

# ***SUPERBIKES***

**OVER 200 TOP PERFORMANCE MACHINES, PAST AND PRESENT**

**ALAN DOWDS**



# ***SUPERBIKES***

**S**uperbikes features more than 200 of the most important motorcycles of the last 30 years, including classic, off-road, and racing machines. It provides a detailed, easy-to-use guide to the diverse range of current motorcycle models, their technologies, and designs. From the earliest Superbikes, such as Honda's CB750 and Kawasaki's Z1, to the latest Yamaha YZF R-1, and Ducati's 998R, as well as tourers, custom cruisers, and large-capacity scooters, this comprehensive guide takes you through the exciting world of modern two-wheelers.

**Superbikes** includes full-color photographs, with stripped-down pictures of many models, a comprehensive specification table, and detailed history and performance tips for each bike.

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**ALAN DOWDS**



Author. Alan Dowds

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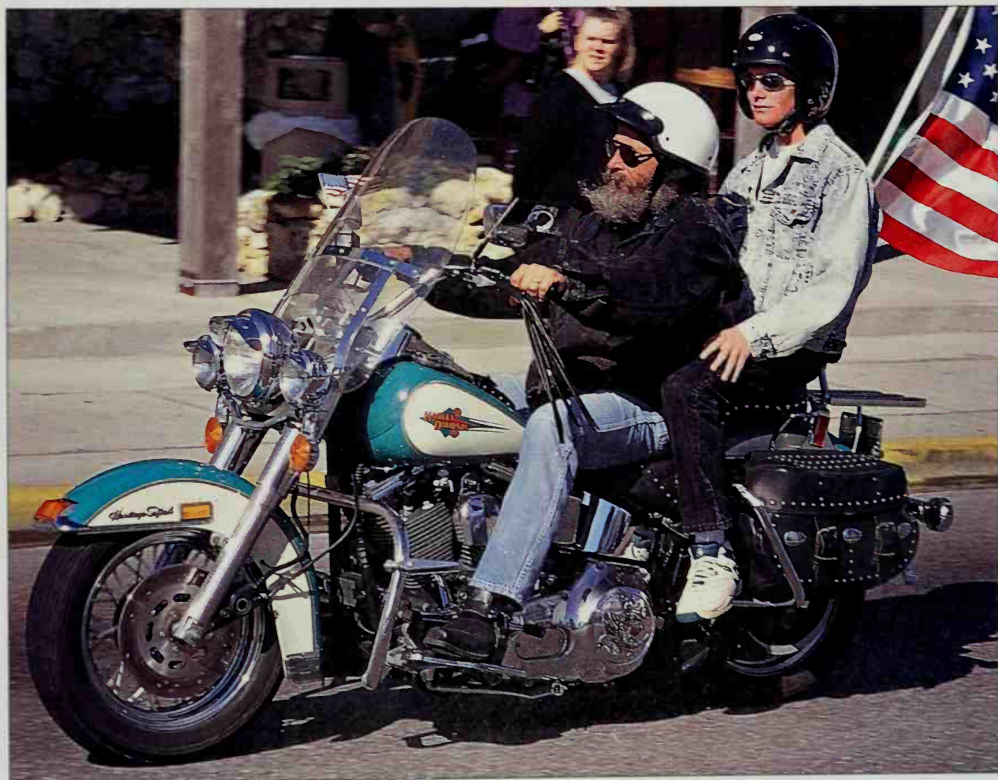
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# Introduction

The term 'superbike' is not a new one – it was first applied to cover a genre of bikes more than thirty years ago. But the superbike of today is a very different beast from the machines of the late 1960s which began the trend for lightweight, powerful, exciting sports bikes. Modern machines such as Yamaha's YZF-R1, Honda's CBR900RR FireBlade or Suzuki's GSX-R1000 combine extremely powerful engines, producing over 110kW (150bhp), with advanced chassis technologies and incredibly low weight.

But before we examine these modern automotive masterpieces, it is worth taking a look at where they came from. Motorcycling began around the end of the nineteenth century, with various pioneering inventors marrying the then-new internal combustion engine with bicycle chassis, which had been around for



*With a laid-back riding position that is perfect for leisurely cruising, the Harley-Davidson typifies the dream bike of the 1960s.*

many years. Gottlieb Daimler is usually credited with producing the first powered motorcycle in 1885, with a single-cylinder four-stroke engine.

### THE DECLINE OF THE BRITISH AND THE RISE OF THE JAPANESE

It was in the 1960s that motorcycling began to make the great strides forward that have led to today's machines. The motorcycle market up until then had been dominated by British motorcycle manufacturers, including Triumph, Norton and BSA. American firm Harley-Davidson and Italian firms like Ducati, Gilera and Laverda were producing their own designs, but it was British machines that formed the motorcycling mainstream.

However, the post-war decline in the fortunes of the UK firms had led to decades of under-investment in new designs and production techniques. Most British bikes were underpowered, unreliable, vibrated badly and leaked oil from their twin-cylinder engines.

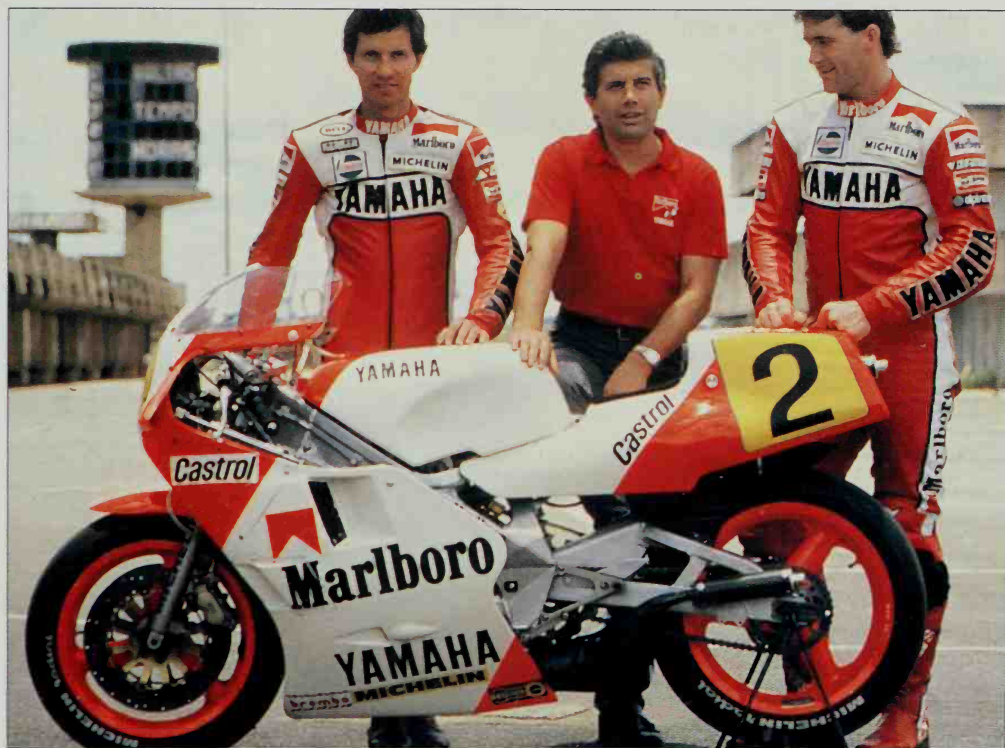
Despite this, things were changing. Japanese motorcycle firms, led by Honda, began to extend their product ranges from the small-capacity commuter machines they had been making since the war, to larger capacity machinery. This threat from the east was seldom taken seriously by a complacent British bike industry, even when Japanese race teams began competing and winning at race meetings in Europe and the US.

The complacency began to evaporate when Honda released its four-cylinder CB750 in 1969, the first in a long line of successful Japanese machines. It was a massive leap forward in terms of power, refinement and reliability, and sounded a death knell for the poorly developed and produced machines of the time.

Throughout the 1970s, the 'big four' Japanese companies – Honda, Kawasaki, Suzuki and Yamaha – continued to develop and sell a wide range of motorcycles. Every year saw new advances in power and sophistication, and machines as diverse as Kawasaki's two-stroke triples, Suzuki's RE5 rotary-engine powered bike and Honda's six-cylinder CBX1000 pushed back the boundaries of engine design.

### HANDLING TO MATCH THE POWER

All too often, though, the strong power of these engines overwhelmed the chassis and tyre technology of the time, and it wasn't until the early 1980s that Japanese machines began to handle well. Kawasaki's GPZ900R, introduced in 1984, was the first of the modern generation of superbikes, and its performance is still impressive today. An advanced liquid-cooled 16-valve inline-four engine produced a genuine 75kW (100bhp), and was fitted into a



*Introduced in 1984, the Yamaha YZR500 won six world championships up to 1993. Rider Eddie Lawson (left) won three of them.*

stiff, well-designed rolling chassis, with a full plastic fairing and less than 230kg (507lb) dry weight. It took the first three places in its maiden Isle of Man TT production race, and set the standard for other machines to follow.

The rest of the 1980s saw motorcycle engineers experiment further with turbochargers, fuel injection and large-capacity two-stroke engines, but the basic principles of modern motorcycle engines were beginning to emerge. Liquid-cooling was essential, as were four (or five) valves per cylinder. High-horsepower sportsbike applications really required four-cylinder four-strokes, and inline or V-4 engines became the dominant design. Defining bikes like Yamaha's FZR1000, Honda's CBR600 and VFR750, and Suzuki's GSX-R750 first appeared in the 1980s, and were excellent, well-designed performance machines.

By the early 1990s, however, the Japanese machines were not the only available options. European firms like Ducati and BMW began producing advanced designs. Ducati emerged from a long period of financial uncertainty,

and started producing machines which were not only desirable – they were always that – but also strong performers on the road and the racetrack.

BMW, based in Munich, Germany, also began using unusual designs and more advanced engineering in its range. Bikes such as the R1100GS and K1200RS pioneered new suspension technologies, and a new range of four-valve flat-twin Boxer engines revitalized the ageing R series of tourers and sports tourers.

In England, where the troubled Triumph name was reborn in Hinckley, massive funding by property developer John Bloor had allowed a new firm to rise from the ashes of the old Triumph, with an all-new range of modern superbikes, including sports, touring and roadster machines. Powered by modern, liquid-cooled, multi-valve engines in stiff, dynamic chassis, it seemed like the British manufacturers had finally learned some lessons from the Japanese bike industry.

## 2000 AND BEYOND

By the end of the twentieth century, the motorcycle market had matured, and the choice for enthusiasts had never been better. Segmentation of the market, and increasingly advanced designs, meant a massive choice of excellent machinery from which to choose.

In the unlimited-horsepower 'hypersports' class, bikes such as Kawasaki's ZX-12R and Suzuki's Hayabusa brush 322km/h (200mph) while remaining civilized enough for two-up continental tours. Their untrammelled power has caused problems, though, and major manufacturers have sought to avoid statutory speed limits by adopting a 300km/h (186mph) top speed limit on these superfast machines.

The pure sportsbike class divides into three or four capacity and engine classes – 600, 750 and 1000cc fours and 1000cc V-twins. The 600 class is the most closely fought, because a 600cc motorcycle is in many ways the ideal compromise for most riders. A modern 600 like Honda's CBR600F can top 240km/h (150mph), offers superb track performance, yet remains affordable in terms of running costs and insurance. The less intense performance is also more manageable for most riders.

The 750 class has become less important on the road – most riders either go for the budget savings of a 600 or the outright performance of a 1000cc. bike. But the demands of racing have always called for a 750 – the World Superbike (WSB) championship pitted 750cc four-cylinder bikes against 1000cc twins or triples throughout the 1990s, leading to the development of bikes such as Yamaha's exotic R7 and Kawasaki's ZX-7R.

The WSB championship also led to the popularity of the 1000cc sports twins



*Above: The Honda CBR900 FireBlade dominated the supersports category in the 1990s.*

class, which was a class of one in 1990. Ducati's 851 superbike has since grown into the latest 998 superbike, via the class-defining 916 and 996 machines. Ducati dominated WSB throughout the 1990s with its twin-cylinder machines, spurring Honda, Aprilia and Suzuki to produce their own 1000cc V-twins, although none has had the racing success of Ducati.

But the premier flagship sporting class has, until recently, been a purely road-based fight. Honda's FireBlade turned the unlimited class upside-down in 1992, and

set out the essential parameters of success. It was no longer enough to produce powerful engines and fit them into chassis which worked OK on the road. Throughout the 1990s, designers had to struggle to combine the plus 93kW (125bhp) of a litre bike with the mass, dimensions and controllability of a 600cc or less machine. This intense competition has led, via Yamaha's R1 and Suzuki's GSX-R1000, to a class where the lightest weighs less than a 600cc, and the most powerful matches WSB racing machines on peak horsepower. Recent changes in racing regulations, in Moto GP and British superbikes, have revitalized racing interest in this class, however for the 2002 season BSB teams are running four-cylinder, 1000cc machines, and Moto GP1 has adopted a 990cc four-stroke class to run alongside the 500cc two-strokes.

#### TOURERS, TRAIL BIKES AND MARKET DEMANDS

It is not just in the sportsbike market that modern motorcycle design has excelled. Many riders use their bikes for touring, and the latest grand touring machines offer a previously unimaginable mix of luxury equipment and

dynamic performance. Honda's GL1800 Gold Wing and BMW's K1200LT are amazingly complex and well-equipped machines. Technologies that had previously been seen only on sporting machines, for example aluminium frames and swingarms, weight-saving alloys and low-friction power-boosting engine internals, are now commonplace on touring bikes.

Less obvious touring machines have also become successful. The large trail-styled bikes like BMW's R1150GS and Triumph's Tiger have found favour with



*Designed for the leisure market, customized cruising bikes such as this 1997 BMW Cruiser express the traditional motorcycling impulse in its purest form.*

the type of 'Adventure' rider who wishes to ride hundreds of kilometres off the beaten track, including areas where road quality and condition is less than perfect. Improved performance and reliability, together with large fuel ranges and better touring equipment, have made these machines every bit as impressive as sportsbikes.

But for some riders, their touring passion must be combined with a sporting edge, and a sports-touring bike is essential. The market leaders – Honda's VFR800, Triumph's Sprint ST and Ducati's ST4 – all combine sporting chassis and engines with long-legged touring ability. Fully adjustable suspension and race-spec brakes are essential, as are plus 75kW (100bhp) engines, large fuel tanks and enough comfort and wind protection for hundreds of two-up miles in a day. The ability to ride round a racetrack on the pace the next morning is paramount.

Fuel injection and advanced electronic engine management systems have also become more commonplace across all types of machine, partly to improve performance and reduce costs, but mainly to comply with emissions legislation. Motorcycles were previously exempt from pollution checks in many parts of the world. But tightening rules mean more and more machines are following the path taken by cars a decade ago, and switching from carburettors to fuel injection.

Changing market demands have led to the expansion of several other types of machine. The budget/commuter middleweight class typified by Honda's CB600F Hornet, Yamaha's FZS600 Fazer and Suzuki's Bandit 600 have become increasingly popular. These designs use previous-generation sportsbike technologies in all-rounder roadster packages, and offer a surprisingly capable stepping-stone for novice riders, or riders on a budget looking for big-bike performance in an affordable, easy-to-use package. The custom cruiser market has also remained a strong performer in many markets, particularly the US and Germany. Image is very important in motorcycle buying decisions, and for many riders the chrome-plated, low-rider style is the purest expression of traditional motorcycling.

### SUPERBIKES OF TODAY

This book attempts to give an idea of the technologies and design principles behind the superbikes of today and yesterday, placing each bike in the context of its market, and how it is used by owners. It also gives some idea of the feelings and emotions inspired by each machine, whether a gentle cruising machine, a simple commuter or a fire-breathing supersport machine.

# Aprilia RS50



**A**prilia's RS 50 brings big-bike styling and equipment levels to the 50cc entry class. The full fairing and race-replica paint echo the styling of the RS50's bigger brothers, while the compact two-stroke single-cylinder engine produces 6kW (8bhp) in its full-power form. The engine complies with the Euro 1 emissions limits, thanks to a catalytic converter, and also features a balance shaft for smoother running. A stiff twin-spar cast aluminium frame offers superb handling, aided by disc brakes front and rear, monoshock rear suspension and radial tyres. The advanced chassis completes the high-tech spec of an accomplished mini sportsbike. In the UK, the RS50 is usually restricted to 48km/h (30mph), so is eligible for moped status.

Top speed:	112km/h (70mph) [unrestricted]
Engine type:	49cc, 1/c two-stroke single-cylinder
Maximum power:	5kW (7.3bhp)
Frame type:	twin-spar aluminium
Tyre sizes:	front 90/80 17, rear 110/80 17
Final drive:	chain
Gearbox:	six-speed
Weight:	89kg (296lb)



# Aprilia RS125



**L**ike the firm's RS50, the RS125 has a very high level of equipment, performance and styling for its class. An aluminium alloy perimeter beam frame holds an advanced liquid-cooled two-stroke engine. The 125cc single-cylinder motor uses a ceramic-type coating on the cylinder to cut friction and wear, while modern intake and exhaust designs boost power to over 194kW (260bhp)/litre. The aerodynamic fairing echoes the designs of Aprilia's GP machinery, and there have been various race-replica paint schemes. The RS125 has a high-specification chassis design, with wide, sporty tyres, 40mm (0.8in) upside-down front forks and an aluminium swingarm with adjustable monoshock rear suspension, giving fine handling especially on the track.

Top speed:	147km/h (92mph)
Engine type:	124.8cc, 1/c two-stroke single-cylinder
Maximum power:	25kW (33bhp) at 11,000rpm
Frame type:	twin-spar aluminium
Tyre sizes:	front 110/70 17, rear 150/60 17
Final drive:	chain
Gearbox:	six-speed
Weight:	115kg (253lb)

APRILIA

# Aprilia RS250



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**T**he RS250 is that increasingly rare item: a current two-stroke production roadbike. Emissions legislation worldwide has made the large-capacity two-stroke engine a thing of the past, with its poor fuel consumption and excessively dirty exhaust emissions.

But Aprilia's RS250 continues to provide some of the purest motorcycling performance available. The heart of the bike is a rather outdated engine, Suzuki's RGV250 motor, first seen in 1989. It's a V-twin two-stroke, with several advanced power-boosting features, including guillotine-type power valves, electronically-controlled 34mm Mikuni flat-slide carburetors and ceramic-coated cylinders. Aprilia modified the RGV's exhaust and intake systems to produce a power increase to 52kW (70bhp) at the crankshaft, equivalent to 280bhp/litre: the highest specific power output of any current production roadgoing motorcycle.

The rest of the bike is more than capable of handling this impressive power figure. A twin-spar aluminium frame provides super-stiff handling, and the fully-adjustable Showa upside-down front forks and rear monoshock allow a wide range of adjustment for any track or road situation. Wide sports tyres provide amazing grip, and the front twin Brembo four-piston calipers offer superlative stopping power, especially for a bike weighing just 140kg (224lb).

While the RS250's engine is based around a design that's more than a decade old,



the styling is undoubtedly modern. A banana-style upswept aluminium swingarm and twin side-mounted exhausts pay tribute to the Grand Prix technology behind the RS, as well as providing a unique look.

Since Suzuki discontinued its RGV250, the RS250 has been unique in its class. The closest rivals to this mini-racebike are the four-cylinder 400cc four stroke machines like Honda's VFR400 and Kawasaki's ZXR400. But these heavier machines can't provide the ultimate cornering experience of the RS250, nor the exhilaration of the 250's screaming two-stroke acceleration.

Top speed:	205km/h (128mph)
Engine type:	249cc, l/c 90° V-twin two-stroke
Maximum power:	52kW (70bhp) at 10,500rpm
Frame type:	twin-spar aluminium
Tyre sizes:	front 110/70 17, rear 150/60 17
Final drive:	chain
Gearbox:	six-speed
Weight:	140kg (224lb)

APRILIA

# Aprilia Pegaso



**T**he Pegaso is Aprilia's entry into the popular middleweight trail-styled bike, and while the off-road capabilities of the Pegaso are limited, its long-travel suspension, off-road styled tyres and narrow chassis make it well-suited as a town and back-roads bike. Hidden behind the swoopy fairing is a modern liquid-cooled single-cylinder engine. The Rotax-based design uses a five-valve cylinder head and Sagem electronic fuel-injection to produce almost 37kW (50bhp), with a balance shaft to reduce vibration. A five-speed gearbox drives the 130-section rear tyre through a chain drive, and twin underseat silencers give a sleek tail unit design. Aftermarket hard luggage systems make the Pegaso a decent middle-distance tourer.

Top speed:	176km/h (110mph)
Engine type:	652cc, l/c single-cylinder, five-valve, SOHC
Maximum power:	37kW (49bhp) at 6250rpm
Frame type:	twin-spar aluminium
Tyre sizes:	front 100/90 19, rear 130/80 17
Final drive:	chain
Gearbox:	five-speed
Weight:	175kg (385lb)

# Aprilia Blue Marlin



**U**nveiled at the 2001 Milan Show, the Blue Marlin is an advanced prototype model designed in collaboration with French company Boxer Design. It uses a back-to-basics approach to provide a rawer sportsbike experience. The 60° V-twin engine common to all of Aprilia's large-capacity bikes is housed in a steel-tube frame with aluminium rear plates. The line of the frame continues back up to the tail unit, in the style of race machines from the 1950s and 1960s. There are modern elements to the design too, with an aluminium tube swingarm, upside-down front forks and a purposeful twin headlamp nosecone. While the Blue Marlin looks simple, its components are very high quality, including Öhlins suspension and Brembo brakes.

Top speed:	280km/h (175mph)
Engine type:	998cc, l/c 60° V-twin, eight-valve, DOHC
Maximum power:	97kW (130bhp) at 9500rpm
Frame type:	chrome-moly steel-tube double cradle
Tyre sizes:	front 120/70 17, rear 180/55 17
Final drive:	chain
Gearbox:	six-speed
Weight:	not available

APRILIA

# Aprilia Caponord



**T**he large-capacity trail-styled bike market is a lucrative one in Europe, and Aprilia's entry is certainly distinctive. The large twin-headlamp fairing follows the quirky design brief of the rest of the firm's bikes, while providing good weather protection. The familiar RSV Mille-based engine has been re-tuned to produce 73kW (98bhp) rather than the 97kW (130bhp) of the donor bike, providing a flatter, less peaky power delivery, more suited to relaxing progress. The unusual 'Double Wave' frame is very stiff, and long-travel suspension soaks up the worst bumps. Like most big-bore trailbikes, the Caponord is mainly aimed at touring use, so it has a large 25-litre (5.5 gal) fuel tank, spacious pillion accommodation and a large, comfy dual seat.

Top speed:	224km/h (140mph)
Engine type:	998cc, 1/c 60° V-twin, eight-valve, DOHC
Maximum power:	73kW (98bhp) at 8250rpm
Frame type:	twin-spar Double Wave aluminium/magnesium alloy
Tyre sizes:	front 110/80 19, rear 150/70 17
Final drive:	chain
Gearbox:	six-speed
Weight:	215kg (473lb)

# Aprilia SLV 1000 Falco



**L**aunched two years after Aprilia's RSV Mille, the Falco used the same 60° V-twin engine used in the RSV range. Since not every rider wishes to ride a committed sports machine like the RSV Mille, the Falco offers a more relaxed sports-touring ride. Its 998cc engine has a lower state of tune, producing 9kW (12bhp) less than the RSV Mille. But despite the lower power output and relaxed riding position, the Falco's chassis is as highly specified as the RSV. Showa upside-down forks and a Sachs rear shock are both fully adjustable, and the Brembo brakes are race-spec items. In some ways, the Falco has rather fallen between the two stools of the firm's RSV and Futura. The RSV is more suitable for track work, while the Futura is a better tourer.

Top speed:	256km/h (160mph)
Engine type:	998cc, l/c 60° V-twin, eight-valve, DOHC
Maximum power:	88kW (118bhp) at 9250rpm
Frame type:	twin-spar aluminium/magnesium alloy
Tyre sizes:	front 120/70 17, rear 180/55 17
Final drive:	chain
Gearbox:	six-speed
Weight:	190kg (418lb)

# Aprilia Futura



**T**he Futura is an attack on the lucrative sports tourer market long dominated by Honda's VFR750/800 range. Heavier and less powerful than the Falco, it combines performance and practicality with Aprilia's trademark quirky style. The single-sided rear swingarm is practical, allowing easy wheel removal, as well as stylish. The sharp-edged full-fairing design gives sound aerodynamic performance and good wind protection. The innovative exhaust incorporates a large underseat silencer making room for hard luggage provision. On the move, the retuned RSV engine allows easy progress thanks to a stronger midrange delivery, and the relaxed riding position is comfortable for hundreds of kilometres of fast touring.

Top speed:	253km/h (158mph)
Engine type:	998cc, l/c 60° V-twin, eight-valve, DOHC
Maximum power:	85kW (114bhp) at 9250rpm
Frame type:	twin-spar aluminium/magnesium alloy
Tyre sizes:	front 120/70 17, rear 180/55 17
Final drive:	chain
Gearbox:	six-speed
Weight:	210kg (462lb)