

TRACK TEST:

Honda CR125R

Pro-Link suspension brings the red waterpumper to a boil. BY DAVID DEWHURST

Honda has performed a brilliant magic trick with its new CR125R. And as with the best magic, most likely you missed what really happened when Honda pulled its new waterpumper from the corporate top hat. You no doubt noticed the twin black radiators and the finless, red cylinder barrel—but that's where you were fooled. While you were distracted by what looks like a radically new engine, Honda performed the real magic with the Pro-Link suspension.

So cleverly did Honda complete this illusion that many people still believe that a water-cooled motor is the CR125R's new secret for racing success. But if you believe

that, you could be disappointed. Beneath the CR motor's factory-bike appearance lurks last year's production engine, unchanged apart from its red water jacket.

Yet the new CR can be ridden faster than any previous eighth-liter Honda—and that is no illusion. You see, thanks to its Pro-Link suspension the CR125R can be ridden harder, faster and longer than any 125 MXer we have tested to date.

Honda's new Pro-Link chassis transforms the CR so magically that it is hard to compare it with previous models. In fact, the new chassis is as different from the previous CR as the motor is similar. The core of the new package is a single, remote-res-

ervoir Kayaba shock with four positions of rebound damping. The key to the way the shock works, however, is a simple cast-iron link connecting the bottom of the shock to the extruded aluminum swingarm. This linkage gives the rear suspension truly rising-rate springing and damping. During the initial millimeters of rear axle travel, the shock compresses easily at a ratio of 4.5:1. As the rear axle moves upward, the shock compresses at a decreasing rate until the leverage ratio is 1.6:1 at the end of the axle's movement. So the first inches of suspension travel are very soft, becoming progressively harder as the suspension compresses.

This engineering theory translates into magical reality on the track, where the Honda glides over rough terrain like no other 125 before it. Actually, the first thing you notice is that even short-legged riders can reach the ground when they climb into the CR125R's saddle, despite the 11.5 inches of rear wheel travel. That is because the soft initial wheel rate permits the rear end to sag a distance that amounts to one-third of its total travel. This same soft



springing and damping allows the rear wheel to follow small ripples on the track like a magnet. Even over the tiniest bumps, the CR's rear wheel moves fast enough to stay on the ground. Better still, the Pro-Link has strong enough legs to support you when you get out in the deep stuff beyond Turn Three. Whether the obstacles are rolling whoops or big sharply-edged craters, Pro-Link seems to have the answer. It makes any track feel like nothing more than dirt-covered foam rubber.

Proof that it is the rising-rate aspect of Pro-Link and not just the location and size of the shock that gives Honda an edge over other brands in rear-suspension action comes in a comparison of the CR125R with Kawasaki's latest KX125. The KX has a single shock mounted vertically behind the engine and it too works on the swingarm through a linkage system. But even though the Kawasaki benefits from the same reduction in unsprung weight and lower center of gravity as the Honda, its Uni-Trak feels harsh in comparison to Pro-Link. That is because Pro-Link effectively has a broad range of spring rates to cope with different obstacles, while the Uni-Trak on the KX125 has only a single rate suspension. Also, Pro-Link uses the rising rate of compression damping to further cushion the bumps, something that straight rate suspension systems do not do.

In view of all these Pro-Link advantages, it is remarkable that the CR125R's new front fork is not overshadowed. Honda has abandoned Showa for Kayaba front suspension units this year and at last it has a fork that really works. In fact, the CR's air-spring unit has been so carefully dialed in that on the rare occasions when the CR's suspension bottoms, both front and rear do so at the same time. That is not only an indication of how well the Kayaba fork works but also an illustration of how well balanced the CR's suspension is.

Honda's new suspension for the CR125R is so well balanced, in fact, that it is hard to do anything wrong while you are riding. Even when you do finally get yourself all crossed up, the suspension will save you. At first the suspension's ability to absorb punishment, with a resulting insulation from the ordinary traumas of the track, makes the CR feel slow—but it is not slow. Actually, the CR is competitively fast. There are two main reasons. First, the suspension affords terrific traction. And second, the suspension lets you ride harder than other bikes in the rough stuff.

Right off the line, the CR squats down and takes a big bite of the track thanks to the soft initial travel of the rear suspension which permits a lot of weight transfer to



the Bridgestone M22 tire for more traction. And because the wheel follows the ground so precisely from that point on, the rear tire rarely loses its bite. So not only acceleration is improved, but braking and jumping too. Pro-Link absorbs so much of the impact as you slam into a jump's take-off ramp that you are not thrown as high into the air. So when you leave the ground, your trajectory is low and fast. Still, you can almost get into trouble if you are not prepared for this additional traction on jumps. If you leave the gas on as you launch off the crest, you might find the rear wheel touching down and hooking up while other bikes are still in mid-air. The CR jumps quickly into action even though you may be looking for a brief second of airborne relaxation.

The primary benefit of the rear suspension, though, is the fact that the CR never stops racing hard. Over the roughest straights or out of the slickest turns, the little red Honda races forward at warp speed. And thanks to the combination of a short wheelbase and steep steering head angle, the CR will also handle the slow stuff pretty well. Last year's YZ125G probably was more nimble in the turns, but considering the additional weight high on the bike thanks to its twin radiators, the Honda does a good job. And the CR won't be alone in packing that extra burden near the steering head this year, either. The '81 YZ will carry a radiator there too, which

could well narrow the cornering gap.

Honda certainly could not have mounted the radiators any higher on the CR125R than they are right now. Their location ahead of the gas tank also contradicts Honda's policy of mass centralization—that is, its practice of locating as much heavy hardware as close as possible to the bike's center of mass to improve handling. But Honda engineers maintain that mounting the radiators behind the steering head was the only way to insure protection from flying rocks and to keep the radiators clear of mud.

Unfortunately, we discovered that even such a high and remote position does not give the radiators total protection. The steel screen attached to the fork legs in front of the coolers bounces up and down, providing little shielding from rocks. Also, the individual steel screens covering the front of the radiators themselves leave the corners of the coolers exposed. During our first ride, the corners of both radiators were dinged by rocks. There were no leaks, but one big rock seemingly could do it easily. One Honda spokesman suggested that a spare radiator would be a sensible thing to take racing. But that is an expensive luxury that few can afford and even fewer would need if better protection had been designed. You certainly should look for a way to improve the protection offered. Also, you might even replace the angled number plate (designed to permit

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cooling air to reach the radiators), because the stones that miss the radiator seem to be deflected by the plate's sloping surface right into your face.

To be fair, of course, vulnerability is a common problem with any radiator cooling system, and not just those found on CRs. Even so, the second that the 50/50 blend of water and anti-freeze drains away, the water-cooled CR loses its one big advantage—the ability to run longer without a loss of power due to overheating. And with the CR, cooler running really is the only advantage to the new engine configuration. Honda engineers believe the popular notion that watercooling permits the design of more radical motors should be quashed as a myth. They have left the internals of the CR125R engine virtually unchanged this year. There is nothing more radical to the package than a new exhaust, a redesigned carburetor and a new ignition advance curve. Three different gear ratios also are fitted to make best use of the slightly revised powerband.

A micrometer shows that the four transfers, booster transfer and exhaust cut in the steel liner are exactly the same shape and size as those in the liner of last year's engine. Even the tolerances between

piston and liner are unchanged. Apparently, the sole benefit from water-cooling in the CR is the careful control of those tolerances.

Honda's engineers claim that after 20 minutes of hard racing, an air-cooled motor might lose as much as 30 percent of its horsepower through expansion and distortion of the cylinder barrel, which lets the horsepower leak away. Watercooling, they maintain, reduces these losses to no more than eight percent. The only trade-off is the vulnerability of the radiator, for a comparison of last year's CR engine with this year's shows that the popular belief that watercooling adds weight is unfounded. The new finless engine is actually four pounds lighter than last year's. And when you add the weight of the 950cc of coolant and two aluminium radiators into the equation, the overall weight difference is minimal.

Honda's CR125R also proves that watercooling can be simple. In fact, the only mechanical addition to the engine is a gear-driven impeller in the drive-side primary case which acts as a water pump. Spinning a little slower than crank speed, the tiny pump sucks water from the radiator and pushes it past the ports and into

the cylinder head. From there it is piped into the base of the right-side radiator, across the bridge at the filler cap into the left radiator, and then back to the pump.

In every other respect, the CR125's engine will look completely familiar to riders of last year's bike. Thanks to its awkwardly placed right-hand kickstarter, the CR still isn't the easiest bike for short-legged riders to fire up, but the new Mikuni-replica Keihin carb does help to clean up the bike's starting act. Honda claims greater adjustability and better flow for the new carb, and both seem to be true. We needed to adjust the jetting by raising the needle all the way and dropping the pilot jet from a 72 to a 65. But once adjusted, the carburetor worked just fine and delivered very clean response.

Unfortunately, smooth carburetion is not matched by the smoothest of powerbands. Thanks to a different exhaust and ignition advance, the engine revs a little higher and produces a little more peak power. But it does so at the expense of low end power. As a result, the engine feels pipier than last year—which won't bother the pro but could trouble the novice. At least the clutch and gearbox are very easy to use, so with plenty of footwork the motor can easily be kept perking. And when it is on the boil, the little CR is pretty fast, certainly faster at high revs than last year and probably fast enough to keep up with its watercooled opposition.

But do not think the bright red water-cooled engine is suddenly going to put you in victory circle. For three-lap dashes, the new engine will probably be at more of a disadvantage than last year's air-pumper. The narrow powerband makes the difference. The real gain this year is for those who race longer and harder than most riders. Then watercooled stamina makes a very real difference between first place and second place. That is because Honda thinks watercooling is not a way to gain power, but rather a means of maintaining what you already have.

And that is why the new CR125R is faster than any previous 125cc Honda MXer. Now it begins each moto with a healthy amount of power that keeps its potency right to the checkered flag. But most of all, the new suspension lets you use all that power for a full 40-minute moto. So it is only in long motos that the new CR's factory-bike illusion turns into racetrack reality. Only if you can ride long, hard and fast will you recognize the real edge that the new CR provides. Only then will you realize the source of the magic. Because, as with any such magical trick, the individual elements are not important—the overall result is.

Charting the Changes

Engine: New internal ratios for first, second and third gears. New primary drive ratio. Gear driven water pump feeds water-cooled cylinder and head. New ignition advance curve and redesigned exhaust for more power at high rpm. New 34mm Keihin carburetor.

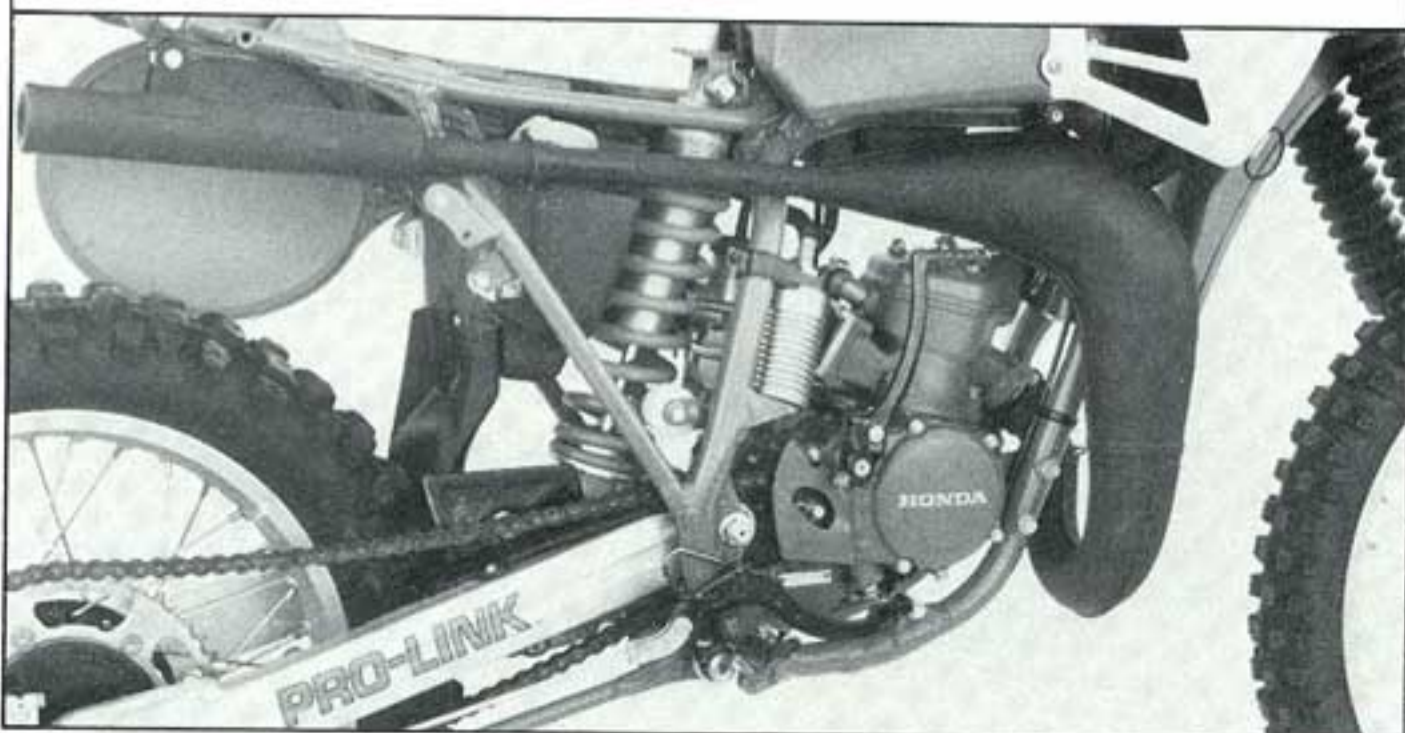
Chassis: New single downtube semi-cradle design. One degree shallower head angle,

and 8mm more trail. Wheelbase is two inches longer.

Suspension: Pro-Link rear suspension gives 17mm more travel. Kayaba fork replaces Showa with one millimeter larger stanchion tube diameter.

Tires: Front tire changes from an M23 to an M27 Bridgestone.

Details: Total weight increases by 8lbs. Twin aluminum radiators mounted ahead of gas tank. Side pull throttle and short dog-leg levers. New pivot seals exclude mud from kickstart and folding end prevents damage to new shift lever.



Proximity of Pro-Link suspension and engine shows evidence of mass centralization

Making motocrossers easier to handle with help from Father Physics.



Finding the Factory Team Edge

• Honda's new CR125R could be ten seconds a lap faster if you follow the factory-team advice of Donnie Hansen's tuner, Brian Lunniss. That extra speed won't cost a penny either because, as Lunniss explains, the race team edge comes from careful preparation and not just expensive parts.

In fact, tightening bolts, checking oil levels and cleaning air filters is the most important part of preparation. The fastest bike in a race cannot win if it does not finish. That is a truism that many riders forget.

Even more riders assume that a production bike in a crate will be set up perfectly for them. That is as unlikely as you beating Roger De Coster. Each model is only suited to an average-weight rider racing averagely fast on an average track. And if you're Mr. Average, you may not be interested in working for that extra ten seconds a lap.

Lunniss suggests that the less-than-average rider start first by dialing in the motor as soon as it is broken in. Carburetion is the area that will need work, even if it feels all right. To avoid confusing what is right and wrong, Brian suggests that only one item be changed at a time. He also suggests writing down every move in a logbook so that you can backtrack if things go wrong.

Mainjet settings are probably the easiest to correct. A plug reading will give a rough guide, but small changes from what appears to be correct could unearth a few more horses. The thing to remember is always try richer jetting first. Otherwise you possibly could fry your motor.

Tape marking quarter- and half-throttle openings on the twistgrip will help you check pilot and needle settings. Again, always try going richer first and be careful how lean you go. Our own bike needed the stock mainjet, but worked best with the needle raised as far as it would go and the pilot jet dropped three sizes, to a number 65. Conditions may vary for you, but this gives an indication of how much carburetion can be improved.

Suspension, too, is never perfect for everyone. The Pro-Link CR works particularly well when set up correctly, and the factory team has one strict rule to follow: Spring preload is critical. When you sit on your bike, the rear end should compress

one-third of the total wheel travel. This setting is a constant, and as the spring sags with age you should make weekly corrections to maintain this figure. Lunniss recommends that you first extend the suspension fully and measure from the axle to a point on the fender. Then take the same measurement with the suspension fully compressed. Then you can readily measure the one-third mark for regular checks.

Front suspension should match the rear end, otherwise the bike will handle badly. A rough check is to jump on the footpeg and see if front and rear ends compress at roughly the same rate. As with carburetion, suspension changes should only be made one at a time. First set the rear spring; it should bottom no more than twice a lap. If it does, go to a heavier spring, but always keep the preload setting the same. Then alter the damping and use a stopwatch to check for improvements.

Forks, too, can drastically effect handling. Too little air pressure may cause the fork to dive, and too little oil may cause bottoming. Both should be altered to find the best result. If you have been carefully writing every change down you will be able to return the bike to stock condition, and you may find you fooled yourself. Your "improvements" may actually have made the motorcycle worse. Never be afraid to make changes—or admit mistakes.

Even careful gearing changes can improve lap times. Again using a stopwatch, try different rear sprockets at your local track to find a combination that improves your times. And if, as often happens, you end up with gearing that is still a tad tall for the slowest turns, you can try the factory-team trick of leaning out the pilot jet a fraction. That will sharpen slow-speed response and compensate for the tall gearing. The reverse may also help provide traction on slick tracks. As Lunniss points out, many riders jet the CR so weak that it becomes very pipey. Sometimes a slightly rich pilot jet makes the motor more tractable.

Subtle changes like these can make all the difference in a close race. And while you may not gain a full ten seconds a lap, this bit of factory-team preparation will certainly give you a racer's edge. —David Dewhurst

Ride Review

• As changed in specification as this bike is from its predecessor, not to mention its ancestor with the 23-inch front wheel, I like it more than other 125s for the same reason I've liked the whole second generation of Honda CR125s, including the model with the 23-inch front wheel: It's easy to ride. It might be pipier than last year, but the power still comes on with perfect predictability. And the wheelbase might be longer, but I can still stick out a Malcolm Smith and pivot on a dime.

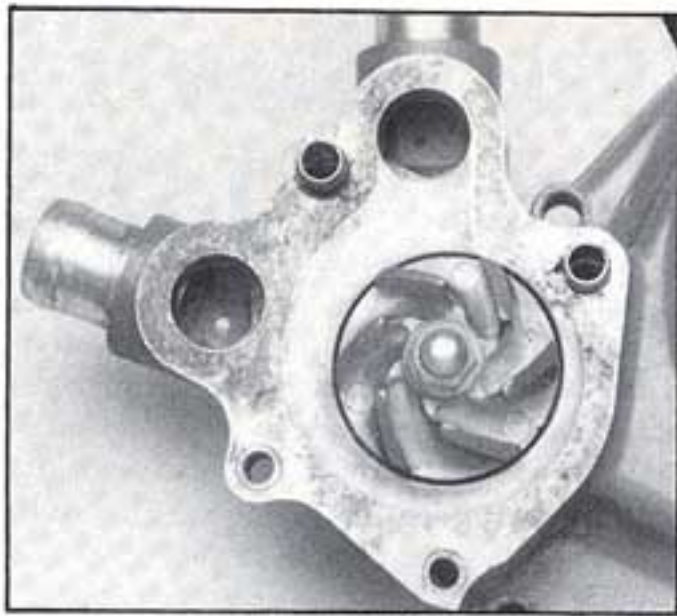
Again and again, I return to this theme of "easy to ride," and with good reason. It applies to 125s perhaps even more powerfully than big bikes. And this notion of friendly ridability has nothing to do with long motos and rough tracks and that sort of thinking. The fact of the matter is, I can go faster when I devote my modest powers of concentration to the terrain—and the riders ahead—instead of the motorcycle I'm aboard. Everyone who's felt that sudden change in attitude from thinking about riding to thinking about racing, knows what I mean. The Honda lets me span that gap quicker than any other 125 motocrosser. And that gives me an edge over all you humpties out there wondering what gear you should be in for the next corner or whether the next set of whoops are going to buck you off. —Michael Jordan

• There's no doubt in my mind that the CR125R is the niftiest 125cc motocrosser I've ever ridden. But I have to confess that power-wise, it fell a bit short of my admittedly high expectations.

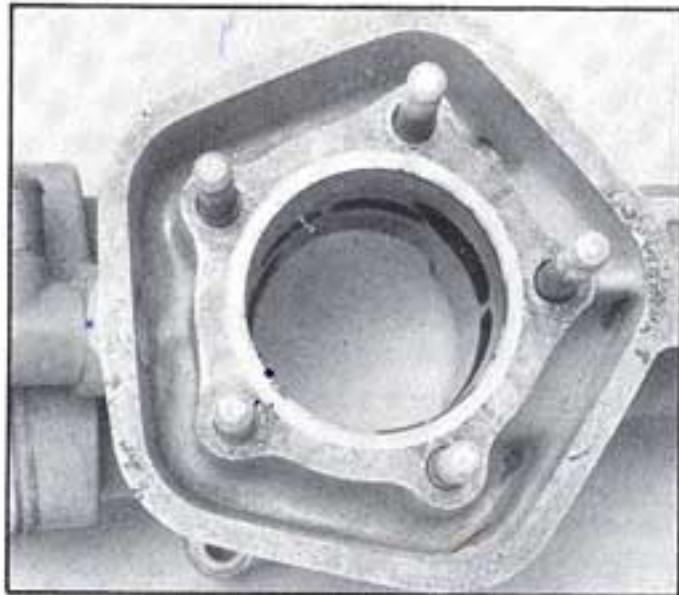
You see, according to all of the hype that preceded this year's crop of motocrossers, watercooling was going to work wonders for small-bore bikes. The more-even distribution of engine heat made possible by the circulation of cooling liquid was supposed to usher in a new era of truly radical cylinder porting and, thus, brutally powerful new motors. That's why I expected the Honda to be a mind-blowing 125 that would fire from corner to corner as though equipped with afterburners.

But that's not how it happened. Okay, so the new CR is the fastest 125 we've ever tested—that only required that it be just a little faster than last year's aircooled CR. I admit this new one is pretty damned quick—and it will be that way at the end of the moto as well as the beginning—but I still can't hide my disappointment.

I guess the issue here is whether my sights for the CR's performance were set too high, or Honda's too low. Whatever the case, I'm not lowering mine until after I've tried all of the 125 waterpumpers. One of them just might be the rocketship I've been expecting. —Paul Dean



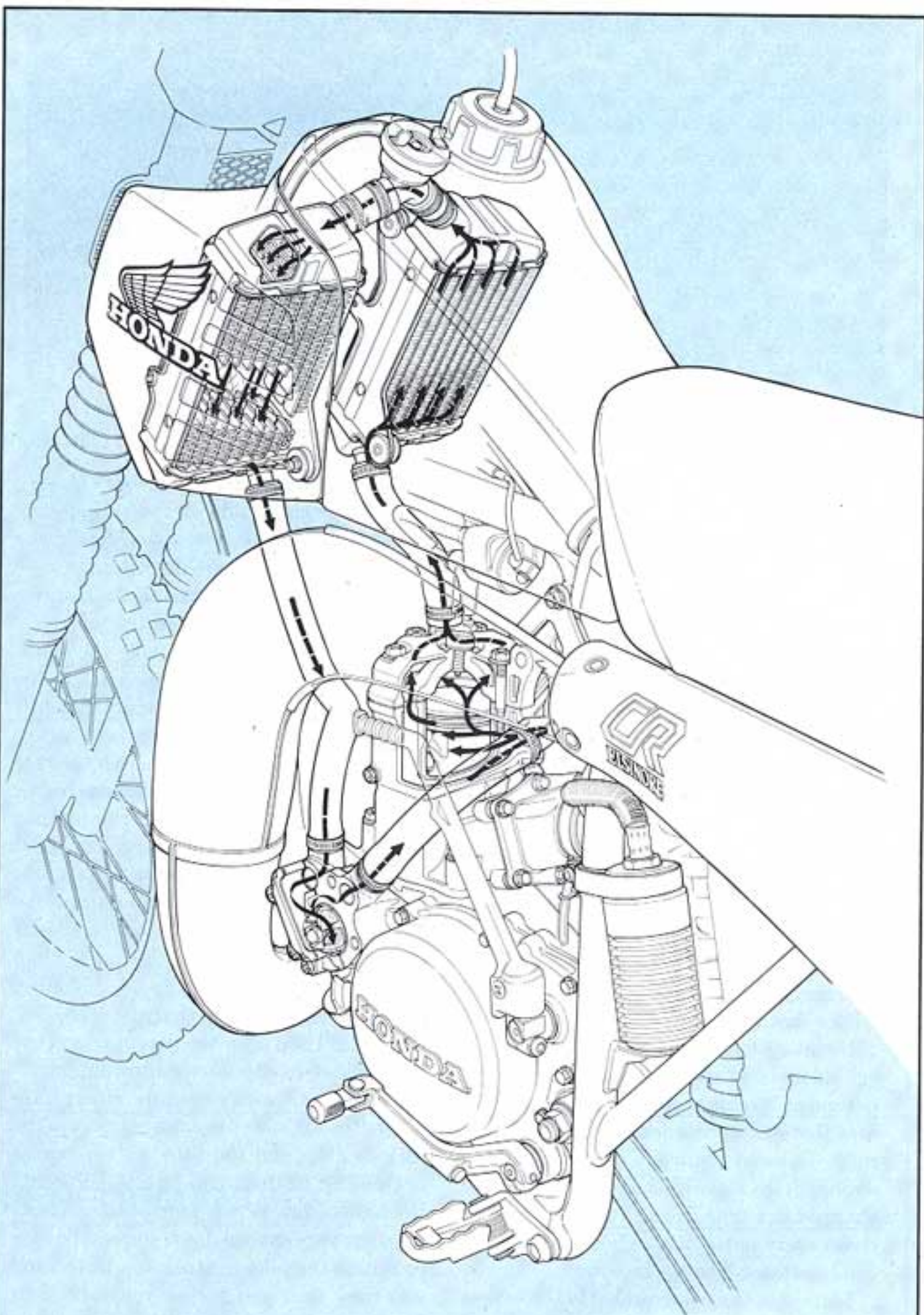
Crank-driven Prestone pumper
Fresh coolant every five seconds.



Large bathtub surrounds '80-style ports
Honda's into hot tubs.



Air flows beneath plate to twin coolers
Reshaping the gas tank for a lower cg.



Radical as the new CR125R engine looks, Honda's watercooling system actually is very simple. Indeed, only a small gear-driven waterpump and two radiators separate this engine from that of the previous small CR motor. Yet these few changes have a considerable effect. The illustration of the CR250's watercooling system shown here provides a good reference for our purposes.

The primary advantage of watercooling lies in the controlled cooling of the cylinder barrel and head. The circulation of the 50/50 blend of water and antifreeze—which prevents oxidation of the aluminum—begins when the impeller sucks water from the radiator and pumps it into the rear of the barrel. Then the coolant circulates into the cylinder head.

Once it has passed through the motor, the coolant is piped to the base of the right-hand aluminum radiator. It is forced through the cooling core and across a pipe into the left-hand radiator. From there, it is sucked into the crankshaft-drive waterpump again.

The CR125R engine contains only 950cc of coolant pressurized to 12 psi, but at 10,500 rpm the tiny pump circulates all that liquid every five seconds. That is sufficient to reduce power loss through heat distortion by as much as 22 percent. And that, however you look at it, is a radical improvement even with so little complication.

Honda CR125R

SPECIFICATIONS:

Importer: American Honda
100 West Alondra Blvd.,
Gardena, California 90247

CATEGORY: motocross

SUGGESTED RETAIL PRICE: \$1525

ENGINE

Type two-stroke vertical single
Port arrangement one reed-valve-controlled
intake, four transfers, one booster
transfer, one exhaust

Bore and stroke 55.5mm x 50.7mm
Displacement 122.7cc
Compression ratio (corrected) 8.2:1
Carburetion one 34mm Keihin
Air filter washable foam element
Lubrication pre-mixed fuel and oil
Starting system kick primary
Ignition internal-rotor magneto CDI
Charging system none

DRIVETRAIN

Primary drive straight-cut gears; 3.313:1 ratio
Clutch wet, multi-plate
Final drive #520 chain (5/8-in. pitch, 1/4-in. width) 13/51
3.923:1 ratio

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.42	31.41	2.4
II	2.00	25.99	2.9
III	1.61	20.94	3.6
IV	1.35	17.54	4.3
V	1.14	14.76	5.2
VI	1.00	13.00	5.8

SUSPENSION/WHEEL TRAVEL

Front air spring, 38 mm stanchion tube diameter /
10.6 in. (269 mm)
Rear 4-way adjustable rebound damping /
11.5 in. (292 mm)

BRAKES

Front drum, single-leading shoe
Rear drum, single-leading shoe, rod-operated

TIRES

Front 3.00 x 21 Bridgestone M27
Rear 4.00 x 18 Bridgestone M22

DIMENSIONS AND CAPACITIES

Weight 213 lbs. (97kg)
Weight distribution 46.7% front, 53.3% rear
Wheelbase 56.5 to 57.3 in. (1435 to 1454mm)
Seat height 37.5 in. (953mm)
Handlebar width 32.5 in. (826mm)
Footpeg height 16.3 in. (413mm)
Ground clearance 13.1 in. (334mm), at engine cradle
Steering head angle 29.5 degrees from vertical
Front wheel trail 4.8 in. (123mm)
Frame tubular chromoly steel, single front downtube
Fuel tank plastic, 1.7 gal. (6.6l)
Instrumentation none

PERFORMANCE

Top speed (observed) 68 mph (109 kph)

WARRANTY: none

AVAILABLE COLORS: red

All weights and measurements are taken with machine
unladen and fuel tank empty.



COMPARATIVE TEST DATA:

Make & Model	Horsepower	Wheel Travel Front / Rear, in.	Weight (fuel tank empty), lb.	Weight bias Front / Rear percent	Transmission, number of speeds
Honda CR125R-'81	NA	10.6/11.5	213	46.7/53.3	6
Honda CR125R-'80	20.8	11.5/10.8	202	45.8/54.2	6
Kawasaki KX125 A7	20.9	10.4/11.3	207	48.0/52.0	6
Suzuki RM125T	19.8	11.2/11.7	200	47.0/53.0	6
Yamaha YZ125E	15.9	9.3/9.1	198	48.7/51.3	6
Husqvarna 125 CR-'80	18.8	11.8/11.8	214	43.9/56.1	6

PERFORMANCE:

