

SUPERCHARGED KAWASAKI 1000's FOR STREET AND STRIP

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HOT BIKE

PDC



**TESTS: YAMAHA IT400E,
KAWASAKI KZ 750,
MOTO MORINI
3 1/2 SPORT, And
SUZUKI'S DIRT
SCAMP FUN BIKES**

MARCH 1978
VOLUME 2, NO. 3

\$1.25
U.K. 60p



**TRACK TESTING A FOUR-VALVE
JAWA SPEEDWAY BIKE
ALCOHOL For Racing Applications**

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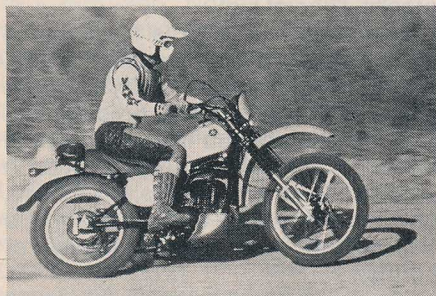
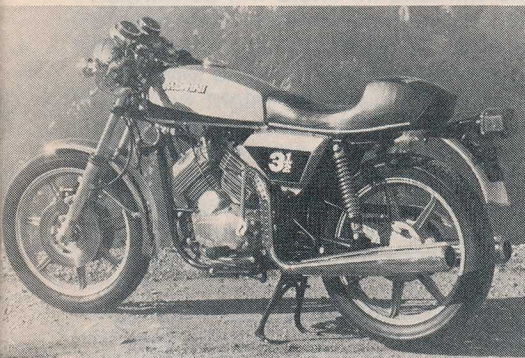
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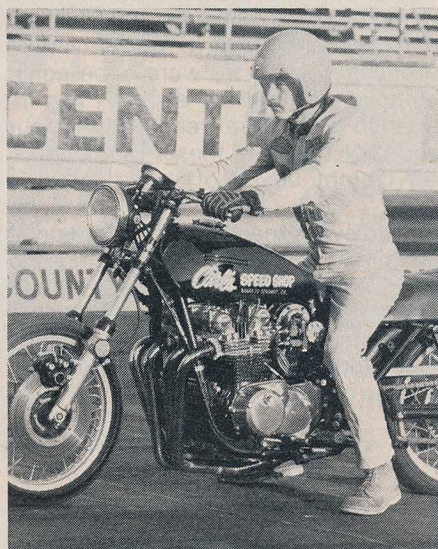
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ADVERTISING: Closing date for camera ready copy is three days before date of shipment to printer. Contact Advertising Department for exact dates. Allow extra time for rough copy. Rate card, circulation and production requirements furnished by writing the Advertising Department. In addition to Hot Bike, TRM PUBLICATIONS also publishes 'Truckin', Street Rodder, Street Chopper, Chopper Guide, and VW Trends.

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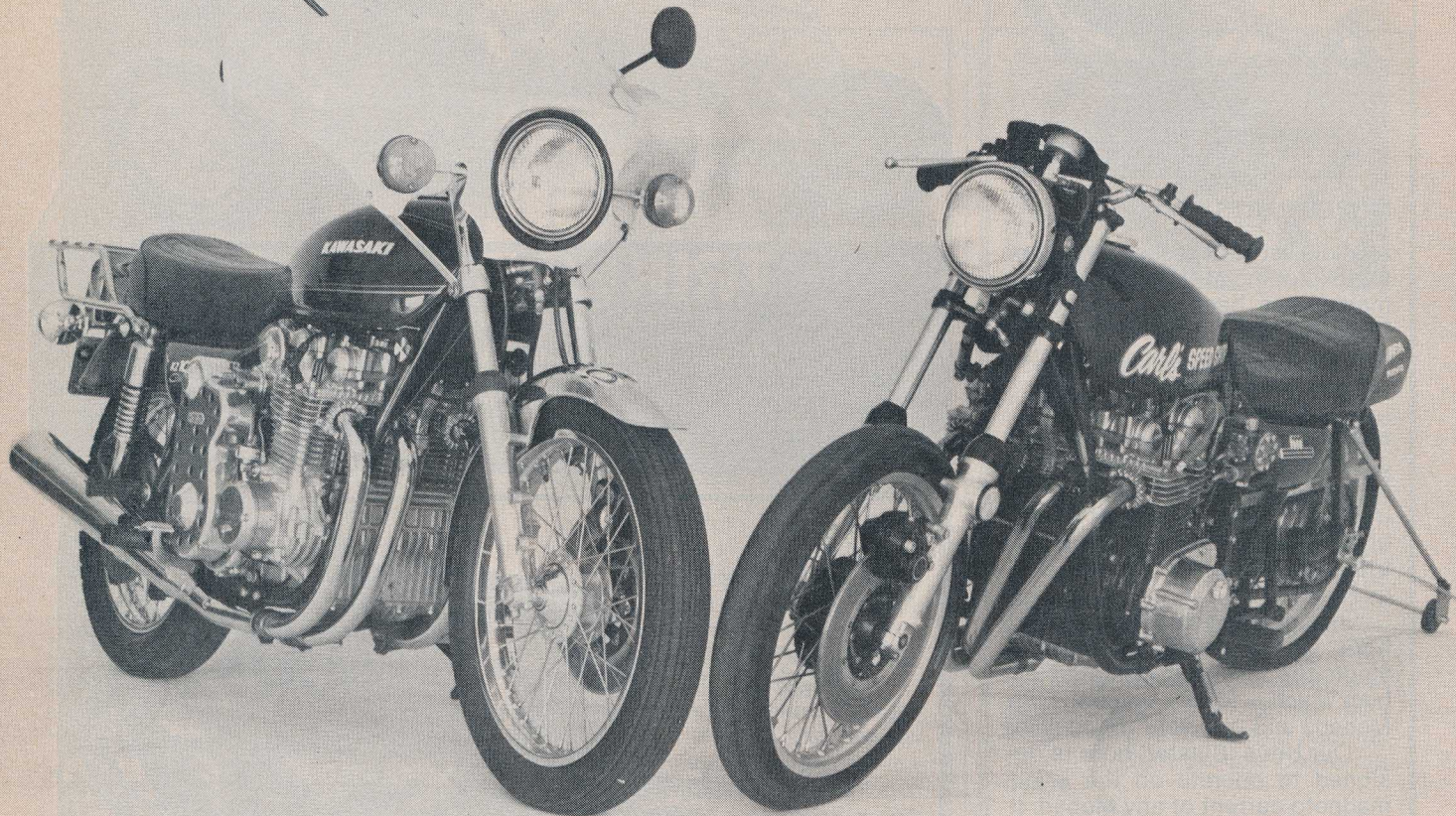
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On the Cover: Yamaha's IT400 was plenty of fun riding through the hills of Malibu. Extachrome by Mike Griffin. The Kawasaki KZ750 was photographed by Dain Gingerelli.

JEKYLL and HYDE



...On Two Wheels!

**This Pair of Puffed
'Sakis Offers Two
Divergent Aspects
of Pressurized
Motorcycling**

by Mike Griffin

Now wait. Don't go flying off the handle, throwing this issue to the floor and stomping on it, shrieking "I've read this story before! What gives?"

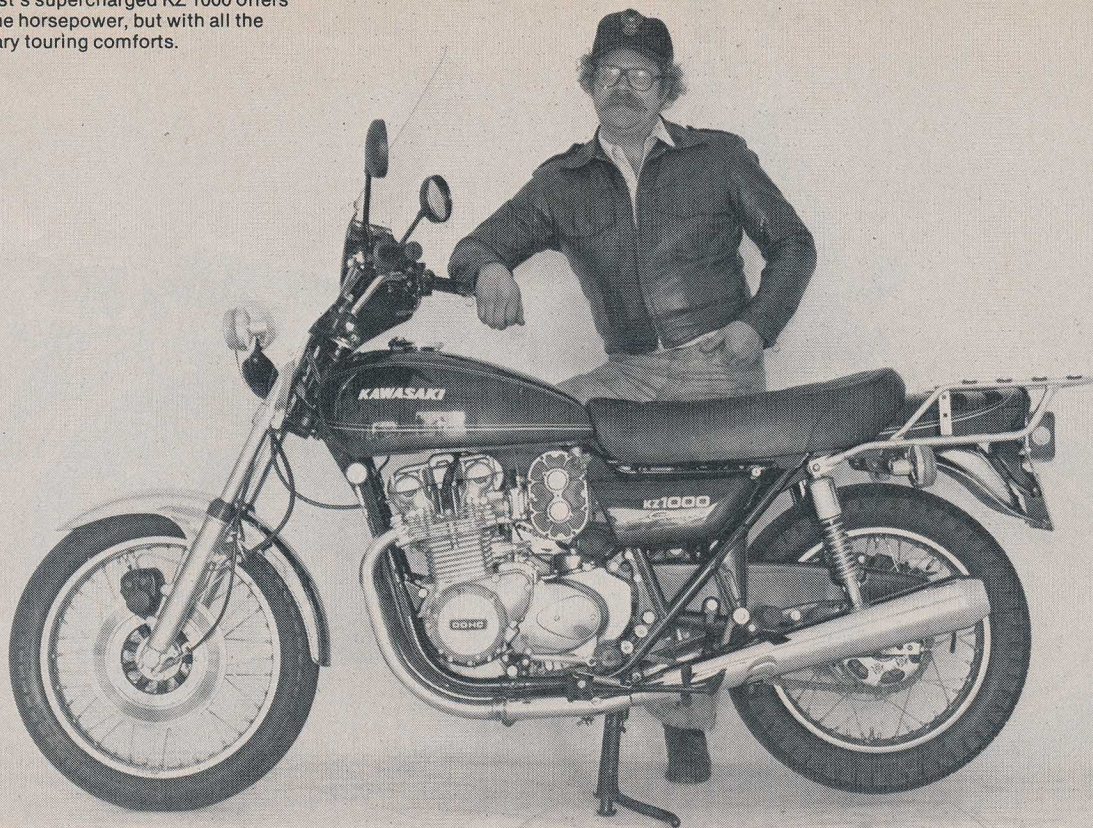
You haven't read this story before. Admittedly, there was one like it appearing on these pages a couple of months ago ("Recipe for Oblivion," HOT BIKE, December 1977). It was about a supercharged Kawasaki, similar to the ones shown here. But that machine was something of a prototype. The Jekyll and Hyde twosome shown here are not protos, however. Instead, they are two manifestations of motorcycle supercharging technology that is available to enthusiasts on a retail basis. In other words, "you pays your money (about \$1000) and takes it home to do with it what you wants."

It all depends on what type of motorcycling you prefer, and how passionate

you are in pursuing dreams and turning them into reality.

Dan West, for example, a professional motorcycle mechanic, wanted to have what some people might consider the ultimate in street/touring performance. So he bought a blower kit from Jerry Magnuson, whose supercharging emporium is located at 1020 N. Fuller St., Santa Ana, CA 92701. West's personal concept of what a motorcycle should be follows certain parameters. The machine must, of course, have a fairing, for West's touring jaunts often mean hours of saddle-time, which in turn means prolonged wind-buffeting of the unshielded rider. The machine must also be reasonably quiet, for excess noise is every bit as fatiguing as being blasted by the wind for hours on end. Mechanical reliability is also a must and so is reasonable gasoline mileage.

Dan West's supercharged KZ 1000 offers awesome horsepower, but with all the necessary touring comforts.



photography: Dain Gingerelli

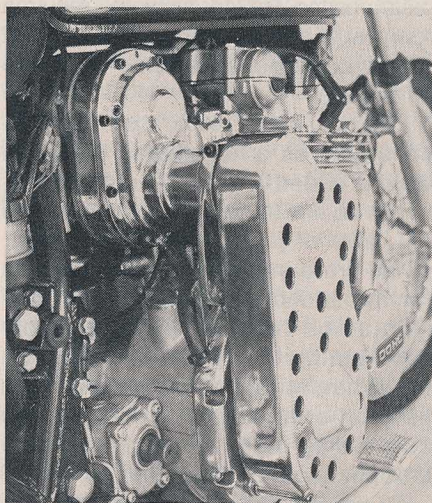
What West didn't want was a lumpy idle. He also didn't want peaky engine throttle response, fouling-prone spark plug and all the other shortcomings attendant to hot cams, gaping suck-em-up induction systems and other hotrodding practices.

But still, West wanted power — heaps of it — in reliable, relatively low-maintenance quantities. Given these guidelines, it soon became apparent that supercharging was the way to go.

West tells us that an experienced mechanic can perform the installation on a stock Kawasaki in about two hours, and the average wrench could do the whole thing in three to four hours, provided he has the proper tools.

Much of the kit pictured here uses allen screws, so nothing special is required by way of fasteners or wrenches in the conversion. No sheet metal cutting is needed. However, West did find it necessary to extend the brake pedal outward two inches, and ditto, the right footpeg. This is due to the blower drive assembly and cover on the right side of the motorcycle, which intrude upon foot space here.

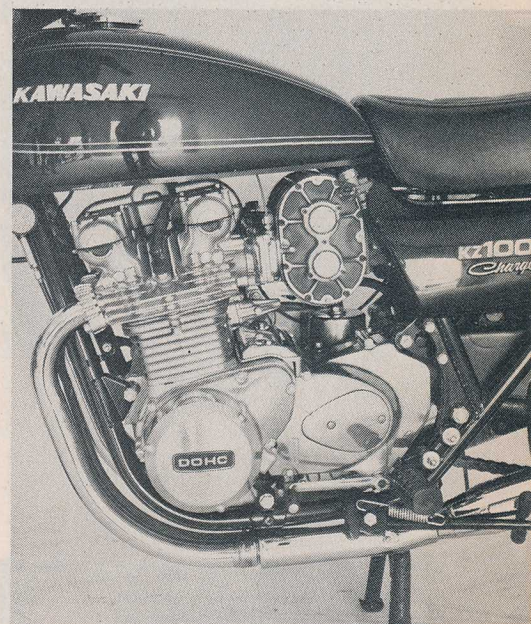
On the other hand, from the left side of the bike the supercharger is quite unobtrusive. And with a rider in the saddle the blower is almost totally



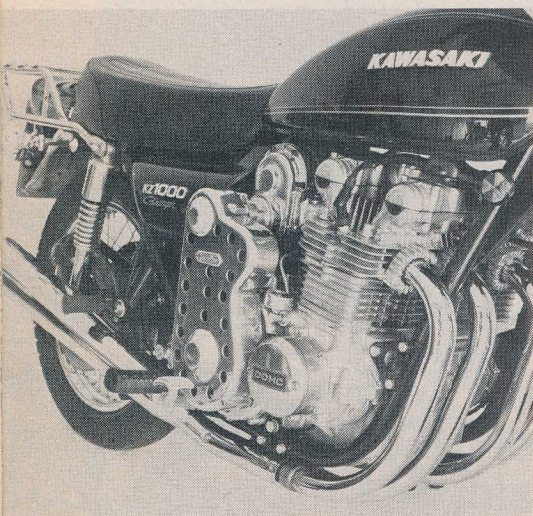
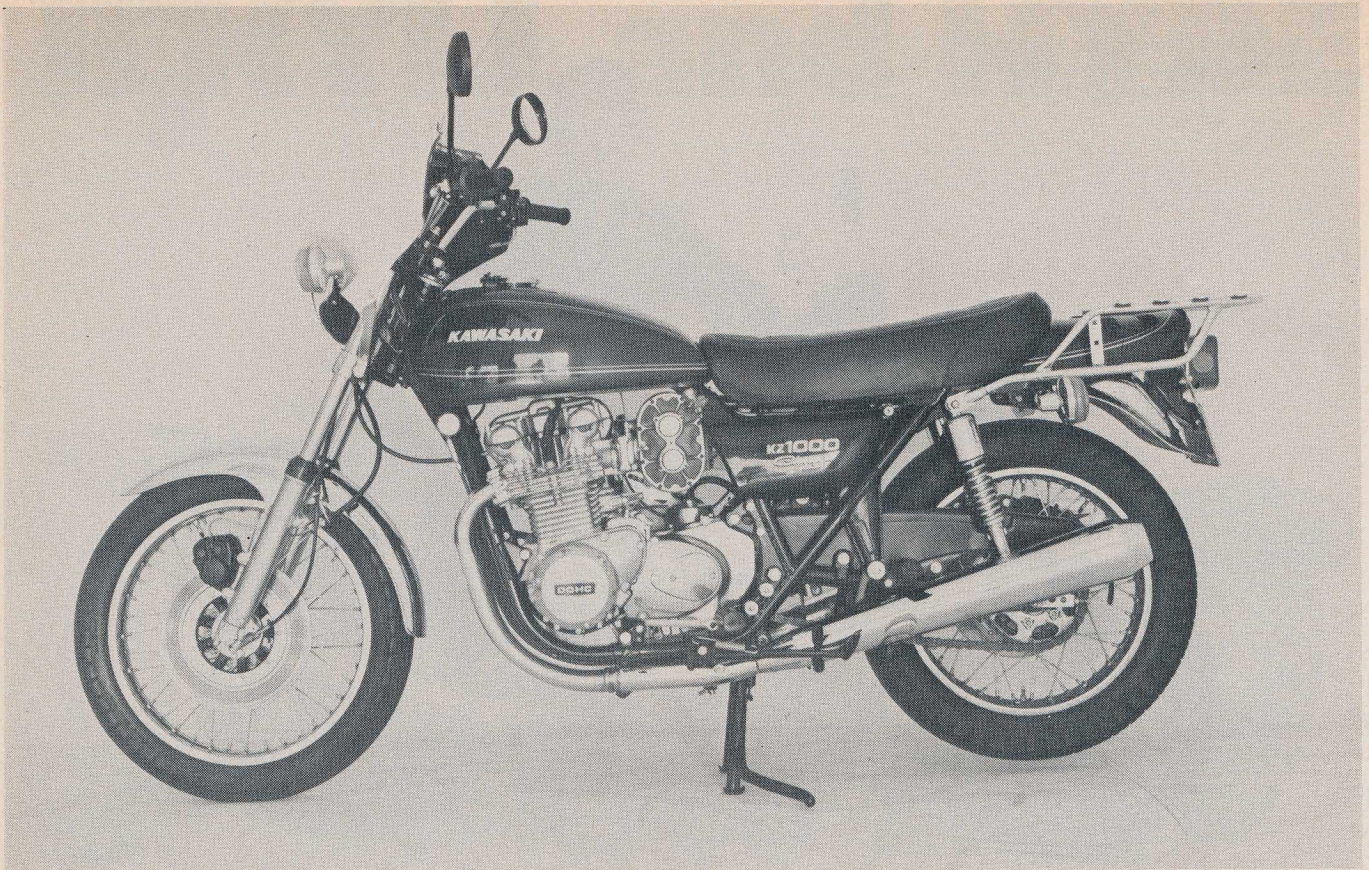
Blower drive is by Gilmer belt, which offers reasonably quiet running with minimal maintenance.

concealed by the pilot's leg. So, in this respect the motorcycle is a real sleeper.

In terms of maintenance, there are no special demands made by the supercharger. Its lubricating oil comes from the engine, tapped from the main oil galley located at the cylinder block base. An idler pulley maintains proper tension on the Gilmer belt which drives the blower. And, of course, being a Gilmer belt, no lubrication is used here.



The installation of the Magnuson blower appears quite unobtrusive from the left side of the machine.



West drilled holes in the drive cover to eliminate mechanical noise harmonics. Otherwise kit is unchanged.



West indicates that the only hitch in the installation has to do with battery maintenance. Battery servicing requires removal of the air cleaner. And removal of the battery means removal of the carburetor.

The only other factor that might be construed as a negative is the extra weight added to the motorcycle: between 25 and 27 pounds. However, the only area of performance this weight would prove perceptible is in cornering, for the added poundage is relatively high up on the motorcycle, possibly contributing to slightly heavier steering. Whatever effect the weight might have on straight-line performance is eclipsed by the great power increase brought about by the supercharger.

Of course, the stock quartet of carburetors could not be used in conjunction with the blower. They would result in unnecessary complication and besides, under high boost conditions the strong vacuum on the downstream side of the throttle slides would literally jam the slides, locking them in their bores. So, the upshot of all this is the use of a side-draft Dellorto carburetor with two 40-mm diameter throats.

The use of both carburetor throats provides way too much bottom-end power. Something had to be done, for the motorcycle could break the rear tire loose easily at just the slightest

jerk of the throttle. Not only was this hard on tires, chains and such, but it was also dangerous. Giant slewing slides could result if the motorcycle were not pointed straight ahead.

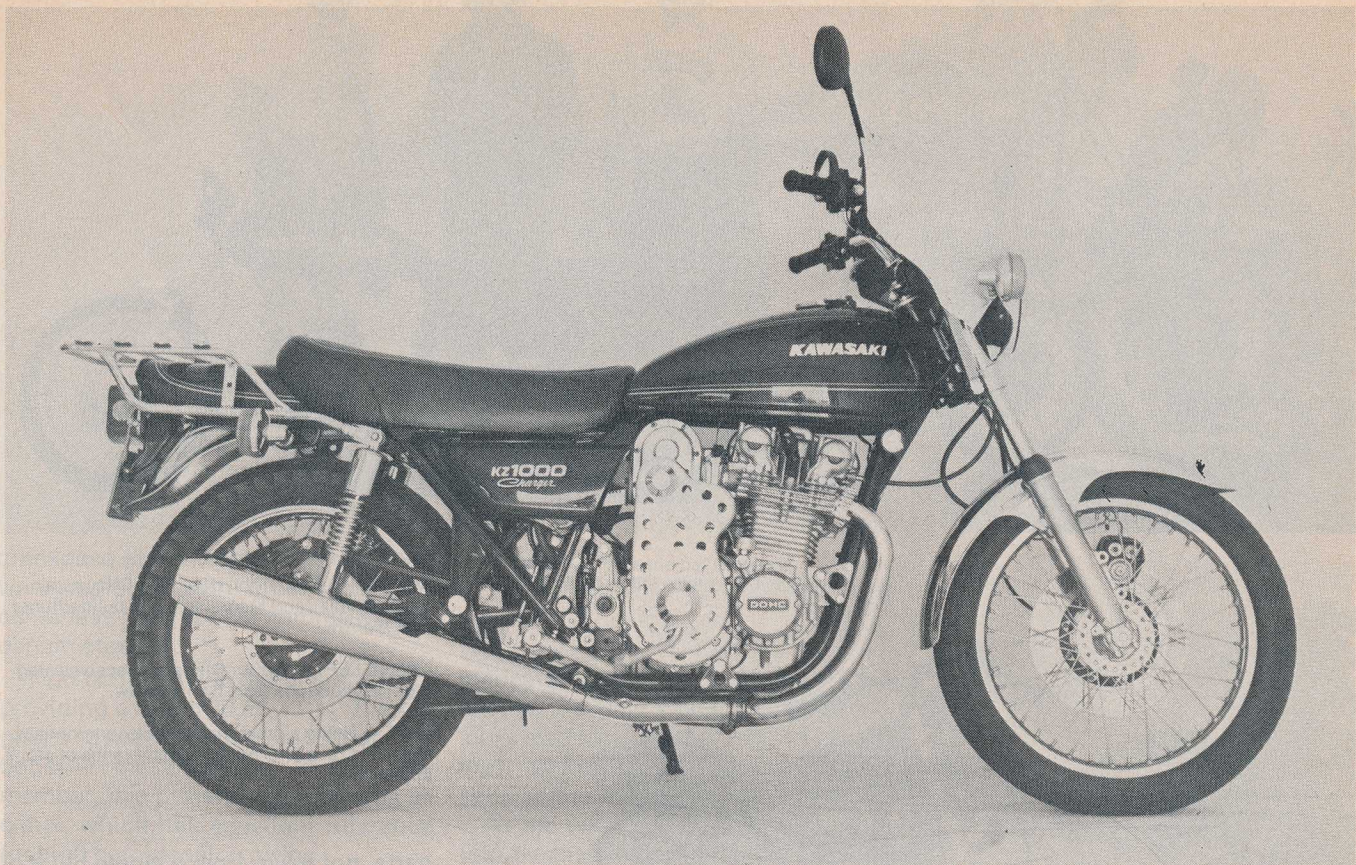
What West did was convert the Dellorto to progressive operation. Only one throat feeds the engine up to 60 percent throttle opening, at which point the second throat opens.

Only one other change was made to the carburetor and that was to install a larger air correction jet in the primary throat to provide better mileage. Indeed, the supercharged motorcycle's appetite for gasoline is surprisingly modest, yielding about 35 miles per gallon during easy riding.

Even though the Dellorto is fitted with a mixture enriching circuit to ease cold starting, it has never been used. Starting the machine has proven to be quite easy, hot or cold.

An Autopulse electric fuel pump has been fitted to the motorcycle, thus ensuring that the float bowl stays filled with gasoline, even under wide open throttle. Fuel pressure is moderated to between three and three-and-a-half psi.

To improve low-speed running the ignition's advance curve has been modified to yield more advance at idle. This does much to minimize surging at idle speeds, plus low-speed



pottering around.

Just recently, a set of Kenny Harmon KD-grindcams were installed in the engine. These units offer just a little bit higher lift and a bit more duration. West indicates that the stock Kawasaki camshafts yielded good results. But the chance to experiment with the KH cams were strong temptation.

Surprisingly, just about everything else in the engine is stock. The standard exhaust pipe is used, as are the spark plugs(!), valve springs and clutch. No high-compression pistons are not used; the stockers are holding up just fine. And this with 1000 miles logged on the supercharged engine.

Supercharger boost is limited to 12-13 psi, using an eight-percent engine-to-blower underdrive. Of course, only premium fuel is used in the motorcycle. Under these circumstances, the engine is operating at the threshold of detonation at full boost. West tells us that detonation cannot be heard over wind and engine noise, but it can be felt, because throttle response flattens out perceptibly.

The top speed of the motorcycle has not been accurately checked, but we have little doubt that it is capable of showing its pilot the scary side of 140 mph.

And for commuter/tourer/streetster

Dan West that is certainly fast enough, thank you.

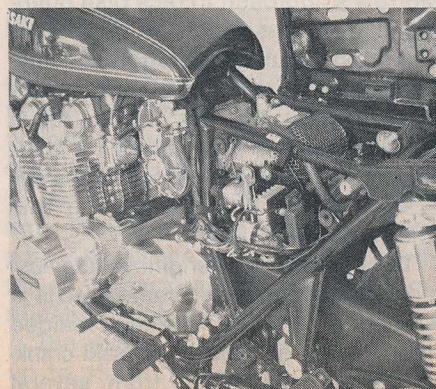
If you've been reading HOT BIKE for the past several months, you're aware that we like to pop in on Carl Morrow of Carl's Speed Shop from time to time. He has a way of involving himself in some pretty nifty projects. The alcohol-burning drag racer shown here is an excellent example.

Carl had been deeply involved in the prototyping of the Magnuson Kawasaki supercharging kit for the past year-and-a-half. It has been his feeling that a blown, injected, alky-slurping Kawasaki multi would be the way to go in earning the Super Eliminator class championship. After all, the powerplant comes with a head that flows very well for high-performance use.

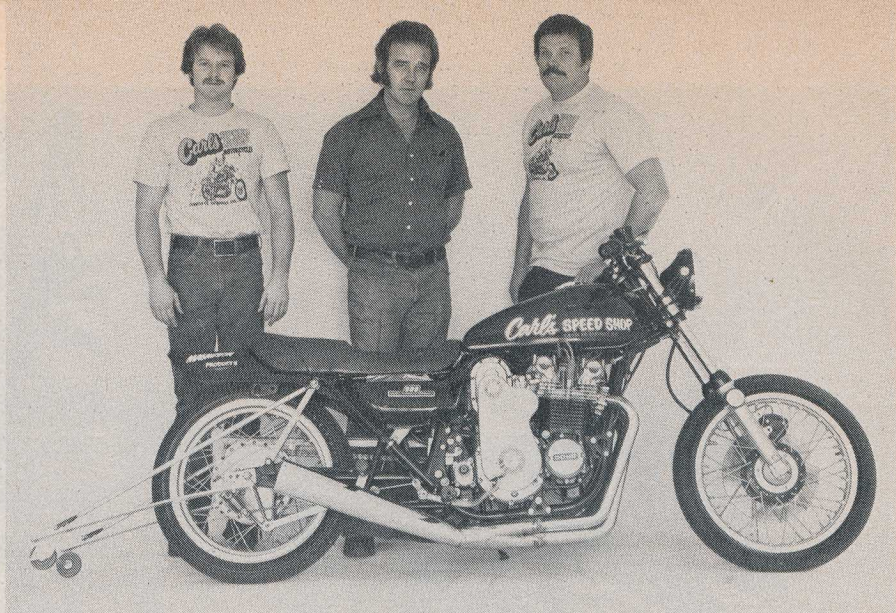
This motorcycle's performance



Dellorto carburetor is located under saddle. Carburetor maintenance is easy.



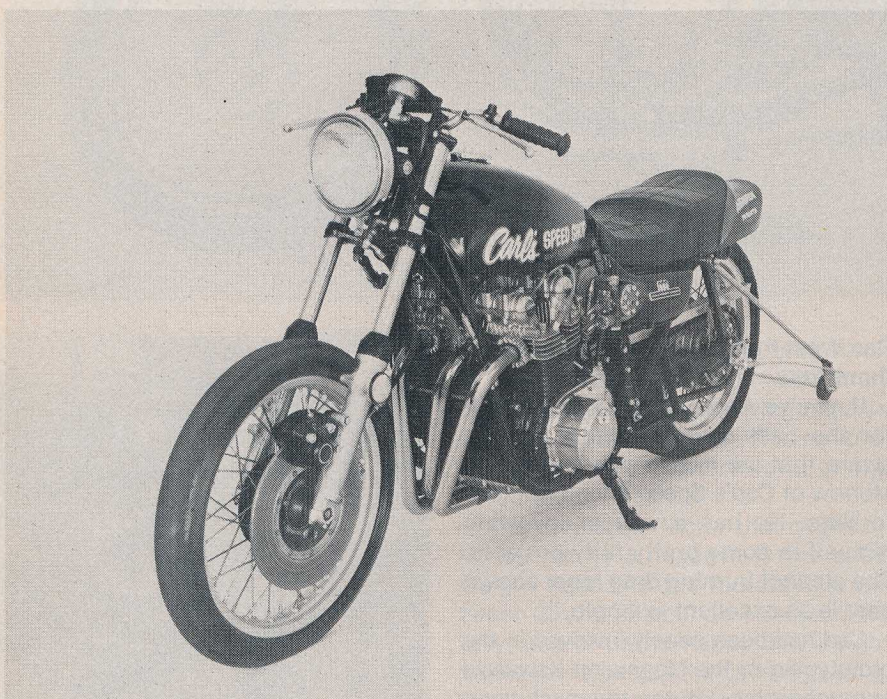
JEKYLL
On Two Wheels!



ABOVE — Left to right, rider Paul Otto, super-charger whiz Jerry Magnuson, and builder/tuner Carl Morrow.

ABOVE LEFT — Editor Gingerelli receives staging(!) instructions from Carl Morrow.

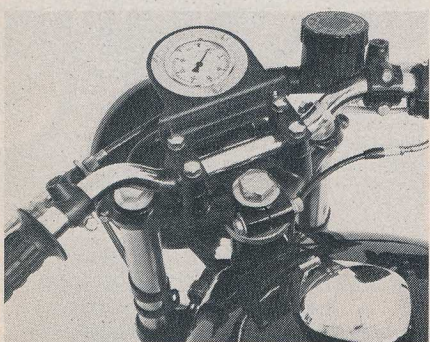
LEFT — Using a great many stock components, Morrow's race bike retains a semblance of stock appearance.



parts, not hewn from a single billet of steel. The great horsepower these things develop has a way of twisting the crankshaft so that its throws are out of proper alignment. As a matter of fact, in early days of Z-1 racing, it was not unusual to see tweaked cranks with throws sometimes more than 20 degrees out of index. Consequently, it is now accepted practice to weld the various crankshaft interfaces thus obviating this problem.

It is not unusual for some motorcycle hotrodders to devote all their attentions to realizing huge horsepower increases, while completely forgetting other less obvious but equally important modifications. The area of lubrication is a good example. As a drag racing motorcycle, the machine is, of course, intended to accelerate as hard as possible. As a result, there is the hazard of oil flowing away from the oil pump pickup in the crankcase, thus leaving the engine's vitals without lubrication when they need it most. Consequently, Morrow modified the crankcase innards to keep the pump inlet surrounded with oil under the hardest acceleration. This is achieved through the addition of trap door baffling. Incidentally, the fuel tank is also baffled to keep the alcohol fuel near the Hilborn injector pump intake line.

In order to better cope with the engine's vastly increased internal pressures and strains, all the stock engine



Glycerine-damped pressure gauge is mounted so maximum boost occurs when needle is nearly vertical.

potential is hard to assess at this point. However, to bring home the gold the vehicle will have to run in the low-nines at nearly 155. But so new is the bike that it had yet to see a drag race as this story is written.

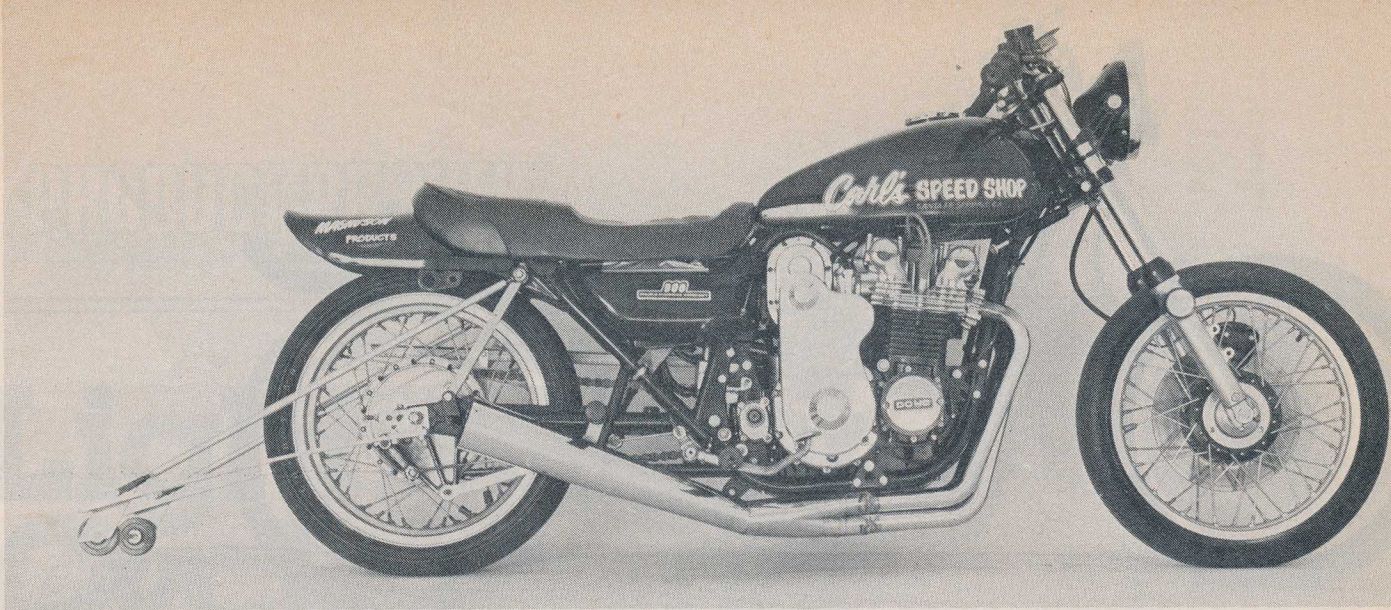
If you're looking for super-trick exotica, you'll have to look hard, for Morrow's approach to race bike building is based as much on hard work and thoughtful deliberation as anything else. Such conscientiousness pays off in a big way, for Morrow's motorcycles are well known for their reliability as well as stellar performance.

Let's take a close-up look at this finely crafted sprinter:

To begin with, the engine's displacement is 1013cc. The crankshaft is a Kawasaki item that has been welded for increased strength. Kawasaki crankshafts are assembled from several

HYDE

On Two Wheels



crankcase studs were removed. They were replaced with studs made of centerless ground 4130 chrome-molybdenum steel.

High-compression pistons are used, providing a static 10.5:1 ratio. The engine's dynamic ratio — under full boost — calculates out to 17:1. (Remember, this powerplant thrives on alcohol, which has excellent tolerance for high compression ratios.)

Morrow admits that the cylinder head has not been extensively ported. Instead, the intake and exhaust ducts have been carefully cleaned up with regard to surface finish rough spots and irregularities. However, Morrow does point out that the valve seats were subjected to a precision three-angle, .060 in. grinding. This is most important for both performance and race track reliability.

The stock Kawasaki cam drive chain was replaced by a heavy-duty DID unit, again to ensure high speed reliability. Indeed, with the engine sporting its experimental-grind Engle camshaft, heavy valve springs and titanium retainers, it can safely wind to close to 11,000 rpm through the timing lights. So cam chain loads are increased many times over stock.

Truly, without a strong ignition system, all these modifications would be wasted — what good is an explosive intake charge if it can't be ignited? This motorcycle is fitted with a Martek ignition unit and Andrews high-tension coils. Nearly indestructible Thunder-volt secondary wiring is used to deliver great dollops of voltage to the NGK B-9ES spark plugs gapped at .030 in. Electrical wiring was neatly executed by Dick Sams.

A PG-150 Hilborn injector pump supplies fuel to the Magnuson blower. The injector's 2-7/8-in. diameter intake

RIGHT — Wheelie bar is mandatory for performance out of the chute. Goodyear road race slick is used.

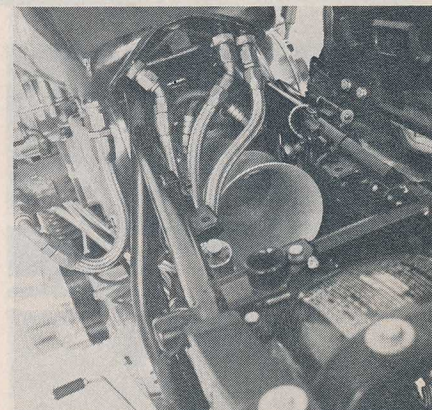
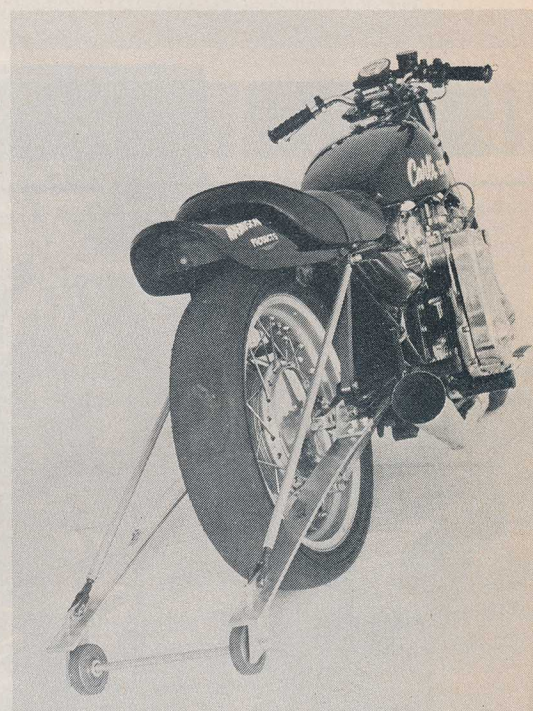
is located under the front part of the saddle. It's truly a sight to behold, and looks awesome indeed, with its gaping maw appearing even larger with its spun aluminum intake horn.

At the outset of this story Morrow told us that the motorcycle was surprisingly tractable, that it is flexible enough for use on the street! And wouldn't you know, he started the motorcycle, warmed it up and offered Editor Gingerelli a ride on the snarling machine that was now idling forcefully at 2000 rpm. Gingerelli's pass down La Palma Avenue was largely anti-climatic . . . to us observers. But to Dain his brief stint in the saddle was, well, deeply moving. His basketball-sized eyes were convincing testimony that the bike is dreadfully powerful and tractable, too.

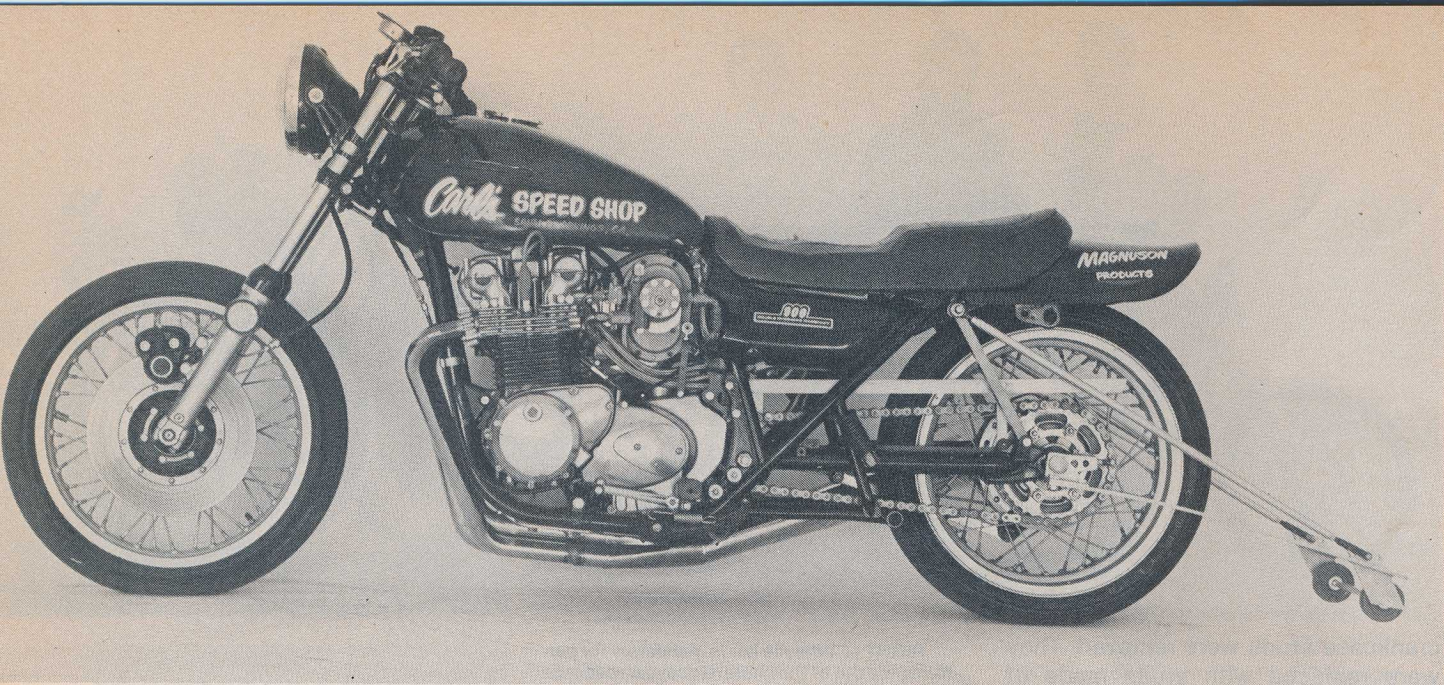
Incidentally, on the street the motorcycle is estimated to yield about 10 miles per gallon of alcohol. (Interestingly, this suggests that the bike might well deliver a little over 20 mpg on gasoline, which is not particularly gluttonous!) As a drag racer, Morrow's creation is expected to consume somewhere between two and four pints fuel per quarter-mile run.

The Jerry Magnuson supercharger is spun quite a bit faster than that on Dan West's street machine, also described on these pages. An 18-percent overdrive is used, which provides 17-18 psi boost between 3000 and 8500 rpm. Given such a wide resultant power band, the motorcycle's out-of-the-chute performance should be terrifically strong.

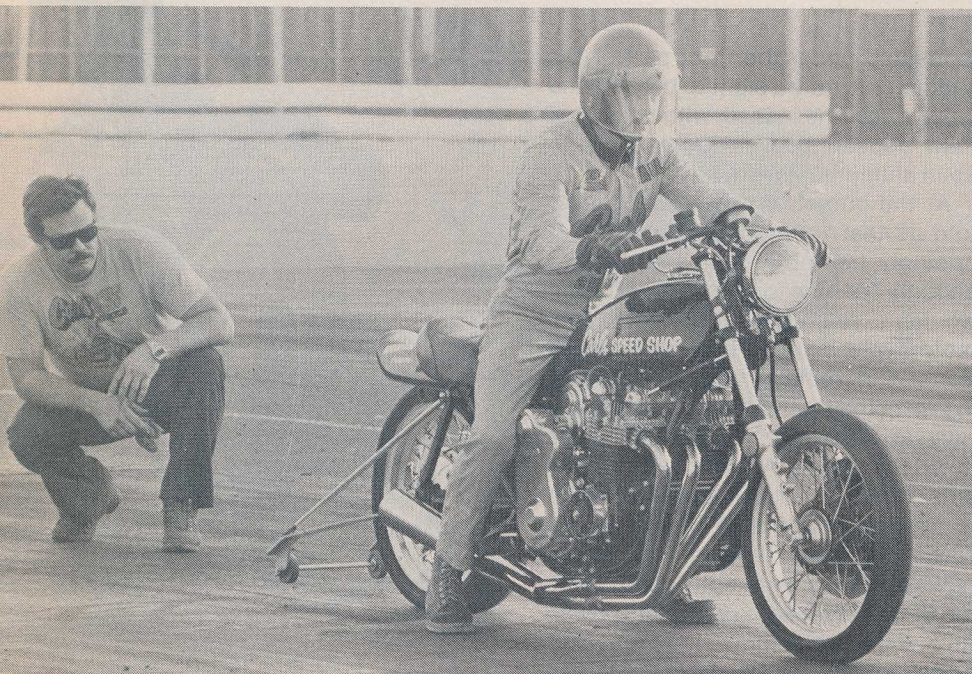
The supercharger is designed to spin up to 15,000 rpm or so with safety,



Gaping injector outlet is found underneath saddle. Braided steel hoses are fuel supply and bypass lines.



LEFT — Morrow oversees while Paul Otto stages the alky digger during shakedown runs.



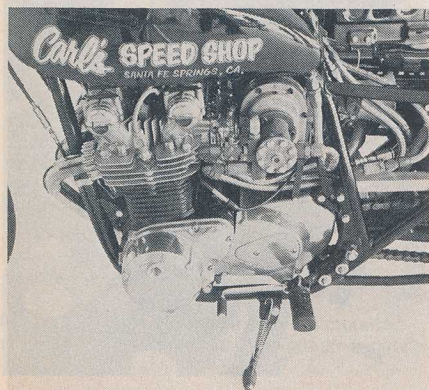
are shimmed with spark plug washers. Incidentally, the clutch springs are actually the inner units from the stock Kawasaki two-piece valve spring assembly.

Chassis changes are not particularly elaborate. The swing arm is lengthened two inches over stock. As per drag race practice, the rear shock absorbers are replaced by solid struts. A four-inch-wide DID rim is used at the rear, while a two-and-one-half-incher is found at the front. Stainless steel, nine-gauge spokes lace the rims to the hubs. Both front and rear hoops are shod with Goodyear road racing slicks.

Rider Paul Otto indicates that the 500-pound (estimated) motorcycle is, of course, awfully fast but handles stably. It goes straight, free of wiggles and lurches.

Paul tells us that in the motorcycle's initial shakedown runs it was found that high revs are not needed at the starting line. Instead, the bike leaves the chute at about 4500 rpm; anything more is wasted power and results in poor ETs. Depending upon available traction, the motorcycle is either driven smoothly off the line, or the clutch unceremoniously dumped.

What the future holds for this machine is speculative. But we have little doubt that there is definitely a place for both superchargers and alcohol fuel in race bikes and even street machines. And if anyone is to develop these performance aids to their fullest extent, you can be sure it will be due to the efforts of men like Carl Morrow and Jerry Magnuson.



Hilborn fuel injection pump is driven off the end of the supercharger.

HYDE On Two Wheels

but efficiency of these Roots-type blowers tends to fall off around 12,000 rpm or so due to cavitation.

The transmission has been modified to make for easier, more positive shifting under racing stresses. The gear engagement dogs have been undercut to allow gears to pull toward one another at partial engagement during lightning-fast race shifting.

Clutch modifications are not extensive. Heavier springs are used in the clutch pressure plate. The springs