

● TRADING HARD-EARNED DOLLARS FOR THE best of something or for more of something else makes sense. We pay more for extra displacement and horsepower, for saddlebags and cruise controls and adjustable suspension. We don't mind as long as we get a tangible product that justifies the expense, whether that product satisfies a creature comfort or our lust for performance.

Paying more for less is contrary to this logic. After all, good deals, bargains and discount prices are the apple pie of American shopping. The proverbial free lunch may not be attainable—but damn it if we don't try anyway.

If your only gauge of a motorcycle's value is that set of numbers on a specification page, then Honda's CM400A Hondamatic may strike you as the bike farthest from the free-lunch end of the buying spectrum. It offers pitiful performance compared with other machines in its displacement class and price range.

That performance deficit, ironically and illogically, is a direct result of its most unorthodox and expensive feature—its automatic transmission. Confounding the issue, that feature also produces the CM's most attractive but intangible advantage: freedom. Freedom from constantly monitoring the gearbox, from manipulating the clutch and shift levers and from coordinating standing-start clutch slip with throttle control and gear shifting. Performance as judged by the numbers is not the CM's long suit, but if you could grade simplicity of operation and put that on a spec page, then you'd have to admit the Hondamatic offers something tangible for your money.

Its automatic transmission demands little attention, leaving the rider free to concentrate more fully on surrounding traffic and less on coordinating hand and foot movements to manipulate the bike. This offers safer or at least less intimidating operation for the inexperienced rider,

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Honda's Automatic presents the new rider with an intriguing trade-off: shiftless riding for a power loss. Is this like buying a baseball card but not getting the bubble gum?

PHOTOGRAPHY: DAVE HAWKINS







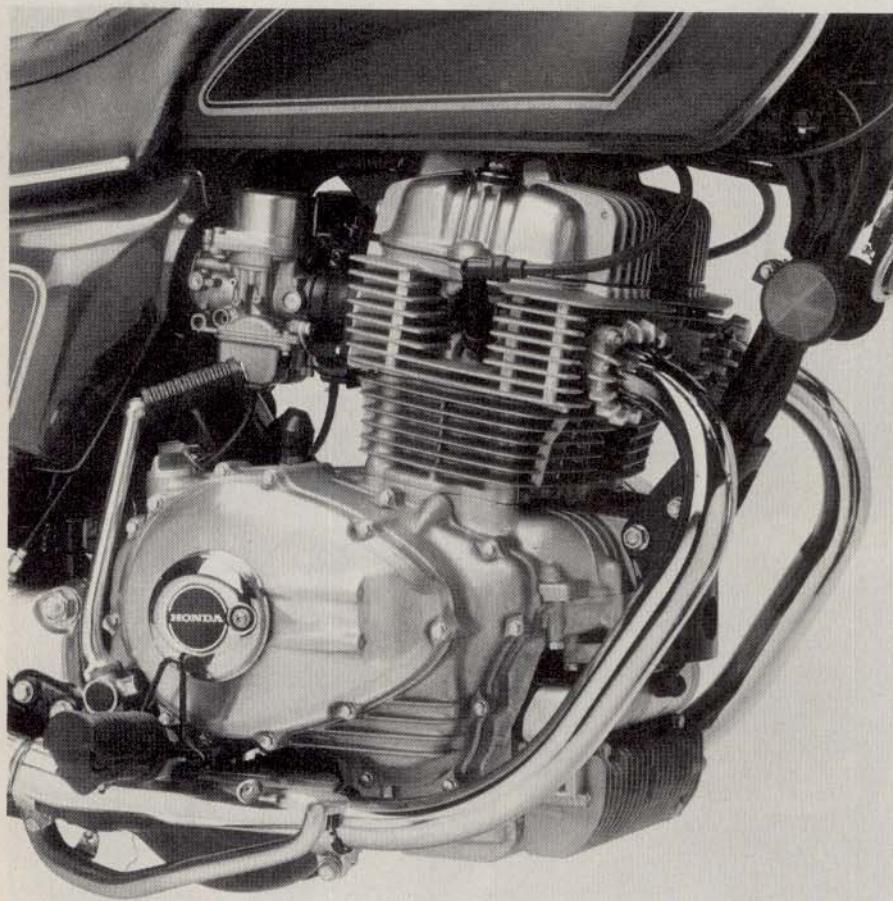
## HONDA CM400A

who may become confused in an emergency situation and for whom lever control is not instinct.

The Hondamatic version of the Hawk powerplant package was one of three that kicked off the Hawk series in 1977. Now we have five models: the budget-priced five-speed economy version, the six-speed sport model, two five-speed customs, and the Hondamatic. At their foundations are engines that—except for gearbox—share the same design.

This powerplant hasn't changed mechanically since its introduction. Its three-valve cylinder head features one exhaust and two inlet valves. They're opened by rockers operated from a single, chain-driven overhead camshaft. Two counter-rotating chain-driven balancers effectively reduce vibration and make the CM's powerplant feel smoother than some four-cylinder engines.

Besides the variations in transmissions, the only major difference between the Hondamatic and the manual-shifting models is their carburetion; the CM400A uses 28mm carbs, two millimeters smaller than its siblings' mixers. The 400A's carbs have an accelerator pump that feeds both units to help get past low- and mid-range stumbling—symptoms of lean carburetion. Our CM400A suffered a slight stagger when we were cruising at city speeds, mainly in the 25 to 35 mph range. This caused the bike to surge, alternately hesitating and lunging.



Other Hawk-engined models don't have—or need—the Hondamatic's built-in cooler, seen at bottom front.



The engine's power is transmitted through an oil-bath torque converter (see "Liquid Gears," page 74) to a two-speed gearbox. The gears incorporate spring and rubber dampers to help cushion impact when changing gears. These gears run on roller bearings in a fixed location on the countershaft; gear engagement is accomplished by a sliding dog (of enormous proportions considering the power output of the engine), which rolls over 45 steel balls to minimize sliding friction. The result of all these dampers and roller and ball bearings can be felt when shifting gears: engagement is exceptionally smooth, free of jolts and jerks.

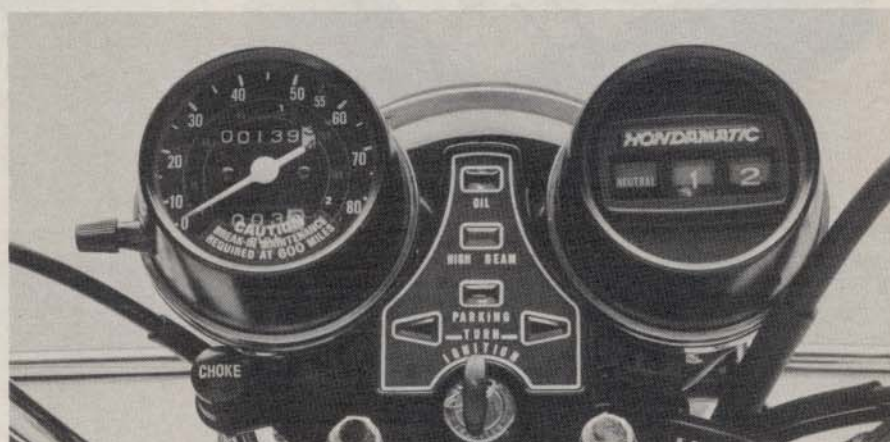
In operation the CM feels like a big moped. You simply toe the shift lever into low gear and twist the throttle. Sometime before reaching the 50-mph maximum speed in first gear, jab the gear lever into second. This is best accomplished with a simultaneous momentary chop of the throttle. Riding in this manner, by starting in low and shifting to second, you can coax the CM into delivering maximum gas mileage and acceleration. Alternatively, you can engage high gear right from the beginning and never again touch the shift pedal until you've reached your destination.

The CM400A's docile manners make it the ideal urbanite. Even when the engine is cold it idles unhesitatingly while you attend to helmet strap, gloves and jacket zippers. With the choke partially closed you can zoom away smoothly without the engine gargling on its fuel mixture. At this fast-idle choke setting the brakes are capable of pulling the bike to a standstill without stalling the engine.

The no-clutch-lever starts are a blessing on crowded downtown streets, leaving the rider free to direct full concentration on surrounding traffic and survival. Though the CM's acceleration is sluggish compared with other motorcycles', the 400A easily beats out almost all cars in daily traffic situations. Occasionally some lead-footed motorist may ace you out of that prime up-front spot, but those near-misses are rare. The CM's quarter-mile performance puts it in the same class as such sports-car notables as the Datsun 280ZX, Triumph TR7 and Toyota Celica, but only if you take off in low and manually shift to second. If you're lazy and leave the gearbox in high gear you'll lose your off-the-line advantage.

The CM400A takes longer to reach the far end of the quarter-mile strip than any motorcycle we've tested recently. The Suzuki GS250T, tested in June 1980, and the Suzuki GS400XX, tested in February 1981, have the CM beat by 2.21 and 2.23 seconds, respectively. The CB400T, tested in January 1981, is 3.67 seconds quicker, 16 mph faster, \$100 less expensive and a whole lot more versatile. Speed is not the Hondamatic's key selling feature.

Despite its leisurely quarter-mile per-



No tachometer here: clean instrument layout is easily readable; gear indicator lights are especially bright.



PHOTOGRAPHY: DAVE HAWKINS, ROBIN RIGGS



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formance, the CM carries two people without straining. Two-up performance is comfortably adequate for out-accelerating municipal traffic and for freeway cruising at supra-legal speeds; however, passing slower traffic at high speeds with or without a passenger involves deliberate calculation.

Maneuvering in tight spots, such as busy parking lots, even with a passenger, is easy thanks to the basement-level seat height and light feel at the handlebar. Steering is neutral and responsive to deliberate inputs without being overly sensitive to small erratic inputs.

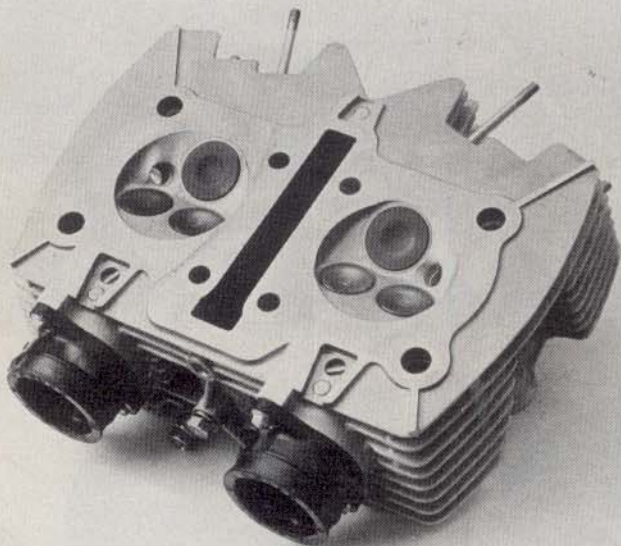
Moving around on the seat doesn't send the bike off on a different line. This sure-footed competency instills confidence in inexperienced riders.

Several other factors also influence handling. The 3.50 front and 4.60 rear tubeless tires plant a Bigfoot-sized tread pattern on the road surface and provide very good traction under heavy braking and cornering. The bike's footpegs are first to touch the ground at steep lean angles, but that's well before the limits of adhesion are approached. Despite having decent suspension components, the Hondamatic should not be pushed to its limits when you're cruising through the canyons. The longish handlebar and overly spongy handlebar-mounting sys-

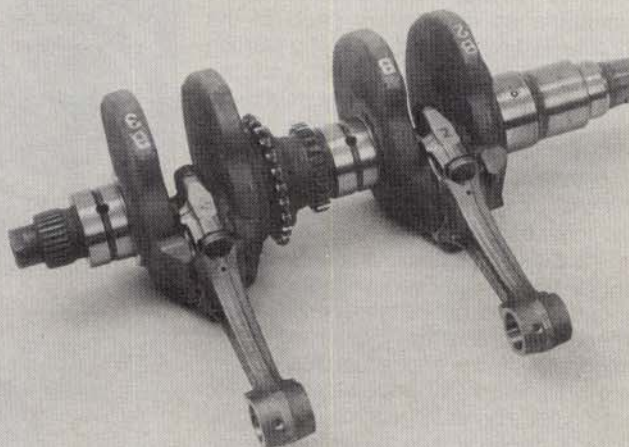
tem do little to aid precise control at high speeds. But, considering the 400A's nature, this is a niggling complaint.

The air-adjustable fork has a connecting tube that equalizes the legs so you can make air-pressure changes at one valve stem. Honda recommends pressures from eight to 14 psi. Thanks to light spring rates and low-friction Syntallic bushings the fork produces a comfortable ride, especially with less air in it. With over 14 psi in the fork, though, the rebound damping fails to control wheel bounce over rough roads. There's another consequence, too, of the comparatively light springing and damping: the fork sags nearly to the limits of travel

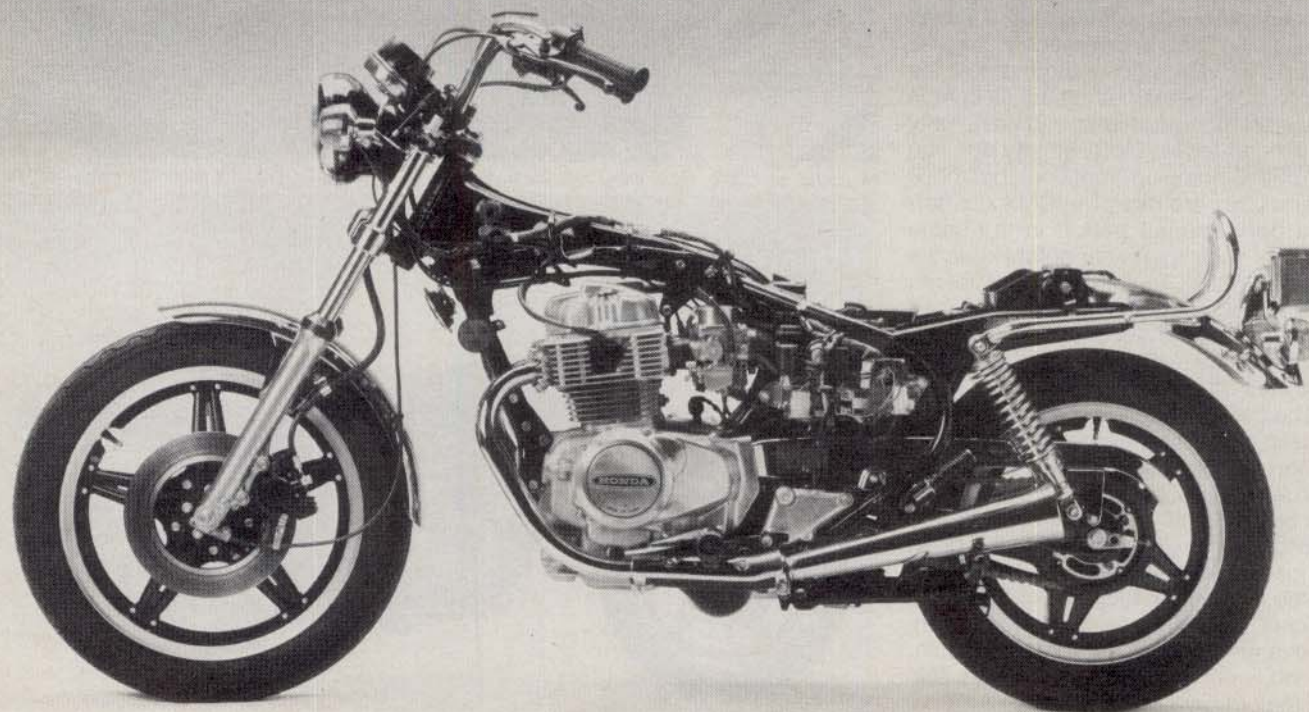
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Offset exhaust valve allows more central spark plug for shorter flame front.



The sturdy one-piece forged crankshaft is supported on three plain bearings.





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under hard braking, even with 12–14 psi.

The rear shocks are slightly oversprung for lightweight riders. With the spring preload on the lowest setting, a 140-pound rider can feel the rear end buck over freeway expansion joints. Except for this slight deficiency, the suspension is compliant and produces a comfortable ride over typical road surfaces.

All but the smallest riders find comfort during long rides limited. The seating position seems marvelously contoured when you first settle into the sway-back, high-stepped saddle, grapple the swept-back, buckhorn-style handlebar and rest your feet on the forward-positioned footrests. While you may feel accommodated at first, after a few hours in the saddle you'll feel as if you're on a medieval rack. Upon completing one 399-mile trip, one of *Cycle's* testers, a five-foot ten-inch rider, reported that after 80 miles, tension had begun creeping across his shoulder blades. As 135 miles registered on the odometer, his right wrist and thighs began cramping. He completed his 400-mile day driven by a sense of duty.

The low, stepped seat, although wonderful for allowing a shorter rider's feet to reach the ground, traps the rider in one place. The handlebar kinks your wrists and arms, which is acceptable only for short periods of time. The footpegs position the rider's feet too high and too wide, in contrast to the narrow gas tank, which allows your knees to close to about eight inches. Because of the narrow tank, the rider can either let his knees hang out in the breeze, or physically pull them against the gas tank. Either approach strains leg muscles. For runabout jaunts, which suit this machine ideally, the seating position is acceptable.

The stopping power of the front disc brake matches the bike's performance capabilities. Considerable pressure is required at the lever for super-quick stops, but the relationship between squeezing and brake actuation is linear and produces precise feedback.

The rear brake is more than adequate, easily controllable and not prone to lockup. A lever-actuated parking brake mounts to the left end of the handlebar—identical to the clutch-lever placement of typical motorcycles. It incorporates a small knob, which must be depressed while operating the parking brake. This prevents accidental rear-brake application if the rider inadvertently grabs the "clutch lever."

The instrumentation presents limited but valuable information for everyday riding. Although there's no tachometer, the speedometer's face is marked to indicate maximum speed in low gear—50 mph. The other instrument face has three lights to tell you whether the transmission

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## LIQUID GEARS

● There's nothing mystifying about Honda's torque converter. Fluids in motion (or bodies in motion through fluids) possess tremendous kinetic potential. Incredibly heavy jumbo jets, for example, shed their earthbound dependency in air—a fluid that weighs only 0.076 pounds per cubic foot. A denser fluid, such as oil, can transmit an engine's power simply by pumping oil through a system of vanes and turbines, replacing the friction plates and springs of a conventional clutch with turbines and oil.

Picture a fan blowing against a non-running, stationary fan. The motionless fan will soon begin to rotate almost as rapidly as the driving fan. This is the principle of torque converters. A hydraulic "fan," driven by the engine, pumps a centrifugal flow of oil against the curved vanes of a turbine connected to the bike's gearbox.

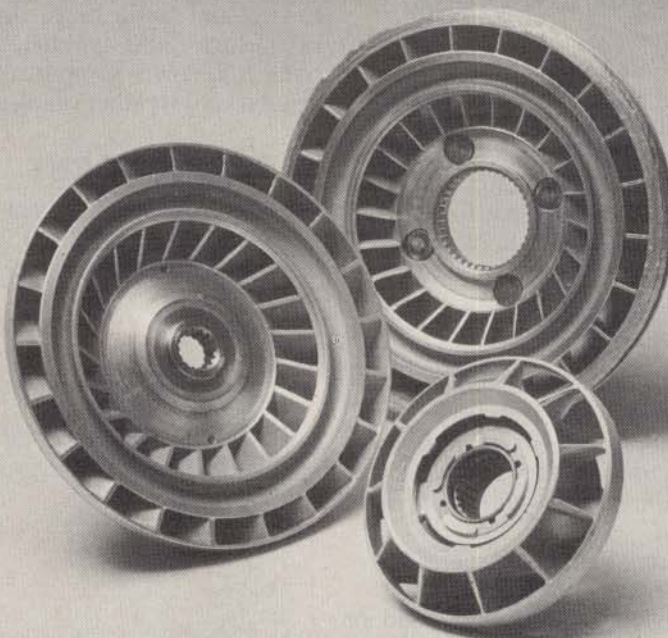
The Honda torque converter employs three trochoidal impellers: the crankshaft-driven pump; the pump-driven turbine, which is splined to the gearbox mainshaft; and the stator, a small turbine between the pump and turbine, which redirects the flow of oil for more efficiency. The oil forced by the pump into the turbine pushes against the turbine's blades. The curvature of these vanes and the turbine housing channels the oil back toward the center of the pump. Here the stator sweeps the oil flow in the direction of pump rotation. Without this stator, the oil would hit the pump in the wrong di-

rection and cause back pressure rather than forward pressure. After circulating the converter the oil returns to the engine's sump; oil is replenished by a supply from the engine's oil pump.

Torque converters have the unique quality of varying the amount of torque between the converter's pump and turbine. The overall range of this multiplication differential depends on the design of the vanes and the dynamics of fluid flow. Maximum torque multiplication occurs when the pump strains against a stationary (or "stalled") turbine. The CM400A has a 2:1 torque multiplication at stall, when the engine is turning 3550–3850 rpm. At stall, oil from the turbine exerts a backward pressure on the stator, but the stator has a sprag clutch in its center, which holds the stator stationary. Once the turbine is in motion, the stator tries to rotate with it.

As the converter's pump accelerates the turbine and stator to faster speeds, and as the turbine speed comes nearer to the pump's speed, the torque multiplication converges on a 1:1 ratio. The CM400A achieves a 1:1 torque multiplication ratio at a 0.85 turbine/pump speed ratio, and at a 0.95 turbine/pump speed ratio the torque multiplication is actually less than 1:1. The turbine never spins as fast as the pump, which in this particular case means that the transmission mainshaft will always turn less than 95 percent of the driven gear.

—Buzz Buzzelli



The CM400A's torque converter pump, right rear, is gear-driven by engine crankshaft; stator is at lower right; turbine, left, attaches to gearbox mainshaft. The entire assembly is about six inches in diameter.



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The tripmeter reset knob, easily resettable, will be used frequently if you zero

The Hondamatic's maintenance schedule doesn't give you reason to reserve a special parking place at your local dealer's service department. After the required break-in maintenance at 600 miles, Honda recommends regular services at 3750 miles, punctuated with engine oil changes at 1875-mile intervals. These regular inspections and adjustments can be performed with the bike's toolkit—except for the lack of feeler gauges for tappet adjustments.

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Make and model ..... Honda CM400A Hondamatic  
Price, suggested retail (as of 4/7/81) ..... \$1998

Standing start ¼-mile ..... 17.80 sec. @ 73.95 mph  
Average fuel consumption rate ..... 48.4 mpg (20.6 km/l)  
Cruising range, main/reserve ..... 101/24 mi.  
Load capacity (GVWR less curb weight)..... 188.2 kg  
(414 lbs.)

Type	Four-stroke in-line twin; air-cooled with three-valve, single-camshaft head and Hy-Vo chain timing drive
Bore and stroke	70.5 x 50.6mm (2.77 x 1.99 in.)
Piston displacement	395cc (24.2 cu. in.)
Compression ratio	9.3:1
Carburetion	(2) 28mm constant-velocity Keihin with accelerator pumps
Exhaust system	two into two
Ignition	Capacitor discharge
Air filtration	Paper element, disposable
Oil filtration	Paper element, disposable
Oil capacity	2.5 liters (2.6 qts.)

Type .....	Two-speed, constant-mesh with sliding dog engagement; hydraulic torque converter
Primary drive .....	Straight-cut spur gears
Final drive .....	# 530 chain
Gear ratios, overall .....	(1) 9.36 (2) 6.59

Type .....	Backbone with engine as stressed member
Suspension, front ..	Center-axle air/spring telescopic fork
rear .....	Swing arm with (2) dampers of adjustable spring preload
Wheelbase .....	57.2 in. (1453mm)
Rake/trail .....	29.5°/ 108mm (4.3 in.)
Brake, front .....	Hydraulic, single-disc

276mm rotor (10.88 in.) with dual-piston caliper	
rear	Rod-actuated drum
Wheel, front	Composite five-spoke, 2.15 x 18 in.
rear	Composite five-spoke, 2.50 x 16 in.
Tire, front	3.50 S 18 Bridgestone "Mag Mopus" S703
rear	4.60 S 16 Bridgestone "Mag Mopus" L302
Seat height	759mm (29.9 in.)
Ground clearance	150mm (5.9 in.)
Fuel capacity, main/reserve	8.3/1.7 liters (2.1/0.5 gal.)
Curb weight, full tank	186.8 kg (411.0 lbs.)
Test weight	259.5 kg (571.0 lbs.)

Power source.....	A.C. generator, 170 watts
Charge control.....	Solid-state voltage regulator
Headlight beams, high/low.....	50/35 watts
Tail/stop lights.....	3cp/32cp
Battery.....	12 V, 12Ah

Includes.....Speedometer, odometer, tripmeter,  
gear and neutral indicators;  
indicators for high beam, turn signal, oil pressure.  
Speedometer error, 30 mph indicated, actual ..29.61 mph  
60 mph indicated, actual ..59.84 mph

Customer Service Department  
American Honda Motor Company, Inc.  
100 West Alondra Blvd.  
Gardena, CA 90247

*Cycle's Schenk dynamometer, long residing at Webco, Inc., in Venice, California, is in the process of being moved and re-installed at a new location. Consequently, this motorcycle could not be dyno-tested at this time. Figures for this motorcycle will appear in Cycle in an upcoming issue.*

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If you choose to do your own servicing, the operations are no more than a Saturday-afternoon project; simply remove the fuel tank, seat and side covers—a two-minute chore—and go to it. All regularly serviced items, such as the air cleaner, battery, valve tappets and oil filter, are easily accessible. The capacitor-discharge ignition system requires no attention. Its energy source is a flywheel magneto, which doesn't depend on the battery. The kick lever will start the engine if the battery goes dead.

Two thousand dollars is a lot of money, even in these days of four-grand Superbikes and six-grand econo-cars. You can buy the Hondamatic's otherwise-identical five-speed counterpart or you can buy the six-speed sport model; either way you'll get more performance and function for less money. For a few hundred dollars more you can enter the high-performance world of the sport 550s and 650s. Continuing this line of comparison, you ultimately arrive at the CM400A Bottom Line, the only feature that makes the Hondamatic worthy of consideration: its simple and convenient operation. You'll trade away some performance, some all-around versatility and a lot of excitement in return for the CM's automatic transmission and the convenience it offers. If your entry-level buying criteria centers around that feature, then the CM400A is your choice—your only choice. ●