

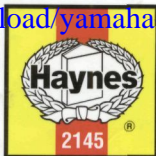
Yamaha Xj600s (92-99), Xj600n (95-99) Service Repair Manual

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# YAMAHA

**XJ600S** (Diverston, Seca II) '92 to '99

**XJ600N** '95 to '99

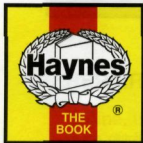


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# Yamaha XJ600S & XJ600N

## Service and Repair Manual

by Alan Ahlstrand  
and John H Haynes Member of the Guild of Motoring Writers

### Models covered

Yamaha XJ600S Diversion. 598cc. UK 1992 to 1999  
Yamaha XJ600S Seca II. 598cc. US 1992 to 1999  
Yamaha XJ600N. 598cc. UK 1995 to 1999

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# Yamaha

## Musical instruments to Motorcycles

### The Yamaha Motor Company

The Yamaha name can be traced back to 1889, when Torakusu Yamaha founded the Yamaha Organ Manufacturing Company. Such was the success of the company, that in 1897 it became Nippon Gakki Limited and manufactured a wide range of reed organs and pianos.

During World War II, Nippon Gakki's manufacturing base was utilised by the

Japanese authorities to produce propellers and fuel tanks for their aviation industry. The end of the war brought about a huge public demand for low cost transport and many firms decided to utilise their obsolete aircraft tooling for the production of motorcycles. Nippon Gakki's first motorcycle went on sale in February 1955 and was named the 125 YA-1 Red Dragonfly. This machine was a copy of the German DKW RT125 motorcycle, featuring a single cylinder two-stroke engine with a four-speed gearbox. Due to the

outstanding success of this model the motorcycle operation was separated from Nippon Gakki in July 1955 and the Yamaha Motor Company was formed.

The YA-1 also received acclaim by winning two of Japan's biggest road races, the Mt. Fuji Climbing race and the Asama Volcano race. The high level of public demand for the YA-1 led to the development of a whole series of two-stroke singles and twins.

Having made a large impact on their home market, Yamahas were exported to the USA in 1958 and to the UK in 1962. In the UK the signing of an Anglo-Japanese trade agreement during 1962 enabled the sale of Japanese lightweight motorcycles and scooters in Britain. At that time, competition between the many motorcycle producers in Japan had reduced numbers significantly and by the end of the sixties, only the big-four which are familiar with today remained.

Yamaha Europe was founded in 1968 and based in Holland. Although originally set up to market marine products, the Dutch base is now the official European Headquarters and distribution centre. Yamaha motorcycles are built at factories in Holland, Denmark, Norway, Italy, France, Spain and Portugal. Yamahas are imported into the UK by Yamaha Motor UK Ltd, formerly Mitsui Machinery Sales (UK) Ltd. Mitsui and Co. were originally a trading house, handling the shipping, distribution and marketing of Japanese products into western countries. Ultimately Mitsui Machinery Sales was formed to handle Yamaha motorcycles and outboard motors.

Based on the technology derived from its motorcycle operation, Yamaha have produced many other products, such as automobile and lightweight aircraft engines, marine engines and boats, generators, pumps, ATVs, snowmobiles, golf cars, industrial robots, lawnmowers, swimming pools and archery equipment.

### Two-strokes first

Part of Yamaha's success was a whole string of innovations in the two-stroke world. Autolube engine lubrication, pressed steel monocoque frame, electric starting, torque induction, multi-ported engines, reed valves and power valves kept their two-strokes at the forefront of technology.

In the 1960s and 70s the two-stroke engined YA53 125, YDS1 to YDS7 250 and YR5 350 formed the core of Yamaha's range. By the mid-70s they had been superseded by the RD (Race-Developed) 125, 250, and 350 range of two-stroke twins, featuring improved 7 port engines with reed valve induction. Braking was improved by the use of an hydraulic brake on the front wheel of DX models, instead of the drum arrangement used previously, and cast alloy wheels were available as an option on later RD models. The RD350 was replaced by the RD400 in 1976.



The FS1-E - first bike of many sixteen year olds in the UK

Running parallel with the RD twins was a range of single-cylinder two-strokes. Used in a variety of chassis types, the engine was used in the popular 50 cc FS1-E moped, the V50 to 90 step-thrus, RS100 and 125, YB100 and the DT trail range.

The air-cooled single and twin cylinder RD models were eventually replaced by the LC series in 1980, featuring liquid-cooled engines, radical new styling, spiral pattern cast wheels and cantilever rear suspension (Yamaha's Monoshock). Of all the LC models, the RD350LC, or RD350R as it was later known, has made the most impact in the market. Later models had YPVS (Yamaha Power Valve System) engines, another first for Yamaha - this was essentially a valve located in the exhaust ports which was electronically operated to alter port timing to achieve *maximum power output*. The RD500LC was the largest two-stroke made by Yamaha and differed from the other LCs by the use of its vee-four cylinder engine.

With the exception of the RD350R, now manufactured in Brazil, the LC range has been discontinued. Two-stroke engine models have given way to environmental pressure, and thus with a few exceptions, such as the TZR125 and TZR250, are used only in scooters and small capacity bikes.

## The Four-strokes

Yamaha concentrated solely on two-stroke models until 1970 when the XS1 was produced, their first four-stroke motorcycle. It was perhaps Yamaha's success with two-strokes that postponed an earlier move into the four-stroke motorcycle market, although their work with Toyota during the



The distinctive paintwork and trim of the RD models

1960s had given them a sound base in four-stroke technology.

The XS1 had a 650 cc twin-cylinder SOHC engine and was later to become known as the XS650, appearing also in the popular SE custom form. Yamaha introduced a three cylinder 750 cc engine in 1976, fitted in a sport-tourer frame and called the XS750, TX750 in the USA. The XS750 established

itself well in the sport tourer class and remained in production with very few changes until uprated to 850 cc in 1980.

Other four-strokes followed in 1976, with the introduction of the XS250/380/400 series twins. The XS range was strengthened in 1978 by the four-cylinder XS1100.

The 1980s saw a new family of four-strokes, the XJ550, 650, 750 and 900 Frogs. Improvements over the XS range amounted to a slimmer DOHC engine unit due to the relocation of the alternator behind the cylinders, electronic ignition and uprated braking and suspension systems. Models were available mainly in standard trim, although custom-styled Maxims were produced especially for the US market. The XJ650T was the first model from Yamaha to have a turbo-charged engine. Although these early XJ models have now been discontinued, their roots live on in the XJ600S and XJ900S Diversion (Seca II) models.

The FZR prefix encompasses the pure sports Yamaha models. With the exception of the 16-valve FZR400 and FZR600 models, the FZ/FZR750 and FZR1000 used 20-valve engines, two exhaust valves and three inlet valves per cylinder. This concept was called Genesis and gave improved gas flow to the combustion chambers. Other features of the new engine were the use of down-draught carburetors and the engine's inclined angle in the frame, plus the change to liquid-cooling. Lightweight Deltabox design aluminium frames and uprated suspension improved the bikes's handling. The Genesis engine lives on in the YZF750 and 1000 models.

The vee-twin engine has been the mainstay of the XV Virago range. Since 1981 XV's have



The XS650 led the way for Yamaha's four-stroke range



Yamaha's XS750 was produced from 1976 to 1982 and then updated to 850 cc

been produced in 535, 700, 750, 920, 1000 and 1100 engine sizes, all using the same basic air-cooled sohc vee-twin engine. Other uses of vee engines have been in the XZ550 of the early 1980s, the XVZ12 Venture and the mighty VMX-12 V-Max.

Anti-lock braking, engine management, catalytic converters and hub center steering are all features found on present-day models, ensuring that Yamaha remain at the forefront of technology.

### The XJ600S and XJ600N

Yamaha's XJ range goes back to the XJ650 of 1980, introduced to replace the ageing XS series of four-strokes. The XJs have appeared in 550, 600, 750 and 900 cc form, with an XJ400 for the Japanese home market.

The Diversion is not a retro version of the old XJ or XS Yamahas, but an uncomplicated and affordable middleweight bike. Launched in 1992, the Diversion soon established itself as a firm favourite with riders wanting a good all-round motorcycle which was relatively cheap to insure and run. Its success was so great that it wasn't long before this approach was seen on other manufacturers' models,



A new family of four-strokes was released in 1980 with the introduction of the XJ range

like Suzuki's popular 600 Bandit. Yamaha carried the Diversion formula onto a 900 cc bike when the ageing XJ900F was replaced in 1994.

The *Diversion*, or *Seca II*, as it is named in the USA, uses a two valve DOHC air-cooled engine like the previous XJ models, but the engine is tilted 35° forwards in the frame to lower the centre of gravity. Angling the engine in this way allows the use of straight inlet tracts and downdraft Mikuni carburettors as seen on the Genesis-engined FZR bikes. One of the engine's most distinctive features is the crossover exhaust header pipes; the pipes from cylinders 2 and 3 connect to the right-hand silencer, whereas the pipe from cylinder no. 4 crosses over to join the no. 1 cylinder pipe in the left-hand silencer.

Without the added complexity of liquid cooling and a 16- or 20-valve head, the *Diversion* is a DIY mechanics dream; easy to service and with all components very accessible. Transmission is by a six speed gearbox with chain drive to the rear wheel. The three-spoke cast aluminium wheels, 17 inch front and 18 inch rear, carry tubeless tyres.

Suspension is by straightforward 38 mm telescopic forks at the front and a Monoshock linkage with preload adjustment at the rear linked to an oval section steel swingarm. Braking is all hydraulic, using a single twin piston sliding caliper at the front and an opposed caliper at the rear. The engine is rubber-mounted in a steel tube double cradle frame, painted the same colour as the fuel



The XJ600S Diversion model

tank and bodywork on many models. The US *Seca II* model has the benefit of a colour-matched belly pan or chin fairing.

In 1995 Yamaha responded to the need for a 'naked' style bike by producing the XJ600N – one of the most notable models being the yellow bodywork and yellow framed version. The only difference between this model and the *Diversion* was that it lacked a fairing and according was fitted with a chrome round headlamp and chrome instrument pods. However, the *Diversion* still remains the most popular of the two models, with most riders preferring its looks and the wind protection offered by its fairing.

Apart from colour and graphics there were very few changes until 1996 (JK) or 1997 (JL) when the XJ600S received a new style fairing and windshield. Both models were fitted with new rear bodywork, identified by the small black fillet between the tank and side cover. Less obvious changes included a handlebar-mounted choke lever, rather than the operating knob on the carburettors, and European models received an oil cooler, electric fuel pump, throttle position switch and revised carburettor heater system. Later European models were fitted with twin front disc brakes and hazard warning lights.

## Acknowledgements

Our thanks are due to Mitsui Machinery Sales (UK) Ltd for permission to reproduce certain illustrations used in this manual and for supplying some of the cover photographs. We would also like to thank NGK Spark Plugs (UK) Ltd for supplying the colour spark plug condition photos and the Avon Rubber Company for supplying information on tyre fitting.

Special thanks to Doreen DeMello for supplying the XJ600S used in these photographs; to Dave Jewell for organising and performing the teardown; and to both Dave and Denny Jewell for the technical expertise that comes from their years of experience as motorcycle mechanics and racers. Thanks are also due to Taylors Motorcycles of Misterton, Crewkerne, who supplied the later model XJ600S.

## About this manual

The aim of this manual is to help you get the best value from your motorcycle. It can do so in several ways. It can help you decide what work must be done, even if you choose to have it done by a dealer; it provides information and procedures for routine maintenance and servicing; and it offers diagnostic and repair procedures to follow when trouble occurs.

We hope you use the manual to tackle the work yourself. For many simpler jobs, doing it yourself may be quicker than arranging an appointment to get the vehicle into a dealer and making the trips to leave it and pick it up. More importantly, a lot of money can be saved by avoiding the expense the dealer must pass on to you to cover its

labour and overhead costs. An added benefit is the sense of satisfaction and accomplishment that you feel after doing the job yourself.

References to the left or right side of the motorcycle assume you are sitting on the seat, facing forward.

We take great pride in the accuracy of information given in this manual, but motorcycle manufacturers make alterations and design changes during the production run of a particular motorcycle of which they do not inform us. No liability can be accepted by the authors or publishers for loss, damage or injury caused by any errors in, or omissions from, the information given.



Professional mechanics are trained in safe working procedures. However enthusiastic you may be about getting on with the job at hand, take the time to ensure that your safety is not put at risk. A moment's lack of attention can result in an accident, as can failure to observe simple precautions.

There will always be new ways of having accidents, and the following is not a comprehensive list of all dangers; it is intended rather to make you aware of the risks and to encourage a safe approach to all work you carry out on your bike.

## Asbestos

● Certain friction, insulating, sealing and other products - such as brake pads, clutch linings, gaskets, etc. - contain asbestos. Extreme care must be taken to avoid inhalation of dust from such products since it is hazardous to health. If in doubt, assume that they do contain asbestos.

## Fire

● Remember at all times that petrol is highly flammable. Never smoke or have any kind of naked flame around, when working on the vehicle. But the risk does not end there - a spark caused by an electrical short-circuit, by two metal surfaces contacting each other, by careless use of tools, or even by static electricity built up in your body under certain conditions, can ignite petrol vapour, which in a confined space is highly explosive. Never use petrol as a cleaning solvent. Use an approved safety solvent.

● Always disconnect the battery earth terminal before working on any part of the fuel or electrical system, and never risk spilling fuel on to a hot engine or exhaust.

● It is recommended that a fire extinguisher of a type suitable for fuel and electrical fires is kept handy in the garage or workplace at all times. Never try to extinguish a fuel or electrical fire with water.

## Fumes

● Certain fumes are highly toxic and can quickly cause unconsciousness and even death if inhaled to any extent. Petrol vapour comes into this category, as do the vapours from certain solvents such as trichloroethylene. Any draining or pouring of such volatile fluids should be done in a well ventilated area.

● When using cleaning fluids and solvents, read the instructions carefully. Never use materials from unmarked containers - they may give off poisonous vapours.

● Never run the engine of a motor vehicle in an enclosed space such as a garage. Exhaust fumes contain carbon monoxide which is extremely poisonous; if you need to run the engine, always do so in the open air or at least have the rear of the vehicle outside the workplace.

## The battery

● Never cause a spark, or allow a naked light near the vehicle's battery. It will normally be giving off a certain amount of hydrogen gas, which is highly explosive.

● Always disconnect the battery ground (earth) terminal before working on the fuel or electrical systems (except where noted).

● If possible, loosen the filler plugs or vent when charging the battery from an external source. Do not charge at an excessive rate as the battery may burst.

● Take care when topping up, cleaning or carrying the battery. The acid electrolyte, even when diluted, is very corrosive and should not be allowed to contact the eyes or skin. Always wear rubber gloves and goggles or a face shield. If you ever need to pour electrolyte yourself, always add the acid slowly to the water; never add the water to the acid.

## Electricity

● When using an electric power inspection light etc., always ensure that the appliance is correctly connected to its ground and that, where necessary, it is properly grounded (earthed). Do not use electrical appliances in damp conditions and, beware of creating a spark or applying excessive heat in the vicinity of fuel or vapour. Also ensure that the appliances conform to national safety standards.

● A severe electric shock can result from touching certain parts of the electrical system such as the spark plug wires (HT leads), when the engine is running or being cranked, particularly if components are damp and insulation is defective. Where an electrical ignition system is used, the secondary voltage is much higher and could prove fatal.

## Remember...

**X Don't** start the engine without first ascertaining that the transmission is in neutral.

**X Don't** suddenly remove the pressure cap from a hot cooling system - cover it with a cloth and release the pressure gradually first, or you may get scalded by escaping coolant.

**X Don't** attempt to drain oil until you are sure it has cooled sufficiently to avoid scalding you.

**X Don't** grasp any part of the engine or exhaust system without first ascertaining that it is cool enough not to burn you.

**X Don't** allow brake fluid or antifreeze to contact the machine's paintwork or plastic components.

**X Don't** siphon toxic liquids such as fuel, hydraulic fluid or antifreeze by mouth, or allow them to remain on your skin.

**X Don't** inhale dust - it may be injurious to health (see Asbestos heading).

**X Don't** allow any spilled oil or grease to remain on the floor - wipe it up right away, before someone slips on it.

**X Don't** use ill-fitting spanners or other tools which may slip and cause injury.

**X Don't** lift a heavy component which may be beyond your capability - get assistance.

**X Don't** rush to finish a job or take unverified short cuts.

**X Don't** allow children or animals in or around an unattended vehicle.

**X Don't** inflate a tyre above the recommended pressure. Apart from overstressing the carcass, in extreme cases the tyre may blow off forcibly.

**✓ Do** ensure that the machine is supported securely at all times. This is especially important when the machine is blocked up to aid wheel or fork removal.

**✓ Do** take care when attempting to loosen a stubborn nut or bolt. It is generally better to pull on a spanner, rather than push, so that if you slip, you fall away from the machine rather than onto it.

**✓ Do** wear eye protection when using power tools such as drill, sander, bench grinder etc.

**✓ Do** use a barrier cream on your hands prior to undertaking dirty jobs - it will protect your skin from infection as well as making the dirt easier to remove afterwards; but make sure your hands aren't left slippery. Note that long-term contact with used engine oil can be a health hazard.

**✓ Do** keep loose clothing (cuffs, ties etc. and long hair) well out of the way of moving mechanical parts.

**✓ Do** remove rings, wristwatch etc., before working on the vehicle - especially the electrical system.

**✓ Do** keep your work area tidy - it is too easy to fall over articles left lying around.

**✓ Do** exercise caution when compressing springs for removal or installation. Ensure that the tension is applied and released in a controlled manner, using suitable tools which preclude the possibility of the springs escaping violently.

**✓ Do** ensure that any lifting tackle used is of a safe working load rating adequate for the job.

**✓ Do** get someone to check periodically that all is well, when working alone on a vehicle.

**✓ Do** carry out work in a logical sequence and check that everything is correctly assembled and tightened afterwards.

**✓ Do** remember that your vehicle's safety affects that of yourself and others. If in doubt on any point, get professional advice.

● If in spite of following these precautions you are unfortunate enough to injure yourself, seek medical attention as soon as possible.

# Yamaha Xj600s(92 99) Xj600h(95 99) Service Repair M

## Frame and engine numbers

The frame and engine numbers are stamped in a label affixed to the right side of the frame. The engine number is stamped into the right upper side of the crankcase. Both of these numbers should be recorded and kept in a safe place so they can be furnished to law enforcement officials in the event of a theft.

The frame serial number, engine serial number and carburettor identification number should also be kept in a handy place (such as with your driver's licence) so they are always available when purchasing or ordering parts for your machine.

## Buying spare parts

Once you have found all the identification numbers, record them for reference when buying parts. Since the manufacturers change specifications, parts and vendors (companies that manufacture various components on the machine), providing the ID numbers is the only way to be reasonably sure that you are buying the correct parts.

## Identification numbers

Whenever possible, take the worn part to the dealer so direct comparison with the part supplied by the manufacturer to the parts shop, there are numerous places that the part can end up with the wrong number or be listed incorrectly.

The two places to purchase new parts for your motorcycle – the accessory shop and the franchised dealer – differ in the type of parts they carry. While dealers can obtain virtually every part for your motorcycle, the accessory shop is usually limited to normal high wear items such as shock absorbers, filters, various engine gaskets, cables, chains, brake pads, etc. Rarely will an accessory outlet have major suspension components, cylinders, transmission gears, or cases.

Used parts can be obtained for roughly half the price of new ones, but you can't always be sure of what you're getting. Once again, take your worn part to the breaker (wrecking yard) for direct comparison.

Whether buying new, used or rebuilt parts, the best course is to deal directly with someone who specialises in parts for your particular make.



The frame number is stamped into the right side of the frame. The engine number is stamped into the right side of the crankcase. The carburettor identification number is stamped into the right side of the steering head.

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