



## TRACK TEST: Yamaha YZ250J

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Yamaha's new YZ250J has a double mission in 1982. And the two tasks of the mission have produced the most radically changed motocross machine of a year that has been filled with radical changes.

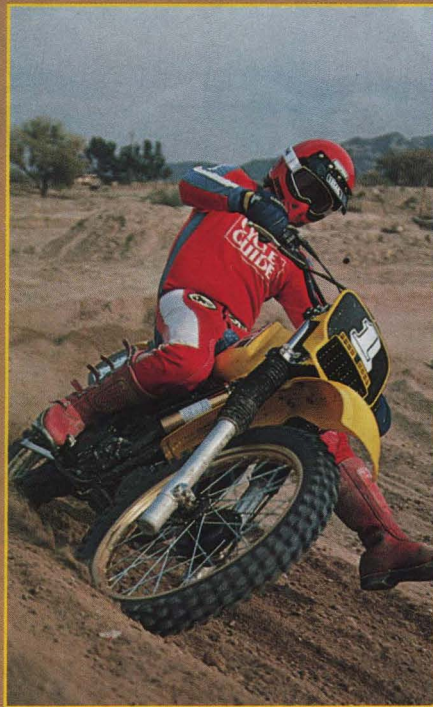
The YZ's first job is to continue a Yamaha tradition of innovation. Over the last decade, that tradition has been developed through Yamaha's presentation of a series of technological firsts to the motocross world. It started with the early use of reed valves (or Torque Induction, as Yamaha still labels it) and continued with the Monoshock and last year's Energy Induction canister. Now the '82

YZ inherits the task of being the industry's innovator, and it answers the call well.

The 250J, along with its 125cc little brother, is the first mass-produced motorcycle to use variable port timing to aid performance, as Yamaha does with the Power Valve. It's also the first and only motocrosser to have a rear shock that offers both adjustable rebound *and* compression damping. And Yamaha tops off the package with a welcome seat design straight off the works machines. It extends forward over the tank and lets the rider climb up almost to the gas cap when cornering – without risking bodily damage.

These ideas maintain Yamaha's step-





liquidcooled 250 further pricked Yamaha's corporate ego.

So, while continuing with innovation, Yamaha must also prove itself with existing technology. To this end, the YZ sports another set of radical changes over last year's model. The new Monocross rear suspension now features linkage between the swingarm and shock that transforms the Monoshock into a rising-rate system. And sitting under the front number plate, you'll find a radiator. Yamaha is using techniques borrowed from its 125 to produce its first quarter-litre water-pumper.

It's a strange position, but Yamaha has mandated the YZ to move ahead and catch up at the same time. And even if you don't care about Yamaha's corporate image or the reasons why the YZ has evolved into what it is, you had better pay attention to the YZ250's mission. Because its success or failure is not only going to affect Yamaha's position in the industry, but your position on the track as well.

*Continued on page 29*

ahead image well, but that's only half of the YZ's job. As odd as it may sound, the YZ must also play a game of technological catch-up in one of the very fields that Yamaha pioneered—single-shock suspension. Yamaha got a head-start in single-shocking back when Hakan Andersson Monocrossed across Europe in the early Seventies on the first modern-day one-shocker. But that advantage disappeared as the rest of Japan discovered how to make one shock do the work of two. The rising-rate systems of Honda and Suzuki pointed the way the rest of the industry would have to follow. And the fact that it was Honda that introduced the first





## Yamaha YZ250J: Will It Win?

• If a bike's personality were determined by its looks and features, the space-age Yamaha YZ250J would be a trim, ultra-horsepower radi-crosser. With a seat that crawls over the tank and its Power-Valved engine, the Yamaha looks like nothing that roosted its way across the Pacific yet. But out on the track, looks aren't going to put the Yamaha on top. What matters is its performance, and in this respect, what the Yamaha delivers is far different from what



its appearance would have you believe.

The J-model actually isn't radical in performance at all. In spite of the roadracing heritage that the Power Valve gives the YZ, power is smooth and manageable with no uncontrollable top-end surge. YPVS takes last year's strong but pipey power curve and smoothes it out. The J-model hasn't lost any of its predecessor's top-end muscle, and now the powerband is broader, making the transition from low speed to top-end less abrupt. The J-model does, however, share some of the H's lack of grunt at the very bottom of the rpm scale. Even though the YPVS allows the new YZ to roll into its mid-range zone smoothly, below that zone is a no-racer's-land that has to be avoided with an occasional fan of the clutch lever. But the mid-range power is strong, and the new liquid-cooling system assures that it remains strong well into a moto.

The rear end of the Yamaha is just as mechanically radical-looking as the engine, with links and levers pushing and pivoting in plain sight, rather than hidden as on other single-shockers. Such an elaborate system again promises great improvement, and in this case, the YZ performs as advertised. The little holes and bumps—the ones that slowly wear a rider down throughout half an hour of moto-cruelty—disappear when they see the YZ coming. Past Yamahas have worked well in the big

whoops, but the linkage that gives the J-model its rising rate makes it the first Yamaha to swallow the little stuff as well. And the Monocross suspension system has the most adjustments available on a production motocrosser with its 24-way adjustable rebound damping and 10-way adjustable compression damping as well as two optional springs (one firmer, one softer). So if you don't like it as delivered, some time and experimentation can produce a machine that is personalized to your tastes. We felt that the stock spring rate was too soft for our 170- to 190-pound test riders, and Yamaha does claim that out of the crate, the YZ is set up for riders in the 145-pound range. But when the YZ was tested, the optional springs were not yet available.

Up front, the suspension is equally impressive over the little stuff but it also was too soft to suit the heavier crowd. A healthy handful of the excellent double-leading-shoe front brake going into a turn would cause the front end to dive and make the already-steep rake seem nearly vertical. And when exiting the turn, the soft rear would squat enough to result in rather slow and unresponsive steering. But there are two optional fork springs as well that should cure those problems.

But soft suspension is easy to fix; excessive weight isn't. And that, more than anything else, is going to hinder the Yamaha when it competes against the ultra-light machines of '82. At 235 pounds, the YZ weighs 18 pounds more than the Suzuki RM250Z. And on the track, it feels like an even greater difference. The radiator and shock are mounted higher than they are on any other watercrosser, raising the bike's center of gravity noticeably. Some of the YZ's extra weight is in the Monocross linkage, but most of it is in the beefed-up frame. Pro riders will want to start replacing bits and pieces all over the machine with trick aluminum goodies right away, in an effort to save as much weight as possible.

Novice and beginner riders, on the other hand, if they can learn to live with the Yamaha's heft, will find the YZ much more agreeable. In fact, the YZ's smooth power delivery will make it much more suitable for the less-experienced racer. But more-serious riders aren't going to turn in their best performances on box-stock YZs. Not until the time comes when races are won by looks.

—Ron Lawson

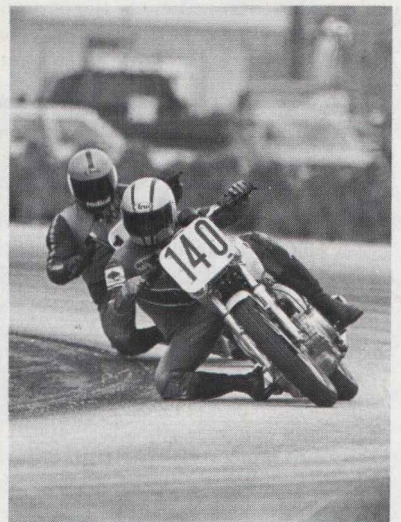
## Yamaha's TR1 - top twin in streetbike racing!

Anyone with any doubts about the sporting capabilities of Yamaha's TR1 need only check out the style of American streetbike racer Chris Steward!

Campaigning the American 920cc version of the TR1 in the Streetbike class of the U.S. "Battle of the Twins" series, the 24-year-old from Los Angeles has already won the two opening events of 1982.

On the superfast speedbowls of Daytona and Talladega, the TR1 outsped, outhandled and outlasted opposition from Ducati, Moto Guzzi and BMW.

The possibility of a twin-cylinder class in the popular Motor Cycle News "Streetbike" series has already been discussed between sponsors and organizers. If this should happen, you can bet your life that Yamaha's TR1 will be a prime contender.



Chris Steward in knee-dragging action on the TR1 in the Battle of the Twins stock class at Daytona. Impressive handling for a completely standard machine!



# YZ250J: Tech Inspection

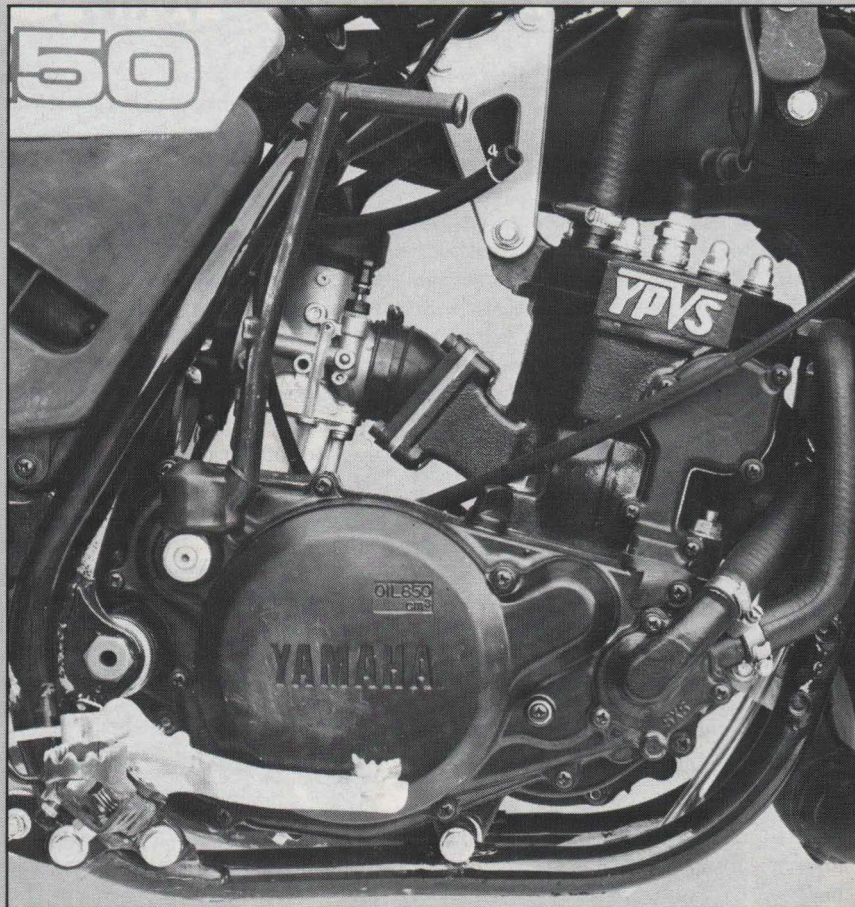
## Engine:

**Top End:** Under the finless exterior of the YZ250J's liquid-cooled barrel are found four conventional transfer ports assisted by one boost port. The upper edge of the YZ's intake port window, which previously was straight, now droops downward so there is less stress on the piston's rear skirt. A 38mm Mikuni carb feeds the intake port through a six-petal reed valve. The J-model's reed petals are thinner than those used on the H-model to improve fuel flow at low rpm. A far more radical change can be found in the exhaust port which is now centrally located and fitted with the Yamaha Power Valve System (YPVS) to broaden the engine's powerband (see YVPS, page 86). Machined aluminum surfaces constitute the seal between the new head and barrel, supplanting the usual copper head gasket. Two large O-rings, however, are also used at the head/barrel joint to contain coolant as it flows through the top end. From there, the 1000cc mixture of anti-freeze and distilled water flows to a triple-clamp-mounted radiator through sealed passages in the frame backbone, steering head and fork triple clamps.

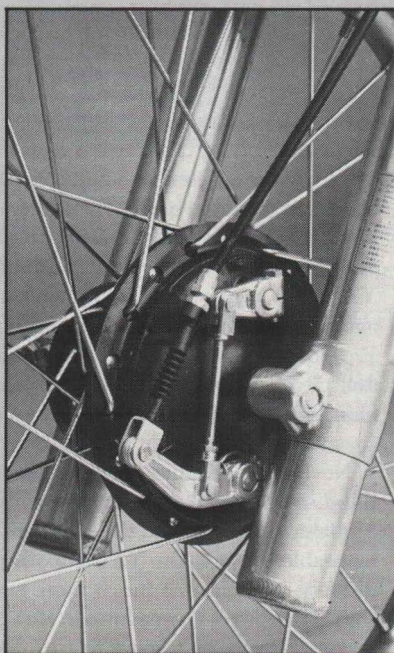
**Bottom End:** The righthand end of the full-circle crankshaft now carries three pinions. Inboard of the main primary-drive gear is another straight-cut gear that drives the Power Valve's centrifugal advance mechanism. On the outboard end of the crank is a narrow helical gear that spins the water pump's six-bladed impeller. On the opposite end of the crank lives the internal rotor for the YZ's capacitive-discharge ignition.

## Drivetrain:

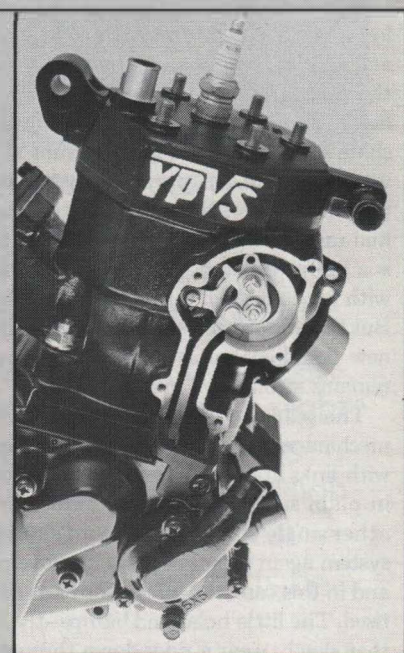
Because the J-model YZ has those two additional gear drives on the crankshaft, it has straight-cut primary-drive gears, rather than the helical type used on previous YZs, to reduce driveline power losses. To decrease the clutch chattering that was prevalent on the H-model, the J's clutch basket has narrower fingers extending to engage the seven plates—one more than last year. Those plates have correspondingly wider tangs.



**The J-model loses an Energy Induction canister but gains a water jacket**  
And the Yamaha Power Valve system quenches an industry first.



**The 250 gets its big brother's brake**  
Double-leading hand-me-down shoes.



**Power Valve's mechanical linkage**  
Porting regulated by engine speed.



**Gearbox:** Improved heat treatment increases the strength of otherwise unchanged gears. A lighter detent spring reduces the amount of pedal-pressure needed for gear shifting.

**Final Drive:** The J-model's 3.46:1 final-drive ratio was made fractionally taller than last year's through a change from 48/14 to 45/13 gearing.

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## Suspension:

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**Front:** New Kayaba fork sliders are made from straight aluminum tubing, with the axle-mounting lugs heat-shrunk into place. Yamaha claims this process makes the new sliders less expensive to manufacture than the old forged sliders. Inside the massive 43mm stanchion tubes are the same straight-wound springs used in the H-model fork. But damping rates have changed considerably, with standard compression damping decreasing due in part to a change from 10 weight fork oil to 7.5 weight, and in part to a change in valving. Even with the thinner oil, though, rebound damping is increased through the use of smaller orifices.

**Rear:** Those front suspension changes were made to better suit the new rising-rate Monocross rear suspension (see "Monocross," page 86). A shorter deCarbon shock and an extruded (rather than box-section) swingarm are connected

by an L-shaped aluminum bell crank. Needle bearings are used in the pivots between the bell crank and frame pivot, and between the crank and swingarm. A long collar inside the shock's lower bush mounting prevents the bush from being pinched by an over-tightened bolt. All these extra pieces are claimed to make the new Monocross rear end 2.3 pounds heavier than last year's design. But as well as rising-rate suspension, the new rear end offers 24-way-adjustable rebound damping and, for the first time, 10-way-adjustable compression damping.

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## Wheels:

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The front brake now uses the double-leading-shoe backing plate employed on Open-class YZs since 1980. The tab that locates the backing plate to the fork slider has been positioned horizontally to make wheel installation easier. New IRC tires have a different rubber compound and taller knobs for improved traction on loamy tracks.

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## Frame:

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The single-backbone frame has a relatively steep head angle of 27.5 degrees, one degree less than last year's. To maintain

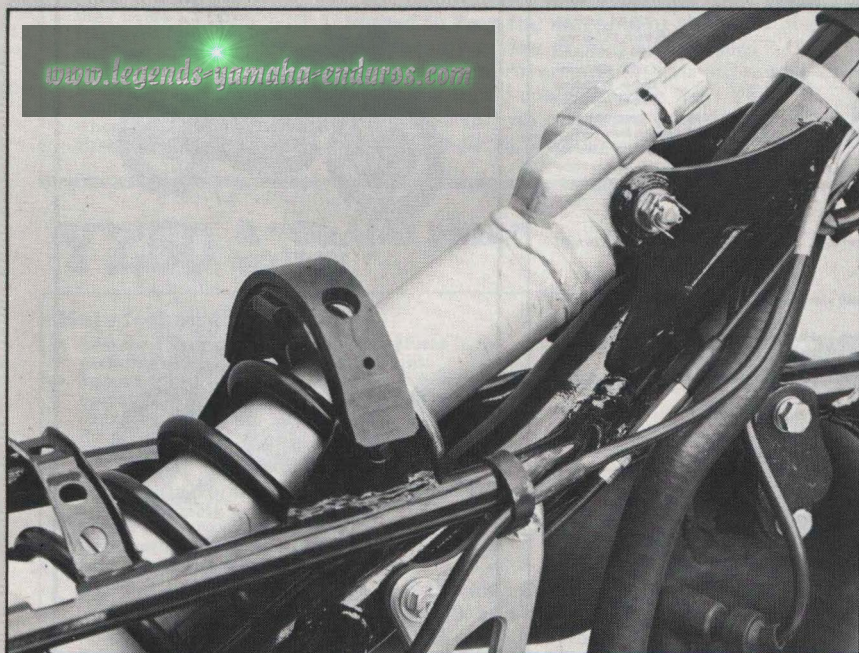
straight line stability with that quicker steering geometry, the YZ's wheelbase is almost one inch longer than the H-model's. The single front downtube now splits into two engine cradle tubes much closer to the steering head to allow the centrally located exhaust pipe to exit the cylinder. The rear frame tubes have been increased in diameter and wall-thickness to handle the higher stress load imparted into the Monocross linkage pivot.

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## Details:

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To allow the rider to sit further forward more comfortably in the turns, the YZ's new seat extends almost to the gas cap. The seat is stuffed with higher-quality, denser foam to increase its service life. A larger airbox volume allows better air flow and easier access to the same dual-layered conical foam element. Square number plates are designed to meet AMA regulations. Foam inserts prevent mud build-up in open cavities in the swingarm. Alloy brake arms are now used on both hubs and a new brake pedal has a more compact pivot mechanism for its folding tip. Yamaha no longer uses rubber covers over the air valves in the fork caps. The YPVS motor no longer uses the YEIS canister on its inlet system, although its mounting bracket is retained. The inlet manifold and YEIS canister from the new 490 are a bolt-on replacement.



**Compression-damping combines with the YZ's rebound and spring options**

*To give you 720 ways to adjust the new Monocross rear suspension.*



**Two O-rings replace a copper gasket**

*To keep the YZ's head tight.*

*Continued*



# Yamaha YZ250J



## SPECIFICATIONS:

**MANUFACTURER:** Yamaha Motor Corporation, USA  
6555 Katella Avenue  
Cypress, California 90630

**CATEGORY:** motocross

**SUGGESTED RETAIL PRICE:** \$2179

### ENGINE

Type ..... liquid-cooled two-stroke vertical single  
Port arrangement ..... one reed-valve-controlled intake,  
four transfers, one booster transfer,  
one variable-height exhaust

Bore and stroke ..... 70.0mm x 64.0mm  
Displacement ..... 246.3cc  
Compression ratio (corrected) ..... variable from 7.0 to 8.6:1  
Carburetion ..... one 38mm Mikuni slide/needle  
Air filter ..... washable oiled foam element  
Lubrication ..... pre-mixed fuel and oil  
Starting system ..... primary kick  
Ignition ..... Internal-rotor magneto CDI  
Charging system ..... none

### DRIVETRAIN

Primary drive ..... straightcut gears; 2.625:1 ratio  
Clutch ..... wet, multi-plate  
Final drive ..... #520 chain (5/16-in. pitch, 1/4-in. width);  
3.462:1 (45/13) ratio

Gear	Internal gear ratio	Overall gear ratio	MPH per 1000 RPM
I	2.143	19.471	4.1
II	1.813	16.469	4.8
III	1.412	12.828	6.2
IV	1.143	10.385	7.7
V	0.957	8.691	9.2

### SUSPENSION/WHEEL TRAVEL

Front ..... air-spring, 43mm stanchion tube diameter/  
11.0 in. (279mm)  
Rear ..... Monocross, 24-way adjustable rebound damping,  
10-way adjustable compression damping,  
25mm spring preload adjustment/11.0 in. (279mm)

### BRAKES

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

### TIRES

Front ..... 3.00 x 21 IRC Motocross Z MKII  
Rear ..... 5.10 x 18 IRC Motocross Z MKII

### DIMENSIONS AND CAPACITIES

Weight ..... 235 lbs. (107kg.)  
Weight distribution ..... 48.5% front, 51.5% rear  
Wheelbase ..... 59.0 to 59.5 in. (1499 to 1511mm)  
Seat height ..... 37.0 in. (940mm)  
Handlebar width ..... 33.0 in. (838mm)  
Footpeg height ..... 16.0 in. (406mm)  
Ground clearance ..... 12.5 in. (318mm), at engine cradle  
Steering head angle ..... 27.5 degrees from vertical  
Front wheel trail ..... 4.65 in. (118mm)  
Frame ..... tubular chromoly steel, single front downtube  
Fuel tank ..... plastic, 2.5 gal. (9.5l), no reserve  
Instrumentation ..... none

### PERFORMANCE

Top speed (observed) ..... 80 mph (129 kph)

**WARRANTY:** none

**AVAILABLE COLOR:** yellow only

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

## COMPARATIVE TEST DATA:

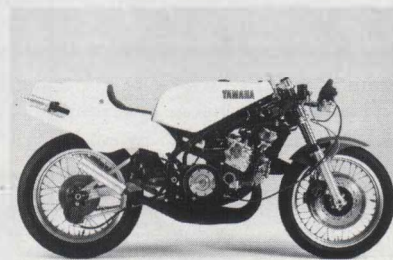
Make & Model	Horsepower	Wheel Travel Front/Rear, in.	Weight (fuel tank empty), lb.	Weight bias Front/Rear percent	Transmission, number of speeds
Yamaha YZ250J	NA	11.0/11.0	235	48.5/51.5	5
Suzuki RM250Z	NA	10.3/11.0	217	47.5/52.5	5
Suzuki RM250X	NA	10.5/11.3	219	47.0/53.0	5
Yamaha YZ250G	27.5	11.6/11.7	217	46.5/53.5	6
Kawasaki KX250A6	26.8	11.3/11.2	230	46.5/53.5	5
Honda CR250R-80	27.5	11.6/11.7	222	47.0/53.0	5

# From Championship to Customer

The Yamaha TZ500 which heads the production road race range for 1982 is identical in all major respects to Kenny Roberts' 1980 World Championship-winning machine.

The 500cc four puts out well in excess of 100hp and features the Yamaha Power Valve System and reversed outer cylinders first introduced on the Roberts championship-winner.

Yamaha's production road race range for 1982 is completed by the bike that has been the backbone of 250cc racing for so long, the well-proven and always-successful TZ250 twin.



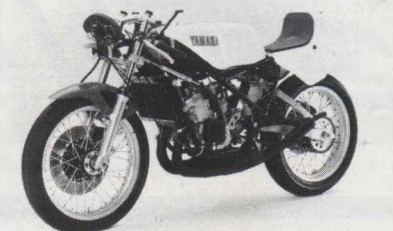
The Yamaha TZ500



The Yamaha TZ250



TZ 250 '82



TZ 250 '82



# YZ THE FACTS

Yamaha asked you to wait. We hope you did and if you've had a chance to see the new bikes you're pleased you did...right.

In any event, for those who have not seen them, here's the facts...no bull.

## YZ125LC

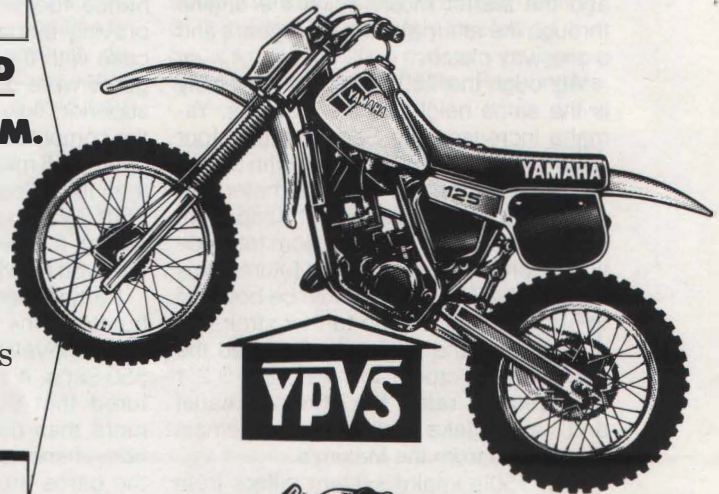
### Main technical features

- Powerful liquid-cooled Torque Induction engine with YPVS
- Newly-designed air cleaner, combustion chamber and expansion-chamber muffler
- Durable, easy-to-handle clutch and transmission
- Rigid, strong high-tensile steel tubular frame
- New rising-rate Monocross suspension system using separately adjustable expansion/compression damping shock absorber
- The combination of enlarged fuel tank and extended seat offers better riding position
- New square type number plate and improved front fender
- Convenient detachable side stand

**GP-PROVED  
POWER  
VALVE SYSTEM.**

**SPARE  
PARTS KIT**

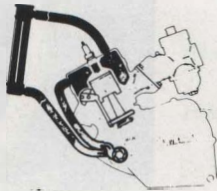
The YZ125 was the first YZ machine to employ a liquid-cooling system for higher racing performance. The '82 model comes with a number of new technical improvements including the race-bred YPVS (Yamaha Power Valve System).



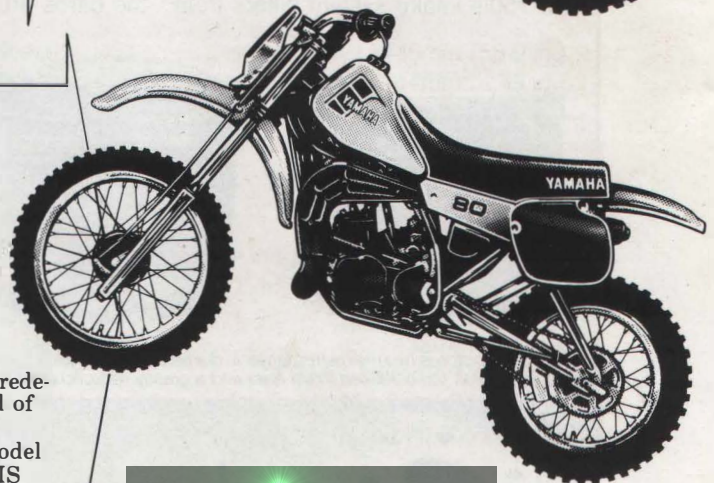
## YZ80LC LIQUID-COOLED AND COMPLETELY NEW.

### Main technical features

- Newly designed liquid-cooled Torque Induction engine with YEIS
- Near-square type bore and stroke for excellent torque and power
- Strengthened con-rod and newly designed expansion-chamber muffler
- Increased wheel travel front and rear
- Extended swingarm and increased-stroke shock absorber
- Adjustable damping and gas-pressure De Carbon type damper with remote reservoir
- Newly designed fuel tank and extended seat for increased freedom of riding position. Enlarged fuel tank holds 5.2 litres of fuel.
- Improved front fender and new square type number plates
- Bevel-gear throttle grip
- Aluminium front and rear wheel rims and strengthened rear axle



The sensationally new YZ80 has been redesigned to keep the machine at the head of its class by giving greater racing performance. Improvements on this '82 model include a liquid-cooled engine with YEIS which delivers an increased power output of 19.5 PS at 12,250 rpm.



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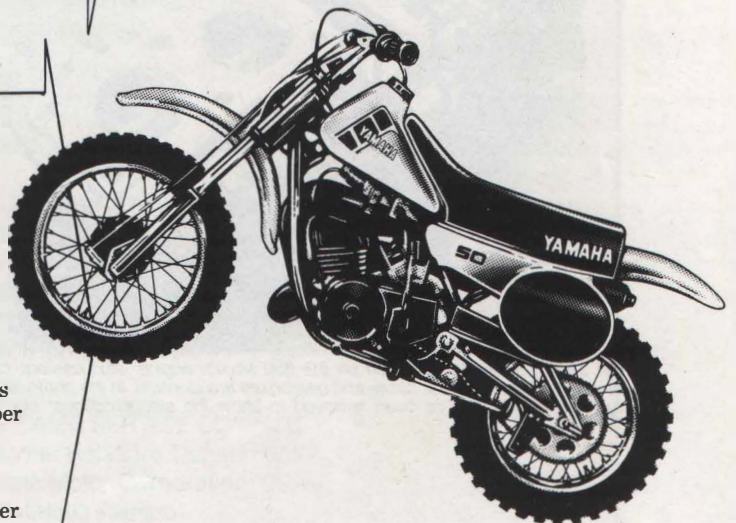
## YZ50 A "GRAND PRIX" TOUCH.

### Main technical features

- 2-stroke Torque Induction engine features high performance and outstanding durability
- 5-speed transmission ensures positive gearshift operation matching the engine's power characteristics
- Strong and rigid semi-double cradle frame
- Leading-axle front forks provide extended 110mm wheel stroke
- Monocross suspension system ensures greater manoeuvrability and riding stability
- Sturdy high-tensile steel wheel rims and new tread pattern tyres give better roadholding
- Improved drive chain tensioner
- Extended seat helps the rider adopt best riding position
- F.R.P. fuel tank reduces total machine weight
- Improved front fender and new square type number plates

This model retains all the proven features of the '81 YZ50, and also provides a number of new technical improvements for increased racing performance.

The seat has been extended forward and lapped over the fuel tank, allowing the rider a wide range of riding positions for greater control.



# YZ...what else!

