

2014 HONDA CB650F

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New model: *A brand new middleweight naked bike with streetfighter style and attitude, a new four-cylinder engine tuned for high torque and all-round excitement plus well balanced high-quality chassis and optional ABS; a 35kW A2-licence option with ABS standard will also be available.*



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1. Introduction

The four-cylinder CB range has a proud history dating back to 1969 and the ground-breaking CB750. Within that history, Honda's middleweights have always found starring roles, thanks to the poise and usability produced by their combination of low mass and strong engine performance.

In recent years, the trend has been toward ever-larger capacity mid-sized machines. Honda has decided on a different direction, and for 2014 will produce a true four-cylinder middleweight that offers high style and specification, an easy-to-use all-round fun riding experience and real value for money.

The CB650F turns the page on the CB600F Hornet and, sharing no common parts, starts a fresh chapter. Brand new from the wheels up – conceived and developed by a young team of Honda engineers – the concept behind its performance is completely different. It's been designed from the outset to put the rider fully in tune with the machine and offer arresting style, identity and attitude.

Teishiro Goto, Large Project Leader CB650F:

“The CB650F captures the joy of winding roads and is also great around town. It is sporty but makes no compromise to rider lifestyle – and is a real pleasure to look at. More and more of our customers, novice or veteran, are drawn to this distinctive identity and riding feel and it gives me great pleasure to welcome them to Honda’s new CB family.”

CB650F – ‘Street Fighting Steel’

2. Model Overview

The DOHC 649cc four-cylinder engine powering the CB650F is completely new and engineered to deliver high torque and response through the low-to-mid rpm range, especially below 4,000rpm.

The development team included many engineers in their twenties, selected to produce a bike with a focus on the younger customer. They decided early on that chasing peak power at redline was off the agenda. On a naked machine, strong acceleration from a standing start, low/mid-range torque and mid-gear roll-on throttle response were targeted as the essential elements.

Crisp pick-up above 6,000rpm and – for the sake of reduced running costs – economical cruising at highway speeds was also a focus. The engine has also been designed to look good, with no external plumbing obscuring its lines. Sitting relatively far forward in the chassis for optimal weight distribution, the engine is truly at the heart of the machine.

The CB650F’s steel twin-spar frame has a tuned rigidity balance along with cast pivot plates and aluminium swingarm. The rear shock works directly on the swingarm and is matched to a 41mm telescopic front fork; the wheels are a new five-spoke design. Twin 320mm front and a single 240mm rear disc deliver the stopping power with 2-channel ABS fitted as an option.

Available as an option will be a 35kW output version for A2 licence holders, featuring ABS as standard.

Crisp, aggressive lines and angular silhouette give the CB650F real visual appeal while the low centre of gravity, slim feel, upright riding position and wide handlebars give excellent control. An HRC-inspired White, Red and Blue Tricolour paint option provides the finishing touch.

3. Key Features

3.1 Engine

The CB650F’s liquid-cooled engine uses compact internal architecture, stacked six-speed gearbox and starter/clutch layout with the four cylinders canted forward 30°. The DOHC 16-valve cylinder head employs direct cam actuation and cam timing that equals strong torque performance and drivability below 4,000rpm.

Bore and stroke is set at 67mm x 46mm. Optimisation of con-rod length has decreased the side-force on each piston and 'breathing' holes in the crankcase walls between the journals reduce pumping losses as rpm rises. The pistons were developed with Computer Aided Engineering (CAE) and asymmetric skirts minimise bore contact and reduce friction. Ferrous spines on the outer surface of the cylinder sleeves reduce oil consumption (and friction) with improved heat transfer.

A silent SV cam chain reduces frictional losses by using a Vanadium coating on its pins and the water pump – designed with CAE study of water flow – is compact, light and efficient.

Peak power of 64kW arrives at 11,000rpm with peak torque of 63Nm at 8,000rpm. The engine is smooth at all rpm, with distinct inline four-cylinder character and resonance.

Internal water channeling from cylinder head to cylinders does away with a great deal of the exterior hoses normally required and the motor shows off its minimal, elegant beauty and functional style. The layout of the oil filter (behind the engine) and oil cooler (front left) plus internal oilways further enhance the visual appeal and has enabled use of an evocative right side-swept 4-2-1 exhaust.

With strong echoes of the original Honda 1974 CB400/4 the design employs optimised downpipe length and diameter, plus patented internal plates regulating airflow to improve torque. The 'wafer' design stubby underslung muffler – with 400-cell catalyser – contributes to mass centralization.

PGM-FI fuel injection is fed through a down-flow airbox and narrow 30mm high-velocity funnels, with intake gas flow routed in as straight a line as possible. It operates with information from four separate throttle body sensors on 32mm throttle bores for crisp and accurate throttle response. Careful siting, position and angle of the throttle bodies allow a narrow frame width, improving manageability for the rider.

To deliver good fuel economy at constant throttle (cruising at higher speeds) short valve overlap timing works with a specific ignition map; fuel consumption of 21km/l (WMTC mode) gives over 350km range.

3.2 Chassis

The steel diamond frame uses twin 64mm x 30mm elliptical spars. Its rigidity balance has been specifically tuned – it's much stiffer around the headstock and more 'flexible' in the spar sections – to deliver the desired handling characteristics and level of rider feedback. Rake is set at 25.5° with trail of 101mm and wheelbase of 1,450mm. Kerb weight is 206kg (ABS: 208kg).

The swingarm pivot plate is forged then welded together, while the gravity die-cast aluminium swingarm features a curvaceous shape that arcs over the muffler on the right. Adjustable for 7-stage spring preload the single-tube monoshock operates directly on the swingarm. Both the rear shock and 41mm telescopic fork (with 120mm stroke) have been developed to work directly with the frame's performance dynamics to provide supple, neutral control in all conditions.

Cast aluminium six-spoke wheels wear 120/70-17 and 180/55-17 front and rear radial tyres. The wavy discs use the same manufacturing technique as the twin-cylinder NC750 series: the 240mm rear is formed within a 320mm front, saving material (and ultimately cost) to the customer. The two-piston front calipers and single-piston rear provide plenty of stopping power, with 2-channel ABS an option.

A '*Mass Forward*' stance with minimal front and rear overhang gives the CB650F its muscular appearance, hunched and ready for action. The short fuel tank, shroud covers and sharp nose fairing add dramatic presence as does the stubby, shrink-wrapped upswept tail unit. Hinged at the back, the tank allows easy access to the cylinder head for maintenance. Both taillight and front position lights are LED and the headlight uses the distinctive 'CB' V-shape.

The riding position is naturally upright and slightly forward, placing the rider close to the bike's centre of gravity. High, wide tubular handlebars give leverage and pillions get an ample seat and strap for security. Seat height is 810mm and the narrow middle profile helps ground reach.

The dash comprises twin large digital screens. On the left are the rev-counter and speedometer; on the right are a fuel gauge, clock, odometer and the warning lights. Both sides are lit by a white back light. A compact 'wave' design ignition key offers improved security and reduced chance of breakage.

The CB650F will be available in the following colour options:

Pearl Metalloid White (Tricolour)
Pearl Himalayas White
Matt Gunpowder Black Metallic
Sword Silver Metallic
Pearl Queen Bee Yellow

4. Accessories

A range of accessories will be available for the CB650F, including:

35L top box
Seat bag
Rear carrier
Carbon-look hugger
Carbon-look under cowl
Carbon-look seat cowl
Carbon-look front mudguard
Carbon-look fly screen
Crankcase protectors
Heated grips
Paddock stand
Alarm

5. Technical Specifications

ENGINE	
Type	Liquid-cooled 4-stroke 16-valve DOHC inline-4
Displacement	649cm ³
Bore × Stroke	67 x 46mm
Compression Ratio	11.4:1
Max. Power Output	64kW @ 11,000min ⁻¹ (95/1/EC)
Max. Torque	63Nm @ 8,000min ⁻¹ (95/1/EC)
Oil Capacity	3.5L
FUEL SYSTEM	
Carburation	PGM-FI electronic fuel injection
Fuel Tank Capacity	17.3L
Fuel Consumption	21km/litre
ELECTRICAL SYSTEM	
Starter	Electric
Battery Capacity	12V/8.6AH
ACG Output	343W
DRIVETRAIN	
Clutch Type	Wet, multiplate with coil springs
Transmission Type	6-speed
Final Drive	#525 O-ring sealed chain
FRAME	
Type	Steel diamond
CHASSIS	

Dimensions (LxWxH)	2,110mm x 775mm x 1,120mm
Wheelbase	1,450mm
Caster Angle	25.5°
Trail	101mm
Seat Height	810mm
Ground Clearance	150mm
Kerb Weight	206kg (ABS: 208kg)
SUSPENSION	
Type Front	41mm conventional telescopic fork 120mm stroke
Type Rear	Monoshock damper with adjustable preload, 43.5mm stroke
WHEELS	
Type Front	Hollow-section 5-spoke cast aluminium
Type Rear	Hollow-section 5-spoke cast aluminium
Rim Size Front	17M/C x MT3.5
Rim Size Rear	17M/C x MT5.5
Tyres Front	120/70-ZR17M/C (58W)
Tyres Rear	180/55-ZR17M/C (73W)
BRAKES	
ABS System Type	2-channel
Type Front	320 x 5.0mm dual hydraulic disc with dual-piston calipers and

	sintered metal pads
Type Rear	240 x 5mm hydraulic disc with single-piston caliper and resin mold pads
INSTRUMENTS & ELECTRICS	
Instruments	Digital speedometer, digital bar graph tachometer, dual trip meter, digital bar graph fuel gauge, digital clock
Security System	HISS
Headlight	12V, 55W x 1 (low)/55W x 1 (high)
Taillight	LED

All specifications are provisional and subject to change without notice.

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.