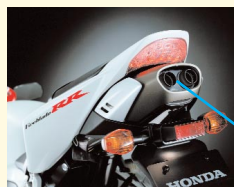


# 2004 CBR1000RR Fireblade



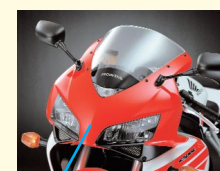
**NEW** Slim and lightweight 7-segment LED taillight integrated into the underside of the tail cowl provides a brilliant brake light display from its position above the aggressively styled Centre-Up exhaust.



Locking pillion pad opens to reveal compact carrying space for small-sized U-lock and other essentials.



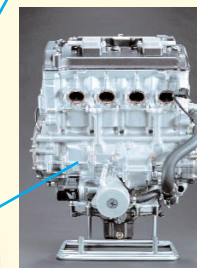
**NEW** Slim and compact, fully electronic instrument panel with adjustable shift indicator, large digital LCD speedometer, multi-segment fuel gauge, coolant temperature gauge, and blinking H.I.S.S. warning light.



**NEW** Dual Line Beam multi-reflector headlights pioneered on the CBR600RR provide brilliant night-time illumination from their slim, low-profile forms.



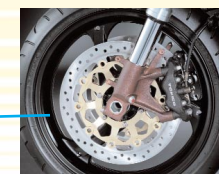
**NEW** Racer-style cassette-type transmission with stronger gears facilitates gearing changes to match circuit conditions in the heat of competition.



**NEW** Larger-displacement 998cm<sup>3</sup> inline-4 engine achieves stronger overall power characteristics in a shorter, more compact configuration for optimised mass centralisation and quicker, lighter handling. Features new semi-closed cylinder deck casting for assured high-speed endurance and reliability, molybdenum-impregnated pistons for reduced friction and higher performance, and a balancer for smoother operation.

The new CBR1000RR Fireblade will also be released with an assortment of optional parts that have been specially designed and produced by Honda Access Corporation to improve upon aspects of its road and track performance.

**NEW** Lightweight and compact 4-into-2-into-1 stainless steel Centre-Up exhaust system reaches under engine and up under seat cowl for unimpeded cornering clearance and a clean, aggressive look. Features servo-operated exhaust valve for optimised performance at all engine speeds.



**NEW** Rigid, high-performance radial-mounted 4-piston brake callipers grip large-diameter 310mm floating rotors for braking control on par with many race machines.

**NEW** Lightweight and rigid hybrid aluminium swingarm integrates new Unit Pro-Link suspension system into its cast pivot section to isolate frame and handling from rear suspension stresses.



**NEW** Revolutionary electrohydraulic steering damper automatically monitors vehicle speed to maintain optimum damping characteristics for more assured high-speed cornering control and easy low-speed manoeuvrability.



**NEW** Fuel tank cover conceals RC211V-based centralised fuel tank and Dual Sequential Fuel Injector-equipped aircleaner within its more compact form.

**NEW** Innovative hollow-section Gravity Die Cast aluminium frame achieves a supreme balance of light weight and optimised rigidity for exceptional handling on both street and track.

**2004**

**CBR1000RR**  
**FIREBLADE**  
**PRESS INFORMATION**

# Introduction

The 1992 debut of the history-making CBR900RR Fireblade completely rewrote the book of Super Sport motorcycle design with a remarkably compact and lightweight configuration based on a 'Less Is More' concept that achieved a breathtaking blast of litre-class performance from a 900cc inline-4 engine shoehorned into a highly advanced 600cc-class chassis. With its compact proportions, light, responsive handling and unprecedented power-to-weight ratio, the Fireblade embodied the origin of the Supersport motorcycle, and sparked the expansion of the current litre-class Supersport category.

Over the years, the Fireblade received a series of evolutionary improvements that saw sometimes quite radical changes, though always based on its two guiding development themes of 'Light Makes Right' and 'Total Control.' Engine displacement also saw small, incremental increases, but in the desire to keep the engine's external profile as slim as possible, there was no pressing need to boost its size up into the litre range.

In racing competition around the world, privateer teams and club racers quickly recognised the 'Blade's competitive potential, and over the years have won an enviable collection of winner's trophies ranging from box-stock club racing events to such prestigious venues as the Isle of Man T.T., the Suzuka 8-Hour and Le Mans. Changes to Superbike racing rules announced at the beginning of this year spurred further interest in expanding the Fireblade's racing capabilities, and a new goal was set for its continuing development: to create a new base machine for litre-class racing that could be used to successfully compete in everything from local box-stock races to the big Superbike circus.

To achieve that aim required a new direction in the CBR's conceptual approach, as well as in its overall definition of performance. Where until now its central focus had been on being the 'Lightest Super Sport in its Class,' the determining factors in its development were re-focused on boosting its Superbike race-winning performance potential and all-out riding Excitement. A 'no holds barred' combination of race-ready power and performance that Fireblade owners have been requesting for some time.

The starting point for this radical new departure in the Fireblade's long history of development was never in question. None other than Honda's all-conquering new MotoGP powerhouse, the RC211V, held the key to the future evolution of the company's premier Super Sport flagship; the very same machine on which this year's impressive new CBR600RR is also based. The main goals set for the Fireblade were, of course, stronger power, RCV-DNA-based chassis and handling, a strikingly powerful design, and cleaner and greener all-round performance than its competitors. Top performance, leading-edge technology and ultimate riding control, all held together by Honda's Racing DNA in the strongest 'RR' ever.

# Development Concept

Like the CBR600RR before it, the main focus of the new CBR1000RR Fireblade strays away from the single-minded pursuit of absolute peak power or the lightest weight. Specification figures can't possibly tell the whole story about a motorcycle's performance potential, since the overall handling and performance of a bike depends most on making efficient and effective use of the engine's full power throughout its entire powerband, rather than simply concentrating on the big numbers.

The Fireblade's totally new 998cc engine was designed from the ground up for World Superbike levels of performance. Shorter and more compact than ever before, it provides a strong yet smoothly linear power delivery, with a new ram air induction system combining with a new Dual Sequential Fuel Injection system like that introduced on the CBR600RR to provide a breathtaking surge of top-end performance combined with stronger, more highly responsive low-to-midrange power output.

In its chassis department, the quest for a more impressive range of excitement led the Fireblade's development team to lean heavily on Honda's astoundingly successful MotoGP champion, the RCV211V, for a wealth of design influences related to riding and racing performance, fully optimised handling, and a more intensely focused, yet well-rounded range of circuit performance that delivers the potential for full World Superbike racing conquest.

The new Fireblade's exterior styling is strongly influenced by feedback from Honda's MotoGP-conquering RC211V racer. As the top machine on both track and street, the Fireblade embodies Honda's racing spirit and most advanced technology. Standing still it looks just like the RC211V, on the road it will surely make riders feel like MotoGP champion Valentino Rossi.

With all this emphasis on top performance, you might think that the Fireblade had forsaken its well-deserved reputation for being a comfortable and forgiving mount that ably compensates for a wide range of rider skill and experience. You might think so, but you'd be wrong. As Honda's premier Super Sports flagship, the Fireblade still proudly carries its 'Fun to Ride' standard with a superb level of riding comfort that encourages better ability in every rider. Its track capability is certainly for real, but this capability also translates into greater confidence on the street. With stronger acceleration, easier

anticipation and smoother handling, the new Fireblade offers easier control through the corners than any litre-class motorcycle ever experienced before. Even its seat height and riding position have seen improvements for both finely honed racing prowess and remarkably comfortable control. And as if that weren't already enough, the new Fireblade also introduces a revolutionary new technology—the Honda Electronic Steering Damper, a world's first which enhances high-speed cornering performance for more confidently enjoyable riding.

Needless to say, even though the new Fireblade aims to be the top bike on both street and track, it also reflects Honda's concern for the environment by meeting all relevant exhaust emissions standards while still ensuring top race-ready performance.

# Styling

Like the CBR600RR before it, the all-new CBR1000RR Fireblade borrows many of its fundamental design aspects from Honda's current new MotoGP racing champion, the RC211V. Packed with the world's most advanced race-proven technology, the new 'RR' also takes many of its styling cues from this most dominant force in the current MotoGP season.

Making a clean visual break from its long line of predecessors, the new Fireblade's bodywork features a sharper and more aggressively angled nose with a lower windscreen and more dynamic form geared more to the needs of the circuit than to the comforts of the street. Like the fairing enshrouding the remarkable RCV, its smaller, more compact form achieves a totally optimised balance of slippery high-speed aerodynamics and lightweight, instantly responsive control.

The fairing's side body cowls now feature a new 3-piece design, with the large lower halves constructed of a different material than the upper sections for easier access to engine and chassis components and a more aggressive look.

The new Fireblade's distinctively designed fuel tank, or to be correct, its new fuel tank cover, is shorter in length, as measured from the steering head than its predecessor, with a sharp rise up to its flat upper surface and deep leg indents providing a secure hold in rapid cornering manoeuvres. Based on a format conceived for and tested on the RC211V racer, this new design plays a fundamental role in the new RR's compact configuration and swift, neutral handling, as it positions the rider closer to the machine's overall centre of mass.

Like the CBR600RR, and the RC211V before it, the Fireblade's actual fuel tank shares space underneath this cover with the forward-positioned airbox, where it makes a critical contribution to the new CBR's guiding concept of total mass centralisation by extending down between the frame rails to the top of the engine cases. This positioning allows the CBR to carry the large bulk and weight of its full 18-litre fuel load closer to the centremost rotating axes of the machine, thus minimising the inertial effect that this large mass of shifting weight can have on handling, and resulting in lighter, more responsive manoeuvrability that facilitates quick changes of direction by remaining essentially neutral, regardless of how much fuel it's carrying.

The CBR's slim, new racer-look seat cowl also features lighter and more dynamic lines jetting back to terminate into a sharp edge which incorporates the same slimline flush-mounted LED taillight featured on the CBR600R into its lower surface.

### **Sleek, New 'Line Beam' Dual Headlights**

Brilliantly adding to the Fireblade's sleek and speedy MotoGP look are a slim pair of 'Line Beam' headlights like those first introduced on the dynamic new CBR600RR. Projecting a more modern and boldly aggressive image, these low-profile units feature a compact, yet high-illumination multi-reflector design projecting through clear lenses that are less than half the size of the dual headlights used on most road bikes, yet provide a brilliant night-time view of the road ahead while imparting a more dynamic look to the front of the machine.

Elsewhere, the Fireblade's indicators and slim, lightweight LED taillight were also borrowed from the 600RR, further contributing to its sleek look of aggressive performance. Other changes are evident in the new design of the 'Blade's cast aluminium pillion steps and holders, and in the front cowl's lighter-weight cast aluminium stays. With a broad yet thin seat pad provided for the rider, the detachable pillion seat can be easily replaced with an optional colour-matched cowl to provide solo riders with a more completely focused racer look. Underneath, a more compact carrying space provides room for a U-lock, gloves, and a few other small essentials.

### **Impressive, High-Performance Centre-Up Exhaust System**

Beneath the Fireblade's new tail juts out the impressive end of a new Centre-Up exhaust system like that introduced on the 600RR, with two distinctive ports in its endpiece delivering the Fireblade's attention-getting racer-like growl of performance. As with the 600RR, this new 4-into-2-into-1 system runs under the engine, then up and over the rear tyre to nestle its large-capacity stainless steel silencer in the specially sculpted space beneath the rear seat cowl. Thus hidden from the air stream, this new system eliminates the turbulence and related air resistance associated with side-mounted pipes, while leaving nothing in the way of maximum cornering clearance. Race-bred design for a new litre-class champion.

# Colouring Concept

The new Fireblade's colours and styling strive to maintain a strong visual link to both the original Fireblade and the RC211V MotoGP racer on which much of its fundamental design is now based. In black and Winning Red, the new Fireblade impressively emphasises its visual ties to the RC211V with dark silver metallic undercowls and a fierce-looking race-ready demeanour that shows a strong family resemblance to the other race-base machines in the Honda Super Sport stable. And for a touch of Honda's popular tricolor tradition, a bold red on white version with the Honda Wing Mark enhanced by a deep matte blue is offered which should prove popular among the Fireblade's many European fans.

## Colours

- Pearl Fadeless White (with Winning Red and Matte Barents Blue Metallic)
- Black Matte (with Moonstone Silver Metallic)
- Winning Red (with Matte Gun Powder Black Metallic)

# Engine

Racing regulation changes introduced earlier this year stimulated a new burst of activity in the factories and design centres of the world's largest motorcycle manufacturers. Nowhere were the possibilities of this change in policy more strongly grasped than among the members of the team then working on the development of the next generation of the famed CBR RR Fireblade.

This new revelation and subsequent reordering of the new Fireblade's development goals called for a total redesign of its already compact liquid-cooled inline four-cylinder engine, with its primary focus now shifted toward achieving race-winning performance potential in the litre class without requiring more extensive modifications in order to remain competitive.

To start, cylinder bores and pitch were left untouched in order to preserve the engine's narrow overall width. Instead, displacement was upped through an increase in stroke from 54mm to 56.5mm, for a total displacement of 998cm<sup>3</sup>, which would also realise stronger torque throughout its wide powerband.

In order to free up space to lengthen the swingarm, thereby reducing angular movement through its suspension travel and subsequently reducing pitching over rough road surfaces, the arrangement of the engine's crankshaft, main shaft and countershaft was completely revised, with the countershaft relocated underneath the main shaft for a dramatic reduction in engine length.

A balancer shaft is used to reduce secondary vibration to an absolute minimum. To reduce the balancer shaft's influence on the crankshaft's vibration moment, it was positioned closer to the engine's centre of gravity.

Even the starter motor was repositioned, with its corresponding gear on the crankshaft shifted from the left side to the right, to realise a narrower engine profile and a 2° increase in maximum bank angle. The starter motor's torque was also increased in line with the engine's larger displacement while still maintaining essentially the same size and weight. Due to the new engine layout, the starter clutch that was previously located inside the ACG cover was moved from the left side of the engine to the right.

Although the cooling system's water pump retains essentially the same configuration and positioning as in the current model, the cooling system itself was

radically modified, with coolant now entering the cylinder block from the sides, instead of a central port behind the cylinders. Also, to free up space in front of the engine for greater freedom in designing the layout of the exhaust headers, the piggyback-style liquid-cooled oil cooler and oil filter were moved from the lower front and centre of the cases to the right side of the engine, and separated for a more compact overall configuration, as well as easier access to the filter for maintenance.

### **New Semi-Closed Deck Cylinder Block**

Modern open-deck die-casting techniques have permitted the design and construction of lighter, more precisely formed engine blocks that offer greatly enhanced cylinder cooling capability, especially when formed around the PMC (Powdered Metal Composite) aluminium/ceramic cylinder sleeves used in Honda's high-performance Super Sport engines.

For the first time ever in a motorcycle engine design, the Fireblade's compact new engine features a fundamentally simple new 'semi-closed' deck design which firmly secures the tops of the cylinder bores to the outer walls of the block with innovative new bridges formed in the initial casting process that reduce the possible development of friction at high engine speeds for maximised endurance and reliability.

### **New Forged Aluminium Pistons**

A fundamental key to creating high-revving, high-powered engines is the minimisation of both reciprocating mass and power-robbing friction. As always, in its never-ending quest for achieving more with less, the new CBR1000RR stands on the cutting edge of engine development with a new, leading-edge advance in piston design.

The RR's lightweight new forged aluminium Slipper pistons feature a radical new surface preparation process applied to their side skirts that greatly reduces frictional losses as the pistons thrust up and down in the engine's PMC cylinder sleeves. No mere surface coating, this treatment literally shoots particles of pure, low-friction molybdenum into the side skirt faces of the piston with such high force and temperature that they are embedded deep into the surface of the aluminium with a chemical reaction that seals the material in place.

To help ensure that these hot new pistons keep running cool, new high-pressure oil jets provide a continuous stream to the underside of the pistons, with increased output for more efficient cooling.

### **Nutless Connecting Rods**

Lighter weight connecting rods also play an important role in quickly reaching peak power, since excessive reciprocating mass here can slow response and acceleration while introducing vibration and stress that can adversely affect operation at higher rpms. The Fireblade's new Nutless connecting rods have their endcaps held in place by standard threaded bolts screwed directly into tapped holes in the rods, instead of the conventional nut and bolt combination, for a total weight savings of approximately 50g. Combined with the Fireblade's lightweight, freer moving new pistons, this significant reduction in reciprocating weight makes a major contribution toward reduced mechanical loads to realise a much sharper and more aggressive feeling of responsive acceleration.

### **Revised Cylinder Head Configuration**

Already designed to efficiently flow fuel and air mixture in, and exhaust gases out of the 'Blade's hot-firing combustion chambers, the engine's head also received some small but significant improvements. While its magnesium head cover and cam holders remain essentially unchanged, intake port angles were raised for a straighter injection and intake path, and a significant contribution to more responsive performance. Included valve angles were also narrowed for a flatter squish band, with the current 12° intake valve angle reduced to 11° 20' and the exhaust valve angle reduced from 13° to 12° 10'.

While valve diameters remain the same at 29mm for intake and 24mm for exhaust, the valves' stems were slimmed from 4.5mm to 4mm for lighter weight and reduced friction. This important weight reduction also permitted the use of lighter valve springs, that keep valve actuation quick and accurate.

### **New PGM-DSFI Dual Sequential Fuel Injection System**

Pioneered on the blazing RC211V and first introduced in the production CBR600RR, the Fireblade's new PGM-DSFI Dual Sequential fuel injection system

features two separate sets of injectors; the first installed in the throttle bodies attached to the cylinder head, as in most conventional systems, and the second set positioned up in the aircleaner, directly above the velocity stack of each cylinder.

The theory behind this is as follows: in the past if quick response was the goal, the injectors were mounted close to the engine. If maximum power at high revs was the goal, the injectors had to be mounted further away. Achieving both proved to be an extremely difficult proposition. The new Fireblade makes maximum use of the 2-injector system to effectively achieve both goals. One injector is mounted in an insulator directly to the head. The second injector is mounted above the velocity stack for maximum power output. The result is both brilliant throttle response and high power output. An ideal air/fuel mixture at all engine speeds results in highly efficient combustion for high power output, and a major reduction in unburned exhaust gasses for environmentally friendly low emissions.

To realize this performance, the Fireblade's second set of injectors are programmed to only operate when the throttle is opened wide at engine speeds of over 5,000rpm. As a result, as in Formula One race car engines, the cooling period and distance of the incoming air/fuel mixture is increased, lowering the temperature of the intake air. This creates a denser mixture that improves volumetric efficiency, creating very strong acceleration power.

This new, higher-performance PGM-DSFI system also features a new 32-bit processor in its Electronic Control Unit, replacing the earlier 16-bit unit for quicker response and more accurate control. Besides overseeing the control of the fuel injection, ignition and emissions systems, this new processor also incorporates the control systems for the new servo-actuated ram air duct and exhaust valve, as well as the control system for the Fireblade's newly developed electrohydraulic steering damper. Remarkably, with all the duties it is now called upon to perform, this new ECU is also more compact and lighter in weight, for super computer processing capability that fits in the palm of your hand.

### **High-Performance New UC Injectors**

The new Fireblade's injection system also introduces a new generation of lightweight, high-performance UC injectors (the 4<sup>th</sup> generation, counting from the '98 VFR800FI), which deliver a more finely atomised spray. Because this finely atomised

fuel covers a wider area, it mixes more completely with the air, speeding up the combustion process.

The result is more efficient air/fuel mixing and subsequently smoother, more responsive performance. This finer spray was achieved with an entirely new hole manufacturing process that creates a radial 12-hole array of smaller holes that produce a wider, more evenly diffused output.

Further, higher response was achieved by using dramatically lighter new needle bearings that allow the valve to respond in 1/1,000 sec. to electric signals (30% faster), allowing the new Fireblade engine to operate at a higher rpm than the RR.

With their vastly improved atomisation characteristics, these new UC injectors offer higher potential and smoother performance than any other comparable units by far, for a full rank up in overall performance. At 30 grams, the eight injectors are also considerably lighter than current model's, which weigh in at 38 grams, and their simpler design and construction also helps reduce manufacturing costs. The lower set is now also installed in new 44mm machined aluminium throttle bodies.

### **New Servo-Controlled Exhaust Valve System & Ram Air System**

The Fireblade features a new servo-controlled exhaust valve system that controls a new type of valve located inside the under-seat exhaust. By giving independent control over the flap located at the front mouth of the ram air intake, power and torque across the rpm range are significantly increased.

Positioned just above the top of the 'Blade's new large-capacity radiator, and below its steering head, the large central duct at the front of the airbox provides a high-pressure volume of cool, power-producing air at speed for a dramatic surge in midrange to high-speed power and performance. This system provides excellent ram air performance for street and box-stock racing applications—although may require a bit more intake volume for full Superbike racing potential. Inside the new airbox, a pair of large cylindrical air filter elements replace the panel-type element used till now, providing a clean, unrestricted flow of air to the intakes.

Further optimising power output, the Fireblade's new 4-into-2-into-1 stainless steel and titanium exhaust system features a new exhaust valve designed to achieve a superb balance of low-to-midrange power delivery and effectively modulated sound output, as well as improved driveability.

The cable-actuated valve is located just before the upward bend in the exhaust pipe and is operated by a servomotor that receives control signals from the central CPU. This system significantly improves power and response at low, medium and high rpm. Besides enhancing overall performance, the new valve is also fully 770g lighter (at 479g compared to 1,249g) than the Honda Titanium Exhaust Valve (H-TEV) system it replaces.

CBRs destined for the German market will also be equipped with Honda's low-pollution HECS3 O<sub>2</sub> sensing catalytic emissions control system to keep it in conformity with EURO-2 regulations while still maintaining the Fireblade's phenomenal power and performance.

### **New Cassette-Type Transmission**

Specially designed to provide winning performance on both the street and the track with its larger displacement and more aggressive power output, the Fireblade's new engine also required a transmission system that was up to the task of handling the stresses of racing competition without missing a shift. To facilitate optimum gear selection and help racers more easily meet the needs of different race courses, a cassette-type transmission was selected, with new ratios and stronger, more durable gears designed to match the engine's stronger performance.

While its outer gear shift linkage closely resembles that found on the CBR600RR, with a long linkage rod reaching straight up from the shift lever to the shifter shaft, the actual shift mechanism was moved closer to where the action is, from the right to the left side of the engine.

Clutch operation is now managed by a newly developed hydraulic actuation system replacing the cable-actuated system on the current 'Blade, and the clutch diameter was increased from 125mm to 140mm for a significant increase in surface area and operating capacity.

Power is delivered to the rear wheel by way of a newly developed, more durable and lighter weight #530 drive chain, while the size of the rear driven sprocket was reduced from 42t to 40t to take full advantage of the engine's increased power and torque and to raise the Fireblade's top speed.

### **New High-Capacity Race-Ready Radiator**

Extremes of performance—especially in racing— by definition generate extremes of temperature, and the new CBR1000RR is certainly up to the job of keeping a cool head in the heat of competition with a new large-volume radiator that seems to take up the entire area behind the front wheel. Featuring an expansive 1,359cm<sup>2</sup> of surface area, compared to the current RR's 815cm<sup>2</sup>, this new radiator increases total cooling capacity from 26kW to 36.8kW to easily meet the cooling needs of box-stock racing competition. Even the radiator's fan was boosted in size, from 171 to 191mm, to ensure ample cooling capacity on hot days in stop-and-go city traffic conditions.

### **Thinner and Lighter New ACG**

The Fireblade's smaller diameter, thinner and lighter (down from 2kg to 1.6kg) ACG utilises neodymium magnets to ensure ample electrical output. Output at idle has also been increased for more efficient battery charging at low rpms. Neodymium magnets are also used on other models.

### **Lightweight Magnesium Oil Pan**

In the pursuit of reduced engine weight combined with improved structural rigidity, the CBR's new oil pan was formed of ultra-lightweight magnesium, achieving a weight savings of 375g over conventional aluminium. This new material also provides better structural resistance to the deformative extremes of high engine temperatures, thereby ensuring more reliable sealing of its new liquid gasket. Combined with the RR's current magnesium head cover, this new magnesium oil pan provides increased efficiency coupled with a significant loss of weight.

Inside this magnesium pan, the engine's new oil pump design features a larger yet lighter nylon strainer replacing the standard steel unit for a weight reduction of nearly 50g.

# Chassis

The CBR900RR has maintained its superb control and handling for over a decade with a chassis built on a basic twin-spar aluminium frame configuration that has seen small but important evolutionary improvements in its design over the course of the years. Its last major change came in 2000, with the introduction of its current Semi-Pivotless frame configuration, which relocated the pivot of the swingarm at the back of the engine case castings in order to isolate the frame from the direct influence of the swingarm's stresses.

For 2004, the CBR receives an entirely new frame configuration proven on the RC211V, and further honed in the development of the CBR600RR. This frame features large GDC (gravity die-cast) sections extending from the front steering head down and around the engine to its diamond configuration hangers, and reaching up and forward from the engine-mounted swingarm pivot to join the cast forward sections around a pair of short but large, open-section extrusions in a quasi-twin-spar layout.

Relatively simple in its construction, this new frame achieves a high balance of rigidity and strength that ably provides the swift and highly responsive handling control required for circuit conquest, and valued highest by sports riders everywhere.

## **New Die-Cast Aluminium Seat Rails**

The RR's new cast frame provides a solid mount in the rear for a lightweight and simply constructed cast aluminium seat rail like that featured on the CBR600RR. Structurally strong and organically designed, this new frame not only rigidly supports the rider and a passenger, but also surround the CBR's large, new, Centre-Up exhaust system with a perfect custom fit that would be difficult and highly time-consuming to duplicate with conventional welded tube construction. Like the seat rail developed for the 600RR, this rail is an assembly of four basic pieces bolted together to provide lighter weight and assured lateral strength and rigidity for road or track.

## **Reconfigured Inverted Front Fork**

The Fireblade's highly rigid yet confidently responsive cartridge-type inverted front fork retains essentially the same components as the current version. Front fork

offset, however, was reduced from 30mm to 25mm, and trail was increased 5mm. The Fireblade's new Honda Electronic Steering Damper, mounted directly atop the front fork upper triple-clamp, effectively enhances high-speed performance while maintaining low-speed handling for easier riding across a wide range of conditions.

### **Unit Pro-Link Rear Suspension System**

One of the most revolutionary developments found on the RC211V MotoGP racer is its Unit Pro-Link rear suspension system, which carries the entire rear damper and suspension linkage assembly in the swingarm. This innovative configuration completely isolates the frame from the usual stresses that are transmitted to it by the rear suspension under hard riding and racing, and thus eliminates the need for the extra stiffness and its associated weight which conventional frame designs require to counteract these stresses.

In 2003, this remarkable new advance in suspension design appeared for the first time ever in a production machine on the new CBR600RR, and immediately generated a storm of interest. Now this high-performance racing suspension makes its way to the new CBR1000RR Fireblade, and brings with it a new level of responsive performance and race-ready handling.

Similar to the 600RR's system, the upper mount of the rear damper is firmly mounted to the upper surface of the swingarm's robust pivot section, while a pair of lower arms provide an anchor for the system's newly configured Delta-Link linkage. The damper is arranged in a different orientation from the CBR600RR, and its prominent remote gas reservoir is still positioned within easy reach for quick adjustments of compression and rebound damping, while a new 2-piece preload adjuster facilitates setting changes.

The aluminium swingarm itself features composite construction that combines cast, press-forged and extruded sections joined together into a rigid and lightweight whole. Reflecting reductions in the length of the engine, the swingarm was increased in length over the current design, for more progressive suspension operation and improved overall handling. Torsional rigidity was also increased compared to the current 'Blade, while lateral rigidity was reduced to help the chassis settle more easily into fast corners.

Wheels on the new Fireblade feature an all-new design that retains the same basic triple-spoke configuration. Their wide rims mount new BT014 tyres developed by

Bridgestone simultaneously with the CBR1000RR. The new wheels are also designed to offer full compatibility with racing tyres, which will certainly see frequent use on the new CBR1000RR.

Finally, in a small but important accommodation for the environment, the lead wheel balance weights have been replaced with zinc weights.

### **New Front Brake System**

It's a well-known fact that race-ready performance is as much determined by a motorcycle's ability to stop as by its ability to go, and the new Fireblade comes equipped with the very latest in high-performance front brakes to pull it quickly and smoothly down from top speed for well-controlled corner entry with remarkably precise response.

Although the Fireblade has traditionally used axial-mounted four-piston callipers, the new Fireblade's new front brake system now features a set of Tokiko radial-mount callipers. These new callipers feature distinctive turret-like mounts that seem to jut directly outward from the front axle, onto which the callipers bolt straight down. The new callipers are held together by three lateral bolts for a more rigid design that provides both stronger grip and more even pressure distribution across the entire surface area of the pads for highly efficient braking with excellent feel at the lever.

The calliper's pistons feature an optimised surface plating preparation to ensure that they slide easily, providing smoother operation coupled with greater resistance to corrosion, for more confidently responsive performance over the long haul. Their improved performance permits smaller rotors to be used, which have been reduced in diameter from 330 to 310mm while still realising improvements in both braking ratio and performance, not to mention providing a small but important contribution to the Fireblade's lighter and more responsive handling.

Along with these new radial mount front brake callipers, the new front brake system features a newly developed vertical piston master cylinder which offers high braking efficiency with excellent feel and controllability.

At the rear, the 'Blade's new single-piston brake calliper is slightly lighter than the unit it replaces, and provides smooth, confidence-inspiring braking.

# Equipment

## **Revolutionary New Honda Electronic Steering Damper**

Likely one of the most revolutionary developments in riding control debuting on the new 2004 Fireblade can be seen right under the rider's nose. The 'black box' installed directly over the steering head is the heart of the Honda Electronic Steering Damper, which has been designed to enhance high-speed performance while maintaining low-speed handling.

Steering dampers have been in existence for decades, particularly in the world of racing, where high performance and high speeds constantly test the outer limits of a motorcycle's overall performance.

Steering dampers add a damping force to enhance high-speed performance. Some are operated by large knobs, while some are hydro-mechanical damping units mounted to the fork and frame. Regardless of their design, their purpose is to reduce excessive steering movement, and many aftermarket companies and motorcycle manufacturers are engaged in research and development on such systems. While all these systems perform their desired function, each design comes with its own compromises and inherent drawbacks.

For instance, one common complaint has been that when such dampers are set for reasonably good high-speed performance, the motorcycle's handling would become too rigid at lower speeds. In an attempt to satisfy the two requirements of higher damping force at higher speeds and lower damping force at low speeds, prior technology made it necessary to adopt a compromise of damping force characteristics.

While other manufacturers have at various times chosen to include steering dampers on some of their more sport-oriented models, Honda has generally avoided adding these devices to its offerings because, while these dampers may have been developed for enhanced high-speed performance, their design has still left quite a bit to be desired in terms of both overall performance and balance.

So, rather than attaching such devices to any of its Super Sports machines, Honda's engineers set out to study both the advantages and disadvantages of such steering damper devices, and set themselves the target of developing a steering damper that provides a fully optimised balance of damping and handling characteristics.

## **Damper System Configuration**

Jointly developed in co-operation with Kayaba, the world-famous hydraulics and suspension experts, Honda's revolutionary Electronic Steering Damper is comprised of the following major components:

- 1) The world's first electronically controlled hydraulic rotary steering damper, which is prominently mounted directly above the steering head.
- 2) The computerised control system integrated into the motorcycle's ECU.
- 3) Sensors to monitor vehicle speed, which are linked to the speedometer.
- 4) A panel-mounted warning light installed in the instrument console to provide an instant visual indication should any system irregularities be detected.

A linkage arm extends down from the damper mounted atop the steering head to the top surface of the upper triple-clamp and is attached with a single bolt. Within the damper unit, a large chamber filled with oil is divided in two by a moving vane connected internally to the linkage arm. In response to movements transmitted by the linkage arm/vane, oil moves between the left and right sides of the chamber via linking valve-controlled hydraulic passages.

Four one-way check valves ensure that oil only flows through the central main valve in one direction, whether the vane is moved left or right. The opening of the main valve is controlled by a linear solenoid that receives its control signals from the ECU. A relief valve maintains internal pressure below a set level, while a small free piston compensates for temperature-induced changes in oil volume.

## **Damper Operation**

Unlike most existing steering dampers, this new Honda Electronic Steering Damper System has no fixed damping characteristics. The damper is automatically controlled by the ECU in response to vehicle speed and acceleration so as to offer ideal damping performance over a wide range of riding conditions.

At lower vehicle speeds, the damper's main valve fully opens and handling feel remains light, with little perceptible damping effect. As vehicle speed and rate of acceleration increase, the linear solenoid controlling the flow of oil through the system

reacts to signals from the ECU and correspondingly constricts the flow of oil between the two sides of the chamber, resulting in a subtle but highly effective damping effect.

As a significant technological advance and another in a long line of innovations designed to contribute to a Super Sport motorcycle's overall balance of control, Honda's new Electronic Steering Damper provides confidence-inspiring handling ability that translates into a more widely enjoyable ride than has ever been achieved until now with other steering dampers.

Currently making its debut on this year's all-new CBR1000RR Fireblade, the revolutionary new Honda Electronic Steering Damper provides a significant level of operating ease and technological sophistication.

### **New, More Compact Instrument Panel**

The Fireblade's compact and lightweight new instrument panel features a more compact, six-sided design similar to that on the RC211V, with LCD readouts positioned around a large, new tachometer dial. The surrounding LCDs offer clearly visible indications for the large-digit speedometer, a dual-trip and odometer readout, a digital coolant temperature gauge and a clock. In addition, the displays are concentrated at the centre of the panel, making them easy for the rider to read.

Besides the usual selection of indicator lights, the panel also features a new adjustable shift indicator which can be set to between 5,000 and 11,500 rpms for an instantly recognisable indication of the optimal shift point, especially useful in racing applications. This indicator light also features three distinct selectable blinking patterns (ON, slow, or fast flashing) and three brightness levels for easier recognition

Likewise, as a sign of the new Fireblade's high-performance intent, its tachometer dial also features a new redline zone, which was extended upward 2,000rpms, from 11,500 to 13,500rpm.

The right-side handlebar switch pod is now no longer integrated with throttle, and is instead a separate unit taking up position next to the throttle, thus facilitating replacement or removal for racing applications.

### **Honda Ignition Security System (H.I.S.S.)**

Like nearly all the machines in Honda's extensive larger displacement road bike line-up, the new Fireblade features the highly effective Honda Ignition Security System,

which prevents the engine from being started by any other than the motorcycle's two original keys. Completely disabling the engine at the very heart of its ignition system, the system cannot be bypassed by either hot-wiring the ignition or exchanging the ignition switch module, thus effectively deterring joyriders and greatly reducing the possibility of ride-away theft. A blinking red light on the instrument panel provides an attention-getting warning to potential thieves to look elsewhere for easier marks.

### **U-Lock Carrying Space Under Seat**

Although the Fireblade's new Centre-Up muffler has necessarily limited the amount of space available under the locking pillion seat, room has still been made available to carry one of several sizes of U-lock, as well as a few small objects, such as gloves and maps.

# Optional Equipment

The new CBR1000RR Fireblade will also be released with an assortment of optional parts that have been specially designed and produced by Honda Access Corporation to improve upon aspects of its road and track performance. These include:

- A motion-and vibration-sensitive AVERTO security system that emits a piercing wail if tampering is detected.
- A locking moulded plastic rear cowl that installs in place of the pillion pad for a more singularly sporty and purposefully competitive look on par with the CBR's highly competitive level of performance.
- A set of two titanium-coloured screen-printed ABS scuff pads for impeccable protection of the edges of the painted seat cowl.
- A tamper-resistant barrel key U-lock designed to be easily carried in the compact U-lock carrier space located under the pillion pad.
- A tilting tubular steel rear maintenance stand that lifts the motorcycle by the end of its swingarm.
- An adhesive 3-piece tank pad that protects the fuel tank's painted finish against damage from belt buckles and other hard objects.
- A heavy-duty weather-resistant motorcycle cover.

## **Optional HRC Racing Kit**

As it has for the VTR1000 SP-2 and many of Honda's other production motorcycles that vie in amateur and world-class racing competition, Honda Racing Corporation (HRC) will be releasing an extensive array of specialised racing engine parts for the new CBR1000RR Fireblade.

**Specifications****CBR1000RR Fireblade (ED-type)****Engine**

Type	Liquid-cooled 4-stroke 16-valve DOHC inline-4
Displacement	998cm <sup>3</sup>
Bore x Stroke	75 x 56.5mm
Compression Ratio	11.9 : 1
Oil Capacity	3.9 litres

**Fuel System**

Carburation	PGM-DSFI electronic fuel injection
Throttle Bore	44mm
Aireleaner	Dry, cylindrical-type paper filter x 2
Fuel Tank Capacity	18 litres

**Electrical System**

Ignition System	Computer-controlled digital transistorised with electronic advance
Starter	Electric
Battery Capacity	12V/10AH
Headlights	12V 55W x 1 (low) / 55W x 2 (high)

**Drivetrain**

Clutch	Wet, multiplate with coil springs
Clutch Operation	Hydraulic
Transmission Type	6-speed
Final Drive	#530 O-ring sealed chain

**Frame**

Type	Diamond; aluminium composite twin-spar
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**Chassis**

Dimensions	(LxWxH) 2,025 x 735 x 1,120mm
Wheelbase	1,410mm
Caster Angle	23° 45'
Trail	102mm
Ground Clearance	130mm

## **Suspension**

Type	Front	43mm inverted H.M.A.S. cartridge-type telescopic fork with stepless preload, compression and rebound adjustment, 120mm axle travel
	Rear	Unit Pro-Link with gas-charged H.M.A.S. damper featuring 13-step preload and stepless compression and rebound damping adjustment, 135mm axle travel

## **Wheels**

Type	Hollow-section triple-spoke cast aluminium	
Rim Size	Front	17 x MT3.50
	Rear	17 x MT6.00
Tyre Size	Front	120/70 ZR17M/C (58W)
	Rear	190/50 ZR17M/C (73W)

## **Brakes**

Type	Front	310 x 5mm dual hydraulic disc with 4-piston callipers and sintered metal pads
	Rear	220 x 5mm hydraulic disc with single-piston calliper and sintered metal pads

All specifications are provisional and subject to change without notice.