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The New Toyota Corolla

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The new generation Toyota Corolla Touring Sports makes its first public appearance at the 2018 Paris Motor Show, joining the Corolla Hatchback that was unveiled in Geneva earlier this year. The all-new Corolla, built at Toyota's Burnaston factory in the UK, has a more dynamic look with stronger differentiation between the compact, sporty hatch and the sleek, refined Touring Sports wagon.

The Touring Sports body style, created and developed in Europe, is a key model for fleet sales, commanding a growing share of the market.

Toyota has more than 20 years of hybrid technical leadership and has amassed more than 12 million global hybrid vehicle sales – including 1.5 million in Europe. The 2018 Corolla establishes another landmark in its development of the technology with the debut of Toyota's dual hybrid strategy, adding a new 2.0-litre self-charging hybrid electric powertrain to the range.

Toyota has responded to feedback from potential customers who want more power when driving a hybrid car, moving to offer its core models with a choice of two hybrid powertrains. One has all the established strengths of Toyota's fourth generation system, including improved responsiveness, more linear acceleration, fuel efficiency and a relaxing drive; the other builds on these qualities with more power on demand, effortless acceleration and more dynamic, "fun to drive" characteristics.

Both the Hatchback and Touring Sports will be available with a single conventional engine option – a 114bhp 1.2-litre turbo petrol unit. The hybrid choices will be 120bhp 1.8 litre or 178bhp 2.0-litre systems.

The 1.8 delivers everything customers have come to expect from a self-charging Toyota hybrid electric powertrain: quiet, intuitive and responsive performance with low cost of ownership and greater reliability than any conventional car engine. The system provides outstanding fuel economy and low CO_2 emissions and doesn't require connection to a power source for recharging.

The 2.0-litre system rewards customers with all the benefits above while also offering a more "energised" drive, with more power and steering-wheel mounted paddle shifts. It allows Corolla to fully exploit the comfort, stability and handling qualities inherent in its new Toyota New Global Architecture (TNGA) GA-C platform.

The new Corolla meets all the requirements of daily commutes and weekend leisure journeys, offering driving enjoyment in all road conditions and the peace of mind with the low running costs that come with Toyota's hybrid electric technology.

TOYOTA NEW GLOBAL ARCHITECTURE

The Toyota New Global Architecture (TNGA) is the foundation for all Toyota's future powertrain and vehicle development, bringing a new consistency to the driving quality experienced across the entire Toyota model range. TNGA is a philosophy, not simply a platform, marking a revolution in the way the company designs, engineers and manufactures its vehicles. It is central to Toyota's mission to build ever-better cars that are more stylish and more enjoyable and even safer to drive.

TNGA introduces new, defined guidelines for positioning different components, simplifying vehicle design in key areas. The impact is on items that are largely out of sight, so designers still had the freedom to give each new Corolla version a distinctive, individual look with a lower stance and more appealing proportions.

The TNGA GA-C platform guarantees a more rewarding driving experience, thanks to a centre of gravity lowered by 10mm (bonnet height -47mm, front and rear hip points -24 and -26mm respectively), multi-link rear suspension as standard and a 60 per cent more rigid body shell, with high-strength steel reinforcement in key areas. All these factors contribute to better handling and stability, without compromising ride and comfort.

All new TNGA-based vehicles prioritise the highest active and passive safety standards. The new Corolla is designed to meet the exacting requirements of independent crash testing programmes and provide higher active safety protection with the sophisticated functions and systems of the latest Toyota Safety Sense technology.

DESIGN

Corolla Touring Sports exterior design

"With the new Corolla Touring Sports, we aimed to develop the most sleek and sporty wagon in the C-segment while offering customers downsizing from the D-segment the benefits of class-leading rear seat leg room and highly competitive loadspace." Kazuhiko Isawa, Chief Stylist, European Design Centre

The new Corolla Touring Sports has a body style that is unique to Europe and was styled in Europe, at Toyota's recently opened design centre in Zaventem, Belgium. Thanks to the adoption of TNGA, the wagon is no longer simply a variation of the hatchback, but has become a distinct model in its own right.

It is 58mm longer overall than the previous Touring Sports; more significantly, the wheelbase has been increased by 100mm to 2,700mm and the front to rear seat couple distance has been extended by 48mm to 928mm, giving best-in-class rear seat leg room.

Although it has the same frontal styling and 25mm reduction in overall height as the new Corolla Hatchback, every body panel rear of the B pillar is exclusive to the model, giving it a refined, sensuous appearance with the sweeping roofline of an estate car that's elegant yet robust.

The sporting profile is reinforced by the same wide, flaring wheel arches found on the hatchback, their edges hemmed so the wheels can be positioned further outwards, emphasising Corolla's wider stance and lower centre of gravity.

At the rear, the Touring Sports design incorporates the muscular rear haunches seen on the hatchback. The full LED lamp clusters are spaced widely apart and the rear screen has a 12-degree lower rake than the current model. The licence plate sits higher on the tailgate and the tailgate sill has a smaller step. Deeper rear bumpers echo Toyota's "catamaran" design cue witnessed in the car's frontal styling.

The Corolla Touring Sports will be available with five new wheel designs, including 18-inch machine-finished aluminium alloy wheels and two new 17-inch alloys – one silver and one black/machined. Customers will have 11 body colours to choose from, including four new shades.

Exclusive in its segment, the new model will also be available with four optional bi-tone colour schemes, combining a black roof, pillars and lower grille surround with a contrasting body colour.

Corolla Hatchback exterior design

"Our primary goal with the new Corolla was create the boldest and most dynamic hatchback on the market, without compromising interior usability. Harnessing the low centre of gravity afforded by the TNGA layout, the vehicle is light and agile in the side view, yet as we move to the rear, the architecture transforms to create a solid, wide and low stance that is absolutely critical to the European market." Simon Humphries, Executive General Manager, Toyota Global Design.

The new Corolla Hatchback has a more striking frontal design that is dynamic and distinctive. The car's overall length has been increased by 40mm, all of which is contained within a longer wheelbase. Significantly, overall height has been reduced by 25mm, while the cowl height has been brought down by 47mm. The result is a sleeker shape and lower, more attractive bonnet, which in turn improves safety by increasing the driver's field of vision.

Beneath the curved edge of a flatter, clamshell bonnet, a narrow upper grille accommodates new, all-LED lamp clusters with integral daytime running lights. The trapezoidal lower grille has a new mesh design and a frame that projects powerfully forwards. It is less sharply angular and sits more upright than before, resulting in the vehicle's front overhang being reduced by 20mm.

The sides of the grille surround generate Toyota's signature catamaran shape at the front corners of the car, emphasising the 30mm increase in the car's width and its broad, sporting stance. The upturned edges of the front spoiler house new LED fog lights.

In profile, the Hatchback's silhouette is enhanced by the same new wheel design options as the Touring Sports.

The rear styling is more rounded than before, strengthening the visual relationship with the front of the vehicle. The tailgate is made of a resin material, which makes the complex curves of its design possible while also saving weight.

A 14-degree increase in the angle of the rear screen and muscular haunches above the rear wheel arches combine to give the car a more compact appearance. All versions of the Hatchback feature a roof spoiler and shark fin antenna.

The car's width is emphasised by the all-LED light clusters being located as far to the edge as possible, while the rear bumper styling echoes the catamaran look of the front. A lower rear lip features twin chrome inserts.

Colour choices will be the same as those for the Touring Sports, including bi-tone finishes.

Corolla Touring Sports and Hatchback interior design

"Having already demonstrated their expertise on C-HR, a dedicated Toyota Motor Europe Sensory Quality team was assigned to oversee interior quality in the new Corolla. Working in close co-operation with stylists and engineers, they analysed and visualised the whole interior, taking into account not only colours, grades

and executions, but also details such as light intensity and direction.

"Based on this work, numerous enhancements were implemented at each development phase, ranging from consistency of shape to colour and grain matching, as well as quality control in the later phases. The result of this painstaking attention to detail has been a significant improvement in overall sensory quality." Yasushi Ueda, Chief Engineer, Toyota Motor Corporation.

The new Corolla Touring Sports and Hatchback range showcases an all-new interior that presents a spacious, modern and cohesive cabin environment in which new textures, colours and trims combine to offer the highest levels of visual and tactile quality.

Special attention has been paid to the interior of the Touring Sports, which is specifically tailored to the European market.

A new instrument panel, 24mm slimmer than in the current model, is key to generating a sense of spaciousness. The resulting reduction in the height of the upper panel area reduces the perceived mass of the panel itself and improves the driver's forward visibility, while still allowing for the front seat hip point to be lowered and brought closer to the car's centre of gravity, giving a more engaging driving position.

Conversely, the centre console has been made 42mm wider and 22mm higher to improve switchgear and gear lever ergonomics and enhance the wrap-around feel of the driver's cockpit. At the same time, the console armrest height has been optimised and its sliding range has been increased to improve comfort.

The front seat design has been revised with changes to the seatback and cushion springs and the thickness of the urethane pad. Together, these measures promote a better driving posture with wider pressure dispersal, increasing comfort and reducing fatigue, particularly on long journeys.

Higher grade models have new front sports seats with thin and wide shoulder supports which overlap solid, thick side bolsters to achieve excellent holding performance in an overall slim seat design.

New switchgear and instrumentation features include (according to model and grade) a new driver's instrument binnacle incorporating a 3D-effect panel or multi-information display, a 10-inch colour head-up display, eight-inch central multimedia display, electronic parking brake, wireless phone charging pad and auto-dimming rear-view mirror.

The rear seats have also been revised, with a new seat cushion material that allows for more even distribution of the occupant's weight. As standard, all rear seats can be folded using a remote lever to create a fully flat extension to the loadspace.

The materials and trim finishes have high visual and tactile quality, including satin chrome plating and paint, piano black elements, synthetic and genuine leather and a choice of cloth, Alcantara or genuine leather upholstery.

The Corolla Touring Sports has the additional benefits of a 48mm increase in front to rear seat couple distance, giving more room for rear seat passengers and a load space with a 598 litre VDA capacity and numerous features for practicality and ease of use.

A power tailgate can be operated using a hands-free kick sensor; the tailgate opening height has been increased by 10mm.

Relocation of the rear shock absorbers has allowed for a simpler deck wall side trim to be fitted. This maximises the space available, makes loading easier and allows for side wall storage pockets to be fitted on both sides, behind the rear wheel housings. The load surface features a two-position (upper and lower) deck; this can be opened and closed in the upper position, as if hinged on the rear seatbacks. On all model grades, the deck board is reversible: carpeted on one side and with a resin finish on the other for use when carrying wet or dirty items.

The space beneath the deck has been enlarged and is fully carpeted, with detachable side separators. The load area is also fitted with LED lights (a world first) on either side and a detachable tonneau cover.

PREMIUM COMFORT AND CONVENIENCE TECHNOLOGY

A comprehensive range of comfort and convenience technology features are provided as standard or available as an option, according to model grade. Special attention has been paid to making the loadspace practical and easy to use, with a reversible, two-position deck board, LED lighting and, on higher spec' models, an aluminium anti-slide rail.

Technology highlights are summarised below.

LED headlamps: three LED headlight systems are featured in the Corolla line-up, according to model grade – a triple LED parabola unit headlamp; a bi-beam LED headlight with Automatic High Beam System; and an LED headlight with an Adaptive High-beam System.

World-first 3D driver's meter: the driver's meter cluster includes a seven-inch multi-information display with a choice of digital or analogue speedometer modes. The panel can also be switched to a world-first 3D effect in which the dials appear to float in mid-air.

Head-up display: the position and brightness of the head-up display can be adjusted using controls on the steering wheel. The 10-inch colour TFT display projects driving information and alerts onto the windscreen in the driver's line of sight, including speed limits, navigation prompts and an eco driving indicator.

Toyota Touch 2 multimedia system: the Toyota Touch 2 with Go multimedia system is operated using a full-colour, eight-inch touchscreen in the centre console. It is quick and intuitive to use, reacting to familiar pinch, zoom and slide gestures like a smartphone.

eCall: eCall will automatically contact emergency services in the event of an accident in which the airbags are deployed, giving details of the vehicle's precise location and the number of people on board. The eCall button can also be used to reach the emergency services directly; the call is made using the car's built-in SIM, with no charge to the owner.

Connected services: connected services will be available for the new Corolla, giving access to convenience and peace-of-mind features such as Last Mile Guidance, Send to Car navigation, Find My Car, Driving Analytics and Maintenance Reminder.

JBL GreenEdge Premium Sound System: an eight-speaker JBL Premium Sound System will be available for new Corolla hybrid electric models. The speakers, which include JBL's signature horn tweeter mounted in the A-pillar, have been tuned to suit Corolla's notably quiet cabin. The system incorporates Clari-Fi™ technology which supplements frequencies that are lost in compressed digital audio files in real time, restoring the sound quality and stereo mix as closely as possible to the original recording.

Wireless phone charging: A wireless charging system allows Wireless Power Consortium (WPC) compatible phones to be charged simply by placing them on a dedicated pad located in front of the gear lever.

Skyview panoramic sunroof: the Skyview panoramic sunroof has two glass panels. The front panel slides to give a maximum opening of 272mm, with a mesh deflector to reduce wind noise. The roof is also fitted with an internal roller shade.

Power tailgate kick sensor: a hands-free kick sensor is available for the power tailgate on the Corolla Touring Sports, activated by sliding a foot beneath the central section of the rear bumper. The tailgate's fully open height can be customised to suit the owner's preference. The tailgate also has a one-touch lock and close button.

Simple Park Assist with Intelligent Clearance Sonar: the SIPA system uses a rear camera and ultrasonic sensors on the sides of the front bumper to identify viable reverse and parallel parking spaces. It will automatically apply the correct sequence of steering angles to manoeuvre the car into the target space; all the driver has to do is control the vehicle's speed. SIPA activates the Intelligent Clearance Sonar system to ensure safe manoeuvring.

HYBRID ELECTRIC POWERTRAINS

Greater awareness of environmental issues has helped prompt ever-stricter emissions regulations, particularly in large European cities. Toyota's self-charging hybrid electric powertrains are a compelling proposition, offering exceptionally low emissions and high fuel efficiency, with the ability to cover up to half of the average European commuting journey on electric power alone.

The new Corolla is the first Toyota model to be offered with a choice of two self-charging hybrid powertrains: both the Hatchback and Touring Sports models will be available with 120bhp 1.8-litre and 178bhp 2.0-litre hybrid systems, and one conventional petrol engine – a 1.2-litre turbo unit.

Improved 1.8-litre hybrid system

The fourth generation 1.8-litre hybrid electric system develops 120bhp/90kW and 142Nm of engine torque; added power is provided by a 53kW electric motor-generator, which generates 163Nm of torque from zero rpm.

The size and weight of the system have been reduced so that it can be installed on the new GA-C platform without compromising its output or quietness. The 1.8-litre engine benefits from a series of friction-reducing measures, a larger-capacity exhaust gas recirculation system and optimised heat management.

The hybrid drive system's calibration has been further refined and greater torque from the electric motor gives a more linear increase in revs under acceleration. Fuel efficiency is aided by the use of a lithium-ion hybrid battery.

New 2.0-litre hybrid system

"At the start of the project, we studied European customer profiles and the level of satisfaction with the 1.8-litre hybrid powertrain. While being very happy with the system's fuel consumption, comfort, smoothness and reliability, it became apparent that we would not be able to satisfy the requirements of a significant group of potential customers.

"People driving turbocharged powertrains above 1.4 litres were clearly asking for faster acceleration and response, and that's why we took the decision to develop the 2.0-litre hybrid for the European market."
Rembert Serrus, Senior Manager Performance Planning, Toyota Motor Europe.

The new 2.0-litre hybrid electric system develops 178bhp/132kW and 192Nm of engine torque, with further torque provided by the electric motor-generator.

Exploiting the stability and handling benefits of the TNGA platform, it offers an energised drive with more power, a Sport drive mode and a six-speed Sequential Shiftmatic transmission that can be operated using paddle shifts on the steering wheel.

The new system is unique in Corolla's market segment: no conventional powertrain can offer the same combination of power and low emissions. Toyota has applied numerous measures to ensure the extra power is matched by fuel efficiency, reduced emissions and quieter running.

The fuel efficiency is supported by the engine's high, 14.0:1 compression ratio, a high tumble flow generated by an efficient intake port design and long stroke, a new oil pump design and a series of friction-reducing measures. Reducing the size of the transaxle, power control unit, motor-generator and hybrid battery further helps save fuel.

The maximum speed when driving in EV all-electric mode has been increased to more than 70mph and system control has been changed so that the engine cannot be started without the accelerator pedal being operated, even before engine warm-up starts. Together these measures substantially improve fuel efficiency.

The exhaust system catalytic converter has been located closer to the engine, and warm-up control after engine start has been optimised to give early, improved performance to reduce emissions.

Powertrain noise has been reduced to exceptionally low levels with the use of a balancer shaft, a change in the engine mount position and shape, structural changes to the transaxle, polishing of the gear teeth and the adoption of a positive/negative hysteris damper, lightweight timing chain and revisions to the water pump motor.

DRIVING DYNAMICS

The new GA-C platform brings considerable dynamic benefits to the new Corolla range, together with marked improvements in ergonomics and the driver's view from the wheel.

Rigid and lightweight TNGA body shell

The body shell makes extensive use of aluminium, high-tensile strength steel and hot stamped materials, and the thickness of the doors and roof panel has been reduced. The result is a considerable reduction in weight and a consequent improvement in fuel efficiency.

Using adhesives and more extensive spot welding has helped increase body rigidity by around 60 per cent compared to the current Hatchback and Touring Sports models. This helps achieve a notable increase in handling agility, steering responsiveness and high-speed stability.

Handling and agility are further improved by a lower engine mounting height, a lower hip point for the seats and the location of the hybrid battery beneath the rear seats. These measures have helped lower the car's centre of gravity by 10mm.

Suspension

The new Corolla uses a proven Macpherson strut front suspension and an all-new multilink system at the rear. The shock absorbers feature new valve technology and, for the first time, Corolla will be available with Adaptive Variable Suspension.

The front suspension geometry has been revised and the characteristics of the coil springs and shock absorbers have been optimised for a linear steering response in mid to high-speed cornering. Changes have been made to the suspension arms and bushes and friction in the sliding parts has been reduced to minimise transmission of shock from rough surfaces, securing high-quality ride comfort.

The compact packaging of the new multilink rear suspension means there is less intrusion in the loadspace, allowing for an increase in load volume. It also delivers excellent handling stability and ride comfort, supported by an exclusive coil spring design. Link arm location has been precisely determined to keep the tyres at a toe-in angle, both during cornering and under braking, improving the vehicle's stability and response to steering inputs.

Both front and rear suspension systems benefit from a new shock absorber valve design which provides a 40 per cent reduction in friction for a smoother and more comfortable ride.

The Adaptive Variable Suspension (AVS) system controls shock absorber damping on all four wheels, giving better ride and comfort and, with improved steering response and a flatter ride, enhanced driving performance. Damping force is automatically and continuously controlled through 650 steps by a linear solenoid actuator which operates four times faster than a conventional step motor.

The AVS co-operates with the Drive Mode Select system to control damping force in line with the driver's selection of Eco, Normal, Sport S, Sport S+ or Custom drive modes, to give the appropriate balance of ride comfort and handling agility.

Aerodynamics

A further benefit of the GA-C platform is the freedom it gives to design a highly aerodynamic body, thanks to the reduction in overall vehicle height and the significant reduction in the height of the bonnet.

An optional grille shutter can control airflow to the engine compartment. Closing the shutter reduces drag and also allows the engine to reach its optimum running temperature more quickly from a cold start.

Improved noise and vibration

Building on the inherent quietness of Toyota's hybrid technology, the new Corolla benefits from measures that minimise the amount of noise and vibration entering the cabin.

The engine installation is designed to minimise vibration at start-up and idling speeds. The increase in engine speed at the start of acceleration has been suppressed, to achieve both a more linear relationship between engine and vehicle speeds and quieter operation.

The GA-C platform itself helps prevent the transmission of vibrations. The steering wheel pad functions as a dynamic damper to suppress steering vibration, and even the tool box helps reduce vibration in the rear floor panel.

There is generous application of sound-absorbing and insulating material in the engine bay and a triple-layered dashboard inner silencer to minimise the amount of engine and transmission noise reaching the cabin.

Other measures include the adoption of an integral floor silencer, increased use of body sealer in the panel gaps and the installation of foam material in numerous parts of the body frame to reduce wind and road noise intrusion.

NEW TOYOTA COROLLA TECHNICAL SPECIFICATIONS

POWERTRAIN		**1.8-litre HYBRID**	**2.0-litre HYBRID**
Toyota Hybrid System			
Full system output (bhp/kW)		120/90	178/132
ENGINE			
Fuel type		Petrol	Petrol
Max. power (bhp/kW @ rpm)		97/52 @ 5.200	151/112 @ 6,000
Max. torque (Nm @ rpm)		142 @ 3,600	190 @ 6,000
PERFORMANCE			
Acceleration 0-62mph (sec)	Hatchback	10.9	7.9
	Touring Sports	11.1	8.1
Max. speed (mph)		112	112
FUEL CONSUMPTION[1]			
Combined cycle (NEDC correlated, mpg)	Hatchback	83.1	74.3
	Touring Sports	83.1	74.3
EMISSIONS[1]			
Combined cycle (NEDC correlated, g/km)	Hatchback	76	86
	Touring Sports	76	87
WEIGHT			
Kerb weight (min-max, kg)	Hatchback	1,345-1,400	1,310-1,510
	Touring Sports	1,370-1,430	1,465-1,560

DIMENSIONS		HATCHBACK	TOURING SPORTS
Overall length (mm)		4,370	4,653
Overall width (mm)		1,790	1,790
Overall height (mm)		1,435	1,435
Wheelbase (mm)		2,640	2,700
Ground clearance (mm)		135	135
Boot capacity (litres, VDA)	1.8 Hybrid	361	598
	2.0 Hybrid	313	581

[1] Based on Regulation EC 2017/1153 as amended EC 2017/1231 – pending final homologation. All figures for models with 16in wheels.

[2] Including space beneath deckboard; above deckboard volume is 242l.

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