Ferrari

Media

The Ferrari 488 Pista: the synthesis of extreme, track-level power and driving exhilaration for the road

Ginevra, 6 March 2018 – The Ferrari 488 Pista is powered by the most powerful V8 engine in the Maranello marque's history and is the company's special series sports car with the highest level yet of technological transfer from racing. In fact the name, meaning 'track' in Italian, was chosen specifically to testify to Ferrari's unparalleled heritage in motor sports.

Technically, the Ferrari 488 Pista encompasses all of the experience built up on the world's circuits by the 488 Challenge and the 488 GTE. For over 25 years, Maranello has been organising the most prestigious of all one-make championships, the Ferrari Challenge, in which over 100 drivers split into three continental series do battle at the wheel. Last year saw the introduction of the 488 Challenge, the first model in the series to be equipped with a turbo engine. The Ferrari 488 GTE is instead the car fielded in the FIA World Endurance Championship, the pinnacle of GT racing, where it has won two consecutive GT Manufacturers' titles and no less than five titles in total since the championship's inception in 2012. Thanks to wins in both the Pro and Am categories, the 488 GTE has taken no fewer than 35 out of the 50 races run to date.

The new car's engine adopts numerous solutions from that of the 488 Challenge and its power output has been increased to 720 cv. It is also lighter, thanks to new titanium con-rods and carbon-fibre intake plenums. The inverted radiator cooling system is also derived from the Challenge with the radiators raked rearwards (rather forwards as in the 488 GTB), improving cooling and maintaining optimal performance levels even in high thermal stress situations.

The car's aerodynamics are derived from both the 488 GTE and from Formula 1, specifically the S-Duct at its front, the rear spoiler and diffuser profiles which boost efficiency by 20% compared to the 488 GTB. Other solutions have been carried over from the track to shave off further weight, including the lithium battery (from the 488 Challenge) and also the new carbon-fibre wheel rims - a

first for Ferrari. The overall result is that the 488 Pista is an impressive 90 kg lighter than the 488 GTB.

As with the three previous special series, the Challenge Stradale, 430 Scuderia and 458 Speciale, this new berlinetta is the perfect marriage of extreme performance and track car-style handling.

The vehicle dynamics were designed for unique driving feedback and to make the car's full potential available to all drivers, professional or otherwise. Specific vehicle controls were developed with this in mind, first and foremost being a new oversteer management system usable in the manettino's CT-OFF position and designed to make the car's performance on the limit easier to reach and control.

A new gear-shift strategy in the RACE position delivers a far more sporty experience, very similar to that of a track car. In other words, the Ferrari 488 Pista offers drivers of all abilities an exceptional and exhilarating experience that normally only a competition car could deliver, setting a whole new benchmark in terms of driving pleasure for the Ferrari range.

The Ferrari 488 Pista's extreme design is underlined by the optional livery that highlights the aerodynamic innovation of the S-Duct. The car's lines were developed to underscore its sporty soul and cleverly combine the purity of the 488 GTB with some of the hugely successful racing and functional elements of the 488 GTE and 488 Challenge while staying true to Ferrari's traditional styling.

ENGINE

The Ferrari 488 Pista can punch out 720 cv at 8000 rpm, giving it the best specific power output in its class at 185 cv/l, while torque is higher at all engine speeds, peaking at 770 Nm (10 Nm more than the 488 GTB). An extreme evolution of the turbo engine elected overall International Engine of the Year in both 2016 and 2017, this is the most powerful V8 in Ferrari history.

The 50 cv power increase over the 488 GTB's engine is also the largest ever leap in engine power for a Ferrari special series car and a remarkable 115 cv more than the previous model, the 458 Speciale. In short, this V8 is the new benchmark not only for turbo-charged power units, but for all engines.

The development of this sportier version of the 488 GTB thus presented Ferrari's engineers with the highly complex challenge of improving on what was already acknowledged as the world's best engine. To do so, they had to test out

a string of leading-edge solutions, drawing on Ferrari's successful experience in the competition world. The result is that the Ferrari 488 Pista's engine has over 50% of new components compared to that of the 488 GTB.

The Ferrari 488 Pista also fully exploits new features developed for the 488 Challenge, not least the engine air intake layout with the intakes moved from the flanks to the rear spoiler area where they are connected directly to the plenums. This drastically reduces fluid-dynamic load losses and ensures a higher volume and cleaner flow of air to the engine, thereby contributing to the increase in power.

Moving the air intakes from the sides to the rear also freed up space for a larger intercooler. Thanks to a cooling layout derived from the 488 Challenge and featuring radiators with an inverted rake so that they are inclined towards the rear, the hot air flow is channelled to below the flanks, well away from the side intakes for the intercooler. This guarantees that power is maintained even in critical situations, such as in the wake of another car.

Specific valves and springs combined with a new cam profile give this engine a more aggressive, racing character. The pistons and cylinder heads have been strengthened to cope with the higher loads - up to an extra 10% of pressure in the combustion chambers. Particular attention was also focused on reducing internal friction by introducing, for example, DLC-coated piston pins.

The Ferrari 488 Pista's engine also benefits from all the lightweight components featured on the Challenge version, resulting in a weight reduction of 18 kg compared to the 488 GTB. The exhaust manifolds are now made from Inconel while the crankshaft and flywheel are both lighter too. Titanium con-rods have also been introduced and the reductions in the weight of the rotating masses cut inertia by 17%. Drivers feel the impact of these reductions very clearly as the driver can see the revs increasing much more rapidly.

The 488 Challenge also provides the turbos with integrated rev sensors. Response times are instantaneous and even faster than the 488 GTB thanks to a new control strategy developed specifically for this model. A new pedal map also makes driving on the limit even easier.

Lastly, the Ferrari 488 Pista's engine sound is unique and unmistakable, as such a special version of the Ferrari V8 sports car warrants. The new Inconel exhaust manifolds and an optimised exhaust bypass logic contribute to the superior quality and the intensity. The level of sound is also higher than the 488 GTB in all gears and at all engine speeds, up to a maximum of 8 dB more, in proportion with the progressive increase in power.

GEARBOX

The sporty driving feedback is further enhanced by the high-performance gear shifting, typical of a thoroughbred race car. The new gear shift strategy, available in the manettino's RACE position, reduces shifting times by 30 ms with positive acceleration when the higher gear engages that the driver can feel distinctly.

This model also adopts the hugely successful Ferrari Variable Torque Management strategy for all gears. To adapt it to the car's extreme sporty spirit, all of the curves were redesigned to deliver a feeling of consistently smooth, powerful acceleration all the way to the red line.

VEHICLE DYNAMICS

The aim of the Ferrari 488 Pista's dynamic development was to produce a car that offers blistering mechanical performance in terms of lap times and standing starts, driving pleasure and accessibility of performance to drivers of all types.

To achieve these objectives, Ferrari's engineers had to work on several fronts, starting with introducing numerous lightweight solutions as well as evolving both a new generation of the Side Slip Control System (SSC 6.0), improving the efficiency of the braking system and developing a new specific tyre, the Michelin Sport Cup 2.

The Ferrari 488 Pista is 90 kg lighter than the 488 GTB, which brings huge advantages in terms of its agility and responsiveness. To maximise on this, the weight reductions are concentrated in the most weight-sensitive areas of the car, such as the unsprung masses and components away from the car's centre of gravity.

The body shell was designed to keep the car as light as possible and features ultralight materials such as carbon-fibre for the bonnet, the front and rear bumpers and the rear spoiler, and Lexan for the rear window.

This is also the first time that a 20" (optional) single-piece carbon-fibre wheel rim has been used in the Ferrari range. Entirely in carbon-fibre, it is around 40% lighter than the 488 GTB's standard wheel rims and features a special coating developed for the aerospace industry to the channel and spokes which efficiently dissipates heat generated under braking.

The evolution of the Ferrari 488 Pista's dynamic vehicle control systems saw the introduction of a new actuation system that flanks those featured on the 488 GTB and is integrated into the new version 6.0 of the SSC concept.

The 488 Pista also hails another first for a Ferrari road car – a lateral dynamics control system that uses Ferrari software to adjust the brake pressure at the callipers. The Ferrari Dynamic Enhancer (FDE) is available when the manettino is in the "CT-OFF" position. It regulates the lateral dynamics variables, including side slip angle estimation. The control system intervenes in advance, lightly actuating the callipers through, and exiting corners.

As a result the system manages the evolution of the side slip angle, making control of the lateral dynamics in high performance situations more intuitive, controllable and predictable. So it is not a stability control system, but a maximum performance-focused system.

The introduction of the Ferrari Dynamic Enhancer into the integrated SSC 6.0 system thus gives drivers extra confidence so that they can more easily handle even lengthy oversteer situations. It also makes performance on the limit easier to reach and control even for less expert drivers.

The Ferrari 488 Pista is extremely efficient in dealing with rapid changes of direction and offers drivers a unique sense of predictability. The recalibrated SCM-E dampers and the 10% stiffer springs contribute to this improved handling precision.

As the Ferrari 488 Pista was developed for mostly road use but also to unleash impressive performance on the track, the braking system was modified to improve cooling, particularly under extreme use, and also to cut the time it takes to get up to temperature. The 488 Challenge's brake servo was adopted to enhance the sporty pedal feel and deliver smooth, consistent braking even in extreme conditions.

These interventions, combined with the lightweight solutions adopted, have shortened the 200-0 km/h stopping distance by a metre compared to the 488 GTB.

AERODYNAMICS

In-depth aerodynamics research played a big part in improving the Ferrari 488 Pista's performance. Working on a concept focused on uncompromising innovation allowed considerable engineering freedom in developing significant solutions. The already-exceptional aerodynamic efficiency of the 488 GTB has

been improved by 20%, with major benefits in terms of absolute speed and lap times on medium-fast tracks as well as sheer fun behind the wheel.

Essential to the development of the Ferrari 488 Pista's aerodynamics was the wealth of knowledge Ferrari has built up on previous and parallel projects where the aerodynamics department was able to test new and efficient solutions, integrating ideas developed for the 488 Challenge and the 488 GTE.

The 488 Pista's V8 turbo punches out 50 cv more than the car on which it is based, thanks in part to a reduction of almost 15° C in the temperature of the air entering the plenum with respect to the 488 GTB. The development of the thermo-fluid dynamics consequently focused on the powertrain cooling specifics, to minimise any impact on pure aerodynamic performance.

To guarantee the kind of performance demanded of the powertrain, the intercooler required an increase of over 25% in size compared to that of the 488 GTB. In order to minimise the increase in weight and drag associated with such a large radiating surface, the engineers worked intensively on the car as a whole to improve efficiency, limiting the increase required in surface area to just 7%. The main contributing factors to the improved intercooler efficiency were the radical layout choices made at the front of the car.

The front radiator arrangement was completely redesigned to minimise interference caused by the thermal boundary layer, introduced by the hot air flow coming off the front radiators, with the air flow entering the intercooler intake. As with 488 Challenge, the rake of the radiators has been inverted and they are now inclined towards the rear to direct the hot air to the underbody ahead of the front wheels.

This choice produced, on the one hand, an improvement of 10% in the performance of the rear intercoolers, and, on the other, an additional aerodynamic benefit: the virtual fairing of the exposed area of the tyre cuts the car's drag by 7%.

The engine air intakes have been moved from the flanks – the solution adopted on the 488 GTB – to the rear spoiler as per the 488 Challenge. The specific shape of the spoiler delivers powerful recompression which guarantees the engine air intake benefits from high dynamic pressure, shortening the length of the inlet duct, reducing consequent losses and boosting engine performance.

The need for efficient downforce resulted in the whole of the front of the car being completely redesigned, particularly the bumpers and bonnet. One innovative Formula 1-derived solution in particular stands out: the S-Duct,

which is being used for the very first time on a road car. The air from the intake on the front bumper passes through an aerodynamic duct with calibrated sections and exits through a vent on the bonnet, creating downward force over the front axle.

Furthermore, the front intake is completed by a central lower wing profile that, on the one hand, acts as a splitter which, thanks to its curvature, accelerates the flow and increases the amount of air passing through the S-Duct, thus improving its performance while, on the other hand, creating a low pressure area under the front underbody thanks to the acceleration of the flow generated on its lower surface, further boosting downforce.

This introduction of this particular solution accounts for 18% of the overall increase in downforce compared to the 488 GTB, but barely a 2% increase in drag.

The exterior sections of the bumper ahead of the wheels were also extensively redesigned with solutions modified from the 488 Challenge and reinterpreted so successfully that they are responsible for 23% of the increase in downforce compared to the 488 GTB. Radical scoops in the front bumper allow aerodynamic elements to protrude in areas where they can be most efficient. The volume of the front bumper extends towards the wheelarch to deflect the flow ahead of the wheels outwards, generating suction from the wheelarch and thus from the front underbody, which is equipped with diffusers, all to the benefit of front downforce.

At the rear, two elements contributed to the achievement of the downforce target: the blown spoiler system and the venting behind the rear wheels.

The spoiler is higher (+30 mm) and longer (+40 mm) compared to the spoiler on the standard production car. Development work focused on the efficiency of the bleed under the spoiler to adapt it to the change in the car's overall downforce. The calibrated sections have been optimised and the direction in which the air is blown has been modified: the angle is now upward, aided by the deflection of the flow by the upper surfaces of the spoiler, to generate even more rear downforce. The evolution of the spoiler system and its bleed has had a significant impact on downforce, accounting for 25% of the overall increase compared to the 488 GTB.

The increase in drag caused by the new blown spoiler system is compensated for by the shape of the air flows venting from the rear bumper below the tail lights. Furthermore, the vents have been optimised to exploit the pressure field generated by the spoiler to encourage evacuation from the rear wheelarches,

increasing intercooler efficiency by 3%, on the one hand, and incorporating the wake from the wheels on the other, allowing the diffuser to be struck by a cleaner, more energised flow, boosting the rear downforce it generates.

As is always the case with each new Ferrari, the 488 Pista's underbody has been specifically redesigned to ensure it delivers as efficient a Cl figure as possible. The first big difference compared to the 488 GTB is how the hot air from the radiators is deflected to the underbody ahead of the front wheels. This choice, made to enhance the cooling layout and lower the car's drag coefficient, however shrinks the surfaces that can be used to generate downforce. To make up for this and further boost downforce, the designers decided to exploit other areas of the underbody.

The Ferrari 488 Pista was thus equipped with front diffusers, made possible by the change in the inclination of the front radiators and the elimination of the dams ahead of the wheels. Thanks to a ramp already optimised for the 488 GTE, the diffusers accelerate the flow, venting it into the wheelarches, creating strong suction that in turn is responsible for 12% of the overall downforce increase compared to the 488 GTB.

The vortex generators on the underbody have also been optimised and now generate 20% more downforce, thanks to modifications to their profile and length.

The rear diffuser is also derived directly from Ferrari's World Endurance Championship experience and has the same double kink line as the 488 GTE's, amplifying the extraction and downforce generation capacities of a traditional diffuser. As in the 488 GTB, the diffuser is equipped with a system of 3 active flaps which rotate 14° in minimum drag configuration to completely stall the diffuser and thus significantly reduce the car's drag.

DESIGN

EXTERIOR

Aerodynamic demands guided the work of the Ferrari Design Centre team. The 488 Pista's forms have been meticulously sculpted to ensure they are more performance-oriented than ever, with huge attention lavished ensuring that while aerodynamic demands were met, the Maranello marque's signature styling elements and aesthetic canons were respected.

The designers used innovative elements, such as the aerodynamic S-Duct at the front, as an opportunity to visually shorten the car's nose, creating an original

floating wing effect. The black, omega-shaped edging on the front bumpers and the side flicks reference the prominent aerodynamic underbody motif of the 488 GTE.

Most notable on the flanks is the fact that the splitter in the side air intakes of the 488 GTB has been removed. At the front, the aerodynamic profiles that start at the front bumpers run sleekly along the side miniskirts all the way to the side appendages of the rear diffuser.

The concept of the front is echoed in the dolphin-tail rear spoiler which appears suspended to provide an impression lightness and efficiency, while the rear volumes add a sense of power to the tail. The rear diffuser juts out and has been developed in width: its design was inspired by that of the 488 GTE.

The Ferrari 488 Pista features a two-tone livery that runs the entire length of the car, starting at the front bumper, then diving into the S-Duct and continuing all the way to the rear spoiler.

COCKPIT

The interior has a distinctive racing feel with all superfluous elements eliminated. The extensive use of lightweight, exclusive technical materials such as carbon-fibre and Alcantara works brilliantly with the meticulous crafting and sophistication that is the signature of all Ferrari cockpits. Contrasting hand-stitching, tread plates and heel rests in triangular pattern aluminium and particularly fluidly sculpted door panels are fine examples of this.

The glove compartment (normally incorporated into the dashboard directly in front of the passenger) has been removed and replaced by handy storage pockets on the rear bench and the doors. The effect is to significantly visually slim down the volume of the under-dash area.

Imagines of the new Ferrari 488 Pista can be downloaded from the Ferrari media site: www.media.ferrari.com

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Ferrari 488 Pista
Technical Specifications

ENGINE	
Type	V8 - 90° twin turbo
Overall displacement	3902 cm^3
Max. power output*	530 kW (720 cv) at 8000 rpm
Max. torque*	770 Nm at 3000 rpm in VII
Specific power output	185 cv/l
Max. engine speed	8000 rpm
Compression ratio	9.6:1
DIMENSIONS AND WEIGHTS	
Length	4605 mm
Width	1975 mm
Height	1206 mm
Front track	1679 mm
Rear track	1649 mm
Kerb weight**	1385 kg
Dry weight**	1280 kg
Dry weight/power ratio	1.78 kg/cv
Weight distribution	41.5% front – 58.5% rear
Boot capacity	170 l
Fuel tank capacity	78 l
TYRES	
Front	245/35 ZR 20 J9.0
Rear	305/30 ZR 20 J11.0
BRAKES	
Front	398 x 223 x 38 mm
Rear	360 x 233 x 32 mm
TRANSMISSION AND GEAR BOX	
	F1 7-speed dual-clutch gearbox
ELECTRONIC CONTROLS	E-Diff3, F1-Trac, High Performance ABS/EBD with Ferrari Pre-Fill, FrS SCM-E, SSC with FDE
PERFORMANCE	
0-100 km/h	2.85 s
0-200 km/h	7.6 s
100-0 km/h	29.5 m
Max. speed	> 340 km/h
Fiorano lap time	1'21.5"
FUEL CONSUMPTION/$C0_2$ EMISSIONS	
Fuel consumption***	11.5 l/100 km
Emissions***	263 g CO_2/km

* With 98 octane petrol
** With optional content
*** ECE+EUDC Combined Cycle with HELE: under homologation