

# NEW FORMULA RENAULT 2.0



2010



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RENAULT SPORT



# NEW FORMULA RENAULT 2.0 :



# A WORTHY SUCCESSOR

**Decidedly modern with flowing, sensual lines, New Formula Renault 2.0 has been designed to give young drivers aiming to graduate to Formula 1 the perfect tool to hone their talent. Successor to the best-selling single-seater in the world, this new generation race car has been developed and manufactured by Renault Sport Technologies. The car will make its competitive debut in 2010 in the Eurocup Formula Renault 2.0 and national championships.**

Formula Renault has been an essential stage in the career of many young drivers for close to thirty years. Alain Prost, René Arnoux, Didier Pironi and more recently, Kimi Räikkönen, Lewis Hamilton, Robert Kubica and Felipe Massa all made a name for themselves in Formula Renault at the start of their careers. The 2010 season will see the competitive debut of New Formula Renault 2.0, devised and designed by Renault Sport Technologies to give young drivers the chance to learn about a race car with features and handling similar to those used in the more prestigious categories.

The honeycomb and carbon-fibre monocoque is the first to be awarded the FIA F3 2011 homologation. Studied using wind tunnel tests and CFD (Computational Fluid Dynamics), the car's aerodynamic downforce is significantly greater than that of its predecessor, enabling it to corner at higher speeds.

The 210bhp 4-cylinder 2.0-litre 16V engine, derived from Clio III Renault Sport Phase 2, is combined with a seven-speed sequential gearbox with electric steering wheel mounted paddles. New Formula Renault 2.0 therefore comes with a transmission system that was previously unavailable for race cars in this category or at this price. The new gearbox offers drivers the opportunity to grapple with the kind of system they will encounter throughout their racing careers, right up to the dizzy heights of F1.

Fitted with adjustable twin-tube shock absorbers, the suspension system features two conventional solutions: single shock absorber at the front and double shock absorber at the rear. Michelin has custom-developed wider tyres for the car. New Formula Renault 2.0 is now able to complete 200 kilometres on the same set of tyres.

The new car's braking system reveals another of its strengths. Identical on all four wheels, the floating



brake disc system with four-piston calipers offers greater performance and durability.

A key ingredient in modern motorsport, particular attention has been paid to the car's onboard electronics. Engine and gearbox management is handled by an ECU that may only be accessed by Renault Sport. A second unit manages data acquisition, which makes full use of the car's built-in sensors. The new steering wheel, featuring a built-in colour dashboard display, provides drivers and teams with a wealth of information.

A development programme covering over 6,000 kilometres, led by Renault Sport Technologies' technical teams and the drivers Filipe Albuquerque, Alvaro Parente and Andy Soucek, clearly demonstrated the car's improved performance levels.

New Formula Renault 2.0 calls upon deft driving skills, very similar to those needed to drive a Formula Renault 3.5. Thanks to its optimized design, incredible reliability and a reduced number of spare parts, New Formula Renault 2.0's running costs have been cut by 10%. Assembled at the Alpine plant in Dieppe, the race cars undergo thorough inspection and road testing prior to delivery. New Formula Renault 2.0 is available in race-ready configuration at €57,500 excl. tax. It is set to make its competitive debut in 2010 in the Eurocup Formula Renault 2.0 and national championships.

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## SECTION 1

# FORMULA RENAULT

## A CATEGORY ROOTED IN THE HISTORY OF MOTORSPORT



**Since its official launch in 1971, Formula Renault has become an essential stage in the career of any talented young driver hoping to reach the upper echelons of motorsport. Alain Prost, Lewis Hamilton, Kimi Räikkönen and Felipe Massa, not to mention many other F1 drivers, have all graduated from racing in Formula Renault.**

It all started back in 1968, when the French Motorsport Federation, the FFSA, launched Formule France, with a Gordini-powered single-seater race car. Three years later, the category was taken over by Renault, who renamed it Formula Renault. On French tracks, the burgeoning talents of Jacques Laffite, Patrick Tambay and many others were unveiled during some memorable early races.

In 1975, the formula moved onto the international scene: Formula Renault Europe was created, with René Arnoux winning the title ahead of Jean Ragnotti. The following year, Alain Prost became French Champion, winning an incredible 12 races out of 13, whilst Didier Pironi claimed the European crown. The category's reputation was growing – it was already the best way to access the world of F1.

Normally-aspirated or turbocharged engine, unrestricted or single-brand chassis: the formula has just gone from strength to strength as the years have

gone by and the car has evolved. The name Formula Renault has become familiar to all motorsport fans.

In 2000, the formula made a major breakthrough with the introduction of the current Formula Renault 2.0. That year, a certain Kimi Räikkönen won the Formula Renault 2.0 UK championship and created a stir when he went straight into Formula 1!

Between 2000 and 2009, Formula Renault 2.0 became the best-selling single-seater in the world, with 950 chassis produced and championships organized throughout the world. Designed to build on this success, New Formula Renault 2.0 will make its official competitive debut in 2010.

PAST WINNERS OF THE EURO CUP FR 2.0	
2009	Albert Costa
2008	Valtteri Bottas
2007	Brendon Hartley
2006	Filipe Albuquerque
2005	Kamui Kobayashi
2004	Scott Speed
2002	Eric Salignon
2001	Augusto Farfus
2000	Felipe Massa
1999	Gianmaria Bruni
1998	Bruno Besson
1997	Jeffrey van Hooydonk
1996	Enrique Bernoldi

## SECTION 2

# STYLING & AERODYNAMICS: A SENSUAL, SMOOTH RACE CAR

New Formula Renault 2.0 is a totally new race car. Whilst maintaining a strong Renault Sport identity, especially thanks to the F1-inspired front splitter, the car's sensual, flowing lines lend it a distinctive look.



## A STRONG IDENTITY

Devised by Renault Design in conjunction with Renault Sport Technologies, New Formula Renault 2.0's most striking feature is its sensual, flowing exterior design. Instantly recognizable, the car's strong identity speaks volumes about its pedigree, with a perfect balance between style and aerodynamic efficiency.

The F1-inspired front splitter, also featured on Formula Renault 3.5 and Mégane Trophy, makes it clear that this is a Renault Sport.

The design integrates the constraints required by the 2011 FIA F3 safety standards. New Formula Renault 2.0 is the first single-seater to meet the necessary criteria, including a new rear crash box and a neck restraint combined with the removable bucket seat.



## MORE AERODYNAMIC DOWNFORCE MEANS BETTER CORNERING PERFORMANCE

New Formula Renault 2.0 makes use of the latest advances in technology to achieve outstanding aerodynamic performance. As is the case on all modern race cars, downforce is generated by the adjustable front and rear wings and by the combination of undertray and diffuser, which pin the car to the track by accelerating the airflow beneath the car.

The aerodynamic options selected for New Formula Renault 2.0 were confirmed following extended wind tunnel testing, initially on a model 30% of full size and then on a full-scale prototype. Aerodynamic efficiency was equally optimized using CFD, a cutting-edge technology used by Renault F1 Team and by Renault Sport Technologies on Mégane Trophy. CFD (Computational Fluid Dynamics) involves studying the movements of a fluid, or their effects, by using computers to solve the equations governing the fluid.

New Formula Renault 2.0 aerodynamic characteristics also promote better cornering performance. As the car is more sensitive to setup adjustment than its predecessor, the drivers will need to describe its handling very precisely and work in very close conjunction with their engineer in order to define the optimum setup for each track, a habit which will serve them well for the rest of their racing careers.





### SECTION 3

## CHASSIS SYSTEMS AND GROUND LINK TECHNOLOGY: OUT-AND-OUT PERFORMANCE

The honeycomb and carbon-fibre monocoque benefits from Renault Sport Technologies' extensive know-how in chassis design. Bringing together perfect mass distribution and compliance with the strictest safety standards, New Formula Renault 2.0's chassis has been designed to combine efficiency and quality.

### A STRUCTURAL DESIGN INTENDED TO KEEP COSTS DOWN

New Formula Renault 2.0 has been designed based on a carbon-fibre monocoque that complies with the 2001 FIA F3 standards, with self-supporting engine and gearbox. All of the bodywork parts are equally made of carbon fibre. The car is therefore able to boast an ideal weight distribution, with 43% at the front. The kerb weight of the race car is just 505kg.

Always determined to cut running costs, Renault Sport Technologies and its technical partners have designed a race car that makes it easier for mechanics to carry out work rapidly. For example, the undertray is divided into three parts. In the event of an accident, it is therefore possible to change just the damaged

part. This approach to the design also makes it easier to access the various mechanical components..

### HANDLES LIKE A "MINI F1"

A race car must offer perfect roadholding, the aim being to constantly improve cornering speed. To improve its handling, New Formula Renault 2.0 has been fitted with the latest in adjustable twin-tube shock absorbers at the rear, whilst the front suspension uses a single shock absorber.

Several possibilities are available for independent adjustments to the setup: ride height, wheel alignment, anti-roll bar, roll centre height and anti-squat.

Capable of cornering at higher speeds and requiring



more precision and subtlety from drivers, New Formula Renault 2.0 delivers significantly better performance than its predecessor.

The on-track handling is very close to that of its “big sister”, Formula Renault 3.5. The driving style needed for the two Renault Sport cars is very similar. In an effort to put together a driver development programme guiding the most promising drivers all the way to Formula 1, there will be a natural and easy progression from New Formula Renault 2.0 to Formula Renault 3.5.

### NEW TYRES FROM MICHELIN

To exploit its full potential, Michelin has custom-developed tyres for New Formula Renault 2.0. The tyres are wider than on the previous version – 20/54–13 at the front and 24/57–13 at the rear – further improving the car’s balance. The lifespan of the tyres has also been significantly lengthened, which can now cover up to 200 kilometres on the track. Consequently, fewer set of tyres are required for a season.



### MORE POWERFUL BRAKING SYSTEM

Braking is a strong point on all Renault Sport cars. Consistent with the cost-cutting approach pursued elsewhere on the car, the design office engineers selected the same components for the front and rear brakes, using discs with 4-piston calipers. The effectiveness of the braking system has been increased by using floating discs, which produce a reduction in friction and unsprung mass. It is therefore possible to brake harder and later than on the previous generation of race car.



## SECTION 4

# ENGINE AND GEARBOX: MIXING IT WITH THE BIG BOYS

New Formula Renault 2.0 is fitted with a brand new engine and gearbox. The 210bhp 2.0–litre 16V engine is combined with a seven–speed sequential gearbox with electric steering wheel mounted paddles. A first for a Renault Sport–branded race car.

### A NEW 210BHP 2.0–LITRE 16V ENGINE

New Formula Renault 2.0 takes its four–cylinder, 2.0–litre normally–aspirated engine from Clio III Renault Sport Phase 2. Although this engine develops twenty more horsepower than on the current FR2.0, it remains close to the production version. Specific preparation for the racing version involved the addition of a dry sump, a new oil pump and reinforced connecting rod bolts. It was possible to keep the production intake manifold and motorized throttle valve, however, when the engine was integrated in the car.

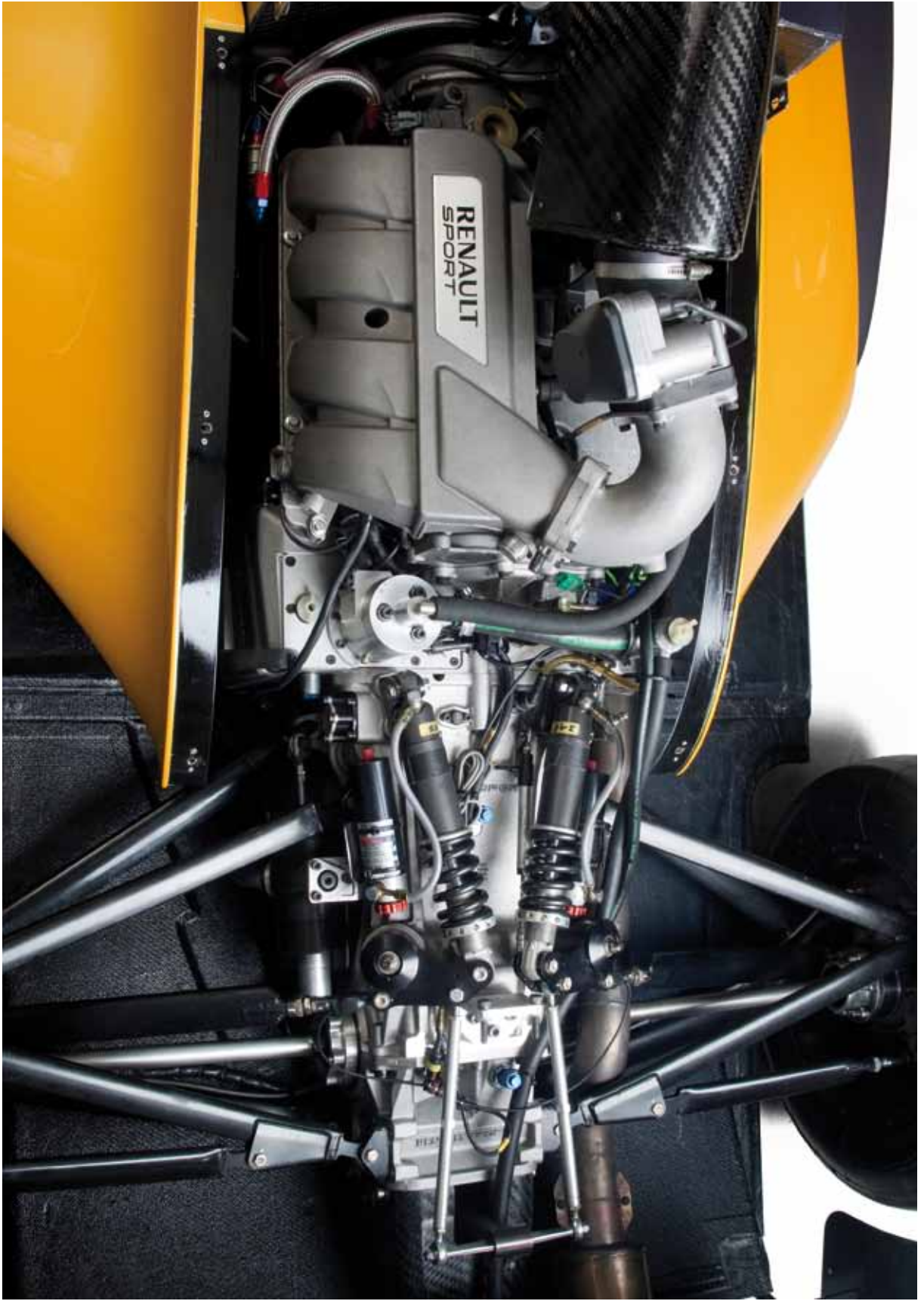
Aside from the engine’s performance, reliability was given special attention during the research and development conducted by Renault Sport Technologies. Over 5,500 kilometres of testing were successfully completed – equivalent to the theoretical lifespan of an engine – without the slightest problem.



### F1–STYLE TRANSMISSION

The most significant innovation lies in the transmission: New Formula Renault 2.0 is fitted with a seven–speed, sequential gearbox with steering–wheel mounted paddles. Drivers taking their first steps in motor racing will therefore get used to a system that is similar to that used at the highest level of the sport, in Formula 1.

Electric controls, via an actuator, not only enable quicker gear changes but are also much simpler to use and facilitate quicker maintenance operations. The seven–speed gearbox only requires one gear ratio setting for the entire season, which reduces costs even further. For tracks with a very high maximum speed, such as Monza, a longer seventh gear is available.



## SECTION 5

# ONBOARD ELECTRONICS: MORE MODERN AND MORE PRECISE

Particular attention has been paid to New Formula Renault 2.0's onboard electronics, with a new ECU, built-in sensors and new data acquisition software.

### TWO ELECTRONIC UNITS AT THE CORE OF NEW FORMULA RENAULT 2.0

Renault Sport Technologies has totally redesigned New Formula Renault 2.0's onboard electronic management system so as to improve the car's performance and make it easier to operate as well as ensuring that competitors are treated perfectly equally from a technical point of view.

The race car is now equipped with two ECUs. The first, which may only be accessed by Renault Sport Technologies' engineers, manages engine and gearbox operations. Inspections are thus made easier, ensuring the sporting equity of events.

The second ECU is devoted to data acquisition. Combined with the Pi Toolbox suite, the gold standard of data analysis software used in motor racing, this ECU can be used to access all of the car's data. More modern and easy-to-use, this new data acquisition system makes life even easier for drivers and engineers alike.

New Formula Renault 2.0 also comes with built-in chassis sensors, enabling the teams to access even more parameters.

### THE LATEST IN STEERING WHEEL TECHNOLOGY

The new steering wheel, equipped with a colour dashboard display, gives drivers and teams access to a wealth of information. Several screens are devoted to technical diagnostics. It is therefore possible to identify the source of a problem immediately without needing to use the data acquisition software.

The driver is able to switch between two screens whilst driving, each offering a variety of information. It is also possible to download and view the track map. The driver can – in real time – compare his/her lap times with a reference time, which can either be his/her best lap time, or the best time of another driver.



## SECTION 6

# EVEN GREATER SAFETY

Driver safety remains Renault Sport Technologies' no.1 priority. New Formula Renault 2.0 is the first single-seater race car to have been designed in accordance with the 2011 FIA F3 standards. With a finish that is equally remarkable, this race car looks certain to set new standards in its category.

### OPTIMUM SAFETY

Safety is a key strategic goal for Renault Sport in the development of its cars, and special care has been taken to afford New Formula Renault 2.0 drivers the best possible protection in the event of an accident.

New Formula Renault underwent a series of demanding tests to ensure it complied with the latest safety standards set out by the FIA:

- Static load test then crash test on the front and rear crash boxes
- Crash tests on the steering column
- Crash box pull-off resistance tests
- Static load test on the safety roll cage
- Pull-off resistance test on the safety roll cage

New Formula Renault 2.0 also comes with wheel-retention cables, a removable seat and a neck restraint to protect the driver's head.

### A REMARKABLE FINISH

Everything has been designed to make life easier for drivers and teams. From the comfort of the bucket seat designed to accommodate the HANS system, the driver has all the key data to hand on the display built into the steering wheel. The pedals can be removed easily, which means they can be adjusted from the outside.

A series of carefully thought-out details help to reduce the time needed to carry out work on the car. For example, it is possible to change the clutch without removing the clutch case. It is also possible to change the engine without having to interchange the powertrain/oil tank.

New Formula Renault 2.0 will be assembled at the Alpine plant, in Dieppe. It will be road-tested and tuned prior to being delivered in race-ready configuration.



## TECHNICAL DATA SHEET

CHASSIS	
<b>Type</b>	Honeycomb and carbon fibre monocoque
<b>Bodywork</b>	Carbon-fibre
<b>Aerodynamic features</b>	Front and rear wings, diffuser
ENGINE	
<b>Layout</b>	Self-supporting engine and gearbox
<b>Type</b>	Renault F4R 832 – 4 cylinder – 16 valve – 1,998cc – 1998 cm
<b>Bore x stroke</b>	82.7 x 93mm
<b>Fuel injection/ignition</b>	Built-in management system
<b>Maximum power</b>	210bhp at 7,150rpm
<b>Maximum torque</b>	220Nm at 5,500rpm
<b>Max. engine speed</b>	7,500rpm
TRANSMISSION	
<b>Type</b>	Rear-wheel drive
<b>Gearbox</b>	Sequential, 7-speed + reverse
<b>Gearshift</b>	Electric semi-automatic steering wheel mounted
<b>Differential</b>	Limited slip, auto-locking differential with clutch discs and ramp pressure plates
<b>Clutch</b>	Cerametallic twin-disk
AXLES AND SUSPENSION SYSTEMS	
<b>Suspension</b>	Front: single adjustable twin-tube shock absorber Rear: double adjustable twin-tube shock absorber
<b>Brakes</b>	278 x 18mm floating discs and 4-piston callipers
WHEELS	
<b>Wheel rims</b>	One-piece aluminium wheel rims, 9 x 13 (front) and 10.5 x 13 (rear)
<b>Tyres</b>	Michelin tyres, 20-54 x 13 (front) and 24-57 x 13 (rear)
DIMENSIONS, WEIGHT AND CAPACITIES	
<b>Length</b>	4,391 mm
<b>Front and rear track</b>	1502 – 1440 mm
<b>Fuel tank</b>	50 litres
<b>Kerb weigh</b>	505 kg
PRICE	
<b>Full car</b>	€57,500 excl. tax (price subject to entry in a Renault Sport championship)



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