YAMAHA YZ465G

If You Can Ride This One Wide Open, Noyce and Lackey Are in Trouble

CYCLE WORLD TEST

■ Ever since the factories got serious about motocross, open class bikes have been bears to ride. The 250s are the median, the normal. In most cases open machines have been based on the 250s, which usually means that a good frame and suspension get more power and weight than they can handle. After a period in which the big motors went slower around the average track, the makers figured things out and downsized a bit. We saw 360s and 370s, based on the 250 cases most of the time and giving as much power as the suspension—and the rider—could use.

With the current crop of open bikes, we get to the next stage. Better frames, more controlled suspension, improved brakes and suddenly displacement goes up; witness the Maico 450 and the 420s from Suzuki, Kawasaki and KTM.

At the top of the heap, Yamaha unleashes the YZ465. It weighs only a few pounds more than a 250, it's the most powerful motocross engine offered to the general public, and unless you're a serious rider who can use more power than any non-factory rider has ever had in his hand, the YZ may be more than you're ready for.

The 465 engine is completely new. It has small center cases that look like they have been shrunk wrapped around the all-new internal engine parts. The countershaft sprocket is placed so close to the swing arm that the sprocket teeth almost touch. The swing arm bolt doubles as the rear engine bolt. The cases are designed for this and bracket plates have been eliminated.

Many parts of the 465 engine are shared with the new YZ250. The clutch and primary drive are identical, many transmission bearings are the same, and the crank main bearings are shared. The kick lever is long and has a ribbed end to prevent slipping when wet or muddy and primary kick starting is provided. The long kick lever also has a new method of attaching to the kick shaft; the pinch system has been discarded and the lever completely encircles the kick shaft. It is held in place by a bolt that threads into the center of the shaft, eliminating loose levers and increasing strength.

The bore and stroke of the 465 measures 85 x 82mm. Last year's 400 (actually 396) had an 82 x 75mm configuration. The new dimensions are the result of an aluminum cylinder with a steel bore surface that allows four overbores in case of mishap or eventual wear. The cylinder head is radially finned and compression ratio, measured in the standard Japanese fashion; from closing of the intake ports to Top Dead Center, is 7:1.

That's one clue as to how the 465 engine works and why: Radical compression isn't needed because the engine is so big and has so much punch to begin with.

Next, the carb. It's a 38mm Mikuni, the same size as the carb used on the 1980 YZ250. More surprising, the two engines use the same needle, starter jets and slide cutaways. (The 465 does get a larger main, smaller pilot and a different needle jet.)

Because the 250 winds higher than the 465, both engines need lots of carb at the top end. The 38 is the right size for a full-race 250, and the right size for a mildly tuned 465.

Plus, the six-petal reed valve allows porting that makes power on top, while closing off the intake so the incoming gulps are pushed back out. The other big jobs, like the KTM and Maico, probably make nearly as much power at peak. What they don't do is crank out the beans any time the engine is turning over.

The tunnel backbone frame of years past is gone. In its place is a chrome-moly steel frame with a large single front downtube. The backbone tubing is more conventional, with a large main tube, braced and triangulated by a smaller one. Triangulation in the critical area under the seat is excellent and all frame junctions are gusseted with single layer steel plates that have been shaped to make a closed or boxed type gusset. Gone are the ugly multilayered gussets that marked older YZs. >

Photos by Ron Griewe

An aluminum swing arm is stock and looks identical to the one used on Yamaha's 250 YZ. It is similar but measures 1 in. longer. Made from square aluminum tubing, it's heavily triangulated and strong. It is by far the best swing arm Yamaha has ever used and won't be topped by many aftermarket arms. Flex is almost non-existent and it pivots in a combination of caged needle bearings and plain bushings.

YZ shocks have been changed almost every year since the first one was introduced. The G has another new one. It is mounted farther back on top of the frame's main backbone tube, effectively lowering the weight and allowing better air flow. The latest shock is a piece of trickery that has also been reversed on the frame so the heaviest part of the shock is toward the front of the motorcycle. YZ monoshocks have always had adjustable rebound damping, but the G is easier than ever to adjust, requiring only a twist of the wrist. The adjuster has been placed at the rear of the shock, just in front of the rear tire, and adjusted by turning a finger knob. Adjusting spring preload on the tapered wire spring is almost as easy but requires the use of a special wrench that Yamaha supplies in the tool kit. Past models required shock removal; the adjustment on the G can be changed by turning the nuts just in front of the rebound adjuster. Lots of R & D time has gone into the damping of the new shock and it is apparent when the bike is ridden. Gone is the kick and other bad manners the older models sometimes displayed. The G is right on and won't need damping modifications. Yamaha has a stiffer and softer spring available for people who prefer a rate more or less than the adjustments offer. Other adjustments can be made by altering the nitrogen pressure with the easily accessible reservoir mounted air valve and the shock oil can be changed.

The leading axle air/oil forks offer the same broad range of adjustment. Oil weight and volume can be altered and air pressure varied. Heavier springs are used in the forks for '80 and Yamaha recommends no air pressure. Softer springs will have to be used if the front is too stiff but we didn't have one test rider who complained about the stock spring rate. The bike was ridden throughout the test with the stock weight and volume of oil and no air pressure. The return to a spring that works without a boost from air is an attempt at reducing the air pressure buildup during a long race. Air assisted forks normally gain 5 to 6 psi during a long race, thus becoming stiffer when the rider is the most tired and going the slowest. Even starting at 0 psi, the forks may gain pressure but usually not more than a couple of pounds. Fork travel has been increased from 10.6 in. on the F to 11.8 in. for the G. The added travel didn't come as a result of decreased engagement however; new lower legs maintain the same tube engagement as before. Stanchion tube diameter is 38mm and the tubes extend through the top triple clamp, allowing height adjustment for quicker or slower steering. Both triple clamps have double pinch bolts and the top one has rubber mounted handlebar pedestals to cancel vibration, making long races less tiring.

The 465 engine has an 85 x 82mm bore and stroke. Cases are extremely small and the swing arm bolt doubles as the rear engine bolt, eliminating the bracketry of years past. Ignition is CDI via an outside flywheel. Countershaft sprocket is close to swing arm pivot.

Front brake is a double leading shoe arrangement that retains the same hub as the F. Forks have 11.8 in. of travel and work beautifully.

Yamaha YZs have always had excellent brakes. The 465 G has the best brakes of any motocrosser we have tested. The rear brake looks the same, and the basic hub and spoke combination is. But the front brake is new and contains a double leading shoe set-up. The double leading shoe system is similar to that used by road racers a few years ago but the principle has been applied to the YZ and used with a small motocross hub. The backing plate has two brake levers: one the normal length, one about half as long. The two are connected by a short rod and both turn brake cams, increasing braking leverage substantially. The rear is the same large hub Yamaha YZs have had for a few years. It is a full-floater and doesn't chatter or hop when applied in downhill whoops and cross grain.

The YZ465 looks much like last year's 400 at a glance, but it is almost totally different. Both fenders are wider and reshaped, the plastic fuel tank has been reshaped to hold 2.4 gal. of premix and has decals that don't fall off. Side number plates are new, the seat is reshaped and mounts lower on the bike, and the airbox and filter are new. We could only find a couple of parts that are interchangable with the F of last year; the aluminum brake pedal and the wheel hubs. Yamaha hubs are considered the best production units around by many racers so it seems logical to continue the design. The same applies to the aluminum rear brake pedal. It has a strong return spring, tucks in nicely, and a riveted claw prevents boot slippage.

Yamaha's YZ monoshocks have been plagued with poorly designed airboxes year after year. The first monos used a double filter—one on each side of the bike, connected by a through bolt, and required two people to change. Every year has seen a new airbox and filter design in an attempt at perfecting a design that would fit around the large shock yet have adequate size and reasonable access. The G model >


BELL
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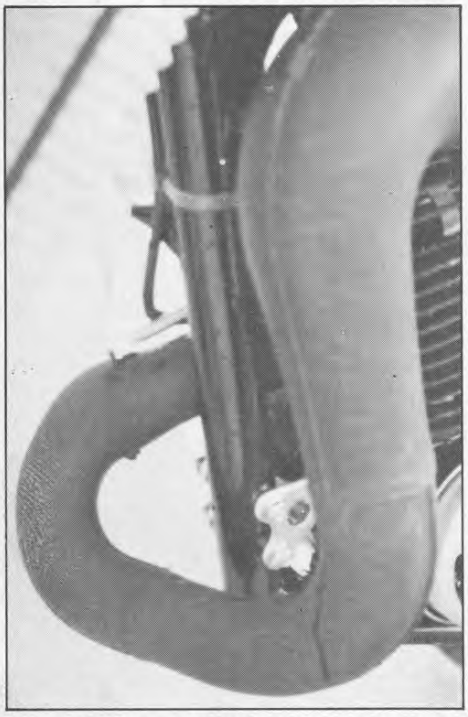
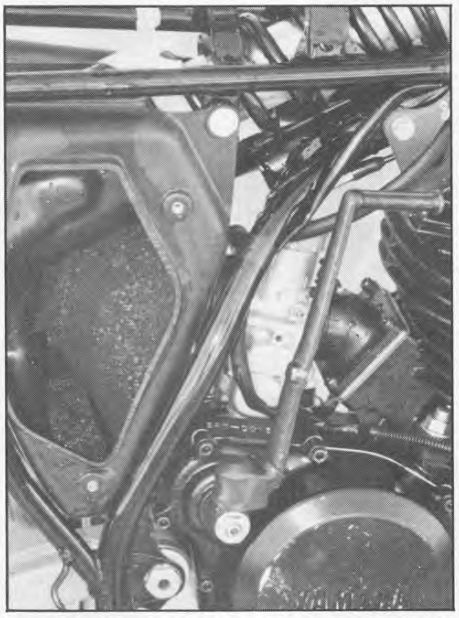
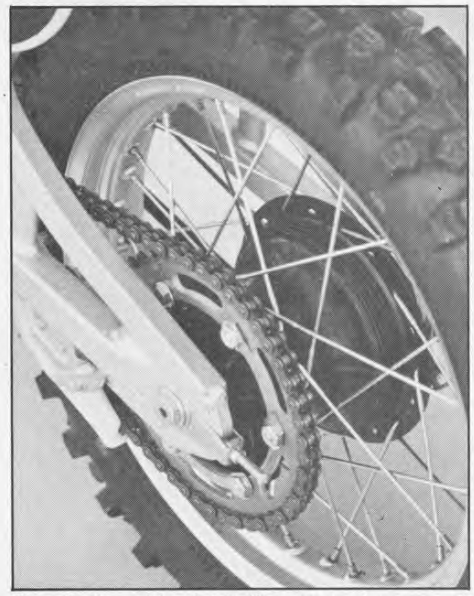
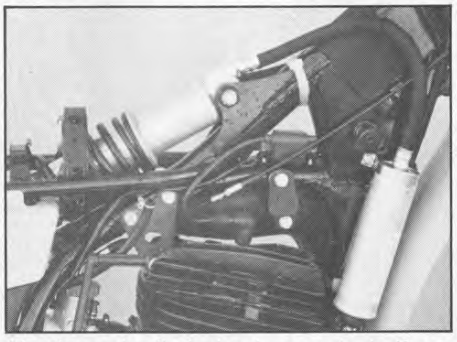
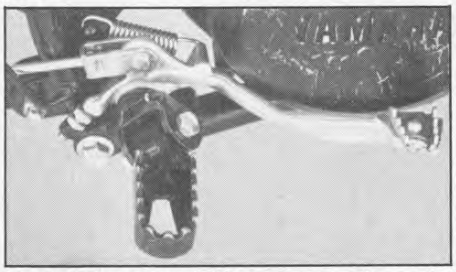
Seat height has been lowered despite the added suspension travel.


Headpipe has a tuning bulge 4 in. from the cylinder, improving mid range. Large diameter pipe is well routed and doesn't burn the rider.


Cone shaped air cleaner does a good job. Kick start lever is long and has a ribbed end but the beast is still hard to kick.


Rear hub and brake is the same strong part as before. Swing arm is aluminum.


Aluminum bodied shock mounts half way back on the backbone tube. Reservoir is also aluminum and gas pressure can be adjusted.


The best brake pedal in motocross is carried over from the F.

can claim success; the airbox isn't half bad. Gone is the dogleg air boot between the carburetor and airbox, in its place is a centered boot that goes straight from the carb to the airbox. Air intake is high up under the seat and through the right side cover. The top opening is well placed, the side opening is filtered by a layer of foam. Access is made by removing four screws from the right side plate. Once the cover is removed, the cone shaped two stage foam filter is removed by unscrewing two wing nuts. The wing nuts are located at the outside front of the airbox, just aft of the carburetor. The filter unit does a good job and won't need replacement unless the owner prefers a certain brand. The outside part of the filter is coarse foam and its sides wrap around the finer inner filter. Greasing the sealing edge of the filter is a must, as room between the filter and box is limited toward the far side, making it difficult to check proper sealing.

The 465 is a genuine bear to start when cold. The force required to turn the big engine over is great, even with the long kick lever. And it almost always needs five to ten hard kicks before coming to life. When warm, one or two kicks will light it off if the gearbox is in neutral. It offers primary kick starting but like most large bores, the slight clutch drag from trying to start in gear usually means more kicks before the clutch completely breaks loose and the engine spins fast enough to get a spark from the CDI. The compression ratio may be only 7:1, but it feels like 17:1 when kicking the bike over while cold.

Riding the giant 465 will quicken the pulse of anyone, even long-time experts. Torque and horsepower are everyplace. Third gear starts are easy and fourth was used at a couple of tracks. Although the 465 has one inch more wheelbase than the 250, it is on the rear wheel much of the time.

Hole shots are as easy as third gear starts. If the rear wheel finds traction, the bike will easily win the drag to the first corner. Using the abundant power of the giant engine takes time. Any time the throttle is turned over a quarter turn, the bike will leap 20 ft. on the rear wheel. The rider soon learns to keep the transmission in a higher gear than he is used to being in. By using a higher gear than normal and rolling the throttle on, power can be used to full advantage. The engine isn't pipey; quite the opposite, it has a very wide torque curve. The reason for the leopard-like leap in the lower gears comes from a tremendous amount of horsepower and torque at low rpms combined with light flywheels.

We were concerned about possible engine vibration when we first heard about such a large bore engine. Earlier Yamaha 400s were among the smoothest open bikes made, the 465 retains this distinction. The 465 is as smooth as a well balanced 125.

Along with the normal—these days—

suspension tuning for individual riders and courses, the 465 benefitted from a couple of less standard techniques.

We added one full link to the drive chain so we could move the rear wheel back an inch, in effect lengthening the wheelbase *and* the swing arm. That puts the engine further ahead, so there's more weight on the front and more power could be used without the front wheel coming up.

Even with the longer wheelbase, the YZ was a handful under power, so the stanchion tubes were moved down in the clamps. That raised the front end and increased rake and trail, plus adding another fraction to the wheelbase. Slower steering, more stability at speed.

The front sprocket got an added tooth. Yes, that means more top speed, but that wasn't the goal. Instead, because the engine was turning more slowly in every gear at any given ground speed, there was less surplus power. And the pulses were spaced more widely. Less spin, less surplus power wasted in hurling rocks at anyone unlucky enough to be aft of the monster, more forward velocity.

For our conditions, we went from the stock #50 pilot jet to a #45, backed the shock damping down six clicks and put the rear spring on full soft.

It all worked. Don't worry about the exact settings here, each bike, rider and situation will be different. The important point is the way the bike reacts to different adjustments. To get the full benefit from the YZG's potential, it is important the buyer takes the time to play with different combinations. Moving the fork tubes up or down a half inch makes an unbelievable difference in the way the YZ turns. And the adjuster ring on the rear shock isn't something for the salesman to blow about, a couple turns actually make a difference.

The five speeds are more than enough with the broad powerband. Shifting is somewhat clumsy, though. The shift lever is too short and a boot larger than size 8 doesn't fit under it well. Raising the lever on the splined shaft helps, but doesn't cure the problem. We installed a longer, folding unit from International Motorsports and that stopped the complaints.

Actually shifting is fine. Buth ends of the shifting drum have bearings, a caged needle on one side and a caged ball bearing on the other. This improves shifting under power, although perhaps not quite up to Maico's standard.

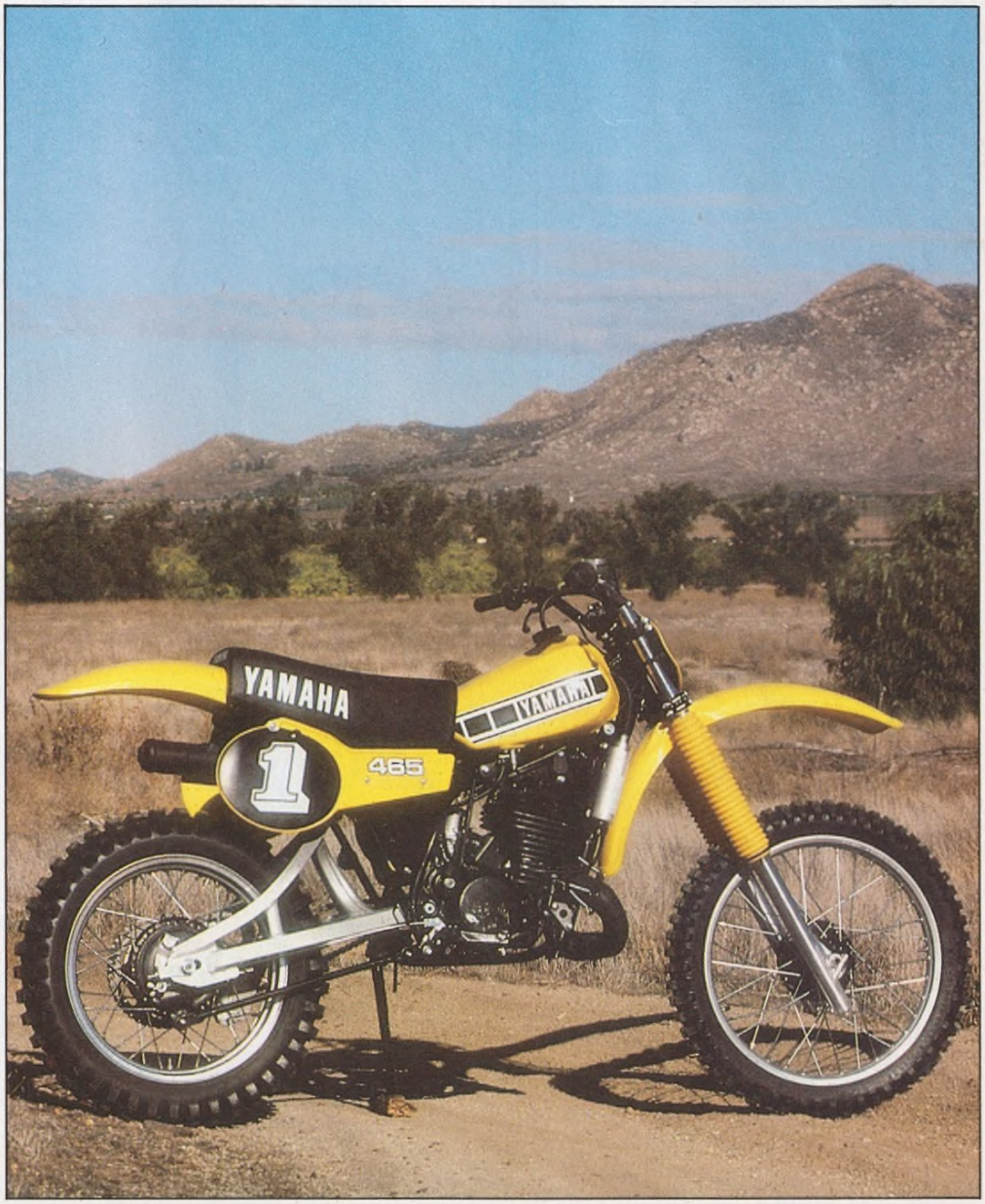
The 465 is an extremely agile open class machine. It is light and can be thrown around like a 250. It goes where the rider points it (as long as the front wheel is on the ground) and the chassis doesn't twist or flex. Although suspension travel has increased from last year, the reshaped seat and new frame have lowered the seat height. Touching the ground isn't a problem for anyone over five-foot-nine. The seat is thick and nicely shaped, making long motos or all-day trail rides pleasant.

Monoshocks have always been whoop-de-do specialists and the G is even better. Breathtaking speeds can be maintained as the YZ skips across the tops of the whoops and the roughest terrain can be crossed in arm chair comfort. The suspension swallows gulleys and dropoffs like they didn't exist. Launching the bike into the air is easy, thanks to the light weight and high horsepower. And landing from big jumps is pillowy soft. The YZ lands quietly, never clunks or crash lands. Its manners in the air are as good as on the ground; it stays straight and doesn't try to loop, dive or list.

The YZ465 has the strongest brakes of any motocross bike *Cycle World* has tested to date. Going into the corner deeper than the competition is easy. It will out-stop any dirt bike made. It takes a little while to adapt to brakes as strong as the G has. Two fingers are all that will ever be necessary on the front brake lever. More than two fingers on the lever or applying it when the bike is crossing a side slope can dump the rider faster than he has ever been dumped. The front brake isn't grabby, just STRONG. Combined with the excellent rear brake and light weight of the bike, the YZ is a serious stopper. Any first time rider of a 465 should be cautioned about the stopping power. Even riders who use a front brake hard required a few hours to adapt.

Because many open class motocrossers are used as play bikes and desert racers, we took the YZ to the Mojave desert for a day. The vastness of the desert has a way of absorbing horsepower and deep uphill sand grades usually slow even the biggest engines. The YZ465 didn't bog on the longest sand washes and roared up sandy five mile grades as if they were flat ground. Rock trails were easy to handle as long as the rider remembered to keep the transmission one gear higher than he would normally. And the excellent cornering manners make full-lock slides around greasewood bushes great sport.

A long time desert expert took a fast loop through the Mojave Desert on the 465 and came in claiming the YZ as the fastest, most powerful bike he had ridden. "It might have more power than most people can use. But I think I would be able to use most of it after a few long rides." We couldn't find a hill steep enough to humble



YAMAHA YZ465G

SPECIFICATIONS

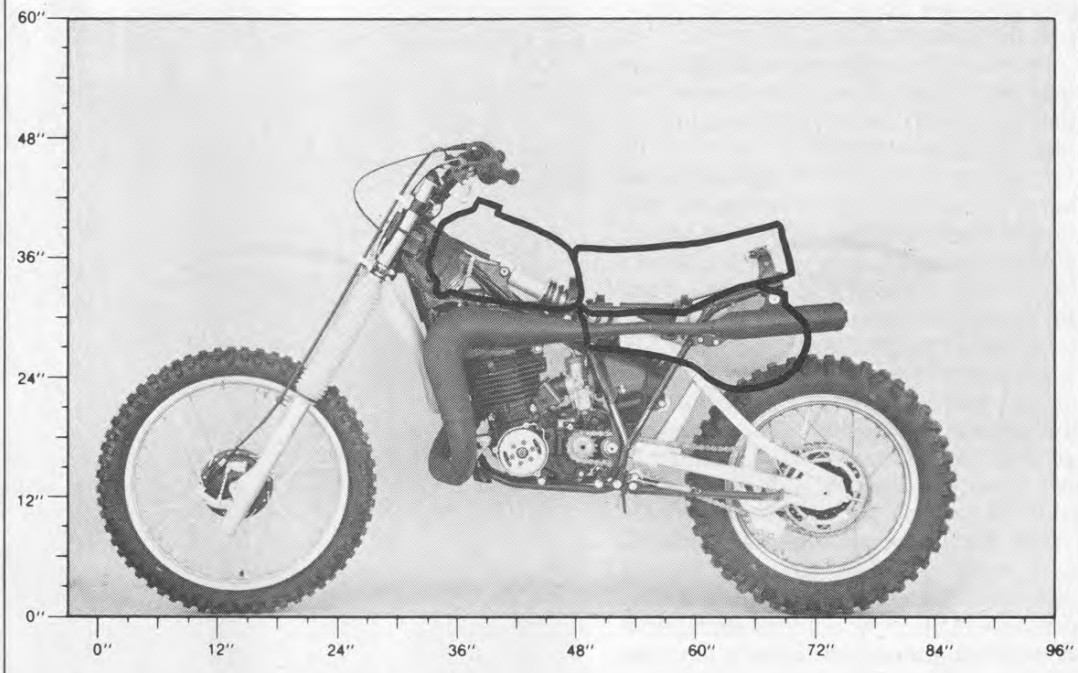
List price	$1998.
Fork travel	11.8 in.
Fork stanchion tube diameter	38mm
Rear wheel travel	12.2 in.
Front tire	3.00-21 Bridgestone
Rear tire	5.10-18 Bridgestone
Engine	two-stroke Single
Bore x stroke	85 x 82mm
Piston displacement	465cc
Compression ratio	7.0:1
Claimed power	na
Claimed torque	na
Carburetion	38mm Mikuni
Ignition	CDI
Lubrication system	premix
Primary drive	helical gear
Gear ratios, overall:1	
5th	7.18
4th	9.01
3rd	11.34
2nd	15.09
1st	18.48
Oil capacity	1.5 pt.
Fuel capacity	2.4 gal.
Fuel tank	plastic
Swing arm material	aluminum
Starter	primary kick
Air filtration	oiled foam
Frame material	chrome-moly steel

DIMENSIONS

Wheelbase	59.0 in.
Seat height	37.7 in.
Seat width	5.3 in.
Seat length	20.5 in.
Seat front to steering stem center	13.3 in.
Handlebar width	34.0 in.
Footpeg height	16.3 in.
Footpeg to seat top	21.5 in.
Footpeg to shift lever center	6.0 in.
Footpeg to brake pedal center	5.4 in.
Swing arm length	21.7 in.
Swing arm pivot to drive sprocket center	2.7 in.
Gas tank filler hole size	1.7 in.
Ground clearance	13.0 in.
Fork rake angle	30°
Trail	5.12 in.
Test weight w/half tank fuel	233 lb.
Weight bias, front/rear percent	46/54

FEATURES

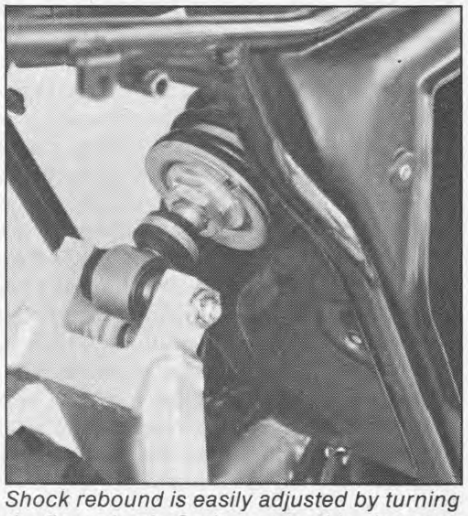
Forks adjustable with air?	yes
Rear shock damping adjustable?	yes
Rear shock rebuildable?	no
Provision to check transmission oil level?	yes
Does owners manual show how to disassemble complete engine?	yes
Does pipe burn rider?	no
Brake pedal height adjustable?	yes



the giant engine; it climbs hills easier than any off-road bike experienced. The abundance of torque and horsepower and light overall weight lets the 465 shoot up grades easily. Earlier Yamaha 400s have had a reputation of being gas hogs; the 465 isn't. It gets around 25 miles per gallon when used hard in a combination of desert including sand, rocks and fast trails.

The YZ465 is the best open motocrosser Yamaha has built. It is also an excellent desert machine when taller gearing, large tank and skid plate are installed. Its potent engine and brakes will take getting used to and the first time rider should use good sense and caution. The YZ465 simply has more horsepower and stronger brakes than any production dirt machine made. And it has a chassis to match. With a retail price of $1998 it will surely be a popular bike.

Plastic gas tank holds 2.4 gal. of premix and the decals don't fall off. Bars are correctly shaped and rubber mounted.



Shock rebound is easily adjusted by turning the finger knob. Spring preload is almost as easy but requires use of the supplied tool.