HONDA XR350R AND XR500R

Okay, folks, time to get serious. The old XRs were nice, but far from competitive with the two-strokes. This year's 350 and 500 feature all-new engines and running gear. And they're good enough to take home the gold.

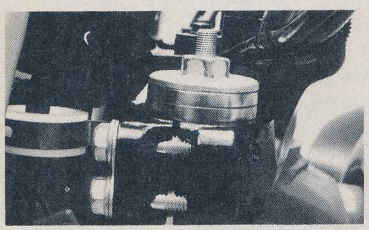
☐ Forget everything you know about Honda XRs. The arrival of the 1983 XR350R and XR500R marks a new beginning for Honda's middleweight and big-bore thumpers. Although the big red bikes have long led their respective four-stroke classes, they've traditionally worn a playbike moniker—because they simply couldn't run beside the two-stroke enduro machines. This year's XRs cast off the old ranking. They are so different from—and so much better than—past Honda thumpers, only name and color connect old XRs to new.

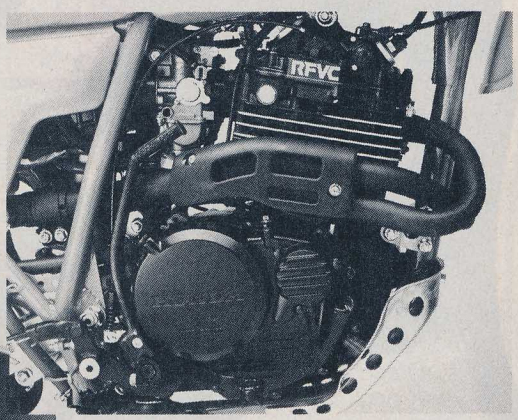
Both the 350 and 500 engines feature Honda's new Radial Four-Valve Combustion Chamber (RFVC) head design, which arranges the two intake and two exhaust valves radially relative to bore axis. This configuration leaves ample room between the valves, allowing Honda's engineers to make the included valve angle extremely narrow (24 degrees for the intake, 28 for the exhaust) and the hemispherical combustion chamber extremely shallow. The result? Rapid and efficient combustion.

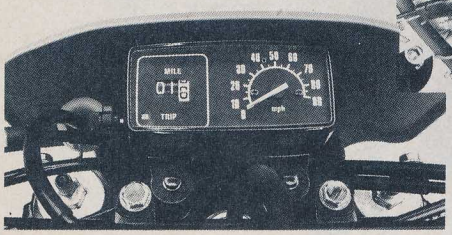
The RFVC engines use relatively large valves; the 500's intake valve diameter measures 36mm and exhaust 31mm, while the 350's intake measures 32mm and exhaust 29mm. In comparison, the old XR500 uses 35mm intake valves and 30mm exhaust valves. The new engines employ a single overhead camshaft that spins in ball bearings and is driven by a silent-type chain, and the valve train includes some extra hardware. Since no two valve stems are parallel, the valves can't actuate through a conventional rocker system without producing heavy side loads against stems and guides. In Honda's special assembly, sub-rockers redirect the rocker arms' actuating motion into the valve stem plane. By mounting the sub-rocker arms on shafts in the rocker tower, Honda eliminated almost all increase in reciprocating mass. The RFVC engines still use screw-type valve adjusters, and a new automatic cam-chain tensioner eliminates chain maintenance.

Honda's dual-carburetor, dual-port induction system is integral to the RFVC design. Two small round-slide Keihin carburetors replace the typical single large-throat carb found on most big singles. A common throttle linkage operates both carburetors, but only the primary (left-side) carb feeds the engine at low throttle settings. After the primary carburetor opens about one-third, the secondary carb (which contains only a main jet) begins to open. A progressive linkage on the right side lets the secondary carb "catch up" so the two reach full-open simultaneously. Consequently, this system provides crisp, accurate carburetion at low engine speeds without sacrificing maximum-flow capabilities. A reed-valve-controlled passageway con-


O'NEAL







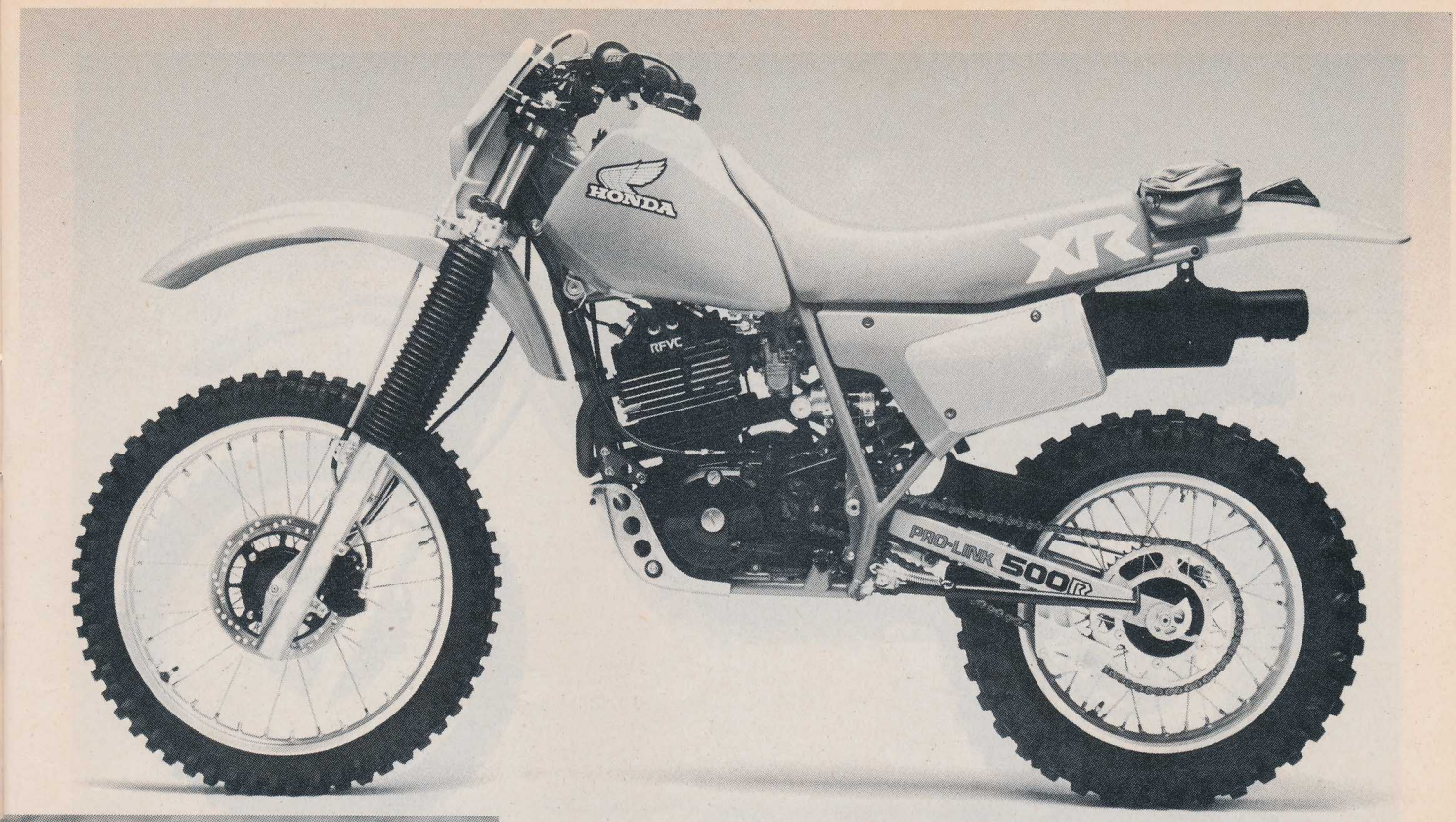
HONDA XR350 & XR500

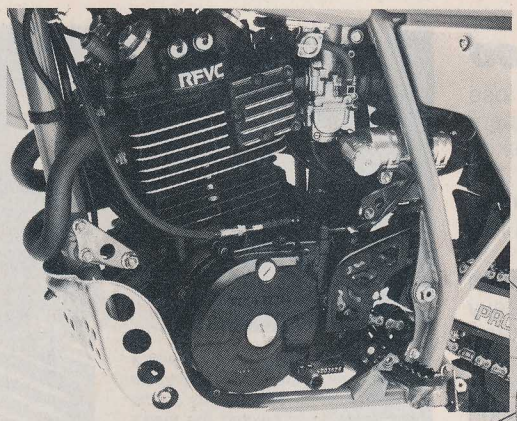
necting the two intake ports passes some of the air/fuel mixture to the secondary port at small throttle openings, helping feed the engine and preventing fuel from pooling in the secondary tract as mixture "backs up" past the right-side intake valve. The 500 uses 28mm Keihins; the 350, 26mm.

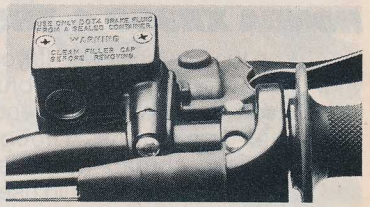
Although both XR engines share the basic RFVC design, the 350 is more than just a scaled-down version of the 500. While the 350 is a wet-sump engine, the dry-sump 500 stores its engine oil in the frame backbone and front downtube. As a result, the 500 uses a dual-rotor oil pump instead of a single-rotor unit. Both bikes use a wet clutch with six friction plates, but the 350's clutch has a smaller diameter than the 500's. Also, the 350 features a six-speed gearbox; the 500, five cogs. Gear-driven counterbalancers reduce engine vibration, important considering the size of the two thumpers; with a bore and stroke of 92.0 by 75.0mm, the 500 displaces an actual 498cc, and the 350's 84.0 by 61.3mm dimensions yield a displacement of 339cc.

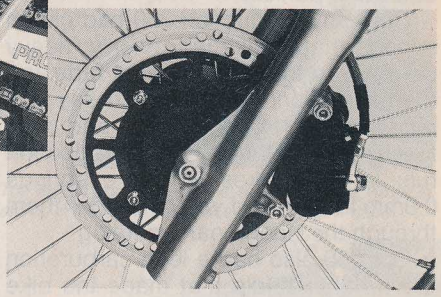
Honda wrapped the RFVC engines in completely new running gear. Both bikes feature full-cradle chrome-moly frames; both the old XRs used the engine as a stressed member. Both '83 XRs also use box-section steel swing arms; the 500's swing arm is 0.8 inch longer than the 350's, and the 500 holds this same 0.8-inch advantage in wheelbase. Although both bikes have identical aluminum Pro-Link linkage pieces, their gas-charged, remote-reservoir, aluminum-body shocks differ. The 500's shock produces considerably heavier damping than the 350's on both compression and rebound strokes. These new-generation shocks offer 12 compression damping settings and four choices for rebound damping; spring preload adjusts via threaded lock rings. The 350 yields 10.6 inches of rear-wheel travel; the 500, a full 11.0 inches. This difference is due to the 500's swing arm describing a longer arc—both bikes' shocks have an 83.5mm stroke.

Enlarged Showa forks replace the small 37mm units used on last year's XR500 and XR250. The new 350 fork









features 41mm tubes, while the 500 front end includes larger 43mm tubes. Both forks incorporate dual Syntallic bushings to reduce stiction and are air adjustable; Honda recommends running the forks at zero psi. Each fork offers 11.0 inches of travel, up an inch from last year's bikes. Both '82 XRs used 28.0 degrees of steering rake and 4.4 inches of trail; in comparison, the new 350 features a steep 26.0 degrees and 3.9 inches, the 500's rake a radical 25.5 degrees and trail 4.5 inches.

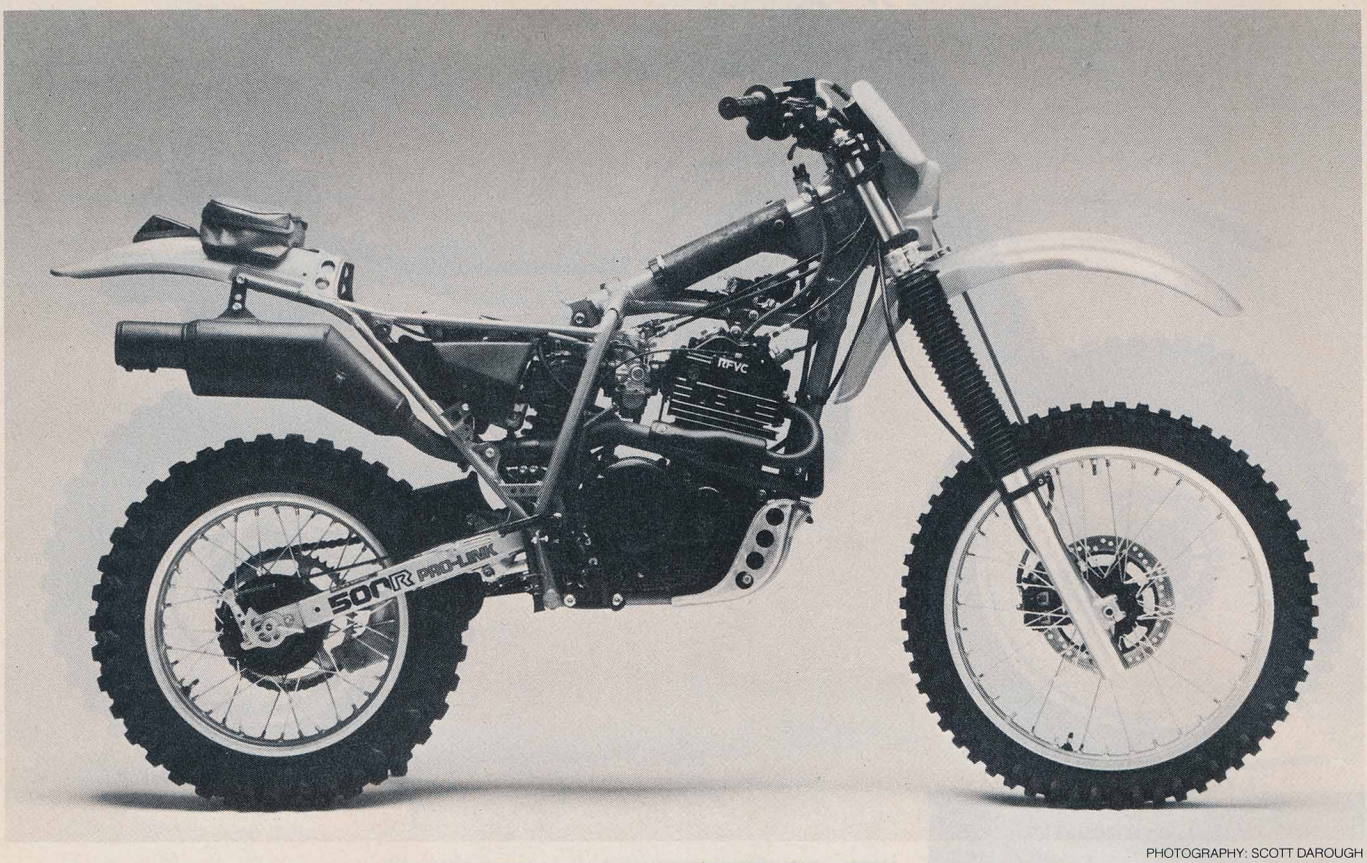
Just a short ride reveals what a giant leap Honda has made with the new XRs; both have a tightness and surefootedness past Honda thumpers lacked. At long last, the playbike feel gives way to honest-to-goodness *serious* off-road manners.

The XR350, in particular, handles delightfully, thanks to a new chassis and a weight-reduction program that has pared the bike down to a modest 257.5 pounds with one gallon of gas—24 pounds lighter than the 1982 XR250, and only 12 pounds heavier than last year's Yamaha IT250J, one of the best enduro-ready two-strokes.

The 350's light weight and precise response to rider input encourage you to throw it into corners. When you do you'll find the bike steers lightly and quickly, and the front end sticks remarkably well—especially if you keep the gas on. If you're not aggressive, sometimes the front end pushes, and it knifes a bit cornering on sandy trails no matter what. Still, the 350 is a fine, quick handler all in all.

That the 350 feels nimbler than the 500 is only partially explained by differences in wheelbase and steering geometry. What's even more significant, the 500 carries 26 pounds more than the 350—283.5 pounds with one gallon of gas. The 350's suspension works well over small and medium-sized bumps, but our heavier testers bottomed it gently over large jumps and sharp ruts; lighter riders found the suspension just fine. The 350 remains reassuringly stable over fast fireroads and along open sandy trails, and it holds its course through deep whoops—if you keep the throttle open.

At times, big whoops can overwhelm the 350 because it is down on power compared to a two-stroke middle-



PHOTOGRAPHY: SCOTT DAROUGH

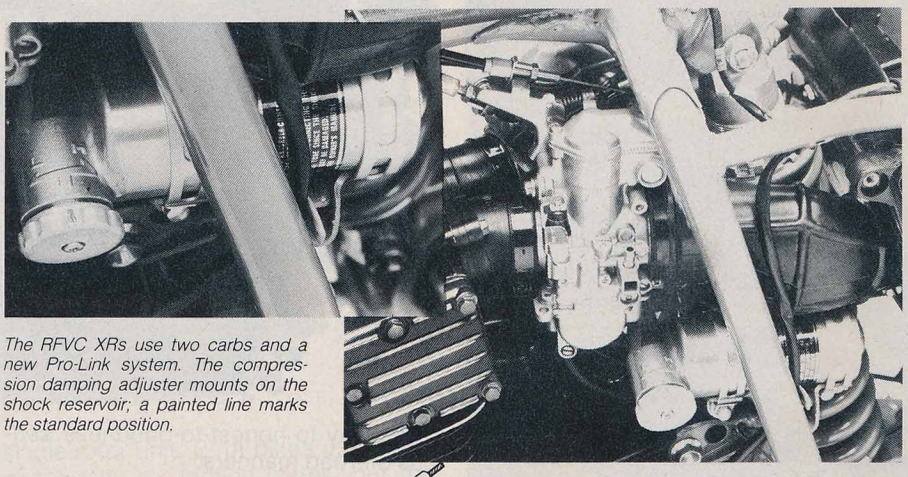
HONDA XR350 & XR500

weight or the big-bore XR. If you lose your timing, you can't rely on brute engine muscle to keep the front end skipping over the bumps. Though the XR350 offers a broad power spread and flat torque curve, it could use a few additional ponies.

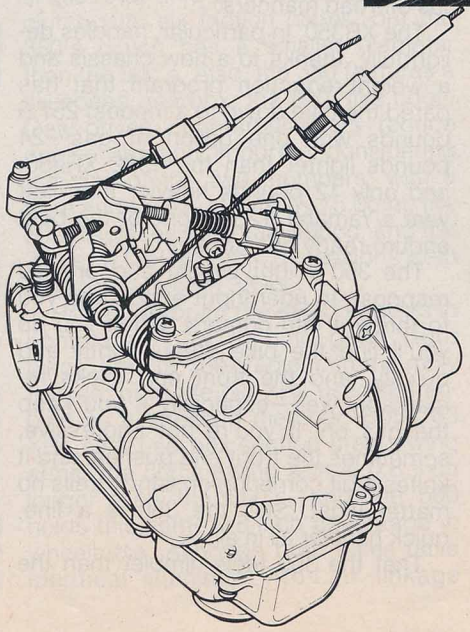
Our early production 350 had clutch springs that weakened quickly; heavy use caused the clutch to heat-fade and then slip. Honda spokesmen say this problem surfaced quickly and was fixed midway through the production run; late-line bikes will have springs 0.9mm longer, and you can order them through the Honda parts catalog.

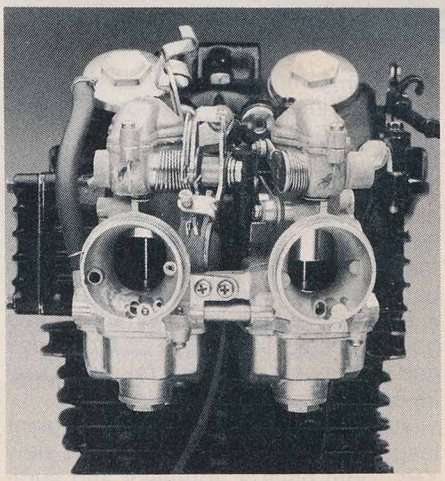
Our 350 also had a lean carburetion glitch right off idle that made the bike hesitate and sometimes stall as the rider grabbed a handful of throttle, especially at low rpm. Our Honda contacts tell us that replacing the #45 low-speed jet with a #48 jet relieves this problem. Unfortunately, since these Keihins are completely new, replacement jets were unavailable and, consequently, we couldn't evaluate the 350 with updated jetting.

Like most big thumpers, the XRs start easily most of the time, occasionally requiring a drill that's half muscle, half prayer. To facilitate kickstarting, Honda gave each XR an engine decompression system. The compression release is linked to the kickstarter; it can also be operated manually from the bar, especially handy for bump-

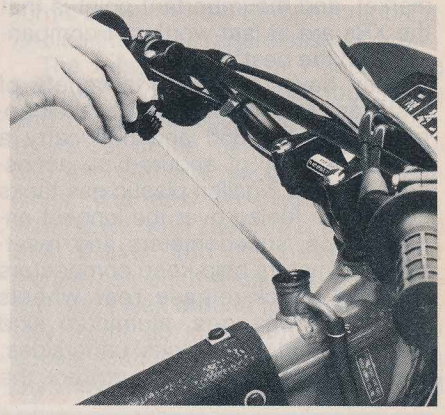


The RFVC XRs use two carbs and a new Pro-Link system. The compression damping adjuster mounts on the shock reservoir; a painted line marks the standard position.





Although the primary (left-side) carb opens first, a progressive linkage lets the right side "catch up" so the two slides reach full-open simultaneously.

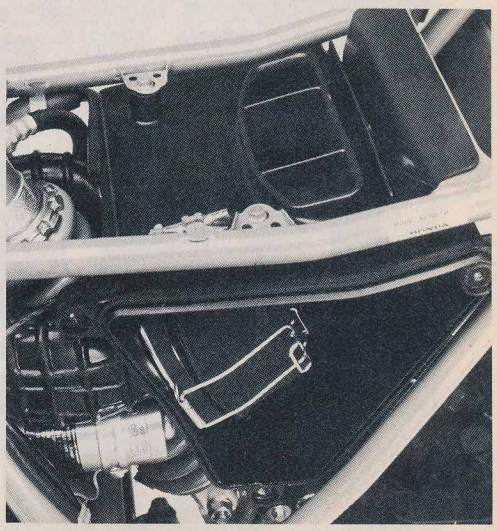


The XR500 engine is a dry-sump design; engine oil is stored in the frame backbone and front downtube.

starting or just turning the engine over top dead center. With the choke on and the throttle closed, both bikes usually started cold within two or three tries; sometimes, however, starting required a half-dozen kicks or more. And once warm, the XRs could be stubborn about restarting. For this, Honda recommends an effective procedure; if the bike resists starting after a few kicks, hold the kill button on, pull the decompression lever in, hold the throttle wide open, and stroke the starter through several times. Next, release the decompression lever and kill button, crack the throttle open a bit, and kick once more with gusto. Both the 350 and 500 kick back through the starter lever occasionally—nothing to fear if you're in good riding boots.

Our 500 ran well under all engine conditions and throttle settings, and the carburetion was spot-on. This torquey big-bore pulls strongly and revs freely; though it won't dethrone any horsepower kings in the two-stroke open-class motocrosser category, it embodies all the qualities riders find desirable in big thumper engines. The 500 pulls much harder than the 350, and its five speeds are sensibly spaced to take advantage of the abundant torque. Our big thumper's shifting action and clutch performance also left nothing to be desired.

Even though the 500 steers lightly and accurately for a big bike, it feels much larger than the 350, thanks to its extra inch of seat height, its extra 0.8 inch of wheelbase and its extra weight. Despite this greater bulk, the 500 feels as if it's suspended better than the



The oiled-foam filter draws clean, dry air from under the seat, yet is readily accessible for servicing.

350, easily soaking up small-to-medium-sized bumps, and bottoming less frequently over large obstacles. The 500 hooks up remarkably well, and it has enough power to get the front end light through whoops.

Most of the 500's handling shortcomings relate directly to its weight. At 283.5 pounds, the 500 is 11 pounds lighter than last year's big XR, but still too heavy for truly first-rate handling. Under most riding conditions, and especially in wide-open desert terrain, the 500 handles smoothly and predictably. When you press the XR, though, shortcomings surface. Charge through a set of deep whoops at high speed, for example, and the weight overpowers the shock, causing an incipient side-hop in the rear end. It's easy to determine the onset, and prudent riders will work within the 500's clearly delineated boundaries. The weight also affects handling in fast turns; both ends push increasingly as speeds rise. The natural tactic is to head for the berm (if there is one), and different tires may improve performance, but shedding pounds is the only sure route to optimum handling. Remember, these comments are relative to the best equipment on the market, and the important point is that the XRs are at last worthy of comparison with the best.

They have, moreover, a variety of first-class features to enhance their appeal. Both the 350 and 500 carry a complete array of enduro-type accessories. The 3.2-gallon plastic gas tanks keep them fueled over the longest enduro loops, speedometers and resettable tripmeters help keep competitors on time, quick-release rear wheels speed tire changes, aluminum skid plates protect the engines' undersides, and wide plastic fenders protect the

TEST SPECIFICATIONS

Make and model . . . . . Honda XR350R
Price, suggested retail (as of 3/24/83) $1998

Engine

Type . . . . . Four-stroke, single-cylinder; air-cooled with one chain-driven overhead camshaft; four valves per cylinder
Bore and stroke . . 84.0 x 61.3mm (3.31 x 2.41 in.)
Piston displacement . . . . . 339cc (20.7 cu. in.)
Compression ratio 9.5:1
Carburetion . . . . . (2) Keihin 26mm round-slide
Exhaust system . . Two-into-one with silencer and USFS-approved spark arrestor
Ignition . . . . . Capacitor-discharge; magneto
Air filtration . . . . . Oiled foam element
Oil filtration . . . . . Paper element, disposable
Oil capacity . . . . . 2.1 qts. (2.0 l)
Bhp @ rpm . . . . . 22.43 @ 7500
Torque @ rpm . . . . . 17.17 @ 6500

Transmission

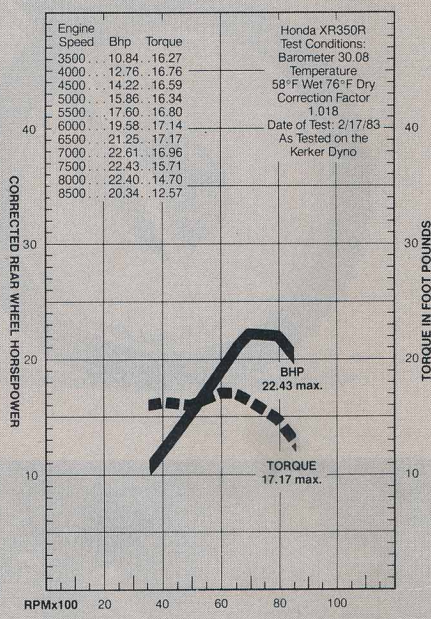
Type . . . . . Six-speed, constant-mesh; wet-clutch
Primary drive . . . . . Straight-cut gear; 65/23, 2.83
Final drive . . . #520 chain; 14/42 sprockets, 3.00
Gear ratios (transmission) . . . . . (1) 38/13, 2.92
(2) 34/17, 2.00 (3) 31/20, 1.55
(4) 28/22, 1.27 (5) 27/25, 1.08
(6) 25/27, 0.93

Chassis

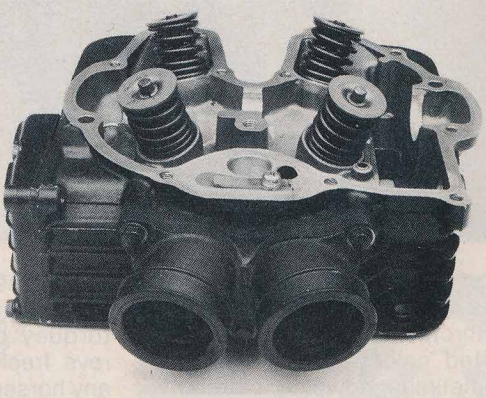
Type . . . . . Single downtube, full-cradle chrome-moly frame; box-section steel swing arm
Suspension, front . . . Leading-axle air-adjustable fork with 41mm tubes and 11.0 in. (280mm) of travel
rear . . . . . (1) gas-charged, remote-reservoir shock absorber, adjustable for spring preload and rebound and compression damping, producing 10.6 in. (270mm) of rear-wheel travel
Wheelbase . . . . . 55.3 in. (1405mm)
Rake/trail . . . . . 26.0°/3.9 in. (100mm)
Brake, front . . . . . Cable-actuated, single-leading-shoe drum
rear . . Rod-actuated, single-leading-shoe drum
Wheel, front . . . 1.60 x 21 DID aluminum alloy rim
rear . . . . 2.15 x 17 DID aluminum alloy rim
Tire, front . . . . . 90/80-21 Bridgestone Gritty-ED9
rear . . . . . 130/80-17 Bridgestone Gritty-ED8
Seat height . . . . . 36.1 in. (917mm)
Ground clearance . . . . . 12.4 in. (314mm)
Footpeg ground clearance . . . . 13.9 in. (330mm)
Fuel capacity (main/reserve) . . . . . 2.4/0.8 gal. (9.0/3.0 l)
Curb weight, with one gallon of gas . . . 257.5 lbs. (116.8 kg)
Test weight . . . . . 417.5 lbs. (189.4 kg)

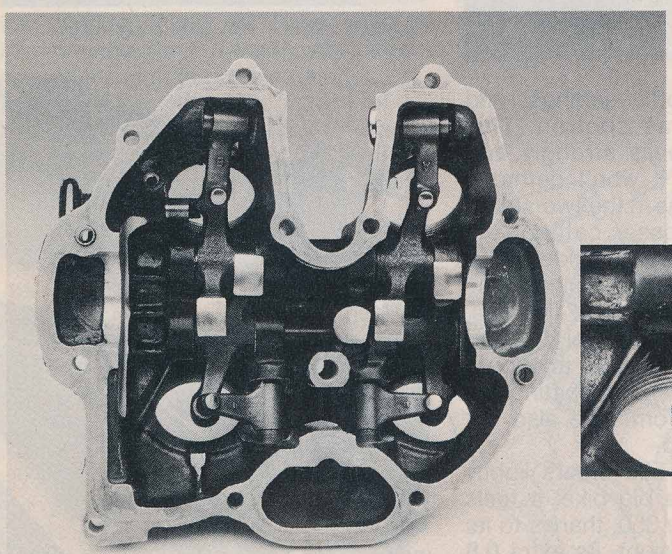
Customer Service Contact

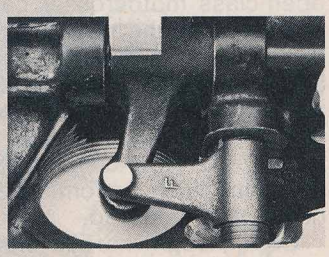
American Honda Motor Co.
100 W. Alondra Blvd.
Gardena, CA 90247
(213) 321-8680



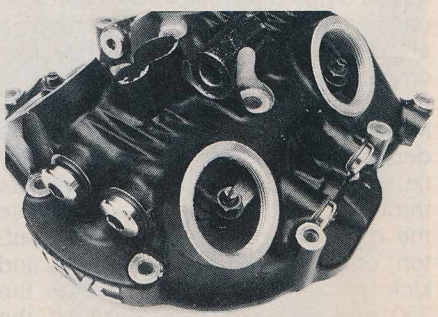
The radially disposed valves make actuation through conventional rocker arms impossible.







Sub-rockers redirect the rocker arms' actuating motion into the plane of the valve stems.



Both Honda thumpers feature screw-type adjusters that make valve maintenance simple for home mechanics.

Make & model ..... Honda XR500R
Price, suggested retail (as of 3/24/83) $2298

Engine

Type ..... Four-stroke, single-cylinder; air-cooled with one chain-driven overhead camshaft; four valves per cylinder
Bore & stroke ....92.0 x 75.0mm (3.62 x 2.95 in.)
Piston displacement ..... 498cc (30.4 cu. in.)
Compression ratio 9.2:1
Carburetion ..... (2) Keihin 28mm round-slide
Exhaust system ..Two-into-one with silencer and USFS-approved spark arrestor
Ignition ..... Capacitor-discharge; magneto
Air filtration ..... Oiled foam element
Oil filtration ..... Paper element, disposable
Oil capacity ..... 2.6 qts. (2.5 l)
Bhp @ rpm ..... 34.40 @ 7500
Torque @ rpm ..... 26.08 @ 6000

Transmission

Type .....Five-speed, constant-mesh, wet-clutch
Primary drive .....Straight-cut gear; 71/30, 2.37
Final drive ... #520 chain; 14/48 sprockets, 3.43
Gear ratios (transmission) ..... (1) 32/13, 2.46
(2) 28/17, 1.65 (3) 25/20, 1.25
(4) 23/23, 1.00 (5) 21/25, 0.84

Chassis

Type .. Single-downtube, full-cradle chrome-moly frame; box-section steel swing arm
Suspension, front ...Leading-axle, air-adjustable fork with 43mm tubes and 11.0 in. (280mm) of travel
rear ..... (1) gas-charged, remote-reservoir shock absorber, adjustable for spring preload and rebound and compression damping, producing 11.0 in. (280mm) of rear-wheel travel
Wheelbase ..... 56.1 in. (1425mm)
Rake/trail ..... 25.5°/4.5 in. (114mm)
Brake, front ..... Hydraulic, single-disc with twin-piston caliper
rear .....Rod-actuated, single-leading-shoe drum
Wheel, front ... 1.60 x 21 DID aluminum alloy rim
rear .... 2.15 x 17 DID aluminum alloy rim
Tire, front .....3.00 x 21 IRC Volcanduro VE-32
rear .....5.00 x 17 IRC Volcanduro VE-31
Seat height ..... 37.1 in. (943mm)
Ground clearance ..... 13.5 in. (343mm)
Footpeg ground clearance .... 14.6 in. (371mm)
Fuel capacity (main/reserve)..... 2.7/0.5 gal. (10.0/2.0 l)
Curb weight, with one gallon of gas ....283.5 lbs (128.6 kg)
Test weight ..... 443.5 lbs (201.2 kg)

Customer Service Contact

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100 W. Alondra Blvd.
Gardena, CA 90247
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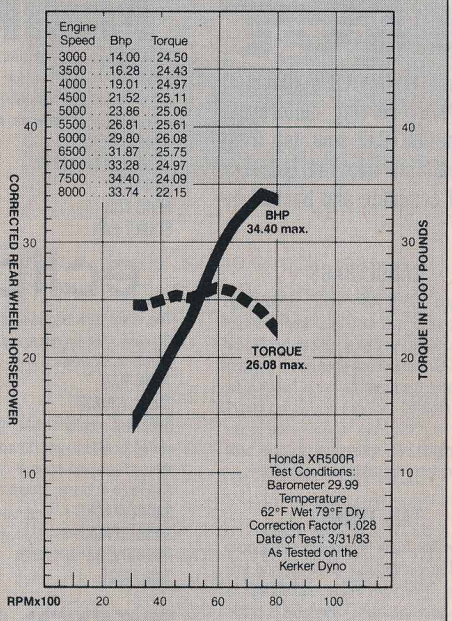
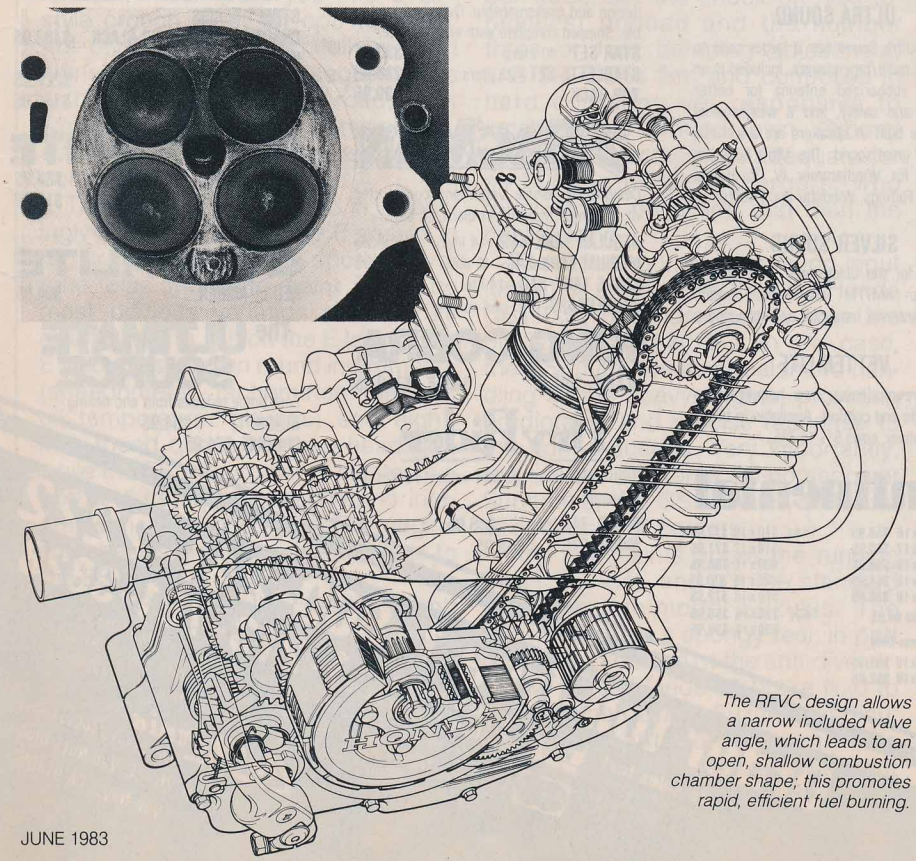


rider. A fender-mounted tool pouch contains an enduro-style multi-purpose wrench, leaving plenty of room for spare parts. As delivered, the pouches contain accessory silencing kits for the XRs that reduce noise level to 86 dB(A); with or without this kit the XR muffler systems incorporate a USFS-approved spark arrestor. While the XR350's brakes are good, the 500 features a twin-piston-caliper front disc that is outright excellent; it provides power and feel few other dirt bikes can match. The 500 also comes stock with a superb 55-watt headlamp and a 12-volt, 150-watt lighting system; if you want to add an accessory Baja-style running light, you just bolt it on.

Yes, the Honda four-strokes have come of age, offering a viable alternative to two-strokes for serious riders. If you ride in woods and over tight trails, the 350 fills the bill; for wide-open high-speed blasting, the 500 is just the ticket. Granted, other companies such as KTM and Can-Am already offer excellent thumpers, but these machines also command a price about a thousand bucks higher than the Honda; with the XR350 listed at $1998 and the 500 at $2298, Honda clearly holds the edge in per-dollar value, and you can make the case that the XR500 performs as well as the European and Canadian thumpers regardless of price.

The reincarnations of Honda's big XRs won't drive the other four-stroke and two-stroke enduro bike manufacturers out of the market. Good as the 350 and 500 are, each has its blemishes. The ideal XR might be a 350-sized bike with the 500's power and disc brake, and it's possible that Honda has such a bike in the works. But don't wait around for what the factory might do in the future; for four-stroke enthusiasts, what Honda has built now will do just fine. ■



The RFVC design allows a narrow included valve angle, which leads to an open, shallow combustion chamber shape; this promotes rapid, efficient fuel burning.