

CLIO UP







4 CHASSIS

CONTENTS

<u>4</u> C	CHASSIS	1
4.1	SETUP	2
4.2	FRONT AXLE	3
4.2.1	PRESENTATION AND CHARACTERISTICS	3
4.2.2	2 GEOMETRY INSPECTION	6
4.2.3	3 GEOMETRY VARIATIONS	8
4.2.4	ADJUSTMENT OF GEOMETRY	9
4.2.5	5 FRONT LOAD-BEARING COMPONENTS	10
4.2.6	6 WHEEL PASSAGES	19
4.3	REAR AXLE	21
4.3.1	I PRESENTATION AND CHARACTERISTICS	21
4.3.2	2 GEOMETRY VARIATIONS	23
4.3.3	3 ADJUSTMENT OF GEOMETRY	24
4.3.4	A REAR LOAD-BEARING COMPONENTS	26
4.4	STEERING	29
4.4.1	I STEERING UNIT	29
4.4.2	2 INTERMEDIATE SHAFT	33
4.4.3	3 STEERING COLUMN	34
4.4.4	ELECTRIC POWER SYSTEM	36
4.5	BRAKING SYSTEM	39
4.5.1	I CHARACTERISTICS	39
4.5.2	2 FRONT BRAKES	40
4.5.3	3 REAR BRAKES	43
4.5.4	A BRAKING CIRCUIT	47
4.6	WHEELS AND TYRES	53
4.6.1	I CHARACTERISTICS	53
4.7	TIGHTENING TORQUES	54

4.1 SETUP

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



4.2 FRONT AXLE

4.2.1 PRESENTATION AND CHARACTERISTICS

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









Hinges

- Wishbones (6):
 - Subframe side: by flexible connector.
 - 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





Measuring the rear body height

Ground projection under subframe

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

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







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 tierod **(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

A

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

- <u>Removal</u>

Operations	Photos
1 - Remove the wheel.	
2 - Remove the upper mounting nut (2) of the anti-roll bar tie-rod.	2
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.	3
6 - Remove the upper mounting nut (3) .	0
7 - Remove the fitted support strut.	

- <u>Refitting</u>

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



- 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

10 - Remove

13 - Remove

<u>Removal</u> -

	Operations	Photos
1 -	Remove the wheel.	2
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.	AND THE REAL PROPERTY AND
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.	4
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

- <u>Removal</u>

Operations

- **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.
 - <u>Refitting</u>

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

- <u>Removal</u>







- <u>Refitting</u>

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

<u>Note:</u> 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: 70Nm.

Wishbone flexible bushings



If the point A bearing is replaced, the replacement part must be fitted in the same position: the shoulder area on the bearing must rest on the wishbone ribbing **(1)**.

If the point B flexible bearing is replaced, it must be fitted in the same direction of assembly: the two fins **(1)** must be positioned perpendicular to the vehicle's x-axis.



Subframe

- <u>Removal</u>



Δ

- 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.



- Preparing the subframe before refitting
- 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
- Carry out a clearing around the screw head to allow the access of a 6 sides bushing (18mm)

Any other modification is not allowed



- <u>Refitting</u>

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

- <u>Removal</u>



- <u>Refitting</u>

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.







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.





4.3.2 GEOMETRY VARIATIONS

Roll center height variation



Per-wheel camber variation



Per-wheel alignment variation



0mm for 110 mm body height



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.



		Camber shims			А	lignmen	t shims		
	No shim	10′	20′	30′	1°	10′	20′	30′	1 °
Camber	-1°23′	-1°33′	-1°42′	-1°52′	-2°21′	-1°26′	-1°28′	-1°31′	-1°40′
Alignment	0°21′	0°24′	0°26′	0°30′	0°37′	0°11′	0°02′	-0°07′	-0°36′

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.



Shim references

	Angle	Reference no.
	10'	77 11 160 176
Combox	20′	77 11 160 175
Calliber	30′	77 11 160 174
	1°	77 11 160 173
	10'	77 11 160 172
Wheel	20′	77 11 160 171
alignment	30′	77 11 160 170
	1°	77 11 160 169



4.3.4 REAR LOAD-BEARING COMPONENTS

Hub

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

Damper system

- <u>Removal</u>

Operations	Photos
 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) .	1
5 - Remove the damper system.	2

- <u>Refitting</u>

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

- <u>Removal</u>

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

- <u>Refitting</u>

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



- Reassembly

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



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.



- <u>Removal</u>



- <u>Refitting</u>

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)**.



Right ball joint unit



Tightening torques:

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

Steering unit

- <u>Removal</u>

Operations

- Remove the subframe (see 4-2 Front **1** 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)**.





- <u>Refitting</u>

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

- <u>Removal</u>

	Operations	Photos
1 - Remove the	e folding yoke bell (1) (discard).	
2 - Set the whe	eels straight.	
3 - Remove the	e folding yoke bolt (7) (discard).	
4 - Remove the	e folding yoke nut (discard).	
5 - Remove th column.	ne intermediate shaft bolt (8) on	n the
6 - Remove the	e intermediate shaft (9) .	

- <u>Refitting</u>

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

- <u>Removal</u>

г

	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.	一人的犯
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.	2
10 -	Remove the extinguisher jet attachment lug (4).	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.	Store and
	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).	STATISTICS STATISTICS

0

- <u>Refitting</u>

- **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 recalibrating 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.



- <u>Removal</u>

 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.	34-14
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).	

- <u>Refitting</u>

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

- <u>Removal</u>

Operations	Photos
Push back the pistons. 1 - M 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.	

- <u>Refitting</u>

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.

- <u>Removal</u>

Operations

- 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.



- <u>Refitting</u>

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

- <u>Removal</u>

Operations

Push back the pistons.

- 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.

Photos





- <u>Refitting</u>

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** $\frac{1}{1000}$ 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.
- <u>Removal</u>



- <u>Refitting</u>





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.

- <u>Removal</u>





- <u>Refitting</u>

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.

Tightening torques:

- 7 • Small column bolts: **32Nm**.
 - Brake hose: 14Nm.

Hub disc

- <u>Removal</u>

	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).	



- <u>Refitting</u>

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

- <u>Top-up</u>

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

- <u>Removal</u>

Operations

- **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.

Photos





- <u>Refitting</u>

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
- <u>Removal</u>

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).	
Remove the dual safety coupling shaft (5) 4 - between the braking amplifier thrust rod and the brake pedal.	
5 - Remove the braking amplifier mounting nuts (9)	$// \mathcal{O}_{\mathcal{O}} \setminus \mathcal{O}_{\mathcal{O}}$
6 - Remove the braking amplifier.	
7 - Remove the braking amplifier spacer mounting bolts (10).	
8 - Remove the braking amplifier spacer.	



- <u>Refitting</u>

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

- <u>Removal</u>



- <u>Refitting</u>

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).

0 arear	Brake	5
P BRAKEP 1 bar	50 %	R BRAKEP Ö bar
9.0%	74%	50%
Front		Rear



<u>Removal</u>

Operations

1 - Unscrew the connectors **(1)** (allow for brake fluid discharge).

2 - Remove the mounting bolts **(2)** and the wastegate.

- <u>Refitting</u>

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



4.6 WHEELS AND TYRES

4.6.1 CHARACTERISTICS

Wheels

Material: Aluminum/magnesium alloy.

	Α	В	С	D	E
Wheel type	Width (inches)	Wheel rim profile	Nominal \emptyset under tyre bead (inches)	Number of holes	ET offset
8J×17	8	J	17	5	68

<u>Maximum offset</u>: 0.3mm measured on the wheel rim. <u>Maximum out-of-round</u>: 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	S9B	P2C
Туре	Rear	S9B	P2C
Dimonsions	Front	20/61-17	20/62-17
Dimensions	Rear	20/61-17	20/62-17
Cold inflation	Front	1.6*	1.7*
pressure (bar)	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 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	70	
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	70	
(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	