

## Press Information

# 2011 VFR1200F Dual Clutch Transmission

Press release date: 5 October 2010

Model updates: New colour version



### Introduction

Launched in 2009, the VFR1200F was developed in keeping with previous VFRs, which have delivered a combination of sports and touring capabilities using the latest technologies. This motorcycle was, however, brand new. It was a clean-sheet interpretation of the ultimate road-sport machine – a concept driven by extensive understanding of customer needs and the adoption of state-of-the-art technologies.

In pursuit of heightened levels of control and feedback, the VFR1200F adopted the latest race-track bred technologies, but adapted and evolved to create a machine that can be many things to many riders. The harmonic growl of the flexible and responsive V4 motor may rekindle the emotions inspired by previous iconic VFRs, but its unique 'heartbeat' engine feel and an unrivalled level of manageability set the new VFR apart, not only from its forbears - but also from every bike currently available.

For 2011, the VFR1200F is available in a luxurious new Darkness Black Metallic / Digital Silver Metallic colour version, selected to emphasise the highly-polished look, smooth texture and unique shapes and layers of its bodywork.

## Styling

To a large degree, pure function determined the VFR1200F's form. Mass centralisation, consummate rider control and aerodynamic efficiency provided the key underlying design criteria and from this starting point the machine's form evolved. The remarkably narrow cylinder heads and clever cylinder spacing allowed a very narrow waist, effectively lowering the seat height and thus making it easier for the rider to place both feet flat on the ground at rest. This wasp-like waist also gives the rider the feeling of being 'in' the bike rather than perched on top – crucial for feedback and control. The fuel tank's elegant yet complicated contours have purpose as well as eye-pleasing aesthetics in mind. Its shape and form supports and assists the rider to add extra elements of control and heightened levels of feedback whatever the riding situation. The ergonomically styled fairing works in harmony with the fuel tank to provide extra support and efficient weather protection for the rider and pillion. Even the hand controls and switchgear with their revised button positioning are engineered to ergonomic advantage. The pillion's comfort and security have not been overlooked, either. The supportive, vacuum-moulded dual-seat has a flat and expansive area for the pillion and strong, easy-reach grab handles and footrests positioned with comfort and security in mind.

## Layered Fairing technology

The patented layered fairing design of the VFR1200F is a perfect match of form and function. Designers and engineers worked together to create a uniquely beautiful shape and, at the same time, optimal air flow and heat management. The fairing design incorporates two layers, which harnesses the benefits of flowing air to the machine's dynamic and mechanical advantage. This has two functions; air entering between the layers and through two oval-shaped spaces in the front of the fairing is channelled in exactly the directions needed to enhance the bike's stability at higher speeds. By effectively increasing the speed of the air by channelling it through smaller apertures before it reaches the radiators, engine cooling is optimised and the hot, exhausted air is channelled away from the rider and passenger for a cooler, more comfortable ride. The heat generated by the powerful, enclosed V4 engine is also channelled away to keep hot air away from the rider.

A balance of positive and negative surfaces gives the front of the motorcycle a light, open look while also creating a profile that slices through the wind with the least possible resistance. A strongly defined X-shape characterises the front of the machine. Concave surfaces direct the eye and air up towards the windscreen, which incorporates another air-directing aperture at its lower edge. Even the edges of the screen have been crafted to enhance stability at speed. The powerful single line-beam headlight is the same type used on the CBR1000RR Fireblade. Its light streams into two tinted LED-look strips that frame the sides of the headlight, increasing the illusion of lightness and space.

A high attention to detail and quality is evident everywhere, and every design element has been fine-tuned in tandem with engineering requirements. The cowl and body are fused together, creating one smooth, unified, aerodynamic surface. The rear design is compact and tapers upwards, emphasising the bike's lightness and dynamic shape. The tail-light and rear indicators subtly mimic the frontal design.

New painting technologies, specially developed at the hi-tech Kumamoto factory, focused on creating top-quality colouring with the most uniform coverage. A deep clear-coat finish enhances the bodywork colour, creating a luxurious, high-class shine far above normal production standards. The mirror-like surfaces create a sharp, memorable profile that attracts attention even from a distance.

## Engine

The VFR1200F engine was designed to provide its rider with high speed, quick acceleration and a strong, engaging feeling coming from the engine's power characteristics. Honda also wanted to deliver the invigorating engine sound and feel that characterise the V4 sports bikes, but with an additional focus on comfortable, responsive power delivery. The new V4 engine's performance is delivered where it's most useful and most enjoyable. Its linear torque curve is focused in the low and mid range, making it possible for the rider to simply roll on and off the throttle while powering through bends. This effortless control makes the bike great fun to ride – this is a sports bike with real-world usable power.

### Smooth delivery

There were several challenges involved in tailoring the strong V4 power for use in an all-round machine that can be used for weekend enjoyment, commuting and long-distance touring. Key elements of the VFR1200F's power characteristics are its unrivalled response and strong torque delivery. To allow full enjoyment of the engine's power while still providing a high level of comfort, vibration needed to be carefully managed. A unique cylinder layout was developed for this purpose. Instead of the traditional V4 cylinder configuration, with the cylinders evenly spaced front-to-rear, the VFR1200F adopts an ingenious solution in order to centralise mass and at the same time achieve a compact, space-saving solution. The rear cylinders are placed side by side but close together, while the front cylinders are more widely spaced. This layout allows for a slim, compact 'waist' that fits comfortably between the rider's legs. It also supports mass centralisation, thus contributing to the bike's balanced feel and ease of control. With no right-left couple imbalance, the need for a balancer is eliminated and friction is reduced.

A new Phase-shift Crankshaft complements the advantages of the cylinder layout. Operating with a 28° throw, it effectively reduces primary vibration and noise, eliminating the need for a power-sapping balance shaft. The new V4 typically produces more than 90% of its maximum torque (129Nm/8,750 rpm) at 4,000rpm. To allow the rider to comfortably take full advantage of this torque, delivery is smoothed by four drivetrain dampers, which further eliminate uncomfortable vibration and backlash.

### Racing technologies

The VFR1200F utilises the UNICAM single overhead camshaft cylinder head design from the world-class CRF motocrossers. The logic was straightforward: in an environment where space, performance and weight are at a premium this technology was perfect for a project where mass centralisation and ergonomics were prime design criteria. Also borrowed from the CRF range and the RC211V is the sealed crankcase system that reduces the pumping loss created through piston movement, and air density. This system has never been used on a road machine before but the gains for the rider are identical - electrifying throttle response and improved fuel consumption.

### Refined control

A throttle-by-wire system improves the rider's connectivity with the VFR1200F. Providing light, precise fuel metering at all engine parameters this highly developed accuracy gives the rider increased levels of control, whatever the situation. It is another individual aspect that adds to the heightened feelings of response and control.

To aid control under intense deceleration a slipper clutch is fitted, similar to the system on the CBR1000RR Fireblade. Even under the most excessive downshifting the clutch is designed to slip, thus preventing the rear wheel from inadvertently locking up, allowing the rider to stay firmly in control.

### Unique exhaust and exhilarating sound

Engineers and designers alike focused not only on the new engine's power and delivery, but also on its feel and sound. They chose a configuration which would emulate the briskness of a typical inline-4 engine's performance but deliver this with the beat and feel that are pure V4. The exhaust layout was made as compact as possible with the assembly of catalyser-containing exhaust pipes

placed on one side of the sump and the exhaust pipes of the rear cylinder bank placed on the other side. On the bike's right flank a handsome triangular-shaped muffler highlights the styling lines of the bodywork. The combined induction and exhaust notes create a raw, compelling sound that is authentic Honda V4 and distinguishes the VFR1200F from any other motorcycle. At idle it pulses smoothly, hinting at the engine's huge performance potential. Each twist of the throttle releases a burst of instant V4 aggression that becomes a thrilling howl as it rises quickly through the revs. The sound and beat of this engine contribute to the unique character of this new sports bike and are as essential to the design as the bodywork or riding position.

A key element in the raw emotion of this V4's sound is the exhaust system. Engineered to provide excellent cornering clearance and minimal intrusion to the rider's and pillion's feet, the high-volume, twin outlet high-chrome muffler produces an unobtrusive but fantastically stirring note. At low revs the noise is off-beat and bass-rich. Further up the rev range, once the servo-operated valve is opened, the noise changes to a truly inspiring, hard-edged V4 howl to stir the emotions.

### **New transmission layout and ground-breaking shaft drive system**

A compact new transmission layout contributed to high-speed stability, better cornering and improved traction capability. The highly developed shaft drive system features an offset propeller shaft and a pivot that expands vertically as well as a sliding constant velocity joint that takes up any variations in length during the rear wheel's arc of travel. At the output shaft a clutch damper absorbs backlash effectively. Thanks to the rigidity of the pivot, stability is improved and throttle-to-drive delivery is much more direct.

## **Dual Clutch Transmission**

The VFR1200F features a dual clutch transmission, the first time this technology has ever been available in the motorcycle world, featuring an automated clutch and shift operation. This delivers the same level of rider enjoyment as a manual transmission but with the flexibility of a fully electronic option for enhanced sport and comfort riding. This next-generation motorcycle shows one path to the future of motorcycling, with freedom of choice of how to ride being central to the motorcycle experience. Honda believes this is a significant development for the future of motorcycling with greater customer choice.

### **Background**

For decades, manual shifting has served as an integral and required part of the motorcycling experience. But just as alternative shifting technologies were utilized to improve lap times at the highest levels of racing, electronic shifting has at last made its way into a large displacement, high-performance motorcycle.

Honda introduces dual clutch transmission, the world's first fully automatic dual clutch transmission for large-displacement motorcycles. This new transmission offers riders the enjoyment of full sports riding capabilities along with effortless and seamless operation, applied in a powerful, large-displacement machine. At the same time, this transmission's superior efficiency can deliver fuel efficiency equal to or better than a conventional manual transmission.

The dual clutch transmission features a light and compact design that allows it to be combined with existing engines without substantial layout modification.

Mechanically, the system is similar to the larger dual clutch transmissions fitted to automobiles which have more room for a large transmission system, allowing for long transmission shafts and multiple shafts.

However – space is at a premium on motorcycles; making it difficult to use an automotive-type dual clutch transmission. Limited ground clearance and shifting of the motorcycle's centre of gravity when turning are other limiting factors – as is potential interference with the rider's legs. To solve these problems, the Honda dual clutch transmission uses two main shafts and in-line

hydraulic clutches. Then hydraulic passageways for the system are located behind the right side engine cover; making for a shorter transmission shaft so it will fit onto the motorcycle. Unlike typical automotive transmissions that use independent shifters to directly shift the gears, the motorcycle system uses a motorcycle-type shift drum, resulting in a simple and more compact shift mechanism.

Further, the new transmission delivers the precise acceleration control that is an integral part of sports riding, thanks to electronic control technology that helps ensure smooth, seamless gear changes. And since it uses conventional transmission gears, it behaves just like its manual transmission counterpart; giving valuable feedback to the rider. It's also as rugged and durable as the conventional manual transmissions that Honda has developed.

To respond to rider demands through a broad range of conditions and situations, the transmission offers three operating modes: two full-auto modes (D-mode for relaxed, fuel efficient operation and S-mode for sports riding), and a six-speed gear-select mode for full rider control via electronic trigger-shift controls that deliver the same shifting response as a manual transmission. As an indication of the deep level of innovation involved in developing such a novel transmission, Honda has 100 patents pending related to this design.

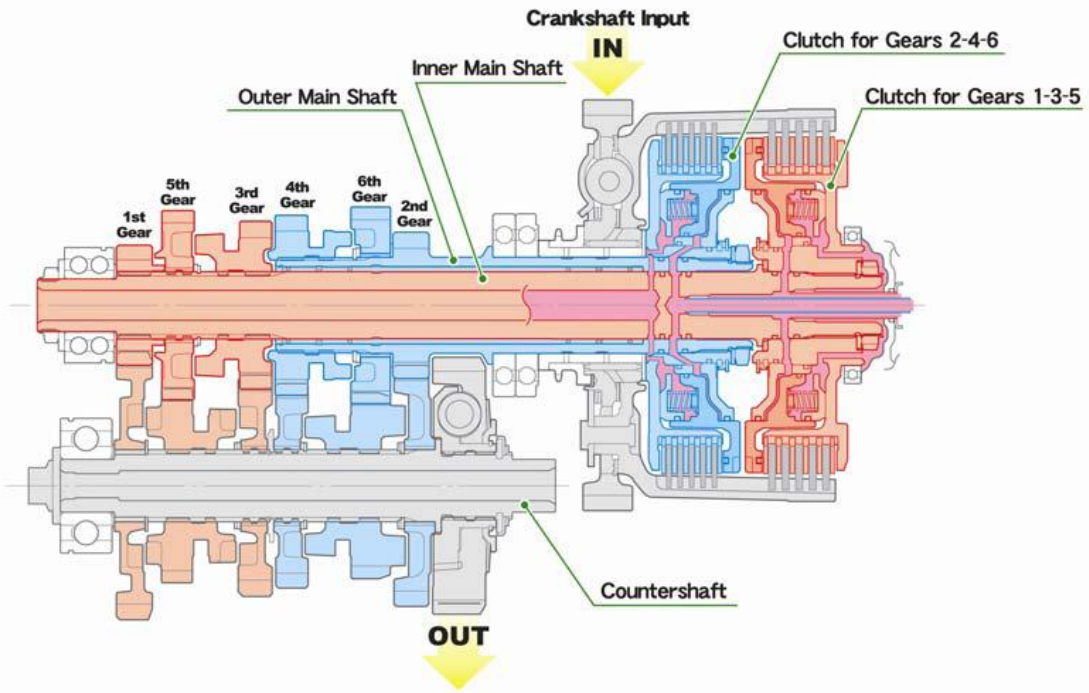


### **Key Features**

The dual clutch transmission configuration employs independent clutches for the odd-numbered gears (1st, 3rd, 5th) and the even-numbered gears (2nd, 4th, 6th), respectively. The two clutches operate alternately to effect gear changes. For example, when changing from 1st to 2nd gear, the computer detects the up-shift and engages 2nd gear, then releases the 1st-gear clutch while engaging the 2ndgear clutch to achieve a seamless gear change. It's a fast, smooth and efficient transition that delivers extremely quick shifts.

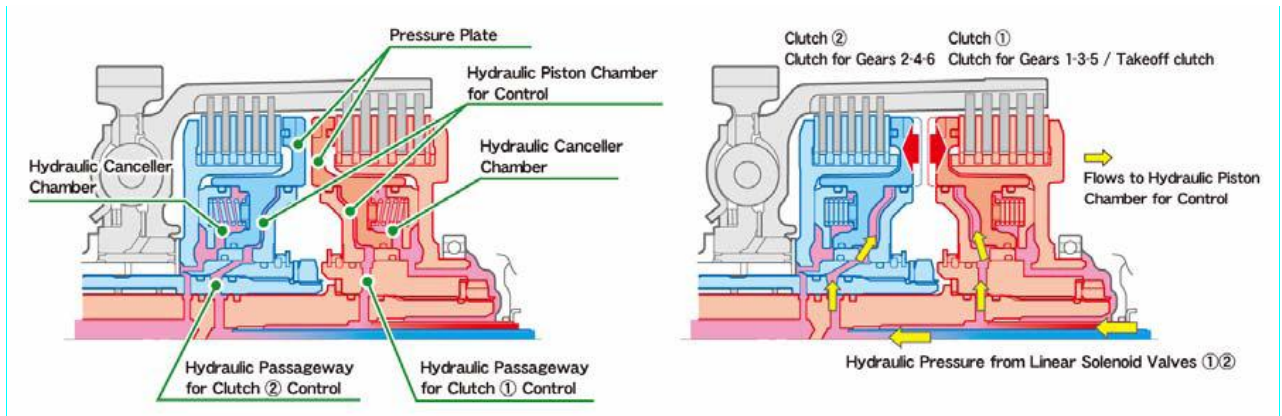
The VFR1200F Dual Clutch Transmission employs dual concentric input shafts (one shaft runs inside the other hollow shaft), an exclusive in-line clutch design, and concentration of hydraulic circuitry beneath the engine cover to achieve a compact design. Compactness and lightness is further enhanced through the use of a simple shift mechanism design based on that of a conventional motorcycle shift drum. Optimized shift scheduling achieves fuel efficiency equal to or better than that of a fully manual transmission, enabling this dual clutch transmission to deliver both sports riding and economical performance – whatever the rider chooses.

## Dual Clutch Transmission Mechanism



### Aluminum wet multi-plate dual clutch

The two clutches are laid out in-line along the transmission, with the hydraulic control of the piston installed on the inner face of the clutch disc. This configuration minimises lateral intrusions in the direction of the engine.



### Dual Clutch Transmission: How it works

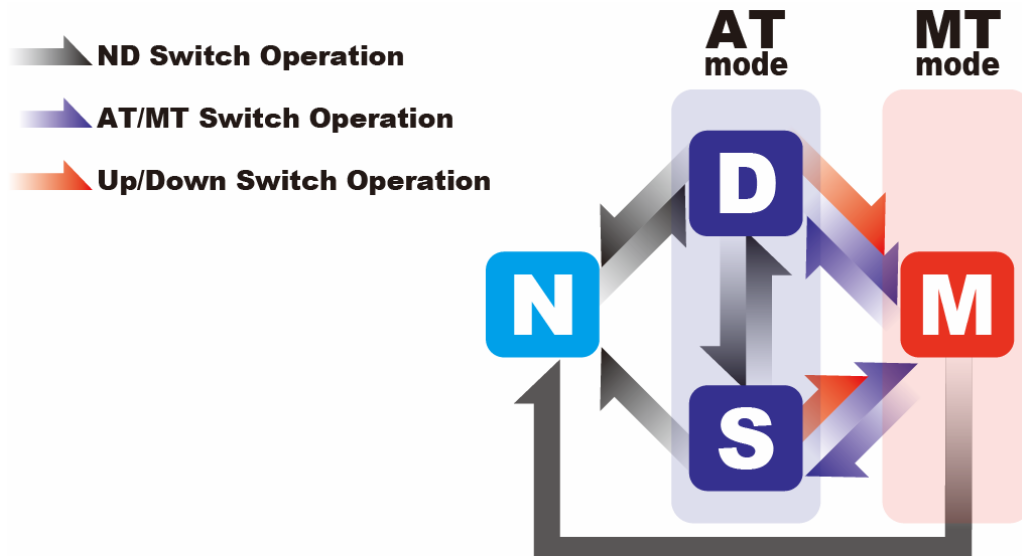
The dual clutch transmission features two operating modes (AT and MT) to suit the style of riding the rider chooses by selecting a switch located on the right handlebar:

In AT mode, all gear shifts are performed automatically, controlled by a microcomputer with an intelligent electronic shift function that constantly evaluates rider and motorcycle behaviour and recognises when to change gear. The rider chooses with the right thumb, either 'D' for maximum fuel efficiency, or 'S', for maximum performance. The clutch and gear shifts are then electronically controlled by the computer giving the rider the freedom to concentrate on enjoying the road ahead.

In MT mode, the rider uses the trigger shifters to select gears. In this mode, the rider can enjoy direct control of gear selection. Shifting up or down is operated by the '+' or '-' trigger with the left forefinger and thumb.

In every operation mode, the dual clutch transmission system offers quicker, smooth gear shifts with dependable traction and seamless acceleration because drive power is continuous.

This diagram shows show the rider can switch between modes and can use both the AT/MT switch and the triggers (Up/Down Switch) themselves to access the Manual option.



**Benefit for the rider**

Once an essential skill required for achieving the best riding experience, manual operation of a clutch and shift mechanism is no longer a must for motorcycle operation.

Honda has taken the world of motorcycling further with a new dimension in control and exhilaration. With innovative electronic gear shifting, the VFR1200F Dual Clutch Transmission offers high performance sport riding like no other machine.

Skilled riders as well as riders of less experience have one less task to deal with, which means more focus on the real joy of sports riding. Many riders will still prefer a manual-shift transmission, which is why the VFR1200F Dual Clutch Transmission gives a real choice. The MT mode gives riders an innovative new way to change gear to deliver effortless, seamless operation, and a truly revolutionary technological development for riders who are eager to embrace new technology.

## Chassis

The VFR1200F frame, suspension and drive components are brought together in a unique configuration that facilitates both sports bike power and smooth stability. Its strong aluminium twin-spar diamond configuration frame is both lightweight and rigid. The swingarm and driveshaft length are optimised without extending the overall length of the motorcycle. The long swingarm contributes to balanced, confident manoeuvring and exceptional high-speed stability.

The swingarm is complemented by a compliant Pro-Link rear shock absorber with adjustable rebound damping. At the front, sturdy 43mm telescopic forks with adjustable preload provide smooth and assured control. Together, these systems ensure a comfortable ride, even with a pillion and luggage on board, and add to the overall feeling of total control.

## High-performance brakes

The VFR1200F is equipped with the most highly developed brake technology for all-round sports bike use. Powerful six-piston calipers for the front and two piston calipers for the rear act on large discs (320mm at the front and 276mm at the rear). A Combined Braking System creates the optimal balance of front and rear braking forces. The addition of a standard-fit compact and lightweight ABS supports both the motorcycle's sports riding potential and its touring proficiency.

## Standard equipment

### Instrument panel

The VFR1200F instrument panel combines sophisticated styling and practicality. Shielded and at the same time displayed by the tilt of the aerodynamic windscreen, its elegant design fully complements the airy and spacious feel at the front. It also adds to the sensation of total rider control. A large, sporty analogue rev counter and a digital speedometer are surrounded by LCD readouts of the fuel, coolant temperature levels and fuel consumption. The display also includes a clock, ambient temperature display, HISS indicator and ABS indicator.

### Pannier mounts

To enhance the touring potential of the VFR1200F, the rear is equipped with integrated luggage mounts. These mounting points are unobtrusively cast into the injection moulded under-seat area and pillion footrest mounts. They allow easy installation and removal of specially designed optional panniers without interrupting the motorcycle's clean styling.

### Ergonomic hand controls

The VFR1200F is the first motorcycle to feature state-of-the-art ergonomic revisions to the handlebar and switch layout. The designers looked at the time required to reach controls comfortably and the ease of operation, particularly considering the hand position during cornering. As a result, the VFR1200F received new handlebar switches and a new layout with reversed horn and indicator controls. The indicator switch shape is designed around natural thumb movement for effortless operation.

## Colours

- Darkness Black Metallic / Digital Silver Metallic **New!**
- Candy Prominence Red
- Seal Silver Metallic
- Pearl Sunbeam White



## Optional equipment

A wide range of optional equipment has been developed by Honda Access Europe specifically for the VFR1200F. These accessories were designed in line with the new all-round sports bike concept and in every detail, from the choice of materials to integration with the bike's contours, they complement its styling and performance. They include:

- **A 29-litre pannier set:** Fits motorcycle's integral pannier attachments with no need for additional stays. Aerodynamically shaped. Coloured to match the motorcycle's bodywork. Operated with the motorcycle key. Left pannier can hold one full-face helmet.
- **A 31-litre top box:** Features locking, quick-detach mounting system. Lid matches motorcycle's bodywork. Can hold a full-face helmet as well as other luggage.
- **Inner bags for the top box and panniers:** Black with zipper and Honda Wing logo. Carrying straps and handles included. Pannier inner bags can be zipped together for easy carrying.
- **A 7-litre tank bag:** Black with embroidered VFR logo. Includes preset for easy installation. Adjustable shoulder strap, carrying handle and rain cover included.
- **A 3-position adjustable add-on screen:** Integrates perfectly with the standard windscreen. Extends wind protection for taller riders. WVTA approved.
- **A replacement low/narrow seat:** Maintains the bike's ergonomics. Provides easier reach to the ground for shorter riders. 25mm lower than factory standard seat.
- **Heated grips:** Kit includes integrated controller. Compact for maximum comfort and design integration. 3-step variable heating levels.
- **A motorcycle navigation kit:** Features unique controller that allows operation without removing hands from the handlebars. Earphone and car kit included. Honda dealers included in POI list.

## Specifications - VFR1200F AMT ABS (ED-type)

### ENGINE

Type	Liquid-cooled 4-stroke UNICAM 76° V-4
Displacement	1,237cm <sup>3</sup>
Bore × Stroke	81 × 60mm
Compression Ratio	12:1
Max. Power Output	ED: 127kW/10,000min <sup>-1</sup> (95/1/EC) F: 83kW/9,500min <sup>-1</sup> (95/1/EC)
Max. Torque	ED: 129Nm/8,750min <sup>-1</sup> (95/1/EC) F: 115Nm/4,000min <sup>-1</sup> (95/1/EC)
Idling Speed	1,150min <sup>-1</sup>
Oil Capacity	4.9 litre

### FUEL SYSTEM

Carburation	PGM-FI electronic fuel injection
Aircleaner	Oil-permeated, viscous-type paper filter
Fuel Tank Capacity	18.5 litres
Fuel Consumption	15.9 km/l (WMTC mode* Tested in D-Mode)

### ELECTRICAL SYSTEM

Ignition System	Computer-controlled digital transistorised with electronic advance
Ignition Timing	8.4° BTDC (idle speed)

Sparkplug Type	IMR9E-9HES (NGK); VUH27ES (DENSO)
Starter	Electric
Battery Capacity	12V/11.2AH (YTZ14S)
ACG Output	570W
Headlights	12V, 55W x 1 (low) / 55W x 1 (high)

### DRIVETRAIN

Clutch	Wet, multiplate, hydraulic, dual
Clutch Operation	Hydraulic
Transmission Type	6-speed
Primary Reduction	1.738 (73/42)
Gear Ratios	12.4666 (37/15)
	2 1.7894 (34/19)
	3 1.4090 (31/22)
	4 1.1600 (29/25)
	5 1.0322 (32/31)
	6 0.9393 (31/33)
Final Reduction	2.71
Final Drive	Shaft

### FRAME

Type	Diamond; aluminium twin-spar
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### CHASSIS

Dimensions (L×W×H)	2,250 × 740 × 1,220mm
Wheelbase	1,545mm

Caster Angle	25.5°
Trail	101mm
Turning Radius	3.5m
Seat Height	815mm
Ground Clearance	125mm
Kerb Weight	277kg
Loaded Weight (GVWR)	473kg

## SUSPENSION

Type	Front	43mm cartridge-type telescopic fork with stepless preload adjustment, 120mm axle travel
	Rear	Pro-Link with gas-charged damper, 25-step (*stepless remote-controlled hydraulic) preload and stepless rebound damping adjustment, 130mm axle travel

## WHEELS

Type	Front	5-spoke hollow gravity die cast aluminium
	Rear	7-spoke gravity die cast aluminium
Rim Size	Front	17MC × MT3.5
	Rear	17MC × MT6
Tyre Size	Front	120/70 ZR17MC (58W)
	Rear	190/55 ZR17MC (75W)
Tyre Pressure	Front	250kPa
	Rear	290kPa

## BRAKES

Type	Front	320mm dual floating hydraulic disc with two 6-piston calipers, C-ABS and sintered metal pads
	Rear	276mm hydraulic disc with 2-piston caliper, C-ABS and sintered metal pads

\* Please note that the figures provided are results obtained by Honda under standardised testing conditions prescribed by WMTC. Tests are conducted on a rolling road using a standard version of the vehicle with only one rider and no additional optional equipment. Actual fuel consumption may vary depending on how you ride, how you maintain your vehicle, weather, road conditions, tire pressure, installation of accessories, cargo, rider and passenger weight, and other factors.

All specifications are provisional and subject to change without notice.

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