Roll center height variation



Per-wheel camber variation



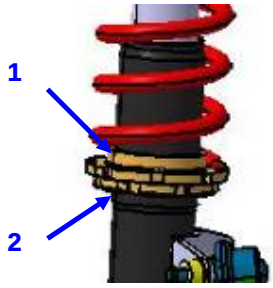
Per-wheel alignment variation



4.2.4 ADJUSTMENT OF GEOMETRY

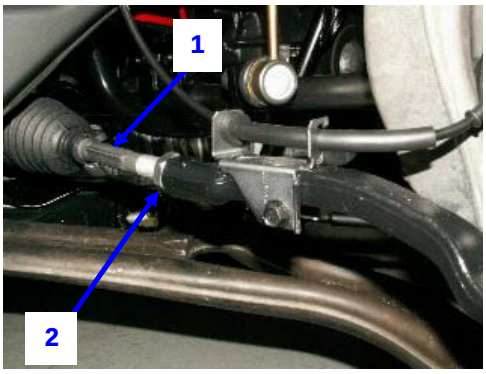
Body height

Body height is adjusted using the nut **(1)** mounted on the support strut.
Loosen the locknut **(2)**.
Adjust body height by tightening or loosening the nut.
Once the required height has been reached, tighten the locknut.



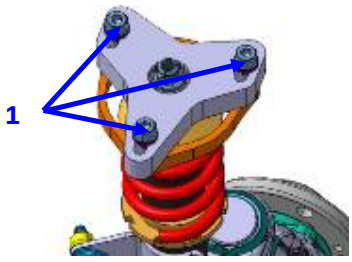
Wheel alignment

Adjust the clip by means of the steering tie-rod **(1)**.
Loosen the locknut **(2)**.
Adjust the alignment by tightening or loosening the steering tie-rod.
One the required setting achieved, tighten the locknut to **53Nm**.



Camber

Adjust the camber by means of the upper shock absorber mounting (point F).
Loosen the 3 plate bolts **(1)**.
Adjust the camber.
Tighten the 3 bolts to **100Nm**.



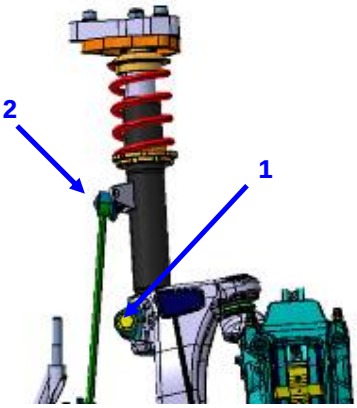
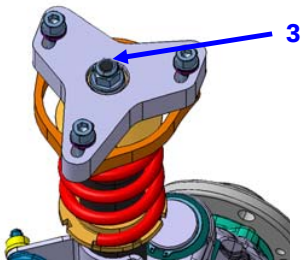
⚠ To avoid disconnecting the front left-hand drivetrain, driving with less than 3° negative camber (more than -3°) on the front left-hand wheel is prohibited.

4.2.5 FRONT LOAD-BEARING COMPONENTS

Support strut

Since 2009 february the 1st , the damper tube 77 11 160 015 has been replaced by a new reference 77 11 162 518
The mechanicals characteritics of the material and the shape of the part have been modified to avoid plastic deformation of the damper tube
Remarque= these geomatrical modifications don't have any incidence on the car behaviour

- Removal

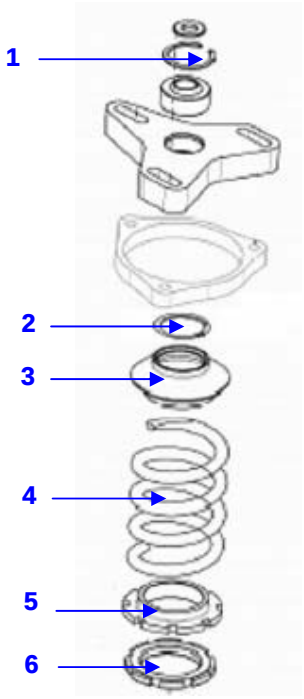
Operations	Photos
1 - Remove the wheel.	
2 - Remove the upper mounting nut **(2)** of the anti-roll bar tie-rod.	
3 - Remove the support strut mounting bolt **(1)** on the pivot holder.	
4 - Extract the pivot-holder support strut.	
5 - Attach the pivot holder in the wheel arch to avoid damaging the brake hose.	
6 - Remove the upper mounting nut **(3)**.	
7 - Remove the fitted support strut.	

- Refitting

Perform the operations in the reverse order of removal, taking care not to damage the drivetrain bellows.
Tightening torques:

- Support strut mounting bolts on pivot holder **(1)**: **105Nm**.
- Upper shock absorber nut **(3)**: **105Nm**.
- Anti-roll bar tie-rod mounting nut on support strut **(2)**: **44Nm**.

- Disassembly

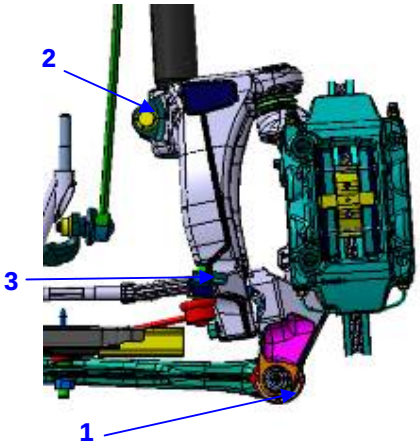
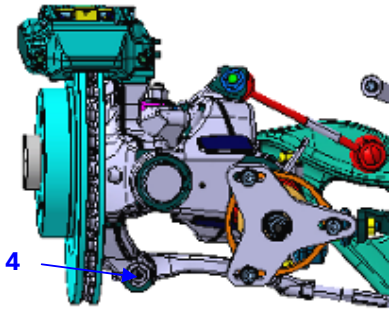
Operations	Photos
1 - Remove the upper nut, holding the shock absorber with a hexagonal socket wrench. **2 -** Remove the snap ring **(1)**. **3 -** Loosen the nut **(5)** and locknut **(6)** so that the spring is relaxed **(3)**. **4 -** Remove the retainer ring **(2)** from the spring cup. **5 -** Remove the suspension spring cup **(3)**. **6 -** Remove the suspension spring **(4)**. **7 -** Unscrew the support strut shock absorber rod	

- Reassembly

Operations
1 - Thoroughly clean the inside of the support strut and shock absorber cartridge.
2 - Replace the filters (ref **77 11 156 541**) where necessary.
3 - Position the bump stop (ref **77 11 160 290**) on the shock absorber rod.
4 - Lubricate the shock absorber cartridge with Bilstein grease (ref **77 11 126 744**).
5 - Proceed in reverse removal order.
6 - Tighten the upper shock absorber nut to **105Nm**.

Pivot holder

- Removal

Operations		Photos
1 -	Remove the wheel.	
2 -	Remove the brake caliper (see 4-5 Brake system/Front brakes/Calipers) and attach it in the wheel arch.	
3 -	Remove the point E nut **(1)**.	
4 -	Extractsupport EE' from the point E ball joint; a ball joint puller must be used to do this.	
5 -	Remove the anti-roll bar mounting nut from the pivot holder**(3)**.	
6 -	Disconnect the steering rod at the level of point H **(4)**.	
7 -	Remove the wheel speed sensor at the level of the pivot.	
8 -	Remove the support strut mounting bolt **(2)** on the pivot holder.	
9 -	Extract the pivot-holder support strut.	
10 -	Remove the pivot-holder, pivot and EE' support assembly.	
11 -	Remove the EE' support (see following section)	
12 -	Remove the nut from point F'.	
13 -	Remove the pivot from the pivot holder using a ball joint puller.	

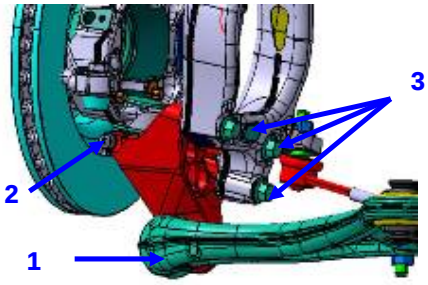
- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Support strut mounting bolt: **105Nm**.
- Anti-rotation tie-rod nut: **100Nm**.
- Point E nut : **105Nm**.
- EE' support mounting bolt on pivot holder: **105Nm**.
- Point F' ball joint nut: **140Nm**.

EE' support

- Removal

Operations	Photos
1 - Remove the wheel. **2 -** Remove the point E nut **(1)**. **3 -** Extract the EE' support from the point E ball joint; a ball joint puller must be used to do this. **4 -** Remove the point E' ball joint mounting bolt **(2)**. **5 -** Remove the 3 EE' support mounting bolts on the pivot holder **(3)**. **6 -** Remove the EE' support.	

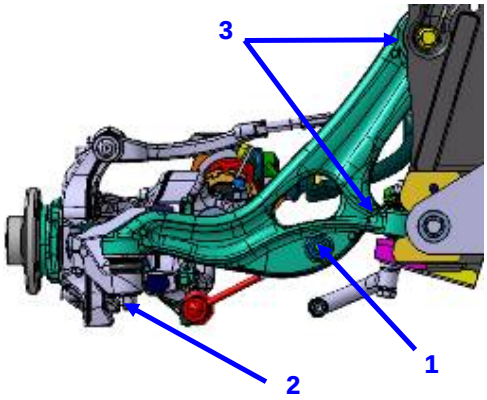
- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Point E' mounting bolt: **26.5Nm**.
- 3 pivot holder mounting bolts: **105Nm**.
- Point E nut: **105Nm**.

Wishbone

- Removal

Operations	Photos
1 - Remove the attachment **(1)** of the anti-roll bar at the level of the wishbone. **2 -** Remove the point E nut **(2)**. **3 -** Extract support EE' from the point E ball joint; a ball joint puller must be used to do this. **4 -** Remove the two wishbone mounting bolts **(3)** on the subframe. **5 -** Remove the wishbone.	

- Refitting

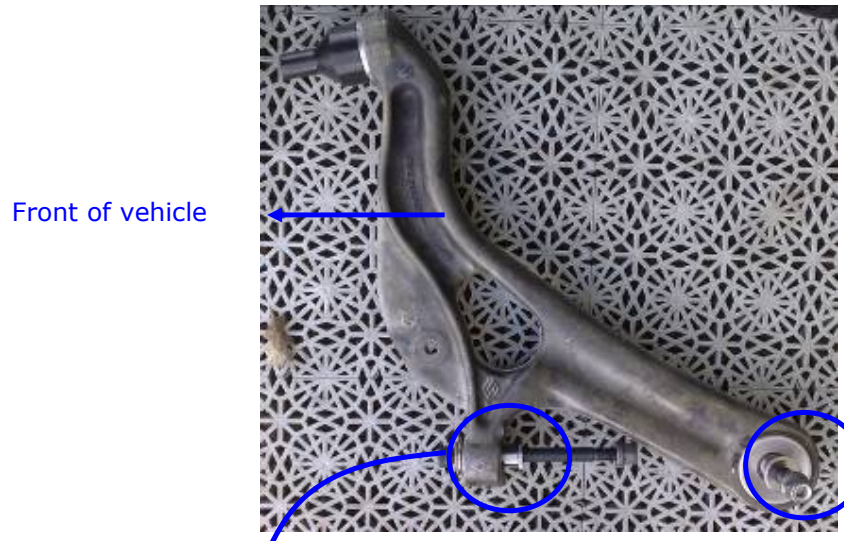
Perform the removal steps in reverse order.
Check front axle geometry and adjust if necessary.

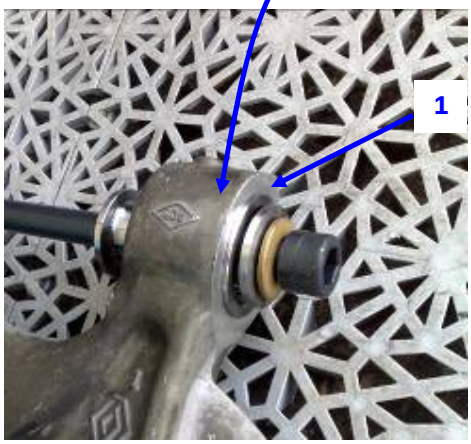
Note: *The wishbone mounting bolts on the subframe should be tightened when the vehicle is completely static.*

Tightening torques:

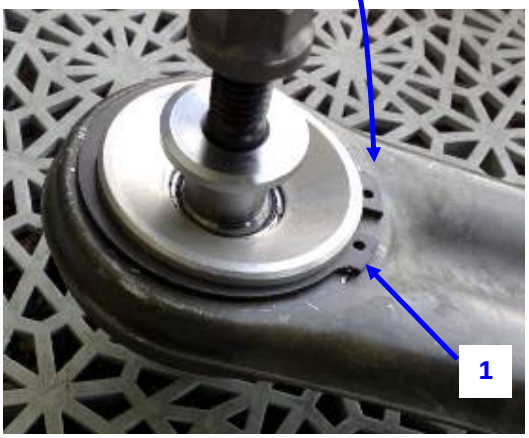
- Point E nut: **105Nm**.
- Wishbone point A bolt: **80Nm**.
- Wishbone point B bolt: **80Nm**.

Wishbone ball joints





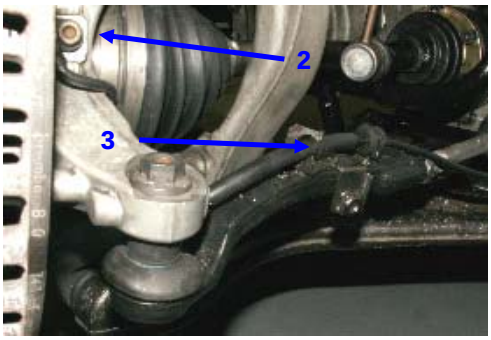
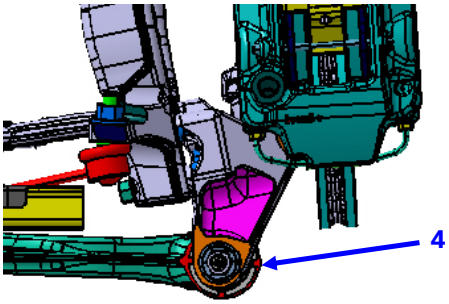
In case of replacement, the new part must be fitted in the same position: the shoulder area of the A casing must rest on the wishbone machined surface **(1)**.



In case of replacement, the new part must be fitted in the same position: the shoulder area of the B casing must rest on the wishbone machined surface in order to permit the fitting of the snap ring **(1)**.

Subframe

- Removal

	Operation	Photos
1 -	Remove the intermediate shaft (see 4-4 Steering/Intermediate shaft). ***Note**: Do not turn the wheel when the shaft is not connected to the steering unit.*	
2 -	Remove the connecting torque rod.	
3 -	Place a hydraulic plate in contact under the subframe.	
4 -	Remove the wheel speed sensors **(2)** at the level of the pivots and disconnect them from the support **(3)** on the steering tie-rod.	
5 -	Remove the point E nuts **(4)**.	
6 -	Extract the EE' support from the point E ball joint; a ball joint puller must be used to do this.	

7 - Disconnect the anti-rotation tie-rods at the level of the wishbones **(5)**.

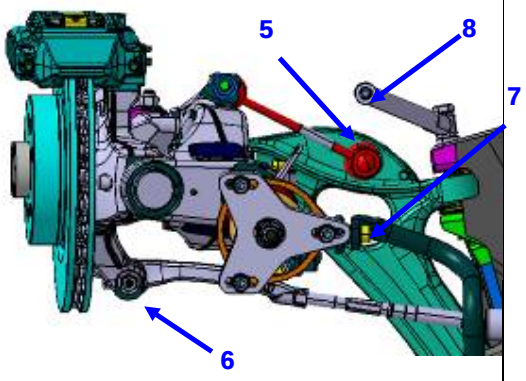
8 - Disconnect the steering tie-rods at the level of points H **(6)**.

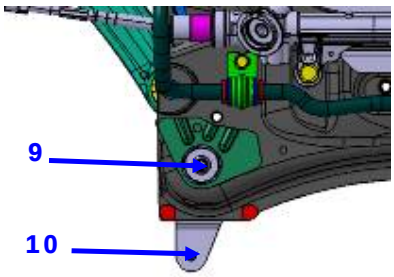
9 - Disconnect the anti-roll bar tie-rods at the level of the support struts **(7)**.

10 - Disconnect the QQ' tie-rods at the body level **(8)**.

11 - Remove the bolts from points P **(9)** and P' **(10)**.

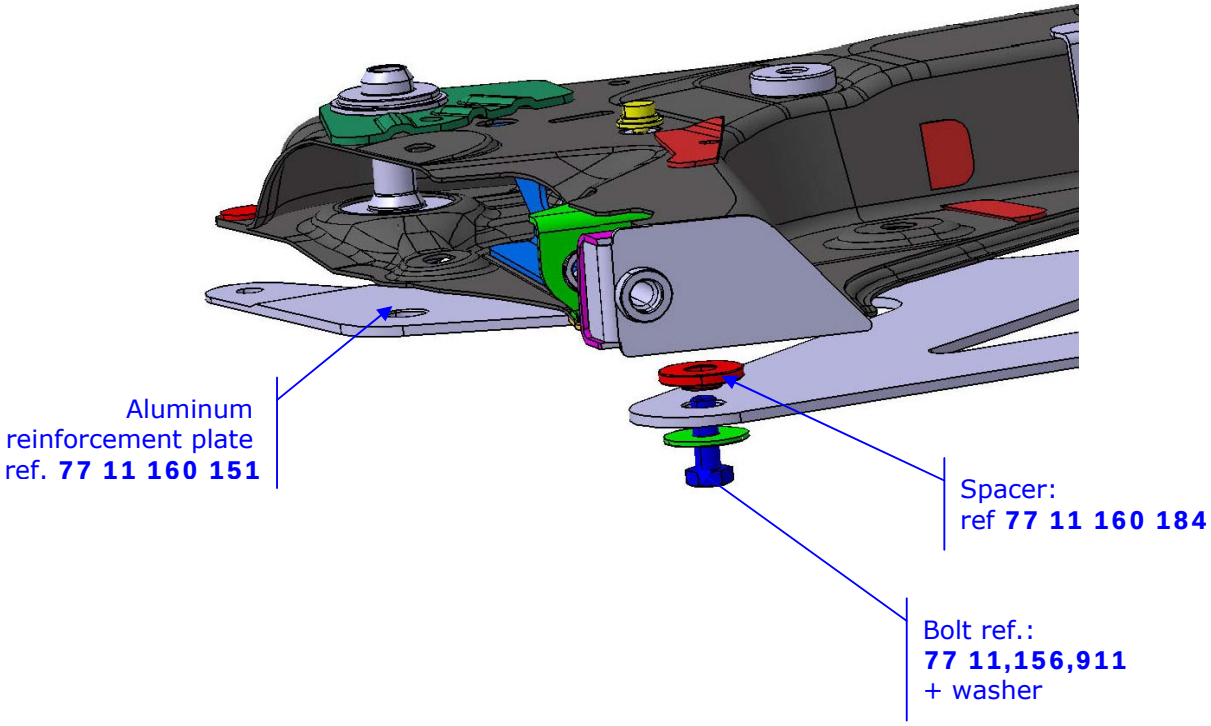
12 - Extract the subframe by lowering the hydraulic plate.

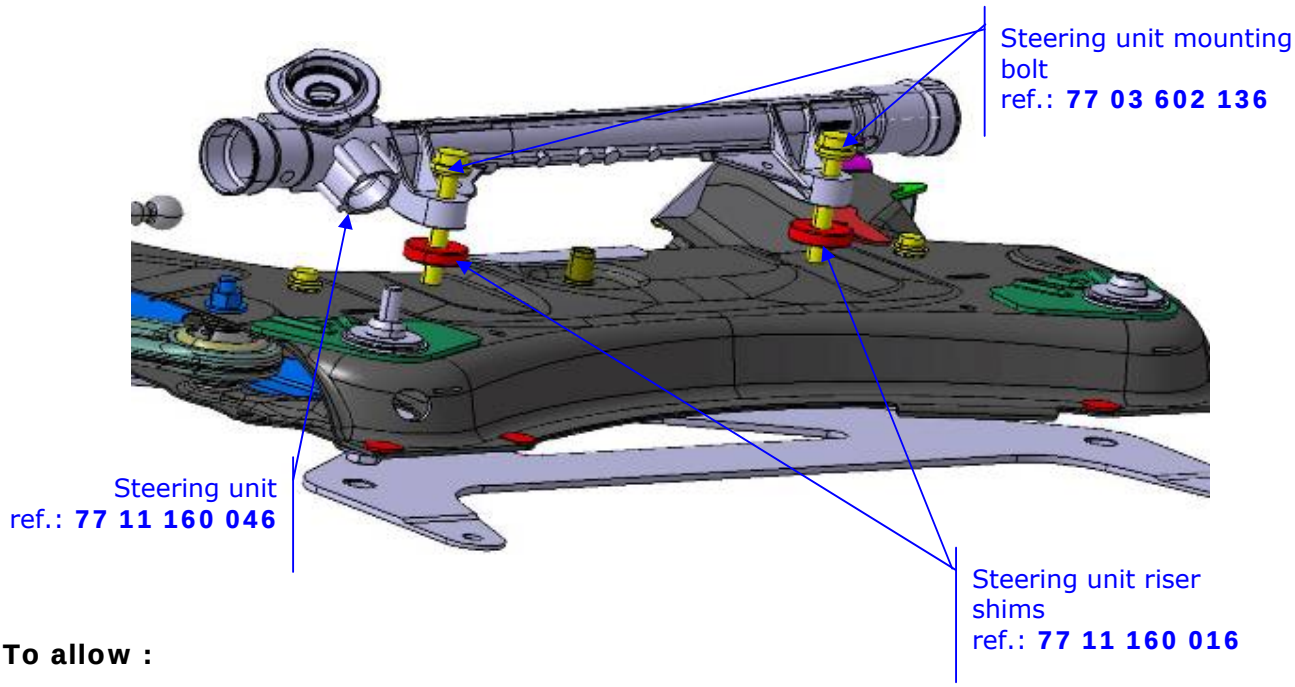




- <u>Preparing the subframe before refitting</u>

⚠ Do not forget the subframe braces and steering unit riser shims.





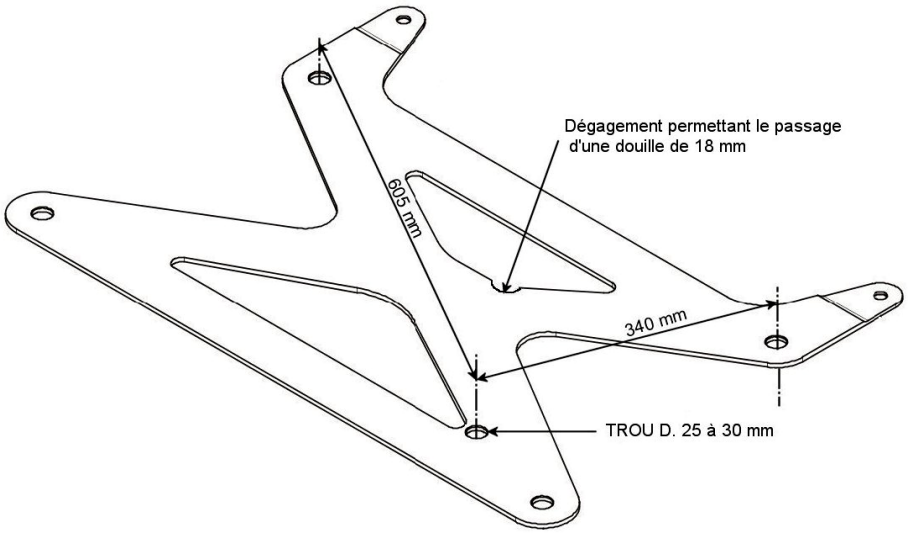
To allow :

- The differential casing-oil change,
- An access to the fixation screw of the rear powertrain support rod:

It is allowed to modify the subframe reinforcement plate as below,

1) Drill a ø 25 to 30 mm hole below the draining stopper of the differential casing
2) Carry out a clearing around the screw head to allow the access of a 6 sides bushing (18mm)

Any other modification is not allowed



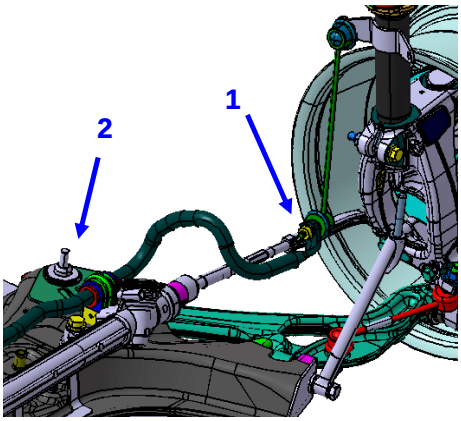
- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Bolts for points P and P': **120Nm**.
- QQ' mounting bolts to body: **105Nm**.
- Anti-roll bar tie-rod mounting bolt: **44Nm**.
- Point H nut: **37Nm**.
- Anti-rotation tie-rod mounting bolt on wishbone: **100Nm**.
- Point E nut: **105Nm**.
- Connecting torque rod mounting bolt on yoke: **105Nm.**
- Connecting torque rod mounting bolt on subframe: **105Nm**.

Anti-roll bar

- Removal

Operations	Photos
1 - Remove the anti-roll bar tie-rod mounting nuts **(1)** at the level of the anti-roll bar.	
2 - Remove the subframe (see. 4-2 Front axle/Front load bearing components/Subframe).	
3 - Remove the bar support bearings **(2)**.	
4 - Remove the bar.	
5 - Check the condition of the bearings and replace if necessary.	

- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Anti-roll bar bearing mounting bolts: **21Nm**.
- Anti-roll bar tie-rod mounting nuts: **44Nm**.

4.2.6 WHEEL PASSAGES

The wheel passages are in 2 parts, a rear one and a front one.

1 Cut out the rear wheel passages like on the photograph

2 Fit the wheel passages

3 Fix the plastic mounting clamps (right side on photograph)

4 Tight this 3 screws

behind the wheel

under the protective moulding

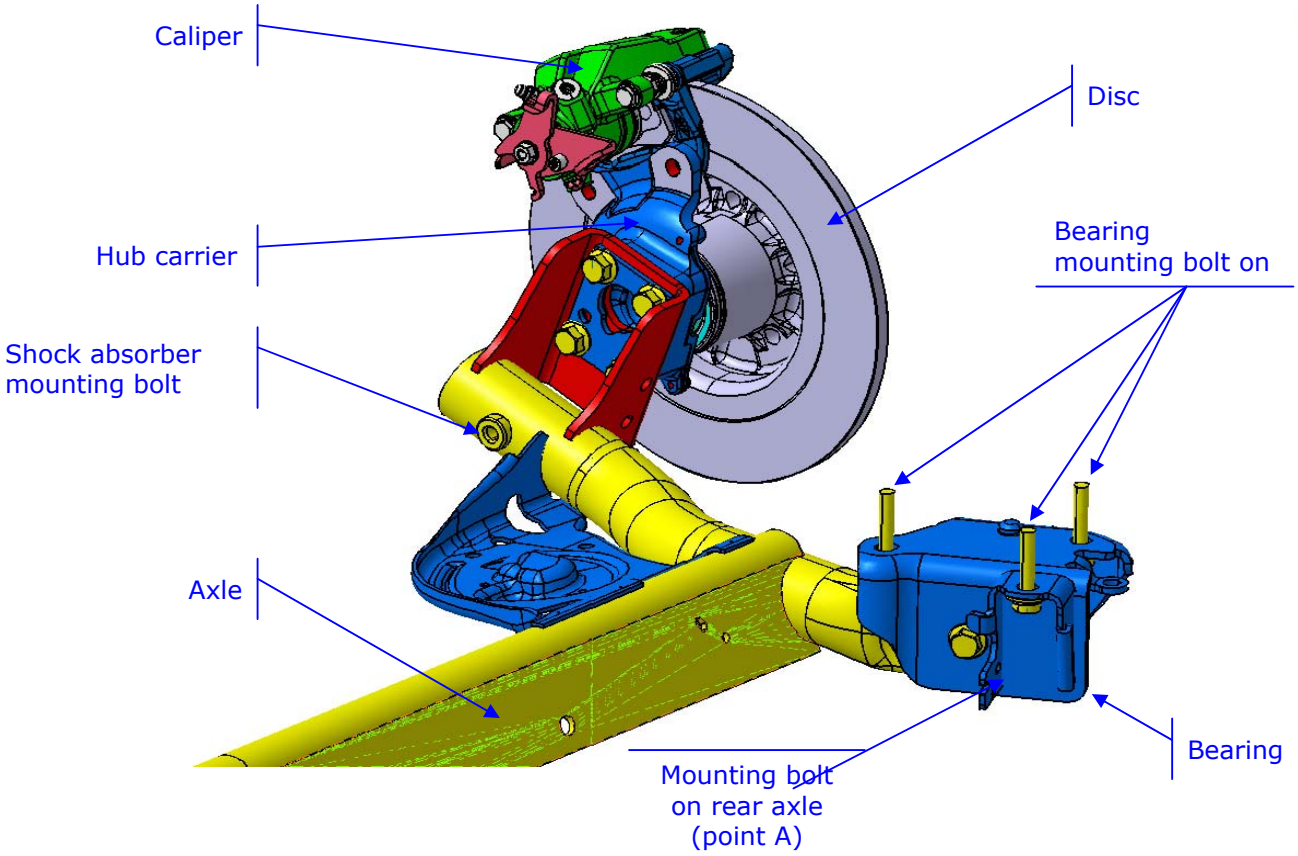
5 Fix a plastic collar between the front wheel passage and the plastic plate for engine protection

Perform the assembly steps in reverse order to remove it.

4.3 REAR AXLE

4.3.1 PRESENTATION AND CHARACTERISTICS

The rear axle has combined swingshafts.



Hinges

- Lower: by ball joint.
- Upper (shock absorber): by ball joint.

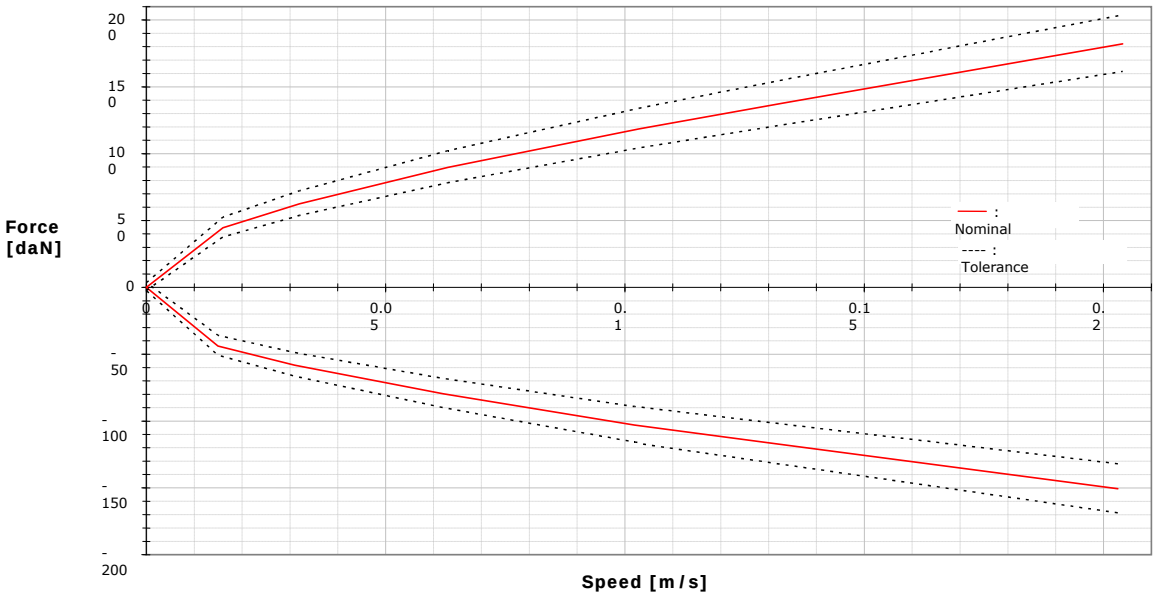
Suspension

- Suspension spring: 130N.
- Bump stop:
  - length: 50mm
  - diameter: 31mm.

Damping

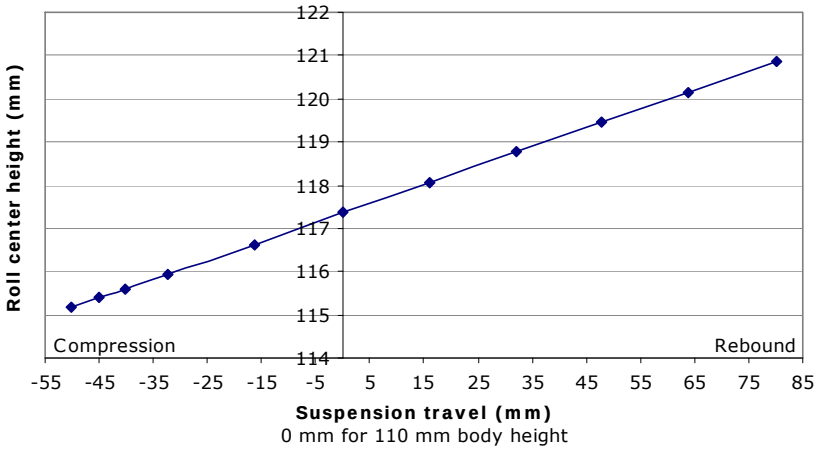
The shock absorbers are not adjustable, they must not be opened.
They are provided with seal paint. The lack of, or damage to this paint can be considered as a technical non-compliance.

Effect of shock absorber movement speed on stress

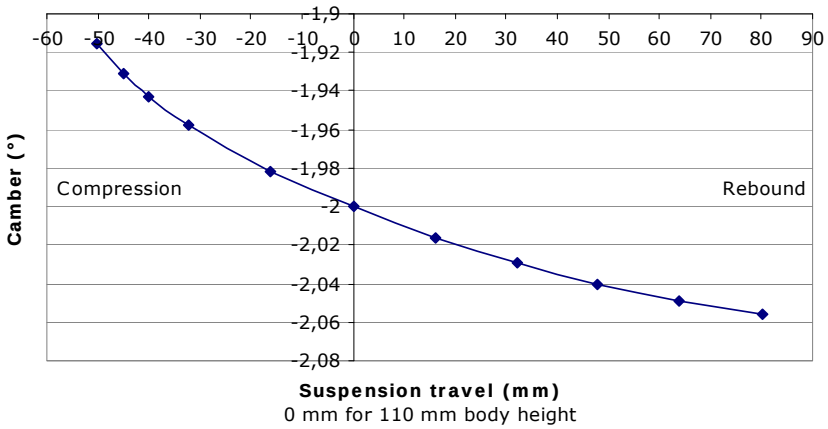


4.3.2 GEOMETRY VARIATIONS

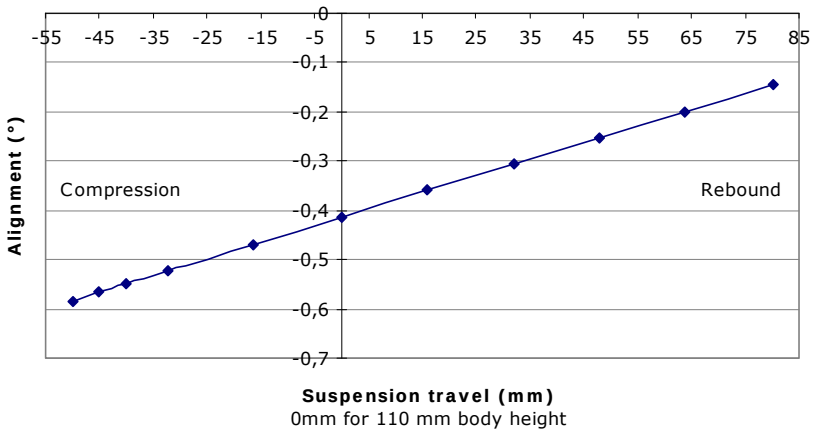
Roll center height variation



Per-wheel camber variation



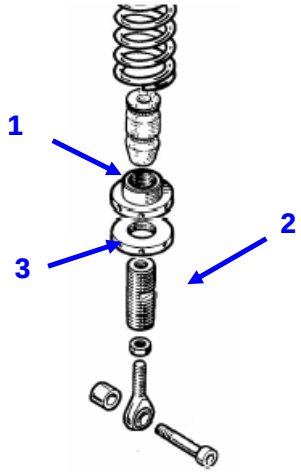
Per-wheel alignment variation



4.3.3 ADJUSTMENT OF GEOMETRY

Body height

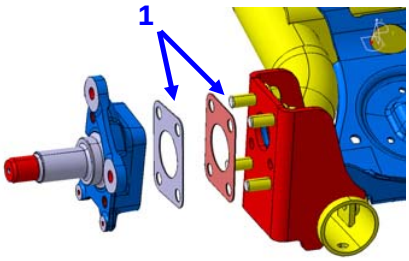
Body height is adjusted using the nut **(1)** mounted on the extension **(2)**.
Loosen the locknut **(3)**.
Adjust body height by tightening or loosening the nut.
Once the required height has been reached, tighten the locknut.



Alignment and camber

The alignment and camber of the rear axle are adjusted by inserting shims **(1)** between the hub carrier and the axle.

Depending on the required effect, the shims should be positioned according to the thickest edge.



The correspondence between the shims and their resulting alignment/camber is given in the following table.

		Camber shim				Alignment shim			
	No shim	**10'** 77 11 160 176	**20'** 77 11 160 175	**30'** 77 11 160 174	**1°** 77 11 160 173	**10'** 77 11 160 172	**20'** 77 11 160 171	**30'** 77 11 160 170	**1°** 77 11 160 169
Camber	**-1,23**	-0,1	-0,19	-0,29	-0,98	-0,03	-0,05	-0,08	-0,17
Alignment	**0,21**	0,03	0,05	0,09	0,16	-0,1	-0,19	-0,28	-0,84

To obtain the recommended setup (see 4-1 Setup) the following shim set should be used:

- Alignment (wheel opening): one 1° shim,
- Camber (wheel negative camber): one 1° shim.

Note: *To achieve the same setting for both rear axle wheels, the shims used on the left and right-hand sides may differ.*

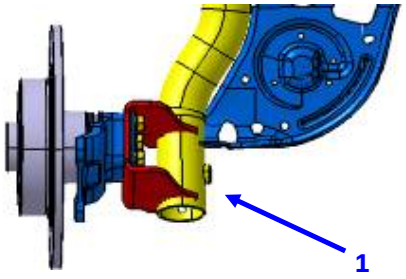
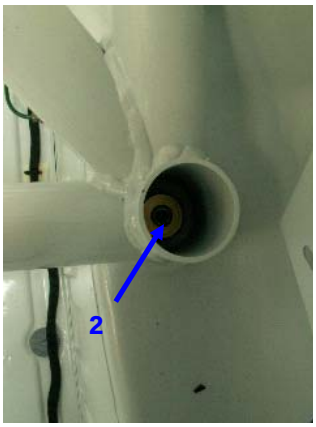
4.3.4 REAR LOAD-BEARING COMPONENTS

Hub

See 4-5 Brake System/Rear brakes/Hub disc.

Damper system

- Removal

Operations	Photos
1 - Place the vehicle on a jack stand on the appropriate side.	
2 - Remove the wheel.	
3 - Remove the lower mounting bolt **(1)**.	
4 - Remove the upper mounting nut **(2)**.	
5 - Remove the damper system.	

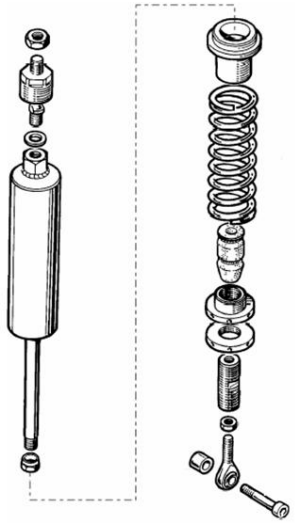
- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Lower mounting bolt: **105Nm**.
- Upper mounting bolt: **80Nm**.

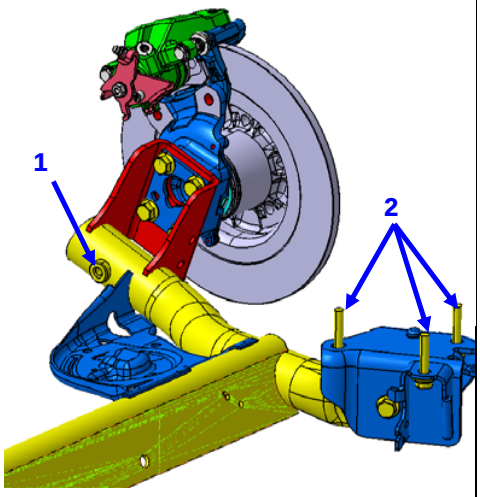
- Disassembly & reassembly

The disassembly & reassembly of the damper system is performed in the same manner as for the front axle (see 4-3 Front axle/Front load bearing components/Support strut).



Rear axle

- Removal

Operations	Photos
1 - Place the vehicle on an auto-lift.	
2 - Remove the lower attachment **(1)** of the two shock absorbers.	
3 - Remove the brake hoses from the calipers.	
4 - Support the rear axle and then remove: ▪ The six bearing mounting bolts **(2)**. ▪ The rear axle.	

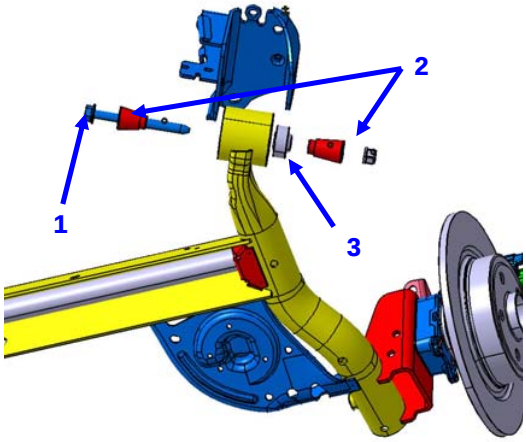
- Refitting

Perform the removal steps in reverse order.
Tightening torques:

- Lower shock absorber mounting bolt: **105Nm**.
- Bearing mounting bolt on body: **62Nm**.
- Brake hose on caliper: **14Nm**.

Drain the braking circuit.

- Disassembly

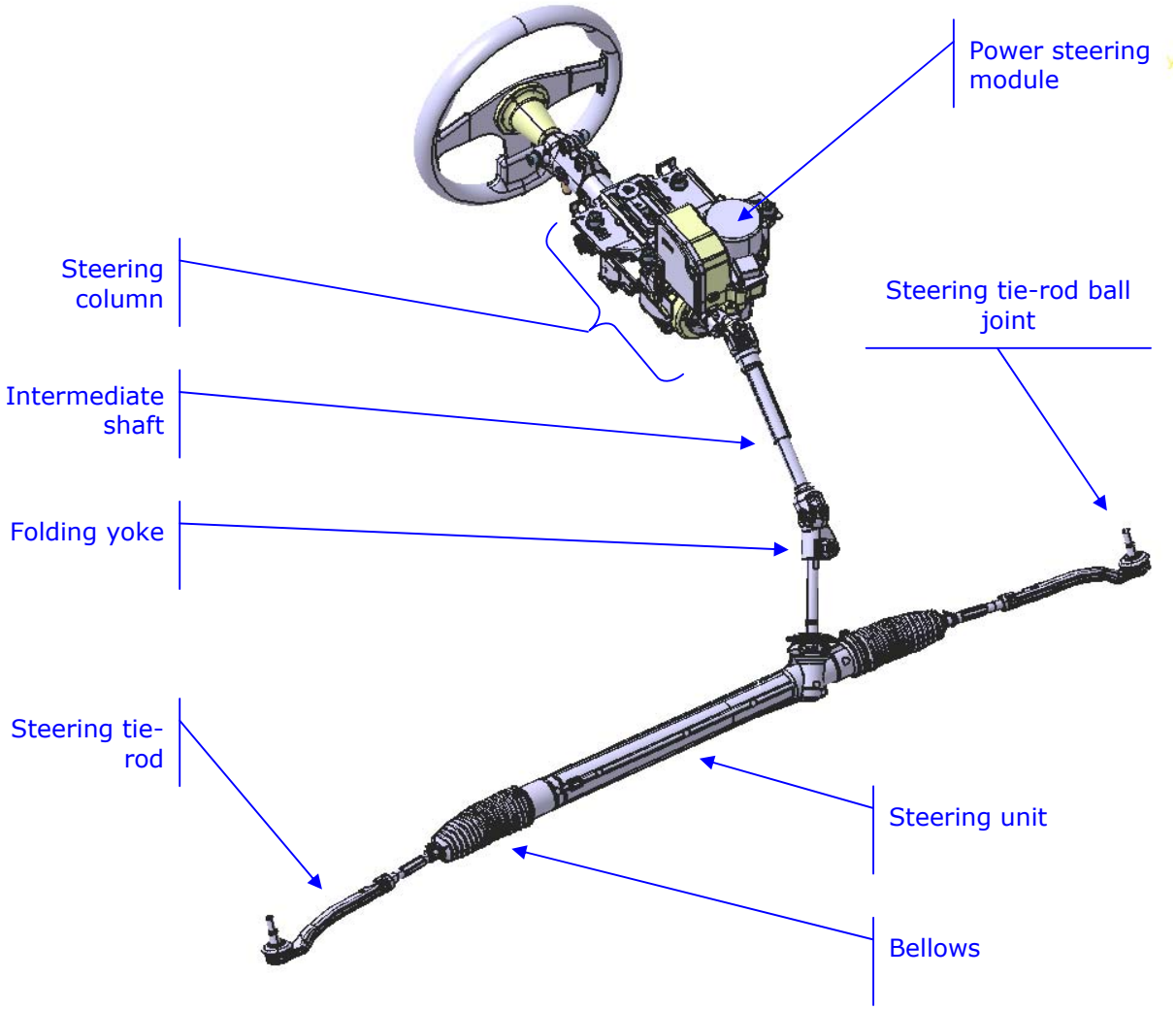
Operations	Photo
1 - Remove the point A bolt **(1)** and collect the spacers **(2)**.	
2 - Remove the snap ring.	
3 - Remove the ball joint from point A **(3)**.	

- Reassembly

Perform the removal steps in reverse order.
Tighten the bolt **(1)** to **125Nm**.

⚠ Follow spacer assembly direction **(2)**: long spacer (Ref **77 11 160 125**) inside and short spacer (Ref: **77 11 160 124**) outside.

4.4 STEERING



4.4.1 STEERING UNIT

Axial ball joint

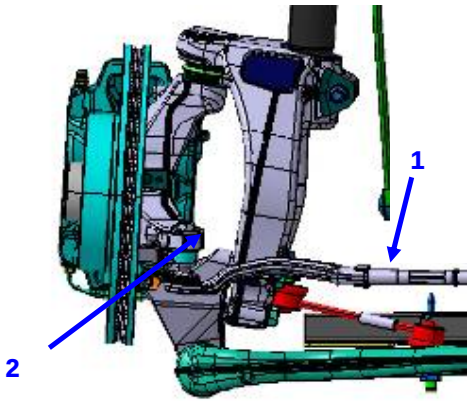
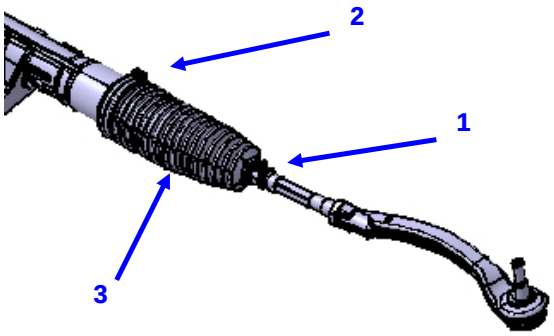
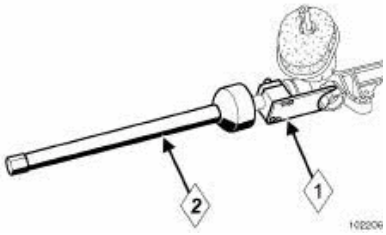
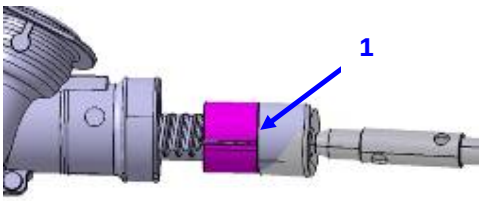
Specialist tools

- **Dir. 1305-01** Axial ball joint removal-refitting tool.
- **Dir. 1741** Steering unit bar retainer tool.
- **TAV 476** Ball joint puller.

The axial ball joint is replaced with the steering unit in place on the vehicle. Indeed, the **Dir. 1741** or **Dir. 1305-01** tool is used to connect the bar to the steering unit.

⚠ To avoid damaging the pinion teeth and steering unit bar during this operation, it **MUST** be supported using the tool: **Dir. 1741**.

- Removal

Operations	Photos
1 - Place the vehicle on an auto-lift.	
2 - Remove the front wheel on the relevant side.	
3 - Loosen the alignment locknut **(1)**.	
4 - Remove the point H nut **(2)**.	
5 - Extract the ball joint from point H using the tool: **(1) Tav. 476**.	
6 - Remove the small bellows clamp **(1)**.	
7 - Cut the large bellows clamp **(2)**.	
8 - Unscrew the steering tie-rod counter-clockwise and note the number of rotations for refitting.	
9 - Remove the steering tie-rod.	
10 - Extract the bellows **(3)**.	
11 - Unlock the steering column.	
12 - Position the tool: **(1) Dir. 1741** on the steering bar, pinion side.	
13 - Release the axial ball joint using the **(2) Dir 1305-01** tool.	
14 - Remove the axial ball joint and steering unit shim **(1)** (Ref **77 11 160 142**).	

- Refitting

⚠ Minimum thread installation: 1.5 times the thread diameter, i.e. 18mm of thread engaged in the ball joint sleeve.

Perform the removal steps in reverse order.

Note: *Position the steering unit shim (Ref **77 11 160 142**) before fitting the axial ball joint onto the steering unit.*
Fit the bellows (see 4-4 Steering/Steering unit/Bellows)
*Follow the ball joint unit markings: one mark on the right **(1)** and 2 on the left **(2)**.*

Left ball joint unit

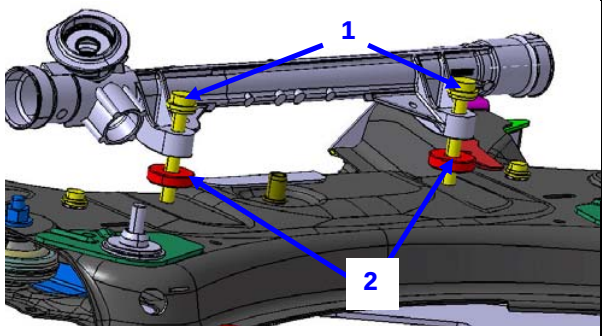
Right ball joint unit

Tightening torques:

- Axial ball joint on bar: **80Nm**.
- Point H nut: **37Nm**.
- Steering tie-rod locknut: **53Nm**.

Steering unit

- Removal

Operations	Photos
1 - Remove the subframe (see 4-2 Front axle/Front load bearing components/ Subframe).	
2 - Remove the two steering unit mounting bolts **(1)**.	
3 - Remove the steering unit and collect the unit's riser shims **(2)**.	

- Refitting

Operations
1 - Position the riser shims on the subframe (ref **77 11 160 016**, thickness: **5mm**).
2 - Fit the steering unit on the subframe.
3 - Tighten the two bolts to **105Nm**.
4 - Refit the subframe (see 4-4 Front axle/Front load bearing components/Subframe).

Bellows

- Bellows assembly

⚠ *When replacing an axial ball joint, new bellows **MUST** be refitted.*
*To ensure the good air balance, the steering **MUST** be placed at the mid-point.*

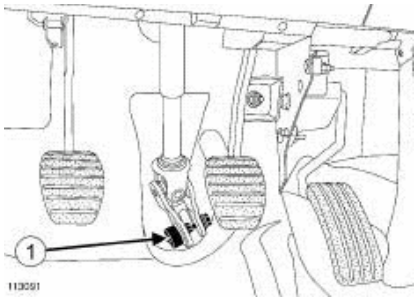
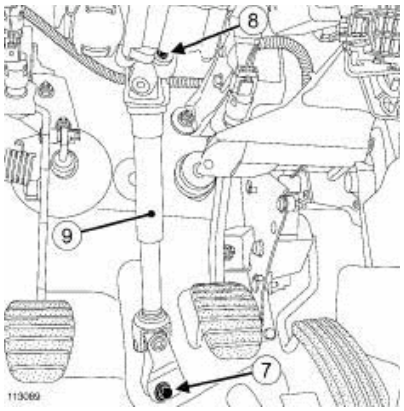
1 - Fit a nose cone on the axial ball joint in order to avoid damaging the bellows during assembly.

2 - Coat the bellows' contact surface with the axial ball joint with grease to prevent the bellows from twisting.

3 - Attach the bellows with a new clamp (provided with the bellows).

4.4.2 INTERMEDIATE SHAFT

- Removal

Operations	Photos
1 - Remove the folding yoke bell **(1)** (discard).	
2 - Set the wheels straight.	
3 - Remove the folding yoke bolt **(7)** (discard).	
4 - Remove the folding yoke nut (discard).	
5 - Remove the intermediate shaft bolt **(8)** on the column.	
6 - Remove the intermediate shaft **(9)**.	

- Refitting

Perform the removal steps in reverse order.

⚠ Systematically replace the folding yoke bolt (ref **77 03 602 097**) and cam nut after each removal.

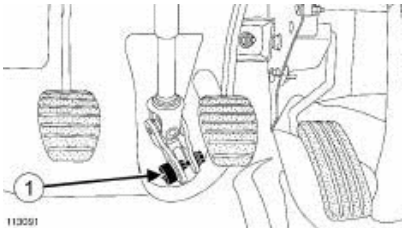
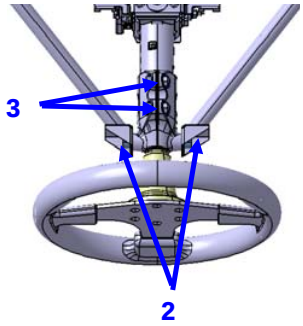
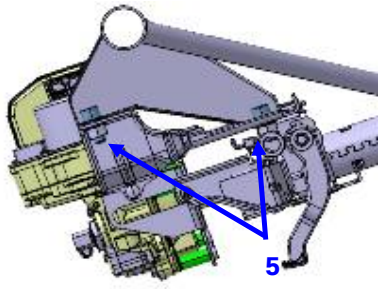
Note: *On a new intermediate shaft, the folding yoke cam nut is pre-assembled, do not remove the bell.*
Follow the direction of assembly of the folding yoke bolt and cam nut.

Tightening torques:

- Folding yoke bolt on steering box: **24Nm**.
- Bolt on steering column: **32Nm**.

4.4.3 STEERING COLUMN

- Removal

Operations	Photo
1 - Set the vehicle wheels straight.	
2 - Disconnect the battery's ground cable.	
3 - Remove the dashboard.	
4 - Disconnect the power steering wiring harness.	
5 - Remove the steering wheel, followed by the wheel hub, after marking their initial positions.	
6 - Extract the bell from the folding yoke **(1)**.	
7 - Remove the 2 roll cage stay bolts **(2)** on the steering sheath.	
8 - Remove the 2 sheath mounting bolts **(3)** on the column.	
9 - Remove the column sheath.	
10 - Remove the extinguisher jet attachment lug **(4)**.	
11 - Remove the 4 steering column bolts **(5)** on the roll cage crossmember.	
12 - Remove the column, power steering module and intermediate shaft assembly.	
⚠ It is important not to turn the wheel when the column has been removed in order to not offset the position sensor (see 4-4 Steering/EPS unit).	

- Refitting

1 - Refit the steering column.

2 - Tighten the four bolts to **105Nm**.

3 - Fit the folding yoke.

4 - Tighten the cam nut to **24Nm**.

5 - Fit the sheath onto the column and tighten the 2 bolts to **21Nm**.

6 - Tighten the 2 roll cage stay mounting bolts on the column to **21Nm**.

7 - Place the steering wheel hub on the column.

8 - Tighten the hub mounting bolt to **44Nm**.

9 - Fix the wheel on the hub.

10 - Connect the power steering module wiring harness.

11 - Refit the dashboard and central console.

4.4.4 ELECTRIC POWER SYSTEM

⚠ If the unit undergoes a heavy impact or if the vehicle is involved in an accident. The unit **MUST** be sent to the Alpine after-sales service.

Transport precautions

The unit must be held in place by the shaft and engine housing.
Handling the unit using the shaft alone can cause significant damage to the torque sensor and, consequently, can lead to unit malfunction.

Safety recommendation

The EPS system may generate significant forces and rotation speeds, which may in turn cause injury. It is therefore important to handle it with caution, in accordance with the maintenance guidelines (see following paragraph) and to return it to the supplier prior to re-use if it has been damaged.

Maintenance guidelines

- The condition of all of the EPS mechanical components and electrical connections should be checked after each race.
- A period of at least 20 seconds should be left between general vehicle power cut-off and EPS disconnection to allow all internal diagnostic procedures to complete.
- The unit can reach temperatures of 85°C following repeated operations. It is therefore necessary to check the unit's temperature before disassembling it.

Use

- Start-up
  - Ensure that the EPS is correctly connected to the wiring harness.
  - Turn on the vehicle's electrics (button **(12)** on the control panel; see 1-6 Using the car).
  - After a short period of time, the EPS makes a "clicking" noise. This indicates that the unit is powered up and ready to use.
  - Turn the wheel. The EPS should function and the less effort should be required to turn the wheel.
  - For the wheel position sensor to transmit its measurements, it must first be calibrated. The power steering will function correctly, even if the sensor has not been calibrated, but angle measurements will not be available on data acquisition.
  - To calibrate the sensor, turn the wheel slowly to the 0° position (this information is visible from the "Vision" software see 6 Operating software/Vision). This position is an item of production data and may not correspond to the vehicle's wheels being straight. It is for this reason that, when calibrating the sensor for the first time, the wheel must be rotated 360°**(don't turn up to the stop!)** in each direction. The 0° position will then correspond to the straight wheels position. The system will maintain this calibration as long as the vehicle's electrics are on, but will require re-calibrating to 0° on each general power cut.

- Power off

  Before switching off completely, the system switches to "power latch" mode. During this phase, the system checks the operation of certain components that cannot be tested during the operating phase.

  To ensure that all the tests are performed correctly, power must be maintained for at least 30 seconds after dashboard shutdown (wait 30 seconds between turning off the engine: using switch **(12)** before cutting off the general power supply with switch **(1)**).

Fault diagnosis

Symptom 1: When the system is powered up, the effort required to turn the wheel does not reduce. Furthermore, the system does not "click".

Solutions:

- Ensure that the ignition switch is in the up position (on).
- Check that the wiring harness is connected to the battery and that the battery is charged.
- Check all connections between the battery, EPS and ignition switch. Ensure that there is no power loss and that they are connected to the correct pins.
- Check that all fuses between the battery and the EPS are in working order.

If the system is still malfunctioning after these checks, it must be immediately returned to the Alpine after-sales service.

Symptom 2: When the steering wheel is turned, the power steering stops before reaching full travel. When the wheel it turned in the opposite direction, however, the power steering operates correctly to full travel.

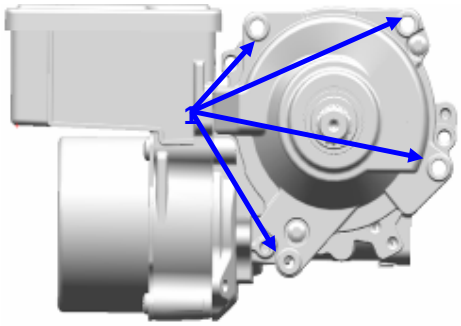
Solution: This problem is due to the maximum rotation allowed by the system of 1600°. If the 0° position stored by the system is significantly different from the angle of the wheels, the angle measured by the EPS may exceed the maximum value in one direction. To solve this problem, disconnect the intermediate shaft and rotate the wheel 360° in the direction of correct system operation. This will align the system's 0° position with that of the wheels.

Symptom 3: When driving the vehicle, the power steering varies randomly, even though the system is constantly powered up.

Solution: Ensure that all connections between the EPS, the battery and the ignition switch are shielded and sealed and that there is no corrosion or dirt on them.

If these solutions fail to solve the problem, the system must be immediately returned to the Alpine after-sales service.

- Removal

Operations	Photo
1 - Remove the steering column (see previous paragraph).	
2 - Remove the 4 unit mounting bolts **(1)** on the steering column. Remove the power steering module from the column. ***Note:*** *keep the four spacers.*	
3 - ⚠ It is important not to run the EPS unit when the column has been removed in order to not offset the position sensor (see 4-4 Steering/EPS unit).	

- Refitting

Operations
1 - Refit the power steering module on the column, using the 4 spacers (ref **77 11 160 149**).
2 - Tighten the 4 bolts **(1)** to **6Nm**.
3 - Refit the column (see 4-4 Steering/Steering column).

4.5 BRAKING SYSTEM

4.5.1 CHARACTERISTICS

Front brake

- Clutch slave cylinder diameter: **40mm**.
- Disc diameter: **312mm**.
- Disc thickness: **28mm**.
- Minimum disc thickness: **26mm**.

Rear brake

- Clutch slave cylinder diameter: **38mm**.
- Disc diameter: **300mm**.
- Disc thickness: **11mm**.
- Minimum disc thickness: **9.5mm**.

Master cylinder

- Diameter: **23.8mm**.

Brake booster

- Diameter **10''**

Front brake pads

- Ferodo DS 1.11

Rear brake pads

- Ferodo DS 2500

⚠ Clio Cup is only officially approved by Renault Sport when fitted **with Ferodo brake pads.**

Running in

Ferodo DS 1.11 brake pads do not require any specific running-in.

DS 2500 brake pad run-in protocol:

- Clean the brake disc with Emery paper (surface in contact with the pad).
- Remove all traces of previous friction.
- Create a 45° chamfer on the outer circumference of the pad if the discs are hollowed.
- Perform 3 to 4 medium pressure braking operations (150 to 100kph).
- Allow to cool between braking (+/-400 meters).
- Perform 1 heavy pressure braking operation (180 to 100kph).
- Allow to cool (+/- 800meters).
- Repeat the process two or three times.

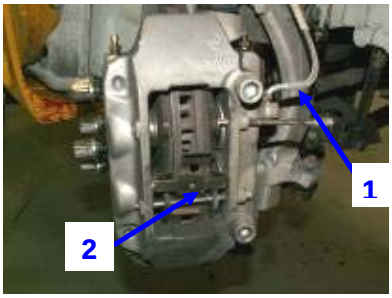
Under no circumstances during run-in should brake pad temperature exceed **300°C to 400°C**.

⚠ Brake pad operation at low temperatures may lead to the build-up of friction material on the disc. This deposit may cause vibrations when braking. Should this occur, buff the discs to eliminate this phenomenon.

4.5.2 FRONT BRAKES

Brake pads

- Removal

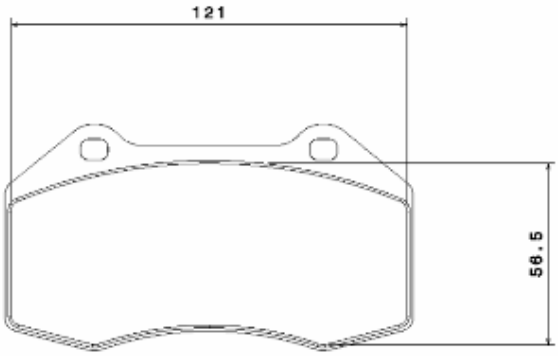
Operations	Photos
Push back the pistons. **1 -** ⚠ Watch out for rising brake fluid levels in the tank.	
2 - Remove the upper spindle **(1)** using a drift punch. **3 -** Remove the spring and lower spindle **(2)**.	
4 - Remove the pads, noting their position for refitting, where appropriate.	

- Refitting

Perform the removal steps in reverse order.

Maximum authorized contact surface with the disc

The maximum front brake pad friction material surface area tolerated on the Clio Cup is shown on the following diagram.



Brake calipers

⚠ The brake calipers cannot be repaired. If a fault is detected on the caliper, it must be systematically replaced.

- Removal

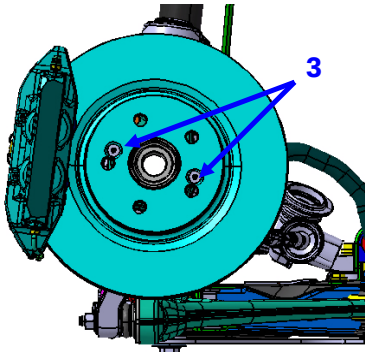
Operations	Photos
1 - Disconnect the banjo bolt **(1)** linking the hose to the caliper (brake fluid will pour out).	
2 - Remove the brake pads (see previous paragraph).	
3 - Remove the two caliper mounting bolts **(2)**.	
4 - Remove the caliper.	

- Refitting

Operations
1 - Fit the caliper on the pivot and attach it using its bolts **(2)**.
2 - Tighten to **164Nm**.
3 - Check the condition of the hose (replace if necessary) and attach with the banjo bolt.
4 - Tighten to **14Nm**.
5 - Drain the braking circuit.

Disk

- Removal

Operations	Photos
Push back the pistons. **1 -** ⚠ Watch out for rising brake fluid levels in the tank. **2 -** Remove the two bolts **(2)** holding the caliper on the pivot. **3 -** Release the caliper and attach it in the wheel arch. Do not damage the hose **(1)**.	
4 - Remove the two disc mounting bolts (3).	
5 - Remove the track shim and the disk.	

- Refitting

Operations
1 - Fit the disc onto the hub.
2 - Fit the track shim (ref **77 11 160 154**).
3 - Fix the assembly with two new bolts and tighten to **21Nm**.
4 - Refit the brake caliper and tighten to **164Nm**.
5 - Press the brake pedal several times in order to place the piston in contact with the pads.

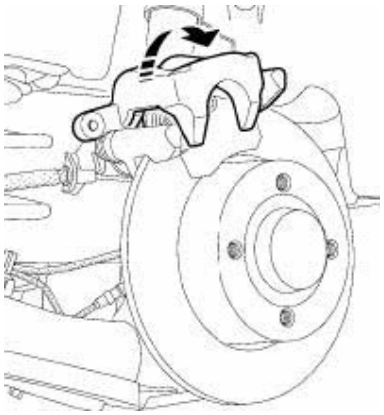
4.5.3 REAR BRAKES

Brake pads

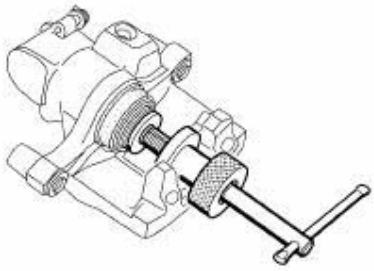
Specialist tools:

- **Fre 1190-01** Brake caliper piston driver.

- Removal

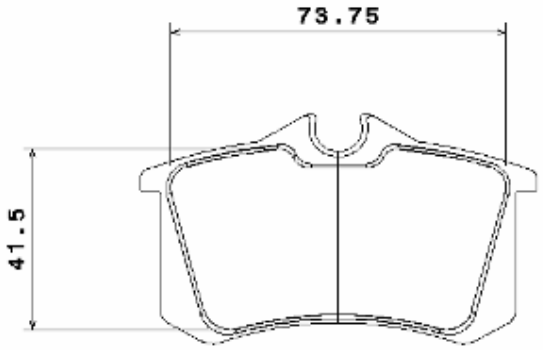
Operations	Photos
1 - Remove the wheels.	
2 - Remove the lower small column mountings.	
3 - Swivel the calipers upwards.	
4 - Remove the brake pads.	

- Refitting

Operations	Photos
1 - Check pad thickness.	
2 - Clean the caliper supports and the calipers.	
3 - Push caliper piston back into its bore using the **Fre 1190-01** tool.	
4 - Fit the pads.	
5 - Swivel the caliper downwards into its initial position.	
6 - Refit a **NEW** small column bolt.	
7 - Tighten the small column bolt to **32Nm**.	

Maximum authorized contact surface with the disc

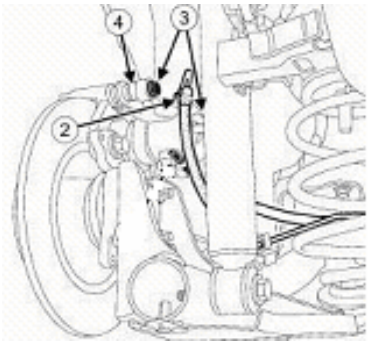
The maximum rear brake pad friction material surface area tolerated on the Clio Cup is shown on the following diagram.



Brake calipers

⚠ The brake calipers cannot be repaired. If a fault is detected on the caliper, it must be systematically replaced.

- Removal

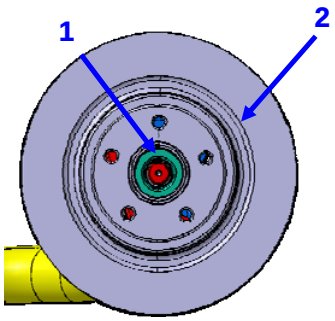
Operations	Photos
1 - Remove the wheel.	
2 - Remove the brake hose **(2)**. ⚠ Allow for fluid discharge.	
3 - Remove the small column mounting bolts **(3)** while holding the nuts **(4)**.	
4 - Remove the caliper.	

- Refitting

Operations
1 - Check the condition of the caliper piston bellows.
2 - Clean the caliper support and the caliper.
3 - Refit the brake pads (see 4-5 Braking system/Rear brakes/Pads).
4 - Refit the caliper.
5 - Refit the new small column bolts.
6 - Refit the brake hose.
7 - Tightening torques: ▪ Small column bolts: **32Nm**. ▪ Brake hose: **14Nm**.

Hub disc

- Removal

Operations	Photos
1 - Release the spindle bolt **(1)**.	
2 - Remove the wheel.	
3 - Remove the brake pads (see previous paragraph).	
4 - Remove the two brake caliper mounting bolts.	
5 - Remove the brake caliper and attach it in the wheel arch.	
6 - Remove the spindle nut.	
7 - Remove the hub disc **(2)**.	

- Refitting

Operations
1 - Fit the hub. disc **(1)** on the spindle.
2 - Position the spindle bolt.
3 - Refit the brake caliper and tighten the bolts to **105Nm**.
4 - Refit the pads (see corresponding paragraph).
5 - Refit the wheel and tighten the bolts to **130Nm**.
6 - Tighten the spindle nut to **220Nm**.
7 - Press the brake pedal several times in order to place the piston in contact with the pads.

- Checking play

Check axial play using a dial gauge mounted on the disc: **max**. **0.03 mm**.

4.5.4 BRAKING CIRCUIT

Brake fluid

- Top-up

Brake pad wear leads to a progressive drop in brake fluid levels in the tank. Do not compensate this drop, the level shall be restored on the next brake pad change.
Ensure, however, that it does not drop below the minimum mark.

- Approved brake fluids

The combination of two incompatible brake fluids in the braking circuit may lead to significant leakage risks caused mainly by damage to gaskets and cups. To avoid such risks, only those fluids inspected and approved by our laboratories, and compliant with the **SAE J 1703 dot 5 standard** should be used.

Recommended brake fluid: **RENAULT ref. 77 01 422 979** (0.5L bottle).

- Bleeding

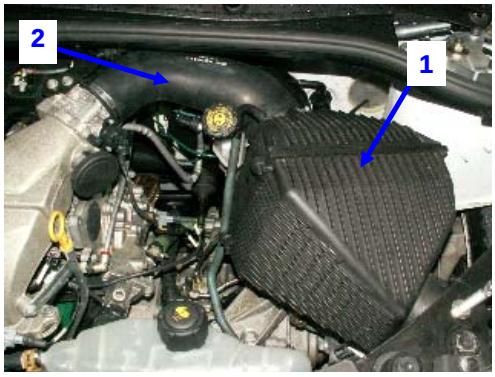
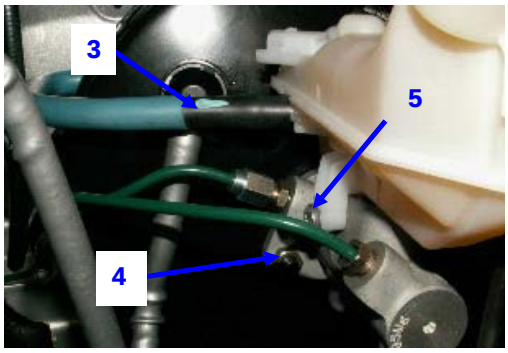
Drainage should be performed starting with the caliper furthest away from the master cylinder and ending with the nearest.

- Open the brake limiter to the maximum, taking care to note its initial position.
- Bleed the rear right-hand caliper.
- Bleed the rear left-hand caliper.
- Bleed the outer body of the front right-hand caliper.
- Bleed the inner body of the front right-hand caliper.
- Bleed the outer body of the front left-hand caliper.
- Bleed the inner body of the front left-hand caliper.
- Reset the limiter to its initial setting.

⚠ The level of brake fluid must never be allowed to drop below the minimum level during bleeding.

Master cylinder

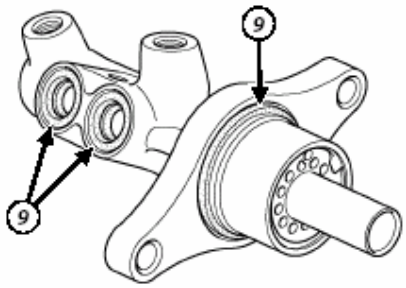
- Removal

Operations	Photos
1 - Remove the air box **(1)** and intake pipe **(2)**.	
2 - Drain the master cylinder tank with a syringe.	
3 - Remove the clutch master cylinder pipe **(3)**.	
4 - Remove the brake pipes, taking care to catch any brake fluid discharge.	
5 - Remove the 2 master cylinder mounting bolts **(4)** on the amplifier.	
6 - Remove the master cylinder – tank assembly.	
7 - Remove the master cylinder tank mounting bolt **(5)**.	
8 - Remove the master cylinder tank.	

- Refitting

Perform the removal steps in reverse order.

The master cylinder seals **(9)** must be replaced.



Ensure that the cup is centered on the braking amplifier when refitting.

Tightening torques:

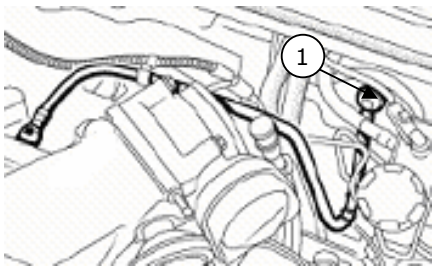
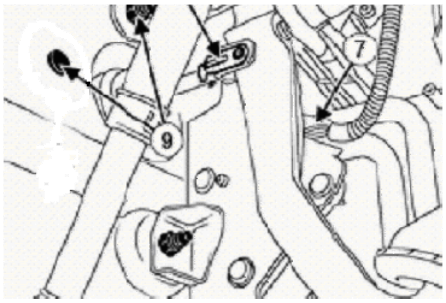
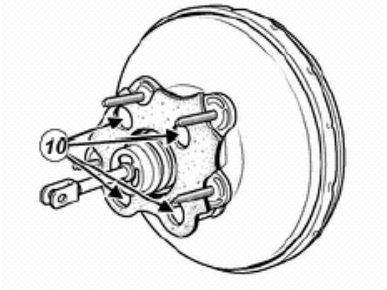
- Master cylinder tank mounting bolts: **8.5Nm**.
- Master cylinder mounting nuts: **25Nm**.
- Brake pipes: **17Nm**.

Braking amplifier

The brake booster cannot be repaired. Maintenance operations are only allowed on the following parts:

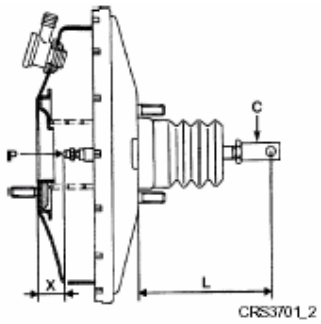
- Air filter
- Check valve

- Removal

Operations	Photos
1 - Remove the air box and intake pipe.	
2 - Remove the check valve at the amplifier lever **(1)**.	
3 - Remove the master cylinder (see previous paragraph).	
4 - Remove the dual safety coupling shaft **(5)** between the braking amplifier thrust rod and the brake pedal.	
5 - Remove the braking amplifier mounting nuts (9)	
6 - Remove the braking amplifier.	
7 - Remove the braking amplifier spacer mounting bolts **(10)**.	
8 - Remove the braking amplifier spacer.	

- Refitting

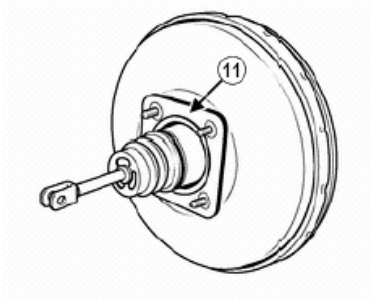
Perform the removal steps in reverse order.
Tighten the amplifier and spacer bolts to **21Nm**.



Check the dimension L = 171mm, adjustable using the rod **(C)**.

Drain the braking circuit.

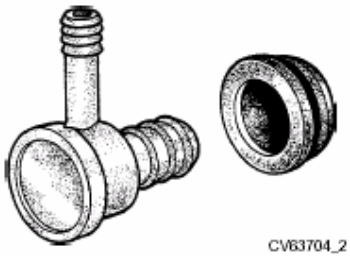
Ensure that the braking amplifier gasket seal **(11)** is present and replace it if faulty.



On each removal, systematically replace the coupling shaft (ref **82 00 420 641**) between the braking amplifier thrust rod and the brake pedal.
Ensure it is locked.

Check valve

- Removal

Operation	Photo
1 - Disconnect the check valve from the brake booster.	
2 - Pull and rotate the valve to release it from the rubber sealing washer.	CV63704_2

- Refitting

Perform the removal steps in reverse order.
Check the condition of the sealing washer and check valve and replace them if necessary.

⚠ Take care not to push the sealing washer into the braking amplifier when inserting the valve.

Wastegate

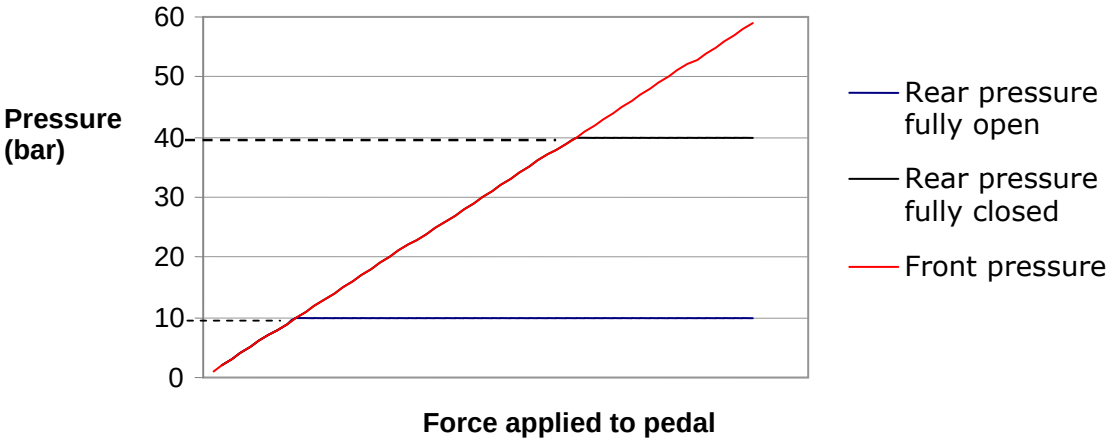
- Operation

The wastegatecan be adjusted by the driver from his seat:

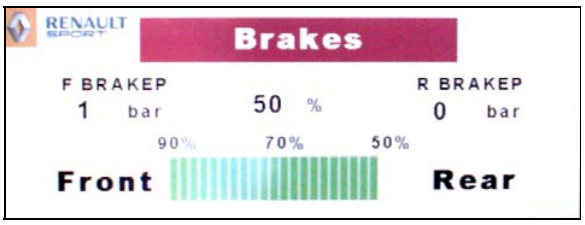
- Tighten the star wheel to increase rear braking,
- Loosen the star wheel to reduce rear braking.

Above a pressure of 10 bars in the braking circuit, and depending on the setting, the rear circuit pressure is limited to between 10 and 40 bars.

- Wastegate operating curve:



Note: *The front/rear pressure distribution can be displayed on the "Brakes" page of the display (if the optional data acquisition kit **77 11 160 189** has been fitted onto the vehicle).*



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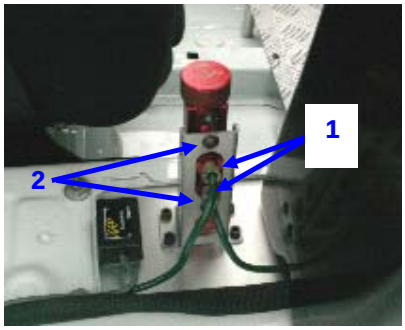
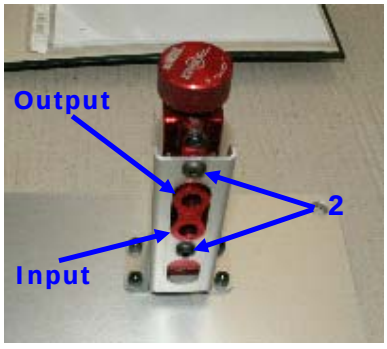
Removal

Operations	Photos
1 - Unscrew the connectors **(1)** (allow for brake fluid discharge). **2 -** Remove the mounting bolts **(2)** and the wastegate.	

- Refitting

Operations	Photos
1 - Fit the wastegate on the support using the two bolts **(2)**. **2 -** Place the connector ends in the wastegate's threaded holes. Initiate threading manually. ***Note:*** *Follow the direction of assembly.* **3 -** Tighten the connectors to **13Nm**. **4 -** Drain the braking circuit. **5 -** Preset the wastegate to the centre position: 15 "clicks" from one of the 2 end positions.	

4.6 WHEELS AND TYRES

4.6.1 CHARACTERISTICS

Wheels

Material: Aluminum/magnesium alloy.

	A	B	C	D	E
Wheel type	Width (inches)	Wheel rim profile	Nominal ∅ under tyre bead (inches)	Number of holes	ET offset
8J×17	8	J	17	5	68

Maximum offset: 0.3mm measured on the wheel rim.
Maximum out-of-round: 0.3mm measured on the tyre bead bearing surface.

⚠ When balancing the fitted wheels, it is essential to avoid placing the balancing weights in an area where they could come into contact with the EE' support in steering lock position.

Tyres

The tyres are made by Michelin.

		Dry	Wet
Type	Front	S9C	P2E
	Rear	S9C	P2E
Dimensions	Front	20/61-17	20/61-17
	Rear	20/61-17	20/61-17
Cold inflation pressure (bar)	Front	1.6*	1.7*
	Rear	1.7*	1.8*

*The cold pressure values are given for information and should be adjusted according to track conditions (temperature, roughness, grip, amount of water, etc.).

Notes:

- ☐ *To ensure predictable and reproducible pressure increase, we strongly recommend the use of a water vapor-free inflation gas (dry air, nitrogen, etc.).*
- ☐ *To ensure a good valve seal, the cap should always be used.*
- ☐ *The wheels are identified by the two engravings on the inside, corresponding to their widths (see photos). Only the engraving with a cross **(1)** on the right should be taken into account.*

4.7

KIT EVO 2009

4.7.1 NOMENCLATURE

WISHBONES		
Designation	**Reference**	**Qty**
Assembled wishbone with A and B casings	77 11 162 592	2
External snap ring Ø58	77 11 162 563	2
Point A spacer	77 11 162 525	4
Point B spacer	77 11 162 526	4
Ball joint Ø15	77 11 128 370	4
Internal snap ring Ø30	77 11 128 850	4
M12 deported locknut	77 03 034 248	4
M12 washer	77 11 156 931	4
CHC screw M12 x 145	77 11 162 527	2
CHC screw M12 x 86	77 11 156 908	2
BODYWORK		
Black rear diffuser	77 11 162 532	1
Diffuser's duct	77 11 162 533	2
External exhaust nozzle	77 11 162 534	2
Front bumper skin	77 11 162 535	1
Front bumper inferior plastic fence	77 11 162 536	1
Inferior deflector	77 11 162 537	1
Left aerodynamic blade	77 11 162 538	1
Right aerodynamic blade	77 11 162 539	1
Anti-fog light left cover	77 11 162 540	1
Anti-fog light right cover	77 11 162 541	1
Front left bumper support	77 11 162 542	1
Front right bumper support	77 11 162 543	1
Left halogen headlight	77 11 162 544	1
Right halogen headlight	77 11 162 545	1
Black superior bumper trim cover	77 11 162 546	1
Black inferior bumper trim cover (F1 blade)	77 11 162 547	1
Black left rearview mirror shell	77 11 162 548	1
Black right rearview mirror shell	77 11 162 549	1
Left external rearview mirror	77 11 162 550	1
Right external rearview mirror	77 11 162 551	1
Assembled Renault ensign	77 11 162 565	1
FASTENERS		
Diffuser screw	77 03 017 090	2
Diffuser nut	77 03 034 276	2
Screw for diffuser's duct	77 03 008 211	6
Nut for diffuser's duct	77 03 046 151	6
F1 blade fitting screw	77 03 017 101	8
Screw for bumper fitting on inferior radiator support	77 03 602 206	2
Screw for bumper fitting on front quarter panel	77 03 019 211	2
Retainer for bumper fitting on superior radiator support	77 03 072 360	2
Bumper retainer	82 00 700 969	2
Star rivet	77 03 072 419	18
Plastic clip for headlight fitting on front quarter panel	77 03 081 222	2
Black star rivet for superior bumper trim cover	77 03 072 322	4
Plastic clip for superior bumper trim cover	77 03 072 361	2

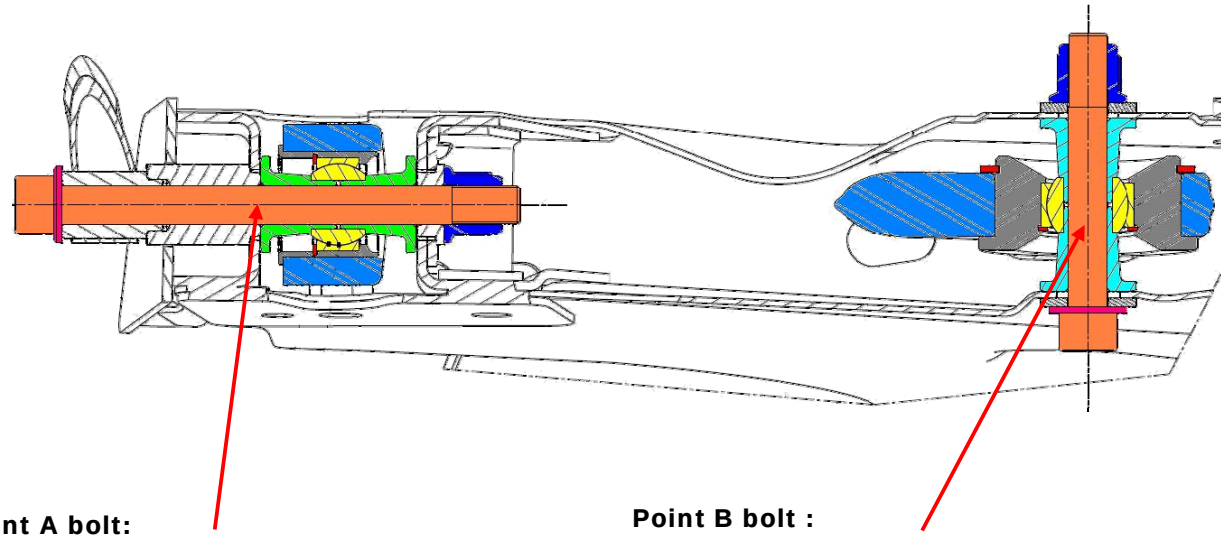
4.7.2 NEW WISHBONE MOUNTING

The wishbones can only be purchased with their A and B casings already fitted. You only have to mount the ball joints 77 11 128 370 :

- Fit the snap ring 77 11 162 563 in its groove (B casing)
- Heat the casing (oven) et cool the ball joint (freezer)
  Do not heat the complete wishbone more than 100°C not to damage the point E ball joint.
- Fit the ball joint using a pressing machine leaning on the external ring of the ball joint, without glue (If you do not have a press, a vice should be sufficient)
- Fit the snap ring 77 11 128 850
- Repeat this procedure for the 3 other ball joints

! WARNING ! Without either heating the casing or cooling the ball joint, you could damage the parts because of too important force. Be careful to not deform the inner shoulder of the B casing.

To ease the understanding of the fitting on the car, hereafter is a cut view of a left wishbone mounted on the subframe :



Point A bolt:

Screw :	77 11 162 527
Under head washer :	77 11 156 931
Locknut :	77 03 034 115
Tightening torque :	**80 N.m**

Point B bolt :

Screw :	77 11 156 908
Under head washer :	77 11 156 931
Locknut :	77 03 034 115
Tightening torque :	**80 N.m**

4.7.3 EXTERNAL MIRRORS

The external mirrors directly take place instead of the old ones:

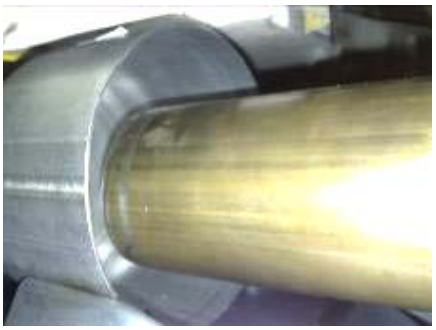
- Use the fasteners of the old ones (2 x 3 screws).
- Fit the shell, mirror pulled down.

4.7.4 DIFFUSER

- Fit the external nozzles 77 11 162 534 on the diffuser :

- Fit the ducts 77 11 162 533 using the 6 screws 77 03 008 211 and the 6 nuts 77 03 046 151 :
  (Recommended glue : Loctite® 222 low strength threadlock)

- Cut right the exit of the silencer tubes starting from the bottom of the genuine bevel :



Recovering distance in the duct between 20 and 30 mm

- It is allowed to cut the screws in front of the duct to prevent from a possible contact with the silencer tubes :

- Fit the diffuser on the car. Fasteners are the same as the ones used for the old one (new fasteners included) :

4.7.5 FRONT HEADLIGHTS

The front headlights directly take place instead of the old ones.

- Change the plastic nut 77 03 081 222 on each side :

- Fit the bumper supports on the headlights using 4 rivets 77 03 072 419 (2 per headlight):

- Use the fasteners of the old ones (2 x 3 screws).
- Connect the headlight to the front wiring loom.
  ! The connector of the left headlight is reversed compared to the old one!

4.7.6 FRONT BUMPER

- Get back the 3 fences of the old bumper.
- Fit the towing hook.
- Fit the Renault ensign using the 2 screws of the old ensign :

- Fit the plastic central fence 77 11 162 536 on the bumper.
- Fit the superior bumper trim cover on the bumper.

- Fasten definitively the superior trim cover 77 11 162 546 using the 4 rivets 77 03 072 322 and the 2 plastic clips 77 03 072 361 :

Rivets on superior face

Plastic clip on inferior face

- Fit the inferior bumper trim cover 77 11 162 547 on the plastic central fence.
- Fasten the inferior trim cover using the 8 screws 77 03 017 101 :

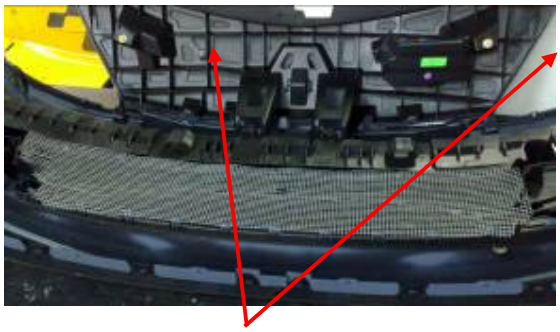
- Fit the new aerodynamic blade (in 2 parts) on the bumper and fasten it definitely using 4 rivets 77 03 072 419 :

- Bend the 2 brackets of the inferior deflector:

- Fit the deflector using the 10 rivets 77 03 072 419 :



- Fit the old central fence using plastic collars:



- Fit the 2 plastic retainers 82 00 700 969 on the front bumper:

- Fit the 2 old anti-fog light fences (glue, plastic collars or star rivets) on the anti-fog light covers :

- Fit these covers on the bumper.
- Fit the bumper on the car. Fasteners are the same as the ones used for the old one.

- Cut the inferior part of the towing hook plastic trap door:

- Fit the strap on the bumper using a velcro type fastener :

It is forbidden to paint all parts in genuine shiny black paint.
The anti-fog light and central fences are mandatory.

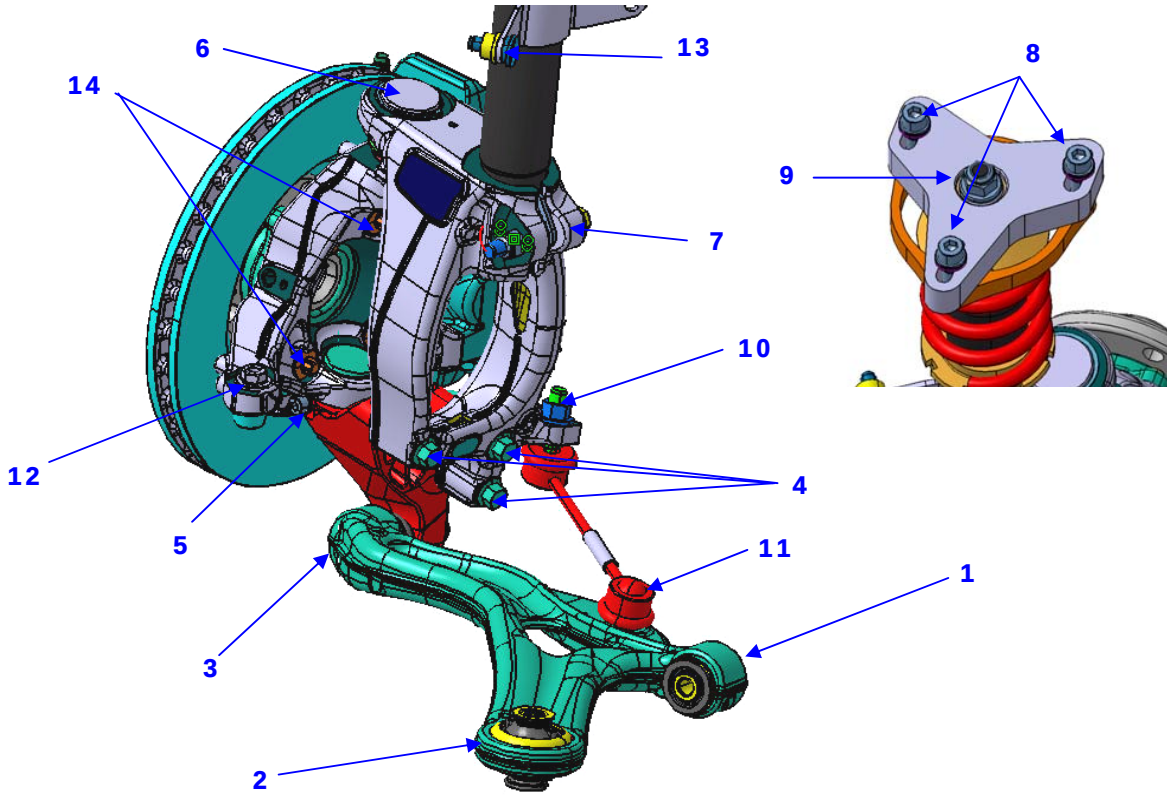
NOTA : *It is possible to use a standard rivet with a dished washer, in case you would not have any star rivet:*

4.8 TIGHTENING TORQUES

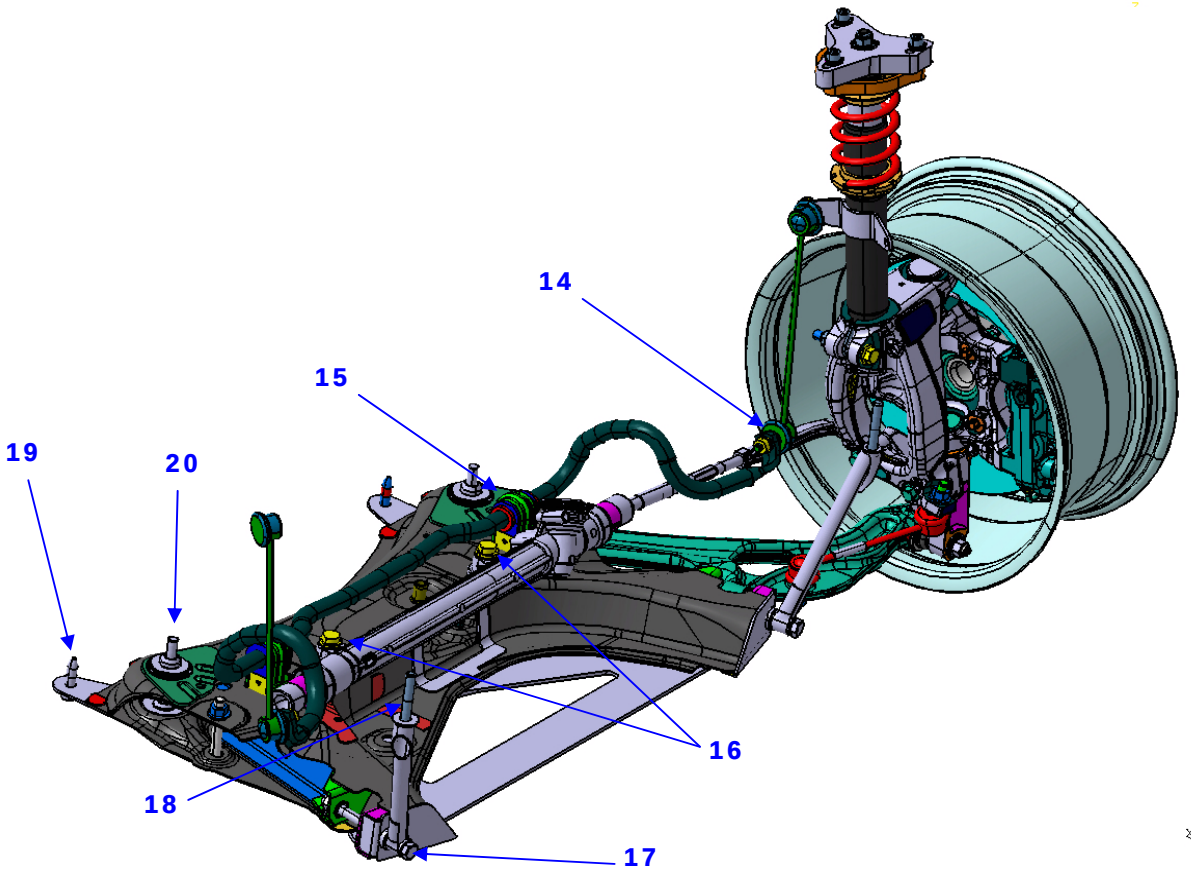
Parts	Tightening torques in Nm	Specific recommendations
FRONT AXLE		
Wheels		
Wheel studs	**100**	Copper grease
Wheel nuts	**110**	
Wheel speed sensor	**8 to 10**	
Drivetrain nut	**280**	
Damper system		
Upper shock absorber nut	**100**	
Point F plate bolt on body	**100**	
Support strut mounting bolt on pivot holder	**105**	
Pivot holder		
Point E nut	**105**	Bolt class: 12.9
EE' support		
Mounting bolt on pivot holder	**140**	
Ball joint E' mounting bolt	**26.5**	
Wishbone		
Point A bolt	**80**	
Point B bolt	**80**	
Subframe		
Aluminum plate mounting bolt on subframe	**100**	
Connecting torque rod mounting bolt on GB yoke	**105**	
Connecting torque rod mounting bolt on subframe	**105**	
Bolts for points P and P'	**120**	
QQ' tie-rod mounting bolts to body	**105**	
QQ' tie-rod mounting bolts to subframe	**80**	

Anti-roll bar tie-rod mounting bolts	**44**	
Point H nut	**37**	
Anti-rotation tie-rod mounting bolt on wishbone	**100**	
Anti-roll bar		
Bearing mounting bolts on subframe	**21**	
Anti-roll bar tie-rod nut	**44**	
REAR AXLE		
Wheel		
Wheel bolt	**110**	
Hub		
Spindle nut	**220**	
Damper system		
Upper mounting bolt	**80**	
Lower mounting bolt	**105**	
Rear axle		
Bearing mounting bolt on body	**62**	
Nut for bearing mounting bolt on rear axle	**125**	
Plate spindle on axle	**71**	
Brake hose nut	**14**	
STEERING		
Axial ball joint		
Axial ball joint	**50**	
Point H ball joint nut	**37**	
Wheel alignment locknut	**53**	
Steering unit		
Steering unit mounting on subframe	**105**	
Folding yoke cam bolt	**24**	
Steering column		
Column mounting bolt on roll cage crossmember	**105**	
Sheath bolt	**21**	
Sheath mounting bolt on roll cage stays	**21**	
Intermediate shaft mounting bolt on column	**34**	
Wheel hub bolt	**44**	

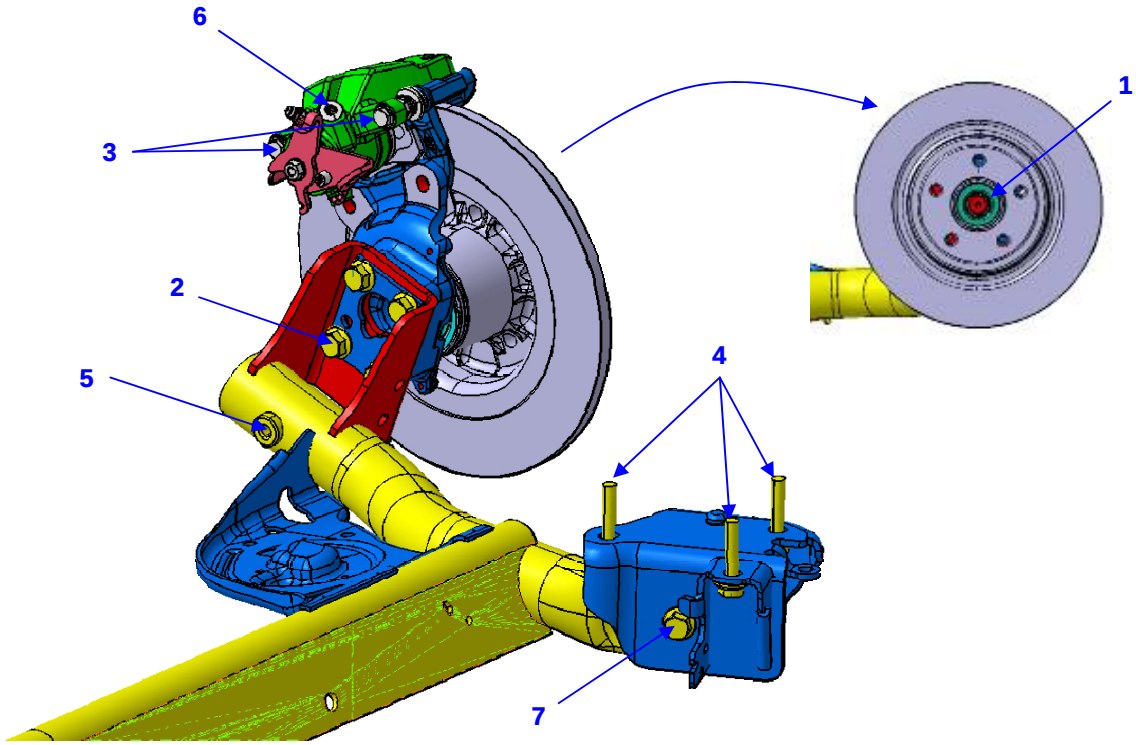
Electric power steering		
Module mounting bolt on steering column	**6**	
BRAKING SYSTEM		
Front brake caliper		
Brake caliper mounting bolt on pivot	**164**	
Brake hose banjo bolt	**14**	
Bleed screw	**5 to 8**	
Front disc		
Disc bolt	**21**	
Rear brake caliper		
Brake caliper mounting bolt on axle	**105**	
Brake hose nut	**14**	
Rear disc		
Spindle nut	**220**	
Master cylinder		
Mounting bolt on brake booster	**23**	
M10 x 100 master cylinder outlets	**13**	
Braking amplifier		
Mounting bolt on bulkhead	**21**	
Spacer mounting bolt	**21**	
Rear brake limiter		
Lines on brake limiter	**13**	



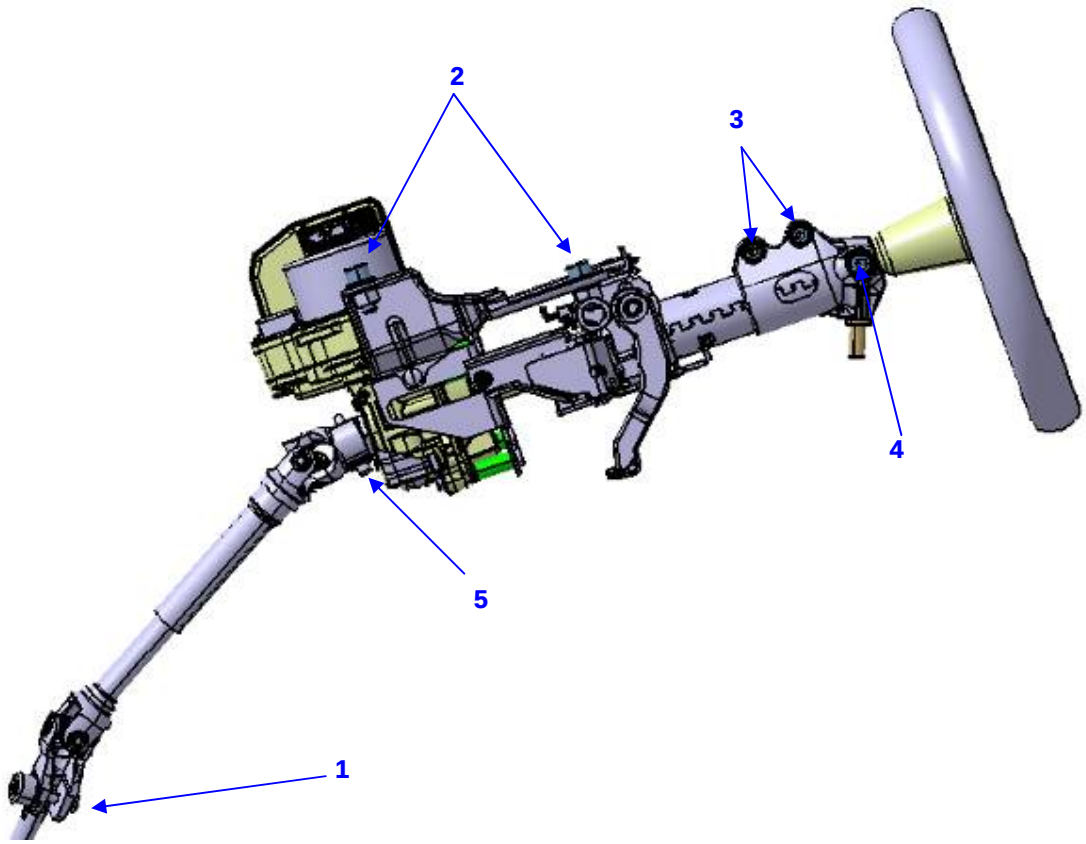
	Parts	Tightening torque in Nm	Specific recommendations
(1)	Point A bolt	**80**	
(2)	Point B bolt	**80**	
(3)	EE' support nut on wishbone (point E)	**105**	Bolt class: 12.9
(4)	EE' support bolt on pivot holder	**105**	
(5)	EE' support bolts on pivot (point E')	**26.5**	
(6)	Pivot ball joint nut on pivot holder (point F')	**140**	
(7)	Support strut bolt on pivot holder	**105**	
(8)	Point F plate bolt on body	**100**	
(9)	Upper shock absorber nut	**105**	
(10)	Anti-rotation tie-rod mounting bolt on pivot holder	**100**	
(11)	Anti-rotation tie-rod mounting bolt on wishbone	**100**	
(12)	Point H ball joint nut	**37**	
(13)	Anti-roll bar tie-rod mounting bolt on support strut	**44**	
(14)	Wheel bearing mounting bolt	**105**	



	Parts	Tightening torque in Nm	Specific recommendations
(14)	Anti-roll bar mounting bolt on tie-rod	**44**	
(15)	Anti-roll bar bearing bolts on subframe	**21**	
(16)	Steering unit mounting bolt on subframe	**24**	
(17)	QQ' tie-rod bolt on subframe	**80**	
(18)	QQ' tie-rod bolt on body	**105**	
(19)	Reinforcement plate mounting bolt on body (point P')	**120**	
(20)	Rear subframe mounting bolt on body (point P)	**120**	



	Parts	Tightening torque in Nm	Specific recommendations
(1)	Spindle nut	**220**	
(2)	Hub carrier bolt on axle	**71**	
(3)	Small column bolt	**32**	
(4)	Bearing mounting bolt on body	**62**	
(5)	Lower shock absorber mounting bolt	**105**	
(6)	Brake hose nut	**14**	
(7)	Nut for bearing mounting bolt on rear axle	**125**	



	Parts	Tightening torque in Nm	Specific recommendations
(1)	Folding yoke cam bolt	**24**	
(2)	Column mounting bolt on roll cage crossmember	**105**	
(3)	Sheath bolt	**21**	
(4)	Sheath mounting bolt on roll cage stays	**21**	
(5)	Intermediate shaft mounting bolt on column	**34**	