



DUCATI PANIGALE V4

The Panigale V4. A bike that begins an exciting new chapter in the Ducati story, a new “symphony” of all-Italian performance and emotion. The Panigale V4 is the first mass-produced Ducati bike to mount a four-cylinder engine, derived directly from the MotoGP Desmosedici. It's a concentrate of Ducati technology, style and performance. With an engine displacement of 1,103 cm³, 214 hp and a power/weight ratio of 1.1 hp/kg, this bike sets a new standard in the supersport production bike segment.

The Panigale V4 replaces the iconic 1299 at the top of the Ducati supersport range, doing so by enhancing performance and ridability so that riders of all skill levels can enjoy boundless fun and excitement. The Panigale V4 has been developed in close collaboration with Ducati Corse, drawing directly on know-how and technology from the racing world to provide a road bike that is the closest thing possible to its MotoGP counterpart.

The outstanding performance of the Panigale V4 is underlined by a completely new design which, while it follows on from that of the supersport bikes that preceded it, now even more effectively transmits the power and essentialness of Ducati racing bikes. The Panigale V4 name combines the alluring “Panigale” tag with the “V4” designation that marks the break with the past, indicating the start of a whole new era for the Bologna-based bike manufacturer.

The new Ducati supersports family consists of the Panigale V4 - the essence of the new sports bike - and the Panigale V4 S. The latter mounts Öhlins suspension featuring the Smart EC 2.0 system with a new adjustment interface and top-drawer components such as forged aluminium wheels and the lithium ion battery. Completing the range is the exclusive Panigale V4 Speciale, a numbered, limited-edition bike with a dedicated livery, titanium exhaust and machined from solid components.

The philosophy followed by the Panigale V4 development team mirrors the approach taken by Ducati when developing a racing bike: total integration of engine, chassis and rider. To achieve that goal MotoGP-derived technology has been employed. Development has involved Ducati Corse technicians and riders, making the Panigale V4 a production sports bike that comes close to being a MotoGP prototype, built for both excellent on-track performance and outstanding on-road ridability.

The Desmosedici Stradale engine is a 90° V4 with Desmodromic timing, just like the Desmosedici GP from which it also takes an 81 mm bore (the maximum allowed by MotoGP rules). This has been combined with a longer stroke than that used in racing (giving a total displacement of 1,103 cm³) to boost low-to-mid rev torque and reduce maximum revs so that the power is easier to handle. The new Ducati engine puts out a maximum of 214 hp at 13,000 rpm, making the Panigale V4 the most powerful bike in the segment, yet easy to handle thanks to a torque of 12.6 Kgm at 10,000 rpm. Despite such outstanding performance, the Desmosedici Stradale has long maintenance intervals, with valve clearance inspection only necessary every 24,000 km.

The Panigale V4 engine is the only one in the sports segment with a 90° V configuration. It's also the only engine to use technology such as the counter-rotating crankshaft and twin pulse ignition. These solutions have a positive impact on bike dynamics, making it more agile during changes of direction, fast and stable on the straight and ensuring easier out-of-the-corner torque handling.

The already high power of the standard Desmosedici Stradale configuration can be boosted to 226 hp by mounting the all-titanium racing exhaust, made by Akrapovič as per Ducati Corse specifications.



To contain the inevitable weight gain with respect to the 1299 Panigale (because of the 4 cylinders) Ducati has developed an all-new frame where the Desmosedici Stradale itself has a load-bearing function. Called Front Frame, it's more compact and lighter than a perimeter frame and uses the engine as a stressed chassis element. This solution ensures the right torsional rigidity for on-the-edge riding and gives riders outstanding "feel". The Front Frame has allowed the designer to create a bike that is slender in the tank-seat merge zone: this, together with seat/handlebar/footpeg triangulation, ensures perfect bike-rider integration. Together with meticulous design and the use of light materials, the new frame keeps the kerb weight of the S and Special versions down to 195 kg. This weight, combined with the 214 hp, means a power/weight ratio of 1.1 hp/kg, putting the Panigale V4 S at the top of the sport bike segment.

The Panigale V4 doesn't just set new performance standards. Thanks to the potential of the six-axis Bosch inertial platform, a latest-generation electronics package with some previously unseen features defines new active safety and dynamic vehicle control standards in all riding situations. The Panigale V4 introduces controls such as controlled drift during braking, ABS Cornering on the front wheel only thanks to a set-up specially designed for track riding and Quickshift Up & Down with a strategy that takes lean angles into account. All these controls - developed on the track together with official Ducati riders and test riders - are incorporated in the three new Riding Modes (Race, Sport and Street) and can be adjusted via the advanced TFT panel that makes the Panigale V4 the highest-tech bike in the category.



The range

Panigale V4

- **Colour**
 - Ducati Red with grey frame and black wheels
- **Main standard features**
 - New Desmosedici Stradale engine, 1,103 cm³
 - New "Front Frame"
 - Cast Magnesium alloy front sub frame
 - 43 mm Showa Big Piston Forks (BPF), fully adjustable
 - Sachs monoshock, fully adjustable
 - Sachs steering damper
 - Latest-generation electronic package with 6-axis Inertial Measurement Unit (6D IMU): ABS Cornering Bosch EVO; Ducati Traction Control EVO (DTC EVO); Ducati Slide Control (DSC); Ducati Wheelie Control EVO (DWC EVO); Ducati Power Launch (DPL); Ducati Quick Shift up/down EVO (DQS EVO); Engine Brake Control EVO (EBC EVO)
 - Buttons for quick level shifting
 - Riding Modes (Race, Sport, Street)
 - 16 litre aluminium tank
 - 5" full-TFT dashboard
 - Full-LED headlight with DRL
 - Two-seater configuration kit
 - Braking system with new Brembo Stylema[®] monobloc calipers
 - New Pirelli Diablo Supercorsa SP tyres, 200/60 at the rear
 - Pre-setting for Ducati Data Analyser + GPS (DDA + GPS) and Ducati Multimedia System (DMS)

Panigale V4 S

- **Colour**
 - Ducati Red with grey frame and black wheels
- **Same standard features as the Panigale V4 with the exception of:**
 - Suspension and steering damper with Öhlins Smart EC 2.0 system
 - Öhlins NIX-30 forks
 - Öhlins TTX 36 shock absorber
 - Öhlins steering damper
 - Aluminium forged wheels
 - Lithium-ion battery



Panigale V4 Speciale

- **Colour**
 - "Speciale" colour scheme with grey frame and black wheels
- **Same standard features as the Panigale V4 S with the exception of:**
 - Carbon fibre front/rear mudguards
 - Machined-from-solid top yoke with identification number
 - Alcantara® seat
 - Dedicated handle grips
 - Adjustable foot pegs
 - Carbon fiber heel guard
 - Carbon fiber cover swinging arm
 - Racing articulated levers
 - Brake level protection
- **Supplied kit:**
 - Full racing titanium Ducati Performance by Akrapovič exhaust system
 - Racing screen
 - Plate holder removal kit
 - Machined-from solid mirror replacement plugs
 - Ducati Data Analyser+ GPS (DDA+ GPS)
 - Bike cover
 - Racing fuel tank cap



Desmosedici Stradale, the new Ducati V4 engine

90-degree V4: the racing engine *par excellence*

Ducati sees the 90-degree V4 layout as the pinnacle of motorcycle engine sports performance. It's no coincidence that this same solution is employed on Desmosedici MotoGP engines. The 90-degree V layout evens up first order forces naturally without having to resort to a balancing countershaft to eliminate vibration, a solution that, as is known, increases weight and drains power. This key benefit, crucial to the reliability and mechanical efficiency of an engine that revs as high as 14,000 rpm, is just one of many that make this Ducati-selected configuration the most technically refined possible.

Compared to a classic in-line 4, the lateral compactness of the V arrangement allows for better mass centralization and reduces the bike's frontal cross-section. Moreover, the shorter crankshaft diminishes the gyroscopic effect. All these aspects have a positive impact on motorcycle dynamics, making it lighter and faster when changing direction. Ample space inside the V provides room for both the water pump and an outsize airbox (12.8 litres) that lets the Desmosedici Stradale breathe better.

Smooth integration of engine and chassis set-up forms the foundation of every Ducati. That's why the Desmosedici Stradale is designed to be banked rearward 42°, just like the Ducati engines used in MotoGP. This optimises weight distribution, allows for larger radiators and brings the swingarm pivot as far forward as possible.

Moreover, the Desmosedici Stradale has been designed as a structural chassis element. The main frame attachment points have been incorporated in the front of the upper crankcase half and in the rear cylinder bank head. What's more, the crankcase acts as a rear suspension and swingarm attachment point.

Light and compact

Synergies with Ducati Corse has yielded a compact, light, high-performance engine. Meticulous design and development by Ducati's engine team has resulted in power delivery that maximises road riding pleasure and gives supreme track performance.

Weighing in at 64.9 kg, the Desmosedici Stradale is just 2.2 kg heavier than the 1,285 cm³ Superquadro twin, clearly demonstrating the attention to lightness that lies at the heart of every Ducati project.

Engine casings are made of gravity die cast aluminium and are coupled horizontally. The upper crankcase half incorporates the four Nikasil-coated aluminium cylinder liners ensuring wear protection and low friction.

The 81 mm diameter pistons that slide inside the liners have two low-attrition compression rings and an oil ring. Made of moulded aluminium, the pistons feature "box in box" technology: this contains both skirt height and below-chamber thickness, helping to reduce attrition and inertial loads while maintaining the necessary strength and stiffness.

Racing-derived design is also underscored by a high compression ratio of 14:1. The pistons are coupled to forged steel con rods with a centre-to-centre of 101.8 mm.

Mounted on brass bushings, the crankshaft rotates on three supports and is made of nitrided steel with crank pins ground twice over and offset at 70° as on the Desmosedici engines that compete in MotoGP.



This particular shaft geometry, combined with the V engine layout, allows for a special “Twin Pulse” ignition sequence.

To limit weight, all engine casings are made of die cast magnesium. The same material has been used to make the cam covers, the oil sump, the alternator cover and the two-piece clutch cover.

Counter-rotating crankshaft

On normal factory bikes, the crankshaft turns in the same direction as the wheels. In MotoGP, instead, counter-rotating crankshafts that run in the opposite direction are widely used. Ducati engineers have borrowed this top-level racing solution for the same reasons that first saw it applied in competition. Its benefits stem from two aspects of physics: gyroscopic effect and inertia.

A counter-rotating crankshaft offsets some of the gyroscopic effect generated by the turning wheels and that, in turn, improves handling and makes the bike more agile when changing direction.

The second benefit has to do with the inertia (i.e. the tendency of an object to oppose any change of state) of the vehicle and the rotating engine parts. During acceleration, drive torque is put down on the ground, causing the bike to wheelie. A counter-rotating crankshaft, however, produces inertia-linked torque in the opposite direction, lowering the front of the bike, limiting the wheelie effect and thus boosting acceleration performance.

Similarly, during hard braking/deceleration the bike undergoes rear wheel lift-up: however, the crankshaft itself also decelerates (i.e. its revs drop), producing an inertial torque that works against lift-up. So a counter-rotating crankshaft has advantages during both acceleration and braking.

Of course, this layout demands the addition of the so-called 'jackshaft' (*) to transfer crankshaft drive through the gearbox to the rear wheel so it turns the right way.

** The jackshaft adds an extra transmission element to the crankshaft-wheel connection system. This needs to be taken into consideration when establishing crankshaft power if the latter is obtained from measurements made at the wheel. During both homologation and measurement on acceleration test benches it is, therefore, necessary to consider an efficiency or, in any case, an additional coefficient that is, by law, fixed at 0.98.*

Twin Pulse ignition

A combination of 70° crank pin offset and 90-degree V layout generates what Ducati calls a “Twin Pulse” firing order because it's as if the engine were reproducing the firing sequence of a twin-cylinder. The distinctiveness lies in the fact that the two left-hand cylinders fire closely together, as do the two right-hand ones. In the timing chart, the ignition points are, then, at 0°, 90°, 290° and 380°. It's this particular firing order makes the V4 sound like a MotoGP Desmosedici.

In practice, if we imagine a cycle starting from 0°, the first cylinder to fire is the front one on the alternator side. After just 90° of rotation, the rear cylinder on the same side fires. There then follows an interval in which the engine generates no drive torque until the two cylinders on the clutch side fire, again just 90° apart. In addition to an exhaust rumble like no other in the motorcycle world, the Twin Pulse ignition sequence provides a power delivery that Ducati MotoGP riders deem unbeatable as it provides outstanding engine performance and, therefore, smooth handling, especially on corners and out-of-the-corner stretches.



Variable Intake System

The Desmosedici Stradale engine takes in air through four oval throttle bodies (52 mm diameter equivalent), connected to variable-height air intake horns, featured for the first time on a Ducati engine. This solution optimises cylinder intake across the rev range, giving major advantages in terms of power delivery and handling.

As rpm and rider-requested power vary, the air intake horns take on a configuration that lengthens or shortens the ducts, optimising the fluid dynamics of the pressure waves that run along the duct itself. Controlled by the ECU, the system consists of two stages: a fixed horn on the throttle body and a mobile one that is moved along steel guides by an electric motor. When the latter is lowered, it comes into contact with the short horn, geometrically lengthening the duct. When raised, the fluid dynamics involve only the fixed lower horn and the engine configuration is characterised by a very short duct.

Each throttle body has two injectors: a sub-butterfly one for low-load use and another above it that comes into play when maximum engine performance is required. The throttle bodies of each cylinder bank are moved by a dedicated electric motor. Thanks to the full Ride by Wire system, this allows complex electronic control strategies and modulation of engine 'feel' according to the selected riding mode.

Latest-generation Desmodromic system

As on all Ducati engines, the Desmosedici Stradale sees Desmodromic design playing a pivotal performance role. On the Desmosedici Stradale, the Desmodromic system uses fully redesigned, miniaturised components that have allowed for the construction of very small cylinder heads, achieving a degree of sophistication, lightness and compactness never before seen on a Ducati. Every single system component has been designed and tested to operate safely at the high revs the V4 is capable of. New spark plugs - smaller than standard models - also help keep the heads compact.

The four Desmosedici Stradale engine camshafts control the sixteen valves: valve diameters are 34 mm diameter on intakes and 27.5 mm on exhausts, values decidedly on the high side given the 81 mm bore. The valve seats are made of sintered steel.

Given the high revs attained by the V4 and the large valves, a traditional spring system would be inadequate because the valves would be unable to follow the steep cam profiles. This, then, is where the Desmodromic system becomes a must. With the "Desmo" system the valves are closed mechanically with the same level of accuracy as they're opened. This allows the steep cam profiles and radical cam timings that optimise intake and exhaust fluid dynamics to provide higher engine performance.

The camshafts are controlled by two "silent" timing chains. At the front, the chain drives the intake camshaft which, in turn, transmits drive to the exhaust camshaft via a pair of cogs (hybrid chain-cog timing). On rear timing, instead, the chain drives the exhaust camshaft, which transmits drive to the intake camshaft. This solution minimises timing power absorption, enhancing performance and reliability. Front cylinder timing is controlled by the chain on the right-hand side of the engine, turned by the crankshaft via a gear obtained on the primary drive pinion. The one that controls rear cylinder timing is on the left-hand side of the engine and is driven by a monobloc gear on the crankshaft. Each cylinder head has an "anti-knocking" sensor that optimises spark advance to prevent any combustion shock.

Semi-dry sump lubrication



As on MotoGP engines, the Desmosedici Stradale uses semi-dry sump lubrication with delivery and return stages that ensure effective lubrication of all moving parts at all times.

The oil circulation system consists of four pumps: one delivery lobe pump and three recovery pumps. One of the latter, a gear pump, draws oil from the heads via two ducts while the other two lobe pumps ensure efficient oil recovery under all conditions, keeping the crankcase zone under the pistons in a controlled, constant low pressure state and thus reducing airing losses (i.e. power absorption caused by the aerodynamic resistance exerted by the air and splashing of the oil in the con rod casing).

The oil tank - which also acts as a filter housing - is in a magnesium sump mounted underneath the crankcase and connected to the gearbox but separate from the crankcase. A dedicated radiator, attached just below the water radiator, cools the oil.

Cooling system

Housed in the engine 'V', the water pump is operated by a shaft, in turn driven by a gear train. This positioning solution is designed to minimise circuit size, boost efficiency and optimise engine weight.

Gearbox and clutch

The 6-speed gearbox is specially designed for the Desmosedici Stradale engine and features a rotary gear sensor to ensure optimal operation with Ducati Quick Shift (DQS) up & down.

The sensor assesses the position of the gear shift drum and, consequently, of the gear shift forks, with extreme accuracy to ensure precise gear selection. This, then, allows for a strategy that can restore torque transmission only once the gear change has been completed, thus preventing undue gear mesh stress so shifts are always complete, precise and swift.

The hydraulically controlled wet clutch has 11 driving plates and features a progressive self-servo mechanism that compresses the friction plates when under drive from the engine without requiring any extra effort from the rider to release the clutch.

While enhancing frictional efficiency, this also results in a rider-friendly, light clutch lever "feel". In sport riding conditions, the same mechanism reduces pressure on the friction plates, enabling a pure racing "slipper" action and reducing rear end destabilisation during aggressive down-shifting, with the added benefit of a super-responsive lever.

Long maintenance intervals

While performance levels surpass even those of the Superquadro, the valve clearance inspection and adjustment (Desmo Service) interval remains at 24,000 km (15,000 miles), while general service intervals remain unchanged at 12 months/12,000 km (7,500 miles).



Shapes modelled on mechanics

The new Panigale V4 was designed by the Ducati Design Center, starting from the 1299 Panigale styling elements and evolving them into a muscular machine, with sleek surfaces and assertive profiles. The styling development has followed three typical racing model guidelines: design minimalism, integration among components and the power transmitted by surface treatment. An extra touch to this project has been added by the improved aerodynamic efficiency achieved through wind tunnel testing by the Ducati Corse engineers.

The motorcycle's bodywork develops around the technical parts, and in particular, the new "Front Frame" left exposed, with the two pillars extending laterally to the Desmosedici Stradale cylinder heads. The front is dominated by two large airbox air intakes, which incorporate the full-LED headlight in the top part, overshadowed by the ports. The headlight sizing is reduced with the precise aim of enhancing the aggressive look of the two oversized ports, especially when the engine is switched off. Below the air intakes are two wing attachments designed to accelerate the incoming airflow. The full-LED headlight includes a Daytime Running Light outlining with a double-edged profile the top of the air intakes, and two compact LED modules ensuring low-beam and high-beam functions.

The nose fairing is a perfect example of the concept of integration underlying the new Panigale V4 stylistic approach. The front sub-frame, made of magnesium, is partially exposed to become part of the bodywork. The sub-frame also supports the mirrors with LED turn indicators integrated in the outer shell.

The search for essentiality and integration has also led to the dual-layer fairing design: a less stretched out main fairing, and another layer that also acts as an air outtake. The "dual layer" solution emphasises the compact nature of the vehicle mechanics and is inspired by the iconic clean lines of Ducati racing models - traditionally characterised by their stylish fairings. The main fairing extends upward by embracing the tank with two muscular shoulders which, at the top, morph into the cover of the compartment that accommodates easily accessible electrical and electronic components.

The tank has a shape designed to support the rider during track riding and stretches out to below the seat - just like in racing models. This feature is highlighted by exposing the tank in the tail area. The tail is made of two shell-cast aluminium half-shells, which starting from the rear cylinder head, reach out to hug the tank part below the seat, ending up in the single-seater one-piece tail end, whose wing-shaped design is inspired by the shape of a car spoiler. The tail fairing integrates the full LED light that is also wing shaped: although a single piece, it features the signature split lighting typical of Ducati racing models.

Innovative Front Frame

The racing soul of the new Panigale V4 is apparent in its technical specifications including a kerb weight of 195 kg for the "S" and Speciale versions (only 5.5 kg more than the 1299 Panigale S). It would be impossible to achieve these values by using a traditional perimeter frame. For this reason, a "Front Frame" has been developed - using the Desmosedici Stradale engine as a load-bearing feature. This solution is an evolution of the monocoque design and was developed on the strength of the experience gained in MotoGP.

Compared to the Monocoque design, the "Front Frame" allows torsional rigidity and lateral rigidity to be kept separate, so as to obtain the right response to the stress transmitted to the frame and better absorb any



road surface roughness in cornering, ensuring the necessary stability. All this results in superior agility and riding precision - ensuring easier control and less fatigue for the Panigale V4 rider.

The main difference in lay-out over traditional perimeter frames is the use of the engine as a structural element of the frame. At just 4 kg, the "Front Frame" features a compact frontal structure, secured directly to the upper half-crankcase of the front cylinder head and to the V4 rear cylinder head, with the engine also acting as a fixing point for the rear suspension and a fulcrum point for the single-sided swingarm.

The most important advantage offered by the Ducati "Front Frame" is that the Desmosedici Stradale engine can be used to achieve the required rigidity, making it possible to significantly reduce the outreach, and consequently, the weight, of the main frame, resulting in a better rigidity/weight ratio. Another plus is the fact that the reduced length of the pillars running alongside the engine has resulted in a more compact motorcycle design - especially in the rider seat area.

The frame is complemented by the lightweight front sub-frame, made of magnesium, and the shell-cast aluminium seat sub-frame, secured to the "Front-Frame" at the top, and screwed into the top of the rear cylinder head at the bottom.

The rear suspension uses a rising-rate linkage mechanism attached to the Desmosedici Stradale engine via a forged aluminium element. The linkage responds to the motion transmitted by a 600 mm long high-triangulation cast aluminium single-sided swingarm, among the longest in the segment, to ensure the best performance riding out of corners.

The rake and trail are 24,5° and 100 mm – respectively.

Sophisticated suspension

The Panigale V4 is equipped with 43 mm Showa Big Piston Forks (BPF), fully adjustable in spring pre-load and compression and rebound damping. The fork bodies house chrome sliders with Brembo radial caliper mountings. A Sachs steering damper completes the front-end package. The rear unit is a fully adjustable Sachs shock, fixed at one end to the Desmosedici Stradale through a forged aluminium element.

The Panigale V4 S and Panigale V4 Speciale are equipped with Öhlins NIX-30 forks, Öhlins TTX36 rear shock and Öhlins steering damper, with an event-based control system. In these versions, the suspension and the steering damper are controlled by the second-generation control system Öhlins Smart EC 2.0, featuring, among other things, the new Objective Based Tuning Interface (OBTi).

Wheels and Tyres

While the Panigale V4 is fitted with 5-spoke cast aluminium wheels, the Panigale V4 S and Speciale feature 5-spoke forged aluminium alloy wheels.

Ducati and Pirelli worked hand in hand to develop the new Panigale V4, the first motorcycle ever to feature as factory equipment the new Pirelli DIABLO™ Supercorsa SP 120/70 ZR17 at the front and the revolutionary size 200/60 ZR 17 at the rear. The latest version of the DIABLO™ Supercorsa SP, in the new 200/60 ZR 17 size already popular as a slick option in the FIM World Superbike Championship, is a pioneer in the field of racing replica tyres. The innovative profile of the resized rear tyre maximises the contact patch at extreme lean angles and makes the most of the bi-compound technology used: the SC2 compound used for the shoulder area is the same used for racing slick products, ensuring the enhanced grip of racing tyres



while guaranteeing at the same time the strength and versatility needed for road use. In order to work in perfect harmony with the rear tyre, the front tyre has gone through an extra, major development step: all the riding items related to handling, from rider feedback through support solidity to safety feeling and grip loss predictability, have been optimised by creating a new front profile, slightly increased in terms of maximum section width with respect to the previous version of the product. Redesigning the geometries of the semi-finished products and the belt pattern has made it possible to set new agility and rideability standards, with at the same time top racing level performance. Finally, the new tread pattern of the DIABLO™ Supercorsa SP features a new "flash" geometry to optimise track performance by improving wear, and reduced groove widths designed to provide adequate support for stronger side thrusts.

Exclusive braking system with new Brembo Stylema® calipers

The Panigale V4 range is fitted exclusively with the brand new Brembo Stylema® monobloc calipers - the latest evolution of the already high-performance M50.

The new Stylema® calipers, machined from a single piece of alloy, feature lighter-weight areas in the fixing bushings and in the body, which, compared to the M50, make them visually more compact - allowing at the same time a weight reduction of 70 g for each caliper, without compromising on rigidity. Other improvements have been introduced in terms of internal ventilation to ensure higher efficiency.

The new Stylema® calipers ensure improved hydraulic performance thanks to their extreme rigidity, which translates into excellent fingertip feel, a shorter brake lever travel and prompt response.

The twin Brembo calipers each have four 30mm pistons that grip 330mm discs to achieve outstanding braking performance - with at the rear a single 245 mm disc with a 2 piston caliper. The braking system is supported by the ABS Cornering EVO system, which uses the extra-lightweight 9.1MP Bosch control unit.

Racing tank

The Panigale V4's racing soul is enhanced by the 16 litre lightweight aluminium tank which, just like in racing motorcycles, relocates part of the fuel storage to below the rider's seat. The space not occupied by the fuel has been used to store all the electronics at front of the tank, under a plastic cover: this includes the battery, which in the Panigale V4 S and Panigale V4 Speciale versions is a lithium-ion pack.



Electronics

Latest-generation electronic controls

The Panigale V4 not only sets new benchmarks in terms of top performance, but also defines new active safety standards and vehicle dynamics control - thanks to a state-of-the-art electronic package, based on the use of a 6-axis inertial platform (6D IMU - Inertial Measurement Unit) that instantly detects the motorcycle's roll, yaw and pitch angles in space.

The Panigale V4 electronic package includes controls to ensure management of all the riding phases; some of these control the start, acceleration and braking phases, others manage traction, while others kick in when riding into and out of corners.

- ABS Cornering Bosch EVO
- Ducati Traction Control EVO (DTC EVO)
- Ducati Slide Control (DSC)
- Ducati Wheelie Control EVO (DWC EVO)
- Ducati Power Launch (DPL)
- Ducati Quick Shift up/down EVO (DQS EVO)
- Engine Brake Control EVO (EBC EVO)
- Ducati Electronic Suspension EVO (DES EVO)

The operating parameters of each control are factory-associated with the three Panigale V4's signature Riding Modes. The rider can customise his or her riding style and restore Ducati's factory settings. The level of one of the DTC, DWC, DSC or EBC control functions can be quickly adjusted via the direct access buttons provided on the left-hand switchgear.

ABS Cornering Bosch EVO

The Bosch ABS system, equipped with a "Cornering" function that extends ABS action to situations in which the vehicle is leaning in corners, has undergone a major evolution to reflect the latest action logic and types of control.

The Bosch EVO Cornering ABS is settable to three different levels to fully meet track and road riding needs, even in the most critical low-grip situations.

While level 3 is indicated on the road or for low-grip conditions, ensuring safer and more stable braking, levels 2 and 1, the hard-braking options, are more suited to higher grip surfaces and track racing.

Selecting level 2 enables the rider to skid into corners safely, enhancing racing performance.

The ABS Level 1, recommended for track riding, is activated while maintaining the "Cornering" feature - for extremely hard braking into corner and to help rectify any rider mistakes.

Ducati Traction Control EVO (DTC EVO)

The DTC EVO featured by the Panigale V4 is based on an algorithm that makes intervention faster and more accurate. The DTC EVO interfaces with the Bosch Inertial Measurement Unit (IMU), constantly



monitoring the vehicle's lean angle and using it to accurately calculate the degree of intervention needed to ensure suitable rear wheelspin (according to the DTC EVO level setting).

Moreover, the DTC EVO also acts on the throttle body valves and controls spark and injection advance. In all situations in which fast intervention of the DTC EVO is not required, the use of the throttle body valves ensures maintenance of optimal combustion parameters, ensuring a smoother Desmosedici Stradale response and system intervention.

With simpler types of traction control, detection of rear wheelspin sees the system kick in to hold it in check. When optimal grip is re-established, the system reduces intervention until spin reoccurs, and the cycle repeats. This produces a graph that shows intervention oscillating around a theoretical "ideal intervention line" that represents the traction limit. The DTC EVO reduces the magnitude of those oscillations, making the system operate closer to the perfect intervention line. This kind of behaviour is highly advantageous as its effect on the dynamic balance of the motorcycle is minimal. In addition, the system is designed to be stronger and more consistent, allowing the motorcycle to maintain constant and predictable behaviour even when the grip level changes - i.e. in case of rear tyre wear.

In addition to this enhanced intervention precision, when set to level "1" or "2", the DTC EVO introduces a new function, named "spin on demand", allowing the rider to control the motorcycle up to levels that would previously only have been possible for experts or pros. Now, when the machine is leaned over, the rider can use the throttle to request more wheelspin than that obtained at the normal intervention level, allowing the motorcycle to pivot around its front wheel and close the cornering line. The DTC EVO allows riders to do this while keeping safety parameters under control, effectively letting them 'close' the cornering line with the rear wheel.

Ducati Slide Control (DSC)

The introduction of the 6D IMU has allowed the Ducati Slide Control (DSC) - developed in conjunction with Ducati Corse - to be added to the Ducati Traction Control EVO (DTC EVO). This new system provides the rider with further support by controlling the torque delivered by the Desmosedici Stradale engine as a function of the slide angle; its goal is to improve out-of-the-corner performance by preventing slide angles that might otherwise be difficult to handle. The DSC relies on the 6D IMU that provides the vehicle control unit with crucial information on vehicle dynamics (such as lean angle, acceleration and much more). Thanks to these data - and depending on the user-selected level - the DSC extends the performance range of the motorcycle for everyone, providing improved assistance under extreme riding conditions.

Like the DTC EVO, the DSC controls torque reduction by acting on the throttle body valves, spark advance decrease and injection cuts. In every situation in which fast intervention of the DSC is not required, the use of the throttle body valves ensures optimal combustion parameters, with a smoother Desmosedici Stradale engine response and system intervention.

The DSC has two different settings: switching from level 1 to level 2 results in easier control of slide angles that would otherwise be difficult to handle. DSC intervention levels can be changed by accessing a special menu, in which DTC EVO and DWC EVO values can also be set. It is also possible to set direct DSC control via the direct access buttons on the left-hand switchgear. The DSC setting is always shown on the display.



Ducati Wheelie Control EVO (DWC EVO)

The Panigale V4 also comes equipped with the latest version of Ducati Wheelie Control EVO (DWC EVO). This system, using Bosch 6D IMU information, ensures wheelie control to obtain top acceleration performance in a smooth, safe manner. The DWC EVO detects the occurrence and extent of wheelies to control them with a higher level of precision - ensuring a more accurate response to rider input.

Ducati Power Launch (DPL)

This 3-level adjustable system ensures lightning-fast starts, letting the rider focus only on releasing the clutch. Once set, the rider simply engages the first gear and opens the throttle. During the first stage of starting off, while the rider is modulating the clutch release, the DPL stabilises the Desmosedici Stradale at optimal revs as a function of the selected DPL level. In the second phase, when the clutch has been fully released, the DPL controls torque delivery to ensure the maximum degree of acceleration according to the chosen level.

The DPL makes use of the DWC functions and always keeps the DTC active to ensure maximum safety at all times. Automatic deactivation of the system occurs above the end-of-start speed, or once third gear is selected. To protect the clutch, a specially developed algorithm allows only a limited number of consecutive starts. The number of available starts resets itself when the rider uses the motorcycle normally.

The DPL is adjustable to three different levels, and is activated by pressing the special button on the right handlebar. Level 1 favours high-performance starts, level 3 is safer and more stable.

Ducati Quick Shift up/down EVO (DQS EVO)

The DQS EVO with up/down function, developed for the Panigale V4, compared to the previous Panigale 1299 system uses the information concerning the lean angle to maximise motorcycle stability when shifting gears in corners.

The DQS EVO, as well as minimising gear shifting times, allows down-shifting without using the clutch - ensuring even more effective hard braking. The system consists of a two-way microswitch built into the linkage of the gear change lever; each time that the gearbox is actuated, it sends a signal to the Desmosedici Stradale ECU. The system works differently for upshifts and downshifts, integrating adjustment of the spark advance and injection during upshifts with a controlled opening of the throttle valve during downshifts - ensured by the full Ride-by-Wire system management.

The extent and duration of system operation are designed to ensure seamless gear meshing even under extreme track riding conditions; during downshifts the system works synergetically with the slipper clutch and the Engine Brake Control (EBC).

Engine Brake Control EVO (EBC EVO)

The EBC (Engine Brake Control) system has been developed to help riders optimise vehicle stability under extreme turn-in conditions, by balancing the forces applied to the rear tyre under severe Desmosedici Stradale engine-braking conditions. The Panigale V4 EBC EVO, optimised on the basis of the lean angle, monitors the throttle position, selected gear and crankshaft deceleration rate under heavy braking and fine-tunes throttle opening to balance the torque forces acting on the tyre. The EBC EVO can be set to three levels integrated in the Riding Modes.



Ducati Electronic Suspension EVO (DES EVO)

The "S" and Speciale versions are equipped with the event-based electronic control Öhlins suspension system, based on the second-generation Öhlins Smart EC (Electronic Control) system which, in addition to leveraging all the potential offered by the 6D IMU, has a new and more intuitive rider interface, OBTi (Objective Based Tuning Interface).

The electronic suspension offers the choice between manual mode ("Fixed") - allowing compression, rebound, and damping of the steering damper to be manually set via "virtual clicks" (32, from fully open to fully closed, for the suspension, and 10 for the shock absorber) - and automatic ("Dynamic").

When the "Dynamic" mode is selected, based on the information received from the 6D IMU and other sensors, the system automatically adjusts compression and rebound damping in response to the riding style.

The main advantages offered by the Öhlins Smart EC 2.0 system concern the rider's option to customise the level of intervention on the suspension, depending on individual riding events (braking, cornering, acceleration), as well as to adjust the operating parameters of individual hardware components. For the rider, this means having access to a superior level of motorcycle dynamics control - improving road safety and track lap time efficiency.

New Ducati Riding Mode strategy

The Riding Modes allow the rider to choose from three different factory-set riding styles, perfectly adapting the Panigale V4's behaviour to the rider's, to the track type, and to environmental conditions. Each Riding Mode is programmed to instantly change the engine's character, electronic control parameters and, in the "S" and "Speciale" versions, also the suspension set-up. Each rider can customise his or her riding style and later restore Ducati's factory settings.

Riding Mode Race - As the name implies, the Race RM has been developed for experienced riders who wish to make the most of all the potential of the Panigale V4 on high-grip track surfaces. By selecting Race, the rider can rely on 214 HP, with direct Ride-by-Wire throttle response and, on the 'S' and Speciale versions, a high-performance hard suspension set-up. The Race mode implies a low-intervention default electronics setting, without, however, compromising on safety, with the ABS only intervening on the front wheel to provide maximum braking performance, but with the Cornering feature always active.

Riding Mode Sport - By selecting the Sport Riding Mode, the rider can count on 214 HP power delivery with a sporty Ride-by-Wire response to throttle opening and, in the S and Speciale versions, an equally sport-oriented suspension set-up. Electronic controls are set in such a way as to help also less experienced riders adopt an effective, highly spectacular riding style. In the Sport mode, for instance, the controlled braking drift feature is active, allowing for safe wheel skidding when turning into corners. The rear wheel lift control function is active and the ABS Cornering function is set to provide maximum cornering performance.

Riding Mode Street - The Street Riding Mode is the one recommended for road use of the Panigale V4. This RM offers the rider 214 HP power delivery with progressive Ride-by-Wire response to throttle opening, like in the Sport RM, and, in the Panigale V4 S and Panigale V4 Speciale versions, an extremely soft suspension set-up to absorb any bumps in the road. The default setting of electronic controls helps ensure maximum safety, by guaranteeing the best grip and stability.



Second generation TFT display instrumentation

Ducati was the first motorcycle manufacturer to fit a model, the 2012 1199 Panigale, with full-TFT (Thin Film Transistor) colour display instrumentation.

Six years later, with the Panigale V4, Ducati sets a new standard by launching an advanced 5" full-TFT, high-res (186.59 PPI - 800xRGBx480) and high-brightness colour display, completely redesigned in terms of lay-out and up-to-date graphics, and even more alluring. In developing the motorcycle's instrumentation, the main focus was on readability and easy access to functions.

The most visible element of the brand new dashboard is the "virtual" circular rev-counter, located on the right side, a clean break with past equipment tradition, inspired by high-end automotive production. The Desmosedici Stradale revs are displayed in the 1,000 to 15,000 rpm range via a needle indicator, whose motion is highlighted by a white trail acting as a "shiftlight", changing from white to orange and then going red when approaching the over-rev area.

Two different layouts are available to - and can be recalled by - the rider: the "Track" display, which focuses attention on the lap time indication and in which the rev counter scale highlights the engine rpm values related to the track-specific range of use; and the "Road" display, which instead of lap times, shows Ducati Multimedia System (DMS) information, and highlights engine rpm values typical of road riding. For improved readability, the indications of the (digital) top speed, selected Riding Mode, and selected gear do not change position when the selected lay-out is changed.

The Panigale V4 dashboard, in addition to the classic menu including total kilometres, Trip 1, Trip 2, fuel consumption, average fuel consumption, Trip Fuel, Trip Time, Average Speed, Air Temperature, Lap On/Off (in "Track" mode only), and Player On/Off (in "Road" mode only), also features another menu in the bottom right corner with two available functions: display/indication of parameters related to the selected Riding Mode or quick changing of DTC, DWC, EBC and DSC parameters. Finally, the Panigale V4 has an "auto off" function for its direction indicators: the indicators will go off automatically after riding out of a corner or, if pressed unintentionally, after a few hundred metres on a straight stretch (variable between 200 and 2000 metres depending on the current speed of the vehicle when the indicator button is actuated).

Ducati Lap Timer GPS (DLT GPS)

The DLT GPS allows lap times to be automatically recorded, stored and displayed directly on the dashboard each time the finish line is crossed - providing the rider has previously entered the finish line coordinates, by pressing the light flasher button. The system has a useful "Best Lap" feature that displays the lap time flashing for 5 seconds if it is the best recorded lap time in the current track session. For each lap, and for a total of **15** consecutive laps, the lap time, max rpm and top speed are stored; this information can be viewed on the dashboard by accessing the special menu. The DLT GPS is part of the standard equipment on the Panigale V4 Speciale and is available as a Ducati Performance plug-and-play accessory for the Panigale V4 and Panigale V4 S.

Ducati Data Analyser + GPS (DDA + GPS)

The Ducati Data Analyser + GPS (DDA + GPS), evaluates the performance of the motorcycle and its rider by graphically presenting specific channels of information. The DDA + GPS is an essential piece of equipment for track use: it monitors the rider's performance, in addition to automatically recording and displaying lap times whenever the Panigale V4 crosses the start and finish line. It stores a number of data channels including throttle opening, vehicle speed, engine rpm, gear selection, engine temperature, distance



travelled, revs and DTC index. DDA + GPS is available as a Ducati Performance plug-and-play accessory, while it is supplied as standard with the Speciale.

Ducati Multimedia System (DMS)

The Panigale V4's versatility is demonstrated by a pre-setting for the Ducati Multimedia System (DMS) - allowing the rider to accept incoming calls, select and listen to a music track, and receive SMS notifications thanks to Bluetooth technology.

When the rider gets on the motorcycle, his or her smartphone automatically connects to the vehicle via Bluetooth, allowing the rider to handle the main multimedia features. The TFT display shows the played track, the icon indicating new incoming SMS or the name of the caller. The call or music sound are transmitted to the rider's helmet earphones. The DMS is available for the entire Panigale V4 range as an accessory.