

# Cycle

MAY 1976 75 CENTS

ROKON'S NEW RT-340-II  
COMPLETE DAYTONA COVERAGE  
XT-500 SINGLE YAMABANGER

## EXCLUSIVE: \$2300 HONDA AUTOMATIC





# HONDA CB-750A



**Less public notice and more concentration  
for the rider who has nothing  
to prove and places to go.**

● When the Honda R&D types began to ask what we thought of automatic-transmission bikes just over a year ago, our response was one of reserved curiosity. Such a machine could range in nature from being the equivalent of Jim Hall's brilliant Chevy-powered two-speed/torque converter racer to the mid-fifties Powerglide. Knowing Honda as we do, something between these extremes seemed probable.

The result of the questioning, which occurred when the still-secret Honda automatic was at the mid-prototype stage, is our CB750A-76 test bike. This new machine is a thoroughly worked-over version of previous CB750 models. The chassis is essentially a CB750F unit with 10mm more wheelbase, and the engine is retuned (for less top-end power and more torque at low rpm) in the same manner as automotive automatic-transmission powerplants. But the engine is no quick lash-up for a marketing test: a completely new set of crankcases and side-covers house the gearbox and fluid coupling components of the Hondamatic system.

The engine breathing changes begin with four 24mm carburetors (4mm smaller than the other CB750s) feeding cylinders with lower compression ratios (8.6:1 vs. 9.0:1 for the CB750-76 and 9.2:1 for the harder-running CB750F). And the camshaft gives less valve-open duration to provide maximum cylinder filling at low rpm. We suspect that the reason for using the four-into-one exhaust had more to do with its easily-tunable scavenging effect than for appearance.

Changing the engine to a wet-sump oiling  
MAY 1976



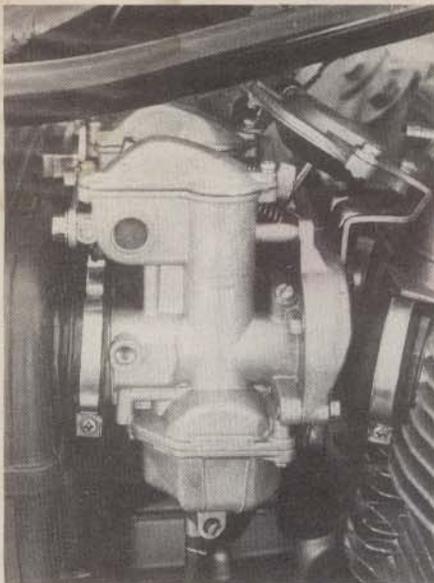
PHOTOGRAPHY: DAVE HOLEMAN (COLOR), PAUL R. HALESWORTH

system, in which the lower crankcase-half holds a common 5.8 quarts for the engine, transmission, and torque converter, allows the installation of a much larger 20 amp-hour battery in the space previously occupied by the remote oil tank. The bigger battery will give much better cold-weather starting and deal easily with multi-stop urban commuting where there are no sustained periods of cruising to allow for re-charging time. Feeding the battery is an alternator, with an output increased from 210 to 290 watts.

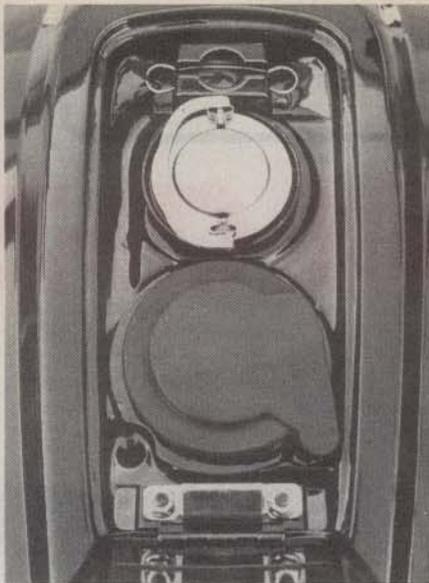
Any similarity to previous CB750 power/transmission packages ends at the crank-

shaft. Even the triplex-roller primary drive chain has been changed to one of the Hy-Vo type to decrease mechanical noise. This chain connects the crank to a jackshaft mounted between the engine and transmission components. The left end of the jackshaft drives tandem engine and transmission oil pumps, and the right end is geared to a mating pinion which drives the torque converter. Actually, the coupling drive is the outermost of three concentric shafts: the one in the middle connects the torque converter stator to a pressure regulating valve, and the innermost is the gearbox mainshaft—which is splined to the converter's driven half.

There are two pair of gears on the mainshaft and layshaft, and the rear chain drive sprocket is on the left end of the layshaft. This would constitute a straightforward two-speed gearbox, except that in place of conventional sliding dogs to engage the free-spinning pinions to their shafts there are hydraulically-operated multi-plate clutches. The Low clutch and pinion are on the mainshaft and the Drive pair are on the layshaft. The foot-pedal lever operates a hydraulic valve, which directs pressure from the pump to the appropriate clutch, where it works against a piston to force a small stack of metallic plates together to make the gear engagement. Under full throttle at low rpm, where torque multiplication is greatest, the torque converter's stator operates a linkage to direct additional pressure to the shifting clutch so that it can't slip. Drilled passages in the case lead to sealed slip-ring



Linkage above new 24mm carbs is electric-solenoid-controlled idle speed governor for Hondamatic.



Panel in top of fuel tank hinges backward for safety and opens with ignition key for filling 5-gal. tank.



Rubber boot on rear brake lever pivot covers stop switch and cable-controlled ratchet on park brake.

carriers on the shifting clutches to transmit the engaging pressure. Petal valves in the shifting pistons allow complete dumping of oil by centrifugal force when system pressure is removed. Were it not for this hydraulic gear-engagement system, a complete conventional clutch would have to be placed in the drive train in order to shift gears, as it has in the Guzzi system.

The rear drive sprocket, chain and rear hub are the same items used on the CB750-76 (this year's version of the regular four-pipe CB750). In order to get higher load capacity and better tire life, Honda has chosen to fit the larger-profile 4.50H17 tire and rim from the GL1000 on the CB750A's hub. Although the rim size is an inch smaller in diameter than the other two Honda 750s, the fatter tire gives a greater rolling circumference than a 4.00 x 18. And the added section also gives a bigger footprint for added traction. The tire fitted is a Dunlop K-87. The new style GL1000 alloy rim is also fitted on the front wheel, and it is shod with

the tried and proven Dunlop F-6 3.50H19 rib-pattern tire. The rest of the fork and wheel assembly is virtually unchanged from the CB750F components. Both fenders are new chromium-plated steel items that are quite wide and flared at their lower extremity to shield the rider from road spray.

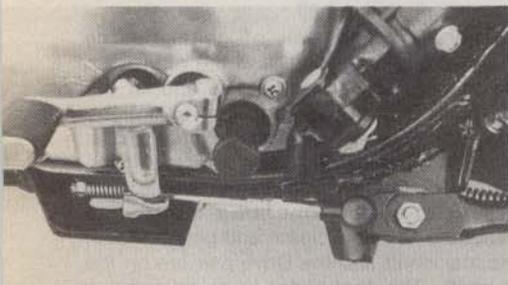
One must become accustomed to much change in the instrument cluster. Both the ignition key and choke control knob are exactly where they should be: right up there between the handlebar clamps where you can see them. No more dark-of-night fiddles to find the key hole or fumbling around to find a choke lever to push off after you are doing the speed limit and the engine is warm. Another convenience is that the key fits the switch either way, and with the handlebars turned against one of the stops a push and counter-clockwise twist of the key locks the fork in that position for parking.

In the speedometer dial, there are two bands to tell you when the engine is at its maximum permissible rpm, which occurs at

60 mph in low range and 105 mph in high. And that's all there is to tell you of engine revs: no tachometer is provided. In the round housing that looks exactly like a tach, there are a series of warning lights and an electric fuel gauge. Across the top, the three small lights tell when the high beam of the headlight is on, when the oil pressure is dangerously low, and when the parking brake is engaged. Three more lights indicate whether the gearbox is in neutral, low, or drive. The turn signal lights are on the right and left under that, and the fuel gauge is at bottom. All are easy to read, even at night, and there is no mistaking their message.

The parking brake is a little ratcheting device that locks the rear-wheel brake when a two-part knob is pulled out near the fuel valve on the left side of the bike. This feature is necessary because the gearbox automatically returns to neutral anytime the side-stand is lowered. And the fluid coupling would allow the bike to roll even if the transmission could stay in gear. As it is, the

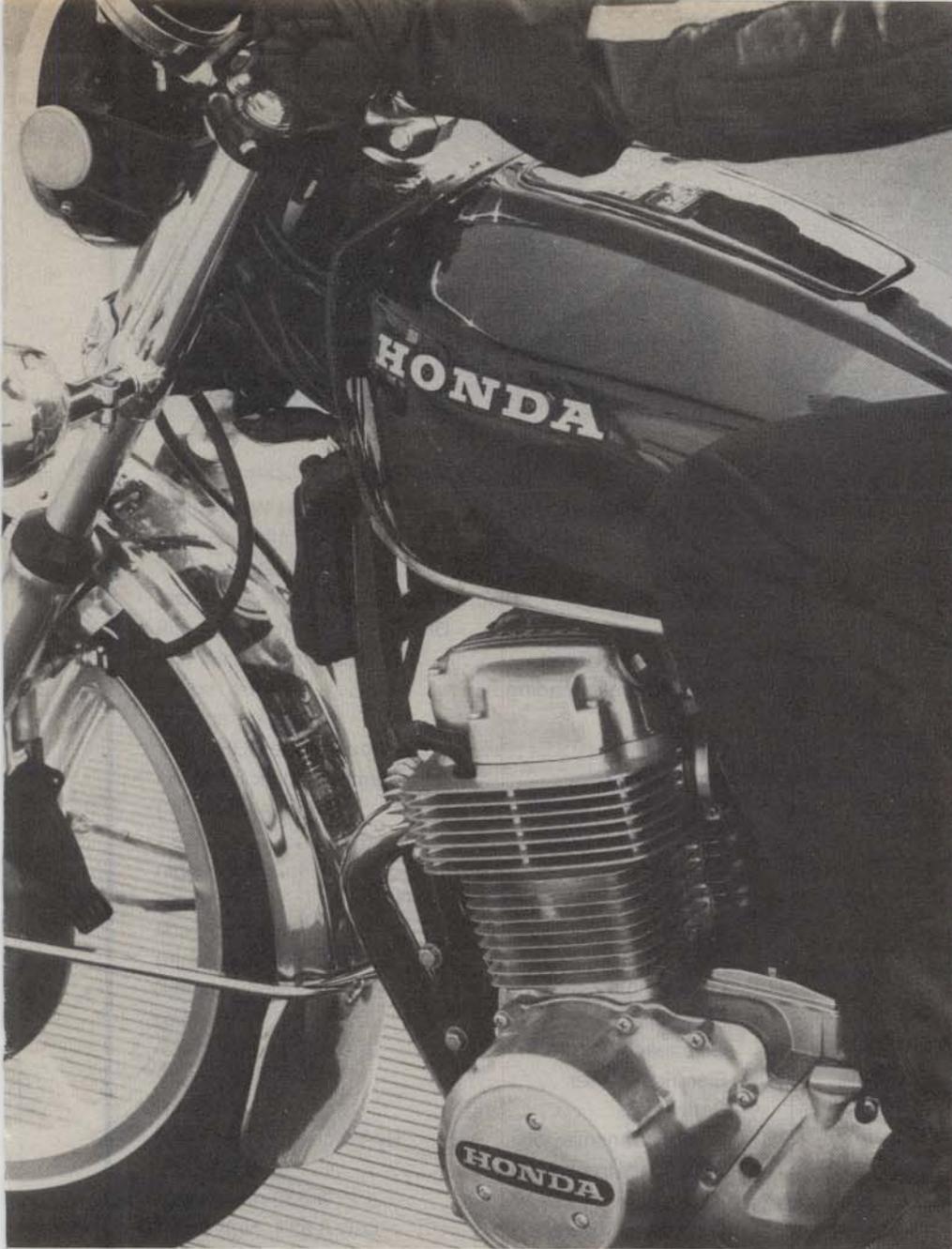
## HONDA CB-750A



Linkage is for automatic neutral device when side stand is down. Emergency start lever fits on stub.



Plastic box on frame downtube holds the wiring connectors so electrical problems can be found fast.



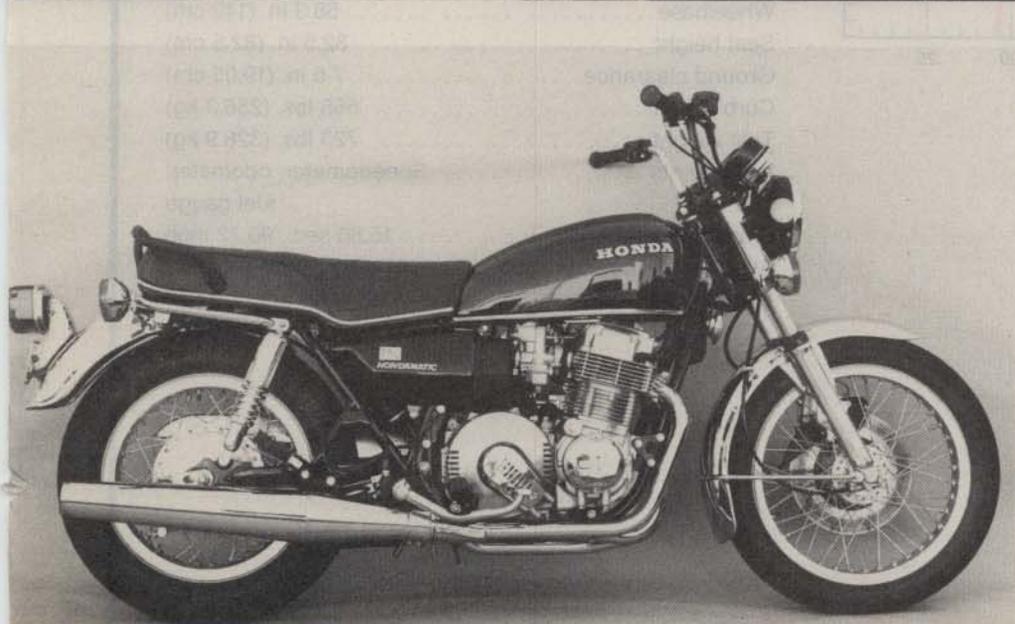
Beautiful shoulderless rims from the GL1000, and fork sliders that move easier over little bumps, are new.

machine will stay stationary, held by the rear brake, with either end pointing downhill. Pushing the center button releases the knob, and then a dab with your toe on the brake pedal releases the brake ratchet. The parking-brake warning light is there so you won't ride off with the knob pulled out and then unexpectedly find yourself being pulled down to a full stop the first time the rear brake is applied.

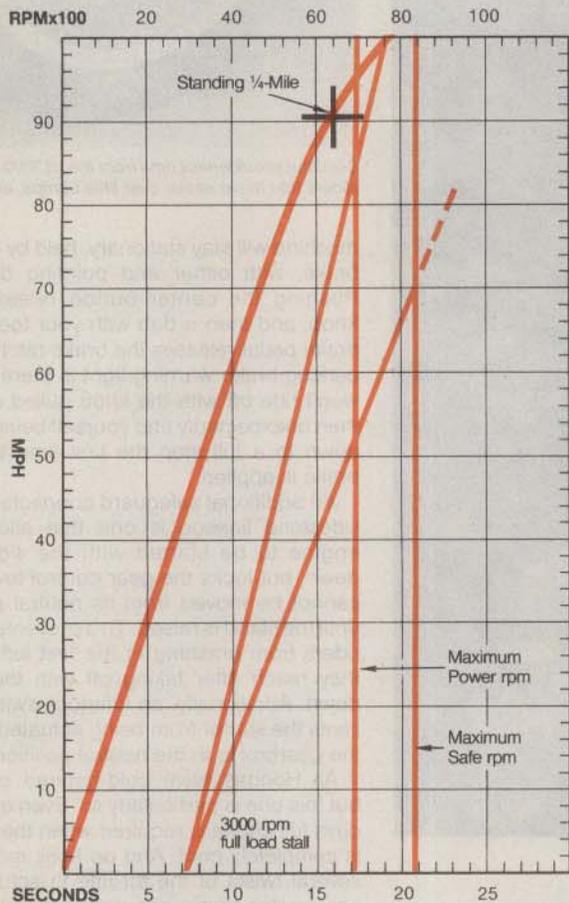
An additional safeguard connected to the sidestand linkage is one that allows the engine to be started with the sidestand down, but locks the gear control lever so it cannot be moved from its neutral position until the stand is raised. This prevents novice riders from crashing in the first left corner they reach after taking off with the stand down. Additionally, an interlock-switch prevents the starter from being actuated unless the gearbox is in the neutral position.

All Hondas have cold-natured engines, but this one is particularly so. Even on warm days full choke is required when the engine is completely cool. And on brisk mornings, several twists of the throttle to actuate the accelerator pump are required before the engine will fire up. The engine usually sputters and dies a few times before it catches and groans to life. After a couple of minutes the engine will respond to the throttle on about half-choke and low range can be selected without killing the engine. After a mile the engine will run cleanly with the choke fully returned, but a sluggish feel from the engine and buzzing vibration in the seat and footrests indicate there's still a lot of thick-oil resistance for the engine to fight. After about ten miles on a 40-degree morning, the oil thins out and the CB750A begins to run normally.

The transmission is not an automatic. If you take off in low, the transmission stays in low until you shift. If the lever is left in high, the bike takes off in high and stays there. The automatic part is the change in ratio provided by the torque converter, which gives the equivalent of an approximately 2:1 reduction ratio at stall, but eases toward a 1:1 straight-through drive as its speed rises. This



The exhaust system is similar to that of the CB750F, but has been modified for max torque at 6000 rpm.  
MAY 1976



### HONDA CB-750A

Price, suggested retail . . . . . \$2194 West Coast  
 Tire, front . . . . . 3.50 x 19 Dunlop F6  
 rear . . . . . 4.50 x 17 Dunlop K87  
 Brake, front . . . . . Disc, 11.7 x 1.625 in. (29.7 x 4.12 cm)  
 rear . . . . . Drum, 7.1 x 1.6 in. (18 x 4 cm)  
 Brake swept area . . . . . 152.8 sq. in. (986 sq. cm)  
 Specific brake loading . . . . . 4.74 lbs./sq. in.  
 (0.33 kg/sq. cm)  
 Engine type . . . . . Four-stroke SOHC four  
 Bore and stroke . . . . . 61 x 63mm (2.402 x 2.480 in.)  
 Piston displacement . . . . . 736cc (44.9 cu. in.)  
 Compression ratio . . . . . 8.6:1  
 Carburetion . . . . . 4; 24mm Keihin  
 Air filtration . . . . . Dry paper  
 Ignition . . . . . Battery and coil  
 Rake/Trail . . . . . 28°/4.5 in. (115mm)  
 Mph/1000 rpm, top gear . . . . . 13 (approximate)  
 Fuel capacity . . . . . 5.1 gal. (19.3 liters)  
 Oil capacity . . . . . 5.8 qts. (5.5 liters)  
 Electrical power . . . . . 290 watt alternator  
 Battery . . . . . 12V, 20AH  
 Primary transmission . . . . . Hy-Vo chain (1.35:1 ratio)  
 Secondary transmission . . . . . 5/16 x 5/8 in.  
 # 530 roller chain  
 Gear ratios, overall . . . . . Low 8.63:1, high 5.80:1  
 Wheelbase . . . . . 58.3 in. (148 cm)  
 Seat height . . . . . 32.5 in. (82.5 cm)  
 Ground clearance . . . . . 7.5 in. (19.05 cm)  
 Curb weight . . . . . 565 lbs. (256.3 kg)  
 Test weight . . . . . 725 lbs. (328.9 kg)  
 Instruments . . . . . Speedometer, odometer,  
 fuel gauge  
 Standing start 1/4-mile . . . . . 15.86 sec.; 90.72 mph  
 Average fuel consumption . . . . . 51 mpg (21.69 km/liter)  
 Speedometer error . . . . . 30 mph actual 32.52  
 60 mph actual 57.17

assists the two transmission ratios so that acceptable acceleration and a broad speed range can be squeezed out of them.

Actually, more-than-decent acceleration is only a part of the Hondamatic's traffic capabilities. Freed of the attention required for the usual clutch and gearshift operation, a rider can concentrate on the ever-changing traffic pattern around him and make the most of its opportunities. Our initial prejudice against automatics (they didn't seem sporting) was quickly overcome during our first encounter with an automatic, the Rokon dirt bike. Riding an off-road bike fast and guiding a street machine through dense traffic present similar concentration problems. Your eyes are constantly scanning near and far to judge immediate and future problems. A mistake in deciding the trajectory of your machine can be disastrous in either situation. There's a definite gain in one's ability to concentrate, and less disturbance of the vehicle's balance, with both the Rokon Automatic and the Hondamatic.

Two other very attractive characteristics of the CB750A contribute greatly to its dense-traffic capabilities. First, there's absolutely no lash in the drive components: when the throttle is opened and closed, the bike's reaction is always fluid and very smooth. One of our on-going complaints about many Hondas (and other makes) is the decided lurch that occurs when the total driveline slack is abruptly banged against the engine or rear wheel resistance. This trait can be enormously annoying in a line of stop-and-go traffic. Second, the Hondamatic provides very strong engine braking in low range. With a maximum speed of 60 mph available in low, the system gives fantastically smooth and responsive control when you need it.

The turn-signal switch is made so that it can be pushed part-way to either side to produce a few flashes for a lane change, or pushed all the way over to a self-held position for longer periods. When in the self-held position, each flash of a signal is accompanied by a loud beep from the reminder device mounted behind the headlight.

By sporting-motorcycle standards, the Hondamatic 750's acceleration from a dead stop is poor. Even with the engine's design compromises, which increase low rpm torque, and with the converter's maximum multiplication ratio of about 2:1, there simply isn't enough force available at the wheel to accelerate at a brisk rate. But acceleration performance in the real world of traffic is not as bad as the dragstrip figures might suggest. Once the engine is revving within its efficient range, acceleration is actually quite good. The 30- to 70-mph times for the CB750A and the CB750-76 are much closer than the quarter-mile times indicate.

Looking at the performance of even the fastest new cars puts the CB750A in an entirely different perspective. This year's stock Corvettes with four-speed manual gearboxes run the quarter-mile in the mid-to-low 15s at just over 90 mph. The CB750A (15.86 seconds at 90.72 mph) is quick enough from a dead stop to zap the four-wheeled herd and allow several lane changes within a block, if necessary. And when rolling along with a stream of cars, the Honda can accelerate hard enough to do

MAY 1976

## The Hondamatic Torque Converter

• The Hondamatic hydrokinetic torque converting device has the same basic design as those found in many standard automobiles, and is practically identical to the one in the Moto-Guzzi V-1000 described in *Cycle*, March '76. Actually, the motorcycle torque converter is the same as was fitted to Honda's domestic-model N600 cars, and very similar to the one on the present Civic automatic.

The converter is a three element assembly in a single toroidal housing. The part driven by the engine is a centrifugal hydraulic pump, which throws oil at the turbine wheel, which drives the gearbox shaft. This works the same way as when you have a stream of water hitting the vanes of a mill wheel. But the many streams of oil from the vanes of the pump hit all the vanes of the turbine at the same time. After imparting the bulk of its energy to the turbine vanes, the oil is forced by the curved housing wall back down to the center of the turbine. There the oil encounters a third wheel, whose function is to catch streams of oil returning from the turbine in its cup-shaped vanes and deflect them back toward the pump's hub at the right attack angle and with minimum energy loss. This third wheel is called the stator.

The amount of torque multiplication is governed by the maximum speed differential allowed to exist by the angle of the vanes in the turbine and the kinetics of fluid flow. The maximum torque multiplication of this system is about 2:1 and occurs at "stall", when the engine is straining against the load of the pump but the turbine has not yet begun to turn.

As the pump rotor drags the turbine along in its wake, the torque multiplication decreases in proportion to the increase in speed of the turbine. When the turbine speed rises to 95-percent of the pump speed, the torque multiplication is zero.

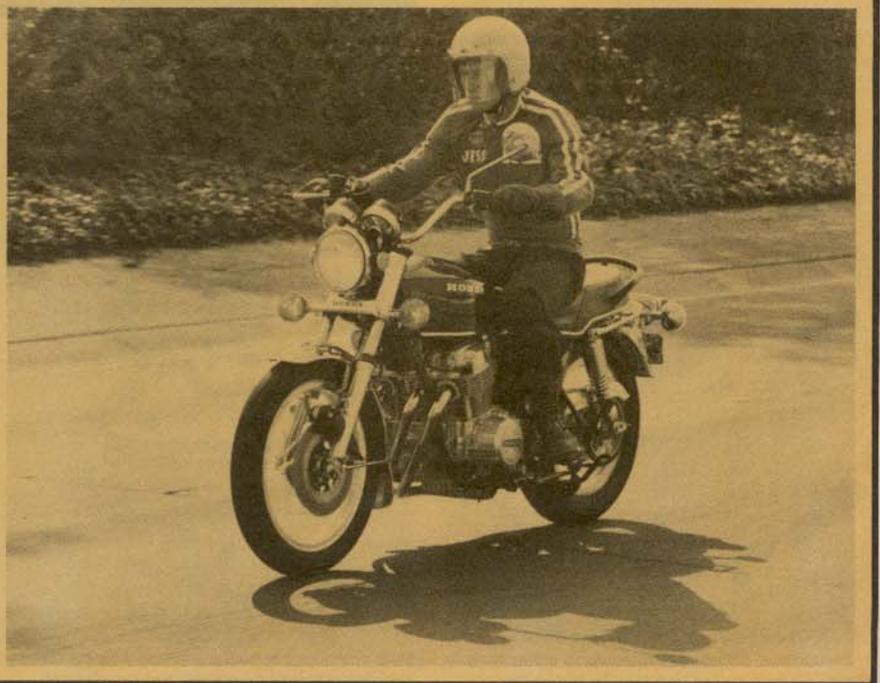
Were it not for the necessity of cooling the oil in the converter, it would operate perfectly well as a sealed oil-filled unit. Since hydraulically-controlled shifting was chosen, Honda's engineers neatly combined the engine lubrication oil, hydraulic shifting oil, and converter cooling oil together in a common pool. The engine has enough cooling area to dissipate what heat the finned aluminum converter housing can't get rid of for itself.

The oil pump which supplies pressure to the shifting circuit has its output controlled by a spring-loaded regulator valve. A unique feature of the Hondamatic system is that it has an arm attached to the converter stator to override the relief valve at stall and supply extra pressure to the shifting clutches to prevent slipping. Cooling oil circulated through the converter is that which is the excess valved away from the shifting circuit by the system's pressure regulator.

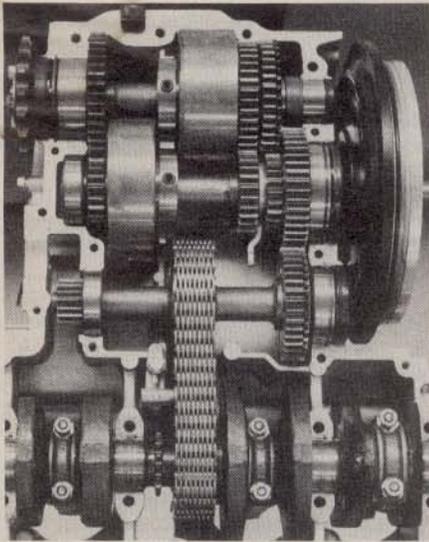
When an upshift is made, the feel to the rider is extremely smooth. Even at full throttle, there are no jerks or lurches. But the blend in speed change is tight: the engine does not rev for an indecisive moment as many automotive units do. There are no overrides in the system. When the lever is pushed down, the gearbox is going to shift. And if the bike is above the low-range rpm limit when the downshift is made, the rear wheel is going to hop up and down or slide in protest. One wouldn't want to downshift while negotiating a fast curve at high speed.

A regular whirring sound can be heard from the converter when the bike is at rest, particularly if the oil is cold. On the highway, the only sounds come from the exhaust pipe and the rear chain. There is decidedly less noise than comes from the standard five-speed transmission.

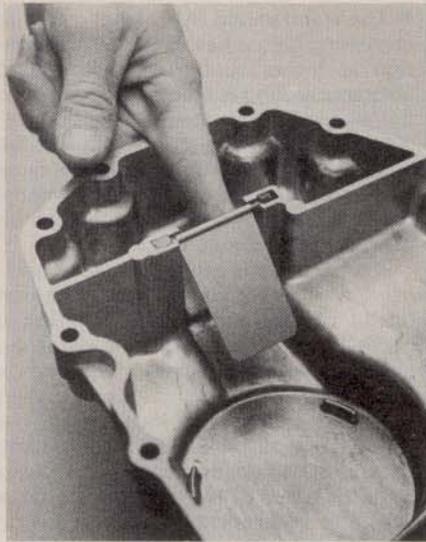
—Jess Thomas



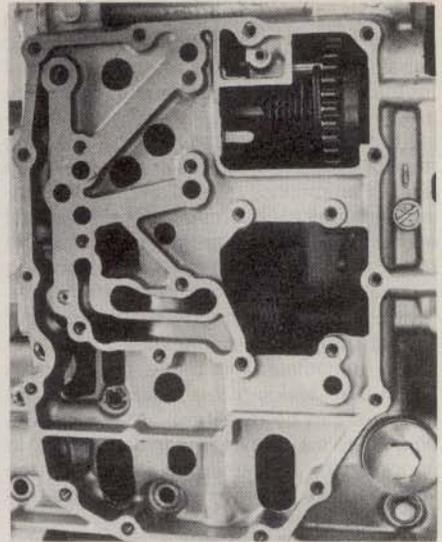
# HONDA CB-750A



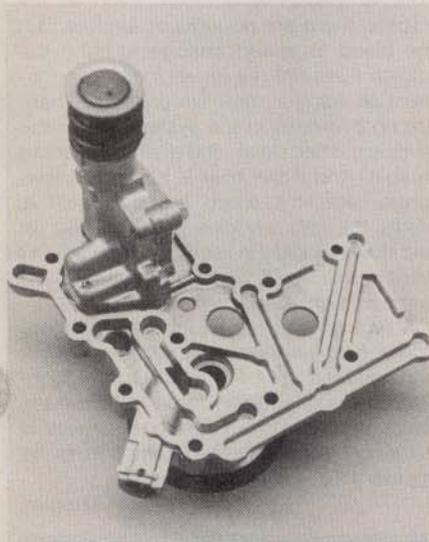
Removed bottom case reveals Hy-Vo primary chain and hydraulic shifting clutches on gearbox shafts.



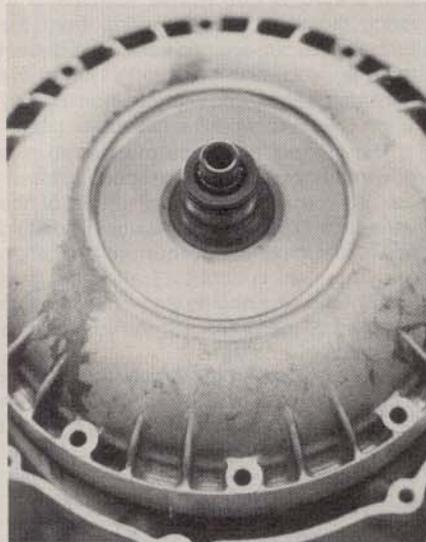
This one-way valve in the oil sump prevents surges from robbing oil pickup at the pump during braking.



Under sump and pressure-control covers are passages from pumps to clutches and engine galleries.



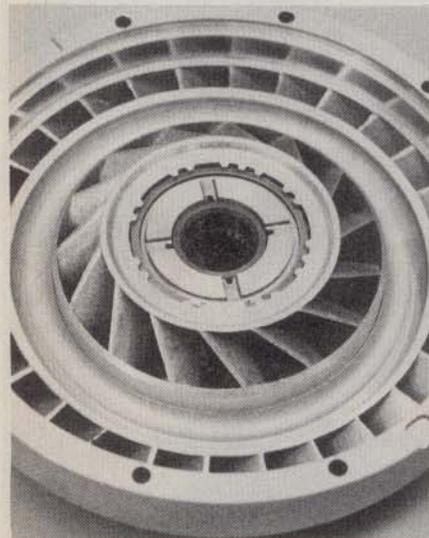
Distribution cover houses strainer for pump pickup, engine pressure relief valve, and gearbox relief.



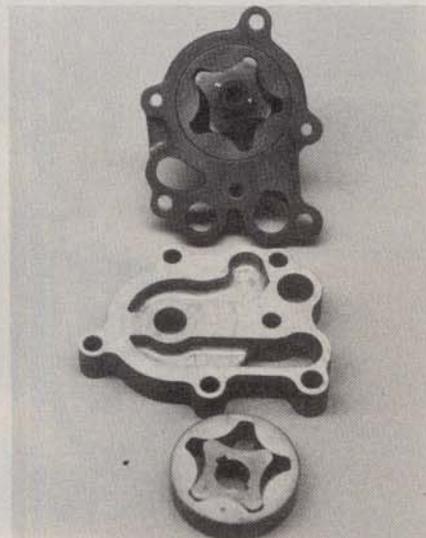
The converter cover is removed to show toroidal turbine housing. Cooling oil passes through shaft.



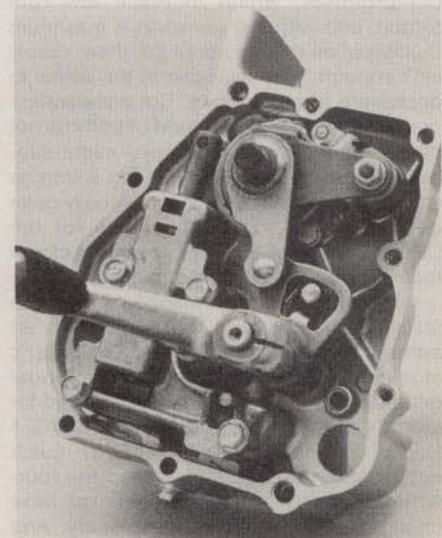
Gearbox mainshaft shows detail on shifting clutch, stator reaction arm, and sprung converter gear.



Outer turbine, with torque-multiplying stator lying in place, is driven half of Hondamatic converter.



Dual-chamber trochoid pump with flow-control panel supplies pressure for engine and Hondamatic.



Gear shift control lever actuates a simple, three-position hydraulic control valve for shift clutches.

any kind of maneuver desired within the bounds of legality and rider experience.

Both the rear shocks and front fork have spring compression rates and rebound damping that are set to the stiff side of just right. The settings give extremely accurate steering and oscillation-free ride stability, even during hard cornering at moderately high speeds. Ordinarily, firm springing and damping are synonymous with very uncomfortable riding on highways that are laced with expansion seams. The slight bumps caused by the seams aren't emphatic enough to overcome the initial friction between the fork tubes and sliders. Marked improvement in slider bearing material on the CB750A allows them to react sufficiently to small bumps, and as a result, the Automatic's ride is firm but comfortable.

With steering geometry almost identical to the CB750F's, the A has about an inch more trail than the older CBs. The result is more positive self-alignment, as opposed to the quick-turn oversteer feeling common to earlier 750s. This extra trail contributes greatly

to the high-speed stability we noticed, and allows the bike to ride across a row of lane divider mounds on the freeway without attempting to dive quickly to either side.

The CB750A has really great cornering clearance. A concerted effort to raise the brake lever, side stand, footrests, and exhaust collector has resulted in greater maximum lean angles than even the cafe-racer CB750F. Metal feelers on the ends of the footrests are designed to touch the pavement first during hard cornering to warn the rider that he is getting close to hanging up something immovable. Even with the rear shocks set at their full-down spring load position, the A must be leaned over an amazing amount before the footrests drag.

With the pegs mounted high for maximum clearance and the seat height left at 32.5 inches, the seat-to-footrest distance is on the cramped side for taller riders. It's fine for fast, spirited blasts, but can cause leg cramps during extended touring rides.

A good compromise between firmness and conformability was made in the choice

of seat padding, and the rider's portion of the saddle is nicely rounded for the proper thigh clearance. The seat is moderately comfortable for long trips, but nothing extraordinary. One extremely nice feature of the seat is the thickly padded grab rail which surrounds the passenger portion.

We would have predicted that fuel economy would be poor with the Hondamatic, but the reigning geniuses of engine-building have pulled off another hat trick: the worst mileage we got was 46.8 mpg. And freeway cruising produced a sparkling 55.7 mpg.

The CB750A is a long first step toward a motorcycle that appeals to people who perhaps would never have otherwise been drawn to the sport. These people just might not have any interest in conquering a truculent machine or leaving a great deal of public notice in their wake. Where conventional motorcycles are still characterized by rough transitions of all kinds, the Hondamatic glides and blends and whirs—without ever, for a second, letting its rider forget that it is indeed a motorcycle. ●

